KYOCERA

SOLID CARBIDE
MICRO DIAMETER CUTTING TOOLS

We Put The Micro In Your Machining™

ABOUT US

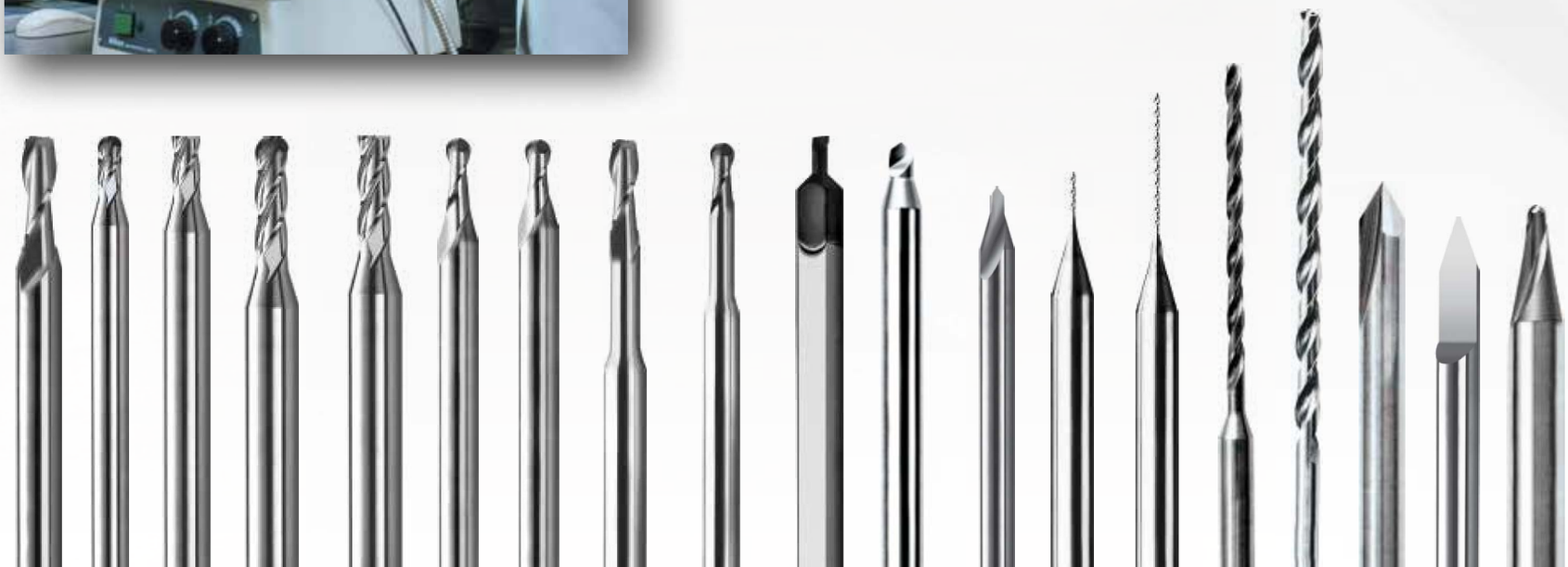
Since 1987, Kyocera has designed and manufactured tight tolerance carbide cutting tools and miniature parts for a broad range of markets including the electronics, industrial, medical and aerospace industries. We offer high-volume CNC grinding consistency in diameters from 0.0015” (38um) to 0.264” (6.70mm), tolerances as tight as 0.00025” (.6um) and superior surface finishes. Kyocera is the only company that offers a complete range of micro diameter cutting tools.

Equipment

Our state-of-the-art facilities include over 65 Swiss-made Rollomatic CNC grinding centers and extensive automated optical inspection (AOI) to ensure quality and consistency. Every tool we build is CAD/CAM designed and has SPC lot traceability as our ISO 9001:2008 and 14001:2004 certifications require.

Partnering with Kyocera Micro Tools will help with the strategic development of the entire machining process. We offer our customers technical support and recommendations regarding efficient tool applications, proper feeds and speeds, cutting oils, equipment selection, and overall machining process optimization. Upon implementation, we continue to work closely with our customers to further improve their micro machining capabilities.

With over 80% of the 4 Million tools built each month smaller than 0.020” in diameter, Kyocera Micro Tools offers the largest breadth of precision micro tools available.



DRILLING - SECTION 1

MILLING - SECTION 2

TURNING - SECTION 3

THREADING - SECTION 4

REAMING - SECTION 5

ROUTING - SECTION 6

ENGRAVING - SECTION 7

TECHNICAL - SECTION 8

Service

Kyocera Tycom Corporation
3565 Cadillac Avenue
Costa Mesa, California USA 92626
www.KyoceraMicroTools.com

For orders and Inquiries:

- U.S. customers call 888-848-8449
- International customers call 001-714-428-3636
- Fax 714-428-3607
- E-mail MITSales@kyocera.com

NOTE: Prices and specifications subject to change without notice. For more Information and new product notifications, please visit www.KyoceraMicroTools.com

We Put The Micro In Your Machining™

DRILLING - SECTION 1

DRILLING - SECTION 1

1/8″ SHANK SOLID CARBIDE MICRO SPOTTING DRILLS

SERIES 080 0.0050″ - 0.1250″ Diameter

Diameter Tolerance (+0/-0.0003″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

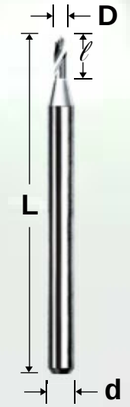
PLASTIC | CU ALLOY | AL | CAST IRON | TI | NI/CO | STAINLESS | STEEL | HI-CSTEEL

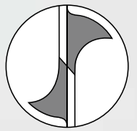
90 DEGREE INCLUDED POINT ANGLE

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
.0050	.025	1/8	1 1/2	080-0050.90	080-0050L90
.0100	.035	1/8	1 1/2	080-0100.90	080-0100L90
.0150	.045	1/8	1 1/2	080-0150.90	080-0150L90
.0200	.050	1/8	1 1/2	080-0200.90	080-0200L90
.0312	.090	1/8	1 1/2	080-0312.90	080-0312L90
.0625	.200	1/8	1 1/2	080-0625.90	080-0625L90
.0938	.200	1/8	1 1/2	080-0938.90	080-0938L90
.1250	.200	1/8	1 1/2	080-1250.90	080-1250L90

130 DEGREE INCLUDED POINT ANGLE

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
.0050	.025	1/8	1 1/2	080-0050.130	080-0050L130
.0100	.035	1/8	1 1/2	080-0100.130	080-0100L130
.0150	.045	1/8	1 1/2	080-0150.130	080-0150L130
.0200	.050	1/8	1 1/2	080-0200.130	080-0200L130
.0312	.090	1/8	1 1/2	080-0312.130	080-0312L130
.0625	.200	1/8	1 1/2	080-0625.130	080-0625L130
.0938	.200	1/8	1 1/2	080-0938.130	080-0938L130
.1250	.200	1/8	1 1/2	080-1250.130	080-1250L130





4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO SPOTTING DRILLS

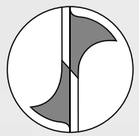
SERIES 081

0.15mm - 3.00mm Diameter

Diameter Tolerance (+0/-0.008mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI | NI/CO | STAINLESS | STEEL | HI-CSTEEL



4 Facet Point Geometry

90 DEGREE INCLUDED POINT ANGLE

D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.15	0.65	3	38	081-0059.90	081-0059L90
0.25	0.90	3	38	081-0098.90	081-0098L90
0.40	1.15	3	38	081-0157.90	081-0157L90
0.50	1.30	3	38	081-0197.90	081-0197L90
1.00	2.30	3	38	081-0394.90	081-0394L90
1.50	5.00	3	38	081-0591.90	081-0591L90
2.00	5.00	3	38	081-0787.90	081-0787L90
3.00	5.00	3	38	081-1181.90	081-1181L90

130 DEGREE INCLUDED POINT ANGLE

D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.15	0.65	3	38	081-0059.130	081-0059L130
0.25	0.90	3	38	081-0098.130	081-0098L130
0.40	1.15	3	38	081-0157.130	081-0157L130
0.50	1.30	3	38	081-0197.130	081-0197L130
1.00	2.30	3	38	081-0394.130	081-0394L130
1.50	5.00	3	38	081-0591.130	081-0591L130
2.00	5.00	3	38	081-0787.130	081-0787L130
3.00	5.00	3	38	081-1181.130	081-1181L130

1/8″ SHANK SOLID CARBIDE MICRO DRILLS

SERIES 105

0.0040″ - 0.0200″ Diameter

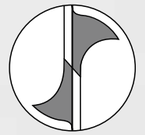
Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

Drill Size	D (in)	ℓ (in)	PT Angle	PN Uncoated	PN AlTiN
.10mm	.0040	.040	118 Deg	105-0040.040	105-0040L040
.13mm	.0050	.040	118 Deg	105-0050.040	105-0050L040
#97	.0059	.080	118 Deg	105-0059.080	105-0059L080
#96	.0063	.080	118 Deg	105-0063.080	105-0063L080
#95	.0067	.080	118 Deg	105-0067.080	105-0067L080
#94	.0071	.100	118 Deg	105-0071.100	105-0071L100
#93	.0075	.100	118 Deg	105-0075.100	105-0075L100
#92	.0079	.100	118 Deg	105-0079.100	105-0079L100
#91	.0083	.100	118 Deg	105-0083.100	105-0083L100
#90	.0087	.100	118 Deg	105-0087.100	105-0087L100
#89	.0091	.150	118 Deg	105-0091.150	105-0091L150
#88	.0095	.150	118 Deg	105-0095.150	105-0095L150
.25mm	.0098	.150	118 Deg	105-0098.150	105-0098L150
#87	.0100	.150	118 Deg	105-0100.150	105-0100L150
#86	.0105	.150	118 Deg	105-0105.150	105-0105L150
#85	.0110	.150	118 Deg	105-0110.150	105-0110L150
#84	.0115	.150	118 Deg	105-0115.150	105-0115L150
.30mm	.0118	.225	118 Deg	105-0118.225	105-0118L225
#83	.0120	.225	118 Deg	105-0120.225	105-0120L225
#82	.0125	.225	118 Deg	105-0125.225	105-0125L225
#81	.0130	.225	118 Deg	105-0130.225	105-0130L225
#80	.0135	.225	130 Deg	105-0135.225	105-0135L225
.35mm	.0138	.225	130 Deg	105-0138.225	105-0138L225
#79	.0145	.225	130 Deg	105-0145.225	105-0145L225
1/64”	.0156	.250	130 Deg	105-0156.250	105-0156L250
.40mm	.0157	.250	130 Deg	105-0157.250	105-0157L250
#78	.0160	.250	130 Deg	105-0160.250	105-0160L250
.45mm	.0177	.250	130 Deg	105-0177.250	105-0177L250
#77	.0180	.250	130 Deg	105-0180.250	105-0180L250
.50mm	.0197	.260	130 Deg	105-0197.260	105-0197L260
#76	.0200	.260	130 Deg	105-0200.260	105-0200L260



4 Facet Point Geometry

1/8″ SHANK SOLID CARBIDE MICRO DRILLS

SERIES 105

0.0210″ - 0.0430″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

4 Facet Point Geometry

Drill Size	D (in)	ℓ (in)	PT Angle	PN Uncoated	PN AlTiN
#75	.0210	.310	130 Deg	105-0210.310	105-0210L310
.55mm	.0217	.340	130 Deg	105-0217.340	105-0217L340
#74	.0225	.340	130 Deg	105-0225.340	105-0225L340
.60mm	.0236	.340	130 Deg	105-0236.340	105-0236L340
#73	.0240	.340	130 Deg	105-0240.340	105-0240L340
#72	.0250	.340	130 Deg	105-0250.340	105-0250L340
.65mm	.0256	.340	130 Deg	105-0256.340	105-0256L340
#71	.0260	.340	130 Deg	105-0260.340	105-0260L340
.70mm	.0276	.400	130 Deg	105-0276.400	105-0276L400
#70	.0280	.400	130 Deg	105-0280.400	105-0280L400
#69	.0292	.400	130 Deg	105-0292.400	105-0292L400
.75mm	.0295	.400	130 Deg	105-0295.400	105-0295L400
#68	.0310	.400	130 Deg	105-0310.400	105-0310L400
1/32”	.0312	.400	130 Deg	105-0312.400	105-0312L400
.80mm	.0315	.400	130 Deg	105-0315.400	105-0315L400
#67	.0320	.400	130 Deg	105-0320.400	105-0320L400
#66	.0330	.400	130 Deg	105-0330.400	105-0330L400
.85mm	.0335	.400	130 Deg	105-0335.400	105-0335L400
#65	.0350	.400	130 Deg	105-0350.400	105-0350L400
.90mm	.0354	.400	130 Deg	105-0354.400	105-0354L400
#64	.0360	.400	130 Deg	105-0360.400	105-0360L400
#63	.0370	.400	130 Deg	105-0370.400	105-0370L400
.95mm	.0374	.400	130 Deg	105-0374.400	105-0374L400
#62	.0380	.400	130 Deg	105-0380.400	105-0380L400
#61	.0390	.400	130 Deg	105-0390.400	105-0390L400
1.00mm	.0394	.400	130 Deg	105-0394.400	105-0394L400
#60	.0400	.400	130 Deg	105-0400.400	105-0400L400
#59	.0410	.400	130 Deg	105-0410.400	105-0410L400
1.05mm	.0413	.400	130 Deg	105-0413.400	105-0413L400
#58	.0420	.400	130 Deg	105-0420.400	105-0420L400
#57	.0430	.400	130 Deg	105-0430.400	105-0430L400

1/8″ SHANK SOLID CARBIDE MICRO DRILLS

SERIES 105

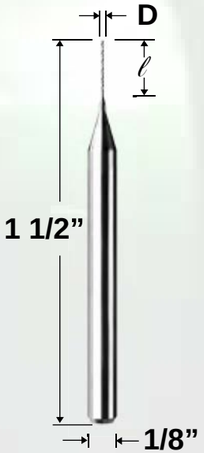
0.0433″ - 0.0768″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH



4 Facet Point Geometry

Drill Size	D (in)	ℓ (in)	PT Angle	PN Uncoated	PN AlTiN
1.10mm	.0433	.400	130 Deg	105-0433.400	105-0433L400
1.12mm	.0440	.400	130 Deg	105-0440.400	105-0440L400
1.15mm	.0453	.400	130 Deg	105-0453.400	105-0453L400
#56	.0465	.400	130 Deg	105-0465.400	105-0465L400
3/64”	.0469	.400	130 Deg	105-0469.400	105-0469L400
1.20mm	.0472	.400	130 Deg	105-0472.400	105-0472L400
1.25mm	.0492	.400	130 Deg	105-0492.400	105-0492L400
1.30mm	.0512	.400	130 Deg	105-0512.400	105-0512L400
#55	.0520	.400	130 Deg	105-0520.400	105-0520L400
1.35mm	.0531	.400	130 Deg	105-0531.400	105-0531L400
#54	.0550	.400	130 Deg	105-0550.400	105-0550L400
1.40mm	.0551	.400	130 Deg	105-0551.400	105-0551L400
1.45mm	.0571	.400	130 Deg	105-0571.400	105-0571L400
1.50mm	.0591	.400	130 Deg	105-0591.400	105-0591L400
#53	.0595	.400	130 Deg	105-0595.400	105-0595L400
1.55mm	.0610	.400	130 Deg	105-0610.400	105-0610L400
1/16”	.0625	.400	130 Deg	105-0625.400	105-0625L400
1.60mm	.0630	.400	130 Deg	105-0630.400	105-0630L400
#52	.0635	.400	130 Deg	105-0635.400	105-0635L400
1.65mm	.0650	.400	130 Deg	105-0650.400	105-0650L400
1.70mm	.0669	.400	130 Deg	105-0669.400	105-0669L400
#51	.0670	.400	130 Deg	105-0670.400	105-0670L400
1.75mm	.0689	.400	130 Deg	105-0689.400	105-0689L400
#50	.0700	.400	130 Deg	105-0700.400	105-0700L400
1.80mm	.0709	.400	130 Deg	105-0709.400	105-0709L400
1.85mm	.0728	.400	130 Deg	105-0728.400	105-0728L400
#49	.0730	.400	130 Deg	105-0730.400	105-0730L400
1.90mm	.0748	.400	130 Deg	105-0748.400	105-0748L400
#48	.0760	.400	130 Deg	105-0760.400	105-0760L400
1.95mm	.0768	.400	130 Deg	105-0768.400	105-0768L400

1/8″ SHANK SOLID CARBIDE MICRO DRILLS

SERIES 105

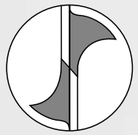
0.0781″ - 0.1083″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AL | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH



4 Facet Point Geometry

Drill Size	D (in)	ℓ (in)	PT Angle	PN Uncoated	PN AlTiN
5/64”	.0781	.400	130 Deg	105-0781.400	105-0781L400
#47	.0785	.400	130 Deg	105-0785.400	105-0785L400
2.00mm	.0787	.400	130 Deg	105-0787.400	105-0787L400
2.05mm	.0807	.400	130 Deg	105-0807.400	105-0807L400
#46	.0810	.400	130 Deg	105-0810.400	105-0810L400
#45	.0820	.400	130 Deg	105-0820.400	105-0820L400
2.10mm	.0827	.400	130 Deg	105-0827.400	105-0827L400
2.15mm	.0846	.400	130 Deg	105-0846.400	105-0846L400
#44	.0860	.400	130 Deg	105-0860.400	105-0860L400
2.20mm	.0866	.400	130 Deg	105-0866.400	105-0866L400
2.25mm	.0886	.400	130 Deg	105-0886.400	105-0886L400
#43	.0890	.400	130 Deg	105-0890.400	105-0890L400
2.30mm	.0906	.400	130 Deg	105-0906.400	105-0906L400
2.35mm	.0925	.400	130 Deg	105-0925.400	105-0925L400
#42	.0935	.400	130 Deg	105-0935.400	105-0935L400
3/32”	.0938	.400	130 Deg	105-0938.400	105-0938L400
2.40mm	.0945	.400	130 Deg	105-0945.400	105-0945L400
#41	.0960	.400	130 Deg	105-0960.400	105-0960L400
2.45mm	.0965	.400	130 Deg	105-0965.400	105-0965L400
#40	.0980	.400	130 Deg	105-0980.400	105-0980L400
2.50mm	.0984	.400	130 Deg	105-0984.400	105-0984L400
#39	.0995	.400	130 Deg	105-0995.400	105-0995L400
2.55mm	.1004	.400	130 Deg	105-1004.400	105-1004L400
#38	.1015	.400	130 Deg	105-1015.400	105-1015L400
2.60mm	.1024	.400	130 Deg	105-1024.400	105-1024L400
#37	.1040	.400	130 Deg	105-1040.400	105-1040L400
2.65mm	.1043	.400	130 Deg	105-1043.400	105-1043L400
2.70mm	.1063	.400	130 Deg	105-1063.400	105-1063L400
#36	.1065	.400	130 Deg	105-1065.400	105-1065L400
2.75mm	.1083	.400	130 Deg	105-1083.400	105-1083L400

1/8″ SHANK SOLID CARBIDE MICRO DRILLS

SERIES 105

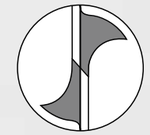
0.1094″ - 0.1250″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AL | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH



4 Facet Point Geometry

Drill Size	D (in)	ℓ (in)	PT Angle	PN Uncoated	PN AlTiN
7/64”	.1094	.400	130 Deg	105-1094.400	105-1094L400
#35	.1100	.400	130 Deg	105-1100.400	105-1100L400
2.80mm	.1102	.400	130 Deg	105-1102.400	105-1102L400
#34	.1110	.400	130 Deg	105-1110.400	105-1110L400
2.85mm	.1122	.400	130 Deg	105-1122.400	105-1122L400
#33	.1130	.400	130 Deg	105-1130.400	105-1130L400
2.90mm	.1142	.400	130 Deg	105-1142.400	105-1142L400
#32	.1160	.400	130 Deg	105-1160.400	105-1160L400
2.95mm	.1161	.400	130 Deg	105-1161.400	105-1161L400
3.00mm	.1181	.400	130 Deg	105-1181.400	105-1181L400
#31	.1200	.400	130 Deg	105-1200.400	105-1200L400
3.05mm	.1201	.400	130 Deg	105-1201.400	105-1201L400
3.10mm	.1220	.400	130 Deg	105-1220.400	105-1220L400
3.15mm	.1240	.400	130 Deg	105-1240.400	105-1240L400
1/8”	.1250	.400	130 Deg	105-1250.400	105-1250L400

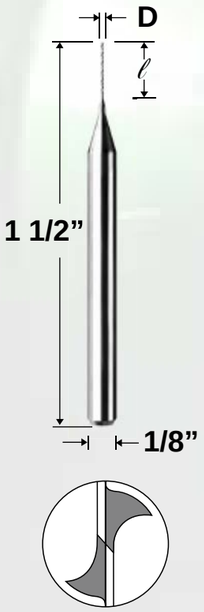
1/8″ SHANK SOLID CARBIDE MICRO DRILLS

SERIES 105 0.0040″ - 0.0200″Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AI | TI | NI/CO | CAST IRON | STAINLESS



4 Facet Point Geometry

EXTENDED FLUTE LENGTH

Drill Size	D (in)	ℓ (in)	PT Angle	PN Uncoated	PN AlTiN
.10mm	.0040	.070	118 Deg	105-0040.070	105-0040L070
.13mm	.0050	.070	118 Deg	105-0050.070	105-0050L070
#97	.0059	.120	118 Deg	105-0059.120	105-0059L120
#96	.0063	.120	118 Deg	105-0063.120	105-0063L120
#95	.0067	.120	118 Deg	105-0067.120	105-0067L120
#94	.0071	.150	118 Deg	105-0071.150	105-0071L150
#93	.0075	.150	118 Deg	105-0075.150	105-0075L150
#92	.0079	.150	118 Deg	105-0079.150	105-0079L150
#91	.0083	.150	118 Deg	105-0083.150	105-0083L150
#90	.0087	.150	118 Deg	105-0087.150	105-0087L150
#89	.0091	.220	118 Deg	105-0091.220	105-0091L220
#88	.0095	.220	118 Deg	105-0095.220	105-0095L220
.25mm	.0098	.220	118 Deg	105-0098.220	105-0098L220
#87	.0100	.220	118 Deg	105-0100.220	105-0100L220
#86	.0105	.220	118 Deg	105-0105.220	105-0105L220
#85	.0110	.220	118 Deg	105-0110.220	105-0110L220
#84	.0115	.220	118 Deg	105-0115.220	105-0115L220
.30mm	.0118	.280	118 Deg	105-0118.280	105-0118L280
#83	.0120	.280	118 Deg	105-0120.280	105-0120L280
#82	.0125	.280	118 Deg	105-0125.280	105-0125L280
#81	.0130	.280	118 Deg	105-0130.280	105-0130L280
#80	.0135	.280	130 Deg	105-0135.280	105-0135L280
.35mm	.0138	.280	130 Deg	105-0138.280	105-0138L280
#79	.0145	.280	130 Deg	105-0145.280	105-0145L280
1/64”	.0156	.295	130 Deg	105-0156.295	105-0156L295
.40mm	.0157	.295	130 Deg	105-0157.295	105-0157L295
#78	.0160	.295	130 Deg	105-0160.295	105-0160L295
.45mm	.0177	.295	130 Deg	105-0177.295	105-0177L295
#77	.0180	.295	130 Deg	105-0180.295	105-0180L295
.50mm	.0197	.310	130 Deg	105-0197.310	105-0197L310
#76	.0200	.310	130 Deg	105-0200.310	105-0200L310

1/8″ SHANK CARBIDE INVERSE DIAMETER MICRO DRILLS

SERIES 155 0.1260″ - 0.1594″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AI | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

Drill Size	D (in)	ℓ (in)	PT Angle	PN
3.20mm	.1260	.500	130 Deg	155-1260.500
3.25mm	.1280	.500	130 Deg	155-1280.500
#30	.1285	.500	130 Deg	155-1285.500
3.30mm	.1299	.500	130 Deg	155-1299.500
3.35mm	.1319	.500	130 Deg	155-1319.500
3.40mm	.1339	.500	130 Deg	155-1339.500
3.45mm	.1358	.500	130 Deg	155-1358.500
#29	.1360	.500	130 Deg	155-1360.500
3.50mm	.1378	.500	130 Deg	155-1378.500
3.55mm	.1398	.500	130 Deg	155-1398.500
#28	.1405	.500	130 Deg	155-1405.500
9/64”	.1406	.500	130 Deg	155-1406.500
3.60mm	.1417	.500	130 Deg	155-1417.500
3.65mm	.1437	.500	130 Deg	155-1437.500
#27	.1440	.500	130 Deg	155-1440.500
3.70mm	.1457	.500	130 Deg	155-1457.500
#26	.1470	.500	130 Deg	155-1470.500
3.75mm	.1476	.500	130 Deg	155-1476.500
#25	.1495	.500	130 Deg	155-1495.500
3.80mm	.1496	.500	130 Deg	155-1496.500
3.85mm	.1516	.500	130 Deg	155-1516.500
#24	.1520	.500	130 Deg	155-1520.500
3.90mm	.1535	.500	130 Deg	155-1535.500
#23	.1540	.500	130 Deg	155-1540.500
3.95mm	.1555	.500	130 Deg	155-1555.500
5/32”	.1562	.500	130 Deg	155-1562.500
#22	.1570	.500	130 Deg	155-1570.500
4.00mm	.1575	.500	130 Deg	155-1575.500
#21	.1590	.500	130 Deg	155-1590.500
4.05mm	.1594	.500	130 Deg	155-1594.500

4 Facet Point Geometry

1/8″ SHANK CARBIDE INVERSE DIAMETER MICRO DRILLS

SERIES 155 0.1610″ - 0.1949″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AI | TI | NI/CO | CAST IRON | STAINLESS

4 Facet Point Geometry

STANDARD FLUTE LENGTH

Drill Size	D (in)	ℓ (in)	PT Angle	PN
#20	.1610	.500	130 Deg	155-1610.500
4.10mm	.1614	.500	130 Deg	155-1614.500
4.15mm	.1634	.500	130 Deg	155-1634.500
4.20mm	.1654	.500	130 Deg	155-1654.500
#19	.1660	.500	130 Deg	155-1660.500
4.25mm	.1673	.500	130 Deg	155-1673.500
4.30mm	.1693	.500	130 Deg	155-1693.500
#18	.1695	.500	130 Deg	155-1695.500
4.35mm	.1713	.500	130 Deg	155-1713.500
11/64”	.1719	.500	130 Deg	155-1719.500
#17	.1730	.500	130 Deg	155-1730.500
4.40mm	.1732	.500	130 Deg	155-1732.500
4.45mm	.1752	.500	130 Deg	155-1752.500
#16	.1770	.500	130 Deg	155-1770.500
4.50mm	.1772	.500	130 Deg	155-1772.500
4.55mm	.1791	.500	130 Deg	155-1791.500
#15	.1800	.500	130 Deg	155-1800.500
4.60mm	.1811	.500	130 Deg	155-1811.500
#14	.1820	.500	130 Deg	155-1820.500
4.65mm	.1831	.500	130 Deg	155-1831.500
#13	.1850	.500	130 Deg	155-1850.500
4.70mm	.1850	.500	130 Deg	155-1850.500
4.75mm	.1870	.500	130 Deg	155-1870.500
3/16”	.1875	.500	130 Deg	155-1875.500
#12	.1890	.500	130 Deg	155-1890.500
4.80mm	.1890	.500	130 Deg	155-1890.500
4.85mm	.1909	.500	130 Deg	155-1909.500
#11	.1910	.500	130 Deg	155-1910.500
4.90mm	.1929	.500	130 Deg	155-1929.500
#10	.1935	.500	130 Deg	155-1935.500
4.95mm	.1949	.500	130 Deg	155-1949.500

KYOCERA MICRO TOOLS

DRILLS

1/8″ SHANK CARBIDE INVERSE DIAMETER MICRO DRILLS

SERIES 155 0.1960″ - 0.2323″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AI | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

Drill Size	D (in)	ℓ (in)	PT Angle	PN
#9	.1960	.500	130 Deg	155-1960.500
5.00mm	.1968	.500	130 Deg	155-1968.500
5.05mm	.1988	.500	130 Deg	155-1988.500
#8	.1990	.500	130 Deg	155-1990.500
5.10mm	.2008	.500	130 Deg	155-2008.500
#7	.2010	.500	130 Deg	155-2010.500
5.15mm	.2028	.500	130 Deg	155-2028.500
13/64”	.2031	.500	130 Deg	155-2031.500
#6	.2040	.500	130 Deg	155-2040.500
5.20mm	.2047	.500	130 Deg	155-2047.500
#5	.2055	.500	130 Deg	155-2055.500
5.25mm	.2067	.500	130 Deg	155-2067.500
5.30mm	.2087	.500	130 Deg	155-2087.500
#4	.2090	.500	130 Deg	155-2090.500
5.35mm	.2106	.500	130 Deg	155-2106.500
5.40mm	.2126	.500	130 Deg	155-2126.500
#3	.2130	.500	130 Deg	155-2130.500
5.45mm	.2146	.500	130 Deg	155-2146.500
5.50mm	.2165	.500	130 Deg	155-2165.500
5.50mm	.2185	.500	130 Deg	155-2185.500
7/32”	.2188	.500	130 Deg	155-2188.500
5.60mm	.2205	.500	130 Deg	155-2205.500
#2	.2210	.500	130 Deg	155-2210.500
5.65mm	.2224	.500	130 Deg	155-2224.500
5.70mm	.2244	.500	130 Deg	155-2244.500
5.75mm	.2264	.500	130 Deg	155-2264.500
#1	.2280	.500	130 Deg	155-2280.500
5.80mm	.2283	.500	130 Deg	155-2283.500
5.85mm	.2302	.500	130 Deg	155-2302.500
5.90mm	.2323	.500	130 Deg	155-2323.500

4 Facet Point Geometry

1/8″ SHANK CARBIDE INVERSE DIAMETER MICRO DRILLS

SERIES 155 0.2340″ - 0.2638″ Diameter

Diameter Tolerance (+0/-0.0003″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC · CFRP · CU ALLOY · Al · TI · NI/CO · CAST IRON · STAINLESS

4 Facet Point Geometry

STANDARD FLUTE LENGTH

Drill Size	D (in)	ℓ (in)	PT Angle	PN
A	.2340	.500	130 Deg	155-2340.500
5.95mm	.2343	.500	130 Deg	155-2343.500
15/64”	.2344	.500	130 Deg	155-2344.500
6.00mm	.2362	.500	130 Deg	155-2362.500
B	.2380	.500	130 Deg	155-2380.500
6.05mm	.2382	.500	130 Deg	155-2382.500
6.10mm	.2402	.500	130 Deg	155-2402.500
C	.2420	.500	130 Deg	155-2420.500
6.15mm	.2421	.500	130 Deg	155-2421.500
6.20mm	.2441	.500	130 Deg	155-2441.500
D	.2460	.500	130 Deg	155-2460.500
6.25mm	.2461	.500	130 Deg	155-2461.500
6.30mm	.2480	.500	130 Deg	155-2480.500
1/4”	.2500	.500	130 Deg	155-2500.500
6.35mm	.2500	.500	130 Deg	155-2500.500
E	.2500	.500	130 Deg	155-2500.500
6.40mm	.2520	.500	130 Deg	155-2520.500
6.50mm	.2559	.500	130 Deg	155-2559.500
F	.2570	.500	130 Deg	155-2570.500
6.60mm	.2598	.500	130 Deg	155-2598.500
G	.2610	.500	130 Deg	155-2610.500
6.70mm	.2638	.500	130 Deg	155-2638.500

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226 0.04mm - 0.33mm Diameter

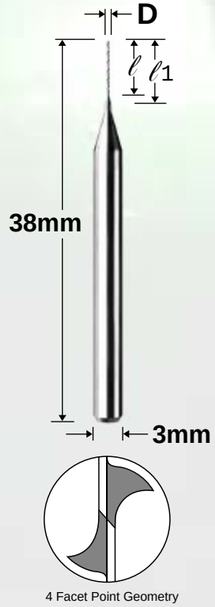
Diameter Tolerance (+.0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC · CFRP · CU ALLOY · Al · TI · NI/CO · CAST IRON · STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.04	0.5	0.5	3	226-0016.020	
0.05	0.8	0.8	3	226-0020.030	
0.06	0.8	0.8	3	226-0024.030	
0.07	1.3	1.3	3	226-0028.050	
0.08	1.3	1.3	3	226-0031.050	
0.09	1.3	1.3	3	226-0035.050	
0.10	1.0	1.2	3	226-0039.040	
0.11	1.0	1.2	3	226-0043.040	
0.12	1.0	1.2	3	226-0047.040	
0.13	1.0	1.2	3	226-0051.040	
0.14	1.0	1.2	3	226-0055.040	
0.15	2.0	2.2	3	226-0059.080	
0.16	2.0	2.2	3	226-0063.080	
0.17	2.0	2.2	3	226-0067.080	
0.18	2.5	2.7	3	226-0071.100	
0.19	2.5	2.7	3	226-0075.100	
0.20	2.5	2.7	3	226-0079.100	
0.21	2.5	2.7	3	226-0083.100	
0.22	2.5	2.7	3	226-0087.100	
0.23	3.8	4.0	3	226-0091.150	
0.24	3.8	4.0	3	226-0094.150	
0.25	3.8	4.0	3	226-0098.150	
0.26	3.8	4.0	3	226-0102.150	
0.27	3.8	4.0	3	226-0106.150	
0.28	3.8	4.0	3	226-0110.150	
0.29	3.8	4.0	3	226-0114.150	
0.30	5.7	5.9	3	226-0118.225	226-0118L225
0.31	5.7	5.9	3	226-0122.225	226-0122L225
0.32	5.7	5.9	3	226-0126.225	226-0126L225
0.33	5.7	5.9	3	226-0130.225	226-0130L225



4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226

0.34mm - 0.54mm Diameter

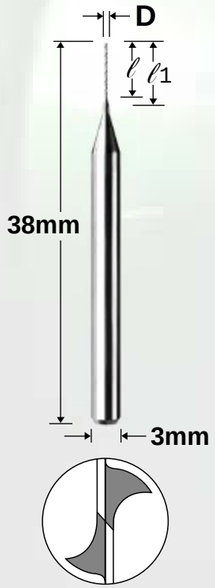
Diameter Tolerance (+.0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AI | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.34	5.7	5.9	3	226-0134.225	226-0134L225
0.35	5.7	5.9	3	226-0138.225	226-0138L225
0.36	5.7	5.9	3	226-0142.225	226-0142L225
0.37	5.7	5.9	3	226-0146.225	226-0146L225
0.38	6.4	6.6	3	226-0150.250	226-0150L250
0.39	6.4	6.6	3	226-0154.250	226-0154L250
0.40	6.4	6.6	3	226-0157.250	226-0157L250
0.41	6.4	6.6	3	226-0161.250	226-0161L250
0.42	6.4	6.6	3	226-0165.250	226-0165L250
0.43	6.4	6.6	3	226-0169.250	226-0169L250
0.44	6.4	6.6	3	226-0173.250	226-0173L250
0.45	6.4	6.6	3	226-0177.250	226-0177L250
0.46	6.4	6.6	3	226-0181.250	226-0181L250
0.47	6.4	6.6	3	226-0185.250	226-0185L250
0.48	6.6	6.8	3	226-0189.260	226-0189L260
0.49	6.6	6.8	3	226-0193.260	226-0193L260
0.50	6.6	6.8	3	226-0197.260	226-0197L260
0.51	6.6	6.8	3	226-0201.260	226-0201L260
0.52	6.6	6.8	3	226-0205.260	226-0205L260
0.53	6.6	6.8	3	226-0209.260	226-0209L260
0.54	6.6	6.8	3	226-0213.260	226-0213L260



4 Facet Point Geometry

METRIC
DRILLS

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226

0.55mm - 0.84mm Diameter

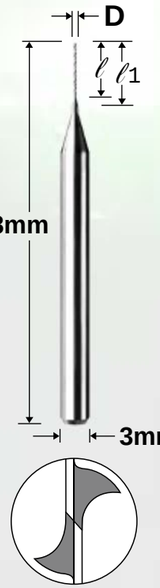
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AI | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.55	8.6	8.8	3	226-0217.340	226-0217L340
0.56	8.6	8.8	3	226-0220.340	226-0220L340
0.57	8.6	8.8	3	226-0224.340	226-0224L340
0.58	8.6	8.8	3	226-0228.340	226-0228L340
0.59	8.6	8.8	3	226-0232.340	226-0232L340
0.60	8.6	8.8	3	226-0236.340	226-0236L340
0.61	8.6	8.8	3	226-0240.340	226-0240L340
0.62	8.6	8.8	3	226-0244.340	226-0244L340
0.63	8.6	8.8	3	226-0248.340	226-0248L340
0.64	8.6	8.8	3	226-0252.340	226-0252L340
0.65	8.6	8.8	3	226-0256.340	226-0256L340
0.66	8.6	8.8	3	226-0260.340	226-0260L340
0.67	8.6	8.8	3	226-0264.340	226-0264L340
0.68	8.6	8.8	3	226-0268.340	226-0268L340
0.69	8.6	8.8	3	226-0272.340	226-0272L340
0.70	10.2	10.4	3	226-0276.400	226-0276L400
0.71	10.2	10.4	3	226-0280.400	226-0280L400
0.72	10.2	10.4	3	226-0283.400	226-0283L400
0.73	10.2	10.4	3	226-0287.400	226-0287L400
0.74	10.2	10.4	3	226-0291.400	226-0291L400
0.75	10.2	10.4	3	226-0295.400	226-0295L400
0.76	10.2	10.4	3	226-0299.400	226-0299L400
0.77	10.2	10.4	3	226-0303.400	226-0303L400
0.78	10.2	10.4	3	226-0307.400	226-0307L400
0.79	10.2	10.4	3	226-0311.400	226-0311L400
0.80	10.2	10.4	3	226-0315.400	226-0315L400
0.81	10.2	10.4	3	226-0319.400	226-0319L400
0.82	10.2	10.4	3	226-0323.400	226-0323L400
0.83	10.2	10.4	3	226-0327.400	226-0327L400
0.84	10.2	10.4	3	226-0331.400	226-0331L400



4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226 0.85mm - 1.14mm Diameter

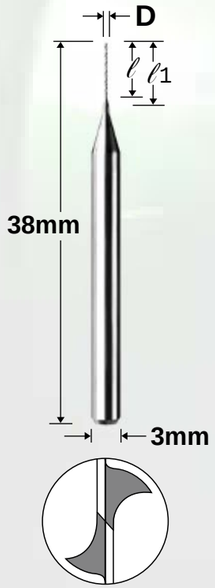
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AL | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.85	10.2	10.4	3	226-0335.400	226-0335L400
0.86	10.2	10.4	3	226-0339.400	226-0339L400
0.87	10.2	10.4	3	226-0343.400	226-0343L400
0.88	10.2	10.4	3	226-0346.400	226-0346L400
0.89	10.2	10.4	3	226-0350.400	226-0350L400
0.90	10.2	10.4	3	226-0354.400	226-0354L400
0.91	10.2	10.4	3	226-0358.400	226-0358L400
0.92	10.2	10.4	3	226-0362.400	226-0362L400
0.93	10.2	10.4	3	226-0366.400	226-0366L400
0.94	10.2	10.4	3	226-0370.400	226-0370L400
0.95	10.2	10.4	3	226-0374.400	226-0374L400
0.96	10.2	10.4	3	226-0378.400	226-0378L400
0.97	10.2	10.4	3	226-0382.400	226-0382L400
0.98	10.2	10.4	3	226-0386.400	226-0386L400
0.99	10.2	10.4	3	226-0390.400	226-0390L400
1.00	10.2	10.4	3	226-0394.400	226-0394L400
1.01	10.2	10.4	3	226-0398.400	226-0398L400
1.02	10.2	10.4	3	226-0402.400	226-0402L400
1.03	10.2	10.4	3	226-0406.400	226-0406L400
1.04	10.2	10.4	3	226-0409.400	226-0409L400
1.05	10.2	10.4	3	226-0413.400	226-0413L400
1.06	10.2	10.4	3	226-0417.400	226-0417L400
1.07	10.2	10.4	3	226-0421.400	226-0421L400
1.08	10.2	10.4	3	226-0425.400	226-0425L400
1.09	10.2	10.4	3	226-0429.400	226-0429L400
1.10	10.2	10.4	3	226-0433.400	226-0433L400
1.11	10.2	10.4	3	226-0437.400	226-0437L400
1.12	10.2	10.4	3	226-0441.400	226-0441L400
1.13	10.2	10.4	3	226-0445.400	226-0445L400
1.14	10.2	10.4	3	226-0449.400	226-0449L400



4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226 1.15mm - 1.44mm Diameter

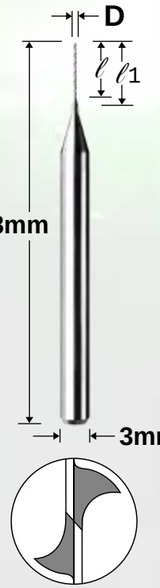
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AL | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
1.15	10.2	10.4	3	226-0453.400	226-0453L400
1.16	10.2	10.4	3	226-0457.400	226-0457L400
1.17	10.2	10.4	3	226-0461.400	226-0461L400
1.18	10.2	10.4	3	226-0465.400	226-0465L400
1.19	10.2	10.4	3	226-0469.400	226-0469L400
1.20	10.2	10.4	3	226-0472.400	226-0472L400
1.21	10.2	10.4	3	226-0476.400	226-0476L400
1.22	10.2	10.4	3	226-0480.400	226-0480L400
1.23	10.2	10.4	3	226-0484.400	226-0484L400
1.24	10.2	10.4	3	226-0488.400	226-0488L400
1.25	10.2	10.4	3	226-0492.400	226-0492L400
1.26	10.2	10.4	3	226-0496.400	226-0496L400
1.27	10.2	10.4	3	226-0500.400	226-0500L400
1.28	10.2	10.4	3	226-0504.400	226-0504L400
1.29	10.2	10.4	3	226-0508.400	226-0508L400
1.30	10.2	10.4	3	226-0512.400	226-0512L400
1.31	10.2	10.4	3	226-0516.400	226-0516L400
1.32	10.2	10.4	3	226-0520.400	226-0520L400
1.33	10.2	10.4	3	226-0524.400	226-0524L400
1.34	10.2	10.4	3	226-0528.400	226-0528L400
1.35	10.2	10.4	3	226-0531.400	226-0531L400
1.36	10.2	10.4	3	226-0535.400	226-0535L400
1.37	10.2	10.4	3	226-0539.400	226-0539L400
1.38	10.2	10.4	3	226-0543.400	226-0543L400
1.39	10.2	10.4	3	226-0547.400	226-0547L400
1.40	10.2	10.4	3	226-0551.400	226-0551L400
1.41	10.2	10.4	3	226-0555.400	226-0555L400
1.42	10.2	10.4	3	226-0559.400	226-0559L400
1.43	10.2	10.4	3	226-0563.400	226-0563L400
1.44	10.2	10.4	3	226-0567.400	226-0567L400



4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226 1.45mm - 1.74mm Diameter

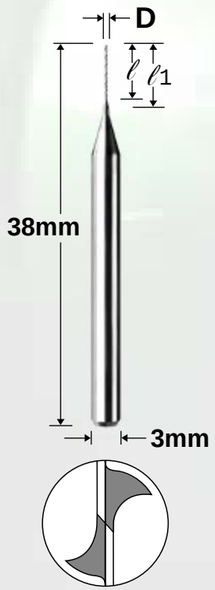
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
1.45	10.2	10.4	3	226-0571.400	226-0571L400
1.46	10.2	10.4	3	226-0575.400	226-0575L400
1.47	10.2	10.4	3	226-0579.400	226-0579L400
1.48	10.2	10.4	3	226-0583.400	226-0583L400
1.49	10.2	10.4	3	226-0587.400	226-0587L400
1.50	10.2	10.4	3	226-0591.400	226-0591L400
1.51	10.2	10.4	3	226-0594.400	226-0594L400
1.52	10.2	10.4	3	226-0598.400	226-0598L400
1.53	10.2	10.4	3	226-0602.400	226-0602L400
1.54	10.2	10.4	3	226-0606.400	226-0606L400
1.55	10.2	10.4	3	226-0610.400	226-0610L400
1.56	10.2	10.4	3	226-0614.400	226-0614L400
1.57	10.2	10.4	3	226-0618.400	226-0618L400
1.58	10.2	10.4	3	226-0622.400	226-0622L400
1.59	10.2	10.4	3	226-0626.400	226-0626L400
1.60	10.2	10.4	3	226-0630.400	226-0630L400
1.61	10.2	10.4	3	226-0634.400	226-0634L400
1.62	10.2	10.4	3	226-0638.400	226-0638L400
1.63	10.2	10.4	3	226-0642.400	226-0642L400
1.64	10.2	10.4	3	226-0646.400	226-0646L400
1.65	10.2	10.4	3	226-0650.400	226-0650L400
1.66	10.2	10.4	3	226-0654.400	226-0654L400
1.67	10.2	10.4	3	226-0657.400	226-0657L400
1.68	10.2	10.4	3	226-0661.400	226-0661L400
1.69	10.2	10.4	3	226-0665.400	226-0665L400
1.70	10.2	10.4	3	226-0669.400	226-0669L400
1.71	10.2	10.4	3	226-0673.400	226-0673L400
1.72	10.2	10.4	3	226-0677.400	226-0677L400
1.73	10.2	10.4	3	226-0681.400	226-0681L400
1.74	10.2	10.4	3	226-0685.400	226-0685L400



4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226 1.75mm - 2.02mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
1.75	10.2	10.4	3	226-0689.400	226-0689L400
1.76	10.2	10.4	3	226-0693.400	226-0693L400
1.77	10.2	10.4	3	226-0697.400	226-0697L400
1.78	10.2	10.4	3	226-0701.400	226-0701L400
1.79	10.2	10.4	3	226-0705.400	226-0705L400
1.80	10.2	10.4	3	226-0709.400	226-0709L400
1.81	10.2	10.4	3	226-0713.400	226-0713L400
1.82	10.2	10.4	3	226-0717.400	226-0717L400
1.83	10.2	10.4	3	226-0720.400	226-0720L400
1.84	10.2	10.4	3	226-0724.400	226-0724L400
1.85	10.2	10.4	3	226-0728.400	226-0728L400
1.86	10.2	10.4	3	226-0732.400	226-0732L400
1.87	10.2	10.4	3	226-0736.400	226-0736L400
1.88	10.2	10.4	3	226-0740.400	226-0740L400
1.89	10.2	10.4	3	226-0744.400	226-0744L400
1.90	10.2	10.4	3	226-0748.400	226-0748L400
1.91	10.2	10.4	3	226-0752.400	226-0752L400
1.92	10.2	10.4	3	226-0756.400	226-0756L400
1.93	10.2	10.4	3	226-0760.400	226-0760L400
1.94	10.2	10.4	3	226-0764.400	226-0764L400
1.95	10.2	10.4	3	226-0768.400	226-0768L400
1.96	10.2	10.4	3	226-0772.400	226-0772L400
1.97	10.2	10.4	3	226-0776.400	226-0776L400
1.98	10.2	10.4	3	226-0780.400	226-0780L400
1.99	10.2	10.4	3	226-0783.400	226-0783L400
2.00	10.2	10.4	3	226-0787.400	226-0787L400
2.01	10.2	10.4	3	226-0791.400	226-0791L400
2.02	10.2	10.4	3	226-0795.400	226-0795L400

4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226 2.03mm - 2.30mm Diameter

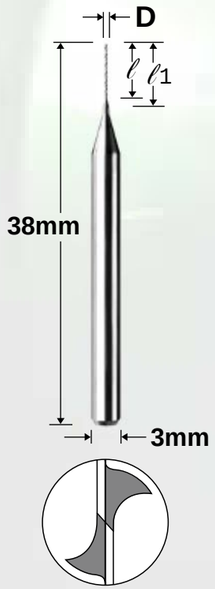
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
2.03	10.2	10.4	3	226-0799.400	226-0799L400
2.04	10.2	10.4	3	226-0803.400	226-0803L400
2.05	10.2	10.4	3	226-0807.400	226-0807L400
2.06	10.2	10.4	3	226-0811.400	226-0811L400
2.07	10.2	10.4	3	226-0815.400	226-0815L400
2.08	10.2	10.4	3	226-0819.400	226-0819L400
2.09	10.2	10.4	3	226-0823.400	226-0823L400
2.10	10.2	10.4	3	226-0827.400	226-0827L400
2.11	10.2	10.4	3	226-0831.400	226-0831L400
2.12	10.2	10.4	3	226-0835.400	226-0835L400
2.13	10.2	10.4	3	226-0839.400	226-0839L400
2.14	10.2	10.4	3	226-0843.400	226-0843L400
2.15	10.2	10.4	3	226-0846.400	226-0846L400
2.16	10.2	10.4	3	226-0850.400	226-0850L400
2.17	10.2	10.4	3	226-0854.400	226-0854L400
2.18	10.2	10.4	3	226-0858.400	226-0858L400
2.19	10.2	10.4	3	226-0862.400	226-0862L400
2.20	10.2	10.4	3	226-0866.400	226-0866L400
2.21	10.2	10.4	3	226-0870.400	226-0870L400
2.22	10.2	10.4	3	226-0874.400	226-0874L400
2.23	10.2	10.4	3	226-0878.400	226-0878L400
2.24	10.2	10.4	3	226-0882.400	226-0882L400
2.25	10.2	10.4	3	226-0886.400	226-0886L400
2.26	10.2	10.4	3	226-0890.400	226-0890L400
2.27	10.2	10.4	3	226-0894.400	226-0894L400
2.28	10.2	10.4	3	226-0898.400	226-0898L400
2.29	10.2	10.4	3	226-0902.400	226-0902L400
2.30	10.2	10.4	3	226-0906.400	226-0906L400



4 Facet Point Geometry

METRIC
DRILLS

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226 2.31mm - 2.60mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
2.31	10.2	10.4	3	226-0909.400	226-0909L400
2.32	10.2	10.4	3	226-0913.400	226-0913L400
2.33	10.2	10.4	3	226-0917.400	226-0917L400
2.34	10.2	10.4	3	226-0921.400	226-0921L400
2.35	10.2	10.4	3	226-0925.400	226-0925L400
2.36	10.2	10.4	3	226-0929.400	226-0929L400
2.37	10.2	10.4	3	226-0933.400	226-0933L400
2.38	10.2	10.4	3	226-0937.400	226-0937L400
2.39	10.2	10.4	3	226-0941.400	226-0941L400
2.40	10.2	10.4	3	226-0945.400	226-0945L400
2.41	10.2	10.4	3	226-0949.400	226-0949L400
2.42	10.2	10.4	3	226-0953.400	226-0953L400
2.43	10.2	10.4	3	226-0957.400	226-0957L400
2.44	10.2	10.4	3	226-0961.400	226-0961L400
2.45	10.2	10.4	3	226-0965.400	226-0965L400
2.46	10.2	10.4	3	226-0969.400	226-0969L400
2.47	10.2	10.4	3	226-0972.400	226-0972L400
2.48	10.2	10.4	3	226-0976.400	226-0976L400
2.49	10.2	10.4	3	226-0980.400	226-0980L400
2.50	10.2	10.4	3	226-0984.400	226-0984L400
2.51	10.2	10.4	3	226-0988.400	226-0988L400
2.52	10.2	10.4	3	226-0992.400	226-0992L400
2.53	10.2	10.4	3	226-0996.400	226-0996L400
2.54	10.2	10.4	3	226-1000.400	226-1000L400
2.55	10.2	10.4	3	226-1004.400	226-1004L400
2.56	10.2	10.4	3	226-1008.400	226-1008L400
2.57	10.2	10.4	3	226-1012.400	226-1012L400
2.58	10.2	10.4	3	226-1016.400	226-1016L400
2.59	10.2	10.4	3	226-1020.400	226-1020L400
2.60	10.2	10.4	3	226-1024.400	226-1024L400

4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226

2.61mm - 2.90mm Diameter

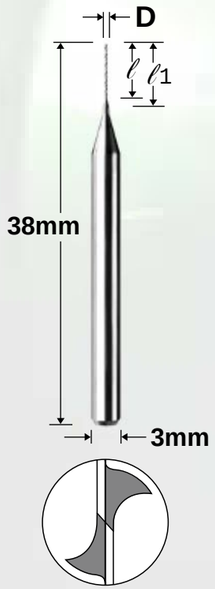
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
2.61	10.2	10.4	3	226-1028.400	226-1028L400
2.62	10.2	10.4	3	226-1031.400	226-1031L400
2.63	10.2	10.4	3	226-1035.400	226-1035L400
2.64	10.2	10.4	3	226-1039.400	226-1039L400
2.65	10.2	10.4	3	226-1043.400	226-1043L400
2.66	10.2	10.4	3	226-1047.400	226-1047L400
2.67	10.2	10.4	3	226-1051.400	226-1051L400
2.68	10.2	10.4	3	226-1055.400	226-1055L400
2.69	10.2	10.4	3	226-1059.400	226-1059L400
2.70	10.2	10.4	3	226-1063.400	226-1063L400
2.71	10.2	10.4	3	226-1067.400	226-1067L400
2.72	10.2	10.4	3	226-1071.400	226-1071L400
2.73	10.2	10.4	3	226-1075.400	226-1075L400
2.74	10.2	10.4	3	226-1079.400	226-1079L400
2.75	10.2	10.4	3	226-1083.400	226-1083L400
2.76	10.2	10.4	3	226-1087.400	226-1087L400
2.77	10.2	10.4	3	226-1091.400	226-1091L400
2.78	10.2	10.4	3	226-1094.400	226-1094L400
2.79	10.2	10.4	3	226-1098.400	226-1098L400
2.80	10.2	10.4	3	226-1102.400	226-1102L400
2.81	10.2	10.4	3	226-1106.400	226-1106L400
2.82	10.2	10.4	3	226-1110.400	226-1110L400
2.83	10.2	10.4	3	226-1114.400	226-1114L400
2.84	10.2	10.4	3	226-1118.400	226-1118L400
2.85	10.2	10.4	3	226-1122.400	226-1122L400
2.86	10.2	10.4	3	226-1126.400	226-1126L400
2.87	10.2	10.4	3	226-1130.400	226-1130L400
2.88	10.2	10.4	3	226-1134.400	226-1134L400
2.89	10.2	10.4	3	226-1138.400	226-1138L400
2.90	10.2	10.4	3	226-1142.400	226-1142L400



4 Facet Point Geometry

METRIC
DRILLS

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226

2.91mm - 3.00mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
2.91	10.2	10.4	3	226-1146.400	226-1146L400
2.92	10.2	10.4	3	226-1150.400	226-1150L400
2.93	10.2	10.4	3	226-1154.400	226-1154L400
2.94	10.2	10.4	3	226-1157.400	226-1157L400
2.95	10.2	10.4	3	226-1161.400	226-1161L400
2.96	10.2	10.4	3	226-1165.400	226-1165L400
2.97	10.2	10.4	3	226-1169.400	226-1169L400
2.98	10.2	10.4	3	226-1173.400	226-1173L400
2.99	10.2	10.4	3	226-1177.400	226-1177L400
3.00	10.2	10.4	3	226-1181.400	226-1181L400

4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226

0.75mm - 1.85mm Diameter

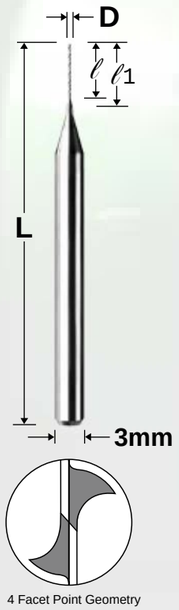
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

EXTENDED FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.75	11.0	11.2	3	50	226-0295.433	226-0295L433
0.80	11.0	11.2	3	50	226-0315.433	226-0315L433
0.85	13.0	13.2	3	50	226-0335.512	226-0335L512
0.90	13.0	13.2	3	50	226-0354.512	226-0354L512
0.95	15.0	15.2	3	50	226-0374.591	226-0374L591
1.00	15.0	15.2	3	50	226-0394.591	226-0394L591
1.05	17.0	17.2	3	50	226-0413.670	226-0413L670
1.10	17.0	17.2	3	50	226-0433.670	226-0433L670
1.15	17.0	17.2	3	50	226-0453.670	226-0453L670
1.20	17.0	17.2	3	50	226-0472.670	226-0472L670
1.25	19.0	19.2	3	50	226-0492.749	226-0492L749
1.30	19.0	19.2	3	50	226-0512.749	226-0512L749
1.35	19.0	19.2	3	50	226-0531.749	226-0531L749
1.40	19.0	19.2	3	50	226-0551.749	226-0551L749
1.45	20.0	20.2	3	50	226-0571.788	226-0571L788
1.50	20.0	20.2	3	50	226-0591.788	226-0591L788
1.55	20.0	20.2	3	50	226-0610.788	226-0610L788
1.60	20.0	20.2	3	50	226-0630.788	226-0630L788
1.65	20.0	20.2	3	50	226-0650.788	226-0650L788
1.70	20.0	20.2	3	50	226-0669.788	226-0669L788
1.75	20.0	20.2	3	50	226-0689.788	226-0689L788
1.80	20.0	20.2	3	50	226-0709.788	226-0709L788
1.85	22.8	23.0	3	60	226-0728.898	226-0728L898



4 Facet Point Geometry

www.KyoceraMicroTools.com 888-848-8449 FAX 714-428-3607

3.00MM SHANK SOLID CARBIDE MICRO DRILLS

SERIES 226

1.90mm - 3.00mm Diameter

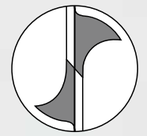
Diameter Tolerance (+0/-0.008mm)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

EXTENDED FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
1.90	22.8	23.0	3	60	226-0748.898	226-0748L898
1.95	24.0	24.2	3	60	226-0768.945	226-0768L945
2.00	24.0	24.2	3	60	226-0787.945	226-0787L945
2.05	25.2	25.4	3	60	226-0807.992	226-0807L992
2.10	25.2	25.4	3	60	226-0827.992	226-0827L992
2.15	26.4	26.6	3	60	226-0846.1039	226-0846L1039
2.20	26.4	26.6	3	60	226-0866.1039	226-0866L1039
2.25	27.6	27.8	3	60	226-0886.1087	226-0886L1087
2.30	27.6	27.8	3	60	226-0906.1087	226-0906L1087
2.35	28.8	29.0	3	60	226-0925.1134	226-0925L1134
2.40	28.8	29.0	3	60	226-0945.1134	226-0945L1134
2.45	30.0	30.2	3	60	226-0965.1181	226-0965L1181
2.50	30.0	30.2	3	60	226-0984.1181	226-0984L1181
2.55	31.2	31.4	3	60	226-1004.1228	226-1004L1228
2.60	31.2	31.4	3	60	226-1024.1228	226-1024L1228
2.65	32.4	32.6	3	60	226-1043.1276	226-1043L1276
2.70	32.4	32.6	3	60	226-1063.1276	226-1063L1276
2.75	33.6	33.8	3	60	226-1083.1323	226-1083L1323
2.80	33.6	33.8	3	60	226-1102.1323	226-1102L1323
2.85	34.8	35.0	3	60	226-1122.1370	226-1122L1370
2.90	34.8	35.0	3	60	226-1142.1370	226-1142L1370
2.95	36.0	36.2	3	60	226-1161.1417	226-1161L1417
3.00	36.0	36.2	3	60	226-1181.1417	226-1181L1417



4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE LEFT HAND MICRO DRILLS

SERIES 226L 0.04mm - 0.33mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Standard Non-Stocked
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STANDARD FLUTE LENGTH

4 Facet Point Geometry

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.04	0.5	0.5	3	226L-0016.020	
0.05	0.8	0.8	3	226L-0020.030	
0.06	0.8	0.8	3	226L-0024.030	
0.07	1.3	1.3	3	226L-0028.050	
0.08	1.3	1.3	3	226L-0031.050	
0.09	1.3	1.3	3	226L-0035.050	
0.10	1.0	1.2	3	226L-0039.040	
0.11	1.0	1.2	3	226L-0043.040	
0.12	1.0	1.2	3	226L-0047.040	
0.13	1.0	1.2	3	226L-0051.040	
0.14	2.0	2.2	3	226L-0055.080	
0.15	2.0	2.2	3	226L-0059.080	
0.16	2.0	2.2	3	226L-0063.080	
0.17	2.0	2.2	3	226L-0067.080	
0.18	2.5	2.7	3	226L-0071.100	
0.19	2.5	2.7	3	226L-0075.100	
0.20	2.5	2.7	3	226L-0079.100	
0.21	2.5	2.7	3	226L-0083.100	
0.22	2.5	2.7	3	226L-0087.100	
0.23	3.8	4.0	3	226L-0091.150	
0.24	3.8	4.0	3	226L-0094.150	
0.25	3.8	4.0	3	226L-0098.150	
0.26	3.8	4.0	3	226L-0102.150	
0.27	3.8	4.0	3	226L-0106.150	
0.28	3.8	4.0	3	226L-0110.150	
0.29	3.8	4.0	3	226L-0114.150	
0.30	5.7	5.9	3	226L-0118.225	226L-0118L225
0.31	5.7	5.9	3	226L-0122.225	226L-0122L225
0.32	5.7	5.9	3	226L-0126.225	226L-0126L225
0.33	5.7	5.9	3	226L-0130.225	226L-0130L225

3.00MM SHANK SOLID CARBIDE LEFT HAND MICRO DRILLS

SERIES 226L 0.34mm - 0.54mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Standard Non-Stocked
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STANDARD FLUTE LENGTH

4 Facet Point Geometry

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.34	5.7	5.9	3	226L-0134.225	226L-0134L225
0.35	5.7	5.9	3	226L-0138.225	226L-0138L225
0.36	5.7	5.9	3	226L-0142.225	226L-0142L225
0.37	5.7	5.9	3	226L-0146.225	226L-0146L225
0.38	6.4	6.6	3	226L-0150.250	226L-0150L250
0.39	6.4	6.6	3	226L-0154.250	226L-0154L250
0.40	6.4	6.6	3	226L-0157.250	226L-0157L250
0.41	6.4	6.6	3	226L-0161.250	226L-0161L250
0.42	6.4	6.6	3	226L-0165.250	226L-0165L250
0.43	6.4	6.6	3	226L-0169.250	226L-0169L250
0.44	6.4	6.6	3	226L-0173.250	226L-0173L250
0.45	6.4	6.6	3	226L-0177.250	226L-0177L250
0.46	6.4	6.6	3	226L-0181.250	226L-0181L250
0.47	6.4	6.6	3	226L-0185.250	226L-0185L250
0.48	6.6	6.8	3	226L-0189.260	226L-0189L260
0.49	6.6	6.8	3	226L-0193.260	226L-0193L260
0.50	6.6	6.8	3	226L-0197.260	226L-0197L260
0.51	6.6	6.8	3	226L-0201.260	226L-0201L260
0.52	6.6	6.8	3	226L-0205.260	226L-0205L260
0.53	6.6	6.8	3	226L-0209.260	226L-0209L260
0.54	6.6	6.8	3	226L-0213.260	226L-0213L260

3.00MM SHANK SOLID CARBIDE LEFT HAND MICRO DRILLS

SERIES 226L 0.55mm - 0.84mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Standard Non-Stocked
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.55	8.6	8.8	3	226L-0217.340	226L-0217L340
0.56	8.6	8.8	3	226L-0220.340	226L-0220L340
0.57	8.6	8.8	3	226L-0224.340	226L-0224L340
0.58	8.6	8.8	3	226L-0228.340	226L-0228L340
0.59	8.6	8.8	3	226L-0232.340	226L-0232L340
0.60	8.6	8.8	3	226L-0236.340	226L-0236L340
0.61	8.6	8.8	3	226L-0240.340	226L-0240L340
0.62	8.6	8.8	3	226L-0244.340	226L-0244L340
0.63	8.6	8.8	3	226L-0248.340	226L-0248L340
0.64	8.6	8.8	3	226L-0252.340	226L-0252L340
0.65	8.6	8.8	3	226L-0256.340	226L-0256L340
0.66	8.6	8.8	3	226L-0260.340	226L-0260L340
0.67	8.6	8.8	3	226L-0264.340	226L-0264L340
0.68	8.6	8.8	3	226L-0268.340	226L-0268L340
0.69	8.6	8.8	3	226L-0272.340	226L-0272L340
0.70	10.2	10.4	3	226L-0276.400	226L-0276L400
0.71	10.2	10.4	3	226L-0280.400	226L-0280L400
0.72	10.2	10.4	3	226L-0283.400	226L-0283L400
0.73	10.2	10.4	3	226L-0287.400	226L-0287L400
0.74	10.2	10.4	3	226L-0291.400	226L-0291L400
0.75	10.2	10.4	3	226L-0295.400	226L-0295L400
0.76	10.2	10.4	3	226L-0299.400	226L-0299L400
0.77	10.2	10.4	3	226L-0303.400	226L-0303L400
0.78	10.2	10.4	3	226L-0307.400	226L-0307L400
0.79	10.2	10.4	3	226L-0311.400	226L-0311L400
0.80	10.2	10.4	3	226L-0315.400	226L-0315L400
0.81	10.2	10.4	3	226L-0319.400	226L-0319L400
0.82	10.2	10.4	3	226L-0323.400	226L-0323L400
0.83	10.2	10.4	3	226L-0327.400	226L-0327L400
0.84	10.2	10.4	3	226L-0331.400	226L-0331L400

4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE LEFT HAND MICRO DRILLS

SERIES 226L 0.85mm - 1.70mm Diameter

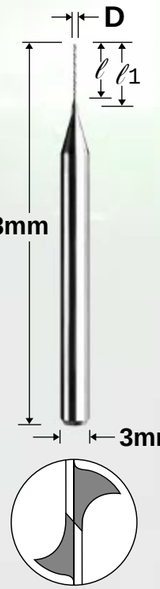
Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Standard Non-Stocked
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | Al | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
0.85	10.2	10.4	3	226L-0335.400	226L-0335L400
0.86	10.2	10.4	3	226L-0339.400	226L-0339L400
0.87	10.2	10.4	3	226L-0343.400	226L-0343L400
0.88	10.2	10.4	3	226L-0346.400	226L-0346L400
0.89	10.2	10.4	3	226L-0350.400	226L-0350L400
0.90	10.2	10.4	3	226L-0354.400	226L-0354L400
0.91	10.2	10.4	3	226L-0358.400	226L-0358L400
0.92	10.2	10.4	3	226L-0362.400	226L-0362L400
0.93	10.2	10.4	3	226L-0366.400	226L-0366L400
0.94	10.2	10.4	3	226L-0370.400	226L-0370L400
0.95	10.2	10.4	3	226L-0374.400	226L-0374L400
0.96	10.2	10.4	3	226L-0378.400	226L-0378L400
0.97	10.2	10.4	3	226L-0382.400	226L-0382L400
0.98	10.2	10.4	3	226L-0386.400	226L-0386L400
0.99	10.2	10.4	3	226L-0390.400	226L-0390L400
1.00	10.2	10.4	3	226L-0394.400	226L-0394L400
1.05	10.2	10.4	3	226L-0413.400	226L-0413L400
1.10	10.2	10.4	3	226L-0433.400	226L-0433L400
1.15	10.2	10.4	3	226L-0453.400	226L-0453L400
1.20	10.2	10.4	3	226L-0472.400	226L-0472L400
1.25	10.2	10.4	3	226L-0492.400	226L-0492L400
1.30	10.2	10.4	3	226L-0512.400	226L-0512L400
1.35	10.2	10.4	3	226L-0531.400	226L-0531L400
1.40	10.2	10.4	3	226L-0551.400	226L-0551L400
1.45	10.2	10.4	3	226L-0571.400	226L-0571L400
1.50	10.2	10.4	3	226L-0591.400	226L-0591L400
1.55	10.2	10.4	3	226L-0610.400	226L-0610L400
1.60	10.2	10.4	3	226L-0630.400	226L-0630L400
1.65	10.2	10.4	3	226L-0650.400	226L-0650L400
1.70	10.2	10.4	3	226L-0669.400	226L-0669L400



4 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE LEFT HAND MICRO DRILLS

SERIES 226L 1.75mm - 3.00mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Standard Non-Stocked
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AL | TI | NI/CO | CAST IRON | STAINLESS

STANDARD FLUTE LENGTH

4 Facet Point Geometry

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	PN Uncoated	PN AlTiN
1.75	10.2	10.4	3	226L-0689.400	226L-0689L400
1.80	10.2	10.4	3	226L-0709.400	226L-0709L400
1.85	10.2	10.4	3	226L-0728.400	226L-0728L400
1.90	10.2	10.4	3	226L-0748.400	226L-0748L400
1.95	10.2	10.4	3	226L-0768.400	226L-0768L400
2.00	10.2	10.4	3	226L-0787.400	226L-0787L400
2.05	10.2	10.4	3	226L-0807.400	226L-0807L400
2.10	10.2	10.4	3	226L-0827.400	226L-0827L400
2.15	10.2	10.4	3	226L-0846.400	226L-0846L400
2.20	10.2	10.4	3	226L-0866.400	226L-0866L400
2.25	10.2	10.4	3	226L-0886.400	226L-0886L400
2.30	10.2	10.4	3	226L-0906.400	226L-0906L400
2.35	10.2	10.4	3	226L-0925.400	226L-0925L400
2.40	10.2	10.4	3	226L-0945.400	226L-0945L400
2.45	10.2	10.4	3	226L-0965.400	226L-0965L400
2.50	10.2	10.4	3	226L-0984.400	226L-0984L400
2.55	10.2	10.4	3	226L-1004.400	226L-1004L400
2.60	10.2	10.4	3	226L-1024.400	226L-1024L400
2.65	10.2	10.4	3	226L-1043.400	226L-1043L400
2.70	10.2	10.4	3	226L-1063.400	226L-1063L400
2.75	10.2	10.4	3	226L-1083.400	226L-1083L400
2.80	10.2	10.4	3	226L-1102.400	226L-1102L400
2.85	10.2	10.4	3	226L-1122.400	226L-1122L400
2.90	10.2	10.4	3	226L-1142.400	226L-1142L400
2.95	10.2	10.4	3	226L-1161.400	226L-1161L400
3.00	10.2	10.4	3	226L-1181.400	226L-1181L400

METRIC
DRILLS

3.00MM SHANK SOLID CARBIDE LEFT HAND MICRO DRILLS

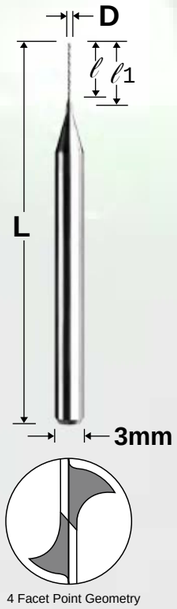
SERIES 226L 0.75mm - 1.85mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Standard Non-Stocked
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CFRP | CU ALLOY | AL | TI | NI/CO | CAST IRON | STAINLESS

EXTENDED FLUTE LENGTH



4 Facet Point Geometry

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.75	11.0	11.2	3	50	226L-0295.433	226L-0295L433
0.80	11.0	11.2	3	50	226L-0315.433	226L-0315L433
0.85	13.0	13.2	3	50	226L-0335.512	226L-0335L512
0.90	13.0	13.2	3	50	226L-0354.512	226L-0354L512
0.95	15.0	15.2	3	50	226L-0374.591	226L-0374L591
1.00	15.0	15.2	3	50	226L-0394.591	226L-0394L591
1.05	17.0	17.2	3	50	226L-0413.670	226L-0413L670
1.10	17.0	17.2	3	50	226L-0433.670	226L-0433L670
1.15	17.0	17.2	3	50	226L-0453.670	226L-0453L670
1.20	17.0	17.2	3	50	226L-0472.670	226L-0472L670
1.25	19.0	19.2	3	50	226L-0492.749	226L-0492L749
1.30	19.0	19.2	3	50	226L-0512.749	226L-0512L749
1.35	19.0	19.2	3	50	226L-0531.749	226L-0531L749
1.40	19.0	19.2	3	50	226L-0551.749	226L-0551L749
1.45	20.0	20.2	3	50	226L-0571.788	226L-0571L788
1.50	20.0	20.2	3	50	226L-0591.788	226L-0591L788
1.55	20.0	20.2	3	50	226L-0610.788	226L-0610L788
1.60	20.0	20.2	3	50	226L-0630.788	226L-0630L788
1.65	20.0	20.2	3	50	226L-0650.788	226L-0650L788
1.70	20.0	20.2	3	50	226L-0669.788	226L-0669L788
1.75	20.0	20.2	3	50	226L-0689.788	226L-0689L788
1.80	20.0	20.2	3	50	226L-0709.788	226L-0709L788
1.85	22.8	23.0	3	60	226L-0728.898	226L-0728L898

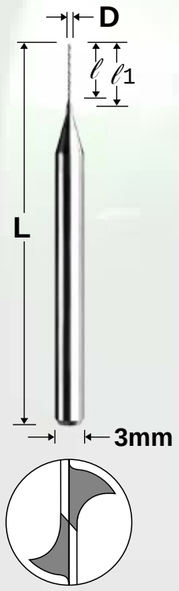
3.00MM SHANK SOLID CARBIDE LEFT HAND MICRO DRILLS

SERIES 226L

1.90mm - 3.00mm Diameter

Diameter Tolerance (+0/-0.008mm)
130 Degree Point Angle
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Standard Non-Stocked
Shank Diameter Tolerance h6

MATERIAL PRIORITY



4 Facet Point Geometry

EXTENDED FLUTE LENGTH

D (mm)	ℓ (mm)	ℓ1 (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
1.90	22.8	23.0	3	60	226L-0748.898	226L-0748L898
1.95	24.0	24.2	3	60	226L-0768.945	226L-0768L945
2.00	24.0	24.2	3	60	226L-0787.945	226L-0787L945
2.05	25.2	25.4	3	60	226L-0807.992	226L-0807L992
2.10	25.2	25.4	3	60	226L-0827.992	226L-0827L992
2.15	26.4	26.6	3	60	226L-0846.1039	226L-0846L1039
2.20	26.4	26.6	3	60	226L-0866.1039	226L-0866L1039
2.25	27.6	27.8	3	60	226L-0886.1087	226L-0886L1087
2.30	27.6	27.8	3	60	226L-0906.1087	226L-0906L1087
2.35	28.8	29.0	3	60	226L-0925.1134	226L-0925L1134
2.40	28.8	29.0	3	60	226L-0945.1134	226L-0945L1134
2.45	30.0	30.2	3	60	226L-0965.1181	226L-0965L1181
2.50	30.0	30.2	3	60	226L-0984.1181	226L-0984L1181
2.55	31.2	31.4	3	60	226L-1004.1228	226L-1004L1228
2.60	31.2	31.4	3	60	226L-1024.1228	226L-1024L1228
2.65	32.4	32.6	3	60	226L-1043.1276	226L-1043L1276
2.70	32.4	32.6	3	60	226L-1063.1276	226L-1063L1276
2.75	33.6	33.8	3	60	226L-1083.1323	226L-1083L1323
2.80	33.6	33.8	3	60	226L-1102.1323	226L-1102L1323
2.85	34.8	35.0	3	60	226L-1122.1370	226L-1122L1370
2.90	34.8	35.0	3	60	226L-1142.1370	226L-1142L1370
2.95	36.0	36.2	3	60	226L-1161.1417	226L-1161L1417
3.00	36.0	36.2	3	60	226L-1181.1417	226L-1181L1417

1/8″ SHANK SOLID CARBIDE ULTRA PRECISION MICRO DRILLS

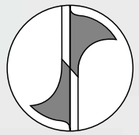
SERIES 390

0.0015″ - 0.0040″ Diameter

Macor ® / Vespel ® Drilling

Industry Leading Diameter Tolerance (+0/-0.000050″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes

MATERIAL PRIORITY



4 Facet Point Geometry

STANDARD FLUTE LENGTH

Drill Size	D (in)	ℓ (in)	PT Angle	PN
	.0015	.020	90 Deg	390-0015.020
	.0018	.025	90 Deg	390-0018.025
.05mm	.0020	.030	90 Deg	390-0020.030
	.0021	.030	90 Deg	390-0021.030
	.0022	.030	90 Deg	390-0022.030
	.0023	.030	90 Deg	390-0023.030
.06mm	.0024	.030	90 Deg	390-0024.030
	.0025	.040	90 Deg	390-0025.040
	.0026	.040	90 Deg	390-0026.040
	.0027	.050	90 Deg	390-0027.050
.07mm	.0028	.050	90 Deg	390-0028.050
	.0029	.050	90 Deg	390-0029.050
	.0030	.050	90 Deg	390-0030.050
.08mm	.0031	.050	90 Deg	390-0031.050
	.0032	.050	90 Deg	390-0032.050
	.0033	.050	90 Deg	390-0033.050
	.0034	.050	90 Deg	390-0034.050
.09mm	.0035	.050	90 Deg	390-0035.050
	.0036	.050	90 Deg	390-0036.050
	.0037	.050	90 Deg	390-0037.050
	.0038	.050	90 Deg	390-0038.050
	.0039	.050	90 Deg	390-0039.050
.10mm	.0040	.015	90 Deg	390-0040.015
.10mm	.0040	.025	90 Deg	390-0040.025
.10mm	.0040	.050	90 Deg	390-0040.050
.10mm	.0040	.060	130 Deg	390-0040.060

1.00MM SHANK SOLID CARBIDE ULTRA PRECISION MICRO DRILLS

SERIES 392

0.12mm - 0.60mm Diameter

Fuel Injector / Nozzle Drills

Diameter Tolerance (+0/-0.008mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | CAST IRON | PLASTIC | CFRP | CU ALLOY | AI | TI

STANDARD FLUTE LENGTH

4 Facet Point Geometry

D (mm)	ℓ (mm)	PN Uncoated	PN AlTin
0.12	1.45	392-0046.057	
0.14	1.45	392-0054.057	
0.16	1.45	392-0063.057	
0.18	1.45	392-0071.057	
0.20	1.45	392-0079.057	
0.25	1.75	392-0098.069	392-0098L069
0.27	1.75	392-0106.069	392-0106L069
0.29	3.65	392-0114.144	392-0114L144
0.30	3.65	392-0118.144	392-0118L144
0.31	3.65	392-0122.144	392-0122L144
0.32	3.65	392-0126.144	392-0126L144
0.34	3.65	392-0134.144	392-0134L144
0.36	3.65	392-0142.144	392-0142L144
0.38	3.65	392-0150.144	392-0150L144
0.40	3.65	392-0157.144	392-0157L144
0.42	3.65	392-0165.144	392-0165L144
0.44	3.65	392-0173.144	392-0173L144
0.46	3.65	392-0181.144	392-0181L144
0.48	3.65	392-0189.144	392-0189L144
0.50	3.65	392-0197.144	392-0197L144
0.52	3.65	392-0205.144	392-0205L144
0.54	3.65	392-0213.144	392-0213L144
0.56	3.65	392-0220.144	392-0220L144
0.58	3.65	392-0228.144	392-0228L144
0.60	3.65	392-0236.144	392-0236L144

3.00MM SHANK SOLID CARBIDE COOLANT FED MICRO DRILLS

SERIES 813

1.50mm - 3.00mm Diameter

Deep Hole Drilling Priority

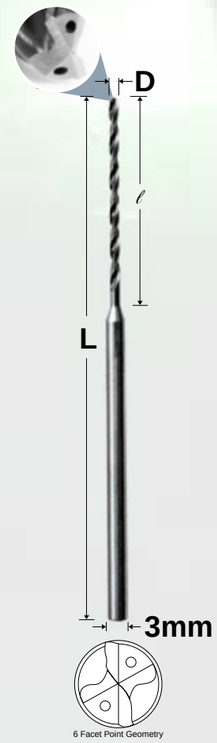
Diameter Tolerance (+0.001mm/-0.002mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
140 Degree Point Angle
8 x D
Shank Diameter Tolerance h6

MATERIAL PRIORITY

TI | NI/CO | STAINLESS | STEEL | HI-CSTEEL | CAST IRON

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	L (mm)	PN Uncoated	PN AlTiN
1.50	15.00	60	813-0591.591	813-0591L591
1.55	15.50	60	813-0610.611	813-0610L611
1.60	16.00	60	813-0630.630	813-0630L630
1.65	16.50	60	813-0650.650	813-0650L650
1.70	17.00	60	813-0669.670	813-0669L670
1.75	17.50	60	813-0689.690	813-0689L690
1.80	18.00	60	813-0709.709	813-0709L709
1.85	18.50	60	813-0728.729	813-0728L729
1.90	19.00	60	813-0748.749	813-0748L749
1.95	19.50	60	813-0768.768	813-0768L768
2.00	20.00	60	813-0787.788	813-0787L788
2.05	20.50	60	813-0807.808	813-0807L808
2.10	21.00	62	813-0827.827	813-0827L827
2.15	21.50	62	813-0846.847	813-0846L847
2.20	22.00	62	813-0866.867	813-0866L867
2.25	22.50	62	813-0886.887	813-0886L887
2.30	23.00	62	813-0906.906	813-0906L906
2.35	23.50	62	813-0925.926	813-0925L926
2.40	24.00	64	813-0945.946	813-0945L946
2.45	24.50	64	813-0965.965	813-0965L965
2.50	25.00	64	813-0984.985	813-0984L985
2.55	25.50	64	813-1004.1005	813-1004L1005
2.60	26.00	64	813-1024.1024	813-1024L1024
2.65	26.50	64	813-1043.1044	813-1043L1044
2.70	27.00	66	813-1063.1064	813-1063L1064
2.75	27.50	66	813-1083.1084	813-1083L1084
2.80	28.00	66	813-1102.1103	813-1102L1103
2.85	28.50	66	813-1122.1123	813-1122L1123
2.90	29.00	66	813-1142.1143	813-1142L1143
2.95	29.50	66	813-1161.1162	813-1161L1162
3.00	30.00	66	813-1181.1182	813-1181L1182



6 Facet Point Geometry

3.00MM SHANK SOLID CARBIDE COOLANT FED MICRO DRILLS

SERIES 813

1.50mm - 3.00mm Diameter

Deep Hole Drilling Priority

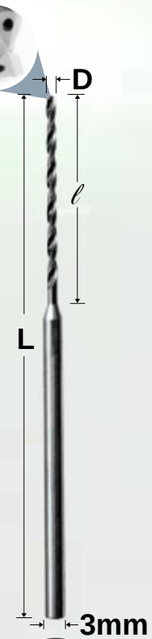
Diameter Tolerance (+0.001mm/-0.002mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
16 x D
Shank Diameter Tolerance h6

MATERIAL PRIORITY

TI | NI/CO | STAINLESS | STEEL | HI-CSTEEL | CAST IRON

EXTENDED FLUTE LENGTH

D (mm)	ℓ (mm)	L (mm)	PN Uncoated	PN AlTiN
1.50	27.00	77	813-0591.1064	813-0591L1064
1.55	27.90	77	813-0610.1099	813-0610L1099
1.60	28.80	77	813-0630.1135	813-0630L1135
1.65	29.70	77	813-0650.1170	813-0650L1170
1.70	30.60	77	813-0669.1206	813-0669L1206
1.75	31.50	77	813-0689.1241	813-0689L1241
1.80	32.40	84	813-0709.1277	813-0709L1277
1.85	33.30	84	813-0728.1312	813-0728L1312
1.90	34.20	84	813-0748.1347	813-0748L1347
1.95	35.10	84	813-0768.1383	813-0768L1383
2.00	36.00	84	813-0787.1418	813-0787L1418
2.05	36.90	84	813-0807.1454	813-0807L1454
2.10	37.80	91	813-0827.1489	813-0827L1489
2.15	38.70	91	813-0846.1525	813-0846L1525
2.20	39.60	91	813-0866.1560	813-0866L1560
2.25	40.50	91	813-0886.1596	813-0886L1596
2.30	41.40	91	813-0906.1631	813-0906L1631
2.35	42.30	91	813-0925.1667	813-0925L1667
2.40	43.20	91	813-0945.1702	813-0945L1702
2.45	44.10	91	813-0965.1738	813-0965L1738
2.50	45.00	91	813-0984.1773	813-0984L1773
2.55	45.90	91	813-1004.1808	813-1004L1808
2.60	46.80	91	813-1024.1844	813-1024L1844
2.65	47.70	91	813-1043.1879	813-1043L1879
2.70	48.60	104	813-1063.1915	813-1063L1915
2.75	49.50	104	813-1083.1950	813-1083L1950
2.80	50.40	104	813-1102.1986	813-1102L1986
2.85	51.30	104	813-1122.2021	813-1122L2021
2.90	52.20	104	813-1142.2057	813-1142L2057
2.95	53.10	104	813-1161.2092	813-1161L2092
3.00	54.00	104	813-1181.2128	813-1181L2128




6 Facet Point Geometry

4.00MM SHANK SOLID CARBIDE COOLANT FED MICRO DRILLS

SERIES 813

3.05mm - 4.00mm Diameter

Deep Hole Drilling Priority

Diameter Tolerance (+0.001mm/-0.002mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
140 Degree Point Angle
8 x D
Shank Diameter Tolerance h6

MATERIAL PRIORITY

TI | NI/CO | STAINLESS | STEEL | HI-CSTEEL | CAST IRON

STANDARD FLUTE LENGTH

D (mm)	ℓ (mm)	L (mm)	PN Uncoated	PN AlTiN
3.05	30.50	70	813-1201.1202	813-1201L1202
3.10	31.00	70	813-1220.1221	813-1220L1221
3.15	31.50	70	813-1240.1241	813-1240L1241
3.20	32.00	70	813-1260.1261	813-1260L1261
3.25	32.50	70	813-1280.1281	813-1280L1281
3.30	33.00	70	813-1299.1300	813-1299L1300
3.35	33.50	70	813-1319.1320	813-1319L1320
3.40	34.00	70	813-1339.1340	813-1339L1340
3.45	34.50	70	813-1358.1359	813-1358L1359
3.50	35.00	70	813-1378.1379	813-1378L1379
3.55	35.50	70	813-1398.1399	813-1398L1399
3.60	36.00	70	813-1417.1418	813-1417L1418
3.65	36.50	76	813-1437.1438	813-1437L1438
3.70	37.00	76	813-1457.1458	813-1457L1458
3.75	37.50	76	813-1476.1478	813-1476L1478
3.80	38.00	76	813-1496.1497	813-1496L1497
3.85	38.50	76	813-1516.1517	813-1516L1517
3.90	39.00	76	813-1535.1537	813-1535L1537
3.95	39.50	76	813-1555.1556	813-1555L1556
4.00	40.00	76	813-1575.1576	813-1575L1576


6 Facet Point Geometry

4.00MM SHANK SOLID CARBIDE COOLANT FED MICRO DRILLS

SERIES 813

3.05mm - 4.00mm Diameter

Deep Hole Drilling Priority

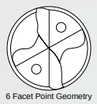
Diameter Tolerance (+0.001mm/-0.002mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
16 x D
Shank Diameter Tolerance h6

MATERIAL PRIORITY

TI | NI/CO | STAINLESS | STEEL | HI-CSTEEL | CAST IRON

EXTENDED FLUTE LENGTH

D (mm)	ℓ (mm)	L (mm)	PN Uncoated	PN AlTiN
3.05	54.90	104	813-1201.2163	813-1201L2163
3.10	55.80	104	813-1220.2199	813-1220L2199
3.15	56.70	104	813-1240.2234*	813-1240L2234*
3.20	57.60	104	813-1260.2269	813-1260L2269
3.25	58.50	104	813-1280.2305*	813-1280L2305*
3.30	59.40	104	813-1299.2340	813-1299L2340
3.35	60.30	104	813-1319.2376*	813-1319L2376*
3.40	61.20	104	813-1339.2411	813-1339L2411
3.45	62.10	104	813-1358.2447*	813-1358L2447*
3.50	63.00	104	813-1378.2482	813-1378L2482
3.55	63.90	104	813-1398.2518*	813-1398L2518*
3.60	64.80	104	813-1417.2553	813-1417L2553
3.65	65.70	104	813-1437.2589*	813-1437L2589*
3.70	66.60	104	813-1457.2624	813-1457L2624
3.75	67.50	104	813-1476.2660*	813-1476L2660*
3.80	68.40	104	813-1496.2695	813-1496L2695
3.85	69.30	104	813-1516.2730*	813-1516L2730*
3.90	70.20	104	813-1535.2766	813-1535L2766
3.95	71.10	104	813-1555.2801*	813-1555L2801*
4.00	72.00	104	813-1575.2837	813-1575L2837


6 Facet Point Geometry

*NOT STOCKED - CALL FOR DELIVERY

3.00MM SHANK SOLID CARBIDE MICRO DRILLS FOR BRASS

SERIES 885

0.30mm - 2.00mm Diameter

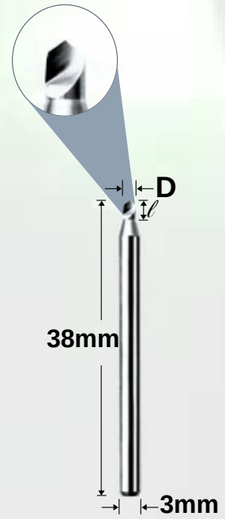
Deep Hole Drilling Priority

Diameter Tolerance (+0/-0.008")
Sub Micron Grain Carbide
Mirror Surface Finishes
Single Flute
120 Degree Point Angle
Shank Diameter Tolerance h6

MATERIAL PRIORITY

CU ALLOY | AL | PLASTIC

D (mm)	ℓ (mm)	PN Uncoated	PN TiCN
0.30	1.65	885-0118.065	885-0118C065
0.35	1.65	885-0138.065	885-0138C065
0.40	1.65	885-0157.065	885-0157C065
0.45	1.65	885-0177.065	885-0177C065
0.50	2.15	885-0197.085	885-0197C085
0.55	2.15	885-0217.085	885-0217C085
0.60	2.15	885-0236.085	885-0236C085
0.65	2.15	885-0256.085	885-0256C085
0.70	2.15	885-0276.085	885-0276C085
0.75	2.15	885-0295.085	885-0295C085
0.80	2.15	885-0315.085	885-0315C085
0.85	2.15	885-0335.085	885-0335C085
0.90	2.15	885-0354.085	885-0354C085
0.95	2.15	885-0374.085	885-0374C085
1.00	2.15	885-0394.085	885-0394C085
1.10	2.85	885-0433.112	885-0433C112
1.20	2.85	885-0472.112	885-0472C112
1.30	2.85	885-0512.112	885-0512C112
1.40	2.85	885-0551.112	885-0551C112
1.50	2.85	885-0591.112	885-0591C112
1.60	2.85	885-0630.112	885-0630C112
1.70	2.85	885-0669.112	885-0669C112
1.80	2.85	885-0709.112	885-0709C112
1.90	2.85	885-0748.112	885-0748C112
2.00	2.85	885-0787.112	885-0787C112



MILLING - SECTION 2

2.21 Solid Carbide 2 Flute Ball Nose End Mills for Hard Metal Milling

16 HMS
0.20mm - 3.00mm Diameter - Page 21
16 HMR - Extended Reach
0.20mm - 3.00mm Diameter - Page 22

2.23 Solid Carbide 2 Flute Ball Nose End Mills for Rib Processing

16 RB
0.50mm, 0.75mm Radius - Page 23
1.00mm, 1.50mm Radius - Page 24

2.25 Solid Carbide 3 Flute Corner Radius High Helix End Mills

Series 1703
1.00mm - 6.00mm Diameter - Page 25

2.26 Solid Carbide 3 Flute Square End Mills Standard Length

Series 1710
0.015″ - 0.100″ Diameter - Page 26

2.27 Solid Carbide 3 Flute Ball Nose End Mills Standard Length

Series 1725
0.015″ - 0.100″ Diameter - Page 27

2.28 Solid Carbide 3 Flute Square End Mills Extended Reach

Series 1740
0.015″ - 0.055″ Diameter - Page 28
0.060″ - 0.100″ Diameter - Page 29

2.30 Solid Carbide 3 Flute Ball Nose End Mills Extended Reach

Series 1745
0.015″ - 0.100″ Diameter - Page 30

2.31 Solid Carbide 3 Flute Square End Mills Reinforced Shank

Titan-AX
1/32″ - 1/4″ Diameter - STUB LENGTH - Page 31
1/32″ - 1/4″ Diameter - STANDARD LENGTH - Page 31
1/32″ - 1/4″ Diameter - EXTENDED REACH - Page 31
Titan-AXM
1.00mm - 8.00mm Diameter - STUB LENGTH - Page 32
1.00mm - 8.00mm Diameter - STANDARD LENGTH - Page 32
1.00mm - 8.00mm Diameter - EXTENDED REACH - Page 32

MILLING - SECTION 2

MILLING 2

2.33 Solid Carbide 3 Flute Corner Radius End Mills Reinforced Shank

Titan-AX
1/32″ - 1/4″ Diameter - STUB LENGTH - Page 33
1/32″ - 1/4″ Diameter - STANDARD LENGTH - Page 33
1/32″ - 1/4″ Diameter - EXTENDED REACH - Page 34
Titan-AXM
1.00mm - 8.00mm Diameter - STUB LENGTH - Page 35
1.00mm - 8.00mm Diameter - STANDARD LENGTH - Page 36
1.00mm - 8.00mm Diameter - EXTENDED REACH - Page 37

2.38 Solid Carbide 4 Flute Corner Radius High Helix End Mills

Series 1804
1.00mm - 6.00mm Diameter - Page 38

2.39 Solid Carbide 4 Flute Square End Mills Standard Length

Series 1810
1/64″ - 1/4″ Diameter - Page 39
0.005″ - 0.100″ Diameter - Page 40
0.10mm - 6.00mm Diameter - Page 41

2.42 Solid Carbide 4 Flute Square End Mills Small Corner Radius

Series 1812
0.015″ - 0.100″ Diameter - Page 42

2.43 Solid Carbide 4 Flute Square End Mills Standard Corner Radius

Series 1813
0.040″ - 0.100″ Diameter - Page 43

2.44 Solid Carbide 4 Flute Square End Mills Stub Length

Series 1820
1/32″ - 1/4″ Diameter - Page 44
0.10mm - 6.00mm Diameter - Page 45

2.46 Solid Carbide 4 Flute Ball Nose End Mills Standard Length

Series 1825
1/64″ - 1/4″ Diameter - Page 46
0.40mm - 6.00mm Diameter - Page 47

2.48 Solid Carbide 4 Flute Ball Nose End Mills Stub Length

Series 1835
1/64″ - 1/4″ Diameter - Page 48
0.40mm - 6.00mm Diameter - Page 49

MILLING - SECTION 2

SOLID CARBIDE 2 FLUTE SQUARE END MILLS STANDARD LENGTH

SERIES 1610

1/64″ - 1/4″ Diameter

General Purpose Machining

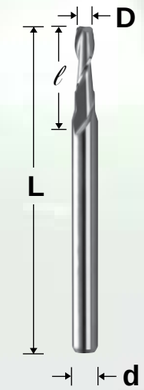
Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AL | TI | CAST IRON | STAINLESS

STANDARD LENGTH

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	1/8	1 1/2	1610-0156.047	1610-0156L047
1/32	.094	1/8	1 1/2	1610-0312.094	1610-0312L094
3/64	.141	1/8	1 1/2	1610-0469.141	1610-0469L141
1/16	.188	1/8	1 1/2	1610-0625.188	1610-0625L188
5/64	.234	1/8	1 1/2	1610-0781.234	1610-0781L234
3/32	.281	1/8	1 1/2	1610-0938.281	1610-0938L281
7/64	.328	1/8	1 1/2	1610-1094.328	1610-1094L328
1/8	.375	1/8	1 1/2	1610-1250.375	1610-1250L375
9/64	.500	3/16	2	1610-1406.500	1610-1406L500
5/32	.500	3/16	2	1610-1563.500	1610-1563L500
11/64	.563	3/16	2	1610-1719.563	1610-1719L563
3/16	.563	3/16	2	1610-1875.563	1610-1875L563
13/64	.625	1/4	2 1/2	1610-2031.625	1610-2031L625
7/32	.625	1/4	2 1/2	1610-2188.625	1610-2188L625
15/64	.750	1/4	2 1/2	1610-2344.750	1610-2344L750
1/4	.750	1/4	2 1/2	1610-2500.750	1610-2500L750



SOLID CARBIDE 2 FLUTE SQUARE END MILLS STANDARD LENGTH

SERIES 1610

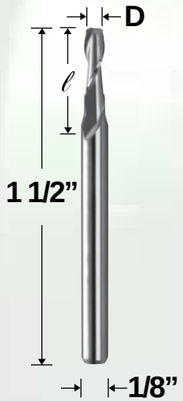
0.005″ - 0.100″ Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON | STAINLESS



STANARD LENGTH

D (in)	ℓ (in)	PN Uncoated	PN AlTiN
.005	.015	1610-0050.015	1610-0050L015
.006	.018	1610-0060.018	1610-0060L018
.007	.021	1610-0070.021	1610-0070L021
.008	.024	1610-0080.024	1610-0080L024
.009	.027	1610-0090.027	1610-0090L027
.010	.030	1610-0100.030	1610-0100L030
.011	.033	1610-0110.033	1610-0110L033
.012	.036	1610-0120.036	1610-0120L036
.013	.039	1610-0130.039	1610-0130L039
.014	.042	1610-0140.042	1610-0140L042
.015	.045	1610-0150.045	1610-0150L045
.016	.048	1610-0160.048	1610-0160L048
.017	.051	1610-0170.051	1610-0170L051
.018	.054	1610-0180.054	1610-0180L054
.019	.057	1610-0190.057	1610-0190L057
.020	.060	1610-0200.060	1610-0200L060
.021	.063	1610-0210.063	1610-0210L063
.022	.066	1610-0220.066	1610-0220L066
.023	.069	1610-0230.069	1610-0230L069
.024	.072	1610-0240.072	1610-0240L072
.025	.075	1610-0250.075	1610-0250L075
.026	.078	1610-0260.078	1610-0260L078
.027	.041	1610-0270.041	1610-0270L041
.027	.081	1610-0270.081	1610-0270L081
.028	.084	1610-0280.084	1610-0280L084
.029	.087	1610-0290.087	1610-0290L087
.030	.090	1610-0300.090	1610-0300L090
.031	.093	1610-0310.093	1610-0310L093
.032	.096	1610-0320.096	1610-0320L096
.033	.099	1610-0330.099	1610-0330L099
.034	.102	1610-0340.102	1610-0340L102
.035	.105	1610-0350.105	1610-0350L105
.040	.120	1610-0400.120	1610-0400L120
.045	.135	1610-0450.135	1610-0450L135
.050	.150	1610-0500.150	1610-0500L150
.055	.165	1610-0550.165	1610-0550L165
.060	.180	1610-0600.180	1610-0600L180
.065	.195	1610-0650.195	1610-0650L195
.070	.210	1610-0700.210	1610-0700L210
.075	.225	1610-0750.225	1610-0750L225
.080	.240	1610-0800.240	1610-0800L240
.085	.255	1610-0850.255	1610-0850L255
.090	.270	1610-0900.270	1610-0900L270
.095	.285	1610-0950.285	1610-0950L285
.100	.300	1610-1000.300	1610-1000L300

Ideal for easier to machine materials. For tougher milling applications see our 3 and 4 flute end mills.

SOLID CARBIDE 2 FLUTE SQUARE END MILLS STANDARD LENGTH

SERIES 1610

0.10mm - 6.00mm Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON | STAINLESS

STANDARD LENGTH

D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.10	0.30	3	38	1610-0039.012	1610-0039L012
0.15	0.45	3	38	1610-0059.018	1610-0059L018
0.20	0.60	3	38	1610-0079.024	1610-0079L024
0.25	0.75	3	38	1610-0098.029	1610-0098L029
0.30	0.90	3	38	1610-0118.035	1610-0118L035
0.35	1.05	3	38	1610-0138.041	1610-0138L041
0.40	1.20	3	38	1610-0157.047	1610-0157L047
0.45	1.35	3	38	1610-0177.053	1610-0177L053
0.50	1.50	3	38	1610-0197.059	1610-0197L059
0.60	1.80	3	38	1610-0236.071	1610-0236L071
0.70	2.10	3	38	1610-0276.083	1610-0276L083
0.80	2.40	3	38	1610-0315.095	1610-0315L095
0.90	2.70	3	38	1610-0354.106	1610-0354L106
1.00	3.00	3	38	1610-0394.118	1610-0394L118
1.10	3.30	3	38	1610-0433.130	1610-0433L130
1.20	3.60	3	38	1610-0472.142	1610-0472L142
1.30	3.90	3	38	1610-0512.154	1610-0512L154
1.40	4.20	3	38	1610-0551.165	1610-0551L165
1.50	4.50	3	38	1610-0591.177	1610-0591L177
1.60	4.80	3	38	1610-0630.189	1610-0630L189
1.70	5.10	3	38	1610-0669.201	1610-0669L201
1.80	5.40	3	38	1610-0709.213	1610-0709L213
1.90	5.70	3	38	1610-0748.224	1610-0748L224
2.00	6.00	3	38	1610-0787.236	1610-0787L236
2.50	7.50	3	38	1610-0984.295	1610-0984L295
2.80	9.00	3	38	1610-1102.354	1610-1102L354
3.00	9.00	3	38	1610-1181.354	1610-1181L354
3.50	10.50	4	50	1610-1378.413	1610-1378L413
3.80	12.00	5	50	1610-1496.473	1610-1496L473
4.00	12.00	5	50	1610-1575.473	1610-1575L473
4.50	13.50	5	50	1610-1772.532	1610-1772L532
4.80	15.00	5	50	1610-1890.590	1610-1890L590
5.00	15.00	5	50	1610-1968.590	1610-1968L590
5.50	16.50	6	50	1610-2165.650	1610-2165L650
5.80	18.00	6	50	1610-2283.709	1610-2283L709
6.00	18.00	6	50	1610-2362.709	1610-2362L709

SOLID CARBIDE 2 FLUTE SQUARE END MILLS SMALL CORNER RADIUS

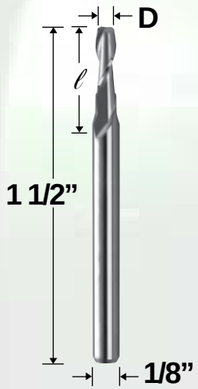
SERIES 1612

0.015″ - 0.100″ Diameter

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Small Corner Radius
Mirror Surface Finishes
Single End Construction
Flute Length 3X Diameter

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON | STAINLESS



STANDARD LENGTH

D (in)	ℓ (in)	CR (in)	PN Uncoated	PN AlTiN
.015	.045	.003	1612-0150.045CR	1612-0150L045CR
.020	.060	.005	1612-0200.060CR	1612-0200L060CR
.025	.075	.005	1612-0250.075CR	1612-0250L075CR
.030	.090	.005	1612-0300.090CR	1612-0300L090CR
.035	.105	.005	1612-0350.105CR	1612-0350L105CR
.040	.120	.005	1612-0400.120CR	1612-0400L120CR
.045	.135	.005	1612-0450.135CR	1612-0450L135CR
.050	.150	.010	1612-0500.150CR	1612-0500L150CR
.060	.180	.010	1612-0600.180CR	1612-0600L180CR
.070	.210	.010	1612-0700.210CR	1612-0700L210CR
.080	.240	.010	1612-0800.240CR	1612-0800L240CR
.090	.270	.010	1612-0900.270CR	1612-0900L270CR
.100	.300	.010	1612-1000.300CR	1612-1000L300CR

SOLID CARBIDE 2 FLUTE SQUARE END MILLS STANDARD CORNER RADIUS

SERIES 1613

0.040″ - 0.100″ Diameter

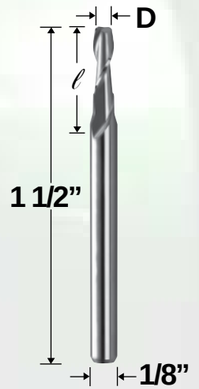
Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Small Corner Radius
Mirror Surface Finishes
Single End Construction
Flute Length 3X Diameter

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON | STAINLESS

STANDARD LENGTH

D (in)	ℓ (in)	CR (in)	PN Uncoated	PN AlTiN
.040	.120	.010	1613-0400.120CR	1613-0400L120CR
.045	.135	.010	1613-0450.135CR	1613-0450L135CR
.050	.150	.015	1613-0500.150CR	1613-0500L150CR
.060	.180	.015	1613-0600.180CR	1613-0600L180CR
.070	.210	.015	1613-0700.210CR	1613-0700L210CR
.080	.240	.015	1613-0800.240CR	1613-0800L240CR
.090	.270	.015	1613-0900.270CR	1613-0900L270CR
.100	.300	.015	1613-1000.300CR	1613-1000L300CR



SOLID CARBIDE 2 FLUTE SQUARE END MILLS STUB LENGTH

SERIES 1620

1/64″ - 1/4″ Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC · CU ALLOY · AL · TI · NI/CO · CAST IRON · STAINLESS · STEEL · HI-C STEEL

STUB LENGTH

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.023	1/8	1 1/2	1620-0156.023	1620-0156L023
1/32	.047	1/8	1 1/2	1620-0312.047	1620-0312L047
3/64	.071	1/8	1 1/2	1620-0469.071	1620-0469L071
1/16	.094	1/8	1 1/2	1620-0625.094	1620-0625L094
5/64	.117	1/8	1 1/2	1620-0781.117	1620-0781L117
3/32	.141	1/8	1 1/2	1620-0938.141	1620-0938L141
7/64	.164	1/8	1 1/2	1620-1094.164	1620-1094L164
1/8	.188	1/8	1 1/2	1620-1250.188	1620-1250L188
9/64	.313	3/16	2	1620-1406.313	1620-1406L313
5/32	.313	3/16	2	1620-1563.313	1620-1563L313
11/64	.375	3/16	2	1620-1719.375	1620-1719L375
3/16	.375	3/16	2	1620-1875.375	1620-1875L375
13/64	.438	1/4	2 1/2	1620-2031.438	1620-2031L438
7/32	.438	1/4	2 1/2	1620-2188.438	1620-2188L438
15/64	.500	1/4	2 1/2	1620-2344.500	1620-2344L500
1/4	.500	1/4	2 1/2	1620-2500.500	1620-2500L500

END MILLS

SOLID CARBIDE 2 FLUTE SQUARE END MILLS STUB LENGTH

SERIES 1620

0.005″ - 0.100″ Diameter

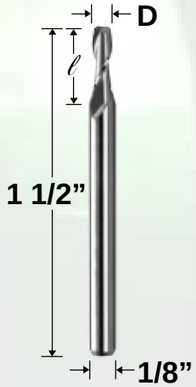
General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC · CU ALLOY · AL · TI · CAST IRON

STUB LENGTH



D (in)	ℓ (in)	PN Uncoated	PN AlTiN
.005	.008	1620-0050.008	1620-0050L008
.006	.009	1620-0060.009	1620-0060L009
.007	.011	1620-0070.011	1620-0070L011
.008	.012	1620-0080.012	1620-0080L012
.009	.014	1620-0090.014	1620-0090L014
.010	.015	1620-0100.015	1620-0100L015
.011	.017	1620-0110.017	1620-0110L017
.012	.018	1620-0120.018	1620-0120L018
.013	.020	1620-0130.020	1620-0130L020
.014	.021	1620-0140.021	1620-0140L021
.015	.023	1620-0150.023	1620-0150L023
.016	.024	1620-0160.024	1620-0160L024
.017	.026	1620-0170.026	1620-0170L026
.018	.027	1620-0180.027	1620-0180L027
.019	.029	1620-0190.029	1620-0190L029
.020	.030	1620-0200.030	1620-0200L030
.021	.032	1620-0210.032	1620-0210L032
.022	.033	1620-0220.033	1620-0220L033
.023	.035	1620-0230.035	1620-0230L035
.024	.036	1620-0240.036	1620-0240L036
.025	.038	1620-0250.038	1620-0250L038
.026	.039	1620-0260.039	1620-0260L039
.027	.041	1620-0270.041	1620-0270L041
.028	.042	1620-0280.042	1620-0280L042
.029	.044	1620-0290.044	1620-0290L044
.030	.045	1620-0300.045	1620-0300L045
.031	.047	1620-0310.047	1620-0310L047
.032	.048	1620-0320.048	1620-0320L048
.033	.050	1620-0330.050	1620-0330L050
.034	.051	1620-0340.051	1620-0340L051
.035	.053	1620-0350.053	1620-0350L053
.040	.060	1620-0400.060	1620-0400L060
.045	.068	1620-0450.068	1620-0450L068
.047	.071	1620-0470.071	1620-0470L071
.050	.075	1620-0500.075	1620-0500L075
.055	.083	1620-0550.083	1620-0550L083
.060	.090	1620-0600.090	1620-0600L090
.065	.098	1620-0650.098	1620-0650L098
.070	.105	1620-0700.105	1620-0700L105
.075	.113	1620-0750.113	1620-0750L113
.080	.120	1620-0800.120	1620-0800L120
.085	.128	1620-0850.128	1620-0850L128
.090	.135	1620-0900.135	1620-0900L135
.095	.143	1620-0950.143	1620-0950L143
.100	.150	1620-1000.150	1620-1000L150

SOLID CARBIDE 2 FLUTE SQUARE END MILLS STUB LENGTH

SERIES 1620

0.10mm - 6.00mm Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON | STAINLESS

STUB LENGTH

D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.10	0.15	3	38	1620-0039.006	1620-0039L006
0.15	0.23	3	38	1620-0059.009	1620-0059L009
0.20	0.30	3	38	1620-0079.012	1620-0079L012
0.25	0.38	3	38	1620-0098.015	1620-0098L015
0.30	0.45	3	38	1620-0118.018	1620-0118L018
0.35	0.53	3	38	1620-0138.021	1620-0138L021
0.40	0.60	3	38	1620-0157.024	1620-0157L024
0.45	0.68	3	38	1620-0177.027	1620-0177L027
0.50	0.75	3	38	1620-0197.030	1620-0197L030
0.60	0.90	3	38	1620-0236.035	1620-0236L035
0.70	1.05	3	38	1620-0276.041	1620-0276L041
0.80	1.20	3	38	1620-0315.047	1620-0315L047
0.90	1.35	3	38	1620-0354.053	1620-0354L053
1.00	1.50	3	38	1620-0394.059	1620-0394L059
1.10	1.65	3	38	1620-0433.065	1620-0433L065
1.20	1.80	3	38	1620-0472.071	1620-0472L071
1.30	2.60	3	38	1620-0512.102	1620-0512L102
1.40	2.80	3	38	1620-0551.110	1620-0551L110
1.50	2.25	3	38	1620-0591.089	1620-0591L089
1.60	3.20	3	38	1620-0630.126	1620-0630L126
1.70	3.70	3	38	1620-0669.146	1620-0669L146
1.80	3.60	3	38	1620-0709.142	1620-0709L142
1.90	3.80	3	38	1620-0748.150	1620-0748L150
2.00	3.00	3	38	1620-0787.118	1620-0787L118
2.50	3.75	3	38	1620-0984.148	1620-0984L148
2.80	4.50	3	38	1620-1102.177	1620-1102L177
3.00	4.50	3	38	1620-1181.177	1620-1181L177
3.50	5.25	4	50	1620-1378.207	1620-1378L207
3.80	6.00	5	50	1620-1496.236	1620-1496L236
4.00	6.00	5	50	1620-1575.236	1620-1575L236
4.50	6.75	5	50	1620-1772.266	1620-1772L266
4.80	7.50	5	50	1620-1890.295	1620-1890L295
5.00	7.50	5	50	1620-1968.295	1620-1968L295
5.50	8.25	6	50	1620-2165.325	1620-2165L325
5.80	9.00	6	50	1620-2283.354	1620-2283L354
6.00	9.00	6	50	1620-2362.354	1620-2362L354

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS STANDARD LENGTH

SERIES 1625

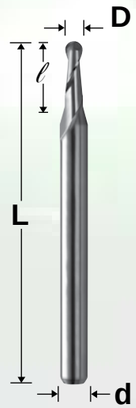
1/64" - 1/4" Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001")
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON



STANDARD LENGTH

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	1/8	1 1/2	1625-0156.047	1625-0156L047
1/32	.094	1/8	1 1/2	1625-0312.094	1625-0312L094
3/64	.141	1/8	1 1/2	1625-0469.141	1625-0469L141
1/16	.188	1/8	1 1/2	1625-0625.188	1625-0625L188
5/64	.234	1/8	1 1/2	1625-0781.234	1625-0781L234
3/32	.281	1/8	1 1/2	1625-0938.281	1625-0938L281
7/64	.328	1/8	1 1/2	1625-1094.328	1625-1094L328
1/8	.375	1/8	1 1/2	1625-1250.375	1625-1250L375
9/64	.500	3/16	2	1625-1406.500	1625-1406L500
5/32	.500	3/16	2	1625-1563.500	1625-1563L500
11/64	.563	3/16	2	1625-1719.563	1625-1719L563
3/16	.563	3/16	2	1625-1875.563	1625-1875L563
13/64	.625	1/4	2 1/2	1625-2031.625	1625-2031L625
7/32	.625	1/4	2 1/2	1625-2188.625	1625-2188L625
15/64	.750	1/4	2 1/2	1625-2344.750	1625-2344L750
1/4	.750	1/4	2 1/2	1625-2500.750	1625-2500L750

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS STANDARD LENGTH

SERIES 1625

0.010″ - 0.100″ Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON | STAINLESS

STANDARD LENGTH

D (in)	ℓ (in)	PN Uncoated	PN AlTiN
.010	.030	1625-0100.030	1625-0100L030
.011	.033	1625-0110.033	1625-0110L033
.012	.036	1625-0120.036	1625-0120L036
.013	.039	1625-0130.039	1625-0130L039
.014	.042	1625-0140.042	1625-0140L042
.015	.045	1625-0150.045	1625-0150L045
.016	.048	1625-0160.048	1625-0160L048
.017	.051	1625-0170.051	1625-0170L051
.018	.054	1625-0180.054	1625-0180L054
.019	.057	1625-0190.057	1625-0190L057
.020	.060	1625-0200.060	1625-0200L060
.021	.063	1625-0210.063	1625-0210L063
.022	.066	1625-0220.066	1625-0220L066
.023	.069	1625-0230.069	1625-0230L069
.024	.072	1625-0240.072	1625-0240L072
.025	.075	1625-0250.075	1625-0250L075
.026	.078	1625-0260.078	1625-0260L078
.027	.081	1625-0270.081	1625-0270L081
.028	.084	1625-0280.084	1625-0280L084
.029	.087	1625-0290.087	1625-0290L087
.030	.090	1625-0300.090	1625-0300L090
.031	.093	1625-0310.093	1625-0310L093
.032	.096	1625-0320.096	1625-0320L096
.033	.099	1625-0330.099	1625-0330L099
.034	.102	1625-0340.102	1625-0340L102
.035	.105	1625-0350.105	1625-0350L105
.040	.120	1625-0400.120	1625-0400L120
.045	.135	1625-0450.135	1625-0450L135
.050	.150	1625-0500.150	1625-0500L150
.055	.165	1625-0550.165	1625-0550L165
.060	.180	1625-0600.180	1625-0600L180
.065	.195	1625-0650.195	1625-0650L195
.070	.210	1625-0700.210	1625-0700L210
.075	.225	1625-0750.225	1625-0750L225
.080	.240	1625-0800.240	1625-0800L240
.085	.255	1625-0850.255	1625-0850L255
.090	.270	1625-0900.270	1625-0900L270
.095	.285	1625-0950.285	1625-0950L285
.100	.300	1625-1000.300	1625-1000L300

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS STANDARD LENGTH

SERIES 1625

0.10mm - 6.00mm Diameter

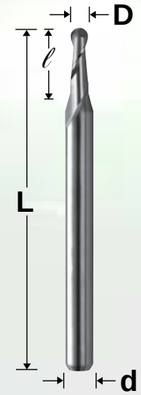
General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON | STAINLESS

STANDARD LENGTH



D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.10	0.30	3	38	1625-0039.012	1625-0039L012
0.15	0.45	3	38	1625-0059.018	1625-0059L018
0.20	0.60	3	38	1625-0079.024	1625-0079L024
0.25	0.75	3	38	1625-0098.029	1625-0098L029
0.30	0.90	3	38	1625-0118.035	1625-0118L035
0.35	1.05	3	38	1625-0138.041	1625-0138L041
0.40	1.20	3	38	1625-0157.047	1625-0157L047
0.45	1.35	3	38	1625-0177.053	1625-0177L053
0.50	1.50	3	38	1625-0197.059	1625-0197L059
0.60	1.80	3	38	1625-0236.071	1625-0236L071
0.70	2.10	3	38	1625-0276.083	1625-0276L083
0.80	2.40	3	38	1625-0315.095	1625-0315L095
0.90	2.70	3	38	1625-0354.106	1625-0354L106
1.00	3.00	3	38	1625-0394.118	1625-0394L118
1.10	3.30	3	38	1625-0433.130	1625-0433L130
1.20	3.60	3	38	1625-0472.142	1625-0472L142
1.30	3.90	3	38	1625-0512.154	1625-0512L154
1.40	4.20	3	38	1625-0551.165	1625-0551L165
1.50	4.50	3	38	1625-0591.177	1625-0591L177
1.60	4.80	3	38	1625-0630.189	1625-0630L189
1.70	5.10	3	38	1625-0669.201	1625-0669L201
1.80	5.40	3	38	1625-0709.213	1625-0709L213
1.90	5.70	3	38	1625-0748.224	1625-0748L224
2.00	6.00	3	38	1625-0787.236	1625-0787L236
2.50	7.50	3	38	1625-0984.295	1625-0984L295
3.00	9.00	3	38	1625-1181.354	1625-1181L354
3.50	10.50	4	50	1625-1378.413	1625-1378L413
4.00	12.00	5	50	1625-1575.473	1625-1575L473
4.50	13.50	5	50	1625-1772.532	1625-1772L532
5.00	15.00	5	50	1625-1968.590	1625-1968L590
5.50	16.50	6	50	1625-2165.650	1625-2165L650
6.00	18.00	6	50	1625-2362.709	1625-2362L709

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS STUB LENGTH

SERIES 1635

1/64″ - 1/4″ Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CUALLOY | AI | TI | CAST IRON

STUB LENGTH

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.023	1/8	1 1/2	1635-0156.023	1635-0156L023
1/32	.047	1/8	1 1/2	1635-0312.047	1635-0312L047
3/64	.070	1/8	1 1/2	1635-0469.070	1635-0469L070
1/16	.094	1/8	1 1/2	1635-0625.094	1635-0625L094
5/64	.117	1/8	1 1/2	1635-0781.117	1635-0781L117
3/32	.141	1/8	1 1/2	1635-0938.141	1635-0938L141
7/64	.164	1/8	1 1/2	1635-1094.164	1635-1094L164
1/8	.188	1/8	1 1/2	1635-1250.188	1635-1250L188
9/64	.313	3/16	2	1635-1406.313	1635-1406L313
5/32	.313	3/16	2	1635-1563.313	1635-1563L313
11/64	.375	3/16	2	1635-1719.375	1635-1719L375
3/16	.375	3/16	2	1635-1875.375	1635-1875L375
13/64	.438	1/4	2 1/2	1635-2031.438	1635-2031L438
7/32	.438	1/4	2 1/2	1635-2188.438	1635-2188L438
15/64	.500	1/4	2 1/2	1635-2344.500	1635-2344L500
1/4	.500	1/4	2 1/2	1635-2500.500	1635-2500L500

END MILLS

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS STUB LENGTH

SERIES 1635

0.010″ - 0.100″ Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CUALLOY | AI | CAST IRON | TI

STUB LENGTH

D (in)	ℓ (in)	PN Uncoated	PN AlTiN
.010	.015	1635-0100.015	1635-0100L015
.011	.016	1635-0110.016	1635-0110L016
.012	.018	1635-0120.018	1635-0120L018
.013	.019	1635-0130.019	1635-0130L019
.014	.021	1635-0140.021	1635-0140L021
.015	.023	1635-0150.023	1635-0150L023
.016	.024	1635-0160.024	1635-0160L024
.017	.025	1635-0170.025	1635-0170L025
.018	.027	1635-0180.027	1635-0180L027
.019	.028	1635-0190.028	1635-0190L028
.020	.030	1635-0200.030	1635-0200L030
.021	.031	1635-0210.031	1635-0210L031
.022	.033	1635-0220.033	1635-0220L033
.023	.034	1635-0230.034	1635-0230L034
.024	.036	1635-0240.036	1635-0240L036
.025	.038	1635-0250.038	1635-0250L038
.026	.039	1635-0260.039	1635-0260L039
.027	.040	1635-0270.040	1635-0270L040
.028	.042	1635-0280.042	1635-0280L042
.029	.043	1635-0290.043	1635-0290L043
.030	.045	1635-0300.045	1635-0300L045
.031	.047	1635-0310.047	1635-0310L047
.032	.048	1635-0320.048	1635-0320L048
.033	.050	1635-0330.050	1635-0330L050
.034	.051	1635-0340.051	1635-0340L051
.035	.053	1635-0350.053	1635-0350L053
.040	.060	1635-0400.060	1635-0400L060
.045	.068	1635-0450.068	1635-0450L068
.050	.075	1635-0500.075	1635-0500L075
.055	.083	1635-0550.083	1635-0550L083
.060	.090	1635-0600.090	1635-0600L090
.065	.098	1635-0650.098	1635-0650L098
.070	.105	1635-0700.105	1635-0700L105
.075	.113	1635-0750.113	1635-0750L113
.080	.120	1635-0800.120	1635-0800L120
.085	.128	1635-0850.128	1635-0850L128
.090	.135	1635-0900.135	1635-0900L135
.095	.143	1635-0950.143	1635-0950L143
.100	.150	1635-1000.150	1635-1000L150

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS STUB LENGTH

SERIES 1635

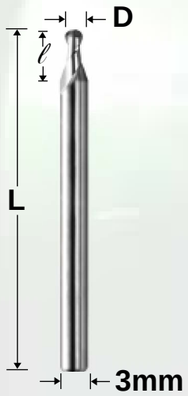
0.10mm - 6.00mm Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC · CUALLOY · Al · TI · CAST IRON · STAINLESS



STUB LENGTH

D (mm)	ℓ (mm)	L_1 (mm)	L (mm)	PN Uncoated	PN AlTiN
0.10	0.15	3	38	1635-0039.006	1635-0039L006
0.15	0.23	3	38	1635-0059.009	1635-0059L009
0.20	0.30	3	38	1635-0079.012	1635-0079L012
0.25	0.38	3	38	1635-0098.015	1635-0098L015
0.30	0.45	3	38	1635-0118.018	1635-0118L018
0.35	0.53	3	38	1635-0138.021	1635-0138L021
0.40	0.60	3	38	1635-0157.024	1635-0157L024
0.45	0.68	3	38	1635-0177.027	1635-0177L027
0.50	0.75	3	38	1635-0197.030	1635-0197L030
0.60	0.90	3	38	1635-0236.035	1635-0236L035
0.70	1.05	3	38	1635-0276.041	1635-0276L041
0.80	1.20	3	38	1635-0315.047	1635-0315L047
0.90	1.35	3	38	1635-0354.053	1635-0354L053
1.00	1.50	3	38	1635-0394.059	1635-0394L059
1.10	1.65	3	38	1635-0433.065	1635-0433L065
1.20	1.80	3	38	1635-0472.071	1635-0472L071
1.30	1.95	3	38	1635-0512.077	1635-0512L077
1.40	2.10	3	38	1635-0551.083	1635-0551L083
1.50	2.25	3	38	1635-0591.089	1635-0591L089
1.60	2.40	3	38	1635-0630.095	1635-0630L095
1.70	2.50	3	38	1635-0669.098	1635-0669L098
1.80	2.70	3	38	1635-0709.106	1635-0709L106
1.90	2.85	3	38	1635-0748.112	1635-0748L112
2.00	3.00	3	38	1635-0787.118	1635-0787L118
2.50	3.75	3	38	1635-0984.148	1635-0984L148
3.00	4.50	3	38	1635-1181.177	1635-1181L177
3.50	5.25	4	50	1635-1378.207	1635-1378L207
4.00	6.00	5	50	1635-1575.236	1635-1575L236
4.50	6.75	5	50	1635-1772.266	1635-1772L266
5.00	7.50	5	50	1635-1968.295	1635-1968L295
5.50	8.25	6	50	1635-2165.325	1635-2165L325
6.00	9.00	6	50	1635-2362.354	1635-2362L354

SOLID CARBIDE 2 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1640

1/64″ - 1/8″ Diameter

Deep Reach Milling

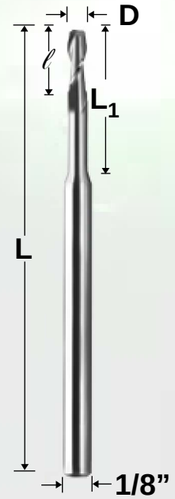
Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC · CUALLOY · Al · CAST IRON · TI · STAINLESS · STEEL · HI-CSTEEL

EXTENDED REACH

D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	.120	1 1/2	1640-0156.120	1640-0156L120
1/32	.094	.315	1 1/2	1640-0312.315	1640-0312L315
3/64	.141	.390	1 1/2	1640-0469.390	1640-0469L390
1/16	.188	.590	2	1640-0625.590	1640-0625L590
5/64	.234	.590	2	1640-0781.590	1640-0781L590
3/32	.281	.590	2	1640-0938.590	1640-0938L590
7/64	.328	.590	2	1640-1094.590	1640-1094L590
1/8	.375	.590	2	1640-1250.590	1640-1250L590



SOLID CARBIDE 2 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1640

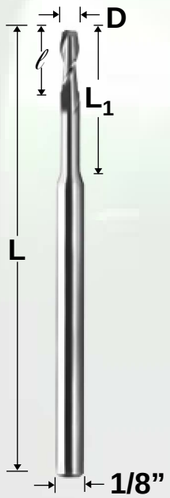
0.010″ - 0.110″ Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON | STAINLESS



EXTENDED REACH

D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
.010	.030	.100	1 1/2	1640-0100.100	1640-0100L100
.015	.045	.150	1 1/2	1640-0150.128	1640-0150L128
.015	.045	.128	1 1/2	1640-0150.150	1640-0150L150
.020	.060	.200	1 1/2	1640-0200.170	1640-0200L170
.020	.060	.170	1 1/2	1640-0200.200	1640-0200L200
.025	.075	.250	1 1/2	1640-0250.213	1640-0250L213
.025	.075	.213	1 1/2	1640-0250.250	1640-0250L250
.030	.090	.300	1 1/2	1640-0300.270	1640-0300L270
.030	.090	.270	1 1/2	1640-0300.300	1640-0300L300
.035	.105	.350	1 1/2	1640-0350.315	1640-0350L315
.035	.105	.315	1 1/2	1640-0350.360	1640-0350L300
.040	.120	.360	1 1/2	1640-0400.360	1640-0400L360
.040	.120	.400	1 1/2	1640-0400.400	1640-0400L400
.045	.135	.405	1 1/2	1640-0450.405	1640-0450L405
.045	.135	.450	1 1/2	1640-0450.450	1640-0450L450
.050	.150	.500	1 1/2	1640-0500.500	1640-0500L500
.055	.165	.500	1 1/2	1640-0550.500	1640-0550L500
.060	.180	.500	1 1/2	1640-0600.500	1640-0600L500
.060	.180	.600	2	1640-0600.600	1640-0600L600
.065	.195	.500	1 1/2	1640-0650.500	1640-0650L500
.065	.195	.600	2	1640-0650.600	1640-0650L600
.070	.210	.500	1 1/2	1640-0700.500	1640-0700L500
.070	.210	.700	2	1640-0700.700	1640-0700L700
.075	.225	.500	1 1/2	1640-0750.500	1640-0750L500
.075	.225	.700	2	1640-0750.700	1640-0750L700
.080	.240	.500	1 1/2	1640-0800.500	1640-0800L500
.080	.240	.750	2	1640-0800.750	1640-0800L750
.085	.255	.500	1 1/2	1640-0850.500	1640-0850L500
.085	.255	.750	2	1640-0850.750	1640-0850L750
.090	.270	.625	1 1/2	1640-0900.625	1640-0900L625
.090	.270	.750	2	1640-0900.750	1640-0900L750
.095	.285	.625	1 1/2	1640-0950.625	1640-0950L625
.095	.285	.750	2	1640-0950.750	1640-0950L750
.100	.300	.625	1 1/2	1640-1000.625	1640-1000L625
.100	.300	.750	2	1640-1000.750	1640-1000L750
.110	.330	.750	2	1640-1100.750	1640-1100L750

SOLID CARBIDE 2 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1640

0.40mm - 6.00mm Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI

EXTENDED REACH

D (mm)	ℓ (mm)	L_1 (mm)	L (mm)	d (mm)	PN Uncoated	PN AlTiN
0.40	1.20	3	38	3	1640-0157.118	1640-0157L118
0.50	1.50	4	38	3	1640-0197.157	1640-0197L157
0.60	1.80	5	38	3	1640-0236.197	1640-0236L197
0.65	1.95	6	38	3	1640-0256.236	1640-0256L236
0.70	2.10	7	38	3	1640-0276.276	1640-0276L276
0.75	2.25	8	38	3	1640-0295.315	1640-0295L315
0.80	2.4	9	50	3	1640-0315.354	1640-0315L354
0.90	2.7	10	50	3	1640-0354.394	1640-0354L394
1.00	3.0	10	50	3	1640-0394.394	1640-0394L394
1.50	4.5	15	50	3	1640-0591.591	1640-0591L591
2.00	6.0	20	50	3	1640-0787.787	1640-0787L787
2.50	7.5	23	50	3	1640-0984.906	1640-0984L906
3.00	9.0	23	50	3	1640-1181.906	1640-1181L906
3.50	10.5	25	75	6	1640-1378.984	1640-1378L984
4.00	12.0	25	75	6	1640-1575.984	1640-1575L984
4.50	13.5	30	75	6	1640-1772.1181	1640-1772L1181
5.00	15.0	30	75	6	1640-1968.1181	1640-1968L1181
5.50	16.5	30	75	6	1640-2165.1181	1640-2165L1181
6.00	18.0	30	75	6	1640-2362.1181	1640-2362L1181

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS EXTENDED REACH

SERIES 1645

1/64″ - 1/8″ Diameter

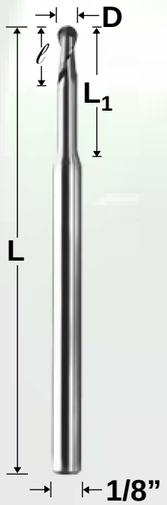
Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON | STAINLESS | STEEL | HI-CSTEEL

EXTENDED REACH



D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	.120	1 1/2	1645-0156.120	1645-0156L120
1/32	.094	.315	1 1/2	1645-0312.315	1645-0312L315
3/64	.141	.390	1 1/2	1645-0469.390	1645-0469L390
1/16	.188	.590	2	1645-0625.590	1645-0625L590
5/64	.234	.590	2	1645-0781.590	1645-0781L590
3/32	.281	.590	2	1645-0938.590	1645-0938L590
7/64	.328	.590	2	1645-1094.590	1645-1094L590
1/8	.375	.590	2	1645-1250.590	1645-1250L590

END MILLS

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS EXTENDED REACH

SERIES 1645

0.010″ - 0.110″ Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON | STAINLESS

EXTENDED REACH

D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
.010	.030	.100	1 1/2	1645-0100.100	1645-0100L100
.015	.045	.150	1 1/2	1645-0150.150	1645-0150L150
.015	.045	.128	1 1/2	1645-0150.128	1645-0150L128
.020	.060	.200	1 1/2	1645-0200.200	1645-0200L200
.020	.060	.170	1 1/2	1645-0200.170	1645-0200L170
.025	.075	.250	1 1/2	1645-0250.250	1645-0250L250
.025	.075	.213	1 1/2	1645-0250.213	1645-0250L213
.030	.090	.300	1 1/2	1645-0300.300	1645-0300L300
.030	.090	.270	1 1/2	1645-0300.270	1645-0300L270
.035	.105	.350	1 1/2	1645-0350.350	1645-0350L350
.035	.105	.315	1 1/2	1645-0350.315	1645-0350L315
.040	.120	.400	1 1/2	1645-0400.400	1645-0400L400
.040	.120	.360	1 1/2	1645-0400.360	1645-0400L360
.045	.135	.450	1 1/2	1645-0450.450	1645-0450L450
.045	.135	.405	1 1/2	1645-0450.405	1645-0450L405
.050	.150	.500	1 1/2	1645-0500.500	1645-0500L500
.055	.165	.500	1 1/2	1645-0550.500	1645-0550L500
.060	.180	.500	1 1/2	1645-0600.500	1645-0600L500
.060	.180	.600	2	1645-0600.600	1645-0600L600
.065	.195	.500	1 1/2	1645-0650.500	1645-0650L500
.065	.195	.600	2	1645-0650.600	1645-0650L600
.070	.210	.500	1 1/2	1645-0700.500	1645-0700L500
.070	.210	.700	2	1645-0700.700	1645-0700L700
.075	.225	.500	1 1/2	1645-0750.500	1645-0750L500
.075	.225	.700	2	1645-0750.700	1645-0750L700
.080	.240	.500	1 1/2	1645-0800.500	1645-0800L500
.080	.240	.750	2	1645-0800.750	1645-0800L750
.085	.255	.500	1 1/2	1645-0850.500	1645-0850L500
.085	.255	.750	2	1645-0850.750	1645-0850L750
.090	.270	.625	1 1/2	1645-0900.625	1645-0900L625
.090	.270	.750	2	1645-0900.750	1645-0900L750
.095	.285	.625	1 1/2	1645-0950.625	1645-0950L625
.095	.285	.750	2	1645-0950.750	1645-0950L750
.100	.300	.625	1 1/2	1645-1000.625	1645-1000L625
.100	.300	.750	2	1645-1000.750	1645-1000L750
.110	.330	.750	2	1645-1100.750	1645-1100L750

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS EXTENDED REACH

SERIES 1645

0.40mm - 6.00mm Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON | STAINLESS

EXTENDED REACH

D (mm)	ℓ (mm)	L_1 (mm)	L (mm)	d (mm)	PN Uncoated	PN AlTiN
0.40	1.20	3	38	3	1645-0157.118	1645-0157L118
0.50	1.50	4	38	3	1645-0197.157	1645-0197L157
0.60	1.80	5	38	3	1645-0236.197	1645-0236L197
0.65	1.95	6	38	3	1645-0256.236	1645-0256L236
0.70	2.10	7	38	3	1645-0276.276	1645-0276L276
0.75	2.25	8	38	3	1645-0295.315	1645-0295L315
0.80	2.40	9	50	3	1645-0315.354	1645-0315L354
0.90	2.70	10	50	3	1645-0354.394	1645-0354L394
1.00	3.00	10	50	3	1645-0394.394	1645-0394L394
1.50	4.50	15	50	3	1645-0591.591	1645-0591L591
2.00	6.00	20	50	3	1645-0787.787	1645-0787L787
2.50	7.50	23	50	3	1645-0984.906	1645-0984L906
3.00	9.00	23	50	3	1645-1181.906	1645-1181L906
3.50	10.5	25	75	6	1645-1378.984	1645-1378L984
4.00	12.0	25	75	6	1645-1575.984	1645-1575L984
4.50	13.5	30	75	6	1645-1772.1181	1645-1772L1181
5.00	15.0	30	75	6	1645-1968.1181	1645-1968L1181
5.50	16.5	30	75	6	1645-2165.1181	1645-2165L1181
6.00	18.0	30	75	6	1645-2362.1181	1645-2362L1181

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS FOR HARD METAL MILLING

16 HMS

0.20mm - 3.00mm Diameter

Hard Metal Milling

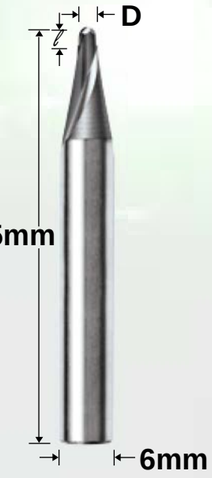
Ball Radius Tolerance (+/-0.005mm)
Sub Micron Grain Carbide
Single End Construction
6mm Shank
AX High Performance Coating
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-C STEEL | NI/CO | Al

METRIC RADIUS (r)

r (mm)	D (mm)	ℓ (mm)	PN
0.10	0.20	0.2	1625-0079J008S
0.15	0.30	0.3	1625-0118J012S
0.20	0.40	0.4	1625-0157J016S
0.25	0.50	0.5	1625-0197J020S
0.30	0.60	0.6	1625-0236J024S
0.40	0.80	0.8	1625-0315J032S
0.50	1.00	1.0	1625-0394J040S
0.60	1.20	1.2	1625-0472J048S
0.70	1.40	1.4	1625-0551J055S
0.75	1.50	1.5	1625-0591J060S
0.80	1.60	1.6	1625-0630J063S
0.90	1.80	1.8	1625-0709J071S
1.00	2.00	2.0	1625-0787J078S
1.25	2.50	2.5	1625-0984J098S
1.50	3.00	3.0	1625-1181J118S



SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS FOR HARD METAL MILLING

16 HMR

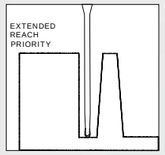
0.20mm - 3.00mm Diameter

Hard Metal Milling

Ball Radius Tolerance (+/-0.005mm)
Sub Micron Grain Carbide
Single End Construction
AX High Performance Coating
1 X Diameter Length of Cut
Designed for 10:1 Depth to Diameter Aspect Ratio
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI



METRIC RADIUS (r) - EXTENDED REACH

r (mm)	D (mm)	ℓ (mm)	L_1 (mm)	L_1Ø (mm)	d (mm)	L (mm)	PN
0.10	0.20	0.2	2	0.17	4	50	1625-0079J008R
0.15	0.30	0.3	3	0.26	4	50	1625-0118J012R
0.20	0.40	0.4	4	0.36	4	50	1625-0157J016R
0.25	0.50	0.5	5	0.45	4	50	1625-0197J020R
0.30	0.60	0.6	6	0.57	4	50	1625-0236J024R
0.40	0.80	0.8	8	0.76	4	50	1625-0315J032R
0.50	1.00	1.0	10	0.95	4	50	1625-0394J040R
0.60	1.20	1.2	12	1.14	4	50	1625-0472J048R
0.70	1.40	1.4	14	1.33	4	50	1625-0551J055R
0.75	1.50	1.5	15	1.43	4	50	1625-0591J060R
0.80	1.60	1.6	16	1.52	4	50	1625-0630J063R
0.90	1.80	1.8	18	1.71	4	50	1625-0709J071R
1.00	2.00	2.0	20	1.90	4	60	1625-0787J078R
1.25	2.50	2.5	25	2.43	4	60	1625-0984J098R
1.50	3.00	3.0	30	2.91	6	70	1625-1181J118R

SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS FOR RIB PROCESSING

16 RB

0.50mm, 0.75mm Radius

H13, P20, A-2, D-2, S-7, M-2 upto Rc 62

Ball Radius Tolerance (+/-0.005mm)
Sub Micron Grain Carbide
Single End Construction
AX High Performance Coating
1 X Diameter Length of Cut
Multiple Length to Diameter Aspect Ratios
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI

METRIC RADIUS (r)

0.50r

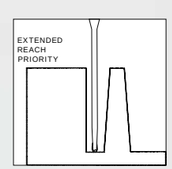
0.50mm Radius	+/-0.005mm
1.00mm Diameter (D)	+0/-0.0254mm
50mm Overall Length (L)	+0/-0.05mm
4mm Shank Diameter (d)	+0/-0.005mm
1XD Length of Cut (ℓ)	+0.02/-0mm

L_1 (mm)	L (mm)	PN
2	50	16RB0394U-2
4	50	16RB0394U-4
6	50	16RB0394U-6
8	50	16RB0394U-8
10	50	16RB0394U-10
12	50	16RB0394U-12

0.75r

0.75mm Radius	+/-0.005mm
1.50mm Diameter (D)	+0/-0.0254mm
50mm Overall Length (L)	+0/-0.05mm
4mm Shank Diameter (d)	+0/-0.005mm
1XD Length of Cut (ℓ)	+0.02/-0mm

L_1 (mm)	L (mm)	PN
2	50	16RB0591U-2
4	50	16RB0591U-4
6	50	16RB0591U-6
8	50	16RB0591U-8
10	50	16RB0591U-10
12	50	16RB0591U-12



SOLID CARBIDE 2 FLUTE BALL NOSE END MILLS FOR RIB PROCESSING

16 RB

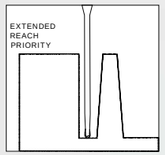
1.00mm, 1.50mm Radius

H13, P20, A-2, D-2, S-7, M-2 upto Rc 62

Ball Radius Tolerance (+/-0.005mm)
Sub Micron Grain Carbide
Single End Construction
AX High Performance Coating
1 X Diameter Length of Cut
Multiple Length to Diameter Aspect Ratios
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · NI/CO · AI



METRIC RADIUS (r)

1.00r

1.00mm Radius	+/-0.005mm
2.00mm Diameter (D)	+0/-0.0254mm
50mm Overall Length (L)	+0/-0.05mm
4mm Shank Diameter (d)	+0/-0.005mm
1XD Length of Cut (ℓ)	+0.02/-0mm

L_1 (mm)	L (mm)	PN
2	50	16RB0787U-2
4	50	16RB0787U-4
6	50	16RB0787U-6
8	50	16RB0787U-8
10	50	16RB0787U-10
12	50	16RB0787U-12

1.50r

1.50mm Radius	+/-0.005mm
3.00mm Diameter (D)	+0/-0.0254mm
60mm Overall Length (L)	+0/-0.05mm
6mm Shank Diameter (d)	+0/-0.005mm
1XD Length of Cut (ℓ)	+0.02/-0mm

L_1 (mm)	L (mm)	PN
2	60	16RB1181U-2
4	60	16RB1181U-4
6	60	16RB1181U-6
8	60	16RB1181U-8
10	60	16RB1181U-10
12	60	16RB1181U-12

SOLID CARBIDE 3 FLUTE CORNER RADIUS HIGH HELIX END MILLS

SERIES 1703

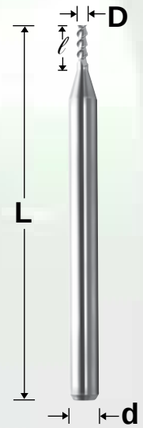
1.00mm - 6.00mm Diameter

Difficult Machining Applications

Diameter Tolerance (+0/-0.0254mm)
50° Helix
Sub Micron Grain Carbide
Corner Radius 10% of Diameter
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC · CU ALLOY · AI · CAST IRON · TI · STAINLESS · STEEL · HI-CSTEEL



STANDARD LENGTH

D (mm)	ℓ (mm)	CR (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
1.00	3	0.10	3	38	1703-0394.118R	1703-0394L118R
1.50	4.5	0.15	3	38	1703-0591.177R	1703-0591L177R
2.00	6	0.20	3	38	1703-0787.236R	1703-0787L236R
2.50	7.5	0.25	3	38	1703-0984.295R	1703-0984L295R
3.00	9	0.30	3	38	1703-1181.354R	1703-1181L354R
3.50	12	0.35	6	50	1703-1378.472R	1703-1378L472R
4.00	12	0.40	5	50	1703-1575.473R	1703-1575L473R
4.50	15	0.45	6	50	1703-1772.591R	1703-1772L591R
5.00	15	0.50	5	50	1703-1968.590R	1703-1968L590R
5.50	18	0.55	6	50	1703-2165.709R	1703-2165L709R
6.00	18	0.60	6	50	1703-2362.709R	1703-2362L709R

SOLID CARBIDE 3 FLUTE SQUARE END MILLS STANDARD LENGTH

SERIES 1710

0.015″ - 0.100″ Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI

STANDARD LENGTH

D (in)	ℓ (in)	PN Uncoated	PN AlTiN
.015	.075	1710-0150.075	1710-0150L075
.020	.100	1710-0200.100	1710-0200L100
.025	.125	1710-0250.125	1710-0250L125
.030	.150	1710-0300.150	1710-0300L150
.035	.175	1710-0350.175	1710-0350L175
.040	.200	1710-0400.200	1710-0400L200
.045	.225	1710-0450.225	1710-0450L225
.050	.300	1710-0500.300	1710-0500L300
.055	.385	1710-0550.385	1710-0550L385
.060	.500	1710-0600.500	1710-0600L500
.065	.500	1710-0650.500	1710-0650L500
.070	.500	1710-0700.500	1710-0700L500
.075	.500	1710-0750.500	1710-0750L500
.080	.750	1710-0800.750	1710-0800L750
.085	.750	1710-0850.750	1710-0850L750
.090	.750	1710-0900.750	1710-0900L750
.095	.750	1710-0950.750	1710-0950L750
.100	.750	1710-1000.750	1710-1000L750

SOLID CARBIDE 3 BALL NOSE END MILLS STANDARD LENGTH

SERIES 1725

0.015″ - 0.100″ Diameter

General Purpose Machining

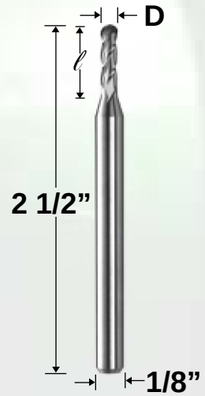
Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI

STANDARD LENGTH

D (in)	ℓ (in)	PN Uncoated	PN AlTiN
.015	.075	1725-0150.075	1725-0150L075
.020	.100	1725-0200.100	1725-0200L100
.025	.125	1725-0250.125	1725-0250L125
.030	.150	1725-0300.150	1725-0300L150
.035	.175	1725-0350.175	1725-0350L175
.040	.200	1725-0400.200	1725-0400L200
.045	.225	1725-0450.225	1725-0450L225
.050	.300	1725-0500.300	1725-0500L300
.055	.385	1725-0550.385	1725-0550L385
.060	.500	1725-0600.500	1725-0600L500
.065	.500	1725-0650.500	1725-0650L500
.070	.500	1725-0700.500	1725-0700L500
.075	.500	1725-0750.500	1725-0750L500
.080	.750	1725-0800.750	1725-0800L750
.085	.750	1725-0850.750	1725-0850L750
.090	.750	1725-0900.750	1725-0900L750
.095	.750	1725-0950.750	1725-0950L750
.100	.750	1725-1000.750	1725-1000L750



SOLID CARBIDE 3 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1740

0.015″ - 0.055″ Diameter

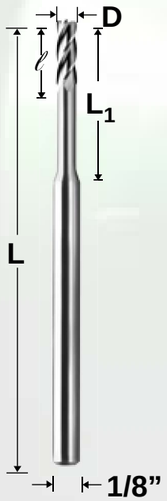
Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI

EXTENDED REACH



D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
.015	.022	.078	2 1/2	1740-0150.078	1740-0150L078
.015	.022	.125	2 1/2	1740-0150.125	1740-0150L125
.015	.075	.150	2 1/2	1740-0150.150	1740-0150L150
.020	.030	.100	2 1/2	1740-0200.100	1740-0200L100
.020	.030	.160	2 1/2	1740-0200.160	1740-0200L160
.020	.100	.200	2 1/2	1740-0200.200	1740-0200L200
.025	.037	.125	2 1/2	1740-0250.125	1740-0250L125
.025	.037	.200	2 1/2	1740-0250.200	1740-0250L200
.025	.125	.250	2 1/2	1740-0250.250	1740-0250L250
.030	.045	.156	2 1/2	1740-0300.156	1740-0300L156
.030	.045	.250	2 1/2	1740-0300.250	1740-0300L250
.030	.150	.300	2 1/2	1740-0300.300	1740-0300L300
.035	.052	.187	2 1/2	1740-0350.187	1740-0350L187
.035	.052	.280	2 1/2	1740-0350.280	1740-0350L280
.035	.175	.350	2 1/2	1740-0350.350	1740-0350L350
.040	.060	.200	2 1/2	1740-0400.200	1740-0400L200
.040	.060	.325	2 1/2	1740-0400.325	1740-0400L325
.040	.200	.400	2 1/2	1740-0400.400	1740-0400L400
.045	.067	.225	2 1/2	1740-0450.225	1740-0450L225
.045	.067	.375	2 1/2	1740-0450.375	1740-0450L375
.045	.225	.450	2 1/2	1740-0450.450	1740-0450L450
.050	.075	.250	2 1/2	1740-0500.250	1740-0500L250
.050	.075	.400	2 1/2	1740-0500.400	1740-0500L400
.050	.300	.600	2 1/2	1740-0500.600	1740-0500L600
.055	.082	.275	2 1/2	1740-0550.275	1740-0550L275
.055	.082	.450	2 1/2	1740-0550.450	1740-0550L450
.055	.385	.770	2 1/2	1740-0550.770	1740-0550L770

END MILLS

SOLID CARBIDE 3 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1740

0.060″ - 0.100″ Diameter

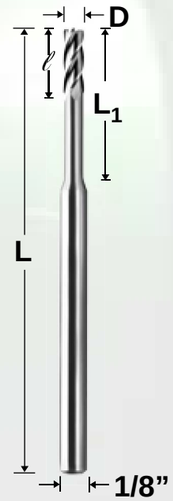
Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI

EXTENDED REACH



D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
.060	.090	.300	2 1/2	1740-0600.300	1740-0600L300
.060	.090	.500	2 1/2	1740-0600.500	1740-0600L500
.060	.500	1.000	2 1/2	1740-0600.1000	1740-0600L1000
.065	.097	.325	2 1/2	1740-0650.325	1740-0650L325
.065	.097	.530	2 1/2	1740-0650.530	1740-0650L530
.065	.500	1.000	2 1/2	1740-0650.1000	1740-0650L1000
.070	.105	.375	2 1/2	1740-0700.375	1740-0700L375
.070	.105	.570	2 1/2	1740-0700.570	1740-0700L570
.070	.500	1.000	2 1/2	1740-0700.1000	1740-0700L1000
.075	.112	.375	2 1/2	1740-0750.375	1740-0750L375
.075	.112	.625	2 1/2	1740-0750.625	1740-0750L625
.075	.500	1.000	2 1/2	1740-0750.1000	1740-0750L1000
.080	.120	.400	2 1/2	1740-0800.400	1740-0800L400
.080	.120	.650	2 1/2	1740-0800.650	1740-0800L650
.080	.750	1.250	2 1/2	1740-0800.1250	1740-0800L1250
.085	.127	.425	2 1/2	1740-0850.425	1740-0850L425
.085	.127	.700	2 1/2	1740-0850.700	1740-0850L700
.085	.750	1.250	2 1/2	1740-0850.1250	1740-0850L1250
.090	.135	.450	2 1/2	1740-0900.450	1740-0900L450
.090	.135	.750	2 1/2	1740-0900.750	1740-0900L750
.090	.750	1.250	2 1/2	1740-0900.1250	1740-0900L1250
.095	.142	.500	2 1/2	1740-0950.500	1740-0950L500
.095	.142	.750	2 1/2	1740-0950.750	1740-0950L750
.095	.750	1.250	2 1/2	1740-0950.1250	1740-0950L1250
.100	.150	.500	2 1/2	1740-1000.500	1740-1000L500
.100	.150	.800	2 1/2	1740-1000.800	1740-1000L800
.100	.750	1.250	2 1/2	1740-1000.1250	1740-1000L1250

SOLID CARBIDE 3 FLUTE BALL NOSE END MILLS EXTENDED REACH

SERIES 1745

0.015″ - 0.100″ Diameter

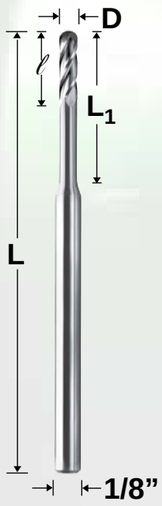
Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC · CU ALLOY · AI · CAST IRON · TI

EXTENDED REACH



D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
.015	.075	.150	2 1/2	1745-0150.150	1745-0150L150
.020	.100	.200	2 1/2	1745-0200.200	1745-0200L200
.025	.125	.250	2 1/2	1745-0250.250	1745-0250L250
.030	.150	.300	2 1/2	1745-0300.300	1745-0300L300
.035	.175	.350	2 1/2	1745-0350.350	1745-0350L350
.040	.200	.400	2 1/2	1745-0400.400	1745-0400L400
.045	.225	.450	2 1/2	1745-0450.450	1745-0450L450
.050	.300	.600	2 1/2	1745-0500.600	1745-0500L600
.055	.385	.770	2 1/2	1745-0550.770	1745-0550L770
.060	.500	1.000	2 1/2	1745-0600.1000	1745-0600L1000
.065	.500	1.000	2 1/2	1745-0650.1000	1745-0650L1000
.070	.500	1.000	2 1/2	1745-0700.1000	1745-0700L1000
.075	.500	1.000	2 1/2	1745-0750.1000	1745-0750L1000
.080	.750	1.250	2 1/2	1745-0800.1250	1745-0800L1250
.085	.750	1.250	2 1/2	1745-0850.1250	1745-0850L1250
.090	.750	1.250	2 1/2	1745-0900.1250	1745-0900L1250
.095	.750	1.250	2 1/2	1745-0950.1250	1745-0950L1250
.100	.750	1.250	2 1/2	1745-1000.1250	1745-1000L1250

SOLID CARBIDE 3 FLUTE SQUARE END MILLS REINFORCED SHANK

TITAN - AX

1/32″ - 1/4″ Diameter

Tough Machining Applications

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Single End Construction
1/4″ Diameter Rigid Shank
AX High Performance Coating

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · CAST IRON · NI/CO · AI

STUB LENGTH

Size	D (in)	ℓ (in)	PN
1/32”	.0312	.063	T0312O063
3/64”	.0469	.094	T0469O094
1/16”	.0625	.140	T0625O140
5/64”	.0781	.140	T0781O140
3/32”	.0938	.188	T0938O188
7/64”	.1094	.188	T1094O188
1/8”	.1250	.250	T1250O250
5/32”	.1562	.375	T1562O375
3/16”	.1875	.375	T1875O375
7/32”	.2188	.375	T2188O375
1/4”	.2500	.500	T2500O500

STANDARD LENGTH

Size	D (in)	ℓ (in)	PN
1/32”	.0312	.094	T0312O094
3/64”	.0469	.141	T0469O141
1/16”	.0625	.188	T0625O188
5/64”	.0781	.234	T0781O234
3/32”	.0938	.375	T0938O375
7/64”	.1094	.438	T1094O438
1/8”	.1250	.500	T1250O500
5/32”	.1562	.563	T1562O563
3/16”	.1875	.625	T1875O625
7/32”	.2188	.625	T2188O625
1/4”	.2500	.750	T2500O750

EXTENDED REACH

Size	D (in)	ℓ (in)	L_1 (in)	PN
1/32”	.0312	.063	.155	T0312O063ER
3/64”	.0469	.094	.230	T0469O094ER
1/16”	.0625	.140	.312	T0625O140ER
5/64”	.0781	.140	.390	T0781O140ER
3/32”	.0938	.188	.465	T0938O188ER
7/64”	.1094	.188	.545	T1094O188ER
1/8”	.1250	.250	.625	T1250O250ER
5/32”	.1562	.375	.781	T1562O375ER
3/16”	.1875	.375	.938	T1875O375ER
7/32”	.2188	.375	1.093	T2188O375ER
1/4”	.2500	.500	1.250	T2500O500ER

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SOLID CARBIDE 3 FLUTE SQUARE END MILLS REINFORCED SHANK

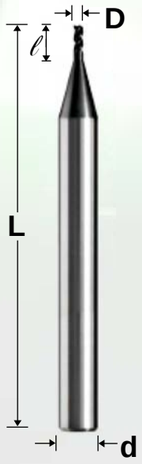
TITAN-AXM — 1.00mm - 8.00mm Diameter

Tough Machining Applications

Sub Micron Grain Carbide
Single End Construction
AX High Performance Coating
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · CAST IRON · NI/CO · AI



STUB LENGTH

D (mm)	d (mm)	ℓ (mm)	L (mm)	PN
1.00	6	1.5	63.5	T0394O059
1.50	6	2.5	63.5	T0591O098
2.00	6	3.0	63.5	T0787O118
2.50	6	4.0	63.5	T0984O157
3.00	6	5.0	63.5	T1181O197
4.00	6	6.0	63.5	T1575O236
5.00	6	8.0	63.5	T1969O315
6.00	6	9.0	63.5	T2362O354
8.00	8	12.0	63.5	T3150O472

STANDARD LENGTH

D (mm)	d (mm)	ℓ (mm)	L (mm)	PN
1.00	6	3.0	63.5	T0394O118
1.50	6	4.5	63.5	T0591O177
2.00	6	6.0	63.5	T0787O236
2.50	6	7.5	63.5	T0984O295
3.00	6	9.0	63.5	T1181O354
4.00	6	12.0	63.5	T1575O472
5.00	6	15.0	63.5	T1969O591
6.00	6	18.0	63.5	T2362O709
8.00	8	24.0	63.5	T3150O945

EXTENDED REACH

D (mm)	d (mm)	ℓ (mm)	L (mm)	L_1 (mm)	PN
1.00	6	3.0	75	10	T0394O118ER
1.50	6	4.5	75	15	T0591O177ER
2.00	6	6.0	75	20	T0787O236ER
2.50	6	7.5	75	25	T0984O295ER
3.00	6	9.0	75	30	T1181O354ER
4.00	6	12.0	75	30	T1575O472ER
5.00	6	15.0	75	40	T1969O591ER
6.00	6	18.0	75	45	T2362O709ER
8.00	8	24.0	100	50	T3150O945ER

SOLID CARBIDE 3 FLUTE CORNER RADIUS END MILLS REINFORCED SHANK

TITAN-AX — 1/32″ - 1/4″ Diameter

Tough Machining Applications

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Single End Construction
1/4″ Diameter Rigid Shank
AX High Performance Coating

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · CAST IRON · NI/CO · AI

STUB LENGTH

Size	D (in)	ℓ (in)	CR (in)	PN
1/32”	.0312	.063	.006	T0312O063CR
3/64”	.0469	.094	.010	T0469O094CR
1/16”	.0625	.140	.010	T0625O140CR
5/64”	.0781	.140	.010	T0781O140CR
3/32”	.0938	.188	.010	T0938O188CR
7/64”	.1094	.188	.010	T1094O188CR
1/8”	.1250	.250	.015	T1250O250CR
5/32”	.1562	.375	.015	T1562O375CR
3/16”	.1875	.375	.015	T1875O375CR
7/32”	.2188	.375	.015	T2188O375CR
1/4”	.2500	.500	.015	T2500O500CR

STANDARD LENGTH

Size	D (in)	ℓ (in)	CR (in)	PN
1/32”	.0312	.094	.006	T0312O094CR
3/64”	.0469	.141	.010	T0469O141CR
1/16”	.0625	.188	.010	T0625O188CR
5/64”	.0781	.234	.010	T0781O234CR
3/32”	.0938	.375	.010	T0938O375CR
7/64”	.1094	.438	.010	T1094O438CR
1/8”	.1250	.500	.015	T1250O500CR
5/32”	.1562	.563	.015	T1562O563CR
3/16”	.1875	.625	.015	T1875O625CR
7/32”	.2188	.625	.015	T2188O625CR
1/4”	.2500	.750	.015	T2500O750CR

SOLID CARBIDE 3 FLUTE CORNER RADIUS END MILLS REINFORCED SHANK

TITAN-AX

1/32″ - 1/4″ Diameter

Tough Machining Applications

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Single End Construction
1/4″ Diameter Rigid Shank
AX High Performance Coating

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · CAST IRON · NI/CO · AI

EXTENDED REACH

Size	D (in)	ℓ (in)	CR (in)	L_1 (in)	PN
1/32”	.0312	.094	.006	.155	T0312O094ERC
3/64”	.0469	.141	.010	.230	T0469O141ERC
1/16”	.0625	.188	.010	.312	T0625O188ERC
5/64”	.0781	.234	.010	.390	T0781O234ERC
3/32”	.0938	.375	.010	.465	T0938O375ERC
7/64”	.1094	.438	.010	.545	T1094O438ERC
1/8”	.1250	.500	.015	.625	T1250O500ERC
5/32”	.1562	.563	.015	.781	T1562O563ERC
3/16”	.1875	.625	.015	.938	T1875O625ERC
7/32”	.2188	.625	.015	1.093	T2188O625ERC
1/4”	.2500	.750	.015	1.250	T2500O750ERC

SOLID CARBIDE 3 FLUTE CORNER RADIUS END MILLS REINFORCED SHANK

TITAN-AXM

1.00mm - 8.00mm Diameter

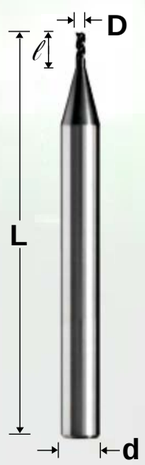
Tough Machining Applications

Sub Micron Grain Carbide
Single End Construction
AX High Performance Coating
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · CAST IRON · NI/CO · AI

STUB LENGTH



D (mm)	d (mm)	ℓ (mm)	L (mm)	CR (mm)	PN
1.00	6	1.5	63.5	0.1	T0394O059CR1
1.00	6	1.5	63.5	0.2	T0394O059CR2
1.00	6	1.5	63.5	0.3	T0394O059CR3
1.50	6	2.5	63.5	0.1	T0591O098CR1
1.50	6	2.5	63.5	0.2	T0591O098CR2
1.50	6	2.5	63.5	0.3	T0591O098CR3
1.50	6	2.5	63.5	0.5	T0591O098CR4
2.00	6	3.0	63.5	0.2	T0787O118CR1
2.00	6	3.0	63.5	0.3	T0787O118CR2
2.00	6	3.0	63.5	0.5	T0787O118CR3
2.50	6	4.0	63.5	0.2	T0984O157CR1
2.50	6	4.0	63.5	0.3	T0984O157CR2
2.50	6	4.0	63.5	0.5	T0984O157CR3
3.00	6	5.0	63.5	0.2	T1181O197CR1
3.00	6	5.0	63.5	0.3	T1181O197CR2
3.00	6	5.0	63.5	0.5	T1181O197CR3
3.00	6	5.0	63.5	1.0	T1181O197CR4
4.00	6	6.0	63.5	0.2	T1575O236CR1
4.00	6	6.0	63.5	0.3	T1575O236CR2
4.00	6	6.0	63.5	0.5	T1575O236CR3
4.00	6	6.0	63.5	1.0	T1575O236CR4
5.00	6	8.0	63.5	0.2	T1969O315CR1
5.00	6	8.0	63.5	0.3	T1969O315CR2
5.00	6	8.0	63.5	0.5	T1969O315CR3
5.00	6	8.0	63.5	1.0	T1969O315CR4
5.00	6	8.0	63.5	1.5	T1969O315CR5
6.00	6	9.0	63.5	0.2	T2362O354CR1
6.00	6	9.0	63.5	0.3	T2362O354CR2
6.00	6	9.0	63.5	0.5	T2362O354CR3
6.00	6	9.0	63.5	1.0	T2362O354CR4
6.00	6	9.0	63.5	1.5	T2362O354CR5
6.00	6	9.0	63.5	2.0	T2362O354CR6
8.00	8	12.0	63.5	0.2	T3150O472CR1
8.00	8	12.0	63.5	0.3	T3150O472CR2
8.00	8	12.0	63.5	0.5	T3150O472CR3
8.00	8	12.0	63.5	1.0	T3150O472CR4
8.00	8	12.0	63.5	1.5	T3150O472CR5
8.00	8	12.0	63.5	2.0	T3150O472CR6

SOLID CARBIDE 3 FLUTE CORNER RADIUS END MILLS REINFORCED SHANK

TITAN-AXM

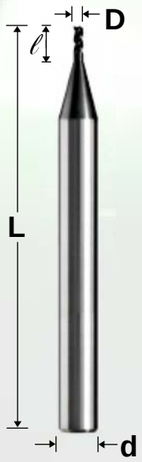
1.00mm - 8.00mm Diameter

Tough Machining Applications

Sub Micron Grain Carbide
Single End Construction
AX High Performance Coating
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | STAINLESS | CU ALLOY | AL | TI | NI/CO | CAST IRON | STEEL | HI-CSTEEL



STANDARD LENGTH

D (mm)	d (mm)	ℓ (mm)	L (mm)	CR (mm)	PN
1.00	6	3.0	63.5	0.1	T0394O118CR1
1.00	6	3.0	63.5	0.2	T0394O118CR2
1.00	6	3.0	63.5	0.3	T0394O118CR3
1.50	6	4.5	63.5	0.1	T0591O177CR1
1.50	6	4.5	63.5	0.2	T0591O177CR2
1.50	6	4.5	63.5	0.3	T0591O177CR3
1.50	6	4.5	63.5	0.5	T0591O177CR4
2.00	6	6.0	63.5	0.2	T0787O236CR1
2.00	6	6.0	63.5	0.3	T0787O236CR2
2.00	6	6.0	63.5	0.5	T0787O236CR3
2.50	6	7.5	63.5	0.2	T0984O295CR1
2.50	6	7.5	63.5	0.3	T0984O295CR2
2.50	6	7.5	63.5	0.5	T0984O295CR3
3.00	6	9.0	63.5	0.2	T1181O354CR1
3.00	6	9.0	63.5	0.3	T1181O354CR2
3.00	6	9.0	63.5	0.5	T1181O354CR3
3.00	6	9.0	63.5	1.0	T1181O354CR4
4.00	6	12.0	63.5	0.2	T1575O472CR1
4.00	6	12.0	63.5	0.3	T1575O472CR2
4.00	6	12.0	63.5	0.5	T1575O472CR3
4.00	6	12.0	63.5	1.0	T1575O472CR4
5.00	6	15.0	63.5	0.2	T1969O591CR1
5.00	6	15.0	63.5	0.3	T1969O591CR2
5.00	6	15.0	63.5	0.5	T1969O591CR3
5.00	6	15.0	63.5	1.0	T1969O591CR4
5.00	6	15.0	63.5	1.5	T1969O591CR5
6.00	6	18.0	63.5	0.2	T2362O709CR1
6.00	6	18.0	63.5	0.3	T2362O709CR2
6.00	6	18.0	63.5	0.5	T2362O709CR3
6.00	6	18.0	63.5	1.0	T2362O709CR4
6.00	6	18.0	63.5	1.5	T2362O709CR5
6.00	6	18.0	63.5	2.0	T2362O709CR6
8.00	8	24.0	63.5	0.2	T3150O945CR1
8.00	8	24.0	63.5	0.3	T3150O945CR2
8.00	8	24.0	63.5	0.5	T3150O945CR3
8.00	8	24.0	63.5	1.0	T3150O945CR4
8.00	8	24.0	63.5	1.5	T3150O945CR5
8.00	8	24.0	63.5	2.0	T3150O945CR6

METRIC
END MILLS

SOLID CARBIDE 3 FLUTE CORNER RADIUS END MILLS REINFORCED SHANK

TITAN-AXM

1.00mm - 8.00mm Diameter

Tough Machining Applications

Sub Micron Grain Carbide
Single End Construction
AX High Performance Coating
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | CAST IRON | NI/CO | AL

EXTENDED REACH

D (mm)	d (mm)	ℓ (mm)	L (mm)	L_1 (mm)	CR (mm)	PN
1.00	6	3.0	75	10	0.1	T0394O118ECR1
1.00	6	3.0	75	10	0.2	T0394O118ECR2
1.00	6	3.0	75	10	0.3	T0394O118ECR3
1.50	6	4.5	75	15	0.1	T0591O177ECR1
1.50	6	4.5	75	15	0.2	T0591O177ECR2
1.50	6	4.5	75	15	0.3	T0591O177ECR3
1.50	6	4.5	75	15	0.5	T0591O177ECR4
2.00	6	6.0	75	20	0.2	T0787O236ECR1
2.00	6	6.0	75	20	0.3	T0787O236ECR2
2.00	6	6.0	75	20	0.5	T0787O236ECR3
2.50	6	7.5	75	25	0.2	T0984O295ECR1
2.50	6	7.5	75	25	0.3	T0984O295ECR2
2.50	6	7.5	75	25	0.5	T0984O295ECR3
3.00	6	9.0	75	30	0.2	T1181O354ECR1
3.00	6	9.0	75	30	0.3	T1181O354ECR2
3.00	6	9.0	75	30	0.5	T1181O354ECR3
3.00	6	9.0	75	30	1.0	T1181O354ECR4
4.00	6	12.0	75	30	0.2	T1575O472ECR1
4.00	6	12.0	75	30	0.3	T1575O472ECR2
4.00	6	12.0	75	30	0.5	T1575O472ECR3
4.00	6	12.0	75	30	1.0	T1575O472ECR4
5.00	6	15.0	75	40	0.2	T1969O591ECR1
5.00	6	15.0	75	40	0.3	T1969O591ECR2
5.00	6	15.0	75	40	0.5	T1969O591ECR3
5.00	6	15.0	75	40	1.0	T1969O591ECR4
5.00	6	15.0	75	40	1.5	T1969O591ECR5
6.00	6	18.0	75	45	0.2	T2362O709ECR1
6.00	6	18.0	75	45	0.3	T2362O709ECR2
6.00	6	18.0	75	45	0.5	T2362O709ECR3
6.00	6	18.0	75	45	1.0	T2362O709ECR4
6.00	6	18.0	75	45	1.5	T2362O709ECR5
6.00	6	18.0	75	45	2.0	T2362O709ECR6
8.00	8	24.0	100	50	0.2	T3150O945ECR1
8.00	8	24.0	100	50	0.3	T3150O945ECR2
8.00	8	24.0	100	50	0.5	T3150O945ECR3
8.00	8	24.0	100	50	1.0	T3150O945ECR4
8.00	8	24.0	100	50	1.5	T3150O945ECR5
8.00	8	24.0	100	50	2.0	T3150O945ECR6

SOLID CARBIDE 4 FLUTE CORNER RADIUS HIGH HELIX END MILLS

SERIES 1804

1.00mm - 6.00mm Diameter

Difficult Machining Applications

Diameter Tolerance (+0/-0.0254mm)
50˚ Helix
Sub Micron Grain Carbide
Corner Radius 10% of Diameter
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON | STAINLESS | STEEL | HI-C STEEL

STANDARD LENGTH

D (mm)	ℓ (mm)	CR (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
1.00	3	0.10	3	38	1804-0394.118R	1804-0394L118R
1.50	4.5	0.15	3	38	1804-0591.177R	1804-0591L177R
2.00	6	0.20	3	38	1804-0787.236R	1804-0787L236R
2.50	7.5	0.25	3	38	1804-0984.295R	1804-0984L295R
3.00	9	0.30	3	38	1804-1181.354R	1804-1181L354R
3.50	12	0.35	6	50	1804-1378.473R	1804-1378L473R
4.00	12	0.40	5	50	1804-1575.473R	1804-1575L473R
4.50	15	0.45	6	50	1804-1772.590R	1804-1772L590R
5.00	15	0.50	5	50	1804-1968.590R	1804-1968L590R
5.50	18	0.55	6	50	1804-2165.709R	1804-2165L709R
6.00	18	0.60	6	50	1804-2362.709R	1804-2362L709R

SOLID CARBIDE 4 FLUTE SQUARE END MILLS STANDARD LENGTH

SERIES 1810

1/64" - 1/4" Diameter

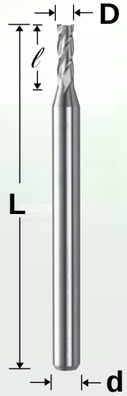
General Purpose Machining

Diameter Tolerance (+0/-0.001")
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON | STAINLESS | STEEL | HI-C STEEL

STANDARD LENGTH



D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	1/8	1 1/2	1810-0156.047	1810-0156L047
1/32	.094	1/8	1 1/2	1810-0312.094	1810-0312L094
3/64	.141	1/8	1 1/2	1810-0469.141	1810-0469L141
1/16	.188	1/8	1 1/2	1810-0625.188	1810-0625L188
5/64	.234	1/8	1 1/2	1810-0781.234	1810-0781L234
3/32	.281	1/8	1 1/2	1810-0938.281	1810-0938L281
7/64	.328	1/8	1 1/2	1810-1094.328	1810-1094L328
1/8	.375	1/8	1 1/2	1810-1250.375	1810-1250L375
9/64	.500	3/16	2	1810-1406.500	1810-1406L500
5/32	.500	3/16	2	1810-1563.500	1810-1563L500
11/64	.563	3/16	2	1810-1719.563	1810-1719L563
3/16	.563	3/16	2	1810-1875.563	1810-1875L563
13/64	.625	1/4	2 1/2	1810-2031.625	1810-2031L625
7/32	.625	1/4	2 1/2	1810-2188.625	1810-2188L625
15/64	.750	1/4	2 1/2	1810-2344.750	1810-2344L750
1/4	.750	1/4	2 1/2	1810-2500.750	1810-2500L750

SOLID CARBIDE 4 FLUTE SQUARE END MILLS STANDARD LENGTH

SERIES 1810

0.005″ - 0.100″ Diameter

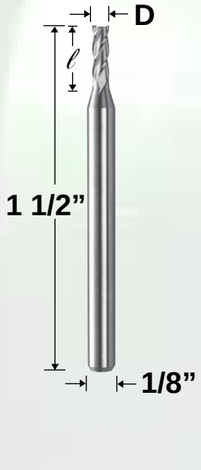
General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CUALLOY | Al | TI | CAST IRON | STAINLESS | STEEL | HI-CSTEEL

STANDARD LENGTH



D (in)	ℓ (in)	PN Uncoated	PN AlTiN
.005	.015	1810-0050.015	1810-0050L015
.010	.030	1810-0100.030	1810-0100L030
.015	.045	1810-0150.045	1810-0150L045
.020	.060	1810-0200.060	1810-0200L060
.025	.075	1810-0250.075	1810-0250L075
.030	.090	1810-0300.090	1810-0300L090
.035	.105	1810-0350.105	1810-0350L105
.040	.120	1810-0400.120	1810-0400L120
.045	.135	1810-0450.135	1810-0450L135
.050	.150	1810-0500.150	1810-0500L150
.055	.165	1810-0550.165	1810-0550L165
.060	.180	1810-0600.180	1810-0600L180
.065	.195	1810-0650.195	1810-0650L195
.070	.210	1810-0700.210	1810-0700L210
.075	.225	1810-0750.225	1810-0750L225
.080	.240	1810-0800.240	1810-0800L240
.085	.255	1810-0850.255	1810-0850L255
.090	.270	1810-0900.270	1810-0900L270
.095	.285	1810-0950.285	1810-0950L285
.100	.300	1810-1000.300	1810-1000L300

SOLID CARBIDE 4 FLUTE SQUARE END MILLS STANDARD LENGTH

SERIES 1810

0.10mm - 6.00mm Diameter

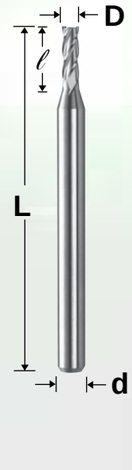
General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CUALLOY | Al | CAST IRON | TI | STAINLESS | STEEL | HI-CSTEEL

STANDARD LENGTH



D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.10	0.30	3	38	1810-0039.012	1810-0039L012
0.15	0.45	3	38	1810-0059.018	1810-0059L018
0.20	0.60	3	38	1810-0079.024	1810-0079L024
0.25	0.75	3	38	1810-0098.029	1810-0098L029
0.30	0.90	3	38	1810-0118.035	1810-0118L035
0.35	1.05	3	38	1810-0138.041	1810-0138L041
0.40	1.20	3	38	1810-0157.047	1810-0157L047
0.45	1.35	3	38	1810-0177.053	1810-0177L053
0.50	1.50	3	38	1810-0197.059	1810-0197L059
0.60	1.80	3	38	1810-0236.071	1810-0236L071
0.70	2.10	3	38	1810-0276.083	1810-0276L083
0.80	2.40	3	38	1810-0315.095	1810-0315L095
0.90	2.70	3	38	1810-0354.106	1810-0354L106
1.00	3.00	3	38	1810-0394.118	1810-0394L118
1.10	3.30	3	38	1810-0433.130	1810-0433L130
1.20	3.60	3	38	1810-0472.142	1810-0472L142
1.30	3.90	3	38	1810-0512.154	1810-0512L154
1.40	4.20	3	38	1810-0551.165	1810-0551L165
1.50	4.50	3	38	1810-0591.177	1810-0591L177
1.60	4.80	3	38	1810-0630.189	1810-0630L189
1.70	5.10	3	38	1810-0669.200	1810-0669L200
1.80	5.40	3	38	1810-0709.213	1810-0709L213
1.90	5.70	3	38	1810-0748.224	1810-0748L224
2.00	6.00	3	38	1810-0787.236	1810-0787L236
2.50	7.50	3	38	1810-0984.295	1810-0984L295
2.80	9.00	3	38	1810-1102.354	1810-1102L354
3.00	9.00	3	38	1810-1181.354	1810-1181L354
3.50	10.50	4	50	1810-1378.413	1810-1378L413
3.80	12.00	5	50	1810-1496.473	1810-1496L473
4.00	12.00	5	50	1810-1575.473	1810-1575L473
4.50	13.50	5	50	1810-1772.532	1810-1772L532
4.80	15.00	5	50	1810-1890.590	1810-1890L590
5.00	15.00	5	50	1810-1968.590	1810-1968L590
5.50	16.50	6	50	1810-2165.650	1810-2165L650
5.80	18.00	6	50	1810-2283.709	1810-2283L709
6.00	18.00	6	50	1810-2362.709	1810-2362L709

SOLID CARBIDE 4 FLUTE SQUARE END MILLS SMALL CORNER RADIUS

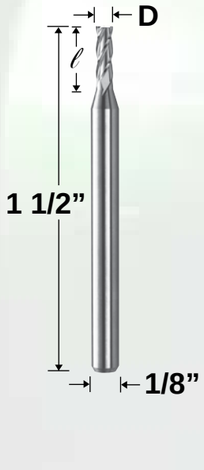
SERIES 1812 0.015″ - 0.100″ Diameter

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Small Corner Radius
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CUALLOY | Al | CAST IRON | TI

STANDARD LENGTH



D (in)	ℓ (in)	CR (in)	PN Uncoated	PN AlTiN
.015	.045	.003	1812-0150.045CR	1812-0150L045CR
.020	.060	.005	1812-0200.060CR	1812-0200L060CR
.025	.075	.005	1812-0250.075CR	1812-0250L075CR
.030	.090	.005	1812-0300.090CR	1812-0300L090CR
.035	.105	.005	1812-0350.105CR	1812-0350L105CR
.040	.120	.005	1812-0400.120CR	1812-0400L120CR
.045	.135	.005	1812-0450.135CR	1812-0450L135CR
.050	.150	.010	1812-0500.150CR	1812-0500L150CR
.060	.180	.010	1812-0600.180CR	1812-0600L180CR
.070	.210	.010	1812-0700.210CR	1812-0700L210CR
.080	.240	.010	1812-0800.240CR	1812-0800L240CR
.090	.270	.010	1812-0900.270CR	1812-0900L270CR
.100	.300	.010	1812-1000.300CR	1812-1000L300CR

SOLID CARBIDE 4 FLUTE SQUARE END MILLS STANDARD CORNER RADIUS

SERIES 1813 0.040″ - 0.100″ Diameter

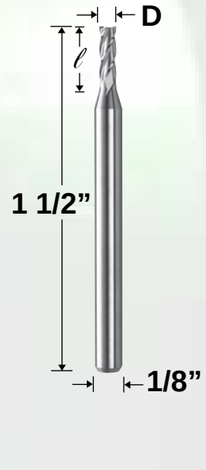
Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Standard Corner Radius
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CUALLOY | Al | CAST IRON | TI

STANDARD LENGTH

D (in)	ℓ (in)	CR (in)	PN Uncoated	PN AlTiN
.040	.120	.010	1813-0400.120CR	1813-0400L120CR
.045	.135	.010	1813-0450.135CR	1813-0450L135CR
.050	.150	.015	1813-0500.150CR	1813-0500L150CR
.060	.180	.015	1813-0600.180CR	1813-0600L180CR
.070	.210	.015	1813-0700.210CR	1813-0700L210CR
.080	.240	.015	1813-0800.240CR	1813-0800L240CR
.090	.270	.015	1813-0900.270CR	1813-0900L270CR
.100	.300	.015	1813-1000.300CR	1813-1000L300CR



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SOLID CARBIDE 4 FLUTE SQUARE END MILLS STUB LENGTH

SERIES 1820

1/32" - 1/4" Diameter

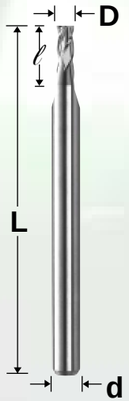
General Purpose Machining

Diameter Tolerance (+0/-0.001")
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI | STAINLESS | STEEL | HI-C STEEL

STUB LENGTH



D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/32	.047	1/8	1 1/2	1820-0312.047	1820-0312L047
3/64	.070	1/8	1 1/2	1820-0469.070	1820-0469L070
1/16	.094	1/8	1 1/2	1820-0625.094	1820-0625L094
5/64	.125	1/8	1 1/2	1820-0781.125	1820-0781L125
3/32	.141	1/8	1 1/2	1820-0938.141	1820-0938L141
7/64	.172	1/8	1 1/2	1820-1094.172	1820-1094L172
1/8	.188	1/8	1 1/2	1820-1250.188	1820-1250L188
9/64	.313	3/16	2	1820-1406.313	1820-1406L313
5/32	.234	3/16	2	1820-1563.234	1820-1563L234
11/64	.375	3/16	2	1820-1719.375	1820-1719L375
3/16	.375	3/16	2	1820-1875.375	1820-1875L375
13/64	.438	1/4	2 1/2	1820-2031.438	1820-2031L438
7/32	.438	1/4	2 1/2	1820-2188.438	1820-2188L438
15/64	.500	1/4	2 1/2	1820-2344.500	1820-2344L500
1/4	.500	1/4	2 1/2	1820-2500.500	1820-2500L500

SOLID CARBIDE 4 FLUTE SQUARE END MILLS STUB LENGTH

SERIES 1820

0.10mm - 6.00mm Diameter

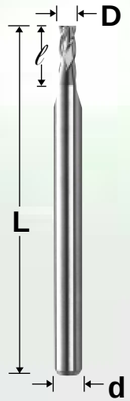
General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI

STUB LENGTH



D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.10	0.15	3	38	1820-0039.006	1820-0039L006
0.15	0.23	3	38	1820-0059.009	1820-0059L009
0.20	0.30	3	38	1820-0079.012	1820-0079L012
0.25	0.38	3	38	1820-0098.015	1820-0098L015
0.30	0.45	3	38	1820-0118.018	1820-0118L018
0.35	0.53	3	38	1820-0138.021	1820-0138L021
0.40	0.60	3	38	1820-0157.024	1820-0157L024
0.45	0.68	3	38	1820-0177.027	1820-0177L027
0.50	0.75	3	38	1820-0197.030	1820-0197L030
0.60	0.90	3	38	1820-0236.035	1820-0236L035
0.70	1.05	3	38	1820-0276.041	1820-0276L041
0.80	1.20	3	38	1820-0315.047	1820-0315L047
0.90	1.35	3	38	1820-0354.053	1820-0354L053
1.00	1.50	3	38	1820-0394.059	1820-0394L059
1.10	1.50	3	38	1820-0433.059	1820-0433L059
1.20	1.50	3	38	1820-0472.059	1820-0472L059
1.30	2.25	3	38	1820-0512.089	1820-0512L089
1.40	2.25	3	38	1820-0551.089	1820-0551L089
1.50	2.25	3	38	1820-0591.089	1820-0591L089
1.60	2.25	3	38	1820-0630.089	1820-0630L089
1.70	2.25	3	38	1820-0669.089	1820-0669L089
1.80	3.00	3	38	1820-0709.118	1820-0709L118
1.90	3.00	3	38	1820-0748.118	1820-0748L118
2.00	3.00	3	38	1820-0787.118	1820-0787L118
2.50	3.75	3	38	1820-0984.148	1820-0984L148
2.80	4.50	3	38	1820-1102.177	1820-1102L177
3.00	4.50	3	38	1820-1181.177	1820-1181L177
3.50	5.25	4	50	1820-1378.207	1820-1378L207
3.80	6.00	5	50	1820-1496.236	1820-1496L236
4.00	6.00	5	50	1820-1575.236	1820-1575L236
4.50	6.75	5	50	1820-1772.266	1820-1772L266
4.80	7.50	5	50	1820-1890.295	1820-1890L295
5.00	7.50	5	50	1820-1968.295	1820-1968L295
5.50	8.25	6	50	1820-2165.325	1820-2165L325
5.80	9.00	6	50	1820-2283.354	1820-2283L354
6.00	9.00	6	50	1820-2362.354	1820-2362L354

SOLID CARBIDE 4 FLUTE BALL NOSE END MILLS STANDARD LENGTH

SERIES 1825

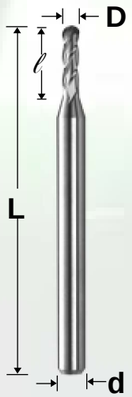
1/64″ - 1/4″ Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CUALLOY | Al | CAST IRON | TI



STANDARD LENGTH

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	1/8	1 1/2	1825-0156.047	1825-0156L047
1/32	.094	1/8	1 1/2	1825-0312.094	1825-0312L094
3/64	.141	1/8	1 1/2	1825-0469.141	1825-0469L141
1/16	.188	1/8	1 1/2	1825-0625.188	1825-0625L188
5/64	.234	1/8	1 1/2	1825-0781.234	1825-0781L234
3/32	.281	1/8	1 1/2	1825-0938.281	1825-0938L281
7/64	.328	1/8	1 1/2	1825-1094.328	1825-1094L328
1/8	.375	1/8	1 1/2	1825-1250.375	1825-1250L375
9/64	.500	3/16	2	1825-1406.500	1825-1406L500
5/32	.500	3/16	2	1825-1563.500	1825-1563L500
11/64	.563	3/16	2	1825-1719.563	1825-1719L563
3/16	.563	3/16	2	1825-1875.563	1825-1875L563
13/64	.625	1/4	2 1/2	1825-2031.625	1825-2031L625
7/32	.625	1/4	2 1/2	1825-2188.625	1825-2188L625
15/64	.750	1/4	2 1/2	1825-2344.750	1825-2344L750
1/4	.750	1/4	2 1/2	1825-2500.750	1825-2500L750

SOLID CARBIDE 4 FLUTE BALL NOSE END MILLS STANDARD LENGTH

SERIES 1825

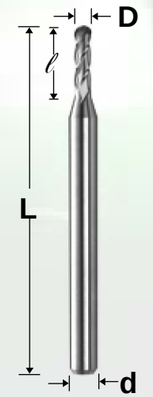
0.40mm - 6.00mm Diameter

General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CUALLOY | Al | TI | CAST IRON | STAINLESS



STANDARD LENGTH

D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.40	1.20	3	38	1825-0157.047	1825-0157L047
0.45	1.35	3	38	1825-0177.053	1825-0177L053
0.50	1.50	3	38	1825-0197.059	1825-0197L059
0.60	1.80	3	38	1825-0236.071	1825-0236L071
0.70	2.10	3	38	1825-0276.083	1825-0276L083
0.80	2.40	3	38	1825-0315.095	1825-0315L095
0.90	2.70	3	38	1825-0354.106	1825-0354L106
1.00	3.00	3	38	1825-0394.118	1825-0394L118
1.10	3.30	3	38	1825-0433.130	1825-0433L130
1.20	3.60	3	38	1825-0472.142	1825-0472L142
1.30	3.90	3	38	1825-0512.154	1825-0512L154
1.40	4.20	3	38	1825-0551.165	1825-0551L165
1.50	4.50	3	38	1825-0591.177	1825-0591L177
1.60	4.80	3	38	1825-0630.189	1825-0630L189
1.70	5.10	3	38	1825-0669.200	1825-0669L200
1.80	5.40	3	38	1825-0709.213	1825-0709L213
1.90	5.70	3	38	1825-0748.224	1825-0748L224
2.00	6.00	3	38	1825-0787.236	1825-0787L236
2.50	7.50	3	38	1825-0984.295	1825-0984L295
3.00	9.00	3	38	1825-1181.354	1825-1181L354
3.50	10.50	4	50	1825-1378.413	1825-1378L413
4.00	12.00	5	50	1825-1575.473	1825-1575L473
4.50	13.50	5	50	1825-1772.532	1825-1772L532
5.00	15.00	5	50	1825-1968.590	1825-1968L590
5.50	16.50	6	50	1825-2165.650	1825-2165L650
6.00	18.00	6	50	1825-2362.709	1825-2362L709

SOLID CARBIDE 4 FLUTE BALL NOSE END MILLS STUB LENGTH

SERIES 1835

1/64" - 1/4" Diameter

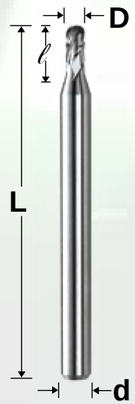
General Purpose Machining

Diameter Tolerance (+0/-0.001")
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC · CU ALLOY · AI · CAST IRON · TI · STAINLESS · STEEL · HI-C STEEL

STUB LENGTH



D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.023	1/8	1 1/2	1835-0156.023	1835-0156L023
1/32	.047	1/8	1 1/2	1835-0312.047	1835-0312L047
3/64	.070	1/8	1 1/2	1835-0469.070	1835-0469L070
1/16	.094	1/8	1 1/2	1835-0625.094	1835-0625L094
5/64	.117	1/8	1 1/2	1835-0781.117	1835-0781L117
3/32	.141	1/8	1 1/2	1835-0938.141	1835-0938L141
7/64	.164	1/8	1 1/2	1835-1094.164	1835-1094L164
1/8	.188	1/8	1 1/2	1835-1250.188	1835-1250L188
9/64	.211	3/16	2	1835-1406.211	1835-1406L211
5/32	.234	3/16	2	1835-1563.234	1835-1563L234
11/64	.258	3/16	2	1835-1719.258	1835-1719L258
3/16	.281	3/16	2	1835-1875.281	1835-1875L281
13/64	.305	1/4	2 1/2	1835-2031.305	1835-2031L305
7/32	.328	1/4	2 1/2	1835-2188.328	1835-2188L328
15/64	.352	1/4	2 1/2	1835-2344.352	1835-2344L352
1/4	.375	1/4	2 1/2	1835-2500.375	1835-2500L375

SOLID CARBIDE 4 FLUTE BALL NOSE END MILLS STUB LENGTH

SERIES 1835

0.40mm - 6.00mm Diameter

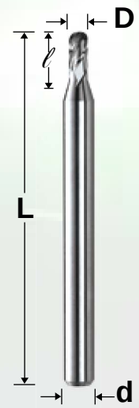
General Purpose Machining

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC · CU ALLOY · AI · CAST IRON · TI · STAINLESS · STEEL · HI-C STEEL

STUB LENGTH



D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.40	0.60	3	38	1835-0157.024	1835-0157L024
0.45	0.68	3	38	1835-0177.027	1835-0177L027
0.50	0.75	3	38	1835-0197.030	1835-0197L030
0.60	0.90	3	38	1835-0236.035	1835-0236L035
0.70	1.05	3	38	1835-0276.041	1835-0276L041
0.80	1.20	3	38	1835-0315.047	1835-0315L047
0.90	1.35	3	38	1835-0354.053	1835-0354L053
1.00	1.50	3	38	1835-0394.059	1835-0394L059
1.50	2.25	3	38	1835-0591.089	1835-0591L089
2.00	3.00	3	38	1835-0787.118	1835-0787L118
2.50	3.75	3	38	1835-0984.148	1835-0984L148
3.00	4.50	3	38	1835-1181.177	1835-1181L177
3.50	5.25	4	50	1835-1378.207	1835-1378L207
4.00	6.00	5	50	1835-1575.236	1835-1575L236
4.50	6.75	5	50	1835-1772.266	1835-1772L266
5.00	7.50	5	50	1835-1968.295	1835-1968L295
5.50	8.25	6	50	1835-2165.325	1835-2165L325
6.00	9.00	6	50	1835-2362.354	1835-2362L354

SOLID CARBIDE 4 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1840

1/64″ - 1/8″ Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON

EXTENDED REACH

D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	.120	1 1/2	1840-0156.120	1840-0156L120
1/32	.094	.315	1 1/2	1840-0312.315	1840-0312L315
3/64	.141	.390	1 1/2	1840-0469.390	1840-0469L390
1/16	.188	.590	2	1840-0625.590	1840-0625L590
5/64	.234	.590	2	1840-0781.590	1840-0781L590
3/32	.281	.590	2	1840-0938.590	1840-0938L590
7/64	.328	.590	2	1840-1094.590	1840-1094L590
1/8	.375	.590	2	1840-1250.590	1840-1250L590

END MILLS

SOLID CARBIDE 4 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1840

0.010″ - 0.110″ Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | AI | TI | CAST IRON | STAINLESS

EXTENDED REACH

D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
.010	.030	.100	1 1/2	1840-0100.100	1840-0100L100
.015	.045	.150	1 1/2	1840-0150.150	1840-0150L150
.015	.045	.128	1 1/2	1840-0150.128	1840-0150L128
.020	.060	.200	1 1/2	1840-0200.200	1840-0200L200
.020	.060	.170	1 1/2	1840-0200.170	1840-0200L170
.025	.075	.213	1 1/2	1840-0250.213	1840-0250L213
.025	.075	.250	1 1/2	1840-0250.250	1840-0250L250
.030	.090	.270	1 1/2	1840-0300.270	1840-0300L270
.030	.090	.300	1 1/2	1840-0300.300	1840-0300L300
.035	.105	.315	1 1/2	1840-0350.315	1840-0350L315
.035	.105	.350	1 1/2	1840-0350.350	1840-0350L350
.040	.120	.360	1 1/2	1840-0400.360	1840-0400L360
.040	.120	.400	1 1/2	1840-0400.400	1840-0400L400
.045	.135	.405	1 1/2	1840-0450.405	1840-0450L405
.045	.135	.450	1 1/2	1840-0450.450	1840-0450L450
.050	.150	.500	1 1/2	1840-0500.500	1840-0500L500
.055	.165	.500	1 1/2	1840-0550.500	1840-0550L500
.060	.180	.500	1 1/2	1840-0600.500	1840-0600L500
.060	.180	.600	2	1840-0600.600	1840-0600L600
.065	.195	.500	1 1/2	1840-0650.500	1840-0650L500
.065	.195	.600	2	1840-0650.600	1840-0650L600
.070	.210	.500	1 1/2	1840-0700.500	1840-0700L500
.070	.210	.700	2	1840-0700.700	1840-0700L700
.075	.225	.500	1 1/2	1840-0750.500	1840-0750L500
.075	.225	.700	2	1840-0750.700	1840-0750L700
.080	.240	.500	1 1/2	1840-0800.500	1840-0800L500
.080	.240	.750	2	1840-0800.750	1840-0800L750
.085	.255	.500	1 1/2	1840-0850.500	1840-0850L500
.085	.255	.750	2	1840-0850.750	1840-0850L750
.090	.270	.625	1 1/2	1840-0900.625	1840-0900L625
.090	.270	.750	2	1840-0900.750	1840-0900L750
.095	.285	.625	1 1/2	1840-0950.625	1840-0950L625
.095	.285	.750	2	1840-0950.750	1840-0950L750
.100	.300	.625	1 1/2	1840-1000.625	1840-1000L625
.100	.300	.750	2	1840-1000.750	1840-1000L750
.110	.330	.750	2	1840-1100.750	1840-1100L750

* Custom L_1 Lengths Available Upon Request

SOLID CARBIDE 4 FLUTE SQUARE END MILLS EXTENDED REACH

SERIES 1840

0.40mm - 6.00mm Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON

EXTENDED REACH

D (mm)	ℓ (mm)	L_1 (mm)	L (mm)	d (mm)	PN Uncoated	PN AlTiN
0.40	1.20	3	38	3	1840-0157.118	1840-0157L118
0.50	1.50	4	38	3	1840-0197.157	1840-0197L157
0.60	1.80	5	38	3	1840-0236.197	1840-0236L197
0.65	1.95	6	38	3	1840-0256.236	1840-0256L236
0.70	2.10	7	38	3	1840-0276.276	1840-0276L276
0.75	2.25	8	38	3	1840-0295.315	1840-0295L315
0.80	2.40	9	50	3	1840-0315.354	1840-0315L354
0.90	2.70	10	50	3	1840-0354.394	1840-0354L394
1.00	3.00	10	50	3	1840-0394.394	1840-0394L394
1.50	4.50	15	50	3	1840-0591.591	1840-0591L591
2.00	6.00	20	50	3	1840-0787.787	1840-0787L787
2.50	7.50	23	50	3	1840-0984.906	1840-0984L906
3.00	9.00	23	50	3	1840-1181.906	1840-1181L906
3.50	10.5	25	75	6	1840-1378.984	1840-1378L984
4.00	12.0	25	75	6	1840-1575.984	1840-1575L984
4.50	13.5	30	75	6	1840-1772.1181	1840-1772L1181
5.00	15.0	30	75	6	1840-1968.1181	1840-1968L1181
5.50	16.5	30	75	6	1840-2165.1181	1840-2165L1181
6.00	18.0	30	75	6	1840-2362.1181	1840-2362L1181

SOLID CARBIDE 4 FLUTE BALL NOSE END MILLS EXTENDED REACH

SERIES 1845

1/64″ - 1/8″ Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | CAST IRON

EXTENDED REACH

D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
1/64	.047	.120	1 1/2	1845-0156.120	1845-0156L120
1/32	.094	.315	1 1/2	1845-0312.315	1845-0312L315
3/64	.141	.390	1 1/2	1845-0469.390	1845-0469L390
1/16	.188	.590	2	1845-0625.590	1845-0625L590
5/64	.234	.590	2	1845-0781.590	1845-0781L590
3/32	.281	.590	2	1845-0938.590	1845-0938L590
7/64	.328	.590	2	1845-1094.590	1845-1094L590
1/8	.375	.590	2	1845-1250.590	1845-1250L590

SOLID CARBIDE 4 FLUTE BALL NOSE END MILLS EXTENDED REACH

SERIES 1845

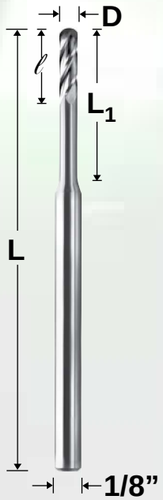
0.010″ - 0.110″ Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.001″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI | STAINLESS



EXTENDED REACH

D (in)	ℓ (in)	L_1 (in)	L (in)	PN Uncoated	PN AlTiN
.010	.030	.100	1 1/2	1845-0100.100	1845-0100L100
.015	.045	.150	1 1/2	1845-0150.150	1845-0150L150
.015	.045	.128	1 1/2	1845-0150.128	1845-0150L128
.020	.060	.200	1 1/2	1845-0200.200	1845-0200L200
.020	.060	.170	1 1/2	1845-0200.170	1845-0200L170
.025	.075	.250	1 1/2	1845-0250.250	1845-0250L250
.025	.075	.213	1 1/2	1845-0250.213	1845-0250L213
.030	.090	.270	1 1/2	1845-0300.270	1845-0300L270
.030	.090	.300	1 1/2	1845-0300.300	1845-0300L300
.035	.105	.315	1 1/2	1845-0350.315	1845-0350L315
.035	.105	.350	1 1/2	1845-0350.350	1845-0350L350
.040	.120	.360	1 1/2	1845-0400.360	1845-0400L360
.040	.120	.400	1 1/2	1845-0400.400	1845-0400L400
.045	.135	.405	1 1/2	1845-0450.405	1845-0450L405
.045	.135	.450	1 1/2	1845-0450.450	1845-0450L450
.050	.150	.500	1 1/2	1845-0500.500	1845-0500L500
.055	.165	.500	1 1/2	1845-0550.500	1845-0550L500
.060	.180	.500	1 1/2	1845-0600.500	1845-0600L500
.060	.180	.600	2	1845-0600.600	1845-0600L600
.065	.195	.500	1 1/2	1845-0650.500	1845-0650L500
.065	.195	.600	2	1845-0650.600	1845-0650L600
.070	.210	.500	1 1/2	1845-0700.500	1845-0700L500
.070	.210	.700	2	1845-0700.700	1845-0700L700
.075	.225	.500	1 1/2	1845-0750.500	1845-0750L500
.075	.225	.700	2	1845-0750.700	1845-0750L700
.080	.240	.500	1 1/2	1845-0800.500	1845-0800L500
.080	.240	.750	2	1845-0800.750	1845-0800L750
.085	.255	.500	1 1/2	1845-0850.500	1845-0850L500
.085	.255	.750	2	1845-0850.750	1845-0850L750
.090	.270	.625	1 1/2	1845-0900.625	1845-0900L625
.090	.270	.750	2	1845-0900.750	1845-0900L750
.095	.285	.625	1 1/2	1845-0950.625	1845-0950L625
.095	.285	.750	2	1845-0950.750	1845-0950L750
.100	.300	.625	1 1/2	1845-1000.625	1845-1000L625
.100	.300	.750	2	1845-1000.750	1845-1000L750
.110	.330	.750	2	1845-1100.750	1845-1100L750

SOLID CARBIDE 4 FLUTE BALL NOSE END MILLS EXTENDED REACH

SERIES 1845

0.40mm - 6.00mm Diameter

Deep Reach Milling

Diameter Tolerance (+0/-0.0254mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | CAST IRON | TI | STAINLESS | NI/CO | STEEL | HI-C STEEL

EXTENDED REACH

D (mm)	ℓ (mm)	L_1 (mm)	L (mm)	d (mm)	PN Uncoated	PN AlTiN
0.40	1.20	3	38	3	1845-0157.118	1845-0157L118
0.50	1.50	4	38	3	1845-0197.157	1845-0197L157
0.60	1.80	5	38	3	1845-0236.197	1845-0236L197
0.65	1.95	6	38	3	1845-0256.236	1845-0256L236
0.70	2.10	7	38	3	1845-0276.276	1845-0276L276
0.75	2.25	8	38	3	1845-0295.315	1845-0295L315
0.80	2.40	9	50	3	1845-0315.354	1845-0315L354
0.90	2.70	10	50	3	1845-0354.394	1845-0354L394
1.00	3.00	10	50	3	1845-0394.394	1845-0394L394
1.50	4.50	15	50	3	1845-0591.591	1845-0591L591
2.00	6.00	20	50	3	1845-0787.787	1845-0787L787
2.50	7.50	23	50	3	1845-0984.906	1845-0984L906
3.00	9.00	23	50	3	1845-1181.906	1845-1181L906
3.50	10.5	25	75	6	1845-1378.984	1845-1378L984
4.00	12.0	25	75	6	1845-1575.984	1845-1575L984
4.50	13.5	30	75	6	1845-1772.1181	1845-1772L1181
5.00	15.0	30	75	6	1845-1968.1181	1845-1968L1181
5.50	16.5	30	75	6	1845-2165.1181	1845-2165L1181
6.00	18.0	30	75	6	1845-2362.1181	1845-2362L1181

SOLID CARBIDE 4 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP4

1/4" - 3/4" Diameter

Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

Variable Helix
Unequal Flutes to reduce chatter
AlCrN coating
Can be used as a rougher or a finishing mill

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI | PLASTIC | CAST IRON | TI | CU ALLOY

STUB LENGTH

D (in)	d (in)	ℓ (in)	L (in)	CR (in)	PN AlCrN
1/4	1/4	1/2	2	.015 - .020	AP4-2500.500
5/16	5/16	1/2	2	.015 - .020	AP4-3125.500
3/8	3/8	5/8	2	.015 - .020	AP4-3750.625
1/2	1/2	5/8	2-1/2	.025 - .030	AP4-5000.625
5/8	5/8	3/4	3	.030 - .035	AP4-6250.750
3/4	3/4	1	3	.030 - .035	AP4-7500.1000

SOLID CARBIDE 4 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP4

1/8" - 1" Diameter

Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

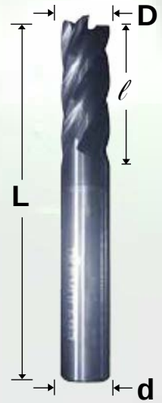
Variable Helix
Unequal Flutes to reduce chatter
AlCrN coating
Can be used as a rougher or a finishing mill

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI | PLASTIC | CAST IRON | TI | CU ALLOY

STANDARD LENGTH

D (in)	d (in)	ℓ (in)	L (in)	CR (in)	PN AlCrN
1/8	1/8	1/2	1-1/2	.010 - .015	AP4-1250.500
3/16	3/16	5/8	2	.015 - .020	AP4-1875.625
1/4	1/4	3/4	2-1/2	.015 - .020	AP4-2500.750
5/16	5/16	13/16	2-1/2	.015 - .020	AP4-3125.813
3/8	3/8	1	2-1/2	.015 - .020	AP4-3750.1000
7/16	7/16	1	2-3/4	.015 - .020	AP4-4375.1000
1/2	1/2	1 1/4	3	.025 - .030	AP4-5000.1000
5/8	5/8	1-1/4	3-1/2	.030 - .035	AP4-6250.1250
3/4	3/4	1-1/2	4	.030 - .035	AP4-7500.1500
1	1	1-1/2	4	.030 - .035	AP4-10000.1500



SOLID CARBIDE 4 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP4

1/4" - 3/4" Diameter

Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

- Variable Helix
- Unequal Flutes to reduce chatter
- AlCrN coating
- Can be used as a rougher or a finishing mill

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI | PLASTIC | CAST IRON | TI | CU ALLOY

LONG LENGTH

D (in)	d (in)	ℓ (in)	L (in)	CR (mm)	PN AlCrN
1/4	1/4	1-1/8	3	.015 - .020	AP4-2500.1125
5/16	5/16	1-1/8	3	.015 - .020	AP4-3125.1125
3/8	3/8	1-1/8	3	.015 - .020	AP4-3750.1125
1/2	1/2	2	4	.025 - .030	AP4-5000.2000
5/8	5/8	2-1/4	5	.030 - .035	AP4-6250.2250
3/4	3/4	2-1/4	5	.030 - .035	AP4-7500.2250

SOLID CARBIDE 4 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP4M

3mm - 20mm Diameter

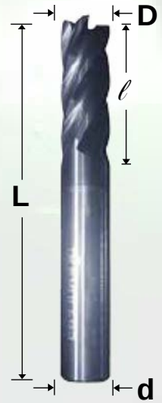
Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

- Variable Helix
- Unequal Flutes to reduce chatter
- AlCrN coating
- Can be used as a rougher or a finishing mill
- Cutting Diameter Tolerance h10
- Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI | PLASTIC | CAST IRON | TI | CU ALLOY

STUB LENGTH



D (mm)	d (mm)	ℓ (mm)	L (mm)	CR (mm)	PN AlCrN
3	3	6	38	0.4	AP4M-1181.236
6	6	10	50	0.4	AP4M-2362.394
8	8	12	50	0.4	AP4M-3150.472
10	10	12	50	0.4	AP4M-3937.787
12	12	16	63	0.7	AP4M-4724.630
16	16	20	89	0.7	AP4M-6299.787
20	20	22	101	0.7	AP4M-7874.866

SOLID CARBIDE 4 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP4M

4mm - 25mm Diameter

Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

Variable Helix
Unequal Flutes to reduce chatter
AlCrN coating
Can be used as a rougher or a finishing mill
Cutting Diameter Tolerance h10
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI | PLASTIC | CAST IRON | TI | CU ALLOY

STANDARD LENGTH

D (mm)	d (mm)	ℓ (mm)	L (mm)	CR (mm)	PN AlCrN
4	4	14	51	0.4	AP4M-1575.551
6	6	20	63	0.4	AP4M-2362.787
8	8	20	63	0.4	AP4M-3150.787
10	10	25	70	0.4	AP4M-3937.984
12	12	25	76	0.6	AP4M-4724.984
16	16	32	89	0.7	AP4M-6299.1260
20	20	38	100	0.7	AP4M-7874.1496
25	25	38	100	0.7	AP4M-10000.1496

SOLID CARBIDE 4 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP4M

6mm - 25mm Diameter

Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

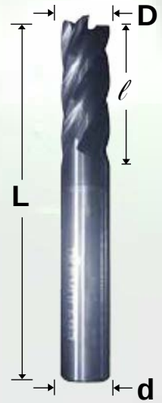
Variable Helix
Unequal Flutes to reduce chatter
AlCrN coating
Can be used as a rougher or a finishing mill
Cutting Diameter Tolerance h10
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI | PLASTIC | CAST IRON | TI | CU ALLOY

LONG LENGTH

D (mm)	d (mm)	ℓ (mm)	L (mm)	CR (mm)	PN AlCrN
6	6	25	75	0.4	AP4M-2362.984
8	8	25	75	0.4	AP4M-3150.984
10	10	30	75	0.4	AP4M-3937.1181
12	12	50	100	0.6	AP4M-4724.1969
14	14	50	125	0.6	AP4M-5511.1969
16	16	50	125	0.7	AP4M-6299.1969
18	18	50	125	0.7	AP4M-7087.1969
20	20	50	125	0.8	AP4M-7874.1969
25	25	50	125	0.8	AP4M-10000.1969



SOLID CARBIDE 5 FLUTE CORNER RADIUS HIGH HELIX END MILLS

SERIES 1905

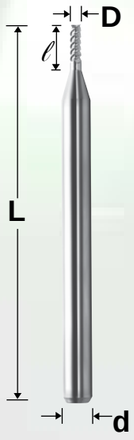
1.00mm - 6.00mm Diameter

Difficult Machining Applications

Diameter Tolerance (+0/-0.0254mm)
50˚ Helix
Sub Micron Grain Carbide
Corner Radius 10% of Diameter
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC · CU ALLOY · Al · CAST IRON · TI · STAINLESS · STEEL · HI-CSTEEL



STANDARD LENGTH

D (mm)	ℓ (mm)	CR (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
1.00	3	0.10	3	38	1905-0394.118R	1905-0394L118R
1.50	4.5	0.15	3	38	1905-0591.177R	1905-0591L177R
2.00	6	0.20	3	38	1905-0787.236R	1905-0787L236R
2.50	7.5	0.25	3	38	1905-0984.295R	1905-0984L295R
3.00	9	0.30	3	38	1905-1181.354R	1905-1181L354R
3.50	12	0.35	6	50	1905-1378.473R	1905-1378L473R
4.00	12	0.40	5	50	1905-1575.473R	1905-1575L473R
4.50	15	0.45	6	50	1905-1772.590R	1905-1772L590R
5.00	15	0.50	5	50	1905-1968.590R	1905-1968L590R
5.50	15	0.55	6	50	1905-2165.709R	1905-2165L709R
6.00	18	0.60	6	50	1905-2362.709R	1905-2362L709R

SOLID CARBIDE 5 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP5

1/4" - 1" Diameter

Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

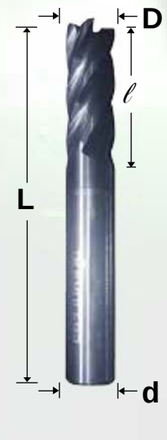
Variable Helix
Unequal Flutes to reduce chatter
AlCrN coating
Can be used as a rougher or a finishing mill

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · NI/CO · Al · PLASTIC · CAST IRON · TI · CU ALLOY

STANDARD LENGTH

D (in)	d (in)	ℓ (in)	L (in)	CR (in)	PN AlCrN
1/4	1/4	3/4	2-1/2	.015 - .020	AP5-2500.750
3/8	3/8	1	2-1/2	.015 - .020	AP5-3750.1000
1/2	1/2	1	3	.025 - .030	AP5-5000.1000
5/8	5/8	1-1/4	3-1/2	.030 - .035	AP5-6250.1250
3/4	3/4	1-1/2	4	.030 - .035	AP5-7500.1500
1	1	1-1/2	4	.030 - .035	AP5-10000.1500



SOLID CARBIDE 5 FLUTE APOLLO VARIABLE HELIX END MILLS

SERIES AP5M

4mm - 25mm Diameter

Excellent for Alloy Steel, Nickel Inconel Alloys, Stainless Steel, and Carbon Steel

- Variable Helix
- Unequal Flutes to reduce chatter
- AlCrN coating
- Can be used as a rougher or a finishing mill
- Cutting Diameter Tolerance h10
- Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · NI/CO · AI · PLASTIC · CAST IRON · TI · CU ALLOY

STANDARD LENGTH

D (mm)	d (mm)	ℓ (mm)	L (mm)	CR (mm)	PN AlCrN
4	4	14	51	0.4	AP5M-1575.551
6	6	20	63	0.4	AP5M-2362.787
8	8	20	63	0.4	AP5M-3150.787
10	10	25	70	0.4	AP5M-3937.984
12	12	25	76	0.6	AP5M-4724.984
16	16	32	89	0.7	AP5M-6299.1260
20	20	38	100	0.7	AP5M-7874.1496
25	25	38	100	0.7	AP5M-10000.1496

1/8" SHANK SOLID CARBIDE CHAMFER MILLS

SERIES CM

30° - 120° Angles

Laminates, Composites, Plastics Drilling Priority

- Angle Tolerance (+/-1deg)
- Sub Micron Grain Carbide
- Mirror Surface Finishes
- Single End Construction

MATERIAL PRIORITY

STAINLESS · STEEL · HI-CSTEEL · NI/CO · AI · PLASTIC · CAST IRON · TI · CU ALLOY

Included Angle A (deg)	Side Angle A2 (deg)	ℓ (in)	Shank (in)	OAL (in)	PN Uncoated	PN AlTiN
30	15	.230	1/8	1 1/2	CM-030.230	CM-030L230
45	22.5	.150	1/8	1 1/2	CM-045.150	CM-045L150
50	25	.130	1/8	1 1/2	CM-050.130	CM-050L130
60	30	.105	1/8	1 1/2	CM-060.105	CM-060L105
82	41	.070	1/8	1 1/2	CM-082.070	CM-082L070
90	45	.060	1/8	1 1/2	CM-090.060	CM-090L060
100	50	.050	1/8	1 1/2	CM-100.050	CM-100L050
118	59	.036	1/8	1 1/2	CM-118.036	CM-118L036
120	60	.035	1/8	1 1/2	CM-120.035	CM-120L035

SOLID CARBIDE CHAMFER MILLS

SERIES CMM

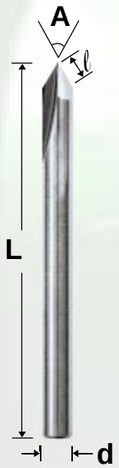
60°, 90°, 120° Angles

Angle Tolerance (+/-1deg)

Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | STEEL | HI-CSTEEL | NI/CO | AI



60 DEGREES

Included Angle A (deg)	Side Angle A2 (deg)	ℓ (mm)	D (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
60	15	2.5	3.00	3	38	CMM-1181.060	CMM-1181L060
60	15	5.2	6.00	6	50	CMM-2362.060	CMM-2362L060
60	15	6.9	8.00	8	59	CMM-3150.060	CMM-3150L060
60	15	8.6	10.00	10	60	CMM-3937.060	CMM-3937L060
60	15	10.3	12.00	12	70	CMM-4724.060	CMM-4724L060

90 DEGREES

Included Angle A (deg)	Side Angle A2 (deg)	ℓ (mm)	D (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
90	45	1.5	3.00	3	38	CMM-1181.090	CMM-1181L090
90	45	3.0	6.00	6	50	CMM-2362.090	CMM-2362L090
90	45	4.0	8.00	8	59	CMM-3150.090	CMM-3150L090
90	45	5.0	10.00	10	60	CMM-3937.090	CMM-3937L090
90	45	6.0	12.00	12	70	CMM-4724.090	CMM-4724L090

120 DEGREES

Included Angle A (deg)	Side Angle A2 (deg)	ℓ (mm)	D (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
120	60	0.8	3.00	3	38	CMM-1181.120	CMM-1181L120
120	60	1.7	6.00	6	50	CMM-2362.120	CMM-2362L120
120	60	2.3	8.00	8	59	CMM-3150.120	CMM-3150L120
120	60	2.8	10.00	10	60	CMM-3937.120	CMM-3937L120
120	60	3.4	12.00	12	70	CMM-4724.120	CMM-4724L120

TURNING - SECTION 3

SOLID CARBIDE MICRO BORING BARS STANDARD LENGTH

SERIES MBS

Minimum Bore Diameter (+0/-0.0025″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

0.015″ - 0.240″ Diameter

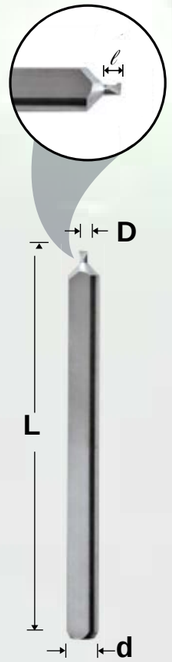
Internal Diameter Profile Boring

MATERIAL PRIORITY

PLASTIC | STAINLESS | CU ALLOY | Al | TI | NI/CO | CAST IRON | STEEL | HI-C STEEL

STANDARD LENGTH

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
.015	.030	1/8	1 1/2	MBS-0150.030	MBS-0150L030
.020	.030	1/8	1 1/2	MBS-0200.030	MBS-0200L030
.025	.050	1/8	1 1/2	MBS-0250.050	MBS-0250L050
.030	.050	1/8	1 1/2	MBS-0300.050	MBS-0300L050
.035	.050	1/8	1 1/2	MBS-0350.050	MBS-0350L050
.040	.050	1/8	1 1/2	MBS-0400.050	MBS-0400L050
.045	.100	1/8	1 1/2	MBS-0450.100	MBS-0450L100
.050	.100	1/8	1 1/2	MBS-0500.100	MBS-0500L100
.055	.100	1/8	1 1/2	MBS-0550.100	MBS-0550L100
.060	.100	1/8	1 1/2	MBS-0600.100	MBS-0600L100
.080	.250	1/8	1 1/2	MBS-0800.250	MBS-0800L250
.100	.375	1/8	1 1/2	MBS-1000.375	MBS-1000L375
.110	.500	1/8	1 1/2	MBS-1100.500	MBS-1100L500
.120	.600	3/16	2	MBS-1200.600	MBS-1200L600
.140	.700	3/16	2	MBS-1400.700	MBS-1400L700
.160	.800	3/16	2 1/2	MBS-1600.800	MBS-1600L800
.180	.900	1/4	2 1/2	MBS-1800.900	MBS-1800L900
.200	1.000	1/4	3	MBS-2000.1000	MBS-2000L1000
.220	1.250	1/4	3	MBS-2200.1250	MBS-2200L1250
.240	1.500	1/4	3	MBS-2400.1500	MBS-2400L1500



SOLID CARBIDE MICRO BORING BARS STANDARD LENGTH

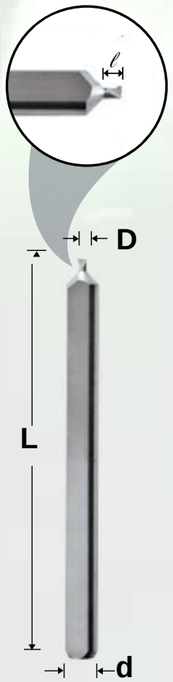
SERIES MBS — 0.40mm - 6.00mm Diameter

Internal Diameter Profile Boring

Minimum Bore Diameter (+0/-0.06mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | STAINLESS | CU ALLOY | Al | TI | NI/CO | CAST IRON | STEEL | HI-CSTEEL



STANDARD LENGTH

D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.40	1.0	3	38	MBS-0157.039	MBS-0157L039
0.50	1.0	3	38	MBS-0197.039	MBS-0197L039
0.60	1.3	3	38	MBS-0236.051	MBS-0236L051
0.70	1.3	3	38	MBS-0276.051	MBS-0276L051
0.80	1.3	3	38	MBS-0315.051	MBS-0315L051
0.90	1.3	3	38	MBS-0354.051	MBS-0354L051
1.00	2.5	3	38	MBS-0394.098	MBS-0394L098
1.10	2.5	3	38	MBS-0433.098	MBS-0433L098
1.20	2.5	3	38	MBS-0472.098	MBS-0472L098
1.30	2.5	3	38	MBS-0512.098	MBS-0512L098
1.50	6.0	3	38	MBS-0591.236	MBS-0591L236
1.70	7.0	3	38	MBS-0669.276	MBS-0669L276
2.00	8.0	3	38	MBS-0787.315	MBS-0787L315
3.00	15	5	50	MBS-1181.591	MBS-1181L591
3.50	20	5	50	MBS-1378.787	MBS-1378L787
4.00	22	5	50	MBS-1575.866	MBS-1575L866
4.50	23	8	65	MBS-1772.906	MBS-1772L906
5.00	25	8	65	MBS-1969.984	MBS-1969L984
5.50	27	8	65	MBS-2165.1063	MBS-2165L1063
6.00	29	8	65	MBS-2362.1142	MBS-2362L1142

SOLID CARBIDE MICRO BORING BARS EXTENDED REACH

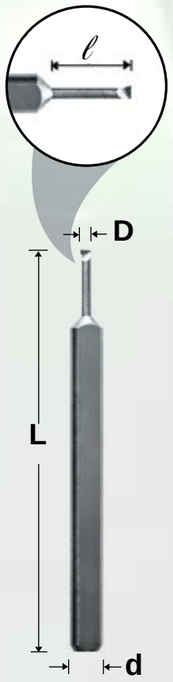
SERIES MBE — 0.015″ - 0.240″ Diameter

Internal Diameter Profile Boring

Minimum Bore Diameter (+0/-0.0025″)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

MATERIAL PRIORITY

PLASTIC | STAINLESS | CU ALLOY | Al | TI | NI/CO | CAST IRON | STEEL | HI-CSTEEL



EXTENDED LENGTH

D (in)	ℓ (in)	d (in)	L (in)	PN Uncoated	PN AlTiN
.015	.075	1/8	1 1/2	MBE-0150.075	MBE-0150L075
.020	.075	1/8	1 1/2	MBE-0200.075	MBE-0200L075
.025	.125	1/8	1 1/2	MBE-0250.125	MBE-0250L125
.030	.125	1/8	1 1/2	MBE-0300.125	MBE-0300L125
.035	.125	1/8	1 1/2	MBE-0350.125	MBE-0350L125
.040	.125	1/8	1 1/2	MBE-0400.125	MBE-0400L125
.045	.250	1/8	1 1/2	MBE-0450.250	MBE-0450L250
.050	.250	1/8	1 1/2	MBE-0500.250	MBE-0500L250
.055	.250	1/8	1 1/2	MBE-0550.250	MBE-0550L250
.060	.250	1/8	1 1/2	MBE-0600.250	MBE-0600L250
.080	.500	1/8	1 1/2	MBE-0800.500	MBE-0800L500
.100	.600	1/8	1 1/2	MBE-1000.600	MBE-1000L600
.110	.700	1/8	1 1/2	MBE-1100.700	MBE-1100L700
.120	.850	3/16	2	MBE-1200.850	MBE-1200L850
.140	.900	3/16	2	MBE-1400.900	MBE-1400L900
.160	1.100	3/16	2 1/2	MBE-1600.1100	MBE-1600L1100
.180	1.250	1/4	2 1/2	MBE-1800.1250	MBE-1800L1250
.200	1.400	1/4	3	MBE-2000.1400	MBE-2000L1400
.220	1.500	1/4	3	MBE-2200.1500	MBE-2200L1500
.240	1.750	1/4	3	MBE-2400.1750	MBE-2400L1750

SOLID CARBIDE MICRO BORING BARS EXTENDED REACH

SERIES MBE

0.40mm - 6.00mm Diameter

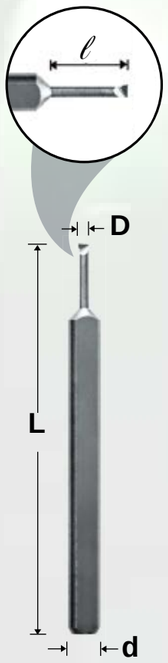
Internal Diameter Profile Boring

Minimum Bore Diameter (+0/-0.06mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | STAINLESS | CU ALLOY | AI | TI | NI/CO | CAST IRON | STEEL | HI-CSTEEL

EXTENDED LENGTH



D (mm)	ℓ (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
0.40	2	3	38	MBE-0157.079	MBE-0157L079
0.50	2	3	38	MBE-0197.079	MBE-0197L079
0.60	3	3	38	MBE-0236.118	MBE-0236L118
0.70	3	3	38	MBE-0276.118	MBE-0276L118
0.80	3	3	38	MBE-0315.118	MBE-0315L118
0.90	3	3	38	MBE-0354.118	MBE-0354L118
1.00	5	3	38	MBE-0394.197	MBE-0394L197
1.10	5	3	38	MBE-0433.197	MBE-0433L197
1.20	5	3	38	MBE-0472.197	MBE-0472L197
1.30	5	3	38	MBE-0512.197	MBE-0512L197
1.50	10	3	38	MBE-0591.394	MBE-0591L394
1.70	10	3	38	MBE-0669.394	MBE-0669L394
2.00	10	3	38	MBE-0787.394	MBE-0787L394
3.00	20	5	50	MBE-1181.787	MBE-1181L787
3.50	25	5	50	MBE-1378.984	MBE-1378L984
4.00	27	5	50	MBE-1575.1063	MBE-1575L1063
4.50	32	8	65	MBE-1772.1260	MBE-1772L1260
5.00	32	8	65	MBE-1969.1260	MBE-1969L1260
5.50	32	8	65	MBE-2165.1260	MBE-2165L1260
6.00	35	8	65	MBE-2362.1378	MBE-2362L1378

4.01 Solid Carbide Thread Mills
Series 98M
M0.5 - M8 Threads - Page 01

SOLID CARBIDE THREAD MILLS

SERIES 98M

M0.5 - M8 Threads

Single Point Thread Milling

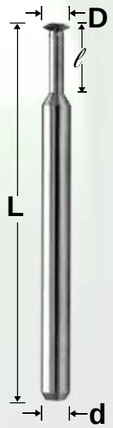
Diameter Tolerance (+0/-0.008mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Excellent for Titanium Dental Implants
Shank Diameter Tolerance h6

MATERIAL PRIORITY

PLASTIC | CU ALLOY | Al | TI | NI/CO | CAST IRON

STANDARD LENGTH

Metric Thread	D (mm)	Number of Flutes	d (mm)	L (mm)	ℓ (mm)	PN Uncoated	PN AlTiN
M0.5 X 0.125	0.30	2	3	38	1.0	98M05-0125.2FA1	98M05-0125L2FA1
M0.6 X 0.15	0.37	2	3	38	1.0	98M06-0150.2FA1	98M06-0150L2FA1
M0.7 X 0.175	0.45	2	3	38	2.0	98M07-0175.2FA1	98M07-0175L2FA1
M0.8 X 0.20	0.51	2	3	38	2.0	98M08-0200.2FA1	98M08-0200L2FA1
M0.9 X 0.25	0.58	2	3	38	2.0	98M09-0225.2FA1	98M09-0225L2FA1
M1.0 X 0.25	0.65	2	3	38	5.0	98M10-0250.2FA1	98M10-0250L2FA1
M1.1 X 0.25	0.75	4	3	38	5.0	98M11-0250.4FA1	98M11-0250L4FA1
M1.2 X 0.25	0.85	4	3	38	5.0	98M12-0250.4FA1	98M12-0250L4FA1
M1.4 X 0.30	1.00	4	3	38	5.0	98M14-0300.4FA1	98M14-0300L4FA1
M1.6 X 0.35	1.15	4	3	38	7.0	98M16-0350.4FA1	98M16-0350L4FA1
M1.8 X 0.35	1.35	4	3	38	7.0	98M18-0350.4FA1	98M18-0350L4FA1
M2.0 X 0.40	1.50	4	3	38	7.0	98M20-0400.4FA1	98M20-0400L4FA1
M2.5 X 0.45	1.95	4	4	50	9.4	98M25-0450.4FB1	98M25-0450L4FB1
M3 X 0.5	2.40	4	4	50	9.4	98M30-0500.4FB1	98M30-0500L4FB1
M3.5 X 0.6	2.80	4	4	50	9.4	98M35-0600.4FB1	98M35-0600L4FB1
M4 X 0.7	3.10	4	6	64	12.7	98M40-0700.4FB1	98M40-0700L4FB1
M5 X 0.8	3.85	4	6	64	12.7	98M50-0800.4FB1	98M50-0800L4FB1
M6 X 1	4.65	4	6	64	12.7	98M60-1000.4FB1	98M60-1000L4FB1
M8 X 1.25	5.95	4	6	64	12.7	98M80-1250.4FB1	98M80-1250L4FB1



REAMING - SECTION 5

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

0.20mm - 0.49mm Diameter

Diameter Tolerance (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
45 Degree Chamfer Angle
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | AI | TI | NI/CO | STEEL | HI-CSTEEL

D (mm)	ℓ (mm)	R (mm)	PN
0.20	1.5	3	MR34-0079.059
0.21	1.5	3	MR34-0083.059
0.22	1.5	3	MR34-0087.059
0.23	1.5	3	MR34-0091.059
0.24	1.5	3	MR34-0094.059
0.25	1.5	3	MR34-0098.059
0.26	1.5	3	MR34-0102.059
0.27	1.5	3	MR34-0106.059
0.28	1.5	3	MR34-0110.059
0.29	1.5	3	MR34-0114.059
0.30	2.0	4	MR34-0118.079
0.31	2.0	4	MR34-0122.079
0.32	2.0	4	MR34-0126.079
0.33	2.0	4	MR34-0130.079
0.34	2.0	4	MR34-0134.079
0.35	2.0	4	MR34-0138.079
0.36	2.0	4	MR34-0142.079
0.37	2.0	4	MR34-0146.079
0.38	2.0	4	MR34-0150.079
0.39	2.0	4	MR34-0154.079
0.40	2.5	5	MR34-0157.099
0.41	2.5	5	MR34-0161.099
0.42	2.5	5	MR34-0165.099
0.43	2.5	5	MR34-0169.099
0.44	2.5	5	MR34-0173.099
0.45	2.5	5	MR34-0177.099
0.46	2.5	5	MR34-0181.099
0.47	2.5	5	MR34-0185.099
0.48	2.5	5	MR34-0189.099
0.49	2.5	5	MR34-0193.099

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

0.50mm - 0.79mm Diameter

Minimum Bore Diameter (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · CU ALLOY · AL · TI · NI/CO · STEEL · HI-CSTEEL

D (mm)	ℓ (mm)	R (mm)	PN
0.50	3	6	MR34-0197.118
0.51	3	6	MR34-0201.118
0.52	3	6	MR34-0205.118
0.53	3	6	MR34-0209.118
0.54	3	6	MR34-0213.118
0.55	3	6	MR34-0216.118
0.56	3	6	MR34-0220.118
0.57	3	6	MR34-0224.118
0.58	3	6	MR34-0228.118
0.59	3	6	MR34-0232.118
0.60	7	18	MR34-0236.281
0.61	7	18	MR34-0240.281
0.62	7	18	MR34-0244.281
0.63	7	18	MR34-0248.281
0.64	7	18	MR34-0252.281
0.65	7	18	MR34-0256.281
0.66	7	18	MR34-0260.281
0.67	7	18	MR34-0264.281
0.68	7	18	MR34-0268.281
0.69	7	18	MR34-0272.281
0.70	7	18	MR34-0276.281
0.71	7	18	MR34-0279.281
0.72	7	18	MR34-0283.281
0.73	7	18	MR34-0287.281
0.74	7	18	MR34-0291.281
0.75	7	18	MR34-0295.281
0.76	7	18	MR34-0299.281
0.77	7	18	MR34-0303.281
0.78	7	18	MR34-0307.281
0.79	7	18	MR34-0311.281

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

0.80mm - 1.09mm Diameter

Minimum Bore Diameter (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · CU ALLOY · AL · TI · NI/CO · STEEL · HI-CSTEEL

D (mm)	ℓ (mm)	R (mm)	PN
0.80	7	18	MR34-0315.281
0.81	7	18	MR34-0319.281
0.82	7	18	MR34-0323.281
0.83	7	18	MR34-0327.281
0.84	7	18	MR34-0331.281
0.85	7	18	MR34-0335.281
0.86	7	18	MR34-0338.281
0.87	7	18	MR34-0342.281
0.88	7	18	MR34-0346.281
0.89	7	18	MR34-0350.281
0.90	7	18	MR34-0354.281
0.91	7	18	MR34-0358.281
0.92	7	18	MR34-0362.281
0.93	7	18	MR34-0366.281
0.94	7	18	MR34-0370.281
0.95	7	18	MR34-0374.281
0.96	7	18	MR34-0378.281
0.97	7	18	MR34-0382.281
0.98	7	18	MR34-0386.281
0.99	7	18	MR34-0390.281
1.00	7	18	MR34-0394.281
1.01	7	18	MR34-0398.281
1.02	7	18	MR34-0401.281
1.03	7	18	MR34-0405.281
1.04	7	18	MR34-0409.281
1.05	7	18	MR34-0413.281
1.06	10	18	MR34-0417.406
1.07	10	18	MR34-0421.406
1.08	10	18	MR34-0425.406
1.09	10	18	MR34-0429.406

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

1.10mm - 1.39mm Diameter

Minimum Bore Diameter (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | Al | TI | NI/CO | STEEL | HI-CSTEEL

D (mm)	ℓ (mm)	R (mm)	PN
1.10	10	18	MR34-0433.406
1.11	10	18	MR34-0437.406
1.12	10	18	MR34-0441.406
1.13	10	18	MR34-0445.406
1.14	10	18	MR34-0449.406
1.15	10	18	MR34-0453.406
1.16	10	18	MR34-0457.406
1.17	10	18	MR34-0461.406
1.18	10	18	MR34-0464.406
1.19	10	18	MR34-0468.406
1.20	10	18	MR34-0472.406
1.21	10	18	MR34-0476.406
1.22	10	18	MR34-0480.406
1.23	10	18	MR34-0484.406
1.24	10	18	MR34-0488.406
1.25	10	18	MR34-0492.406
1.26	10	18	MR34-0496.406
1.27	10	18	MR34-0500.406
1.28	10	18	MR34-0504.406
1.29	10	18	MR34-0508.406
1.30	10	18	MR34-0512.406
1.31	10	18	MR34-0516.406
1.32	10	18	MR34-0520.406
1.33	10	18	MR34-0523.406
1.34	10	18	MR34-0527.406
1.35	10	18	MR34-0531.406
1.36	10	18	MR34-0535.406
1.37	10	18	MR34-0539.406
1.38	10	18	MR34-0543.406
1.39	10	18	MR34-0547.406

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

1.40mm - 1.69mm Diameter

Diameter Tolerance (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
45 Degree Chamfer Angle
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | Al | TI | NI/CO | STEEL | HI-CSTEEL

D (mm)	ℓ (mm)	R (mm)	PN
1.40	10	18	MR34-0551.406
1.41	10	18	MR34-0555.406
1.42	10	18	MR34-0559.406
1.43	10	18	MR34-0563.406
1.44	10	18	MR34-0567.406
1.45	10	18	MR34-0571.406
1.46	10	18	MR34-0575.406
1.47	10	18	MR34-0579.406
1.48	10	18	MR34-0583.406
1.49	10	18	MR34-0586.406
1.50	10	18	MR34-0590.406
1.51	10	18	MR34-0594.406
1.52	10	18	MR34-0598.406
1.53	10	18	MR34-0602.406
1.54	10	18	MR34-0606.406
1.55	10	18	MR34-0610.406
1.56	10	18	MR34-0614.406
1.57	10	18	MR34-0618.406
1.58	10	18	MR34-0622.406
1.59	10	18	MR34-0626.406
1.60	10	18	MR34-0630.406
1.61	10	18	MR34-0634.406
1.62	10	18	MR34-0638.406
1.63	10	18	MR34-0642.406
1.64	10	18	MR34-0646.406
1.65	10	18	MR34-0649.406
1.66	10	18	MR34-0653.406
1.67	10	18	MR34-0657.406
1.68	10	18	MR34-0661.406
1.69	10	18	MR34-0665.406

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

1.70mm - 1.99mm Diameter

Minimum Bore Diameter (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | AI | TI | NI/CO | STEEL | HI-C STEEL

D (mm)	ℓ (mm)	R (mm)	PN
1.70	10	18	MR34-0669.406
1.71	10	18	MR34-0673.406
1.72	10	18	MR34-0677.406
1.73	10	18	MR34-0681.406
1.74	10	18	MR34-0685.406
1.75	10	18	MR34-0689.406
1.76	10	18	MR34-0693.406
1.77	10	18	MR34-0697.406
1.78	10	18	MR34-0701.406
1.79	10	18	MR34-0705.406
1.80	10	18	MR34-0708.406
1.81	10	18	MR34-0712.406
1.82	10	18	MR34-0716.406
1.83	10	18	MR34-0720.406
1.84	10	18	MR34-0724.406
1.85	10	18	MR34-0728.406
1.86	10	18	MR34-0732.406
1.87	10	18	MR34-0736.406
1.88	10	18	MR34-0740.406
1.89	10	18	MR34-0744.406
1.90	10	18	MR34-0748.406
1.91	10	18	MR34-0752.406
1.92	10	18	MR34-0756.406
1.93	10	18	MR34-0760.406
1.94	10	18	MR34-0764.406
1.95	10	18	MR34-0768.406
1.96	11	20.5	MR34-0771.438
1.97	11	20.5	MR34-0775.438
1.98	11	20.5	MR34-0779.438
1.99	11	20.5	MR34-0783.438

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

2.00mm - 2.19mm Diameter

Diameter Tolerance (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
45 Degree Chamfer Angle
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | AI | TI | NI/CO | STEEL | HI-C STEEL

D (mm)	ℓ (mm)	R (mm)	PN
2.00	11	20.5	MR34-0787.438
2.01	11	20.5	MR34-0791.438
2.02	11	20.5	MR34-0795.438
2.03	11	20.5	MR34-0799.438
2.04	11	20.5	MR34-0803.438
2.05	11	20.5	MR34-0807.438
2.06	11	20.5	MR34-0811.438
2.07	11	20.5	MR34-0815.438
2.08	11	20.5	MR34-0819.438
2.09	11	20.5	MR34-0823.438
2.10	11	20.5	MR34-0827.438
2.11	11	20.5	MR34-0830.438
2.12	11	20.5	MR34-0835.438
2.13	11	20.5	MR34-0838.438
2.14	11	20.5	MR34-0843.438
2.15	11	20.5	MR34-0846.438
2.16	11	20.5	MR34-0850.438
2.17	11	20.5	MR34-0854.438
2.18	11	20.5	MR34-0858.438
2.19	11	20.5	MR34-0862.438

3.00MM SHANK SOLID CARBIDE 4 FLUTE MICRO REAMERS

SERIES MR34

2.20mm - 2.40mm Diameter

Minimum Bore Diameter (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | AI | TI | NI/CO | STEEL | HI-C STEEL

D (mm)	ℓ (mm)	R (mm)	PN
2.20	11	20.5	MR34-0866.438
2.21	11	20.5	MR34-0870.438
2.22	11	20.5	MR34-0874.438
2.23	11	20.5	MR34-0878.438
2.24	11	20.5	MR34-0882.438
2.25	11	20.5	MR34-0886.438
2.26	11	20.5	MR34-0890.438
2.27	11	20.5	MR34-0894.438
2.28	11	20.5	MR34-0896.438
2.29	11	20.5	MR34-0901.438
2.30	11	20.5	MR34-0906.438
2.31	11	20.5	MR34-0909.438
2.32	11	20.5	MR34-0913.438
2.33	11	20.5	MR34-0917.438
2.34	11	20.5	MR34-0921.438
2.35	11	20.5	MR34-0925.438
2.36	11	20.5	MR34-0929.438
2.37	11	20.5	MR34-0933.438
2.38	11	20.5	MR34-0937.438
2.39	11	20.5	MR34-0941.438
2.40	11	20.5	MR34-0945.438

4.00MM SHANK SOLID CARBIDE 6 FLUTE MICRO REAMERS

SERIES MR46

2.41mm - 2.72mm Diameter

Diameter Tolerance (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
45 Degree Chamfer Angle
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | AI | TI | NI/CO | STEEL | HI-C STEEL

D (mm)	ℓ (mm)	R (mm)	PN
2.41	14	51	MR46-0949.563
2.42	14	51	MR46-0953.563
2.43	14	51	MR46-0957.563
2.44	14	51	MR46-0960.563
2.45	14	51	MR46-0965.563
2.46	14	51	MR46-0968.563
2.47	14	51	MR46-0972.563
2.48	14	51	MR46-0976.563
2.49	14	51	MR46-0980.563
2.50	14	51	MR46-0984.563
2.51	14	51	MR46-0988.563
2.52	14	51	MR46-0992.563
2.53	14	51	MR46-0996.563
2.54	14	51	MR46-1000.563
2.55	14	51	MR46-1004.563
2.56	14	51	MR46-1008.563
2.57	14	51	MR46-1012.563
2.58	14	51	MR46-1015.563
2.59	14	51	MR46-1019.563
2.60	14	51	MR46-1024.563
2.61	14	51	MR46-1028.563
2.62	14	51	MR46-1031.563
2.63	14	51	MR46-1035.563
2.64	14	51	MR46-1039.563
2.65	14	51	MR46-1043.563
2.66	14	51	MR46-1047.563
2.67	14	51	MR46-1051.563
2.68	14	51	MR46-1055.563
2.69	14	51	MR46-1059.563
2.70	14	51	MR46-1063.563
2.71	14	51	MR46-1067.563
2.72	14	51	MR46-1071.563

4.00MM SHANK SOLID CARBIDE 6 FLUTE MICRO REAMERS

SERIES MR46 2.73mm - 3.10mm Diameter

Minimum Bore Diameter (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

D (mm)	ℓ (mm)	R (mm)	PN
2.73	14	51	MR46-1075.563
2.74	14	51	MR46-1078.563
2.75	14	51	MR46-1083.563
2.76	14	51	MR46-1087.563
2.77	14	51	MR46-1090.563
2.78	14	51	MR46-1094.563
2.79	14	51	MR46-1098.563
2.80	14	51	MR46-1102.563
2.81	14	51	MR46-1106.563
2.82	14	51	MR46-1110.563
2.83	14	51	MR46-1114.563
2.84	14	51	MR46-1118.563
2.85	14	51	MR46-1122.563
2.87	14	51	MR46-1130.563
2.88	14	51	MR46-1134.563
2.89	14	51	MR46-1138.563
2.90	14	51	MR46-1141.563
2.91	14	51	MR46-1146.563
2.92	14	51	MR46-1149.563
2.93	14	51	MR46-1154.563
2.94	14	51	MR46-1157.563
2.95	16	51	MR46-1161.625
2.96	16	51	MR46-1164.625
2.97	16	51	MR46-1169.625
2.98	16	51	MR46-1173.625
2.99	16	51	MR46-1177.625
3.00	16	51	MR46-1181.625
3.01	16	51	MR46-1185.625
3.02	16	51	MR46-1189.625
3.03	16	51	MR46-1193.625
3.05	16	51	MR46-1200.625
3.10	16	51	MR46-1220.625

4.00MM SHANK SOLID CARBIDE 6 FLUTE MICRO REAMERS

SERIES MR46 3.20mm - 3.90mm Diameter

Diameter Tolerance (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
45 Degree Chamfer Angle
Shank Diameter Tolerance h6

MATERIAL PRIORITY

D (mm)	ℓ (mm)	R (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
3.20	17.00	36.00	4	64.00	MR46-1260.669	MR46-1260L669
3.30	17.00	36.00	4	64.00	MR46-1299.669	MR46-1299L669
3.40	17.00	36.00	4	64.00	MR46-1339.669	MR46-1339L669
3.50	17.00	36.00	4	64.00	MR46-1378.669	MR46-1378L669
3.60	17.00	36.00	4	64.00	MR46-1417.669	MR46-1417L669
3.70	17.00	36.00	4	64.00	MR46-1457.669	MR46-1457L669
3.80	17.00	36.00	4	64.00	MR46-1496.669	MR46-1496L669
3.90	17.00	36.00	4	64.00	MR46-1535.669	MR46-1535L669

6.00MM SHANK SOLID CARBIDE 6 FLUTE MICRO REAMERS

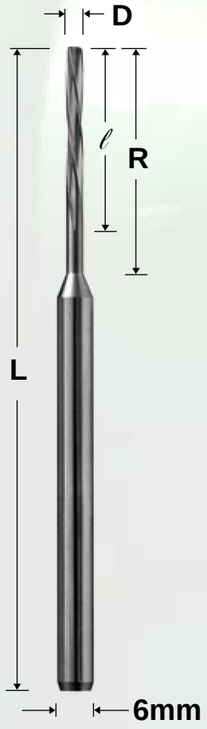
SERIES MR66

3.97mm - 5.90mm Diameter

Minimum Bore Diameter (+0/-0.06mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · CU ALLOY · AL · TI · NI/CO · STEEL · HI-C STEEL



D (mm)	ℓ (mm)	R (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
3.97	21.00	45.00	6	77.00	MR66-1563.827	MR66-1563L827
3.98	21.00	45.00	6	77.00	MR66-1567.827	MR66-1567L827
3.99	21.00	45.00	6	77.00	MR66-1571.827	MR66-1571L827
4.00	21.00	45.00	6	77.00	MR66-1575.827	MR66-1575L827
4.01	21.00	45.00	6	77.00	MR66-1579.827	MR66-1579L827
4.02	21.00	45.00	6	77.00	MR66-1583.827	MR66-1583L827
4.03	21.00	45.00	6	77.00	MR66-1587.827	MR66-1587L827
4.10	21.00	45.00	6	77.00	MR66-1614.827	MR66-1614L827
4.20	21.00	45.00	6	77.00	MR66-1654.827	MR66-1654L827
4.30	21.00	45.00	6	77.00	MR66-1693.827	MR66-1693L827
4.40	21.00	45.00	6	77.00	MR66-1732.827	MR66-1732L827
4.50	21.00	45.00	6	77.00	MR66-1772.827	MR66-1772L827
4.60	21.00	45.00	6	77.00	MR66-1811.827	MR66-1811L827
4.70	21.00	45.00	6	77.00	MR66-1850.827	MR66-1850L827
4.80	21.00	45.00	6	77.00	MR66-1890.827	MR66-1890L827
4.90	21.00	45.00	6	77.00	MR66-1929.827	MR66-1929L827
4.97	26.00	59.00	6	93.00	MR66-1957.1024	MR66-1957L1024
4.98	26.00	59.00	6	93.00	MR66-1961.1024	MR66-1961L1024
4.99	26.00	59.00	6	93.00	MR66-1965.1024	MR66-1965L1024
5.00	26.00	59.00	6	93.00	MR66-1968.1024	MR66-1968L1024
5.01	26.00	59.00	6	93.00	MR66-1972.1024	MR66-1972L1024
5.02	26.00	59.00	6	93.00	MR66-1976.1024	MR66-1976L1024
5.03	26.00	59.00	6	93.00	MR66-1980.1024	MR66-1980L1024
5.10	26.00	59.00	6	93.00	MR66-2008.1024	MR66-2008L1024
5.20	26.00	59.00	6	93.00	MR66-2047.1024	MR66-2047L1024
5.30	26.00	59.00	6	93.00	MR66-2087.1024	MR66-2087L1024
5.40	26.00	59.00	6	93.00	MR66-2126.1024	MR66-2126L1024
5.50	26.00	59.00	6	93.00	MR66-2165.1024	MR66-2165L1024
5.60	26.00	59.00	6	93.00	MR66-2205.1024	MR66-2205L1024
5.70	26.00	59.00	6	93.00	MR66-2244.1024	MR66-2244L1024
5.80	26.00	59.00	6	93.00	MR66-2283.1024	MR66-2283L1024
5.90	26.00	59.00	6	93.00	MR66-2323.1024	MR66-2323L1024

8.00MM SHANK SOLID CARBIDE 6 FLUTE MICRO REAMERS

SERIES MR86

5.97mm - 7.90mm Diameter

Diameter Tolerance (+0.003mm/-0)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
45 Degree Chamfer Angle
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS · CU ALLOY · AL · TI · NI/CO · STEEL · HI-C STEEL

D (mm)	ℓ (mm)	R (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
5.97	26.00	59.00	8	93.00	MR86-2350.1024	MR86-2350L1024
5.98	26.00	59.00	8	93.00	MR86-2354.1024	MR86-2354L1024
5.99	26.00	59.00	8	93.00	MR86-2358.1024	MR86-2358L1024
6.00	26.00	59.00	8	93.00	MR86-2362.1024	MR86-2362L1024
6.01	26.00	59.00	8	93.00	MR86-2366.1024	MR86-2366L1024
6.02	26.00	59.00	8	93.00	MR86-2370.1024	MR86-2370L1024
6.03	26.00	59.00	8	93.00	MR86-2374.1024	MR86-2374L1024
6.10	26.00	59.00	8	93.00	MR86-2402.1024	MR86-2402L1024
6.20	26.00	59.00	8	93.00	MR86-2441.1024	MR86-2441L1024
6.30	26.00	59.00	8	93.00	MR86-2480.1024	MR86-2480L1024
6.40	26.00	59.00	8	93.00	MR86-2520.1024	MR86-2520L1024
6.50	26.00	59.00	8	93.00	MR86-2559.1024	MR86-2559L1024
6.60	26.00	59.00	8	93.00	MR86-2598.1024	MR86-2598L1024
6.70	26.00	59.00	8	93.00	MR86-2638.1024	MR86-2638L1024
6.80	26.00	59.00	8	93.00	MR86-2677.1024	MR86-2677L1024
6.90	26.00	59.00	8	93.00	MR86-2717.1024	MR86-2717L1024
6.97	31.00	69.00	8	109.00	MR86-2744.1220	MR86-2744L1220
6.98	31.00	69.00	8	109.00	MR86-2748.1220	MR86-2748L1220
6.99	31.00	69.00	8	109.00	MR86-2752.1220	MR86-2752L1220
7.00	31.00	69.00	8	109.00	MR86-2756.1220	MR86-2756L1220
7.01	31.00	69.00	8	109.00	MR86-2760.1220	MR86-2760L1220
7.02	31.00	69.00	8	109.00	MR86-2764.1220	MR86-2764L1220
7.03	31.00	69.00	8	109.00	MR86-2768.1220	MR86-2768L1220
7.10	31.00	69.00	8	109.00	MR86-2795.1220	MR86-2795L1220
7.20	31.00	69.00	8	109.00	MR86-2835.1220	MR86-2835L1220
7.30	31.00	69.00	8	109.00	MR86-2874.1220	MR86-2874L1220
7.40	31.00	69.00	8	109.00	MR86-2913.1220	MR86-2913L1220
7.50	31.00	69.00	8	109.00	MR86-2953.1220	MR86-2953L1220
7.60	31.00	69.00	8	109.00	MR86-2992.1220	MR86-2992L1220
7.70	31.00	69.00	8	109.00	MR86-3031.1220	MR86-3031L1220
7.80	31.00	69.00	8	109.00	MR86-3071.1220	MR86-3071L1220
7.90	31.00	69.00	8	109.00	MR86-3110.1220	MR86-3110L1220

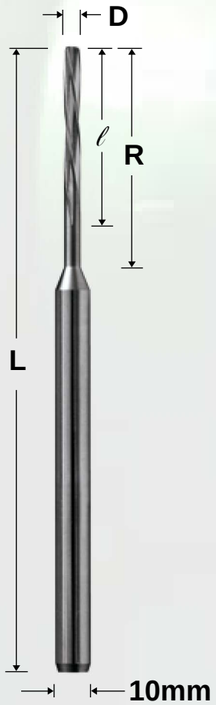
10.00MM SHANK SOLID CARBIDE 6 FLUTE MICRO REAMERS

SERIES MR106 7.97mm - 8.03mm Diameter

Minimum Bore Diameter (+0/-0.06mm)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
Shank Diameter Tolerance h6

MATERIAL PRIORITY

STAINLESS | CU ALLOY | Al | TI | NI/CO | STEEL | HI-C STEEL



D (mm)	ℓ (mm)	R (mm)	d (mm)	L (mm)	PN Uncoated	PN AlTiN
7.97	33.00	75.00	10	133.00	MR106-3138.1299	MR106-3138L1299
7.98	33.00	75.00	10	133.00	MR106-3142.1299	MR106-3142L1299
7.99	33.00	75.00	10	133.00	MR106-3146.1299	MR106-3146L1299
8.00	33.00	75.00	10	133.00	MR106-3150.1299	MR106-3150L1299
8.01	33.00	75.00	10	133.00	MR106-3154.1299	MR106-3154L1299
8.02	33.00	75.00	10	133.00	MR106-3157.1299	MR106-3157L1299
8.03	33.00	75.00	10	133.00	MR106-3161.1299	MR106-3161L1299

SOLID CARBIDE DIAMOND PATTERN UP CUT ROUTER BITS

SERIES 2120

Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
DLC is Amorphous Diamond

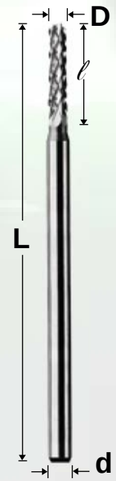
1/32" - 1/4" Diameter
CFRP, Fiberglass and Composite Materials

MATERIAL PRIORITY

PLASTIC CFRP

UP CUT

D (in)	ℓ (in)	d (in)	L (in)	End Style	PN Uncoated	PN DLC	PN CVD Diamond
1/32	.255	1/8	1 1/2	Fish Tail	2120-0312.255F	2120-0312D255F	2120-0312V255F
1/32	.255	1/8	1 1/2	Drill Point	2120-0312.255D	2120-0312D255D	2120-0312V255D
3/64	.255	1/8	1 1/2	Fish Tail	2120-0469.255F	2120-0469D255F	2120-0469V255F
3/64	.255	1/8	1 1/2	Drill Point	2120-0469.255D	2120-0469D255D	2120-0469V255D
1/16	.255	1/8	1 1/2	Fish Tail	2120-0625.255F	2120-0625D255F	2120-0625V255F
1/16	.255	1/8	1 1/2	Drill Point	2120-0625.255D	2120-0625D255D	2120-0625V255D
3/32	.395	1/8	1 1/2	Fish Tail	2120-0938.395F	2120-0938D395F	2120-0938V395F
3/32	.395	1/8	1 1/2	Drill Point	2120-0938.395D	2120-0938D395D	2120-0938V395D
1/8	.500	1/8	1 1/2	Fish Tail	2120-1250.500F	2120-1250D500F	2120-1250V500F
1/8	.500	1/8	1 1/2	Drill Point	2120-1250.500D	2120-1250D500D	2120-1250V500D
3/16	.625	3/16	2	Fish Tail	2120-1875.2625F	2120-1875D2625F	2120-1875V2625F
3/16	.625	3/16	2	Drill Point	2120-1875.2625D	2120-1875D2625D	2120-1875V2625D
1/4	.750	1/4	2	Fish Tail	2120-2500.2750F	2120-2500D2750F	2120-2500V2750F
1/4	.750	1/4	2	Drill Point	2120-2500.2750D	2120-2500D2750D	2120-2500V2750D
1/4	.750	1/4	2 1/2	Fish Tail	2120-2500.3750F	2120-2500D3750F	2120-2500V3750F
1/4	.750	1/4	2 1/2	Drill Point	2120-2500.3750D	2120-2500D3750D	2120-2500V3750D
1/4	1	1/4	3	Fish Tail	2120-2500.4100F	2120-2500D4100F	2120-2500V4100F
1/4	1	1/4	3	Drill Point	2120-2500.4100D	2120-2500D4100D	2120-2500V4100D



End Styles

Fish Tail

Drill Point

SOLID CARBIDE DIAMOND PATTERN UP CUT ROUTER BITS

SERIES 2120

0.80mm - 8.00mm Diameter

CFRP, Fiberglass and Composite Materials

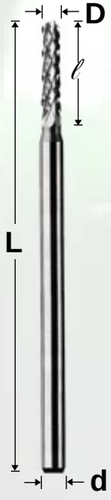
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
DLC is Amorphous Diamond
Shank Diameter Tolerance h6

MATERIAL PRIORITY

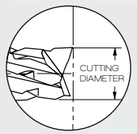
PLASTIC CFRP

UP CUT

D (mm)	ℓ (mm)	d (mm)	L (mm)	End Style	PN Uncoated	PN DLC	PN CVD Diamond
0.80	4	3	38	Fish Tail	2120-0315.157F	2120-0315D157F	2120-0315V157F
0.80	4	3	38	Drill Point	2120-0315.157D	2120-0315D157D	2120-0315V157D
1.00	5	3	38	Fish Tail	2120-0394.197F	2120-0394D197F	2120-0394V197F
1.00	5	3	38	Drill Point	2120-0394.197D	2120-0394D197D	2120-0394V197D
1.50	8	3	38	Fish Tail	2120-0591.315F	2120-0591D315F	2120-0591V315F
1.50	8	3	38	Drill Point	2120-0591.315D	2120-0591D315D	2120-0591V315D
2.00	9	3	38	Fish Tail	2120-0787.354F	2120-0787D354F	2120-0787V354F
2.00	9	3	38	Drill Point	2120-0787.354D	2120-0787D354D	2120-0787V354D
3.00	12	3	38	Fish Tail	2120-1181.472F	2120-1181D472F	2120-1181V472F
3.00	12	3	38	Drill Point	2120-1181.472D	2120-1181D472D	2120-1181V472D
4.00	15	4	40	Fish Tail	2120-1575.591F	2120-1575D591F	2120-1575V591F
4.00	15	4	40	Drill Point	2120-1575.591D	2120-1575D591D	2120-1575V591D
5.00	20	5	50	Fish Tail	2120-1968.787F	2120-1968D787F	2120-1968V787F
5.00	20	5	50	Drill Point	2120-1968.787D	2120-1968D787D	2120-1968V787D
6.00	20	6	50	Fish Tail	2120-2362.787F	2120-2362D787F	2120-2362V787F
6.00	20	6	50	Drill Point	2120-2362.787D	2120-2362D787D	2120-2362V787D
8.00	25	8	63	Fish Tail	2120-3150.984F	2120-3150D984F	2120-3150V984F
8.00	25	8	63	Drill Point	2120-3150.984D	2120-3150D984D	2120-3150V984D



End Styles



Fish Tail

Drill Point

SOLID CARBIDE DIAMOND PATTERN DOWN CUT ROUTER BITS

SERIES 2121

1/32" - 1/4" Diameter

CFRP, Fiberglass and Composite Materials

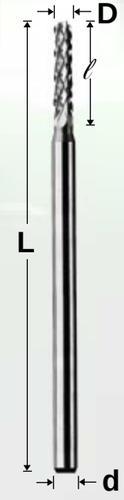
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
DLC is Amorphous Diamond

MATERIAL PRIORITY

PLASTIC CFRP

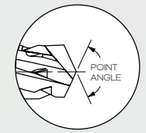
DOWN CUT

D (in)	ℓ (in)	d (in)	L (in)	End Style	PN Uncoated	PN DLC	PN CVD Diamond
1/32	.255	1/8	1 1/2	Fish Tail	2121-0312.255F	2121-0312D255F	2121-0312V255F
1/32	.255	1/8	1 1/2	Drill Point	2121-0312.255D	2121-0312D255D	2121-0312V255D
3/64	.255	1/8	1 1/2	Fish Tail	2121-0469.255F	2121-0469D255F	2121-0469V255F
3/64	.255	1/8	1 1/2	Drill Point	2121-0469.255D	2121-0469D255D	2121-0469V255D
1/16	.255	1/8	1 1/2	Fish Tail	2121-0625.255F	2121-0625D255F	2121-0625V255F
1/16	.255	1/8	1 1/2	Drill Point	2121-0625.255D	2121-0625D255D	2121-0625V255D
3/32	.395	1/8	1 1/2	Fish Tail	2121-0938.395F	2121-0938D395F	2121-0938V395F
3/32	.395	1/8	1 1/2	Drill Point	2121-0938.395D	2121-0938D395D	2121-0938V395D
1/8	.500	1/8	1 1/2	Fish Tail	2121-1250.500F	2121-1250D500F	2121-1250V500F
1/8	.500	1/8	1 1/2	Drill Point	2121-1250.500D	2121-1250D500D	2121-1250V500D
3/16	.625	3/16	2	Fish Tail	2121-1875.2625F	2121-1875D2625F	2121-1875V2625F
3/16	.625	3/16	2	Drill Point	2121-1875.2625D	2121-1875D2625D	2121-1875V2625D
1/4	.750	1/4	2	Fish Tail	2121-2500.2750F	2121-2500D2750F	2121-2500V2750F
1/4	.750	1/4	2	Drill Point	2121-2500.2750D	2121-2500D2750D	2121-2500V2750D
1/4	.750	1/4	2 1/2	Fish Tail	2121-2500.3750F	2121-2500D3750F	2121-2500V3750F
1/4	.750	1/4	2 1/2	Drill Point	2121-2500.3750D	2121-2500D3750D	2121-2500V3750D
1/4	1	1/4	3	Fish Tail	2121-2500.4100F	2121-2500D4100F	2121-2500V4100F
1/4	1	1/4	3	Drill Point	2121-2500.4100D	2121-2500D4100D	2121-2500V4100D



End Styles

Fish Tail



Drill Point

SOLID CARBIDE DIAMOND PATTERN DOWN CUT ROUTER BITS

SERIES 2121

0.80mm - 8.00mm Diameter

CFRP, Fiberglass and Composite Materials

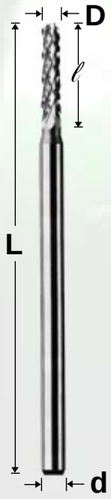
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
DLC is Amorphous Diamond
Shank Diameter Tolerance h6

MATERIAL PRIORITY

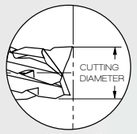
PLASTIC CFRP

DOWN CUT

D (mm)	ℓ (mm)	d (mm)	L (mm)	End Style	PN Uncoated	PN DLC	PN CVD Diamond
0.80	4	3	38	Fish Tail	2121-0315.157F	2121-0315D157F	2121-0315V157F
0.80	4	3	38	Drill Point	2121-0315.157D	2121-0315D157D	2121-0315V157D
1.00	5	3	38	Fish Tail	2121-0394.197F	2121-0394D197F	2121-0394V197F
1.00	5	3	38	Drill Point	2121-0394.197D	2121-0394D197D	2121-0394V197D
1.50	8	3	38	Fish Tail	2121-0591.315F	2121-0591D315F	2121-0591V315F
1.50	8	3	38	Drill Point	2121-0591.315D	2121-0591D315D	2121-0591V315D
2.00	9	3	38	Fish Tail	2121-0787.354F	2121-0787D354F	2121-0787V354F
2.00	9	3	38	Drill Point	2121-0787.354D	2121-0787D354D	2121-0787V354D
3.00	12	3	38	Fish Tail	2121-1181.472F	2121-1181D472F	2121-1181V472F
3.00	12	3	38	Drill Point	2121-1181.472D	2121-1181D472D	2121-1181V472D
4.00	15	4	40	Fish Tail	2121-1575.591F	2121-1575D591F	2121-1575V591F
4.00	15	4	40	Drill Point	2121-1575.591D	2121-1575D591D	2121-1575V591D
5.00	20	5	50	Fish Tail	2121-1968.787F	2121-1968D787F	2121-1968V787F
5.00	20	5	50	Drill Point	2121-1968.787D	2121-1968D787D	2121-1968V787D
6.00	20	6	50	Fish Tail	2121-2362.787F	2121-2362D787F	2121-2362V787F
6.00	20	6	50	Drill Point	2121-2362.787D	2121-2362D787D	2121-2362V787D
8.00	25	8	63	Fish Tail	2121-3150.984F	2121-3150D984F	2121-3150V984F
8.00	25	8	63	Drill Point	2121-3150.984D	2121-3150D984D	2121-3150V984D



End Styles



Fish Tail

Drill Point

SOLID CARBIDE CHIPBREAKER PATTERN UP CUT ROUTER BITS

SERIES 2320

1/32″ - 1/8″ Diameter

CFRP, Fiberglass and Composite Materials

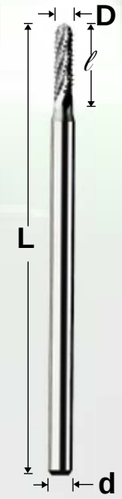
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
DLC is Amorphous Diamond

MATERIAL PRIORITY

PLASTIC CFRP

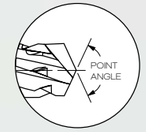
UP CUT

D (in)	ℓ (in)	d (in)	L (in)	End Style	PN Uncoated	PN DLC	PN CVD Diamond
1/32	.255	1/8	1 1/2	Fish Tail	2320-0312.255F	2320-0312D255F	2320-0312V255F
1/32	.255	1/8	1 1/2	Drill Point	2320-0312.255D	2320-0312D255D	2320-0312V255D
3/64	.255	1/8	1 1/2	Fish Tail	2320-0469.255F	2320-0469D255F	2320-0469V255F
3/64	.255	1/8	1 1/2	Drill Point	2320-0469.255D	2320-0469D255D	2320-0469V255D
1/16	.255	1/8	1 1/2	Fish Tail	2320-0625.255F	2320-0625D255F	2320-0625V255F
1/16	.255	1/8	1 1/2	Drill Point	2320-0625.255D	2320-0625D255D	2320-0625V255D
3/32	.395	1/8	1 1/2	Fish Tail	2320-0938.395F	2320-0938D395F	2320-0938V395F
3/32	.395	1/8	1 1/2	Drill Point	2320-0938.395D	2320-0938D395D	2320-0938V395D
1/8	.500	1/8	1 1/2	Fish Tail	2320-1250.500F	2320-1250D500F	2320-1250V500F
1/8	.500	1/8	1 1/2	Drill Point	2320-1250.500D	2320-1250D500D	2320-1250V500D



End Styles

Fish Tail



Drill Point

SOLID CARBIDE CHIPBREAKER PATTERN UP CUT ROUTER BITS

SERIES 2320

0.80mm - 8.00mm Diameter

CFRP, Fiberglass and Composite Materials

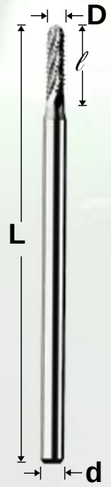
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction
DLC is Amorphous Diamond
Shank Diameter Tolerance h6

MATERIAL PRIORITY

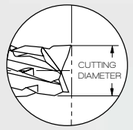
PLASTIC CFRP

UP CUT

D (mm)	ℓ (mm)	d (mm)	L (mm)	End Style	PN Uncoated	PN DLC	PN CVD Diamond
0.80	4	3	38	Fish Tail	2320-0315.157F	2320-0315D157F	2320-0315V157F
0.80	4	3	38	Drill Point	2320-0315.157D	2320-0315D157D	2320-0315V157D
1.00	5	3	38	Fish Tail	2320-0394.197F	2320-0394D197F	2320-0394V197F
1.00	5	3	38	Drill Point	2320-0394.197D	2320-0394D197D	2320-0394V197D
1.50	8	3	38	Fish Tail	2320-0591.315F	2320-0591D315F	2320-0591V315F
1.50	8	3	38	Drill Point	2320-0591.315D	2320-0591D315D	2320-0591V315D
2.00	9	3	38	Fish Tail	2320-0787.354F	2320-0787D354F	2320-0787V354F
2.00	9	3	38	Drill Point	2320-0787.354D	2320-0787D354D	2320-0787V354D
3.00	12	3	38	Fish Tail	2320-1181.472F	2320-1181D472F	2320-1181V472F
3.00	12	3	38	Drill Point	2320-1181.472D	2320-1181D472D	2320-1181V472D
4.00	15	4	40	Fish Tail	2320-1575.591F	2320-1575D591F	2320-1575V591F
4.00	15	4	40	Drill Point	2320-1575.591D	2320-1575D591D	2320-1575V591D
5.00	20	5	50	Fish Tail	2320-1968.787F	2320-1968D787F	2320-1968V787F
5.00	20	5	50	Drill Point	2320-1968.787D	2320-1968D787D	2320-1968V787D
6.00	20	6	50	Fish Tail	2320-2362.787F	2320-2362D787F	2320-2362V787F
6.00	20	6	50	Drill Point	2320-2362.787D	2320-2362D787D	2320-2362V787D
8.00	25	8	63	Fish Tail	2320-3150.984F	2320-3150D984F	2320-3150V984F
8.00	25	8	63	Drill Point	2320-3150.984D	2320-3150D984D	2320-3150V984D



End Styles



Fish Tail

Drill Point

ENGRAVING - SECTION 7

SOLID CARBIDE 2 FLUTE ENGRAVING TOOLS

SERIES EGR

30° - 90° Angles

General Purpose Engraving

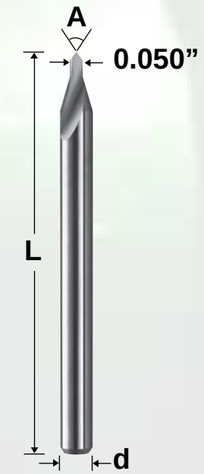
Point Angle Tolerance (+/- 1deg)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes

1/8″ SHANK

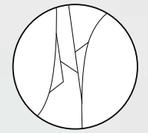
A (deg)	d (in)	L (in)	PN
30	1/8	1 1/2	EGR1250-030
60	1/8	1 1/2	EGR1250-060
90	1/8	1 1/2	EGR1250-090

3.00MM SHANK

A (deg)	d (mm)	L (mm)	PN
30	3	38	EGR1181-030
60	3	38	EGR1181-060
90	3	38	EGR1181-090



End Style



SOLID CARBIDE HALF ROUND ENGRAVING TOOLS

SERIES HR

0.005″ - 0.0315″ Line Widths

General Purpose Engraving

Cutting Tip Tolerance (+0/-0.0005″)
Complete Diameter Selection
Sub Micron Grain Carbide
Mirror Surface Finishes

1/8″ SHANK

W (in)	Letter Height (in)	d (in)	L (in)	PN
.005	1/16	1/8	1 1/2	HR125SSS005A
.010	3/32	1/8	1 1/2	HR125SSS010A
.015	1/8	1/8	1 1/2	HR125SSS015A
.020	3/16	1/8	1 1/2	HR125SSS020A
.025	7/32	1/8	1 1/2	HR125SSS025A

3.00MM SHANK

W (mm)	Letter Height (mm)	d (mm)	L (mm)	PN
0.25	2.40	3	38	HR118SSS025A
0.30	2.75	3	38	HR118SSS030A
0.35	3.10	3	38	HR118SSS035A
0.40	3.45	3	38	HR118SSS040A
0.45	3.80	3	38	HR118SSS045A
0.50	4.75	3	38	HR118SSS050A
0.60	5.50	3	38	HR118SSS060A
0.70	6.25	3	38	HR118SSS070A
0.80	7.00	3	38	HR118SSS080A

SOLID CARBIDE SPADE TOOLS

SERIES SPD

30° - 118° Angles

Designed for spotting or chamfering

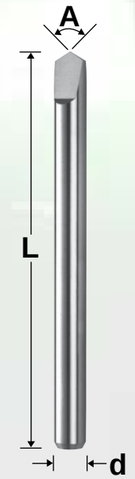
Point Angle Tolerance (+/- 1deg)
Sub Micron Grain Carbide
Mirror Surface Finishes
Single End Construction

1/8″ SHANK

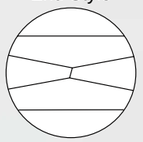
A (deg)	d (in)	L (in)	PN
30	1/8	1 1/2	SPD1250-030
45	1/8	1 1/2	SPD1250-045
60	1/8	1 1/2	SPD1250-060
90	1/8	1 1/2	SPD1250-090
118	1/8	1 1/2	SPD1250-118

3.00MM SHANK

A (deg)	d (mm)	L (mm)	PN
30	3	38	SPD1181-030
45	3	38	SPD1181-045
60	3	38	SPD1181-060
90	3	38	SPD1181-090
118	3	38	SPD1181-118



End Style



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TECHNICAL - SECTION 8

8.01 Feeds and Speeds

8.23

DRILLING FEEDS AND SPEEDS
INCH CARBIDE MICRO DRILLS

		V_c in/min Uncoated		V_c in/min Coated		f = in/U ø < 0.039"		ø < 0.059"		ø < 0.079"		ø < 0.098"		ø < 0.118"	
STEEL	<500 N/mm²	787	1969	787	1969	0.00138	0.00177	0.00157	0.00217	0.00197	0.00256	0.00236	0.00295	0.00256	0.00315
	<800 N/mm²	787	1969	787	1969	0.00118	0.00138	0.00138	0.00177	0.00157	0.00217	0.00197	0.00256	0.00217	0.00276
HI-CSTEEL	<1,000 N/mm²	591	1378	591	1378	0.00079	0.00098	0.00098	0.00138	0.00118	0.00157	0.00138	0.00177	0.00157	0.00197
	<1,300 N/mm²	394	984	394	984	0.00098	0.00059	0.00039	0.00059	0.00059	0.00079	0.00059	0.00098	0.00079	0.00098
HRC	54 HRC	787	169	787	169	0.00059	0.00079	0.00079	0.00118	0.00098	0.00138	0.00118	0.00157	0.00138	0.00177
STAINLESS		591	1575	591	1575	0.00079	0.00098	0.00098	0.00138	0.00118	0.00157	0.00138	0.00177	0.00157	0.00197
		394	984	394	984	0.00098	0.00039	0.00020	0.00039	0.00039	0.00059	0.00039	0.00059	0.00059	0.00079
NI/CO		197	394	197	394	0.00039	0.00059	0.00039	0.00059	0.00059	0.00079	0.00079	0.00098	0.00079	0.00098
TI	<900 N/mm²	197	394	197	394	0.00059	0.00059	0.00020	0.00039	0.00039	0.00059	0.00039	0.00059	0.00059	0.00079
	>900 N/mm²														
CAST IRON	<180 HB	984	2559	984	2559	0.00157	0.00197	0.00177	0.00256	0.00236	0.00295	0.00276	0.00354	0.00315	0.00374
	>180 HB	984	2362	984	2362	0.00157	0.00197	0.00177	0.00256	0.00236	0.00295	0.00276	0.00354	0.00315	0.00374
AI	Aluminum	1969	5906	1969	5906	0.00157	0.00197	0.00177	0.00256	0.00236	0.00295	0.00276	0.00354	0.00315	0.00374
	Silicon <6%	1772	4331	1772	4331	0.00157	0.00197	0.00177	0.00256	0.00236	0.00295	0.00276	0.00354	0.00315	0.00374
	Silicon >6%	1772	4331	1772	4331	0.00177	0.00236	0.00217	0.00295	0.00276	0.00354	0.00315	0.00394	0.00354	0.00472
CU ALLOY	Brass	1969	3543	1969	3543	0.00118	0.00236	0.00236	0.00394	0.00394	0.00591	0.00591	0.00709	0.00709	0.00787
PLASTIC		3150	4724	3150	4724	0.00118	0.00236	0.00118	0.00236	0.00118	0.00236	0.00118	0.00236	0.00118	0.00236

DRILLING FEEDS AND SPEEDS
INCH CARBIDE DRILLS

		V_c in /min Uncoated	V_c in /min AlTiN	f = in/U ø0.079"	ø0.157"	ø0.315"	ø0.472"	ø0.630"
STEEL	<500 N/mm²	3937	3937	0.00157	0.00236	0.00472	0.00669	0.00906
	<800 N/mm²	3937	3937	0.00157	0.00236	0.00472	0.00669	0.00906
HI-CSTEEL	<1,000 N/mm²	3150	3150	0.00118	0.00157	0.00315	0.00512	0.00630
	<1,300 N/mm²	1575	2362	0.00079	0.00157	0.00276	0.00433	0.00630
HRC	54 HRC	236 394	315 472	0.00079	0.00118	0.00236	0.00276	0.00315
	62HRC			0.00000	0.00000	0.00000	0.00000	0.00000
STAINLESS	ferritic	2756	3150	0.00118	0.00157	0.00315	0.00512	0.00630
	martensitic	1969	2362	0.00118	0.00157	0.00315	0.00512	0.00630
	austenitic	1772	1575	0.00118	0.00157	0.00315	0.00512	0.00630
NI/CO		1378	1969	0.00079	0.00157	0.00276	0.00433	0.00630
		984	1575	0.00079	0.00118	0.00236	0.00276	0.00315
TI	<900 N/mm²	1378	1969	0.00118	0.00157	0.00315	0.00512	0.00630
	>900 N/mm²	984	1575	0.00157	0.00236	0.00472	0.00669	0.00906
CAST IRON	<180 HB	2756	3150	0.00236	0.00354	0.00787	0.00984	0.01378
	>180 HB	2362	1969	0.00197	0.00315	0.00472	0.00945	0.01102
AI	Silicon <10%	5906	5906	0.00197	0.00315	0.00472	0.00945	0.01102
	Silicon >10%	3150	3150	0.00197	0.00315	0.00472	0.00945	0.01102
CU ALLOY		3937	3937	0.00236	0.00354	0.00787	0.00984	0.01378
				0.00000	0.00000	0.00000	0.00000	0.00000
PLASTIC	thermoplastic	3937	3937 7874	0.00079	0.00157	0.00276	0.00433	0.00630
	thermoset	3937	3937 7874	0.00079	0.00157	0.00276	0.00433	0.00630
GRAPHITE		3937	3937 5906	0.00079	0.00157	0.00276	0.00433	0.00630
				0.00000	0.00000	0.00000	0.00000	0.00000

DRILLING FEEDS AND SPEEDS
INCH CARBIDE CENTER DRILLS

		V_c in/min Uncoated	V_c in/min AlTiN	f = in/U ø0.079"	ø0.118"	ø0.236"	ø0.394"	ø0.630"
STEEL	<500 N/mm²	2756 3150	3150 3543	0.0039	0.0047	0.0087	0.0130	0.0177
	<800 N/mm²	2362 2953	2756 3543	0.0039	0.0047	0.0087	0.0130	0.0177
HI-CSTEEL	<1,000 N/mm²	1969 2362	2362 2756	0.0028	0.0031	0.0059	0.0091	0.0122
	<1,300 N/mm²	984 1575	1181 1969	0.0024	0.0028	0.0051	0.0079	0.0106
STAINLESS		787 1181	1181 1575	0.0024	0.0031	0.0059	0.0079	0.0118
NI/CO		787 984	1181 1575	0.0197	0.0276	0.0051	0.0071	0.0106
TI	<900 N/mm²	787 1181	1181 1575	0.0024	0.0031	0.0059	0.0079	0.0118
	>900 N/mm²							
CAST IRON	<180 HB	1969 2362	2362 2765	0.0039	0.0047	0.0087	0.0130	0.0177
	>180 HB	1378 1969	1575 2362	0.0031	0.0039	0.0067	0.0118	0.0157
AI	Silicon <10%	3937 5906	3937 5906	0.0047	0.0059	0.0079	0.0098	0.0157
	Silicon >10%	2756 3543	2756 3543	0.0047	0.0059	0.0079	0.0098	0.0157
CU ALLOY		2756 3543	2756 3543	0.0047	0.0059	0.0079	0.0098	0.0157
PLASTIC		5906 7874	5906 7874	0.0051	0.0059	0.0098	0.0157	0.0197

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DRILLING FEEDS AND SPEEDS
INCH CARBIDE STEP DRILLS

		V_c in/min AlTiN	f = in /U ø0.118"	ø0.157"	ø0.197"	ø0.236"	ø0.315"	ø0.394"	ø0.472"	ø0.630"
STEEL	<800 N/mm²	2362 4724	0.0028	0.0035	0.0047	0.0055	0.0079	0.0094	0.0114	0.0138
HI-C STEEL	<1,000 N/mm²	1575 3150	0.0020	0.0024	0.0031	0.0035	0.0047	0.0055	0.0067	0.0091
	<1,300 N/mm²	787 1575	0.0016	0.0016	0.0020	0.0024	0.0028	0.0035	0.0043	0.0063
STAINLESS		1575 2756	0.0016	0.0020	0.0024	0.0028	0.0035	0.0043	0.0051	0.0071
NI/CO		591 1181	0.0016	0.0020	0.0024	0.0028	0.0035	0.0043	0.0051	0.0071
TI	<900 N/mm²	591 1181	0.0020	0.0024	0.0031	0.0035	0.0047	0.0055	0.0067	0.0091
	>900 N/mm²									
CAST IRON	<180 HB	1575 3937	0.0028	0.0035	0.0047	0.0055	0.0079	0.0094	0.0114	0.0138
	>180 HB	1575 3150	0.0024	0.0035	0.0043	0.0051	0.0063	0.0083	0.0094	0.0110
AI		4724 5906	0.0024	0.0035	0.0043	0.0051	0.0063	0.0083	0.0094	0.0110
CU ALLOY	Bronze	2362 3937	0.0028	0.0035	0.0047	0.0055	0.0079	0.0094	0.0114	0.0138
	Brass	1575 3150	0.0020	0.0024	0.0031	0.0035	0.0047	0.0055	0.0067	0.0091

DRILLING FEEDS AND SPEEDS
INCH CARBIDE SPOTTING DRILLS

		V_c in /min Uncoated	V_c in /min AlTiN	f = in/U ø0.078"	ø0.118"	ø0.236"	ø0.394"	ø0.630"
STEEL	<500 N/mm²	3150 3937	3937 4724	0.0039	0.0047	0.0087	0.0130	0.0177
	<800 N/mm²	2362 3543	3150 4331	0.0039	0.0047	0.0087	0.0130	0.0177
HI-C STEEL	<1,000 N/mm²	2165 2953	2362 3150	0.0028	0.0031	0.0059	0.0091	0.0122
	<1,300 N/mm²	1181 1969	1575 2362	0.0024	0.0028	0.0051	0.0079	0.0106
STAINLESS		984 1969	1181 2362	0.0024	0.0031	0.0059	0.0079	0.0118
NI/CO		984 1378	1181 1575	0.0197	0.0276	0.0051	0.0071	0.0106
TI	<900 N/mm²	1378 1378	1181 1575	0.0024	0.0024	0.0059	0.0079	0.0118
	>900 N/mm²							
CAST IRON	<180 HB	3150 3937	3150 3543	0.0039	0.0047	0.0087	0.0130	0.0177
	>180 HB	2362 3543	2756 3543	0.0031	0.0039	0.0067	0.0118	0.0157
AI		3937 7087	5906 7874	0.0047	0.0059	0.0079	0.0098	0.0157
CU ALLOY		3543 4724	4331 5512	0.0047	0.0059	0.0079	0.0098	0.0157
PLASTIC		3937 7087	5906 7874	0.0047	0.0059	0.0079	0.0098	0.0157

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DRILLING FEEDS AND SPEEDS
INCH CARBIDE CHAMFERING DRILLS

		V_c in/min Uncoated	V_c in/min AlTiN	f = in/U ø0.078"	ø0.157"	ø0.236"	ø0.315"	ø0.394"	ø0.472"	ø0.630"	ø0.787"
STEEL	<500 N/mm²	2756	2953	0.00098	0.00197	0.00315	0.00551	0.00551	0.00748	0.00945	0.01102
	<800 N/mm²	1575	2362	0.00098	0.00197	0.00315	0.00551	0.00551	0.00748	0.00945	0.01102
HI-C STEEL	<1,000 N/mm²	1378	1575	0.00091	0.00177	0.00276	0.00472	0.00472	0.00709	0.00866	0.01102
	<1,300 N/mm²	1181	1378	0.00091	0.00177	0.00276	0.00472	0.00669	0.00669	0.00866	0.01024
HRC	54 HRC	984	1181	0.00079	0.00157	0.00236	0.00433	0.00433	0.00630	0.00866	0.00984
	62HRC										
STAINLESS	ferritic	984	1181	0.00091	0.00177	0.00276	0.00472	0.00669	0.00669	0.00866	0.01024
	austenitic	984	1181	0.00079	0.00157	0.00236	0.00433	0.00433	0.00630	0.00866	0.00984
NI/CO		787	984	0.00079	0.00157	0.00236	0.00433	0.00433	0.00630	0.00866	0.00984
TI	<900 N/mm²	984	1181	0.00079	0.00157	0.00236	0.00433	0.00433	0.00630	0.00866	0.00984
	>900 N/mm²										
CAST IRON	<180 HB	1378	1575	0.00091	0.00177	0.00276	0.00472	0.00472	0.00709	0.00866	0.01102
	>180 HB	1181	1378								
AL		5906	7874	0.00098	0.00197	0.00354	0.00591	0.00787	0.00787	0.01063	0.01378
CU ALLOY		3150	4724	0.00197	0.00394	0.00591	0.00984	0.01181	0.01181	0.01378	0.01772
PLASTIC		5906		0.00098	0.00197	0.00354	0.00591	0.00787	0.00787	0.01063	0.01378

DRILLING FEEDS AND SPEEDS
INCH CARBIDE COOLANT MICRO DRILLS

		V_c in /min Uncoated	V_c in /min AlTiN	f = in /U ø<0.0394"	ø<0.0591"	ø<0.0787"	ø<0.0984"	ø<0.1181"
STEEL	<500 N/mm²							
	<800 N/mm²	787 1969	984 3150	0.0008 0.0016	0.0008 0.0016	0.0012 0.0024	0.0016 0.0031	0.0016 0.0031
HI-C STEEL	<1,000 N/mm²	591 1378	984 3150	0.0008 0.0016	0.0008 0.0016	0.0012 0.0024	0.0016 0.0031	0.0016 0.0031
	<1,300 N/mm²	394 984	787 1772	0.0008 0.0016	0.0008 0.0016	0.0012 0.0020	0.0016 0.0024	0.0016 0.0024
STAINLESS		591 1575	591 1378	0.0004 0.0008	0.0004 0.0008	0.0008 0.0016	0.0012 0.0024	0.0012 0.0024
		394 984						
TI	<900 N/mm²	197 394	591 1378	0.0004 0.0008	0.0004 0.0008	0.0008 0.0016	0.0012 0.0024	0.0012 0.0024
	>900 N/mm²							
CAST IRON	<180 HB	984 2559	1181 3543	0.0008 0.0039	0.0008 0.0039	0.0012 0.0024	0.0016 0.0035	0.0016 0.0035
	>180 HB	984 2362	984 3150	0.0039 0.0059	0.0039 0.0059	0.0059 0.0098	0.0079 0.0118	0.0079 0.0118
AL	Alu	1969 5906						
	Silicon <12%	1772 4331	1969 7874	0.0012 0.0024	0.0012 0.0024	0.0016 0.0028	0.0028 0.0047	0.0028 0.0047
	Silicon >12%	1772 4331	1969 7874	0.0008 0.0024	0.0008 0.0024	0.0012 0.0028	0.0016 0.0039	0.0016 0.0039

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DRILLING FEEDS AND SPEEDS INCH CARBIDE HIGH PERFORMANCE COOLANT MICRO DRILLS

		V_c in/min	f = in/U				
		AlTiN	ø0.157"	ø0.315"	ø0.472"	ø0.630"	ø0.787"
STEEL	<500 N/mm²	4331	0.0047	0.0059	0.0110	0.0134	0.0161
	<800 N/mm²	3937	0.0071	0.0098	0.0138	0.0150	0.0161
HI-CSTEEL	<1,000 N/mm²	3150	0.0063	0.0087	0.0122	0.0134	0.0146
	<1,300 N/mm²	2559	0.0063	0.0087	0.0122	0.0134	0.0146
STAINLESS		1575	0.0039	0.0051	0.0075	0.0087	0.0098
			0.0000	0.0000	0.0000	0.0000	0.0000
NI/CO		984	0.0039	0.0051	0.0075	0.0087	0.0098
			0.0000	0.0000	0.0000	0.0000	0.0000
TI	<900 N/mm²	1181	0.0031	0.0043	0.0063	0.0071	0.0079
	>900 N/mm²		0.0000	0.0000	0.0000	0.0000	0.0000
CAST IRON	<180 HB	3543	0.0071	0.0087	0.0138	0.0150	0.0161
	>180 HB	3150	0.0063	0.0098	0.0122	0.0134	0.0146
AI	Silicon <10%	8661	0.0071	0.0098	0.0150	0.0177	0.0205
	Silicon >10%	7874	0.0071	0.0098	0.0150	0.0177	0.0205
CU ALLOY	Brass	5906	0.0063	0.0087	0.0138	0.0165	0.0193
	Bonze	3150	0.0063	0.0087	0.0138	0.0165	0.0193

MILLING FEEDS AND SPEEDS INCH CARBIDE MICRO END MILLS

		V_c in /min	V_c in /min		f_z = in /U						
		Uncoated	AlTiN		ø0.0079"	ø0.0197"	ø0.0315"	ø0.0394"	ø0.0591"	ø0.0787"	ø0.1181"
STEEL	<500 N/mm²	2362	3150	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
	<800 N/mm²	2362	3150	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
HI-CSTEEL	<1,000 N/mm²	2362	3150	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
	<1,300 N/mm²	1575	2362	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
STAINLESS		984	1772	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
NI/CO			984	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
TI			984	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
CAST IRON		2362	3150	Slotting ap=0.0394" ae=0.0394"	0.00004	0.00004	0.00008	0.00008	0.00012	0.00016	0.00024
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
AI		5906		Slotting ap=0.0394" ae=0.0394"	0.00008	0.00020	0.00035	0.00047	0.00071	0.00094	0.00142
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00004	0.00004	0.00004	0.00008	0.00008	0.00016
CU ALLOY		3150		Slotting ap=0.0394" ae=0.0394"	0.00008	0.00024	0.00031	0.00047	0.00071	0.00094	0.00142
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00004	0.00004	0.00004	0.00008	0.00008	0.00016
GRAPHITE		3150		Slotting ap=0.0394" ae=0.0394"	0.00008	0.00020	0.00031	0.00039	0.00059	0.00079	0.00118
				Finishing ap=0.0394" ae=0.1181"	0.00000	0.00004	0.00004	0.00004	0.00008	0.00008	0.00012

MILLING FEEDS AND SPEEDS
INCH CARBIDE MICRO MOLD END MILLS

		V_c in /min AlTiN		f_z = in /U ø0.0079"	ø0.0197"	ø0.0315"	ø0.0394"	ø0.0591"	ø0.0787"	ø0.1181"
STEEL	<500 N/mm²	7874	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
	<800 N/mm²	7874	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
HI-CSTEEL	<1,000 N/mm²	7874	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
	<1,300 N/mm²	4724	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
HRC	< 54 HRC	3150	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
				0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
	< 62 HRC	2362	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
				0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
STAINLESS		3937	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
NI/CO		3150	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
TI		3150	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
CAST IRON		7874	High Speed ap=0.1xø ae=1.0xø	0.00008	0.00008	0.00016	0.00020	0.00020	0.00024	0.00028
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00016	0.00020	0.00024
AL		11811	High Speed ap=0.1xø ae=1.0xø	0.00004	0.00012	0.00016	0.00020	0.00024	0.00031	0.00035
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00020	0.00024	0.00028
CU ALLOY		7874	High Speed ap=0.1xø ae=1.0xø	0.00004	0.00012	0.00016	0.00020	0.00024	0.00031	0.00035
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00020	0.00024	0.00028
GRAPHITE		4724	High Speed ap=0.1xø ae=1.0xø	0.00004	0.00012	0.00016	0.00020	0.00024	0.00031	0.00035
			Copy Milling	0.00004	0.00008	0.00012	0.00016	0.00020	0.00024	0.00028

MILLING FEEDS AND SPEEDS
INCH CARBIDE END MILLS

		V_c in/min Uncoated	V_c in/min AlTiN		f_z = in/U ø0.157"	ø0.236"	ø0.315"	ø0.394"	ø0.472"	ø0.630"	ø0.787"	ø0.984"
STEEL	<400 N/mm²	3937	5906	Roughing	0.00067	0.00138	0.00181	0.00224	0.00280	0.00346	0.00402	0.00445
				Finishing	0.00094	0.00189	0.00252	0.00315	0.00390	0.00484	0.00563	0.00626
				Slotting	0.00047	0.00094	0.00126	0.00157	0.00197	0.00244	0.00283	0.00311
	<700 N/mm²	3937	5906	Roughing	0.00063	0.00126	0.00165	0.00205	0.00256	0.00319	0.00370	0.00409
				Finishing	0.00087	0.00173	0.00232	0.00287	0.00358	0.00445	0.00520	0.00575
				Slotting	0.00043	0.00087	0.00114	0.00146	0.00181	0.00224	0.00260	0.00287
HI-CSTEEL	<1,000 N/mm²	2756	4331	Roughing	0.00051	0.00102	0.00134	0.00169	0.00209	0.00260	0.00303	0.00335
				Finishing	0.00071	0.00142	0.00189	0.00236	0.00295	0.00366	0.00425	0.00469
				Slotting	0.00035	0.00071	0.00094	0.00118	0.00146	0.00181	0.00213	0.00236
	<1,300 N/mm²	2362	3937	Roughing	0.00047	0.00091	0.00122	0.00150	0.00185	0.00232	0.00268	0.00299
				Finishing	0.00063	0.00126	0.00169	0.00209	0.00260	0.00323	0.00378	0.00417
				Slotting	0.00031	0.00063	0.00083	0.00106	0.00130	0.00161	0.00189	0.00209
HRC	54 HRC	1181	2362	Roughing	0.00039	0.00079	0.00106	0.00130	0.00161	0.00201	0.00236	0.00260
				Finishing	0.00055	0.00110	0.00146	0.00185	0.00228	0.00283	0.00331	0.00366
				Slotting	0.00028	0.00055	0.00075	0.00091	0.00114	0.00142	0.00165	0.00181
	62 HRC	787	1575	Roughing	0.00035	0.00067	0.00091	0.00114	0.00142	0.00173	0.00201	0.00224
				Finishing	0.00047	0.00094	0.00126	0.00157	0.00197	0.00244	0.00283	0.00311
				Slotting	0.00024	0.00047	0.00063	0.00079	0.00098	0.00122	0.00142	0.00157
STAINLESS	<900 N/mm²	2362	3543	Roughing	0.00051	0.00102	0.00134	0.00169	0.00209	0.00260	0.00303	0.00335
				Finishing	0.00071	0.00142	0.00189	0.00236	0.00295	0.00366	0.00425	0.00469
				Slotting	0.00035	0.00071	0.00094	0.00118	0.00146	0.00181	0.00213	0.00236
	>900 N/mm²	1969	3150	Roughing	0.00047	0.00091	0.00122	0.00150	0.00185	0.00232	0.00268	0.00299
				Finishing	0.00063	0.00126	0.00169	0.00209	0.00260	0.00323	0.00378	0.00417
				Slotting	0.00031	0.00063	0.00083	0.00106	0.00130	0.00161	0.00189	0.00209
NI/CO	<900 N/mm²	1575	2362	Roughing	0.00039	0.00079	0.00106	0.00130	0.00161	0.00201	0.00236	0.00260
				Finishing	0.00055	0.00110	0.00146	0.00185	0.00228	0.00283	0.00331	0.00366
				Slotting	0.00028	0.00055	0.00075	0.00091	0.00114	0.00142	0.00165	0.00181
	>900 N/mm²	1181	1969	Roughing	0.00035	0.00067	0.00091	0.00114	0.00142	0.00173	0.00201	0.00224
				Finishing	0.00047	0.00094	0.00126	0.00157	0.00197	0.00244	0.00283	0.00311
				Slotting	0.00024	0.00047	0.00063	0.00079	0.00098	0.00122	0.00142	0.00157
TI	<900 N/mm²	1181	1969	Roughing	0.00039	0.00079	0.00106	0.00130	0.00161	0.00201	0.00236	0.00260
				Finishing	0.00055	0.00110	0.00146	0.00185	0.00228	0.00283	0.00331	0.00366
				Slotting	0.00028	0.00055	0.00075	0.00091	0.00114	0.00142	0.00165	0.00181
	>900 N/mm²	787	1575	Roughing	0.00035	0.00067	0.00091	0.00114	0.00142	0.00173	0.00201	0.00224
				Finishing	0.00047	0.00094	0.00126	0.00157	0.00197	0.00244	0.00283	0.00311
				Slotting	0.00024	0.00047	0.00063	0.00079	0.00098	0.00122	0.00142	0.00157
CAST IRON	<180 HB	3937	5906	Roughing	0.00063	0.00126	0.00165	0.00205	0.00256	0.00319	0.00370	0.00409
				Finishing	0.00087	0.00173	0.00232	0.00287	0.00358	0.00445	0.00520	0.00575
				Slotting	0.00043	0.00087	0.00114	0.00146	0.00181	0.00224	0.00260	0.00287
	>180 HB	3150	4724	Roughing	0.00055	0.00114	0.00150	0.00189	0.00232	0.00291	0.00335	0.00374
				Finishing	0.00079	0.00157	0.00213	0.00264	0.00327	0.00406	0.00472	0.00520
				Slotting	0.00039	0.00079	0.00106	0.00130	0.00161	0.00201	0.00236	0.00260
AL	Sillicon <10%	11811	19685	Roughing	0.00067	0.00138	0.00181	0.00224	0.00280	0.00346	0.00402	0.00445
				Finishing	0.00094	0.00189	0.00252	0.00315	0.00390	0.00484	0.00563	0.00626
				Slotting	0.00047	0.00094	0.00126	0.00157	0.00197	0.00244	0.00283	0.00311
	Sillicon >10%	7874	15748	Roughing	0.00063	0.00126	0.00165	0.00205	0.00256	0.00319	0.00370	0.00409
				Finishing	0.00087	0.00173	0.00232	0.00287	0.00358	0.00445	0.00520	0.00575
				Slotting	0.00043	0.00087	0.00114	0.00146	0.00181	0.00224	0.00260	0.00287
CU ALLOY	Bronze	3937	5906	Roughing	0.00055	0.00114	0.00150	0.00189	0.00232	0.00291	0.00335	0.00374
				Finishing	0.00079	0.00157	0.00213	0.00264	0.00327	0.00406	0.00472	0.00520
				Slotting	0.00039	0.00079	0.00106	0.00130	0.00161	0.00201	0.00236	0.00260
	Brass	3150	4724	Roughing	0.00055	0.00114	0.00150	0.00189	0.00232	0.00291	0.00335	0.00374
				Finishing	0.00079	0.00157	0.00213	0.00264	0.00327	0.00406	0.00472	0.00520
				Slotting	0.00039	0.00079	0.00106	0.00130	0.00161	0.00201	0.00236	0.00260
GRAPHITE		11811	19685	Roughing	0.00055	0.00114	0.00150	0.00189	0.00232	0.00291	0.00335	0.00374
				Finishing	0.00079	0.00157	0.00213	0.00264	0.00327	0.00406	0.00472	0.00520
				Slotting	0.00039	0.00079	0.00106	0.00130	0.00201	0.00201	0.00236	0.00260

DRILLING FEEDS AND SPEEDS
METRIC CARBIDE MICRO DRILLS

		V_c m/min Uncoated	V_c m/min Coated	f = mm/U ø < 1.0	ø < 1.5	ø < 2.0	ø < 2.5	ø < 3.0
STEEL	<500 N/mm²	20 50	20 50	0.035 0.045	0.040 0.055	0.050 0.065	0.060 0.075	0.065 0.080
	<800 N/mm²	20 50	20 50	0.030 0.035	0.035 0.045	0.040 0.055	0.050 0.065	0.055 0.070
HI-CSTEEL	<1,000 N/mm²	15 35	15 35	0.020 0.025	0.025 0.035	0.030 0.040	0.035 0.045	0.040 0.050
	<1,300 N/mm²	10 25	10 25	0.010 0.015	0.010 0.015	0.015 0.020	0.015 0.025	0.020 0.025
HRC	54 HRC	20 50	20 50	0.015 0.020	0.020 0.030	0.025 0.035	0.030 0.040	0.035 0.045
STAINLESS		15 40	15 40	0.020 0.025	0.025 0.035	0.030 0.040	0.035 0.045	0.040 0.050
		10 25	10 25	0.005 0.010	0.005 0.010	0.010 0.015	0.010 0.015	0.015 0.020
NI/CO		5 10	5 10	0.010 0.015	0.010 0.015	0.015 0.020	0.020 0.025	0.020 0.025
TI	<900 N/mm²	5 10	5 10	0.005 0.010	0.005 0.010	0.010 0.015	0.010 0.015	0.015 0.020
	>900 N/mm²							
CAST IRON	<180 HB	25 65	25 65	0.040 0.050	0.045 0.065	0.060 0.075	0.070 0.090	0.080 0.095
	>180 HB	25 60	25 60	0.040 0.050	0.045 0.065	0.060 0.075	0.070 0.090	0.080 0.095
AI	Aluminum	50 150	50 150	0.040 0.050	0.045 0.065	0.060 0.075	0.070 0.090	0.080 0.095
	Silicon <6%	45 110	45 110	0.040 0.050	0.045 0.065	0.060 0.075	0.070 0.090	0.080 0.095
	Silicon >6%	45 110	45 110	0.045 0.060	0.055 0.075	0.070 0.090	0.080 0.100	0.090 0.120
CU ALLOY	Brass	50 90	50 90	0.030 0.060	0.060 0.100	0.100 0.150	0.150 0.180	0.180 0.200
PLASTIC		80 120	80 120	0.030 0.060	0.030 0.060	0.030 0.060	0.030 0.060	0.030 0.060

DRILLING FEEDS AND SPEEDS
METRIC CARBIDE DRILLS

		V_c m/min Uncoated	V_c m/min AlTiN	f = mm/U ø2	ø4	ø8	ø12	ø16
STEEL	<500 N/mm²	100	100	0.04	0.06	0.12	0.17	0.23
	<800 N/mm²	100	100	0.04	0.06	0.12	0.17	0.23
HI-CSTEEL	<1,000 N/mm²	80	80	0.03	0.04	0.08	0.13	0.16
	<1,300 N/mm²	40	60	0.02	0.04	0.07	0.11	0.16
HRC	54 HRC 62HRC	6 10	8 12	0.02	0.03	0.06	0.07	0.08
STAINLESS	ferritic	70	80	0.03	0.04	0.08	0.13	0.16
	martensitic	50	60	0.03	0.04	0.08	0.13	0.16
	austenitic	45	40	0.03	0.04	0.08	0.13	0.16
NI/CO		35	50	0.02	0.04	0.07	0.11	0.16
		25	40	0.02	0.03	0.06	0.07	0.08
TI	<900 N/mm²	35	50	0.03	0.04	0.08	0.13	0.16
	>900 N/mm²	25	40	0.04	0.06	0.12	0.17	0.23
CAST IRON	<180 HB	70	80	0.06	0.09	0.20	0.25	0.35
	>180 HB	60	50	0.05	0.08	0.12	0.24	0.28
AI	Silicon <10%	150	150	0.05	0.08	0.12	0.24	0.28
	Silicon >10%	80	80	0.05	0.08	0.12	0.24	0.28
CU ALLOY		100	100	0.06	0.09	0.20	0.25	0.35
PLASTIC	thermoplastic	100	100 200	0.02	0.04	0.07	0.11	0.16
	thermoset	100	100 200	0.02	0.04	0.07	0.11	0.16
GRAPHITE		100	100 150	0.02	0.04	0.07	0.11	0.16

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DRILLING FEEDS AND SPEEDS
METRIC CARBIDE CENTER DRILLS

		V_c m/min Uncoated	V_c m/min AlTiN	f = mm/U ø2	ø3	ø6	ø10	ø16
STEEL	<500 N/mm²	70 80	80 90	0.10	0.12	0.22	0.33	0.45
	<800 N/mm²	60 70	70 90	0.10	0.12	0.22	0.33	0.45
HI-CSTEEL	<1,000 N/mm²	50 60	60 70	0.07	0.08	0.15	0.23	0.31
	<1,300 N/mm²	25 30	30 50	0.06	0.07	0.13	0.20	0.27
STAINLESS		20 30	30 40	0.06	0.08	0.15	0.20	0.30
NI/CO		20 30	30 40	0.50	0.70	0.13	0.18	0.27
TI	<900 N/mm²	20 30	30 40	0.06	0.08	0.15	0.20	0.30
	>900 N/mm²							
CAST IRON	<180 HB	50 60	60 70	0.10	0.12	0.22	0.33	0.45
	>180 HB	35 40	40 60	0.08	0.10	0.17	0.30	0.40
AI	Silicon <10%	100 100	100 150	0.12	0.15	0.20	0.25	0.40
	Silicon >10%	70 70	70 90	0.12	0.15	0.20	0.25	0.40
CU ALLOY		70 70	70 90	0.12	0.15	0.20	0.25	0.40
PLASTIC		150 150	150 200	0.13	0.15	0.25	0.40	0.50

DRILLING FEEDS AND SPEEDS
METRIC CARBIDE STEP DRILLS

		V_c m/min AlTiN	f = mm/U ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16
STEEL	<800 N/mm²	60 120	0.07	0.09	0.12	0.14	0.20	0.24	0.29	0.35
HI-CSTEEL	<1,000 N/mm²	40 80	0.05	0.06	0.08	0.09	0.12	0.14	0.17	0.23
	<1,300 N/mm²	20 40	0.04	0.04	0.05	0.06	0.07	0.09	0.11	0.16
STAINLESS		40 70	0.04	0.05	0.06	0.07	0.09	0.11	0.13	0.18
NI/CO		15 30	0.04	0.05	0.06	0.07	0.09	0.11	0.13	0.18
TI	<900 N/mm²	15 30	0.05	0.06	0.08	0.09	0.12	0.14	0.17	0.23
	>900 N/mm²									
CAST IRON	<180 HB	40 100	0.07	0.09	0.12	0.14	0.20	0.24	0.29	0.35
	>180 HB	40 80	0.06	0.09	0.11	0.13	0.16	0.21	0.24	0.28
AI		120 150	0.06	0.09	0.11	0.13	0.16	0.21	0.24	0.28
CU ALLOY	Bronze	60 100	0.07	0.09	0.12	0.14	0.20	0.24	0.29	0.35
	Brass	40 80	0.05	0.06	0.08	0.09	0.12	0.14	0.17	0.23

DRILLING FEEDS AND SPEEDS
METRIC CARBIDE SPOTTING DRILLS

		V_c m/min Uncoated	V_c m/min AlTiN	f = mm/U ø2	ø3	ø6	ø10	ø16
STEEL	<500 N/mm²	80 100	100 120	0.10	0.12	0.22	0.33	0.45
	<800 N/mm²	60 90	80 110	0.10	0.12	0.22	0.33	0.45
HI-C STEEL	<1,000 N/mm²	55 75	60 80	0.07	0.08	0.15	0.23	0.31
	<1,300 N/mm²	30 50	40 60	0.06	0.07	0.13	0.20	0.27
STAINLESS		25 50	30 60	0.06	0.08	0.15	0.20	0.30
NI/CO		25 35	30 40	0.50	0.70	0.13	0.18	0.27
TI	<900 N/mm²	35 35	30 40	0.06	0.06	0.15	0.20	0.30
	>900 N/mm²							
CAST IRON	<180 HB	80 100	80 90	0.10	0.12	0.22	0.33	0.45
	>180 HB	60 90	70 90	0.08	0.10	0.17	0.30	0.40
AI		100 180	150 200	0.12	0.15	0.20	0.25	0.40
CU ALLOY		90 120	110 140	0.12	0.15	0.20	0.25	0.40
PLASTIC		100 180	150 200	0.12	0.15	0.20	0.25	0.40

DRILLING FEEDS AND SPEEDS
METRIC CARBIDE CHAMFERING DRILLS

		V_c m/min Uncoated	V_c m/min AlTiN	f = mm/U ø2	ø4	ø6	ø8	ø10	ø12	ø16	ø20
STEEL	<500 N/mm²	70	75	0.025	0.050	0.080	0.140	0.140	0.190	0.240	0.280
	<800 N/mm²	40	60	0.025	0.050	0.080	0.140	0.140	0.190	0.240	0.280
HI-C STEEL	<1,000 N/mm²	35	40	0.023	0.045	0.070	0.120	0.120	0.180	0.220	0.280
	<1,300 N/mm²	30	35	0.023	0.045	0.070	0.120	0.170	0.170	0.220	0.260
HRC	54 HRC 62HRC	25	30	0.020	0.040	0.060	0.110	0.110	0.160	0.220	0.250
STAINLESS	ferritic	25	30	0.023	0.045	0.070	0.120	0.170	0.170	0.220	0.260
	austenitic	25	30	0.020	0.040	0.060	0.110	0.110	0.160	0.220	0.250
NI/CO		20	25	0.020	0.040	0.060	0.110	0.110	0.160	0.220	0.250
TI	<900 N/mm²	25	30	0.020	0.040	0.060	0.110	0.110	0.160	0.220	0.250
	>900 N/mm²										
CAST IRON	<180 HB	35	40	0.023	0.045	0.070	0.120	0.120	0.180	0.220	0.280
	>180 HB	30	35								
AI		150	200	0.025	0.050	0.090	0.150	0.200	0.200	0.270	0.350
CU ALLOY		80	120	0.050	0.100	0.150	0.250	0.300	0.300	0.350	0.450
PLASTIC		150		0.025	0.050	0.090	0.150	0.200	0.200	0.270	0.350

DRILLING FEEDS AND SPEEDS METRIC CARBIDE COOLANT MICRO DRILLS

		V_c m/min Uncoated	V_c m/min AlTiN	f = mm/U ø<1.0mm	ø<1.5mm	ø<2.0mm	ø<2.5mm	ø<3.0mm
STEEL	<500 N/mm²							
	<800 N/mm²	20 50	25 80	0.02 0.04	0.02 0.04	0.03 0.06	0.04 0.08	0.04 0.08
HI-C STEEL	<1,000 N/mm²	15 35	25 80	0.02 0.04	0.02 0.04	0.03 0.06	0.04 0.08	0.04 0.08
	<1,300 N/mm²	10 25	20 45	0.02 0.04	0.02 0.04	0.03 0.05	0.04 0.06	0.04 0.06
STAINLESS		15 40	15 35	0.01 0.02	0.01 0.02	0.02 0.04	0.03 0.06	0.03 0.06
		10 25						
TI	<900 N/mm²	5 10	15 35	0.01 0.02	0.01 0.02	0.02 0.04	0.03 0.06	0.03 0.06
	>900 N/mm²							
CAST IRON	<180 HB	25 65	30 90	0.02 0.05	0.02 0.05	0.03 0.06	0.04 0.09	0.04 0.09
	>180 HB	25 60	25 80	0.10 0.20	0.10 0.20	0.15 0.25	0.20 0.30	0.02 0.30
AL	Alu	50 150						
	Silicon <12%	45 110	50 200	0.03 0.06	0.03 0.06	0.04 0.07	0.07 0.12	0.07 0.12
	Silicon >12%	45 110	50 200	0.02 0.06	0.02 0.06	0.03 0.07	0.04 0.10	0.04 0.10

DRILLING FEEDS AND SPEEDS METRIC CARBIDE HIGH PERFORMANCE COOLANT MICRO DRILLS

		V_c m/min AlTiN	f = mm/U ø4	ø8	ø12	ø16	ø20
STEEL	<500 N/mm²	110	0.12	0.15	0.28	0.34	0.41
	<800 N/mm²	100	0.18	0.25	0.35	0.38	0.41
HI-C STEEL	<1,000 N/mm²	80	0.16	0.22	0.31	0.34	0.37
	<1,300 N/mm²	65	0.16	0.22	0.31	0.34	0.37
STAINLESS		40	0.10	0.13	0.19	0.22	0.25
NI/CO		25	0.10	0.13	0.19	0.22	0.25
TI	<900 N/mm²	30	0.08	0.11	0.16	0.18	0.20
	>900 N/mm²						
CAST IRON	<180 HB	90	0.18	0.22	0.35	0.38	0.41
	>180 HB	80	0.16	0.25	0.31	0.34	0.37
AL	Silicon <10%	220	0.18	0.25	0.38	0.45	0.52
	Silicon >10%	200	0.18	0.25	0.38	0.45	0.52
CU ALLOY	Brass	150	0.16	0.22	0.35	0.42	0.49
	Bonze	80	0.16	0.22	0.35	0.42	0.49

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MILLING FEEDS AND SPEEDS
METRIC CARBIDE MICRO END MILLS

		V_c m/min Uncoated	V_c m/min AlTiN		f_z = mm/U ø0.2	ø0.5	ø0.8	ø1.0	ø1.5	ø2.0	ø3.0
STEEL	<500 N/mm²	60	80	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
	<800 N/mm²	60	80	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
HI-CSTEEL	<1,000 N/mm²	60	80	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
	<1,300 N/mm²	40	60	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
STAINLESS		25	45	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
NI/CO			25	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
TI			25	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
CAST IRON		60	80	Slotting ap=1.0 ae=1.0	0.001	0.001	0.002	0.002	0.003	0.004	0.006
				Finishing ap=1.0 ae=0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.001
AI		150		Slotting ap=1.0 ae=1.0	0.002	0.005	0.009	0.012	0.018	0.024	0.036
				Finishing ap=1.0 ae=0.3	0.000	0.001	0.001	0.001	0.002	0.002	0.004
CU ALLOY		80		Slotting ap=1.0 ae=1.0	0.002	0.006	0.008	0.012	0.018	0.024	0.036
				Finishing ap=1.0 ae=0.3	0.000	0.001	0.001	0.001	0.002	0.002	0.004
GRAPHITE		80		Slotting ap=1.0 ae=1.0	0.002	0.005	0.008	0.010	0.015	0.020	0.030
				Finishing ap=1.0 ae=0.3	0.000	0.001	0.001	0.001	0.002	0.002	0.003

MILLING FEEDS AND SPEEDS
METRIC CARBIDE MICRO MOLD END MILLS

		V_c m/min AlTiN		f_z = mm/U ø0.2	ø0.5	ø0.8	ø1.0	ø1.5	ø2.0	ø3.0
STEEL	<500 N/mm²	200	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
	<800 N/mm²	200	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
HI-CSTEEL	<1,000 N/mm²	200	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
	<1,300 N/mm²	120	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
HRC	< 54 HRC	80	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
				0.001	0.002	0.003	0.004	0.004	0.005	0.006
	< 62 HRC	60	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
				0.001	0.002	0.003	0.004	0.004	0.005	0.006
STAINLESS		100	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
NI/CO		80	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
TI		80	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
CAST IRON		200	High Speed ap=0.1xø ae=1.0xø	0.002	0.002	0.004	0.005	0.005	0.006	0.007
			Copy Milling	0.001	0.002	0.003	0.004	0.004	0.005	0.006
AI		300	High Speed ap=0.1xø ae=1.0xø	0.001	0.003	0.004	0.005	0.006	0.008	0.009
			Copy Milling	0.001	0.002	0.003	0.004	0.005	0.006	0.007
CU ALLOY		200	High Speed ap=0.1xø ae=1.0xø	0.001	0.003	0.004	0.005	0.006	0.008	0.009
			Copy Milling	0.001	0.002	0.003	0.004	0.005	0.006	0.007
GRAPHITE		120	High Speed ap=0.1xø ae=1.0xø	0.001	0.003	0.004	0.005	0.006	0.008	0.009
			Copy Milling	0.001	0.002	0.003	0.004	0.005	0.006	0.007

MILLING FEEDS AND SPEEDS METRIC CARBIDE END MILLS

		V_c m/min Uncoated	V_c m/min AlTiN		f_z = mm/U ø4	ø6	ø8	ø10	ø12	ø16	ø20	ø25
STEEL	<400 N/mm²	100	150	Roughing	0.017	0.035	0.046	0.057	0.071	0.088	0.102	0.113
				Finishing	0.024	0.048	0.064	0.080	0.099	0.123	0.143	0.159
				Slotting	0.012	0.024	0.032	0.040	0.050	0.062	0.072	0.079
	<700 N/mm²	100	150	Roughing	0.016	0.032	0.042	0.052	0.065	0.081	0.094	0.104
				Finishing	0.022	0.044	0.059	0.073	0.091	0.113	0.132	0.146
				Slotting	0.011	0.022	0.029	0.037	0.046	0.057	0.066	0.073
HI-C STEEL	<1,000 N/mm²	70	110	Roughing	0.013	0.026	0.034	0.043	0.053	0.066	0.077	0.085
				Finishing	0.018	0.036	0.048	0.060	0.075	0.093	0.108	0.119
				Slotting	0.009	0.018	0.024	0.030	0.037	0.046	0.054	0.060
	<1,300 N/mm²	60	100	Roughing	0.012	0.023	0.031	0.038	0.047	0.059	0.068	0.076
				Finishing	0.016	0.032	0.043	0.053	0.066	0.082	0.096	0.106
				Slotting	0.008	0.016	0.021	0.027	0.033	0.041	0.048	0.053
HRC	54 HRC	30	60	Roughing	0.010	0.020	0.027	0.033	0.041	0.051	0.060	0.066
				Finishing	0.014	0.028	0.037	0.047	0.058	0.072	0.084	0.093
				Slotting	0.007	0.014	0.019	0.023	0.029	0.036	0.042	0.046
	62 HRC	20	40	Roughing	0.009	0.017	0.023	0.029	0.036	0.044	0.051	0.057
				Finishing	0.012	0.024	0.032	0.040	0.050	0.062	0.072	0.079
				Slotting	0.006	0.012	0.016	0.020	0.025	0.031	0.036	0.040
STAINLESS	<900 N/mm²	60	90	Roughing	0.013	0.026	0.034	0.043	0.053	0.066	0.077	0.085
				Finishing	0.018	0.036	0.048	0.060	0.075	0.093	0.108	0.119
				Slotting	0.009	0.018	0.024	0.030	0.037	0.046	0.054	0.060
	>900 N/mm²	50	80	Roughing	0.012	0.023	0.031	0.038	0.047	0.059	0.068	0.076
				Finishing	0.016	0.032	0.043	0.053	0.066	0.082	0.096	0.106
				Slotting	0.008	0.016	0.021	0.027	0.033	0.041	0.048	0.053
NI/CO	<900 N/mm²	40	60	Roughing	0.010	0.020	0.027	0.033	0.041	0.051	0.060	0.066
				Finishing	0.014	0.028	0.037	0.047	0.058	0.072	0.084	0.093
				Slotting	0.007	0.014	0.019	0.023	0.029	0.036	0.042	0.046
	>900 N/mm²	30	50	Roughing	0.009	0.017	0.023	0.029	0.036	0.044	0.051	0.057
				Finishing	0.012	0.024	0.032	0.040	0.050	0.062	0.072	0.079
				Slotting	0.006	0.012	0.016	0.020	0.025	0.031	0.036	0.040
TI	<900 N/mm²	30	50	Roughing	0.010	0.020	0.027	0.033	0.041	0.051	0.060	0.066
				Finishing	0.014	0.028	0.037	0.047	0.058	0.072	0.084	0.093
				Slotting	0.007	0.014	0.019	0.023	0.029	0.036	0.042	0.046
	>900 N/mm²	20	40	Roughing	0.009	0.017	0.023	0.029	0.036	0.044	0.051	0.057
				Finishing	0.012	0.024	0.032	0.040	0.050	0.062	0.072	0.079
				Slotting	0.006	0.012	0.016	0.020	0.025	0.031	0.036	0.040
CAST IRON	<180 HB	100	150	Roughing	0.016	0.032	0.042	0.052	0.065	0.081	0.094	0.104
				Finishing	0.022	0.044	0.059	0.073	0.091	0.113	0.132	0.146
				Slotting	0.011	0.022	0.029	0.037	0.046	0.057	0.066	0.073
	>180 HB	80	120	Roughing	0.014	0.029	0.038	0.048	0.059	0.074	0.085	0.095
				Finishing	0.020	0.040	0.054	0.067	0.083	0.103	0.120	0.132
				Slotting	0.010	0.020	0.027	0.033	0.041	0.051	0.060	0.066
AI	Sillicon <10%	300	500	Roughing	0.017	0.035	0.046	0.057	0.071	0.088	0.102	0.113
				Finishing	0.024	0.048	0.064	0.080	0.099	0.123	0.143	0.159
				Slotting	0.012	0.024	0.032	0.040	0.050	0.062	0.072	0.079
	Sillicon >10%	200	400	Roughing	0.016	0.032	0.042	0.052	0.065	0.081	0.094	0.104
				Finishing	0.022	0.044	0.059	0.073	0.091	0.113	0.132	0.146
				Slotting	0.011	0.022	0.029	0.037	0.046	0.057	0.066	0.073
CU ALLOY	Bronze	100	150	Roughing	0.014	0.029	0.038	0.048	0.059	0.074	0.085	0.095
				Finishing	0.020	0.040	0.054	0.067	0.083	0.103	0.120	0.132
				Slotting	0.010	0.020	0.027	0.033	0.041	0.051	0.060	0.066
	Brass	80	120	Roughing	0.014	0.029	0.038	0.048	0.059	0.074	0.085	0.095
				Finishing	0.020	0.040	0.054	0.067	0.083	0.103	0.120	0.132
				Slotting	0.010	0.020	0.027	0.033	0.041	0.051	0.060	0.066
GRAPHITE		300	500	Roughing	0.014	0.029	0.038	0.048	0.059	0.074	0.085	0.095
				Finishing	0.020	0.040	0.054	0.067	0.083	0.103	0.120	0.132
				Slotting	0.010	0.020	0.027	0.033	0.051	0.051	0.060	0.066

METRIC PRE-DRILL DIAMETERS FOR REAMERS

ø	STEEL	HI-C STEEL	STAINLESS	CAST IRON	TI	NI/CO	CU ALLOY	AI	TH PLASTIC	HD PLASTIC
0.3	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
0.4	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
0.5	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
0.6	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.8	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
1.0	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
2.0	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
3.0	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
4.0	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
5.0	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80
6.0	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80
8.0	7.80	7.80	7.80	7.80	7.80	7.80	7.70	7.70	7.80	7.70

COATING GUIDE

Coating	TiN	TiCN	TiAlCN	TiAlN	AlTiN	ZrN	CrN	CBC	AlTiN/ Si_3N_4	AlCrN/ Si_3N_4	DLC	CVD Diamond
Nanohardness (Gpa)	24	37	28	28	38	20	18	20	45	42	77	87
Friction Coeefficient (Fretting)	0.55	0.2	0.3	0.6	0.7	0.4	0.3	0.15	0.45	0.35	0.2	0.25
Thickness (µm) (Application Dependant)	1-5	1-4	1-4	1-4	1-3	1-4	1-4	0.5 - 1.5	1-4	1-5	1-3	8 - 12
Maximum Working Temperature	600° C (1100° F)	400° C (750° F)	500° C (930° F)	700° C (1290° F)	900° C (1650° F)	550° C (1020° F)	700° C (1290° F)	400° C (750° F)	1200° C (2190° F)	1100° C (2010° F)	700° C (1290° F)	800° C (1470° F)
Color	Golden Yellow	Blue-Gray	Red Copper	Violet	Blue Black	Pale Yellow	Silver	Charcoal Gray	Blue Black	Silver Gray	Black	Gray

KYOCERA MICRO TOOLS

CUSTOM TOOL REQUEST

COMMERCIAL INFORMATION

Date
Customer Name
Control #

Success Criteria (1-5, 5 Most Important)
Tool Life
Price
Capability

Estimated Consumption (Year)
Quote Request Qty (Ex: 5,10,50,100 etc)

Technical Information

Work Piece Information
Material Code
Hardness (HRc)
Type Holder

Coating Type
Coating Thickness
Coating Description
Special Tolerance?

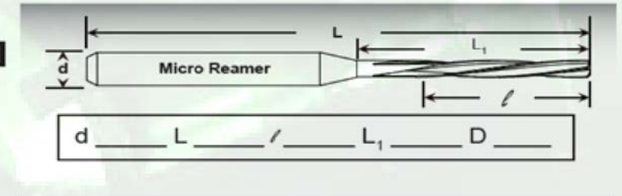
Specify Text Request and Important Information

Quote Information Requested (Check)
Similar to Kyocera Part Number
Similar to Other Tool Supplier PN

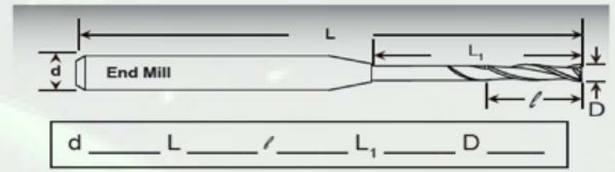
Additional Information Not Specified Elsewhere

Tool Drawing

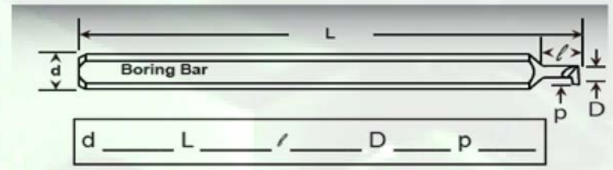
Check Box For Desired Tool Style

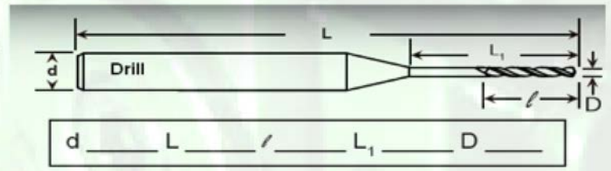


☐ Coolant Thru

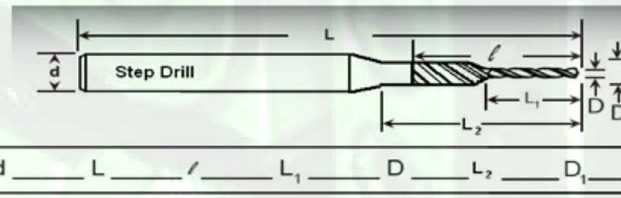


☐ Ball Nose
☐ Square End
☐ Corner Radius
Corner Radius: _____





☐ Coolant Thru



☐ Coolant Thru

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