

## Wire Type IQI – ASTM E747-97

ASTM E747-97 wire penetrameters are accepted by ASME V and AWS as an alternative to plaque IQI's. Encapsulated in vinyl for durability, they are available in 4 set sizes (A, B, C and D).

Metal	Set available
Stainless Steel	A, B, C and D
Aluminum	A, B, C and D
Copper	A, B, C and D
Inconel	A and B
Titanium	A and B



ASTM E747 – Wire IQI sizes and Wire identity number.

Set A		Set B		Set C		Set D	
Wire diameter Inch (mm)	Wire Identity	Wire diameter Inch (mm)	Wire Identity	Wire diameter Inch (mm)	Wire Identity	Wire diameter Inch (mm)	Wire Identity
0.0032 (0.08)	1	0.010 (0.25)	6	0.032 (0.81)	11	0.10 (2.5)	16
0.004 (0.1)	2	0.013 (0.33)	7	0.040 (1.02)	12	0.126 (3.2)	17
0.005 (0.13)	3	0.016 (0.4)	8	0.050 (1.27)	13	0.160 (4.06)	18
0.0063 (0.16)	4	0.020 (0.51)	9	0.063 (1.6)	14	0.20 (5.1)	19
0.008 (0.2)	5	0.025 (0.64)	10	0.08 (2.03)	15	0.25 (6.4)	20
0.010 (0.25)	6	0.032 (0.81)	11	0.100 (2.5)	16	0.32 (8)	21

Each IQI set covers a range of thicknesses for which it is used, based on a standard 2T level of inspection.

IQI Set	Thickness range
A	0.25" to 0.75"
B	0.75" to 1.7"
C	1.7" to 4.0"
D	4.0" to 10.0"

ASTM 747 - Wire Sizes Equivalent t corresponding 1T, 2T and 4T holes in various hole type IQI's

Plaque Thickness inch (mm)	Plaque IQI ID number.	Diameter of wire with EPS of hole in plaque, inch (mm)		
		1T	2T	4T
0.005 (0.13)	5		0.0038 (0.09)	0.006 (0.15)
0.006 (0.16)	6		0.004 (0.10)	0.0067 (0.18)
0.008 (0.20)	8	0.0032 (0.08)	0.005 (0.13)	0.008 (0.20)
0.009 (0.23)	9	0.0035 (0.09)	0.0056 (0.14)	0.009 (0.23)
0.010 (0.25)	10	0.004 (0.10)	0.006 (0.15)	0.010 (0.25)
0.012 (0.30)	12	0.005 (0.13)	0.008 (0.20)	0.012 (0.28)
0.015 (0.38)	15	0.0065 (0.16)	0.010 (0.25)	0.016 (0.41)
0.017 (0.43)	17	0.0076 (0.19)	0.012 (0.28)	0.020 (0.51)
0.020 (0.51)	20	0.010 (0.25)	0.015 (0.38)	0.025 (0.63)
0.025 (0.64)	25	0.013 (0.33)	0.020 (0.51)	0.032 (0.81)
0.030 (0.76)	30	0.016 (0.41)	0.025 (0.63)	0.040 (1.02)
0.035 (0.89)	35	0.020 (0.51)	0.032 (0.81)	0.050 (1.27)
0.040 (1.02)	40	0.025 (0.63)	0.040 (0.2)	0.063 (1.57)
0.050 (1.27)	50	0.032 (0.81)	0.050 (1.27)	0.080 (2.03)
0.060 (1.52)	60	0.040 (1.02)	0.063 (1.57)	0.100 (2.54)
0.070 (1.78)	70	0.050 (1.27)	0.080 (2.03)	0.126 (3.20)
0.080 (2.03)	80	0.063 (1.57)	0.100 (2.54)	0.160 (4.06)
0.100 (2.5)	100	0.080 (2.03)	0.126 (3.20)	0.200 (5.08)
0.120 (3.05)	120	0.100 (2.54)	0.160 (4.06)	0.250 (6.35)
0.140 (3.56)	140	0.126 (3.20)	0.200 (5.08)	0.320 (8.13)
0.160 (4.06)	160	0.160 (4.06)	0.250 (6.35)	
0.200 (5.08)	200	0.200 (5.08)	0.320 (8.13)	
0.240 (6.10)	240	0.250 (6.35)		
0.280 (7.11)	280	0.320 (8.13)		

DIN – Available in aluminum, copper and steel.

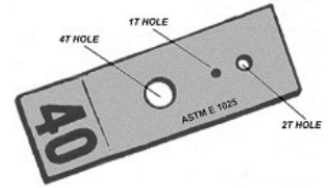
Set A		Set B		Set C		Set D	
Wire diameter Inch (mm)	Wire Identity	Wire diameter Inch (mm)	Wire Identity	Wire diameter Inch (mm)	Wire Identity	Wire diameter Inch (mm)	Wire Identity
0.0032 (0.08)	1	0.010 (0.25)	6	0.025 (0.64)	10	0.050 (1.27)	13
0.004 (0.1)	2	0.013 (0.33)	7	0.032 (0.81)	11	0.063 (1.6)	14
0.005 (0.13)	3	0.016 (0.4)	8	0.040 (1.02)	12	0.08 (2.03)	15
0.0063 (0.16)	4	0.020 (0.51)	9	0.050 (1.27)	13	0.10 (2.5)	16
0.008 (0.2)	5	0.025 (0.64)	10	0.063 (1.6)	14	0.126 (3.2)	17
0.010 (0.25)	6	0.032 (0.81)	11	0.08 (2.03)	15	0.160 (4.06)	18
0.013 (0.33)	7	0.040 (1.02)	12	0.100 (2.5)	16	0.20 (5.1)	19



## IQI - ASTM E1025 Penetrameters

ASTM E1025 penetrameters have lead figures identifying the material and thickness.

2% of material's thickness to be radiographed (Small hole diameter = 1x thickness, Medium hole diameter = 2x thickness, Large hole diameter = 4x thickness).



IQI or "Penetrameter" to ASTM E 1025

### Standard Image Quality Levels

Image Quality Levels	IQI Thickness	Minimum Perceptible Hole Diameter	Equivalent IQI Sensitivity %*
2-1T	1/50 (2%) of specimen thickness	1T	1.4
2-2T		2T	2.0
2-4T		4T	2.8

\* Equivalent IQI sensitivity is that thickness of the IQI, expressed as a percentage of the part thickness, in which the 2T hole would be visible under the same conditions.

### General dimensions:

Size	Length	Width
#50 and smaller	1.5"	0.5"
>#50 to #160	2.25"	1"
>#160	Diameter equal to 4x thickness	Diameter equal to 4x thickness (2 holes)

Group no.	Material Type
1	Aluminum (6061), Steel (1018), Stainless (304).
2	Aluminium (2014, 2024, 2219, 7075), Aluminium-bronze, Brass, Copper, Cupro-Nickel, Inconel 600, Magnesium (AZ 31B, ZK60), Monel 400, Nickel, Phosphor-Bronze.
3	Cobalt (Haynes 25, Haynes 188).
4	Hastelloy (C, X), Inconel (625, 718).
5	Zirconium.
6	Titanium 6/4.

**Available sets: ASTM E1025**

<b>Set "A" - ASTM E1025</b>	<p>Consists of 25 IQI's and contains the following sizes:            5, 6, 7, 9, 10, 11, 12, 13, 15, 16, 17, 18, 20, 22, 25, 27, 30, 32, 35, 37, 40, 42, 45, 47, 50.</p> <p>Make sure to specify the material required (see above).</p>
<b>Set "B" - ASTM E1025</b>	<p>Consists of 11 IQI's and contains the following sizes:            55, 60, 65, 70, 75, 80, 90, 100, 120, 140, 160.</p> <p>Make sure to specify the material required (see above).</p>



Options:

- IQI serialization.
- IQI serialization and calibration.
- IQI encapsulation.

## IQI - ASTM E1742 Penetrameters

ASTM E1742 penetrameters have lead figures identifying the material and thickness. 2% of material's thickness to be radiographed (Small hole diameter = 1x thickness, Medium hole diameter = 2x thickness, Large hole diameter = 4x thickness).

### Standard Image Quality Levels

Image Quality Levels	IQI Thickness	Minimum Perceptible Hole Diameter	Equivalent IQI Sensitivity %*
2-1T	1/50 (2%) of specimen thickness	1T	1.4
2-2T		2T	2.0
2-4T		4T	2.8

\* Equivalent IQI sensitivity is that thickness of the IQI, expressed as a percentage of the part thickness, in which the 2T hole would be visible under the same conditions.

### General dimensions:

Size	Length	Width
2.5" and smaller	2"	0.5"
2.6" to 8"	2.850"	1"
Over 8"	Diameter equal to 4x thickness	Diameter equal to 4x thickness (2 holes)

Group no.	Material Type
1	Aluminum (6061), Steel (1018), Stainless (304).
2	Aluminium (2014, 2024, 2219, 7075), Aluminium-bronze, Brass, Copper, Cupro-Nickel, Inconel 600, Magnesium (AZ 31B, ZK60), Monel 400, Nickel, Phosphor-Bronze.
3	Cobalt (Haynes 25, Haynes 188).
4	Hastelloy (C, X), Inconel (625, 718), Waspaloy.
5	Zirconium.
6	Titanium 6/4.

Group no.	Size Range
A	0.06" to 1.0"
B	1.1" to 2.5"
C	2.6" to 5.0"
D	5.2" to 8.0"
E	8.2" to 20.0"



**Available sets: ASTM E1742**

Material Type	Size Range	Group No.	Part No.
1	0.06" to 1.0"	A	QP-ASTM-E1742-1A
1	1.1" to 2.5"	B	QP-ASTM-E1742-1B
1	2.6" to 5.0"	C	QP-ASTM-E1742-1C
1	5.2" to 8.0"	D	QP-ASTM-E1742-1D
1	8.2" to 20.0"	E	QP-ASTM-E1742-1E
2	0.06" to 1.0"	A	QP-ASTM-E1742-2A
2	1.1" to 2.5"	B	QP-ASTM-E1742-2B
2	2.6" to 5.0"	C	QP-ASTM-E1742-2C
2	5.2" to 8.0"	D	QP-ASTM-E1742-2D
2	8.2" to 20.0"	E	QP-ASTM-E1742-2E
3	0.06" to 1.0"	A	QP-ASTM-E1742-3A
3	1.1" to 2.5"	B	QP-ASTM-E1742-3B
3	2.6" to 5.0"	C	QP-ASTM-E1742-3C
3	5.2" to 8.0"	D	QP-ASTM-E1742-3D
3	8.2" to 20.0"	E	QP-ASTM-E1742-3E
4	0.06" to 1.0"	A	QP-ASTM-E1742-4A
4	1.1" to 2.5"	B	QP-ASTM-E1742-4B
4	2.6" to 5.0"	C	QP-ASTM-E1742-4C
4	5.2" to 8.0"	D	QP-ASTM-E1742-4D
4	8.2" to 20.0"	E	QP-ASTM-E1742-4E
5	0.06" to 1.0"	A	QP-ASTM-E1742-5A
5	1.1" to 2.5"	B	QP-ASTM-E1742-5B
5	2.6" to 5.0"	C	QP-ASTM-E1742-5C
6	0.06" to 1.0"	A	QP-ASTM-E1742-6A
6	1.1" to 2.5"	B	QP-ASTM-E1742-6B
6	2.6" to 5.0"	C	QP-ASTM-E1742-6C

Options:

- IQI serialization.
- IQI serialization and calibration.
- IQI encapsulation.



## Shims for E1025 Penetrameters

### Shims for E1025 Penetrameter

Used under ASTM E1025 or ASME SE1025 penetrameters to compensate for thickness. Shims are available in 1/16" increments, from 1/16" to 1" in thickness. Material and size identification indicating actual thickness is marked on each shim. All shims are 2" long x 0.75" wide. Shims and mounting blocks should be visible on 3 sides.

Standard materials available: Aluminum (6061), Brass, Copper, Cupro-Nickel, Inconel, Magnesium, Nickel, Stainless (304), Steel (1018) and Titanium and Zirconium.

Special materials also available: Aluminium (2014, 2024, 2219 or 7075), Cobalt, Haynes 25, Hastelloy (B, C or X), Inconel (625 or 718), Monel, Phosphorus-bronze and Waspaloy.

Group no.	Size Range
A	0.005" to 0.050"
B	0.060" to 0.250"
C	0.260" to 0.500"
D	0.510" to 1.0"



Available standard E1025 Shims kits (2" long x 0.75" wide), marked with material and size identification:

Standard Material Type	Size Range	Group No.	Part No.
Aluminum (6061)	0.005" to 0.050"	A	QPZ-SAL-A
Aluminum (6061)	0.060" to 0.250"	B	QPZ-SAL-B
Aluminum (6061)	0.260" to 0.500"	C	QPZ-SAL-C
Aluminum (6061)	0.510" to 1.0"	D	QPZ-SAL-D
Brass	0.005" to 0.050"	A	QPZ-SBR-A
Brass	0.060" to 0.250"	B	QPZ-SBR-B
Brass	0.260" to 0.500"	C	QPZ-SBR-C
Brass	0.510" to 1.0"	D	QPZ-SBR-D
Copper	0.005" to 0.050"	A	QPZ-SCU-A
Copper	0.060" to 0.250"	B	QPZ-SCU-B
Copper	0.260" to 0.500"	C	QPZ-SCU-C
Copper	0.510" to 1.0"	D	QPZ-SCU-D
Inconel	0.005" to 0.050"	A	QPZ-SIN-A
Inconel	0.060" to 0.250"	B	QPZ-SIN-B
Inconel	0.260" to 0.500"	C	QPZ-SIN-C
Inconel	0.510" to 1.0"	D	QPZ-SIN-D
Magnesium	0.005" to 0.050"	A	QPZ-SMG-A
Magnesium	0.060" to 0.250"	B	QPZ-SMG-B
Magnesium	0.260" to 0.500"	C	QPZ-SMG-C
Magnesium	0.510" to 1.0"	D	QPZ-SMG-D



Shims for E1025 Penetrameters  
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Stainless (304)	0.005" to 0.050"	A	QPZ-SSS-A
Stainless (304)	0.060" to 0.250"	B	QPZ-SSS-B
Stainless (304)	0.260" to 0.500"	C	QPZ-SSS-C
Stainless (304)	0.510" to 1.0"	D	QPZ-SSS-D
Steel (1018)	0.005" to 0.050"	A	QPZ-SST-A
Steel (1018)	0.060" to 0.250"	B	QPZ-SST-B
Steel (1018)	0.260" to 0.500"	C	QPZ-SST-C
Steel (1018)	0.510" to 1.0"	D	QPZ-SST-D

- Contact us for special materials, shim without markings, options and/or receive a quote.

Options:

- Shim serialization.



## Mounting Blocks for E1742 Penetrameters

### Mounting Blocks for E1742 Penetrameters

Used when it is impractical to place the IQI directly on the object. Mounting blocks are supplied in sizes corresponding with ASTM E1742 IQI sizes. All blocks are 2.25" long x 1.0" wide. Shims and mounting blocks should be visible on 3 sides.

Standard materials available: Aluminum (6061), Brass, Copper, Cupro-Nickel, Inconel, Magnesium, Nickel, Stainless (304), Steel (1018) and Titanium and Zirconium.

Special materials also available: Aluminium (2014, 2024, 2219 or 7075), Cobalt, Haynes 25, Hastelloy (B, C or X), Inconel (625 or 718), Monel, Phosphorus-bronze and Waspaloy (up to 0.375").

Group no.	Size Range
A	0.005" to 0.050"
B	0.060" to 0.250"
C	0.260" to 0.500"
D	0.510" to 1.0"



Available standard E1742 mounting blocks kits (2.25" long x 1.0" wide), marked with material and size identification:

Standard Material Type	Size Range	Group No.	Part No.
Aluminum (6061)	0.005" to 0.050"	A	QPZ-MAL-A
Aluminum (6061)	0.060" to 0.250"	B	QPZ-MAL-B
Aluminum (6061)	0.260" to 0.500"	C	QPZ-MAL-C
Aluminum (6061)	0.510" to 1.0"	D	QPZ-MAL-D
Brass	0.005" to 0.050"	A	QPZ-MBR-A
Brass	0.060" to 0.250"	B	QPZ-MBR-B
Brass	0.260" to 0.500"	C	QPZ-MBR-C
Brass	0.510" to 1.0"	D	QPZ-MBR-D
Copper	0.005" to 0.050"	A	QPZ-MCU-A
Copper	0.060" to 0.250"	B	QPZ-MCU-B
Copper	0.260" to 0.500"	C	QPZ-MCU-C
Copper	0.510" to 1.0"	D	QPZ-MCU-D
Inconel	0.005" to 0.050"	A	QPZ-MIN-A
Inconel	0.060" to 0.250"	B	QPZ-MIN-B
Inconel	0.260" to 0.500"	C	QPZ-MIN-C
Inconel	0.510" to 1.0"	D	QPZ-MIN-D
Magnesium	0.005" to 0.050"	A	QPZ-MMG-A
Magnesium	0.060" to 0.250"	B	QPZ-MMG-B
Magnesium	0.260" to 0.500"	C	QPZ-MMG-C
Magnesium	0.510" to 1.0"	D	QPZ-MMG-D



Mounting Blocks for E1742 Penetrameters

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Stainless (304)	0.005" to 0.050"	A	QPZ-MSS-A
Stainless (304)	0.060" to 0.250"	B	QPZ-MSS-B
Stainless (304)	0.260" to 0.500"	C	QPZ-MSS-C
Stainless (304)	0.510" to 1.0"	D	QPZ-MSS-D
Steel (1018)	0.005" to 0.050"	A	QPZ-MST-A
Steel (1018)	0.060" to 0.250"	B	QPZ-MST-B
Steel (1018)	0.260" to 0.500"	C	QPZ-MST-C
Steel (1018)	0.510" to 1.0"	D	QPZ-MST-D

- Contact us for special materials, shim without markings, options and/or receive a quote.

Options:

- Block serialization.

## Step Wedges for X-ray

### Step Wedges (Blocks)

Used for the calibration of x-ray machines and evaluation of techniques. When an object with varying thicknesses is radiographed a step wedge of the same material, incorporating the same thicknesses, may often be advantageously used. By placing an IQI on each step, and including the step wedge in the radiograph, the sensitivity may be suitably determined for each thickness.



Standard step wedges are 1" high and 2.25" wide, with 4, 8 or 16 steps are available in all standard materials. Step wedges of other materials and alloys are made on order.

Standard materials available: Aluminum (6061), Brass, Cobalt, Copper, Cupro-Nickel, Hastelloy (C or X), Inconel (600, 625 or 718), Magnesium, Monel, Nickel, Stainless (304), Steel (1018) and Titanium.

### DIMENSIONS

	<b>4 Steps</b>	<b>8 Steps</b>	<b>16 Steps</b>
Step Height	0.250"	0.125"	0.0625"
Step Width	0.750"	0.750"	0.500"
Block Length	3.000"	6.000"	8.000"

Special step wedges to any height and width can be ordered to your specifications.

Contact us to discuss the materials, options and/or receive a quote.