



Ace-Threds Adapters Beakers  
Bearings Bottles Cell  
Culture Chromatography  
Clamps Columns  
Condensers Connectors  
Cylinders Distillation  
Apparatus Drying Apparatus  
DynaBlocs Air Sampling

# **GENERAL LABWARE CATALOG & TECHNICAL GUIDE**

*Laboratory Glassware and  
Scientific Equipment*

Apparatus Evaporation, Rotary  
Evaporators Extraction  
Apparatus Filter Reactors  
Filtration Flasks Fritted  
Ware Funnels Gas  
Apparatus Heating  
Mantles Homogenizers  
Hydrogenation Apparatus  
Instatherm® Joints Mini-  
Lab/Micro/Mini-Lab Mixing  
Moisture Test Apparatus  
No-Air Glassware  
NMR Tubes O-Rings  
Photochemical Equipment  
Pressure Tubes/Bottles,  
Flasks Process Pipe  
Pumps Recirculators/  
Chillers Rotary Evaporators  
Septa Stirring Stirrer/  
Hot Plates Stirrer Motors  
Stopcocks Sublimation  
Apparatus Supports  
Temperature Controllers/  
Sensors Theaters  
Trubore Stirrer Rings  
Ultrasonics Vacuum  
Apparatus Vacuum  
Pumps Valves Vials





In the 80 years of our service to the world's research community, we've learned that the collaborative effort to design and manufacture a product to meet the customer's particular need builds a strong bond that fosters the trust that Ace Glass currently enjoys with so many of you.

To continue building that trust, we've redoubled our efforts to provide the very best Technical, Engineering and On-Site Support in the Industry. Our perpetual focus on improving our support capabilities and custom glassware quotation turnaround time has continued to separate us from the pack of glassware providers who will sell you less quality and provide less support to go with it.

Our glassware, being manufactured entirely in our Vineland, New Jersey facility, has for 80 years been a staple tool for not only the domestic researcher, but also for those around the world that won't compromise on quality, safety or utility.

If you are a current customer, I thank you for allowing us the pleasure of working with you. If you are not yet our customer, I urge you to give us an opportunity to build your trust in us.

Thank you,

Jeff Kramme  
President  
Ace Glass, Inc.



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## Office/Shipping Location

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Vineland, NJ 08362-0688

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sales@aceglass.com • export@aceglass.com

Toll-Free 1-800-223-4524  
Toll-Free Fax 1-800-543-6752

[www.aceglass.com](http://www.aceglass.com)



## Specifications

The products in this catalog represent what we believe to be the most advanced design and construction. However, design improvements are constantly being made, and we reserve the right to modify specifications where we feel that a change is warranted.

Apparatus fabricated in accordance with ASTM, API, AOAC and other technical organization specifications such as USP, NIST, and NIOSH, are subject to modification by these organizations.

All precision-grade ware is warranted to be within the tolerance prescribed in ASTM Specifications. All laboratory-grade ware is twice precision-grade tolerances.

## Special Apparatus

Orders or inquiries for special apparatus should be accompanied by prints or drawings, if possible. To prevent delay, and to enable us to more intelligently quote on your specials, all necessary dimensions and tolerances should be noted. **For technical information, design assistance and help please visit [www.aceglass.com](http://www.aceglass.com).**

The following information should also be furnished where applicable: joint sizes, Ace-Thred sizes, capacity, whether "to contain" or "to deliver," porosity of filter, and any abnormal operating conditions, such as extremely high pressure or temperature, to which the apparatus may be subjected.

We reserve the right to overrun or under run by 10% on orders for special items and to ship and invoice for amounts within this variation.

**NOTE: Special items are not returnable.**

Our research and drafting departments are always available to assist you in designing special apparatus. Your special will be assigned a permanent drawing number for future reference, duplication or change. You will be sent a drawing of your special for your approval/sign-off before manufacturing begins.

## Types of Glass

All ACE-manufactured glassware items listed in this catalog are, unless otherwise noted, fabricated from 33 expansion borosilicate glass, such as Pyrex® Brand Glass, a product of Corning Incorporated; KG-33 Glass, a product of Kimble Glass Company; Duran Glass, a product of DWK Life Sciences; Simax, a product of Kavalier Glaswork.

## Breakage or Loss

In case of **Breakage**:

1. Notify ACE immediately.
2. Please retain all inner and outer cartons and packing material.
3. ACE will advise you whether the carrier will report to your location for inspection or if item(s) are to be returned for inspection.

In case of **Shortage**:

1. Notify ACE immediately.
2. A replacement will be issued upon confirming inventory discrepancy.

In case of **Loss**:

1. First, please verify with all your receiving departments that delivery was not made.
2. Notify ACE immediately.
3. ACE will contact the carrier for tracking information as applicable.
4. A replacement will be issued upon verification that the shipment was not delivered and upon confirmation that the carrier cannot locate shipment.

### PLEASE NOTE:

**All breakages and shortages must be reported within two weeks of receipt.**

## Returns and Repairs

**Ace Glass reserves the right to deny requests to return products 90 days from their original purchase date.**

Incoming material (returns or repairs) must be pre-approved by our Product Return Specialist. Please follow these steps to ensure our Receiving Department does not refuse your shipment.

**1** Contact ACE for an **RA# (Return Authorization Number)**.  
1-800-223-4524 (Vineland, NJ, USA)  
E-mail: [returns@aceglass.com](mailto:returns@aceglass.com)

2. Once an RA# is given, properly pack the item(s) in an inner and outer box/carton and write the RA# on the outside of the box. All used items are to be thoroughly cleaned and defined in the assignment of an RA#.
3. A 20% restocking fee will be assessed for authorized returns. ACE cannot accept responsibility for damage or destruction of glassware that occurs in your shipment to us. We strongly advise you to purchase additional insurance with your carrier.
4. For *Returns* that are the result of your receiving the item(s) broken, ACE cannot accept responsibility for **further** damage or destruction of glassware that occurs in the return shipment due to improper packing.
5. *Repairs* will be evaluated by our technicians. You will be advised if any pieces are beyond repair or cannot be salvaged economically. ACE cannot accept responsibility for further damage or destruction of any glassware that is damaged during return shipment.

### PLEASE NOTE:

**ACE cannot accept responsibility for material returned without proper authorization.**

**Specifications are subject to change without prior notice. Although they are represented to be accurate, it is best to verify product specifications with ACE prior to purchase in the event they have been changed since publication of this catalog.**

## Order by Code

Each item in this catalog has a two or three-digit code in addition to the four or five-digit number. No other ordering information is needed since each individual size, capacity, etc. has its own code. **Example:** 5000 \$10/30 top \$14/35 bottom would be ordered as 5000-05. The majority of items listed in this catalog are normally available from stock at our plant in Vineland, NJ. In the event your entire order cannot be filled immediately, a partial shipment will be sent, with the back-ordered items following shortly. If you should desire the entire order to be sent in one shipment, please specify on your purchase order. Unless otherwise specified on the order, we will ship material by what we consider the "best way."

## Ways to Order

Ace Glass products are also available from our many lab distribution partners, particularly VWR International and Sigma Aldrich.

<b>PHONE</b>	856-692-3333 800-223-4524
<b>FAX</b>	856-692-8919 800-543-6752
<b>CREDIT CARD</b>	VISA MasterCard American Express
<b>MAIL</b>	P.O. Box 688 Vineland, NJ 08362
<b>WEB SITE</b>	www.aceglass.com
<b>E-MAIL</b>	sales@aceglass.com
<b>CANADA</b>	canada@aceglass.com
<b>INTERNATIONAL</b>	export@aceglass.com

Shipments are F.O.B. from our factory in Vineland, NJ, USA.

## ACE Glassware Discounts

All ACE-manufactured glassware, identified with a spade (♠), listed in this catalog is subject to the following dollar value discounts. Items marked by a star (★) or that have no designation whatsoever are not subject to this discount.

- 10% on purchases of \$500.00 and over
- 12% on purchases of \$1000.00 and over
- 15% on purchases of \$1500.00 and over

Terms: Net 30 days (Domestic only)  
Minimum Order: \$25.00

**All quantities in this catalog are "each" unless otherwise noted.**

Contact us for current pricing or visit [www.aceglass.com](http://www.aceglass.com)



**Contract Holder**  
Contract GS-07F-119CA

GSA pricing for Ace Glass products is available through our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)

## INTERNATIONAL SALES

### Ways to Order

- Mail:** Ace Glass Incorporated  
Export Sales  
1430 North West Blvd.  
P.O. Box 688  
Vineland, NJ 08362-0688 USA
- Phone:** 856-692-3333
- Fax:** 856-692-8919
- E-mail:** [export@aceglass.com](mailto:export@aceglass.com)

### Methods of Payment

1. Payment in advance by check or money order, in US Funds only, drawn on US Bank
2. Credit Card: Amex, Visa, MasterCard
3. Wire Transfer

### Did You Know? A Few Ace Glass Firsts...

- First American-made Spherical Joints
- First Ace Tubore Stirrers
- First Micro/Mini Labware and Kits
- First Heating Blocks
- Sonochemistry Glass and Equipment
- First American-made sintered fritted ware
- First internally threaded glass joints — Ace Threds
- First lab scale Pilot Plants and Reactors
- Photochemistry Glass and Equipment
- Pressure Vessels and Reactors



### Trademarks

Adjusta-Chrom, FETFE, Flex-Grip, Instatherm, Mini-Lab, Micro/Mini-Lab, and Stir-Lube are Registered Trademarks of ACE GLASS INCORPORATED.

Buchi is a Registered Trademark of Buchi, Ltd.

Chemraz is a Registered Trademark of Greene Tweed & Co.

Duran is a Registered Trademark of DWK Life Sciences, GmbH.

IKAMG, IKATRON, VIBRAX, ULTRA-TURRAX and IKA are Registered Trademarks of IKA Works, Inc.

Kel-F is a Registered Trademark of 3M Company.

Lab-Guard and Therm-O-Watch are Registered Trademarks of Glas-Col.

LabJaws, bioforce, Talboys, and Flexaframe are Registered Trademarks of Troemner Co.

Nylon, Delrin, Kalrez, Viton, Surlyn, Tefzel, Teflon, and Krytox are Registered Trademarks of E. I. DuPont & Co.

Poly-Jaque and Polystormor are Registered Trademarks of Bel-Art Products.

Poly-Seal is a Registered Trademark of Poly-Seal Corp.

Powerstat is a Registered Trademark of Superior Electric Co.

Precision Seal and Suba Seal are Trademarks of Sigma-Aldrich Biotechnology, LP.

Rodaviss is a Registered Trademark of S.A.V. France.

Swagelok is a Registered Trademark of Crawford Fittings.

V-Vial is a Registered Trademark of Wheaton Science Products Division.

### Manufacturers whose quality products are listed in this catalog:

- |                         |                             |                               |                             |
|-------------------------|-----------------------------|-------------------------------|-----------------------------|
| ■ Assem-Pak             | ■ Electrothermal            | ■ Lamson & Goodnow Mfg. Co.   | ■ Sonics & Materials, Inc.  |
| ■ Arrow Engineering     | ■ Gallagher Controls        | ■ Lauda                       | ■ Thermo-Fisher Scientific  |
| ■ Bel Art Products      | ■ Glas-Col Apparatus        | ■ Master Appliance            | ■ The Superior Electric Co. |
| ■ BriskHeat             | ■ Greene, Tweed & Co., Inc. | ■ Optimize Technologies, Inc. | ■ Troemner                  |
| ■ Heidolph              | ■ W.A. Hammond Drierite Co. | ■ Parr Instrument Co.         | ■ VWR International         |
| ■ Cadence Science       | ■ Hanovia                   | ■ PolyScience                 | ■ Welch/ILMVAC              |
| ■ Caframo               | ■ IKA Works                 | ■ Pope Scientific             | ■ Worldwide Glass Resources |
| ■ Cannon Instrument Co. | ■ I.W. Tremont              | ■ Quartz Scientific, Inc.     |                             |
| ■ Cowie Technology      | ■ J-Kem                     | ■ Scientific Development Co.  |                             |
| ■ DWK Life Sciences     | ■ KNF Neuberger Inc.        | ■ Sigma-Aldrich               |                             |
| ■ E. I. DuPont & Co.    | ■ Julabo                    | ■ SGE                         |                             |

## Reference Guide to Ace-Thred Sizes

Size	Accepts Tube O.D., mm	Use Bushing Number	Use With O-ring No.	Optional Ferrule	Suggested Uses
Mini #7	6-7	5029-10	7855-704	11710-07	A, B, I
Midi #11	9-10.5	7506-02	7855-708	11710-11	D, E, F, G
Maxi #15	12.5-14	7506-06	7855-716	11710-15	C, H
	16-17	7506-08	7855-720	—	H, L
Giant #25	24-25	7506-10	7855-734	11710-25	K
	34-35	7506-12	7855-740	—	K, L
Jumbo #50	47-48	7506-14	7855-744	11710-50	K, L
	80	7506-20	7855-782	—	—

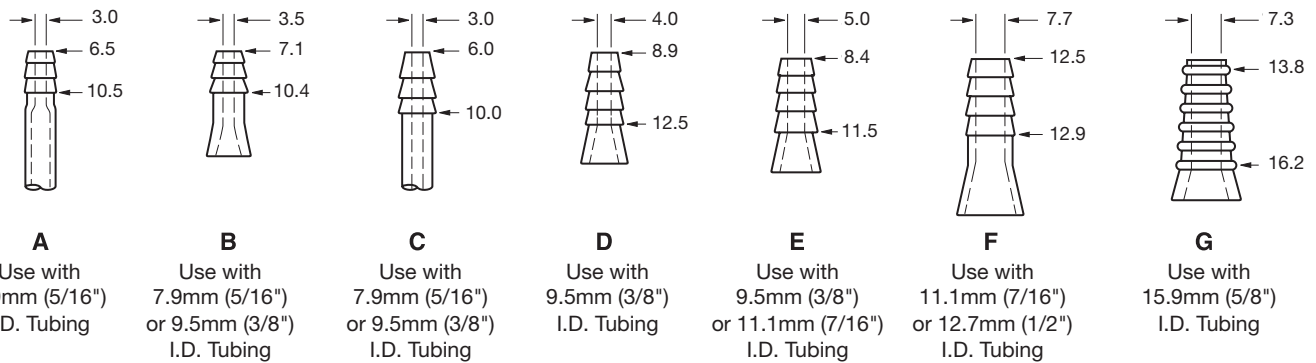
**A**—Thermometers, **B**—Bleed Tubes, **C**—Electrodes, **D**—Sensing Probes, **E**—Thermowells, **F**—Gas Dispersion Tubes, **G**—Vacuum Take-Offs, **H**—Inlet and Outlet Tubes, **I**—Miniature Electrodes, **K**—Manifolds, **L**—Immersion Wells

## Fraction Conversion

Length, Fractional Inches	Millimeters
1/16	1.6
1/8	3.2
3/16	4.8
1/4	6.4
5/16	7.9
3/8	9.5
7/16	11.1
1/2	12.7
9/16	14.3
5/8	15.9
11/16	17.5
3/4	19.1
13/16	20.6
7/8	22.1
15/16	23.8
1	25.4

## Hose Connection Size Guide

### Dimensions in Millimeters



## Specifications for Joints, Threads, and Stopcocks



### Standard Taper

Symbol used to designate interchangeable joints, stoppers and stopcocks that comply with the requirements of Commercial Standard CS-21 published by N.I.S.T.



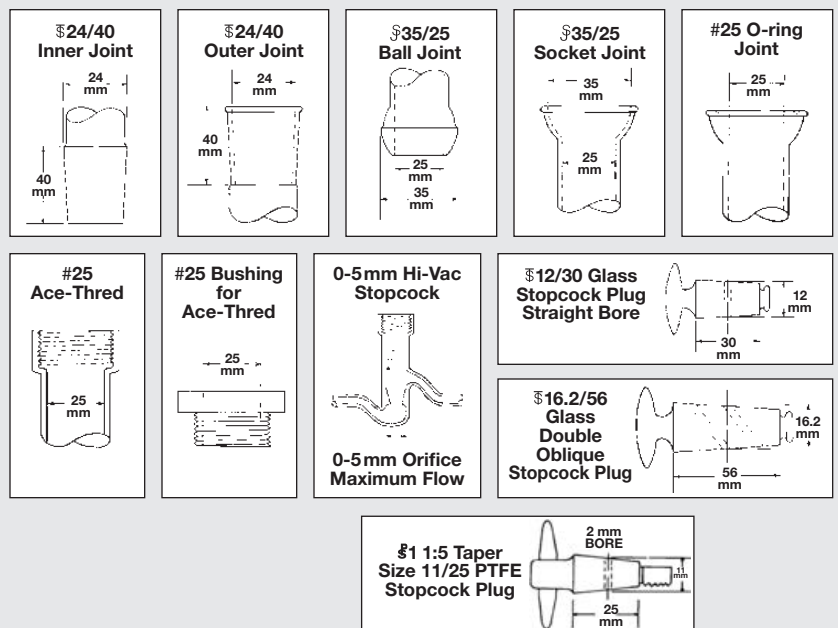
### Spherical Joint

Symbol designates spherical joints that comply with CS-21.



### Product Standard

Symbol designates stopcock plugs made of PTFE that meet requirements of N.I.S.T. Voluntary Product Standard PS 28-70.



Plastic Properties	Low Density Polyethylene (LDPE)	High Density Polyethylene (HDPE)	Polypropylene (PP)	PTFE FEP	Polycarbonate (PC)	Polymethylpentene (PMP)
Temperature Limit, °C	80	120	135	205	135	175
Specific Gravity	0.92	0.95	0.90	2.15	1.20	0.83
Tensile Strength, psi	2000	4000	5000	3000	8000	4000
Brittleness Temperature, °C	-100	-100	0	-270	-135	20
Water Absorption, %	<0.01	<0.01	<0.02	<0.01	0.35	<0.01
Flexibility	excellent	rigid	rigid	excellent	rigid	rigid
Transparency	translucent	translucent	translucent	translucent	clear	clear

## Conversion Factors

### Length

1 millimeter (mm)	.....0.1 centimeter (cm)
1 centimeter	..... 0.01 meter (M)
1 centimeter	.....0.394 inch
1 inch	.....2.540 centimeters
1 meter	..... 3.2808 feet
1 foot	..... 0.305 meter

### Area

1 square centimeter (cm)	.....0.1550 square inch
1 square inch	.....6.452 square centimeters
1 square meter (M)	..... 10.764 square feet
1 square foot	..... 0.09290 square meter

### Mass

1 gram	.....0.03527 ounce (Avoirdupois)
1 ounce (Avoirdupois)	..... 28.3495 grams
1 kilogram	..... 2.20462 pound (Avoirdupois)
1 pound (Avoirdupois)	.....0.45359 kilogram

### Volume

1 cubic centimeter	.....0.001 liter (L)
1 cubic centimeter	.....0.0610 cubic inch
1 cubic inch	.....16.3872 cubic centimeter
1 cubic meter	.....35.314 cubic feet
1 cubic foot	..... 0.02832 cubic meter

### Capacity

1 milliliter (mL)	.....0.03382 ounce (U.S. Liquid)
1 ounce (U.S. Liquid)	.....29.573 milliliters
1 liter (L)	..... 1.05671 quarts (U.S. Liquid)
1 quart (U.S. Liquid)	.....0.94633 liter
1 liter	.....0.26418 gallon (U.S. Liquid)
1 gallon (U.S. Liquid)	.....3.78533 liters
1 lambda	..... 0.001 cc / 1 microliter

### Power

1 watt	..... 0.73756 foot pound per second
1 foot pound per second	..... 1.3582 watts
1 watt	..... 0.056884 BTU per minute
1 BTU per minute	..... 17.580 watts
1 watt	.....0.001341 horsepower (U.S.)
1 horsepower (U.S.)	.....754.7 watts
1 watt	..... 0.01433 kilogram-calorie per minute
1 kilogram-calorie per minute	.....69.767 watts

### Temperature

°C = (F-32) 5/9
°F = 9/5 C +32



## Borosilicate Glass Properties

Unless otherwise specified, ACE GLASS brand glassware is fabricated from Corning 7740, Kimble KG-33, Kavalier/Simax, or Duran® glass and conforms to federal specifications DD-G-541B and ASTM E-438. Also meets the U.S. Pharmacopoeia specs for Type I Borosilicate Glass. Glass properties are those represented by the aforementioned companies.

### Composition

	Corning 7740	Duran	Kavalier/Simax
SiO <sub>2</sub>	80.6%	81%	80.4%
B <sub>2</sub> O <sub>3</sub>	13.0%	13%	13.0%
Na <sub>2</sub> O/K <sub>2</sub> O	4.1%	4%	4.2%
Al <sub>2</sub> O <sub>3</sub>	2.3%	2%	2.4%

### Properties

	Corning 7740	Duran	Kavalier/Simax
Coefficient of Expansion	32.5 x 10 <sup>-7</sup> cm/cm/°C	3.3 x 10 <sup>-6</sup> cm/cm/°K	3.3.1 x 10 <sup>-6</sup> cm/cm/°K
Strain Point	510°C	510°C	510°C
Annealing Point	560°C	560°C	560°C
Softening Point	821°C	815°C	820°C
Density	2.53 g/cm <sup>3</sup>	2.23 g/cm <sup>3</sup>	2.23 g/cm <sup>3</sup>
Temperature Limits	230°C (Normal use) 400°C (Extreme, short-term use only)	230°C (Normal use) 400°C (Extreme, short-term use only)	240°C (Normal use) 400°C (Extreme, short-term use only)
Maximum Thermal Shock	160°C	160°C	160°C
Refractive Index	1.474 <sup>1</sup>	1.474 <sup>1</sup>	1.472 <sup>1</sup>

<sup>1</sup>At Sodium D Line

### Needle Sizes

Gauge	O.D. in./mm	I.D. in./mm†	Wall Thickness in./mm	Gauge	O.D. in./mm	I.D. in./mm†	Wall Thickness in./mm
33	.0082/.21	.0042/.11	.002 /.05	21	.0323/ .82	.0202/ .51	.006 /.15
32	.0093/.24	.0042/.11	.002 /.05	20	.0358/ .91	.0237/ .60	.006 /.15
31	.0103/.26	.0052/.13	.0025/.06	19	.0420/1.07	.0270/ .69	.0075/.19
30	.0123/.31	.0062/.16	.003 /.08	18	.0500/1.27	.0330/ .84	.0085/.22
29	.0133/.34	.0072/.18	.003 /.08	17	.0580/1.47	.0420/1.07	.008 /.20
28	.0143/.36	.0072/.18	.0035/.09	16	.0650/1.65	.0470/1.19	.009 /.23
27	.0163/.41	.0082/.21	.004 /.10	15	.0720/1.83	.0540/1.37	.009 /.23
26s	.0187/.47	.0050/.13	.007 /.18	14	.0830/2.11	.0630/1.60	.010 /.25
26	.0183/.46	.0102/.26	.004 /.10	13	.0950/2.41	.0710/1.80	.012 /.31
25s	.0203/.51	.0060/.15	.007 /.18	12	.1090/2.77	.0850/2.16	.012 /.31
25	.0203/.51	.0102/.26	.005 /.13	11	.1200/3.05	.0940/2.39	.013 /.33
24	.0223/.57	.0122/.31	.005 /.13	10	.1340/3.40	.1060/2.69	.014 /.36
23	.0253/.64	.0133/.34	.006 /.15				
22s	.0283/.72	.0060/.15	.011 /.28				
22	.0283/.72	.0162/.41	.006 /.15				

†mm are nominal

### Pressure Equivalents

Micron or Millitorr	Torr or mm of Hg
1000	100
100	10 <sup>-1</sup>
10	10 <sup>-2</sup>
1	10 <sup>-3</sup>
0.05	5x10 <sup>-4</sup>
0.1	10 <sup>-4</sup>
0.01	10 <sup>-5</sup>
0.001	10 <sup>-6</sup>

### Flask Stoppers

Stopper Number	Approximate Diameter at Small End, mm	Length of Ground Zone, mm	Diameter at Large End, mm
8	7.25	10 ±1.0	8.25
9	8	14 ±1.0	9.40
13	12	14 ±1.0	13.40
16	15	15 ±1.0	16.50
19	18	17 ±1.0	19.70
22	20	20.5 ±1.0	22.05
27	25	21.5 ±1.0	27.15
32	30	21.5 ±1.0	32.15
38	35	30 ±1.0	38.00

### ACE Glass Fiber Filter Discs

ACE Porosity Designation	Porosity Maximum Pore Diameter Range (micron)	Corning, Kimble and ChemGlass Equivalents/ Porosities	Uses
A	145-174	ACE	EC (170-220) Coarse Filtration
B	70-100		— Coarse Filtration
C	25-50		C (40-60) Gas Dispersion
D	10-20		M (10-15) Extraction
E	4-8		F (4-5.5) Extraction
VF	2-2.5	Robu	VF (2-2.5) Bacteria Filtration
UF	0.9-1.4		UF (0.9-1.4) Bacteria Filtration

### Pressure Conversions









Absolute										Gauge Pressure	
cm of Hg	Torr or mm of Hg	Micron	Atmo-sphere	lb/ in. <sup>2</sup>	ton/ ft. <sup>2</sup>	gram/ cm <sup>2</sup>	ft. of H <sub>2</sub> O	in. of Hg	lb. in.	in. of Hg	
76	760	760000	1	14.7	1.06	1033	33.9	29.9	0.00	0.00	
70	700	700000	0.921	13.53	0.975	952	31.2	27.6	1.16	2.36	
60	600	600000	0.79	11.6	0.835	816	26.8	23.6	3.10	6.30	
50	500	500000	0.659	9.67	0.696	680	22.3	19.7	5.03	10.2	
40	400	400000	0.526	7.74	0.557	545	17.8	15.7	6.97	14.2	
30	300	300000	0.395	5.8	0.417	408	13.4	11.8	8.90	18.1	
20	200	200000	0.263	3.87	0.278	272	8.92	7.87	10.8	22.0	
10	100	100000	0.132	1.94	0.139	136	4.46	3.94	12.8	26.0	
5	50	50000	0.006	0.967	0.07	68	2.23	1.97	13.7	27.9	
1	10	10000	0.013	0.194	0.014	13.6	0.446	0.394	14.5	29.5	
0.1	1	1000	0.001	0.019	0.001	1.36	0.045	0.039	14.68	29.88	
0	0	0	0	0	0	0	0	0	14.7	29.92	

### Selecting a Septa

Material(s)	Compatible	Incompatible	Resealability
<b>Butyl Rubber</b>	Acetone, alcohols, diethylamine, DMSO, MEK, sodium peroxide	Benzene, chloroform, DMF, HF, HCL, phenol, toluene, xylene	Very good
<b>Butyl Rubber/PTFE</b>	PTFE resistance until punctured, then septa or liner will have compatibility of butyl rubber		Teflon does not reseal after being punctured
<b>PTFE</b>		Diethylamine, fluorine	Single injection use
<b>Red Rubber</b>	Acetone, alcohols, diethylamine, DMSO, sodium peroxide	Chloroform, DMF, HF, HCL, MEK, phenol, toluene, xylene	Excellent
<b>Red Rubber/PTFE</b>	PTFE resistance until punctured, then septa or liner will have compatibility of red rubber		Teflon does not reseal after being punctured
<b>Silicone</b>	Alcohol, DMF, DMSO, hydrogen peroxide, sodium hydroxide	ACN, benzene, chloroform, hexane, HCL, MEK, THF, toluene	
<b>Silicone/PTFE</b>	PTFE chemical resistance until punctured, then septa or liner will have compatibility of silicone		Teflon does not reseal after being punctured
<b>Viton®</b>	Alcohols, benzene, chlorinated solvents, HF, heptane, hexane	Acetone, ACN, DMF, dioxane, pyridine, ketones, MEK, THF	Good

**NOTE:** All septa liners are designed for a variety of applications. Individual performance requirements may vary; therefore, it is recommended that customers perform the proper tests to determine which septa or liner is most suitable for the exact application.

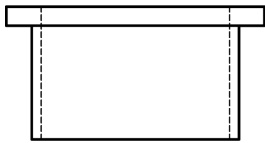

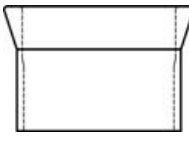
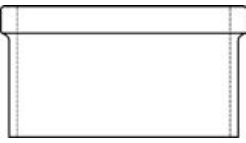
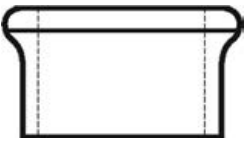
## Tubing Sizer for Peristaltic Pumps

Tubing sizes																
Inner diameter (mm):	0.8	1.7	3.1	4.8	6.3	4.8	6.3	7.9								
Outer diameter (mm):	4.0	4.9	6.3	8.0	9.5	9.8	11.3	12.9								
Wall thickness (wt) (mm):	1.6	1.6	1.6	1.6	1.6	2.5	2.5	2.5								
Max. pressure (continuous/short time) (bar):	0.7/1.7	0.7/1.7	0.7/1.7	0.5/1.5	0.5/1.5	0.8/1.8	0.8/1.8	0.8/1.8								
Suction height (mH <sub>2</sub> O):	8.8	8.8	8.8	8.8	6.7	8.8	8.8	8.8								
<b>Flow rates in combination with pump head/pump drive</b>																
<b>SP quick</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>
PD 5106/PD 5206 (ml/min):	1.6	40	6.8	169	25.7	643	56	1,400	88.7	2,217	56	1,400	88.7	2,217	132	3,300
PD 5006 (ml/min):	3.3	40	14.1	169	53.6	643	116.7	1,400	184.8	2,217	116.7	1,400	184.8	2,217	275	3,300
PD 5101/PD 5201 (ml/min):	0.3	8.0	1.4	34	5.2	129	11.2	280	17.7	443	11.2	280	17.7	443	26.4	660
PD 5001 (ml/min):	0.7	8.0	2.8	34	10.7	129	23.3	280	37.0	443	23.3	280	37.0	443	55	660
<b>SP standard/SP vario</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>		
PD 5106/PD 5206 (ml/min):	2.4	60.2	10.4	260	41.2	1,029	86.3	2,157	146	3,644	86.3	2,157	146	3,644		
PD 5006 (ml/min):	5.0	60.2	21.7	260	85.8	1,029	179.8	2,157	304	3,644	179.8	2,157	304	3,644		
PD 5101/PD 5201 (ml/min):	0.5	12.0	2.1	52	8.2	206	17.3	431	29.2	729	17.3	431	29.2	729		
PD 5001 (ml/min):	1.0	12.0	4.3	52	17.2	206	36	431	60.7	729	36.0	431	60.7	729		

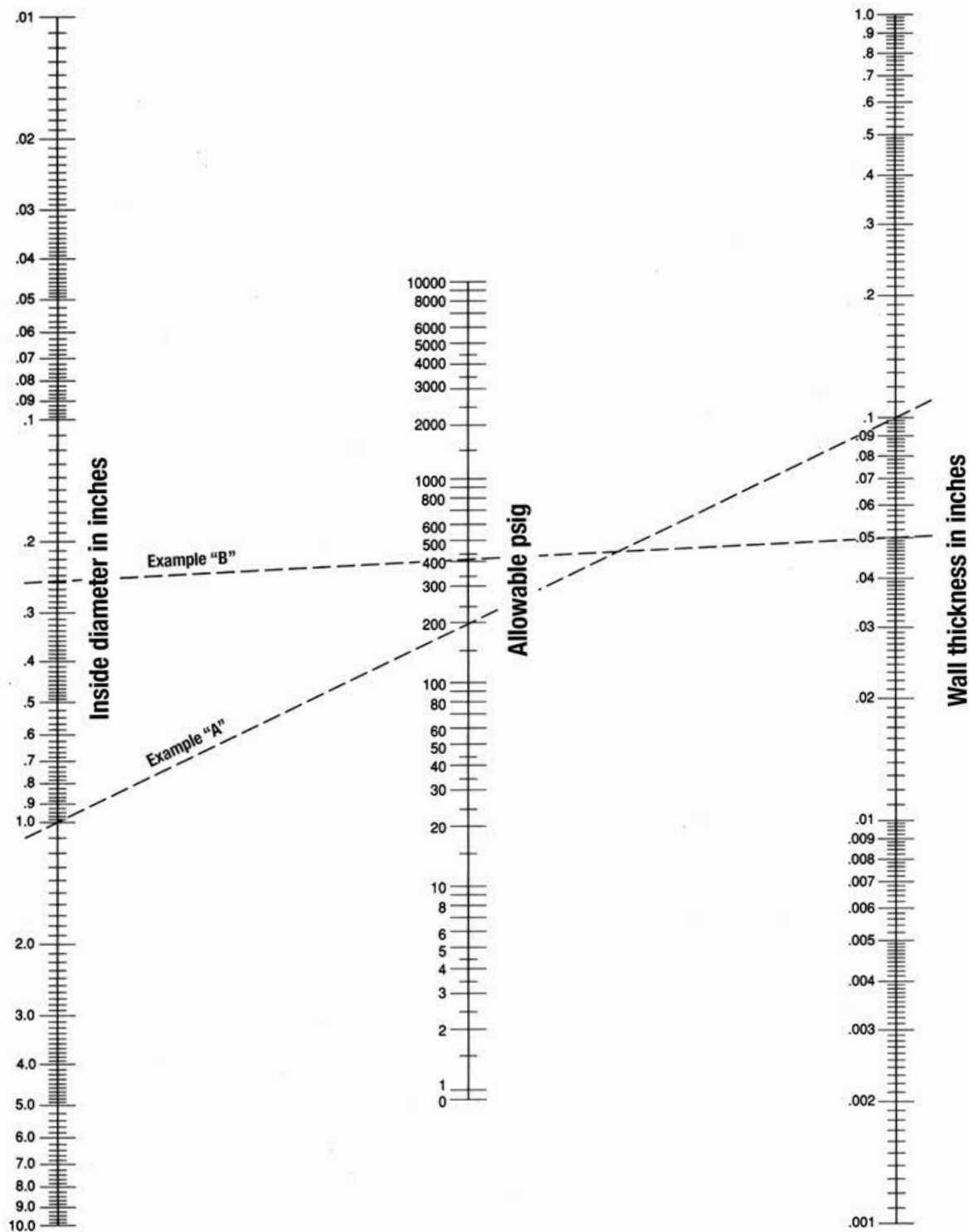
## Reference Guide to ACE Boiling Flasks

Capacity, mL	Approx. O.D. mm	Approx. O.D. Inches	Capacity, mL	Approx. O.D. mm	Approx. O.D. Inches	Capacity, mL	Approx. O.D. mm	Approx. O.D. Inches
5	25	1.0	200	75	3.0	12000	285	11.22
10	31	1.24	250	82	3.25	22000	350	13.78
15	35	1.4	300	86	3.385	50000	457	18.0
20	38	1.5	500	100	4.0	72000	508	20.0
25	42	1.68	1000	125	5.0	100000	610	24.0
50	50	2.0	2000	160	6.3	200000	750	29.5
100	58	2.25	3000	180	7.0			
			5000	225	8.86			

## Guide to Flange Styles

Flat Flange (with or without O-Ring groove)	Duran Flange (with or without O-Ring groove)	Conical Flange	KF Plane Flange	Beaded Process Pipe Flange
				
<b>Uses Clamp:</b> 6508, 6509, 6510 Flat clamp	<b>Uses Clamp:</b> 6517 Quick release clamp	<b>Uses Clamp:</b> 6496 Standard clamp	<b>Uses Clamp:</b> 6525 Coupling	<b>Uses Clamp:</b> 8856 Coupling

### Nomogram of Allowable Pressures for Borosilicate Glass Tubes



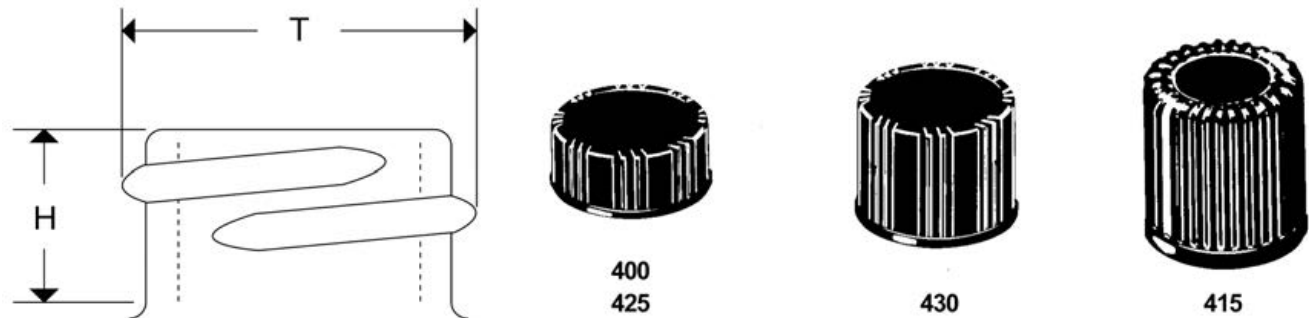
**CAUTION:** With any glassware used for pressure or vacuum applications, great care must be taken in handling. The strength of the glass can be degraded due to scratches, checks and abrasions. Always use protective shielding and eyewear when working with glass under pressure.

## GPI Thread Finishes

GPI refers to the “Glass Packaging Institute” which is responsible for establishing and issuing uniform standards regarding the types of finishes produced by American Glass Manufacturers. GPI replaces the former GCM I or “Glass Container Manufacturers Institute.” When a cap is designated as 15-425, it means that the diameter across the threaded area is approximately 15 millimeters. (See “T” dimension on illustration below.) The numerical 425 designates a specific

style. The methods employed in manufacturing containers and culture tubes from tubing do not include a transfer ring as commonly observed on mold-blown vessels. As a result, the “H” dimension may vary slightly from GPI’s published values. Since the “H” dimension is not designated in the size code, the chart below will assist in differentiating styles of finishes having similar thread diameters. The dimensions listed are averages. The finishes below appear in this catalog.

### GPI Thread Finish Comparison Chart



“T” Dimension	“H” Measurements in millimeters (mm)				
	400	410	415	425	430
8				6.52	
10				6.86	
13			11.22	7.50	
15			13.90	7.50	
18	9.05	13.03	15.42		15.34
20	9.50	13.82	18.59		15.34
22	9.50	14.60	21.01		15.34
24	10.25	16.15	24.05		16.43
28	10.25	17.73	27.23		18.39
33	9.85				19.69
38	9.85				24.03
38					22.00

### Suggested Screw Cap Application Torque

(Reference U.S.P. XXI, page 1240)

Cap Size (Millimeters)	Torque (Inch-Pounds)	Cap Size (Millimeters)	Torque (Inch-Pounds)
8*	3-5	38	15-23
10*	4-6	43	17-26
13*	5-7	48	19-29
15	6-9	53	21-32
18	7-11	58	23-35
20	8-12	63	25-38
22	9-13	70	28-42
24	10-15	83	34-49
28	11-17	89	36-53
33	13-20	120	48-72

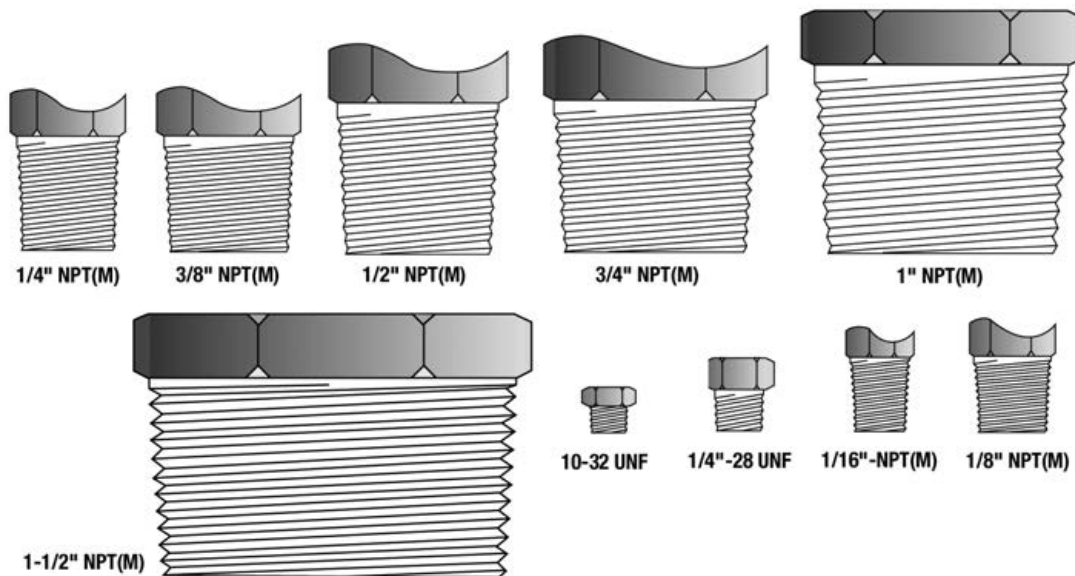
\*Not included in USP table.

The figures at left are offered as guidelines for automatic capping machines. Obviously, variables such as cap and liner material and product characteristics play an important part in correct torque application.

The recommended procedure for checking capping machines torque application is as follows:

Apply caps to a representative number of product filled containers with the torque required. Then, the cap removal torque is established. Once the removal torque for a known application is established, the machine can be checked at intervals for proper application torque by measuring removal cap torque.

### Standard Pipe Thread Fittings



The illustrations are actual size. If you have any questions as to the size of fitting you require, simply compare the threads per inch, the diameter and length of the threading, and the taper of the threading of your existing fittings to these drawings.

### Sterilization Reference Guide

Method	Procedure
<b>Autoclave:</b>	Cycle is 121°C, 15 psig (1bar) 20 min
<b>Dry Heat:</b>	170°C for 60 min
<b>Gas:</b>	Ethylene Oxide for formaldehyde
<b>Microwave:</b>	Transmission of microwaves
<b>Gamma Irradiation:</b>	High energy ionizing gamma radiation from a Cobolt 60 source
<b>Chemical Disinfectants:</b>	Quaternary Ammonium Compounds, Iodophors, Formalin, Benzalkonium Chloride, Ethanol, etc.

### Viscosity Conversion Factors

Viscosity is the resistance to flow due to the internal friction within a fluid. This is generally expressed as the force required to move one unit area one unit distance. Kinematic and absolute viscosity are related by the density of the fluid.

#### Kinematic Viscosity

Multiply to get	→	←	to get
			Divide
ft <sup>2</sup> /sec	92903.04		centistokes
ft <sup>2</sup> /sec	0.092903		sq. meters/sec
sq. meters/sec	10.7639		ft <sup>2</sup> /sec
sq. meters/sec	1000000.0		centistokes
centistokes	0.000001		sq. meters/sec
centistokes	0.0000107639		ft <sup>2</sup> /sec

#### Absolute to Kinematic Viscosity

Multiply to get	→	←	to get
			Divide
centipoises	1/density (g/cm <sup>3</sup> )		centistokes
centipoises	0.00067197/density (lb/ft <sup>3</sup> )		ft <sup>2</sup> /sec
lb-sec/ft <sup>2</sup>	32.174/density (lb/ft <sup>3</sup> )		ft <sup>2</sup> /sec
kg-sec/m <sup>2</sup>	9.80665/density (kg/m <sup>3</sup> )		sq. meters/sec
Pascal-sec	1000/density (g/cm <sup>3</sup> )		centistokes

#### Absolute or Dynamic Viscosity

Multiply to get	→	←	to get
			Divide
lb-sec/ft <sup>2</sup>	47880.26		centipoises
lb-sec/ft <sup>2</sup>	47.8803		Pascal-sec
centipoises	0.000102		kg-sec/sq. meter
centipoises	0.001		lb-sec/ft <sup>2</sup>
Pascal-sec	0.0208854		Pascal-sec
Pascal-sec	1000		centipoises

#### Kinematic to Absolute Viscosity

Multiply to get	→	←	to get
			Divide
centistokes	density (g/cm <sup>3</sup> )		centipoises
sq. meters/sec	0.10197 x density (kg/m <sup>3</sup> )		kg-sec/m <sup>2</sup>
ft <sup>2</sup> /sec	0.03108 x density (lb/ft <sup>3</sup> )		lb-sec/ft <sup>2</sup>
ft <sup>2</sup> /sec	1488.16 x density (lb/ft <sup>3</sup> )		centipoises
centistokes	0.001 x density (g/cm <sup>3</sup> )		Pascal-sec
sq. meters/sec	1000/density (g/cm <sup>3</sup> )		Pascal-sec

**Dilatant Liquids** — viscosity increases as shear rate increases. Mixers can bog down and stall after initially mixing such liquids. Dilatant liquids include slurries, clay, and candy compounds.

**Newtonian Liquids** — viscosity remains constant regardless of shear rate or agitation. As mixer speed increases, flow increases proportionately. Newtonian liquids include water, mineral oils, and hydrocarbons.

**Pseudoplastic Liquids** — viscosity decreases as shear rate increases, but initial viscosity may be sufficiently great to prevent mixing. Typical pseudoplastic liquids are gels, latex paints, and lotions.

**Thixotropic Liquids** — as with pseudoplastic liquids, viscosity decreases as shear rate or agitation increases. When agitation is stopped or reduced, hysteresis occurs and viscosity increases. Often the viscosity will not return to its initial value. Thixotropic liquids include soaps, tars, shortening, glue, inks, and peanut butter.

\*Sometimes absolute viscosity is given in terms of pounds mass. In this case—centipoises x 0.000672 = lbm/ft sec.

## Chemical Resistance for Plastic Resins @ 20°C

	Classes of Substances										
	Acids, dilute or weak	Acids, strong & conc.	Alcohols, aliphatic	Aldehydes	Bases	Esters	Hydrocarbons, aliphatic	Hydrocarbons, aromatic	Hydrocarbons, halogenated	Ke-tones	Oxidizing agents, strong
ACL	✗	✗	▲	■	▲	▲	●	●	▲	▲	✗
ECTFE/ETFE	●	▲	●	●	●	●	●	●	●	▲	■
FEP/TFE/PFA	●	●	●	●	●	●	●	●	●	●	●
FLPE	●	●	●	▲	■	●	●	●	▲	●	■
XLPE	●	●	●	▲	●	▲	▲	▲	■	▲	■
HDPE/XLPE	●	●	●	▲	●	▲	▲	▲	■	▲	■
LDPE	●	●	●	▲	●	▲	■	■	✗	▲	■
PC	●	✗	▲	■	✗	✗	■	✗	✗	✗	✗
PCT	●	■	●	■	▲	■	●	✗	✗	■	✗
PTE	●	✗	●	✗	✗	✗	●	✗	✗	✗	✗
PMMA	▲	✗	✗	▲	■	✗	▲	✗	✗	✗	✗
PMP	●	●	●	▲	●	▲	■	■	✗	■	■
PP/PPCO	●	●	●	▲	●	▲	▲	■	■	▲	■
PS	●	■	●	✗	●	✗	✗	✗	✗	✗	✗
PSF	●	▲	▲	■	●	✗	▲	✗	✗	✗	▲
PUR	▲	■	■	▲	✗	✗	●	✗	✗	✗	✗
PVC Bottles	●	●	●	✗	●	✗	●	✗	✗	✗	▲
Flexible PVC Tubing	●	■	▲	✗	▲	✗	■	✗	✗	✗	■
PVDF	●	●	●	●	●	▲	●	●	✗	✗	▲
TPE	●	■	●	✗	●	✗	✗	✗	✗	✗	✗

### Resin Codes

ACL	Acetal (Polyoxymethylene)
ECTFE	Halar® ECTFE (Ethylene-Chlorotrifluoroethylene Copolymer)
ETFE	Tefzel® ETFE (Ethylene-Tetrafluoroethylene)
FEP	Teflon® FEP (Fluorinated Ethylene Propylene)
FLPE	Fluorinated High-Density Polyethylene
HDPE	High-Density Polyethylene
LDPE	Low-Density Polyethylene
PC	Polycarbonate
PCT	Poly (1,4 Cyclohexylene Dimethylene Terephthalate)
PET	Polyethylene Terephthalate
PFA	Teflon® PFA (Perfluoroalkoxy)
PMMA	Polymethyl Methacrylate (Acrylic)
PMP	Polymethylpentene ("TPX®")
PP	Polypropylene
PPCO	Polypropylene Copolymer
PS	Polystyrene
PSF	Polysulfone
PUR	Polyurethane
PVC	Polyvinyl Chloride
PVDF	Polyvinylidene Fluoride
TFE	Teflon® TFE (Tetrafluoroethylene)
TPE	Thermoplastic Elastomer
XLPE	Cross-Linked High-Density Polyethylene

### Chemical Resistance Classifications

- 30 days of constant exposure causes no damage. Plastic may even tolerate for years.
- ▲ Little or no damage after 30 days of constant exposure to the reagent.
- Some effect after seven days of constant exposure to the reagent. Depending on the plastic, the effect may be crazing, cracking, loss of strength or discoloration. Solvents may cause softening, swelling and permeation losses with LDPE, HDPE, PP, PPCO and PMP. The solvent effect on these five resins are normally reversible; the part will usually return to its normal condition after evaporation.
- ✗ Not recommended for continuous use. Immediate damage may occur. Depending on the plastic, the effect will be a more severe crazing, cracking, loss of strength, discoloration, deformation, dissolution or permeating loss.

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## Care and Handling of Borosilicate Glass

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Always inspect your glass before use, even when purchased new. Bumping of glass in transit or in washing is always possible, and this can cause small fractures or star cracks. You can usually see these when you hold the vessel up to normal sunlight. If you should have one, a polariscope is an even better way to view the glass for stress. If it's cracked or abraded — even if it's minor — the glass can fail under elevated pressure or temperature.

When washing, always take care not to bump glass together or against the wall of a sink. Also, always use a soft bristle brush or a brush with a plastic or soft wooden handle. This will help cut down on scratching. Never use HF or strong alkali soaps or acids. When using glass labware, always make sure it's borosilicate glass or quartz — some bottles used in lab work or sampling are made of soda lime or soft glass, and these do not have the temperature, pressure or autoclaving capability of standard borosilicate or quartz labware.

Autoclaving of Glass: Always make sure of the materials you are working with. Most lab glass is 32-33 expansion borosilicate glass. Standard borosilicate glass is autoclavable. One cautionary measure is to always let the autoclave and glass cool and vent slowly. Most failures are due to two things: glassware that has a

scratch or abrasion and can fail when autoclaved; or a very rapid cool down or return to atmospheric pressure.

### Depyrogenation and ashing or extreme heat cleaning of lab glassware

Any abrasions, micro-cracks or star cracks will weaken the glass and degrade performance. And any of these issues will certainly cause the glass to fail when using high temperature ovens. Ashing glass in mechanical ovens or furnaces over 500° for long periods of time will cause the glass to weaken, and in some cases, even fail. It will certainly shorten the life span of your glassware.

### Borosilicate glass temperatures:

- Standard use — up to 230-240°C.
- Extreme use — for short intervals — 400°C.

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## Cleaning Laboratory Glassware

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### Introduction

Laboratory procedures require exact methods and should include good glassware cleaning to insure excellent lab results. In all instances, labware should be physically clean, including both chemical-residue-free and grease-free, and in many cases, it should even be sterile. All Class A glassware used in precise measuring of liquids should have fully wettable surfaces. A good test is to use distilled water and see if the water wets all the inner surfaces equally. Grease or residues will not only contaminate the reaction and test results, but will also alter the measurement of the liquids. Good cleaning practices should also be accompanied by good inspection of the glass surfaces for chips, cracks or abrasions which cause mechanical failure.

### Cleaning

Always wash glass labware immediately after use. If a thorough cleaning is not immediately possible, always allow the glassware to soak. If not cleaned immediately some residues may be impossible to remove.

Most new glass is slightly alkaline and should be washed upon receipt and generally can be soaked in a 1% HCL or HNO<sub>3</sub> solution before wash and DI rinse.

Never soak for long periods in strong alkaline solutions as this will damage the glass.

Always follow up a soap or acid wash with a good DI water rinse. Always use soft brushes with a wooden or soft plastic handle to avoid abrasion. Do not use wire brushes or brushes with a wire core as this can abrade the glass.

### Glass Cleaners

Alconox is the best cleaner to use, as it is not abrasive. In fact,

Alconox offers a full line of detergents for soaking, hand washing and automatic washers. A detergent, such as a non-abrasive dishwasher soap, will also work well. Always use soft brushes. Always rinse glass well and do a final DI rinse. If you need to do an acid wash, always rinse the soap off the glass completely or it may cause a reaction and leave a film on the glass. There are many lab detergents available commercially such as; Mallinckrodt's KleanAR and Chem-Solv. Texwipe and EM Science also make good cleaning detergents.

### Chromic Acid or Chromerge

Chromic Acid/Chromerge are great cleaners, and will also remove organic residues. Use gloves and well ventilate the area when using chromic acid, as it is a carcinogen and very corrosive. Make sure metal clamps or flanges are removed. It is best to fill the vessel or soak the item in the solution for a short time in a plastic tub so that you can contain the wash material, then rinse immediately several times before proceeding to a detergent wash. Make sure the residual chromic acid is diluted after use and disposed of properly and according to your local and/or company regulations.

Occasionally, stronger acid washes are necessary for certain types of precipitates or residues. It is best to keep these very dilute, and they should be used in an area where there is good ventilation. Make sure you contain the residual acid and dissolved material for proper disposal. This method should only be used when absolutely necessary. Disposal of seriously stained glass maybe a less troublesome and less expensive course of action than using strong acid washes.



### Cleaning Laboratory Glassware (continued):

One other caution: strong acid or Chromerge-type washes may damage the graduation markings.

### Removal of Grease

Grease is best removed by boiling the glass in a weak solution of sodium carbonate. Acetone or any other organic solvent can be used also, followed by several water and DI water rinses.

### Other Stains

For permanganate stains, use a mixture of equal 3% sulfuric acid and 3% hydrogen peroxide.

For iron stains, use a solution containing one part hydrochloric acid and one part water.

For bacteriological contamination, glassware should be soaked in a disinfectant solution, steam autoclaved, and then followed by a suitable washing and rinsing.

**Caution:** Make sure you refer to MSDS sheets for the cleaning solutions and the materials that were in the glassware to insure that there won't be any adverse reactions from the combination of the materials.

### Ultrasonic Cleaners

Ultrasonics is a good method of cleaning glassware. Ultrasonic cleaners that are heated will be the best type and generally combined with a mild detergent they will clean most residues off of glassware. We typically clean all glass in our factory both during and after the fabrication process in heated ultrasonic cleaners.

### Rinsing

Glassware should always have a water rinse after any cleaning

procedure followed by a DI rinse. It is best to give smaller pieces such as test tubes a soaking rinse followed by a DI soaking rinse. Glass pipettes are best soaked in a suitable pipette washer and washed and given both a water rinse and DI soaking rinse.

### Drying

Oven drying at 100°C is best for all glassware. If this is not convenient, rack drying will work.

### Steam Autoclaving or Sterilizing

Proper protocol for steam autoclaving of borosilicate glassware is 15-20 minutes at 100-120°C. Always leave closures off or loose during autoclaving.

### Inspection after Cleaning

Always inspect all glassware before steam autoclaving for cracks, chips or damage. If it is already damaged, the autoclave procedure will cause your glassware to break.

Remember: all labware is generally borosilicate glass, especially if it's made in the USA. The suggestions herein refer to borosilicate labware only. Bottles are generally NOT borosilicate glass and are made from soda lime or soft glass. Bottles do not have the temperature range or autoclave range of borosilicate glass. Please refer to the manufacturer's cleaning procedures for these containers. Do not mix bottles and labware in the same washers or heat dryers, and especially not during autoclaving procedures.

## Cleaning Glass Fiber Frits

### Flow Characteristics

Aqueous flow rate from 0.5 to 200mL/min./cm<sup>2</sup> at 100mm Hg. pressure drop are covered in the porosities A to E. A tabulation of these flow rates for various porosities is almost meaningless since operating conditions vary so widely. In addition, a number of interesting phenomena occur that may rapidly change the flow rate of a given filter by a factor of two or more, particularly in filters of smaller pore size. Hence, any discussion of flow rate becomes detailed and involved. Glass filters carry a negative charge.

Only materials that attack glass will affect these filters, i.e. HF, Alkalies, H<sub>3</sub>PO<sub>4</sub>. HF attacks rapidly; the others, relatively slowly. Inasmuch as surface scratches materially reduce the strength of glass, scratching the envelope in the vicinity of the disc should be guarded against, particularly on large filters, since this is the area of maximum stress under vacuum. Mechanical cleaning can be accomplished by reverse-flow washing. This is the most effective mechanical means. Do not exceed 1.06 Kg/cm<sup>2</sup> pressure.

### Care and Cleaning

*For Chemical Cleaning, the following is recommended:*

Material to be Removed:	Removal Agent:
Barium Sulfate	Concentrated H <sub>2</sub> SO <sub>4</sub> plus a small amount of KClO <sub>4</sub> to 80-90°C and soak
Fat	CCl <sub>4</sub>
Mercury	Hot HNO <sub>3</sub>
Mercuric Sulfide	Hot Aqua Regia
Organic Residues	Warm concentrated H <sub>2</sub> SO <sub>4</sub> plus a small amount of KNO <sub>3</sub> and soak
Silver Chloride	NH <sub>4</sub> OH
Sugars & Glucose	Hot H <sub>2</sub> SO <sub>4</sub> plus HNO <sub>3</sub>
Free Carbon	Heat in a muffle furnace to 482°C in an oxidizing atmosphere. Cooling may be at the rate of -12°C/min. or greater, but thermal shock must not exceed 93°C.
Dia (micron) = $\frac{30\delta}{P}$	Surface tension in a dynes/cm at test temperature P = mm Hg. where first bubble appears.

*The test liquid must wet the filter; that is, the contact angle must be negligible.*

## Lab Glassware Safety Tips

### Unsticking glass to glass joints and stopcocks

If a freezer is available, place the part inside for a brief period of time. Then use gloves and gently twist apart. If a freezer is not convenient, use a hair dryer or a similar type heat gun to gently heat the area. Again, wear gloves and gently twist apart.

If you are fortunate enough to have a glassblower on site, let them dislodge the joint or stopcock.

Best recommendation for prevention: use stopcock grease or use PTFE sleeves for joints. You might also consider using PTFE stoppers or PTFE hollow stoppers instead of glass stoppers.

### To unstick PTFE stopcocks

Simply put the part in a freezer overnight and gently twist apart.

### Safety shields — use of glass under pressure

Always use shields or safety coated glassware when using high pressures. Most standard borosilicate glassware with standard wall weight has only a 15-20 psig pressure rating at room temperature. Elevating the temperature will lower the pressure capability. It's best to check with our Ace Engineering Department if you plan to work with higher temperatures and pressures. Finally, make sure you always use safety glasses and shields when working at higher temperatures and pressures.

It may sound very simplistic, but always make sure you have the proper size vessels and flasks when working, especially when

doing any exothermic reactions, to allow for changes in volume or for boil over.

### Ace-Safe Connectors

The most common lab injuries are from broken or chipped glass. One innovation from ACE is our Ace-Safe connectors, which utilize Ace-Threds and plastic/PTFE hose barbs. This not only reduces breakage and injury, but is also economical, as you only have to replace the plastic/PTFE barb (if it does snap off) rather than replacing the entire vessel. See Ace-Safe connectors all throughout this catalog.

### Glass wall weight and uniformity

Uniform, consistent glass wall weight is very important. A thin wall is not as bad as some manufacturers would like you to think. A uniform, thin wall is excellent for heating and has good thermal properties, while a thick wall is good for mechanical shock but not as good thermally as a thinner wall. But wall uniformity is very important throughout. The lip of a beaker, the neck of a flask, and the corners on a beaker should all be rounded and uniform. Otherwise, both thermal and mechanical breakage can occur. Our glass blanks and tubing are mainly from Duran glass, and are very uniform with consistent wall thicknesses.

## Alconox Detergent Selection Guide for Laboratory Cleaning

Application Key Concern	Articles Cleaned/ Soil Removed	Cleaning Method	Recommended Alconox Cleaner
<b>Laboratory</b> Reproducible results, no interfering residues, extending equipment life, keep laboratory accreditation, laboratory safety	Glass, metal, plastic labware, ceramics, tissue culture, porcelain, clean rooms, animal cages, bioreactors tubing, benches, safety equipment	Manual, Ultrasonic, Soak	Alconox powder Liquinox liquid (P-free)
		Machine, power spray, labware washer, washer-sterilizer, cage-washer	Alcojet powder Detojet liquid Tergajet powder (P-free) Solujet liquid (P-free)
	Tubes and pipettes	Siphon rinser/washer	Alcotabs tablet
	Microbiology, water lab, environmental sampling, phosphate sensitive labware, EPA procedures	Field, manual, ultrasonic, soak	Liquinox liquid (P-free)
		Machine washer, labware washer	Tergajet powder (P-free) Solujet liquid (P-free) Citrajat acid rinse liquid (P-free)
	Radioactive equipment, stopcock grease	Manual, Ultrasonic, Soak	Alconox powder
		Machine washer, labware washer	Alcojet powder Detojet liquid
	Trace metals, oxides, salts, scale, starch, amines	Manual, Ultrasonic, Soak	Citranox liquid (P-free)
		Machine washer, labware washer	Citrajat liquid (P-free)
	Proteins, bio-wastes, tissue, blood, body fluids, fermentation residues	Manual, Ultrasonic, Soak	Tergazyme powder
Machine washer, labware washer		Alcojet powder Detojet liquid	
P-free = phosphate free			

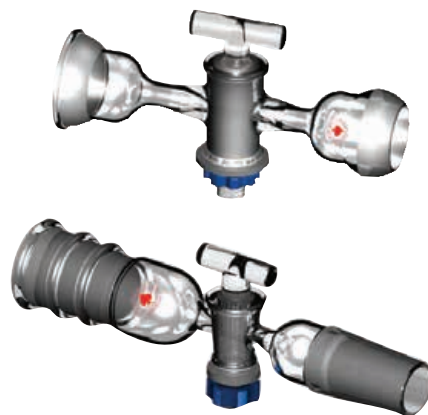
Courtesy: Alconox, Inc.

McLaughlin and Zisman, The Aqueous Cleaning Handbook, (AI Technical Communications, 2005) available from Alconox, Inc.

### ADAPTER *Straight Connecting w/Glass Stopcock* ♦

With glass plug and ₤ inner and outer or ₤ ball and socket joints at top and bottom. Outer ₤ joints are reinforced.

Plug Bore, mm	Bottom Inner ₤ Joint	Top Outer ₤ Joint	Qty	Order Code	Plug Bore, mm	Bottom Ball ₤ Joint	Top Socket ₤ Joint	Qty	Order Code
2	14/20	14/20	1	3840-04	4	28/15	28/15	1	3840-52
2	24/40	24/40	1	3840-08	4	35/25	35/25	1	3840-56
2	29/42	29/42	1	3840-12					
4	14/20	14/20	1	3840-32					
4	24/40	24/40	1	3840-36					
4	29/42	29/42	1	3840-39					



#### Replacement Stopcock Plugs

2	1	8223-03
4	1	8223-07

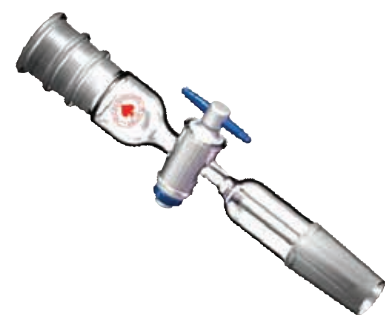
### ADAPTER *Straight Connecting w/PTFE Stopcock, ₤ Joints* ♦

With 1:5 PTFE plug and ₤ inner and outer joints at top and bottom, with drip tip in lower position. Outer joint is reinforced.

Plug Bore, mm	Bottom Inner ₤ Joint	Top Outer ₤ Joint	Qty	Order Code
4	24/40	24/40	1	3842-11

#### Replacement Stopcock Plugs

4	1	8224-12
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### ADAPTER *Straight Connecting w/PTFE Stopcock* ♦

With 1:5 PTFE plug and ₤ inner and outer or ₤ ball and socket joints at top and bottom. Outer ₤ joints are reinforced.

Plug Bore, mm	Bottom Inner ₤ Joint	Top Outer ₤ Joint	Qty	Order Code	Plug Bore, mm	Bottom Ball ₤ Joint	Top Socket ₤ Joint	Qty	Order Code
4	14/20	14/20	1	3843-09	4	28/15	28/15	1	3843-55
4	24/40	24/40	1	3843-11	4	35/25	35/25	1	3843-58
4	29/42	29/42	1	3843-15					
6	14/20	14/20	1	3843-33					
6	24/40	24/40	1	3843-37					
6	29/42	29/42	1	3843-40					

#### Replacement Stopcock Plugs

4	1	8224-12
6	1	8224-16



### ADAPTER *Straight Connecting w/Easy Action Stopcock, ₤ Joints* ♦

With Easy-Action threaded plug and ₤ inner and reinforced ₤ outer joints at top and bottom.

Plug Bore, mm	Bottom Inner ₤ Joint	Top Outer ₤ Joint	Qty	Order Code	Plug Bore, mm	Bottom Inner ₤ Joint	Top Outer ₤ Joint	Qty	Order Code
0-3	14/20	14/20	1	3844-05	0-10	24/40	24/40	1	3844-47
0-3	24/40	24/40	1	3844-07	0-10	29/42	29/42	1	3844-49
0-3	29/42	29/42	1	3844-09					
0-5	14/20	14/20	1	3844-31					
0-5	24/40	24/40	1	3844-34					
0-5	29/42	29/42	1	3844-36					

#### Replacement Stopcock Plugs

0-3	1	8194-266
0.5	1	8194-268
0.10	1	8194-270




**ADAPTER** *Straight Connecting w/Easy Action Stopcock, O-ring Joints* ♠

With #15 O-ring joint at top and bottom. Supplied with (2) O-rings.

Plug Bore, mm	Bottom O-ring Joint	Top O-ring Joint	Qty	Order Code
0-5	#15	#15	1	3845-05
0-10	#15	#15	1	3845-10

**Replacement Stopcock Plugs**

0-5	1	8194-268
0-10	1	8194-270

**Replacement O-Ring**

#15	12	7855-726
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**ADAPTER** *Straight Connecting w/#15 O-ring, Glass Stopcock* ♠

4mm glass plug stopcock and #15 O-ring top joint. Either standard taper or spherical joint at bottom.

Plug Bore, mm	Bottom Joint	Top O-ring Joint	Qty	Order Code
4	35/25 Ball	#15	1	3846-05
4	35/25 Socket	#15	1	3846-07
4	24/40	#15	1	3846-09
4	29/42	#15	1	3846-11
4	14/20	#15	1	3846-13

**Replacement Stopcock Plug**

4	1	8223-06
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**Replacement O-Ring**

#15	12	7855-726
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**ADAPTER** *Straight Connecting w/#15 O-ring, PTFE Stopcock* ♠

4mm PTFE plug stopcock and #15 O-ring top joint. Either standard taper or spherical joint at bottom.

Plug Bore, mm	Bottom Joint	Top O-ring Joint	Qty	Order Code
4	35/25 Socket	#15	1	3847-04
4	35/25 Ball	#15	1	3847-06
4	24/40	#15	1	3847-08
4	29/42	#15	1	3847-10
4	14/20	#15	1	3847-12

**Replacement Stopcock Plug**

4	1	8224-12
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**Replacement O-Ring**

#15	12	7855-726
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**ADAPTER** *Reducing* ♠

Standard taper joint at top and bottom. Top joint is smaller than bottom joint. Full-length outer standard taper joints are reinforced.

Top Outer	Bottom Inner	Qty	Order Code	Top Outer	Bottom Inner	Qty	Order Code	Top Outer	Bottom Inner	Qty	Order Code
10/30	14/20	1	9092-08	14/35	24/40	1	5000-25	24/40	55/50	1	5000-47
10/30	14/35	1	5000-05	14/35	29/42	1	5000-26	24/40	60/50	1	5000-49
10/30	19/38	1	5000-07	19/22	24/40	1	9092-25	24/40	71/60	1	5000-50
10/30	24/40	1	5000-09	19/38	24/40	1	5000-30	24/40	103/60	1	5000-51
10/30	29/42	1	5000-10	24/40	29/42	1	5000-38	29/42	34/45	1	5000-53
14/20	14/20	1	9092-12	24/40	24/40	1	5000-39	29/42	45/50	1	5000-56
14/20	19/22	1	9092-14	24/40	34/45	1	5000-41	29/42	55/50	1	5000-58
14/20	24/25	1	9092-16	24/40	40/50	1	5000-43	45/50	55/50	1	5000-66
14/20	24/40	1	9092-24	24/40	45/50	1	5000-45	45/50	71/60	1	5000-68
14/35	19/38	1	5000-23	24/40	50/50	1	5000-46	55/50	71/60	1	5000-72

### ADAPTER Enlarging ♦

Standard taper joint at top and bottom. Full length outer standard taper joint is reinforced.

Top Outer	Bottom Inner	Qty	Order Code	Top Outer	Bottom Inner	Qty	Order Code	Top Outer	Bottom Inner	Qty	Order Code
14/20	10/30	1	9092-10	24/40	12/30	1	5005-10	34/45	24/40	1	5005-28
19/22	14/20	1	9092-20	24/40	14/20	1	9092-26	34/45	29/42	1	5005-30
19/38	14/20	1	9092-21	24/40	14/35	1	5005-12	45/50	24/40	1	5005-36
19/38	14/35	1	5005-06	24/40	19/22	1	9092-28	45/50	29/42	1	5005-38
24/25	14/20	1	9092-22	24/40	19/38	1	5005-14	55/50	24/40	1	5005-42
24/25	14/35	1	9092-27	29/42	14/35	1	5005-23				
24/40	10/30	1	5005-08	29/42	24/40	1	5005-24				



### ADAPTER Reducing and Enlarging ♦

Transition adapter to convert a spherical ball or socket joint to a standard taper inner joint. Made of borosilicate glass.

Top Socket	Bottom Inner	Qty	Order Code	Top Ball	Bottom Inner	Qty	Order Code
28/15	24/40	1	5020-20	28/15	24/40	1	5020-21
28/15	29/42	1	5020-22	28/15	29/42	1	5020-23
28/15	45/50	1	5020-40	28/15	45/50	1	5020-41
35/25	24/40	1	5020-30	35/25	24/40	1	5020-31
35/25	29/42	1	5020-32	35/25	29/42	1	5020-33
35/25	45/50	1	5020-42	35/25	45/50	1	5020-43
DN25	24/40	1	5020-44	DN25	24/40	1	5020-45
DN25	29/42	1	5020-46	DN25	29/42	1	5020-47
DN25	45/50	1	5020-48	DN25	45/50	1	5020-49
DN40	24/40	1	5020-50	DN40	24/40	1	5020-51
DN40	29/42	1	5020-52	DN40	29/42	1	5020-53
DN40	45/50	1	5020-54	DN40	45/50	1	5020-55



### ADAPTER Reducing ♦

Reducing adapter, bushing type, larger outside standard taper joint, smaller inside standard taper joint.

Top Inside	Bottom Outside	Qty	Order Code	Top Inside	Bottom Outside	Qty	Order Code	Top Inside	Bottom Outside	Qty	Order Code
10/18	14/20	1	9061-05	14/20	24/40	1	5021-14	24/40	29/42	1	5021-28
10/30	14/20	1	9061-10	14/20	29/42	1	5021-15	24/40	34/45	1	5021-30
10/30	14/35	1	5021-05	14/35	19/38	1	5021-18	29/42	34/45	1	5021-35
10/30	19/38	1	5021-07	14/35	24/40	1	5021-20	24/40	45/50	1	5021-36
10/30	24/40	1	5021-09	14/35	29/42	1	5021-22	29/42	45/50	1	5021-94
10/30	29/42	1	5021-12	19/38	24/40	1	5021-24	34/45	45/50	1	5021-39
14/20	19/22	1	9061-16	19/38	29/42	1	5021-26				



### ADAPTER Thermometer, Offset ♦

Standard taper inner joint at bottom and standard taper 10/30 outer joint at top which is offset and angled for use in multiple neck flasks.

Bottom Joint	Order Code
24/40	5024-10
29/42	5024-20




**ADAPTER Spherical and Standard Taper** ♠

§ reinforced joint at top and § at bottom.

Top § Outer	Bottom § Ball	Qty	Order Code	Top § Outer	Bottom § Ball	Qty	Order Code
24/40	28/15	1	5025-17	24/40	65/40	1	5025-24
24/40	35/20	1	5025-19	29/42	35/25	1	5025-27
24/40	35/25	1	5025-21				


**ADAPTER Tube, "Mini" #7 Ace-Thred** ♠

Straight tube with #7 Ace-Thred at one end for use with 5029 nylon bushing. Complete includes glass member, nylon bushing and FETFE® O-ring.

Ace-Thred Size	Tube O.D. (mm)	Approx. Length (mm)	Qty	Order Code
7	12.7	114	1	5027-20

**Replacement Glass Only**

7	12.7	114	1	5027-05
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**Replacement Nylon Bushing w/O-Ring**

7			1	5029-10
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**Replacement FETFE O-Ring**

			12	7855-704
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**ADAPTER "Mini" #7 Ace-Thred** ♠

With ground joint at bottom and threaded nylon bushing at top which tightens into #7 Ace-Thred to form an O-ring compression seal with thermometers, bleed tubes, etc. § 10/10 size will accommodate thermometers up to 6.4mm diameter; all others will accommodate 7mm diameters. Suitable for vacuum work. Supplied complete with nylon bushing and FETFE O-ring.

Ace-Thred Size	Bottom Joint	Qty	Order Code
7	§10/10	1	5028-24
7	§14/10	1	5028-25
7	§14/20	1	5028-26
7	§19/22	1	5028-28
7	§24/40	1	5028-30
7	§29/42	1	5028-32
7	§18/9	1	5028-38
7	§35/25	1	5028-42

**Replacement Nylon Bushing w/O-Ring**

		1	5029-10
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**Replacement FETFE O-Ring**

		12	7855-704
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### ADAPTER “Mini” #7 Ace-Thred, w/PTFE Ferrule

With inner joint at bottom and #7 Ace-Thred at top. Suitable for most vacuum work. Supplied complete with nylon bushing and PTFE ferrule in place of O-ring.

Ace-Thred Size	Bottom Joint	Qty	Order Code	
7	14/20	1	5028-27	♠
7	24/40	1	5028-31	♠

#### Replacement Nylon Bushing

7	1	5029-10	♠
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#### Replacement Ferrules

7	12	11710-07	★
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### ADAPTER Electrode, “Mini” #7 Ace-Thred ♠

With inner joint at bottom and #7 Ace-Thred at top. For use with any probes up to 8mm diameter. Suitable for most vacuum work. Supplied complete with nylon bushing and FETFE O-ring.

Ace-Thred Size	Bottom Joint	Qty	Order Code
7	14/20	1	5028-117
7	24/40	1	5028-119

#### Replacement Nylon Bushing

7	1	5029-30
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#### Replacement FETFE O-Ring

7	12	7855-704
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### ADAPTER “Giant” #25 or #36 Ace-Thred ♠

With ground inner joint at bottom and Ace-Thred that accepts outside diameters of 24-25mm and 34-35mm, respectively. **Note:** Joint size limits size O.D. of inserted tube. Complete item supplied with nylon bushing and FETFE O-ring.

This item can be used with ultrasonics equipment. 5030-70 will accept 9852-41 slide adapter; 5030-76 will accept 9852-45 slide adapter and/or 9814 ultrasonic horn with extenders.

**Note:** When using horn with extenders, depth distances must be determined for proper operation.

Bottom Joint	Glass Only		Complete	
	Qty	Order Code	Qty	Order Code
<b>#25 Ace-Thred</b>				
24/25	1	5030-52	1	5030-70
45/50	1	8067-18	1	5030-84
50/55	1	8067-20	1	5030-86
71/60	1	8067-22	1	5030-88
<b>#36 Ace-Thred</b>				
24/25	1	5030-55	1	5030-76
45/50	1	5030-78	1	5030-80
55/50	1	8067-24	1	5030-90

#### Replacement Nylon Bushing

#25 Ace-Thred	1	7506-10
#36 Ace-Thred	1	7506-12

#### Replacement FETFE O-Ring

for use w/ #25 Bushing	6	7855-734
for use w/ #36 Bushing	6	7855-740




**ADAPTER “Midi” #11 Ace-Thred ♠**

With ground joint at bottom and #11 Ace-Thred at top. Will accept inner tubes with diameters of 9mm to 10.5mm such as thermowells, gas dispersion tubes, vacuum take-offs, etc. Suitable for most vacuum work. Supplied complete with nylon bushing and FETFE O-ring. See 6470 for thermowell.

Ace-Thred Size	Bottom Joint	Glass Only		Complete	
		Qty	Order Code	Qty	Order Code
11	⌘ 19/22	1	5030-04	1	5030-20
11	⌘ 24/40	1	5030-06	1	5030-22
11	⌘ 29/42	1	5030-08	1	5030-24
11	⌘ 45/50	1	5030-60	1	5030-19
11	⌘ 35/25	1	5030-16	1	5030-28

**Replacement Nylon Bushing**

1	7506-02
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**Replacement FETFE O-Ring**

12	7855-708
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**ADAPTER “Maxi” #15 Ace-Thred ♠**

With ground joint at bottom and #15 Ace-Thred at top. Will accept tubes with diameters of 12.5 to 14mm such as electrodes, inlet and outlet tubes, etc. Suitable for most vacuum work. Supplied complete with nylon bushing and FETFE O-ring.

Ace-Thred Size	Bottom Joint	Glass Only		Complete	
		Qty	Order Code	Qty	Order Code
15	⌘ 24/40	1	8042-15	1	5030-40
15	⌘ 29/42	1	8042-17	1	5030-42
15	⌘ 45/50	1	8042-21	1	5030-45
15	⌘ 35/25	1	8042-35	1	5030-44

**Replacement Nylon Bushing**

1	7506-06
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**Replacement FETFE O-Ring**

12	7855-716
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**ADAPTER “Twin” Ace-Thred ♠**

With ⌘ inner joint at bottom and two off-set Ace-Threds at top. Two threaded openings enable you to insert two inner tubes, such as a thermometer and a bleed tube, through the same joint. The ⌘ 24/25 medium length joint is compatible with ⌘ 24/40 full length outer joints. Supplied complete with (2) nylon bushings and FETFE O-rings.

Ace-Thred Size	Ace-Thred Size	Bottom Joint	Qty	Order Code
#7	#7	⌘ 24/25	1	5031-10
#7	#7	⌘ 29/42	1	5031-12
#11	#11	⌘ 45/50	1	5031-24
#15	#15	⌘ 45/50	1	5031-33
#11	#15	⌘ 45/50	1	5031-86

**Replacement Nylon Bushing**

#7 Ace-Thred	1	5029-05
#11 Ace-Thred	1	7506-01
#15 Ace-Thred	1	7506-05

**Replacement FETFE O-Ring**

for use w/ #7 Bushing	12	7855-704
for use w/ #11 Bushing	12	7855-708
for use w/ #15 Bushing	12	7855-716



**ADAPTER** *Offset, #7 Ace-Thred ♠*

Thermometer adapter with inner  $\text{F}$  joint at bottom and top threaded piece offset and angled approximately  $10^\circ$  for use in multiple neck flasks. Threaded nylon bushing tightens into glass piece to form an O-ring compression seal with thermometers, bleed tubes, etc. up to 7mm diameter. Thread at top not only allows for variable vertical positioning of thermometers, etc. but also, because of the  $10^\circ$  angle, by rotating joint you can position the thermometer in the bottom of the flask. Supplied complete with nylon bushing and FETFE O-ring.

Ace-Thred Size	Bottom Joint	Qty	Order Code
#7	$\text{F}$ 19/22	1	5032-18
#7	$\text{F}$ 24/40	1	5032-22
#7	$\text{F}$ 29/42	1	5032-25

**Replacement Nylon Bushing**

#7 Ace-Thred	1	5029-10
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**Replacement FETFE O-Ring**

for use w/ #7 Bushing	12	7855-704
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**ADAPTER** *Twin ♠*

With inner  $\text{F}$  joint at bottom, (1) #7 Ace-Thred and (1)  $\text{F}$ 10/18 outer joint, offset at the top. Threaded opening will accept 6.5 to 7mm diameter thermometers, bleed tubes, etc. The  $\text{F}$  24/25 medium length joint is compatible with a full length  $\text{F}$  24/40 joint. Supplied complete with nylon bushing and FETFE O-ring.

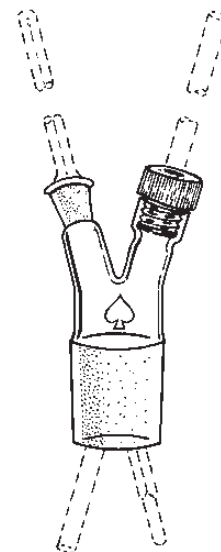
Ace-Thred Size	Top Outer Joint	Bottom Joint	Qty	Order Code
#7	$\text{F}$ 10/18	$\text{F}$ 24/25	1	5034-11

**Replacement Nylon Bushing**

#7 Ace-Thred	1	5029-10
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**Replacement FETFE O-Ring**

for use w/ #7 Bushing	12	7855-704
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# U.S. Government Buyer?

GSA pricing for **Ace Glass** products is available thru our partner, the VWR Corporation.

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**Schedule**  
 Contract GS07F119CA

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**ADAPTER** PTFE, Ace-Thred to ⌘ Joint

This PTFE adapter is used to connect Ace-Thred to inner ⌘ joint. Supplied with one FETFE O-ring.

Ace-Thred Size	Top ⌘ Outer	Qty	Order Code	Ace-Thred Size	Top ⌘ Outer	Qty	Order Code
15	14/20	1	5026-15	25	14/20	1	5026-24 ★
15	24/40	1	5026-20	25	24/40	1	5026-26 ★

**Replacement FETFE O-Ring**

15	12	7855-716	♠
25	6	7855-734	♠


**ADAPTER** Standard Taper to Sanitary, PTFE ★

Transition adapter to convert a sanitary flanged apparatus to a standard taper inner joint. Made of virgin PTFE.

Bottom Inner ⌘	Top Sanitary	Qty	Order Code	Bottom Inner ⌘	Top Sanitary	Qty	Order Code
24/40	1/2	1	5001-02	45/50	1/2	1	5001-22
24/40	3/4	1	5001-04	45/50	3/4	1	5001-24
24/40	1	1	5001-06	45/50	1	1	5001-26
24/40	1 1/2	1	5001-08	45/50	1 1/2	1	5001-28
24/40	2	1	5001-10	45/50	2	1	5001-30
29/42	1/2	1	5001-12				
29/42	3/4	1	5001-14				
29/42	1	1	5001-16				
29/42	1 1/2	1	5001-18				
29/42	2	1	5001-20				


**ADAPTER** Beaded Pipe to Sanitary Adapter, PTFE ★

Transition adapter to convert beaded pipe to sanitary. Made of Virgin PTFE.

Beaded Pipe	Sanitary	Qty	Order Code	Beaded Pipe	Sanitary	Qty	Order Code
3/4	3/4	1	8872-50	1	1 1/2	1	8872-56
1	3/4	1	8872-52				
1	1	1	8872-54				


**FERRULE** PTFE ★

PTFE ferrules can substitute for the Ace-Thred o-ring to avoid any possibility of sample contamination. Additionally, the use of our pre-drilled ferrules will allow the use of a slightly smaller O.D. tube. For example, our 5029-45 PTFE bushing with a ferrule will allow the use of a 1/4 inch O.D. tube rather than the usual 7mm O.D. tube.

**Note:** Ferrules are also available in solid versions ready for a customized size hole.

Ace-Thred Size	For Tubing O.D. (In.)	Qty	Order Code	Ace-Thred Size	For Tubing O.D. (In.)	Qty	Order Code
#7	1/8	12	11710-03	#7	Solid	12	11710-104
#7	3/16	12	11710-05	#11	Solid	12	11710-106
#7	1/4	12	11710-07	#15	Solid	12	11710-108
#11	3/8	12	11710-11	#25	Solid	6	11710-112
#15	1/2	12	11710-15	#50	Solid	6	11710-114
#25	1	6	11710-25				
#50	2	6	11710-50				

## BUSHING Nylon or PTFE ♠

Machine threaded nylon or PTFE bushing with hole in center or solid. For use with 5027, 5028, 5031, 5032, 5034, 5086, 5092, 5101, 5136, 5261, 5263 and other apparatus with #7 internal threads. (2) FETFE O-rings supplied with bushing.

**Note:** Solid bushing is for drilling different size hole, only. NOT intended for use as a stopper. For stoppers, see 5803 or 5846. Nylon version has a maximum temperature of 100°C, PTFE is 200°C.

Ace-Thred Size	Hole Size (mm)	Qty	Nylon	PTFE
			Order Code	Order Code
7	7.5	1	5029-10	1 5029-35
7	8	1	5029-30	1 5029-31
7	Solid	1	5029-20	1 5029-40



### Ferrule Style Bushing (ferrule not included)

7	7.5	1	5029-12	1 5029-45
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### Replacement FETFE O-Ring

				12 7855-704
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**If O-rings are a problem, see PTFE ferrules for use with Ace-Threds.**

## BUSHING Ace-Thred Bushing ♠

Bushing connector for joining an Ace-Thred to a reduced end tube. Assorted bushing and O-Ring materials. Supplied with O-Ring.

Ace-Thred Size	Accepts Tubing, mm	O-ring Size	O-Ring Material	Qty	Order Code
<b>PTFE</b>					
#7	7.5	-008	Fetfe	1	5029-35
#11	9-10.5	-012	Fetfe	1	7506-23
#15	12.5-14	-110	Fetfe	1	7506-27
#18	16-17	-112	Fetfe	1	7506-29
#25	24-25	-212	Fetfe	1	7506-31
#36	34-35	-217	Fetfe	1	7506-33
#50	47-48	-225	Fetfe	1	7506-35
#80	80	-336	Fetfe	1	7506-39



### Nylon

11	9-10.5	-	Na	1	7506-01
11	9-10.5	-012	Fetfe	1	7506-02
11	9-10.5	-108	Fetfe	1	7506-03
15	12.5-14	-	Na	1	7506-05
15	12.5-14	-110	Fetfe	1	7506-06
18	16-17	-112	Fetfe	1	7506-08
25	24-25	-	Na	1	7506-09
25	24-25	-212	Fetfe	1	7506-10
25	24-25	-214	Capfe	1	7506-11
36	34-35	-217	Fetfe	1	7506-12
50	47-48	-225	Fetfe	1	7506-14
50	47-48	-225	Silicone	1	7506-15

## ADAPTER PTFE Pour Spout ♠

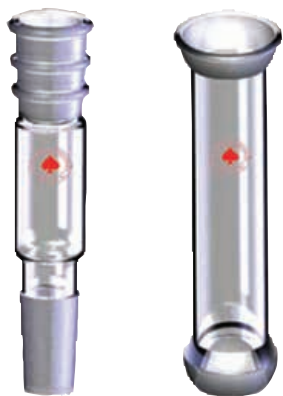
PTFE threaded pour spout with FETFE O-ring. Prevents material contact with threads.

Ace-Thred Size	Qty	Order Code
#15	1	7645-04
#25	1	7645-07
#50	1	7645-15



### Replacement FETFE O-Ring

#15	12	7855-716
#25	6	7855-734
#50	3	7855-744


**ADAPTER Straight Connecting** ♦

With ₤ or § inner and outer joints at both top and bottom. Length stated is approximate overall length. Outer ₤ joints are reinforced.

₤ Joints	Length, mm	Qty	Order Code	§ Joints	Length, mm	Qty	Order Code
19/38	150	1	5035-05	28/15	142	1	5035-25
24/40	150	1	5035-10	35/20	142	1	5035-30
29/42	150	1	5035-15	35/25	142	1	5035-35

**ADAPTER Straight Connecting** ♦

Straight connecting adapter with reinforced standard taper joints at both ends.



₤ Joints	Length Between Joints, mm	Inner Joints		Outer Joints	
		Qty	Order Code	Qty	Order Code
14/35	30	-	-	1	9071-01
14/35	70	-	-	1	9071-03
14/35	120	-	-	1	9071-05
24/40	30	1	5039-03	-	-
24/40	70	1	5039-05	1	5036-04
24/40	120	1	5039-07	1	5036-06
29/42	30	1	5039-09	-	-
29/42	70	1	5039-11	1	5036-07
29/40	120	1	5039-13	1	5036-08
24/40	175	-	-	1	5036-10
29/42	175	-	-	1	5036-12

**ADAPTER Adjustable, Electrode, Ace-Thred**

Threaded adapter for use with platinum or other wire electrodes or 12185/12186 temperature sensors that normally would be sealed in glass. Ace-Thred bushing and silicone rubber septa for setting electrode in place. Allows for adjusting of sensor or easy removal. Adapter has 7mm O.D. glass capillary with 2mm I.D. with 120mm stem length for sealing to other glass apparatus. Actual I.D. size is determined by bore of hole in nylon bushing. Supplied complete with bushing and silicone septa.



Bushing Bore I.D., mm	Length, mm	Glass Only		Bushing Only		Complete	
		Qty	Order Code	Qty	Order Code	Qty	Order Code
<b>#7 Ace-Thred</b>							
0.5	140	1	5037-03 ♦	1	5037-08 ♦	1	5037-10 ♦
1.0	140	1	5037-03 ♦	1	5037-12 ♦	1	5037-20 ♦
1.5	140	1	5037-03 ♦	1	5037-22 ♦	1	5037-30 ♦

**Replacement Septa**

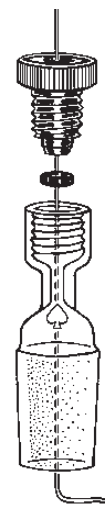
Silicone, Three Layer	12	12901-42	★
Silicone w/PTFE face (optional)	48	8787-40	★

For microscale adapters with ₤14/10 joints, see 9557 or 9574.

### ADAPTER Adjustable, Electrode, ⌘ Joint/Ace-Thred

Allows for use with ⌘ joints. Similar to 5037 Adapter except for ⌘, inner lower joint and Ace-Thred upper joint. Complete includes glass adapter, nylon bushing and 12901-42 silicone septa.

Bushing Bore I.D., mm	Bottom Joint	Glass Only		Bushing Only		Complete	
		Qty	Order Code	Qty	Order Code	Qty	Order Code
<b>#7 Ace-Thred</b>							
0.5	⌘ 14/20	1	5038-04 ♠	1	5037-08 ♠	1	5038-06 ♠
1.0	⌘ 14/20	1	5038-04 ♠	1	5037-12 ♠	1	5038-16 ♠
1.5	⌘ 14/20	1	5038-04 ♠	1	5037-22 ♠	1	5038-26 ♠
0.5	⌘ 24/40	1	5038-05 ♠	1	5037-08 ♠	1	5038-07 ♠
1.0	⌘ 24/40	1	5038-05 ♠	1	5037-12 ♠	1	5038-17 ♠
1.5	⌘ 24/40	1	5038-05 ♠	1	5037-22 ♠	1	5038-27 ♠
1.5	⌘ 29/42	1	5038-08 ♠	1	5037-22 ♠	1	5038-28 ♠



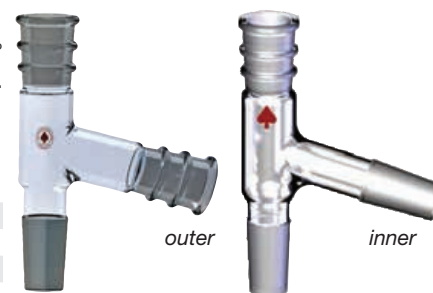
#### Replacement Septa

Silicone, Three Layer	12	12901-42	★
Silicone w/PTFE face (optional)	48	8787-40	★

### ADAPTER 75° Side Arm ♠

Adapter with reinforced standard taper joints. Outer top joint and inner bottom joint, with 75° standard taper side arm joint. Side arm joint is available for either inner or outer joint connection.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Side ⌘ Joint	Inner Side Arm		Outer Side Arm	
			Qty	Order Code	Qty	Order Code
14/20	14/20	14/20	1	9074-02		–
19/22	19/22	19/22	1	9074-04		–
24/40	24/40	24/40	1	5040-10	1	5045-10
29/42	29/42	29/42	1	5040-12		–
24/40	45/50	45/50	1	5040-96		–



### ADAPTER 105° Side Arm ♠

Adapter with reinforced outer joints at top and side, inner joint at bottom.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Outer Side ⌘ Joint	Qty	Order Code
24/40	24/40	24/40	1	5050-10
29/42	29/42	29/42	1	5050-12



### ADAPTER 105° Side Arm, w/Ace-Thred ♠

With reinforced outer joint on side, inner joint at bottom, and Ace-Thred at Top.

**Note:** Not supplied with bushing and O-ring, which must be ordered separately.

Ace-Thred Size	Bottom Inner ⌘ Joint	Outer Side ⌘ Joint	Qty	Order Code
#25	45/50	45/50	1	5050-86
#15	45/50	45/50	1	5050-96



#### Nylon Bushing

#25 Ace-Thred	1	7506-10
#15 Ace-Thred	1	7506-06

#### FETFE O-Ring

for use w/ #25 Bushing	12	7855-734
for use w/ #15 Bushing	12	7855-716

**ADAPTER Claisen** ♦

With parallel side arm, outer joints at top, inner joint at bottom. Outer ⌘ joints are reinforced.

Top Outer Joint	Bottom Inner Joint	Outer Side Joint	Qty	Order Code
⌘ 14/20	⌘ 14/20	⌘ 14/20	1	9067-02
⌘ 19/22	⌘ 19/22	⌘ 19/22	1	9067-04
⌘ 24/40	⌘ 24/40	⌘ 24/40	1	5055-10
⌘ 29/42	⌘ 29/42	⌘ 29/42	1	5055-15
⌘ 35/25	⌘ 35/25	⌘ 35/25	1	5055-35

**ADAPTER Claisen, Modified** ♦

Claisen style adapter with an additional reinforced ⌘ outer joint at a 45° angle to the vertical outer joint.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Outer Side ⌘ Joint	Height x Width, mm	Qty	Order Code
14/20	14/20	14/20	117 x 105	1	4013-08
24/40	24/40	24/40	165 x 150	1	4013-10
29/42	29/42	29/42	170 x 155	1	4013-12

**ADAPTER "U"** ♦

Connecting adapter, U-shaped, with reinforced ⌘ outer joints at both ends.

Outer ⌘ Joint	Qty	Order Code
⌘ 24/40	1	5060-10

**ADAPTER "U", Connecting** ♦

Connecting adapter, U-shaped, with either standard taper or spherical joints at the ends.

Joint	Joint	Distance between Joints, mm	Qty	Order Code
⌘ 12/5 Ball	⌘ 12/5 Socket	31	1	5065-20
⌘ 12/5 Socket	⌘ 12/5 Socket	31	1	5065-22
⌘ 18/11 Socket	⌘ 18/11 Socket	75	1	5065-29
⌘ 28/15 Ball	⌘ 28/15 Socket	75	1	5065-31
⌘ 28/15 Socket	⌘ 28/15 Socket	75	1	5065-32
⌘ 14/20	⌘ 14/20	100	1	9079-08
⌘ 14/20	⌘ 14/20	150	1	9079-12
⌘ 24/40	⌘ 24/40	170	1	5125-10
⌘ 35/25	⌘ 35/25	170	1	5125-35
⌘ 24/40	⌘ 35/25	170	1	5125-50

**ADAPTER 75° Angle ♠**

With ⌘ inner joint at both ends.

Joints, ⌘	Qty	Order Code
14/20-14/20	1	9052-08
14/35-24/40	1	9052-12
24/40-24/40	1	5070-10
29/42-29/42	1	5070-15


**ADAPTER 90° Angle ♠**

Connecting adapter with spherical joint at one end, other end straight tube.

Joints, ⌘	Qty	Order Code
<b>Ball Joint to Plain</b>		
12/5	1	5072-20
18/9	1	5072-22
28/15	1	5072-24

**Socket Joint to Plain**

12/5	1	5072-28
18/9	1	5072-30
28/15	1	5072-34

**Socket Joint to Socket Joint**

12/5	1	5072-38
28/15	1	5072-45

**Ball Joint to Socket Joint**

12/5	1	5072-37
28/15	1	5072-43


**ADAPTER 105° Angle ♠**

With ⌘ or ⌘ inner-to-outer joints at top and bottom.

Top Joint	Bottom Joint	Qty	Order Code
⌘ 14/20	⌘ 14/20	1	9055-04
⌘ 24/40	⌘ 24/40	1	5075-10
⌘ 29/42	⌘ 29/42	1	5075-15
⌘ 45/50	⌘ 45/50	1	5075-45
⌘ 35/25	⌘ 35/25	1	5075-35


**ADAPTER 160° Angle ♠**

Designed to go from angled flask side joints to a vertical position. Inner-to-outer joints.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Qty	Order Code
14/20	14/20	1	9056-08





**ADAPTER Distillate Take-Off** ♠

With reinforced ⌘ joint, 105° angle. Straight tube bottom.

Top Outer ⌘ Joint	Qty	Order Code
14/20	1	9083-08
24/40	1	5080-10



**ADAPTER Distilling** ♠

For connecting distilling column with vertical condensers. Top outer joint ⌘ 10/30 is for 76mm immersion thermometer. Side arm at 75°, vertical side arm 17.8cm from center tube.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Bottom Inner Side ⌘ Joint	Qty	Order Code
10/30	24/40	24/40	1	5085-10



**ADAPTER Distilling, Ace-Thred** ♠

For connecting distilling column with vertical condenser. Top has #7 Ace-Thred for use with bushing and adjustable length thermometer. Side arm at 75°, vertical side arm 17.8cm from center tube. Supplied complete with nylon bushing and FETFE O-ring.

Ace-Thred Size	Bottom Inner ⌘ Joint	Bottom Inner Side ⌘ Joint	Qty	Order Code
#7	45/50	45/50	1	5086-54

**Nylon Bushing**

#7 Ace-Thred	1	5029-10
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**FETFE O-Ring**

for use w/ #25 Bushing	12	7855-704
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**ADAPTER 75° Angle ♠**

With ₣ or § joint at bottom and side. Top thermometer joint.

*Note: For vacuum jacketed version of 5090, see 5140.*

Top Outer ₣ Joint	Immersion Depth, mm	Side Inner Joint	Bottom Inner Joint	Qty	Order Code
<b>Standard Taper Joint Bottom and Side</b>					
10/18	25	₣ 14/20	₣ 14/20	1	9077-02
10/30	25	₣ 14/20	₣ 14/20	1	9077-06
10/30	25	₣ 19/22	₣ 19/22	1	9077-16
10/30	76	₣ 24/40	₣ 24/40	1	5090-10
10/30	76	₣ 29/42	₣ 29/42	1	5090-15

**Spherical Ball Joint Bottom and Side**

10/30	76mm	§ 35/25	§ 35/25	1	5090-35
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**ADAPTER 75° Angle, #7 Ace-Thred ♠**

With ₣ 24/40 inner joint at bottom and side. Top joint has #7 Ace-Thred for use with nylon bushing and adjustable length thermometer. Supplied complete with nylon bushing and FETFE O-ring.

Ace-Thred Size	Bottom Inner ₣ Joint	Inner Side ₣ Joint	Qty	Order Code
#7	24/40	24/40	1	5092-54

**Replacement Nylon Bushing**

#7 Ace-Thred	1	5029-10
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**Replacement FETFE O-Ring**

for use w/ #25 Bushing	12	7855-704
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**ADAPTER 75° Angle, Outlet Tube ♠**

With ₣ 24/40 inner joint at bottom and side, 15.8 mm O.D. x 9.5 mm I.D. outlet tube at top.

Bottom Inner ₣ Joint	Inner Side ₣ Joint	O.D., mm	Top Outlet ID, mm	Qty	Order Code
24/40	24/40	15.8	9.5	1	5095-10




**ADAPTER** *Thermometer Joint, Offset* ♠

With 10/30 thermometer joint for 76mm immersion at top. 24/40 inner bottom joint and 24/40 outer side joint.

Thermometer Joint	Inner Side Joint	Outer Side Joint	Immersion Depth, mm	Qty	Order Code
10/30	24/40	24/40	76	1	5100-10


**ADAPTER** *Offset, #7 Ace-Thred* ♠

Similar to 5100 adapter except with #7 Ace-Thred for use with nylon bushing and adjustable length thermometer. Supplied with nylon bushing and FETFE O-ring.

Ace-Thred Size	Bottom Inner Joint	Inner Side Joint	Qty	Order Code
#7	24/40	24/40	1	5101-54

**Replacement Nylon Bushing**

#7 Ace-Thred	1	5029-10
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**Replacement FETFE O-Ring**

for use w/ #25 Bushing	12	7855-704
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**ADAPTER** *Offset, #7 and #15 Ace-Threds*

With #15 Ace-Thred at bottom and two #7 Ace-Threds at top, one offset. Used with 8648 temperature measurement apparatus for 7482 hydrogenation/gas apparatus.

**Note:** Glass only, NOT supplied with nylon bushings or O-rings.

Top Ace-Threds Size	Top Ace-Thred Size	Qty	Order Code
(2) #7	#15	1	5102-05 ♠

**Nylon Bushing, (center hole)**

#7 Ace-Thred	1	5029-200 ★
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**FETFE O-Ring**

for use w/ #7 Bushing	12	7855-711 ♠
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**ADAPTER** *Septum Inlet, Single Port*

Sampling adapter with inner joint at bottom and septum port at top for handling air-sensitive materials. Supplied with septum.

Bottom Inner Joint	Qty	Order Code
14/20	1	5110-13 ♠
24/40	1	5110-11 ♠

**Replacement Septa**

for 8mm O.D. Tubing, red	12	9096-32 ★
for 8mm O.D. Tubing, white	12	9096-33 ★

**ADAPTER Septum Inlet, w/Stopcock**

Sampling adapter with  $\text{F}$  inner joint at bottom, 2 mm bore PTFE or glass stopcock and (2) septum ports at top. Used to handle air-sensitive materials. Supplied with (2) 8mm sleeve septa.

Bottom Inner $\text{F}$ Joint	Stopcock Type	Qty	Order Code	
14/20	PTFE	1	9094-04	♠
14/20	Glass	1	9094-14	♠
24/40	PTFE	1	5111-09	♠
24/40	Glass	1	5111-19	♠

**Replacement Septa**

for 8mm O.D. Tubing, red	12	9096-32	★
for 8mm O.D. Tubing, white	12	9096-33	★


**ADAPTER Septum Inlet, Two Inlets**

Sampling adapter with  $\text{F}$  inner joint at bottom and (2) septum at top for handling air-sensitive materials. Supplied with (2) 8mm sleeve septa.

Bottom Inner $\text{F}$ Joint	Qty	Order Code	
14/20	1	9091-03	♠
24/40	1	5112-14	♠

**Replacement Septa**

for 8mm O.D. Tubing, red	12	9096-32	★
for 8mm O.D. Tubing, white	12	9096-33	★


**ADAPTER Septum Inlet, Single Syringe Port**

Sampling adapter with  $\text{F}$  inner joint at bottom and 8-425 GPI thread at top. Supplied with a Cap with hole and a PTFE faced septum to allow insertion of a syringe needle.

Bottom Inner $\text{F}$ Joint	Top Thread, GPI	Qty	Order Code	
14/20	8-425	1	5113-13	♠
24/40	8-425	1	5113-23	♠

**Replacement Caps**

5mm drilled 8-425, fits 5/5 joint	48	9590-44	♠
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**Replacement Septa**

PTFE faced	48	8787-40	★
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**ADAPTER w/Stopcock and Syringe Port**

With  $\text{F}$  inner joint at bottom and 8-425 GPI thread at top. Supplied with a cap with hole and a PTFE faced septum to allow insertion of a syringe needle. Stopcock is 2mm bore PTFE plug.

Bottom Inner $\text{F}$ Joint	Top Thread, GPI	Stopcock Bore, mm	Qty	Order Code	
14/20	8-425	2	1	5114-14	♠
19/22	8-425	2	1	5114-19	♠
24/40	8-425	2	1	5114-24	♠
29/42	8-425	2	1	5114-29	♠

**Replacement Caps**

5mm drilled 8-425, fits 5/5 joint	48	9590-44	♠
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**Replacement Septa**

PTFE faced	48	8787-40	★
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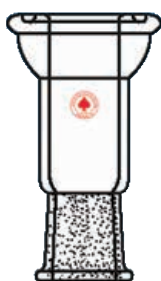




**ADAPTER Pour Out** ♠

Convenient adapters for pouring from flasks or funnel without pouring over a ground joint.

Bottom Inner ⌘ Joint	<i>Straight</i>		<i>Angled</i>	
	Qty	Order Code	Qty	Order Code
24/40	1	5120-14	1	5120-20



**ADAPTER Connecting, O-ring Joint to ⌘ Outer** ♠

Used with 8737, 8738, 8739, 8740, 8743 and 8745 vacuum manifolds as port connections. #15 O-ring joint on one end, outer joint opposite. Supplied with one O-ring.

O-ring Joint	Bottom Outer ⌘ Joint	Qty	Order Code
#15	14/20	1	5127-04
#15	19/22	1	5127-06
#15	24/40	1	5127-20

**Replacement FETFE O-Ring**

for use w/ #15 Joint	12	7855-716
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**ADAPTER Connecting, O-ring Joint to ⌘ Inner** ♠

Used with 8737, 8738, 8739, 8740, 8743 and 8745 vacuum manifolds as port connections. #15 O-ring joint on one end, inner joint opposite. Supplied with one O-ring.

Porosity B (70-100 micron) glass frit below O-ring joint and ⌘ inner joint at the opposite end.

O-Ring Joint	Bottom Inner ⌘ Joint	<i>With Frit</i>		<i>Without Frit</i>	
		Qty	Order Code	Qty	Order Code
#15	14/20	1	5117-18	1	5128-07
#15	19/22	1	5117-21	1	5128-11
#15	24/40	1	-	1	5128-26

**Replacement FETFE O-Ring**

for use w/ #15 Joint	12	7855-716
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**ADAPTER Connecting, O-ring Joint to Ace-Thred** ♠

Used with 8737, 8738, 8739, 8740, 8743 and 8745 vacuum manifolds as port connections. #15 O-ring joint on one end, Ace-Thred opposite end. Supplied with one O-ring.

O-ring Joint	Ace-Thred Size	Qty	Order Code
#15	#7	1	5129-07
#15	#11	1	5129-11
#15	#15	1	5129-15
#15	#25	1	5129-25

**Replacement FETFE O-Ring**

for use w/ #15 Joint	12	7855-716
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### ADAPTER *Connecting, O-ring Joint to Straight Tube* ♦

Used with 8737, 8738, 8739, 8740, 8743 and 8745 vacuum manifolds as port connections. #15 O-ring joint on one end, straight tube opposite end. Supplied with one O-ring.

**Note:** Sized for use with Cajon® or Swagelok® compression fittings.

O-ring Joint	Tube Size, in.	Qty	Order Code
#15	3/8	1	5131-30
#15	1/2	1	5131-40



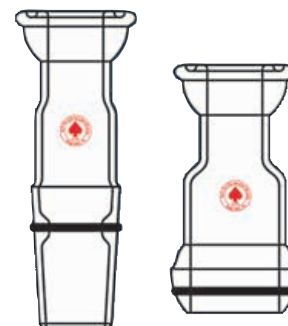
#### Replacement FETFE O-Ring

for use w/ #15 Joint	12	7855-716
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### ADAPTER *Connecting, O-ring Joint to Inner or Ball O-ring Joint* ♦

Used with 8737, 8738, 8739, 8740, 8743 and 8745 vacuum manifolds as port connections. #15 O-ring joint on one end, O-ring seal inner or ball opposite end. Supplied with O-rings.

O-ring Joint	Joint	Qty	Order Code
#15	14/20	1	5132-06
#15	24/40	1	5132-09
#15	28/15	1	5132-34
#15	35/20	1	5132-37



#### Replacement FETFE O-Ring

for use w/ #15 Joint	12	7855-716
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### ADAPTER *Claisen* ♦

With outer joint at top side arm for immersion thermometer. Outer joint at top, inner joints side and bottom.

Thermometer Joint	Top/Bottom Joints	Inner Side Joint	Immersion Depth, mm	Qty	Order Code
10/18	14/20	14/20	25	1	5135-06
10/18	19/22	19/22	25	1	5135-08
10/30	24/40	24/40	76	1	5135-10
10/18	29/26	29/26	25	1	5135-12
10/30	29/42	29/42	76	1	5135-14



### ADAPTER *Claisen, #7 Ace-Thred* ♦

Top side arm has #7 Ace-Thred for use with supplied nylon bushing and FETFE o-ring for adjustable length thermometer. Side and bottom joints are inner joint, top joint is outer joint.

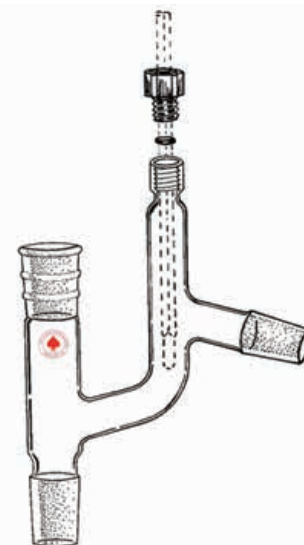
Thermometer Joint, Ace-Thred	Top/Bottom Joints	Inner Side Joint	Qty	Order Code
#7	24/40	24/40	1	5136-54

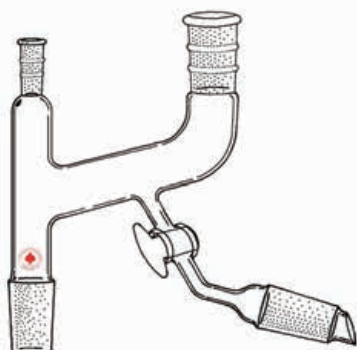
#### Replacement FETFE O-Ring

	12	7855-704
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#### Replacement Nylon Bushing

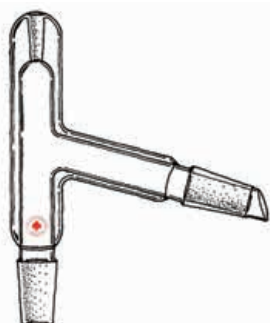
	1	5029-10
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**ADAPTER Claisen** ♠

With glass or 1:5 solid PTFE stopcock plug on lower side arm. Top joint on center tube is  $\text{\textcircled{R}}10/30$  for 76mm immersion thermometer. All other joints are  $\text{\textcircled{R}}14/20$  or  $\text{\textcircled{R}}24/40$ . Take-off arm is at  $75^\circ$  angle to the vertical. Plug is 2mm bore.

Thermometer $\text{\textcircled{R}}$ Joint	Top/Bottom $\text{\textcircled{R}}$ Joints	Side $\text{\textcircled{R}}$ Joints	Plug Style Style	Qty	Order Code
10/30	14/20	14/20	Glass	1	9068-06
10/30	24/40	24/40	Glass	1	5150-10
10/30	24/40	24/40	PTFE	1	5150-29

**ADAPTER Vacuum Jacketed** ♠

Used as distilling head for connecting top of column with side condenser. Top joint  $\text{\textcircled{R}}10/30$  inner for 76mm immersion thermometer. Side and bottom joints are  $\text{\textcircled{R}}24/40$  inner.

Inner Thermometer $\text{\textcircled{R}}$ Joint	Bottom $\text{\textcircled{R}}$ Joint	Side $\text{\textcircled{R}}$ Joint	Immersion Depth, mm	Qty	Order Code
10-30	24/40	24/40	25	1	5140-10

**ADAPTER 105° Angle, Jacketed** ♠

Jacketed with water-cooled  $\text{\textcircled{R}}$  joints. Extension arm below joint is 50mm. Size D hose connections, for use with 3/8-inch I.D. tubing.

Outer Top $\text{\textcircled{R}}$ Joint	Inner Bottom $\text{\textcircled{R}}$ Joint	Extension Arm Below Joint, mm	Hose Connection, in.	Qty	Order Code
24/40	24/40	50	3/8 (Size D)	1	5155-10

**ADAPTER Drying Tube** ♠

Drying tube adapter with inner joint and rubber stopper.

Inner Bottom $\text{\textcircled{R}}$ Joint	Qty	Order Code
19/38	1	5170-05
24/40	1	5170-10
29/42	1	5170-15

**Replacement Rubber Stopper and Adapter Tube**

Qty	Order Code
1	5170-40

**ADAPTER Liquid Inlet** ♠

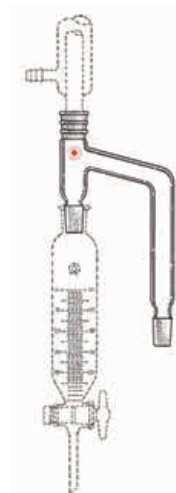
With  $\text{\textcircled{R}}$  inner joint and two vacuum take-offs. Size D hose connections, for use with 3/8-inch I.D. tubing.

Inner Bottom $\text{\textcircled{R}}$ Joint	Hose Connection, in.	Qty	Order Code
24/40	3/8 (Size D)	1	5175-10

### ADAPTER *Moisture Trap* ♠

Unique adapter used in place of a Dean-Stark moisture test receiver. Simply add a condenser to top ⚗ outer joint, any graduated funnel from 125mL to 2000mL to bottom ⚗ inner joint, attach sample flask to ⚗ inner side arm joint and you have a moisture test receiver.

Outer Top ⚗ Joint	Inner Bottom ⚗ Joint	Inner Side Arm ⚗ Joint	Qty	Order Code
14/20	14/20	14/20	1	<b>9101-20</b>
24/40	24/40	24/40	1	<b>5179-07</b>



### ADAPTER *Gas Inlet* ♠

Side tube with hose connection for purging out as a gas inlet tube. Stem below joint is 175mm long. Size D hose connections, for use with 3/8-inch I.D. tubing.

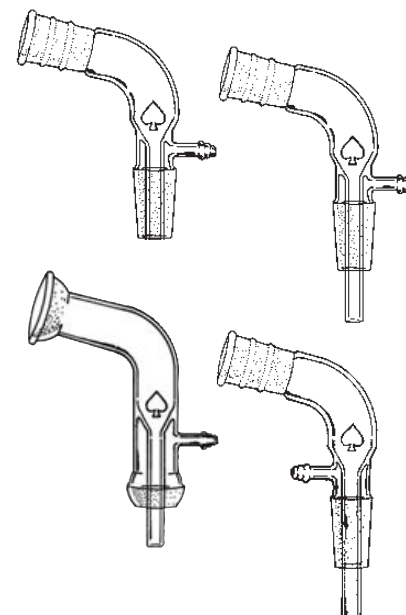
Outer Top Joint	Inner Bottom Joint	Extension Below Joint, mm	Hose Connection, in.	Qty	Order Code
⚗ 24/40	⚗ 24/40	175	3/8 (Size D)	1	<b>5190-10</b>
⚗ 29/42	⚗ 29/42	175	3/8 (Size D)	1	<b>5190-15</b>
⚗ 35/25	⚗ 35/25	175	3/8 (Size D)	1	<b>5190-35</b>



### ADAPTER *Vacuum Take-off* ♠

Outer joint at angle of 105°. Hose connection on side either facing (5192-45) or opposing top joint.

Outer Top Joint	Inner Bottom Joint	Extension Below Joint, mm	Hose Connection, in.	Qty	Order Code
<b>Hose Connection Opposite Top Joint</b>					
⚗ 14/20	⚗ 14/20	0	5/16 or 3/8 (Size B)	1	<b>9124-05</b>
⚗ 14/20	⚗ 14/20	90	5/16 or 3/8 (Size B)	1	<b>9124-06</b>
⚗ 19/22	⚗ 19/22	0	5/16 (Size A)	1	<b>9124-07</b>
⚗ 24/40	⚗ 24/40	175	5/16 or 3/8 (Size C)	1	<b>5195-10</b>
⚗ 29/42	⚗ 29/42	175	5/16 or 3/8 (Size C)	1	<b>5195-15</b>
⚗ 24/40	⚗ 24/40	30	5/16 or 3/8 (Size C)	1	<b>5192-12</b>
⚗ 29/42	⚗ 29/42	30	5/16 or 3/8 (Size C)	1	<b>5192-16</b>
⚗ 35/25	⚗ 35/25	30	5/16 or 3/8 (Size C)	1	<b>5192-33</b>
<b>Hose Connection Facing Top Joint</b>					
⚗ 24/40	⚗ 24/40	30	5/16 or 3/8 (Size C)	1	<b>5192-45</b>
⚗ 24/40	⚗ 24/40	30	#11 Ace-Thred	1	<b>5192-49</b>



**ADAPTER Vacuum Take-off, w/Stem** ♦

Stem below joint. Size C hose connection, for use with 3/8-inch or 5/16 inch I.D. tubing.

Inner Bottom Joint	Extension Below Joint, mm	Hose Connection, in.	Qty	Order Code
⌀ 24/40	30	5/16 or 3/8 (Size C)	1	5193-08
⌀ 29/42	30	5/16 or 3/8 (Size C)	1	5193-14
⌀ 24/40	250	5/16 or 3/8 (Size C)	1	5196-10
⌀ 24/40	125	5/16 or 3/8 (Size C)	1	5196-12
⌀ 29/42	250	5/16 or 3/8 (Size C)	1	5196-15
⌀ 35/25	250	5/16 or 3/8 (Size C)	1	5196-35

**ADAPTER Stopcock, Hose Connection** ♦

With either angled or straight hose connections and ⌀ or ⌀ joint.



Inner Bottom Joint	Plug Bore, mm	Tube Connection Type	Hose Connection, in.	Qty	Order Code
<b>Glass Stopcock Plug</b>					
⌀ 14/20	2	Angled	5/16 (Size A)	1	9080-02
⌀ 19/22	2	Angled	5/16 (Size A)	1	9080-08
⌀ 14/10	2	Angled	5/16 (Size A)	1	9080-10
⌀ 19/38	2	Angled	5/16 or 3/8 (Size C)	1	5200-05
⌀ 24/40	2	Angled	5/16 or 3/8 (Size C)	1	5200-10
⌀ 29/42	3	Angled	5/16 or 3/8 (Size C)	1	5200-15
⌀ 24/40	3	Straight	5/16 or 3/8 (Size C)	1	5200-110
⌀ 29/42	2	Straight	5/16 or 3/8 (Size C)	1	5200-115
⌀ 35/25	2	Angled	5/16 or 3/8 (Size C)	1	5200-35
⌀ 35/25	2	Straight	5/16 or 3/8 (Size C)	1	5300-26

**1:5 PTFE Stopcock Plug**

⌀ 14/20	2	Angled	5/16 (Size A)	1	9080-12
⌀ 19/22	2	Angled	5/16 (Size A)	1	9080-18
⌀ 14/20	2	Straight	5/16 (Size A)	1	9080-112
⌀ 19/22	2	Straight	5/16 (Size A)	1	9080-118
⌀ 24/40	2	Angled	5/16 or 3/8 (Size C)	1	5202-12
⌀ 29/42	2	Angled	5/16 or 3/8 (Size C)	1	5202-92
⌀ 24/40	2	Straight	5/16 or 3/8 (Size C)	1	5202-110
⌀ 29/26	2	Straight	5/16 or 3/8 (Size C)	1	5202-112
⌀ 29/42	2	Straight	5/16 or 3/8 (Size C)	1	5202-114

**Replacement Stopcock Plug**

Glass	2			1	8223-02
Glass	3			1	8223-04
PTFE	2			1	8224-04

**ADAPTER 1:5 PTFE Metering Valve, Hose Connection** ♦

With angled hose connection, ⌀ inner joint and 1:5 solid PTFE 2mm bore stopcock plug with metering valve.



Inner Bottom ⌀ Joint	Plug Bore, mm	Tube Connection Type	Hose Connection, in.	Qty	Order Code
14/20	2	Angled	5/16 (Size A)	1	9081-21
24/40	2	Angled	5/16 or 3/8 (C)	1	5203-20

**Replacement Metering Valve**

PTFE	2			1	8232-14
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### ADAPTER *Hose Connection* ♦

With ⌘ inner or Ⓢ ball joint and 90° hose connection.

Inner Bottom Joint	Fritted Disc, micron	Hose Connection, in.	Qty	Order Code
⌘ 14/20	–	5/16 (Size A)	1	9088-07
⌘ 19/22	–	5/16 (Size A)	1	9088-09
⌘ 19/38	–	3/8 (Size D)	1	5205-05
⌘ 24/40	–	3/8 (Size D)	1	5205-10
⌘ 29/42	–	3/8 (Size D)	1	5205-15
⌘ 45/50	–	3/8 (Size D)	1	5205-16
Ⓢ 28/15	–	3/8 (Size D)	1	5205-25
Ⓢ 35/25	–	3/8 (Size D)	1	5205-35
⌘ 19/22	145-174 (Porosity A)	5/16 (Size A)	1	5205-110
⌘ 24/40	145-174 (Porosity A)	3/8 (Size D)	1	5205-112
⌘ 29/42	145-174 (Porosity A)	3/8 (Size D)	1	5205-114



### ADAPTER *Twin Hose Connection* ♦

With ⌘ inner joint and twin hose connections opposite each other. Normally used with 6620 reflux apparatus to allow inert gas flow over top of apparatus to maintain oxygen free system.

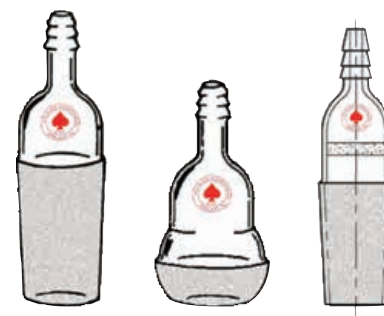
Inner Bottom Joint	Hose Connection, in.	Qty	Order Code
⌘ 14/20	5/16 or 3/8 (Size C)	1	5206-04
⌘ 24/40	5/16 or 3/8 (Size C)	1	5206-10
⌘ 29/42	5/16 or 3/8 (Size C)	1	5206-12
⌘ 45/50	5/16 or 3/8 (Size C)	1	5206-20



### ADAPTER *Hose Connection* ♦

With ⌘ inner or Ⓢ ball joint at bottom and straight hose connection at top.

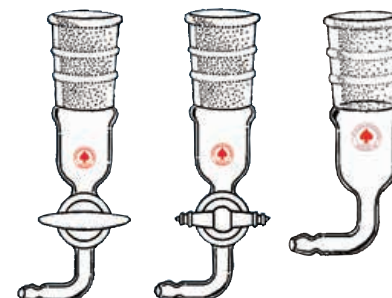
Inner Bottom Joint	Fritted Disc, micron	Hose Connection, in.	Qty	Order Code
⌘ 14/10	–	5/16 (Size A)	1	9069-04
⌘ 14/20	–	5/16 (Size A)	1	9069-05
⌘ 19/22	–	5/16 (Size A)	1	9069-06
⌘ 14/20	145-174 (Porosity A)	5/16 (Size A)	1	9069-115
⌘ 19/22	145-174 (Porosity A)	5/16 (Size A)	1	9069-116
⌘ 24/40	–	5/16 or 3/8 (Size C)	1	5216-10
⌘ 29/42	–	5/16 or 3/8 (Size C)	1	5216-15
⌘ 45/50	–	5/16 or 3/8 (Size C)	1	5216-16
Ⓢ 18/9	–	5/16 or 3/8 (Size C)	1	5216-23
Ⓢ 35/25	–	5/16 or 3/8 (Size C)	1	5216-35
⌘ 24/40	145-174 (Porosity A)	5/16 or 3/8 (Size C)	1	5216-110
⌘ 29/26	145-174 (Porosity A)	5/16 or 3/8 (Size C)	1	5216-116
⌘ 29/42	145-174 (Porosity A)	5/16 or 3/8 (Size C)	1	5216-118

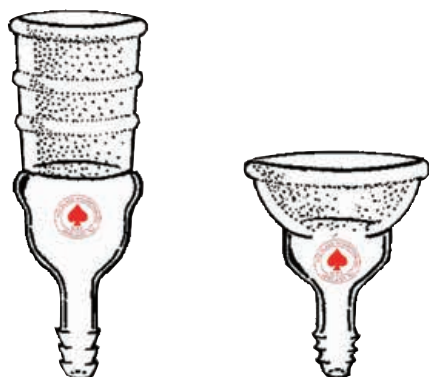


### ADAPTER *90°* ♦

With ⌘ outer joint and hose connection. Available with a Glass or 1:5 PTFE Stopcock or without a stopcock.

Outer Top Joint	Plug Bore, mm	Hose Connection, in.	Qty	Order Code
<b>Glass Stopcock Plug</b>				
⌘ 24/40	2	5/16 or 3/8 (Size C)	1	5210-10
<b>1:5 PTFE Stopcock Plug</b>				
⌘ 24/40	2	5/16 or 3/8 (Size C)	1	5210-40
<b>No Stopcock Plug, Plain</b>				
⌘ 24/40	–	3/8 (Size D)	1	5215-10
<b>Replacement Stopcock Plug</b>				
Glass	2		1	8223-02
PTFE	2		1	8224-04

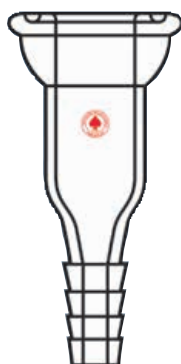




**ADAPTER** *Hose Connection* ♠

With ⌘ outer or ⌘ socket joint at one end and a hose connection at the other end.

Outer Top Joint	Hose Connection, in.	Qty	Order Code
⌘ 14/20	5/16 (Size A)	1	9070-02
⌘ 24/40	5/16 or 3/8 (Size C)	1	5217-10
⌘ 18/9	5/16 or 3/8 (Size C)	1	5217-23
⌘ 28/15	5/16 or 3/8 (Size C)	1	5217-11
⌘ 35/25	5/16 or 3/8 (Size C)	1	5217-35
⌘ 35/20	7/16 or 1/2 (Size F)	1	5217-40



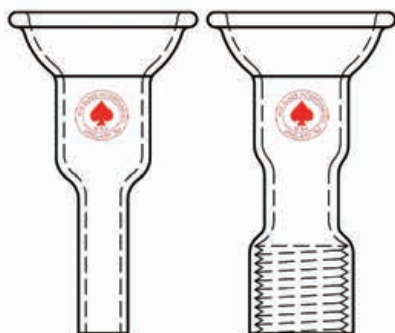
**ADAPTER** *O-ring Joint to Hose Connection* ♠

With O-ring joint at one end and hose connection at other end. Size E hose connection, for use with 3/8-inch or 7/16-inch I.D. tubing. FETFE O-ring included.

Outer Top Joint	Hose Connection, in.	Qty	Order Code
15mm	3/8 or 7/16 (Size E)	1	5218-10

**Replacement FETFE O-Ring**

15mm	12	7855-713
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**ADAPTER** *Socket Joint* ♠

With ⌘ socket joint at one end and straight tube at the other end.

Outer Top ⌘ Joint	Bottom Joint Connection	Qty	Order Code
35/20	3/8" O.D. Tube	1	5219-23
35/20	1/2" O.D. Tube	1	5219-26
28/15	10mm Tube	1	5221-05
28/15	#11 Ace-Thred	1	5221-09
28/15	#15 Ace-Thred	1	5221-11
35/25	3/4" O.D. Tube	1	5221-20
35/25	#15 Ace-Thred	1	5221-24
35/25	#25 Ace-Thred	1	5221-28



**ADAPTER** *Vial or Bottle, PTFE*

Used to connect a vial or a bottle to the vapor tube of a rotary evaporator. Fabricated from PTFE, one side is a standard taper outer joint with rib for using clamp such as 7598, other end is a female vial or bottle GPI thread.

⌘ Joint	to Joint Connection	Qty	Order Code
24/40	13-425 Thread	1	5223-13 ♠
24/40	20-400 Thread	1	5223-20 ♠
24/40	38-400 Thread	1	5223-38 ♠
24/40	58-400 Thread	1	5223-58 ♠

**Joint Clips, Keck Type**

Polymethylene Acetal Resin, 24/40	10	7598-24	★
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### ADAPTER *Distilling Trap* ♠

Distilling trap adapter with outer joint top and inner joint bottom.

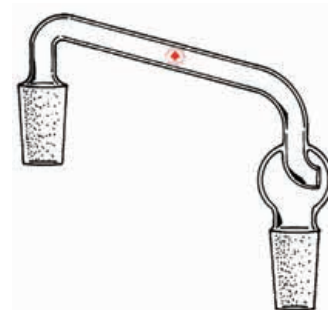
Outer Top § Joint	Inner Bottom § Joint	Qty	Order Code
14/20	14/20	1	9086-02
24/40	24/40	1	5225-10
29/42	29/42	1	5225-15



### ADAPTER *Kjeldahl Trap* ♠

Catch splashes from material being boiled or foaming. Also allow only vapors to enter the distillation column.

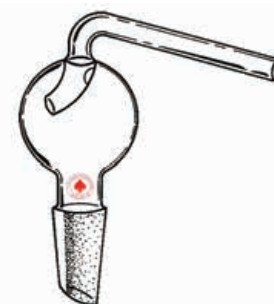
Inner Bottom § Joints	Distance between joint centers, mm	Qty	Order Code
24/40	200	1	5226-10



### ADAPTER *Distilling Trap, w/75° Outlet Tube* ♠

Distillation trap adapter with outlet tube bent at 75° downward angle.

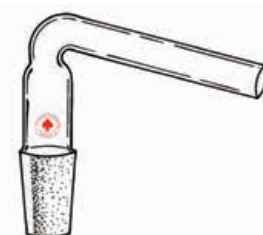
Inner Bottom § Joint	Qty	Order Code
24/40	1	5230-10



### ADAPTER *Distilling, w/75° Outlet Tube* ♠

Distillation adapter with 8mm O.D. outlet tube bent at 75° downward angle.

Inner Bottom § Joint	Outlet Tube O.D., mm	Qty	Order Code
24/40	8	1	5235-10



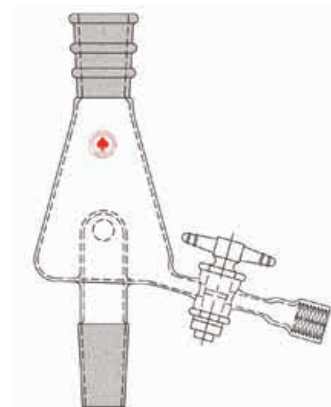
### ADAPTER *Sampling* ♠

With 1:5 solid PTFE stopcock plug connected to side of apron for removing distillate or sample. Approximate flask capacity is 125mL. 5245-04 has #7 Ace-Thred after stopcock, 5245-29 has plain tubing.

Outer Top § Joint	Inner Bottom § Joint	Capacity, mL	Plug Bore, mm	Side Arm Outlet Type	Qty	Order Code
24/40	24/40	125	2	#7 Ace-Thred	1	5245-04
24/40	24/40	125	2	Plain Tube	1	5245-29

#### Replacement Stopcock Plug

PTFE	2	1	8224-04
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**ADAPTER Adjustable Flow Stopcock** ♠

This adapter has an adjustable flow glass stopcock, with reinforced 24/40 standard taper outer joint at top and 24/40 standard taper inner joint at bottom.

Outer Top ∅ Joint	Inner Bottom ∅ Joint	Qty	Order Code
24/40	24/40	1	5250-10


**ADAPTER "Splash Guard," Firestone** ♠

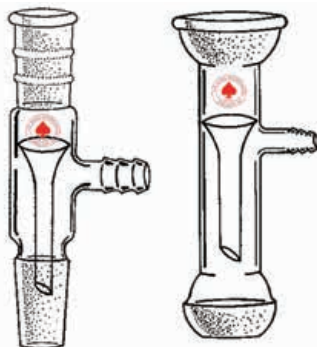
Rotary evaporator "splash guard" adapter with ∅ medium length joints, top and bottom, that will accept full length ∅ joints. Available with or without a coarse Porosity A (147-174 micron) fritted disc that assures no carry-over in the event of splash-up. When inserted into flask, splash guard combines with flask neck to give best protection against splash-up. Overall length is kept to a minimum to effect best distillation.

*Note: Designed by Dr. Raymond Firestone*

Top Outer ∅ Joint	Bottom Inner ∅ Joint	Fritted Disc, micron	Qty	Order Code
<b>with Fritted Disc</b>				
14/20	14/20	145-174 (Porosity A)	1	5257-43
24/25	24/25	145-174 (Porosity A)	1	5257-49
24/25	29/26	145-174 (Porosity A)	1	5257-53
24/25	45/35	145-174 (Porosity A)	1	5257-62

**without Fritted Disc**

14/20	14/20	–	1	5258-06
24/25	24/25	–	1	5258-12
24/25	29/26	–	1	5258-16
24/25	45/35	–	1	5258-62


**ADAPTER Vacuum** ♠

With side hose connection and drip tip.

Top Outer Joint	Bottom Inner Joint	Hose Connection, in.	Qty	Order Code
∅ 14/20	∅ 14/20	5/16 or 3/8 (Size B)	1	9123-06
∅ 19/22	∅ 19/22	5/16 or 3/8 (Size B)	1	9123-08
∅ 24/25	∅ 24/25	3/8 (Size D)	1	5260-07
∅ 24/40	∅ 24/40	3/8 (Size D)	1	5260-10
∅ 29/42	∅ 29/42	3/8 (Size D)	1	5260-15
∅ 35/25	∅ 35/25	3/8 (Size D)	1	5260-35


**ADAPTER Vacuum, with Stopcock** ♠

Vacuum adapter with 2mm bore glass stopcock on side arm.

Top Outer Joint	Bottom Inner Joint	Plug Bore, mm	Side Arm Outlet Type	Qty	Order Code
∅ 14/20	∅ 14/20	2	Plain Tube	1	9175-04

**Replacement Stopcock Plug**

Glass		2		1	8223-02
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## ADAPTER w/Hose Connection, Ace-Thred ♠

With ⌘ inner joint at bottom, #7 Ace-Thred at top and serrated hose connection. Suitable for most vacuum work. Supplied complete with nylon bushing and FETFE O-ring.

#7 Ace-Thred will accommodate thermometers, bleed tubes, etc. up to 7mm diameter.

#11 Ace-Thred will accommodate thermowells, gas dispersion tubes, vacuum take-offs, etc. with diameters of 9mm to 10.5mm.

#15 Ace-Thred will accommodate electrodes, inlet and outlet tubes, etc. with diameters of 12.5mm to 14mm such as electrodes, inlet and outlet tubes, etc.

Ace-Thred	Inner Bottom ⌘ Joint	Hose Connection, in.	Glass Adapter, only	Qty	Order Code
7	14/10	5/16 (Size A)	-	1	5261-06
7	14/20	5/16 (Size A)	-	1	5261-08
7	19/22	5/16 (Size A)	-	1	5261-12
7	24/40	3/8 (Size D)	-	1	5261-16
7	29/42	3/8 (Size D)	-	1	5261-20
11	19/22	5/16 (Size A)	5261-35	1	5261-36
11	24/40	3/8 (Size D)	5261-37	1	5261-38
11	29/42	3/8 (Size D)	5261-39	1	5261-40
15	24/40	3/8 (Size D)	5261-56	1	5261-57
15	29/42	3/8 (Size D)	5261-58	1	5261-59

### Replacement Nylon Bushing

7	1	7506-02
11	1	5029-10
15		7506-06

### Replacement FETFE O-Ring

7	12	7855-704
11	12	7855-708
15	12	7855-716



## ADAPTER Multi-neck, "Mini" #7 Ace-Thred ♠

With ⌘ inner joint at bottom, two #7 Ace-Threds and one ⌘ outer joint at top. Ace-Threds would commonly be used for thermometers or gas inlet tubes thus leaving joint for condenser, addition funnel, still head, etc. ⌘ 24/25 medium length joint is compatible with ⌘ 24/40 full length joint. Supplied complete with (2) nylon bushings and FETFE O-rings.

Ace-Thred	Outer Top ⌘ Joint	Inner Bottom ⌘ Joint	Qty	Order Code
7	24/40	24/25	1	5263-17

### Replacement Nylon Bushing

7	1	7506-02
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### Replacement FETFE O-Ring

7	12	7855-704
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## ADAPTER Gas Inlet ♠

Adapter with side hose connection. Use as gas inlet or vacuum adapter. Supplied with holed cap and FETFE O-Ring.

Outer Top ⌘ Joint	Inner Bottom ⌘ Joint	Hose Connection, in.	Qty	Order Code
14/10	14/10	5/16 or 3/8 (Size B)	1	9119-22
14/20	19/38	5/16 (Size A)	1	9119-02
24/40	24/40	3/8 (Size D)	1	5265-10



**ADAPTER Thermometer** ♠

With vacuum take-off or gas addition side tube. Center tube top is 12.7mm O.D. and 9.5mm I.D. (Top bead has O.D. of 16mm). Side plain tube is 6mm O.D. and inner bottom joint is  $\text{§}$  24/40.

Top Joint O.D., mm	Inner Bottom $\text{§}$ Joint	Side Tube O.D., mm	Qty	Order Code
10	24/40	6	1	5266-10

**ADAPTER Vacuum Filtration** ♠

Used for reduced pressure filtration with plain stem Buchner funnels (7186 style). Top is tooled to accept a pluro stopper, bottom has a  $\text{§}$  inner joint.

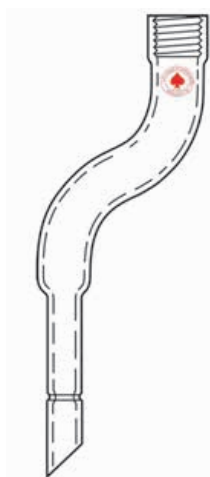
**Note:** Inserting the recommended size pluro stopper and the next smaller size allows use of smaller capacity funnels. (i.e., in  $\text{§}$  24/25 size, insertion of 31mm x 16mm and 22mm x 11mm will allow use of 15 or 30mL capacity funnels.) For Pluro Stoppers see our 12014 product line.

Uses Pluro Stopper, I.D.	Inner Bottom $\text{§}$ Joint	Hose Connection, in.	For Funnel Capacity, mL	Qty	Order Code
17mm x 7mm	14/20	3/8 (Size D)	2	1	5267-06
17mm x 7mm	19/22	3/8 (Size D)	2	1	5267-08
31mm x 16mm	24/25	3/8 (Size D)	140	1	5267-11
31mm x 16mm	24/40	3/8 (Size D)	140	1	5267-15
60mm x 36mm	29/26	3/8 (Size D)	4000	1	5267-18
60mm x 36mm	29/42	3/8 (Size D)	4000	1	5267-20

**ADAPTER Offset** ♠

Both bottom inner joint and top outer joints are slightly offset and angled for reactor heads.

Top Outer Joint	Bottom Inner Joint	With Drip Tip		Without Drip Tip	
		Qty	Order Code	Qty	Order Code
$\text{§}$ 14/20	$\text{§}$ 14/20	1	9089-40	1	9089-08
$\text{§}$ 24/40	$\text{§}$ 24/40	1	5268-54	1	5268-10
$\text{§}$ 29/42	$\text{§}$ 29/42	1	5268-56	1	5268-15
$\text{§}$ 45/50	$\text{§}$ 45/50	1	5268-58	1	5268-21
$\text{§}$ 35/25	$\text{§}$ 35/25	1	-	1	5268-35

**ADAPTER Offset, w/Ace-Thred** ♠

Offset adapter with #15 Ace-Thred offset to a 14mm O.D. tube with O-ring groove. For use with ACE pressure reactors to locate condenser, etc., away from stirrer.

**Note:** NOT supplied with bushing or O-ring.

Ace-Thred	Bottom Tube O.D., mm	Qty	Order Code
15	14	1	5269-12

**Nylon Bushing w/FETFE O-Ring**

7	1	7506-06
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**Replacement FETFE O-Ring**

7	12	7855-716
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**ADAPTER Additive ♠**

Graduated separatory funnel with 1:5 solid PTFE stopcock plug and dropping bulb. Capacity 50mL, in 1mL subdivisions. Plug bore is 2mm.

Outer Top § Joint	Inner Bottom § Joint	Capacity, mL	Plug Bore, mm	Qty	Order Code
24/40	24/40	50	2	1	5270-29

**Replacement Stopcock Plug**

PTFE			2	1	8224-04
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**ADAPTER w/Stopcock, Ace-Thred ♠**

With § inner joint at bottom, Ace-Thred at top, and a side 1:5 solid PTFE bored stopcock plug with hose connection. Supplied complete with nylon bushing and FETFE O-ring that allows compression seal with thermometers, bleed tubes, etc.

Ace-Thred	Inner Bottom § Joint	Plug Bore, mm	Hose Connection, in.	Qty	Order Code
<b>Complete</b>					
#7	24/40	2	5/16 or 3/8 (Size C)	1	5272-15
#7	24/29	2	5/16 or 3/8 (Size C)	1	5272-17
#15	45/50	4	5/16 or 3/8 (Size C)	1	5274-43

**Replacement Glass Adapter**

#15	45/50		5/16 or 3/8 (Size C)	1	5274-22
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**Replacement Nylon Bushing**

#7				1	5029-10
#15				1	7506-05

**Replacement FETFE O-Rings**

#7				12	7855-704
#15				12	7855-716

**Replacement 1:5 PTFE Stopcock Plug**

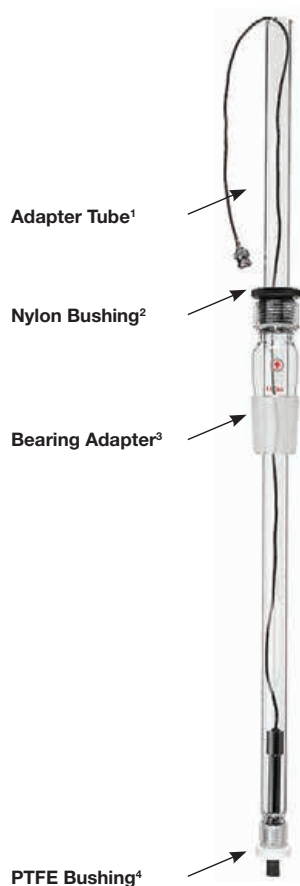
		2		1	8224-04
		4		1	8224-12


**ADAPTER Purge w/Shutoff**

PTFE purge / shutoff adapter allows purging of air-sensitive contents. Ace-Thred adapter features two top taps, either 1/4"-28 UNF or 1/8in NPT, controlled by a 2-way stopcock. Max 160 psig, min 0.003mmHg.

Ace-Thred	Tap	Qty	Order Code
#15	1/4in-28 UNF	1	5808-30 ★
#15	1/8in NPT	1	5808-35 ★
#25	1/4in-28 UNF	1	5808-40 ★
#25	1/8in NPT	1	5808-45 ★
#36	1/4in-28 UNF	1	5808-50 ★
#36	1/8in NPT	1	5808-55 ★





### ADAPTER pH Probe, Pilot Plant

Adapter tube, 25mm O.D., with a #15 Ace-Thred at one end, other end open. Insert 1/2-inch probe in open end down to and through the Ace-Thred, leaving enough exposed to secure with PTFE Bushing and size -110 FETFE O-ring to make a compression seal. Adapter tube is held in flask  $\text{F}$  joint using a Bearing Adapter with Nylon Bushing and size -212 FETFE O-ring, again with a compression seal, thus making the tube vertically adjustable. Supplied complete with glass Adapter Tube, PTFE Bushing with FETFE or Chemraz O-ring and Bearing Adapter. Takes any standard size pH probe.

Length of Adapter Tube, mm (in.)	Bottom Joint	Top Joint	Qty	w/FETFE O-Ring		w/Chemraz O-Ring	
				Order Code		Qty	Order Code
<b>Complete</b>							
610 (24)	-	-	1	5278-40	♠	1	5278-141 ★
910 (36)	-	-	1	5278-44	♠	1	5278-145 ★
1220 (48)	-	-	1	5278-48	♠	1	5278-149 ★

#### Replacement Adapter Tube¹ (only)

61 (24)	#15	Plain Tube		5278-14	♠
91 (36)	#15	Plain Tube		5278-18	♠
122 (48)	#15	Plain Tube		5278-23	♠

#### Replacement Bearing Adapter³ (only)

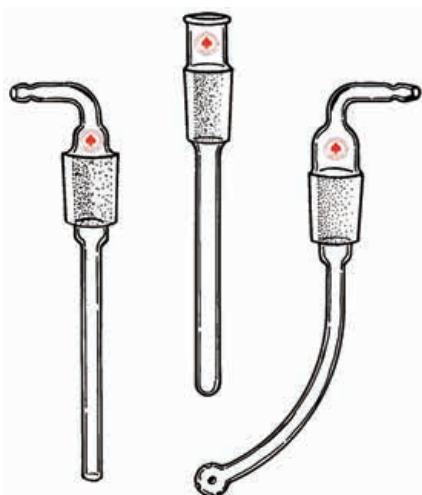
	$\text{F}$ 45/50	#25		8065-16	♠
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#### Replacement Nylon Bushing² (for Bearing Adapter)

	#25		1	7506-10	♠
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#### Replacement PTFE Bushing⁴ (for Adapter Tube)

w/FETFE O-Ring	#15		1	7506-27	♠
w/Chemraz O-Ring	#15		1	7506-127	★



### ADAPTER Distillation, Custom Length, $\text{F}$ Joints ♠

A general listing of several adapters that can be ordered as below or can be modified to meet your application. All adapters are supplied with inner  $\text{F}$  24/40 joints. We will supply the bottom tube with the proper curvature, if required to fit the vessel. These can be supplied to fit flask capacities up to 72L.

**Note:** Please specify either the length needed below the joint, or the capacity, or the Ace code number of the vessel into which the adapter is being placed.

Adapter Type (pictured from left to right)	Length Below Joint	Hose Connection, in.	Qty	Order Code
Gas Inlet	Customer Specified	3/8 (Size D)	1	5295-12
Thermometer Well	Customer Specified	-	1	5295-22
Aeration Tube	Customer Specified	3/8 (Size D)	1	5295-14

### ADAPTER Thermometer ♠

Adapter for use as a thermometer or thermoprobe holder or a plain vent. Tubes have three different, bottom, inner  $\text{F}$  joint sizes. Top tube I.D. is 10mm.

Inner Bottom $\text{F}$ Joint	Top Tube O.D., mm	Length, mm	Qty	Order Code
14/20	10	55	1	9058-04
19/22	10	57		9058-06
24/40	10	80		5295-24





## ADAPTER *Distillation* ♠

Distillation adapter for use with bench or pilot plant reactors. Moisture is collected in center vessel and drained off through the bottom stopcock which is ground to accept a compression style fitting. Stopcock plug is 1:5 PTFE. Available with either one or two top standard taper outer joints.

§ Joints	Plug Bore, mm	Compression Fitting Joint Size, in.	Qty	Order Code
<b>with (1) Top Joint</b>				
24/40	6	1/2	1	5299-01
29/42	6	1/2	1	5299-03
45/50	10	3/4	1	5299-07
<b>with (2) Top Joints</b>				
24/40	6	1/2	1	5299-10
29/42	6	1/2	1	5299-12
45/50	10	3/4	1	5299-16
<b>Replacement 1:5 PTFE Stopcock Plug</b>				
	6		1	8224-16
	10		1	



## ADAPTER *Thermocouple Well* ♠

With inner § joint for adapting thermocouples into jointed heads, etc. The well is fabricated from very thin wall borosilicate glass to allow for better temperature transfer. Well fabricated in two lengths for 25mm or 76mm immersion. 10/30 joint is for Micro/Mini-Lab scale.

**Note:** Immersion length is measured below the joint.

Bottom Inner § Joint	25mm Immersion		76mm Immersion	
	Qty	Order Code	Qty	Order Code
14/20	1	9099-06	1	9099-10
10/30	1	9099-08	1	9099-12

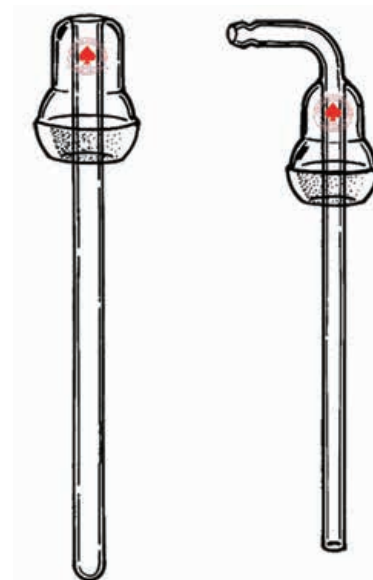


## ADAPTERS § Joints ♠

A general listing of several adapters that can be ordered as shown or can be modified to meet your application. All adapters are supplied with inner § 35/25 joints. We will supply the bottom tube with the proper curvature, if required to fit the vessel. These can be supplied to fit flask capacities of up to 72L.

**Note:** Please specify either the length needed below the joint, or the capacity, or the Ace code number of the vessel into which the adapter is being placed.

Adapter Type <i>(pictured from left to right)</i>	Length Below Joint	Hose Connection, in.	Qty	Order Code
Gas Inlet	Customer Specified	3/8 (Size D)	1	5300-22
Thermometer Well	Customer Specified	-	1	5300-30





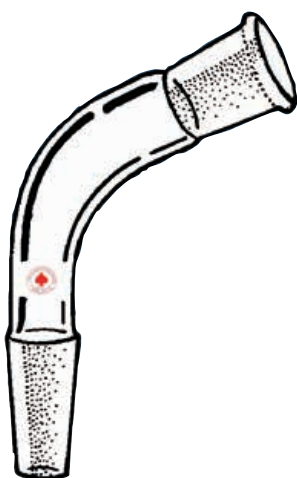
**ADAPTER Conversion** ♠

Used for converting a single neck round bottom flask to air-free operation. With outer joint at top and inner at bottom. Stopcock is 2mm bore.

Outer Top ⌘ Joint	Inner Bottom ⌘ Joint	Plug Bore, mm	Qty	Order Code
14/20	14/25	2	1	7802-09
24/40	24/40	2	1	7802-15

**Replacement Glass Stopcock Plug**

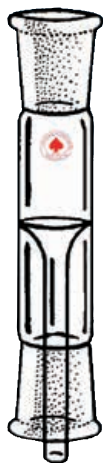
		2	1	8223-02
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**ADAPTER 105° Angle** ♠

With ⌘ joints, one 14/20 outer and one 14/35 inner, or one 24/25 outer and one 24/40 inner.

Outer Top ⌘ Joint	Inner Bottom ⌘ Joint	Qty	Order Code
14/20	14/35	1	7803-12
24/25	24/40	1	7803-25



**ADAPTER Straight, w/Drip Tube** ♠

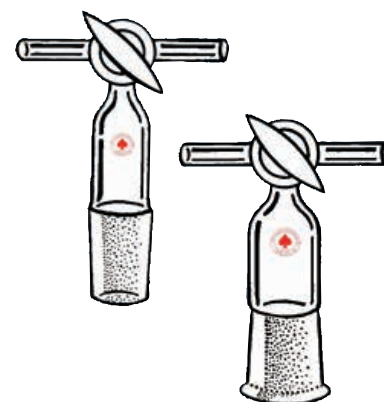
With two ⌘ 14/20 outer joints, one 7mm drip tube.

Outer Top ⌘ Joint	Inner Bottom ⌘ Joint	Drip Tube O.D., mm	Qty	Order Code
14/20	14/20	7	1	7805-12

## ADAPTER Gas ♠

With  $\text{F}$  joint and T-Bore, 2mm glass stopcock.

$\text{F}$ Joints	Plug Bore, mm	Qty	Order Code
<b>Inner Joint</b>			
14/20	2	1	7809-03
24/25	2	1	7809-07
<b>Outer Joint</b>			
14/35	2	1	7810-04
24/40	2	1	7810-08
<b>Replacement Glass Stopcock Plug</b>			
	2	1	8228-09



## ADAPTER Cap ♠

This adapter has a 15mm o-ring joint (No. 15) on one side and a blank cap on the other. Supplied with a FETFE O-Ring.

Outer Top Joint	Qty	Order Code
15mm	1	8273-05
<b>Replacement FETFE O-Ring</b>		
-116	12	7855-726



## ADAPTER Thermometer, $\text{F}$ 10/20 ♠

Made of PTFE with nylon knurled nut to adapt standard chemical thermometers. For use in  $\text{F}$  10/18 or  $\text{F}$  10/30 joints. Simple to use: insert thermometer to desired depth, tighten nut.

Inner Bottom $\text{F}$ Joint	Max Temperature, °C	Qty	Order Code
10/20	160	1	8299-10



## ADAPTER Thermometer, Compression Seal ♠

PTFE adapter with FETFE O-ring for use with plain stem thermometers, gas inlet tubes, etc. O-ring compression seal allows adjustable depth positioning. Except for the  $\text{F}$  10/18 size, all have external O-ring seal. All include internal O-ring 7855-711.

Inner Bottom $\text{F}$ Joint	Accommodates Thermometer Sizes up to, mm	Qty	Order Code
10/18	6.5	1	8300-05
14/20	7	1	8300-07
19/22	7	1	8300-09
24/25	7	1	8300-16
29/26	7	1	8300-21



### Replacement Internal FETFE O-Ring

Fits all	12	7855-711
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### Replacement External FETFE O-Ring

10/18	12	-
14/20	12	7855-710
19/22	12	7855-713
24/25	12	7855-715
29/26	12	7855-719

**ADAPTER** *Bleed* ♠

With drawn capillary tip for the introduction of gases below the liquid surface. Can also be used with #7 Ace-Thred, i.e., 5028.

Adapter Type	Outside O.D., mm	Approx. Length, mm (in)	Hose Connection, in.	Qty	Order Code
Straight	7	320 (12.5)	–	1	9059-08
90° Bend	7	320 (12.5)	3/8 (Size D)	1	9059-12

**ADAPTER** *Vacuum, Long Stem* ♠

Useful as a vacuum adapter or addition tube. Stem length below joint is 130mm. Size A hose connection, for use with 5/16-inch I.D. tubing. Outer ⌘ joint at top, inner ⌘ joint at bottom.

Outer Top ⌘ Joint	Inner Bottom ⌘ Joint	Length Below Joint, mm	Hose Connection, in.	Qty	Order Code
14/20	14/20	130	5/16 (Size A)	1	9121-04
24/40	24/40	130	5/16 (Size A)	1	9121-06
29/42	29/42	130	5/16 (Size A)	1	9121-08

**ADAPTER** *Bleed Capillary* ♠

Length measured from top of joint to tip. Size A hose connection, for use with 5/16-inch I.D. tubing.

For Flask Size, mL	Inner Bottom ⌘ Joint	Length Top of Joint to Tip, mm	Hose Connection, in.	Qty	Order Code
50	14/20	70	5/16 (Size A)	1	9328-18
50	14/20	80	5/16 (Size A)	1	9328-22
50	14/20	184	5/16 (Size A)	1	9328-02
100	14/20	207	5/16 (Size A)	1	9328-04

**ADAPTER** *Beaded Pipe to Standard Taper Joint* ♠

Borosilicate glass transition adapter to convert beaded pipe to standard taper joint.

Bottom Inner ⌘ Joint	Beaded Pipe	Order Code	Bottom Outer ⌘ Joint	Beaded Pipe	Order Code
24/40	1	5003-10	24/40	1	5003-40
24/40	1.5	5003-12	24/40	1.5	5003-42
24/40	2	5003-14	24/40	2	5003-44
29/42	1	5003-20	29/42	1	5003-50
29/42	1.5	5003-22	29/42	1.5	5003-52
29/42	2	5003-24	29/42	2	5003-54
45/50	1	5003-30	45/50	1	5003-60
45/50	1.5	5003-32	45/50	1.5	5003-62
45/50	2	5003-33	45/50	2	5003-63

**ADAPTER Thermometer Holder ♠**

Used in various Mini-Lab assemblies to hold standard thermometer.

Bottom Inner ⌘ Joint	Length above joint, mm	O.D., mm (in.)	Qty	Order Code
14/20	50	12.7 (0.5)	1	9554-05
19/22	50	12.7 (0.5)	1	9554-09

**Rubber Thermometer Adapter**

			1	9095-05
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**ADAPTER Conversion, Ace-Thred to ⌘ Joint ♠**

Glass adapter with Ace-Thred to ⌘ outer joint. For use with connecting adapter (*below*) to connect vial or flasks to rotary evaporators.

Ace-Thred Joint	Outer ⌘ Joint	Qty	Order Code
25	24/40	1	13290-34
25	24/40	1	13290-37
15	29/42	1	13290-44
15	29/32	1	13290-45
25	29/42	1	13290-47


**ADAPTER Vial, PTFE, Rotary Evaporator**

Chemically inert PTFE adapter with Ace-Thred and GPI vial thread inner to connect conversion adapter (*above*) to matching vial for use in rotary evaporators. Suitable for vacuum work. Supplied with either FETFE or Chemraz O-ring.

**Note:** FETFE not suitable for use with methylene chloride or acetone. Use Chemraz instead.

Inside GPI Thread	Outside Ace-Thred	w/FETFE O-ring			w/Chemraz O-ring		
		Qty	Order Code		Qty	Order Code	
8-425	15	1	13290-11	★	1	13290-121	★
9-425	15	1	13290-12	★	1	13290-122	★
13-425	15	1	13290-13	★	1	13290-123	★
15-425	15	1	13290-15	★	1	13290-125	★
18-400	15	1	13290-18	★	1	13290-128	★
20-400	15	1	13290-20	★	1	13290-130	★
22-400	15	1	13290-22	★	1	13290-132	★
24-410	15	1	13290-24	★	1	13290-134	★
24-410	25	1	13290-26	★	1	13290-136	★


**Replacement O-Rings**

	15	12	7855-716	♠	1	7859-516	★
	25	6	7855-734	♠	1	7859-534	★

**ADAPTER Bellows, PTFE ★**

PTFE bellows used for correct alignment of ⌘ joints and relieves stress in reaction systems. Operates to 200°C.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Qty	Order Code
19/22	19/22	1	13441-19
19/38	19/38	1	13441-23
24/40	24/40	1	13441-28
29/42	29/42	1	13441-32
45/50	45/50	1	13441-36




**ADAPTER** *Bushing, Reducing, PTFE* ★

PTFE adapter from one standard taper joint size to another.

Top Inside § Joint	Bottom Outside § Joint	Qty	Order Code
10/30	14/35	1	13430-05
10/30	19/38	1	13430-07
14/35	19/38	1	13430-11
14/35	24/40	1	13430-13
19/38	24/40	1	13430-16
19/38	29/42	1	13430-18
19/38	34/45	1	13430-21
24/40	29/42	1	13430-25
24/40	34/45	1	13430-28
29/42	34/45	1	13430-32
45/50	24/40	1	13430-40
45/50	29/42	1	13430-42
45/50	34/45	1	13430-44


**ADAPTER** *Stainless Steel, Circulator Hose* ★

304 Stainless steel adapters designed for use with ACE jacketed glass pilot plant reactors and circulator hoses for popular circulating chillers. One style connects O-ring ball joints on jacket inlet/outlet to hoses to/from circulator. The other style connects "M" style to NPT thread.

Connection Description	Qty	Order Code
<b>Flask to Hose</b>		
§ 28/15 Socket to M16x1 Male	1	12187-05
§ 35/25 Socket to M16x1 Male	1	12187-07
§ 35/25 Socket to M24x1 Male	1	12187-10
§ 35/25 Socket to M30x1 Male	1	12187-12
§ 35/25 Socket to M38x1.5 Male	1	12187-14
<b>Hose to Circulator</b>		
M16x1 Male to 3/4 inch NPT Male	1	12187-100
M30x1.5 Male to 3/4 inch NPT Male	1	12187-101
M24x1.5 Male to 3/4 inch NPT Male	1	12187-102


**COMPRESSION FITTING** *Union* ★

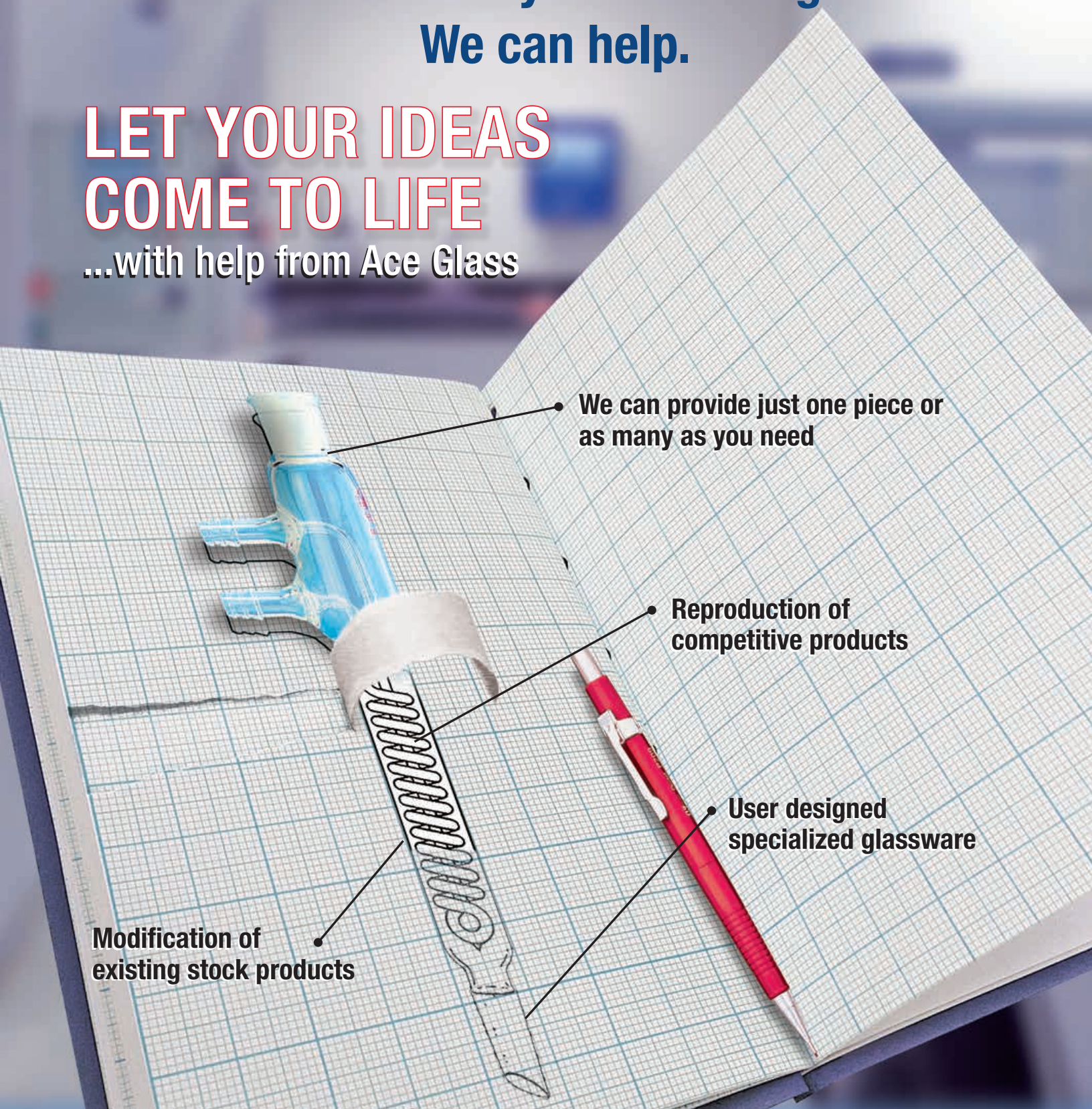
Body and ferrules made of virgin PTFE. The nut and ferrule-gripper is made of PVDF. Performance at ambient room conditions: 120psig for 1/16" fittings linear decreasing to 80psig for 3/4" fittings and 60psig for fittings larger than 3/4". Performance at elevated temperatures up to 85°C/185°F: 90psig for 1/16" fittings linear decreasing to 60psig for 3/4" fittings and 40psig for fittings larger than 3/4".

Tubing O.D.	Qty	Order Code
1/16 in	1	12721-02
1/8 in	1	12721-04
3/16 in	1	12721-06
1/4 in	1	12721-08
5/16 in	1	12721-10
3/8 in	1	12721-12
1/2 in	1	12721-14
5/8 in	1	12721-16
3/4 in	1	12721-18
1 in	1	12721-20
4 mm	1	12721-22
6 mm	1	12721-24
8 mm	1	12721-26
10 mm	1	12721-28
12 mm	1	12721-30

**Don't see what you're looking for?  
We can help.**

# LET YOUR IDEAS COME TO LIFE

...with help from Ace Glass

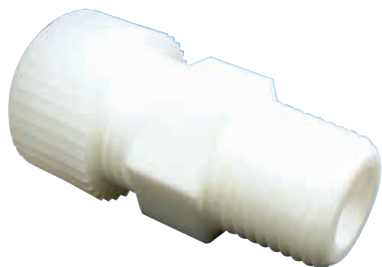


We can provide just one piece or as many as you need

Reproduction of competitive products

User designed specialized glassware

Modification of existing stock products


**COMPRESSION FITTING Tube to NPT** ★

Wetted surfaces use chemically resistant PTFE. Compression-style fitting with gripping ring. Great with vacuum or pressure. Performance at ambient room conditions: 120psig for 1/16" fittings linear decreasing to 80psig for 3/4" fittings, and 60psig for fittings larger than 3/4". Performance at elevated temperatures up to 85°C/185°F: 90psig for 1/16" fittings linear decreasing to 60psig for 3/4" fittings, and 40psig for fittings larger than 3/4".

NPT Size	Tubing O.D.	Qty	Order Code
1/8	1/16	1	12709-02
	1/8	1	12709-04
	3/16	1	12709-06
	1/4	1	12709-08
	5/16	1	12709-10
	4 mm	1	12709-12
	6 mm	1	12709-14
1/4	1/8	1	12709-16
	1/4	1	12709-18
	5/16	1	12709-20
	3/8	1	12709-22
	1/2	1	12709-24
	6 mm	1	12709-26
	8 mm	1	12709-28
3/8	10 mm	1	12709-30
	1/4	1	12709-32
	5/16	1	12709-34
	3/8	1	12709-36
	1/2	1	12709-38
1/2	10 mm	1	12709-40
	12 mm	1	12709-42
	1/4	1	12709-44
	3/8	1	12709-46
3/4	1/2	1	12709-48
	12 mm	1	12709-50
	3/4	1	12709-52
1	1	1	12709-54
	1	1	12709-56


**COMPRESSION REDUCING TUBING UNION** ★

Wetted surfaces use chemically resistant PTFE. Compression-style fitting with gripping ring. Great with vacuum or pressure. Performance at ambient room conditions: 120psig for 1/16" fittings linear decreasing to 80psig for 3/4" fittings, and 60psig for fittings larger than 3/4". Performance at elevated temperatures up to 85°C/185°F: 90psig for 1/16" fittings linear decreasing to 60psig for 3/4" fittings, and 40psig for fittings larger than 3/4".

Tubing O.D., in.	Tubing O.D., in.	Qty	Order Code
3/16		1	12711-02
1/4	1/8	1	12711-04
5/16		1	12711-06
1/4	3/16	1	12711-08
5/16		1	12711-10
3/8	1/4	1	12711-12
1/2		1	12711-14
3/4	1/2	1	12711-16
1		1	12711-18
1	3/4	1	12711-20



**COMPRESSION FITTING Elbow, Tube to NPT ★**

Wetted surfaces use chemically resistant PTFE. Compression-style fitting with gripping ring. Great with vacuum or pressure. Performance at ambient room conditions: 120psig for 1/16" fittings linear decreasing to 80psig for 3/4" fittings, and 60psig for fittings larger than 3/4". Performance at elevated temperatures up to 85°C/185°F: 90psig for 1/16" fittings linear decreasing to 60psig for 3/4" fittings, and 40psig for fittings larger than 3/4".

NPT Size	Tubing O.D., in.	Qty	Order Code
1/8	1/8	1	12715-02
	3/16	1	12715-04
	1/4	1	12715-06
	3/8	1	12715-08
1/4	1/8	1	12715-10
	1/4	1	12715-12
	3/8	1	12715-14
3/8	1/4	1	12715-16
	3/8	1	12715-18
	1/2	1	12715-20
1/2	3/8	1	12715-22
	1/2	1	12715-24
3/4	1	1	12715-26
	3/4	1	12715-28
1	1	1	12715-30



**STOPCOCK VALVE 2-way ★**

Wetted surfaces use chemically resistant PTFE. Compression-style PTFE fitting with PVDF gripping or female NPT. Great with vacuum or pressure (60psig max).

Description	Tubing O.D., in.	Qty	Order Code
Female NPT	1/8	1	5839-60
	1/4	1	5839-64
	3/8	1	5839-68
	1/2	1	5839-72
	3/4	1	5839-76
Tube Compression	1/8	1	5839-62
	1/4	1	5839-66
	3/8	1	5839-70
	1/2	1	5839-74
	3/4	1	5839-78



**Also available upon request:**

- 3-way and 4-way stopcocks
  - Panel mounting
  - Metric tube ends
- Male NPT connections
- Sanitary Connections

**COMPRESSION FITTING Elbow ★**

Wetted surfaces use chemically resistant PTFE. Compression-style fitting with gripping ring. Great with vacuum or pressure. Performance at ambient room conditions: 120psig for 1/16" fittings linear decreasing to 80psig for 3/4" fittings, and 60psig for fittings larger than 3/4". Performance at elevated temperatures up to 85°C/185°F: 90psig for 1/16" fittings linear decreasing to 60psig for 3/4" fittings, and 40psig for fittings larger than 3/4".

Tubing O.D., in.	Qty	Order Code
1/8	1	12716-02
3/16	1	12716-04
1/4	1	12716-08
3/8	1	12716-10
1/2	1	12716-12
3/4	1	12716-14
1	1	12716-16





Right Angle

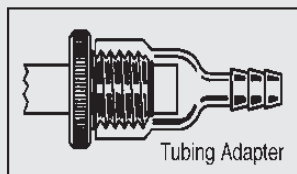


Vertical

Twin  
Right Angle
**TUBE COMPRESSION** *Standard Taper Joint adapter* ♦

These adapters feature a ground glass tube sidearm which allows for the attachment of compression fittings. They offer a versatile connection for adapting flexible or rigid tubing. They may also be used for support of probes or other rigid-body equipment.

Joint Size	Tube O.D., in.	<i>Right Angle</i> Order Code	<i>Vertical</i> Order Code	<i>Twin Right Angle</i> Order Code
<b>w/o Drip Tip</b>				
14/20	1/4	12719-02	12731-02	12737-02
	3/8	12719-04	12731-04	12737-04
24/40	1/4	12719-06	12731-06	12737-06
	3/8	12719-08	12731-08	12737-08
	1/2	12719-10	12731-10	12737-10
	3/4	12719-12	12731-12	12737-12
29/42	1/4	12719-14	12731-14	12737-14
	3/8	12719-16	12731-16	12737-16
	1/2	12719-18	12731-18	12737-18
	3/4	12719-20	12731-20	12737-20
45/50	3/8	12719-22	12731-22	12737-22
	1/2	12719-24	12731-24	12737-24
	3/4	12719-26	12731-26	12737-26
<b>w/Drip Tip</b>				
14/20	1/4	12722-01	12736-01	12739-01
	3/8	12722-03	12736-03	12739-03
24/40	1/4	12722-07	12736-07	12739-07
	3/8	12722-09	12736-09	12739-09
	1/2	12722-11	12736-11	12739-11
	3/4	12722-13	12736-13	12739-13
29/42	1/4	12722-15	12736-15	12739-15
	3/8	12722-17	12736-17	12739-17
	1/2	12722-19	12736-19	12739-19
	3/4	12722-21	12736-21	12739-21
45/50	3/8	12722-23	12736-23	12739-23
	1/2	12722-25	12736-25	12739-25
	3/4	12722-27	12736-27	12739-27


**THREADED TUBING ADAPTER** ♦

Glass Hose Connection Adapter for 14mm Diameter Tubing.

**Note:** Use 7506-06 Nylon Bushing to Attach.

Ace-Thred Size	For Inlet/Outlet Tube O.D., mm	Qty	Order Code
15	14	1	8746-75
25	24	1	8746-78

**TUBE COMPRESSION** *Spherical joint adapters* ♦

These adapters feature a ground glass tube sidearm which allows for the attachment of compression fittings. They offer a versatile connection for adapting flexible or rigid tubing. They may also be used for support of probes or other rigid-body equipment.

Tubing O.D., in.	Joint Type	<i>Right Angle</i> Order Code	<i>Vertical</i> Order Code	<i>Twin Right Angle</i> Order Code
<b>28/15 Joint</b>				
3/8	Socket	12719-28	12731-28	12737-28
	Ball	12719-30	12731-30	12737-30
1/2	Socket	12719-32	12731-32	12737-32
	Ball	12719-34	12731-34	12737-34
3/4	Socket	12719-36	12731-36	12737-36
	Ball	12719-38	12731-38	12737-38
<b>35/25 Joint</b>				
3/8	Socket	12719-40	12731-40	12737-40
	Ball	12719-42	12731-42	12737-42
1/2	Socket	12719-44	12731-44	12737-44
	Ball	12719-46	12731-46	12737-46
3/4	Socket	12719-48	12731-48	12737-48
	Ball	12719-50	12731-50	12737-50
<b>DN25 Joint</b>				
3/8	Socket	12719-52	12731-52	12737-52
	Ball	12719-54	12731-54	12737-54
1/2	Socket	12719-56	12731-56	12737-56
	Ball	12719-58	12731-58	12737-58
3/4	Socket	12719-60	12731-60	12737-60
	Ball	12719-62	12731-62	12737-62
<b>DN40 Joint</b>				
3/8	Socket	12719-64	12731-64	12737-64
	Ball	12719-66	12731-66	12737-66
1/2	Socket	12719-68	12731-68	12737-68
	Ball	12719-70	12731-70	12737-70
3/4	Socket	12719-72	12731-72	12737-72
	Ball	12719-74	12731-74	12737-74


**Right Angle**

**Vertical**

**Twin  
Right Angle**


# Ace-Thred Reference

U.S. Patent #3,695,642

## Reference Guide to Ace-Thred Sizes

Size	Accepts Tube O.D., mm	Use Bushing Number	Use With O-Ring No.	Suggested Uses
#7	6-7	5029-10	7855-704	A, B, I
#11	9-10.5	7506-02	7855-708	D, E, F, G
#15	12.5-14	7506-06	7855-716	C, H
#18	16-17	7506-08	7855-720	H, L
#25	24-25	7506-10	7855-734	K
#36	34-35	7506-12	7855-740	K, L
#50	47-48	7506-14	7855-744	K, L
#80	80	7506-20	7855-782	—

A—Thermometers	E—Thermowells	I—Miniature Electrodes
B—Bleed Tubes	F—Gas Dispersion Tubes	K—Manifolds
C—Electrodes	G—Vacuum Take-Offs	L—Immersion Wells
D—Sensing Probes	H—Inlet and Outlet Tubes	

Ace-Threds with Bushing and O-Ring have proven useful as Adapters in: **Chromatography Equipment, Flasks, Reaction Equipment, Environmental Glassware, Air Sampling Manifolds, Hi-Vacuum Stopcocks, No-Air Glassware, Photochemical Equipment, Freeze Drying Equipment, Joints, and numerous special pieces of equipment.**

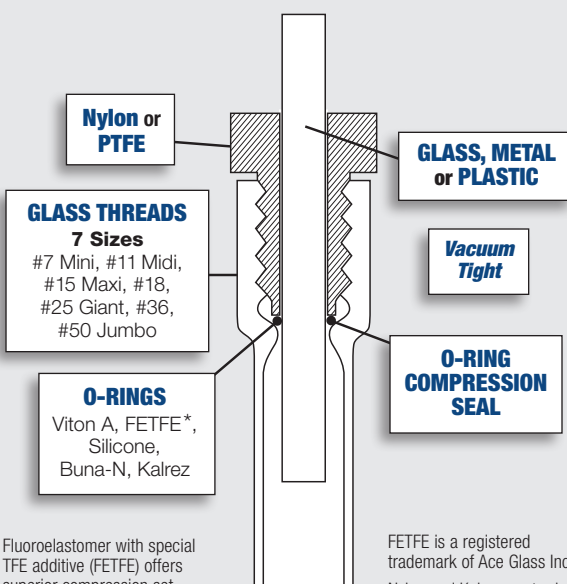
As a general rule, the #7, #11 and #15 threads can attain a vacuum of  $10^{-5}$  or better using the FETFE O-Ring supplied. The #25 thread will attain a vacuum of  $10^{-4}$  or better. The diameter and surface condition of the inner tube or rod inserted in the thread have an influence on the vacuum that can be attained.

The vacuum that can be attained using PTFE ferrules is slightly less than using O-Rings.

**Ace-Threds provide versatile, grease-free, no-clamp connections.**



## Ace-Threds Work



\* Fluoroelastomer with special TFE additive (FETFE) offers superior compression set resistance with built-in lubricity.

FETFE is a registered trademark of Ace Glass Inc. Nylon and Kalrez are trademarks of the E.I. DuPont Company

## BEAKER MUG *Heavy-Wall, Graduated* ★

Graduated beaker coffee mug made from heavy wall borosilicate glass. A great novelty item for your bench. 400mL capacity.

Capacity, mL	Qty	Order Code
400	1	5324-10



## BEAKER *Heavy-Wall, Pilot Plant* ★

Duran

Heavy wall beakers with spout.

Capacity, mL	O.D., mm	Height, mm	Graduated	Qty	Order Code
5,000	182	256	Yes	1	5332-28
10,000	225	340	No	1	5332-33
15,000	260	390	No	1	5332-36
20,000	285	430	No	1	5332-39



## BEAKER *Pilot Plant*

Large size graduated beaker for batch operations and mixing large volumes of measured liquids.

Capacity, mL	O.D., mm	Height, mm	Graduation Div., mL	Qty	Order Code
5,000	152	457	100	1	6228-05 ♦
10,000	223	457	100	1	6228-10 ♦
15,000	260	390	500	1	6231-21 ★
20,000	285	430	500	1	6231-27 ★



## BEAKER *Quartz, Low Form* ★

With pouring spout.

Capacity, mL	O.D., mm	Height, mm	Graduated	Qty	Order Code
50	45	50	No	1	5334-06
100	51	62	No	1	5334-08
250	67	86	No	1	5334-14
400	80	105	No	1	5334-18
500	84	112	No	1	5334-20
600	90	119	No	1	5334-22
1000	107	140	No	1	5334-26




**BEAKER Jacketed, Hose Connections** ♠

Jacketed beaker with one upper and one lower hose connection on opposite sides. Also available with Ace-Safe connections. All are without a pouring spout.

Ace-Safe hose connection models come with Ace-Thred inlet/outlets in place of the serrated fittings for use with an "Ace-Safe" tubing connection barb. Supplied complete with hose connection with O-Ring and nylon bushing.

**Note:** 100mL, 250mL and 400mL have #7 Ace-Thred for 1/4-inch tubing; all others have #15 Ace-Thred for 3/8-inch or 1/2-inch tubing.

Capacity, mL	I.D., mm	Inside Height, mm	Hose Connection, in.	Qty	Order Code
<b>Glass Hose Connections</b>					
100	48	61	3/8 (Size D)	1	5340-03
250	65	89	3/8 (Size D)	1	5340-05
400	75	112	3/8 (Size D)	1	5340-10
600	81	152	3/8 (Size D)	1	5340-15
1000	91	175	3/8 (Size D)	1	5340-18
2000	119	190	7/16 or 1/2 (Size F)	1	5340-20
3000	133	225	7/16 or 1/2 (Size F)	1	5340-25
4000	150	232	7/16 or 1/2 (Size F)	1	5340-30
5000	160	250	7/16 or 1/2 (Size F)	1	5340-35

**Ace-Safe Hose Connections**

100	48	61	#7 for 1/4	1	5340-103
250	65	89	#7 for 1/4	1	5340-105
400	75	112	#7 for 1/4	1	5340-110
600	81	152	#15 for 3/8	1	5340-115
1000	91	175	#15 for 3/8	1	5340-118
2000	119	190	#15 for 3/8	1	5340-120
3000	133	225	#15 for 1/2	1	5340-125
4000	150	232	#15 for 1/2	1	5340-130
5000	160	250	#15 for 1/2	1	5340-135

**Replacement Ace-Safe Connectors**

			#7 for 1/4	1	5853-06
			#15 for 3/8	1	5853-23
			#15 for 1/2	1	5853-26

**BEAKER Big Jars** ★

Cylindrical jars with side indents for easier handling. Made of heavy wall glass, the jars are graduated and have pour spout. Also available with poly safety coating.

**Note:** Do not use with heat, pressure or vacuum applications.



Capacity, L	Graduation Div., mL	Qty	Order Code
7.25	500	1	6233-07
9.25	500	1	6233-09
17	1000	1	6233-17
26.5	2000	1	6233-26
32	2000	1	6233-32

**INSTATHERM BEAKER** *Griffin Low Form* ★

Includes lip and pouring spout with silicone rubber treated glass cloth insulation for use up to 250°C. The bottom is an uncoated, flat bottom suitable for use with magnetic stirrers. Includes controller cord.

**Note:** Do not run dry or above max voltage.

Capacity, mL	I.D., mm	O.D., mm	Height, mm	Volt/Amp, max	Qty	Order Code
50	64	68	90	20/7	1	9605-40
100	72	77	110	40/6	1	9605-42
250	85	90	124	40/8	1	9605-44

**Replacement Connecting Cord**

Instatherm, Twist-Lok, 6ft	1	9698-20
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**BEAKER PTFE** ★

Beakers made from molded virgin PTFE with pour spout. Also available with a stabilized PTFE-Carbon bottom outer surface for even better heat transfer and higher temperature rating to 270°C.

Capacity, mL	O.D., mm	Height, mm	Qty	Order Code
<b>PTFE Bottom</b>				
100	54	68	1	5500-05
250	66	97	1	5500-07
400	80	106	1	5500-09
600	90	125	1	5500-11
1000	100	155	1	5500-13

**Thermotech™ (PTFE-Carbon) Bottom**

100	56	74	1	5500-22
250	75	94	1	5500-24
400	85	112	1	5500-26



**BEAKER Griffin Low Form** ★

Griffin-style polypropylene beakers for general laboratory use. Autoclavable. Combines “no-drip” pouring with unbreakability and maximum translucency. Tapered walls for safe handling and convenient stacking. Lids not included.

Capacity, mL	Package Quantity	Case Quantity	Order Code
50	12	48	12420-06
100	12	48	12420-08
150	12	48	12420-10
250	6	36	12420-12
400	6	36	12420-14
600	4	24	12420-16
1000	3	12	12420-18
2000	1	6	12420-20
4000	1	6	12420-22

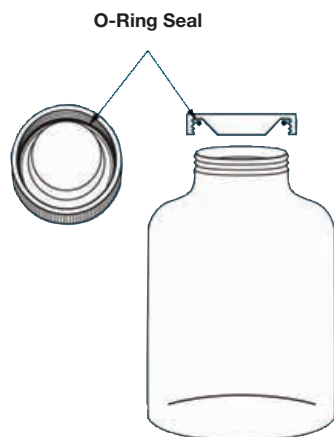


**BEAKER Stainless Steel** ★

Seamless, polished, sanitary, 304 stainless steel, with handy pouring spout.

Capacity, mL	I.D., mm	O.D., mm	Height, mm	Volt/Amp, max	Qty	Order Code
125	55		65		1	10300-04
250	64		84		1	10300-08
600	83		117		1	10300-10
1200	101		154		1	10300-13
2000	122		182		1	10300-16
4000	153		229		1	10300-20




**BOTTLE** *Solution, Threaded Neck* ★

PYREX® brand, borosilicate glass bottle designed for storage of solutions. Bottles have GL120 external thread finish neck with large 106mm (4.2-inch) I.D. opening. The 9.5 liter and 13.25 liter sizes have a conventional bottle shape. The 19 liter and 45.5 liter sizes are similar in design to a carboy. Glass-filled PTFE cap with CAPFE (PTFE encapsulated silicone) O-Ring is available.

**Note:** Cap sold separately.

Capacity, mL	Capacity, Gallons	Approx. Dia., mm	Approx. Height, mm	Qty	Order Code
9.5	2.5	187	460	1	4048-09
13.25	3.5	238	380	1	4048-13
19.0	5	292	480	1	4048-19
45.5	12	406	520	1	4048-45

**Closure**

White PTFE Cap with O-Ring	1	7622-155
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**BOTTLE** *Single Neck* ♠

Made of heavy wall glass, with reinforced  $\text{F}$  outer joint. Stopper not included.

Capacity, mL	Top Outer $\text{F}$ Joint	Qty	Order Code
500	24/40	1	5345-12
1000	24/40	1	5345-16
2000	29/42	1	5345-20
4000	29/42	1	5345-24

**Glass Stoppers**

24/40	1	8250-12
29/42	1	8250-14


**BOTTLE** *Three Neck, Woulff* ♠

Three-neck, made of heavy wall glass with reinforced  $\text{F}$  outer joints. Stoppers not included.

Capacity, mL	Top Outer $\text{F}$ Joints	Qty	Order Code
1000	24/40	1	5365-10

**Glass Stoppers**

24/40	1	8250-12
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**BOTTLE** *Solution, Plastic Coated* ♠

Coated to neck with PVC safety coating to reduce potential breakage and exposure to laboratory personnel when handling hazardous material. Carboy style bottles with sloping shoulders. Necks are tooled for uniform fit with stoppers. Stopper not supplied.

Capacity, L	Capacity, Gallons	Approx. Dia., mm	Approx. Height, mm	Rubber Stopper No.	Qty	Order Code
9.5	2.5	187	476	12	1	5393-06
13.25	3.5	238	438	12	1	5393-07
19	5	292	508	12	1	5393-09



**BOTTLE** *Hose Connection, Plastic Coated*

Solution bottles with glass serrated vacuum take-off fitting for 7/16 inch to 1/2 inch I.D. tubing. All sizes have the sloping shoulders of the carboy style of bottle. Bottles are safety coated up to the vacuum take-off with a translucent plastic coating which will withstand -20°C to 120°C. Do not expose to direct flame.

Ace-Safe bottles have the same stopper top and safety coating, replacing the glass hose connection with a #15 Ace-Thred with a polypropylene hose connection fitting for 3/8 inch ID tubing. Supplied complete with the hose connection, nylon bushing and silicone o-ring.

**Note:** Stopper not supplied.

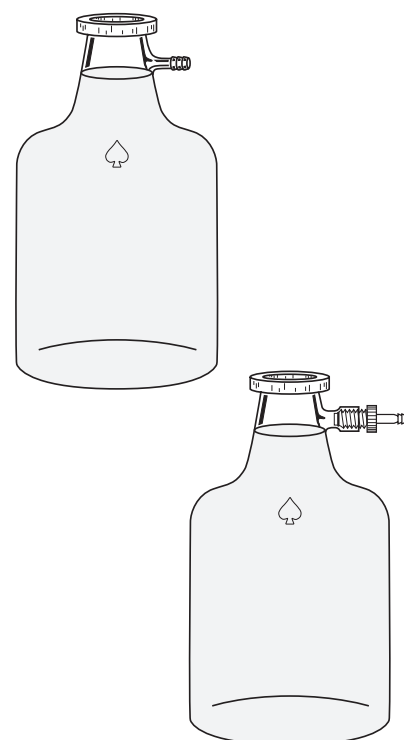
Capacity, L	Approx. Cap., Gal.	Approx. Dia., mm	Approx. Height, mm	Rubber Stopper No.	Hose Connection, in.	Qty	Order Code
<b>Glass Hose Connection</b>							
9.5	2.5	187	476	12	7/16 or 1/2 (Size F)	1	5395-02 ♦
13.25	3.5	238	438	12	7/16 or 1/2 (Size F)	1	5395-04 ♦
19	5	292	508	12	7/16 or 1/2 (Size F)	1	5395-06 ♦

**Ace-Safe Hose Connection**

9.5	2.5	187	476	12	#15 for 3/8	1	5395-103 ♦
13.25	3.5	238	438	12	#15 for 3/8	1	5395-105 ♦
19	5	292	508	12	#15 for 3/8	1	5395-107 ♦

**Replacement Parts and Accessories**

Ace-Safe Connector	#15 for 3/8	1	5853-19 ♦
Silicone Pluro Stopper Set, 18-68mm		1	12014-14 ★



**BOTTLE** *Filtering, w/Removable PP Hose Connection* ★

**Duran**

Heavy wall, bottle shaped, filtering flask with removable polypropylene hose connection. Offered clear or plastic coated.

Capacity, mL	Body O.D., mm	Approx. Height, mm	Neck I.D., mm	Hose Connection, in.	Qty	Order Code
<b>Plain Glass</b>						
3,000	170	295	60	3/8 (Size D)	1	6989-15
5,000	185	360	70	3/8 (Size D)	1	6989-18
10,000	240	420	70	3/8 (Size D)	1	6989-21
15,000	255	500	70	3/8 (Size D)		6989-24
20,000	290	535	70	3/8 (Size D)		6989-27

**Plastic Coated Glass**

3,000	170	295	60	3/8 (Size D)	1	6989-115
5,000	185	360	70	3/8 (Size D)	1	6989-118
10,000	240	420	70	3/8 (Size D)	1	6989-121
15,000	255	500	70	3/8 (Size D)		6989-124
20,000	290	535	70	3/8 (Size D)		6989-127

**Replacement Hose Connector**

Polypropylene	3/8 (Size D)	10	6989-40
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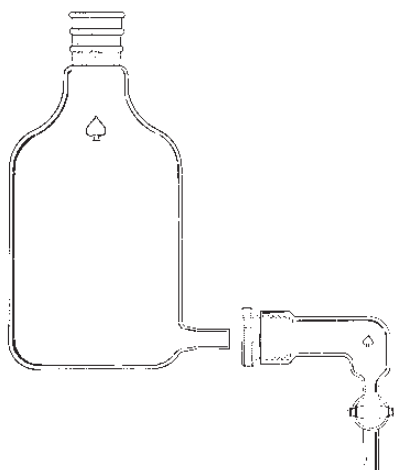


**BOTTLE Aspirator** ♠

Duran

Borosilicate glass, aspirator bottle with bottom hose connection for aspirating liquids off bottom. Use with 7/16-inch or 1/2-inch I.D. tubing, Size F hose connection.

Capacity, mL	Approx. Dia., mm	Approx. Height, mm	Rubber Stopper No.	Hose Connection, in.	Qty	Order Code
250	73	131	2	7/16 or 1/2 (Size F)	10	5399-01
500	89	162	4	7/16 or 1/2 (Size F)	10	5399-05
1000	111	200	6	7/16 or 1/2 (Size F)	1	5399-09

**BOTTLE Dispensing, w/Top Outer Joint** ♠

With 24mm O.D. drain extension near bottom for attaching stopcock shut-off valve. The 9.5 and 13.5 liter sizes are conventional bottle shape; 19 liter is similar in design to a carboy. Neck is  $\text{F}$  45/50 joint rather than a tooled neck for a rubber stopper.

Shutoff Valve has an 8mm bore PTFE plug stopcock with a #25 Ace-Thred at a right angle. Ace-Thred attaches to drain extension via Nylon bushing and FETFE O-Ring.

**Note:** Order each part separately.

Capacity, mL	Approx. Diameter, mm	Approx. Height, mm	Top Neck, $\text{F}$ Joint	Qty	Order Code
<b>Flask only</b>					
9.5	187	476	45/50	1	5400-20
13.25	238	445	45/50	1	5400-27
19	292	508	45/50	1	5400-33

**Shut-off Valve only**

1 5400-40

**Nylon Bushing w/FETFE O-Ring only**

1 7506-10

**Replacement Parts and Accessories**

8mm Bore Glass Stopcock	1	8224-18
Full Length Glass Stopper	1	8250-20

**BOTTLE Carboy, w/Spigot** ♠

Bel-Art

Constructed of polyethylene with polyethylene spigot and screw closure. Quick-action spigot, for easy, positive control, leakproof operation and long life. Suitable for collecting and dispensing distilled water, handling acids. Leakproof closures.

Capacity, L	Qty	Order Code
4	1	12477-02
8	1	12477-04
20	1	12477-06

**RESERVOIR** *Graduated Glass, Reagent* ★

Heavy-wall borosilicate glass bottle with three PTFE valves with Tefzel keys. Pressure-tight PTFE coated Fluoron forms a seal within cap; hence, fluid contact is restricted to glass, PTFE and Tefzel. The three individually controlled valves permit the application of gas under pressure to the bottle for venting, flushing, or delivery of the bottle contents to one or two points. Bottles may be pressurized in isolation or in series with the other bottles. One of the valves may be used to allow corrosive fumes to be vented safely. Rated to 14 psig at ambient; **must be adequately shielded when under pressure**. Each bottle is provided with a three-valve, 1/4"-28UNF cap ideal for use with our 5859 and 5855 tubing connectors. Also available ambered.

Capacity, mL	Netted	Qty	Order Code
<b>Clear Plain Glass, w/Cap</b>			
250	Yes	1	5414-07
500	Yes	1	5414-10
1000	Yes	1	5414-15

**Plastic Coated Glass, w/Cap**

250	No	1	5414-137
500	No	1	5414-139
1000	No	1	5414-141

**Replacement Parts and Accessories**

Cap only, w/valves	1	5414-502
Filter, Sparger, PTFE/Stainless Steel, 10 micron	1	5414-31
Filter, Bottle Bottom, PTFE, 10 micron	1	5414-32
Filter, Bottle Bottom, Polypropylene, 20 micron	1	5414-33
Filtered Check Valve, PTFE, 10 micron	1	5414-34



**BOTTLE** *Specific Gravity* ♠

Conical shape flask for maximum stability. Supplied with non-mercury thermometers for accurate reading. Thermometer has a range of 14°C to 38°C, 0.2°C subdivisions with § 10/18 joint. Thermometer is 25mm immersion.

**Note:** The 50 mL size complies with ASTM Method of Test D 153.

Cap., mL	Approx. Assembled Height, mm	Bottle only		Thermometer only		Complete	
		Qty	Order Code	Qty	Order Code	Qty	Order Code
10	168	1	5415-05	1	5415-06	1	5415-08
50	186	1	5415-12	1	5415-06	1	5415-16

**Replacement Parts and Accessories**

§ 5/12 Cap, only	1	5415-07
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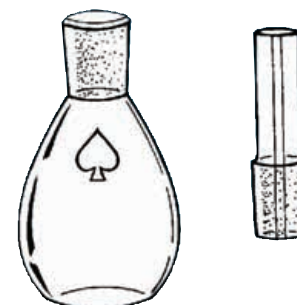


**BOTTLE** *Specific Gravity* ♠

Guy-Lussac type unadjusted for calibration in the laboratory.

**Note:** When adjusted, suitable for ASTM D 369.

Cap., mL	§ Stopper	Bottle only		Stopper only		Complete	
		Qty	Order Code	Qty	Order Code	Qty	Order Code
2	7/12	1	5420-04	1	5420-05	1	5420-06
10	7/18	1	5420-16	1	5420-17	1	5420-18
25	10/18	1	5420-22	1	5420-23	1	5420-24




**BOTTLE** *Specific Gravity, Calibrated* ♠

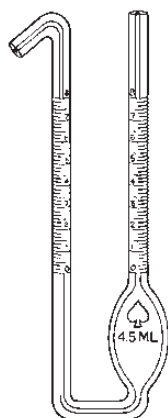
Similar to 5420 except calibrated (2mL — ±0.05mL; 5, 10, & 25mL — ±0.10mL) and engraved. Supplied complete with stopper and bottle.

Capacity, mL	Calibration	Qty	Order Code
2	±0.05mL	1	5425-05
5	±0.10mL	1	5425-10
10	±0.10mL	1	5425-15
25	±0.10mL	1	5425-20


**BOTTLE** *Specific Gravity* ♠

Specific gravity bottle, weld, unadjusted for calibration in the lab. Supplied complete with cap to reduce evaporation losses when using volatile liquids. Stopper is  $\text{N} 10/18$  and cap  $\text{N} 14/20$  outer for both capacities.

Capacity, mL	Qty	Order Code
10	1	5475-05
25	1	5475-10


**PYCNOMETER TUBE** *Specific Gravity* ♠

A method for measurement of light hydrocarbon liquids as per ASTM D 941.

Bulb Capacity, mL	Qty	Order Code
4.5	1	5437-12


**SERUM BOTTLE** ★

**Wheaton**

These borosilicate glass serum bottles meet the requirements of the Pharmacopeia of the United States (USP) for Type I glasses. Repeated sterilization does not affect Type I qualities. Offer maximum protection for delicate injectables and biological materials. With large mouth openings for ease in filling, emptying and cleaning. Fabricated from 33 expansion borosilicate glass.

Bulb Capacity, mL	Mouth I.D., mm	Mouth O.D., mm	Diameter, mm	Height, mm	Qty	Order Code
5	13	20	23	47	288	5530-08
10	13	20	25	54	288	5530-10
20	13	20	32	58	288	5530-12
30	13	20	37	63	288	5530-14
50	13	20	43	73	288	5530-16
60	13	20	41	91	144	5530-18
100	13	20	52	95	144	5530-20
125	13	20	54	107	144	5530-22

**STOPPER Rubber ★**

Rubber pharmaceutical style stopper septa for all serum vials and bottles with 13x20mm opening necks. These are referred to as 20mm stoppers. Made with tight tolerances to fit easily and securely. Rubber formulations include; gray butyl and natural red rubber. Silicone and other compounds are available.

For Mouth I.D. x O.D.	Material	Qty	Order Code
<b>Sleeve Style</b>			
13 x 20	Red Rubber	1000	5531-06
<b>Flange Style</b>			
13 x 20	Red Rubber	1000	5531-23
13 x 20	Gray Butyl	300	5531-47
<b>Slotted Style</b>			
13 x 20	Gray Butyl	1000	5531-33



**SEPTA Silicone/PTFE ★**

Flat, white silicone septa bonded with white PTFE face. Resists coring when punctured via syringe needle. Use with our 5532 series aluminum crimp seals.

O.D., mm	Thickness, mm	Qty	Order Code
19	3	72	12908-60



**SEALS Aluminum ★**

Natural color Aluminum seals for use with any 20mm O.D. flat septa or 5531 flange style stoppers. Aluminum crimp-seals are for serum vials and bottles, headspace vials and any other crimp finish vials. For use with auto or hand crimping tools. Colored or color coded are available on special order as are other sizes. Sold in case of 1000.

For Mouth I.D. x O.D., mm	Liner Style	Qty	Order Code
<b>Center Tears Out</b>			
13 x 20	-	1000	5532-07
13 x 20	PTFE-faced w/natural red rubber	1000	5532-38
<b>Center Tears Completely Off</b>			
13 x 20	-	1000	5532-27
<b>Open Top Center</b>			
13 x 20	-	1000	5532-37



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**CRIMPER** ★

For attaching aluminum seals. Crimper features a new ergonomic design cushioned handle that aids in reducing hand fatigue and provides a higher degree of comfort for the user. Each crimper is labeled for quick identification for seal size. Can be autoclaved.

Seal Size, mm	Qty	Order Code
11	1	5533-03
20	1	5533-05

**DE-CRIMPER** ★

Decapper features a new ergonomic design cushioned handle that aids in reducing hand fatigue and provides a higher degree of comfort for the user. Labeled for quick identification for seal size. The new design removes seals quickly and efficiently. Can be autoclaved.

Seal Size, mm	Qty	Order Code
11	1	5535-03
20	1	5535-07

**DECAPPER** Plier Type ★

Plier type decapper for detaching 11mm and 20mm aluminum seals.

Seal Size, mm	Qty	Order Code
11	1	5534-11
20	1	5534-24

**BOTTLE** Boston Round, Safety Coated, Clear ★

Wheaton

Clear glass bottles, fabricated of soda lime, flint glass, PVC safety coated to reduce potential breakage and exposure to laboratory personnel in handling hazardous materials. Not autoclavable. *Supplied without caps.*

*Note: 80oz is supplied with a jug handle.*

Capacity, oz	Diameter, mm	Height, mm	Screw Cap Size	Qty	Order Code
8	62	140	24-400	6	5546-08
16	79	170	28-400	6	5546-10
32	96	208	33-400	4	5546-12
80*	136	291	38-439C	2	5546-20

**Caps, PTFE Lined**

24-400	6	12489-08
28-400	4	12489-16
33-400	4	12489-18
38-430	4	12489-26

**BOTTLE** Boston Round, Safety Coated, Amber ★

Wheaton

Amber glass bottles to protect light sensitive compounds, fabricated of soda lime, flint glass. PVC safety coated to reduce potential breakage and exposure to laboratory personnel in handling hazardous materials. Not autoclavable. *Supplied without caps.*

Capacity, oz	Diameter, mm	Height, mm	Screw Cap Size	Qty	Order Code
8	62	140	24-400	6	5547-09
16	79	170	28-400	6	5547-11

**Caps, PTFE Lined**

24-400	6	12489-08
28-400	4	12489-16
33-400	4	12489-18
38-430	4	12489-26

**BOTTLE** *Wide Mouth, Safety Coated* ★

**Wheaton**

Clear glass bottles fabricated of soda lime, flint glass. PVC coated to reduce potential breakage and exposure to laboratory personnel in handling hazardous materials. Not autoclavable.

*Note: Supplied without caps.*

Capacity, oz	Diameter, mm	Height, mm	Screw Cap Size	Qty	Order Code
8	75	90	70-400	6	5549-08
16	89	147	70-400	6	5549-16

**Caps, PTFE Lined**

			70-400	4	12489-30
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**CAP** *PTFE Lined* ★

**Wheaton**

Black phenolic plastic screw caps with PTFE liners for use with 5546, 5547 and 5549 bottles.

Fits Bottle Size	Screw Cap Size	Qty	Order Code
4oz	22-400	6	12489-04
8oz	24-400	6	12489-08
16oz	28-400	4	12489-16
32oz	33-400	4	12489-18
1gal	38-430	4	12489-26
wide mouth	70-400	4	12489-30


**BOTTLE** *Borosilicate Glass, w/o Cap* ★

**Wheaton**

Bottles of low-alkali content to prevent changes of pH and maintain the purity of contents. Large opening, special lip and sloping shoulders facilitate pouring and cleaning. Used for distilled water, analytical standards and reagents when fitted with a polyethylene-lined cap, or for the mixing and storage of culture media when fitted with a rubber-lined cap. Also available with PTFE liners that are inert to most chemicals. Rubber and PTFE-lined caps can be autoclaved. Graduated bottles show approximate volumes and have label space for pencil markings. For protection, these bottles are also offered with safety coating. Autoclavable.

*Note: Order caps separately.*

Capacity, mL	O.D., mm	Height, mm	Screw Cap Size	Qty	Order Code
<b>Plain Bottle w/Graduations</b>					
125	55	119	33-430	48	5537-03
250	67	148	33-430	48	5537-05
500	88	188	33-430	24	5537-09
1000	102	221	38-430	24	5537-11

**Safety Coated Bottle w/Graduations**

125	55	119	33-430	48	5537-103
250	67	148	33-430	48	5537-105

**Black Phenolic Plastic Screw Caps**

w/ Polyethylene Liner	33-430	200	12487-53
w/ Polyethylene Liner	38-430	200	12487-54
w/ Rubber Liner	33-430	200	12487-40
w/ Rubber Liner	38-430	200	12487-41
w/ PTFE Liner	33-430	100	12487-64
w/ PTFE Liner	38-430	100	12487-65




**BOTTLE** Laboratory, GL Thread ★

Duran

Chemically resistant and stable laboratory bottles, fabricated from borosilicate glass. Supplied graduated, with or without red PBT cap and removable pouring ring that allows drip-free operation. Cap has PTFE liner. All versions can be autoclaved. None are suitable for vacuum or pressure use.

Plain glass is for use up to 180°C.

Safety Coated available for protection against mechanical damage and to prevent leakage of contents should the glass break. Coated glass is for use up to 135°C.

Ambered available for protection of liquids sensitive to light. Amber glass is for use up to 180°C

**Note:** 25mL size NOT supplied with pouring ring.

Capacity, mL	GL Thread Size	O.D., mm	Height w/Cap, mm	Qty	w/ Red Cap		w/o Cap	
					Order Code	Order Code		
<b>Plain Glass</b>								
25	25	36	74	10	5539-03		5539-49	
25	25	36	74	10	5539-05		5539-50	
50	32	46	91	10	5539-08		5539-52	
100	45	56	105	10	5539-10		5539-54	
250	45	70	143	10	5539-15		5539-56	
500	45	86	181	10	5539-18		5539-58	
1000	45	101	230	10	5539-22		5539-60	
2000	45	136	265	10	5539-25		5539-62	
5000	45	182	335	1	5539-30		5539-64	
10000	45	227	415	1	5539-35		5539-66	
15000	45	268	450	1	5539-41		5539-68	
20000	45	288	510	1	5539-44		5539-70	
<b>Safety Coated Glass</b>								
100	45	56	105	10	5539-105		5539-150	
250	45	70	143	10	5539-115		5539-152	
500	45	86	181	10	5539-118		5539-154	
1000	45	101	230	10	5539-122		5539-156	
2000	45	136	265	10	5539-125		5539-158	
5000	45	182	335	1	5539-130		5539-160	
<b>Ambered Glass</b>								
25	25	36	74	10	5539-205		5539-250	
50	32	46	91	10	5539-208		5539-252	
100	45	56	105	10	5539-210		5539-254	
250	45	70	143	10	5539-215		5539-256	
500	45	86	181	10	5539-218		5539-258	
1000	45	101	230	10	5539-222		5539-260	
5000	45	182	335	1	5539-230		5539-262	
10000	45	227	415	1	5539-235		5539-264	
15000	45	268	450	1	5539-241		5539-266	
20000	45	288	510	1	5539-244		5539-268	
<b>Closures, PTFE Lined</b>					<b>Pouring Ring</b>		<b>Cap</b>	
							10	7622-14
						10	7622-56	10
						10	7622-58	10



**BOTTLE** *Laboratory, Netted, GL Thread* ★

**Duran**

Chemically resistant and stable laboratory bottles, fabricated from borosilicate glass and netted for protection against mechanical damage. Supplied graduated with blue polypropylene cap and removable pouring ring that allows drip-free operation. For use to 140°C. Suitable for vacuum or pressure use (21 psig).



Capacity, mL	GL Thread Size	O.D., mm	Height w/Cap, mm	Qty	Order Code
<i>w/ Blue Cap</i>					
<b>Plain Glass</b>					
250	45	70	143	1	5539-216
500	45	86	181	1	5539-219
1000	45	101	230	1	5539-224
<b>Closures, Polypropylene</b>					
	45			10	7622-06

**BOTTLE** *Storage, Heavy Wall, Epoxy Coated*

Heavy wall glass storage bottles with #15 Ace-Thred are intended only for storage of low-boiling liquids from -20°C to ambient. They are designed to resist internal pressures up to 100psig in the stated temperature range. The low pressure rating is based primarily on the rating for PTFE/T.F.E. When purged with an inert gas before filling, peroxide formation is not progressive as in metal containers. Bottles are safety coated to the neck with a translucent, protective film to help prevent shattering and reduce spills.

Closures are inert PTFE plugs with FETFE O-Rings that will not freeze. Two closure styles available: one with O-Ring positioned at front of the thread (5846); the other with O-Ring at top of thread (5845).

**Note:** Chemraz® O-Rings are available for use with aggressive compounds that would attack FETFE.



Capacity, mL	Tube only	Front Seal	Back Seal
		Complete	Complete
	Order Code	Order Code	Order Code
<b>#15 Ace-Thred</b>			
50	5555-02 ♠	5555-23 ♠	5555-22 ♠
125	5555-03 ♠	5555-25 ♠	5555-24 ♠
250	5555-06 ♠	5555-33 ♠	5555-32 ♠

- **Plastic Coating** is largely UV absorbent (to 380nm)
- Autoclavable in steam, max. 135°C.
- Not suitable for freezing, or for microwave operation.
- Do not use distilled water or vacuum for cooling.

**Replacement Parts and Accessories**

PTFE Plug	5846-48 ♠	5845-47 ♠
FETFE O-Ring	7855-716 ♠	7855-730 ♠
Chemraz O-Ring	7859-516 ★	7859-530 ★

**BOTTLE** *Vacuum/Pressure Resistant, GL Thread* ★

**Duran**

Chemically resistant and stable laboratory bottles, approved for use under vacuum pressures up to 1.5 bar (21psig) at ambient. Supplied bottle only, with blue graduations, without cap or pouring ring. Available clear, amber or plastic coated. Temperature range up to a maximum of 135°C for coated version, 500°C for clear and amber versions.

**Note:** Order caps and pouring rings separately (7622). Temperature ratings for caps vary.

Capacity, mL	GL Thread Size	O.D., mm	Height, mm	Qty	Order Code
<b>Plain Glass</b>					
1000	45	101	230	10	5557-20
<b>Amber Glass</b>					
1000	45	101	230	10	5557-121
<b>Plastic Coated Glass</b>					
1000	45	101	230	10	5557-214




**BOTTLE** *Wide Mouth, GLS 80* ★

Duran

Ideal for pouring, filling, mixing, etc. The wide neck allows the easy use of spoons, spatulas and tweezers. Even large-volume funnels can be inserted into the bottles without difficulty. Supplied with blue polypropylene quick release caps (less than two turns to lock) and pouring ring that are autoclavable up to 140°C. Available clear, amber coated for UV sensitive materials or PVC safety coated.

Capacity, mL	GLS Thread Size	O.D., mm	Height, mm	Qty	Order Code
250	80	95	105	10	5559-03
500	80	101	148	10	5559-05
1000	80	101	218	10	5559-07
5000	80	182	311	1	5559-09
10000	80	227	395	1	5559-20
20000	80	288	483	1	5559-24

**Plain Glass**
**Amber Glass**

250	80	95	105	10	5559-203
500	80	101	148	10	5559-205
1000	80	101	218	10	5559-207
5000	80	182	311	1	5559-209
10000	80	227	395	1	5559-220
20000	80	288	483	1	5559-224

**Plastic Coated Glass**

500	80	101	148	10	5559-300
1000	80	101	218	10	5559-302
5000	80	182	311	1	5559-304
10000	80	227	395	1	5559-306
20000	80	288	483	1	5559-308

**Caps and Pouring Rings**

Polypropylene Cap	80	10	7622-38
Polypropylene Ring	80	10	7622-65


**BOTTLES** *YOUTILITY, Laboratory Bottle System* ★

Duran

Made from 3.3 borosilicate glass. Features a specially shaped gripping zone on both sides of the bottle to permit easier and safer handling. A pre-defined labeling area is compatible with the dedicated self-adhesive bottle labels. Colorful bottle tags can easily and securely be attached around the neck of the bottle for individualized identification. Tags are available in eight different colors; red, orange, yellow, green, blue, purple, black, and white.

**Note:** Comes complete with Cap and Pouring Ring.

Capacity, mL	GLS Thread Size	Graduated	Qty	Order Code
<b>Plain Glass Bottle</b>				
125	45	Yes	4	5563-02
250	45	Yes	4	5563-04
500	45	Yes	4	5563-06
1000	45	Yes	4	5563-08
<b>Amber Glass Bottle</b>				
125	45	Yes	4	5563-22
250	45	Yes	4	5563-24
500	45	Yes	4	5563-26
1000	45	Yes	4	5563-28

**Replacement Parts and Accessories**

Screw Cap, GL45, Polypropylene, Cyan	10	5563-50
Pouring Ring, GL45, Polypropylene, Cyan	20	5563-52
Bottle Tag, Silicone, 2 each color	16	5563-54
Bottle Labels, Self Adhesive Polyester, White (200/Bottle & 200/Cap)	200	5563-56

**CAP & POURING RING *GL Thread* ★**
**Duran**

Screw caps and pouring rings for use with GL threads. Red caps have PTFE liner, all others are with lip seal. For 5539, 5557, 5559, and 5560 bottles.

**CAPS**

For Thread Size	Lined	Color	Temperature Range, °C	O.D., mm	Height, mm	Qty	Order Code
<b>Polypropylene</b>							
25	–	Blue	-40 to +140	33	19	10	7622-02
32	–	Blue	-40 to +140	40	24	10	7622-04
45	–	Blue	-40 to +140	54	26	10	7622-06
45	–	Yellow	-40 to +140	54	26	10	7622-32
45	–	Green	-40 to +140	54	26	10	7622-35
45	–	Grey	-40 to +140	54	26	10	7622-37
80	–	Blue	-40 to +140	86	40	10	7622-38

**Polybutylene Teraphthalate (PBT)**

14	PTFE	Red	-45 to +180			1	7622-103
18	PTFE	Red	-45 to +180			1	7622-107
25	PTFE	Red	-45 to +180	33	19	10	7622-14
25	PTFE	Red	-45 to +180	33	19	1	7622-114
32	PTFE	Red	-45 to +180	40	24	10	7622-21
32	PTFE	Red	-45 to +180	40	24	1	7622-121
45	PTFE	Red	-45 to +180	54	26	10	7622-24
45	PTFE	Red	-45 to +180	54	26	1	7622-124

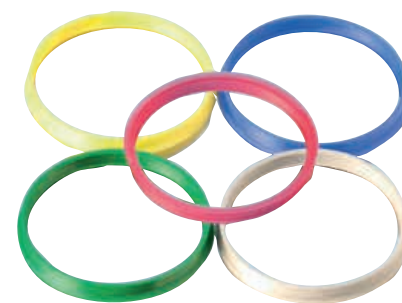
**POURING RINGS**

For Thread Size	Color	Temperature Range, °C	O.D., mm	Height, mm	Qty	Order Code
<b>Polypropylene</b>						
32	Blue	-40 to +140	40	4	10	7622-52
45	Blue	-40 to +140	54	4	10	7622-54
45	Green	-40 to +140	54	4	10	7622-60
45	Yellow	-40 to +140	54	4	10	7622-62
45	Grey	-40 to +140	54	4	10	7622-64
80	Blue	-40 to +140	86	7	10	7622-65

**Polybutylene Teraphthalate (PBT)**

32	Red	-45 to +180	33	4	10	7622-56
45	Red	-45 to +180	33	4	10	7622-58

**Color-Coded Caps and Pouring Rings**

**Caps**

**Pouring Rings**
**CAP & POURING RING *Premium, GL45 Thread* ★**
**Duran**

This premium cap is designed for GL45 thread Duran bottles. It is made of colorless, TPCh260 resin so that there are no leachables. High chemical resistance and leak tight due to a PTFE coated silicone seal. Meets USP standards. Autoclavable. Retrace code.

Description	GL Thread Size	Temperature Range, °C	O.D., mm	Height, mm	Qty	Order Code
Cap	45	-196 to +260	51	26	5	7627-02
Pour Ring	45	-196 to +260	51	4	5	7627-03


**CAP & POURING RING *Wide Mouth, GL80 Thread* ★**
**Duran**

Quick-release closure for new GL80 thread, wide-mouth bottles. Made of white polyarylsulphone 1 resin, which gives high thermal, mechanical and chemical compatibility. Inner-seal is coated both sides with PTFE. Pouring ring also available in PSU.

Description	GL Thread Size	Temperature Max, °C	O.D., mm	Height, mm	Qty	Order Code
Cap	80	180	86	40	5	7628-03
Pour Ring	80	180	86	6.85	5	7628-04




**CAP GL80 Connection System** ★

Duran

The heart of the GL80 connection system is a GL80 polypropylene cap with 4, GL18 threaded ports. Modular accessories include polypropylene tube connection caps, GL18 solid polybutylene terephthalate (PBT) caps, GL18 PBT pressure equalization caps and PTFE cap inserts to accommodate various sizes of tubing. A typical application is the safe transfer of liquid media within a closed and sterile system for which you'd need (1) two-pack code -01 GL80 cap, (2) -04 equalization caps, and some combination of solid caps and tubing connections with inserts.

For Thread Size	Description	Qty	Order Code
<b>Cap</b>			
80	4-Port (GL18) Polypropylene Cap	2	7631-01
<b>Cap Accessories</b>			
	GL18 Polypropylene Tube Connection	2	7631-02
	Solid GL18 PBT Cap	2	7631-03
	GL18 PBT Cap with Pressure Equalizing Valve	1	7631-04
	3.2mm I.D. PTFE Cap Insert	1	7631-10
	6.0mm I.D. PTFE Cap Insert	1	7631-11
	8.0mm I.D. PTFE Cap Insert	1	7631-12
	10.0mm I.D. PTFE Cap Insert	1	7631-13
	12.0mm I.D. PTFE Cap Insert	1	7631-14


**CAP GL45 Connection System** ★

Duran

The heart of the GL45 connection system is a GL45 polypropylene cap with GL18 threaded ports. Modular accessories include polypropylene tube connection caps, GL18 solid polybutylene terephthalate (PBT) caps, GL18 PBT pressure equalization caps and PTFE cap inserts to accommodate various sizes of tubing. A typical application is the safe transfer of liquid media within a closed and sterile system for which you'd need (1) two-pack GL45 cap, (2) -07 equalization caps, and some combination of solid caps and tubing connections with inserts.

For Thread Size	Description	Qty	Order Code
<b>Cap</b>			
45	2-Port (GL14) Polypropylene Cap	2	7632-01
45	3-Port (GL14) Polypropylene Cap	2	7632-02
<b>Cap Accessories</b>			
	GL14 Polypropylene Tube Connection	2	7632-05
	Solid GL18 PBT Cap	2	7632-06
	GL14 PBT Cap with Pressure Equalizing Valve	1	7632-07
	Extra Pressure Membranes for 7632-07	2	7632-08
	1.6mm I.D. PTFE Cap Insert	1	7632-10
	3.0mm I.D. PTFE Cap Insert	1	7632-11
	3.2mm I.D. PTFE Cap Insert	1	7632-12
	6.6mm I.D. PTFE Cap Insert	1	7632-13


**CAP GL45, NPT Tapped** ★

GL45 cap with an NPT tap designed to accept various male NPT adapters found, for instance, in Ace compression tube fittings product families 12707, 12708, 12709, 12710 & 12770 or standard taper joint adapters in family 12866. Caps are available in polypropylene or PTFE. Contact Ace for larger NPT sizes.

For Thread Size	Material	NPT Tap Size, in	Qty	Order Code
45	Polypropylene	1/8	1	12703-11
45	Polypropylene	1/4	1	12703-12
45	Polypropylene	3/8	1	12703-13
45	Polypropylene	1/2	1	12703-14
45	PTFE	1/8	1	12703-21
45	PTFE	1/4	1	12703-22
45	PTFE	3/8	1	12703-23
45	PTFE	1/2	1	12703-24

**CAP** *Open-top, PTFE Membrane, GL Thread* ★

Polypropylene GL threaded cap with center hole and welded-in PTFE membrane. Membrane is 0.2µm PTFE gas permeable, not liquid permeable for pressure equalization. Autoclavable. Great for media sterilization and storage. For use on 5539, 5557, 5559 and 5560 bottles.

**Duran**


For Thread Size	Material	Temperature Range, °C	O.D., mm	Height, mm	Qty	Order Code
25	Polypropylene	-40 to +140	33	19	5	7629-25
32	Polypropylene	-40 to +140	41	24	5	7629-32
45	Polypropylene	-40 to +140	54	25	2	7629-45
80	Polypropylene	-40 to +140	86	40	2	7629-80

**BOTTLE** *Laboratory, Square, GL Thread* ★

Chemically resistant square bottles, fabricated from borosilicate glass. Graduated with polypropylene blue cap and removable pouring ring that allows drip-free operation. For use up to 140°C. Can be hot air sterilized.

**Duran**


**Note:** Not suitable for vacuum or pressure use.

Capacity, mL	GLS Thread Size	O.D., mm	Height w/Cap, mm	Qty	Order Code
100	32	50	109	10	5560-10
250	45	64	143	10	5560-15
500	45	78	181	10	5560-20
1000	45	94	222	10	5560-25

**Caps and Pouring Rings**

Polypropylene Cap	32			10	7622-04
Polypropylene Ring	32			10	7622-52
Polypropylene Cap	45			10	7622-06
Polypropylene Ring	45			10	7622-54

**BOTTLE** *HDPE Rectangular* ★

Rectangular shape wide mouth bottles take less shelf space. Sturdy, heavy-wall construction for laboratory use and drug storage. Made of high-density polyethylene with leakproof screw closures. Well suited for shipping and storing both liquids and dry materials.

Capacity, mL	Screw Cap Size	Package Quantity	Case Quantity	Order Code
120	38	12	72	12431-05
500	43	12	48	12431-11
1000	53	6	24	12431-15


**WASH BOTTLE** *Economy* ★

Wash bottle with a top-angled spout at a money-saving price. Bottle, tubing and tip are made of polyethylene with polyallomer cap and nozzle. Molded tip dispenses uniform stream, can be cut back to increase flow.

**Bel-Art**

Capacity, mL	Package Quantity	Case Quantity	Order Code
125	12	48	12461-07
250	12	36	12461-09
500	6	24	12461-11
1000	6	12	12461-13

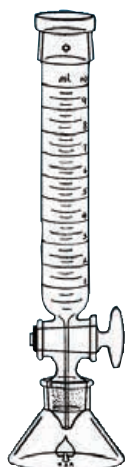

**WASH BOTTLE** *Safety Labeled* ★

Guaranteed leakproof wide mouth wash bottles made of flexible, impact-resistant polyethylene with color-coded polyallomer closure and spout. Standard "diamond alert" symbols indicate what type hazard the contents may present.

**Bel-Art**

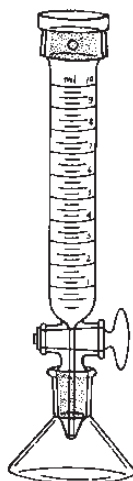
Chemical	Capacity, mL	Package Quantity	Case Quantity	Order Code
Acetone	500	6	12	12464-02
Ethanol	500	6	12	12464-06
Methanol	500	6	12	12464-10
Isopropanol	500	6	12	12464-14
Toluene	500	6	12	12464-16
Water	500	6	12	12464-18




**BURET Weighing ♠**

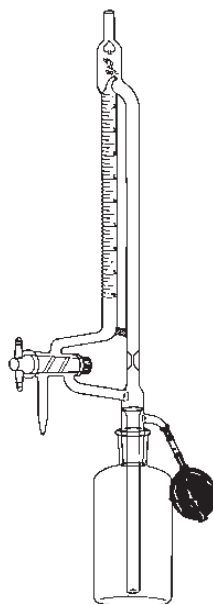
Smith type buret for dispensing precise quantities of liquids. The wide base adds stability when placed on a balance pan. The overall height has been reduced to a minimum so it can be used on single pan balances. Complete apparatus consists of a flask, buret and cap stopper.

Capacity, mL	⌘ Joint	Qty	Order Code
<b>Complete</b>			
10		1	5625-08
<b>Flask only</b>			
10	12/10 outer	1	5625-05
<b>Buret only</b>			
10	12/10 lower	1	5625-06
<b>Cap Stopper only</b>			
	19/10	1	5625-07


**BURET Weighing ♠**

Smith type buret for dispensing precise quantities of liquids. The wide base on the flask enables the operator to place the entire unit on the balance pan.

Capacity, mL	⌘ Joint	Qty	Order Code
<b>Complete</b>			
10		1	9176-02
<b>Flask only</b>			
10	14/20 outer	1	9176-05
<b>Buret only</b>			
10	14/20 lower	1	9176-03
30	14/20 lower		9176-06
<b>Cap Stopper only</b>			
		1	9176-07


**BURET Automatic, 1:5 PTFE Plug**

Simplified design provides greater strength, resulting in longer service life, easier repair in the event of breakage and elimination of hold-up in the immersed tube. Supplied complete with pressure bulb, polyethylene release tube and reservoir bottle.

Capacity, mL	⌘ Joint	Subdivisions, mL	Qty	Order Code
<b>Complete</b>				
10	24/40	1/20	1	5735-40 ★
25	24/40	1/10	1	5735-44 ★
50	29/42	1/10	1	5735-46 ★
<b>Bottle only</b>				
1000	24/40		1	5345-16 ♠
1000	24/40		1	5345-16 ♠
2000	29/42		1	5345-20 ♠
<b>Buret only</b>				
10	24/40	1/20	1	5735-11 ★
25	24/40	1/10	1	5735-16 ★
50	29/42	1/10	1	5735-21 ★
<b>Pressure Bulb and Release Tube only</b>				
			1	5747-10 ♠
<b>Stopcock Plug only</b>				
			1	5735-98 ★

**BURET Both Ends Open** ♠

Graduated straight-through buret, open at top and bottom. Top is beaded, bottom is fire polished. Used in fabrication of apparatus requiring graduation.

Capacity, mL	Scale Length, mm	Overall Length, mm	Subdivisions, mL	Qty	Order Code
25	322	425	1/10	1	5758-04
100	500-600	600-700	1/5	1	5758-08
250	310-350	410-450	1	1	5758-10



**BURET Measuring, w/blunt** ♠

Laboratory grade, with blunt, 7.5-8mm O.D. tip.

Capacity, mL	Tip O.D., mm	Subdivisions, mL	Qty	Order Code
10	7.5-8	1/20	1	5760-10
50	7.5-8	1/10	1	5760-20



**BURET Dispensing, w/Hose Barb** ♠

Laboratory grade. Size E hose barb for connecting to 3/8-inch or 7/16-inch tubing at bottom.

Capacity, mL	Scale Length, mm	Overall Length, mm	Subdivisions, mL	Qty	Order Code
500	400	600	5	1	5771-35
1000	530	705	10	1	5771-40



**CLONING CYLINDER** ♠

Clone a single cell or group of cells by surrounding them with this glass cylinder. Dip the end of the cylinder into a sterile silicone grease before pressing to the bottom of a culture flask to create an isolated well.

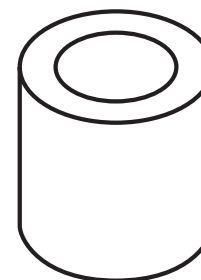
Cylinders for use in the Disinfectant Procedure as described in the 1992 J.A.O.A.C. *Hard Surface Carrier Test for Efficacy Testing of Disinfectants: Collaborative Study*. Tubes are glazed on both ends.

O.D., mm	Height, mm	Qty	Order Code
6	8	125	3865-06
8	8	125	3865-08
10	10	125	3865-10

**Cloning**

**Disinfectant Testing**

8	8	125	3865-52
10	10	125	3865-55




**FILLING BELL** Aseptic ♠

For aseptic filling of vessels. Rubber tubing is attached to the top hose connection, the receiving vessel is placed inside the bell.

For Use With	I.D., mm	Height, mm	Hose O.D., mm	Hose Connection, in.	Qty	Order Code
Tubes	22	75	11.0	3/8 (Size D)	2	<b>3868-02</b>
Tubes	41	95	11.0	3/8 (Size D)	2	<b>3868-04</b>
Bottles	49	95	11.0	3/8 (Size D)	2	<b>3868-05</b>
Bottles	70	130	11.0	3/8 (Size D)	2	<b>3868-07</b>
Bottles	104	140	12.7	7/16 or 1/2 (Size F)	2	<b>3868-10</b>


**FLASK** Culture, Fernbach, Triple Baffled, Beaded Neck ♠

Wide mouth flask designed for culturing organisms requiring a large surface-area-to-volume ratio. Triple baffles on the bottom edges to achieve maximal oxygen transfer to culture medium. Beaded neck is 63mm I.D. and accepts cotton plugs or rubber stoppers. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck I.D., mm	O.D., mm	Height, mm	Use Stopper Size	Qty	Order Code
1800	63	200	157	#10	3	<b>3874-18</b>
2800	63	205	225	#13	3	<b>3874-30</b>


**FLASK** Culture, Fernbach, Baffled, Plain Neck ♠

With a long-style 38mm neck for plastic or Stainless Steel closures. Triple baffles are located at the center of the bottom to achieve maximal oxygen transfer to culture medium. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Qty	Order Code
1800	38	200	157	3	<b>3874-18</b>
2800	38	205	225	3	<b>3874-30</b>

**Closures**

Stainless Steel	1	<b>3918-55</b>
Polypropylene	1	<b>3917-03</b>


**FLASK** Culture, Fernbach, Baffled, Screw Cap ♠

Wide mouth flask designed for culturing organisms requiring a large surface-area-to-volume ratio. Triple baffles on the bottom outside edges to achieve maximal oxygen transfer to culture medium. Supplied with GL45 polypropylene cap. **Caution: Do not place on direct heat source.**

Capacity, mL	Closure Size	O.D., mm	Height, mm	Qty	Order Code
1800	GL45	200	157	1	<b>3877-30</b>
2800	GL45	205	225	1	<b>3877-45</b>



**FLASK Culture, Fernbach, 38mm Neck ♠**

Designed for culturing organisms requiring a large surface-to-volume ratio. With long 38 mm neck that takes Stainless Steel or plastic closures. Without baffles. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Qty	Order Code
1800	38	200	157	3	3879-18
2800	38	205	225	3	3879-30
4000	38	205	400	1	3879-34


**FLASK Shaker, Three Side Baffles ♠**

Long-style neck with three side baffles to enhance gas transfer when used with rotary or reciprocating shakers. Long neck reduces splashing and is designed for polypropylene closures. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Qty	Order Code
50	18	60	105	12	3883-03
125	25	67	140	12	3883-05
250	38	80	160	12	3883-07
300	38	88	170	12	3883-09
500	38	100	205	12	3883-11
1000	38	130	240	6	3883-13
2000	38	160	295	3	3883-15


**FLASK Shaker ♠**

With long-style neck for use with plastic closures. Ideal for growing, storing and mixing of aerobic and anaerobic cultures. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Qty	Order Code
25	18	40	90	24	3884-05
50	18	50	100	24	3884-10
125	25	70	140	12	3884-15
250	38	85	155	12	3884-19
300	38	90	165	12	3884-23
500	38	100	200	12	3884-26
1000	38	130	240	6	3884-30
2000	38	160	300	3	3884-34
4000	38	205	370	3	3884-37
6000	38	237	410	3	3884-40


**FLASK Shaker, Three Deep Baffles ♠**

Long-style neck with three extra deep baffles to enhance gas transfer when used with rotary or reciprocating shakers. Long neck reduces splashing and is designed for polypropylene closures. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Qty	Order Code
50	18	50	100	12	3887-05
125	25	67	140	12	3887-07
250	38	80	160	12	3887-09
300	38	88	170	12	3887-11
500	38	100	200	12	3887-13
1000	38	130	240	6	3887-17
2000	38	160	300	3	3887-19
3000	38	185	327	3	3887-22
4000	38	207	370	3	3887-24




**FLASK Shaker, Baffled, Beaded Neck ♠**

Used for converting homogenous tissue samples into cell suspensions by digestion of connective tissues. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84). Cannot use indented closure.

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Use Stopper Size	Qty	Order Code
125	30	67	105	#5	12	3889-14
250	35	80	130	#6	12	3889-18
500	40	100	170	#6	12	3889-22
1000	50	130	215	#7	6	3889-24
2000	55	160	285	#8	3	3889-29


**FLASK Shaker, Deep Baffles, Beaded Neck ♠**

Used for converting homogenous tissue samples into cell suspensions by digestion of connective tissues. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84). Cannot use indented closure.

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Use Stopper Size	Qty	Order Code
250	35	85	130	#6	12	3890-04
300	35	90	140	#6	12	3890-06
500	40	100	170	#6	12	3890-09
1000	50	130	215	#7	6	3890-13
2000	55	160	285	#8	3	3890-18


**FLASK Shaker, Three Side and Three Bottom Baffles ♠**

Similar to 3887, except these long-style neck flasks have three extra-deep baffles on side and bottom to enhance gas transfer when used with rotary or reciprocating shakers. Long neck reduces splashing and is designed for polypropylene closures. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Qty	Order Code
250	38	80	160	12	3891-06
500	38	100	200	12	3891-11
1000	38	128	240	6	3891-14
2000	38	158	300	3	3891-20
3000	38	184	327	3	3891-25
4000	38	205	370	3	3891-29


**FLASK Shaker, Bulb Neck, Four Bottom Baffles ♠**

With four bottom baffles. Long-style 38mm neck. Used for converting homogenous tissue samples into cell suspensions by digestion of connective tissues. With constricted neck to reduce spillage and foaming. **Caution: Do not place on direct heat source.**

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	O.D., mm	Height, mm	Qty	Order Code
250	38	81	160	12	3893-07
500	38	100	200	12	3893-12
1000	38	128	240	6	3893-16

**FLASK** *Biometer, w/Stopcock* ★

Use to measure production of carbon dioxide produced by microorganisms grown on a variety of culture media over long periods of time. Minimizes the need for commonly used gas trains. Also useful in Bioremediation studies.

Supplied complete with #6 rubber stopper in the flask neck, #7 rubber stopper in the side tube, and 16-gauge needle. Delivery funnel has a GPI 15-415 PTFE-lined screw cap and 1/2" 12/30 stopcock plug with 2mm bore.

Capacity, mL	Qty	Order Code
<b>Complete</b>		
250	1	3894-40
<b>Replacement Phenolic Cap w/PTFE liner</b>		
	288	4240-11



**FLASK** *Media Storage and Dispensing, Bottom Hose* ♠

Used for sterile dispensing; use with an aseptic filling bell. Bottom 1/2-inch hose connection assures aseptic drainage. With beaded rim.

**Note:** Closure NOT included (Page 84). Cannot use indented closure.

Capacity, mL	Stopper Size	O.D., mm	Height, mm	Hose Connection, in	Qty	Order Code
250	#6	80	130	1/2	6	3906-03
500	#6	101	183	1/2	6	3906-05
1000	#9	128	225	1/2	6	3906-07
2000	#9	158	290	1/2	3	3906-09
4000	#10	205	355	1/2	3	3906-11
6000	#11	235	395	1/2	2	3906-13



**FLASK** *Nephelo Culture* ♠

Long-style neck accommodates a 25mm Stainless Steel or plastic closure. Ideal for growing, and mixing of aerobic and anaerobic cultures. Side arm fits standard spectrophotometers.

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	Sidearm O.D., mm	Sidearm Length, mm	Qty	Order Code
125	25	14	130	4	3908-20
300	25	14	130	4	3908-24



**FLASK** *Nephelo Culture, Triple Baffled* ♠

Long-style neck accommodates a 25mm Stainless Steel or plastic closure. Ideal for growing, storing and mixing of aerobic and anaerobic cultures. Has standard cuvette size side arm.

**Note:** Closure NOT included (Page 84).

Capacity, mL	Neck O.D., mm	Sidearm O.D., mm	Sidearm Length, mm	Qty	Order Code
300	25	12	130	4	3912-03
300	25	14	130	4	3912-05
300	25	19	130	4	3912-07




**FLASK** *Nephelo Culture, Triple Baffled, w/Screw Cap* ♦

Threaded neck with clean out port and depressed sidearm. Ideal for growing, storing and mixing of aerobic and anaerobic cultures. Supplied with GPI 38-415 and GPI 18-415 nontoxic, rubber-lined phenolic screw caps.

Capacity, mL	Sidearm O.D., mm	Sidearm Length, mm	Qty	Order Code
300	14	130	4	<b>3914-07</b>
500	14	130	4	<b>3914-11</b>
300	19	130	4	<b>3914-19</b>
500	19	130	4	<b>3914-24</b>

**CLOSURES** *Stainless Steel* ★

Closures for use with long-style necks on culture flasks. Autoclavable.



For Neck Size, mm	<i>with Indents</i>		<i>without Indents</i>	
	Qty	Order Code	Qty	Order Code
13	144	<b>3918-50</b>	144	<b>3918-56</b>
16	144	<b>3918-51</b>	144	<b>3918-57</b>
18	144	<b>3918-52</b>	144	<b>3918-58</b>
20	144	<b>3918-53</b>	144	<b>3918-59</b>
25	72	<b>3918-54</b>	72	<b>3918-61</b>
38	36	<b>3918-55</b>		

**BEADS** *Solid Borosilicate Glass* ★

PYREX® brand solid glass beads. Useful as packing for distillation columns, mixing beads and boiling stones. Packaged in 0.45 kg. (1 lb.) boxes, with a packing volume of approximately 360 cm<sup>3</sup>.



O.D., mm	Avg. Count Per Pound	Pkg. Qty	Case Qty	Order Code
3	13,600	1	4	<b>8035-03</b>
4	5,700	1	4	<b>8035-05</b>
5	3,000	1	4	<b>8035-07</b>
6	1,700	1	4	<b>8035-09</b>

**CLOSURES** *Polypropylene* ★

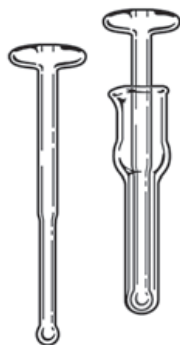
Polypropylene closures for culture tubes and rimless, straight neck flasks. Two position closures: open for gas exchange or closed for humidified environment. An internal drip ring minimizes contamination. Autoclavable at 121°C.



For Neck O.D., mm	Pkg. Qty	Case Qty	Order Code
<b>Orange</b>			
25	50	100	<b>3917-01</b>
38	50	100	<b>3917-03</b>
<b>Clear</b>			
16	50	100	<b>3917-05</b>
18	50	100	<b>3917-07</b>

**TISSUE HOMOGENIZER** *Dounce, Two Glass Pestles* ★

Supplied with two pestles, one "loose" and one "tight," to ensure dissociation of cells into fine particles with minimal damage to cell nuclei. Use the large-clearance pestle for initial reduction of soft tissue. Complete the homogenization with the small-clearance pestle. Particularly useful in enzyme studies where heat build-up must be avoided.



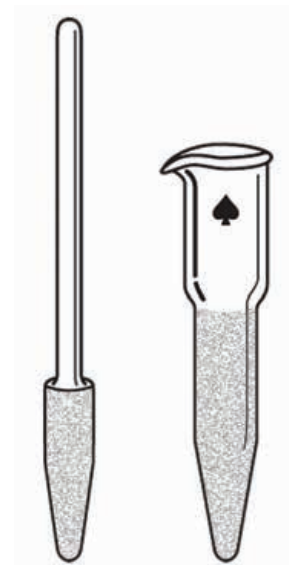
Capacity, mL	Overall Length, mm	Body O.D., mm	Body Length, mm	Qty	Order Code
1	125	11	48	2	<b>8343-01</b>
7	175	13	82	2	<b>8343-07</b>
15	210	22	94	2	<b>8343-15</b>
40	285	32	140	2	<b>8343-40</b>

## TISSUE HOMOGENIZER *Tapered, Glass, Interchangeable* ♠

Highly efficient, all glass, tapered tissue grinder combining two grinding surfaces on a single pestle and tube. The conical area is for initial grinding and the cylindrical area for final homogenization. Interchangeably ground to 0.1–0.15mm clearance. With pouring lip. The 10mm rod may be used with the 8124-10 “Flex-Grip” chuck. The 6mm rod is for use with the 8124-05 chuck.

**Note:** Capacities represent volumes with pestle inserted.

Capacity, mL	Rod Length, mm	Qty	Order Code
<b>Complete</b>			
2	6	1	8325-08
15	10	1	8325-20
30	10	1	8325-26
50	10	1	8325-32
<b>Tube only</b>			
2	6	1	8325-04
15	10	1	8325-16
30	10	1	8325-22
50	10	1	8325-28
<b>Pestle only</b>			
2	6	1	8325-06
15	10	1	8325-18
30	10	1	8325-24
50	10	1	8325-30



## TISSUE HOMOGENIZER *Potter-Elvehjem, PTFE Pestle* ★

Homogenization occurs as the sample and buffer are forced through the cylindrical portion of the mortar as the pestle is rotated downward. Mortar is unground and the pestle contact surface is PTFE, threaded onto a stainless steel shaft.

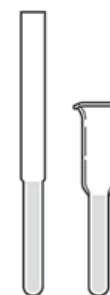
Capacity, mL	Overall Length, mm	Body O.D., mm	Body Length, mm	Qty	Order Code
2	203	11	45	2	8355-02
5	219	13	66	2	8355-05
10	219	16	74	2	8355-10
15	219	19	85	2	8355-15
30	266	24	118	2	8355-30
55	266	30	130	2	8355-55



## TISSUE HOMOGENIZER *Potter-Elvehjem, Micro* ★

Micro size for extremely precise work. This unit is designed for delicate hand operation. A reservoir and pouring lip are incorporated into the design. All glass mortar and pestle.

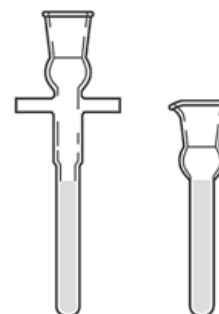
Capacity, mL	Overall Length, mm	Body O.D., mm	Body Length, mm	Qty	Order Code
0.1	110	4	65	2	8357-03



## TISSUE HOMOGENIZER *Tenbroeck, All-Glass* ★

All-glass Tenbroeck tissue grinders come with precision-made, interchangeable pestles and tubes. The hollow handle permits packing with ice. This unit also features an expanded reservoir and pouring lip. Designed for tissues such as liver, intestines and heart.

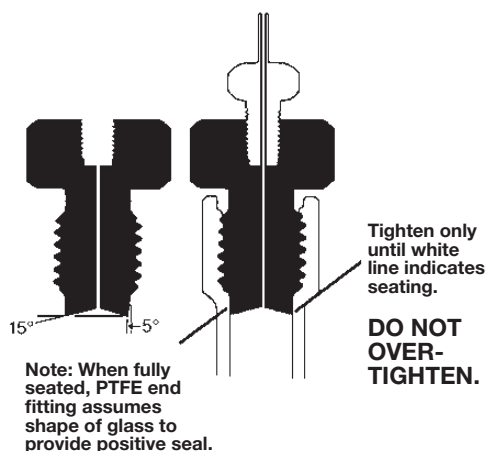
Capacity, mL	Overall Length, mm	Body O.D., mm	Body Length, mm	Qty	Order Code
1	140	11	48	2	8358-02
2	140	11	50	2	8358-05
7	190	16	82	2	8358-10
15	250	22	94	2	8358-15
40	320	32	140	2	8358-30



We offer a complete line of liquid chromatography columns, fittings and related components featuring *Ace-Threds: the easy-to-assemble, internally threaded glass that uses Nylon® or PTFE fittings.*

- Michel-Miller High Performance Low Pressure System operates up to 300psig without O-Rings.
- Adjusta-Chrom®, a recycling column, uses Ace-Threds for easy adjustment of bed volumes.
- Ion-Exchange columns for precious metals recovery.
- System II is supplied with Ace-Threds and uses O-Rings to make a leak-tight seal.
- General columns, plain or with joints, with or without stopcocks, are also offered.

## Three Different Leak-tight Seals



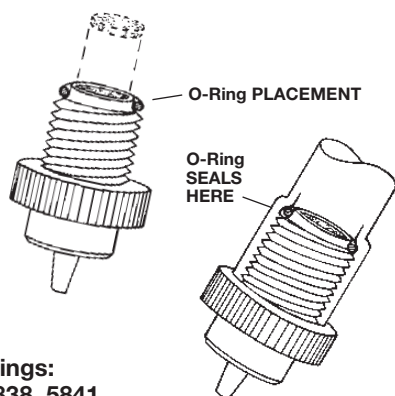
### Michel-Miller Style (No O-Rings)

*PTFE fitting that seals without O-Rings.*

See Fittings:  
5801, 5802, 5803, 5805, 5807

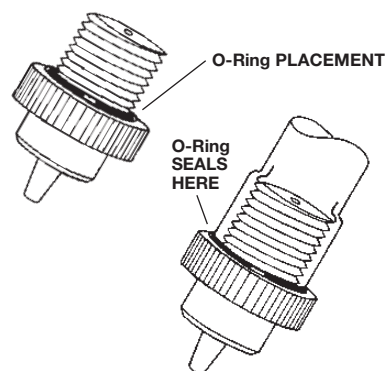
### Ace-Thred Style (O-Ring Seals – at Front or Back)

#### FRONT SEAL



See Fittings:  
5837, 5838, 5841,  
5843, 5844, 5846

#### BACK SEAL



See Fittings:  
5840, 5842, 5845

**SOLVENT RESERVOIR** Glass, GL45 Thread with Netting ★

Duran

Chemically resistant and stable laboratory bottles, fabricated from borosilicate glass and netted for protection against mechanical damage. Supplied graduated with blue polypropylene cap and removable pouring ring that allows drip-free operation. For use to 140°C. Suitable for vacuum or pressure use (21psig).

Capacity, mL	Pressure Rating, psig	GL Thread	O.D., mm	Height w/ Cap, mm	Netted	Qty	Order Code
250	21	45	70	143	Yes	1	5539-216
500	21	45	86	181	Yes	1	5539-219
1000	21	45	101	230	Yes	1	5539-224

**Replacement Cap and Pouring Ring**

Cap	45	10	7622-06
Pouring Ring		10	7622-54



**SOLVENT RESERVOIR** Glass, #25 Ace-Thred, w/o Netting

Borosilicate glass bottle, only, with internal #25 Ace-Thred at top. Use 5810-25 or 5810-35 with 7506-10 bushing to make tubing connections to bottle. Pressure rating is at ambient.

**Note:** Order netting and bushing separately.

Capacity, mL	Pressure Rating, psig	Body O.D., mm	Length (below thread), mm	Qty	Order Code
300	60	75	115	1	8648-140 ♦
950	60	114.3	170	1	8648-155 ♦
1850	60	152.4	170	1	8648-157 ♦

**Bottle only**

**Netting only**

for bottle 8648-140	1	11850-18	★
for bottle 8648-155	1	11850-21	★

**Accessories**

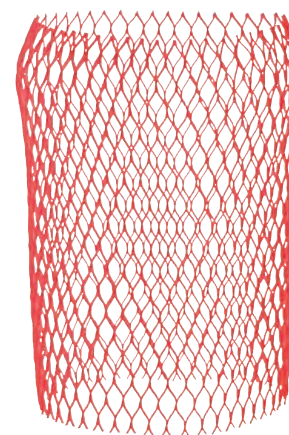
#25 Easy Adapter, 1/4"-28 UNF	1	5810-25	★
#25 Easy Adapter, (2) 1/4"-28 taps, Silicone O-Ring	1	5810-35	★
#25 Ace-Thred Nylon Bushing, FETFE O-Ring	1	7506-10	♦



**PROTECTIVE NETTING** ★

Protective pre-cut netting (only) for 5539 and 8648 reservoir bottles. Sold in one-foot lengths.

Capacity, mL	Qty	Order Code
300	1	11850-18
1000	1	11850-21




**SYRINGE** *Luer-Lok, Gas Tight* ★

For sample introduction in 5790 solvent delivery systems. PTFE coated plunger with Luer-Lok.

Capacity, mL	Qty	Order Code
5	1	5932-08


**ADAPTER** *End Fitting, 1/4"-28 UNF to Ace-Thred, Michel-Miller* ♠

Precision-made replacement PTFE end fitting for use at either end of the 5792 Michel-Miller columns. Designed to make a leak-tight seal without the use of O-Rings. Simply tighten until white ring appears indicating a seal has been made, then secure locknut; no need to over tighten. Male thread is size designation and matches thread size of column. Female thread at top is 1/4"-28 UNF with Heli-Coil insert to accept flanged end tubing fittings. Bore is 1.5mm (.060"). Can be used with 5795 columns and 5820 columns.

**Note:** Codes -46, -47 and -48 normally use paper filter discs to retain packing material (not supplied). Codes -53, -55 and -57 are supplied with replaceable Porosity D (10-20 micron) glass filter discs in end.

For Ace-Thred, #	Bore Size, mm	<i>without Disc</i>		<i>with Disc</i>	
		Qty	Order Code	Qty	Order Code
7	1.5	1	5801-46	1	5801-53
11	1.5	1	5801-47	1	5801-55
15	1.5	1	5801-48	1	5801-57

**Replacement Glass Discs**

7	6	5848-05
11	6	5848-13
15	6	5848-42

**Replacement Paper Discs**

7	12	5814-206
11	12	5814-211
15	12	5814-215


**ADAPTER** *Injection Port, Michel-Miller* ♠

A simple, all-PTFE septum injector that allows for the most efficient use of 5795 Michel-Miller non-packed columns. Allows direct on-column injection to the center of the filter disc at top of column without stopping the solvent flow. Designed to make a leak-tight seal without the use of O-Rings. Simply tighten until white ring appears indicating a seal has been made, then secure locknut; no need to over tighten. Top thread is 5/16"-28 UNF for use with injection port cap that holds the 12898 septum. Male thread is size designation and matches thread size of columns. Has Heli-Coil insert. Bore is 1.5mm (.060"). Can be used with 5795 columns and 5820 columns.

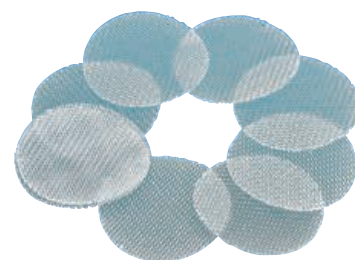
For Ace-Thred, #	Bore Size, mm	Side Female Thread	Top Thread	Qty	Order Code
7	1.5	1/4"-28 UNF	5/16"-28 UNF	1	5807-48
11	1.5	1/4"-28 UNF	5/16"-28 UNF	1	5807-49



## FILTER DISCS ★

Filter material and discs (paper, PTFE, and polypropylene).

**Note:** Discs can also be supplied in polyethylene and fluorocarbon. However, since they are not stock items, a minimum quantity will be supplied. Call for a quotation.



For Ace-Thred, #	Disc Dia.	Microns	Qty	Order Code
<b>Paper</b>				
7	7.5mm	–	100	5814-06
11	10.5mm	–	100	5814-11
7	7.5mm	–	12	5814-206
11	10.5mm	–	12	5814-211
15	14.6mm	–	12	5814-215

### Polypropylene

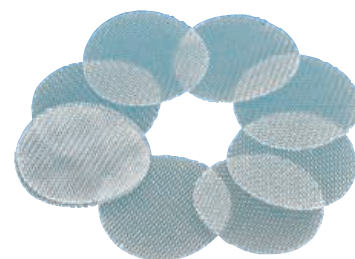
11	.407in	350	12	5814-42
15	.510in	350	12	5814-44
25	.625in	350	12	5814-46
50	1.312in	350	12	5814-48
80	2.95in	350	12	5814-50
11	.407in	295	12	5814-52
15	.510in	295	12	5814-54
25	.625in	295	12	5814-56
50	1.312in	295	12	5814-58
80	2.95in	295	6	5814-60
11	.407in	210	12	5814-62
15	.510in	210	12	5814-64
25	.625in	210	12	5814-66
50	1.312in	210	12	5814-68
80	2.95in	210	6	5814-70
11	.407in	105	12	5814-82
15	.510in	105	12	5814-84
25	.625in	105	12	5814-86
50	1.312in	105	12	5814-88
80	2.95in	105	6	5814-90
25	1.01in	350	12	5814-346
50	1.95in	350	12	5814-348
80	2.95in	350	12	5814-350
50	1.95in	295	12	5814-358
50	1.95in	210	12	5814-368
50	1.95in	74	12	5814-378

## FILTER FABRIC Polypropylene ★

Filter material (polypropylene). Screen support filter fabric for use with end fittings to retain packing material. Sold by the yard.

**Note:** Fabric can be supplied in polyethylene and fluorocarbon. Call for a quotation.

% Open Area	Mesh Count/in.	Microns	Thread Dia., Mic.	Qty	Order Code
34	42	350	250	1 yd	5814-104
25	43	295	300	1 yd	5814-107
34	71	210	150	1 yd	5814-111
25	121	74	106	1 yd	5814-154




**FILTER DISC** Packing Support ♠

Filter disc for use with 5837 or 5838 column adapters. Available in polyethylene (100 micron pore size), and glass — Porosity A (145-174 microns), B (70-100 microns), C (25-50 microns) and D (10-20 microns). Sold in packages.

**Note:** These discs are intended to be removable. However, because of the tight fit, the glass disc may break when being removed.

For Ace-Thred, #	Pkg. Qty	Polyethylene		Glass			
		100 microns	Order Code	Porosity A 145-174 microns	Porosity B 70-100 microns	Porosity C 25-50 microns	Porosity D 10-20 microns
11	6	5848-07	5848-43	5848-52	5848-21	5848-31	
15	6	5848-10	5848-44	5848-54	5848-23	5848-33	
25	6	5848-14	5848-47	5848-56	5848-25	5848-35	
50	6	5848-17	5848-49	5848-58	5848-28	5848-38	
80	1	5848-19	5848-100	5848-120	5848-122	5848-124	


**ADAPTER** Column, Small Sample Injection ♠

Miniature column, with #7-#7 or #11-#11 Ace-Threds.

Ace-Thred, #	Capacity, mL	Qty	Order Code
7 to 7	0.9	1	5826-07
11 to 11	2.0	1	5826-09
11 to 11	5.0	1	5826-11


**ADAPTER** Column, Small Sample Injection ★

Sample injection glass column with #11 Ace-Thred at one end and 1/4"-28 UNF male thread at the other end.

**Note:** To avoid breakage, ACE does not recommend threading 1/4"-28 UNF end directly into end fitting on column but rather making a connection using 12780-04.

Ace-Thred, #	Capacity, mL	Qty	Order Code
11 to 1/4"-28 UNF	6	1	5826-60

**Recommended Connection**

1/4"-28 UNF Male Nipple, PTFE	1	12780-04
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# Michel-Miller

The Michel-Miller Chromatography System has been designed for high performance, low pressure liquid chromatography (HP/LPLC) in analytical or preparative applications.

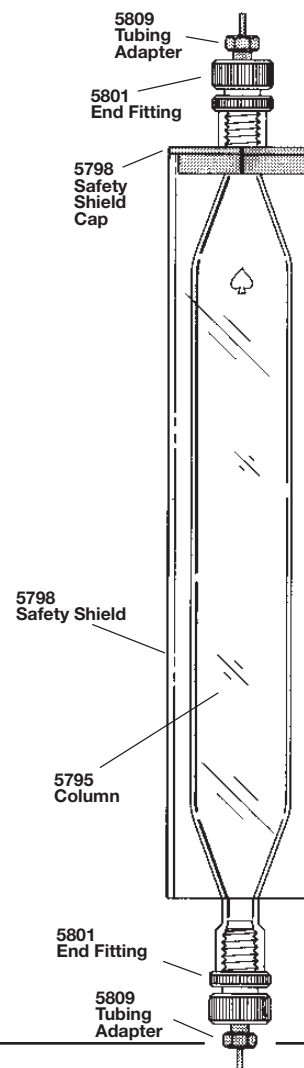
This system provides the chromatographer with a complete concept of high performance liquid chromatography for use at low (0-100psig) and moderate (100-300psig) pressures.

**Columns features:**

- Simple to assemble
- Constructed of borosilicate glass and PTFE — no O-Rings
- Safe operation to 300psig, with safety shield
- Usable with various packing materials
- Chemically inert
- Zero dead volume
- Analytical or Preparative
- Leak free

\*Designed and tested by Karl H. Michel and Robert F. Miller at The Lilly Research Laboratories, Indianapolis, IN

**Note:** Starter Kits include only the basic items for operation. Items such as a pressure gauge, pump, valves, etc, are not included.

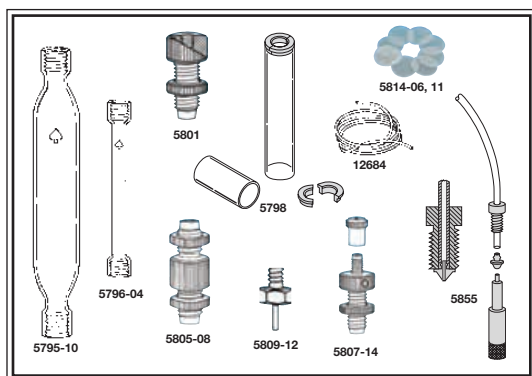


## Michel-Miller Starter Kits (Non-Packed Columns)

**Analytical — Consists of:**

- (1) each: 5795-04, 5795-10, 5805-08, 5807-14, 5814-06, 5814-11, 5855-10, 5855-73, 5855-80, 12684-19, 12684-28
- (2) each: 5798-30, 5798-31, 5801-07, 5801-14, 5809-12

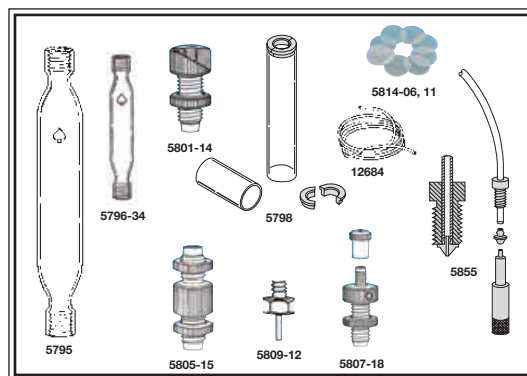
Qty	Order Code
1	5795-202



**Preparative — Consists of:**

- (1) each: 5795-10, 5795-16, 5795-24, 5796-34, 5814-11, 5855-10, 5855-73, 5855-80, 12684-19, 12684-28
- (2) each: 5798-34, 5798-35, 5805-15, 5807-18
- (4) each: 5801-14, 5809-12

Qty	Order Code
1	5795-208





## Epoxy-coated Chromatography columns increase safety and durability

- Chemically resistant to dilute acids, most salts and solvents
- Easy assembly with Ace-Threds
- Note maximum pressure ratings

Need a different size column?  
We'll make it for you.

Visit [www.aceglass.com](http://www.aceglass.com)  
for more information.

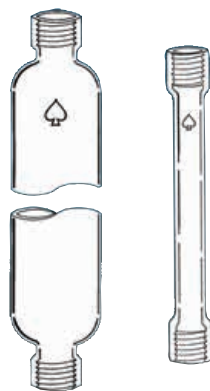


### CHROMATOGRAPHY COLUMN Michel-Miller, Epoxy Coated, Heavy Wall ♠

Designed for high performance, low pressure liquid chromatography (HP/LPLC) and **epoxy coated externally for added protection against scratching**. Column end geometry allows the sample to be introduced at the inlet as a narrow band and at the outlet will not increase band width nor distort peak shape. The conical design of the three larger columns reduces flow path length differences. This shape avoids dead volume that can form with square end fittings. For use with 5801, 5802, 5803, 5805, and 5807 PTFE fittings, without O-Rings. The columns have Ace-Threds at both ends. **These columns are intended for operation at elevated pressures and should always be used with 5798 plastic safety shields**. Use filter paper disc, 5814, to retain packing. I.D. of column is measured at largest diameter; effective length is distance between threads.

**Note:** For chromatography use only. Not intended for use with 40 micron or smaller packing which will cause operating pressures to exceed safe limits of glass. ALWAYS USE A SAFETY SHIELD (5798).

Column I.D., mm	Effective Length, mm	Ace-Thred, #	Maximum Pressure, psig	Qty	Order Code
8	250	7 to 7	150	1	5795-04
21	300	11 to 11	150	1	5795-10
40	350	11 to 11	125	1	5795-16
51	450	11 to 11	100	1	5795-24
25	450	25 to 11	100	1	5795-40
25	600	25 to 11	100	1	5795-48
50	600	50 to 11	100	1	5795-54



### CHROMATOGRAPHY COLUMN Michel-Miller, Epoxy Coated, Heavy Wall ♠

Larger size columns designed for high performance, low pressure liquid chromatography (HP/LPLC) when used with 5801 and 5805 PTFE fittings, without O-Rings. **These columns are epoxy coated externally for added protection against scratching**. Columns have straight thru ends for use as packing columns or operating columns. Note thred size when ordering so proper size fitting can be ordered. **These columns are intended for operation at elevated pressures, and they should always be used with 5798 plastic safety shields**.

**Note:** For chromatography use only. Not intended for use with 40 micron or smaller packing which will cause operating pressures to exceed safe limits of glass. ALWAYS USE A SAFETY SHIELD (5798).

Capacity, mL	Column I.D., mm	Effective Length, mm	Ace-Thred, #	Maximum Pressure, psig	Qty	Order Code
29	11	300	11 to 11	150	1	5820-06
53	15	300	15 to 15	150	1	5820-18
79	15	450	15 to 15	100	1	5820-22
22	25	450	25 to 25	100	1	5820-36
29	25	600	25 to 25	100	1	5820-39
1180	50	600	50 to 50	100	1	5820-57

## COLUMN Injection Reservoir, Epoxy Coated ♠

Chromatography accessory pre-column and injection reservoirs. Also used with 5795 Michel-Miller columns as a pre-column to enable the chromatographer to add prepurified sample mixtures to the main column. This technique allows silica gel or alumina packed mail columns to be reused several times. Also suitable for use in the final stages of slurry packing. Pre-column is epoxy coated for added protection against scratching and stacks on top of the main column using 5805 coupling (page 95).

**Note:** For chromatography use only. Not intended for use with 40 micron or smaller packing which will cause operating pressures to exceed safe limits of glass. ALWAYS USE A SAFETY SHIELD (5798).

Capacity, mL	Column I.D., mm	Effective Length, mm	Ace-Thred, #	Maximum Pressure, psig	Qty	Order Code
32	22	130	11 to 11	200	1	5796-34
75	25	160	11 to 11	200	1	5796-38
148	40	170	11 to 11	150	1	5796-44
75	25	165	11 to 25	200	1	5796-50
148	44	165	11 to 25	150	1	5796-52



## SAFETY SHIELD Plastic, Michel-Miller ♠

Acrylic safety shield and polyethylene cap for use with Michel-Miller columns to insure safe operation at pressures to 300psig. Top thread of column is hung in polyethylene cap; cap is then held by the plastic shield. Clamp the shield, not the column. Wall thickness of shield is 3mm.

Size A for 5795 codes -04, -10 and 5796-34

Size B for 5792-05, -35

Size C for 5792-07, -69, 5795-10

Size D for 5792 codes -09, -11, -67, 5795 codes -10, -16, -24 and 5820-04

Size E for 5792-08

Size F for 5820-16, -20

Size G for 5795-40, -48 and 5820-34, -37

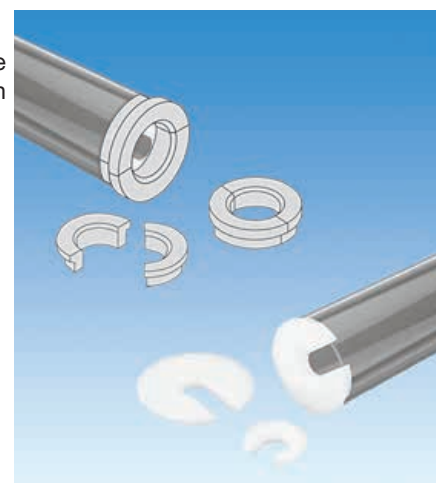
Size H for 5795-54 and 5820-55

Size I for 5792-85

Size J for 5792-89

**Note:** Part numbers in green are no longer available but remain listed above for your reference.

The 5798 shields are made of plastic and are NOT resistant to most solvents.



Cap Code	For Ace-Thred, #	Cap Code	For Ace-Thred, #
-127	7	-137	11
-127	11	-138	25
-133	11	-144	50
-134	15	-146	11
		-180	11

Size	I.D., mm	Length, mm	Cap only		Shield only		Complete	
			Qty	Order Code	Qty	Order Code	Qty	Order Code
B	32	130	1	5798-127	1	5798-26	1	5798-230
A	32	250	1	5798-127	1	5798-31	1	5798-232
C	32	300	1	5798-127	1	5798-40	1	5798-234
E	57	170	1	5798-133	1	5798-33	1	5798-235
D	57	335	1	5798-133	1	5798-35	1	5798-236
D	70	450	1	5798-137	1	5798-53	1	5798-240
F	57	335	1	5798-134	1	5798-35	1	5798-249
F	57	450	1	5798-134	1	5798-50	1	5798-252
G	57	450	1	5798-138	1	5798-50	1	5798-256
G	57	600	1	5798-138	1	5798-55	1	5798-258
H	76	600	1	5798-144	1	5798-62	1	5798-264
I	76	600	1	5798-146	1	5798-62	1	5798-266
J	95	750	1	5798-180	1	5798-72	1	5798-272


**ADAPTER** End Fitting, 1/4"-28 UNF to Ace-Thred, Michel-Miller

Precision made PTFE end fitting for use at either end of the 5795 Michel-Miller, or 5820 columns. Designed to make a leak-tight seal without the use of O-Rings. Simply tighten until white ring appears indicating a seal has been made, then secure locknut; no need to over-tighten. #7 and #11 normally use paper filter disc, 5814-06 or 5814-11 respectively, to retain packing material. Larger fittings use PTFE screens; see 5814, codes -13 or -16. Female thred at top is 1/4"-28 UNF to accept standard miniature plumbing systems. Bore is 1.5mm (.060"). Male thred is size designation and matches thred size of columns.

**Note:** For #50 Ace-Thred use 5838-54 and 7855-829.

For Ace-Thred, #	Bore Size, mm	Qty	Order Code	
7	1.5	1	5801-07	♠
11	1.5	1	5801-14	♠

**Paper Filter Disc, not included**
**PTFE Screen Packing Support, not included**

15	1.5	1	5801-18	♠
25	1.5	1	5801-22	♠

**Replacement Paper Discs**

7	100	5814-06	★
11	100	5814-11	★

**Replacement PTFE Screen**

15	12	5814-13	★
25	12	5814-16	★


**ADAPTER** End Fitting, NPT to Ace-Thred, Michel-Miller ♠

PTFE adapter, precision made, for use when making NPT thread connection to Ace-Threds. One end designed to make leak-tight seal with Ace-Thred without use of O-Rings, other end accepts NPT male thread. 12770 nipple or 12770 tube fitting connector is necessary to make these connections.

**Note:** For #50 Ace-Thred use 5844-78, 5844-85 and 7855-829.

		#7 Thred	#11 Thred	#15 Thred	#25 Thred
NPT Size, in	Qty	Order Code	Order Code	Order Code	Order Code
1/16	1	5802-04	5802-12	—	—
1/8	1	5802-08	5802-14	5802-17	—
1/4	1	—	5802-15	5802-19	5802-37
3/8	1	—	—	5802-27	5802-40

**Note:** valve adapters, #5839,  
for use with 5802.


**STOPPER** Michel-Miller ♠

Precision made PTFE stoppers for use at either end of the 5795 Michel-Miller, 5820 columns or all 7644 Ace-Threds when a leak-tight seal without the use of O-Rings is desired.

**Note:** For #50 Ace-Thred use 5846-52 and 7855-829.

For Ace-Thred, #	Qty	Order Code	
7	1	5803-05	
11	1	5803-08	
15	1	5803-11	
25	1	5803-25	

**Paper Filter Disc, not included**

**COUPLING** Michel-Miller, 316 Stainless Steel Liner ♠

Precision made PTFE coupling with 316 stainless steel liner for connecting Michel-Miller, or 5820 columns when packing. Designed to make a leak-tight seal without the use of O-Rings. Simply tighten until white ring appears indicating a seal has been made, then secure locknut; no need to tighten further. Male thred is size designation and matches thred size of columns.

Ace-Thred, #	Qty	Order Code
7 to 7	1	5805-03
7 to 11	1	5805-08
11 to 11	1	5805-15
15 to 15	1	5805-20
25 to 25	1	5805-28
50 to 50	1	5805-32



**ADAPTER** Injection Port, Michel-Miller ♠

A simple, all PTFE, septum injector port that allows for the most efficient use of the 5796 Michel-Miller columns. Allows direct on-column injection to the center of the filter disc at top of column without stopping the solvent flow. Top thread is 5/16"-28 UNF for use with injection port cap that holds the 12898 septum. Side female thread is 1/4"-28 UNF to accommodate the 5809, 5854, 5855 and 12724 tubing connectors or other miniature plumbing systems. Bottom male thread is size designation and refers to thread on 5795 columns. Complete item supplied with (1) PTFE coated silicone rubber septum. For paper filter discs, see 5814. For extra septa, see 12898.

**Note:** Not suitable for larger columns; we recommend a loop and valve system.

Ace-Thred, #	Side Female Thread	Top Thread	Qty	Order Code
7	1/4"-28 UNF	5/16"-28 UNF	1	5807-14
11	1/4"-28 UNF	5/16"-28 UNF	1	5807-18



**ADAPTER** PTFE, Purge, w/Shutoff ★

PTFE adapter for use with 8648 pressure vessels to allow purging of air-sensitive contents. Male Ace-Thred at bottom, (2) 1/4"-28 UNF or (2) 1/8" NPT female taps at top with directional knob shutoff for both. Turn shutoff to open one side to evacuate, turn 180° to close vacuum side and purge contents of flask. Turn shutoff 90° to close both openings.

Ace-Thred, #	Tap Size (2)	Qty	Order Code
15	1/4"-28 UNF	1	5808-30
15	1/8" UNF	1	5808-35
25	1/4"-28 UNF	1	5808-40
25	1/8" UNF	1	5808-45
36	1/4"-28 UNF	1	5808-50
36	1/8" UNF	1	5808-55



**ADAPTER** Tubing, Stainless Steel ♠

Stainless steel tubing adapter for use with 5801 end fitting adapters to connect tubing to the 5795 Michel-Miller columns. Thread is 1/4"-28 UNF. Extension opposite thread is 1.5mm O.D. (.060").

Ace-Thred, #	Thread Size	Extension O.D., mm	Qty	Order Code
15	1/4"-28 UNF	1.5	1	5809-12





### FILTER COLUMN *Michel-Miller* ♠

For use with Michel-Miller Liquid Chromatography System as filter to assure only clean solvent enters column. Threads are #7 Ace-Thred for use with 5801-07 end fitting. Usually positioned, in line, between pump and column using 1/4"-28 UNF tubing connectors such as 5854, 5855 or 12724.

**Note:** Glass only is supplied. Fittings must be ordered separately. Filter material, such as glass wool, not supplied.

Ace-Thred, #	Column I.D., mm	Effective Length, mm	Qty	Order Code
7	8	85	1	5813-23
7	8	150	1	5813-26
7	15	150	1	5813-32



### GAUGE *Pressure* ★

Pressure gauge for monitoring pressure in laboratories; especially suited for use with the Michel-Miller HP/LPLC System or other LP chromatography systems. Available with brass or 316 stainless steel internals. Gauge measures 2-1/2" or 1-1/2" with 1/4" NPT bottom.

Complete Gauge supplied with a nylon adapter that has 1/4"-28 UNF male thread and three-way tubing connector for direct in-line connection.

Pressure Rating, psig	Internal Material	NPT Bottom Fitting, in	O.D., in	Length, in	Qty	Order Code
<b>Complete Gauge</b>						
0-400	Brass	1/4	2.5		1	13385-35
0-400	Stainless Steel	1/4	2.5		1	13385-38

#### Pressure Gauge only

0-60	Brass	1/4	2.5		1	13385-10
0-400	Stainless Steel	1/4	2.5		1	13385-12
0-400	Stainless Steel	1/4	2.5		1	13385-14
0-60	Stainless Steel	1/8	1.5		1	13385-44
0-160	Stainless Steel	1/8	1.5		1	13385-48

#### Pressure/Vacuum Gauge only

Vacuum-60	Stainless Steel	1/8	1.5		1	13385-52
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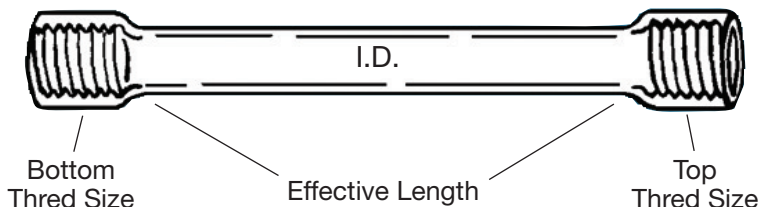
#### Replacement Parts and Accessories

Nylon Adapter	1/4			1	13385-20
Stainless Steel Adapter	1/8		1.5	1	13385-60
Stainless Steel Extension	1/8		3	1	13385-64
3-way Tubing Connector	1/4			1	12720-25



# NEED A DIFFERENT COLUMN?

Furnish the following information. We'll make it for you.



**FURNISH THIS INFO:**

Column I.D.	Effective Length	Bottom Thred # <sup>2</sup>	Top Thred # <sup>2</sup>

<sup>2</sup>See Catalog No. 7644 for Thread Sizes



## ACE Quality Laboratory & Scientific Product Lines Include...

**Hydrogenation/Gas Apparatus** — Featuring heavy-walled pressure-tested glass reaction vessels and connectors with Ace-Threds — eliminates rubber stoppers.

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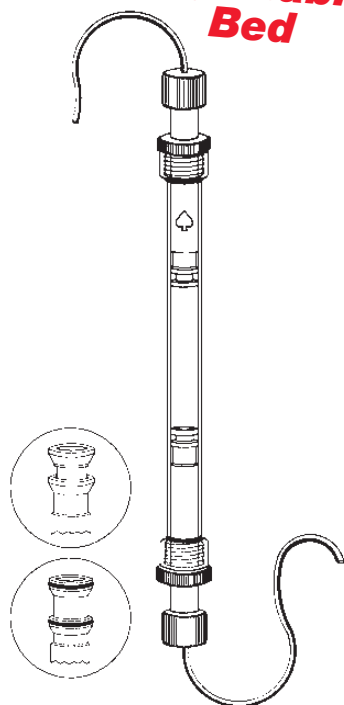
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**Ultrasonics** — Complete line of glassware and equipment used to promote and enhance chemical reactions through the use of ultrasonic energy.

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**Multi-Step Filter Reactors** — 150 to 6,000 mL capacity. single or multi-step filter reactors. Also, Pilot Plant/Kilo filter reactors up to 100L. **Contact ACE to get a copy of our reactor catalog.**

### Adjustable Bed



### ADJUSTA-CHROM Recycling Column ♠

Adjustable bed chromatography column used for recycling, ascending or descending applications allowing for quick and easy adjustment of the PTFE plunger. The Porosity C (25-50 micron) glass disc gives rapid flow with a minimum of mixing. PTFE plunger available with PTFE or FETFE O-ring seals.

**Note:** Pressure tight to 3.515 Kg/cm<sup>2</sup> (50psig) at room temperature or slightly below.

Column I.D., mm	Column Length, mm	Effective Bed Length, mm	Tubing Length, m	Tubing I.D., mm	Top / Bottom Ace-Thred, #	Qty	Order Code
10	300	85-300	3	1.5	11	1	5815-03
10	900	120-900	3	1.5	11	1	5815-07
25	300	85-300	3	1.5	25	1	5815-15
25	900	120-900	3	1.5	25	1	5815-19

#### FETFE O-Ring Seals, Complete Column

10	300	85-300	3	2	11	1	5815-04
10	900	120-900	3	2	11	1	5815-08
25	300	85-300	3	2	25	1	5815-16
25	900	120-900	3	2	25	1	5815-20

#### Column only

10	300				11	1	5815-26
10	900				11	1	5815-30
25	300				25	1	5815-33
25	900				25	1	5815-37

### ADJUSTA-CHROM Recycling Column, Jacketed ♠

Jacketed, adjustable bed chromatography column used for recycling, ascending or descending applications. Completely jacketed for better temperature uniformity with a single bushing at each end allowing for quick and easy adjustment of the PTFE plunger. The Porosity C (25-50 micron) glass disc gives rapid flow with a minimum of mixing. PTFE plunger available with PTFE or O-Ring seals. Use with 3/8" I.D. Tubing, Size D hose connection.

**Note:** Pressure tight to 3.515 Kg/cm<sup>2</sup> (50psig) at room temperature or slightly below.

Column I.D., mm	Column Length, mm	Effective Bed Length, mm	Tubing Length, m	Tubing I.D., mm	Top / Bottom Ace-Thred, #	Qty	Order Code
10	300	90-290	3	1.5	11	1	5819-02
25	300	90-290	3	2	25	1	5819-12
25	600	100-520	3	2	25	1	5819-14
50	900	320-820	3	2	50	1	5819-28

#### FETFE O-Ring Seals, Complete Column

10	300	90-290	3	1.5	11	1	5819-03
25	300	90-290	3	2	25	1	5819-13
25	600	100-520	3	2	25	1	5819-15
50	900	320-820	3	2	50	1	5819-28

#### Column only

10	300				11	1	5819-27
25	300				25	1	5819-34
25	600				25	1	5819-36
50	900				50	1	5819-44



**REPLACEMENT PARTS FOR ADJUSTA-CHROM COLUMNS 5815 and 5819 ♠**

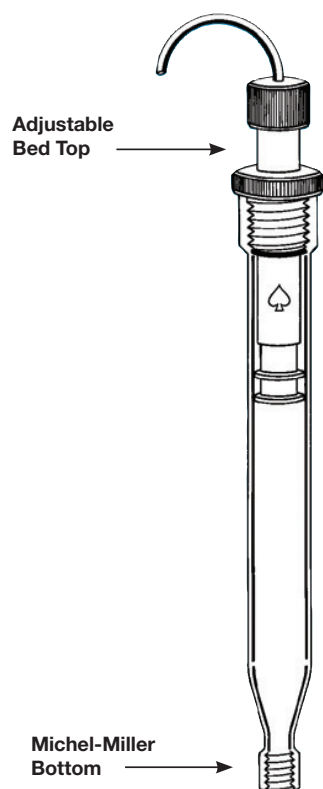
		<i>For 10mm I.D.</i>			<i>For 25mm I.D.</i>			<i>For 50mm I.D.</i>		
		Qty	Order Code		Qty	Order Code		Qty	Order Code	
Glass Columns, Jacketed	300mm	1	5819-27	♠	1	5819-34	♠	—	—	
	600mm	—	—		1	5819-36	♠	—	—	
	900mm	—	—		—	—		1	5819-44	♠
Glass Columns, Unjacketed	300mm	1	5815-26	♠	1	5815-33	♠	—	—	
	900mm	1	5815-30	♠	1	5815-37	♠	—	—	
Plunger Tip with Filter Disc and Collar (PTFE Seals)		1	5819-152	♠	1	5819-153	♠	1	5819-158	♠
Plunger Tip with Filter Disc and Collar (O-Ring Seals)		1	5819-163	♠	1	5819-164	♠	1	5819-169	♠
Extender only 15cm		1	5819-54	♠	1	5819-56	♠	—	—	
Extender only 30cm		1	5819-55	♠	1	5819-57	♠	—	—	
Extender Cap, only		1	5819-67	♠	1	5819-69	♠	—	—	
Extender with Cap, 15.2cm (6")		—	—		—	—		1	5819-70	♠
Extender with Cap, 30.5cm (12")		—	—		—	—		1	5819-71	♠
End bushing		1	7506-02	♠	1	7506-10	♠	1	7506-14	♠
FETFE O-Rings, for Extender Bushing		12	7855-716	♠	6	7855-734	♠	3	7855-744	♠
FETFE O-Rings, Plunger Tip		6	5819-181	♠	6	5819-182	♠	6	5819-183	♠
PTFE Tubing 300cm, 1-1/2mm I.D.		1	12684-17	★	—	—		—	—	
PTFE Tubing 300cm, 2mm I.D.		—	—		1	12684-27	★	1	12684-27	★
Glass Filter Disc, only		6	5819-80	♠	6	5819-82	♠	3	5819-84	♠



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### COLUMN Michel-Miller, with Adjustable Bed ♠

A combination of the high performance, low pressure Michel-Miller chromatography line and Adjusta-Chrom recycling column. Top has adjustable fitting that allows for a bed height anywhere within **1-6" below thread**; i.e., if packing tends to expand or contract due to changing conditions, top fitting can be moved by loosening bushing and sliding plunger tip up or down. Plunger tip is all PTFE with a Porosity C (25-50 micron) glass disc.

Bottom of column is standard #11 Ace-Thred Michel-Miller fitting for use with 5801-14 end fitting and can utilize #11 sized packing supports such as our 5814-11 paper filter disc (not included).

**(Note: 10mm I.D. column is the same diameter top to bottom.)** 5801 fitting has a 1/4"-28 UNF tap for connecting small bore tubing, top fitting has connection for 2mm I.D. PTFE tubing. Complete item supplied with adjustable top fitting and 5801-14 bottom end fitting.

Column I.D., mm	Column Length, mm	Tubing Length, m	Tubing I.D., mm	Ace-Thred, Top / Bottom #	Qty	Order Code
<b>Complete Column</b>						
10	300	3	1.5	11 / 11	1	5816-34
10	600	3	1.5	11 / 11	1	5816-37
10	900	3	1.5	11 / 11	1	5816-40
25	300	3	1.5	25 / 11	1	5816-35
25	600	3	1.5	25 / 11	1	5816-38
25	900	3	1.5	25 / 11	1	5816-41
<b>Column only</b>						
10	300			11 / 11	1	5816-05
10	600			11 / 11	1	5816-09
10	900			11 / 11	1	5816-13
25	300			25 / 11	1	5816-06
25	600			25 / 11	1	5816-10
25	900			25 / 11	1	5816-14



### CHROMATOGRAPHY COLUMN ♠

Rugged columns with internally threaded ends to which a wide choice of upper and lower end pieces can be fitted using 5837, 5838, 5840, 5841, 5842 and 5843 fittings. Available in the diameters and lengths listed below.

**Note:** Not for use with 5819 fittings.

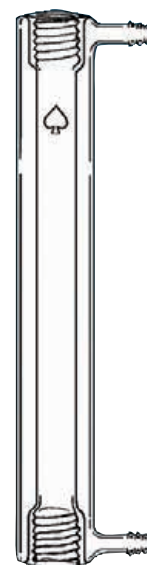
Column I.D., mm	Effective Length, mm, (in)	Capacity, mL	Ace-Thred, #	Maximum Pressure, psig	Qty	Order Code
11.11	300 (12)	29	11	50	1	5820-04
11.11	450 (18)	43	11	50	1	5820-08
11.11	600 (24)	57	11	50	1	5820-12
15.9	300 (12)	53	15	50	1	5820-16
15.9	450 (18)	79	15	50	1	5820-20
15.9	600 (24)	110	15	50	1	5820-24
25.0	300 (12)	150	25	50	1	5820-30
25.0	450 (18)	220	25	50	1	5820-34
25.0	600 (24)	290	25	50	1	5820-37
25.0	1200 (48)	590	25	50	1	5820-40
36.0	450 (18)	480	25	50	1	5820-104
50.0	300 (12)	590	50	50	1	5820-50
50.0	450 (18)	880	50	50	1	5820-53
50.0	600 (24)	1180	50	50	1	5820-55
50.0	900 (36)	1770	50	50	1	5820-59
50.0	1200 (48)	2350	50	50	1	5820-58
75.0	300 (12)	1320	50	50	1	5820-105
75.0	600 (24)	2650	50	50	1	5820-107
75.0	1200 (48)	5300	50	50	1	5820-109
100.0	1200 (48)	9430	50	50	1	5820-116
100.0	1800 (71)	14140	50	50	1	5820-119
150.0	600 (24)	10300	50	50	1	5820-121
150.0	1200 (48)	21200	50	50	1	5820-125
150.0	1800 (71)	31800	50	50	1	5820-129
150.0	2400 (95)	42200	50	50	1	5820-133

## CHROMATOGRAPHY COLUMN Jacketed ♦

Columns are fully jacketed including internally threaded ends for circulation of heat exchange media. Upper and lower end pieces can be fitted to columns using 5837, 5838, 5840, 5841, 5842 and 5843 fittings.

**Note:** Not for use with 5819 fittings.

Column I.D., mm	Effective Length, mm, (in)	Capacity, mL	Ace-Thred, #	Hose Connection Size	Qty	Order Code
11	300 (12)	29	11	D	1	5821-05
11	600 (24)	53	11	D	1	5821-09
15	300 (12)	53	15	D	1	5821-13
15	450 (18)	79	15	D	1	5821-15
15	600 (24)	110	15	D	1	5821-17
25	300 (12)	150	25	D	1	5821-24
25	450 (18)	220	25	D	1	5821-26
25	600 (24)	290	25	D	1	5821-28
25	1200 (48)	590	25	D	1	5821-112
50	300 (12)	590	50	D	1	5821-29
50	450 (18)	880	50	D	1	5821-30
50	600 (24)	1180	50	D	1	5821-31
50	1200 (48)	2350	50	F	1	5821-32

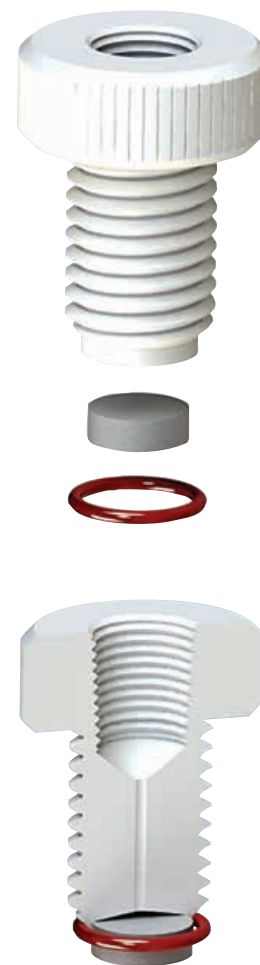


## ADAPTER End-Fitting, with NPT ♦

Column end fitting that allows connection of Ace-Thred to tubing connectors with NPT threads. 5838 adapters are made of **PTFE** and supplied complete with (1) 100 micron polyethylene disc support, (1) 350 micron polypropylene screen support with PTFE retainer ring, and FETFE O-Ring. The screen with retainer ring support has a large pore size and offers less resistance to flow. When smaller particle size packing is used, it will be necessary to replace the screen and retainer ring with the 100 micron support.

The 5857 fittings are machined of **polypropylene** for strength. A “coin” tightened locking retainer nut is used to hold 350 micron support screen firmly in place. Each adapter, #25 and #50, is supplied with retainer lock nut, 350 micron screen and FETFE O-Ring.

Ace-Thred, #	NPT Size, in	Qty	Order Code
11	.125	1	5838-72
15	.125	1	5838-75
15	.25	1	5838-76
25	.25	1	5838-78
50	.375	1	5838-80
80	.375	1	5838-82
25	.25	1	5857-05
25	.375	1	5857-10
50	.375	1	5857-15
50	.50	1	5857-20

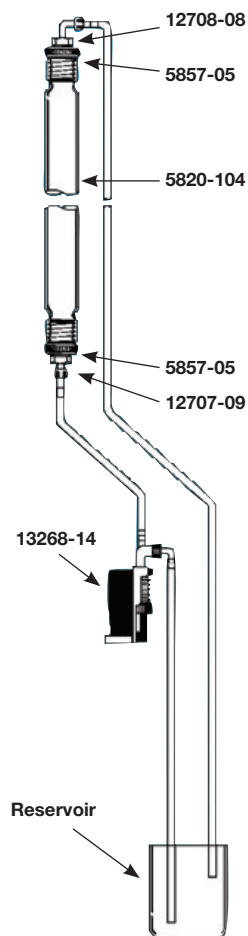


## Replacement Parts and Accessories

Ace-Thred, #	100 Micron PE Disc		Retainer Ring		350 Micron PP Screen		O-Ring	
	Qty	Order Code	Qty	Order Code	Qty	Order Code	Qty	Order Code
<b>For 5838</b>								
11	6	5848-07	6	5857-32	12	5814-42	12	7855-708
15	6	5848-10	6	5857-34	12	5814-44	12	7855-710
25	6	5848-14	1	5857-36	12	5814-346	12	7855-727
50	6	5848-17	1	5857-38	12	5814-348	6	7855-729
80	1	5848-19	1	5857-52	12	5814-350	3	7855-764

### For 5857

25	1	5857-80	12	5814-46	12	7855-727
50	1	5857-82	12	5814-48	6	7855-729



### ION-EXCHANGE ASSEMBLY *Laboratory Size, #25 Ace-Thred*

Unit is designed for metal recovery using Ion-Exchange resins such as Amborane.

Borosilicate glass column has #25 Ace-Thred at both ends. Polypropylene end fittings mate with Ace-Threds and form a leak-tight seal with FETFE O-Rings. Each end fitting has a "coin" tightened retainer that holds packing support screen firmly in place; screen can be replaced in seconds. Fittings have 1/4" NPT female thread for connecting 3/8" O.D. flexible vinyl tubing from pump and reservoir using a 1/4" to 3/8" tubing connector. Normal flow is in upward direction. Column is easily held by ring stand and clamp.

Complete unit consists of one each 5820-104, 13268-14, 12679-26, 12681-812, 5814-46, 5814-56, 7855-727, 5881-150, 11077-18 and two each 5857-05, 12707-09 and 12708-08.

Description	Qty	Order Code	
Column, 37mm I.D. x 450mm long	1	5820-104	♠
End Fitting, PP, #25 to 1/4" NPT	2	5857-05	♠
Pump, Bellows Type, maximum capacity, 409mL/min. Self primes to four feet. Polypropylene bellows and swivel connections for 3/8" I.D. tubing. Operates on 110v, 50/60Hz.	1	13268-14	★
Tubing, vinyl, 3/8" I.D. x 1/2" O.D.	50 ft.	12679-26	★
Tubing, PP, 3/8" O.D. x 75mm long	12	12681-812	★
Screen Support, PP, 350 micron	12	5814-46	♠
Screen Support, PP, 295 micron	12	5814-56	♠
O-Ring, FETFE, Size -121	12	7855-727	♠
Connector Tube to M.P.T.	2	12707-09	★
Elbow Tube to M.P.T.	2	12708-08	★
Ring stand, rectangular steel base, finished in hard enamel, 127mm x 229mm. Rod is 9.5mm O.D. zinc-plated, 508mm high.	1	5881-150	★
Clamp, three-prong, vinylized jaws	1	11077-18	★
<b>Complete</b>	1	5881-502	★



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- Advanced PID algorithm

**ADDITION FUNNEL** *Cylindrical or Conical* ♠

For charging columns. The capacity is approximately five times the largest column volume. Size listed is Ace-Thred designation which refers to I.D. of tubing above thred and corresponds to 5820 column diameter.

Ace-Thred, #	Capacity, mL	Qty	Order Code
<b>Cylindrical</b>			
11	300	1	5822-05
15	600	1	5822-10
25	1500	1	5822-15
50	3000	1	5822-20
<b>Conical</b>			
11	300	1	5822-40
15	600	1	5822-45
25	2000	1	5822-50
50	3000	1	5822-55



**FUNNEL** *Preparative, Bulb-Type Reservoir* ♠

Bulb type reservoir for preparative work. Both ends threaded. Top can be sealed with 5803, 5845 or 5846 solid plug. Size listed is Ace-Thred designation which refers to I.D. of tubing above thred and corresponds to 5820 column diameter.

Ace-Thred	Capacity, mL	Bulb O.D., mm	Qty	Order Code
11	250	82	1	5824-05
15	500	100	1	5824-10
25	2000	160	1	5824-15
50	3000	180	1	5824-20



**ADAPTER** *Feed Tube* ♠

Threaded both ends. #7 thred at top is supplied with 5029 nylon bushing and FETFE O-Ring for use with 5831, 5832 adjustable feed tubes. Size listed is Ace-Thred designation which refers to I.D. of tubing above lower thread and corresponds to 5820 column diameter.

Bottom Ace-Thred, #	Top Ace-Thred, #	Qty	Order Code
11	7	1	5826-20
15	7	1	5826-24
25	7	1	5826-28
50	7	1	5826-30



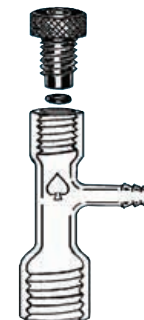
**Replacement Parts**

#7 Nylon Bushing w/7.5mm Center Hole	1	5029-10
FETFE O-Ring	12	7855-704

**ADAPTER** *Feed Tube* ♠

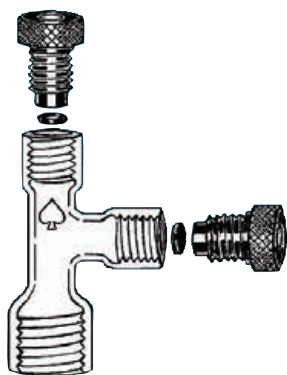
Similar to 5826 except with hose connection side arm.

Bottom Ace-Thred, #	Top Ace-Thred, #	Hose Connection, in	Qty	Order Code
11	7	3/8 (Size D)	1	5827-20
15	7	3/8 (Size D)	1	5827-24
25	7	3/8 (Size D)	1	5827-28
50	7	5/16 or 3/8 (Size C)	1	5827-30



**Replacement Parts**

#7 Nylon Bushing w/7.5mm Center Hole	1	5029-10
FETFE O-Ring	12	7855-704

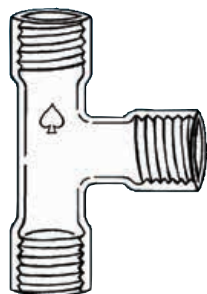

**ADAPTER Feed Tube, Septa**

Similar to 5826 except with additional #7 thred side opening for introduction of samples by hypodermic syringe. Supplied complete with (1) silicone rubber septa and (2) nylon bushings with FETFE O-Rings.

Bottom Ace-Thred, #	Top Ace-Thred, #	Side Ace-Thred, #	Qty	Order Code	
11	7	7	1	5828-20	♠
15	7	7	1	5828-24	♠
25	7	7	1	5828-28	♠
50	7	7	1	5828-30	♠

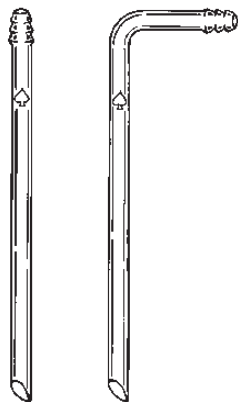
**Replacement Parts**

#7 Nylon Bushing w/7.5mm Center Hole	1	5029-10	♠
FETFE O-Ring	12	7855-704	♠
Silicone Septa	12	12904-06	★


**ADAPTER Connecting ♠**

All three ends are threaded the same size. For bushings, see 7506.

Bottom Ace-Thred, #	Top Ace-Thred, #	Side Ace-Thred, #	Qty	Order Code	
11	11	11	1	5829-04	
15	15	15	1	5829-08	
25	25	25	1	5829-12	
50	50	50	1	5829-14	


**FEED TUBE Hose Connection ♠**

Permits packing of column without excessive drop impact. Also used for side arm introduction of effluent or may be used for pressurized operation. Used in conjunction with 5029 nylon bushing. Supplied straight or bent. Hose connection size C for use with 5/16" or 3/8" I.D. tubing. Glass tube is 7mm O.D.

Length, mm	Hose Connection, in	Qty	Order Code	
<b>Straight</b>				
76	5/16 or 3/8 (Size C)	1	5831-04	
<b>Bent</b>				
76	5/16 or 3/8 (Size C)	1	5831-12	


**FEED TUBE Luer-Lok Tip ♠**

Similar to 5831 except with Luer-Lok connection. Supplied straight only.

Length, mm (in)	Tube O.D., mm	Qty	Order Code	
76 (3)	8	1	5832-04	
457 (18)	8	1	5832-08	

**Accessories**

50mm Luer Extension	1	5832-19	
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**ADAPTER Bottom Drip** ♠

Drip tip for chemical type chromatography. I.D. of drip approximately 4mm. Size listed is Ace-Thred designation which refers to I.D. of tubing below thread and corresponds to 5820 column diameter.

Bottom Ace-Thred, #	Tube I.D., mm	Qty	Order Code
11	4	1	5834-05
15	4	1	5834-10
25	4	1	5834-15
50	4	1	5834-20



**ADAPTER Bottom Drip, w/1:5 PTFE Stopcock** ♠

Drip tip for chemical type chromatography with 1:5 taper PTFE stopcock at bottom for controlling flow. Size listed is Ace-Thred designation which refers to I.D. of tubing below thred and corresponds to 5820 column diameter.

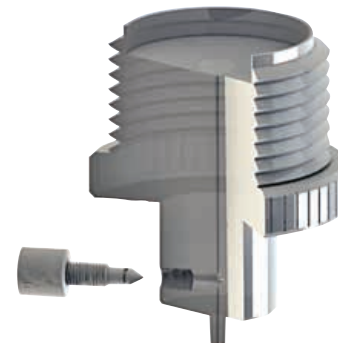
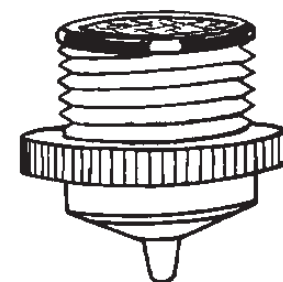
Bottom Ace-Thred, #	Bore, mm	Qty	Order Code
11	2	1	5835-07
15	2	1	5835-11
25	4	1	5835-17
50	4	1	5835-21



**ADAPTER Bottom Drip, Luer-Lok** ♠

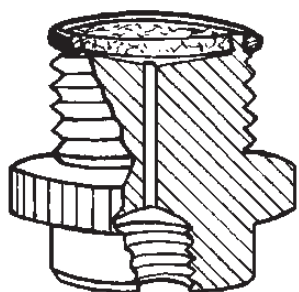
For use with all ACE threaded chromatography columns. Shallow taper at upper end minimizes mixing below the packing support. Supplied with (1) FETFE O-Ring and (1) replaceable polyethylene packing support. Available with or without drip regulator valve. Bore is 1mm without regulator valve. Adjustable bore is from 0 to 1mm maximum with the valve.

Ace-Thred, #	Bored, mm	<i>w/o Regulator Valve</i>		<i>w/Regulator Valve</i>	
		Qty	Order Code	Qty	Order Code
<b>Nylon</b>					
11	1	1	5837-06	1	5837-08
15	1	1	5837-11	1	5837-13
25	1	1	5837-16	1	5837-19
50	1	1	5837-21	1	5837-23
<b>Polyethylene</b>					
80	1	1	5837-27		-
<b>PTFE</b>					
11	1	1	5837-46	1	5837-48
15	1	1	5837-51	1	5837-53
25	1	1	5837-56	1	5837-58
50	1	1	5837-61	1	5837-63
80	1	1	5837-65		-



**Replacement Parts and Accessories**

FETFE O-Ring for #11	12	7855-708
FETFE O-Ring for #15	12	7855-710
FETFE O-Ring for #25	12	7855-727
FETFE O-Ring for #50	6	7855-729
FETFE O-Ring for #80	3	7855-764
Valve Stem Replacement	1	5837-80
Replacement O-Ring	12	5837-180
Filter Disc Remover	1	5837-204



**ADAPTER** Bottom Drip, Internally Threaded ♦

For use with all ACE threaded chromatography columns. Shallow taper at upper end minimizes mixing below the packing support. Available with or without drip regulator valve. Bore is 1mm without regulator valve. While, adjustable bore is from 0 to 1mm maximum with the valve. Supplied with 1/4"-28 UNF 2B internal thread that will accept 5854 or 5855 tubing connectors. Pouring support fits into the top of the adapter. Adapter can also be used at top of column as inlet adapter.

*Note: Supplied with (1) FETFE O-Ring and (1) polyethylene packing support.*



Ace-Thred, #	Internal Threads	w/o Regulator Valve		w/Regulator Valve	
		Qty	Order Code	Qty	Order Code
<b>Nylon</b>					
11	1/4"-28 UNF	1	5838-05	1	5838-07
15	1/4"-28 UNF	1	5838-08	1	5838-09
25	1/4"-28 UNF	1	5838-10	1	5838-13
50	1/4"-28 UNF	1	5838-14	1	5838-16
<b>PTFE</b>					
11	1/4"-28 UNF	1	5838-43	1	5838-45
15	1/4"-28 UNF	1	5838-47	1	5838-49
25	1/4"-28 UNF	1	5838-51	1	5838-53
50	1/4"-28 UNF	1	5838-54	1	5838-55

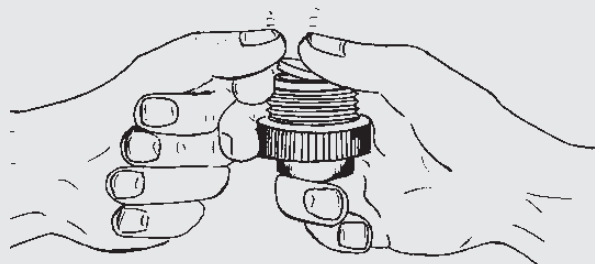
**Replacement Parts and Accessories**

FETFE O-Ring for #11	12	7855-708
FETFE O-Ring for #15	12	7855-710
FETFE O-Ring for #25	12	7855-727
FETFE O-Ring for #50	6	7855-729
Valve Stem Replacement	1	5837-80
Replacement O-Ring	12	5837-180
Filter Disc Remover	1	5837-204

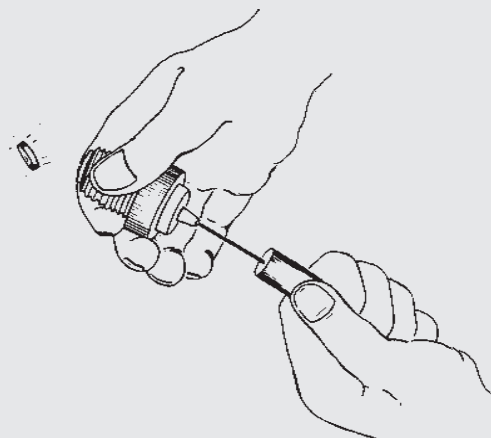
# Filter Disc Location

For 5837, and 5838 Fittings

**INSERTION**



**REMOVAL**





**ADAPTER** End Fitting, with NPT ♠

For use as column end fitting that allows connection of appropriate size Ace-Thred to tubing connectors with NPT threads. The screen with retainer ring support has a large pore size and offers less resistance to flow. When smaller particle size packing is used, it will be necessary to replace the screen and retainer ring with the 100 micron support. Fabricated of PTFE.

Note: Supplied with (1) 100 micron polyethylene packing support, (1) 350 micron polypropylene screen support with polyethylene retainer ring, and (1) FETFE O-Ring.

Ace-Thred, #	Internal Threads, NPT	Filter, micron	Filter, material	O-Ring	Qty	Order Code
11	1/8	100	Polypropylene	FETFE	1	5838-72
15	1/8	100	Polypropylene	FETFE	1	5838-75
15	1/4	100	Polypropylene	FETFE	1	5838-76
25	1/4	100	Polypropylene	FETFE	1	5838-78
50	3/8	100	Polypropylene	FETFE	1	5838-80
80	3/8	100	Polypropylene	FETFE	1	5838-82
50	3/8	100	Polypropylene	CAPFE	1	5838-83
15	1/4	25-50	CAPFE	CAPFE	1	5838-91
25	1/4	25-50	CAPFE	CAPFE	1	5838-94
50	1/4	25-50	CAPFE	CAPFE	1	5838-96

**Replacement Parts and Accessories**

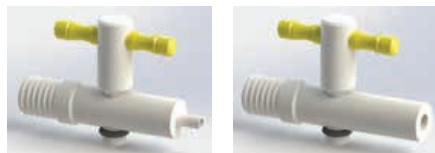
FETFE O-Ring for #11	12	7855-708
FETFE O-Ring for #15	12	7855-710
FETFE O-Ring for #25	12	7855-727
FETFE O-Ring for #50	6	7855-729
FETFE O-Ring for #80	3	7855-764
CAPFE O-Ring for #50	1	7855-829
CAPFE O-Ring for #80	1	7855-864
Retainer Rings, PTFE, #50	1	5857-38
Retainer Rings, Nylon, #50	1	5857-50
Polypropylene Filter Screen, 350 microns, #25	12	5814-346
Polypropylene Filter Screen, 350 microns, #50	12	5814-348

## Pressure Vessels



- Round-bottom, heavy wall design to facilitate use in heating mantles
- Several sizes available with either #7, #15, #25 or #36 Ace-Thred top fitting
- PTFE front seal plug for better sealability with FETFE O-Rings
- Available with side thermowell to accommodate either temperature sensors or thermometers
- Side port options also available for sampling

*Safety coated versions of these vessels are available upon special request.*

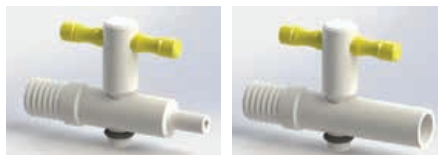


5839-04

5839-08

**ADAPTER Valve, PTFE ♠**

Bottom adapter with shutoff for use with chromatography adapters, 5802, 5838-72, 5844, or any adapter with a 1/4" female NPT (FNPT) connection to allow flow regulation. Top connection is 1/4" male NPT (MNPT).

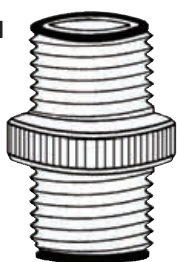


5839-10

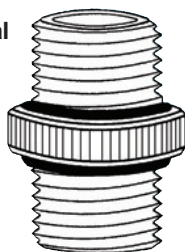
5839-14

Style	Male NPT Port, in	Bore, mm	Qty	Order Code
.25" Luer-Lok, male	.25	1.5	1	5839-04
1/4"-28 UNF, female	.25	3	1	5839-08
.125" NPT, female	.25	3	1	5839-10
.25" O.D. Tube	.25	3	1	5839-14

Front Seal



Back Seal



**COUPLING Nylon or PTFE, Ace-Thred ♠**

For coupling threaded columns together, or to end fittings with single O-Ring seal for leak-tight engagement with hand pressure and no significant size reduction in I.D. Size listed refers to inside diameter of threads. Use with 5820 and 5821 columns. Supplied with (2) FETFE O-Rings.

Ace-Thred, #	Front Seal		Back Seal	
	Qty	Order Code	Qty	Order Code
<b>Nylon</b>				
11	1	5841-06	1	5840-05
15	1	5841-12	1	5840-10
25	1	5841-16	1	5840-15
50	1	5841-22	1	5840-20

<b>PTFE</b>				
11	1	5841-46	1	5840-45
15	1	5841-48	1	5840-47
25	1	5841-50	1	5840-49
50	1	5841-52	1	5840-51

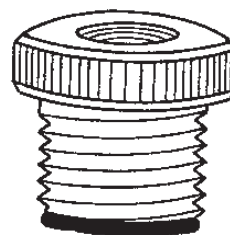
**Replacement Parts**

FETFE O-Ring for #11	12	7855-708	12	7855-722
FETFE O-Ring for #15	12	7855-710	6	7855-730
FETFE O-Ring for #25	12	7855-727	6	7855-742
FETFE O-Ring for #50	6	7855-729	3	7855-748

**ADAPTER** for Swagelok, Ace-Thred ♠

Adapter used with Ace-Thred for connecting tubing to threaded glass via a Swagelok connection. One end Ace-Thred, the other has an NPT female thread. Adapters are available in either nylon or PTFE.

**Note:** Supplied with (1) FETFE O-Ring.



Ace-Thred, #	1/16in NPT Thread		1/8in NPT Thread		1/4in NPT Thread	
	Qty	Order Code	Qty	Order Code	Qty	Order Code
7	-	-	1	5844-16	-	-
11	-	-	1	5844-18	-	-
15	-	-	1	5844-20	1	5844-34
25	-	-	1	5844-22	1	5844-36
36	-	-	1	5844-23	1	5844-37
50	-	-	1	5844-24	1	5844-38
80	-	-	-	-	1	5844-40

**PTFE**

7	1	5844-42	1	5844-58	1	5844-72
11	1	5844-44	1	5844-60	1	-
15	1	5844-46	1	5844-62	1	5844-74
25	1	5844-48	1	5844-64	1	5844-76
36	1	5844-49	1	5844-65	1	5844-77
50	-	-	-	-	1	5844-78
80	-	-	-	-	1	5844-80

**Replacement Parts**

FETFE O-Ring for #7	12	7855-704
FETFE O-Ring for #11	12	7855-708
FETFE O-Ring for #15	12	7855-716
FETFE O-Ring for #25	6	7855-734
FETFE O-Ring for #36	6	7855-772
FETFE O-Ring for #50	3	7855-744
FETFE O-Ring for #80	3	7855-764

**COUPLING** Reducing, Nylon or PTFE, Ace-Thred ♠

Same as 5840 except that one end is threaded for the next smallest diameter.

Ace-Thred, #	Ace-Thred, #	Qty	Front Seal Order Code	Qty	Back Seal Order Code
15	11	1	5843-06	1	5842-05
25	15	1	5843-12	1	5842-10
50	25	1	5843-16	1	5842-15

**PTFE**

15	11	1	5843-47	1	5842-46
25	15	1	5843-49	1	5842-48
50	25	1	5843-51	1	5842-50

**Replacement Parts**

FETFE O-Ring for #11	12	7855-708	12	7855-722
FETFE O-Ring for #15	12	7855-710	6	7855-730
FETFE O-Ring for #25	12	7855-727	6	7855-742
FETFE O-Ring for #50	6	7855-729	3	7855-748





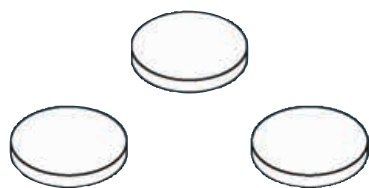
**PLUG** Nylon or PTFE, Ace-Thred ♠

A solid plug for sealing column ends. Permits preparation and storage of column. Supplied with (1) FETFE O-Ring.

Ace-Thred, #	Qty	Front Seal Order Code	Qty	Back Seal Order Code
<b>Nylon</b>				
7	1	5846-04	1	5845-03
11	1	5846-06	1	5845-05
15	1	5846-12	1	5845-10
18	1	5846-14	1	5845-12
25	1	5846-16	1	5845-15
36	1	5846-18	1	5845-17
50	1	5846-22	1	5845-20
<b>HDPE</b>				
80	1	5846-27	1	5845-30
<b>PTFE</b>				
7	1	5846-44	1	5845-43
11	1	5846-46	1	5845-45
15	1	5846-48	1	5845-47
18	1	5846-49	1	5845-48
25	1	5846-50	1	5845-49
36	1	5846-51	1	5845-50
50	1	5846-52	1	5845-51
80	1	5846-60	1	5845-56

**Replacement Parts**

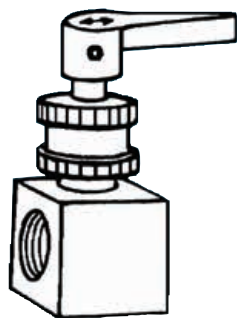
	Qty	Order Code	Qty	Order Code
FETFE O-Ring for #7	12	7855-707	12	7855-712
FETFE O-Ring for #11	12	7855-708	12	7855-722
FETFE O-Ring for #15	12	7855-716	6	7855-730
FETFE O-Ring for #18	12	7855-721	6	7855-734
FETFE O-Ring for #25	6	7855-734	6	7855-742
FETFE O-Ring for #36	6	7855-772	3	7855-774
FETFE O-Ring for #50	3	7855-744	3	7855-748
FETFE O-Ring for #80	3	7855-764	3	7855-766



**FLOAT** Polyethylene ♠

Used on top of column packing to prevent turbulence caused by drop-wise addition.

Ace-Thred, #	Qty	Order Code
11	6	5849-05
15	6	5849-10
25	6	5849-15
50	6	5849-20



**VALVE** Miniature, Inert ★

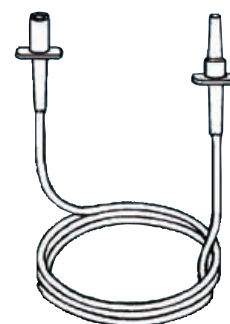
Miniature straight-through shut-off valve designed for small fluid volumes of ultrapure or corrosive fluids. Liquids touch only inert PTFE or inert CTFE. Housing has 1/4"-28 UNF female threaded ports with .059" I.D. holes that accept a variety of fittings.

Female Thread Ports	Hole I.D., in	Qty	Order Code
1/4"-28 UNF	.059	1	5850-10

**ADAPTER Luer-Lok ♦**

84cm of thin wall biological grade vinyl tubing connects an outer Luer-Lok taper and an inner Luer-Lok taper. Tubing is approximately 2mm I.D. Connects to 5837 bottom drip adapter.

Tubing Wall Thickness, cm	Tubing I.D., mm	Qty	Order Code
84	2	6	5852-10



**CONNECTORS Tubing ★**

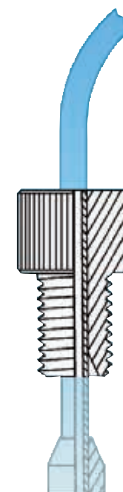
Chemically inert connectors with male 1/4"-28 UNF thread for connecting 1/16" or 1/8" O.D. PTFE or Tefzel tubing to ACE 5801, 5807 or 5838 chromatography adapters. Easy-to-assemble, "no-flange, no-tool" system is rated at 1000psig with PTFE tubing, higher with Tefzel.

Just slip nut and ferrule over tubing and finger tighten in any 1/4"-28 UNF threaded fitting. Offers zero-dead volume, leak-free seal. Ferrules are made of pure, virgin Tefzel (PTFE); no coloring agents are added. Male nuts are made of white acetal and nylon. Can be used with 12684-05 or 12684-28 PTFE tubing.

**Note:** For complete item, order nut and ferrule.

For Tubing O.D., mm (in)	<i>Nut, only</i>		<i>Ferrule, only</i>	
	Qty	Order Code	Qty	Order Code
1.5 (1/16)	1	5854-07	1	5854-24
3.3 (1/8)	1	5854-09	1	5854-26

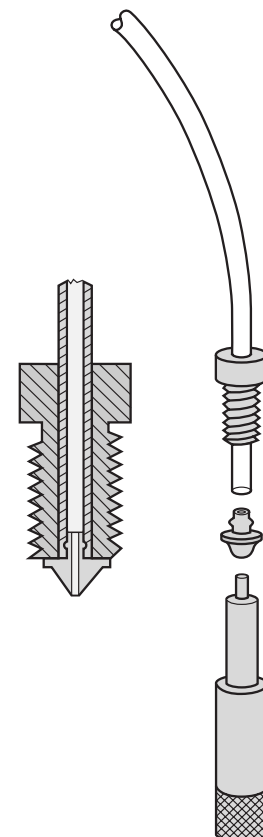
OPTI-LOK LP is a trademark of Optimize Technologies Inc.



**CONNECTORS Tubing ★**

Virgin TFE tubing connectors with 1/4"-28 UNF 2B male thread for connecting small I.D. tubing to 5838 adapters. Suitable for vacuum or pressure applications since tubing won't slip off or blow out. Easily assembled with simple tool, code -80. The Kel-F insert, code -71 or -73, mechanically wedges the tubing against the fitting. For tubing, see 12684, standard wall.

For Tubing I.D., mm	<i>Nut, only</i>		<i>Insert, only</i>		<i>Insertion Tool, only</i>	
	Qty	Order Code	Qty	Order Code	Qty	Order Code
1.5	12	5855-08	12	5855-71	1	5855-80
2	12	5855-10	12	5855-73	1	5855-80




**“ACE-SAFE” CONNECTIONS** *Tubing, Polypropylene*

Tubing connector, used to connect flexible tubing (1/4", 3/8", 1/2", 3/4", 1" I.D.) to #7, #11, #15 or #25 Ace-Thred™ for easy, safe connect/disconnect. 5029/7506 Nylon bushing slides over serrated end and secures polypropylene connector in thread with silicone O-Ring in front groove to make vacuum tight compression seal. Temperature range is -20 to 76°C. Always add or remove tubing from the hose barb while the connector is unthreaded from the glass.

**Note:** Maximum temperature is 76°C.

Description	Qty	#7 Ace-Thred to 1/4" I.D. Tubing	#11 Ace-Thred to 1/4" I.D. Tubing	#15 Ace-Thred to 1/4" I.D. Tubing	#11 Ace-Thred to 3/8" I.D. Tubing
		Order Code	Order Code	Order Code	Order Code
Hose Connection, only, w/O-Ring	1	5853-03	5853-09	5853-18	5853-10
Nylon Bushing, only	1	5029-05	7506-01	7506-05	7506-01

**Complete Connection**

	1	5853-06	5853-12	5853-20	5853-15
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**Replacement O-Rings**

	12	7855-207	7855-206	7855-210	7855-206
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Description	Qty	#15 Ace-Thred to 3/8" ID Tubing	#15 Ace-Thred to 1/2" ID Tubing	#25 Ace-Thred to 3/4" ID Tubing	#25 Ace-Thred to 1" ID Tubing
		Order Code	Order Code	Order Code	Order Code
Hose Connection, only, w/O-Ring	1	5853-19	5853-21	5853-31	5853-33
Nylon Bushing, only	1	7506-05	7506-05	7506-09	7506-09

**Complete Connection**

	1	5853-23	5853-26	5853-35	5853-37
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**Replacement O-Rings**

	12	7855-210	7855-210	7855-270	7855-270
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**CONNECTOR** *Tubing, Stem only*

Used to connect flexible tubing to Ace-Thred for easy, safe connect/disconnect. Connector temperature range is -20°C to 82°C.

**Note:** Stem only. Supplied with silicone O-Ring. Order bushing separately.

For Tubing I.D., in	Ace-Thred, #	Use Bushing No.	Qty	Order Code
.25	7	5029-05	1	5853-03
.50	15	7506-05	1	5853-07
.25	11	7506-01	1	5853-09
.375	11	7506-01	1	5853-10
.25	15	7506-05	1	5853-18
.375	15	7506-05	1	5853-19
.50	15	7506-05	1	5853-21
.75	25	7506-09	1	5853-31
1	25	7506-09	1	5853-33



**“ACE-SAFE” CONNECTIONS** *Tubing, PTFE*

Same as 5853 (left), but manufactured from PTFE instead of polypropylene. Connectors are supplied with FETFE O-Ring.

*Note: Maximum temperature is 200°C.*



Description	Qty	#7 Ace-Thred to 1/4" I.D. Tubing	#11 Ace-Thred to 1/4" I.D. Tubing	#15 Ace-Thred to 1/4" I.D. Tubing	#11 Ace-Thred to 3/8" I.D. Tubing
		Order Code	Order Code	Order Code	Order Code
<b>Complete Connection</b>					
	1	5858-03 ★	5858-05 ★	5858-07 ★	5858-10 ★

**Replacement O-Rings**

	12	7855-707 ♠	7855-706 ♠	7855-710 ♠	7855-706 ♠
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Description	Qty	#15 Ace-Thred to 3/8" ID Tubing	#15 Ace-Thred to 1/2" ID Tubing
		Order Code	Order Code
<b>Complete Connection</b>			
	1	5858-12 ★	5858-14 ★

**Replacement O-Rings**

	12	7855-710 ♠	7855-710 ♠
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## Tubing Connector Reference Chart

### For 5853 and 5858

(Flow Rate @10 lbs. H<sub>2</sub>O)

Tubing Connector Order Code Nylon / PTFE	Fits Ace-Thred #	Connector I.D., in. (mm)	Nominal Flow Rate Gal./Min.	Use Bushing Order Code Nylon / PTFE	Use O-Ring Order Code, Silicone / FETFE	For Tubing I.D., In. (mm)
5853-03 / 5858-03	7	.125 (3.18)	1.5	5029-05 / 5029-35	7855-207 / 7855-707	1/4 (6.35)
5853-09 / 5858-05	11	.125 (3.18)	1.5	7506-01 / 7506-23	7855-206 / 7855-706	1/4 (6.35)
5853-10 / 5858-10	11	.187 (4.74)	3.3	7506-01 / 7506-23	7855-206 / 7855-706	3/8 (9.5)
5853-18 / 5858-07	15	.125 (3.18)	1.5	7506-05 / 7506-27	7855-210 / 7855-710	1/4 (6.35)
5853-19 / 5858-12	15	.187 (4.74)	3.3	7506-05 / 7506-27	7855-210 / 7855-710	3/8 (9.5)
5853-21 / 5858-14	15	.375 (9.5)	13.3	7506-05 / 7506-27	7855-210 / 7855-710	1/2 (12.7)
5853-31 / -	25	.500 (12.7)	23.6	7506-09 / -	7855-270 / 7855-772	3/4 (19)
5853-31 / -	25	.750 (19)	53.3	7506-09 / -	7855-270 / 7855-772	1 (25.4)


**RESERVOIR** *Graduated Glass, Reagent* ★

Heavy-wall borosilicate glass bottle with three PTFE valves with Tefzel keys. Pressure-tight PTFE coated Fluoron forms a seal within cap; hence, fluid contact is restricted to glass, PTFE and Tefzel. The three individually controlled valves permit the application of gas under pressure to the bottle for venting, flushing, or delivery of the bottle contents to one or two points. Bottles may be pressurized in isolation or in series with the other bottles. One of the valves may be used to allow corrosive fumes to be vented safely. Rated to 14psig at ambient; **must be adequately shielded when under pressure**. Each bottle is provided with a three-valve, 1/4"-28 UNF cap ideal for use with our 5859 and 5855 tubing connectors.

Cap., mL	Cap	Max psig @ ambient	Qty	Order Code
<b>Clear Reagent Reservoir, w/Netting &amp; Cap</b>				
250	1/4"-28 UNF	14	1	5414-07
500	1/4"-28 UNF	14	1	5414-10
1000	1/4"-28 UNF	14	1	5414-15

**Coated Solvent Reservoir, w/Cap**

250	1/4"-28 UNF	14	1	5414-137
500	1/4"-28 UNF	14	1	5414-139
1000	1/4"-28 UNF	14	1	5414-141

**Accessories**

Cap only, with valves	1	5414-502
Filter, Sparger, PTFE/Stainless Steel, 10 micron	1	5414-31
Filter, Bottle Bottom, PTFE, 10 micron	1	5414-32
Filter, Bottle Bottom, Polypropylene, 20 micron	1	5414-33
Filtered Check Valve, PTFE, 10 micron	1	5414-34

## Color Coated Glassware



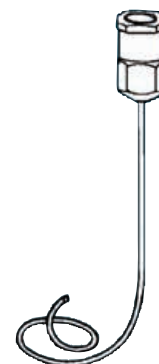
**Ace Glass** offers many of our existing glass vessels in various coated versions. Flasks, pressure bottles, beakers, bottles and many other items listed in this catalog can be amber or color coated on request. The coating is a proprietary process and gives excellent UV protection characteristics. Contact Ace for more details and pricing.

## ADAPTER Needle ★

Designed to eliminate “dead space” between end of standard Luer-Lok taper and bottom of standard hub when using 5837 adapters. Kel-F hub and PTFE tubing extension approximately one meter long. (Longer extensions are available via special order. Also available with Kel-F hub at both ends on special order.)

PTFE needle will slip into PTFE tubing making a sleeve fit satisfactory for discharging into an open container. All 5837 adapters now have a 0.051” opening for 10mm distance from end of Luer-Lok tip. If you have previously purchased 5837, the Luer-Lok tip can be enlarged to 0.051” with a No. 55 drill to accommodate these new needle adapters.

Length, m (in)	Qty	Order Code
1 (40)	1	5856-10



## TUBING PTFE ★

Clear, standard and thin-walled PTFE tubing for use with 5854, 5855, Omnifit tubing connectors or for other chromatography needs.

**Note:** Supplied in three-meter (10ft.) lengths.

I.D., mm	AWG Size	Wall, mm	Qty	Order Code
<b>Standard Wall Weight</b>				
0.8	20	.4	3 meters (10 ft.)	12684-23
1.0	18	.4	3 meters (10 ft.)	12684-08
1.5	15	.4	3 meters (10 ft.)	12684-19
2.0	12	.4	3 meters (10 ft.)	12684-28
4.8	5	.5	3 meters (10 ft.)	12684-11



### Thin Wall Weight

1.5	15	.3	3 meters (10 ft.)	12684-17
2.0	12	.3	3 meters (10 ft.)	12684-27

## CHROMATOGRAPHY APPARATUS Neutral Oil ♠

Newly designed flask increases the efficiency and standardization of neutral oil determination by: permitting automatic transfer of weighed crude oil samples onto alumina columns; converting column operation to a semi-automatic level, thereby reducing the cost of operation. Meets A.O.C.S. Ca9f-57 specifications.

**Complete apparatus consists of:**

**Reservoir** – 175mL capacity, 4mm PTFE stopcock, 19/22 male joint at bottom and #27 stopper joint at top

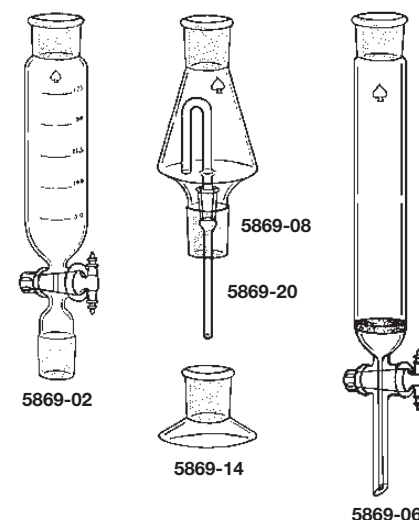
**Flask** – 20mL capacity, 19/22 joints at top and bottom, 7/15 joint on inner tube

**Base** – 19/22 joint

**Extension tube** – 7/15 joint

**Column** – 19mm I.D., 270mm length, 19/22 joint at top, 2mm PTFE stopcock, Porosity C (25-50 micron) fritted disc

Description	Qty	Order Code
Reservoir	1	5869-02
Flask	1	5869-08
Base	1	5869-14
Extension Tube	1	5869-20
Column	1	5869-06



### Complete Chromatography Apparatus

	1	5869-40
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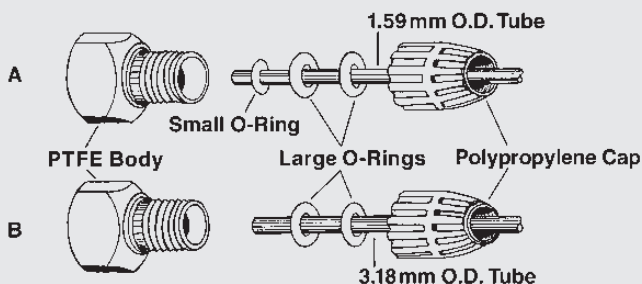
### Replacement Parts

PTFE Stopcock, 4mm bore, (for Reservoir)	1	8224-12
PTFE Stopcock, 2mm bore, (for Column)	1	8224-04

## Omnifit Variable-Bore Connectors and Valves

provide the utmost in flexibility and applicability. Leak-tight connection can be made to tubing of any diameter from 0.5mm to 11mm. Self-centering, zero dead volume connection can be made without flanging of tubing and without tools. Because flanging of the tubing is not required, Omnifit components can be used with rigid or flexible tubing of virtually any material. For example, connecting PTFE tubing to glassware is easy and quick with a variable-bore connector. The tube is simply inserted into the fitting and the cap tightened.

### How to Use Omnifit Variable-Bore Fittings



As supplied, Omnifit variable-bore fittings make the following types of connection:

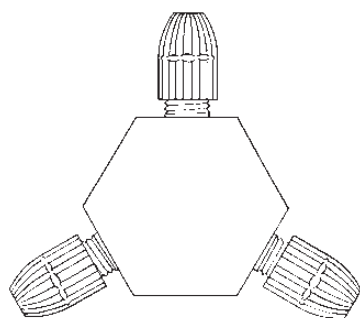
- TYPE 1: **Instant**
- TYPE 2: **High Pressure**
- TYPE 3: **Chemically Inert**
- TYPE 4: **Fitting to Fitting**



### CONNECTOR Tubing, Variable Bore ★

Provides instant connection of rigid or flexible tubing within a range of 0.5 to 4mm O.D. Dead volume is zero. Connections are made in seconds without flanging of tubing and are leak-tight to at least 50psig. Body is virgin PTFE. Caps are polypropylene with Fluoron elastomer O-Ring seals. Caps have 1/4"-28 UNF thread for interfacing with 5854, 5855 and 12724 adapters or other miniature plumbing systems. Supplied with PTFE cones for making O-Ring free connections.

Variable Bore O.D., mm	Maximum psig	Cap Thread	Qty	Order Code
0.5 to 4	50	1/4"-28 UNF	3	12714-20



### CONNECTOR Tubing, 3-Way, Variable Bore ★

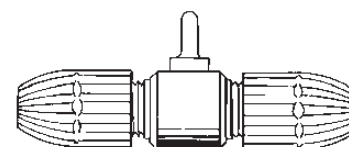
For instant connection of up to three rigid or flexible tubes within a range of 0.5 to 4mm O.D. Leak-tight to 50psig without flaring; if tubing is flared, pressure rating is 800psig. Suitable for in-line connection of 13385 pressure gauge when using the Michel-Miller Chromatography System. Body is virgin PTFE. Caps are polypropylene with Fluoron elastomer O-Ring seals. PTFE cones for all-PTFE connection of tubing are supplied. Caps have 1/4"-28 UNF thread for interfacing with 5854, 5855 and 12724 adapters or with other miniature plumbing systems.

Variable Bore O.D., mm	Maximum psig, (w/o flaring)	Maximum psig, (w/flaring)	Cap Thread	Qty	Order Code
0.5 to 4	50	800	1/4"-28 UNF	1	12720-25

**Omnifit valves** listed below are supplied with Variable-Bore Omnifit fittings for instant connection to tubing or to other fittings. The valves are unique, having but one moving part for each channel, and dead volume within the valves is zero. Valve keys are non-pyrogenic and biologically inert Tefzel. All valve bodies are machined from a single piece of PTFE for strength and maximum chemical inertness. In normal laboratory use Omnifit valves are virtually indestructible.

### VALVE Tubing Connector, 2-Way ★

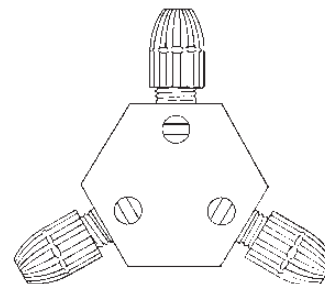
Similar to 12714-20 Connector except with single Tefzel control valve, rated 500psig. Valve has one moving part for long life and trouble free operation. Unique design prevents valve from leaking to outside even at excessive pressures. Body is machined from a single-piece of PTFE. Caps are polypropylene with Fluoron elastomer seals for instant connection of rigid or flexible tubing within a range of 0.5 to 4mm O.D. With 1/4"-28 UNF thread at back of cap for direct connection to other adapters. Autoclavable.



Variable Bore O.D., mm	Maximum psig	Cap Thread	Qty	Order Code
0.5 to 4	500	1/4"-28 UNF	2	12728-32

### VALVE Tubing Connector, 3-Way ★

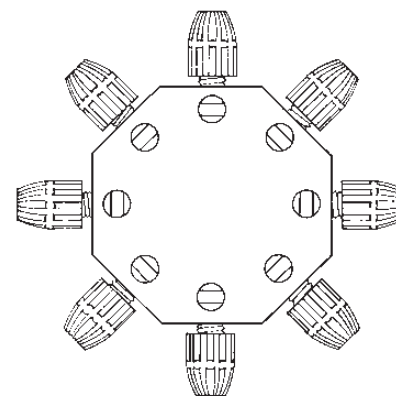
Three-way tubing connector Valve for applications where stream switching, reagent switching, sample removal or sample injection is desirable. Body is machined from a single-piece of PTFE. The Tefzel valves are rated to 500psig and have one moving part per channel for long life and trouble-free operation. The 1.5mm I.D. channels meet at valve center. Leak-tight to outside even at excessive pressures. Dead space within Valve is zero. Caps are polypropylene with Fluoron elastomer O-Ring seals for instant connection of rigid or flexible tubing within a range of 0.5 to 4mm O.D. With 1/4"-28 UNF thread at back of caps for direct connection with other adapters. Autoclavable.



Variable Bore O.D., mm	Maximum psig	Cap Thread	Qty	Order Code
0.5 to 4	500	1/4"-28 UNF	1	12730-39

### VALVE Tubing Connector, 8-Way ★

Eight-way tubing connector valve for applications where multiple channels are necessary for distributing reagents, solvents or buffers to chromatography columns, etc. Body is machined from a single-piece of PTFE. Valves are Tefzel and are rated at 500psig. The 1.5mm I.D. channels meet at valve center and have one moving part for long life and trouble-free operation. Leak-tight to outside even at excessive pressures. Dead space within valve is zero. Caps are polypropylene with Fluoron elastomer O-Ring seals for instant connection of rigid or flexible tubing within a range of 0.5 to 4mm O.D. With 1/4"-28 UNF thread at back of cap for direct connection with other adapters. Autoclavable.

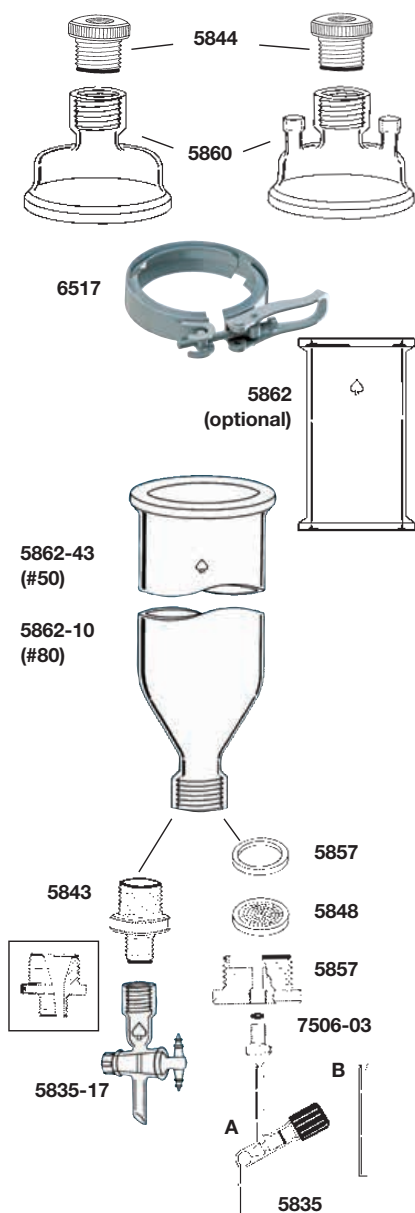


Variable Bore O.D., mm	Maximum psig	Cap Thread	Qty	Order Code
0.5 to 4	500	1/4"-28 UNF	1	12732-46

# BIG COLUMNS

All types of special combinations made to order

- Heads can be supplied with additional threads or joints or combination of both
- Columns available in various lengths and diameters



### ADAPTER for Swagelok ♦

PTFE adapter for use at top of 5860 column head or at bottom of 5862 column to connect tubing via Swagelok type connector to #50 Ace-Thred, other end has 1/4" NPT female thread. Supplied with (1) FETFE O-Ring.

Ace-Thred, #	Female Tubing Connection	Qty	Order Code
50	1/4in NPT	1	5844-78

### Replacement Parts

FETFE O-Ring	6	7855-729
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### COLUMN HEAD ♦

For use with 5862 column. Has #50 Ace-Thred center neck, with or without (2) #15 Ace-Thred side necks. 4" or 6" Duran flange at bottom, ground flat. Use with 6517 clamp.

Flange Size, in	Center Neck, Ace-Thred	Side Neck, Ace-Thred	Qty	Order Code
4	50	-	1	5860-24
6	50	-	1	5860-28
6	50	(2) 15	1	5860-32

### CLAMP Stainless Steel ★

Quick release clamp with (3) retaining clips for connecting heads with Duran flanges, (5860 head to 5862 column). Available with or without rod for clamping to support frame.

**Note:** Properly support bottom of your reactor, the clamp is only recommended for stabilization, not support.

Flange Size, in	Qty	Order Code
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#### Clamp w/o Support Rod

4	1	6517-25
6	1	6517-27

#### Clamp w/Support Rod

4	1	6517-54
6	1	6517-56

### COLUMN EXTENDER Chromatography ♦

Extenders that can be added to 5862 columns to increase column height. Extenders have an O-Ring grooved Duran flat flange on one end to attach 5860 column head and ground flat flange at other end to attach the 5862 column. Supplied with (1) silicone O-Ring. Use 6517 clamp to secure sections.

Flange Size, in	Column I.D., in	Length, in	Qty	Order Code
4	4	12	1	5862-72
4	4	18	1	5862-73
4	4	24	1	5862-74
6	6	12	1	5862-77
6	6	18	1	5862-78
6	6	24	1	5862-79

# BIG COLUMNS

## COLUMN Chromatography

Large size column with O-Ring grooved Duran flat flange for easy access. Supplied with silicone O-Ring to make seal when using 5860 head with 6517 clamp. Columns are tapered to either a #50 or #80 Ace-Thred at bottom.

Flange Size, in	Column I.D., in	Length, in	Bottom Ace-Thred, #	Qty	Order Code	
<b>#50 Ace-Thred Bottom</b>						
4	4	12	50	1	5862-43	♠
4	4	18	50	1	5862-45	♠
4	4	24	50	1	5862-47	♠
4	4	48	50	1	5862-49	♠
6	6	18	50	1	5862-58	♠
6	6	24	50	1	5862-62	♠
6	6	48	50	1	5862-65	♠
6	6	72	50	1	5862-68	♠

### #80 Ace-Thred Bottom

6	6	18	80	1	5862-10	♠
6	8	18	80	1	5862-18	♠
6	12	18	80	1	5862-26	♠
6	6	24	80	1	5862-12	♠
6	8	24	80	1	5862-20	♠
6	12	24	80	1	5862-28	♠
6	6	48	80	1	5862-14	♠
6	8	48	80	1	5862-22	♠
6	12	48	80	1	5862-30	♠

### Replacement O-Rings

Silicone - 4" Flange	5	7855-254	★
Silicone - 6" Flange	5	7855-260	★
CAPFE - 4" Flange	1	7855-880	♠
CAPFE - 6" Flange	1	7855-881	♠

## COUPLING Reducing, w/Support ♠

For connecting 5835 bottom drip stopcock adapter to 5862 column with leak-tight O-Ring seals. One end is #50 Ace-Thred for column, the other #25 Ace-Thred for 5835 adapter (B). Supplied with Porosity A glass packing support, press fitted. Supplied with (2) FETFE O-Rings.

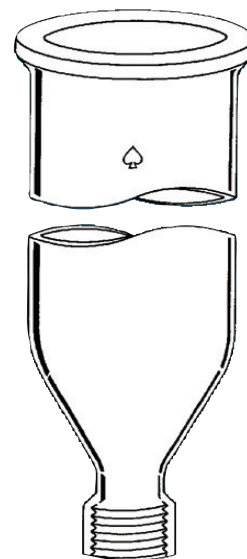
Top Ace-Thred, #	Bottom Ace-Thred, #	Pack Support, micron	Qty	Order Code
50	25	145-174 (A)	1	5843-74

### Replacement Glass Packing Supports

Porosity A (145-174 micron)	6	5848-49
Porosity B (70-100 micron)	6	5848-58

### Replacement FETFE O-Rings

50	6	7855-729
25	12	7855-727



# BIG COLUMNS



### ADAPTER *Bottom Drip, w/1:5 PTFE Stopcock* ♠

Drip tip for bottom of 5862 column using 5843 coupling. #25 Ace-Thred with drip tip and 4mm bore PTFE stopcock for controlling flow.

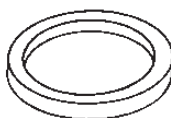
Ace-Thred, #	Bore, mm	Qty	Order Code
25	4	1	5835-17



### SUPPORT PLATE *Perforated Glass*

73mm diameter glass plate with 1x3mm rectangular slits for supporting column packing. Used with #80 threaded adapters (5857).

Diameter, mm	Qty	Order Code
73	1	5848-60 ★



### BOTTOM ADAPTER *UHMWPE or PTFE*

Fits #80 Ace-Thred. Recessed for 5848 perforated support plate and 5857-50 retaining ring. Your choice of bottom outlet, #11 Ace-Thred for bushing 7506-03 to secure 5835 outlet valve, or threaded to accept 3/8" NPT fitting.

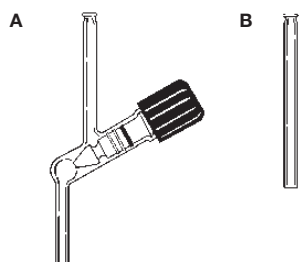
**Note:** UHMWPE - Ultra High Molecular Weight Polypropylene



Description	#11 Ace-Thred		3/8" NPT	
	Qty	Order Code	Qty	Order Code
<b>UHMWPE</b>				
Adapter, #80 Thred	1	5857-30 ♠	1	5857-35 ♠
Support Plate	1	5848-60 ★	1	5848-60 ★
Retaining Ring	1	5857-50 ♠	1	5857-50 ♠
Bushing	1	7506-03 ♠	1	—
Connector, 3/8"	1	—	1	12770-27 ★
<b>COMPLETE</b>	<b>1</b>	<b>5857-44 ♠</b>	<b>1</b>	<b>5857-46 ♠</b>
<b>PTFE</b>				
Adapter, #80 Thred	1	5857-60 ♠	1	5857-64 ♠
Support Plate	1	5848-60 ★	1	5848-60 ★
Retaining Ring	1	5857-52 ♠	1	5857-52 ♠
Bushing	1	7506-03 ♠	1	—
Connector, 3/8"	1	—	1	12770-27 ★
<b>COMPLETE</b>	<b>1</b>	<b>5857-67 ♠</b>	<b>1</b>	<b>5857-69 ♠</b>

### Replacement FETFE O-Rings

	3	7855-764 ♠
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### BOTTOM OUTLET VALVE *with or without Stopcock* ♠

**Type A** — With 0-8mm threaded stopcock for controlling flow.

**Type B** — Straight stem without stopcock. Both stems to take 3/8" Swagelok fittings. Secured to 5857 Bottom adapter with 7506-03 bushing.

Type	Stopcock Bore, mm	Qty	Order Code
A	0-8	1	5835-32
B	—	1	5835-34

### Replacement Plug

	0-8	1	8192-263
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**SUPPORT STAND** for Large Chromatography Columns ★

Four-post stands for large scale chromatography columns feature all stainless steel construction. Each stand is designed to accept either 24", 48" or 72" length columns. Each stand is designed to accommodate the height of the column and has a PTFE collar at the bottom that accepts and supports the tapered bottom of the column. Each stand has an adjustable stainless upper collar assembly that supports the top of the column. All stands have locking casters for mobility.

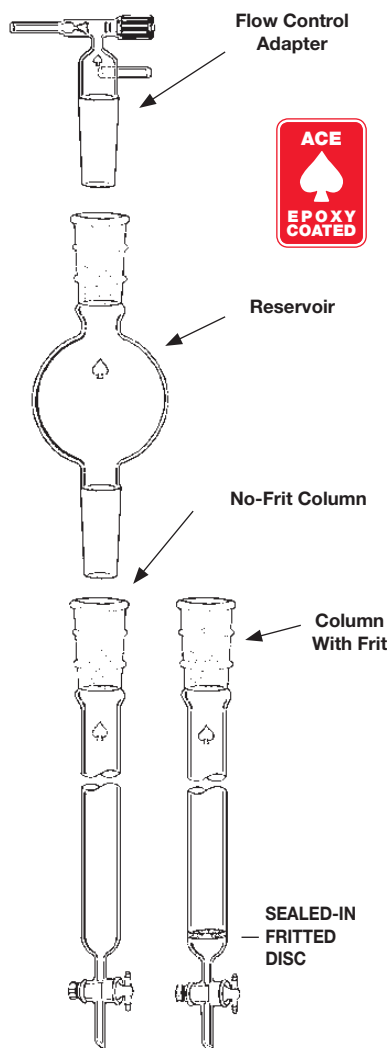
Fits Column (Height) in	Dimensions, Inches (W x D x H)	Qty	Order Code
24	15 x 15 x 40	1	<b>5867-24</b>
48	15 x 15 x 60	1	<b>5867-48</b>
72	15 x 15 x 85	1	<b>5867-72</b>


**SUPPORT STAND** for Bench-Scale Chromatography Columns ★

Support stand assembly for bench scale size Chromatography columns. "H" shaped base stand and 48" high stainless steel rod gives great stability for the larger bench scale columns. Stand comes complete with base, rod, support plate with hole, clamp holder, chain clamp and cork ring.

Fits Column (Height) in	Overall Stand Height, in	Rod Thickness, in	Rod Height, in	Qty	Order Code
12 and 18	49	1	48	1	<b>5868-122</b>





### COLUMN Flash Chromatography, Standard Taper Joint, Epoxy Coated

Simple absorption chromatography column for rapid preparative separations. Allows separations of samples from 0.01 to 10.0g<sup>3</sup> in 10-15 minutes. **Column and reservoir only are epoxy coated for safety.** Reservoir connects between column and flow control adapter. Columns available with or without Porosity B (70-100 micron) sealed-in, fritted disc. Stopcock on column is PTFE.

**Note:** Order each item separately.

Column I.D., mm (in)	Length, mm (in)	Capacity, mL	Upper Joint \$	Lower Joint \$	Bore, mm	Qty	w/o Fritted Disc		w/Fritted Disc		
							Order Code	Qty	Order Code	Qty	
<b>Column only</b>											
10 (.39)	457 (18)	36	24/40	-	2	1	5903-20	♣	1	5904-22	♣
13 (.50)	203 (8)	30	24/40	-	2	1	5871-03	♣	1	5871-51	♣
13 (.50)	254 (10)	34	24/40	-	2	1	5871-05	♣	1	5871-53	♣
13 (.50)	305 (12)	40	24/40	-	2	1	5871-07	♣	1	5871-55	♣
13 (.50)	457 (18)	60	24/40	-	2	1	5871-08	♣	1	5871-56	♣
19 (.75)	203 (8)	60	24/40	-	2	1	5871-09	♣	1	5871-58	♣
19 (.75)	254 (10)	70	24/40	-	2	1	5871-11	♣	1	5871-59	♣
19 (.75)	305 (12)	86	24/40	-	2	1	5871-13	♣	1	5871-61	♣
19 (.75)	457 (18)	130	24/40	-	2	1	5871-14	♣	1	5871-62	♣
19 (.75)	610 (24)	173	24/40	-	2	1	5903-24	♣	1	5904-26	♣
25 (1.0)	203 (8)	100	24/40	-	2	1	5871-15	♣	1	5871-65	♣
25 (1.0)	254 (10)	125	24/40	-	2	1	5871-17	♣	1	5871-67	♣
25 (1.0)	305 (12)	150	24/40	-	2	1	5871-18	♣	1	5871-68	♣
25 (1.0)	457 (18)	220	24/40	-	2	1	5871-19	♣	1	5871-69	♣
25 (1.0)	510 (20)	250	24/40	-	2	1	5903-26	♣	1	5904-28	♣
38 (1.5)	203 (8)	230	24/40	-	2	1	5871-21	♣	1	5871-73	♣
38 (1.5)	254 (10)	290	24/40	-	2	1	5871-22	♣	1	5871-75	♣
38 (1.5)	305 (12)	350	24/40	-	2	1	5871-24	♣	1	5871-76	♣
38 (1.5)	457 (18)	520	24/40	-	2	1	5871-25	♣	1	5871-77	♣
41 (1.6)	610 (24)	805	24/40	-	2	1	5903-27	♣	1	5904-37	♣
50 (2.0)	203 (8)	400	24/40	-	2	1	5871-29	♣	1	5871-79	♣
50 (2.0)	254 (10)	500	24/40	-	2	1	5871-30	♣	1	5871-81	♣
50 (2.0)	305 (12)	600	24/40	-	2	1	5871-32	♣	1	5871-82	♣
50 (2.0)	457 (18)	900	24/40	-	2	1	5871-34	♣	1	5871-84	♣
50 (2.0)	610 (24)	1,200	24/40	-	2	1	5903-28	♣	1	5904-40	♣
64 (2.5)	203 (8)	650	45/50	-	4	1	5871-37	♣	1	5871-85	♣
64 (2.5)	254 (10)	820	45/50	-	4	1	5871-39	♣	1	5871-86	♣
64 (2.5)	305 (12)	980	45/50	-	4	1	5871-40	♣	1	5871-88	♣
64 (2.5)	457 (18)	1,470	45/50	-	4	1	5871-41	♣	1	5871-90	♣
64 (2.5)	610 (24)	1,960	45/50	-	4	1	5871-42	♣	1	5871-91	♣
75 (3.0)	203 (8)	900	45/50	-	4	1	5871-43	♣	1	5871-92	♣
75 (3.0)	254 (10)	1,120	45/50	-	4	1	5871-44	♣	1	5871-94	♣
75 (3.0)	305 (12)	1,350	45/50	-	4	1	5871-46	♣	1	5871-96	♣
75 (3.0)	457 (18)	2,020	45/50	-	4	1	5871-48	♣	1	5871-97	♣
75 (3.0)	610 (24)	2,690	45/50	-	4	1	5871-49	♣	1	5871-98	♣

#### Reservoir only

250	24/40	24/40	1	5871-112	♣
500	24/40	24/40	1	5871-114	♣
1000	24/40	24/40	1	5871-120	♣
1000	24/40	45/50	1	5871-124	♣
2000	24/40	24/40	1	5871-130	♣
2000	24/40	45/50	1	5871-132	♣
3000	24/40	45/50	1	5871-143	♣
5000	24/40	45/50	1	5871-150	♣

#### Flow Control Adapter only

24/40	0-3	1	5871-165	♣
45/50	0-3	1	5871-167	♣

#### Replacement Parts and Accessories

24/40 Joint Clamp, Plastic	10	7598-24	★	
45/50 Joint Clamp, Plastic	10	7598-45	★	
PTFE Stopcock Plug	2	1	8224-04	♣
PTFE Stopcock Plug	4	1	8224-12	♣
PTFE Plug	0-3	1	8192-261	♣

**Column lengths and diameters can be made to order.**

## COLUMN Flash Chromatography, Spherical Joint, Epoxy Coated

Simple absorption chromatography column for rapid preparative separations. Allows separations of samples from 0.01 to 10.0g<sup>3</sup> in 10-15 minutes. **Column and reservoir only are epoxy coated for safety.** Reservoir connects between column and flow control adapter. Columns available with or without Porosity B (70-100 micron) sealed-in, fritted disc. Stopcock on column is PTFE.

**Note:** Order each item separately.

Column I.D., mm (in)	Length, mm (in)	Capacity, mL	Upper Joint ♂	Lower Joint ♂	Bore, mm	w/o Fritted Disc		w/Fritted Disc	
						Qty	Order Code	Qty	Order Code
<b>Column only</b>									
10 (.39)	457 (18)	40	35/20	-	2	1	5872-06	♣	1 5872-50 ♣
13 (.50)	203 (8)	30	35/20	-	2	1	5872-02	♣	1 5872-55 ♣
13 (.50)	254 (10)	34	35/20	-	2	1	5872-03	♣	1 5872-57 ♣
13 (.50)	305 (12)	40	35/20	-	2	1	5872-04	♣	1 5872-58 ♣
13 (.50)	457 (18)	60	35/20	-	2	1	5872-05	♣	1 5872-60 ♣
19 (.75)	203 (8)	60	35/20	-	2	1	5872-07	♣	1 5872-61 ♣
19 (.75)	254 (10)	70	35/20	-	2	1	5872-08	♣	1 5872-62 ♣
19 (.75)	305 (12)	86	35/20	-	2	1	5872-09	♣	1 5872-63 ♣
19 (.75)	457 (18)	130	35/20	-	2	1	5872-10	♣	1 5872-54 ♣
25 (1.0)	203 (8)	100	35/20	-	2	1	5872-12	♣	1 5872-64 ♣
25 (1.0)	254 (10)	125	35/20	-	2	1	5872-13	♣	1 5872-65 ♣
25 (1.0)	305 (12)	150	35/20	-	2	1	5872-15	♣	1 5872-66 ♣
25 (1.0)	457 (18)	220	35/20	-	2	1	5872-16	♣	1 5872-67 ♣
38 (1.5)	203 (8)	230	35/20	-	2	1	5872-17	♣	1 5872-68 ♣
38 (1.5)	254 (10)	290	35/20	-	2	1	5872-18	♣	1 5872-69 ♣
38 (1.5)	305 (12)	350	35/20	-	2	1	5872-19	♣	1 5872-70 ♣
38 (1.5)	457 (18)	520	35/20	-	2	1	5872-22	♣	1 5872-71 ♣
41 (1.6)	457 (18)	600	35/20	-	2	1	5872-14	♣	1 5872-56 ♣
50 (2.0)	203 (8)	400	50/30	-	2	1	5872-23	♣	1 5872-72 ♣
50 (2.0)	254 (10)	500	50/30	-	2	1	5872-24	♣	1 5872-73 ♣
50 (2.0)	305 (12)	600	50/30	-	2	1	5872-25	♣	1 5872-74 ♣
50 (2.0)	457 (18)	900	35/20	-	2	1	5872-20	♣	1 5872-59 ♣
50 (2.0)	610 (24)	1,200	50/30	-	2	1	5872-27	♣	1 5872-75 ♣
64 (2.5)	203 (8)	650	50/30	-	4	1	5872-28	♣	1 5872-76 ♣
64 (2.5)	254 (10)	820	50/30	-	4	1	5872-29	♣	1 5872-80 ♣
64 (2.5)	305 (12)	980	50/30	-	4	1	5872-30	♣	1 5872-81 ♣
64 (2.5)	457 (18)	1,470	50/30	-	4	1	5872-31	♣	1 5872-82 ♣
64 (2.5)	610 (24)	1,960	50/30	-	4	1	5872-32	♣	1 5872-86 ♣
75 (3.0)	203 (8)	900	75/50	-	4	1	5872-33	♣	1 5872-87 ♣
75 (3.0)	254 (10)	1,120	75/50	-	4	1	5872-34	♣	1 5872-88 ♣
75 (3.0)	305 (12)	1,350	75/50	-	4	1	5872-51	♣	1 5872-90 ♣
75 (3.0)	457 (18)	2,020	75/50	-	4	1	5872-52	♣	1 5872-97 ♣
75 (3.0)	610 (24)	2,690	75/50	-	4	1	5872-26	♣	1 5872-98 ♣

### Reservoir only

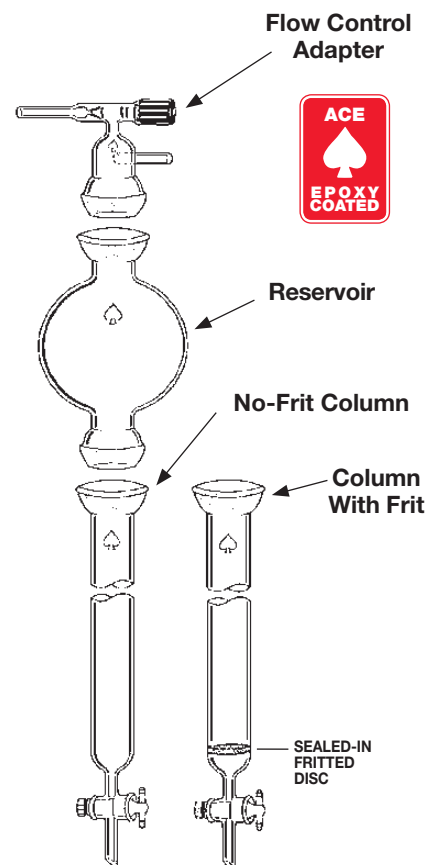
250	35/20	35/20	1	5872-41	♣
500	35/20	35/20	1	5872-42	♣
1000	35/20	35/20	1	5872-43	♣
1000	35/20	50/30	1	5872-44	♣
2000	35/20	35/20	1	5872-45	♣
2000	35/20	50/30	1	5872-46	♣
2000	35/20	75/50	1	5872-47	♣
3000	35/20	75/50	1	5872-48	♣
5000	35/20	75/50	1	5872-49	♣

### Flow Control Adapter only

	35/20	0-3	1	5872-35	♣
	50/30	0-3	1	5872-36	♣
	75/30	0-3	1	5872-37	♣

### Replacement Parts and Accessories

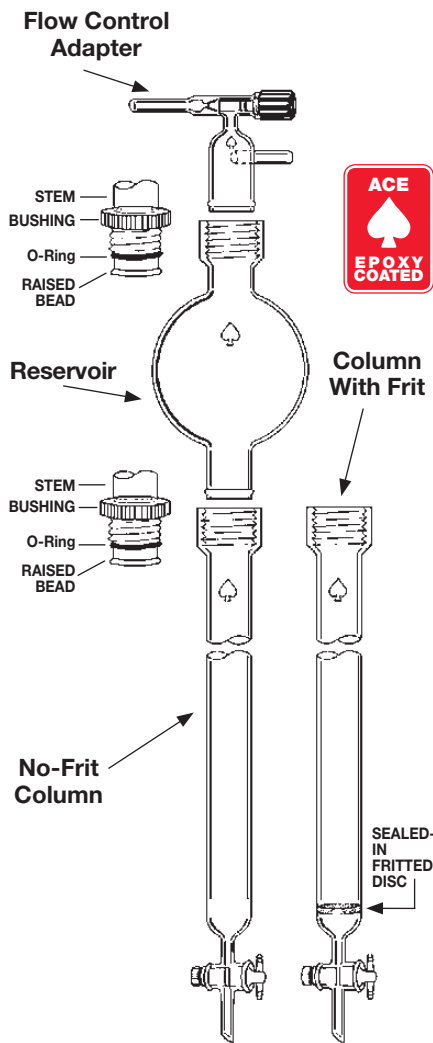
35/20 Pinch Type Clamp	1	7669-14	★
50/30 Pinch Type Clamp	1	7669-18	★
75/50 Pinch Type Clamp	1	7669-22	★
PTFE Stopcock Plug	2	8224-04	♣
PTFE Stopcock Plug	4	8224-12	♣
PTFE Plug	0-3	8192-261	♣



**For one-piece columns, with reservoir, see 5906, 5907 & 5908.**

**Column lengths and diameters can be made to order.**

**Easy assembly  
and more stability  
with Ace-Thred  
connections**



**COLUMN** Flash Chromatography, Epoxy Coated, Modified ♠

Modified version of 5872 simple absorption column for rapid preparative separations. This version incorporates a #25 Ace-Thred connector in place of the § 35/20 joints, for grease-free connection. The internally threaded connector and 7506 Nylon bushing make a pressure-tight, O-Ring compression seal with glass stem on reservoir and flow adapter. Glass bead helps O-Ring form a more positive seal against bushing to help prevent back out. Bushing replaces joint clamp. **Column and reservoir, only, are Epoxy Coated for added protection against scratching.** Column available with or without Porosity B (70–100 micron) fritted disc sealed in.

*Note: Order each item separately.*

Column I.D., mm (in)	Length, mm (in)	Capacity, mL	Upper Ace-Thred, #	Lower Joint	Bore, mm	w/o Fritted Disc		w/Fritted Disc	
						Qty	Order Code	Qty	Order Code
<b>Column only</b>									
10	457	40	25	–	2	1	5873-05	1	5873-51
19	457	130	25	–	2	1	5873-09	1	5873-54
41	457	600	25	–	2	1	5873-13	1	5873-57
50	457	950	25	–	2	1	5873-19	1	5873-60
<b>Reservoir only</b>									
		250	25	Bead				1	5873-44
		500	25	Bead				1	5873-45
		1000	25	Bead				1	5873-46
<b>Flow Control Adapter only</b>									
				Bead	0-3			1	5873-32
<b>Replacement Parts and Accessories</b>									
								1	7506-10
								1	8224-04
								1	8192-261

**CAUTION**  
**For Chromatography Use Only**  
 Not intended for use with 40 micron or smaller packing which will cause operating pressures to exceed safe limits of glass.  
**ALWAYS USE A SAFETY SHIELD**

**For a complete assembly of 5871, 5872 or 5873 systems, order flow control adapter, column with or without frit, reservoir and clamp or bushing.**

**Need Something Special? Choose ACE**

Whether you're simply changing a joint size or designing an entire custom unit, our technical staff is at your service!

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## RAPID PREPARATIVE CHROMATOGRAPHY SYSTEM

Rapid preparative chromatography system suitable for use with pressures up to 50psig. **(CAUTION: Care should be taken when using glass under pressure. Operation behind a shield is recommended.)** Available with 25mm or 50mm I.D. glass column, 300mm effective length, with corresponding Ace-Threads. Adapter at bottom of column is nylon or PTFE with a “pop-in” polyethylene packing support, 100 micron porosity maximum, and a Luer-Lok fitting takeoff. **Reservoir is 2000mL or 3000mL capacity, epoxy coated for safety, pressure tested**, with #25 Ace-Threds top and bottom. Connection to column is by nylon or PTFE coupling. Fitting at top of reservoir is nylon or PTFE with a 1/8” NPT female thread to accept a Swagelok quick connect/disconnect fitting that in turn connects to brass manifold; brass manifold attaches directly to reservoir using a nylon or PTFE reducer coupling.

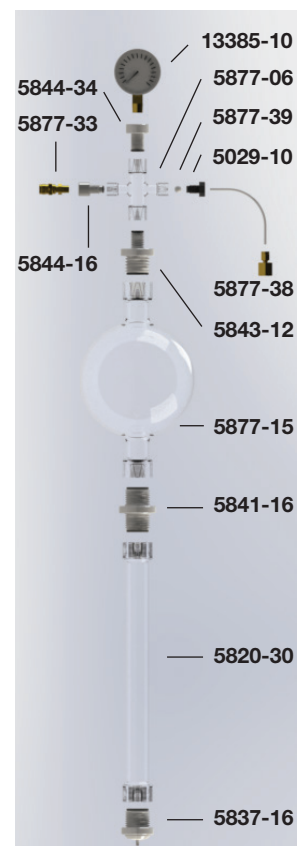
Brass manifold has three 1/8” NPT female threads for connection to reservoir, a brass pressure relief valve, and Swagelok tubing connector for connecting to pressure line. Fourth thread is 1/8” NPT adapted to 1/4-inch NPT for connecting to a 0-60psig, 2-1/2” diameter pressure gauge.

Glass manifold has two #7 Ace-Threds; one for connecting pressure line directly using nylon bushing with PTFE ball for quick disconnect, the other has a nylon to PTFE fitting for connecting brass pressure relief valve. Lower thread is #15 for direct connection to reservoir using a reducer coupling, #15-25 Ace-Thred. Top #15 Ace-Thred on glass manifold accepts threaded nylon or PTFE fitting to connect pressure gauge.

### BRASS MANIFOLD



### GLASS MANIFOLD



### Complete item includes:

#### Brass:

- Brass manifold
- Pressure gauge
- Brass connector 1/8” NPT to 1/8” O.D. tubing
- Brass connector 1/8” O.D. tubing to 1/4” NPT female
- Quick connect/disconnect fitting
- Brass pressure relief valve
- Nylon connector #25 to 1/8” NPT female
- Epoxy coated column
- Epoxy coated reservoir
- Nylon couplings with FETFE O-Ring
- Nylon end fittings with FETFE O-Ring
- PTFE Tubing 1/8” O.D., 10ft

#### Glass:

- Glass manifold
- Pressure gauge
- Nylon connector 1/8” NPT Female to #7
- Brass pressure relief valve
- Nylon bushing #7 with PTFE ball
- Nylon bushing #15 to 1/4” NPT female
- Nylon couplings with FETFE O-Rings
- Epoxy coated reservoir
- Epoxy coated column
- Nylon end fitting with FETFE O-Ring
- PTFE tubing 1/8” O.D., 10ft

Type Manifold	Reservoir Capacity, mL	Column Length x Dia., mm	Qty	Order Code	
Brass	2000	300 x 25	1	5877-60	★
Brass	3000	300 x 50	1	5877-65	★

Type Manifold	Reservoir Capacity, mL	Column Length x Dia., mm	Qty	Order Code	
Glass	2000	300 x 25	1	5877-50	♣
Glass	3000	300 x 50	1	5877-55	♣

**REPLACEMENT PARTS** for 5877 Rapid Preparative Chromatography System

<b>Replacement Chromatography Columns</b>							
Length, mm	O.D., mm	Qty	Column Only Order Code	Capacity, mL	Ace-Thred, #	Reservoir only Qty	Reservoir only Order Code
300	25	1	5820-30 ♠	2000	25	1	5877-15 ♠
300	50	1	5820-50 ♠	3000	25	1	5877-16 ♠

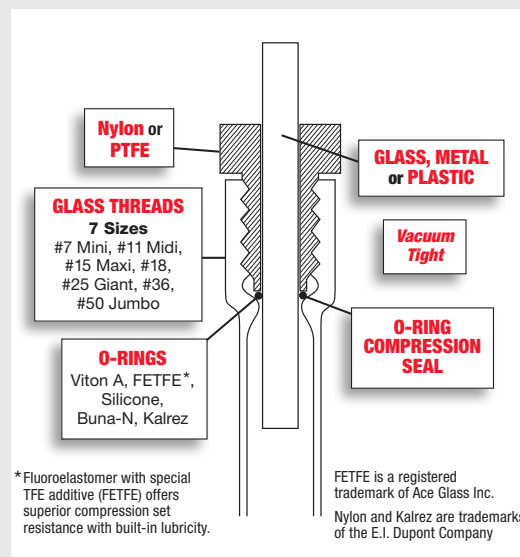
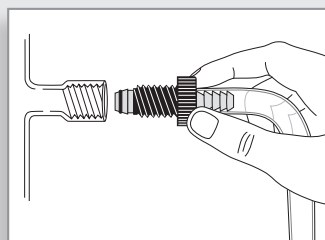
  

<b>Brass Manifold Parts</b>				<b>Glass Manifold Parts</b>			
	Qty	Order Code		Qty	Order Code		
Brass manifold, only	1	5877-05 ★	Glass manifold, only	1	5877-06 ♠		
End fitting, nylon, #25	1	5837-16 ♠	End fitting, nylon, #25	1	5837-16 ♠		
End fitting, PTFE, #25	1	5837-56 ♠	End fitting, PTFE, #25	1	5837-56 ♠		
End fitting, nylon, #50	1	5837-21 ♠	End fitting, nylon, #50	1	5837-21 ♠		
End fitting, PTFE, #50	1	5837-61 ♠	End fitting, PTFE, #50	1	5837-61 ♠		
Coupling, nylon, #25-25	1	5841-16 ♠	Coupling, nylon, #25-25	1	5841-16 ♠		
Coupling, PTFE, #25-25	1	5841-50 ♠	Coupling, PTFE, #25-25	1	5841-50 ♠		
Coupling, nylon, #25-50	1	5843-16 ♠	Coupling, nylon, #25-50	1	5843-16 ♠		
Coupling, PTFE, #25-50	1	5843-51 ♠	Coupling, PTFE, #25-50	1	5843-51 ♠		
Nylon connector, #25 to 1/8in NPT female	1	5844-22 ♠	Coupling, nylon, #25-15	1	5843-12 ♠		
PTFE connector, #25 to 1/8in NPT female	1	5844-64 ♠	Coupling, PTFE #25-15	1	5843-49 ♠		
Quick connect-disconnect	1	5877-31 ★	Brass pressure relief valve, 1/8in	1	5877-33 ★		
Brass pressure relief valve, 1/8in	1	5877-33 ★	Bushing, nylon, #15 to 1/4in NPT female	1	5844-34 ♠		
Brass connector, 1/8in NPT male to 1/8in tube	1	5877-36 ★	Bushing, PTFE, #15 to 1/4in NPT female	1	5844-74 ♠		
Brass connector, 1/8in O.D. tube to 1/4in NPT female	1	5877-38 ★	Bushing, nylon, #7	1	5029-10 ♠		
Pressure Gauge, 0-60psig, brass internals, 1/4in male NPT bottom fitting, 2.5in O.D.	1	13385-10 ★	Pressure Gauge, 0-60psig, brass internals, 1/4in male NPT bottom fitting, 2.5in O.D.	1	13385-10 ★		
Tubing, PTFE, 1/8in O.D., 10 ft.	1	12687-04 ★	Bushing, PTFE, #7	1	5029-35 ♠		
			PTFE Ball	1	5877-39 ♠		
			Bushing, nylon #7 to 1/8in NPT female	1	5844-16 ♠		
			Bushing, PTFE #7 to 1/8in NPT female	1	5844-58 ♠		
			Tubing, PTFE 1/8in O.D., 10 ft.	1	12687-04 ★		

*\*Designed and used by M. Haslanger, E. Petrillo and P. Sprague at The Squibb Institute For Medical Research, Princeton, NJ*

# Ace-Threds

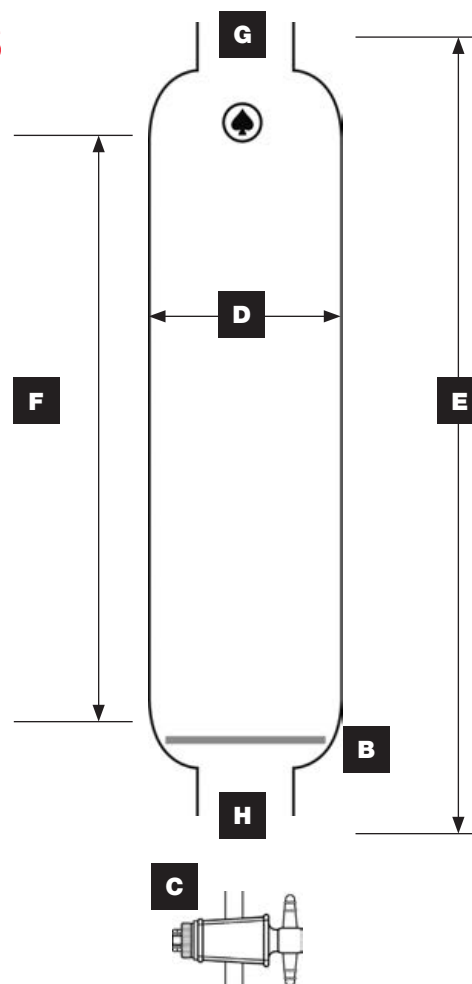
Grease Free | Clamp Free | More Convenient



**Fax to Ace Glass: 1-800-543-6752**

# Custom Chromatography Columns

<b>A</b>	Coated?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>B</b>	Frit Size	mm
	Porosity	
<b>C</b>	Stopcock Size	
	Stopcock Type	
<b>D</b>	Column I.D.	mm
<b>E</b>	Column Length	mm
<b>F</b>	Column Effective Length	mm
<b>G</b>	Top Joint Size	
	Top Joint Type	
<b>H</b>	Bottom Joint Size	
	Bottom Joint Type	
<b>I</b>	Jacketed?	<input type="checkbox"/> Yes <input type="checkbox"/> No


**Additional Notes/Specification (please print):**


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**Your contact information:**

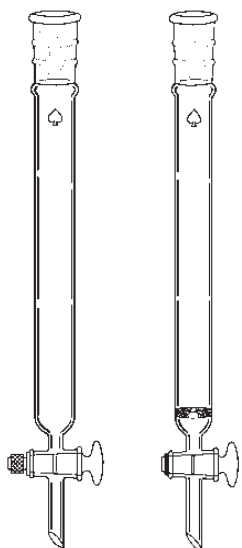
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<b>Company</b>	
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<b>City, State, Zip</b>	
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<b>Email Address</b>	

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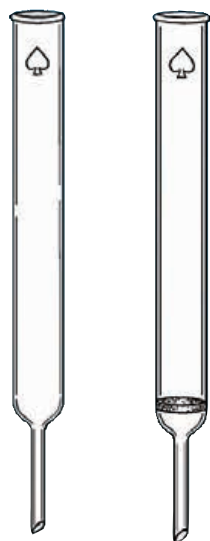
You can also order custom chromatography columns on our website at [www.aceglass.com](http://www.aceglass.com)



### CHROMATOGRAPHY COLUMN ♠

With 24/40 outer joint at top and a 2mm bore glass stopcock at the bottom. Available with Porosity B (70–100 micron) fritted disc sealed into the bottom of tube.

Top Outer Joint, 24/40	Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Bore, mm	Qty	Order Code
<b>without Fritted Disc</b>						
24/40	19	610	170	2	1	5865-10
<b>with Fritted Disc</b>						
24/40	10	460	40	2	1	5866-05
24/40	19	610	170	2	1	5866-10
<b>Replacement Glass Stopcock</b>						
				2	1	8223-02



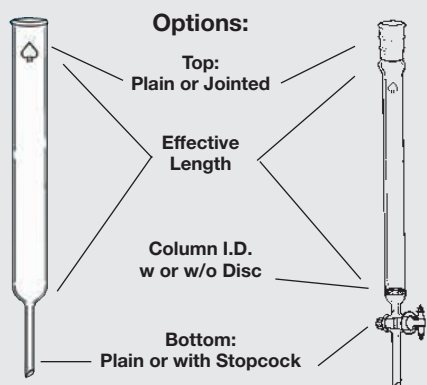
### CHROMATOGRAPHY COLUMN Plain ♠

Plain, open top chromatography column, universally suitable for many separations. Available with Porosity B (70–100 micron) fritted disc sealed in.

Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Qty	Order Code
<b>without Fritted Disc</b>				
22	250	950	1	5884-05
<b>with Fritted Disc</b>				
10	300	24	1	5885-06
19	410	116	1	5885-12
25	510	250	1	5885-18
41	610	805	1	5885-24

## Need a different column?

Furnish the following information. We'll make it for you.



#### Furnish this Info:

Top	Effective Length	Column I.D.*	Support	Bottom
Plain or Jointed (Size)			Without or With Disc**	Plain or With Stopcock***

\* See Catalog No. 8802 for tubing sizes.

\*\* Supplied with Porosity B (70-100 micron) unless ordered otherwise.

\*\*\* Supplied with 2mm bore 1:5 solid PTFE plug unless ordered otherwise.



## CHROMATOGRAPHY COLUMN 1:5 PTFE Plug ♠

Chromatography column with 2mm bore 1:5 taper solid PTFE stopcock plug at bottom. Available with Porosity B (70–100 micron) fritted disc sealed in.

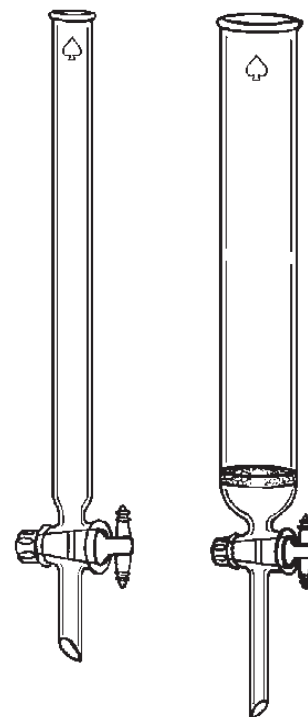
Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Bore, mm	Qty	Order Code
<b>without Fritted Disc</b>					
10.5	250	22	2	1	5888-10
14.5	250	41	2	1	5888-15
14.5	510	84	2	1	5888-20
19	250	71	2	1	5888-25
19	300	85	2	1	5888-30
19	510	145	2	1	5888-35
22	300	114	2	1	5888-37
22	410	156	2	1	5888-39
22	510	194	2	1	5888-41
25	300	147	2	1	5888-42
25	510	250	2	1	5888-45
41	510	673	2	1	5888-50
41	610	805	2	1	5888-55

### with Fritted Disc

10	300	24	2	1	5889-05
19	410	116	2	1	5889-10
22	300	114	2	1	5889-15
22	410	156	2	1	5889-20
25	300	147	2	1	5889-25
25	510	250	2	1	5889-30
41	610	805	2	1	5889-35
50	610	1197	2	1	5889-40

### Replacement PTFE Stopcock

				2	1	8224-04
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## CHROMATOGRAPHY COLUMN 1:5 PTFE Plug, with #15 Ace-Thred ♠

Chromatography column with #15 Ace-Thred at top and 2mm bore 1:5 taper solid PTFE stopcock plug at bottom. Complete item consists of column with 7506-06 nylon bushing and FETFE O-Ring, and 5853-07 tubing connector for connecting 12.5 to 14mm O.D. tubing to column. Also available with Porosity B (70–100 micron) fritted disc sealed in at bottom

**Note:** When using 5853 connector, O-Ring supplied with bushing is NOT necessary.

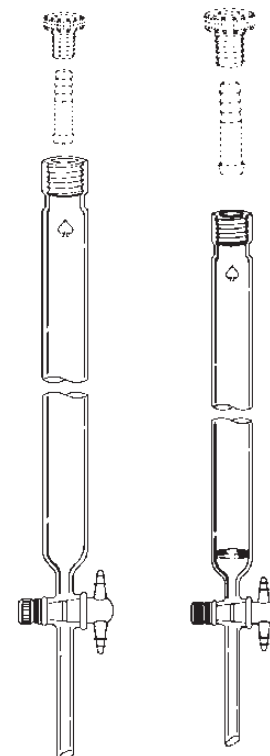
Ace-Thred, #	Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Column w/Stopcock Plug		Complete	
				Qty	Order Code	Qty	Order Code
<b>without Fritted Disc</b>							
15	10	460	36	1	5902-19	1	5902-39
15	19	610	173	1	5902-21	1	5902-41
15	25	510	250	1	5902-23	1	5902-45
15	50	610	1197	1	5902-25	1	5902-49

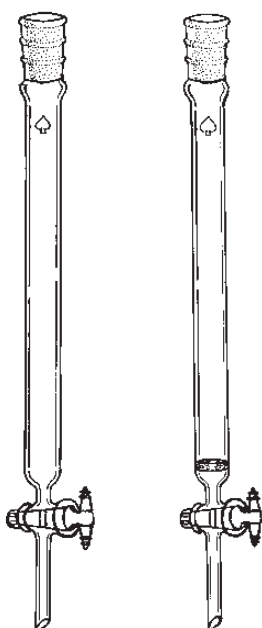
### with Fritted Disc

15	10	460	36	1	5905-15	1	5905-35
15	19	610	173	1	5905-19	1	5905-39
15	25	510	250	1	5905-23	1	5905-41
15	41	610	805	1	5905-25	1	5905-46
15	50	610	1197	1	5905-29	1	5905-49

### Replacement Parts

PTFE Stopcock	1	8224-04
Nylon Bushing w/FETFE O-Ring	1	7506-06
Tubing Connector	1	5853-07

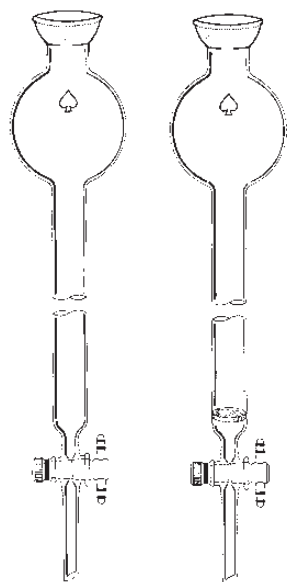




**CHROMATOGRAPHY COLUMN 1:5 PTFE Plug, § 24/40 Joint ♠**

Chromatography column similar to 5902 except § 24/40 joint replaces thred at top of column. Columns are epoxy coated. Also available with Porosity B (70–100 micron) fritted disc sealed near bottom of tube. **These columns also appear in expanded listing under 5871.**

Top Outer Joint, §	Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Bore, mm	Qty	Order Code
<b>without Fritted Disc</b>						
24/40	10	460	36	2	1	5903-20
24/40	19	610	173	2	1	5903-24
24/40	25	510	250	2	1	5903-26
24/40	41	610	805	2	1	5903-27
24/40	50	610	1197	2	1	5903-28
<b>with Fritted Disc</b>						
24/40	10	460	36	2	1	5904-22
24/40	19	410	116	2	1	5904-24
24/40	19	610	173	2	1	5904-26
24/40	25	510	250	2	1	5904-28
24/40	41	610	805	2	1	5904-37
24/40	50	610	1197	2	1	5904-40
<b>Replacement PTFE Stopcock</b>						
				2	1	8224-04



**CHROMATOGRAPHY COLUMN 1:5 PTFE Plug, Flow Control Connection**

Chromatography column with integral reservoir for connecting 5872 flow control adapter. With 2mm bore, 1:5 taper solid PTFE stopcock plug at bottom. Available with or without Porosity B (70–100 micron) fritted disc sealed in.

**Note:** Order column, flow control adapter and clamp separately.

Top Outer Joint, §	Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Reservoir Capacity, mL	Bore, mm	Qty	Order Code
<b>without Fritted Disc</b>							
35/20	10.5	250	22	200	2	1	5906-06 ♠
35/20	14.5	250	41	250	2	1	5906-09 ♠
35/20	19.0	300	85	250	2	1	5906-11 ♠
35/20	25.0	300	147	250	2	1	5906-14 ♠
50/30	38.0	300	340	250	2	1	5906-16 ♠
50/30	50.0	300	589	500	2	1	5906-18 ♠
<b>with Fritted Disc</b>							
35/20	10.5	250	22	200	2	1	5906-33 ♠
35/20	14.5	250	41	250	2	1	5906-36 ♠
35/20	19.0	300	85	250	2	1	5906-39 ♠
35/20	25.0	300	147	250	2	1	5906-43 ♠
50/30	38.0	300	340	250	2	1	5906-45 ♠
50/30	50.0	300	589	500	2	1	5906-47 ♠

**Replacement Parts and Accessories**

PTFE Stopcock Plug, 2mm bore	1	8224-04 ♠
Flow Control Adapter, only, § 35/20	1	5872-35 ♠
Flow Control Adapter, only, § 50/30	1	5872-36 ♠
Clamp, Pinch Type, § 35/20	1	7669-14 ♠
Clamp, Pinch Type, § 50/30	1	7669-18 ★

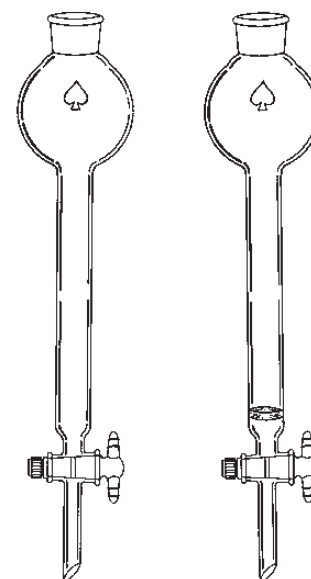
## CHROMATOGRAPHY COLUMN 1:5 PTFE Plug ♠

Chromatography column with integral reservoir at top, and 2mm bore 1:5 taper PTFE stopcock plug at bottom. Opening at top for #3 stopper or § 24/40 outer joint. Available with or without Porosity B (70–100 micron) fritted disc sealed in.

Top Outer Joint, §	Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Reservoir Capacity, mL	Without Disc		With Disc	
					Qty	Order Code	Qty	Order Code
<b>#3 Stopper Top</b>								
24/40	10.5	250	22	200	1	5907-05	1	5907-32
24/40	14.5	250	41	250	1	5907-10	1	5907-35
24/40	19.0	300	85	250	1	5907-15	1	5907-37
24/40	25.0	300	147	250	1	5907-20	1	5907-41
24/40	38.0	300	340	250	1	5907-22	1	5907-43
24/40	50.0	300	589	500	1	5907-24	1	5907-45
<b>§ 24/40 Outer Joint Top</b>								
24/40	10.5	250	22	200	1	5907-105	1	5907-132
24/40	14.5	250	41	250	1	5907-110	1	5907-135
24/40	19.0	300	85	250	1	5907-115	1	5907-137
24/40	25.0	300	147	250	1	5907-120	1	5907-141
24/40	38.0	300	340	250	1	5907-122	1	5907-143
24/40	50.0	300	589	500	1	5907-124	1	5907-145

### Replacement PTFE Stopcock

	1	8224-04
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## CHROMATOGRAPHY COLUMN 1:5 PTFE Plug, #15 Ace-Thred ♠

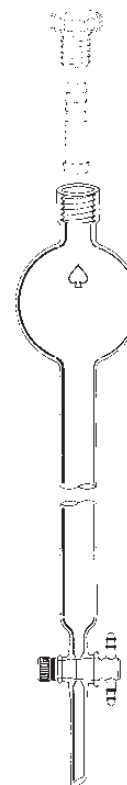
Chromatography column with integral reservoir and #15 Ace-Thred at top, and 2mm bore 1:5 taper PTFE plug at bottom. Column supplied with 7506-06 nylon bushing and FETFE O-Ring. Complete item consists of column with bushing and O-Ring, and 5853-07 tubing connector for connecting 12.5 to 14mm O.D. tubing to column.

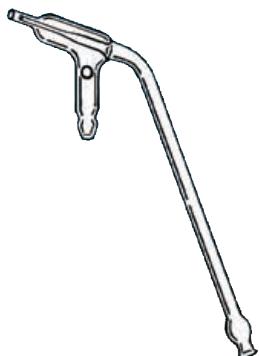
**Note:** When using 5853, O-Ring supplied with bushing is NOT necessary.

Ace-Thred, #	Column I.D., mm	Effective Length, mm	Approx. Capacity, mL	Reservoir Capacity, mL	Column		Complete	
					Qty	Order Code	Qty	Order Code
15	10.5	250	22	200	1	5908-06	1	5908-36
15	14.5	250	41	250	1	5908-12	1	5908-42
15	19.0	300	85	250	1	5908-18	1	5908-44
15	25.0	300	147	250	1	5908-22	1	5908-46

### Replacement Parts and Accessories

PTFE Stopcock Plug, 2mm bore	1	8224-04
Nylon Bushing w/FETFE O-Ring	1	7506-06
Tubing Connector	1	5853-07





**CHROMATOGRAPHY SPRAYER** ♠

Delivers a true aerosol with no droplets. Enables thorough brushing for uniform development. Spray action begins at .028m<sup>3</sup> per minute air flow. Atomization rate approximately 10mL per minute. Easily controlled with thumb pressure on side vent hole. Suction stem is 125mm long. 8mm I.D. hose connects to bottom inlet for aspiration and 6mm I.D. hose connects to bottom arm for air inlet.

Stem Length, mm	Aspiration Hose Connection, mm	Air Inlet Hose Connection, mm	Qty	Order Code
125	8	6	1	5917-10



**CHROMATOGRAPHY INDICATOR SPRAYER** ★

A convenient, powerful spray unit for spraying indicators. Complete unit consists of spray head with dip tube, can of propellant and plastic jar. Refill sprays up to one liter.

	Qty	Order Code
<b>Complete Sprayer</b>		
	1	5918-10

**Replacement Parts**

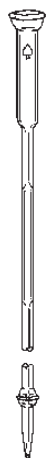
Plastic Jar, only	1	5918-02
Can of propellant, only	1	5918-04



**ADSORPTION COLUMN** ♠

Used in ASTM D1319-0, a “test for hydrocarbon types in liquid petroleum products.” Consists of a charger section with a capillary neck, a separator section, and an analyzer section. Upper joint § 28/12.

Top Joint, §	Qty	Order Code
28/12	1	5920-05



**ADSORPTION COLUMN Trubore**® ♠

Used for same test as 5920. This unit is fabricated from ACE Trubore® tubing. Tip is attached to column by means of a § 12/2 spherical joint. Upper joint § 28/12.

Top Joint, §	Tip Connection, §	Qty	Order Code
28/12	12/2	1	5921-05

**PIPETTS** *Micro Capillary, TLC Spotting* ♦

Uncalibrated, useful for spotting both aqueous and organic solutions. Sturdy construction helps hold breakage to a minimum. 5" length. Supplied 100 tubes per clear vial.



Length, in	Qty	Order Code
5	100	5922-10

**SYRINGE** *Chromatography, LC Injection* ★

With epoxy cemented 304 stainless steel needle permanently attached. Needles are 50mm long with 20° bevel tip.

Capacity, microliter	Needle Length, mm	Tip Bevel	Qty	Order Code
<b>22 Gauge</b>				
10	50	20°	1	5925-03
25	50	20°	1	5925-05
50	50	20°	1	5925-07
100	50	20°	1	5925-09
250	50	20°	1	5925-11

**25 Gauge**

25	50	20°	1	5928-04
50	50	20°	1	5928-06
100	50	20°	1	5928-08
250	50	20°	1	5928-10
500	50	20°	1	5928-12

**26 Gauge**

10	50	20°	1	5928-02
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**SYRINGE** *Chromatography, LC Injection, w/Guide* ★

Same as 5928 LC injection syringe, except fitted with adapter guide for repetitive deliveries.

Capacity, microliter	Needle Length, mm	Tip Bevel	Qty	Order Code
<b>26 Gauge w/Guide</b>				
10	50	20°	1	5928-118


**SYRINGE** *Chromatography, LC Injection, 6-Pack* ★

Basic 10 microliter LC injection syringe with epoxy cemented 304 stainless steel needle permanently attached or removable needle, supplied in convenient package of six. In addition to an approximate 7–12% savings in cost, you get a convenient storage container. Needles are 26 gauge.

Capacity, microliter	Needle Length, mm	Tip Bevel	Needle Type	Qty	Order Code
<b>26 Gauge</b>					
10	50	20°	Fixed	6	5928-302
10	50	20°	Removable	6	5928-330




**SYRINGE Chromatography** ★

For delivering liquid samples to a gas chromatograph with the very highest reproducibility and accuracy. The needle holds the entire sample. A tungsten wire plunger is individually fitted to the 0.152mm bore of the stainless steel needle and bottoms at the tip of the needle to discharge the entire sample. A PTFE ferrule contained in the needle hub makes a final seal around the plunger at the base of the needle and is easily tightened to compensate for wear. Needle and plunger may be disassembled for cleaning or replacement.

Capacity, microliter	Needle Length, mm	Qty	Order Code
<b>23 Gauge</b>			
1.0	70	1	5929-05
5.0	70	1	5929-12
<b>25 Gauge</b>			
1.0	70	1	5929-02


**SYRINGE Chromatography, Gas Tight, Fixed Needle** ★

Designed for highest performance in such applications as liquid or gas chromatography, handling of corrosive gases and liquids, radioactive materials and sterile solutions. PTFE coated plungers with precision PTFE tips for leak-tight seal. Accuracy and reproducibility of  $\pm 1\%$ . With fixed needle.

**Note:** Several sizes of this syringe are available with Luer-Lok tip and Luer-Lok. Contact us for information.

Capacity, microliter	Qty	Order Code
10	1	5931-01
25	1	5931-03
50	1	5931-02
100	1	5931-04
250	1	5931-06


**SYRINGE Chromatography, Gas Tight, Removable Needle** ★

Gas tight syringes with removable needle type (RN) and a 3/4" length, bevel point style #2 needle; needle gauge is given.

Capacity, microliter	Qty	Order Code
<b>25 Gauge</b>		
25	1	5933-05
50	1	5933-07
100	1	5933-09
250	1	5933-11
500	1	5933-13
<b>26 Gauge</b>		
10	1	5933-03

**SYRINGE** *Chromatography, Removable Needle* ★

Basic microliter syringe with removable needle for precise liquid delivery. The 10 microliter size has a 26 gauge needle, all others have 25 gauge needles, Needle length, 50mm.

Capacity, microliter	Needle Length, mm	Qty	Order Code
<b>25 Gauge</b>			
25	50	1	5934-14
50	50	1	5934-18
100	50	1	5934-24
250	50	1	5934-28
500	50	1	5934-32
<b>26 Gauge</b>			
10	50	1	5934-12

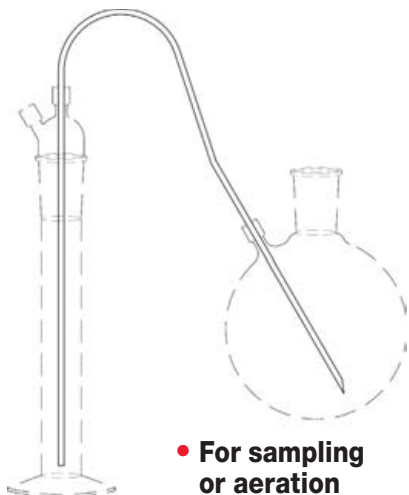

**SYRINGE** *Chromatography, Sample Retrieval, All Plastic* ♠

1mL all-plastic syringe intended for use in Microscale sample retrieval applications. Features built-in dead space tip plug, safety stop, Luer-Lok tip for needle connection, blue colored smooth-drawing plunger. Supplied in package of 25 or a case of 100 units.

**Note:** Needles NOT included. For needles, see 5936 or 13682.

Capacity, mL	Order Code
1	13675-09





**CANNULA** Chromatography, Stainless Steel ★

Available with deflected point at one end and other end blunt or with deflected point on both ends, for septum penetration with a minimum of coring. These long cannula can be bent to avoid tipping reagent bottles which would cause liquid to come in contact with rubber septa. Available individually or in cases.

**Note:** Deflected septum point is equivalent to B-D Huber or Hamilton Style 1 & 2.

Gauge	Length, cm (in)	Needle Ends Deflected-Blunt	Needle Ends Deflected-Deflected
		Order Code	Order Code
22	46 (18)	5938-18	5938-19
22	76 (30)	5938-22	5938-23
22	122 (48)	5938-26	5938-27
18	46 (18)	5938-32	5938-33
18	76 (30)	5938-36	5938-37
18	122 (48)	5938-40	5938-41
15	46 (18)	5938-44	5938-45
15	76 (30)	5938-48	5938-49
15	122 (48)	5938-52	5938-53



**NEEDLES** Chromatography, Syringe ★

Standard hypodermic type needles made from 304 full hard stainless steel tubing with chrome plated brass American standard Luer-Lok taper short hubs. Supplied 50mm (2") long with point style #2 (20° bevel) for septum penetration.

Needle Gauge	Needle Length, mm	O.D., mm	I.D., mm	Tip Bevel	Qty	Order Code
23	50	.63	.32	20°	5	5936-32
19	50	1.07	.65	20°	5	5936-39
18	50	1.27	.80	20°	5	5936-40
14	50	2.1	1.6	20°	5	5936-44



**NEEDLES** Chromatography, Stainless Steel ★

Sterile, stainless steel syringe needles with inert plastic Luer-Lok hub and regular 12° medical point. Can be sterilized.

**Note:** 20 gauge needle fits ACE Cat. No. 12684-23, 0.8mm I.D. PTFE Tubing.

Needle Gauge	Needle Length, in	O.D., in	I.D., in	Tip Bevel	Qty	Order Code
20	1.5	.035	.023	12°	25	13682-12
22	1.5	.028	.016	°	25	13682-15



## NEEDLES Chromatography, 304 Stainless Steel, Standard ★

Hypodermic stainless steel needles with 12° regular medical point tip and female Luer-Lok hub. Packed 12 needles on card — cellophane wrapped. Each card individually boxed.

	Needle Length, mm	Tip Bevel	Qty	Order Code
<b>15 Gauge</b>	51	12°	12	13683-32
<b>18 Gauge</b>	51	12°	12	13683-29
<b>20 Gauge</b>	89	12°	12	13683-23



## NEEDLES Chromatography, 304 Stainless Steel ★

Special length stainless steel needles with deflected septum point\* and standard female hub. Packed 6 per package or a case of 12.

\*Deflected septum point is equivalent to B-D Huber or Hamilton Style 1 & 2.

	Needle Length, mm	Order Code
<b>15 Gauge</b>	305	13684-27
	610	13684-31
<b>18 Gauge</b>	152	13684-15
	305	13684-19
	610	13684-23
<b>20 Gauge</b>	152	13684-07
	305	13684-11



## SEPTA Sleeve Type ★

With hollow plug. Top is flanged with sleeve-like extension that folds down over the neck of vessel. The diaphragm can be punctured readily with a syringe needle. Puncture seals automatically after the needle is withdrawn.

For use with	Qty	Order Code	Qty	Order Code	Qty	Order Code
<b>Red Rubber</b>						
For 8mm O.D. Std. Wall Glass Tubing	12	9096-32	72	9096-132	144	9096-232
For § 14/20, § 14/35 Joints	12	9096-43	72	9096-143	144	9096-243
For § 19/38, § 19/22 Joints	12	9096-54	72	9096-154	144	9096-254
For § 24/40, § 24/25 Joints	12	9096-56	72	9096-156	144	9096-256
<b>White Rubber</b>						
For 5mm O.D. NMR Tubes & for small tubing	12	9096-26	72	9096-126	144	9096-226
For 7mm O.D. Std. Wall Glass Tubing	12	9096-31	72	9096-131	144	9096-231
For 8mm O.D. Std. Wall Glass Tubing	12	9096-33	72	9096-133	144	9096-233
For 9-12mm O.D. Std. Wall Glass Tubing	12	9096-39	72	9096-139	144	9096-239
For § 14/20, § 14/35 Joints	12	9096-44	72	9096-144	144	9096-244
For 13-18mm O.D. Test Tubes	12	9096-49	72	9096-149	144	9096-249
For § 24/40, § 24/25 Joints	12	9096-57	72	9096-157	144	9096-257





**CLAMP One-Piece** ★

One-piece clamp for securing flat flanges on reaction kettles. Powder coated, high strength aluminum clamp features three brass, stainless steel spring-loaded lugs with nylon knobs which quickly secure the assembly when pivoted underneath the kettle bottom's flange.

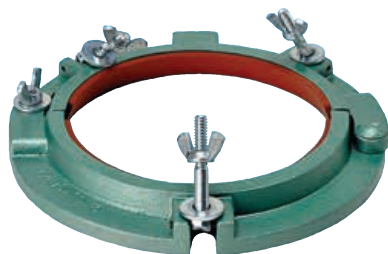
Fits O.D., mm	Fits I.D., mm	For Flask Size, mL	Qty	Order Code
137	100	500-1000	1	6510-05
168	130	2000-4000	1	6510-10



**CLAMP Two-Piece** ★

Two-piece clamp for securing flat flanges on reaction flasks. Powder coated, high strength aluminum clamp features three brass tilting bolts which will swing freely away from the top piece upon loosening the securing brass knurled thumb nuts.

Fits O.D., mm	Fits I.D., mm	For Flask Size, mL	Qty	Order Code
137	100	500-1000	1	6508-06
168	130	2000-4000	1	6508-11



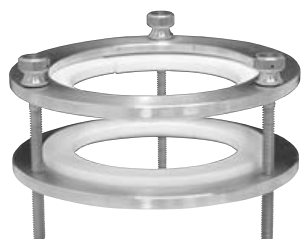
**CLAMP Conical Flange** ★

Clamp is designed to fit 4-inch conical flanges, allowing the top half to be removed without disturbing the lower half. Clamp features an extension arm (1/2 x 8 inch) suitable for attachment to an appropriate support stand or lab frame. Silicone liner will withstand temperatures up to 500°F. Used with 15305 conical flanges.

Flange Size, in	Extension Arm O.D., in	Extension Arm Length, in	Qty	Order Code
4	.50	8	1	6496-10

**Replacement Gaskets**

Silicone	4	6496-30
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**CLAMP Flat Flange** ★

Two-piece unfinished aluminum clamp with PTFE gaskets and brass tightening bolts. Code -03 fits our 7646-18, 75mm O-Ring joint and our 7519, (76mm) filter support assembly. Code -05 fits our 7519, (102mm) filter support assembly and our 6504 kettles with 130mm O.D. x 110mm I.D. flat flanges (500mL & 1000mL). Bolt head is flanged to secure top half as bolt is threaded into bottom half.

Flange Size, mm	O.D., mm	I.D., mm	Qty	Order Code
76	152	111	1	6509-03
102	160	120	1	6509-05



**CLAMP Quick Release, Stainless Steel** ★

Stainless Steel Quick Release clamp for use with two-piece Pressure Reaction Flasks and Heads with Duran flanges. Available with or without rod for clamping to support frame. For use with 15310/15311 Duran flanges and all Duran conical style flanges.

**Note:** Ensure proper bottom support of reactor, the clamp is only recommended for stabilization, not support.

Flange Size, mm	Extension Arm O.D., in	Extension Arm Length, in	Qty	Order Code
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**without Extension**

60	–	–	1	6517-22
100	–	–	1	6517-25
120	–	–	1	6517-24
150	–	–	1	6517-27
200	–	–	1	6517-31

**with Extension**

100	.625	12	1	6517-54
150	.625	12	1	6517-56
200	.625	12	1	6517-60

## JOINT CLIPS *Standard Taper Joint, PTFE, Keck® Type* ★

Keck® type clips manufactured from PTFE snap on and off with ease and will not scratch glass. Designed to secure two standard taper joints from becoming completely disconnected but not designed to maintain a seal under positive pressure. Maximum operating temperature is 250°C. For applications above 5psig positive pressure, we recommend Ace-Thred™ connections.

**Note:** Not for pressure work.

For Joint Size, §	Other Uses	Color Coded Mark	Qty	Order Code
14/20	2mm bore § 18	Yellow	1	7597-14
24/40	§ 28	Green	1	7597-24
29/42	8mm bore	Red	1	7597-29
45/50	—	Brown	1	7597-45



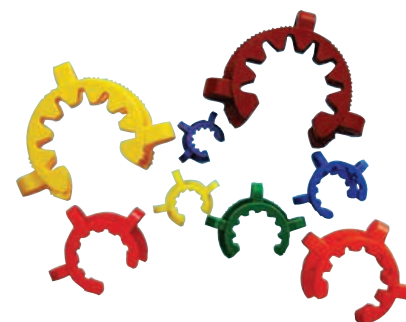
## JOINT CLIPS *Standard Taper Joint, Acetal Plastic, Keck® Type* ★

Dupont

Keck® type clips manufactured from Acetal plastic snap on and off with ease and will not scratch glass. Designed to secure two standard taper joints from becoming completely disconnected but not designed to maintain a seal under positive pressure. Maximum operating temperature is 140°C. For applications above 5psig positive pressure, we recommend Ace-Thred™ connections.

**Note:** Not for pressure work.

For § Joint	Other Uses	Color	Qty	Order Code
10/18	—	Lt. Green	10	7598-10
12/30	—	Violet	10	7598-12
14/20	2mm bore § 18	Yellow	10	7598-14
19/22	4 x 6 bore	Blue	10	7598-19
24/40	§ 28	Green	10	7598-24
29/42	8mm bore	Red	10	7598-29
34/45	—	Orange	10	7598-34
40/35	—	Dk. Yellow	10	7598-40
45/50	—	Brown	10	7598-45



## JOINT CLIPS *Spherical Joint, Acetal Plastic, Keck® Type* ★

Dupont

Keck® type clips manufactured from Acetal plastic snap on and off with ease and will not scratch glass. Designed to secure two spherical joints from becoming completely disconnected but not designed to maintain a seal under positive pressure. Maximum operating temperature is 140°C. For applications above 5psig positive pressure, we recommend Ace-Thred™ connections.

**Note:** Not for pressure work.

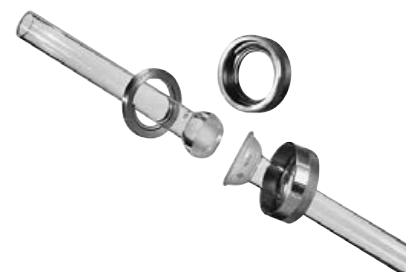
Joint Size, mm	For § Joint	For O-Ring Joint I.D., mm	Color	Qty	Order Code
12	12/5	—	Dk. Violet	10	7668-12
18	18/7, 18/9	7 & 9	Lt. Blue	10	7668-18
28	28/11, 28/15	15	Dk. Red	10	7668-28
35	35/20, 35/25	20 & 25	Lt. Orange	10	7668-35



## CLAMPS *Spherical Joint, Union Type* ♠

Fabricated from aluminum. This type clamp affords a positive, uniform clamping pressure. The clamp threads together and covers the entire joint.

Joint Size, mm	For § Joint	Qty	Order Code
12	12/1 to 12/5	1	7666-05
18	18/7 to 18/9	1	7666-10
28	28/11 to 28/15	1	7666-15
35	35/20 to 35/25	1	7666-20
65	65/40	1	7666-30



### Spanner Wrenches

For Union Size 12-35mm	1	7666-50
For Union Size 65mm	1	7666-54



**CLAMPS Pinch Type, Stainless Steel** ★

All stainless steel pinch clamps for use with O-Ring spherical joints and ball and socket joints. Available either spring-loaded or with a screw-locking device.

**Note:** Only screw-locking clamps should be used with O-Ring spherical joints.

Joint Size, mm	For ⌘ Joint	Qty	Order Code
<b>Spring-Loaded</b>			
12	12/5	1	7669-03
18	18/9	1	7669-05
<b>Screwlock</b>			
12	12/5	1	7669-08
18	18/9	1	7669-10
28	28/15	1	7669-12
35	35/25	1	7669-14
40	—	1	7669-16
50	50/30	1	7669-18
65	65/40	1	7669-20
75	75/50	1	7669-22
102	102/75	1	7669-26



**CLAMPS Standard Taper, Metal** ★

Nickel plated steel clip snaps on and off standard taper joints with ease and offers increased resistance to heating and cracking. Can be used to 500°C. Will not scratch glass.

Joint Size, ⌘	For ⌘ Joint	Other Uses	Qty	Order Code
14/20	12/5	2mm bore ⌘ 18	6	7599-13
24/40	18/7, 18/9	⌘ 28	6	7599-25



**CLAMPS Standard Taper, Stainless Steel** ★

These clamps will securely hold ⌘ 10/30 through ⌘ 45/50 joints. No screw needed. Will secure ⌘ thermometers, vacuum systems, distillation setups, chromatographic columns, evaporators, or any glass apparatus that has to be secured with springs or clamps. ⌘ clamps are made to last, of corrosion-free stainless spring wire. Use proper clamp for designated joint size.

Joint Size, ⌘	Qty	Order Code
10/30	12	7600-05
12/30	12	7600-10
14/35	12	7600-15
19/38	12	7600-20
24/40	12	7600-25
29/42	8	7600-30
34/45	6	7600-35
45/50	6	7600-40

**Assorted Clamps**

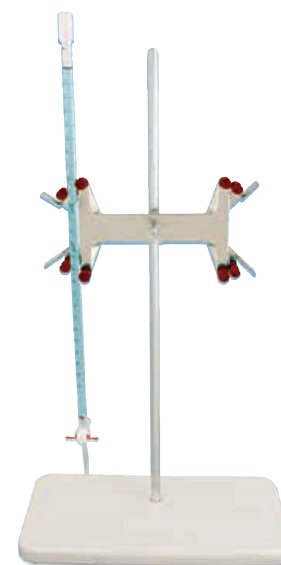
Contains: (4) 10/30, (2) 12/30, (2) 14/35, (4) 19/38, (6) 24/40, (4) 29/42, (1) 34/45 and (1) 45/50	24	7601-10
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## BURET SUPPORT STAND *Double Clamp* ★

Troemner

Double Buret Clamp holds any size buret from micro to 100mL capacity. Simply compress the scissor-like mechanism, insert buret and gently release to grip. Numbers and graduation on buret remain easy to read. For height adjustments, recompress mechanism and slide buret up or down and gently release. Provides large, stable work area. Buret support combines 612cm<sup>2</sup> glazed porcelain base for ample work space, double buret holder. Base is easy to clean, impervious to all ordinary reagents, withstands high heat (260°C). Weight is 2.3 Kg. for overall stability. Has four rubber feet to prevent sliding.

Rod Length, mm	Rod O.D., mm	Base Dimensions, mm	Qty	Order Code
578	13	178 x 330 x 25	1	11051-15



## SUPPORT STAND *Stainless Steel* ★

All-stainless-steel support stand. Heavy base (6lbs.) can accommodate vessels up to 18" in diameter. Support rod is 5/8 inches in diameter, approximately 28, 36, or 60 inches high, fastened to base with stainless steel lock nuts. Two additional threaded holes in base legs to accommodate extra support rods. Complete item consists of (1) base and (1) rod.

**Note:** Additional support rods may be purchased separately.

Rod Length, in	Qty	Order Code
28	1	13586-10
36	1	13586-13

### Additional Support Rods

28	1	13586-25
36	1	13586-27
60	1	13586-15



## SUPPORT STAND/CHAIN CLAMP ★

**Stand (Heidolph):** Rugged, with "H" shaped base for use with filter reaction flasks. Stainless steel vertical rod available in three different lengths: 700mm (27"); 920mm (36"); or 1220mm (48").

**Clamp Holder (Heidolph):** Connect up to 13mm O.D. mounting rod to 25mm O.D. support rod.

**Chain Clamp (Troemner):** Code -24, Connect up to 165mm O.D. vessels; Code -38, Connect up to 280mm O.D. vessels.

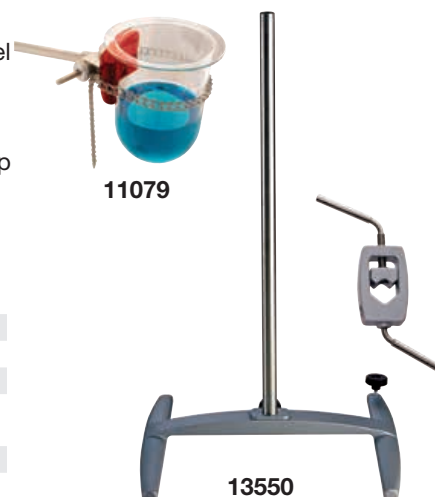
Rod Length, mm (in)	Rod O.D., mm	Base Dimensions, mm	Qty	Order Code
700 (27)	25	430 x 420	1	13550-21
920 (36)	25	430 x 420	1	13550-23
1220 (48)	25	430 x 420	1	13550-24

### Universal Clamp

13-32	1	13550-25
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### Chain Clamp w/Extension Arm

5" arm, 170mm grip	1	11079-24
5" arm, 280mm grip	1	11079-38



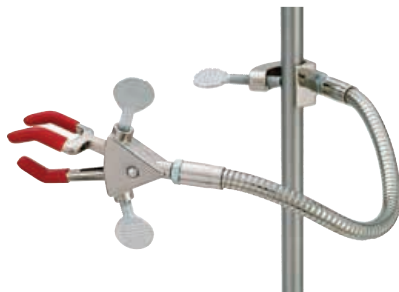


**CLAMP** *Stainless Steel, 3 Prong* ★

**Troemner**

Multi-purpose, three-prong clamps manufactured from electropolished stainless steel for improved corrosion resistance and autoclave sterilization. Features include dual screw adjustments and vinyl sleeved prongs. See our 11074 product family for vinyl or fiberglass (high temperature) replacement sleeves. See our 11083 & 11086 product families for stainless clamp holders.

Grip Size	Maximum Grip Size mm	Arm Length, in	Qty	Order Code
Small	48	4	1	<b>11057-01</b>
Medium	69	5	1	<b>11057-03</b>
Large	102	5	1	<b>11057-05</b>



**CLAMP** *Gooseneck Extension, 3 Prong* ★

**Troemner**

Clamping system features a 12-inch or 16-inch flex arm. Ideal for working within hoods. The system mounts to any lab frame or support stand with a 19mm or less diameter. An optional base plate or bench clamp provides increased versatility. Complete units (-10 and -12) include flex arm, two-prong head, three-prong head, spring head, and lab frame connector. Comes with an extra set of fiberglass prong covers for temperatures above 100°C.

Arm Length, in	Qty	Order Code
12	1	<b>11058-10</b>
18	1	<b>11058-12</b>

**Ultraflex Clamping Complete System**

**Replacement Parts and Accessories**

2-Prong 6.6 cm Grip Head	1	<b>11058-02</b>
3-Prong 5.8 cm Grip Head	1	<b>11058-03</b>
Spring Head <i>(used for thermometer clamping)</i>	1	<b>11058-05</b>
12-inch arm	1	<b>11058-14</b>
18-inch arm	1	<b>11058-18</b>
Flat base plate	1	<b>11058-20</b>
Lab frame connector	1	<b>11058-22</b>
Bench clamp	1	<b>11058-24</b>



**CLAMP** *Swivel, 2 Prong* ★

**Troemner**

Used to hold apparatus near the lab-frame. Unlike extension clamps, the swivel clamps have an integrated holder for attaching to a lab-frame or other apparatus. Built-in holder grips rods up to 19mm (0.75") in diameter and is adjustable for forward or reverse-facing adjustment screws. Shaft wing-nut allows the holding angle of the swivel clamp to adjust through 360° of rotation and can be locked in place once desired position is achieved. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.

Grip Size	Maximum Grip Size mm	Overall Length, mm	Qty	Order Code
Large	95	180	1	<b>11060-13</b>



**CLAMP** *Swivel, 3 Prong* ★

**Troemner**

Used to hold apparatus near the lab-frame. Unlike extension clamps, the swivel clamps have an integrated holder for attaching to a lab-frame or other apparatus. Built-in holder grips rods up to 19mm (0.75") in diameter and is adjustable for forward or reverse-facing adjustment screws. Shaft wing-nut allows the holding angle of the swivel clamp to adjust through 360° of rotation and can be locked in place once desired position is achieved. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.

Grip Size	Maximum Grip Size mm	Overall Length, mm	Qty	Order Code
Medium	69	178	1	<b>11062-14</b>

**Replacement Sleeves found on page 145**

## ULTRAJAWS CLAMPS 3 Prong Extension ★

Troemner

Heavy-Duty Clamps feature an innovative closed yoke construction that minimizes contamination and corrosion of internal components. The unique design enables secure gripping and positioning with added strength and durability.

Prongs open gradually to maximize grip size without binding. Both designs feature precise pressure regulation when gripping glassware surfaces to reduce chance of breakage. UltraJaws Clamps are constructed with extension rods for easy attachment to lab frames and other apparatus. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.

The prong height of the UltraJaws Heavy-Duty Clamps make them ideal for use in holding and securing glassware with precision ground glass joints.



Grip Size	Maximum Grip Size cm	Overall Length, cm	Grip Height, cm	Qty	Order Code
Small	2.8	15.6	1.4	1	11064-09
Medium	6.5	22.2	3.4	1	11064-11
Large	10.0	26.1	4.7	1	11064-13

## CLAMP 3 Prong, Extended ★

Troemner

Designed to securely hold every type of laboratory glassware and apparatus. Long, seamless nickel-plated brass tube attaches clamp head securely and offers easy positioning in the deepest fume hoods. Clamps are constructed with round extension arms, which allow the clamps to be rotated 360°. Extension arms also allow placement of apparatus at various distances from lab frames without compromising the integrity of your experiment. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.



Grip Size	Maximum Grip Size mm	Arm Length, mm	Overall Length, mm	Qty	Order Code
Large	105	127	273	1	11065-16
Large	105	305	451	1	11065-17
Medium	69	127	229	1	11067-14
Small	46	102	168	1	11069-18

## CLAMP 3 Prong, Single Adjustment ★

Troemner

Designed to securely hold every type of laboratory glassware and apparatus. Long, seamless nickel-plated brass tubing attaches clamp head securely and offers easy positioning in the deepest fume hoods. Clamps are constructed with round extension arms, which allow the clamps to be rotated 360°. Extension arms also allow placement of apparatus at various distances from lab frames without compromising the integrity of your experiment. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.



Grip Size	Maximum Grip Size mm	Arm Length, mm	Overall Length, mm	Qty	Order Code
Small	39	102	160	1	11068-12
Medium	71	127	218	1	11068-13
Large	108	127	248	1	11068-14

## CLAMP 2 Prong, Single Adjustment ★

Troemner

Designed to securely hold laboratory glassware and apparatus. Extension arm attaches clamp head securely and offers easy positioning in the deepest fume hoods. Clamps are constructed with round extension arms, which allow the clamps to be rotated 360°. Extension arms also allow placement of apparatus at various distances from lab frames without compromising the integrity of your experiment. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.



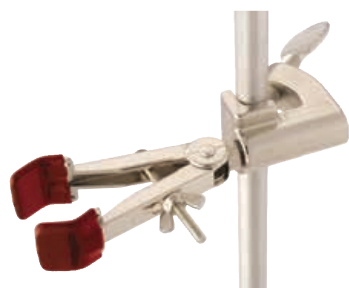
Grip Size	Maximum Grip Size mm	Arm Length, mm	Overall Length, mm	Qty	Order Code
Large	92	127	229	1	11072-17

**Replacement Sleeves found on page 145**

**CLAMP 2 Prong, Dual Adjustment** ★**Troemner**

Designed to securely hold laboratory glassware and apparatus. Extension arm attaches clamp head securely and offers easy positioning in the deepest fume hoods. Clamps are constructed with round extension arms, which allow the clamps to be rotated 360°. Extension arms also allow placement of apparatus at various distances from lab frames without compromising the integrity of your experiment. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.

Grip Size	Maximum Grip Size mm	Arm Length, mm	Overall Length, mm	Qty	Order Code
Medium	75	127	229	1	<b>11073-20</b>
Large	95	127	248	1	<b>11073-27</b>

**CLAMP 2 Prong, Fixed Position** ★**Troemner**

Used to hold apparatus near the lab-frame where no adjustment is required after set-up. Built-in holder grips rods up to 19mm (0.75") in diameter. Fixed-position clamps have an integral holder but can be rotated after attachment to a lab frame or other apparatus. Stainless steel electro-polished finish or nickel-plated zinc construction. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.

Grip Size	Maximum Grip Size mm	Overall Length, mm	Qty	Order Code
Medium	77	133	1	<b>11075-21</b>

**CLAMP 4 Prong, Heavy Duty, Tapered** ★**Troemner**

Heavy-Duty 4 prong, dual adjust clamps are designed to hold vessels with ground glass joint necks. Clamps are constructed with extension rods for easy attachment to lab frames and other apparatus. Nickel-plated zinc construction.

Grip Size	Maximum Joint Size mm	Arm Length, mm	Overall Length, mm	Qty	Order Code
Small	24/40	229	356	1	<b>11076-10</b>
Large	34/45	229	381	1	<b>11076-15</b>

**CLAMP 3 Prong, Fixed Position** ★**Troemner**

Used to hold apparatus near the lab frame where no adjustment is required after set-up. Built-in holder grips rods up to 19mm (0.75") in diameter. Fixed-position clamps have an integral holder but can be rotated after attachment to a lab-frame or other apparatus. Stainless steel electro-polished finish or nickel-plated zinc construction. Supplied with non-slip vinyl sleeves, and for temperatures above 100°C, fiberglass covers.

Grip Size	Maximum Grip Size mm	Overall Length, mm	Qty	Order Code
Medium	69	146	1	<b>11077-18</b>

**CLAMP Chain** ★**Troemner**

Holds large round or irregular shaped objects firmly, yet gently to lab frames and rods. Quick and secure slip-on chain connection with large, easy-to-turn adjusting knob. Extension arm allows user to vary distance from the frame. Available as stainless steel clamp, constructed entirely of stainless steel with electro-polished finish or nickel-plated zinc clamp with strong, chromed-brass chain.

Grip Size	Maximum Grip Size mm	Arm Length, mm	Overall Length, mm	Qty	Order Code
Small	170	127	188	1	<b>11079-24</b>
Large	280	127	206	1	<b>11079-38</b>
Large	280	305	384	1	<b>11079-40</b>

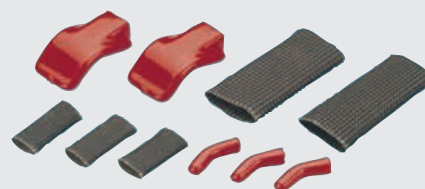
**Replacement Sleeves found on page 145**



## REPLACEMENT SLEEVES *For Clamps* ★

Sleeves are easily removed for cleaning or replacement. Both vinyl and fiberglass sleeves are available. Fiberglass sleeves are recommended for all applications above 100°C (212°F).

Clamp Style	Qty	Vinyl		Fiberglass	
		Qty	Order Code	Qty	Order Code
Medium Two-Prong	2	2	11074-03	2	11074-05
Large Two-Prong	2	2	11074-07	2	11074-09
Small Three-Prong	3	3	11074-21	3	11074-23
Medium Three-Prong	3	3	11074-25	3	11074-27
Large Three-Prong	3	3	11074-29	3	11074-31

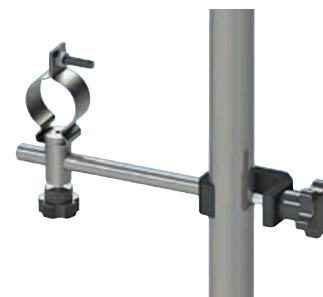


**Troemner**

## CLAMP *Recirculator Hose Support, Stainless Steel* ★

All stainless steel, fully adjustable clamps for securing and supporting circulator hoses used with jacketed pilot plants. The universal clamps adjust to any pipe style pilot plant stand, and the clip will accommodate any standard circulator hose size.

	Qty	Order Code
	1	13010-01



## CLAMP *"Power Hold"* ★

Fits support stand with 9.5mm to 16mm (3/8" to 5/8") diameter shaft and stirrers with mounting rod from 9.5mm to 16mm (3/8" to 5/8") diameter. Supplied complete with Stop Collar.

Grip Size mm	Qty	Order Code
9.5 to 16	1	11082-07

**Arrow**



## CLAMP HOLDER *Regular* ★

Normally used to hold the (11057, 11065, 11073, 11076 & 11079) clamps to rods and lab frame supports. Ideal for holding clamps to lab frames. Use wherever clamping at 90° is required. Stainless steel electro-polished finish or nickel-plated zinc construction.

Maximum Grip Size mm	Qty	Order Code
18	1	11080-19

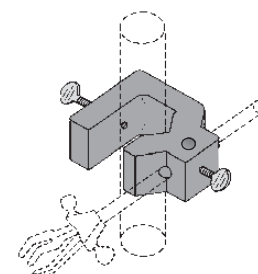
**Troemner**



## CLAMP HOLDER *Pilot Plant* ★

Used with (11057 through 11073, 11076 & 11079) versatile jaw-type clamp to secure condenser, etc., on 6472 & 12842 pilot plant reactor support frame. Holder clamps to 1-inch bar on frame of reactor; 11065 clamp is held in clamp holder with thumb screw. Fabricated of aluminum, powder coated black. For clamps, see 11065, add-on 1/2" hole for vertical rod extension.

Maximum Grip Size in	Qty	Order Code
1	1	11081-21



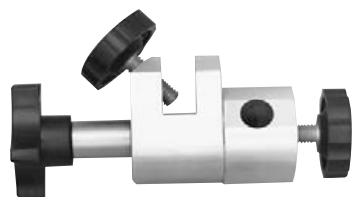


**CLAMP HOLDER** *Jumbo, Stainless Steel* ★

**Troemner**

Ideal for holding clamps to lab frames or ring stands. Stainless steel electro-polished finish or aluminum construction. For use with 11057 series clamps.

Grip Size mm	Qty	Order Code
0-21	1	11083-51



**CLAMP** *Universal Swivel, "Power Hold"* ★

**Arrow**

Universal swivel clamp allows positioning of stirrer at any compound angle for best stirring action.

- One knob — Lets you lower or raise stirrer
- One knob — Locks stirrer on support rod, tilts right/left
- One knob — Controls swivel setting, forward/backward

Fits support stand from 9.5mm to 16mm (3/8" to 5/8") diameter. Will hold stirrer mounting rod from 9.5mm to 16mm (3/8" to 5/8") diameter. Fabricated of precision machined aluminum.

Grip Size mm	Qty	Order Code
9.5-16	1	11084-11

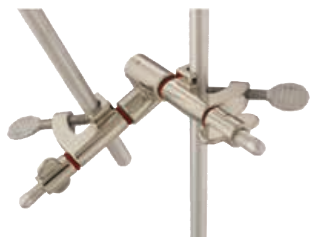


**CLAMP HOLDER** *Hook Type, Stainless Steel* ★

**Troemner**

Stainless steel electro-polished finish or nickel-plated zinc construction. Simple, versatile, and easy-to-use. Hook connectors allow one-handed assembly of two components with one adjustment screw.

Grip Size mm	Qty	Order Code
0-13	1	11086-01



**CLAMP HOLDER** *All-Position* ★

**Troemner**

Surpasses standard holding capabilities. The all-position clamp holder permits adjustments at any angle, in any plane. Holders are set at 90° to each other and connected by a 90° connector, allowing 360° rotation. Nickel-plated zinc construction.

Grip Size mm	Qty	Order Code
0-19	1	11090-17



**CLAMP HOLDER** *Jumbo* ★

**Troemner**

Ideal for holding clamps to lab frames or ring stands. Aluminum construction.

Grip Size mm	Qty	Order Code
0-21	1	11095-13



**CLAMP** *Fastening*

**Caframo**

Designed to accommodate stirrer support rods up to 16 mm (5/8") diameter. Durable, strong and easy to use. Includes a convenient place to hold chuck key. The cast zinc-aluminum alloy is coated for protection from corrosion and chemical spills.

Grip Size mm	Qty	Order Code
15-30	1	13568-16

**PINCHCOCK** ★

Talboys' flow control devices offer selection and quality. They are finely machined to deliver accurate regulation or interruption of fluid flow. Every flow control device resists corrosion and rust. Pinchcocks are designed to quickly start and stop flow to provide complete closure without damaging tubing. Operated with a simple squeeze operation. Constructed of nickel-plated zinc. Adjustment screw with oversized head for accurate regulation.

**Troemner**


Spring Type	Maximum Grip Size mm	Clamp Height, mm	Qty	Order Code
Heavy Duty	0-11	47	1	<b>11136-14</b>
Standard	0-12	47	1	<b>11136-16</b>
Universal Flow	0-13	47	1	<b>11136-20</b>

**HOSECOCK** ★

Talboys' flow control devices offer selection and quality. They are finely machined to deliver accurate regulation or interruption of fluid flow. Every flow control device resists corrosion and rust. Hosecocks offer easy one-hand operation. Convex bearing surfaces and rounded edges protect tubing. Constructed of nickel-plated zinc. Adjustment screw with oversized head for accurate regulation.

**Troemner**


Spring Type	Maximum Grip Size mm	Clamp Height, (open) mm	Extension Arm Length, mm	Qty	Order Code
Standard	0-17	62	–	1	<b>11140-25</b>
Heavy Duty	0-29	106	–	1	<b>11140-27</b>
Standard	0-17	–	145	1	<b>11140-30</b>

**TUBING CLAMP** ★

Eliminates older method of wiring rubber tubing to glass. Simple in design, low in cost and easy to use. Requires only one hand to apply; can be instantly applied or removed. Fits standard 10–12mm fittings.

Fitting Size mm	Qty	Order Code
0-12	100	<b>11145-20</b>


**TUBING CLAMP** "Dura-Clamp®" ★

Autoclavable, white plastic unitized construction tubing clamp, can also be used as a flow valve. Instant 15-position control clamp accepts flexible tubing from 3.2 to 12.7 mm O.D. (1/8" to 1/2").

**Bel-Art**

Fitting Size mm	Qty	Order Code
3.2-12.7	12	<b>11146-08</b>


**HOSE CLAMP** *Stainless Steel* ★

Adjustable, with hex head finger nut.

Fitting Size mm	Qty	Order Code
10-14	1	<b>11148-10</b>
12-16	1	<b>11148-12</b>
17-22	1	<b>11148-17</b>



**OPEN RING SUPPORT** *Coated* ★

Thermo Fisher

Split ring allows easy placement and removal of bulb. Vinyl-coated sheath on ring protects bulb from breakage. Integral clamp holds ring tightly to support rods.

O.D., in	Qty	Order Code
2	1	11176-12

**OPEN RING SUPPORT** *PVC Coated* ★

Troemner

Ideal for supporting funnels, round bottom flasks, reaction vessels, and other apparatus that require lower support. Opening in PVC coated aluminum ring allows for easy removal of sample container. PVC coating protects glassware. Long extension arm permits depth adjustment of the open ring from the lab-frame or ring stand.

Size	Ring O.D., mm (in)	Arm O.D., mm	Arm Length, mm (in)	Qty	Order Code
Small	76 (3)	9	254 (10)	1	11177-13
Medium	102 (4)	9	305 (12)	1	11177-17
Large	127 (5)	11	305 (12)	1	11177-19

**CLAMP** *Stainless Steel, Circulator Hose* ★

304 Stainless steel clamp designed for use with ACE jacketed glass pilot plant reactors and circulator hoses for popular circulating chillers. Connects glass O-Ring ball joints on jacket inlet/outlet to hoses to/from circulator. Powder coated aluminum with glass-filled PTFE backing.

For ♂ Joint Size	Qty	Order Code
28/15	1	12187-28
35/25	1	12187-35



## ACE Quality Laboratory & Scientific Product Lines Include...

**Hydrogenation/Gas Apparatus** — Featuring heavy-walled pressure-tested glass reaction vessels and connectors with Ace-Threds — eliminates rubber stoppers.

**Pilot Plant/Reaction Equipment** — Standard and custom-designed portable reactors from 10 to 200L. **Contact Ace to get a copy of our reactor catalog.**

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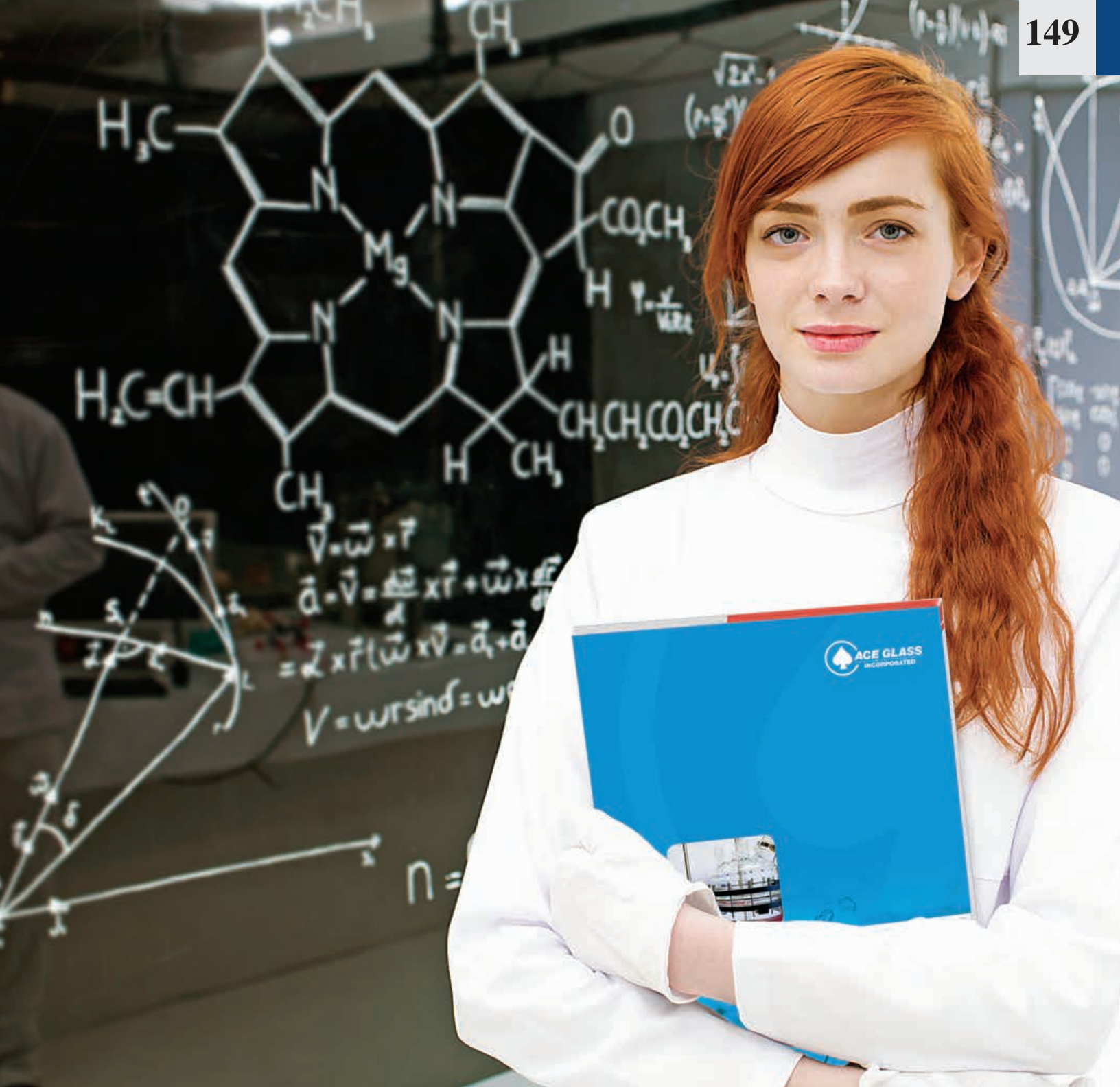
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**CONDENSER** *Allihn* ♠

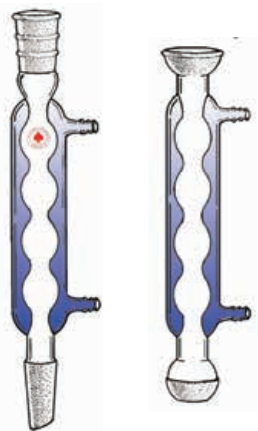
Bulb type, approximately one bulb per every 50mm, with  $\text{F}$  24/40 inner joint at bottom, open tube at the top. Use with 3/8" I.D. tubing, size D hose connections.

Inner Bottom $\text{F}$ Joint	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	200	3/8 (Size D)	1	5941-12
24/40	300	3/8 (Size D)	1	5941-14

**CONDENSER** *Allihn, Fully Jacketed* ♠

Bulb type, approximately one bulb per every 50mm, jacketed with  $\text{F}$  24/40 inner and outer joint enclosed at bottom and top. Use with 3/8-inch I.D. tubing, size D hose connections.

$\text{F}$ Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	200	3/8 (Size D)	1	5943-12
24/40	400	3/8 (Size D)	1	5943-15

**CONDENSER** *Allihn* ♠

Bulb type, approximately one bulb per every 50mm, with  $\text{F}$  or  $\text{S}$  joint at bottom and top. Use with 3/8" I.D. tubing, size D hose connections.

	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
<b>19/38 Standard Taper</b>				
	200	3/8 (Size D)	1	5945-05
<b>24/40 Standard Taper</b>				
	200	3/8 (Size D)	1	5945-12
	250	3/8 (Size D)	1	5945-13
	300	3/8 (Size D)	1	5945-14
	400	3/8 (Size D)	1	5945-15
	500	3/8 (Size D)	1	5945-16
	600	3/8 (Size D)	1	5945-17
<b>29/42 Standard Taper</b>				
	300	3/8 (Size D)	1	5945-24
	400	3/8 (Size D)	1	5945-25
	500	3/8 (Size D)	1	5945-26
	600	3/8 (Size D)	1	5945-27
<b>35/25 Spherical</b>				
	400	3/8 (Size D)	1	5945-65

## CONDENSER *Allihn, Ace-Thred Connectors*

Bulb type, approximately one bulb per 50mm, with  $\text{\textcircled{24}}$  24/40 inner and outer joint at bottom and top, Ace-Thred and "Ace-Safe" hose connections on inlet and outlet with barb for tubing. For replacement connectors, see 5853. The 45/50 joint condenser is used with 12845 & 12846 pilot plant reactors.

$\text{\textcircled{24}}$ Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
<b>Glass Condenser only</b>				
24/40	250	#7 Ace-Thred	1	5946-16 ♠
24/40	300	#7 Ace-Thred	1	5946-18 ♠
29/42	300	#7 Ace-Thred	1	5946-22 ♠

### Complete with #7 Ace-Thred Connectors

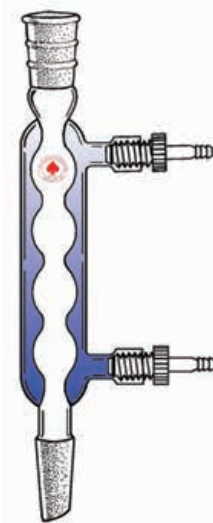
24/40	250	1/4	1	5946-116 ♠
24/40	300	1/4	1	5946-118 ♠
29/42	300	1/4	1	5946-122 ♠

### Complete with #11 Ace-Thred Connectors

45/50	500	3/8	1	5945-76 ★
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### Replacement Connector

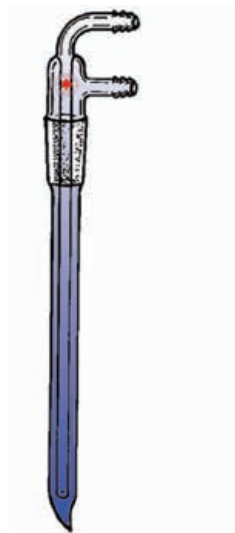
#7 Ace-Thred	1/4	1	5853-06 ♠
#11 Ace-Thred	3/8	1	5853-10 ♠



## COLD FINGER *For Allihn Condensers ♠*

Cold Finger accessory for standard Allihn type condensers. This cold finger has a  $\text{\textcircled{24}}$  24/40 inner joint that fits inside the condenser's upper outer joint and tube to provide added cooling ability and faster condensation. Fits into 6606, 6609 & 6613 distillation heads. Has two upper, glass, size D hose connections that take 3/8" tubing.

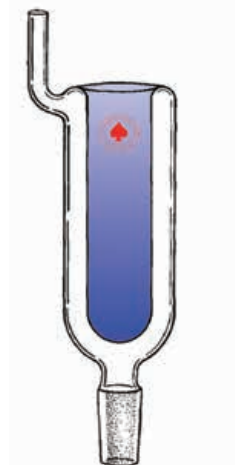
Inner Bottom $\text{\textcircled{24}}$ Joint	Length, (below joint) mm	Hose Connection, in.	Qty	Order Code
24/40	110	3/8 (Size D)	1	5960-08
24/40	215	3/8 (Size D)	1	5960-12

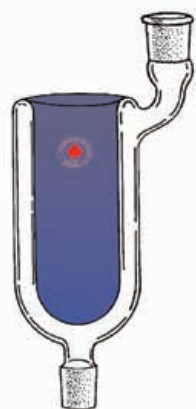


## CONDENSER *Dewar ♠*

For use with dry ice and other solid cooling agents. Upper tube is 12mm O.D. Inner joint is  $\text{\textcircled{24}}$  24/40.

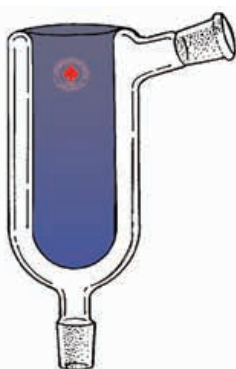
Inner Bottom $\text{\textcircled{24}}$ Joint	Jacket Length, mm	Upper Tube		Qty	Order Code
		I.D., mm	O.D., mm		
24/40	200	40	12	1	5964-12
24/40	250	50	12	1	5964-13
24/40	300	75	12	1	5964-14



**CONDENSER Dewar** ♠

For use with dry ice and other solid cooling agents. Can also be adapted for use as a small constant temperature bath by using a constant boiling liquid. In this manner, can also be used as an oil bath. The larger size will hold 100mL flask, small size will hold 10mL flask.

Inner Bottom ⌘ Joint	Inside Depth, mm	I.D., mm	Upper Tube, ⌘ Joint	Capacity, mL	Qty	Order Code
14/20	90	36	14/20	10	1	9253-08
14/20	90	70	14/20	100	1	9253-10

**CONDENSER Dewar** ♠

For use with dry ice and other solid cooling agents. Can also be adapted for use as a small constant temperature bath by using a constant boiling liquid. In this manner, can also be used as an oil bath. The larger size will hold 100mL flask, small size will hold 10mL flask. Side joint is angled 105°.

Inner Bottom ⌘ Joint	Inside Depth, mm	I.D., mm	Upper Tube, ⌘ Joint	Capacity, mL	Qty	Order Code
14/20	90	36	14/20	10	1	9254-05
14/20	90	70	14/20	100	1	9254-07
14/20	120	32	14/20	10	1	9254-10

**CONDENSER Friedrichs** ♠

Reflux controlled by regulating jacket temperature. Provides compact spiral path for condensation. Jacket length 200mm. Use with 3/8-inch I.D. tubing, size D hose connections.

Inner Bottom ⌘ Joint	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	200	3/8 (Size D)	1	5969-10

**CONDENSER Friedrichs** ♠

With molded spiral condensing surface and ⌘ joint at bottom. Jacket length 250mm. Use with 3/8-inch I.D. tubing, size D hose connections.

Inner Bottom ⌘ Joint	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	250	3/8 (Size D)	1	5970-10



**CONDENSER** *Friedrichs*

With molded spiral condensing surface and ⌘ joint at bottom and top. Jacket length 250mm. Use with 3/8-inch I.D. tubing, size D hose connections. Available with #7 Ace-Thred and "Ace-Safe" hose connections on inlet and outlet with barb for 1/4-inch I.D. tubing. For high-temperature applications, use 5858 high-temperature hose connections.

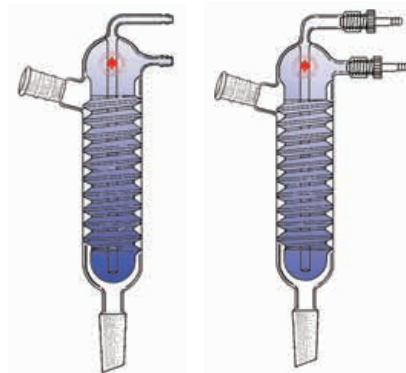
Outer Top ⌘ Joint	Inner Bottom ⌘ Joint	Jacket Length, mm	Hose Connection, in.	Qty	Order Code	
<b>Glass Hose Barb Connection</b>						
24/40	24/40	250	3/8 (Size D)	1	5971-10	♠
29/42	29/42	250	3/8 (Size D)	1	5971-15	♠
24/40	34/45	250	3/8 (Size D)	1	5971-20	♠
24/40	45/50	250	3/8 (Size D)	1	5971-23	♠
24/40	55/50	250	3/8 (Size D)	1	5971-27	♠

**#7 Ace-Thred Connection**

24/40	24/40		1/4	1	5971-111	♠
29/42	29/42		1/4	1	5971-116	♠
24/40	45/50		1/4	1	5971-124	♠
24/40	55/50		1/4	1	5971-128	♠

**Replacement Connector**

#7 to 1/4inch tubing, polypropylene	1/4	1	5853-06	♠
#7 to 1/4inch tubing, PTFE, high temperature	1/4	1	5858-03	★



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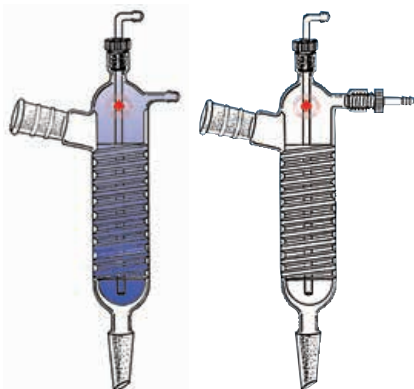
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**CONDENSER Friedrichs** ♠

With molded spiral condensing surface and 24/40 inner joint at bottom. Top tubulation tooled to take No. 3 stopper. Jacket length 250mm. Use with 3/8-inch I.D. tubing, size D hose connections.

Inner Bottom 24/40 Joint	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	250	3/8 (Size D)	1	5972-10



**CONDENSER Friedrichs, Modified** ♠

Top of condenser modified with #7 Ace-Thred so inlet tube is removable. This offers easier cleaning and greater economy if inlet tube breaks. With molded spiral condensing surface and 24/40 joint at bottom and top. Jacket length 250mm. Complete unit consists of body, inlet tube and 5029-10 bushing. Use with 3/8-inch I.D. tubing, size D hose connections. Available with #7 Ace-Thred and "Ace-Safe" hose connection on inlet with barb for 1/4-inch I.D. tubing.

Inner Bottom 24/40 Joint	Condenser Top, Ace-Thred	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	#7	250	3/8 (Size D)	1	5974-10

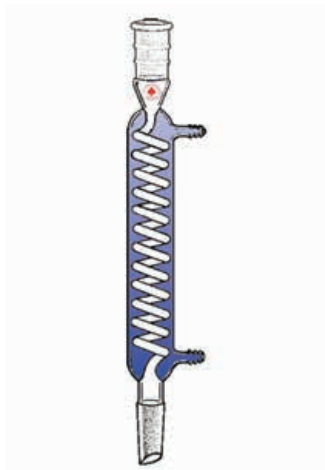
**Side - Glass Hose Barb Connection**

24/40	#7	250	1/4	1	5974-109
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**Side - Ace-Thred Connection**

**Replacement Parts**

Inlet Tubes	6	5974-02
Ace-Thred Connector, #7 to 1/4inch tubing, polypropylene	1	5853-06



**CONDENSER Graham** ♠

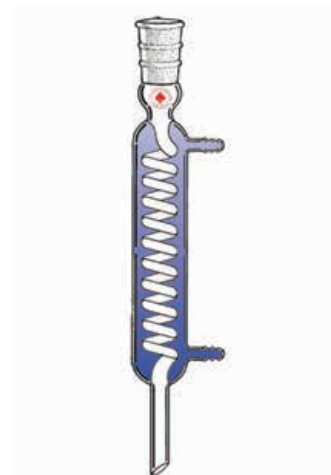
With 24/40 inner and outer joint at bottom and top. Use with 3/8-inch I.D. tubing, size D hose connections.

24/40 Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	200	3/8 (Size D)	1	5977-12
24/40	300	3/8 (Size D)	1	5977-14
24/40	400	3/8 (Size D)	1	5977-15
24/40	500	3/8 (Size D)	1	5977-16
24/40	600	3/8 (Size D)	1	5977-17
24/40	900	3/8 (Size D)	1	5977-19

**CONDENSER** *Graham* ♠

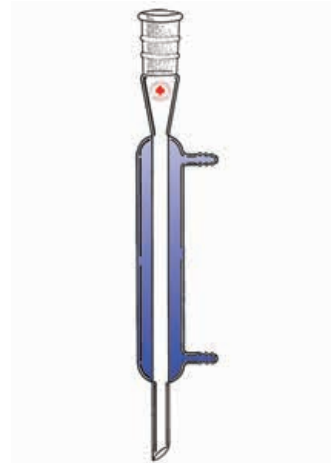
With 24/40 outer joint at top. Straight 12mm O.D. tube at bottom for insertion into a rubber stopper. For jacket connections, use with 3/8-inch I.D. tubing, size D hose connection.

Outer Top Joints	Bottom Tube		Hose Connection, in.	Qty	Order Code
	O.D., mm	Jacket Length, mm			
24/40	12	200	3/8 (Size D)	1	5979-12
24/40	12	300	3/8 (Size D)	1	5979-14


**CONDENSER** *Liebig, "No Hold Up"* ♠

With outer 24/40 joint at top. Jacket length 300mm. Straight 14mm O.D. tube at bottom for insertion into a rubber stopper. For jacket connections, use with 3/8-inch I.D. tubing, size D hose connections.

Outer Top Joints	Bottom Tube		Hose Connection, in.	Qty	Order Code
	O.D., mm	Jacket Length, mm			
24/40	14	300	3/8 (Size D)	1	5994-14

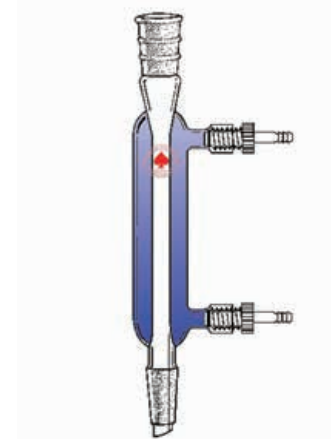

**CONDENSER** *Liebig, with Ace-Thred Connectors* ♠

"No Hold-Up" condenser with 24/40 inner and outer joint at bottom and top, #7 Ace-Thred inlet/outlet for connecting "Ace-Safe" hose connections with barb for 1/4-inch I.D. tubing. For replacement hose connections, see 5853. Complete item includes two hose connectors with O-Ring and two nylon bushings.

Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	200	1/4	1	5997-132
24/40	250	1/4	1	5997-133
24/40	300	1/4	1	5997-134

**Replacement Connector**

#7 to 1/4inch tubing, polypropylene	1/4	5853-06
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**CONDENSER** *Liebig, "No Hold-Up"* ♠

With  $\text{F}$  inner and outer joints at bottom and top. Use with 3/8-inch I.D. tubing, size D hose connections.

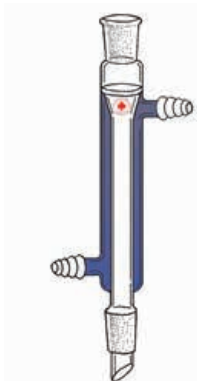
Jacket Length, mm	Hose Connection, in.	Qty	Order Code
<b>19/38 Standard Taper</b>			
200	3/8 (Size D)	1	5998-04
<b>24/40 Standard Taper</b>			
200	3/8 (Size D)	1	5998-12
250	3/8 (Size D)	1	5998-13
300	3/8 (Size D)	1	5998-14
400	3/8 (Size D)	1	5998-15
500	3/8 (Size D)	1	5998-16
600	3/8 (Size D)	1	5998-17
<b>29/42 Standard Taper</b>			
200	3/8 (Size D)	1	5998-22
250	3/8 (Size D)	1	5998-23
300	3/8 (Size D)	1	5998-24
400	3/8 (Size D)	1	5998-25



**CONDENSER** *Liebig* ♠

With 110mm jacket length, also an additional vacuum takeoff between top outer joint and jacket. Use with 5/16-inch I.D. tubing, size A hose connections.

$\text{F}$ Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
14/20	110	5/16 (Size A)	1	9258-02



**CONDENSER** *Liebig* ♠

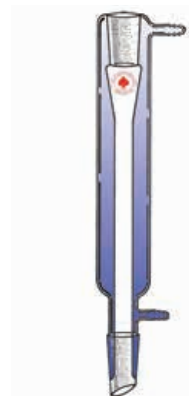
With straight inner tube sealed through the jacket. This condenser is acceptable for use with Abderhalden or Mini-Lab moisture test apparatus.

Jacket Length, mm	Hose Connection, in.	Qty	Order Code
<b>14/20 Standard Taper</b>			
110	5/16 (Size A)	1	9261-02
250	5/16 (Size A)	1	9261-12
<b>19/22 Standard Taper</b>			
110	5/16 or 3/8 (Size B)	1	9261-04
250	5/16 or 3/8 (Size B)	1	9261-15

## CONDENSER *Liebig, "No Hold-Up", Fully Jacketed* ♦

Fully jacketed with water-cooled 24/40 inner and outer joint at bottom and top. Use with 3/8-inch I.D. tubing, size D hose connections.

24/40 Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	200	3/8 (Size D)	1	5999-12
24/40	300	3/8 (Size D)	1	5999-14



## CONDENSER *Reflux, Coiled* ♦

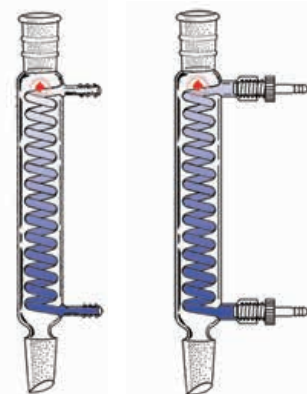
Coiled condensing tube, with 24/40 inner and outer joint at bottom and top. Use with 3/8-inch I.D. tubing, size D hose connections. Available with #7 Ace-Thred and "Ace-Safe" hose connections on inlet and outlet with barb for 1/4-inch I.D. tubing.

24/40 Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	200	3/8 (Size D)	1	5953-12
24/40	250	3/8 (Size D)	1	5953-13
24/40	300	3/8 (Size D)	1	5953-14
24/40	400	3/8 (Size D)	1	5953-15

### Glass Hose Barb Connection

### #7 Ace-Thred Connection

24/40	200	1/4	1	5953-101
24/40	250	1/4	1	5953-103
24/40	300	1/4	1	5953-106
24/40	450	1/4	1	5953-108



### Replacement Connector

#7 to 1/4inch tubing, polypropylene	1	5853-06
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## CONDENSER *Reflux, Coiled* ♦

Double jacketed with 24/40 inner and outer joint at bottom and top. Use with 3/8-inch I.D. tubing, size D hose connections. Available with #7 Ace-Thred and "Ace-Safe" hose connections on inlet and outlet with barb for 1/4-inch I.D. tubing.

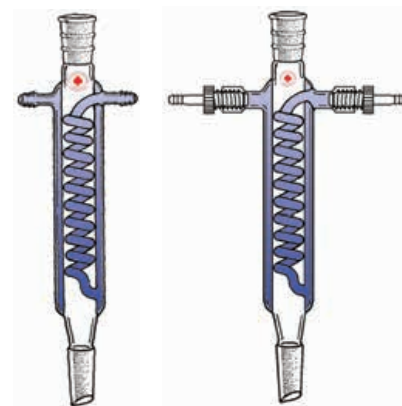
24/40 Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
24/40	250	3/8 (Size D)	1	5955-13
24/40	300	3/8 (Size D)	1	5955-14
24/40	400	3/8 (Size D)	1	5955-15
29/42	300	3/8 (Size D)	1	5955-34

### #7 Ace-Thred Connection

24/40	250	1/4	1	5956-143
24/40	400	1/4	1	5956-145

### Replacement Connector

#7 to 1/4inch tubing, polypropylene	1	5853-06
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**CONDENSER** *Reflux, Spiral* ♠

With spiral condensing tube having both inlet and outlet connections at top, on same side. With inner and outer joints at bottom and top. Length between joints is approximately 80-90 mm longer than coil length.

⌘ Joints	Coil Length, mm	Hose Connection, in.	Qty	Order Code
14/20	100	5/16 or 3/8 (Size B)	1	9270-04
24/40	200	3/8 (Size D)	1	6020-02
24/40	250	3/8 (Size D)	1	6020-04
24/40	300	3/8 (Size D)	1	6020-06
24/40	400	3/8 (Size D)	1	6020-08
29/42	300	3/8 (Size D)	1	6020-10
45/50	400	3/8 (Size D)	1	6020-12


**CONDENSER** *Reflux, Spiral* ★

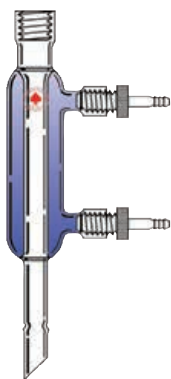
This compact spiral coil condenser has a tightly wrapped coil for maximum cooling. Excellent for use with high vapor pressure solvents. Jacket length approximately 100mm, overall height approximately 210mm. 75 degree angle top ⌘14/20 outer joint, ⌘14/20 inner bottom joint. Size C hose connections. Other joint sizes available.

⌘ Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
14/20	100	5/16 or 3/8 (Size C)	1	6040-02
24/40	100	5/16 or 3/8 (Size C)	1	6040-04


**CONDENSER** *Reflux, Bulb, Drip-Tip* ♠

New style, compact, high-output reflux condenser, has an inner double wall, thimble-shape internal bulb. Overall height is approximately 210mm, but has the output equal to condensers with twice the length. Unit has ⌘ outer top joint and ⌘ drip-tip inner joint bottom. Top and bottom hose connections size D, for 3/8-inch tubing. Other joint sizes available.

⌘ Joints	Hose Connection, in.	Qty	Order Code
14/20	3/8 (Size D)	1	6042-02
24/40	3/8 (Size D)	1	6042-04
29/42	3/8 (Size D)	1	6042-06
29/32	3/8 (Size D)	1	6042-08
45/50	3/8 (Size D)	1	6042-10
14/23	3/8 (Size D)	1	6042-114
24/29	3/8 (Size D)	1	6042-124


**CONDENSER** *West, Ace-Thred Connectors* ♠

Used with pressure reactors, listed in our reactor catalog. Heavy wall condenser has a #15 Ace-Thred at top that can be stoppered using 5846 plug (not supplied). Bottom drip tip is long enough to be secured in the #15 Ace-Thred on 6433 reactor head, one-piece pressure reactor or any vessel with a #15 Ace-Thred. Drip tip has a groove that restricts blowout when secured with 7506-06 bushing and O-Ring (not supplied). Inlet/outlet have #7 Ace-Threds for use with "Ace-Safe" 5853 easy connect/disconnect tubing connectors.

**Note:** Includes (2) #7 Ace-Safe Connectors. Does not include #15 Plug.

Top Joint, Ace-Thred	Jacket Length, mm	Side Joint, Ace-Thred	Qty	Order Code
#15	200	#7	1	6024-20

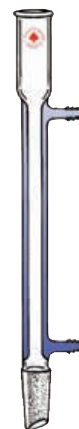
**Replacement Parts**

Ace-Thred Connector, #7 to 1/4inch tubing, polypropylene	1	5853-06
#15 Nylon Plug	1	5846-12

## CONDENSER *West* ♠

With  $\text{F}$  inner joint at bottom. Jacket length 300mm. Open top. Use with 3/8-inch I.D. tubing, size D hose connections.

Top Joint	Inner Bottom $\text{F}$ Joint	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
Beaded	24/40	300	3/8 (Size D)	1	6025-14



## CONDENSER *West, "No Hold-Up"* ♠

With  $\text{F}$  inner and outer joints at bottom and top.

$\text{F}$ Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
<b>Glass Hose Barb Connection</b>				
24/40	250	3/8 (Size D)	1	6029-13
24/40	300	3/8 (Size D)	1	6029-14
24/40	400	3/8 (Size D)	1	6029-15
24/40	500	3/8 (Size D)	1	6029-16
24/40	600	3/8 (Size D)	1	6029-17

### #7 Ace-Thred Connection

24/40	250	1/4	1	6029-112
24/40	300	1/4	1	6029-115
24/40	400	1/4	1	6029-117
24/40	500	1/4	1	6029-118
24/40	600	1/4	1	6029-119

### Replacement Connector

#7 to 1/4inch tubing, polypropylene	1	5853-06
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## CONDENSER *West, "No Hold-Up"* ♠

With  $\text{F}$  inner and outer joints at bottom and top.

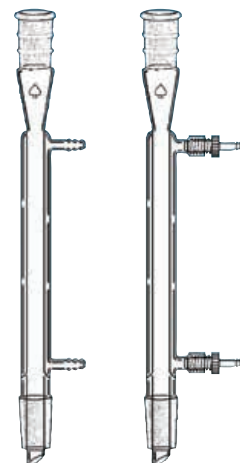
$\text{F}$ Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
<b>Glass Hose Barb Connection</b>				
14/20	200	5/16 (Size A)	1	9297-05
19/22	200	5/16 or 3/8 (Size B)	1	9297-09

### #7 Ace-Thred Connection

14/20	200	1/4	1	9297-106
19/22	200	1/4	1	9297-110

### Replacement Connector

#7 to 1/4inch tubing, polypropylene	1	5853-06
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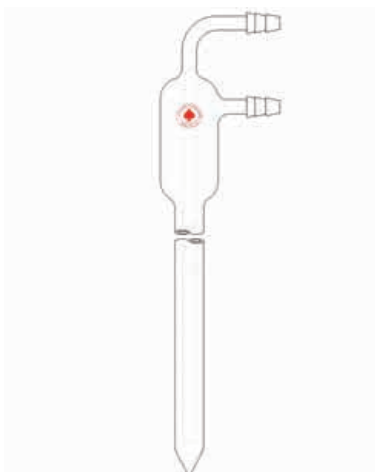




**CONDENSER** *West, Jacketed* ♠

With top joint jacketed for water cooling. Jacket length measured from bottom of top joint. Use with 5/16-inch I.D. tubing, size A hose connections.

⌘ Joints	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
14/20	120	5/16 (Size A)	1	9299-08



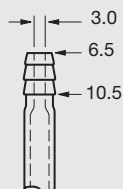
**CONDENSER** *Cold Finger, Pilot Plant Reactors* ★

Jacket length is measured from the lower shoulder of the bulb to the bottom of the finger. Diameter of tube is 14mm. Used in 12845 & 12846 pilot plant reactors. Use with #15 Ace-Thred bushing and 8042 glass adapter to fit top ⌘ 45/50 joint in 5945-76 condenser. Use with 5/16-inch or 3/8-inch I.D. tubing, size C hose connections.

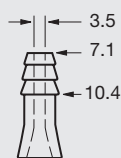
Tube Diameter, mm	Jacket Length, mm	Hose Connection, in.	Qty	Order Code
14	625	5/16 or 3/8 (Size C)	1	5958-99

## Hose Connection Size Guide

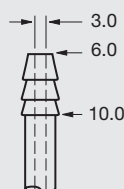
*Dimensions are in millimeters*



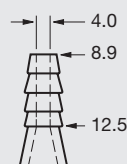
**A**  
Use with 7.9mm (5/16") I.D. Tubing



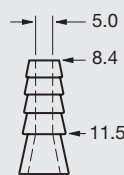
**B**  
Use with 7.9mm (5/16") or 9.5mm (3/8") I.D. Tubing



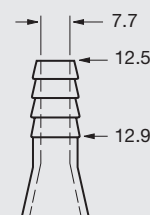
**C**  
Use with 7.9mm (5/16") or 9.5mm (3/8") I.D. Tubing



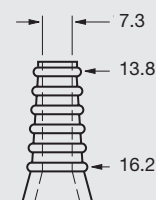
**D**  
Use with 9.5mm (3/8") I.D. Tubing



**E**  
Use with 9.5mm (3/8") or 11.1mm (7/16") I.D. Tubing



**F**  
Use with 11.1mm (7/16") or 12.7mm (1/2") I.D. Tubing



**G**  
Use with 15.9mm (5/8") I.D. Tubing



## CONDENSER Pilot Plant, Soxhlet, Bulb Type, for Giant Extraction Apparatus ♠

This apparatus comes complete with a bulb-type condenser and one flask. Cycling rates may be doubled over conventional style extractors. All joints are interchangeable.

Overall Length, mm	Condenser Length, mm	Bottom ⌘ Joint	Length, mm	Hose Connection, in	Order Code
450	340	71/60	340	1/2 or 7/16 (Size F)	<b>6810-04</b>
525	375	103/60	460	1/2 or 7/16 (Size F)	<b>6810-14</b>
930	730	55/50	730	1/2 or 7/16 (Size F)	<b>6810-24</b>

### Glass Hose Connections

450	340	71/60	340	1/2 or 7/16 (Size F)	<b>6810-04</b>
525	375	103/60	460	1/2 or 7/16 (Size F)	<b>6810-14</b>
930	730	55/50	730	1/2 or 7/16 (Size F)	<b>6810-24</b>

### Ace-Thred Connections

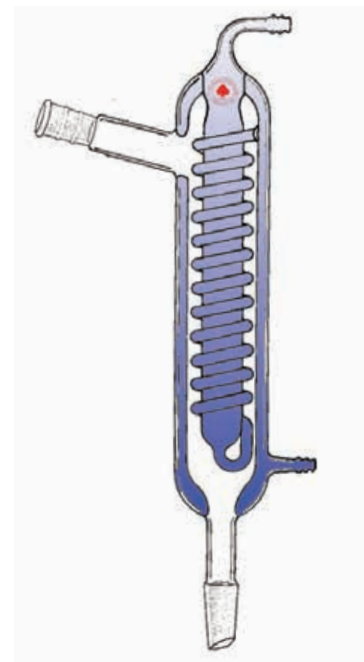
450	340	71/60	340	#15 Ace-Thred	<b>6810-05</b>
525	375	103/60	460	#15 Ace-Thred	<b>6810-15</b>
930	730	55/50	730	#15 Ace-Thred	<b>6810-25</b>

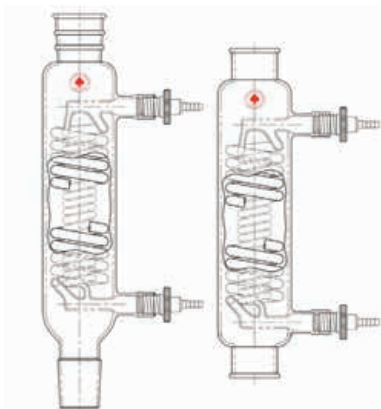


## CONDENSER Pilot Plant, Long Path ♠

Turbulent flow created makes this condenser very desirable for use under reduced pressure. Internal and external cooling surfaces result in high efficiency per unit length. ⌘ 24/40 inner and outer joints. Use with 7/16-inch or 1/2-inch I.D. tubing, size F hose connections.

⌘ Joints	Length, mm	Hose Connection, in.	Qty	Order Code
24/40	500	7/16 or 1/2 (Size F)	1	<b>6012-16</b>
24/40	600	7/16 or 1/2 (Size F)	1	<b>6012-17</b>





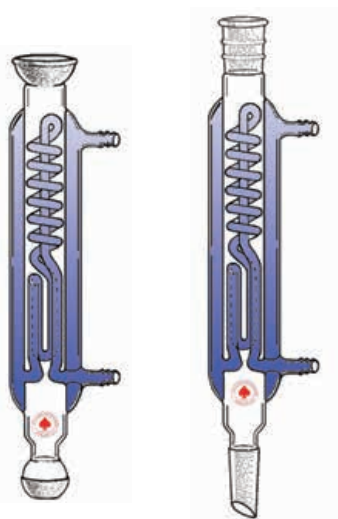
**CONDENSER Pilot Plant, High Capacity, Double Coil**

High through-put double coil condensers are made for larger systems and reactors, especially pilot plants, to handle larger scale reactions. These are also similar to rotary evaporator type condensers where a lot of material is being condensed at a higher temperature and where large amounts of cooling water are needed to generate higher efficiency. The unit can be ordered with standard taper joints or beaded pipe end connections. The overall length is approximately 390mm and O.D. is approximately 85-90mm. Both units have #15 Ace-Thred connections for Ace-Safe hose connections. Supplied with full Ace Safe connections.

⌘ Joints	Jacket Length, mm	Condensing Area, cm <sup>2</sup>	Qty	Order Code
Beaded	315	1480	1	<b>6015-12</b> ★
45/50	290	1400	1	<b>6015-17</b> ★

**Replacement Connector**

Ace-Thred Connector, #15 to 3/8inch tubing, polypropylene	1	<b>5853-23</b> ♠
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**CONDENSER Pilot Plant** ★

Highly efficient. May be used either for through condensation or refluxing. Internal baffling acts as impinging surface for entrained particles and discourages diffusion loss. Comes with either ⌘ or ⌘ top and bottom. Use with 7/16" or 1/2" I.D. tubing, size F hose connections.

Jacket Length, mm	Hose Connection, in	Qty	Order Code
<b>45/50 Standard Taper</b>			
500	7/16 or 1/2 (Size F)	1	<b>6016-36</b>
750	7/16 or 1/2 (Size F)	1	<b>6016-39</b>
1000	7/16 or 1/2 (Size F)	1	<b>6016-41</b>

**71/60 Standard Taper**

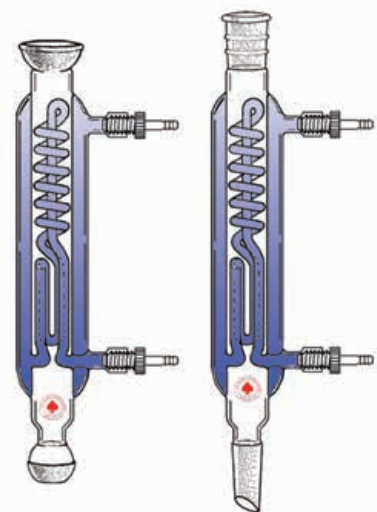
750	7/16 or 1/2 (Size F)	1	<b>6016-52</b>
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**35/25 Spherical**

500	7/16 or 1/2 (Size F)	1	<b>6016-66</b>
1000	7/16 or 1/2 (Size F)	1	<b>6016-69</b>

**65/40 Spherical**

500	7/16 or 1/2 (Size F)	1	<b>6016-75</b>
750	7/16 or 1/2 (Size F)	1	<b>6016-77</b>
1000	7/16 or 1/2 (Size F)	1	<b>6016-79</b>



**CONDENSER Pilot Plant, with Ace-Thred Connectors** ★

Highly efficient. May be used either for through condensation or refluxing. Internal baffling acts as impinging surface for entrained particles and discourages diffusion loss. With #11 Ace-Thred and "Ace-Safe" polypropylene hose connections on inlet and outlet with barb for 1/4" I.D. tubing. For replacement hose connections, see 5853.

Jacket Length, mm	Hose Connection, in	Qty	Order Code
<b>45/50 Standard Taper</b>			
500	#11 for 1/4	1	<b>6016-137</b> ★
750	#11 for 1/4	1	<b>6016-139</b> ★
1000	#11 for 1/4	1	<b>6016-141</b> ★

**35/25 Spherical**

500	#11 for 1/4	1	<b>6016-167</b> ★
1000	#11 for 1/4	1	<b>6016-170</b> ★

**65/40 Spherical**

500	#11 for 1/4	1	<b>6016-176</b> ★
750	#11 for 1/4	1	<b>6016-178</b> ★
1000	#11 for 1/4	1	<b>6016-180</b> ★

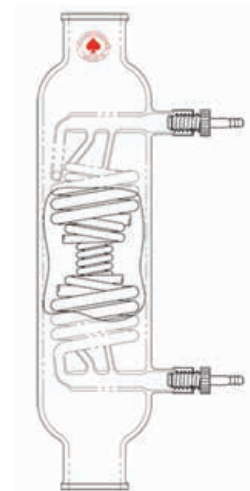
**Replacement Connector**

Ace-Thred Connector, #11 to 1/4inch tubing, polypropylene	1	<b>5853-12</b> ♠
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## CONDENSER *Pilot Plant, High Capacity, Triple Coil*

This new design gives even higher through-put than the double coil or any rotary evaporator condenser with three internal cooling coils. Designed also for pilot plants and larger reactors where a lot of cooling area is needed for condensing, or for higher temperature reactions where more through-put is needed. Comes with #15 Ace-Thred ports with Ace-Safe connections. Top and bottom connections are 2" beaded pipe. Overall length is approximately 460mm and O.D. is approximately 110mm.

Joints	Coil Length, mm	Condensing Area, cm <sup>2</sup>	Hose Connection, in	Qty	Order Code
<b>Glass only</b>					
Beaded	220	1600	#15	1	6017-210 ★
<b>Complete with #15 Ace-Thred Connectors</b>					
Beaded	220	1600	#15 for 3/8	1	6017-212 ★
<b>Replacement Connector</b>					
Ace-Thred Connector, #15 to 3/8inch tubing, polypropylene				1	5853-23 ♦

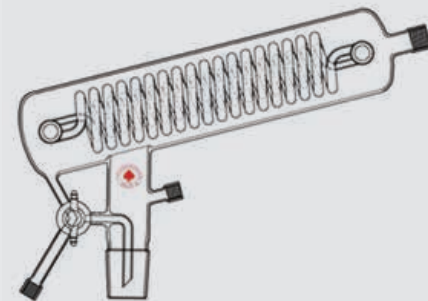


## Special Request Items are Available

### CONDENSER *Pilot Plant, Modified Keenan, Dual Coil, Horizontal*

Highly efficient, double coil, condenser with 30 degree horizontal angle vs. typical vertical style. Great for under hoods or on pilot plant reactors where height may be an issue and a high level of distillation is required. Condenser has a 45/50 bottom joint to fit on reactor heads, all other connections are either #7 or #15 Ace-Safe, (supplied). Comes with either a PTFE or glass stopcock. Overall length is approximately 470mm. Height from top of bottom joint to highest point at top is 90mm.

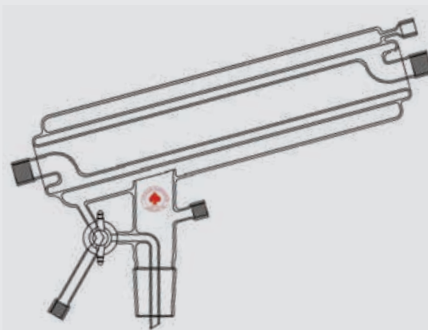
45/50 Joints	Stopcock Type	Qty	Order Code
45/50	PTFE	1	6021-20 <span style="color: red;">Priced Upon Request</span>
45/50	Glass	1	6021-30 <span style="color: red;">Priced Upon Request</span>



### CONDENSER, KEENAN *Pilot Plant, Single Tube, Horizontal*

Highly efficient, innovative condenser. Features a horizontal angle for low clearance but extremely good capacity and through-put. Especially useful when assembling a large reactor in limited height clearance situations. Surface area is 710cm<sup>2</sup>. Cooling fluid volume: 600mL. Condenser has a 45/50 bottom joint. All other connections are #7 or #15 Ace-Thred that accepts a 7mm O.D. tube or 5853 "Ace-Safe" connectors (supplied) to attach tubing. Overall length: 475mm.

45/50 Joints	Stopcock Type	Qty	Order Code
45/50	Glass	1	6022-22 <span style="color: red;">Priced Upon Request</span>
45/50	PTFE	1	6022-30 <span style="color: red;">Priced Upon Request</span>



**Just about any time a ground joint connection is made,  
an Ace-Thred can be substituted!**

### Reference Guide to Ace-Thred Sizes

Size	Accepts Tube O.D., mm	Use Bushing Number	Use With O-Ring No.	Suggested Uses
#7	6-7	5029-10	7855-704	A, B, I
#11	9-10.5	7506-02	7855-708	D, E, F, G
#15	12.5-14	7506-06	7855-716	C, H
#18	16-17	7506-08	7855-720	H, L
#25	24-25	7506-10	7855-734	K
#36	34-35	7506-12	7855-740	K, L
#50	47-48	7506-14	7855-744	K, L
#80	80	7506-20	7855-782	—

- |                  |                          |                        |
|------------------|--------------------------|------------------------|
| A—Thermometers   | E—Thermowells            | I—Miniature Electrodes |
| B—Bleed Tubes    | F—Gas Dispersion Tubes   | K—Manifolds            |
| C—Electrodes     | G—Vacuum Take-Offs       | L—Immersion Wells      |
| D—Sensing Probes | H—Inlet and Outlet Tubes |                        |



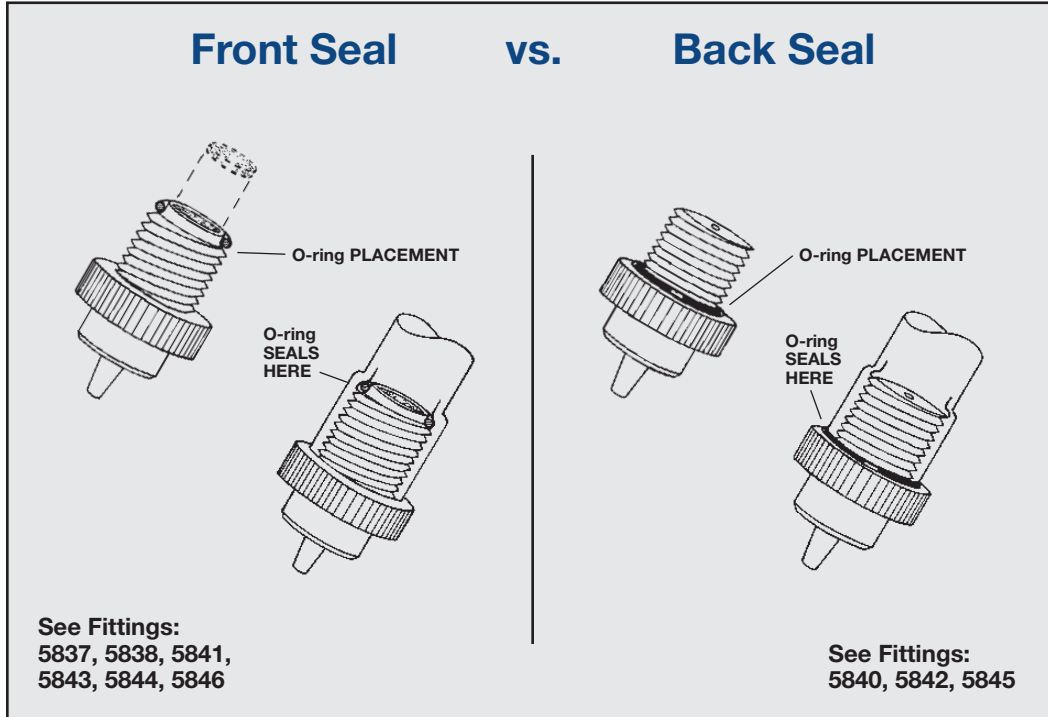
#### **CONNECTORS** Threaded, Ace-Thred ♠

Internally threaded connectors, available in glass or 18-8 type 303 free machining stainless steel. For use in place of ground glass joints on flasks, columns, etc. Threads offer positive pressure O-Ring seal when used with fittings like 5837, 5838, 5840-5846, and 7506.

**Note:** Fittings and bushings for all sizes must be ordered separately.

Ace-Thred Size	Tube O.D., mm	Thread O.D., mm	Qty	Order Code	
<b>Glass Connector</b>					
7	12.5	18	1	5027-05	♠
11	16	22	1	7644-10	♠
15	23	26	1	7644-15	♠
18	25	29	1	7644-18	♠
25	32	41	1	7644-20	♠
36	45	51	1	7644-22	♠
50	57	71	1	7644-25	♠
80	102	110	1	7644-36	♠
<b>Stainless Steel Connector</b>					
7	14	18	1	7644-70	★
11	17	22	1	7644-72	★
15	22	26	1	7644-76	★
25	34	41	1	7644-79	★
36	49	51	1	7644-81	★

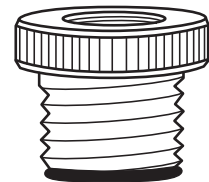
## Ace-Thred Styles Front or Back O-Ring Seals



### ADAPTER FOR SWAGELOK *Front Seal O-Ring* ♦

Bushing adapter used with Ace-Threds for connecting tubing to threaded glass via a Swagelok®-type connection. One end Ace-Thred, the other end has an NPT female thread. Supplied with (1) FETFE O-ring. Adapters available in either nylon or PTFE.

**Note:** Codes -40 & -41 are fabricated from High Density Polyethylene.



NPT Thread, in Qty		#7 Ace-Thred Order Code	#11 Ace-Thred Order Code	#15 Ace-Thred Order Code	#25 Ace-Thred Order Code	#36 Ace-Thred Order Code	#50 Ace-Thred Order Code	#80 Ace-Thred Order Code
<b>NYLON</b>								
1/8	1	5844-16	5844-18	5844-20	5844-22	5844-23	5844-24	—
1/4	1	—	—	5844-34	5844-36	5844-37	5844-38	5844-40
3/8	1	—	—	—	—	—	5844-39	5844-41

NPT Thread, in Qty		#7 Ace-Thred Order Code	#11 Ace-Thred Order Code	#15 Ace-Thred Order Code	#25 Ace-Thred Order Code	#36 Ace-Thred Order Code	#50 Ace-Thred Order Code	#80 Ace-Thred Order Code
<b>PTFE</b>								
1/16	1	5844-42	5844-44	5844-46	5844-48	5844-49	—	—
1/8	1	5844-58	5844-60	5844-62	5844-64	5844-65	—	—
1/4	1	5844-72	—	5844-74	5844-76	5844-77	5844-78	5844-80
3/8	1	—	5844-81	—	5844-105	—	5844-85	5844-87
3/4	1	—	—	—	—	5844-95	5844-97	5844-98
1/2	1	—	—	5844-103	5844-104	5844-106	5844-107	5844-108

#### Replacement FETFE O-Rings

7855-704	7855-708	7855-716	7855-734	7855-772	7855-744	7855-764
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Front Seal



Back Seal

**PLUG** Nylon or PTFE, Ace-Thred ♠

A solid plug for sealing column ends. Permits preparation and storage of column. Supplied with (1) FETFE O-ring.

Ace-Thred	Front Seal		Back Seal	
	Qty	Order Code	Qty	Order Code
<b>Nylon</b>				
7	1	5846-04	1	5845-03
11	1	5846-06	1	5845-05
15	1	5846-12	1	5845-10
18	1	5846-14	1	5845-12
25	1	5846-16	1	5845-15
36	1	5846-18	1	5845-17
50	1	5846-22	1	5845-20
<b>HDPE</b>				
80	1	5846-27	1	5845-30
<b>PTFE</b>				
7	1	5846-44	1	5845-43
11	1	5846-46	1	5845-45
15	1	5846-48	1	5845-47
18	1	5846-49	1	5845-48
25	1	5846-50	1	5845-49
36	1	5846-51	1	5845-50
50	1	5846-52	1	5845-51
80	1	5846-60	1	5845-56
<b>Replacement FETFE O-Rings</b>				
7		7855-707		7855-712
11		7855-708		7855-722
15		7855-716		7855-730
18		7855-721		7855-734
25		7855-734		7855-742
36		7855-772		7855-774
50		7855-744		7855-748
80		7855-764		7855-766

## Still Unsure About Which Plug to Use?

Let us help explain it for you...

- Front Seal O-rings create a seal internally or below the vessel's threads
- Back Seal O-rings create the seal above the threads of the vessel

By simply hand tightening these plugs, the O-ring assures a tight seal. For pressure work, a "Front Seal" plug (5846) is recommended. "Back Seal" plugs (8545) are also available, if preferred.



5846  
Front Seal



5845  
Back Seal

## BUSHING *Front Seal* ♠

Front Seal Bushing connector for use with Ace-Threds, threaded glass or stainless steel connectors. For joining threaded end to a reduced end tube. Available in either nylon or PTFE. (1) FETFE O-ring supplied with each bushing.

**Note:** \*7506-20 fabricated from High Density Polyethylene.

Ace-Thred	I.D. (B), mm	O-ring Size	Qty	Nylon	PTFE
				Order Code	Order Code
7	7.5	-008	1	5029-10	5029-35
11	10	-012	1	7506-02	7506-23
15	14	-110	1	7506-06	7506-27
18	17	-112	1	7506-08	7506-29
25	26	-212	1	7506-10	7506-31
36	36	-217	1	7506-12	7506-33
50	49	-225	1	7506-14	7506-35
80	80.7	-336	1	7506-20*	7506-39



### Replacement FETFE O-Rings

7	7855-704
11	7855-708
15	7855-716
18	7855-720
25	7855-734
36	7855-740
50	7855-744
80	7855-782

## FERRULES *PTFE* ★

Single-piece PTFE Ferrule\* used in place of O-rings with Ace-Threds to avoid possible contamination from O-ring compounds. Also enables the use of smaller outside diameter tubes with a given size Ace-Thred and still maintain tight conditions. For instance, the #7 Ace-Thred, 5027-20, with O-ring accepts a 7 mm O.D. tube. By inserting a 6.4 mm PTFE ferrule in place of the O-ring, the #7 Ace-Thred will now accept as small as a 6.4 mm O.D. tube. For operation up to 140°C.

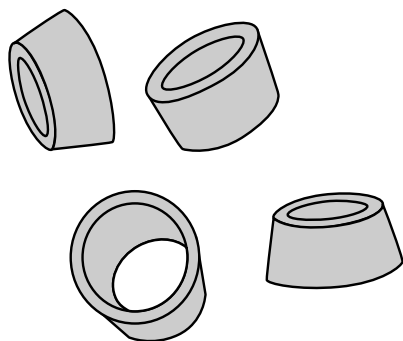
**Note:** Ferrules are not always suitable for vacuum applications.

Use with Ace-Thred Size	Hole I.D., mm (in)	Qty	Order Code
<b>With Pre-Drilled Hole</b>			
7	3.2 (1/8)	12	11710-03
7	4.8 (3/16)	12	11710-05
7	6.4 (1/4)	12	11710-07
11	9.5 (3/8)	12	11710-11
15	12.7 (1/2)	12	11710-15
18	15.9 (5/8)	6	11710-21
25	25.4 (1)	6	11710-25
50	50.8 (2)	6	11710-50

### Solid (for drilling special size hole)

7	–	12	11710-104
11	–	12	11710-106
15	–	12	11710-108
18	–	6	11710-110
25	–	6	11710-112
50	–	6	11710-114

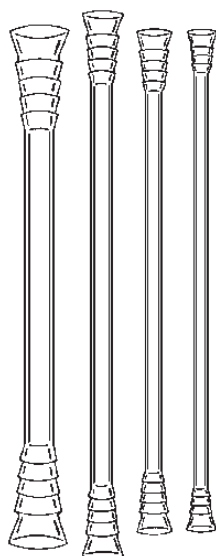




**FERRULES** *Graphite, High Temperature* ★

Single piece, high purity graphite ferrule — no back ferrule needed, no organic binders used. Ideal for glass-to-glass or glass-to-metal connections. All sizes are used with #7 Ace-Thred. Due to their high purity and unique properties, these ferrules make a monomolecular seal — one of the strongest seals known. Ferrules are not always suitable for vacuum applications.

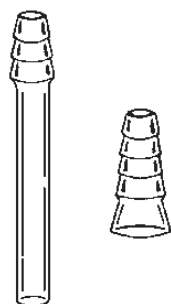
Ace-Thred Size	For Tubing O.D., mm (in)	Qty	Order Code
7	1.0 (.04)	10	<b>11720-12</b>
7	1.6 (1/16)	10	<b>11720-16</b>
7	3.2 (1/8)	10	<b>11720-18</b>
7	6.4 (1/4)	10	<b>11720-20</b>



**HOSE CONNECTIONS** *Direct Seal* ♠

Four-ring connector (code -03 has three rings) is tooled with flare and exposed for direct sealing to apparatus. Tooled on each end of tubing with approximately 5-6" between connectors. Packed per dozen connectors (i.e., six doubles).

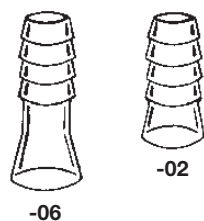
Hose Connection I.D., in	Second Ring O.D., mm	Tube O.D., mm	Qty	Order Code
5/16	8	3	12	<b>8469-03</b>
3/8	10	4	12	<b>8469-08</b>
3/8	11	5	12	<b>8469-12</b>
1/2	13.5	7.5	12	<b>8469-17</b>



**HOSE CONNECTIONS** *Regular* ♠

Ring-style hose connections for use with regular size condensers, etc. Codes -03 and -07 are on straight tubing; code -11 has a flare opposite rings.

I.D., mm	Second Ring O.D., mm	For Tube I.D., in	Length, mm	Qty	Order Code
<b>Straight</b>					
3	9.5	5/16	25	12	<b>8470-03</b>
3	9.5	5/16	76	12	<b>8470-07</b>
<b>Flared</b>					
4	8.9	5/16	29	12	<b>8470-11</b>



**HOSE CONNECTIONS** *Large* ♠

Ring-style hose connections for use on large soxhlet condensers, etc. With flare opposite rings.

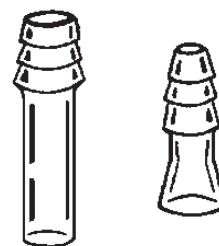
I.D., mm	Second Ring O.D., mm	For Tube I.D., in	Length, mm	Qty	Order Code
<b>Flared</b>					
5	11.1	3/8	32	12	<b>8471-02</b>
7.7	12.6	1/2	41	12	<b>8471-06</b>



## HOSE CONNECTIONS *Mini-Lab Size* ♦

Ring-style hose connections for use on small-scale apparatus such as Mini-Lab. Codes -05 and -09 are on straight tubing; code -14 has a flare opposite rings.

I.D., mm	Second Ring O.D., mm	For Tube I.D., in	Length, mm	Qty	Order Code
3.5	7.9	5/16	25	12	8472-05
3	8	5/16	100	12	8472-09
<b>Flared</b>					
3.5	7.9	5/16	25	12	8472-14



## SPRINGS *Stainless Steel* ★

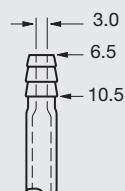
For connecting interchangeable joints, washing bottles and other apparatus where glass hooks are provided. \*Assortment pack contains 12 of each size.

Coil Length, mm	Coil Length, in	Qty	Order Code
13	1/2	12	8030-02
19	3/4	12	8030-04
25	1	12	8030-08
32	1-1/4	12	8030-12
38	1-1/2	12	8030-16
44	1-3/4	12	8030-20
51	2	12	8030-24
<b>Assorted Pack</b>			
12 of each		84	8030-30

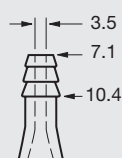


## Hose Connection Size Guide

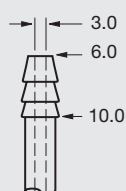
*Dimensions are in millimeters*



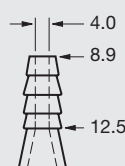
**A**  
Use with  
7.9mm (5/16")  
I.D. Tubing



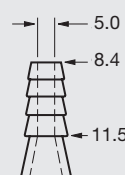
**B**  
Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



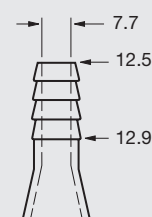
**C**  
Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



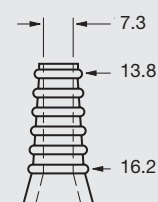
**D**  
Use with  
9.5mm (3/8")  
I.D. Tubing



**E**  
Use with  
9.5mm (3/8")  
or 11.1mm (7/16")  
I.D. Tubing



**F**  
Use with  
11.1mm (7/16")  
or 12.7mm (1/2")  
I.D. Tubing



**G**  
Use with  
15.9mm (5/8")  
I.D. Tubing



**“ACE-SAFE” TUBING CONNECTOR Polypropylene**

Tubing connector, used to connect flexible tubing (1/4”, 3/8”, 1/2”, 3/4”, 1” I.D.) to #7, #11, #15 or #25 Ace-Thred™ for easy, safe connect/disconnect. 5029/7506 Nylon bushing slides over serrated end and secures polypropylene connector in thread with silicone O-Ring in front groove to make vacuum tight compression seal. Temperature range is -20 to 110°C. Always add or remove tubing from the hose barb while the connector is unthreaded from the glass.

**Note:** For replacement O-Rings, order 7855-207 for Code -03; 7855-206 for codes -09 and -10; 7855-210 for code -18 and -21; 7855-772 for code -31 and -33.

	Qty	#7 Ace-Thred to 1/4" I.D. Tubing Order Code	#11 Ace-Thred to 1/4" I.D. Tubing Order Code	#15 Ace-Thred to 1/4" I.D. Tubing Order Code	#11 Ace-Thred to 3/8" I.D. Tubing Order Code
Connector, only, w/O-ring	1	5853-03	5853-09	5853-18	5853-10
Nylon Bushing, only	1	5029-05	7506-01	7506-05	7506-01
Complete	1	5853-06	5853-12	5853-20	5853-15

	Qty	#15 Ace-Thred to 3/8" I.D. Tubing Order Code	#15 Ace-Thred to 1/2" I.D. Tubing Order Code	#25 Ace-Thred to 3/4" I.D. Tubing Order Code	#25 Ace-Thred to 1" I.D. Tubing Order Code
Connector, only, w/O-ring	1	5853-19	5853-21	5853-31	5853-33
Nylon Bushing, only	1	7506-05	7506-05	7506-09	7506-09
Complete	1	5853-23	5853-26	5853-35	5853-37



**“ACE-SAFE” TUBING CONNECTOR PTFE**

Same as 5853 above, but manufactured from PTFE instead of polypropylene. Connectors are supplied with FETFE O-ring. For replacement O-rings, order 7855-707 for Code -03; 7855-706 for codes -05 and -10; 7855-710 for code -07, -12, and -14. Maximum temperature is 200°C.

	Qty	#7 Ace-Thred to 1/4" I.D. Tubing Order Code	#11 Ace-Thred to 1/4" I.D. Tubing Order Code	#15 Ace-Thred to 1/4" I.D. Tubing Order Code	#11 Ace-Thred to 3/8" I.D. Tubing Order Code
Complete Connector	1	5858-03 ★	5858-05 ★	5858-07 ★	5858-10 ★

	Qty	#15 Ace-Thred to 3/8" I.D. Tubing Order Code	#15 Ace-Thred to 1/2" I.D. Tubing Order Code
Complete Connector	1	5858-12 ★	5858-14 ★

## 5853/5858 Tubing Connector Reference Chart

(Flow Rate @10 lbs. H<sub>2</sub>O)

Tubing Connector Catalog No.	Fits Ace-Thred Size	Connector I.D., in. (mm)	Nominal Flow Rate Gal./Min.	Use Bushing Number	Use O-Ring Number	For Tubing I.D., In. (mm)
5853-03 / 5858-03	7	.125 (3.18)	1.5	5029-05 / 5029-35	7855-207 / 7855-707	1/4 (6.35)
5853-09 / 5858-05	11	.125 (3.18)	1.5	7506-01 / 7506-23	7855-206 / 7855-706	1/4 (6.35)
5853-10 / 5858-10	11	.187 (4.74)	3.3	7506-01 / 7506-23	7855-206 / 7855-706	3/8 (9.5)
5853-18 / 5858-07	15	.125 (3.18)	1.5	7506-05 / 7506-27	7855-210 / 7855-710	1/4 (6.35)
5853-19 / 5858-12	15	.187 (4.74)	3.3	7506-05 / 7506-27	7855-210 / 7855-710	3/8 (9.5)
5853-21 / 5858-14	15	.375 (9.5)	13.3	7506-05 / 7506-27	7855-210 / 7855-710	1/2 (12.7)
5853-31	25	.500 (12.7)	23.6	7506-09	7855-772	3/4 (19)
5853-33	25	.750 (19)	53.3	7506-09	7855-772	1 (25.4)

## CONNECTOR *Quick Disconnect*

Bel-Art

Connects tubing from 3-12mm I.D. Quick disconnect of high-density polyethylene tubulations slide snugly together. An important safety factor on vacuum lines with filtering flasks.



Taper, mm	Order Code	
4.8 to 6.4	12512-02	★
6.4 to 9.5	12512-04	★

## TUBE *Glass, Connecting* ♦

Straight reducing glass connector tube, with ends of different size.

I.D., mm	O.D., mm	Length, mm	Qty	Order Code
9.5 to 6.4	12 to 8	63	6	8481-03
12.7 to 6.4	15 to 8	70	6	8481-05
12.7 to 9.5	15 to 12	76	6	8481-07



## CONNECTORS *Tubing, T-Type*

Bel-Art

Autoclavable polyethylene connectors.

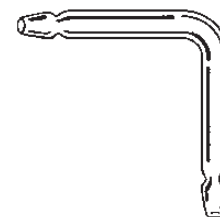
For Tubing I.D., mm	Order Code	
4.8	12513-05	★
6.4	12513-07	★
9.5	12513-11	★



## CONNECTOR *Glass Tube, 90°* ♦

With ends having constriction to hold rubber tubing securely.

For Tubing I.D., mm	O.D., mm	Length, mm	Qty	Order Code
4.8	6	38	6	8486-03
6.4	8	38	6	8486-07
7.9	10	38	6	8486-12
9.5	12	38	6	8486-18



## CONNECTORS *Y-Type*

Bel-Art

Versatile connectors of polypropylene. Autoclavable.

For Tubing I.D., mm	Order Code	
3.2	12514-04	★
4.8	12514-08	★
6.4	12514-10	★
7.9	12514-12	★
9.5	12514-14	★
12.7	12514-16	★



## CONNECTORS *PTFE Plug Valve*

Bel-Art

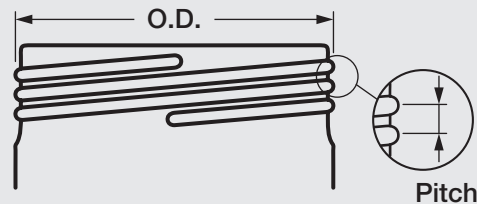
Polypropylene connectors, two-way or three-way, with PTFE valve and serrated tubulations. Takes 6.4mm to 9.5mm I.D. tubing.

For Tubing I.D., mm	Type	Bore, mm	Order Code	
6.4 to 9.5	2-Way	2	12611-04	★
6.4 to 9.5	2-Way	4	12611-08	★
6.4 to 9.5	3-Way	2	12611-21	★
6.4 to 9.5	3-Way	4	12611-23	★



# GL Threads

## Determination of Thread Size



GL threads are round threads. This means there are only round ends at the flanks of the screw thread. This thread can easily be formed on glass bottles, adapters, etc. The extremely high pitch and the large flanks give this thread an important carrying power.

- The GL number refers to the Overall Diameter (O.D.) of the Joint, including the threads. (ie. GLS80 has an O.D. of 80mm)
- Thread pitch refers to the vertical distance from the thread tip to thread tip.

Thread	Type	O. D., mm	Pitch, mm
GL	12	12	2.0
GL	14	14	2.5
GL	18	18	3.0
GL	25	25	3.5
GL	32	32	4.0
GL	45	45	4.0
GLS	80	80	15.0



### CONNECTORS Screw Thread, GL ★

Externally threaded glass connectors. For use as replacement on apparatus using the GL thread, or when designing items where the external thread is preferred. Length is 100 mm.

GL Thread Size	Tubing O.D., mm	Wall Thickness, mm	Qty	Order Code
14	12	1.5	1	7620-14
18	16	1.8	1	7620-18
25	22	1.8	1	7620-25
32	18	2.0	1	7620-32
45	40	2.3	1	7620-45
120	120	5.0	1	7620-60



### CAP Center Hole, GL Thread ★

Duran

Open top red polybutylene terephthalate (PBT) cap for use with 7620 GL threads. When used with 7623 hose connection and 7624 sealing ring, will accommodate tubing of approximate diameter.

GL Thread Size	Temperature Range, °C	Aperature Size, mm	O.D., mm	Height, mm	Qty	Order Code
14	-45 to +180	-	-	-	1	7621-04
18	-45 to +180	-	-	-	1	7621-08
25	-45 to +180	15	33	19	1	7621-15
32	-45 to +180	20	40	24	1	7621-22
45	-45 to +180	34	54	26	1	7621-25

**CAP Solid, GL, w/PTFE Liner** ★

**Duran**

Solid red PBT cap with PTFE liner\* for use with 7620 GL threads. Temperature range -45 to +180°C.

*Note: 120 GL size has a CAPFE O-ring seal.*

GL Thread Size	Temperature Range, °C	Qty	Order Code
14	-45 to +180	1	<b>7622-103</b>
18	-45 to +180	1	<b>7622-107</b>
25	-45 to +180	1	<b>7622-114</b>
32	-45 to +180	1	<b>7622-121</b>
45	-45 to +180	1	<b>7622-124</b>
120	-45 to +180	1	<b>7622-155</b>


**HOSE CONNECTION for GL Thread, w/Rubber Seal** ★

**Duran**

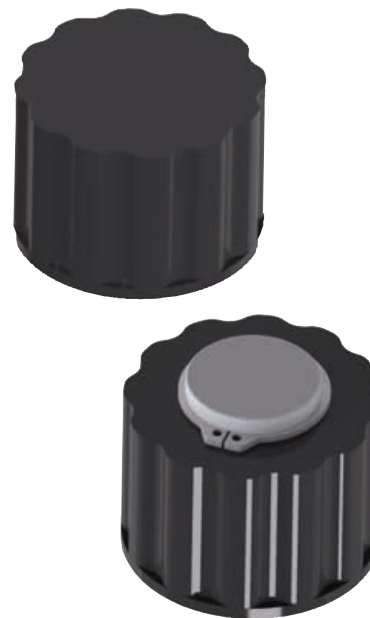
Polypropylene hose connections with a silicone rubber seal for use with 7620 screw thread connector, sizes 14 and 18. Allows connection of tubing for cooling/heating, etc. to hose connection and securing to thread with 7621 holed cap. To remove, simply unscrew cap. Two styles: straight and bent, both are 8mm O.D. x 4mm I.D.

For Thread Size (GL No.)	Style	Qty	Order Code
14	Bent	1	<b>7623-20</b>
14	Straight	1	<b>7623-22</b>
18	Bent	1	<b>7623-24</b>
18	Straight	1	<b>7623-26</b>


**CAP SVL, PTFE Lined** ★

Replacement caps, solid or open with SVL thread, for Buchi® glassware. 7647-40 has an open-top vent insert with retainer clip and is similar to Buchi® Part No. 46574.

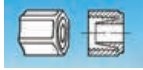
SVL Thread Size	Type	Qty	Order Code
15	Solid	1	<b>7647-15</b>
22	Solid	1	<b>7647-22</b>
30	Solid	1	<b>7647-30</b>
22	Open-Top	1	<b>7647-40</b>



**See the Chromatography section for listings of threaded PTFE, PFA connectors.**

# Glass-Filled Polypropylene Tube Connectors ★

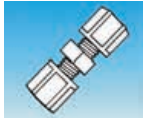
For use with Stainless Steel, Nylon Polyolefin, Aluminum and all other tubing.



**12692**

Nut

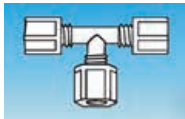
O.D. of Tube, mm (In.)	Qty	Order Code
6.4 (1/4)	1	12692-02
9.5 (3/8)	1	12692-06



**12693**

Union Tube to Tube

O.D. of Tube, mm	Qty	Order Code
6.4 x 3.2	1	12693-02
6.4 x 6.4	1	12693-03
9.5 x 6.4	1	12693-05
12.7 x 12.7	1	12693-09



**12699**

Tee Tube to Tube to Tube

O.D. of Tube, mm (In.)	Qty	Order Code
6.4 (1/4)	1	12699-10
9.5 (3/8)	1	12699-14
12.7 (1/2)	1	12699-16



**12705**

Elbow Tube to Tube

O.D. of Tube, mm (In.)	Qty	Order Code
6.4 (1/4)	1	12705-11
9.5 (3/8)	1	12705-15
12.7 (1/2)	1	12705-17



**12706**

Female Coupling Tube to F.P.T.

O.D. of Tube, mm (In.)	NPT Pipe Thread, mm	Qty	Order Code
6.4 (1/4)	3.2	1	12706-18
6.4 (1/4)	6.4	1	12706-20
9.5 (3/8)	6.4	1	12706-24
9.5 (3/8)	9.5	1	12706-26
12.7 (1/2)	9.5	1	12706-28



**12707**

Connector Tube to M.P.T.

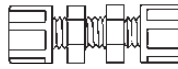
O.D. of Tube, mm (In.)	NPT Pipe Thread, mm	Qty	Order Code
6.4 (1/4)	6.4	1	12707-05
9.5 (3/8)	6.4	1	12707-09
9.5 (3/8)	9.5	1	12707-11
12.7 (1/2)	9.5	1	12707-13
12.7 (1/2)	12.7	1	12707-15
15.9 (5/8)	12.7	1	12707-19



**12708**

Elbow Tube to M.P.T.

O.D. of Tube, mm (In.)	NPT Pipe Thread, mm	Qty	Order Code
6.4 (1/4)	3.2	1	12708-02
6.4 (1/4)	6.4	1	12708-04
9.5 (3/8)	6.4	1	12708-08
9.5 (3/8)	9.5	1	12708-10
12.7 (1/2)	9.5	1	12708-12
12.7 (1/2)	12.7	1	12708-14



**12712**

Bulkhead Union Tube to Tube

O.D. of Tube, mm (In.)	Qty	Order Code
6.4 (1/4)	1	12712-02
9.5 (3/8)	1	12712-06
12.7 (1/2)	1	12712-08



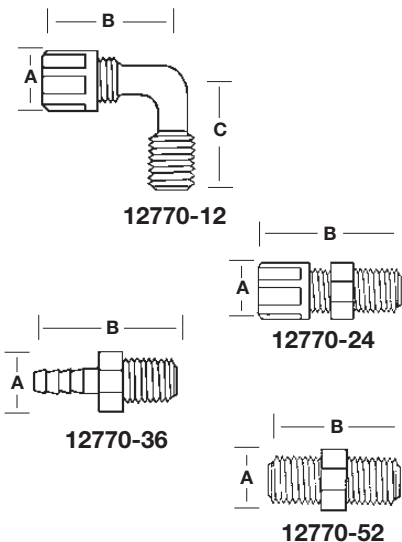
**12713**

Insert for Soft and Thin Wall Tubing

O.D. of Tube, mm (In.)	Qty	Order Code
6.4 (1/4)	1	12713-21
9.5 (3/8)	1	12713-25

## TUBE FITTINGS, CONNECTORS PTFE ★

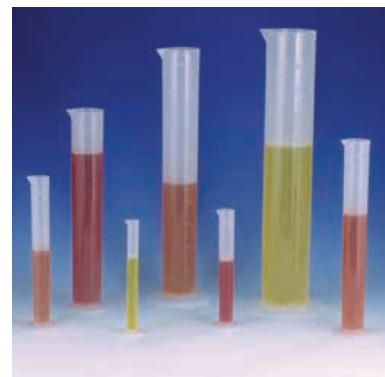
All PTFE fittings have male NPT thread at one end and tube compression, barb or NPT thread at other.



Style	Tube O.D., mm (In.)	NPT Size in	Dimensions			Qty	Order Code
			A, mm	B, mm	C, mm		
Elbow	6.4 (1/4)	1/4	18	31	21.4	1	12770-12
Elbow	9.5 (3/8)	1/4	23.5	37.6	27.2	1	12770-14
Elbow	9.5 (3/8)	3/8	23.5	37.6	27.2	1	12770-16
Elbow	12.7 (1/2)	3/8	27	37.6	27.2	1	12770-18
Elbow	12.7 (1/2)	1/2	27	36.8	27.2	1	12770-32
Connector	6.4	1/4	18	43.2	—	1	12770-24
Connector	9.5	1/4	23.5	45.5	—	1	12770-26
Connector	6.4	3/8	18	43.2	—	1	12770-27
Connector	9.5	3/8	23.5	45.5	—	1	12770-28
Connector	12.7	3/8	27	44.7	—	1	12770-30
Connector	12.7	1/2	27	47.5	—	1	12770-31
Nipple	—	1/4	17.8	35.2	—	1	12770-52
Nipple	—	3/8	23.5	35.2	—	1	12770-54
Nipple	—	1/2	27	43.2	—	1	12770-59
Barb	—	1/4	16	39.6	—	1	12770-36
Barb	—	3/8	20.6	39.6	—	1	12770-38

**CYLINDER** *Graduated, Polypropylene* ★

Polypropylene cylinders with octagonal base. Ideal for rugged industrial and school lab use. With single scale graduations for easier, quicker reading. No meniscus means easy to read liquid level. Large octagonal base provides good stability. 10mL size has conical top for easy filling. Autoclavable, however repeated autoclaving may affect accuracy. May also be sterilized by standard chemical methods.

**Bel-Art**


Capacity, mL	Subdivisions, mL	Order Code
10	0.1	12530-03
25	0.5	12530-05
50	1.0	12530-07
100	1.0	12530-09
250	2.0	12530-11
1000	10	12530-15
2000	10	12530-17

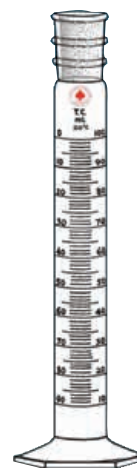
**CYLINDER** *Graduated, Standard Taper* ♠

With full length  $\text{§}$  24/40 top joint, single scale metric graduations. Can be used for distillation receiver.

Capacity, mL	Subdivisions, mL	Top Joint, $\text{§}$	Qty	Order Code
50	1	24/40	1	6195-13
100	1	24/40	1	6195-16
250	2	24/40	1	6195-21
500	5	24/40	1	6195-24
1000	10	24/40	1	6195-27

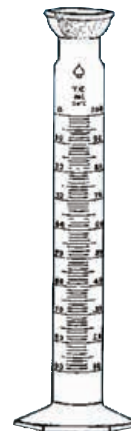
**Accessories**

Stopper	24/40	1	8250-12
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**CYLINDER** *Graduated, Spherical* ♠

With  $\text{§}$  35/25 top joint, single scale metric graduations. Can be used for distillation receiver.

Capacity, mL	Subdivisions, mL	Top Joint, $\text{§}$	Qty	Order Code
250	2	35/25	1	6196-21
500	5	35/25	1	6196-24
1000	10	35/25	1	6196-27



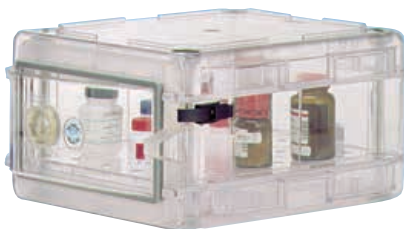


**DESICCATOR Plastic** ★

**Bel-Art**

Transparent polycarbonate top, white polypropylene bottom. Space-saving design gives an average of 13% greater interior volume. Extra heavy walls aid in avoiding danger of implosion. This shatterproof desiccator will hold a vacuum of 740mm of Hg (29 inches) for a period of 24 hours. Three-way polypropylene stopcock barrel with PTFE plug has a vacuum draw that accepts 1/4-inch I.D. tubing. Third port allows turbulence-free vacuum release. Neoprene O-ring seals lid to bottom and does not need grease. Supplied with perforated polypropylene plate, 3/8-inch (3.2mm) thick with 1/8-inch diameter perforations for air transfer. Packed 4 per case.

Size	Flange O.D., mm (in.)	I.D., mm (in.)	Plate Size, mm	Overall Height, mm (in.)	Max. Dist. Above Plate, mm (in.)	Qty	Order Code	Qty	Order Code
A	171 (6-3/4)	149 (5-7/8)	140	206 (8-1/8)	121 (4-3/4)	1	<b>6248-12</b>	4	<b>6248-31</b>
B	230 (9-1/16)	197 (7-3/4)	190	260 (10-1/4)	157 (6-3/16)	1	<b>6248-15</b>	4	<b>6248-35</b>
C	273 (10-3/4)	240 (9-7/16)	230	311 (12-1/8)	197 (7-3/4)	1	<b>6248-21</b>	4	<b>6248-39</b>



**DESICCATOR CABINET Horizontal Profile** ★

**Bel-Art**

Stackable, clear or blue plastic Secador™ desiccator cabinet, perfect for cramped locations. Can be safely stacked up to three high. Cabinet is completely transparent or blue with clear door and built-in Hygrometer. Patented sealed construction — for air-tight, dust- and moisture-free storage. One latch: provision for lock or tamper evident seal. Use any desiccant.

Internal volume: 0.75 cu. ft.

Shipping weight: 15.9 lb (7.2 Kg).



	Door Opening Height, in	Door Opening Width, in	Height, in	Width, in	Depth, in	Qty	Order Code
<b>Clear</b>	12.3	8.9	8.4	13.4	16.3	1	<b>6252-25</b>
<b>Blue</b>	12.3	8.9	8.4	13.4	16.3	1	<b>6253-35</b>



**DESICCATOR CABINET Vertical Profile** ★

**Bel-Art**

Stackable, plastic desiccator cabinet, perfect for cramped locations. Can be safely stacked up to two high. Cabinet offered in clear or blue with clear door and built-in hygrometer. Non-electric unit has three shelves, four shelf positions. Patented sealed construction — for air-tight, dust- and moisture-free storage. Two latches: provision for lock or tamper evident seal. Use any desiccant.

Internal volume: 1.9 cu. ft.

Shipping weight: 23.9 lb (10.9 Kg).



	Door Opening Height, in	Door Opening Width, in	Height, in	Width, in	Depth, in	Qty	Order Code
<b>Clear</b>	16.4	8.9	20.4	13.4	16.3	1	<b>6256-43</b>
<b>Blue</b>	16.4	8.9	20.4	13.4	16.3	1	<b>6256-47</b>



**AUTO-DESICCATOR CABINET Vertical Profile, Electric ★**
**Bel-Art**

Stackable, plastic Secador™ desiccator cabinet, perfect for cramped locations. Can be safely stacked up to two high. Cabinet offered clear or blue with clear door. With patented dehumidifying module — automatic desiccant regeneration and built-in hygrometer. Unit has three shelves, four shelf positions. Patented sealed construction— for air-tight, dust- and moisture-free storage. Two latches: provision for lock or tamper evident seal. Operates on 120v.

Internal volume: 1.9 cu. ft.

Shipping weight: 26.4 lb (12 Kg).

	Door Opening Height, in	Door Opening Width, in	Height, in	Width, in	Depth, in	Qty	Order Code
<b>Clear</b>	16.4	8.9	20.4	13.4	16.3	1	6257-50
<b>Blue</b>	16.4	8.9	20.4	13.4	16.3	1	6257-64


**DESICCATOR CABINET Amber ★**
**Plas-Labs**

Stackable, acrylic desiccator cabinet, ambered to protect contents from harmful U.V. rays. Perfect for cramped locations. Cabinet is completely transparent. Unique “Gasket Guard” system prevents gaskets from taking a set and thus destroying their effectiveness. Shelves are perforated for optimum gas saturation. Single cubicle has two shelves with five possible positions. Supplied with built in hygrometer-(RH).

	Height, in	Width, in	Depth, in	Qty	Order Code
<b>Amber</b>	12	12	12	1	6259-30

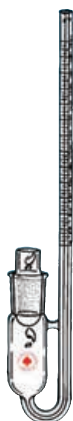

**INSTATHERM DESICCATOR Vacuum Oven ★**

250mm diameter with bottom Instatherm heated (low voltage: 40 volts, 10 amps maximum). Top is not heated, but has insulation cover. May be used as a vacuum oven continuously at temperatures up to 180°C. The top has an observation stripe for visibility and is supplied with vacuum take-off valve. Insulation is resilient silicone rubber impregnated glass cloth, and electrical connections are covered. Temperatures can be regulated by means of ACE or J-Kem temperature controllers. Also available with uncoated top.

**Note:** Supplied complete with a detachable twist-lok, 6ft cord, for 250°C operation, #7 to 24/29 vacuum stopcock adapter (5217-17) and -10°C to 200°C total immersion thermometer (8294-15).

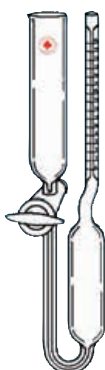
	Qty	Order Code
<b>Complete Desiccator</b>	1	9625-10



**DILATOMETER A.O.C.S. ♠**

For determination of fat and oil constants. Described in A.O.C.S., Method Cd 10-57. Total volume of precision bore capillary is 1.4mL  $\pm$  0.015mL. The smallest graduation is 0.005mL. Complete with stopper and hooks. Both stopper and tube are numbered.

Capacity, mL	Qty	Order Code
1.4	1	6282-10

**DILATOMETER Volumetric ♠**

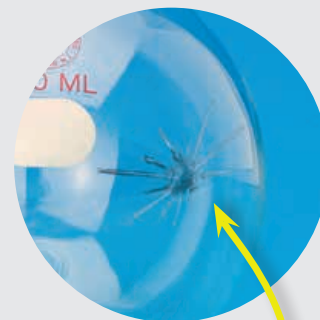
For use in any reaction where there is a change in volume. Described in *Experiments in Physical Chemistry*, Shoemaker & Garland, 1962, by McGraw-Hill Book Company, Inc. Experiment 27. Capacity of bath is 75mL, bulb 50mL, with capillary tube graduated from 0.0cm at bottom to 15.0cm at top. I.D. of capillary is 0.6mm. Stopcock is 2mm bore.

Bath Capacity, mL	Bulb Capacity, mL	Capillary I.D., mm	Bore, mm	Qty	Order Code
75	50	.6	2	1	6284-10

# Repair Service

*Yes, we fix it, too!*

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. These repairs can be far less expensive than the cost of replacing.



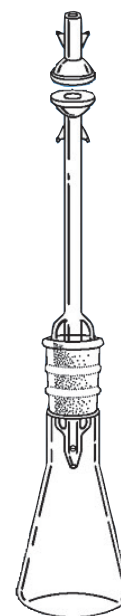
To find out more about our repair service call **1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)

**Broken joint or a cracked flask,  
we can restore it!**

### DISTILLATION APPARATUS *Arsenic Limit Test*

Used for limit test for arsenic as described in *European Pharmacopeia*, 1997, page 51. Complete consists of 125mL conical flask with  $\text{\textcircled{24/40}}$  joint, a capillary chimney with a pulled tip below  $\text{\textcircled{24/40}}$  joint at bottom, #5 flat-ground joint at top with hooks for 3/4-inch springs, and an adapter tube with #5 flat-ground joint with hooks.

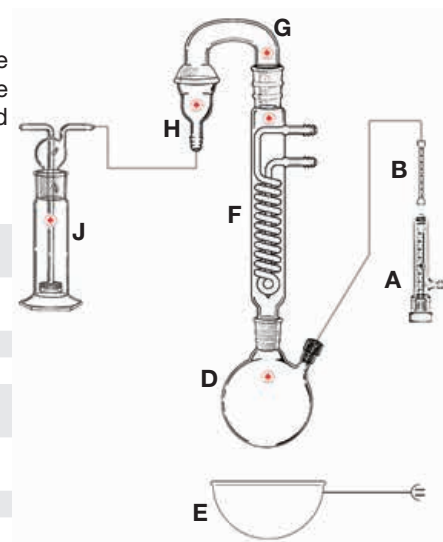
Description	Qty	Order Code	
Conical Flask, 125mL, $\text{\textcircled{24/40}}$	1	6965-22	♣
Chimney, $\text{\textcircled{24/40}}$ – #5 Joint	1	6544-14	★
Adapter Tube, #5 joint	1	6544-19	★
Springs, S-S, 3/4-inch, pkg./12	1	8030-04	★
<b>Complete</b>	1	6544-46	★



### DISTILLATION APPARATUS *Alginates Assay*

Alginates assay apparatus similar to system described in *US Pharmacopeia*, 2006, chapter 311. The complete system contains all the parts necessary to carry out the assay with the exception of the vinyl tubing, glass wool and the 20-mesh Zinc bands. The components are listed and described below. Order the complete apparatus or the individual components.

Description	Qty	Order Code	
<b>A, B.</b> Metering valve and flow meter tube set with size C hose connection for 5/16-inch tubing	1	7481-40	★
<b>D.</b> 250 mL round bottom reaction flask with $\text{\textcircled{24/40}}$ outer top joint and #11 Ace-Safe side neck for 5/16-inch tubing connection	1	6936-56	♣
5/16-inch hose barb connector for above flask	1	5853-10	♣
<b>E.</b> Glas-Col heating mantle for above flask	1	12035-13	
<b>F.</b> 250 mm spiral coil reflux condenser with $\text{\textcircled{24/40}}$ top and bottom joints	1	6020-04	♣
<b>G.</b> U-shaped connecting tube with $\text{\textcircled{24/40}}$ inner joint one end and $\text{\textcircled{35/25}}$ outer outlet end	1	5125-50	♣
<b>H.</b> Adapter $\text{\textcircled{35/25}}$ ball to 5/16-inch hose barb	1	5216-35	♣
<b>J.</b> 250 mL gas washing bottle with coarse porosity fritted disc, 5/16-inch outlet to tubing	1	7163-16	♣
<b>Complete</b>	1	6546-155	★



#### Accessories

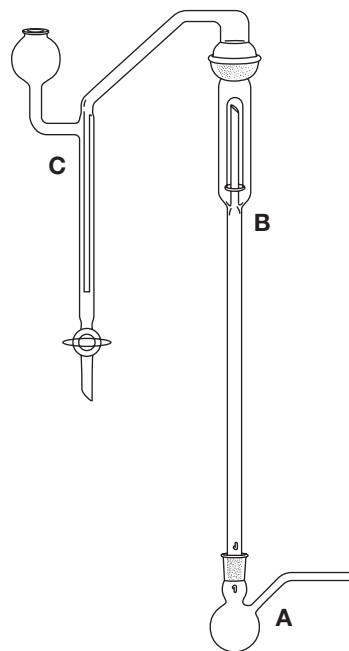
5/16-inch vinyl tubing for the above set-up	50	12679-20	★
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### DISTILLATION APPARATUS *Congealing Temperature*

Similar to congealing temperature apparatus described in *U.S. Pharmacopeia*, 1995, page 1780, except this apparatus is supplied with Ace-Threds in place of rubber stoppers, where practical. #50 thread at center holds a test tube with a #25 bushing, open-top test tube utilizes a rubber stopper to secure a thermometer and wire stirrer. One side port has a #7 Ace-Thred for a thermometer, other side port is a 22mm I.D. opening for access to the 125mm O.D. x 150mm high cylinder. Applicable to substances that melt between  $-20^{\circ}$  and  $150^{\circ}\text{C}$ .

Description	Qty	Order Code	
Main Chamber, #50 to #25 Center Neck, #7 and 22mm Side Necks, 12.5cm O.D. x 15cm high	1	6547-10	★
Test Tube, 25mm x 200mm	1	6547-14	★
Bushing, Nylon, #7	1	5029-10	♠
Bushing, Nylon, #25	1	7506-10	♠
Connector, Nylon, #50-#25	1	6547-22	★
Wire Stirrer, 30cm long, w/stopper	1	6547-25	★
<b>Complete</b>			
	1	6547-45	★



### DISTILLATION APPARATUS *Methoxy Determination* ★

Used for methoxy determination as described in *U.S. Pharmacopeia*, 1995, page 1742. Complete consists of 20mL boiling flask with  $\text{K} 14/20$  joint and a capillary side arm, scrubber trap column with  $\text{K} 14/20$  inner and  $\text{S} 35/20$  socket, and an absorption tube with  $\text{S} 35/20$  ball joint and a 2mm bore glass stopcock. Flask and column supplied with hooks for spring connection.

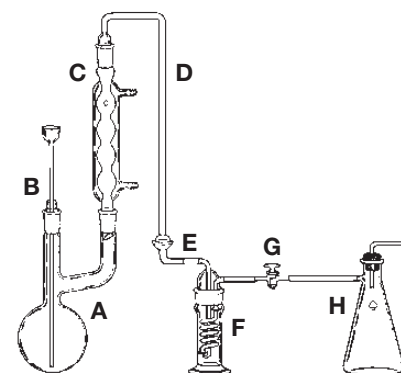
Description	Qty	Order Code	
<b>A</b> Boiling Flask, 20mL, $\text{K} 14/20$	1	6549-04	
<b>B</b> Scrubber Column-Trap, $\text{K} 14/20$ - $\text{S} 35/20$	1	6549-11	
<b>C</b> Absorption Tube, $\text{S} 35/20$ , 2mm Bore	1	6549-23	
Springs, Stainless Steel, 1-1/4-inch	2	8030-12	
<b>Complete</b>			
	1	6549-45	

### DISTILLATION APPARATUS Cyanide ♠

Distillation apparatus for converting simple and most complex cyanides into HCN. Also used for isolating cyanide from most interferences before measuring by titration or colorimetric analysis in the examination of industrial wastes and other water. Method is described in *Standard Methods for the Examination of Water and Wastewater*, 20th Edition, 1998.

Apparatus consists of a 500mL Claisen flask with  $\text{24/40}$  joints, thistle tube, Allihn condenser, connecting tube  $\text{24/40}$ – $\text{18/7}$ , elbow connector  $\text{18/7}$ , 270mL spiral gas washer, stopcock and suction flask.

Description	Qty	Order Code
<b>A</b> Claisen Flask	1	6550-02
<b>B</b> Thistle Tube	1	6550-06
<b>C</b> Condenser	1	5945-12
<b>D</b> Connecting Tube	1	6550-14
<b>E</b> Elbow Connector	1	6550-18
<b>F</b> Gas Washer	1	7167-30
<b>G</b> Stopcock	1	8137-04
<b>H</b> Suction Flask	1	6550-27



#### Complete

	1	6550-50
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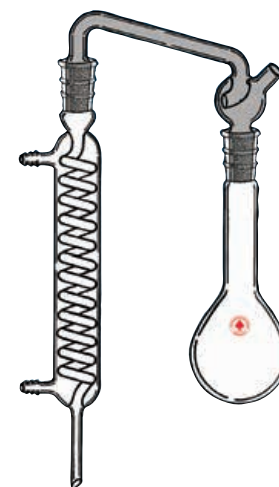
### DISTILLATION APPARATUS Ammonia ♠

Generally used for the determination of ammonia in water. Joints are  $\text{24/40}$ . Condenser uses 3/8-inch I.D. tubing, size D hose connections.

Flask Capacity, mL	300	500	800			
Condenser Length, mm	200	300	300			
Description	Qty	Order Code	Qty	Order Code	Qty	Order Code
Flask	1	6967-25	1	6967-26	1	6967-27
Condenser	1	5979-12	1	5979-14	1	5979-14
Connector Tube	1	6553-02	1	6553-02	1	6553-02

#### Complete

	1	6553-05	1	6553-10	1	6553-15
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### STILL HEAD Short Path ♠

Jacketed distillation head for distilling samples up to 3mL. Jacket allows positioning of a coolant such as dry ice/acetone at site of desired condensation, thus reducing loss of valuable sample. Distillate can be removed with a Pasteur pipet. With outer  $\text{14/20}$  joint at top and  $\text{14/20}$  inner at bottom. Measures approximately 80mm wide, 110mm high.

**Note:** Related items for a complete short path still include: condenser, jacketed,  $\text{14/20}$  joints (9261-02); thermometer adapter, #7 Thread— $\text{14/20}$  (5028-25); and flask, pear shaped, 5mL,  $\text{14/20}$  (9477-02).

Outer Top $\text{14/20}$ Joint	Inner Bottom $\text{14/20}$ Joint	Qty	Order Code
$\text{14/20}$	$\text{14/20}$	1	9311-15





**STILL** *Short Path, Firestone\*, with Jacket* ♠

Zero hold-up, no-splash, short path still for small quantity distillations with the accuracy of larger stills. Improved design eliminates even the minimal hold-up experienced with original short path stills by further reducing wetted surfaces and travel paths. Added feature is the splash guard at bottom of head/flask joint that gives best protection against splash-up, with cooling jacket on head.

Sensitivity is improved by a low mass immersion stem and joint combined with an optimized bulb volume. Joints on head and cow receiver are  $\text{F} 14/20$ . Flask is 10mL, with  $\text{F} 14/20$  center,  $\text{F} 10/18$  side neck. Use with 5/16-inch I.D. tubing, size A hose connection.

Description	Qty	Order Code
Still Body, $\text{F}14/20$	1	9313-12
Cow Receiver, $\text{F}14/20$	1	9317-11
Distillation Flask, 10mL, $\text{F}14/20-10/18$	1	9481-04
Bleed Tube, $\text{F}10/18$	1	9317-17

**Complete**

	1	9313-30
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\*Designed by Dr. Raymond Firestone



**STILL** *Short Path, Minimum Hold-Up,  $\text{F}10/18$  Joint* ♠

Supplied as shown with one-piece, 9317-11 cow receiver with four 3mL arms. Order optional 9316-04 cow receiver that accommodates four 9477-02, 5mL mini-flasks. Standard taper joint sizes are  $\text{F} 14/20$  with  $\text{F} 10/18$  on the tube adapter and flask side neck. Gas inlet tube is positioned in distillation flask with a 5028-24 Ace-Thred adapter. Use with 5/16-inch I.D. tubing, size A hose connection.

Description	Qty	Order Code
Still Body, $\text{F}14/20$	1	9315-05
Cow Receiver, $\text{F}14/20$	1	9317-11
Distillation Flask, 10mL, $\text{F}10/18$	1	9481-30
Gas Inlet Tube	1	9315-08
Threaded Adapter, $\text{F}10/18$	1	5028-24

**Complete**

	1	9315-10
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**Accessories**

Cow Receiver, $\text{F}14/20$	1	9316-04
Receiver Flask, 5mL (4), $\text{F}14/20$	1	9477-02



9316-04



9317-11

## DISTILLATION APPARATUS *Short Path*

A still designed for small quantities where hold-up between flask and receiver must be minimized but where it is also desired to measure vapor temperature with an accuracy compared to large apparatus.

- Physical carry-over is practically eliminated by impingement.
- Condenser delivery tube is straight through.
- Condensate drops directly into one of the four receiver flasks attached to cow receiver and held in place with Delrin clips (supplied). Cow receiver is held in place in the same way. Optional graduated receiver may be substituted for pear shaped flasks.

Upper hose connections are for water lines, lower connection is for vacuum or vent. The center joint of the two-neck pear-shape flask is equipped with an adjustable gas inlet tube. All joints are  $\text{F} 14/20$ . Size A hose connections for 5/16-inch I.D. tubing.

Description	Qty	Order Code	
Still Body, $\text{F}14/20$	1	9316-02	♠
Cow Receiver, $\text{F}14/20$	1	9316-04	♠
Gas Inlet Tube, $\text{F}14/20$	1	9316-06	♠
Receiver Flask, 5mL (4), $\text{F}14/20$	1	9477-02	♠
Distillation $\text{F}$ Flask, 10mL, 14/20	1	9479-05	♠

### Complete

	1	9316-20	♠
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### Accessories

Graduated receivers, capacity 5 mL, 0-1 mL x 0.1, 1-5 mL x 0.2	1	9316-08	♠
Glas-Col Mantle, 10 mL	1	9516-04	



## DISTILLATION APPARATUS *Short Path* ♠

Designed for small quantities where hold-up between flask and receiver must be minimized, but where it is also desired to measure vapor temperature with the accuracy of larger apparatus. Still body is available with or without vacuum jacket and with or without vigreux indents for greater efficiency. Upper hose connections are for water lines, lower connection for vacuum or vent. Main joints are  $\text{F} 14/20$ . Thermometer joint and bleed tube are  $\text{F} 10/18$ . One-piece receiver. Size A hose connections for 5/16-inch I.D. tubing.

Description	Qty	Order Code	
Still Body, $\text{F}14/20-10/18$ (unjacketed)	1	9317-03	
Still Body, $\text{F}14/20-10/18$ (jacketed)	1	9317-42	
Still Body, $\text{F}14/20-10/18$ (jacketed with indents)	1	9317-52	
Cow Receiver, $\text{F}14/20$	1	9317-11	
Bleed Tube, $\text{F}10/18$	1	9317-17	
Flask, 10mL, $\text{F}14/20-10/18$	1	9481-04	

### Complete

Unjacketed body	1	9317-21	
Jacketed body	1	9317-50	
Jacketed body with indents	1	9317-60	

### Accessories

Still Body, $\text{F}14/20-10/18$ (unjacketed with indents)	1	9317-30	
Still Body, $\text{F}24/40-10/18$ (unjacketed with indents)	1	9317-35	




**STILL (60mm) Short Path, Low Hold-Up** ♠

A short path still designed to be effective with high boiling materials at low pressures, where moderate foaming can be tolerated as well as slight bumping. A fine tip adjustable gas inlet tube can be used for stirring or as a foam breaker. One-piece cow receiver with 2.5mL measuring tube supplied with complete unit. The 9316 cow receiver with 9477-02, 5mL flasks or 9316-08 graduated receiver can be substituted for the one-piece receiver. Main joints are  $\text{F} 14/20$ . Size A hose connections for 5/16-inch I.D. tubing.

Description	Qty	Order Code
Still Body	1	9319-02
Cow Receiver, $\text{F} 14/20$ , 3mL Tubes	1	9317-11
Distillation Flask, 10mL, $\text{F} 14/20-10/18$	1	9464-24
Gas Inlet Tube 2.5mL	1	9315-08
Threaded Adapter, $\text{F} 10/18$	1	5028-24

**Complete**

	1	9319-15
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**Accessories**

Cow Receiver-jointed, $\text{F} 14/20$	1	9316-04
Receiver Flasks (5mL), $\text{F} 14/20$	1	9477-02
Graduated receivers, capacity 5 mL, 0-1 mL x 0.1, 1-5 mL x 0.2	1	9316-08
Mantle, Glas-Col (10mL)	1	12035-02

**STILL Short Path, with  $\text{F} 24/40$  Joints** ♠

Full size  $\text{F} 24/40$  jointed, low hold-up, short path still, available in plain version or jacketed with indents. Extension tube from still body allows positioning of drop directly over receiver flask. Gas inlet tube is positioned in distillation flask with 5028 adapter and secured with a #7 Ace-Thred. Thermometer joint is  $\text{F} 10/30$ , all other joints are  $\text{F} 24/40$ . Complete item consists of 500mL distillation flask, still body, cow receiver, gas inlet tube, threaded adapter, (3) 250mL receiver flasks. Size D hose connections for 3/8-inch I.D. tubing.

Description	Qty	Order Code
Still Body ( <i>unjacketed</i> )	1	6554-06
Still Body ( <i>jacketed with indents</i> )	1	6554-08
Cow Receiver (3 necks)	1	6554-10
Gas Inlet Tube	1	6554-14
Threaded Adapter	1	5028-30
Dist. Flask, 2 Neck, $\text{F} 24/40$ , 500mL	1	6927-22
Receiver Flasks, Single Neck, $\text{F} 24/40$ , 250mL	3	6887-24

**Complete**

Unjacketed body	1	6554-48
Jacketed body with indents	1	6554-50



### DISTILLATION APPARATUS *Steam, Nielsen-Kryger, Improved Version*

A steam distillation apparatus for the exhaustive distillation of pesticides and industrial chemicals from water, sediments and tissue. Simultaneously extracts the distillate by a small volume of organic solvent.

The original modified version was submitted for publication in the *Bulletin of Environmental Contamination and Toxicology*, G.D Veith and L.M. Kiwus, U.S.E.P.A., Environmental Research Laboratory, Duluth, MN.

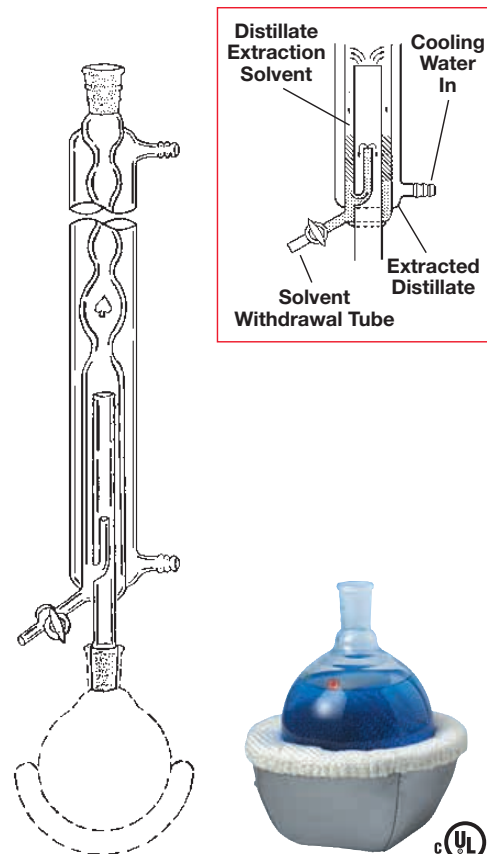
**The addition of a bulb condenser in place of the straight tube condenser results in more efficient condensing and reduces blowout. Also, the first bulb above the chimney is larger to avoid choking.**

Dimensions of condenser are 60mm x 500mm with  $\text{F} 24/40$  joints and a solvent capacity of 15mL. Stopcock is 2mm bore 1:5 PTFE. Complete unit consists of condenser, 2L flask and heating mantle. Size D hose connections for 3/8-inch I.D. tubing.

Description	Qty	Order Code	
Condenser, only	1	6555-40	★
Flask, 2000mL, only	1	6887-28	♠
Mantle, only	1	12035-21	

#### Complete

	1	6555-45	★
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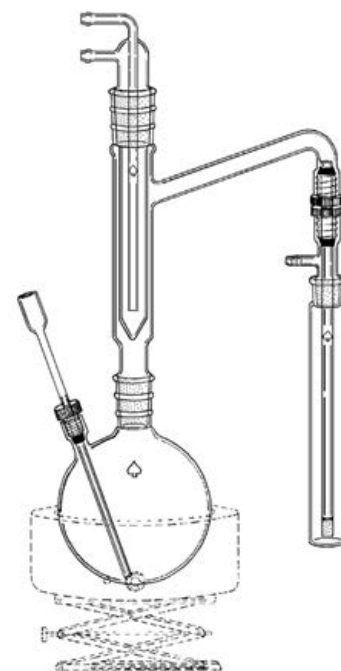
### DISTILLATION APPARATUS *Cyanide, Model A ♠*

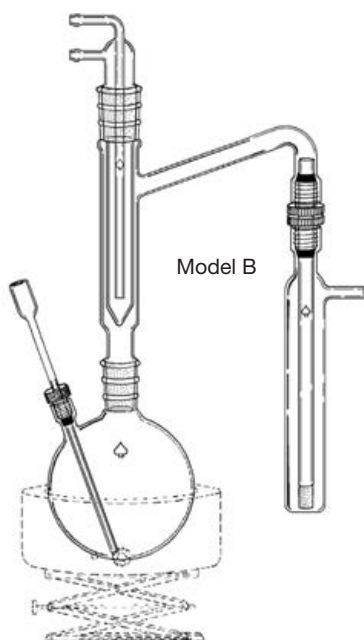
Cyanide distillation apparatus used in testing for soluble and insoluble cyanides in water. Flask is 1000mL with  $\text{F} 24/40$  joint and #7 Ace-Thred that permits variable depth positioning of fill tube. Fill tube has been reduced in diameter to retard "boil back" or splattering that occurs with conventional tubes. Still head and cold finger have a  $\text{F} 29/42$  joint and a #11 Ace-Thred on the medium wall side arm. Two #11 bushings, back to back, hold the threaded adapter to still head by compressing PTFE ferrules against the glass dispersion tube. Because of this feature, the dispersion tube depth is adjustable inside the trap and the fritted end need not be in contact with caustic solutions when not necessary. This will extend the life of the frit and assure consistent dispersion for a longer time. Joint on trap is  $\text{F} 19/22$ . PTFE ferrules are supplied in place of FETFE O-Rings for threaded compression fittings.

Description	Qty	Order Code	
Flask, 1000mL, $\text{F} 24/40$ , #7 Thred with Bushing	1	6936-44	
Fill Tube	1	6556-07	
Distilling Head only, $\text{F} 24/40$ , $\text{F} 29/42$ , #11 Thred	1	6556-12	
Condenser, Finger, $\text{F} 29/42$	1	6556-13	
Bushing, #11	2	7506-02	
Adapter, Threaded, #11, $\text{F} 19/22$	1	5261-35	
Dispersion Tube, Porosity D (10-20 micron)	1	6556-23	
Trap, $\text{F} 19/22$	1	6556-26	
Ferrules, one #7, two #11, Per Pkg.	3	6556-33	

#### Complete

	1	6556-05	
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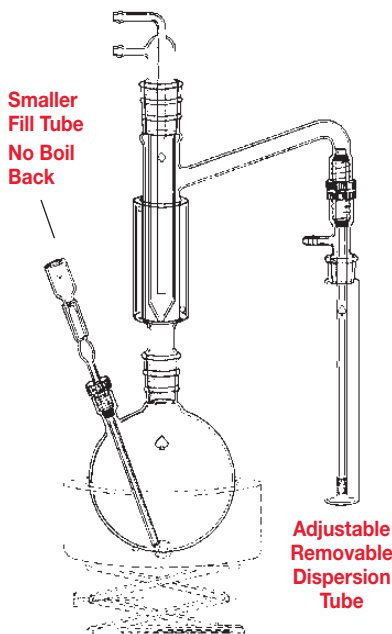




**DISTILLATION APPARATUS Cyanide, Model B ♠**

Similar to Model A, except threaded adapter used to connect still head and trap has been eliminated. Trap is supplied with #11 Ace-Thred for direct connection. As in Model A, dispersion tube depth is still adjustable. Side arm on trap is 8mm O.D. PTFE ferrules are supplied in place of FETFE O-Rings for threaded compression fittings.

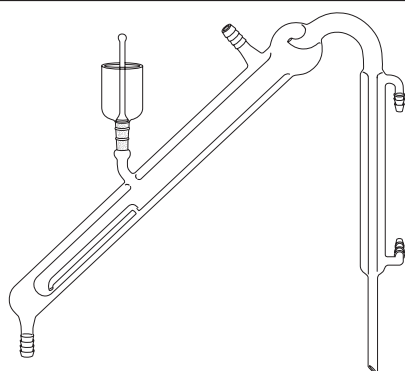
Description	Qty	Order Code
Flask, 1000mL, 24/40, #7 Thred, with Bushing	1	6936-44
Fill Tube	1	6556-07
Distilling Head only, 24/40, 29/42, #11 Thred	1	6556-12
Condenser, Finger, 29/42	1	6556-13
Bushing, #11	2	7506-02
Dispersion Tube, Porosity D (10-20 micron)	1	6556-23
Trap, #11 Thred	1	6556-27
Ferrules, one #7, two #11, Per Pkg.	3	6556-33
<b>Complete</b>	1	6556-10



**DISTILLATION APPARATUS Cyanide ♠**

Cyanide distillation apparatus used in testing for soluble and insoluble cyanides in water. Flask is 1000mL with 24/40 joint and #7 Ace-Thred that permits variable depth positioning of fill tube. Fill tube has been designed with a float valve for added protection against “boil back” or splattering that occurs with conventional tubes. Still head is jacketed and lengthened for more efficient condensing. Head and cold finger have a 29/42 joint and a #11 Ace-Thred on side arm. Two #11 bushings, back to back, hold the threaded adapter to still head by compressing PTFE ferrules against the adjustable depth glass dispersion tube. Frit on dispersion tube is Porosity D, 10-20 micron. Joint on trap is 19/22. Side arm on threaded adapter is 8mm.

Description	Qty	Order Code
Flask, 1 L, 24/40, #7 Thred, with Bushing	1	6936-44
Fill Tube	1	6557-08
Distilling Head, only, 29/42, #11 Ace-Thred	1	6557-14
Condenser, Finger, 29/42, Size D H/C	1	6557-15
Bushing, #11	2	7506-02
Adapter, Threaded, #11, 19/22	1	5261-35
Dispersion Tube, Porosity D (10-20 micron)	1	6557-24
Trap, 19/22	1	6556-26
Ferrules, PTFE, one #7, two #11, Per Pkg.	3	6556-33
<b>Complete</b>	1	6557-50



**DISTILLATION APPARATUS Markham Still ★**

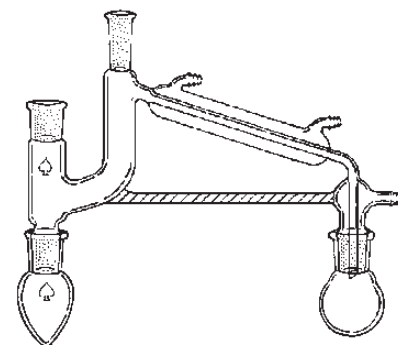
Used for volatile fatty acid test. Fabricated from standard wall tubing throughout. Hose connections on still are 3/8-inch I.D. tubing, size D; on condenser, 5/16-inch or 3/8-inch, size C.

Still Hose Connection, in	Condenser Hose Connection, in	Qty	Order Code
3/8 (Size D)	5/16 or 3/8 (Size C)	1	6558-40

### DISTILLATION APPARATUS ♠

With  $\text{F}$  10/30 joint for a 25mm immersion thermometer. All other joints are  $\text{F}$  14/20. Hose connections project to rear. Round bottom and pear-shape flasks supplied with complete unit are 25mL capacity. Use with 5/16-inch I.D. tubing, size A hose connection.

Description	Qty	Order Code
Head, Distilling	1	9322-05
Flask, Round Bottom	1	9458-06
Flask, Pear Shaped	1	9477-06
<b>Complete</b>	1	9322-10



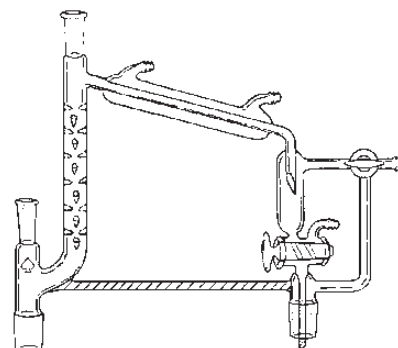
### DISTILLATION APPARATUS ♠

A compact fractionation unit for distilling small quantities in a vacuum, and for ordinary separation. The indents are positioned to cause the vapor to follow a spiral path, adding to the efficiency of the unit. By use of the three-way stopcock, a manifold arrangement is achieved, making it possible to remove receivers without disturbing the equilibrium of the system.  $\text{F}$  10/30 joint at top is for 25mm immersion thermometer. All other joints are  $\text{F}$  14/20. Stopcocks are 2mm bore. Use with 5/16-inch I.D. tubing, size A hose connection.

Outer Top $\text{F}$ Joint	All other $\text{F}$ Joints	Hose Connections, in	Bore, mm	Qty	Order Code
10/30	14/20	5/16 (Size A)	2	1	9324-04

#### Replacement Stopcocks

Double Oblique Stopcock	2	1	8226-99
T-bore Stopcock	2	1	8228-09

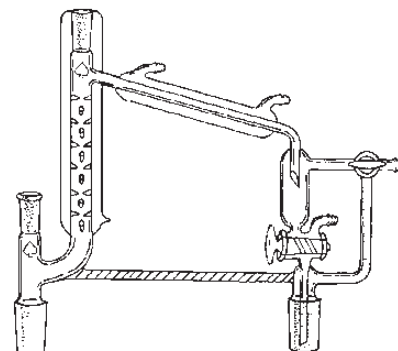


### DISTILLATION APPARATUS ★

A compact fractionation unit for distilling small quantities in a vacuum, and for ordinary separation. Column, including top joint, is vacuum jacketed. The indents are positioned to cause the vapor to follow a spiral path, adding to the efficiency of the unit. Approximately three theoretical plates at 60mL/hr. Hold up to 1.2mL operating, 0.5mL static. Receiver capacity is 15mL.

By use of the three-way stopcocks, a manifold arrangement is achieved, making it possible to remove receivers without disturbing the equilibrium of the system.  $\text{F}$  10/30 thermometer joints are for 25mm immersion thermometers.

Joints $\text{F}$	Approx. Column Length, mm	Hose Connections, in	Qty	Order Code
14/20	114	5/16 (A)	1	9325-06
24/40	152	5/16 or 3/8 (C)	1	6562-05

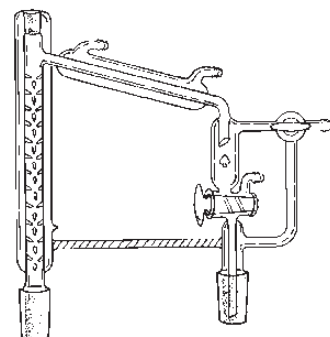


### DISTILLATION APPARATUS High Boiling ★

Useful for separating higher boiling liquids that require a short flask-to-column distance to prevent excessive condensation.

If flask bleed is desired, a two-neck flask can be used. Thermometer joint is  $\text{F}$  10/18 for 9551, 25mm immersion.

Joints $\text{F}$	Approx. Column Length, mm	Hose Connections, in	Qty	Order Code
14/20	177	5/16 (A)	1	9326-10
24/40	202	5/16 or 3/8 (C)	1	6563-10





### SPLITTER *Distillation, Reflux* ♠

Reflux distillation splitter adapters for all size reactors. Standard taper, inner joint bottom, standard taper, outer joint top. Straight path splitter intended for use with 90° vertical joints. See product family 6089 for splitters intended for use with angled side neck joints. Side valve is 0-10 with a 1/2-inch precision ground bottom take-off that matches 1/2-inch compression fittings. Valve replacement FETFE o-rings are size -011 and -111.

Joints, §	Stopcock Valve, mm	Qty	Order Code
24/40	0-10	1	6088-08
29/42	0-10	1	6088-10
29/32	0-10	1	6088-12
45/50	0-10	1	6088-14

#### Replacement FETFE O-Rings

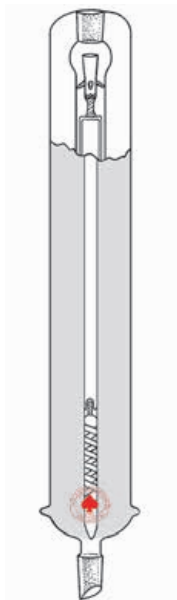
Size -011	12	7855-706
Size -111	12	7855-718



### SPLITTER *Straight and 10° Angled, Distillation, Reflux* ★

The reflux/distillation splitter is used to allow easy switching of the distillate path by means of adjusting the valve position to either open or closed. This in-line adapter simplifies the vapor flow path, and its compact design and integrated Swagelok take-off side arm make vacuum-assisted distillate transfers streamlined. These splitters are available in both a straight or an angled configuration. Angled adapters are used with 10° angled side necks and transition to a vertical 90° position.

Inner Bottom § Joint	Outer Top § Joint	Qty	Order Code
<b>Straight Configuration</b>			
14/20	14/20	1	6089-02
24/40	24/40	1	6089-04
14/23	14/23	1	6089-114
24/29	24/29	1	6089-124
<b>10° Angle Configuration</b>			
14/20	14/20	1	6089-03
24/40	24/40	1	6089-07
14/23	14/23	1	6089-214
24/29	24/29	1	6089-224



### CONCENTRIC TUBE COLUMN ★

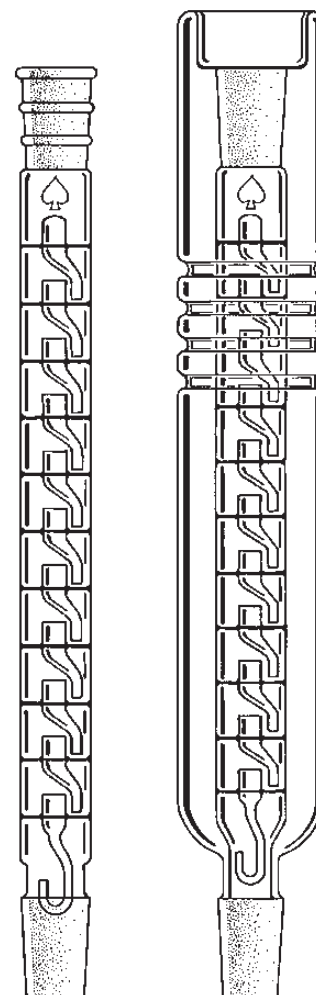
A high efficiency, low holdup, low pressure drop fractionating column, vacuum jacketed with observation stripe. Same as column supplied with 9331, suitable for samples as small as 2mL. Center tube is removable for cleaning. Double expansion spiral eliminates choking. Joints are § 14/20. Approximately 40 theoretical plates at 80mL/hr. boil-up. Operating pressure drop is less than 1mm Hg. Column holdup (approx.): Operating — with 9362 head, 0.6mL at 80mL/hr. Static — with 9362 head, 0.25mL Xylene. Static: Column alone, 0.1mL Xylene.

Joints, §	Qty	Order Code
<b>Column Concentric Tube</b>		
14/20	1	9333-10
<b>Replacement Inner Tube</b>		
	1	9333-08

**DISTILLATION COLUMN** *Perforated Plate*

Perforated plate column, with or without a jacket. Holes are .032-inch diameter. Vacuum-jacketed has internal bellows and is silvered.

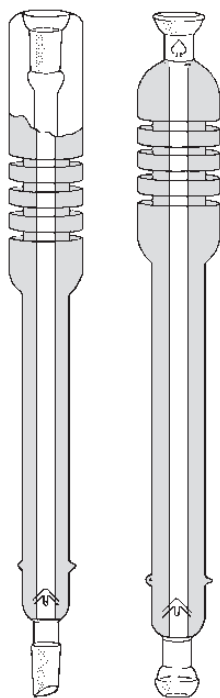
No. of Plates	Plate Diameter, mm	Joints, $\text{\textcircled{S}}$	Effective Length, mm	Overall Length, mm	<i>UnJacketed</i>		<i>Jacketed</i>	
					Qty	Order Code	Qty	Order Code
5	28	29/42	140	245	1	6565-02	1	6566-03
10	28	29/42	280	385	1	6565-04	1	6566-05
15	28	29/42	420	525	1	6565-06	1	6566-07
20	28	29/42	560	665	1	6565-08	1	6566-09
30	28	29/42	840	945	1	6565-10	1	6566-11
5	33	34/45	165	270	1	6565-12	1	6566-13
10	33	34/45	330	435	1	6565-14	1	6566-15
15	33	34/45	495	600	1	6565-16	1	6566-17
20	33	34/45	660	765	1	6565-18	1	6566-19
30	33	34/45	990	1095	1	6565-20	1	6566-21
5	40	45/50	160	325	1	6565-22	1	6566-23
10	40	45/50	360	525	1	6565-24	1	6566-25
15	40	45/50	560	725	1	6565-26	1	6566-27
20	40	45/50	760	925	1	6565-28	1	6566-29
30	40	45/50	1160	1325	1	6565-30	1	6566-31
5	50	55/50	200	400	1	6565-32	1	6566-33
10	50	55/50	450	650	1	6565-34	1	6566-35
15	50	55/50	700	900	1	6565-36	1	6566-37
20	50	55/50	950	1150	1	6565-38	1	6566-39
30	50	55/50	1450	1650	1	6565-40	1	6566-41
5	75	71/60	260	445	1	6565-42	1	6566-43
10	75	71/60	585	770	1	6565-44	1	6566-45
15	75	71/60	910	1095	1	6565-46	1	6566-47
20	75	71/60	1235	1420	1	6565-48	1	6566-49
5	100	103/60	300	530	1	6565-52	1	6566-53
10	100	103/60	675	905	1	6565-54	1	6566-55
15	100	103/60	1050	1280	1	6565-56	1	6566-57
20	100	103/60	1425	1655	1	6565-58	1	6566-59


**DISTILLATION COLUMN**  $\spadesuit$ 

Vacuum jacketed and silvered with observation stripe. Also available unsilvered. With an enlarged bulb knockdown section that removes high boiling ends without choking. Length of packing section is 100 or 200mm, I.D. approximately 10mm. With indents to hold packing.

Joints, $\text{\textcircled{S}}$	Length, mm	Qty	Order Code
14/20	100	1	9335-02
14/20	200	1	9335-08



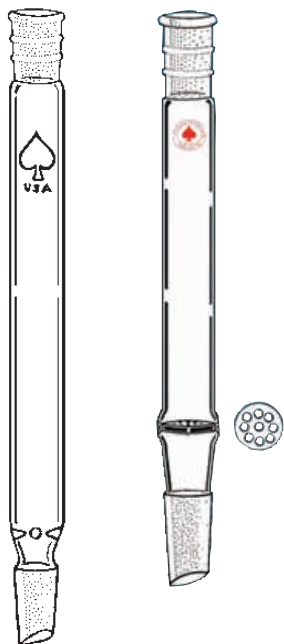


### DISTILLATION COLUMN *Vacuum Jacketed*

With internal expansion bellows. Baked out and evacuated to  $10^{-6}$  Torr. All ⌘ top joints are jacketed. Spherical joints are not jacketed, in order to allow for clamping. All vacuum jacketed distilling columns are furnished with internal-type expansion bellows to compensate for the unequal expansion between the inside tube and the outer jacket, and will withstand a temperature differential of 180°C. All columns, regardless of length, are supplied with the proper number of bellows to withstand the above temperature differential at all times. Standard silvered columns are supplied with an observation stripe running down the entire length of the jacket.

The packing support is a conical tripod in which the free area is at least 90% of the diametrical area. **In addition to the columns listed, we also have facilities for fabricating a complete line of special vacuum-jacketed units to your specifications.** This includes additional bellows to enable you to maintain temperature differentials greater than 180°C. When ordering a special column, please specify the highest temperatures which may be reached in the column, so that we can supply the unit with sufficient bellows to take care of the expansion which may take place during distillation.

Length, mm	I.D., mm	Joints, ⌘	Qty	Order Code
610	127	⌘ 24/40	1	6569-40
610	254	⌘ 29/42	1	6569-50
610	381	⌘ 35/25	1	6569-60
910	127	⌘ 24/40	1	6569-42
910	254	⌘ 29/42	1	6569-52
910	381	⌘ 35/25	1	6569-62
1220	127	⌘ 24/40	1	6569-44
1220	254	⌘ 29/42	1	6569-54
1220	381	⌘ 35/25	1	6569-64



### DISTILLATION COLUMN *Hempel ♠*

With ⌘ joints and either indentations or glass disc to support packing. Length in millimeters refers to the length from the packing support to the bottom of the outer ground joint.

Length, mm	I.D., mm	Joints, ⌘	Qty	Order Code
<b>Indentation Packing Support</b>				
203 (8)	24	24/40	1	6572-02
254 (10)	24	24/40	1	6572-04
305 (12)	24	24/40	1	6572-06
380 (15)	24	24/40	1	6572-08
457 (18)	24	24/40	1	6572-10
508 (20)	24	24/40	1	6572-12
610 (24)	25	29/42	1	6572-14
<b>Glass Disc Packing Support</b>				
203 (8)	24	24/40	1	6573-04
254 (10)	24	24/40	1	6573-06
305 (12)	24	24/40	1	6573-08
380 (15)	24	24/40	1	6573-10

*Non-silvered columns are available on special order.*

**DISTILLATION COLUMN Plain ♠**

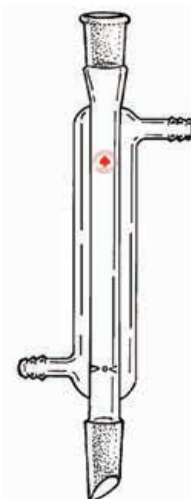
Plain type, 10mm I.D. with indents for supporting glass beads or other packing.

Length, mm	I.D., mm	Joints, ⌘	Qty	Order Code
130	10	14/20	1	<b>9343-06</b>
250	10	14/20	1	<b>9343-09</b>


**DISTILLATION COLUMN Jacketed ♠**

Jacket length 250mm, with indents for supporting glass beads or other packing. Use with 5/16-inch or 3/8-inch I.D. tubing, size B hose connection.

Length, mm	Joints, ⌘	Hose Connections, in	Qty	Order Code
250	14/20	5/16 or 3/8 (Size B)	1	<b>9342-01</b>


**DISTILLATION COLUMN Snyder ♠**

Floating ball type, with ⌘ joints. Each section is approximately 50mm long.

Column Length, mm	Chamber Length, mm	Number of Sections	I.D., mm	Joints, ⌘	Qty	Order Code
225	50	3	24	24/40	1	<b>6575-02</b>
375	50	6	24	24/40	1	<b>6575-04</b>
750	50	12	24	24/40	1	<b>6575-06</b>



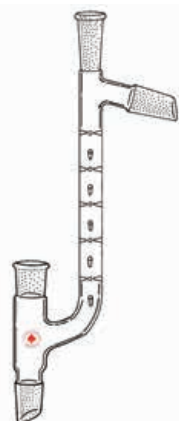


**DISTILLATION COLUMN Vigreux ♠**

Vigreux columns with standard taper joints, jacketed and unjacketed. Length in millimeters refers to the effective length of the column as measured from the lowest to the highest indent of the column.

Length, mm (in)	I.D., mm	Joints, ⌘	Qty	Order Code
<b>Unjacketed</b>				
100 (4)	16	14/20	1	9345-08
130 (5.2)	16	14/20	1	9345-09
100 (4)	19	19/22	1	9345-10
130 (5.2)	19	19/22	1	9345-11
170 (6.8)	19	19/22	1	9345-13
203 (8)	24	24/40	1	6578-04
254 (10)	24	24/40	1	6578-06
305 (12)	24	24/40	1	6578-08
381 (15)	24	24/40	1	6578-10
457 (18)	24	24/40	1	6578-12
508 (20)	24	24/40	1	6578-14
610 (24)	24	24/40	1	6578-16
305 (12)	44	45/50	1	6578-20
457 (18)	44	45/50	1	6578-22
610 (24)	44	45/50	1	6578-24

<b>Jacketed</b>				
305 (12)	44	45/50	1	6578-30
457 (18)	44	45/50	1	6578-32
610 (24)	44	45/50	1	6578-34



**DISTILLATION COLUMN Vigreux ♠**

With male drip tip on joint of Claisen side arm and ⌘ 10/30 joint for 25mm immersion thermometer. Other joints are ⌘ 14/20.

Indent Length, mm	Joints, ⌘	Thermometer Joint, ⌘	Qty	Order Code
100	14/20	10/30	1	9347-02
200	14/20	10/30	1	9347-04



**DISTILLATION COLUMN ♠**

With honeycomb packing support sealed into column above the bottom joint. Packing cone has hole at bottom for complete drainage. Holes in cone are 3.2mm.

Length, mm (in)	I.D., mm	Joints, ⌘	Packing Cone Hole Size, mm	Qty	Order Code
406 (16)	16	24/40	3.2	1	6584-06
610 (24)	16	24/40	3.2	1	6584-08



**ELECTROMAGNETIC COIL ★**

With high permeability core to operate take-off device on standard automatic distilling heads. Fastened to head with special clamp. For operation at 120 volt, 50/60 Hz AC maximum or 24 volts DC maximum. For intermittent service only; 30 seconds maximum ON, 50% maximum duty cycle.

**Note:** Supplied complete with clamp and wires to connect to automatic time switch.

Core O.D., mm	Coil O.D., mm	Height, mm	Qty	Order Code
12.5	38	32	1	6588-10


**ELECTROMAGNETIC COIL ★**

This coil is designed to operate automatic distilling heads which operate on the plunger principle whereby the glass rod is pulled up through the center of the magnet. For operation at 120 volts, 50/60 Hz AC maximum or 24 volts DC maximum. For intermittent service only; 30 seconds maximum ON, 25% maximum duty cycle.

**Note:** Supplied complete with necessary wiring to connect into the system.

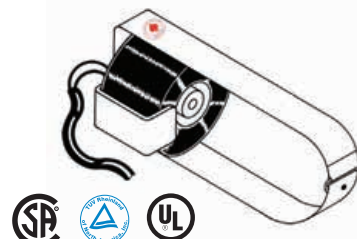
Core O.D., mm	Coil O.D., mm	Height, mm	Qty	Order Code
12.7	38	32	1	6590-10


**ELECTROMAGNETIC COIL ★**

Similar to 6588, for use with large distilling heads. 76mm O.D. by 44mm high, diameter of metal slug 28.6mm.

**Note:** For intermittent service only.

Core O.D., mm	Coil O.D., mm	Height, mm	Qty	Order Code
28.6	76	44	1	6592-10


**ELECTROMAGNETIC COIL ★**

This coil is a potted type "horseshoe" core design to operate large automatic distilling heads, up to 3-1/4-inch (83mm) O.D. with adjustable clamp. Operates at 120 volts, 50/60 Hz AC maximum delivering 24 watts pulling power. For 100% duty cycle operation. Supplied with 6-foot, 3-prong cord and a grounded aluminum cover. Weight: 1-3/4 lbs. Warranty: one-time 90-day unconditional.

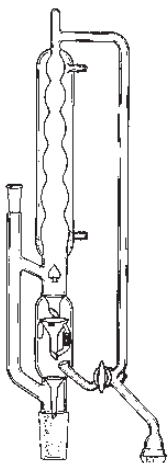
Length, in	Width, in	Depth, in	Clamp Adjustment, in	Qty	Order Code
2-3/8	2	1-3/8	up to 3-1/4	1	6593-40


**TIMER/CONTROL Repeat Cycle, Electronic ★**

Repeat cycle timer control, bench top or rack mountable (has clamp for up to 3/4-inch rod), for regulating reflux ratio on distillation heads. Maximum ON/OFF time setting is 0.1 to 6000 seconds. Solid state relay and microprocessor-based, timer control with LCD display. Red output indicator LED. Output: 120v, 5A max., 50/60 Hz or 220v, 5A max., 50/60 Hz. Features include: Front main power switch, fast acting, solid state 5A fuse, Rear power outlet, run/standby-set switch on front, four-digit adjust buttons. Conditional 2-year warranty.



Time Max. Scale	Min. On or Off Setting	120V Max. Output	220V Max. Output	Clamp for Rod Size, in	Qty	Order Code
0.1-6000 sec.	0.1 sec.	5A, 50/60Hz	5A, 50/60Hz	up to 3/4	1	6671-14

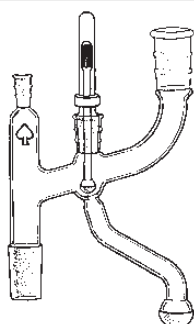


**DISTILLATION HEAD** *Magnetic* ★

Magnetically operated swinging funnel type, with iron slug totally enclosed. This head maintains reflux ratio constant with changing throughput. The vapor bypass is designed to give accurate thermometer readings. Tapered bulb condenser increases capacity without choking. Side arm joint is  $\text{S } 28/12$ . Thermometer joint is  $\text{S } 10/30$  for 76mm immersion. Stopcock bore is 4mm. Supplied with  $\text{S } 29/42$  column joint.

**Note:** Contact us for replacement stopcocks.

Bottom Joint, $\text{S}$	Side Arm Joint, $\text{S}$	Thermometer Joint, $\text{S}$	Stopcock Bore Size, mm	Hose Connections, in	Qty	Order Code
29/42	29/42	10/30	4	3/8 (Size D)	1	6594-10



**DISTILLATION HEAD** *Automatic Reflux Control* ♠

A small, low holdup automatic head which can be completely disassembled for easy cleaning or replacement of parts. Lower column joint and side arm for condenser are  $\text{S } 24/40$ . Joint on takeoff arm is  $\text{S } 28/11$ . The plunger guide is  $\text{S } 19/38$  and the  $\text{S } 10/30$  thermometer joint is for a 76 or 102mm immersion thermometer.

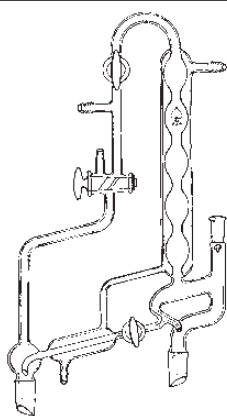
**Note:** Supplied with Nylon Coil Stop for use with 6590 coil. Order Thermometer and Coil separately.

Lower Column Joint, $\text{S}$	Condenser Side Arm Joint, $\text{S}$	Thermometer Joint, $\text{S}$	Plunger Guide Joint, $\text{S}$	Take-off Arm Joint, $\text{S}$	Qty	Order Code
24/40	24/40	10/30	19/38	28/11	1	6598-10

**Complete Head**

**Replacement Parts**

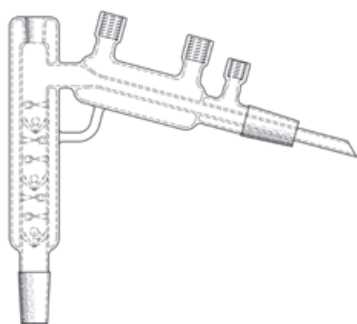
Plunger, only	1	6598-04
Plunger Holder, only	1	6598-06
Nylon Stop, only	1	6598-08



**DISTILLATION HEAD** *Variable Reflux Ratio* ★

Constructed so that satisfactory operation can be maintained under any pressure condition.  $\text{S } 10/30$  thermometer joint takes 76mm immersion thermometer listed under 8314. Side arm joint is  $\text{S } 24/40$ .

Bottom Joints, $\text{S}$	Side Arm Joint, $\text{S}$	Thermometer Joint, $\text{S}$	Hose Connections, in	Qty	Order Code
24/40	24/40	10/30	5/16 or 3/8 (Size C)	1	6604-10



**DISTILLATION HEAD** *Short-Path Still* ♠

Distillation head with integral vigreux vapor path column. Ace-Thred™ condenser inlet/outlets and vacuum monitoring port. Drip tip distribution receiver joint and thermometer/probe port.

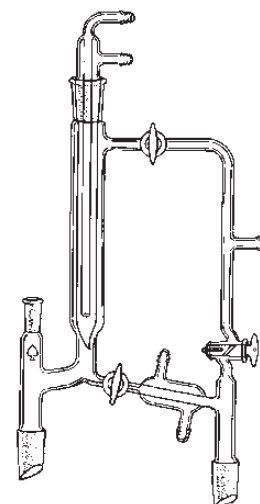
**Note:** Choose from our Ace-Safe™ 5853 or PTFE 5858 family of hose connections. 5028-26, 14/20 to #7 Ace-Thred™ thermometer probe adapter.

Condenser Length, mm	Joints, $\text{S}$	Thermometer Joint, $\text{S}$	Column Length, mm	Hose Connections, Ace-Thred	Qty	Order Code
100	24/40	14/20	180	#11	1	6611-10
150	24/40	14/20	220	#11	1	6611-20

**DISTILLATION HEAD *Hennion Design*** ♠

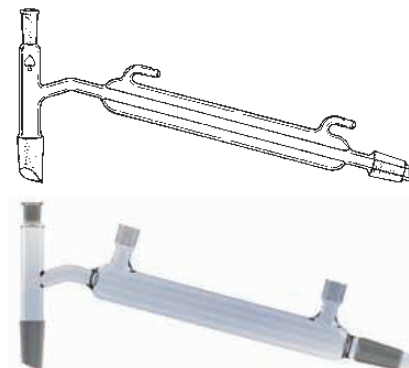
For variable reflux ratio, can be used for operation under vacuum and receiver can be removed without disturbing the system's vacuum. § 10/30 thermometer joint takes 76mm immersion thermometer listed under 8314. Side arm joint is § 24/40. Stopcock bores are 2mm. For cold finger only, see 5960.

Top/Bottom Joints, §	Side Arm Joint, §	Thermometer Joint, §	Stopcock Bore Size, mm	Hose Connections, in	Qty	Order Code
24/40	24/40	10/30	2	5/16 or 3/8 (Size C)	1	<b>6606-10</b>


**DISTILLATION HEAD** ♠

With condenser jacket on side arm. Thermometer joint is § 10/30 (see 8314 for thermometer listing). Side arm is at a 75° angle.

Jacket Length, mm	Joints, §	Thermometer Immersion, mm	Thermometer Joint, §	Hose Connections, in	Qty	Order Code
100	14/20	50	10/30	5/16 (Size A)	1	<b>9359-04</b>
200	14/20	50	10/30	5/16 (Size A)	1	<b>9359-06</b>
250	24/40	76	10/30	3/8 or 5/16 (Size C)	1	<b>6608-06</b>
400	24/40	76	10/30	3/8 or 5/16 (Size C)	1	<b>6608-20</b>


***Ace-Thred Connections***

250	24/40	76	14/20	#11 Ace-Thred	1	<b>6608-10</b>
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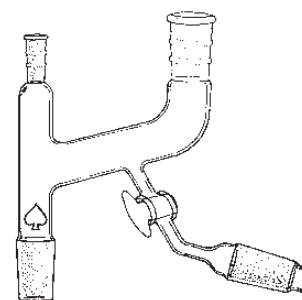
**DISTILLATION HEAD** ♠

Glass or 1:5 solid PTFE stopcock plug on lower side arm. Top joint on center tube is § 10/30 for 76mm immersion thermometer. All other joints are § 24/40. Take-off arm is at 75° angle to the vertical.

Stopcock Material	All Joints, §	Thermometer Joint, §	Stopcock Bore Size, mm	Qty	Order Code
Glass	24/40	10/30	2	1	<b>5150-10</b>
PTFE	24/40	10/30	2	1	<b>5150-29</b>

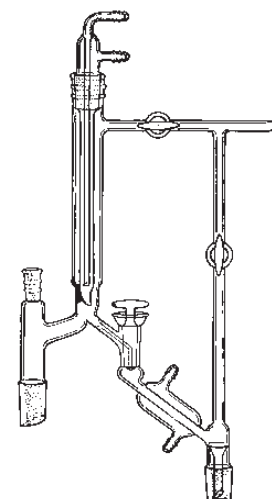
***Replacement Stopcocks***

Glass	2	1	<b>8223-02</b>
PTFE	2	1	<b>8223-04</b>


**DISTILLATION HEAD *Vacuum Type*** ♠

Finger type condenser and Newman type stopcock for reflux control. Stopcock manifold and reflux stopcock can be used to isolate head from receiver so that receiver contents can be removed without disturbing the vacuum in the system. Thermometer joint is § 10/30 for 76mm immersion thermometer. All other joints are § 24/40. Finger condenser is approximately 203mm long. Newman type stopcock is 2mm bore; all others are 3mm. For cold finger only, see 5960.

Joints, §	Finger Condenser Length, mm	Thermometer Joint, §	Stopcock Bore Size, mm	Newman Type Stopcock Bore Size, mm	Hose Connections, in	Qty	Order Code
24/40	203	10/30	3	2	5/16 or 3/8 (Size C)	1	<b>6606-10</b>

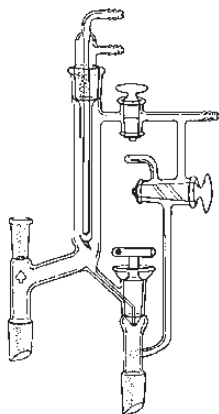




### COLD FINGER *For Standard Distilling Heads & Systems* ♠

Cold Finger accessory for standard distilling heads and systems. This cold finger has an inner joint that fits inside the upper outer joint and tube to provide added cooling ability and faster condensation. Has two upper, glass, size A hose connections that take 5/16-inch tubing.

Bottom Joint, $\text{\textcircled{S}}$	Length Below Joint, mm	Hose Connections, in	Qty	Order Code
14/10	80	5/16 (Size A)	1	9250-02
14/20	92	5/16 (Size A)	1	9250-04
19/22	92	5/16 (Size A)	1	9250-08



### DISTILLATION HEAD ♠

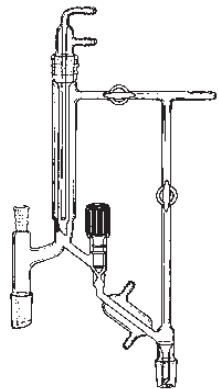
Newman stopcock facilitates reflux ratio adjustment and reduces hold-up on walls; product drops directly into receiver. Stopcocks are arranged for convenient manipulation and are placed so that the head may be used in either right- or left-hand setup. The condenser drip is adjustable for directing reflux into takeoff. Condenser hose connections point to rear.

Condenser Length: 100mm

Joints  $\text{\textcircled{S}}$ : Thermometer - 10/30; all others - 14/20

Hose Connections: 5/16in (Size A)

$\text{\textcircled{S}}$ Joints	Head Only		Condenser Only		Complete	
	Qty	Order Code	Qty	Order Code	Qty	Order Code
14/20	1	9357-01	1	9250-04	1	9357-02



### DISTILLATION HEAD *Vacuum Type* ★

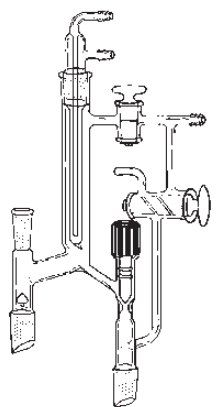
With cold finger type condenser and 0-3mm PTFE stopcock for reflux control. Glass stopcocks on manifold and reflux arms can be used to isolate head from receiver so that receiver contents can be removed without disturbing the vacuum in the system. For cold finger only, see 5960.

Condenser Length: 203mm

Joints  $\text{\textcircled{S}}$ : Thermometer - 10/30; all others - 14/20

Hose Connections: 5/16 or 3/8in (Size C or D)

$\text{\textcircled{S}}$ Joints	Glass Stopcock Bore, mm	PTFE Stopcock, mm	Qty	Order Code
24/40	3	0-3	1	6613-12



### DISTILLATION HEAD

With cold finger type condenser and 0-3mm PTFE stopcock plug with PTFE ring seals for reflux control. The seals prevent O-Ring exposure to corrosive liquids and are backed up by a FETFE O-Ring.

Condenser Length: 203mm

Joints  $\text{\textcircled{S}}$ : Thermometer - 10/30; all others - 14/20

Hose Connections: 5/16in (Size A)

$\text{\textcircled{S}}$ Joints	Head Only		Condenser Only		Complete	
	Qty	Order Code	Qty	Order Code	Qty	Order Code
14/20	1	9358-02 ♠	1	9250-04 ★	1	9358-03 ♠

## DISTILLATION HEAD ★

Automatic reflux control via solenoid valve arrangement. Reflux control is effected by an adjustable time switch and solenoid take-off valve. Reflux ratio is thus a time function and is independent of throughput except when a single drop is a significant part of the condensate. Even then, drops can be split by shortening take-off time and adjusting plunger travel by means of the brass washers provided. Vapors pass, for the most part, around the outside of the plunger housing to reach the condenser. The condensate is directed to the interior of the housing and returns to the column via holes in the housing at the valve seat. A drip below the plunger seat directs the reflux to the center of the packing. The design is such that viscous liquids like glycerin cause no difficulty. Temperature measurement is by means of a thermocouple or thermometer; #7 Ace-Thred for 40mm immersion is located in the vapor stream. Vapor velocity prevents reflux from running down the well. Joints are  $\text{N} 14/20$ . Thermometer not supplied.

Hold-up: Static — 0.2mL for liquids such as toluene or ethanol.

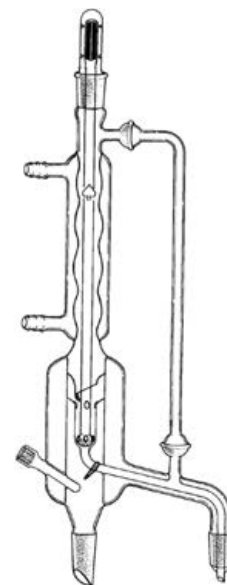
Dynamic — 0.4mL toluene at 4.5mL/min.

Dimensions — Overall height approximately 350mm;

Distance from column to take-off arm approximately 75mm.

For magnetic coil, see 6590.

Joints, $\text{N}$	Height, mm	Distance Column to Take-off, mm	Hose Connections, in	Qty	Order Code
14/20	350	75		1	9362-08



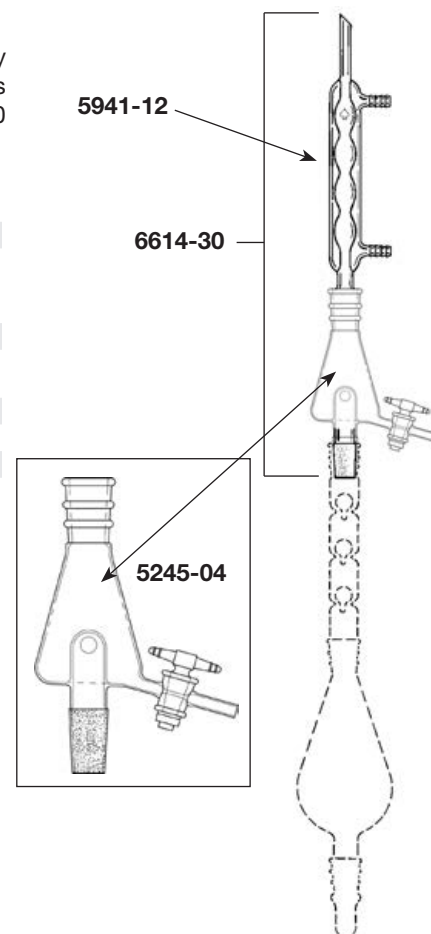
## STILL Solvent Recovery

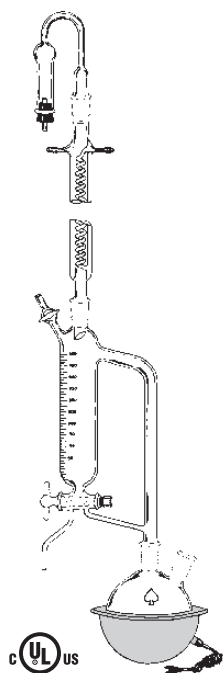
When attached to the top of Snyder Column, unit is designed to recover solvent normally lost during Kuderna-Danish Evaporative Concentrations. PTFE stopcock (1:5, 2mm bore) provides option for total reflux or takeoff. #7 Ace-Thred on side arm accepts tubing 6-7mm O.D. 5029-10 nylon bushing and FETFE O-Ring supplied with adapter.

Description	Qty	Order Code	
Adapter, Solvent Recovery, $\text{N} 24/40$	1	5245-04	◆
Condenser, Allihn, 200mm, $\text{N} 24/40$	1	5941-12	◆
<b>Complete</b>	1	6614-30	◆

### Accessories

PTFE Sleeve, $\text{N} 24/40$	3	7643-08	★
Snyder Column	1	6575-02	◆
Flask, 500mL	1	6708-03	◆
Flask, Graduated, 10mL Receiver	1	6708-37	◆





### DISTILLATION HEAD *Solvent Recovery*

Versatile unit for use as a solvent recovery still for azeotropic separations of solvents, either heavier or lighter than water.

As a solvent recovery unit, the lower 4mm PTFE double oblique stopcock permits total return to flask, total take-off, and total storage in the 500mL graduated receiver. Bottom exit extends away from the distilling flask for easier takeoff. The 2mm bore PTFE stopcock at top has tubing that will accept our 9096 septum to permit use of a syringe for extracting smaller samples as needed, while avoiding air contact. Joints are  $\text{NPT } 24/40$ . Complete item consists of head, flask, mantle, condenser, drying tube and 12 Septa.

Description	Qty	Order Code	
Distilling Head, only	1	6616-10	♠
Flask, 2 Neck, $\text{NPT } 24/40$ , 2 liter	1	6927-44	♠
Mantle	1	12043-21	
Condenser, Reflux, $\text{NPT } 24/40$ , 300mm	1	5955-14	♠
Drying Tube, $\text{NPT } 24/40$	1	5170-10	♠
Septa	12	9096-32	★

#### Complete

	1	6616-40	♠
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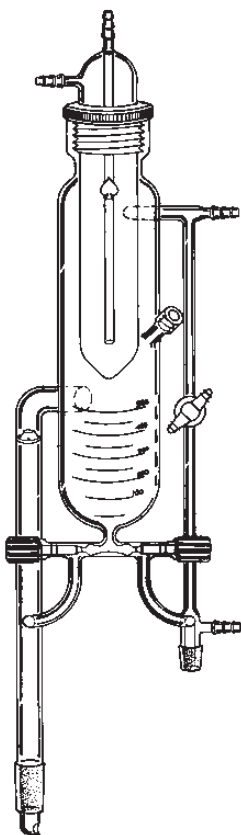
#### Replacement PTFE Stopcocks

2mm Bore	1	8224-04	♠
4mm Bore, Double Oblique Bore	1	8226-10	♠

### SOLVENT STILL *Re-Purifier*

Solvent re-Purifier still that distills, refluxes, stores and delivers. When used with PTFE sleeves on joints, unit is totally grease free. #50 Ace-Thred holds cold finger condenser enabling easy removal for cleaning. Inlet on body, below thread, is for nitrogen flushing through entire apparatus with outlets on boiling flask as well as above receiver flask. Septum access located on side of still reservoir, supplied with septum. Two PTFE stopcocks, below reservoir, allow recycling solvent to boiling flask, take-off to receiver flask, or if both are closed, storage in graduated 500mL reservoir. Lower joint on distillation path is  $\text{NPT } 24/40$  with a "splash guard" to aid in distillation. Joint on receiver is  $\text{NPT } 14/20$ . Distillation flask is a round bottom, two-neck boiling flask for use with Glas-Col mantles. Use with 5/16" or 3/8" I.D. tubing, size C hose connection.

**Note:** Distillation flask and receiver flask are NOT supplied with still head. Complete item includes still head, finger condenser and bushing with O-Ring.



Description	Qty	Order Code	
Still Head, only	1	6617-06	★
Finger Condenser, only	1	6617-11	★
Nylon Bushing, only, #50, w/O-Ring	1	7506-14	♠

#### Complete

	1	6617-35	★
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#### Replacement Parts and Accessories

PTFE Stopcock Plug, 2mm Bore	1	8224-04	♠
PTFE Plug, 0-10mm	1	8192-261	♠
Distillation Round Bottom Flask, 2-neck, 500mL, $\text{NPT } 24/40$	1	6927-22	♠
Distillation Round Bottom Flask, 2-neck, 1000mL, $\text{NPT } 24/40$	1	6927-32	♠
Distillation Round Bottom Flask, 2-neck, 2000mL, $\text{NPT } 24/40$	1	6927-44	♠
Receiver Flask, Single neck, 50mL, $\text{NPT } 14/20$	1	9470-06	♠
Receiver Flask, Single neck, 100mL, $\text{NPT } 14/20$	1	9470-08	♠
Receiver Flask, Single neck, 200mL, $\text{NPT } 14/20$	1	9470-10	♠
Joint Clamps, Delrin, $\text{NPT } 14/20$	12	7598-14	★
Joint Clamps, Delrin, $\text{NPT } 24/40$	12	7598-24	★
Septa, Silicone	12	12901-48	★

### REFLUX APPARATUS *Continuous, Fuchs*

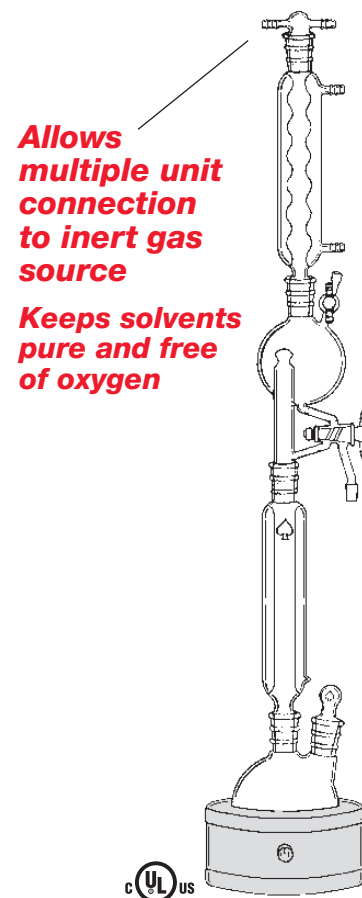
Continuous reflux apparatus to keep solvents pure and free of oxygen. Compact, upright design allows multiple units to be assembled in small areas, i.e. 1000mL — 9" diameter x 39" high, 2000mL — 10-3/8" diameter x 41" high (shorter versions have been fabricated, inquire for details). Storage head has overflow high enough to allow storage of solvent for retrieval by syringe through upper part or through lower double oblique stopcock. Lower drain is centered for complete drainage of head. Distillation column is 250mm long, vacuum jacketed, unsilvered. Allihn condenser is 250mm. Adapter at top has two size D hose connections (use with 3/8-inch I.D. tubing) for maintaining inert atmosphere. Stopcocks are 2mm bore PTFE. Joint on lower drain arm is  $\text{§}$  14/20, all others  $\text{§}$  24/40. Complete unit consists of adapter, condenser, storage head, column, flask and mantle. Septa are optional.

**Note:** Designed by Dr. Philip Fuchs, Purdue University Chemistry Dept., West Lafayette, IN.

1000mL			2000mL			
Description	Qty	Order Code	Description	Qty	Order Code	
Adapter, $\text{§}$ 24/40	1	5206-10	♠ Adapter, $\text{§}$ 24/40	1	5206-10 ♠	
Column, Vac. Jacketed	1	7793-04	♠ Column, Vac. Jacketed	1	7793-04 ♠	
Condenser, Allihn	1	5945-13	♠ Condenser, Allihn	1	5945-13 ♠	
Head, Storage, 500mL	1	6620-12	♠ Head Storage, 1000mL	1	6620-14 ♠	
Flask, 1000mL	1	6927-32	♠ Flask, 2000mL	1	6927-44 ♠	
Stopper, $\text{§}$ 24/40	1	8250-12	♠ Stopper, $\text{§}$ 24/40	1	8250-12 ♠	
Mantle, 1 Liter	1	12053-19	Mantle, 2 Liter	1	12053-21	
<b>Complete</b>			<b>Complete</b>			
	1	6620-40	★	1	6620-45	★

#### Replacement Parts and Accessories

PTFE Stopcock, 2mm Bore	1	8224-04	♠
PTFE Stopcock, 2mm Bore, Double Oblique Bore	1	8226-08	♠
Septa, Red, 8mm	12	9096-32	★



### RINGS *Raschig* ♠

Borosilicate glass. Wall weight on 5mm size is approximately 0.8mm, other sizes have wall weight of approximately 1.0mm.

Size, mm	Approx. Wall Weight, mm	Approx. Qty per lb.	Qty	Order Code
5 x 5	0.8	580	1 lb.	8033-04
6 x 6	1.0	590	1 lb.	8033-06
7 x 7	1.0	600	1 lb.	8033-08
8 x 8	1.0	770	1 lb.	8033-10



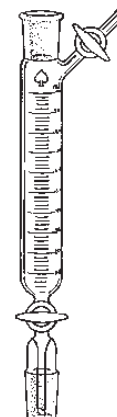
### DISTILLATION RECEIVER *Vacuum Type* ♠

With  $\text{§}$  inner joint at bottom and outer joint at top. Graduated to 125mL in 1mL subdivisions. Double scale with glass stopcocks.

Joints, $\text{§}$	Graduations, mL	Bore, mm	Qty	Order Code
24/40	1	2	1	6628-10

#### Replacement Glass Stopcock

	2	1	8223-02
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**DISTILLATION RECEIVER Vacuum Type** ♠

With  $\text{\textcircled{S}}$  joint at top. Capacity 125mL, in 1mL subdivisions. Double scale. With glass stopcock.

Joints, $\text{\textcircled{S}}$	Capacity, mL	Graduations, mL	Bore, mm	Qty	Order Code
24/40	125	1	2	1	6629-10

**Replacement Glass Stopcock**

				1	8223-02
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**DISTILLATION RECEIVER** ♠

Specially designed receiver to draw samples during distillation or to return the condensed vapor to the flask. Available with a glass or solid 1:5 PTFE stopcock plug

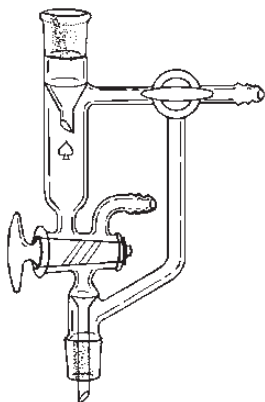
Joints, $\text{\textcircled{S}}$	Capacity, mL	Bore, mm	Qty	Order Code
<b>With Glass Stopcock</b>				
24/40	125	4	1	6635-10

**With PTFE Stopcock**

24/40	125	2	1	6635-20
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**Replacement Stopcocks**

PTFE	2	1	8226-08
Glass	4	1	8226-09


**DISTILLATION RECEIVER** ♠

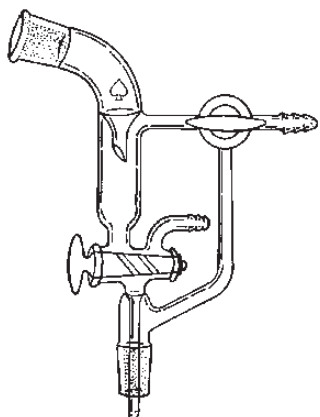
For operation other than at atmospheric pressure. Vacuum is applied to the side arm with the T-bore stopcock. The secondary receiver is vented by means of the lower stopcock. The capacity from the bottom of the drip to the stopcock is 2.5mL. Both stopcocks are glass.

**Note:** Contact us to special order double oblique stopcock.

Joints, $\text{\textcircled{S}}$	Hose Connection, in	Qty	Order Code
14/20	3/8 (Size D)	1	9375-08

**Replacement Glass Stopcocks**

T-Bore, 2mm		1	8228-09
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**DISTILLATION RECEIVER** ♠

With upper joint at 105° angle. For operation other than at atmospheric pressure. Vacuum is applied to the side arm with the T-bore stopcock. The secondary receiver is vented by means of the lower stopcock. The capacity from the bottom of the drip to the stopcock is 2.5mL. Tubing connections are 8mm O.D. olive type.

**Note:** Contact us to special order double oblique stopcock.

Joints, $\text{\textcircled{S}}$	Hose Connection, mm	Qty	Order Code
14/20	8	1	9389-02

**Replacement Glass Stopcocks**

T-Bore, 2mm		1	8228-09
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## DISTILLATION RECEIVER ★

An excellent all-purpose receiver for general distillation work. Equipped with a complete stopcock manifold to allow contents of the receiver to be removed to a single receiving flask without disturbing the vacuum of the system. Stopcocks are 4mm bore. Tubing connections are 10mm O.D. olive type. Available with graduated and non-graduated body (picture is of graduated body).

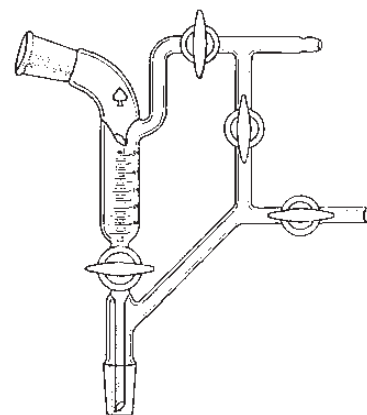
Capacity, mL	Joints, $\frac{1}{8}$ "	Bore, mm	Hose Connection, mm	Qty	Order Code
<b>Non-Graduated Body</b>					
50	24/40	4	10	1	6637-04
100	24/40	4	10	1	6637-06
250	24/40	4	10	1	6637-08

### Graduated Body

50	24/40	4	10	1	6638-04
100	24/40	4	10	1	6638-06
250	24/40	4	10	1	6638-08

### Replacement Glass Stopcocks

		4		1	8223-06	◆
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## DISTILLATION RECEIVER Jacketed ★

Graduated jacketed receiver with vacuum manifold for removal of sample during operation without disturbing the system.

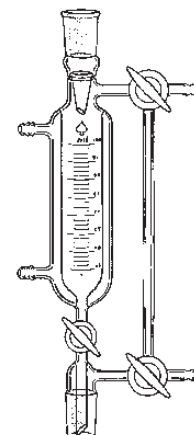
Stopcocks on manifold are 4mm bore, receiver stopcock is 3mm.

Use with 3/8-inch or 7/16-inch I.D. tubing, size E hose connection, on condenser; 10mm O.D. olive on manifold.

Capacity, mL	Joints, $\frac{1}{8}$ "	Subdivisions, mL	Qty	Order Code
250	24/40	5	1	6642-08

### Replacement Glass Stopcocks

			1	8228-09	◆
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# Laboratory Glassware Safety Tips

## ...Safe Handling of Glassware

### Inspection

- Always inspect glass for scratches, abrasions, cracks or chips before using or cleaning.
- Safely dispose of any damaged glass.
- Inspect glass routinely for strain with a polariscope.

### Washing/Cleaning

- Always inspect glass for chips and fractures prior to cleaning, especially any solvent or acid cleaning.
- Use Alconox or similar type detergents.
- Avoid HF, strong alkalis or abrasive cleaners.
- Distilled water rinse.

### Storage

- Store glass in a manner to avoid vessels bumping each other.

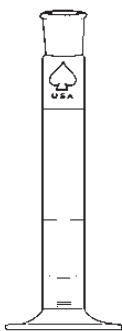
### Temperature, Borosilicate Glass

- Standard use limit — 240°C.
- Maximum short-term use — 490°C.
- Avoid rapid temperature changes or rapid thermal shock.

### Heating Glass

- Heat with mantles, Instatherm®, heat tapes, guns or immersion heaters.
- Avoid direct flame as much as possible.
- Standard temperature limit for borosilicate glass is 240°C.



**DISTILLATION RECEIVER** ♠

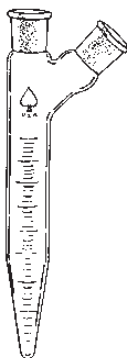
Calibrated to contain. Supplied in 10mL capacity with 0.2mL subdivisions.

Capacity, mL	Top ⚔ Joint	Subdivisions, mL	Qty	Order Code
10	14/20	0.2	1	9396-02

**DISTILLATION RECEIVER** ♠

Centrifugal type, calibrated to contain. Graduated in 0.1mL subdivisions. Total capacity 15mL.

Capacity, mL	Top ⚔ Joint	Subdivisions, mL	Qty	Order Code
15	14/20	0.1	1	9397-06

**DISTILLATION RECEIVER with Side Arm** ♠

Graduated to 15mL in 0.1mL subdivisions with lower 0.5mL contained in a precision tip for better accuracy with extremely small samples.

Capacity, mL	Joints, ⚔	Qty	Order Code
15	14/20	1	9373-06

**DISTILLATION TUBE 12mL, Graduated, with Side Tab** ♠

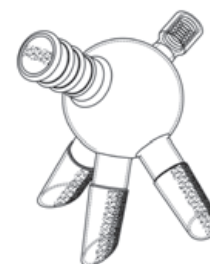
Graduated to 12mL, with side tab. #7 Ace-Thred top joint. For use in ASTM D7528-09 procedure for simulation and test of auto engine oils.

Capacity, mL	Ace-Thred	Qty	Order Code
12	7	1	D120677

### DISTILLATION RECEIVER *Short-Path* ♠

Short-path still distribution receiver with Ace-Thred™ vacuum port. Features a 24/40 condenser connection joint and three drip tip 24/40 receiving flask joints. Vacuum port with Ace-Thred™ allows you to purchase your choice of Ace-Safe™ hose connections.

Description	Joints, ⌘	Hose Connection	Qty	Order Code
Distributor	24/40	#11 Ace-Thred	1	9404-10



### DISTILLATION RECEIVER

For use where separate fractions are desired without disturbing distillation pressure. 9400-25 is similar to 9400-10 except all the inner joints are PTFE-Clad, while outer joints are polished.

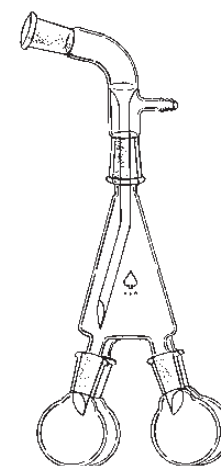
Receiver Flask Capacity: 5mL - ⌘ 14/20 size;  
50mL - ⌘ 24/40 size

Hose Connection: on ⌘ 14/20 joints - 3/8" or 5/16" I.D. tubing, size B;  
on ⌘ 24/40 joints - 3/8" I.D. tubing, size D

Description	Qty	⌘ 14/20		⌘ 24/40		PTFE-Clad Inner Joints ⌘ 14/20			
		Order Code	♠	Order Code	♠	Order Code	♠		
Vacuum Adapter	1	9400-03	♠	1	6647-04	♠	1	9400-20	♠
Distributor	1	9400-04	♠	1	6647-06	♠	1	9400-22	♠
Flasks, 5mL	4	9458-02	♠	4	6887-20	♠	4	9458-02	♠
Joint Clips*	5	7598-14	★	5	7598-24	★	5	7598-14	★

#### Complete

	1	9400-10	♠	1	6647-10	♠	1	9400-25	♠
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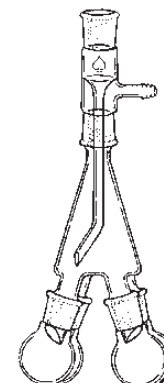
### DISTILLATION RECEIVER

Similar to 9400-10 except with ⌘ 14/20 vertical top joint. Use with 5/16" or 3/8" I.D. tubing, size B hose connection.

Description	Qty	⌘ 14/20	
		Order Code	♠
Vacuum Adapter	1	9401-05	♠
Distributor	1	9400-04	♠
Flasks, 5mL	4	9458-02	♠
Joint Clips*	5	7598-14	★

#### Complete

	1	9401-30	♠
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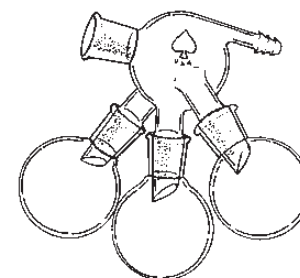
### DISTILLATION RECEIVER

The three 25mL flasks are in the same plane, rotated about the condenser axis. Hose connection is parallel to and above condenser axis. Three clips are supplied for holding flasks to condenser. All joints are ⌘ 14/20. Use with 5/16" I.D. tubing, size A hose connection.

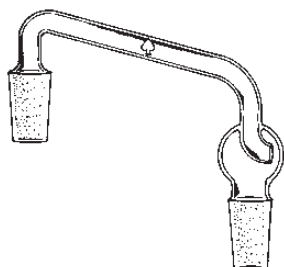
Description	Qty	⌘ 14/20	
		Order Code	♠
Distributor	1	9403-08	♠
Flasks, 25mL	3	9458-06	♠
Joint Clips*	4	7598-14	★

#### Complete

	1	9403-10	♠
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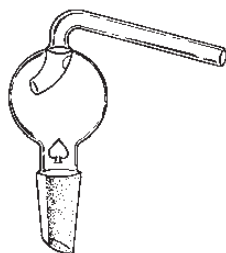
\*The 7598 joint clips listed in the complete items above are supplied in quantities of five (9400-10, 6657-10, 9400-25, 9401-30) or four (9403-10). However, when you order replacement clips (part numbers 7598-14 or 7598-24), you will receive a package of 10 clips.



**ADAPTER** *Kjeldahl Trap* ♠

Distance between center of joints is approximately 200mm.

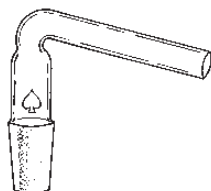
Joint, §	Distance between Joints, mm	Qty	Order Code
24/40	200	1	5226-10



**ADAPTER** *Distilling Trap* ♠

With outlet tube bent at 75° angle.

Joint, §	Qty	Order Code
24/40	1	5230-10



**ADAPTER** *Distilling* ♠

With 8mm O.D. outlet tube bent at 75° angle.

Joint, §	Outlet Tube O.D., mm	Qty	Order Code
24/40	8	1	5235-10



**ADAPTER** *Distilling Trap* ♠

Joints, §	Qty	Order Code
14/20	1	9086-02
24/40	1	5225-10
29/42	1	5225-15



**ADAPTER** *Distillation* ♠

Distillation adapter for use with bench or pilot plant reactors. Moisture is collected in center vessel and drained off through the bottom stopcock which is ground to accept a compression style fitting. Stopcock plug is 1:5 PTFE. Available with either one or two top standard taper outer joints.

§ Joints	Plug Bore, mm	Compression Fitting Joint Size, in.	Qty	Order Code
<b>with (1) Top Joint</b>				
24/40	6	1/2	1	5299-01
29/42	6	1/2	1	5299-03
45/50	10	3/4	1	5299-07
<b>with (2) Top Joints</b>				
24/40	6	1/2	1	5299-10
29/42	6	1/2	1	5299-12
45/50	10	3/4	1	5299-16
<b>Replacement 1:5 PTFE Stopcock Plug</b>				
	6		1	8224-16
	10		1	Call to Order

## DRYING APPARATUS Modified Abderhalden ♠

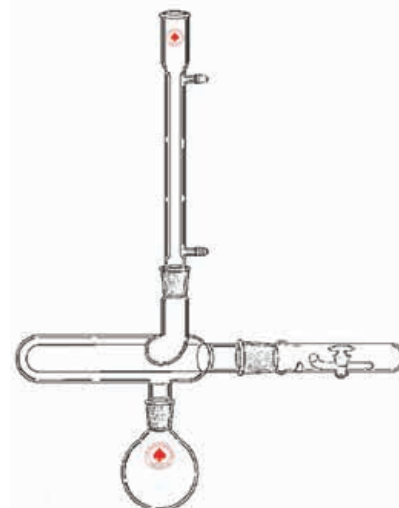
Vacuum. Desiccant tube has two-way action that permits the use of a smaller desiccant volume and better air contact with desiccant. During the final stage of drying, the T-bore stopcock is turned so that the evacuation path is directly over the desiccant, while in the early stages the desiccant is bypassed. The condenser is placed above the boiling flask, but off to the side of the heating tube. The upper 24/40 joint is offset so that the condensed liquid does not drop over the inner tube. Opening to the inside chamber is 40/35.

*Note: Complete item consists of condenser, drying chamber, desiccant tube with stopcock and round bottom boiling flask.*

Description	Joint, "	Qty	Order Code
Drying Chamber	40/35	1	6692-02
Desiccant Tube	40/35	1	6692-04
Condenser	24/40	1	6025-14
Flask, 250mL	24/40	1	6887-25

### Complete

		1	6692-10
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## DRYING APPARATUS Modified Abderhalden

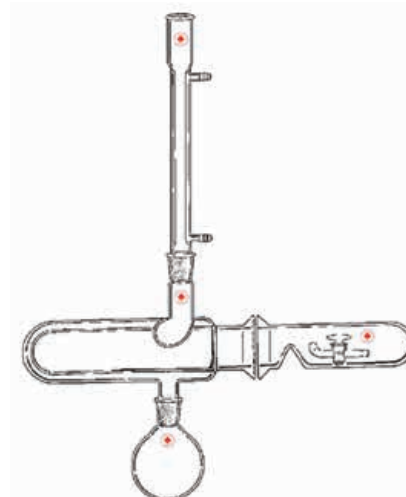
Modified design replaces the 24/40 joint connection normally found between the chambers, with a 60mm I.D. flat flange and a quick release stainless steel clamp. Flange on drying chamber has a groove for a silicone O-Ring to make a leak-tight seal with flat flange on desiccant tube. Joints on condenser and flask are 24/40.

*Note: Complete item consists of condenser, drying chamber, desiccant tube, flask, clamp and O-Ring.*

Description	Joint, "	Qty	Order Code
Drying Chamber	—	1	6693-04 ♠
Desiccant Tube	—	1	6693-07 ♠
Condenser	40/35	1	6025-14 ♠
Flask, 300mL	24/40	1	6887-25 ♠
O-Ring, Silicone	—	1	7855-251 ★
Clamp, #60	—	1	6517-22 ★
Glass Stopcock	—	1	8223-02 ♠

### Complete

		1	6693-40 ♠
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## DRYING APPARATUS Abderhalden ♠

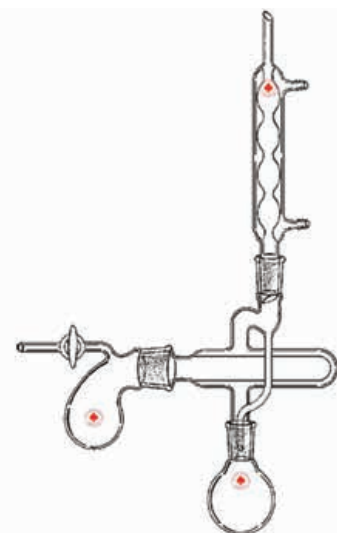
Vacuum, improved form. Material to be dried is placed in the inner tube, 15.2cm long by 25.4mm I.D. When the liquid in the distilling flask boils, the vapors pass through the drying chamber and heat the inner tube at a constant temperature. The vapors then ascend to the reflux condenser, condense and flow back through the return tube into the boiling flask. Boiling flask is 250mL capacity and has a 24/40 joint. Flask with interchangeable stopcock has a 40/35 joint.

*Note: Complete apparatus consists of condenser, drying chamber, desiccant flask and boiling flask.*

Description	Joint, "	Qty	Order Code
Drying Chamber	40/35	1	6695-02
Desiccant Flask	40/35	1	6695-04
Condenser	24/40	1	5941-14
Boiling Flask, 250mL	24/40	1	6887-24
Glass Stopcock	—	1	8223-02

### Complete

		1	6695-10
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**TUBE Drying** ♠

U-shaped drying tube with  $\text{§}$  inner joint on one end and a flared open end for a rubber stopper on the other. Length refers to approximate length of desiccant area.

Joint, $\text{§}$	Length, mm	Qty	Order Code
14/20	180	1	9419-03
19/38	150	1	5170-05
24/40	150	1	5170-10
29/42	150	1	5170-15

**Rubber Stopper and Adapter Tube, only**

		1	5170-40
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**TUBE Drying** ♠

Bent gooseneck-type drying tube. Length refers to approximate length of desiccant area.

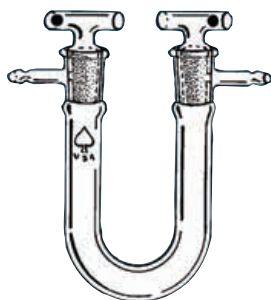
*Note: Code -02 uses #00 rubber stopper, code -04 uses a #3 stopper.*

Joint, $\text{§}$	Length, mm	Qty	Order Code
14/20	140	1	9420-02
19/22	140	1	9420-04

**TUBE Drying** ♠

Drying tubes available with beaded or standard taper tops and standard taper bottom. Length refers to approximate length of desiccant area.

Top Joint $\text{§}$	Bottom Joint $\text{§}$	Length, mm	Qty	Order Code
$\text{§}$ 14/20	$\text{§}$ 14/20	100	1	9421-08
Beaded	$\text{§}$ 19/22	100	1	9421-10

**TUBE Drying, Schwartz** ♠

Schwartz drying tube with standard taper stoppers. Length is from top of joint to bottom of curve.

Stopper, $\text{§}$	Tube O.D., mm	Length, mm	Qty	Order Code
14/35	17	100	1	8531-04
14/35	17	153	1	8531-06

**TUBE Test, Stoppered** ♠

With interchangeable glass stopper;  $\text{§}$  24/40 stopper is hollow; #16 and #19 stoppers are solid.

Tube Size, mm	Stopper Type	Stopper only		Tube Only		Complete	
		Qty	Order Code	Qty	Order Code	Qty	Order Code
16 x 150	#16	1	8645-04	1	8645-06	1	8645-08
22 x 150	#19	1	8645-16	1	8645-18	1	8645-20
25 x 200	$\text{§}$ 24/40	1	8250-12	1	8645-36	1	8645-38

## GAS DRYING UNIT *Laboratory* ★

A sturdy, convenient and time-saving piece of laboratory equipment. Intermittent requirements for dry gases are readily available by simply making a rubber tube connection between the laboratory bench air line or gas cylinder and bottom inlet of the drying tower. The unit will dry approximately 2200 liters of air, saturated with moisture at 21°C and 740mm pressure, to a dew point of approximately minus 79°C. Gases when expanded from a compressed state are not saturated with water, and the drying unit will, therefore, dry several times the volume of gas noted for saturated conditions. For maximum efficiency, the gas flow should not exceed 200 liters per hour.

When exhausted, the Drierite may be regenerated by heating in very thin layers (one granule deep) in an open pan or tray, and with careful handling, the drying unit will last indefinitely. The tower is made of acrylic plastic with anodized aluminum cap. Unit measures 67mm diameter by 289mm high, packed with 8 mesh indicating Drierite.

O.D., mm	Length, mm	Qty	Order Code
67	289	1	10165-10



## DRIERITE *Indicating* ★

The granules of calcium sulfate are impregnated with C.P. cobalt chloride. On dehydration, the active desiccant assumes a distinct blue color. In use, the color changes to a rose-red as the margin between the exhausted and active desiccant progresses through a tube or tower.

	<b>1 lb.</b>		<b>5 lb.</b>	
	Qty	Order Code	Qty	Order Code
6-mesh	1	10175-17	1	10175-27
8 mesh	1	10175-19	1	10175-29
10-20 mesh	1	10175-21	1	10175-31

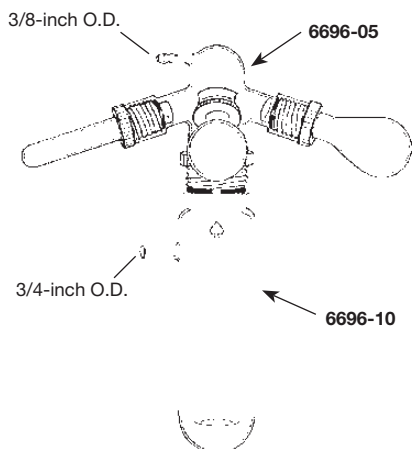


# Freeze Drying Apparatus

## ...with Ace-Thred Design

- Vessels are less expensive: They can also be readily adapted to mechanical units. (*Virtis, Labconco, etc.*)
- Screw-cap vessels can be used for quick, easy storage.
- Less freeze-up of vapor path.
- No hooks, springs, or rubber bands are needed; no vessel "drop-off."
- Disassembles easily for cleaning.
- Rugged, heavy-wall vessels are safer, less likely to implode.



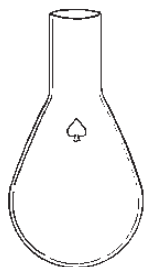


### FREEZE DRYING APPARATUS ♠

Economical “umbrella”-design freeze drying apparatus utilizing Ace-Threds for positive, grease-free connections that are easy to manipulate. Compression fitting of Nylon bushing on FETFE O-Ring against the shoulder of the Ace-Thred holds the vessel in place with or without vacuum and thus prevents vessel “drop-off” at start-up or shut-down. Umbrella has three #25 threads at 90° angles of each other, leaving the rear of the umbrella without a port for easier mounting. Vacuum gauge connection is near top of the umbrella. Vertical tube extending down from the umbrella is secured in the collection trap by a #50 Ace-Thred. Cooling is done in Dewar in usual manner. Should main tube of umbrella or cooling trap clog, it may be disassembled, cleaned and reassembled in minutes without fear of vessel “drop-off.” Capacity of trap is approximately two liters.

**Note:** A complete unit would consist of 6696-05 umbrella manifold, 6696-10 collection trap, three 7506-10 #25 bushings, one 7506-14 #50 bushing and three vessels of your choice. Order each item separately.

Description	Qty	Order Code
Umbrella Manifold, only	1	6696-05
Collection Trap, 3-1/2-inch O.D.	1	6696-10
Bushing, Nylon, #25 (3 needed)	1	7506-10
Bushing, Nylon, #50	1	7506-14



### VESSEL Freeze Dry, Heavy Wall, Sloped Shoulder ♠

These heavy wall vessels are rugged, less likely to implode. Vessels have 25mm O.D. neck to fit #25 Ace-Thred on 6696-05 umbrella. Sloped shoulders for easy removal of contents. Working capacity of flasks is about half of the volume listed.

Capacity, mL	Neck O.D., mm	Qty	Order Code
100	25	1	6696-12
200	25	1	6696-14
300	25	1	6696-16

#### Nylon Bushing

	1	7506-10
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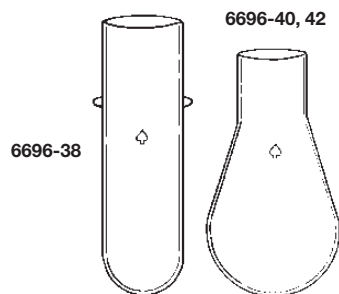
### VESSEL Freeze Dry and Storage, Sloped Shoulder, Screw Cap ♠

Vessel has GCMI-24-410 bottle thread and PTFE lined cap. Neck also fits inside a #25 Ace-Thred bushing. for use with 6696-05 umbrella manifold. After drying material, vessel can be capped and stored. Working capacity of flasks is about half of the volume listed.

Capacity, mL	Neck O.D., mm	Qty	Order Code
100	25	1	6696-20
200	25	1	6696-22
300	25	1	6696-24

#### Nylon Bushing

	1	7506-10
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### VESSEL Freeze Dry ♠

Vessels have 48 mm O.D. neck to fit #50 Ace-Thred bushing on 6696-50 connecting adapter for connection to the 6696-05 umbrella manifold. The 300 mL size has straight sides and stops on side to prevent “suck-in” under vacuum; other sizes have sloped sides. Working capacity of flasks is about one-half volume listed.

Capacity, mL	Neck O.D., mm	Qty	Order Code
300	48	1	6696-38
600	48	1	6696-40
1000	48	1	6696-42

#### Nylon Bushing

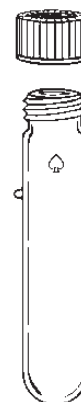
	1	7506-14
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## TUBE Freeze Dry and Storage, Screw Cap ♠

Modified culture tubes with PTFE lined screw-cap and stops on side to prevent “suck-in” under vacuum. Both sizes fit inside a #25 Ace-Thred bushing for use with 6696-05 umbrella manifold. Working capacity of tubes is about half of the volume listed.

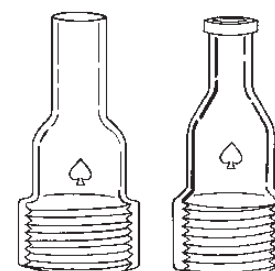
O.D., mm	Length, mm	Capacity, mL	G.P.I. Thread	Qty	Order Code
25	100	30	24-410	1	6696-31
25	150	50	24-410	1	6696-32



## ADAPTER Connecting ♠

Glass adapter used for connecting ACE freeze drying vessels to the rubber valves on the Virtis, Labconco, and most other commercially available freeze drying units. Supplied Glass only.

Fits Valve O.D. Size, mm	Ace-Thred Size	Qty	Order Code
10.0 (no flange)	25	1	6696-74
12.7 (w/19.1 mm flange)	25	1	6696-76
19.1 (no flange)	25	1	6696-77



### Nylon Bushing

	1	7506-10
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## ADAPTER Connecting ♠

Used for connecting freeze drying vessels with 48mm O.D. necks to #25 Ace-Threds on umbrella manifold. O.D. of straight side is 25mm.

Neck O.D., mm	Qty	Order Code
48	1	6696-50



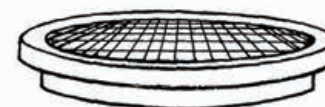
### Nylon Bushing

	1	7506-14
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## ADAPTER Screen ♠

Used with ACE freeze drying vessel with either 25mm O.D. or 48mm O.D. necks for assuring that the contents of the vessel do not accidentally get sucked out during the freeze drying process. Adapter is PTFE with a stainless steel screen and press fits in the end of the vessel before attaching it to the Ace-Thred.

For Neck Size, mm	Qty	Order Code
25	1	6696-84
48	1	6696-86



## BUSHING ♠

Bushing connector for joining a threaded end to a reduced end tube in the air sampling glassware. Available in either nylon or PTFE. (1) FETFE O-Ring supplied with each bushing.

Ace-Thred	I.D., mm	O-Ring Size	Qty	O-Ring	Nylon	O-Ring	PTFE
				Order Code	Order Code	Order Code	Order Code
11	10	-012	1	7855-708	7506-02	7855-708	7506-23
25	26	-212	1	7855-734	7506-10	7855-734	7506-31
50	49	-225	1	7855-744	7506-14	7855-744	7506-35



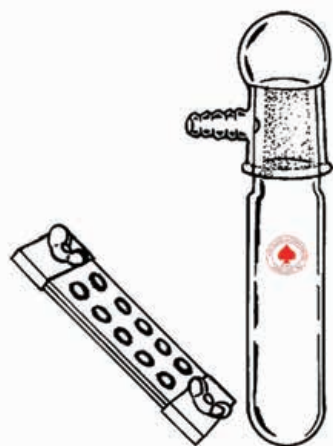

**ADAPTER** Rotary Evaporator to Freeze Dry Vessel ♦

By using this adapter, preliminary evaporation may be done on a rotary evaporator, then vessels can be transferred directly to freeze drying manifold. No need to transfer contents of flask. Joint is  $\text{\textcircled{R}} 24/40$  with 2mm hole mid length for relieving vacuum gently.

Joint, $\text{\textcircled{R}}$	Ace-Thred Size	Qty	Order Code
24/40	25	1	6696-70

**Nylon Bushing**

		1	7506-10
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**DRYING ASSEMBLY** with Aluminum Holder ♦

Originally used for Lyophilizing and storing frozen slices of tissue for quantitative histochemistry. Can also be used as a vacuum tube with aluminum holders by Nelson & Wakefield, *Journal of Neuropathology & Exper. Neurology*, Vol. XXVII, No. 2, April 1968. Joint is  $\text{\textcircled{R}} 40/50$ . Aluminum holder measures 25mm x 90mm x 3mm, with two rows of eight, 8mm diameter holes. Furnished with two microscope slides. Use with 5/18-inch I.D. tubing, size G.

Description	Qty	Order Code
Cap	1	6699-02
Bottle	1	6699-04
Aluminum Holder (only)	1	6699-15

**Complete (with Holder)**

	1	6699-20
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**Complete (without Holder)**

	1	6699-10
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Not for use  
at elevated  
temperatures


**FLASK** Rotary Evaporator/Freeze Drying ♦

Dual purpose flask features the "TWISTLOR" ACE-Seal: simply push adapter head and flask together, turn 90°.

Flange on flask has two ground-flats opposite each other that allow nylon retainers on adapter head to pass over. O-Ring positioned in head and flask grooves makes a vacuum-tight seal when head is turned 90° in either direction.

To remove, turn 90° in either direction or until nylon retainers line up with flats on flange, and flask and adapter head come apart.

One adapter head fits all capacity flasks. Each adapter head is supplied with one FETFE O-Ring. Complete item would consist of adapter head and flask. Order each separately.

**Note:** Not for use at elevated temperatures.

Flask, Only			Adapter Head, Only		
Capacity, mL	Qty	Order Code	Joint, $\text{\textcircled{R}}$	Qty	Order Code
125	1	7030-03	24/40	1	7030-21
250	1	7030-04	29/42	1	7030-23
500	1	7030-06	40/35	1	7030-27
1000	1	7030-08			
2000	1	7030-10			
3000	1	7030-12			
5000	1	7030-14			

**Replacement FETFE O-Rings**

	3	7855-775
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## FLASK Freeze Dry

Complete “fast-freeze” flask with snap-on rubber cap and 1/2-inch or 3/4-inch O.D. plain or valve adapter, compatible with all major brand freeze drying manifold valves.

Borosilicate flasks are designed for ease of handling, faster loading. Uniform wall weight maximizes heat transfer while maintaining structural strength. Wide (53mm ID) mouth provides easy access to inner walls.

Snap-on black rubber cap is grease free; one size fits all capacity flasks. Plain straight adapter for connecting flask cap to lyophilizer manifold is removable and fabricated from PTFE. PTFE adapter also available with shut-off valve. Complete item consists of flask, cap and PTFE adapter.

Flask, mL	Height, mm	Neck I.D., mm	Body O.D., mm	Adapter Size (In.) / Style	Qty	Order Code	
300	156	53	60	1/2 / Plain	1	7035-03	◆
300	156	53	60	3/4 / Plain	1	7035-05	◆
300	156	53	60	1/2 / Valve	1	7035-34	◆
300	156	53	60	3/4 / Valve	1	7035-36	◆
600	282	53	60	1/2 / Plain	1	7035-09	◆
600	282	53	60	3/4 / Plain	1	7035-11	◆
600	282	53	60	1/2 / Valve	1	7035-40	◆
600	144	53	100	1/2 / Plain	1	7035-15	◆
600	144	53	100	3/4 / Plain	1	7035-17	◆
600	282	53	60	3/4 / Valve	1	7035-42	◆
600	144	53	100	1/2 / Valve	1	7035-46	◆
600	144	53	100	3/4 / Valve	1	7035-48	◆
900	199	53	100	1/2 / Plain	1	7035-21	◆
900	199	53	100	3/4 / Plain	1	7035-23	◆
900	199	53	100	1/2 / Valve	1	7035-52	◆
900	199	53	100	3/4 / Valve	1	7035-54	◆
1200	249	53	100	1/2 / Plain	1	7035-27	◆
1200	249	53	100	3/4 / Plain	1	7035-29	◆
1200	249	53	100	1/2 / Valve	1	7035-56	◆
1200	249	53	100	3/4 / Valve	1	7035-58	◆



### Replacement Flasks

300	156	53	60	1	7035-104	◆
600	282	53	60	1	7035-110	◆
600	144	53	100	1	7035-116	◆
900	199	53	100	1	7035-122	◆
1200	249	53	100	1	7035-128	◆

### Replacement Cap and PTFE Adapters

	1/2 / Plain	1	7035-150	★
	3/4 / Plain	1	7035-152	★
	1/2 / Valve	1	7035-160	★
	3/4 / Valve	1	7035-162	★
	Cap only	1	7035-170	★



### C.A.R.B.\* OCTOPUS GLASS AIR SAMPLING SYSTEM

These new vertical systems fit more easily into air sampling stations, trailers and cabinets, and provide a more efficient methodology of sample collection. All the inner surfaces that are exposed to the air are either inert borosilicate glass or inert PTFE. Thanks to our convenient Ace-Threds®, the systems can be safely and easily disassembled for cleaning or replacing parts.

Both canes offer a PTFE sampling port outside for spot sampling or EPA auditing. The heavy duty #7 Ace-Thred ports on the manifolds can be fitted to any type of tubing, and can be sealed with ferrules and bushings to facilitate connection to air sampling instrumentation and monitors. Choose between four- or eight-port manifolds with either a glass sampling cane with an inverted glass cone or a straight glass cane with a polyethylene inverse funnel on top.

Approximate I.D. of sampling tube is 25mm (1 inch). Approximate overall height of four-port system is 150cm (60 inches). Approximate overall height of eight-port system is 155cm (62 inches).

**Note:** California Air Resources Board (C.A.R.B.)

Description	Qty	Order Code	
<b>4-Port Octopus System</b>			
<b>Complete</b> system with PE hood top	1	7489-20	♠
<b>Complete</b> system with glass funnel top	1	7489-22	♠
Glass manifold only	1	7489-04	♠
<b>8-Port Octopus System</b>			
<b>Complete</b> with glass cane and PE hood top	1	7489-24	♠
<b>Complete</b> with glass cane and glass funnel top	1	7489-26	♠
Glass manifold only	1	7489-08	♠
<b>Components for Both Systems</b>			
Sampling cane with glass hood and sample port	1	7493-22	♠
Sampling cane with PTFE hood and sample port	1	7494-35	♠
250mL glass collection bottle	1	7501-11	♠
#25 nylon bushing w/CAPFE O-Ring	1	7506-11	♠
#7 nylon bushing	1	5029-12	♠
PTFE ferrule for #7 bushing	12	11710-07	★
#7 PTFE plug with w/CAPFE O-Ring	1	5846-45	♠
Sampling cane without sample port — glass hood	1	7493-12	♠
Sampling cane without sample port — PE hood	1	7494-25	♠



\*As described in SPA protocol TAD 40CFR58, Appendix E for precursor gas measurements in the NCare Multi-Pollutant Monitoring Network, Version 4.

# Air Sampling Glassware for mobile or stationary installation

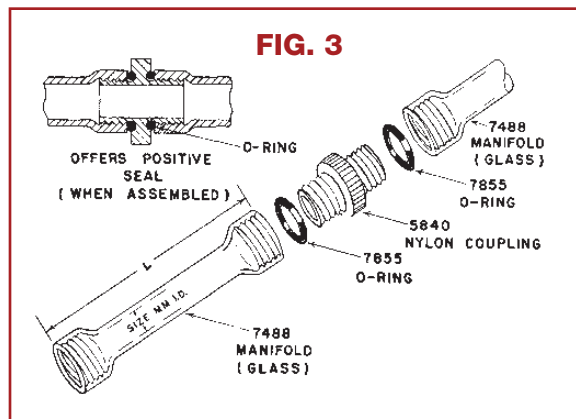
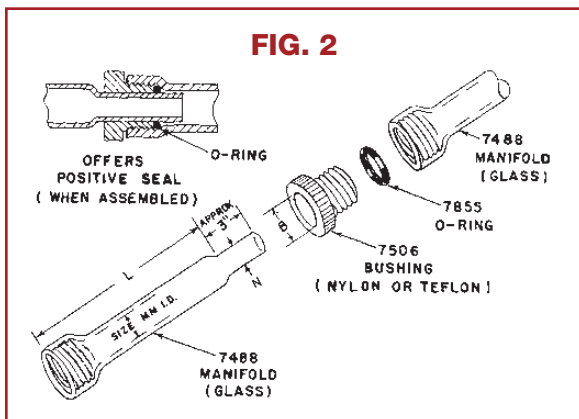
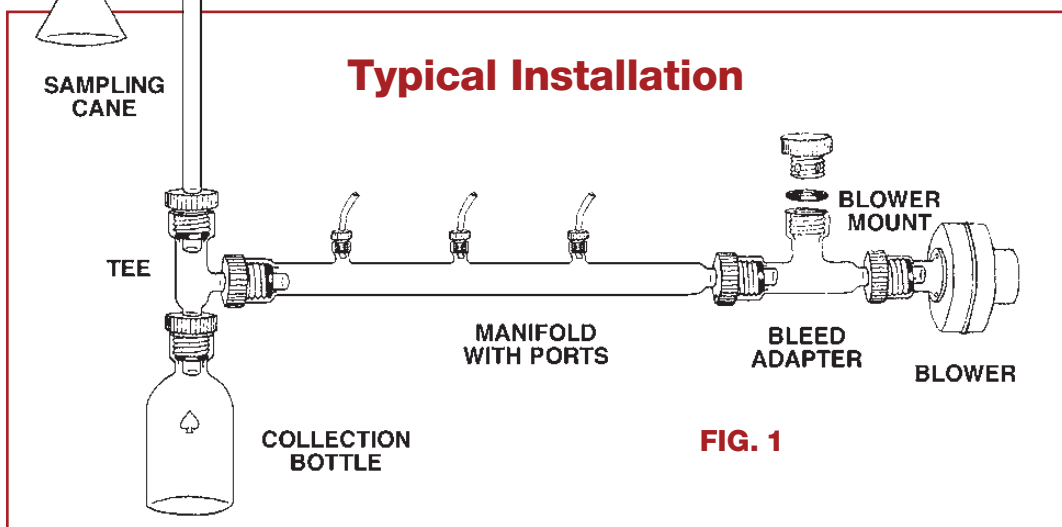
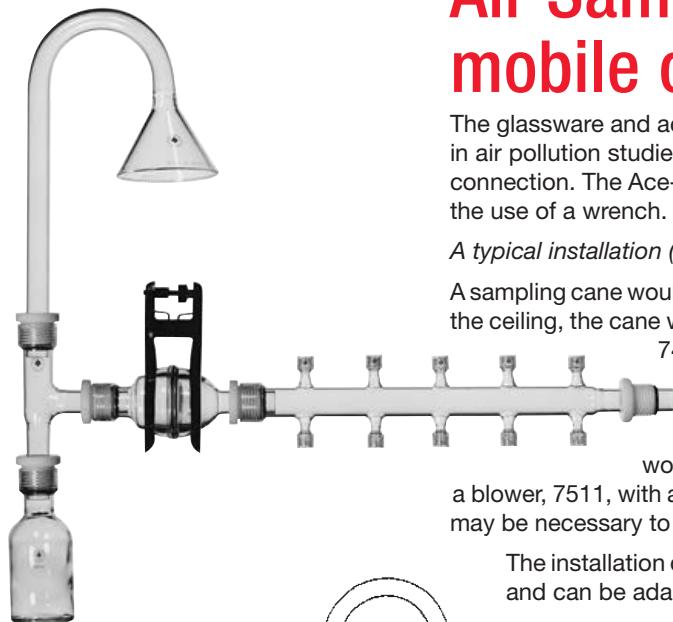
The glassware and accessories listed here have been designed for the purpose of sampling air in air pollution studies, by use of either a bushing type (Figure 2), or a coupling type (Figure 3), connection. The Ace-Thred glass connectors are instantly and easily installed by hand, without the use of a wrench.

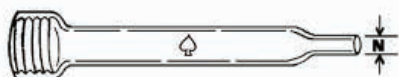
A typical installation (Figure 1) in a portable trailer van would be as follows:

A sampling cane would be secured through the roof by means of the roof attachment 7508. Below the ceiling, the cane would then be connected by means of a bushing into either a sweep elbow, 7490, or a tee, 7495, which in both cases would turn the manifold line to the horizontal and, in the latter case, allow for the addition of a collection bottle, 7501. At this point additional lengths of manifold sections would be added with and without ports, depending on the need. The ports would be used to connect to the measuring instruments. At the end of the line a blower, 7511, with a blower mount, 7509, would be added. The addition of 7499 bleed adapter may be necessary to reduce air flow. Exhaust would be either to the outside or into the trailer.

The installation described above is a functional setup for a trailer. This glassware is versatile and can be adapted to fit almost any need — mobile trailer or plant type installation.

**NOTE!!**  
Air Sampling Glassware with reduced ends, i.e. Fig. 2, is recommended versus thread to thread, Fig 3, to assure ports can be positioned in the desired direction.



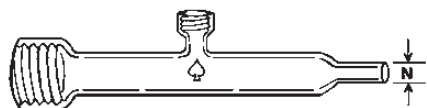


**AIR SAMPLING MANIFOLD** with Reduced End ♠

Straight sampling manifold, one end threaded, the other end reduced for use with 7506 bushing.

Note: As listed, this item is NOT for extending 7493, or 7494 Canes. Extenders must be ordered as a special.

		Order Code						
Ace-Thred	N, mm	12" Length	24" Length	36" Length	48" Length	60" Length	72" Length	84" Length
25	24	7488-04-12	7488-04-24	7488-04-36	7488-04-48	7488-04-60	7488-04-72	7488-04-84
50	49	7488-05-12	7488-05-24	7488-05-36	7488-05-48	7488-05-60	-	-



**AIR SAMPLING MANIFOLD** with Reduced End and Ports ♠

Straight sampling manifold, one end threaded, the other end reduced to use with 7506 bushing.

With adjustable depth, #7 Ace-Thred sampling ports for use with up to 7mm O.D. tube. 5029 bushings for ports are included.

		Order Code								
Ace-Thred	N, mm	No of Ports	12" Length	24" Length	36" Length	48" Length	60" Length	72" Length	84" Length	120" Length
25	24	1	7488-14-12-1	7488-14-24-1	7488-14-36-1	7488-14-48-1	-	-	-	-
25	24	2	7488-14-12-2	7488-14-24-2	7488-14-36-2	-	-	-	-	-
25	24	3	7488-14-12-3	7488-14-24-3	7488-14-36-3	7488-14-48-3	-	-	-	-
25	24	4	7488-14-12-4	7488-14-24-4	7488-14-36-4	7488-14-48-4	7488-14-60-4	-	-	-
25	24	5	7488-14-12-5	7488-14-24-5	7488-14-36-5	7488-14-48-5	7488-14-60-5	7488-14-72-5	-	-
25	24	6	7488-14-12-6	7488-14-24-6	7488-14-36-6	7488-14-48-6	7488-14-60-6	7488-14-72-6	-	-
25	24	7	7488-14-12-7	7488-14-24-7	7488-14-36-7	7488-14-48-7	7488-14-60-7	7488-14-72-7	-	-
25	24	8	7488-14-12-8	7488-14-24-8	7488-14-36-8	7488-14-48-8	-	-	-	-
25	24	9	-	7488-14-24-9	-	-	-	-	-	-
25	24	10	-	7488-14-24-10	7488-14-36-10	7488-14-48-10	-	-	-	-
25	24	12	-	-	-	-	7488-14-60-12	-	-	-
50	49	1	-	7488-15-24-1	-	-	-	-	-	-
50	49	2	-	-	-	7488-15-48-2	-	-	-	-
50	49	3	7488-15-12-3	7488-15-24-3	7488-15-36-3	7488-15-48-3	7488-15-60-3	-	-	-
50	49	4	-	-	-	7488-15-48-4	-	7488-15-72-4	-	-
50	49	5	7488-15-12-5	7488-15-24-5	7488-15-36-5	-	-	7488-15-72-5	-	7488-15-120-5
50	49	6	-	7488-15-24-6	7488-15-36-6	-	7488-15-60-6	7488-15-72-6	7488-15-84-6	7488-15-120-6
50	49	7	-	-	-	-	-	-	-	-
50	49	8	-	-	-	7488-15-48-8	-	-	-	-
50	49	9	-	-	-	-	-	-	-	-
50	49	10	-	-	-	7488-15-48-10	-	-	-	-



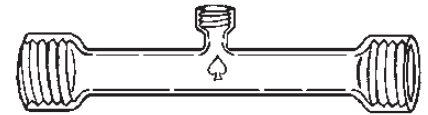
**AIR SAMPLING MANIFOLD** ♠

Straight sampling manifold with thread at both ends for use with either 7506 bushing or 5841 coupling.

		Order Code						
Ace-Thred		12" Length	24" Length	36" Length	48" Length	72" Length	96" Length	120" Length
25		7488-24-12	7488-24-24	7488-24-36	7488-24-48	7488-24-72	7488-24-96	7488-24-120
50		7488-25-12	7488-25-24	-	7488-25-48	-	-	-

## AIR SAMPLING MANIFOLD with Ports ♠

Straight sampling manifold with threads at both ends for use with either 7506 bushing or 5841 coupling. With adjustable depth, threaded sampling ports for use with up to 7mm O.D. tube. 5029 bushings for ports are included.



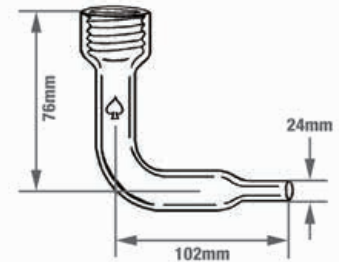
**REMEMBER:** If connecting thread to thread, you cannot be sure ports will be positioned in the desired direction.

Ace-Thred	No of Ports	Order Code							
		12" Length	24" Length	36" Length	48" Length	60" Length	72" Length	96" Length	
25	1	7488-34-12-1	-	7488-34-36-1	-	-	-	-	
25	2	7488-34-12-2	7488-34-24-2	7488-34-36-2	7488-34-48-2	-	-	-	
25	3	7488-34-12-3	7488-34-24-3	7488-34-36-3	7488-34-48-3	-	-	7488-34-96-3	
25	4	7488-34-12-4	7488-34-24-4	7488-34-36-4	7488-34-48-4	7488-34-60-4	7488-34-72-4	-	
25	5	7488-34-12-5	7488-34-24-5	-	7488-34-48-5	7488-34-60-5	7488-34-72-5	-	
25	6	7488-34-12-6	7488-34-24-6	7488-34-36-6	7488-34-48-6	7488-34-60-6	7488-34-72-6	-	
25	7	-	7488-34-24-7	-	-	-	-	-	
25	8	-	7488-34-24-8	7488-34-36-8	7488-34-48-8	-	-	7488-34-96-8	
25	10	-	7488-34-24-10	7488-34-36-10	-	-	-	-	
50	1	7488-35-12-1	7488-35-24-1	-	-	-	-	-	
50	2	-	7488-35-24-2	-	-	7488-35-60-2	-	-	
50	3	7488-35-12-3	7488-35-24-3	7488-35-36-3	-	-	-	-	
50	4	-	7488-35-24-4	7488-35-36-4	-	-	-	-	
50	5	7488-35-12-5	7488-35-24-5	-	-	-	-	-	
50	6	-	7488-35-24-6	-	7488-35-48-6	7488-35-60-6	-	-	
50	10	-	7488-35-24-10	-	-	-	-	-	
50	10	-	7488-35-24-11	-	-	-	-	-	

## AIR SAMPLING SWEEP ELBOW with Reduced End ♠

Sweep elbow with one end threaded, the other end reduced for use with 7506 bushing.

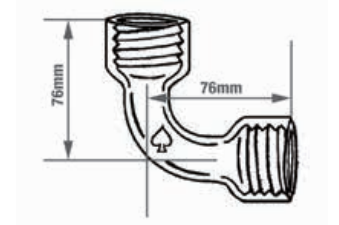
I.D., mm	B mm	C mm	N mm	Qty	Order Code
25	76	102	24	1	7490-14

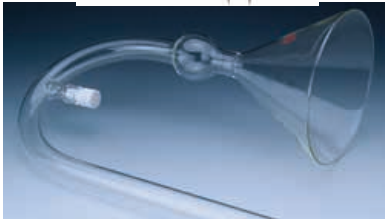
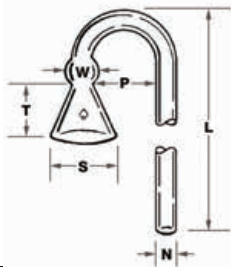


## AIR SAMPLING SWEEP ELBOW ♠

Sweep elbow with both ends threaded for use with either 7506 bushing or 5841 coupling.

I.D., mm	B mm	Qty	Order Code
25	76	1	7490-37





### AIR SAMPLING CANE with Funnel ♠

Air sampling cane with funnel at one end to avoid water droplets from collecting at edge and being sucked into manifold train. Bulge above the funnel is for glass wool or similar material to allow for filtering of particulates. This piece is normally installed outside the van, etc. and is connected at the roof with 7508 roof attachment. Inside the van it is then connected to the manifold train with 7506 bushing. See 7503 filter screen for funnel.

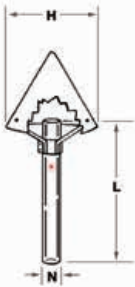
Important: If cane need be mounted higher above roof than "L" measurement will allow, order 7488-sp. Identify I.D., "N" length and identify as extension cane.

For Size	L cm	N mm	P mm	S mm	T mm	W mm	Qty	Order Code
<b>without Calibration Port</b>								
25	122	24	152	152	152	51	1	7493-12
50	152	49	254	229	254	76	1	7493-16

#### with #7 Calibration Port

25	122	24	152	152	152	51	1	7493-22
50	152	49	254	229	254	76	1	7493-26

\*Additional packing materials necessary to prevent breakage, Size 50 carries a surcharge per cane.



### AIR SAMPLING CANE Modified ♠

Economical sampling cane which eliminates the bend and funnel of the 7493. More stable in windy conditions. Consists of a length of glass pipe and a polyethylene hood with stainless steel brackets.

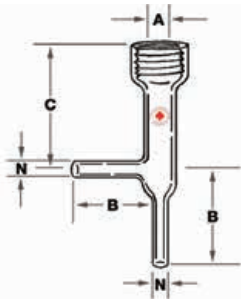
For Size mm	L cm	H cm	N mm	Qty	Order Code
<b>without Calibration Port</b>					
25	120	12.7	24	1	7494-25
50	120	25.4	49	1	7494-27

#### with #7 Calibration Port

25	120	12.7	24	1	7494-35
50	120	25.4	49	1	7494-37

#### Polyethylene Hood Assembly

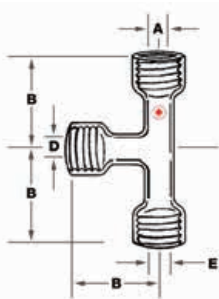
25	1	7494-89
50	1	7494-96



### AIR SAMPLING TEE with Reduced Ends ♠

Sampling tee with top threaded, side and bottom tubes reduced for use with 7506 bushing.

A mm	B mm	C mm	N mm	Qty	Order Code
25	76	76	24	1	7495-06
50	102	102	49	1	7495-08



### AIR SAMPLING TEE ♠

Sampling tee with threads on all three arms for use with either 7506 bushing or 5841 coupling.

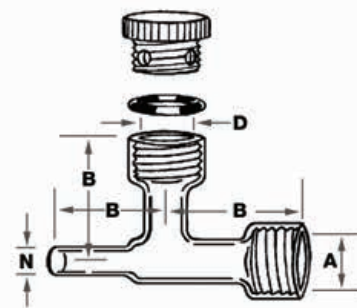
A mm	B mm	D mm	E mm	Qty	Order Code
25	76	25	25	1	7495-27



## AIR SAMPLING BLEED ADAPTER ♠

Adjustable bleed adapter used for reducing air flow in the air sampling manifold to prevent a pressure drop across the sampling ports. Normally installed in front of the 7511 blower, in line with the manifold. Positioning of holes in threaded nylon plug controls the volume of air flow. Plug supplied with O-Ring.

A	B	D	N	Qty	Glass Only Order Code	Nylon Plug Order Code	Complete Order Code
25	76	25	24	1	7499-12	7499-33	7499-21
50	102	25	49	1	7499-15	7499-33	7499-23



## AIR SAMPLING COLLECTION BOTTLE ♠

Collection bottle, usually connected to the bottom arm of the 7495 tee with reduced ends, to collect heavy particulates before they enter the manifold train.

A	Capacity, mL	Qty	Order Code
25	250	1	7501-11
50	250	1	7501-15



## FILTER SCREEN ♠

PTFE filter screen, 6.4mm mesh, for use on the funnel end of a 7493. Screen is held on the bottom of the funnel by a stainless steel yoke retainer and three springs. Available for the 25 size sampling cane.

For Funnel Size	Screen Size, mm	Qty	Screen Only Order Code	Retainer Only Order Code	Complete Order Code
25	152	1	7503-05	7503-15	7503-25



## BUSHING Nylon or PTFE ♠

Bushing connector for joining a threaded end to a reduced end tube in the air sampling glassware. Available in either nylon or PTFE. (1) FETFE O-Ring supplied with each bushing.

Ace-Thred	I.D., mm	O-Ring Size	Qty	O-Ring Order Code	Nylon Order Code	O-Ring Order Code	PTFE Order Code
11	10	-012	1	7855-708	7506-02	7855-708	7506-23
25	26	-212	1	7855-734	7506-10	7855-734	7506-31
50	49	-225	1	7855-744	7506-14	7855-744	7506-35

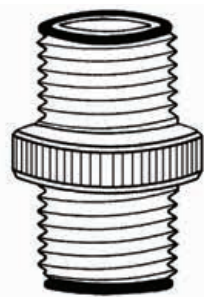


## BUSHING/PLUG Nylon or PTFE ♠

Machine threaded nylon or PTFE bushing with a hole in the center or solid. Used in threaded ports of air sampling manifolds and other apparatus with similar internal threads. (1) FETFE O-Ring supplied with each bushing.

Description	Qty	O-Ring Order Code	Nylon Order Code	O-Ring Order Code	PTFE Order Code
With hole	1	7855-704	5029-10	7855-704	5029-35
Solid	1	7855-707	5846-04	7855-707	5846-44




**COUPLING** *Nylon or PTFE* ♠

For coupling manifolds in leak-tight engagement with hand pressure and no significant size reduction in I.D. Size listed refers to inside diameter of threads and corresponds to 7488 manifold diameter. Supplied with (2) FETFE O-Rings. See 7855 for replacement O-Rings.

For Thread Size, mm	Qty	<i>Nylon</i>	<i>PTFE</i>
		Order Code	Order Code
11	1	5841-06	5841-46
25	1	5841-16	5841-50
50	1	5841-22	5841-52


**REPLACEMENT O-RINGS** *FETFE* ♠

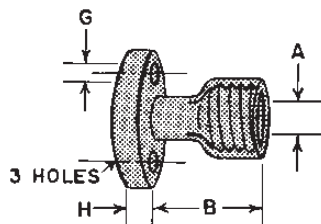
Replacement O-Rings for various bushings.

For Bushing Size	O-Ring Size	Qty	Order Code
11	-012	12	7855-708
25	-212	6	7855-734
50	-225	3	7855-744


**ROOF ATTACHMENT** *Nylon* ♠

Roof attachment for securing sampling cane to roof of van. Fabricated from nylon with two O-Rings that make a watertight seal. Threaded length is 20.3cm (8 inches).

Thread Size	Roof Hole Size, mm (in)	Qty	Order Code
25	38 (1-1/2)	1	7508-06
50	64 (2-1/2)	1	7508-08


**BLOWER MOUNT** ♠

Aluminum blower mount for connecting blower to glass manifold. With threaded stock.

A, mm	B, mm	G, mm	H, mm	Qty	Order Code
25	60.5	5	3	1	7509-09
50	76	5	3	1	7509-13


**BLOWER** ★

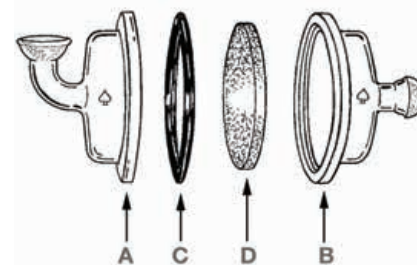
Shaded pole blower used to pull air through the air sampling manifold. Blower has air delivery of 1.7m<sup>3</sup>/Min. (50 CFM) at 0.0 meters of water static pressure which assures a minimum pressure drop across each port in the manifold train. Free air rpm is 3030. Operates on 115 volts, 50/60 cycles.

Blower Capacity	Volts	Qty	Order Code
1.7m <sup>3</sup> /Min. (50 CFM)	120	1	7511-10
1.7m <sup>3</sup> /Min. (50 CFM)	230	1	7511-500

## FILTER SUPPORT ASSEMBLY ★

Filter support assembly for collecting dust particles in a stack sampling system. Available in either 51mm (2-inch), 76mm (3-inch) or 102mm (4-inch, illustrated) size.

Consists of: PART A, with  $\frac{1}{8}$  28/15 outer joint bent perpendicular to flow path; PART B, with seat for fritted disc and  $\frac{1}{8}$  28/15 inner joint; PART C, neoprene gasket used to seal filter paper and prevent leakage around filter; PART D, Porosity B fritted disc.

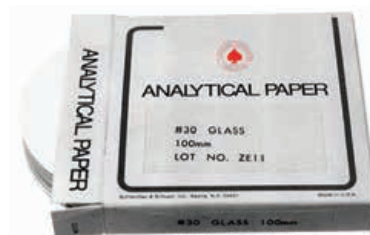


		Clamp Only 51mm		Clamp Only 76mm		Clamp Only 102mm	
	Qty	Order Code	Order Code	Order Code	Order Code	Order Code	Order Code
Part A	1	7669-22	7519-04	6509-03	7519-05	6509-05	7519-06
Part C	1	7669-22	7519-08	6509-03	7519-09	6509-05	7519-10
Part D	1	7669-22	7519-11	6509-03	7519-12	6509-05	7519-13
Part B $\frac{1}{8}$ 28/15	1	7669-22	7519-22	6509-03	7519-25	6509-05	7519-30

## FILTER PAPER Glass Fiber ★

A very efficient glass fiber paper that retains the finest particles and microorganisms, as much as 99.99% of 0.3 micron smoke. Recommended for use with 7519 filter assembly. 100 circles per box.

Recommended For Use With	Diameter, cm	Qty	Order Code
7519-11	7.0	100	11969-62
7519-12	9.0	100	11969-66
7519-13	12.5	100	11969-70



## VIALS EPA, Screw Cap, 40mL ★

Vials, fabricated from low extractable borosilicate glass, for use in water sampling according to EPA 40CFR136 Guidelines for Establishing Test Procedures for the Analysis of Pollutants. Vials are offered clear or amber. Supplied assembled with open-top screw caps and specially designed septum of 10 mils of PTFE facing on 90 mils of silicone.

Vials measure 27.75mm O.D. x 98mm high (with cap on). Cap size is 24-400.

Packed 36 pieces per tray, 72 pieces per case.

**Note:** Vials are NOT pre-cleaned.

Vial Type	Capacity, mL	Qty	Order Code
Clear	40	72	8781-20
Amber	40	72	8781-25

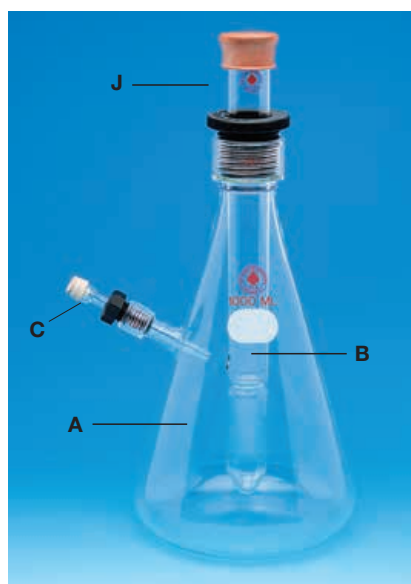


### Replacement Parts

Replacement Caps	200	8781-40
Replacement Septa	100	8781-45

## ACE Glass Fiber Filter Discs

ACE Porosity Designation	Porosity Maximum Pore Diameter Range (micron)	Corning, Kimble and ChemGlass Equivalents/ Porosities	Uses
A	145-174	ACE EC (170-220) — C (40-60) M (10-15) F (4-5.5)	Coarse Filtration Coarse Filtration Gas Dispersion Extraction Extraction
B	70-100		
C	25-50		
D	10-20		
E	4-8		
VF	2-2.5	Robu VF (2-2.5) UF (0.9-1.4)	Bacteria Filtration Bacteria Filtration
UF	0.9-1.4		



### SHAKE FLASK ASSEMBLY $CO_2$ , Gledhill\*, Modified

Used for determining  $CO_2$  evolution to assess biodegradability by soil and sewerage microorganisms. Shake flask, (A), containing culture medium, fits standard laboratory shakers. #7 Ace-Thred side port with nylon bushing and FETFE O-Ring holds a glass septum adapter, (C). Insertion of this septum allows easier sampling or aeration while system is closed. Adapter can easily be removed for septa change. Inner well, (B), contains culture material (Barium Hydroxide, etc.) and has a capacity of 10mL plus head space. Side hole in well permits good interface of vapors. Well is held securely in Ace-Thred with nylon bushing and FETFE O-Ring that permits variable depth positioning. Well top is flared to accept septa, (J), and can be removed or pierced to permit venting for aerating of culture media. One well fits all size vessels. Complete item consists of flask, well, septa adapter, septa for adapter and well, and bushings with FETFE O-Rings.

**Note:** Other size flasks available, contact ACE for details.

Flask Cap., mL	Qty	Order Code	
<b>Complete</b>			
250	1	14205-37	♣
500	1	14205-40	♣
1000	1	14205-44	♣
2000	1	14205-50	♣

#### Replacement Parts

Flask, #15, 250mL, only	1	14205-05	♣
Flask, #25, 500mL, only	1	14205-07	♣
Flask, #25, 1000mL, only	1	14205-09	♣
Flask, #25, 2000mL, only	1	14205-13	♣
Well, only, for #15	1	14205-23	♣
Well, only, for #25	1	14205-25	♣
Septum Adapter, only	1	14205-28	♣
Bushing, Nylon #7	1	5029-10	♣
Bushing, Nylon #15	1	7506-06	♣
Bushing, Nylon #25	1	7506-10	♣
O-Rings, FETFE for #7	12	7855-704	♣
O-Rings, FETFE for #15	12	7855-716	♣
O-Rings, FETFE for #25	6	7855-734	♣
Septum for Side port	12	9096-32	★
Septum for Well, for #25	12	9096-56	★

\*Dr. William E. Gledhill, Monsanto Company, as described in "Journal of Applied Microbiology," December 1975, pp 922-929.

## U.S. Government Buyer?

GSA pricing for Ace Glass products is available thru our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)



**Schedule**  
 Contract GS07F119CA

[www.gsasmart.com](http://www.gsasmart.com)

Some of the apparatus in this section has been referred to in one or more of the publications listed here. Please check references for further information on the apparatus in which you are interested. You are invited to call on ACE for your custom requirements — we specialize in fabrication to your specifications.

**REFERENCES:**

1. *Selection Methods for the Measurement of Air Pollutants*. Public Health Service Publication No. 999-AP-11 (May 1965).
2. *Sampling Microbiological Aerosols*. Public Health Service Monograph No. 60.
3. *The Chemical Analysis of Air Pollutants* by Morris B. Jacobs, Ph.D. (Interscience Publishers).

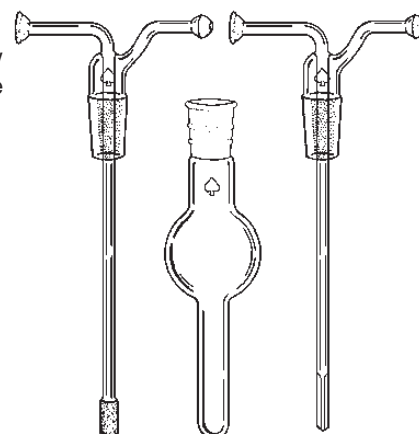
**BUBBLER** *Smog* ♠

Bubbler with either fritted tip or plain orifice tube. Bottle has 24/40 joint and 10cm tube below bulge. Tube has 12/5 outer joint on inlet arm and 12/5 inner on outlet arm. Approximate capacity, with tube inserted, 200mL.

Fritted tip is Porosity C (25-50 micron).

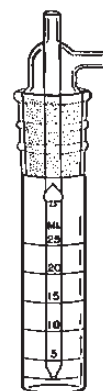
Orifice tip is 1.5mm capillary with end tapered.

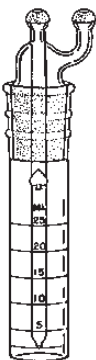
Description	Qty	Order Code
<b>Fritted Tip</b>		
Bottle	1	7529-07
Tube-Fritted	1	7529-10
<b>Complete Bubbler</b>	1	7529-12
<b>Orifice Tip</b>		
Bottle	1	7529-07
Tube-Orifice	1	7529-14
<b>Complete Bubbler</b>	1	7529-16


**MIDGET IMPINGER** *Plain Tube, Open Tube End Nozzle* ♠

Used for sampling small air volumes at a low jet velocity. Bottle has encircling graduations from 0 to 25mL, or 0 to 30mL in 5mL divisions. Nozzle is calibrated to deliver 0.09 to 0.11 CFM at 30.5 cm (12-inch) H<sub>2</sub>O vacuum. Used in determination of oxidants: Alkaline Potassium Method.

Description	Inlet/Outlet O.D., mm	Joint, ʒ	Qty	Order Code
<b>25mL Bottle</b>				
Bottle		24/40	1	7531-02
Tube	7		1	7531-06
<b>Complete Impinger</b>			1	7531-10
<b>30mL Bottle</b>				
Bottle		24/40	1	7531-04
Tube	7		1	7531-06
<b>Complete Impinger</b>			1	7531-12



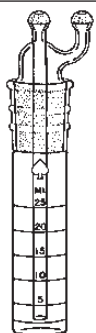

**MIDGET IMPINGER** *Spherical Joint, Calibrated Nozzle*

Used for sampling air volumes at a low jet velocity. Bottle joint is  $\text{S } 24/40$ . Tube is modified with  $\text{S } 12/5$  joints, both vertical (use 7669-08 clamp). Nozzle is calibrated to deliver 0.09 to 0.11 CFM at 30.5cm H<sub>2</sub>O vacuum. Bottle is graduated 0 to 25mL in 5mL divisions.

Inlet $\text{S}$ Joint	Outlet $\text{S}$ Joint	Qty	Tube Only Order Code	Bottle Only Order Code	Complete Order Code
12/5 Ball	12/5 Ball	1	7531-24 ♠	7531-02 ♠	7531-25 ♠
12/5 Socket	12/5 Ball	1	7531-28 ♠	7531-02 ♠	7531-29 ♠

**Accessories**

12/5 Stainless Steel Screwlock Pinch Clamp	7669-08	★
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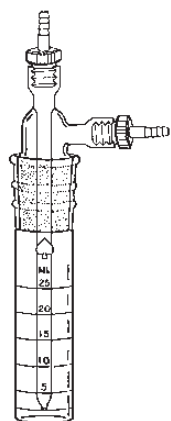

**MIDGET IMPINGER** *Spherical Joint, Open Tube End Nozzle* ♠

Tube is modified with  $\text{S } 12/5$  joints, both vertical (use 7669-08 clamp). With plain nozzle. Bottle joint is  $\text{S } 24/40$ , with graduations from 0 to 25mL in 5mL divisions.

Inlet $\text{S}$ Joint	Outlet $\text{S}$ Joint	Qty	Tube Only Order Code	Bottle Only Order Code	Complete Order Code
12/5 Ball	12/5 Ball	1	7531-32 ♠	7531-02 ♠	7531-33 ♠
12/5 Socket	12/5 Ball	1	7531-36 ♠	7531-02 ♠	7531-37 ♠

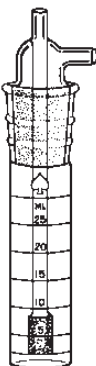
**Accessories**

12/5 Stainless Steel Screwlock Pinch Clamp	7669-08	★
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**MIDGET IMPINGER** *Ace-Thred Inlet/Outlet, Calibrated Nozzle* ♠

Used for sampling air volumes at low jet velocity. #7 "Ace-Safe" removable hose connections for easy connect/disconnect. Nozzle is calibrated to deliver 0.09 to 0.11 CFM at 30.5cm (12 inches) H<sub>2</sub>O vacuum. Bottle has encircling graduations from 0 to 25mL or 0 to 30mL in 5mL divisions. Complete item supplied with connectors and bushings.

Description	Inlet/Outlet Ace-Thred	Joint, $\text{S}$	Qty	Order Code
<b>25mL Bottle</b>				
Bottle		24/40	1	7531-02
Tube	#7		1	7533-08
<b>Complete Impinger</b>			1	7533-15
<b>30mL Bottle</b>				
Bottle		24/40	1	7531-04
Tube	#7		1	7533-08
<b>Complete Impinger</b>			1	7533-23
<b>Replacement Connector</b>				
Ace-Thred Connector, #7 to 1/4inch tubing, polypropylene			1	5853-06

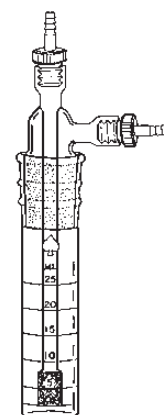

**MIDGET BUBBLER** *Plain Tube, Sintered Glass Filter Tube End* ♠

Identical to 7531-10 with the exception that the nozzle is replaced by a sintered glass filter, porosity A (145-175 microns). Used in determination of Acrolein: 4-Hexylresorcinol Method #1. Bottle has encircling graduations from 0 to 25mL or 0 to 30mL in 5mL divisions.

Description	Porosity, microns	Inlet/Outlet O.D., mm	Joint, $\text{S}$	Qty	Order Code
<b>25mL Bottle</b>					
Bottle			24/40	1	7531-02
Tube	(A) 145-174	7		1	7532-06
<b>Complete Bubbler</b>	(A) 145-174			1	7532-10
<b>30mL Bottle</b>					
Bottle			24/40	1	7531-04
Tube	(A) 145-174	7		1	7532-06
<b>Complete Bubbler</b>	(A) 145-174			1	7532-20

## MIDGET BUBBLER *Ace-Thred Inlet/Outlet, Sintered Glass Filter Tube End* ♦

Used for sampling air volumes at low jet velocity. Bottle joint is § 24/40. Stopper uses #7 "Ace-Safe" removable hose connections for easy connect/disconnect. Nozzle has sintered glass filter, Porosity A (145-174 microns) or Porosity B (70-100 micron). Bottle has encircling graduations from 0 to 25mL or 0 to 30mL in 5mL divisions. Complete item supplied with connectors and bushings.



Description	Porosity, microns	Inlet/Outlet Ace-Thred	Joint, §	Qty	Order Code
<b>25mL Bottle</b>					
Bottle			24/40	1	7531-02
Tube	(A) 145-174	#7		1	7533-11
Tube	(B) 70-100	#7		1	7533-13
<b>Complete Bubbler</b>	(A) 145-174			1	7533-18
<b>Complete Bubbler</b>	(B) 70-100			1	7533-19

### 30mL Bottle

Bottle			24/40	1	7531-04
Tube	(A) 145-174	#7		1	7533-11
Tube	(B) 70-100	#7		1	7533-13
<b>Complete Bubbler</b>	(A) 145-174			1	7533-27
<b>Complete Bubbler</b>	(B) 70-100			1	7533-28

### Replacement Connector

Ace-Thred Connector, #7 to 1/4inch tubing, polypropylene	1	5853-06
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## IMPINGER *Greenburg-Smith* ♦

A high velocity impinger for the determination of dust concentration in air or other gases. A glass plate is located at a distance of 5mm below the orifice tip so that incoming particles are impinged onto the plate and are momentarily arrested, after which they are washed into the liquid. Total volume is approximately 500mL.

Description	Inlet/Outlet O.D., mm	Joint, §	Capacity, mL	Qty	Order Code
Bottle		45/50	500	1	7536-04
Tube	12.5			1	7536-06
<b>Complete Impinger</b>				1	7536-10



## IMPINGER *Greenburg-Smith, Modified*

Same as 7536-10, except tube is modified with spherical joints, both vertical, for connecting in series. Bottle joint is § 45/50.

**Note:** § 28/15 is interchangeable with § 28/12 and § 28/11.

		<b>Tube Only</b>		<b>Bottle Only</b>		<b>Complete</b>	
Inlet § Top Joint	Outlet § Top Joint	Qty	Order Code	Order Code	Order Code	Order Code	
18/9 Ball	18/9 Ball	1	7536-25 ♦	7536-04 ♦	7536-26 ♦		♦
28/15 Ball	28/15 Ball	1	7536-31 ♦	7536-04 ♦	7536-32 ♦		♦



### Accessories

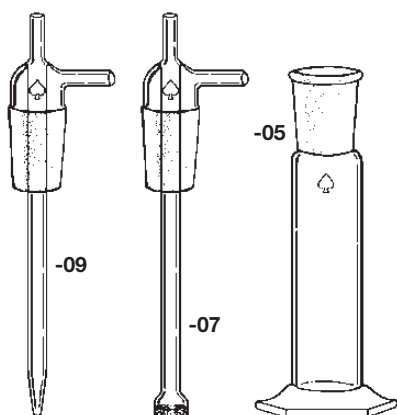
18/9 Stainless Steel Screwlock Clamp	7669-10	★
28/15 Stainless Steel Screwlock Clamp	7669-12	★

## IMPINGER *Greenburg-Smith, Modified* ♦

A high velocity impinger for the determination of dust concentration in air or other gases. Tube is modified with spherical joints, both vertical. Stem without impinging plate, cut flat. Bottle is ungraduated, joint is § 45/50.

		<b>Tube Only</b>		<b>Bottle Only</b>		<b>Complete</b>	
Inlet § Top Joint	Outlet § Top Joint	Qty	Order Code	Order Code	Order Code	Order Code	
18/9 Ball	18/9 Ball	1	7536-12	7536-04	7536-13		
28/15 Ball	28/15 Ball	1	7536-15	7536-04	7536-16		

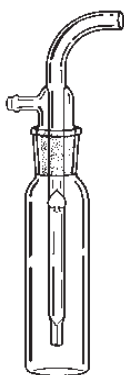




### IMPINGER Sherer ♠

Consists of bottle with hex base and  $\text{\textcircled{F}}$  45/50 top joint, and either an SO<sub>2</sub> bubbler tube with 25mm diameter Porosity C (25-50 micron) fritted disc, or an impinger stopper. Capacity, 275mL. Inlet/outlet tubes are 8mm.

Description	Porosity, microns	Inlet/Outlet O.D., mm	Joint, $\text{\textcircled{F}}$	Capacity, mL	Qty	Order Code
<b>Sherer Impinger</b>						
Bottle			45/50	275	1	7538-05
Bubbler Tube	(C) 25-50	8			1	7538-07
<b>Complete Bubbler</b>	(C) 25-50				1	7538-27
<b>Impinger</b>						
Bottle			45/50	275	1	7538-05
Impinger Stopper		8			1	7538-09
<b>Complete Bubbler</b>					1	7538-29

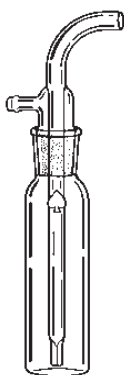


### IMPINGER Air Sampling, (Ref. AGI-30) ♠

A high velocity impinger (Ref. AGI-30) which passes 12 to 13L/min (+/-4%, corrected to engineering standard gas conditions) when the pressure drop across the orifice is 41cm Hg. or greater. Joint is  $\text{\textcircled{F}}$  24/25. Capacity approximately 125mL. Center tube is 11mm O.D.; side is 8mm O.D. with bulge.

- Tip of capillary stem is 30mm from the flask bottom.
- 12.3 to 12.6L/min

Description	Inlet/Outlet O.D., mm	Joint, $\text{\textcircled{F}}$	Capacity, mL	Qty	Order Code
Bottle		24/25	125	1	7540-04
Tube	11			1	7540-06
<b>Complete Impinger</b>				1	7540-10

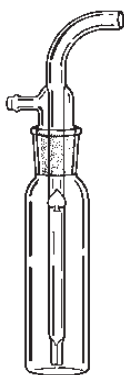


### IMPINGER Air Sampling ♠

A high velocity impinger which passes 6L/min (corrected to engineering standard gas conditions) when the pressure drop across the orifice is 41cm Hg. or greater. Joint is  $\text{\textcircled{F}}$  24/25. Capacity approximately 125mL. Center tube is 11mm O.D.; side is 8mm O.D. with bulge.

- Tip of capillary stem is 4mm from the flask bottom.
- 6L/min

Description	Inlet/Outlet O.D., mm	Joint, $\text{\textcircled{F}}$	Capacity, mL	Qty	Order Code
Bottle		24/25	125	1	7540-04
Tube	11			1	7541-06
<b>Complete Impinger</b>				1	7541-10



### IMPINGER Air Sampling, (Ref. AGI-4) ♠

A high velocity impinger (Ref. AGI-4) which passes 12.3 to 12.6L/min (+/-4%, corrected to engineering standard gas conditions) when the pressure drop across the orifice is 41cm Hg. or greater. Joint is  $\text{\textcircled{F}}$  24/25. Capacity approximately 125mL. Center tube is 11mm O.D.; side is 8mm O.D. with bulge.

- Tip of capillary tube is 4mm from the flask bottom.
- 12.3 to 12.6L/min

Description	Inlet/Outlet O.D., mm	Joint, $\text{\textcircled{F}}$	Capacity, mL	Qty	Order Code
Bottle		24/25	125	1	7540-04
Tube	11			1	7542-06
<b>Complete Impinger</b>				1	7542-10



## TUBE Gas Dispersion ♠

Supplied with 6, 7 or 8mm O.D. stem tubing, 150mm overall length. Maximum O.D. of bottom and filter disc is 20mm. Filter disc is 10mm diameter, Porosity B (70-100 micron).

Stem O.D., mm	Length, mm	Filter Disc		Qty	Order Code
		O.D., mm	Porosity, microns		
6	150	10	(B) 70-100	1	7198-06
7	150	10	(B) 70-100	1	7198-07
8	150	10	(B) 70-100	1	7198-08



## MIDGET IMPINGER Modified

Unique impinger designed to be more economical when connecting in series — eliminates need for connecting tubes. The  $\frac{1}{2}$  12/5 joints are perpendicular and come directly off bottle 180° apart. Screw cap on bottle has PTFE liner. Each bottle has one ball and one socket joint. Capacity 25mL. Bottle is dimensionally the same as 7531.

Capacity, mL	Joint Style	Joints, $\frac{1}{2}$	Qty	Order Code
25	180°	12/5	1	7544-35 ♠



### Accessories

12/5 Stainless Steel Screwlock Pinch Clamp	1	7669-08	★
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## ADAPTER "U" ♠

Connecting adapter, U-shaped, with spherical joints at both ends.

$\frac{1}{2}$ Joint Combinations	A, mm	Qty	Order Code
12/5 Socket – 12/5 Socket	31	1	5065-22
18/11 Socket – 18/11 Socket	75	1	5065-29
28/15 Socket – 28/15 Socket	75	1	5065-32



## ADAPTER 90° Angle ♠

90° connecting adapter with either spherical to spherical ends or spherical to plain ends.

Joint, $\frac{1}{2}$	Qty	Order Code
<b>Spherical Ball to Plain Tube</b>		
12/5	1	5072-20
18/9	1	5072-22
28/15	1	5072-24
<b>Spherical Socket to Plain Tube</b>		
12/5	1	5072-28
18/9	1	5072-30
28/15	1	5072-34
<b>Spherical Ball to Socket</b>		
12/5	1	5072-37
28/15	1	5072-43
<b>Spherical Socket to Socket</b>		
12/5	1	5072-38
28/15	1	5072-45



## Specifications for Joints, Threads, and Stopcocks



### Standard Taper

Symbol used to designate interchangeable joints, stoppers and stopcocks that comply with the requirements of Commercial Standard CS-21 published by N.I.S.T.



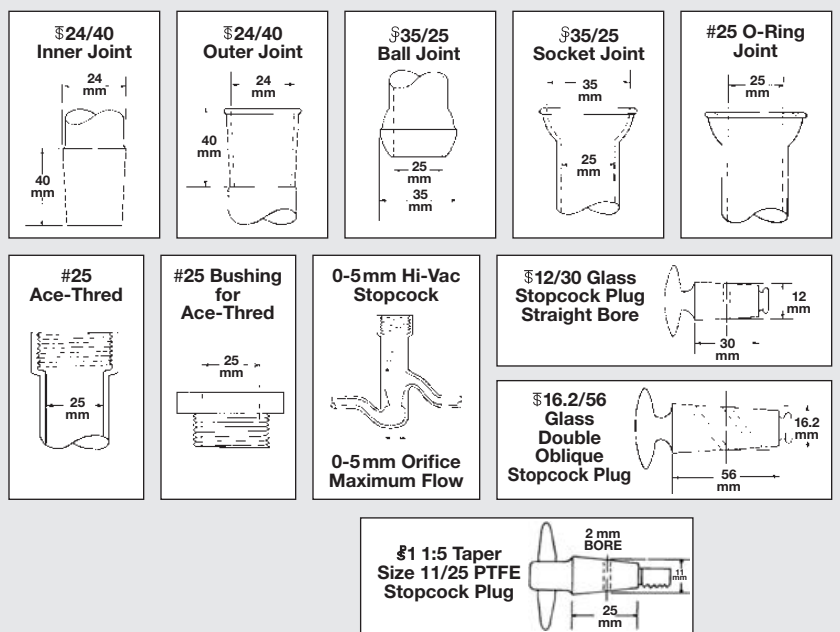
### Spherical Joint

Symbol designates spherical joints that comply with CS-21.



### Product Standard

Symbol designates stopcock plugs made of PTFE that meet requirements of N.I.S.T. Voluntary Product Standard PS 28-70.



## Glass Fiber Frits

### Flow Characteristics

Aqueous flow rate from 0.5 to 200mL/min./cm<sup>2</sup> at 100mm Hg. pressure drop are covered in the porosities A to E. A tabulation of these flow rates for various porosities is almost meaningless since operating conditions vary so widely. In addition, a number of interesting phenomena occur that may rapidly change the flow rate of a given filter by a factor of two or more, particularly in filters of smaller pore size. Hence, any discussion of flow rate becomes detailed and involved. Glass filters carry a negative charge.

### Care and Cleaning

Only materials that attack glass will affect these filters, i.e. HF, Alkalies, H<sub>3</sub>PO<sub>4</sub>. HF attacks rapidly; the others, relatively slowly. Inasmuch as surface scratches materially reduce the strength of glass, scratching the envelope in the vicinity of the disc should be guarded against, particularly on large filters, since this is the area of maximum stress under vacuum. Mechanical cleaning can be accomplished by reverse-flow washing. This is the most effective mechanical means. Do not exceed 1.06 Kg/cm<sup>2</sup> pressure.

## Porosity Chart

ACE Porosity Designation	Porosity Max. Pore Diameter Range (micron)	Corning, Kimble and ChemGlass Equivalents/ Porosities	Uses
A	145-174	EC (170-220)	Coarse Filtration
B	70-100	—	Coarse Filtration
C	25-50	C (40-60)	Gas Dispersion
D	10-20	M (10-15)	Extraction
E	4-8	F (4-5.5)	Extraction
VF	2-2.5	VF (2-2.5)	Bacteria Filtration
UF	0.9-1.4	UF (0.9-1.4)	Bacteria Filtration

*Note: ACE designations A-E are associated with ACE Porosity Designation. VF and UF are associated with Robu designations.*

### For Chemical Cleaning, the following is recommended:

Material to be Removed:	Removal Agent:
Barium Sulfate	Concentrated H <sub>2</sub> SO <sub>4</sub> plus a small amount of KClO <sub>4</sub> to 80-90°C and soak
Fat	CCl <sub>4</sub>
Mercury	Hot HNO <sub>3</sub>
Mercuric Sulfide	Hot Aqua Regia
Organic Residues	Warm concentrated H <sub>2</sub> SO <sub>4</sub> plus a small amount of KNO <sub>3</sub> and soak
Silver Chloride	NH <sub>4</sub> OH
Sugars & Glucose	Hot H <sub>2</sub> SO <sub>4</sub> plus HNO <sub>3</sub>
Free Carbon	Heat in a muffle furnace to 482°C in an oxidizing atmosphere. Cooling may be at the rate of -12°C/min. or greater, but thermal shock must not exceed 93°C.
Dia (micron) = $\frac{30\delta}{P}$	Surface tension in a dynes/cm at test temperature P = mm Hg. where first bubble appears.

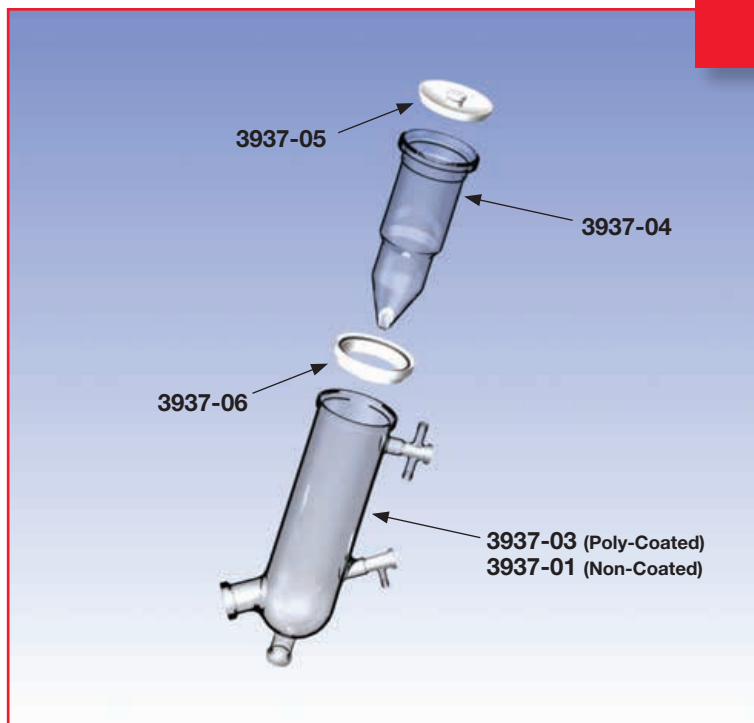
*The test liquid must wet the filter; that is, the contact angle must be negligible.*

# Replacement Glassware for Rotary Evaporators

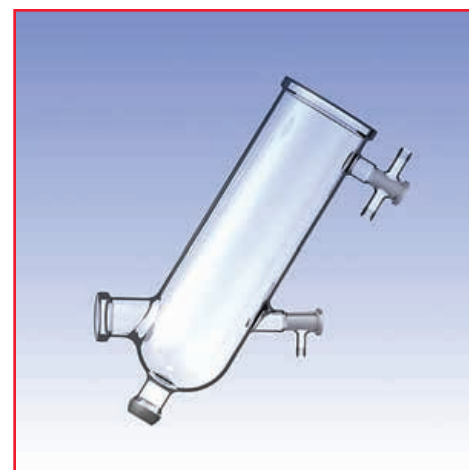
## Condenser "C" Assembly for Rotary Evaporators ★

### Fits Buchi Models 200/205 and Series 114-144

Glassware can be ordered either poly-coated or standard non-coated. The "C" Assembly contains the main glass outer trap body with a 35/20 inner ball joint bottom connection that attaches to the receiver flasks (which are sold separately). Features standard top and side flange that connects directly to the Buchi rotary evaporator. Assembly "C" also includes the glass cold trap inner body, Buchi Part #00672, PTFE sealing ring with Viton O-Rings, PTFE lid or cap, PTFE hose barbs and GL threaded caps.



**3937-10 (Poly-Coated)**    **3937-100 (Non-Coated)**



**3937-03 (Poly-Coated)**  
**3937-01 (Non-Coated)**



**3937-04**

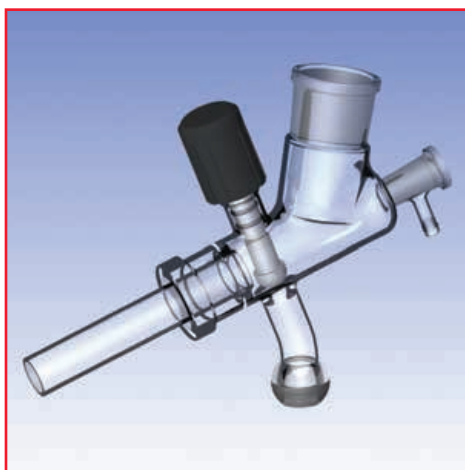
Description	Buchi Part #	Qty	Order Code
<b>Complete "C" Assembly Poly-Coated ★</b>			
Complete "C" Assembly	40646	1	<b>3937-10</b>
Complete "C" Assembly. Also includes 1 x 1000mL receiving flask, stainless steel clamp	40642	1	<b>3937-12</b>
<b>Poly-Coated Components</b>			
Outer trap body only	40643	1	<b>3937-03</b>
<b>Complete "C" Assembly Non-Coated ★</b>			
Complete "C" Assembly	40645	1	<b>3937-100</b>
Complete "C" Assembly. Also includes 1 x 1000mL receiving flask, stainless steel clamp	40640	1	<b>3937-112</b>
<b>Non-Coated Components</b>			
Outer trap body only	40641	1	<b>3937-01</b>
Cold trap inner body	00672	1	<b>3937-04</b>
PTFE Lid	27479	1	<b>3937-05</b>
PTFE seal ring with Viton O-Ring	27462	1	<b>3937-06</b>
Stopcock (Bottom)	40627	1	<b>13295-08</b>
Stopcock (Top)	40628	1	<b>13295-10</b>
29/32 joint adapter (without clip)	40615	1	<b>3954-04</b>
Stainless steel clamp	03275	1	<b>7669-14</b>
Glass steam tube (part of Buchi #40016)	40610	1	<b>3958-02</b>

# Replacement Glassware for Rotary Evaporators

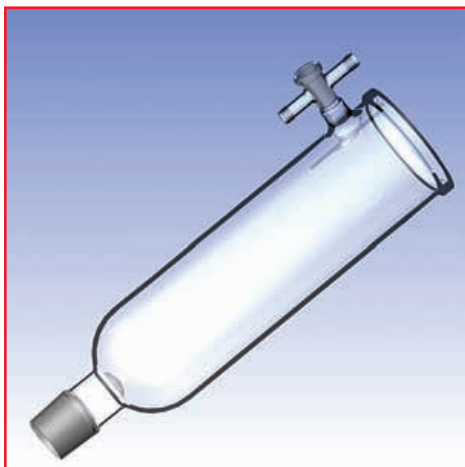
## Condenser "CR" Assembly for Rotary Evaporators ★

### Fits Buchi Models 200/205 and Series 114-144

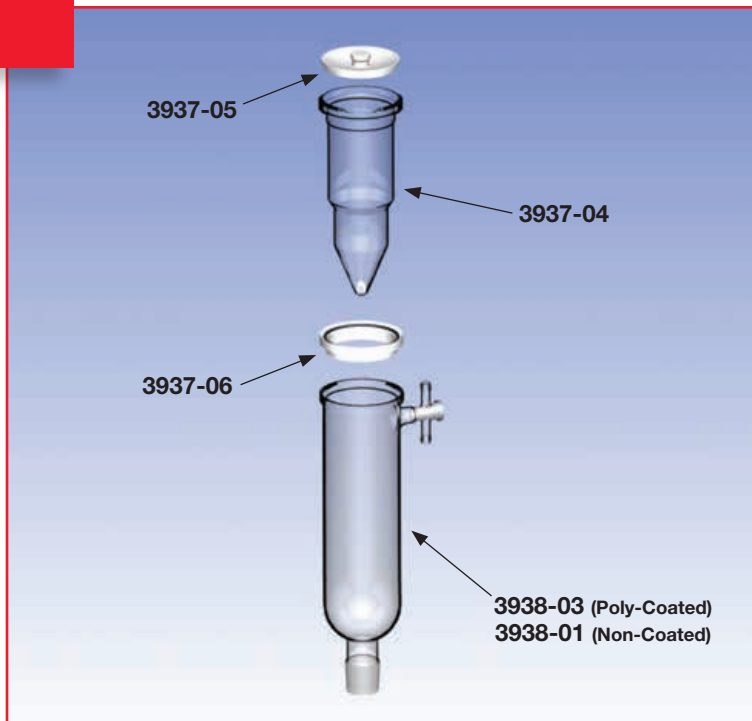
Assembly is very similar to "C" Assembly except that the bottom joint is  $\text{F } 45/50$  inner to fit into separate distribution head. Complete "CR" Assembly includes main glass cold trap outer body, glass cold trap inner body, PTFE cap, PTFE seal ring with Viton O-Rings, GL thread caps and hose barbs.



3955-03 (Poly-Coated)  
3955-08 (Non-Coated)



3938-03 (Poly-Coated)  
3938-01 (Non-Coated)



3938-10 (Poly-Coated)    3938-100 (Non-Coated)

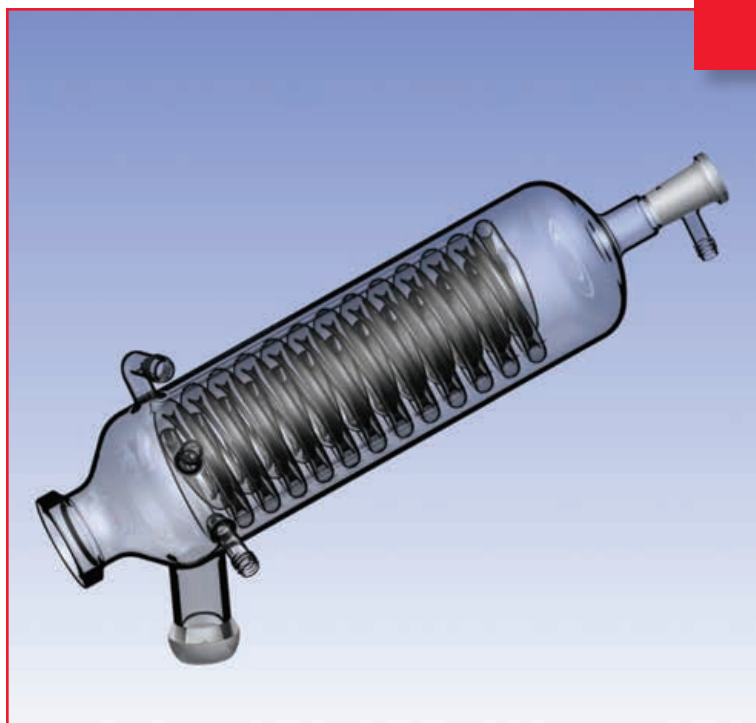
Description	Buchi Part #	Qty	Order Code
<b>Complete "CR" Assembly Poly-Coated ★</b>			
Complete "CR" Assembly	33478	1	3938-10
<b>Poly-Coated Components</b>			
Cold trap condenser body only	25614	1	3938-03
Lower distribution head with shut-off valve	40658	1	3955-03
<b>Complete "CR" Assembly Non-Coated ★</b>			
Complete "CR" Assembly	11511	1	3938-100
<b>Non-Coated Components</b>			
Cold trap condenser body only	11228	1	3938-01
Lower distribution head with shut-off valve	40657	1	3955-08
Cold trap inner body	00672	1	3937-04
PTFE Lid	27479	1	3937-05
PTFE seal ring with Viton O-Ring	27462	1	3937-06
Stopcock (Bottom)	40627	1	13295-08
Stopcock (Top)	40628	1	13295-10
29/32 joint adapter (without clip)	40615	1	3954-04
Stainless steel clamp	03275	1	7669-14
Glass steam tube (part of Buchi #40016)	40610	1	3958-02

# Replacement Glassware for Rotary Evaporators

## Condenser "A" Assembly for Rotary Evaporators ★

### Fits Buchi Models 200/205 and Series 114-144

Complete "A" Assembly includes main glass condenser body with inner coil for angled installation, O-Ring, GL thread caps and hose barbs. Bottom joint is  $\text{S } 35/20$ .



3950-01 (Poly-Coated) 3950-03 (Non-Coated)

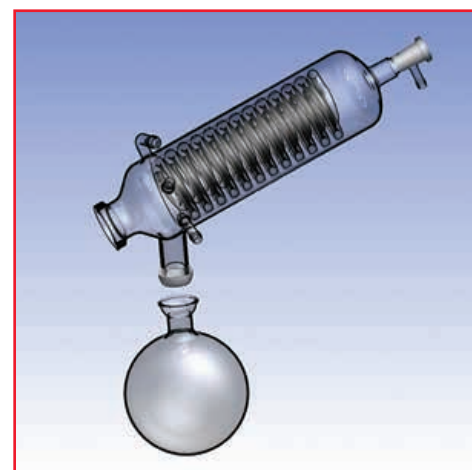


3954



3958-02

Description	Buchi Part #	Qty	Order Code
<b>Complete "A" Assembly Poly-Coated ★</b>			
Complete "A" Condenser	40633/32304	1	3950-01
Complete "A" Assembly. Also includes 1 x 1000mL receiving flask, stainless steel clamp	40632	1	3950-10
<b>Complete "A" Assembly Non-Coated ★</b>			
Complete "A" Condenser	40631	1	3950-03
Complete "A" Assembly. Also includes 1 x 1000mL receiving flask, stainless steel clamp	40630	1	3950-07
<b>Non-Coated Components</b>			
29/32 joint adapter (without clip)	40615	1	3954-04
Stopcock	40627	1	13295-08
Stainless steel clamp	03275	1	7669-14
Glass steam tube (part of Buchi #40016)	40610	1	3958-02



3950-10 (Poly-Coated)  
 3950-07 (Non-Coated)

# Replacement Glassware for Rotary Evaporators

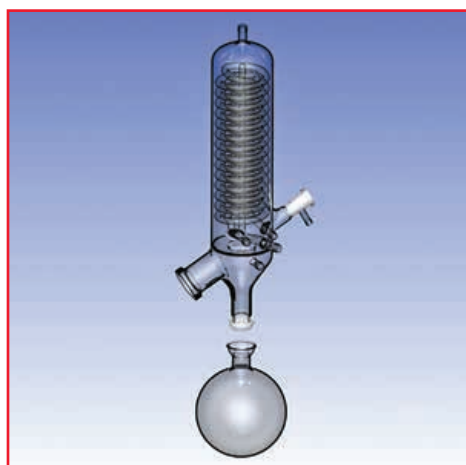
## Condenser "V" Assembly for Rotary Evaporators ★

### Fits Buchi Models 200/205 and Series 114-144

Complete "V" Assembly includes main glass vertical condenser body with inner coil, O-Ring, GL thread caps and hose barbs. Bottom joint is  $\text{S } 35/20$ .

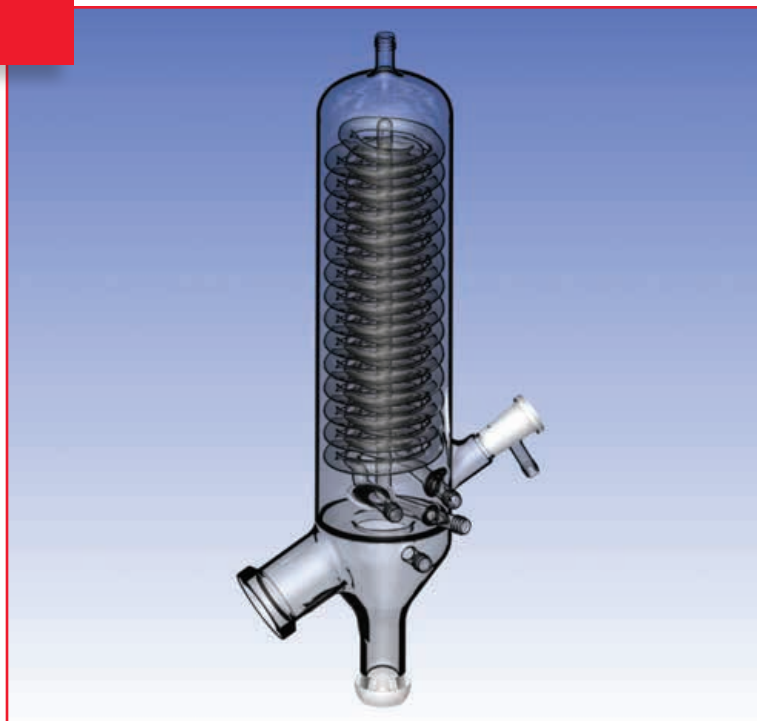


3954



3951-10 (Poly-Coated)

3951-05 (Non-Coated)



3951-01 (Poly-Coated)    3951-03 (Non-Coated)

Description	Buchi Part #	Qty	Order Code
<b>Complete "V" Assembly Poly-Coated ★</b>			
Complete "V" Condenser	40603/32304	1	3951-01
Complete "V" Assembly. Also includes 1 x 1000mL receiving flask, stainless steel clamp	40602	1	3951-10
<b>Complete "V" Assembly Non-Coated ★</b>			
Complete "V" Condenser	40601	1	3951-03
Complete "V" Assembly. Also includes 1 x 1000mL receiving flask, stainless steel clamp	40600	1	3951-05
<b>Non-Coated Components</b>			
29/32 joint adapter (without clip)	40615	1	3954-04
Stopcock	40627	1	13295-08
Stainless steel clamp	03275	1	7669-14
Glass steam tube (part of Buchi #40016)	40610	1	3958-02

# Replacement Glassware for Rotary Evaporators

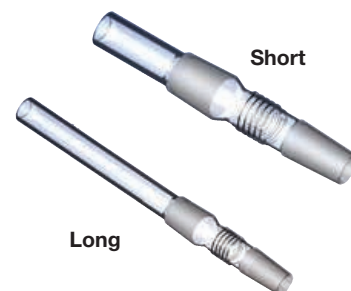
## VAPOR DUCT TUBES *Without Combi Clip* ★

Replacement vapor duct tube for Buchi rotary evaporators. The middle joint is tooled to fit the specific rotary evaporator for which it was designed. That middle section also has a GL thread to accommodate the Combi-Clip (not included). The other end is a straight tube, fabricated from borosilicate glass.

Joint, §	Fits Buchi Models	Length, mm	For Assembly	Buchi Part #	Qty	Order Code
29/32	210-215	160	A	46964	1	13285-04*
24/40	210-215	160	A	48068	1	13285-06*
29/32	210-215	54	V	46962	1	13285-08*
24/40	210-215	54	V	48067	1	13285-10*
29/32	R114-R144	165	A	32001	1	13285-20**
24/40	R114-R144	165	A	32336	1	13285-22**
29/42	R114-R144	165	A	32338	1	13285-24**
29/32	R114-R144	55	V	32002	1	13285-26**
24/40	R114-R144	55	V	32335	1	13285-28**
29/42	R114-R144	55	V	32337	1	13285-30**

\* Same as Buchi part numbers 48160, 48161, 48165 and 48164, except the above are without clip.

\*\* Same as Buchi part numbers 32340, 32342, 32344, 32339, 32341, 32343, except the above are without clip.



## JOINT — FLASK ADAPTERS *Without Combi Clip* ★

Replacement receiving flask adapters for Buchi rotary evaporators. Joins steam tube to receiving flask. Combi-clip not included.

Joint, §	Fits Buchi Models	Buchi Part #	Qty	Order Code
29/32	200-205	40615	1	3954-04
24/40	200-205	40616	1	3954-06
29/42	200-205	40617	1	3954-08
24/40	114-144	23747	1	3954-11



## FLASK *Receiving, Single Neck, Round Bottom, Heavy Wall* ♦

Replacement flask for Buchi rotary evaporators. Round bottom flasks with a 35/20 or 35/25 single neck and available with a safety coating.

Joint, §	Size, mL	Buchi Part #	Qty	Order Code
<b>Poly-Coated</b>				
35/20	50		1	3996-02
35/20	100		1	3996-04
35/20	250		1	3996-06
35/20	500		1	3996-08
35/20	1000	40775/20728	1	3996-20
35/20	2000	40776/25265	1	3996-22
35/20	3000	40777/25266	1	3996-24
<b>Non-Coated</b>				
35/20	1000	00425	1	6902-227
35/20	2000	00426	1	6902-228
35/20	3000	00427	1	6902-229
35/25	50		1	6902-234
35/25	100		1	6902-235
35/25	250		1	6902-238
35/25	500		1	6902-240




**FLASK** Recovery, Pear Shaped with Joint, Heavy Wall ♠

Replacement evaporator flask for Buchi rotary evaporators. Pear shaped heavy wall with a standard taper single neck. Available plain or safety coated.

Joint ⌀	Size, mL	Buchi Part #	Qty	Order Code
<b>Poly-Coated</b>				
29/42	50		1	3990-10
24/40	50		1	3990-12
29/32	50		1	3990-14
29/42	100		1	3990-20
24/40	100		1	3990-22
29/32	100		1	3990-24
29/42	250		1	3990-30
24/40	250		1	3990-32
29/32	250		1	3990-34
29/32	500	25322	1	3990-104
29/32	1000	20729	1	3990-106
29/32	2000	25323	1	3990-108
29/42	500	—	1	3990-120
29/42	1000	25517	1	3990-122
29/42	2000	—	1	3990-124
24/40	500	25261	1	3990-132
24/40	1000	20730	1	3990-134
24/40	2000	25262	1	3990-136
29/42	3000		1	3990-140
24/40	3000		1	3990-142
29/32	3000		1	3990-144
<b>Non-Coated</b>				
29/32	50		1	6892-203
24/40	50		1	6892-204
29/42	50		1	6892-205
24/25	50		1	6892-214
24/40	100		1	6892-206
29/42	100		1	6892-207
24/25	100		1	6892-216
24/40	200		1	6892-208
29/42	200		1	6892-209
24/25	200		1	6892-218
29/42	250		1	6892-211
29/32	500	00434	1	6892-213
29/32	100		1	6892-217
29/32	1000	00435	1	6892-231
29/32	2000	00436	1	6892-243
29/42	500	08739	1	6892-293
24/25	500		1	6892-222
29/42	1000	08762	1	6892-232
24/40	250		1	6892-237
29/32	250		1	6892-239
29/42	2000	08769	1	6892-242
29/42	3000		1	6892-245
29/32	3000		1	6892-247
24/40	3000		1	6892-249
24/40	500	08758	1	6892-212
24/40	1000	00440	1	6892-230
24/40	2000	08765	1	6892-240



**FLASK** *Recovery, Pear Shaped with Side Indents, 24/40 Neck Joint, Heavy Wall* ♦

Replacement drying flask for Buchi rotary evaporators. Pear shaped heavy wall with a standard taper single neck. Available plain or safety coated. NOT suitable for vacuum operation.

Joint 24/40	Size, mL	Buchi Part #	Qty	Order Code
<b>Poly-Coated</b>				
29/32	500	—	1	<b>3994-110</b>
29/32	1000	—	1	<b>3994-112</b>
29/32	2000	—	1	<b>3994-114</b>
24/40	500	—	1	<b>3994-120</b>
24/40	1000	—	1	<b>3994-124</b>
24/40	2000	—	1	<b>3994-126</b>
<b>Non-Coated</b>				
29/32	500	00452	1	<b>3994-10</b>
29/32	1000	00453	1	<b>3994-12</b>
29/32	2000	00454	1	<b>3994-14</b>
24/40	500	11579	1	<b>3994-20</b>
24/40	1000	00420	1	<b>3994-22</b>
24/40	2000	11580	1	<b>3994-23</b>


**STOPCOCK** *with Inlet Feed Tube*

Used in **Heidolph 4000 Series Rotary Evaporator** condensers and other popular brand Rotary Evaporator condensers as inlet feed tube to allow continuous feed of volumes exceeding capacity of evaporating flask. Size is 19/38 with 6mm O.D. feed tube.

Joint 19/38	Feed Tube O.D., mm	Qty	Order Code
19/38	6	1	<b>13295-20</b> ★


**PURGE ADAPTER** *Rotary Evaporator* ♦

Glass purge adapter for use with rotary evaporators. Top has a 35/25 socket joint for joining to the condenser or trap and the bottom has a 35/25 ball joint for joining to the receiver flask. Middle tube has either a 4mm PTFE stopcock or a 2mm valve to allow for purging of the vapor from the receiver flask or for adding purge gas into the flask. Overall length is 75 mm.

Description	Joint, 35/25	Length, mm	Qty	Order Code
with 4mm PTFE stopcock	35/25	75	1	<b>3953-03</b>
with 2mm valve	35/25	75	1	<b>3953-05</b>




**TRAP Rotary Evaporator, Boulanger, Self Washing** ♠

Self-washing rotary evaporator trap. Unique design incorporates an inverted, straight, heavy-walled expansion chamber that allows for flow-back of bumped materials. Condensation of evaporated solvent on walls of trap continuously rinses trap during operation. Vacuum stem has two opposing holes, flush with bottom of stem, to allow solvent vapor to rapidly flow out, while allowing condensed solvent to return to flask. This feature means the evaporator shaft is also continuously rinsed and the material returned to the flask. To prevent pooling of the condensate in the shaft trap, the end of the trap has a center hole for complete drainage. When solids are bumped onto the sides of the trap toward the end of solvent evaporation, introduction of a small amount of solvent at top of trap with a swirling motion effectively rinses the material back into the flask.

Capacity, mL	Top Outer \$ Joint	Bottom Inner \$ Joint	Qty	Order Code
100	24/40	14/20	1	6703-05
100	24/40	24/40	1	6703-10
250	24/40	14/20	1	6703-15
250	24/40	24/40	1	6703-20
250	29/42	29/42	1	6703-25

Designed by William A. Boulanger.


**TRAP Rotary Evaporator, Anti-Splash** ♠

Greatly reduces carry-over from foaming or bumping.

Capacity, mL	Top Outer \$ Joint	Bottom Inner \$ Joint	Approx. Overall Height, mm	Qty	Order Code
100	24/40	14/20	145	1	6704-04
100	24/40	24/40	175	1	6704-08
100	29/42	14/20	145	1	6704-12
250	14/20	14/20	200	1	6704-14
250	24/40	24/40	200	1	6704-16
250	29/42	29/42	200	1	6704-20
500	24/40	24/40	215	1	6704-24


**TRAP Rotary Evaporator, Anti-Splash, Improved** ♠

Greatly reduces carry-over from foaming or bumping. Two drain holes, close to base of the inner tube, allow solvent to drain back into evaporator flask.

Capacity, mL	Top Outer \$ Joint	Bottom Inner \$ Joint	Approx. Overall Height, mm	Qty	Order Code
100	24/40	14/20	145	1	6705-06
100	24/40	24/40	175	1	6705-10
250	14/20	14/20	200	1	6705-12
250	24/40	24/40	200	1	6705-14
250	29/42	29/42	200	1	6705-22
500	24/40	24/40	215	1	6705-26


**TRAP Rotary Evaporator, Anti-Climb** ♠

Upper tubulation prevents migration of film and foam directly into the condenser.

Capacity, mL	Top Outer \$ Joint	Bottom Inner \$ Joint	Approx. Overall Height, mm	Qty	Order Code
100	24/40	14/20	160	1	6706-05
100	24/40	24/40	190	1	6706-09
250	24/40	14/20	180	1	6706-13
250	24/40	24/40	215	1	6706-17
250	29/42	29/42	215	1	6706-21

## TRAP *Elliptical* ♠

Space saving, elliptical shaped bump trap. For use in rotary evaporators between the steam tube and the evaporator flask. Prevents fluid from being drawn into the condenser. Shape allows for the same effect as standard traps but with less space between the flask and evaporator tube. This allows for use of larger flasks in the rotary evaporator bath.

Top Outer ⌀ Joint	Bottom Inner ⌀ Joint	Qty	Order Code
24/40	24/40	1	6710-01
29/42	29/42	1	6710-05
29/32	29/32	1	6710-07



## RECEIVING BOTTLE/FLASK ♠

Graduated, round bottom receiving flasks for use as replacement receivers on all glassware sets supplied with Heidolph LR4000 Series rotary evaporators or with other evaporators. 250mL size graduated in 10mL increments; 1000mL and 2000mL in 100mL increments. Joint is ⌀ 35/20.

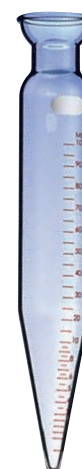
Capacity, mL	Joint ⌀	O.D., mm	Length below joint, mm	Qty	Order Code
250	35/20	75	120	1	6893-05
500	35/20	85	170	1	6893-15
1000	35/20	100	220	1	6893-21
2000	35/20	125	275	1	6893-27



## RECEIVING TUBE/CYLINDER ♠

Graduated, tapered bottom receiving tube for use as replacement receivers on all glassware sets supplied with Heidolph LR4000 Series rotary evaporators or with other evaporators. 100mL size graduated in 0.5mL increments from 0-10mL; 5mL increments from 10-100mL. Joint is ⌀ 35/20.

Capacity, mL	Joint ⌀	O.D., mm	Length below joint, mm	Qty	Order Code
100	35/20	38	225	1	8387-04



## ADAPTER *Conversion* ♠

Glass adapter with ⌀ 24/40 or ⌀ 29/42 joint to #15 or #25. #15 is used with 13290-11 through -22 or 13290-121 through -134; #25 is used with 13290-26 or 13290-136 connecting adapter to connect vials or flasks to rotary evaporator. Suitable for vacuum work. Order each item separately.

⌀ Joint	Ace-Thred	Qty	Order Code
24/40	#15	1	13290-34
24/40	#25	1	13290-37
29/42	#15	1	13290-44
29/42	#25	1	13290-47



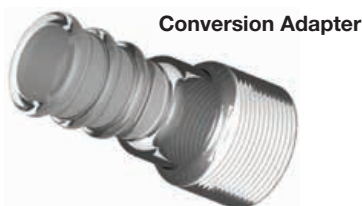


**ADAPTER** *Connecting, PTFE* ★

PTFE Adapter with #15 or #25 Ace-Thred and GPI thread to connect 13290-34, -37, -44 or -47 conversion adapter to mating vial for use in rotary evaporator. Suitable for vacuum work. Order separately.

**Note:** FETFE not suitable for use with methylene chloride or acetone, use a Chemraz O-Ring.

GPI Thread	Ace-Thred	Qty	Order Code	With FETFE O-Ring	With Chemraz O-Ring
8-425	#15	1	13290-11	13290-11	13290-121
9-425	#15	1	13290-12	13290-12	13290-122
13-425	#15	1	13290-13	13290-13	13290-123
15-425	#15	1	13290-15	13290-15	13290-125
18-400	#15	1	13290-18	13290-18	13290-128
20-400	#15	1	13290-20	13290-20	13290-130
22-400	#15	1	13290-22	13290-22	13290-132
24-410	#15	1	13290-24	13290-24	13290-134
24-410	#25	1	13290-26	13290-26	13290-136



Conversion Adapter

**MULTIPACK CONNECTING ADAPTER KIT** ★

For researchers in need of various GPI thread adapters, the convenience multipack offers a solution.

**For 24/40 connections** (glass 24/40 to #15 Ace-Thred™ adapter included), choose either the code -55 adapter multipack featuring FETFE® O-Rings or the code -59 multipack featuring Chemraz® O-Rings.

**For 29/32 connections** (glass 29/42 to #15 Ace-Thred™ adapter included), choose code -65 FETFE® or code -69 Chemraz®. Included PTFE adapters in all multipacks, 8-425, 13-425, 15-425, 18-400, 20-400, 22-400 & 24-410



Connecting Adapter

O-Ring Material	Qty	Order Code
FETFE	1	13290-55
Chemraz	1	13290-59
FETFE	1	13290-65
Chemraz	1	13290-69



**ADAPTER** *“Splash Guard,” with Fritted Disc, Firestone\** ♠

⌘ medium length joints, top and bottom, that will accept full length ⌘ joints, plus a coarse porosity A (145-174 micron) fritted disc that assures no carry-over in the event of pot splash-up. Overall length is kept to a minimum to effect best distillation.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Qty	Order Code
14/20	14/20	1	5257-43
24/25	24/25	1	5257-49
24/25	29/26	1	5257-53
24/25	45/35	1	5257-62

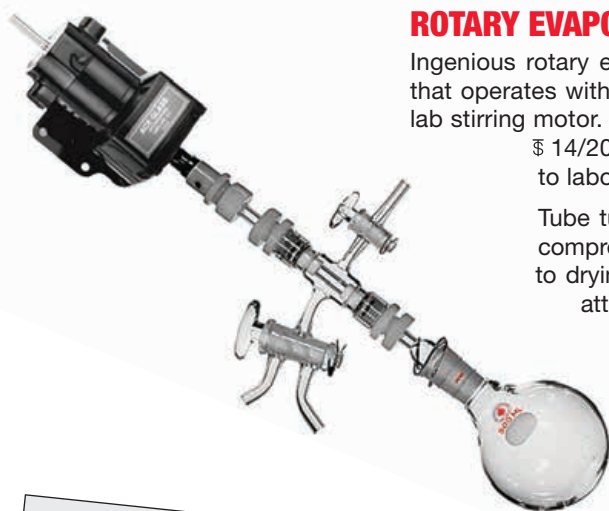


**ADAPTER** *“Splash Guard,” Firestone\** ♠

⌘ medium length joints, top and bottom, that will accept full length ⌘ joints. When inserted into flask, splash guard combines with flask neck to give best protection against pot splash-up. Overall height is kept to a minimum to effect best distillation.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Qty	Order Code
14/20	14/20	1	5258-06
24/25	24/25	1	5258-12

\*Designed by Dr. Raymond Firestone



### ROTARY EVAPORATOR *Firestone\**

Ingenious rotary evaporator constructed of glass or stainless steel, PTFE and glass-filled PTFE that operates without the devices normally associated with this type of equipment. Use with any lab stirring motor. Hollow glass or stainless steel (for larger capacity flasks) 10mm O.D. tube, with  $\text{₹}$  14/20 or  $\text{₹}$  24/40 at one end for flask and holes drilled near center for vacuum, attaches to laboratory stirring motor.

Tube turns inside PTFE bearing held in #15 Ace-Threds by glass-filled PTFE bushing, compression saddle with O-Ring and lock nut. 2mm straight bore stopcock attaches to drying tube and/or McLeod gauge. One arm of 4mm bore double oblique stopcock attaches to dry ice trap and vacuum line; other arm is for easy vacuum release and can be connected to a trap. Complete item supplied with  $\text{₹}$  joint clamp; does NOT include stirring motor, chuck, flask or splash guard.

**Instead of connecting motor directly, use ACE 8081 flexible shaft, to get heavy motor out of the way (optional).**

**Stainless steel shaft available for heavier flasks**

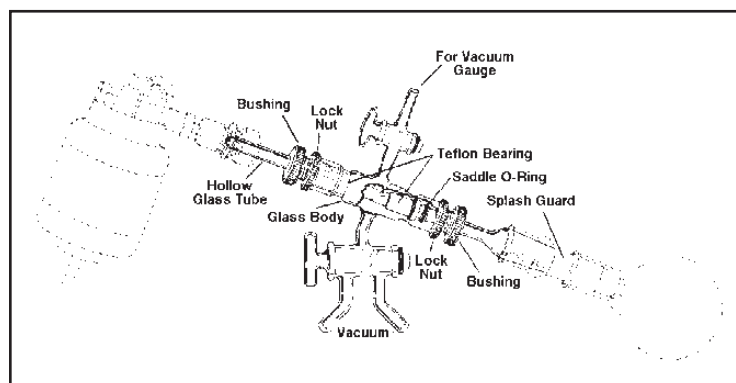
**Can be all glass and PTFE**

For Flask $\text{₹}$ Joint	Qty	With Glass Shaft Order Code	With Stainless Steel Shaft Order Code
14/20	1	6714-36 ♠	6714-55 ★
24/40	1	6714-40 ♠	6714-58 ★

#### Replacement Parts

Description	Qty	Order Code
Glass Body, only	1	6714-04 ♠
Glass/PTFE Bushing, with O-Ring, only	2	8066-12 ♠
Glass/PTFE Lock Nut, only	2	8066-13 ♠
Compression Saddle with O-Ring, only	2	8066-15 ♠
PTFE Bearing, only	2	6714-06 ♠
Hollow Glass Tube, $\text{₹}$ 14/20	1	6714-07 ♠
Hollow Glass Tube, $\text{₹}$ 24/40	1	6714-08 ♠
Hollow S-S Tube, $\text{₹}$ 14/20	1	6714-22 ★
Hollow S-S Tube, $\text{₹}$ 24/40	1	6714-24 ★
Splash Guard, $\text{₹}$ 14/20	1	5258-06 ♠
Splash Guard, $\text{₹}$ 24/25	1	5258-12 ♠
Flexible Shaft, 91.4cm, Complete	1	8081-30 ★

(Additional size and information listed under 8081)



*\*Designed by Dr. Raymond Firestone*

**See our Industrial Scale Rotary Evaporator Glassware –  
View our Process Scale-Up Systems catalog online at [AceGlass.com](http://AceGlass.com)**

# Replacement Flasks for Buchi Large-Scale Evaporators

**Easy replacement – select the size and capacity you need**

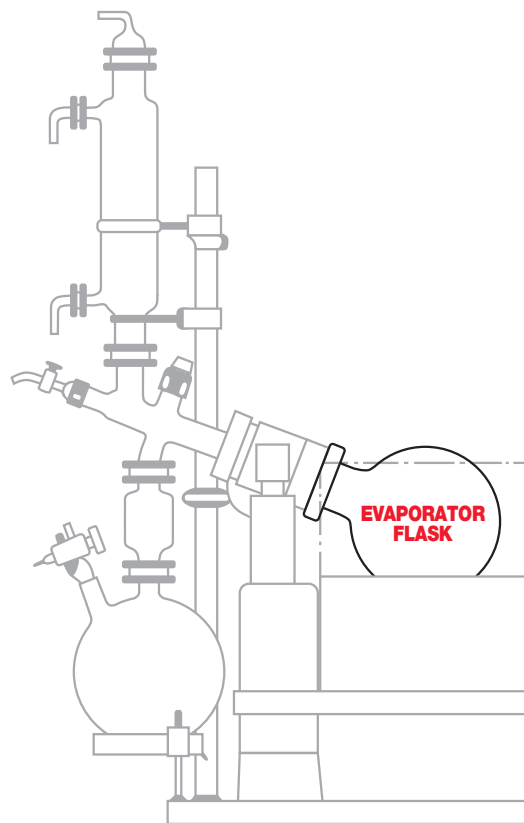
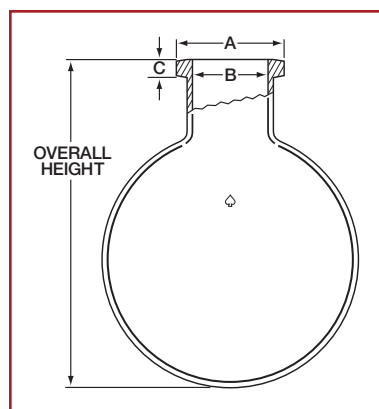
## LARGE EVAPORATOR FLASKS

These large flasks are from blanks selected for balance and quality. Necks are carefully welded to prevent “rotational whip.”

*Flasks can be plastic coated\* upon request.*

### Easy Order Instructions

1. Determine flange size (A) O.D., (B) I.D., (C) thickness (see diagram).
2. Match flask capacity with overall height and flange size.



### 1. Select flange size.

Flange Size Designation	A O.D., mm (Inches)	B I.D., mm (Inches)	C Thickness (mm)
S (Small)	90 (3.5)	67 (2.7)	18
M (Medium)	100 (3.9)	72 (2.8)	19
L (Large)	110 (4.3)	83 (3.3)	23
XL (Extra Large)	149.5 (5.9)	118.8 (4.7)	21

### 2. Select flask capacity and match with flange size.

\* Plastic coated flasks are transparent, and will withstand temperatures up to 100°C.

The coating is resistant to the occasional laboratory solvent or acid “splash,” but should not be soaked in them.

Avoid prolonged contact.

Capacity, Liters	Overall Height, mm	Flange Size	Qty	Order Code
6	300	S	1	6702-05
6	325	M	1	6702-07
6	380	M	1	6702-10
6	295	L	1	6702-15
6	380	L	1	6702-17
6	351	XL	1	6702-19
10	350	S	1	6702-20
10	335	M	1	6702-25
10	413	M	1	6702-27
10	410	L	1	6702-30
10	380	XL	1	6702-33
20	375	M	1	6702-35
20	435	M	1	6702-37
20	435	L	1	6702-40
20	413	XL	1	6702-44
<b>Plastic Coated</b> → 6	380	M	1	6702-110* Call to Order

**Special sizes can be made to order. Call ACE GLASS for more information.**

# Replacement Items for *Heidolph Rotary Evaporators*

## LARGE EVAPORATOR FLASKS ★

Used with Heidolph 20L rotary evaporators. These large flasks are from blanks selected for balance and quality. Necks are carefully welded to prevent “rotational whip.” Flasks can be plastic coated upon request.

**Note:** Flanges for Laborota and Hei-Vap Industrial are different. Refer to the Heidolph original part numbers.

Capacity, Liters	Heidolph Part Number	Qty	Order Code
<b>Laborota</b>			
10	036303000	1	<b>6701-12</b>
20	036302990	1	<b>6701-22</b>
<b>Hei-Vap Industrial</b>			
10	036303005	1	<b>6701-32</b>
20	036302995	1	<b>6701-33</b>



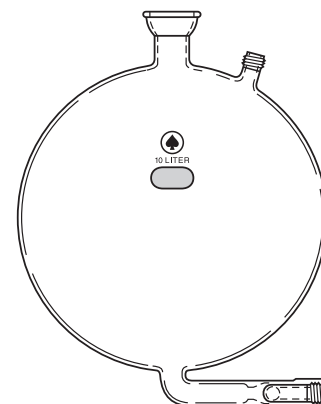
## LARGE RECEIVER FLASKS ★

Used with Heidolph 20L rotary evaporators. This receiver flask is fabricated from blanks selected for balance and quality. Center neck is a polished  $\text{J}$  40/25 joint; side neck is a GL-18 thread, supplied with solid cap. At bottom is a 0-10mm Easy-Action stopcock with a GL-18 side arm, supplied with a 3/8-inch hose connection tube. Flasks can be plastic-coated upon request.

Capacity, Liters	Center Neck	Side Neck	Bottom Outlet	Heidolph Part Number	Qty	Order Code
10	$\text{J}$ 40/25	GL18	0-10mm/GL-18	036303040	1	<b>6701-44</b>

### Accessories

Replacement GL-18 cap	7622-107
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## VAPOR TUBE for *Heidolph 4000 Series* ★

Used as replacements with Heidolph 4000 Series rotary evaporators. Tube is secured in rotary drive with low-stress plastic clip that seats into groove behind  $\text{J}$  joint. Available plain or with Firestone “splash guard” to protect against splash-up. 13286-30 is supplied with Heidolph evaporator.

Type	$\text{J}$ Joint	Qty	Order Code
Plain	24/25	1	<b>13286-28</b>
Plain	24/40	1	<b>13286-30</b>
Plain	29/42	1	<b>13286-32</b>
Plain	45/50	1	<b>13286-34</b>
w/Splash Guard	24/40	1	<b>13286-37</b>
w/Splash Guard	29/42	1	<b>13286-39</b>



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### Specifications for ACE Extractor Bodies

Size	A	C	D	E
Use Thimble Size, mm	27 x 80	30 x 80	33 x 94	40 x 123
Extractor Cap., mL	50	85	145	200
Extractor I.D., mm	30	38	45	50
Length of Siphon, mm	70	75	88	113
Extractor Top † Joint	34/45	45/50	50/50	55/50
Extractor Bottom † Joint	24/40	24/40	24/40	24/40

### EXTRACTION APPARATUS Soxhlet Improved Design ♠

The improved design of ACE extractor condensers permits greater condensing capacity. Cycling rates may be doubled over conventional style extractors. All items feature † 24/40 extractor bottom joint.

Size	Flask Cap., mL	Extractor Top † Joint	Qty	Condenser Only	Extractor Only	Flask Only	Complete
				Order Code	Order Code	Order Code	Order Code
A	125	34/45	1	6740-02	6730-02	6895-22	6716-12
C	250	45/50	1	6740-06	6730-06	6895-24	6716-16
D	300	50/50	1	6740-08	6730-08	6895-25	6716-18
E	300	55/50	1	6740-10	6730-10	6895-25	6716-20



### EXTRACTION APPARATUS Soxhlet, with Friedrichs Condenser ♠

Improved design of ACE extractor with Friedrichs condenser in place of Allihn condenser. All items feature † 24/40 extractor bottom joint.

Size	Flask Cap., mL	Extractor Top † Joint	Qty	Condenser Only	Extractor Only	Flask Only	Complete
				Order Code	Order Code	Order Code	Order Code
A	125	34/45	1	5971-20	6730-02	6895-22	6718-15
C	250	45/50	1	5971-23	6730-06	6895-24	6718-23
E	300	55/50	1	5971-27	6730-10	6895-25	6718-29



## KUDERNA-DANISH EVAPORATIVE CONCENTRATOR ♦

For concentration of materials in volatile solvents. Combines rapidity, simplicity and quantitative efficiency including minimization of entrainment escape and transfer losses. With a  $\text{§} 19/22$  inner joint on bottom of flask,  $\text{§} 24/40$  on top. Supplied with springs. **Please specify type of column, flask and receiver or order by code.**

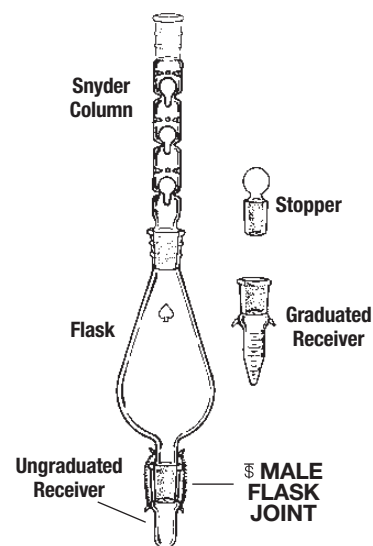
Flask			Ungraduated Receiver		
Capacity, mL	Qty	Order Code	Capacity, mL	Qty	Order Code
250	1	6708-11	10	1	6708-13
500	1	6708-03	15	1	6708-15
			20	1	6708-17

Graduations x Subdivisions, mL	Qty	Order Code
Snyder Column, $\text{§}24/40$	1	6575-02
Graduated Receiver 5 mL, $\text{§}19/22$	1	6708-35
Graduated Receiver 10 mL, $\text{§}19/22$	1	6708-37
Protective Stopper, $\text{§}19/22$	1	8255-12

### Replacement Springs

	1	8030-04
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## KUDERNA-DANISH EVAPORATIVE CONCENTRATOR ♦

Same apparatus for concentration of materials in volatile solvents as described above except each flask is supplied with (1)  $\text{§} 24/40$  and (1)  $\text{§} 19/22$  Delrin clamp in place of hooks and springs.

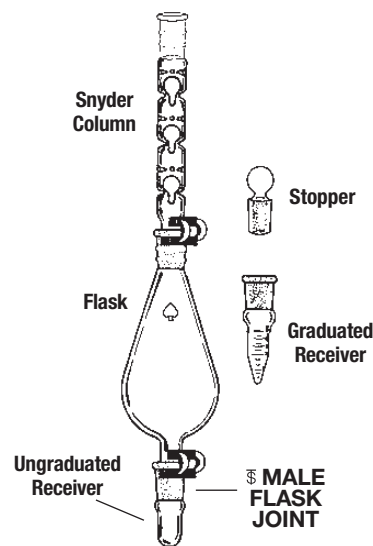
Flask			Ungraduated Receiver		
Capacity, mL	Qty	Order Code	Capacity, mL	Qty	Order Code
250	1	6708-08	15	1	6708-20
500	1	6708-09			
1000	1	6708-10			

Graduations x Subdivisions, mL	Qty	Order Code
Snyder Column, $\text{§}24/40$	1	6575-02
Graduated Receiver 5 mL, $\text{§}19/22$	1	6708-26
Graduated Receiver 10 mL, $\text{§}19/22$	1	6708-27
Protective Stopper, $\text{§}19/22$	1	8255-12

### Replacement Clamps

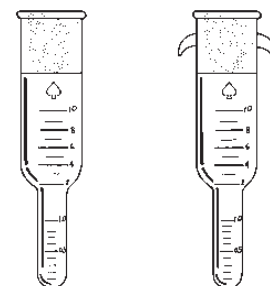
See 7598 for replacement clamps



## RECEIVER Graduated ♦

Graduated receiver for use with Kuderna-Danish or similar evaporative concentrators. Capacity 10mL, graduated 0-1 in 0.1mL subdivisions and 1-10 in 1.0mL subdivisions. Joint is  $\text{§} 19/22$ . Available with or without glass hooks.

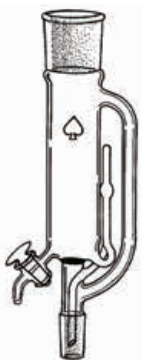
	Graduations x Subdivisions, mL	Qty	Order Code
Receiver with hooks	0-1 x 0.1 1-10 x 1.0	1	6708-38
Receiver without hooks	0-1 x 0.1 1-10 x 1.0	1	6708-28



**EXTRACTOR Soxhlet** ♦

Extractor body only. All items feature  $\text{F}$  24/40 extractor bottom joint.

Size	Extractor Top $\text{F}$ Joint	Qty	Order Code
A	34/45	1	6730-02
C	45/50	1	6730-06
D	50/50	1	6730-08
E	55/50	1	6730-10

**EXTRACTOR Soxhlet** ♦

Extractor body only, with stopcock for withdrawing samples from extraction chamber. Can be used interchangeably with the standard Soxhlet extraction apparatus. All items feature  $\text{F}$  24/40 extractor bottom joint.

Size	Extractor Top $\text{F}$ Joint	Qty	Order Code
C	45/50	1	6735-06
E	55/50	1	6735-10

**Replacement Stopcocks**

		1	8223-02
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**EXTRACTION CONDENSER Allihn, Improved Design** ♦

Bulb type for use with regular extraction apparatus. Improved design permits greater condensing capacity. Jacket lengths approximately 250mm with one bulb per 50mm.

Size	Extractor $\text{F}$ Joint	Tubing Size (inches)	Qty	Order Code
A	34/45	3/8 (D)	1	6740-02
C	45/50	3/8 or 7/16 (E)	1	6740-06
D	50/50	3/8 or 7/16 (E)	1	6740-08
E	55/50	3/8 or 7/16 (E)	1	6740-10

**MICRO Soxhlet, Improved Design** ♦

Designed for small chemical applications. Improved design permits greater condensing capacity. Condenser approximately 139mm jacket length. Joint between condenser and extractor is  $\text{F}$  24/25. Flask joint is  $\text{F}$  14/20. Designed to accommodate paper thimble, size 10 x 50mm. Flask is 30mL capacity. Use with 5/16-inch or 3/8-inch I.D. tubing, size B hose connection.

Description	Qty	Order Code
Condenser	1	6776-02
Extractor	1	6776-04
Flask	1	6776-06

**Complete**

	1	6776-10
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## COMBINATION HEATING MANTLE

Lower profile, safer, multi-place Combo Mantle that allows user to easily replace an element in a matter of minutes, should that element fail. By unscrewing two captive screws and lowering front panel of cabinet, the disposable element containers can be replaced by detaching the two lead wires and sliding the containers out. A new unit can be installed by reversing the procedure. These elements act as spill containment chambers so a spill does not damage other parts of mantle.

Offered in a six-place unit for 100 to 300mL flasks, and a three-place unit for 500 to 1000mL flasks. The clear anodized aluminum cabinet has a black PTFE coated stainless steel top and comes complete with a glassware superstructure consisting of two upright rods, two horizontal rods, and four double-sided, open faced clamps. Six-place mantle comes with six spring-type glassware clamps; three-place model comes with three.

Choice of two three-place controllers: a percentage-timer version that pulses full-line voltage to each position according to dial setting; or proportional-voltage version that supplies a constant, steady-state voltage to each position. Controllers are supplied with 6-foot (1.8m) multiconductor interconnect cord to mantle and one 4-foot (1.2m) long, three-wire power cord with grounding plug. **Note:** Six-place mantle uses two three-place controllers.

To order: select mantle based on flask size and power needed, then select type and number of controller necessary.



### COMBO MANTLE, Only

#### SIX-POSITION

For Flask Size, mL	For Flask Bottom	Wattage	Cabinet Dimensions, L x D x H, in.	Qty	Order Code
100/125	Flat	85w-120v	29¼ x 10½ x 5¼	1	12061-03
100/125	Round	85w-120v	29¼ x 10½ x 5¼	1	12061-05
100/125	Flat	140w-120v	29¼ x 10½ x 5¼	1	12061-07
100/125	Round	140w-120v	29¼ x 10½ x 5¼	1	12061-09
250/300	Flat	125w-120v	29¼ x 10½ x 5¼	1	12061-11
250/300	Round	125w-120v	29¼ x 10½ x 5¼	1	12061-13
250/300	Flat	125w-240v	29¼ x 10½ x 5¼	1	12061-19
250/300	Round	125w-240v	29¼ x 10½ x 5¼	1	12061-21
250/300	Flat	210w-240v	29¼ x 10½ x 5¼	1	12061-29
250/300	Round	210w-240v	29¼ x 10½ x 5¼	1	12061-31

### COMBO MANTLE, Only

#### THREE-POSITION

For Flask Size, mL	For Flask Bottom	Wattage*	Cabinet Dimensions, L x D x H, in.	Qty	Order Code
500	Flat	180w-120v	24½ x 12½ x 6¼	1	12061-102
500	Round	180w-120v	24½ x 12½ x 6¼	1	12061-108
50	Round	200w-120v	24½ x 12½ x 6¼	1	12061-113
800	Round	225w-120v	24½ x 12½ x 6¼	1	12061-115
1000	Round	290w-120v	24½ x 12½ x 6¼	1	12061-117
500	Flat	180w-240v	24½ x 12½ x 6¼	1	12061-123
500	Round	180w-240v	24½ x 12½ x 6¼	1	12061-128
650	Round	200w-240v	24½ x 12½ x 6¼	1	12061-134
800	Round	225w-240v	24½ x 12½ x 6¼	1	12061-137
1000	Round	290w-240v	24½ x 12½ x 6¼	1	12061-140

\*Larger wattages available

### COMBO POWER CONTROL, Only

Control Type	For Use With	Amps x Volts	Qty	Order Code
Percentage Timer	3-Place 120v	12 x 120	1	12061-61
Percentage Timer	3-Place 240v	12 x 240	1	12061-63
Percentage Timer	6-Place 120v	15 x 120	1	12061-65
Percentage Timer	6-Place 240v	15 x 240	1	12061-67
Proportional Voltage	3-Place 120v	12 x 120	1	12061-71
Proportional Voltage	3-Place 240v	12 x 240	1	12061-73
Proportional Voltage	6-Place 120v	15 x 120	1	12061-75
Proportional Voltage	6-Place 240v	15 x 240	1	12061-77



### GIANT EXTRACTION APPARATUS *Soxhlet*

Complete with bulb type condenser and one flask. Cycling rates may be doubled over conventional style extractors. All joints are interchangeable. Size H (illustrated) is supplied with an adapter for connecting the extractor and condenser. This is necessary because of the extremely large top joint on the extractor. Approximate overall height: **Size F** – 39 inches; **Size G** – 46 inches; **Size H** – 82 inches. For extraction thimbles, see 6812. Use with 7/16-inch or 1/2-inch I.D. tubing, size F hose connection.

#### Dimensions of 6810 Extraction Apparatus

Size (Inches)	Extractor Cap., mL	Extractor I.D., mm	Extractor Top Joint	Extractor Bottom Joint	Condenser Joint	Condenser Length, mm	Flask Cap., mL
F (39)	500	68	71/60	34/45	71/60	340	1000
G (46)	1500	95	103/60	45/50	103/60	460	3000
H (82)	5000	140	145/60	55/50	55/50	730	12000

#### Complete Apparatus

Size, in	Qty	Order Code	
F (39)	1	6810-10	♠
G (46)	1	6810-20	♠
H (82, includes adapter)	1	6810-30	♠

Size, in	Qty	Extractor Only	Condenser Only	Flask Only	
		Order Code	Order Code	Order Code	
F (39)	1	6810-02	6810-04	6885-53	♠
G (46)	1	6810-12	6810-14	6885-64	♠
H (82)	1	6810-22	6810-24	6885-82	♠
Adapter for Size H, $\text{¥}55/50\text{-}\text{¥}145/60$ only				6810-40	♠

#### Replacement Parts and Accessories

Description	1000mL	3000mL	12000mL
	Order Code	Order Code	Order Code
Soxhlet Condenser, #15 Ace-Thred inlet/outlet	6810-05	6810-15	6810-25
Extraction Flask, 24/40 side neck	6885-33	6885-34	6885-35
24/40 Glass Stopper	8250-12	8250-12	8250-12
Thermocouple Adapter, 24/40 w/PTFE bushing	5041-10	5041-10	5041-10
Fabric Mantles	12031-19	12031-23	—
Aluminum Housed Mantles	12043-19	12043-23	12043-27
Tripod Supports Stands	—	12097-04	12097-08
Mantle Extension Supports ( <i>not pictured</i> )	12094-06	12094-08	—
Controllers	12319-03	12319-03	12319-03
Water-Flo Power Cut-off	12160-15	12160-15	12160-15



## EXTRACTION THIMBLES ★

Cellulose fiber. Good retention. Seamless, high quality extraction thimbles, single thickness. Readily permeable to the flow of ether and other organic solvents. Also available in giant size for the giant 6810 extraction apparatus

Size, I.D. x H	Qty	Order Code
<b>Regular Size</b>		
9 x 50	25	6811-02
27 x 80	25	6811-08
27 x 60	25	6811-14
30 x 80	25	6811-20
33 x 94	25	6811-22
40 x 123	25	6811-24
<b>Giant Size</b>		
60 x 180	1	6812-02
68 x 250	1	6812-04



## EXTRACTION THIMBLES Glass ♠

With an ACE fritted disc sealed in. Can be used in any standard Soxhlet extraction apparatus. The sizes below correspond to the size specifications of extraction bodies and will fit those units. Available in Porosities A, B, C, D and E. All porosities of a given size are priced the same. Height listed is above disc.

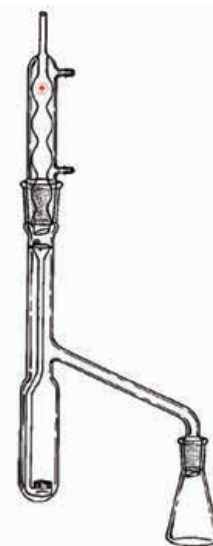
Size, mm	O.D., mm	Height, mm	Cap., mL	Qty	Porosity	Porosity	Porosity	Porosity	Porosity
					A	B	C	D	E
					Order Code	Order Code	Order Code	Order Code	Order Code
A	28	85	40	1	6813-02	6813-04	6813-06	6813-08	6813-10
C	35	85	70	1	6813-12	6813-14	6813-16	6813-18	6813-20
E	45	125	160	1	6813-22	6813-24	6813-26	6813-28	6813-30



## EXTRACTION APPARATUS ♠

Designed for the extracting of liquids with ether. The dispersion of the ether is accomplished by the use of an ACE fritted disc, Porosity B (70-100 micron), which is attached to the base of the funnel tube. With 24/40 and 40/50 joints. Available in the following sizes. Use with 7/16-inch or 3/8-inch I.D. tubing, size E hose connection.

Capacity, Extraction Chamber, mL	Flask Capacity, mL	Qty	Flask	Condenser	Distributor	Extraction Chamber	Complete
			Order Code	Order Code	Order Code	Order Code	Order Code
100	125	1	6965-22	6740-04	6840-02	6840-15	6840-30
250	250	1	6965-24	6740-04	6840-04	6840-17	6840-35
500	500	1	6965-26	6740-04	6840-06	6840-19	6840-40
1000	1000	1	6965-27	6740-04	6840-08	6840-21	6840-45
2000	2000	1	6965-28	6740-04	6840-10	6840-23	6840-50

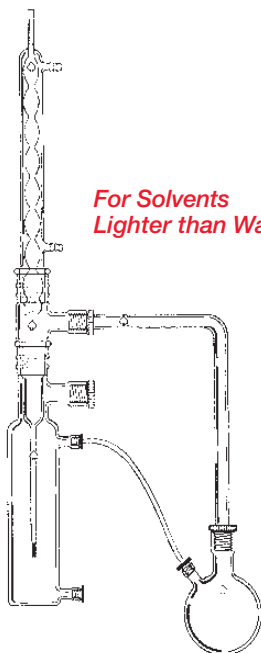


## EXTRACTION APPARATUS

### Liquid-Liquid, Heavier- or Lighter-than-Water

A liquid-liquid extractor for use with lighter- or heavier-than-water extracting solvents. Overflow and boil-up tube uses Ace-Thred connections, thus allowing easy removal for cleaning to reduce cross-contamination among samples. Joints are  $\text{\textcircled{R}} 45/50$ .

For Solvents  
Lighter than Water

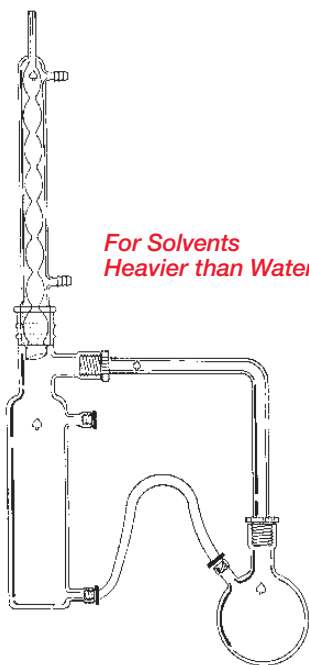


**FOR SOLVENTS LIGHTER THAN WATER:** The glass dispersion tube adapter is inserted into the extractor body and the #25 Ace-Thred on the body and #7 Ace-Thred near the bottom are plugged. Solvent flask is heated and vapors rise to condenser through glass elbow tube connected by two #25 threads. Condensed solvent fills adapter tube stem and is dispersed upward thru sample from capillary on bottom of stem, thereby increasing solvent surface-area-to-volume ratio. Solvent overflows thru PTFE tubing connected to #7 Ace-Thred on body top to flask. (For JUST lighter-than-water applications, order 6846-08, 6846-11, 6846-15, 6846-24, 6846-30, 6740-26, 5846-04, 5846-16 and two 7506-10.)

**FOR SOLVENTS HEAVIER THAN WATER:** The dispersion tube adapter is removed and the #7 thread near extractor body is plugged. Solvent is heated in flask, vapors rise thru glass elbow tube connected to #25 Ace-Thred on flask and extractor body and liquefy in condenser. Solvent droplets pass down through sample and return to flask via PTFE tube connected to #7 Ace-Threds near body bottom and flask. (For JUST heavier-than-water applications, order 6846-08, 6846-14, 6846-25, 6846-30, 6740-26, 5846-04 and two 7506-10.)

Complete item consists of extractor body (approx. 1300mL capacity), dispersion tube adapter, lighter-than-water and heavier-than-water elbow tubes, PTFE solvent return tube for heavier- and lighter-than-water, flask, condenser, (2) #25 nylon bushings with FETFE O-Rings, and one #7 nylon bushing with FETFE O-Ring.

For Solvents  
Heavier than Water



Description	Qty	Order Code	
Extractor Body, only, $\text{\textcircled{R}} 45/50$ , (1) #25 and (2) #7 Ace-Threds	1	6846-08	★
Dispersion Tube Adapter, $\text{\textcircled{R}} 45/50$ , #25 Ace-Thred	1	6846-11	★
Elbow Tube, Heavier-than-Water, 1-inch O.D.	1	6846-14	★
Elbow Tube, Lighter-than-Water, 1-inch O.D.	1	6846-15	★
Solvent Return Tube, Lighter-than-Water, PTFE, 12-inch x 1/4-inch O.D.	1	6846-24	★
Solvent Return Tube, Heavier-than-Water, PTFE, 12-inch x 1/4-inch O.D.	1	6846-25	★
Flask, 1 liter, RB, #7 and #25 Ace-Threds	1	6846-30	★
Condenser, Allihn, only, $\text{\textcircled{R}} 45/50$ , 390mm length (Size E hose connections)	1	6740-26	♣
Bushing, Nylon, #25 with FETFE O-Ring (2)	1	7506-10	♣
Plug, Nylon, #7 with FETFE O-Ring	1	5846-04	♣
Plug, Nylon, #25 with FETFE O-Ring	1	5846-16	♣

### Complete

	1	6846-50	♣
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## EXTRACTION APPARATUS *Liquid-Liquid*

Designed for U.S.E.P.A. "Priority Pollutant" analysis using Method 625 (base neutrals/acid extractables). Accommodates one liter sample and approximately 200mL of a heavier-than-water extracting solvent, such as methylene chloride. Features an extractor body designed to accept a common condenser with a  $\text{\textcircled{45}}$  45/50 joint, a  $\text{\textcircled{24}}$  24/40 opening with a PTFE stopper near top of body for addition of reagents and a 1:5 PTFE 2mm bore stopcock for draining. Flattened body bottom allows use of optional magnetic stirring bar to enhance extraction of compounds from sample. One  $\text{\textcircled{24}}$  24/40 plastic clamp supplied with extractor body.

**Reference:** Federal Register Vol. 49, No. 209, October 26, 1984.

Description	Qty	Order Code	
Extractor Body $\text{\textcircled{45}}$ 45/50, $\text{\textcircled{24}}$ 24/40, only	1	6848-05	★
Condenser, Allihn, $\text{\textcircled{45}}$ 45/50, only (size E hose connections)	1	6740-06	★
Flask, 1L, $\text{\textcircled{24}}$ 24/40, only	1	6887-27	★
PTFE Stopper, $\text{\textcircled{24}}$ 24/25, only	1	12631-15	♠

### Complete

	1	6848-20	♠
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### Replacement and Additional Items

Heating Mantle, 115v-380w	1	12053-19	
Magnetic Stirring Bar, octagonal 25.4mm long x 7.9mm	1	13654-10	★
PTFE Sleeve, $\text{\textcircled{24}}$ 24/40, pkg/3	1	7643-08	★
PTFE Sleeve, $\text{\textcircled{45}}$ 45/50, pkg/3	1	7643-16	★
Replacement (bottom) PTFE Stopcock	1	8224-12	♠



## LIQUID-LIQUID EXTRACTOR

For extraction with liquids of lighter density than liquid extracted such as water with ether; 9422 and 9414 are used with extraction flask 9451.

Description	Qty	Order Code	
Flask	1	9451-06	★
Chamber	1	9422-05	♠
Tube	1	9414-08	♠

### Complete

	1	9428-12	♠
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9428-12



9422-05

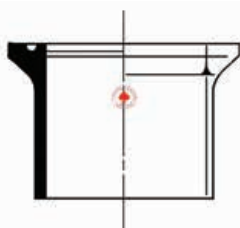


9414-08

**FLANGE Conical** ★

Borosilicate glass, conical-type flange used to fabricate reaction flasks. Supplied on medium-wall tubing. Use 6496 standard clamp.

Flange I.D., mm	Stem O.D., mm	Stem Length, mm	Qty	Order Code
105	114	152	1	15305-20

**FLANGE Duran-Style**

Borosilicate glass, Duran-style flange used to fabricate reaction flasks. Offered with or without groove.

Flange I.D., mm	Flange O.D., mm	Overall Height, mm	Stem O.D., mm	Qty	Order Code
<b>With O-Ring Groove</b>					
60	100	50	68	1	15310-15 ★
100	138	60	106	1	15310-20 ★
120	158	60	130	1	15310-22 ★
150	184	75	155	1	15310-25 ★
200	241	75	215	1	15310-30 ★

**Without O-Ring Groove**

60	100	50	68	1	15311-16 ★
100	138	60	106	1	15311-21 ★
120	158	60	130	1	15311-23 ★
150	184	75	155	1	15311-26 ★
200	241	75	215	1	15311-31 ★

**Replacement and Additional Parts**

See 6517 for quick release clamp

See 7855 for replacement CAPFE or silicone O-Rings.

**FLANGE Reaction Flask, Flat** ★

Borosilicate glass, flat-style flange used to fabricate reaction flasks like 6511. Offered with or without groove.

Flange I.D., mm	Flange O.D., mm	Overall Height, mm	Stem O.D., mm	Qty	Order Code
<b>With O-Ring Groove</b>					
100	137	150	114	1	15316-04
130	168	150	140	1	15316-08
<b>Without O-Ring Groove</b>					
100	137	150	114	1	15316-25
130	168	150	140	1	15316-30

**Replacement and Additional Parts**

See 6508 or 6510 for clamp

See 7855 for replacement CAPFE or silicone O-Rings.

**CLAMP** ★

For use with 15316 and flat style flanges.

For I.D., mm	Qty	Order Code
<b>Two-Piece</b>		
105	1	6508-06
130	1	6508-11
<b>One-Piece</b>		
105	1	6510-05
130	1	6510-10



# Flasks



ACE 33 Expansion borosilicate glass flasks are available in either standard or heavy wall glass. All standard taper necks 24/40 or larger have reinforced bead to provide longer service life. Ace starts with high-quality Duran blanks to manufacture these precise “tools of science and discovery”.

If you need rapid, even heating, use the standard wall. If mechanical strength and even heating are more important than speed, use the high-value heavy wall flasks.

All flasks in this section, except where otherwise noted, are made from Type I, 33 Expansion borosilicate glass.

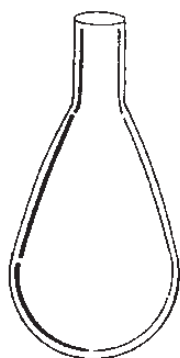
## Reference Guide to ACE Flasks

Capacity, mL	Approx. O.D., mm	Approx. O.D., Inches	Capacity, mL	Approx. O.D., mm	Approx. O.D., Inches
50	50	2.0	2000	160	6.3
100	58	2.25	3000	180	7.0
200	75	3.0	5000	225	8.86
250	82	3.25	12000	285	11.22
300	86	3.385	22000	350	13.78
500	100	4.0	50000	457	18.0
1000	125	5.0	72000	508	20.0


**FLASK BLANKS** *Glassblowers, Standard/Heavy Wall*

Round bottom flask with one unfinished neck. Available with standard or heavy wall. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. Used by glassblowers in fabricating single- or multi-necked flasks.

Capacity, mL	Neck O.D., mm	Qty	Order Code	Capacity, mL	Neck O.D., mm	Qty	Order Code
<b>Heavy Wall</b>							
100	26	1	6870-206 ★	2000	46	1	6870-218 ★
250	34	1	6870-210 ★	3000	47	1	6870-220 ★
500	34	1	6870-214 ★	5000	57	1	6870-222 ★
1000	42	1	6870-216 ★				
<b>Standard Wall</b>							
50	26	10	6870-04 ★	3000	47	1	6870-20 ★
100	26	10	6870-06 ★	5000	57	1	6870-22 ★
250	34	10	6870-10 ★	6000	51	1	6870-21 ★
300	25	1	6870-12 ★	12000	60	1	6870-24 ★
500	34	10	6870-14 ★	22000	76	1	6870-26 ★
1000	42	10	6870-16 ★	50000	115	1	6870-29
2000	46	1	6870-18 ★	72000	115	1	6870-30 ★


**FLASK BLANKS** *Recovery, Glassblowers ★*

Recovery/Kjeldahl shaped blank with one unfinished neck.

Capacity, mL	Qty	Order Code
100	1	6871-07
250	1	6871-13
500	1	6871-15
1000	1	6871-19
2000	1	6871-23


**FLASK** *Boiling, Quartz ★*

Capacity, mL	Neck O.D., mm	Qty	Order Code	Capacity, mL	Neck O.D., mm	Qty	Order Code
50	22	1	6883-06	750	34	1	6883-18
100	22	1	6883-08	1000	34	1	6883-20
250	28	1	6883-14	2000	40	1	6883-24
500	34	1	6883-16				

**For Heating Mantles, see Catalog Nos. 12031–12053.**

All flasks in this section are made from 33 Expansion Borosilicate Glass unless noted otherwise.

**FLASK** *Single Neck, Standard/Heavy Wall* ♠

Round bottom with short neck and ⌘ outer joint. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. Full-length ⌘ joints are reinforced for better strength.

Capacity, mL	⌘ Joint	Qty	Order Code	Capacity, mL	⌘ Joint	Qty	Order Code
<b>Heavy Wall</b>							
5	14/20	1	9458-202	250	29/42	1	6887-238
10	14/20	1	9458-204	250	45/50	1	6887-203
10	19/22	1	9458-215	300	24/40	1	6887-225
15	14/20	1	9458-205	300	29/42	1	6887-239
25	14/20	1	9458-206	500	14/20	1	9458-214
25	19/22	1	9458-217	500	19/22	1	9458-225
50	14/20	1	9458-208	500	24/40	1	6887-226
50	19/22	1	9458-219	500	29/42	1	6887-240
50	24/40	1	6887-220	500	45/50	1	6887-207
50	29/42	1	6887-231	1000	24/40	1	6887-227
100	14/20	1	9458-210	1000	29/42	1	6887-241
100	19/22	1	9458-221	1000	34/45	1	6887-253
100	24/40	1	6887-221	1000	45/50	1	6887-262
100	29/42	1	6887-235	2000	24/40	1	6887-228
125	24/40	1	6887-232	2000	29/42	1	6887-242
125	29/42	1	6887-236	2000	45/50	1	6887-263
150	24/40	1	6887-233	3000	24/40	1	6887-229
150	29/42	1	6887-234	3000	29/42	1	6887-243
200	24/40	1	6887-223	3000	34/45	1	6887-245
200	29/42	1	6887-237	3000	45/50	1	6887-264
250	14/20	1	9458-212	5000	24/40	1	6887-230
250	19/22	1	9458-223	5000	29/42	1	6887-244
250	24/40	1	6887-224	5000	45/50	1	6887-265

**Standard Wall**

5	14/20	1	9458-02	500	14/20	1	9458-14
10	14/20	1	9458-04	500	19/22	1	9458-25
10	19/22	1	9458-15	500	24/40	1	6887-26
15	14/20	1	9458-05	500	29/42	1	6887-40
25	14/20	1	9458-06	500	45/50	1	9456-06
25	19/22	1	9458-17	1000	24/40	1	6887-27
35	14/20	1	9458-07	1000	29/42	1	6887-41
50	14/20	1	9458-08	1000	34/45	1	6887-53
50	19/22	1	9458-19	2000	24/40	1	6887-28
50	24/40	1	6887-20	2000	29/42	1	6887-42
50	29/42	1	6887-31	2000	45/50	1	6887-63
60	14/20	1	9458-09	3000	24/40	1	6887-29
100	14/20	1	9458-10	3000	29/42	1	6887-43
100	19/22	1	9458-21	3000	45/50	1	6887-64
100	24/40	1	6887-21	5000	24/40	1	6887-30
100	29/42	1	6887-35	5000	29/42	1	6887-44
125	29/42	1	6887-36	5000	45/50	1	6887-65
200	24/40	1	6887-23	6000	24/40	1	6887-66
200	29/42	1	6887-37	6000	29/42	1	6887-68
250	14/20	1	9458-12	6000	45/50	1	6887-70
250	19/22	1	9458-23	6000	55/50	1	6887-72
250	24/40	1	6887-24	12000	45/50	1	6887-67
250	29/42	1	6887-38	12000	55/50	1	6887-82
250	45/50	1	9456-03	22000	45/50	1	6887-69
300	24/40	1	6887-25				




**FLASK** *Single Neck, Flat Bottom* ♦

With short neck and reinforced § 24/40 outer joint.

Capacity, mL	Qty	Order Code
50	1	6895-20
100	1	6895-21
125	1	6895-22
250	1	6895-24
300	1	6895-25
500	1	6895-26
1000	1	6895-27
2000	1	6895-28


**RECEIVING BOTTLE/FLASK** ♦

Graduated, round bottom receiving flasks for use as replacement receivers on all glassware sets supplied with Heidolph LR4000 Series rotary evaporators or with other evaporators. 250mL size graduated in 10mL increments; 1000mL and 2000mL in 100mL increments. Joint is § 35/20.

Capacity, mL	§ Joint	O.D., mm	Length below joint, mm	Qty	Order Code
250	35/20	75	120	1	6893-05
500	35/20	85	170	1	6893-15
1000	35/20	100	220	1	6893-21
2000	35/20	125	275	1	6893-27


**FLASK** *Single Neck, Pear-Shaped, Ground/Polished Joint, Heavy Wall* ♦

Distilling, pear-shaped with ground § outer joint. Also available with polished § outer joint.

Capacity, mL	§ Joint	Qty	Order Code	Capacity, mL	§ Joint	Qty	Order Code
<b>Ground Joint</b>							
5	14/20	1	9477-02	25	19/22	1	9477-27
10	14/20	1	9477-04	50	19/22	1	9477-29
15	14/20	1	9477-05	100	19/22	1	9477-31
25	14/20	1	9477-06	250	19/22	1	9477-33
50	14/20	1	9477-08	50	24/40	1	9477-34
100	14/20	1	9477-10	100	24/40	1	9477-36
250	14/20	1	9477-12	250	24/40	1	9477-38
5	19/22	1	9477-23	500	24/40	1	9477-40
10	19/22	1	9477-25	300	24/40	1	9477-44
<b>Polished Joint</b>							
5	14/20	1	9477-45				
10	14/20	1	9477-47				
25	14/20	1	9477-49				

**FLASK Recovery, Rotary Evaporator, Pear-Shaped, Standard/Heavy Wall ♦**

A multipurpose, pear-shaped flask with modified side for ease in inserting spatula or brush for removing solids or cleaning sides. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. With reinforced full-length  $\text{§}$  outer joint. Fits all rotary evaporators.

Capacity, mL	$\text{§}$ Joint	Qty	Order Code	Capacity, mL	$\text{§}$ Joint	Qty	Order Code
<b>Heavy Wall</b>							
10	14/20	1	9470-202	200	24/40	1	6892-208
25	14/20	1	9470-204	200	29/42	1	6892-209
25	19/22	1	9470-221	250	29/42	1	6892-211
50	14/20	1	9470-206	250	24/40	1	6892-237
50	19/22	1	9470-223	250	29/32	1	6892-239
50	24/25	1	6892-214	500	24/25	1	6892-222
50	29/32	1	6892-203	500	24/40	1	6892-212
50	24/40	1	6892-204	500	29/32	1	6892-213
50	29/42	1	6892-205	500	29/42	1	6892-293
100	24/40	1	6892-206	1000	24/40	1	6892-230
100	29/42	1	6892-207	1000	29/32	1	6892-231
100	14/20	1	9470-208	1000	29/42	1	6892-232
100	19/22	1	9470-225	2000	24/40	1	6892-240
100	24/25	1	6892-216	2000	29/42	1	6892-242
100	29/32	1	6892-217	2000	29/32	1	6892-243
125	19/22	1	9470-226	3000	29/42	1	6892-245
200	14/20	1	9470-210	3000	29/32	1	6892-247
200	19/22	1	9470-227	3000	24/40	1	6892-249
200	24/25	1	6892-218				

**Standard Wall**

10	14/20	1	9470-02	200	24/25	1	6892-18
25	14/20	1	9470-04	200	24/40	1	6892-08
25	19/22	1	9470-21	200	29/42	1	6892-09
50	14/20	1	9470-06	250	29/42	1	6892-11
50	19/22	1	9470-23	250	45/35	1	6892-51
50	24/25	1	6892-14	500	24/25	1	6892-22
50	24/40	1	6892-04	500	24/40	1	6892-12
50	29/42	1	6892-05	500	29/26	1	6892-13
100	14/20	1	9470-08	500	29/42	1	6892-15
100	19/22	1	9470-25	500	45/35	1	6892-53
100	24/25	1	6892-16	1000	24/40	1	6892-30
100	24/40	1	6892-06	1000	29/42	1	6892-32
100	29/42	1	6892-07	1000	45/35	1	6892-55
125	19/22	1	9470-26	2000	24/40	1	6892-40
125	45/35	1	6892-49	2000	29/42	1	6892-42
200	14/20	1	9470-10	2000	45/35	1	6892-57
200	19/22	1	9470-27				


**FLASK Two Necks, Pear-Shaped, Heavy Wall ♦**

Pear-shaped, with side arm for use with rubber stopper. Center joint is  $\text{§}14/20$  outer.

Capacity, mL	Qty	Order Code
5	1	9478-02
10	1	9478-04
100	1	9478-10




**FLASK** *Two Necks, Pear-Shaped, Heavy Wall* ♦

Pear-shaped with 3 outer joints.

Cap., mL	Center Neck 3	3 Side Necks	Qty	Order Code	Cap., mL	Center Neck 3	3 Side Necks	Qty	Order Code
5	14/20	14/20	1	9479-03	10	14/20	10/18	1	9481-04
10	14/20	14/20	1	9479-05	25	14/20	10/18	1	9481-06
25	14/20	14/20	1	9479-07	50	14/20	10/18	1	9481-08
50	14/20	14/20	1	9479-09					
100	14/20	14/20	1	9479-11					


**FLASK** *Recovery, Pear-Shaped, with Full-Length Reinforced 3 Joints, Poly-Coated, Heavy Wall* ♦

For rotary evaporators, evaporations, and drying.

3 Joint	Size, mL	Buchi Part #	Qty	Order Code
29/42	50	—	1	3990-10
24/40	50	—	1	3990-12
29/32	50	—	1	3990-14
29/42	100	—	1	3990-20
24/40	100	—	1	3990-22
29/32	100	—	1	3990-24
29/42	250	—	1	3990-30
24/40	250	—	1	3990-32
29/32	250	—	1	3990-34
29/32	500	25322	1	3990-104
29/32	1000	20729	1	3990-106
29/32	2000	25323	1	3990-108
29/42	500	—	1	3990-120
29/42	1000	25517	1	3990-122
29/42	2000	—	1	3990-124
24/40	500	25261	1	3990-132
24/40	1000	20730	1	3990-134
24/40	2000	25262	1	3990-136
29/42	3000	—	1	3990-140
24/40	3000	—	1	3990-142
29/32	3000	—	1	3990-144

## U.S. Government Buyer?

GSA pricing for **Ace Glass** products is available thru our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)



**Schedule**  
Contract GS07F119CA

[www.gsasmart.com](http://www.gsasmart.com)

**FLASK** Recovery, Pear-Shaped with Side Indents, Full-Length Reinforced  
 ⌘ Joint, Heavy Wall ♠

Fits all rotary evaporators, evaporations, and drying.

⌘ Joint	Size, mL	Buchi Part #	Qty	Order Code
<b>Poly Coated</b>				
29/32	500mL	—	1	3994-110
29/32	1000mL	—	1	3994-112
29/32	2000mL	—	1	3994-114
24/40	500mL	—	1	3994-120
24/40	1000mL	—	1	3994-124
24/40	2000mL	—	1	3994-126
<b>Non-Coated</b>				
29/32	500mL	00452	1	3994-10
29/32	1000mL	00453	1	3994-12
29/32	2000mL	00454	1	3994-14
24/40	500mL	11579	1	3994-20
24/40	1000mL	00420	1	3994-22
24/40	2000mL	11580	1	3994-23



**FLASK** Single Neck, Round Bottom, Receiving, Poly-Coated, Heavy Wall ♠

Fits all rotary evaporators. With poly-coated safety coating.

⌘ Joint	Size, mL	Buchi Part #	Qty	Order Code
35/20	50	—	1	3996-02
35/20	100	—	1	3996-04
35/20	250	—	1	3996-06
35/20	500	—	1	3996-08
35/20	1000	40775/20728	1	3996-20
35/20	2000	40776/25265	1	3996-22
35/20	3000	40777/25266	1	3996-24



**FLASK** Single Neck, Round Bottom, Receiving, Heavy Wall ♠

With short neck and ⌘ outer joint. Fabricated with heavy walls, approximately 30% heavier than standard-wall flasks. Fits all rotary evaporators.

Capacity, mL	⌘35/20 Joint		⌘35/25 Joint
	Qty	Order Code	Order Code
50	—	—	6902-234
100	—	—	6902-235
250	—	—	6902-238
500	1	6902-226	6902-240
1000	1	6902-227	6902-241
2000	1	6902-228	6902-242
3000	1	6902-229	6902-243
5000	—	—	6902-244




**FLASK** *Receiving, Single Neck, Spherical, Standard Wall* ♠

With short neck and 3 outer joint.

Capacity, mL	Qty	35/20 Joint	35/25 Joint
		Order Code	Order Code
50	—	—	6902-34
250	—	—	6902-38
300	1	6902-25	—
500	1	6902-26	6902-40
1000	1	6902-27	6902-41
2000	1	6902-28	6902-42
3000	1	6902-29	6902-43
5000	—	—	6902-44


**FLASK** *Single Neck* ♠

With long neck and reinforced 24/40 outer joint.

Capacity, mL	Overall Neck		Qty	Order Code
	Length, mm			
250	95		1	6905-24
500	105		1	6905-26
1000	120		1	6905-27


**FLASK** *Single Neck, Flat Bottom* ♠

With long neck and reinforced 24/40 outer joint.

Capacity, mL	Overall Neck		Qty	Order Code
	Length, mm			
500	105		1	6915-25
1000	120		1	6915-26



## FLASK Two Necks, Angled, Standard/Heavy Wall ♠

Round bottom with reinforced full-length  $\text{S}$  outer joints. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. With side neck angled.

Cap., mL	Center Neck $\text{S}$	$\text{S}$ Side Neck	Qty	Order Code	Cap., mL	Center Neck $\text{S}$	$\text{S}$ Side Neck	Qty	Order Code
<b>Heavy Wall</b>									
25	14/20	14/20	1	9464-206	250	24/40	24/40	1	6927-208
25	19/22	14/20	1	9463-206	250	29/42	24/40	1	6927-226
50	14/20	14/20	1	9464-208	500	24/40	10/30	1	6927-220
50	19/22	14/20	1	9463-208	500	24/40	24/40	1	6927-222
100	14/20	14/20	1	9464-210	500	29/42	24/40	1	6927-229
100	19/22	14/20	1	9463-210	1000	24/40	24/40	1	6927-232
100	24/40	14/20	1	9463-211	1000	29/42	24/40	1	6927-239
250	14/20	14/20	1	9464-295	2000	24/40	24/40	1	6927-244
250	19/22	14/20	1	9463-212	3000	29/42	29/42	1	6927-258
250	24/40	10/30	1	6927-204	5000	24/40	24/40	1	6927-262

### Standard Wall

10	14/20	14/20	1	9464-04	500	24/40	24/40	1	6927-22
25	14/20	14/20	1	9464-06	1000	24/40	24/40	1	6927-32
25	19/22	14/20	1	9463-06	2000	24/40	24/40	1	6927-44
50	14/20	14/20	1	9464-08	3000	29/42	29/42	1	6927-58
50	19/22	14/20	1	9463-08	3000	45/50	24/40	1	6927-160
100	14/20	14/20	1	9464-10	5000	24/40	24/40	1	6927-62
100	19/22	14/20	1	9463-10	5000	45/50	24/40	1	6927-168
100	24/40	14/20	1	9463-11	6000	24/40	24/40	1	6927-64
250	19/22	14/20	1	9463-12	6000	29/42	29/42	1	6927-66
250	24/40	10/30	1	6927-04	6000	45/50	24/40	1	6927-68
250	24/40	24/40	1	6927-08	6000	45/50	29/42	1	6927-70
500	24/40	10/30	1	6927-20					



## FLASK Two Necks, Vertical, Standard/Heavy Wall ♠

Round bottom with reinforced  $\text{S}$  outer joints. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. With side neck vertical.

Cap., mL	Center Neck $\text{S}$	$\text{S}$ Side Neck	Qty	Order Code	Cap., mL	Center Neck $\text{S}$	$\text{S}$ Side Neck	Qty	Order Code
<b>Heavy Wall</b>									
100	24/40	24/40	1	6928-207	1000	24/40	24/40	1	6928-232
250	24/40	24/40	1	6928-208	2000	24/40	24/40	1	6928-244
250	29/42	24/40	1	6928-211	2000	29/42	24/40	1	6928-246
500	24/40	24/40	1	6928-222					

### Standard Wall

100	24/40	24/40	1	6928-07	1000	24/40	24/40	1	6928-32
250	24/40	24/40	1	6928-08	1000	29/42	29/42	1	6928-38
500	24/40	24/40	1	6928-22					




**FLASK** *Two Necks, Vertical, Standard Wall* ♠

Round bottom with ⌘ outer socket joints. 500mL and 1000mL sizes have angled necks, but are available with straight necks as special orders.

Capacity, mL	Center Neck ⌘	Side Neck ⌘	Qty	Order Code
500	35/25	35/25	1	6930-26
1000	35/25	35/25	1	6930-38
2000	35/25	35/25	1	6930-48
5000	35/25	35/25	1	6930-66


**FLASK** *with Septum Port, Standard/Heavy Wall*

Used when handling air-sensitive materials. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. With ⌘ outer joint and septum joint. Supplied with septum. 24/40 joints are reinforced.

Capacity, mL	⌘ Joint	Qty	Order Code	
<b>Heavy Wall</b>				
50	14/20	1	9461-210	♠
100	14/20	1	9461-212	♠
250	14/20	1	9461-214	♠
250	24/40	1	6933-224	♠
500	24/40	1	6933-226	♠
1000	24/40	1	6933-227	♠
<b>Standard Wall</b>				
50	14/20	1	9461-10	♠
100	14/20	1	9461-12	♠
250	14/20	1	9461-14	♠
250	24/40	1	6933-24	♠
500	24/40	1	6933-26	♠
1000	24/40	1	6933-27	♠
<b>Replacement Septa</b>				
		12	9096-32	★

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**FLASK** with Stopcock and Septum Inlet, Standard/Heavy Wall ★

Used when handling air-sensitive materials. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. With reinforced 24/40 outer joint, 2mm bore 1:5 PTFE stopcock and septum port. Supplied with septum.

Capacity, mL	Bore Size, mm	Qty	Stopcock Only	Septum Only	Complete
			Order Code	Order Code	Order Code
<b>Heavy Wall</b>					
250	2	1	8224-04	9096-32	6934-225
500	2	1	8224-04	9096-32	6934-227
1000	2	1	8224-04	9096-32	6934-229
<b>Standard Wall</b>					
50	2	1	8224-04	9096-32	9467-11
100	2	1	8224-04	9096-32	9467-13
250	2	1	8224-04	9096-32	9467-15
250	2	1	8224-04	9096-32	6934-25
500	2	1	8224-04	9096-32	6934-27
1000	2	1	8224-04	9096-32	6934-29



## ACE Quality Laboratory & Scientific Product Lines Include...

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**Multi-Step Filter Reactors** — 150mL to 100L capacity. single or multi-step filter reactors. **Contact ACE to get a copy of our reactor catalog.**


**FLASK** with Side Well ♠

With full-length reinforced  $\text{F}$  outer joint and side tube. Available in type A with side port, or C with a side deep well, as illustrated.

Capacity, mL	$\text{F}$ Joint	Qty	Style A		Style C	
			Approx. Well I.D., mm	Order Code	Approx. Well I.D., mm	Order Code
5	14/20	1	9.5	9460-02	—	—
10	14/20	1	9.5	9460-04	—	—
25	14/20	1	9.5	9460-06	—	—
50	14/20	1	9.5	9460-08	—	—
50	24/40	1	9.5	6935-03	—	—
100	14/20	1	9.5	9460-10	—	—
100	19/38	1	9.5	6935-04	—	—
100	24/40	1	9.5	6935-05	9.0	6935-64
200	24/40	1	—	—	9.0	6935-66
250	14/20	1	—	9460-12	—	—
250	24/40	1	9.5	6935-09	9.0	6935-68
300	24/40	1	—	—	9.0	6935-70
500	24/40	1	9.5	6935-13	9.0	6935-72
1000	24/40	1	—	—	9.0	6935-74
2000	24/40	1	9.5	6935-17	—	—
3000	29/42	1	—	—	9.0	6935-78


**FLASK** Threaded Side Arm, #7 Ace-Thred, Standard/Heavy Wall ♠

With full-length reinforced  $\text{F}$  outer joint and side arm which is internally threaded for use with 5029 nylon bushing. Will accommodate thermometers or bleed tubes up to 7mm outside diameter. Supplied complete with 5029 bushing and FETFE O-Ring. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks.

Capacity, mL	Center Neck $\text{F}$	Qty	Order Code	Cap., mL	Center Neck $\text{F}$	Qty	Order Code
<b>Heavy Wall</b>							
25	14/20	1	9462-207	250	29/42	1	6936-237
50	14/20	1	9462-209	500	24/40	1	6936-240
100	14/20	1	9462-211	500	29/42	1	6936-242
100	24/40	1	6936-230	1000	24/40	1	6936-244
250	24/40	1	6936-235	1000	29/42	1	6936-246
<b>Standard Wall</b>							
25	14/20	1	9462-07	250	14/20	1	9462-13
50	14/20	1	9462-09	250	24/40	1	6936-35
100	14/20	1	9462-11	500	24/40	1	6936-40
100	24/40	1	6936-30	1000	24/40	1	6936-44

**Replacement Nylon Bushings**

See 5029 for replacement bushings

**FLASK Flat Bottom, Three Necks, 3 Outer Joints ♠**

Flat bottom flask can sit directly on top of heater or stirrer, no other support needed. 250 and 500mL sizes have angled side necks; 1000mL has straight side necks. All joints are reinforced.

Capacity, mL	Center Neck, 3	Side Necks, 3	Qty	Order Code
250	24/40	24/40	1	6939-10
500	24/40	24/40	1	6939-15
1000	24/40	24/40	1	6939-20


**FLASK Thermowell ♠**

Round bottom borosilicate flask with 3 top and angled side thermometer well.

Capacity, mL	3 Joint	Qty	Order Code
500	35/25	1	6940-49
1000	35/25	1	6940-51



## Color Coated Glassware



**Ace Glass** offers many of our existing glass vessels in various coated versions. Flasks, pressure bottles, beakers, bottles and many other items listed in this catalog can be amber or color-coated on request. The coating is a proprietary process and gives excellent UV protection characteristics. Contact Ace for more details and pricing.



### FLASK Three Necks, Vertical, Standard/Heavy Wall ♠

With full-length reinforced ⌘ outer joints. The flare out directly below the center joint facilitates cleaning the flask, and enables stirring blades, etc., to be easily removed. With *vertical* side necks. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks.

Capacity, mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code	Capacity, mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code
<b>Heavy Wall</b>									
100	24/40	24/40	1	6944-203	2000	29/42	24/40	1	6944-242
200	24/40	24/40	1	6944-205	2000	29/42	29/42	1	6944-244
250	24/40	24/40	1	6944-204	2000	34/45	24/40	1	6944-246
250	29/42	24/40	1	6944-206	2000	34/45	29/42	1	6944-247
250	29/42	29/42	1	6944-207	2000	45/50	24/40	1	6944-249
300	24/40	24/40	1	6944-210	2000	45/50	29/42	1	6944-245
500	24/40	24/40	1	6944-216	3000	24/40	24/40	1	6944-248
500	29/42	24/40	1	6944-218	3000	29/42	24/40	1	6944-250
500	29/42	29/42	1	6944-220	3000	29/42	29/42	1	6944-254
500	34/45	24/40	1	6944-222	3000	34/45	24/40	1	6944-256
500	34/45	29/42	1	6944-223	3000	34/45	29/42	1	6944-257
500	45/50	24/40	1	6944-225	3000	45/50	24/40	1	6944-258
500	45/50	29/42	1	6944-229	3000	45/50	29/42	1	6944-259
1000	24/40	24/40	1	6944-224	5000	24/40	24/40	1	6944-260
1000	29/42	24/40	1	6944-226	5000	29/42	24/40	1	6944-262
1000	29/42	29/42	1	6944-228	5000	29/42	29/42	1	6944-264
1000	34/45	24/40	1	6944-230	5000	34/45	24/40	1	6944-266
1000	34/45	29/42	1	6944-231	5000	45/50	24/40	1	6944-267
1000	45/50	24/40	1	6944-238	5000	45/50	29/42	1	6944-268
2000	24/40	24/40	1	6944-240					

### Standard Wall \*22L Industry Standard, Total Volume is 19.5L

100	24/40	24/40	1	6944-03	5000	45/50	24/40	1	6944-67
200	24/40	24/40	1	6944-05	5000	45/50	29/42	1	6944-68 ★
250	24/40	24/40	1	6944-04	5000	60/40	24/40	1	6944-167
250	29/42	24/40	1	6944-06	6000	24/40	24/40	1	6944-107
300	24/40	24/40	1	6944-10	6000	29/42	24/40	1	6944-109
500	24/40	24/40	1	6944-16	6000	29/42	29/42	1	6944-111
500	29/42	24/40	1	6944-18	6000	34/45	24/40	1	6944-113
500	29/42	29/42	1	6944-20	6000	34/45	29/42	1	6944-115
500	34/45	24/40	1	6944-22	6000	45/50	24/40	1	6944-117
500	45/50	24/40	1	6944-25	6000	45/50	29/42	1	6944-119
1000	24/40	24/40	1	6944-24	6000	45/50	45/50	1	6944-120
1000	29/42	24/40	1	6944-26	6000	60/40	24/40	1	6944-127
1000	29/42	29/42	1	6944-28	12000	29/42	24/40	1	6944-69
1000	34/45	24/40	1	6944-30	12000	29/42	29/42	1	6944-70
1000	34/45	29/42	1	6944-31	12000	34/45	29/42	1	6944-71
1000	45/50	24/40	1	6944-38	12000	34/45	24/40	1	6944-72
2000	24/40	24/40	1	6944-40	12000	45/50	45/50	1	6944-73
2000	29/42	24/40	1	6944-42	12000	55/50	24/40	1	6944-74
2000	29/42	29/42	1	6944-44	12000	45/50	24/40	1	6944-75
2000	34/45	24/40	1	6944-46	12000	45/50	29/42	1	6944-76
2000	34/45	29/42	1	6944-47	12000	55/50	29/42	1	6944-78
2000	45/50	24/40	1	6944-148	12000	55/50	45/50	1	6944-79
2000	45/50	29/42	1	6944-49	12000	60/40	24/40	1	6944-177
3000	24/40	24/40	1	6944-48	12000	71/60	45/50	1	6944-178
3000	29/42	24/40	1	6944-50	22000*	45/50	24/40	1	6944-80
3000	29/42	29/42	1	6944-54	22000*	29/42	29/42	1	6944-81
3000	34/45	24/40	1	6944-56	22000*	45/50	29/42	1	6944-82
3000	34/45	29/42	1	6944-57	22000*	45/50	45/50	1	6944-83
3000	45/50	24/40	1	6944-58	22000*	55/50	24/40	1	6944-84
3000	45/50	29/42	1	6944-59	22000*	55/50	29/42	1	6944-86
3000	60/40	24/40	1	6944-157	22000*	55/50	45/50	1	6944-88
5000	24/40	24/40	1	6944-60	22000*	71/60	55/50	1	6944-91
5000	29/42	24/40	1	6944-62	22000*	71/60	45/50	1	6944-188
5000	29/42	29/42	1	6944-64	50000	45/50	45/50	1	6944-294
5000	34/45	24/40	1	6944-66	72000	71/60	45/50	1	6944-297

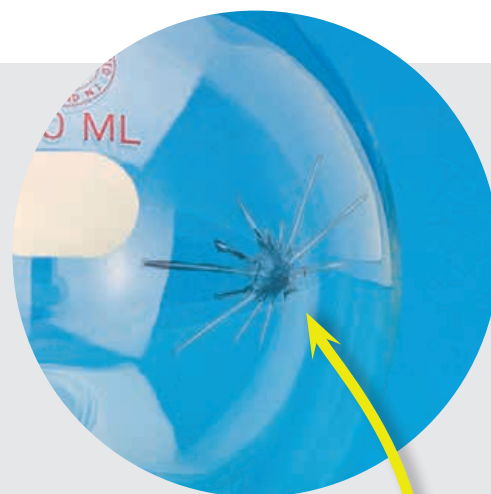
**All full-length outer joints are tooled with reinforcement rings for added strength and stability.**

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**FLASK** Three Necks, Angled, Standard/Heavy Wall ♠

With full-length reinforced ⌘ outer joints. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard wall flasks. With side necks angled.

Capacity, mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code	Capacity, mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code
<b>Heavy Wall</b>									
15	14/20	14/10	1	9465-204	1000	24/40	24/40	1	6948-226
25	14/20	14/20	1	9465-207	1000	29/42	24/40	1	6948-227
25	19/22	14/20	1	9466-206	1000	34/45	24/40	1	6948-234
50	14/20	14/20	1	9465-209	2000	24/40	24/40	1	6948-232
50	19/22	14/20	1	9466-208	2000	29/42	24/40	1	6948-235
100	14/20	14/20	1	9465-211	2000	29/42	29/42	1	6948-236
100	19/22	14/20	1	9466-210	2000	34/45	24/40	1	6948-237
100	24/40	24/40	1	6948-203	3000	24/40	24/40	1	6948-238
200	24/40	24/40	1	6948-205	3000	29/42	24/40	1	6948-239
250	14/20	14/20	1	9465-213	3000	29/42	29/42	1	6948-241
250	19/22	14/20	1	9466-212	3000	34/45	24/40	1	6948-240
250	24/40	24/40	1	6948-207	3000	34/45	29/42	1	6948-242
250	29/42	24/40	1	6948-208	5000	24/40	24/40	1	6948-258
250	19/22	19/22	1	9466-220	5000	29/42	24/40	1	6948-260
300	24/40	24/40	1	6948-212	5000	29/42	29/42	1	6948-261
500	19/22	14/20	1	9466-214	5000	34/45	24/40	1	6948-262
500	24/40	24/40	1	6948-216	5000	34/45	29/42	1	6948-263
500	29/42	24/40	1	6948-222	5000	45/50	24/40	1	6948-267
500	29/42	29/42	1	6948-220					
500	34/45	24/40	1	6948-224					
500	19/22	19/22	1	9466-224					
<b>Standard Wall</b> *22L Industry Standard, Total Volume is 19.5L									
15	14/20	14/20	1	9465-05	3000	24/40	24/40	1	6948-38
15	19/22	14/20	1	9466-04	3000	34/45	24/40	1	6948-40
25	14/20	14/20	1	9465-07	5000	24/40	24/40	1	6948-58
25	19/22	14/20	1	9466-06	5000	45/50	24/40	1	6948-67
25	14/10	14/10	1	9465-34	6000	24/40	24/40	1	6948-104
50	14/10	14/10	1	9465-36	6000	29/42	24/40	1	6948-106
50	14/20	14/20	1	9465-09	6000	29/42	29/42	1	6948-108
50	19/22	14/20	1	9466-08	6000	34/45	24/40	1	6948-110
50	19/22	19/22	1	9465-23	6000	34/45	29/42	1	6948-112
100	14/20	14/20	1	9465-11	6000	45/50	24/40	1	6948-114
100	19/22	14/20	1	9466-10	6000	45/50	29/42	1	6948-116
100	19/22	19/22	1	9465-25	12000	29/42	24/40	1	6948-69
100	24/40	19/38	1	6948-02	12000	29/42	29/42	1	6948-70
100	24/40	24/40	1	6948-03	12000	34/45	24/40	1	6948-71
200	24/40	24/40	1	6948-05	12000	34/45	29/42	1	6948-72
250	14/20	14/20	1	9465-13	12000	45/50	24/40	1	6948-75
250	19/22	14/20	1	9466-12	12000	45/50	29/42	1	6948-76
250	19/22	19/22	1	9465-27	12000	45/50	45/50	1	6948-78
250	24/40	19/38	1	6948-10	12000	55/50	24/40	1	6948-79
250	24/40	24/40	1	6948-07	12000	55/50	29/42	1	6948-81
300	24/40	24/40	1	6948-12	12000	55/50	45/50	1	6948-82
500	19/22	14/20	1	9466-14	12000	71/60	45/50	1	6948-83
500	19/22	19/22	1	9465-29	22000*	29/42	29/42	1	6948-85
500	24/40	24/40	1	6948-16	22000*	45/50	24/40	1	6948-80
500	29/42	24/40	1	6948-22	22000*	45/50	29/42	1	6948-86
500	29/42	29/42	1	6948-20	22000*	45/50	45/50	1	6948-87
500	34/45	24/40	1	6948-24	22000*	55/50	24/40	1	6948-88
500	45/50	24/40	1	6948-25	22000*	55/50	29/42	1	6948-89
1000	24/40	24/40	1	6948-26	22000*	55/50	45/50	1	6948-90
1000	34/45	24/40	1	6948-34	22000*	71/60	45/50	1	6948-91
2000	24/40	24/40	1	6948-32	22000*	71/60	55/50	1	6948-92



**FLASK Three Necks, Jacketed, Heavy Wall** ★

Round bottom flask with three in-line reinforced  $\text{S}$  outer joints. Fabricated with heavy walls, approximately 30% heavier than standard-wall flasks. Inlet/outlet connections are 28/15 O-Ring ball joints, sealed tangentially.

Cap., mL	Center Neck $\text{S}$	$\text{S}$ Side Necks	Qty	Order Code	Cap., mL	Center Neck $\text{S}$	$\text{S}$ Side Necks	Qty	Order Code
500	24/40	24/40	1	6945-217	5000	29/42	29/42	1	6945-266
500	29/42	24/40	1	6945-219	5000	34/45	24/40	1	6945-268
1000	24/40	24/40	1	6945-223	5000	45/50	24/40	1	6945-270
1000	29/42	24/40	1	6945-225	6000	24/40	24/40	1	6945-274
2000	29/42	24/40	1	6945-245	6000	29/42	24/40	1	6945-276
3000	29/42	24/40	1	6945-255	6000	29/42	29/42	1	6945-278
3000	29/42	29/42	1	6945-257	6000	45/50	24/40	1	6945-280
3000	34/45	24/40	1	6945-259	6000	45/50	29/42	1	6945-282
3000	45/50	24/40	1	6945-261	6000	45/50	45/50	1	6945-284
5000	29/42	24/40	1	6945-264					


**Replacement FETFE O-Rings**

12 7855-726

**FLASK Three Necks, Spherical, Standard/Heavy Wall** ♦

With  $\text{S}$  outer joints vertical. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard wall flasks.

Cap., mL	Center $\text{S}$ Neck	$\text{S}$ Side Necks	Qty	Order Code	Cap., mL	Center $\text{S}$ Neck	$\text{S}$ Side Necks	Qty	Order Code
<b>Heavy Wall</b>									
250	35/25	35/25	1	6950-208	2000	35/25	35/25	1	6950-238
500	35/25	35/25	1	6950-222	3000	35/25	35/25	1	6950-244
1000	35/25	35/25	1	6950-230	5000	35/25	35/25	1	6950-250
<b>Standard Wall</b>									
250	35/25	35/25	1	6950-08	3000	35/25	35/25	1	6950-44
500	35/25	35/25	1	6950-22	5000	35/25	35/25	1	6950-50
1000	35/25	35/25	1	6950-30	6000	35/25	35/25	1	6950-54
2000	35/25	35/25	1	6950-38	12000	65/40	35/25	1	6950-60



# Let Your Ideas Come to Life!

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- User-designed specialized glassware
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### FLASK Four Necks, Standard/Heavy Wall ♠

Round bottom with full-length reinforced  $\text{F}$  outer joints. The fourth neck is at 90° from the three in-line necks. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard wall flasks.

**Note:** The following sizes have angled side necks, unless ordered via special order: 250mL and 500mL for Heavy Wall (50mL, 100mL, 250mL and 500mL for Standard Wall). Illustration represents capacities of 1000mL and larger.

Capacity, mL	Center Neck $\text{F}$	$\text{F}$ Side Neck	Qty	Order Code	Capacity, mL	Center Neck $\text{F}$	$\text{F}$ Side Neck	Qty	Order Code
<b>Heavy Wall</b>									
250	24/40	24/40	1	6952-201	2000	45/50	29/42	1	6952-227
500	24/40	24/40	1	6952-202	3000	24/40	24/40	1	6952-232
500	29/42	24/40	1	6952-203	3000	29/42	24/40	1	6952-236
500	29/42	29/42	1	6952-206	3000	29/42	29/42	1	6952-237
500	34/45	24/40	1	6952-204	3000	34/45	24/40	1	6952-240
1000	24/40	24/40	1	6952-208	3000	45/50	24/40	1	6952-244
1000	29/42	24/40	1	6952-212	5000	24/40	24/40	1	6952-248
1000	29/42	29/42	1	6952-213	5000	29/42	24/40	1	6952-252
1000	34/45	24/40	1	6952-216	5000	29/42	29/42	1	6952-253
1000	34/45	29/42	1	6952-218	5000	34/45	24/40	1	6952-256
1000	45/50	24/40	1	6952-217	5000	34/45	29/42	1	6952-257
1000	45/50	29/42	1	6952-219	5000	45/50	24/40	1	6952-260
2000	24/40	24/40	1	6952-220	5000	45/50	29/42	1	6952-263
2000	29/42	24/40	1	6952-224	5000	45/50	45/50	1	6952-264
2000	34/45	24/40	1	6952-228	5000	55/50	24/40	1	6952-266
2000	34/45	29/42	1	6952-225	5000	55/50	29/42	1	6952-267
2000	45/50	24/40	1	6952-229					

### Standard Wall \*22L Industry Standard, Total Volume is 19.5L

50	14/20	14/20	1	9468-11	5000	45/50	24/40	1	6952-60
50	19/22	14/20	1	9469-12	5000	45/50	29/42	1	6952-63
100	14/20	14/20	1	9468-13	6000	24/40	24/40	1	6952-101
100	19/22	14/20	1	9469-14	6000	29/42	24/40	1	6952-103
250	14/20	14/20	1	9468-15	6000	29/42	29/42	1	6952-105
250	19/22	14/20	1	9469-16	6000	34/45	24/40	1	6952-107
250	24/40	24/40	1	6952-01	6000	34/45	29/42	1	6952-109
500	24/40	24/40	1	6952-02	6000	45/50	24/40	1	6952-111
500	29/42	29/42	1	6952-03	6000	45/50	29/42	1	6952-113
500	34/45	24/40	1	6952-04	6000	45/50	45/50	1	6952-115
1000	24/40	24/40	1	6952-08	6000	55/50	24/40	1	6952-117
1000	29/42	24/40	1	6952-12	6000	55/50	29/42	1	6952-119
1000	29/42	29/42	1	6952-13	12000	34/45	24/40	1	6952-68
1000	34/45	24/40	1	6952-16	12000	45/50	24/40	1	6952-72
1000	34/45	29/42	1	6952-18	12000	45/50	29/42	1	6952-75
1000	45/50	24/40	1	6952-17	12000	45/50	45/50	1	6952-73
1000	45/50	29/42	1	6952-19	12000	55/50	24/40	1	6952-76
2000	24/40	24/40	1	6952-20	12000	55/50	29/42	1	6952-77
2000	29/42	24/40	1	6952-24	22000*	45/50	24/40	1	6952-80
2000	34/45	24/40	1	6952-28	22000*	45/50	29/42	1	6952-81
2000	34/45	29/42	1	6952-25	22000*	45/50	45/50	1	6952-78
2000	45/50	24/40	1	6952-29	22000*	55/50	24/40	1	6952-82
2000	45/50	29/42	1	6952-27	22000*	55/50	29/42	1	6952-83
3000	24/40	24/40	1	6952-32	22000*	55/50	45/50	1	6952-84
3000	29/42	24/40	1	6952-36	22000*	71/60	24/40	1	6952-88
3000	29/42	29/42	1	6952-37	22000*	71/60	29/42	1	6952-89
3000	34/45	24/40	1	6952-40	50000	45/50	45/50	1	6952-79
3000	45/50	24/40	1	6952-44	50000	71/60	45/50	1	6952-95
5000	24/40	24/40	1	6952-48	72000	45/50	45/50	1	6952-96
5000	29/42	24/40	1	6952-52	72000	71/60	45/50	1	6952-97
5000	34/45	24/40	1	6952-56					

**FLASK Four Necks, Heavy Wall ♠**

With four reinforced ⌘ outer joints. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. The ⌘ 10/30 joint is at 90° from the three in-line joints. Illustration represents all capacities except 500mL.

**Note:** The 500mL size has angled side necks (500mL size is available with straight necks via special order).

Capacity, mL	Center Neck ⌘	⌘ Side Necks	90° Neck	Qty	Order Code
<b>Heavy Wall</b>					
500	24/40	24/40	10/30	1	6953-204
500	29/42	24/40	10/30	1	6953-205
1000	24/40	24/40	10/30	1	6953-208
1000	29/42	24/40	10/30	1	6953-212
1000	34/45	24/40	10/30	1	6953-216
2000	24/40	24/40	10/30	1	6953-220
2000	29/42	24/40	10/30	1	6953-224
2000	34/45	24/40	10/30	1	6953-228
3000	24/40	24/40	10/30	1	6953-232
5000	45/50	24/40	10/30	1	6953-260
<b>Standard Wall</b>					
500	24/40	24/40	10/30	1	6953-04
1000	24/40	24/40	10/30	1	6953-08
1000	29/42	24/40	10/30	1	6953-12
1000	34/45	24/40	10/30	1	6953-16
2000	24/40	24/40	10/30	1	6953-20
2000	29/42	24/40	10/30	1	6953-24
2000	34/45	24/40	10/30	1	6953-28
3000	24/40	24/40	10/30	1	6953-32
3000	34/45	24/40	10/30	1	6953-40
5000	45/50	24/40	10/30	1	6953-60
6000	45/50	24/40	10/30	1	6953-64
6000	45/50	29/42	10/30	1	6953-66
12000	45/50	24/40	10/30	1	6953-72


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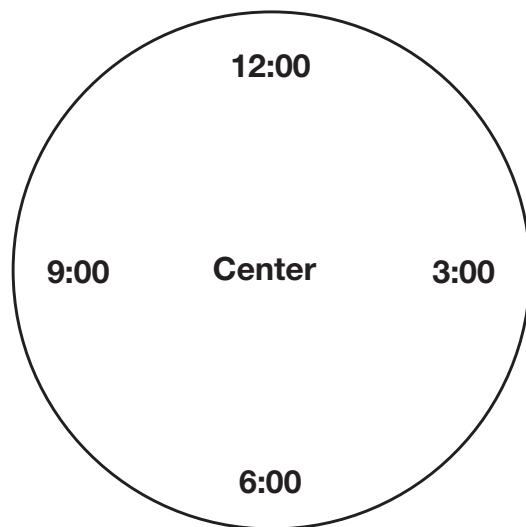


**Fax to Ace Glass: 1-800-543-6752**

## Custom Flasks

<b>A</b>	Style (bottom)	<input type="checkbox"/> Round <input type="checkbox"/> Flat	
<b>B</b>	Capacity	mL	
<b>C</b>	Number of Necks		
<b>D</b>	Neck(s) Configuration		
	Location	Distance From Center Neck	Joint Type/Size*
	Center	mm	
	3:00	mm	
	6:00	mm	
	9:00	mm	
	12:00	mm	
	Other (indicate location on diagram)	mm	
<b>E</b>	Bottom Outlet	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>F</b>	Bottom Outlet Type		
<b>G</b>	Joint Style	<input type="checkbox"/> Angled <input type="checkbox"/> Straight	

\*Joint types available include Ace-Thred, Standard Taper (⌘), or Spherical Ball/Socket (⌘). In the case of an Ace-Thred joint, you'll need to indicate the desired size (#7, #15, etc.). In the case of Standard Taper and Spherical joints, please provide desired size, i.e., 24/40, 29/42, 45/50, 35/20, 45/50, and more.



**Additional Notes/Specification (please print):**

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**Your contact information:**

<b>Name</b>	
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<b>Email Address</b>	

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## FLASK Four Necks, One #7 Ace-Thred, Standard/Heavy Wall ♠

With three reinforced ⌘ outer joints and thermometer neck internally threaded to accept 5029 nylon bushing. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard-wall flasks. Supplied complete with bushing and FETFE O-Ring. Illustration represents all capacities except 250 and 500mL.

**Note:** 250 and 500mL have angled side necks (these sizes are available with straight necks via special order).

Cap., mL	⌘ Joints Center-Side Necks	Qty	Order Code	Cap., mL	⌘ Joints Center-Side Necks	Qty	Order Code
<b>Heavy Wall</b>							
250	24/40-24/40	1	6954-272	2000	29/42-24/40	1	6954-283
500	24/40-24/40	1	6954-275	3000	24/40-24/40	1	6954-285
500	29/42-24/40	1	6954-276	3000	29/42-24/40	1	6954-286
1000	24/40-24/40	1	6954-277	3000	34/45-24/40	1	6954-287
1000	29/42-24/40	1	6954-278	3000	45/50-24/40	1	6954-288
2000	24/40-24/40	1	6954-282	5000	24/40-24/40	1	6954-289

### Standard Wall

250	24/40-24/40	1	6954-72	2000	24/40-24/40	1	6954-82
500	24/40-24/40	1	6954-75	3000	24/40-24/40	1	6954-85
1000	24/40-24/40	1	6954-77	5000	24/40-24/40	1	6954-89

### Replacement Nylon Bushings

						1	5029-10
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### Replacement FETFE O-Rings

						12	7855-704
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## FLASK Five Necks, One #7 Ace-Thred, Standard/Heavy Wall ♠

Round bottom flask with three in-line and one front reinforced ⌘ outer joint; the other front neck is a #7 Ace-Thred for use with thermometers, bleed tubes, etc. up to 7mm O.D. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard wall flasks. Supplied complete with 5029 nylon bushing and FETFE O-Ring.

Capacity, mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code
<b>Heavy Wall</b>				
500	24/40	24/40	1	6955-208
1000	24/40	24/40	1	6955-212
2000	24/40	24/40	1	6955-215

### Standard Wall

500	24/40	24/40	1	6955-08
1000	24/40	24/40	1	6955-12
2000	24/40	24/40	1	6955-15

### Replacement Nylon Bushings

						1	5029-10
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### Replacement FETFE O-Rings

						12	7855-704
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**FLASK** Five Necks, Standard/Heavy Wall ♠

With reinforced ⌘ outer joints. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard wall flasks. All five necks are in vertical position. Side necks are 90° apart.

Cap., mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code	Cap., mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code
<b>Heavy Wall</b>									
1000	24/40	24/40	1	6957-208	3000	45/50	24/40	1	6957-238
2000	24/40	24/40	1	6957-220	5000	24/40	24/40	1	6957-248
2000	29/42	24/40	1	6957-222	5000	29/42	24/40	1	6957-252
3000	24/40	24/40	1	6957-232	5000	45/50	24/40	1	6957-260
3000	29/42	24/40	1	6957-236					
<b>Standard Wall</b>									
1000	24/40	24/40	1	6957-08	5000	45/50	24/40	1	6957-60
2000	24/40	24/40	1	6957-20	6000	24/40	24/40	1	6957-70
3000	24/40	24/40	1	6957-32	6000	29/42	24/40	1	6957-72
3000	29/42	24/40	1	6957-36	6000	29/42	29/42	1	6957-74
3000	45/50	24/40	1	6957-38	6000	45/50	24/40	1	6957-76
5000	24/40	24/40	1	6957-48	6000	45/50	29/42	1	6957-78
5000	29/42	24/40	1	6957-52	6000	45/50	45/50	1	6957-80


**Indented**
**FLASK** Three Necks, Indented Morton Type, Standard/Heavy Wall

Three-neck, indented flask with reinforced ⌘ outer joints. Use caution under vacuum/pressure. Photo shows angled neck flasks. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard wall flasks.

**Note:** The 500mL and 1L sizes have angled side necks (available with straight necks via special order).

Cap., mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code	Cap., mL	Center Neck ⌘	⌘ Side Necks	Qty	Order Code
<b>Standard Wall</b>									
500	45/50	24/40	1	6958-04	5000	45/50	29/42	1	6958-20
1000	45/50	24/40	1	6958-06	6000	45/50	24/40	1	6958-22
1000	45/50	29/42	1	6958-08	6000	45/50	29/42	1	6958-24
2000	45/50	29/42	1	6958-12	6000	45/50	45/50	1	6958-26
3000	45/50	29/42	1	6958-16	12000	45/50	29/42	1	6958-28
<b>Heavy Wall</b>									
500	45/50	24/40	1	6958-204	3000	45/50	29/42	1	6958-216
500	45/50	29/42	1	6958-205	5000	45/50	29/42	1	6958-220
1000	45/50	24/40	1	6958-206	12000	45/50	29/42	1	6958-228
2000	45/50	29/42	1	6958-212					


**Indented**
**FLASK** Indented Morton Type, Standard Wall ♠

Three necks (two angled). With indents to provide for more complete agitation. The nominal capacities referred to are the standard flask capacity without indents. The actual capacity is with indents. With ⌘ 14/20 outer joints.

Nominal Capacity, mL	Actual Capacity, mL	Qty	Order Code
50	40	1	9475-08
100	80	1	9475-10
250	200	1	9475-12
300	240	1	9475-14

## FLASK *European Style, Three Necks, Jacketed* ★

Fully jacketed European style, tapered walls with shallow bottom for more efficient magnetic or mechanical half-moon shaped paddle stirring. Easy to clean. Supplied with ⌘ center neck, two ⌘ angled side necks. 24/40 necks are reinforced.

Capacity, mL	⌘ Center Neck	⌘ Side Necks	Size I.D. Tube for H/C, mm (Inches)	Qty	Order Code
125	14/20	14/20	9.5 (3/8)	1	6959-03
125	24/40	14/20	9.5 (3/8)	1	6959-05
250	14/20	14/20	11.1 (7-3/16)	1	6959-11
250	24/40	24/40	11.1 (7-3/16)	1	6959-13
500	14/20	14/20	12.7 (1/2)	1	6959-22
500	24/40	24/40	12.7 (1/2)	1	6959-24
500	29/42	24/40	12.7 (1/2)	1	6959-26
1000	24/40	24/40	12.7 (1/2)	1	6959-30
1000	29/42	24/40	12.7 (1/2)	1	6959-33
2000	24/40	24/40	12.7 (1/2)	1	6959-36
2000	29/42	24/40	12.7 (1/2)	1	6959-38



## FLASK *European Style, Five Necks, Jacketed* ★

Fully jacketed European style, tapered walls with shallow bottom for more efficient magnetic or mechanical half-moon shaped paddle stirring. Easy to clean. Supplied with ⌘ center neck, two reinforced ⌘ angled side necks, and two #7 Ace-Threads for thermometers, etc., up to 7 mm O.D. Supplied with nylon bushings and FETFE O-Rings. 24/40 necks are reinforced.

Capacity, mL	⌘ Center Neck	⌘ Side Necks	Size I.D. Tube for H/C, mm (Inches)	Qty	Order Code
125	14/20	⌘14/20-#7	9.5 (3/8)	1	6959-44 ★
250	24/40	⌘24/40-#7	11.1 (7-3/16)	1	6959-48 ★
250	29/42	⌘24/40-#7	11.1 (7-3/16)	1	6959-51 ★
500	24/40	⌘24/40-#7	12.7 (1/2)	1	6959-55 ★



### Replacement Nylon Bushings

	1	5029-10	◆
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### Replacement FETFE O-Rings

	12	7855-704	◆
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## FLASK *Tapered Wall, Five Necks, Jacketed* ★

Fully jacketed with flask walls tapered toward the bottom. Supplied with ⌘ center neck, two ⌘ angled side necks, and two #7 Ace-Threads for thermometers, etc., up to 7 mm O.D. Supplied with nylon bushings and FETFE O-Rings. 24/40 necks are reinforced.

Capacity, mL	⌘ Center Neck	⌘ Side Necks	Size I.D. Tube for H/C, mm (Inches)	Qty	Order Code
50	14/20	⌘14/20-#7	9.5 (3/8)	1	6960-02 ★
125	14/20	⌘14/20-#7	9.5 (3/8)	1	6960-09 ★
250	24/40	⌘24/40-#7	11.1 (7-3/16)	1	6960-18 ★
250	29/42	⌘24/40-#7	11.1 (7-3/16)	1	6960-20 ★
500	24/40	⌘24/40-#7	12.7 (1/2)	1	6960-35 ★
500	29/42	⌘24/40-#7	12.7 (1/2)	1	6960-37 ★



### Replacement Nylon Bushings

	1	5029-10	◆
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### Replacement FETFE O-Rings

	12	7855-704	◆
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**FLASK** *European Style, Three Necks* ♠

European style, tapered walls with shallow bottom for more efficient magnetic or mechanical half-moon shaped paddle stirring. Easy to clean. With 1/2" center neck, (2) 1/2" angled side necks. 24/40 joints are reinforced.

Capacity, mL	1/2" Center Neck	1/2" Side Necks	Qty	Order Code
125	24/40	14/20	1	6961-04
250	24/40	24/40	1	6961-09
500	24/40	24/40	1	6961-16


**FLASK** *European Style, Four Necks with Single #7 Ace-Thred* ♠

European style with additional #7 Ace-Thred port for thermometers, etc. up to 7mm O.D. With (1) reinforced 1/2" center neck and (2) reinforced 1/2" angled side necks.

**Note:** Supplied with nylon bushing and FETFE O-Ring.

Capacity, mL	1/2" Center Neck	1/2" Side Necks	Qty	Bushing Only	O-Ring Only	Complete
				Order Code	Order Code	Order Code
125	24/40	14/20	1	5029-10	7855-704	6961-34
250	24/40	24/40	1	5029-10	7855-704	6961-39
250	29/42	24/40	1	5029-10	7855-704	6961-40
500	24/40	24/40	1	5029-10	7855-704	6961-45


**FLASK** *European Style, Five Necks, with Two #7 Ace-Threds* ♠

European style with (2) #7 Ace-Thred ports, reinforced 1/2" center neck and (2) reinforced 1/2" angled side necks.

**Note:** Supplied complete with nylon bushings and FETFE O-Rings

Capacity, mL	1/2" Center Neck	1/2" Side Necks	Qty	Bushing Only	O-Ring Only	Complete
				Order Code	Order Code	Order Code
125	24/40	14/20	1	5029-10	7855-704	6961-64
250	24/40	24/40	1	5029-10	7855-704	6961-69
250	29/42	24/40	1	5029-10	7855-704	6961-70
500	24/40	24/40	1	5029-10	7855-704	6961-75


**FLASK** *Tapered Wall, Five Necks, with Two #7 Ace-Threds* ♠

With flask walls tapered inward toward the bottom. With 1/2" center neck and (2) 1/2" angled side necks. Two other necks are #7 Ace-Thred ports for thermometers, miniature electrodes, etc. up to 7mm O.D.

**Note:** Supplied with nylon bushings and FETFE O-Rings. 24/40 and 29/42 joints are reinforced.

Capacity, mL	1/2" Center Neck	1/2" Side Necks	Qty	Bushing Only	O-Ring Only	Complete
				Order Code	Order Code	Order Code
50	14/20	14/20	1	5029-10	7855-704	9473-13
125	14/20	14/20	1	5029-10	7855-704	9473-15
250	24/40	24/40	1	5029-10	7855-704	6963-17
500	24/40	24/40	1	5029-10	7855-704	6963-19
3000	60/40	29/42	1	5029-10	7855-704	6963-60


**FLASK** *Tapered Wall, Four Necks, with Single #7 Ace-Thred* ♠

With flask walls tapered inward toward the bottom. Supplied with 1/2" center neck and two reinforced 1/2" angled side necks. With single #7 Ace-Thred for thermometers, miniature electrodes, etc. up to 7mm O.D. Supplied with nylon bushings and FETFE O-Rings. 24/40 joints are reinforced.

Capacity, mL	1/2" Joints	Qty	Bushing Only	O-Ring Only	Complete
			Order Code	Order Code	Order Code
50	14/20	1	5029-10	7855-704	9473-20
125	14/20	1	5029-10	7855-704	9473-24
250	24/40	1	5029-10	7855-704	6963-34
500	24/40	1	5029-10	7855-704	6963-36



## FLASK Tapered Wall, $\text{F}$ Three Necks $\spadesuit$

With flask walls tapered inward toward the bottom. This type design allows continuous operation with smaller volumes. Supplied with reinforced  $\text{F}$  center neck and two  $\text{F}$  angled side necks. 24/40 necks are reinforced.

Capacity, mL	$\text{F}$ Joints	Qty	Order Code
50	14/20	1	9473-30
125	14/20	1	9473-32
250	24/40	1	6963-43
500	24/40	1	6963-45



## FLASK Erlenmeyer, $\text{F}$ Joint, Standard/Heavy Wall $\spadesuit$

Full-length neck is a reinforced  $\text{F}$  outer joint. Available with standard or heavy walls. Heavy wall flasks are fabricated to be approximately 30% heavier than standard wall flasks.

Capacity, mL	$\text{F}$ Joint	Qty	Order Code	Capacity, mL	$\text{F}$ Joint	Qty	Order Code
<b>Standard Wall</b>							
5	14/20	1	9471-02	500	24/40	1	6965-26
10	14/20	1	9471-04	500	29/42	1	6965-40
15	14/20	1	9471-06	500	45/50	1	6965-61
25	14/20	1	9471-08	1000	24/40	1	6965-27
50	14/20	1	9471-10	1000	29/42	1	6965-41
50	24/40	1	6965-20	1000	45/50	1	6965-62
100	14/20	1	9471-12	2000	24/40	1	6965-28
125	24/40	1	6965-22	2000	29/42	1	6965-42
250	24/40	1	6965-24	2000	45/50	1	6965-63
250	29/42	1	6965-38	4000	45/50	1	6965-64
300	24/40	1	6965-25				



### Heavy Wall

250	24/40	1	6971-24
500	24/40	1	6971-26
1000	24/40	1	6971-27
2000	29/42	1	6971-42
4000	29/42	1	6971-44

## FLASK Erlenmeyer, Stopper Top $\spadesuit$

Erlenmeyer style flask with  $\text{F}$  top joint and hollow  $\text{F}$  ground glass stopper.

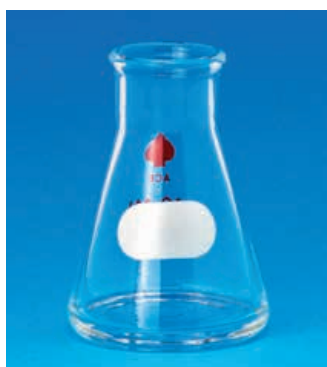
Capacity, mL	Stopper Size	Qty	Stopper Only	Complete
			Order Code	Order Code
25	16	1	8260-08	6999-06
50	19	1	8260-10	6999-10
125	22	1	8260-12	6999-14
250	27	1	8260-14	6999-18
500	32	1	8260-16	6999-22
1000	32	1	8260-16	6999-26




**FLASK Erlenmeyer** ♠

Standard Erlenmeyer style borosilicate flask with 28 joint.

Capacity, mL	Qty	28/15 Joint		35/25 Joint	
		Order Code	Order Code	Order Code	Order Code
125	1	6975-10	—	—	—
250	—	—	—	6975-37	—
300	—	—	—	6975-39	—
500	—	—	—	6975-40	—


**FLASK Erlenmeyer, Semi-Micro** ♠

Wide mouth with beaded lip to resist chipping.

Capacity, mL	I.D. of Neck, mm	Qty	Order Code
10	13	1	6991-03
25	20	1	6991-05
50	24	1	6991-10


**FLASK Kjeldahl** ♠

Standard Kjeldahl style round bottom flask with long neck and reinforced 24 top joint.

Capacity, mL	Qty	24/40		29/42	
		Order Code	Order Code	Order Code	Order Code
100	1	6967-21	—	—	—
300	1	6967-25	—	—	—
500	1	6967-26	—	6967-40	—
800	1	6967-27	—	6967-41	—


**FLASK Filtering, Heavy Wall** ♠

With reinforced 24/40 outer joint and stopcock on hose connection outlet. Glass stopcock, olive hose connection.

Capacity, mL	Qty	Order Code
250	1	6978-05
500	1	6978-10
1000	1	6978-15

**Replacement Stopcocks**

Qty	Order Code
1	8223-06

## FLASK Filtering, Heavy Wall ♠

Heavy wall Erlenmeyer style flask with 1/4-inch side hose barb and reinforced 24/40 top joint. Use with 3/8-inch I.D. tubing, size D.

Capacity, mL	Qty	Order Code
250	1	6979-05
500	1	6979-10
1000	1	6979-15
2000	1	6979-20



## STOPPER\* Firestone Hy-n-Dry ♠

“Hy-n-Dry” stopper makes any vessel a desiccator, inexpensively. Allows sample storage for long periods, free from atmospheric moisture, even during overnight temperature changes or when refrigerating. Bottom of stopper has a Porosity B (70-100 microns) sintered glass disc sealed in. Fill stopper with drying agent, 10175-21, -31 (10-20 mesh), cover with plastic cap, insert into any jointed vessel, i.e., boiling flask, volumetric flask, cylinder, etc., and you have an inexpensive desiccator. A pinhole in plastic cap allows assembled unit to “breathe” with temperature fluctuations through, not around, the desiccant. A warming trend or trace solvent evaporation does not produce pressure buildup that often causes stopper to pop out. Filled with Drierite, a 24/40 “Hy-n-Dry” stopper will absorb up to one gram of water. Supplied with plastic cap.

**Note:** NOT supplied with drying agent, see 10175.

Inner Joint	Height above Joint, mm	Top O.D. mm	Approx. Vol. mL	Qty	Order Code
14/10	35	17	6	1	8277-12
14/20	35	17	6	1	8277-14
24/40	40	28	22	1	8277-19
29/42	45	32	30	1	8277-23

\*Designed by Dr. Raymond Firestone



## FLASK Filtering, Heavy Wall, with “Ace-Safe” Thread Hose Connection ♠

With tooled neck for uniform stopper fit. Side hose connection is #11 Ace-Thred that accepts a PTFE tubing connector with silicone O-Ring and nylon bushing to make an easier, safer, more convenient vacuum hose connection. Simply slide bushing over connector, attach hose to serrated end, insert into Ace-Thred and tighten until O-Ring compresses, making a leak-tight seal. Two connectors are available: one, 5853-09, for 1/4-inch I.D. tubing with a bore of .125 inches (3.18mm); and one, 5853-10, for 3/8-inch I.D. tubing with a bore of 0.187 inches (4.75mm). Complete item consists of flask, tubing connector (-09 or -10) and 7506-01 bushing.

**Note:** One connector for all capacity flasks.

Approx. Capacity, mL	Rubber Stopper Number	Qty	Flask, only			Complete	
			Order Code	For 1/4-inch Tubing	For 3/8-inch Tubing		
250	6	1	6983-08	6983-47	6983-28		
500	6	1	6983-12	6983-49	6983-32		
1000	8	1	6983-15	6983-51	6983-36		
2000	9	1	6983-20	6983-63	6983-40		



### Replacement Parts

Tubing connector for 1/4-inch I.D. tubing, with O-Ring	5853-09
Tubing connector for 3/8-inch I.D. tubing, with O-Ring	5853-10
Nylon Bushing, only	7506-01
Silicone O-Rings	7855-206


**FLASK** *Filtering, with Removable Hose Connection* ★

Duran

Heavy wall, bottle shaped, filtering flask with removable Polypropylene hose connection. Offered clear or plastic coated. Side hose barb fits 3/8" I.D. tubing.

*Note: For replacement hose connection assembly, order 6989-40, below.*

Capacity, mL	O.D., mm	Height, mm	Neck I.D., mm	Qty	Order Code
3,000	170	295	60	1	6989-15
5,000	185	360	70	1	6989-18
10,000	240	420	70	1	6989-21
15,000	255	500	75	1	6989-24
20,000	290	535	75	1	6989-27

**Clear Glass**
**Plastic Coated**

3,000	170	295	60	1	6989-115
5,000	185	360	70	1	6989-118
10,000	240	420	70	1	6989-121
15,000	255	500	75	1	6989-124
20,000	290	535	75	1	6989-127


**REPLACEMENT HOSE CONNECTION SET** ★

Polypropylene hose connection, straight, and tubulature replacement set. Fits 3/8" I.D. tubing.

Qty	Order Code
10	6989-40


**FLASK** *Separatory Funnel Type, Three Necks, 1:5 PTFE Plug, Heavy Wall* ♠

With three reinforced necks and PTFE plug (6 mm bore on 5000mL, 4mm bore on all other sizes) stopcock bottom outlet. Fabricated with heavy walls, approximately 30% heavier than standard-wall flasks.

Capacity, mL	Joints Center-Side Necks	Qty	Replacement Stopcock	Complete
			Order Code	Order Code
500	24/40-24/40	1	8224-12	7011-244
500	29/42-24/40	1	8224-12	7011-245
500	34/45-24/40	1	8224-12	7011-246
1000	24/40-24/40	1	8224-12	7011-248
1000	29/42-24/40	1	8224-12	7011-247
1000	34/45-24/40	1	8224-12	7011-249
2000	24/40-24/40	1	8224-12	7011-251
2000	29/42-24/40	1	8224-12	7011-253
2000	34/45-24/40	1	8224-12	7011-252
2000	45/50-24/40	1	8224-12	7011-254
3000	24/40-24/40	1	8224-12	7011-255
3000	29/42-24/40	1	8224-12	7011-256
3000	34/45-24/40	1	8224-12	7011-257
3000	45/50-24/40	1	8224-12	7011-258
5000	24/40-24/40	1	8224-16	7011-259
5000	29/42-24/40	1	8224-16	7011-261
5000	34/45-24/40	1	8224-16	7011-262
5000	45/50-24/40	1	8224-16	7011-260

**PRESSURE FLASK** *Round Bottom* ♠

Heavy wall flasks with a rounded bottom to facilitate use in heating mantles, and for other round bottom flask applications. Several sizes are available, with either a #15 or #25 Ace-Thred top fitting for easy sample access and re-sealing. These flasks have a PTFE front-seal plug for better sealability with FETFE O-Rings. Flasks are rated @ 60psig maximum up to 120°C. Safety coated versions of these vessels are available upon special request. Can be ordered with a side thermowell to accommodate either temperature sensors or thermometers.

Capacity, mL	O.D., mm	Ace-Thred Size	Qty	Replacement Plug	Complete
				Order Code	Order Code
50	50	15	1	5846-48	8415-05
100	62	15	1	5846-48	8415-07
250	82	15	1	5846-48	8415-11
500	100	15	1	5846-48	8415-15
100	62	25	1	5846-50	8415-17
250	82	25	1	5846-50	8415-21
500	100	25	1	5846-50	8415-25

**With Side Thermowell**

50	50	15	1	5846-48	8417-03
100	62	15	1	5846-48	8417-05
250	82	15	1	5846-48	8417-07
500	100	15	1	5846-48	8417-09
100	62	25	1	5846-50	8417-13
250	82	25	1	5846-50	8417-15
500	100	25	1	5846-50	8417-17



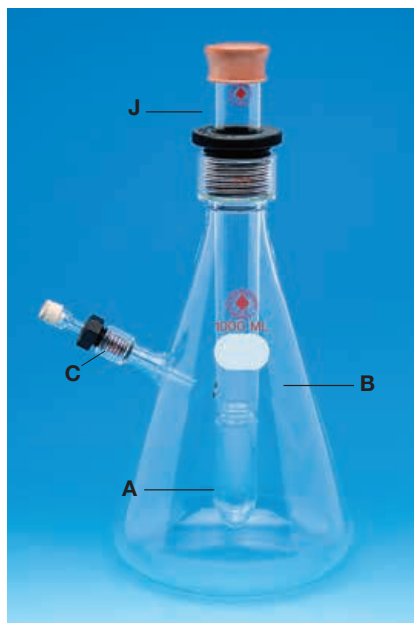
**Ace does not recommend using stir bars in pressure vessels.**

## Pressure Vessels



- Round-bottom, heavy wall design to facilitate use in heating mantles
- Several sizes available with either #7, #15, #25 or #36 Ace-Thred top fitting
- PTFE front seal plug for better sealability with FETFE O-Rings
- Available with side thermowell to accommodate either temperature sensors or thermometers
- Side port options also available for sampling.

**Safety coated versions of these vessels are available upon special request.**



### SHAKE FLASK ASSEMBLY $CO_2$ , Gledhill\*, Modified

Used for determining  $CO_2$  evolution to assess biodegradability by soil and sewerage microorganisms. Shake flask, **(A)**, containing culture medium, fits standard laboratory shakers. #7 Ace-Thred side port with nylon bushing and FETFE O-Ring holds a glass septum adapter, **(C)**. Insertion of this septum allows easier sampling or aeration while system is closed. Adapter can easily be removed for septum change. Inner well, **(B)**, contains culture material (Barium Hydroxide, etc.) and has a capacity of 10mL plus head space. Side hole in well permits good interface of vapors. Well is held securely in #25 Ace-Thred with nylon bushing and FETFE O-Ring that permits variable depth positioning. Well top is flared to accept septum, **(J)**, and can be removed or pierced to permit venting for aerating of culture media. One well fits all size vessels. Complete item consists of flask, well, septum adapter, septa for adapter and well, #7 and #25 bushings with FETFE O-Rings.

Capacity, mL	Qty	Order Code	
500	1	14205-40	♣
1000	1	14205-44	♣
2000	1	14205-50	♣

#### Replacement Parts

Flask, #25, 500mL, only	1	14205-07	♣
Flask, #25, 1000mL, only	1	14205-09	♣
Flask, #25, 2000mL, only	1	14205-13	♣
Well, only	1	14205-25	♣
Septum Adapter only	1	14205-28	♣
Bushing, Nylon, #7	1	5029-10	♣
Bushing, Nylon, #25	1	7506-10	♣
O-Rings, FETFE for #7	12	7855-704	♣
O-Rings, FETFE for #25	6	7855-734	♣
Septum, Side Port	12	9096-32	★
Septum, Well	12	9096-56	★

\*Dr. William E. Gledhill, Monsanto Company, as described in "Journal of Applied Microbiology", December 1975, pp 922-929.



### ACE PLASTIC COATING ♣

Easy to apply plastic coating forms a protective film around a glass vessel. If the glass should fracture during use, the film will help contain both the broken glass and the product inside the vessel until the materials can be safely disposed of. The film does not increase the mechanical strength of the vessel; instead, it merely holds the broken vessel together for disposal. The film can withstand temperatures up to 110°C for an extended period without degrading. The film is resistant to most chemicals for a period long enough for recovery or proper disposal. The film will work even in vacuum applications and can contain fractured manifolds or vessels. The ACE plastic coating can also be used to apply a protective coating on spatulas, ring stands, clamps and other tools. Available in two different size containers.

	500mL	1.9 Liters
Qty	Order Code	Order Code
1	13100-10	13100-15

## FLASK Dewar ★

Borosilicate glass cylindrical form, silvered and evacuated. Furnished with an aluminum base and plastic mesh.

Capacity, mL	I.D., mm	Inside Height, mm	Qty	Order Code
350	68	113	1	7075-05
665	68	195	1	7075-10
1000	68	302	1	7075-15
1900	119	195	1	7075-20
4300	152	276	1	7075-25



## FLASK Dewar, Plastic Coated

Borosilicate glass cylindrical form, silvered and evacuated. Furnished with an aluminum base. Exterior, including base, is coated with a tough, resilient, baked-on plastic which does not rupture if flask breaks.

Capacity, mL	I.D., mm	Inside Height, mm	Qty	Order Code	
350	68	113	1	7076-03	♠
665	68	195	1	7076-06	♠
1000	68	302	1	7076-09	♠
1900	119	195	1	7076-12	♠
4300	152	276	1	7076-15	★



## FLASK Dewar, Low Form ★

Cylindrical low form silvered and evacuated. Ideal for sub-ambient work. Low form design allows use of multi-neck flask with magnetic stirring.

Capacity, mL	I.D., mm	Inside Height, mm	Qty	Order Code
150	80	35	1	7078-04
350	80	75	1	7078-06
500	105	80	1	7078-08
850	130	75	1	7078-10
1500	143	109	1	7078-12
2500	170	135	1	7078-14



## FLASK Dewar, Plastic ★

Molded of high-density polyethylene expanded polystyrene cover; polyethylene coated handle. The first all-plastic Dewar flask suitable for cryogenic work. Unbreakable. The double walls are molded from chemically-resistant linear polyethylene, which will withstand temperatures from -196°C to +100°C. The annulus is filled with insulating urethane foam. Ribs molded in for safe handling. Vented, insulating cover. Convenient bail-type handle on all but 10 liter size.

Capacity, L	I.D. at Mouth, mm	Inside Depth, mm	Overall Height, mm	Qty	Order Code
1	95	194	229	Each or case of 4	12540-05
2	121	225	260	Each or case of 2	12540-07
4	146	287	324	Each or case of 2	12540-09
10	197	394	457	1	12540-11




**FLASK Volumetric, Class A ♠**

Specially designed, standardized volumetric flasks, with stoppers. All capacities have  $\frac{1}{2}$  12/18 outer joint with approximately 10mm opening. Cylindrical body affords better mixing and drainage, and ease of withdrawal using pipets. Wide base offers greater stability. Upper surface of base is ground to allow pencil markings. Class "A" tolerances.

Capacity, mL	Qty	Order Code
15	1	7124-15
20	1	7124-20

**Replacement Stoppers**

	1	8255-08
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**FLASK Volumetric, Pilot Plant**

Large capacity volumetric flask with  $\frac{1}{2}$  outer joint, without graduation mark. Supplied without stopper.

Capacity, mL	$\frac{1}{2}$ Joint	Flask only			Stopper only	
		Qty	Order Code		Order Code	
5000	34/28	1	7127-25	★	8255-18	♠
10000	40/35	1	7127-30	★	8255-20	♠

## Repair Service

*Yes, we fix it, too!*

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. These repairs can be far less expensive than the cost of replacing.

To find out more about our repair service call **1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)



Broken joint or a cracked flask, we can restore it!



## FLASK Reaction, Jacketed, Conical 4-Inch Flange ♦

Jacketed cylindrical flask with conical neck opening of four inches (100mm). Inlet and outlet connections are size 28/15 O-Ring ball joints, both sealed tangentially, one at top and one at bottom of jacketed section.

**Note:** See 6495 for FETFE gaskets, 6496-10 for clamp.

Capacity, mL	O.D., mm	I.D., mm	Height, mm	Top PTFE Gasket	Qty	Order Code
1000	150	104	235	6495-10	1	6475-10
1500	150	104	245	6495-10	1	6475-15
2000	150	104	335	6495-10	1	6475-20
3000	150	104	415	6495-10	1	6475-25



## FLASK Reaction, Conical 4-Inch Flange ♦

Rugged cylindrical flask with conical neck opening of four inches (100mm). Uses 6496-10 clamp for securing flask head to flask.

**Note:** See 6495 for FETFE gaskets.

Capacity, mL	O.D., mm	I.D., mm	Height, mm	Top PTFE Gasket	Qty	Order Code
500	114	104	120	6495-10	1	6476-05
1000	114	104	180	6495-10	1	6476-10
1500	114	104	220	6495-10	1	6476-15
2000	114	104	260	6495-10	1	6476-20
3000	114	104	340	6495-10	1	6476-25



## FLASK Reaction, with Indents, Conical 4-Inch Flange ♦

Same as 6476, except with side indents for improved stirring characteristics. Uses 6496-10 clamp for securing conical flask head to flask. Use caution under vacuum/pressure.

**Note:** See 6495 for FETFE gaskets.

Capacity, mL	O.D., mm	I.D., mm	Height, mm	Top PTFE Gasket	Qty	Order Code
500	114	104	120	6495-10	1	6477-05
1000	114	104	180	6495-10	1	6477-10
1500	114	104	220	6495-10	1	6477-15
2000	114	104	260	6495-10	1	6477-20
3000	114	104	340	6495-10	1	6477-25



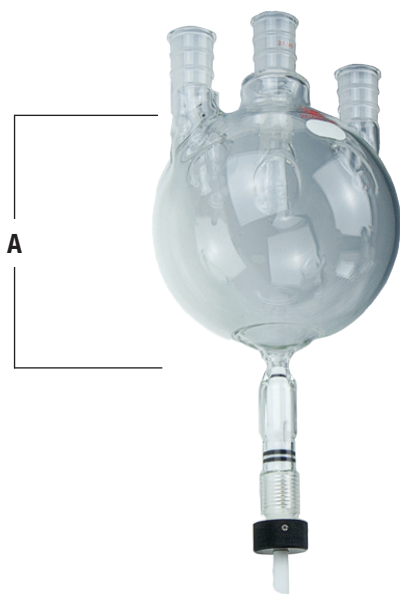
## FLASK Reaction, with Indents, Conical 4-Inch Flange ♦

Rugged spherical flask with conical neck opening of four inches (100mm). With side indents for improved stirring characteristics. Standard size flasks use regular Glas-Col heating mantles of equivalent capacity. Length of straight section, including flange, approximately 9.5cm (3-3/4 inches). Uses 6496 clamp for securing conical flask head to flask. Use caution under vacuum/pressure.

**Note:** See 6495 for FETFE gaskets, 6496-10 for clamp.

Capacity, Liters	Nominal O.D., mm	Nominal I.D., mm	Height, mm	Neck Height, mm	Qty	Order Code
3	180	166	270	100	1	6481-05
5	226	212	320	100	1	6481-10
12	285	270	380	100	1	6481-15



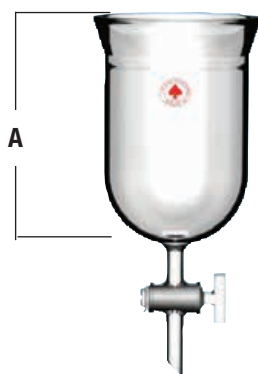

**FLASK** Three Necks, Heavy Wall, with ZDS™ Valve

Heavy wall, round bottom flask with three 24/40 vertical necks and ZDS™ valve attached. Other 24/40 neck joint sizes are available as special orders. Bottom outlet is Zero Dead Space (ZDS) valve.

Capacity, Liters	Nominal O.D., mm	Nominal I.D., mm	Height, mm (A)	Neck Height, mm	Center Neck 24/40	24/40 Side Necks	Bottom Outlet, mm	Qty	Order Code	
1	125	115	180	100	24/40	24/40	0-10	1	6483-110	♠
2	160	150	250	100	24/40	24/40	0-10	1	6483-112	♠
3	180	166	270	100	24/40	24/40	0-10	1	6483-120	♠

**Replacement Valves**

								1	6541-150	★
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**REACTION FLASK** Conical 4-Inch Flange ♠

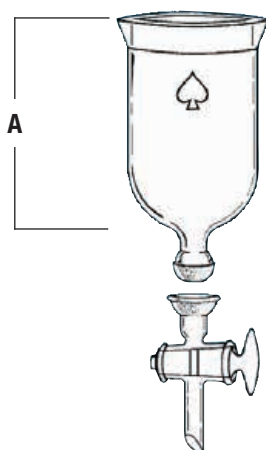
With 4mm bore stopcock for rapid removal of contents without disturbing the general arrangement of the apparatus. Conical neck opening is 100mm (4-inches). Use 6496-10 clamp for securing head to flask.

Note: See 6495 for gaskets, 6496 for clamp.

Capacity, Liters	O.D., mm	I.D., mm	Height, mm (A)	Top PTFE Gasket	Qty	Order Code
1	114	104	180	6495-10	1	6491-10
2	114	104	260	6495-10	1	6491-20

**Replacement Stopcocks**

					1	8223-06
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**REACTION FLASK** Conical 4-Inch Flange ♠

With 4mm bore stopcock. Stopcock is separated from lower section by 28/15 joint. Otherwise, identical to 6491. For bottom joint clamp, order 7669-12. Use 6496-10 clamp for securing head to flask.

Note: See 6495 for gaskets.

Capacity, Liters	O.D., mm	I.D., mm	Height, mm (A)	Qty	Flask, only	Stopcock, only	Complete
					Order Code	Order Code	Order Code
1	114	104	220	1	6492-02	6492-10	6492-15
2	114	104	300	1	6492-06	6492-10	6492-25

**For a complete listing of larger size reaction flasks, view our Process Scale-Up Reactor catalog online at [AceGlass.com](http://AceGlass.com)**

## FLASK Reaction, Flat Flange ♠

Cylindrical, heavy-wall reaction flask, round bottom, with flat, ground flange. Without constriction at top to facilitate introduction/removal of material and allow for ease of cleaning.

Capacity, Liters	O.D., mm	I.D., mm	Height, mm	Flange		Top FETFE Gasket	Qty	Order Code
				O.D., mm	O.D., mm			
1	110	100	165	137	137	6495-21	1	6511-06
2	140	130	185	168	168	6495-23	1	6511-08
3	140	130	260	168	168	6495-23	1	6511-10
4	140	130	335	168	168	6495-23	1	6511-12

### Replacement Parts and Accessories

Reaction Heads- See 6512, 6513 or 6515

Clamps- See 6508 or 6510



## FLASK Reaction, Flat Flange, with O-Ring Groove ♠

Cylindrical, heavy-wall reaction flask, round bottom. Top has flat flange with an O-Ring groove for use with CAPFE® (PTFE encapsulated silicone rubber) O-Ring instead of gasket. Without constriction at top to facilitate introduction/removal of material and allow for ease of cleaning. Flask is supplied with one CAPFE O-Ring.

Capacity, Liters	O.D., mm	I.D., mm	Height, mm	Flange		Top CAPFE O-Ring	Qty	Order Code
				O.D., mm	O.D., mm			
1	110	100	165	137	137	7855-887	1	6511-42
2	140	130	185	168	168	7855-889	1	6511-45
3	140	130	260	168	168	7855-889	1	6511-47
4	140	130	335	168	168	7855-889	1	6511-49

### Replacement Parts and Accessories

Reaction Heads- See 6512, 6513 or 6515

Clamps- See 6508 or 6510



## FLASK Reaction, Flat Flange ♠

Cylindrical heavy wall reaction flask, with flat bottom rounded into side wall, and flat, ground flange top. Without constriction at top to facilitate introduction/removal of material and allow for ease of cleaning.

Capacity, Liters	O.D., mm	I.D., mm	Height, mm	Flange		Top PTFE Gasket	Qty	Order Code
				O.D., mm	O.D., mm			
1	110	100	165	137	137	6495-21	1	6511-24
2	140	130	185	168	168	6495-23	1	6511-27
3	140	130	260	168	168	6495-23	1	6511-29
4	140	130	335	168	168	6495-23	1	6511-31

### Replacement Parts and Accessories

Reaction Heads- See 6512, 6513 or 6515

Clamps- See 6508 or 6510



## FLASK Reaction, Flat Flange, with O-Ring Groove ♠

Cylindrical heavy-wall reaction flask, with flat bottom rounded inside wall, and flat flange. Flange has an O-Ring groove for use with CAPFE® (PTFE encapsulated silicone rubber) O-Ring instead of gasket. Without constriction at top to facilitate introduction/removal of material and allow for ease of cleaning. Flask is supplied with one CAPFE O-Ring.

Capacity, Liters	O.D., mm	I.D., mm	Height, mm	Flange		Top CAPFE O-Ring	Qty	Order Code
				O.D., mm	O.D., mm			
1	110	100	165	137	137	7855-887	1	6511-53
2	140	130	185	168	168	7855-889	1	6511-56
3	140	130	260	168	168	7855-889	1	6511-58
4	140	130	335	168	168	7855-889	1	6511-60

### Replacement Parts and Accessories

Reaction Heads- See 6512, 6513 or 6515

Clamps- See 6508 or 6510



**GASKET PTFE**

PTFE gaskets, white in color, for mating ground flange surfaces on reactor flasks and matching heads. Work on all conical style and flat flange style flask and heads. PTFE makes a leak-free seal with slight clamp pressure. They also provide the added chemical resistance and purity of PTFE.

Thickness, inches/mm	O.D., inches (mm)	Fits Flask Size, mL	Grooved	Qty	Order Code	
0.03/0.8	5.250 (133.4)	500-3000	No	1	<b>6495-10</b>	♠
0.03/0.8	5.375 (136.7)	500-1000	Yes	1	<b>6495-21</b>	♠
0.03/0.8	6.625 (168.4)	2000-4000	Yes	1	<b>6495-23</b>	★

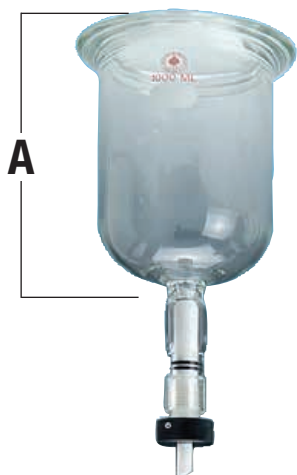
**GASKET FETFE**

ACE FETFE gaskets, black in color, for mating ground flange surfaces on reactor flasks and matching heads. Work on all conical style and flat flange style flask and heads. FETFE makes a leak-free seal with clamp pressure. FETFE is an exclusive ACE product made from TFE impregnated fluoroelastomers with good chemical and temperature resistance.

Thickness, inches/mm	O.D., inches (mm)	Fits Flask Size, mL	Grooved	Qty	Order Code	
0.02/0.5	5.375 (136.7)	500-1000	Yes	1	<b>6495-43</b>	★
0.02/0.5	6.625 (168.4)	2000-1000	No	1	<b>6495-47</b>	★

**FLASK Reaction, Cylindrical, with ZDS™ Valve ♠**

Cylindrical, heavy wall flask with round bottom. Flask has Duran style top flange supplied with O-Ring groove for use with heads 6433, 6527, 6528 or 6529. Comes with one CAPFE O-Ring (silicone optional). Bottom outlet is ZDS™ (Zero Dead Space) PTFE valve with Chemraz O-Rings. Uses 6517 quick release clamp.



Capacity, mL	O.D., mm	I.D., mm	Height, mm (A)	Flange Size, mm (in.)	Bottom Outlet, mm	Qty	Top O-Ring Only	Bottom Valve Only	Complete
							Order Code	Order Code	Order Code
1000	110	100	180	100 (4)	0-10	1	7855-880	6541-150	<b>6518-10</b>
2000	110	100	265	100 (4)	0-10	1	7855-880	6541-150	<b>6518-12</b>
2000	155	145	200	150 (6)	0-20	1	7855-881	6541-152	<b>6518-14</b>
3000	110	100	400	100 (4)	0-10	1	7855-880	6541-150	<b>6518-16</b>
3000	150	140	250	150 (6)	0-20	1	7855-881	6541-152	<b>6518-18</b>
4000	155	145	300	150 (6)	0-20	1	7855-881	6541-152	<b>6518-20</b>

**FLASK Reaction, Cylindrical, Indented Style ♠**

Rugged cylindrical reaction flask with Duran style flat flange with O-Ring groove, for use with 6517 quick release clamp, but with indents for greater agitation. Each flask is supplied with one CAPFE O-Ring (PTFE encapsulated silicone O-Ring). Plain silicone O-Rings are also available.

**Note:** Use caution under vacuum/pressure.

Capacity, Liters	O.D., mm	I.D., mm	Height, mm	Flange Size, mm (in.)	Top O-Ring	Qty	Order Code
1	110	100	180	100 (4)	7855-880	1	<b>6526-10</b>
2	110	100	265	100 (4)	7855-880	1	<b>6526-12</b>

**Replacement Parts and Accessories**

Reaction Heads- See 6528

Cooling/heating coils- See 12067

Quick Release Clamp- 6517-25



**Don't see what you're looking for?  
We can help.**

# LET YOUR IDEAS COME TO LIFE

...with help from Ace Glass

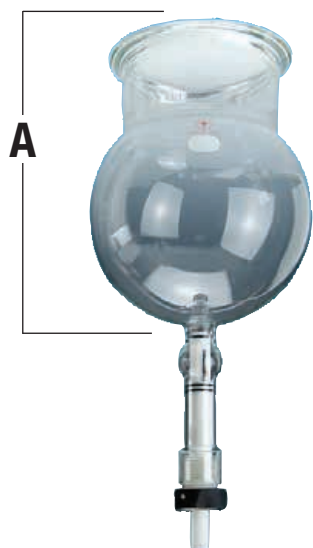


We can provide just one piece or as many as you need

Reproduction of competitive products

User designed specialized glassware

Modification of existing stock products


**FLASK** Reaction, Spherical, with ZDS™ Valve ♠

Heavy wall spherical reaction flask with Duran style flat grooved flange opening. Flask uses 6517 quick release clamp. Takes all Duran style heads. Flask comes with one CAPFE O-Ring. Bottom outlet is Zero Dead Space (ZDS) valve.

Cap, Liters	O.D., mm	I.D., mm	Height, mm (A)	Neck Height, mm	Flange I.D., mm (In.)	Bottom Outlet, mm	Qty	Top CAPFE O-Ring Only	Bottom Valve Only*	Complete
								Order Code	Order Code	Order Code
2	160	150	250	100	100 (4)	0-10	1	7855-880	6541-150	6540-104
3	180	166	270	100	100 (4)	0-20	1	7855-880	6541-152	6540-106
5	226	212	320	100	100 (4)	0-20	1	7855-880	6541-152	6540-108
5	226	212	320	100	150 (6)	0-20	1	7855-881	6541-152	6540-110
12	285	270	380	100	150 (6)	0-20	1	7855-881	6541-152	6540-115
22	350	336	450	100	150 (6)	0-20	1	7855-881	6541-152	6540-120

\*Bottom valves are Net (★) and not subject to discount.

For a complete listing of larger size reaction flasks, view our Process Scale-Up Reactor catalog online at [AceGlass.com](http://AceGlass.com)

**THE SAFEST HEATING METHOD...**

# ACE INSTATHERM®

## FOR GLASS VESSELS

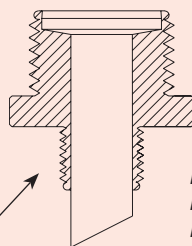
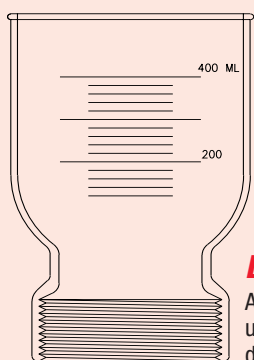
- Eliminate the need for heating tape, immersion heaters and heating mantles.
- Can be added to custom orders!



## A Unique Concept in Lab Filtration Apparatus!

### No clamp, no leakage!

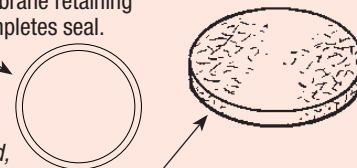
Using Ace-Thred design, filter funnel and filter flask thread together without the silicone stopper and troublesome clamping device.



### Better membrane utilization!

Accommodates the 47mm and 25mm membranes and uses 45mm of the 47mm grid vs. only 35-40mm in older designs.

Nylon membrane retaining ring completes seal.



### Removable frits!

Unit disassembles completely for easy cleaning. Uses removable frits of different porosities, from extra coarse to extra fine, instead of expensive, sealed-in frits.

## FILTRATION APPARATUS 25mm ♠

Ace Glass offers a unique concept for lab filtration apparatus. Using our famous Ace-Thred design, we are able to thread the filter funnel and filter flask together without the silicone stopper and troublesome clamping device. This design also eliminates leakage problems.

The filter unit has four basic parts; the funnel, flask, nylon adapter piece and a removable glass fritted disk. The unit can be completely disassembled for easy cleaning. Instead of a sealed-in glass fritted support, the disks can be easily removed and cleaned, and offer the availability of different frit sizes, from extra coarse to extra fine. The adapters are also available in PTFE or other polymers on special order. The assembly is autoclavable.

**Complete Filtration Apparatus 3700-10 includes one each:** 500mL filter flask w/Ace-Thred top & #7 Ace-Thred & Ace-Safe connector, nylon adapter w/#25 Ace-Threds, 25mm Porosity B (70-100 micron) fritted disc, nylon retaining ring, 100mL graduated funnel with Ace-Thred bottom.

Description	Qty	Order Code
500mL filter flask with #25 Ace-Thred top and #7 Ace-Safe connector	1	<b>3700-08</b>
500mL filter flask with $\text{F}$ 24/40 outer joint top and glass hose barb side port	1	<b>6979-10</b> <i>optional</i>
Nylon adapter with #25 Ace-Thred both ends	1	<b>3700-06</b>
Nylon adapter with #25 Ace-Thred one end and $\text{F}$ 24/40 inner joint bottom	1	<b>3700-04</b> <i>optional</i>
100mL funnel with #25 Ace-Thred bottom, graduated	1	<b>3700-02</b>
Porosity B fritted disk (70-100 micron) 25mm	1	<b>3703-25</b>
Porosity A fritted disk (145-174 micron) 25mm	1	<b>3703-23</b> <i>optional</i>
Porosity C fritted disk (25-50 micron) 25mm	1	<b>3703-29</b> <i>optional</i>
Nylon ring 25mm	1	<b>3700-01</b>

### Complete

1 **3700-10**



## FILTRATION APPARATUS 47mm ♠

A 47mm version of 3700 filtration apparatus, listed above. **Complete filtration apparatus 3702-10 includes one each:** 1000mL filter flask w/Ace-Thred top & #7 Ace-Thred & Ace-Safe side port connector, nylon adapter w/#25 Ace-Thred bottom & #50 Ace-Thred top, nylon retaining ring, 50mm Porosity B (70-100 micron) fritted disc, 500mL graduated funnel w/#50 Ace-Thred bottom.

Description	Qty	Order Code
1000mL filter flask with #25 Ace-Thred top and #7 Ace-Safe connector	1	<b>3702-08</b>
1000mL filter flask with $\text{F}$ 24/40 outer joint top and glass hose barb side port	1	<b>6979-15</b> <i>optional</i>
Nylon adapter with #25 Ace-Thred bottom and #50 Ace-Thred top	1	<b>3702-06</b>
Nylon adapter with #50 Ace-Thred top and $\text{F}$ 24/40 inner joint bottom	1	<b>3702-05</b> <i>optional</i>
500mL funnel with #50 Ace-Thred bottom, graduated	1	<b>3702-04</b>
Porosity B fritted disk (70-100 micron) 47mm	1	<b>3703-47</b>
Porosity A fritted disk (145-174 micron) 47mm	1	<b>3703-45</b> <i>optional</i>
Porosity C fritted disk (25-50 micron) 47mm	1	<b>3703-49</b> <i>optional</i>
Nylon ring 47mm	1	<b>3702-02</b>

### Complete

1 **3702-10**





### INSTATHERM FILTRATION APPARATUS *Funnel, 47mm*

This apparatus differs from the standard 47mm filtration apparatus as it uses Ace Glass' proprietary Instatherm technology to evenly heat the top 400mL funnel, thus keeping the viscous materials in a flowing liquid state. The middle adapter is PTFE with a PTFE snap-ring. The interchangeable fritted disk is the coarse, 25-to-50 micron size. The entire assembly can be easily taken apart for cleaning and the fritted filter disc can easily and inexpensively be cleaned or replaced. This system is excellent for filtering oils or thick slurries and using either 47mm membranes or filter paper disks. Perfect for sample prep for various ASTM petroleum and polymer testing procedures and for new biofuel testing protocols.

Description

Qty

Order Code

#### Complete Apparatus

1 3704-10 ★

#### Replacement Parts

1L Filter flask w/ #25 Ace-Thred

1

3702-08

♠

PTFE Adapter w #25 btm and #50 top Ace Threads

1

3704-05

★

PTFE retaining ring

1

3704-06

★

47mm OD porosity C (25-50 micron) fritted disc

1

3703-49

♠

500mL Instatherm coated filter funnel w/temp controller connecting cord

1

3704-01

★



### VACUUM PUMP *Mini, ILMVAC* ★

These compact new models are designed with a small, twin-head, diaphragm pump, enclosed in robust housing and a wide voltage range power adapter. They are extremely quiet with low vibration for lab bench use. The small footprint also takes up very little bench space. The Model MP is standard duty for most applications in water and wastewater sampling and testing and for biological testing and sampling. They match very well to the ACE filtration apparatus units 3700 and 3702. The MPR series is chemically resistant for solvent or vapor applications such as low-pressure chromatography or for small rotary evaporators. Both pumps utilize PTFE diaphragms and PEEK valves for wear resistance and minimal maintenance. Selectable voltage from 90-240 volt. 60mBar maximum vacuum, 10L/min. flow rate

General Features:

- Low priced vacuum pumps for filtration, drying and degassing
- Standard and chemically resistant models
- Extremely quiet – low noise and low vibration twin head design
- Plug and play wide range power adapter

Head Material ILMVAC Model

Qty

Order Code

Aluminum MP060E

1

14125-01

PPS MPR060E

1

14125-03





### FILTRATION APPARATUS 2 Liter Flask, 75mm

75mm OD filtration apparatus. Can be used with membranes or filter paper with 75mm OD. Design gives 99% utilization of the surface area for membranes or filter paper. Can be used with just Size C "Coarse" fritted glass disc for solvent recycling. Glass components are all borosilicate and the center adapter is all inert PTFE. The entire assembly threads apart easily for cleaning and filter paper insertion; autoclaveable. Erlenmeyer flask version (pictured). Easily threads together and apart for ease of use and easy cleaning. The contents can be easily captured or poured out of the flask. The frit is easily interchanged. Flask has #15 Ace-Safe connection with 1/2-inch hose connection for vacuum hook-up.

Description	Order Code	
<b>Complete Apparatus</b>	<b>3708-02</b>	♠
<b>Replacement Parts</b>		
1000mL Funnel with graduations	3708-10	♠
PTFE Flask Adapter #80 to #50 Ace-Thred	3708-14	★
2L Erlenmeyer Flask	3708-20	♠
Porosity C fritted disk (25-50 micron), 75mm	3703-75	♠
PTFE Ring, 75mm	3708-16	★



### FILTRATION APPARATUS 2 Liter Bottle, 75mm

75mm OD filtration apparatus. Can be used with membranes or filter paper with 75mm OD. Design gives 99% utilization of the surface area for membranes or filter paper. Can be used with just Size C "Coarse" fritted glass disc for solvent recycling. Glass components are all borosilicate and the center adapter is all inert PTFE. The entire assembly threads apart easily for cleaning and filter paper insertion; autoclaveable. Bottle has a GLS80 wide mouth, balance of components for the complete apparatus are a 1L graduated funnel, an all-PTFE bottle adapter and a PTFE retaining ring. The GLS80 polypropylene cap is included to seal off the bottle after filtering. Bottle has #15 Ace-Thred vacuum port with 1/2-inch hose connection, and 75mm "coarse" glass fritted disc.

Description	Order Code	
<b>Complete Apparatus</b>	<b>3709-05</b>	♠
<b>Replacement Parts</b>		
1000mL Funnel with graduations	3708-10	♠
PTFE Bottle Adapter #80 Ace-Thred to GLS80	3709-16	★
5L Duran bottle with #15 Ace-Safe connection	3709-18	♠
Porosity C fritted disk (25-50 micron), 75mm	3703-75	♠
PTFE Ring, 75mm	3708-16	★



### FILTRATION APPARATUS 5000mL Bottle, 75mm

Jacketed filtration apparatus for 75mm membranes or filter paper. Ideal for solvent recycling and other filter applications where temperature control is required. All threaded apparatus eliminates the need for clamping. Coarse glass fritted disc is interchangeable with an all PTFE support (5814-338) if preferred. GL80 wide mouth bottle with #15 Ace-Thred vacuum connection, all PTFE center adapter and jacketed filter funnel complete the unit.

Description	Order Code	
<b>Complete Apparatus</b>		
1000mL Jacketed Funnel, 5000mL Bottle	3710-01	
2000mL Jacketed Funnel, 5000mL Bottle	3710-02	
<b>Funnel Only</b>		
1000mL Jacketed Funnel, #80 Ace-Thred, 1in beaded pipe inlet/outlet	3710-11	
2000mL Jacketed Funnel, #80 Ace-Thred, 1in beaded pipe inlet/outlet	3710-12	

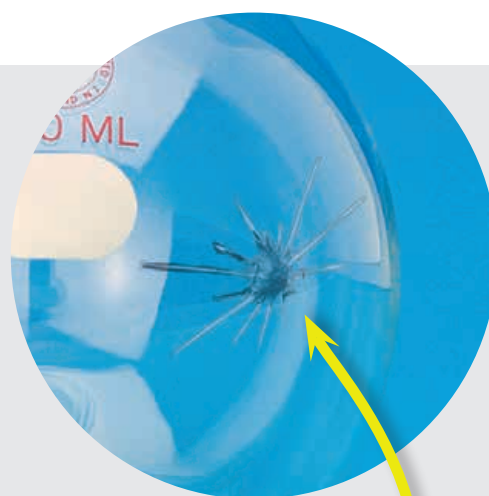


# REPAIR SERVICE SCIENTIFIC GLASSWARE

## Yes, we fix it, too!

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. These repairs can be far less expensive than the cost of replacing.

Broken joint or a cracked flask, we can restore it!



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## The Only Glass Fiber Disc

### General Information

The proprietary glass fiber structure of Ace frits results in a more abrasion-resistant surface. The particles are fused together in stronger, wider matrix, and do not detach from the filter body as easily as the spheroid granules used in other frits. Being made entirely of glass, resistance to thermal shock and chemical attack is superior. We offer what we believe to be the highest quality filter available, with a hardness which is unsurpassed, featuring less “flaking” of material.

Pore size is determined by the pressure required to force the first bubble of air through the filter when it is just immersed in a liquid of known surface tension. From this pressure, the maximum pore diameter in microns is calculated. This method, which is in common use among filter manufacturers, gives calculated values in reasonable agreement with optical measurements. It is generally agreed that a glass filter will retain all particles larger than the maximum determined pore diameter.

### Data on Pore Diameter and Uses

ACE Designation	Porosity Maximum Pore Dia. Range (micron)	Corning, Kimble & ChemGlass Equivalent	Most Frequent Uses
A	145-174	EC (170-220)	Coarse filtration. Gas Dispersion
B	70-100	—	Coarse filtration. Gas Dispersion
C	25-50	C (40-60)	Filtration. Gas Dispersion
D	10-20	M (10-15)	Filtration and extraction
E	4-8	F (4-5.5)	Filtration and extraction

### Flow Characteristics

Aqueous flow rate from 0.5 to 200mL/min./cm<sup>2</sup> at 100mm Hg. pressure drop are covered in the porosities A to E. A tabulation of these flow rates for various porosities is almost meaningless since operating conditions vary so widely. In addition, a number of interesting phenomena occur that may rapidly and reversibly change the flow rate of a given filter by a factor of two or more, particularly in filters of smaller pore size. Hence, any discussion of flow rate becomes detailed and involved. Glass filters carry a negative charge.

Only materials that attack glass will affect these filters, i.e. HF, Alkalies, H<sub>3</sub>PO<sub>4</sub>. HF attacks rapidly; the others, relatively slowly.

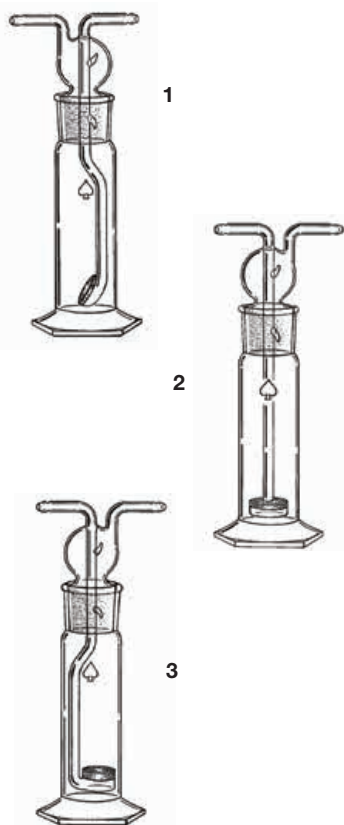
Since surface scratches can materially reduce the strength of glass, scratching the envelope in the vicinity of the disc should be guarded against, particularly on large filters, since this is the area of maximum stress under vacuum. Mechanical cleaning can be accomplished by reverse-flow washing. This is the most effective mechanical means. Do not exceed 1.06 Kg/cm<sup>2</sup> pressure.

### Care and Cleaning

**For Chemical Cleaning, the following are recommended:**

Material to be Removed:	Removal Agent:
Barium Sulfate	Concentrated H <sub>2</sub> SO <sub>4</sub> plus a small amount of KClO <sub>4</sub> to 80-90°C and soak
Fat	CCl <sub>4</sub>
Mercury	Hot HNO <sub>3</sub>
Mercuric Sulfide	Hot Aqua Regia
Organic Residues	Warm concentrated H <sub>2</sub> SO <sub>4</sub> plus a small amount of KNO <sub>3</sub> and soak
Silver Chloride	NH <sub>4</sub> OH
Sugars & Glucose	Hot H <sub>2</sub> SO <sub>4</sub> plus HNO <sub>3</sub>
Free Carbon	Heat in a muffle furnace to 482°C in an oxidizing atmosphere. Cooling may be at the rate of -12°C/min. or greater, but thermal shock must not exceed 93°C.
Dia (micron) = $\frac{30\delta}{P}$	Surface tension in a dynes/cm at test temperature P = mm Hg. where first bubble appears.

*The test liquid must wet the filter; that is, the contact angle must be negligible.*



**BOTTLE Gas Washing ♦**

Large disc size provides greater capacity. 125mL size has a 25mm fritted disc. The 250mL and 500mL sizes are fitted with a 30mm disc. Joints are  $\text{K} 40/35$ . All porosities of a given size are priced the same. Inlet/outlet arms are 8mm O.D.

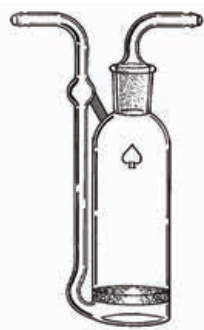
**Complete**

Capacity, mL	Style	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code
125	1	1	7162-02	7162-04	7162-06
125	2	1	7163-02	7163-04	7163-06
125	3	1	7164-02	7164-04	7164-06
250	1	1	7162-12	7162-14	7162-16
250	2	1	7163-12	7163-14	7163-16
250	3	1	7164-12	7164-14	7164-16
500	1	1	7162-22	7162-24	7162-26
500	2	1	7163-22	7163-24	7163-26
500	3	1	7164-22	7164-24	7164-26

**Bottle Only**

**Stopper Only**

Capacity, mL	Style	Qty	Order Code	Por. A Order Code	Por. B Order Code	Por. C Order Code
125	1	1	7162-50	7162-60	7162-62	7162-64
125	2	1	7162-50	7163-60	7163-62	7163-64
125	3	1	7162-50	7164-60	7164-62	7164-64
250	1	1	7162-52	7162-70	7162-72	7162-74
250	2	1	7162-52	7163-70	7163-72	7163-74
250	3	1	7162-52	7164-70	7164-72	7164-74
500	1	1	7162-54	7162-80	7162-82	7162-84
500	2	1	7162-54	7163-80	7163-82	7163-84
500	3	1	7162-54	7164-80	7164-82	7164-84



**BOTTLE Gas Washing ♦**

With fritted disc. Joint is  $\text{K} 29/42$  for all sizes. All porosities of a given size are priced the same. Inlet/outlet arms are 8mm O.D.

**Complete**

Capacity, mL	Disc Dia., mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code
250	50	1	7166-12	7166-14	7166-16
500	75	1	7166-22	7166-24	7166-26

**Stopper Only**

**Bottle Only**

Capacity, mL	Qty	Order Code	Por. A Order Code	Por. B Order Code	Por. C Order Code
250	1	7166-40	7166-60	7166-62	7166-64
500	1	7166-40	7166-70	7166-72	7166-74

ACE Designation	Porosity Maximum Pore Dia. Range (micron)	Corning Equivalent	Kimble Equivalent	Most Frequent Uses
A	145-174	EC (170-220)	EC (170-220)	Coarse filtration. Gas Dispersion
B	70-100	—	—	Coarse filtration. Gas Dispersion
C	25-50	C (40-60)	C (40-60)	Filtration. Gas Dispersion
D	10-20	M (10-15)	M (10-15)	Filtration and extraction
E	4-8	F (4-5.5)	F (4-5.5)	Filtration and extraction

**SPRINGS** *Stainless Steel* ★

For connecting interchangeable joints, Warburg flasks, washing bottles and other apparatus where glass hooks are provided. Supplied 12 per shelf-pack, or in assortment pack containing 12 of each size (144 total).

Coil Length, cm (In.)	Qty	Order Code
1.3 (1/2)	12	8030-02
1.0 (3/4)	12	8030-04
2.5 (1)	12	8030-08
3.2 (1-1/4)	12	8030-12
3.8 (1-1/2)	12	8030-16
4.1 (1-3/4)	12	8030-20
5.1 (2)	12	8030-24
Assortment Pack	144	8030-30


**BOTTLE** *Gas Washing* ♠

Gas washing bottle, 270mL with inner coil. Used with 6550 cyanide distillation apparatus.

Description	Qty	Order Code
270mL bottle only	1	7167-07
Inner coil for 7167-07 bottle	1	7167-12

**Complete**

270mL bottle with coil	1	7167-30
------------------------	---	---------


**BOTTLE** *Gas Washing* ♠

Dreschel, high form with  $\text{K} 24/40$  joint.

Capacity, mL	Qty	<i>Bottle only</i>	<i>Stopper only</i>	<i>Complete</i>
		Order Code	Order Code	Order Code
125	1	5516-05	5516-06	5516-08
500	1	5516-14	5516-15	5516-16


**CRUCIBLE** *Gooch High Form* ♠

With fritted disc. Disc diameter 30mm, height above disc is 45mm. All porosities of a given size are priced the same.

Capacity, mL	Qty	Por. A	Por. B	Por. C	Por. D	Por. E
		Order Code	Order Code	Order Code	Order Code	Order Code
30	1	7170-02	7170-04	7170-06	7170-08	7170-10


**FUNNEL** *Separatory, Cylindrical, 1:5 PTFE Plug* ♠

With straight, open top and a 2mm bore 1:5 taper PTFE stopcock plug.

Capacity, mL	Disc Dia., mm	Qty	Por. A Order Code
125	40	1	7183-50
250	65	1	7183-60

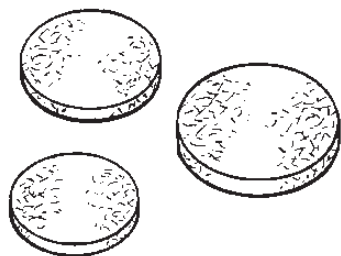




**SINTERED GLASS FILTER DISC** ♠

The only glass *fiber filter disc* — lasts longer, more abrasion resistant, superior in performance than granular type discs. Available in a complete range of porosities and diameters for use in the manufacture of special apparatus. Porosities A, B, C and D are priced the same.

Disc Diameter, mm	Approx. Thickness mm	Qty	Por. A (145–174 micron) Order Code	Por. B (70–100 micron) Order Code	Por. C (25–50 micron) Order Code	Por. D (10–20 micron) Order Code	Por. E (4–8 micron) Order Code
8	3.0	1	7176-17	7176-18	7176-19	7176-20	7176-21
10	3.5	1	7176-01	7176-02	7176-03	7176-04	7176-05
12	3.5	1	7176-32	7176-33	7176-34	7176-35	7176-36
14	3.5	1	7176-52	7176-53	7176-54	7176-55	7176-56
15	3.5	1	7176-06	7176-07	7176-08	7176-09	7176-10
18½	3.5	1	7176-100	7176-101	7176-102	7176-103	7176-105
20	3.5	1	7176-12	7176-13	7176-14	7176-15	7176-16
21	3.5	1	7176-112	7176-113	7176-114	7176-115	7176-116
23½	3.5	1	7176-122	7176-123	7176-124	7176-125	7176-126
25	3.5	1	7176-22	7176-23	7176-24	7176-25	7176-26
30	4.0	1	7176-27	7176-28	7176-29	7176-30	7176-31
40	4.5	1	7176-37	7176-38	7176-39	7176-40	7176-41
47½	4.5	1	7176-132	7176-133	7176-134	7176-135	7176-136
50	4.5	1	7176-42	7176-43	7176-44	7176-45	7176-46
61½	6.0	1	7176-142	7176-143	7176-144	7176-145	7176-146
65	6.0	1	7176-47	7176-48	7176-49	7176-50	7176-51
82½	8.0	1	7176-152	7176-153	7176-154	7176-155	7176-156
90	8.0	1	7176-57	7176-58	7176-59	7176-60	7176-61
93	8.0	1	7176-162	7176-163	7176-164	7176-165	7176-166
120	10.0	1	7176-67	7176-68	7176-69	7176-70	7176-71
150	12.0	1	7176-77	7176-78	7176-79	7176-80	7176-81



**GLASS FILTER DISC** ★

**Robu**

*Granular* type discs in very fine and ultra fine porosity for analytical and general bacteria filtration.

Approx. Disc Dia, mm	Thickness, mm	Por. Very Fine (2–2.5 micron) Order Code	Por. Ultra Fine (0.9–1.4 micron) Order Code
5	2.8	7176-204	7176-305
10	2.8	7176-207	7176-308
20	3.0	7176-210	7176-311
25	3.0	7176-212	7176-313
30	3.5	7176-215	7176-316
40	4.5	7176-217	7176-318
50	5.0	7176-219	7176-320
60	5.0	7176-221	7176-323
65	6.0	7176-224	7176-326
70	6.0	7176-227	7176-330
80	6.0	7176-230	7176-333
90	6.5	7176-233	7176-337
100	7.5	7176-236	7176-340
120	8.5	7176-239	7176-343

**FUNNEL Filter, 14/20 Joints ♠**

Diameter of sintered glass filter disc is 18mm. Measures 40mm from disc to bottom of joint. All porosities of a given size are priced the same. Volume approximately 10mL. Use with 5/16-inch I.D. tubing, size A hose connection.

14/20 Joints	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
14/20	1	9438-02	9438-04	9438-06	9438-08	9438-10


**FUNNEL Filter, Buchner, 14/20 Joint ♠**

Buchner type with 14/20 inner joint. Featuring a standard taper, drip-tip bottom joint and a vacuum source hose connection. Available in various sizes and porosities.

Capacity, mL	Disc Dia, mm	Tubing Sizes (Inches)	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
<b>With 14/10 Joint</b>								
15	40	5/16 or 3/8 (C)	1	9439-11	9439-13	9439-15	9439-17	9439-19
<b>With 14/20 Joint</b>								
15	40	5/16 or 3/8 (C)	1	—	—	9439-40	9439-42	9439-44
30	40	5/16 or 3/8 (C)	1	—	—	9439-50	9439-52	9439-54
60	40	5/16 or 3/8 (C)	1	9439-02	9439-04	9439-06	9439-08	9439-10
<b>With 19/22</b>								
60	40	5/16 (A)	1	9439-22	9439-24	9439-26	9439-28	9439-30
<b>With 24/40 Joint</b>								
15	20	3/8 (D)	1	7184-42	7184-44	7184-46	7184-48	7184-50
30	30	3/8 (D)	1	7184-52	7184-54	7184-56	7184-58	7184-60
60	40	3/8 (D)	1	7184-02	7184-04	7184-06	7184-08	7184-10
140	65	3/8 (D)	1	7184-12	7184-14	7184-16	7184-18	7184-20
350	80	3/8 (D)	1	7184-24	7184-26	7184-28	7184-30	7184-32
<b>With 29/42 Joint</b>								
140	65	3/8 (D)	1	7184-13	7184-15	7184-17	7184-19	7184-21
350	80	3/8 (D)	1	7184-25	7184-27	7184-29	7184-31	7184-33



ACE Designation	Porosity Maximum Pore Dia. Range (micron)	Corning Equivalent	Kimble Equivalent	Most Frequent Uses
A	145-174	EC (170-220)	EC (170-220)	Coarse filtration. Gas Dispersion
B	70-100	—	—	Coarse filtration. Gas Dispersion
C	25-50	C (40-60)	C (40-60)	Filtration. Gas Dispersion
D	10-20	M (10-15)	M (10-15)	Filtration and extraction
E	4-8	F (4-5.5)	F (4-5.5)	Filtration and extraction

**FUNNEL Filter, Buchner** ★

With jacket for cooling or heating. All porosities of a given size are priced the same. Use with 3/8-inch or 5/16-inch I.D. tubing, size C hose connection.

Capacity, mL	Disc Dia., mm	Qty	Por. C Order Code	Por. D Order Code
30	30	1	7185-06	7185-08
140	65	1	7185-16	7185-18
600	90	1	7185-26	7185-28

**FUNNEL Filter, Buchner** ◆

With ACE fritted disc. Porosities A, B, C and D are priced the same.

Cap., mL	Disc O.D., mm	Height Above Disc, mm	Stem O.D., mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
2	10	30	6	1	7186-02	7186-04	7186-06	7186-08	7186-10
15	20	45	10	1	7186-12	7186-14	7186-16	7186-18	7186-20
30	30	45	10	1	7186-22	7186-24	7186-26	7186-28	7186-30
60	40	50	12	1	7186-32	7186-34	7186-36	7186-38	7186-40
140	65	65	15	1	7186-42	7186-44	7186-46	7186-48	7186-50
350	80	75	22	1	7186-52	7186-54	7186-56	7186-58	7186-60
600	90	90	22	1	7186-62	7186-64	7186-66	7186-68	7186-70
1500	120	150	22	1	7186-72	7186-74	7186-76	7186-78	7186-80
2500	135	200	25	1	7186-82	7186-84	7186-86	7186-88	7186-90
4000*	143	200	32	1	7186-110	7186-112	7186-114	7186-116	
6000*	150	240	32	1	7186-130	7186-132	7186-134	7186-136	

Not as illustrated. Body diameter larger than disc diameter.

## Pressure Vessels



- Round-bottom, heavy wall design to facilitate use in heating mantles
- Several sizes available with either #7, #15, #25 or #36 Ace-Thred top fitting
- PTFE front seal plug for better sealability with FETFE O-Rings
- Available with side thermowell to accommodate either temperature sensors or thermometers
- Side port options also available for sampling.

**Safety coated versions of these vessels are available upon special request.**



**FUNNEL** *Filter, Hirsch* ♠

Useful where it is necessary to wash the precipitation and redissolve with chemicals which would attack filter paper. Angle of funnel 60°.

Capacity, mL	Disc O.D., mm	Height Above Disc, mm	Top O.D., mm	Qty	Por. C Order Code	Por. D Order Code
25	20	30	55	1	7187-06	7187-08
170	30	70	100	1	7187-16	7187-18


**PLURO STOPPER** ★

Neoprene stopper for use with filter flasks to support funnels securely. Individual sizes listed.

O.D. Top x Bottom, mm	I.D. Top x Bottom, mm	Height, mm	Qty	Order Code
21 x 11	17 x 7	21	12	12014-40
27 x 16	22 x 11	21	12	12014-44
37 x 22	31 x 16	25	12	12014-46
46 x 29	39 x 22	29	12	12014-48
58 x 38	50 x 30	35	12	12014-50
69 x 45	60 x 36	40	12	12014-52
86 x 57	75 x 46	45	12	12014-54


**PLURO STOPPER SET** ★

A versatile silicone stopper that equals 17 standard stoppers. All the rings are cut from the same stopper, each ring nesting perfectly into the next. Whether making up a small or large stopper, a vacuum-tight fit is assured. Sold as a set.

O.D. Range, mm	Qty	Order Code
18-70	1 Set	12014-14



## Let Your Ideas Come to Life!

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- Modification of existing stock products

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**FUNNEL** *Pressure Filter/Drying, Rusek\**

Used for drying air-sensitive compounds with inert gas or a simple pressure filter funnel. Unique feature is the use of O-Ring joints to connect cap with body creating a larger opening for easier access to contents.

Funnel will withstand pressures of 20psig as supplied, but NO warranty, expressed or implied, is made on pressure resistance due to the fact that surface conditions have a primary effect on glass strength.

Cap adapter has serrated size C hose connection for pressure source. O-Ring joint on cap matches joint on funnel body and is secured with 7669 pinch clamp. Offered with porosity A (145-174 micron), Porosity B (70-100 micron) or porosity C (25-50 micron) disc. Other porosities available. Complete item consists of cap and funnel body with FETFE O-Ring.

**Note:** *Clamp NOT included.*

Approx. Capacity, mL	Dia., of Disc, mm	Height, above Disc to Joint, mm	Stem O.D., mm	O-Ring Joint Size, mm	Porosity	Qty	Order Code
<b>Complete</b>							
15	20	45	10	20	A	1	7190-39 ♠
15	20	45	10	20	B	1	7190-40 ♠
15	20	45	10	20	C	1	7190-41 ♠
60	40	50	12	40	A	1	7190-44 ♠
60	40	50	12	40	B	1	7190-46 ♠
60	40	50	12	40	C	1	7190-45 ♠
140	65	65	15	40	A	1	7190-47 ♠
140	65	65	15	40	B	1	7190-48 ♠
140	65	65	15	40	C	1	7190-49 ♠
350	80	75	22	40	A	1	7190-51 ♠
350	80	75	22	40	B	1	7190-50 ♠
350	80	75	22	40	C	1	7190-53 ♠
600	90	90	22	40	A	1	7190-54 ♠
600	90	90	22	40	B	1	7190-52 ♠
600	90	90	22	40	C	1	7190-55 ♠

<b>Cap Only</b>				<b>Body Only</b>			
Disc Dia., mm	Qty	Order Code		Disc Dia., mm	Porosity	Qty	Order Code
20	1	7190-25 ♠		20	A	1	7190-05 ♠
40	1	7190-27 ♠		20	B	1	7190-06 ♠
65	1	7190-27 ♠		20	C	1	7190-07 ♠
80	1	7190-27 ♠		40	A	1	7190-09 ♠
90	1	7190-27 ♠		40	B	1	7190-11 ♠
				40	C	1	7190-10 ♠
				65	A	1	7190-13 ♠
				65	B	1	7190-12 ♠
				65	C	1	7190-15 ♠
				80	A	1	7190-16 ♠
				80	B	1	7190-14 ♠
				80	C	1	7190-18 ♠
				90	A	1	7190-19 ♠
				90	B	1	7190-17 ♠
				90	C	1	7190-20 ♠

<b>Clamp Only</b>			
Disc Dia., mm	Qty	Order Code	
20	1	7669-14	★
40	1	7669-20	★
65	1	7669-20	★
80	1	7669-20	★
90	1	7669-20	★

\*Designed and evaluated by Frank Rusek, Pfizer Inc., Groton, CT.

ACE Designation	Porosity Maximum Pore Dia. Range (micron)	Corning, Kimble & ChemGlass Equivalent	Most Frequent Uses
A	145-174	EC (170-220)	Coarse filtration. Gas Dispersion
B	70-100	—	Coarse filtration. Gas Dispersion
C	25-50	C (40-60)	Filtration. Gas Dispersion
D	10-20	M (10-15)	Filtration and extraction
E	4-8	F (4-5.5)	Filtration and extraction

**ADAPTER Vacuum Filtration ♠**

Used for reduced pressure filtration with 7186 style, plain stem Buchner funnels. Top is tooled to accept a pluro stopper, bottom has a ⚙ joint. Serrated hose connection has a second ring of 13.5mm O.D. Inserting the recommended size pluro stopper and the next smaller size allows use of smaller capacity funnels; i.e., in ⚙ 24/25 size, insertion of 31mm x 16mm and 22mm x 11mm will allow use of 15 or 30mL capacity funnels. Use with 3/8-inch I.D. tubing, size D hose connection.

⚙ Inner Joint	Uses Pluro Stopper, I.D.	Fits Funnel Cap., mL	Qty	Order Code
14/20	17mm x 7mm	2	1	5267-06
19/22	17mm x 7mm	2	1	5267-08
24/25	31mm x 16mm	140	1	5267-11
24/40	31mm x 16mm	140	1	5267-15
29/26	60mm x 36mm	4000	1	5267-18
29/42	60mm x 36mm	4000	1	5267-20


**TUBE Allihn ♠**

Diameter of disc is 30mm, height above disc is 100mm, diameter of bottom tube is 8mm.

Porosity	Qty	Order Code
A	1	7194-02
B	1	7194-04
C	1	7194-06
D	1	7194-08


**TUBE Allihn, Rupp ♠**

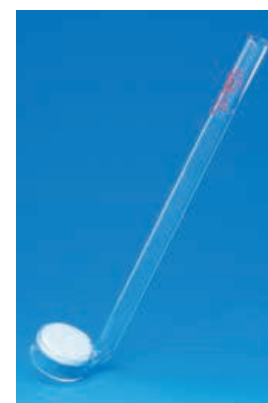
Diameter of disc is 20mm. Height above disc is 100mm. Funnel capacity is 30mL.

Porosity	Qty	Order Code
A	1	7195-02
B	1	7195-04
C	1	7195-06
D	1	7195-08
E	1	7195-10


**TUBE Gas Dispersion ♠**

Outside diameter of tube is 8mm, total length of tube is 150mm. All porosities of a given size are priced the same. Bottom support is the same O.D. as the disc.

Disc Dia., mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
20	1	7196-02	7196-04	7196-06	7196-08	7196-10
25	1	7196-12	7196-14	7196-16	7196-18	7196-20

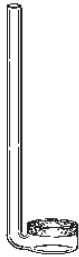




**TUBE Gas Dispersion** ♦

Outside diameter of top tube is 8mm, total length of top tube is 150mm. All porosities of a given size are priced the same. Thickness of bottom is 14mm. Bottom O.D. matches disc diameter. Overall length is 164mm.

Disc Dia., mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code
25	1	7197-02	7197-04	7197-06	7197-08
30	1	7197-12	7197-14	7197-16	7197-18



**TUBE Gas Dispersion** ♦

Supplied with 6, 7, or 8mm O.D. stem top tubing, 150mm in overall length. Maximum O.D. of stem and filter disc is 20mm; Bottom thickness is 10mm. Filter disc is 10mm diameter, porosity B (70-100 micron).

Stem O.D., mm	Qty	Order Code
6	1	7198-06
7	1	7198-07
8	1	7198-08



**TUBE Gas Dispersion** ♦

Fritted disc is angled approximately 15° from stem, which permits the small gas bubbles to rise from the disc surface without excessive formation of large bubbles. These tubes give a performance compared to a horizontal disc, but the method of construction allows its use in test tubes or flasks where a large opening is not available. Outside diameter of tube 8mm. Overall length is approximately 195mm. Bottom O.D. matches disc O.D.

Disc Dia., mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
10	1	7200-24	—	7200-26	7200-28	7200-30
25	1	7200-02	7200-04	7200-06	—	—
30	1	7200-12	7200-14	7200-16	7200-18*	7200-20*
40	1	7200-40	—	7200-42	7200-44	7200-46

\*Tubes are not subject to discount.



**TUBE Gas Dispersion** ♦

Disc diameter is 10mm, overall length is 150mm. Disc is approximately 2mm thick. Outside diameter of tube is 7mm.

Porosity	Qty	Order Code
A	1	9436-02
B	1	9436-04
C	1	9436-06
D	1	9436-08
E	1	9436-10



**TUBE Gas Dispersion** ♦

Outside diameter of tube is 8mm; total length of tube is 150mm. Bottom frit is approximately 2mm thick.

Disc Dia., mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code
25	1	7201-02	7201-04	7201-06
30	1	7201-12	7201-14	7201-16

**TUBE Gas Dispersion** ♦

For fine dispersion. Porous tip is approximately 5mm or 7mm O.D. x 10mm length. 7mm O.D. tube fits a #7 Ace-Thred.

Stem O.D. x Length, mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
5 x 135	1	9435-06	9435-07	9435-08	9435-09	9435-10
7 x 135	1	9435-21	9435-22	9435-23	9435-24	9435-25
5 x 210	1	9435-36	9435-37	9435-38	9435-39	9435-40
7 x 210	1	9435-51	9435-52	9435-53	9435-54	9435-55


**TUBE Gas Dispersion** ♦

With porous fritted glass tip. Available in 150mm, 300mm, 400mm, and 500mm lengths. O.D. of all sizes is 10mm. Fits a #11 Ace-Thred.

Length, mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
150	1	7202-02	7202-04	7202-06	7202-08	7202-10
300	1	7202-12	7202-14	7202-16	7202-18	7202-20
400	1	7202-32	7202-34	7202-36	7202-38	7202-40
500	1	7202-42	7202-44	7202-46	7202-48	7202-50


**TUBE Gas Dispersion, 15° Angle** ♦

Gas dispersion tube with porous fritted tip for use with #7 Ace-Threds. Tube is 6.5mm O.D. and bent 15° to allow positioning inside flask to avoid stirring paddles and yet reach close to bottom of flask. Frit length is 10mm.

*Note: Specify porosity and length or code when ordering.*

Overall Length, mm	Fits Flask Size, mL	Qty	Por. A Order Code	Por. B Order Code
250	500-2000	1	7204-03	7204-04
330	3000-5000	1	7204-07	7204-08


**TUBE Straight, with Porous Disc** ♦

For construction of special apparatus. Disc is centered in tube. All porosities of a given size are priced the same.

Disc Dia., mm	Total Lgth., mm	Tube O.D., mm	Qty	Por. A Order Code	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
10	200	13	1	7205-02	7205-04	7205-06	7205-08	7205-10
20	200	25	1	7205-12	7205-14	7205-16	7205-18	7205-20
30	200	35	1	7205-22	7205-24	7205-26	7205-28	7205-30
40	200	45	1	7205-32	7205-34	7205-36	7205-38	7205-40
50	250	54	1	7205-42	7205-44	7205-46	7205-48	—
65	250	70	1	7205-52	7205-54	7205-56	7205-58	—
90	250	100	1	7205-72	7205-74	7205-76	7205-78	—


**TUBE Pressure Filtering** ♦

Used in filtering glucose, agar and serums. All porosities of a given size are priced the same. Top accepts #3 or #4 rubber stopper.

Cap., mL	Disc Dia., mm	Height Above Disc, mm	Qty	Por. A Order Code	Por. D Order Code
50	30	100	1	7208-02	7208-08
175	50	128-138	1	7208-12	—



**TUBE** ♠

With fritted disc sealed on bottom. Overall length 125mm. All porosities of a given size are priced the same.

O.D., mm	Qty	Por. B Order Code	Por. C Order Code	Por. D Order Code	Por. E Order Code
12	1	7209-04	7209-06	7209-08	7209-10
20	1	7209-14	7209-16	—	—

**TUBE Reduced Ends** ♠

These filters are supplied in a range of sizes from the 20mm disc size to the 50mm disc size. The smaller sizes are used to remove end products of a reaction during recirculation of liquid reactants. The larger units are suitable for filtering operations in the preparation of organic chemicals and biologic solutions. Unit is supplied with hose connection ends. All porosities of a given size are priced the same.

Disc Dia., mm	Hose Conn. O.D., mm	Qty	Por. A Order Code	Por. B Order Code	Por. D Order Code
20	8	1	—	7212-04	7212-08
30	10	1	—	7212-14	7212-18
50	16	1	7212-22	—	7212-28

**TUBE Reduced Ends, Ace-Thred** ♠

Same as 7212 tube with integral fritted disc, except with Ace-Safe connectors. All have 50mm diameter disc. Supplied with two #15 nylon bushings (7506-05) and 5853-18 polypropylene hose barbs for 1/4-inch I.D. tubing

Qty	Por. A Order Code	Por. B Order Code	Por. D Order Code
1	7213-06	—	—
1	—	7213-08	—
1	—	—	7213-10

**TUBE Sulphur Absorption** ♠

For sulphur absorption chamber. Diameter of disc is 30mm, height above disc 200mm, capacity 130mL. Will accept a No. 7 rubber stopper.

Porosity	Qty	Order Code
A	1	7216-02
C	1	7216-06
D	1	7216-08

**FLASK** Reaction, with O-Ring Groove, Heavy Wall ♦

Cylindrical, heavy wall reaction kettles or flasks, with integral fritted disc and bottom tube outlet. Top of flask has flat flange with a groove for use with O-Ring. For reaction heads, see 6528, 6529 and 6530 series. Can be used with 6517 quick release clamps.

Frit Porosity	Flask Size, mL	Flange (Inches)	Height, mm	Bottom Tube O.D. (In.)	Frit Diameter, mm	Qty	Order Code
A	1000	4	300	5/8	100	1	6300-06
B	1000	4	300	5/8	100	1	6300-08
C	1000	4	300	5/8	100	1	6300-10
A	4000	6	460	1-1/4	145	1	6300-18
B	4000	6	460	1-1/4	145	1	6300-20
C	4000	6	460	1-1/4	145	1	6300-22
A	6000	8	430	1-1/4	178	1	6300-30
B	6000	8	430	1-1/4	178	1	6300-32
C	6000	8	430	1-1/4	178	1	6300-34



ACE Designation	Porosity Maximum Pore Dia. Range (micron)	Corning, Kimble & ChemGlass Equivalent	Most Frequent Uses
A	145-174	EC (170-220)	Coarse filtration. Gas Dispersion
B	70-100	—	Coarse filtration. Gas Dispersion
C	25-50	C (40-60)	Filtration. Gas Dispersion
D	10-20	M (10-15)	Filtration and extraction
E	4-8	F (4-5.5)	Filtration and extraction

# Laboratory Glassware Safety Tips

## ...Safe Handling of Glassware



### Inspection

- Always inspect glass for scratches, abrasions, cracks or chips before using or cleaning.
- Safely dispose of any damaged glass.
- Inspect glass routinely for strain with a polariscope.

### Washing/Cleaning

- Always inspect glass for chips and fractures prior to cleaning, especially any solvent or acid cleaning.
- Use Alconox or similar type detergents.
- Avoid HF, strong alkalis or abrasive cleaners.
- Distilled water rinse.

### Storage

- Store glass in a manner to avoid vessels bumping each other.

### Temperature, Borosilicate Glass

- Standard use limit — 240°C.
- Maximum short-term use — 490°C.
- Avoid rapid temperature changes or rapid thermal shock.

### Heating Glass

- Heat with mantles, Instatherm®, heat tapes, guns or immersion heaters.
- Avoid direct flame as much as possible.
- Standard temperature limit for borosilicate glass is 240°C.



**SHAKE FUNNEL** *Safe Grip* ★

Separatory, globe-type funnel with neck and section between globe and stopcock shaped to provide a secure grip for shaking contents or transporting. Also makes clamping easier.

Capacity, mL	\$ Stopper	Plug Bore, mm	Qty	Replacement Stoppers		Complete	
				Order Code	Order Code	Order Code	Order Code
3000	45/50	6	1	8250-20	♠	7224-22	★
5000	45/50	8	1	8250-20	♠	7224-28	★
12000	55/50	10	1	8250-24	♠	7224-33	★

**Replacement Stopcocks**

See 8223 for replacement stopcocks



**FUNNEL** *Separatory, Squibb, Pear-Shaped* ◆

With PTFE stopper and glass stopcock.

Capacity, mL	\$ Stopper	Plug Bore, mm	Qty	Replacement Stopcock		Complete	
				Order Code	Order Code	Order Code	Order Code
30	13	2	1	8223-02	♠	7226-04	♠
60	13	2	1	8223-02	♠	7226-06	♠
125	16	2	1	8223-02	♠	7226-08	♠
250	22	3	1	8223-04	♠	7226-10	♠
500	27	4	1	8223-06	♠	7226-12	♠
1000	27	4	1	8223-06	♠	7226-14	♠
2000	38	6	1	8223-08	♠	7226-16	♠
3000	38	6	1	8223-08	♠	7226-18	♠
4000	38	10	1	8223-12	♠	7226-20	♠
6000	38	10	1	8223-12	♠	7226-22	♠

**Replacement Stoppers**

	13	1	12632-13	★
	16	1	12632-16	★
	22	1	12632-22	★
	27	1	12632-27	★
	38	1	12632-38	★



**FUNNEL** *Separatory, Globe* ◆

Globe style, 125mL capacity separatory funnel featuring a 175mm stem below the PTFE stopcock, supplied with a top stopper.

Qty	Order Code
1	7221-09
<b>Replacement Stopcocks</b>	
1	8224-04



**FUNNEL** *Separatory, Squibb, with Detachable Drip Tip* ♠

Multipurpose, separatory funnel with either #11 or #15 Ace-Thred at bottom that accepts a detachable PTFE drip tip. Avoids breaking delivery tip, easier to clean, and allows leak tight closed system tubing connections using 5801, 5802, 5854 and/or 12770 connectors. Stopcock is 1:5 PTFE.


Capacity, mL	Stopper Size	Plug Bore, mm	Qty	<i>Funnel Body, Only</i>	<i>Drip Tip, Only</i>	<i>Stopcock Only</i>	<i>Stopper Only*</i>	<i>Complete</i>
				Order Code	Order Code	Order Code	Order Code	Order Code
<b>#11 Ace-Thred</b>								
125	16	2	1	7223-07	7223-40	8224-04	12632-16	7223-50
250	22	2	1	7223-12	7223-40	8224-04	12632-22	7223-53
500	27	4	1	7223-17	7223-40	8224-12	12632-27	7223-57
1000	27	4	1	7223-20	7223-40	8224-12	12632-27	7223-59

**#15 Ace-Thred**

2000	38	6	1	7223-30	7223-42	8224-16	12632-38	7223-62
4000	38	6	1	7223-34	7223-42	8224-16	12632-38	7223-66
5000	38	6	1	7223-37	7223-42	8224-16	12632-38	7223-69

\*Stoppers listed are Net (★) and not subject to discount.





**PTFE Drip Tip**

**7223-40** For #11 Ace-Thred, 6.35 mm Bore, 3.2 inches long

**7223-42** For #15 Ace-Thred, 8.3 mm Bore, 3.5 inches long

**FUNNEL** *Separatory, Squibb, Pear-Shaped, 1:5 PTFE Plug* ♠

With ⌘ PTFE stopper and stopcock.

Capacity, mL	⌘ Stopper	Plug Bore, mm	Qty	<i>Stopcock Only</i>	<i>Stopper Only*</i>	<i>Complete</i>
				Order Code	Order Code	Order Code
30	13	2	1	8224-04	12632-13	7228-60
60	13	2	1	8224-04	12632-13	7228-62
125	16	2	1	8224-04	12632-16	7228-64
250	22	4	1	8224-12	12632-22	7228-66
500	27	4	1	8224-12	12632-27	7228-68
1000	27	4	1	8224-12	12632-27	7228-70
2000	38	6	1	8224-16	12632-38	7228-72
4000	38	6	1	8224-16	12632-38	7228-76
4000	38	8	1	8224-18	12632-38	7228-77
6000	38	8	1	8224-18	12632-38	7228-79

\*Stoppers listed are Net (★) and not subject to discount.


**FUNNEL** *Separatory, Safety* ★

The safest separatory funnel available, our 7247 funnel features a plastic coating, a removable PTFE drip tip and pressure relief rodaviss threaded cap and stopper. Common accidents involving separatory funnels are breaking the glass drip leaving a jagged edge, weakening the vessel's integrity by scratching the surface of the glass and spills when the stopper is removed under the pressure caused by agitation of the contents. The features of these funnels lessen the risk of all these accidents.

Capacity, mL	Rodaviss Top, ⌘	Drip Tip Bottom, Ace-Thred	Plug Bore, mm	Qty	<i>Stopcock Only*</i>	<i>Funnel Only</i>	<i>Complete</i>
					Order Code	Order Code	Order Code
1000	24/40	11	4	1	8224-12	7247-04	7247-10
2000	45/50	15	6	1	8224-16	7247-05	7247-20

\*Stopcocks listed are (♠) and are subject to discount.





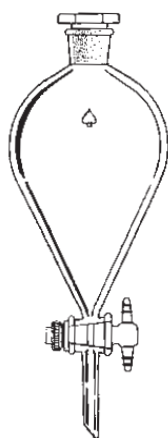
**FUNNEL** Separatory, Squibb, with 1:5 PTFE Plug and  $\text{K}$  45/50 Polyethylene Stopper  $\spadesuit$

Wide-mouth separatory funnel for easy access to ingredients.

Capacity, mL	$\text{K}$ Stopper	Plug Bore, mm	Qty	Stopcock Only	Complete
				Order Code	Order Code
2000	45/50	6	1	8224-16	7230-22
4000	45/50	6	1	8224-16	7230-26
4000	45/50	8	1	8224-18	7230-30
6000	45/50	8	1	8224-18	7230-34

**Replacement Stoppers**

See 12633 or 12635 for replacement stoppers



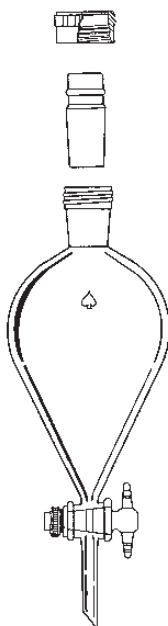
**FUNNEL** Separatory, Squibb, with 1:5 PTFE Plug and Stopper Joint  $\spadesuit$

European style. Supplied with  $\text{K}$  24/25 polyethylene stopper in all capacities except 2000mL size which is supplied with large  $\text{K}$  45/50 polyethylene stopper.

Capacity, mL	$\text{K}$ Stopper	Plug Bore, mm	Qty	Stopcock Only	Complete
				Order Code	Order Code
60	24/25	2	1	8224-04	7231-06
125	24/25	2	1	8224-04	7231-09
250	24/25	4	1	8224-12	7231-12
500	24/25	4	1	8224-12	7231-15
1000	24/25	4	1	8224-12	7231-18
2000	45/50	6	1	8224-16	7231-21

**Replacement Stoppers**

See 12633 (PTFE) or 12635 (Polyethylene) for replacement stoppers



**FUNNEL** Separatory, Squibb, with 1:5 PTFE Plug, Locktight Stopper  $\spadesuit$

European style funnel with new leak-tight, locking stopper that will not fall out during shaking or transportation. Outer ground joint at top is a Rodaviss (externally threaded) joint. Stopper can be secured in top joint via cap and O-Ring for a positive, leak-tight seal. Complete item supplied with plug, stopper, cap and O-Ring.

Capacity, ml	$\text{K}$ Stopper	Plug Bore, mm	Qty	Funnel Body, Only	Stopcock Only	Complete
				Order Code	Order Code	Order Code
60	24/40	2	1	7231-34	8224-04	7231-55
125	24/40	2	1	7231-36	8224-04	7231-57
250	24/40	4	1	7231-38	8224-12	7231-59
500	24/40	4	1	7231-40	8224-12	7231-61
1000	24/40	4	1	7231-42	8224-12	7231-63
2000	45/50	6	1	7231-44	8224-16	7231-65

For $\text{K}$ Joint	Qty	Stopper only Order Code	Cap only* Order Code	Viton O-Ring only Order Code
24/40	1	8267-19	7616-21	7617-17
45/50	1	8267-29	7616-27	7617-23

\*Caps listed are Net ( $\star$ ) and not subject to discount.

**FUNNEL** *Separatory, Glass or PTFE Plug* ♦

 Pear shaped, with  $\text{F}$  joint and drip tip.

Capacity, mL	Plug Bore, mm	$\text{F}$ Joints	Qty	1:5 PTFE Plug	Glass Plug
				Order Code	Order Code
30	2	14/20	1	—	9506-02
60	2	14/20	1	9500-06	9506-04
125	2	14/20	1	9500-08	9506-06

**Replacement Stopcocks**

See 12633 (PTFE) or 12635 (Polyethylene) for replacement stoppers


**FUNNEL** *Powder Dispensing, Vertical* ♦

 A vertical, compact, screw feed funnel for the addition of powders and solids (up to 25 mesh) into reactions without seizing or binding. Features a flexible PTFE screw thread wrapped on a precision Rulon shaft and contained within a precision bore housing. This offers a unique flexibility in that the thread can move aside temporarily; as one spacing increases, the adjacent spacing decreases, thereby maintaining an average feed rate. Completely inert materials allow flushing with solvents without fear of contamination. #15 Ace-Thred at top offers easy disassembly for cleaning. Large 1-1/4-inch knob makes turning smooth and easy. Top side port is  $\text{F}$  14/20 outer joint, bottom inner joint is  $\text{F}$  24/40. Overall height, 9-1/2 inches.

Capacity, mL	Qty	Order Code
50	1	7233-20
100	1	7233-30


**FUNNEL** *Powder Dispensing* ♦

 A vertical, compact, screw feed funnel for the addition of powders and solids (up to 25 mesh) into reactions without seizing or binding. Features a flexible PTFE screw thread wrapped on a precision Rulon shaft and contained within a precision bore housing. This offers a unique flexibility in that the thread can move aside temporarily; as one spacing increases, the adjacent spacing decreases, thereby maintaining an average feed rate. Completely inert materials allow flushing with solvents without fear of contamination. #7 Ace-Thred offers easy disassembly for cleaning. Top outer and bottom inner joints are  $\text{F}$  14/20. Approximate capacity, 15mL.

Capacity, mL	Qty	Order Code
15	1	9485-15

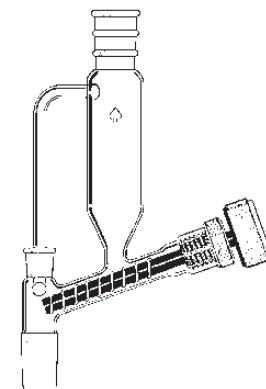

**FUNNEL** *Powder Dispensing* ♦

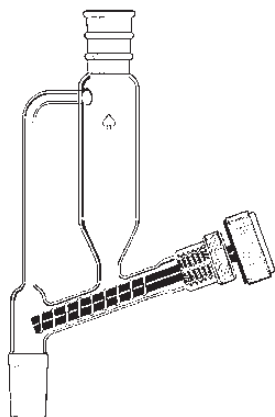
Side operated screw feed funnel for the addition of powders and solids (up to 25 mesh) to reactions without problems of seizing or binding.

Features a flexible PTFE screw thread wrapped on a precision Rulon shaft and contained within a precision bore housing. This offers a unique flexibility in that the thread can move aside temporarily; as one spacing increases, the adjacent spacing decreases, thereby maintaining an average feed rate.

 Completely inert materials allow flushing with solvents without fear of contamination. #15 Ace-Thred offers easy disassembly for cleaning. Large 1-1/4-inch knob makes turning smooth and easy. Top outer and bottom inner joints are  $\text{F}$  24/40.  $\text{F}$  14/20 outer joint atop inner joint is for easier flushing.

Capacity, mL	Qty	Order Code
100	1	7234-25
250	1	7234-35

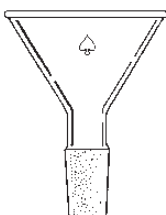




**FUNNEL Powder Dispensing** ♠

Side operated screw feed funnel similar to 7234 except 14/20 outer joint atop bottom inner joint has been eliminated. Bottom 1/8 joint and top 1/8 outer joints are 24/40. Same features as 7233.

Capacity, mL	Qty	Order Code
100	1	7239-30
250	1	7239-40



**FUNNEL Powder, Heavy Wall, 58°** ♠

1/8 jointed powder funnels are fabricated with heavy walls for greater durability when pouring powders or liquids into ground joint containers.

Approx. Top Dia., mm	Bottom Joint	Qty	Order Code
75	24/40	1	7235-05
100	24/40	1	7235-07



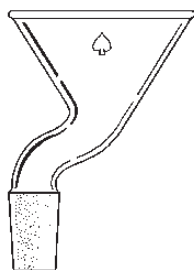
**FUNNEL Powder** ♠

Useful in pouring powders or liquids into ground joint containers. Available with 1/8 or 1/8 inner joint.

Approximate Top Diameter, mm	1/8 Bottom Joint	Qty	Order Code
<b>Standard Taper Joint</b>			
65	14/20	1	9488-10
65	19/38	1	7236-06
75	24/40	1	7236-08
100	24/40	1	7236-10
125	24/40	1	7236-11
100	29/42	1	7236-12
125	34/45	1	7236-14
190	45/50	1	7236-16
150	29/42	1	7236-18
100	24/29	1	7236-124
100	29/32	1	7236-129
190	45/50	1	7236-145

**Spherical Joint**

100	35/25	1	7236-20
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**FUNNEL Powder, Offset** ♠

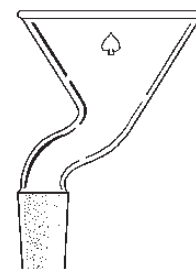
Used for pouring liquids or powders into multi-neck flasks. Available with 1/8 inner joint.

Approx. Top Dia., mm	1/8 Bottom Joint	Qty	Order Code
65	14/20	1	9489-20
75	24/40	1	7237-09
100	24/40	1	7237-11
125	24/40	1	7237-15
100	29/42	1	7237-19

**FUNNEL Powder, Offset, Heavy Wall, 58° ♠**

With heavy walls for greater durability when pouring powders or liquids into multi-neck flasks.

Approx. Top Dia., mm	Bottom Joint	Qty	Order Code
75	24/40	1	7238-06
100	24/40	1	7238-08


**FUNNEL Powder, Flat Side ♠**

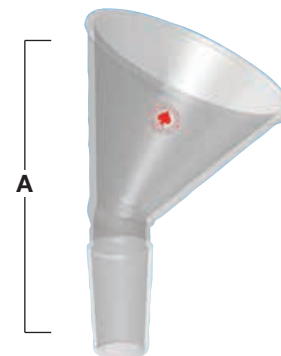
Powder funnel with ⚗ joint and flattened side, for easy use with multi-neck flasks.

Bottom Joint	Top Opening (B), mm	Height (A), mm	Qty	Order Code
14/20	75	70	1	7250-01
24/40	75	90	1	7250-05
24/40	100	145	1	7250-09
29/42	145	145	1	7250-10
29/32	145	145	1	7250-12
45/50	150	250	1	6469-52
71/60	255	255	1	7250-15


**FUNNEL Powder, Angled, Heavy Wall ♠**

Borosilicate funnel angled to permit use in multi-neck flasks. On angled neck flasks such as 6948, this funnel will bring the mouth of the funnel back to vertical.

Top Diameter, mm	Dimension A, mm	Bottom Joint	Qty	Order Code
75	120	24/40	1	7245-07
100	150	24/40	1	7245-15
100	195	29/42	1	7245-21
200	200	45/50	1	7245-25


**FUNNEL Analytical, Polypropylene ★**

Made of polypropylene, the funnel takes standard size filter papers. Body of funnel is exact 60° angle, and internal ribs are 58° angle for rapid filtration. Outside ribbing prevents air lock. May be autoclaved.

Top I.D., mm	Stem Length, mm	Stem O.D., mm	Paper Dia., mm	Capacity, mL	Package Qty	Case Qty	Order Code
55	60	8	90	36	12	36	12548-07
65	65	8.5	110	60	12	36	12548-09
75	75	9	125	95	6	36	12548-11
100	100	11.5	185	225	4	24	12548-15





**FUNNEL Powder, Polypropylene** ★

Autoclavable, powder funnels molded of polypropylene. Parallel stem minimizes bridging of powder; external ribbing prevents air lock.

Top I.D., mm	Stem O.D., mm	Stem Length, mm	Package Qty	Case Qty	Order Code
65	15	25	12	36	12549-04
80	18	25	12	36	12549-06
100	21	25	6	24	12549-08
150	29	25	4	24	12549-10



**FUNNEL Powder, Polypropylene** ★

With ⚗ joint.

	Qty	Order Code
10.2cm, (4-inch) funnel with ⚗24/40	1	12552-06
15.2cm, (6-inch) funnel with ⚗24/40	1	12552-08



**FUNNEL Buchner, Polypropylene** ★

Lightweight polypropylene funnels. Bottom and top separate for easy cleaning.

Filter paper size, mm	Package Qty	Case Qty	Order Code
42.5	6	12	12557-05
55	1	12	12557-07
70	1	6	12557-09
90	1	6	12557-11
110	1	6	12557-13

Plastic Properties	Low Density Polyethylene (LDPE)	High Density Polyethylene (HDPE)	Polypropylene (PP)	PTFE FEP	Polycarbonate (PC)	Polymethylpentene (PMP)
Temperature Limit, °C	80	120	135	205	135	175
Specific Gravity	0.92	0.95	0.90	2.15	1.20	0.83
Tensile Strength, psi	2000	4000	5000	3000	8000	4000
Brittleness Temperature, °C	-100	-100	0	-270	-135	20
Water Absorption, %	<0.01	<0.01	<0.02	<0.01	0.35	<0.01
Flexibility	excellent	rigid	rigid	excellent	rigid	rigid
Transparency	translucent	translucent	translucent	translucent	clear	clear

**FUNNEL** *Buchner, Table Top, Polyethylene* ★

POROUS FILTER PLATE type or PERFORATED PLATE type, fixed or removable, polyethylene Buchner funnel. Features one-piece, welded construction with welded-in plate and multiple-ring support grid below plate. A non-porous ring around plate seals filter paper. Vacuum connection accepts 1/2-inch I.D. tubing. Temperature limit of 125°F (52°C).

FILTER PLATE is available in medium (M) or coarse (C) porosity, 1/4-inch (6.4mm) thick. Medium porosity is 45-90 microns, while coarse porosity is 90-130 microns.

PERFORATED PLATE is 3/16 inches (4.8mm) thick with 3/16-inch perforations on 7/16-inch (11mm) centers. Good for coarse filtration or use with cloth or paper filter.



I.D., Inches	Overall Height (Inches)	Rim to Plate (Inches)	Qty	Porous Plate		Perforated Plate
				Plate Type/ Porosity ( )	Order Code	Order Code
10-1/4 (26cm)	7	5	1	Fixed/(M)	12560-02	12560-14
10-1/4 (26cm)	7	5	1	Fixed/(C)	12560-04	
10-1/4 (26cm)	7	5	1	Removable/(M)	12560-30	12560-50
10-1/4 (26cm)	7	5	1	Removable/(C)	12560-32	
18 (45.7cm)	11-1/2	9	1	Fixed/(M)	12560-05	12560-16
18 (45.7cm)	11-1/2	9	1	Fixed/(C)	12560-06	
18 (45.7cm)	11-1/2	9	1	Removable/(M)	12560-35	12560-57
18 (45.7cm)	11-1/2	9	1	Removable/(C)	12560-37	
24 (61cm)	13	10-1/2	1	Fixed/(M)	12560-07	12560-18
24 (61cm)	13	10-1/2	1	Fixed/(C)	12560-08	
24 (61cm)	13	10-1/2	1	Removable/(M)	12560-38	12560-59
24 (61cm)	13	10-1/2	1	Removable/(C)	12560-39	
36 (91.4cm)	14-3/4	12	1	Fixed/(M)	12560-09	12560-20
36 (91.4cm)	14-3/4	12	1	Fixed/(C)	12560-10	
36 (91.4cm)	14-3/4	12	1	Removable/(M)	12560-41	12560-63
36 (91.4cm)	14-3/4	12	1	Removable/(C)	12560-53	

I.D., In.	=	Gallons
10.25	=	1.8
18	=	10
24	=	20
36	=	53

**FILTER PAPER** is to fit 12560 Funnels. Rough crepe surface, .25 mm thick, flow rate 235 mL/min., retention of 24 microns and wet strength of 25 cm of water. Packed 100 per box.

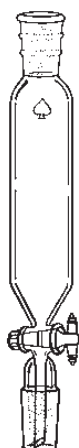
For Funnel Size (In.)	Qty	Order Code
10-1/4	100	12560-70
18	100	12560-72
24	100	12560-74
36	100	12560-76

**FUNNEL** *Buchner, All Stainless Steel*

Stainless steel Buchner funnel for organic or inorganic chemical synthesis. This funnel incorporates a removable perforated plate that allows thorough manual cleaning and autoclaving. Since the plate is removable, yield is increased because internal supports that would trap product are eliminated. Will not chip, crack or break. Offered in 9.5- and 20-inch sizes that accept commercially available filter sizes with 240 grit, 30 Ra (electropolished) for critical applications, i.e., pharmaceuticals. Outlet port is 1/2-inch O.D. for both sizes.



Inside O.D., in	Height Above Disc, in	Overall Height, in	Grit Finish	Qty	Order Code
9.5	5	7	240	1	12563-09
20	10	12	240	1	12563-27


**FUNNEL Addition, 1:5 PTFE Plug** ♠

Ungraduated, with ⌘ joint top and bottom.

Capacity, mL	⌘ Joint	⌘ Stopper	Plug Bore, mm	Qty	Order Code
10	14/20	14/20	2	1	9498-03
25	14/20	14/20	2	1	9498-05
50	14/20	14/20	2	1	9498-11
125	24/40	24/40	2	1	7257-50
250	24/40	24/40	2	1	7257-52
500	24/40	24/40	4	1	7257-54

**Replacement Stoppers**

-	-	14/20	-	1	8255-10
-	-	24/40	-	1	8250-12

**Replacement Stopcocks**

-	-	-	2	1	8224-04
-	-	-	4	1	8224-12



1:5 PTFE



Metering



Glass

**FUNNEL Addition, Graduated** ♠

Cylindrical with ⌘ joint top and bottom, drip stem, and double scale graduations, calibrated up from stopcock. Drip stem does not extend beyond joint, thereby eliminating possible source of breakage. Stopcock available with 1:5 PTFE plug, PTFE metering plug or glass plug.

*Note: Stoppers are NOT supplied.*

Cap., mL	Plug Bore, mm	⌘ Joints Bottom/Top	Qty	1:5 PTFE Stopcock	Metering Valve Stopcock	Glass Stopcock	Stopper Only
				Order Code	Order Code	Order Code	Order Code
10	2	14/20/14/20	1	9499-02	9499-04	—	8250-10
25	2	14/20/14/20	1	9499-05	9499-06	—	8250-10
50	2	14/20/14/20	1	9499-08	9499-12	—	8250-10
125	2	24/40/24/40	1	7268-60	7318-08	7267-08	8250-12
250	2	24/40/24/40	1	7268-62	7318-12	7267-12	8250-12
500	4	24/40/24/40	1	7268-64	7318-16	7267-16	8250-12
500	4	29/42/24/40	1	—	—	7267-18	8250-12
1000	4	24/40/24/40	1	7268-66	7318-20	7267-20	8250-12
2000	4	29/42/24/40	1	7268-70	—	—	8250-12

**Replacement Stopcocks**

1	See 8224	See 8232	See 8223	
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**FUNNEL Addition** ♠

With an equalizing arm and a special stopper so that material may be isolated from the atmosphere. Turning the stopper completely closes the vessel to the equalizing arm so that the funnel may be disconnected without exposing contents to moist air, etc. Glass stopcock is 2mm bore.

Capacity, mL	Subdivision, mL	⌘ Joints	Qty	Order Code
25	0.5	14/20	1	9486-03
50	1.0	14/20	1	9486-05

**Replacement Stoppers**

-	-	14/20	1	9486-89
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**Replacement Stopcocks**

-	-	-	1	8223-02
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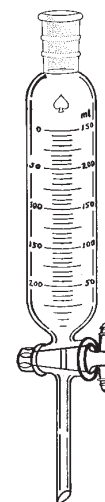


**FUNNEL Addition, Cylindrical, Graduated, 1:5 PTFE Plug** ♦

With 24/40 stopper joint at top and 1:5 PTFE stopcock plug at bottom.

Note: Stoppers are NOT supplied.

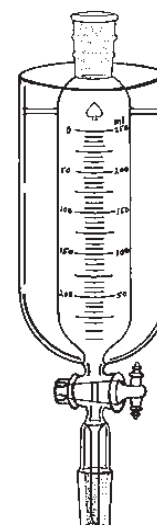
Capacity, mL	Subdivision mL	Plug Bore, mm	Qty	Stopcock Only	Stopper Only	Complete (w/o Stopper)
				Order Code	Order Code	Order Code
125	1	2	1	8224-04	8250-12	7262-50
250	5	3	1	8224-08	8250-12	7262-52
500	5	4	1	8224-12	8250-12	7262-54
1000	10	4	1	8224-12	8250-12	7262-56
2000	20	4	1	8224-12	8250-12	7262-58


**FUNNEL Addition, with Jacket** ★

Double scale graduated funnel with jacket for cooling with dry ice. Calibrated up from stopcock. With 1:5 PTFE stopcock plug.

Capacity, mL	Joint	Stopper	Plug Bore, mm	Qty	Stopcock Only*	Stopper Only*	Complete
					Order Code	Order Code	Order Code
250	24/40	24/40	2	1	8224-08	8250-12	7270-37
500	24/40	24/40	4	1	8224-12	8250-12	7270-41

\*Stopcocks and Stopper listed are subject to discount.


**FUNNEL Addition, Pilot Size, Ace-Thred**

Large separatory funnel for use where large volumes are needed. Cylindrical shape necks down to a #25 Ace-Thred and connects to an 8mm bore PTFE stopcock via a PTFE coupling using FETFE O-Rings. The system is completely grease-free. Complete unit consists of the funnel body, coupling with two O-Rings, and stopcock.

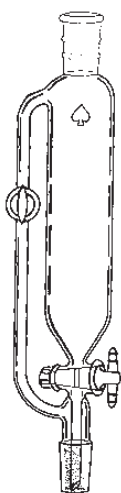
Capacity, Liters	I.D., mm	O.D., mm	Overall* Height, mm	Straight Section Height, mm	Qty	Body Only	Complete
						Order Code	Order Code
9.4	201	217	440	325	1	7272-04 ★	7272-34 ★
19.0	280	290	400	230	1	7272-10 ★	7272-40 ★
35.0	390	410	450	350	1	7272-14 ★	7272-44 ★

**Replacement Parts and Accessories**

Stopcock Adapter, Only	1	5835-55	♦
Stopcock Plug, Only	1	8224-18	♦
Coupling, PTFE with O-Ring	1	5841-50	♦

\*Overall height does NOT include stopcock adapter.

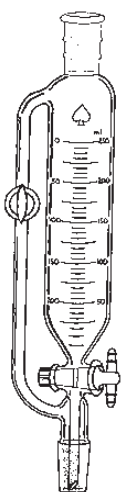



**FUNNEL** Pressure Equalizing, 1:5 PTFE Plug ♠

Cylindrical, with  $\text{K}$  24/40 joint top and bottom. Supplied with 1:5 PTFE stopcock plugs which require no lubrication. Stopcock on equalizing arm permits filling funnel without having to open the system to the atmosphere. Drip tip does not extend beyond joint, thereby eliminating a possible source of breakage.

**Note:** Stoppers are NOT supplied.

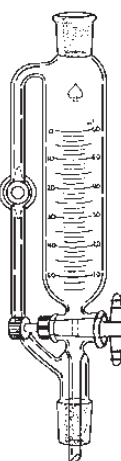
Capacity, mL	$\text{K}$ Joints	Plug Bore, mm	Qty	Stopcock Only (Side Port)	Stopcock Only (Bottom Port)	Stopper Only	Complete (Without Stopper)
				Order Code	Order Code	Order Code	Order Code
125	24/40	2	1	8224-04	8224-04	8250-12	7285-35
250	24/40	2	1	8224-04	8224-04	8250-12	7285-37
500	24/40	4	1	8224-04	8224-12	8250-12	7285-39


**FUNNEL** Graduated, Pressure Equalizing, 1:5 PTFE Plug ♠

Cylindrical with  $\text{K}$  joint at top and bottom and drip stem. Stopcock on equalizing arm permits filling funnel without having to open the system to atmosphere.

**Note:** Stoppers are NOT supplied.

Capacity, mL	$\text{K}$ Joints	Plug Bore, mm	Qty	Stopcock Only (Side Port)	Stopcock Only (Bottom Port)	Stopper Only	Complete (Without Stopper)
				Order Code	Order Code	Order Code	Order Code
60	14/20	2	1	8224-04	8224-04	8255-10	9495-22
125	24/40	2	1	8224-04	8224-04	8250-12	7286-08
250	24/40	2	1	8224-04	8224-04	8250-12	7286-10
500	24/40	4	1	8224-04	8224-12	8250-12	7286-12
1000	24/40	4	1	8224-04	8224-12	8250-12	7286-14


**FUNNEL** Pressure Equalizing, Graduated, with 1:5 PTFE Metering Valve ♠

Similar to 9495, except lower stopcock is solid 1:5 PTFE metering valve, side arm plug is regular 1:5 solid PTFE.

**Note:** Stoppers are NOT supplied.

Capacity, mL	$\text{K}$ Joints	Plug Bore, mm	Qty	Stopcock Only (Side Port)	Stopcock Only (Bottom Port)	Stopper Only	Complete (Without Stopper)
				Order Code	Order Code	Order Code	Order Code
60	14/20	2	1	8224-04	8232-14	9543-04	9496-15

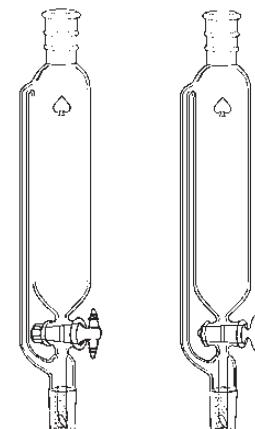
**Need a heated addition funnel? See our Instatherm product line.**

**FUNNEL Pressure Equalizing** ♦

Cylindrical with ⚙ joint top and bottom and drip stem. Drip stem does not extend beyond joint, thereby eliminating possible source of breakage. Stopcock available with glass plug or 1:5 PTFE plug.

*Note: Stoppers are NOT supplied.*

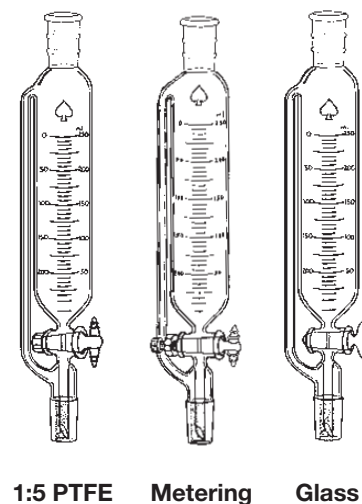
Capacity, mL	Plug Bore, mm	⚙ Joints	Qty	PTFE	1:5 PTFE	Glass	Glass	Stopper
				Stopcock Only	Stopcock (Complete)	Stopcock Only	Stopcock (Complete)	Only
				Order Code	Order Code	Order Code	Order Code	Order Code
10	2	14/20	1	8224-04	9491-03	8223-02	9490-02	8255-10
25	2	14/20	1	8224-04	9491-05	8223-02	9490-04	8255-10
30	2	14/20	1	8224-04	9491-06	8223-02	—	8255-10
50	2	14/20	1	8224-04	9491-07	8223-02	9490-06	8255-10
60	2	14/20	1	8224-04	9491-15	8223-02	9490-10	8255-10
125	2	24/40	1	8224-04	7292-30	8223-02	7291-08	8250-12
250	2	24/40	1	8224-04	7292-32	8223-02	7291-10	8250-12
500	4	24/40	1	8224-12	7292-34	8223-06	7291-12	8250-12
1000	4	24/40	1	8224-12	7292-36	8223-06	7291-14	8250-12


**FUNNEL Pressure Equalizing, Graduated** ♦

Cylindrical with ⚙ joint top and bottom, drip stem, pressure equalizing arm and double scale graduations, calibrated from stopcock. Drip stem does not extend beyond joint, thereby eliminating possible source of breakage. Stopcock available with glass plug, 1:5 PTFE plug or PTFE metering plug.

*Note: Stoppers are NOT supplied.*

Capacity, mL	Plug Bore, mm	⚙ Joints	Qty	With 1:5 PTFE	With Metering	With Glass	Stopper
				Stopcock	Valve Stopcock	Stopcock	Only
				Order Code	Order Code	Order Code	Order Code
10	2	14/20	1	9493-03	9493-06	9492-02	8255-10
25	2	14/20	1	9493-05	9493-08	9492-04	8255-10
50	2	14/20	1	9493-07	9493-10	9492-06	8255-10
60	2	14/20	1	9493-15	9493-14	9492-10	8255-10
125	2	24/40	1	7297-31	7320-08	7296-50	8250-12
250	2	24/40	1	7297-33	—	7296-52	8250-12
250	4	24/40	1	—	7320-10	—	8250-12
500	4	24/40	1	7297-35	7320-12	7296-54	8250-12
1000	4	24/40	1	7297-37	7320-14	7296-56	8250-12
2000	4	29/42	1	7297-39	7320-17	7296-58	8250-12


**Replacement Stopcocks**

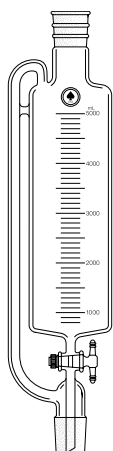
1	See 8224	See 8232	See 8223	
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**FUNNEL Addition, Separatory, Jacketed** ♦

Graduated addition funnels like 7268 series, except with outside jacket for cooling or heating. Jacket extends from just below shoulder of vessel down to the bottom tube just above the bottom stopcock. Stopcock is 2 or 4mm bore PTFE. Bottom drip tube extends to the bottom edge of the lower, inner standard taper, joint, Top outer stopcock size matches the bottom joint size. Side hose connections are size D for 3/8-inch (9.5mm) ID tubing.

Capacity, mL	⚙ Joints	Qty	Order Code
500	24/40	1	7278-07
500	29/42	1	7278-11
1000	24/40	1	7278-15
1000	29/42	1	7278-17
1000	29/32	1	7278-19
2000	29/42	1	7278-23
2000	29/32	1	7278-25




**FUNNEL** *Pressure Equalizing, Graduated, Pilot Plant*

Cylindrical, pilot plant size, 5 liter capacity funnel. With  $\text{\textcircled{K}}$  45/50 joint top and bottom, drip stem, pressure equalizing arm and single scale graduations in 100mL subdivisions. Drip stem does not extend beyond male joint, thereby eliminating possible source of breakage. Stopcock is 8mm bore PTFE plug. Body height is approximately 350mm, O.D. is 152mm.

Capacity, mL	Qty	Order Code	
5000	1	7297-45	★

**Replacement Stopcocks**

	1	8224-18	♠
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**FUNNEL** *Pressure Equalizing, Graduated, with PTFE Needle Valve Stopcock* ♠

Threaded stopcock with PTFE plug permits smooth needle valve adjustment down to 0.1 mL/min. flow rate. Double PTFE ring seals prevent exposure of backup O-Ring to corrosive liquids. Angled position makes manipulation of stopcock easier than conventional style.  $\text{\textcircled{K}}$  24/40 joints top and bottom, double scale graduations.

Capacity, mL	$\text{\textcircled{K}}$ Joints	Stopcock Orifice, mm	Qty	Order Code
60	14/20	0-3	1	9493-40
125	24/40	0-3	1	7298-05
250	24/40	0-3	1	7298-10
500	24/40	0-3	1	7298-15
500	24/40	0-5	1	7298-20
1000	24/40	0-5	1	7298-24
2000	24/40	0-5	1	7298-28

**Replacement Stopcocks**

	0-3	1	8192-261
	0-5	1	8192-263


**FUNNEL** *Addition, Pressure Equalizing, Jacketed* ♠

Jacketed version of 7297 series addition funnels. Jacket runs from shoulder at top of vessel to just above the PTFE stopcock with size D hose connections for 3/8-in ID tubing. Equalizing side arm runs from top of vessel to just below the stopcock. Graduations are both ascending and descending volume. Top and bottom standard taper joints are the same size. Bottom drip tip extends to the edge of the bottom inner joint. Top outer joint is reinforced. PTFE stopcock plug is 4MM bore.

Capacity, mL	$\text{\textcircled{K}}$ Joints	Qty	Order Code
500	24/40	1	7281-08
500	29/42	1	7281-12
1000	24/40	1	7281-14
1000	29/42	1	7281-16
1000	29/32	1	7281-18
2000	29/42	1	7281-22
2000	29/32	1	7281-24

**Replacement Stopcocks**

	1	8224-12
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**FUNNEL-RESERVOIR** *Rate Measuring with PTFE Plug, 120° Bore Stopcock* ★

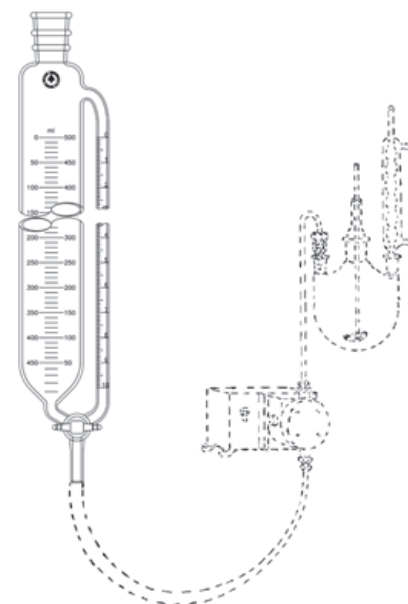
Cylindrical, graduated reservoir permits determination of volume added at any time during pumping cycle. By stopcock manipulation, material may be pumped from graduated (10mL in 0.1mL) side tube only. This permits obtaining accurate pumping rate over short periods of time. Top joint is  $\frac{1}{4}$ " 24/40 outer. Outside diameter of bottom outlet is 9.5mm (3/8-inch) tubing which fits Swagelok.

Tubing approximately 9.5mm in diameter may be used to connect reservoir outlet to pump. Pump outlet fitting may also be connected via same type tubing to 9.5mm glass tubing then to reactor by using Ace-Thred adapter 5030 with #11 thread.

Capacity, mL	Subdivision, mL	Plug Bore, mm	Qty	Order Code
250	5	2	1	7342-12
500	5	2	1	7342-14
1000	10	4	1	7342-16
2000	20	4	1	7342-18

**Replacement Stopcocks**

*This item requires custom stopcocks, contact us to order*



# Repair Service

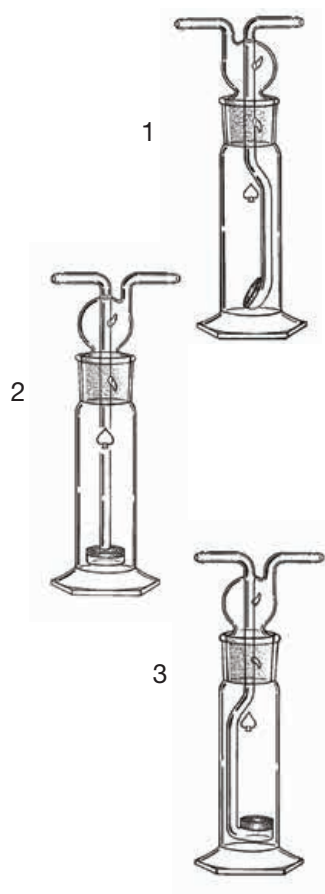
*Yes, we fix it, too!*

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. These repairs can be far less expensive than the cost of replacing.



Broken joint or a cracked flask,  
we can restore it!

To find out more about our repair service call **1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)


**BOTTLE** Gas Washing ♦

Large disc size provides greater capacity. 125mL size has a 25mm fritted disc. The 250mL and 500mL sizes are fitted with a 30mm disc. Joints are \$ 40/35. All porosities of a given size are priced the same. Inlet/outlet arms are 8mm O.D. Available in style A, B or C.

Capacity, mL	Style	Qty	Porosity A Order Code	Porosity B Order Code	Porosity C Order Code
<b>Complete</b>					
125	1	1	7162-02	7162-04	7162-06
125	2	1	7163-02	7163-04	7163-06
125	3	1	7164-02	7164-04	7164-06
250	1	1	7162-12	7162-14	7162-16
250	2	1	7163-12	7163-14	7163-16
250	3	1	7164-12	7164-14	7164-16
500	1	1	7162-22	7162-24	7162-26
500	2	1	7163-22	7163-24	7163-26
500	3	1	7164-22	7164-24	7164-26

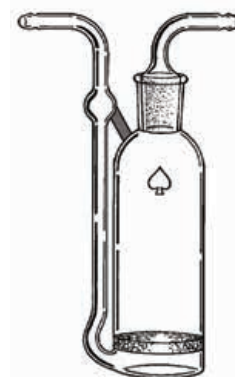
Capacity, mL	Style	Qty	<i>Bottle Only</i>		<i>Stopper Only</i>		
			Order Code	Porosity A Order Code	Porosity B Order Code	Porosity C Order Code	
125	1	1	7162-50	7162-60	7162-62	7162-64	
125	2	1	7162-50	7163-60	7163-62	7163-64	
125	3	1	7162-50	7164-60	7164-62	7164-64	
250	1	1	7162-52	7162-70	7162-72	7162-74	
250	2	1	7162-52	7163-70	7163-72	7163-74	
250	3	1	7162-52	7164-70	7164-72	7164-74	
500	1	1	7162-54	7162-80	7162-82	7162-84	
500	2	1	7162-54	7163-80	7163-82	7163-84	
500	3	1	7162-54	7164-80	7164-82	7164-84	

ACE Designation	Porosity Maximum Pore Dia. Range (micron)	Corning, Kimble & ChemGlass Equivalent	Most Frequent Uses
A	145-174	EC (170-220)	Coarse filtration. Gas Dispersion
B	70-100	—	Coarse filtration. Gas Dispersion
C	25-50	C (40-60)	Filtration. Gas Dispersion
D	10-20	M (10-15)	Filtration and extraction
E	4-8	F (4-5.5)	Filtration and extraction

## BOTTLE Gas Washing ♦

With fritted disc. Joint is ₣ 29/42 for all sizes. All porosities of a given size are priced the same. Inlet/outlet arms are 8mm O.D.

Capacity, mL	Disc Diameter, mm	Qty	Porosity		
			Order Code	Order Code	Order Code
<b>Complete</b>					
250	50	1	7166-12	7166-14	7166-16
500	75	1	7166-22	7166-24	7166-26
			<b>Stopper Only</b>		
Capacity, mL	Qty	Order Code	Porosity A Order Code	Porosity B Order Code	Porosity C Order Code
250	1	7166-40	7166-60	7166-62	7166-64
500	1	7166-40	7166-70	7166-72	7166-74



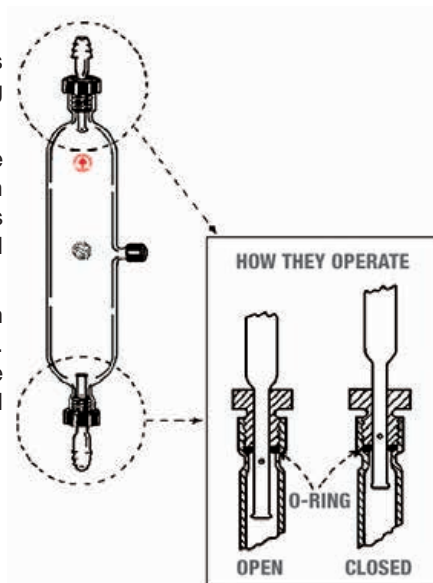
## GAS COLLECTING BULB Ace-Thred

Designed with #7 Ace-Thred end valves that insure tight fit without grease. No stopcock plugs to “pop out.” Nylon bushing tightens into the internally threaded glass to form an O-Ring compression seal.

**Operation:** With bushings at fingertip tightness, push plungers into bulb until flow holes are inside O-Rings (enlarged end of plunger acts as automatic stop). Valves are now OPEN and ready for flush sampling. When sampling is complete and with bushing still at finger tip tightness, pull plungers out so flow holes are outside O-Rings. Valves are now CLOSED. Bushings can then be tightened more for handling until ready to analyze.

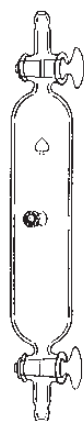
Note: A bulge is built on the small end of the plunger to help guard against complete pullout. Each bulb has a side syringe sampling port, with two bushings, two FETFE O-Rings and one septum. Plungers are supplied with hose connections. Special bulb capacities and plungers can be made to order. Complete item consists of bulb with two bushings, two FETFE O-Rings, one septum and two plungers. Use with 3/8-inch or 5/16-inch I.D. tubing, size C hose connection.

Capacity, mL	Qty	Bulb Only		Hose Connection Plungers Only		Complete	
		Order Code	♦	Order Code	♦	Order Code	♦
10	1	7395-04	♦	7395-50	♦	7395-40	♦
250	1	7395-18	♦	7395-50	♦	7395-44	♦
1000	1	7395-30	♦	7395-50	♦	7395-48	♦



### Replacement Parts and Accessories

Extra Bushings	1	5029-10	♦
Extra Septa	12	9096-33	★
Extra O-Rings, FETFE	12	7855-704	♦



### GAS COLLECTING TUBE

Standard collecting tube with glass stopcocks on each end, with capillary tubing for connecting to rubber tubing. Also has a side syringe sampling port with septum.

Capacity, mL	Bore Size, mm	Qty	Order Code	
125	2	1	7401-18	♠
250	3	1	7401-20	♠
500	3	1	7401-22	♠

#### Replacement Stopcocks

	2	1	8223-02	♠
	3	1	8223-04	♠
	3	1	8223-04	♠

#### Replacement Septa

		12	9096-33	★
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### GAS COLLECTING TUBE with 1:5 PTFE Plug and Sampling Port

Standard collecting tube supplied with 1:5 taper PTFE stopcock plugs in place of glass plugs on each end and a side syringe sampling port with septum.

Capacity, mL	Bore Size, mm	Qty	Order Code	
250	3	1	7401-50	♠

#### Replacement Stopcocks

	3	1	8224-08	♠
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#### Replacement Septa

		12	9096-33	★
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### EQUILIBRATION FLASK ♠

Designed by Dr. H.R. Krouse, University of Calgary, for use in  $H_2O^{18}/H_2O^{16}$  determination. Unique design eliminates the use of grease or breakseals in  $CO_2$  recovery. Water samples are introduced by pipet into bulb by removing PTFE plug. After reinstating plug, degassing of water and  $CO_2$  is transferred to sample tube 7410. Unit consists of PTFE plug with FETFE O-Ring and glass vessel with 25mL bulb at bottom.

Qty	Order Code
1	7408-10

#### Replacement Plugs

	1	8194-268
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### SAMPLE TUBE ♠

Designed by Dr. H.R. Krouse, University of Calgary, for use with 7408 in  $H_2O^{18}/H_2O^{16}$  determinations.  $CO_2$  from the equilibration flask is transferred to the sample tube for isotopic analysis. Unit consists of PTFE plug with FETFE O-Ring and glass vessel with 5mL tube at bottom.

Qty	Order Code
1	7410-10

#### Replacement Plugs

	1	8194-266
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**SAMPLE FLASK** with ★ Joint ♠

Similar in design to 7408 and 7410 except with ⚙ joint on side arm in the vertical position. 5mL size is tube style, 25mL size is bulb style.

Capacity, mL	Side ⚙ Joint	Qty	Plug Only	Complete
			Order Code	Order Code
5	14/20	1	8194-266	7412-03
25	14/20	1	8194-268	7412-07



**GAS MANIFOLD** ♠

For portable gas analysis apparatus. Three or four straight 2mm bore glass stopcocks and one three-way stopcock with back port, fabricated on capillary tubing.

Note: We can fabricate special gas manifolds of all kinds — contact us for a FREE no hassle quotation.

Bore Size, mm	Qty	Order Code
3	1	7416-10
4	1	7416-14



**Also see the Vacuum section for complete manifold listing.**

**ARSINE GENERATOR** Guthzeit

Designed for arsenic analysis by the diethylthiocarbamate colorimetric method. Meets APHA Standard 104A, ACS/USP, and EPA Specifications. Fabricated from borosilicate glass for grease free operation. Joint on 125mL flask is ⚙ 24/40, polished. Spherical joint between absorber and scrubber is ⚙ 12/2. Complete item consists of absorber, scrubber, and Erlenmeyer Flask.

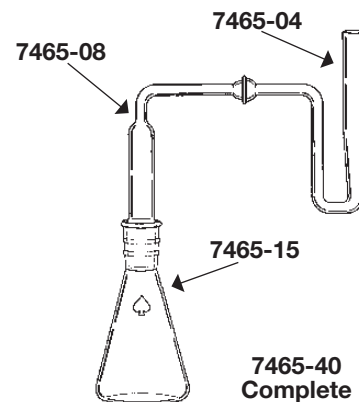
	Qty	Order Code	
Arsine Absorber	1	7465-04	♠
Arsine Scrubber	1	7465-08	♠
Flask, 125mL, ⚙24/40	1	7465-15	♠

**Complete**

	1	7465-40	♠
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**Accessories**

Delrin Joint Clamps	10	7668-12	★
Pinch Type Joint Clamp, Steel	1	7669-03	★



**SPRINGS** Stainless Steel ★

For connecting interchangeable joints, Warburg Flasks, washing bottles and other apparatus where glass hooks are provided. Supplied 12 per shelf-pack, or in assortment pack\* containing 12 of each size (144 total).

Coil Length, cm (In.)	Qty	Order Code
1.3 (1/2)	12	8030-02
1.0 (3/4)	12	8030-04
2.5 (1)	12	8030-08
3.2(1-1/4)	12	8030-12
3.8 (1-1/2)	12	8030-16
4.1 (1-3/4)	12	8030-20
5.1 (2)	12	8030-24
Assortment Pack*	144	8030-30



### ROTAMETER *Needle Valve, Compact, Ace-Thred*

All working parts and indicia are visible, meter readings are unobstructed; the outlet swivels 360°. By inverting the metering tubes, the outlet can be changed to inlet. This compact needle valve rotameter is used to regulate and measure flows conveniently. Pressure tight to 2Kg/cm<sup>2</sup> or more (air).

Flow rates from 5 to 50,000mL/min. air; or 0.1 to 500mL/min. water using six interchangeable tubes with fused-on 70mm scales (see table below). Each tube is furnished with a 316 stainless steel and Pyrex glass ball float, except where noted, average calibration curves  $\pm 5\%$  of flow; one set of correction curves for temperature, pressure and specific gravity.

Exposed surfaces within the system are glass, nylon 316 stainless steel (float ball and spring) and FETFE (silicone and ethylene-propylene rubber O-Rings also available). Nylon is suitable for use from pH 3 to pH 14, unaffected by most ordinary solvents and chemicals except oxidizing acids and amines.

The components are readily disassembled for cleaning or interchanging metering tubes merely by unscrewing the threaded metering tube cap, and/or the needle plug. Supplied in plastic case convenient for storage.



Description	Qty	Order Code	
Stopcock Body, <i>glass only</i>	1	7481-04	★
Stopcock Valve Stem	1	8192-261	♠
Outer Body, #15	1	7481-08	★
Nylon Coupling, <i>stopcock to outer body</i>	1	7481-10	★
Rotameter Tubes, Complete with necessary floats:			
#31	1	7481-15	★
#32	1	7481-17	★
#33	1	7481-19	★
#34	1	7481-21	★
#35	1	7481-23	★
#36	1	7481-25	★
Tension Spring	1	7481-30	★
Set of Calibration Curves	1	7481-32	★

#### Complete

	1	7481-40	★
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#### Replacement O-Rings

FETFE	1	7481-46	★
Silicone	1	7481-47	★
Ethylene-Propylene (EPDM)	1	7481-48	★

Meter Tube No.	Float	Flow Range mL/min.	
		Air Flow	Water Flow
31	Stainless Steel	5.0-45	0.065-0.65
	Glass	None	—
32	Stainless Steel	120-1200	03.0-30
	Glass	48-475	0.5-6.0
33	Stainless Steel	475-5700	10-180
	Glass	240-2800	5-60
34	Stainless Steel	950-17,000	50-500
	Glass	None	—
35	Stainless Steel	4.8-50 L/min.	—
	Glass	2.5-28 L/min.	—
36	Stainless Steel	None	—
	Wide Range	Glass	0.24-14.3 L/min.

## MANTLE Fabric/Cloth

For use with 6476 and 6511 reaction flasks. Upper temperature limit, 450°C. Detachable 4-foot cord and locking connector. CSA approved.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	I.D. x Depth, inches/mm	Watts/Volts	Qty	Order Code
500	4.63/117.4 x 2.5/63.5	250w-115v	1	6478-05
1000	4.63/117.4 x 5.63/142.8	300w-115v	1	6478-10
1500	4.63/117.4 x 6.63/168.2	380w-115v	1	6478-15
2000	4.63/117.4 x 8.89/225.4	450w-115v	1	6478-20
3000	4.63/117.4 x 10/254	600w-115v	1	6478-25



## MANTLE Aluminum Housing, For Cylindrical Flasks

Cylindrical type for use with 6476, 6477, and 6511 reaction flasks. With hard aluminum housing. CSA approved, 115 volt complete with 4-foot detachable cord with locking connector. Temperature range is ambient +10°C to 450°C. 230V versions available.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	Maximum Flask Dia., in./mm	I.D. x Depth, inches/mm	Watts/Volts	Qty	Order Code
500	4.63/117.4	4.63/117.4 x 2.5/63.5	250w-115v	1	6478-45
1000	4.63/117.4	4.63/117.4 x 5.63/142.8	300w-115v	1	6478-47
1500	4.63/117.4	4.63/117.4 x 6.63/168.2	380w-115v	1	6478-49
2000	4.63/117.4	4.63/117.4 x 8.89/225.4	450w-115v	1	6478-51
3000	4.63/117.4	4.63/117.4 x 10/254	600w-115v	1	6478-53



## FLASK HEATER Fabric/Cloth

Specially designed glass/fiber cloth mantle with bottom opening and zipper for use with 6491, 6492, 6518, and 6522 flasks to allow valve to protrude below heater. Upper temperature limit, 450°C. Complete with 4-foot cord and locking connector. CSA approved.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	I.D. x Depth, inches/mm	Watts/Volts	Qty	Order Code
1000	4.625/117.4 x 5.625/142.8	300w-115v	1	6494-10
1500	4.625/117.4 x 6.625/168.2	380w-115v	1	6494-15
2000	4.625/117.4 x 8.875/225.4	450w-115v	1	6494-20
3000	4.625/117.4 x 10/254	600w-115v	1	6494-25



## MANTLE Spherical

Fabric mantle covers both top and bottom of 1-, 2-, or 3-neck flasks. Temperature range is ambient +10°C to 450°C. The circumferential zipper holds the halves snugly together to prevent heat loss, and the side split in the top section allows for easy flask removal. CSA certified. Each half has a detachable four-foot cord and interlocking connector. **230C CE-approved versions are available.**

**Note:** Must be operated with a temperature controller.

	For Flask Size, mL	Distribution		Qty	Order Code
		Lower Half	Upper Half		
Glass Fabric	50	60w-115v	None	1	12031-05
	100	80w-115v	None	1	12031-07
	200	100w-115v	None	1	12031-11
	250	180w-115v	None	1	12031-13
	500	270w-115v	None	1	12031-17
Silicone Impregnated Glass Fabric	1000	380w-115v	140w-115v	1	12031-19
	2000	500w-115v	200w-115v	1	12031-21
	3000	500w-115v	200w-115v	1	12031-23
	5000	600w-115v	300w-115v	1	12031-25





**MANTLE Hemispherical**

Fabric mantle, adaptable to unusual shapes and sizes. Temperature to 450°C. Detachable 4-foot cord, 2-wire cord and locking connector. Requires 12095 or 12096 supports. CSA certified\*.

**Note:** Must be operated with a temperature controller.

	For Flask Capacity, mL	Wattage	Qty	Order Code
Glass Fabric ▶	5	12w- 30v	1	12035-01
	10	20w- 30v	1	12035-02
	25	30w- 60v	1	12035-03
	50	60w-115v	1	12035-05
	100	80w-115v	1	12035-07
	125	80w-115v	1	12035-09
	200	100w-115v	1	12035-11
	250	180w-115v	1	12035-13
	300	180w-115v	1	12035-15
Silicone Impregnated Glass Fabric ▶	500	270w-115v	1	12035-17
	1000	380w-115v	1	12035-19
	2000	500w-115v	1	12035-21
	3000	500w-115v	1	12035-23
	5000	600w-115v	1	12035-25
	12000	2-650w-115v	1	12035-27

\*12035-01, -02, -03 are not CSA rated due to the 115v requirement.



**MANTLE Fabric/Cloth**

For use with 6504 or 6511 reaction flasks. Upper temperature limit, 450°C. Four-foot cord and locking connector. CSA approved.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	I.D. x Depth, inches/mm	Watts/Volts	Qty	Order Code
500	3.75/95.2 x 4.5/114.3	270w-115v	1	12036-17
1000	4.25/107.9 x 5.2/132	335w-115v	1	12036-19
2000	5.5/139.7 x 6.0/152.3	470w-115v	1	12036-21
3000	5.5/139.7 x 9.0/228.6	550w-115v	1	12036-23
4000	5.5/139.7 x 11.0/279.4	750w-115v	1	12036-24



**MANTLE**

For Griffin-type beakers. With separable 4-foot, 2-wire cord and locking connector. CSA certified.

**Note:** Must be operated with a temperature controller.

For Beaker Capacity, mL				Order Code	For Beaker Capacity, mL				Order Code
Wattage	Qty				Wattage	Qty			
40w-115v	1			12037-04	600	325w-115v	1		12037-14
100w-115v	1			12037-06	800	350w-115v	1		12037-16
100w-115v	1			12037-08	1000	430w-115v	1		12037-18
140w-115v	1			12037-10	2000	550w-115v	1		12037-20
240w-115v	1			12037-12	3000	630w-115v	1		12037-22
					4000	710w-115v	1		12037-24

For large-size mantles, view our Process Scale-Up Systems catalog at [AceGlass.com](http://AceGlass.com)

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### MANTLE

For Squibb type separatory funnels. With separable 4-foot, 2-wire cord and locking connector. Large sizes of one liter and up have viewing slots, as shown. CSA certified.

**Note:** Must be operated with a temperature controller.

For Funnel Capacity, mL	Wattage	Qty	Order Code
250	140w-115v	1	12038-04
500	180w-115v	1	12038-06
1000	190w-115v	1	12038-08
2000	280w-115v	1	12038-10



### MANTLE Aluminum Housing

Offers the benefit of grounding through aluminum housing. The heating element is embedded in layers of glass fabric to protect the flask wall from thermal strain. Mantle is thoroughly covered with glass insulation to prevent heat from being radiated outward. Glass fabric affords operating temperatures to 450°C. With detachable 4-foot, 3-wire cord and locking connector. Requires 12094 support. CSA certified. **230v version is also available for 250mL and larger mantles.**

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	Max. Flask O.D., in/mm	I.D. x Depth, in/mm	Watts/Volts	Qty	Order Code
1000	5.1/130	5.1/130 x 2.5/65	380w-115v	1	12043-19
2000	6.6/170	6.6/170 x 3.3/85	500w-115v	1	12043-21
3000	7.2/183	7.2/184 x 3.6/91.5	500w-115v	1	12043-23
5000	8.6/220	8.7/222 x 4.3/110	600w-115v	1	12043-25
12000	11.5/293	11.5/294 x 5.8/147.6	(2) 650w-115v	1	12043-27
22000	13.6/347	13.7/350 x 6.8/173.5	(2) 770w-115v	1	12043-29
50000	17.9/456	18.0/458 x 8.9/228	(3) 1000w-115v	1	12043-31
50000 (For Duran)	19.9/506	19.9/506 x 8.9/228	(3) 1000w-115v	1	12043-32
72000	20.5/522	20.6/525 x 10.1/258.9	(2) 2000w-230v	1	12043-33



### MANTLE Aluminum Housing, with Bottom Opening

Same as 12043, above, but with bottom opening to accommodate flasks such as 6450, 6469, 6534, and 6536.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	Max. Flask O.D., in/mm	I.D. x Depth, in/mm	Watts/Volts	Bottom Opening O.D., in/mm	Qty	Order Code
3000	7.2/183	7.2/184 x 3.6/91.5	500w-115v	2.5/63.5	1	12044-24
5000	8.6/220	8.7/222 x 4.3/110	600w-115v	2.5/63.5	1	12044-26
12000	11.5/293	11.5/294 x 5.8/147.6	(2) 650w-115v	2.5/63.5	1	12044-28
12000	11.5/293	11.5/294 x 5.8/147.6	(2) 650w-115v	5.0/127	1	12044-29
22000	13.6/347	13.7/350 x 6.8/173.5	(2) 770w-115v	2.5/63.5	1	12044-30
22000	13.6/347	13.7/350 x 6.8/173.5	(2) 770w-115v	5.0/127	1	12044-31
50000	17.9/456	18.0/458 x 8.9/228	(3) 1000w-115v	5.0/127	1	12044-34
72000	20.5/522	20.6/525 x 10.1/258.9	(2) 2000w-230v	5.0/127	1	12044-37

## HEATING TOPS

For use with 1-, 2- and 3-neck flasks. Top can be put on flask without disturbing permanently attached equipment. Temperature range is ambient +10°C to 450°C. For use with 12043, 12045, 12053 and 12058 mantles. With detachable 4-foot, 2-wire cord and locking connector. 115v units are CSA certified.

**Note:** Must be operated with a temperature controller.

For Flask Capacity, mL	Wattage	Qty	Order Code
250	140w-115v	1	12047-13
300	140w-115v	1	12047-15
500	140w-115v	1	12047-17
1000	140w-115v	1	12047-19
2000	200w-115v	1	12047-21
3000	200w-115v	1	12047-23
5000	300w-115v	1	12047-25

All 115v units are also available in 230v versions.



## MANTLE Aluminum Housing, Solid Bottom, for Spherical Flasks

Solid, aluminum housed, heating mantles can be used on lab bench, stand or floor for smaller sizes. Fit cylindrical and spherical flasks. Temperature range ambient +10°C to 450°C. All have 4-foot detachable cord with interlocking connector. CSA approved.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	For Flask Type	Maximum Flask Dia., in/mm	I.D. x Depth, in/mm	Watts/Volts	Qty	Order Code
50	Spherical	1.8/48	1.9/49 x 0.9/23.9	60w-115v	1	12053-05
100	Either	2.3/60	2.3/60 x 1.1/30.2	80w-115v	1	12053-07
250	Either	3.2/83	3.3/84 x 1.6/41.4	180w-115v	1	12053-13
500	Either	3.9/101	4.0/102 x 2.0/50.8	270w-115v	1	12053-17
1000	Either	5.1/130	5.1/130 x 2.5/65	380w-115v	1	12053-19
2000	Either	6.6/170	6.6/170 x 3.3/86	500w-115v	1	12053-21
3000	Either	7.2/183	7.2/183 x 3.6/91.5	500w-115v	1	12053-23
5000	Either	8.6/220	8.6/220 x 4.3/109.5	600w-115v	1	12053-25
6000	Spherical	9.25/235	9.25/235 x 4.7/120.6	700w-115v	1	12053-26



## MANTLE Aluminum Housing, Small Capacity, Spherical

The StirMantle adds electromagnetic stirring capability (50-750 rpm) to the Series TM heating mantle for spherical flasks. Heating and stirring are independent; choose either or both. Speed is easily adjusted by a single dial on the StirControl II (*ordered separately*).

The StirControl II creates and synchronizes the magnetic field. When restarting, (as for removal and reinsertion of the flask). Glas-Col's exclusive "Synchrostart" feature maintains linkage between the field and the bar. The StirControl II connects to the StirMantle by cord, so it may be placed outside corrosive hood atmospheres and is easily accessible. Control features (2) receptacles for operating (2) Stirmantles at once. Ships complete with mantle, PTFE stirbar and 4' cord.

**Note:** For heating control, we recommend you purchase our 12125-14 temperature controller and our 12110-15 J type temperature probe with 72" lead.



For Flask Size*, mL	Inside Depth, in/mm	Volts	StirControl, only Order Code	Stirmantle, only Order Code	Complete Order Code
1000	2.56/65.02	120v, 50/60Hz	12046-01	12046-15	12046-10
1000	2.56/65.02	230v, 50/60Hz	12046-02	12046-17	12046-23
2000	3.35/85.09	120v, 50/60Hz	12046-01	12046-25	12046-20
2000	3.35/85.09	230v, 50/60Hz	12046-02	12046-27	12046-23

\*StirMantle is designed for Spherical Flasks.



### MANTLE Aluminum Housing, Cylindrical Flasks

Resin and reaction flask mantle mainly used for ACE pressure reactors, but fit many other cylindrical reaction flasks such as 6476, 6511-06 series, 6521, Aluminum housed with solid bottom. The code -03 is for a flask with a flat bottom with rounded corners such as the 6511-24 series. CSA approved. 4-foot detachable cord with locking connector. Temperature range is ambient +10°C to 450°C.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	Max. Flask O.D., in/mm	I.D. x Depth, in/mm	Watts/Volts	Qty	Order Code
500 (tall)	2.75/69.9	2.76/70 x 6.25/158.8	280w-115v	1	12058-03
500 (short)	4.38/111.3	4.5/114.3 x 3.0/76.2	250w-115v	1	12058-07
3000	6.38/162	6.4/162.6 x 6.0/152.4	600w-115v	1	12058-30
5000	6.38/162	6.4/162.6 x 10.9/276.9	1000w-115v	1	12058-33



### MANTLE Aluminum Housing

Resin and reaction flask mantle. Bench top size with small footprint, aluminum housing. For use with ONLY the following ACE flasks: 6521-12, 6521-14, 6472-15, 6472-20 and 6472-25. Complete with 4-foot detachable cord with locking connector. CSA approved, 115 volt.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	Max. Flask O.D., in/mm	I.D. x Depth, in/mm	Watts/Volts	Qty	Order Code
500	3.75/95.2	3.75/95.2 x 4.5/114.3	270w-115v	1	12058-08
1000	4.25/107.9	4.25/107.9 x 5.25/133.3	335w-115v	1	12058-12
2000	5.5/139.7	5.5/139.7 x 6.0/152.3	470w-115v	1	12058-16
3000	5.5/139.7	5.5/139.7 x 9.0/228.6	550w-115v	1	12058-22
4000	5.5/139.7	5.5/139.7 x 11.0/279.4	750w-115v	1	12058-28



### MANTLE Aluminum Housing, Cylindrical Flasks, Bottom Opening

Resin and reaction flask mantle mainly used for ACE pressure reactors with a bottom valve or outlet. Will also fit many other cylindrical reaction flasks such as 6518, 6522, 6521, 6300. The code -44 is for a flask with a flat bottom with rounded corners such as the 6437 series. Aluminum housed with bottom opening. CSA approved. 4-foot detachable cord with locking connector. Temperature range is ambient +10°C to 450°C.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	Max. Flask O.D., in/mm	I.D. x Depth, in/mm	Watts/Volts	Qty	Order Code
500 (tall)	2.75/69.9	2.8/70 x 6.25/158.8	280w-115v	1	12058-44
500 (short)	4.38/111.3	4.4/111.8 x 3.0/76.2	250w-115v	1	12058-47
1000	4.25/107.9	4.28/109 x 5.25/133.4	335w-115v	1	12058-49
2000	5.5/139.7	5.7/144.8 x 6.0/152.4	470w-115v	1	12058-51
3000	6.38/162.1	6.4/162.6 x 6.0/152.4	600w-115v	1	12058-53
5000	6.38/162.1	6.4/162.6 x 10.8/276.4	1000w-115v	1	12058-55



### MANTLE Aluminum Housing, For Cylindrical Flasks

Resin and reaction flask mantle. Bench top size with small footprint. Aluminum housing for 6423, 6436, 6526, 6476, 6477, 9526, 6516-01, 6521-10,-12,-14, 6511-06,-42,-24,-53 ACE flasks. Complete with 4-foot detachable cord with locking connector. Temperature range is ambient +10°C to 450°C. CSA approved, 115 volt. 230V versions available.

**Note:** Must be operated with a temperature controller.

For Flask Size, mL	Max. Flask O.D., in/mm	I.D. x Depth, in/mm	Watts/Volts	Qty	Order Code
1000	4.5/114.3	4.5/114.3 x 4.5/114.3	270w-115v	1	12075-08
2000	4.5/114.3	4.5/114.3 x 7.5/190.5	400w-115v	1	12075-10
3000	4.5/114.3	4.5/114.3 x 11/279.4	600w-115v	1	12075-12



**CAL-CORD** High Temperature Heating Cord

Glas-Col Cal-Cord is designed specially for high-temperature laboratory heating problems. Only 6.4mm in diameter, this wrap-around heater can be installed and removed quickly.

It can be wrapped and unwrapped on tubes as small as 12.7mm without damage. Power supply connections are made with lock plug at one end. All cords are furnished with separable extension cord with two-blade cup. Because of the high temperature capabilities of the Cal-Cord insulation, the cord should be used in dry- or low-moisture areas only.



**Medium "Cal-Cord" — 400°C Specifications**

Length, meters	Wattage	Qty	Order Code
0.6 (2 ft)	80w-115v	1	12062-03
0.9 (3 ft)	120w-115v	1	12062-05
1.2 (4 ft)	160w-115v	1	12062-07
1.8 (6 ft)	240w-115v	1	12062-09
2.4 (8 ft)	340w-115v	1	12062-11
3.0 (10 ft)	400w-115v	1	12062-13

Made of glass fabric material.

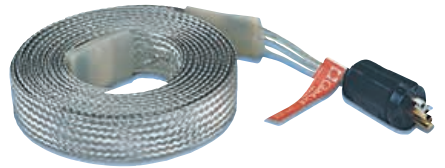
**Super "Cal-Cord" — 600°C Specifications**

Length, meters	Wattage	Qty	Order Code
0.6 (2 ft)	200w-115v	1	12062-32
1.2 (4 ft)	400w-115v	1	12062-36
1.8 (6 ft)	500w-115v	1	12062-38

Made of quartz fabric material.

**HEATING TAPES** Lab Type

Glas-Col heating tapes which allow even short tapes, 0.9m long, to be used on 115v without the need of a reducing voltage transformer. Can be operated directly with a temperature controller at normal outlet voltage. Operating temperatures to 249°C. Both power supply connections are made at one end of the tape. All tapes are supplied with separable 1.2m extension cord with two-blade cup.



**FET SERIES** — 15mm wide (complete with cord and plug)

Length, meters	Wattage	Qty	Order Code
1.5 (5 ft)	145w-115v	1	12063-02
1.8 (6 ft)	120w-115v	1	12063-04
2.1 (7 ft)	105w-115v	1	12063-06
2.4 (8 ft)	90w-115v	1	12063-08
2.7 (9 ft)	80w-115v	1	12063-10
3.0 (10 ft)	300w-230v	1	12063-12

**SET SERIES** — 25mm wide (complete with cord and plug)

Length, meters	Wattage	Qty	Order Code
0.9 (3 ft)	150w-115v	1	12063-42
1.2 (4 ft)	120w-115v	1	12063-44
1.5 (5 ft)	100w-115v	1	12063-46
1.8 (6 ft)	300w-230v	1	12063-48



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- NIST traceable
- Advanced PID algorithm

### HEATING TAPES' Ribbon-Type Elements

Glas-Col heating tapes use two-ribbon-type heating elements running lengthwise in the tape and encased in durable glass braid, then impregnated and covered with tough silicone rubber. This construction method easily passes a 1000-volt test for electrical insulation. Silicone rubber is also used to insulate the stranded terminal leads at one end for waterproof fittings at both ends of the tape. The only limitation is the upper temperature limit of 249°C for the silicone covering.

**Note:** Temperature level and heat input control on heating tapes should be effected with a Powerstat.

#### 6.4mm (1/4-inch) wide heating tapes (standard lengths complete w/cord & plug)

Length, meters	Wattage*	Qty	Order Code
1.2 (4 ft)	60w-45v	1	12064-02
1.8 (6 ft)	90w-70v	1	12064-04
2.4 (8 ft)	120w-95v	1	12064-06
3.0 (10 ft)	150w-120v	1	12064-08

Ohms per meter of tape, 29.8 (9.08/foot)

#### 12.7mm (1/2-inch) wide heating tapes (standard lengths complete w/cord & plug)

Length, meters	Wattage*	Qty	Order Code
1.2 (4 ft)	140w-45v	1	12064-23
1.8 (6 ft)	210w-70v	1	12064-25
2.4 (8 ft)	280w-95v	1	12064-27
3.0 (10 ft)	340w-115v	1	12064-29
6.1 (20 ft)	680w-230v	1	12064-31

Ohms per meter of tape, 12.4 (3.77/foot)

#### 25.4mm (1-inch) wide heating tapes (standard lengths complete with cord and plug)

3.0 (10 ft)	700w-115v	1	12064-42
6.1 (20 ft)	1400w-230v	1	12064-44

Ohms per meter of tape, 6.2 (1.88/ft.)

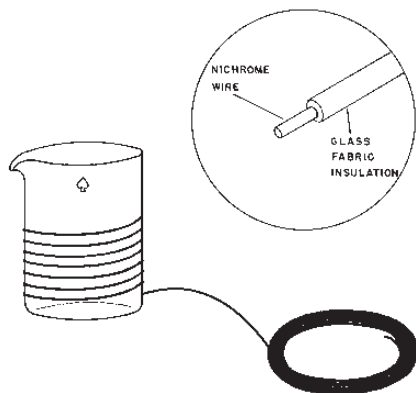
\*These limits are arbitrary since the heating element can be used at much higher wattage and voltage provided the silicone rubber covering does not exceed 249°C.



**6.4mm double element heating tape wraps easily around smallest objects — it's flexible and strong.**

### HEATER ELEMENT WIRE Electrically Insulated ★

The do-it-yourself heater that can be wrapped on metal or glass sampling probes, columns, or vessels of any size that need heat. This is the same wire used on our Nichrome-wrapped probes, approximately five feet per foot of glass. This electrically insulated 25 gauge Nichrome wire can be wound closed- or open-spaced. Maximum temperature is 594°C (1100°F). Including the glass-fabric insulation, the wire is approximately 1mm in diameter and has a resistivity of 2.1ohms/foot at 20°C; maximum ampere rating in open air at 594°C is 3.7 amps. The amperes are derated when enclosed and tightly wound; typical for 316°C (600°) operation is 2.5 amps. Electrical insulation voltage is 1000 volts. Note: Proper contact, welding or mechanical, must be made when attaching the power source leads. The use of a line voltage controller is recommended to properly power the heater element.

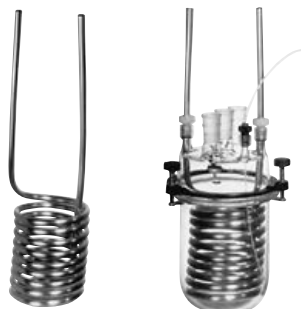


Qty	Order Code
50 ft.	12065-25

### HEAT EXCHANGER TUBING Fluorocarbon Covered ★

Copper tubing encapsulated with fluorocarbon for use as a make-your-own heat exchanger coil. (Shipped in (2) three-foot diameter coils for forming to desired shape, at a 50-foot maximum continuous run). Can be used in corrosive solutions or strong solvents like ammonia, fuming sulfuric acid, potassium hydroxide concentrate, sodium sulfate, etc. Eliminates need for costly metals like Tantalum. Highly temperature resistant, electrically insulated and will not stain, corrode or contaminate. Does not support bacteria, and anti-stick property of fluorocarbon rinses easily.

Easy to custom make your own exchanger for heat or cooling by wrapping around simple mandrel or forming to desired size. Tubing ends can be connected to almost any compression type fitting.



Nominal Copper O.D., in.	Fluoro-Carbon Wall (In.)	Copper Wall (In.)	Approx. Min. Bend Diameter, in.	Approx. Sq. Ft. of Surface Per Linear Ft.	Qty	Order Code
1/4	.015	.030	2	.0733	One 3 ft. coil	12067-15
3/8	.015	.030	4	.106	One 3 ft. coil	12067-20
1/2	.020	.030	8	.141	One 3 ft. coil	12067-25

## HEAT GUN *Varitemp*® ★

Heavy-duty, flameless heat gun featuring an exclusive locking electronic temperature control that enables the user to dial in just the right temperature for the job. Control locks in place so same setting can be used over and over. Approximate temperature range at nozzle, ambient to 400°C. Has 13/16-inch nozzle with a powerful turbo fan controlled by a three-way switch, “Off,” “Cold” or “Hot” with guard. Reinforced ceramic heating element with double-jacketed heater housing for protection. Rugged, die-cast aluminum housing with externally replaceable carbon brushes. Supplied with an eight-foot, neoprene cord with a three-wire ground plug.

Volts	Amps	Approx. Air Vol., CFM	Approx. Air Vel., FPM	Shipping Wt., lbs.	Qty	Order Code
120	14	9	1300	6	1	12070-10

®Varitemp, TM Master Appliance Corp.



## DRYER *Heat Gun, Mite*® ★

Economical, compact, flameless heat gun for heat shrinkage as well as countless other industrial applications. Input is 120v, 5.4 amps. Supplied with 2.1m, three-conductor grounded cord. Unit consists of heat gun with silver nozzle and deflector adapter.

Qty	Order Code
1	12072-20

®Mite, TM Master Appliance Corp.



## DRYER *Heat Gun* ★

Heavy-duty type, flameless heat gun. Compact gun-type housing is of die-cast aluminum with 30mm diameter, screen-capped nozzle. Adjustable air-intake shutter gives exact degree of heat desired. Three-way switch provides the option of hot, cold or off at a flick of a finger. With 2.4m, three-wire molded plug neoprene cord and adjustable “slide-on” base.

Temp. °C	Master No.	Voltage	Amps	Qty	Order Code
93-149	HG-201A	120	5	1	12073-04
149-260	HG-301A	120	12	1	12073-08
260-399	HG-501A	120	14	1	12073-12
399-538	HG-751B	120	20	1	12073-16



## POWERSTAT® 0-140 Volts

Variable transformer for all heating mantles up to and including 50 liters. Suitable for standard resin reaction flask. Input 120 volts, 50/60 cycles, single phase. Output voltage range 0-140 volts. Maximum output current 10 amperes, maximum 1.4 Kva rating. Fitted with NEMA standard three-blade plug and receptacle. Case is grounded.

Qty	Order Code
1	12080-10



## POWERSTAT® MOUNTING BRACKET

Mounting bracket permits easy and convenient mounting of 12080 or 12081 Powerstats on standard laboratory racks or stands having up to 16mm O.D. rods. Made of strong, rust and corrosion resistant aluminum alloys. Bracket is attached to the bottom of the powerstat by two screws, and to the rack or stand by a twist of two thumbscrews.

Qty	Order Code
1	11150-17





**POWERSTAT® 0–280 Volts**

Variable transformer for 12043 and 12053, 72L mantles; 12051 and 12050, 72L mantles; 12047-33 heating top; 12062-15, -17, -19, -40 heating cords; 12063-12, -48 and 12064-31, -44 heating tapes. Input 240 volts, 50/60 cycles, single phase. Output 0–280 volts, 10 amperes, 2.8 Kva. Fitted with standard NEMA three-blade plug and receptacle.

Qty	Order Code
1	12082-10



**POWERSTAT® 0–140 Volts**

Same as 12082 except input 120 volts, 50/60 cycles, single phase. Output 0–140 volts, 22 amperes, 3.1 Kva. Fitted with NEMA standard three-blade plug and receptacle.

Qty	Order Code
1	12083-05



**POWERSTAT® 0–140 Volts**

Variable transformer ideally suited for use in applications requiring a portable source of variable AC voltage up to 1.4KVA capacity. Controls on panel are recessed for eye appeal and protection from accidental bumping. Equipped with grounded NEMA cord-plug assembly, on-off switch, pilot light, output receptacle and fuse. Supplied with slots at rear that accept wall hanger brackets. Measures 9.4 high x 6.5 wide x 6.25 (inches) deep. Input 120 volts, 50/60 cycles. Output 0–140 volts, 10 amps.

Qty	Order Code
1	12084-20



**VOLTAGE CONTROLLER Mantle Minder II™**

For controlling all Glas-Col mantles. Time proportioning, 1/16 DIN, automatic control for use with mantles, tapes, cords, small ovens, and other resistive heating loads up to 1800 watts at 120 volts. Features a detachable iron-constantan “J” thermocouple with 6-inch stainless steel probe, lighted ON/OFF power switch with auxiliary indication, load and thermocouple receptacles located on front panel for easy accessibility, and set point dial calibrated in °C in 20 degree increments. Fused to protect small loads. Operates on 120 VAC, 50/60 Hz input. Range 0–750°C. Ambient temperature range 30–130°F. Accuracy ±1.5% of full scale. Supplied with three-wire load receptacle, three-wire line cord with molded plug. Power consumption four watts plus load. Thermocouple included. Measures 8 wide x 6 deep x 3-3/8 (inches) high.

Qty	Order Code
1	12085-20



**VOLTAGE CONTROLLER 0–120v at 10 Amps, Solid State ★**

Variable control from zero output to 95% line voltage. A voltage-limit, rear-mounted center-off switch is used to select a 40v or 120v maximum output with the control knob full on.

**With 0–10 ammeter.** 5% accuracy. (Since this is a solid state transformerless line voltage controller, it is NOT recommended for heaters rated less than 120 volts.) Warning glow light mounted next to correcting switch which lights when dangerous reversed wiring condition exists. (Flip switch to extinguish light and correct condition.) Easy-access 10 amp fuse type 3 AG (rear mounted). Line voltage pilot light. Standard 1.8 meter heavy duty neoprene three-wire power cord (grounded to case) with NEMA plug. Dimensions: 17.8cm (7 inches) x 10.2cm (4 inches) x 8.9cm (3-1/2 inches). Weight: 794 grams. Input 120 volts, 60 cycles.

Qty	Order Code
1	12087-10

# DynaBloc

## Cylindrical Heating Blocks

**ACE DynaBloc** anodized aluminum blocks are ideal for heating and mixing solutions in a variety of vials and small round bottom flasks.

**ACE DynaBloc** heating blocks use a universal base plate (13698), which fits easily on top of any circular-top hotplate stirrers. Simply match the top I.D. to the appropriate base plate.

The **ACE DynaBloc** system is low-cost, and its efficient heating blocks utilize a wide range of standard laboratory glassware. They can be used for stirring and/or heating multiple samples in applications such as digestion, extraction, distillation, and synthesis. The system is easy to set up, allows switching from vials to flasks in seconds, and is also easy to disassemble for cleaning. The configuration of the vial/flask holes allows for optimum heating and mixing in every well.

Use **ACE DynaBloc** heating blocks with your standard labware and hotplates for highly economical and efficient heating/stirring.

### DYNABLOC BASE PLATE ★

Anodized aluminum base plate for use with 13696, 13698 and 13699 DynaBloc heads and fits the standard circular 135mm or 145mm diameter stirrer/hotplate top. The base has a hole in the side to accommodate a standard thermocouple sensor to measure the heat at the base.

I.D., mm	O.D., mm	Qty	Order Code
145	164	1	<b>13698-03</b>
135	164	1	<b>13698-05</b>



### DYNABLOC Cylindrical, for Vials & Tubes ★

Anodized aluminum blocks for use with 13698-05 or 13698-03 base plate. Pre-drilled openings for standard-size glass vials and tubes including small dram vials, chromatography vials, scintillation vials, EPA vials, VOC vials, and standard test tubes. The blocks can be separated from the base plate for easy cleaning and handling. All blocks have a predrilled hole to accommodate sensor probe and have another hole to accommodate the T-handle extractor for easy removal of the block, even when hot. Order base plate, block and T-handle separately.

Number of Holes	For Vessel Size	Hole Size, mm	Qty	Order Code
18	20mL Vial	28 x 27.6	1	<b>13698-12</b>
18	40mL Vial	28 x 50.0	1	<b>13698-13</b>
18	10mL Reaction V-Vial® or 25x100mm tubes	26 x 50.0	1	<b>13698-14</b>
28	4 Dram/16mL Vial	22 x 35.6	1	<b>13698-20</b>
54	1mL Reaction V-Vial® or 12 x 75mm tubes	13 x 27.6	1	<b>13698-21</b>
40	16mm O.D. tubes	17 x 50.0	1	<b>13698-30</b>
28	5mL Reaction V-Vial®	22 x 35.6	1	<b>13698-37</b>
36	2 Dram/8mL Vial	17 x 27.6	1	<b>13698-38</b>
52	1 Dram/4mL Vial	15 x 27.6	1	<b>13698-41</b>
54	0.5 Dram or 1.2mL Chrom. Vial	13 x 27.6	1	<b>13698-49</b>



# DynaBloc

## Cylindrical Heating Blocks



### DYNABLOC Cylindrical, for Flasks ★

Anodized aluminum blocks are machined to accommodate small round bottom flasks and small Erlenmeyer flasks. The blocks fit the universal base plate, 13698-03 or 13698-05, and have one hole to accommodate the extension rods and the T-handle extractor which assists moving the blocks even while hot. The blocks also have a hole for a temperature sensor probe. Short support rod (31cm long) is for supporting flasks in the flask blocks; long (61cm) rod supports, condensers and other taller glass apparatus. Clamp devices are necessary to stabilize glassware while in blocks. Order base plate, block, clamp device, and support rod separately.

# of Holes	For Vessel Size	Well Dia., mm	Block Height	Qty	Order Code
3	125mL Erlenmeyer Flask	69.0	27.6mm	1	<b>13699-03</b>
3	250 or 300mL Round Bottom Flask	62.2	27.6mm	1	<b>13699-04</b>
4	100mL Round Bottom Flask	60.3	27.6mm	1	<b>13699-06</b>
5	50mL Round Bottom Flask	48.5	27.6mm	1	<b>13699-09</b>



### DYNABLOC Segmented ★

Heating/mixing blocks with even more versatility. These aluminum blocks have three segments within each block that have different size holes per each segment to accommodate a broad range of a flask or vials at the same time. Chose different size vials, tubes or a flask to run simultaneously. Block fits standard base plate, 13698-05, and blocks fit all standard size 135mm diameter round top hotplate/stirrers. Order base plate, block, clamp device, and support rod separately.

# of Holes	For Vessel Size	Block Height, mm	Qty	Order Code
12	0.5 Dram/2mL Vials	30.8	1	<b>13696-03</b>
12	1 Dram/4mL Vials			
8	2 Dram/8mL Vials			
12	1 Dram/4mL Vials	30.8	1	<b>13696-07</b>
4	4 Dram/16mL Vials			
8	2 Dram/8mL Vials			
10	16 mm Tubes	53	1	<b>13696-11</b>
1	50mL Round Bottom Flask			
4	40mL Vials			

### DYNABLOC ACCESSORIES For ACE DynaBlocs ★



Description	Qty	Order Code
Flask/Condenser Clamp Device	1	<b>13699-63</b>
Stainless Steel Short Support Rod (31cm)	1	<b>13699-40</b>
Stainless Steel Long Support Rod (61cm)	1	<b>13699-44</b>
T-handle Extractor (fits all ACE blocks)	1	<b>13698-09</b>

# DynaBloc

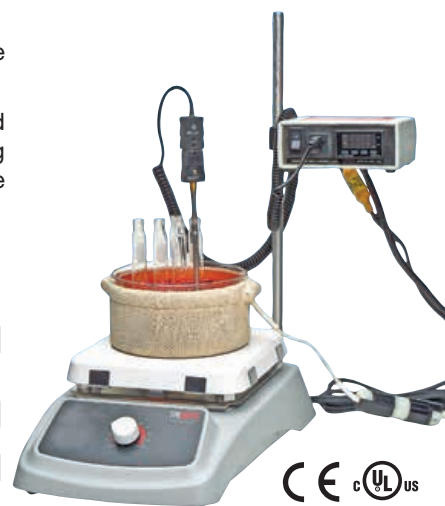
## Cylindrical Heating Blocks

### COMPLETE INSTATHERM®/BLOCK SYSTEM ★

A combination of two great ideas. The best and most accurate way of heating combined with the Dynabloc technology.

Instatherm® baths with engineered aluminum Dynablocs that fit into the bath body and hold popular size vials and tubes. Just use your existing 1,200mL bath and block for precise heating or place the entire unit on any magnetic stirrer to combine stirring with Instatherm® heat. Use existing equipment or buy a complete system.

	Qty	Order Code
<b>Complete System</b> (contains all items listed below)	1	9600-20
<b>Replacement Parts</b>		
Aluminum Block for 16mm Tubes	1	13697-16
Temperature Controller, J Type, Complete with Sensor	1	12125-32
J Type Temperature Sensor Probe, 1/8" x 6" SS Sheath		12110-09
Talboys Magnetic Stirrer (4" x 4")	1	13470-10
12" Aluminum Rod	1	11166-37
1,200mL Instatherm® Bath, Complete with Clip	1	9601-46



### INDIVIDUAL INSTATHERM® BLOCKS ★

Individual blocks for use with Instatherm® baths only. Block diameter (141mm) is for use in the 9601-16, 1,200mL Instatherm® bath.

**Note:** These blocks require NO base plate.

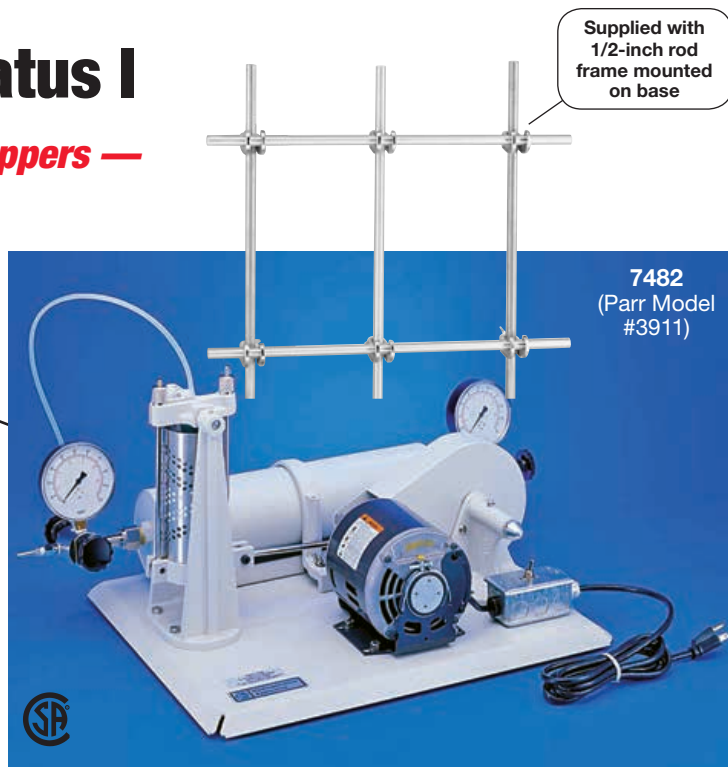
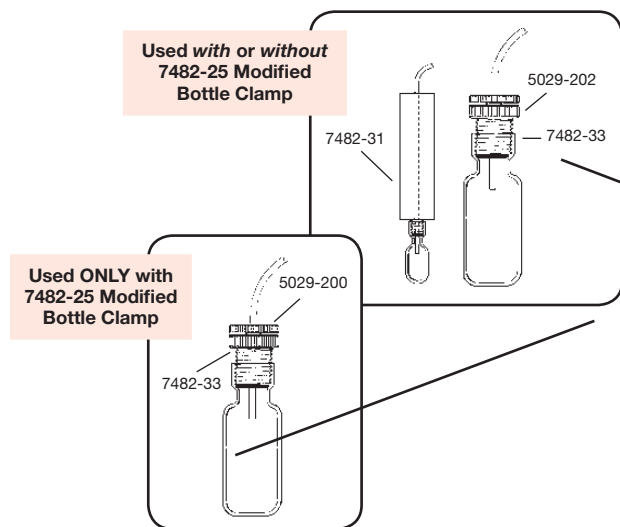
Description	Block Height, mm	Qty	Order Code
For 22, 2 Dr./8mL or 17 mm O.D. vials	30.8	1	13697-04
For 14, 4 Dr./16mL or 22mm O.D. vials	38.8	1	13697-08
For 24, 16mm O.D. tubes	50	1	13697-16
For 8, 40mL or 28mm O.D. vials	50	1	13697-40



Shaker Type

# Hydrogenation/Gas Apparatus I

**Ace-Threds eliminate the use of rubber stoppers — no more cross contamination**



Three small-volume reactors are supplied with #7 Ace-Thred that accepts a nylon bushing-spacer, 7482-31, with a #7 male thread at bottom to secure tubing from gas tank via an O-Ring compression seal. This bushing-spacer is used to take up the space between the vessel and the top of the shaker. Three larger-volume reactors supplied accept 7482-33 adapter #25 to #7. Tubing is secured via 5029-202 big head #7 bushing. These vessels are large enough to fill space to top of shaker.

The three items listed below consist of the unit ONLY. **No glassware or additional parts are supplied with these units.**

**Complete System**

	Order Code
	<b>7482-50</b> ★

The individual parts and glassware below, along with Hydrogenation/Gas Apparatus I (7482-20, at right), comprise the complete item listed above. These parts may also be ordered separately.

**Replacement Parts**

	Ace-Thred Size	Capacity, mL	Qty	Order Code
Glass Vessel*	#7	9	1	<b>8648-120</b> ♠
Glass Vessel*	#7	16	1	<b>8648-124</b> ♠
Glass Vessel*	#7	46	1	<b>8648-126</b> ♠
Glass Vessel*	#25	77	1	<b>8648-135</b> ♠
Glass Vessel*	#25	180	1	<b>8648-138</b> ♠
Glass Vessel*	#25	335	1	<b>8648-140</b> ♠
Spacer-Bushing, Nylon	#7	—	1	<b>7482-31</b> ★
Bushing, Nylon, Big Head	#7	—	1	<b>5029-202</b> ★
Adapter, PTFE	#7-#25	—	1	<b>7482-33</b> ★
Upper Rubber Pad	—	—	1	<b>7482-37</b> ★
Lower Rubber Pad	—	—	1	<b>7482-38</b> ★
Aluminum Mounting Frame	—	—	1	<b>7482-77</b> ★

\*Each glass vessel is pressure tested to 1/2 x the recommended working pressure (60 psig), but cannot be guaranteed due to the nature of glass.

**Apparatus only**

	Qty	Order Code
Apparatus I	1	<b>7482-20</b> ★
Apparatus IA, for Hazardous Locations, 115v-60Hz [Conforms to NEC Class I, Grp. D and Class II, Grp. E, F, G]	1	<b>7482-70</b> ★
Apparatus IB, with Air Motor	1	<b>7482-74</b> ★

**Accessories**

Top Bottle Clamp, only, Modified	1	<b>7482-25</b> ★
Tubing, PTFE, 1/4-inch O.D. x 3/6-inch I.D. x 1/32-inch wall	10 ft.	<b>12687-12</b> ★
Bushing, Nylon, #7	1	<b>5029-200</b> ★
Replacement O-Rings, FETFE, for 5029-200 and 5029-202	12	<b>7855-711</b> ♠
Replacement O-Rings, FETFE, for 7482-31	12	<b>7855-704</b> ♠
Ferrules, PTFE, for #7 Ace-Thred	12	<b>11710-07</b> ★
Replacement O-Rings, FETFE, for 7482-33	6	<b>7855-734</b> ♠

**Working volume of pressure reaction vessels is approximately 1/2 of the actual capacity listed.**



## Shaker Type Hydrogenation/Gas Apparatus II

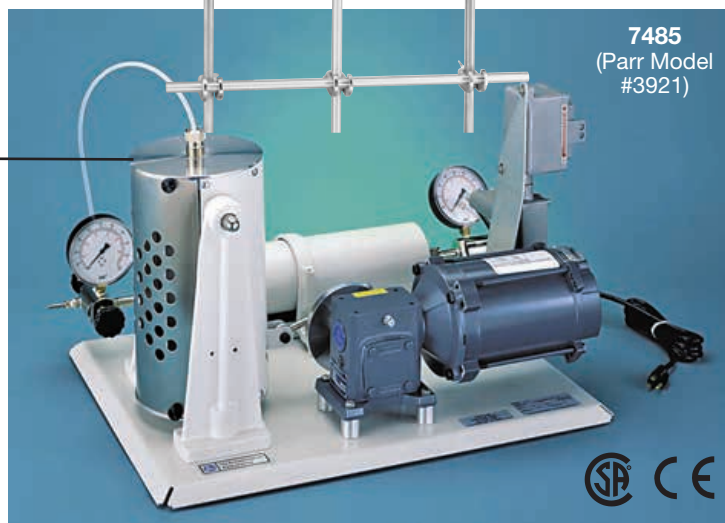
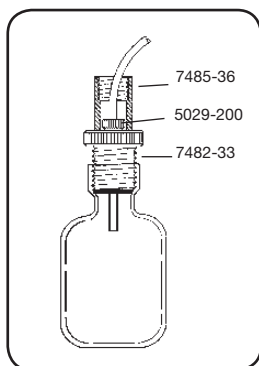
Supplied with 1/2-inch rod frame mounted on base

### The ACE Difference in Parr Hydrogenation Apparatus...

- **No more** rubber stoppers
- **No more** crossover contamination because of leeching or sample retention

By using...

### The Ace-Thred



7485  
(Parr Model #3921)

Two reactors are supplied with #25 Ace-Thred that accepts 7482-33 PTFE adapter (#25 to #7 Ace-Thred) or 5844-105 (#25 to 3/8-inch NPT). The former is for use with 5029-202 nylon bushing; the latter is suitable for use with 12770-27 tubing adapter with 3/8-inch NPT. Both are used to secure tubing from tank via an O-Ring compression seal. The only adjustment in Apparatus II (as opposed to the regular Parr Apparatus #3921) is the addition of an aluminum spacer-adapter, 7485-36, that threads onto the slotted bottle screw clamp located at top of the bottle guard. This adapter butts against the #25 PTFE adapter on top of the reaction vessel, and may be purchased separately to allow use of ACE vessels with your existing Parr unit.

### Complete System

Order Code

7485-55 ★

The individual parts and glassware below, along with Hydrogenation/Gas Apparatus I (7485-25, at right), comprise the complete item listed above. These parts may also be ordered separately.

Ace-Thred Capacity, Order  
Size mL Qty Code

### Replacement Parts

Glass Vessel*	#25	950	1	8648-155	♠
Glass Vessel*	#25	1850	1	8648-157	♠
Spacer-Bushing, Aluminum	#7	—	1	7485-36	★
Bushing, Nylon, Big Head	#7	—	1	5029-202	★
Adapter, PTFE	#7-#25	—	1	7482-33	★
Upper Rubber Pad	—	—	1	7482-37	★
Lower Rubber Pad	—	—	1	7482-38	★
Aluminum Mounting Frame	—	—	1	7482-77	★

\*Each glass vessel is pressure tested to 1-1/2 x the recommended working pressure (60 psig), but cannot be guaranteed due to the nature of glass. Available in either epoxy of plated coated. Call or email for quote.

The three items listed below consist of the unit ONLY. **No glassware or additional parts are supplied with these units.**

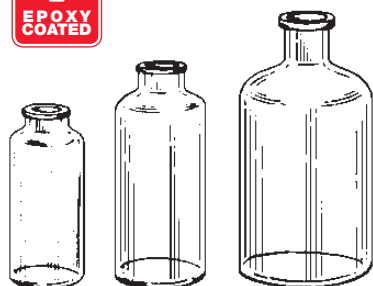
### Apparatus only

	Qty	Order Code	
Apparatus II	1	7485-25	★
Apparatus IIA, for Hazardous Locations, 115v-60Hz [Conforms to NEC Class I, Grp. D and Class II, Grp. E, F, G]	1	7485-72	★
Apparatus IIB, with Air Motor	1	7485-78	★

### Accessories

Replacement O-Rings, for 5029-200	12	7855-711	♠
Replacement O-Rings, for 5844-105	6	7855-734	♠
Bushing, Nylon, #7	1	5029-200	★
Ferrules, PTFE, for #7 Ace-Thred	12	11710-07	★
Adapter, PTFE, #25 Ace-Thred to 3/8-inch NPT	1	5844-105	♠
Adapter, Tube Fitting, 3/8-inch NPT to 1/4-inch tube	1	12770-27	★

**Working volume of pressure reaction vessels is approximately 1/2 of the actual capacity listed.**



**REACTION BOTTLES** for Hydrogenation/Gas Apparatus ★

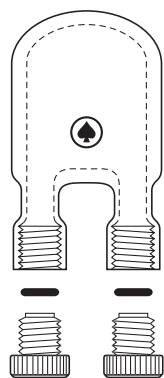
Borosilicate glass bottles with tooled neck to accept a #6 rubber stopper. Bottles are epoxy coated to help prevent scratching. Bottles and stoppers sold separately. Rated at 60 psig @ 20°C. Working volume is 1/2 actual capacity.

Actual mL	Use with Apparatus	Approx. O.D. x Height, mm	Qty	Order Code
50	7482	30 x 160	1	7478-05
100	7482	40 x 160	1	7478-10
250	7482	60 x 143	1	7478-12
500	7482	73 x 175	1	7478-15
1000	7485	94 x 216	1	7478-34
2500	7485	133 x 240	1	7478-37
Neoprene #6 rubber stopper for use with 7478 bottles, with one hole:			1	7478-60



**HEATING MANTLES** for Hydrogenation/Gas Bottles ★

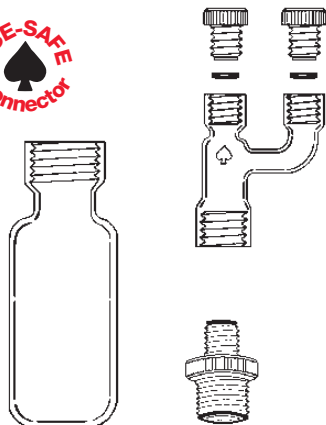
For Use with Vessel Size	Qty	Order Code
250 & 500mL (7478)	1	7479-20
1000 & 2500mL (7478)	1	7479-42



**TRAP** Hydrogenation/Gas

Used normally between hydrogen source and reaction flask. Bottle measures approximately 41mm I.D. x 90mm long, with two #7 Ace-Threds. Use 5029-200 bushing and O-Ring in each neck to secure tubing.

Description	Qty	Order Code
Bottle, only	1	7482-42 ♠
Bushing, Nylon, #7 with O-Ring (2)	1	5029-200
<b>Complete</b>	1	7482-46 ♠



**TEMPERATURE MEASUREMENT APPARATUS**

for 7482 Hydrogenation/Gas Apparatus

Borosilicate glass vessel, offset adapter, coupling and modified top bottle clamp for use with 7482 shaker type Parr Hydrogenation/Gas Apparatus I to allow temperature measurement while connected to hydrogen source. For use with three larger vessels only, with #25 Ace-Thred neck. Capacities listed are for working volumes (approximately 1/2 actual capacity of vessel) @ 20°C.

Description	Qty	Order Code
Reaction Vessel, glass, #25 Ace-Thred, 10-35mL	1	8648-135 ♠
Reaction Vessel, glass, #25 Ace-Thred, 25-75mL	1	8648-138 ♠
Reaction Vessel, glass, #25 Ace-Thred, 50-200mL	1	8648-140 ♠
Adapter, Offset, (2) #7, (1) #15 Ace-Threds	1	5102-05 ♠
Bushing, Nylon, #7, with O-Ring, (2)	1	5029-200 ★
Coupling, PTFE, #15 to #25 Ace-Thred	1	5843-120 ♠
Top Bottle Clamp, only, modified	1	7482-25 ★
Ferrules, #7	12	11710-07 ★
<b>Complete</b>	1	8648-57 ♠

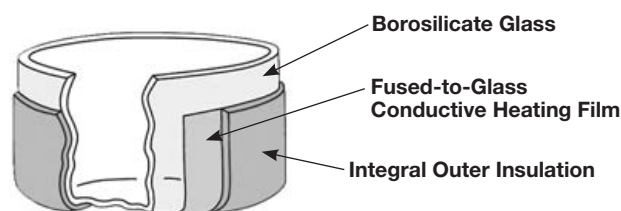
# THE SAFEST HEATING METHOD...

# ACE INSTATHERM® FOR GLASS VESSELS

**Eliminate the need for heating tapes, immersion heaters and heating mantles.**

Instatherm® is a safer, more precise heating method for the laboratory. It is an Ace Glass proprietary process that fuses a noble metal alloy coating directly onto the glass surface. Once the insulating and protective covering is applied, the Instatherm electrical circuit provides the most rapid and precise heating method available. Thermal lag is minimal with no hot spots. When placed on a magnetic stirrer, it becomes the best heating and mixing combination on the market. Because Instatherm® is a process, it can be adhered to any glass vessel. This section features our standard vessels for your convenience; however, custom application inquiries are most welcome.

- **Rapid, even heat – low thermal lag**
- **No super-heating**
- **Suitable for magnetic stirrers**
- **Extremely accurate heating**
- **More precise than mantles**
- **Accommodates variety of vessel sizes and shapes**



## INSTATHERM® OIL BATH *Low Form* ★

Low form, glass open vessels coated with Instatherm®. Designed to operate up to 250°C, heating response time is very rapid, (5° per minute), with very low thermal lag. The bottom is uncoated so the bath can be put on any popular magnetic stirrer for stirring while heating. Baths are designed to run with oil or a heating media. Never run Instatherm baths dry or breakage can occur, especially at higher temperatures. Capacity is without a vessel. Connector plug is designed to work with Ace or J-Kem temperature controllers where the output voltage can be automatically limited to match the bath. Bath can also be matched with ACE or J-Kem temperature thermocouple sensors for complete automatic operation. If using another type temperature controller, **voltage should not exceed the rated voltage** (see below).

**Note:** Complete item includes Bath with six-foot controller cord and clip for sensor and/or thermometer.



### Low Form Instatherm Baths

Allows small Mini-Lab size flasks to be stirred internally with magnetic stirrer bars while being heated in baths

Approx. (mm) I.D. x O.D. x Height	Capacity, mL	Volt/Amp Rating	Qty	Bath & Cord, only Order Code	Complete with Clip Order Code
64 x 70 x 50	160	20/5	1	9601-08	9601-38
94 x 125 x 65	340	40/6	1	9601-12	9601-42
119 x 125 x 65	700	40/8	1	9601-14	9601-44
142 x 150 x 75	1200	120/5	1	9601-16	9601-46
182 x 190 x 100	2600	120/10	1	9601-18	9601-48

A line voltage control should not be used on ACE Instatherm low voltage oil baths unless it incorporates a step-down transformer that limits the voltage to the heater rating, e.g. 20 volts or 40 volts.



### INSTATHERM® OIL BATH Large ★

Large version bath that can accept round bottom flask up to 5L and other larger vessels. Bath measures 290mm (11.4 inches) I.D. by 235mm (9.3 inches) deep. The bath has a rolled lip for easy handling. The maximum temperature on this bath is 100°C. The full capacity is 15L without a vessel, and typically should have a minimum of six liters when using a vessel like a 5L round bottom flask. Baths must be run with a heating media or oil. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

**Note:** Complete item includes clip for sensor and/or thermometer.

Approx. (mm) I.D. x O.D. x Height	Capacity, Liters	Volt/Amp Rating	Qty	Order Code	Complete Order Code
290 x 300 x 240	15	120/14	1	9601-23	9601-55



### INSTATHERM® OIL BATH Low Form, with 12-foot Cord ★

The same vessels as listed under 9601 Low Form series except with longer integral cord that is 12 feet in length and is PTFE clad.

**Note:** Complete item includes clip for sensor and/or thermometer.

Approx. (mm) I.D. x O.D. x Height	Capacity, mL	Volt/Amp Rating	Qty	Order Code	Complete Order Code
64 x 70 x 50	160	20/5	1	9602-07	9602-37
94 x 100 x 55	340	40/6	1	9602-11	9602-41
119 x 125 x 65	700	40/8	1	9602-13	9602-43
142 x 150 x 75	1200	120/5	1	9602-15	9602-45
182 x 190 x 100	2600	120/10	1	9602-17	9602-47



### INSTATHERM® OIL BATH High Form ★

High form, heavy wall glass vessels coated with Instatherm® to accommodate larger and taller vessels. A thermocouple well is imbedded in the insulation in this series. Do not run baths dry or above max voltage or breakage can occur. Bottom is uncoated so it can be used with or without magnetic stirrers. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

**Note:** Complete item includes clip for sensor and/or thermometer.

Approx. (mm) I.D. x O.D. x Height	Volt/Amp Rating	Takes Flask Size, mL	Qty	Order Code	Complete Order Code
90 x 100 x 100	40/10	300 & smaller	1	9603-02	9603-20
140 x 150 x 155	120/8	1000 & smaller	1	9603-04	9603-22
200 x 210 x 200	120/10	3000 & smaller	1	9603-06	9603-24



### INSTATHERM® BEAKER Griffin Low Form ★

With lip and pouring spout. With silicone rubber treated glass cloth insulation for use up to 250°C. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

Approx. (mm) I.D. x O.D. x Height	Capacity, mL	Volt/Amp Rating	Qty	Order Code
64 x 68 x 90	250	20/7	1	9605-40
72 x 77 x 110	400	40/6	1	9605-42
85 x 90 x 124	600	40/8	1	9605-44

# ACE Instatherm® Temperature Controller *Kits*



**Complete Bath Kits for your convenience**



← **Bath Kit Complete ★**

Consists of one each 9601-14 and 9601-16 bath, plus one 12324-25 digital temperature controller with one "J" type temperature sensor and controller cord.

Qty	Order Code
1	9601-355

**Bath Kit Complete ★ Economy** →

Consists of one 9601-16 bath plus one 12125-14 Economy temperature controller, one 9601-30 clip, and one 12110-17 type "J" thermocouple temperature sensor and cord.

Qty	Order Code
1	9601-335

**For 120v Baths**



**For All Size Baths**



← **Bath Kit Complete ★**

Consists of one each 9601-12, 9601-14 and 9601-16 baths, three 9601-30 clips, three 9698-16 cords, plus one 12324-25 digital temperature controller with one "J" type temperature sensor and controller cord.

Qty	Order Code
1	9601-352

Also available with extended 12-foot controller cord baths:

Qty	Order Code
1	9602-364



### BATH OIL ★

An extremely stable, medium viscosity silicone oil. Available in two temperature ranges:

Low Temp — maximum 180°C

High Temp — maximum 230°C

Type	Size	Qty	Order Code
Low Temp (180°C)	.9L (1 Qt.)	1	14115-05
High Temp (230°C)	.9L (1 Qt.)	1	14115-12
Low Temp (180°C)	1.8L (½ Gal.)	1	14115-10
High Temp (230°C)	1.8L (½ Gal.)	1	14115-14

Low temp oil color is CLEAR. High temp oil color is AMBER.

### CONNECTING CORD & CLIPS ★

Controller cords with various connectors for connecting all Instatherm vessels to temperature controllers. -16 and -20 cords have 10 amp, “fast-acting” fuse to protect both vessel and controller from over-voltage or surges.

Description	Qty	Order Code
Cinch Type	1	9698-05
Pin Type	1	9698-10
Banana Type (old style)	1	9698-16
Twist Lock Type (new style)	1	9698-20

#### Clip for thermocouple or thermometer:

Description	For Bath Series	Qty	Order Code
Small clip with one hole	9601-07 and -08	1	9601-29
Medium clip with two holes	All other baths	1	9601-30
Medium clip with two 1/4-inch holes	All other baths	1	9601-32
Large clip with two 1/4-inch holes	9603-06	1	9601-34
Extra large clip with two 1/4-inch holes	9603-23	1	9601-36



### INSTATHERM® FUNNEL Addition ★

Graduated addition funnel with Instatherm coating for critical heating. The funnel has a bottom inner standard taper joint and an outer joint on top. The funnel can be hooked to an Ace temperature controller and heated for liquefying solids or keeping liquids at a set temperature for addition to system or a reactor. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

Capacity, mL	Volt/Amp Rating	⌘ Joints	⌘ Stopcock	Qty	Order Code
125	40/5	24/40	2	1	9610-08
250	40/6	24/40	2	1	9610-10
500	40/10	24/40	2	1	9610-12
500	40/10	29/42-24/40	4	1	9610-14



A line voltage control should not be used on ACE Instatherm low voltage oil baths unless it incorporates a step-down transformer that limits the voltage to the heater rating, e.g. 20 volts or 40 volts.

**INSTATHERM® DESICCATOR** *Vacuum Oven*

250mm diameter with bottom Instatherm heated (low voltage: 40 volts, 10 amps max.). Top is not heated, but has insulation cover. May be used as a vacuum oven at temperatures up to 180°C continuously.

The top has an observation stripe for visibility and is supplied with vacuum take-off valve. Insulation is resilient silicone rubber impregnated glass cloth, and electrical connections are covered. Temperatures can be regulated by means of Ace temperature controllers. Also available with uncoated top. Supplied complete with detachable cord, -10 to 250°C. 100mm immersion 10/30 ground joint thermometer, thermometer adapter.

Description	Qty	Order Code	
Desiccator	1	9625-04	★
Adapter	1	9061-10	♠
Thermometer	1	8314-31	★

**Complete**

	1	9625-10	★
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9625-04 and 9625-10 supplied with 9698-16 controller cord for connection to temperature controllers.


**INSTATHERM® DRYING APPARATUS** *Vacuum, Abderhalden*

Instantly variable jacket temperature, to 200°C, enables programmed drying. The jacket is coated with Instatherm with a viewing strip. A thermowell, 6-7mm O.D., may be substituted for the purpose of employing a thermistor. The heater operates on AC or DC up to 40v, 3 amps. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

Description	Qty	Order Code	
Desiccant Tube	1	9632-02	★
Drying Chamber	1	9632-04	★
Cord	1	9698-16	★
Nylon Bushing	1	5029-10	♠

**Complete**

	1	9632-10	★
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**INSTATHERM® FLASK** *High Temp Type, Single Neck* ★

Distilling, round bottom with 24/40 joint. With silicone rubber treated glass cloth insulation for use up to 250°C. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

Capacity, mL	Volt/Amp Rating	Qty	Order Code
500	40/6	1	9635-158
1000	40/10	1	9635-160




**INSTATHERM® FLASK** *High Temp Type, Two Necks* ★

Distilling, round bottom with 24/40 joints. With silicone rubber treated glass cloth insulation for use up to 250°C. No clamp needed. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

Capacity, mL	Volt/Amp Rating	Qty	\$24/40 Order Code	\$29/42 Order Code
250	20/8	1	9637-136	—
500	40/6	1	9637-138	—
3000	120/10	1	—	9637-170


**INSTATHERM® FLASK** *High Temp, Three Necks* ★

Distilling, round bottom with three 24/40 joints. With silicone rubber treated glass cloth insulation for use up to 250°C. No clamp needed. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord.

Capacity, mL	Volt/Amp Rating	Qty	Order Code
250	20/8	1	9642-127
500	40/7	1	9642-129
1000	40/10	1	9642-131


**INSTATHERM® REACTION FLASK AND HEAD** ★

Rugged cylindrical reaction flask and head with Duran, flat ground 4-inch flange with O-Ring groove for use with 6517-25 quick release clamp and integral heating element that eliminates the local superheating commonly associated with more conventional heating methods and eliminates cumbersome and dangerous oil baths. The response is rapid and accurate. Supplied with silicone coating for insulation and protection. End contacts are standard banana plugs. Comes with 9698-20 (for flask) or 9698-16 (for head) connecting cord for connection to temperature controllers. O-Ring, supplied with flask, is a CAPFE (PTFE encapsulated silicone O-Ring). Flask is coated to within approximately 38mm of the flange for 200°C operation. Interchangeable with Ace reaction heads, code -33, -37, -39, and non-heated tops listed in the Ace complete catalog. Order flask, head, and clamp separately.

**Flask, only**

Capacity, mL	Volt/Amp Rating	Watts	Qty	Order Code
1000	40/8	400	1	9655-17
2000	120/5	600	1	9655-22

**Head, Four Necks, only**

Center 24 Joint	Side 24 Joints	Volt/Amp Rating	Qty	Order Code
24/40	24/40	40/8	1	9655-33
29/42	24/40	40/8	1	9655-37
45/50	24/40	40/8	1	9655-39
Clamp, only			1	6517-25
Connecting Cord, only			1	9698-16





**REACTION FLASK** *Instatherm® Heated, Conical, 4-Inch Flange* ★

Same flask as listed under 6476, except with Instatherm coating. Has flat-ground, 4-inch conical flange. This integral heating element eliminates the local super-heating commonly associated with more conventional heating methods. Eliminates cumbersome and dangerous oil baths. The heating response is rapid and accurate. Supplied with 9698-20 cord for connection to variable voltage or temperature controller. Flask is coated to within 38mm of the flange for 200°C operation, 360°C maximum on special order. Interchangeable with some ACE 4-inch reaction heads. For controllers, see ACE or J-Kem temperature controllers with voltage limiting output, such as 12125, 12324.

*Note: Use 6496 clamp for securing head to flask.*

Capacity, Liters	O.D., mm	I.D., mm	Height, mm (A)	Volt/Amp Rating	Watts	Qty	Order Code
1	110	100	180	40/8	400	1	9656-08
2	114	104	260	120/5	500	1	9656-12


**INSTATHERM® FLASK** *Erlenmeyer* ★

Ace Erlenmeyer flask with Instatherm provide a convenient, safe heating of contents in the popular Erlenmeyer flask format for bench or magnetic stirrer use. For operation up to 250°C. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord. For controllers, see ACE or J-Kem temperature controllers with voltage limiting output, such as 12125, 12324.

Capacity, mL	Volt/Amp Rating	Qty	Order Code
125	20/8	1	9633-08
250	20/8	1	9633-10
500	40/7	1	9633-14


**INSTATHERM® FILTRATION FUNNEL** *47mm* ★

This 47mm filtration funnel uses Ace Glass proprietary Instatherm technology to evenly heat viscous materials, keeping them in a flowing, liquid state. Excellent for filtering oils or thick slurries using either 47mm membranes or filter paper disks. Perfect for sample prep for various ASTM petroleum and polymer testing procedures and for new biofuel testing protocols. Three-pronged plug for insertion into Ace temperature controllers. Integral six-foot controller cord. For controllers, see ACE or J-Kem temperature controllers with voltage limiting output, such as 12125, 12324.

Description	Qty	Order Code
500mL Instatherm coated filter funnel w/temp controller connecting cord	1	3704-01


**Instatherm Custom Orders**

**Ace INSTATHERM®**, *“the heat without a mantle,”* is a self-heating, fused heat source that adds speed, accuracy and convenience to every reaction requiring heat. You get reproducible results.

**No mantle to detach. Better observation. Less current used.** Instatherm provides convenience and assures better results and economy for the lab.

Instatherm adapts readily to custom applications on any glass, quartz or porcelain apparatus. It can be applied to stopcocks, adapters, manifolds, receivers — even the most complicated systems.

Contact the Ace Technical Department at 1-800-223-4524; Email: Sales@AceGlass.com

**INSTATHERM® FILTRATION APPARATUS** *Funnel, 47mm ★*

This apparatus differs from the standard 47mm filter apparatus as it uses Ace Glass' proprietary Instatherm technology to evenly heat the top 400mL funnel, thus keeping the viscous materials in a flowing liquid state. The middle adapter is PTFE with a PTFE snap-ring. The interchangeable fritted disk is the coarse, 25-50 micron size. The entire assembly can be easily taken apart for cleaning and the fritted filter disc can easily and inexpensively be cleaned or replaced. This system is excellent for filtering oils or thick slurries and using either 47mm membranes or filter paper disks. Perfect for sample prep for various ASTM petroleum and polymer testing procedures and for new biofuel testing protocols. Filter funnel has three-pronged plug for insertion into Ace temperature controllers and integral six-foot controller cord.



Description	Qty	Order Code	
<b>Complete Apparatus</b>	1	3704-10	★
<b>Replacement Parts</b>			
1L Filter flask w/ Ace Thred	1	3702-08	◆
PTFE Adapter w #25 bottom and #50 top Ace Threds	1	3704-05	★
PTFE retaining ring	1	3704-06	★
47mm OD porosity C (25-50) fritted disc	1	3703-49	◆
500mL Instatherm coated filter funnel w/temp controller connecting cord	1	3704-01	★

**FLASK, INSTATHERM® ROBO REACTOR** *for ASTM D7528-09 ★*

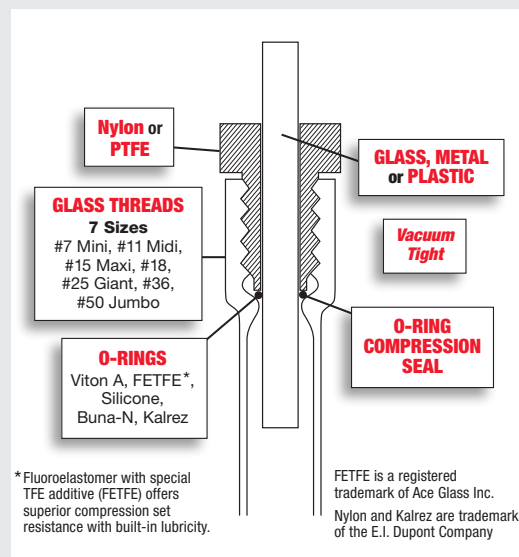
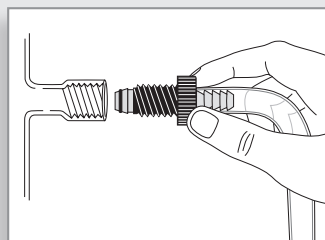
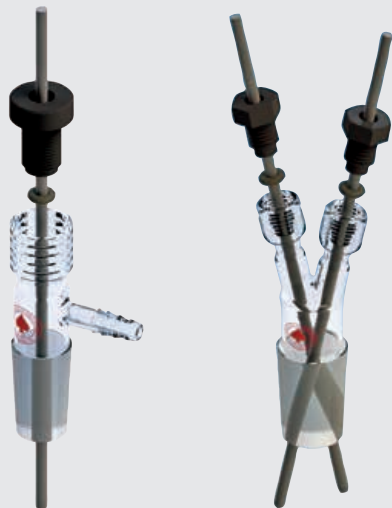
Flask for use with ASTM Protocol D7528-09 Standard Test Method. For bench oxidation of engine oils by ROBO. Use ONLY 9698-16 controller cord (supplied) for connection to temperature controllers.



Capacity, mL	Volts/Amps	Qty	Order Code
1,000	40/10	1	Call to Order

# Ace-Threds

*Grease Free | Clamp Free | More Convenient*



### BUSHING ♠

Bushing connector for use with Ace-Threds, threaded glass or stainless steel connectors. Used for joining threaded end to a reduced end tube. Available in either nylon\* or PTFE. One FETFE O-Ring supplied with each bushing. For replacement O-Rings, see 7855.

For Ace-Thred Size	B, mm	O-Ring Size	Qty	Nylon	PTFE
				Order Code	Order Code
7	7.5	-008	1	5029-10	5029-35
11	10	-012	1	7506-02	7506-23
15	14	-110	1	7506-06	7506-27
18	17	-112	1	7506-08	7506-29
25 (With #7 tap)	25	-212	1	7506-50	-
25	26	-212	1	7506-10	7506-31
36	36	-217	1	7506-12	7506-33
50	49	-225	1	7506-14	7506-35
80	80.7	-336	1	7506-20*	7506-39



\*7506-20 fabricated from High Density Polyethylene.

### JOINTS Inner, Full Length

§ inner ground joint for use with outer members 7565, 7566, 7567, 7651 and 7652. Can also be used with half joints 7568 and 7585.

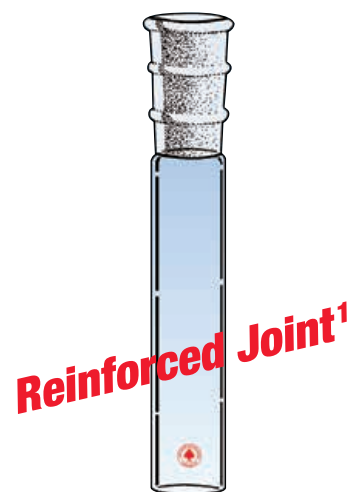
§ Size	Tube O.D., mm	Qty	Order Code	♠	§ Size	Tube O.D., mm	Qty	Order Code	♠
7/25	6	1	7565-07	♠	40/50	38	1	7565-47	♠
10/30	8	1	7565-12	♠	45/50	45	1	7565-52	♠
12/30	11	1	7565-17	♠	50/50	45	1	7565-57	
14/35	13	1	7565-22	♠	55/50	51	1	7565-62	
19/38	16	1	7565-27	♠	60/50	54	1	7565-67	
24/40	22	1	7565-32	♠	71/60	64	1	7565-72	
29/42	28	1	7565-37	♠	86/50	80	1	7565-71	
34/45	32	1	7565-42	♠	103/60	102	1	7565-77	



### JOINTS Outer, Straight-Through

Tubing is same diameter as reinforcing rings on the joint. Strain on the joint is reduced from expansion due to temperature increase. Properly clamped, the joint tends to remain cooler, with less tendency toward lubrication loss. Very heavy walls are not desirable for thermal shock resistance, but are desirable for resistance to mechanical pressure and shock. Therefore, providing reinforcement rings instead of heavy wall results in a better balanced design. No hold-up below joint makes this an ideal joint for flask necks, receivers, etc.

§ Size	Tube O.D., mm	Qty	Order Code	♠	§ Size	Tube O.D., mm	Qty	Order Code	♠
7/25	9	1	7566-08	♠	29/42	32	1	7566-38	♠
10/30	13	1	7566-13	♠	34/45	38	1	7566-43	♠
12/30	16	1	7566-18	♠	40/50	45	1	7566-48	♠
14/20	19	1	7566-21	♠	45/50	51	1	7566-53	♠
14/35	16	1	7566-23	♠	50/50	54	1	7566-58	★
19/22	22	1	7566-26	♠	55/50	64	1	7566-63	★
19/38	22	1	7566-28	♠	60/50	64	1	7566-68	★
24/40	28	1	7566-33	♠	71/60	75	1	7566-73	★
					86/50	95	1	7566-75	★



**'All FULL LENGTH flask joints are reinforced.**



### JOINTS Outer, Straight-Sided

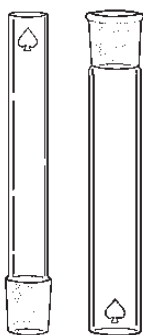
O.D. of joint and tube are approximately same size, allowing for ease in clamping.

Size	Tube O.D., mm	Qty	Order Code	Size	Tube O.D., mm	Qty	Order Code
7/25	10	1	7567-08	40/50	45	1	7567-48
10/30	13	1	7567-13	45/50	48	1	7567-53
12/30	14	1	7567-18	50/50	54	1	7567-58
14/35	17	1	7567-23	55/50	60	1	7567-63
19/38	22	1	7567-28	60/50	64	1	7567-68
24/40	28	1	7567-33	71/60	75	1	7567-73
29/42	32	1	7567-38				
34/45	38	1	7567-43				



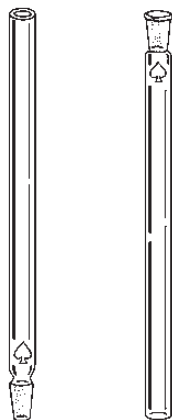
### JOINTS Outer, Medium Length, Straight-Sided

Size	Tube O.D., mm	Qty	Order Code
10/18	13	1	7568-04
14/20	17	1	7568-06
19/22	22	1	7568-08
24/25	28	1	7568-10
29/26	32	1	7568-12
34/28	38	1	7568-14



### JOINTS Medium Length, Inner & Outer Joints

Size	Tube O.D., mm	Qty	Order Code	Size	Tube O.D., mm	Qty	Order Code
<b>Inner</b>							
5/12	4	1	7585-02	24/25	22	1	7585-38
7/15	6	1	7585-08	29/26	25	1	7585-44
10/18	8	1	7585-14	34/28	32	1	7585-50
12/18	10	1	7585-20	40/35	38	1	7585-56
14/20	13	1	7585-26	60/40	54	1	7585-65
19/22	16	1	7585-32				
<b>Outer</b>							
5/12	8	1	7585-04	24/25	28	1	7585-40
7/15	11	1	7585-10	29/26	32	1	7585-46
10/18	13	1	7585-16	34/28	38	1	7585-52
12/18	16	1	7585-22	40/35	45	1	7585-58
14/20	19	1	7585-28	60/40	64	1	7585-67
19/22	22	1	7585-34				



### JOINTS Luer-Lok Type

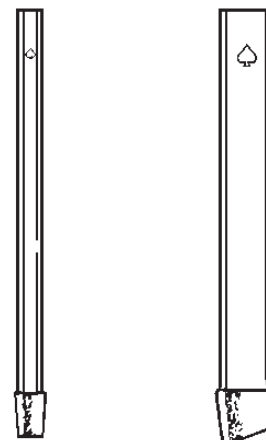
Standard Luer-Lok type joint as found on syringes. Inside diameter through ground tip approximately 1.2mm.

Approx. Tube I.D., mm	Joint Type	Wall Thickness	Qty	Order Code
1	Inner	Capillary	1	7602-10
1	Outer	Capillary	1	7602-15
2	Inner	Capillary	1	7602-20
2	Outer	Capillary	1	7602-25
4	Inner	Medium Wall	1	7602-30
4	Outer	Medium Wall	1	7602-35

**JOINTS Inner, Microscale ♠**

Inner ground ⌘ joints used in fabrication of ACE Microscale glassware. Use with 7609 outer member. Codes -11, -12 and -13 have drip tip.

⌘ Size	O.D. x I.D., mm	Qty	Order Code
5/5	5 x 2	1	7608-04
7/10	6 x 1	1	7608-06
7/10	6.35 x 4	1	7608-07
7/25	6.35 x 4	1	7608-09
10/10	6 x 1	1	7608-11
10/10	8 x 5	1	7608-12
14/10	12.7 x 9.5	1	7608-13


**JOINTS Outer, Threaded, Microscale ♠**

Outer ground ⌘ joints with external thread for making an “O-Ring-Cap Seal” connection with mating 7608 inner joint. Used in fabricating ACE Microscale glassware. Joints **not** supplied with cap or O-Ring, see 9590 and 7855, below.

⌘ Size	O.D. x I.D., mm	Qty	Order Code
7/10	12.7 x 9.5	1	7609-05
10/10	12.7 x 9.5	1	7609-07
10/10	16 x 13.5	1	7609-08
10/10	20 x 17.5	1	7609-09
14/10	20 x 17.5	1	7609-15
14/10	22 x 19.5	1	7609-17


**CAPS Replacement ♠**

Used with 7609 joints along with O-Ring to make an “O-Ring-CAP SEAL” connection and with GPI threads on solid phase reaction vessels. Solid supplied with PTFE-faced rubber liner. Open top caps do not have linings.

GPI Size, mm	Type	For Use With	Qty	Order Code
5	With Hole	5/5 Joint	48	9590-44
13	With Hole	7/10 Joint	48	9590-45
13	Solid	7/10 Joint	48	9590-55
15	With Hole	10/10 Joint	48	9590-47
15	Solid	10/10 Joint	48	9590-58
20	With Hole	14/10 Joint	48	9590-46
20	Solid	14/10 Joint	48	9590-60
24	With Hole	—	48	9590-48
24	Solid	—	48	9590-64
38	With Hole	—	24	9590-50
38	Solid	—	24	9590-66


**O-RINGS FETFE ♠**

Used with 7609 joints along with caps to make an “O-Ring-CAP SEAL” connection. O-Rings are fabricated of FETFE.

Size	For Use With	Qty	Order Code
-010	7/10 Joint	12	7855-705
-011	10/10 Joint	12	7855-706
-112	14/10 Joint	12	7855-720





### JOINTS Inner, with Ring, Rodaviss ★

⌘ inner ground glass joint with ring on shank for use with threaded outer member, O-Ring and cap to form a leak-tight seal.

⌘ Joint	Qty	Order Code	Replacement Cap	⌘ Joint	Qty	Order Code	Replacement Cap
14/20	1	7612-19	7616-17	24/40	1	7612-27	7616-21
14/35	1	7612-21	Call to Order	29/42	1	7612-29	7616-23
19/22	1	7612-23	7616-19	45/50	1	7612-35	7616-27

#### Replacement O-Rings

See 7617 for replacement O-Rings



### JOINTS Outer, Threaded, Rodaviss ★

⌘ outer member glass joint with external thread for use with inner member, O-Ring and cap to form a leak tight-seal.

⌘ Joint	Qty	Order Code	Replacement Cap	⌘ Joint	Qty	Order Code	Replacement Cap
14/20	1	7612-20	7616-17	24/40	1	7612-28	7616-21
19/22	1	7612-24	7616-19	29/42	1	7612-30	7616-23
				45/50	1	7612-36	7616-27

#### Replacement O-Rings

See 7617 for replacement O-Rings



### JOINTS Inner, w/Ring and Drip Tip, Rodaviss ★

⌘ inner ground glass joint with drip tip and ring on shank for use with 7612 outer member, O-Ring and cap to form a leak-tight seal.

⌘ Joint	Qty	Order Code	Replacement Cap	⌘ Joint	Qty	Order Code	Replacement Cap
14/20	1	7613-03	7616-17	24/40	1	7613-11	7616-21
19/22	1	7613-07	7616-19	45/50	1	7613-17	7616-27

#### Replacement O-Rings

See 7617 for replacement O-Rings



### CAP Joint, with Hole, Rodaviss ★

Threaded resin cap for use with 7617 O-Ring to secure 7612 or 7613 inner members to 7612 outer member joints.

For ⌘ Joints	Qty	Order Code
14/20, 14/35	1	7616-17
19/22	1	7616-19
24/40	1	7616-21
29/42	1	7616-23
34/45	1	7616-25
45/50	1	7616-27



### O-RINGS Rodaviss ♠

For use with 7612, 7613 and 7616 Rodaviss joints and cap to form a leak-tight seal.

For ⌘ Joints	Qty	Nitrile	Viton
		Order Code	Order Code
14/20, 14/35	12	7617-02	7617-13
19/22	12	7617-04	7617-15
24/40	6	7617-06	7617-17
29/42	6	7617-08	7617-19
34/45	6	7617-10	7617-21
45/50	3	7617-12	7617-23

**LOOSENING RING** *Polyamide, Rodaviss* ★

Use to free frozen joints. Insert between top of cap and ring on shank of inner member, unscrew cap and inner member will release.



For ₤ Joint Size	Qty	Order Code	For ₤ Joint Size	Qty	Order Code
14/20, 14/35	1	7618-03	29/42	1	7618-09
19/22, 19/38	1	7618-05	34/45	1	7618-11
24/40	1	7618-07	45/50	1	7618-13

**CONNECTORS** *Screwthread, GL* ★

Externally threaded glass connectors. For use as replacement on apparatus using the GL thread or when designing items where the external thread is preferred. Supplied in 100mm overall length.

GL Thread Dimensions, mm			
Thread Size	O.D.	Height	I.D.
14	13.75	12.0	8.45
18	17.5	15.5	11.0
25	24.5	18.5	18.0
32	31.5	16.0	23.0
45	44.5	26.0	34.5
120	119.5	21.0	106.0

Thread Size (GL No.)	Tubing O.D. x Wall, mm	Qty	Order Code
14	12 x 1.5	1	7620-14
18	16 x 1.8	1	7620-18
25	22 x 1.8	1	7620-25
32	28 x 2.0	1	7620-32
45	40 x 2.3	1	7620-45
120	120 x 5.0	1	7620-60


**CAP with Hole, GL** ★

Open top red polybutylene terephthalate (PBT) cap for use with 7620 GL threads. When used with 7623 hose connection and 7624 sealing ring, will accommodate tubing of approximate diameter. Temperature range is -45°C to 180°C.

For Thread Size	Temperature Range, °C	Aperture Size, mm	O.D., mm	Height, mm	Qty	Order Code
14	-45 to +180				1	7621-04
18	-45 to +180				1	7621-08
25	-45 to +180	15	33	19	1	7621-15
32	-45 to +180	20	40	24	1	7621-22
45	-45 to +180	34	54	26	1	7621-25


**CAP Solid, GL, with PTFE Liner** ★

Solid red polybutylene terephthalate (PBT) cap with PTFE liner\* for use with 7620 GL threads. Temperature range is -45°C to 180°C.

For GL Thread Size	Qty	Order Code
14	1	7622-103
18	1	7622-107
25	1	7622-114
32	1	7622-121
45	1	7622-124
120	1	7622-155



\*120 GL size has a CAPFE O-Ring seal.


**HOSE CONNECTION** for GL Thread, with Rubber Seal ★

Polypropylene hose connections with a silicone rubber seal for use with 7620 screw thread connector, sizes 14 and 18. Allows connection of tubing for cooling/heating, etc. to hose connection and securing to thread with 7621 holed cap. To remove, simply unscrew cap. Two styles: straight and bent, both are 8mm O.D. x 4mm I.D. Temperature limit: 110°C.

For GL Thread Size	Style	Qty	Order Code
14	Bent	1	7623-20
14	Straight	1	7623-22
18	Bent	1	7623-24
18	Straight	1	7623-26


**SEALING RING** for GL Thread, with Rubber Seal ★

Silicone rubber seal, for use with 7621 holed cap to allow sealing of tubing in 7620 threads.

For GL Thread Size	Fits Tubing O.D., mm	Qty	Order Code
14	5.5 to 6.5	1	7624-40
18	5.5 to 6.5	1	7624-42
18	9.0 to 11.0	1	7624-45
25	7.5 to 9.0	1	7624-47
25	11.0 to 13.0	1	7624-49
32	11.0 to 13.0	1	7624-52
45	25.0 to 27.0	1	7624-54


**JOINTS Inner** ♠

§ inner joint with reduced tube at both ends. Length of tube below joint is 100mm.

§ Size	O.D. Tube, mm	Qty	Order Code
10/30	5	1	7630-04
14/35	7	1	7630-08
24/40	12	1	7630-12


**JOINTS Inner** ♠

§ inner joint with extending tube reduced in diameter.

§ Size	O.D. Tube, mm	Qty	Order Code
14/20	7	1	7635-05
24/40	12	1	7635-10


**JOINTS Inner, Drip Tip** ♠

§ inner joint with an unconstricted 30° angle drip tip extending from bottom of joint.

§ Size	O.D. Tube, mm	Qty	Order Code
24/40	22	1	7636-06



**JOISTS Extended Drip Tip** ♠

Inner ⌘ joint with lower tube reduced in diameter to size listed. Length of extended tube is 101mm.

⌘ Size	O.D. of Lower Tube, mm	Qty	Order Code	⌘ Size	O.D. of Lower Tube, mm	Qty	Order Code
10/30	5	1	7640-02	24/40	12	1	7640-10
14/35	7	1	7640-06	29/42	13	1	7640-12
19/38	10	1	7640-08	34/45	14	1	7640-14


**PTFE SLEEVES 0.4 mm** ★

Sturdy, reusable, knurled and reinforced gripping ring for easy and safe removal from ⌘ ground joints. Wall thickness is 0.4mm (.016 inches).

To Fit ⌘ Size	Qty	Order Code
14/20	3	7641-04
24/40	3	7641-08
29/42	3	7641-10
34/45	3	7641-12
45/50	3	7641-16


**PTFE SLEEVES 0.13mm** ★

Ground joint standard taper sleeve for greaseless connections. NOT intended for cementing. Wall thickness is 0.13mm (.005 inches).

To Fit ⌘ Size	Qty	Order Code	To Fit ⌘ Size	Qty	Order Code
7/10	3	7642-02	29/42	3	7642-15
10/10	3	7642-04	34/45	3	7642-19
10/18	3	7642-03	45/50	3	7642-23
14/10	3	7642-06	60/50	1	7642-25
14/20	3	7642-07	71/60	1	7642-27
24/40	3	7642-11			


**PTFE SLEEVES 0.050mm** ★

This sleeve provides a vacuum-tight seal to a ground joint without grease wherever used. The sleeve is an elongated cone, PTFE, 0.050mm (.002 inches) thick, accurately tapered to fit tightly over the male ground glass cone, in sizes from ⌘ 10/30 to 71/60 inclusive. Sleeve completely eliminates the problem caused by seizure of joints, as well as precludes contamination due to stopcock lubricants and leaking ground joints.

To Fit ⌘ Size	Qty	Order Code
10/30	12	7643-102
14/10	12	7643-107
14/20	12	7643-109
19/38	12	7643-106
24/40	12	7643-108
29/42	12	7643-110
34/45	12	7643-112
45/50	12	7643-116
60/50	12	7643-125
71/60	12	7643-129





**PTFE SLEEVES 0.38mm ★**

Designed for use with  $\text{F}$  inner member regular joints with only a slight mismatch. Treated on inner surface so that it may be cemented to glass with ACE 7560 epoxy adhesive. Sleeves may also be used uncemented to replace lubricant at low pressure differentials. ACE PTFE sleeves are accurately shaped to 1:10 taper. Rugged, approximately 0.38mm (0.015-inch) wall thickness.

$\text{F}$ Size	Qty	Order Code	$\text{F}$ Size	Qty	Order Code
10/30	1	7551-02	29/42	1	7551-14
14/20	1	7551-06	34/45	1	7551-16
14/35	1	7551-08	40/50	1	7551-18
19/22	1	7551-09	45/50	1	7551-20
19/38	1	7551-10	50/50	1	7551-22
24/40	1	7551-12	55/50	1	7551-24



**PTFE SLEEVES for Spherical Joints, 0.38mm ★**

Used in place of lubricant for average laboratory use (not intended for high vacuum use) unless cemented to glass with ACE 7560 epoxy adhesive. Rugged, approximately 0.38mm (0.015-inch) wall thickness.

$\text{S}$ Size	Qty	Order Code	$\text{S}$ Size	Qty	Order Code
12/5	1	7556-02	35/25	1	7556-10
18/9	1	7556-04	50/30	1	7556-12
28/15	1	7556-06	65/40	1	7556-14
35/20	1	7556-08			

**JOINTS Ball, Spherical ♠**

For use with PTFE sleeves; ground slightly undersize so that with 7556 sleeves in place, joint conforms to standard  $\text{S}$  dimensions.

$\text{S}$ Size	Tube O.D., mm	Qty	Order Code	$\text{S}$ Size	Tube O.D., mm	Qty	Order Code
12/5	9	1	7557-02	28/15	19	1	7557-06
18/9	13	1	7557-04	35/25	28	1	7557-10

**JOINTS Socket, Polished, Spherical ♠**

Recommended for use with PTFE-clad ball member. Polished surface does not wear PTFE, assures more precise fit than the standard ground surface.

$\text{S}$ Size	Tube O.D., mm	Qty	Order Code	$\text{S}$ Size	Tube O.D., mm	Qty	Order Code
12/5	9	1	7558-02	35/20	25	1	7558-08
18/9	13	1	7558-04	35/25	28	1	7558-10
28/15	19	1	7558-06				

**EPOXY ADHESIVE ♠**

A two component epoxy system, which cures to a chemical resistant film. The epoxy is used to tightly bond a PTFE sleeve to a glass joint. Supplied in 30mL jars with the activator in a separate container. The 30mL supply will cement at least 25 joints, depending on size.

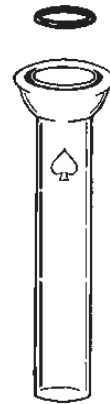


Qty	Order Code
1	7560-10

**JOINTS O-Ring Seal ♠**

Joint tooled with groove to take O-Ring and provide greaseless, vacuum-tight connection. Joints (codes -02 thru -16) are held together with 7669 pinch type clamps; code -18 is secured by using 6509-03. O-Rings are FETFE and may be used to 230°C. Each joint is furnished with an O-Ring so you get a spare O-Ring with every two joints purchased.

I.D., mm	Stem O.D., mm	Use Clamp No.	O-Rings Size	Qty	Order Code
5	8	7669-08	-110	1	7646-02
7	10	7669-10	-111	1	7646-04
9	13	7669-10	-112	1	7646-06
15	19	7669-12	-116	1	7646-08
20	25	7669-14	-214	1	7646-10
25	28	7669-14	-217	1	7646-12
40	45	7669-20	-226	1	7646-14
50	57	7669-22	-229	1	7646-16
75	83	6509-03	-341	1	7646-18



ACE O-Ring joints can be supplied in Stainless Steel. Email or call for information.

**JOINTS O-Ring Seal, § ♠**

§ inner member ground joint with groove for O-Ring. For use with outer members 7566, 7567, 7651, and 7652. Leak-proof at high vacuum (up to 1 x 10<sup>-8</sup>mm Hg.). O-Ring permits use without grease. Supplied with one FETFE O-Ring.

§ Size	Stem O.D., mm	O-Ring Size	Qty	Order Code
12/30	10	-011	1	7648-06
14/20	12	-012	1	7648-07
14/35	12	-012	1	7648-08
19/22	17	-111	1	7648-09
19/38	17	-111	1	7648-10
24/40	22	-115	1	7648-12
29/42	25	-118	1	7648-14


**JOINTS O-Ring Seal, Spherical Ball §**

§ spherical ball, precision ground, with groove for O-Ring; for use with matching socket members. Leak-proof at high vacuums when clamped. O-Ring permits use without grease. Supplied with one FETFE O-Ring.

§ Size	Stem O.D., mm	O-Ring Size	Qty	Order Code
12/5	9	-011	1	7649-11
18/9	13	-014	1	7649-23
28/15	19	-116	1	7649-41
35/25	28	-118	1	7649-53


**Replacement Parts**

See 7855 for O-Rings

See 7669 or 7670 for clamps

**JOINTS Stainless Steel, § ★**

Interchangeable, full length. These joints are machined from 18-8 type 303 free machining stainless steel and are supplied in accordance with CS21-58 of the N.I.S.T., O.D. and I.D. dimensions approximately the same as the glass joints listed under 7565. Shanks are machined for thread size listed, but are NOT threaded.

§ Size	Thread Size (In.)	O.D., in	Qty	Inner	Outer
				Order Code	Order Code
10/30	—	.345	1	7651-02	7651-04
24/40	1/2	.840	1	7651-20	7651-22
29/42	3/4	1.050	1	7651-26	7651-28




**JOINTS** *Stainless Steel, Threaded, § ★*

Same as listed under 7651 above, except these joints are machined with NPT male thread.

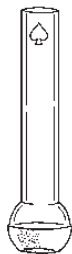
§ Size	Thread Size, in	O.D., in	Qty	Inner	Outer
				Order Code	Order Code
24/40	1/2	.840	1	7651-220	7651-222
29/42	3/4	1.050	1	7651-226	7651-228


**JOINTS** *Inner, Quartz ★*

§ Size	Tube O.D., mm	Qty	Order Code	§ Size	Tube O.D., mm	Qty	Order Code
19/38	17	1	7652-14	45/50	40	1	7652-44
24/40	21.6	1	7652-20				

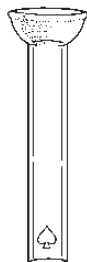

**JOINTS** *Outer, Quartz ★*

§ Size	Tube O.D., mm	Qty	Order Code	§ Size	Tube O.D., mm	Qty	Order Code
19/38	20	1	7652-16	45/50	45	1	7652-46
24/40	25	1	7652-22				


**JOINTS** *Ball, Spherical, Borosilicate*

Full length, standard wall. These famous ACE spherical joints are precision ground.

§ Size	Ball O.D., mm	Tube		Qty	Order Code	§ Size	Ball O.D., mm	Tube		Qty	Order Code
		O.D., mm	O.D., mm					O.D., mm	O.D., mm		
12/3	12	6	1	7655-04	♠	35/20	35	25	1	7655-46	♠
12/5	12	9	1	7655-10	♠	35/25	35	28	1	7655-52	♠
18/7	18	11	1	7655-16	♠	50/30	50	35	1	7655-58	★
18/9	18	13	1	7655-22	♠	65/40	65	45	1	7655-64	★
28/11	28	16	1	7655-28	♠	75/50	75	57	1	7655-70	★
28/12	28	16	1	7655-34	♠	102/75	102	83	1	7655-76	★
28/15	28	19	1	7655-40	♠						


**JOINTS** *Socket, Spherical, Borosilicate*

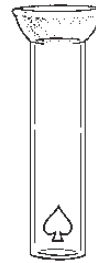
§ Size	Fits Ball, mm	Tube		Qty	Order Code	§ Size	Fits Ball, mm	Tube		Qty	Order Code
		O.D., mm	O.D., mm					O.D., mm	O.D., mm		
12/3	12	6	1	7655-06	♠	35/20	35	25	1	7655-48	♠
12/5	12	9	1	7655-12	♠	35/25	35	28	1	7655-54	♠
18/7	18	11	1	7655-18	♠	50/30	50	35	1	7655-60	★
18/9	18	13	1	7655-24	♠	65/40	65	45	1	7655-66	★
28/11	28	16	1	7655-30	♠	75/50	75	57	1	7655-72	★
28/12	28	16	1	7655-36	♠	102/75	102	80	1	7655-78	★
28/15	28	19	1	7655-42	♠						

**JOINTS** *Ball, Spherical, Borosilicate, Heavy Wall*

Size	Tube I.D., mm	Tube O.D., mm	Wall Thickness, mm (in)	Qty	Order Code	
35/25	25	32	3.5 (1/8)	1	<b>7656-10</b>	♠
50/30	30	38	3.5 (1/8)	1	<b>7656-22</b>	★
65/40	40	51	4.0 (5/32)	1	<b>7656-28</b>	★


**JOINTS** *Socket, Spherical, Borosilicate, Heavy Wall* ♠

Size	Tube I.D., mm	Tube O.D., mm	Wall Thickness, mm (in)	Qty	Order Code	
35/25	25	32	3.5 (1/8)	1	<b>7656-12</b>	♠
50/30	30	38	3.5 (1/8)	1	<b>7656-24</b>	★
65/40	40	51	4.0 (5/32)	1	<b>7656-30</b>	★


**JOINTS** *Ball, Spherical, Quartz* ★

Size	Tube O.D., mm	Qty	Order Code	Size	Tube O.D., mm	Qty	Order Code
12/5	8	1	<b>7657-10</b>	28/15	18	1	<b>7657-25</b>
18/9	12	1	<b>7657-16</b>	35/25	29	1	<b>7657-31</b>


**JOINTS** *Socket, Spherical, Quartz* ★

Size	Tube O.D., mm	Qty	Order Code	Size	Tube O.D., mm	Qty	Order Code
12/5	8	1	<b>7657-11</b>	28/15	18	1	<b>7657-26</b>
18/9	12	1	<b>7657-17</b>	35/25	29	1	<b>7657-32</b>


**JOINTS** *Stainless Steel, Spherical* ★

Fabricated from 18-8 type stainless steel No. 303 free machining. Inside diameter is the same as our glass joints, 7655, and are fully interchangeable. Can also be supplied from other metals, made to order. Shanks are machined for thread sizes listed, but are NOT threaded.

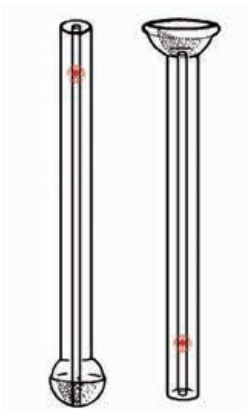
Size	Thread Size, in	O.D., in	Qty	<i>Ball</i>	<i>Socket</i>
				Order Code	Order Code
12/5	1/8	.405	1	<b>7658-08</b>	<b>7658-10</b>
18/9	1/4	.540	1	<b>7658-20</b>	<b>7658-22</b>
28/12	1/2	.840	1	<b>7658-32</b>	<b>7658-34</b>
28/15	1/2	.840	1	<b>7658-38</b>	<b>7658-40</b>
35/25	1	1.315	1	<b>7658-50</b>	<b>7658-52</b>
40/25	1	1.315	1	<b>7658-56</b>	<b>7658-58</b>
50/30	1-1/4	1.660	1	<b>7658-62</b>	<b>7658-64</b>




**JOINTS** *Stainless Steel, Spherical, Threaded* ★

Same as previous item 7658, except these joints are machined with an NPT male thread.

§ Size	Thread Size, in	O.D., in	Qty	<i>Ball</i>	<i>Socket</i>
				Order Code	Order Code
12/5	1/8	.405	1	7658-208	7658-210
18/9	1/4	.540	1	7658-220	7658-222
28/12	1/2	.840	1	7658-232	7658-234
28/15	1/2	.840	1	7658-238	7658-240
35/25	1	1.315	1	7658-250	7658-252


**JOINTS** *Capillary, Spherical* ♠

§ Size	Ball O.D., mm	Tube I.D., mm	Qty	<i>Ball</i>	<i>Socket</i>
				Order Code	Order Code
12/2	12	2	1	7660-14	7660-16


**SOCKET** *Rubber Septum* ♠

End tooled to accept rubber stopper septa. Used on chromatography columns. Overall length 15cm, opening is 5mm. Rubber septum listed below. Socket also works well with 12898 septa.

Tube I.D., mm	Tube O.D., mm	Qty	Order Code	
4	6.4		1	7663-01
2	7.5	1	7663-02	♠
3	7.8	1	7663-04	♠
Rubber septum			12	9096-32 ★

For use with #7 Ace-Thred, see 7644 for listing.


**GRADED SEALS** *Quartz to Borosilicate* ★

For connecting Kimax, Pyrex, Simax or Duran 33 Expansion borosilicate glass parts to quartz. Quartz length is 7.6cm, glass length, 10.2cm.

I.D., mm	Qty	Order Code	I.D., mm	Qty	Order Code
3	1	8455-02	17	1	8455-28
4	1	8455-04	19	1	8455-30
5	1	8455-06	20	1	8455-32
6	1	8455-08	22	1	8455-34
7	1	8455-10	25	1	8455-36
8	1	8455-12	27	1	8455-38
9	1	8455-14	30	1	8455-40
10	1	8455-16	32	1	8455-42
11	1	8455-18	35	1	8455-44
12	1	8455-20	37	1	8455-46
13	1	8455-22	40	1	8455-48
15	1	8455-24	50	1	8455-50
16	1	8455-26			

**TUBE Break Seal** ♠

Used as a one-time opening valve. Drawn to a point so that a small weight will fracture seal.

Tube O.D., mm	Qty	Order Code
10	1	8468-03
13	1	8468-05
16	1	8468-07


**JOINTS Flask Length, Outer** ♠

Size	Tube O.D., mm	Qty	Order Code	Size	Tube O.D., mm	Qty	Order Code
#13	17	1	7678-12	#27	32	1	7678-28
#16	20	1	7678-15	#32	38	1	7678-32
#22	25	1	7678-24	#38	45	1	7678-36


**Specifications for Joints, Threads, and Stopcocks**

**Standard Taper**

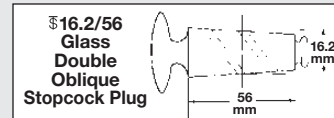
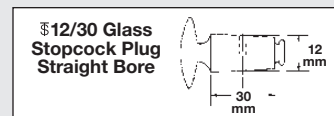
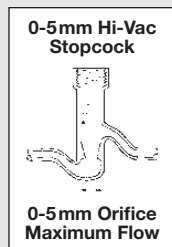
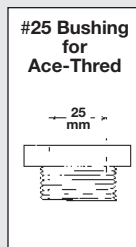
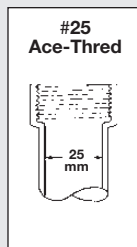
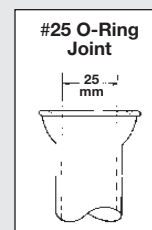
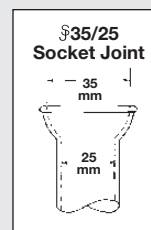
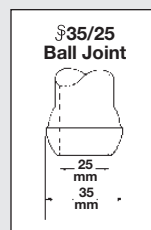
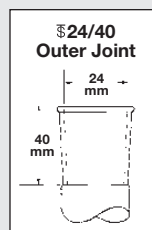
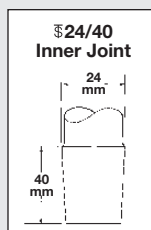
Symbol used to designate interchangeable joints, stoppers and stopcocks that comply with the requirements of Commercial Standard CS-21 published by N.I.S.T.

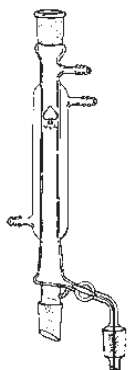

**Spherical Joint**

Symbol designates spherical joints that comply with CS-21.


**Product Standard**

Symbol designates stopcock plugs made of PTFE that meet requirements of N.I.S.T. Voluntary Product Standard PS 28-70.

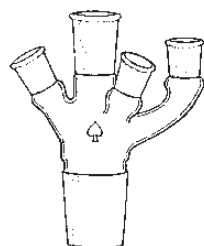




**CONDENSER & ANALYTICAL STILL HEAD COMBINED** ♠

By closing the glass stopcock, serves as a reflux condenser; open serves as a still head for Claisen type distillation. Top joint can be used for thermometer or for cold finger condenser insertion. Side vent enables head to be used in vacuum distillation. Jacketed section is 140mm. Use with 3/8-inch or 5/16-inch I.D. tubing, size C hose connection.

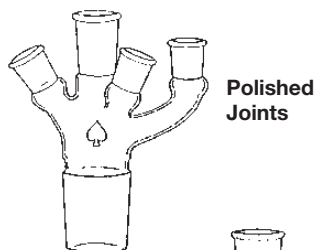
№ Joints	Hose Connection, in	Qty	Order Code
14/20	C (3/8 or 5/16)	1	9244-06



**FLASK HEAD** ♠

Standard interchangeable Mini-Lab head for use with 9448-05 through code -15, 9451 or 9456 flasks. Top has № 14/20 joints with the exception of top center joint, which is № 19/38. Side arms are placed at the proper angle so that the thermometer or addition tube can be placed in the flask without interfering with stirring.

Bottom Inner Joint, №	Qty	Order Code
45/50	1	9443-10



**FLASK HEAD** ♠

Interchangeable Mini-Lab head for use with 9448-50 or 9450 flasks. Top polished joints, № 19/38 polished center and № 14/20 polished sides. Side arms are placed at the proper angle so that the thermometer or addition tube can be placed in the flask without interfering with stirring. PTFE-clad bottom joint. Available with either polished or unpolished joints.

Bottom Inner Joint, №	Qty	Order Code
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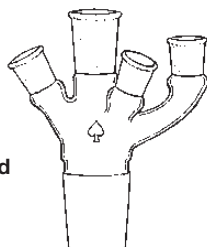
**With Polished Joints**

45/50	1	9443-20
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**With Unpolished Joints**

45/50	1	9446-10
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Unpolished Joints



**U.S. Government Buyer?**

GSA pricing for **Ace Glass** products is available thru our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)



**Schedule**  
Contract GS07F119CA

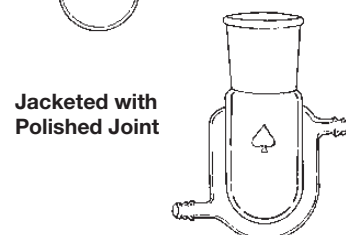
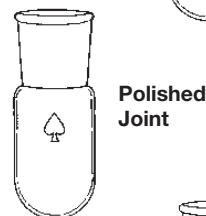
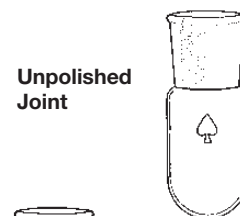
[www.gsasmart.com](http://www.gsasmart.com)



## FLASK ♠

Round bottom, cylindrical sides. Useful in many Mini-Lab assemblies. Can also be applied to many other applications in the laboratory where a wide-mouthed flask of small capacity is desired. Glas-Col mantles listed under 9515. Use with 9443 or 9446 head. Flask is available with either polished or unpolished joints, as well as, jacketed options.

Capacity, mL	⌘ Joint	Qty	Order Code
<b>With Polished Joint</b>			
100	45/50	1	9448-50
<b>With Unpolished Joint</b>			
50	45/50	1	9448-05
100	45/50	1	9448-10
150	45/50	1	9448-15
<b>Jacketed, with Polished Joint</b>			
100	45/50	1	9450-08

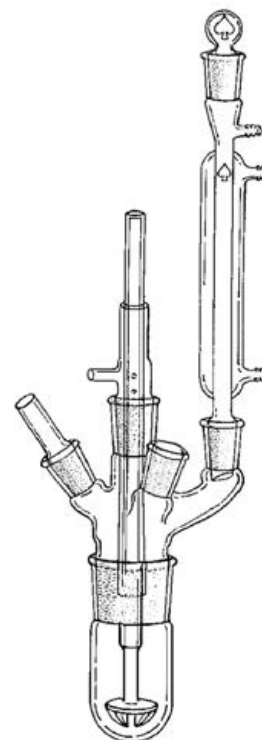


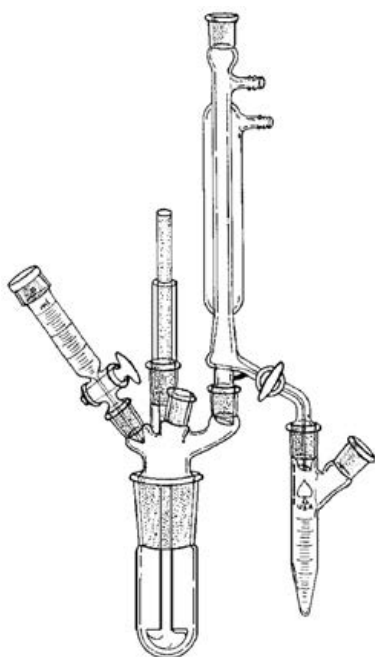
## GAS EQUILIBRIUM ASSEMBLY ♠

A practical set-up for the study of chemistry which involves the reaction of a gas-liquid or a liquid-solid heterogeneous system. The agitator is constructed to permit gas introduced through side arm of the bearing to enter the hollow agitator shaft and pass into the reaction system underneath the disc which supports the four blades. With the agitator running between 800-1600 rpm, a very fine dispersion of gas-liquid is obtained. The catalytic hydrogenation of aromatic nitro derivatives with platinum, palladium or Raney-nickel catalyst serves as an excellent example. Center joint on flask is ⌘ 45/50, center joint on head is ⌘ 19/38. All others are ⌘ 14/20. Condenser uses 3/8-inch or 5/16-inch I.D. tubing, size C hose connection.

**Note:** Assembly consists of (1) each of 9448, 9443, 9523, 9532, 9258, 9543, and (2) 9554. Thermometer not included.

Flask Capacity, mL	Flask Center Joint, ⌘	Head Center Joint, ⌘	Head, Other Joints, ⌘	Hose Connection, in	Qty	Order Code
50	45/50	19/38	14/20	C (3/8 or 5/16)	1	9510-06
100	45/50	19/38	14/20	C (3/8 or 5/16)	1	9510-13

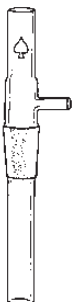




### MINI-LAB ASSEMBLY ♠

The flask is fabricated with an ACE  $\text{F}$  45/50 joint and is available in either 50 or 100mL capacity. Head is fabricated with three  $\text{F}$  14/20 outer joints surrounding the  $\text{F}$  19/38 center opening. The Trubore bearing is 8038. The agitator is constructed as a solid shaft with the blades shaped in the form of a half propeller. Blades are rounded to permit close tolerance with the flask bottom. The shaft is inserted in the bearing from underneath, rather than through the neck as in a conventional flask; design of the agitator is limited only by the joint dimensions. The analytical still head with stopcock serves as a reflux condenser. Top joint is for thermometer or cold finger condenser. Controlled addition of liquids is done by graduated weighing buret used as a dropping funnel. Heating of assembly is done with a 9515 Glas-Col mantle with a 12080 voltage controller. Heater and controller not included. *Thermometer not included.* Assembly consists of 9176, 9443, 9448, 9555, 8038, 9533, 9244 and 9373. Use with 3/8-inch or 5/16-inch I.D. tubing, size C hose connection.

Flask Capacity, mL	Flask Center Joint, $\text{F}$	Head Center Joint, $\text{F}$	Head, Other Joints, $\text{F}$	Hose Connection, in	Qty	Order Code
50	45/50	19/38	14/20	C (3/8 or 5/16)	1	9521-05
100	45/50	19/38	14/20	C (3/8 or 5/16)	1	9521-15



### BEARING Trubore, 10mm ♠

For use with flask head 9443. By using precision bore tubing throughout the length of the bearing, a stirrer bearing can be produced that will hold to within 1mm of vacuum and withstand pressures in the flask up to 300psig. The 9532 agitator used with this bearing actually develops a negative pressure of 230mm water at operation speeds. The side opening on the bearing is used to add gases through the hollow rod stirrer as listed under 9532. 10mm I.D.

Joint, $\text{F}$	Qty	Order Code
19/38	1	9523-04



### HEATING MANTLE

Designed especially for 9448 Mini-Lab flasks. Special heaters can also be made to order for flask with stopcock opening at lower end. Power with ACE 120 volt temperature controllers or 12080 variable voltage controller.

Flask Capacity, mL	Qty	Order Code
50	1	9515-04
100	1	9515-06
150	1	9515-08



### HEATING MANTLE Pear Shaped

Mantle withstands 400°C internal operating temperatures. Use with 12080-10, 12083-05, 12084-20 or 12087-10 power controllers. Pear shaped flask NOT included.

For Flask Capacity, mL	Approx. Dia., mm	Wattage	Qty	Order Code
5	25	12w - 30v	1	9516-02
10	31	15w - 30v	1	9516-04
25	45	25w - 60v	1	9516-06
50	51	35w - 60v	1	9516-08
100	59	70w - 115v	1	9516-10
250	81	135w - 115v	1	9516-12

9516-02, -04, -06, -08 are not CSA rated due to the 115v requirement.

## ACE BASIC KIT\* II

Basic MICRO/MINI-LAB KIT, approved by the authors of *Microscale Organic Laboratory* — Dana W. Mayo, Ronald M. Pike, Samuel S. Butcher; John Wiley and Sons, New York. This kit will do 95% of the experiments in the text.

This basic kit will also do the majority of experiments in *Organic Laboratory Techniques* — Donald L. Pavia, Gary M. Lampman, George S. Kriz, Randall G. Engel; Saunders College Publishing, Chicago.

Basic Kit II includes the 9599-62 Hickman-Hinkle Still with side port. (With the 9599-20 PTFE band, still can be used as a spinning Hickman distillation still.) Also, the 5261-06 multi-purpose adapter has replaced the 5028-25 thermometer adapter to allow more versatility, including reduced pressure operations.

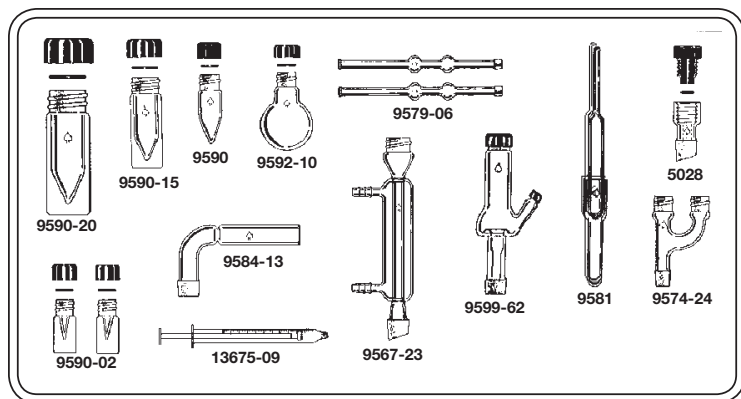
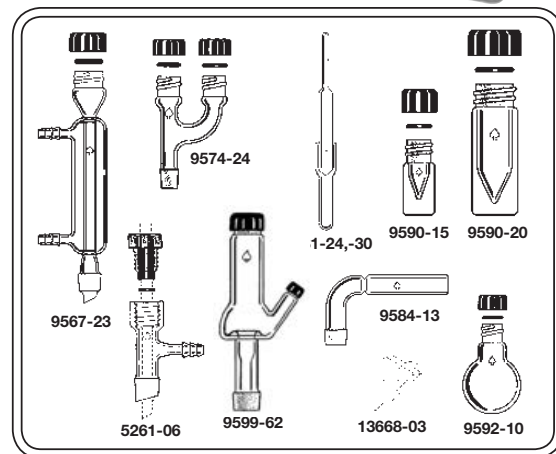
All joints are  $\text{K}$  14/10. Supplied in a clear, flexible plastic, tilt lid, compartmentalized box.



### KIT COMPONENTS ♠

(1)	<b>9567-23</b>	Jacketed Condenser	(1)	<b>9581-24</b>	2mL Outer, Craig
(1)	<b>9599-62</b>	Hickman-Hinkle Column, with Side Port	(1)	<b>9581-30</b>	PTFE Plug, Craig
			(1)	<b>9592-10</b>	10mL RB Flask
			(1)	<b>9584-13</b>	Drying Tube
(1)	<b>9574-24</b>	Claisen Adapter	(1)	<b>5261-06</b>	Multi-Purpose Adapter
(1)	<b>9590-15</b>	3.0mL Vial	(1)	<b>13668-03</b>	Magnetic "V" Stir Bar
(1)	<b>9590-20</b>	5.0mL Vial			

Qty	Order Code
1	<b>9560-30</b>



## KIT\* Deluxe, $\text{K}$ 14/10, with Spinning Hickman

Deluxe micro/mini-lab kit with microscale glassware to do all experiments in *Microscale Organic Laboratory* — Dana W. Mayo, Ronald M. Pike, Samuel S. Butcher; John Wiley and Sons, New York. This kit is supplied with  $\text{K}$  14/10 joints and makes converting from  $\text{K}$  14/20 to microscale realistic and convenient. Included in this kit is the Hickman-Hinkle spinning distillation column. Supplied in plastic tilt lid box with foam inserts.

### KIT COMPONENTS ♠

(1)	<b>13675-09</b>	Sample Syringe	(1)	<b>9584-13</b>	Drying Tube	(1)	<b>9590-15</b>	3.0mL Vial
(1)	<b>9567-23</b>	Jacketed Condenser	(2)	<b>9579-06</b>	GC Coll. Tube	(1)	<b>9591-16</b>	3.0mL Vial, Thin
(1)	<b>9574-24</b>	Claisen Head	(1)	<b>9581-23</b>	1mL Outer, Craig	(1)	<b>9590-20</b>	5.0mL Vial
(1)	<b>9599-62</b>	Hickman-Hinkle Col.	(1)	<b>9581-30</b>	(PTFE Plug, Craig	(1)	<b>9591-21</b>	5.0mL Vial, Thin
(1)	<b>9599-20</b>	PTFE Band	(1)	<b>9592-10</b>	10mL RB Flask	(1)	<b>5028-25</b>	Adapter, Therm.
(1)	<b>9599-23</b>	Plastic Insulator	(2)	<b>9590-02</b>	0.1mL Vial			

Qty  
Order Code

**Complete**

1 **9560-18**

Micro/Mini-Lab is a registered trademark of Ace Glass Incorporated.



Micro/Mini-Lab is a registered trademark of Ace Glass Inc.

### ACE KIT\* Deluxe, with $\text{\textcircled{14}}$ /10 Joints ★

Deluxe MICRO/MINI-LAB KIT with microscale glassware to do all experiments described in *Microscale Organic Laboratory* — Dana W. Mayo, Ronald M. Pike, Samuel S. Butcher; John Wiley and Sons, New York.

This kit, supplied with  $\text{\textcircled{14}}$ /10 joints (in place of the  $\text{\textcircled{7}}$ /10 and  $\text{\textcircled{14}}$ /10 joints in 9560-05 Original Deluxe Kit), makes converting from  $\text{\textcircled{14}}$ /20 to micro more convenient. This kit includes a 13675 sample retrieval syringe, plus the improved, unbreakable, PTFE inner plug for the Craig recrystallization tube. Supplied in plastic tilt lid box with foam insert.

Complete	Qty	Order Code	
	1	9560-14	★

#### KIT COMPONENTS ♠

(1) 13675-09	Sample Syringe	(1) 9581-24	2mL Outer, Craig
(1) 9566-17	Air Condenser	(1) 9581-30	PTFE Plug, Craig
(1) 9567-23	Jacketed Condenser	(1) 9584-13	Drying Tube
(1) 9574-24	Claisen Head	(1) 9586-18	Gas Del Tube
(1) 9576-04	Hickman Still	(2) 9590-02	0.1mL Vial
(2) 9579-06	GC Coll. Tube	(2) 9590-15	3.0mL Vial
(1) 9581-23	1mL Outer, Craig	(1) 9590-20	5.0mL Vial

### REPLACEMENT FOAM INSERTS for Microscale Kits

#### 3 Piece Set

For Kit	Qty	Order Code	
9560-14	1	9560-63	★
9560-18	1	9560-62	★

### REPLACEMENT FOAM INSERTS for Spinning Band Column

#### 3 Piece Set

Qty	Order Code	
1	9595-60	★

### REPLACEMENT BOX Plastic, Tilt Lid, for 9560-05,-14,-18 Kits

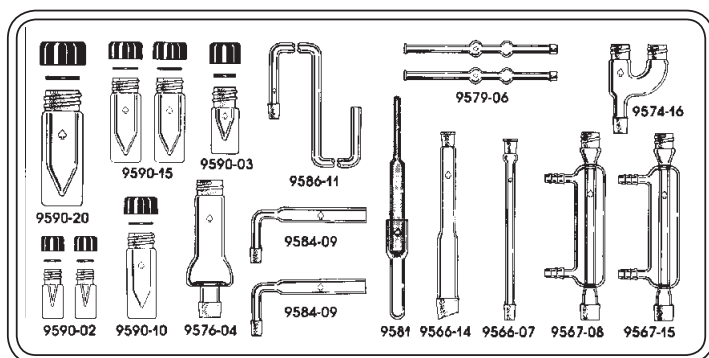
Qty	Order Code	
1	9560-66	★

### REPLACEMENT BOX Plastic, Tilt Lid, for Spinning Band Column

Qty	Order Code	
1	9595-61	★

### REPLACEMENT BOX Plastic, Tilt Lid, for 9560-30 Kit

Qty	Order Code	
1	9560-68	★



Micro/Mini-Lab is a registered trademark of Ace Glass Inc.

**ACE KIT\* Deluxe ★**

The original deluxe MICRO/MINI-LAB KIT with all microscale glassware necessary to conduct the 52 experiments described in *Microscale Organic Laboratory* – Dana W. Mayo, Ronald M. Pike, Samuel S. Butcher; John Wiley and Sons, New York. This equipment, originally developed by the authors, is supplied with  $\text{5/5}$ ,  $\text{7/10}$  and  $\text{14/10}$  joints and includes the improved, unbreakable PTFE inner plug for the Craig recrystallization tube. Supplied in plastic tilt lid box with foam insert.

	Qty	Order Code
	1	9560-05

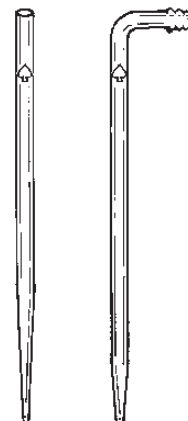
**KIT COMPONENTS ♠**

(1) 9566-07 Air Condenser	(2) 9579-06 GC Coll. Tube	(2) 9590-02 0.1mL Vial
(1) 9566-14 Air Condenser	(1) 9581-23 1mL Outer, Craig	(1) 9590-03 0.3mL Vial
(1) 9567-08 Jacketed Condenser	(1) 9581-24 2mL Outer, Craig	(1) 9590-10 1.0mL Vial
(1) 9567-15 Jacketed Condenser	(1) 9581-30 PTFE Plus, Craig	(2) 9590-15 3.0mL Vial
(1) 9574-16 Claisen Adapter	(2) 9584-09 Drying Tube	(1) 9590-20 5.0mL Vial
(1) 9576-04 Hickman Still	(1) 9586-11 Gas Delivery Tube	

**ADAPTER Bleed ♠**

With drawn capillary tip for the introduction of gases below the liquid surface. Outside diameter is 7mm. Length approximately 270mm (10-3/4 inches). For use with #7 Ace-Thred. Hose connection on bent adapter is size A hose connection, 5/16-inch I.D. tubing.

Description	Qty	Order Code
Straight Adapter	1	9059-08
Bent Adapter	1	9059-12

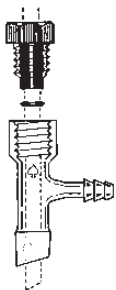


**ADAPTER "Mini" #7 Ace-Thred ♠**

With  $\text{5/5}$  ground inner drip joint at bottom and #7 Ace-Thred at top that forms an O-Ring compression seal with thermometers, bleed tubes, etc. Supplied complete with bushing and FETFE O-Ring that will accommodate 6.5 to 7.0mm O.D. For smaller thermometers, like 9548, substitute 11710-04 PTFE ferrule for O-Ring. For normal student thermometers, use 11710-07 ferrule. Bottom joint supplied with a drip tip.

$\text{5/5}$ Joint	Qty	Order Code
14/10	1	5028-25

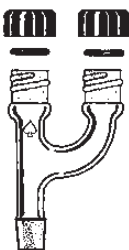



**ADAPTER** with Hose Connection, "Mini" #7 Ace-Thred ♠

With  $\text{§}$  14/10 ground inner drip joint at bottom, and a #7 Ace-Thred at top that forms an O-Ring compression seal with 6.5-7mm thermometers, bleed tubes, etc., and side hose connection.

**Note:** Supplied complete with nylon bushing and FETFE O-Ring. Use with 5/16-inch I.D. tubing, size A hose connection.

$\text{§}$ Joint	Hose Connection, in	Order Code
14/10	A (5/16)	5261-06


**ADAPTER** Claisen, Threaded

Microscale Claisen adapter/head often used to facilitate syringe addition of reagents to sealed or moisture-sensitive systems. The top joints are combination cap, thread and  $\text{§}$  joints to accommodate and seal other microscale apparatus. The O.D. of the top joints have an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground outer joint. With inner  $\text{§}$  joint at bottom. Supplied with two threaded caps with hole, two PTFE-faced silicone rubber septas and two O-Rings.

Top Threaded/ Outer $\text{§}$ Joint	Inner $\text{§}$ Joint	O-Ring Only	Cap Only	Septa Only	Order Code
7/10	14/10	7855-705 ♠	9590-45 ♠	8787-41 ★	9574-16 ♠
10/10	10/10	7855-706 ♠	9590-47 ♠	8787-43 ★	9574-20 ♠
14/10	14/10	7855-720 ♠	9590-46 ♠	8787-42 ★	9574-24 ♠


**ADAPTER** Connecting Hose ♠

With  $\text{§}$  14/10 inner joint and three-ring hose connection. Use with 5/16-inch I.D. tubing, size A hose connection.

$\text{§}$ Joint	Hose Connection, in	Order Code
14/10	A (5/16)	9069-04


**ADAPTER** Connecting Hose, with 1:5 PTFE Plug ♠

With  $\text{§}$  14/10 inner joint and solid PTFE stopcock plug. Use with 5/16-inch I.D. tubing, size A hose connection.

$\text{§}$ Joint	Hose Connection, in	Bore Size, mm	Order Code
14/10	A (5/16)	2	9080-10

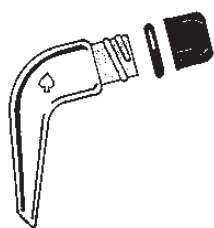
**Replacement Stopcock**

PTFE	2	8224-04
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**ADAPTER** Distilling ♠

The top joint is a combination cap, thread and  $\text{§}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{§}$  14/10 outer joint.  $\text{§}$  14/10 inner joint at bottom and at 75° angle. Supplied with cap and O-Ring.

Top Threaded/ Outer $\text{§}$ Joint	Inner $\text{§}$ Joints	Order Code
14/10	14/10	9562-11


**ADAPTER** Distillate Take-Off ♠

The top joint is a combination cap, thread and  $\text{§}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{§}$  14/10 outer joint. 105° angle. Supplied with cap and O-Ring.

Top Threaded/ Outer $\text{§}$ Joint	Order Code
14/10	9563-07

**ADAPTER Vacuum Take-Off, with Hose Connection** ♠

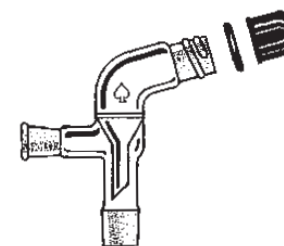
Used for Microscale vacuum distillations. The top joint is a combination cap, thread and  $\text{\textcircled{S}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{\textcircled{S}}$  14/10 outer joint. Inner  $\text{\textcircled{S}}$  joint at other end and size C hose connection for vacuum. 105° angle. Supplied with cap and O-Ring.



Top Threaded/ Outer $\text{\textcircled{S}}$ Joint	Bottom Inner $\text{\textcircled{S}}$ Joint	Order Code
14/10	14/10	9564-10

**ADAPTER Vacuum Take-Off, with  $\text{\textcircled{S}}$  Side Joint** ♠

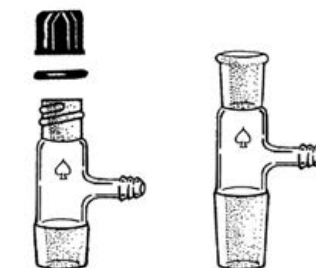
Used for Microscale vacuum distillations, especially for use with 9595 spinning band micro-distillation column. The top joint is a combination cap, thread and  $\text{\textcircled{S}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground outer joint. Inner  $\text{\textcircled{S}}$  joint at other end and  $\text{\textcircled{S}}$  7/10 outer side joint for vacuum connection or stopper when using spinning band column technique. 105° angle. Supplied with cap and O-Ring.



Top Threaded/ Outer $\text{\textcircled{S}}$ Joint	Bottom Inner $\text{\textcircled{S}}$ Joint	$\text{\textcircled{S}}$ Side Joint	Order Code
7/10	10/10	7/10	9565-05
7/10	14/10	7/10	9565-06

**ADAPTER Gas Inlet/Vacuum, Microscale** ♠

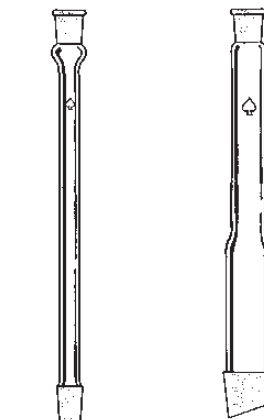
Use as gas inlet or vacuum adapter. Code -02 has a  $\text{\textcircled{S}}$  14/10 top joint and a  $\text{\textcircled{S}}$  19/38 bottom joint. Code -22 has an externally threaded top outer joint and  $\text{\textcircled{S}}$  14/10 bottom joint, and it is supplied with a holed cap and FETFE O-Ring. Both have a serrated size B hose connection off to the side, and should be used with 5/16-inch or 3/8-inch I.D. tubing.



Top Outer $\text{\textcircled{S}}$ Joint	Bottom Inner $\text{\textcircled{S}}$ Joint	Hose Connection, in	Order Code
14/10	19/38	B (5/16 or 3/8)	9119-02
14/10	14/10	B (5/16 or 3/8)	9119-22

**CONDENSER Air Reflux, Mini-Lab** ♠

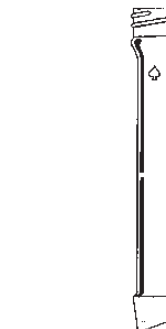
Micro scale air condensers used in reflux experiments. When packed with desiccant material, condensers become a drying tube. Inner  $\text{\textcircled{S}}$  joint at bottom and an outer  $\text{\textcircled{S}}$  joint at top. The code -14 has a drip tip bottom  $\text{\textcircled{S}}$  joint for use with the 9595 spinning band column. Effective length is approximately 100mm.



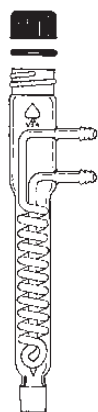
Tube O.D., mm	Bottom $\text{\textcircled{S}}$ Inner Joint	Top $\text{\textcircled{S}}$ Outer Joint	Order Code
6.4	7/10	7/10	9566-07
10	14/10	7/10	9566-14

**CONDENSER Air Reflux, with Cap**

Micro scale air condensers used in reflux experiments. When packed with desiccant material, condensers become a drying tube. Inner drip tip,  $\text{\textcircled{S}}$  joint at bottom and a combination outer cap thread at top with a ground outer joint inside to accommodate other microscale components. Use 9590 caps and 7855 FETFE o-rings, or 9590 flat septas. Effective length is approximately 100mm.

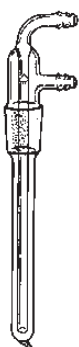


Tube O.D., mm	Bottom $\text{\textcircled{S}}$ Inner Joint	Top Cap x $\text{\textcircled{S}}$ Outer Joint	Septa Only	Cap Only	Order Code
8	10/10	15-425 Thread x 10/10	8787-43 ★	9590-47 ♠	9566-10 ♠
10	14/10	20-400 Thread x 14/10	8787-42 ★	9590-46 ♠	9566-17 ♠


**CONDENSER** *Coil Reflux, Microscale* ♠

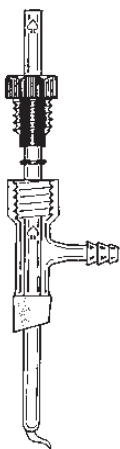
High efficiency coil condenser especially suited for vacuum applications. Coil length is 70mm. The top joint is a combination cap, thread and ⌘ joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground ⌘ 14/10 outer joint. Bottom is ⌘ 14/10 inner joint. Supplied with cap and O-Ring.

⌘ Joint	Coil Length, mm	Qty	Order Code
14/10	70	1	9569-24


**CONDENSER** *Cold Finger* ♠

Can be used with 9119 adapter and 9785 still for micro distillations. Length of finger below joint is 80mm. Joint is ⌘ 14/10. Use with 5/16-inch I.D. tubing, size A hose connection.

⌘ Joint	Hose Connection, in	Qty	Order Code
14/10	A (5/16)	1	9250-02

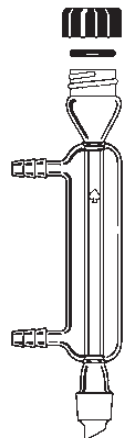

**CONDENSER** *Cold Finger, Adjustable, Micro* ♠

Micro cold finger condenser with drip tip on bottom for directing drops into the well of ⌘ 14/10 jointed 9576 or 9599 Hickman Stills. Cold water is introduced into cold finger periodically by means of a Pasteur pipet. Complete item consists of cold finger condenser and multi-purpose vacuum adapter with #7 Ace-Thred that makes compression O-Ring seal with cold finger and allows for vertical adjustment. Threaded adapter supplied with nylon bushing and FETFE O-Ring. Use with 5/16-inch I.D. tubing, size A hose connection.

Description	Qty	Order Code
Cold Finger Condenser, only	1	9573-08
Vacuum Adapter, only	1	5261-06

**Complete**

	1	9573-20
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**CONDENSER** *Jacketed Reflux, Threaded* ♠

Microscale, water-jacketed condenser used in reflux experiments. The top joint is a combination cap, thread and ⌘ joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground outer joint. Inner ⌘ joint at bottom, with drip tip. I.D. of inner tube on codes -19 and -23 is sufficiently large enough to accept regular size thermometer. Jacket length approximately 80mm. Inlet and outlet water connections are three-ring serrated fittings. Use with 5/16-inch I.D. tubing, size A hose connection.

Bottom Inner Joint, ⌘	Top Outer Joint, ⌘	Hose Connection, in	Qty	Order Code
7/10	7/10	A (5/16)	1	9567-08
14/10	7/10	A (5/16)	1	9567-15
10/10	10/10	A (5/16)	1	9567-19
14/10	14/10	A (5/16)	1	9567-23



**COLUMN** *Chromatography, Micro, Threaded* ♠

With internally threaded ends. Threads are #7 Ace-Thred for use with 5801-07 end fitting. Column measures 85mm effective length, 8mm I.D.

Ace-Threds	Length, mm	I.D., mm	Qty	Order Code
#7	85	8	1	5813-23



**ADAPTER** *End Fitting, 1/4-28 to Ace-Thred, Michel-Miller* ♠

Precision made PTFE end fitting for use at either end of the 5813 column. Designed to make a leak-tight seal without the use of O-Rings. Simply tighten until white ring appears, indicating a seal has been made, then secure locknut. Use paper filter disc, 5814-06, to retain packing material. Female thread at top is 1/4-28 to accept standard miniature plumbing systems. Bore is 1.5mm (.060 inches).

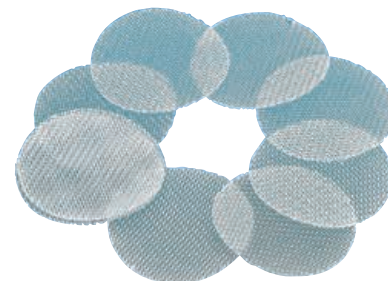
For Thread Size, mm	Bore Size, mm	Qty	Order Code
7	1.5	1	5801-07



**FILTER DISCS** ★

For use with 5801 end fittings to retain packing material. Made from a specially pure, very uniform, highly absorbent paper.

For Thread Size, mm	Disc O.D., mm	Qty	Order Code
7	7.5	100	5814-06



**COLUMN** *Distilling, Vigreux, Microscale* ♠

For vacuum distillation of high boiling materials. The top joint is a combination cap, thread and ⌘ joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground ⌘ 14/10 outer joint. Bottom ⌘ 14/10 inner, and indents.

**Note:** Supplied with holed cap and FETFE O-Ring. Length stated is length of indents.

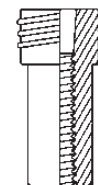
Length of indents, mm	⌘ Joints	Qty	Order Code
75	14/10	1	9345-32
100	14/10	1	9345-35



**GC CONNECTION ADAPTER** *Stainless Steel* ♠

Microscale gas chromatography connection-adapter for making direct connection between GC column and 9579-06 collection tube. Stainless steel adapter has a 6-32 NPT female thread for attaching to heated port on GC and a ⌘ 5/5 outer joint, externally threaded, to allow an "O-Ring-CAP-SEAL" connection with 9579 tube.

G-M Model	Thread, NPT	Outer ⌘ Joint	Qty	Order Code
#150	6-32	5/5	1	9571-40
#350	6-32	5/5	1	9571-42



**TUBE GC Collection** ♠

Microscale gas chromatography collection tube for fraction collection followed by transfer of sample to 9590-02, 0.1mL, conical vial for storage.  $\text{3/8}$  5/5 inner joint on tube allows direct connection to heated exit port of GC column via 9571-40 stainless steel connection adapter. Inner joint facilitates transfer since 0.1mL vial has  $\text{3/8}$  5/5 outer joint.

Bottom Inner Joint, $\text{3/8}$	Qty	Order Code
5/5	1	9579-06

**TUBE Craig Recrystallization** ♠

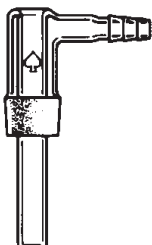
Microscale Craig tube for recrystallizing small quantities of reaction product. Consists of a glass outer tube with non-uniform grind to purposely allow leakage, and a PTFE inner plug. This plug eliminates breakage normally experienced with glass plugs. Volume stated is capacity below grind.

*Note: ACE Microscale kits are supplied with a PTFE plug. For those who would prefer the original glass inner plug, it is also available.*

Capacity, mL	Qty	Glass Outer	PTFE Plug	Complete
		Order Code	Order Code	Order Code
1	1	9581-23	9581-30	9581-05
2	1	9581-24	9581-30	9581-03

**Accessories**

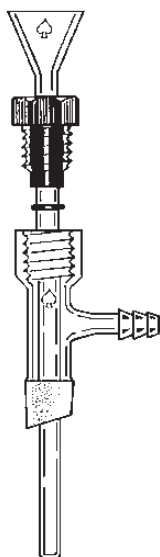
Glass Inner Plug, Only	9581-28
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**SUBLIMATION ADAPTER** ♠

Microscale sublimation adapter for use with 9591-21 vial and 9592-10 flask. Supplied with  $\text{3/8}$  14/10 inner joint. Use with 5/16-inch I.D. tubing, size A hose connection.

Bottom Inner Joint, $\text{3/8}$	Hose Connection, in	Qty	Order Code
14/10	A (5/16)	1	9582-12

*Designed by Dr. Anthony Winston, West Virginia Univ. Dept. of Chemistry, Morgantown, WV 26506*

**SUBLIMATION ADAPTER Adjustable** ♠

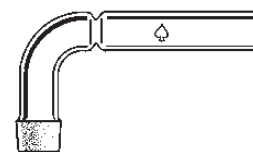
Microscale sublimation adapter with vertically adjustable condenser tube that allows use with 3 mL, 5 mL, and 10 mL microscale vessels. Two-piece adapter features a #7 Ace-Thred at top of vacuum adapter that, with nylon bushing and O-Ring, forms a compression seal with condenser tube, bottom  $\text{3/8}$  14/10 inner drip joint, and side hose connection. **Note:** without condenser tube, threaded vacuum adapter will accept thermometer, bleed tube, etc. Complete item consists of vacuum adapter with nylon bushing and FETFE O-Ring, and condenser tube. Use with 5/16-inch I.D. tubing, size A hose connection.

	Qty	Order Code
Vacuum Adapter with Bushing & O-Ring	1	5261-06
Condenser Tube, only	1	9583-02
<b>Complete</b>	1	9583-24

**TUBE Drying** ♠

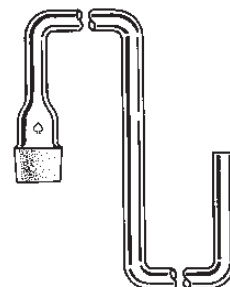
Microscale drying tube used to protect moisture sensitive reaction components from atmospheric water vapor while allowing a reaction system to be kept unsealed. With inner  $\text{\textcircled{S}}$  joint, bent 90° to main chamber.

Bottom Inner Joint, $\text{\textcircled{S}}$	Qty	Order Code
7/10	1	9584-09
10/10	1	9584-11
14/10	1	9584-13


**TUBE Capillary Gas Delivery** ♠

Microscale bent capillary gas delivery tube for transferring gases generated during reactions to storage containers, such as, 9588 sampling reservoir.

Bottom Inner Joint, $\text{\textcircled{S}}$	Qty	Order Code
7/10	1	9586-11
10/10	1	9586-15
14/10	1	9586-18


**GAS RESERVOIR** ♠

Gas collecting reservoir, described in *Microscale Organic Laboratory*, Mayo, Pike, Butcher text, as a means of collecting and sampling gaseous products when using 9586 capillary gas delivery tube. Open-bottom tube has single line graduation at 3 and 4mL level and 20-400 thread at top. The top joint is a combination cap, thread and  $\text{\textcircled{S}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{\textcircled{S}}$  14/10 outer joint. Supplied with cap and septum.

Top Threaded Outer $\text{\textcircled{S}}$ Joint	Top Thread	Qty	Order Code
14/10	20-400	1	9588-14 ♠


**Replacement Septas**

	48	8787-42	★
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**Replacement Caps**

20-400	48	9590-46	♠
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**VIAL Conical Bottom, Reaction**

Microscale, heavy-wall reaction vial. The top joint is a combination cap, thread and  $\text{\textcircled{S}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground outer joint. This type connection eliminates the need for clamps while offering the positive leak-tight seal of ground glass joints. Replace O-Ring in cap with PTFE-faced silicone rubber septa and vial can be capped for storage. Each vial supplied with threaded and holed cap, (1) PTFE faced silicone rubber septum and (1) O-Ring for making "O-Ring-CAP-SEAL." This is not a standard V-Vial.

Capacity, mL	Top Threaded Outer $\text{\textcircled{S}}$ Joint	Cap only	O-Ring only	Septa only	Order Code
0.1	5/5	9590-44 ♠	7855-01 ♠	8787-40 ★	9590-02 ♠
0.3	7/10	9590-45 ♠	7855-705 ♠	8787-41 ★	9590-03 ♠
0.3	10/10	9590-47 ♠	7855-706 ♠	8787-43 ★	9590-04 ♠
1.0	7/10	9590-45 ♠	7855-705 ♠	8787-41 ★	9590-10 ♠
1.0	10/10	9590-47 ♠	7855-706 ♠	8787-43 ★	9590-11 ♠
3.0	10/10	9590-47 ♠	7855-706 ♠	8787-43 ★	9590-14 ♠
3.0	14/10	9590-46 ♠	7855-720 ♠	8787-42 ★	9590-15 ♠
5.0	10/10	9590-47 ♠	7855-706 ♠	8787-43 ★	9590-19 ♠
5.0	14/10	9590-46 ♠	7855-720 ♠	8787-42 ★	9590-20 ♠




**VIAL Conical Reaction, Research** ♠

Microscale, thin-wall reaction vial. The top joint is a combination cap, thread and ⚙ joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground ⚙ 14/10 outer joint. Similar to 9590, but major difference is this thin-walled vial has better heat transfer for the more demanding research projects. Supplied with threaded cap with hole, (1) PTFE faced silicone rubber septum and (1) O-Ring.

Capacity, mL	Top Threaded/ Outer ⚙ Joint	Top Thread	Qty	Order Code
3	14/10	20-400	1	9591-16
5	14/10	20-400	1	9591-21
10	14/10	20-400	1	9591-23

**Replacement Caps**

	20-400	48	9590-46
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**VIAL Conical Reaction, with Side Port**

Similar to research reaction vial listed above, except with the addition of an externally threaded side port. Side port supplied with holed cap and septum that facilitates syringe retrieval or injection. ⚙ outer joint supplied with holed cap, PTFE-faced silicone rubber septum and FETFE O-Ring.

Capacity, mL	Top Threaded/ Outer ⚙ Joint	Top Thread	Side Thread	Qty	Order Code
3	14/10	20-400	8-425	1	9591-46 ♠
5	14/10	20-400	8-425	1	9591-47 ♠
10	14/10	20-400	8-425	1	9591-48 ♠

**Replacement Parts**

Replacement Upper Cap	20-400	48	9590-46 ♠
Replacement Side Cap	8-425	48	9590-44 ♠
Replacement Septa		48	8787-40 ★


**FLASK Round Bottom, with Threaded Joint** ♠

Microscale, single-neck, round-bottom reaction flask. The top joint is a combination cap, thread and ⚙ joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground outer joint. This type connection eliminates the need for clamps while offering the positive leak-tight seal of ground glass.

**Note:** Supplied with threaded cap with hole, (1) PTFE-faced silicone rubber septum and (1) O-Ring.

Capacity, mL	Top Threaded/ Outer ⚙ Joint	Cap	O-Ring	Septa	Qty	Order Code
5	14/10	9590-46	7855-720	8787-42	1	9592-04
10	10/10	9590-47	7855-706	8787-43	1	9592-09
10	14/10	9590-46	7855-720	8787-42	1	9592-10
25	14/10	9590-46	7855-720	8787-42	1	9592-15


**FLASK Round Bottom, with Side Port** ♠

Microscale, single-neck, round-bottom reaction flask, similar to the above, but with the addition of an externally threaded side port. Side port is supplied with holed cap and PTFE-faced silicone rubber septum that facilitates retrieval or injection. ⚙ Outer joint supplied with holed cap, PTFE-faced septum and FETFE O-Ring.

**Note:** Supplied with (2) threaded caps with hole, (2) PTFE-faced silicone rubber septum and (1) O-Ring.

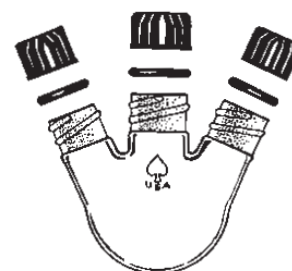
Capacity, mL	Top Threaded/ Outer ⚙ Joint	Cap (Top / Side)	O-Ring (Top)	Septa (Top / Side)	Qty	Order Code
5	14/10	9590-46 / 9590-44	7855-720	8787-42 / 8787-40	1	9592-35
10	14/10	9590-46 / 9590-44	7855-720	8787-42 / 8787-40	1	9592-37

**FLASK Round Bottom, Three Necks** ♠

Microscale, round-bottom flask with three  $\text{\textcircled{F}}$  14/10 outer ground joints externally threaded. The joints are a combination cap, thread and  $\text{\textcircled{F}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the joints have an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{\textcircled{F}}$  14/10 outer joint.

**Note:** Supplied with (3) holed caps, PTFE faced septa and FETFE O-Rings.

Capacity, mL	Top Threaded/ Outer $\text{\textcircled{F}}$ Joint	Qty	Order Code
25	14/10	1	9465-34
50	14/10	1	9465-36


**FLASK Pear Shaped** ♠

Microscale, pear-shaped, single-neck flask. The top joint is a combination cap, thread and  $\text{\textcircled{F}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{\textcircled{F}}$  14/10 outer joint.

**Note:** Supplied with holed cap, PTFE faced septa and FETFE O-Ring.

Capacity, mL	Top Threaded/ Outer $\text{\textcircled{F}}$ Joint	Qty	Order Code
5	14/10	1	9477-60
10	14/10	1	9477-62
25	14/10	1	9477-64


**FLASK Pear Shaped, Two Necks** ♠

Microscale, pear-shaped flask. The top joint is a combination cap, thread and  $\text{\textcircled{F}}$  joints to accommodate and seal other microscale apparatus. The O.D. of the joints have an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{\textcircled{F}}$  14/10 outer joint.

**Note:** Supplied with (2) holed caps, PTFE faced septa and FETFE O-Rings.

Capacity, mL	Top Threaded/ Outer $\text{\textcircled{F}}$ Joint	Qty	Order Code
25	14/10	1	9479-29


**FLASK Recovery, Rotary Evaporator** ♠

Microscale, recovery type flask with sides modified for ease in inserting spatula or brush for removing solids or cleaning. The top joint is a combination cap, thread and  $\text{\textcircled{F}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{\textcircled{F}}$  14/10 outer joint.

**Note:** Supplied with holed cap, PTFE faced silicone rubber septum and FETFE O-Ring.

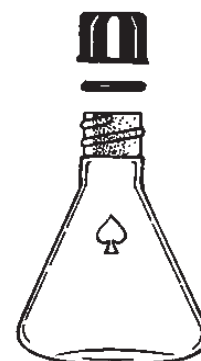
Capacity, mL	Top Threaded/ Outer $\text{\textcircled{F}}$ Joint	Qty	Order Code
10	14/10	1	9470-43
25	14/10	1	9470-45


**FLASK Erlenmeyer** ♠

Microscale, Erlenmeyer flask. The top joint is a combination cap, thread and  $\text{\textcircled{F}}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{\textcircled{F}}$  14/10 outer joint.

**Note:** Supplied with holed cap, PTFE faced silicone rubber septum and FETFE O-Ring.

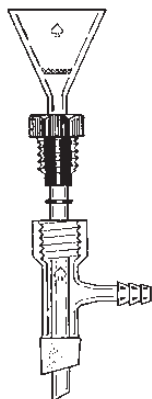
Capacity, mL	Top Threaded/ Outer $\text{\textcircled{F}}$ Joint	Qty	Order Code
10	14/10	1	9471-42
25	14/10	1	9471-44



**FLASK Dewar, Low Form** ★

Cylindrical low form, silvered and evacuated. Ideal for sub ambient work. Low form allows use of multi-neck flask and magnetic stirring.

Capacity, mL	Inside O.D., mm	Inside Height, mm	Qty	Order Code
150	80	35	1	<b>7078-04</b>
350	80	75	1	<b>7078-06</b>

**FUNNEL Filter, Hirsch, Adjustable** ♠

Microscale, vacuum adapter with vertically adjustable Hirsch filter funnel that is suitable for use with all Microscale flasks and vials with  $\text{§}$  14/10 joints. This two-piece vacuum adapter features a #7 Ace-Thred at top with a nylon bushing and O-Ring that forms a compression seal with funnel stem, bottom joint, and side hose connection. Plain stem funnel has a disc diameter of 10 mm with a capacity above disc of approximately 7mL. Sintered disc offered in Porosity C (25-50 micron) or Porosity D (10-20 micron). Without funnel, vacuum adapter will accept thermometers, bleed tubes, etc. Use with 5/16-inch I.D. tubing, size A hose connection.

**Note:** Complete item consists of vacuum adapter with nylon bushing and FETFE O-Ring, and funnel.

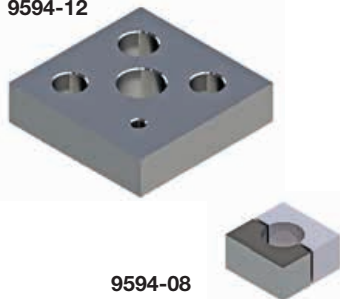
Funnel Porosity	Ace-Thred	Hose Connection, in	Qty	Funnel Only Order Code	Adapter Only Order Code	Complete Order Code
C (25-50)	#7	A (5/16)	1	<b>9727-03</b>	<b>5261-06</b>	<b>9727-20</b>
D (10-20)	#7	A (5/16)	1	<b>9727-07</b>	<b>5261-06</b>	<b>9727-30</b>

**FUNNEL Filter** ♠

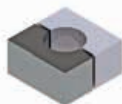
Buchner type. Diameter of sintered glass disc is 18mm. Measures 40mm from disc to top. Inner joint is  $\text{§}$  14/10. All porosities are priced the same. Use with 5/16-inch I.D. tubing, size A hose connection.

$\text{§}$ Joint	Qty	Porosity A Order Code	Porosity B Order Code	Porosity C Order Code	Porosity D Order Code	Porosity E Order Code
14/10	1	<b>9439-11</b>	<b>9439-13</b>	<b>9439-15</b>	<b>9439-17</b>	<b>9439-19</b>

9594-12



9594-08

**HEAT TRANSFER BLOCK\*** Microscale ★

Aluminum heat transfer block for magnetic hotplate/stirrers, used in place of a glass sand bath in Microscale experiments. Offers excellent heat transfer and will not interfere with magnetic stirring. Block has (4) holes to accommodate all Ace Microscale reaction vials and (1) hole for thermometer. 9594-12 measures 3 inches square x 3/4 inches thick. 9594-08 is an auxiliary heat block for 3mL and 5mL conical vials with (1) 20mm hole and split.

Length, in	Width, in	Thickness, in	Qty	Order Code
1.5	1.5	.75	1	<b>9594-08</b>
3	3	.75	1	<b>9594-12</b>

\*Designed by Dr. Siegfried Ludwig, Centralia College, Centralia, WA 98531

**HEAT TRANSFER BLOCK** Microscale ★

Aluminum heat transfer block for use on top of stirrer-hot plate to effect better heat transfer. Block has (3) bowl-shaped recesses for 3 and 5mL thin-walled vials and 5, 10 and 25mL round-bottom flasks; (1) 20mm straight-thru hole, (1) deep bowl-shaped hole for 10mm test tubes and (1) hole for a thermometer. Measures 3-1/2 inches square x 3/4 inches thick.

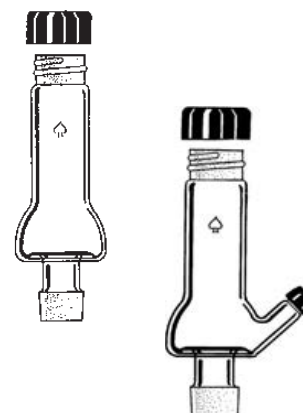
Length, in	Width, in	Thickness, in	Qty	Order Code
3.5	3.5	.75	1	<b>9594-16</b>

**HEAD Hickman Still** ♠

Microscale Hickman still head used to carry out micro-sample fractional distillations. The top joint is a combination cap, thread and  $\text{F}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground outer joint. Inner  $\text{F}$  joint at bottom. Inner joint can be secured in 9590 reaction vials via “O-Ring-CAP-SEAL” connection. Also available with threaded side port (9576-37).

*Note: Supplied with cap, O-Ring and septa.*

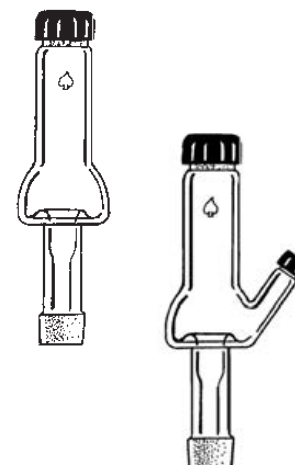
Top Threaded/ Outer $\text{F}$ Joint	Inner $\text{F}$ Joint	Cap Only	O-Ring Only	Septa Only	Complete
<b>Without Threaded Side Port</b>					
10/10	10/10	9590-47	7855-706	8787-43	<b>9576-02</b>
14/10	14/10	9590-46	7855-720	8787-42	<b>9576-04</b>
<b>With Threaded Side Port</b>					
14/10	14/10	9590-44	7855-720	8787-40 or -42	<b>9576-37</b>



**HEAD Hickman-Hinkle Still** ♠

Microscale Hickman-Hinkle still head used to carry out simple and fractional distillations. Similar to 9576 Hickman Still except this still has an elongated section below well to accommodate a PTFE spinning band, if so desired. When operated carefully, with this band, the Hickman-Hinkle still will yield 6-10 theoretical plates (data from Bowdoin College reports). The top joint is a combination cap, thread and  $\text{F}$  joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground  $\text{F}$  14/10 outer joint.  $\text{F}$  14/10 inner joint at bottom. Top outer joint supplied with cap, O-Ring and septa. Also available with threaded side port (9599-62).

Top Threaded/ Outer $\text{F}$ Joint	Inner $\text{F}$ Joint	Cap Only	O-Ring Only	Septa Only	PTFE Band Only	Complete
<b>Without Threaded Side Port</b>						
14/10	14/10	9590-46	7855-720	8787-42	9599	<b>9599-14</b>
<b>With Threaded Side Port</b>						
14/10	14/10	9590-46	7855-720	8787-42	9599	<b>9599-62</b>



**SPINNING BAND PTFE** ♠

PTFE band only for use with Hickman-Hinkle stills. Band controls flooding of the concentric tube section of the still.

Qty	Order Code
1	<b>9599-20</b>





### **STIRRER/HOTPLATE** *Talboys Advanced Series* ★

Talboys Advanced Series hotplate/stirrers. Available in three popular sizes and with either a ceramic top (temperature range ambient +5 to 500°C) or aluminum top (temperature range ambient +5 to 400°C). Speed range 60-1600 rpm. LED display with last set point recall. Safety features include: HOT top indicator light, 10° over-temp shut-off and stirrer motor failure shut-off. 120v (230v available), CE, CSA & CSAUS approved. Two-year manufacturer's limited warranty.

Top Size, in	Capacity, mL	Top	Qty	Order Code
4x4	600	Ceramic	1	<b>13468-06</b>
4x4	600	Aluminum	1	<b>13468-08</b>
7x7	2500	Ceramic	1	<b>13468-10</b>
7x7	2500	Aluminum	1	<b>13468-12</b>
10x10	6000	Ceramic	1	<b>13468-20</b>
10x10	6000	Aluminum	1	<b>13468-22</b>

#### **Accessories**

Support Rod & Clamp Kit	<b>13468-30</b>
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### SPINNING BAND COLUMN *Microscale* ♠

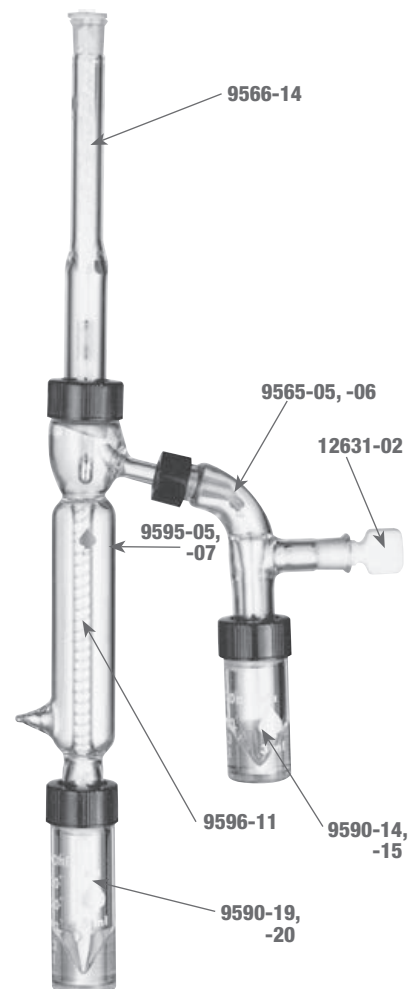
High performance, low cost, Microscale Spinning Band Distillation Column system effective in separating low-boiling liquid mixtures with volumes in the 0.5 to 5mL range. Designed by Drs. Dana Mayo, Ronald M. Pike, and Samuel S. Butcher, authors of *Microscale Organic Laboratory*, John Wiley and Sons, New York. This 2.5 inch microdistillation column separates close-boiling (5-10°C) mixtures without stopcocks, utilizing a PTFE band uniquely driven by a bottom magnet. Coupled to a conventional magnet stirrer, experimental data indicates satisfactory performance at 1000 rpm. Column has been shown to achieve height equivalent/theoretical plate values approaching 0.2 inches/plate within 90 minutes of boil-up.

The column top joint is a combination cap, thread and ⌘ joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground ⌘ 14/10 outer joint. Inner ⌘ joint at bottom and ⌘ 7/10 inner drip tip on takeoff arm. Body is vacuum jacketed. Band is virgin PTFE spiral with permanently attached "V" bottom magnet.

Complete item consists of column with 24-400 thread size caps, PTFE band, top air condenser, vacuum takeoff adapter, reactor vial, receiver vial, PTFE ⌘ 7/10 stopper.

**Note:** Air condenser, reactor vial and receiver vial are also part of kits 9560-05 and 9560-06.

	Qty	Order Code		Order Code	
⌘ Joint 14/10-10/10 Column, only	1	9595-05	♠	—	
⌘ Joint 14/10-14/10 Column, only	1	—		9595-07	♠
PTFE Band	1	9596-11	♠	9596-11	♠
Adapter, Vacuum Takeoff w/ ⌘ 7/10 Threaded Outer Side Joint, ⌘ 10/10 Inner Joint	1	9565-05	♠	—	
Adapter, Vacuum Takeoff w/ ⌘ 7/10 Threaded Outer Side Joint, ⌘ 14/10 Inner Joint	1	—		9565-06	♠
Vial, Reaction, 5mL	1	9590-19	♠	9590-20	♠
Vial, Receiver, 3mL	1	9590-14	♠	9590-15	♠
Air Condenser	1	9566-14	♠	9566-14	♠
Stopper, ⌘7/10, PTFE	1	12631-02	★	12631-02	★
<b>Complete</b>					
	1	9595-43	♠	9595-47	♠

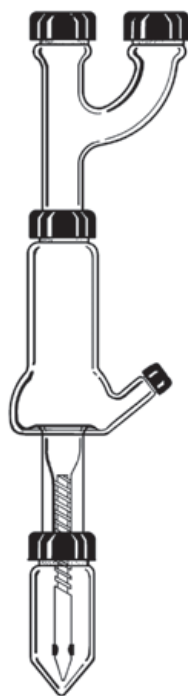


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### SPINNING HICKMAN-HINKLE COLUMN\* with Side Port, Microscale ♠

Low cost Microscale distillation column designed similar to 9576 Hickman still with threaded side port on reservoir, but with elongated section below well to accommodate a longer PTFE spinning band. When operated carefully, the Hickman-Hinkle column will yield 6-10 theoretical plates (data from Bowdoin College reports that this type column achieved an equivalent to HETP of better than 0.33cm/plate).

This apparatus is really a hybrid system. It is a concentric tube/spinning band distillation column. The purpose of the band is to control flooding of the concentric tube (the shaft of the PTFE band). High plate values are achieved by expanding the shaft diameter to the maximum amount until flooding occurs. Plastic tubing is fitted around PTFE band area of column for insulation. Column hold-up is approximately 20ul. Temperature range of this non-reduced pressure still is 45° to 110°C. The top joint of this heavy walled still is a combination cap, thread and ⚙ joint to accommodate and seal other microscale apparatus. The O.D. of the top joint has an external thread to facilitate an O-Ring and open-top phenolic cap. The internal or I.D. at the top is a ground ⚙ 14/10 outer joint. ⚙ 14/10 inner joint at bottom. Complete item consists of modified Hickman still, Claisen head, PTFE band, thin-walled vial, plastic insulator, and operating instructions.

	Qty	Order Code
Column, w/side port, only	1	9599-62
PTFE Band	1	9599-20
Claisen Head	1	9574-24
Plastic Insulator	1	9599-23
Vial, Reaction	1	9591-21

#### Complete

	1	9599-49
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- NIST traceable
- Advanced PID algorithm

**ROTARY EVAPORATOR** *Firestone, Micro ♠*

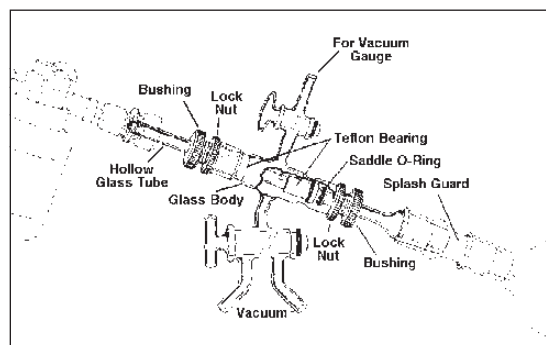
Ingenious micro rotary evaporator constructed of glass, PTFE and nylon that operates without metal devices normally associated with this type of equipment. Use with any laboratory stirring motor.

Hollow glass, 10mm O.D. tube with  $\text{F}$  14/10 inner joint at one end for flask and holes drilled near center for vacuum, couples to lab stirring motor. Tube turns inside PTFE bearing held in #15 Ace-Threds by nylon bushing, saddle O-Ring and lock nut. 2mm straight bore stopcock attaches to drying tube and/or McLeod gauge. One arm of double oblique stopcock attaches to dry ice trap and vacuum line; other arm is for easy vacuum release and can be connected to trap. For flasks, see 9592; for chuck, see 8124; for dry ice trap, order 8758.

Complete item supplied with  $\text{F}$  joint clamp; does **not** include stirring motor, chuck, flask or splash guard.



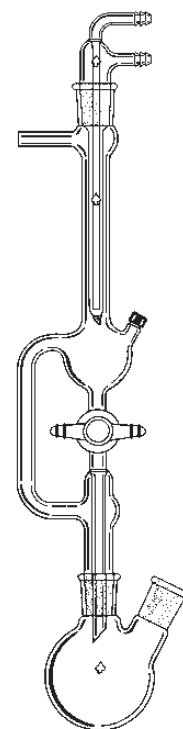
	Qty	Order Code
<b>Complete, <math>\text{F}</math> 14/10</b>	1	<b>6714-31</b>
<b>Replacement Parts</b>		
Glass Body, only	1	<b>6714-04</b>
Nylon Bushing, with O-Ring	2	<b>8066-12</b>
Nylon Lock Nut	2	<b>8066-13</b>
Saddle O-Ring	2	<b>8066-15</b>
PTFE Bearing	2	<b>6714-06</b>
Hollow Glass Tube, $\text{F}$ 14/10	1	<b>6714-09</b>
Splash Guard, $\text{F}$ 14/20	1	<b>5258-06</b>



**STILL** *Solvent Reflux, Micro ♠*

Microscale size solvent still that allows continuous reflux of solvents with stopcock open and collection of pure solvent when closed. Capacity of collection bulb is 15mL and has side port with cap and septum for syringe removal of contents. Still has 2mm bore PTFE stopcock  $\text{F}$  14/20 joints top and bottom and side connection at top for vacuum. Use with 5/16-inch I.D. tubing, size A hose connection.

Description	Qty	Order Code
Still Head, only	1	<b>9785-24</b>
Finger Condenser, 100mm, $\text{F}$ 14/20	1	<b>9250-02</b>
Flask, 2N, 25mL, $\text{F}$ 14/20	1	<b>9464-06</b>
<b>Complete</b>	1	<b>9785-40</b>




**SYRINGE** *Sample Retrieval, All Plastic* ♠

1mL all plastic syringe intended for use in Microscale sample retrieval applications. Features built-in dead space tip plug, safety stop, Luer-Lok tip for needle connection, blue colored piston and is smooth drawing. Supplied in package of 25 or box of 100 units.

**Note:** Needles not included. For needles, see 5936 or 13682.

Quantity	Order Code
Pack of 25 or Box of 100	<b>13675-09</b>


**NEEDLE** *Syringe* ★

Standard hypodermic type needles made from 304 full hard stainless steel tubing with chrome-plated brass American standard Luer-Lok hub. Supplied 51mm (2 inches) long with point style #2 (20° bevel) for septum penetration. Supplied five needles per package.

Gauge	O.D., mm	I.D., mm	Qty	Order Code
23	.63	.32	5	<b>5936-32</b>
19	1.07	.65	5	<b>5936-39</b>
18	1.27	.80	5	<b>5936-40</b>
14	2.1	1.6	5	<b>5936-44</b>


**NEEDLE** *Stainless Steel* ★

Sterile, stainless steel syringe needles with inert plastic Luer-Lok hub and regular 12° medical point. Can be sterilized. Supplied 25 needles per package.

Gauge	O.D., in	I.D., in	Length, in	Qty	Order Code
20	.035	.023	1-1/2	25	<b>13682-12</b>
22	.028	.016	1-1/2	25	<b>13682-15</b>

**Note:** 20 gauge needle fits 12684-23, 0.8mm I.D. PTFE Tubing.


**CAPS** *Replacement* ♠

Replacement caps with hole for use with 9590 Microscale reaction vials as well as other Microscale equipment with externally threaded joints.

Size	For Use With	Qty	Order Code
8 mm	5/5 Thread Joint	48	<b>9590-44</b>
13 mm	7/10 Thread Joint	48	<b>9590-45</b>
15 mm	10/10 Thread Joint	48	<b>9590-47</b>
20 mm	14/10 Thread Joint	48	<b>9590-46</b>
22 mm	24-410 Thread	48	<b>9590-48</b>
20 mm	9060-04 Bushing	48	<b>9590-49</b>
38 mm	38-430 Thread	24	<b>9590-50</b>

**CAPS Replacement, without Hole ♠**

Solid replacement caps without hole for use with 9590 Microscale reaction vials, as well as, other Microscale equipment with externally threaded joints. Supplied with PTFE-faced rubber liner.

Size	For Use With	Qty	Order Code
13 mm	7/10 Thread Joint	48	9590-55
15 mm	10/10 Thread Joint	48	9590-58
20 mm	14/10 Thread Joint	48	9590-60
22 mm	24-410 Thread	48	9590-64
38 mm	38-430 Thread	24	9590-66


**O-RINGS Replacement ♠**

Replacement O-Rings for use with 9590, 9591 and 9592 Microscale reaction vials, as well as, other Microscale equipment with externally threaded joints for making an "O-Ring-Cap-Seal" type connection.

Size	For Use With	Material	Qty	Order Code
-006	5/5 Thread Joint	Viton	12	7855-01
-010	7/10 Thread Joint	FETFE	12	7855-705
-011	10/10 Thread Joint	FETFE	12	7855-706
-112	14/10 Thread Joint	FETFE	12	7855-720


**SEPTUM Replacement ★**

Replacement septa for use with 9590 Microscale reaction vials and 9574 Claisen head. Made of silicone rubber with PTFE face.

Size	For Use With	Qty	Order Code
8 mm	5/5 Thread Joint	48	8787-40
13 mm	7/10 Thread Joint & Claisen Head	48	8787-41
15 mm	10/10 Thread Joint	48	8787-43
20 mm	14/10 Thread Joint	48	8787-42
24 mm	24-410 Thread	48	8787-55
38 mm	38-430 Thread	48	8787-58


**MICRO STIRRER MAGNETS PTFE ★**

PTFE-coated magnetic bar for use in microscale reaction flasks.

Length, mm	O.D., mm	Qty	Order Code
8	1.5	1	13658-04
5	2.0	1	13658-05
7	2.0	1	13658-07
3	3.0	1	13658-08
6.35	3.0	1	13658-10
10	3.0	1	13658-12


**STIRRER MAGNETS Micro, Triangular, PTFE ★**

PTFE "V" shaped vane with magnetic bar cross mounted. For use with 9590 and 9591 Microscale vials.

For Use With ⚙ Joint Size	Qty	Order Code
7/10 & 10/10	1	13668-01
14/10	1	13668-02
14/10	1	13668-03




**FLASK** *Erlenmeyer, Reaction* ♠

Erlenmeyer flask, 10 and 25mL capacity, used to carry out reactions or to hold items such as 9581 Craig tube in microscale work.

Capacity, mL	Qty	Order Code
10	1	6991-03
25	1	6991-05


**STOPPER** *Glass* ♠

Ground glass stopper for use with microscale equipment.

⌘ Joint	Qty	Order Code
7/10	1	9543-02
14/20	1	9543-04


**STOPPER** *Hy-n-Dry, Firestone* ♠

Hy-n-Dry stopper makes any ⌘ vessel a desiccator, inexpensively. Allows sample storage for long periods, free from atmospheric moisture, even during overnight temperature changes or when refrigerating.

Bottom of stopper has a Porosity B (70-100 microns) sintered glass disc sealed-in. Fill stopper with 10-20 mesh drying agent, cover with plastic cap, insert into any jointed vessel, i.e., boiling flask, volumetric flask, cylinder, etc., and you have an inexpensive desiccator. A pin hole in cap allows assembled unit to "breathe" with temperature fluctuations through, not around, the desiccant; this prevents pressure buildup.

⌘ Joint	Height Above Joint, mm	Top O.D., mm	Approx. Volume, mL	Qty	Order Code
14/10	35	17	6	1	8277-12


**PTFE SLEEVES** *0.13mm Thickness* ★

For use with ground ⌘ joints on microscale glassware. Wall thickness: 0.13mm (0.005 inches).

To Fit Size	Qty	Order Code
7/10	3	7642-02
10/10	3	7642-04
14/10	3	7642-06


**PTFE SLEEVES** *0.050mm Thickness* ★

For use with ground ⌘ joints on microscale glassware. Wall thickness: 0.050mm (0.002 inches).

To Fit Size	Qty	Order Code
14/10	3	7643-07

**The first complete line of Microscale Schlenk and Photochemical Schlenk Glassware.**

Designed by ACE and Dr. Thomas Bitterwolf of The University of Idaho, Moscow, ID. This glassware allows the full range of applications of standard Schlenk glassware, at 10–100mg scale. In addition, unique head designs make it possible to conduct photochemical reactions in microscale without a glove box or costly quartz equipment.

Like Microscale Organic Laboratory Glassware, listed on previous pages, Micro No-Air Glassware uses the O-RING-CAP-SEAL connections to make leak-tight seals that enable typical transfers, filtrations, etc., while under inert atmosphere. This connection eliminates the need for clamps.

**STORAGE TUBE** *Micro Schlenk* ♠

Used for storage or simple reactions. With § 10/10 or § 14/10 outer joint externally threaded for making an O-RING-CAP-SEAL connection with mating inner joint. Stopcock on side arm is 1mm bore glass. Item supplied with holed cap, O-Ring and septa for sealing or syringe retrieval.

Capacity, mL	Top Threaded/Outer § Joint	Qty	Order Code	
5	10/10	1	9703-04	♠
15	14/10	1	9703-06	♠

**Replacement Caps**

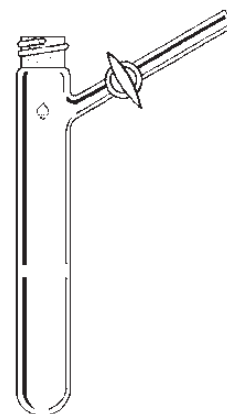
-	10/10	48	9590-47	Holed Cap	♠
-	14/10	48	9590-46	Holed Cap	♠
-	10/10	48	9590-58	Solid Cap	♠
-	14/14	48	9590-60	Solid Cap	♠

**Replacement O-Rings**

-	10/10	12	7855-706,		♠
-	14/10	12	7855-720		♠

**Replacement Septas**

-	10/10	48	8787-43		★
-	14/10	48	8787-42		★



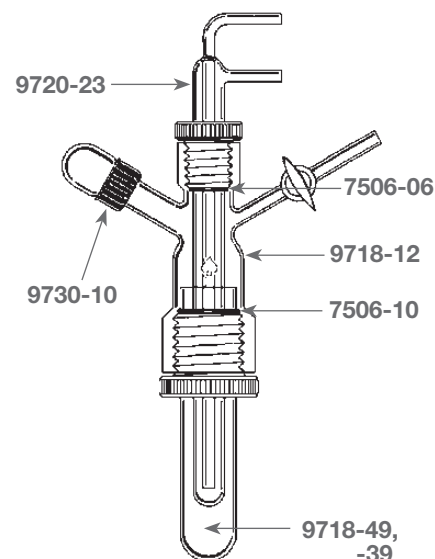
**REACTOR** *Micro Photochemical, with "Giant" #25 Ace-Thred* ♠

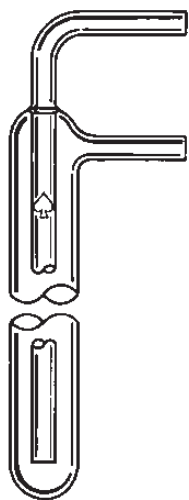
Microscale photochemical reactor with internally threaded connections both top and bottom of head. Top is #15 Ace-Thred that accepts 12.5-14mm O.D. tubes such as 9720-23 finger condenser; bottom is #25 Ace-Thred that accepts a 24mm O.D. quartz or glass (borosilicate) reactor tube for photolysis experiments. Complete item consists of head, #15 and #25 nylon bushings with O-Rings, 9730 cap stopper with cap and O-Ring, finger condenser, and either quartz or glass 25 x 120mm reactor tube.

	Top Ace-Thred	Bottom Ace-Thred	Inner § Joint	Reactor Type	Qty	Order Code
Complete Reactor	15	25	14/10	Quartz	1	9718-19
Complete Reactor	15	25	14/10	Glass	1	9718-23

**Components**

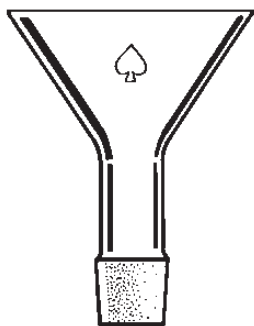
Head, only	15	25	14/10		1	9718-12
Nylon Bushing, #15, with O-Ring, only					1	7506-06
Nylon Bushing, #25, with O-Ring, only					1	7506-10
Cap Stopper, §14/10, only					1	9730-10
Quartz Reactor Tube, 25 x 120mm, only					1	9718-39
Condenser, Finger, only					1	9720-23
Borosilicate Glass Reactor Tube, 25 x 150mm, only					3	9718-49




**CONDENSER** *Finger, Micro ♠*

Code -23 for use with 9718 reactor. Outside body diameter is 10 mm or 14 mm to fit #11 or #15 Ace-Thred bushing respectively. Water connection tubing is 5mm O.D. Overall body length is 200mm.

Description	Qty	Order Code
For #11 Ace-Thred	1	9720-13
For #15 Ace-Thred	1	9720-23


**FUNNEL** *Micro ♠*

With  $\text{F}$  inner joint. Top diameter is 40mm.

Bottom Threaded/ Inner $\text{F}$ Joint	Qty	Order Code
14/10	1	9729-21


**CAP STOPPER** *Micro ♠*

With  $\text{F}$  14/10 outer joint externally threaded for making O-Ring-Cap-Seal connection with mating inner joint. Supplied with cap and O-Ring.

Inner $\text{F}$ Joint	Qty	Order Code
14/10	1	9730-10

**Replacement Caps**

	48	9590-46
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**Replacement O-Rings**

	12	7855-720
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**STOPPER** *PTFE, Micro ★*

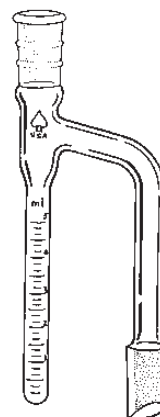
Inner $\text{F}$ Joint	Qty	Order Code
10/10	1	12631-04
14/10	1	12631-06



**RECEIVER, MOISTURE TEST Bidwell & Sterling ♠**

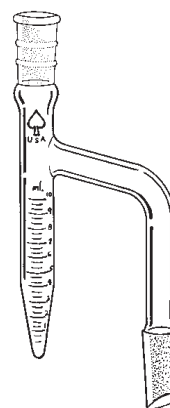
For determination of moisture contents in foods, fatty acids, etc. Conforms to specifications of ASTM and A.O.A.C.

Capacity, mL	Joints	Qty	Order Code
5	24/40	1	7705-02


**RECEIVER, MOISTURE TEST Dean-Stark ♠**

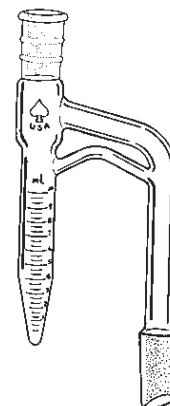
Suitable for ASTM D 95 and E 123. Subdivided 0.1mL to 1mL and 0.2mL above 1mL.

Capacity, mL	Qty	Order Code		
		Joints 24/40	Joints 35/20	Joints 29/42
10	1	7720-02	7720-08	7720-20
25	1	7720-04	—	—


**RECEIVER, MOISTURE TEST Dean-Stark ♠**

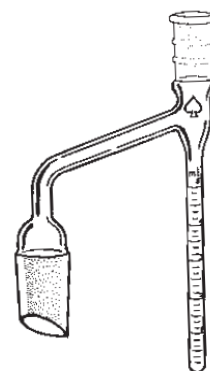
With return line, allowing excess solvent to return to boiling flask. Suitable for ASTM D 95 and E 123. Joints are 24/40.

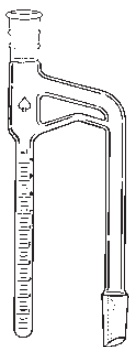
Capacity, mL	Upper Joint, 24/40	Side Arm, 24/40	Qty	Order Code
10	24/40	24/40	1	7725-02
25	24/40	24/40	1	7725-04


**RECEIVER, MOISTURE TEST ♠**

Used in phosphorus determination. Receiver capacity 5mL, graduated in 0.05mL subdivisions. Upper joint is 24/40, side arm joint, 45/50.

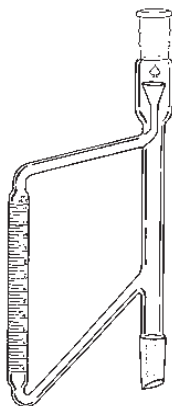
Capacity, mL	Upper Joint, 24/40	Side Arm, 45/50	Subdivisions, mL	Qty	Order Code
5	24/40	45/50	0.05	1	7729-10




**RECEIVER, MOISTURE TEST** ♠

Modified Bidwell & Sterling type with overflow to allow excess solvent to return to boiling flask. Both capacities are calibrated in 0.1mL subdivisions. Joints are  $\text{\textcircled{S}}$  24/40.

Capacity, mL	Upper Joint, $\text{\textcircled{S}}$	Side Arm, $\text{\textcircled{S}}$	Subdivisions, mL	Qty	Order Code
5	24/40	24/40	0.1	1	7735-02
10	24/40	24/40	0.1	1	7735-04


**MOISTURE TRAP** ♠

For solvents heavier than water. Used in the method of quantitative separation and determination of glycol mixture by azeotropic distillation described in *Analytical Chemistry*, Vol. 29, No. 1, page 100. Capacity is 12.5mL, graduated in 0.1mL. Joints are  $\text{\textcircled{S}}$  24/40.

Capacity, mL	Upper Joint, $\text{\textcircled{S}}$	Side Arm, $\text{\textcircled{S}}$	Subdivisions, mL	Qty	Order Code
12.5	24/40	24/40	0.1	1	7737-02


**RECEIVER, MOISTURE TEST** *Barrett Type, Pilot Plant* ♠

One liter Barrett type moisture test receiver. 2mm PTFE stopcock on bottom for draining contents.  $\text{\textcircled{S}}$  45/50 joints at top and on side arm. 60mm distance between side arm and body for clearance on spherical or cylindrical reactor bodies. Graduated in 10mL subdivisions.

Capacity, L	Upper Joint, $\text{\textcircled{S}}$	Side Arm, $\text{\textcircled{S}}$	Subdivisions, mL	Bore Size, mm	Qty	Order Code
1	45/50	45/50	10	2	1	7744-50

**Replacement Stopcocks**

				2	1	8224-04
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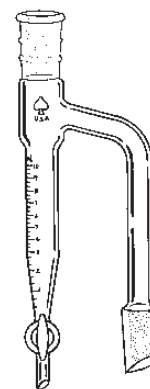
## RECEIVER, MOISTURE TEST *Barrett Type* ♠

Used to determine the water content in petroleum and bituminous material. Similar to ASTM type, except supplied with joints and stopcock to empty measuring tube during the determination. The 10mL size is subdivided in 0.1mL from 0-1mL, 0.2mL from 1-10mL; 20mL size in 0.1mL from 0-1mL, 0.2mL from 1-20mL. With 2mm bore glass or 1:5 solid PTFE stopcock plug. Joints are  $\text{S 24/40}$ .

Plug Style	Capacity, mL	Upper Joint, $\text{S}$	Side Arm, $\text{S}$	Bore Size, mm	Qty	Order Code
Glass	10	24/40	24/40	2	1	7745-02
PTFE	10	24/40	24/40	2	1	7745-21
Glass	20	24/40	24/40	2	1	7745-04
PTFE	20	24/40	24/40	2	1	7745-26

### Replacement Stopcocks

Glass	-			2	1	8223-02
PTFE	-			2	1	8224-04



## RECEIVER, MOISTURE TEST *Barrett Type, Jacketed* ♠

Same as 7745 above, except this item has a vacuum jacketed side arm to prevent condensation and improve performance. The 10mL size is subdivided in 0.1mL from 0-1mL, 0.2mL from 1-10mL; 20mL size in 0.1mL from 0-1mL, 0.2mL from 1-20mL. With 2mm bore glass or 1:5 solid PTFE stopcock plug. Joints are  $\text{S 24/40}$ .

Plug Style	Capacity, mL	Upper Joint, $\text{S}$	Side Arm, $\text{S}$	Bore Size, mm	Qty	Order Code
Glass	10	24/40	24/40	2	1	7745-102
PTFE	10	24/40	24/40	2	1	7745-202
Glass	20	24/40	24/40	2	1	7745-104
PTFE	20	24/40	24/40	2	1	7745-206

### Replacement Stopcocks

Glass	-			2	1	8223-02
PTFE	-			2	1	8224-04



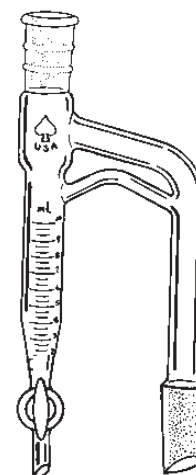
## RECEIVER, MOISTURE TEST *Barrett Type* ♠

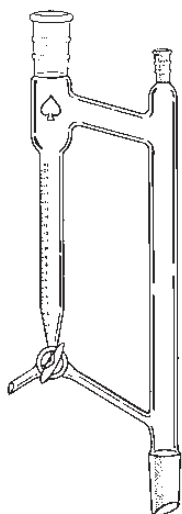
Similar to 7745 except with overflow line to allow excess solvent to return to boiling flask. The 10mL size is subdivided in 0.1mL from 0-1mL, 0.2mL from 1-10mL; 25mL size, in 0.1mL from 0-1mL, 0.2mL from 1-25mL; 50mL size in 1mL from 1-50mL. Joints are  $\text{S 24/40}$ .

Plug Style	Capacity, mL	Upper Joint, $\text{S}$	Side Arm, $\text{S}$	Bore Size, mm	Qty	Order Code
Glass	10	24/40	24/40	2	1	7746-03
Glass	25	24/40	24/40	2	1	7746-07
Glass	50	24/40	24/40	2	1	7746-13

### Replacement Stopcocks

Glass				2	1	8223-02
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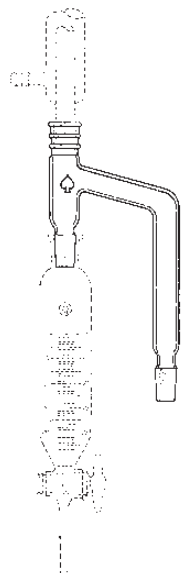


Note: Graduated section on Codes -17, -19 does not have cutdown as on -02, -04.

### RECEIVER, MOISTURE TEST *Recycle Type* ♠

Especially useful when heavier-than-water solvents are employed. A 120°, 1:5 PTFE stopcock provides adequate shut-off in the intermediate position. Thermometer joint is 10/30.

Capacity, mL	⌘ Joints	Bore, mm	Qty	Order Code
20	24/40	2	1	7747-02
20	29/42	2	1	7747-04
125	29/42	2	1	7747-17
500	45/50	2	1	7747-19



### ADAPTER *Moisture Trap* ♠

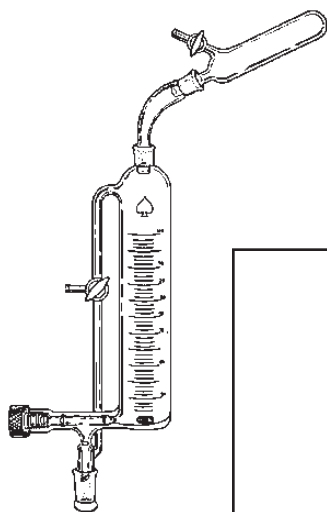
Unique adapter used in place of a Dean & Stark moisture test receiver. Simply add a condenser to top ⌘ outer joint, any graduated funnel from 125mL to 2000mL to bottom ⌘ inner joint, attach sample flask to ⌘ inner side arm joint to create a moisture test receiver.

Top Outer ⌘ Joint	Bottom Inner ⌘ Joint	Inner Side Arm ⌘ Joint	Qty	Order Code
14/20	14/20	14/20	1	9101-20
24/40	24/40	24/40	1	5179-07

**Also, see the Vacuum section for manifolds, etc.**

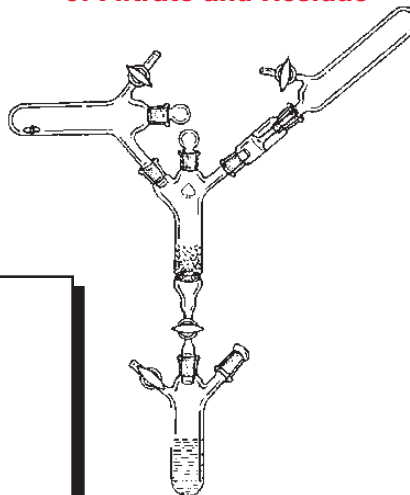
# No-Air Glassware Operations

**Solid Transfer for  
Solution Preparation**

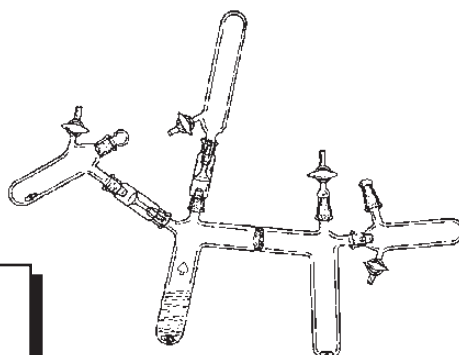


**ACE GLASS**  
INCORPORATED

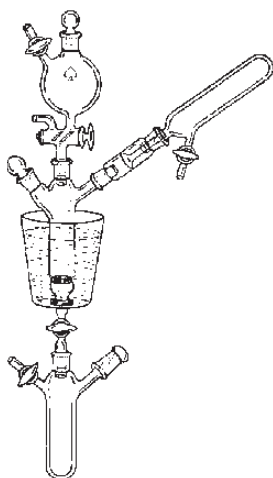
**Filtration, Collection  
of Filtrate and Residue**



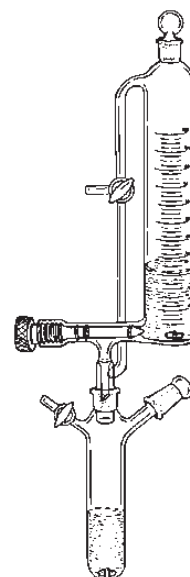
**Loading the  
Multiple Recrystallizer**



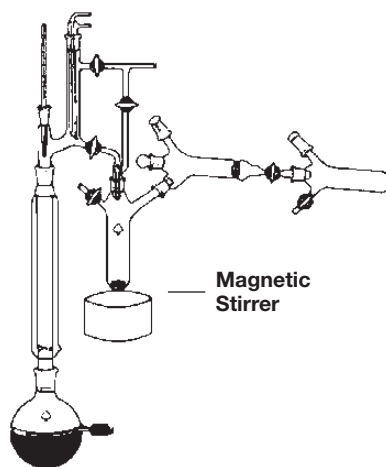
**Low Temperature  
Recrystallization**



**Controlled Addition  
of Stored Solution**



**Solvent Distillation**



Outer Joint Tube w/  
Glass Stopcock

Inlet Valve



Hi-Vac Valve

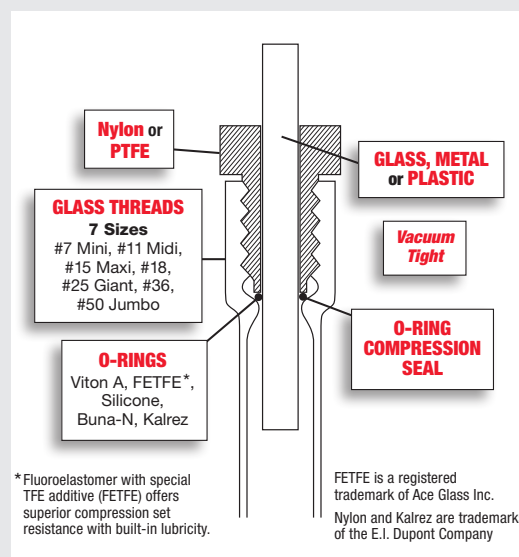
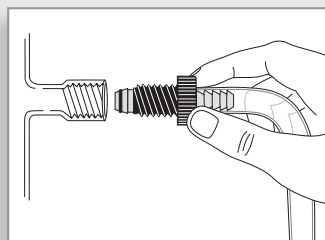
Inner Joint Tube w/  
Glass Stopcock**STORAGE TUBE** Schlenk ♠

Used for storage, but also may be used for simple reactions. With  $\text{F}$  14/20,  $\text{F}$  24/25 or  $\text{F}$  24/40 outer joint. Item can also be ordered with a  $\text{F}$  14/35 or  $\text{F}$  24/40 inner joint. Either style can come with either a 2 or 4mm bore stopcock or 2mm inlet valve.

Capacity, mL	Side Port	Top $\text{F}$ Joint	Qty	Stopper Only	Order Code
<b>With Outer Joint</b>					
25	2mm Glass Stopcock	14/20	1	9543-04	7752-08
40	2mm Glass Stopcock	14/20	1	9543-04	7752-12
100	2mm Glass Stopcock	24/40	1	8250-12	7752-15
200	4mm Glass Stopcock	24/25	1	Call to Order	7752-26
25	0-4 Hi-Vac Valve	14/20	1	9543-04	7752-108
40	0-4 Hi-Vac Valve	14/20	1	9543-04	7752-112
100	0-4 Hi-Vac Valve	24/40	1	8250-12	7752-114
200	0-4 Hi-Vac Valve	24/40	1	8250-12	7752-116
25	Inlet Valve	14/20	1	9543-04	7752-208
40	Inlet Valve	14/20	1	9543-04	7752-212
100	Inlet Valve	24/40	1	8250-12	7752-215
200	Inlet Valve	24/25	1	Call to Order	7752-226
<b>With Inner Joint</b>					
25	2mm Glass Stopcock	14/35	1	8250-08	7753-08
40	2mm Glass Stopcock	14/35	1	8250-08	7753-12
100	2mm Glass Stopcock	24/40	1	8250-12	7753-18
200	4mm Glass Stopcock	24/40	1	8250-12	7753-26
25	0-4 Hi-Vac Valve	14/35	1	8250-08	7753-110
40	0-4 Hi-Vac Valve	14/35	1	8250-08	7753-112
100	0-4 Hi-Vac Valve	24/40	1	8250-12	7753-114
200	0-4 Hi-Vac Valve	24/40	1	8250-12	7753-116
25	Inlet Valve	14/35	1	8250-08	7753-208
40	Inlet Valve	14/35	1	8250-08	7753-212
100	Inlet Valve	24/40	1	8250-12	7753-218
200	Inlet Valve	24/40	1	8250-12	7753-226

**Ace-Threds**

Grease Free | Clamp Free | More Convenient



**STORAGE FLASK Schlenk ♠**

Used for storage, but may also be used for simple reactions. With  $\text{\textcircled{F}}$  14/20 or  $\text{\textcircled{F}}$  24/40 inner joint or #15 O-Ring joint and 2mm or 4mm bore glass stopcock or 2mm inlet valve.

Capacity, mL	Side Port	Top Joint	Qty	Order Code
10	2mm Stopcock	$\text{\textcircled{F}}$ 14/20	1	7754-05
25	2mm Stopcock	$\text{\textcircled{F}}$ 14/20	1	7754-07
50	2mm Stopcock	$\text{\textcircled{F}}$ 14/20	1	7754-09
100	2mm Stopcock	$\text{\textcircled{F}}$ 14/20	1	7754-11
200	2mm Stopcock	$\text{\textcircled{F}}$ 14/20	1	7754-13
100	2mm Stopcock	$\text{\textcircled{F}}$ 24/40	1	7754-22
200	4mm Stopcock	$\text{\textcircled{F}}$ 24/40	1	7754-24
500	4mm Stopcock	$\text{\textcircled{F}}$ 24/40	1	7754-26
200	4mm Stopcock	#15 O-Ring	1	7754-45
500	4mm Stopcock	#15 O-Ring	1	7754-47
10	Valve	$\text{\textcircled{F}}$ 14/20	1	7754-205
25	Valve	$\text{\textcircled{F}}$ 14/20	1	7754-207
50	Valve	$\text{\textcircled{F}}$ 14/20	1	7754-209
100	Valve	$\text{\textcircled{F}}$ 14/20	1	7754-211
200	Valve	$\text{\textcircled{F}}$ 14/20	1	7754-213
100	Valve	$\text{\textcircled{F}}$ 24/40	1	7754-222
200	Valve	$\text{\textcircled{F}}$ 24/40	1	7754-224
500	Valve	$\text{\textcircled{F}}$ 24/40	1	7754-226
200	Valve	#15 O-Ring	1	7754-245
500	Valve	#15 O-Ring	1	7754-247


**FLASK Reaction, Schlenk ♠**

Used for carrying out most reactions in solution with **7759** filter tube. Also may be used with **7807** finger condenser in center joint for reflux reactions. Available with either a 2mm glass stopcock or 0-3 inlet valve side port and a  $\text{\textcircled{F}}$  14/35 or  $\text{\textcircled{F}}$  24/40 side joint. Manufactured with either a  $\text{\textcircled{F}}$  14/20 or  $\text{\textcircled{F}}$  24/25 outer center joint opening. Graduated.

Capacity, mL	Side Port	$\text{\textcircled{F}}$ Joint	Center Joint, $\text{\textcircled{F}}$	Qty	Optional Stoppers	Order Code
50	2mm Stopcock	14/35	14/20	1	9543-06	7756-11
100	2mm Stopcock	14/35	14/20	1	9543-06	7756-17
250	4mm Stopcock	24/40	24/25	1	8255-14	7756-23
50	Inlet Valve	14/35	14/20	1	9543-06	7756-211
100	Inlet Valve	14/35	14/20	1	9543-06	7756-217
250	Inlet Valve	24/40	24/25	1	8255-14	7756-223




**CONNECTING TUBE** Schlenk ♠

Used for filtration of solvents and collection of precipitate. With two  $\text{F}$  14/20 or  $\text{F}$  24/25 outer joints and two  $\text{F}$  14/35 or  $\text{F}$  24/40 inner joints. With glass fritted disc at bottom (Porosity C = 20-25 micron or Porosity D = 10-20 micron).

Capacity, mL	$\text{F}$ Joints	Qty	Porosity C	Porosity D
			Order Code	Order Code
20	14/20-14/35	1	7759-11	7759-12
80	14/20-14/35	1	7759-21	7759-22
250	24/25-24/40	1	7759-31	7759-32


**CONNECTING TUBE** Schlenk ♠

Similar to **7759**, except with 2mm bore PTFE stopcock on 20 and 80mL sizes, 3mm bore PTFE on 250mL size. In addition to collecting and filtering, this vessel may be used as a crystallizer. With two  $\text{F}$  14/20 or  $\text{F}$  24/25 outer joints and two  $\text{F}$  14/35 or  $\text{F}$  24/40 inner. With glass fritted disc (Porosity C = 20-25 micron; Porosity D = 10-20 micron).

Capacity, mL	$\text{F}$ Joints	Qty	Porosity C	Porosity D	Replacement Stopcock
			Order Code	Order Code	
20	14/20-14/35	1	7761-16	7761-17	8224-04
80	14/20-14/35	1	7761-26	7761-27	8224-04
250	24/25-24/40	1	7761-36	7761-37	8224-08


**TUBE** Double Recrystallizer ♠

Used for multiple recrystallization of extremely air-sensitive compounds. A solid crystallized in one arm may be recrystallized in a closed system by decanting the supernatant liquid into the other arm and vacuum distilling the solvent back into the crystals in the first arm. This process may be repeated as often as necessary. After removal of the final supernatant liquid, dried crystals may be transferred to a Schlenk tube. With four  $\text{F}$  14/20 outer joints and Porosity B (70-100 micron) glass fritted disc. Approximate volume in each section is 75mL.

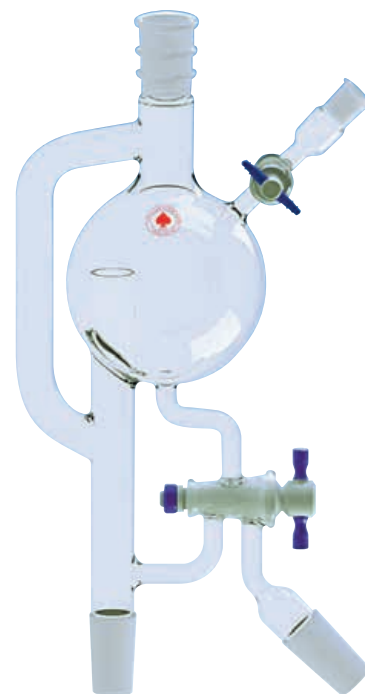
Approx. Capacity, (per section) mL	Outer Joints, $\text{F}$	Disc Porosity (Micron)	Qty	Order Code
75	14/20	B (70-100)	1	7772-11



**HEAD Solvent Distillation, NO-AIR™ ♠**

Solvent distillation head designed to maintain solvents or vapors in an air-free atmosphere. Top has an outer ⚙ joint. Bottom and bottom side port have an inner ⚙ joint. Top takeoff port has a 14/20 outer ⚙ joint on all sizes. Upper stopcock is 2mm glass. Bottom takeoff is a double oblique glass stopcock. The top, bottom, and the bottom takeoff ⚙ joints are all the same size.

Capacity, mL	⚙ Joints	Qty	Order Code
250	14/20	1	7812-08
500	24/40	1	7812-10
1,000	24/40	1	7812-14


**BUBBLER Air Metering Valve, NO-AIR™ ♠**

Bubbler with metering valve for precise control of inert gas introduction. Features 9mm O.D. tube-end side arms for use with 3/8-inch vacuum tubing.

Side Arms, mm	Valve Size	Qty	Order Code
9	0-3	1	7413-01

**Replacement Stopcocks**

Tef-Cap	0-3	1	8189-43
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**TUBE** Filter, Inner  $\text{\textcircled{F}}$  Joints, NO-AIR™ ♠

Connecting tube for building Schlenk lines. Upper and lower inner  $\text{\textcircled{F}}$  joints. Both joint sizes are the same. Integral porous glass fritted disc is located midway, in the center of the tube.

$\text{\textcircled{F}}$ Joint	Disc Porosity (micron)	Qty	Order Code
14/20	C (25-50)	1	7827-01
14/20	D (10-20)	1	7827-03
24/40	D (10-20)	1	7827-05
24/40	C (25-50)	1	7827-07


**FLASK** Storage Vessel, Cajon Side Port, NO-AIR™ ♠

Tube shaped reaction or storage vessel with a 9mm O.D side arm for use with 3/8-inch Cajon connections. Has a 0-4 Hi-Vac stopcock/valve for control of inlet/outlet flow.

Capacity, mL	Valve Size	Qty	Order Code
25	0-4	1	7813-05
60	0-4	1	7813-07
140	0-4	1	7813-11
210	0-4	1	7813-15

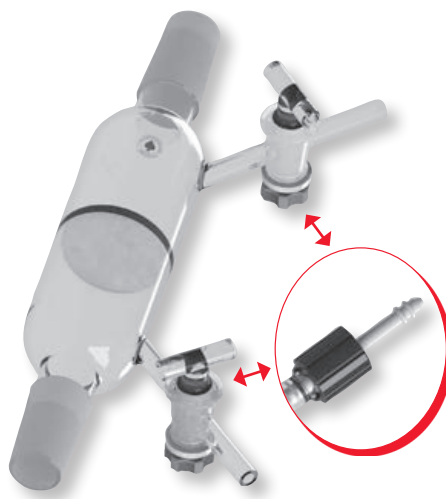
**Replacement Stopcocks**

Tef-Cap	0-4	1	8189-43
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**FILTER TUBE** Fritted Disc, Two Side Ports, NO-AIR™ ♠

Filter tube for NO-AIR™ applications, with two inner  $\text{\textcircled{F}}$  joints top and bottom. Two, upper and lower side arms with either 2mm glass stopcocks or a 0-3 inlet valve. Two porosities are standard for the inner fritted disc made from sintered glass fiber, for stronger and more precise flow. Approximate overall length is 240mm; approximate O.D. is 45mm.

$\text{\textcircled{F}}$ Joint	Approx. Disc O.D. (mm)	Disc Porosity (Micron)	Outlet Type	Qty	Order Code
24/40	40	D (10-20)	Glass	1	7774-14
14/20	40	D (10-20)	Glass	1	7774-18
14/20	40	C (25-50)	Glass	1	7774-20
24/40	40	C (25-50)	Glass	1	7774-24
24/40	40	D (10-20)	Inlet Valve	1	7774-214
14/20	40	D (10-20)	Inlet Valve	1	7774-218
14/20	40	C (25-50)	Inlet Valve	1	7774-220
24/40	40	C (25-50)	Inlet Valve	1	7774-222



**FUNNEL** *Distillation Receiver, Vacuum Type, NO-AIR™ ♠*

With ⌘ joint at top. Capacity 125mL, in 1mL subdivisions. Double scale. With 2mm glass stopcocks on side and at bottom. Side and bottom tubes have 8mm O.D.

⌘ Joint	Bore Size, mm	Side/Bottom Tube O.D., mm	Qty	Order Code
24/40	2	8	1	6629-10

**Replacement Stopcocks**

2	1	8223-02
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**FUNNEL** *Distillation Receiver, NO-AIR™ ♠*

Specially designed receiver to draw samples during distillation or to return the condensed vapor to the flask. Capacity 125mL. With 2mm glass double oblique stopcock. Outlet tube is 10mm O.D.

⌘ Joints	Bore Size, mm	Outlet Tube O.D., mm	Capacity, mL	Qty	Order Code
24/40	2	10	125	1	6635-10

**FUNNEL** *Distillation Receiver, 2mm PTFE Plug ♠*

Similar to 6635 above, except with solid 2mm PTFE oblique stopcock plug. Outlet tube is 8mm O.D.

⌘ Joint	Bore Size, mm	Outlet Tube O.D., mm	Capacity, mL	Qty	Order Code
24/40	2	8	125	1	6635-20


**FUNNEL** *Filter, Addition, Side Stopcock, Bottom Valve, NO-AIR™ ♠*

Filter, addition funnel; with integral fritted disc, ⌘ top inner joint, 2mm glass side stopcock and a 0-4 Hi-Vac valve bottom outlet with an inner ⌘ joint. For Schlenk lines and air sensitive materials. Top outer joint and bottom inner joint are the same size.

Approx. Capacity, mL	⌘ Joint	Disc O.D., mm	Porosity (micron)	Qty	Order Code
60	14/20	40	C (25-50)	1	7773-30
60	14/20	40	D (10-20)	1	7773-42
200	24/40	50	C (25-50)	1	7773-44
200	24/40	50	D (10-20)	1	7773-46

**Replacement Stopcocks**

Glass	2	1	8223-03
Tef-Cap	0-4	1	8189-43



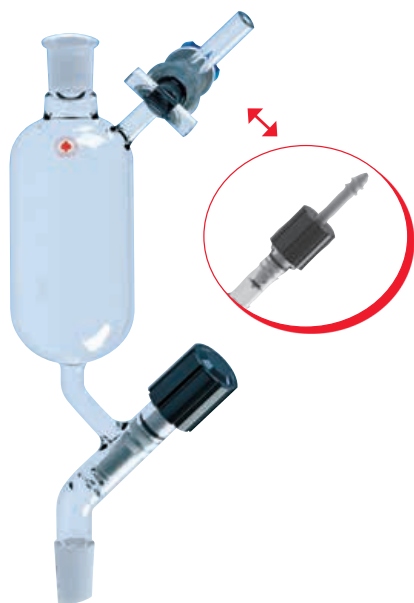

**FUNNEL** Filter, Addition, Side Outlet, Bottom Valve, NO-AIR™ ♠

Filter, addition funnel with integral fritted disc,  $\text{F}$  top outer joint, 2mm glass side stopcock and a 0-4 Hi-Vac valve bottom outlet with an inner  $\text{F}$  joint. For Schlenk lines and air sensitive materials. Top inner joint and bottom inner joints are the same size.

Capacity, mL	$\text{F}$ Joint	Disc O.D., mm	Porosity (micron)	Qty	Order Code
60	14/20	40	C (25-50)	1	7776-09
60	14/20	40	D (10-20)	1	7776-11
200	24/40	50	C (25-50)	1	7776-23
200	24/40	50	D (10-20)	1	7776-25

**Replacement Stopcocks**

Tef-Cap	0-4	1	8189-43
Glass	2	1	8223-03


**FUNNEL** Addition, Side Outlet, Bottom Valve, NO-AIR™ ♠

Addition funnel designed for air sensitive compound work. Outer  $\text{F}$  joint on top and an inner  $\text{F}$  joint on bottom outlet. Side outlet with either a 2mm glass stopcock or a 0-3 inlet valve. Bottom outlet is a 0-4 Hi-Vac valve.

Capacity, mL	$\text{F}$ Joint	Body O.D., mm	Outlet Type	Valve Size	Qty	Order Code
60	14/20	45	Glass	2	1	7778-03
100	24/40	38	Glass	2	1	7778-05
200	24/40	57	Glass	2	1	7778-07
60	14/20	45	Inlet Valve	0-3	1	7778-22
100	24/40	38	Inlet Valve	0-3	1	7778-24
200	24/40	57	Inlet Valve	0-3	1	7778-26

**Replacement Stopcocks**

Tef-Cap	0-4	1	8189-43
Glass	2	1	8223-03

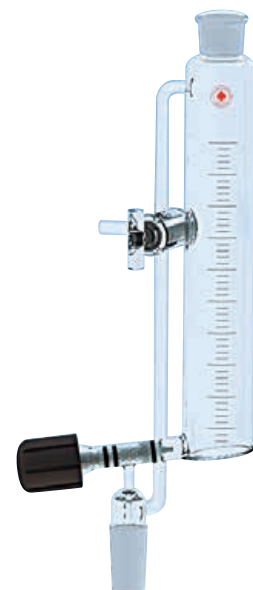
**FUNNEL** *Addition/Storage*

The T-bore 2mm stopcock in the equalizing arm permits isolation of the contents for storage. Capacity, 100 or 250mL. Lower threaded 0-3 PTFE valve. Outer joint is  $\text{\textcircled{14}}/20$  or  $\text{\textcircled{24}}/25$ , inner joint is  $\text{\textcircled{14}}/35$  or  $\text{\textcircled{24}}/40$  with drip tube. The 100mL size is calibrated in 1mL subdivisions, the 250mL in 10mL subdivisions.

Capacity, mL	$\text{\textcircled{14}}/20$ Joints	Qty	Order Code	
100	$\text{\textcircled{14}}/20$	1	7786-20	★
250	$\text{\textcircled{24}}/40$	1	7786-25	★

**Replacement Stopcocks**

Glass	2	1	8228-09	◆
PTFE Plug	0-3	1	8192-261	◆


**FLASK** *Solvent Collector And Dispenser, NO-AIR™ ◆*

Used for collection and long-term storage of solvents. With  $\text{\textcircled{14}}/20$  outer joint and a 2mm bore PTFE stopcock at top, double oblique 2mm bore PTFE stopcock and  $\text{\textcircled{14}}/35$  joint at bottom. Capacity is 250mL.

Capacity, mL	Top Outer Joint, $\text{\textcircled{14}}/20$	Bottom Inner Joint, $\text{\textcircled{14}}/35$	Bore Size, mm	Qty	Order Code
250	$\text{\textcircled{14}}/20$	$\text{\textcircled{14}}/35$	2	1	7789-12

**Replacement Stopcocks**

PTFE	single	2	1	8224-04
PTFE	double oblique	2	1	8226-08




**FLASK** with Septum Port, Heavy Wall, NO-AIR™ ♠

Used when handling air-sensitive materials. Fabricated with standard or heavy walls. Heavy walls are approximately 30% heavier than standard-wall flasks. With  $\text{F}$  outer joint and septum joint. Supplied with septum.  $\text{F}$  24/40 joints are reinforced.

Capacity, mL	$\text{F}$ Joint	Qty	Order Code	
<b>Heavy Wall</b>				
50	14/20	1	9461-210	♠
100	14/20	1	9461-212	♠
250	14/20	1	9461-214	♠
250	24/40	1	6933-224	♠
500	24/40	1	6933-226	♠
1000	24/40	1	6933-227	♠

**Standard Wall**

50	14/20	1	9461-10	♠
100	14/20	1	9461-12	♠
250	14/20	1	9461-14	♠
250	24/40	1	6933-24	♠
500	24/40	1	6933-26	♠
1000	24/40	1	6933-27	♠

**Replacement Septums**

12	9096-32	★
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**FLASK** Short Neck, with Stopcock and Septum Inlet ♠

Used when handling air-sensitive materials. With  $\text{F}$  14/20 or  $\text{F}$  24/40 joint, 2mm bore PTFE stopcock and septa port (supplied with one septa).

Capacity, mL	Qty	$\text{F}$ 14/20		$\text{F}$ 24/40	
		Order Code		Order Code	
50	1	9467-11	♠	—	♠
100	1	9467-13	♠	—	♠
250	1	9467-15	♠	6934-25	♠
500	1	—		6934-27	♠
1000	1	—		6934-29	♠

**Replacement Septas**

12	9096-32	★
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**FLASK** Single Neck, Side Outlet, NO-AIR™ ♠

Round bottom flask for use with Schlenk for air sensitive compounds and reactions. With either  $\text{F}$  24/40 or  $\text{F}$  14/20 outer center neck joint, and either a 2mm bore glass stopcock or 0-3 valve side outlet. Supplied with one septa.

Capacity, mL	$\text{F}$ Joint	Outlet Type	Qty	Order Code	
50	14/20	Glass	1	7003-11	♠
100	14/20	Glass	1	7003-13	♠
250	14/20	Glass	1	7003-15	♠
250	24/40	Glass	1	7003-25	♠
500	24/40	Glass	1	7003-27	♠
1,000	24/40	Glass	1	7003-29	♠
50	14/20	Inlet Valve	1	7003-211	♠
100	14/20	Inlet Valve	1	7003-213	♠
250	24/40	Inlet Valve	1	7003-215	♠
500	24/40	Inlet Valve	1	7003-217	♠
1,000	24/40	Inlet Valve	1	7003-219	♠

**Replacement Septas**

12	9096-32	★
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**FLASK** *Reaction, Side Valve, NO-AIR™* ♠

Round bottom reaction flask for air sensitive compounds. ⚗ joint center neck. Side arm has a 0-4 Hi-Vac stopcock/valve for precise control. The 8mm outlet tube can accept a rubber septa for sample insertion via syringe.

Capacity, mL	Valve Size	⚗ Joint	Qty	Order Code
50	0-4	14/20	1	7764-02
100	0-4	14/20	1	7764-04
250	0-4	14/20	1	7764-06
500	0-4	24/40	1	7764-08
1,000	0-4	24/40	1	7764-10

**Replacement Plugs**

Tef-Cap			1	8189-43
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**FLASK** *Round Bottom, Two Necks, Side Port, NO-AIR™* ♠

Round bottom, NO-AIR™ reaction flask with two ⚗ necks and one side port. Side port is available with either a 2mm bore glass stopcock or 0-3 Inlet valve. The glass stopcock can be fitted with a rubber septum and used as an injection port.

Capacity, mL	⚗ Joints	Outlet Type	Qty	Order Code
50	14/20	2mm Glass Stopcock	1	7799-02
100	14/20	2mm Glass Stopcock	1	7799-04
250	24/40	2mm Glass Stopcock	1	7799-06
500	24/40	2mm Glass Stopcock	1	7799-08
50	14/20	Inlet Valve	1	7799-100
100	14/20	Inlet Valve	1	7799-110
250	24/40	Inlet Valve	1	7799-112
500	24/40	Inlet Valve	1	7799-114


**FLASK** *Round Bottom, Cajon® Side Arm, NO-AIR™* ♠

A round bottom storage/reaction flask with a 0-4 Hi-Vac valve and a 9mm O.D. side arm tube for use with Cajon® 3/8-inch connections. The Hi-Vac valve gives precise control for gas or liquid flow into or out of the vessel.

Capacity, mL	Valve Size, mm	Qty	Order Code
50	0-4	1	7814-02
100	0-4	1	7814-04
250	0-4	1	7814-06
500	0-4	1	7814-08
1,000	0-4	1	7814-10

**Replacement Plugs**

Tef-Cap	0-4	1	8189-43
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**FLASK** Storage Tube/Round Bottom, O-Ring Side Arm, NO-AIR™ ♠

Tube or round bottom shaped storage vessel with a No. 15 o-ring joint side arm for air free connections. Complete with a 0-4 Hi-Vac valve for excellent gas or liquid flow control. Made with **medium** wall tubing for better pressure capability. Adapts easily to NO-AIR™/vacuum manifolds with No. 15 o-ring ports. Comes with one size -116, **7855-726** FETFE o-ring.

Capacity, mL	Valve Size, mm	Qty	Order Code
<b>Tube</b>			
25	0-4	1	<b>7815-01</b>
60	0-4	1	<b>7815-03</b>
140	0-4	1	<b>7815-05</b>
210	0-4	1	<b>7815-07</b>
<b>Round Bottom (Spherical Side Arm)</b>			
50	0-4	1	<b>7816-02</b>
100	0-4	1	<b>7816-04</b>
250	0-4	1	<b>7816-06</b>
500	0-4	1	<b>7816-08</b>
<b>Round Bottom (Side Arm Outer <math>\overline{\text{F}}</math> Joint)</b>			
50	0-4	1	<b>7817-02</b>
100	0-4	1	<b>7817-04</b>
250	0-4	1	<b>7817-06</b>
500	0-4	1	<b>7817-08</b>
<b>Replacement Plugs</b>			
Tef-Cap	0-4	1	<b>8189-43</b>
<b>Replacement O-Rings</b>			
		12	<b>7855-726</b>


**FLASK** Storage Tube/Round Bottom, Side Arm  $\overline{\text{F}}$  Joint, NO-AIR™ ♠

Tube or round bottom shaped, storage vessel with a side arm. Complete with a 0-4 Hi-Vac valve for excellent control for gases or liquids. Made from medium wall glass blanks for better pressure capability.

Capacity, mL	Valve Size, mm	$\overline{\text{F}}$ Joint	Qty	Order Code
<b>Round Bottom</b>				
50	0-4	14/20	1	<b>7817-02</b>
100	0-4	14/20	1	<b>7817-04</b>
250	0-4	24/40	1	<b>7817-06</b>
500	0-4	24/40	1	<b>7817-08</b>
<b>Tube</b>				
25	0-4	14/20	1	<b>7821-01</b>
60	0-4	14/20	1	<b>7821-03</b>
140	0-4	24/40	1	<b>7821-05</b>
210	0-4	24/40	1	<b>7821-07</b>
<b>Replacement Plugs</b>				
Tef-Cap	0-4		1	<b>8189-43</b>



**FLASK Solvent Collector, NO-AIR™ ♠**

Used for collection and short-term storage of solvents. With 2mm bore PTFE stopcock and  $\text{F}$  14/20 joint. A precision septa is used on side port for syringe removal of solvents.

Capacity, mL	Qty	Order Code
50	1	7791-06
250	1	7791-21

**Replacement Stopcock**

PTFE	1	8224-04
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**CONNECTING TUBE Distillation Head, Vacuum Type ★**

Used for distilling solvents directly into Schlenk tubes. With  $\text{F}$  10/18 thermometer joint for 51mm immersion thermometer. All other joints are  $\text{F}$  24/40. Use **9092-27** adapter to collect in smaller size Schlenk tubes. Takeoff arm has a 0-3 PTFE stopcock. Stopcocks on manifold and reflux arms are 2mm bore, glass, or 1:5 taper solid PTFE. Allow isolation of head from receiver so that receiver may be removed without disturbing the refluxing solvent. Takeoff arms on cold finger and main assembly are 8mm O.D.

**With 2mm Glass Stopcock**

	Qty	Order Code	
Head, only	1	7792-04	★
Cold Finger	1	7792-07	★
Complete	1	7792-15	★

**With 1:5 Solid PTFE Stopcock**

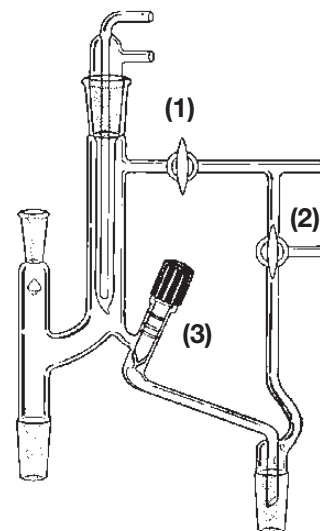
	Qty	Order Code	
Head, only	1	7792-06	★
Cold Finger	1	7792-07	★
Complete	1	7792-20	★

**Replacement Stopcocks (See Picture)**

(1)	1	8223-02	♠	1	8224-04	♠
(2)	1	8228-09	♠	1	8228-32	♠

**Replacement Plugs (See Picture)**

(3)	1	8192-261	★	1	8192-261	★
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# Repair Service

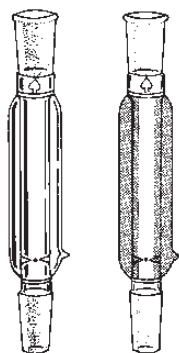
*Yes, we fix it, too!*

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. The majority of the time, these repairs are far less expensive than the cost of replacing.

To find out more about our repair service call **1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)



Broken joint or a cracked flask, we can restore it!


**COLUMN** *Distillation, Hempel* ♠

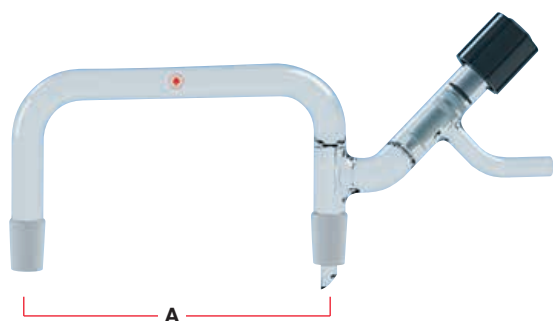
Vacuum jacketed and silvered with viewing strip or unsilvered. For use with 7792 head. With  $\text{F}$  24/40 joints. Effective length, 250mm.

Description	Length, mm	$\text{F}$ Joints	Qty	Order Code
Unsilvered	250	24/40	1	7793-04
Silvered	250	24/40	1	7793-12


**CONNECTING TUBE** *Distillation Apparatus, Trap-to-Trap* ♠

Used for the removal of solvents or other volatiles by vacuum distillation at ambient temperature. When used with 7756 Schlenk reaction vessel, the trap prevents excessive loss of solution in the event of a "bump." The distillate is collected in a 9477 pear-shaped flask or other suitable receiver and cooled by dry ice. For low-boiling solvents, closed system conditions can be maintained. With  $\text{F}$  14/35 joints and 2mm bore stopcock. Tube off the stopcock is 8mm O.D. Length is approximately 190mm.

$\text{F}$ Joints	Length A, mm	Tube End O.D., mm	Bore Size, mm	Qty	Order Code
14/35	190	8	2	1	7794-08
24/40	190	8	2	1	7794-10

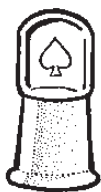

**TUBE** *Connecting/Transfer, NO-AIR™* ♠

Straight horizontal tube for assembling Schlenk lines. Can be used for transfer solvents or other volatiles with vacuum distillation directly into storage flask or tubes. Both end  $\text{F}$  joints are the same size. Receiving end has a drip tip joint. Has a 0-4 Hi-Vac valve to control liquid or gas flow.

$\text{F}$ Joint	Length A, mm	Valve Size	Qty	Order Code
14/20	125	0-4	1	7811-08
24/40	125	0-4	1	7811-10

**Replacement Plugs**

Tef-Cap	0-4	1	8189-43
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**CAP** ♠

For 7753 storage tubes. The  $\text{F}$  14/35 and  $\text{F}$  24/40 sizes are used when it is important to evacuate completely. The  $\text{F}$  14/20 and  $\text{F}$  24/25 are used when there is more concern about grease not entering the storage tube.

$\text{F}$ Joint	Qty	Order Code	$\text{F}$ Joint	Qty	Order Code
14/20	1	7795-04	24/25	1	7795-09
14/35	1	7795-06	24/40	1	7795-11


**CAP with Stopcock, NO-AIR™** ♠

For 7753 storage tubes. With 2mm bore stopcock for evacuating or introduction of inert gases. The  $\text{F}$  14/35 or  $\text{F}$  24/40 joints are used when it is necessary to evacuate completely.

$\text{F}$ Joint	Qty	Order Code	$\text{F}$ Joint	Qty	Order Code
14/20	1	7797-05	24/40	1	7797-16
14/35	1	7797-07			

**Replacement Stopcocks**

Glass	4mm	1	8223-07
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### ADAPTER *Connecting, Side Outlet, NO-AIR™* ♠

Straight connecting adapter with upper and lower  $\text{K}$  joints, side outlet with either a 2mm glass stopcock or a 0-3 inlet valve. Upper and lower joint sizes are the same. Great for Schlenk line assemblies to connect several NO-AIR™ flasks and other components.

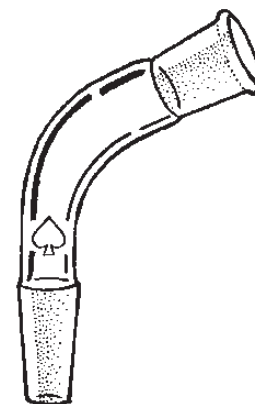
$\text{K}$ Joints	Side Outlet	Qty	Order Code
14/20	Glass	1	7802-09
24/40	Glass	1	7802-15
14/20	Inlet Valve	1	7802-23
24/40	Inlet Valve	1	7802-25



### ADAPTER *105° Angle, $\text{K}$ Joints* ♠

With  $\text{K}$  joints, one 14/20 outer and one 14/35 inner, or one 24/25 outer and one 24/40 inner.

Inner $\text{K}$ Joint	Outer $\text{K}$ Joint	Qty	Order Code
14/35	14/20	1	7803-12
24/40	24/25	1	7803-25



### ADAPTER *Straight, NO-AIR™* ♠

With two  $\text{K}$  14/20 outer joints, one 7mm drip tube at bottom.

Inner $\text{K}$ Joint	Outer $\text{K}$ Joint	Qty	Order Code
14/20	14/20	1	7805-12

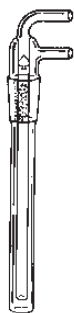


### ADAPTER *Two No. 15 O-Ring Joint ends with 1/2-Inch Hose Connection* ♠

Adapter for Schlenk line with No. 15 o-ring joints on both ends and a #15 Ace-Thred port with a 1/2-inch hose connection.

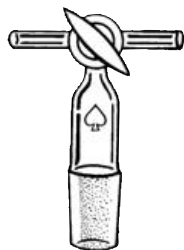
O-Ring Joint	Ace-Thred Port	Hose Connection, in	Qty	Order Code
No. 15	15	1/2	1	8876-22



**CONDENSER** Finger ♠

For use with 7756 reaction vessel. Top takeoff tubes are 8mm O.D.

Inner ⚗ Joint	Length, mm	Qty	Order Code
14/20	125	1	7807-04
24/25	150	1	7807-06

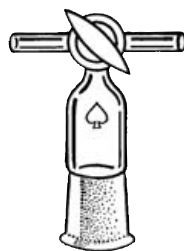
**ADAPTER** NO-AIR™

With ⚗ inner joint and T-Bore, 2mm glass stopcock. Arms are 8mm O.D.

Inner ⚗ Joint	Qty	Order Code
14/20	1	7809-03 ♠
24/25	1	7809-07 ♠

**Replacement Stopcocks**

	1	8228-09 ★
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**ADAPTER** NO-AIR™

With ⚗ outer joint and T-Bore, 2mm glass stopcock. Arms are 8mm O.D.

Outer ⚗ Joint	Qty	Order Code
14/35	1	7810-04 ♠
24/40	1	7810-08 ♠

**Replacement Stopcocks**

	1	8228-09 ★
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**ADAPTER** Septa Inlet, Single Port, NO-AIR™

Sampling adapter with ⚗ joint at bottom and septa port at top for handling air-sensitive materials. Supplied with septa.

Inner ⚗ Joint	Replacement Septas	Qty	Order Code
14/20	9096-32 ★	1	5110-13 ♠
24/40	9096-32 ★	1	5110-11 ♠

**VALVE** Adapter, Hi-Vac, O-Ring Joints, NO-AIR™ ♠

Hi-Vac valve adapter with two, No. 15 o-ring ball joint ports. Helps with set up of NO-AIR™/vacuum manifolds and Schlenk lines. Comes with (2) size -116, FETFE o-rings.

Valve Size	Qty	Order Code
0-4	1	8105-08
0-8	1	8105-10
0-10	1	8105-14
0-15	1	8105-100

**Replacement Plugs**

0-4	1	8189-43
0-8	1	8189-45
0-10	1	8189-50
0-15	1	8194-272

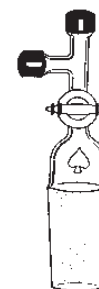
**Replacement O-Rings**

	12	7855-726
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## ADAPTER Septum Inlets, PTFE Stopcock, NO-AIR™ ♠

Sampling adapter with  $\text{F}$  inner joint at bottom. 2mm bore PTFE or glass stopcock and (2) septum ports at top. Can be used to handle air-sensitive materials. Supplied with (2) 8mm sleeve septas.

$\text{F}$ Joint	Stopcock Type	Replacement Septas	Qty	Order Code
14/20	PTFE	9096-32 ★	1	9094-04 ♠
14/20	Glass	9096-32 ★	1	9094-14 ♠
24/40	PTFE	9096-32 ★	1	5111-09 ♠
24/40	Glass	9096-32 ★	1	5111-19 ♠



### Replacement Stopcocks

Stopcock Type	Qty	Order Code
PTFE	1	8224-04 ♠
Glass	1	8223-02 ♠

## ADAPTER Septum Inlets ♠

Sampling adapter with  $\text{F}$  inner joint at bottom and (2) septums at top for handling air-sensitive materials. Supplied with (2) 8mm sleeve septas.

$\text{F}$ Joint	Replacement Septas	Qty	Order Code
14/20	9096-32 ★	1	9091-03 ♠
24/40	9096-32 ★	1	5112-14 ♠



## TUBE Bubbler, Mineral Oil ♠

Used to make a vent to the atmosphere. Reservoir head prevents oil from being sucked back into the system. With 8mm O.D. tubing connections. Volume approximately 40mL below side arm.

Tubing Connection, mm	Qty	Order Code
8	1	8761-10



## ADAPTER 75° Angle ♠

With  $\text{F}$  inner joints at both ends.

$\text{F}$ Joint	Qty	Order Code
14/20-14/20	1	9052-08
14/35-24/40	1	9052-12
24/40-24/40	1	5070-10



## ADAPTER Reducing and Enlarging ♠

With  $\text{F}$  outer joint at top and  $\text{F}$  inner at bottom.

Top Outer Joint, $\text{F}$	Bottom Inner Joint, $\text{F}$	Qty	Order Code
14/20	24/40	1	9092-24
24/25	14/35	1	9092-27



## ADAPTER Straight Connecting ♠

With  $\text{F}$  outer joints at both ends.

$\text{F}$ Joints	Qty	Order Code
14/35-14/35	1	9071-05
24/40-24/40	1	5036-06




**ADAPTER** *Angled Hose Connection, Stopcock, NO-AIR™* ♠

2mm glass stopcock adapter with hose connection and bottom ⌘ inner joint.

⌘ Joint	Connecting Tubing Size, in	Bore Size, mm	Qty	Order Code
14/20	A (5/16)	2	1	9080-02
24/40	C (5/16 or 3/8)	2	1	5200-10

**Replacement Stopcocks**

Glass		2	1	8223-02
-------	--	---	---	---------


**ADAPTER** *Connecting, NO-AIR™* ♠

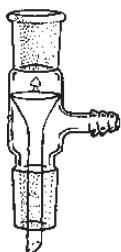
Three way, "Y" shaped adapter for connecting three other NO-AIR™ or Schlenk vessels. One outer ⌘ joint and two inner ⌘ joints, all are the same joint size.

⌘ Joints	Qty	Order Code
14/20	1	5238-01
24/40	1	5238-03


**ADAPTER** *Connecting, NO-AIR™* ♠

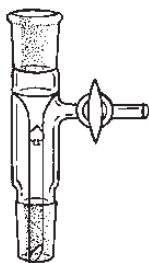
Three way, "Y" shaped adapter for connecting three other NO-AIR™ or Schlenk vessels. One inner ⌘ joint and two outer ⌘ joints, all are the same joint size.

⌘ Joints	Qty	Order Code
14/20	1	5239-02
24/40	1	5239-04


**ADAPTER** *Vacuum* ♠

With ⌘ outer joint at top and ⌘ inner at bottom.

⌘ Joints	Connecting Tubing Size, in	Qty	Order Code
14/20	B (5/16 or 3/8)	1	9123-06
24/25	D (3/8)	1	5260-07


**ADAPTER** *Vacuum, with Stopcock, NO-AIR™* ♠

With 2mm bore glass stopcock on side arm. Side tube is straight, 8mm O.D. Drip-tip center tube.

⌘ Joint	Bore Size, mm	Qty	Order Code
14/20	2	1	9175-04

**Replacement Stopcocks**

Glass	2	1	8223-02
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**STOPPER** ♠

With hollow head, ⌘ 14/20 or ⌘ 24/40.

⌘ Joint	Qty	Order Code
14/20	1	9543-04
24/40	1	8250-12

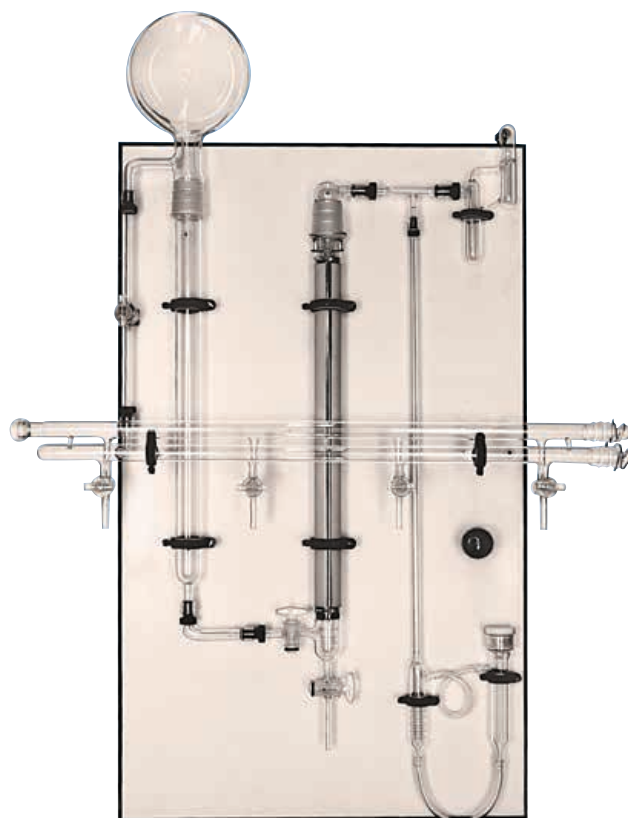
**This system is designed for maximum convenience and versatility in the handling of air-sensitive compounds in conjunction with ACE No-Air Labware or suitably adapted conventional glassware.**

Four two-way, high-vacuum stopcocks on a double-tube manifold permit convenient and rapid access to either vacuum (0.005 torr is common) or inert gas as required for simultaneous manipulations. The inert gas flow is controlled with a panel-mounted needle valve and is monitored with an oil bubbler that has a built-in overflow trap. Excess gas is vented to the atmosphere through the mercury bubbler-manometer which may be adjusted to control the over-pressure in the system. Traces of oxygen and carbon dioxide in the inert gas are removed by a BASF catalyst in a column that is coated with Instatherm® for convenient activation and regeneration of the catalyst. (Column holds approximately 0.5 Kg. of catalyst.) Residual moisture is removed from the inert gas by a drying agent\* (not supplied) in a second column.

Pressure surges are reduced by a three-liter bulb in the system. Threaded fittings with FETFE O-Rings are employed to facilitate assembly and disassembly, drying agent replacement, etc. The double tube manifold may be removed easily without contaminating the rest of the system and is supplied with 24/40 stoppers at the end of each manifold for rapid cleaning. All of these components are conveniently mounted on a 104 x 62cm wooden panel painted white for better observation of the equipment.

**In addition to the panel-mounted system, as pictured, a supplemental vacuum line with two service stopcocks, a McLeod Gauge (8726-12) and a liquid nitrogen trap are supplied.**

\*For Drierite, see 10175. Complete instructions on assembly, leak testing and preparation of the system are included.



\* Items in components listing marked with an asterisk are either not shown or cannot be seen in above photo.

## ACE-INERT ATMOSPHERE SYSTEM

Qty	Order Code
1	7818-10

### COMPONENTS

Qty	Order Code	Qty	Order Code
1	7818-24	1	7818-87
1	7818-26	1	5217-35
1	7818-28	1	7818-50
1	7818-30	1	8294-15
1	7818-32	1	8250-12
1	7818-34	1	7818-52
1	9698-16	1	7818-54
1	7818-35	1	7506-02
1	7818-36	1	5029-10
1	7818-38	1	7818-56
1	7818-39	1	7818-58
1	7818-42	1 Kg.	7818-60
1	7818-44	10	7598-24
1	7818-46	10	7598-45
1	7818-70	1	7669-12
		1	7669-14
		1	7669-20
		1	7818-65

### Reference Guide to Ace-Thred Sizes

Size	Accepts Tube O.D., mm	Use Bushing Number	Use With O-Ring No.	Optional Ferrule	Suggested Uses
Mini #7	6-7	5029-10	7855-704	11710-07	A, B, I
Midi #11	9-10.5	7506-02	7855-708	11710-11	D, E, F, G
Maxi #15	12.5-14	7506-06	7855-716	11710-15	C, H
	16-17	7506-08	7855-720	—	H, L
Giant #25	24-25	7506-10	7855-734	11710-25	K
	34-35	7506-12	7855-740	—	K, L
Jumbo #50	47-48	7506-14	7855-744	11710-50	K, L
	80	7506-20	7855-782	—	—

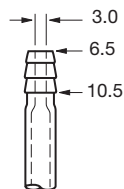
A—Thermometers, B—Bleed Tubes, C—Electrodes, D—Sensing Probes, E—Thermowells, F—Gas Dispersion Tubes, G—Vacuum Take-Offs, H—Inlet and Outlet Tubes, I—Miniature Electrodes, K—Manifolds, L—Immersion Wells

### Fraction Conversion

Length, Fractional Inches	Millimeters
1/16	1.6
1/8	3.2
3/16	4.8
1/4	6.4
5/16	7.9
3/8	9.5
7/16	11.1
1/2	12.7
9/16	14.3
5/8	15.9
11/16	17.5
3/4	19.1
13/16	20.6
7/8	22.1
15/16	23.8
1	25.4

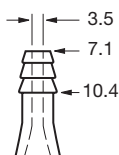
### Hose Connection Size Guide

#### Dimensions in Millimeters



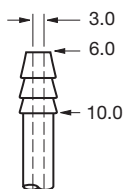
**A**

Use with 7.9mm (5/16") I.D. Tubing



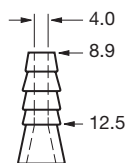
**B**

Use with 7.9mm (5/16") or 9.5mm (3/8") I.D. Tubing



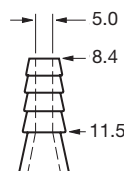
**C**

Use with 7.9mm (5/16") or 9.5mm (3/8") I.D. Tubing



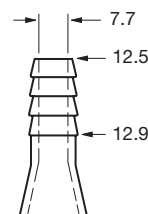
**D**

Use with 9.5mm (3/8") I.D. Tubing



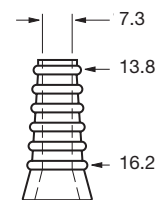
**E**

Use with 9.5mm (3/8") or 11.1mm (7/16") I.D. Tubing



**F**

Use with 11.1mm (7/16") or 12.7mm (1/2") I.D. Tubing



**G**

Use with 15.9mm (5/8") I.D. Tubing

### Specifications for Joints, Threads, and Stopcocks



#### Standard Taper

Symbol used to designate interchangeable joints, stoppers and stopcocks that comply with the requirements of Commercial Standard CS-21 published by N.I.S.T.



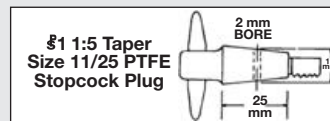
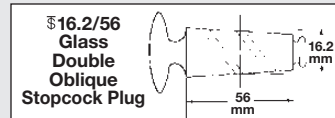
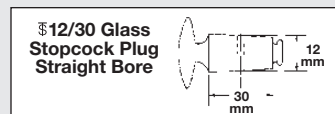
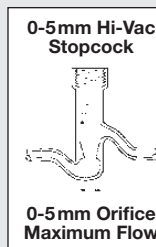
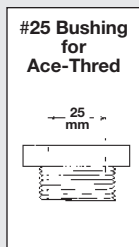
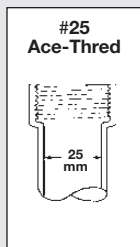
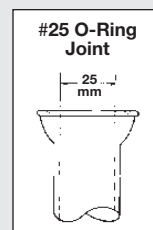
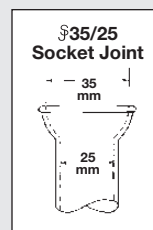
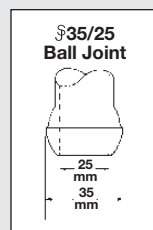
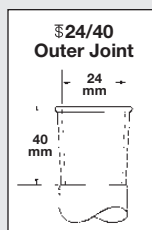
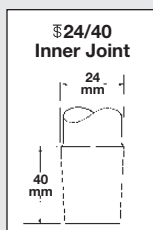
#### Spherical Joint

Symbol designates spherical joints that comply with CS-21.



#### Product Standard

Symbol designates stopcock plugs made of PTFE that meet requirements of N.I.S.T. Voluntary Product Standard PS 28-70.





**Don't see what you're looking for?  
We can help.**

**LET YOUR IDEAS  
COME TO LIFE**  
...with help from Ace Glass



• We can provide just one piece or as many as you need

• Reproduction of competitive products

• User designed specialized glassware

• Modification of existing stock products


**O-RINGS** ♠

**VITON A** — A linear copolymer of Vinylidene Fluoride and Hexafluoropropylene.

**SILICONE** — A group of elastomeric materials made from Silicone, Hydrogen and Carbon.

**BUNA-N** — A copolymer of Butadiene and Acrylonitrile.

**FETFE®** — A fluoroelastomer with special TFE Additives.

**EPDM (ETHYLENE-PROPYLENE)** — An elastomer prepared from Ethylene and Propylene Monomers.

Size	Dimensions		Qty	VITON Order Code	SILICONE Order Code	BUNA-N Order Code	FETFE Order Code	EPDM Order Code
	I.D., mm	W.						
-006	2.9	1.78	12	7855-01	7855-201	7855-401	7855-701	—
-007	3.7	1.78	12	7855-02	7855-202	7855-402	7855-702	—
-008	4.5	1.78	12	7855-04	7855-204	7855-404	7855-704	7855-904
-009	5.3	1.78	12	7855-07	7855-207	7855-407	7855-707	—
-010	6.1	1.78	12	7855-05	7855-205	7855-405	7855-705	—
-011	7.7	1.78	12	7855-06	7855-206	7855-406	7855-706	7855-906
-012	9.2	1.78	12	7855-08	7855-208	7855-408	7855-708	7855-908
-013	10.8	1.78	12	7855-10	7855-210	7855-410	7855-710	7855-910
-014	12.4	1.78	12	7855-12	7855-212	7855-412	7855-712	7855-912
-015	14.0	1.78	12	7855-13	7855-213	7855-413	7855-713	—
-016	15.6	1.78	12	7855-14	7855-214	7855-414	7855-714	7855-914
-018	18.8	1.78	12	7855-15	7855-215	7855-415	7855-715	—
-021	23.5	1.78	12	7855-19	7855-219	7855-419	7855-719	—
-022	25.1	1.78	12	7855-17	7855-217	7855-417	7855-717	—
-105	3.6	2.6	12	7855-03	7855-203	7855-403	7855-703	—
-107	5.2	2.6	12	7855-09	7855-209	7855-409	7855-709	—
-108	6.0	2.6	12	7855-11	7855-211	7855-411	7855-711	—
-110	9.2	2.6	12	7855-16	7855-216	7855-416	7855-716	7855-916
-111	10.8	2.6	12	7855-18	7855-218	7855-418	7855-718	—
-112	12.4	2.6	12	7855-20	7855-220	7855-420	7855-720	—
-113	13.9	2.6	12	7855-21	7855-221	7855-421	7855-721	—
-114	15.5	2.6	12	7855-22	7855-222	7855-422	7855-722	7855-922
-115	17.1	2.6	12	7855-24	7855-224	7855-424	7855-724	—
-116	18.7	2.6	12	7855-26	7855-226	7855-426	7855-726	7855-926
-118	21.9	2.6	12	7855-70	7855-270	7855-470	7855-770	—
-121	26.6	2.6	12	7855-27	7855-227	7855-427	7855-727	7855-927
-122	28.2	2.6	6	7855-71	7855-271	7855-471	7855-771	—
-123	29.8	2.6	6	7855-28	7855-228	7855-428	7855-728	7855-928
-125	33.0	2.6	6	7855-72	7855-272	7855-472	7855-772	—
-127	36.2	2.6	6	7855-76	7855-276	7855-476	7855-776	—
-128	37.8	2.6	6	7855-73	7855-273	7855-473	7855-773	—
-136	50.5	2.6	6	7855-29	7855-229	7855-429	7855-729	7855-929
-210	18.6	3.5	6	7855-30	7855-230	7855-430	7855-730	7855-930
-211	20.2	3.5	6	7855-32	7855-232	7855-432	7855-732	7855-932
-212	21.8	3.5	6	7855-34	7855-234	7855-434	7855-734	7855-934
-213	23.4	3.5	6	7855-36	7855-236	7855-436	7855-736	—
-214	25.0	3.5	6	7855-38	7855-238	7855-438	7855-738	7855-938
-215	26.6	3.5	6	7855-37	—	7855-437	—	—
-216	28.2	3.5	6	7855-39	7855-239	7855-439	7855-739	7855-939
-217	29.7	3.5	6	7855-40	7855-240	7855-440	7855-740	—
-218	31.3	3.5	6	7855-41	—	7855-441	—	—
-219	32.9	3.5	6	7855-43	—	7855-443	—	—
-220	34.5	3.5	6	7855-42	7855-242	7855-442	7855-742	7855-942
-221	36.1	3.5	6	7855-51	—	7855-451	—	—
-222	37.7	3.5	6	7855-52	—	7855-452	—	—
-223	40.9	3.5	3	7855-74	7855-274	7855-474	7855-774	—
-225	47.2	3.5	3	7855-44	7855-244	7855-444	7855-744	7855-944
-226	50.4	3.5	3	7855-46	7855-246	7855-446	7855-746	7855-946
-227	53.6	3.5	3	7855-45	7855-245	7855-445	7855-745	—
-228	56.7	3.5	3	7855-47	7855-247	7855-447	7855-747	—
-229	59.9	3.5	3	7855-48	7855-248	7855-448	7855-748	7855-948
-230	63.1	3.5	3	7855-75	7855-275	7855-475	7855-775	7855-975

Continued on following page



**VITON A** — A linear copolymer of Vinylidene Fluoride and Hexafluoropropylene.

**SILICONE** — A group of elastomeric materials made from Silicone, Hydrogen and Carbon.

**BUNA-N** — A copolymer of Butadiene and Acrylonitrile.

**FETFE®** — A fluoroelastomer with special TFE Additives.

**EPDM (ETHYLENE-PROPYLENE)** — An elastomer prepared from Ethylene and Propylene Monomers.

## O-RINGS (listing continued from previous page)

Size	Dimensions		Qty	VITON Order Code		SILICONE Order Code		BUNA-N Order Code		FETFE Order Code		EPDM Order Code
	I.D., mm	W.										
-233	72.6	3.5	3	—		—		—		7855-778	♠	—
-235	79.0	3.5	3	7855-64	♠	7855-264	♠	—		7855-764	♠	—
-239	91.7	3.5	3	—		—		—		—		—
-240	94.9	3.5	3	—		—		—		—		—
-325	37.5	5.3	6	7855-65	♠	—		7855-453	♠	—		—
-326	40.6	5.3	6	7855-67	♠	—		7855-454	♠	—		—
-327	43.8	5.3	6	7855-68	♠	7855-278	♠	7855-455	♠	—		—
-329	50.2	5.3	3	—		7855-283	♠	—		7855-783	♠	—
-335	69.2	5.3	3	—		—		7855-499	★	—		—
-336	72.4	5.3	3	7855-82	♠	7855-282	♠	—		7855-782	♠	—
-338	78.7	5.3	3	7855-77	♠	7855-277	♠	—		7855-777	♠	—
-341	88.3	5.3	3	7855-50	♠	7855-250	♠	7855-450	♠	7855-750	♠	—
-343	94.6	5.3	3	7855-66	♠	7855-266	♠	—		7855-766	♠	—
-348	110.5	5.3	3	7855-79	♠	—		—		7855-779	♠	—
-349	113.6	5.3	3	—		7855-287	♠	—		7855-787	♠	—
-359	145.4	5.3	3	—		7855-289	♠	—		—		—
5-101	2.5	0.97	12	7855-80	♠	—		—		—		—
5-193	4.5	1.0	12	7855-81	♠	—		—		—		—
5-017	6.1	2.6	12	—		—		7855-482		—		—
—	75.5	4.0	1	—		7855-251	★	—		—		—
—	110.0	5.0	1	—		7855-254	★	—		—		—
—	150.0	5.0	1	—		7855-260	★	—		—		—
—	215.0	5.0	1	—		7855-288	★	—		—		—
O-Ring Kits — 30 Sizes			500	7855-99	★	—		7855-499	★	—		—
O-Ring Sets: one box of 18 sets				—		—		—		8194-310	♠	—
O-Ring Sets: one box of 18 sets				—		—		—		8194-313	♠	—
O-Ring Sets: one box of 12 sets				—		—		—		8194-315	♠	—
O-Ring Sets: one box of 6 sets				—		—		—		8194-317	♠	—

\*Sizes not listed are available via special order. Call or email for quotation.

## CHEMICAL COMPATIBILITY CHART

Key: 1=Recommended; 2=Satisfactory; 3=Poor; 4=Marginal; 5=Not Recommended; A=Acceptable; NA=Not Acceptable

	Viton	Silicone	Buna-N	EPDM	Chemraz 514	Kalrez 4079	FETFE	CAPFE
Temperature Range °C	-26 to 204	-115 to 200	-40 to 120	-55 to 150	-30 to 220	-15 to 316	-18 to 204	-60 to 204
Compression set	2	2	2	2	2	2	2	3
Durometer	75	70	70	70	70	75	70	70
Steam < 120 °C	3	4	4	4	1	1	1	5
Acetone	4	3	3	2	1	1	5	1
Toluene	2	3	3	3	1	1	2	2
Tetrachloroethane	1	3	3	3	1	1	1	2
THF	4	4	4	4	1	1	5	3
Methyl Ethyl Ketone	5	5	5	2	1	1	5	2
Acetonitrile	5	5	5	5	1	1	5	2
Hydrochloric Acid (conc)	2	5	4	5	1	1	2	4
Ammonia Gas (cold)	4	1	2	2	1	1	4	2
Tetrachloroethylene	3	5	3	3	1	1	3	2
Sulfuric Acid (dilute)	2	5	1	5	2	2	2	2
Nitric Acid (conc)	2	5	4	5	1	1	2	4
Calcium Carbonate	2	5	1	1	1	1	2	2
Xylene	2	4	4	3	1	1	2	2
Mineral Oils	1	2	1	4	1	1	1	1
Sodium Carbonate	1	1	1	1	1	1	1	2
Vacuum	1	4	2	4	4	4	1	2
FDA	A	A	A	A	NA	NA	NA	A

Chemical compatibility information courtesy of the respective manufacturers of each o-ring type. Ace is not responsible for errors.

# CAPFE – A “Rubbery” PTFE O-Ring

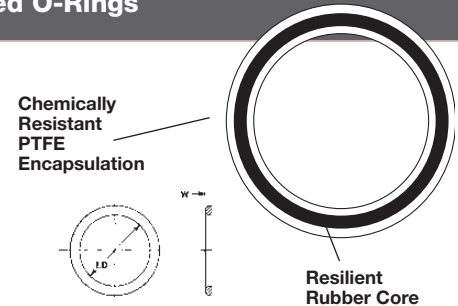
## O-RINGS CAPFE ♠

A totally different O-Ring having a resilient rubber core encased in a continuous, thick, non-porous FEP/PTFE encapsulation. This unique O-Ring solves the sealing problems where the chemical inertness of PTFE is a MUST and where maintenance-free dependability and long service life are required.

### CAPFE Advantages

- Continuous encapsulation of thick, pure PTFE offers no seams or weak spots to break and leak.
- CAPFE offers both resilience and chemical resistance.
- Thick PTFE encapsulation permits wide application without leakage or deterioration.
- Resistant to all chemicals except molten alkali metals, hot fluorine and certain complex halogenated compounds.
- Extreme slipperiness of PTFE reduces friction in dynamic applications.
- CAPFE ranges from **-60°C to +204°C**, deterioration vacuum to 10,000 psi.

- Low friction
- High chemical resistance
- Low compression set compared to solid PTFE O-Rings
- Low gas and water vapor permeability compared to “flash” coated O-Rings



Size	Dimensions		Order Code
	I.D., mm	W., mm	
-010	6.1	1.78	7855-805
-011	7.7	1.78	7855-806
-012	9.3	1.78	7855-808
-013	10.8	1.78	7855-810
-015	12.4	1.78	7855-813
-018	18.8	1.78	7855-815
-021*	23.5	1.78	7855-819
-022	25.1	1.78	7855-817
-110	9.2	2.6	7855-816
-111	10.8	2.6	7855-818
-112	12.4	2.6	7855-820
-113	13.9	2.6	7855-821
-114	15.5	2.6	7855-822
-115	17.1	2.6	7855-824
-116	18.7	2.6	7855-826
-118	21.9	2.6	7855-870
-121	26.6	2.6	7855-827
-122	28.2	2.6	7855-871
-123	29.8	2.6	7855-828
-125	33.0	2.6	7855-872
-127	36.2	2.6	7855-876
-128	37.8	2.6	7855-873
-136	50.5	2.6	7855-829
-210	18.6	3.5	7855-830
-211	20.2	3.5	7855-832
-212	21.8	3.5	7855-834

Size	Dimensions		Order Code
	I.D. mm	W., mm	
-213	23.4	3.5	7855-836
-214	25.0	3.5	7855-838
-217	29.7	3.5	7855-840
-220	34.5	3.5	7855-842
-223	40.9	3.5	7855-874
-225	47.2	3.5	7855-844
-226	50.4	3.5	7855-846
-227	53.6	3.5	7855-845
-228	56.7	3.5	7855-847
-229	59.9	3.5	7855-848
-230	63.1	3.5	7855-875
-232	69.4	3.5	7855-877
-235	79.0	3.5	7855-864
—	134.37	3.5	7855-885
-317	23.2	5.3	7855-860
-329	50.2	5.3	7855-883
-341	88.3	5.3	7855-850
-348	110.5	5.3	7855-879
-349	113.6	5.3	7855-887
-359	145.4	5.3	7855-889
-361	151.8	5.3	7855-861
—	75.0	4.0	7855-878
—	110.0	5.0	7855-880
—	150.0	5.0	7855-881
—	215.0	5.0	7855-884

# KALREZ® 4079

## KALREZ O-RINGS ★

Offer the resilience and sealing force of an elastomer with chemical inertness and thermal stability similar to PTFE fluorocarbon resin.

### Sealing Performance

- Compared with other elastomers, KALREZ is normally more resistant to swelling and embrittlement and will retain these properties for a longer period of time.
- Compared with metal seals, KALREZ is easily installed and conforms to the sealing surface despite irregularities due to improper assembly or wear.
- Compared with PTFE seals, KALREZ is not likely to creep or cold flow.

### Chemical Resistance

KALREZ has excellent chemical resistance, far above that of other commercial elastomers. KALREZ should be considered for service in hot, corrosive environments, including:

- Polar solvents (ketones, esters, ethers)
- Strong organic solvents (benzene, dimethyl formamide, perchloroethylene, tetrahydrofuran (THF))
- Inorganic and organic acids (hydrochloric, nitric, sulfuric, trichloroacetic) and bases (hot caustic soda)
- Strong oxidizing agents (dinitrogen tetroxide, fuming nitric acid)
- Metal halogen compounds (titanium tetrachloride, diethylaluminum chloride)
- Hot mercury/caustic soda
- Chlorine, wet or dry
- Inorganic salt solutions
- Fuels, (ASTM Reference Fuel C, JP-5 Jet Fuel, aviation gas, kerosene)
- Hydraulic fluids (SKYDROL<sup>1</sup>, 500A, PYDRAUL<sup>1</sup> 312, ANDEROL<sup>2</sup> L-774, and transmission fluids)
- Heat transfer fluids (DOWTHERM<sup>3</sup>A)
- Oil well sour gas (methane, hydrogen sulfide/carbon dioxide/steam)
- Steam

### Thermal Stability

KALREZ O-Rings retain their elastic properties in long-term service at temperatures as high as 316°C and in intermittent service up to 327°C. Generally KALREZ provides reliable performance at temperatures up to 83°C (150°F) higher than O-Rings made from other commercial elastomers.

®Registered DUPONT Trademark

<sup>1</sup> U.S. Trademark of Solutia Co., <sup>2</sup>U.S. Trademark of Tenneco Chemicals,

<sup>3</sup> U.S. Trademark of Dow Chemical Co.

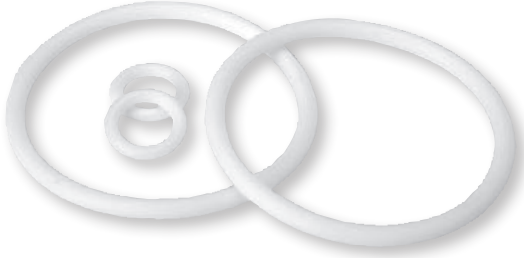
Size	Dim., mm		Order Code	(Use) / Flange Type
	I.D.	W		
-006	2.9	1.78	7855-601	
-007	3.7	1.78	7855-602	(S)
-008	4.5	1.78	7855-604	(T,C,S)
-009	5.3	1.78	7855-607	
-010	6.1	1.78	7855-605	
-011	7.7	1.78	7855-606	(T,J,S)
-012	9.3	1.78	7855-608	(C,T,J)
-013	10.8	1.78	7855-610	(C,T)
-014	12.4	1.78	7855-612	(O)
-015	14.0	1.78	7855-613	(O,G)
-016	15.6	1.78	7855-614	(T,J)
-018	18.8	1.78	7855-615	(J,S)
-110	9.2	2.6	7855-616	(J,S)
-021	23.5	1.78	7855-617	(C,T,G)
-111	10.8	2.6	7855-618	(C,T,S)
-022	25.1	1.78	7855-619	(C,T,G)
-112	12.4	2.6	7855-620	
-113	13.9	2.6	7855-621	
-114	15.5	2.6	7855-622	(J,S)
-115	17.1	2.6	7855-623	
-116	18.7	2.6	7855-626	(C,T,G)
-121	26.6	2.6	7855-627	(C,T,G)
-136	50.5	2.6	7855-629	(C,T,G)
-210	18.6	3.5	7855-630	
-211	20.2	3.5	7855-632	(T,G)
-212	21.8	3.5	7855-634	(T)
-217	29.7	3.5	7855-640	(C,T,G)
-220	34.5	3.5	7855-642	(T,G,J)
-225	47.2	3.5	7855-644	(C,T,G,J)
-229	59.9	3.5	7855-648	(C,T,G,J)
-105	3.6	2.6	7855-650	(C,T,G)
-108	6.0	2.6	7855-653	(T,G)
-118	21.9	2.6	7855-655	(O)
-122	28.2	2.6	7855-657	(C,T,J)
-123	29.8	2.6	7855-658	(C,T)
-125	33.0	2.6	7855-659	(O)
-127	36.2	2.6	7855-670	(T,J)
-128	37.8	2.6	7855-671	(J,S)
-213	23.4	3.5	7855-675	(C,T,G)
-214	25.0	3.5	7855-676	(T,G)
-216	28.2	3.5	7855-677	(C,T,G)
-223	40.9	3.5	7855-680	(C,T,G,J)
-226	50.4	3.5	7855-684	(C,T,G,J)
-227	53.6	3.5	7855-685	
-228	56.7	3.5	7855-686	
-230	63.1	3.5	7855-689	
-235	78.9	3.5	7855-687	
-327	43.8	5.3	7855-690	
-341	88.3	5.3	7855-691	
-348	110.0	5.3	7855-692	
-349	113.6	5.3	7855-693	{G} 137mm flat flange
-359	145.4	5.3	7855-694	{G} 168mm flat flange
-	75.5	4	7855-695	60mm Duran flange
-245	110.7	3.5	7855-696	100mm Duran flange
-362	158	5.3	7855-697	150mm Duran flange
-	214.6	5.3	7855-698	200mm Duran flange

#### USE REFERENCE CODES

T = Ace-Threds      S = Stopcocks      C = Chromatographic Fittings  
 G = Gaskets      J = O-Ring Joints      O = Special

# CHEMRAZ® 514

## THE **WHITE** O-RING



### CHEMRAZ O-RINGS *White* ★

Molded of a perfluoroelastomer polymer, CHEMRAZ has the broadest chemical resistance of any elastomeric material. Combines the resilience and sealing force of an elastomer with chemical resistance approaching that of PTFE.

#### Sealing Performance

- Compared with other elastomers, CHEMRAZ is normally more resistant to swelling and embrittlement and will retain these properties for a longer period of time.
- Compared with metal seals, CHEMRAZ is easily installed and conforms to the sealing surface despite irregularities due to improper assembly or wear.
- Compared with PTFE seals, CHEMRAZ is not likely to creep or cold flow.

#### Chemical Resistance

CHEMRAZ has excellent chemical resistance, far above that of other commercial elastomers. CHEMRAZ should be considered for service in hot, corrosive environments including:

- Polar solvents (ketones, esters, ethers)
- Strong organic solvents (benzene, dimethyl formamide, perchloroethylene, tetrahydrofuran (THF))
- Inorganic and organic acids (hydrochloric, nitric, sulfuric, trichloroacetic) and bases (hot caustic soda)
- Strong oxidizing agents (dinitrogen tetroxide, fuming nitric acid)
- Metal halogen compounds (titanium tetra-chloride, diethylaluminum chloride)
- Hot mercury/caustic soda
- Chlorine, wet or dry
- Inorganic salt solutions
- Fuels, (ASTM Reference Fuel C, JP-5 Jet Fuel, aviation gas, kerosene)
- Hydraulic fluids (SKYDROL<sup>1</sup>, 500A, PYDRAUL<sup>1</sup> 312, ANDEROL<sup>2</sup> L-774, and transmission fluids)
- Heat transfer fluids (DOWTHERM<sup>3A</sup>)
- Oil well sour gas (methane, hydrogen sulfide/carbon dioxide/steam)
- Steam

Size	Dimensions, mm		Order Code	(Use)
	I.D.	W		
-006	2.9	1.78	7859-501	(O)
-007	3.7	1.78	7859-502	(S)
-008	4.5	1.78	7859-504	(T,C,S)
-009	5.3	1.78	7859-507	(O)
-010	6.1	1.78	7859-505	(T,J,S)
-011	7.7	1.78	7859-506	(T,J,S)
-012	9.3	1.78	7859-508	(C,T,J)
-013	10.8	1.78	7859-510	(C,T)
-014	12.4	1.78	7859-512	(O)
-015	14.0	1.78	7859-513	(J,S)
-016	15.6	1.78	7859-514	(T,J)
-018	18.8	1.78	7859-515	(J,S)
-021	23.5	1.78	7859-519	(C,T,G)
-022	25.1	1.78	7859-517	(C,T,G)
-105	3.6	2.6	7859-503	(C,T,G)
-108	6.0	2.6	7859-511	(T,G)
-110	9.2	2.6	7859-516	(J,S)
-111	10.8	2.6	7859-518	(C,T,S)
-112	12.4	2.6	7859-520	(T,G,J)
-113	13.9	2.6	7859-521	(C,T,G,J)
-114	15.5	2.6	7859-522	(J,S)
-115	17.1	2.6	7859-524	(S)
-116	18.7	2.6	7859-526	
-118	21.9	2.6	7859-570	(O)
-121	26.6	2.6	7859-527	(C,T,G)
-122	28.2	2.6	7859-571	(C,T,J)
-123	29.8	2.6	7859-528	(C,T)
-125	33.0	2.6	7859-572	(O)
-127	36.2	2.6	7859-576	(T,J)
-128	37.8	2.6	7859-573	(J,S)
-136	50.5	2.6	7859-529	(C,T,G)
-210	18.6	3.5	7859-530	(J,S)
-211	20.2	3.5	7859-532	(T,G)
-212	21.8	3.5	7859-534	(T)
-213	23.4	3.5	7859-536	(C,T,G)
-214	25.0	3.5	7859-538	(T,G)
-216	28.2	3.5	7859-539	(C,T,G)
-217	29.7	3.5	7859-540	(T,G,J)
-220	34.5	3.5	7859-542	(T,G,J)
-223	40.9	3.5	7859-574	(C,T,G,J)
-225	47.2	3.5	7859-544	(C,T,G,J)
-226	50.4	3.5	7859-546	
-227	53.6	3.5	7859-545	
-228	56.7	3.5	7859-547	
-229	59.9	3.5	7859-548	(C,T,G,J)
-230	63.1	3.5	7859-575	
-327	43.8	5.3	7859-578	
-341	88.3	5.3	7859-550	
-348	110.5	5.3	7859-579	

#### USE REFERENCE CODES

T= Ace-Threds    S= Stopcocks    C= Chromatographic Fittings  
G= Gaskets    J= O-Ring Joints    O= Special

#### Thermal Stability

CHEMRAZ O-Rings retain their elastic properties longer in harsh chemical environments at temperatures from -30°C to 220°C.

®Chemraz is a Registered Trademark of Greene Tweed & Co.

<sup>1</sup>U.S. Trademark of Solutia Co., <sup>2</sup>U.S. Trademark of Tenneco Chemicals,

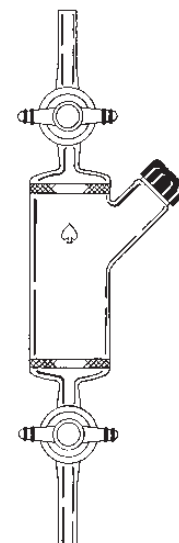
<sup>3</sup>U.S. Trademark of Dow Chemical Co.

**VESSEL** Peptide ♠

Cylindrical vessel with 2mm bore PTFE stopcock at either end, and porosity C (25-50 micron) fritted disc on top and bottom. With threaded side port, angled, for charging vessel. Designed so all wetted surfaces are glass or PTFE. Sold complete with cap for side port.

Actual Capacity, mL	Working Capacity, mL	Length*, mm	Disc O.D., mm	GPI Cap Thread Size	Qty	Replacement Stopcock	Order Code
20	10	60	18-20	15-415	1	8224-04	6400-07
60	30	105	25	15-415	1	8224-04	6400-10
120	60	110	30	20-400	1	8224-04	6400-16
250	125	160	40	20-400	1	8224-04	6400-19
500	250	210	50	20-400	1	8224-04	6400-23

\*Distance between filter discs.

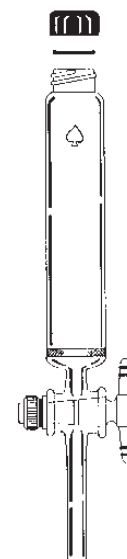


**VESSEL** Peptide ♠

Cylindrical vessel with 2mm bore PTFE stopcock and porosity C (25-50 micron) fritted disc at bottom, GPI thread at top. Supplied with solid cap, holed cap, and PTFE-faced silicone rubber septum. All wetted surfaces are either glass or PTFE.

Actual Capacity, mL	Working Capacity, mL	Length*, mm	Disc O.D., mm	GPI Cap Thread Size	Qty	Replacement Stopcock	Order Code
20	10	60	18-20	15-415	1	8224-04	6402-12
60	30	105	25	15-415	1	8224-04	6402-15
120	60	110	30	20-400	1	8224-04	6402-20
250	125	160	40	24-440	1	8224-04	6402-24
500	250	210	50	38-430	1	8224-04	6402-27

\*Distance from filter disc to thread.



**Replacement Parts**

See 9590 for replacement Caps  
See 8787 for replacement Septas

## Still Unsure About Which Plug to Use?

Let us help explain it for you.

- Front Seal O-rings create a seal internally or below the vessel's threads
- Back Seal O-rings create the seal above the threads of the vessel

By simply hand tightening these plugs, the O-ring assures a tight seal. For pressure work, a "Front Seal" plug (5846) is recommended. "Back Seal" plugs (8545) are also available, if preferred.



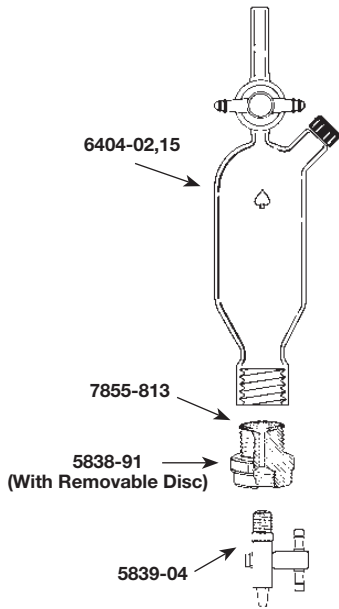
5846

Front Seal



8545

Back Seal



**ACE DESIGN:  
Removable Frit  
& PTFE Fittings**

**VESSEL** *Peptide, Ace-Thred, with Side Port* ♦

Cylindrical vessel with a 2mm bore PTFE stopcock at top, GPI threaded side port, angled, and #15 Ace-Thred at bottom that accepts a PTFE adapter with removable filter disc and a PTFE shut-off valve. PTFE adapter has a “front”-type seal using a CAPFE (PTFE encapsulated silicone) O-Ring to make a compression seal in the #15 Ace-Thred on vessel. Porosity C (25-50 micron) glass filter disc is press fit into recess at top of the adapter and it can be replaced easily. Other end of adapter has a 1/4-inch FNPT thread that allows connection of a 2.5mm bore PTFE shut-off valve with a luer extension. Supplied with a solid cap for side port. **Complete item consists of vessel, PTFE adapter, CAPFE O-Ring, and valve.**

Actual Capacity, mL	Working Capacity, mL	Length*, mm	Body Dia. mm	GPI Cap Thread Size	Qty	Order Code
20	10	60	25	15-415	1	6404-30
60	30	105	31	15-415	1	6404-33
120	60	110	44	15-415	1	6404-36
250	125	160	51	15-415	1	6404-40
500	250	210	63	15-415	1	6404-44

\*Distance from stopcock to thread.

**Replacement Parts and Accessories**

Actual Capacity, mL	Qty	Glass Vessel Order Code	Glass Disc Order Code	#15 Ace-Thred PTFE Adapter Order Code	PTFE Valve Order Code	CAPFE O-Ring Order Code	Stopcock Order Code
20	1	6404-02	5848-23	5838-91	5839-04	7855-813	8224-04
60	1	6404-05	5848-23	5838-91	5839-04	7855-813	8224-04
120	1	6404-08	5848-23	5838-91	5839-04	7855-813	8224-04
250	1	6404-11	5848-23	5838-91	5839-04	7855-813	8224-04
500	1	6404-15	5848-23	5838-91	5839-04	7855-813	8224-04



**Let Your Ideas Come to Life!**  
*...Custom Vessels are Available*

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- Reproduction of competitive products
- Modification of existing stock products

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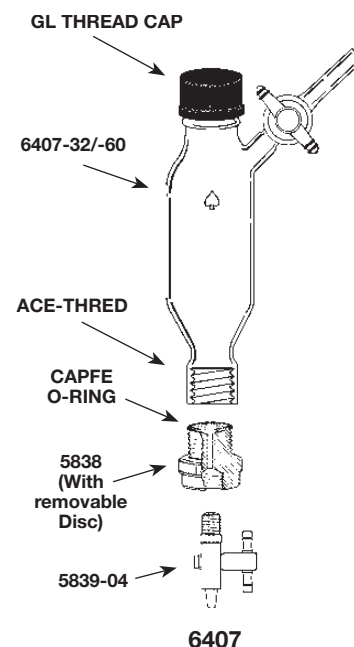
## VESSEL Peptide, Ace-Thred, with Side Port

Cylindrical vessel with a 2mm bore PTFE stopcock, GL thread at top, Ace-Thred at bottom that accepts a PTFE adapter with removable filter disc and a PTFE shut-off valve. PTFE adapter has a “front”-type seal using a CAPFE (PTFE encapsulated silicone) O-Ring to make a compression seal in the Ace-Thred on vessel. Porosity C (25-50 micron) glass filter disc is press fit into recess at top of the adapter and can be replaced easily. Other end of adapter has a 1/4" FNPT thread that allows connection of a 2.5mm bore PTFE shut-off valve with a luer extension.

**Note:** Supplied with a solid cap GL thread. Complete item consists of vessel, PTFE adapter, CAPFE O-Ring, and valve.

Actual Capacity, mL	Working Capacity, mL	Length*, mm	Body Dia., mm	Top Cap GL Thread Size	Bottom Ace-Thred Size	Qty	Order Code		Cap Only (Top)	
20	10	20	25	14	15	1	6407-32	♠	7622-103	★
60	30	105	31	25	25	1	6407-36	♠	7622-114	★
125	60	110	44	25	25	1	6407-42	♠	7622-114	★
250	125	160	51	32	25	1	6407-48	♠	7622-121	★
250	125	160	51	32	50	1	6407-54	♠	7622-121	★
500	250	210	63	32	50	1	6407-57	♠	7622-121	★
1000	500	260	76	32	50	1	6407-60	♠	7622-121	★

\*Distance from thread to thread.



### Replacement Parts and Accessories

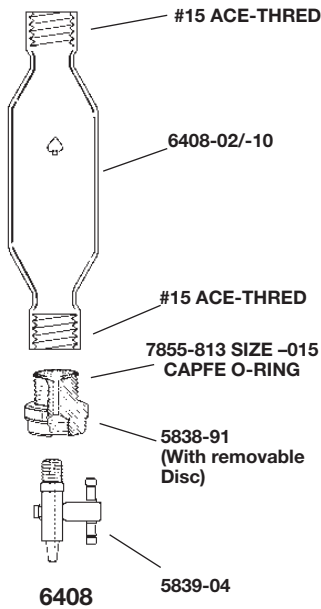
Actual Capacity, mL		Qty	Glass Vessel Order Code		PTFE Adapter			PTFE Valve			Stopcock	
Actual Capacity, mL	Qty		Order Code		Ace-Thred Size	Order Code		Order Code		Order Code		Order Code
20	1		6407-02	♠	#15	5838-91	♠	5839-04	♠	8224-04	♠	8224-04
60	1		6407-06	♠	#25	5838-94	♠	5839-04	♠	8224-04	♠	8224-04
125	1		6407-08	♠	#25	5838-94	♠	5839-04	♠	8224-04	♠	8224-04
250	1		6407-11	♠	#25	5838-94	♠	5839-04	♠	8224-04	♠	8224-04
250	1		6407-12	♠	#50	5838-96	♠	5839-04	♠	8224-04	♠	8224-04
500	1		6407-15	♠	#50	5838-96	♠	5839-04	♠	8224-04	♠	8224-04
1000	1		6407-19	♠	#50	5838-96	♠	5839-04	♠	8224-04	♠	8224-04

### Replacement Glass Disc

For PTFE Adapter/ Ace-Thred Size	Order Code	
5838-91 / #15	6	5848-23 ♠
5838-94 / #25	6	5848-25 ♠
5838-96 / #50	6	5848-28 ♠

### CAPFE O-Ring

O-Ring Size	Qty	Order Code	
-015	1	7855-813	♠
-121	1	7855-827	♠
-136	1	7855-829	♠



**VESSEL** Peptide, Ace-Thred Top and Bottom ♠

Cylindrical vessels with #15 Ace-Thred at both ends, no side port. Use 5838-91 PTFE adapter (not included) with removable filter disc and 5839-04 PTFE valve (also not included) with Luer-Lok extension at either end.

**Note:** See 6404 for a complete listing of accessories that fit this vessel.

Actual Capacity, mL	Working Capacity, mL	Length*, mm	Top and Bottom Ace-Thred Size	Qty	Order Code
20	10	60	15	1	6408-02
60	30	105	15	1	6408-04
120	60	110	15	1	6408-06
250	125	160	15	1	6408-08
500	250	210	15	1	6408-10

\*Distance between threads

## Custom Fritted Ware

Featuring the only Glass Fiber filters

### Special Shapes

- Square — up to 11 x 11 inches
- Rectangular
- Discs — up to 8 inches
- Cylindrical

### Special Sizes

- Up to 1-inch thick

### Micron Range

- 4 – 174

**You design it,  
we'll make it!**





***For complete assemblies,  
see 7840 and 7861.***

**Individual components listed.**



### IMMERSION LAMP Photochemical (Medium Pressure)

Medium pressure, quartz, mercury-vapor lamp. For use in all ACE immersion wells. 61cm PTFE covered lead wires, fitted with pin type connectors. A 6-foot power cord also allows for lowering lamp into well for vertical operation. Approximately 40-48% of the radiated energy is in the ultraviolet portion of the spectrum, 40-43% in the visible region and the balance in the Infrared. Can be inserted into a glass well/sleeve with a 25mm I.D.

Watts	Lamp Volts	Lamp Amps	Arc Length, mm	Distance from Lamp to Bottom, mm	Approx. Total Length, mm	Order Code		Replacement Cord Only	
100	90-110	1.2	69.85	42.86	155.58	7825-30	★	9698-10	★
200	110-130	1.9	121.92	64.52	250.95	7825-32	★	9698-10	★
450	125-145	3.6	131.50	56.50	244.35	7825-34	★	9698-10	★
450	125-145	3.6	279.40	57.15	400.05	7825-35	★	9698-10	★
550	140-150	4.5	109.54	57.15	236.54	7825-36	★	9698-10	★
1200	270-300	4.7	317.50	87.38	492.25	7825-40	★	9698-10	★

Warranty: One year from date of shipment (WHEN USED UNDER NORMAL CONDITIONS WITH ACE EQUIPMENT).  
Typical lamp life 1000 hrs.

#### CAUTION:

Ultra-violet radiation is permanently damaging to the retina of the eye. Never operate lamp where it can be viewed directly.

#### Spectral Characteristics (Watts)

Lamp No.	Far U.V	Middle U.V	Near U.V.	Visible	Infrared	Total Radiated Energy
7825-30	2200A-2800A	2800A-3200A	3200A-4000A	4000A-6000A	10000A-14000A	11.49
7825-32	1.14	1.97	1.53	4.73	2.12	11.49
7825-34	2.88	4.14	3.46	10.6	4.1	25.18
7825-35	27.0	28.7	28.0	75.7	16.4	175.8
7825-36	27.0	28.7	28.0	75.7	16.4	175.8
7825-36	29.2	32.8	32.9	87.2	20.6	202.7
7825-40	116.15	117.01	104.03	187.07	48.68	572.9

#### FOR SAFETY:

We recommend use of 7836 Safety Cabinet plus Water-Flo Power Cut-Off when operating these lamps.



### POWER SUPPLY Photochemical ★

Power supply transformers, for 7825 photochemical lamps, that supply the extra voltage and current required to initiate the arc and to reduce power for operation. Sizes A-1, B-1, C-1 and D-1 operate at 115v, 60 Hz. Size A-2, C-21 and G-22 operate at 230v, 50 Hz. G-21 operates at 230v, 60 Hz.

Size	For Lamp No.	Primary Volts	Weight	Hz.	Case Dimensions			Order Code
					L, cm	W, cm	H, cm	
A-1	7825-30	120	8 lbs.	60	17.8	12.7	11.4	7830-52
A-2	7825-30	230	8 lbs.	50	17.8	12.7	11.4	7830-53
B-1	7825-32	120	28 lbs.	60	30.5	21.6	22.9	7830-56
C-1	7825-34 & -35	120	36 lbs.	60	30.5	21.6	22.9	7830-60
C-21	7825-34 & -35	230	40 lbs.	50	30.5	21.6	22.9	7830-61
D-1	7825-36	120	64 lbs.	60	45.7	28.3	27.9	7830-64
G-21	7825-40	230	65 lbs.	60	45.7	28.3	27.9	7830-71
G-22	7825-40	230	65 lbs.	50	45.7	28.3	27.9	7830-89

Warranty: Two years from date of shipment (WHEN USED UNDER NORMAL CONDITIONS WITH ACE EQUIPMENT).

Note that sizes A-2, C-21 and G-22 are for international use only due to 230V, 50Hz operation.

## ABSORPTION SLEEVES ★

Filter sleeve for use with all ACE Immersion Wells to restrict portions of the radiated energy from reaching the reactant material. An invaluable aid in predetermining which portion of the spectrum creates the reaction. Sleeves are glass, open end tubes which telescope into the well assembly to surround the light source.

*Note: For use with 100, 200, 450, and 1200 watt lamps, only.*

Type Glass	Length, mm	O.D., mm	I.D., mm	Order Code
Pyrex 7740	280	30	26	7835-44
Pyrex 7740*	762	30	26	7835-45

\*762mm long for 7885 pilot plant reactor.



## PHOTOCHEMICAL SAFETY REACTION CABINET\* ★

This steel cabinet allows for the safe operation of ACE photochemical reaction equipment. Eliminates the need for a hood, or to construct a special safe area to operate the U.V. lamp. The cabinet has welded seams and a fully hinged door with lip to prevent light from escaping. The door has a key lock for positive closure and it controls a safety switch that prevents U.V. lamp operation unless door is closed. The floor of cabinet is sealed to one-inch height to contain any possible spills.

Inside the cabinet is a plug-in light, auxiliary 120v socket and a 60 CFM exhaust fan, all controlled by an ON/OFF switch. Also inside are pin jack sockets for lamp connection and a removable 1/2-inch aluminum rod, mounted vertically, for clamping the reactor.

The cabinet is supplied with a six-foot grounded power cord with NEMA plug for connection to a 120v source, and a six-foot, two-wire cord with male pin jacks for connection to the lamp power supply. Handles are mounted on both sides for easier carrying, and there are rubber feet on the bottom of the cabinet for stability. Measures: 36 (H) x 21-1/4 (W) x 18-1/2 (D) inches. Painted black inside, chemically resistant blue outside. Weight: 60 lbs.



Order Code  
7836-20

*\*Designed by Dr. John Penn, West Virginia University Dept. of Chemistry, Morgantown, WV 26506  
For international use, 230 volts, 50Hz, use with step-up/step-down transformer 7834-17.*

## STAND Photochemical Reactor ★

Sturdy aluminum, powder coated stand for use with cylindrical reactors such as those listed under 7840, 7841, 7844, 7861, 7863, 7864 or 7865. Design allows vessel to be operated in a cold bath in the event the reactant material needs cooling. Also can be used stand-alone.

Description	Qty	Order Code
Stand, only	1	7837-75

### PTFE Stand Inserts

Vessel Size, mL	Vessel Style	Qty	Order Code
250	Plain	1	7837-02
500	Plain	1	7837-05
1000	Plain	1	7837-10
250	Jacketed	1	7837-25
500	Jacketed	1	7837-60
1000	Jacketed	1	7837-100

**Stand is universal for all sizes. User must select the appropriate PTFE insert to accommodate desired vessel size.**





### REACTION ASSEMBLY Photochemical, Ace-Thred, Complete ★

Complete reaction assembly with all parts needed for immediate operation. Utilizes an internally threaded connection in place of the ground glass joint. Bushing and FETFE O-Ring form a compression type seal with immersion well. Well has removable inner cooling tube. Reactor has one- $\frac{1}{4}$ " 14/20 angled joint for sparger tube, one- $\frac{1}{4}$ " 24/40 vertical joint for condenser, and one-#7 Ace-Thred for thermometer. Volume indicated is total volume. Actual working volume is approximately 40-50% of total.

**Complete assembly consists of reactor, 7874-38 quartz immersion well, sparger tube, PTFE stir bar, #7 nylon bushing with O-Ring, three meters of 4.8mm I.D. PTFE tubing, stand, 450 watt lamp and 450 watt power supply.**

#### 115 Volts, 60 Hz

Capacity, mL	Order Code
250	7861-245
500	7861-250
1000	7861-255

#### 230 Volts, 50 Hz

Capacity, mL	Order Code
250	7861-410
500	7861-430
1000	7861-450



### REACTION VESSEL Photochemical, Ace-Thred ♠

Reaction vessel fabricated of borosilicate glass to accommodate the 7874, 7875 or 7876 immersion wells only, With #50 Ace-Thred at top which accepts a 7506-14 bushing and FETFE O-Ring to form a compression seal with the immersion well, one- $\frac{1}{4}$ " 14/20 angled joint for sparger tube, one- $\frac{1}{4}$ " 24/40 vertical joint for condenser and one #7 Ace-Thred side arm for thermometer. Bottom of reactor is flat to allow use of magnetic stirrer. Volumes indicated are total volumes. Working volume in reactive area of lamp is approximately 40-50% of total volume. **Complete unit consists of vessel, sparger tube, PTFE stir bar, threaded nylon thermometer bushing, #50 nylon bushing and three meters of 4.8mm (3/16-inch) I.D. PTFE tubing.**

**Note:** Stand not Included.

Capacity, mL	Body only		Complete	
	Order Code		Order Code	
250	7863-16	♠	7863-36	♠
500	7863-18	♠	7863-38	♠
1000	7863-20	♠	7863-40	♠

#### Replacement Parts and Accessories

Sparger Tube, $\frac{1}{4}$ " 14/20	7841-09	♠
PTFE Stir Bar, 38mm x 8mm	13654-14	★
Nylon Thermometer Bushing, #7	5029-10	♠
Nylon #50 Bushing	7506-14	♠
PTFE Tubing, 4.8mm I.D. x 3m (for sparger)	12687-12	★



### REACTION VESSEL Photochemical, Ace-Thred ♠

Jacketed reaction vessel designed to enable cooling of reactant material during photolysis. Constructed of borosilicate glass to accommodate the 7874, 7875 or 7876 immersion wells. With one- $\frac{1}{4}$ " 14/20 angled joint for sparger tube, one- $\frac{1}{4}$ " 24/40 vertical joint for condenser and one #7 Ace-Thred side arm for thermometer. Center joint is #50 Ace-Thred. Bottom of reactor is flat to allow use of stir bar. Volumes indicated are total volumes. Volume in reactive area of lamp is approximately 40-50% of total volume. Size C hose connections.

**Note:** Listing is vessel only.

Capacity, mL	Order Code
250	7864-08
500	7864-10
1000	7864-12

#### Replacement Parts and Accessories

Sparger Tube, $\frac{1}{4}$ " 14/20	7841-09
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## REACTION VESSEL Photochemical, Jacketed, Ace-Thred ♦

Jacketed reaction vessel to enable cooling of reactant material during photolysis plus the added feature of a 2mm bore, 1:5 PTFE stopcock at bottom for draining inner vessel contents. Constructed of borosilicate glass to accommodate the 7874, 7875 or 7876 immersion wells. With one- $\frac{1}{4}$  14/20 angled joint for sparger tube, one- $\frac{1}{4}$  24/40 vertical joint for condenser and one-#7 Ace-Thred side arm for thermometer. Center joint is #50 Ace-Thred. Bottom of reactor is flat to allow use of stir bar. Volumes indicated are total volumes. Volume in reactive area of lamp is approximately 40-50% of total volume. Size C hose connections.

**Note:** Listing is vessel only.

Capacity, mL	Order Code
250	7865-06
500	7865-08
1000	7865-10



## STIRRER Talboys Advanced Series ★

Talboys Advanced series magnetic stirrer with either a ceramic or aluminum top. Microprocessor controlled with analog speed knob. Speed range 60-1600 rpm. The new low-profile design makes it easier to place under reactors like our Ace photochemical reactor vessels. PTFE stir bar included. Accessory support rod kit available on request. 120v (230v available). CE, UL and CUL approved. Two-year manufacturer's limited warranty.

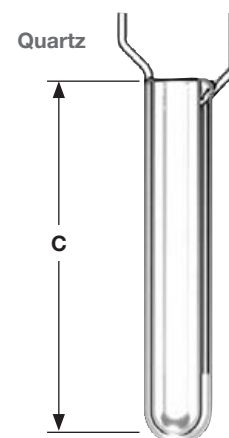
Top Size, in	Capacity, mL	Top	Order Code
4x4	600	Ceramic	13470-10
4x4	600	Aluminum	13470-14
7x7	2500	Ceramic	13470-16
7x7	2500	Aluminum	13470-18

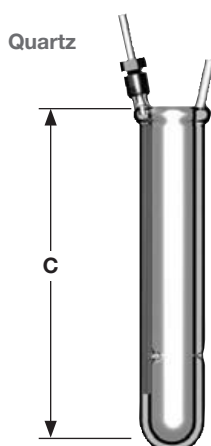


## IMMERSION WELL Photochemical, Quartz, without Joint ★

Double-walled, quartz, immersion well for use with 7863, 7864, 7865, or 7891 reactors and 7825 lamps only. A small diameter inner tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet. Well is used with 7506-14 nylon bushing with FETFE O-Ring to form a compression type seal with threaded reaction vessels. Well offers a greaseless connection and can be adjusted to desired height. **Code -23 is for use in 7891 turntable reactor; code -35 for use in 7863, 7864, and 7865 reaction vessels, all capacities.**

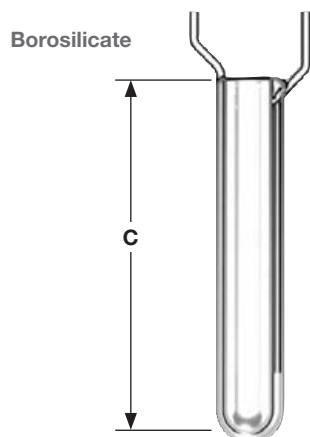
I.D., mm	O.D., mm	Total Length (C), mm	Order Code
31	48	255	7874-23
31	48	450	7874-35




**IMMERSION WELL** Photochemical, Quartz, Modified, without Joint ★

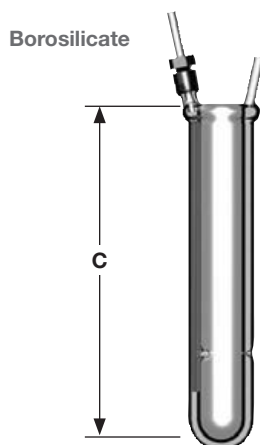
Double-walled quartz immersion well for use with 7863, 7864, 7865, 7891, or 7885 pilot scale reactors and 7825 lamps only. Coolant is introduced through a 4.8mm I.D. PTFE tube attached to a glass tube and secured with a #7 Ace-Thred bushing. PTFE tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet. Well is used with 7506-14 nylon bushing with FETFE O-Ring to form a compression type seal with threaded reaction vessels. Well offers a greaseless connection and can be adjusted to desired height. The Ace-Thred means easier dismantling since it prevents any chance of freezing. **Code -26 is for use in 7891 turntable reactor; code -38 for use in 7863, 7864, and 7865 reaction vessels, all capacities.**

I.D., mm	O.D., mm	Total Length (C), mm	Order Code
31	48	255	7874-26
31	48	450	7874-38
31	48	840	7874-48


**IMMERSION WELL** Photochemical, Borosilicate, without Joint ♠

Double-walled, borosilicate glass, immersion well for use with 7863, 7864, 7865, or 7891 reactors and 7825 lamps only. A small diameter inner tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet. Well is used with 7506-14 nylon bushing with FETFE O-Ring to form a compression type seal with threaded reaction vessels. Well offers a greaseless connection and can be adjusted to desired height. **Code -30 for use with 7891 turntable reactor; code -40 for use in 7863, 7864, and 7865, all capacities.**

I.D., mm	O.D., mm	Total Length (C), mm	Order Code
31	48	255	7875-30
31	48	450	7875-40


**IMMERSION WELL** Photochemical, Borosilicate, Modified, without Joint ♠

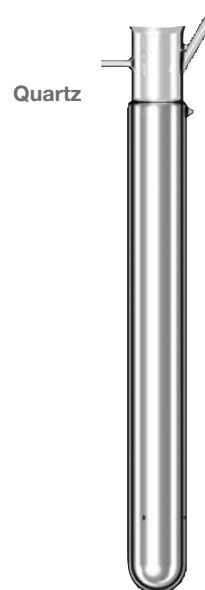
Double-walled, borosilicate glass, immersion well for use with 7863, 7864, 7865, or 7891 reactors and 7825 lamps only. Coolant is introduced through a 4.8mm I.D. PTFE tube attached to a glass tube and secured with a #7 Ace-Thred bushing. PTFE tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet. Well is used with 7506-14 nylon bushing with FETFE O-Ring to form a compression type seal with threaded reaction vessels. Well offers a greaseless connection and can be adjusted to desired height. The Ace-Thred joint means easier dismantling since it prevents any chance of freezing. **Code -35 for use with 7891 turntable reactor; code -45 for use in 7863, 7864, and 7865, all capacities.**

I.D., mm	O.D., mm	Total Length (C), mm	Order Code
31	48	255	7875-35
31	48	450	7875-45



## IMMERSION WELL *Low temperature, Photochemical, Plain* ★

Tripled walled, quartz, immersion well for use in temperatures as low as -78°C. Same as 7858 immersion well, except, plain-sided, (without standard taper joint), for use with #50 Ace-Thred bushing and all 7863, 7864, and 7865 vessels. 415mm total jacket length. Will accommodate 7858-85 and -88 inner tubes.



Description	Order Code
<b>Complete</b>	
	<b>7876-50</b>
<b>Replacement Parts</b>	
Outer Well	7876-10
Stopper	7858-84
O-Ring	7855-740
Inlet Tube	7858-82
Inlet Holder	7858-81
#50 Nylon Bushing with FETFE O-Ring	7506-14
<b>Inner Tubes (480mm x 30 mm)</b>	
Quartz	7858-85
Borosilicate Glass	7858-88

## BUSHING *#50 Ace-Thred* ♠

Bushing connector for securing 7874, 7875, or 7876 Immersion Wells in 7863, 7864, or 7865 reaction vessels by forming a FETFE O-Ring compression seal. Supplied with O-Ring. Fits all #50 Ace-Thred joints.



Material	Order Code
Nylon	7506-14
PTFE	7506-35

### Replacement O-Rings

FETFE	7855-744
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## REFLECTOR *For Medium Pressure Lamp*

Reflector, for use with Ace-Hanovia U.V. lamps. Reflects 85% of spectral rays. Made of aluminum with 44.5 x 10cm opening. Holes in reflector are drilled to accept 11.4cm lamp and are adjustable for 19.1cm and 30.5cm lamps. Reflector supplied with clamps on rear brackets for mounting to 1/2-inch rod (not supplied) and 6-foot power cord.

Lamp is the same as listed under 7825, except ends are adapted for reflector. (Larger lamps available on special order).

Power supply operates on 120v, 60Hz. (230v, 50Hz available, order 7830-61 in place of 7830-60).

**Note:** Lamp and reflector must be ordered separately.



Lamp Watts	Arc Length, cm	Qty	<b>Reflector</b>	<b>Lamp</b>	<b>Power Supply (120V)</b>
			Order Code	Order Code	Order Code
450	11.4 (4.5 in.)	1	7883-02	7883-14	7830-60


**REACTION ASSEMBLY** Photochemical, Complete,  $\text{F}$  Joint ★

Complete reaction assembly with all parts needed for immediate operation. Borosilicate glass reactor has a  $\text{F}$  60/40 center joint, one- $\text{F}$  14/20 angled joint for sparger tube, one- $\text{F}$  24/40 vertical joint for condenser, and one-#7 Ace-Thred joint to accommodate thermometer. Volumes indicated are total volumes. Volume in reactive area of lamp is 40-50% of the total volume. **Complete assembly consists of reactor, 7854 quartz immersion well, sparger tube, PTFE stir bar #7 thermometer bushing, three meters of 4.8mm (3/16-inch) I.D. PTFE tubing, stand, 450 watt lamp and 450 watt power supply.**

115 Volts, 60 Hz		230 Volts, 50 Hz	
Capacity, mL	Order Code	Capacity, mL	Order Code
250	7840-175	250	7840-320
500	7840-180	500	7840-340
1000	7840-185	1000	7840-360

For Low Pressure Lamps, see 12128 or 12132.


**REACTION VESSEL** Photochemical ♠

Reaction vessel constructed of borosilicate glass to accommodate the 7854, 7857 or 7858 immersion wells. With one- $\text{F}$  14/20 angled joint for sparger tube, one- $\text{F}$  24/40 vertical joint for condenser and one-#7 Ace-Thred side arm for thermometer. Center joint is  $\text{F}$  60/40. Bottom of reactor is flat to allow use of magnetic stirrer. Volumes indicated are total volumes. Volume in reactive area of lamp is approx. 40-50% of total volume. **Complete unit consists of vessel, sparger tube, PTFE stir bar, threaded nylon bushing and three meters of 4.8mm (3/16-inch) I.D. PTFE tubing.**

Capacity, mL	For Immersion Well Size, mm	Body only	Complete
		Order Code	Order Code
250	220	7841-03	7841-14
500	220	7841-04	7841-15
1000	290	7841-06	7841-19

**Replacement Parts and Accessories**

Sparger Tube, $\text{F}$ 14/20	7841-09
PTFE Stir Bar, 38mm x 8mm	13654-14
Nylon Bushing, #7	5029-10
PTFE Tubing, 4.8mm I.D. x 3m (for sparger)	12687-12


**REACTION VESSEL** Photochemical, Jacketed ♠

Jacketed reaction vessel designed to enable cooling of reactant material during photolysis. Constructed of borosilicate glass to accommodate the 7854 or 7857 immersion wells. With one- $\text{F}$  14/20 angled joint for sparger tube, one- $\text{F}$  24/40 vertical joint for condenser and one #7 Ace-Thred side arm for thermometer. Center joint is  $\text{F}$  60/40. Bottom of reactor is flat to allow use of stir bar. Volumes indicated are total volumes. Volume in reactive area of lamp is approximately 40-50% of total volume. Size C hose connections. **Listing is vessel only.**

Capacity, mL	For Immersion Well Size, mm	Order Code
250	220	7841-05
500	220	7841-10
1000	290	7841-16

**Replacement Parts and Accessories**

Sparger Tube, $\text{F}$ 14/20	7841-09
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## REACTION VESSEL *Photochemical, Jacketed, with Stopcock* ♠

Jacketed reaction vessel to enable cooling of reactant material during photolysis plus the added feature of a 2mm bore, 1:5 PTFE stopcock at bottom for draining inner vessel contents. Constructed of borosilicate glass to accommodate the 7874, 7875, or 7876 immersion wells. With one- $\frac{1}{4}$ " 14/20 angled joint for sparger tube, one- $\frac{1}{4}$ " 24/40 vertical joint for condenser and one-#7 Ace-Thred side arm for thermometer. Center joint is  $\frac{1}{2}$ " 60/40. Bottom of reactor is flat to allow use of stir bar. Volumes indicated are total volumes. Volume in reactive area of lamp is approximately 40-50% of total volume. Size C hose connections. **Listing is vessel only.**

Capacity, mL	For Immersion Well Size, mm	Order Code
250	220	7844-03
500	220	7844-06
1000	290	7844-09

### Replacement Parts and Accessories

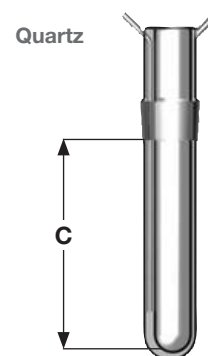
Sparger Tube, $\frac{1}{4}$ " 14/20	7841-09
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## IMMERSION WELL *Photochemical, Quartz* ★

Double-walled, quartz immersion well for use with 7825-30, -32, -34, and -36 lamps. With inlet and outlet tubes for cooling. A small diameter inlet tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet. Well has  $\frac{1}{2}$ " 60/40 inner joint. Outer jacket 53mm O.D. Length above joint is 76mm. Order 7854-25 for use with 7841-03 (250mL) and 7841-04 (500mL) reaction vessels. Order 7854-27 for use with 7841-06 (1000mL) reaction vessel.

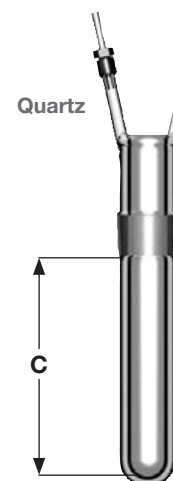
I.D. mm	O.D., mm	For Use With These Reaction Vessels	Distance (C) From Bottom of Well to Bottom of Joint	Order Code
31	53	250, 500mL	220mm	7854-25
31	53	1000mL	290mm	7854-27

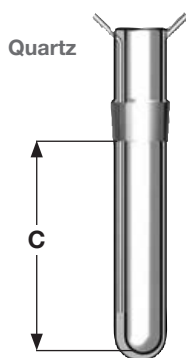


## IMMERSION WELL *Photochemical, Quartz, Modified* ★

Double-walled, quartz immersion well for use with 7825-30, -32, -34, and -36 U.V. lamps. Coolant is introduced through a 4.8mm I.D. PTFE tube attached to a glass tube and secured with a #7 Ace-Thred bushing. PTFE tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet. Well has  $\frac{1}{2}$ " 60/40 inner joint. Outer jacket is 53mm OD. Length above joint is 76mm. Order 7854-26 for use with 7841-03-(250mL) and 7841-04-(500mL), reaction vessels. Order 7854-28 for use with 7841-06 (1000mL) reaction vessel.

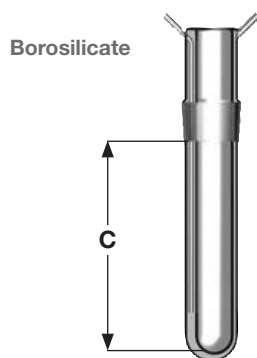
I.D. mm	O.D., mm	For Use With These Reaction Vessels	Distance (C) From Bottom of Well to Bottom of Joint	Order Code
31	53	250, 500mL	220mm	7854-26
31	53	1000mL	290mm	7854-28




**IMMERSION WELL** Photochemical, Quartz, PTFE-Clad Joint ★

Double-walled, quartz immersion well, for use with 7825-30, -32, -34, and -36 lamps. With inlet and outlet tubes for cooling. A small diameter inlet tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet. Well has PTFE-clad  $\text{3/60/40}$  inner joint. Outer jacket 53mm O.D. Length above joint is 76mm. Order 7854-25 for use with 7841-03 (250mL) and 7841-04 (500mL) reaction vessels. Order 7854-27 for use with 7841-06 (1000mL) reaction vessel.

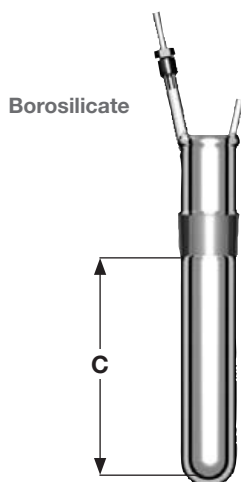
I.D. mm	O.D., mm	For Use With These Reaction Vessels	Distance (C) From Bottom of Well to Bottom of Joint	Order Code
31	53	250, 500mL	220mm	7856-10


**IMMERSION WELL** Photochemical, Borosilicate ♠

Double-walled, borosilicate glass immersion well for use with 7825-30, -32, -34, and -36 U.V. lamps. With inlet and outlet tubes for cooling. A small diameter inlet tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet.

Well has  $\text{3/60/40}$  inner joint. Outer jacket is 53mm OD. Length above joint is 76mm. Order 7857-05 for use with 7841-03 (250mL) and 7841-04 (500mL) reaction vessels. Order 7857-10 for use with 7841-06(1000mL) reaction vessel.

I.D. mm	O.D., mm	For Use With These Reaction Vessels	Distance (C) From Bottom of Well to Bottom of Joint	Order Code
31	53	250, 500mL	220mm	7857-05
31	53	1000mL	290mm	7857-10


**IMMERSION WELL** Photochemical, Borosilicate, Modified ♠

Double-walled, borosilicate immersion well for use with 7825-30, -32, -34, and -36 U.V. lamps. Coolant is introduced through a 4.8mm I.D. PTFE tube attached to a glass tube and secured with a #7 Ace-Thred bushing. PTFE tube extends down the annular space to insure flow of coolant from bottom of well upward to outlet.

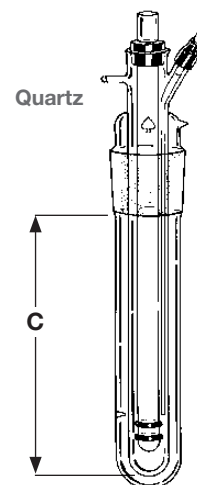
Well has  $\text{3/60/40}$  inner joint. Outer jacket is 53mm OD. Length above joint is 76mm. Order 7857-06 for use with 7841-03 (250mL) and 7841-04 (500mL) reaction vessels. Order 7857-11 for use with 7841-06 (1000mL) reaction vessel.

I.D. mm	O.D., mm	For Use With These Reaction Vessels	Distance (C) From Bottom of Well to Bottom of Joint	Order Code
31	53	250, 500mL	220mm	7857-06
31	53	1000mL	290mm	7857-11

## IMMERSION WELL *Photochemical, Low Temperature* ★

Triple-walled, quartz, immersion well for use at temperatures as low as -78°C. With 60/40 center inner joint. Outer two walls are permanently sealed together and the space between evacuated. This keeps lamp coolant water from warming the reactant and also prevents coolant water from freezing, thus lamp emits correct wavelengths and operates at optimum temperature for longer life. Innermost wall is held in place via a stopper and permits a carefully positioned, PTFE water inlet tube to extend below the lamp bottom. Inner tube is removable and may be interchanged with borosilicate glass tubes. One size tube fits both wells. Well is for use only with 7825 code -30, -32, -34 and -35 lamps. Outer chamber consists of a 7858-84 drilled neoprene stopper, 7855-740 spacer O-Rings, metal water inlet, connecting tube and PTFE tubing.

**Complete unit consists of quartz evacuated outer chamber, one each quartz and borosilicate glass inner tube and assembly Instructions.**



Size	Distance (C) From Bottom of Well to Joint	Outer only	Complete
		Order Code	Order Code
AA	220mm	7858-08	7858-42
BB	290mm	7858-14	7858-45

### Replacement Inner Tubes, only

Quartz	7858-85
Borosilicate Glass	7858-88

## TURNTABLE REACTOR ★

ACE photochemical reactor with sample roundtable feature for the determination of relative and absolute quantum yields. Features adjustable height slots for up to 33 sample tubes in outer circle and 18 tubes in inner circle, 13mm O.D.

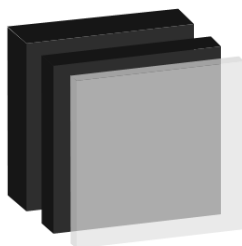
Samples rotate equidistantly around lamp at 6 rpm. Chamber between lamp and samples holds four, 51mm square, removable flat filters. Unit is constructed of anodized aluminum, brass and PTFE. Measures 25.4cm diameter at base x 61cm high at top of motor stand. Except for motor, reactor is completely immersible and can be easily disassembled for cleaning. We recommend use with 7825-34 Lamp and 7874-23 or 7875-30 immersion well. Operates on 115v, 50/60 Hz. A 230v, 50Hz version is available by special order. Supplied with two-wire, ground NEMA plug. **Complete unit includes motor, but does not include filters, immersion well, lamp, power supply or sample tubes.**

	Order Code 7891-30
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### Sample Tubes Only

For sample tubes see 8683-08 or 8686-09



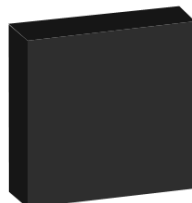


### FILTER GLASSES Color, Polished ★

A combination of either 7891-40 and 7891-42 or 7891-40 and 7891-44 isolates 3650 line. 51 x 51mm.

*Note: For use in four-sided filter chamber supplied with 7891 reactor.*

Corning #	Thickness	Color	Order Code
CS 0-52	1.9-2.1mm	Clear	7891-40
CS 7-37	4.9-5.1mm	Black	7891-42
CS 7-60	4.4-4.6mm	Black	7891-44



### FILTER GLASSES Color, Polished ★

When used in conjunction with a filter solution of potassium chromate and sodium hydroxide less than 3% of the 3340 line passes. The solution may be circulated via pump as a coolant through well. 51 x 51mm.

*Note: For use in four-sided filter chamber supplied with 7891 reactor.*

Corning #	Color	Order Code
CS 7-54	Black	7891-46



### PLATFORM REACTOR Photochemical/Photobiological ★

Used by water chemists for radiating metals in water to obtain metal-free water. Also used to remove unbound chlorine from drinking water. This reactor is similar to the unit published in *Nature*, London, Vol. 211, pgs. 481-483, 1966; *Photochemical Combustion of Organic Matter in Sea Water, for Nitrogen, Phosphorus and Carbon Determination*, by Armstrong and Tibbits. This aluminum reactor consists of a top platform with eight 33mm I.D. sample tube holes encircling a 40mm lamp well hole; adjustable height, 0-20.5cm, middle platform with grooves to stabilize sample tubes; and a lower platform holding a fan for blowing air up the side of center lamp well. Lamp well is held in a basket pouch attached to the middle platform low enough so that the effective area of the U.V. lamp radiates the very bottom of the sample tubes. Fan is shielded top and bottom by a stainless steel screen and is supplied with 1.8m grounded line cord. Operates on 115v, 50/60 Hz. Overall height approximately 40cm. Lamp, power supply, lamp well and sample tubes NOT included. Available for 230v, 50 cycle operation, ask for quotation. Recommended for up to a 450 watt rated lamp.

Order Code  
7892-24

### SAMPLE TUBES

Sample tubes, for 7892 photochemical platform reactor, made from quartz or borosilicate glass. Tubes are 20cm long x 32mm O.D. and hold approximately 130mL. Available with plain end or with  $\text{F}$  24/40 joint.

Style	Order Code
Quartz, Plain end	7892-30
Borosilicate, Plain End	7892-35
Quartz, $\text{F}$ Joint	7892-31
Borosilicate, $\text{F}$ Joint	7892-36

### IMMERSION WELL

Single walled, quartz or borosilicate glass immersion well for use with 7892 photochemical platform reactor. Measure 25.5cm long x 38mm O.D. Will accept **only** 7825-30, -32 and -34 immersion lamps and 7835 absorption sleeves.

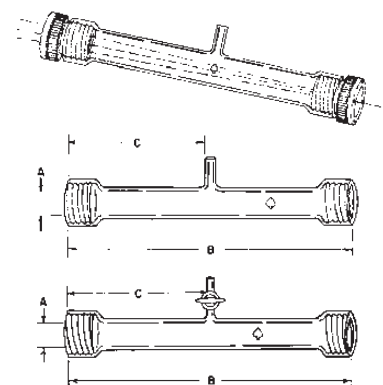
Style	Order Code
Quartz	7892-40
Borosilicate	7892-45

**PHOTOCHEMICAL CELL with Removable Window** ♦

Straight, borosilicate glass, photochemical cell with threaded end fittings for use with 7896 cell window holder. The ease in removing these holders makes cleaning the cell easier. Available with single or plain port or with single, straight, 2mm bore, glass stopcock. **NOT** supplied with windows or holders. Please state dimension B, otherwise we will supply B = 12 inches. Port will be centered between threaded ends unless requested otherwise. For lengths smaller than one foot, use single foot prices.

Type Port	Size (A) I.D., mm	Order Code
Plain	25	7894-10
Plain	50	7894-15
w/Stopcock	25	7894-30
w/Stopcock	50	7894-35

**For additional or larger lengths, call for quote.**



For an operational unit, order one 7894, two 7895 Windows and two 7896 Window Holders. You choose cell length and inside diameter.

**CELL WINDOWS** ★

Windows to be used with 7894 photochemical cells and 7896 cell window holder. The windows are grounded and polished (optical grade).

Material	For #25 Ace-Thred		For #50 Ace-Thred	
	Size Diameter, mm x W.T., in.	Order Code	Size Diameter, mm x W.T., in.	Order Code
Quartz	30 x 1/8	7895-03	62 x 1/8	7895-08


**CELL WINDOW HOLDER** ♦

Nylon cell window holder for use with 7894 photochemical cells and 7895 cell windows. The removable cell window is compressed between (2) FETFE O-Rings for a leak-tight fit. Holder is then threaded into end of a 7894 cell until O-Ring compression seal is formed between the holder and the cell.

**Note:** Supplied complete, consisting of Threaded Body, (2) FETFE O-Rings, Compression Ring and (4) Flat-head Screws.

Ace-Thred	Order Code
25	7896-20
50	7896-30

**Replacement O-Rings**

25	7855-727
50	7855-729



**Don't see what you're looking for?  
We can help.**

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COME TO LIFE**

...with help from Ace Glass



**We can provide just one piece or  
as many as you need**

**Reproduction of  
competitive products**

**User designed  
specialized glassware**

**Modification of  
existing stock products**



## PHOTOBIOLOGICAL-OXIDATION APPARATUS U.V.

Standard unit for liberation of inorganic phosphate from organically bound phosphorus compounds, oxidation of carbon in organic matter and oxidation of organic nitrogen compounds. Oxidation of organic compounds in water and sediment samples is accomplished by exposure to ultraviolet radiation in the presence of excess oxygen. Organically bound phosphorus is liberated as the ortho-phosphate in as little as one hour. Organic matter is oxidized to CO<sub>2</sub>. Nitrogen compounds are oxidized to the nitrate and nitrite ions.

Additional applications include decomposition of organometallic compounds, providing organic-free samples for culture, nutrition and vitamin assay, destruction of algal suspensions, and oxidation of sediment or residue samples.

Apparatus consists of a cylindrical lamp housing with twelve-position sample tube chamber for twelve quartz tubes of approximately 100mL capacity that surround a 1200 watt medium pressure photochemical lamp. **Access door is provided for set-up, inspection and repairs only – for your safety, do not use this door while the unit is in operation.**

A cooling fan is located at bottom of housing for air movement. Lamp power supply includes a manual or automatic twelve-hour timer selector for programming exposure time. Available in 220v, 60Hz. or 230v, 50Hz. Lamp housing measures 12 inches wide x 20 inches deep x 36 inches high, and weighs 75 lbs. Power supply measures 11 inches wide x 18 inches deep x 11 inches high, and weighs approximately 75 lbs.

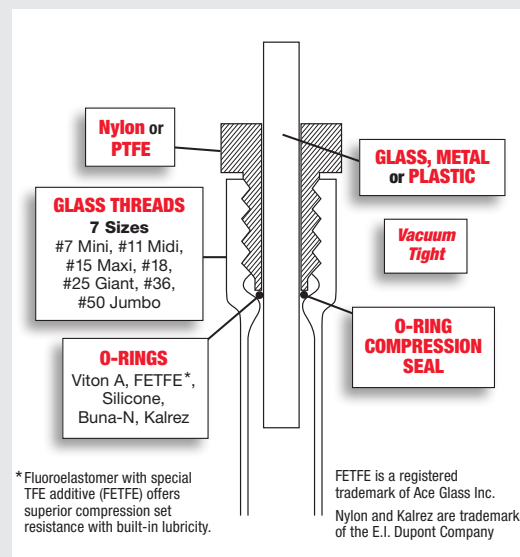
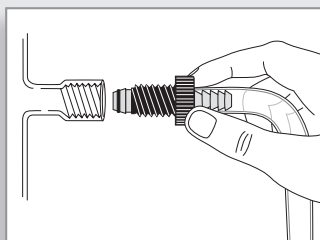
- Liberation of inorganic phosphate from organically bound phosphorous compounds
- Oxidation of organic nitrogen compounds, and carbon in organic matter

	220v, 60Hz.	230v, 50Hz.
	<b>Order Code</b>	<b>Order Code</b>
Lamp Housing, only	7900-81	7900-81
Power Supply with Timer	7900-71	7900-74
Lamp, 1200 watt	7825-40	7825-40
Quartz Sample Tubes, 35 x 2.5cm (12)	7900-12	7900-12
Pyrex Stopper (12)	7900-13	7900-13
<b>Complete</b>		
	7900-31	7900-30



## Ace-Threds

Grease Free | Clamp Free | More Convenient





### PHOTOBIOLOGICAL-OXIDATION APPARATUS U.V., Flow-Thru

Modified version of 7900 Apparatus. Sample tubes have been replaced with a flow-thru quartz or borosilicate coil for continuous radiation of small (as little as 175mL) or large samples. Coil is available with cooling jacket for slow flow rates or without jacket when heating of sample is not a concern because of the higher flow rate.

Apparatus consists of a cylindrical lamp housing, medium pressure 1200 watt photochemical lamp, quartz or borosilicate glass coil (with or without jacket), and power supply. **Access door is provided for set-up, inspection and repairs only — for your safety, do not use this door while the unit is in operation.**

A cooling fan is located at bottom of housing for air movement. Lamp power supply includes a manual or automatic twelve-hour timer selector for programming exposure time. Available in 220v, 60Hz. or 230v, 50Hz. Lamp housing measures 12 inches wide x 20 inches deep x 36 inches high, and weighs 75 lbs. Power supply measures 11 inches wide x 18 inches deep x 11 inches high, and weighs approximately 75 lbs. Coil is 12.7mm O.D. x 8.0mm (5/16-inch) I.D. with 1/2-inch Swagelok ends, 16 ±1 turns with approximate capacity of 175mL, maximum flow rate of 10L/min.

- Coil available with cooling jacket for slow flow rate or without cooling jacket for high flow
- Flow-thru quartz or borosilicate glass coil for continuous radiation of small (as little as 175 mL) or large volumes

	220v, 60Hz.	230v, 50Hz.
	<b>Order Code</b>	<b>Order Code</b>
Lamp Housing, only	7901-65	7901-65
Power Supply w/Timer	7900-71	7900-74
Lamp, 1200 watt	7825-40	7825-40
Quartz Coil, 12.7mm O.D. x 8.0mm I.D., 175mL	7901-76	7901-76
<b>Complete</b>		
	7901-55	7901-58
<b>Accessories</b>		
Borosilicate Coil, 12.7mm O.D. x 8.0mm I.D., 175mL	7901-80	7901-80
Quartz Coil, Jacketed, 12.7mm O.D. x 8.0mm I.D., 175mL	7901-88	7901-88
Borosilicate Coil, Jacketed, 12.7mm O.D. x 8.0mm I.D., 175mL	7901-89	7901-89



## ACE Quality Laboratory & Scientific Product Lines Include...

**Hydrogenation/Gas Apparatus** — Featuring heavy-walled pressure-tested glass reaction vessels and connectors with Ace-Threds — eliminates rubber stoppers.

**Pilot Plant/Reaction Equipment** — Standard and custom-designed portable reactors from 10 to 200 Liters. **Contact Ace to get a copy of our reactor catalog.**

**Pressure Reactor Systems** — 500 to 5,000 mL capacity. Pressure limits to 45 psig/100°C. **Contact ACE to get a copy of our reactor catalog.**

**Instatherm® Oil Baths** — Rapid, even heat, very efficient, no super-heating.

**Temperature Controllers** — Dependable, accurate ACE & J-Kem temperature controllers for oil baths, mantles, immersion heaters, etc..

**Ultrasonics** — Complete line of glassware and equipment used to promote and enhance chemical reactions through the use of ultrasonic energy.

**Micro/Mini-Lab®** — The original microscale-sized glassware designed exclusively for ACE by Drs. Dana W. Mayo, Ronald M. Pike and Samuel S. Butcher of Bowdoin College.

**Multi-Step Filter Reactors** — 150 to 6,000 mL capacity. single or multi-step filter reactors. **Contact ACE to get a copy of our reactor catalog.**

## REACTION FLASK *Photochemical, Kriel\**

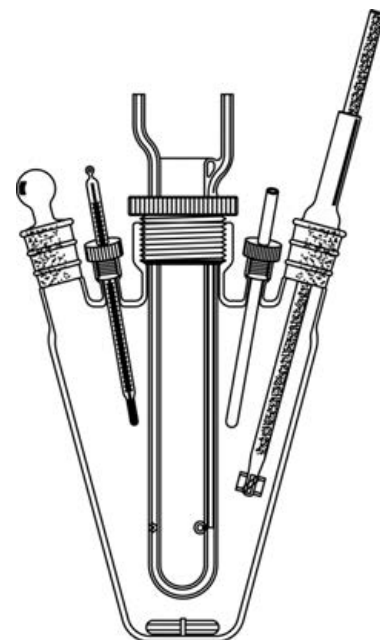
Tapered wall style reaction vessel for prep-scale photolysis. Tapered sides assure that the effective area of a 450w or 550w photochemical lamp can be entirely submersed into the liquid, contrary to traditional round bottom reaction flasks. Net result is approximately a 20% savings in reaction time. An additional advantage of this design is in the initial mixing of reactants. The flat bottom allows immediate stirring with a magnetic stirrer and after only one-third full, mechanical stirring can be implemented. Center neck is #50 Ace-Thred for use with 7874 or 7875, 450mm Immersion Wells. **Threaded design offers convenience of vertical depth positioning of well to suit your needs.** Two side joints are  $\text{F} 29/42$ , one for 10mm stirring shaft and bearing, the other for charging flask or condenser, etc. Two front ports are #7 Ace-Threds, one with 7mm I.D. bushing for a thermometer, the other with 8mm I.D. bushing for sparger tube, etc.

**Complete unit consists of flask, immersion well (quartz), glass stopper, stirring shaft, bearing, one #7 nylon bushing with 7mm I.D. hole, one #7 bushing with 8mm I.D. hole and PTFE stir bar.** For stirrer coupling, flexible shaft, see 8124-10 and 8081. For motor and controller, see 13649 and 13530.

Style Center Neck	Capacity, mL	For Immersion Well Size, mm	Order Code
#50 Ace-Thred	3000	450	6962-62
#50 Ace-Thred	5000	450	6962-65

### Replacement Parts

Flask Only, 3L, #50 CN, (2) $\text{F} 29/42$ , (2) #7 threads w/bushings and O-Rings	6962-32
Flask Only, 5L, #50 CN, (2) $\text{F} 29/42$ , (2) #7 threads w/bushings and O-Rings	6962-35
Immersion Well, Quartz, 450mm for #50 Ace-Thred	7874-35
Bushing, Nylon, with O-Ring, for -62 and -65	7506-14
Stopper, $\text{F} 29/42$	8250-14
Bearing, $\text{F} 29/42$	8038-20
Stirring Shaft, 10mm	8068-303
PTFE Stir Bar, 7.9mm x 50.8mm long	13654-18



\*Designed and evaluated by Dr. Dennis Kriel, The Dow Chemical Co., Central Research-Polymer Research Lab, Midland, MI 48640.

## LAMP *Low Pressure, PenRay®*

Cold cathode, low pressure, mercury arc, gaseous discharge lamps made of double-bore quartz. Lamp power consumption is 5.5 or 15 watts, with principal output at 254 nanometers. Lamps are rated for 5000 hours of operation.

**Note:** Lamp comes with 90-day warranty. CE rated.

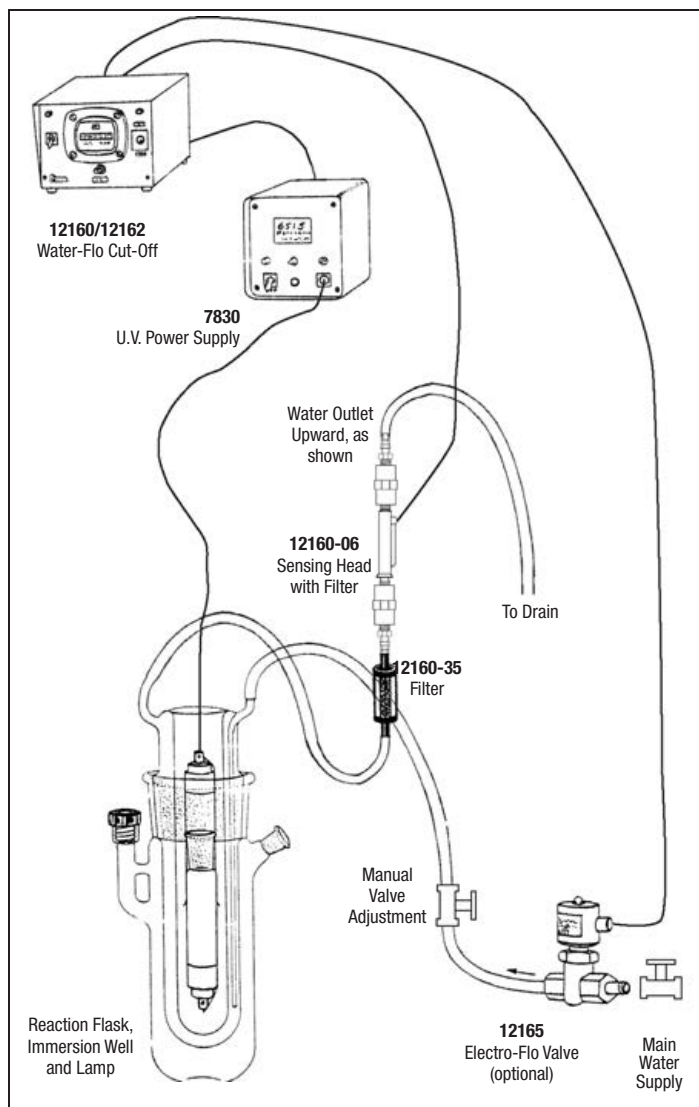
### 115 Volt Environments

Power Supply						Lamp							
Input Voltage	Input Freq.	Starting Voltage, Vac	Max. Lamp Voltage, Vac	Dim., mm	Order Code	Lighted Length, mm	Overall Length, mm	Quartz O.D., mm	Handle O.D., mm	Cord Length, mm	Starting Voltage, Vac	Operating Voltage, Vac	Order Code
115	60	2300	300	160x94x53	12132-30	53.8	117.3	6.5	9.5	406	800	270	12132-08
						228.6	294.6	9.5	12.7	640	560	12132-15	

### 230 Volt Environments

230	50/60	2800	300	117x147x97	12132-35	228.6	294.6	9.5	12.7	406	640	560	12132-15
230	50/60	2300	300	160x94x53	12132-502	53.8	117.3	6.5	9.5	406	800	270	12132-08





**Typical Installation**

### WATER-FLO POWER CUT-OFF 15 amps ★

- Prevents damage caused by water or power failure.
- Controls 1.8 kw AC power at 120\* volts, 15 amperes (12160 and 12162); or 4.6 kw AC power at 230 volts, 20 amperes (12164).
- Provides automatic reset for power outages of **less than 90 seconds' time and water line pressure drops of less than 5.0 seconds.**

A water flow monitoring unit that will shut off all power in the event of water or main power failure. On/Off control normally operates with water flow above 0.2 L/Min. One front and two rear outlets allow control of up to three apparatus at once at 1.8 kilowatts AC power. 120 volts\* (up to 15 amps), fused. Unit starts with push button reset located on front panel.

In the event of water flow failure and later correction, monitor must be reset to operate. Main ON-OFF. Yellow indicator light monitors output power outlet; red pilot light indicates when power is at input (120v AC-15 amps). Heavy duty contractor relay delivers up to 1.8 kilowatts output. Low voltage at detector (5 volts) means user safety, isolation from ground shock. With 5.0 second time delay OFF to address water line air bubble or short pressure drops.

This improved version provides automatic reset for power outages of less than 90 seconds time. This allows output power to re-start for brown-outs of the main, that would normally stop the process.

Water-Flo Power Cut-Off is functional with any type detector using an on-off switch such as 12160-06 Sensing Head, micro-switches, proximity switches, bimetal thermostats. It will control any type load such as ACE 7830 Photochemical Power Supplies, 12165 Shut-Off Solenoid Valve, heaters, mantles, AC motors, pumps, or any load using 120v AC line power and maximum 15 amps.

Supplied with 1.8 meter grounded line cord with NEMA plug. Water sensing head, supplied complete with water filter, connects via pin jacks to rear of panel and is marked IN and OUT for proper installation. With 9.5mm (3/8-inch) hose connections.

Description	Order Code
Sensing Head, w/Water Filter	12160-06

We recommend the use of a sediment filter at the water source to avoid long term failure, see 12165-70.  
2-year Conditional Warranty.  
For 240 volt use, see 12164-30.

## WATER FILTER

Installs *ahead of* sensing head. 50 micron screen prevents failure of sensing head due to dirt or rust coming from the water supply. Supplied with replaceable filter cartridge. Has 3/8-inch O.D. hose connections. Labeled inlet and outlet.



Order Code
12160-35

## WATER-FLO POWER CUT-OFF 20 amps (230 volts) ★

Similar to 12160 except will control one or two apparatus at 4.6 kilowatts AC power, 208-250 volts, 50/60 Hz. (up to 20 amps), fused. Two rear outlets allow use with our 7830-71 power supply and 12165 shut-off water valve (230v).



Description	Order Code
Sensing Head, w/Water Filter	12160-06
Power Pack, only	12164-20

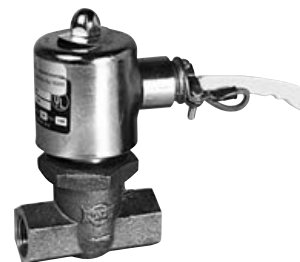
### Complete

12164-30
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## “ELECTRO-FLO” SHUT-OFF VALVE

A water or air\* shut-off solenoid valve for use with 12160, 12162 or 12164 water-flo power cut-off or as a general laboratory shut-off valve. Operates from 0.35Kg/cm<sup>2</sup> to 10.5Kg/cm<sup>2</sup> (5 to 150 psi) for water or 0.35Kg/cm<sup>2</sup> for air and up to 91°C. Internal design of pilot-operated, piston-type, valve assures exceptional flow performance. Constructed of cast bronze with waterproof cast-coil that has a lifetime warranty. Valve must be installed in horizontal piping with solenoid in vertical position. Supplied with 1.8 meter grounded cord and female pipe thread. Codes -14, -20 and -26 for use with 12160 and 12162. Codes -48, -54 and -57 for use with 12164.



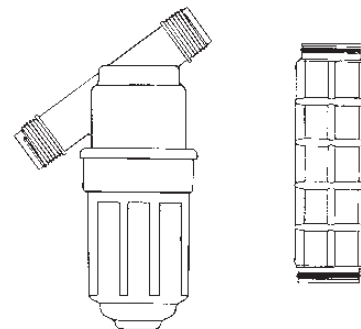
*Note: A pre-filter is recommended when this product is used with water or air (15 micron or less).*

Pipe Sizes, mm	(For 120v)	(For 230v)
	Order Code	Order Code
9.5 (3/8 in.)	12165-14	12165-48
12.7 (1/2 in.)	12165-20	12165-54
19.1 (3/4 in.)	12165-26	12165-57

*\*When used as air shut-off valve, a strainer is recommended.*

## WATER FILTER Screen

General purpose, chemically resistant, non-corrosive water filter with a polyester housing and filter screen. Recommended for use with ACE No. 12165 Solenoid Valves\*, above, or other in-line valves to prevent particulate matter from entering valve and causing malfunction. Fluid flows along longitudinal axis of cylinder, resulting in minimum pressure drop. Flow direction is indicated by arrow on top of housing body. Filtered particles collect in bottom of cylinder. Bottom housing unscrews to allow cleaning. Top and bottom neoprene O-Rings on filter screen eliminate the possibility of fluid by-pass and assure complete fluid filtration. Filter supplied is 22 micron (450 mesh). Maximum working temperature: 140°F; maximum pressure: 115 psi; maximum flow rate: 12 GPM. Measures: 10-1/4 inches high x 6-5/8 inches wide. Connections are 3/4-inch NPT male.



Description	Qty	Order Code
Filter Housing , only	1	12165-64
Filter Screen, 22 micron, only	1	12165-67

### Complete

1	12165-70
---	----------

*\*Also for use with 12160, 12162 and 12164 Water-Flo Power-Cutoff.*



### WATER FLOW MONITOR *J-Kem Model WFM-120*

J-Kem monitor precisely measures the flow of water through a condenser, bath or a photochemical reactor. Upon interruption or if the flow drops below an operator set rate, power to the monitored equipment is cutoff. Manual power reset. Inclusion of a 12168-10 shut-off valve and either a 12169-01 audible alarm or a 12169-05 digital alarm is recommended.

J-Kem Model	Description	Flow Rate, LPM	Qty	Order Code
WFM-01	Flow Sensor	0.1 to 2.5	1	<b>12168-01</b>
WFM-02	Flow Sensor	1 to 10	1	<b>12168-02</b>
WFM-03	Flow Sensor	2 to 30	1	<b>12168-03</b>
—	Shut-Off Valve	—	1	<b>12168-10</b>
WFM-120	Water Flow Monitor	—	1	<b>12168-120</b>
WFM-230	Water Flow Monitor	—	1	<b>12168-230</b>



### LAB SAFETY CONTROLLER *J-Kem Model LS-120*

Combines all the features of the digital temperature monitor and the water-flow monitor into a single versatile instrument. Plug any piece of equipment into the monitor, then if the water flow rate falls below the set level, or if the reaction temperature goes above or below the user set limits, the outlet power turns off automatically. The unit will also cut off power if the main power is interrupted. The controller then has to be reset. See ACE 12168 product family for flow sensors.









J-Kem Model	With Sensor Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
LS-120-T	No	-200 to 250	T	1	<b>12167-01</b>
LS-120-J	No	0 to 800	J	1	<b>12167-03</b>
LS-120-K	No	-50 to 1200	K	1	<b>12167-05</b>

### 12169 ALARM *J-Kem*

Digital alarm outlet and audible alarm accessories for J-Kem safety controller and water-flow monitors. Allows units to be set up for alarm warnings when in unsafe conditions. The audible alarm sounds during low or no water conditions for the 12168 monitor and the digital alarm activates on either the water flow monitor or the safety controller, when conditions are out of set ranges.

J-Kem Model	Alarm Type	For Controllers	Order Code
WFM-AA	Digital	12167 & 12168	<b>12169-01</b>
WFM-OC	Audible	12168	<b>12169-05</b>

## Tubing Sizer for Peristaltic Pumps

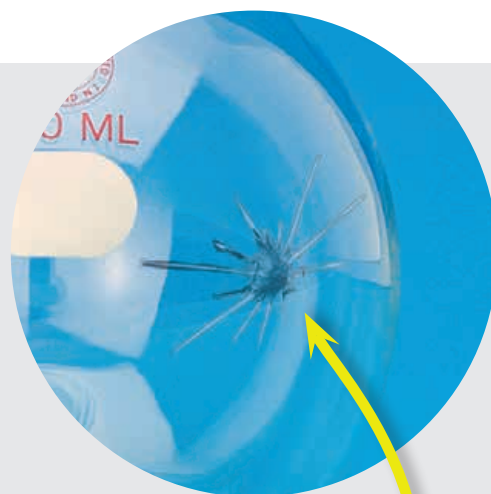
Tubing sizes																
Inner diameter (mm):	0.8	1.7	3.1	4.8	6.3	4.8	6.3	7.9								
Outer diameter (mm):	4.0	4.9	6.3	8.0	9.5	9.8	11.3	12.9								
Wall thickness (wt) (mm):	<b>1.6</b>	<b>1.6</b>	<b>1.6</b>	<b>1.6</b>	<b>1.6</b>	<b>2.5</b>	<b>2.5</b>	<b>2.5</b>								
Max. pressure (continuous/short time) (bar):	0.7/1.7	0.7/1.7	0.7/1.7	0.5/1.5	0.5/1.5	0.8/1.8	0.8/1.8	0.8/1.8								
Suction height (mH <sub>2</sub> O):	8.8	8.8	8.8	8.8	6.7	8.8	8.8	8.8								
<b>Flow rates in combination with pump head/pump drive</b>																
<b>SP quick</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>
PD 5106/PD 5206 (ml/min):	1.6	40	6.8	169	25.7	643	56	1,400	88.7	2,217	56	1,400	88.7	2,217	132	3,300
PD 5006 (ml/min):	3.3	40	14.1	169	53.6	643	116.7	1,400	184.8	2,217	116.7	1,400	184.8	2,217	275	3,300
PD 5101/PD 5201 (ml/min):	0.3	8.0	1.4	34	5.2	129	11.2	280	17.7	443	11.2	280	17.7	443	26.4	660
PD 5001 (ml/min):	0.7	8.0	2.8	34	10.7	129	23.3	280	37.0	443	23.3	280	37.0	443	55	660
<b>SP standard/SP vario</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>	<b>min.</b>	<b>max.</b>		
PD 5106/PD 5206 (ml/min):	2.4	60.2	10.4	260	41.2	1,029	86.3	2,157	146	3,644	86.3	2,157	146	3,644		
PD 5006 (ml/min):	5.0	60.2	21.7	260	85.8	1,029	179.8	2,157	304	3,644	179.8	2,157	304	3,644		
PD 5101/PD 5201 (ml/min):	0.5	12.0	2.1	52	8.2	206	17.3	431	29.2	729	17.3	431	29.2	729		
PD 5001 (ml/min):	1.0	12.0	4.3	52	17.2	206	36	431	60.7	729	36.0	431	60.7	729		

# REPAIR SERVICE SCIENTIFIC GLASSWARE

## Yes, we fix it, too!

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. The majority of the time, these repairs are far less expensive than the cost of replacing.

**Broken joint or a cracked flask, we can restore it!**



To find out more about our repair service call  
**1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)

### POLYSCIENCE BENCHTOP MINI-CHILLER

*High Performance at a Reasonable Price* ★

Benchtop mini-chiller by PolyScience. Compact size for bench applications such as photochemistry, Chromatography or jacketed bench reactors. Features include:

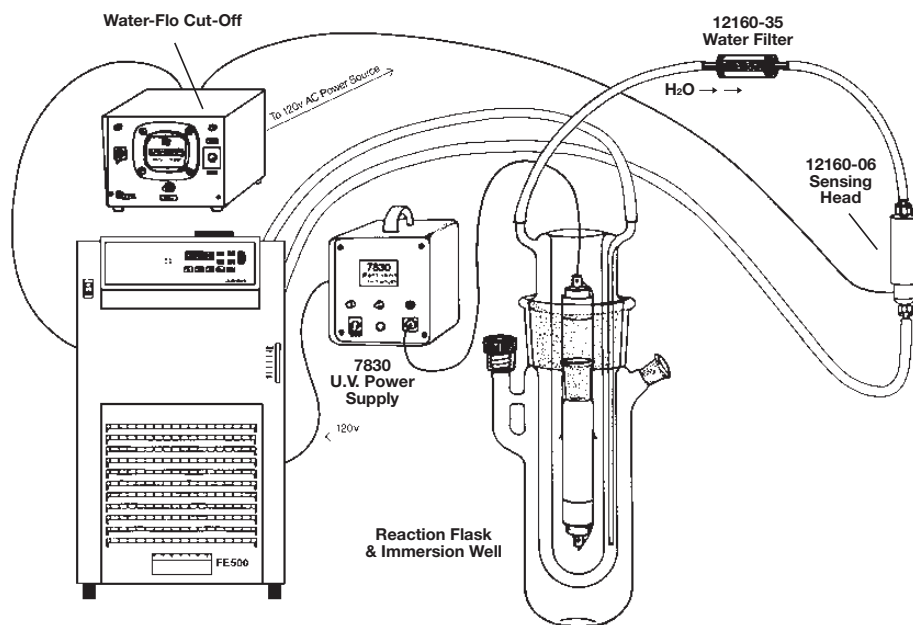
- 130 watts of cooling @ 5°C
- Top-mounted fill port with spill protection cup
- Lighted fluid level indicator on front panel
- Easy access front panel and air filter
- Low flow rate and energy consumption
- High and low liquid level alarms
- Low flow alarm
- Temperature range -5 to 50° C at 0.1° stability
- Maximum pump flow 7.9LPM
- Pump type: centrifugal
- Reservoir capacity 2.65L
- 120V, 60Hz, 130W, 12 amp
- Also available in 240V, 50hz, CE-approved version



Order  
Code

12450-07

**Highly recommended for use in the operation of Ace 7861 and 7840 reactors.**

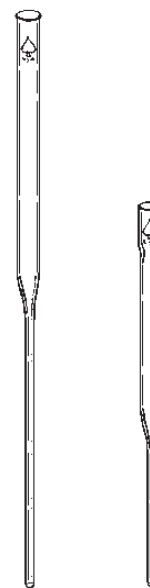




**PIPET Disposable ♠**

Used for transferring blood in blood testing work and other areas where transfer of material is essential but accuracy not important. Each box contains extra pipets to compensate for possible breakage due to fragility of the item. Available in 14.6cm (5-3/4-inch) and 22.9cm (9-inch) lengths. Minimum order 1-1/4 gross.

Size, cm	Qty	Order Code
14.6	Box of 1,000	<b>7974-10</b>
22.9	Box of 1,000	<b>7974-20</b>


**DISPENSING PIPET Automatic ♠**

Fills and pours automatically, rapidly. One head for all capacities, all volumes. Short tipping angle, interchangeable volumetric bulbs give reproducible volumes. Bulb joint is  $\text{K} 14/20$ , head and flask  $\text{K} 29/42$ . Complete apparatus consists of head, flask, volumetric bulb, clip, two 19mm (3/4-inch) springs, one 38mm (1-1/2-inch) spring.

Description	Capacity, mL	Qty	Order Code
Head (including spring and clip)	–	1	<b>8004-10</b>
Flask	500	1	<b>6965-40</b>
Flask	1000	1	<b>6965-41</b>
Clip for Head only	–	3	<b>8004-03</b>

**Replacement Springs**

For replacement springs see 8030

**Volumetric Bulbs**

Capacity, mL	Qty	Order Code	Capacity, mL	Qty	Order Code
1	1	<b>8004-15</b>	15	1	<b>8004-30</b>
2	1	<b>8004-18</b>	20	1	<b>8004-33</b>
3	1	<b>8004-21</b>	25	1	<b>8004-36</b>
4	1	<b>8004-22</b>	30	1	<b>8004-39</b>
5	1	<b>8004-24</b>	50	1	<b>8004-42</b>
6	1	<b>8004-23</b>	60	1	<b>8004-44</b>
10	1	<b>8004-27</b>	100	1	<b>8004-45</b>





### PRESSURE FLASKS 60psig @ 120°C

Round bottom pressure flask, with either #15 or #25 PTFE plug seal for top opening. The 8417 product family also has a side thermowell port to facilitate a thermometer or a temperature probe to measure flask temperature without losing the pressure integrity of the vessel. The flask has a PTFE front-seal plug with FETFE O-Ring for an optimum seal. Flasks have a pressure rating of 60psig at 120°C. All flasks are tested at 1.5x for pressure ratings.

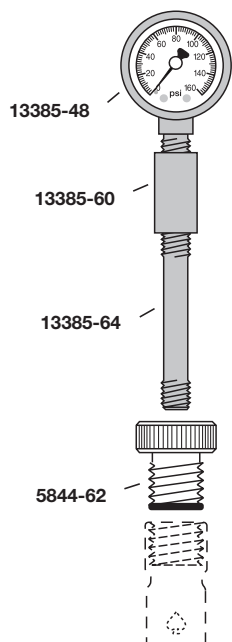
Body O.D., mm	Flask Dimension, mL	Approx. Total Capacity, mL	Complete w/o Thermowell	Complete w/Thermowell
			Order Code	Order Code
<b>#15 Ace-Thred</b>				
50	50	46	8415-05	8417-03
62	100	94	8415-07	8417-05
82	250	199	8415-11	8417-07
100	500	394	8415-15	8417-09
<b>#25 Ace-Thred</b>				
62	100	94	8415-17	8417-13
82	250	199	8415-21	8417-15
100	500	394	8415-25	8417-17



### PURGE ADAPTER with Shutoff, PTFE

PTFE purge/shutoff adapter allows purging of air-sensitive contents from within our 8415, 8417, and 8648 pressure vessels. Ace-Thred adapter features (2) top taps, either 1/4"-28 UNF or 1/8" NPT, controlled via a two-way stopcock. Complete with FETFE® O-Rings. Max 160psig, min 0.003mmHg.

Ace-Thred Size	Tap Size	Order Code
#15	1/4"-28 UNF	5808-30
#15	1/8" NPT	5808-35
#25	1/4"-28 UNF	5808-40
#25	1/8" NPT	5808-45
#36	1/4"-28 UNF	5808-50
#36	1/8" NPT	5808-55



### PRESSURE GAUGE 0-160psig, 1/8" NPT

Monitor pressure in 8415, 8417, 8648 and 8649 pressure vessels. Gauge has a 1-1/2" dial, Grade B dry, 0-160psig with 1/8" NPT male threaded extension. Connection can be made to 8648 tube by substituting 5846 plug with 5844-62 adapter. Gauge can be threaded directly into the 5844 or in the event the pressure tube is being heated in an oven, a 3" stainless steel extension is offered to keep gauge outside the oven. We suggest you use PTFE sealing tape when making these connections to assure a tight seal.

**Note:** Order all items individually.

Description	Order Code
<b>Pressure Gauge Components</b>	
Gauge only, 1-1/2", 0-160psig, 1/8" NPT	13385-48
Gauge only, 1-1/2" full vacuum-60psig, 1/8" NPT	13385-52
Adapter, #15 to 1/8", PTFE	5844-62
Coupling, S-S, 1/8"-1/8" NPT female, 1.5"	13385-60
Threaded Extension, S-S, 1/8", 3" long	13385-64
PTFE Sealing Tape, 1/4" width	14120-14
FETFE O-Ring, Size -110	7855-716

## PRESSURE TUBES 150psig @ 120°C

These heavy wall tubes are unique in that Ace-Threds allow for easy closing of plugs, which are reusable. The plugs have O-Rings for assurance of a tight seal by simply hand tightening. The tubes are offered in several lengths with #7, #15, #25, or #36 Ace-Threds. They can be custom fabricated in various lengths and diameters, if needed.

For pressure work, a “Front Seal” plug (5846) is recommended. “Back Seal” plugs (8545) are also available, if preferred. Tubes have a pressure rating of 150psig at 120°C.

Complete items include Glass Tube and PTFE Plug with FETFE® O-Ring.

**Note:** Also available, as an option, for monitoring purposes, the tubes can be assembled with a stainless steel, 0-160psig pressure gauge (previous page) using a 5844 Adapter in place of the 5845 or 5846 Plugs. Stainless steel tube extensions are offered to allow use of the tube in a furnace.



Length, (below thread), cm	Body O.D., mm	Approx. Total Capacity, mL	Tube only	Complete Front Seal	Complete Back Seal
			Order Code	Order Code	Order Code
<b>#7 Ace-Thred</b>					
10.2 (4")	8	1	8648-40	8648-10	—
10.2 (4")	13	4	8648-41	8648-12	—
10.2 (4")	19	9	8648-42	8648-17	—
17.8 (7")	8	2	8648-132	8648-21	—
17.8 (7")	13	8	8648-133	8648-25	—
17.8 (7")	19	18	8648-134	8648-34	—
20.3 (8")	8	2.5	8648-45	8648-36	—
20.3 (8")	13	9	8648-46	8648-38	—
20.3 (8")	19	21	8648-47	8648-43	—
30.5 (12")	8	3	8648-50	8648-48	—
30.5 (12")	13	15	8648-51	8648-53	—
30.5 (12")	19	27	8648-52	8648-55	—
<b>#15 Ace-Thred</b>					
10.2 (4")	25.4	15	8648-23	8648-04	8648-03
10.2 (4")	38.1	60	8648-24	8648-77	8648-98
17.8 (7")	25.4	35	8648-26	8648-07	8648-06
17.8 (7")	38.1	120	8648-27	8648-88	8648-89
20.3 (8")	25.4	38	8648-29	8648-09	8648-08
20.3 (8")	38.1	140	8648-30	8648-96	8648-97
30.5 (12")	25.4	60	8648-32	8648-102	8648-103
30.5 (12")	38.1	210	8648-33	8648-105	8648-106
<b>#25 Ace-Thred</b>					
10.2 (4")	38.1	60	8648-187	8648-136	8648-137
17.8 (7")	38.1	120	8648-162	8648-109	8648-110
20.3 (8")	38.1	140	8648-165	8648-113	8648-114
30.5 (12")	38.1	210	8648-166	8648-115	8648-116
<b>#36 Ace-Thred</b>					
10.2 (4")	50.0	90	8648-190	8648-117	8648-118
17.8 (7")	50.0	170	8648-194	8648-121	8648-122
20.3 (8")	50.0	200	8648-195	8648-123	8648-125
30.5 (12")	50.0	300	8648-196	8648-127	8648-128

## PTFE PLUGS:

The plugs have O-Rings for assurance of a tight seal, by simply hand tightening. They are offered in several sizes for #7, #15, #25, or #36 Ace-Thred joints. For pressure work, a “Front Seal” plug (5846) is recommended. “Back Seal” plugs (8545) are also available, if preferred.

Front Seal O-Rings create a seal internally or below the vessel’s threads. Back Seal O-Rings create the seal above the threads of the vessel.



5846  
Front Seal



8545  
Back Seal



### PRESSURE BOTTLES 60psig @ Room Temperature

These heavy wall bottles are unique in that Ace-Threds allow for easy closing of plugs, which are reusable. The plugs have O-Rings for assurance of a tight seal by simply hand tightening. The bottles are offered in several lengths with #7, #15, #25, or #36 Ace-Threds. They can be custom fabricated in various lengths and diameters, if needed.

For pressure work, a "Front Seal" plug (5846) is recommended. "Back Seal" plugs (8545) are also available, if preferred. Bottles have a pressure rating of 60psig at room temperature.

Complete items include Glass Bottle and PTFE Plug with FETFE® O-Ring.

**Note:** Also available, as an option, for monitoring purposes, the bottles can be assembled with a stainless steel, 0-160psig pressure gauge using a 5844 Adapter in place of the 5845 or 5846 Plugs. Stainless steel extensions are offered to allow use of the tube in a furnace.

Length, (below thread), cm	Body O.D., mm	Approx. Total Capacity, mL	Bottle only	Complete Front Seal	Complete Back Seal
			Order Code	Order Code	Order Code
<b>#7 Ace-Thred</b>					
4.0 (1 <sup>9</sup> / <sub>16</sub> " <sup>in</sup> )	25.4	8	8648-120	8648-230	—
4.0 (1 <sup>9</sup> / <sub>16</sub> " <sup>in</sup> )	31.7	14	8648-124	8648-232	—
5.0 (2" <sup>in</sup> )	44.5	25	8648-126	8648-234	—
<b>#25 Ace-Thred</b>					
11.5 (4 <sup>9</sup> / <sub>16</sub> " <sup>in</sup> )	57.2	175	8648-138	8648-245	8648-246
11.5 (4 <sup>13</sup> / <sub>16</sub> " <sup>in</sup> )	75.0	325	8648-140	8648-247	8648-248
12.3 (4 <sup>7</sup> / <sub>8</sub> " <sup>in</sup> )	38.1	75	8648-135	8648-249	8648-250
17.0 (6 <sup>13</sup> / <sub>16</sub> " <sup>in</sup> )	114.3	950	8648-155	8648-251	8648-252
17.0 (6 <sup>13</sup> / <sub>16</sub> " <sup>in</sup> )	152.4	1850	8648-157	8648-253	8648-254
<b>#36 Ace-Thred</b>					
11.5 (4 <sup>13</sup> / <sub>16</sub> " <sup>in</sup> )	75.0	325	8648-191	8648-308	8648-309
17.0 (6 <sup>13</sup> / <sub>16</sub> " <sup>in</sup> )	114.3	950	8648-192	8648-310	8648-311
17.0 (6 <sup>13</sup> / <sub>16</sub> " <sup>in</sup> )	152.4	1850	8648-193	8648-312	8648-313



### REPLACEMENT O-RINGS Front or Back Seal Plugs

FETFE® is an ACE Glass exclusive fluoroelastomer compound with TFE additives. It has good compression set, temperature and chemical compatibility.

**Note:** Reference O-Ring Chemical Compatibility for more information. <http://www.aceglass.com/literature.php>

	Front Seal	Back Seal
	Order Code	Order Code
<b>#7 Ace-Thred</b>		
O-Ring, FETFE	7855-707	7855-712
Plug, PTFE	5846-44	5845-43
O-Ring, Silicone	7855-207	
<b>#15 Ace-Thred</b>		
O-Ring, FETFE	7855-716	7855-730
Plug, PTFE	5846-48	5845-47
O-Ring, Silicone	7855-216	7855-230
<b>#25 Ace-Thred</b>		
O-Ring, FETFE	7855-734	7855-742
Plug, PTFE	5846-50	5845-49
O-Ring, Silicone	7855-234	7855-242
<b>#36 Ace-Thred</b>		
O-Ring, FETFE	7855-772	7855-774
Plug, PTFE	5846-51	5845-50
O-Ring, Silicone	7855-272	7855-274

## PRESSURE TUBES with Plunger Valve

Heavy wall tube with bushing and plunger valve that allows purging of the tube. Closed bottom plunger has a hole inside, that when positioned in relation to O-Ring seal, will open tube to the atmosphere (i.e., pull to close, push to open). Plunger has step-down extension that acts as stop-in bushing. Complete item consists of Tube, PTFE Bushing w/FETFE® O-Ring, and Plunger Valve.

Length, (below thread), cm	Body O.D., mm	Approx. Total Capacity, mL	<i>Tube only</i>	<i>Complete Front Seal</i>
			Order Code	Order Code
<b>#7 Ace-Thred</b>				
10.2 (4")	8	1	8648-40	8648-60
10.2 (4")	13	4	8648-41	8648-61
10.2 (4")	19	9	8648-42	8648-62
20.3 (8")	8	2.5	8648-45	8648-64
20.3 (8")	13	8	8648-46	8648-65
20.3 (8")	19	21	8648-47	8648-66
30.5 (12")	8	3	8648-50	8648-68
30.5 (12")	13	15	8648-51	8648-69
30.5 (12")	19	27	8648-52	8648-70
<b>#15 Ace-Thred</b>				
10.2 (4")	25.4	15	8648-23	8648-75
10.2 (4")	38.1	60	8648-24	8648-76
17.8 (7")	25.4	35	8648-26	8648-78
17.8 (7")	38.1	120	8648-27	8648-79
20.3 (8")	25.4	38	8648-29	8648-82
20.3 (8")	38.1	140	8648-30	8648-83
30.5 (12")	25.4	60	8648-32	8648-85
30.5 (12")	38.1	210	8648-33	8648-86

### Replacement O-Rings

Size -008 FETFE, 12/pk	7855-704
Size -013 FETFE, 12/pk	7855-710



## PRESSURE TUBES with Plunger Valve and Thermowell

Rugged, heavy wall tube, similar to listing above, except glass plunger valve has a 5mm I.D. thermowell for a thermocouple wire or sheathed probe up to 1/8" (3.2mm) O.D. Closed bottom plunger has a hole inside that when positioned in relation to O-Ring seal, allowing Tube to be opened or closed to the atmosphere (i.e., pull to close, push to open). Step-down extension on upper end of plunger acts as stop in-bushing. Complete item consists of Tube (#15 Ace-Thred), PTFE Bushing with FETFE® O-Ring, and Plunger Valve with Thermowell. See listing above for replacement Tube only with #15 Ace-Thred and 8648-19 Bushing.

Length, (below thread), cm	Body O.D., mm	Approx. Total Capacity, mL	<i>Tube only</i>	<i>Plunger Valve only</i>	<i>Complete</i>
			Order Code	Order Code	Order Code
<b>#15 Ace-Thred</b>					
10.2 (4")	25.4	15	8648-23	8648-104	8648-164
10.2 (4")	38.1	60	8648-24	8648-104	8648-167
17.8 (7")	25.4	35	8648-26	8648-107	8648-170
17.8 (7")	38.1	120	8648-27	8648-107	8648-172
20.3 (8")	25.4	38	8648-29	8648-108	8648-175
20.3 (8")	38.1	140	8648-30	8648-108	8648-177
30.5 (12")	25.4	60	8648-32	8648-112	8648-179
30.5 (12")	38.1	210	8648-33	8648-112	8648-181

### Replacement O-Rings

Size -013 FETFE, 12/pk	7855-710
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**PRESSURE BOTTLES** w/Sampling Port, 150psig @ 120°C

Ace Glass pressure tubes are the premier glass pressure tubes in the world, rated at 150psig at 120°C. Featuring a #7 Ace-Thred sample port, these tubes offer the convenience of sampling while remaining connected to the researcher's apparatus.

Length, (below thread), cm	Body O.D., mm	Approx. Total Capacity, mL	<i>Tube only</i>	<i>Complete Front Seal</i>	<i>Complete Back Seal</i>
			Order Code	Order Code	Order Code
<b>#7 Ace-Thred</b>					
10.2 (4")	13	4	<b>8649-10</b>	<b>8649-110</b>	<b>8649-210</b>
10.2 (4")	19	9	<b>8649-12</b>	<b>8649-112</b>	<b>8649-212</b>
17.8 (7")	13	8	<b>8649-20</b>	<b>8649-120</b>	<b>8649-220</b>
17.8 (7")	19	18	<b>8649-22</b>	<b>8649-122</b>	<b>8649-222</b>
20.3 (8")	13	9	<b>8649-30</b>	<b>8649-130</b>	<b>8649-230</b>
20.3 (8")	19	21	<b>8649-32</b>	<b>8649-132</b>	<b>8649-232</b>
<b>#15 Ace-Thred</b>					
10.2 (4")	25.4	15	<b>8649-14</b>	<b>8649-114</b>	<b>8649-214</b>
10.2 (4")	38.1	60	<b>8649-15</b>	<b>8649-115</b>	<b>8649-215</b>
17.8 (7")	25.4	35	<b>8649-24</b>	<b>8649-124</b>	<b>8649-224</b>
17.8 (7")	38.1	120	<b>8649-26</b>	<b>8649-126</b>	<b>8649-226</b>
20.3 (8")	25.4	38	<b>8649-33</b>	<b>8649-133</b>	<b>8649-233</b>
20.3 (8")	38.1	140	<b>8649-35</b>	<b>8649-135</b>	<b>8649-235</b>
30.5 (12")	25.4	60	<b>8649-40</b>	<b>8649-140</b>	<b>8649-240</b>
<b>#25 Ace-Thred</b>					
10.2 (4")	38.1	60	<b>8649-17</b>	<b>8649-117</b>	<b>8649-217</b>
17.8 (7")	38.1	120	<b>8649-28</b>	<b>8649-128</b>	<b>8649-228</b>
20.3 (8")	38.1	140	<b>8649-37</b>	<b>8649-137</b>	<b>8649-237</b>
30.5 (12")	38.1	210	<b>8649-45</b>	<b>8649-145</b>	<b>8649-245</b>
<b>#36 Ace-Thred</b>					
20.3 (8")	50	200	<b>8649-39</b>	<b>8649-139</b>	<b>8649-239</b>

**Pressure Conversions**

<u>Absolute</u>										<u>Gauge Pressure</u>	
cm of Hg	Torr or mm of Hg	Micron	Atmo- sphere	lb/ in. <sup>2</sup>	ton/ ft. <sup>2</sup>	gram/ cm <sup>2</sup>	ft. of H <sub>2</sub> O	in. of Hg		lb. in.	in. of Hg
76	760	760000	1	14.7	1.06	1033	33.9	29.9		0.00	0.00
70	700	700000	0.921	13.53	0.975	952	31.2	27.6		1.16	2.36
60	600	600000	0.79	11.6	0.835	816	26.8	23.6		3.10	6.30
50	500	500000	0.659	9.67	0.696	680	22.3	19.7		5.03	10.2
40	400	400000	0.526	7.74	0.557	545	17.8	15.7		6.97	14.2
30	300	300000	0.395	5.8	0.417	408	13.4	11.8		8.90	18.1
20	200	200000	0.263	3.87	0.278	272	8.92	7.87		10.8	22.0
10	100	100000	0.132	1.94	0.139	136	4.46	3.94		12.8	26.0
5	50	50000	0.006	0.967	0.07	68	2.23	1.97		13.7	27.9
1	10	10000	0.013	0.194	0.014	13.6	0.446	0.394		14.5	29.5
0.1	1	1000	0.001	0.019	0.001	1.36	0.045	0.039		14.68	29.88
0	0	0	0	0	0	0	0	0		14.7	29.92

## MANIFOLD Pressure, Epoxy Coated

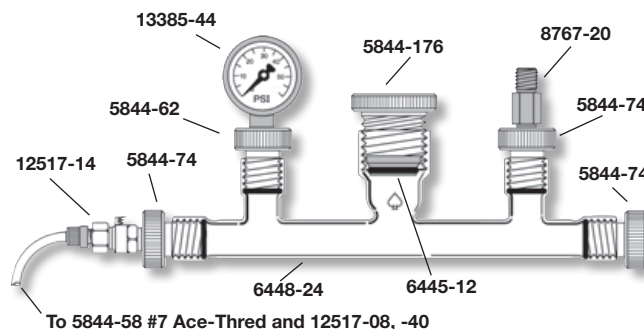
Complete glass manifold, fitted with a pressure gauge, primary adjustable pressure relief valve, and secondary rupture disc to allow for safer operation of pressure and filter reactors.

**13385 Pressure Gauge** is a 0-60 psi stainless steel internal, with 1-1/2-inch face and 1/8-inch npt male connection for use with 5844-74 adapter in #15 Ace-Thred.

**8767 Pressure Relief Valve** is adjustable from 3-50 psig by adjusting set screws to desired cracking pressure. Ends are 1/4-inch npt for connecting to #15 Ace-Thred on manifold with 5844-74 adapter.

**6445 Rupture Disc** is a secondary safety device that, in the event of an overpressure (one that cannot be handled by the 8767 relief valve) will rupture at a predetermined burst rating; 55 psig ( $\pm 3$  psig) for -12 version, 65 psig ( $\pm 3$  psig) for -41 version. Disc is manufactured from high-purity carbon with a PTFE coating on the underside. No springs or moving parts, disc is secured directly in #25 Ace-Thred of manifold with 5844-176 adapter.

Manifold is connected to #7 Ace-Thred on 6433 head using 5844-58 adapter (must be ordered separately) and 12517 tubing connectors with 1/4-inch tubing.



Description	Qty	For Two-Piece Pressure Reactors (55 psig) and Filter Reactors		For One-Piece Pressure Reactors (65 psig)	
		Order Code	Order Code	Order Code	Order Code
Adapter, PTFE, #15-1/8-inch NPT	1	♠	5844-62	♠	5844-62
Adapter, PTFE, #15-1/4-inch NPT (3)	3	♠	5844-74	♠	5844-74
Adapter, PTFE, #25-1/4-inch NPT, w/o O-Ring	1	♠	5844-176	♠	5844-176
Rupture Disc, Graphite, 55 psig	1	♠	6445-12		
Rupture Disc, Graphite, 65 psig (for pressure version only)	1			♠	6445-41
Manifold, Glass, (4) #15, (1) #25, Epoxy Coated	1	★	6448-24	★	6448-24
Valve, Pressure Relief, 1/4-inch NPT, 3-50 psig	1	♠	8767-20	♠	8767-20
Coupling Body, 1/8-inch MPT	1	♠	12517-08	♠	12517-08
Coupling Body, 1/4-inch MPT	1	♠	12517-14	♠	12517-14
Coupling Insert, for 1/4-inch O.D. tubing (2)	2	♠	12517-40	♠	12517-40
Tubing, PP, 1/4-inch O.D. x .170-inch I.D., 10 feet	1	♠	12681-110	♠	12681-110
Gauge, Pressure, 0-60psig, stainless steel internal materials, 1/8-inch male NPT bottom fitting. 1.5-inch diameter	1	♠	13385-44	♠	13385-44
	1	★	6448-54*	★	6448-68**

### Complete

### Replacement O-Rings

Size -110 for #15 adapters (shelf-pack of 12)	12	♠	7855-716	♠	7855-716
Size -212 for #25 adapters (shelf-pack of 6)	6	♠	7855-734	♠	7855-734

### Accessories

Adapter, PTFE, #7-1/8-inch NPT	1	♠	5844-58	♠	5844-58
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\*6448-54 is for use with two-piece pressure and filter style reactors.

\*\*6448-68 is for use with one-piece pressure reactors only.

## IMPORTANT – General Warnings for Pressurized Glassware

Due to varying conditions, ACE cannot guarantee glass vessels from breakage under pressure.

**ALL LABORATORY SAFETY PROCEDURES SHOULD BE OBSERVED. ALWAYS WORK BEHIND A SHIELD.**

- Do not use with materials which solidify on standing and create excessive stress on glass.
- Before applying pressure, examine glassware carefully for surface scratches which may weaken its strength.
- Questions regarding the safe operating conditions of a particular glass vessel under pressure may be directed to ACE GLASS INCORPORATED.
- Safety coatings: Epoxy and plastic coating help prevent scratching and shattering and reduce spills; however, they do not prevent breakage.



**POWER OUTLET STRIP** *Four Outlets* ♠

Power outlet strip with four outlets. Furnished with 15 amp push-to-reset circuit breaker, U-ground outlets with electrically wired ground and heavy duty UL listed cord set. Sturdy, blue finished steel housing measures 8-5/8 x 2-3/8 x 1-1/2 inches high. Rated 15 amps, 130 volts continuous duty. Supplied with six-foot cord. Shipping weight, 2 lbs.

Qty	Order Code
1	12195-20



**POWER OUTLET STRIP** *Ten Outlets* ♠

Wiremold UL210BC power outlet strip featuring (10)NEMA 5-15R outlets measuring 1-15/16in center-to-center, lighted power switch, 15amp continuous duty with overload circuit breaker protection. Aluminum housing measures 13 x 3.5 x 2in (LxWxH). 6 foot AC power cord. 120v 50/60Hz 15amp. cULus rated. Two year Manufacturer's Limited Warranty.

Qty	Order Code
1	12196-40



**POWER STRIP** *Surge and Noise Protection* ★

Fellows 99015 Superior Workstation Power Surge Protector designed for high-end office and computer equipment. Reset 15amp circuit breaker and catastrophic fuse. Eight NEMA 5-15R outlets in wide format easily accommodates up to six AC transformer type power cords. 50-60dB EMI/RFI noise filtration, 1 ns response time, 120v 50/60Hz 15amp. UL & cUL rated. One year limited Manufacturer's Warranty.

Qty	Order Code
1	12207-36



# Beaded Process Pipe

**Ace Glass** has been manufacturing and fabricating glassware and equipment for the scientific and research communities for over 80 years. Ace fabricates glass process pipe here in the USA, from medium- and heavy-wall borosilicate tubing such as Scimax and Duran, to provide you with a high quality product to fit into your process stream. From glass process pipe to glass reactors and pilot plants, to temperature equipment and sensors, Ace offers a broad line of products to the process engineer. Ace will also fabricate custom sizes and shapes for your needs — if you don't see what you need in this catalog, contacts us at [www.aceglass.com](http://www.aceglass.com) to discuss your needs with our engineering staff.

Glass meets an ASTM spec for borosilicate glass, ASTM E-438 and Federal spec DD-G-541B. The "system" can be constructed by a contractor to meet ASTM spec C1053-90, ASTM spec C1053-00, Federal spec DD-G-541B, Military spec MIL-P 2256B(YD) when it is all put together using the same pipe and couplings.

Glass also meets specs for USP Type 1 glass.

## Process Piping Systems

Industry has long regarded borosilicate glass piping components to be one of the best corrosion resistant materials of construction. For a wide range of manufacturing and process piping applications Ace Glass brand glass pipe installations have provided excellent service in the most difficult piping applications, positive evidence of its outstanding performance. The use of glass offers many advantages over other conventional piping materials such as:

### Long Service Life

Low-expansion borosilicate glass is resistant to almost all substances except hydrofluoric acid, hot concentrated phosphoric acid and strong alkalis at elevated temperatures.

### Product Purity

All glass piping systems are comprised of chemically inert borosilicate glass and TFE gaskets to ensure no chemical contamination of process fluids. Materials that do not corrode do not contaminate.

### Smooth Interior Surface

The hard, liquid smooth surface inhibits or prevents scale formation and product buildup. For example, sticky latex dispersions easily move through smooth glass pipe. Glass resists fouling and is easy to clean.

### Transparency

You can see what is happening inside glass systems. Process and product can be inspected at a glance. Trouble cannot hide behind glass, so processes stay in better control.

## Low Maintenance Cost

Over the life of a piping system this can be the smallest cost component for glass piping systems and the largest cost consideration for many other competitive piping systems. Chances are that low maintenance cost is the prime reason for considering, specifying, and operating a glass piping system.

## Properties of Borosilicate Glass

### Chemical Composition

The borosilicate glass used in the manufacture of our pipeline components conforms to the standard ASTM E 438 and has the following approximate composition.

Component	% By Weight
SiO <sub>2</sub>	81%
B <sub>2</sub> O <sub>3</sub>	13%
Na <sub>2</sub> O	4%
Al <sub>2</sub> O <sub>3</sub>	2%

### Chemical Resistance

Borosilicate glass is resistant to almost all substances except hydrofluoric acid, phosphoric acid and hot strong caustic solutions. Of these, hydrofluoric acid has the most serious effect and, even when a solution contains a few parts per million, corrosion will occur. Phosphoric acid and caustic solutions at elevated temperatures will also attack glass.

Under service conditions, the effects of turbulence and some trace chemicals in solution may increase or decrease the rate of attack. Therefore, it is not possible to give precise figures for corrosion by hydrofluoric acid and caustic solutions, but Figures 1 and 2 show typical rates.

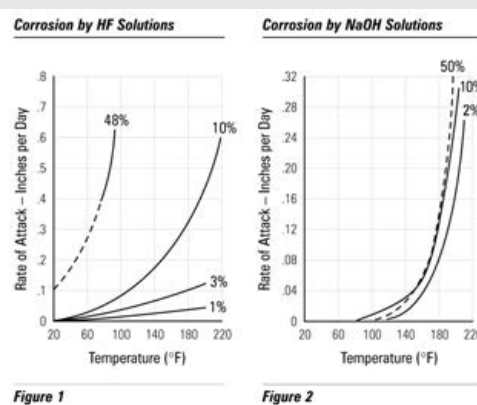


Figure 1

Figure 2

# Beaded Process Pipe

## Physical Properties — Borosilicate Glass

Coefficient of mean linear expansion Between 20°C and 300°	(3.3 ±0.1) x 10 <sup>-6</sup> K <sup>-1</sup>
Mean thermal conductivity Between 20°C and 200°C	1.3 W/mK
Mean specific heat capacity Between 20°C and 200°	0.98 kJ/kgK
Density at 20°C	2.23 g/cm <sup>3</sup>
Operating Temperature (Maximum)	Short term: Do not operate below 0°C Normal Use: 230°C

## Versatility

For comparison purposes, weights of various 2-inch pipes are given in the table below.

Material	Approx. Weight of 2-inch Pipe, Lbs/Ft.
Glass Process Pipe	1.13
Steel (Schedule 40)	3.65
High Silicon Iron	7.70
Stainless Steel (Schedule 40)	3.65
TFE Lined Steel	4.10
Glass Lined Steel	3.95
FRP	1.25

## Relative Thermal Expansion

The thermal expansion of Ace brand pipe is 0.022 inches per 100 feet of pipe and 100°F temperature change. Values of other materials relative to this (assuming glass Pipe = 1) are given below. These relative thermal expansions should be considered when connecting glass pipe into other materials. When other materials expand more than glass pipe, allowance must be made for the expansion difference. A common way to accommodate this differential expansion is with flexible “bellows” or hose at critical locations.

Material	Relative Thermal Expansion
Glass Process Pipe	1.00
Steel (Schedule 40)	3.60
High Silicon Iron	4.90
Stainless Steel (Schedule 40)	6.20
TFE Lined Steel	3.65
Glass Lined Steel	3.65
FRP	7.00

## Beaded Pressure System

A large bead design feature assures a tight leak-free joint under pressure conditions.

The one-bolt compression coupling shell is made from 300-series stainless steel. The flexible, elastomeric sleeve is lined with a tough layer of TFE fluorocarbon plastic. The flexibility feature allows deflections up to 3° per joint from the axis under bending loads due to misalignment or pitching.

## Pressure

The permissible operating pressure for Ace beaded pipe and fittings depends on the pipe diameter.

Pipe Diameter	Maximum Working Pressure
1-inch	100 psig
1-1/2-inch	75 psig
2-inch	75 psig
3-inch	50 psig
4-inch	50 psig
6-inch	30 psig

When a system is assembled from several glass components with different pressure ratings, the maximum operating pressure of the system is limited to the pressure rating of the component with lowest permissible working gauge pressure.

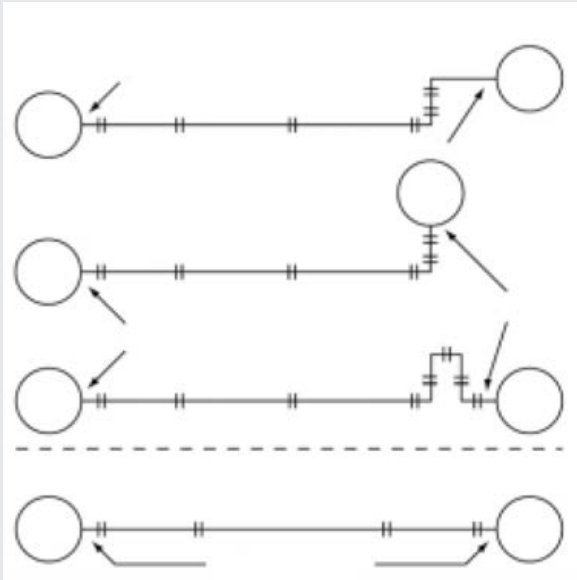
All sizes of glass piping are suitable for full vacuum service. Full vacuum is defined as 29.92-inch (760mm) of Hg below standard sea-level pressure. Of course the vacuum actually achieved is a function of system design, tightness of the gasket joints, types of gasket used and other operating factors.

Permissible operating pressures require the use of Ace bead to bead process couplings. Ace process pipe is tested at 1.5x the stated maximum working pressure.

## Anchor Points

An anchor point is a rigid support for the glass line tying it into the building structure, or to fixed equipment such as tanks, pumps or independently supported valves. There should be one — and only one — anchor point in each straight run of pipe. The diagrams below show the correct and incorrect installation methods between anchor points. Note the use of right-angle bends to obtain flexibility.

# Beaded Process Pipe



All valves, strainers, meters or other heavy equipment must be supported rigidly and independently of the glass pipeline. This prevents transmitting the dead weight to the glass pipeline. It also prevents transmitting stresses to the line when valves are operated; equipment shifts positions, or expands more than the glass pipe. Rigidly supported equipment such as the above are considered anchor points. No more than one anchor point should be used in any straight run of glass pipe. Flexible “bellows” or hose can be used at the tie-in place.

## Pipe Hanging and Support

Glass piping must be installed without mechanical restraint and the pipe should be free to move to prevent stresses. A mechanical restraint may set up a tensile stress that over a period of time will cause the pipe to fail. Hangers should not clamp the pipe tightly. Some lengthwise and sidewise movements are desirable. Padded hangers should always be used and spaced 8-10 feet apart. Use an extra hanger where there are two or more couplings in an 8-10 foot span. Do not pull or spring the pipe into place. Always move the hanger to the pipe do not force the pipe to the hanger.

## Vertical Line Support

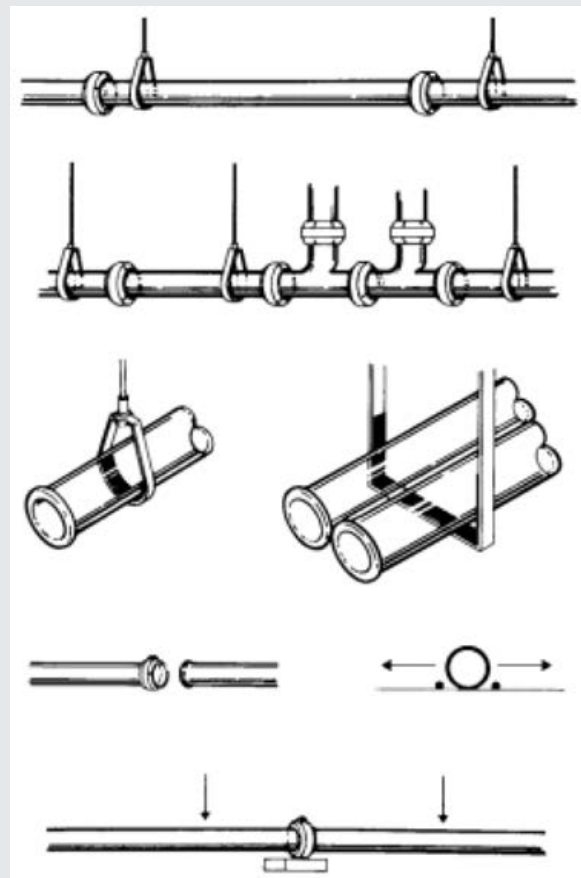
Vertical lines should be supported by plates beneath the couplings or by padded saddles beneath 90° elbows at the bottom of vertical risers. Do not support by rigid clamp anchorages around the vertical pipe. Usually only one rigid support is used. Lateral guides should be used approximately every 20 feet of unsupported riser. The horizontal run at the top of the riser should not be supported within 7 feet of the riser. This reduces bending strains in the horizontal run.

## Vibration

Connection to vibrating machinery such as a pump can be made with the use of a flexible connection consisting of either hoses, or PTFE “bellows” as determined by the characteristics of the service.

## Pressure Surges

Pressure surges must be controlled to prevent end motion in a line. If lines have hydraulic pressure surges, (positive displacement pumps or shutoff valves), it may be necessary to provide a pressure relief valve. It is usually necessary to provide a protected air dome to reduce the pressure surge. The domes can be installed on the discharge side of the pump, next to a valve, or at the highest point in the vertical rise of the discharge line. Use a tee at the top of the riser, plus a straight section and a cap.



# Beaded Process Pipe

## Protection

It is usually desirable to run glass pipe close to structures such as walls, columns, ceilings, etc., where conditions are favorable for obtaining a firm support. This also would keep the pipelines away from the heaviest traffic. When the pipelines are run through congested areas, provision should be made for protection. Angle or channel iron, or expanded metal guards, should be provided around exposed sections of glass pipe.

## Testing

Tighten bolts on all couplings and flanges at the time of installation. The pipeline, when empty, should be examined for stresses by gently shaking the line. There should be some limited movement the lines. To make sure all joints are tight when line is ready for service, test at 1-1/2 times the working pressure. However, do not test at more than the maximum working pressure. All air must be removed from the pipeline so there is no trapped air. **DO NOT TEST WITH AIR PRESSURE.** If a joint leaks, carefully check the joint assembly, retighten to recommended torque value, and retest. If leaking persists, remove coupling, check the gasket surface to be sure they are free from dirt, sand or other particles, and replace if necessary.

## Spare Parts

Generally, one spare for every twelve should be provided. The proper storage of spare parts will ensure they are available when required. Keep lengths of pipe on racks and store them in a protected area. Keep fittings in their original packaging.

## Cleaning

Flush line clean with water, other cleaning fluids, or atmospheric pressure steam (open drain). Do not use hydrofluoric acid, hot caustic solutions, abrasives or metallic tube cleaners.

## Tools Required

### Tools need to install glass piping (installation tools):

a) Wrenches	7/16-inch Open End, 1/2-inch Open End 9/16-inch Open End, 3/4-inch Open End
b) Ratchet	3/8-inch Drive
c) Sockets	7/16-inch Deep Socket, 1/2-inch Deep Socket 9/16-inch Deep Socket, 3/4-inch Deep Socket
d) Torque Wrench	Calibrated in inch-lbs. Preferred ratchet type 3/8-inch Drive.
e) Water-pump pliers	3/8-inch Drive
f) Various screw-drivers	
g) Hammer	Plastic or rubber head

### Structural Tools:

a) Allen wrenches	5/16-inch and 3/8-inch
b) Hammer	
c) Hack saw	

## Making Joints with Process Pipe Couplings

1. Dip coupling in water or wipe beaded ends with damp cloth.
2. Snap coupling over one end of pipe making certain TFE liner is behind bead... then stab other section of pipe into opposite side of coupling.
3. Tighten coupling bolt with 6-inch ratchet wrench until the gap between segments is approximately 3/16-inch.



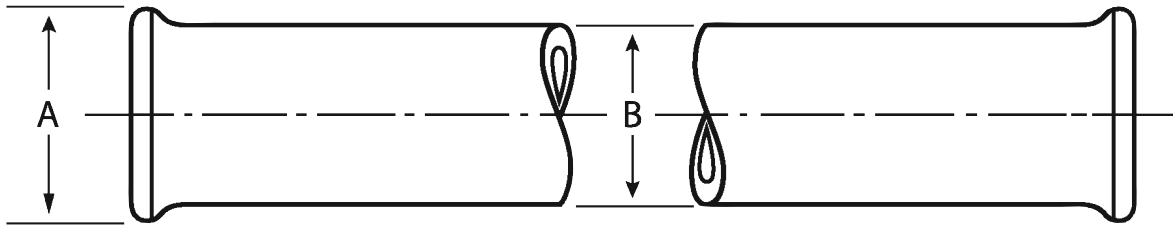
1



2



3



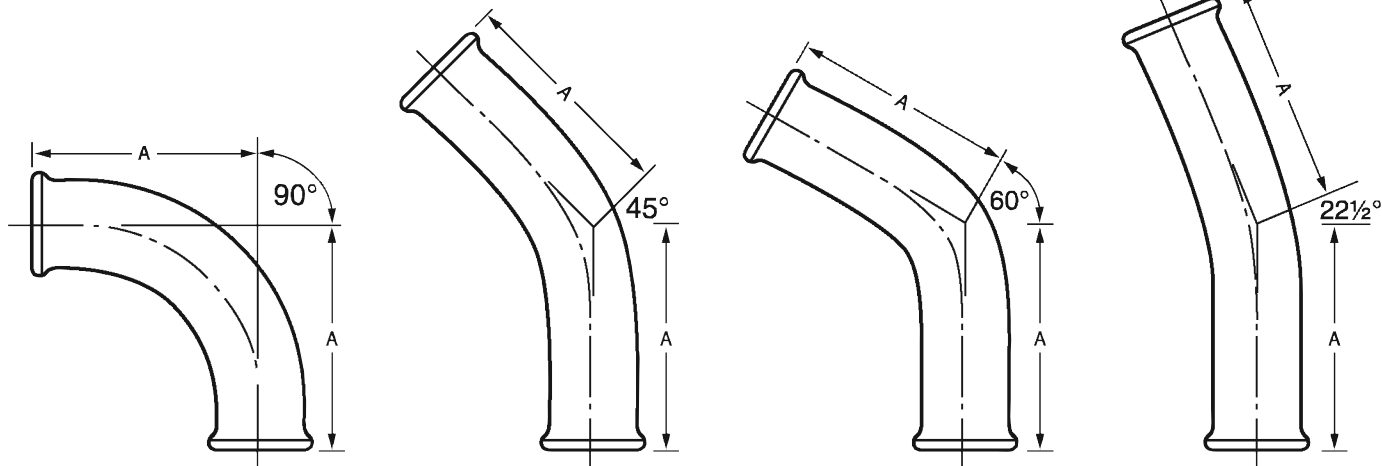
**BEADED PIPE** ★

All pipe is available from stock in lengths shown; special lengths available at slightly higher cost.

Qty	1/2-inch I.D.	A	3/4-inch I.D.	A	1-inch I.D.	A	1-1/2-inch I.D.	A
	Length (Inches)	Order Code	Length (Inches)	Order Code	Length (Inches)	Order Code	Length (Inches)	Order Code
1	3	8828-02	3	8828-102	3	8828-202	—	—
1	4	8828-03	4	8828-103	4	8828-203	4	8828-303
1	6	8828-05	6	8828-105	6	8828-205	6	8828-305
1	12	8828-09	12	8828-109	12	8828-209	12	8828-309
1	18	8828-11	18	8828-111	18	8828-211	18	8828-311
1	24	8828-13	24	8828-113	24	8828-213	24	8828-313
1	30	8828-15	30	8828-115	30	8828-215	30	8828-315
1	36	8828-20	36	8828-120	36	8828-220	36	8828-320
1	48	8828-25	48	8828-125	48	8828-225	48	8828-325
1	60	8828-30	60	8828-130	60	8828-230	60	8828-330
1	72	8828-38	72	8828-138	72	8828-238	72	8828-338
1	84	8828-45	84	8828-145	84	8828-245	84	8828-345
1	96	8828-56	96	8828-156	96	8828-256	96	8828-356
1					108	8828-260	108	8828-360
1					120	8828-262	120	8828-362

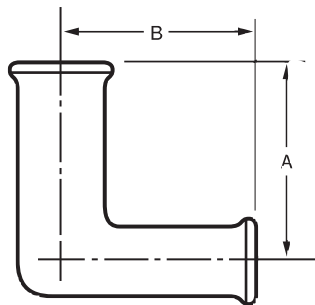
Qty	2-inch I.D.	A	3-inch I.D.	A	4-inch I.D.	A	6-inch I.D.	A
	Length (Inches)	Order Code	Length (Inches)	Order Code	Length (Inches)	Order Code	Length (Inches)	Order Code
1	4	8828-403	4	8828-503	—	—	—	—
1	6	8828-405	6	8828-505	6	8828-605	6	8828-705
1	12	8828-409	12	8828-509	12	8828-609	12	8828-709
1	18	8828-411	18	8828-511	18	8828-611	18	8828-711
1	24	8828-413	24	8828-513	24	8828-613	24	8828-713
1	30	8828-415	30	8828-515	30	8828-615	30	8828-715
1	36	8828-420	36	8828-520	36	8828-620	36	8828-720
1	48	8828-425	48	8828-525	48	8828-625	48	8828-725
1	60	8828-430	60	8828-530	60	8828-630	60	8828-730
1	72	8828-438	72	8828-538	72	8828-638	72	8828-738
1	84	8828-445	84	8828-545	84	8828-645	84	8828-745
1	96	8828-456	96	8828-556	96	8828-656	96	8828-756
1	108	8828-460	108	8828-560	108	8828-660	108	8828-760
1	120	8828-462	120	8828-562	120	8828-662	120	8828-762



**SWEEP ELBOW ★**

Qty	90°			45°			60°			22 1/2°		
	Size (inches)	A (In.)	Order Code	Size (inches)	A (In.)	Order Code	Size (inches)	A (In.)	Order Code	Size (inches)	A (In.)	Order Code
1	1/2 - 90°	2 1/4	8830-03	1/2 - 45°	2 1/4	8830-103	1/2 - 60°	2 1/4	8830-203	1/2 - 22°	2 1/4	8830-303
1	3/4 - 90°	2 1/2	8830-05	3/4 - 45°	2 1/2	8830-105	3/4 - 60°	2 1/2	8830-205	3/4 - 22°	2 1/2	8830-305
1	1 - 90°	2 3/4	8830-07	1 - 45°	2 3/4	8830-107	1 - 60°	2 3/4	8830-207	1 - 22°	2 3/4	8830-307
1	1-1/2 - 90°	5	8830-09	1-1/2 - 45°	3 1/2	8830-109	1-1/2 - 60°	3 1/2	8830-209	1-1/2 - 22°	3 1/2	8830-309
1	2 - 90°	6	8830-11	2 - 45°	4	8830-111	2 - 60°	4	8830-211	2 - 22°	4	8830-311

Use catalog dimensions for piping layout as gasket thickness allowance is included.

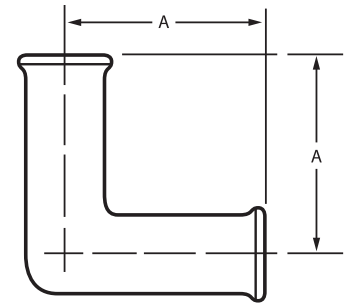


**REDUCER ELBOW ★**

Size Run x Branch, in	A, in	B, in	Qty	Order Code
3/4 x 1/2	2-1/2	2-1/2	1	8831-02
1 x 1/2	2-3/4	2-3/4	1	8831-04
1 x 3/4	2-3/4	2-3/4	1	8831-06
1-1/2	3-1/2	3	1	8831-08
1-1/2 x 3/4	3-1/2	3	1	8831-10
1-1/2 x 1	3-1/2	3	1	8831-12
2 x 1/2	4	3	1	8831-14
2 x 3/4	4	3	1	8831-16
2 x 1	4	3	1	8831-18
2 x 1-1/2	4	3-1/2	1	8831-20
3 x 1	5	3-1/2	1	8831-22
3 x 1-1/2	5	4	1	8831-24
3 x 2	5	4-1/2	1	8831-26
4 x 1	7	4	1	8831-28
4 x 1-1/2	7	4-1/2	1	8831-30
4 x 2	7	5	1	8831-32
4 x 3	7	5-1/2	1	8831-34
6 x 1-1/2	9	5-1/2	1	8831-36
6 x 2	9	6	1	8831-38
6 x 3	9	6-1/2	1	8831-40
6 x 4	9	8	1	8831-42

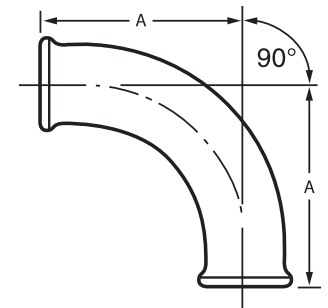
**MITERED ELBOW 90° ★**

Size, in	A, in	Qty	Order Code
1-1/2	3-1/2	1	8832-03
2	4	1	8832-05
3	5	1	8832-07
4	7	1	8832-09
6	9	1	8832-11



**SHORT RADIUS ELBOW 90° ★**

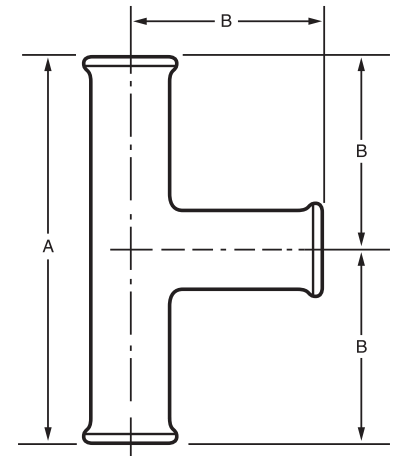
Size, in	A, in	Qty	Order Code
1-1/2	3-1/2	1	8833-32
2	4	1	8833-34
3	5	1	8833-36
4	7	1	8833-38



Interchangeable with 8836 – TEE

**TEE Straight ★**

Size, in	A, in	B, in	Qty	Order Code
1/2	4-1/2	2-1/4	1	8836-02
3/4	5	2-1/2	1	8836-04
1	5-1/2	2-3/4	1	8836-06
1-1/2	7	3-1/2	1	8836-08
2	8	4	1	8836-10
3	10	5	1	8836-12
4	14	7	1	8836-14
6	18	9	1	8836-16



# U.S. Government Buyer?

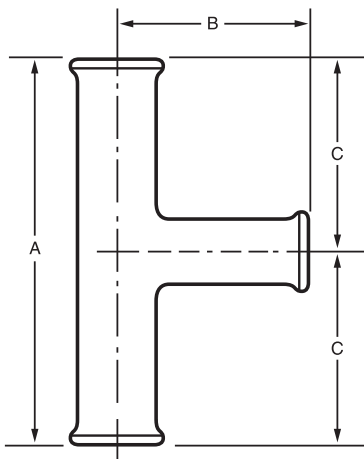
GSA pricing for **Ace Glass** products is available thru our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)



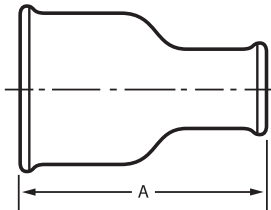
**Schedule**  
Contract GS07F119CA

[www.gsamart.com](http://www.gsamart.com)



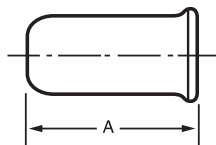
**TEE Reducing** ★

Size Run x Branch, in	A, in	B, in	C, in	Qty	Order Code
3/4 x 1/2	5	2-1/2	2-1/2	1	8837-03
1 x 1/2	5-1/2	2-3/4	2-3/4	1	8837-05
1 x 3/4	5-1/2	2-3/4	2-3/4	1	8837-07
1-1/2 x 1/2	7	3	3-1/2	1	8837-09
1-1/2 x 3/4	7	3	3-1/2	1	8837-11
1-1/2 x 1	7	3	3-1/2	1	8837-13
2 x 1/2	8	3	4	1	8837-15
2 x 3/4	8	3	4	1	8837-17
2 x 1	8	3	4	1	8837-19
2 x 1-1/2	8	3-1/2	4	1	8837-21
3 x 1	10	3-1/2	5	1	8837-23
3 x 1-1/2	10	4	5	1	8837-25
3 x 2	10	4-1/2	5	1	8837-27
4 x 1	14	4	7	1	8837-29
4 x 1-1/2	14	4-1/2	7	1	8837-31
4 x 2	14	5	7	1	8837-33
4 x 3	14	5-1/2	7	1	8837-35
6 x 1-1/2	18	5-1/2	9	1	8837-37
6 x 2	18	6	9	1	8837-39
6 x 3	18	6-1/2	9	1	8837-41
6 x 4	18	8	9	1	8837-43



**REDUCER Straight** ★

Size, in	A, in	Qty	Order Code	Size, in	A, in	Qty	Order Code
3/4 x 1/2	4	1	8842-03	3 x 1-1/2	5	1	8842-25
1 x 1/2	4	1	8842-05	3 x 2	5	1	8842-27
1 x 3/4	4	1	8842-07	4 x 1	7	1	8842-29
1-1/2 x 1/2	4	1	8842-09	4 x 1-1/2	7	1	8842-31
1-1/2 x 3/4	4	1	8842-11	4 x 2	7	1	8842-33
1-1/2 x 1	4	1	8842-13	4 x 3	7	1	8842-35
2 x 1/2	4	1	8842-15	6 x 1	9	1	8842-37
2 x 3/4	4	1	8842-17	6 x 1-1/2	9	1	8842-39
2 x 1	4	1	8842-19	6 x 2	9	1	8842-41
2 x 1-1/2	4	1	8842-21	6 x 3	9	1	8842-43
3 x 1	5	1	8842-23	6 x 4	9	1	8842-45



**END CAP Extended** ★

Size, in	A, in	Qty	Order Code
1/2	2	1	8845-03
3/4	2	1	8845-05
1	2	1	8845-07
1-1/2	3	1	8845-09
2	4	1	8845-11
3	4-3/4	1	8845-15
4	6	1	8845-17
6	7	1	8845-19



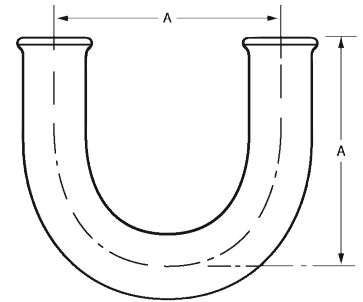
**END CAP Short** ★

Size, in	A, in	Qty	Order Code
1-1/2	7/8	1	8847-02
2	1	1	8847-04
3	1-1/8	1	8847-06
4	1-1/4	1	8847-08
6	1-1/2	1	8847-10



**U BEND** ★

Size, in	A, in	Qty	Order Code
1/2	2-1/4	1	8849-03
3/4	2-1/2	1	8849-05
1	5-1/2	1	8849-07
1-1/2	7	1	8849-09
2	7	1	8849-11
3	9	1	8849-13
4	12	1	8849-15



**PROCESS PIPE COUPLINGS** *Bead to Bead*

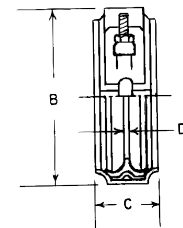
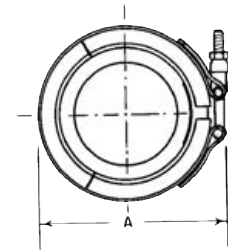
Coupling assemblies consist of a 0.300 series stainless steel outer band with T-Bolt and hex nut; Fluoroelastomer liner and a TFE seal ring.

No. 8856 coupling is designed for temperature service up to 450°F.

**High Temperature – Fluoroelastomer Liner (450°, Black)**

Size	A, in	B, in	C, in	D, in	Max. Torque, in-lbs	Qty	Order Code
1/2	1-5/8	1-3/8	7/8	3/16	20	1	8856-03
3/4	1-3/4	1-1/2	7/8	3/16	25	1	8856-05
1	2-5/8	1-7/8	1	3/16	35	1	8856-07
1-1/2	3	2-5/8	1-5/16	3/16	50	1	8856-09
2	3-1/2	3-1/8	1-5/16	3/16	60	1	8856-11
3	4-3/4	4-1/4	1-7/16	3/16	75	1	8856-13
4	6	5-1/2	1-1/2	3/16	80	1	8856-15
6	8-3/4	8	1-3/4	1/4	90	1	8856-17

Use catalog dimensions for piping layout as gasket thickness allowance is included.



**PADDED PIPE HANGER** *with Mounting Foot*

Size	Qty	Order Code
1-inch (25mm)	1	8862-03
2-inch (50mm)	1	8862-07
3-inch (76mm)	1	8862-11

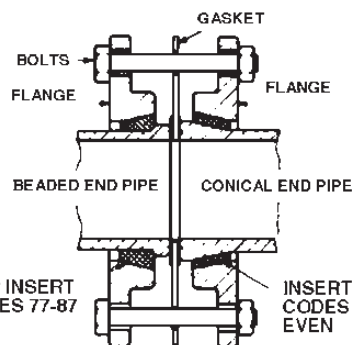


**PADDED PIPE HANGER** *without Mounting Foot*

All hangers are zinc coated and have factory applied plastic sleeve to prevent glass-to-metal contact. Use one hanger every 8 or 10 feet. Support all valves and gauges individually.

Size, in	Qty	Order Code
1/2	1	8863-02
3/4	1	8863-04
1	1	8863-06
1-1/2	1	8863-08
2	1	8863-10
3	1	8863-12
4	1	8863-14





Pressure rating limited to that of Conical Pipe Stem. Not to be used with Beaded Armored Pipe.

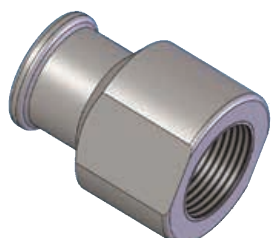
**COUPLING ASSEMBLY** *Beaded to Conical End Pipe* ★

To join beaded end pipe to conical end pipe. Kit includes two flanges, inserts, bolts and TFE sheath gasket.

Size, in	Order Code
1	8866-03
1-1/2	8866-05
2	8866-07
3	8866-09

**Assembly Consists of...**

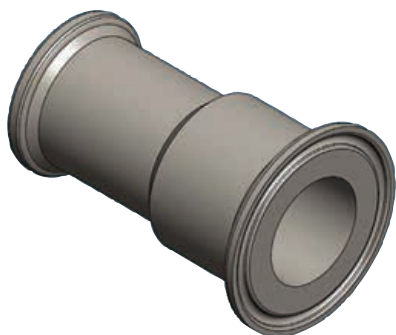
Size, in	Flange	Insert	Gasket	7190 Nuts & Bolts	Qty
1	8867-68	8867-76 8867-77	8868-16	3/8 -16 x 2-1/4	4
1-1/2	8867-69	8867-78 8867-79	8868-17	3/8 -16 x 2-1/4	4
2	8867-70 8867-81	8867-80	8868-18	3/8 -16 x 2-1/2	4
3	8867-71	8867-82 8867-83	8868-19	3/8 -16 x 3	4



**ADAPTER** *Beaded Process Pipe to Female NPT, 304 Stainless Steel* ★

A 304 stainless steel adapter for matching glass beaded process pipe to male NPT fittings, gauges and flanges.

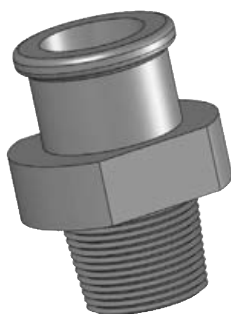
Size	Qty	Order Code
3/4-inch beaded pipe to 3/4-inch female NPT	1	8871-20
1-inch beaded pipe to 1-inch female NPT	1	8871-22
1.5-inch beaded pipe to 1.5-inch female NPT	1	8871-24
2-inch beaded pipe to 2-inch female NPT	1	8871-28



**ADAPTER** *Beaded Process Pipe to Sanitary Flange, 304 Stainless Steel* ★

A 304 stainless steel adapter with sanitary type flange on one end. Mates glass beaded pipe to sanitary type flanges.

Size	Qty	Order Code
3/4-inch beaded pipe to 3/4-inch sanitary flange	1	8872-04
3/4-inch beaded pipe to 1-inch sanitary flange	1	8872-06
1-inch beaded pipe to 1-inch sanitary flange	1	8872-08
1-inch beaded pipe to 3/4-inch sanitary flange	1	8872-10
1-inch beaded pipe to 1.5-inch sanitary flange	1	8872-12
1.5-inch beaded pipe to 1.5-inch sanitary flange	1	8872-14
1.5-inch beaded pipe to 1-inch sanitary flange	1	8872-16
1.5-inch beaded pipe to 2-inch sanitary flange	1	8872-18
2-inch beaded pipe to 2-inch sanitary flange	1	8872-20
2-inch beaded pipe to 1.5-inch sanitary flange	1	8872-22
2-inch beaded pipe to 1-inch sanitary flange	1	8872-24



**MALE THREADED ADAPTER** *304 Stainless Steel* ★

Used to join threaded female fittings, valves and flanges to beaded pipe. Size, below, refers to the bead and the NPT thread. Length, below, refers to the overall length of the adapter.

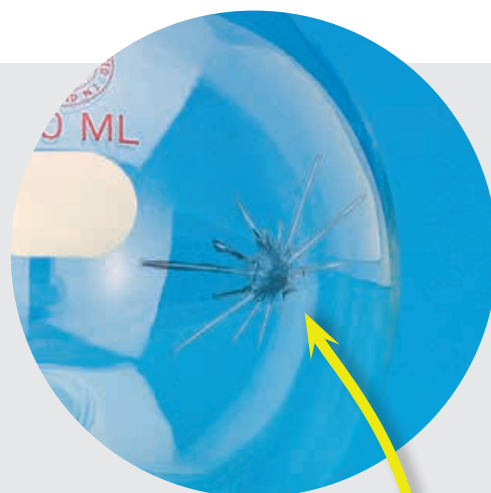
Size, in	Length, in	Qty	Order Code
1/2	2-9/16	1	8870-02
3/4	2-9/16	1	8870-04
1	2-9/16	1	8870-06
1-1/2	2-9/16	1	8870-08
2	2-5/8	1	8870-10
3	3-1/8	1	8870-12

# REPAIR SERVICE SCIENTIFIC GLASSWARE

## Yes, we fix it, too!

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. The majority of the time, these repairs are far less expensive than the cost of replacing.

Broken joint or a cracked flask, we can restore it!



To find out more about our repair service call  
**1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)



CE

**PUMP, SYRINGE SYSTEM** *Single Position Module*

**J-Kem**

The 1400 series is a pump module and software for PC control for the 13185 single position syringes and the 13186 valves. Flow rates available from 0.75  $\mu\text{L}/\text{min}$ . up to 375mL/min. The syringe automatically refills to deliver any volume. Four standard pump programs preloaded and custom programs available. Programs include; timed addition, multi-step timed addition, multi-reactor addition and program builder. The J-Kem commander software allows for custom control and data-logging on your PC. User must select the 13185 glass syringe for your dispensing volumes and a 13186 PTFE distribution valve that allows for interface with up to eight reactors or reagent bottles. Available in 120V or CE 230V models.

Voltage	Model	Qty	Order Code
120V	SYR-1200-Net	1	13180-12
230V	SYR-1240-Net	1	13180-124



CE

**PUMP, SYRINGE SYSTEM** *Dual Position Module*

**J-Kem**

Same controller as above except for dual position pump systems. Dual position controller requires user to select two 13185 glass syringes and two 13186 distribution valves to complete system. Available in either 120V or CE approved 230V versions.

Voltage	Model	Qty	Order Code
120V	SYR-2200-Net	1	13180-22
230V	SYR-2240-Net	1	13180-224

**Custom systems are available.**



**SYRINGE** *Glass/PTFE Plunger*

**J-Kem SPGS**

Syringe modules for Model SYR, Code 13180 syringe pumps, All borosilicate glass or PTFE wetted components. One syringe is needed for each syringe module or two for dual position module.

Volume	Qty	Order Code
10 $\mu\text{L}$	1	13185-01
25 $\mu\text{L}$	1	13185-03
50 $\mu\text{L}$	1	13185-05
100 $\mu\text{L}$	1	13185-07
250 $\mu\text{L}$	1	13185-09
500 $\mu\text{L}$	1	13185-11
1.0mL	1	13185-13
1.25mL	1	13185-15
2.5mL	1	13185-17
5.0mL	1	13185-19
10mL	1	13185-21
25mL	1	13185-23
50mL	1	13185-25



**VALVE** *PTFE, Distribution*

**J-Kem SPDV**

All PTFE wetted parts, distribution valve for 13180 syringe pump systems. One needed for each 13185 syringe module. Choose from three to eight addressable ports. Valves fit into pump modules.

Number of Ports	Qty	Order Code
3	1	13186-03
4	1	13186-04
6	1	13186-06
8	1	13186-08

# Ace Glass Reactor Systems

## 100mL to 200L

### The essential tool for research, scale-up, or production across a wide range of scientific disciplines.

Designed for maximum diversity and ease of use, we have developed a building platform which allows any reactor system to be customized using catalog or custom designed parts. For customized components or application design, contact our technical department for further assistance.

Using the Universal Stand allows for upward scalability. Notice that a wide range of reactor sizes may be used per stand by simply changing the motor mounting or bolt latch clamps dependent on reactor size. Start with a 10L and gradually scale all the way up to a 50L, or start with a 50L and scale all the way up to a 150L, using only one stand. Also, notice that the selected components are sized to easily cross over a wide range of vessel sizes to make an economical and ultimately universal scaling platform. The same concept is pertinent to our Scale-Up Series™ single or dual bench top reactors.

### General Reactor Specifications:

Maximum Allowable Temperature Range* (all reactors):	-60 to 200°C
Maximum Allowable Temperature Differential ( $\Delta T$ ) (all reactors):	80°C
Maximum Jacket Pressure (jacketed reactors):	8 PSIG (.55 bar)
Maximum Working Pressure Range (non pressure rated vessels):	5 PSIG to 0 Torr
Maximum Working Pressure Range (1-Piece pressure vessels):	45 PSIG@100°C to 0 Torr
Maximum Working Pressure Range (2-Piece pressure vessels):	35 PSIG@100°C to 0 Torr
Wetted Surfaces:	Borosilicate Glass & PTFE

\* Temperature limits specified according to temperature limitations of supplied CAPFE o-ring, PTFE valve stems on bottom drain valves, and inlet and outlet clamp materials on jacketed vessels. Higher and lower ranges are obtainable using alternative stem and o-ring materials. Contact technical services for temperature ranges outside of the specified range.

### Limitations And Precautions

The strength of glass is primarily determined by its surface condition, thickness, and uniformity. Mechanical stress applied to glass contributes to strain, which results in breakage when the total strain exceeds its allowable limit (i.e. tensile strength). Thus, careful handling and use of glassware are important to avoid scratching and mechanical shock to outside and inside surfaces. Thermal stress may produce the same result — catastrophic breakage. It is important to avoid rapid or uneven temperature changes across any glass wall. This refers to temperature increases from externally applied heat (mantles) or internally generated heat (exothermic reactions), as well as temperature decreases, such as rapidly introducing large quantities of cold liquids to hot reactants, etc. Remember: Mechanical and Thermal Stresses are additives.

## Bench Scale Reactors

bench top reactors were born from the idea that a simple, yet versatile, mixing platform could assist in the scale-up process across multiple laboratory disciplines.

### Major Design Features

- 100 mL to 6000 mL
- Jacketed or Unjacketed
- Temperature range of -60°C to 200°C
- Working pressure range of Atm to 0 torr
- Maximum jacket pressure of 8psig
- Borosilicate glass and PTFE wetted surfaces
- Rod mounted style motor mount
- 38" or 48" stand height to accommodate various laboratory hoods
- Easy assembly/disassembly for cleaning
- Single or dual reaction stands available



*View the complete line of Scale-Up Reactors online.*

*Scan the QR Code to the left.*





# Kilo Scale Reactors

designed for maximum diversity and ease of use.

## *Major Design Features*

- 10L to 200L
- Jacketed or Unjacketed
- Temperature range of -60°C to 200°C
- Working pressure ranges of Atm to 200 torr
- Maximum jacket pressure of 8psig
- Borosilicate glass and PTFE wetted surfaces
- Rod or Flange mounted style motor mount
- 82.25" or 96.25" stand height to accommodate various laboratory hoods
- Easy assembly/disassembly for cleaning



*View the complete line of Kilo Scale Reactors online.*

*Scan the QR Code to the left.*

# Filter Reactors

allow single or multi-step reactions and filtrations in the same vessel.

## Major Design Features

- 100 mL to 6000 mL
- Jacketed or Unjacketed
- All inert materials
- Reactions at ambient or pressure conditions
- Filtering by vacuum and/or pressure
- Removable/changeable filters, poly screen or glass, wide choice of porosities
- Mechanical agitation
- Inert bottom drain valve
- Easy assembly/disassembly for cleaning



*View our complete line of  
Filter Reactors online.*

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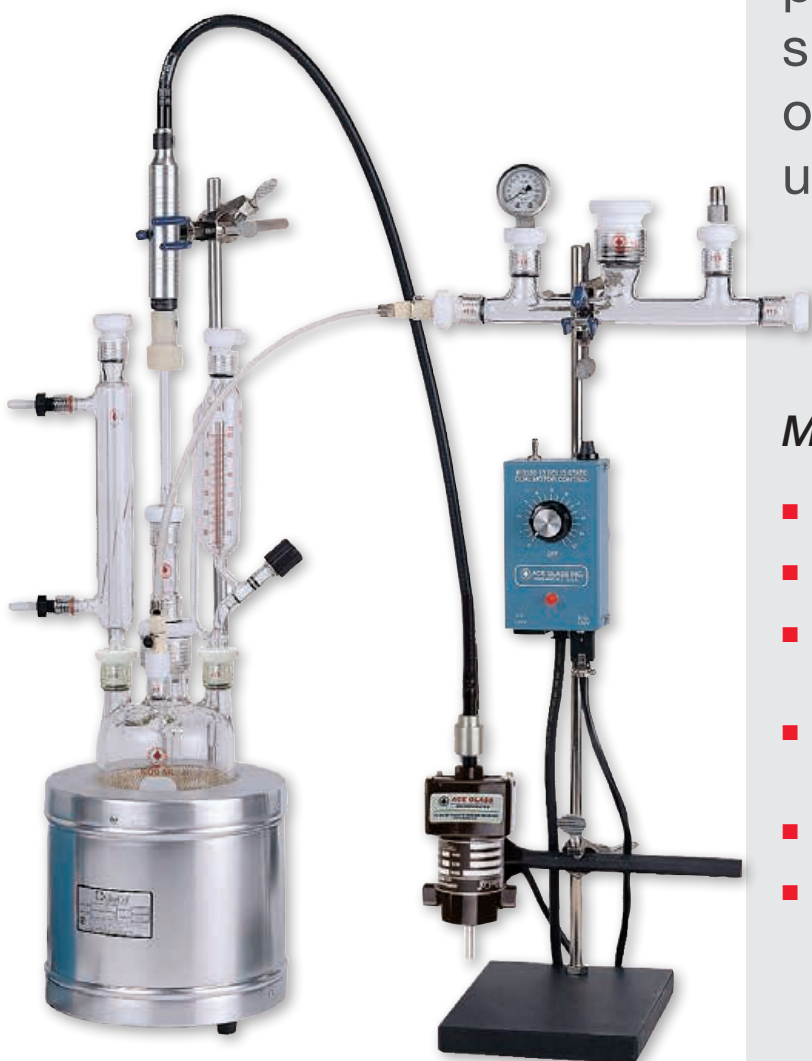


# Pressure Reactors

designed and tested to provide low to moderate positive pressure reactions, synthesis, and catalysis, or simply to run reactions under inert gas conditions.

## Major Design Features

- 500mL to 5000mL
- Jacketed or Unjacketed
- One piece systems with pressure limit of 45psig @ 100°C
- Two piece systems with pressure limit of 35psig @ 100°C
- Ace-Threds for a leak-tight system
- With or without bottom outlet valves



*View our complete line of Pressure Reactors online.*

*Scan the QR Code to the left.*



Find all of our reactor systems, parts and accessories in the *Process Scale-Up Catalog*.

Contact your local Sales Representative today.

# Impresario I

## Reactor Automation Controller



### Capabilities:

- pH monitoring and dosing control with the addition of a syringe pump available from Ace.
- Temperature monitor/control via type J thermocouple accessories in conjunction with heating accessories such as mantles or circulators, from such manufacturers as Glas-Col, Lauda, Julabo and Polyscience. Utilize the Ace Glass Technical Staff to size the appropriate solution.
- Vacuum/pressure monitoring and control with the addition of vacuum/pressure source and the appropriate proportioning valve available from Ace.
- Overhead stirring speed and torque monitoring and control using a variety of stirring systems available from Ace. Explosion proof stirring options available.
- CFR 21 part 11 compliant software organizes the reaction parameters in a single tabbed document in table or graphical form and can report in encrypted, read only Microsoft® Excel format.
- Fully customizable multi-step ramps for reaction control and safety alarm response definition, including emergency shutdown.

### Base Unit Specifications:

- 120vac 50/60Hz input
- (2) type J thermocouple connections
- (1) pH probe BNC connection
- Internal pressure transducer, full vacuum to 15psia (29.7psig) monitoring
- Pressure/vacuum proportioning valve connections for control
- (3) RS-232 serial ports
- (1) USB port and cable
- (4) Digital 0-5Vdc pin jack inputs
- (4) Open collector pin jack outputs for interfacing with many different families of devices with different operating voltage levels, 0-24Vdc
- (1) 120vac socket, 15amp max

### System requirements:

- PC running Windows XP, 7, 8 or 10
- 250 MB of disk space
- Minimum of 1GB ram
- USB port

### Accessories: (Not Included)

- Lab notebook/Laptop
- Cables for peripheral connections
- Vacuum proportioning control valve or vacuum controller
- Peripheral equipment or probes
- Device drivers for additional peripherals

### Any analog or digital control capable peripheral is a candidate for Impresario control, including:

- Balances
  - Circulators/Water baths
  - Liquid pumps (*peristaltic and syringe*)
  - Solids pumps
  - Vacuum pumps, sensors, and controllers
  - Pressure sensors and controllers
  - Flow meters
  - Turbidity sensors
  - Ultrasonic equipment
  - Temperature controllers and sensors
  - pH controllers and sensors
  - Dissolved oxygen sensors
  - Heating mantles, tapes, and Instatherm
  - Hot plate stirrers
  - Valves
  - Dosing or powder additions systems
  - Overhead stirrers or mixing equipment
  - Level measurement and control
- (communication ports required on peripheral devices)*

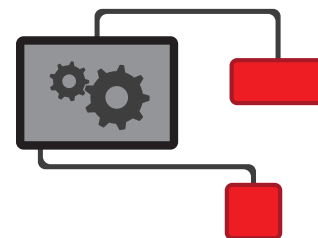
**Order Code**

### Impresario Automation Control

**6458-10**

### REACTOR AUTOMATION *Software Option*

Reaction automation control software by j\_Kem for use with hardware capable of serial communications protocol control. Software is compatible with Windows 7, 8 & 10. Supported equipment includes chillers from Lauda, Julabo, Huber and Polyscience; stirrers from IKA and Heidolph; mantle temperature controls from J-Kem and Ace Glass; syringe pumps from J-Kem. Custom driver programming for equipment from alternative manufactures available. Contact Ace Technical Support for matching the software to your equipment and application. Some additional cabling may be required at additional cost.



**Order Code**

### Software only option

**14110-20**

# Pilot Plant Reactors

ACE cylindrical and spherical pilot plant reactors have been field tested and improved to provide a portable, self-contained reaction system for research and production purposes.

## Standard Design Specifications:

- Complete listing of domed as well as flat head Reactor Assemblies.
- Jacketed and Non-Jacketed flasks.
- Various bottom outlet valve versions available.
- Universal Support Stand with reactor support platform/ring, and stirring motor mount.
- Large, locking wheels on support frame for easier movement and greater stability.
- Unique design for securing bottom and upper agitators on shaft.
- Digital Temperature Control System for added safety.
- Various stirring motor combinations and types
- Clear Safety Shields for Support Frame available, call or email for details.

## LIMITATIONS AND PRECAUTIONS

The strength of glass is primarily determined by its surface condition, thickness, and uniformity. Mechanical stress applied to glass contributes to strain, which results in breakage when the total strain exceeds its allowable limit (i.e., tensile strength). Thus, careful handling and use of glassware are important to avoid scratching and mechanical shock to outside and inside surfaces.

Thermal stress may produce the same result — catastrophic breakage. It is important to avoid rapid or uneven temperature changes across any glass wall. This refers to temperature increases from externally applied heat (mantles) or internally generated heat (exothermic reactions), as well as temperature decreases such as rapidly introducing large quantities of cold liquids to hot reactants, etc. Remember: Mechanical and Thermal Stresses are additives.

## MAXIMUM ALLOWABLE TEMPERATURES

The standard reactors have a maximum operating temperature of 200°C. The maximum allowable temperature difference ( $\Delta T$ ) across the glass wall for units with domed head is 80°C; 30°C for flat head.

**Also, these values limit the rate at which a reactor may heat up or cool down. ACE recommends continuous monitoring of internal and external temperatures to avoid exceeding allowable temperature differences. Caution must be used when heating a reactor vessel with mantles since they produce local temperatures in excess of 350°C. When using variable voltage controllers, we suggest 3/4 voltage (i.e., half power) during warm-up and gradually increasing voltage until desired internal temperature is reached, never exceeding the maximum  $\Delta T$ .**

## MAXIMUM PRESSURE

Maximum pressure for reactors is 5 psig with standard taper joints (domed head) using clips. Flat head NOT recommended for use with pressure.

## MAXIMUM VACUUM

Maximum permissible operating vacuum for spherical and cylindrical vessels with 50°C max.  $\Delta T$ :

10 liter = "Full" Vacuum (i.e., 5 mm Hg)

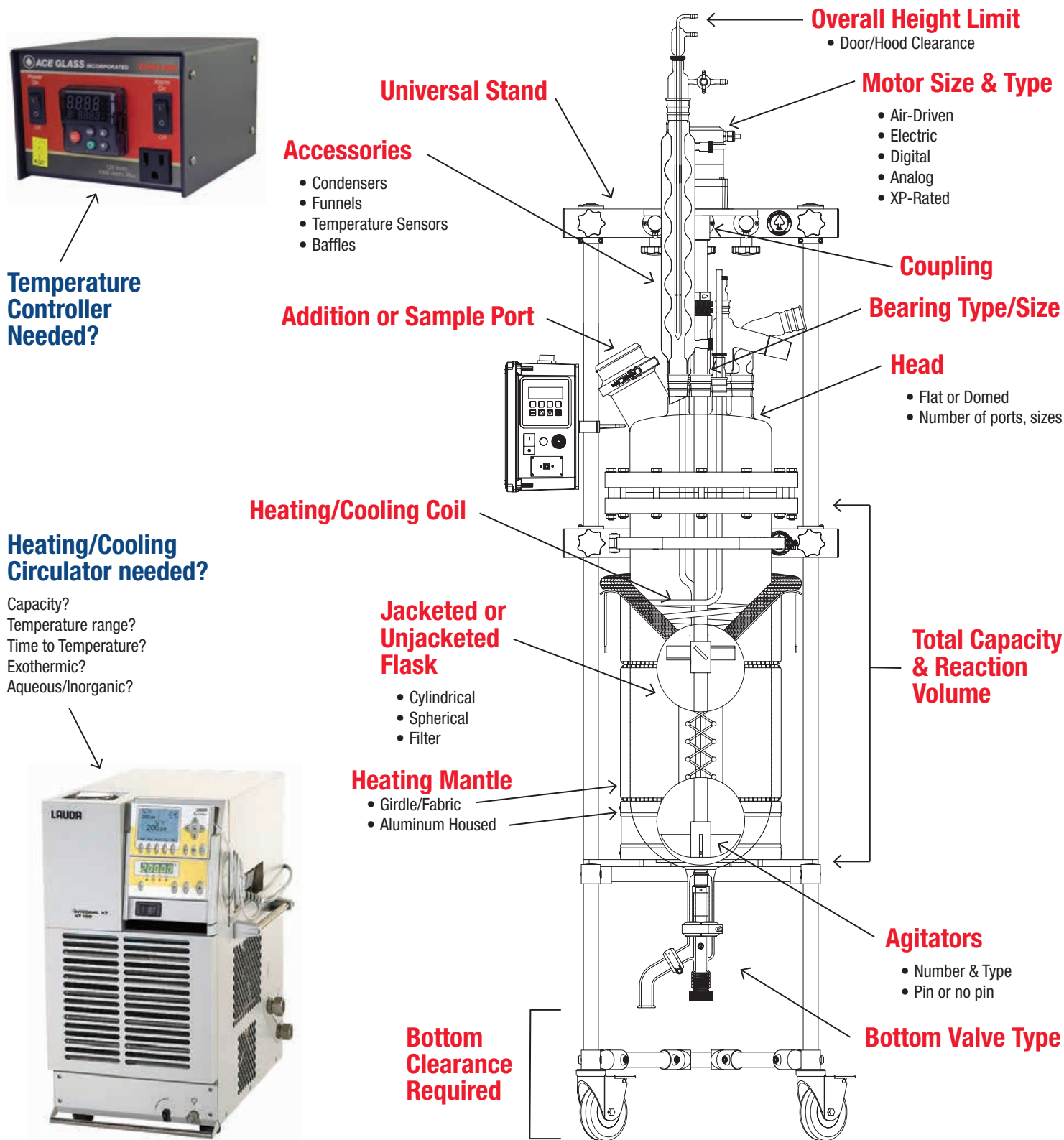
30 & 50 liter Cylindrical }  
 50, 72 & 100 liter Spherical } 50mm Hg

100 & 200 liter Cylindrical }  
 200 liter Spherical } 200mm Hg

Flat head NOT recommended for use under vacuum.

# A Guide to Ordering Custom Pilot Plants

It's easy to customize one of our standard listings with a Pilot Plant Reactor design that will meet your specific application needs. Here are some key points to consider when specifying a Pilot Plant that will work for you:



# LAUDA Air & Water Cooled Circulators

Process thermostats for professional external thermostating across a wide temperature range from -90 up to 300°C.



11505-15

11505-03

**LAUDA** equipment stands out for its excellent handling, optimum ergonomics & intuitive operation for your heating & cooling needs.

- Back-lit graphic LCD display with high resolution and different display modes. Additional green LED display for temperature
- Command console can be detached and used as remote control
- Fully electronic continuous controller with PID action for internal and external control
- Low-level protection and adjustable over-temperature protection with acoustic alarm. Float switch for identifying low or high level
- Powerful LAUDA Variopump (pressure pump) with 8 selectable output levels or control of outflow pressure
- Optically decoupled RS 232/485 interface integrated as a standard
- Option for upgrading with up to 2 interfaces (RS 232/485, Profibus, analogue or contact modules)
- Programmer with 150 temperature/time segments that can be separated into 5 programs
- Timer function for switching on the thermostat, entering the stand-by mode, or running of programs
- Very small internal volume and big non-thermostated expansion vessel (cold fluid layer system)
- SmartCool system for energy-saving digital cooling management including compressor on-off control

**XT 350 W**

**XT 150**

Order Code	11505-03	11505-15
Operating Temp Range	-50° to 220°	-45° to 220°
Heating Capacity	3.5kW	3.5kW
Cooling Capacity @ 200°C	3.1kW	1.5kW
Cooling Capacity @ 20°C	3.1kW	1.5kW
Cooling Capacity @ 0°C	3.1kW	1.1kW
Cooling Capacity @ -20°C	2.0kW	.62kW
Cooling Capacity @ -30°C	1.2kW	.28kW
Cooling Capacity @ -40°C	.25kW	.06kW
Cooling Capacity @ -60°C	—	—
Cooling Capacity @ -60°C	—	—
Flow Rate l/min	18 to 45	18 to 45
Pump Connection	M30 x 1.5 Male	M30 x 1.5 Male
Condenser Cooling	Water Cooled	Air Cooled
Dimension (LxWxH)	21.65" x 18.1" x 50.6"	21.65" x 13.2" x 26"
Weight	330 lbs	191.8 lbs
Power Requirement	208-220V, 60Hz, 17.7A	208-220V, 60Hz, 17.7A

# Julabo Air & Water Cooled Circulators

These instruments cover a working temperature of -92 to 250°C with high cooling and heating capacity.



12262-50



12262-38

Highly dynamic systems of the **Presto®** series employ cutting-edge temperature control technology delivering the thermodynamic power needed to handle almost any application. Great for use with jacketed reactors, calorimeters, autoclaves for polymerization, combinatorial chemistry, reaction blocks, organic synthesis, life sciences, distillation, and the semiconductor industry.

- Extremely fast cool-down and heat-up times
- Wide working temperature ranges without changing the bath fluid
- Ultra-fast compensation of exothermic and endothermic reactions
- Heating capacity of up to 2.8kW
- Space-optimized design to create more space directly next to the units
- Precision temperature control to +/- .01°C
- Connections for USB, Ethernet, RS232, and Alarm Output
- Optional analog connections for RS485, Profibus DP, Modbus

### Presto W40

### Presto A80

Order Code	12262-50	12262-38
Operating Temp Range	-40° to 250°	-80° to 250°
Temperature Stability	+/- .01 to .05	+/- .01 to .05
Heating Capacity	2.30kW	1.5kW
Cooling Capacity @ 100°C	1.20kW	1.2kW
Cooling Capacity @ 20°C	1.20kW	1.2kW
Cooling Capacity @ 0°C	1.0kW	1.2kW
Cooling Capacity @ -20°C	.60kW	1.1kW
Cooling Capacity @ -40°C	.10kW	1.1kW
Cooling Capacity @ -60°C	—	.65kW
Cooling Capacity @ -80°C	—	.10kW
Flow Rate @ 10 PSI	20 LPM	27 LPM
Pump Connection	M24 x 1.5 Male	M24 x 1.5 Male
Condenser Cooling	Water Cooled	Air Cooled
Dimension (LxWxH)	12.72" x 22.95" x 26.06"	16.93" x 25.59" x 49.53"
Weight	172 lbs	362 lbs
Power Requirement	208V, 1PH, 60Hz, 15A	208V, 1PH, 60Hz, 20A

## PolyScience® **Benchtop Mini-Chiller**

Process thermostats for professional external thermostating across a wide temperature range from -90 up to 300°C.

CE



12450-07

**Benchtop mini-chiller by PolyScience. Compact size for bench applications such as photochemistry, Chromatography or jacketed bench reactors. Features include:**

- 130 watts of cooling @ 5°C
- Top-mounted fill port with spill protection cup
- Lighted fluid level indicator on front panel
- Easy access front panel and air filter
- Low flow rate and energy consumption
- High and low liquid level alarms
- Low flow alarm
- Temperature range -5 to 50° C at 0.1° stability
- Maximum pump flow 7.9LPM
- Pump type: centrifugal
- Reservoir capacity 2.65L
- 120V, 60Hz, 130W, 12 amp
- Also available in 240V, 50hz, CE-approved version

**Highly recommended for use in the operation of Ace 7861 and 7840 Photochemistry reactors.**

### MM Series

Order Code	12450-07
Operating Temp Range	-5° to 50°
Heating Capacity	—
Cooling Capacity @ 50°C	.55kW
Cooling Capacity @ 40°C	.52kW
Cooling Capacity @ 30°C	.49kW
Cooling Capacity @ 20°C	.46kW
Cooling Capacity @ 10°C	.32kW
Cooling Capacity @ 0°C	.215kW
Cooling Capacity @ -5°C	.13kW
Flow Rate l/min	7.9
Pump Connection	1/2" (F) NPT
Dimension (LxWxH)	20" x 10" x 17"
Weight	75 lbs
Power Requirement	120V, 60Hz, 12A





Find all of our reactor systems, parts and accessories in the *Process Scale-Up Catalog*.

Contact your local Sales Representative today.

# heidolph Advantage Series Rotary Evaporator

Capacity of supplied evaporating and collecting flasks is 1000mL; joints are 24/40 and 35/20 respectively.



User-friendly digital control panel makes your job easier

**Hei-VAP Advantage** rotary evaporators feature a built-in vacuum controller, digital display and water/oil heating bath. They are ideal for the most demanding applications that require precise operating parameters and the finest integrated vacuum control capabilities.

Meet the most advanced evaporator in its class. Choose either the Hei-VAP Advantage HL (hand lift) or the Hei-VAP Advantage ML (motor lift), and your work couldn't get any easier: set the required bath temperature, vapor temperature and vacuum with the user-friendly digital control panel; start the rotation, vacuum control and process timer all at once with just one press of a button; you can even set and program nine of your most common applications. The unique process timer allows for unattended operation. **There's no other evaporator this easy and hassle-free!**

- Four glassware sets to choose from
- Coated or non-coated glassware
- Digital Controls
- Flask ejector presses off sticking evaporation flasks
- 20-210°C bath for water or oil, with  $\pm 1.0^\circ\text{C}$  accuracy
- Large bath area allows for large flask sizes and additional glass such as bump traps
- 20-270 RPM rotation speed range
- Three-year warranty
- Choice of manual or electric motor lift
- Optional protection shield available
- Safety bath temperature back-up system
- Optional chiller system available
- Flask angle can be changed quickly to accommodate larger flasks.
- 115V – 60 Hz standard.
- Required accessories – valve control vacuum pump or reliable house vacuum source; VAC Sensor; and vacuum valve (see accessories list)
- Easy angle adjust
- Three different series of rotary evaporators available

Supplied Glassware Set	Safety Coated?	Order Code
<b>Hand Lift</b>		
G1	No	13289-01
G3	No	13289-03
G5	No	13289-05
G6	No	13289-06
G1	Yes	13289-11
G3	Yes	13289-13
G5	Yes	13289-15
G6	Yes	13289-16
<b>Motor Lift</b>		
G1	No	13289-21
G3	No	13289-23
G5	No	13289-25
G6	No	13289-26
G1	Yes	13289-31
G3	Yes	13289-33
G5	Yes	13289-35
G6	Yes	13289-36

# heidolph Value Series Rotary Evaporator

Capacity of supplied evaporating and collecting flasks is 1000mL; joints are 24/40 and 35/20 respectively.



The affordable **Hei-VAP Value** Series rotary evaporators feature a hand lift for all standard applications. The units have large dial controls for adjustment of speed and bath temperature, and an easily adjustable angle. The hand lift provides easy height adjustment of the bath. Four glassware sets are available in either poly-coated or plain type. Temperature range up to 210°C.

- Three glassware sets to choose from
- Coated or non-coated glassware
- Dial Controls, no digital display
- Flask ejector presses off sticking evaporation flasks
- 20-210°C bath for water or oil, with ±1.0°C accuracy
- Large bath area allows for large flask sizes and additional glass such as bump traps
- 20-270 RPM rotation speed range
- Three-year warranty
- Manual hand lift
- Optional protection shield available
- Safety bath temperature back-up system
- Optional chiller system available
- Flask angle can be changed quickly to accommodate larger flasks.
- 115V — 60 Hz standard.
- Required accessories — valve control vacuum pump or reliable house vacuum source; VAC Sensor; and vacuum valve (see accessories list)
- Easy angle adjust
- Three different series of rotary evaporators available



Supplied Glassware Set	Safety Coated?	Order Code
<b>Hand Lift</b>		
G1	No	13284-03
G3	No	13284-05
G5	No	13284-07
G1	Yes	13284-23
G3	Yes	13284-25
G5	Yes	13284-27

Visit [AceGlass.com](http://AceGlass.com) to view our Rotary Evaporator glassware brochures

# heidolph Industrial Large Scale Rotary Evaporator

Capacity of supplied evaporating flask is 20L and collecting flasks are 10L.



Supplied Glassware Set

Order Code

### Compact

RC	13301-04
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### Safety

RC	13301-02
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The **Hei-VAP Industrial** series are perfectly designed for a great deal of different distilling processes, from standard evaporation without vacuum control up to complex distillation processes with vacuum control.

A temperature sensor powers off the bath in case of any uncontrolled heat-up event. The unique integrated evaporating flask support system allows for “one person operation” to remove the flask in just moments. Distilling through automated vacuum distillation allows you to spend a significantly less amount of time on solvent evaporation tasks. The automatic water bath refill system along with an additional control panel for filling and electronics allow for use over an extended period of time.

With the Hei-VAP Industrial series you can be sure you are always on the safe side when doing automatic distillation. Safety features guarantee a smooth distillation process, no matter what solvent you evaporate.

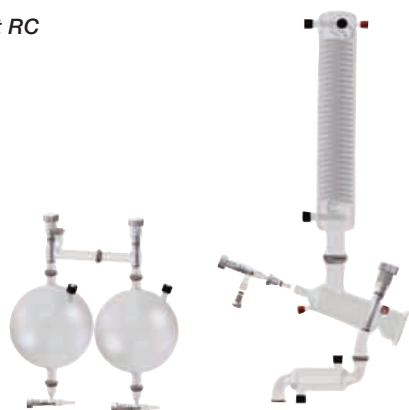
### Compact Model:

- 230V, 50/60Hz
- w/o Base Cart
- w/Glassware set RC: (1) ascending condenser, (1) 20L evaporating flask, (2) 10L receiving flask
- Large touch screen control panel with illuminated displays for all process parameters, programmable ramps
- The evaporation flask is illuminated during operation for increased visibility
- Certification according to GMP available for this model: validation for installation (IQ) and operating qualification (OQ)
- Universal heating bath accommodates water or other bath fluids allowing for temperature settings up to 180°C
- Comes standard with integrated refill water system, spillover prevention and a release valve on the bottom

### Safety Model:

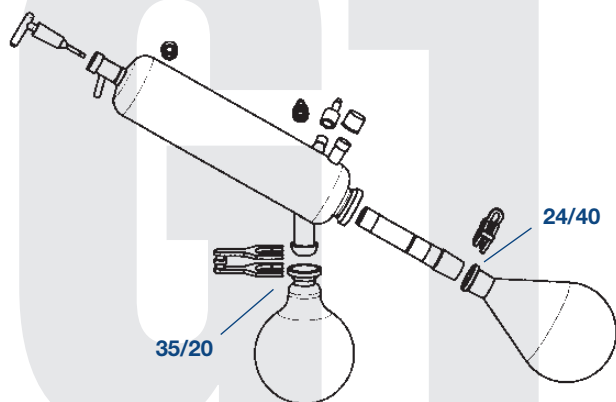
- Compact model features plus the following features
- User safety with high-impact transparent PMMA door
- Non-fogging safety glass and metal frame guard hood provides excellent user protection
- Receiver cassettes and additional PMMA door housing protect against threat of glassware breakage

Glassware Set RC



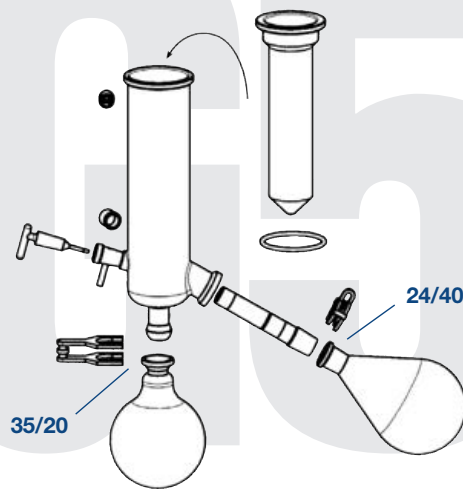
**GLASSWARE SETS** for Hei-VAP Value Series / Advantage Series Rotary Evaporators

**Supplied Glassware Set G1**



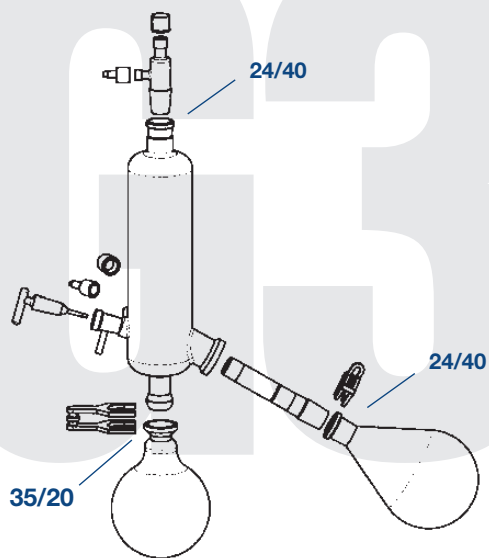
Diagonal condenser for all standard distillations

**Supplied Glassware Set G5**



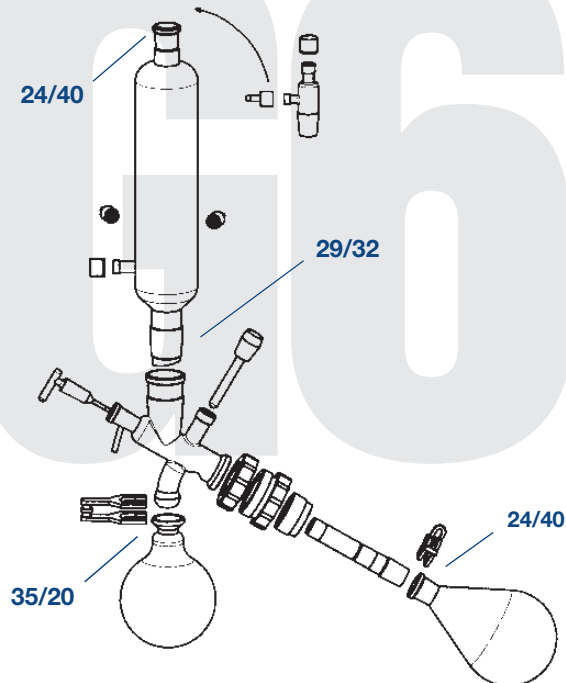
Condensate trap for low boiling solvents

**Supplied Glassware Set G3**



Vertical condenser for all standard distillations

**Supplied Glassware Set G6**



Vertical condenser; centerpiece with valve for reflux distillation.

*Not available on the Value Series.*

# heidolph RotoCool® Chiller

The perfect accessory for completing your evaporation workstation.



The only chiller designed specifically for rotary evaporator workstations. Its unique “L-shaped” design allows any benchtop evaporator to fit right on its platform. With its innovative technology, the ROTACOOOL chiller offers high cooling capacity while occupying minimal bench space.

### Compact Model:

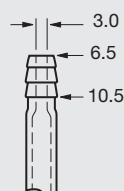
- This chiller is designed specifically for rotary evaporators
- Minimal bench space due to unique "L" shape design
- Provides space of 470 x 405 mm for evaporator
- Temperature range from -10°C to +40°C
- Temperature control accuracy of ± 0.5°C
- Display for setting temperature and reading out actual temperature
- Maximum cooling capacity of 420W
- Footprint of chiller: 580 x 470 x 420 mm (LxWxH)

Temperature Range,  
°C  
-10 to 40

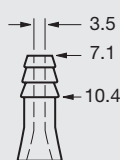
Order  
Code  
13286-101

## Hose Connection Size Guide

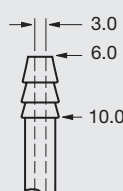
Dimensions are in millimeters



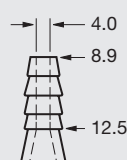
**A**  
Use with  
7.9mm (5/16")  
I.D. Tubing



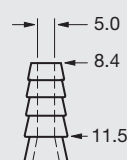
**B**  
Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



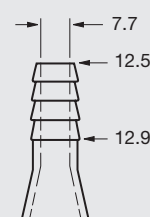
**C**  
Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



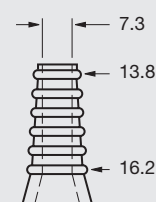
**D**  
Use with  
9.5mm (3/8")  
I.D. Tubing



**E**  
Use with  
9.5mm (3/8")  
or 11.1mm (7/16")  
I.D. Tubing



**F**  
Use with  
11.1mm (7/16")  
or 12.7mm (1/2")  
I.D. Tubing



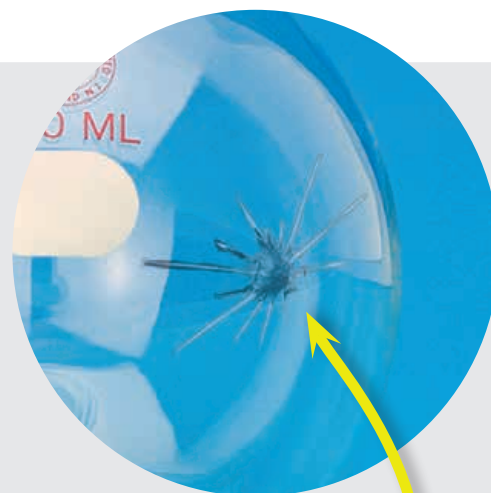
**G**  
Use with  
15.9mm (5/8")  
I.D. Tubing

# REPAIR SERVICE SCIENTIFIC GLASSWARE

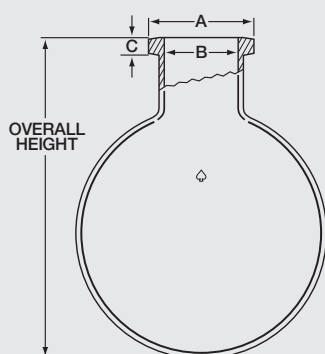
## Yes, we fix it, too!

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. These repairs can be far less expensive than the cost of replacing.

Broken joint or a cracked flask, we can restore it!



To find out more about our repair service call  
**1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)



## FLANGE SIZES

Flange Size Designation	A Flange O.D., mm (Inches)	B Flange I.D., mm (Inches)	C Flange Thickness (mm)
S (Small)	90 (3.5)	67 (2.7)	18
M (Medium)	100 (3.9)	72 (2.8)	19
L (Large)	110 (4.3)	83 (3.3)	23
XL (Extra Large)	149.5 (5.9)	118.8 (4.7)	21



### FLASKS *Large Scale*

These large size evaporation flasks are fabricated from heavy wall flask blanks selected for balance and quality. Necks are carefully fabricated to prevent “rotational whip”. Flasks are now available in clear plain glass, poly-coated, or amberized. Amber coated flask can protect light sensitive contents. The XL size flange (see table) is compatible with the 150mm, and is standard for Buchi® Model R220 rotary evaporators.

Capacity, Liters	Similar to Buchi® Part No.	Overall Height, mm	Flange Size	Order Code	
6	27470	300	S	6702-05	★
6	27470	325	M	6702-07	★
6	27470	380	M	6702-10	★
6	27470	295	L	6702-15	★
6	27470	380	L	6702-17	★
6	27470	351	XL	6702-19	★
10	27469	350	S	6702-20	★
10	27469	335	M	6702-25	★
10	27469	413	M	6702-27	★
10	27469	410	L	6702-30	★
10	27469	380	XL	6702-33	★
20	27468	375	M	6702-35	★
20	27468	435	M	6702-37	★
20	27468	435	L	6702-40	★
20	27468	413	XL	6702-44	★



### FLASKS *Large Scale, Poly-Coated*

Same as 6702 above, but poly-coated for added safety. Plastic coated flasks are clear and will withstand temperatures up to 100°C.

Capacity, Liters	Similar to Buchi® Part No.	Overall Height, mm	Flange Size	Order Code	
6	—	300	S	6702-105	★
6	—	325	M	6702-107	★
6	—	380	M	6702-110	★
6	—	295	L	6702-115	★
6	—	380	L	6702-117	★
6	27470	351	XL	6702-119	★
10	—	350	S	6702-120	★
10	—	335	M	6702-125	★
10	—	413	M	6702-127	★
10	—	410	L	6702-130	★
10	27469	380	XL	6702-133	★
20	—	375	M	6702-135	★
20	—	435	M	6702-137	★
20	—	435	L	6702-140	★
20	27468	413	XL	6702-144	★



## FLASKS *Large Scale, Amberized*

Same as 6702, except with an amber coating to protect light sensitive contents. The XL size matches Buchi® large scale rotary evaporators. Plain, not plastic coated.

Capacity, Liters	Similar to Buchi® Part No.	Overall Height, mm	Flange Size	Order Code
6	—	351	XL/149.5	6702-219 ★
10	—	380	XL/149.5	6702-233 ★
20	—	413	XL/149.5	6702-244 ★

### Accessories

Polyethylene Dust Cover	6702-300 ★
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## FLASKS *Large Scale, Indented*

These flasks are also referred to as drying flasks. They are particularly suited for drying of powdered samples. The baffles, indented into the glass, provide better circulation and mixing of the powders while rotating. Plain, not coated.

Capacity, Liters	Similar to Buchi® Part No.	Overall Height, mm	Flange Size	Order Code
10	28592	380	XL/149.5	6720-10 ★
20	28593	413	XL/149.5	6720-20 ★

### Accessories

Polyethylene Dust Cover	6702-300 ★
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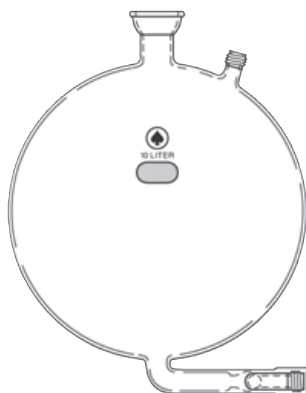
## FLASKS *for Heidolph 20L*

Used with Heidolph 20L rotary evaporators. These large flasks are from blanks selected for balance and quality. Necks are carefully welded to prevent “rotational whip.” Flasks can be plastic coated upon request.

**Note:** Flanges for Laborota and Hei-Vap Industrial are different. Refer to the Heidolph original part numbers.

Capacity, Liters	Heidolph Part Number	Qty	Order Code
<b>Laborota</b>			
10	036303000	1	6701-12
20	036302990	1	6701-22
<b>Hei-Vap Industrial</b>			
10	036303005	1	6701-32
20	036302995	1	6701-33





### FLASKS *Bottom Outlet, Side Neck, for Heidolph 20L*

Used with Heidolph 20L rotary evaporators. This receiver flask is fabricated from blanks selected for balance and quality. Center neck is a polished  $\$$  40/25 joint; side neck is a GL-18 thread, supplied with solid cap. At bottom is a 0-10mm Easy-Action stopcock with a GL-18 side arm, supplied with a 3/8-inch hose connection tube. Flasks can be plastic-coated upon request.

Capacity, Liters	Center Neck	Side Neck	Bottom Outlet	Heidolph Part Number	Qty	Order Code
10	$\$$ 40/25	GL18	0-10mm/GL-18	036303040	1	<b>6701-44</b>

#### Accessories

Replacement GL-18 cap	7622-107	★
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### FLASKS *Receiving, Jacketed*

Standard receiving flask for all rotary evaporators. Similar to 6726 except, with outer jacket for cooling/heating of contents. Inlet/outlet connections are 28/15 o-ring ball joints and include 7855-726 FETFE o-rings, size -116. Top and bottom joints are DN25. Bottom inner ball joint includes 7855-840 CAPFE (PTFE-encapsulated silicone rubber) o-ring, size -217. Side joint is SVL-22 thread, with 7647-40 black vent cap included.

Description	Plastic Coated?	Fits Rotavap Models	Order Code
Receiving Flask 8L	No	All	<b>6727-10</b> ★

#### Accessories

SVL-22 vent cap with PTFE insert	7647-40	★
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### FLASKS *Receiving*

Replacement borosilicate glass for Buchi® R220, R220EX, and R220SE rotary evaporators. Receiving flasks are designed to fit all large-scale rotary evaporators. Now available in coated, plain, non-coated, amberized, and 6727 jacketed versions. Side necks include 7647-40 SVL-22 threaded black vent caps. Top and bottom socket joints are DN25, and bottom joint includes 7855-840 CAPFE (PTFE-encapsulated silicone rubber) o-ring, size -217.

Description	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Order Code
Receiving Flask 10L	Yes	37569	All	<b>6726-10</b> ★
Receiving Flask 10L	No	46519	All	<b>6726-15</b> ★
Receiving Flask 20L	Yes	41446	All	<b>6726-20</b> ★
Receiving Flask 20L	No	28671	All	<b>6726-25</b> ★
Receiving Flask 10L — Amber	No	—	All	<b>6726-30</b> ★
Receiving Flask 20L — Amber	No	—	All	<b>6726-32</b> ★

#### Accessories

SVL-22 vent cap with PTFE insert	7647-40	★
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## TRAPS *Fits Glassware Set C*

Replacement borosilicate glass components for Buchi® R220, R220EX, and R220SE rotary evaporators. Inner and outer cold trap components for Buchi® C glassware Set. Available poly-coated or plain, non-coated. DN40 inner ball joint includes 7855-844 CAPFE (PTFE-encapsulated silicone rubber) o-rings, size -225. Black cap (included) is SVL-22 thread. Top 7855-881 CAPFE o-ring (included) for 3971-03 and 3971-05 is for 150mm grooved top flat flange. 150mm clamp and PFA cap, listed below, must be ordered separately.

Description	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Order Code	
Inner Cold Trap	No	25124	220, 220EX, 220SE	<b>3971-01</b>	★
Outer Cold Trap	Yes	25978	220	<b>3971-03</b>	★
Outer Cold Trap	No	46518	220EX, 220SE	<b>3971-05</b>	★
PFA Cap (Lid)	No	25979	All	<b>3971-21</b>	★
Duran Quick Clamp	No	—	All	<b>6517-27</b>	★



## VAPOR TUBES *Vapor Duct Steam Tube*

Replacement borosilicate glass vapor tubes for Buchi® R220, R220EX, and R220SE rotary evaporators. 3976-05 contains a Porosity C (25-50 micron) glass frit. Works with all glassware sets.

Replacement 316 stainless steel vapor tube for Buchi® R220, R220EX, and R220SE rotary evaporators. Works with all glassware sets.

Description	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Order Code	
Vapor Duct Tube	No	41084	R220	<b>3976-03</b>	★
Vapor Duct Tube w/C Frit	No	41100	R220	<b>3976-05</b>	★

### **Stainless Steel**

Vapor Duct Tube	No	41084	R220	<b>3976-10</b>	★
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## VAPOR TUBE *for Heidolph Bench-Top Series*

Used as replacements with Heidolph Bench-Top Series rotary evaporators. Tube is secured in rotary drive with low-stress plastic clip that seats into groove behind ⚙ joint. Available plain or with Firestone “splash guard” to protect against splash-up. The 13286-30 vapor tube comes standard with all Heidolph bench-scale rotary evaporators.

Type	⚙ Joint	Order Code	
Plain	24/25	<b>13286-28</b>	★
Plain	24/40	<b>13286-30</b>	★
Plain	29/42	<b>13286-32</b>	★
Plain	45/50	<b>13286-34</b>	★
w/Splash Guard	24/40	<b>13286-37</b>	★
w/Splash Guard	29/42	<b>13286-39</b>	★





### EXPANSION TANK

Replacement borosilicate glass components for Buchi® R220, R220EX, and R220SE rotary evaporators. Upper expansion tanks for Buchi® glass sets available in either poly-coated or plain, non-coated versions. DN40 ball joints on top and bottom. Inner bottom ball joint includes 7855-844 CAPFE (PTFE-encapsulated silicone rubber) o-ring, size -225.

Fits Glassware Set	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Order Code	
D, D2, DB, DB2	Yes	01165	R220	<b>3967-10</b>	★
D, D2, DB, DB2	No	41442	R220EX, SE	<b>3967-15</b>	★

### HEAD Distribution

Replacement borosilicate glass components for Buchi® R220, R220EX, and R220SE rotary evaporators. Lower distribution heads with improved design with easy to use Ace-Threds, PTFE stem valves. 3970-30 PTFE 0-20mm valve stem includes three Kalrez o-rings. Stems are replaceable. Available poly-coated or plain, non-coated. Upper joint is DN40 outer ball joint. Red caps (included) are GL-14 thread; black cap (included) is SVL-15 thread. DN25 inner ball joint on 3970-05 and 3970-10 includes 7855-840 CAPFE (PTFE-encapsulated silicone rubber) o-ring, size -217. End thread is #15 Ace-Thred, for connection to 3978 valve assembly.



Fits Glassware Set	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Order Code	
C, RB, R	No	41373	R220	<b>3970-05</b>	★
C, RB, R	No	46511	R220EX, SE	<b>3970-10</b>	★
D, D2, DB, DB2	Yes	41335	R220	<b>3970-15</b>	★
D, D2, DB, DB2	No	41307	R220EX, SE	<b>3970-18</b>	★

### Accessories

0-20mm PTFE valve stem  
 includes (2) 7855-626 size -116 and  
 (1) 7855-622 size -114 Kalrez o-rings

R220EX, SE

**3970-30** ★

### COVER Polyethylene, for XL Flange

Polyethylene dust cover for evaporating flasks with 149.5mm I.D. XL flange has integral O-Ring to keep a tight seal. Comes complete with Viton o-ring.



Similar to  
 Buchi® Part No.

42895

Order  
 Code

**6702-300** ★

**CAPS GL Thread**

Red polybutylteraphthalate (PBT) replacement caps with GL threads. Temperature range to 140°. Available with solid tops or open tops. Open tops are for use with 7623 hose barbs.

GL Thread Size	Order Code	
<b>Solid Top</b>		
14	7622-103	★
18	7622-107	★
25	7622-114	★
32	7622-121	★
45	7622-124	★
<b>Open Top</b>		
14	7621-04	★
18	7621-08	★
25	7621-15	★


**CAPS SVL Thread**

Black replacement caps with SVL thread for rotary evaporator components. Available with and without vent plug. For Buchi® glassware.

SVL Thread Size	Similar to Buchi® Part No.	Order Code	
<b>Solid Top</b>			
15		7647-15	★
22		7647-22	★
30		7647-30	★
<b>Vented Top</b>			
22	46574	7647-40	★


**HOSE CONNECTIONS GL w/Rubber Seal**

Polypropylene hose connections with a silicone rubber seal for use with 7621 open-top caps. Available in either straight or angled styles.

GL Thread Size	Order Code	
<b>Angled</b>		
14	7623-20	★
18	7623-24	★
<b>Straight</b>		
14	7623-22	★
18	7623-26	★
<b>Accessories</b>		
Silicone Seal Replacement 10/pk	7623-30	★





**TUBES** *Connecting, for Side Receiver Assembly*

Borosilicate glass connecting tubes for side receiver assembly on R220 rotary evaporators. Include right and left branching pieces for both double and single receiving assemblies. Ace-Thred valves with Kalrez o-rings are a significant design improvement. Available in either plain glass or with safety poly-coating. Supplied with CAPFE o-rings on the inner ball joints.

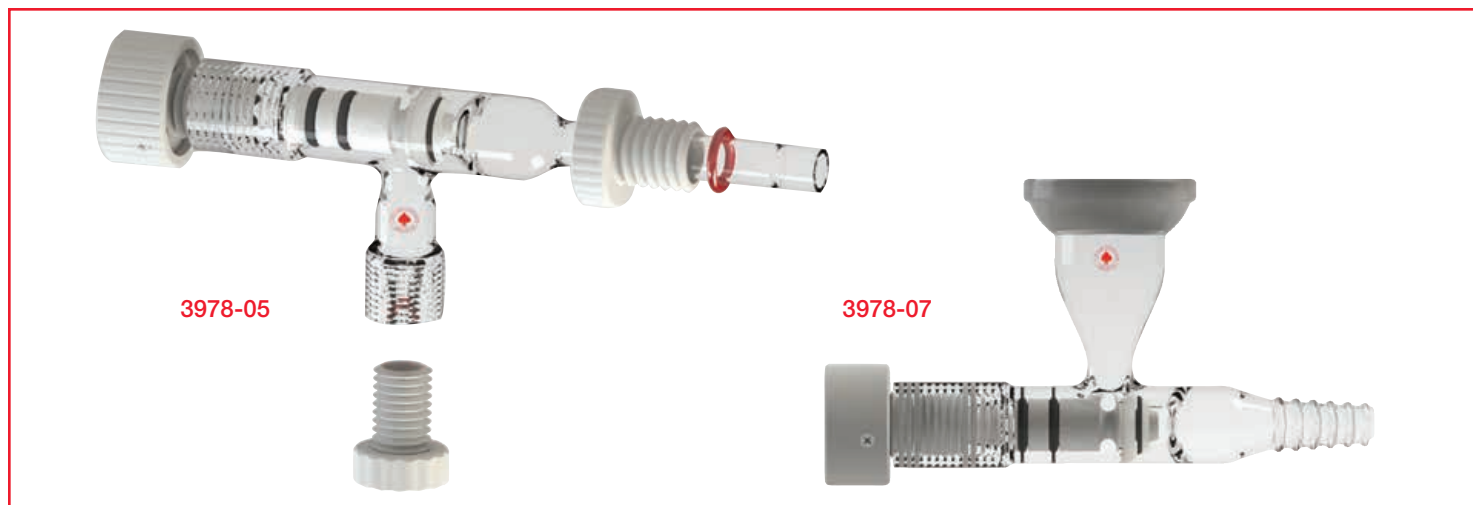
Description	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Order Code
<b>For Double Receiver Assembly</b>				
Upper Branching Piece — #1 Right, Ace Valve	Yes	41048-1	R220	<b>3973-01</b> ★
Upper Branching Piece — #1 Right, Ace Valve	No	41447-1	R220EX, SE	<b>3973-03</b> ★
Upper Branching Piece — #2 Left, Ace Valve	Yes	41049 / 41047-2	R220	<b>3973-04</b> ★
Upper Branching Piece — #2 Left, Ace Valve	No	46520-2	R220EX, SE	<b>3973-06</b> ★
<b>For Single Receiver Assembly</b>				
Upper Branching Piece — Ace Valve	Yes	41053	R220	<b>3973-08</b> ★
Upper Branching Piece — Ace Valve	No	46521	R220EX, SE	<b>3973-10</b> ★
<b>Accessories</b>				
0-20mm PTFE valve stem <i>includes (2) 7855-626 size -116 and (1) 7855-622 size -114 Kalrez o-rings</i>	No	—	All	<b>3973-30</b> ★



### TUBES *Connecting, Glass Sets*

Replacement borosilicate glass tubes for Buchi® R220, R220EX, and R220SE rotary evaporators. Upper and lower connecting tubes for glass distillation sets available poly-coated or plain, non-coated. The 3974-20 codes through -27 have two GL14 thread ports (with red caps) on top for thermosensor, or for easy clean out. DN40 inner ball joints on -12, -13, -20, -22, -25, and -27 include 7855-844 CAPFE (PTFE-encapsulated silicone rubber) o-rings, size -225. Bottom DN25 ball joint on -15 and -18 includes 7855-840 CAPFE o-ring, size -217. 3974-12 and -13 both include an SVL-22 thread black cap and a GL-14 thread red cap.

Description	Fits Glassware Set	Plastic Coated?	Buchi® Part No.	Fits Buchi® Models	Order Code
Vacuum Connector Tube	DB, D	Yes	01129	R220	<b>3974-12</b> ★
Vacuum Connector Tube	DB, D	No	41443	R220EX, SE	<b>3974-13</b> ★
“Y” Bottom Tube	DB, D2, D	Yes	01169	R220	<b>3974-15</b> ★
“Y” Bottom Tube	DB, D2, D	No	46513	R220EX, SE	<b>3974-18</b> ★
“U” Top Connect Tube	DB, DB2	Yes	27837	R220	<b>3974-20</b> ★
“U” Top Connect Tube	DB, DB2	No	46515	R220EX, SE	<b>3974-22</b> ★
“U” Top Connect Tube	D, D2	Yes	27150	R220	<b>3974-25</b> ★
“U” Top Connect Tube	D, D2	No	46512	R220EX, SE	<b>3974-27</b> ★
“Y” Bottom Tube	DB2	Yes	41166	R220	<b>3974-30</b> ★
“Y” Bottom Tube	DB2	No	46514	R220EX, SE	<b>3974-33</b> ★



## VALVES

Replacement borosilicate glass for Buchi® R220, R220EX, and R220SE rotary evaporators. PTFE valve stem parts and valve assemblies, with Kalrez O-Rings, for receiving flasks and 3970 lower distribution heads. Socket joint on 3978-07 is DN25. Joints on 3978-05 are PTFE, Ace-Thred #11 and #15, and they include CAPFE (PTFE-encapsulated silicone rubber) O-Rings. Hose coupling on -07 is size G, for 5/8-inch I.D. tubing.

**Note:** Replacement O-Rings for the bushings on 3978-05 are CAPFE size -110 (7855-816) for side port and CAPFE size -112 (7855-820) on end.

Description	Fits Glassware Set	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Order Code
Glass Body (only) for 3978-05 Inlet Valve	All	No	41346	All	<b>3978-01</b> ★
Complete Inlet Valve Assembly for Distribution Head	All	No	41348	All	<b>3978-05</b> ★
Bottom Drain Valve (Receiver)	—	No	41061	All	<b>3978-07</b> ★

## Accessories

PTFE valve stem: includes (2) 7855-606 size -011 and (1) 7855-618 size -111 Kalrez o-rings		No	—	All	<b>3978-33</b> ★
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## Color Coated Glassware



**Ace Glass** offers many of our existing glass vessels in various coated versions. Flasks, pressure bottles, beakers, bottles and many other items listed in this catalog can be amber or color coated on request. The coating is a proprietary process and gives excellent UV protection characteristics. Contact Ace for more details and pricing.



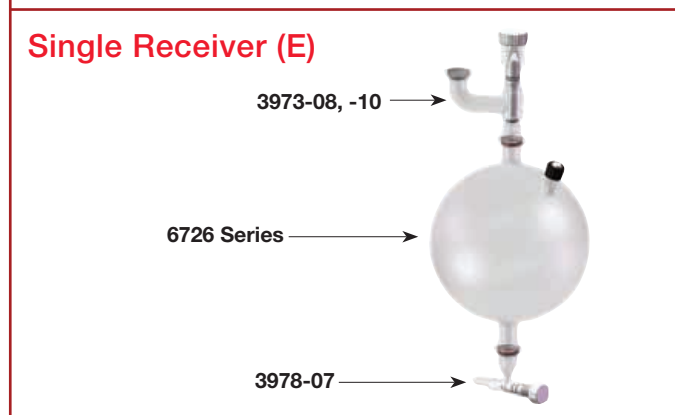
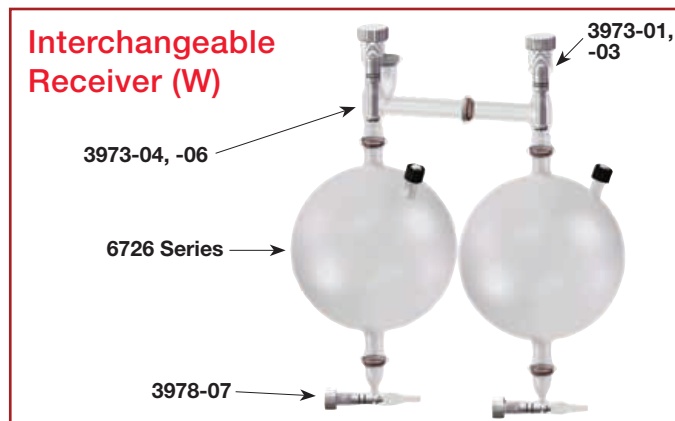
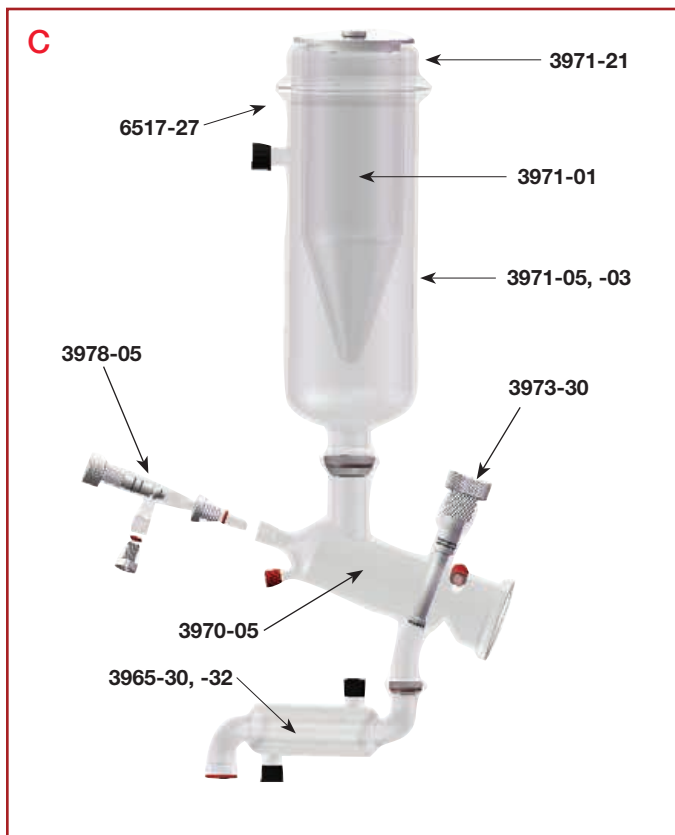
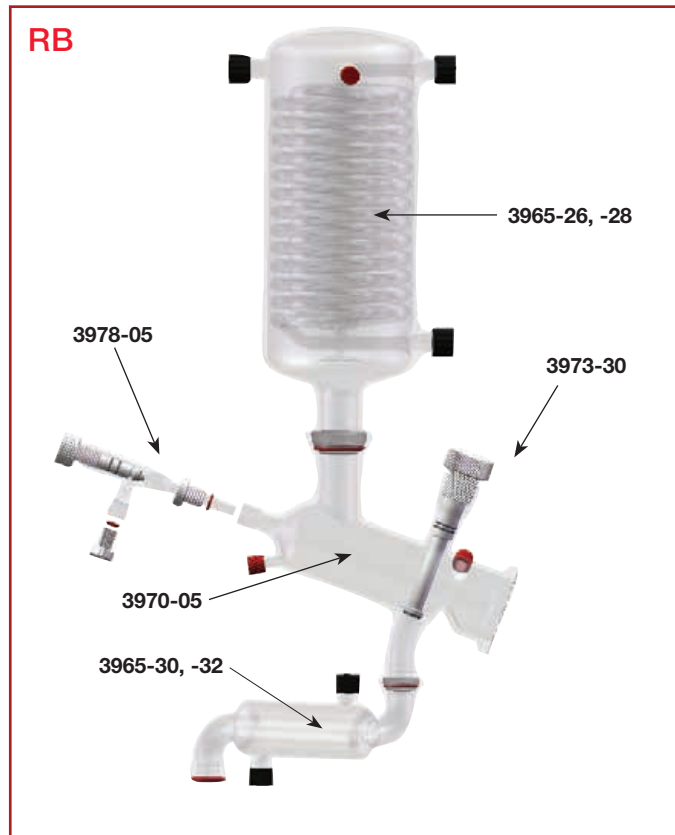
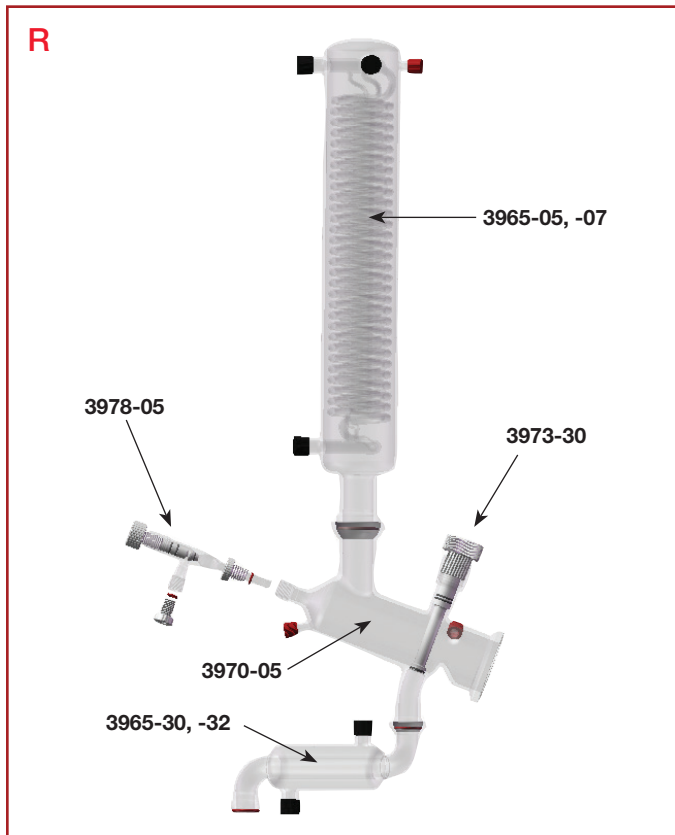


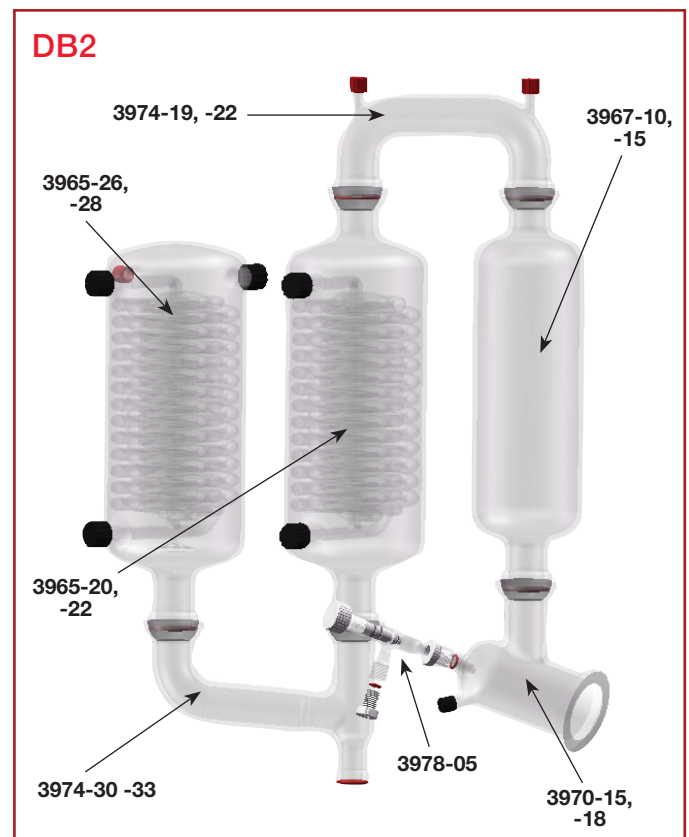
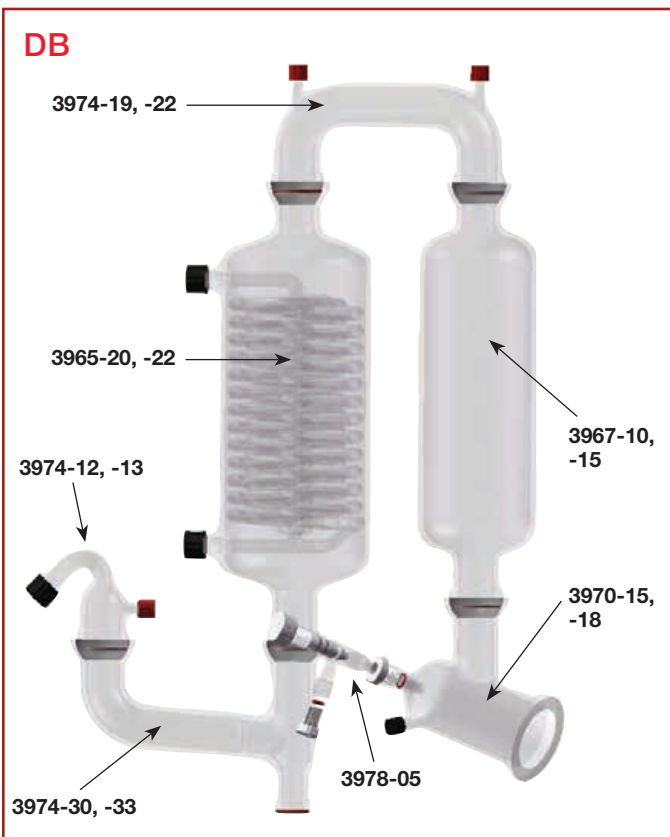
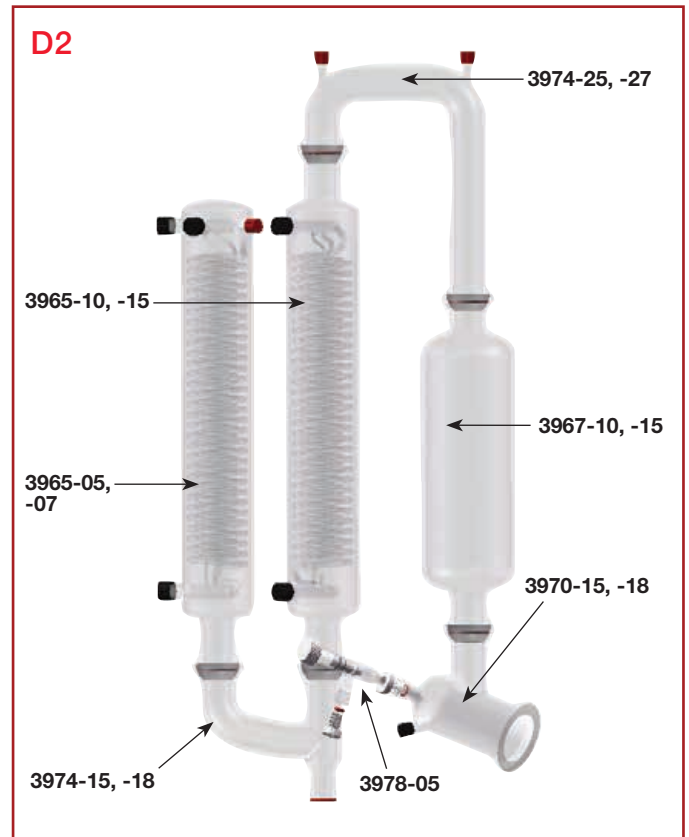
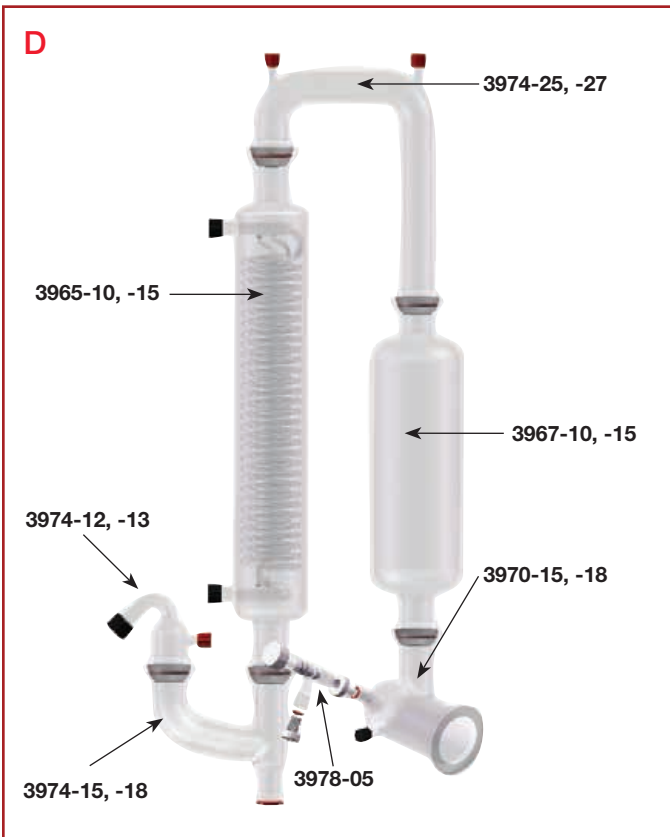
### CONDENSERS/COOLERS for Buchi® Rotary Evaporators

The condensers and coolers are available in either poly-coated or plain, non-coated borosilicate glass. All condensers fit easily into the glass sets listed below. Inner ball joints include CAPFE (PTFE-encapsulated silicone rubber) o-rings. Black caps (included) are SVL-22 threads; red cap (included) is GL-14 thread.

Description	Fits Glassware Set	Plastic Coated?	Similar to Buchi® Part No.	Fits Buchi® Models	Uses O-Ring Size/Code	Order Code
<b>#40 Joint Sizes</b>						
Triple-Coil Condenser	R, D2	Yes	41159	R220	-225/7855-844	<b>3965-05</b> ★
Triple-Coil Condenser	R, D2	No	41399	R200EX, SE	-225/7855-844	<b>3965-07</b> ★
Triple-Coil Condenser	D, D2	Yes	27308	R220	-225/7855-844	<b>3965-10</b> ★
Triple-Coil Condenser	D, D2	No	41333	R200EX, SE	-225/7855-844	<b>3965-15</b> ★
Glass Condenser (Bullfrog)	DB, DB2	Yes	27825	R220	-225/7855-844	<b>3965-19</b> ★
Glass Condenser (Bullfrog)	DB, DB2	No	46516	R220EX, SE	-225/7855-844	<b>3965-22</b> ★
Glass Condenser (Bullfrog)	RB, DB2	Yes	27824	R220	-225/7855-844	<b>3965-26</b> ★
Glass Condenser (Bullfrog)	RB, DB2	No	41458	R220	-225/7855-844	<b>3965-28</b> ★
<b>#25 Joint Sizes</b>						
Condensate Cooler, Jacketed	C, RB, R	Yes	41162	R220	-217/7855-840	<b>3965-30</b> ★
Condensate Cooler, Jacketed	C, RB, R	No	46510	R220EX	-217/7855-840	<b>3965-32</b> ★
Condensate Cooler, Unjacketed	C, RB, R	Yes	—	R220	-217/7855-840	<b>3965-34</b> ★
Condensate Cooler, Unjacketed	C, RB, R	No	—	R220EX	-217/7855-840	<b>3965-36</b> ★

**GLASSWARE SETS** for Buchi Rotary Evaporator Set-ups





### Flask Stoppers

Stopper Number	Approximate Diameter at Small End, mm	Length of Ground Zone, mm	Diameter at Large End, mm
8	7.25	10 ±1.0	8.25
9	8	14 ±1.0	9.40
13	12	14 ±1.0	13.40
16	15	15 ±1.0	16.50
19	18	17 ±1.0	19.70
22	20	20.5 ±1.0	22.05
27	25	21.5 ±1.0	27.15
32	30	21.5 ±1.0	32.15
38	35	30 ±1.0	38.00

### ACE Glass Fiber Filter Discs

ACE Porosity Designation	Porosity Maximum Pore Diameter Range (micron)	Corning, Kimble and ChemGlass Equivalents/ Porosities	Uses
A	145-174	EC (170-220)	Coarse Filtration
B	70-100	—	Coarse Filtration
C	25-50	C (40-60)	Gas Dispersion
D	10-20	M (10-15)	Extraction
E	4-8	F (4-5.5)	Extraction
VF	2-2.5	VF (2-2.5)	Bacteria Filtration
UF	0.9-1.4	UF (0.9-1.4)	Bacteria Filtration

*Note: ACE designations A-E are grouped together, and VF/UF are grouped under Robu.*

### Pressure Conversions

Absolute									Gauge Pressure	
cm of Hg	Torr or mm of Hg	Micron	Atmosphere	lb/ in. <sup>2</sup>	ton/ ft. <sup>2</sup>	gram/ cm <sup>2</sup>	ft. of H <sub>2</sub> O	in. of Hg	lb. in.	in. of Hg
76	760	760000	1	14.7	1.06	1033	33.9	29.9	0.00	0.00
70	700	700000	0.921	13.53	0.975	952	31.2	27.6	1.16	2.36
60	600	600000	0.79	11.6	0.835	816	26.8	23.6	3.10	6.30
50	500	500000	0.659	9.67	0.696	680	22.3	19.7	5.03	10.2
40	400	400000	0.526	7.74	0.557	545	17.8	15.7	6.97	14.2
30	300	300000	0.395	5.8	0.417	408	13.4	11.8	8.90	18.1
20	200	200000	0.263	3.87	0.278	272	8.92	7.87	10.8	22.0
10	100	100000	0.132	1.94	0.139	136	4.46	3.94	12.8	26.0
5	50	50000	0.006	0.967	0.07	68	2.23	1.97	13.7	27.9
1	10	10000	0.013	0.194	0.014	13.6	0.446	0.394	14.5	29.5
0.1	1	1000	0.001	0.019	0.001	1.36	0.045	0.039	14.68	29.88
0	0	0	0	0	0	0	0	0	14.7	29.92

### Selecting a Septa

Material(s)	Compatible	Incompatible	Resealability
<b>Butyl Rubber</b>	Acetone, alcohols, diethylamine, DMSO, MEK, sodium peroxide	Benzene, chloroform, DMF, HF, HCL, phenol, toluene, xylene	Very good
<b>Butyl Rubber/PTFE</b>	PTFE resistance until punctured, then septa or liner will have compatibility of butyl rubber		Teflon does not reseal after being punctured
<b>PTFE</b>		Diethylamine, fluorine	Single injection use
<b>Red Rubber</b>	Acetone, alcohols, diethylamine, DMSO, sodium peroxide	Chloroform, DMF, HF, HCL, MEK, phenol, toluene, xylene	Excellent
<b>Red Rubber/PTFE</b>	PTFE resistance until punctured, then septa or liner will have compatibility of red rubber		Teflon does not reseal after being punctured
<b>Silicone</b>	Alcohol, DMF, DMSO, hydrogen peroxide, sodium hydroxide	ACN, benzene, chloroform, hexane, HCL, MEK, THF, toluene	
<b>Silicone/PTFE</b>	PTFE chemical resistance until punctured, then septa or liner will have compatibility of silicone		Teflon does not reseal after being punctured
<b>Viton®</b>	Alcohols, benzene, chlorinated solvents, HF, heptane, hexane	Acetone, ACN, DMF, dioxane, pyridine, ketones, MEK, THF	Good

**NOTE:** All septa liners are designed for a variety of applications. Individual performance requirements may vary; therefore, it is recommended that customers perform the proper tests to determine which septa or liner is most suitable for the exact application.

### RUBBER STOPPER FOR SERUM BOTTLES ♠

Rubber pharmaceutical style stopper septa for all serum vials and bottles with 13x20mm opening necks. These are referred to as 20mm stoppers. Made with tight tolerances to fit easily and securely. Rubber formulations include; gray butyl and natural red rubber. Silicone and other compounds are available.

Style	For Mouth I.D. x O.D., mm	Case Qty	Order Code
Sleeve Style, Red Rubber	13 x 20	1000	<b>5531-06</b>
Flange Style, Red Rubber	13 x 20	1000	<b>5531-23</b>
Slotted, Gray Butyl	13 x 20	1000	<b>5531-33</b>
Flange Style, Gray Butyl	13 x 20	300	<b>5531-47</b>
Flange Style, Gray Butyl, PTFE face	13 x 20	1000	<b>5531-60</b>



### SEPTA Sleeve Type ★

With hollow plug. Top is flanged with sleeve-like extension that folds down over the neck of vessel. The diaphragm can be punctured readily with a syringe needle. Puncture seals automatically after the needle is withdrawn.

For use with	Qty	Order Code	Qty	Order Code	Qty	Order Code
<b>Red Rubber</b>						
For 8mm O.D. Std. Wall Glass Tubing	12	<b>9096-32</b>	72	<b>9096-132</b>	144	<b>9096-232</b>
For $\text{§}$ 14/20, $\text{§}$ 14/35 Joints	12	<b>9096-43</b>	72	<b>9096-143</b>	144	<b>9096-243</b>
For $\text{§}$ 19/38, $\text{§}$ 19/22 Joints	12	<b>9096-54</b>	72	<b>9096-154</b>	144	<b>9096-254</b>
For $\text{§}$ 24/40, $\text{§}$ 24/25 Joints	12	<b>9096-56</b>	72	<b>9096-156</b>	144	<b>9096-256</b>



### White Rubber

For 5mm O.D. NMR Tubes & for small tubing	12	<b>9096-26</b>	72	<b>9096-126</b>	144	<b>9096-226</b>
For 7mm O.D. Std. Wall Glass Tubing	12	<b>9096-31</b>	72	<b>9096-131</b>	144	<b>9096-231</b>
For 8mm O.D. Std. Wall Glass Tubing	12	<b>9096-33</b>	72	<b>9096-133</b>	144	<b>9096-233</b>
For 9-12mm O.D. Std. Wall Glass Tubing	12	<b>9096-39</b>	72	<b>9096-139</b>	144	<b>9096-239</b>
For $\text{§}$ 14/20, $\text{§}$ 14/35 Joints	12	<b>9096-44</b>	72	<b>9096-144</b>	144	<b>9096-244</b>
For 13-18mm O.D. Test Tubes	12	<b>9096-49</b>	72	<b>9096-149</b>	144	<b>9096-249</b>
For $\text{§}$ 24/40, $\text{§}$ 24/25 Joints	12	<b>9096-57</b>	72	<b>9096-157</b>	144	<b>9096-257</b>



### SEPTA Flat ★

PTFE faced, silicone septa sized to fit our microscale threaded standard taper joints (white and approx. 1.5mm thick) and our 24-410 and 38-430 threaded caps (grey and approx. 1.2mm thick). The PTFE face offers chemical resistance while the silicone base resists syringe coring.

O.D., mm	For Use With	Qty	Order Code
8	5/5 Thread Joint	48	<b>8787-40</b>
12	7/10 Thread Joint	48	<b>8787-41</b>
13.5	10/10 Thread Joint	48	<b>8787-43</b>
18	14/10 Thread Joint	48	<b>8787-42</b>
22	24-410 Cap Thread	48	<b>8787-55</b>
35	38-430 Cap Thread	48	<b>8787-58</b>



### SEPTA GC Injection Port ★

Thicker, 3.5mm high temperature silicone flat septa with a 6mm O.D.

O.D., mm	Thickness, mm	Qty	Order Code
6	3.5	Pkg/50	<b>12898-24</b>





**SEPTUM** ★

Three layer flat septa. Two harder layers of rubber outside and a softer silicone rubber inside. Available in either 7mm or 10mm O.D., both 4mm thick. 12901-42 is for 5037 electrode adapter, the 12901-48 is ideal for the Code 5029, #7 Ace-Thred bushing. These septa reseal easily.

O.D., mm	Thickness, mm	Qty	Order Code
7	4	Pkg/12	<b>12901-42</b>
10	4	Pkg/12	<b>12901-48</b>



**SEPTUM** ♠

PTFE faced silicone resists coring when punctured via syringe needle.

O.D., mm	For Use With	Thickness, mm	Qty	Order Code
<b>Gray Silicone</b>				
11	#7 Ace-Thred	3	Pkg/12	<b>12904-06</b>
12	-	3	Pkg/12	<b>12904-08</b>
13	#11 Ace-Thred	3	Pkg/12	<b>12904-10</b>

**White Silicone w/White PTFE face**

19	Aluminum Crimp Seals (5532)	3	Pkg/72	<b>12908-60</b>
29.845	33-430 Phenolic Caps (12487)	2	Pkg/100	<b>12913-40</b>



**PRECISION SEAL™ SEPTA White Rubber** ★

Engineered for a precision fit (80% glass to rubber contact ) in standard taper glassware joints and tubes. Precision Seals are manufactured under “white room” conditions, from one certified raw material formulation for absolute consistency in all sizes, from lot-to-lot.

For Use With	Qty	Order Code	Qty	Order Code
5 mm NMR tubes	100	<b>9106-119</b>	10	<b>9106-19</b>
Neck O.D. 7 mm glass tubing	100	<b>9106-121</b>	10	<b>9106-21</b>
Neck O.D. 8 mm glass tubing	100	<b>9106-123</b>	10	<b>9106-23</b>
Neck O.D. 10 mm glass tubing	100	<b>9106-125</b>	10	<b>9106-25</b>
Neck O.D. 13 mm tubing	100	<b>9106-127</b>	10	<b>9106-27</b>
10/30 Joint	100	<b>9106-129</b>	10	<b>9106-29</b>
14/20 Joint	100	<b>9106-131</b>	10	<b>9106-31</b>
19/22 Joint	100	<b>9106-133</b>	10	<b>9106-33</b>
24/40 Joint	100	<b>9106-135</b>	10	<b>9106-35</b>
29/42 Joint	100	<b>9106-137</b>	10	<b>9106-37</b>
Mixed Set	145	<b>9106-139</b>		



**PRECISION SEAL™ SEPTA Red Rubber** ★

Same as above, except red in color.

**Note:** Precision Seal and Suba-Seal are Registered Trademarks of Sigma-Aldrich.

For Use With	Qty	Order Code	Qty	Order Code
5 mm NMR tubes	100	<b>9106-120</b>	10	<b>9106-20</b>
Neck O.D. 7 mm glass tubing	100	<b>9106-122</b>	10	<b>9106-22</b>
Neck O.D. 8 mm glass tubing	100	<b>9106-124</b>	10	<b>9106-24</b>
Neck O.D. 10 mm glass tubing	100	<b>9106-126</b>	10	<b>9106-26</b>
Neck O.D. 13 mm tubing	100	<b>9106-128</b>	10	<b>9106-28</b>
10/30 Joint	100	<b>9106-130</b>	10	<b>9106-30</b>
14/20 Joint	100	<b>9106-132</b>	10	<b>9106-32</b>
19/22 Joint	100	<b>9106-134</b>	10	<b>9106-34</b>
24/40 Joint	100	<b>9106-136</b>	10	<b>9106-36</b>
29/42 Joint	100	<b>9106-138</b>	10	<b>9106-38</b>
Mixed Set	145	<b>9106-140</b>		

**SUBA-SEAL™ SEPTA Red Rubber ★**

Suba-Seal™ Septa, the highest quality roll-over style septa in the world. The bottom of the septa is serrated for maximum sealing even in open-top vessels and containers. Certain sizes are also perfect for maximum sealing in standard taper joints. These septa are ideal for moisture or air sensitive applications. The septa when pierced with a non-coring needle have excellent re-sealing capability. The septa have double sealing feature as the turn-over top seals on the outside of the vessel and the serrated bottom flanges seal excellently to the inner surface of the container. Suba-Seal septa are autoclavable and are packaged in “white room” conditions. Suba-Seal is a trade mark of Sigma-Aldrich Biotechnology LP.



Description	Fits	Qty	Order Code
Sample kit, 10 of each size	All	100	<b>9107-04</b>
#9 fits neck I.D. 8mm		100	<b>9107-116</b>
#13 fits neck I.D. 9.5mm	§10/30	100	<b>9107-110</b>
#17 fits neck I.D. 11mm		100	<b>9107-114</b>
#21 fits neck I.D. 12.5mm		100	<b>9107-118</b>
#25 fits neck I.D. 14mm	§14/20, §14/35	100	<b>9107-124</b>
#29 fits neck I.D. 16mm		100	<b>9107-126</b>
#33 fits neck I.D. 17.5mm		100	<b>9107-130</b>
#37 fits neck I.D. 19mm	§19/22, §19/38	100	<b>9107-134</b>
#41 fits neck I.D. 20.5mm		100	<b>9107-138</b>
#45 fits neck I.D. 22mm	§24/40, §24/25	100	<b>9107-142</b>
#49 fits neck I.D. 24mm		100	<b>9107-146</b>
#53 fits neck I.D. 25.5mm		100	<b>9107-150</b>
#57 fits neck I.D. 27mm	§29/42, §29/38	100	<b>9107-154</b>

**SUBA-SEAL™ SEPTA White Rubber ★**

Same as above except white in color.

**Note:** Suba-Seal is a Registered Trademark of Sigma-Aldrich.

Description	Fits	Qty	Order Code
Sample kit, 10 of each size	All	100	<b>9107-104</b>
#9 fits neck I.D. 8mm		100	<b>9107-109</b>
#13 fits neck I.D. 9.5mm	§10/30	100	<b>9107-111</b>
#17 fits neck I.D. 11mm		100	<b>9107-115</b>
#21 fits neck I.D. 12.5mm		100	<b>9107-119</b>
#25 fits neck I.D. 14mm	§14/20, §14/35	100	<b>9107-123</b>
#29 fits neck I.D. 16mm		100	<b>9107-127</b>
#33 fits neck I.D. 17.5mm		100	<b>9107-131</b>
#37 fits neck I.D. 19mm	§19/22, §19/38	100	<b>9107-135</b>
#41 fits neck I.D. 20.5mm		100	<b>9107-139</b>
#45 fits neck I.D. 22mm	§24/40, §24/25	100	<b>9107-143</b>
#53 fits neck I.D. 25.5mm		100	<b>9107-151</b>
#57 fits neck I.D. 27mm	§29/42, §29/38	100	<b>9107-155</b>





**LAB SCOOP** ★

Stainless steel lab scoop, blade only. Excellent for sample addition while weighing.

Length, mm	Qty	Order Code
229	Pkg/6	13312-07



**SPOON** *Micro* ★

Stainless steel, narrow spoon with plastic handle. Spoon is approximately 25.4mm x 6.4mm.

Length, mm	Width, mm	Depth, mm	Qty	Order Code
165	25.4	6.4	Pkg/3	13316-07



**SPATULA** *Weighing, Wood Handle* ★

Flexible stainless steel blade with wood handle. Excellent for handling samples while weighing.

Length, mm	Qty	Order Code
188	1	13308-08



**SPATULA** *Micro* ★

Made of stainless steel with flat ends, one rounded, one tapered. Blade size; approximately 51 x 8mm (2 inches x 5/16 inches).

Length, mm	Width, mm	Depth, mm	Qty	Order Code
203	51	8	Pkg/3	13304-12



**SPATULA *Micro* ★**

PTFE-coated, stainless steel spatula with 4mm diameter. Double flat ends, one end square, one rounded. Approximately 51mm x 8mm.

Length, mm	Width, mm	Depth, mm	Qty	Order Code
184	51	8	Pkg/12	13318-11



**SPATULA *Micro* ★**

Stainless steel spatula with double flat ends, one rounded, one tapered. Rounded end is 52 x 8.5mm, tapered end is 52 x 7.5mm.

Length, mm	Qty	Order Code
<b>Non-Coated</b>		
195	Pkg/3	13320-06
<b>PTFE Coated</b>		
195	pkg/12	13320-10



**LAB SPOON ★**

Double-ended, stainless steel lab spoon. Spoon end is 29mm x 14.3mm; flat end is 48mm x 14.3mm.

Length, mm	Qty	Order Code
<b>Non-Coated</b>		
229	Pkg/3	13322-11
<b>PTFE Coated</b>		
229	1	13323-32



## General Stirring Information

### Bearings:

Trubore®, **glass** bearings are for use with precision-ground glass shafts or PTFE-covered, stainless steel (8071) shafts. They are not recommended for use with polished glass or plain, stainless steel shafts.

Trubore® bearings with a **PTFE inner** component are for use with polished glass shafts and plain, stainless steel shafts. They are not recommended for precision-ground glass shafts or PTFE-covered, stainless steel shafts.

Glass pressure bearings (8044) are for use with 8074 plain stainless steel or 8075 polished glass shafts.

**8050 Mechanical Seal Bearing** may be used with polished or precision-ground glass and plain stainless steel shafts (10, 19 & 28mm). Not recommended for use with PTFE-covered shafts.

**13443 PTFE Collet Bearing** may be used with any type shaft (6, 8 & 10mm).

**13445 Debris-free PTFE Bearing** should be used with polished glass shafts or plain, stainless steel shafts. They are not recommended for precision-ground glass shafts or PTFE-covered, stainless steel shafts (6, 10 & 19mm).

### Stirring Shafts:

**Glass, Polished:** use only in 8044 glass, pressure bearings or Trubore® bearings with a PTFE inner component (8066) or our 13443 PTFE collet type, 8050 PTFE mechanical seal and 13445 PTFE debris-free bearings.

**Glass, Precision-Ground:** use only Trubore® glass bearings such as our 8059, 8060, 8061, 8065, etc. series or our 13443 PTFE collet seal type and 8050 PTFE mechanical seal bearings.

**Stainless Steel, Plain:** use only in 8044 glass, pressure bearings or Trubore® bearings with a PTFE inner component (8066) or our 13443 PTFE collet type, 8050 PTFE mechanical seal and 13445 debris-free bearings.

**Stainless Steel, PTFE-Covered:** use with Trubore® glass bearings such as our 8059, 8060, 8061, 8065, etc. series or our 13443 PTFE collet type bearings. Not recommended for use with our PTFE debris-free 13445 bearing.

## Trubore® Stirring Equipment — Precision Fit and Performance

### Bearings and shafts guaranteed interchangeable

Trubore® stirrers, pioneered and developed by ACE, are the most widely used precision glass stirrers in research today.

If both shaft and bearing of a given size are manufactured by ACE, we guarantee them to be interchangeable.

### Precision fit and performance

Every shaft and bearing is individually inspected to insure clearance fit of less than .025mm (0.001-inch).

ACE bearings are smooth and transparent. This feature automatically reduces leak path for a given fit clearance and surface roughness; it also prolongs bearing life.

Special “plateau” grinding is employed on shafts. This provides maximum smoothness consistent with optimum retention of lubricant. In terms of performance, this texture means a low leak rate, which permits attainment of at least

1mm absolute with unlubricated surfaces at speeds less than 100 rpm. It also means that plastic shafts, including Fluorocarbon coated glass shafts, may be used with bearings — a practice not feasible with ground bearings.

### Operation

If the components have been properly cleaned prior to operating. A Trubore® stirring unit can be run unlubricated for a limited time at a maximum speed of 500 rpm.

For continuous operation, or operation at speeds greater than 500 rpm, proper lubrication is required. We recommend ACE 8117 Stir-Lube® be used as a proper all-purpose lubricant up to 2000 rpm (water cooled) or 1500 rpm (non-cooled).

For high-speed stirring over 2000 rpm, we recommend a thin base of 8229 grease with application of 8119 Hi-Lube heavy-duty liquid stirrer lubricant. Both materials are also chemically inert. If accidentally

introduced into a solvent system reaction, they will not react with your product, but will be removed with the solvent. Under no circumstances should glycerin be used; it acts as a grinding medium rather than a lubricant.

Note that only a small lubricant well is provided at the top of some ACE bearings; this is because only a slight amount of Stir-Lube® is needed for many hours of stirring.

### Care and cleaning

Because of the very close fit between shaft and bearing, a slight amount of dust or grit will quickly scratch the smooth surface of the bearing. To prevent this, both shaft and bearing should be washed with a good detergent and dried with acetone — instead of with a wiping cloth — prior to use.

ACE lubricants may be completely removed with acetone or most other ketones.



## Matching Ace Stir Bearings to the Appropriate Shafts

Bearing Type	Size	ACE Stir Bearing Codes	Use with ACE Code Stirring Shafts Listed Below
Trubore™, Glass	5mm	9524-04, 9527-08	9534-04, 9535-06, 9541-04, 9541-15
Trubore, Glass	6mm	9524-06, 9524-08, 9527-12, 9527-14, 9529	9534-06
Vacuum	9mm	8098, 8099, 8133, 9528	8134, 9530
Trubore, Glass	10mm	8036, 8038, 8039, 8040, 8042, 8043, 8047, 8051, 8053, 8055	8068, 8070, 8071, 8073, 9532, 9533
Trubore, Glass	10mm	8041	Complete Assemblies
Trubore, Glass	19mm	8059, 8060, 8061, 8065	8076*, 8077, 8078, 8079
Glass, Pressure	10mm	8044	8074, 8075
Glass, Pressure	19mm	8049	8076
Trubore, PTFE/Glass	10mm	8066 (Plain), 8066 (Debris Trap)	8074, 8075
Trubore, PTFE/Glass	19mm	8067 (Trubore), 8067 (Debris Trap)	8076
Trubore, PTFE/Glass	28mm	8067 (Trubore), 8067 (Debris Trap)	8080
Ultra-Vacuum/PTFE	10mm	8050	8068, 8073, 8074, 8075, 9532, 9533
Ultra-Vacuum/PTFE	19mm	8050	8076, 8077, 8078
Ultra-Vacuum/PTFE	28mm	8050	8080
Collet Type/PTFE	6mm	13443-06, 13443-08	9534-06, 9534-40
Collet Type/PTFE	8mm	13443-10	N/A
Collet Type/PTFE	10mm	13443-12	8068, 8070, 8071, 8073, 8074, 8075, 9532, 9533
PTFE	6mm	13445-06, 13445-09	9534-40
PTFE	10mm	13445-30, 13445-32, 13445-34, 13445-36	8074, 8075
PTFE	19mm	13445-46, -44	8076

*\*Polished shaft not recommended for 8076.*

### Custom Pilot Plant Reactor Designs

Selecting components and designing a Pilot Plant System requires you to consider specific site and application aspects,



- Space limitations: what depth, width and height are available for the support stand, stirrer motor, condenser, etc.?
- Do you want a domed or flat head reactor?
- What will be the operating temperature?
- Vacuum or pressure?
- What type bottom outlet (standard, threaded, stopcock, "sink" type valve, etc.)?
- Do you want temperature monitoring/control?
- How much distance is needed below the bottom of the reactor outlet?
- What type of stirring motor (air, electronic, for hazardous or non-hazardous location)?
- What type of stirrer shaft (glass or PTFE)?
- Heat exchange coil needed? PTFE-covered copper or other type metal?
- What accessories are needed (condensers, takeoffs, adapters, spargers, gas inlet/outlet, etc.)?

### Custom Assemblies

In addition to our standard 10L through 200L Cylindrical and Spherical Assemblies, ACE can assist you in designing a specific component reactor. Many of the dimensions and items listed can be modified to accommodate your needs.

Consult ACE by calling our Technical Design and Support Staff toll-free at **1-800-223-4524**, or visiting us on the web at [www.aceglass.com](http://www.aceglass.com).

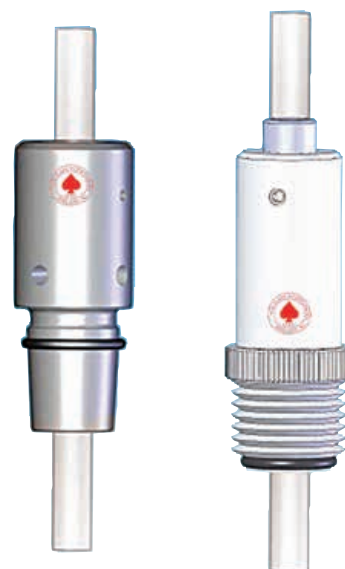
## ACE Stir Shaft Quick Reference Chart

Ace Code	Size		Type	Material	Recommended Use							
	O.D., mm	L, mm			Bearing	Chuck	Agitators					
9534-04	5	318	Button Bottom	Solid Ground Borosilicate Glass	9524-04, 9524-06, 9524-08, 9527-08, 9527-12, 9527-14, 9529	8124, 8126	9542					
9534-06	6	318		Solid Polished Borosilicate Glass								
9534-40	6	318		Hollow Borosilicate Glass								
9535-06		318	Knob Bottom	Solid Ground Borosilicate Glass	9524-04, 9527-08	8124, 8126	9541-06					
9541-04	5	318		PTFE Coated Stainless Steel			9541-07					
9541-15		318					Attached					
8134-15		380	With Paddles				8083, 8085, 8086					
8134-25	9	610	Button Bottom	Solid Polished Borosilicate Glass	8098, 8099, 8133, 9528	8124, 8126	9530					
9530-04		416		Solid Ground Borosilicate Glass			8036, 8038, 8039, 8040, 8041, 8042, 8043, 8047, 8050, 8051, 8053, 8055, 13443	8124, 8126	8082, 8083, 8085, 8086, 8087, 8096			
8068-02		580							Multi-Blade	8036, 8038, 8039, 8040, 8041, 8042, 8043, 8047, 8050, 8051, 8053, 8055, 13443	8124, 8126	Attached
8068-03		440										Double Multi-Blade
8068-04		690							Button Bottom	Hollow Ground Borosilicate Glass	8124, 8126	
8068-06		740		Bead Bottom			Solid Ground Borosilicate Glass	8124, 8126				8082, 8083, 8085, 8086, 8087, 8096
8068-08		440							Button Bottom	PTFE Coated Glass	8124, 8126	8088, 8089, 8090, 8091
8068-17		580		Bottom Drilled Hole			PTFE Coated Stainless Steel	8124, 8126				8082, 8083, 8085, 8086, 8087, 8096
8068-18		440							Crescent Shaft	Solid Ground Borosilicate Glass	8124, 8126	8088, 8089, 8090, 8091
8068-25		440		Remove Button Bottom			Stainless Steel	8124, 8126				8082, 8083, 8085, 8086, 8087, 8094, 8095, 8096
8068-27		580	Button Bottom		Solid Polished Borosilicate Glass	8124, 8126			8082, 8083, 8085, 8086, 8087, 8096			
8068-30		440		Plain Shaft			Solid Polished Borosilicate Glass	8124, 8126	8094, 8095			
8068-31		690	Bead Bottom		Solid Polished Borosilicate Glass	8124, 8126			8088, 8089, 8090, 8091			
8068-32		580		Complete W/Vanes			Hollow Polished Borosilicate Glass	8124, 8126	Attached			
8070-05		440	Solid Ground Borosilicate Glass		8036, 8038, 8039, 8040, 8041, 8042, 8043, 8047, 8050, 8051, 8053, 8055, 13443	8124, 8126			8091, 8092, 8093, 8100			
8070-10		690		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126	8085			
8071-05		460	Button Bottom		Hollow Polished Borosilicate Glass	8124, 8126			8085			
8071-07		640		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8091, 8092, 8093, 8100		
8071-10		690	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8073	10	410		Remove Button Bottom			Stainless Steel	8124, 8126		8085		
8074-02		420	Button Bottom		Solid Polished Borosilicate Glass	8124, 8126			8091, 8092, 8093, 8100			
8074-04		460		Plain Shaft			Solid Polished Borosilicate Glass	8124, 8126		8085		
8074-07		580	Bead Bottom		Solid Polished Borosilicate Glass	8124, 8126			8091, 8092, 8093, 8100			
8075-12		440		Button Bottom			Hollow Polished Borosilicate Glass	8124, 8126		8085		
8075-14		580	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8075-15		690		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8085		
8075-21		440	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8075-23		580		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8085		
8075-24		690	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8075-32		440		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8085		
8075-33		500	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8075-34		580		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8085		
8075-36		690	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8075-38		560		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8085		
9523-04		445	Complete W/Vanes		Hollow Polished Borosilicate Glass	8124, 8126			8085			
9533-02		475		Solid Ground Borosilicate Glass			8036, 8038, 8039, 8040, 8041, 8042, 8043, 8047, 8050, 8051, 8053, 8055, 13443	8124, 8126		8085		
8076-03	19	560	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8076-05		710		Button Bottom			Hollow Polished Borosilicate Glass	8124, 8126		8085		
8076-07		910	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8076-10		1210		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8085		
8076-39		940	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8076-40		910		Bottom Drilled Hole			Solid Polished Borosilicate Glass	8124, 8126		8085		
8076-41		990	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8076-42		810		Bottom Knob			Hollow Polished Borosilicate Glass	8124, 8126		8085		
8076-43		810	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8076-44		1210		Bottom Knob			Hollow Polished Borosilicate Glass	8124, 8126		8085		
8076-45		1140	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8076-46		1380		Bottom Knob			Hollow Polished Borosilicate Glass	8124, 8126		8085		
8076-48		1380	Bottom Drilled Hole		Solid Polished Borosilicate Glass	8124, 8126			8085			
8077-23		710		Button Bottom			Solid Ground Borosilicate Glass	8124, 8126		8085		
8077-25		910	Bottom Knob		Hollow Ground Borosilicate Glass	8124, 8126			8085			
8077-27		1210		Bottom Drilled Hole			PTFE Coated Stainless Steel	8124, 8126		8085		
8078-05		900	Bottom Drilled Hole		PTFE Coated Stainless Steel	8124, 8126			8085			
8078-10		1200		Bottom Drilled Hole			PTFE Coated Stainless Steel	8124, 8126		8085		
8079-03	730	Bottom Drilled Hole	PTFE Coated Stainless Steel		8124, 8126	8085						
8079-05	910			Bottom Drilled Hole			PTFE Coated Stainless Steel	8124, 8126	8085			
8079-10	1210	Bottom Drilled Holes	Solid Polished Borosilicate Glass		8124, 8126	8085						
8080-12	1010			Bottom Drilled Holes			Solid Polished Borosilicate Glass	8124, 8126	8085			
8080-14	1140	Bottom Drilled Holes	Solid Polished Borosilicate Glass		8124, 8126	8085						
8080-16	1300			Bottom Drilled Holes			Solid Polished Borosilicate Glass	8124, 8126	8085			
8080-18	1320	Bottom Drilled Holes	Solid Polished Borosilicate Glass		8124, 8126	8085						
8080-22	1470			Bottom Drilled Holes			Solid Polished Borosilicate Glass	8124, 8126	8085			
8080-24	1400	Bottom Drilled Holes	Solid Polished Borosilicate Glass		8124, 8126	8085						
8080-25	2080			Bottom Drilled Holes			Solid Polished Borosilicate Glass	8124, 8126	8085			
8080-29	1900	Bottom Drilled Holes	Solid Polished Borosilicate Glass		8124, 8126	8085						
8080-30	1600			Bottom Drilled Holes			Solid Polished Borosilicate Glass	8124, 8126	8085			

### STIRRER BEARING *Low Vacuum, PTFE*

Low vacuum, non-shedding PTFE stirrer bearing factory tested to below 3 Torr. Available in standard taper joint and Ace-Thred™ (10mm shaft only) versions. Rated for up to 400 rpm with both glass (polished, rather than precision ground is best) and stainless steel shafts of 10, 19 and 28mm. Wetted materials are PTFE, Rulon™, PEEK and a perfluoroelastomer O-Ring.

Joint Size	Replacement O-Ring	Order Code	
<b>10mm Shaft Size</b>			
⌀ 24/40	7859-526	8050-02	★
⌀ 29/42	7859-534	8050-04	★
⌀ 29/32	7859-534	8050-14	★
#15 Ace-Thred	7859-530	8050-10	★
#25 Ace-Thred	7859-534	8050-12	★
<b>19mm Shaft Size</b>			
⌀ 45/50	7855-773	8050-06	★
<b>25.4mm Shaft Size</b>			
⌀ 45/50	7859-573	8050-16	★
<b>28mm Shaft Size</b>			
⌀ 45/50	7855-773	8050-08	★
<b>30mm Shaft Size</b>			
⌀ 45/50	7859-573	8050-18	★



### BEARING *Debris Free, PTFE*

Vacuum tight (~5 Torr), flake free, chemically-resistant stirrer bearing makes a mechanical seal against a polished glass shaft. Debris trap section consists of a PTFE sleeve for a wide range of joint and shaft diameter sizes. For use with polished glass or stainless steel shafts, NOT recommended for PTFE shafts. Bearing consists of a PTFE standard taper body with added PEEK for better stability, glass filled polypropylene screw cap, PEEK compression spring, PTFE/PEEK sleeve and a glass filled polypropylene loosening nut. For use up to 500 rpm.

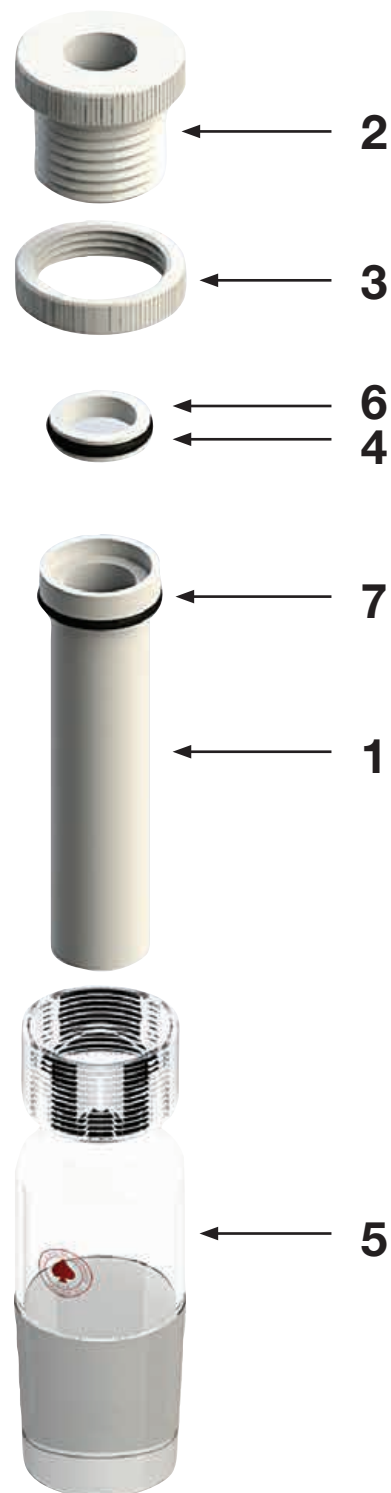
Joint Size	Replacement PTFE/PEEK Sleeve Seal	Replacement PEEK Compression Spring	Order Code	
<b>6mm Shaft Size</b>				
⌀ 19/22	13445-302	13445-304	13445-06	★
⌀ 24/40	13445-302	13445-304	13445-09	★
<b>10mm Shaft Size</b>				
⌀ 24/40	13445-420	13445-426	13445-30	★
⌀ 29/42	13445-420	13445-426	13445-32	★
⌀ 34/45	13445-420	13445-426	13445-34	★
⌀ 45/50	13445-420	13445-426	13445-36	★
<b>19mm Shaft Size</b>				
⌀ 45/50	13445-504	13445-506	13445-46	★



# Ace-Thred Trubore Bearing w/o Debris Trap

PTFE

Self-aligning, lubricant-free PTFE Trubore glass and PTFE bearing for use with stainless steel or glass stirring shafts. The lock nut permits stirring in either direction without fear of unthreading. The compression saddle with O-Ring maintains constant force with little attention. Not recommended for precision ground glass shafts. A slight vacuum may be applied to the clean-out port to pull any excess debris away from the bearing wiper seal.



**Complete Trubore Bearing Assembly**

Shaft Size, mm	Bottom Inner \$ Joint	Bottom Inner \$ Joint	Qty	Order Code	
10		24/40	1	8066-43	♠
		29/42	1	8066-46	♠
		34/45	1	8066-50	♠
		45/50	1	8066-55	♠
	35/25		1	8066-60	♠
19		45/50	1	8067-30	♠
		55/50	1	8067-34	♠
		71/60	1	8067-38	♠
28		45/50	1	8067-105	★

**Replacement components:**

No.	Shaft Size, mm	Description	Joint Size	Qty	Order Code	
1	10	PTFE Inner Bearing w/O-Ring		1	8066-06	♠
	19			1	8067-05	♠
	28			1	8067-55	★
2	10	Glass Filled PTFE Bushing		1	8066-12	♠
	19			1	8067-07	♠
	28			1	8067-58	★
3	10	Glass Filled PTFE Lock Nut		1	8066-13	♠
	19			1	8067-11	♠
	28			1	8067-60	★
4	10	Compression Saddle w/FETFE O-Ring		1	8066-15	♠
	19			1	8067-13	♠
	28			1	8067-65	♠
5	10	Glass Body	24/40	1	8066-20	♠
	10		29/42	1	8066-24	♠
	10		34/45	1	8066-28	♠
	10		45/50	1	8066-32	♠
	10		35/25	1	8066-33	♠
	19		45/50	1	8067-18	♠
	19		55/50	1	8067-20	♠
	19		71/60	1	8067-22	♠
	28		45/50	1	5030-78	♠

**Vacuum Rating:**

Atm to 1mm Torr

**Maximum RPM:**

400

For use with polished glass and stainless steel shafts

Self-aligning

Lubricant-free

Clockwise or counterclockwise operation

FETFE O-Rings

Borosilicate Glass and PTFE construction

			FETFE	Kalrez®	Chemraz®
6	10	Compression Saddle O-Rings	1 7855-718 ♠	7855-618 ★	7859-517 ★
	19		1 7855-730 ♠	7855-630 ★	7859-530 ★
	28		1 7855-739 ♠	7855-677 ★	7859-539 ★
7	10	Inner Bearing O-Rings	1 7855-712 ♠	7855-612 ★	7859-512 ★
	19		1 7855-734 ♠	7855-634 ★	7859-534 ★
	28		1 7855-740 ♠	7855-640 ★	7859-540 ★

# Ace-Thred Trubore Bearing w/Debris Trap

PTFE

Self-aligning, lubricant-free PTFE Trubore glass and PTFE bearing for use with stainless steel or glass stirring shafts. The lock nut permits stirring in either direction without fear of unthreading. The compression saddle with O-Ring maintains constant force with little attention. Not recommended for precision ground glass shafts. Debris trap is designed to prevent particles from entering the reaction vessel and contains an easy access clean out port. A slight vacuum may be applied to the clean-out port to pull any excess debris away from the bearing wiper seal.





**Complete Trubore Bearing Assembly w/Debris Trap**

Shaft Size, mm	Bottom Inner Joint	Qty	Order Code	
10	§ 24/40	1	8066-320	♠
	§ 29/42	1	8066-324	♠
	§ 34/45	1	8066-328	♠
	§ 45/50	1	8066-332	♠
19	§ 35/25	1	8066-333	♠
	§ 45/50	1	8067-54	♠
	§ 45/50	1	8067-57	♠
28	§ 71/60	1	8067-59	♠
	§ 45/50	1	8067-80	★

**Replacement components:**

No.	Shaft Size, mm	Description	Joint Size	Qty	Order Code	
1	10	PTFE Inner Bearing w/O-Ring		1	8066-08	♠
	19			1	8067-07	♠
	28			1	8067-70	★
2	10	Glass Filled PTFE Bushing		1	8066-12	♠
	19			1	8067-07	♠
	28			1	8067-08	♠
3	10	Glass Filled PTFE Lock Nut		1	8066-13	♠
	19			1	8067-11	♠
	28			1	8067-60	★
4	10	Compression Saddle w/FETFE O-Ring		1	8066-15	♠
	19			1	8067-13	♠
	28			1	8067-65	★
5	10	PTFE Washer Style Wiper Seal		1	8066-03	♠
	19			1	8067-09	♠
	28			1	8067-72	★
6	10	PTFE Ace-Thred Plug		1	5846-44	♠
	19			1	5846-46	♠
	28			1	5846-48	♠
7	10	"Ace-Safe" Connector		1	5853-06	♠
	19			1	5853-15	♠
	28			1	5853-23	♠
8	10	Glass Body	24/40	1	8066-220	♠
	10		29/42	1	8066-224	♠
	10		34/45	1	8066-228	♠
	10		45/50	1	8066-232	♠
	10		35/25	1	8066-233	♠
	19		45/50	1	8067-45	♠
	19		55/50	1	8067-47	♠
	19		71/60	1	8067-49	♠
	28		45/50	1	8067-75	★

**Vacuum Rating:**  
Atm to 1mm Torr

**Maximum RPM:**  
400

For use with polished glass and stainless steel shafts

Self-aligning

Lubricant-free

Clockwise or counterclockwise operation

FETFE O-Rings

Borosilicate Glass and PTFE construction

			FETFE		Kalrez®		Chemraz®		
9	10	Compression Saddle O-Rings	1	7855-718	♠	7855-618	★	7859-517	★
	19		1	7855-730	♠	7855-630	★	7859-530	★
	28		1	7855-739	♠	7855-677	★	7859-539	★
9	10	Inner Bearing O-Rings	1	7855-712	♠	7855-612	★	7859-512	★
	19		1	7855-734	♠	7855-634	★	7859-534	★
	28		1	7855-740	♠	7855-640	★	7859-540	★



### STIRRER BEARING PTFE

Inert PTFE stirrer bearing. Features a totally enclosed bearing body for non-shedding, anti-whip, chemically-resistant design. The bearing can also be used in slight vacuum or slight pressure applications. The design has a composite PTFE/PEEK main internal seal and a specially fabricated glass ball-bearing for rigidity and smoothness during lengthy operation. Maximum recommended speeds up to 500 rpm continuous operation. Ideal for glass, metal, or PTFE stir shafts. Bottom is a molded, inner standard taper joint.

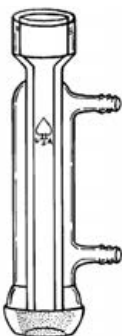
Joint Size	Length, mm	Bearing O.D., mm	Order Code
<b>6mm Shaft Size</b>			
⌀ 19/22	99	45	13443-06 ★
⌀ 24/40	99	45	13443-08 ★
<b>8mm Shaft Size</b>			
⌀ 24/40	99	45	13443-10 ★
<b>10mm Shaft Size</b>			
⌀ 24/40	99	45	13443-12 ★



### BEARING Trubore™, Water Cooled

Jacketed, Trubore bearing with standard taper or spherical joints for use with precision ground stir shafts. Available with PTFE-clad joint to eliminate the need for grease. Up to 2000rpm using Hi-Lube Heavy Duty Liquid Stirrer Lubricant (8119-07) or up to 1500rpm using Stir-Lube Trubore Stirrer Lubricant (8117).

Joint Size	PTFE-Clad Joint	Hose Connection, in.	Order Code
<b>5mm Shaft Size</b>			
⌀ 14/20	—	3/8 or 5/16	9527-08 ♠
<b>6mm Shaft Size</b>			
⌀ 14/20	—	3/8 or 5/16	9527-12 ♠
⌀ 14/20	—	3/8 or 5/16	9527-14 ♠
<b>10mm Shaft Size</b>			
⌀ 24/40	—	3/8 or 5/16	8040-10 ♠
⌀ 29/42	—	3/8 or 5/16	8040-20 ♠
⌀ 34/45	—	3/8 or 5/16	8040-30 ♠
⌀ 45/50	—	3/8 or 5/16	8040-35 ♠
⌀ 35/25	—	3/8 or 5/16	8040-40 ♠
⌀ 65/40	—	3/8 or 5/16	8040-55 ♠
⌀ 24/40	Yes	3/8 or 5/16	8040-60 ♠
⌀ 29/42	Yes	3/8 or 5/16	8040-64 ♠
⌀ 34/45	Yes	3/8 or 5/16	8040-68 ♠
⌀ 45/50	Yes	3/8 or 5/16	8040-70 ♠
<b>19mm Shaft Size</b>			
⌀ 45/50	—	3/8	8059-05 ♠
⌀ 55/50	—	3/8	8059-09 ♠



### BEARING Trubore™, Water-Cooled, 19mm ♠

Trubore® 19mm I.D., glass stirrer bearing with bottom spherical ground joint. Joint can be clamped to prevent rotation. Length is 15.2cm (6 inches). Designed to accommodate ACE 8112-10 packing box which sits directly into the top of the bearing. Designed for use with 19mm O.D. 8077 and 8078 precision ground glass shafts and 8079 PTFE shafts with stainless steel core. Hose connections are size D for use with 3/8-inch I.D. tubing.

Joint Size	PTFE-Clad Joint	Hose Connection, in.	Qty	Order Code
⌀ 65/40	—	3/8	1	8060-10

## BEARING *Trubore™*

Trubore bearing with standard taper joint for use with precision ground stir shafts. Lubricant well at top will accept enough 8117 Stir-Lube® to provide hours of operation at up to 1000 rpm. Match bearing I.D. with stir shaft O.D.

Joint Size	Order Code
<b>5mm Shaft Size</b>	
⌀ 14/20	9524-04 ♠
<b>6mm Shaft Size</b>	
⌀ 14/20	9524-06 ♠
⌀ 19/22	9524-08 ♠
<b>10mm Shaft Size</b>	
⌀ 19/22	8038-04 ♠
⌀ 19/38	8038-05 ♠
⌀ 24/40	8038-10 ♠
⌀ 29/42	8038-20 ♠
⌀ 45/50	8038-32 ♠
⌀ 35/25	8038-40 ♠
⌀ 65/40	8038-55 ♠



## BEARING *Trubore, High Speed Vacuum*

Used with 8111 aluminum packing box. For shaft speeds of 1000 rpm. and higher, and vacuum operation down to 0.5mm Hg. The seal is made entirely by the packing box. Only infrequent lubrication is required using 8122 packing and 8117 Stir-Lube®. We recommend that you use 8113 vacuum adapter to avoid contaminating the flask contents with lubricant.

Joint Size	Order Code
<b>9mm Shaft Size</b>	
⌀ 24/40	8133-10 ♠
⌀ 29/42	8133-15 ♠
⌀ 35/25	8133-40 ♠
<b>10mm Shaft Size</b>	
⌀ 24/40	8051-10 ♠
⌀ 29/42	8051-15 ♠
⌀ 34/45	8051-20 ♠
⌀ 45/50	8051-25 ♠
⌀ 35/25	8051-35 ♠
<b>19mm Shaft Size</b>	
⌀ 45/50	8061-04 ♠



## BEARING *Trubore™, Lubricating Cup*

Interchangeable ground joint bearing with top lubricant well for use with our precision-ground stirring shafts. Bearings feature a tooled lubricating cup at the top and a joint at bottom. Recommended top stirring speed with our 8117 Stir-Lube is 1500 rpm.

Joint Size	Order Code
<b>10mm Shaft Size</b>	
⌀ 19/22	8039-03 ♠
⌀ 19/38	8039-05 ♠
⌀ 24/40	8039-10 ♠
⌀ 29/42	8039-20 ♠
⌀ 34/45	8039-25 ♠
⌀ 35/25	8039-35 ♠




**BEARING** *Trubore™, Gas Balancing*

This glass bearing is supplied with tubulation for feeding inert gases around the bearing to balance any pressure possibly being developed in the flask. Can also be used for gas-liquid reactions and gas dispersions using 10mm hollow shafts.

Joint Size	Hose Connection, in.	Order Code
<b>10mm Shaft Size</b>		
§ 24/40	3/8 or 5/16	8047-10 ♠
§ 29/42	3/8 or 5/16	8047-15 ♠


**BEARING** *Trubore™, Introduction & Dispersion*

Especially useful for controlled atmospheric work. Used with solid shaft to balance small pressure differentials across the bearing. Use hollow shafts for introduction and dispersion of gaseous catalysts, etc.

Joint Size	Hose Connection, in.	Order Code
<b>10mm Shaft Size</b>		
§ 24/40	3/8	8053-10 ♠


**BEARING** *Trubore™, High Vacuum*

This bearing is the standard liquid seal type except that the use of Trubore tubing enables this unit to perform very satisfactorily under high vacuum conditions. I.D. is 10mm.

Joint Size	Order Code
<b>10mm Shaft Size</b>	
§ 24/40	8055-10 ♠

## BEARING *Trubore™, Straight*

Interchangeable bearing designed to be used with our precision-ground stirring shafts. Recommended top stirring speed with our 8117 Stir-Lube® is 1500 rpm.

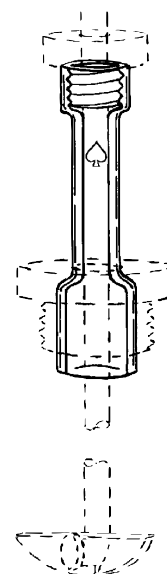
Joint	Order Code
<b>10mm Shaft Size</b>	
Plain	8036-10 ♠



## BEARING *Trubore™, Ace-Thred*

Designed for use with #25 Ace-Thred bushing. Consists of a Trubore™ bearing, pressure bushing, gland with two FETFE® o-rings, and retainer bushing with FETFE o-ring. For use with our precision ground stirring shafts.

Description	Order Code
<b>10mm Shaft Size</b>	
Bearing, only	8043-08 ★
Pressure Bushing	8043-16 ★
Gland with Two O-Rings	8043-20 ★
Retainer Bushing with O-Ring	8043-30 ★
<b>Complete</b>	8043-45 ★



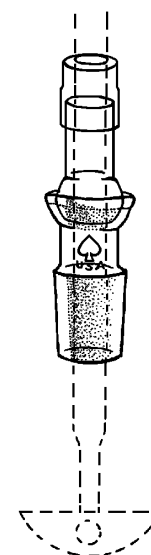
## VACUUM STIRRER BEARING ASSEMBLY 9mm ♠

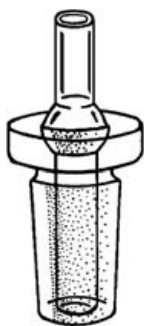
Rotating ball joint seal gives vacuum-tight connection good into the micron range. Ultimate vacuum is determined primarily by the tightness of the vinyl tubing connector which fastens the unground shaft to the ball member. Operate below 500 rpm. Use with unground stirring shafts (8134,9530). Lubricate the 18/11 rotating ball joint with our 8117 Stir-Lube. Bottom joint is 19/22. Upper member is supplied with a vinyl connector.

	<i>Lower Member</i>	<i>Upper Member</i>	<i>Complete</i>
Qty	Order Code	Order Code	Order Code
1	9528-04	9528-02	9528-10

### Accessories

Vinyl Stirrer Connector, for all sizes	12	8098-45
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**STIRRER BEARING** Vacuum, 9mm ♠

A rugged, compact, inexpensive stirrer. The upper member turns with stirring shaft, bottom member remains stationary. Upper member supplied with vinyl connector. Use with size 9mm stirring shafts (8134). Lower member has a standard taper 24/40 joint. Upper member has a spherical 18/10 joint.

	Lower Member	Upper Member	Complete
Qty	Order Code	Order Code	Order Code
1	8098-04	8098-01	8098-12

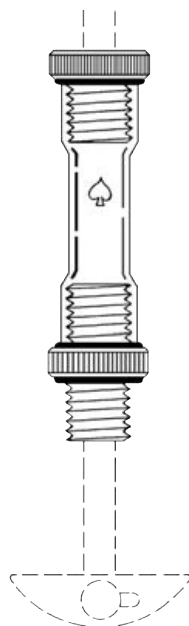
**Accessories**

Vinyl Stirrer Connector, for all sizes	12	8098-45
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**STIRRER BEARING** Vacuum, Threaded, 9mm ♠

Modified version of 8098 in that upper member is internally threaded on the top. #7 Ace-Thred nylon bushing and FETFE O-Ring form a compression seal on stirring shaft in place of the conventional tubing arrangement. Easier to adjust shaft, suitable for vacuum work. For use with 8134 stirring shafts.

	Lower Member	Upper Member	Nylon Bushing	Complete
Qty. ⌘ Joint	Order Code	⌘ Joint Order Code	Order Code	Order Code
1 24/40	8098-04	18/10 8099-03	8099-38	8099-40


**BEARING** Pressure, w/Ace-Threds

Glass bearing with Ace-Thred at each end and glass tubing between, for use with 10mm O.D. stirring shafts. PTFE coupling, with internal FETFE O-Ring seal, connects bottom of bearing to either #15 or #25 Ace-Thred on vessels. Top bushing also has an internal FETFE O-Ring seal for additional seal on shaft to allow pressure reactions. Maximum operating speed 600 rpm. Coupling and bushing supplied with FETFE O-Rings.

Shaft Size, mm	Bushing to Coupling Size	Qty	Order Code	
10	#15 to #15	1	8044-24	♠
10	#15 to #25	1	8044-55	♠

**Complete Bearing Assembly**
**Replacement Parts:**

10	#15 to #15	Glass Bearing, #15-#15	1	8044-07	♠
10	#15 to #15	PTFE Coupling, #15-#15	1	5840-60	♠
10	#15 to #15	PTFE Bushing, #15	1	8044-13	♠
10	#15 to #15	Glass Bearing, #15-#15	1	8044-07	♠
10	#15 to #15	PTFE Coupling, #15-#25	1	5843-62	♠
10	#15 to #15	PTFE Bushing, #15	1	8044-13	♠

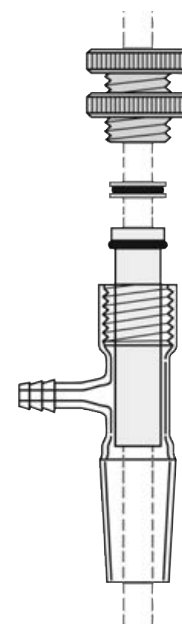
## BEARING *Trubore™, PTFE, Ace-Thred*

Self-aligning, lubricant-free PTFE *Trubore™* bearing for use with stainless steel or glass 10mm stirring shafts. Side port hose connection allows purging flask contents with a gas, or in airless work, allows for an inert gas blanket. Complete consists of PTFE inner *Trubore* bearing, Ace-Thred glass adapter, non-flaking PTFE compression saddle with O-Ring, and glass-reinforced PTFE bushing and lock nut with FETFE o-ring. The lock nut permits stirring in either direction without unthreading. The compression saddle with O-Ring maintains constant force with little attention. Vacuum down to 1mm. *Not recommended for precision ground glass shafts. Up to 400rpm.*

Shaft Size, mm	Joint Size	Qty	Order Code
<b>Complete Bearing Assembly</b>			
10	24/40	1	8066-130 ♠
10	29/42	1	8066-132 ♠
10	34/45	1	8066-134 ♠
10	45/50	1	8066-136 ♠
10	35/25	1	8066-140 ♠

### Replacement Parts:

10	—	PTFE Inner Bearing w/FETFE O-Ring	1	8066-06 ♠
10	—	Glass Filled/PTFE Bushing	1	8066-12 ♠
10	—	Glass Filled/PTFE Lock Nut	1	8066-13 ♠
10	—	Compression Saddle w/FETFE O-Ring	1	8066-15 ♠
10	24/40	Glass Body	1	8066-70 ♠
10	29/42	Glass Body	1	8066-71 ♠
10	34/45	Glass Body	1	8066-72 ♠
10	45/50	Glass Body	1	8066-73 ♠
10	35/25	Glass Body	1	8066-79 ♠



## BEARING *Trubore™, Economy*

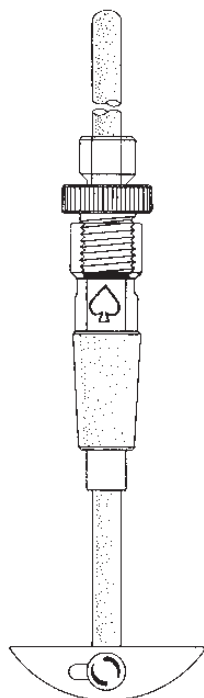
Self-aligning three-piece bearing. Complete consists of inner *Trubore* glass bearing, nylon bushing with FETFE O-Ring, and threaded adapter. Unique design eliminates costly replacement since inner bearing will spin if shaft binds, or will self-align at O-Ring seal in the event the motor is slightly cocked. Inner bearing and bushing can be used with any joint size.

Shaft Size, mm	Joint Size	Qty	Order Code
<b>Complete Bearing Assembly</b>			
6	19/22	1	9529-10 ♠
10	24/40	1	8042-115 ♠
10	29/42	1	8042-117 ♠
10	34/45	1	8042-119 ♠
10	45/50	1	8042-121 ♠
10	35/25	1	8042-135 ♠
19	34/45	1	8065-60 ♠
19	45/50	1	8065-64 ♠

### Replacement Parts:

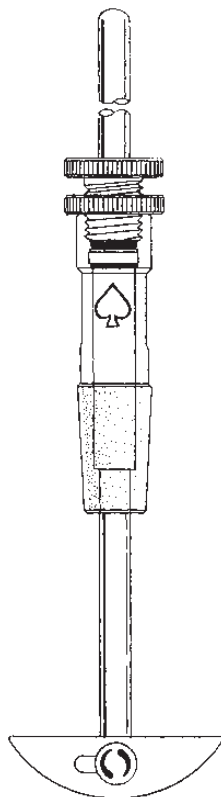
6	—	Inner Bearing	1	9529-04 ♠
6	—	Bushing, w/O-Ring	1	9529-07 ♠
6	19/22	Glass Ace-Thred Adapter	1	5030-04 ♠
10	—	Inner Bearing	1	8042-05 ♠
10	—	Bushing w/O-Ring	1	8042-09 ♠
10	24/40	Glass Ace-Thred Adapter	1	8042-15 ♠
10	29/42	Glass Ace-Thred Adapter	1	8042-17 ♠
10	34/45	Glass Ace-Thred Adapter	1	8042-19 ♠
10	45/50	Glass Ace-Thred Adapter	1	8042-21 ♠
10	35/25	Glass Ace-Thred Adapter	1	8042-35 ♠
19	—	Inner Bearing	1	8065-06 ♠
19	—	Bushing, w/O-Ring	1	8065-10 ♠
19	34/45	Glass Ace-Thred Adapter	1	8065-14 ♠
19	45/50	Glass Ace-Thred Adapter	1	8065-16 ♠




**STIRRER ASSEMBLY** *Glass or PTFE Blade, 10mm ♠*

Precision Trubore® Stirrer Assembly consisting of 10mm I.D. glass bearing, ground glass shaft with button, and glass or PTFE blade. Bearing consists of inner glass bearing, bushing and threaded glass adapter (see bearing only listing under 8042).

For Flask Capacity, mL	⌀ Joint	Bearing	Shaft	Blade	Complete	
		Order Code	Order Code	Order Code	Qty	Order Code
<b>Glass Blade</b>						
250-500	24/40	8042-115	8068-03	8083-08	1	<b>8041-11</b>
500-1000	29/42	8042-117	8068-03	8083-12	1	<b>8041-15</b>
2000-3000	29/42	8042-117	8068-03	8083-16	1	<b>8041-19</b>
5000-12000	45/50	8042-121	8068-02	8083-20	1	<b>8041-20</b>
<b>PTFE Blade</b>						
250-500	24/40	8042-115	8068-03	8085-07	1	<b>8041-30</b>
500-1000	29/42	8042-117	8068-03	8085-11	1	<b>8041-34</b>
2000-3000	29/42	8042-117	8068-03	8085-15	1	<b>8041-38</b>
5000-12000	45/50	8042-121	8068-02	8085-19	1	<b>8041-40</b>
<b>Accessories FETFE O-Ring</b>						
Replacement size -110 FETFE o-ring					12	<b>7855-716</b>


**STIRRER ASSEMBLY** *Glass or Stainless Steel Shaft, PTFE Blade, 10mm ♠*

Precision Trubore® Stirrer Assembly consisting of 10mm I.D. glass and PTFE bearing, polished glass or stainless steel shaft with button, and PTFE blade. Bearing consists of PTFE inner bearing, glass-filled PTFE bushing and lock nut, compression saddle with O-Ring and threaded glass adapter (see complete component listing under 8066).

For Flask Capacity, mL	⌀ Joint	Bearing	Shaft	Blade	Complete	
		Order Code	Order Code	Order Code	Qty	Order Code
<b>Glass Blade</b>						
250-500	24/40	8066-43	8075-12	8085-07	1	<b>8064-13</b>
500-1000	29/42	8066-46	8075-12	8085-11	1	<b>8064-18</b>
2000-3000	29/42	8066-46	8075-12	8085-15	1	<b>8064-21</b>
5000-12000	34/45	8066-50	8075-14	8085-19	1	<b>8064-22</b>
5000-12000	45/50	8066-55	8075-14	8085-19	1	<b>8064-24</b>
<b>PTFE Blade</b>						
250-500	24/40	8066-43	8074-02	8085-07	1	<b>8064-34</b>
500-1000	29/42	8066-46	8074-02	8085-11	1	<b>8064-39</b>
2000-3000	29/42	8066-46	8074-04	8085-15	1	<b>8064-42</b>
5000-12000	45/50	8066-55	8074-07	8085-19	1	<b>8064-45</b>
<b>Accessories FETFE O-Ring</b>						
Replacement size -110 FETFE o-ring					12	<b>7855-716</b>



## LUBRICANT TRAP High Vacuum, 10mm

Primarily designed for use with ACE 8051 bearings. The inner tube through which the stirring shaft passes, plus the PTFE O-Ring supplied with each unit, prevents the lubricant or foreign particles from contaminating the flask contents. For replacement PTFE o-ring, order 8113-89.

Top Joint \$	Bottom Joint \$	Order Code	
24/40	24/40	8113-10	♠
29/42	29/42	8113-20	♠
29/42	34/45	8113-25	♠

### Replacement Parts

PTFE Washer	8113-89
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## Viscosity Conversion Factors

Viscosity is the resistance to flow due to the internal friction within a fluid. This is generally expressed as the force required to move one unit area one unit distance. Kinematic and absolute viscosity are related by the density of the fluid.

### Kinematic Viscosity

Multiply to get	→	to get Divide
ft <sup>2</sup> /sec	92903.04	centistokes
ft <sup>2</sup> /sec	0.092903	sq. meters/sec
sq. meters/sec	10.7639	ft <sup>2</sup> /sec
sq. meters/sec	1000000.0	centistokes
centistokes	0.000001	sq. meters/sec
centistokes	0.0000107639	ft <sup>2</sup> /sec

### Absolute to Kinematic Viscosity

Multiply to get	→	to get Divide
centipoises	1/density (g/cm <sup>3</sup> )	centistokes
centipoises	0.00067197/density (lb/ft <sup>3</sup> )	ft <sup>2</sup> /sec
lb-sec/ft <sup>2</sup>	32.174/density (lb/ft <sup>3</sup> )	ft <sup>2</sup> /sec
kg-sec/m <sup>2</sup>	9.80665/density (kg/m <sup>3</sup> )	sq. meters/sec
Pascal-sec	1000/density (g/cm <sup>3</sup> )	centistokes

### Absolute or Dynamic Viscosity

Multiply to get	→	to get Divide
lb-sec/ft <sup>2</sup>	47880.26	centipoises
lb-sec/ft <sup>2</sup>	47.8803	Pascal-sec
centipoises	0.000102	kg-sec/sq. meter
centipoises	0.001	lb-sec/ft <sup>2</sup>
Pascal-sec	0.0208854	Pascal-sec
Pascal-sec	1000	centipoises

### Kinematic to Absolute Viscosity

Multiply to get	→	to get Divide
centistokes	density (g/cm <sup>3</sup> )	centipoises
sq. meters/sec	0.10197 x density (kg/m <sup>3</sup> )	kg-sec/m <sup>2</sup>
ft <sup>2</sup> /sec	0.03108 x density (lb/ft <sup>3</sup> )	lb-sec/ft <sup>2</sup>
ft <sup>2</sup> /sec	1488.16 x density (lb/ft <sup>3</sup> )	centipoises
centistokes	0.001 x density (g/cm <sup>3</sup> )	Pascal-sec
sq. meters/sec	1000/density (g/cm <sup>3</sup> )	Pascal-sec

\*Sometimes absolute viscosity is given in terms of pounds mass. In this case—centipoises x 0.000672 = lbm/ft sec.

**Dilatant Liquids** — viscosity increases as shear rate increases. Mixers can bog down and stall after initially mixing such liquids. Dilatant liquids include slurries, clay, and candy compounds.

**Newtonian Liquids** — viscosity remains constant regardless of shear rate or agitation. As mixer speed increases, flow increases proportionately. Newtonian liquids include water, mineral oils, and hydrocarbons.

**Pseudoplastic Liquids** — viscosity decreases as shear rate increases, but initial viscosity may be sufficiently great to prevent mixing. Typical pseudoplastic liquids are gels, latex paints, and lotions.

**Thixotropic Liquids** — as with pseudoplastic liquids, viscosity decreases as shear rate or agitation increases. When agitation is stopped or reduced, hysteresis occurs and viscosity increases. Often the viscosity will not return to its initial value. Thixotropic liquids include soaps, tars, shortening, glue, inks, and peanut butter.


**STIRRING SHAFT** *Precision-Ground Glass*

High tolerance precision ground borosilicate glass stirrer shaft. Ground surfaces help prevent slipping when attaching compression style agitators.



Shaft Size, mm	Length, mm	Use with Flask Size	Qty	Order Code	
<b>Button Style</b>					
5	318	250mL or smaller	1	9534-04	♠
6	318	250mL or smaller	1	9534-06	♠
10	440		1	8068-03	♠
10	580		1	8068-02	♠
10	690		1	8068-04	♠
10	740		1	8068-06	♠
19	700		1	8077-23	♠
19	900		1	8077-25	♠
19	1200		1	8077-27	♠

**Polished Glass Button Style**

6	318		1	9534-40	♠
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**Hollow Shaft Button Style**

5	318		1	9535-06	♠
10	440		1	8068-25	♠
10	580		1	8068-27	♠

**Knob Style**

5	318		1	9541-04	♠
10	440		1	8068-30	♠
10	580		1	8068-32	♠
10	690		1	8068-31	♠
19	900		1	8078-05	♠
19	1200		1	8078-10	♠

**Paddle Style**

10	440		1	8068-08	♠
10	440		1	8068-18	♠
10	480		1	8068-17	♠

**Vane Style**

10	440		1	9533-02	♠
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**Hollow Shaft Vane Style**

10	440		1	9532-10	♠
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**"C" Style**

10	523		1	8073-16	♠
10	551		1	8073-19	♠
10	574		1	8073-23	♠



**STIRRING SHAFT** *Polished Glass*

High tolerance polished borosilicate glass stirrer shaft.

Shaft Size, mm	Length, mm	Paddle O.D., mm	Use with Flask Size	Qty	Order Code	
<b>Button Style</b>						
6	318	—	250mL or smaller	1	9534-40	♠
9	416	—		1	9530-04	♠
9	610	—		1	8134-25	♠
10	440	—		1	8075-12	♠
10	580	—		1	8075-14	♠
10	690	—		1	8075-15	♠
19	700	—		1	8076-05	♠
19	900	—		1	8076-07	♠
19	1200	—		1	8076-10	♠
<b>Knob Style</b>						
10	440	—		1	8075-32	♠
10	500	—		1	8075-33	♠
10	580	—		1	8075-34	♠
10	690	—		1	8075-36	♠
19	800	—		1	8076-42	♠
19	1200	—		1	8076-44	♠
19	1400	—		1	8076-46	♠
<b>Plain Style</b>						
10	440	—		1	8075-21	♠
10	580	—		1	8075-23	♠
10	690	—		1	8075-24	♠
<b>Drill Hole Style</b>						
19	800	—		1	8076-43	♠
19	900	—		1	8076-40	♠
19	1140	—		1	8076-45	♠
19	1400	—		1	8076-48	♠
28	1010	—	50L Low Profile	1	8080-12	♠
28	1140	—	30L Cylindrical	1	8080-14	♠
28	1295	—	100L Low Profile	1	8080-16	♠
28	1320	—	50L Cylindrical	1	8080-18	♠
28	1400	—	200L Spherical	1	8080-24	♠
28	1600	—	100L Cylindrical	1	8080-30	♠
28	1905	—	150L Cylindrical	1	8080-29	♠
28	2030	—	200L Cylindrical	1	8080-25	♠
<b>Paddle Style</b>						
9	380	40		1	8134-15	♠




**STIRRING SHAFT** *PTFE-Coated Glass*

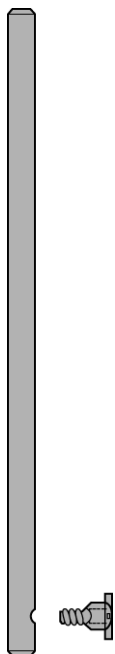
High tolerance precision ground borosilicate glass stirrer shaft with PTFE coating to allow for higher stirring speeds with Trubore™ bearings. 500 RPM max speed if used unlubricated.

Shaft Size, mm	Length, mm	Qty	Order Code	
<b>Button Style</b>				
10	440	1	8070-05	♠
10	690	1	8070-10	♠


**STIRRING SHAFT** *PTFE-Coated Stainless Steel*

High tolerance PTFE-coated stainless steel stirrer shaft allow for higher stirring speeds with Trubore™ bearings. 500 RPM max speed if used unlubricated. Retreat and Paddle Style are one-piece design with stainless steel inner shaft core.

Shaft Size, mm	Length, mm	Paddle O.D., mm	Qty	Order Code	
<b>Knob Style</b>					
5	318	—	1	9541-15	♠
<b>Drilled Hole Style</b>					
10	460	—	1	8071-05	♠
10	640	—	1	8071-07	♠
10	690	—	1	8071-10	♠
19	700	—	1	8079-03	★
19	900	—	1	8079-05	★
19	1200	—	1	8079-10	★
<b>Retreat Curve Style</b>					
10	400	50	1	13850-01	★
10	400	70	1	13850-04	★
<b>Paddle Style</b>					
10	400	50	1	13852-10	★
10	400	70	1	13852-15	★
19	900	95	1	13852-19	★


**STIRRING SHAFT** *Stainless Steel*

High tolerance polished 316 stainless steel stirrer shaft.

Shaft Size, mm	Length, mm	Qty	Order Code	
<b>Button Style</b>				
10	420	1	8074-02	★
10	450	1	8074-04	★
10	580	1	8074-07	★
<b>Replacement Button</b>				
		1	8074-40	★

**STIRRING BLADE** *Button Style*

Stirring blades for use with button-type stirring shafts.

Rod Size O.D., mm	Height, mm	Length, mm	Qty	Order Code	
<b>PTFE</b>					
5	12	41	1	9542-10	♠
6	12	41	1	9542-20	♠
10	19	48	1	8085-03	♠
10	19	60	1	8085-07	♠
10	19	76	1	8085-11	♠
10	23	113	1	8085-15	♠
10	24	134	1	8085-19	♠
10	24	160	1	8085-23	♠
19	35	150	1	8085-52	♠
19	39	160	1	8085-54	♠
19	44	175	1	8085-56	♠
19	54	190	1	8085-58	♠
<b>Borosilicate Glass</b>					
9	12	41	1	9530-08	♠
10	19	48	1	8083-04	♠
10	19	60	1	8083-08	♠
10	19	76	1	8083-12	♠
10	23	113	1	8083-16	♠
10	24	134	1	8083-20	♠
10	24	160	1	8083-24	♠
<b>Stainless Steel</b>					
10	19	76	1	8086-04	♠
10	23	113	1	8086-08	♠
10	24	134	1	8086-12	♠
10	24	160	1	8086-16	♠



## Let Your Ideas Come to Life!

*...Custom Stir Shafts are Available*

- User-designed specialized glassware
- Just one piece or as many as you need
- Reproduction of competitive products
- Modification of existing stock products

**Contact Ace Today**

**STIRRER BLADES** *Oval, Button Style*

Oval stir blades for 10mm O.D. button-type stir shafts.



Rod Size O.D., mm	Height, mm	Length, mm	Qty	Order Code	
<b>PTFE</b>					
10	19	40	1	8082-02	♠
10	19	60	1	8082-04	♠
10	24	80	1	8082-06	♠
10	24	115	1	8082-08	♠
<b>Stainless Steel</b>					
10	19	40	1	8096-04	♠
10	24	80	1	8096-06	♠
10	24	115	1	8096-10	♠
<b>Stainless Steel w/holes</b>					
10	19	60	1	8096-70	♠
10	24	80	1	8096-72	♠
10	24	115	1	8096-74	♠

**STIRRER BLADES** *Banana Type, PTFE*

PTFE banana shaped stir blades for 10mm O.D. button-type stir shafts. 3mm thick blades have a number of perforations, and are designed to closely fit various sizes of round bottom flasks.



Shaft Size, mm	Height, mm	Length, mm	Qty	Order Code	
10	21	87	1	8087-05	♠
10	23	109	1	8087-07	♠
10	31	146	1	8087-09	♠
10	31	157	1	8087-11	♠
10	35	175	1	8087-13	♠
10	37	222	1	8087-15	♠
10	40	263	1	8087-19	♠

**AGITATOR** *Single Blade Type, PTFE*

PTFE agitator with removable blade secured with a PTFE pin.



Shaft Size, mm	Blade Length, mm	Qty	Order Code	
<b>Complete, Shaft w/Blade</b>				
10	76	1	8088-10	♠
19	152	1	8092-10	♠
<b>Replacement Blades</b>				
	76	1	8088-03	♠
	152	1	8092-14	♠

**STIRRING SHAFT AND AGITATOR** *Precision, 5mm*

Stirring shaft agitator combination available in either a solid, precision ground glass shaft or all PTFE knob type shaft with a PTFE snap-fit agitator designed to fit through 14/20 and 18/11 joints. Designed for use with our 5mm ID 9524 or 9527 bearings and flasks of 50ml and smaller.

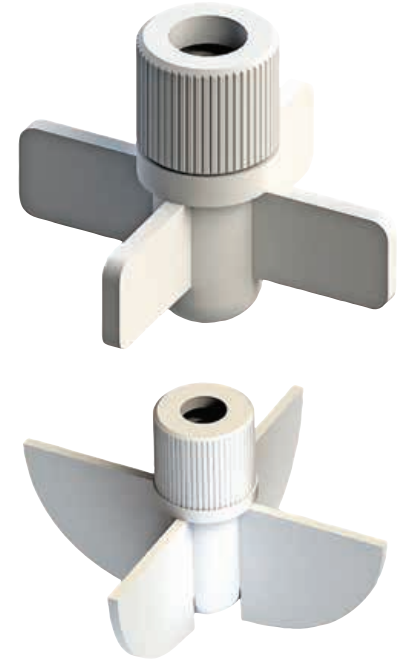


Rod Material	Qty	Rod Order Code	Agitator Order Code	Complete Order Code
Glass	1	9541-04	9541-06	9541-10
PTFE	1	9541-15	9541-07	9541-40

**AGITATOR Multi-Blade, PTFE**

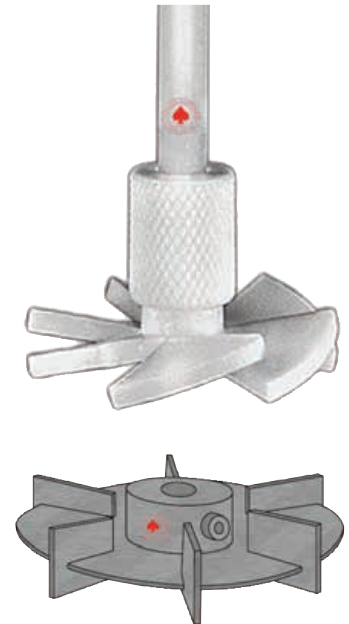
PTFE multi-blade agitator for drilled or knob-type shafts. Paddles are replaceable.

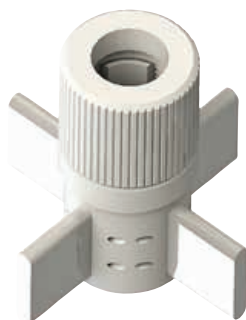
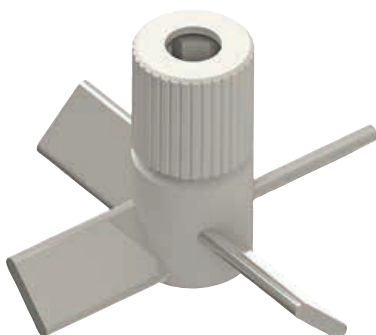
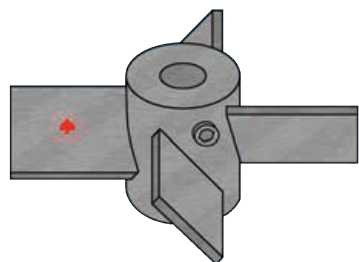
Shaft Size, mm	Blade Length, mm	Blade Style	Qty	Order Code	
<b>Paddle Blades</b>					
10	38	Paddle	1	8089-04	♠
10	64	Paddle	1	8089-06	♠
10	76	Paddle	1	8089-08	♠
19	152	Paddle	1	8091-20	♠
<b>Anchor Blades</b>					
10	50	Anchor	1	8091-02	♠
10	90	Anchor	1	8091-04	♠
19	90	Anchor	1	8091-06	♠
19	102	Anchor	1	8091-10	♠
19	140	Anchor	1	8091-26	★
19	203	Anchor	1	8091-40	★
28	140	Anchor	1	8091-34	★
28	178	Anchor	1	8091-36	★
<b>Replacement Blades</b>					
10	38	Paddle	1	8089-14	♠
10	64	Paddle	1	8089-16	♠
10	76	Paddle	1	8089-18	♠
19	102	Anchor	1	8091-14	♠
19	152	Paddle	1	8091-15	♠
19	140	Anchor	1	8091-28	★
19	203	Anchor	1	8091-44	★


**AGITATOR Turbine**

Turbine pitched blade style agitator for use on knob or drilled hole style shafts. Stainless steel model features vertical blades and is for use with stainless steel shafts only.

Shaft Size, mm	Blade Length, mm	Qty	Order Code	
<b>PTFE Turbine</b>				
10	38	1	8090-04	♠
10	64	1	8090-08	♠
19	102	1	8093-12	♠
19	152	1	8093-22	♠
<b>Stainless Steel Turbine</b>				
10	75	1	8095-31	★
10	89	1	8095-35	★
<b>Replacement Blades</b>				
19	102	1	8093-15	♠
19	152	1	8093-16	♠





### AGITATOR *Vertical and Pitched Blades*

Vertical and pitched blade style agitator for use on knob or drilled hole style shafts. Stainless steel models feature pitched blades and are for use with stainless steel shafts only.

Shaft Size, mm	Length, mm	Blade Angle	Qty	Order Code	
<b>Stainless Steel</b>					
10	75	45	1	8094-23	★
10	89	45	1	8094-27	★

#### PTFE, 45°

10	38	45	1	8097-02	★
10	64	45	1	8097-04	★
10	76	45	1	8097-06	★
19	64	45	1	8097-08	★
19	76	45	1	8097-10	★
19	127	45	1	8097-12	★
28	140	45	1	8093-25	★
28	150	45	1	8093-35	★

#### PTFE, 90°

10	38	90	1	8097-22	★
10	64	90	1	8097-24	★
10	76	90	1	8097-26	★
19	64	90	1	8097-28	★
19	76	90	1	8097-30	★

#### Replacement Parts

Stainless Steel Set Screw, 10mm	1	8094-50	★
Kel-F tipped Set Screw, 10mm	1	8094-52	★
PTFE Nut & Bolt Set, 28mm	1	8093-125	★

## Repair Service

*Yes, we fix it, too!*

Often, broken laboratory glassware items are thrown out. Instead of spending unnecessary money to replace an item, why not have the item repaired. These repairs can be far less expensive than the cost of replacing.

To find out more about our repair service call **1-800-223-4524** or visit [www.aceglass.com](http://www.aceglass.com)



Broken joint or a cracked flask, we can restore it!



**AGITATOR** *Large Scale, Multi-Blade, PTFE*

PTFE agitators for use with large-scale reactors with 6", 8" or 12" flanges. These heavy-duty agitators impart maximum energy and are offset at bottom to accommodate slurries. 19mm agitators fit drilled type or knob type shafts. 28mm agitators fit drilled hole shafts.

Shaft Size, mm	Blade Length, mm	Blade Style	Qty	Order Code	
<b>Anchor Blades</b>					
10	50	Anchor	1	8091-02	♠
10	90	Anchor	1	8091-04	♠
19	90	Anchor	1	8091-06	♠
19	140	Anchor	1	8091-26	★
19	203	Anchor	1	8091-40	★
28	140	Anchor	1	8091-34	★
28	178	Anchor	1	8091-36	★

**Paddle Blades**

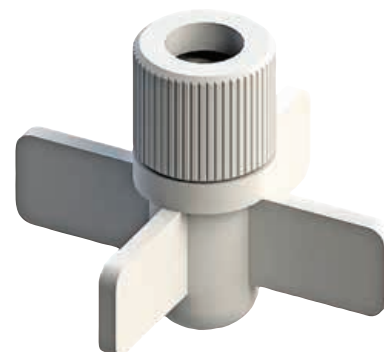
19	102	Paddle	1	8091-10	♠
19	152	Paddle	1	8091-20	♠

**Replacement Blades**

19	102	Paddle	1	8091-14	♠
19	152	Paddle	1	8091-15	♠
19	140	Anchor	1	8091-28	★
19	203	Anchor	1	8091-44	★

**Replacement Parts**

PTFE Nut & Bolt Set, 28mm			1	8091-134	★
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**AGITATOR** *Multi-Paddle w/Receptacle*

PTFE, large-scale, multi-paddle agitator designed to accept pinned bottom valves, like our 6482 flush-seal valve. The pin helps reduce wobble or flexing at higher rpm.

Shaft Size, mm	Blade Length, mm	Blade Style	Qty	Order Code	
<b>PTFE</b>					
19	140	Anchor	1	8100-09	♠
19	200	Anchor	1	8100-19	♠
28	140	Anchor	1	8101-28	★
28	178	Anchor	1	8101-38	★




**CHUCK** *Flex-Grip®*

Nylon chuck for use with ACE stirring shafts or other shafts of the same dimensions. Chuck has flexible insert which allows for misalignment of shaft without danger of breakage.

Shaft Size, mm	Motor Shaft O.D.	Qty	Order Code	
<b>PTFE</b>				
6	1/4 in	1	8124-04	♣
5	5/16 in	1	8124-05	♣
6	5/16 in	1	8124-07	♣
10	5/16 in	1	8124-10	♣
10	3/8 in	1	8124-12	♣
10	13 mm	1	8124-13	♣
19	5/16 in	1	8124-15	♣
19	3/8 in	1	8124-17	♣
19	1/2 in	1	8124-20	♣
19	13 mm	1	8124-22	♣
19	5/8 in	1	8124-23	♣

**Replacement Insert**

6	6	8124-24	♣
10	6	8124-25	♣
5	6	8124-26	♣
19	3	8124-30	♣


**CONNECTOR** *Flexible Beam w/Pin*

Coated steel flex-beam connector, for attaching directly to stir motor drive shaft. Fits three different standard motor shaft sizes (top). Comes with 1/2 inch stainless steel pin, (bottom) that attaches to top of 6472-157, 28mm nylon chuck.

Shaft Size, mm	Motor Shaft O.D., in. (mm)	Qty	Order Code	
28	1/2 (12.7)	1	6472-155	★
28	5/8 (15.9)	1	6472-156	★
28	3/8 (9.5)	1	6472-159	★

**CHUCK** *for 28mm Stir Shaft*

Nylon chuck with nylon side pin for connecting to a 28mm glass stir shaft, (8080) to the 6472-155, -156 or -159 flex beam connectors or a 6462 telescoping chuck coupling. Top hole fits onto 1/2-inch steel pin on 6472 flex beam or 6462 telescoping couplings.

Shaft Size, mm	Qty	Order Code	
<b>Chuck</b>			
28	1	6472-157	★
<b>Side Pin</b>			
28	1	6472-158	★

**PASS-THROUGH ASSEMBLY** *Stainless Steel*

Item includes the stir shaft coupling with pin that is attached to 7mm O.D. stainless steel drive shaft. Shaft is 305mm long and fits up through the chuck and opening in the Heidolph® RZR model and Caframo® BDC model overhead stir motors, and allows for adjusting the height of the entire stir shaft assembly.

Shaft Size, mm	Shaft Length, mm	Qty	Order Code	
10	305	1	8126-24	★
19	305	1	8126-22	★


**COUPLING**

The universal swivel coupling is designed for connection to a metal chuck. The plastic compression connection is secured via Allen screw, and attaches to various O.D. glass stirring shafts. When used with pass-through assemblies, the coupling allows for easy, flexible height adjustment.

Shaft Size, mm	Motor Shaft O.D., in.	Order Code	
6	1/4	8126-05	★
8, 9	1/4	8126-08	★
10	1/4	8126-10	★
19	3/8	8126-19	★
28	3/8	8126-28	★


**COLLAR** *w/PTFE Gasket*

Designed to be used with stirring shafts. Handy for positioning shaft in bearing, and preventing shaft from dropping into flask. Supplied with PTFE gasket to prevent scratching top of bearing, and to act as dust cover.

Shaft Size, mm	Order Code	
<b>Glass-Filled PTFE</b>		
10	8127-10	◆
19	8127-20	◆
28	8127-28	◆
<b>Stainless Steel</b>		
10	8127-42	◆
19	8127-43	◆
28	8127-44	◆





### SHAFT COUPLING *Stirring*

Couples stir motor shaft to reactor stir shaft. Flexible neoprene rubber body with PTFE sleeve inside corrosion-resistant metal end that provides angular and parallel misalignment of glass or metal stirring shaft without danger of breakage. Rubber body absorbs shock and provides quiet vibration free running with great torsional stiffness. Measures four inches overall.

- Easy to Use: (1) Slip coupling end with PTFE sleeve over stirring shaft as far as it will go, approximately three inches.  
 (2) Bring motor shaft down and align visually approximately 1/2 inch above coupling and shaft. Secure motor position and recheck alignment.  
 (3) After motor and reactor are securely in place, slide coupling over motor shaft and tighten set screw.  
 (4) Slide stirring shaft up into coupling just enough to clear bottom of reactor. Tighten PTFE sleeve over shaft, using brass set screw, just enough to prevent slippage.

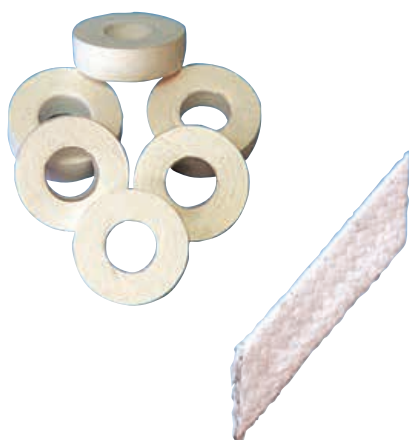
Shaft Size, mm	Motor Shaft O.D., in.	Qty	Order Code	
10	1/4	1	8125-06	★
10	5/16	1	8125-08	★
10	3/8	1	8125-11	★
10	1/2	1	8125-13	★
19	3/8	1	8125-21	★
19	1/2	1	8125-25	★
19	5/8	1	8125-27	★
19	3/4	1	8125-29	★



### GASKET *PTFE, Flat*

Designed to fit stirring shafts. Useful as dust cover and as replacement for gasket supplied with 8127 collar. Twelve to a package.

Shaft Size, mm	Qty	Order Code	
10	12	8128-10	◆
19	12	8128-20	◆
28	12	8128-42	◆



### STIRRER PACKING ◆

PTFE packing for use in 8112 stuffing boxes. This material conforms readily to the contour of the stuffing box and shaft.

Shaft Size, mm	Qty	Order Code	
10	6/pk	8122-10	◆
19	1	8122-40	◆

## ALUMINUM PACKING BOX ★

10mm size designed to be used with 8051 and 8133 bearings; 19mm with 8060 or 8061 bearings supplied with PTFE packing. For replacement packing, see 8122.

Shaft Size, mm	Qty	Order Code	
10	1	8111-10	★
19	1	8112-10	★



## “STIR-LUBE” ACE Trubore™, Stirrer Lubricant ♠

A superior, low melting, silicone-based lubricant which liquifies at body temperature. Because of its composition, you need apply only a very thin film of “Stir-Lube®” to a stirring shaft to increase bearing and shaft life at least three times over that of bearing lubricated with glycerine. Non-cooled ACE bearing can be operated at 1500 rpm and water-cooled bearings up to 2000 rpm for many hours with negligible wear.

Size, grams	Order Code	
28 (1 oz.)	8117-10	♠
113 (4 oz.)	8117-20	♠



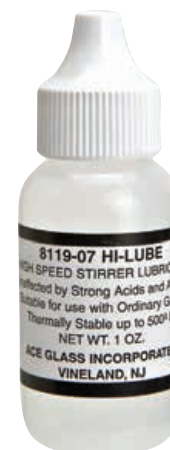
## “HI-LUBE” Heavy-Duty Liquid Stirrer Lubricant ★

ACE chlorofluorocarbon grease for use at speeds up to 6000 rpm with ACE standard glass assemblies. Use 8040 water-cooled type bearing for long-time stirring (over one hour). Below one hour, 8038 type may be used at 1500 rpm; eight hours at 1000 rpm.

**High chemical inertness** — unaffected by strong acids and alkalis. Soluble in most organic solvents. Suitable for use with oxidizing gases.

**High heat resistance** — thermally stable up to 260°C (500°F). Non-flammable; does not carbonize on decomposition. 30mL size.

Size, mL	Order Code	
30	8119-07	★



## LUBRICANT Stopcock Grease

A smooth, stable, odorless petroleum-based (no silicone) lubricant for lubricating joints and stopcocks. Melts at 52°C (125°F). Can be removed with Xylene.

Size, grams	Qty	Order Code	
75 (2.65 oz.)	1	8118-10	★
75 (2.65 oz.)	cs/6	8118-10	★





### **KRYTOX® GPL Fluorinated Grease\***

Superior performance, non-contaminating, nonflammable, general purpose grease. Excellent as a glass bearing lubricant, as a super-inert grease for stopcocks and joints, as a high temperature grease in “baked-out” vacuum systems, or on distillation column joints because it is insoluble in almost all solvents except Freon® 113. Easy removal with fluorinated solvents.

#### **CHEMICAL STABILITY**

Krytox GPL grease has demonstrated an exceptional degree of inertness when contacted with a wide range of reactive chemicals. There is no reaction with the following chemicals:

- oxygen • caustic • fluorine • hydrazine • diethylene triamine • hydrocarbons
- chlorine • hydrogen • ethanol • hydrogen peroxide • phosphoric acid
- red fuming nitric acid • sulfuric acid • methanol • aniline • ammonia
- hydrochloric acid • unsymmetrical dimethyl hydrazine

#### **THERMAL STABILITY**

Krytox GPL can be used at operating temperatures up to 204°C (400°F) for extended periods of time and at 290°C (550°F) intermittently. Approximate minimum use temperature is -35°F.

*\*Reg. U.S. Pat. & Tm. Office, DuPont Company. Fluorinated Greases are made only by DuPont.*

Size,  
oz.  
2

Order  
Code

8115-08 ★



### **KRYTOX LVP High Vacuum Grease\***

Very low vapor pressure, highly inert, nonflammable grease. The grease for high-vacuum systems. Superior performance in laboratory and pilot plant equipment, as a lubricant and sealant for stopcocks, valves, fittings and O-Rings operating at high vacuum or in hostile environments.

#### **Description**

Krytox LVP high vacuum grease is a combination of an extremely low vapor pressure perfluoroalkylpolyether oil and a fluorocarbon resin thickener. This white, buttery grease is designed to lubricate the fittings and accessories of high vacuum systems at operating temperatures down to 10<sup>-12</sup> torr at 20°C (1.33 x 10<sup>-13</sup> kPa).

The optimum useful temperature range of Krytox LVP is -20° to 260°C (-5° to 500°F).

#### **Properties**

- Krytox LVP high vacuum grease has the following important properties:
- Very low vapor pressure
- High degree of chemical inertness
- Excellent lubricating properties
- Complete nonflammability
- Compatibility with metals, plastics and elastomers
- Excellent oxidation and thermal stability
- Vapor Pressure: torr at 20°C — 1 x 10<sup>-13</sup>; torr at 200°C — 1 x 10<sup>-5</sup>

*\*Reg. U.S. Pat. & Tm. Office, DuPont Company. Krytox® LVP is made only by DuPont.*

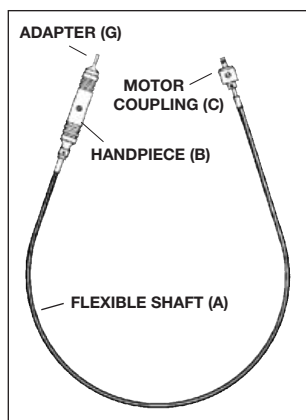
Size,  
oz.  
2

Order  
Code

8116-10 ★

## Use the ACE flexible shaft for added convenience and safety

- Safer when stirring corrosive liquids
- Safer when stirring liquids with explosive vapor
- Available in two lengths

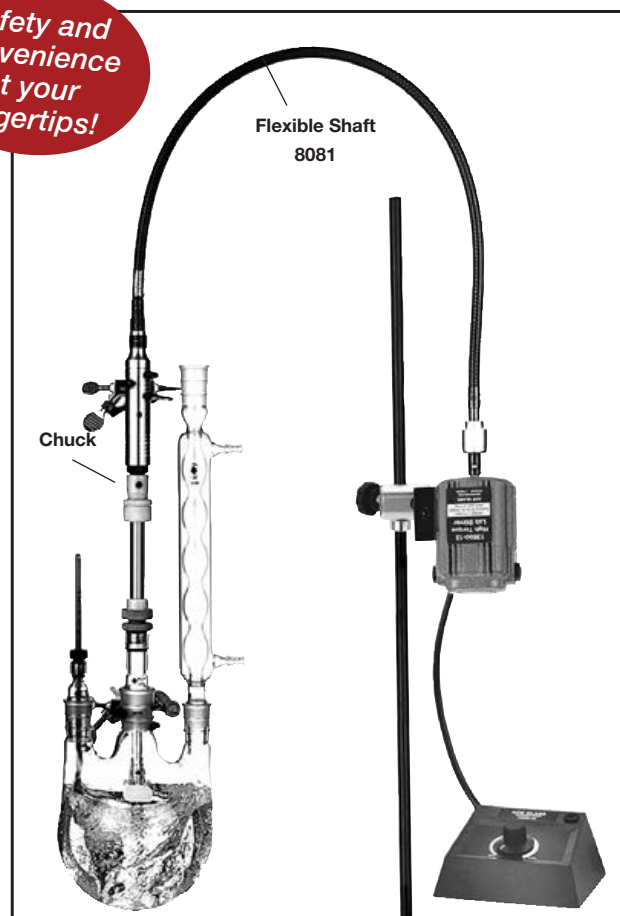


### FLEXIBLE SHAFT

Fully flexible drive shaft connects the motor to any size or type of reactor stir shaft. Designed with a ball bearing motor coupling at one end, for connection to any motor with an 8mm (5/16 inch) diameter shaft. The other end has a detachable handpiece with an 8mm round aluminum pin adapter (8081-24) for connection to our 8124 chucks (supplied separately). The handpiece can be supported by a standard lab clamp or can be hand-held. The shafts operate up to 14,000 rpm. Shafts should run in a counter-clockwise direction.

Typical torque ratings: sharp bend in shaft, (4-inch loop) — 4.7 Kg-cm, (4 in-lbs). Straight shaft — 28 Kg-cm, (24 in-lbs). Shafts measure approximately 91.4 cm, (36 inches) or 52.4 cm, (60 inches) with handpiece and motor coupling attached. Optional adapter 8081-27 allows for connection to motors with 9.5mm (3/8 inch) O. D. shaft. Operating and lubrication instructions included. Complete units consist of: either shaft A -8081-05 or shaft A-1, 8081-06, motor coupling for 8mm motor shaft, 8081-12, handpiece with 1/4 inch collet and adapter, chuck wrench, and key chain.

*Safety and convenience at your fingertips!*



	Order Code	
(A) Flexible shaft only, 91.4cm	8081-05	★
(A-1) Flexible shaft only, 152.4cm	8081-06	★
(B) Handpiece with 8mm adapter (G), with 1/8 inch and 1/4 inch collet, only	8081-08	★
(B-1) Handpiece with chuck wrench with key and chain (E), only	8081-07	★
(C) Motor coupling for 8mm shaft, only	8081-12	★
<b>Complete, 91.4cm</b>		
(consists of A, B, C & E)	8081-30	★
<b>Complete, 152.4cm</b>		
(consists of A-1, B, C & E)	8081-32	★
<b>Replacement Parts and Accessories</b>		
(E) Chuck wrench with key and chain	8081-15	★
(F) Shaft lubrication, 30mL	8081-19	★
(G) Adapter, handpiece	8081-24	★
(H) Adapter, connecting (3/8 inch O.D. motor shaft to motor coupling)	8081-27	★
(I) Pass-Thru Rod, flexible shaft. 12in length, 5/16 diameter w/ machined flat end	13564-01	


**AIR STIRRER** *Light Duty*
**Arrow Model A**

This small, compact and quiet air motor is ideal for stirring all types of solvents, lacquers, paints, oils, synthetics, and fine and heavy chemicals where danger of explosion may exist, as there are no sparks. It is a complete unit, ready for mounting on a laboratory stand. Air supply of only 30 to 100 PSIG is necessary. Variable speeds range from 200 rpm to 10,000 rpm merely by turning the air supply line valve. For bath sizes to 20 liters, this smooth running unit has little or no service cost. Unit adjusts itself to compensate for wear. The shaft and propeller are made of stainless steel to resist most acids and chemicals and for easier cleaning. Will start in most stalled positions with low air pressure and cannot burn out from overload. Air Motor — 0-1/3 hp. at 80 lbs. Coupler and stainless steel shaft 30.5cm overall. Propeller: stainless steel 6.4cm diameter. Shaft is 9.5mm (3/8-inch) O.D. Air consumption = 13 cfm.

*Note: For filter/regulator/lubricator, see 13372.*

Qty	Order Code
1	13365-05


**AIR STIRRER** *Heavy Duty*
**Arrow Model G**

Specially designed air motor for use on the more viscous materials, provides speed with power. More constant speed is attained through gear reduction, lowering speed fluctuations due to changes in air pressure. Speeds range from 50 to 1200 rpm by merely turning valve on air supply line. This smooth running unit is complete and ready to mount on laboratory stand. Air supply of only 30 to 80 PSIG is necessary. Another outstanding feature of the unit is the muffler, which provides quiet operation. The shaft and propeller are stainless steel to resist most acids and chemicals and for easier cleaning. Service costs are almost nil as the unit adjusts itself to compensate for wear. Air Motor — 0-1/3 hp. at 80 lbs. Gear Ratio — 7-1. coupler and stainless steel shaft 30.5cm overall. Propeller: stainless steel 6.4cm diameter. Shaft is 9.5mm (3/8-inch) O.D. Air consumption = 13 cfm.

*Note: For filter/regulator/lubricator, see 13372.*

Qty	Order Code
1	13365-10



**AIR STIRRER** *Heavy Duty, High Torque*

Arrow

A compact, heavy duty air motor with highly damped muffler. Complete unit consists of an air hose with a snap coupling on motor end and shut-off valve on the other. Motor will develop 1.5 hp. at 90 lbs. air pressure. Speeds are variable from 300 to 3000 rpm. It consumes approximately 42 cfm at 3000 rpm. Shaft is 12.7mm (1/2-inch) diameter for use with 8124 chuck, not included.

*Note: For filter/regulator/lubricator, see 13372.*

Qty	Order Code
1	13370-10



**FILTER/REGULATOR/LUBRICATOR**

Arrow

Space-saving, multiple unit, recommended for use with 13665, 13665B and 13370 air motors. Pressurized air flows through louvered deflector in swirling pattern, with liquids and dirt falling into lower baffle where they are prevented from reentering the air stream. Element removes impurities down to 40 microns. Clean air then passes through precision needle valve feed mist lubricator that can be filled under pressure. 150 PSIG maximum pressure range is adjustable through spring action of T-handle. Maximum operating temperature is 125°F. Manual drain. Shatter-proof polycarbonate bowls not recommended for use in atmospheres containing acetone, benzene, carbon tetrachloride, ethylene dichloride, gasoline or toluene. Inlet and outlet connections are 1/4-inch NPT. Supplied complete with gauge and mounting bracket.

Qty	Order Code
1	13372-45

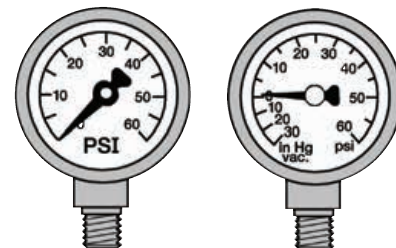


**GAUGE** *Pressure*

Pressure gauges for monitoring pressure in laboratories; especially suited for use with the Michel-Miller HP/LPLC system, pressure reactors or other applications when pressure monitoring is necessary. Available with brass or 316 SS internals.

*Note: Code -52 is a compound gauge, pressure and vacuum.*

Pressure Range, psig	Dial Size, in	Male npt Connector, in	Internals	Qty	Order Code
0-400	2-1/2	1/4	Brass	1	13385-12
0-400	2-1/2	1/4	Stainless Steel	1	13385-14
0-60	1-1/2	1/8	Stainless Steel	1	13385-44
0-160	1-1/2	1/8	Stainless Steel	1	13385-48
Full vacuum-60	1-1/2	1/8	Stainless Steel	1	13385-52



## Three State-of-the-Art Laboratory Stirrers



13543

13542

13544

- Completely enclosed, non-ventilated, permanent magnet D.C. motor for long service life
- Eye level, heavy cast aluminum control box integrated with motor for safe and easy operation of stirrers
- Control knob electronically regulates speed of application required
- Overload protection — a manually resettable circuit breaker for total safety
- On/Off switch for quick stopping if necessary
- Stirrers come complete as shown, including 9/16-inch dia. x 10 inches long aluminum support rod
- 100% backed by the best guarantee in the business:
  - 30-day satisfaction guarantee
  - Six-month unconditional guarantee

*Note: Not supplied with shaft, propeller or coupling. For stainless steel shaft, propeller and coupling, order 13542-60. For glass shafts, agitators and coupling, see 8068-8124.*

### STIRRER Laboratory, Heavy Duty, Variable Speed

**Arrow**

- Handles high viscosity fluids up to 4400 cps in 5-gallon batch or up to 100L water
- Variable speed — up to 1000 rpm, Gear Head
- Constant torque throughout speed range is 7.35 in-lbs.
- 1/10 hp motor operates at 120 VAC, 60 hz
- Motor shaft is 3/8-inch (9.5 mm)

Type	Speed Range, rpm	Constant Torque, in-lbs	Motor, HP	Power, VAC	Qty	Order Code
Gear Head	to 1000	7.35	1/10	120	1	13542-25

### Optional Accessory

#### CLAMP

*“Power Hold”*

Fits stirring stand with 3/8-inch to 5/8-inch diameter shaft and stirrers with mounting rod from 3/8-inch to 5/8-inch diameter. Stop collar included.

Qty	Order Code
1	11082-07



### STIRRER Laboratory, Light Duty

**Arrow**

- Handles watery to light syrupy mixtures, or up to 20L water
- Variable speed — up to 6000 rpm, Direct Drive
- Constant torque throughout speed range is 1.05 in-lbs.
- 1/10 hp motor operates at 120 VAC, 60 hz
- Motor shaft is 3/8-inch (9.5mm)

Type	Speed Range, rpm	Constant Torque, in-lbs	Motor, HP	Power, VAC	Qty	Order Code
Direct Drive	to 6000	1.05	1/10	120	1	13543-12

### STIRRER Laboratory, Medium Torque, Variable Speed

**Arrow**

- Handles light to syrupy mixtures, or up to 100L water
- Variable speed — up to 2000 rpm, Direct Drive
- Constant torque throughout speed range is 2.43 in-lbs.
- 1/15 hp motor operates at 120 VAC, 60 hz
- Motor shaft is 3/8-inch (9.5mm)

Type	Speed Range, rpm	Constant Torque, in-lbs	Motor, HP	Power, VAC	Qty	Order Code
Direct Drive	to 2000	2.43	1/15	120	1	13544-20

**STIRRER** *Laboratory, "The Agitator"*
**Arrow**

FORWARD-REVERSE rotation laboratory stirrer that provides powerful mixing action and eliminates cavitation. The instant-FORWARD, instant-REVERSE rotation of the agitator is electronically controlled and has a variable reversing time cycle of two seconds minimum, 20 seconds maximum. This feature, along with the variable speed control, allows you to create the most dynamic and violent mixing action with no formation of air bubbles. Can also be used as a regular stirrer by selecting standard mode. This stirrer has all the features of the 13544 stirrer. It is direct drive and delivers 39.8 in-oz or 2.43 in-lbs of constant torque throughout its speed range up to 1,750 rpm. Motor shaft is 3/8-inch (9.5mm). The 1/15 hp motor operates on 120 VAC. Shipping weight: nine lbs. NOT supplied with shaft, propeller, coupling, clamp or stand. Order 13542-60 for shaft, propeller and coupling. For clamp and stand, see 11082-07 and 13546-20. For use with glass shafts, see 8124 chuck.



Qty	Order Code
1	13545-40

**SUPPORT STAND**

Base fabricated of steel with 5/8-inch O.D x 29-inch long stainless steel support rod.

Qty	Order Code
1	13546-20


**STIRRER** *Laboratory, Standard*
**Heidolph RZR-1**

Compact 1/40 hp maximum torque 100 rpm laboratory stirrer with two speed ranges: Shaft One, 35–250 rpm; Shaft Two, 280–2200 rpm. Infinitely variable speed control works smoothly by rotary knob control — no rheostat! Precision speed indicator facilitates easy adjustment and control while in the operation mode. 140 in-oz. Fully enclosed split pole motor, output power 18W, was especially developed for continuous operation and is equipped with extra overload protection. Torque increases with decreasing speed. Result: very powerful drive at low operation range; steady power at any given speed. No brushes used, thus fire hazard is eliminated. This maintenance-free motor, with its ball bearings and series-connected friction gear (cone principle), guarantees quiet, vibration-free, safe operation, even under continuous load. Stirrer blade, see accessories, is inserted into chuck easily and extends through top of housing for variable depth adjustment. Operates on 115 v, 60 Hz. Input power: 77 W. Weight: 6 lbs., 5 oz. Measures: 6-3/4 inches L x 2-3/4 inches W x 8-3/4 inches H (172 x 71 x 250 mm).

Stirrer is supplied with 13 mm O.D. rear mounting bar, 6.5 foot (two meter) cord with grounded plug and ON-OFF switch with pilot lamp.



Speed Range, rpm	Torque, Ncm	Qty	Order Code
35-2200	100	1	13365-05

**Parts and Accessories**

Stand: Epoxy Coated Stainless Steel 430x420mm, SS tube 25mm O.D. x 700mm long	13550-21
Fastening Clamp: For connecting 13550 & 13551 motor to 13550-24 stand	13550-25
Stirring Paddle: (for low rpm) stainless steel 2-1/2", rod 18" long x 1/4" O.D.	13550-32
Stirring Blade: (for high rpm) stainless steel 2-1/2", rod 15-3/4" long x 1/4" O.D.	13550-34



**STIRRER Digital**

**IKA**

Laboratory stirrer designed for simple tasks for quantities from 25L to 40L of water. It automatically adjusts the speed through microprocessor-controlled technology within the speed range of 0/30 to 2000 rpm. Safety circuits installed ensure automatic cut-off in anti-stall or overload conditions. Continuous comparison of shaft speed to desired speed is maintained and variations adjusted automatically. This guarantees a constant speed even with changes in viscosities of the sample. Two-year manufacturer's warranty. 230V versions available upon request.

**ROD MOUNT**

	<b>Eurostar 40</b>	<b>Eurostar 60</b>
Stirring Quantity Max (H2O)	25L	40L
Speed Range	0/30-2000 rpm	0/30-2000 rpm
Viscosity Max	30000 mPas	50000 mPas
Setting Accuracy Speed	1 ±rpm	1 ±rpm
Weight	4.4 kg	4.4 kg
Chuck Range (Dia.)	0.5-10 mm	0.5-10 mm
Electrical Input	115V, 50/60Hz	115V, 50/60Hz
Output Max. (at Stir Shaft)	84 W	126 W
Torque Max. (at Stir Shaft)	40 Ncm	60 Ncm

**Order Code**

**13514-10 ★**

**13516-20 ★**



Ace Glass offers the complete line of...

**J-Kem Temperature Controllers**

- J-Kem has established a leadership role in product performance and innovation
- Data logging/control software included with most models
- Monitors and controllers for pressure, vacuum and temperature that cover the entire spectrum of performance
- USB ports and CE certification standard
- Two-year warranty
- NIST traceable
- Advanced PID algorithm

**STIRRER** *Removable Wireless Control*

Universal laboratory stirrer designed with a removable wireless controller and a digital TFT display. It automatically adjusts the speed through microprocessor-controlled technology with the speed range of 0/30 to 2000 rpm. The stirrer comes equipped with a RS232 and USB interface to control and document all parameters. An integrated torque trend display is provided for the measurement of viscosity changes. Safety circuits installed to ensure automatic cut-off in anti-stall or overload conditions. Two-year manufacturer's warranty. 230V versions available upon request.

**IKA**

**ROD MOUNT**

	<b>Eurostar 60</b>	<b>Eurostar 100</b>
Stirring Quantity Max (H2O)	40L	100L
Speed Range	0/30-2000 rpm	0/30-2000 rpm
Viscosity Max	50000 mPas	70000 mPas
Setting Accuracy Speed	1 ±rpm	1 ±rpm
Weight	4.7 kg	4.7 kg
Chuck Range (Dia.)	0.5-10 mm	0.5-10 mm
Electrical Input	115V, 50/60Hz	115V, 50/60Hz
Output Max. (at Stir Shaft)	126 W	136 W
Torque Max. (at Stir Shaft)	60 Ncm	100 Ncm
<b>Order Code</b>	<b>13517-30 ★</b>	<b>13518-02 ★</b>

**STIRRER** *Mechanical*

Powerful, mechanically-controlled stirrer with LED digital display. Suitable for quantities up to 20L (H2O) for use in laboratories and pilot plant stations. Two speed ranges within 60-2000rpm, for highly viscous media and intensive mixing. Push-through mixing tools. Special motor overheating protection by means of self-locking temperature limiter. Two-year manufacturer's warranty. 230V versions available upon request.

**IKA**

**ROD MOUNT**

	<b>RW 20</b>
Stirring Quantity Max (H2O)	20L
Speed Range	60-2000 rpm
Viscosity Max	10000 mPas
Setting Accuracy Speed	1 ±rpm
Weight	3.1 kg
Chuck Range (Dia.)	0.5-10 mm
Electrical Input	115V, 50/60Hz
Output Max. (at Stir Shaft)	26 W
Torque Max. (at Stir Shaft)	150 Ncm
<b>Order Code</b>	<b>13523-10 ★</b>

**ROD  
MOUNT**

**STIRRER** *Overhead, Digital*
**Caframo**

Rugged Ultra-Speed Model with range from 40-6000 rpm. Microprocessor-controlled brushless DC motor with automatic overload protection. Digital display of RPM and torque. Keypad adjustable. Maintains set speed as viscosity changes. 2-speed transmission selects hi-torque or hi-speed range. Adjustable steel chuck with hinged chuck guard. 120V version UL and CSA approved. A 230V (CE approved) version is available via special order. Three year warranty.

**BDC6015**

Low Speed Range	40-1200 rpm
High Speed Range	1200-6000 rpm
Maximum torque (low speed range)	170 N-cm (15 in-lbs)
Maximum torque (high speed range)	34 N-cm (3 in-lbs)
Speed Accuracy	+/- 1% of reading or +/- 1 rpm
Torque Accuracy	+/- 5% of reading or +/- 1 in-lb
Electrical Input	120V, 50/60 Hz, 5 Amps
Output Power	1/5 Hp, 150W
Weight	11 lbs (5 kg)
Chuck	accepts up to 3/8 in (10.1mm) shafts
Maximum Volume	6.6 US Gallons (25 Liters)
Maximum Viscosity	20,000 cps
<b>Order Code</b>	<b>13565-05</b> ★

**ROD  
MOUNT**

**STIRRER** *Overhead, Digital*
**Caframo**

Universal Model with all the specifications and features of the BDC 6015, except with lower speed range (20-3000 rpm). Three year warranty.

**BDC3030**

Low Speed Range	20-600 rpm
High Speed Range	600-3000 rpm
Maximum torque (low speed range)	339 N-cm (30 in-lbs)
Maximum torque (high speed range)	68 N-cm (6 in-lbs)
Speed Accuracy	+/- 1% of reading or +/- 1 rpm
Torque Accuracy	+/- 5% of reading or +/- 1 in-lb
Electrical Input	120V, 50/60 Hz, 5 Amps
Output Power	1/5 Hp, 150W
Weight	11 lbs (5 kg)
Chuck	accepts up to 3/8 in (10.1mm) shafts
Maximum Volume	15.8 US Gallons (60 Liters)
Maximum Viscosity	50,000 cps
<b>Order Code</b>	<b>13565-10</b> ★

**Caframo motors are available in 230v versions.**

**STIRRER** *Overhead, Reversing, Digital*

The 2010 has a rugged DC brushless motor that delivers from 40-2010 RPM. This model has a small footprint and is loaded with features such as “Stirlight” which lights a downward beam of light into the mixture, timer, reverse feature, xRx agitation for a controllable vortex effect, automatic overload protection, and maintains speed at all viscosities. The 2010 is the only stirrer of its kind, and can be set up for automatic time and auto-reverse for better mixing. Three year warranty.

**Caframo**
**ROD MOUNT**

<b>BDC2010</b>	
Speed	40–2010 rpm (clockwise and/or counterclockwise)
Timer	Set from 1-2000 minutes (33.3 hours)
Maximum torque	100 N-cm (8.8 in/lbs)
Electrical Input	100-240V, 50/60 Hz
Output Power	1/10 Hp, 70W
Weight	8.2 lbs (5.6 kg)
Chuck	accepts up to 3/8 in (10.1mm) shafts
Maximum Volume	6.6 US Gallons (25 Liters)
Maximum Viscosity	20,000 cps
<b>Order Code</b>	<b>13566-05 ★</b>


**STIRRER** *Overhead*

Compact size and powerful overhead stir motor. Rugged stir motor that delivers 12-1800 rpm with 1/5 horsepower DC brushless motor. Digital display of RPM and Torque. Keypad adjusts speed and rotation. Set speed is automatically maintained and adjusts to torque changes. 120V CSA and UL approved. Three year warranty. Also available in a 230V version. Comes with adjustable chuck, chuck protective cover.

**Caframo**
**ROD MOUNT**

<b>BDC1850</b>	
Low Speed Range	12–360 rpm
High Speed Range	360-1800 rpm
Maximum torque (low speed range)	565 N-cm (50 in-lbs)
Maximum torque (high speed range)	113 N-cm (10 in-lbs)
Speed Accuracy	+/- 1% of reading or +/- 1 rpm
Torque Accuracy	+/- 5% of reading or +/- 1 in-lb
Electrical Input	120V, 50/60 Hz, 5 Amps
Output Power	1/5 Hp, 150W
Weight	11 lbs (5 kg)
Chuck	accepts up to 3/8 in (10.1mm) shafts
Maximum Volume	21 US Gallons (80 Liters)
Maximum Viscosity	90,000 cps
<b>Order Code</b>	<b>13565-20 ★</b>



**Caframo motors are available in 230v versions.**

**ROD MOUNT**

**STIRRER** *Overhead, Compact*

**Caframo**

A compact versatile complete stirrer system for basic lab stirring applications. A Brushless DC motor delivers 50-2500 RPM in low viscosity solutions. Provides a small footprint and weighs less than one pound which allows for easy transfer from bench to bench, or lab to lab. Comes complete with keyless chuck, stand, integral clamp, both Axial and Radial impeller. Three-year warranty.



<b>BDC250</b>	
Speed Range	50-2500 rpm
Maximum torque	10 N-cm (0.9 in-lbs)
Electrical Input	100-240V, 50/60 Hz, 12W
Weight	3.10 lbs (1.8 kg)
Chuck	Keyless, accepts up to 1/4 in (6mm) shafts
Maximum Volume	0.5 US Gallons (2 Liters)
Viscosity	Water-like
<b>Order Code</b>	<b>13567-05 ★</b>

**Viscosity Conversion Factors**

Viscosity is the resistance to flow due to the internal friction within a fluid. This is generally expressed as the force required to move one unit area one unit distance. Kinematic and absolute viscosity are related by the density of the fluid.

**Kinematic Viscosity**

Multiply to get	→	←	to get Divide
ft <sup>2</sup> /sec	92903.04		centistokes
ft <sup>2</sup> /sec	0.092903		sq. meters/sec
sq. meters/sec	10.7639		ft <sup>2</sup> /sec
sq. meters/sec	1000000.0		centistokes
centistokes	0.000001		sq. meters/sec
centistokes	0.0000107639		ft <sup>2</sup> /sec

**Absolute to Kinematic Viscosity**

Multiply to get	→	←	to get Divide
centipoises	1/density (g/cm <sup>3</sup> )		centistokes
centipoises	0.00067197/density (lb/ft <sup>3</sup> )		ft <sup>2</sup> /sec
lb-sec/ft <sup>2</sup>	32.174/density (lb/ft <sup>3</sup> )		ft <sup>2</sup> /sec
kg-sec/m <sup>2</sup>	9.80665/density (kg/m <sup>3</sup> )		sq. meters/sec
Pascal-sec	1000/density (g/cm <sup>3</sup> )		centistokes

**Dilatant Liquids** — viscosity increases as shear rate increases. Mixers can bog down and stall after initially mixing such liquids. Dilatant liquids include slurries, clay, and candy compounds.

**Newtonian Liquids** — viscosity remains constant regardless of shear rate or agitation. As mixer speed increases, flow increases proportionately. Newtonian liquids include water, mineral oils, and hydrocarbons.

**Pseudoplastic Liquids** — viscosity decreases as shear rate increases, but initial viscosity may be sufficiently great to prevent mixing. Typical pseudoplastic liquids are gels, latex paints, and lotions.

**Thixotropic Liquids** — as with pseudoplastic liquids, viscosity decreases as shear rate or agitation increases. When agitation is stopped or reduced, hysteresis occurs and viscosity increases. Often the viscosity will not return to its initial value. Thixotropic liquids include soaps, tars, shortening, glue, inks, and peanut butter.

**Absolute or Dynamic Viscosity**

Multiply to get	→	←	to get Divide
lb-sec/ft <sup>2</sup>	47880.26		centipoises
lb-sec/ft <sup>2</sup>	47.8803		Pascal-sec
centipoises	0.000102		kg-sec/sq. meter
centipoises	0.001		lb-sec/ft <sup>2</sup>
Pascal-sec	0.0208854		Pascal-sec
Pascal-sec	1000		centipoises

**Kinematic to Absolute Viscosity**

Multiply to get	→	←	to get Divide
centistokes	density (g/cm <sup>3</sup> )		centipoises
sq. meters/sec	0.10197 x density (kg/m <sup>3</sup> )		kg-sec/m <sup>2</sup>
ft <sup>2</sup> /sec	0.03108 x density (lb/ft <sup>3</sup> )		lb-sec/ft <sup>2</sup>
ft <sup>2</sup> /sec	1488.16 x density (lb/ft <sup>3</sup> )		centipoises
centistokes	0.001 x density (g/cm <sup>3</sup> )		Pascal-sec
sq. meters/sec	1000/density (g/cm <sup>3</sup> )		Pascal-sec

\*Sometimes absolute viscosity is given in terms of pounds mass. In this case—centipoises x 0.000672 = lbm/ft sec.



**STIRRER** *Laboratory, Solid State*

Totally enclosed, 1/40 hp., permanent magnet motor with dual 8mm (5/16-inch) armature and gear shafts with milled flats. Armature shaft with maximum speed of 4000 rpm; 18:1 ratio gear shaft rated 4.2 Kg.-cm (58.3 oz-in) torque, up to 333 rpm. Baked black enamel finish, precision die-cast housing, lifetime lubricated ball bearings with steel inserts in die-casting.

**Motor:** Supplied with 1.5 meter three-wire cable with plug and ground lead for connection to controller. Measures: 5-1/2 x 4 x 4 inches. Weight: 4 lbs. 7 oz.

**Controller:** ACE 13530\* solid state 120v, 10 amp AC maximum or 0-120v, 6 amp DC maximum. Features rear ring stand clamp, Forward-Off-Reverse switch. Supplied with heavy duty 1.8 meter three-wire power cord with NEMA plug. Supplied with 0.5 amp fuse to protect motor beyond its rated torque. Controller measures 102 (4 inches) x 54 (2-1/8 inches) x 41mm (1-5/8 inches). Weight: 4.1 lbs. Complete consists of motor, controller and mounting rod.

Description	Qty	Order Code
Motor, only, w/ Mounting Rod	1	13649-09
Controller, only	1	13530-10

**Complete**

	1	13649-19
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**Parts and Accessories**

Three-jaw, keyless chuck, 9.5mm (3/8-inch) Rod	1	13649-24
Nylon chuck, Flex-Grip, for shaft size approximately 10mm	1	8124-10
Set screw wrench	1	13649-26
Paddle, 3-6.4cm blades, S-S, on 22.2cm shaft	1	13649-32
Propeller, 3-3.8cm blades, S-S, on 22.2cm shaft	1	13649-34
Attachments <b>Complete</b> (Does not include 8124-10)	1	13649-40

\*ACE 13530 motor controller offers better performance at slower speeds; for more torque at higher speeds, use 13532.



**STIRRER** *Laboratory, High Torque, Economy ★*

**Motor:** Totally enclosed, non-reversible, 1/17 hp. DC input with a 5/16-inch diameter shaft 1-inch long. Recommended for use with 8081 flexible shaft (shaft turns counter-clockwise when facing shaft) or general stirring. Motor is adjustable from 280 to 2800 rpm and generates 60 oz-in. of nominal torque. (Note: torque diminishes below 280 rpm with safety click off.) Cast aluminum motor case is painted chemically resistant grey. Supplied with 6-foot cord with NEMA plug end and 5/8-inch diameter mounting rod. Measures 4.65 x 3.25 x 3.65 inches. Weight: 4.75 lbs.

**Controller:** Durable plastic case for table top use. Rated at 120 volts, 50/60 Hz, 1.5 amp maximum to protect motor beyond its rated torque. Measures: 6W x 5D x 2.5H inches. Weight: 1.8 lbs. including 6-foot power cord.

Description	Qty	Order Code
Motor, only, w/ Mounting Rod	1	13650-12
Controller, only	1	13650-23

**Complete**

	1	13650-40
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 **Hazardous Duty Series**

**STIRRING MOTOR** *Offset, Hazardous & Standard Duty*

Offset gearbox and motors complete with right angle drive unit for pilot plant systems. Motors with right-angle drive save head- space and work well where height is restricted. Available for standard or hazardous duty applications. Available in either 1/4hp or 1/2hp with either an analog or digital 115/230v 50/60Hz cULus rated control. Hazardous duty version is UL Classified and meets Class I, Group D for flammable gases and vapor atmosphere operation and Class II, Div 1 Group F & G classification for flammable dust.

**Supplied Complete:**

- DC Motor
- Control
- Offset Gear Box
- Pulse Generator



 **Standard Duty Series**

Description	Qty	Order Code
<b>Hazardous Duty Series</b>		
1/4 horse power	1	13557-220
1/2 horse power	1	13557-240
<b>Standard Duty Series</b>		
1/4 horse power	1	13557-420
1/2 horse power	1	13557-440



**GEAR BOX** *Fits Both Standard & Hazardous duty series*

Right-angle drive 5:1 gear box only. Bolts directly to motors with a 5/8-inch diameter shaft.

	Qty	Order Code
For 1/4 or 1/2 horse power motors	1	13557-10



**GEAR REDUCER** *56C Flange, 4:1 Reduction*

In-line, offset 4:1 gear reducer. Top 56C flange accepts 13554 motor with 5/8-inch diameter shaft. Bottom has 56C flange with 5/8-inch diameter shaft. Shaft is offset approximately 1-5/8 inches. Flange face-to-face distance is approximately 4-3/4 inches. Can be used on new or existing reactor motor mounts to increase torque of reactor agitation system.

	Qty	Order Code
	1	13557-20

**STIRRER** *Overhead, Micro*

Micro sized overhead stir motor. Weighs less than a pound, yet delivers 91 in./oz. of torque. The unit can easily stir up to 5L of water. Compact and light weight makes it easy to set-up and align with 10mm stir rods and even large flasks. Sealed housing, spark-less motor. Design also makes it easy to use in small hoods. 10-380rpm with 1rpm control. 100-120V. Comes with or without the controller box.

**Note:** Glassware, Stand and Cork Ring NOT INCLUDED.



Description	Qty	Order Code
<b>Complete</b> w/ controller and 10mm chuck	1	13570-01
Motor only, includes 10mm chuck	1	13570-03

**DUAL MOTOR SPEED AND POWER CONTROLLER** *Solid State* ★

Similar to 13530, but with buffered load control and DC filtration to provide more torque at higher speeds and a higher top speed than motor rating.

Ratings: AC three-prong output socket, standard NEMA type, 1200 watts. 0-120 volts, variable, 60 Hz. maximum 10 amps. DC four-prong output socket, "cinch" type. 360 watts, 0-150 volts, variable, filtered approximately 1/2 hp. max. 3 amps.

A compact 8.9 x 8.9 x 17.8cm (3-1/2 x 3-1/2 x 7 inches), lightweight 1 Kg. (2-1/4 lbs.) solid state control with rugged control regulation and rectification circuitry. Two output sockets AC and DC which work in conjunction. Fwd-Off-Rev. DC control switch only. Fused for AC and DC outputs, 10 amps and three (3) amps respectively. Rear ring stand clamp for easy mounting and access. Light blue modern type case with protective finish. Red pilot light. Large dial plate with 0-100 divisions. Red control knob with Click-Off. Heavy duty 1.8 meter neoprene, three-wire power cord with NEMA plug.



**Uses** — AC output socket, rear mounted: Heating mantles • Universal motors • Hot plates and heating baths • Incandescent lighting, resistive loads • Most loads accept 120v AC up to 10 amps — functions comparable to the autotransformer.

DC output socket, front mounted: Four-conductor output socket for DC reversible series wound motors • Plug supplied with instructions to obtain a DC output of 0-150 volts variable, maximum current three (3) amps at 360 watts.

Description	Qty	Order Code
	1	13532-10


**STIRRER** *Medium Torque, Model 134-1* ★

Talboys

This powerful 1/18 hp, two-shaft stirrer is extremely versatile and is excellent for mixing heavy viscous pastes, glues and oils as well as for high-speed stirring of emulsions and suspensions. Variable speeds from 50 to 750 rpm with 4.7 in-lbs. torque at all speeds from this enclosed type motor. 120 volts AC input. It has a direct drive shaft which delivers 0.5 in-lbs. of torque at speeds of 500 to 7500 rpm. The second shaft has a 10:1 gear ratio and delivers 4.7 in-lbs. of torque at 50–750 rpm. Precision Jacobs chuck takes rods to 7.9mm. Finished in black baked enamel and white solvent-resistant epoxy paint. Motor shafts are 7.9mm (5/16 inches). Two shafts.

Qty	Order Code
1	13562-07

**STIRRER** *Heavy Torque, Model 134-2* ★

Talboys

Similar to 13562, but has a third shaft with a 60:1 gear reduction enabling it to be used for extremely heavy viscous materials in addition to the lighter viscous solutions mentioned above. Delivers 15 in-lbs of torque at speeds of 10 to 125 rpm. Motor shafts are 7.9mm (5/16 inches). Enclosed type motor is 1/18 hp. Three shafts.

Qty	Order Code
1	13563-07


**STIRRER** *Variable Speed Direct Drive, Model 101* ★

Talboys

Light duty, extremely compact (only 203mm high). Several used together can replace an expensive multiple stirrer. Precision, true running 6.4mm collet-type chuck. 1/75 hp.: 120 volts AC input to pen type motor. Calibrated-dial control with off position controls speed from 500 to 7500 rpm. Internal thermal overload protective device. Finished in black baked enamel and white solvent-resistant epoxy paint. Motor shaft is 6.4mm (1/4 inch). Low torque; 0.15 in-lbs.

Qty	Order Code
1	13580-10


**STIRRER** *Variable Speed, Model 102* ★

Talboys

In addition to the direct output shaft of the 13580 stirrer, it also has a 10:1 gear reducer output shaft which permits stirring small quantities of viscous materials. 1/75 hp open type motor. Direct shaft delivers speeds from 500 to 7,500 rpm. Slow speed shaft gives speeds from 50 to 750 rpm. Torque of slow speed shaft is 1 in-lbs. Speeds controlled by an electronic speed control. True running collet chuck. Internal thermal overload protective device. Finished in black baked enamel and white solvent-resistant epoxy paint. 120v, AC input. Motor shaft is 7.9mm (5/16 inches). Two shafts.

Qty	Order Code
1	13583-05


**STIRRER** *Variable Speed, Light-Medium Duty, Model 104* ★

Talboys

One of the most powerful and versatile laboratory stirrers available. It has a 10:1 gear reduction delivering 4.7 in-lbs. of torque. The two shafts permit stirring of heavy viscous pastes, glues and oils, or high-speed stirring of emulsions and suspensions. Continuous-duty 1/18 hp. motor with open type motor housing for cooling. Electronic speed control varies speeds from 100 to 7500 rpm over two ranges. Precision true running 7.9mm chuck. 120 volts, AC input. Finished in black baked enamel and white solvent-resistant epoxy paint. Two motor shafts are 7.9mm (5/16 inches).

Qty	Order Code
1	13584-10

### SUPPORT STAND ★

All-stainless-steel support stand. Heavy base, six pounds, can accommodate vessels up to 18 inches in diameter within its “U” shape. Support rod is 5/8-inch diameter, approximately 29 inches or 36 inches high, fastened to base with stainless steel lock nuts. Two additional threaded holes in base legs to accommodate extra support rods.

**Note:** Complete item consists of (1) base and (1) rod.

Rod Height, in	Support Rod O.D., in	Qty	Order Code
<b>Complete Stand w/Support Rod</b>			
28	5/8	1	13586-10
36	5/8	1	13586-13
<b>Stainless Steel Support Rod only</b>			
60	5/8	1	13586-15
28	5/8	1	13586-25
36	5/8	1	13586-27



### CHUCK Adjustable, T-Line 191 ★

For rods 9.5mm (3/8 inches) in diameter. One chuck for 6.4mm (1/4-inch) motor shaft, the other for 7.9mm (5/16-inch) motor shaft.

Size, mm	Qty	Order Code
6.4	1	13588-02
7.9	1	13588-04



### THREE-BLADED PADDLE Stainless Steel, T-Line 150-151

Two inches in diameter that can be twisted to the desired pitch to throw either up or down. Blade is firmly riveted to a 25.4cm rod. No nuts or set screws to work loose.

Shaft Diameter, mm	Qty	Order Code
6.4	1	13590-02
7.9	1	13590-04



### EXTENSION BAR T-Line 180-181

Diameter, mm	Length, mm	Qty	Order Code
6.4	152	1	13598-03
6.4	305	1	13598-05
7.9	152	1	13598-07
7.9	305	1	13598-09




**STIRRER/HOTPLATE** *C-Mag HS Series*

IKA

All glass/ceramic top stirrer/hotplates with digital readout of temperature. PID controller for accurate temperature setting and control. Light flashes to warn that surface is hot. Fixed safety circuit automatically shuts off heater if temperature rises above 550°C. Available in three popular top sizes.

Volume Limit — Water	5 L	10 L	15 L
Speed Range		100–1,500 rpm	
Temperature Range		50–500°C	
Output	250W	1,000W	1,500W
Dimensions/Top	120 x 120 mm 4.72 x 4.72 inches	200 x 200 mm 7.9 x 7.9 inches	280 x 280 mm 11 x 11 inches
Overall Dimensions	150 x 260 x 105 mm 6 x 10.25 x 4.2 inches	220 x 330 x 105 mm 8.7 x 13 x 4.2 inches	300 x 415 x 105 mm 11.8 x 16.35 x 4.2 in.
Weight/lbs.	6.5	11	13.2
Electric		115V, 50/60 Hz	
Certifications		UL, CUL, CE	
Qty	1	1	1
<b>Order Code</b>	<b>13534-05</b>	<b>13534-10</b>	<b>13534-15</b>

CE


**HOTPLATE** *Advanced Series, Ceramic Top*

Talboys

Advanced Series hotplate with ceramic top. Temperature range is ambient +5° to 500°C. Low-profile design is ideal for use in fume hoods and under small reactors. Features include LED temperature set point, recall of last set point, **HOT** top indicator, 10° over-temp shut-off and a cool-touch corrosion resistant housing. 120v (230v available). CSA, CSAUS & CE approved. Two-year manufacturer's limited warranty.

Top Size, in	Capacity, mL	Order Code
4x4	600	<b>13462-05</b>
7x7	2500	<b>13462-07</b>
10x10	6000	<b>13462-09</b>


**STIRRER** *Slow Speed*

Talboys

Slow speed, 1–150rpm, stirrers designed for use in cold rooms, incubators and CO<sub>2</sub> environments from –10 to 60°C. Ideal for applications such as uniform suspensions of cell cultures or any slow controlled stirring that requires a constant speed under changing load or viscosity conditions. Standard models feature a speed control knob while advanced models feature a LED display, timer, alarm and ramping controls. Single position models have aluminum tops, multi-position models feature a glass-filled nylon top. 120v, 230v available. Two-year manufacturer's limited warranty.

Model	Capacity, L	Number of Positions	Qty	Order Code
Standard	2	1	1	<b>13463-01</b>
Standard	1	4	1	<b>13463-04</b>
Advanced	2	1	1	<b>13463-11</b>
Advanced	1	4	1	<b>13463-14</b>
Advanced	10	1	1	<b>13463-20</b>

**STIRRER Multi-Position**

Multi-position stirrer, 60 to 140 rpm, designed for use in cold rooms, incubators and CO<sub>2</sub> environments from 5 to 40°C. Ideal for applications such as dissolution studies, media/reagent preparations and titration studies. Maintains constant speed under changing load or viscosity conditions. Standard models feature a speed control knob while advanced models feature a LED display, timer, alarm and ramping controls. Glass-filled nylon top. PTFE stir bar included for each position. 120v, 230v available. Two-year manufacturer's limited warranty.

Model	Capacity	Number of Positions	Qty	Order Code
Standard	1L	4	1	<b>13464-04</b>
Advanced	400mL	6	1	<b>13464-06</b>
Standard	1L	4	1	<b>13464-14</b>
Advanced	400mL	6	1	<b>13464-16</b>

**Talboys**

**STIRRER High Capacity**

Advanced, digital magnetic stirrers for higher capacities and high viscosity solutions. Microprocessor controlled LED stirrer complete with alarm and ramping features. Two models, 100L and 200L capacity, feature large, 25 x 21.5 inch stainless steel top plates capable of holding up to 425 lbs. 100 to 1800 rpm speed range. Includes PTFE covered stir bar. 120v, 230v available. Two year manufacturer's limited warranty.

Capacity, L	Qty	Order Code
100	1	<b>13465-01</b>
200	1	<b>13465-04</b>

**Talboys**

**STIRRER High Volume**

Large volume stirrer, up to 25L, designed for use in cold rooms, incubators and CO<sub>2</sub> environments from 5 to 40° C. Ideal for applications such as carboys, chromatography and large volume stirring. Maintains a constant speed under changing load or viscosity conditions. Standard model features a speed control knob, while advanced model feature an LED display, timer, alarm and ramping controls (60 to 1400 rpm). Glass-filled nylon top, 12.5 x 11 inches. Includes PTFE stir bar. 120v, 230v available. Two-year manufacturer's limited warranty.

Description	Qty	Order Code
Standard Model	1	<b>13466-01</b>
Advanced Model	1	<b>13466-11</b>

**Talboys**

**STIRRER & STIRRER/HOTPLATE**

Mini stirrer and hotplate/stirrer models built for the educational lab. Rugged, compact design delivers 100-1200 rpm stirring. Heating models can attain temperatures up to 400°C. Cast aluminum top plate, 4.5 inch diameter and built-in support rod holder. Includes PTFE stir bar. 120v, 230v available. Two-year limited manufacturers warranty.

Description	Qty	Order Code
Mini Stirrer	1	<b>13467-01</b>
Mini Stirrer/Hotplate	1	<b>13467-20</b>

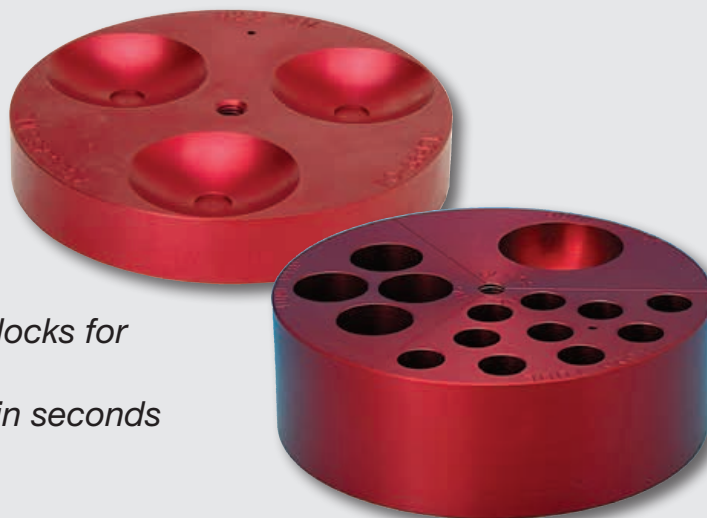
**Talboys**


# DynaBloc™

## Cylindrical Heating Blocks

### Cylindrical Reaction Blocks for Circular-top Magnetic Stirrers

- Convenient — one block base, multiple blocks for different size vials, tubes and flasks
- Easy to use — switch from vials to flasks in seconds
- Economical and efficient
- Excellent heat transfer



#### STIRRER/HOTPLATE *Advanced Series*

**Talboys**

Talboys Advanced series hotplate/stirrers. Available in three popular sizes and with either a ceramic top (temperature range ambient +5 to 500°C) or aluminum top (temperature range ambient +5 to 400°C). Speed range 60-1600 rpm. LED display with last set point recall. Safety features include: **HOT** top indicator light, 10° over-temp shut-off and stirrer motor failure shut-off. 120v (230v available), CE, CSA & CSAUS approved. Two-year manufacturer's limited warranty.

Top Size, in	Capacity, mL	Top	Order Code
4x4	600	Ceramic	13468-06
4x4	600	Aluminum	13468-08
7x7	2500	Ceramic	13468-10
7x7	2500	Aluminum	13468-12
10x10	6000	Ceramic	13468-20
10x10	6000	Aluminum	13468-22

#### Accessories

Support Rod & Clamp Kit	13468-30
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#### STIRRER/HOTPLATE *Professional Series*

**Talboys**

Professional Series Talboys hotplate/stirrers. Microprocessor control LED readout of temperature, speed, and time. Touch-pad control panel for easy programming. Available with ceramic top (temperature range ambient +5 to 500°C) or aluminum top (temperature range ambient +5 to 400°C). Includes PTFE stir bar, rod, Pt100 probe and clamp. Speed range 60-1600 rpm. Safety features: **HOT** top indicator, 10° over-temp shut-off, stir motor failure shut-off, and probe failure shut-off. 120v (230v available). CE, CSA & CSAUS approved. Two-year manufacturer's limited warranty.

Top Size, in	Capacity, mL	Top	Order Code
7x7	2500	Ceramic	13469-08
7x7	2500	Aluminum	13469-10
10x10	6000	Ceramic	13469-20
10x10	6000	Aluminum	13469-22





**STIRRER Advanced Series**

Talboys Advanced series magnetic stirrer with either a ceramic or aluminum top. Microprocessor controlled with analog speed knob. Speed range 60-1600 rpm. The new low-profile design makes it easier to place under reactors like our ACE photochem reactor vessels. PTFE stir bar included. Accessory support rod kit available on request. 120v (230v available). CE, UL and CUL approved. Two-year manufacturer's limited warranty.

**Talboys**


Top Size, in	Capacity, mL	Top	Order Code
4x4	600	Ceramic	13470-10
4x4	600	Aluminum	13470-14
7x7	2500	Ceramic	13470-16
7x7	2500	Aluminum	13470-18

**STIRRER MAGNETS PTFE, Octagonal ♠**

With pivot ring.

Length, mm (in)	O.D., mm (in)	Qty	Order Code	Length, mm (in)	O.D., mm (in)	Qty	Order Code
13 (1/2)	3 (1/8)	1	13654-02	13 (1/2)	10 (3/8)	1	13654-22
13 (1/2)	8 (5/16)	1	13654-04	15 (5/8)	10 (3/8)	1	13654-24
15 (5/8)	8 (5/16)	1	13654-06	25 (1)	10 (3/8)	1	13654-28
22 (7/8)	8 (5/16)	1	13654-08	35 (1-3/8)	10 (3/8)	1	13654-30
25 (1)	8 (5/16)	1	13654-10	38 (1-1/2)	10 (3/8)	1	13654-32
28 (1-1/8)	8 (5/16)	1	13654-12	51 (2)	10 (3/8)	1	13654-36
38 (1-1/2)	8 (5/16)	1	13654-14	64 (2-1/2)	10 (3/8)	1	13654-38
41 (1-5/8)	8 (5/16)	1	13654-16	38 (1-1/2)	13 (1/2)	1	13654-46
51 (2)	8 (5/16)	1	13654-18	75 (3)	13 (1/2)	1	13654-48
64 (2-1/2)	8 (5/16)	1	13654-20				


**STIRRER MAGNETS Raised Ring, PTFE, Octagonal ♠**

With large 25mm (1-inch) pivot ring (PTFE collar).

Length, mm (in)	O.D., mm (in)	For Use with Flask, mL	Qty	Order Code
15.9 (5/8)	9.5 (3/8)	500	1	13655-25
25.4 (1)	9.5 (3/8)	500-1000	1	13655-29
34.9 (1-3/8)	9.5 (3/8)	500-2000	1	13655-31
38.1 (1-1/2)	9.5 (3/8)	500-2000	1	13655-33
50.8 (2)	9.5 (3/8)	2000	1	13655-37
63.5 (2-1/2)	9.5 (3/8)	2000-5000	1	13655-39
38.1 (1-1/2)	12.7 (1/2)	1000-2000	1	13655-41
76.2 (3)	12.7 (1/2)	3000-5000	1	13655-44


**STIRRER MAGNETS PTFE, Round ♠**

With removable pivot ring on 25.4mm and longer.

Length, mm (in)	O.D., mm (in)	Qty	Order Code	Length, mm (in)	O.D., mm	Qty	Order Code
12 (1/2)	8 (5/16)	1	13656-06	38 (1-1/2)	10	1	13656-26
19 (3/4)	8 (5/16)	1	13656-08	42 (1-5/8)	10	1	13656-28
25 (1)	8 (5/16)	1	13656-10	51 (2)	10	1	13656-32
32 (1-1/4)	8 (5/16)	1	13656-12	64 (2-1/4)	16	1	13656-34
38 (1-1/2)	8 (5/16)	1	13656-14	75 (3)	12	1	13656-40
51 (2)	8 (5/16)	1	13656-18				



**STIRRER MAGNETS** PTFE, Octagonal, Colored ♠

With pivot ring. Either red, yellow or blue for instant identification. Please specify color.



Length, mm (in)	O.D., mm (in)	Qty	Red	Blue	Yellow
			Order Code	Order Code	Order Code
13 (1/2)	8 (5/16)	1	13657-05	13657-31	13657-57
15 (5/8)	8 (5/16)	1	13657-07	13657-33	13657-59
22 (7/8)	8 (5/16)	1	13657-09	13657-35	13657-61
25 (1)	8 (5/16)	1	13657-11	13657-37	13657-63
38 (1-1/2)	8 (5/16)	1	13657-17	13657-43	13657-69
51 (2)	8 (5/16)	1	13657-23	13657-49	13657-75
75 (3)	13 (1/2)	1	13657-25	13657-51	13657-76

**MICRO STIRRER MAGNETS** PTFE ♠

Used for micro applications and microscale flasks.



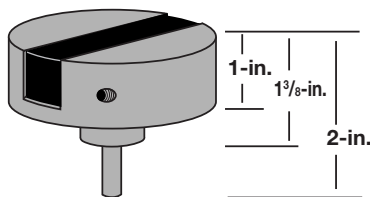
Length, mm	Diameter, mm	Qty	Order Code
8	1.5		1
15	1.5	1	13658-06
5	2	1	13658-05
7	2	1	13658-07
3	3	1	13658-08
6.35	3	1	13658-10
10	3	1	13658-12
12.7	3	1	13658-13

**Disposable**
**STIRRER MAGNETS** Disposable ♠

Designed for single use applications where efficiency and cross contamination is a concern. These Alnico V magnets have a PTFE coating which is inert for high purity contact. Packaged 100 pieces per bag.



Length, mm (in)	Diameter, mm (in)	Qty	Order Code
12 (1/2)	3 (1/8)		100
25 (1)	8 (5/16)	100	13659-18
40 (1-5/8)	8 (5/16)	100	13659-22
50 (2)	8 (5/16)	100	13659-27

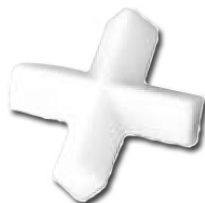

**STIRRER MAGNET** "Super Magnet" ★

Can be used in place of overhead mechanical stirring, in many cases, with equal or better agitation. This extremely strong 3-inch x 3/4-inch wide magnet is mounted in a 3-1/4-inch circular aluminum housing. Two studs supplied, 1/4-inch O.D. and 5/16-inch O.D., for attaching to chuck on a stirring motor. When used with 13655 stirrer magnets with large pivot ring, high velocity mixing can be achieved without spinout. This magnet is so strong, you can actually stir on the side of the vessel wall. Supplied with Allen wrench for attaching stud.

Qty	Order Code
1	13660-50

**STIRRER MAGNETS** X-Shaped, PTFE ♠

PTFE "X"-shaped vane with magnetic bar cross mounted. For use with 9590 and 9591 Microscale vials.



L x W, mm	Qty	Order Code
20 x 20		1
25 x 25	1	13560-02
30 x 30	1	13560-03

**EGG SHAPE MAGNETIC SPINBAR® PTFE ♠**

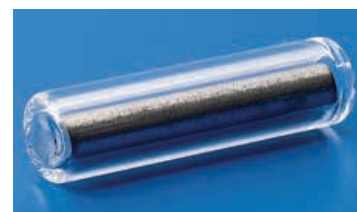
This egg-shaped stirrer magnet provides its own pivot point without a separate ring or abrupt change in contour. Designed especially for round bottom vessels.

Fits Vessel Size, mL	Size, mm	Qty	Order Code
10 thru 100	20 x 10	1	13663-03
100, 200	25 x 12	1	13663-05
300, 500	30 x 16	1	13663-07
300, 500	35 x 16	1	13663-09
500, 1000	40 x 20	1	13663-11
2000, 3000	50 x 20	1	13663-13


**ROUND MAGNETIC SPINBAR Glass Coated ♠**

Borosilicate glass coated magnetic stirring bars, great for high temperatures, (up to 275°C) or for zero absorption of the stirred solution is needed.

Size, mm	Qty	Order Code
12 x 5	1	13664-01
22 x 6.4	1	13664-02
25 x 6	1	13664-03
45 x 8	1	13664-04


**SPINWEDGE MAGNETIC STIR BAR PTFE ♠**

Wedge shaped PTFE magnetic stir bar. Designed to “plow” up sediment for thorough dispersion. Provides very strong magnetic action. Great for viscous solutions.

Size, mm	Qty	Order Code
12 x 6	1	13665-02
25 x 8	1	13665-04
40 x 14	1	13665-06
50 x 12	1	13665-08


**STIRRER MAGNETS Cross, PTFE ♠**

Designed specifically for use in round-bottom test tubes and flasks. All sizes are 12.7mm high.

O.D. x Height, mm	Qty	Order Code
9 x 6	1	13666-04
10 x 8	1	13666-05
14 x 12	1	13666-06
17 x 13	1	13666-08
19.1 x 12.7	1	13666-10
25 x 15	1	13666-12


**STIRRER MAGNETS Triangular, PTFE ♠**

PTFE “V”-shaped vane with magnetic bar cross mounted. For use with 9590 and 9591 Microscale vials. Also used with any V-bottom reaction vial or tubes.

For Use With § Joint Size	Qty	Order Code
7/10 & 10/10	1	13668-01
14/10	1	13668-02
14/10	1	13668-03



## Viscosity Conversion Factors

Viscosity is the resistance to flow due to the internal friction within a fluid. This is generally expressed as the force required to move one unit area one unit distance. Kinematic and absolute viscosity are related by the density of the fluid.

### Kinematic Viscosity

Multiply to get	→	←	to get Divide
ft <sup>2</sup> /sec	92903.04		centistokes
ft <sup>2</sup> /sec	0.092903		sq. meters/sec
sq. meters/sec	10.7639		ft <sup>2</sup> /sec
sq. meters/sec	1000000.0		centistokes
centistokes	0.000001		sq. meters/sec
centistokes	0.0000107639		ft <sup>2</sup> /sec

### Absolute to Kinematic Viscosity

Multiply to get	→	←	to get Divide
centipoises	1/density (g/cm <sup>3</sup> )		centistokes
centipoises	0.00067197/density (lb/ft <sup>3</sup> )		ft <sup>2</sup> /sec
lb-sec/ft <sup>2</sup>	32.174/density (lb/ft <sup>3</sup> )		ft <sup>2</sup> /sec
kg-sec/m <sup>2</sup>	9.80665/density (kg/m <sup>3</sup> )		sq. meters/sec
Pascal-sec	1000/density (g/cm <sup>3</sup> )		centistokes

### Absolute or Dynamic Viscosity

Multiply to get	→	←	to get Divide
lb-sec/ft <sup>2</sup>	47880.26		centipoises
lb-sec/ft <sup>2</sup>	47.8803		Pascal-sec
centipoises	0.000102		kg-sec/sq. meter
centipoises	0.001		lb-sec/ft <sup>2</sup>
Pascal-sec	0.0208854		Pascal-sec
Pascal-sec	1000		centipoises

### Kinematic to Absolute Viscosity

Multiply to get	→	←	to get Divide
centistokes	density (g/cm <sup>3</sup> )		centipoises
sq. meters/sec	0.10197 x density (kg/m <sup>3</sup> )		kg-sec/m <sup>2</sup>
ft <sup>2</sup> /sec	0.03108 x density (lb/ft <sup>3</sup> )		lb-sec/ft <sup>2</sup>
ft <sup>2</sup> /sec	1488.16 x density (lb/ft <sup>3</sup> )		centipoises
centistokes	0.001 x density (g/cm <sup>3</sup> )		Pascal-sec
sq. meters/sec	1000/density (g/cm <sup>3</sup> )		Pascal-sec

\*Sometimes absolute viscosity is given in terms of pounds mass. In this case—centipoises x 0.000672 = lbm/ft sec.

**Dilatant Liquids** — viscosity increases as shear rate increases. Mixers can bog down and stall after initially mixing such liquids. Dilatant liquids include slurries, clay, and candy compounds.

**Newtonian Liquids** — viscosity remains constant regardless of shear rate or agitation. As mixer speed increases, flow increases proportionately. Newtonian liquids include water, mineral oils, and hydrocarbons.

**Pseudoplastic Liquids** — viscosity decreases as shear rate increases, but initial viscosity may be sufficiently great to prevent mixing. Typical pseudoplastic liquids are gels, latex paints, and lotions.

**Thixotropic Liquids** — as with pseudoplastic liquids, viscosity decreases as shear rate or agitation increases. When agitation is stopped or reduced, hysteresis occurs and viscosity increases. Often the viscosity will not return to its initial value. Thixotropic liquids include soaps, tars, shortening, glue, inks, and peanut butter.

## THE SAFEST HEATING METHOD...

# ACE INSTATHERM<sup>®</sup>

## FOR GLASS VESSELS

- Eliminate the need for heating tape, immersion heaters and heating mantles.
- Can be added to custom orders!





# A sampling of **ACE GLASS** Products

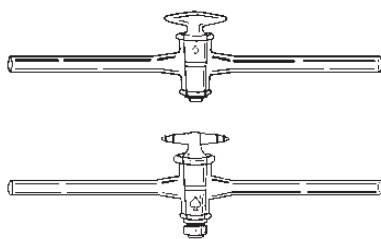


- Adapters
- Bottles, Flasks, and Beakers
- Cell Culture
- Chromatography
- Coated Glassware
- Condensers
- Filtration
- Funnels
- No-Air Vacuum Products
- O-Rings
- Photochemical
- Pilot Plant Reactors
- Pressure Vessels
- Rotary Evaporator Glassware
- Septa and Seals
- Temperature Control
- Ultrasonics
- Vials and Closures

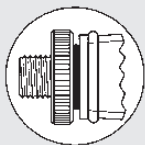


*The Right Partnership Has Its Advantages*





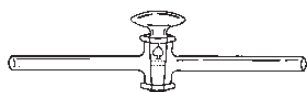
Bores with asterisk (\*) have threaded ends. 8 and 10 bores as per insert; 2 and 4 bores have a three-part retaining device.



### STOPCOCK Straight Bore, Glass or 1:5 PTFE Plug ♠

A ruggedly constructed stopcock with solid glass or 1:5 PTFE plug and tapered flange which insures maximum strength at the seal. Bore of side arms is equal to or slightly larger than bores of plug on all sizes.

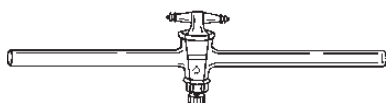
Bore Size, mm	Plug Size, mm	Stem O.D., mm	Plug Only		Complete	
			Order Code	Qty	Order Code	Qty
<b>Glass Plug</b>						
1	12/30	8	8223-01	1	8137-02	1
2	12/30	8	8223-02	1	8137-04	1
2*	12/30	8	8223-03	1	8137-05	1
3	17/40	10	8223-04	1	8137-06	1
4	17/40	10	8223-06	1	8137-08	1
4*	17/40	10	8223-07	1	8137-09	1
6	20/44	12	8223-08	1	8137-10	1
8*	25/52	16	8223-10	1	8137-12	1
10*	35/56	19	8223-12	1	8137-14	1
<b>1:5 PTFE Plug</b>						
2*	11/25	8	8224-04	1	8138-04	1
3*	15.2/30	10	8224-08	1	8138-06	1
4*	15.2/30	10	8224-12	1	8138-08	1
6*	16/35	12	8224-16	1	8138-10	1
8*	24/40	16	8224-18	1	8138-12	1



### STOPCOCK Micro ♠

Specifically designed for micro chemical apparatus. The solid glass plug and barrel are lapped together to give a precision fit suitable for micro chemical requirements. Plugs are interchangeable within the meaning of ASTM Standard E 675.

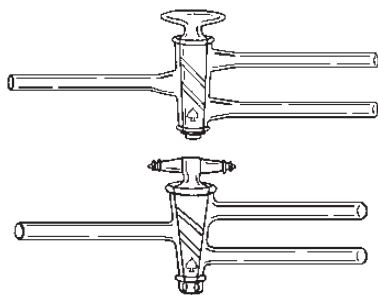
Bore Size, mm	Plug Size, mm	Stem O.D., mm	Order Code	Qty
1	7/25	5	8139-10	1



### STOPCOCK Metering Valve, 1:5 PTFE Plug ♠

Metering valve, with 1:5 PTFE straight bore plug, provides fine control of rate of flow. With polished barrels.

Bore Size, mm	Plug Size, mm	Stem O.D., mm	Plug Only		Complete	
			Order Code	Qty	Order Code	Qty
2	11/25	8	8232-14	1	8141-03	1
4	15.2/30	10	8232-16	1	8141-05	1



### STOPCOCK Three-Way, Glass or 1:5 PTFE Plug ♠

Oblique bore with polished barrels.

Bore Size, mm	Plug Size, mm	Stem O.D., mm	Plug Only		Complete	
			Order Code	Qty	Order Code	Qty
<b>Glass Plug</b>						
2	14.5/50	8	8226-05	1	8144-04	1
3	16/56	10	8226-07	1	8144-06	1
4	16/56	10	8226-09	1	8144-08	1
<b>1:5 PTFE Plug</b>						
2	12.9/44	8	8226-08	1	8143-05	1
4	14.4/44	10	8226-10	1	8143-09	1

**STOPCOCK Three-Way, T-Bore** ♠

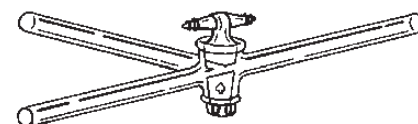
With solid glass plug.

Bore Size, mm	Plug Size, mm	Stem O.D., mm	Plug Only		Complete	
			Order Code	Qty	Order Code	Qty
2	12/30	8	8228-07	1	8145-01	1
1	17/40	8	8228-05	1	8145-02	1
2	17/40	8	8228-09	1	8145-04	1
3	20/44	10	8228-13	1	8145-06	1
4	17/40	10	8228-19	1	8145-07	1
4	20/44	10	8228-17	1	8145-08	1
6	20/44	12	8228-21	1	8145-12	1


**STOPCOCK T-Bore, 1:5 PTFE Plug** ♠

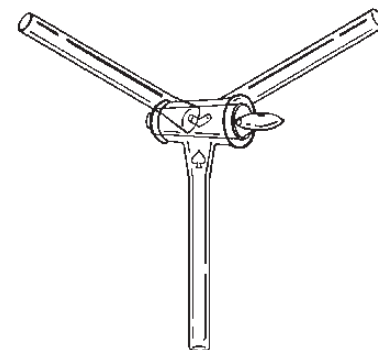
With polished barrels.

Bore Size, mm	Plug Size, mm	Stem O.D., mm	Plug Only		Complete	
			Order Code	Qty	Order Code	Qty
2	15.2/30	8	8228-32	1	8146-05	1
4	16/35	10	8228-36	1	8146-10	1


**STOPCOCK Three-Way** ♠

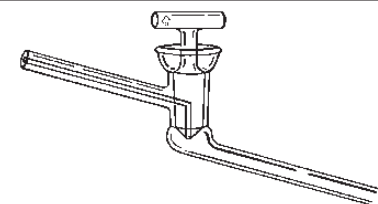
With 120° bore, solid glass plug.

Bore Size, mm	Plug Size, mm	Stem O.D., mm	Complete	
			Order Code	Qty
2	17/40	8	8147-04	1
4	20/44	10	8147-08	1


**STOPCOCK Newman Type** ♠

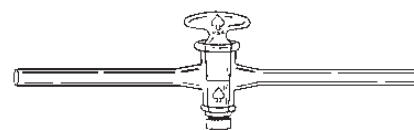
Used with distilling head to enable operator to determine reflux ratios and take-offs.

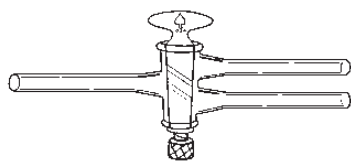
Bore Size, mm	Plug Size, mm	Stem O.D., mm	Complete	
			Order Code	Qty
2	12/30	8	8152-04	1
4	17/40	8	8152-06	1


**STOPCOCK High Pressure, Straight Bore** ♠

With solid glass plug.

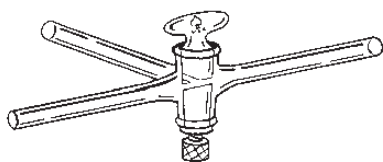
Bore Size, mm	Plug Size, mm	Stem O.D., mm	Complete	
			Order Code	Qty
2	12/30	8	8184-04	1
4	17/40	10	8184-08	1




**STOPCOCK High Pressure, Oblique Bore** ♠

Three-way, with solid glass plug.

Bore Size, mm	Plug Size, mm	Stem O.D., mm	Qty	Order Code
2	14/50	8	1	8186-04
4	16/56	10	1	8186-08

**Complete**

**STOPCOCK High Pressure, T-Bore** ♠

Three-way, with solid glass plug.

Bore Size, mm	Plug Size, mm	Stem O.D., mm	Qty	Order Code
2	17/40	8	1	8188-04
4	20/44	10	1	8188-08

**Complete**

# Ace-Thred Reference

U.S. Patent #3,695,642

Ace-Threds with Bushing and O-Ring have proven useful as Adapters in: **Chromatography Equipment, Flasks, Reaction Equipment, Environmental Glassware, Air Sampling Manifolds, Hi-Vacuum Stopcocks, No-Air Glassware, Photochemical Equipment, Freeze Drying Equipment, Joints, and numerous special pieces of equipment.**

As a general rule, the #7\*, #11 and #15 threads can attain a vacuum of  $10^{-5}$  or better using the FETFE O-Ring supplied. The #25 thread will attain a vacuum of  $10^{-4}$  or better. The diameter and surface condition of the inner tube or rod inserted in the thread have an influence on the vacuum that can be attained.

The vacuum that can be attained using PTFE ferrules is slightly less than using O-Rings.

Ace-Threds provide versatile,  
grease-free, no-clamp connections.

## Reference Guide to Ace-Thred Sizes

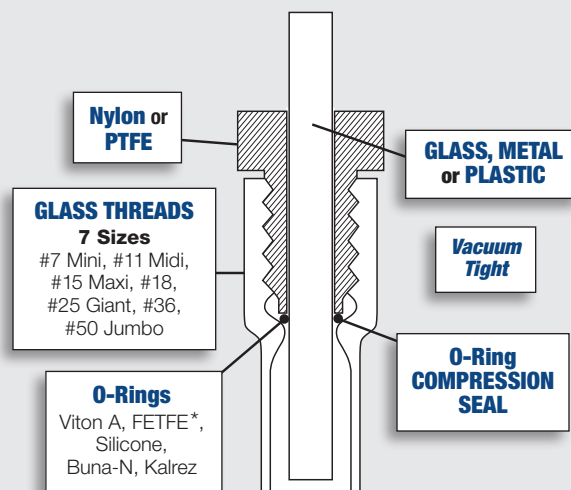
Size	Accepts Tube O.D., mm	Use Bushing Number	Use With O-Ring No.	Suggested Uses
#7	6-7	5029-10	7855-704	A, B, I
#11	9-10.5	7506-02	7855-708	D, E, F, G
#15	12.5-14	7506-06	7855-716	C, H
#18	16-17	7506-08	7855-720	H, L
#25	24-25	7506-10	7855-734	K
#36	34-35	7506-12	7855-740	K, L
#50	47-48	7506-14	7855-744	K, L
#80	80	7506-20	7855-782	—

A—Thermometers  
B—Bleed Tubes  
C—Electrodes  
D—Sensing Probes

E—Thermowells  
F—Gas Dispersion Tubes  
G—Vacuum Take-Offs  
H—Inlet and Outlet Tubes

I—Miniature Electrodes  
K—Manifolds  
L—Immersion Wells

## Ace-Threds Work



\* Fluoroelastomer with special TFE additive (FETFE) offers superior compression set resistance with built-in lubricity.

FETFE is a registered trademark of Ace Glass Inc. Nylon and Kalrez are trademarks of the E.I. DuPont Company



## Ace Stopcock Valves Feature:

- Hooded UHDPE\* handle with bakeable plug
- Fits all 0-5, 0-10 and 0-15 ACE threaded barrels
- Tef-Cap seals — PTFE-covered O-Rings
- Smooth action — internal thread
- Sure-Grip cap & internal thread design protects inside of barrel from liquid spills

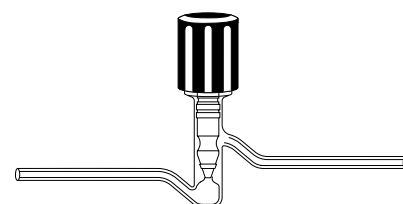
### STOPCOCK High Vacuum, Easy-Action Plug, with Tef-Cap O-Ring ♠

High vacuum stopcock with **Tef-Cap O-Ring seals** that eliminate exposure to corrosive materials. For use to 3.5 Kg/cm<sup>2</sup> internal pressure. With variable openings from 0-3mm to 0-10mm. An ultimate vacuum of 10<sup>-7</sup> can be realized with the standard three seals. Smooth acting valve permits fine adjustment of opening. Front ring seal makes a positive closure against a precision-formed heavy glass seat. Hooded handle is permanently attached to PTFE plug and is therefore not bakeable. O-Rings are NOT replaceable. Reference marks on body aid in repetitive setting.

Size Orifice	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	Complete Order Code
0-3	8	1	8189-43	8194-34	8189-03
0-4	8	1	8189-43	8194-35	8189-04
0-5	9.5	1	8189-45	8194-25	8189-05
0-8	11	1	8189-45	8194-28	8189-08
0-10	12.7	1	8189-50	8194-26	8189-10

\*UHDPE-Ultra High Density Polyethylene, Maximum Temperature Limit 130°C

Tef-Cap Seals — PTFE-Covered O-Rings

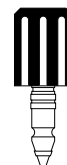


### PTFE PLUG Replacement, Tef-Cap ♠

PTFE replacement plug with two upper **Tef-Cap O-Ring seals**, lower machined ring seal and backup UHDPE\* hooded handle. Not bakeable. O-Rings are NOT replaceable.

For Size	Qty	Order Code
0-3, 0-4	1	8189-43
0-5, 0-8	1	8189-45
0-10	1	8189-50

Tef-Cap Seals — PTFE-Covered O-Rings



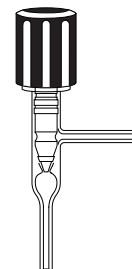
### STOPCOCK High Vacuum, Easy-Action Plug, 90°, with Tef-Cap O-Ring ♠

High vacuum stopcock with arms at 90° and **Tef-Cap O-Ring seals** that eliminate exposure to corrosive materials. For use to 3.5 Kg/cm<sup>2</sup> internal pressure. With variable openings from 0-3mm to 0-10mm. An ultimate vacuum of 10<sup>-7</sup> can be realized with the standard three seals. Smooth acting valve permits fine adjustment of opening. Front ring seal makes a positive closure against a precision-formed heavy glass seat. Hooded handle is permanently attached to PTFE plug and is therefore not bakeable. O-Rings are NOT replaceable. Reference marks on body aid in repetitive setting.

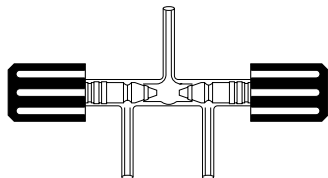
Size Orifice	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	Complete Order Code
0-3	8	1	8189-43	8195-40	8190-13
0-4	8	1	8189-43	8195-41	8190-14
0-5	9.5	1	8189-45	8195-32	8190-15
0-8	11	1	8189-45	8195-33	8190-18
0-10	12.7	1	8189-50	8195-34	8190-20

\*UHDPE-Ultra High Density Polyethylene, Maximum Temperature Limit 130°C

Tef-Cap Seals — PTFE-Covered O-Rings



**Tef-Cap Seals –  
PTFE-Covered  
O-Rings**

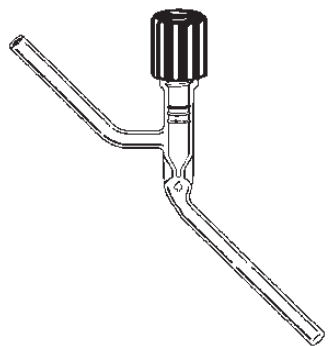


### STOPCOCK High Vacuum, Easy-Action Plug, Three-Way, W/Tef-Cap O-Ring ♠

High vacuum three-way stopcock for use in combining materials in proportion or as a common feed distributed in proportion. With **Tef-Cap O-Ring seals** that eliminate exposure to corrosive materials. For use to 3.5 Kg/cm<sup>2</sup> internal pressure. With variable openings from 0–3mm to 0–5mm. An ultimate vacuum of 10<sup>-7</sup> can be realized with the standard three seals. Smooth acting valve permits fine adjustment of opening. Front ring seal makes a positive closure against a precision-formed heavy glass seat. Hooded handle is permanently attached to PTFE plug and is therefore not bakeable. Each easy action plug acts independently of the other and is connected to a common tubulation through a variable opening.

**Note:** O-Rings are NOT replaceable.

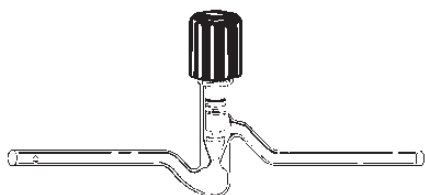
Size Orifice, mm	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-3	8	1	8189-43	8196-56	–	8190-203
0-5	9.5	1	8189-45	8196-58	–	8190-205



### STOPCOCK Vacuum, PTFE, Needle Valve, Low Hold-Up ♠

Threaded vacuum stopcock with PTFE plug and new hooded handle that permits smooth needle valve adjustment down to 0.1cc/min. flow rate. In-line design of barrel offers less hold-up than with 8192 design. Double PTFE ring seals prevent exposure of FETFE backup O-Ring to corrosive gases and liquids. Hooded handle can be removed from plug, making plug bakeable.

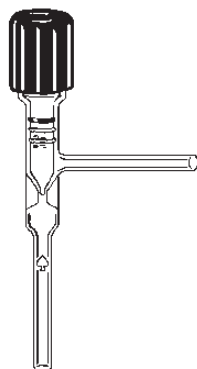
Size Orifice, mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-3	1	8192-261	8191-24	8194-302	8191-202



### STOPCOCK Vacuum, PTFE, Easy-Action Plug ♠

Easy action PTFE plug with hooded handle, threaded into heavy wall glass barrel, permits smooth adjustment. Double PTFE ring seal prevents exposure of FETFE backup O-Ring to corrosive gases and liquids. Plug, with hooded handle removed, is bakeable.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-3	8	1	8192-261	8194-34	8194-302	8192-204
0-5	9.5	1	8192-263	8194-25	8194-303	8192-207
0-8	11	1	8192-263	8194-28	8194-303	8192-209
0-10	12.7	1	8192-264	8194-26	8194-304	8192-211



### STOPCOCK Vacuum, PTFE, Needle Valve ♠

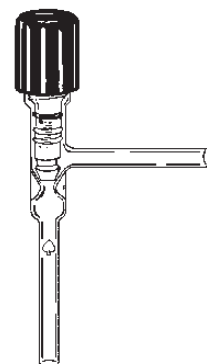
Threaded vacuum stopcock with PTFE plug and new hooded handle that permits smooth needle valve adjustment down to 0.1cc/min. flow rate. Double PTFE ring seals prevent exposure of FETFE backup O-Ring to corrosive gases and liquids. Hooded handle can be removed from plug, making plug bakeable. Stem is at 90° angle.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-3	8	1	8192-261	8195-40	8194-302	8193-214

## STOPCOCK Vacuum, PTFE, Easy-Action Plug, 90° ♠

Easy action PTFE plug with hooded handle, threaded into heavy wall glass barrel, permits smooth adjustment. Arms are at 90° angle. Double PTFE ring seal prevents exposure of FETFE backup O-Ring to corrosive gases and liquids. Plug, with hooded handle removed, is bakeable.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-5	9.5	1	8192-263	8195-32	8194-303	8193-216
0-10	12.7	1	8192-264	8195-34	8194-304	8193-218



## PLUG Replacement, with Double PTFE Ring Seal ♠

Replacement plug with two PTFE ring seals and backup FETFE O-Ring. UHDPE hooded handle can be threaded off plug, making plug bakeable.

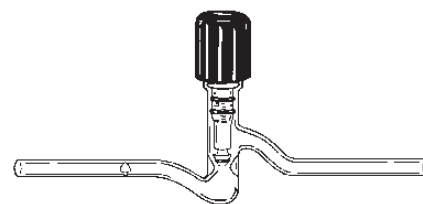
Size Orifice, mm	O-Ring Size	Qty	O-Ring Only Order Code	Complete Order Code
0-3	-008	1	8194-302	8192-261
0-5,0-8	-011	1	8194-303	8192-263
0-10	-111	1	8194-304	8192-264



## STOPCOCK High Vacuum, Easy-Action Plug ♠

High vacuum stopcock for use to at least 3.5 Kg/cm<sup>2</sup> internal pressure. With variable openings from 0-3mm to 0-15mm. An ultimate vacuum of 10<sup>-7</sup> can be realized with the standard three O-Rings. Smooth acting semi-needle valve permits fine adjustment of opening. Front O-Ring makes a positive closure against a precision formed heavy glass seat. Hooded handle can be removed from PTFE plug, making plug bakeable. Reference marks on body aid in repetitive setting. Supplied with FETFE O-Rings.

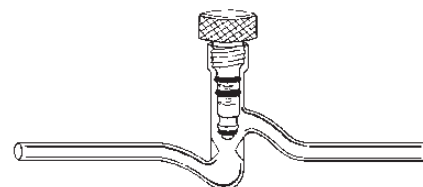
Size Orifice, mm	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-3	8	1	8194-266	8194-34	8194-85	8194-224
0-4	8	1	8194-266	8194-35	8194-85	8194-226
0-5	9.5	1	8194-268	8194-25	8194-86	8194-228
0-8	11	1	8194-268	8194-28	8194-86	8194-230
0-10	12.7	1	8194-270	8194-26	8194-87	8194-232
0-15	19	1	8194-272	8194-27	8194-88	8194-234



## STOPCOCK High Vacuum, Easy-Action Plug, Bakeable ♠

Completely bakeable high vacuum stopcock. Plug has solid PTFE stem and glass filled PTFE threads and handle for dimensional stability and reduced expansion when heated. Barrel is borosilicate glass. An ultimate vacuum of 10<sup>-7</sup> can be realized with the standard O-Rings. An ultra high vacuum down to 10<sup>-9</sup> can be attained by baking out the system and O-Rings at 230°C for two hours or more. Smooth acting semi-needle valve permits the adjustment of opening. Reference marks on the body aid in repetitive setting. Supplied with FETFE O-Rings.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-3	8	1	8194-95	8194-34	8194-85	8194-90
0-4	8	1	8194-95	8194-35	8194-85	8194-83
0-5	9.5	1	8194-96	8194-25	8194-86	8194-91
0-8	11	1	8194-96	8194-28	8194-86	8194-84
0-10	12.7	1	8194-97	8194-26	8194-87	8194-92
0-15	19	1	8194-98	8194-27	8194-88	8194-93





### O-RING REPLACEMENT SETS

Replacement O-Rings for 8194, 8195, 8196 stopcocks. Supplied in packs consisting of two large and one small O-Ring for the plug size specified.

	Qty	For Stopcock Size:			
		0-3, 0-4	0-5, 0-8	0-10	0-15
		Order Code	Order Code	Order Code	Order Code
Buna N	3	8194-40	8194-42	8194-44	8194-46
Silicone	3	8194-48	8194-50	8194-52	8194-54
Ethylene-Propylene	3	8194-55	8194-56	8194-57	8194-58
FETFE*	3	8194-85	8194-86	8194-87	8194-88
Kalrez	3	8194-124	8194-126	8194-128	8194-130

\*Fluoroelastomer with special tfe additive offers superior compression set resistance with built-in lubricity.



### FETFE O-RING REPLACEMENT SETS ♠

FETFE replacement O-Rings for 8194, 8195 and 8196 stopcocks. Supplied in plastic box of multiple sets.

**Note:** Each set consists of two large and one small O-Ring.

For Stopcock Size	Sets Per Box	Qty	Order Code
0-3, 0-4	18	1 Box	8194-310
0-5, 0-8	18	1 Box	8194-313
0-10	12	1 Box	8194-315
0-15	6	1 Box	8194-317



### O-RING KITS ♠

O-Ring kits in two of the more popular materials: Buna-N and Viton. The O-Rings are packaged in a clear, plastic box with a re-sealable lid that lets you see the O-Rings inside. Opens to thirty compartments, each clearly marked with rubber type, O-Ring size, and quantity. The cardboard insert indicates the individual Ace codes for each size, so you can easily re-order the O-Rings individually as they are depleted. The quantity of each O-Ring varies by size and compartment. Sizes provided run from -006 up to -327.

**Note:** Each kit contains 500 total O-Rings.

Material	Kit Qty	Order Code
Viton	500	7855-99
Buna-N	500	7855-499



### FETFE O-RING REPLACEMENT for 8192 or 8193 ♠

For Stopcock Size	Pkg. Qty	Order Code
0-3	12	8194-302
0-5, 0-8	12	8194-303
0-10	12	8194-304

For Kalrez replacements, order 7855-604 for 0-3; 7855-606 for 0-5, 0-8; 7855-618 for 0-10. Sold as each.

## PTFE PLUG REPLACEMENT ♠

PTFE replacement plug with three FETFE O-Ring seals and UHDPE Hooded handle. Handle can be removed from plug, making plug bakeable.



Size Orifice, mm	O-Ring Sizes	Qty	O-Ring Only	Complete
			Order Code	Order Code
0-3, 0-4	(1) -007, (2) -008	1	8194-85	8194-266
0-5, 0-8	(1) -008, (2) -011	1	8194-86	8194-268
0-10	(1) -011, (2) -111	1	8194-87	8194-270
0-15	(1) -114, (2) -116	1	8194-88	8194-272

## APPLICATOR Plastic O-Ring ♠

A tapered plastic sleeve for use in fitting O-Rings on 8194, 8195, 8196 stopcock plugs.

Size Orifice, mm	Qty	Order Code
0-3, 0-4	1	8194-60
0-5, 0-8	1	8194-62
0-10	1	8194-64
0-15	1	8194-66



## PLUG PULLER ♠

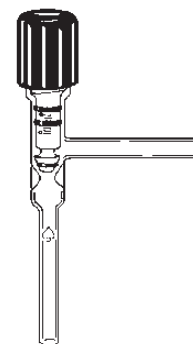
Used to remove PTFE plug from threaded barrel in old style (i.e., 8195-45), threaded stopcocks, **NOT** hooded style as supplied in 8195-236, below. Flat nylon disc has matching thread in center, slit on one side and spring steel wire in groove on outside edge. Simply spread disc over thread on plug, effectively increasing the thread length, and turn plug until O-Rings release.



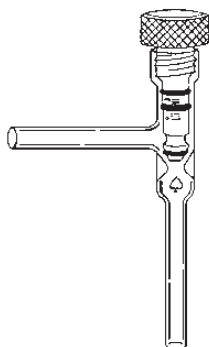
Size Orifice, mm	Qty	Order Code
0-3	1	8194-103
0-5	1	8194-105
0-10	1	8194-110
0-15	1	8194-115

## STOPCOCK High Vacuum, Easy-Action Plug, 90° ♠

High vacuum stopcock with arms at 90° for use to at least 3.5 Kg/cm<sup>2</sup>. internal pressure. With variable openings from 0–3mm to 0–15mm. An ultimate vacuum of 10<sup>-7</sup> can be realized with the standard three O-Rings. Smooth acting semi-needle valve permits fine adjustment of opening. Front O-Ring makes a positive closure against a precision formed heavy glass seat. Hooded handle can be removed from PTFE plug making plug bakeable. Reference marks on body aid in repetitive setting. Supplied with FETFE O-Rings.

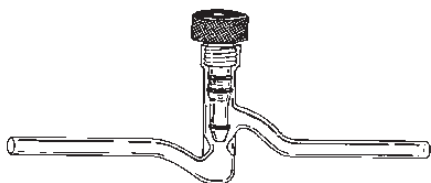


Size Orifice, mm	Stem O.D., mm	Qty	Plug Only	Barrel Only	O-Ring Only	Complete
			Order Code	Order Code	Order Code	Order Code
0-3	8	1	8194-266	8195-40	8194-85	8195-236
0-4	8	1	8194-266	8195-41	8194-85	8195-238
0-5	9.5	1	8194-268	8195-32	8194-86	8195-240
0-8	11	1	8194-268	8195-33	8194-86	8195-242
0-10	12.7	1	8194-270	8195-34	8194-87	8195-244
0-15	19	1	8194-272	8195-36	8194-88	8195-246


**STOPCOCK** High Vacuum, Easy Action Plug, 90°, Bakeable ♠

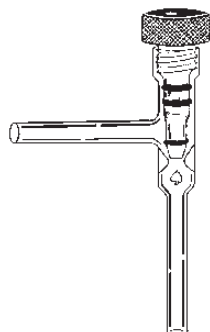
Completely bakeable high vacuum stopcock. Plug has solid PTFE stem and glass-filled PTFE threads and handle for dimensional stability and reduced expansion when heated. Barrel is borosilicate glass. Arms are at 90°. An ultimate vacuum of  $10^{-7}$  can be realized with the standard O-Rings. An ultra high vacuum down to  $10^{-9}$  can be attained by baking out the system and O-Rings at 230°C for two hours or more. Smooth acting semi-needle valve permits the adjustment of opening. Reference marks on the body aid in repetitive setting. Supplied with FETFE O-Rings.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only	Barrel Only	O-Ring Only	Complete
			Order Code	Order Code	Order Code	Order Code
0-3	8	1	8194-95	8195-30	8194-85	8195-45
0-4	8	1	8194-95	8195-31	8194-85	8195-43
0-5	9.5	1	8194-96	8195-32	8194-86	8195-46
0-8	11	1	8194-96	8195-33	8194-86	8195-44
0-10	12.7	1	8194-97	8195-34	8194-87	8195-47
0-15	19	1	8194-98	8195-36	8194-88	8195-48


**STOPCOCK** Vacuum, Easy-Action, Glass Plug ♠

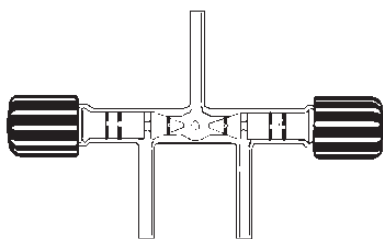
All-glass straight-thru stopcock including plug, the handle is nylon. Supplied with FETFE O-Rings. Pressures to  $10^{-5}$  Torr attainable after baking.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only	Barrel Only	O-Ring Only	Complete
			Order Code	Order Code	Order Code	Order Code
0-5	9.5	1	8194-74	8194-25	8194-86	8194-67
0-10	12.7	1	8194-76	8194-26	8194-87	8194-69


**STOPCOCK** Vacuum, Easy-Action, Glass Plug ♠

All-glass 90° stopcock including plug, the handle is nylon. Supplied with FETFE O-Rings. Pressures to  $10^{-5}$  Torr attainable after baking.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only	Barrel Only	O-Ring Only	Complete
			Order Code	Order Code	Order Code	Order Code
0-5	9.5	1	8194-74	8195-32	8194-86	8195-61
0-10	12.7	1	8194-76	8195-34	8194-87	8195-63


**STOPCOCK** High Vacuum, Three-Way ♠

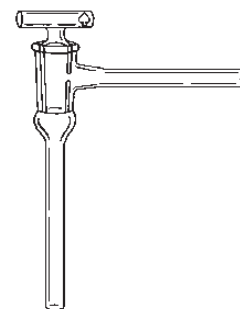
Three-way high vacuum stopcock for use in combining materials in proportion or as a common feed distributed in proportion. Easy action plugs act independently of each other, and are connected to a common tubulation through a variable opening. Supplied with FETFE O-Rings.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only	Barrel Only	O-Ring Only	Complete
			Order Code	Order Code	Order Code	Order Code
0-3	8	1	8194-266	8196-56	8194-85	8196-250
0-5	9.5	1	8194-268	8196-58	8194-86	8196-253

**STOPCOCK** *High Vacuum, Hollow Plug* ♠

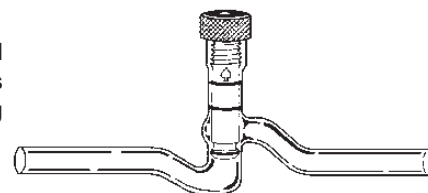
With hollow glass plug for right angle connection.

Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8197-04
4	10	1	8197-06


**STOPCOCK** *High Vacuum, Easy-Action Plug, Quick Open* ♠

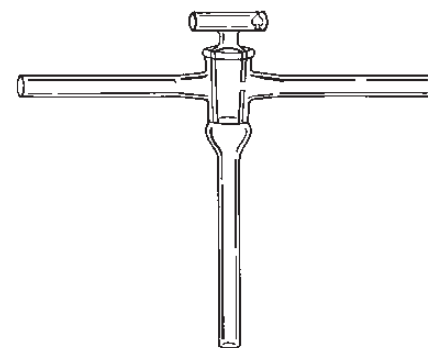
 High vacuum stopcock with easy action plug that has blunt, flat end instead of the tapered end supplied with 8194 or 8195. This modification means stopcock is a quick opening model versus the variable opening 8194 and 8195. Vacuums of  $10^{-7}$  can be realized with standard O-Rings. Plug is NOT bakeable. Supplied with FETFE O-Rings.

Size Orifice, mm	Stem O.D., mm	Qty	Plug Only Order Code	Barrel Only Order Code	O-Ring Only Order Code	Complete Order Code
0-14	19	1	8198-52	8198-32	7855-13 & -111	8198-14
0-20	25.4	1	8198-58	8198-38	7855-114 & -116	8198-20


**STOPCOCK** *High Vacuum, Hollow Plug* ♠

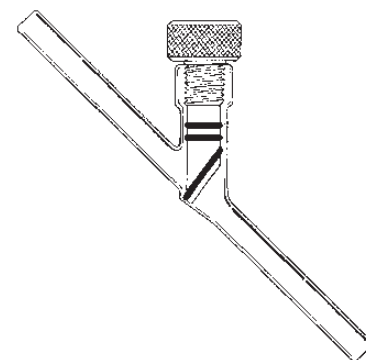
With hollow plug, for connecting either the right or left outlet with the bottom outlet.

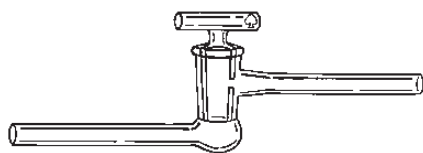
Bore Size, mm	Stem O.D., mm	Qty	Order Code
4	10	1	8199-06
6	12.7	1	8199-08
8	16	1	8199-10
10	16	1	8199-12
15	22	1	8199-14


**VALVE** *"Flickit"* ♠

Quick-open, valve-type stopcock with glass barrel, PTFE plug, and FETFE O-Rings. Unique design allows introduction of particulates or capsules into a system using a rod or plunger. Because the barrel is angled with respect to the side arms and the plug has a corresponding angled end, a 180° turn not only changes the angle of the plug with respect to the pathway, but this rotation in the threaded barrel provides a "lifting" action that nearly retracts the plug from the pathway; additional turn removes it completely. Resulting unobstructed, quick-open pathway offers many advantages not found in conventional PTFE or glass stopcocks. Size of stopcock refers to I.D. of side arms. Plugs and barrels are NOT interchangeable. O-Ring replacements are offered in sets of three rings, three sets per package. Not recommended for high vacuum.

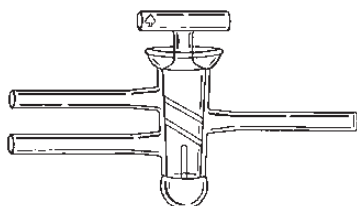
Bore Size, mm	Qty	O-Ring Only Order Code	Complete Order Code
5	1	8200-30	8200-05
10	1	8200-35	8200-10
20	1	8200-40	8200-20




**STOPCOCK High Vacuum, Hollow Plug** ♠

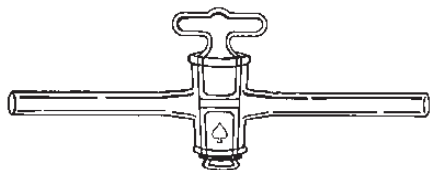
With hollow glass plug, for horizontal connections.

Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8201-04
4	10	1	8201-06
10	16	1	8201-12


**STOPCOCK High Vacuum, Solid Plug** ♠

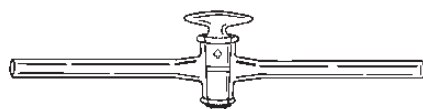
Three-way oblique bore, with liquid seal. The solid glass plug is bored to permit evacuation of the lower chamber and prevents leakage through the bottom.

Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8205-04
3	10	1	8205-05
4	10	1	8205-06


**STOPCOCK High Vacuum, Hollow Plug** ♠

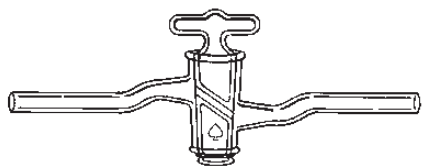
Precision grade, hollow glass plug.

Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8206-05
4	10	1	8206-09
10	19	1	8206-17
15	19	1	8206-19


**STOPCOCK High Vacuum, Solid Plug** ♠

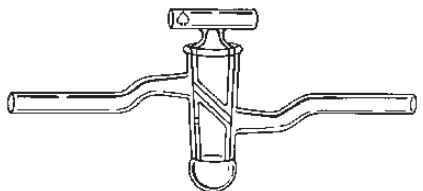
Precision grade, solid glass plug.

Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8206-32
4	10	1	8206-36


**STOPCOCK High Vacuum, Oblique Hollow Plug** ♠

Precision grade, with oblique bore hollow glass plug.

Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8208-04
4	10	1	8208-08


**STOPCOCK High Vacuum, Oblique Hollow Plug** ♠

Oblique bore with vacuum cup at bottom and hollow glass plug.

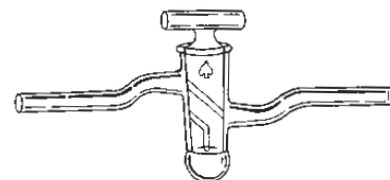
Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8209-04
4	10	1	8209-06
6	12.7	1	8209-08
8	16	1	8209-10



### STOPCOCK High Vacuum, Oblique Solid Plug ♠

Oblique bore with vacuum cup at bottom and solid glass plug.

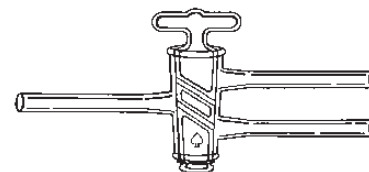
Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8209-22
4	10	1	8209-24



### STOPCOCK High Vacuum, 3-Way Hollow Plug ♠

Precision grade, with three-way oblique bore hollow glass plug.

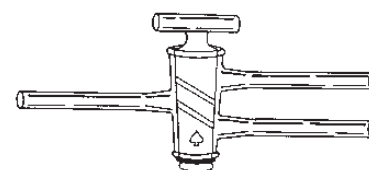
Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8211-04
4	10	1	8211-06



### STOPCOCK High Vacuum, 3-Way Solid Plug ♠

Precision grade, with three-way oblique bore solid glass plug.

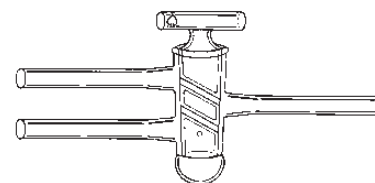
Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8211-16
4	10	1	8211-18



### STOPCOCK High Vacuum, 3-Way Hollow Plug ♠

Precision grade, with three-way oblique bore hollow glass plug. Plug has hole to permit evacuation of the lower chamber and prevents leakage through the bottom. Code -06 is the same stopcock supplied on the Ace-Burlitch inert atmosphere manifold, 7818.

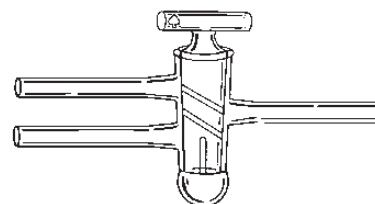
Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8212-02
4	10	1	8212-06



### STOPCOCK High Vacuum, 3-Way Solid Plug ♠

Precision grade, with three-way oblique bore solid glass plug. Plug has hole to permit evacuation of the lower chamber and prevents leakage through the bottom.

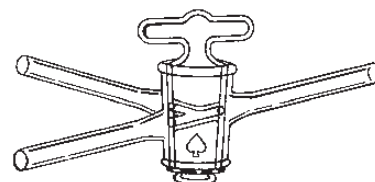
Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8212-26
4	10	1	8212-28



### STOPCOCK High Vacuum, T-Bore Hollow Plug ♠

Precision grade with T-Bore **hollow** glass plug.

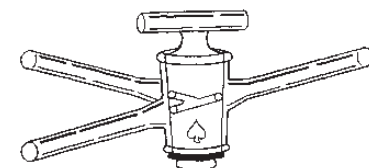
Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8213-04
4	10	1	8213-06
6	12.7	1	8213-08



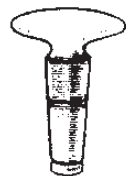
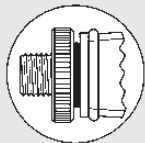
### STOPCOCK High Vacuum, T-Bore Solid Plug ♠

Precision grade with T-Bore **solid** glass plug.

Bore Size, mm	Stem O.D., mm	Qty	Order Code
2	8	1	8213-25
4	10	1	8213-27

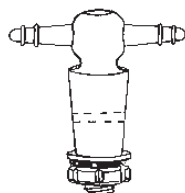


Bores with asterisk (\*) have threaded ends. 8 and 10 bores as per insert; 2 and 4 bores have a three-part retaining device.



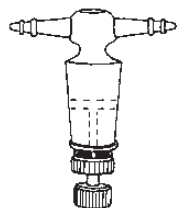
### STOPCOCK PLUGS ‡ Straight Bore, Borosilicate Glass ♠

Bore Size, mm	Stem O.D., mm	Qty	Order Code
1	12/30	1	8223-01
2	12/30	1	8223-02
2*	12/30	1	8223-03
3	17/40	1	8223-04
4	17/40	1	8223-06
4*	17/40	1	8223-07
6	20/44	1	8223-08
8*	25/52	1	8223-10
10*	35/56	1	8223-12



### STOPCOCK PLUGS Straight Bore, 1:5 PTFE ♠

Bore Size, mm	Plug Size, mm	Retainer O-Ring Size	Qty	Order Code
2	11/25	-011	1	8224-04
3	15.2/30	-111	1	8224-08
4	15.2/30	-111	1	8224-12
6	16/35	-111	1	8224-16
8	24/40	-208	1	8224-18



### STOPCOCK PLUGS 1:5 PTFE, Metering Valve ♠

Bore Size, mm	Plug Size, mm	Retainer O-Ring Size	Qty	Order Code
2	11/25	-011	1	8232-14
4	15.2/30	-111	1	8232-16

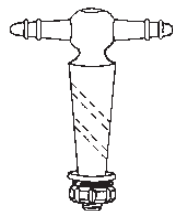
#### Valve Stem O-Rings

2 mm	12	8232-32
4 mm	12	8232-36



### STOPCOCK PLUGS Double Oblique Bore, Borosilicate Glass ♠

Bore Size, mm	Plug Size, mm	Qty	Order Code
2	14.5/50	1	8226-05
3	16/56	1	8226-07
4	16/56	1	8226-09



### STOPCOCK PLUGS Double Oblique Bore, 1:5 PTFE ♠

Bore Size, mm	Plug Size, mm	Retainer O-Ring Size	Qty	Order Code
2	12.9/44	-011	1	8226-08
4	14.4/44	-011	1	8226-10

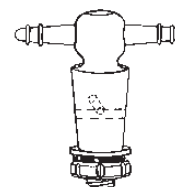


### STOPCOCK PLUGS T-Bore, Borosilicate Glass ♠

Bore Size, mm	Plug Size, mm	Qty	Order Code
1	17/40	1	8228-05
2	12/30	1	8228-07
2	17/40	1	8228-09
3	20/44	1	8228-13
4	20/44	1	8228-17
4	17/40	1	8228-19
6	20/44	1	8228-21

**STOPCOCK PLUGS** *T-Bore, 1:5 PTFE* ♠

Bore Size, mm	Plug Size, mm	Retainer O-Ring Size	Qty	Order Code
2	15.2/30	-111	1	8228-32
4	16/35	-111	1	8228-36


**GREASE** *Stopcock* ★

A halofluorocarbon lubricant especially suited for lubrication when using strong acids, oxygen, ozone, oxidants, halogens, and other corrosive or reactive chemicals. Has good metal-on-metal lubricating properties and thermal stability up to 260°C. Solid up to 177°C vapor pressure at 25°C... less than 10<sup>-3</sup>mm Hg. Complete removal is easily accomplished with organic solvents. 28 gram tube.



Tube Size, oz.	Qty	Order Code
1	1	8229-10

**GREASE** *High Vacuum* ★

Dow Corning High Vacuum Grease. A silicone lubricant that effectively seals and lubricates glass stopcocks, joints and glass-rubber connections. Resistant to most chemicals, heat stable and inert. Supplied in tube, 5.3 oz. (150g).



Tube Size, oz.	Qty	Order Code
5.3	1	8230-06

**KRYTOX® GPL** *Fluorinated Grease* ★

Superior performance, non-contaminating, nonflammable, general purpose grease. Excellent as a super-inert grease for stopcocks and joints, as a high-temperature grease in "baked-out" vacuum systems, or on distillation column joints because it is insoluble in almost all solvents except Freon® 113. Easy removal with fluorinated solvents.



Tube Size, oz.	Qty	Order Code
2	1	8115-08

**KRYTOX® LVP** *High Vacuum Grease* ★

Very low vapor pressure, highly inert, nonflammable grease. The grease for high-vacuum systems. Superior performance in laboratory and pilot plant equipment, as a lubricant and sealant for stopcocks, valves, fittings and O-Rings operating at high vacuum or in hostile environments.

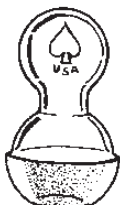
Tube Size, oz.	Qty	Order Code
2	1	8116-10



**STOPPERS**  $\text{S}$  Full Length  $\spadesuit$

Sizes  $\text{S}$  7/25 and  $\text{S}$  10/30 are solid, all others are hollow.

$\text{S}$ Joint	Qty	Order Code	$\text{S}$ Size	Qty	Order Code
7/25	1	8250-02	24/40	1	8250-12
10/30	1	8250-04	29/42	1	8250-14
12/30	1	8250-06	34/45	1	8250-16
14/35	1	8250-08	45/50	1	8250-20
19/38	1	8250-10	55/50	1	8250-24
			71/60	1	8250-28



**STOPPERS** Spherical Joint  $\spadesuit$

Sizes 12 and 18 are solid, all others are hollow.

$\text{S}$ Size	Qty	Order Code	$\text{S}$ Size	Qty	Order Code
12	1	8251-02	35	1	8251-12
18	1	8251-06	65	1	8251-16
28	1	8251-08			



**STOPPERS**  $\text{S}$  Medium Length  $\spadesuit$

Sizes  $\text{S}$  7/15,  $\text{S}$  10/18 and  $\text{S}$  12/18 are solid, all others are hollow.

$\text{S}$ Joint	Qty	Order Code	$\text{S}$ Size	Qty	Order Code
7/15	1	8255-04	24/25	1	8255-14
10/18	1	8255-06	29/26	1	8255-16
12/18	1	8255-08	34/28	1	8255-18
14/20	1	8255-10	40/35	1	8255-20
19/22	1	8255-12			



**STOPPERS**  $\text{S}$  Hollow, Penny Head  $\spadesuit$

Hollow, "penny" head. Ground glass stopper, for use with microscale equipment.

$\text{S}$ Joint	Qty	Order Code
7/10	1	9543-02
14/20	1	9543-04
19/22	1	9543-06



**STOPPERS** Flask Length  $\spadesuit$

Size 9 is solid, all others are hollow.

Size	Qty	Order Code	Size	Qty	Order Code
9	1	8260-04	22	1	8260-12
13	1	8260-06	27	1	8260-14
16	1	8260-08	32	1	8260-16
19	1	8260-10	38	1	8260-18



**STOPPERS**  $\text{S}$  PTFE, Full Length  $\spadesuit$

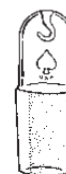
$\text{S}$  24/40 size is solid;  $\text{S}$  45/50 is hollowed from top, bottom closed.

$\text{S}$ Joint	Qty	Order Code
24/40	1	8267-19
45/50	1	8267-29

**STOPPERS** ‡ Full Length, with Hook ♠

Stopper is hollow with internal hook for hanging reactants in flasks.

‡ Joint	Qty	Order Code
24/40	1	8270-10


**STOPPERS** Cap, Spherical Joint ♠

Cap-type stoppers have ‡ joint and are used to seal unused ports on Air Sampling Manifolds. Use 7670 pinch clamp to secure caps to ports.

‡ Joint	Qty	Order Code
12/5	1	8274-06
28/15	1	8274-96


**STOPPERS** Firestone Hy-n-Dry ♠

Hy-n-Dry stopper makes any ‡ vessel into an inexpensive desiccator. Allows sample storage for long periods, free from atmospheric moisture, even during overnight temperature changes or when refrigerating.

Bottom of stopper has a Porosity B (70-100 micron) sintered glass disc sealed in. Fill stopper with drying agent, 10-20 mesh, cover with plastic cap, insert into any joint vessel, i.e. boiling flask, volumetric flask, cylinder, etc., and you have an inexpensive desiccator. A pinhole in plastic cap allows assembled unit to “breathe” with temperature fluctuations through, not around the desiccant. A warming trend or trace solvent evaporation does not produce pressure buildup that often causes stoppers to pop out. Filled with Drierite, ‡ 24/40 Hy-n-Dry stopper will absorb up to one gram of water. Supplied with plastic cap.

**Note:** Drying agent NOT included.

‡ Joint	Height Above Joint, mm	Top O.D., mm	Approx. Volume, mL	Qty	Order Code
14/10	35	17	6	1	8277-12
14/20	35	17	6	1	8277-14
24/40	40	28	22	1	8277-19
29/42	45	32	30	1	8277-23

Designed by Dr. Raymond Firestone.


**PLURO STOPPER** ★

Neoprene stopper for use with filter flasks to support funnels securely. Individual sizes listed.

O.D. Top x Bottom, mm	I.D. Top x Bottom, mm	Height, mm	Qty	Order Code
21 x 11	17 x 7	21	12	12014-40
27 x 16	22 x 11	21	12	12014-44
37 x 22	31 x 16	25	12	12014-46
46 x 29	39 x 22	29	12	12014-48
58 x 38	50 x 30	35	12	12014-50
69 x 45	60 x 36	40	12	12014-52
86 x 57	75 x 46	45	12	12014-54


**PLURO STOPPER SET** ★

A versatile silicone stopper that equals 17 standard stoppers. All the rings are cut from the same stopper, each ring nesting perfectly into the next. Whether making up a small or large stopper, a vacuum-tight fit is assured. Sold as a set.

O.D. Range, mm	Qty	Order Code
18-70	1 Set	12014-14




**STOPPERS** Polyethylene, Hollow ♠

Hollow stoppers made of conventional polyethylene. Fits snugly — easily removed. May be used as containers for micro work. All sizes are 25mm high.

Size No.	Top, mm	Bottom, mm	Capacity, mL	Pkg. Qty	Case Qty	Order Code
1	17	11	4.6	24	144	12629-07
2	20	14	5.2	24	144	12629-09
6	32	26	15.1	24	144	12629-17
8	38	32	24.1	24	144	12629-21


**STOPPERS** PTFE, ★

Standard taper stoppers made of solid PTFE. Available in regular and flask length size.

Size No.	Qty	Order Code
<b>Flask Length</b>		
8	1	12630-04
9	1	12630-06
13	1	12630-12
16	1	12630-16
19	1	12630-22
22	1	12630-24
27	1	12630-28
32	1	12630-34
38	1	12630-38

**Regular Length**

7/10	1	12631-02
7/25	1	12631-03
10/10	1	12631-04
14/10	1	12631-06
14/20	1	12631-07
19/22	1	12631-09
24/25	1	12631-15
29/26	1	12631-17


**STOPPERS** PTFE, ⌘, With Easy-to-Grip Handle ★

Standard taper, available in flask-length and regular length PTFE stoppers with easy-to-grip handle. Sizes vary and are either solid or hollow.

Size No.	Approx. Dia. Large End, mm	Length, mm	Qty	Order Code
<b>Flask Length</b>				
13 (Solid)	13.4	14.0	1	12632-13
16 (Solid)	16.5	15.0	1	12632-16
22 (Hollow)	22.05	20.5	1	12632-22
27 (Hollow)	27.15	21.5	1	12632-27
38 (Hollow)	38.0	30.0	1	12632-38

**Standard Length**

14/20 (Solid)	1	12633-05
19/22 (Solid)	1	12633-09
24/25 (Hollow)	1	12633-12
24/40 (Hollow)	1	12633-15
29/42 (Hollow)	1	12633-17
45/50 (Hollow)	1	12633-23

**STOPPERS PTFE ★**

Virgin TFE/PTFE stoppers with built-in black Delrin stopper extractor ring. Eliminates the hazard of removing a frozen stopper from glass vessel. You need only turn red nut clockwise to exert a gentle force against the vessel's lip and the non-stick stopper is extracted.

Stopper Size	Qty	Order Code	Stopper Size	Qty	Order Code
#8	3	12634-04	§19/22	3	12634-16
#13	3	12634-08	#22	3	12634-18
§14/20	3	12634-10	§24/40	2	12634-20
#16	3	12634-12	§29/42	2	12634-24
#19	3	12634-14			


**STOPPERS Polyethylene ★**

Standard taper, hollow polyethylene stoppers with flat top.

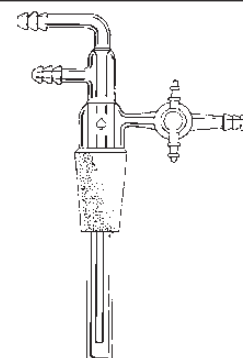
Size No.	Qty	Order Code	Size No.	Qty	Order Code
7	6	12635-07	24	6	12635-24
10	6	12635-10	29	6	12635-29
14	6	12635-14	34	6	12635-34
19	6	12635-19	45	6	12635-45


**SUBLIMATION ADAPTER\* ♠**

Unique device for carrying out sublimation directly in round bottom reaction flask; simply remove condenser, stirrer, etc. from flask joint, insert sublimation adapter and begin. Coolant connection at top and side vacuum connection are 9.5mm (3/8-inch) O.D. Vacuum connection is controlled by 1:5 PTFE 2mm bore stopcock. Adapter supplied with § 24/40 joint for use with 250mL or 500mL flasks. Other joint sizes or capacities are available.

For Flask Cap., mL	Qty	Order Code
250	1	8015-15
500	1	8015-20

\*Suggested by Dr. William H. Myers, Univ. of Richmond, Dept. of Chemistry, Richmond, VA.


**SUBLIMATION APPARATUS ♠**

A 50mm size for samples of approximately 25mL. With a #50 O-Ring joint, unit measures 200mm high x 50mm diameter. The stopcock is positioned so that the bottom can be firmly clamped to the top.

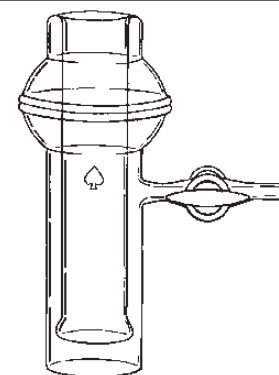
Size	Qty	Outer Body only	Inner Top only	Complete
		Order Code	Order Code	Order Code
50	1	8022-08	8022-06	8022-10

**Replacement Clamps**

75/50	1	7669-22
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**Replacement O-Rings**

229	1	7855-748
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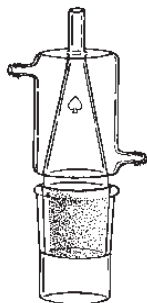

**SUBLIMATION APPARATUS** *Vacuum, Improved*

Two sizes, both featuring an O-Ring sealed, greaseless flange with 6517 quick release clamp. Top flange is ground flat, bottom mating flange has an O-Ring groove for a CAPFE O-Ring (PTFE encapsulated silicone), held tightly together via a quick release clamp. Size 60 is 200mm high x 60mm I.D.; uses 6517-22 clamp and 7588-878 CAPFE O-Ring. Size 152 is 250mm high x 152mm I.D.; uses 6517-27 clamp and 7855-881 CAPFE O-Ring. Complete item consists of outer body, inner top, CAPFE O-Ring and quick release clamp.

Size	Qty	Outer Body, only Order Code	Inner Top, only Order Code	Complete Order Code
60	1	8023-20	8023-25	8023-40
152	1	8023-33	8023-36	8023-55

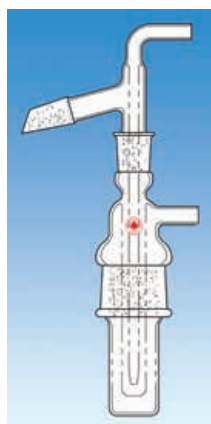
  

Replacement CAPFE O-Ring			Replacement Clamp		
For Size	Qty	Order Code	For Size	Qty	Order Code
60	1	7855-878	60	1	6517-22
152	1	7855-881	152	1	6517-27


**SUBLIMATION APPARATUS** *Vacuum ♠*

Economical small-scale sublimation apparatus. Crystals form in the cone and are easily removed through the vacuum connection at the top. The unique design allows the user to submerge the flask in an oil bath almost to the bottom seal on the cooling jacket, thereby avoiding premature condensation. 25mL size has a  $\text{F}$  34/45 joint; 50mL size has a  $\text{F}$  45/50 joint. Vacuum tube on both sizes will accommodate 10mm I.D. tubing.

Size	Qty	Outer Body, only Order Code	Inner Top, only Order Code	Complete Order Code
25	1	8025-03	8025-13	8025-23
50	1	8025-05	8025-15	8025-25


**SUBLIMATION APPARATUS** *Vacuum ♠*

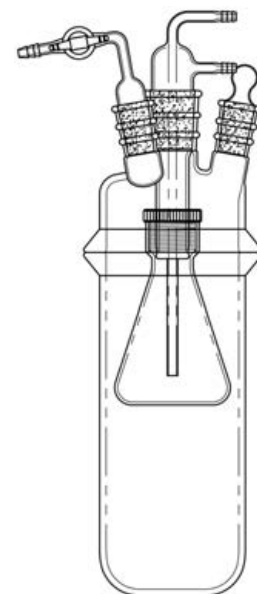
A semi-micro sublimer used by a number of synthesis laboratories. The proportions have been found to be optimum for handling a variety of crystal types. The circulatory stem may be removed and collecting tube filled with dry ice, acetone, etc. Complete unit consists of body, head and circulatory stem. Large joint is  $\text{F}$  29/26, body length approximately 50mm. Side take-off is  $\text{F}$  14/20 inner joint. Outlet tube on 9546-04 is 8mm O.D.; outlet tube on 9546-06 is 9mm O.D.

	Qty	Order Code
Circulatory Stem	1	9546-04
Head	1	9546-06
Body	1	9546-08
<b>Complete</b>	1	9546-10



## SUBLIMATION APPARATUS *Vacuum* ♠

Large scale (2L), sublimation apparatus constructed of heavy wall glass. Unit will sublime approximately 100gms of solid sample. Unique design offers both a sublimation apparatus, as well as, a two-liter reaction kettle. Cold finger tube has a  $\text{3/4}$  34/35 joint which positions in the center neck and is held by means of a plastic bushing to a 300mL condensate flask. The wide flange opening of the kettle allows for easy removal and access to the condenser flask. Side joints are  $\text{3/4}$  24/40. Kettle flange has an O-Ring groove for a CAPFE O-Ring, (supplied) for easy grease free seal. Head and kettle are joined with a quick release clamp. Complete system has all the components listed below. 8027-14 stopcock adapter uses size "C" (3/8-inch) hose connections. 8027-07 condenser tube uses size A (5/16-inch) hose connections.



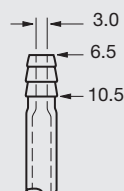
Descriptions	Order Code
<b>Complete</b>	
With 300mL Condenser Flask	8027-25

### Additional Parts

	Qty	Order Code
2L Reaction Kettle Bottom	1	8027-09
Reaction Kettle Top	1	8027-02
Condenser Flask, 300 mL	1	8027-05
Stopcock Adapter	1	8027-14
Condenser Tube	1	8027-07
Bushing, Nylon	1	7506-10
Stopper (two required)	1	8250-12
Clamp, Flange	1	6517-25
CAPFE O-Ring	1	7855-880
$\text{3/4}$ 24/40 Sleeve	3	7642-11
$\text{3/4}$ 34/45 Sleeve	3	7642-19

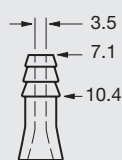
## Hose Connection Size Guide

*Dimensions are in millimeters*



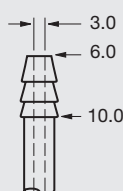
**A**

Use with  
7.9mm (5/16")  
I.D. Tubing



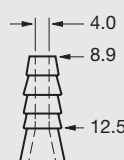
**B**

Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



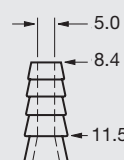
**C**

Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



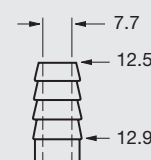
**D**

Use with  
9.5mm (3/8")  
I.D. Tubing



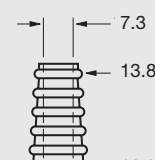
**E**

Use with  
9.5mm (3/8")  
or 11.1mm (7/16")  
I.D. Tubing



**F**

Use with  
11.1mm (7/16")  
or 12.7mm (1/2")  
I.D. Tubing

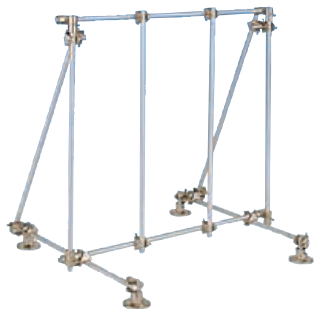


**G**

Use with  
15.9mm (5/8")  
I.D. Tubing

# ALUMINUM LABJAWS<sup>®</sup> LAB FRAMES

Set No.	2-In. /51mm rods	12-In. /305mm rods	18-In. /457mm rods	24-In. /610mm rods	36-In. /914mm rods	48-In. /1219mm rods	72-In. /1829mm rods	"S" Connectors	Rod End Connectors	Feet
11160	8	—	2	8	—	—	—	18	4	4
11162	8	—	2	7	—	4	—	35	4	4
11163	10	—	3	—	2	10	—	38	4	6
11165	6	6	—	2	—	7	5	45	4	8



### LAB-FRAME SET *Frames 61 x 61cm, Small* ★

This Lab Frame Set can be assembled into a support 61cm wide and 61cm high with 46cm base. It is convenient for small laboratory setups and provides a strong support to which glassware, heaters, etc., may be attached with Castaloy clamps.

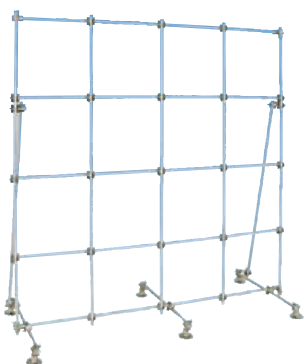
Qty	Order Code
1	11160-04



### LAB-FRAME SET *Frames 61 x 122cm, Medium* ★

This set can be assembled into a support 61 x 122cm in either a horizontal or vertical position. The base rods are 46cm long.

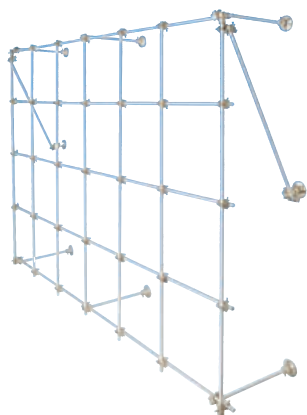
Qty	Order Code
1	11162-08



### LAB-FRAME SET *Frames 122 x 122cm, Large* ★

Elaborate apparatus setups are possible with this set, which is similar to 11162, above. It can be assembled into a support as large as 122cm square with a 46 cm base.

Qty	Order Code
1	11163-07



### LAB-FRAME SET *Frames 122 x 183cm, Extra Large* ★

This wall-type Lab Frame Set can be built into assemblies as large as 1.2 x 1.8 meters. Can be used vertically or horizontally. Includes six 31cm rods and feet for securing frame to a wall. Apparatus is mountable on either side of frame.

Qty	Order Code
1	11165-05

**SUPPORT RODS Aluminum** ★

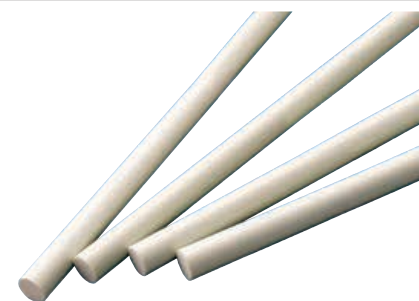
Lab frame rods are made of hard aluminum alloy and are centerless ground to exactly a 13mm (1/2-inch) diameter with a tolerance of 0.013mm to insure a near sliding fit with the connectors. These rods are supplied with the standard sets or can be obtained separately for building special stands for particular requirements. These centerless ground rods should not be confused with the cheaper irregular aluminum rods sometimes offered for supports.

Length, cm (In.)	Qty	Order Code
4.1 (1-5/8)	1	11166-21
15 (6)	1	11166-22
5.1 (2)	1	11166-23
46 (18)	1	11166-25
61 (24)	1	11166-27
91 (36)	1	11166-29
122 (48)	1	11166-31
183 (72)	1	11166-33
31 (12)	1	11166-37
244 (96)	1	11166-39


**SUPPORT RODS Fiberglass** ★

Fiberglass support rods, 13mm (1/2-inch) O.D., for use in place of aluminum rods that pit or become unsightly when used in corrosive atmosphere. Off-white or black color of these rods lends a more attractive appearance to lab setups. For use with all standard laboratory connectors.

Length, cm (In.)	<i>Off-White</i>		<i>Black</i>
	Qty	Order Code	Order Code
31 (12)	1	11167-03	11167-32
46 (18)	1	11167-05	11167-36
61 (24)	1	11167-07	11167-38
91 (36)	1	11167-09	11167-40
122 (48)	1	11167-11	11167-42
183 (72)	1	11167-13	11167-44
244 (96)	1	11167-15	11167-46


**SUPPORT RODS Stainless Steel** ★

303 stainless steel support rods, 13mm (1/2-inch) O.D. for use in place of aluminum or fiberglass. For use with all standard laboratory connectors.

Length, cm (In.)	Qty	Order Code
31 (12)	1	11178-04
46 (18)	1	11178-06
61 (24)	1	11178-08
91 (36)	1	11178-10
122 (48)	1	11178-12
183 (72)	1	11178-14
244 (96)	1	11178-16


**LAB FRAME CONNECTORS** ★

Holds rods firmly at 90° angle. Adjust by tightening square-headed screws. Use wrench or a screwdriver. Holes carefully sized to eliminate play.

Qty	Order Code
1	11168-19





**HOOK CONNECTORS** ★

Lock two Flexaframe rods at a 90° angle. Does not slip. Install without disassembling frame. Supplied with Flexaframe sets.

	Qty	Order Code
	1	11169-24



**OPEN RING SUPPORT** ★

The Flexaframe Open Ring Support can be held by conventional laboratory clamp holders to support equipment such as leveling bulbs and separatory funnels from Flexaframe. There are three different sizes, all made from aluminum.

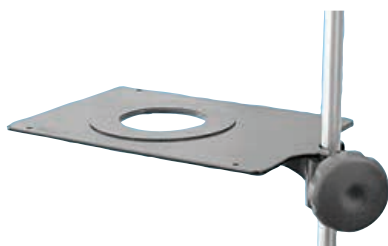
Size, mm (In.)	Qty	Order Code
76 (3)	1	11171-12
102 (4)	1	11171-17
127 (5)	1	11171-22



**PLATE SUPPORT** ★

Aluminum plate supports apparatus with flat base on Flexaframe lattice. Support is 15cm (six inches) in diameter.

	Qty	Order Code
	1	11172-17



**PLATE SUPPORT SHELF** ★

Adjustable cast alloy, black epoxy coated support shelf. With knob, measures 7x10 inches. Fits up to 5/8-inch O.D. rod. Plain or with 102mm (4-inch) diameter hole and with 1-inch rubber around perimeter.

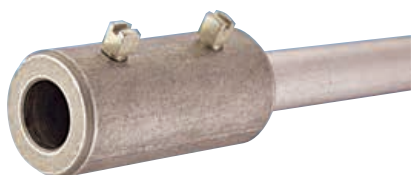
Style/Size	Qty	Order Code
4-3/4 x 5-7/8in, 3.5in diameter hole	1	11173-04
6x7 in, 4in diameter hole	1	11173-06
Solid, No Hole	1	11173-08
102mm (4-inch) Center Hole	1	11173-17



**FOOTPLATE** ★

Mount lattice permanently. Footplate holds Flexaframe poles. Secures them to floors, walls, tables, with screws.

	Qty	Order Code
	1	11174-13



**END-TO-END ROD CONNECTORS** ★

Strong alloy connector permits end-to-end joining of rods. Precision boring of connector ensures perfect aligning of rods. Corrosion resistant. 51mm long, 22mm outside diameter, provided with two set screws.

	Qty	Order Code
	1	11175-23

**OPEN RING SUPPORT Vinyl Coated ★**

Two-inch split ring support with vinyl coating. Ideal for small vessels and funnels.

	Qty	Order Code
	1	11176-12


**OPEN RING SUPPORT PVC Coated ★**

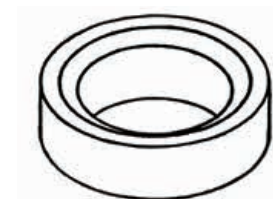
Open ring supports with long extension arms for supporting glassware from the bottom, such as separatory funnels and powder funnels. PVC coated ring also protects glass from scratching. Long extension arms allow for easier connection to labframes or stands.

Size	Ring Size, in	Arm Length, in	Qty	Order Code
Small	3	10	1	11177-13
Medium	4	12	1	11177-17
Large	5	12	1	11177-19


**SUPPORT RING Solid PTFE ★**

Useful for supporting column, flasks, dishes, etc. Shaped with internal bevel.

O.D., mm	I.D., mm	Qty	Order Code
220	175	1	11752-04
180	140	1	11752-06
170	130	1	11752-08
135	90	1	11752-10


**EXTENSION SUPPORT**

Mantle support with extension rod consists of a steel ring with a 6" rod. Use to support Glas-Col M series aluminum housed mantles by attaching to a stable ring stand or lab rack.

**Works with**

Flask Capacity, mL	Ace Glass Mantle	Glas-Col Mantle	Qty	Order Code
50-200	12043-05	100C M94	1	12094-02
	12043-07	100C M96		
		100C M98		
250-500	12043-13	100C M102 100C M104	1	12094-04
1000	12043-19	100C M108	1	12094-06
2000/3000	12043-21	100C M110	1	12094-08
	12043-23	100C M112		
5000	12043-25	100C M114	1	12094-12


**EXTENSION SUPPORT**

Mantle support with extension rod consists of a steel strap fabric basket with a 6" rod. Use to support Glas-Col O series fabric mantles by attaching to a stable ring stand or lab rack.

**Works with**

Flask Capacity, mL	Ace Glass Mantle	Glas-Col Mantle	Qty	Order Code
50	12031-05 12035-05		1	12095-01
100-200	12031-07	100A O963	1	12095-02
	12031-11	100A O1003 100A O983		
250-300	12031-13	100A O1023 100A O1043	1	12095-04
500	12031-17	100A O1063	1	12095-06
1000	12031-19	100A O1083	1	12095-08
2000	12031-21	100A O1103	1	12095-10
3000	12031-23	100A O1123	1	12095-12
5000	12031-25	100A O1143	1	12095-14





**TRIPOD MANTLE SUPPORT** *Static or Adjustable Height*

Tripod mantle support for larger Glas-Col M series aluminum housed mantles. Support is fabricated from steel and features a drilled mounting hole at the bottom of each leg. Some assembly required.

**Works with**

Height, in	Ace Glass Mantle	Glas-Col Mantle	Qty	Order Code
<b>Static Height</b>				
14	12043-23	100C M112	1	12097-04
14	12043-25	100C M114	1	12097-06
14	12043-27	100C M116	1	12097-08
14	12043-29	100C M118	1	12097-10
16	12043-31	100C M120	1	12097-12
18	12043-33	100C M122	1	12097-14
<b>Adjustable Height (3" increments)</b>				
24-36	12043-27	100C M116	1	12097-45
24-36	12043-29	100C M118	1	12097-47
24-36	12043-31	100C M120	1	12097-49
24-36	12043-33	100C M122	1	12097-51



**STAND** *Photochemical Reactor* ★

Sturdy aluminum, powder coated stand for use with cylindrical reactors such as those listed under 7840, 7841, 7844, 7861, 7863, 7864 or 7865. Design allows vessel to be operated in a cold bath in the event the reactant material needs cooling. Also can be used stand-alone.

	Qty	Order Code
Stand, only	1	7837-75

**PTFE Stand Inserts**

Vessel Size, mL	Vessel Style	Qty	Order Code
250	Plain	1	7837-02
500	Plain	1	7837-05
1,000	Plain	1	7837-10
250	Jacketed	1	7837-25
500	Jacketed	1	7837-60
1,000	Jacketed	1	7837-100

Stand is universal for all sizes. User must select the appropriate PTFE insert to accommodate desired vessel size.



**SUPPORT STAND** ★

Tripod support for bottom of Ion-exchange columns. Metal support has hole large enough for end fitting to pass through so that shoulder of column rests on plate. Column should also be stabilized with a clamp such as 11079. For use only with 100mm and 150mm diameter columns.

Height, in	Qty	Order Code
14	1	12099-20

**LABORATORY SUPPORT** *Aluminum* ★

Heavy duty, scissor-type lab support and accessories.

Max. load at middle position, lbs.	Plate Size, in	Vertical Range, in	Color	Qty	Order Code
66	3 x 3	1.9 – 5.7	Blue	1	11210-08
176	4.8 x 5.9	3 – 11	Brass-yellow	1	11210-12
176	8 x 8	3 – 11	Brass-yellow	1	11210-15
198	9.5 x 12.6	4.8 – 19.6	Gray	1	11210-18

**Parts and Accessories**

	Qty	Order Code
Supplementary plate 8 x 8 in. for codes -10 & -12	1	11210-28
Supplementary plate 7 x 10 in for codes -10 & -12	1	11210-32
Supplementary plate 16 x 19.5 in for codes -18	1	11210-34
Support plate 8 x 8 in with clamp	1	11210-36
Support rod, 650mm (25.5 inches) in length	1	11210-38
Support mount for codes -08, -10 & -12	1	11210-11



**LABORATORY SUPPORT** *Heavy Duty, Stainless Steel* ★

Heavy duty, all stainless construction Lab-Lifts are extremely stable lifting platforms with exceptional strength and durability. Corrosion resistant and autoclavable these lifts feature an extra large height adjustment knob for extra leverage under heavy load conditions. Seven sizes available.

Plate Size, in	Maximum Load, lbs.	Qty	Order Code
3 x 3	20	1	11212-54
4 x 4	30	1	11212-55
6 x 6	35	1	11212-56
8 x 8	55	1	11212-57
10 x 10	80	1	11212-58
12 x 12	150	1	11212-59
16 x 16	180	1	11212-60


**LABORATORY SUPPORT** *Poly-Jaque* ★

Fabricated from corrosion- and chemical-resistant glass-reinforced polypropylene and PTFE filled polyetherimide, this lightweight support is non-magnetic and non-conducting. Poly-Jaque utilizes the scissor jack principle for quick, easy and accurate height adjustment. PTFE nuts provide smooth, non-freezing operation. Platform measures: 6-1/2 x 61/4 inches. Height adjustment from 3-1/2 to 12 inches. Weight capacity, 15 lbs.

Qty	Order Code
1	11214-20


**FLASK SUPPORT** *Round Bottom, Polypropylene* ★

Round-bottom flasks of any size up to 10,000mL are cradled securely in the stepped concentric rings of this support. Supports are stackable, affording the ability to create a stable base at various heights. Polypropylene construction is not affected by spilled acids, alkalis or other corrosive liquids. Steam autoclavable at 121°C (250°F). Dimensions: 171mm (6-3/4 inches) in diameter x 51mm (2 inches) high.

Qty	Order Code
1	11700-02


**CORK RINGS** ★

Fine-composition cork rings ideally suited for general laboratory use to support flasks, beakers, dishes, etc. Rings are 30mm (1-3/16-inch) thick. Available in the following sizes.

Size	For Flask, mL	O.D., cm	I.D., cm	Qty	Order Code
1	10-100	7.6	3.0	1	11750-02
2	200-500	11.1	6.0	1	11750-04
3	1000-3000	14.0	8.9	1	11750-06
4	5000	17.1	12.1	1	11750-08
5	12000	20.9	15.2	1	11750-10
6	22000-50000	24.1	18.6	1	11750-12




**SYRINGE** *Chromatography, LC Injection* ★

With epoxy cemented 304 stainless steel needle permanently attached. All sizes have 22 gauge needle. Needles are 50mm long with 20° bevel tip.

Capacity, microliter	Qty	Order Code
10	1	5925-03
25	1	5925-05
50	1	5925-07
100	1	5925-09
250	1	5925-11

**SYRINGE** *Chromatography, LC Injection* ★

With epoxy cemented 304 stainless steel needle permanently attached. The 10 microliter size has 26 gauge needles, all others have 25 gauge needles. Needles are 50mm long with 20° bevel tip.

Capacity, microliter	Qty	Order Code
10	1	5928-02
25	1	5928-04
50	1	5928-06
100	1	5928-08
250	1	5928-10
500	1	5928-12


**SYRINGE** *Chromatography, LC Injection, with Guide* ★

Same as 5928 LC injection syringe, except fitted with adapter guide for repetitive deliveries.

Capacity, microliter	Qty	Order Code
10	1	5928-118


**SYRINGE** *Chromatography, LC Injection, Economy Six-Pack* ★

Basic 10 microliter LC injection syringe with epoxy cemented 304 stainless steel needle permanently attached or removable needle, supplied in convenient package of six. In addition to an approximate 7–12% savings in cost, you get a convenient storage container. Needles are 26 gauge.

Needle Type	Qty	Order Code
Fixed	6	5928-302
Removable	6	5928-330


**SYRINGE** *Chromatography*

For delivering liquid samples to a gas chromatograph with the very highest reproducibility and accuracy. The needle holds the entire sample. A tungsten wire plunger is individually fitted to the 0.152mm bore of the stainless steel needle and bottoms at the tip of the needle to discharge the entire sample. A PTFE ferrule contained in the needle hub makes a final seal around the plunger at the base of the needle and is easily tightened to compensate for wear. Needle and plunger may be disassembled for cleaning or replacement.

Capacity, microliter	Needle Length, cm	Needle Gauge	Qty	Order Code
1.0	7	25	1	5929-02
1.0	7	23	1	5929-05
5.0	7	23	1	5929-12



**SYRINGE** *Chromatography, Gas Tight*

Designed for highest performance in such applications as liquid or gas chromatography, handling of corrosive gases and liquids, radioactive materials, and sterile solutions. PTFE-coated plungers with precision PTFE tips for leak-tight seal. Accuracy and reproducibility of  $\pm 1\%$ . With fixed needle.

Capacity, microliter	Qty	Order Code
10	1	5931-01
25	1	5931-03
50	1	5931-02
100	1	5931-04
250	1	5931-06



**Several sizes of this model syringe are available with Luer-Lok tip and Luer-Lok – contact Ace for more information.**

**SYRINGE** *Chromatography, Gas Tight*

Gas tight syringes with removable needle type (RN) and a 3/4-inch length, bevel point style #2 needle; needle gauge is given.

Capacity, microliter	Qty	Order Code
10	1	5933-03
25	1	5933-05
50	1	5933-07
100	1	5933-09
250	1	5933-11
500	1	5933-13


**SYRINGE** *Chromatography, Removable Needle*

Basic microliter syringe with removable needle for precise liquid delivery. The 10 microliter size has a 26-gauge needle, all others have 25-gauge needles, Needle length, 50mm.

Capacity, microliter	Qty	Order Code
10	1	5934-12
25	1	5934-14
50	1	5934-18
100	1	5934-24
250	1	5934-28
500	1	5934-32

**SYRINGE** *Chromatography, Sample Retrieval, Glass Tip ♦*

1mL plastic syringe intended for use in Microscale sample retrieval applications. Syringe features built-in dead space tip plug, safety stop, blue colored plunger and Luer-Lok tip™ for needle connection.

**Note:** Supplied WITHOUT needles.

	Qty	Order Code
<b>All Plastic</b>	25	13675-09

**Needles**

	5	5936-32,-39,-40,-44
	25	13682-12,-15




**NEEDLES Chromatography, Stainless Steel ★**

Sterile, stainless steel syringe needles with inert plastic Luer-Lok hub and regular 12° medical point. Can be sterilized. Supplied 25 needles per package.

Gauge	O.D., in.	I.D., in.	Length, in	Qty	Order Code
20	.035	.023	1-1/2	25	<b>13682-12</b>
22	.028	.016	1-1/2	25	<b>13682-15</b>

Note: 20-gauge needle fits ACE Cat. No. 12684-23, 0.8mm I.D. PTFE Tubing


**NEEDLES Chromatography, 304 Stainless Steel, Standard ★**

Hypodermic stainless steel needles with 12° regular medical point tip and female Luer-Lok hub. Packed 12 needles on card — cellophane wrapped. Each card individually boxed.

Gauge	Length, mm (in)	Qty	Order Code
20	51 (2)	12	<b>13683-23</b>
18	51 (2)	12	<b>13683-29</b>
15	89 (3-1/2)	12	<b>13683-32</b>

**NEEDLES Chromatography, 304 Stainless Steel, Special ★**

Special length stainless steel needles with deflected septum point\* and standard female hub. Packed six per package, two packages per case (specify desired quantity).

Gauge	Length, mm (in)	Pkg. Qty	Case Qty	Order Code
20	152 (6)	6	12	<b>13684-07</b>
20	305 (12)	6	12	<b>13684-11</b>
18	152 (6)	6	12	<b>13684-15</b>
18	305 (12)	6	12	<b>13684-19</b>
18	610 (24)	6	12	<b>13684-23</b>
15	305 (12)	6	12	<b>13684-27</b>
15	610 (24)	6	12	<b>13684-31</b>

\*Deflected septum point is equivalent to B-D Huber or Hamilton Style 1 & 2.

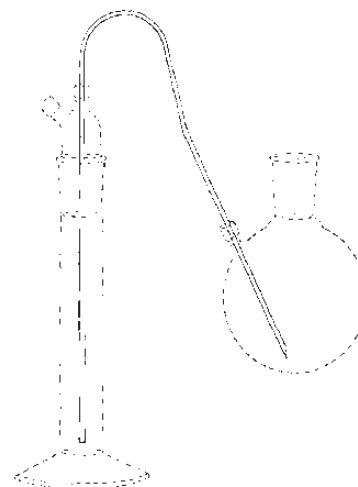
**CANNULA** *Chromatography, Stainless Steel* ★

Available with deflected point at one end and other end blunt or with deflected point on both ends, for septum penetration with a minimum of coring. These long cannula can be bent to avoid tipping reagent bottles which would cause liquid to come in contact with rubber septa. Available individually or in cases.

**Note:** Deflected septum point is equivalent to B-D Huber or Hamilton Style 1 & 2.

Gauge	Length, cm (in)	Needle Ends Deflected-Blunt	Needle Ends Deflected-Deflected
		Order Code	Order Code
22	46 (18)	5938-18	5938-19
22	76 (30)	5938-22	5938-23
22	122 (48)	5938-26	5938-27
18	46 (18)	5938-32	5938-33
18	76 (30)	5938-36	5938-37
18	122 (48)	5938-40	5938-41
15	46 (18)	5938-44	5938-45
15	76 (30)	5938-48	5938-49
15	122 (48)	5938-52	5938-53

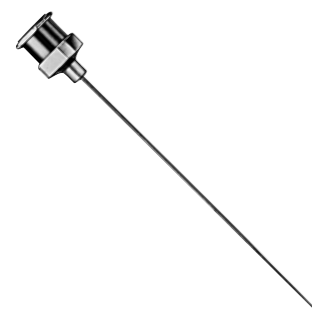
**Easy, convenient transfer  
of materials — liquid or gas**  
• For sampling or aeration


**NEEDLE** *Chromatography, Syringe* ★

Standard hypodermic type needles made from 304 full hard Stainless Steel tubing with chrome-plated brass American standard Luer-Lok taper short hubs. Supplied 50mm (2 inches) long with point style #2 (20° bevel) for septum penetration.

**Note:** Supplied 5 needles per package.

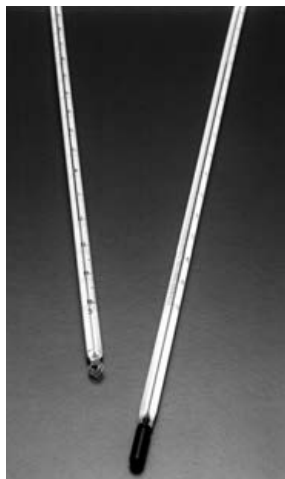
Gauge	O.D., mm	I.D., mm	Pkg. Qty	Order Code
23	0.63	0.32	5	5936-32
19	1.07	0.65	5	5936-39
18	1.27	0.80	5	5936-40
14	2.10	1.60	5	5936-44


**Needle Sizes**

Gauge	O.D. in./mm	I.D. in./mm†	Wall Thickness in./mm	Gauge	O.D. in./mm	I.D. in./mm†	Wall Thickness in./mm
33	.0082/.21	.0042/.11	.002/.05	21	.0323/.82	.0202/.51	.006/.15
32	.0093/.24	.0042/.11	.002/.05	20	.0358/.91	.0237/.60	.006/.15
31	.0103/.26	.0052/.13	.0025/.06	19	.0420/1.07	.0270/.69	.0075/.19
30	.0123/.31	.0062/.16	.003/.08	18	.0500/1.27	.0330/.84	.0085/.22
29	.0133/.34	.0072/.18	.003/.08	17	.0580/1.47	.0420/1.07	.008/.20
28	.0143/.36	.0072/.18	.0035/.09	16	.0650/1.65	.0470/1.19	.009/.23
27	.0163/.41	.0082/.21	.004/.10	15	.0720/1.83	.0540/1.37	.009/.23
26s	.0187/.47	.0050/.13	.007/.18	14	.0830/2.11	.0630/1.60	.010/.25
26	.0183/.46	.0102/.26	.004/.10	13	.0950/2.41	.0710/1.80	.012/.31
25s	.0203/.51	.0060/.15	.007/.18	12	.1090/2.77	.0850/2.16	.012/.31
25	.0203/.51	.0102/.26	.005/.13	11	.1200/3.05	.0940/2.39	.013/.33
24	.0223/.57	.0122/.31	.005/.13	10	.1340/3.40	.1060/2.69	.014/.36
23	.0253/.64	.0133/.34	.006/.15				
22s	.0283/.72	.0060/.15	.011/.28				
22	.0283/.72	.0162/.41	.006/.15				

†mm are nominal

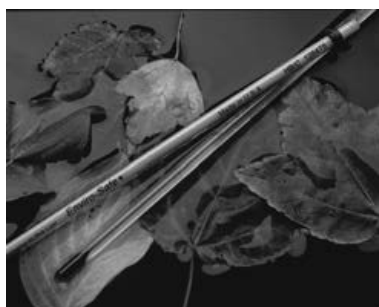
## Non-Mercurial Thermometers *(Spirit Filled)*



### **THERMOMETER** *Low Temperature, Organic Liquid Filled* ♠

Organic liquid filled for use in testing procedures that normally fall below the freezing point of mercury. White back glass supplied in Total or 76mm immersion. Overall length, approximately 30cm, or 12 inches. Meets ANSI/SAMA Z236.1 standard.

Range	Subdivision	Accuracy	Immersion	Qty	Order Code
-50° to 50°C	1°C	±2°C	76 mm	1	<b>8293-03</b>
-50° to 50°C	1°C	±2°C	Total	1	<b>8293-04</b>
-20° to 150°C	1°C	±1°C	76 mm	1	<b>8293-05</b>
-100° to 50°C	1°C	±2°C	76 mm	1	<b>8293-06</b>
-100° to 50°C	1°C	±2°C	Total	1	<b>8293-07</b>
-200° to 30°C	1°C	±2°C	Total	1	<b>8293-09</b>
-20° to 150°C	1°C	±1°C	76 mm	1	<b>8293-11</b>



### **THERMOMETER** *Organic Liquid Filled, Yellow Back* ♠

Enviro-Safe® lab-grade thermometers, filled with organic green liquid. Liquid is safer since it avoids the potential hazards of mercury thermometers. Made from lead-free glass. Comes with N.I.S.T.-traceable statement of accuracy.

Range	Subdivision	Accuracy	Length, in	Immersion	Qty	Order Code
-10° to 110°C	1°C	±1°C	8	50 mm	1	<b>8294-01</b>
-20° to 110°C	1°C	±1°C	12	76 mm	1	<b>8294-04</b>
-20° to 110°C	1°C	±1°C	12	Total	1	<b>8294-05</b>
-10° to 150°C	1°C	±1°C	8	50 mm	1	<b>8294-06</b>
-20° to 150°C	1°C	±1°C	12	76 mm	1	<b>8294-10</b>
-20° to 150°C	1°C	±1°C	12	Total	1	<b>8294-11</b>
-10° to 200°C	1°C	±1°C	14	76mm	1	<b>8294-14</b>
-10° to 200°C	1°C	±1°C	14	Total	1	<b>8294-15</b>
20° to 300°F	2°F	±2°F	8	50 mm	1	<b>8294-16</b>
0° to 230°F	2°F	±2°F	12	76mm	1	<b>8294-33</b>
0° to 230°F	2°F	±2°F	12	Total	1	<b>8294-34</b>
0° to 300°F	2°F	±2°F	12	Total	1	<b>8294-38</b>



### **THERMOMETER** §, *Organic Liquid Filled, White Back* ♠

Organic (red) liquid filled, partial immersion thermometers that avoid the potential hazards of mercury thermometers. Accurate to N.I.S.T. tolerances. Individually serialized. With § 10/30 joint and top suspension ring. 12-inch length.

Range: (°C) -10 to +150			Range: (°C) -10 to +250		
Immersion, mm	Qty	Order Code	Immersion, mm	Qty	Order Code
25	1	<b>8314-14</b>	25	1	<b>8314-28</b>
50	1	<b>8314-15</b>	50	1	<b>8314-29</b>
75	1	<b>8314-16</b>	75	1	<b>8314-30</b>
150	1	<b>8314-19</b>	100	1	<b>8314-31</b>
			125	1	<b>8314-32</b>

## Non-Mercurial Thermometers *(Spirit Filled)*

### Thermometers *Safety PFA coated* ♠

Double-safe, thermometers are the same as our Enviro-safe thermometers except with PFA coating. Black liquid filled, yellow back lead free glass. In the event of breakage, the material is contained by the PFA until it can be safely disposed of. Individually serialized and N.I.S.T. traceable.

Range	Division	Accuracy	Immersion	Length, in		Qty	Order Code
-10° to 150°C	1°C	±1°C, ±1.5°C above 110°C	50mm	8	1	1	<b>8283-03</b>
-10° to 150°C	1°C	±1°C, ±1.5°C above 110°C	Total	8	1	1	<b>8283-04</b>
-20° to 150°C	1°C	±1°C, ±1.5°C above 110°C	76mm	12	1	1	<b>8283-10</b>
-20° to 150°C	1°C	±1°C, ±1.5°C above 110°C	Total	12	1	1	<b>8283-11</b>
0° to 230°F	2°F	±2°F	76 mm	12	1	1	<b>8283-15</b>
0° to 230°F	2°F	±2°F	Total	12	1	1	<b>8283-16</b>



### Thermometers *ANSI/SAMA Fractional Degree* ♠

These thermometers feature fractional degree divisions. They are red spirit filled with white backed glass and permanent fused markings. Meet ANSI/SAMA Z236.1 – 1983 standards.

Range	Division	Accuracy	Immersion	Length, in		Qty	Order Code
-1°C to 51°C	0.1	+/- full scale	76mm	18	1	1	<b>8360-01</b>
-1°C to 101°C	0.1	+/- full scale	76mm	24	1	1	<b>8360-04</b>
-1°C to 201°C	0.2	+/- 0.4°C	Total	24	1	1	<b>8360-06</b>



### Thermometers ♠

Replacement spirit-filled thermometers for kits. Thermometers only. Eight inches in length.

Range	Div	Accuracy	Immersion	Qty	Order Code
-10°C to 150°C	1°C	1°C	50mm	1	<b>9548-13</b>
20°F to 300°F	2°F	2°F	50mm	1	<b>9548-16</b>



### Thermometer Storage Tray ★

A tidy and practical way to keep thermometers handy and organized. Features an inclined angle that helps prevent separation of thermometer liquid, especially useful with red liquid thermometers. Made of Polystyrene with numbered slots. Sold in sets of six.

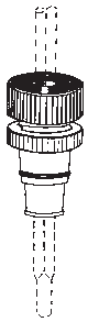
Size	Dimensions, in	Number of Sets	Order Code
Three Slots	4 x 17 x 1.25	6	<b>13708-12</b>




**ADAPTER Thermometer, 10/20** ♠

Made of PTFE with nylon knurled nut to adapt standard chemical thermometers up to 6mm O.D. For use in 10/18 or 10/30 joints. Simple to use: insert thermometer to desired depth, tighten nut.

Qty	Order Code
1	8299-10


**ADAPTER Thermometer, PTFE** ♠

PTFE adapter with FETFE O-Ring for use with plain stem thermometers, gas inlet tubes, etc. O-Ring compression seal allows adjustable depth positioning. 10/18 size will accommodate tubes up to 6.5mm, all other sizes up to 7mm. All sizes have one internal O-Ring size -108 (7855-11); except for 10/18 size, all other sizes have one external O-Ring seal.

10/18	14/20	19/22	24/25	29/26
External O-Ring Size: —	External O-Ring Size: -013	External O-Ring Size: -015	External O-Ring Size: -018	External O-Ring Size: -022
Qty: 1	Qty: 1	Qty: 1	Qty: 1	Qty: 1
Order Code: 8300-05	Order Code: 8300-07	Order Code: 8300-09	Order Code: 8300-16	Order Code: 8300-21

**THERMOCOUPLE** ♠


Type "J" 24-gauge iron constantan thermocouple wire with PTFE insulation. Supplied in 1.8 meter lengths.

Qty	Order Code
1.8 meter length	12109-07


**THERMOMETER Digital, Pocket** ★

Economical type "J" thermocouple pocket thermometer with digital readout. Supplied with three-foot, double PTFE insulated, free-beaded thermocouple sensor and ON-OFF switch. Back of case has magnet for mounting. Optional sheathed thermocouples, listed below, are available.

**Features:**

- Accuracy:  $\pm 0.3\%$  of span  $\pm 1$  Digit
- Range:  $-40$  to  $700^{\circ}\text{C}$
- Resolution:  $1^{\circ}\text{C}$
- Cold junction compensation:  $\pm 0.05^{\circ}\text{C}/^{\circ}\text{C}$
- Ambient temperature:  $0-40^{\circ}\text{C}$
- Battery: (1) 9V approx. 100 hr. alkaline
- Measures: 3 W x 2-3/8 H x 1-1/8 D (Inches)
- Weight: 5.1ozs.

Order Code
8319-21

**Additional Parts**

	Qty	Order Code
Sensor, Type "J" Thermocouple, 12.5 in. long x 1/4 in. O.D. Stainless Steel Sheath, 6-ft. lead to plug	1	12110-15
Sensor, Type "J" Thermocouple 4 in. long x 3/16 in. O.D. Stainless Steel Sheath, 6-ft. lead to plug	1	12110-17
Sensor, Type "J" Thermocouple without sheath, double PTFE insulated, 10-ft. long with plug	1	12110-25
Glass sheath only, 12.5 in. long x 7mm O.D. (5mm I.D.)	1	12103-22

## Laboratory Glassware Safety Tips

### *...Safe Handling of Glassware*



#### Inspection

- Always inspect glass for scratches, abrasions, cracks or chips before using or cleaning.
- Safely dispose of any damaged glass.
- Inspect glass routinely for strain with a polariscope.

#### Washing/Cleaning

- Always inspect glass for chips and fractures prior to cleaning, especially any solvent or acid cleaning.
- Use Alconox or similar type detergents.
- Avoid HF, strong alkalis or abrasive cleaners.
- Distilled water rinse.

#### Storage

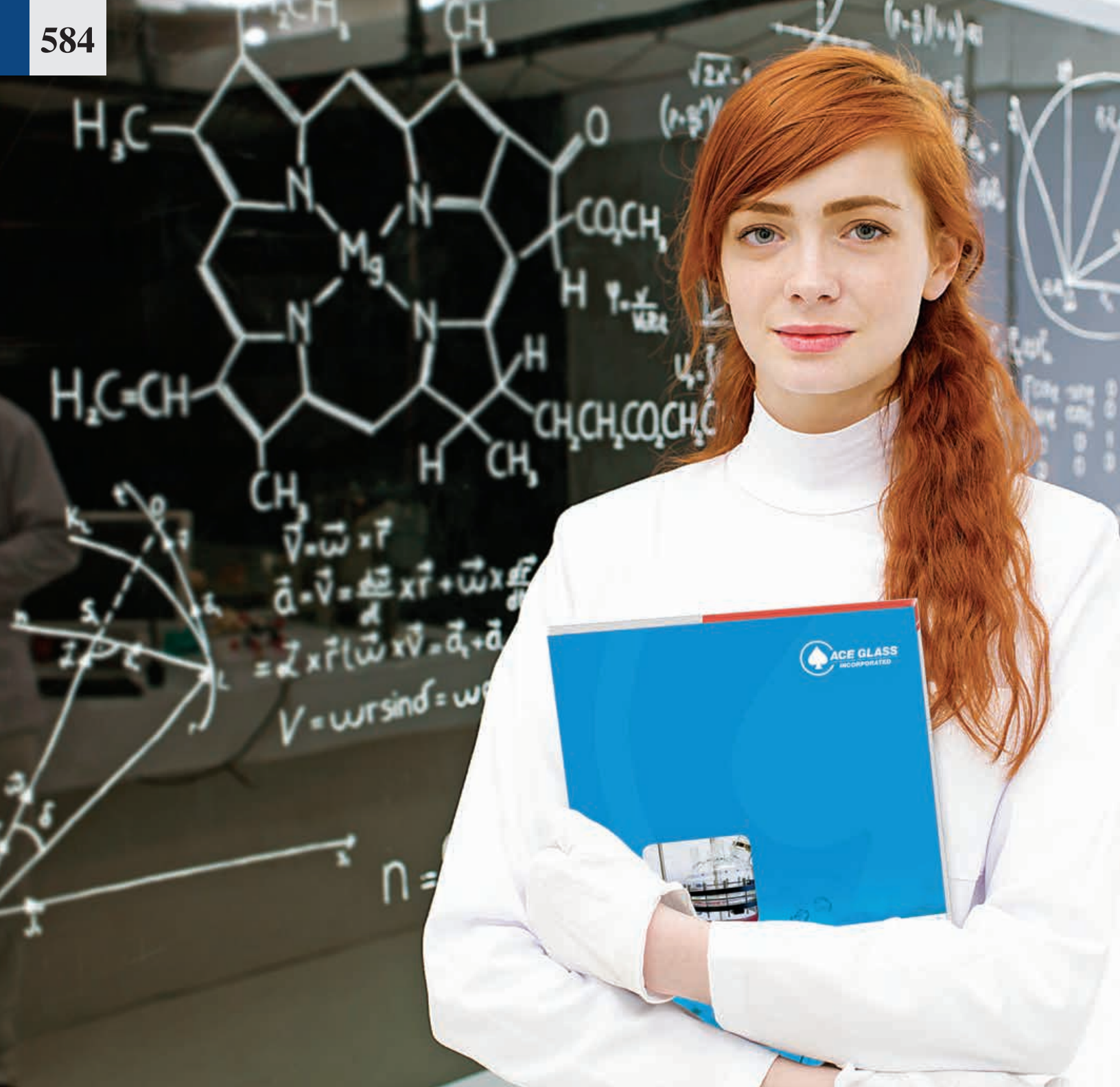
- Store glass in a manner to avoid vessels bumping each other.

#### Temperature, *Borosilicate Glass*

- Standard use limit — 240°C.
- Maximum short-term use — 490°C.
- Avoid rapid temperature changes or rapid thermal shock.

#### Heating Glass

- Heat with mantles, Instatherm®, heat tapes, guns or immersion heaters.
- Avoid direct flame as much as possible.
- Standard temperature limit for borosilicate glass is 240°C.



Find all of our reactor systems, parts and accessories in the *Process Scale-Up Catalog*.

Contact your local Sales Representative today.



## Temperature Controller Quick Guide

Model	Order Code	Temp Range (C°)	Resolution (C°)	Voltage	Amps	Watts	Thermocouple/Included	Timer	Number of Outlets / Voltage
<b>ACE Econo</b>	12125-14	0 to 800	0.1	120	15	1800	J / No	N	1 / 120
	12125-16	-200 to 250	0.1	120	15	1800	T / No	N	1 / 120
	12125-18	-50 to 1200	0.1	120	15	1800	K / No	N	1 / 120
	12125-32	0 to 800	0.1	120	15	1800	J / Yes	N	1 / 120
<b>J-Kem 150</b>	12322-04	-200 to 250	0.1	120	10	1200	T / No	N	1 / 120
	12322-06	0 to 800	0.1	120	10	1200	J / No	N	1 / 120
	12322-08	-50 to 1200	0.1	120	10	1200	K / No	N	1 / 120
	12322-21	-200 to 250	0.1	120	10	1200	T / Yes	N	1 / 120
	12322-23	0 to 800	0.1	120	10	1200	J / Yes	N	1 / 120
	12322-25	-50 to 1200	0.1	120	10	1200	K / Yes	N	1 / 120
	12321-05	-200 to 250	0.1	120	10	1200	T / No	Y-100HR	1 / 120
<b>J-Kem 150/T</b>	12321-07	0 to 800	0.1	120	10	1200	J / No	Y	1 / 120
	12321-09	-50 to 1200	0.1	120	10	1200	K / No	Y	1 / 120
	12321-25	-200 to 250	0.1	120	10	1200	T / Yes	Y	1 / 120
	12321-27	0 to 800	0.1	120	10	1200	J / Yes	Y	1 / 120
	12321-29	-50 to 1200	0.1	120	10	1200	K / Yes	Y	1 / 120
	12325-02	-200 to 250	0.1	120	10	1200	T / No	N	1 / 120
<b>J-Kem 210</b>	12325-04	0 to 800	0.1	120	10	1200	J / No	N	1 / 120
	12325-06	-50 to 1200	0.1	120	10	1200	K / No	N	1 / 120
	12325-08	-200 to 400	0.1	120	10	1200	RTD / No	N	1 / 120
	12325-22	-200 to 250	0.1	120	10	1200	T / Yes	N	1 / 120
	12325-24	0 to 800	0.1	120	10	1200	J / Yes	N	1 / 120
	12325-26	-50 to 1200	0.1	120	10	1200	K / Yes	N	1 / 120
	12325-28	-200 to 400	0.1	120	10	1200	RTD / Yes	N	1 / 120
	12325-33	-200 to 250	0.1	230-CE	10	1200	T / Yes	N	1 / 230
<b>J-Kem 310</b>	12325-35	0 to 800	0.1	230-CE	10	1200	J / Yes	N	1 / 230
	12325-37	-50 to 1200	0.1	230-CE	10	1200	K / Yes	N	1 / 230
	12325-39	-200 to 400	0.1	230-CE	10	1200	RTD / Yes	N	1 / 230
	12326-01	-200 to 250	0.1	120	10	1200	T / No	Y-100HR	1 / 120
<b>J-Kem 210/T</b>	12326-03	0 to 800	0.1	120	10	1200	J / No	Y	1 / 120
	12326-05	-50 to 1200	0.1	120	10	1200	K / No	Y	1 / 120
	12326-07	-200 to 400	0.1	120	10	1200	RTD / No	Y	1 / 120
	12326-23	-200 to 250	0.1	120	10	1200	T / Yes	Y	1 / 120
	12326-25	0 to 800	0.1	120	10	1200	J / Yes	Y	1 / 120
	12326-26	-50 to 1200	0.1	120	10	1200	K / Yes	Y	1 / 120
	12326-27	-200 to 400	0.1	120	10	1200	RTD / Yes	Y	1 / 120
	12319-01	-200 to 250	0.1	120	15	1800	T / No	N	3 / 120
<b>J-Kem 250</b>	12319-03	0 to 800	0.1	120	15	1800	J / No	N	3 / 120
	12319-05	-50 to 1200	0.1	120	15	1800	K / No	N	3 / 120
	12319-07	-200 to 400	0.1	120	15	1800	RTD / No	N	3 / 120
	12319-25	-200 to 250	0.1	120	15	1800	T / Yes	N	3 / 120
	12319-27	0 to 800	0.1	120	15	1800	J / Yes	N	3 / 120
	12319-29	-50 to 1200	0.1	120	15	1800	K / Yes	N	3 / 120
	12319-31	-200 to 400	0.1	120	15	1800	RTD / Yes	N	3 / 120
	12318-01	0 to 800	0.1	120	15	1800	J / No	Y-100Hr	2 / 120
<b>J-Kem 260T</b>	12318-03	-50 to 1200	0.1	120	15	1800	K / No	Y	2 / 120
	12318-05	-200 to 250	0.1	120	15	1800	T / No	Y	2 / 120
	12318-07	-200 to 400	0.1	120	15	1800	RTD / No	Y	2 / 120
	12318-21	0 to 800	0.1	120	15	1800	J / Yes	Y	2 / 120
	12318-23	-50 to 1200	0.1	120	15	1800	K / Yes	Y	2 / 120
	12318-25	-200 to 250	0.1	120	15	1800	T / Yes	Y	2 / 120
	12318-27	-200 to 400	0.1	120	15	1800	RTD / Yes	Y	2 / 120
<b>J-Kem 360T</b>	12318-33	0 to 800	0.1	230-CE	15	1800	J / Yes	Y-100Hr	2 / 230
	12318-35	-50 to 1200	0.1	230-CE	15	1800	K / Yes	Y	2 / 230
	12318-37	-200 to 250	0.1	230-CE	15	1800	T / Yes	Y	2 / 230
	12318-39	-200 to 400	0.1	230-CE	15	1800	RTD / Yes	Y	2 / 230

## Temperature Controller Quick Guide

Model	Order Code	Temp Range (C°)	Resolution (C°)	Voltage	Amps	Watts	Thermo-Couple/Included	Timer	Number of Outlets / Voltage
<b>J-Kem 270</b>	12316-04	-200 to 250	0.1	120	15	1800	T / No	N	2 / 120
	12316-06	0 to 800	0.1	120	15	1800	J / No	N	2 / 120
	12316-08	-50 to 1200	0.1	120	15	1800	K / No	N	2 / 120
	12316-24	-200 to 250	0.1	120	15	1800	T / Yes (2)	N	2 / 120
	12316-26	0 to 800	0.1	120	15	1800	J / Yes (2)	N	2 / 120
	12316-28	-50 to 1200	0.1	120	15	1800	K / Yes (2)	N	2 / 120
<b>J-Kem Apollo</b>	12312-03	-200 to 250	0.1	120	15	1800	T / No	Y-100Hr	2 / 120
	12312-05	0 to 800	0.1	120	15	1800	J / No	Y	2 / 120
	12312-07	-50 to 1200	0.1	120	15	1800	K / No	Y	2 / 120
	12312-09	-200 to 400	0.1	120	15	1800	RTD / No	Y	2 / 120
	12312-23	-200 to 250	0.1	120	15	1800	T / Yes (2)	Y	2 / 120
	12312-25	0 to 800	0.1	120	15	1800	J / Yes (2)	Y	2 / 120
	12312-27	-50 to 1200	0.1	120	15	1800	K / Yes (2)	Y	2 / 120
	12312-29	-200 to 400	0.1	120	15	1800	RTD / Yes (2)	Y	2 / 120
	12314-05	-200 to 250	0.1	120	15	1800	T / No	N	4 / 120
<b>J-Kem Quad</b>	12314-07	0 to 800	0.1	120	15	1800	J / No	N	4 / 120
	12314-09	-50 to 1200	0.1	120	15	1800	K / No	N	4 / 120
	12314-11	-200 to 400	0.1	120	15	1800	RTD / No	N	4 / 120
	12314-20	-200 to 250	0.1	120	15	1800	T / Yes (4)	N	4 / 120
	12314-22	0 to 800	0.1	120	15	1800	J / Yes (4)	N	4 / 120
	12314-24	-50 to 1200	0.1	120	15	1800	K / Yes (4)	N	4 / 120
	12314-26	-200 to 400	0.1	120	15	1800	RTD / Yes (4)	N	4 / 120
	12317-30	-200 to 250	0.1	110-120	130	3600	T / No	Y-100Hr	4 / 120
<b>J-Kem HCC</b>	12317-34	0 to 800	0.1	110-120	130	3600	J / No	Y	4 / 120
	12317-38	-50 to 1200	0.1	110-120	130	3600	K / No	Y	4 / 120
<b>J-Kem 410</b>	12324-08	-200 to 250	0.1	120	10	1200	T / No	N	1 / 120
	12324-10	0 to 800	0.1	120	10	1200	J / No	N	1 / 120
	12324-12	-50 to 1200	0.1	120	10	1200	K / No	N	1 / 120
	12324-14	-200 to 400	0.1	120	10	1200	RTD / No	N	1 / 120
	12324-23	-200 to 250	0.1	120	10	1200	T / Yes	N	1 / 120
	12324-25	0 to 800	0.1	120	10	1200	J / Yes	N	1 / 120
	12324-27	-50 to 1200	0.1	120	10	1200	K / Yes	N	1 / 120
	12324-29	-200 to 400	0.1	120	10	1200	RTD / Yes	N	1 / 120

**THE SAFEST HEATING METHOD...**

# ACE INSTATHERM<sup>®</sup>

## FOR GLASS VESSELS

- Eliminate the need for heating tape, immersion heaters and heating mantles.
- Can be added to custom orders!



## TEMPERATURE CONTROLLER *J-Kem Model 150, Economy*

An ideal controller for applications that don't require the precise regulation of 200 Series controllers. This compact unit features 1200 watts of power, sufficient for heating 5L mantles, many ovens, and other devices. Ramp-to-Set Point feature is standard. USB port, data logging and control software is optional.

2.5 x 3.75 x 5.25 (Inches, HxWxD) / 120vac, 10 amps, 1200 watts

J-Kem Model	With Sensor Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
150-T	No	-200 to 250	T	1	12322-04
150-J	No	0 to 800	J	1	12322-06
150-K	No	-50 to 1200	K	1	12322-08
150-T-S	Yes	-200 to 250	T	1	12322-21
150-J-S	Yes	0 to 800	J	1	12322-23
150-K-S	Yes	-50 to 1200	K	1	12322-25



## TEMPERATURE CONTROLLER *J-Kem Model 150/Timer, Economy*

Same power and versatility as the Model 150, but with a 100-hour digital timer to turn heating ON or OFF at a user-specified time.

2.5 x 4.75 x 5.5 (Inches, HxWxD) / 120vac, 10 amps, 1200 watts

J-Kem Model	With Sensor Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
150/Timer-T	No	-200 to 250	T	1	12321-05
150/Timer-J	No	0 to 800	J	1	12321-07
150/Timer-K	No	-50 to 1200	K	1	12321-09
150/Timer-T-S	Yes	-200 to 250	T	1	12321-25
150/Timer-J-S	Yes	0 to 800	J	1	12321-27
150/Timer-K-S	Yes	-50 to 1200	K	1	12321-29



## TEMPERATURE CONTROLLER *J-Kem Model 210, Single Channel*

The Model 210 is our most compact research grade controller, yet packed with 1200 watts of power. Sufficient for heating mantles up to 5L in size, as well as, most laboratory ovens, hot plates, reaction blocks and other heaters. Comes complete with USB port, data logging and control software. Power control computer provides 0.1°C regulation of anything.

3.25 x 5.25 x 7.25 (Inches, HxWxD) / 10 amps, 1200 watts, 110 VAC

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
210-T	No	-200 to 250	T	1	12325-02
210-J	No	0 to 800	J	1	12325-04
210-K	No	-50 to 1200	K	1	12325-06
210-T-S	Yes	-200 to 250	T	1	12325-22
210-J-S	Yes	0 to 800	J	1	12325-24
210-K-S	Yes	-50 to 1200	K	1	12325-26



## TEMPERATURE CONTROLLER *J-Kem Model 310, Single Channel*

230VAC, CE-marked version of Model 210, above.

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
310-T-S	Yes	-200 to 250	T	1	12325-33
310-J-S	Yes	0 to 800	J	1	12325-35
310-K-S	Yes	-50 to 1200	K	1	12325-37



CE

### TEMPERATURE CONTROLLER *J-Kem Model 210/Timer, Single Channel*

Same power and versatility as the Model 210, above, but also contains a 100-hour digital timer to turn heating OFF or ON at a user-specified time. A new safety feature automatically disconnects power from the heater following recovery from a power failure. Comes complete with USB port, data logging and control software. Power control computer provides 0.1°C regulation of anything.

3.5 x 6.75 x 6 (Inches, HxWxD) / 120vac, 10 amps, 1200 watts.

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
210/Timer-T	No	-200 to 250	T	1	<b>12326-01</b>
210/Timer-J	No	0 to 800	J	1	<b>12326-03</b>
210/Timer-K	No	-50 to 1200	K	1	<b>12326-05</b>
210/Timer-T-S	Yes	-200 to 250	T	1	<b>12326-23</b>
210/Timer-J-S	Yes	0 to 800	J	1	<b>12326-25</b>
210/Timer-K-S	Yes	-50 to 1200	K	1	<b>12326-26</b>



CE

### TEMPERATURE CONTROLLER *J-Kem Model 250, Single Channel*

The Model 250 has both heating and cooling outlets for maximum versatility. Two heating outlets supply 1800 watts of power for large equipment and heating mantles up to 22L. The third outlet, also 1800 watts and normally used for cooling, is programmable to provide power above, below, or at the set point. Comes complete with USB port, data logging and control software. Power control computer provides 0.1°C regulation of anything.

3.5 x 7.75 x 9.25 (Inches, HxWxD) / 120vac, 15 amps, 1800 watts.

J-Kem Model	With Sensor Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
250-T	No	-200 to 250	T	1	<b>12319-01</b>
250-J	No	0 to 800	J	1	<b>12319-03</b>
250-K	No	-50 to 1200	K	1	<b>12319-05</b>
250-T-S	Yes	-200 to 250	T	1	<b>12319-25</b>
250-J-S	Yes	0 to 800	J	1	<b>12319-27</b>
250-K-S	Yes	-50 to 1200	K	1	<b>12319-29</b>



CE

### TEMPERATURE CONTROLLER *J-Kem Model 260/Timer, Single Channel*

The Model 260/Timer disconnects output power if the process temp exceeds the setpoint by a user specified amount or following a recovery from a power failure. Over temp is signaled by both a lamp and an audible alarm. Features a 100 hour timer, two power outlets and 0.1°C regulation of anything. NIST traceable, USB port, free data logging and control software.

3.5 x 7.75 x 9.25 (Inches, HxWxD) / 15 amps, 1800 watts, 120 VAC.

J-Kem Model	With Sensor Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
260/Timer-J	No	0 to 800	J	1	<b>12318-01</b>
260/Timer-K	No	-50 to 1200	K	1	<b>12318-03</b>
260/Timer-T	No	-200 to 250	T	1	<b>12318-05</b>
260/Timer-J-S	Yes	0 to 800	J	1	<b>12318-21</b>
260/Timer-K-S	Yes	-50 to 1200	K	1	<b>12318-23</b>
260/Timer-T-S	Yes	-200 to 250	T	1	<b>12318-25</b>

## TEMPERATURE CONTROLLER *J-Kem Apollo Series, Dual Channel*

Has two independent temperature controllers in one cabinet. Each channel has 1200 watts of power, independent LED display and an over-temp protection circuit. Additionally, both channels have a 100 hour timer. Contains J-Kem's power control computer which provides 0.1°C regulation of anything. NIST traceable, USB port, free data-logging and control software. Power: 120vac, 15 amps, 1800 watts total, 1200 watts per channel. 2 year mfg's warranty. Kit units (-S suffix models) include 2 sets of thermocouples, cord and adapter. Dual SMP/OST.

4 x 8 x 9 (Inches, HxWxD) / 120vac, 15 amps, 1800 watts total / 1200 watts max. per channel

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
Apollo-T	No	-200 to 250	T	1	12312-03
Apollo-J	No	0 to 800	J	1	12312-05
Apollo-K	No	-50 to 1200	K	1	12312-07
Apollo-T-S	Two of each	-200 to 250	T	1	12312-23
Apollo-J-S	Two of each	0 to 800	J	1	12312-25
Apollo-K-S	Two of each	-50 to 1200	K	1	12312-27

*The Apollo Series units noted above each come with two thermocouple sensors, two cords and two adapters.*



## TEMPERATURE CONTROLLER *J-Kem Gemini Series, Dual Channel*

Two independent temperature controllers in one cabinet. Each channel has 1200 watts of power, independent LED display and an over-temp protection circuit. Additionally, channel 1 features a 100 hour timer. Contains J-Kem's power control computer which provides 0.1°C regulation of anything. NIST traceable, USB port, free data-logging and control software. Power: 120/230v, 15 amps, 1800 watts total, 1200 watts per channel. 2 year mfg's warranty. Kit units (-S suffix models) include 2 sets of thermocouples, cord and adapter. Dual SMP/OST.

3.5 x 7.75 x 9.25 (Inches, HxWxD) / 120vac, 15 amps, 1800 watts total / 1200 watts max. per channel

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
Gemini-T	No	-200 to 250	T	1	12310-04
Gemini-J	No	0 to 800	J	1	12310-06
Gemini-K	No	-50 to 1200	K	1	12310-08
Gemini-T-S	Two of each	-200 to 250	T	1	12310-25
Gemini-J-S	Two of each	0 to 800	J	1	12310-27
Gemini-K-S	Two of each	-50 to 1200	K	1	12310-29
Gemini-CE-T-S	Two of each	-200 to 250	T	1	12310-33
Gemini-CE-J-S	Two of each	0 to 800	J	1	12310-35
Gemini-CE-K-S	Two of each	-50 to 1200	K	1	12310-37

*The Gemini Series units noted above each come with two thermocouple sensors, two cords and two adapters.*



## TEMPERATURE CONTROLLER *J-Kem Quad Series, Four Channel*

The Quad is your solution when bench space is at a premium — the Quad packs four independent temperature controllers into a single unit! Each of the four controller channels has 1200 watts of power, an independent display, and an over-temperature protection circuit.

5.25 x 7 x 7.5 (Inches, HxWxD) / 120vac, 15 amps, 1800 watts total / 1200 watts max. per channel

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
Quad-T	No	-200 to 250	T	1	12314-05
Quad-J	No	0 to 800	J	1	12314-07
Quad-K	No	-50 to 1200	K	1	12314-09
Quad-T-S	Four of each	-200 to 250	T	1	12314-20
Quad-J-S	Four of each	0 to 800	J	1	12314-22
Quad-K-S	Four of each	-50 to 1200	K	1	12314-24

*The Quad Series units noted above each come with four thermocouple sensors, four cords and four adapters.*





CE

### TEMPERATURE CONTROLLER J-Kem Model 270, High Safety

Designed for processes requiring uncompromising safety. This controller features a built-in, independent backup controller to guard against heating accidents resulting from equipment failure. The desired temperature is entered into the main temperature controller, which regulates heating, and then a high-temperature cut-off is entered into the backup limit controller. If the reaction reaches the high-temperature limit, or if a thermocouple should break, power is turned off to the heater until the controller is manually reset. Both meters independently monitor the reaction temperature. In the event that one meter fails, the other takes over to prevent a heating accident. Provides 100% redundant control.

3.75 x 7.75 x 9.25 (Inches, HxWxD) / 120vac, 15 amps, 1800W total, 1200W max. per channel

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
270-T	No	-200 to 250	T	1	<b>12316-04</b>
270-J	No	0 to 800	J	1	<b>12316-06</b>
270-K	No	-50 to 1200	K	1	<b>12316-08</b>
270-T-S	Two of each	-200 to 250	T	1	<b>12316-24</b>
270-J-S	Two of each	0 to 800	J	1	<b>12316-26</b>
270-K-S	Two of each	-50 to 1200	K	1	<b>12316-28</b>

*The Model 270 Series units noted above each come with two thermocouple sensors, two cords and two adapters.*



CE

### TEMPERATURE CONTROLLER J-Kem Model HCC, High Power

The HCC line of controllers are designed to power large-scale equipment with volumes up to 100 liters. Built with the same commitment to safety as our 12316 controller, the HCC Series features a built-in, independent backup controller to guard against heating accidents resulting from equipment failure. The desired temperature is entered into the main temperature controller, which regulates heating, and then a high-temperature cut-off is entered into the backup limit controller. If the reaction reaches the high-temperature limit, or if a thermocouple should break, power is turned off to the heater until the controller is manually reset. Both meters independently monitor the reaction temperature. In the event that one meter fails, the other takes over to prevent a heating accident. Provides 100% redundant control. These high-power controllers also incorporate a 100-hour timer to turn heating ON or OFF at a user-specified time. Comes complete with USB port, data logging and control software. Power control computer provides 0.1°C regulation of anything. A 230VAC, CE-approved model is also available via special order.

**Note:** Requires 12184 sensor (not included) for operation.

5.5 x 12 x 12.5 (Inches, HxWxD) / 110-120vac, 30 amps, 3600 watts

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
HCC-130-T	No	-200 to 250	T	1	<b>12317-30</b>
HCC-130-J	No	0 to 800	J	1	<b>12317-34</b>
HCC-130-K	No	-50 to 1200	K	1	<b>12317-38</b>



CE

### TEMPERATURE CONTROLLER J-Kem Model 410, For Instatherm

The Model 410 is designed for heaters that cannot be operated at 120VAC. This makes the unit perfect for use with many of our Ace Instatherm® oil baths. Maximum output voltage of the Model 410 is selected using the power output knob on the front of the controller. Selectable output voltage limit provides precise power and temperature control while protecting low voltage heaters. Comes complete with USB port, data logging and control software. Power control computer provides 0.1°C regulation of anything.

3.25 x 5.25 x 7.25 (Inches, HxWxD) / 10, 20, 40, 60, 120 vac, 10 amps, 1200 watts

J-Kem Model	With Sensor, Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
410-T	No	-200 to 250	T	1	<b>12324-08</b>
410-J	No	0 to 800	J	1	<b>12324-10</b>
410-K	No	-50 to 1200	K	1	<b>12324-12</b>
410-T-S	Yes	-200 to 250	T	1	<b>12324-23</b>
410-J-S	Yes	0 to 800	J	1	<b>12324-25</b>
410-K-S	Yes	-50 to 1200	K	1	<b>12324-27</b>

## LAB SAFETY CONTROLLER *J-Kem Model LS-120*

Lab safety controller by J-Kem combines all the features of the digital temperature monitor and the water-flow monitor into a single versatile instrument. Plug any piece of equipment into the monitor, then if the water flow rate falls below the set level, or if the reaction temperature goes above or below the user set limits, the outlet power turns off automatically. The unit will also cut off power if the main power is interrupted, thus requiring the controller to be reset. See Ace 12168 product family for flow sensors.

J-Kem Model	With Sensor Cord and Adapter	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
LS-120-T	No	-200 to 250	T	1	12167-01
LS-120-J	No	0 to 800	J	1	12167-03
LS-120-K	No	-50 to 1200	K	1	12167-05



## WATER FLOW MONITOR *J-Kem Model WFM-120*

J-Kem monitor precisely measures the flow of water through a condenser, bath or a photochemical reactor. Upon interruption, or if the flow drops below an operator set rate, power to the monitored equipment is cutoff. Manual power reset. Inclusion of a 12168-10 shut-off valve and either a 12169-01 audible alarm or a 12169-05 digital alarm is recommended.

J-Kem Model	Description	Flow Rate, LPM	Qty	Order Code
WFM-01	Flow Sensor	0.1 to 2.5	1	12168-01
WFM-02	Flow Sensor	1 to 10	1	12168-02
WFM-03	Flow Sensor	2 to 30	1	12168-03
—	Shut-Off Valve	—	1	12168-10
WFM-120	Water Flow Monitor	—	1	12168-120



## ALARM *J-Kem*

Digital alarm outlet and audible alarm accessories for J-Kem safety controller and water-flow monitors. Allows 12167 and 12168 units to be set up for alarm warnings when in unsafe conditions. The audible alarm sounds during low or no water conditions for the 12168 monitor and the digital alarm activates on either the water flow monitor or the safety controller when conditions are out of set ranges.

J-Kem Model	Alarm Type	For Controllers	Qty	Order Code
WFM-AA	Digital	12167 & 12168	1	12169-01
WFM-OC	Audible	12168	1	12169-05

## INSTATHERM BATH KIT *Ace/J-Kem*

Consists of one each 9601-14 and 9601-16 bath, plus one 12324-25 digital temperature controller with one "J" Type temperature sensor and controller cord. 120V.

Qty	Order Code
1	9601-355




**DIGITAL TEMPERATURE MONITOR** *J-Kem*

Monitors and displays the temperature of an attached piece of equipment on a bright LED display. Built-in USB port and free data logging software allows remote temperature monitoring, and provides a GMP, GLP compliant temperature history. Audible digital alarm available as an option. 230VAC versions are CE marked.

2.5 x 4.75 x 5.5 (Inches, HxWxD) / 50 watts, 120VAC or 230VAC, USB 2.0

J-Kem Model	Temperature Range (°C)	Thermocouple Type	Qty	Order Code
<b>120VAC Model</b>				
DM120-T	-200 to 250	T	1	<b>12327-03</b>
DM120-J	0 to 800	J	1	<b>12327-05</b>
DM120-K	-50 to 1200	K	1	<b>12327-07</b>
<b>230VAC Model</b>				
DM230-T	-200 to 250	T	1	<b>12327-33</b>
DM230-J	0 to 800	J	1	<b>12327-35</b>
DM230-K	-50 to 1200	K	1	<b>12327-37</b>


**TIMER/CONTROL** *Repeat Cycle, Electronic* ★

Repeat cycle timer control, bench top or rack mountable (has clamp for up to 3/4-inch rod), for regulating reflux ratio on distillation heads. Maximum ON/OFF time setting is 0.1 to 6000 seconds. Solid state relay and micro-processor-based timer control with back lite LCD display. Red output indicator LED. Output: 120v, 10A max., 50/60 Hz or 220v, 10A max., 50/60 Hz. Features include: Front toggle main power switch, Rear mounted, fast acting, solid state 10A fuse, Input/Output Power Rating: 120V, 10A Max., 50/60 Hz., Rear-mounted power outlet, Front, Run/Standby-Set switch, Four-digit adjust buttons. Comes with conditional 24-month warranty.

Supplied with side bar (removable) for mounting to 1/2-inch rod, 6' grounded neoprene line cord with NEMA plug and operating instructions on case. Light grey case with black front panel measures 114.3mm (4-1/2 inches) wide x 158.7mm (6-1/4 inches) deep x 63.5mm (2-1/2 inches) high. Weight: 1 lbs. 10 oz.

Time Max. Scale	Min. On or Off Setting	Voltage	Qty	Order Code
0.1-6000 sec.	0.1 sec.	120v	1	<b>6671-14</b>

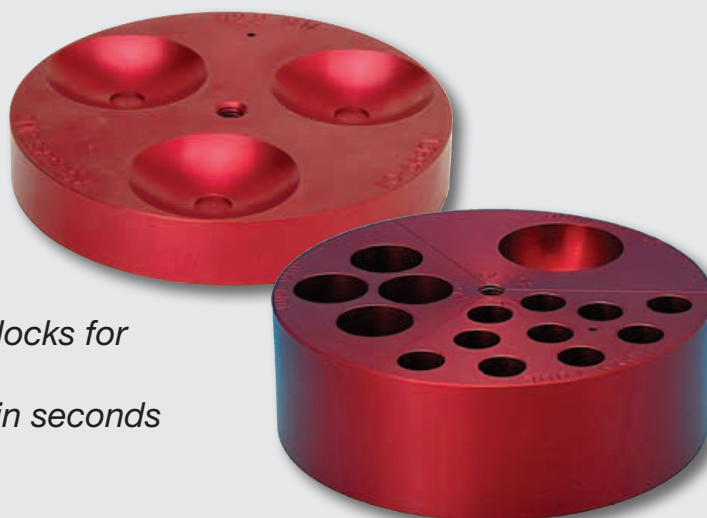
Digital interface available. Call for details.

# DynaBloc™

Cylindrical Heating Blocks

## Cylindrical Reaction Blocks for Circular-top Magnetic Stirrers

- Convenient — one block base, multiple blocks for different size vials, tubes and flasks
- Easy to use — switch from vials to flasks in seconds
- Economical and efficient
- Excellent heat transfer

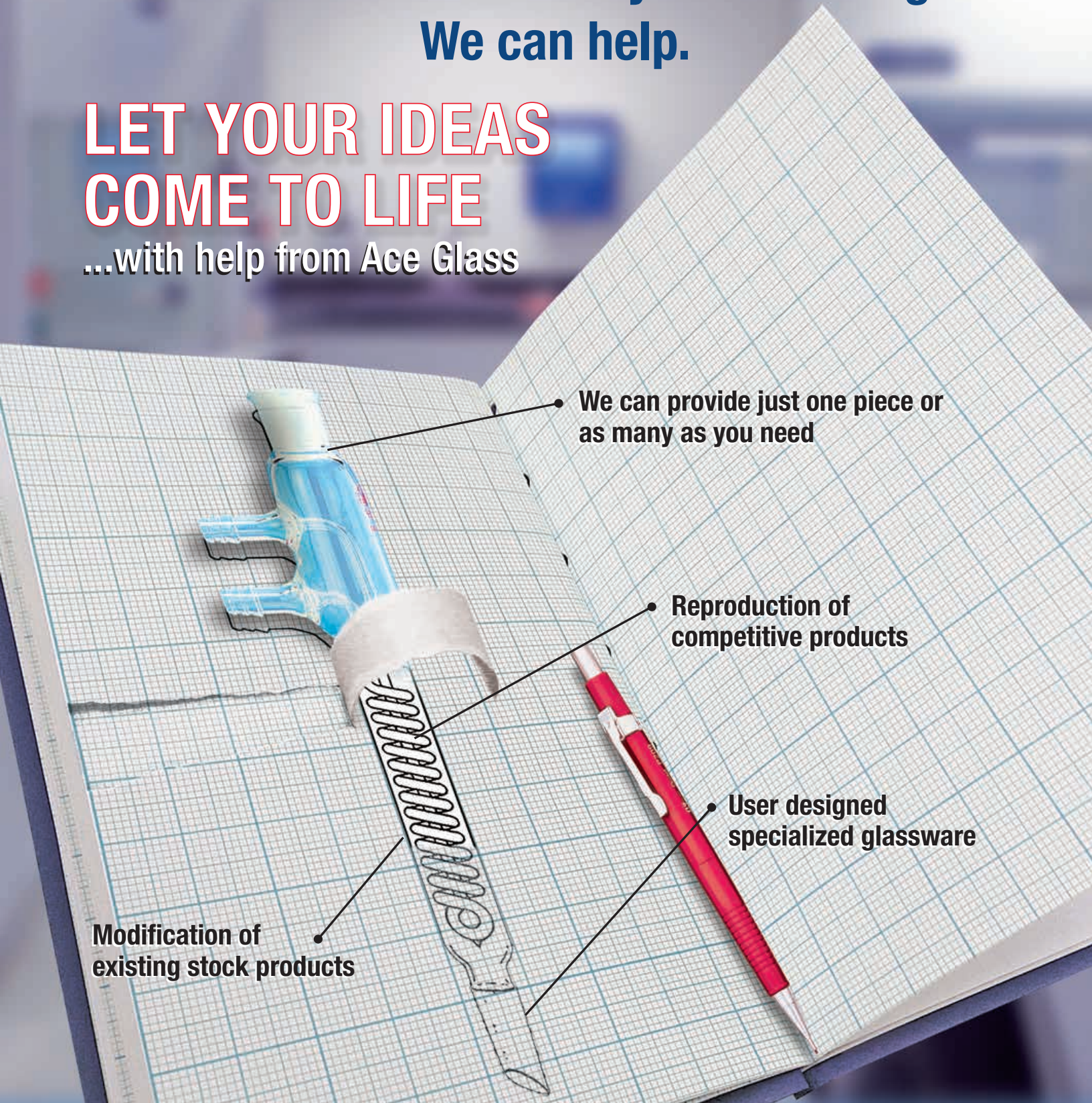




**Don't see what controller you're looking for?  
We can help.**

**LET YOUR IDEAS  
COME TO LIFE**

**...with help from Ace Glass**



**We can provide just one piece or  
as many as you need**

**Reproduction of  
competitive products**

**User designed  
specialized glassware**

**Modification of  
existing stock products**

# ACE GLASS Temperature Controller

For general laboratory use including mantles up to 22L.

- **Two front-mounted 120v outlets**
  - **Compact (3.5 inches high)**
  - **New digital technology**
- **16 segment ramp and soak function**
  - **Fuzzy logic auto tune PID**



**For use in  
controlling all  
Glas-Col Mantles  
rated at 115 volts**

## Features & Specifications:

- Two front-mounted outlets.
- Bar mountable or benchtop operation.
- Single loop type, downsized and lightweight.
- Temperature range: -70 to 870°C, adjustable.
- 0.1°C/0.1°F temperature resolution, field selectable.
- Absolute accuracy: ±0.25% of range, max. ±2°C.
- Control accuracy: ±0.1°C typical.
- Microprocessor-based 1/32 DIN model for digital accuracy and reliability.
- Dual four-digit LED display for instant recognition of process temperature and setpoint 1 value.
- Auto tune PID control can maintain ±0.1° under normal conditions.
- Ramp and soak, field selectable, 16 segment with hold or shut-off.
- Field selectable output % power limit when heating smaller vessels or when using very low setpoints. (factory set at 60% for safety). See OEM Manual (S10H) secure menu.
- Output circuitry utilizes zero crossing fired solid state relay proportional control that provides interference free power (RFI) to electrical heater type resistive loads.
- Heater outlets provide time proportional control, meaning overshoot is minimized. Percent output decreases as set temperature is approached.
- Universal TC input jack for "mini" or "standard" plugs.
- Input power: 120 volts, 50/60 Hz, 15 amps maximum, fused.
- Unit measures: 3.5 inches high x 6-3/16 inches wide x 6-5/16 inches deep; weight: 2.5 lbs.
- Operating instruction label on top for quick reference

## TEMPERATURE CONTROLLER *Improved Model* ★

	Qty	Order Code
Controller, only	1	12126-24
Sensor, Type J Thermocouple, 318mm, 1/4 in.	1	12110-15

### Complete

	1	12126-45
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Digital interface available. Call for details.



# ACE GLASS Economy Model Temperature Controller

For general laboratory use.

## Features & Specifications:

- Bar mountable or benchtop operation.
- Single loop type, downsized and lightweight.
- Temperature range: -50 to 800°C, adjustable.
- 0.1°C\* or 0.1°F temperature resolution, selectable.
- Absolute accuracy: ±0.25% of range, max. ±2°C.
- Control accuracy: ±0.1°C typical.
- Microprocessor-based 1/32 DIN model for digital accuracy and reliability.
- Dual four-digit LED display for instant recognition of process temperature and setpoint 1 value.
- Auto tune PID control can maintain ±0.1° under normal conditions.
- Ramp and soak, field selectable, 16 segment with hold or shut-off.
- Field selectable output % power limit when heating smaller vessels or when using very low setpoints. See OEM manual (SIOH) secure menu, affects all heaters.
- Output circuitry utilizes zero crossing fired solid state relay proportional control that provides interference free power (RFI) to electrical heater type resistive loads.
- Rear heater outlet provides time proportional control, meaning overshoot is minimized. Percent output decreases as set temperature is approached.
- Input power: 120 volts, 50/60 Hz, 15 amps maximum
- Unit measures: 2 inches high x 5-1/4 inches wide x 5-1/4 inches deep; weight: 2 lbs, 2 oz.
- Operating instruction label on top for quick reference.
- Three-year warranty

- **Economy model**
- **Ultra compact (2 inches high)**
- **New digital technology**
- **16 segment ramp and soak function**
- **Fuzzy logic auto tune PID**
- **Temp. Range Field Selectable**



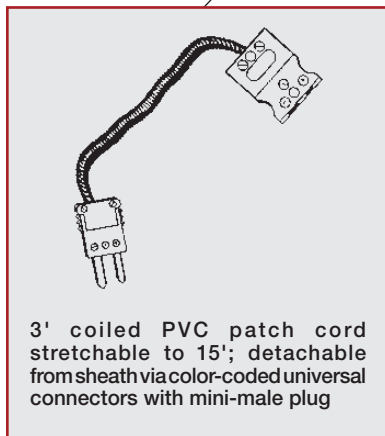
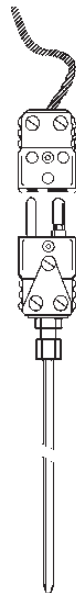
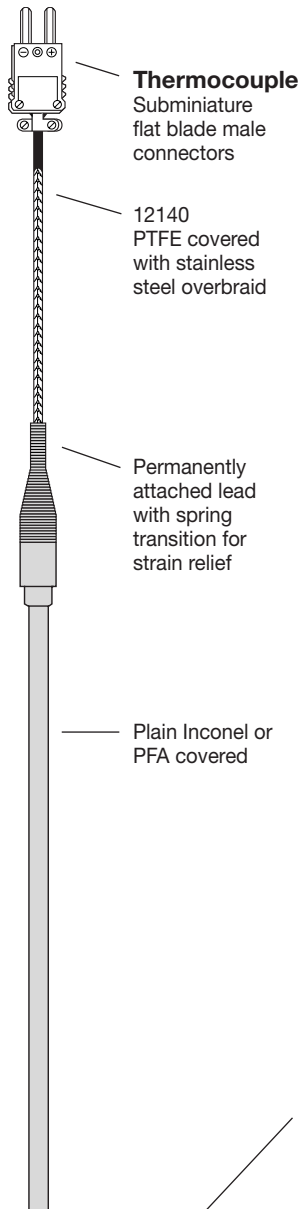
## TEMPERATURE CONTROLLER *Economy Model* ★

	Qty	Order Code
Controller, only ("J" type)	1	12125-14
Controller, only ("T" type)	1	12125-16
Controller, only ("K" type)	1	12125-18
Sensor, Type J Thermocouple, 318 mm, 1/4 inch	1	12110-15
<b>Complete ("J" Type only)</b>	1	12125-32

**For use in controlling all Glas-Col Mantles rated at 115 volts**

## Thermocouple Sensor Probes ★

Type	Length of Inconel Sheath, mm (In.)	Sheath O.D. mm/In.	Sheath Coating	Max. Sheath Temp.	Lead Lgth., Ft.	Lead Attachment	Qty	Order Code
"J"	102 (4)	4.76/0.19	Plain	550°C	6	Permanent	1	12110-17
"J"	305 (12)	1.59/0.06	Plain	550°C	12	Permanent	1	12140-04
"J"	305 (12)	3.17/0.12	Plain	550°C	12	Permanent	1	12140-05
"J"	305 (12)	6.35/0.25	Plain	550°C	6	Permanent	1	12110-15
"J"	305 (12)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-06
"J"	600 (24)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-10
"J"	900 (36)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-14
"J"	1200 (48)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-16
"J"	1800 (72)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-18
"J"	305 (12)	1.59/0.06	PFA	260°C	12	Permanent	1	12140-17
"J"	305 (12)	3.17/0.12	PFA	260°C	12	Permanent	1	12140-19
"J"	305 (12)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-20
"J"	600 (24)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-21
"J"	900 (36)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-25
"J"	1200 (48)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-26
"J"	1800 (72)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-28
"J"	305 (12)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-11
"J"	600 (24)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-12
"J"	900 (36)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-17
"J"	1200 (48)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-18
"J"	1800 (72)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-20
"J"	305 (12)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-25
"J"	600 (24)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-26
"J"	900 (36)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-28
"J"	1200 (48)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-29
"J"	1800 (72)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-30
"K"	102 (4)	4.76/0.19	Plain	550°C	6	Permanent	1	12113-22
"K"	305 (12)	1.59/0.06	Plain	550°C	12	Permanent	1	12140-36
"K"	305 (12)	3.17/0.12	Plain	550°C	12	Permanent	1	12140-61
"K"	305 (12)	6.35/0.25	Plain	550°C	6	Permanent	1	12113-20
"K"	305 (12)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-39
"K"	600 (24)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-41
"K"	900 (36)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-45
"K"	1200 (48)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-46
"K"	1800 (72)	6.35/0.25	Plain	550°C	12	Permanent	1	12140-48
"K"	305 (12)	1.59/0.06	PFA	260°C	12	Permanent	1	12140-37
"K"	305 (12)	3.17/0.12	PFA	260°C	12	Permanent	1	12140-62
"K"	305 (12)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-51
"K"	600 (24)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-53
"K"	900 (36)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-57
"K"	1200 (48)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-58
"K"	1800 (72)	6.35/0.25	PFA	260°C	12	Permanent	1	12140-59
"K"	305 (12)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-43
"K"	600 (24)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-44
"K"	900 (36)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-47
"K"	1200 (48)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-48
"K"	1800 (72)	6.35/0.25	Plain	550°C	3-15	Detachable*	1	12141-50
"K"	305 (12)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-52
"K"	600 (24)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-53
"K"	900 (36)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-58
"K"	1200 (48)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-59
"K"	1800 (72)	6.35/0.25	PFA	260°C	3-15	Detachable*	1	12141-60
*Lead only, for TYPE "J" Sensor (Black)							1	12141-80
*Lead only, for TYPE "K" Sensor (Yellow)							1	12141-83



**PFA:** (Tetrafluoroethylene-perfluoro(propyl)vinyl ether) copolymer, colored black, less permeable than either FEP or TFE. Maximum temperature 260°C.

# Thermocouple Sensors for J-Kem Temperature Controllers

## T-TYPE SENSORS

Type "T" thermocouple temperature sensors for use with all J-Kem "T" Type model temperature controllers. Either 1/4- or 1/8-inch O.D. Available in 304 stainless steel or PTFE coated stainless steel sheaths of various lengths. See Ace 12190 series extension cords.

O.D. (in.)	Lgth. (in.)	PTFE Coated?	Qty	Order Code
1/8	6	No	1	12180-03
1/8	12	No	1	12180-05
1/8	18	No	1	12180-07
1/8	24	No	1	12180-09
1/8	36	No	1	12180-11
1/8	6	Yes	1	12180-20
1/8	12	Yes	1	12180-22
1/8	18	Yes	1	12180-24
1/8	24	Yes	1	12180-26
1/8	36	Yes	1	12180-28
1/4	6	No	1	12180-31
1/4	12	No	1	12180-33
1/4	18	No	1	12180-35
1/4	24	No	1	12180-37
1/4	36	No	1	12180-39
1/4	6	Yes	1	12180-40
1/4	12	Yes	1	12180-42
1/4	18	Yes	1	12180-44
1/4	24	Yes	1	12180-46
1/4	36	Yes	1	12180-48

## J-TYPE SENSORS

Type "J" thermocouple temperature sensors for use with all J-Kem "J" Type model temperature controllers. Either 1/4- or 1/8-inch O.D. Available in 304 stainless steel or PTFE coated stainless steel sheaths of various lengths. See Ace 12190 series extension cords.

O.D. (in.)	Lgth. (in.)	PTFE Coated?	Qty	Order Code
1/8	6	No	1	12181-02
1/8	12	No	1	12181-04
1/8	18	No	1	12181-06
1/8	24	No	1	12181-08
1/8	6	Yes	1	12181-21
1/8	12	Yes	1	12181-23
1/8	18	Yes	1	12181-25
1/8	24	Yes	1	12181-27
1/8	36	Yes	1	12181-29
1/4	6	No	1	12181-32
1/4	12	No	1	12181-34
1/4	18	No	1	12181-36
1/4	24	No	1	12181-38
1/4	36	No	1	12181-39
1/4	6	Yes	1	12181-41
1/4	12	Yes	1	12181-43
1/4	18	Yes	1	12181-45
1/4	24	Yes	1	12181-47
1/4	36	Yes	1	12181-49

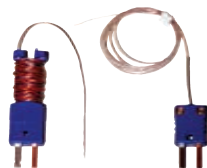
## K-TYPE SENSORS

Type "K" thermocouple temperature sensors for use with all J-Kem "K" Type model temperature controllers. Either 1/4- or 1/8-inch O.D. Available in 304 stainless steel or PTFE coated stainless steel sheaths of various lengths. See Ace 12190 series extension cords.

O.D. (in.)	Lgth. (in.)	PTFE Coated?	Qty	Order Code
1/8	6	No	1	12182-01
1/8	12	No	1	12182-03
1/8	18	No	1	12182-05
1/8	24	No	1	12182-07
1/8	36	No	1	12182-09
1/8	6	Yes	1	12182-20
1/8	12	Yes	1	12182-22
1/8	18	Yes	1	12182-24
1/8	24	Yes	1	12182-26
1/8	36	Yes	1	12182-28
1/4	6	No	1	12182-32
1/4	12	No	1	12182-34
1/4	18	No	1	12182-36
1/4	24	No	1	12182-38
1/4	36	No	1	12182-40
1/4	6	Yes	1	12182-41
1/4	12	Yes	1	12182-43
1/4	18	Yes	1	12182-45
1/4	24	Yes	1	12182-47
1/4	36	Yes	1	12182-49



**For extension cords, see Ace 12190 straight and coiled cords, on the following page.**



## SENSOR CORDS

Sensor extension cords for use with all J-Kem thermocouple probes. Cords match color of probe type: blue, black, yellow or white. Available in either 10- or 20-foot coiled or straight styles. Select length, type, and connector, SMP (flat plug) or OST (round plug).

Probe Style	Length (ft.)	Connector Type	Qty	Order Code
<b>Coiled</b>				
J	10	SMP	1	12190-01
K	10	SMP	1	12190-02
T	10	SMP	1	12190-03
RTD	10	SMP	1	12190-04
J	10	OST	1	12190-08
K	10	OST	1	12190-10
T	10	OST	1	12190-11
J	20	SMP	1	12190-20
K	20	SMP	1	12190-21
T	20	SMP	1	12190-22
J	20	OST	1	12190-26
K	20	OST	1	12190-27
T	20	OST	1	12190-28

### Straight

J	10	SMP	1	12190-40
K	10	SMP	1	12190-41
T	10	SMP	1	12190-42
J	10	OST	1	12190-44
K	10	OST	1	12190-45
T	10	OST	1	12190-46
J	20	SMP	1	12190-50
K	20	SMP	1	12190-51
T	20	SMP	1	12190-52
J	20	OST	1	12190-56
K	20	OST	1	12190-57
T	20	OST	1	12190-58

## DUAL SENSOR CORDS

Dual element extension cords for use with dual element 12184 sensors for J-Kem models HCC and 270 temperature controllers. Available in "T", "K", and "J" types in 10- or 25-ft. lengths.

Probe Style	Length (ft.)	Qty	Order Code
T	10	1	12191-02
J	10	1	12191-06
K	10	1	12191-08
T	25	1	12191-20
J	25	1	12191-22
K	25	1	12191-24

## WIRE SENSORS

Flexible 30-gauge thin wire thermocouple. Ideal for small volumes and hard-to-reach spots. Can be used with heating mantles, hotplates, inside of heating equipment and for small surface measurement. Can be inserted through rubber septum for an airtight seal. Available in standard connections, and in 36- and 72-inch lengths.

Sensor Type	Length (in.)	PTFE Coated?	Qty	Order Code
T	36	Yes	1	12185-01
K	36	Yes	1	12185-03
T	72	No	1	12185-04
K	72	No	1	12185-06
J	72	No	1	12185-08

### DUAL SENSORS *PTFE Coated*

Dual coupling temperature thermocouple sensors for use with Model HCC and 270 J-Kem temperature controllers. Available in "J", "T" or "K" types. Probes are PTFE coated stainless steel in various lengths and O.D. Probes require 12191 extension cords.

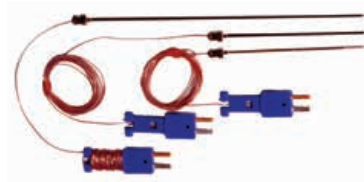
O.D. (in.)	Length (in.)	Sensor Type	Qty	Order Code
1/8	12	T	1	12184-02
1/4	12	T	1	12184-04
1/4	24	T	1	12184-06
1/4	36	T	1	12184-08
1/8	12	J	1	12184-12
1/4	12	J	1	12184-14
1/4	24	J	1	12184-16
1/4	36	J	1	12184-18
1/8	12	K	1	12184-20
1/4	12	K	1	12184-22
1/4	24	K	1	12184-24
1/4	36	K	1	12184-26



### NEEDLE-TIP SENSORS

Needle-tip, 17-gauge thermocouple sensor for measurement and control of very small volumes and in small systems. Sensors come coated and uncoated in 3.5- or 7-in. lengths. Actual temperature measure is at first 2mm of the probe and must have liquid contact for accurate readings. May be inserted through rubber septa 9107 or 9106 for air-tight seal. Comes with 72-in. PTFE wire extension. Available in "T", "K", or "J" type connections.

Length (in.)	Sensor Type	PTFE Coated?	Qty	Order Code
3.5	T	Yes	1	12186-01
7.0	T	Yes	1	12186-02
3.5	K	Yes	1	12186-03
7.0	K	Yes	1	12186-04
3.5	J	Yes	1	12186-05
7.0	J	Yes	1	12186-06
3.5	T	No	1	12186-10
7.0	T	No	1	12186-11
3.5	K	No	1	12186-12
7.0	K	No	1	12186-13
3.5	J	No	1	12186-14
7.0	J	No	1	12186-15



## U.S. Government Buyer?

GSA pricing for **Ace Glass** products is available thru our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)



**Schedule**  
 Contract GS07F119CA

[www.gsamart.com](http://www.gsamart.com)

# SAFETY TIPS

## LABORATORY GLASSWARE

### Safe Handling of Glassware

With the amount of glassware used in laboratories today, in various laboratory operations, chances are good that an accident will result in cuts, slashes, or slices. Minor cuts are the most frequent result of laboratory glassware accidents. However more serious accidents could result with flying glass, exposure to chemicals, or fires. Remember, each piece of glassware is designed for a specific purpose and it should only be used for that purpose.



#### Inspection

- Always inspect glass for scratches, abrasions, cracks or chips before using or cleaning.
- Safely dispose of any damaged glass.
- Inspect glass routinely for strain with a polariscope.

#### Washing/Cleaning

- Always inspect glass for chips and fractures prior to cleaning, especially any solvent or acid cleaning.
- Use Alconox or similar type detergents.
- Avoid HF, strong alkalis or abrasive cleaners.
- Distilled water rinse.

#### Storage

- Store glass in a manner to avoid vessels bumping each other.

#### Temperature, Borosilicate Glass

- Standard use limit — 240°C.
- Maximum short-term use — 490°C.
- Avoid rapid temperature changes or rapid thermal shock.

#### Heating Glass

- Heat with mantles, Instatherm®, heat tapes, guns or immersion heaters.
- Avoid direct flame as much as possible.
- Standard temperature limit for borosilicate glass is 240°C.



**TUBE Aviation Freeze Point ♠**

For determining the freezing point of separated solids in aviation fuels. ASTM D 2386-67.

*Note: Thermometer NOT supplied.*

Description	Qty	Order Code
Jacketed Sample Tube	1	8350-02
Brass Packing Gland	1	8350-04
Collar (A) with side tube	1	8350-06
Collar (B) without side tube	1	8350-08
Stirring Rod	1	8350-10
Rubber Stopper #3 w/ holes	1	8350-01
Vacuum Flask (unsilvered)	1	8350-12

**Complete**

	1	8350-20
--	---	---------


**COLOR STABILITY TUBE ♠**

Used in tentative AOCS Method L-15A-58, for measuring the processing color stability of fatty acids.

Description	Qty	Order Code
Stopper	1	8450-02
Tube	1	8450-04

**Complete**

	1	8450-10
--	---	---------


**TUBE 15mL, for ROBO Apparatus ♠**

For ASTM D7528-09 ROBO Apparatus, this 15mL V-bottom tube has a glass side tube and a PTFE plug.

Qty	Order Code
1	D120677 (Contact Ace to order)



# U.S. Government Buyer?

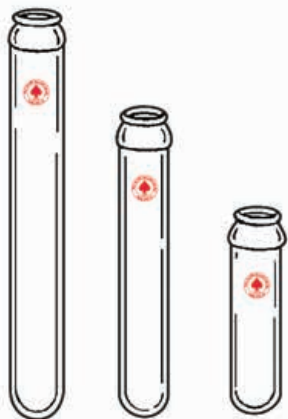
GSA pricing for **Ace Glass** products is available thru our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)



**Schedule**  
 Contract GS07F119CA

[www.gsamart.com](http://www.gsamart.com)

**TUBE Pressure, Diehls-Adler** ♠

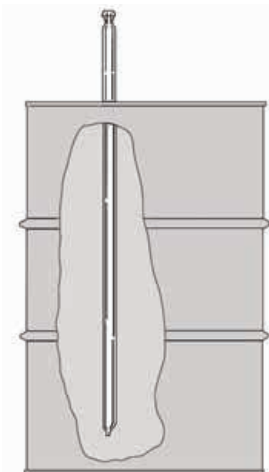
Heavy wall with lip for crown cap closure. Used for polymerization and analysis of halogens by thermal decomposition in the presence of lime. O.D., all sizes, 25.4mm.

Length, cm (In.)	Qty	Order Code
10.2 (4)	1	8650-03
15.2 (6)	1	8650-05
20.3 (8)	1	8650-07

**TUBE Pressure, Diehls-Adler** ♠

Heavy wall with lip for crown cap closure. Approximately 100mL capacity, 38mm O.D. x 17.8 cm long.

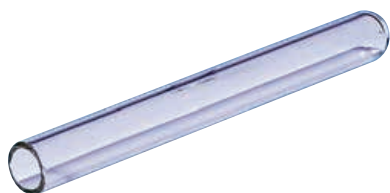
Qty	Order Code
1	8651-10

**TUBE Thief, Sampling** ♠

Used to take samples from large vessels such as 55 gallon drums. Measures 40 inches long x 1-inch O.D. with tooled tip at bottom and bulb handle at top for secure grip; open at both ends.

**Note:** Supplied six per case.

Qty	Order Code
6	8664-05

**TEST TUBE Quartz (without Lip)** ★

Made from quartz. Used as reaction or sample tube in 7891 turntable reactor.

**Note:** Supplied twelve per order.

Approx. O.D., mm	Approx. Length, mm	Qty	Order Code
13	100	12	8683-08

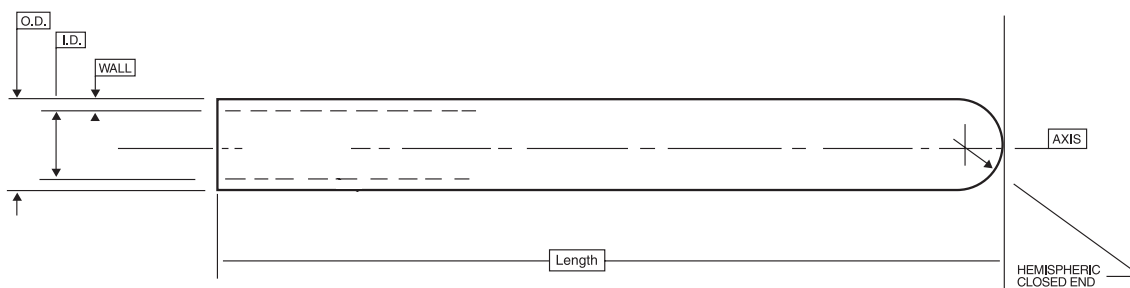
# Ultra-Precision NMR Sample Tubes

## Accurate • Precise



### NMR SAMPLE TUBES *Ultra-Precision, 5mm O.D.* ★

7-inch LENGTH			8-inch LENGTH		
O.D., mm	Qty	Order Code	O.D., mm	Qty	Order Code
5	Pkg./5	2528-07	5	Pkg./5	2528-08
5	Pkg./5	2526-07	5	Pkg./5	2526-08
5	Pkg./5	2507-07	5	Pkg./5	2507-08
5	Pkg./5	2506-07	5	Pkg./5	2506-08
5	Pkg./5	2505-07	5	Pkg./5	2505-08



ACE Cat. No.	(MHz) Inst Freq.	O.D. Inches	O.D. Tolerance (in.)	I.D. (in.)	I.D. Tolerance (in.)	Concentricity I.D. to O.D. (in.)	Camber (Overall, in.)
2528-07,-08	500	.1955	+.0000/-0.0005	.1655	+.0005/-0.0000	≤.0010	≤.0005
2526-07,-08	350	.1955	+.0000/-0.0005	.1655	+.0005/-0.0000	≤.0020	≤.0005
2507-07,-08	300	.1955	+.0000/-0.0005	.1655	+.0005/-0.0000	≤.0020	≤.0020
2506-07,-08	200	.1955	+.0000/-0.0005	.1655	+.0005/-0.0000	≤.0025	≤.0020
2505-07,-08	100	.1955	+.0000/-0.0005	.1655	+.0005/-0.0000	≤.0030	≤.0020

### SEPTUM *Stopper, Sleeve Type, for NMR Tubes* ★

With hollow plug, used for closing NMR tubes and small tubing. Top is flanged with sleeve-like extension that folds down over the neck of vessel. The diaphragm can be punctured readily with a syringe needle. Puncture seals automatically after the needle is withdrawn.

Color	Qty	Order Code	Qty	Order Code	Qty	Order Code
White	Pkg/12	9096-26	72	9096-126	144	9096-226



### PRECISION SEAL™ SEPTA *White or Red Rubber, for NMR Tubes* ★

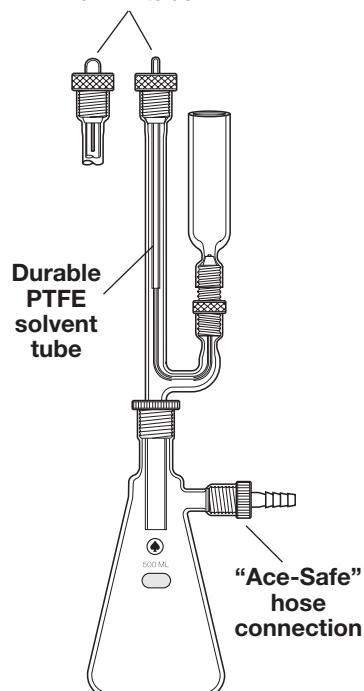
Engineered for a precision fit (80% glass to rubber contact) for 5mm NMR tubes. Precision Seals are manufactured under "white room" conditions, from one certified raw material formulation for absolute consistency in all sizes, from lot-to-lot.

Color	Qty	Order Code	Qty	Order Code
White	100	9106-119	10	9106-19
Red	100	9106-120	10	9106-20



All-threaded  
connections for  
easy assembly

With separate  
bushing adapters  
for 5mm and  
10mm tube



### NMR TUBE WASHER ♠

Rugged NMR tube washer designed with either Ace-Threds for ease and convenience or Ace-Threds and  $\text{S}$  joints. Accepts a single 5mm or 10mm O.D. NMR tube. Features 1/8-inch O.D. PTFE tubing instead of glass to carry solvent from side reservoir to NMR tube in washing chamber. Tube to be washed is held in place in a #11 Ace-Thred with a PTFE bushing adapter; separate adapters for 5mm and 10mm tube. Solvent reservoir capacity is 55mL and is connected to main chamber via #7 Ace-Threds and PTFE coupling.

All-threaded version has a filter flask with a #15 Ace-Thred at top for securing tube washer with a bushing and O-Ring and #11 Ace-Thred side port with a removable "Ace-Safe" hose connection for connecting to suction.

Threaded/jointed version has a filter flask with a  $\text{S}$  24/40 joint at top for connecting to  $\text{S}$  inner joint at bottom of tube washer and a serrated hose connection on side for connecting to suction.

*Complete item consists of: tube washer body, solvent reservoir, PTFE coupling, 5mm and 10mm tube bushing, filter flask, and 1/8-inch PTFE tubing.*

	Qty	Ace-Thred Design Order Code	Thread/Joint Design Order Code
Tube Washer Body, only, Plain Stem	1	2540-12	—
Tube Washer Body, only, $\text{S}$ 24/40	1	—	2540-13
Solvent Reservoir, only	1	2540-15	2540-15
Coupling, PTFE, #7-#7, with Ferrule	1	2540-19	2540-19
5mm NMR Tube Bushing Adapter, PTFE, #11	1	2540-23	2540-23
10mm NMR Tube Bushing Adapter, PTFE, #11	1	2540-25	2540-25
Filter Flask, 500mL, #11 & #15	1	2540-29	—
Filter Flask, 500mL, $\text{S}$ 24/40, Hose Conn.	1	—	6979-10
PTFE Tubing, 1/8-inch O.D. x 312mm long	1	2540-31	2540-31
Tubing Connector, "Ace-Safe," for #11	1	5853-10	—
Bushing, Nylon, #11, w/O-Ring	1	7506-01	—
Bushing, Nylon, #15, w/O-Ring	1	7506-06	—
<b>Complete</b>	1	2540-42	2540-54
<b>Accessories</b>			
PTFE Tubing, 1/8-inch O.D., 10 feet	1	12687-04	12687-04
PTFE Ferrules, Size 3	12	11710-03	11710-03
O-Ring, FETFE, for #7-#7 Coupling	12	7855-712	7855-712

## We Take Pride in YOUR Work

Whether you're simply changing a joint size or designing an entire custom unit, our technical staff is at your service!

**Contact Ace Today 1-800-223-4524.**

**NMR MANIFOLD TIP-OFF ♠**

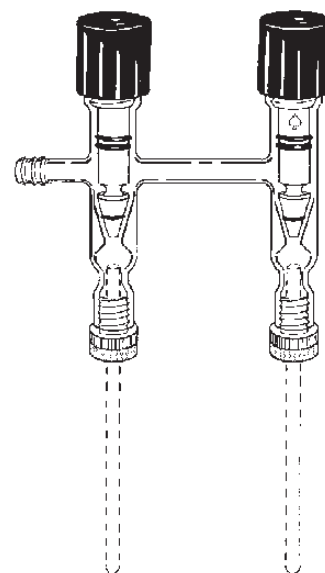
Use to tip-off NMR tubes. How it works: NMR Tube is inserted in lower Ace-Thred port and tightened via bushing for vacuum-thaw work. Vacuum line is connected to side hose connection. Use with 3/8-inch or 7/16-inch I.D. tubing, size E hose connection. Tube can then be tipped-off with flame. Aluminum shield bonded to nylon bushing helps delay heat transfer. Each port is individually controlled by smooth-acting, semi-needle, threaded PTFE plug to allow removal of one tube while others are still under vacuum; vacuum of 10<sup>-6</sup> is common. PTFE plug and tip-off port O-Rings are FETFE or Viton. Tip-off ports can be supplied for 5mm, 8mm and 10mm NMR tubes. Manifolds can be supplied with single port or multiple ports of the same size or different sizes. Quotations will be supplied for manifolds differing from those listed.

*Complete item consists of glass manifold, PTFE plug(s), bushing(s) with fire shield and O-Rings.*

No. of Ports	Manifold for Tube Size	Qty	<i>Glass only</i>	<i>Tip-Off Bushing</i>	<i>Tip-Off Port O-Rings</i>	<i>Complete</i>
			Order Code	Order Code	Order Code	Order Code
2	5mm, 5mm	1	8731-12	8731-75		8731-34
2	8mm, 8mm	1	8731-15	8731-78	7855-704	8731-38
1	10mm	1	8731-19	8731-80	7855-716	8731-44
4	(2) 5mm, 8mm, 10mm	1	8731-22	Above	Above	8731-56

**Replacement Plugs and O-Rings**

PTFE Plug, only	1	8194-268
O-Rings for Plug	1	8194-86



**Let Your Ideas Come to Life!**

*...Custom Tubes are Available*

- User designed specialized glassware
- Just one piece or as many as you need
- Reproduction of competitive products
- Modification of existing stock products

**Contact Ace Today**

## Trubore® Precision Glass Tubing – Chosen for uniform quality and closely held tolerances

Inside diameter tolerance of  $\pm 0.0004$  inches is standard. Trubore®, a trademark of Ace Glass Incorporated, stands for precision bore tubing of the highest quality. The process to precisely control the bore of glass tubing was pioneered and developed by ACE over 60 years ago. Our reputation for the highest quality precision bore tubing is maintained by production techniques, the careful selection of raw materials, and step by step quality control.

### TRUBORE® Precision Glass Tubing ♦

Stock sizes, unless otherwise specified, are fabricated on capillary tubing up to 2.946 mm I.D.; standard wall tubing on all other sizes.

Size I.D. (In)	Approx. I.D., mm	Approx. O.D., mm	Length, cm	Qty	Order Code	Size I.D. (In.)	Approx. I.D., mm	Approx. O.D., mm	Length, cm	Qty	Order Code
0.006	0.152	6.5	61	3	8700-101	0.185	4.699	6.5	61	3	8700-39
0.007	0.178	6.5	61	3	8700-102	0.197	5.029	7.0	61	3	8700-40
0.008	0.203	6.5	61	3	8700-01	0.227	5.766	8.0	61	3	8700-41
0.009	0.229	6.5	61	3	8700-103	0.234	5.944	8.0	61	3	8700-42
0.010	0.254	6.5	61	3	8700-02	0.240	6.096	8.5	61	3	8700-43
0.011	0.279	6.5	61	3	8700-104	0.250	6.350	8.0	61	3	8700-143
0.012	0.305	6.5	61	3	8700-03	0.274	6.960	9.0	61	3	8700-44
0.013	0.330	6.5	61	3	8700-04	0.286	7.264	9.0	61	3	8700-45
0.015	0.381	6.5	61	3	8700-05	0.313	7.950	10.0	61	3	8700-46
0.016	0.406	6.5	61	3	8700-06	0.319	8.103	10.0	61	3	8700-47
0.018	0.457	6.5	61	3	8700-07	0.324	8.230	10.5	61	3	8700-48
0.020	0.508	6.5	61	3	8700-08	0.350	8.890	11.0	61	3	8700-49
0.022	0.559	6.5	61	3	8700-09	0.396	10.058	12.5	61	3	8700-50
0.024	0.610	6.5	61	3	8700-10	0.419	10.643	13.0	61	3	8700-51
0.027	0.686	6.5	61	3	8700-11	0.441	11.201	13.5	61	3	8700-52
0.029	0.737	6.5	61	3	8700-12	0.454	11.532	14.0	61	3	8700-53
0.030	0.762	6.5	61	3	8700-13	0.460	11.684	14.0	61	3	8700-54
0.031	0.787	6.5	61	3	8700-14	0.479	12.167	15.0	61	3	8700-55
0.035	0.889	6.5	61	3	8700-15	0.484	12.294	15.0	61	3	8700-56
0.039	0.991	6.5	61	3	8700-16	0.500	12.700	15.0	61	3	8700-156
0.040	1.016	6.5	61	3	8700-17	0.515	13.081	15.5	61	3	8700-57
0.047	1.194	6.5	61	3	8700-18	0.536	13.614	16.0	61	3	8700-59
0.050	1.270	7.5	61	3	8700-19	0.553	14.046	16.5	61	3	8700-60
0.059	1.499	7.5	61	3	8700-20	0.585	14.859	17.0	61	3	8700-61
0.063	1.600	7.0	61	3	8700-21	0.610	15.484	18.0	61	2	8700-62
0.066	1.676	7.5	61	3	8700-22	0.625	15.875	18.0	61	2	8700-63
0.070	1.778	7.5	61	3	8700-23	0.724	18.390	21.5	61	2	8700-65
0.072	1.829	7.5	61	3	8700-123	0.781	19.837	23.0	61	2	8700-66
0.076	1.930	7.0	61	3	8700-24	0.789	20.041	23.0	61	2	8700-67
0.079	2.006	8.5	61	3	8700-25	0.829	21.057	24.0	61	2	8700-69
0.082	2.083	8.5	61	3	8700-124	0.879	22.225	25.0	61	2	8700-70
0.085	2.159	9.0	61	3	8700-125	1.000	25.400	28.0	61	2	8700-170
0.089	2.261	9.0	61	3	8700-26	1.010	25.654	29.0	61	2	8700-72
0.095	2.413	9.0	61	3	8700-27	1.070	27.178	31.0	61	2	8700-73
0.096	2.438	9.0	61	3	8700-28	1.119	28.423	32.0	61	2	8700-74
0.099	2.515	9.0	61	3	8700-29	1.184	30.074	34.0	61	2	8700-75
0.108	2.743	7.5	61	3	8700-30	1.197	30.404	35.0	61	2	8700-76
0.116	2.946	7.5	61	3	8700-31	1.223	31.064	36.0	61	2	8700-77
0.125	3.175	8.5	61	3	8700-32	1.295	32.893	37.0	61	2	8700-78
0.134	3.404	7.5	61	3	8700-33	1.465	37.211	41.5	61	2	8700-80
0.143	3.632	7.5	61	3	8700-34	1.576	40.030	44.0	61	1	8700-81
0.153	3.886	8.0	61	3	8700-35	1.643	41.732	46.0	61	1	8700-82
0.164	4.166	6.5	61	3	8700-36	1.892	48.057	53.0	61	1	8700-83
0.168	4.267	6.0	61	3	8700-37	1.971	50.063	55.0	61	1	8700-84
0.177	4.496	6.5	61	3	8700-38						



### TRUBORE® Square Precision ♦

I.D., in	I.D., mm	O.D., mm	Length, mm	Qty	Order Code
0.236	6	8	125	4	8700-90
0.393	10	14	225	4	8700-91
0.512	13	16	250	3	8700-92
0.748	19	24	250	2	8700-94
1.000	25.4	30	250	2	8700-96
2.000	50.8	57	200	1	8700-97

## STANDARD WALL TUBING *Borosilicate Glass* ★

Duran

In lengths of 1.5 meters.

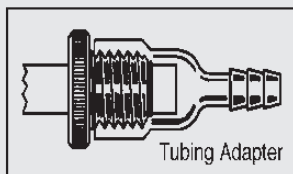
O.D., mm	Wall, mm	Lengths Per Case	Avg. Lbs. Per Case	Order Code
11	1.0	86	19.8	8801-21
14	1.0	110	33.1	8801-27
17	1.2	76	33.1	8801-33
24	1.2	38	24.3	8801-41
26	1.4	33	26.5	8801-44
34	1.4	25	26.7	8801-49
36	1.4	25	27.8	8801-53
40	1.6	16	22.5	8801-57
42	1.6	16	24.0	8801-61
44	1.6	16	25.1	8801-67
46	1.6	16	26.2	8801-71
48	1.6	16	27.3	8801-75
50	1.8	9	18.1	8801-79
52	1.8	9	18.7	8801-83
54	1.8	9	19.6	8801-87
56	1.8	9	20.3	8801-91
58	1.8	9	21.2	8801-95
65	2.2	8	25.8	8801-111
85	2.5	4	19.2	8801-129
100	3.5	3	23.6	8801-137
105	3.0	3	21.2	8801-143
115	3.0	4	31.1	8801-155
125	5.0	2	27.8	8801-167

O.D., mm	Wall, mm	Lengths Per Case	Avg. Lbs. Per Case	Order Code
130	3.0	4	35.3	8801-171
135	5.0	2	30.2	8801-181
140	3.0	4	38.1	8801-193
145	5.0	2	32.4	8801-209
150	3.0	2	20.6	8801-219
155	5.0	2	34.8	8801-223
160	5.0	2	35.9	8801-231
165	5.0	2	37.0	8801-239
170	5.0	2	38.1	8801-245
180	5.0	1	20.3	8801-251
190	5.0	1	21.4	8801-261
200	5.0	1	22.5	8801-269
215	7.0	1	33.7	8801-277
225	7.0	1	35.3	8801-281
240	9.0	1	48.1	8801-297
250	5.0	1	28.4	8801-303
270	5.0	1	30.7	8801-321
300	5.0	1	34.2	8801-343
300	7.0	1	47.5	8801-345
300	9.0	1	60.6	8801-347
315	7.0	1	49.9	8801-355
315	9.0	1	63.8	8801-357

## TUBING *Selected, Quartz* ★

Available in four-foot lengths, maximum.

I.D. mm	Tolerance, mm	Wall, mm	Lengths Per Case	Order Code
2	±0.5	1.0	1	8697-02
3	±0.5	1.0	1	8697-04
5	±0.5	1.0	1	8697-06
6	±0.5	1.0	1	8697-08
8	±0.5	1.0	1	8697-10
9	±0.5	1.0	1	8697-12
13	±0.8	1.0	1	8697-14



## THREADED TUBING ADAPTER

All stainless steel pinch clamps for use with O-Ring spherical joints and ball and socket joints.

**Note:** Only screw-locking clamps should be used with O-Ring spherical joints.

Ace-Thred Size	For Inlet/Outlet Tube O.D., mm	Qty	Order Code
15	14	1	8746-75
25	24	1	8746-78



### VINYL PLASTIC TUBING ★

Non-toxic, food grade, polyvinyl chloride tubing. Easily cleaned and resistant to fruit acids, lye, alcohol, greases and oils. Usable from  $-37^{\circ}\text{C}$  to  $100^{\circ}\text{C}$  ( $-35^{\circ}\text{F}$  to  $212^{\circ}\text{F}$ ) at low pressure. Does not contain any loading ingredients, such as, clays, whittings or carbon black.

**Note:** All sizes packed 15 meters (50 feet) per box, except codes 04, 10, 12, 22, 24, 32, 34, 42, 44, and 80.

I.D., mm (In.)	Wall Thickness, mm (In.)	O.D., mm (In.)	Box Qty (Feet)	Order Code
3.2 (1/8)	1.6 (1/16)	6.4	50	12679-06
4.8 (3/16)	2.4 (3/32)	9.5	100	12679-10
4.8 (3/16)	3.2	11.1	100	12679-12
6.4 (1/4)	1.6 (1/16)	9.5	50	12679-14
6.4 (1/4)	2.4 (3/32)	11.1	50	12679-16
6.4 (1/4)	3.2	12.7	50	12679-18
7.9 (5/16)	1.6 (1/16)	11.1	50	12679-20
9.5 (3/8)	1.6 (1/16)	12.7	50	12679-26
9.5 (3/8)	2.4 (3/32)	14.3	50	12679-28
9.5 (3/8)	3.2	15.9	50	12679-30
19.1 (3/4)	3.2	25.4	50	12679-70
25.4 (1)	3.2	31.8 (1-1/4)	50	12679-78



### TUBING Vacuum, Heavy Wall ★

Hand made, red rubber tubing for high vacuum applications. Heavy wall and low vapor pressure. 1 inch ID x 3/8 inch wall weight size not suitable for full vacuum. 50 feet per case.

I.D., in. (mm)	Wall, in.	Length Per Case	Order Code
1/4 (6.4)	3/16	50 feet	12690-05
3/8 (10)	3/8	50 feet	12690-10
1/2 (12.5)	3/8	50 feet	12690-12
3/4 (19)	3/8	50 feet	12690-20
1 (25)	3/8	50 feet	12690-25



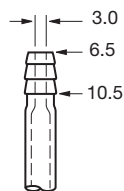
### TUBING Polypropylene ★

Polypropylene tubing used to make connection between pressure source and 12517 quick disconnect on side of pressure manifold and between other side of manifold to the pressure reactor.

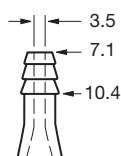
Size (Inches)	Quantity	Order Code
1/4 O.D. x 0.170 I.D.	10-foot length	12681-110

## Hose Connection Size Guide

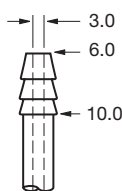
### Dimensions in Millimeters


**A**

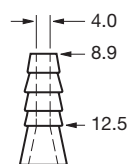
Use with  
7.9mm (5/16")  
I.D. Tubing


**B**

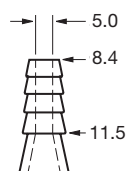
Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing


**C**

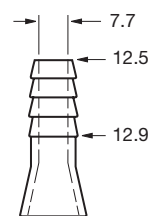
Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing


**D**

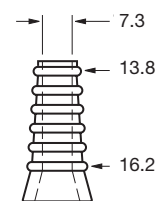
Use with  
9.5mm (3/8")  
I.D. Tubing


**E**

Use with  
9.5mm (3/8")  
or 11.1mm (7/16")  
I.D. Tubing


**F**

Use with  
11.1mm (7/16")  
or 12.7mm (1/2")  
I.D. Tubing


**G**

Use with  
15.9mm (5/8")  
I.D. Tubing



**A**ce Glass offers a variety of Ultrasonic Processing products and systems that cover a wide range of applications, including: life sciences, nanotechnology, emulsions, soil testing, environmental sample processing, cell culture, cell disruption, sonochemistry, and drug development. They can also be used for general super-mixing applications in liquid processing where a very small sample is needed, or where the sample is hard to mix or insert into a solution or dispersion. Ace takes the application one step further, as we add our glass expertise and our Ace-Threds to make glass vessels to match the horn selection. Add a power supply for a complete system, or a reactor for sample ultra-mixing and liquid processing.

## About Ultrasonics

The Ultrasonic power supply converts 50/60Hz voltage to high frequency electrical energy. This alternating current voltage is applied to disc-shaped, ceramic, piezoelectric crystals within the converter head, causing them to expand and contract with each

change of polarity. These longitudinal vibrations are amplified by the horn and transmitted into the liquid mixture as alternating high and low pressure ultrasonic waves. The pressure fluctuations pull the liquid molecules apart, creating millions of micro-bubbles (cavities), which expand during the low pressure phases and implode violently during the high pressure phases. As the bubbles collapse, millions of shock waves, micro-streams, eddies, and extremes in pressure and temperature are generated at the implosion sites. This phenomenon, known as cavitation, lasts but a few microseconds, and while the amount of energy released by each bubble is minimal, the cumulative amount of energy generated is extremely high. This process is self-stimulating because the imploding bubbles create new sites for bubbles to form. The high shear energy delivered is maximized near the tip of the horn, and also decreases the farther the tip is from the solution. The Vibra-Cell power supplies carry a three-year warranty and are CE approved.

## Helpful Hints for Ultrasonics

- As tip size decreases, intensity increases, at a given power setting.
- Almost all activity takes place immediately below the tip.
- Tips **MUST** be kept submerged during operation.
- Horns (probes) or extenders **MUST** be held **ONLY** at the node (nodal point).
- Tips 1/4 inch and smaller **CANNOT** be operated at full power output. Follow directions provided with power supply.
- Side of horn, extender or tip of probe should **NEVER** touch vessel walls.
- Most reactions work better when solution is kept cool.
- In many reactions the probe itself may provide enough turbulence and additional stirring usually is not necessary unless very viscous materials or heavy metal catalysts are used.
- For large-volume reactions, consider multi-neck vessels since mechanical stirring might be necessary.
- Removable tips have been sometimes problematic as liquid may seep into gaps between probe and tip. Many scientists have no problem with this and find the economy of the removable tip important. However, it is important to remove, clean and polish the tip regularly to avoid cross-contamination and excessive wear.

## POWER SUPPLY *Ultrasonics Vibra-Cell*

Ultrasonic power supply, 750W, for superior mixing with automatic amplitude and frequency control circuitry that eliminates the need for constant adjustments, assuring optimum cavitation at any power level. New space-saving design with auto tuning that matches the power supply to the converter/probe assembly and does not have to be manually tuned each time the probe is changed or the unit is turned on, exclusive energy (Joule) setpoint circuit, nonvolatile memory function for storing up to ten preset operating programs, tactile keypad with user friendly menu-driven LCD display, elapsed time/run time timer, and power (watts) readout, integral temperature controller. Three-year unconditional warranty on power supply and converter. Supplied with detailed operating instructions. NOT supplied with horn or glass reactors (order separately).



	Qty	Order Code
750 Watt Power Supply and Converter	1	9810-24

**750W** Model for smaller volumes and continuous flow volumes up to five gallons/19 liters per hour. Also features ON/OFF 1 to 59 seconds pulser, a one-second to 10-hour timer, and integral temperature controller to prevent overheating of sample. Power input is 117v, 5.5amps, 50/60Hz. Not supplied with temperature probe. Weighs 15 lbs. (6.8 k.g.) and measures 7-1/2 x 13-1/2 x 8-1/2 inches (19 x 34 x 26.6cm).



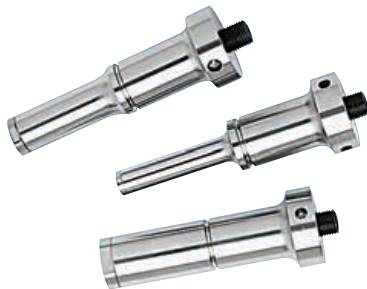
### ULTRASONIC PROCESSOR *Ultrasonics, For Low-Volume Applications*

- Exclusive wattmeter and energy (Joules) Monitor
- Process samples from 150 microliter to 150 ml
- Ideal for cell disruption, sample preparation, or homogenization
- Automatic tuning circuitry eliminates the need for constant adjustments

This ultrasonic power supply is microprocessor controlled, and features automatic tuning to eliminate the need for constant adjustment; a digital wattmeter that displays the amount of power delivered to the probe; an elapsed-time indicator that displays the duration the ultrasonics has been on; and an energy monitor that displays the amount of Joules is transmitted to the probe. The variable power output control allows the ultrasonic vibrations at the probe tip to be set to any desired amplitude. All units include a tool kit, converter, footswitch connector, and a 6-ft cord with grounded plug.

Features a timer that controls the processing time from 1 second to 10 hours and a pulser to enable safe treatment of temperature sensitive samples at high intensity. Both ON and OFF cycles are independently controlled from 1 second to 59 seconds. Includes a 6 mm (1/4-inch) titanium probe.

Qty	Order Code
1	9811-05



### HORN *Ultrasonics*

Basic ultrasonic horns (probes) that focus the ultrasonic energy into the liquid. For use with 9810 power supply. Fabricated from high grade titanium, these horns are autoclavable and have an O-Ring groove at nodal point that allows a tight fit in #36 Ace-Thred without affecting sonic output. Available with solid end (fixed length) or threaded end to accept replaceable tips, microtips or extenders. Supplied with 1/2-inch-20 stud for connection to converter on power supply.

Tip Diameter, in	End Type	Length Below Groove*, in	Intensity	Volume (Batch)	Amplitude (micrometer**),	Qty	Order Code
1/2	Solid	2-1/2	High	10-250mL	120	1	9814-06
1/2	Threaded	2-1/2	High	10-250mL	120	1	9814-25
3/4	Solid	2-3/8	Medium	25-500mL	60	1	9814-08
3/4	Threaded	2-3/8	Medium	25-500mL	60	1	9814-27
1	Solid	2	Low	50-1000mL	30	1	9814-11
1	Threaded	2	Low	50-1000mL	30	1	9814-30

\*Length below groove for threaded horn is with removable tip.

\*\*With output control set at 10.



### EXTENDER *Ultrasonics*

Titanium extender screws into threaded end of ultrasonic horn. This accessory lengthens the horn (probe) by 5 inches for more versatility. Extenders have solid ends. 1/2-inch extender has single groove on 5-inch size for use with #15 Ace-Thred.

**Note:** 3/4-inch and 1-inch extenders do NOT have grooves. Order extender diameter to match horn diameter. Amplitude and other specs match 9814 items.

Extender Diameter, in	Length, in	Qty	Order Code
1/2	5	1	9816-06
3/4	5	1	9816-08
1	5	1	9816-10

## REPLACEABLE, TITANIUM, ULTRASONICS

Tips showing signs of wear should be polished with fine emery cloth. This procedure can be repeated until difficulties are encountered when tuning the power supply, then tips should be replaced.

**Note:** For use with threaded horns only.

For Horn Size, in	Qty	Order Code
1/2	1	9820-12
3/4	1	9820-14
1	1	9820-18



Do not use probes with replaceable tips when processing samples containing solvents or low surface tension liquids.

## BOOSTER *Ultrasonics*

When connected between the converter and 9814 horn, the booster increases the amplitude of vibration at the horn tip by a factor of two. Use to process very difficult applications.

Qty	Order Code
1	9822-20



## CLAMP *Heavy Duty*

For supporting 2-1/2-inch diameter converter securely in place. Fabricated from 3/4-inch thick aluminum, anodized black, this clamp fits 1/2-inch or 5/8-inch diameter rod and is secured by an Allen head screw to (750W) converter.

Qty	Order Code
1	9825-21



## Applications for Ultrasonic Processing:

- Cell Culture
- Soil Sample Prep
- Nanotechnology
- Drug Development
- Agriculture
- Sonochemistry
- Super Mixing
- Colloids, Dispersions
- Emulsions
- Homogenization
- Tissue or Cell Disruption
- Photochemistry


**REACTION ASSEMBLY** *Ultrasonics, Small Volume, Complete* ★

Complete reaction assembly with parts necessary to perform mixing and reactions from 6mL to 250mL. Includes three borosilicate glass vessels, power supply with converter, 1/2-inch horn, 1/2-inch extender, slide adapter and clamp. For details of each item, see individual listings.

**Includes:**

9810-24	9816-06	9825-21	9833-05	9844-07
9814-25	9852-21	9843-04	7506-10 (Qty:4)	

Qty	Order Code
1	9830-25

**REACTION ASSEMBLY** *Ultrasonics, Large Volume, Complete* ★

Complete reaction assembly with parts necessary to perform ultrasonic reactions and mixing from 250mL to 1800mL. Includes three borosilicate reactors, power supply with converter, 3/4-inch horn, 3/4-inch extender, slide adapter and clamp. For details of each item, see individual listings.

**Includes:**

9810-24	9816-08	9833-12	9837-20
9814-27	9825-21	9833-16	7506-12 (Qty: 3)

Qty	Order Code
1	9831-40



## REACTION VESSEL Ultrasonics, Tapered, 4-Neck ♠

Fabricated from borosilicate glass with walls tapered inward toward bottom to allow operation with smaller volumes. 250mL size supplied with #25 Ace-Thred center neck and three  $\text{\textcircled{24}}$  14/20 side necks. All other capacities supplied with #36 Ace-Thred center neck and three  $\text{\textcircled{24}}$  24/40 side necks. Use 7506-10 bushing and O-Ring in #25 Ace-Thred, 7506-12 bushing and O-Ring in #36 Ace-Thred to form a leak-tight compression seal with all 9814 horns with groove and 9852-41 or 9852-45 slide adapter.

**Note:** Stated capacity is WITHOUT horn. See horn selection chart, below, for proper horn size. Vessel NOT supplied with bushing or O-Ring, order separately.

Capacity, mL	Qty	Order Code		Qty	Order Code
250	1	9833-05	#25 Nylon Bushing		
500	1	9833-12	w/FETFE O-Ring, only	1	7506-10
1000	1	9833-16	#36 Nylon Bushing		
2000	1	9833-21	w/FETFE O-Ring, only	1	7506-12



## REACTION VESSEL Ultrasonics, Round Bottom, 4-Neck ♠

Borosilicate glass, round-bottom vessel. Supplied with  $\text{\textcircled{24}}$  24/40 center neck and two  $\text{\textcircled{24}}$  24/40 side necks. Fourth neck is #25 Ace-Thred on 500mL for use with 7506-10 bushing and O-Ring; #36 Ace-Thred on 1000mL and 2000mL sizes for use with 7506-12 bushing and O-Ring to make a leak-tight compression seal with all 9814 horns and 9852-41 or 9852-45 slide adapter. Center neck can be used for mechanical stirring if needed.

**Note:** Stated capacity is WITHOUT horn. See horn selection chart, below, for proper horn size. Vessel NOT supplied with bushing or O-Ring, order separately.

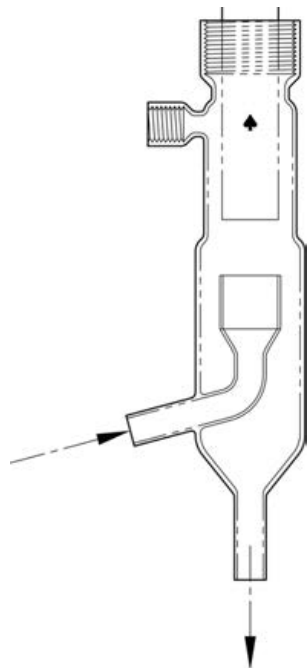
Capacity, mL	Qty	Order Code		Qty	Order Code
500	1	9837-09	#25 Nylon Bushing		
1000	1	9837-14	w/FETFE O-Ring, only	1	7506-10
2000	1	9837-20	#36 Nylon Bushing		
			w/FETFE O-Ring, only	1	7506-12



# HORNS & EXTENDERS — VESSEL SIZE

Horn OD (inches) / ACE Code	Vessel Family: Vessel Order Code / Size (mL): Extender size (inches / ACE code)	9833 Series				9837 Series		
		-05/ 250	-12/ 500	-16/ 1000	-21/ 2000	-09/ 500	-14/ 1000	-20/ 2000
		1/2-in/9814-25	1/2-in x 5-in/9816-06	A	F	F	F	A
3/4-in/9814-27	3/4-in x 5-in/9816-08	N/A	F	F	F	N/A	F	F
1-in/9814-30	1-in x 5-in/9816-10	N/A	F	F	F	N/A	F	F

F — Horn is used as is “fixed” length only  
A — Horn is adjustable and must be used w/9852 slide adapter  
NA — Either don’t need or doesn’t fit vessel



### FLO-THRU REACTOR *Ultrasonics* ♠

Continuous-flow borosilicate glass vessel provides uniform treatment by forcing reactant to pass in front of horn tip. The degree of processing is controlled by varying the power level and flow rate, max. 1.5L/Min. Reactants are pumped through side port, overflowing inner cup and out through bottom port. Treated material drains completely (no hang-up). Use of 9852-41 slide adapter in #25 Ace-Thred at top allows probe position to be varied within the inlet cup area, thereby maximizing use of ultrasonic energy.

Must be used with 1/2-inch O.D. (9814-25) horn and either 1/2-inch-5 extender (9816-06). Inlet and outlet tubes are 1/2-inch O.D. (13mm). #7 Ace-Thred located below top thread is for bleed or vacuum connection. For latter use, bushing with hole needs to be ordered for tubulature connection. Operated in vertical position only.

Complete item consists of reactor, #7 PTFE plug and #25 nylon bushing. Slide adapter and horn must be ordered separately.

	Qty	Order Code
Reactor Body, only	1	9841-18
#7 PTFE Plug, only	1	5803-05
#25 Nylon Bushing w/FETFE O-Ring	1	7506-10

#### Complete

	1	9841-30
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### REACTION VESSEL *Ultrasonics, Small Volume, 6-10mL* ♠

Tapered walls and proper size horn allow volumes as little as 6mL to be mixed. Fabricated of borosilicate glass with #25 Ace-Thred center neck and two  $\frac{1}{4}$  14/20 side necks. With 7506-10 bushing, center neck will accept 9852-41 slide adapter with 9814-25 horn and 9816-06 extender. Vessel measures 123mm (4-7/8 inches) high.

**Note:** Not supplied with bushing.

	Qty	Order Code
Reactor Body, only	1	9843-04
#25 Nylon Bushing w/FETFE O-Ring	1	7506-10

#### Complete

	1	9843-25
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### REACTION VESSEL *Ultrasonics, Small Volume, 10-50mL* ♠

For small-scale reactions and mixing, 10mL in bottom well and up to 50mL in main body. With #25 Ace-Thred center neck and two  $\frac{1}{4}$  14/20 side necks. With 7506-10 Bushing, center neck will accept 9852-41 Slide Adapter with 9814-25 horn and 9816-06 extender. Vessel measures 120mm (4-3/4-inch) high (including thread).

**Note:** Not supplied with bushing.

	Qty	Order Code
Reactor Body, only	1	9844-07
#25 Nylon Bushing w/FETFE O-Ring	1	7506-10

#### Complete

	1	9844-19
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## REACTION VESSEL Jacketed, Ultrasonics ★

Similar to 9833-05 vessel except jacketed to provide active cooling from tap water or mechanical cooler. Jacket is cylindrical with flat bottom for greater stability. With #25 Ace-Thred center neck and three  $\frac{1}{4}$ " 20 side necks. Use 7506-10 bushing with O-Ring in center neck to secure 9852-41 slide adapter for connecting converter. Capacity 250mL. Use with 3/8-inch I.D. tubing, size D hose connection.

	Qty	Order Code
Vessel, only	1	9848-07
#25 Nylon Bushing w/FETFE O-Ring	1	7506-10
<b>Complete</b>	1	9848-35



## REACTION VESSEL Jacketed, Ultrasonics ★

Similar to 9844-07 vessel except jacketed to provide active cooling from tap water or mechanical cooler. Jacket is cylindrical with flat bottom for greater stability. With #25 Ace-Thred center neck and two  $\frac{1}{4}$ " 20 side necks. Use 7506-10 bushing with O-Ring in center neck to secure 9852-41 slide adapter for connecting converter. Capacity 10–50mL. Use with 3/8-inch I.D. tubing, size D hose connection.

	Qty	Order Code
Vessel, only	1	9850-12
#25 Nylon Bushing w/FETFE O-Ring	1	7506-10
<b>Complete</b>	1	9850-30



## REACTION VESSEL Jacketed, Ultrasonics ★

Similar to 9843-04 vessel except jacketed to provide active cooling from tap water or mechanical cooler. Jacket is cylindrical with flat bottom for greater stability. With #25 Ace-Thred center neck and two  $\frac{1}{4}$ " 20 side necks. Use 7506-10 bushing with O-Ring in center neck to secure 9852-41 slide adapter for connecting converter. Capacity 6-10mL. Use with 3/8-inch I.D. tubing, size D hose connection.

	Qty	Order Code
Vessel, only	1	9851-05
#25 Nylon Bushing w/FETFE O-Ring	1	7506-10
<b>Complete</b>	1	9851-27



## ADAPTER Slide, Ultrasonics ♠

For use with 1/2-inch ultrasonic horn, 9814-25, and 1/2-inch extenders, only. Both slide adapters have a #36 Ace-Thred at top with a 6-inch extension, either 25 mm O.D. for insertion into a #25 Ace-Thred, or 35 mm O.D. for use in a #36 Ace-Thred. Secure 1/2-inch horn in adapter with 7506 bushing and O-Ring, then slide adapter extension into thread on reaction vessel, again securing with 7506 bushing. Now you have a variable depth adjustment of horn to achieve greater efficiency. Complete item consists of adapter, one nylon bushing with one FETFE O-Ring.

Ace-Thred Size	Extender O.D., mm	Glass Adapter		Bushing w/O-Ring	Complete
		Qty	Order Code	Order Code	Order Code
36	25	1	9852-21	7506-12	9852-41
36	35	1	9852-25	7506-12	9852-45





### ULTRASONIC SOUND ABATEMENT CABINET ★

Although ultrasonic vibrations are above the human audible range, in ultrasonic processing, high-pitched noise is produced from harmonics emanating from the vessel walls and the fluid surface. The sound abatement cabinet permits extended processing without discomfort by greatly reducing that noise.

Cabinet is fabricated from steel, painted chemically resistant blue, with clear plastic door. Inside of cabinet is lined with sound-abating foam.

One hole supplied at top for lead from power supply, two holes at bottom for water inlet/outlet, etc. All holes are covered with slit rubber. 1/2-inch vertical mounting rod located toward rear to left is for mounting sonochemical reactor.

Supplied with side handles for carrying and locking casters on bottom. Measures 46-1/2 inches high x 24 inches wide x 19 inches deep.

Qty	Order Code
1	9860-24

### ACCESSORIES

For Additional Items:

Pump see 13268	Clamps see 11065, 11082, 11084	Support Stand see 13586	Glass Adapters see 5028, 5030, 5261
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### POLYSCIENCE BENCHTOP MINI-CHILLER

*High Performance at a Reasonable Price* ★

Benchtop mini-chiller by PolyScience. Compact size for bench applications such as photochemistry, chromatography, ultrasonics or jacketed bench reactors. Features include:

- 130 watts of cooling @ 5°C
- Top-mounted fill port with spill protection cup
- Lighted fluid level indicator on front panel
- Easy access front panel and air filter
- Low flow rate and energy consumption
- High and low liquid level alarms
- Low flow alarm
- Temperature range -5 to 50° C at 0.1° stability
- Maximum pump flow 7.9LPM
- Pump type: centrifugal
- Reservoir capacity 2.65L
- 120V, 60Hz, 130W, 12 amp
- Also available in 240V, 50hz, CE-approved version

Qty	Order Code
1	12450-07



## PRECISION VACUUM REGULATOR *J-Kem Model DVR-1000*

Perfect for vacuum distillation. Unit automatically compensates for leaks in the equipment under test and maintains precise pressure, even in systems with a continuous gas purge. This computer (built-in) controlled vacuum regulator maintains pressure in the range of 0.1 to 760 Torr (atm pressure) in test instruments with volumes as small as 1 mL. Standard features include: 16-step programmable pressure ramp, serial communications for PC control and data logging. **Specifications:** Transducer — diaphragm is stainless steel, accuracy to 0.1%, proof pressure 200%. Controller — regulation 0.015% of range; Resolution 0.1 Torr or 0.01 psi; Vapor path materials are stainless steel and PTFE; Ramp Rates are 100 Torr/sec to 0.1 Torr/hr.; Serial communications, RS232 (RS485 or USB upon request). Standard is 120v, 60Hz. Also available in a 230v, 50Hz model.



Qty	Order Code
1	14063-10

## PROPORTIONING VALVES *J-Kem, Stainless Steel*

Select one for use with digital vacuum regulator 14063-10, listed above.

J-Kem Model	For Reactor Volumes	Cv	Orifice Size	Qty	Order Code
PSV-2	1 mL to 2 L	0.033	0.040 in.	1	14066-01
PSV-3	25 mL to 4 L	0.055	0.055 in.	1	14066-02
PSV-4	100 mL to 22 L	0.068	0.063 in.	1	14066-03
PSV-5	1 L to 50 L	0.12	0.093 in.	1	14066-04
PSV-6	Large Capacity	0.37	0.147 in.	1	14066-05
PSV-7	Large Capacity	0.7	0.234 in.	1	14066-06
PSV-8	Large Capacity	1.3	0.316 in.	1	14066-07
PSV-9	Large Capacity	2.0	0.375 in.	1	14066-08
DVR-PNV	Stainless Steel Needle Valve, improves regulation			1	14066-20



## VACUUM REGULATOR *J-Kem, No Mercury*

Connect to any vacuum pump or vacuum source, and then to any piece of equipment, to regulate pressure, in most cases to  $\pm 1$  Torr. A standard pressure ramp feature evacuates equipment at a user-defined rate to eliminate bumping due to solvent degassing or over-evacuation. Ideally suited for large volume distillations, rotary evaporators and vacuum chambers. Not recommended for small volume distillations or applications which involve a continuous purge with gas. Designed for vacuum systems that run continuously, such as, oil-filled vacuum pumps, aspirators, or with systems that are "always on," like in-house vacuum systems. The unit regulates pressure by opening and closing a valve that separates the vacuum source from the system being evacuated.



J-Kem Model	VAC	Qty	Order Code
DVR-200	120	1	14061-08
DVR-300	230	1	14061-20

## VACUUM REGULATOR *J-Kem, No Mercury*

Designed for use with diaphragm vacuum pumps. In some systems, pressure is regulated by turning the vacuum pump itself on and off. This unit extends the life of diaphragm pumps by never forcing the pump to start against an established vacuum, which can increase pump life by 100%. (Not pictured.)



J-Kem Model	VAC	Qty	Order Code
DVR-280	120	1	14062-10
DVR-380	230	1	14062-20

## Recovers >99% of solvent from rotary evaporators

Solvent	DVR Pressure (mm Hg)	Solvent Volume	Time To Dryness	Percent Recovery
Ether	475 Torr	340 mL	14.6 min.	99.6%
CH <sub>2</sub> Cl <sub>2</sub>	300 Torr	360 mL	21.9 min.	99.8%
CH <sub>2</sub> Cl <sub>2</sub>	100 Torr	255 mL	5.9 min.	99.5%
EtOAc	90 Torr	316 mL	17.0 min.	99.9%
Toluene	50 Torr	273 mL	15.7 Min.	99.4%

## DIGITAL VACUUM MONITOR *J-Kem*

Provides continuous display of system pressure, no regulation.

J-Kem Model	VAC	Qty	Order Code
DVM-100	120	1	14065-05
DVW-140	230	1	14065-20


**VACUUM GAUGE** *McLeod, Auto-Zero* ♠

A tilting gauge with a constant zero overflow which eliminates the capillary-depression error from an expanding meniscus. Once the zero line of the scale is aligned with the tip of the closed capillary, it is only necessary to bring the gauge to an upright position and read the scale behind the closed leg. Mercury overflows to maintain a constant head.

Bulbs are enlarged for easier pumping — longer mercury flow.

The mercury trap is incorporated into the female joint instead of the gauge, which allows unobstructed access in cleaning.

Gauges are fabricated from calibrated ACE Trubore® glass tubing, to assure uniform and reproducible reading between the gauges. This feature is also important when broken scales must be replaced, since it enables us to supply new scales without recalibrating the instrument. The McLeod gauge is useful for measuring pressures of true gases only. Water vapors and other condensable vapors should not be permitted to enter the gauge, since they can cause erroneous readings. Metal locking device has positive holding action — eliminates need for glass hooks and springs. Gauge will hold at any operating position to which it is rotated. Tapped hole is provided in the rear of the stand to accommodate the 6-inch threaded mounting rod for frame mounting, optional. Joint is ₣ 20/65.

**Note:** Requires approximately 20mL of mercury, which is NOT supplied.

Type	Pressure Range mm, Hg.	Lowest Reading mm, Hg.	Qty	<i>Glass Body only</i>	<i>Stand w/Joint, only</i>	<i>Joint For Stand, only</i>	<i>Scale only</i>	<i>Complete</i>
				Order Code	Order Code	Order Code	Order Code	Order Code
A	0–1.0	0.001	1	8725-07	8726-22	8726-24	8726-30	8725-47
B	0–5.0	0.005	1	8725-09	8726-22	8726-24	8726-32	8725-49
C	0–10.0	0.010	1	8725-11	8726-22	8726-24	8726-34	8725-51

**Accessories**

6-inch Mounting Rod, only

8726-803


**VACUUM GAUGE** *McLeod* ♠

Accurate to within  $\pm 3\%$ . The McLeod gauge is the most convenient and economical instrument for measuring low pressures from one micron up. The ACE McLeod gauge is offered in four ranges, so that it is possible to accurately measure any pressures between one micron and the highest reading on our D size, which is 15mm. All gauges are fabricated from calibrated ACE Trubore glass tubing, to assure uniform and reproducible readings between gauges. This feature is also important when broken scales must be replaced, since it enables us to supply new scales without recalibrating the instrument. The McLeod gauge is useful for measuring pressures of true gases only. Water vapors and other condensable vapors should not be permitted to enter the gauge, since they can cause erroneous readings. Metal locking device has positive holding action — eliminates need for glass hooks and springs. Gauge will hold at any operating position to which it is rotated. Joint is ₣ 20/65. Optional: Mounting rod that threads to back of stand for rack mount is 1/2-inch O.D. x 9-inches long; fits 8726 and 8728.

**Note:** Requires approximately 20mL of mercury, which is NOT supplied.

Type	Pressure Range mm, Hg.	Lowest Reading mm, Hg.	Qty	<i>Glass Body only</i>	<i>Stand w/Joint, only</i>	<i>Joint For Stand, only</i>	<i>Scale only</i>	<i>Complete</i>
				Order Code	Order Code	Order Code	Order Code	Order Code
A	0–1.0	0.001	1	8726-12	8726-22	8726-24	8726-30	8726-02
B	0–5.0	0.005	1	8726-14	8726-22	8726-24	8726-32	8726-04
C	0–10.0	0.010	1	8726-16	8726-22	8726-24	8726-34	8726-06
D	0–15.0	0.050	1	8726-18	8726-22	8726-24	8726-36	8726-08

**Accessories**

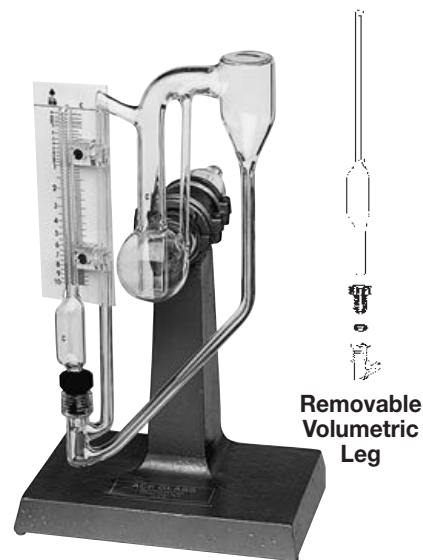
6-inch Mounting Rod, only

8726-803

## VACUUM GAUGE *McLeod, with Interchangeable Measuring Tube* ♠

Eliminates capillary depression error common to other designs. Easily cleaned. Accuracy  $\pm 3\%$ . A tilting McLeod gauge which maintains a constant overflow head of mercury and maintains capillary depression of the meniscus. Readings do not “bounce.” The measuring tube is a completely removable and interchangeable unit, permitting accurate determination of V1 values; the capillary stem is Trubore glass. Minute adjustment of zero line scale position is also possible for increased accuracy. Scales are replaceable without recalibration. The measuring tube bulb is flattened on one side to increase drainage speed without causing hold-up; the lower stem is securely fastened with compressed FETFE O-Ring and threaded coupling. The mercury reservoir system has been redesigned for easier pumping and increased mercury storage, if desired, to prolong overflow time. Inlet trap allows mercury to be dumped out when changing is necessary. For mounting rod, see 8726-803.

**Note:** Requires approximately 20mL of mercury, which is NOT supplied.



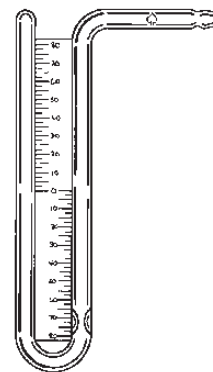
Type	Pressure Range mm, Hg.	Lowest Reading mm, Hg.	Qty	<i>Glass Body only</i>	<i>Stand w/Joint, only</i>	<i>Joint For Stand, only</i>	<i>Scale only</i>	<i>Volumetric Legs</i>	<i>Complete</i>
				Order Code	Order Code	Order Code	Order Code	Order Code	Order Code
B	0-5.0	0.005	1	8728-13	8726-22	8726-24	8726-32	8728-41	8728-05
C	0-10.0	0.010	1	8728-15	8726-22	8726-24	8726-34	8728-43	8728-07
D	0-15.0	0.050	1	8728-17	8726-22	8726-24	8726-36	8728-45	8728-09

## VACUUM GAUGE ♠

A simple form of vacuum gauge, not mounted, but supplied with graduated scale.

**Note:** Mercury NOT supplied.

Qty	Order Code
1	8722-10




**VACUUM GAUGE** *Progressive Display, Digivac TracVac*

Bar graph style vacuum meter. Visually illustrates vacuum pressure rate changes which enables the quick determination of increasing or decreasing vacuum. Vacuum interface: 1/8 inch NPT or 1/4 inch male flare. 10 foot sensor cord. CE rated.

Range, microns	Motor, Voltage	Motor, Hz	Order Code
1-760,000	100-240	50/60	14301-01

**Accessories**

PTFE #15 Ace-Thred Bushing, 1/8" FMPT	5844-62
24/40 to #15 Ace-Thred Adapter	5030-40
29/42 to #15 Ace-Thred Adapter	5030-42
45/50 to #15 Ace-Thred Adapter	5030-45
1/2" PTFE Sealing Tape	14120-18


**VACUUM GAUGE** *Transmitter, Digivac 22W LCD*

A small compact versatile vacuum gauge that can fit almost anywhere. Uses a standard, replaceable, vacuum gauge tube with 1/8in MNPT threads. Easily can be adapted to fit onto any schlenk line to give highly accurate and recordable data readings. Includes a built in rs232 port for data download to a PC and a 5 vdc output with a single set-point for output to PLC's or chart recorders. Factory calibrated to NIST traceable standard. CE rated.

Range, microns	Motor, Voltage	Motor, Hz	Order Code
1-760,000	100-230	50/60	14302-01

**Accessories**

PTFE #15 Ace-Thred Bushing, 1/8" FMPT	5844-62
24/40 to #15 Ace-Thred Adapter	5030-40
29/42 to #15 Ace-Thred Adapter	5030-42
45/50 to #15 Ace-Thred Adapter	5030-45
1/2" PTFE Sealing Tape	14120-18


**VACUUM GAUGE** *Handheld, Bullseye Precision Gauge*

A rugged, portable vacuum measurement instrument designed specifically for the demands of field use. Precise reading with 11 measurable units and field calibrated. Display range is 1-800,000 microns, +/-17% accuracy from 1-2000 microns and +/-30% accuracy from 2001-800,000 microns. Selectable graphic mode allows for chart graphs or numerical display. Data can be logged and output in a spreadsheet format. Vac interface: 1/8 inch NPT or 1/4 inch flare. Features a 7 foot cord, rubber boot, kickstand and magnet for hands free operation.

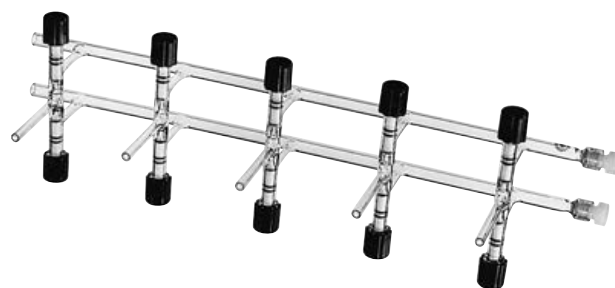
Range, microns	Power, Alkaline Batteries	Order Code
1-800,000	(4) AA	14303-01

**Accessories**

PTFE #15 Ace-Thred Bushing, 1/8" FMPT	5844-62
24/40 to #15 Ace-Thred Adapter	5030-40
29/42 to #15 Ace-Thred Adapter	5030-42
45/50 to #15 Ace-Thred Adapter	5030-45
1/2" PTFE Sealing Tape	14120-18

## MANIFOLD *Double Tube, with Threaded Stopcocks* ♦

Greaseless vacuum/gas manifold with 0-4mm high vacuum, Easy-Action PTFE, and three-way stopcocks for takeoffs. One end of bottom and top manifold tube has a #7 Ace-Thred for easy cleaning. Ends are supplied with 5846-04 nylon stopper/plugs with FETFE O-Rings. Port connections are 8mm O.D.; vacuum and gas connections are 1/2-inch O.D. Distance between takeoffs is 100mm.



No. of Ports	Approx. overall Distance, mm	Qty	Order Code
3	300	1	8729-50
5	500	1	8729-54

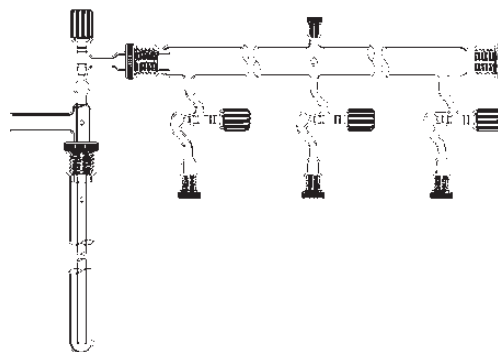
### Replacement Plugs

		1	8194-266
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## MANIFOLD *Vacuum, Walters* ♦

Greaseless vacuum line fabricated from Ace-Threds and Easy-Action PTFE stopcocks. Three ports are 0-5mm high vacuum PTFE stopcocks with #11 Ace-Thred bushing connection to working vessel. Stopcocks are positioned parallel to main body to allow operation from front or back. Main body can be reversed for convenience of left-handed operation.

On top of main body is a #7 Ace-Thred with a 1/8-inch NPT nylon adapter for connection to thermocouple vacuum gauge. Each end of main body has a #25 Ace-Thred for easier cleaning. One end stoppered with nylon plug. Other end has a bushing connection to a vacuum trap. The vacuum trap features an Easy-Action, 0-10mm, high vacuum stopcock with removable trap. This permits cleaning of trap without removing vacuum line tubing. Vacuum tubing connection on trap is 25mm O.D. Length of main body is approximately 24 inches. Vacuum trap is approximately 16 inches.



Description	Qty	Order Code
Main Body, only, w/Stopcocks	1	8729-03
Vacuum Trap Inner Tube, w/Stopcock	1	8729-25
Vacuum Trap Body, only	1	8729-26
Bushing, Nylon, #25 (2)	1	7506-10
Bushing, Nylon, #11 (3)	1	7506-02
Stopper, Nylon, #25	1	5846-16
Stopper, Nylon, #7	1	5846-04
Adapter, Swagelok, #7 to 1/8-inch	1	5844-16

### Complete

	1	8729-40
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### Replacement Stopcocks

0-10mm PTFE Plug	1	8192-264
0-5mm, 0-8mm PTFE Plug	1	8194-268

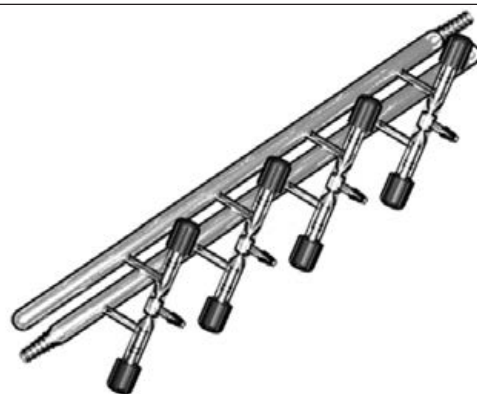
## MANIFOLD *Double tube, Vacuum or Inert Gas, with Threaded Stopcocks* ♦

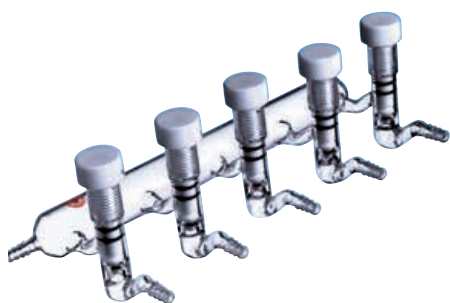
Double tube, greaseless vacuum/gas manifold with four take-off ports. Each port has two 0-4 Easy-Action, PTFE stopcocks connected to main tube bodies at a 45° angle. Overall length is 500mm. Distance between ports is 100mm to center. Hose barb connections at ends and on take-off ports are all size C for 3/8-inch I.D. tubing.

No. of Ports	Approx. overall Distance, mm	Qty	Order Code
4	500	1	8729-52

### Replacement Stopcocks

0-5mm, 0-8mm PTFE Plug	1	8194-266
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**Complete system  
bakeable  
when ordered  
with PTFE  
plug handles**

### MANIFOLD Vacuum ♠

All glass and PTFE vacuum manifold with three, four or five stopcock ports. Each port is a variable opening, 0–10mm, high vacuum threaded stopcock. Plugs are PTFE with polyethylene or UHDPE handles and FETFE O-Rings. Ultimate vacuum of 10<sup>-7</sup> can be realized with O-Rings as supplied. In the event you need to bake the entire system, order bakeable plugs with PTFE handles. Hose connections on stopcocks and vacuum line are size E for 13-15mm O.D. vacuum tubing. Available left side connection (illustration) or right side connection.

**Note:** Manifold can be altered to your special needs, i.e. joint or thread on takeoff, more or fewer takeoffs, etc. Contact us for FREE quotation.

#### Left Side Connection

Plug Handle Material	No. of Ports	Approx. End to End Length, mm	Qty	Order Code
UHDPE*	3	235	1	8730-12
PTFE**	3	235	1	8730-14
UHDPE	4	320	1	8730-16
PTFE	4	320	1	8730-18
UHDPE	5	375	1	8730-20
PTFE	5	375	1	8730-22

#### Right Side Connection

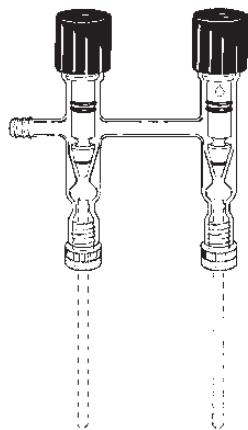
Plug Handle Material	No. of Ports	Approx. End to End Length, mm	Qty	Order Code
UHDPE	3	235	1	8730-27
PTFE	3	235	1	8730-29
UHDPE	4	320	1	8730-31
PTFE	4	320	1	8730-33
UHDPE	5	375	1	8730-35
PTFE	5	375	1	8730-37

\*UHDPE— Ultra High Density Polyethylene, maximum temperature limit, 130°C.

\*\*PTFE — Polytetrafluoroethylene, maximum temperature limit, 200°C.

#### Replacement Stopcocks

For replacement Plugs, use 8194-270 or 8194-97



### MANIFOLD Tip-Off ♠

Used to tip-off NMR tubes. How It Works: NMR tube is inserted in lower Ace-Thred port and tightened via bushing for vacuum-thaw work. Vacuum line is connected to side hose connection, size E. Tube can then be tipped-off with flame. Aluminum shield bonded to nylon bushing helps delay heat transfer. Each port is individually controlled by smooth-acting, semi-needle, threaded PTFE plug to allow removal of one tube while others are still under vacuum; vacuum of 10<sup>-6</sup> is common. PTFE plug and tip-off port O-Rings are FETFE or Viton. Tip-off ports can be supplied for 5mm, 8mm and 10mm NMR tubes. Manifolds can be supplied with single port or multiple ports of the same size or different size. Quotations will be supplied for manifolds differing from those listed. Complete item consists of glass manifold, PTFE plug(s), bushing(s) with fire shield and O-Rings.

No. of Ports	Manifold for Tube Size	Qty	Order Code
2	5mm, 5mm	1	8731-34
2	8mm, 8mm	1	8731-38
1	10mm	1	8731-44
4	5mm, 5mm, 8mm, 10mm	1	8731-56

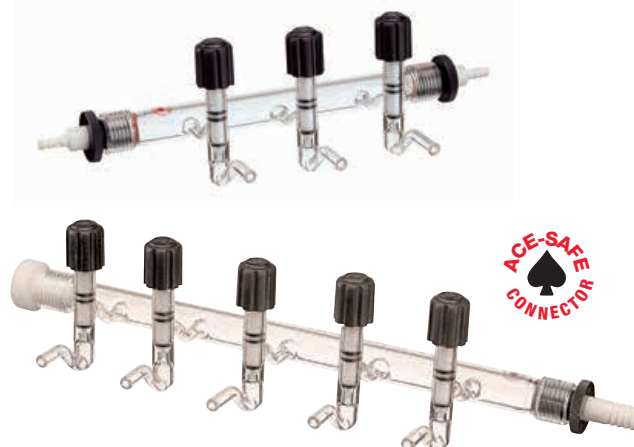
No. of Ports	Manifold for Tube Size	Qty	Order Code	Glass Only	Tip-Off Bushing	Tip-Off Port O-Rings
				Qty	Order Code	Qty
2	5mm, 5mm	1	8731-12	1	8731-75	
2	8mm, 8mm	1	8731-15	1	8731-78	12 7855-704
1	10mm	1	8731-19	1	8731-80	12 7855-716
4	(2) 5mm, 8mm, 10mm	1	8731-22		See Above	See Above

#### Replacement Parts

Replacement PTFE Plug, only	1	8194-268
Replacement O-Rings/set	1	8194-86

## MANIFOLD Vacuum, Dual

Glass Manifold with #15 Ace-Thred at either end to allow switching 5853 vacuum connection to left or right side. Supplied with three or five 0–4mm high vacuum, Easy-Action stopcocks for sample ports (additional ports can be ordered). Plugs are PTFE with nylon hooded handles and FETFE O-Rings. Ultimate vacuum of  $10^{-7}$  can be realized with standard three O-Rings. Overall length of glass manifold is: 9-1/8 inches (232mm) for three ports; 13-5/8 inches (346mm) for five ports. Supplied with “Ace-Safe” serrated connector for one end to connect vacuum line. Complete item consists of 8734 glass manifold, 5846-48 end plug with FETFE O-Ring, and 5853 Ace-Safe connectors with bushing for 1/4-inch or 1/2-inch tubing connection.



### Three Ports

	Qty	Order Code	
Glass Manifold, only	1	8734-07	★
End Plug, PTFE with O-Ring	1	5846-48	♠
Connector, with O-Ring, for 1/4 in.	1	5853-18	♠
Connector, with O-Ring, for 1/2 in.	1	5853-21	♠
Connector Bushing	1	7506-05	♠

### Complete

	1	8734-10	★
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### Five Ports

Glass Manifold, only	1	8734-14	★
End Plug, PTFE with O-Ring	1	5846-48	♠
Connector, with O-Ring, for 1/4 in.	1	5853-18	♠
Connector, with O-Ring, for 1/4 in.	1	5853-21	♠
Connector Bushing	1	7506-05	♠

### Complete

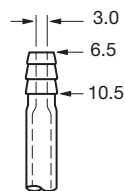
	1	8734-20	★
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### Replacement Parts

Replacement O-Ring, for 5853, use 7855-210; for 5846, use 7855-716  
 Replacement Stopcock use 8194-266 for either manifold

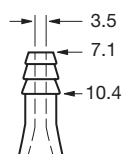
## Hose Connection Size Guide

### Dimensions in Millimeters



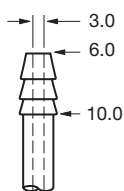
**A**

Use with  
7.9mm (5/16")  
I.D. Tubing



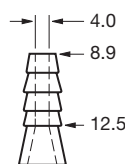
**B**

Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



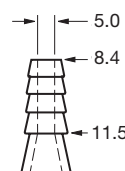
**C**

Use with  
7.9mm (5/16")  
or 9.5mm (3/8")  
I.D. Tubing



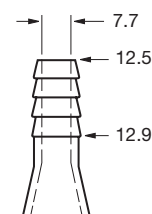
**D**

Use with  
9.5mm (3/8")  
I.D. Tubing



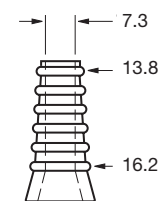
**E**

Use with  
9.5mm (3/8")  
or 11.1mm (7/16")  
I.D. Tubing



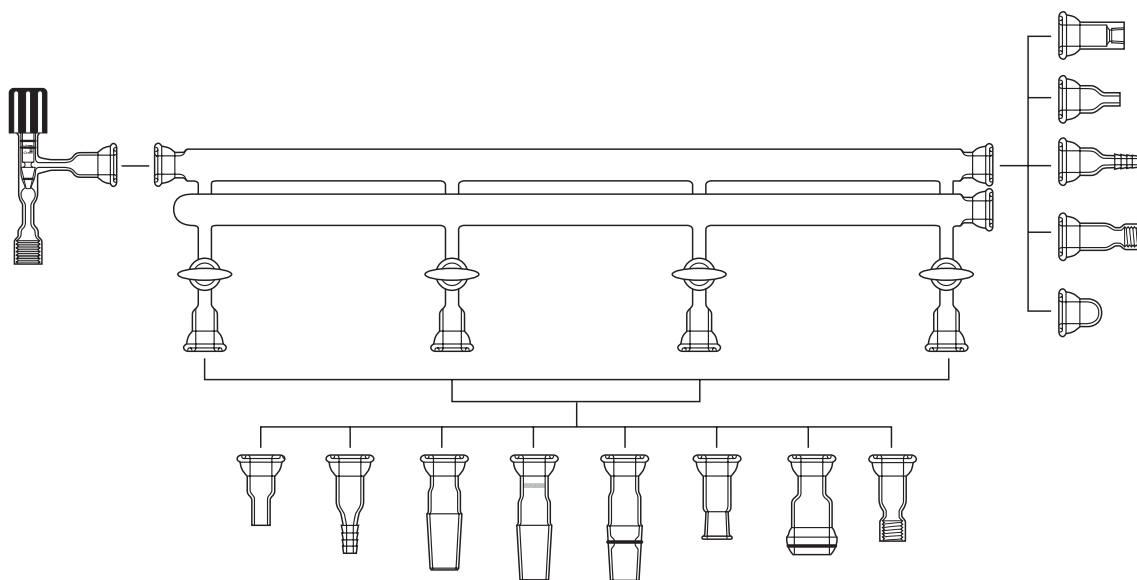
**F**

Use with  
11.1mm (7/16")  
or 12.7mm (1/2")  
I.D. Tubing



**G**

Use with  
15.9mm (5/8")  
I.D. Tubing



### MANIFOLD Double Tube, O-Ring Joint Connections ♦

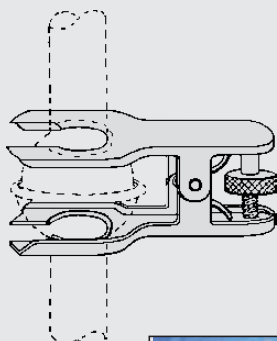
No. 15 O-Ring joint connections at each end. Three or four ports with 4mm bore glass double oblique stopcocks. Standard taper joints or No. 15 O-Ring joint connections off each port. The distance between ports is 210mm, which will accept 3L flasks or smaller.

**Note:** Requires all-stainless-steel pinch-type screw locking clamp 7669-12 (for No. 15 O-Ring joint), listed below.

Number of Ports	Port Joints	Overall Length, mm	Qty	Order Code
3	14/20	500	1	8737-02
3	24/40	500	1	8737-04
3	No. 15 O-Ring	500	1	8737-06
4	14/20	710	1	8737-20
4	24/40	710	1	8737-22
4	No. 15 O-Ring	710	1	8737-24

### Parts and Accessories

28/15 Stainless Steel Screwlock Pinch Clamp	1	7669-12
FETFE O-Ring, Size 123 for No. 15 Joint	6	7855-726



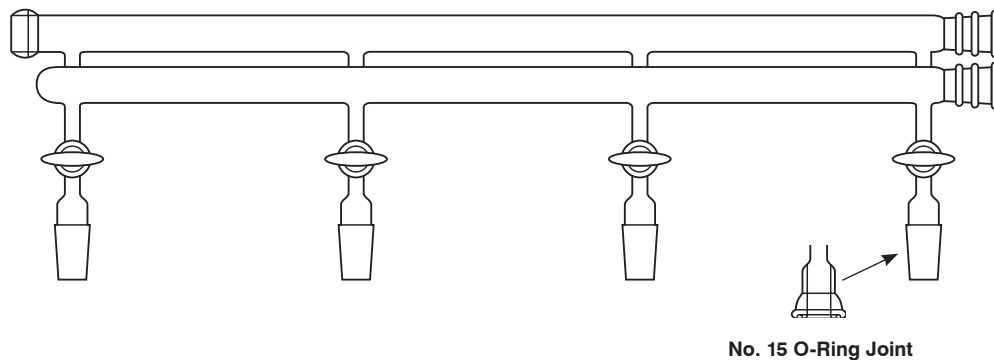
### CLAMPS Pinch Type, Stainless Steel ★

All stainless steel pinch clamps for use with O-Ring spherical joints and ball and socket joints.

**Note:** Only screw-locking clamps should be used with O-Ring spherical joints.

Joint Size, mm	For $\text{J}$ Joint	Qty	Order Code
<b>Spring-Loaded</b>			
12	12/5	1	7669-03
18	18/9	1	7669-05
<b>Screwlock</b>			
12	12/5	1	7669-08
18	18/9	1	7669-10
28	28/15	1	7669-12
35	35/25	1	7669-14
40	—	1	7669-16
50	50/30	1	7669-18
65	65/40	1	7669-20
75	75/50	1	7669-22
102	102/75	1	7669-26





### MANIFOLD Double Tube, Ground Joint Connections ♠

With  $\text{§}$  35/20 ball joint at one end,  $\text{§}$  24/40 outer standard taper joints at opposite end. Three or four ports with 4mm bore glass double oblique stopcocks and standard taper joints or 15 O-Ring joint connections off each port. The distance between ports is 210mm, which will accept 3L flasks or smaller.

**Note:** Requires all-stainless steel pinch-type screw locking clamp 7669-12 (for No. 15 O-Ring joint), listed on pg. 624.

Number of Ports	Port Joints	Overall Length, mm	Qty	Order Code
3	$\text{§}$ 14/20	520	1	8738-14
3	$\text{§}$ 24/40	520	1	8738-16
3	No. 15 O-Ring	520	1	8738-18
4	$\text{§}$ 14/20	730	1	8738-40
4	$\text{§}$ 24/40	730	1	8738-42
4	No. 15 O-Ring	730	1	8738-44

#### Parts and Accessories

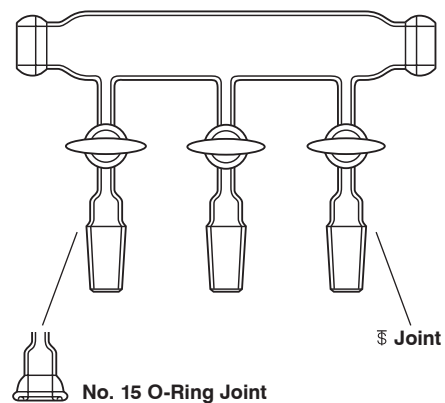
28/15 Stainless Steel Screwlock Pinch Clamp	1	7669-12
FETFE O-Ring, Size 123 for No. 15 Joint	6	7855-726

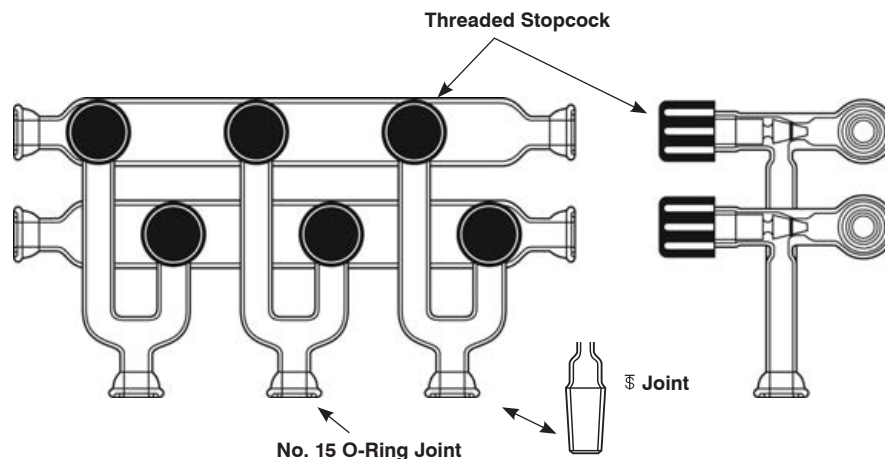
### MANIFOLD Single Tube, Ground Joint Connections ♠

With  $\text{§}$  35/20 ball joint connections at each end. Three or four ports with 4mm bore glass high-vacuum stopcocks and standard taper joints or No. 15 O-Ring joint connections off each port. The distance between ports is 95mm, which will accept 250mL flasks or smaller.

**Note:** Requires all-stainless steel pinch-type screw locking clamp 7669-12 (for No. 15 O-Ring joint), listed on pg. 624.

Number of Ports	Port Joints	Overall Length, mm	Qty	Order Code
3	$\text{§}$ 14/20	310	1	8743-04
3	$\text{§}$ 24/40	310	1	8743-06
3	No. 15 O-Ring	310	1	8743-08
4	$\text{§}$ 14/20	405	1	8743-15
4	$\text{§}$ 24/40	405	1	8743-17
4	No. 15 O-Ring	405	1	8743-19





### MANIFOLD Double Tube, O-Ring Joint Connections ♦

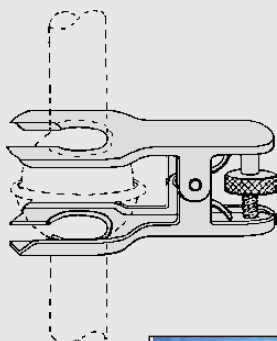
15 O-Ring joint connections at each end. Three or four ports with Easy Action 0-10mm threaded stopcocks and standard taper joints or 15 O-Ring joint connections off each port. The distance between ports is 100mm, which will accept 250mL flasks or smaller.

**Note:** Requires all-stainless-steel pinch-type screw locking clamp 7669-12 (for No. 15 O-Ring joint), listed below.

Number of Ports	Port Joints	Overall Length, mm	Qty	Order Code
3	14/20	355	1	8739-13
3	24/40	355	1	8739-18
3	No. 15 O-Ring	355	1	8739-21
4	14/20	455	1	8739-36
4	24/40	455	1	8739-38
4	No. 15 O-Ring	455	1	8739-40

### Parts and Accessories

28/15 Stainless Steel Screwlock Pinch Clamp	1	7669-12
FETFE O-Ring, Size 123 for No. 15 Joint	6	7855-726
0-10 PTFE-Cap Stopcock Plug	1	8189-50



### CLAMPS Pinch Type, Stainless Steel ★

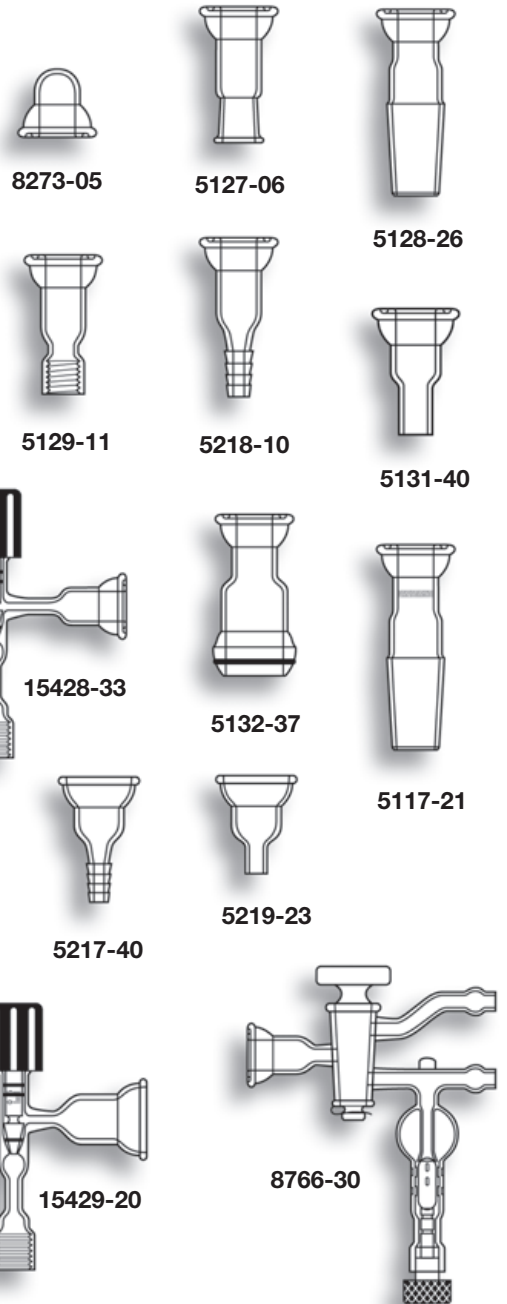
All stainless steel pinch clamps for use with O-Ring spherical joints and ball and socket joints.

**Note:** Only screw-locking clamps should be used with O-Ring spherical joints.

Joint Size, mm	For $\text{J}$ Joint	Qty	Order Code
<b>Spring-Loaded</b>			
12	12/5	1	7669-03
18	18/9	1	7669-05
<b>Screwlock</b>			
12	12/5	1	7669-08
18	18/9	1	7669-10
28	28/15	1	7669-12
35	35/25	1	7669-14
40	—	1	7669-16
50	50/30	1	7669-18
65	65/40	1	7669-20
75	75/50	1	7669-22
102	102/75	1	7669-26

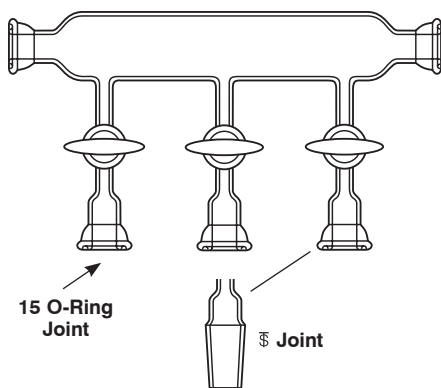
# Manifold Adapters

Description	Qty	Order Code	
No. 15 O-Ring Joint to Cap (Stopper)	1	8273-05	♠
No. 15 O-Ring Joint to 14/20 Outer Joint	1	5127-04	♠
No. 15 O-Ring Joint to 19/22 Outer Joint	1	5127-06	♠
No. 15 O-Ring Joint to 24/40 Outer Joint	1	5127-20	♠
No. 15 O-Ring Joint to 14/20 Inner Joint	1	5128-07	♠
No. 15 O-Ring Joint to 19/22 Inner Joint	1	5128-11	♠
No. 15 O-Ring Joint to 24/40 Inner Joint	1	5128-26	♠
No. 15 O-Ring Joint to #7 Ace-Thred	1	5129-07	♠
No. 15 O-Ring Joint to #11 Ace-Thred	1	5129-11	♠
No. 15 O-Ring Joint to #15 Ace-Thred	1	5129-15	♠
No. 15 O-Ring Joint to #25 Ace-Thred	1	5129-25	♠
No. 15 O-Ring Joint to Size F Hose Conn. (3/8-inch Tube)	1	5218-10	♠
No. 15 O-Ring Joint to Straight 3/8-inch Tube <sup>1</sup>	1	5131-30	♠
No. 15 O-Ring Joint to Straight 1/2-inch Tube <sup>1</sup>	1	5131-40	♠
No. 15 O-Ring Joint to 0-5mm Valve with #7 Ace-Thred	1	15428-28	♠
No. 15 O-Ring Joint to 0-5mm Valve with #11 Ace-Thred	1	15428-33	♠
No. 15 O-Ring Joint to 0-15mm Valve with #15 Ace-Thred	1	15428-35	♠
No. 15 O-Ring Joint to 0-10mm Valve with #15 Ace-Thred	1	15428-37	♠
No. 15 O-Ring Joint to 14/20 O-Ring Joint	1	5132-06	♠
No. 15 O-Ring Joint to 24/40 O-Ring Joint	1	5132-09	♠
No. 15 O-Ring Joint to 35/25 Ball Joint	1	5132-37	♠
No. 15 O-Ring Joint to 14/20 Outer Joint w/Por B Frit	1	5117-18	♠
No. 15 O-Ring Joint to 19/22 Outer Joint w/Por B Frit	1	5117-21	♠
No. 15 O-Ring Joint to 24/40 Outer Joint w/Por B Frit	1	5117-24	♠
35/25 Socket Joint to Size F Hose Conn. (1/2-inch Tube)	1	5217-40	♠
35/25 Socket Joint to Straight 3/8-inch Tube	1	5219-23	♠
35/25 Socket Joint to Straight 1/2-inch Tube	1	5219-26	♠
35/25 Socket Joint to 0-5mm Valve with #7 Ace-Thred	1	15429-17	♠
35/25 Socket Joint to 0-5mm Valve with #11 Ace-Thred	1	15429-20	♠
No. 15 O-Ring Joint to 1/8-inch Female NPT, 316 Stainless Steel	1	8877-14	★
Firestone Purge Valve with No. 15 O-Ring Joint <sup>2</sup>	1	8766-30	♠
FETFE Replacement O-Ring for No. 15 O-Ring Joint	1	7855-726	♠



<sup>1</sup>Sized for use with Cajon® or Swagelok® Compression Fittings  
<sup>2</sup>Use with Vacuum Gauge Sensing Head

**Custom adapters available - contact us for a FREE quote!**


**MANIFOLD Single Tube, O-Ring Joint Connections** ♠

No. 15 O-Ring joint connections at each end. Three or four ports with 4mm bore glass high-vacuum stopcocks and standard taper joints or No. 15 O-Ring joint connections off each port. The distance between ports is 95mm, which will accept 250mL flasks or smaller.

**Note:** Requires all-stainless-steel pinch-type screw locking clamp 7669-12 (for No. 15 O-Ring joint), listed on pg. 626.

Number of Ports	Port Joints	Overall Length, mm	Qty	Order Code
3	⌀14/20	310	1	8740-03
3	⌀24/40	310	1	8740-05
3	No. 15 O-Ring	310	1	8740-07
4	⌀14/20	405	1	8740-18
4	⌀24/40	405	1	8740-20
4	No. 15 O-Ring	405	1	8740-22

**Parts and Accessories**

28/15 Stainless Steel Screwlock Pinch Clamp	1	7669-12
FETFE O-Ring, Size 123 for No. 15 Joint	6	7855-726


**MANIFOLD Single Tube, O-Ring Joint Connections** ♠

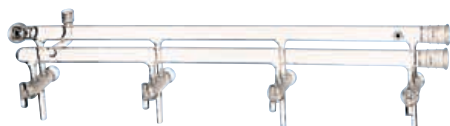
No. 15 O-Ring joint connections at each end. Three or four ports with Easy-Action 0-10mm threaded stopcocks and standard taper joints or No. 15 O-Ring joint connections off each port. The distance between ports is 95mm, which will accept 250mL flasks or smaller.

**Note:** Requires all-stainless-steel pinch-type screw locking clamp 7669-12 (for No. 15 O-Ring joint), listed on pg. 626.

Number of Ports	Port Joints	Overall Length, mm	Qty	Order Code
3	⌀14/20	310	1	8745-10
3	⌀24/40	310	1	8745-12
3	No. 15 O-Ring	310	1	8745-14
4	⌀14/20	405	1	8745-31
4	⌀24/40	405	1	8745-33
4	No. 15 O-Ring	405	1	8745-35

**Parts and Accessories**

28/15 Stainless Steel Screwlock Pinch Clamp	1	7669-12
FETFE O-Ring, Size 123 for No. 15 Joint	6	7855-726
0-10 PTFE-Cap Stopcock Plug	1	8189-50


**MANIFOLD Double Tube** ♠

Double tube manifold, same as item supplied on the ACE-Burlitch Inert Atmosphere System. With four double-oblique high-vacuum glass stopcocks, 4mm bore. Takeoff ports are 10mm O.D. Two ⌀24/40 joints on right end for easy cleaning. Upper manifold tube has a ⌀35/25 ball joint for connection to trap, supplemental vacuum manifold with McLeod gauge (available from ACE) or vacuum.

Lower tube has a #11 Ace-Thred extending toward the rear and bent 90° to the vertical for connecting a 10mm O.D. gas line using 7506-02 bushing with O-Ring. Distance between ports is 200mm; overall length is approximately 670mm.

**Note:** Manifold NOT supplied with bushing, O-Ring, ⌀24/40 stoppers or clamps.

	Qty	Order Code
Double Tube Manifold	1	7818-24

**Stoppers/Clamps**

24/40 Stainless Steel Clamps (pk 12)	1	7600-25
24/40 Stopper	1	8250-12

**Bushing**

11mm Nylon Bushing with O-Ring	1	7506-02
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## MANIFOLD Vacuum, Dual

Glass manifold with #15 Ace-Thred at either end to allow switching 5853 vacuum connection to left or right side. Supplied with three or five 4mm straight bore PTFE stopcock sampling ports. (Additional ports can be ordered). Overall length of glass manifold is 230mm.



	Qty	Order Code	
<b>Three Ports</b>			
Glass Manifold, only	1	8763-14	★
End Plug, PTFE with O-Ring	1	5846-48	♠
Connector, with O-Ring, for 1/4-in.	1	5853-18	♠
Connector, with O-Ring, for 1/2-in.	1	5853-21	♠
Connector Bushing	1	7506-05	♠

### Complete

	1	8763-44	★
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### Five Ports

Glass Manifold, only	1	8763-16	★
End Plug, PTFE with O-Ring	1	5846-48	♠
Connector, with O-Ring, for 1/4-in.	1	5853-18	♠
Connector, with O-Ring, for 1/2-in.	1	5853-21	♠
Connector Bushing	1	7506-05	♠

### Complete

	1	8763-46	★
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### Replacement Stopcocks

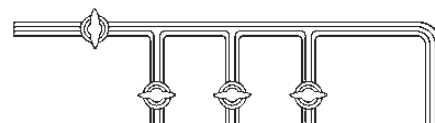
4mm Bore PTFE Stopcock Plug	1	8224-12	
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## GAS MANIFOLD ♠

For portable gas analysis apparatus. Three or four straight 2mm bore glass stopcocks and one three-way stopcock with back port, fabricated on capillary tubing.

**Note:** We can fabricate custom gas manifolds of all kinds. Contact us for a FREE quotation.

No. Straight Bore Stopcocks	Qty	Order Code
3	1	7416-10
4	1	7416-14



## MANIFOLD Vacuum, Firestone<sup>1</sup> ★

Vacuum/gas manifold with a Firestone rapid purge valve at one end and 0–5mm high vacuum, Easy-Action PTFE stopcock ports with 3/8-inch O.D. Swagelok tubing connections. Each connection has an O-Ring groove (O-Rings supplied) for use with #11 Ace-Thred. Valve eliminates the need for a second tube. Simply connect one 10mm O.D. arm to vacuum, the other to a gas source, and by half turn of the stopcock plug you can alternate between vacuum and gas. Shut-off float on gas side of valve prevents pressure buildup when system is purged. Plugs are PTFE with UHDPE\* or PTFE handles with FETFE O-Rings.



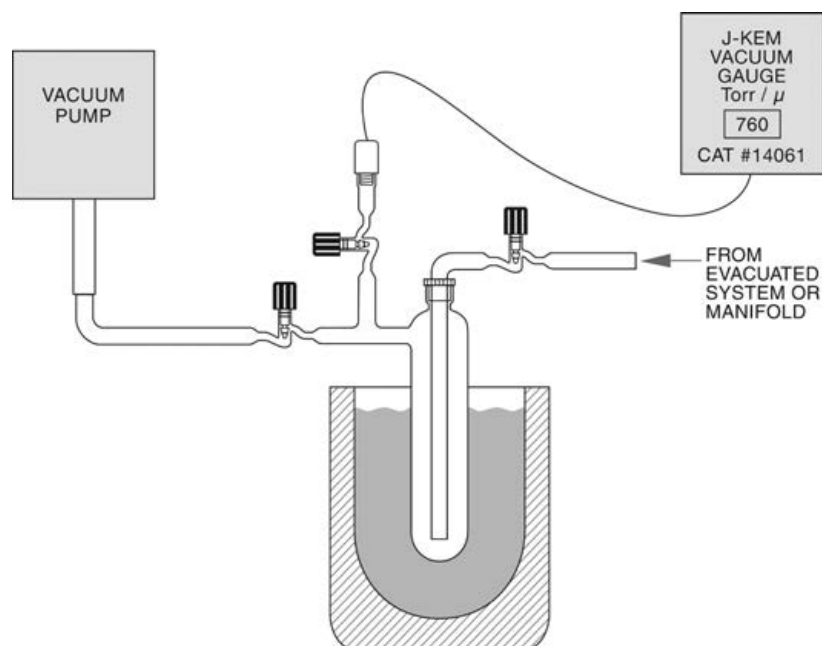
Plug Handle Material	No. of Ports	Qty	Order Code
UHDPE	3	1	8765-13
PTFE	3	1	8765-15
UHDPE	4	1	8765-27
PTFE	4	1	8765-29
UHDPE	5	1	8765-34
PTFE	5	1	8765-36

### Replacement Plugs

0-5mm, 0-8mm PTFE plug w/ UHDPE handle	8194-268
0-5mm, 0-8mm PTFE plug with PTFE handle	8194-96

\*UHDPE — Ultra High Density Polyethylene

<sup>1</sup>Valve designed by Dr. Raymond Firestone



### HIGH VACUUM SYSTEM ♠

Protect your 14065 vacuum gauge or other gauge heads from corrosive vapors or particles that might foul the sensing head. Fabricated from borosilicate glass, this system consists of a Dewar flask and a cold trap with connections to pump, system, and gauge, each with high-vacuum stopcocks. Connections to system and vacuum pump are #25 O-Ring joints. Vacuum gauge head threads into a 5844-62 PTFE adapter, then into an Ace-Thred on the arm of the trap. Trap body is 38mm O.D. x 250mm long.

Item	Qty	Order Code
Trap Body with two stopcocks, O-Ring joint and #15 Ace-Thred	1	8775-16
Trap Inlet Arm with stopcock and O-Ring joint	1	8775-18
Adapter, #15-1/8-inch NPT	1	5844-62
Dewar Flask, 6.8cm I.D. x 30.2cm high	1	7075-15
<b>Complete</b>	1	8775-50

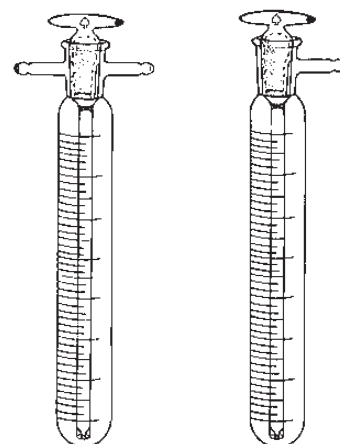
### Pressure Conversions

Absolute									Gauge Pressure	
cm of Hg	Torr or mm of Hg	Micron	Atmo-sphere	lb/in. <sup>2</sup>	ton/ft. <sup>2</sup>	gram/cm <sup>2</sup>	ft. of H <sub>2</sub> O	in. of Hg	lb. in.	in. of Hg
76	760	760000	1	14.7	1.06	1033	33.9	29.9	0.00	0.00
70	700	700000	0.921	13.53	0.975	952	31.2	27.6	1.16	2.36
60	600	600000	0.79	11.6	0.835	816	26.8	23.6	3.10	6.30
50	500	500000	0.659	9.67	0.696	680	22.3	19.7	5.03	10.2
40	400	400000	0.526	7.74	0.557	545	17.8	15.7	6.97	14.2
30	300	300000	0.395	5.8	0.417	408	13.4	11.8	8.90	18.1
20	200	200000	0.263	3.87	0.278	272	8.92	7.87	10.8	22.0
10	100	100000	0.132	1.94	0.139	136	4.46	3.94	12.8	26.0
5	50	50000	0.006	0.967	0.07	68	2.23	1.97	13.7	27.9
1	10	10000	0.013	0.194	0.014	13.6	0.446	0.394	14.5	29.5
0.1	1	1000	0.001	0.019	0.001	1.36	0.045	0.039	14.68	29.88
0	0	0	0	0	0	0	0	0	14.7	29.92

## MANOMETER Mercury ♠

Compact manometer with graduated, round-bottom jacket enclosing the manometer tube which is sealed to a stopcock plug. Tube is vented through one or two side tubulations in the neck. Scale range is from 0–160mm. Joint is  $\text{K} 14/35$ . **Mercury NOT supplied.**

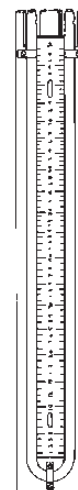
	Qty	Order Code
Complete with one Tubulation	1	8733-07
Complete with two Tubulations	1	8733-17



## GAUGE Vacuum or Pressure ♠

With standard “U” shape gauge made of heavy barometer tubing and mounted on a wooden panel for vertical suspension. The scale is adjustable and accurately calibrated. Supplied with scale and tubes. **Mercury NOT supplied.**

Scale Length, cm	Qty	Order Code
30	1	8735-05
60	1	8735-10
100	1	8735-15



## VACUUM REGULATOR Improved Cartesian Type ♠

Sensitivity and versatility are increased over other models, and mercury requirement is reduced to 20–30mL. A control point within 1mm Hg. can be fine-tuned by adjusting the height of the pump-out tubulation.

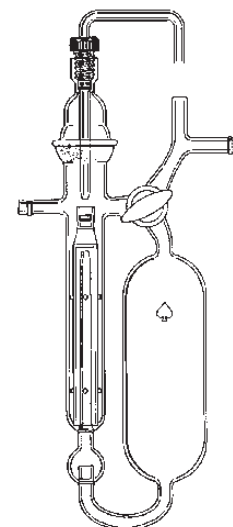
The “Cartesian Diver” float drops away from the pump-out orifice on increasing system pressure and reseals it when the reference pressure set within the large bulb is re-attained. The reference pressure is easily set.

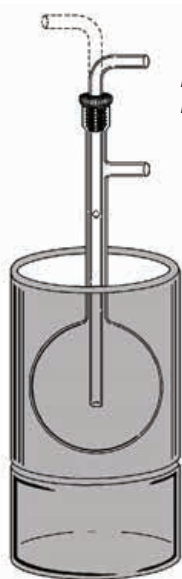
By means of the spherical joint, the attitude of the orifice can be adjusted to accommodate a small continuous leak (i.e. inert gas) without hunting of the float. Flash flushing is easily accomplished by changing the stopcock setting. **Mercury not supplied.**

	Qty	Order Code
	1	8741-08

### Replacement Clamps

	1	7666-20
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**Designed to fit into Dewar Flasks.**

For 500 mL, use Dewar 7075-20 or 12540-07.

For 1000 mL, use Dewar 7075-25 or 12540-09.

For 2000 mL, use Dewar 12540-11.

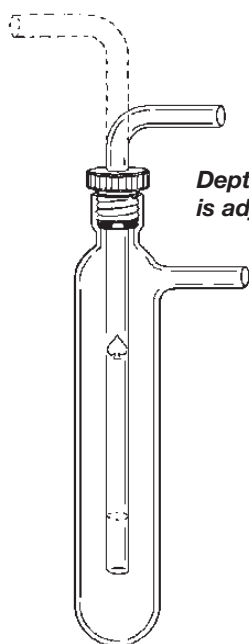
For 3000 mL, use Dewar 12540-11

### VACUUM TRAPS Threaded ♠

Round bottom with adjustable inner tube and nylon bushing with FETFE O-Ring. Optional threaded adapters (8746-75 and -78) will allow safe and easy tubing connect-disconnect. Simply attach tubing to serrated end of adapter, then connect adapter via 7506 bushing to inlet and outlet of trap. Serrated end of adapter has six rings; smallest 14mm O.D., largest 16mm O.D.

**Note:** Adapter NOT supplied with complete unit. Order same 7506 bushing as supplied with trap for use with adapter.

Capacity, mL	Body O.D., mm	Length, Bottom to Side Arm, mm	Inner Tube O.D., mm	Qty	Flask	Inner Tube	Nylon Bushing	Complete
					Order Code	Order Code	Order Code	Order Code
500	100	235	14	1	8744-06	8744-09	7506-06	8744-11
1000	125	315	14	1	8744-08	8744-09	7506-06	8744-13
2000	160	410	24	1	8744-10	8744-20	7506-10	8744-23
3000	180	410	24	1	8744-14	8744-20	7506-10	8744-25



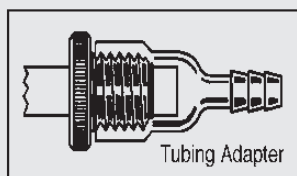
**Depth of inner tube is adjustable**

### VACUUM TRAPS Threaded Body ♠

Consists of body with Ace-Thred, adjustable inner tube and nylon bushing with FETFE O-Ring. Optional threaded tubing adapters (8746-75, 8746-78) allow safe, easy tubing connect-disconnect. Simply attach tubing to serrated end of adapter, then connect adapter via 7506 bushing to inlet and outlet of trap. Serrated end has six rings; smallest is 14mm O.D., largest is 16mm O.D.

**Note:** Adapter NOT supplied with complete item. Order same 7506 bushing as supplied with trap for use with adapter.

Body Diameter, mm	Body Length, mm	O.D. of inner Tube, mm	Qty	Body	Inner Tube	Nylon Bushing	Complete
				Order Code	Order Code	Order Code	Order Code
32	250	14	1	8746-08	8746-10	7506-06	8746-12
38	250	14	1	8746-20	8746-10	7506-06	8746-24
51	250	14	1	8746-32	8746-10	7506-06	8746-36
60	250	14	1	8746-38	8746-10	7506-06	8746-42
90	350	24	1	8746-50	8746-52	7506-10	8746-54



### THREADED TUBING ADAPTER

All stainless steel pinch clamps for use with O-Ring spherical joints and ball and socket joints.

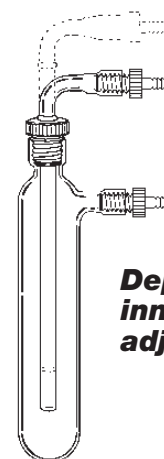
**Note:** Only screw-locking clamps should be used with O-Ring spherical joints.

Ace-Thred Size	For Inlet/Outlet Tube O.D., mm	Qty	Order Code
15	14	1	8746-75
25	24	1	8746-78



**VACUUM TRAPS** Threaded Body, with Ace-Threds on Inlet/Outlet ♠

Consists of body with Ace-Thred that accepts an adjustable inner tube secured by a nylon Bushing and FETFE O-Ring. Unit has been modified with the addition of #15 Ace-Threds on the inlet and outlet for use with PTFE Ace-Safe tubing connectors, 5853, to make an easy, safe connect/disconnect of tubing. Simply attach tubing to the connector and tighten connector in Ace-Thred with 7506-05 bushing to compress silicone O-Ring, supplied with connector, to make a leak-tight seal. Use 7506-06 bushing to secure inner tube in codes -11 thru -44; use 7506-10 in code -60. Complete item consists of body, inner tube, (2) 7506-05, (2) 5853-21, and one 7506-06 or 7506-10.



**Depth of inner tube is adjustable**

Body Diameter, mm	Body Length, mm	O.D. of inner Tube, mm	Qty	Body Order Code	Inner Tube Order Code	Nylon Bushing Order Code	Complete Order Code
32	250	14	1	8746-11	8746-13	7506-06	8746-15
38	250	14	1	8746-23	8746-13	7506-06	8746-27
51	250	14	1	8746-35	8746-13	7506-06	8746-39
60	250	14	1	8746-44	8746-13	7506-06	8746-47
90	350	24	1	8746-60	8746-56	7506-10	8746-68

**Replacement Tubing**

Tubing Connector, 9.5mm I.D., for 1/2-inch Tubing	1	5853-21
Tubing Connector, 6.4mm I.D., for 1/4-inch Tubing <i>(Code -18 is optional, needs to be order separately)</i>	1	5853-18

**Replacement O-Rings**

Silicone O-Rings	12	7855-210
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**VACUUM TRAPS** Threaded, with Serrated Hose Connections ♠

Same as 8746 except adjustable inlet and outlet tubes have six ring hose connections. O.D. of smallest ring is 14mm; largest is 16mm.



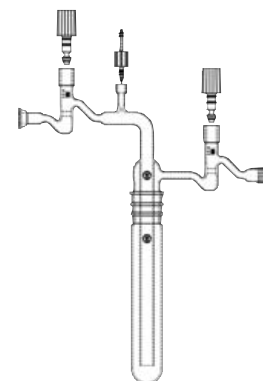
**Depth of inner tube is adjustable**

Body Diameter, mm	Body Length, mm	O.D. of inner Tube, mm	Qty	Body Order Code	Inner Tube Order Code	Nylon Bushing Order Code	Complete Order Code
51	250	14	1	8747-33	8747-11	7506-06	8747-37
60	250	14	1	8747-39	8747-11	7506-06	8747-43

**VACUUM APPARATUS** Trap/Manifold ♠

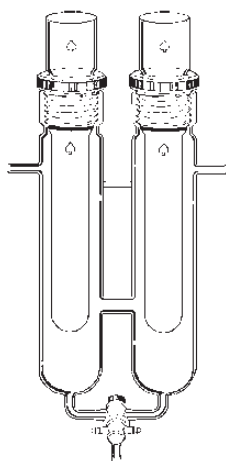
Special vacuum apparatus that can be used as a complex trap with the bottom tube or as a small manifold by itself. Can be joined to ACE 8737,8738 or 8739 manifolds or as a stand alone manifold. The code -23 consists of the -03 manifold and our 8753-21 tube, making a trap unit.

15mm O-Ring joint with a 0-10mm PTFE stopcock on one end and a #15 Ace-Thred with a 0-10mm PTFE stopcock on the other end. In the center, we have an air-inlet needle valve.



Bottom Tube Length, mm	Qty	Manifold Order Code	Tube Order Code	Complete Order Code
200	1	8773-03	8753-21	8773-23

Thanks to Dr. Simon Humphrey, Chemistry Department, University of Texas, Austin, for this design.


**VACUUM TRAP** *Ace-Thred Top* ♠

Twin chambered dry ice vacuum trap for use with rotary evaporators, including ACE 6714, or any other large solvent evaporation applications. Squatty design is 18 inches high, using two chambers offers increased condenser capacity that would be attained only with a much taller single chambered condenser.

Vacuum traps are secured in main body chambers via #50 Ace-Thred using bushings and O-Rings. This type of connection allows for easy removal for cleaning. Two ports are located on the sides of the chambers; one for connecting to evaporator, the other to vacuum source, are 10mm O.D. for 3/8-inch I.D. tubing. Stopcock at bottom is 4mm PTFE 90° bore, for draining condensate, one chamber at a time. Normally, condensate will collect in chamber connected nearest to evaporator until filled to crossover between chamber, then second chamber will fill. Capacity of vacuum traps is 450mL each. Capacity of chambers with finger inserted is approximately 600mL each. Overall height of unit is 18 inches. Complete item includes twin chamber, two vacuum traps, and two #50 nylon bushings with silicone O-Rings.

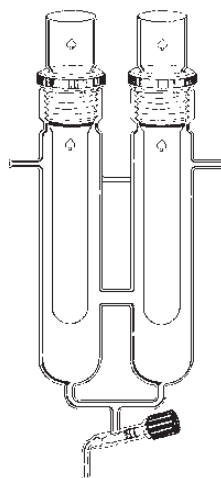
Description	Qty	Order Code
Vacuum Trap, only (2)	1	8748-04
Twin Chamber, only	1	8748-12
Bushing, Nylon, #50, w/O-Ring (2)	1	7506-15

**Complete**

	1	8748-40
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**Replacement Stopcocks**

4mm 16/35 PTFE T-Bore Stopcock	1	8228-36
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**VACUUM TRAP** *Ace-Thred Top* ♠

Similar to 8748-40 except stopcock at bottom is 0-5mm Easy-Action threaded style with double PTFE ring seals on plug for draining both chambers simultaneously. Overall height, approximately 20 inches.

Description	Qty	Order Code
Vacuum Trap, only (2)	1	8748-04
Twin Chamber, only	1	8748-10
Bushing, Nylon, #50 with O-Ring (2)	1	7506-15

**Complete**

	1	8748-43
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**Replacement Stopcocks**

0-5, 0-8mm PTFE plug w/UHDPE handle	1	8192-263
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**CONDENSER/TRAP** *ROBO* ★

For ASTM D7528. Twin-chamber trap/condenser with bottom 0-5 Easy-Action outlet valve. Comes complete with two 7855-844 size -225 and two 7855-816 size -110 CAPFE (PTFE-encapsulated) O-Rings; two 7506-14 (50mm) top nylon bushings; two 7506-06 (15mm) side nylon bushings; and a 12-pack of #15 (1/2-inch I.D.) 11710-15 PTFE ferrules. Use with #D127590 inner condensers (two).

Description	Qty	Order Code
<b>Complete</b>		
(Call to order)	1	D127507

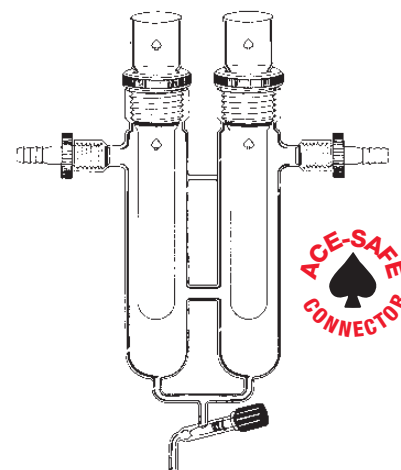
**Replacement Stopcocks**

0-5, 0-8mm PTFE plug w/UHDPE handle	1	8192-263
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**VACUUM TRAP** with Ace-Threds on Inlet/Outlet ♠

Twin chambered dry ice vacuum trap for use with rotary evaporators, including ACE 6714, or any other large solvent evaporation applications. Squatty design is 18 inches high, using two chambers offers increased condensing capacity. Dry ice vacuum traps are secured in main body chambers via #50 Ace-Thred using bushings and silicone O-Rings. This type connection allows easy removal for cleaning. Inlet and outlet ports have been modified with #15 Ace-Threds for use with PTFE Ace-Safe tubing connectors, 5853, to make an easy, safe connect/disconnect of tubing; one to evaporator, other to vacuum source. Simply attach 1/2-inch I.D. tubing to the connector and tighten connector in Ace-Thred with 7506-05 bushing to compress silicone O-Ring, supplied with connector, to make a leak-tight seal. Stopcock at bottom is 0-5mm Easy-Action threaded style with double PTFE ring seals to drain both chambers simultaneously. Overall height is approximately 20 inches. Complete item includes chamber, (2) 7506-15, (2) 7506-05 and (2) 5853-21.



Description	Qty	Order Code
Vacuum trap, only (2)	1	8748-04
Twin Chamber, only	1	8748-08
Bushing, Nylon, #50, w/O-Ring (2)	1	7506-15
Tubing Connector, w/Silicone O-Ring (2)	1	5853-21
Bushing, Nylon, #15, only (2)	1	7506-05

**Complete**

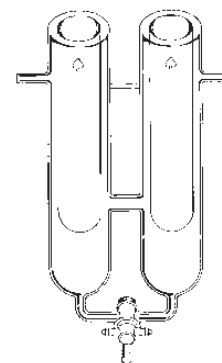
	1	8748-47
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**Replacement Stopcocks**

0-5, 0-8mm PTFE plug w/UHDPE handle	1	8192-263
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**DRY ICE TRAP** Twin ★

Twin chambered dry ice condenser-trap similar to 8748 except dry ice finger condensers in this unit are NOT removable. Tubing outlets on sides of chambers, for connecting to rotary evaporator and vacuum source, are 10mm O.D. for 3/8-inch I.D. tubing. Condensate stopcock at bottom is 4mm PTFE, 90° bore, that allows draining each chamber individually. Overall height is approximately 13-1/2 inches. Capacity of dry ice finger condensers is 200mL each. Capacity of chambers is approximately 500mL each.



Description	Qty	Order Code
	1	8758-20

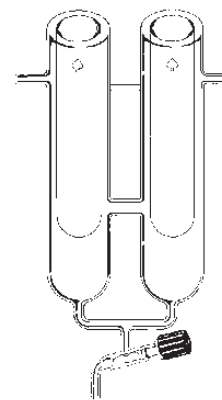
**Complete**

**Replacement Stopcocks**

4mm 16/35 PTFE T-Bore Stopcock	1	8228-36
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**DRY ICE TRAP** Twin ★

Same as 8758 except stopcock at bottom is 0-5mm Easy-Action threaded style with double PTFE ring seals on plug for draining both chambers simultaneously. Overall height is approximately 15-1/2 inches.



Description	Qty	Order Code
	1	8758-42

**Complete**

**Replacement Stopcocks**

0-5, 0-8mm PTFE plug w/UHDPE handle	1	8192-263
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**VACUUM TRAP** *with Reservoir* ♠

Dry ice vacuum trap that features a 1000mL reservoir flask with 3mm bore, 1:5 PTFE stopcock off bottom for easy draining. Chamber body is 125mm O.D. with 25mm annular space. Dry ice chamber is 250mm deep with 9.5mm (3/8-inch) inlet and outlet connections, 3/8-inch I.D. tubing, size D hose connection. Overall height, approximately 54.6cm (21.5 inches). Code -212 comes complete with lid and is plastic coated for safety.

	Qty	Order Code
<b>Complete</b> w/PTFE stopcock bottom	1	8756-12
<b>Complete</b> w/PTFE stopcock bottom, plastic coated uhmw lid	1	8756-212
<b>Replacement Stopcocks</b>		
3mm bore PTFE Stopcock Plug	1	8224-08


**VACUUM TRAP** *with Reservoir & Ace-Thred Inlet/Outlet* ♠

Dry ice vacuum trap that features a 1000mL reservoir flask with 3mm bore, 1:5 PTFE stopcock or 0-5 PTFE "Easy-Action" valve off bottom for easy draining. Unit has been modified with the addition of #15 Ace-Threds on the inlet and outlet for use with "Ace-Safe" Tubing Connectors, 5853, to make an easy, safe connect/disconnect of tubing. Simply attach 1/2-inch I.D. tubing to the connector and tighten connector in Ace-Thred with 7506-05 Bushing to compress silicone O-Ring, supplied with connector, to make a leak-tight seal. Chamber body is 125 mm O.D. with 25 mm annular space. Dry ice chamber is 250 mm deep. Overall height, approximately 54.6 cm (21.5 inches). Complete item consists of body only, (2) 5853 Tubing Connectors, and (2) 7506-05 Bushings.

Description	Qty	Order Code
Body only, with stopcock off bottom	1	8756-32
Body only, with 0-5 PTFE valve off bottom	1	8756-140
Tubing Connector, w/Silicone O-Ring (2)	1	5853-21
Bushing, Nylon, #15, without O-Ring (2)	1	7506-05
<b>Complete</b> , with stopcock off bottom	1	8756-44
<b>Complete</b> , with 0-5 PTFE valve off bottom	1	8756-144
<b>Replacement Stopcocks</b>		
3mm bore PTFE stopcock plug (for 8756-32)	1	8224-08
0-5, 0-8mm PTFE plug w/UHDPE handle (for 8756-140)	1	8192-263


**VACUUM TRAP** *Twin Chamber* ♠

Twin chamber vacuum trap for double protection against undesired vapors in a vacuum system. Trap can be used in a two liter Dewar flask such as 12540-07. Distance from outside of one body to outside of other is approximately 97mm; height is 250mm. Inlet and outlet have serrated fittings; O.D. of smallest ring is 14mm, largest is 16mm.

	Qty	Order Code
	1	8749-20

**VACUUM TRAP** ♠

Used for freezing out undesired vapors in the vacuum system and also for use in conjunction with Dewar flasks.

Body O.D., mm	Body Length, mm	O.D. of Inner & Side Tube, mm	Qty	Order Code
<b>w/ Straight Top Tube</b>				
25	200	10	1	8750-04
32	250	13	1	8750-08
35	250	16	1	8750-12
38	250	18	1	8750-16
45	350	25	1	8750-20

<b>w/ Bent Top Tube</b>				
25	200	10	1	8751-04
32	250	13	1	8751-08
35	250	16	1	8751-12
38	250	18	1	8751-16
45	350	25	1	8751-20



**INNER TRAP/CONDENSER** ROBO ★

For ASTM D7578. inner trap/condenser for ROBO reactor. Two are required for use with dual trap D127507.

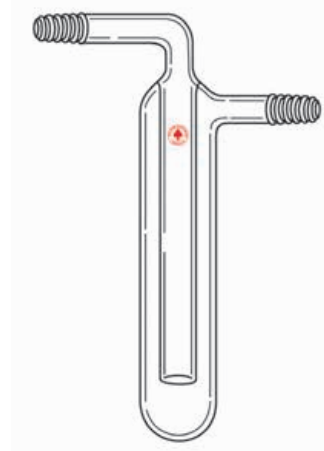
Qty	Order Code
1	D127590 (Call to order)



**VACUUM TRAP** with Serrated Hose Connections ♠

Same as 8751 except with six-ring hose connections on inlet and outlet tubes. O.D. of smallest ring is 14mm; largest is 16mm.

Body O.D., mm	Body Length, mm	O.D. of Inner & Side Tube, mm	Qty	Order Code
25	200	10	1	8752-05
38	250	18	1	8752-17



**VACUUM TRAP** ♠

With ⌘ joint to facilitate cleaning.

⌘ Joint	O.D. of Inner & Side Tube, mm	O.D. of Outer Body, mm	Length of Outer Body Below Joint, mm	Qty	Outer Body	Inner Tube	Complete
					Order Code	Order Code	Order Code
24/40	10	28	200	1	8753-02	8753-04	8753-06
29/42	13	32	250	1	8753-08	8753-10	8753-12
34/45	16	38	250	1	8753-14	8753-16	8753-18
40/50	19	45	250	1	8753-20	8753-22	8753-24
45/50	22	51	250	1	8753-21	8753-23	8753-25
55/50	25	60	140	1	8753-60	8753-62	8753-64
50/50	30	54	110	1	8753-70	8753-72	8753-74

**VACUUM TRAP Modified** ♠

Same as 8753-06 except top tube is bent in line with side tube, but in opposite direction.

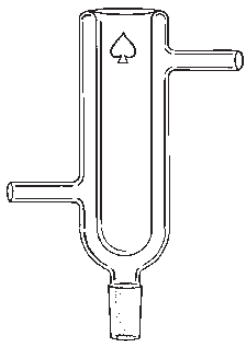
⌘ Joint	O.D. of Inner & Side Tube, mm	O.D. of Outer Body, mm	Length of Outer Body Below Joint, mm	Qty	Outer Body	Inner Tube	Complete
					Order Code	Order Code	Order Code
24/40	10	28	200	1	8753-02	8753-35	8753-37
29/32	13	32	250	1	8753-07	8753-09	8753-11
29/42	13	32	250	1	8753-08	8753-39	8753-40
34/45	16	38	250	1	8753-14	8753-42	8753-43
40/50	19	45	250	1	8753-20	8753-47	8753-49
45/50	22	51	250	1	8753-21	8753-52	8753-54

**VACUUM TRAP O-Ring Flange Connection** ♠

Vacuum trap assembly with a Viton O-Ring flange connection. This style has flexibility and ease of assembly and dis-assembly for cleaning. Utilizes a stainless steel, locking pinch clamp.

**Note:** For replacement O-Rings, see 7855.

O.D. of Inner & Side Tube, mm	O.D. of Outer Body, mm	Length of Outer Body Below Joint, mm	Clamp #	O-Ring Size	Qty	Order Code
10	28	215	7669-14	-217	1	8755-05
16	25	280	7669-18	-223	1	8755-10
19	45	280	7669-20	-226	1	8755-13
22	57	280	7669-22	-229	1	8755-17

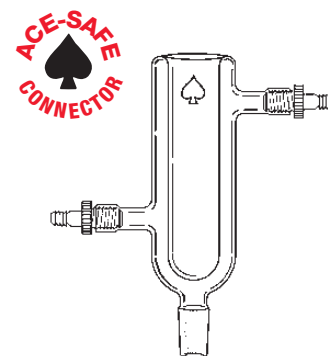
**VACUUM TRAP Dewar Type** ♠

With a ⌘ 24/40 joint at the bottom. Inside diameter of coolant section is 50mm and length is approximately 250mm O.D. of inlet and outlet is 22mm.

⌘ Joint	Qty	Order Code
24/40	1	8757-10

**VACUUM TRAP** Dewar Type, with Ace-Thred Inlet/Outlet ♠

With a  $\text{§}$  24/40 joint at the bottom. Inside diameter of coolant section is 50mm and length is approximately 250mm. Unit has been fitted with #15 Ace-Threds on the inlet and outlet for use with Ace-Safe tubing connectors, 5853, to make an easy, safe connect/disconnect of tubing. Simply attach 1/2-inch I.D. tubing to the connector and tighten connector in Ace-Thred with 7506-05 bushing to compress silicone O-Ring, supplied with connector, to make a leak-tight seal. Complete item consists of body only, (2) 5853 tubing connectors, and (2) 7506-05 bushings.



	Qty	Order Code
Body, only	1	8757-22
Tubing Connector, w/Silicone O-Ring (2)	1	5853-21
Bushing, Nylon, #15, without O-Ring (2)	1	7506-05

**Complete**

	1	8757-35
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**VACUUM TRAP** ♠

With both arms in vertical position. 60mm O.D. x 250mm long. Side arms are 12mm O.D. Available with or without serrated connections on arms. Serrated connectors have six rings: the smallest, 14mm O.D.; largest, 16mm O.D.



	Qty	Order Code
Without Serrated Connectors	1	8759-04
With Serrated Connectors	1	8759-26

**VACUUM TRAP** ♠

Two piece vacuum trap design facilitates easy cleaning. Stopper features hose connection ends and a bent vertical tube. Use with 7/16- inch or 1/2- inch I.D. tubing, size F barb. See Ace 8753 family for the outer trap bodies only.



$\text{§}$	O.D. of Outer Body, mm	Length of Outer Body Below Joint, mm	Inner Tube		Complete
			Qty	Order Code	Order Code
29/42	32	250	1	8760-10	8760-12
34/45	38	250	1	8760-16	8760-18
40/50	45	250	1	8760-22	8760-24
55/50	60	140	1	8760-62	8760-64
50/50	54	110	1	8760-72	8760-74

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GSA pricing for **Ace Glass** products is available thru our partner, the VWR Corporation.

[www.us.vwr.com](http://www.us.vwr.com)



**Schedule**  
 Contract GS07F119CA

[www.gsasmart.com](http://www.gsasmart.com)


**VACUUM TRAP** *Vertical Side Arm* ♠

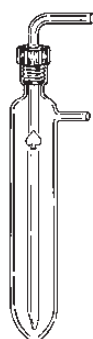
Modified version of 8750 series of vacuum traps, with side arm bent 90 degrees upward for easier attachment of vacuum tubing. For use with vacuum systems to capture undesirable vapors. Fits easily into Dewar flasks.

Body O.D., mm	Body Length, mm	O.D. of Inner & Side Tube, mm	Qty	Order Code
25	200	10	1	8764-04
32	250	13	1	8764-08
35	250	16	1	8764-12
38	250	18	1	8764-16
45	350	25	1	8764-20


**BUBBLER** *Mineral Oil* ♠

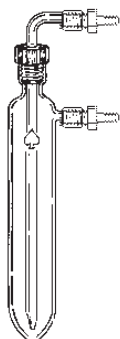
Used to make a vent to the atmosphere. May also be used with mercury when adequate ventilation is available. Reservoir head prevents oil from being sucked back into the system. With 8mm O.D. tubing connections. Volume approximately 40mL below side arm.

Qty	Order Code
1	8761-10


**BUBBLER** *Mineral Oil, Adjustable* ♠

With completely adjustable 7mm inner tube. Tube has a pulled tip and is secured by a #7 Ace-Thred. Volume approximately 40mL. Tapered bottom of vessel allows for use with small volumes. Nylon bushing supplied with FETFE O-Ring.

	Qty	Order Code		Qty	Order Code
Vessel Only	1	8762-03	Bushing Only	1	5029-10
Inner Tube	1	8762-07	<b>Complete</b>	1	8762-14


**BUBBLER** *Mineral Oil, Adjustable with "Ace-Safe"* ♠

Same item as listed above, except with the addition of #7 Ace-Threds on the inlet and outlet for use with Ace-Safe tubing connectors, 5853, to make an easy, safe connect/disconnect of tubing. Simply attach 1/4-inch I.D. tubing to the connector and tighten connector in Ace-Thred with bushing to compress silicone O-Ring, supplied with connector, to make a leak-tight seal. With completely adjustable 7mm inner tube. Tube has a pulled tip and is secured by a #7 Ace-Thred. Volume approximately 40mL. Tapered bottom of vessel allows for use with small volumes. Nylon bushing supplied with FETFE O-Ring.

	Qty	Order Code		Qty	Order Code
Vessel Only	1	8762-05	Connector, only (2)	1	5853-03
Inner Tube	1	8762-08	Bushing, Nylon (2)	1	5029-05
Bushing Only	1	5029-10	<b>Complete</b>	1	8762-20

**Additional Parts**

	Qty	Order Code
Inner Tube with check valve (Fits either 8762-03 or 8762-05)	1	8762-35

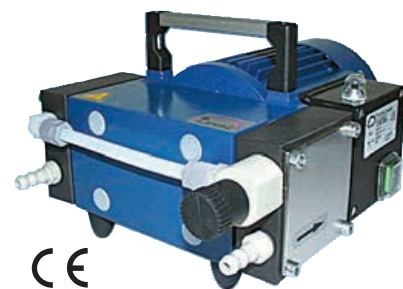


## DIAPHRAGM VACUUM PUMP MPC101Z ★

Two-stage, chemically resistant diaphragm type pump. Ultimate pressure 6 torr (8 mBar), 18L/minute flow rate. Connections are for 8mm I.D. vacuum hose. 115v, 50/60 Hz. Pump is compact and extremely quiet — great for all laboratory applications. Low maintenance due to beltless, oil-free operation. All wetted parts are PTFE or PTFE-type compounds. Two-year manufacturer's warranty is included.

**ILMVAC**

Qty	Order Code
1	14112-07



## DIAPHRAGM VACUUM PUMP MPC104T ★

Three-stage, chemically resistant diaphragm type pump. Ultimate pressure 1.5 torr (2 mBar), 16L/minute flow rate. Connections are for 8mm I.D. vacuum hose. 115v, 50/60 Hz. Pump is compact and extremely quiet — great for all laboratory applications. Low maintenance due to beltless, oil-free operation. All wetted parts are PTFE or PTFE-type compounds. Two-year manufacturer's warranty is included.

**ILMVAC**

Qty	Order Code
1	14112-09



## DIAPHRAGM VACUUM PUMP MPC301Z ★

Two-stage, chemically resistant diaphragm type pump. Ultimate pressure 6 torr (8 mBar), 43L/minute flow rate. Connections are for 8mm I.D. vacuum hose. 115v, 50/60 Hz. Pump is compact and extremely quiet — great for all laboratory applications. Low maintenance due to beltless, oil-free operation. All wetted parts are PTFE or PTFE-type compounds. Two-year manufacturer's warranty is included.

**ILMVAC**

Qty	Order Code
1	14112-11



## DIAPHRAGM VACUUM PUMP MPC201T ★

Three-stage, chemically resistant diaphragm type pump. Ultimate pressure 1.5 torr (2 mBar), 36L/minute flow rate. Connections are for 8mm I.D. vacuum hose. 115v, 50/60 Hz. Pump is compact and extremely quiet — great for all laboratory applications. Low maintenance due to beltless, oil-free operation. All wetted parts are PTFE or PTFE-type compounds. Two-year manufacturer's warranty is included.

**ILMVAC**

Qty	Order Code
1	14112-15




**VACUUM PUMP Mini** ★

**ILMVAC**

These compact new models are designed with a small, twin-head, diaphragm pump, enclosed in robust housing and a wide voltage range power adapter. They are extremely quiet with low vibration for lab bench use. The small footprint also takes up very little bench space. The Model MP is standard duty for most applications in water and wastewater sampling and testing and for biological testing and sampling. The match very well to the ACE filtration apparatus units 3700 and 3702. The MPR series is chemical resistant for solvent or vapor applications such as low-pressure chromatography or for small rotary evaporators. Both pumps utilize PTFE diaphragms and PEEK valves for wear resistance and minimal maintenance. Selectable voltage from 90-240 volt. 60mBar maximum vacuum, 10L/min. flow rate

## General Features:

- Low priced vacuum pumps for filtration, drying and degassing
- Standard and chemically resistant models
- Extremely quiet – low noise and low vibration twin head design
- Plug and play wide range power adapter

Head Material	ILMVAC Model	Qty	Order Code
Aluminum	MP060E	1	14125-01
PPS	MPR060E	1	14125-03

## WAT-VAC Water Vacuum Aspirator Pump

Easy to use • Fast, quiet operation • Stable vacuum


**VACUUM PUMP Water Aspirator** ★

Portable water aspirator vacuum pump featuring a 10 liter polypropylene tank and circulating pump. This mechanical water aspirator eliminates tap hookups, recycles water previously poured down the drain when using conventional aspirators. Built-in feed water drain hose makes it easy to change water. Vacuum ports are 3/8-inch O.D. hose barbs.

**SPECIFICATIONS**

Pump	150w, output 40 liters/min.
Pump Body	Corrosion resistant polypropylene
Suction Nozzles	Two independent built-in sources
Displacement	30L/min @ 50hz; 19L/min @ 60hz
Temperature Range	5° to 35°C
Ultimate Vacuum	28.5 inches Hg each tube
Reservoir Bath	Polypropylene
Capacity	10 liter tank
Power Source	115v AC, 50 hz or 230v AC, 60hz
Weight	13.5 lbs. (6 Kg)
Dimensions	10W x 14.2D x 15.9H Inches (255mm x 361mm x 406mm)

Qty	Order Code
1	14030-25

## PUMP OIL, VACUUM Krytox® ★

A perfluoro ether mechanical pump oil, superior in all comparisons to either hydrocarbon or silicone oils. Krytox oil provides closely controlled viscosity and vapor pressure for systems that require clean, premium-quality fluids. Service costs are reduced because of less frequent down time. Krytox exhibits an extraordinary combination of properties which include:

- Excellent oxidative and thermal stability
- Exceptionally high degree of chemical inertness (contains only carbon, oxygen, fluorine)
- Radiation resistant, no sludge formation
- Low vapor pressure ( $10^{-7}$  @ 20°C)
- Wide liquid viscosity range
- Excellent lubricity at temperatures to 200°C
- Compatibility with metals, plastics and elastomers
- Meets or exceeds the warranty requirements of all major pump manufacturers



Available in 1/2 pint and pint containers. One pint is approximately two lbs.

	Qty	Order Code
	1 Pint	14036-20

® Reg. U.S. Pat. & TM Off. and made only by DuPont Co.

## BATH OIL ★

An extremely stable, medium viscosity silicone oil. Available in two temperature ranges:

Low Temp — maximum 180°C; or High Temp — maximum 230°C.

Type	Qty	Order Code
Low Temp (180°C)	.9L (1 Qt.)	14115-05
High Temp (230°C)	.9L (1 Qt.)	14115-12
Low Temp (180°C)	1.8L (½ Gal.)	14115-10
High Temp (230°C)	1.8L (½ Gal.)	14115-14

Low temp oil color is CLEAR. High temp oil color is AMBER.



## PTFE TAPE Sealing ★

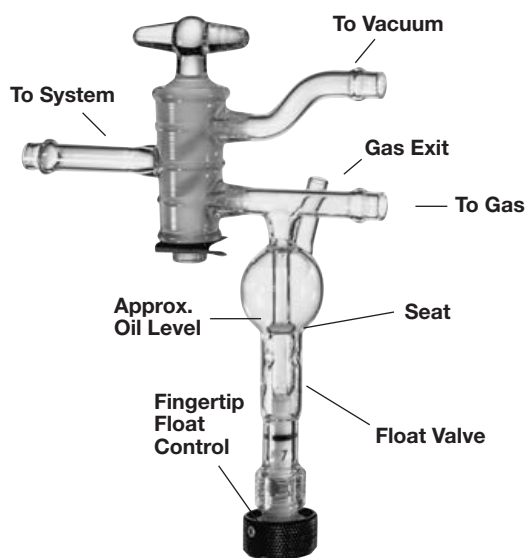
99% pure PTFE tape used to effect a leak-tight seal when connecting items such as 6445 pressure gauge to 5844 adapter, etc. Wrap tape around male thread before threading into female. Thickness is .0035 inches. Supplied in rolls of 520 inches.

Width, in	Qty	Order Code
1/4	1 roll	14120-14
1/2	1 roll	14120-18



# Firestone Valve

## A rapid purge valve for controlled atmosphere work



### VALVE Rapid Purge, Firestone\* ♠

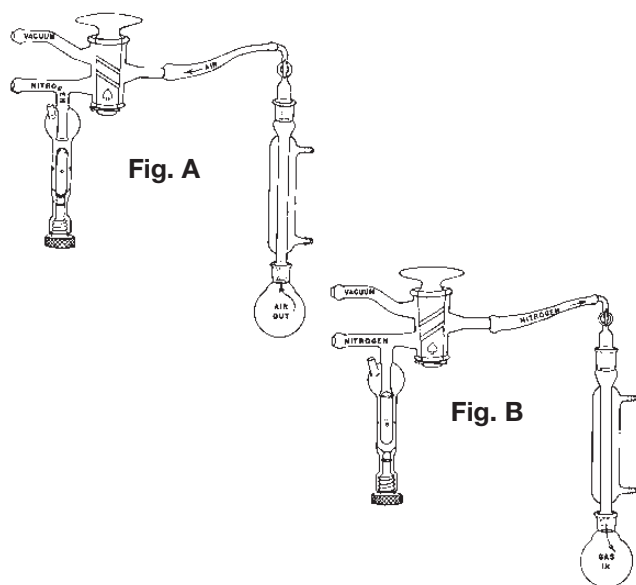
A rapid, efficient and foolproof purge valve for 100% replacement of air in reaction vessels with any desired gas ( $N_2$ ,  $H_2$ , Ar,  $Cl_2$ , etc.). No mercury used, no reducing valve needed on gas source, no high vacuum source necessary. No need to watch manometers, hand control gas flow, or install warning systems to prevent accidents. Expensive gases are conserved because once purging is complete, the flow can be cut almost to zero. This valve is so inexpensive, it is possible to run all reactions under nitrogen as easily as not. For manifold using 8766 valve, see 8765.

Qty	Order Code
1	8766-12

### How It Works:

Connect reaction vessel, house vacuum, and purge gas to valve via 10mm O.D. connections. On vacuum cycle, **Fig. A**, air is removed from the reaction vessel while the stop valve is closing. When filling is complete, **Fig. B**, the stop valve reopens to prevent pressure buildup. Thus, a simple half turn of the stopcock alternates the reaction system from vacuum to gas flow as fast as desired. In small systems, a complete cycle takes as little as one to two seconds. With only 1/2 atmosphere house vacuum, ten cycles removes all but .510 atmospheres of air. About 70 cycles gets you down to the last molecule of oxygen.

After purging, the system is kept under slight positive pressure indefinitely, with a slow bubbling of the gas to prevent diffusion of air past the joints. If the reaction evolves a gas, no pressure builds up, and it may even be collected and measured while maintaining a controlled atmosphere. Proper selection of the liquid for the seal allows purging with any gas that does not react with glass. Liquid not supplied.



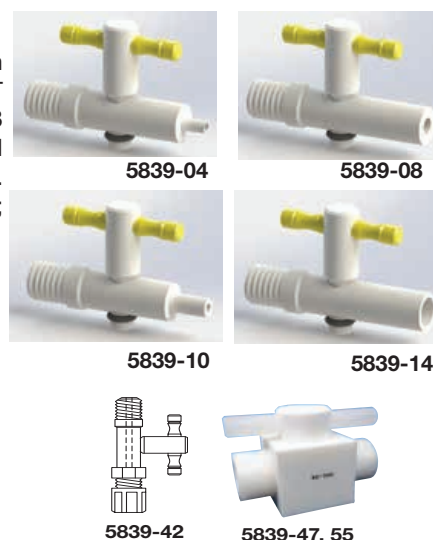
\*Designed by Dr. Raymond Firestone

For ultra dry gas, The Firestone Valve can be used in conjunction with the 7818 ACE-Burlitch drying column. Call or email for details.

**VALVE PTFE**

Shut-off valve for use with 5802, 5838 or 5857 bottom adapters or any other ACE fitting with threads to allow flow regulation. Codes -04,-08,-10,-14 and -42 supplied with 1/4-inch male NPT at one end for threading into bottom adapters, other end with either a male Luer-Lok, 1/4-inch-28 female, 1/8-inch female NPT, 1/4-inch straight tube or 1/4-inch tubing connector; codes -47 and -55 have female NPT threads on both ends, for connecting to 5844 adapter using 12770 nipple. Must use 5844-120 adapter (3/8-inch male NPT – 1/4-inch female NPT) when connecting 5839-42; 12770-54 (3/8-inch male NPT – 3/8-inch male NPT) when connecting 5839-47.

Style, in	Bore, mm	Qty	Order Code
1/4 Male NPT – Male Luer-Lok	1.5	1	5839-04
1/4 Male NPT – 1/4-28 UNF	3.0	1	5839-08
1/4 Male NPT – 1/4 Straight Tube	3.0	1	5839-10
1/4 Male NPT – 1/8 Female NPT	3.0	1	5839-14
1/4 Male NPT – 1/4 Tubing Connector		1	5839-42
3/8 Female NPT – 3/8 Female NPT		1	5839-47
1/2 Female NPT – 1/2 Female NPT		1	5839-55
1/8 Female NPT – 1/8 Female NPT		1	5839-60
1/8 inch tube compression ports		1	5839-62
1/4 Female NPT – 1/4 Female NPT		1	5839-64
1/4 inch tube compression ports		1	5839-66
3/8 Female NPT – 3/8 Female NPT		1	5839-68
3/8 inch tube compression ports		1	5839-70
1/2 Female NPT – 1/2 Female NPT		1	5839-72
1/2 inch tube compression ports		1	5839-74
3/4 Female NPT – 3/4 Female NPT		1	5839-76
3/4 inch tube compression ports		1	5839-78


**VALVE Pressure Relief, Adjustable ★**

The primary protection to personnel and equipment involved with static and dynamic pressured systems. This one-piece pressure relief valve is adjustable from 3 to 50 psig (for use with ACE pressure reactors) or 50 to 150 psig by simply adjusting set screws to desired cracking pressure. When pressure exceeds set cracking pressure, valve bleeds; when a safe lower pressure is realized, valve will reseal. Fabricated from 316 stainless steel with a Viton O-Ring. Ends are 1/4-inch npt for connecting into Ace-Thred with a 5844 adapter. Combining the code -20 valve with the 6445 rupture disc in the same pressure manifold offers fail-safe protection against runaway pressure situations.

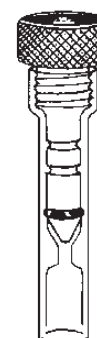


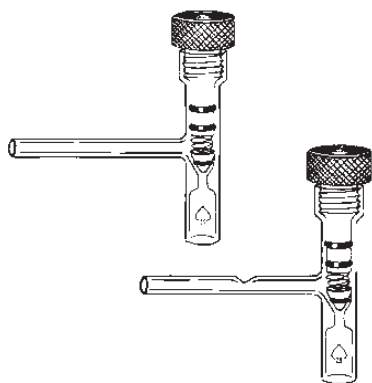
Cracking Pressure, psig	Qty	Order Code
3 to 50	1	8767-20
50 to 150	1	8767-55

**VALVE Vacuum Release ♠**

Threaded vacuum release valve with fingertip control for opening systems to the atmosphere. Plunger stem made of PTFE with single O-Ring of FETFE.

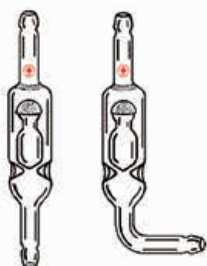
Qty	Order Code
1	8768-10




**VALVE** *Pressure Release, Automatic* ♠

Automatic, adjustable pressure release valve for safer operation of pilot plant or other assemblies where the pressure is of great concern. The tension on the stainless steel spring determines the amount of pressure needed to force the lower piece open. With the spring supplied, the range is 15–50 psi. Available with or without warning whistle. Plunger made of PTFE with FETFE O-Rings.

Description	Qty	Order Code
Without whistle to be sealed by glassblower	1	8769-10
Without whistle used with bushing	1	8769-110
With whistle	1	8769-20


**CHECK VALVE** ♠

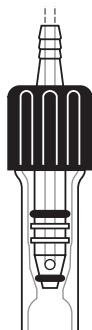
An all-glass check valve with ground seat for liquid seal. Available in style A — for vertical use, and style B — for right angle connection. Connections are 8mm O.D.

Style	Qty	Order Code
Straight	1	8770-05
Angled	1	8770-10


**CHECK VALVE** ♠

All-glass check valve with ground seat and precision ground solid ball. Suitable with mercury in the vertical position, more sensitive to other fluids in the horizontal position. Connections are 8mm O.D.

Qty	Order Code
1	8774-09


**INLET VALVE** ♠

Inlet valve, used primarily with No-Air Reactors to allow evacuation and gas inlet. With 4mm O.D. serrated fitting, 2mm bore.

Qty	Order Code
1	15424-20


**PUMP** *Aspirator* ♠

Operates on water pressures above 11 psi. Integral polypropylene check valve resists corrosive filtrates and fumes. The quick-disconnect hose fitting accepts 1/4-inch to 3/8-inch I.D. tubing. Male thread faucet connection is 3/8-inch I.P. Maximum attainable vacuum is 27.4 inches (696mm) with flow rate of 1.5 gallons (6 liters) per minute. Supplied 12 per case.

Qty	Order Code
Individually or case of 12	12582-08

**VIALS** *Headspace, Flat Bottom* ♠

Standard headspace vials with 20mm finish neck for crimp seals. Manufactured from clear, USP Type 1 borosilicate, glass. These vials come in either a even flat bottom or round bottom. These vials fit into Agilent or Shimadzu autosamplers. Come in pack sizes of 100.

Description	O.D. x H, mm	Pkg. Qty	Order Code	Case Qty	Order Code
<b>Flat Bottom</b>					
6.0 mL Clear, Standard Finish Top	22 x 38	100	<b>5707-20</b>	1000	<b>5707-05</b>
10.0 mL Clear, Standard Finish Top	23 x 48	100	<b>5707-22</b>	1000	<b>5707-06</b>
20.0 mL Clear, Standard Finish Top	23 x 75	100	<b>5707-24</b>	1000	<b>5707-07</b>
6.0 mL Clear, Tapered Finish Top	22 x 38	100	<b>5707-26</b>	1000	<b>5707-10</b>
10.0 mL Clear, Tapered Finish Top	23 x 48	100	<b>5707-28</b>	1000	<b>5707-11</b>
20.0 mL Clear, Tapered Finish Top	23 x 75	100	<b>5707-30</b>	1000	<b>5707-12</b>

**Round Bottom**

6.0 mL Clear, Tapered Finish Top	22 x 38	100	<b>5707-32</b>	1000	<b>5707-40</b>
10.0 mL Clear, Tapered Finish Top	23 x 48	100	<b>5707-34</b>	1000	<b>5707-41</b>
20.0 mL Clear, Tapered Finish Top	23 x 75	100	<b>5707-36</b>	1000	<b>5707-42</b>


**VIALS** *Shell* ♠

1.0mL, 8x40mm, clear and amber USP Type I borosilicate, glass, shell vials with 8mm natural, polyethylene snap plug. Come in shelf packs of 200.

Color	O.D. x H, mm	Pkg. Qty	Order Code	Case Qty	Order Code
Clear	8 x 40	200	<b>5698-12</b>	1000	<b>5698-20</b>
Amber	8 x 40	200	<b>5698-14</b>	1000	<b>5698-24</b>


**SEALS** *Aluminum, with Liner* ♠

20mm lined, natural aluminum crimp style seals for headspace, serum and other styles of vials with 20mm crimp finish tops. Available in natural aluminum with various PTFE/rubber linings. Colored aluminum available via special order. A magnetic crimp seal version is available for use with robotics and a pressure release version designed to release at 3 Bar (43 psi) pressure.

Description	Pkg. Qty	Order Code	Case Qty	Order Code
PTFE/Silicone	100	<b>5708-30</b>	1000	<b>5708-04</b>
PTFE/Butyl Rubber	100	<b>5708-31</b>	1000	<b>5708-05</b>
PTFE/Molded Butyl Rubber	100	<b>5708-32</b>	1000	<b>5708-06</b>
PTFE/Silicone, Pressure Release	100	<b>5708-33</b>	1000	<b>5708-10</b>
PTFE/Butyl Rubber, Pressure Release	100	<b>5708-34</b>	1000	<b>5708-11</b>
PTFE/Molded Butyl Rubber, Pressure Release	100	<b>5708-35</b>	1000	<b>5708-12</b>
PTFE/Silicone, Magnetic	100	<b>5708-36</b>	1000	<b>5708-18</b>
PTFE/Butyl Rubber, Magnetic	100	<b>5708-37</b>	1000	<b>5708-19</b>
PTFE/Molded Butyl Rubber, Magnetic	100	<b>5708-38</b>	1000	<b>5708-20</b>


**SEALS** *Aluminum* ♠

Natural color Aluminum seals for use with any 20mm or 13mm OD flat septa or 5531 flange style stoppers. Aluminum crimp-seals are for serum vials and bottles, headspace vials and any other crimp finish vials. For use with auto or hand crimping tools. Colored or color coded are available on special order as are other sizes. Code -38 and -39 have PTFE faced natural red rubber liner.

Case Qty	20mm			13mm	
	<i>Center disc tears out</i>	<i>Center disc tears completely off</i>	<i>Full Open top</i>	<i>Center disc tears out, Lined</i>	<i>Center disc tears out, Lined</i>
Order Code	Order Code	Order Code	Order Code	Order Code	Order Code
1000	<b>5532-07</b>	<b>5532-27</b>	<b>5532-37</b>	<b>5532-39</b>	<b>5532-38</b>



**CRIMPER** ★

For attaching aluminum seals. Crimper features a new ergonomic design cushioned handle that aids in reducing hand fatigue and provides a higher degree of comfort for the user. Each crimper is labeled for quick identification of seal size. Can be autoclaved.

Seal Size, mm	Qty	Order Code
11	1	5533-03
20	1	5533-05

**DE-CRIMPER** ★

Decapper features a new ergonomic design cushioned handle that aids in reducing hand fatigue and provides a higher degree of comfort for the user. Labeled for quick identification of seal size. The new design removes seals quickly and efficiently. Can be autoclaved.

Seal Size, mm	Qty	Order Code
11	1	5535-03
20	1	5535-07

**DECAPPER** Plier Type ★

Plier type decapper for detaching 11mm and 20mm aluminum seals.

Seal Size, mm	Qty	Order Code
11	1	5534-11
20	1	5534-24

**VIALS** Poly-Seal Screw Cap ♠

USP Type 1 borosilicate glass vials with Poly-Seal cone lined closures which are molded in a premium grade, natural low density polyethylene to help prevent deforming and stress cracking. Inverted cone liner is designed to provide an excellent seal and exceptional torque retention, even at low application torque. Caps are not attached, but are packed with vials in sturdy hand-out shelf boxes of 100 pieces.

Capacity, Drams	Approx. Capacity, mL	O.D. x H, mm	GPI Thread Finish	Pkg. Qty	Case Qty	Order Code
1	4	15 x 45	13-425	144	2304	8779-10
1.5	6	16 x 50	13-425	144	2304	8779-15
2	8	17 x 60	15-425	144	1728	8779-20
3	11	19 x 65	15-425	144	1152	8779-30
4	16	21 x 70	18-400	144	1152	8779-40
6	22	23 x 85	20-400	144	864	8779-60
8	30	25 x 95	22-400	144	576	8779-80

**MICRO SAMPLE VIAL** Metal-Foil Lined Cap ★

Manufactured from borosilicate glass. The small size of the vial reduces sample-to-surface contact when used as a micro package. Economical when used as scintillation vial.

Capacity, Drams	Capacity, mL	O.D. x H, mm	Screw Cap Size	Case Qty	Order Code
½	2	12 x 38	8-425	288	8779-02



**VIAL Reaction, with Cap** ♦

Clear borosilicate Type 1 glass vial with V bottom, with open-top black phenolic caps with PTFE-faced silicone liners. Packed 12 or 6 per case.

Vial Type	Size	O.D. x H, mm	Case Qty	Order Code
Reaction	1mL	13 x 44	12	<b>8782-01</b>
Reaction	5mL	20 x 65	12	<b>8782-05</b>
Reaction	10mL	24 x 72	6	<b>8782-10</b>


**VIALS Sample, Clear Glass with Cap** ♦

USP Type I, class A, clear, borosilicate glass, sample vials complete with solid, black, phenolic, caps. Caps have PTFE faced 14B rubber liners for purity and chemical resistance.

Description	O.D. x H, mm	Cap Size	Pkg. Qty	Order Code
0.5 dram/2mL	12 x 38	8-425	200	<b>8780-01</b>
1 dram/4mL	15 x 48	13-425	200	<b>8780-02</b>
2 dram/8mL	17 x 63	15-425	200	<b>8780-04</b>
4 dram/16mL	21 x 73	18-400	200	<b>8780-08</b>


**VIALS Sample, Amber Glass with Cap** ♦

General screw thread sample vials made from USP Type I, Class B, amber glass. Actual amber glass made from amber tubing, not amber coated. Sample vials complete with solid, black, phenolic, caps. Caps have a 14B rubber liners.

Description	O.D. x H, mm	Cap Size	Pkg. Qty	Order Code
0.5 dram/2mL	12 x 38	8-425	288	<b>8781-02</b>
1 dram/4mL	15 x 48	13-425	144	<b>8781-06</b>
2 dram/8mL	17 x 63	15-425	144	<b>8781-08</b>


**VIALS Scintillation, Digestion, with Cap** ♦

20mL Scintillation type vials, USP type I Class A clear and Class B amber borosilicate glass. These are also referred to as digestion or plain sample vials. Vials have 24-400 solid top black phenolic caps with a 14PB white rubber liner or white open-top caps with bonded PTFE/silicone liners.

Color	Cap Style	O.D. x H, mm	Pkg. Qty	Order Code
Clear	Solid Black	28 x 60	72	<b>8780-29</b>
Amber	Solid Black	28 x 60	72	<b>8781-12</b>





### VIALS EPA, TOC with caps ♠

40mL vials fabricated in either USP Type I Class A or B clear or amber borosilicate glass. Vials are available with either solid 24-400 black phenolic caps with 14PB white rubber liners or with open top caps with a PTFE faced silicone septa type lining. The 40mL vials with the open top caps are for EPA protocol 40CFR136 guidelines. These vials are not pre-cleaned or certified.

Description	O.D. x H, mm	Pkg. Qty	Order Code
Clear with solid cap	28 x 98	72	<b>8780-30</b>
Amber with solid cap	28 x 98	72	<b>8781-35</b>
Clear with open-top cap, black, phenolic	28 x 96	72	<b>8781-20</b>
Amber with open-top cap, white, polypropylene	28 x 96	72	<b>8781-25</b>

#### Replacement Parts

Replacement 24-400 open top caps	200	<b>8781-40</b>
Replacement PTFE/Silicone Septa	100	<b>8781-45</b>



### VIALS Mini ♠

Multipurpose, borosilicate glass vial designed for storage and shipment of small volumes. Cone-shaped interior allows maximum retrieval of contents by syringe or micro-pipette. Ideal for iodine<sup>131</sup>, iodine<sup>125</sup> and other isotopes. Packed in convenient, reusable plastic transport or storage boxes with hinged lid and foam cells. For use with 5532-38 Aluminum Seals with PTFE-faced rubber septa.

Capacity, mL	Mouth I.D. x O.D., mm	O.D. x H, mm	Case Qty	Order Code
0.3	7 x 13	13 x 32	12	<b>8785-07</b>
1.0	7 x 13	13 x 40	12	<b>8785-14</b>



### SERUM BOTTLE ♠

These borosilicate glass serum bottles meet the requirements of the Pharmacopeia of the United States (USP) for Type I glasses. Repeated sterilization does not affect Type I qualities. Offer maximum protection for delicate injectables and biological materials. With large mouth openings for ease in filling, emptying and cleaning.

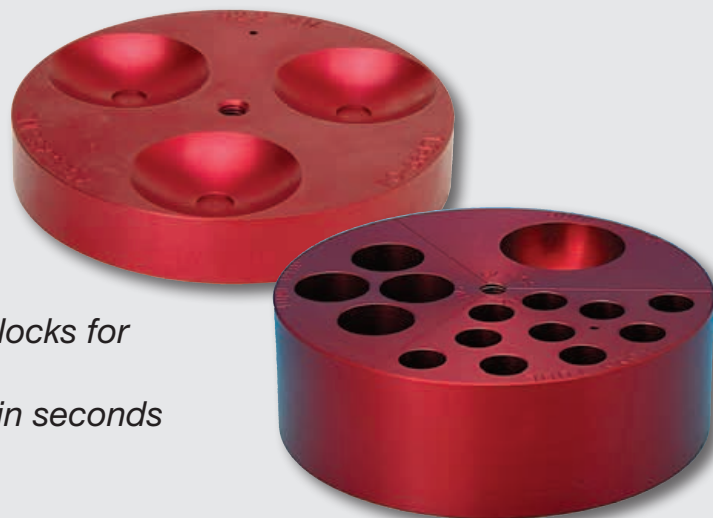
Capacity, mL	Mouth I.D. x O.D., mm	O.D. x H, mm	Case Quantity	Order Code
5	13 x 20	23 x 47	288	<b>5530-08</b>
10	13 x 20	25 x 54	288	<b>5530-10</b>
20	13 x 20	32 x 58	288	<b>5530-12</b>
30	13 x 20	37 x 63	288	<b>5530-14</b>
50	13 x 20	43 x 73	288	<b>5530-16</b>
60	13 x 20	41 x 91	144	<b>5530-18</b>
100	13 x 20	52 x 95	144	<b>5530-20</b>
125	13 x 20	54 x 107	144	<b>5530-22</b>

# DynaBloc™

## Cylindrical Heating Blocks

### Cylindrical Reaction Blocks for Circular-top Magnetic Stirrers

- Convenient — one block base, multiple blocks for different size vials, tubes and flasks
- Easy to use — switch from vials to flasks in seconds
- Economical and efficient
- Excellent heat transfer



### Selecting a Septa

Material(s)	Compatible	Incompatible	Resealability
<b>Butyl Rubber</b>	Acetone, alcohols, diethylamine, DMSO, MEK, sodium peroxide	Benzene, chloroform, DMF, HF, HCL, phenol, toluene, xylene	Very good
<b>Butyl Rubber/PTFE</b>	PTFE resistance until punctured, then septa or liner will have compatability of butyl rubber		Teflon does not reseal after being punctured
<b>PTFE</b>	Diethylamine, fluorine		Single injection use
<b>Red Rubber</b>	Acetone, alcohols, diethylamine, DMSO, sodium peroxide	Chloroform, DMF, HF, HCL, MEK, phenol, toluene, xylene	Excellent
<b>Red Rubber/PTFE</b>	PTFE resistance until punctured, then septa or liner will have compatability of red rubber		Teflon does not reseal after being punctured
<b>Silicone</b>	Alcohol, DMF, DMSO, hydrogen peroxide, sodium hydroxide	ACN, benzene, chloroform, hexane, HCL, MEK, THF, toluene	
<b>Silicone/PTFE</b>	PTFE chemical resistance until punctured, then septa or liner will have compatability of silicone		Teflon does not reseal after being punctured
<b>Viton®</b>	Alcohols, benzene, chlorinated solvents, HF, heptane, hexane	Acetone, ACN, DMF, dioxane, pyridine, ketones, MEK, THF	Good

**NOTE:** All septa liners are designed for a variety of applications. Individual performance requirements may vary; therefore, it is recommended that customers perform the proper tests to determine which septa or liner is most suitable for the exact application.



### ADAPTER Conversion ♠

Glass adapter with  $\text{㉔}$  24/40 or  $\text{㉔}$  29/42 joint to #15 or #25. #15 is used with 13290-11 through -22 or 13290-121 through -134; #25 is used with 13290-26 or 13290-136 connecting adapter to connect vials or flasks to rotary evaporators. Suitable for vacuum work. Order each item separately.

$\text{㉔}$ Joint	Ace-Thred	Qty	Order Code
24/40	#15	1	13290-34
24/40	#25	1	13290-37
29/42	#15	1	13290-44
29/42	#25	1	13290-47

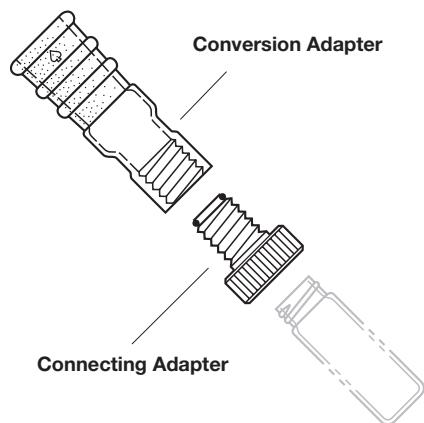


### ADAPTER Connecting, PTFE ★

PTFE adapter with #15 or #25 Ace-Thred and GPI thread to connect 13290-34, -37, -44 or -47 conversion adapter to mating vial for use in rotary evaporators. Suitable for vacuum work. Order separately.

**Note:** FETFE not suitable for use with methylene chloride or acetone, use Chemraz instead.

GPI Thread	Ace-Thred	Qty	With FETFE O-Ring Order Code	With Chemraz O-Ring Order Code
8-425	#15	1	13290-11	13290-121
13-425	#15	1	13290-13	13290-123
15-425	#15	1	13290-15	13290-125
18-400	#15	1	13290-18	13290-128
20-400	#15	1	13290-20	13290-130
22-400	#15	1	13290-22	13290-132
24-410	#15	1	13290-24	13290-134
24-410	#25	1	13290-26	13290-136



### MULTIPACK CONNECTING ADAPTER KIT ★

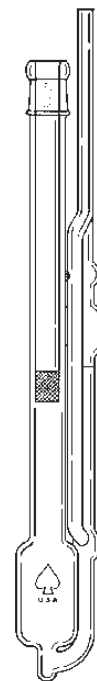
Convenience kit with several PTFE Ace-Thred to GPI thread adapters to fit various vial sizes. 13290-55 version includes the -11 through -24 PTFE adapters listed above. 13290-59 version includes the -121 through -134 PTFE adapters listed above. The kit also includes one 13290-34 #15 glass conversion adapter.

Qty	Order Code
1	13290-55
1	13290-59

**VISCOMETER Modified Ubbelohde ★**

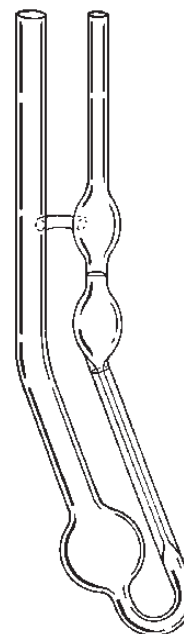
Used in ASTM Method D 1601. A test for dilute solution viscosity of ethylene polymers at 130°C. It is applicable to a reasonably wide spectrum of ethylene polymers having densities from 0.913 to 0.970g/cc. Available in capillary sizes 0.6, 0.7 and 0.8mm.

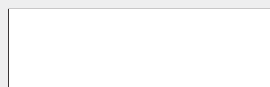
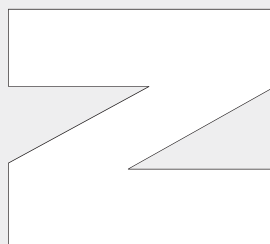
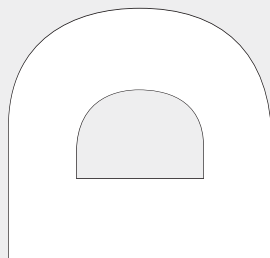
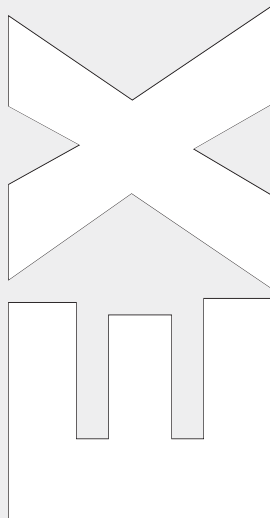
Size, mm	Qty	Order Code
0.6	1	7987-05
0.7	1	7987-10
0.8	1	7987-15


**VISCOMETER Cannon-Fenske ★**

For use in obtaining kinematic viscosities. Directions for use are published in *ASTM Standards on Petroleum Products and Lubricants*, D 445. Viscosities can be measured with a precision of  $\pm 0.2\%$  quickly and easily. A sample of approximately 7mL is necessary. Offered calibrated with certificate or uncalibrated.

Size	Approx. Constant Centistokes/Sec.	Range Centistokes	Qty	Uncalibrated	Calibrated
				Order Code	Order Code
25	0.002	0.5 to 2	1	7988-03	7988-33
50	0.004	0.8 to 4	1	7988-05	7988-35
75	0.008	1.6 to 8	1	7988-07	7988-37
100	0.015	3 to 15	1	7988-09	7988-39
150	0.035	7 to 35	1	7988-11	7988-41
200	0.1	20 to 100	1	7988-13	7988-43
300	0.25	50 to 250	1	7988-15	7988-45
350	0.5	100 to 500	1	7988-17	7988-47
400	1.2	240 to 1200	1	7988-19	7988-49
450	2.5	500 to 2500	1	7988-21	7988-51
500	8	1600 to 8000	1	7988-23	7988-53
600	20	4000 to 20000	1	7988-25	7988-55
650	45	9000 to 45000	1	7988-27	7988-57
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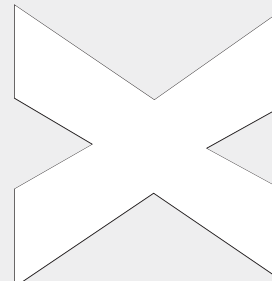
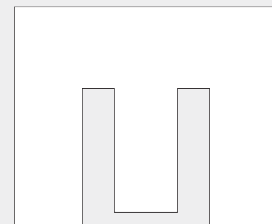
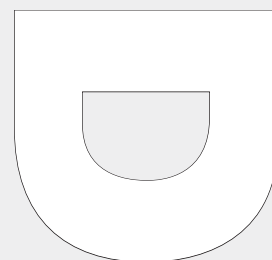
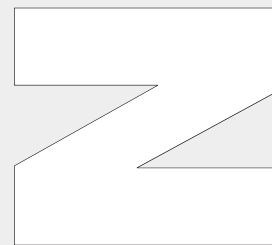
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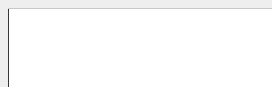
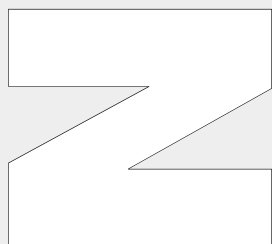
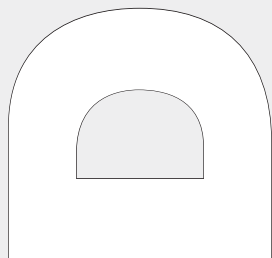
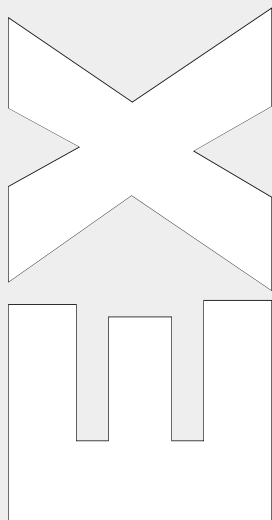
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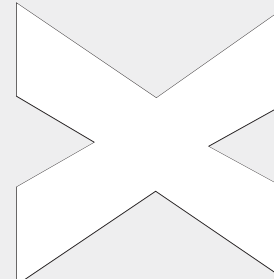
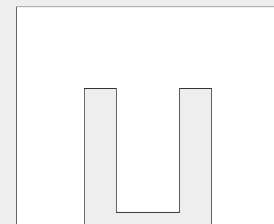
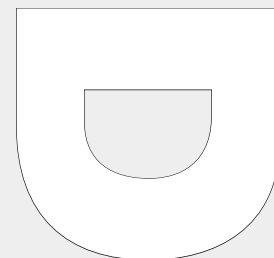
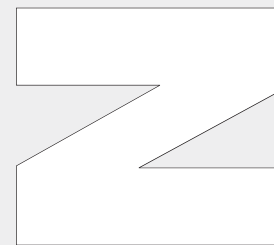
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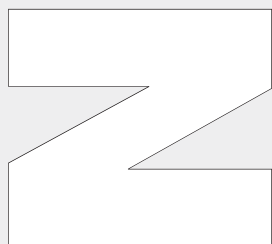
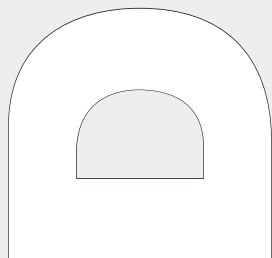
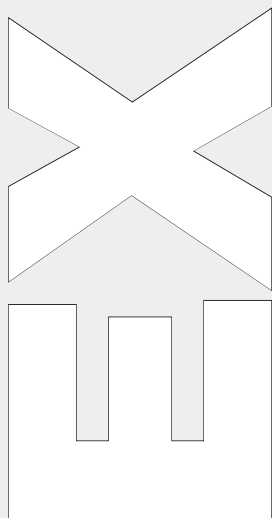
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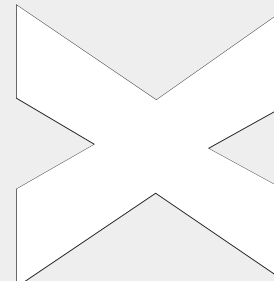
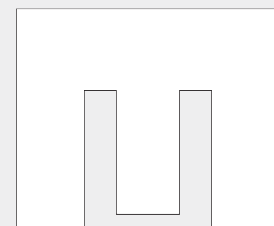
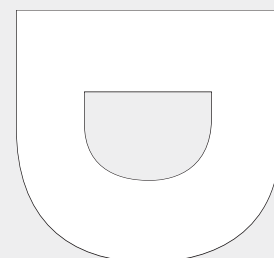
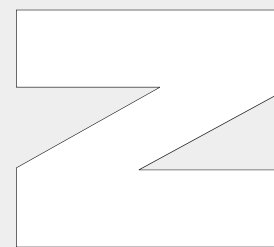
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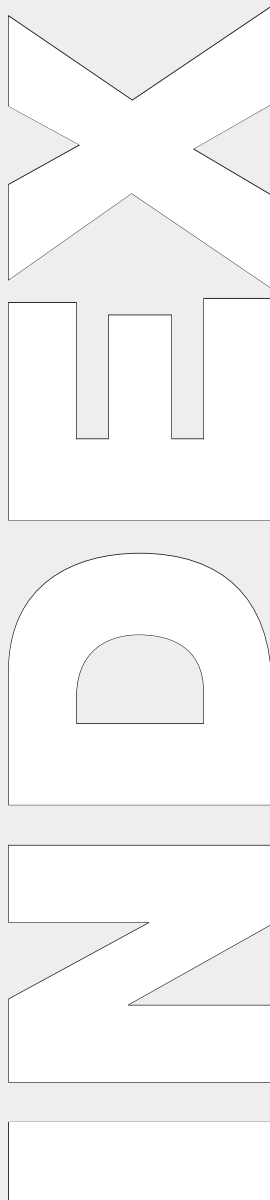
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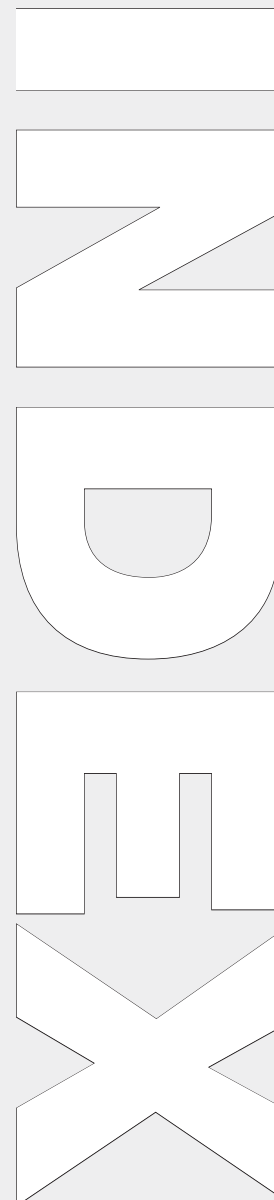
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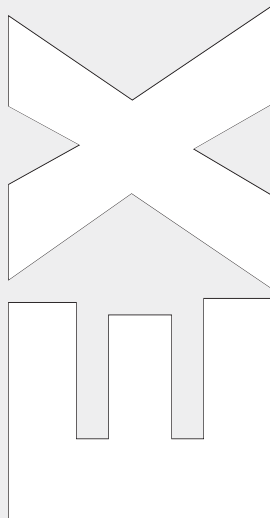
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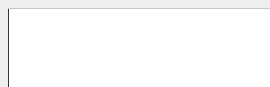
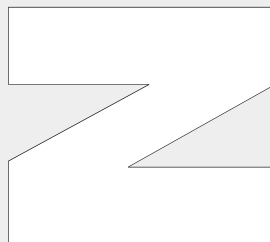
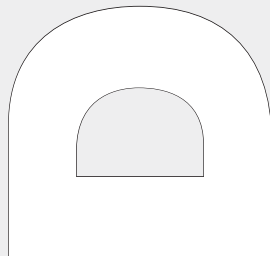
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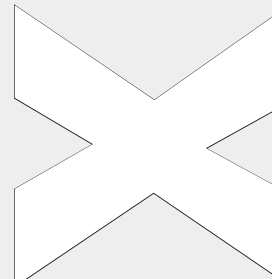
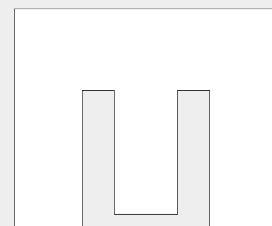
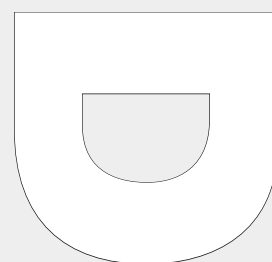
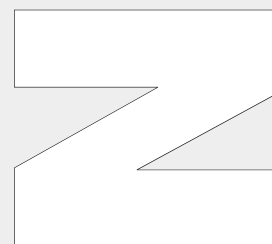
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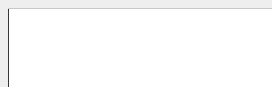
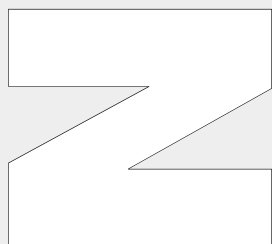
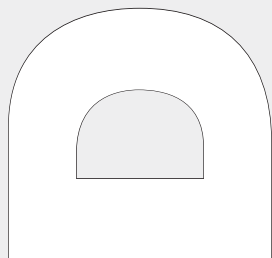
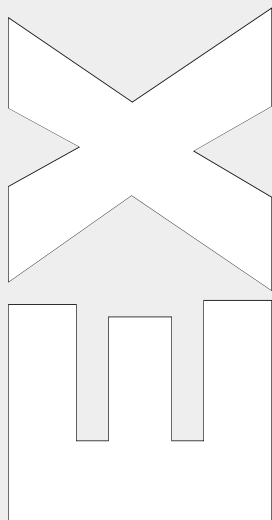
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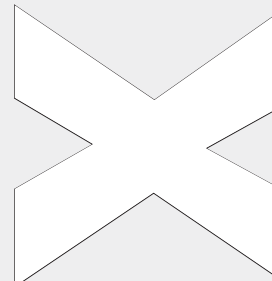
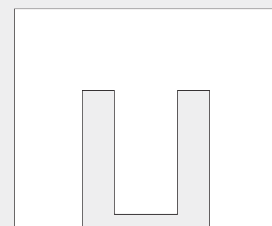
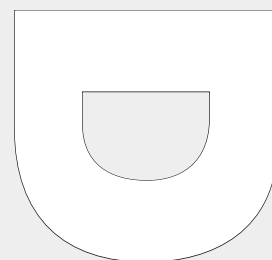
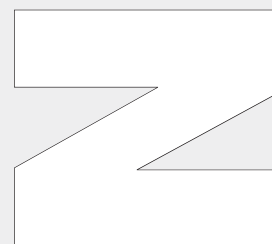
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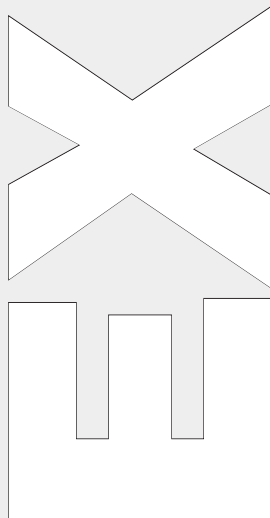
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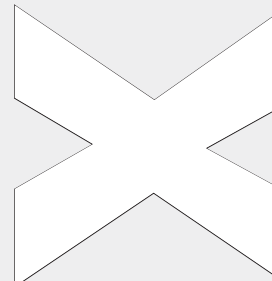
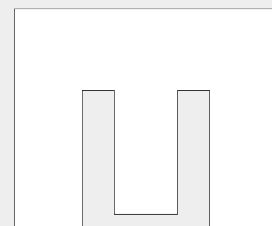
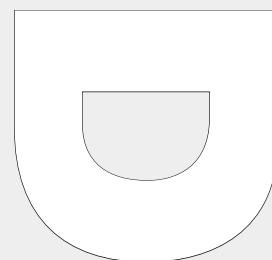
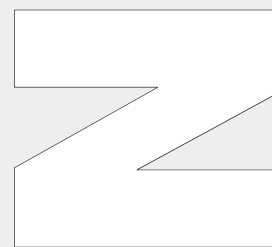
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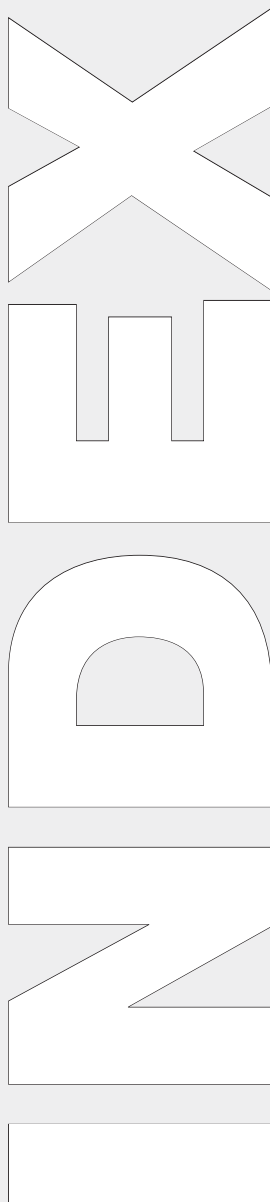
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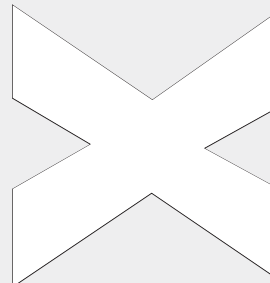
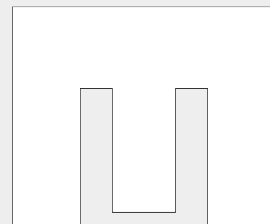
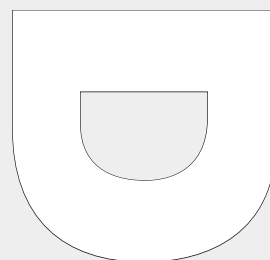
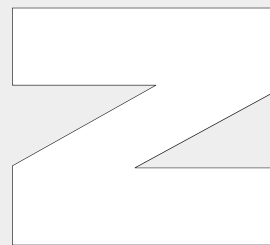
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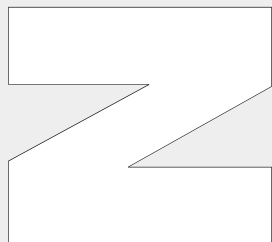
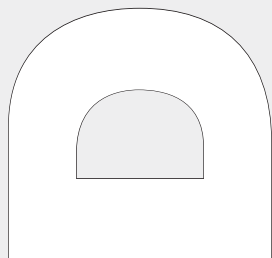
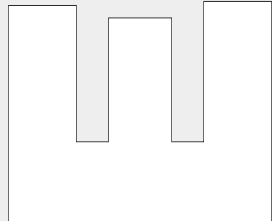
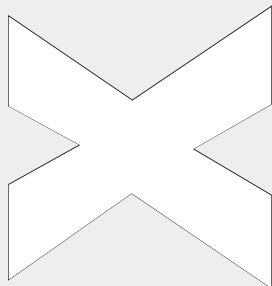
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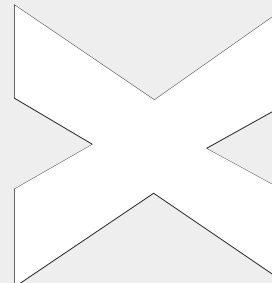
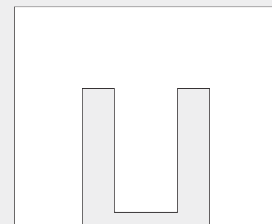
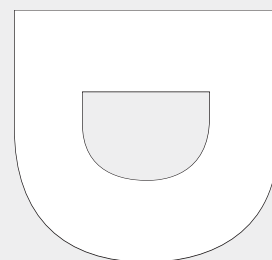
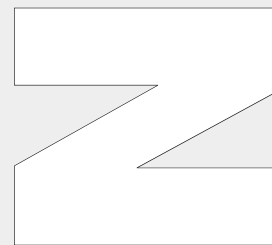
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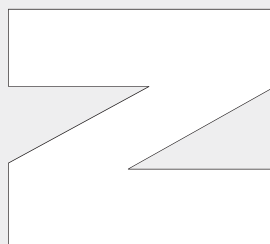
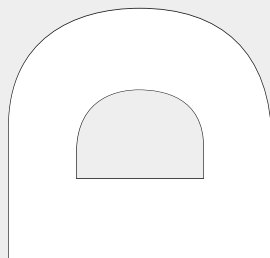
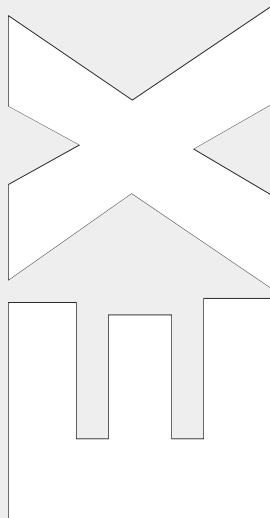
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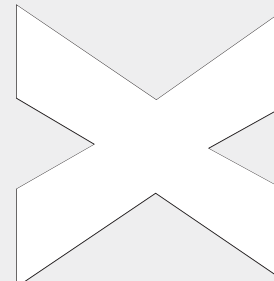
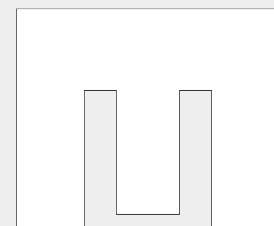
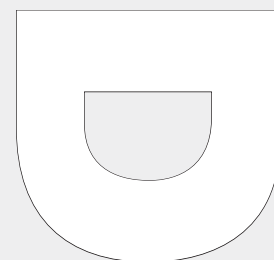
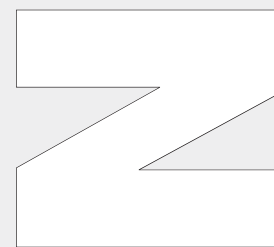
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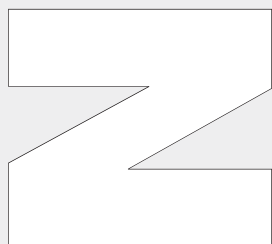
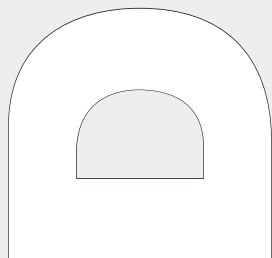
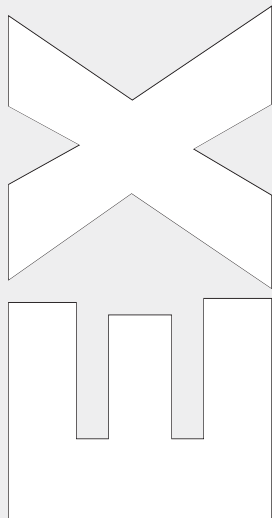
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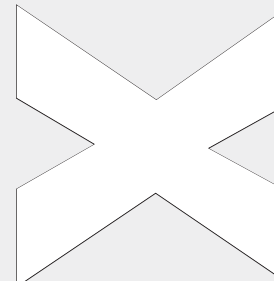
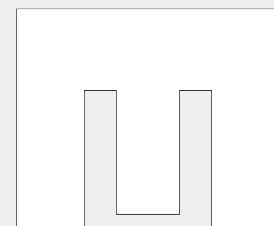
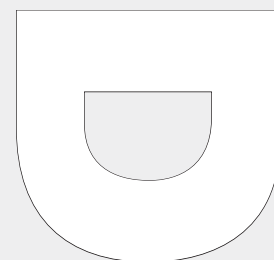
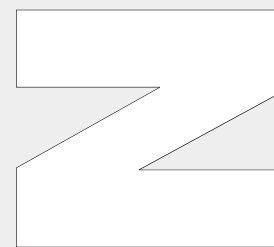
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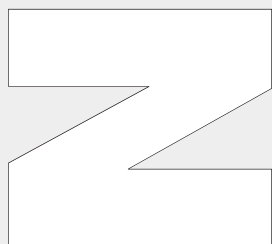
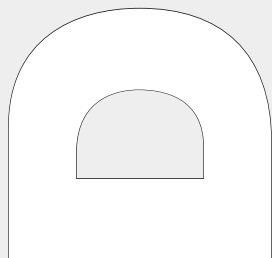
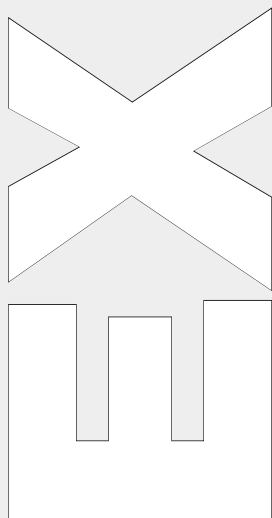
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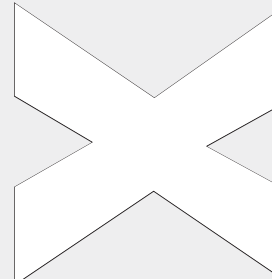
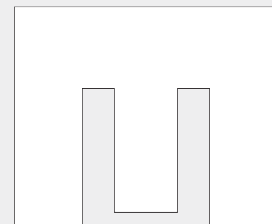
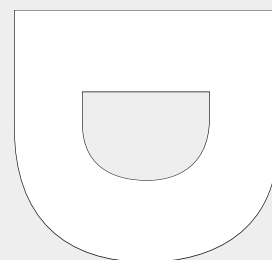
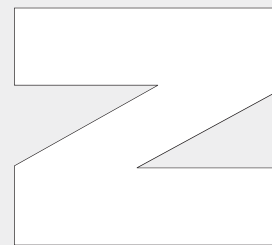
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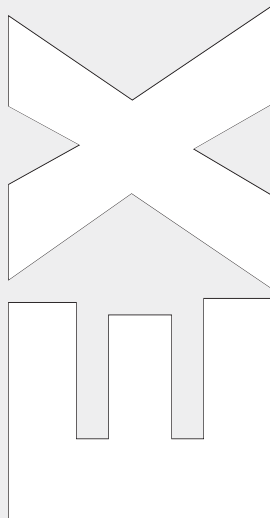
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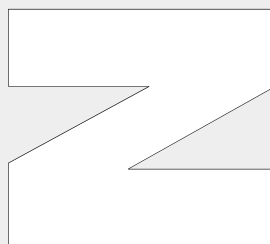
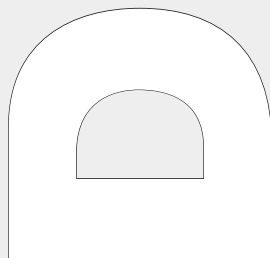
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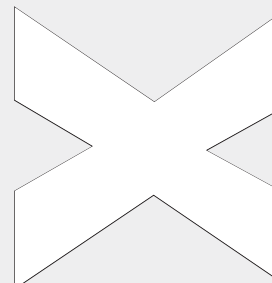
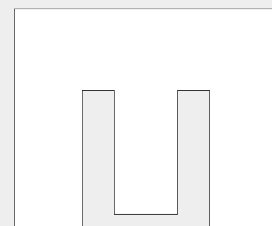
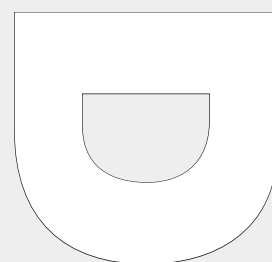
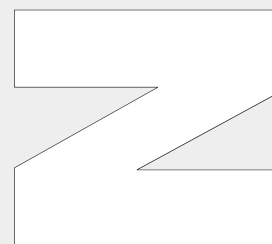
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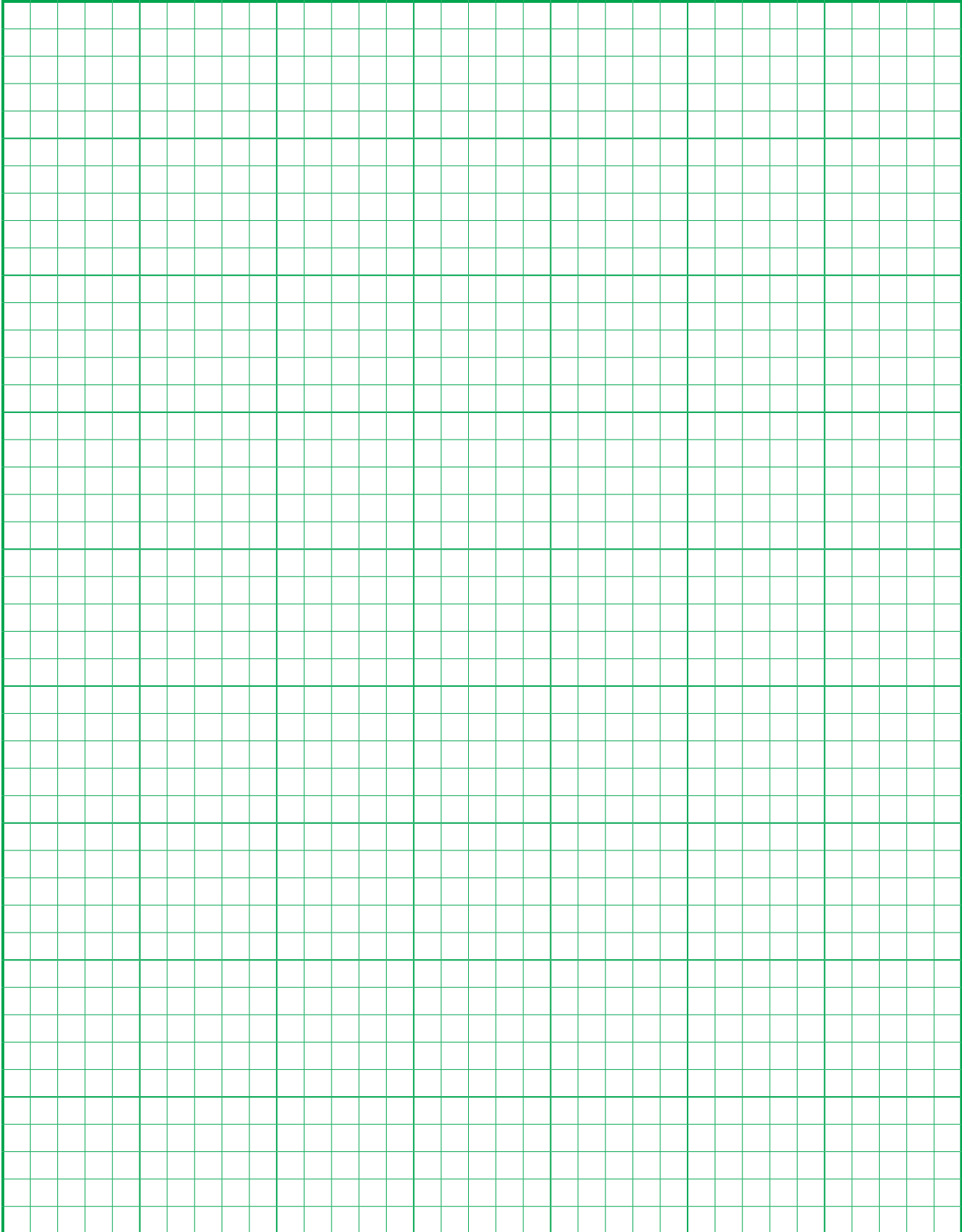
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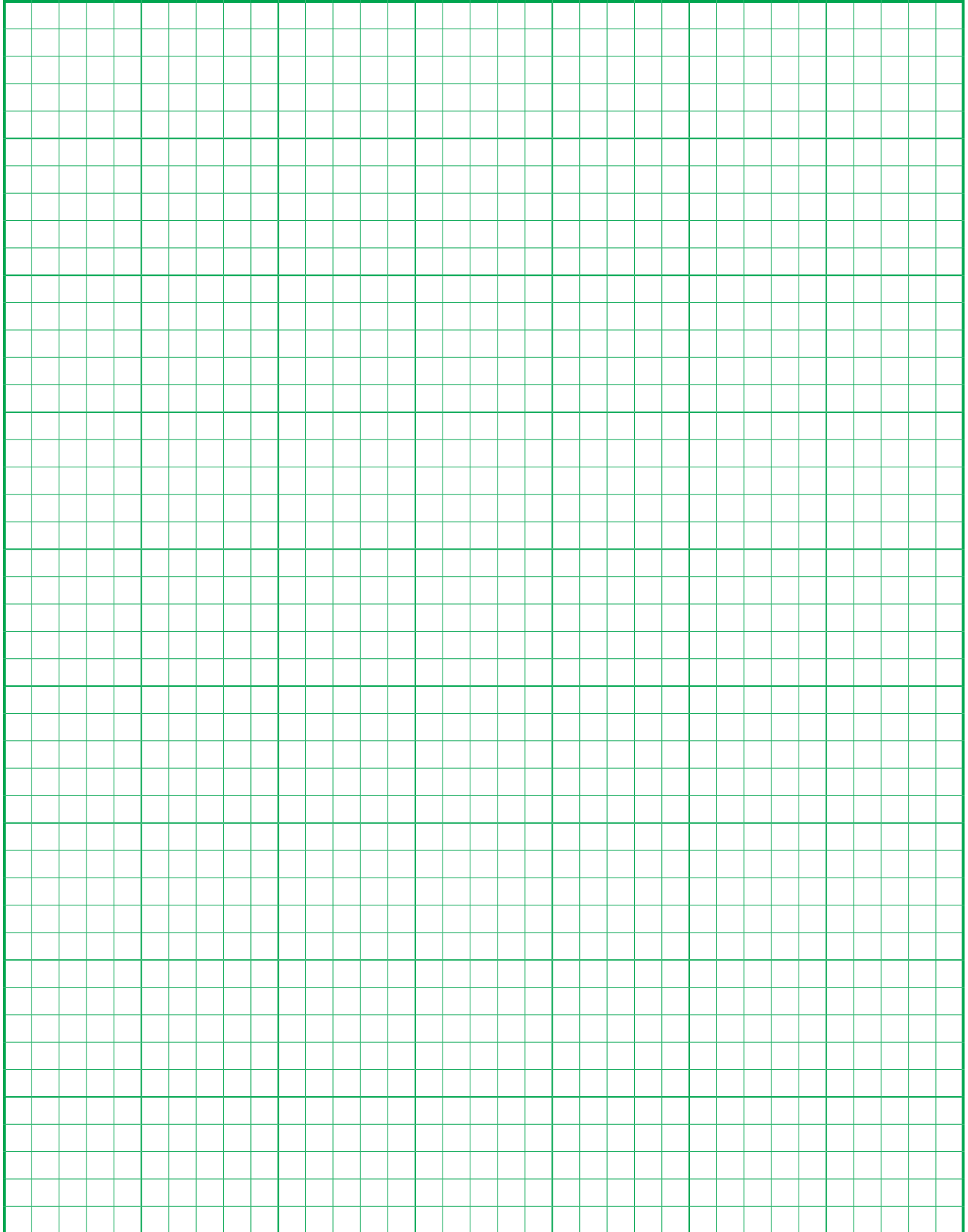





















# Periodic Table of Elements

Key:

1 H Hydrogen 1.008	2 He Helium 4.0026
atomic number	
Symbol	
Name atomic weight	

-  Alkali Metals
-  Alkaline Earth Metals
-  Transition Metals
-  Lanthanoids
-  Actinoids
-  Poor Metals
-  Nonmetals
-  Noble Gases
-  Solid
-  Liquid
-  Gas

3 Li Lithium 6.94	4 Be Beryllium 9.0122	5 B Boron 10.81	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305	13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.06	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078 (4)	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224 (2)	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium	44 Ru Ruthenium 101.07 (2)
55 Cs Cesium 132.91	56 Ba Barium 137.33	57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium	62 Sm Samarium 150.36 (2)
87 Fr Francium	88 Ra Radium	104 Rf Rutherfordium	105 Db Dubnium	106 Sg Seaborgium	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitnerium
118 Og Oganesson	117 Ts Tennessine	116 Lv Livermorium	115 Mc Moscovium	114 Fl Flerovium	113 Nh Nihonium	112 Cn Copernicium	111 Rg Roentgenium
86 Rn Radon	85 At Astatine	84 Po Polonium 209 (8)	83 Bi Bismuth 208.98	82 Pb Lead 207.2	81 Tl Thallium 204.38	80 Hg Mercury 200.59	79 Au Gold 196.97
71 Lu Lutetium 174.97	70 Yb Ytterbium 173.05	69 Tm Thulium 168.93	68 Er Erbium 167.26	67 Ho Holmium 164.93	66 Dy Dysprosium 162.50	65 Tb Terbium 158.93	64 Gd Gadolinium 157.25 (6)
103 Lr Lawrencium	102 No Nobelium	101 Md Mendelevium	100 Fm Fermium	99 Es Einsteinium	98 Cf Californium	97 Bk Berkelium	96 Cm Curium
91 Pa Protactinium 231.04	90 Th Thorium 232.04	89 Ac Actinium	118 Og Oganesson	117 Ts Tennessine	116 Lv Livermorium	115 Mc Moscovium	114 Fl Flerovium
92 U Uranium 238.03	91 Th Thorium 232.04	90 Ce Cerium 140.12	89 La Lanthanum 138.91	88 Ra Radium	87 Fr Francium	86 Rn Radon	85 At Astatine
103 Lr Lawrencium	102 No Nobelium	101 Md Mendelevium	100 Fm Fermium	99 Es Einsteinium	98 Cf Californium	97 Bk Berkelium	96 Cm Curium
92 U Uranium 238.03	91 Pa Protactinium 231.04	90 Th Thorium 232.04	89 Ac Actinium	88 Ra Radium	87 Fr Francium	86 Rn Radon	85 At Astatine
84 Po Polonium 209 (8)	83 Bi Bismuth 208.98	82 Pb Lead 207.2	81 Tl Thallium 204.38	80 Hg Mercury 200.59	79 Au Gold 196.97	78 Pt Platinum 195.08	77 Ir Iridium 192.22
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4 Be Beryllium 9.0122	3 Li Lithium 6.94	2 He Helium 4.0026	1 H Hydrogen 1.008				

Element values obtained through International Union of Pure and Applied Chemistry (IUPAC). Current as of November 28, 2016.



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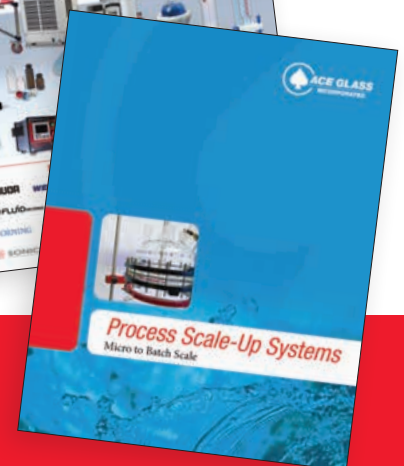


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