

# Metal Orifice Assemblies

## Description

The inserts shown on this page are designed to press-fit into openings accurately machined in fittings, manifolds and custom parts. There is a choice of insert sizes and materials of construction.

## Applications

The inserts can be used with a wide variety of fittings by accurately machining the inside of the fitting. The orifice is then pressed into the fitting for control of the flow rate of liquids or gases.

Manifolds or other custom assemblies that require flow rate control of fluids can be accurately machined to press fit the orifices shown on this page and on page 11.

## General Specifications

### Maximum Operating Pressure

Insert Only (see exceptions)

- Brass – 2000 psig
- 303SS – 4000 psig
- 316SS – 4000 psig

exceptions IAS, US

Maximum Differential Pressure –  
100 psid

**Flow** – See flow chart for air flow on pages 20, 21 and 22.

**Orifice Diameters** – .004" to .125". See chart at right. Consult factory for other sizes.

**Orifice Diameter Accuracy** –  $\pm .0005"$

**C<sub>v</sub> Range** – .000030 to .37

See pages 20, 21 and 22.

**Fluid Media** – Air, Water, Gases and Liquids compatible with materials of construction.

**Dimensions** – See drawings in right hand column of this page and on page 11.

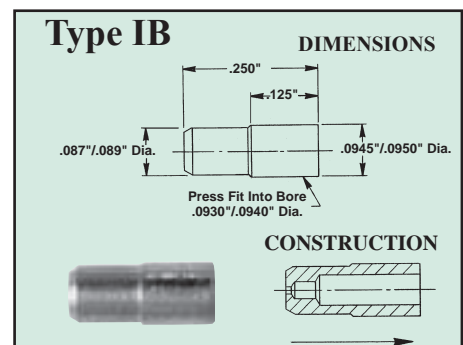
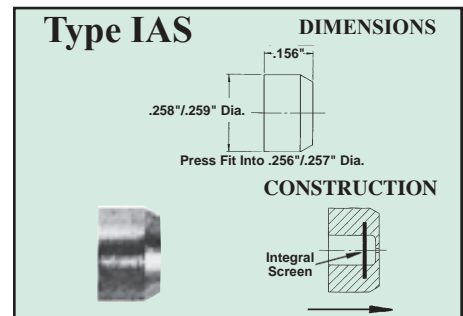
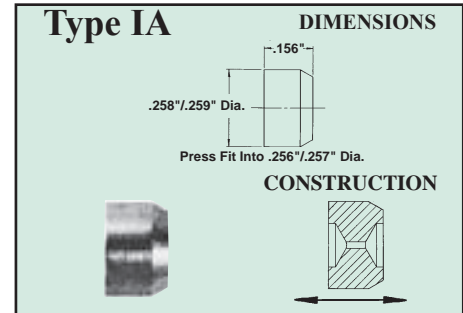
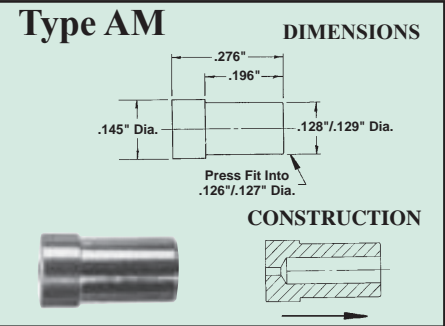
**Press Fit** – See drawings in right hand column of this page and on page 11.

### Materials

- Type IA, AM, IF – Brass or 303 SS
- Type IAS – Brass, 304 SS Screen
- Type IB, IE, IJ – 303 SS
- IK, U
- Type IH – Brass or 303 SS  
with sapphire orifice
- Type IL – Brass
- Type IC, ID – 316 SS
- Type US – 303 SS, 304 SS Screen

## INSERTS

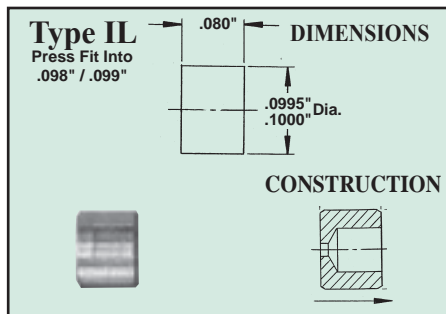
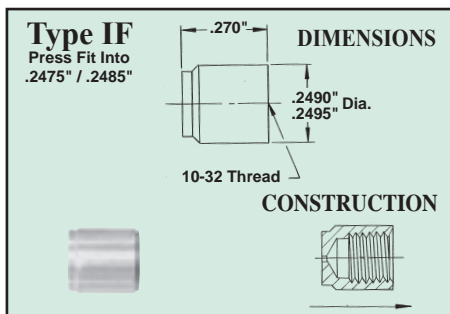
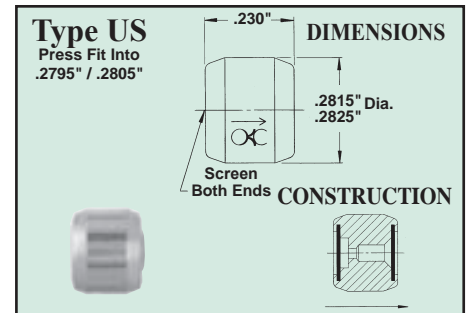
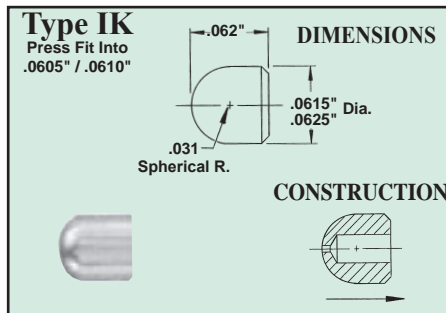
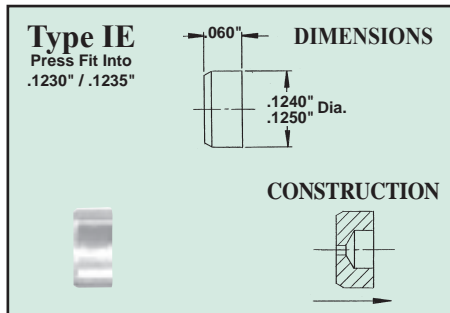
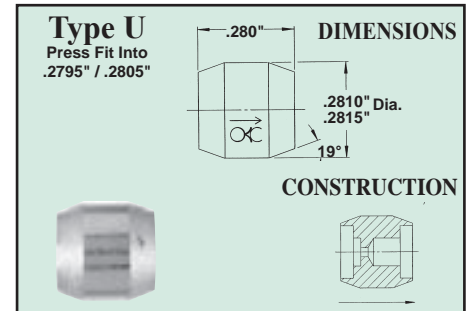
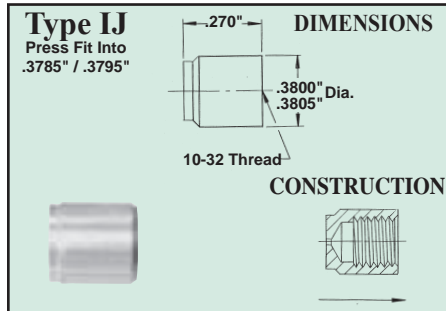
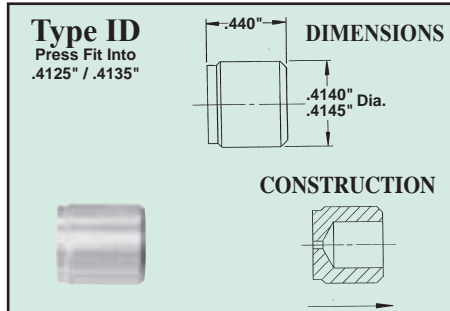
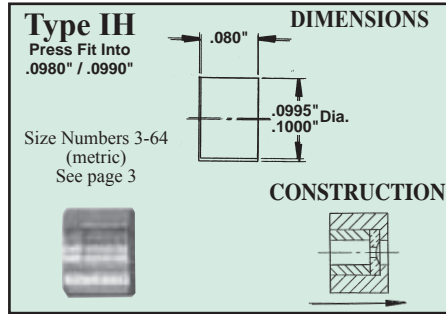
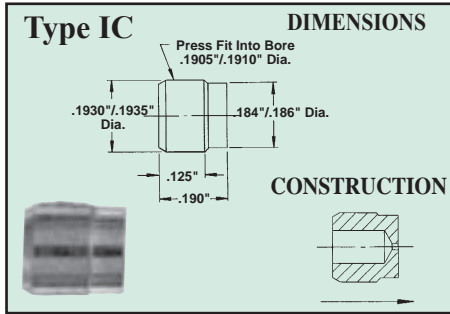
Size Number	Orifice Dia. In.	Size Number Range
4	.0039	
5	.0051	
6	.0059	
7	.0071	Type AM
8	.0079	4-35
9	.0091	
10	.0102	
11	.0110	Type IA
12	.0122	4-63
13	.0130	
14	.0142	Type IAS
15	.0150	4-35
16	.016	
17	.017	Type IB
18	.018	4-25
19	.019	
20	.020	
21	.021	Type IC
22	.022	4-63
23	.023	
24	.024	
25	.025	Type ID
26	.026	4-125
27	.027	
28	.028	Type IE
29	.029	4-35
31	.031	
32	.032	
33	.033	Type IF
35	.035	4-63
37	.037	
38	.038	
39	.039	Type IH
40	.040	(metric)
41	.041	3-64
42	.042	see page 3
43	.043	
47	.047	
52	.052	Type IJ
55	.055	4-125
60	.060	
63	.063	Type IK
67	.067	4-20
70	.070	
73	.073	
76	.076	Type IL
79	.079	4-35
81	.081	
86	.086	Type U
89	.089	4-63
94	.094	
96	.096	
100	.100	Type US
104	.104	4-35
109	.109	
113	.113	
120	.120	
125	.125	



## Custom Inserts

Where quantity requirements exceed 1000 pieces, custom inserts can be manufactured in brass, stainless steel, or special materials to the dimensions required. Provide a dimension drawing, material specifications, and quantities to our technical service department to obtain price and delivery quotations.

## INSERTS



## Orifice Diameters

See chart on page 10 for sizes available for each insert type. Consult factory for other sizes.

## Part Numbers

The complete part number for an orifice assembly includes Type, Size Number, Body Material and Options.

### EXAMPLES

Type	Size Number	Body Material	Options	Part Number
IB	6 (.006")	SS	—	IB-6-SS
AM	10 (.010")	SS	—	AM-10-SS
IA	20 (.020")	Brass	—	IA-20-BR

## Flow Direction

Metal Orifice Assemblies can be used for flow in either direction. The data on pages 20, 21 and 22 is for a flow direction as shown in the right column on page 10 and throughout this page.

# Metal Orifice Assemblies

## COMPRESSION FITTINGS

### Description

Precision orifice assemblies that adapt to common fittings used in the process industry are described on pages 14 and 15. Press-fit inserts are used with standard compression tube fittings to form a precision orifice assembly. The fittings shown here are for 1/4" OD tubing, or 3/16" OD tubing.

### Applications

Compression fittings are used with a metal or rigid plastic tubing. These fittings are used in instrumentation for process control systems. The nature of the connectors allow for easy disassembly and re-assembly without the need for teflon tape or sealants.

### Advantages

- High Pressure Capability
- Bi-directional Flow
- Economical Precision Orifice
- Repeatable Orifice Size and Shape
- Predictable Flow Rate

### General Specifications

**Flow Direction** – Suitable for flow in either direction. Data on pages 20 and 21 is measured for flow direction shown in right column of this page.

**Flow** – See flow chart for air flow on pages 20 and 21.

**C<sub>v</sub> Range** – .00035 to .088

See pages 20 and 21.

**Orifice Size Numbers** – 4 to 63

**Orifice Sizes** – .0039" to .063"

**Orifice Diameter Accuracy** – ±.0005"

**Fluid Media** – Air, Water, Gases and Liquids compatible with materials of construction.

**Dimensions** – See drawings on page 15.

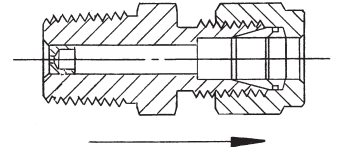
**Materials of Construction** – See page 15.

**Maximum Operating Pressure** – See page 15.

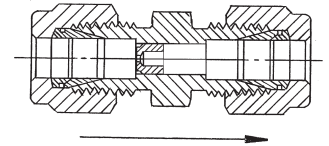
Size Number	Orifice Dia In.	Size Number Range
4	.0039	
5	.0051	
6	.0059	
7	.0071	
8	.0079	
9	.0091	Type IC-MC4
10	.0102	4-63
11	.0110	
12	.0122	
13	.0130	Type IC-MC6
14	.0142	4-63
15	.0150	
16	.016	
17	.017	Type IC-4006
18	.018	4-63
19	.019	
20	.020	
21	.021	
22	.022	Type AM-3006
23	.023	4-35
24	.024	
25	.025	
26	.026	Type IC-UT4
27	.027	4-63
28	.028	
29	.029	
31	.031	Type IC-400R4
32	.032	4-63
33	.033	
35	.035	
37	.037	
38	.038	Type IC-PC4
39	.039	4-63
40	.040	
41	.041	
42	.042	Type IC-DM4
43	.043	4-63
47	.047	
52	.052	
55	.055	
60	.060	
63	.063	

### Construction

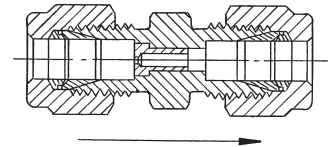
Type IC-MC4, IC-MC6



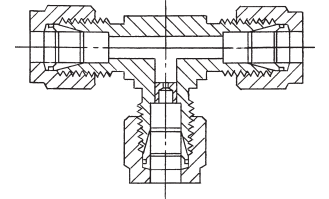
Type IC-4006



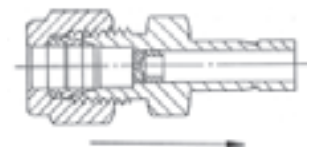
Type AM-3006



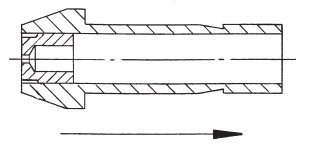
Type IC-UT4



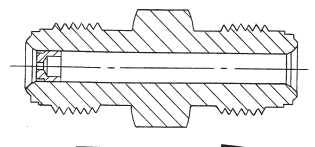
Type IC-400R4



Type IC-PC4



Type IC-DM4



### Part Numbers

The complete part number for an orifice assembly includes Type, Size Number, Body Material and Options.

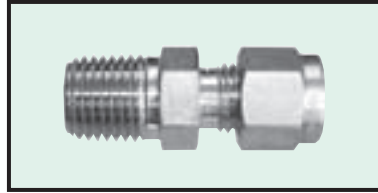
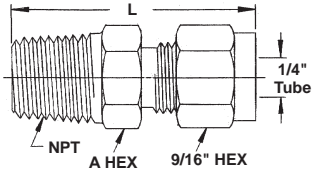
#### EXAMPLES

Type	Size Number	Body Material	Options	Part Number
IC-MC4	6 (.006")	SS	–	IC-MC4-6-SS
IC-400R4	13 (.013")	SS	–	IC-400R4-13-SS
AM-3006	35 (.035")	Brass	–	AM-3006-35-BR
IC-UT4	28 (.028")	SS	–	IC-UT4-28-SS

## COMPRESSION FITTINGS

### Dimensions

Type IC-MC4  
Type IC-MC6



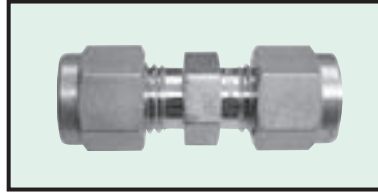
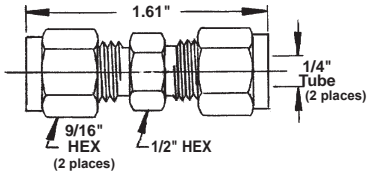
TYPE	NPT	L (in)	A HEX
IC-MC4	1/4"	1.48	9/16"
IC-MC6	3/8"	1.51	11/16"

### Specifications

#### TUBE ADAPTER

Body – 316 SS  
Orifice – 316 SS  
Maximum Body Pressure – 4000 psig  
Maximum Pressure Differential – 200 psid\*  
Orifice Sizes – .004" to .063" dia.

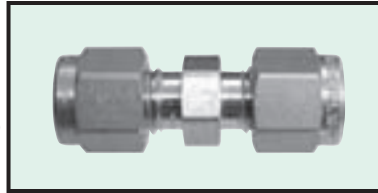
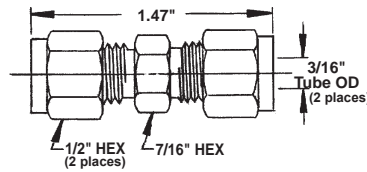
Type IC-4006



#### TUBE UNION – 1/4" OD

Body – 316 SS  
Orifice – 316 SS  
Maximum Body Pressure – 4000 psig  
Maximum Pressure Differential – 200 psid\*  
Orifice Sizes – .004" to .063" dia.

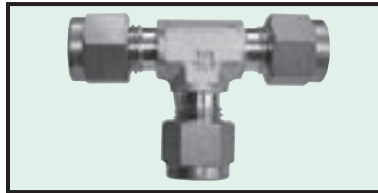
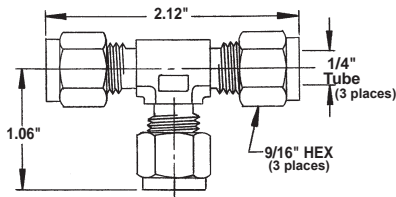
Type AM-3006



#### TUBE UNION – 3/16" OD

Body – Brass or 316 SS  
Orifice – Brass or 303 SS  
Maximum Body Pressure – 4000 psig  
Maximum Pressure Differential – 200 psid\*  
Orifice Sizes – .004" to .035" dia.

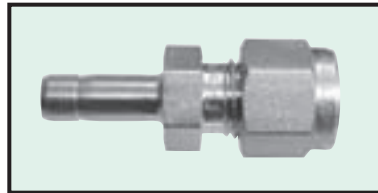
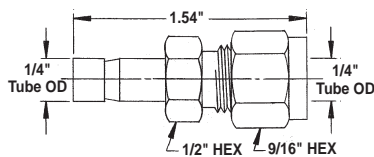
Type IC-UT4



#### UNION TEE

Body – 316 SS  
Orifice – 316 SS  
Maximum Body Pressure – 4000 psig  
Maximum Pressure Differential – 200 psid\*  
Orifice Sizes – .004" to .063" dia.

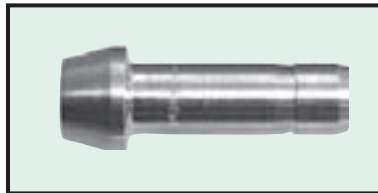
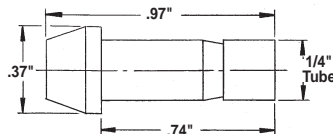
Type IC-400R4



#### TUBE ADAPTER

Body – 316 SS  
Orifice – 316 SS  
Maximum Body Pressure – 4000 psig  
Maximum Pressure Differential – 200 psid\*  
Orifice Sizes – .004" to .063" dia.

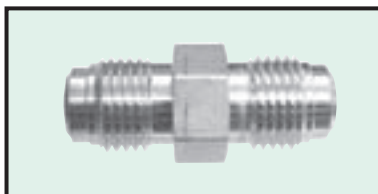
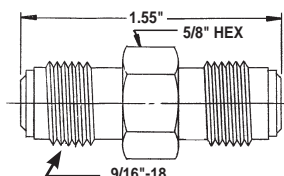
Type IC-PC4



#### PORT CONNECTOR

Body – 316 SS  
Orifice – 316 SS  
Maximum Body Pressure – 4000 psig  
Maximum Pressure Differential – 1000 psid\*  
in direction shown  
Orifice Sizes – .004" to .063" dia.

Type IC-DM4



#### DOUBLE MALE UNION

Body – 316 SS  
Orifice – 316 SS  
Maximum Body Pressure – 4000 psig  
Maximum Pressure Differential – 1000 psid\*  
in direction shown  
Orifice Sizes – .004" to .063" dia.  
Made from Swagelok 1/4" VCR fittings

\*psid – pounds per square inch differential

# Metal Orifice Assemblies

## PUSH-ON TUBE ADAPTERS

## Size Numbers

Type IA-H0134  
IA-H0334  
IA-H0534  
IA-H0734

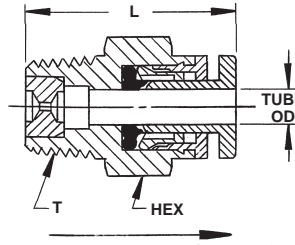
- For Plastic Tubing  
1/8", 5/32", 3/16" or 1/4" OD
- Easy Connect/Disconnect
- Type IA Insert
- Orifice Size Numbers 4 - 63



### PUSH-ON TUBE ADAPTER

1/8" NPT x 1/8" OD Tube  
1/8" NPT x 5/32" OD Tube  
1/8" NPT x 3/16" OD Tube  
1/8" NPT x 1/4" OD Tube

Body – Brass/Plastic  
Orifice – Brass  
Seals – Buna-N  
Max. Body Pressure – 140 psig  
Orifice Sizes – .004" to .063" dia.  
Orifice Size No. 4-63



Type	L	T	HEX	TUBE OD
IA-H0134	.87"	1/8" NPT	7/16"	1/8"
IA-H0334	.87"	1/8" NPT	7/16"	5/32"
IA-H0534	.87"	1/8" NPT	1/2"	3/16"
IA-H0734	.89"	1/8" NPT	5/8"	1/4"

Metal Orifice Size Number	Orifice Dia. in.
---------------------------	------------------

4	.0039
5	.0051
6	.0059
7	.0071
8	.0079
9	.0091
10	.0102
11	.0110
12	.0122
13	.0130
14	.0142
15	.0150
16	.016
17	.017
18	.018
19	.019
20	.020
21	.021
22	.022
23	.023
24	.024
25	.025
26	.026
27	.027
28	.028
29	.029
31	.031
32	.032
33	.033
35	.035
37	.037
38	.038
39	.039
40	.040
41	.041
42	.042
43	.043
47	.047
52	.052
55	.055
60	.060
63	.063

Type IA-H0135  
IA-H0335  
IA-H0535  
IA-H0735

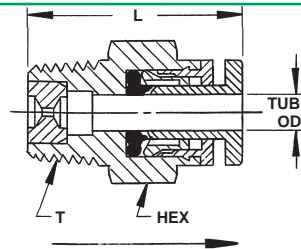
- For Plastic Tubing  
1/8", 5/32", 3/16" or 1/4" OD
- Easy Connect/Disconnect
- Type IA Insert
- Orifice Size Numbers 4 - 63



### PUSH-ON TUBE ADAPTER

1/4" NPT x 1/8" OD Tube  
1/4" NPT x 5/32" OD Tube  
1/4" NPT x 3/16" OD Tube  
1/4" NPT x 1/4" OD Tube

Body – Brass/Plastic  
Orifice – Brass  
Seals – Buna-N  
Max. Body Pressure – 140 psig  
Orifice Sizes – .004" to .063" dia.  
Orifice Size No. 4-63



Type	L	T	HEX	TUBE OD
IA-H0135	.77"	1/4" NPT	5/8"	1/8"
IA-H0335	.77"	1/4" NPT	5/8"	5/32"
IA-H0535	.83"	1/4" NPT	5/8"	3/16"
IA-H0735	.91"	1/4" NPT	5/8"	1/4"

Type IL-H0132  
IL-H0332  
IL-H0532  
IL-H0732

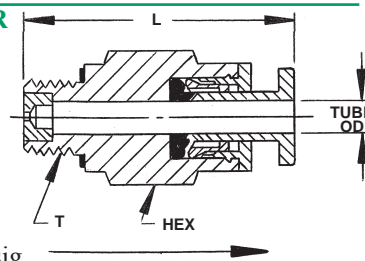
- For Plastic Tubing  
1/8", 5/32", 3/16" or 1/4" OD
- Easy Tubing Connect/Disconnect
- Type IL Insert
- Orifice Size Numbers 4 - 35



### PUSH-ON TUBE ADAPTER

10-32 x 1/8" OD Tube  
10-32 x 5/32" OD Tube  
10-32 x 3/16" OD Tube  
10-32 x 1/4" OD Tube

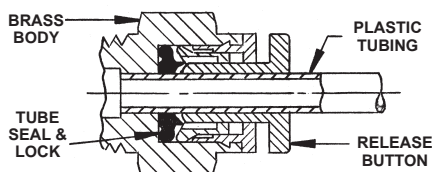
Body – Brass/Plastic  
Orifice – Brass  
Seals – Buna-N  
Max. Body Pressure – 140 psig  
Orifice Sizes – .004" to .035" dia.  
Orifice Size No. 4-35



Type	L	T	HEX	TUBE OD
IL-H0132	.66"	#10-32	9/32"	1/8"
IL-H0332	.67"	#10-32	5/16"	5/32"
IL-H0532	.95"	#10-32	5/16"	3/16"
IL-H0732	.73"	#10-32	7/16"	1/4"

See pages 20 and 21 for orifice flow charts.

## HOW PUSH-ON FITTINGS WORK!



## Part Numbers

The complete part number for these assemblies includes Type, Size Number and Body Material.

EXAMPLES	Type	Size Number	Body Material	Part Number
	IA-H0134 (1/8" NPT x 1/8" OD Tube)	10 (.010")	B/P (all)	IA-H0134-10-B/P
	IA-H0735 (1/4" NPT x 1/4" OD Tube)	25 (.025")	B/P (all)	IA-H0735-25-B/P
	IL-H0332 (10-32 x 5/32" OD Tube)	6 (.006")	B/P (all)	IL-H0332-6-B/P

## REPLACEABLE ORIFICES

### Description

The replaceable orifice assembly provides the opportunity to easily remove and replace an orifice insert. Available in either brass or stainless steel with viton elastomers the assembly can be used for metering the flow of liquids or gases. Optional cleanable screens can be selected to protect small orifices from contamination. **Micro-Orifices®** down to .0003" diameter are also available.

### Applications

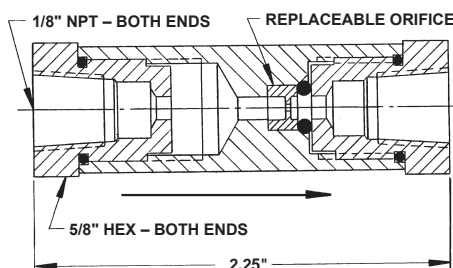
- Leak Test Reference Standards
- Prototype Test and Development
- Flow Inspection Equipment
- Calibration of Flow Measuring Equipment
- Flexible Orifice Size Requirements



Types Y2, Y2SS and Y2LPSS are available in brass or stainless steel. Replaceable orifices and cleanable screens are features.

#### Type Y2

- 1/8" NPT Connections
- Orifice Element Replaceable
- Type IA Insert  
(see page 10 for P/N – insert only)
- Orifice Size Numbers 4 - 63
- Flow Chart (see pages 20 and 21)



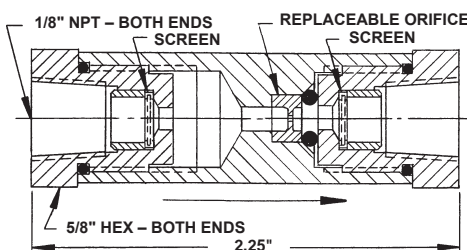
#### REPLACEABLE ORIFICE ASSEMBLY

**Body** – Brass or 303 SS  
**Orifice** – Brass or 303 SS  
**Seals** – Viton  
**Maximum Operating Pressure** – 200 psig  
**Orifice Sizes** – .004" to .063" dia.

See page 16 for orifice size numbers.

#### Type Y2SS

- 1/8" NPT Connections
- Orifice Element Replaceable
- Type IA Insert  
(see page 10 for P/N – insert only)
- Dual Screens
- Orifice Size Numbers 4 - 35
- Flow Chart (see pages 20 and 21)



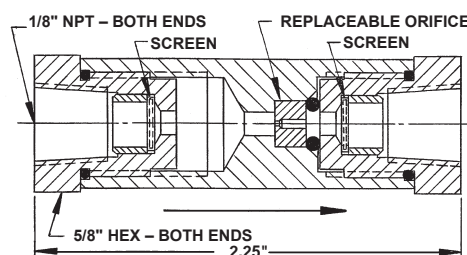
#### TYPE Y2 WITH DUAL SCREENS

**Body** – Brass or 303 SS  
**Orifice** – Brass or 303 SS  
**Seals** – Viton  
**Screens** – 304 SS  
**Maximum Operating Pressure** – 200 psig  
**Orifice Sizes** – .004" to .035" dia.

See page 16 for orifice size numbers.

#### Type Y2LPSS

- 1/8" NPT Connections
- Orifice Element Replaceable
- Type IALP Insert  
(see page 25)
- Dual Screens
- Orifice Size Numbers 0C to 5  
(see chart below)
- For Larger Orifices Use Type Y2SS



#### REPLACEABLE *Micro-Orifices®*

**Body** – Brass or 303 SS  
**Orifice** – Brass or 303 SS  
**Seals** – Viton  
**Screens** – 304 SS  
**Maximum Operating Pressure** – 200 psig  
**Orifice Sizes** – .0003" to .005" dia.

See below for *Micro-Orifice®* size numbers.

#### *Micro-Orifices®*

Size Number	Orifice Dia. in.
0C	.0003
0E	.0005
0G	.0007
1	.0010
1E	.0015
2	.0020
2E	.0025
3	.0030
3E	.0035
4	.0040
5	.0050

### Part Numbers

The complete part number for a replaceable orifice assembly includes Type, Size Number and Body Materials.

#### EXAMPLES

Type	Size Number	Body Material	Part Number
Y2	25 (.025")	Brass	Y2-25-BR
Y2SS (includes 2 screens)	6 (.006")	Brass	Y2SS-6-BR
Y2LPSS (includes 2 screens and <i>Micro-Orifices®</i> )	0G (.0007")	SS	Y2LPSS-0G-SS

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# Metal Orifice Assemblies

## Description

Precision orifice assemblies that adapt to common fittings used in process instruments and hydraulic systems are shown on pages 18 and 19. Types K4, R4 and RG4 are used with nominal 1/4" tube fittings. Type BFS is for 45° flare fittings and Type CFJ is for 37° flare fittings. Type OD is a pipe adapter.

## Applications

- Type K4 is a 1/4" OD Tube and is suitable for use with a wide variety of compression fittings.
- Type K2 is for 1/8" OD Tube fittings.
- Types R4 and RG4 are suitable for use with face seal fittings.
- Types BFS and CFJ are used in hydraulic circuits, having SAE flare connections.

## Advantages

- High Pressure Capability
- Bi-directional Flow
- Economical Precision Orifice
- Repeatable Orifice Size and Shape
- Predictable Flow Rate

## General Specifications

**Flow Direction** – Suitable for flow in either direction. Data on pages 20 and 21 is measured for flow direction shown in right column of this page.

**Flow** – See flow chart for air flow on pages 20 and 21.

**C<sub>v</sub> Range** – .00035 to .37

See pages 20 and 21.

**Orifice Diameter Accuracy** – ±.0005"

**Fluid Media** – Air, Water, Gases and Liquids compatible with materials of construction.

**Dimensions** – See drawings on page 19.

**Materials of Construction** –

See page 19.

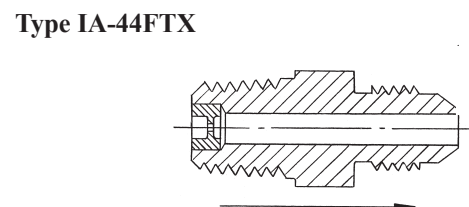
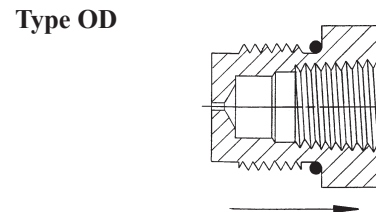
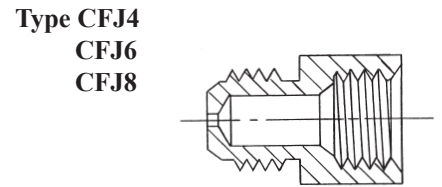
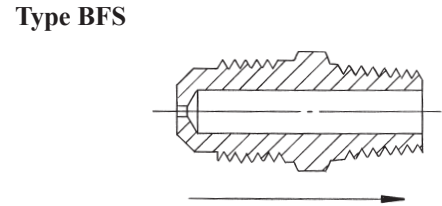
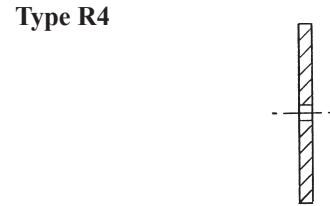
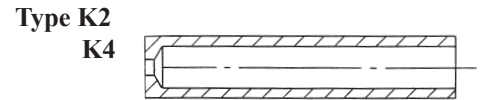
**Maximum Operating Pressure** –

See page 19.

## MISCELLANEOUS

Size Number	Orifice Dia. In.	Size Number Range
4	.0039	
5	.0051	
6	.0059	
7	.0071	Type K2
8	.0079	4-20
9	.0091	
10	.0102	
11	.0110	Type K4
12	.0122	4-35
13	.0130	
14	.0142	
15	.0150	Type R4
16	.016	4-125
17	.017	
18	.018	
19	.019	
20	.020	Type RG4
21	.021	4-125
22	.022	
23	.023	
24	.024	Type BFS
25	.025	4-125
26	.026	
27	.027	
28	.028	Type CFJ4
29	.029	4-125
31	.031	
32	.032	
33	.033	Type CFJ6
35	.035	4-125
37	.037	
38	.038	
39	.039	
40	.040	Type CFJ8
41	.041	4-125
42	.042	
43	.043	
47	.047	Type OD
52	.052	4-125
55	.055	
60	.060	
63	.063	
67	.067	Type IA-44FTX
70	.070	4-63
73	.073	
76	.076	
79	.079	
81	.081	
86	.086	
89	.089	
94	.094	
96	.096	
100	.100	
104	.104	
109	.109	
113	.113	
120	.120	
125	.125	

## Construction



## Part Numbers

The complete part number for an orifice assembly includes Type, Size Number, Body Material and Options.

### EXAMPLES

Type	Size Number	Body Material	Options	Part Number
K4	6 (.006")	Stainless Steel	–	K4-6-SS
R4	13 (.013")	Stainless Steel	–	R4-13-SS
BFS	35 (.035")	Brass	–	BFS-35-BR
CFJ6	104 (.104")	Stainless Steel	–	CFJ6-104-SS

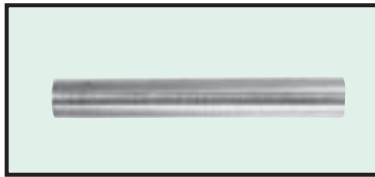
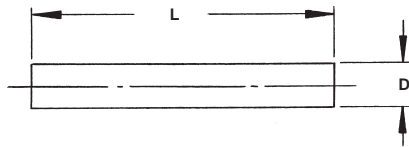
# Metal Orifice Assemblies

## MISCELLANEOUS

### Dimensions

### Specifications

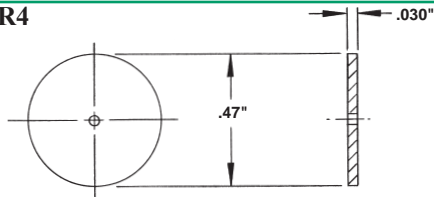
Type K2  
K4



TYPE	L (in)	D (in)
K2	1.25	.125
K4	1.75	.250

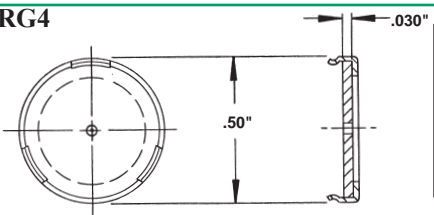
**TUBE**  
For Compression Fittings  
**Maximum Operating Pressure** – 4000 psig  
**Material** – 316 SS  
**Orifice Sizes** – K2 .004" to .020" Dia.  
K4 .004" to .035" Dia.

Type R4



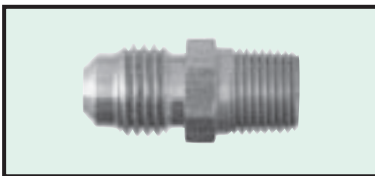
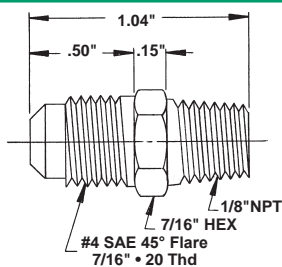
**CIRCULAR DISK**  
For Face Seal Fittings  
**Maximum Operating Pressure** – 100 psig  
**Material** – 316 SS/Silver Plated  
**Orifice Sizes** – .004" to .125" Dia.

Type RG4



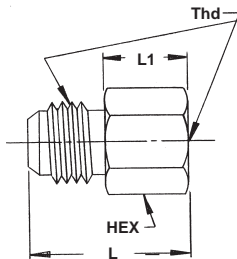
**CIRCULAR DISK WITH RETAINING GASKET**  
For Face Seal Fittings  
**Maximum Operating Pressure** – 100 psig  
**Material** – Disk • 316 SS/Silver Plated  
Gasket • 316 SS  
**Orifice Sizes** – .004" to .125" Dia.

Type BFS



**SAE 45° FLARE ADAPTER**  
**Maximum Operating Pressure** – 2000 psig  
**Material** – Brass  
**Orifice Sizes** – .004" to .125" Dia.

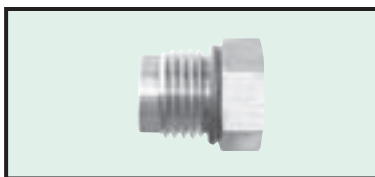
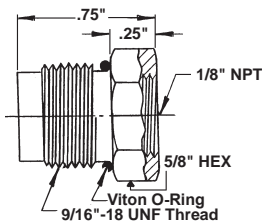
Type CFJ4  
CFJ6  
CFJ8



TYPE	L (in)	L1 (in)	Thd	HEX (in)
CFJ4	1.14	.600	7/16"-20	9/16
CFJ6	1.19	.625	9/16"-18	11/16
CFJ8	1.36	.710	3/4"-16	7/8

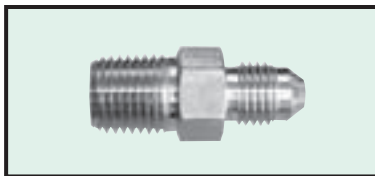
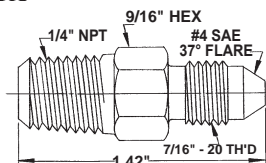
**SAE 37° FLARE ADAPTER**  
**Maximum Operating Pressure** – 4000 psig  
**Material** – 303 SS  
**Orifice Sizes** – .004" to .125" Dia.

Type OD



**STRAIGHT THREAD O-RING/ FEMALE PIPE ADAPTER**  
**Body/Orifice** – Brass or 303 SS  
**O-Ring** – Viton  
**Maximum Operating Pressure** – 2000 psig  
**Orifice Sizes** – .004" to .125" Dia.

Type IA-44FTX



**37° FLARED TUBE CONNECTOR**  
**Body/Orifice** – Brass or 304 SS  
**Orifice** – Brass or 304 SS  
**Maximum Operating Pressure** – 200 psig  
**Orifice Sizes** – .004" to .063" Dia.

# Metal Orifice Air Flow – SCFH

Orifice Diameter Inches	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	31	32	33										
Size																																							
Number																																							
Cv																																							
1	0.0035	0.0061	0.0086	0.0012	0.0015	0.0019	0.0025	0.0028	0.0034	0.0038	0.0043	0.0050	0.0055	0.0067	0.0073	0.0080	0.0088	0.0096	0.011	0.012	0.013	0.014	0.016	0.017	0.018	0.019	0.020	0.021	0.022	0.023	0.024	0.025	0.026	0.027	0.028	0.029	0.031	0.032	0.033
5	0.075	0.136	0.182	0.269	0.360	0.479	0.593	0.653	0.843	0.962	1.11	1.30	1.40	1.64	1.82	2.03	2.22	2.39	2.73	2.99	3.26	3.54	4.05	4.13	4.68	5.06	5.62	6.10	6.42										
10	0.25	0.47	0.65	0.91	1.21	1.57	1.97	2.14	2.73	3.14	3.56	4.13	4.26	4.79	5.38	6.00	6.70	7.48	9.17	10.1	11.0	11.8	13.0	13.6	15.2	16.6	18.3	19.9	21.1										
15	0.34	0.59	0.82	1.14	1.53	1.97	2.48	2.67	3.43	3.92	4.45	5.17	5.30	6.04	6.84	7.56	8.50	9.34	11.3	12.6	13.6	14.7	16.1	17.3	18.9	19.7	21.8	23.7	26.3	28.6	30.3								
20	0.40	0.70	0.97	1.38	1.80	2.33	2.92	3.16	4.07	4.64	5.28	6.08	6.29	7.20	8.18	9.03	10.3	11.1	13.5	14.7	16.1	17.3	18.9	19.7	21.8	23.7	26.3	28.6	30.3										
25	0.47	0.82	1.12	1.59	2.08	2.69	3.37	3.62	4.66	5.30	6.06	6.95	7.25	8.31	9.43	10.4	11.8	12.7	15.5	16.8	18.3	19.9	21.6	22.7	24.8	27.1	30.1	32.6	34.5										
30	0.53	0.92	1.26	1.80	2.37	3.03	3.81	4.09	5.23	5.98	6.80	7.82	8.20	9.39	10.7	11.8	13.4	14.4	17.0	19.0	20.7	22.5	24.4	25.4	28.0	30.5	33.7	36.7	39.0										
40	0.64	1.15	1.56	2.22	2.92	3.75	4.68	5.02	6.44	7.31	8.33	9.56	10.1	11.6	13.2	14.5	16.5	17.8	21.4	23.3	25.4	27.5	29.9	31.1	34.1	37.1	41.1	44.7	47.7										
50	0.76	1.37	1.86	2.67	3.50	4.45	5.55	5.93	7.59	8.62	9.83	11.3	12.1	13.8	15.7	17.3	19.6	21.2	25.2	27.5	30.1	32.6	35.2	36.7	40.3	43.9	48.5	53.0	56.4										
60	0.89	1.59	2.16	3.09	4.05	5.13	6.40	6.84	8.75	10.0	11.3	13.0	14.0	16.0	18.2	20.0	22.7	24.6	29.2	31.8	34.7	37.5	40.7	42.4	46.4	50.4	55.9	61.0	65.0										
70	1.02	1.82	2.46	3.54	4.60	5.83	7.27	7.76	9.92	11.3	12.8	14.7	16.0	18.2	20.7	22.9	25.9	28.0	33.1	36.0	39.2	42.6	46.0	48.1	52.5	57.2	63.6	69.3	73.9										
80	1.14	2.04	2.75	3.96	5.15	6.53	8.12	8.67	11.1	12.6	14.3	16.5	17.9	20.5	23.3	25.6	29.0	31.6	37.1	40.3	43.9	47.7	51.3	53.6	58.7	64.0	71.2	77.8	82.6										
90	1.27	2.27	3.05	4.41	5.70	7.20	8.96	9.56	12.2	13.9	15.9	18.3	19.9	22.7	25.9	28.4	32.2	35.0	40.9	44.5	48.5	52.8	56.8	59.3	65.0	71.0	78.8	86.0	91.5										
100	1.40	2.48	3.35	4.83	6.25	7.88	9.81	10.5	13.4	15.3	17.4	20.0	21.8	25.0	28.4	31.1	35.2	38.1	44.7	48.7	53.2	58.1	62.3	65.3	71.4	78.0	86.7	94.5	101										
5	0.113	0.203	0.273	0.405	0.536	0.703	0.860	0.953	1.23	1.40	1.64	1.90	2.07	2.41	2.70	2.99	3.28	3.60	4.03	4.45	4.87	5.25	5.81	6.00	6.70	7.23	8.01	8.73	9.15										
10	0.145	0.263	0.356	0.521	0.687	0.892	1.10	1.20	1.55	1.77	2.06	2.37	2.62	2.99	3.35	3.79	4.15	4.62	5.17	5.68	6.12	6.63	7.29	7.59	8.48	9.11	10.1	10.9	11.5										
15	0.158	0.284	0.392	0.568	0.744	0.964	1.20	1.30	1.68	1.91	2.26	2.59	2.86	3.28	3.71	4.11	4.64	4.92	5.53	6.04	6.61	7.08	7.73	8.01	8.90	9.56	10.7	11.5	12.1										
20	0.158	0.284	0.392	0.568	0.744	0.964	1.20	1.30	1.68	1.91	2.26	2.59	2.86	3.28	3.71	4.11	4.64	4.92	5.53	6.04	6.61	7.08	7.73	8.01	8.90	9.56	10.7	11.5	12.1										
30	0.158	0.284	0.392	0.568	0.744	0.964	1.20	1.30	1.68	1.91	2.26	2.59	2.86	3.28	3.71	4.11	4.64	4.92	5.53	6.04	6.61	7.08	7.73	8.01	8.90	9.56	10.7	11.5	12.1										

Orifice Diameter Inches	35	37	38	39	40	41	42	43	44	45	47	48	50	52	55	60	63	67	70	73	76	79	81	86	89	94	99	100	104	109	113	120	125
Size																																	
Number																																	
Cv																																	
1	0.028	0.031	0.032	0.033	0.036	0.038	0.039	0.041	0.042	0.043	0.047	0.052	0.055	0.060	0.063	0.068	0.071	0.076	0.079	0.081	0.086	0.089	0.094	0.096	0.100	0.104	0.109	0.113	0.120	0.125			
5	7.37	8.12	8.75	9.45	9.75	9.90	10.6	11.4	13.6	17.0	19.9	23.7	25.9	30.1	33.6	35.9	39.3	43.0	46.0	49.7	53.7	60.2	63.7	69.8	75.2	83.9	91.4	101	106				
10	22.5	25.0	26.5	28.8	30.5	31.4	33.1	35.6	41.0	51.9	57.4	68.2	74.6	86.2	96.6	103	112	121	131	144	153	172	181	196	216	237	250	286	314				
15	27.8	30.7	32.6	35.4	37.5	38.6	40.5	43.2	50.0	62.9	69.7	82.6	90.3	104	117	125	136	147	158	174	185	207	218	235	261	286	303	345	377				
20	32.4	36.0	38.4	41.5	44.3	45.3	47.7	50.9	58.7	74.2	82.0	97.3	106	123	138	146	160	172	185	203	216	242	256	275	305	335	354	403	445				
25	37.5	41.5	44.1	47.9	50.9	52.3	54.9	58.5	67.6	85.4	94.5	112	122	141	158	168	183	198	212	233	248	278	292	316	347	381	405	464	511				
30	42.4	47.0	50.0	54.2	57.6	59.3	62.3	66.3	76.3	96.6	107	126	138	160	179	190	206	222	239	265	280	314	331	356	392	432	458	525	578				
40	52.5	58.1	67.2	67.0	71.2	73.3	76.9	82.0	94.3	119	132	156	170	196	220	233	254	273	295	324	343	384	405	439	483	532	566	648	714				
50	62.5	69.1	73.7	79.7	85.0	87.5	91.7	97.5	112	142	157	185	202	233	261	278	301	324	347	384	407	456	481	523	576	634	672	771	850				
60	72.7	80.5	86.0	92.8	99	102	107	113	130	165	182	214	233	269	301	320	347	375	400	445	473	530	559	606	667	735	760	894	985				
70	83.1	91.7	98.1	106	113	117	122	129	148	187	207	244	267	307	343	362	394	428	458	509	538	604	638	693	763	839	892	1021	1125				
80	93	103	110	119	127	131	137	145	167	210	231	273	298	343	384	405	443	481	513	570	604	678	716	778	856	943	1000	1146	1263				
90	106	115	122	132	141	146	151	161	185	231	256	303	331	379	424	447	489	532	568	631	670	750	792	860	947	1042	1106	1267	1398				
100	114	126	135	146	156	164	167	177	203	254	282	331	362	415	468	496	540	587	627	697	739	831	875	951	1047	1153	1225	1403	1545				
5	10.4	11.4	12.3	13.3	14.3	14.5	15.4	16.3	19.2	23.9	26.4	31.4	36.2	42.4	47.7	50.6	55.1	60.0	64.0	70.3	76.1	84.9	88.6	96.1	104	114	123	138	150				
10	13.1	14.4	15.4	16.6	17.6	18.0	19.2	20.3	23.6	29.4	32.7	38.6	44.9	51.7	57.6	63.4	68.9	74.8	79.9	87.9	94.9	106	110	120	130	142	153	173	187				
15	13.8	15.2	16.2	17.4	18.3	18.8	20.0	21.1	24.5	30.5	33.7	39.4	46.8	54.0	60.2	66.1	71.8	78.0	83.5	91.7	99.0	110	115	125	135	148	160	180	195				
20	13.8	15.2	16.2	17.4	18.3	18.8	20.0	21.1	24.5	30.5	33.7	39.4	46.8	54.0	60.2	66.1	71.8	78.0	83.5	91.7	99.0	110	115	125	135	148	160	180	195				
30	13.8	15.2	16.2	17.4	18.3	18.8	20.0	21.1	24.5	30.5	33.7	39.4	46.8	54.0	60.2	66.1	71.8	78.0	83.5	91.7	99.0	110	115	125	135	148	160	180	195				

Standard Conditions 70°F, 14.7 psia

SCFH – Standard Cu. Ft. Per Hour  
SLPM – Standard Liters Per Minute

Above data obtained with Type B restrictor. Flow rates for other metal restrictors are essentially the same as for Type B. Above data supercedes previous publications.



# Metal Orifice Air Flow – SLPM

Orifice Diameter Inches	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.013	0.014	0.015	0.016	0.017	0.018	0.019	0.020	0.021	0.022	0.023	0.024	0.025	0.026	0.027	0.028	0.029	0.031	0.032	0.033		
<b>Size Number</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>31</b>	<b>32</b>	<b>33</b>		
$C_v$	0.00035	0.00061	0.00086	0.0012	0.0015	0.0019	0.0025	0.0032	0.0034	0.0038	0.0043	0.0050	0.0055	0.0067	0.0073	0.0080	0.0088	0.0096	0.0111	0.012	0.013	0.014	0.016	0.017	0.018	0.019	0.022	0.024	0.024	0.025	
1	0.035	0.064	0.086	0.127	0.170	0.226	0.280	0.308	0.398	0.45	0.52	0.61	0.66	0.77	0.86	0.96	1.05	1.13	1.29	1.41	1.54	1.67	1.91	1.95	2.21	2.21	2.39	2.65	2.88	3.03	
5	0.09	0.16	0.21	0.30	0.40	0.52	0.65	0.71	0.92	1.06	1.21	1.41	1.54	1.76	1.98	2.22	2.47	2.65	2.97	3.24	3.53	3.83	4.34	4.44	4.94	5.31	5.86	6.42	6.80	7.18	
10	0.12	0.22	0.31	0.43	0.57	0.74	0.93	1.01	1.29	1.48	1.68	1.95	2.01	2.26	2.54	2.83	3.16	3.33	3.75	4.11	4.41	4.94	5.18	5.86	6.43	7.18	7.83	8.63	9.40	9.98	
15	0.16	0.28	0.39	0.54	0.72	0.93	1.17	1.26	1.62	1.85	2.10	2.44	2.50	2.85	3.23	3.57	4.01	4.41	5.36	5.93	6.43	6.95	7.58	7.95	8.78	9.58	10.6	11.6	12.3	14.3	
20	0.19	0.33	0.46	0.65	0.85	1.10	1.38	1.49	1.92	2.19	2.49	2.87	2.97	3.40	3.86	4.26	4.84	5.22	6.35	6.95	7.58	8.15	8.90	9.28	10.3	11.2	12.4	13.5	14.3	16.3	
25	0.22	0.39	0.53	0.75	0.98	1.27	1.59	1.71	2.20	2.50	2.86	3.28	3.42	3.92	4.45	4.91	5.59	6.01	7.30	7.95	8.65	9.38	10.2	10.7	11.7	12.8	14.2	15.4	16.3	18.4	
30	0.25	0.44	0.60	0.85	1.12	1.43	1.80	1.93	2.47	2.82	3.21	3.69	3.87	4.43	5.03	5.56	6.33	6.81	8.23	8.98	9.75	10.6	11.5	12.0	13.2	14.4	15.9	17.3	18.4	21.1	22.5
40	0.30	0.54	0.74	1.05	1.38	1.77	2.21	2.37	3.04	3.45	3.93	4.51	4.78	5.47	6.21	6.85	7.81	8.42	10.1	11.0	12.0	13.0	14.1	14.7	16.1	17.5	19.4	21.1	22.5	26.6	28.6
50	0.36	0.65	0.88	1.26	1.65	2.10	2.62	2.80	3.58	4.07	4.64	5.31	5.70	6.51	7.40	8.15	9.26	10.0	11.9	13.0	14.2	15.4	16.6	17.3	19.0	20.7	22.9	25.0	26.6	30.7	32.7
60	0.42	0.75	1.02	1.46	1.91	2.42	3.02	3.23	4.13	4.70	5.34	6.13	6.61	7.56	8.58	9.46	10.7	11.6	13.8	15.0	16.4	17.7	19.2	20.0	21.9	23.8	26.4	28.8	30.7	34.9	37.0
70	0.48	0.86	1.16	1.67	2.17	2.75	3.43	3.66	4.68	5.32	6.05	6.96	7.53	8.61	9.77	10.8	12.2	13.2	15.6	17.0	18.5	20.1	21.7	22.7	24.8	27.0	30.0	32.7	34.9	39.0	41.5
80	0.54	0.96	1.30	1.87	2.43	3.08	3.83	4.09	5.23	5.95	6.77	7.79	8.46	9.67	11.0	12.1	13.7	14.9	17.5	19.0	20.7	22.5	24.2	25.3	27.7	30.2	33.6	36.7	39.0	43.2	45.5
90	0.60	1.07	1.44	2.08	2.69	3.40	4.23	4.51	5.78	6.58	7.49	8.62	9.38	10.7	12.2	13.4	15.2	16.5	19.3	21.0	22.9	24.9	26.8	28.0	30.7	33.5	37.2	40.6	43.2	47.5	50.0
100	0.66	1.17	1.58	2.28	2.95	3.72	4.63	4.94	6.33	7.22	8.21	9.46	10.3	11.8	13.4	14.7	16.6	18.0	21.1	23.0	25.1	27.4	29.4	30.8	33.7	36.8	40.9	44.6	47.5	51.5	54.3
5	0.053	0.096	0.129	0.191	0.253	0.332	0.406	0.450	0.582	0.661	0.773	0.899	0.977	1.14	1.28	1.41	1.55	1.70	1.90	2.10	2.30	2.48	2.74	2.83	3.16	3.41	3.78	4.12	4.32	4.82	5.12
10	0.069	0.124	0.168	0.246	0.324	0.421	0.519	0.564	0.730	0.834	0.972	1.12	1.24	1.41	1.58	1.79	1.96	2.18	2.44	2.68	2.89	3.13	3.44	3.58	4.00	4.30	4.77	5.16	5.45	6.03	6.33
15	0.075	0.134	0.185	0.268	0.351	0.455	0.566	0.614	0.792	0.902	1.07	1.22	1.35	1.55	1.75	1.94	2.19	2.32	2.61	2.85	3.12	3.34	3.65	3.78	4.20	4.51	5.05	5.45	5.72	6.33	6.63
20	0.075	0.134	0.185	0.268	0.351	0.455	0.566	0.614	0.792	0.902	1.07	1.22	1.35	1.55	1.75	1.94	2.19	2.32	2.61	2.85	3.12	3.34	3.65	3.78	4.20	4.51	5.05	5.45	5.72	6.33	6.63
30	0.075	0.134	0.185	0.268	0.351	0.455	0.566	0.614	0.792	0.902	1.07	1.22	1.35	1.55	1.75	1.94	2.19	2.32	2.61	2.85	3.12	3.34	3.65	3.78	4.20	4.51	5.05	5.45	5.72	6.33	6.63

Orifice Diameter Inches	0.035	0.037	0.038	0.039	0.04	0.041	0.042	0.043	0.047	0.052	0.055	0.06	0.063	0.067	0.07	0.073	0.076	0.079	0.081	0.086	0.089	0.094	0.096	0.1	0.104	0.109	0.113	0.12	0.125	
<b>Size Number</b>	<b>35</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>	<b>41</b>	<b>42</b>	<b>43</b>	<b>47</b>	<b>52</b>	<b>55</b>	<b>60</b>	<b>63</b>	<b>67</b>	<b>70</b>	<b>73</b>	<b>76</b>	<b>79</b>	<b>81</b>	<b>86</b>	<b>89</b>	<b>94</b>	<b>96</b>	<b>100</b>	<b>104</b>	<b>109</b>	<b>113</b>	<b>120</b>	<b>125</b>	
$C_v$	0.028	0.031	0.032	0.033	0.036	0.038	0.039	0.041	0.048	0.059	0.068	0.081	0.088	0.1	0.11	0.12	0.13	0.14	0.15	0.17	0.18	0.2	0.21	0.23	0.25	0.27	0.31	0.34	0.37	
1	3.48	3.83	4.13	4.46	4.6	4.67	4.99	5.36	6.43	8.04	9.4	11.2	12.2	14.2	15.9	16.9	18.5	20.3	21.7	23.5	25.4	28.4	30.1	32.9	35.5	39.6	43.1	47.8	50.1	54.8
5	7.67	8.48	9.09	9.7	10.2	10.6	11.3	12.1	14.2	17.6	20.3	23.9	26.1	30.3	33.8	36.1	39.4	43.1	46	51.1	54.9	61.9	65	70.8	76.6	84.8	92.1	102	108	118
10	10.6	11.8	12.5	13.6	14.4	14.8	15.6	16.8	19.4	24.5	27.1	32.2	35.2	40.7	45.6	48.5	52.9	57.3	61.6	67.9	72.3	81	85.5	92.3	102	112	118	135	148	163
15	13.1	14.5	15.4	16.7	17.7	18.2	19.1	20.4	23.6	29.7	32.9	39	42.6	49.3	55.3	58.8	64	69.4	74.5	82.1	87.3	97.8	103	111	123	135	143	163	178	190
20	15.3	17	18.1	19.6	20.9	21.4	22.5	24	27.7	35	38.7	45.9	50.1	58	65	69	75.3	81.4	87.3	95.6	102	114	121	130	144	158	167	190	210	210
25	17.7	19.6	20.8	22.6	24	24.7	25.9	27.6	31.9	40.3	44.6	52.8	57.7	66.7	74.7	79.3	86.4	93.5	100	110	117	131	138	149	164	180	191	219	241	241
30	20	22.2	23.6	25.6	27.2	28	29.4	31.3	36	45.6	50.4	59.7	65.2	75.4	84.3	89.5	97.4	105	113	125	132	148	156	168	185	204	216	248	273	273
40	24.8	27.4	31.7	31.6	33.6	34.6	36.3	38.7	44.5	56.3	62.2	73.6	80.3	92.7	104	110	120	129	139	153	162	181	191	207	228	251	267	306	337	337
50	29.5	32.6	34.8	37.6	40.1	41.3	43.3	46	52.9	66.9	74	87.4	95.4	110	123	131	142	153	164	181	192	215	227	247	272	299	317	364	401	401
60	34.3	38	40.6	43.8	46.7	48.1	50.3	53.5	61.5	77.7	85.8	101	110	127	142	151	164	177	189	210	223	250	264	286	315	347	368	422	465	465
70	39.2	43.3	46.3	50	53.3	55	57.4	61	70	88.4	97.6	115	126	145	162	171	186	202	214	240	254	285	301	327	360	396	421	482	531	531
80	44	48.7	52.1	56.2	60	61.9	64.5	68.5	78.6	99.1	109	129	141	162	181	191	209	227	242	269	285	320	338	367	404	445	472	541	596	596
90	50	54.2	57.8	62.4	66.7	68.9	71.5	76	87.2	109	121	143	156	179	200	211	231	251	268	298	316	354	374	406	447	492	522	598	660	660
100	53.9	59.6	63.7	68.7	73.5	77.3	78.6	83.5	95.																					

# Metal Orifice Water Flow – Gallons/minute

Orifice Diameter Inches	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	31	32	33
1	0.00035	0.0006	0.0009	0.0012	0.0015	0.0019	0.0025	0.0028	0.0034	0.0038	0.0043	0.0050	0.0055	0.0067	0.0073	0.0080	0.009	0.010	0.011	0.012	0.013	0.014	0.016	0.017	0.018	0.019	0.022	0.024	0.025
2	0.00049	0.0009	0.0012	0.0017	0.0021	0.0027	0.0035	0.0040	0.0048	0.0054	0.0061	0.0071	0.0078	0.0095	0.0103	0.0113	0.012	0.014	0.016	0.017	0.018	0.020	0.023	0.024	0.025	0.027	0.031	0.034	0.035
3	0.00061	0.0011	0.0015	0.0021	0.0026	0.0033	0.0043	0.0048	0.0059	0.0066	0.0074	0.0087	0.0095	0.0116	0.0126	0.0139	0.015	0.017	0.019	0.021	0.023	0.024	0.028	0.029	0.031	0.033	0.038	0.042	0.043
4	0.00070	0.0012	0.0017	0.0024	0.0030	0.0038	0.0050	0.0056	0.0068	0.0076	0.0086	0.0100	0.0110	0.0134	0.0146	0.0160	0.018	0.019	0.022	0.024	0.026	0.028	0.032	0.034	0.036	0.038	0.044	0.048	0.050
5	0.00078	0.0014	0.0019	0.0027	0.0034	0.0042	0.0056	0.0063	0.0076	0.0085	0.0102	0.0112	0.0123	0.0150	0.0163	0.0179	0.020	0.021	0.025	0.027	0.029	0.031	0.036	0.038	0.040	0.042	0.049	0.054	0.056
6	0.00086	0.0015	0.0021	0.0029	0.0037	0.0047	0.0061	0.0069	0.0083	0.0093	0.0105	0.0122	0.0135	0.0164	0.0179	0.0196	0.022	0.024	0.027	0.029	0.032	0.034	0.039	0.042	0.044	0.047	0.054	0.059	0.061
7	0.00093	0.0016	0.0023	0.0032	0.0040	0.0050	0.0066	0.0074	0.0090	0.0101	0.0114	0.0132	0.0146	0.0177	0.0193	0.0212	0.023	0.025	0.029	0.032	0.034	0.037	0.042	0.045	0.048	0.050	0.058	0.063	0.066
8	0.00099	0.0017	0.0024	0.0034	0.0044	0.0054	0.0071	0.0079	0.0096	0.0107	0.0122	0.0141	0.0156	0.0190	0.0206	0.0226	0.025	0.027	0.031	0.034	0.037	0.040	0.045	0.048	0.051	0.054	0.062	0.068	0.071
9	0.00105	0.0018	0.0026	0.0036	0.0045	0.0057	0.0075	0.0084	0.0102	0.0114	0.0129	0.0147	0.0165	0.0201	0.0219	0.0240	0.026	0.029	0.033	0.036	0.039	0.042	0.048	0.051	0.054	0.057	0.066	0.072	0.075
10	0.00111	0.0019	0.0027	0.0038	0.0047	0.0060	0.0079	0.0089	0.0108	0.0120	0.0136	0.0158	0.0174	0.0212	0.0231	0.0253	0.028	0.030	0.035	0.038	0.041	0.044	0.051	0.054	0.057	0.060	0.070	0.076	0.079
15	0.00136	0.0024	0.0033	0.0046	0.0058	0.0074	0.0097	0.0108	0.0132	0.0147	0.0167	0.0194	0.0213	0.0259	0.0283	0.0310	0.034	0.037	0.043	0.046	0.050	0.054	0.062	0.066	0.070	0.074	0.085	0.093	0.097
20	0.00157	0.0027	0.0038	0.0054	0.0067	0.0085	0.0112	0.0125	0.0152	0.0170	0.0192	0.0224	0.0246	0.0300	0.0326	0.0358	0.039	0.043	0.049	0.054	0.058	0.063	0.072	0.076	0.080	0.085	0.098	0.107	0.112
30	0.00192	0.0033	0.0047	0.0066	0.0082	0.0104	0.0137	0.0153	0.0186	0.0208	0.0236	0.0274	0.0301	0.0367	0.0400	0.0438	0.048	0.053	0.060	0.066	0.071	0.077	0.088	0.093	0.099	0.104	0.120	0.131	0.137
40	0.00221	0.0039	0.0054	0.0076	0.0095	0.0120	0.0158	0.0177	0.0215	0.0240	0.0272	0.0316	0.0348	0.0424	0.0462	0.0506	0.056	0.061	0.070	0.076	0.082	0.089	0.101	0.108	0.114	0.120	0.139	0.152	0.158
50	0.00247	0.0043	0.0061	0.0085	0.0106	0.0134	0.0177	0.0198	0.0240	0.0269	0.0304	0.0354	0.0389	0.0474	0.0516	0.0566	0.062	0.068	0.078	0.085	0.092	0.099	0.113	0.120	0.127	0.134	0.156	0.170	0.177
60	0.00271	0.0047	0.0067	0.0093	0.0116	0.0147	0.0194	0.0217	0.0263	0.0294	0.0333	0.0387	0.0426	0.0519	0.0565	0.0620	0.068	0.074	0.085	0.093	0.101	0.108	0.124	0.132	0.139	0.147	0.170	0.186	0.194
70	0.00293	0.0051	0.0072	0.0100	0.0125	0.0159	0.0209	0.0234	0.0284	0.0318	0.0360	0.0418	0.0460	0.0561	0.0611	0.0669	0.074	0.080	0.092	0.100	0.109	0.117	0.134	0.142	0.151	0.159	0.184	0.201	0.209
80	0.00313	0.0055	0.0077	0.0107	0.0134	0.0170	0.0224	0.0250	0.0304	0.0340	0.0385	0.0447	0.0492	0.0599	0.0653	0.0716	0.079	0.086	0.098	0.107	0.116	0.125	0.143	0.152	0.161	0.170	0.197	0.215	0.224
90	0.00332	0.0058	0.0082	0.0114	0.0142	0.0180	0.0237	0.0266	0.0323	0.0360	0.0408	0.0474	0.0522	0.0636	0.0693	0.0759	0.083	0.091	0.104	0.114	0.123	0.133	0.152	0.161	0.171	0.180	0.209	0.228	0.237
100	0.00350	0.0061	0.0086	0.0120	0.0150	0.0190	0.0250	0.0280	0.0340	0.0380	0.0430	0.0500	0.0550	0.0670	0.0730	0.0800	0.088	0.096	0.110	0.120	0.130	0.140	0.160	0.170	0.180	0.190	0.220	0.240	0.250

Orifice Diameter Inches	35	37	38	39	40	41	42	43	44	47	52	55	60	63	67	70	73	76	79	81	86	89	94	96	100	104	109	113	120	125
1	0.028	0.031	0.032	0.033	0.036	0.038	0.041	0.042	0.043	0.047	0.052	0.055	0.06	0.063	0.067	0.07	0.073	0.076	0.079	0.081	0.086	0.089	0.094	0.096	0.1	0.104	0.109	0.113	0.12	0.125
2	0.040	0.044	0.045	0.047	0.051	0.054	0.058	0.062	0.066	0.071	0.078	0.083	0.09	0.096	0.103	0.11	0.116	0.123	0.13	0.137	0.144	0.152	0.16	0.167	0.174	0.182	0.191	0.201	0.21	0.215
3	0.048	0.054	0.055	0.057	0.062	0.066	0.071	0.076	0.082	0.088	0.096	0.103	0.11	0.118	0.126	0.134	0.142	0.151	0.16	0.168	0.177	0.186	0.195	0.204	0.213	0.222	0.232	0.242	0.251	0.255
4	0.056	0.062	0.064	0.066	0.072	0.076	0.081	0.087	0.092	0.101	0.108	0.116	0.124	0.132	0.141	0.15	0.159	0.168	0.177	0.186	0.195	0.204	0.213	0.222	0.231	0.24	0.249	0.258	0.267	0.275
5	0.063	0.069	0.072	0.074	0.080	0.085	0.091	0.096	0.103	0.11	0.118	0.126	0.134	0.143	0.152	0.161	0.17	0.179	0.188	0.197	0.206	0.215	0.224	0.233	0.242	0.251	0.26	0.269	0.278	0.286
6	0.069	0.076	0.078	0.081	0.088	0.093	0.099	0.106	0.113	0.121	0.129	0.137	0.145	0.154	0.163	0.172	0.181	0.19	0.199	0.208	0.217	0.226	0.235	0.244	0.253	0.262	0.271	0.28	0.289	0.297
7	0.074	0.082	0.085	0.087	0.095	0.101	0.107	0.114	0.121	0.128	0.136	0.144	0.152	0.16	0.169	0.178	0.187	0.196	0.205	0.214	0.223	0.232	0.241	0.25	0.259	0.268	0.277	0.286	0.295	0.303
8	0.079	0.088	0.091	0.093	0.102	0.107	0.114	0.121	0.128	0.136	0.144	0.152	0.16	0.169	0.178	0.187	0.196	0.205	0.214	0.223	0.232	0.241	0.25	0.259	0.268	0.277	0.286	0.295	0.303	0.311
9	0.084	0.093	0.096	0.099	0.108	0.114	0.121	0.128	0.136	0.144	0.152	0.16	0.169	0.178	0.187	0.196	0.205	0.214	0.223	0.232	0.241	0.25	0.259	0.268	0.277	0.286	0.295	0.303	0.311	0.319
10	0.089	0.098	0.101	0.104	0.112	0.119	0.126	0.133	0.14	0.148	0.156	0.164	0.172	0.18	0.188	0.196	0.204	0.212	0.22	0.228	0.236	0.244	0.252	0.26	0.268	0.276	0.284	0.292	0.3	0.308
15	0.108	0.120	0.124	0.128	0.139	0.147	0.151	0.159	0.166	0.174	0.183	0.192	0.201	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3	0.31	0.32	0.33	0.34	0.35	0.36	0.37
20	0.125	0.139	0.143	0.148	0.161	0.170	0.174	0.183	0.192	0.201	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
30	0.153	0.170	0.175	0.181	0.197	0.208	0.214	0.225	0.233	0.242	0.251	0.26	0.27	0.28	0.29	0.3	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4	0.41	0.42	0.43	0.44
40	0.177	0.196	0.202	0.209	0.228	0.240	0.247	0.259	0.268	0.277	0.286	0.295	0.304	0.313	0.322	0.331	0.34	0.35	0.36	0.37	0.38	0.39	0.4	0.41	0.42	0.43	0.44	0.45	0.46	0.47
50	0.198	0.219	0.226	0.233	0.255	0.269	0.276	0.286	0.295	0.304	0.313	0.322	0.331	0.34	0.35	0.36	0.37	0.38	0.39	0.4	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
60	0.217	0.240	0.248	0.256	0.279	0.294	0.302	0.312	0.321	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5	0.51	0.52	0.53
70	0.234	0.259	0.268	0.276	0.301	0.318	0.326	0.334	0.342	0.35	0.36	0.37	0.38	0.39	0.4	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5	0.51	0.52	0.53</		

# Metal Orifice Water Flow – Liters/minute

Orifice Diameter Inches	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	31	32	33		
0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.013	0.014	0.015	0.016	0.017	0.018	0.019	0.02	0.021	0.022	0.023	0.024	0.025	0.026	0.027	0.028	0.029	0.031	0.032	0.033			
0.00035	0.0006	0.0009	0.0012	0.0015	0.0019	0.0025	0.0032	0.0041	0.0052	0.0068	0.0091	0.012	0.016	0.021	0.028	0.037	0.049	0.065	0.086	0.113	0.148	0.193	0.250	0.321	0.409	0.518	0.659	0.837	1.064	1.351	1.708
0.0013	0.0023	0.0033	0.0045	0.0057	0.0072	0.0095	0.0126	0.0166	0.0218	0.0286	0.0374	0.0494	0.0650	0.0858	0.1124	0.1471	0.1914	0.2461	0.3124	0.3914	0.4941	0.6314	0.8041	0.1014	0.1291	0.1664	0.2144	0.2744	0.3484	0.4384	0.5464
0.0019	0.0033	0.0046	0.0064	0.0080	0.0102	0.0134	0.0180	0.0236	0.0308	0.0400	0.0520	0.0680	0.0896	0.1176	0.1536	0.1992	0.2568	0.3272	0.4128	0.5152	0.6464	0.8176	0.1032	0.1312	0.1696	0.2192	0.2800	0.3520	0.4360	0.5360	0.6560
0.0023	0.0040	0.0056	0.0079	0.0098	0.0125	0.0164	0.0223	0.0299	0.0396	0.0520	0.0680	0.0896	0.1176	0.1536	0.1992	0.2568	0.3272	0.4128	0.5152	0.6464	0.8176	0.1032	0.1312	0.1696	0.2192	0.2800	0.3520	0.4360	0.5360	0.6560	0.7920
0.0026	0.0046	0.0065	0.0091	0.0114	0.0144	0.0189	0.0257	0.0344	0.0456	0.0600	0.0792	0.0104	0.1336	0.1728	0.2232	0.2864	0.3632	0.4560	0.5664	0.7056	0.8832	0.1096	0.1392	0.1792	0.2304	0.2928	0.3672	0.4536	0.5536	0.6736	0.8176
0.0030	0.0052	0.0073	0.0102	0.0127	0.0161	0.0212	0.0288	0.0384	0.0512	0.0680	0.0904	0.1192	0.1568	0.2032	0.2600	0.3280	0.4080	0.5000	0.6144	0.7512	0.9184	0.1112	0.1408	0.1808	0.2320	0.2944	0.3704	0.4592	0.5616	0.6784	0.8160
0.0032	0.0057	0.0080	0.0111	0.0139	0.0176	0.0232	0.0316	0.0420	0.0552	0.0736	0.0976	0.1296	0.1712	0.2232	0.2864	0.3616	0.4496	0.5512	0.6768	0.8272	0.1000	0.1296	0.1696	0.2208	0.2832	0.3576	0.4440	0.5440	0.6576	0.7848	0.9264
0.0035	0.0061	0.0086	0.0120	0.0150	0.0190	0.0250	0.0328	0.0432	0.0576	0.0768	0.1016	0.1344	0.1760	0.2280	0.2912	0.3664	0.4544	0.5560	0.6832	0.8360	0.1008	0.1304	0.1704	0.2216	0.2840	0.3584	0.4448	0.5448	0.6584	0.7872	0.9312
0.0037	0.0065	0.0092	0.0128	0.0161	0.0203	0.0268	0.0356	0.0464	0.0608	0.0800	0.1056	0.1408	0.1856	0.2400	0.3040	0.3792	0.4672	0.5696	0.6880	0.8320	0.1016	0.1312	0.1712	0.2224	0.2848	0.3592	0.4456	0.5456	0.6592	0.7984	0.9472
0.0040	0.0069	0.0098	0.0136	0.0170	0.0216	0.0284	0.0376	0.0496	0.0648	0.0848	0.1104	0.1472	0.1952	0.2536	0.3224	0.4024	0.4944	0.5984	0.7248	0.8736	0.1024	0.1320	0.1720	0.2232	0.2856	0.3600	0.4500	0.5520	0.6664	0.7960	0.9360
0.0042	0.0073	0.0103	0.0144	0.0180	0.0227	0.0299	0.0396	0.0520	0.0680	0.0904	0.1192	0.1568	0.2032	0.2600	0.3280	0.4080	0.5000	0.6144	0.7512	0.9184	0.1112	0.1408	0.1808	0.2320	0.2944	0.3704	0.4592	0.5616	0.6784	0.8160	0.9600
0.0051	0.0089	0.0126	0.0176	0.0220	0.0279	0.0367	0.0476	0.0616	0.0792	0.1016	0.1312	0.1712	0.2208	0.2800	0.3488	0.4288	0.5192	0.6200	0.7312	0.8544	0.1000	0.1296	0.1696	0.2208	0.2832	0.3576	0.4440	0.5440	0.6576	0.7848	0.9264
0.0059	0.0103	0.0146	0.0203	0.0254	0.0322	0.0411	0.0520	0.0656	0.0832	0.1064	0.1376	0.1776	0.2272	0.2872	0.3576	0.4384	0.5296	0.6312	0.7440	0.8688	0.1008	0.1304	0.1704	0.2216	0.2840	0.3584	0.4448	0.5448	0.6584	0.7960	0.9400
0.0073	0.0126	0.0178	0.0249	0.0331	0.0424	0.0536	0.0672	0.0848	0.1072	0.1360	0.1728	0.2192	0.2760	0.3424	0.4184	0.5040	0.5992	0.7040	0.8192	0.9456	0.1016	0.1312	0.1712	0.2224	0.2848	0.3592	0.4456	0.5456	0.6592	0.7984	0.9472
0.0084	0.0146	0.0206	0.0287	0.0359	0.0455	0.0569	0.0708	0.0880	0.1104	0.1416	0.1776	0.2240	0.2800	0.3456	0.4208	0.5056	0.5992	0.7024	0.8160	0.9408	0.1024	0.1320	0.1720	0.2232	0.2856	0.3600	0.4500	0.5520	0.6664	0.7960	0.9360
0.0094	0.0163	0.0230	0.0321	0.0402	0.0509	0.0639	0.0792	0.0984	0.1224	0.1536	0.1944	0.2448	0.3040	0.3720	0.4480	0.5320	0.6240	0.7240	0.8320	0.9504	0.1032	0.1328	0.1728	0.2240	0.2864	0.3608	0.4508	0.5528	0.6672	0.7968	0.9368
0.0103	0.0179	0.0252	0.0352	0.0440	0.0557	0.0700	0.0880	0.1104	0.1416	0.1776	0.2240	0.2800	0.3456	0.4208	0.5056	0.5992	0.7024	0.8160	0.9408	0.1032	0.1328	0.1728	0.2240	0.2864	0.3608	0.4508	0.5528	0.6672	0.7968	0.9368	
0.0111	0.0193	0.0272	0.0380	0.0475	0.0602	0.0752	0.0936	0.1160	0.1472	0.1832	0.2240	0.2704	0.3264	0.3920	0.4672	0.5512	0.6432	0.7440	0.8520	0.9696	0.1040	0.1336	0.1736	0.2248	0.2872	0.3616	0.4516	0.5536	0.6680	0.7976	0.9376
0.0119	0.0207	0.0291	0.0406	0.0508	0.0643	0.0806	0.0996	0.1224	0.1536	0.1944	0.2448	0.3040	0.3720	0.4480	0.5320	0.6240	0.7240	0.8320	0.9504	0.1040	0.1336	0.1736	0.2248	0.2872	0.3616	0.4516	0.5536	0.6680	0.7976	0.9376	
0.0126	0.0219	0.0309	0.0431	0.0539	0.0682	0.0858	0.1064	0.1312	0.1632	0.2040	0.2544	0.3144	0.3840	0.4632	0.5512	0.6480	0.7536	0.8680	0.9912	0.1048	0.1344	0.1744	0.2256	0.2880	0.3624	0.4524	0.5544	0.6688	0.7984	0.9384	0.1056
0.0132	0.0231	0.0326	0.0454	0.0568	0.0719	0.0896	0.1104	0.1352	0.1672	0.2080	0.2584	0.3184	0.3880	0.4672	0.5552	0.6520	0.7576	0.8720	0.9952	0.1056	0.1352	0.1752	0.2264	0.2888	0.3632	0.4532	0.5552	0.6696	0.7992	0.9392	0.1064

Orifice Diameter Inches	35	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																														
0.035	0.037	0.038	0.039	0.04	0.041	0.042	0.043	0.044	0.045	0.046	0.047	0.048	0.049	0.05	0.051	0.052	0.053	0.054	0.055	0.056	0.057	0.058	0.059	0.06	0.061	0.062	0.063	0.064	0.065	0.066	0.067	0.068	0.069	0.07	0.071	0.072	0.073	0.074	0.075	0.076	0.077	0.078	0.079	0.08	0.081	0.082	0.083	0.084	0.085	0.086	0.087	0.088	0.089	0.09	0.091	0.092	0.093	0.094	0.095	0.096	0.097	0.098	0.099	0.1	0.101	0.102	0.103	0.104	0.105	0.106	0.107	0.108	0.109	0.11	0.111	0.112	0.113	0.114	0.115	0.116	0.117	0.118	0.119	0.12	0.121	0.122	0.123	0.124	0.125						
0.028	0.031	0.032	0.033	0.034	0.035	0.036	0.037	0.038	0.039	0.04	0.041	0.042	0.043	0.044	0.045	0.046	0.047	0.048	0.049	0.05	0.051	0.052	0.053	0.054	0.055	0.056	0.057	0.058	0.059	0.06	0.061	0.062	0.063	0.064	0.065	0.066	0.067	0.068	0.069	0.07	0.071	0.072	0.073	0.074	0.075	0.076	0.077	0.078	0.079	0.08	0.081	0.082	0.083	0.084	0.085	0.086	0.087	0.088	0.089	0.09	0.091	0.092	0.093	0.094	0.095	0.096	0.097	0.098	0.099	0.1	0.101	0.102	0.103	0.104	0.105	0.106	0.107	0.108	0.109	0.11	0.111	0.112	0.113	0.114	0.115	0.116	0.117	0.118	0.119	0.12	0.121	0.122	0.123	0.124	0.125
0.106	0.117	0.121	0.125	0.136	0.144	0.148	0.155	0.162	0.17	0.177	0.183	0.19	0.203	0.209	0.219	0.227	0.236	0.246	0.256	0.266	0.276	0.286	0.296	0.306	0.316	0.326	0.336	0.346	0.356	0.366	0.376	0.386	0.396	0.406	0.416	0.426	0.436	0.446	0.456	0.466	0.476	0.486	0.496	0.506	0.516	0.526	0.536	0.546	0.556	0.566	0.576	0.586	0.596	0.606	0.616	0.626	0.636	0.646	0.656	0.666	0.676	0.686	0.696	0.706	0.716	0.726	0.736	0.746	0.756	0.766	0.776	0.786	0.796	0.806	0.816	0.826	0.836	0.846	0.856	0.															