ISO 9001 CERTIFIED

High Pressure Equipment

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High Pressure Equipment

General Information

High Pressure Equipment Company has developed an extensive line of components and systems designed to satisfy the unique requirements of elevated pressure applications. Since our founding in 1954, we have been singularly focused upon this market segment and have consistently committed the resources necessary to be the industry's most reliable and economical source for quality high pressure products.

This dedication to excellence within our core business has earned HiP preferred supplier status within diverse markets such as waterjet cutting and cleaning, oil and gas, chemical and petrochemical, research and development, universities, government, and general industry.

Our product line includes a complete offering of valves, fittings, tubing, gauges, safety devices, pressure vessels, reactors, pumping systems, intensifiers, gas boosters and pressure generators for use at pressures through 150,000 psi. Stainless steel is the material most commonly used for our standard products, although we offer a variety of other materials to address alternative operating conditions.

We maintain a significant inventory of many standard components, allowing us to provide fast response and delivery to our customers. For special requirements, our flexible structure and skilled machinists will produce a component or system designed to your individual specifications, in a timely manner.

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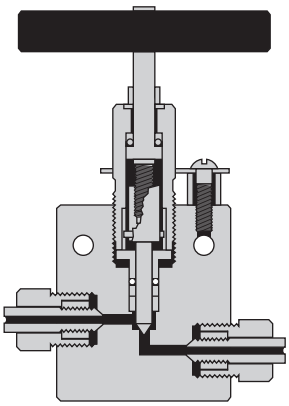
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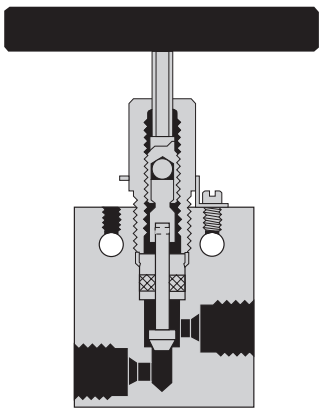
Valve Design

General

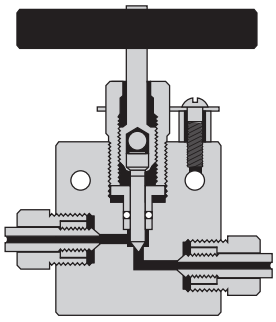
- Valve bodies through 100,000 psi are high tensile Type 316 stainless steel, 150,000 psi valve bodies are 17-4 PH stainless steel.
- Stem assemblies have non-rotating tips to prevent galling with valve seats.
- Packing is located below the stem threads to prevent contact with media (liquid or gas).
- Packing glands are equipped with locking devices or lock nuts.
- Six valve patterns (see chart on page 1.3).
- Tubing connections are: 1/16", 1/8", 1/4", 3/8", 9/16", 3/4", and 1". Pipe connections include: 1/8", 1/4", 3/8", 1/2", 3/4", and 1" NPT.
- Remote control air operators are available for most valves.



Positive Guide Stem



Pinned Stem



Rolled Style Stem

Positive Guide Stem: High Pressure Equipment Company's patented "Positive Guide" stem assembly virtually eliminates lower stem rotation — one of the most common causes of premature stem failure. The lower section stem is manufactured from hardened 17-4 PH stainless steel for exceptional wear and corrosion resistance and can be easily serviced with no special tooling required. The one-piece upper section stem eliminates the need for continual adjustment and minimizes "loose handle" backlash.

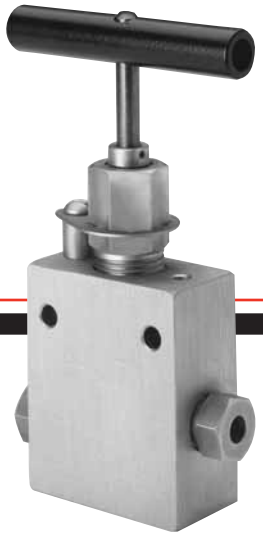
The Positive Guide Stem is standard for all AF4, AF6, HF4, HF6, and HF9 valves, and 60,000 psi HF2 valves.

Rolled Style Stem: This simple two-piece design is also non-rotating and is ideal for smaller valves and for valves made from exotic materials. The standard lower section stem is manufactured from hardened 17-4 PH stainless steel. It is affixed to a one-piece upper stem requiring no periodic adjustment. The two stem components are free to rotate independently of each other, thereby minimizing rotation of the lower stem against the valve seat.

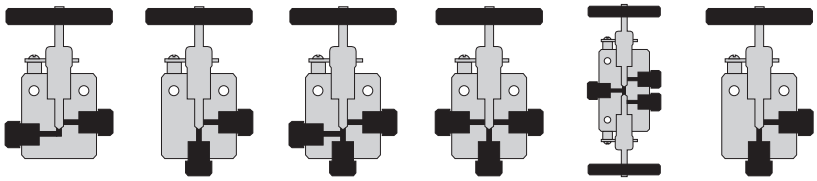
The Rolled Style Stem is standard for all AF1, AF2, NFA, NFB, LF4, LF6 valves, 30,000 psi HF2, XF4, and XF6 valves, as well as most valves requiring stems made from exotic materials. It is optional for any valve normally supplied with a Positive Guide Stem.

Pinned Stem Design: This variation on the Rolled Style Stem is a three-piece design in which the lower stem is pinned into a freely-rotating stem guide. It has all of the advantages of the rolled style stem, with the additional benefit of a replaceable lower section stem.

The Pinned Stem Design is standard for all NFC, NFD, NFF, NFH, LF9, LF12, LF16, and HF16 valves.



Quick Selector Guide to Standard Valves



		Tubing Size O.D.	Tubing Size I.D.	Two Way Straight	Two Way Angle	Three Way Two Press	Three Way One Press	Three Way Two Stem	Replaceable Seat
Taper Seal Valves	10,000 psi	1/4"	1/8"	10-11AF4	10-12AF4	10-13AF4	10-14AF4	10-15AF4	NA
		3/8"	1/4"	10-11AF6	10-12AF6	10-13AF6	10-14AF6	10-15AF6	NA
	15,000 psi	1/16"	.030"	15-11AF1	15-12AF1	15-13AF1	15-14AF1	15-15AF1	NA
		1/8"	1/16"	15-11AF2	15-12AF2	15-13AF2	15-14AF2	15-15AF2	NA
Medium Pressure Valves	20,000 psi	1/4"	7/64"	20-11LF4	20-12LF4	20-13LF4	20-14LF4	20-15LF4	20-12LF4R
		3/8"	13/64"	20-11LF6	20-12LF6	20-13LF6	20-14LF6	20-15LF6	20-12LF6R
		9/16"	5/16"	20-11LF9	20-12LF9	20-13LF9	20-14LF9	20-15LF9	20-12LF9R
		3/4"	33/64"	20-11LF12	20-12LF12	20-13LF12	20-14LF12	20-15LF12	20-12LF12R
		1"	11/16"	20-11LF16	20-12LF16	20-13LF16	20-14LF16	20-15LF16	20-12LF16R
High Pressure Valves	30,000 psi	1/8"	.040"	30-11HF2	30-12HF2	30-13HF2	30-14HF2	30-15HF2	30-12HF2R
		1/4"	.083"	30-11HF4	30-12HF4	30-13HF4	30-14HF4	30-15HF4	30-12HF4R
		3/8"	1/8"	30-11HF6	30-12HF6	30-13HF6	30-14HF6	30-15HF6	30-12HF6R
		9/16"	3/16"	30-11HF9	30-12HF9	30-13HF9	30-14HF9	30-15HF9	30-12HF9R
		1"	.437"	30-11HF16	30-12HF16	30-13HF16	30-14HF16	30-15HF16	30-12HF16R
	60,000 psi	1/8"	.020"	60-11HF2	60-12HF2	60-13HF2	60-14HF2	60-15HF2	60-12HF2R
		1/4"	1/16"	60-11HF4	60-12HF4	60-13HF4	60-14HF4	60-15HF4	60-12HF4R
		3/8"	1/8"	60-11HF6	60-12HF6	60-13HF6	60-14HF6	60-15HF6	60-12HF6R
		9/16"	3/16"	60-11HF9	60-12HF9	60-13HF9	60-14HF9	60-15HF9	60-12HF9R
Ultra High Pressure Valves	100,000 psi	1/4"	1/16"	100-11XF4	100-12XF4	100-13XF4	100-14XF4	NA	100-12XF4R
	150,000 psi	3/8"	1/16"	150-11XF6	150-12XF6	150-13XF6	150-14XF6	NA	150-12XF6R

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Catalog Numbering System

PRESSURE		TYPE	CONNECTION	CONNECTION (IF DIFFERENT FROM FIRST CONNECTION)		OPTIONS / ACCESSORIES
30	-	11	HF9		⌐	

Pressure Series

10 =10,000 psi
15 = 15,000 psi
20 = 20,000 psi
30 = 30,000 psi
40 = 40,000 psi
60 = 60,000 psi
100 = 100,000 psi
150 = 150,000 psi

Catalog part numbers for some components (NPT fittings, special alloy parts) have been maintained for historical consideration.

The referred pressure series may not reflect the actual pressure rating. Please refer to applicable catalog page for pressure rating, or consult the factory.

Type of Components

2 = Gland, Collar or Sleeve
3 = Anti-Vibration Assembly
7 = Plug
11 = 2-Way Straight Valve
12 = 2-Way Angle Valve
13 = 3-Way Valve with Two Pressure Connections
14 = 3-Way Valve with One Pressure Connections
15 = 3-Way, 2-Stem Valve
16 = Ball Valve (Floating)
21 = Coupling or Adapter
22 = Elbow
23 = Tee
24 = Cross
41 = Check Valve
51 = Line Filter
61 = Safety Head (Straight)
63 = Safety Head (Tee Type)
71 = 2-Way Ball Valve *
72 = 3-Way Ball Valve 180° *
73 = 3-Way Ball Valve Diverter *
74 = 2-Way Ball Valve *
75 = 3-Way Ball Valve 180° *
76 = 3-Way Ball Valve Diverter *
77 = 3-Way Mini Ball Valve $^1/_4$ NPT
80 = 2-Way Ball Valve *
81 = 3-Way Ball Valve 180 *
82 = 3-Way Ball Valve Diverter *

* (Trunion)

Connection(s) Size and Type

Female	Male	
AF1	AM1	$^1/_{16}$" Taper Seal
AF2	AM2	$^1/_8$" Taper Seal
AF4	AM4	$^1/_4$" Taper Seal
AF6	AM6	$^3/_8$" Taper Seal
LF4	LM4	$^1/_4$" Medium Pressure
LF6	LM6	$^3/_8$" Medium Pressure
LF9	LM9	$^9/_{16}$" Medium Pressure
LF12	LM12	$^3/_4$" Medium Pressure
LF16	LM16	1" Medium Pressure
HF2	HM2	$^1/_8$" High Pressure
HF4	HM4	$^1/_4$" High Pressure
HF6	HM6	$^3/_8$" High Pressure
HF9	HM9	$^9/_{16}$" High Pressure
HF16	HM16	1" High Pressure
XF4	XM4	$^1/_4$" Ultra High Pressure
XF6	XM6	$^3/_8$" Ultra High Pressure
NFA	NMA	$^1/_8$" NPT Pipe
NFB	NMB	$^1/_4$" NPT Pipe
NFC	NMC	$^3/_8$" NPT Pipe
NFD	NMD	$^1/_2$" NPT Pipe
NFF	NMF	$^3/_4$" NPT Pipe
NFH	NMH	1" NPT Pipe
—	HA9	$^9/_{16}$" Hose
—	HA12	$^3/_4$" Hose
—	HA16	1" Hose
—	HA21	$1^5/_{16}$" Hose

Options

-V = Micro Control Metering Assembly (See page 6.5)
-HT = High Temperature Stem Extension (Up to 1,000° F) (See page 6.4)
-SGS = Sour Gas (H_2S) Service
-N/O = Normally Open
-N/C = Normally Closed
-K = With Antivibration Collars and Glands
-REG = Regulating Tip
-TSR8 = Ball Valve Actuator
-TDA8 = Ball Valve Actuator Double Acting
-W/O = Without Collars and Glands
-LT = Low Temperature Stem Extension (to -320°F)
-MPO-NO = Medium Duty Piston Operator Normally Open
-MPO-NC = Medium Duty Piston Operator Normally Closed
-HPO-NO = Heavy Duty Piston Operator Normally Open
-HPO-NC = Heavy Duty Piston Operator Normally Closed
-EHPO-NO = Extra Heavy Piston Operator Normally Open
-EHPO-NC = Extra Heavy Piston Operator Normally Closed

How to Order Valves and Fittings

Simply indicate catalog number and specify option or special requirement.

Examples:

30-11HF4 = 30,000 psi Straight Valve for $^1/_4$" O.D. tubing
60-23HF4 = 60,000 psi Tee for $^1/_4$" O.D. tubing
15-21AF2 = 15,000 psi Straight Coupling for $^1/_8$" O.D. tubing, Taper Seal connections
15-21AF2NMB = 15,000 psi Adapter with one end $^1/_8$" O.D. Female Taper Seal and opposite end Male $^1/_4$" NPT Pipe
30-11HF6-HT = 30,000 psi Straight Valve for $^3/_8$" O.D. tubing with High Temperature Extension
"HIPCO" 10-12NFB (N/C) = 10,000 psi Angle Valve for $^1/_4$" NPT Pipe with "Hipco" Air Operator, Normally Closed
"HIPPO" 15-11A4F (N/C) = 10,000 psi Angle Valve for $^1/_4$" Taper Seal with "Hippo" Piston Operator, Normally Closed
60-21HF4 (Hastelloy C-276) = 60,000 psi Straight Coupling for $^1/_4$" O.D. tubing, made from Hastelloy C-276 material

Warranty

High Pressure Equipment Company warrants the products which it manufactures to be free from defects in material and workmanship which would impair their intended usefulness. This warranty is for a period of one year after the date of shipment. Warranty is limited to the repair or replacement of any item manufactured by High Pressure Equipment Company. High Pressure Equipment Company shall not be liable for any direct or indirect consequential damage arising from a failure or malfunction of the equipment. This warranty further excludes damage, failure or malfunction which is caused by corrosion or erosion common to the material supplied.

Terms: Net 30 for qualified accounts

FOB: Erie, PA - USA

High Pressure Equipment Company
P.O. Box 8248 • 1222 Linden Ave. • Erie, PA 16505 U.S.A. • Phone: (814) 838-2028 • 1-800-289-7447 • Fax: (814) 838-6075 • E-Mail: sales@highpressure.com

Low Pressure Valves, Fittings and Tubing

Taper Seal and NPT –10,000 and 15,000 psi service

High Pressure Equipment Company has developed the Taper Seal and NPT lines of products to assure safe and easy plumbing through 15,000 psi. These needle valves, fittings, line filters, check valves, safety heads, rupture discs and tubing are engineered and manufactured to the highest standards of repeatable quality. The reliable performance of these products has made HiP one of the world's leading suppliers of elevated pressure components.



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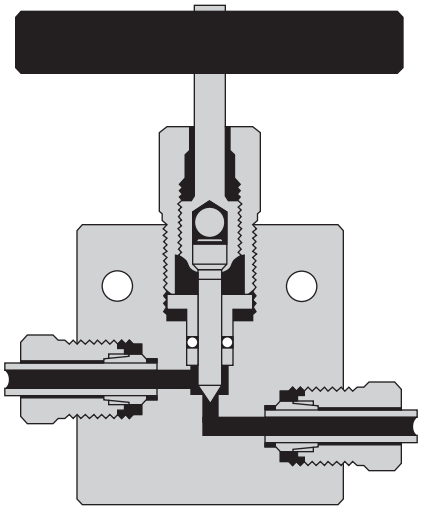
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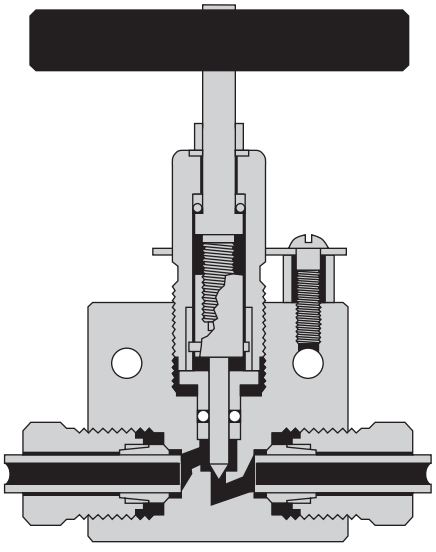
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Taper Seal Needle Valves

10,000 and 15,000 psi service



AF1 (1/16") and AF2 (1/8")
15,000 psi



AF4 (1/4") and AF6 (3/8")
10,000 psi

Compression type tubing connections for 1/16", 1/8", 1/4", and 3/8" O.D. tubing. Requires no special tooling for tubing preparation (simply cut off, deburr, and insert tubing into connection). Connection details are shown on page 2.A.

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available at no additional cost, add - REG to the catalog number.

Glands and sleeves are supplied with each valve unless otherwise requested (glands and sleeves shown on 2.A).

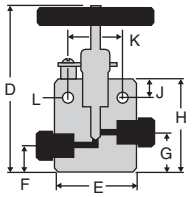
Materials include high tensile type 316 stainless steel for the valve body and hardened 17-4PH stainless steel lower section stem.

Packing is Teflon (450°F) standard, with optional Viton (350°F), BUNA-N (200°F) or Grafoil (650°F) available at no additional cost.

Air operators for remote control operation are available for all valves. (Select required valve and add "HIPCO". Refer to section 7.0 for additional data).

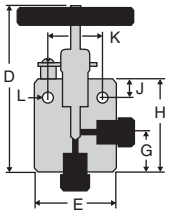
Valve Features

- Non-rotating stem tips
- Packing below stem threads
- Type 316 ss high tensile bodies
- Positive gland lock device
- No stem adjustment needed
- Black T-handles or choice of 4 colors
- Tube sizes 1/16" through 3/8"



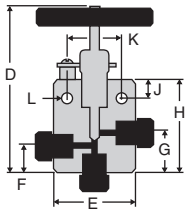
Two Way Straight Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/16" O.D.	15-11AF1	15,000	AF1	0.052"	2 1/2"	1 1/8"	1/4"	13/32"	1 1/8"	5/16"	3/4"	9/64"	1/2"
1/8" O.D.	15-11AF2	15,000	AF2	1/16"	3 1/8"	1 1/2"	11/16"	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	10-11AF4	10,000	AF4	1/8"	4 5/8"	2"	1/2"	1/2"	1 7/8"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	10-11AF6	10,000	AF6	1/8"	4 5/8"	2"	1/2"	1/2"	1 7/8"	1/2"	1 3/8"	7/32"	1"



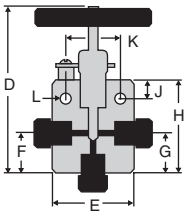
Two Way Angle Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/16" O.D.	15-12AF1	15,000	AF1	0.052"	2 5/8"	1 1/8"	–	21/32"	1 3/8"	5/16"	3/4"	9/64"	1/2"
1/8" O.D.	15-12AF2	15,000	AF2	1/16"	3 1/8"	1 1/2"	–	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	10-12AF4	10,000	AF4	1/8"	5 3/16"	2"	–	1 1/16"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	10-12AF6	10,000	AF6	1/8"	5 3/16"	2"	–	1 1/16"	2 7/16"	1/2"	1 3/8"	7/32"	1"



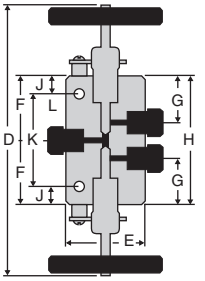
Three Way Valves / Two Pressure Connections

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/16" O.D.	15-13AF1	15,000	AF1	0.052"	2 3/4"	1 1/8"	1/2"	21/32"	1 3/8"	5/16"	3/4"	9/64"	1/2"
1/8" O.D.	15-13AF2	15,000	AF2	1/16"	3 1/8"	1 1/2"	11/16"	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	10-13AF4	10,000	AF4	1/8"	5 3/16"	2"	1/2"	1 1/16"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	10-13AF6	10,000	AF6	1/8"	5 3/16"	2"	1/2"	1 1/16"	2 7/16"	1/2"	1 3/8"	7/32"	1"



Three Way Valves / One Pressure Connection

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/16" O.D.	15-14AF1	15,000	AF1	0.052"	2 3/4"	1 1/8"	21/32"	21/32"	1 3/8"	5/16"	3/4"	9/64"	1/2"
1/8" O.D.	15-14AF2	15,000	AF2	1/16"	3 1/8"	1 1/2"	15/16"	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	10-14AF4	10,000	AF4	1/8"	5 3/16"	2"	1 1/16"	1 1/16"	2 7/16"	1/2"	1 7/8"	7/32"	1"
3/8" O.D.	10-14AF6	10,000	AF6	1/8"	5 3/16"	2"	1 1/16"	1 1/16"	2 7/16"	1/2"	1 3/8"	7/32"	1"



Three Way / Two Stem Connection Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/16" O.D.	15-15AF1	15,000	AF1	0.052"	4 3/4"	1 1/8"	1"	23/32"	2"	5/16"	1 3/8"	9/64"	1/2"
1/8" O.D.	15-15AF2	15,000	AF2	1/16"	5"	1 1/2"	1 1/4"	7/8"	2 1/2"	5/16"	1 7/8"	9/64"	3/4"
1/4" O.D.	10-15AF4	10,000	AF4	1/8"	8 7/8"	2"	1 11/16"	1 3/16"	3 3/8"	1/2"	2 3/8"	7/32"	1"
3/8" O.D.	10-15AF6	10,000	AF6	1/8"	8 7/8"	2"	1 11/16"	1 13/16"	3 3/8"	1/2"	2 3/8"	7/32"	1"

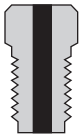
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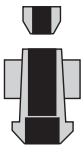
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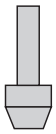
Glands/Sleeves/Plugs
Elbows/Tees/Crosses

A complete range of elbows, tees, and crosses is available for all of the tubing connection sizes. Material is high tensile 316 stainless steel. Standard tubing glands and sleeves are furnished unless otherwise specified.

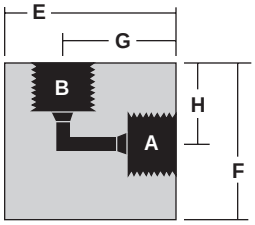
Connection Components

Catalog No.	Tube Size	Gland
15-2AM1	1/16"	
15-2AM2	1/8"	
10-2AM4	1/4"	
10-2AM6	3/8"	

Catalog No.	Tube Size	Sleeve
15-2A1	1/16"	
15-2A2	1/8"	
10-2A4	1/4"	
10-2A6	3/8"	

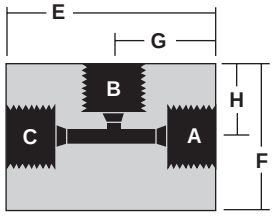
Catalog No.	Tube Size	Plug
15-7AM1	1/16"	
15-7AM2	1/8"	
10-7AM4	1/4"	
10-7AM6	3/8"	

Taper Seal Elbows



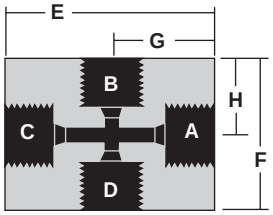
Catalog No.	Pressure Rating psi	Connections	A-B	E	F	G	H	Thickness
15-22AF1	15,000	1/16" O.D. TUBE	AF1	3/4"	3/4"	9/16"	9/16"	3/8"
15-22AF2	15,000	1/8" O.D. TUBE	AF2	1 1/8"	1 1/8"	3/4"	3/4"	3/4"
10-22AF4	10,000	1/4" O.D. TUBE	AF4	1 1/2"	1 1/2"	1"	1"	1"
10-22AF6	10,000	3/8" O.D. TUBE	AF6	1 1/2"	1 1/2"	1"	1"	1"

Taper Seal Tees



Catalog No.	Pressure Rating psi	Connections	A-B-C	E	F	G	H	Thickness
15-23AF1	15,000	1/16" O.D. TUBE	AF1	1"	3/4"	1/2"	9/16"	3/8"
15-23AF2	15,000	1/8" O.D. TUBE	AF2	1 1/2"	1 1/8"	3/4"	3/4"	3/4"
10-23AF4	10,000	1/4" O.D. TUBE	AF4	2"	1 1/2"	1"	1"	1"
10-23AF6	10,000	3/8" O.D. TUBE	AF6	2"	1 1/2"	1"	1"	1"

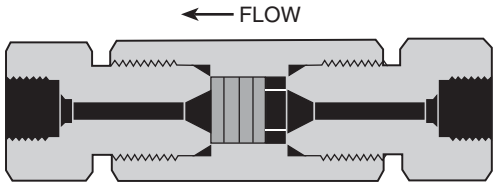
Taper Seal Crosses



Catalog No.	Pressure Rating psi	Connections	A-B-C-D	E	F	G	H	Thickness
15-24AF1	15,000	1/16" O.D. TUBE	AF1	1"	1"	1/2"	1/2"	3/8"
15-24AF2	15,000	1/8" O.D. TUBE	AF2	1 1/2"	1 1/2"	3/4"	3/4"	3/4"
10-24AF4	10,000	1/4" O.D. TUBE	AF4	2"	2"	1"	1"	1"
10-24AF6	10,000	3/8" O.D. TUBE	AF6	2"	2"	1"	1"	1"

Line Filters

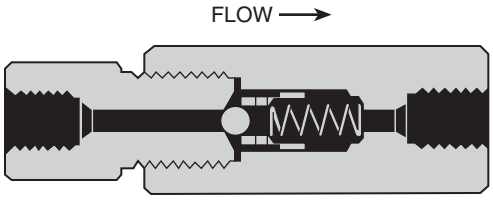
The line filters as shown utilize sintered stainless steel filter discs (AF2 & AF1 – 3 pc./set, AF4 & AF6 – 4 pc./set). Porosities are available as per the chart to the right. If not otherwise specified, 100 micron filter discs are supplied. (One micron = 0.001 millimeters). Material of bodies and end covers is high tensile 316 stainless steel. Standard tubing glands and sleeves are provided unless otherwise specified.



Catalog No.	Pressure Rating psi	Connections	Length	Hex Size	Micron Size Filter Available 0.5	2	5	10	40	100
15-51AF1	15,000	1/16" TAPER SEAL	3 1/8"	3/4"	●	●	●	●	●	●
15-51AF2	15,000	1/8" TAPER SEAL	3 1/8"	3/4"	●	●	●	●	●	●
10-51AF4	10,000	1/4" TAPER SEAL	5 1/4"	1 3/8"	●	●	●	●	●	●
10-51AF6	10,000	3/8" TAPER SEAL	5 1/4"	1 3/8"	●	●	●	●	●	●

Ball Check Valves

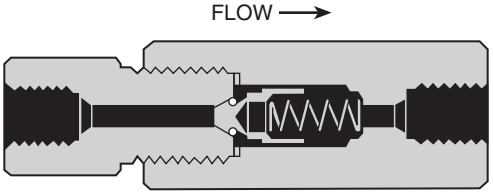
Ball type check valves insure flow in one direction only. Material for bodies, balls, and covers is high tensile 316 stainless steel. Standard tubing glands and sleeves are provided unless otherwise specified.



Catalog No.	psi	Connections	Length	Hex
15-41AF1	15,000	1/16" TAPER SEAL	3 1/8"	1"
15-41AF2	15,000	1/8" TAPER SEAL	3 9/16"	1"
10-41AF4	10,000	1/4" TAPER SEAL	3 7/8"	1"
10-41AF6	10,000	3/8" TAPER SEAL	3 7/8"	1"

Soft Seat Check Valves

Soft seat check valves insure flow in one direction only and can be mounted in any position. These are highly reliable for both gas and liquid service. Standard O-ring (soft seat) material for the sealing surface is Buna-N (nitrile) with other materials including Teflon and Viton available on request. Temperature is limited by the choice of O-ring material. Material of all other parts is high tensile 316 stainless steel. Standard glands and sleeves are provided unless otherwise specified.

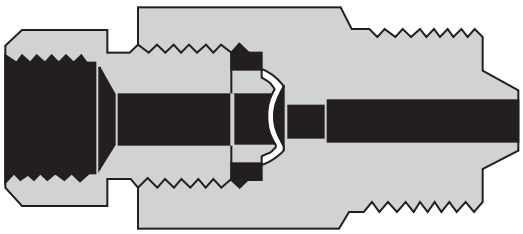


Catalog No.	psi	Connections	Length	Hex
15-41AF1-T	15,000	1/16" TAPER SEAL	3 1/2"	1"
15-41AF2-T	15,000	1/8" TAPER SEAL	3 1/2"	1"
10-41AF4-T	10,000	1/4" TAPER SEAL	3 7/8"	1"
10-41AF6-T	10,000	3/8" TAPER SEAL	3 7/8"	1"

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Safety Heads



A choice of three safety head designs is available: male inlet, female inlet (straight), and tee type. The male inlet design can be inserted directly into the tubing connections of valves and various fittings such as tees and crosses, or located in pressure vessels.

Outlet connections on all sizes are 3/8" pipe (NPT). This outlet may be connected to a suitable discharge line to vent pressure to a safe location in the event of bursting of the rupture disc. Torque required for sealing rupture discs will range from 40 to 60 foot pounds, depending upon pressure and media being used.

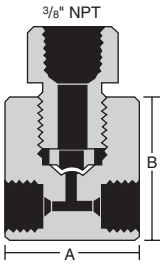
Material of bodies and hold down nuts is high tensile 316 stainless steel. Hold down rings are hardened 17-4PH stainless steel. Standard tubing glands and collars (sleeves) are provided unless otherwise specified.

Note: Rupture discs are **not** included and must be ordered as a separate item.



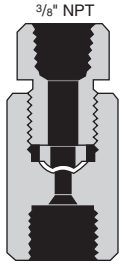
Male Inlet Safety Heads

Catalog No.	Pressure Rating psi	Inlet Connection	Length	Hex Size
10-61AM4	10,000	1/4" TAPER SEAL	2 1/8"	1"
10-61AM6	10,000	3/8" TAPER SEAL	2 1/8"	1"



Tee Type Safety Heads

Catalog No.	Pressure Rating psi	Inlet Connection	A	B	Thickness
15-63AF1	15,000	1/16" TAPER SEAL	1 1/8" HEX	1 3/8"	1 1/8"
15-63AF2	15,000	1/8" TAPER SEAL	1 1/2"	1 1/2"	1"
10-63AF4	10,000	1/4" TAPER SEAL	2"	1 3/4"	1"
10-63AF6	10,000	3/8" TAPER SEAL	2"	1 3/4"	1"



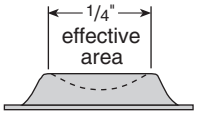
Female Inlet (Straight) Safety Heads

Catalog No.	Pressure Rating psi	Inlet Connection	Length	Hex Size
15-61AF1	15,000	1/16" TAPER SEAL	1 7/8"	1"
15-61AF2	15,000	1/8" TAPER SEAL	1 7/8"	1"
10-61AF4	10,000	1/4" TAPER SEAL	1 7/8"	1"
10-61AF6	10,000	3/8" TAPER SEAL	1 7/8"	1"

Rupture Discs

1/4" Angled Seat







SPECIAL DISCS are available on special order for pressure ranges not shown above and in numerous materials and coatings. Consult factory for price and delivery.

Standard rupture discs are available from stock in burst pressures as listed in the chart below. Taper seal pressures are shaded. These discs are 316 stainless steel (except for 1000 psi which are inconel) and may be used with any of the safety heads shown. Note that these rupture discs are supplied with a tolerance of plus 6% and minus 3% of specified burst pressure. Samples of each batch are then tested and the actual average burst pressure is stamped on an accompanying metal tag. Factors influencing rupture disc life include corrosion, metal fatigue, and cyclic effects. Periodic replacement is recommended to prevent premature failure.

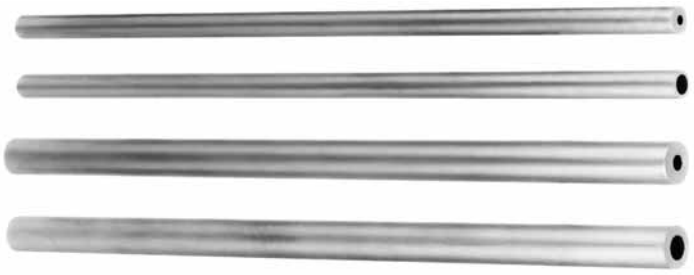
Standard Burst Pressures (in psi at 72°F)

1,000	3,000	5,000	7,000	9,000	11,000	17,500	25,000	37,500	55,000
1,500	3,500	5,500	7,500	9,500	11,500	18,000	27,000	40,000	60,000
2,000	4,000	6,000	8,000	10,000	12,500	20,000	30,000	45,000	65,000
2,500	4,500	6,500	8,500	10,500	15,000	22,500	35,000	50,000	

High Pressure Tubing

Tubing is cold drawn, seamless, and is supplied in the 1/8 hard condition (not annealed). Tensile strength is approximately 40 percent higher than that of annealed tubing. All tubing is manufactured in strict accordance with High Pressure Equipment Company specifications to insure tolerances and bore quality. Tubing is stocked in lengths of 18 to 22 feet but may be ordered in shorter lengths with **no additional cutting charge.**

Note: The 1/16" and 1/8" O.D. tubing sizes may be coiled for shipment. Larger sizes must be shipped in straight lengths.



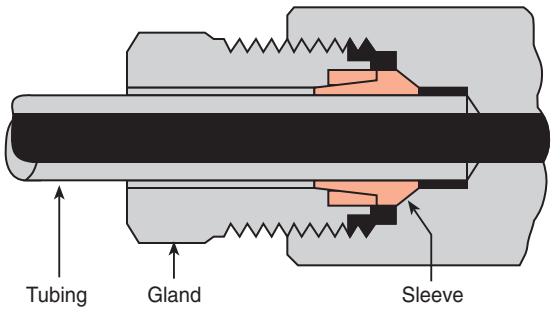
	Tubing Size	Working Pressure psi	Type of Connection Used	Material	Catalog Order Number
1/16"	1/16" O.D. x 0.006" I.D.	15,000	1/16" TAPER SEAL (AF1)	316 SS	15-9A1-006
	1/16" O.D. x 0.030" I.D.				15-9A1-030
1/8"	1/8" O.D. x 0.060" I.D.	15,000	1/8" TAPER SEAL (AF2)	316 SS	15-9A2
1/4"	1/4" O.D. x 1/8" I.D.	10,000	1/4" TAPER SEAL (AF4)	316 SS	10-9A4-316
				304 SS	10-9A4-304
3/8"	3/8" O.D. x 1/4" I.D.	10,000	3/8" TAPER SEAL (AF6)	316 SS	10-9A6-316
				304 SS	10-9A6-304

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Taper Seal Connections

10,000 and 15,000 psi service



Taper Seal connections are available for 1/16", 1/8", 1/4", and 3/8" O.D. tubing. No special tubing preparation is required – simply cut tubing to desired length, deburr and assemble.

The 1/8", 1/4", and 3/8" sizes utilize a two-piece sleeve which is supplied partially assembled. When the connection is assembled, the outer sleeve portion is permanently compressed over the inner portion to rigidly lock the sleeve onto the tubing. Note that the sleeve is not forced to bite into the tubing, but rather is clamped onto the tubing much like a machine collet.

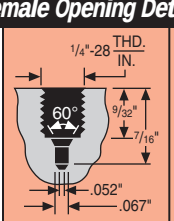
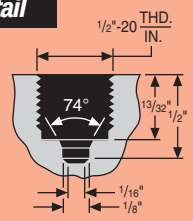
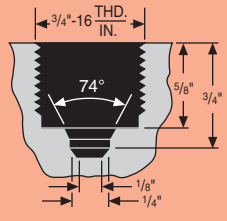
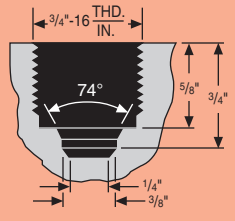
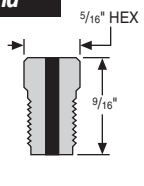
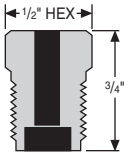
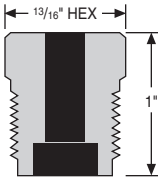
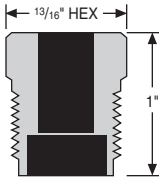
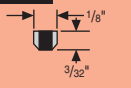
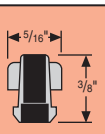
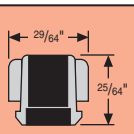
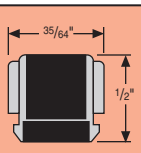
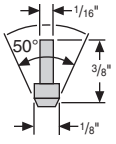
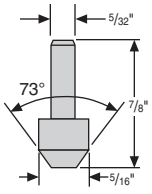
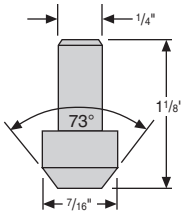
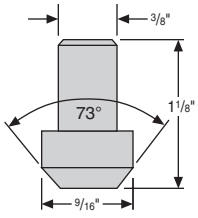
Pressure ratings. The 1/16" and 1/8" O.D. tubing size connections are rated to 15,000 psi working pressure. The 1/4" and 3/8" O.D. sizes are rated to 10,000 psi working pressure.

Easy make-up connections. One of the popular benefits of taper seal connections is that it is very easy to determine when the connection is "tight enough" during initial assembly. Simply rotate the tubing gland into the connection until you feel a "bottoming out" or "dead stop" of the wrench. This signals that the connection has been properly made.

A commercial thread lubricant is highly recommended to facilitate initial makeup of the connection, but such lubrication may be removed afterwards if desired. The Taper Seal connection can be disassembled and then reassembled an indefinite number of times.

Standard material for the gland is Type 316 stainless steel. The inner portion of the two-piece sleeve is Type 316 stainless steel. The non-wetted outer sleeve portion is zinc plated alloy steel. (Note that the 1/16" O.D. size is a one-piece sleeve design) in Type 316 stainless steel.

Tubing glands and sleeves are provided with all valves and fittings unless otherwise requested. (See chart at right for size details and catalog numbers).

	15,000 psi		10,0000 psi	
	AF1 1/16" O.D. Tubing	AF2 1/8" O.D. Tubing	AF4 1/4" O.D. Tubing	AF6 3/8" O.D. Tubing
Female Opening Detail				
	AF1	AF2	AF4	AF6
Gland				
	15-2AM1	15-2AM2	10-2AM4	10-2Am6
Sleeve				
	15-2A1	15-2A2	10-2A4	10-2A6
Plug				
	15-7AM1	15-7AM2	10-7AM4	10-7AM6

Female NPT/10,000 psi

Pipe Connection Valves

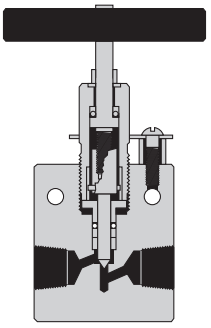
• 1/8" • 1/4" • 3/8" • 1/2" NPT

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost.

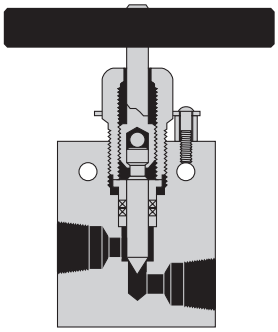
Materials include high tensile Type 316 stainless steel for valve bodies, and hardened 17-4PH stainless steel for lower section stems.

Packing is Teflon (450°F) standard with optional Viton (350°F), BUNA-N (200°F) and Grafoil (650°F) available at no additional cost.

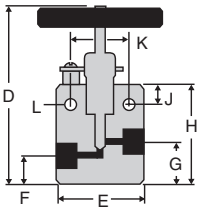
Air operators for remote control operation are available for all valves. (See Air Ooperator section of catalog).



NFA (1/8"), NFB (1/4") and NFC (3/8")

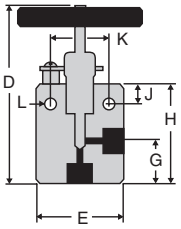


NFD (1/2")



Two Way Straight Valves

Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	**10-11NFA**	10,000	NFA	1/8"	4 3/4"	2"	7/8"	7/8"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" NPT	**10-11NFB**	10,000	NFB	1/8"	4 3/4"	2"	7/8"	7/8"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" NPT	**10-11NFC**	10,000	NFC	1/8"	4 3/4"	2"	7/8"	7/8"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/2" NPT	**10-11NFD**	10,000	NFD	5/16"	5 5/8"	2 5/8"	3/4"	1 3/8"	3 1/8"	1/2"	1 5/8"	5/16"	1 1/2"



Two Way Angle Valves

Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	**10-12NFA**	10,000	NFA	1/8"	4 3/4"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" NPT	**10-12NFB**	10,000	NFB	1/8"	4 3/4"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" NPT	**10-12NFC**	10,000	NFC	1/8"	4 3/4"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/2" NPT	**10-12NFD**	10,000	NFD	5/16"	5 3/4"	2 5/8"	–	1 1/2"	3 1/4"	1/2"	1 5/8"	5/16"	1 1/2"

* For valves requiring high temperature Grafoil packing in the 1/8" NPT, or 1/4" NPT or 3/8" NPT sizes, add suffix "-W" to catalog number. (Example 10-11NFB-W.)

Female NPT/10,000 and 15,000 psi

Pipe Connection Valves

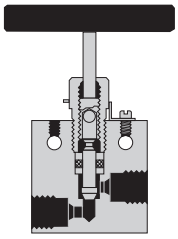
• 1/8" • 1/4" • 3/8" • 1/2" NPT • 3/4" NPT • 1" NPT

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost.

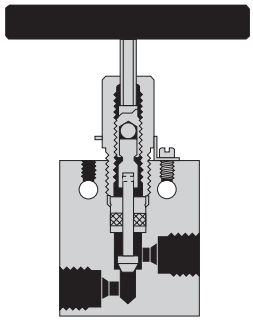
Materials include high tensile Type 316 stainless steel for valve bodies, and hardened 17-4PH stainless steel for lower section stems.

Packing is Teflon (450°F) standard with optional Viton (350°F), BUNA-N (200°F) and Grafoil (650°F) available at no additional cost.

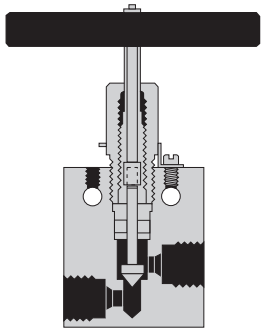
Air operators for remote control operation are available for all valves. (See Air Operator section of catalog).



NFA (1/8") and NFB (1/4")

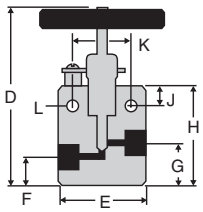


NFC (3/8") and NFD (1/2")



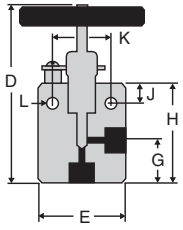
NFF (3/4") and NFH (1")

Two Way Straight Valves



Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	15F-11NFA	15,000	NFA	.203	4 3/8"	2"	3/8"	13/16"	2"	3/8"	1 1/4"	7/32"	3/4"
1/4" NPT	15F-11NFB	15,000	NFB	.203	4 3/8"	2"	3/8"	13/16"	2"	3/8"	1 1/4"	7/32"	3/4"
3/8" NPT	15F-11NFC	15,000	NFC	.312	6 1/8"	2 1/2"	1/2"	1 1/8"	2 7/8"	1/2"	1 3/8"	11/32"	1"
1/2" NPT	15F-11NFD	15,000	NFD	.312	6 3/8"	2 5/8"	3/4"	1 3/8"	3 1/8"	1/2"	1 3/8"	11/32"	1 1/2"
3/4" NPT	10F-11NFF	10,000	NFF	.687	8 1/2"	4 1/8"	7/8"	1 13/16"	4 5/8"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" NPT	10F-11NFH	10,000	NFH	.687	8 1/2"	4 1/8"	7/8"	1 13/16"	4 5/8"	1 1/8"	2 1/2"	9/16"	1 3/4"

Two Way Angle Valves



Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	15F-12NFA	15,000	NFA	.203	4 13/16"	2"	—	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
1/4" NPT	15F-12NFB	15,000	NFB	.203	4 13/16"	2"	—	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
3/8" NPT	15F-12NFC	15,000	NFC	.312	6 1/2"	2 1/2"	—	1 1/2"	3 1/4"	1/2"	1 3/8"	11/32"	1"
1/2" NPT	15F-12NFD	15,000	NFD	.312	6 1/2"	2 5/8"	—	1 1/2"	3 1/4"	1/2"	1 3/8"	11/32"	1 1/2"
3/4" NPT	10F-12NFF	10,000	NFF	.687	9"	4 1/8"	—	2 5/16"	5 1/8"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" NPT	10F-12NFH	10,000	NFH	.687	9"	4 1/8"	—	2 5/16"	5 1/8"	1 1/8"	2 1/2"	9/16"	1 3/4"

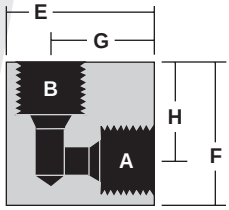
* For valves requiring high temperature Grafoil packing in the 1/8" NPT, or 1/4" NPT or 3/8" NPT sizes, add suffix "-W" to catalog number. (Example 10-11NFB-W.)

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Elbows/Tees/Crosses

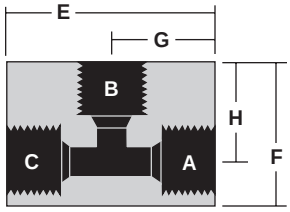
A complete range of elbows, tees, and crosses is available for all of the tubing connection sizes. Material is high tensile 316 stainless steel.

NPT Elbows



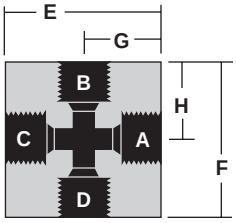
Catalog No.	Pressure Rating psi	Connections	A-B	E	F	G	H	Thickness
15-22NFA	15,000	1/8" FNPT	NFA	1 1/2"	1 1/2"	1"	1"	3/4"
15-22NFB	15,000	1/4" FNPT	NFB	1 1/2"	1 1/2"	1"	1"	1"
15-22NFC	15,000	3/8" FNPT	NFC	1 1/2"	1 1/2"	1"	1"	1"
15-22NFD	15,000	1/2" FNPT	NFD	2 5/8"	1 7/8"	1 7/8"	1 1/8"	1 1/2"
10-22NFF	10,000	3/4" FNPT	NFF	2 5/8"	2 5/16"	1 5/16"	1 3/8"	1 1/2"
10-22NFH	10,000	1" FNPT	NFH	3"	3"	2 1/16"	2 1/16"	1 3/4"

NPT Tees



Catalog No.	Pressure Rating psi	Connections	A-B	E	F	G	H	Thickness
15-23NFA	15,000	1/8" FNPT	NFA	1 1/2"	1 1/4"	3/4"	3/4"	3/4"
15-23NFB	15,000	1/4" FNPT	NFB	2"	1 1/2"	1"	1"	1"
15-23NFC	15,000	3/8" FNPT	NFC	2"	1 1/2"	1"	1"	1"
15-23NFD	15,000	1/2" FNPT	NFD	2 5/8"	2 1/8"	1 5/16"	1 3/8"	1 1/2"
10-23NFF	10,000	3/4" FNPT	NFF	2 5/8"	2 1/8"	1 5/16"	1 3/8"	1 1/2"
10-23NFH	10,000	1" FNPT	NFH	4 1/8"	3"	2 1/16"	2 1/16"	1 3/4"

NPT Crosses



Catalog No.	Pressure Rating psi	Connections	A-B	E	F	G	H	Thickness
15-24NFA	15,000	1/8" FNPT	NFA	1 1/2"	1 1/2"	3/4"	3/4"	3/4"
15-24NFB	15,000	1/4" FNPT	NFB	2"	2"	1"	1"	1"
15-24NFC	15,000	3/8" FNPT	NFC	2"	2"	1"	1"	1"
15-24NFD	15,000	1/2" FNPT	NFD	2 5/8"	2 3/4"	1 5/16"	1 3/8"	1 1/2"
10-24NFF	10,000	3/4" FNPT	NFF	2 5/8"	2 3/4"	1 5/16"	1 3/8"	1 1/2"
10-24NFH	10,000	1" FNPT	NFH	4 1/8"	4 1/8"	2 1/16"	2 1/16"	1 3/4"

NPT Straight Couplings

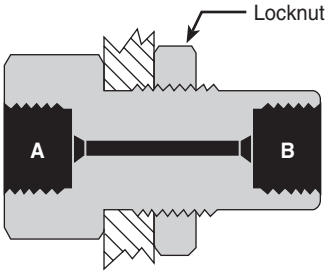
Standard material is high tensile 316 stainless steel.



Catalog No.	Pressure Rating psi	Connections	A-B	Length	Hex
15-21NFA	15,000	1/8" FNPT	NFA	1 1/4"	3/4"
15-21NFB	15,000	1/4" FNPT	NFB	1 3/4"	1"
15-21NFC	15,000	3/8" FNPT	NFC	1 3/8"	1"
15-21NFD	15,000	1/2" FNPT	NFD	1 7/8"	1 3/8"
10-21NFF	10,000	3/4" FNPT	NFF	2 1/2"	1 3/8"
10-21NFH	10,000	1" FNPT	NFH	2 1/2"	1 3/4"

NPT Bulkhead Couplings

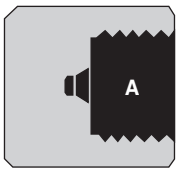
Bulkhead couplings are designed specifically for passing a tubing connection through a panel or steel barricade. These couplings include a locknut as shown. Material is high tensile 316 stainless steel.



Catalog No.	Pressure Rating psi	Connections	A-B	Length	Hex	Hole Diameter
15-21NFA-B	15,000	1/8" FNPT	NFA	2 1/8"	1"	3/4" - 16
15-21NFB-B	15,000	1/4" FNPT	NFB	2 1/8"	1"	3/4" - 16
15-21NFC-B	15,000	3/8" FNPT	NFC	2 3/8"	1 3/8"	7/8" - 14
15-21NFD-B	15,000	1/2" FNPT	NFD	2 3/8"	1 1/2"	1 1/16" - 12
10-21NFF-B	10,000	3/4" FNPT	NFF	2 5/8"	1 7/8"	1 5/8" - 12
10-21NFH-B	10,000	1" FNPT	NFH	3 1/2"	2 1/8"	1 7/8" - 12

NPT Caps

Tubing end caps are offered for use in sealing off tubing ends either for temporary use or permanent use such as on small volume reservoirs. Standard material is high tensile 316 stainless steel.

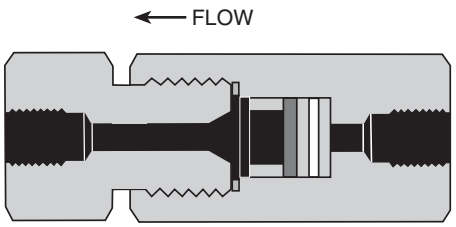


Catalog No.	Pressure Rating psi	Connections	A-B	Length	Hex
15-21NFA-C	15,000	1/8" FNPT	NFA	3/4"	3/4"
15-21NFB-C	15,000	1/4" FNPT	NFB	1"	1"
15-21NFC-C	15,000	3/8" FNPT	NFC	1 1/4"	1"
15-21NFD-C	15,000	1/2" FNPT	NFD	1 1/2"	1 3/8"
10-21NFF-C	10,000	3/4" FNPT	NFF	1 3/4"	1 3/8"
10-21NFH-C	10,000	1" FNPT	NFH	1 3/4"	1 3/4"

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NPT Line Filters

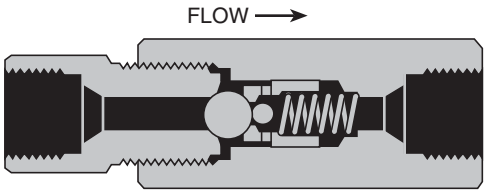
The line filters as shown utilize sintered stainless steel filter discs 3 pc./set. Porosities are available as per the chart to the right. If not otherwise specified, 100 micron filter discs are supplied. (One micron = 0.001 millimeters). Material of body, caps and cover is high tensile 316 stainless steel.



Catalog No.	Pressure Rating psi	Connections	A-B	Length	Hex	Micron Size Filter Available 0.5	2	5	10	40	100
15-51NFA	15,000	1/8" FNPT	NFA	3 3/16"	1 3/8"	●	●	●	●	●	●
15-51NFB	15,000	1/4" FNPT	NFB	4 3/16"	1 3/8"	●	●	●	●	●	●
15-51NFC	15,000	3/8" FNPT	NFC	4 3/16"	1 3/8"	●	●	●	●	●	●
15-51NFD	15,000	1/2" FNPT	NFD	4 3/16"	1 3/8"	●	●	●	●	●	●

NPT Ball Check Valves

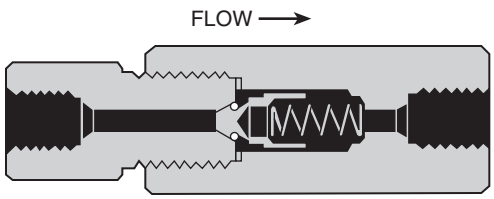
Ball type check valves insure flow in one direction only. Material for body, caps and cover is high tensile 316 stainless steel.



Catalog No.	Pressure Rating psi	Connections	A-B	Length	Hex
15-41NFA	15,000	1/8" FNPT	NFA	4 5/32"	1"
15-41NFB	15,000	1/4" FNPT	NFB	4 5/32"	1"
15-41NFC	15,000	3/8" FNPT	NFC	4 5/32"	1"
15-41NFD	15,000	1/2" FNPT	NFD	4 9/16"	1 3/8"
10-41NFF	10,000	3/4" FNPT	NFF	5 5/16"	1 3/8"
10-41NFH	10,000	1" FNPT	NFH	7 1/8"	2 1/2"

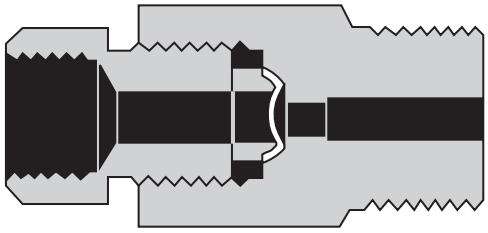
NPT Softseat Check Valves

Soft seat check valves insure flow in one direction only and can be mounted in any position. These are highly reliable for both gas and liquid service. Standard O-ring (soft seat) material for the sealing surface is Buna-N (nitrile) with other materials including Teflon and Viton available on request. Temperature is limited by the choice of O-ring material. Material of all other parts is high tensile 316 stainless steel.



Catalog No.	Pressure Rating psi	Connections	A-B	Length	Hex
15-41NFA-T	15,000	1/8" FNPT	NFA	4 5/32"	1"
15-41NFB-T	15,000	1/4" FNPT	NFB	4 5/32"	1"
15-41NFC-T	15,000	3/8" FNPT	NFC	4 5/32"	1"
15-41NFD-T	15,000	1/2" FNPT	NFD	4 9/16"	1 3/8"
10-41NFF-T	10,000	3/4" FNPT	NFF	5 5/16"	1 3/8"
10-41NFH-T	10,000	1" FNPT	NFH	7 1/8"	2 1/2"

NPT Safety Heads



The male inlet design can be inserted directly into the tubing connections of valves and various fittings such as tees and crosses, or located in pressure vessels.

Outlet connections are 3/8" pipe (NPT). This outlet may be connected to a suitable discharge line to vent pressure to a safe location in the event of bursting of the rupture disc. Torque required for sealing rupture discs will range from 40 to 90 foot pounds, depending upon pressure and media being used.

Material of body and hold down nut is high tensile 316 stainless steel.

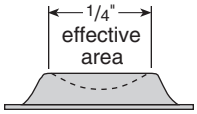
Note: Rupture discs are **not** included and must be ordered as a separate item.

Catalog No.	psi	Connections	Length	Hex
15-61NMA	15,000	1/8" MNPT	2"	1"
15-61NMB	15,000	1/4" MNPT	2"	1"
15-61NMC	15,000	3/8" MNPT	2"	1"
15-61NMD	15,000	1/2" MNPT	2"	1"

Rupture Discs

1/4" Angled Seat







SPECIAL DISCS are available on special order for pressure ranges not shown above and in numerous materials and coatings. Consult factory for price and delivery.

Standard rupture discs are available from stock in burst pressures as listed in the chart below. All pressures through 15,000 psi are shaded. These discs are 316 stainless steel (except for 1,000 psi which are inconel) and may be used with any of the safety heads shown. Note that these rupture discs are supplied with a tolerance of plus 6% and minus 3% of specified burst pressure. Samples of each batch are tested and the actual average burst pressure is stamped on an accompanying metal tag. Factors influencing rupture disc life include corrosion, metal fatigue, and cyclic effects. Periodic replacement is recommended to prevent premature failure.

Standard Burst Pressures (in psi at 72°F)

1,000	3,000	5,000	7,000	9,000	11,000	17,500	25,000	37,500	55,000
1,500	3,500	5,500	7,500	9,500	11,500	18,000	27,000	40,000	60,000
2,000	4,000	6,000	8,000	10,000	12,500	20,000	30,000	45,000	65,000
2,500	4,500	6,500	8,500	10,500	15,000	22,500	35,000	50,000	

High Pressure Equipment Company
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Medium Pressure Valves, Fittings and Tubing

20,000 psi service

High Pressure Equipment Company has developed a line of Medium Pressure products to assure safe and easy plumbing through 20,000 psi. These needle valves, fittings, line filters, check valves, safety heads, rupture discs, anti-vibration gland assemblies, tubing and nipples are engineered to the highest standards of repeatable quality. The reliable performance of these products has made HiP one of the world's leading suppliers of elevated pressure components.

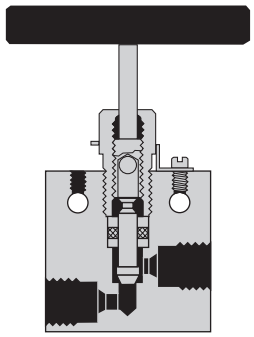
Medium Pressure components use a compact coned-and-threaded connection which permits the larger bore sizes and increased flow rates common in this pressure class. Medium Pressure valves are available in $\frac{1}{4}$", $\frac{3}{8}$", $\frac{9}{16}$", $\frac{3}{4}$", and 1" O.D. tubing sizes and five patterns to satisfy widely varied requirements. A line of fittings is available to facilitate adapting to Taper Seal, High Pressure or other threaded pipe systems.



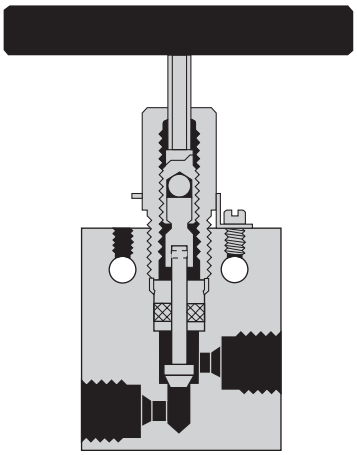
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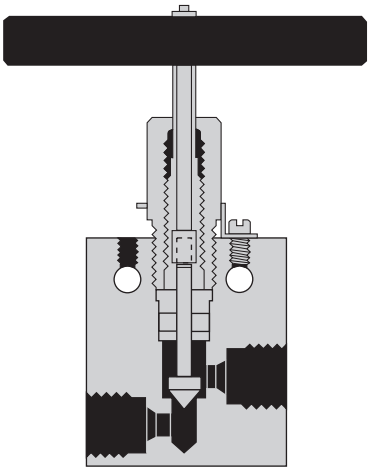
*Note: 10,000 psi large orifice is offered in $\frac{3}{4}$" and 1" size.



LF4 (1/4") and LF6 (3/8")



LF9 (9/16")



LF12 (3/4") and LF16 (1")*

20,000 psi Medium Pressure Valves

Medium Pressure (coned & threaded) type connections for 1/4", 3/8", 9/16", 3/4", and 1" O.D. tubing.

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost, add - REG to part number.

Glands and collars for tubing are supplied with each valve unless otherwise requested (glands and collars shown on pages 3.4 and 3.A).

Materials include high tensile type 316 stainless steel bodies and hardened 17-4PH stainless steel lower section stems.

Packing is Teflon (450°F) standard with optional Viton (350°F), BUNA-N (200°F) and Grafoil (800°F) available at no additional cost.

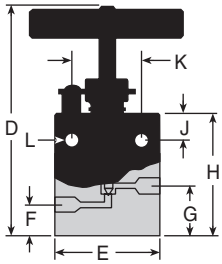
Air operators for remote control operation are available for all valves. (Select required valve and add "HIPCO". Refer to section 7.0 for additional data).

High temperatures can be accommodated by using extended stuffing boxes (see page 6.4).

Valve Features

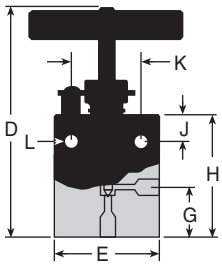
- Non-rotating stem tips
- Packing below stem threads
- Type 316 ss high tensile bodies
- Positive gland lock device
- No stem adjustment needed
- Black T-handles or choice of 4 colors
- Tube sizes 1/4" through 1"

*Note: 10,000 psi large orifice is offered in 3/4" and 1" size.



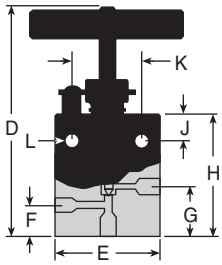
Two Way Straight Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	20-11LF4	20,000	LF4	1/8"	4 3/8"	2"	3/8"	13/16"	2"	3/8"	1 1/4"	7/32"	3/4"
3/8" O.D.	20-11LF6	20,000	LF6	13/64"	4 3/8"	2"	3/8"	13/16"	2"	3/8"	1 1/4"	7/32"	3/4"
9/16" O.D.	20-11LF9	20,000	LF9	5/16"	6 1/8"	2 1/2"	1/2"	1 1/8"	2 7/8"	1/2"	1 3/8"	11/32"	1"
3/4" O.D.	20-11LF12	20,000	LF12	7/16"	7"	3"	3/4"	1 1/2"	3 3/4"	5/8"	1 3/4"	7/16"	1 3/8"
3/4" O.D.	10-11LF12	10,000	LF12	33/64"	7"	3"	3/4"	1 1/2"	3 3/4"	5/8"	1 3/4"	7/16"	1 3/8"
1" O.D.	20-11LF16	20,000	LF16	9/16"	8 27/64"	4 1/8"	7/8"	1 13/16"	4 5/8"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" O.D.	10-11LF16	10,000	LF16	11/16"	8 27/64"	4 1/8"	7/8"	1 13/16"	4 5/8"	1 1/8"	2 1/2"	9/16"	1 3/4"



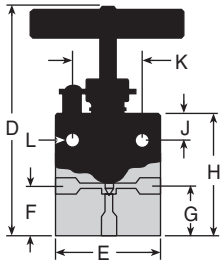
Two Way Angle Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	20-12LF4	20,000	LF4	1/8"	4 13/16"	2"	–	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
3/8" O.D.	20-12LF6	20,000	LF6	13/64"	4 13/16"	2"	–	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
9/16" O.D.	20-12LF9	20,000	LF9	5/16"	6 5/8"	2 1/2"	–	1 5/8"	3 3/8"	1/2"	1 3/8"	11/32"	1"
3/4" O.D.	20-12LF12	20,000	LF12	7/16"	7 1/2"	3"	–	2"	4 1/4"	5/8"	1 3/4"	7/16"	1 3/8"
3/4" O.D.	10-12LF12	10,000	LF12	33/64"	7 1/2"	3"	–	2"	4 1/4"	5/8"	1 3/4"	7/16"	1 3/8"
1" O.D.	20-12LF16	20,000	LF16	9/16"	9 3/8"	4 1/8"	–	2 9/16"	5 7/16"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" O.D.	10-12LF16	10,000	LF16	11/16"	9 3/8"	4 1/8"	–	2 9/16"	5 7/16"	1 1/8"	2 1/2"	9/16"	1 3/4"



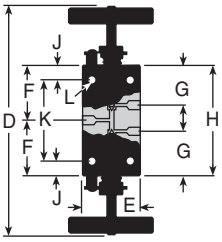
Three Way Valves / Two Pressure Connections

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	20-13LF4	20,000	LF4	1/8"	5"	2"	1"	1 7/16"	2 5/8"	3/8"	1 1/4"	7/32"	3/4"
3/8" O.D.	20-13LF6	20,000	LF6	13/64"	5"	2"	1"	1 7/16"	2 5/8"	3/8"	1 1/4"	7/32"	3/4"
9/16" O.D.	20-13LF9	20,000	LF9	5/16"	6 7/8"	2 1/2"	1 1/4"	1 7/8"	3 5/8"	1/2"	1 3/8"	11/32"	1"
3/4" O.D.	20-13LF12	20,000	LF12	7/16"	7 7/8"	3"	2 5/8"	2 3/8"	4 5/8"	5/8"	1 3/4"	7/16"	1 3/8"
3/4" O.D.	10-13LF12	10,000	LF12	33/64"	7 7/8"	3"	2 5/8"	2 3/8"	4 5/8"	5/8"	1 3/4"	7/16"	1 3/8"
1" O.D.	20-13LF16	20,000	LF16	9/16"	9 3/4"	4 1/8"	2 1/8"	3 1/16"	5 7/8"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" O.D.	10-13LF16	10,000	LF16	11/16"	9 3/4"	4 1/8"	2 1/8"	3 1/16"	5 7/8"	1 1/8"	2 1/2"	9/16"	1 3/4"



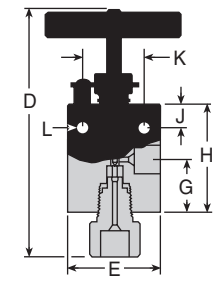
Three Way Valves / One Pressure Connection

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	20-14LF4	20,000	LF4	1/8"	4 13/16"	2"	1 1/4"	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
3/8" O.D.	20-14LF6	20,000	LF6	13/64"	4 13/16"	2"	1 1/4"	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
9/16" O.D.	20-14LF9	20,000	LF9	5/16"	6 5/8"	2 1/2"	1 5/8"	1 5/8"	3 3/8"	1/2"	1 3/8"	11/32"	1"
3/4" O.D.	20-14LF12	20,000	LF12	7/16"	7 1/2"	3"	2"	2"	4 1/4"	5/8"	1 3/4"	7/16"	1 3/8"
3/4" O.D.	10-14LF12	10,000	LF12	33/64"	7 1/2"	3"	2"	2"	4 1/4"	5/8"	1 3/4"	7/16"	1 3/8"
1" O.D.	20-14LF16	20,000	LF16	9/16"	9 3/8"	4 1/8"	2 5/8"	2 5/8"	5 7/16"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" O.D.	10-14LF16	10,000	LF16	11/16"	9 3/8"	4 1/8"	2 5/8"	2 5/8"	5 7/16"	1 1/8"	2 1/2"	9/16"	1 3/4"



Three Way / Two Stem Connection Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	20-15LF4	20,000	LF4	1/8"	5 3/4"	2"	1 11/16"	1 3/16"	3 3/8"	3/8"	1 1/4"	7/32"	3/4"
3/8" O.D.	20-15LF6	20,000	LF6	13/64"	5 3/4"	2"	1 11/16"	1 3/16"	3 3/8"	3/8"	1 1/4"	7/32"	3/4"
9/16" O.D.	20-15LF9	20,000	LF9	5/16"	8 3/8"	2 1/2"	2 9/16"	1 3/4"	5 1/8"	1/2"	1 3/8"	11/32"	1"
3/4" O.D.	20-15LF12	20,000	LF12	7/16"	9 3/4"	3"	3 1/4"	2 1/4"	6 1/2"	5/8"	1 3/4"	7/16"	1 3/8"
3/4" O.D.	10-15LF12	10,000	LF12	33/64"	9 3/4"	3"	3 1/4"	2 1/4"	6 1/2"	5/8"	1 3/4"	7/16"	1 3/8"
1" O.D.	20-15LF16	20,000	LF16	9/16"	12 3/16"	4 1/8"	4 1/8"	2 13/16"	8 1/4"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" O.D.	10-15LF16	10,000	LF16	11/16"	12 3/16"	4 1/8"	4 1/8"	2 13/16"	8 1/4"	1 1/8"	2 1/2"	9/16"	1 3/4"



Replaceable Seat Valves

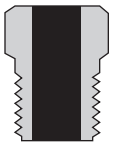
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	20-12LF4-R	20,000	LF4	1/8"	5 5/8"	2"	–	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
3/8" O.D.	20-12LF6-R	20,000	LF6	13/64"	5 5/8"	2"	–	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
9/16" O.D.	20-12LF9-R	20,000	LF9	5/16"	8"	2 1/2"	–	1 5/8"	3 3/8"	1/2"	1 3/8"	11/32"	1"
3/4" O.D.	20-12LF12-R	20,000	LF12	7/16"	8 7/8"	3"	–	2"	4 1/4"	5/8"	1 3/4"	7/16"	1 3/8"
3/4" O.D.	10-12LF12-R	10,000	LF12	33/64"	8 7/8"	3"	–	2"	4 1/4"	5/8"	1 3/4"	7/16"	1 3/8"
1" O.D.	20-12LF16-R	20,000	LF16	9/16"	11 1/16"	4 1/16"	–	2 9/16"	5 7/16"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" O.D.	10-12LF16-R	10,000	LF16	11/16"	11 1/16"	4 1/8"	–	2 9/16"	5 7/16"	1 1/8"	2 1/2"	9/16"	1 3/4"

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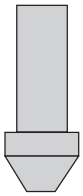
Glands/Collars/Plugs
Elbows/Tees/Crosses

A complete range of elbows, tees, and crosses is available for all of the tubing connection sizes. Material is high tensile 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.

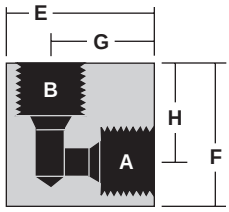
Connection Components

Catalog No.	Tube Size	Gland
20-2LM4	1/4"	
20-2LM6	3/8"	
20-2LM9	9/16"	
20-2LM12	3/4"	
20-2LM16	1"	

Catalog No.	Tube Size	Collar
20-2L4	1/4"	
20-2L6	3/8"	
20-2L9	9/16"	
20-2L12	3/4"	
20-2L16	1"	

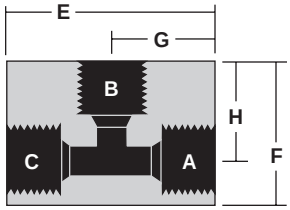
Catalog No.	Tube Size	Plug
20-7LM4	1/4"	
20-7LM6	3/8"	
20-7LM9	9/16"	
20-7LM12	3/4"	
20-7LM16	1"	

Medium Pressure Elbows



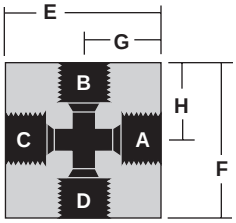
Catalog No.	Pressure Rating psi	Connections	A-B	E	F	G	H	Thickness
20-22LF4	20,000	1/4" O.D. TUBE	LF4	1 3/16"	1"	7/8"	11/16"	5/8"
20-22LF6	20,000	3/8" O.D. TUBE	LF6	1 3/8"	1 3/8"	1"	1"	3/4"
20-22LF9	20,000	9/16" O.D. TUBE	LF9	1 3/4"	1 3/4"	1 1/4"	1 1/4"	1"
20-22LF12	20,000	3/4" O.D. TUBE	LF12	2 1/4"	2 1/4"	1 1/2"	1 1/2"	1 3/8"
20-22LF16	20,000	1" O.D. TUBE	LF16	3"	3"	2 1/16"	2 1/16"	1 3/4"

Medium Pressure Tees



Catalog No.	Pressure Rating psi	Connections	A-B-C	E	F	G	H	Thickness
20-23LF4	20,000	1/4" O.D. TUBE	LF4	1 3/4"	1"	7/8"	11/16"	5/8"
20-23LF6	20,000	3/8" O.D. TUBE	LF6	2"	1 3/8"	1"	1"	3/4"
20-23LF9	20,000	9/16" O.D. TUBE	LF9	2 1/2"	1 3/4"	1 1/4"	1 1/4"	1"
20-23LF12	20,000	3/4" O.D. TUBE	LF12	3"	2 1/4"	1 1/2"	1 1/2"	1 3/8"
20-23LF16	20,000	1" O.D. TUBE	LF16	4 1/8"	3"	2 1/16"	2 1/16"	1 3/4"

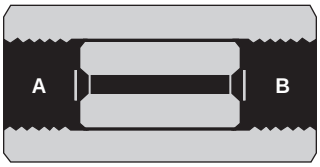
Medium Pressure Crosses



Catalog No.	Pressure Rating psi	Connections	A-B-C-D	E	F	G	H	Thickness
20-24LF4	20,000	1/4" O.D. TUBE	LF4	1 3/4"	1 3/8"	7/8"	11/16"	5/8"
20-24LF6	20,000	3/8" O.D TUBE	LF6	2"	2"	1"	1"	3/4"
20-24LF9	20,000	9/16" O.D. TUBE	LF9	2 1/2"	2 1/2"	1 1/4"	1 1/4"	1"
20-24LF12	20,000	3/4" O.D. TUBE	LF12	3"	3"	1 1/2"	1 1/2"	1 3/8"
20-24LF16	20,000	1" O.D. TUBE	LF16	4 1/8"	4 1/8"	2 1/16"	2 1/16"	1 3/4"

Union Couplings (Slip Type)

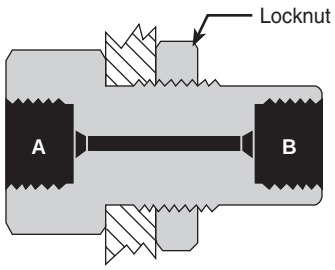
Union (slip type) couplings are ideal for use in confined space installations. This design allows the entire coupling to be disconnected and slipped back over the tubing to facilitate assembly and disassembly. In installations where tubing is easily assembled, it is preferable (and less expensive) to use standard straight couplings (see section 8.0). Standard material is high tensile 316 stainless steel. Standard tubing collars and glands are provided unless otherwise specified.



Catalog No.	Tubing	psi	A	B	Orifice	Length	Hex
20-21LF4-U	1/4" O.D.	20,000	LF4	LF4	1/8"	1 9/16"	5/8"
20-21LF6-U	3/8" O.D.	20,000	LF6	LF6	7/32"	1 3/4"	3/4"
20-21LF9-U	9/16" O.D.	20,000	LF9	LF9	23/64"	2 1/8"	1"
20-21LF12-U	3/4" O.D.	20,000	LF12	LF12	33/64"	2 1/2"	1 3/8"
20-21LF16-U	1" O.D.	20,000	LF16	LF16	11/16"	3 1/2"	1 3/4"

Bulkhead Couplings

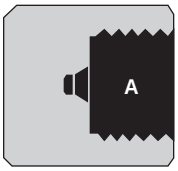
Bulkhead couplings are designed specifically for passing a tubing connection through a panel or steel barricade. These couplings include a locknut as shown. Material is high tensile 316 stainless steel. Standard tubing collars and glands are included unless otherwise specified.



Catalog No.	Tubing	psi	Connections	Orifice	Length	Hex	Hole Diameter
20-21LF4-B	1/4" O.D.	20,000	LF4	1/8"	1 7/8"	1"	3/4" - 16
20-21LF6-B	3/8" O.D.	20,000	LF6	7/32"	2"	1"	7/8" - 14
20-21LF9-B	9/16" O.D.	20,000	LF9	23/64"	2 3/8"	1 3/8"	1 1/16" - 12
20-21LF12-B	3/4" O.D.	20,000	LF12	33/64"	2 5/8"	1 7/8"	1 5/8" - 12
20-21LF16-B	1" O.D.	20,000	LF-16	11/16"	3 1/2"	2 1/8"	1 7/8" - 12

Caps

Tubing end caps are offered for use in sealing off tubing ends either for temporary use or permanent use such as on small volume reservoirs. Standard material is high tensile 316 stainless steel. Standard tubing collars and glands are provided unless otherwise specified.



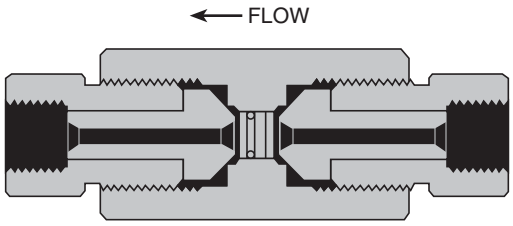
Catalog No.	Tubing	psi	A	Length	Hex
20-21LF4-C	1/4" O.D.	20,000	LF4	7/8"	5/8"
20-21LF6-C	3/8" O.D.	20,000	LF6	1 3/8"	3/4"
20-21LF9-C	9/16" O.D.	20,000	LF9	1 1/2"	1"
20-21LF12-C	3/4" O.D.	20,000	LF12	2 1/2"	1 3/8"
20-21LF16-C	1" O.D.	20,000	LF16	3"	1 3/4"

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Line Filters

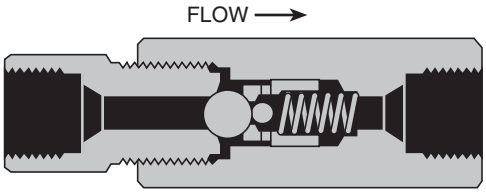
The line filters as shown utilize sintered stainless steel filter discs 3 pc./set. Porosities are available as per the chart to the right. If not otherwise specified, 100 micron filter discs are supplied. (One micron = 0.001 millimeters). Material of body, caps and cover is high tensile 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.



Catalog No.	Tubing	psi	Connections	Orifice	Length	Thickness	Micron Size Filter Available 0.5	2	5	10	40	100
20-51LF4	1/4" O.D.	20,000	LF4	1/8"	5 1/4"	1 3/8"	●	●	●	●	●	●
20-51LF6	3/8" O.D.	20,000	LF6	7/32"	5 1/4"	1 3/8"	●	●	●	●	●	●
20-51LF9	9/16" O.D.	20,000	LF9	23/64"	5 1/4"	1 3/8"	●	●	●	●	●	●

Ball Check Valves

Ball type check valves insure flow in one direction only. Material for body, caps and cover is high tensile 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.

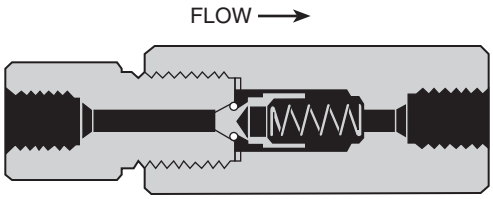


Catalog No.	Tubing	psi	Connections	Orifice	Length	Thickness
20-41LF4	1/4" O.D.	20,000	LF4	1/8"	3 3/4"	1"
20-41LF6	3/8" O.D.	20,000	LF6	7/32"	3 3/4"	1"
20-41LF9	9/16" O.D.	20,000	LF9	23/64"	4 1/2"	1 3/8"
20-41LF12	3/4" O.D.	20,000	LF12	7/16"	5 1/8"	1 3/4"
20-41LF16	1" O.D.	20,000	LF16	9/16"	6 1/2"	2 1/2"

Note: 20-41LF16 material 17-4PH

Soft Seat Check Valves

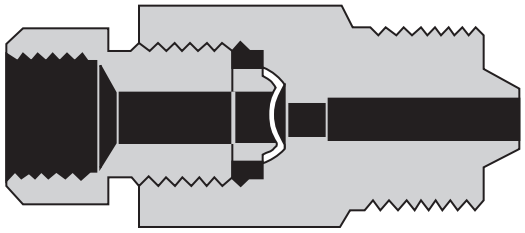
Soft seat check valves insure flow in one direction only and can be mounted in any position. These are highly reliable for both gas and liquid service. Standard O-ring (soft seat) material for the sealing surface is Buna-N (nitrile) with other materials including Teflon and Viton available on request. Temperature is limited by the choice of O-ring material. Material of all other parts is high tensile 316 stainless steel. Standard glands and collars are provided unless otherwise specified.



Catalog No.	Tubing	psi	Connections	Orifice	Length	Thickness
20-41LF4-T	1/4" O.D.	20,000	LF4	1/8"	3 3/4"	1"
20-41LF6-T	3/8" O.D.	20,000	LF6	7/32"	3 3/4"	1"
20-41LF9-T	9/16" O.D.	20,000	LF9	23/64"	4 1/2"	1 3/8"
20-41LF12-T	3/4" O.D.	20,000	LF12	7/16"	5 1/8"	1 3/4"
20-41LF16-T	1" O.D.	20,000	LF16	9/16"	6 1/2"	2 1/2"

Note: 20-41LF16 material 17-4PH

Safety Heads



The male inlet design can be inserted directly into the tubing connections of valves and various fittings such as tees and crosses, or located in pressure vessels.

Outlet connections are 3/8" pipe (NPT). This outlet may be connected to a suitable discharge line to vent pressure to a safe location in the event of bursting of the rupture disc. Torque required for sealing rupture discs will range from 40 to 90 foot pounds, depending upon pressure and media being used.

Material of body and hold down nut is high tensile 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.

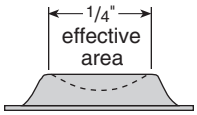
Note: Rupture discs are **not** included and must be ordered as a separate item.

Catalog No.	Tubing	psi	Connections	Orifice	Length	Hex
20-61LM4	1/4" O.D.	20,000	LM4	0.125"	2"	1"
20-61LM6	3/8" O.D.	20,000	LM6	0.219"	2"	1"
20-61LM9	9/16" O.D.	20,000	LM9	0.250"	2 1/8"	1"
20-61LM12	3/4" O.D.	20,000	LM12	0.250"	2 3/8"	1 1/8"
20-61LM16	1" O.D.	20,000	LM16	0.250"	3 1/2"	1 1/8"

Rupture Discs

1/4" Angled Seat







SPECIAL DISCS are available on special order for pressure ranges not shown above and in numerous materials and coatings. Consult factory for price and delivery.

Standard rupture discs are available from stock in burst pressures as listed in the chart below. All pressures through 20,000 psi are shaded. These discs are 316 stainless steel (except for 1,000 psi which are inconel) and may be used with any of the safety heads shown. Note that these rupture discs are supplied with a tolerance of plus 6% and minus 3% of specified burst pressure. Samples of each batch are tested and the actual average burst pressure is stamped on an accompanying metal tag. Factors influencing rupture disc life include corrosion, metal fatigue, and cyclic effects. Periodic replacement is recommended to prevent premature failure.

Standard Burst Pressures (in psi at 72°F)

1,000	3,000	5,000	7,000	9,000	11,000	17,500	25,000	37,500	55,000
1,500	3,500	5,500	7,500	9,500	11,500	18,000	27,000	40,000	60,000
2,000	4,000	6,000	8,000	10,000	12,500	20,000	30,000	45,000	65,000
2,500	4,500	6,500	8,500	10,500	15,000	22,500	35,000	50,000	

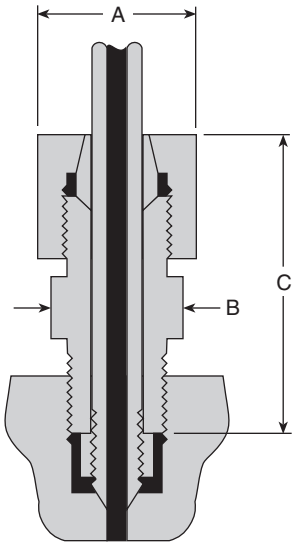
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Anti-Vibration Gland Assemblies

Tubing systems that are subject to extreme vibration or shock, such as mobile pressure systems or long tubing runs culminating at a compressor, will benefit from the use of High Pressure Equipment Company's Anti-Vibration Gland Assemblies. These assemblies utilize the same reliable connection geometries as the standard HiP fittings, with the added benefit of essentially unlimited vibrational fatigue life.

A coned and threaded tube, when subjected to unusual or excessive vibration, may fail prematurely and break at the last thread. The Anti-Vibration Gland Assembly acts to move the fulcrum of vibration away from the threaded portion of the tube and onto the strong, solid wall of the tubing. A wedge-like collet firmly holds the assembly in place, virtually eliminating premature tubing failure while reliably maintaining a leak-free connection between the tube and the connection seat.



Medium Pressure Anti-Vibration Gland Assemblies

Catalog No.	Pressure Rating psi	Connections	A	B	C
20-3LM4	20,000	1/4" MEDIUM PRESSURE	5/8"	1/2"	1 7/16"
20-3LM6	20,000	3/8" MEDIUM PRESSURE	3/4"	5/8"	1 5/8"
20-3LM9	20,000	9/16" MEDIUM PRESSURE	1"	7/8"	1 7/8"
20-3LM12	20,000	3/4" MEDIUM PRESSURE	1 1/4"	1 1/8"	2 1/8"
20-3LM16	20,000	1" MEDIUM PRESSURE	1 1/2"	1 3/8"	2 1/2"

Anti-Vibration Components

Tubing Size	Slotted Collet	Collet Gland	Collet Body	Collar
1/4"	2-8769	2-8770	2-8768	20-2L4
3/8"	2-8772	2-8773	2-8771	20-2L6
9/16"	2-8775	2-8776	2-8774	20-2L9
3/4"	2-8778	2-8779	2-8777	20-2L12
1"	2-8781	2-8782	2-8780	20-2L16

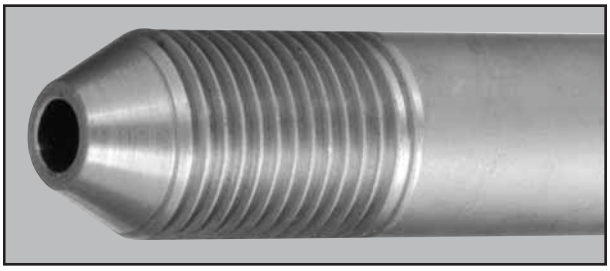
Medium Pressure Tubing

Tubing is cold drawn, seamless, and is supplied in the 1/8 hard condition (not annealed). Tensile strength is approximately 40 percent higher than that of annealed tubing. All tubing is manufactured in strict accordance with High Pressure Equipment Company specifications to insure tolerances and bore quality. Tubing is stocked in lengths of 18 to 22 feet but may be ordered in shorter lengths with **no additional cutting charge.**

	Tubing Size	Working Pressure psi	Type of Connection Used	Material	Catalog Order Number
1/4"	1/4" O.D. x 0.109" I.D.	20,000	1/4" MEDIUM PRESSURE (LF4)	316 SS	20-9M4-316
3/8"	3/8" O.D. x 0.203" I.D.	20,000	3/8" MEDIUM PRESSURE (LF6)	316 SS	20-9M6-316
9/16"	9/16" O.D. x 0.359" I.D.	10,000	9/16" MEDIUM PRESSURE (LF9)	316 SS	10-9M9-316
	9/16" O.D. x 0.312" I.D.	20,000		304 SS	20-9M9-304
				316 SS	20-9M9-316
3/4"	3/4" O.D. x 0.516" I.D.	10,000	3/4" MEDIUM PRESSURE (LF12)	316 SS	10-9M12-316
	3/4" O.D. x 0.438" I.D.	20,000			20-9M12-316
1"	1" O.D. x 0.688" I.D.	10,000	1" MEDIUM PRESSURE (LF16)	316 SS	10-9M16-316
	1" O.D. x 0.562" I.D.	20,000			20-9M16-316

Nipples

Nipples are stocked in 316 stainless steel. Nipples in lengths other than those shown are supplied upon request. Nipples are not furnished with collars and glands, unless specified at time of order.



Coned and Threaded Nipples

	Tubing Size (O.D. x I.D.)						
Length ↓	1/4" O.D. x 7/64" I.D.	3/8" O.D. x 13/64" I.D.	9/16" O.D. x 5/16" I.D.	3/4" O.D. x 33/64" I.D.	3/4" O.D. x 7/16" I.D.	1" O.D. x 11/16" I.D.	1" O.D. x 9/16" I.D.
psi →	20,000 psi	20,000 psi	20,000 psi	10,000 psi	20,000 psi	10,000 psi	20,000 psi
2 3/4"	20-LM4-2.75						
3"		20-LM6-3					
4"			20-LM9-4	10-LM12-4			
6"	20-LM4-6	20-LM6-6	20-LM9-6	10-LM12-6	20-LM12-6	10-LM16-6	20-LM16-6
8"	20-LM4-8	20-LM6-8	20-LM9-8	10-LM12-8	20-LM12-8	10-LM16-8	20-LM16-8
10"	20-LM4-10	20-LM6-10	20-LM9-10	10-LM12-10	20-LM12-10	10-LM16-10	20-LM16-10
12"	20-LM4-12	20-LM6-12	20-LM9-12	10-LM12-12	20-LM12-12	10-LM16-12	20-LM16-12

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Medium Pressure Connections

(Coned and Threaded) 20,000 psi service

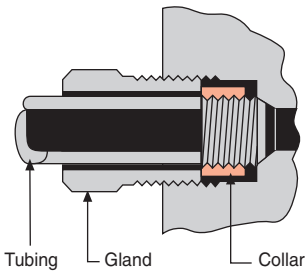
The Medium Pressure tubing connection is available for 1/4", 3/8", 9/16" 3/4", and 1" O.D. tubing. The tubing may be prepared with the use of tooling (see tooling section 9.0) or prepared at the factory to specified lengths. Additionally, standard length coned and threaded nipples are available from stock (see page 3.9).

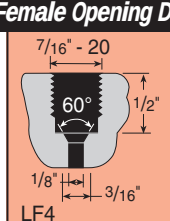
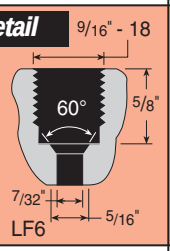
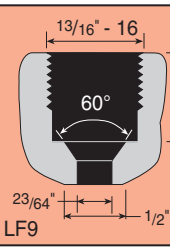
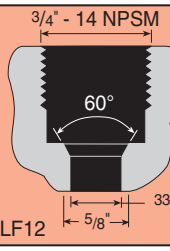
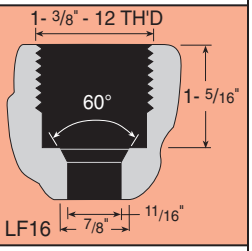
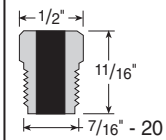
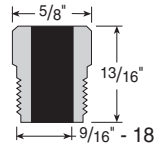
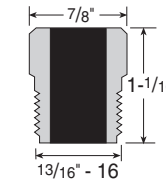
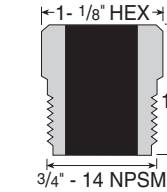
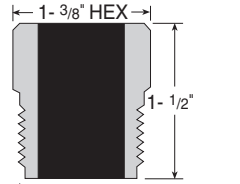
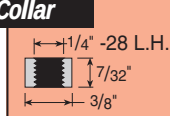
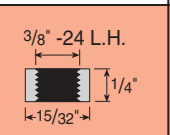
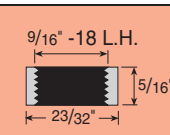
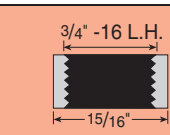
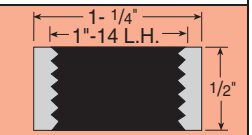
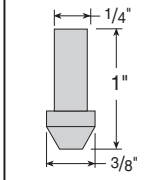
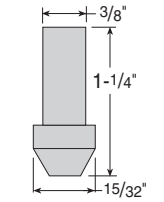
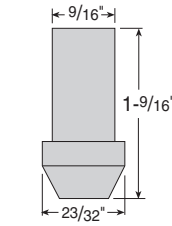
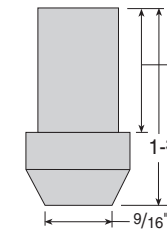
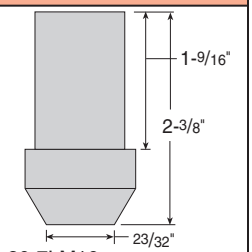
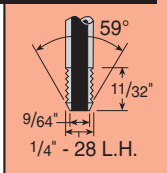
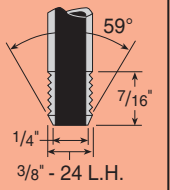
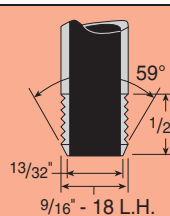
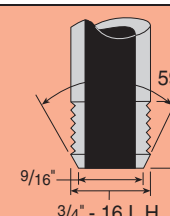
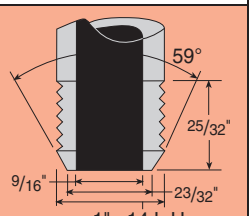
This connection has become an industry standard for use at elevated pressures and temperatures in both liquid and gas applications. It may be disassembled and retightened indefinitely.

The threads of the gland are right-hand while the threads of the collar and tubing are left-hand to prevent rotation of the collar during assembly.

Materials. All of the components required for make-up of a Medium Pressure connection (glands, collars and plugs) are produced in Type 316 stainless steel.

Glands and collars are provided with all valves and fittings (except nipples) unless otherwise requested. (See chart on the right for size details and catalog numbers).



20,000 psi	LF4 1/4" O.D. Tubing	LF6 3/8" O.D. Tubing	LF9 9/16" O.D. Tubing	LF12 3/4" O.D. Tubing	LF16 1" O.D. Tubing
Female Opening Detail	 LF4	 LF6	 LF9	 LF12	 LF16
Gland	 20-2LM4	 20-2LM6	 20-2LM9	 20-2LM12	 20-2LM16
Collar	 20-2L4	 20-2L6	 20-2L9	 20-2L12	 20-2L16
Plug	 20-7LM4	 20-7LM6	 20-7LM9	 20-7LM12	 20-7LM16
Tube End Prep	 LM4	 LM6	 LM9	 LM12	 LM16

High Pressure Valves, Fittings and Tubing

30,000, 40,000 and 60,000 psi service

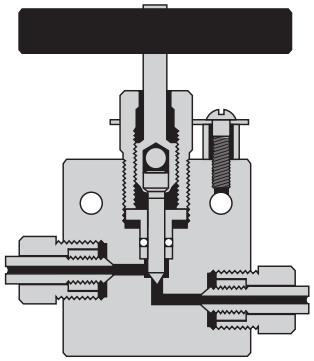
High Pressure Equipment Company has developed a line of High Pressure products to assure safe and easy plumbing for 30,000, 40,000 and 60,000 psi. These needle valves, fittings, line filters, check valves, safety heads, rupture discs, anti-vibration gland assemblies, tubing and nipples are engineered to the highest standards of repeatable quality. The reliable performance of these products has made HiP one of the world's leading suppliers of elevated pressure components.

High Pressure components use a coned-and-threaded connection which accommodates the high temperatures and pressures common in these applications. High Pressure valves are available in various tubing sizes and with body designs to satisfy widely varied requirements. A line of fittings is available to facilitate adapting to Taper Seal, Medium Pressure, or other High Pressure threaded pipe systems.

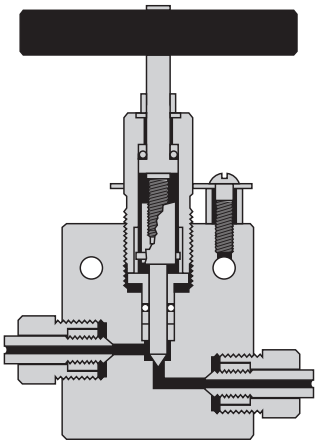


Index

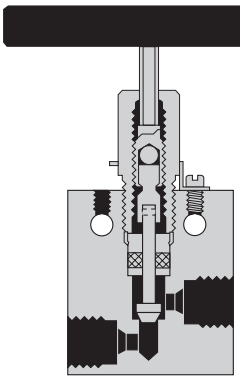
	Page
30,000 psi Valves	4.2-4.3
40,000 psi Valves	4.3.5-4.3.6
60,000 psi Valves	4.4-4.5
Fittings	4.6
Unions, Bulkheads & Caps	4.7
Line Filters & Check Valves	4.8-4.9
Rupture Discs	4.9
Safety Heads	4.10
Anti-Vibration Gland Assemblies	4.11
Tubing	4.12
Coned & Threaded Nipples	4.12
Connection Details	4.A Appendix



HF2 (1/8")



HF4 (1/4"), HF6 (3/8") and HF9 (9/16")



HF16 (1")

30,000 psi High Pressure Valves

High Pressure (coned & threaded) type connections for 1/8", 1/4", 3/8", 9/16" and 1" O.D. tubing.

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost, add - REG to part number.

Glands and collars for tubing are supplied with each valve unless otherwise requested (glands and collars shown on pages 4.8 and 4.A).

Materials include high tensile type 316 stainless steel bodies and hardened 17-4PH stainless steel lower section stems.

Packing is Teflon (450°F) standard with optional Viton (350°F), BUNA-N (200°F) and Grafoil (800°F) available at no additional cost.

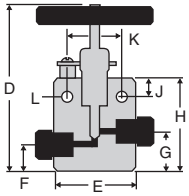
Air operators for remote control operation are available for all valves. (Select required valve and add "HIPCO". Refer to section 7.0 for additional data).

High temperatures can be accommodated using extended stuffing boxes (see page 6.4). These are available for all sizes except 1/8" tubing. To order, add suffix -HT to standard valve catalog number.

Valve Features

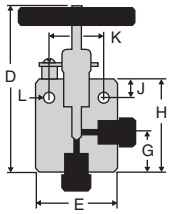
- Non-rotating stem tips
- Packing below stem threads
- Type 316 ss high tensile bodies
- Positive gland lock device
- No stem adjustment needed
- Black T-handles or choice of 4 colors
- Tube sizes 1/8" through 9/16"

Two Way Straight Valves



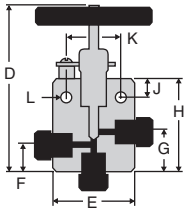
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	30-11HF2	30,000	HF2	1/16"	3 1/4"	1 1/2"	11/16"	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	30-11HF4	30,000	HF4	3/32"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-11HF6	30,000	HF6	1/8"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-11HF9	30,000	HF9	1/8"	5 5/8"	2 5/8"	1"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1" O.D.	30-11HF16	30,000	HF16	7/16"	8 27/64"	4 1/8"	15/16"	1 11/16"	4 7/16"	1 1/8"	2 1/2"	9/16"	1 3/4"

Two Way Angle Valves



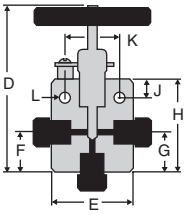
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	30-12HF2	30,000	HF2	1/16"	3 1/4"	1 1/2"	–	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	30-12HF4	30,000	HF4	3/32"	5 3/16"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-12HF6	30,000	HF6	1/8"	5 9/16"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-12HF9	30,000	HF9	1/8"	5 5/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1" O.D.	30-12HF16	30,000	HF16	7/16"	9 11/32"	4 1/8"	–	2 3/8"	5 1/8"	1 1/8"	2 1/2"	9/16"	1 3/4"

Three Way Valves / Two Pressure Connections



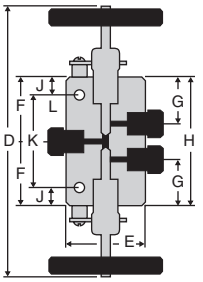
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	30-13HF2	30,000	HF2	1/16"	3 1/4"	1 1/2"	11/16"	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	30-13HF4	30,000	HF4	3/32"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-13HF6	30,000	HF6	1/8"	5 9/16"	2"	1"	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-13HF9	30,000	HF9	1/8"	6 1/16"	2 5/8"	1 7/16"	1 7/8"	3 5/16"	1/2"	1 3/8"	7/32"	1 1/2"
1" O.D.	30-13HF16	30,000	HF16	7/16"	9 23/32"	4 1/8"	2 3/8"	2 13/16"	5 9/16"	1 1/8"	2 1/2"	9/16"	1 3/4"

Three Way Valves / One Pressure Connection



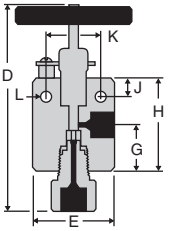
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	30-14HF2	30,000	HF2	1/16"	3 1/4"	1 1/2"	15/16"	15/16"	1 13/16"	5/16"	7/8"	9/64"	3/4"
1/4" O.D.	30-14HF4	30,000	HF4	3/32"	5 3/16"	2"	1"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-14HF6	30,000	HF6	1/8"	5 9/16"	2"	2"	1 7/16"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-14HF9	30,000	HF9	1/8"	5 5/8"	2 5/8"	2 3/16"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1" O.D.	30-14HF16	30,000	HF16	7/16"	9 11/32"	4 1/8"	2 3/8"	2 3/8"	5 1/8"	1 1/8"	2 1/2"	9/16"	1 3/4"

Three Way / Two Stem Connection Valves



Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	30-15HF2	30,000	HF2	1/16"	5 1/4"	1 1/2"	15/16"	7/8"	2 1/2"	5/16"	1 7/8"	9/64"	3/4"
1/4" O.D.	30-15HF4	30,000	HF4	3/32"	9 1/4"	2"	1"	1 7/16"	3 3/4"	1/2"	2 3/4"	7/32"	1"
3/8" O.D.	30-15HF6	30,000	HF6	1/8"	9 1/2"	2"	2"	1 7/16"	4"	1/2"	3"	7/32"	1"
9/16" O.D.	30-15HF9	30,000	HF9	1/8"	9 7/8"	2 5/8"	2 3/16"	1 7/16"	4 3/8"	1/2"	3 3/8"	7/32"	1 1/2"
1" O.D.	30-15HF16	30,000	HF16	7/16"	11 13/16"	4 1/8"	3 7/8"	2 3/4"	7 3/4"	1 1/8"	2 1/2"	9/16"	1 3/4"

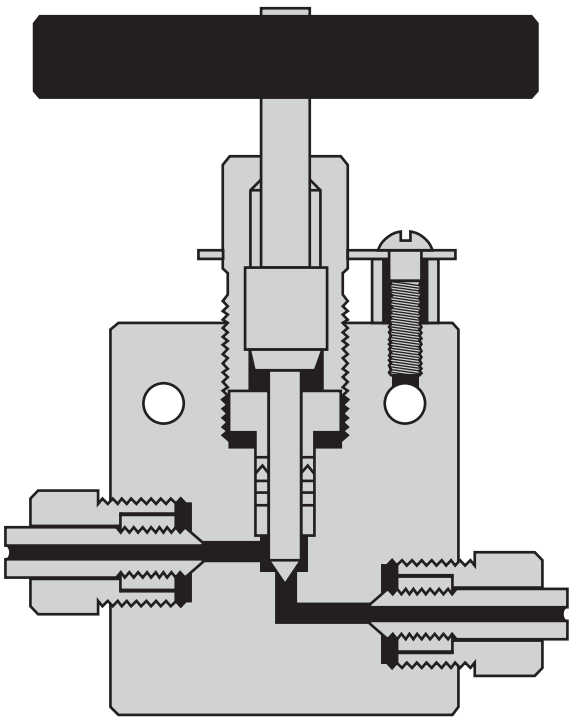
Replaceable Seat Valves



Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	30-12HF4-R	30,000	HF4	3/32"	6"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-12HF6-R	30,000	HF6	1/8"	6 5/8"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-12HF9-R	30,000	HF9	1/8"	6 13/16"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1" O.D.	30-12HF16-R	30,000	HF16	7/16"	10 7/8"	4 1/8"	–	2 3/8"	5 1/8"	1 1/8"	2 1/2"	9/16"	1 3/4"

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R4 2/02



40,000 psi
High Pressure Valves

High Pressure (coned & threaded) type connections for $^{9}/_{16}$" O.D. tubing.

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost, add - REG to part number.

Glands and collars for tubing are supplied with each valve unless otherwise requested (glands and collars shown on pages 4.8 and 4.A).

Materials include high tensile type 316 stainless steel bodies and hardened 17-4PH stainless steel lower section stems.

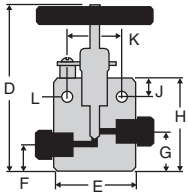
Packing set consists of multiple Teflon packing with nylon back up, with optional Viton (350°F), BUNA-N (200°F) and Grafoil (800°F) available at no additional cost.

Air operators for remote control operation are available for all valves. (Select required valve and add “HIPCO”. Refer to section 7.0 for additional data).

High temperatures can be accommodated using extended stuffing boxes (see page 6.4).

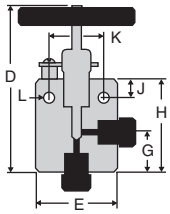
Valve Features

- Non-rotating stem tips
- Packing below stem threads
- Type 316 ss high tensile bodies
- Positive gland lock device
- No stem adjustment needed
- Black T-handles or choice of 4 colors



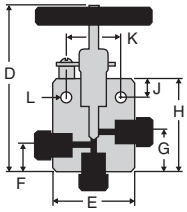
Two Way Straight Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
9/16" O.D.	40-11HF9	40,000	HF9	1/8"	5 5/8"	2 5/8"	1"	1 7/16"	2 7/8"	1/2"	1 5/8"	7/32"	1 1/2"



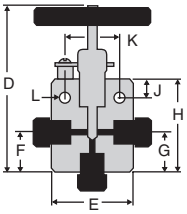
Two Way Angle Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
9/16" O.D.	40-12HF9	40,000	HF9	1/8"	5 5/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 5/8"	7/32"	1 1/2"



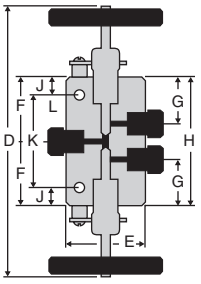
Three Way Valves / Two Pressure Connections

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
9/16" O.D.	40-13HF9	40,000	HF9	1/8"	6 1/16"	2 5/8"	1 7/16"	1 7/8"	3 5/16"	1/2"	1 5/8"	7/32"	1 1/2"



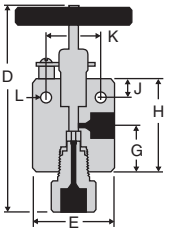
Three Way Valves / One Pressure Connection

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
9/16" O.D.	40-14HF9	40,000	HF9	1/8"	5 5/8"	2 5/8"	1 7/16"	1 7/16"	2 7/8"	1/2"	1 5/8"	7/32"	1 1/2"



Three Way / Two Stem Connection Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
9/16" O.D.	40-15HF9	40,000	HF9	1/8"	9 7/8"	2 5/8"	2 3/16"	1 7/16"	4 3/8"	1/2"	3 3/8"	7/32"	1 1/2"



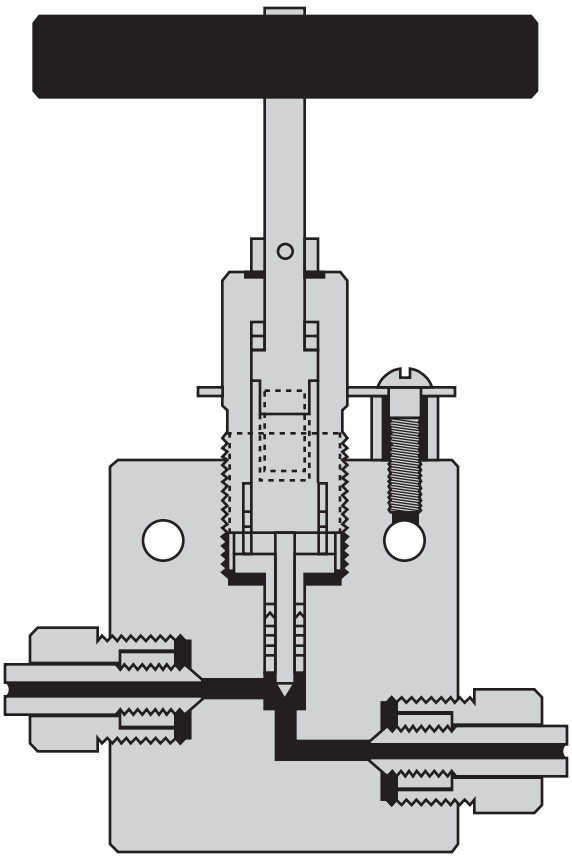
Replaceable Seat Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
9/16" O.D.	40-12HF9-R	40,000	HF9	1/8"	6 3/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 5/8"	7/32"	1 1/2"

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R4 2/02

60,000 psi
High Pressure Valves



High Pressure (coned & threaded) type connections for 1/8", 1/4", 3/8", 9/16" and 1" O.D. tubing.

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost, add - REG to part number.

Glands and collars for tubing are supplied with each valve unless otherwise requested (glands and collars shown on pages 4.8 and 4.A).

Materials include high tensile type 316 stainless steel bodies and hardened 17-4PH stainless steel lower section stems.

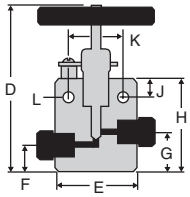
Packing set consists of multiple Teflon packing with nylon back up, with optional Viton (350°F), BUNA-N (200°F) and Grafoil (800°F) available at no additional cost.

Air operators for remote control operation are available for all valves. (Select required valve and add "HIPCO". Refer to section 7.0 for additional data).

High temperatures can be accommodated using extended stuffing boxes (see page 6.4). These are available for all sizes except 1/8" tubing.

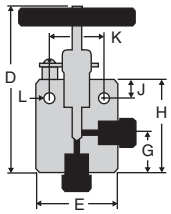
Valve Features

- Non-rotating stem tips
- Packing below stem threads
- Type 316 ss high tensile bodies
- Positive gland lock device
- No stem adjustment needed
- Black T-handles or choice of 4 colors
- Tube sizes 1/8" through 9/16"



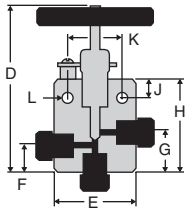
Two Way Straight Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	60-11HF2	60,000	HF2	1/16"	5 3/16"	2"	5/8"	15/16"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" O.D.	60-11HF4	60,000	HF4	1/16"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-11HF6	60,000	HF6	1/16"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-11HF9	60,000	HF9	1/16"	5 5/8"	2 5/8"	1"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"



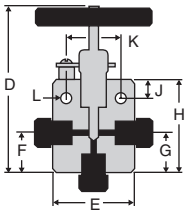
Two Way Angle Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	60-12HF2	60,000	HF2	1/16"	5 3/16"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" O.D.	60-12HF4	60,000	HF4	1/16"	5 3/16"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-12HF6	60,000	HF6	1/16"	5 9/16"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-12HF9	60,000	HF9	1/16"	5 5/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"



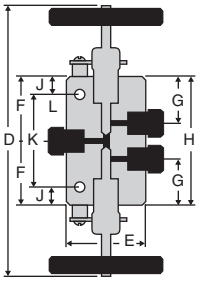
Three Way Valves / Two Pressure Connections

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	60-13HF2	60,000	HF2	1/16"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" O.D.	60-13HF4	60,000	HF4	1/16"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-13HF6	60,000	HF6	1/16"	5 9/16"	2"	1"	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-13HF9	60,000	HF9	1/16"	6 1/16"	2 5/8"	1 7/16"	1 7/8"	3 5/16"	1/2"	1 3/8"	7/32"	1 1/2"



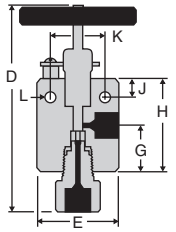
Three Way Valves / One Pressure Connection

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	60-14HF2	60,000	HF2	1/16"	5 3/16"	2"	7/8"	1/2"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" O.D.	60-14HF4	60,000	HF4	1/16"	5 3/16"	2"	1"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-14HF6	60,000	HF6	1/16"	5 9/16"	2"	1 3/8"	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-14HF9	60,000	HF9	1/16"	5 5/8"	2 5/8"	1 7/16"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"



Three Way / Two Stem Connection Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" O.D.	60-15HF2	60,000	HF2	1/16"	9 1/4"	2"	1 7/8"	1 7/16"	3 3/4"	1/2"	2 3/4"	7/32"	1"
1/4" O.D.	60-15HF4	60,000	HF4	1/16"	9 1/4"	2"	1 7/8"	1 7/16"	3 3/4"	1/2"	2 3/4"	7/32"	1"
3/8" O.D.	60-15HF6	60,000	HF6	1/16"	9 1/2"	2"	2"	1 7/16"	4"	1/2"	3"	7/32"	1"
9/16" O.D.	60-15HF9	60,000	HF9	1/16"	9 7/8"	2 5/8"	2 3/16"	1 7/16"	4 3/8"	1/2"	3 3/8"	7/32"	1 1/2"



Replaceable Seat Valves

Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	60-12HF4-R	60,000	HF4	1/16"	6"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-12HF6-R	60,000	HF6	1/16"	6 5/8"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-12HF9-R	60,000	HF9	1/16"	6 13/16"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"

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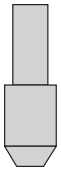
Glands/Sleeves/PlugsElbows/Tees/Crosses

A complete range of elbows, tees, and crosses is available for all of the tubing connection sizes. Material is high tensile 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.

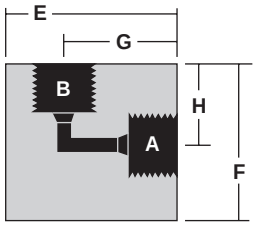
Connection Components

Catalog No.	Tube Size	Gland
60-2HM2	1/8"	
60-2HM4	1/4"	
60-2HM6	3/8"	
60-2HM9	9/16"	
40-2HM9	9/16"	
30-2HM16	1"	

Catalog No.	Tube Size	Collar
60-2H2	1/8"	
60-2H4	1/4"	
60-2H6	3/8"	
60-2H9	9/16"	
40-2H9	9/16"	
30-2H16	1"	

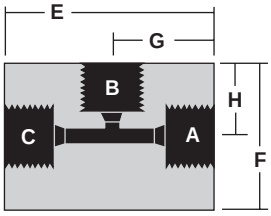
Catalog No.	Tube Size	Plug
60-7HM2	1/8"	
60-7HM4	1/4"	
60-7HM6	3/8"	
60-7HM9	9/16"	
40-7HM9	9/16"	
30-7HM16	1"	

High Pressure Elbows



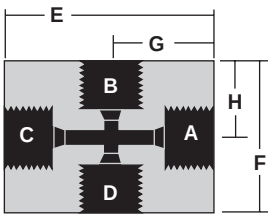
Catalog No.	Pressure Rating psi	Connections	A-B	E	F	G	H	Thickness
60-22HF2	60,000	1/8" O.D. TUBE	HF2	1 1/8"	1 1/8"	3/4"	3/4"	3/4"
60-22HF4	60,000	1/4" O.D. TUBE	HF4	1 3/8"	1 1/2"	7/8"	1"	1"
60-22HF6	60,000	3/8" O.D. TUBE	HF6	1 3/4"	1 1/2"	1 1/4"	1"	1"
60-22HF9	60,000	9/16" O.D. TUBE	HF9	2 5/8"	1 7/8"	1 7/8"	1 1/8"	1 1/2"
40-22HF9	40,000	9/16" O.D. TUBE	HF9	2 5/8"	1 7/8"	1 7/8"	1 1/8"	1 1/2"
30-22HF16	30,000	1" O.D. TUBE	HF16	3"	3"	2 1/16"	2 1/16"	1 3/4"

High Pressure Tees



Catalog No.	Pressure Rating psi	Connections	A-B-C	E	F	G	H	Thickness
60-23HF2	60,000	1/8" O.D.TUBE	HF2	1 1/2"	1 1/8"	3/4"	3/4"	3/4"
60-23HF4	60,000	1/4" O.D.TUBE	HF4	2"	1 3/8"	1"	7/8"	1"
60-23HF6	60,000	3/8" O.D.TUBE	HF6	2"	1 9/16"	1"	1 1/16"	1"
60-23HF9	60,000	9/16" O.D.TUBE	HF9	2 5/8"	2 1/8"	1 5/16"	1 3/8"	1 1/2"
40-23HF9	40,000	9/16" O.D.TUBE	HF9	2 5/8"	2 1/8"	1 5/16"	1 3/8"	1 1/2"
30-23HF16	30,000	1" O.D. TUBE	HF16	4 1/8"	3"	2 1/16"	2 1/16"	1 3/4"

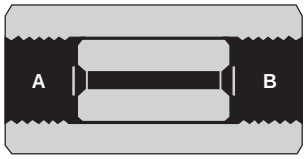
High Pressure Crosses



Catalog No.	Pressure Rating psi	Connections	A-B-C-D	E	F	G	H	Thickness
60-24HF2	60,000	1/8" O.D. TUBE	HF2	1 1/2"	1 1/2"	3/4"	3/4"	3/4"
60-24HF4	60,000	1/4" O.D. TUBE	HF4	2"	1 1/2"	1"	3/4"	1"
60-24HF6	60,000	3/8" O.D. TUBE	HF6	2 1/8"	2"	1 1/16"	1"	1"
60-24HF9	60,000	9/16" O.D. TUBE	HF9	2 3/4"	2 5/8"	1 3/8"	1 5/16"	1 1/2"
40-24HF9	40,000	9/16" O.D. TUBE	HF9	2 3/4"	2 5/8"	1 3/8"	1 5/16"	1 1/2"
30-24HF16	30,000	1" O.D. TUBE	HF16	4 1/8"	4 1/8"	2 1/16"	2 1/16"	1 3/4"

Union Couplings (Slip Type)

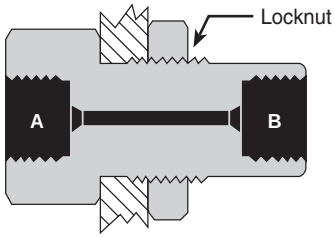
Union (slip Type) couplings are ideal for use in confined space installations. This design allows the entire coupling to be disconnected and slipped back over the tubing to facilitate assembly and disassembly. In installations where tubing is easily assembled, it is preferable (and less expensive) to use standard straight couplings (see accessories section). Standard material is high tensile 316 stainless steel. Standard tubing collars and glands are provided unless otherwise specified.



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
60-21HF2-U	60,000	1/8" O.D. TUBING	HF2	HF2	1 1/8"	3/4"
60-21HF4-U	60,000	1/4" O.D. TUBING	HF4	HF4	1 3/4"	1"
60-21HF6-U	60,000	3/8" O.D. TUBING	HF6	HF6	2"	1"
60-21HF9-U	60,000	9/16" O.D. TUBING	HF9	HF9	2 3/8"	1 3/8"
40-21HF9-U	40,000	9/16" O.D. TUBING	HF9	HF9	2 3/8"	1 3/8"
30-21HF16-U	30,000	1" O.D. TUBING	HF16	HF16	3 1/2"	1 3/4"

Bulkhead Couplings

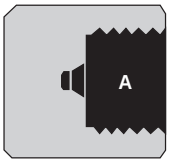
Bulkhead couplings are designed specifically for passing a tubing connection through a panel or steel barricade. These couplings include a locknut as shown. Material is high tensile 316 stainless steel. Standard tubing collars and glands are included unless otherwise specified.



Catalog No.	Pressure Rating psi	Connections	Panel Hole	A	B	Length	Hex Size	Outside Thread
60-21HF2-B	60,000	1/8" O.D. TUBING	15/16"	HF2	HF2	1 13/18"	1"	7/8" - 14
60-21HF4-B	60,000	1/4" O.D. TUBING	15/16"	HF4	HF4	2"	1"	7/8" - 14
60-21HF6-B	60,000	3/8" O.D. TUBING	1 1/8"	HF6	HF6	2 3/8"	1 3/8"	1 1/16" - 12
60-21HF9-B	60,000	9/16" O.D. TUBING	1 11/16"	HF9	HF9	2 3/4"	1 7/8"	1 5/8" - 12
40-21HF9-B	40,000	9/16" O.D. TUBING	1 11/16"	HF9	HF9	2 3/4"	1 7/8"	1 5/8" - 12
30-21HF16-B	30,000	1" O.D. TUBING	1 15/16"	HF16	HF16	3 1/2"	1 7/8"	2 1/8" - 12

Caps

Tubing end caps are offered for use in sealing off tubing ends either for temporary use or permanent use such as on small volume reservoirs. Standard material is high tensile 316 stainless steel. Standard tubing collars and glands are provided unless otherwise specified.



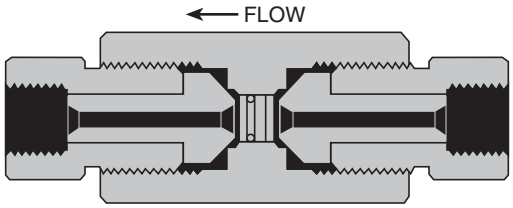
Catalog No.	Pressure Rating psi	Connections	A	Length	Hex Size
60-21HF2-C	60,000	1/8" O.D. TUBING	HF2	7/8"	3/4"
60-21HF4-C	60,000	1/4" O.D. TUBING	HF4	7/8"	3/4"
60-21HF6-C	60,000	3/8" O.D. TUBING	HF6	1 1/4"	1"
60-21HF9-C	60,000	9/16" O.D. TUBING	HF9	1 1/2"	1 3/8"
40-21HF9-C	40,000	9/16" O.D. TUBING	HF9	1 1/2"	1 3/8"
30-21HF16-C	30,000	1" O.D. TUBING	HF16	3"	1 3/4"

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Line Filters

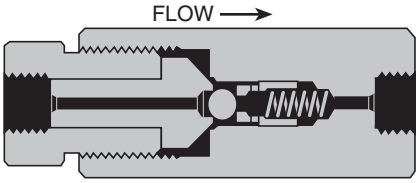
The line filters as shown utilize sintered stainless steel filter discs 3 pc./set. Porosities are available as per the chart to the right. If not otherwise specified, 100 micron filter discsare supplied. (One micron = 0.001 millimeters). Material of bodies and end covers is high tensile 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.



Catalog No.	Pressure Rating psi	Connections	Length	Hex Size	Micron Size Filter Available 0.5	2	5	10	40	100
40F-51HF9	40,000	9/16" HIGH PRESSURE	5 3/4"	1 1/2"	●	●	●	●	●	●
60F-51HF2	60,000	1/8" HIGH PRESSURE	4 11/16"	1 1/2"	●	●	●	●	●	●
60F-51HF4	60,000	1/4" HIGH PRESSURE	4 7/8"	1 1/2"	●	●	●	●	●	●
60F-51HF6	60,000	3/8" HIGH PRESSURE	5 1/4"	1 1/2"	●	●	●	●	●	●
60F-51HF9	60,000	9/16" HIGH PRESSURE	5 3/4"	1 1/2"	●	●	●	●	●	●

Ball Check Valves

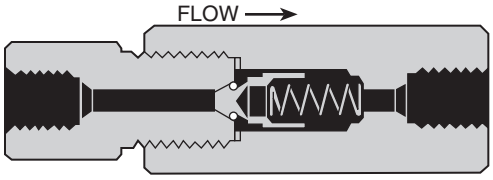
Ball type check valves insure flow in one direction only. Material for bodies and covers is 316 stainless steel (30-41HF16 body and cover are 17-4PH). Standard tubing glands and collars are provided unless otherwise specified.



Catalog No.	psi	Connections	Length	Hex
40-41HF9	40,000	9/16" HIGH PRESSURE	5 1/8"	1 1/2"
60-41HF2	60,000	1/8" HIGH PRESSURE	4 3/16"	1 1/2"
60-41HF4	60,000	1/4" HIGH PRESSURE	4 1/4"	1 1/2"
60-41HF6	60,000	3/8" HIGH PRESSURE	4 5/8"	1 1/2"
60-41HF9	60,000	9/16" HIGH PRESSURE	5 1/8"	1 1/2"
30-41HF16	30,000	1" HIGH PRESSURE	6 1/2"	2 1/2" RD with flats

Soft Seat Check Valves

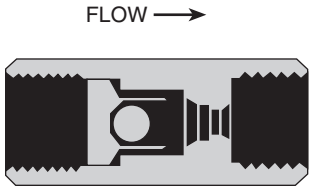
Soft seat check valves insure flow in one direction only and can be mounted in any position. These are highly reliable for both gas and liquid service. Standard O-ring (soft seat) material for the sealing surface is Buna-N (nitrile) with other materials including Teflon and Viton available on request. Temperature is limited by the choice of O-ring material. Material of all other parts is high tensile 316 stainless steel. (30-41HF16-T body and cover are 17-4PH). Standard glands and collars are provided unless otherwise specified.



Catalog No.	psi	Connections	Length	Hex
30-41HF2-T	30,000	1/8" HIGH PRESSURE	3 3/4"	1"
30-41HF4-T	30,000	1/4" HIGH PRESSURE	3 7/8"	1"
30-41HF6-T	30,000	3/8" HIGH PRESSURE	3 7/8"	1"
30-41HF9-T	30,000	9/16" HIGH PRESSURE	4 1/4"	1 3/8"
40-41HF9-T	40,000	9/16" HIGH PRESSURE	5 1/16"	1 1/2"
60-41HF4-T	60,000	1/4" HIGH PRESSURE	4 9/16"	1 1/2"
60-41HF6-T	60,000	3/8" HIGH PRESSURE	4 9/16"	1 1/2"
60-41HF9-T	60,000	9/16" HIGH PRESSURE	5 1/16"	1 1/2"
30-41HF16-T	30,000	1" HIGH PRESSURE	6 1/2"	2 1/2" RD with flats

Excess Surge Check Valves

Excess surge check valves are used to eliminate loss of pressure due to a sudden surge or opening of a pressure component in a pressurized system (such as a breakage of a gauge or test component). These check valves should be mounted in the vertical position. Only one basic size is available (60-41HF9-E) with adapters readily available to convert to other size connections. Standard tubing glands and collars are provided unless otherwise specified.

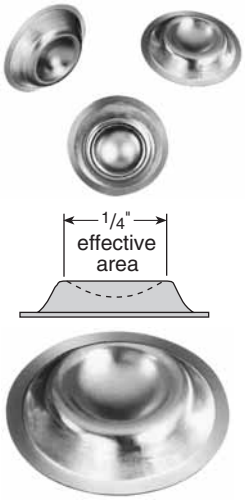


Catalog No.	psi	Connections	Length	Hex
60-41HF9-E	60,000	9/16" HIGH PRESSURE	3 1/8"	1 1/2"

Rupture Discs

1/4" Angled Seat

Standard rupture discs are available from stock in burst pressures as listed in the chart to the right. These discs are 316 stainless steel (except for 1000 psi which are inconel) and may be used with any of the safety heads shown. Note that these rupture discs are manufactured with a tolerance of plus 6% and minus 3% of specified burst pressure. Samples of each batch are then tested and the actual average burst pressure is stamped on the accompanying metal tag. Factors influencing rupture disc life include corrosion, metal fatigue, and cyclic effect. Periodic replacement is recommended to prevent premature failure. It is recommended that working pressure does not exceed 70% of burst rating for maximum life cycle of the disc.



SPECIAL DISCS are available on special order for pressure ranges not shown above and in numerous materials and coatings. Consult factory for price and delivery.

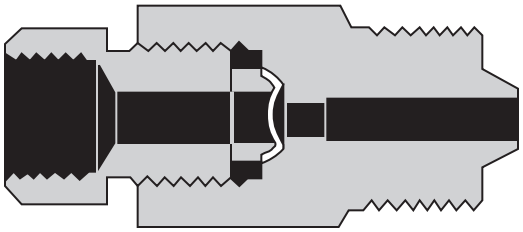
Standard Burst Pressures (in psi at 72°F)

1,000	3,000	5,000	7,000	9,000	11,000	17,500	25,000	37,500	55,000
1,500	3,500	5,500	7,500	9,500	11,500	18,000	27,000	40,000	60,000
2,000	4,000	6,000	8,000	10,000	12,500	20,000	30,000	45,000	65,000
2,500	4,500	6,500	8,500	10,500	15,000	22,500	35,000	50,000	

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R4 2/02

Safety Heads



A choice of three safety head designs is available, male inlet, female inlet (straight), and tee type. The male inlet design can be inserted directly into the tubing connections of valves and various fittings such as tees and crosses, or located in pressure vessels.

Outlet connections on all sizes are 3/8" pipe (NPT). This outlet may be connected to a suitable discharge line to vent pressure to a safe location in the event of bursting of the rupture disc. Torque required for sealing rupture discs will range from 40 to 90 foot pounds, depending upon pressure and media being used.

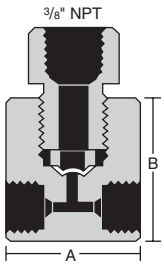
Material of bodies and hold down nuts is high tensile 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.

Note: Rupture discs are **not** included and must be ordered as a separate item.



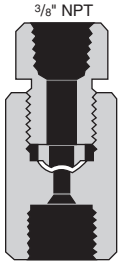
Male Inlet Safety Heads

Catalog No.	Pressure Rating psi	Inlet Connection	Length	Hex Size
60-61HM4	60,000	1/4" HIGH PRESSURE	1 7/8"	1 1/8"
60-61HM6	60,000	3/8" HIGH PRESSURE	2 1/8"	1 1/8"
60-61HM9	60,000	9/16" HIGH PRESSURE	2 3/8"	1 1/2"
40-61HM9	40,000	9/16" HIGH PRESSURE	2 3/8"	1 1/2"
30-61HM16	30,000	1" HIGH PRESSURE	3 1/2"	1 1/8"



Tee Type Safety Heads

Catalog No.	Pressure Rating psi	Inlet Connection	A	B	Thickness
60-63HF2	60,000	1/8" HIGH PRESSURE	1 1/2"	1 3/4"	1"
60-63HF4	60,000	1/4" HIGH PRESSURE	1 1/2"	1 3/4"	1"
60-63HF6	60,000	3/8" HIGH PRESSURE	2"	1 3/4"	1"
60-63HF9	60,000	9/16" HIGH PRESSURE	2 5/8"	2"	1 1/2"
40-63HF9	40,000	9/16" HIGH PRESSURE	2"	2 5/8"	1 1/2"



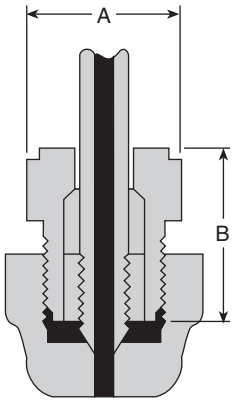
Female Inlet (Straight) Safety Heads

Catalog No.	Pressure Rating psi	Inlet Connection	Length	Hex Size
60-61HF2	60,000	1/8" HIGH PRESSURE	1 7/8"	1 1/8"
60-61HF4	60,000	1/4" HIGH PRESSURE	1 7/8"	1 1/8"
60-61HF6	60,000	3/8" HIGH PRESSURE	1 7/8"	1 1/8"
60-61HF9	60,000	9/16" HIGH PRESSURE	2 7/8"	1 1/2"
40-61HF9	40,000	9/16" HIGH PRESSURE	2 3/8"	1 1/2"

Anti-Vibration Gland Assemblies

Tubing systems that are subject to extreme vibration or shock, such as mobile pressure systems or long tubing runs culminating at a compressor, will benefit from the use of High Pressure Equipment Company's Anti-Vibration Gland Assemblies. These assemblies utilize the same reliable connection geometries as the standard HiP fittings, with the added benefit of essentially unlimited vibrational fatigue life.

A coned and threaded tube, when subjected to unusual or excessive vibration, may fail prematurely and break at the last thread. The Anti-Vibration Gland Assembly acts to move the fulcrum of vibration away from the threaded portion of the tube and onto the strong, solid wall of the tubing. A wedge-like collet firmly holds the assembly in place, virtually eliminating premature tubing failure while reliably maintaining a leak-free connection between the tube and the connection seat.



High Pressure Anti-Vibration Gland Assemblies

Catalog No.	Pressure Rating psi	Connections	A	B
60-3HM4	60,000	1/4" HIGH PRESSURE	5/8"	13/16"
60-3HM6	60,000	3/8" HIGH PRESSURE	13/16"	1 1/8"
60-3HM9	60,000	9/16" HIGH PRESSURE	1 13/16"	1 9/16"
40-3HM9	40,000	9/16" HIGH PRESSURE	1 13/16"	1 9/16"

Anti-Vibration Components

Tubing Size	Slotted Collet	Collet Gland	Collar
1/4"	2-8784	2-8783	60-2H4
3/8"	2-8786	2-8785	60-2H6
9/16"	2-8788	2-8787	60-2H9

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R2 12/99

High Pressure Tubing

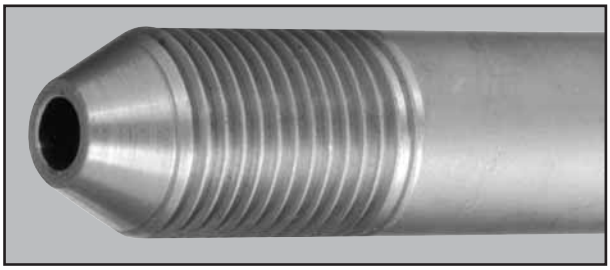
Tubing is cold drawn, seamless, and is supplied in the 1/8 hard condition (not annealed). Tensile strength is approximately 40 percent higher than that of annealed tubing. All tubing is manufactured in strict accordance with High Pressure Equipment Company specifications to insure tolerances and bore quality. Tubing is stocked in lengths of 18 to 22 feet but may be ordered in shorter lengths with **no additional cutting charge.**

Note: The 1/8" O.D. tubing sizes may be coiled for shipment. Larger sizes must be shipped in straight lengths.

	Tubing Size	Working Pressure psi	Type of Connection Used	Material	Catalog Order Number
1/8"	1/8" O.D. x 0.020" I.D.	60,000	1/8" HIGH PRESSURE (HF2)	316 SS	**60-9H2**
	1/8" O.D. x 0.040" I.D.	30,000	1/8" HIGH PRESSURE (HF2)	316 SS	**30-9H2**
1/4"	1/4" O.D. x 0.083" I.D.	60,000	1/4" HIGH PRESSURE (HF4)	316 SS *	**60-9H4-316**
				304 SS *	**60-9H4-304**
3/8"	3/8" O.D. x 1/8" I.D.	60,000	3/8" HIGH PRESSURE (HF6)	316 SS	**60-9H6-316**
				304 SS	**60-9H6-304**
9/16"	9/16" O.D. x 3/16" I.D.	60,000	9/16" HIGH PRESSURE (HF9)	316 SS	**60-9H9-316**
				304 SS	**60-9H9-304**
9/16"	9/16" O.D. x 1/4" I.D.	40,000	9/16" HIGH PRESSURE (HF9)	316 SS	**40-9H9-316**
				304 SS	**40-9H9-304**
1"	1" O.D. x 0.437" I.D.	30,000	1" HIGH PRESSURE (HF16)	316 SS	**30-9H16-316**

Nipples

Nipples as shown below are stocked in Types 304 and 316 Stainless Steel. Nipples in lengths other than those shown are supplied upon request. Nipples are not furnished with collars and glands, unless specified at time of order.



Coned and Threaded Nipples

	Tubing Size (O.D. x I.D.)						
Length ↓	1/8" x 0.020"	1/8" x 0.040" **	1/4" x 0.083"	3/8" x 1/8" *	9/16" x 1/4" *	9/16" x 3/16" *	1" x 0.437" **
psi →	**60,000 psi**	**30,000 psi**	**60,000 psi**	**60,000 psi**	**40,000 psi**	**60,000 psi**	**30,000 psi**
2"	60-HM2-2	30-HM2-2					
2 3/4"			60-HM4-2.75				
3"	60-HM2-3	30-HM2-3		60-HM6-3			
4"	60-HM2-4	30-HM2-4			40-HM9-4	60-HM9-4	
6"	60-HM2-6	30-HM2-6	60-HM4-6	60-HM6-6	40-HM9-6	60-HM9-6	30-HM16-6
8"			60-HM4-8	60-HM6-8	40-HM9-8	60-HM9-8	30-HM16-8
9"	60-HM2-9	30-HM2-9					
10"			60-HM4-10	60-HM6-10	40-HM9-10	60-HM9-10	30-HM16-10
12"	60-HM2-12	30-HM2-12	60-HM4-12	60-HM6-12	40-HM9-12	60-HM9-12	30-HM16-12

Specify 316 SS or 304 SS when ordering. * Also used for 30,000 psi series. ** 316 SS

High Pressure Connections

(Coned and Threaded) 30,000/40,000/60,000 psi service

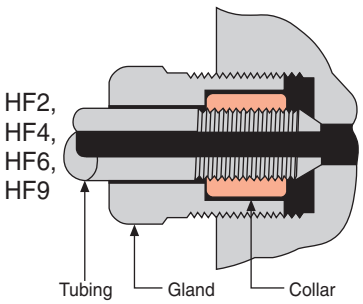
The High Pressure tubing connection is available for 1/8", 1/4", 3/8", 9/16" and 1" O.D. tubing. The tubing may be prepared with the use of tooling (see tooling section 9.0) or prepared at the factory to specified lengths. Additionally, standard length coned and threaded tubing nipples are available from stock (see page 4.12).

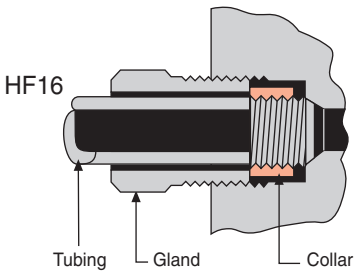
This connection has become an industry standard for use at elevated pressures and temperatures in both liquid and gas applications. It may be disassembled and retightened indefinitely.

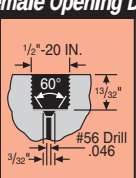
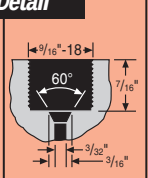
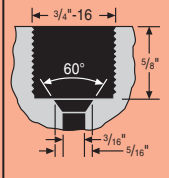
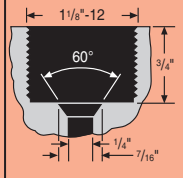
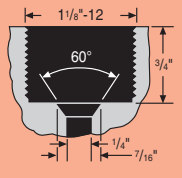
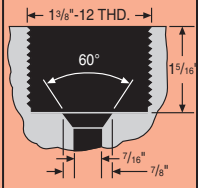
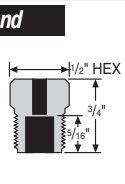
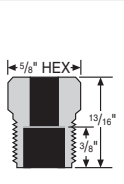
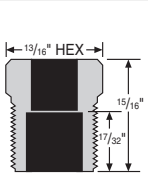
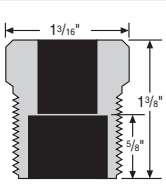
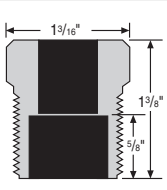
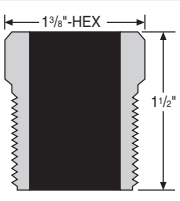
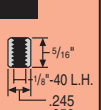
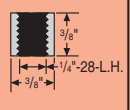
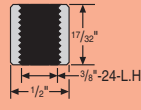
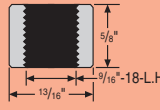
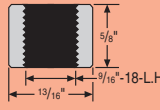
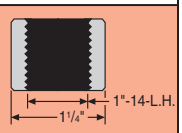
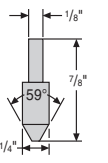
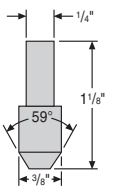
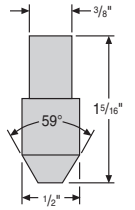
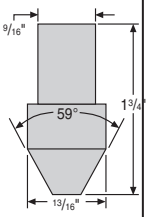
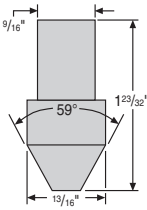
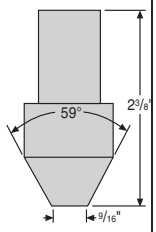
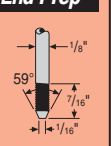
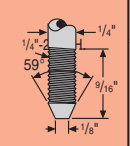
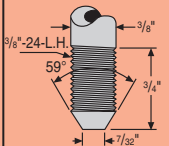
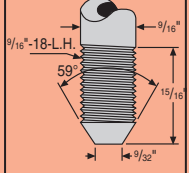
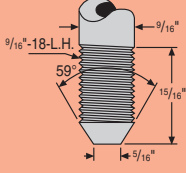
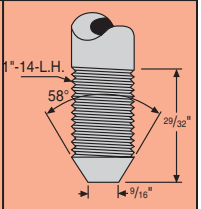
The threads of the gland are right-hand while the threads of the collar and tubing are left-hand to prevent rotation of the collar during assembly.

Materials. All of the components required for make-up of a High Pressure connection (glands, collars and plugs) are produced in Type 316 stainless steel.

Glands and collars are provided with all valves and fittings (except nipples) unless otherwise requested. (See chart on the right for size details and catalog numbers).





	30,000 & 60,000 psi				40,000 psi	30,000 psi
	HF2 1/8" O.D. Tubing	HF4 1/4" O.D. Tubing	HF6 3/8" O.D. Tubing	HF9 9/16" O.D. Tubing	HF9 9/16" O.D. Tubing	HF16 1" O.D. Tubing
Female Opening Detail						
	HF2	HF4	HF6	HF9	HF9	HF16
Gland						
	60-2HM2	60-2HM4	60-2HM6	60-2HM9	60-2HM9	30-2HM16
Collar						
	60-2H2	60-2H4	60-2H6	60-2H9	60-2H9	30-2H16
Plug						
	60-7HM2	60-7HM4	60-7HM6	60-7HM9	40-7HM9	30-7HM16
Tube End Prep						
	HM2	HM4	HM6	HM9	HM9	HM16

Ultra High Pressure Valves, Fittings and Tubing

100,000 and 150,000 psi service

High Pressure Equipment Company has developed a line of Ultra High Pressure products to assure safe and easy plumbing for 100,000 psi and 150,000 psi. These needle valves, fittings, check valves, tubing and nipples are engineered to the highest standards of repeatable quality. The reliable performance of these products has made HiP one of the world's leading suppliers of elevated pressure components.

Ultra High Pressure components use a coned-and-threaded connection which accommodates the extreme conditions found in these applications. Ultra High Pressure valves are available in $^{1}/_{4}$" and $^{3}/_{8}$" O.D. tubing sizes and four patterns to satisfy widely varied requirements. A line of fittings is available to facilitate adapting to High Pressure systems.



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	Page
100,000 psi Valves	5.2
150,000 psi Valves	5.3
Fittings	5.4
Check Valves	5.4
Tubing	5.5
Coned and Threaded Nipples	5.5
Connection Details	5.A Appendix

Ultra High Pressure Valves

100,000 psi service

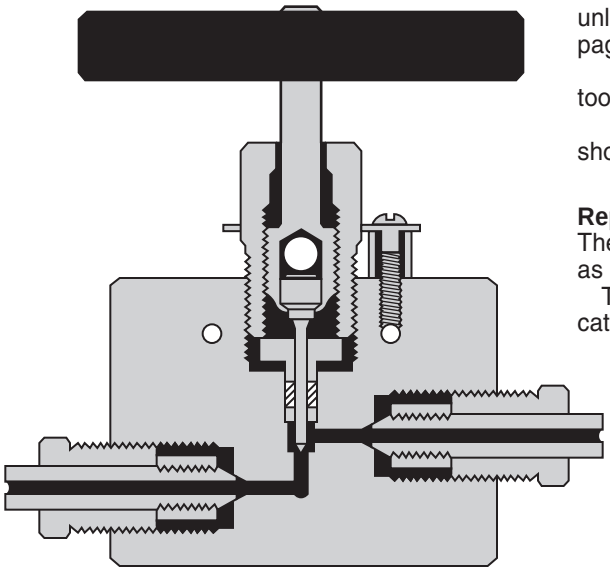
High Pressure (coned and threaded) type connections for 1/4" O.D. by 1/16" I.D. tubing.

Non-rotating tip stems insure long life on valve seats. Heavy duty "rolled style" stem design is shown below.

Glands and collars for tubing are supplied with each valve unless otherwise requested (glands and collars are shown on page 5.A).

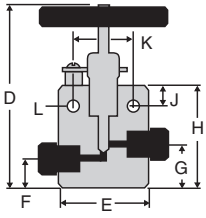
Materials include 316 stainless steel for valve bodies with tool steel lower section stems. Valve packing is teflon.

Corresponding fittings (elbows, tees, crosses, etc.) are shown on page 5.4.

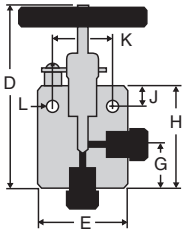


Replaceable Seat Valves are available for 1/4" O.D. tubing. These valves feature the same body style and body dimensions as the two way angle valves (shown below).

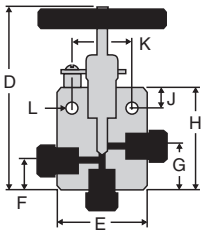
To order add "R" to the corresponding two way valve catalog number (eg. 100-12XF4R).



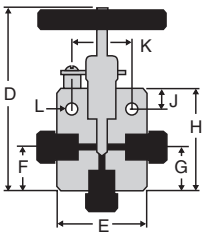
Two Way
Straight



Two Way
Angle



Three Way
Two Inlets



Three Way
One Inlet

Manual Shutoff Valves

Body Pattern	Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
2-Way Straight	1/4" O.D.	100-11XF4	100,000	XF4	1/16"	5"	2 5/8"	3/4"	1 1/16"	2 1/2"	1/2"	1 5/8"	7/32"	1 1/2"
2-Way Angle	1/4" O.D.	100-12XF4	100,000	XF4	1/16"	5 1/4"	2 5/8"	—	1 5/16"	2 3/4"	1/2"	1 5/8"	7/32"	1 1/2"
3-Way/2 Inlets	1/4" O.D.	100-13XF4	100,000	XF4	1/16"	5 1/2"	2 5/8"	1 1/4"	1 9/16"	3"	1/2"	1 5/8"	7/32"	1 1/2"
3-Way/1 Inlet	1/4" O.D.	100-14XF4	100,000	XF4	1/16"	5 1/4"	2 5/8"	1 5/16"	1 5/16"	2 3/4"	1/2"	1 5/8"	7/32"	1 1/2"

Ultra High Pressure Valves

150,000 psi service

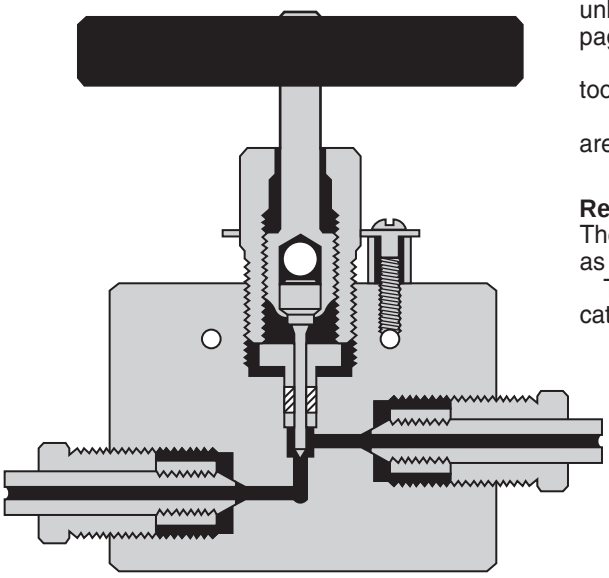
High Pressure (coned and threaded) type connections for $^{3}/_{8}$" O.D. by $^{1}/_{16}$" I.D. tubing.

Non-rotating tip stems insure long life on valve seats. Heavy duty "rolled style" stem design is shown below.

Glands and collars for tubing are supplied with each valve unless otherwise requested (glands and collars are shown on page 5.A).

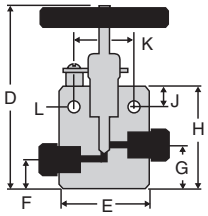
Materials include 17-4 PH for valve bodies with tool steel lower section stems. Valve packing is teflon.

Corresponding fittings (elbows, tees, crosses, etc.) are shown on page 5.4.

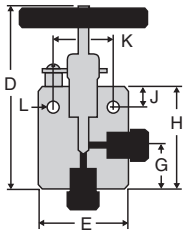


Replaceable Seat Valves are available for $^{3}/_{8}$" O.D. tubing. These valves feature the same body style and dimensions as the two way valves (shown below).

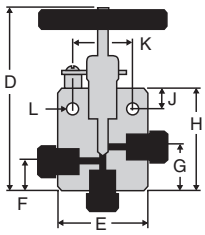
To order add "R" to the corresponding two way valve catalog number (eg. 150-12XF6R).



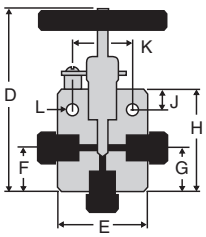
Two Way
Straight



Two Way
Angle



Three Way
Two Inlets



Three Way
One Inlet

Manual Shutoff Valves

Body Pattern	Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
2-Way Straight	$^{3}/_{8}$" O.D.	150-11XF6	150,000	XF6	$^{1}/_{16}$"	5"	$3^{1}/_{2}$"	$^{7}/_{8}$"	$1^{3}/_{16}$"	$2^{5}/_{8}$"	$^{1}/_{2}$"	$1^{5}/_{8}$"	$^{7}/_{32}$"	$1^{1}/_{2}$"
2-Way Angle	$^{3}/_{8}$" O.D.	150-12XF6	150,000	XF6	$^{1}/_{16}$"	$5^{7}/_{8}$"	$3^{1}/_{2}$"	—	$2^{1}/_{16}$"	$3^{1}/_{2}$"	$^{1}/_{2}$"	$1^{5}/_{8}$"	$^{7}/_{32}$"	$1^{1}/_{2}$"
3-Way/2 Inlets	$^{3}/_{8}$" O.D.	150-13XF6	150,000	XF6	$^{1}/_{16}$"	$5^{7}/_{8}$"	$3^{1}/_{2}$"	$1^{3}/_{4}$"	$2^{1}/_{16}$"	$3^{1}/_{2}$"	$^{1}/_{2}$"	$1^{5}/_{8}$"	$^{7}/_{32}$"	$1^{1}/_{2}$"
3-Way/1 Inlet	$^{3}/_{8}$" O.D.	150-14XF6	150,000	XF6	$^{1}/_{16}$"	$5^{7}/_{8}$"	$3^{1}/_{2}$"	$2^{1}/_{16}$"	$2^{1}/_{16}$"	$3^{1}/_{2}$"	$^{1}/_{2}$"	$1^{5}/_{8}$"	$^{7}/_{32}$"	$1^{1}/_{2}$"

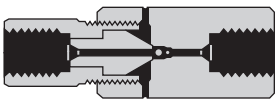
High Pressure Equipment Company
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Fittings/Check Valves

We have developed check valves, elbows, tees and crosses for both the 100,000 and 150,000 psi systems. *Material is high tensile 316 stainless steel. Standard tubing glands and collars are furnished unless otherwise specified.

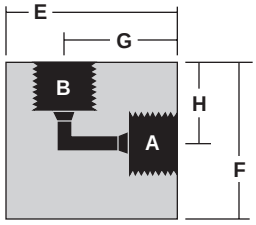
* **Note:** Material for 150,000 psi check valve is 17-4 PH.

Ultra High Pressure Check Valves



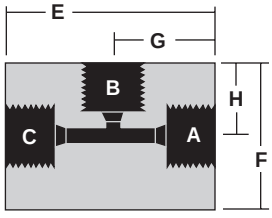
Catalog No.	psi	Connections	Length	Hex
100-41XF4	100,000	1/4" ULTRA PRESSURE	3 9/16"	1 1/2"
150-41XF6	150,000	3/8" ULTRA PRESSURE	4 1/2"	1 1/2"

Ultra High Pressure Elbows



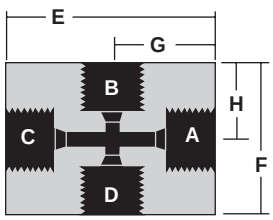
Catalog No.	Pressure Rating psi	Connections	A-B-C-D	E	F	G	H	Thickness
100-22XF4	100,000	1/4" O.D. TUBE	XF4	1 3/4"	1 3/4"	1 1/4"	1 1/4"	1"
150-22XF6	150,000	3/8" O.D. TUBE	XF6	2 5/8"	2 5/8"	1 3/4"	1 3/4"	1 1/2"

Ultra High Pressure Tees



Catalog No.	Pressure Rating psi	Connections	A-B-C-D	E	F	G	H	Thickness
100-23XF4	100,000	1/4" O.D. TUBE	XF4	2 1/2"	1 3/4"	1 1/4"	1 1/4"	1"
150-23XF6	150,000	3/8" O.D. TUBE	XF6	3 1/2"	2 5/8"	1 3/4"	1 3/4"	1 1/2"

Ultra High Pressure Crosses



Catalog No.	Pressure Rating psi	Connections	A-B-C-D	E	F	G	H	Thickness
100-24XF4	100,000	1/4" O.D. TUBE	XF4	2 1/2"	2 1/2"	1 1/4"	1 1/4"	1"
150-24XF6	150,000	3/8" O.D. TUBE	XF6	3 1/2"	3 1/2"	1 3/4"	1 3/4"	1 1/2"

Ultra High Pressure Tubing

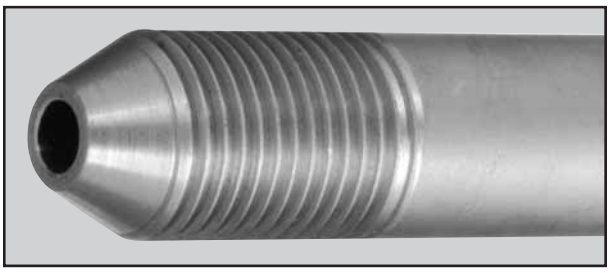
Tubing is cold drawn, seamless, and is supplied in the 1/8 hard condition (not annealed). Tensile strength is approximately 40 percent higher than that of annealed tubing. All tubing is manufactured in strict accordance with High Pressure Equipment Company specifications to insure tolerances and bore quality. Tubing is stocked in lengths of 18 to 22 feet but may be ordered in shorter lengths with **no additional cutting charge.**



	Tubing Size	Working Pressure psi	Type of Connection Used	Material	Catalog Order Number
1/4"	1/4" O.D. x 1/16" I.D.	100,000	1/4" ULTRA HIGH PRESSURE (XF4)	316 SS	100-9X4-316
				304 SS	100-9X4-304
3/8"	3/8" O.D. x 1/16" I.D.	150,000	3/8" ULTRA HIGH PRESSURE (XF6)	304 SS	150-9X6

Nipples

Nipples in lengths other than those shown are supplied upon request. Nipples are not furnished with collars and glands, unless specified at time of order.



Coned and Threaded Nipples

Length ↓	Tubing Size (O.D. x I.D.) 1/4" O.D. x 1/16" I.D. (316 SS)	1/4" O.D. x 1/16" I.D. (304 SS)	3/8" O.D. x 1/16" I.D. (304 SS)
psi →	100,000 psi	100,000 psi	150,000 psi
2 3/4"	100-XM4-2.75	100-XM4-2.75	
4"			150-XM6-4
6"	100-XM4-6	100-XM4-6	150-XM6-6
8"	100-XM4-8	100-XM4-8	150-XM6-8
10"	100-XM4-10	100-XM4-10	150-XM6-10
12"	100-XM4-12	100-XM4-12	150-XM6-12

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R1 12/97

Ultra High Pressure Connections

(Coned and Threaded) 100,000 and 150,000 psi service

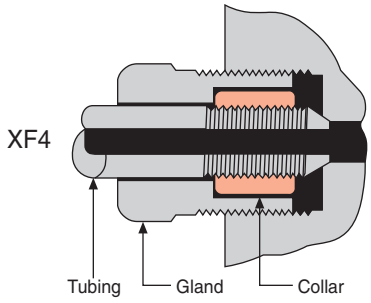
The Ultra High Pressure tubing connection is available for 1/4" and 3/8" O.D. tubing. The tubing may be prepared with the use of tooling (see tooling section 9.0) or prepared at the factory to specified lengths. Additionally, standard length coned and threaded nipples are available from stock, see page 5.5.

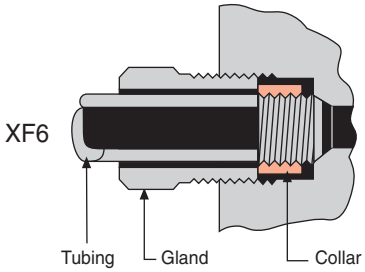
This connection has become an industry standard for use at elevated pressures and temperatures in both liquid and gas applications. It may be disassembled and retightened indefinitely.

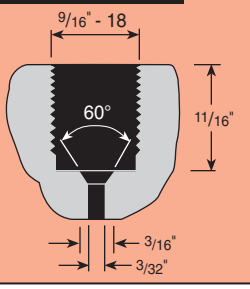
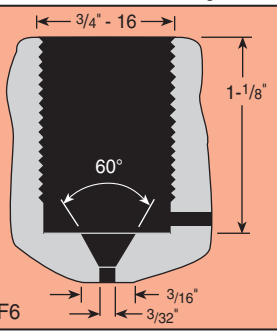
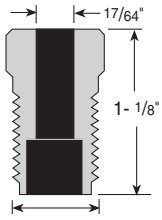
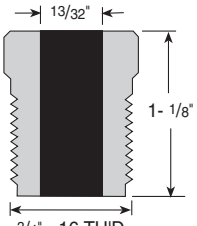
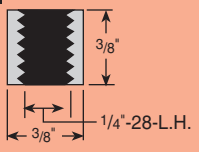
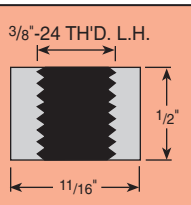
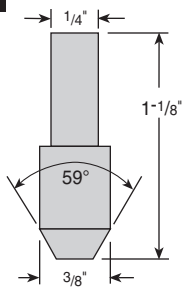
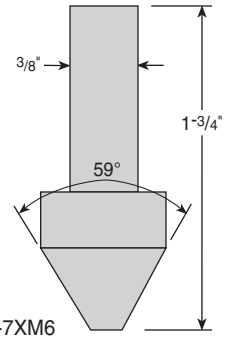
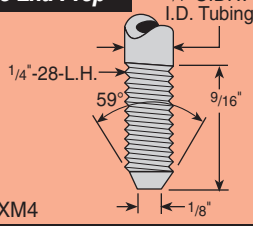
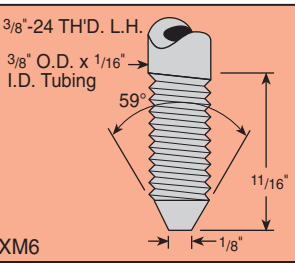
The threads of the gland are right-hand while the threads of the collar and tubing are left-hand to prevent rotation of the collar during assembly.

Materials. All of the components required for make-up of a Ultra High Pressure connection (glands, collars and plugs) are produced in Type 316 stainless steel.

Necessary glands and collars are provided with all valves and fittings (except nipples) unless otherwise requested (see chart on the right for size details and catalog numbers).





	100,000 psi	150,000 psi
	XF4 1/4" O.D. Tubing	XF6 3/8" O.D. Tubing
Female Opening Detail		
Gland		
Collar		
Plug		
Tube End Prep		

Specialty Valves

High Pressure Equipment Company produces many valves engineered for specific requirements and operating conditions.

Ball Valves provide shut-off of liquid or gas flow through 20,000 psi. These valves are available in two way and three way configurations.

Hastelloy Valves are the most common special material valves we produce. We maintain an inventory of Hastelloy C-276 to assure prompt delivery.

High Temperature Valves feature an extension to remove the packing area (stuffing box) from the hot zone of a valve, making them suitable for use at 1,000°F (538°C).

Micro Control Metering Valves are designed to assure the fine and precise stem travel necessary for excellent control of flow. An integral vernier indicator provides exact measurement of stem revolution.

Relief Valves protect a system from over-pressure damage and failure. Relief Valves are offered in pressure ranges: 3,000 psi to 30,000 psi.



Pipe Connection Valves allow you to plumb a system through 15,000 psi using standard NPT pipe connections.

Male Bottom Connection Valves are designed for applications where extra rigidity or space restrictions are critical. These valves feature one-piece stem construction to increase durability and reduce overall height.

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Relief Valves	6.8
Male Bottom Connection Valves	6.9
Pipe Connection Valves	6.10-6.11

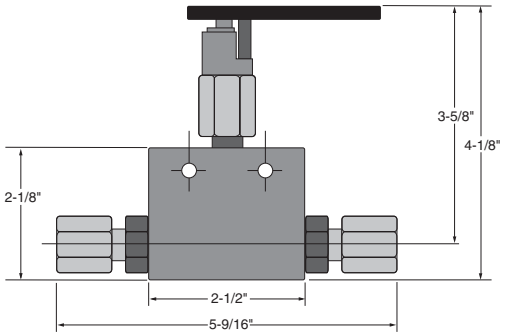
Ball Valves

10,000, 15,000 and 20,000 psi service

High Pressure Equipment offers two styles of ball valves (free floating and trunion) to provide effective shut-off of liquid or gas flow.

Two-way ball valves offer complete shut-off with a convenient 1/4 turn. Valve actuators are available for remote control of HiP ball valves.

Virtually all metal components are stainless steel to insure consistent operation under even the most severe applications. Teflon packing provides reliable leak-free service up to 400°F. Other packings, including Polypak and Grafoil are available upon request.



Two-Way Free Floating Ball Valves

Catalog No.	Tube Size	Conn*	Pressure Rating @RT	Minimum Orifice	C_V
15-16AF1	1/16"	AF1	15,000 psi	0.052	0.09
15-16AF2	1/8"	AF2	15,000 psi	0.094	0.20
10-16AF4	1/4"	AF4	10,000 psi	0.125	0.45
10-16AF6	3/8"	AF6	10,000 psi	0.250	2.70
20-16LF4	1/4"	LF4	20,000 psi	0.109	0.31
20-16LF6	3/8"	LF6	20,000 psi	0.203	1.70
20-16LF9	9/16"	LF9	20,000 psi	0.250	2.70
20-16HF2	1/8"	HF2	20,000 psi	0.062	0.12
20-16HF4	1/4"	HF4	20,000 psi	0.094	0.20
20-16HF6	3/8"	HF6	20,000 psi	0.125	0.45
20-16HF9	9/16"	HF9	20,000 psi	0.188	1.45
10-16NFA	1/8"	1/8" NPT	10,000 psi	0.250	2.70
10-16NFB	1/4"	1/4" NPT	10,000 psi	0.250	2.70
10-16NFC	3/8"	3/8" NPT	10,000 psi	0.250	2.70
10-16NFD	1/2"	1/2" NPT	10,000 psi	0.250	2.70

* Other connections available upon request. Consult factory.

Severe Duty Ball Valves *(Trunion Style)*

10,000, 15,000 and 20,000 psi service

High Pressure Equipment Company introduces its TRUNION STYLE ball valves for effective shut-off of liquid and gas flow through 20,000 psi @ 350°F maximum. Our offering features a trunion ball design, making this type of valve ideal for severe duty applications. This valve is available in two-way or three-way configurations with orifices of .187", .375" or .500".

The two-way ball valve offers complete shut-off with a convenient $^1/_4$ turn. The standard configuration of the three-way ball valve requires $^1/_2$ turn to change port outlets and provides for complete shut-off. An optional diverter style three-way ball valve requires only a $^1/_4$ turn to change the port outlets. Air operated actuators are available for remote control.

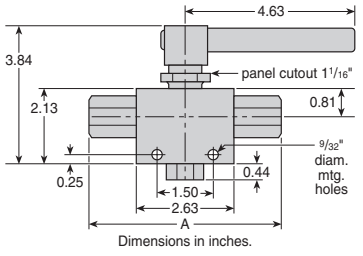
Material of construction is 316 stainless steel, O-rings are Viton, ball seat is PEEK. Alternate materials of construction are available upon request.



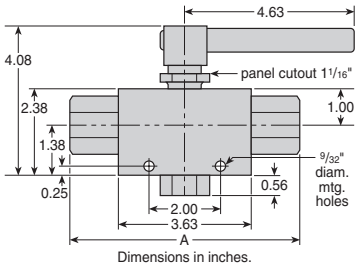
- Trunion style closure, ideal for severe duty applications
- Two-way and three-way valve configurations
- Three-way, $^1/_4$ turn diverter valve
- .187", .375" or .500" orifices
- Air actuators for remote operation
- Convenient panel mount design (cut $1^1/_{16}$" diameter hole) .187 and .375 only
- Large selection of tube and pipe fittings available
- Optional wetted parts available
- Optional O-rings available

Two-Way Trunion Ball Valves - 90°

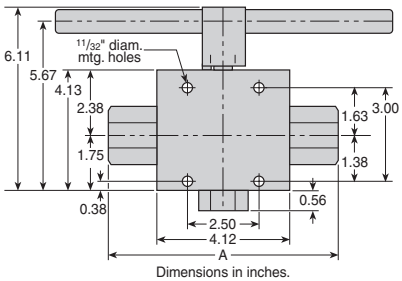
Orifice	Tube Size	Connection	Pressure Rating	Minimum Orifice	Cv	A	Catalog No.
.187	$^1/_{16}$"	AF1	15,000 psi	.052	0.09	4.19	15-71AF1
	$^1/_8$"	AF2	15,000 psi	.094	0.20	4.19	15-71AF2
	$^1/_4$"	AF4	10,000 psi	.125	0.45	4.69	10-71AF4
	$^3/_8$"	AF6	10,000 psi	.187	1.45	4.69	10-71AF6
	$^1/_4$"	LF4	20,000 psi	.109	0.31	4.63	20-71LF4
	$^3/_8$"	LF6	20,000 psi	.187	1.45	4.63	20-71LF6
	$^9/_{16}$"	LF9	20,000 psi	.187	1.45	5.13	20-71LF9
	$^1/_4$"	HF4	20,000 psi	.094	0.20	4.63	20-71HF4
	$^3/_8$"	HF6	20,000 psi	.125	0.45	4.63	20-71HF6
	$^9/_{16}$"	HF9	20,000 psi	.187	1.45	4.87	20-71HF9
	$^1/_8$"	$^1/_8$" NPT	15,000 psi	.187	1.45	4.63	15-71NFA
	$^1/_4$"	$^1/_4$" NPT	15,000 psi	.187	1.45	4.63	15-71NFB
	$^3/_8$"	$^3/_8$" NPT	15,000 psi	.187	1.45	4.65	15-71NFC
.375	$^3/_8$"	AF6	10,000 psi	.250	2.70	5.13	10-74AF6
	$^9/_{16}$"	LF9	15,000 psi	.312	4.22	6.25	15-74LF9
	$^3/_4$"	LF12	15,000 psi	.375	6.08	6.67	15-74LF12
	1"	LF16	15,000 psi	.375	6.08	7.45	15-74LF16
	$^1/_4$"	$^1/_4$" NPT	15,000 psi	.250	2.70	5.63	15-74NFB
	$^3/_8$"	$^3/_8$" NPT	15,000 psi	.375	6.08	5.63	15-74NFC
	$^1/_2$"	$^1/_2$" NPT	15,000 psi	.375	6.08	5.63	15-74NFD
.500	$^3/_4$"	LF12	10,000 psi	.500	19.3	6.56	10-80LF12
	1"	LF16	10,000 psi	.500	19.3	7.44	10-80LF16
	$^3/_4$"	$^3/_4$" NPT	10,000 psi	.500	19.3	6.44	10-80NFF
	1"	1" NPT	10,000 psi	.500	19.3	7.44	10-80NFH



.187 Orifice



.375 Orifice

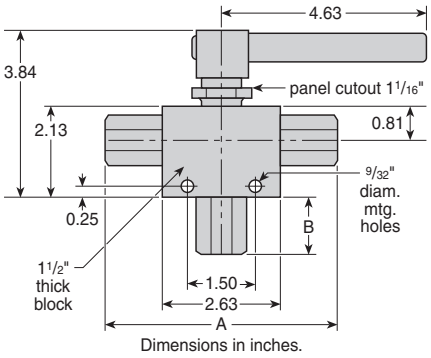


.500 Orifice

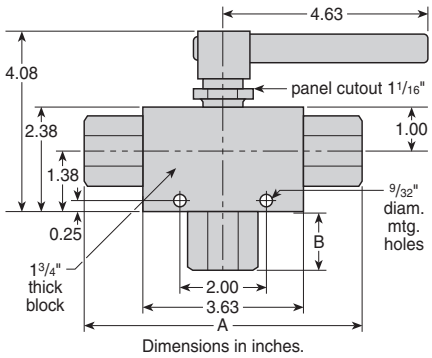
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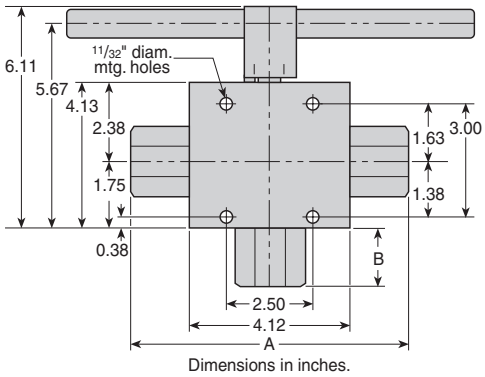
Three-Way Trunion Ball Valves



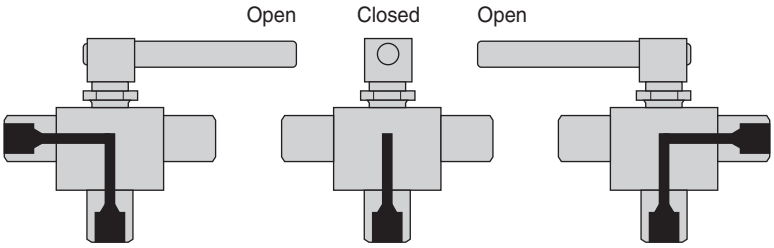
.187 Orifice



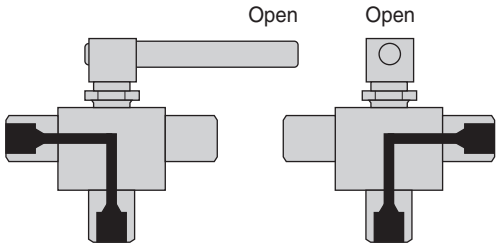
.375 Orifice



.500 Orifice



180° Three-Way Ball Valve



90° Three-Way Diverter Valve

Orifice	Tube Size	Connection	Pressure Rating	Minimum Orifice	C_V	A	B	3-Way 90° Catalog No.	3-Way 180° Catalog No.
.187	1/16"	AF1	15,000 psi	.052	0.04	4.19	0.55	15-73AF1	15-72AF1
	1/8"	AF2	15,000 psi	.094	0.10	4.19	0.55	15-73AF2	15-72AF2
	1/4"	AF4	10,000 psi	.125	0.22	4.69	0.83	10-73AF4	10-72AF4
	3/8"	AF6	10,000 psi	.187	0.71	4.69	1.01	10-73AF6	10-72AF6
	1/4"	LF4	20,000 psi	.109	0.15	4.63	1.00	20-73LF4	20-72LF4
	3/8"	LF6	20,000 psi	.187	0.71	4.63	1.00	20-73LF6	20-72LF6
	9/16"	LF9	20,000 psi	.187	0.71	5.13	1.25	20-73LF9	20-72LF9
	1/4"	HF4	20,000 psi	.094	0.10	4.63	0.81	20-73HF4	20-72HF4
	3/8"	HF6	20,000 psi	.125	0.22	4.63	0.94	20-73HF6	20-72HF6
	9/16"	HF9	20,000 psi	.187	0.71	4.87	1.19	20-73HF9	20-72HF9
	1/8"	1/8" NPT	15,000 psi	.187	0.71	4.63	0.50	15-73NFA	15-72NFA
	1/4"	1/4" NPT	15,000 psi	.187	0.71	4.63	1.06	15-73NFB	15-72NFB
	3/8"	3/8" NPT	15,000 psi	.187	0.71	4.65	1.06	15-73NFC	15-72NFC
.375	3/8"	AF6	10,000 psi	.250	1.07	5.13	0.75	10-76AF6	10-75AF6
	9/16"	LF9	15,000 psi	.312	1.67	6.25	1.06	15-76LF9	15-75LF9
	3/4"	LF12	15,000 psi	.375	2.40	6.67	1.18	15-76LF12	15-75LF12
	1"	LF16	15,000 psi	.375	2.40	7.45	1.99	15-76LF16	15-75LF16
	1/4"	1/4" NPT	15,000 psi	.250	1.07	5.63	1.06	15-76NFB	15-75NFB
	3/8"	3/8" NPT	15,000 psi	.375	2.40	5.63	1.06	15-76NFC	15-75NFC
	1/2"	1/2" NPT	15,000 psi	.375	2.40	5.63	1.06	15-76NFD	15-75NFD
.500	3/4"	LF12	10,000 psi	.500	7.43	6.56	1.30	10-82LF12	10-81LF12
	1"	LF16	10,000 psi	.500	7.43	7.44	1.74	10-82LF16	10-81LF16
	3/4"	3/4" NPT	10,000 psi	.500	7.43	6.44	1.30	10-82NFF	10-81NFF
	1"	1" NPT	10,000 psi	.500	7.43	7.44	1.74	10-82NFH	10-81NFH

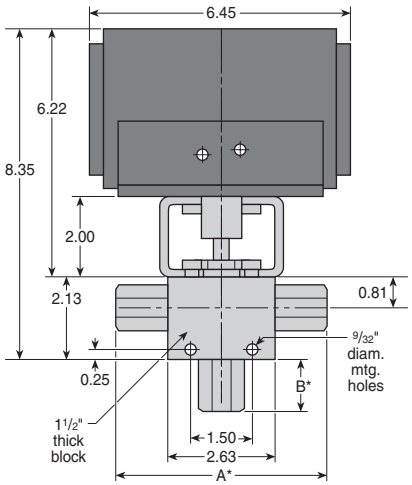
Ball Valve Actuators

High Pressure Equipment Company offers air operated actuators to accommodate remote operation. **NOTE: These air operators are only for use with two-way and three-way diverter style valves.**

To order: simply specify the appropriate ball valve catalog number and add the suffix “-TSR8” for air to open/spring to close, or “-TDA8” for air to open and close (double acting) or TSR20 for 0.500 orifice. For trunion only.

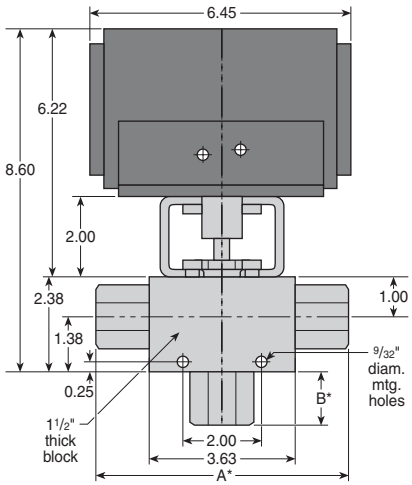
Use TDA4 and TSR4 for floating ball style valves.





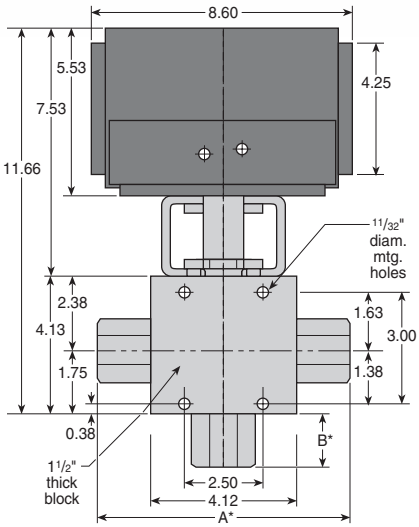
Dimensions in inches.
* Dimensions found within charts on pages 6.3-6.4

.187 Orifice



Dimensions in inches.
* Dimensions found within charts on pages 6.3-6.4

.375 Orifice



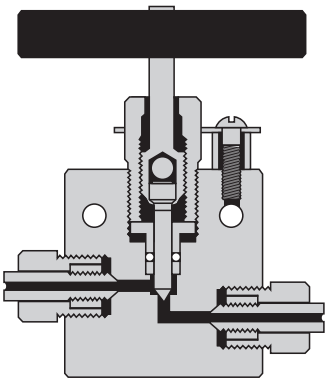
Dimensions in inches.
* Dimensions found within charts on pages 6.3-6.4

.500 Orifice

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Hastelloy Valves



A large number of the valves and fittings shown within this catalog are frequently furnished in special materials to meet the requirements of specific applications. One of the most commonly requested "special" materials is Hastelloy C-276. While very few components are maintained in stock in special materials, a supply of Hastelloy C-276 is normally available.

The following should be observed when requesting items in Hastelloy C-276 or other special materials:

Tubing collars and glands for High Pressure coned-and-threaded connections are "non-wetted" parts which do not normally come into contact with the fluid or gas. Thus these items are supplied in 316 stainless steel unless otherwise specified.

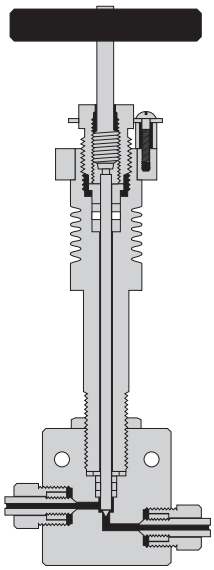
The inner sleeve connection of the Taper Seal is a "wetted" part and must be of the same material as the valve or fitting body. The Taper Seal gland is a "non-wetted" part and is supplied in 316 stainless steel unless otherwise requested.

Physical size of Hastelloy C-276 or other special material items may vary from the dimensions of standard items shown in this catalog, depending on availability of materials. (Parts normally supplied in hex shaped material are frequently supplied in round shaped material with wrench flats when manufacturing from special materials).

Packing material in all special material valves is Teflon unless otherwise specified.

Other materials. In addition to Hastelloy C-276, valves and fittings can be furnished in Monel, Inconel, titanium and various other special materials. Consult factory for price and delivery.

High Temperature Valves



The High Temperature Extension provides a means to move the packing area (stuffing box) away from the hot zone of a valve. Fins are provided around the packing area to dissipate heat and, with proper cooling of the extension, these valves can be used at 1,000°F (538°C).

Size range. High temperature extensions are available for $^{1}/_{4}$" O.D., $^{3}/_{8}$" O.D., and $^{9}/_{16}$" O.D. tubing size valves in the 30,000 psi series and for all Medium Pressure series valves.

Materials and features. Standard packing is Grafoil. Teflon packing is also available. Nonrotating tip stems prevent galling at the seats and minimize torque requirements for positive shut off.

When ordering, simply add the suffix "-HT" to the standard valve catalog number (example: 30-11HF4-HT).

Note: These valves may also be used in cryogenic applications. Teflon packing supplied.

Micro Control Metering Valves

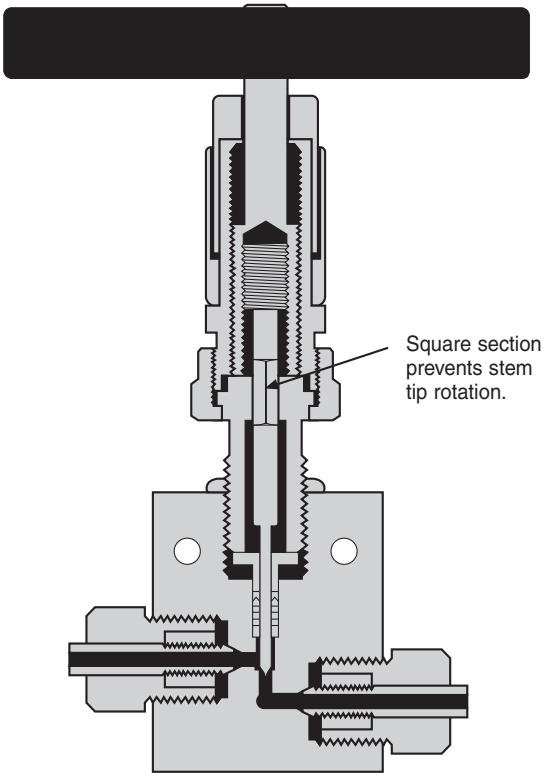
The Micro Control Metering Valve assembly is available for all of the valves in the 60,000 psi series. This unique stem design operates on the principle of a right-hand threaded component operating in an opposite direction of motion to a left-hand threaded component.

As the pitch sizes of these threads are different from each other, a very fine and precise stem travel is made possible. This provides exceptional control that is not possible with ordinary fine pitched stem designs.

Each complete revolution of the stem provides 0.005" stem travel. The vernier indicator allows readings in increments of one-tenth of a revolution (0.0005" stem travel).

The non-rotating lower section stem is ground to a 9 degree included angle to insure maximum control. **While this valve may be turned to the fully off (closed) position, it is always preferable to provide a separate on-off valve in the system to protect the precise control of the metering valve.**

When ordering, simply specify the valve catalog number from the 60,000 psi series and add the suffix "-V" (example: 60-11HF4-V.)



Metering Tip Valves

When the precision control offered by the above "Micro Control" metering valve is not required, a multi-piece, rolled fine pitched stem assembly can be provided. The non-rotating lower section stem is ground to a 9 degree included angle and provides a .050" stem travel per complete revolution of the handle. **While this valve may be turned to the fully off (closed) position, it is always preferable to provide a separate on-off valve in the system to protect the precise control of the metering valve.**

When ordering, simply specify valve catalog number from the 60,000 psi series and add the suffix "-MTS" (example: 60-11HF4-MTS).

For pricing consult factory.



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Relief Valves (Factory Set)

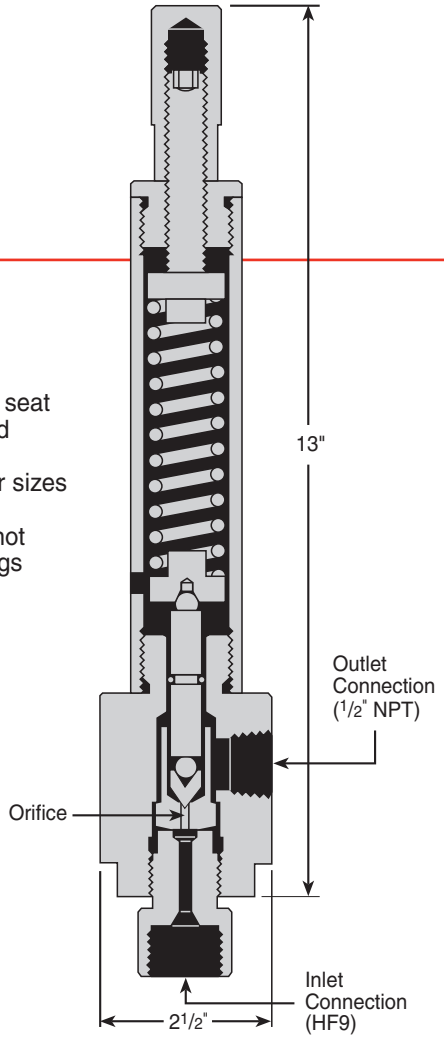
Relief valves are offered in pressure ranges: 1,500 through 60,000 psi.

Standard materials include 316 stainless steel bodies and removable seat glands with 17-4PH stainless steel removable seats and pistons. Standard O-ring material on the piston is Viton Valves may be used up to 350° F.

Inlet connections are for $^{9}/_{16}$" O.D. tubing (HF9) with adapters for other sizes available. Outlet connections are $^{1}/_{2}$" NPT.

These valves are not recommended for use below 1,500 psi, and are not readily adjustable in the field without proper test equipment. Pressure settings are made at the factory and valves are tagged accordingly.

To order, simply specify catalog number and set pressure. See table below.



Pressure Range	Orifice Size	Type of Service*	Assembly Part No.	Max Flow Capacity H_2O (GPM)
1,500 to 2,999 psi	1/4	GAS OR LIQUID	402633-03	13
3,000 to 10,999 psi	1/4	GAS OR LIQUID	402633-10	25
11,000 to 20,999 psi	3/16	GAS OR LIQUID	402633-20	20
21,000 to 30,000 psi	1/8	GAS OR LIQUID	402633-30	10
30,001 to 45,000 psi	7/64	GAS OR LIQUID	402633-45	10
45,001 to 60,000 psi	3/32	GAS OR LIQUID	402633-60	8

*Valves not bubble tight on gas service.

Relief Valves (Field Adjustable)

Relief valves are offered in pressure ranges: 1,000 through 20,000 psi.

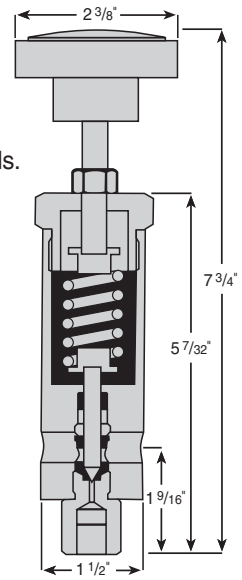
Standard materials include 316 stainless steel bodies and seat glands. Standard O-ring material is EPDM, with teflon packing and nylon seats.

Inlet connections $^{1}/_{4}$" NPT-HIP-10RV; HF4-HIP-20RV. Outlet connections are $^{1}/_{4}$" NPT.

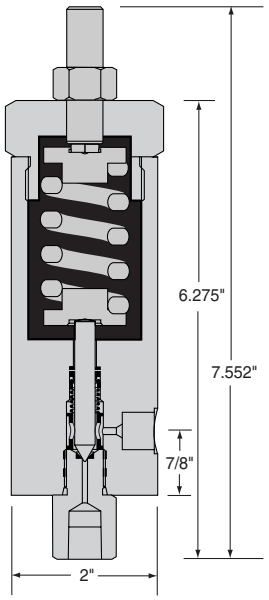
These valves are not recommended for use below 1,000 psi, and are **readily** adjustable in the field.

To order, simply specify catalog number. Example: HIP-10RV

Pressure Range	Orifice Size	Type of Service	Part number	Cv
1,000 to 10,000 psi	0.070	GAS OR LIQUID	HIP-10RV	.12
10,001 - 20,000 psi	0.070	GAS OR LIQUID	HIP-20RV	.12



HIP-10-RV



HIP-20-RV

***Please note HIP-20RV does not have handle, the valve is shipped with $^{1}/_{2}$-13" set screw.**

Male Bottom Connection Valves

Connections. This series of valves is offered in a few select variations which are most frequently required. They have been developed for applications where rigidity is a major concern (such as gas bottles) and where space is restricted.

Pipe connections as well as High Pressure (coned and threaded) connections are available as listed in tables below. Additionally, these valves can be supplied with rupture disc assemblies (safety heads) installed directly into the valve body as shown (see page 3.7 for listing of rupture discs).

Stems. The Male Bottom Connection Valves are supplied with a one-piece (solid construction) stem to maximize sensitivity of "feel" and to reduce overall height. The non-rotating tip stem design as featured on other valves may be supplied as an option at no additional charge.

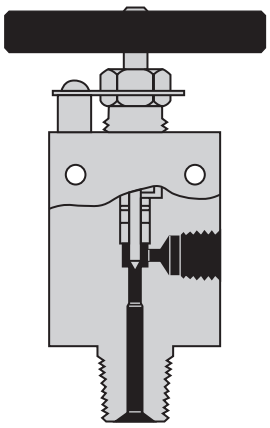
Materials include high tensile Type 316 stainless steel valve bodies and hardened 17-4PH stainless steel stems.

Packing is Teflon (450°F) standard with optional Viton (350°F), BUNA-N (200°F) and Grafoil (650°F) available at no additional cost.

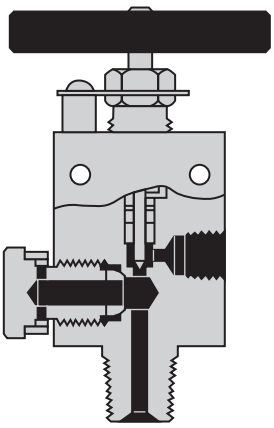
Air operators for remote control operation are available for all valves. (Select required valve and add "HIPCO").

Rupture discs must be ordered separately (see section 3.7).

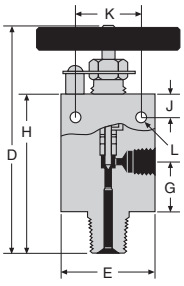
Special valves with connections other than those listed can be manufactured on special order when quantity permits. Consult factory with specifications.



Without Safety Head

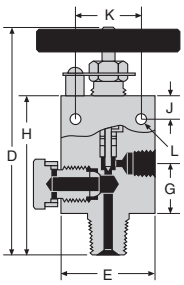


With Safety Head



Male Bottom Connection Valves (without Safety Head)

Assembly Number	Male Bottom	Female Side	psi	Orifice	D	E	G	H	J	K	L	Thickness
2-7928A	1/4" NPT	1/4" NPT	10,000	3/32"	5 1/16"	2"	1 15/16"	3 3/8"	1/2"	1 3/8"	7/32"	1"
2-8144A	1/4" NPT	HF4	10,000	3/32"	5 1/16"	2"	1 15/16"	3 3/8"	1/2"	1 3/8"	7/32"	1"
2-7602A	1/2" NPT	1/4" NPT	10,000	3/32"	5 1/16"	2"	1 15/16"	3 3/8"	1/2"	1 3/8"	7/32"	1"
2-7569-A	1/2" NPT	HF4	10,000	3/32"	5 1/16"	2"	1 15/16"	3 3/8"	1/2"	1 3/8"	7/32"	1"



Male Bottom Connection Valves (with Safety Head)

Assembly Number	Male Bottom	Female Side	psi	Orifice	D	E	G	H	J	K	L	Thickness
2-7927A	1/4" NPT	1/4" NPT	10,000	3/32"	5 1/16"	2"	1 15/16"	3 3/8"	1/2"	1 3/8"	7/32"	1"
2-8039A	1/4" NPT	HF4	10,000	3/32"	5 1/16"	2"	1 15/16"	3 3/8"	1/2"	1 3/8"	7/32"	1"
2-7604A	1/2" NPT	1/4" NPT	10,000	3/32"	5 1/4"	2"	2 1/8"	3 9/16"	1/2"	1 3/8"	7/32"	1"
2-7603A	1/2" NPT	HF4	10,000	3/32"	5 1/4"	2"	2 1/8"	3 9/16"	1/2"	1 3/8"	7/32"	1"

*** Rupture discs** must be ordered separately (see section 3.7).

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R6 8/04

Female NPT/10,000 psi

Pipe Connection Valves

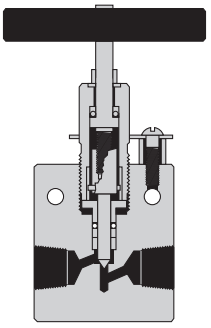
• 1/8" • 1/4" • 3/8" • 1/2" NPT

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost.

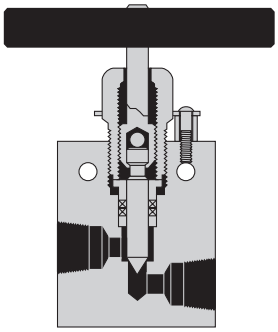
Materials include high tensile Type 316 stainless steel for valve bodies, and hardened 17-4PH stainless steel for lower section stems.

Packing is Teflon (450°F) standard with optional Viton (350°F), BUNA-N (200°F) and Grafoil (650°F) available at no additional cost.

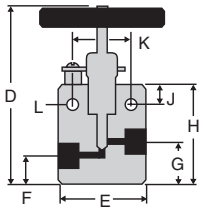
Air operators for remote control operation are available for all valves. (Select required valve and add "HIPCO" Air Operator).



NFA (1/8"), NFB (1/4") and NFC (3/8")

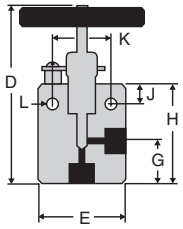


NFD (1/2")



Two Way Straight Valves

Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	**10-11NFA**	10,000	NFA	1/8"	4 3/4"	2"	7/8"	7/8"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" NPT	**10-11NFB**	10,000	NFB	1/8"	4 3/4"	2"	7/8"	7/8"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" NPT	**10-11NFC**	10,000	NFC	1/8"	4 3/4"	2"	7/8"	7/8"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/2" NPT	**10-11NFD**	10,000	NFD	5/16"	5 5/8"	2 5/8"	3/4"	1 3/8"	3 1/8"	1/2"	1 5/8"	5/16"	1 1/2"



Two Way Angle Valves

Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	**10-12NFA**	10,000	NFA	1/8"	4 3/4"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/4" NPT	**10-12NFB**	10,000	NFB	1/8"	4 3/4"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" NPT	**10-12NFC**	10,000	NFC	1/8"	4 3/4"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
1/2" NPT	**10-12NFD**	10,000	NFD	5/16"	5 3/4"	2 5/8"	–	1 1/2"	3 1/4"	1/2"	1 5/8"	5/16"	1 1/2"

* For valves requiring high temperature Grafoil packing in the 1/8" NPT, or 1/4" NPT or 3/8" NPT sizes, add suffix "-W" to catalog number. (Example 10-11NFB-W.)

Female NPT/10,000 and 15,000 psi

Pipe Connection Valves

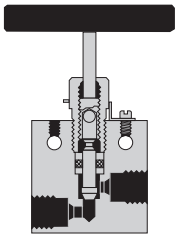
• 1/8" • 1/4" • 3/8" • 1/2" NPT • 3/4" NPT • 1" NPT

Non-rotating tip stems are standard for on-off service and insure long life on valve seats. Regulating tip stems are available for all valves at no additional cost.

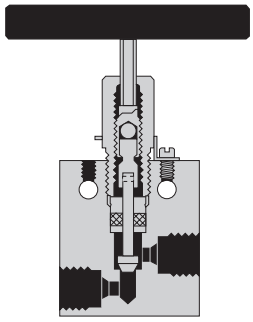
Materials include high tensile Type 316 stainless steel for valve bodies, and hardened 17-4PH stainless steel for lower section stems.

Packing is Teflon (450°F) standard with optional Viton (350°F), BUNA-N (200°F) and Grafoil (650°F) available at no additional cost.

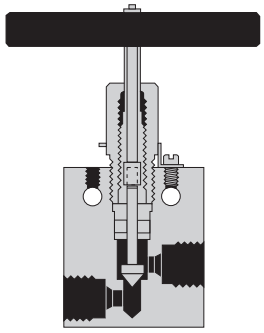
Air operators for remote control operation are available for all valves. (Select required valve and add "HIPCO" Air Operator).



NFA (1/8") and NFB (1/4")

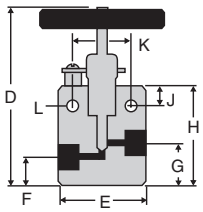


NFC (3/8") and NFD (1/2")



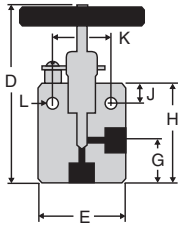
NFF (3/4") and NFH (1")

Two Way Straight Valves



Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	15F-11NFA	15,000	NFA	.203	4 3/8"	2"	3/8"	13/16"	2"	3/8"	1 1/4"	7/32"	3/4"
1/4" NPT	15F-11NFB	15,000	NFB	.203	4 3/8"	2"	3/8"	13/16"	2"	3/8"	1 1/4"	7/32"	3/4"
3/8" NPT	15F-11NFC	15,000	NFC	.312	6 1/8"	2 1/2"	1/2"	1 1/8"	2 7/8"	1/2"	1 3/8"	11/32"	1"
1/2" NPT	15F-11NFD	15,000	NFD	.312	6 3/8"	2 5/8"	3/4"	1 3/8"	3 1/8"	1/2"	1 3/8"	11/32"	1 1/2"
3/4" NPT	10F-11NFF	10,000	NFF	.687	8 1/2"	4 1/8"	7/8"	1 13/16"	4 5/8"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" NPT	10F-11NFH	10,000	NFH	.687	8 1/2"	4 1/8"	7/8"	1 13/16"	4 5/8"	1 1/8"	2 1/2"	9/16"	1 3/4"

Two Way Angle Valves



Pipe Size	Catalog No.*	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/8" NPT	15F-12NFA	15,000	NFA	.203	4 13/16"	2"	—	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
1/4" NPT	15F-12NFB	15,000	NFB	.203	4 13/16"	2"	—	1 1/4"	2 7/16"	3/8"	1 1/4"	7/32"	3/4"
3/8" NPT	15F-12NFC	15,000	NFC	.312	6 1/2"	2 1/2"	—	1 1/2"	3 1/4"	1/2"	1 3/8"	11/32"	1"
1/2" NPT	15F-12NFD	15,000	NFD	.312	6 1/2"	2 5/8"	—	1 1/2"	3 1/4"	1/2"	1 3/8"	11/32"	1 1/2"
3/4" NPT	10F-12NFF	10,000	NFF	.687	9"	4 1/8"	—	2 5/16"	5 1/8"	1 1/8"	2 1/2"	9/16"	1 3/4"
1" NPT	10F-12NFH	10,000	NFH	.687	9"	4 1/8"	—	2 5/16"	5 1/8"	1 1/8"	2 1/2"	9/16"	1 3/4"

* For valves requiring high temperature Grafoil packing in the 1/8" NPT, or 1/4" NPT or 3/8" NPT sizes, add suffix "-W" to catalog number. (Example 10-11NFB-W.)

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High Pressure Equipment

Air Operated Valves

High Pressure Equipment Company offers five lines of air operators to accommodate remote operation of pressure valves up to 100,000 psi. Various models of diaphragm and piston operated valves are available in both normally open and normally closed models, and can be controlled by air regulator, electrical solenoid or low pressure manual valve. The Remetco line of air operated metering valves provides remote operation for fine metering applications.



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Hippo Piston Air Operators 7.3.5

Remetco Piston Air Operated Fine Metering Valves 7.4

Mini-Hippo Piston Air Operators for Remote Operation

To 6,000 psi

Mini-Hippo Air Operators are available for both normally open service (spring to open/air to close) and for normally closed service (air to open/spring to close). These piston air operators provide remote automatic on/off operation of valves and can be controlled by means of an air regulator, an electrical solenoid, or a manual low pressure valve in the user's air supply line. Air inlet is $^1/_8$" NPT. Air pressure requirement ranges from 50 to 90 psi.

The Mini-Hippo air operators may be supplied with the valves and operating pressures shown in table.

To order simply specify catalog number of valve and type operation required.

EXAMPLES: Mini-Hippo 30-11HF4 (normally closed)
Mini-Hippo 10-12AF6 (normally open)
Mini-Hippo 10-15AF4 (normally open/ normally closed)

Normally Open *(Spring To Open/Air To Close)*

Valve Series	Maximum Operating Pressure	Approximate Air Pressure to Seat Valve
10-**AF2	6,000 psi	55 psi
10-**AF4	6,000 psi	55 psi
10-**AF6	6,000 psi	55 psi
30-**HF4	6,000 psi	55 psi
30-**HF6	6,000 psi	55 psi
30-**HF9	6,000 psi	55 psi

Normally Closed *(Air To Open/Spring To Close)*

Valve Series	Maximum Operating Pressure	Minimum Adjusting Screw Torque	Approximate Air Pressure to Unseat Valve	Approximate Air Pressure to Fully Open Valve
10-**AF4	6,000 psi	15 in. lb.	50 psi	90 psi
10-**AF6	6,000 psi	15 in. lb.	50 psi	90 psi
30-**HF4	6,000 psi	15 in. lb.	50 psi	90 psi
30-**HF6	6,000 psi	15 in. lb.	50 psi	90 psi
30-**HF9	6,000 psi	15 in. lb.	50 psi	90 psi

** Standard Valve Patterns (reference Page 1.4)

OPTIONS:

Stems & Seats . . . . Carbide (for cyclic service)
Stellite (for cyclic service)
17-4 (for cyclic service)

Valve Bodies . . . . . Hastelloy C, Hastelloy B
Inconel 600, Inconel 625
Incoloy 800, Incoloy 825
Titanium Grade 2, Titanium 6AL4V
Nickel
Monel

Packing . . . . . PolyPak

Temperature Considerations. . . . Extended stuffing box for temperatures from -423°F to 1,200°F (medium and high pressure connections only)

3" Diameter Piston Air Operators



Normally Open



Normally Closed

Hipco Diaphragm Air Operators for Remote Operation

To 60,000 psi

Hipco Air Operators are available for both normally open service (spring to open/air to close) and for normally closed service (air to open/spring to close). These diaphragm air operators provide remote automatic on/off operation of valves and can be controlled by means of an air regulator, an electrical solenoid, or a manual low pressure valve in the user's air supply line. Air inlet is ¼" NPT.

The Hipco air operators may be supplied with the valves and operating pressures shown in table.

To order simply specify catalog number of valve and type operation required.

EXAMPLES: Hipco 30-11HF4 (normally closed)
Hipco 10-12NFB (normally open)
Hipco 10-15AF4 (normally open/normally closed)

OPTIONS:

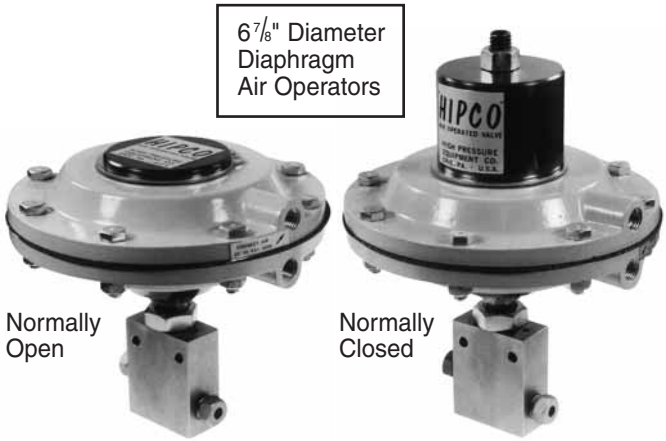
Stems & Seats . . . . Carbide (for cyclic service)
Stellite (for cyclic service)
17-4 (for cyclic service)

Valve Bodies . . . . . Hastelloy C, Hastelloy B
Inconel 600, Inconel 625
Incoloy 800, Incoloy 825
Titanium Grade 2,
Titanium 6AL4V
Nickel
Monel

Packing . . . . . PolyPak

Temperature Considerations. . . . Extended stuffing box for temperatures from -423°F to 1,200°F (medium and high pressure connections only)

6⅞" Diameter Diaphragm Air Operators



Normally Open *(Spring To Open/Air To Close)*

Valve Series	Maximum Operating Pressure	Approximate Air Pressure to Seat Valve
10-**AF4	10,000 psi	35 psi
10-**AF6	10,000 psi	35 psi
10-**NFA	10,000 psi	35 psi
10-**NFB	10,000 psi	35 psi
10-**NFC	10,000 psi	35 psi
15F-**NFA	15,000 psi	85 psi
15F-**NFB	15,000 psi	85 psi
15F-**NFC	10,000 psi	100 psi
15F-**NFD	10,000 psi	100 psi
20-**LF4	20,000 psi	60 psi
20-**LF6	15,000 psi	85 psi
20-**LF9	10,000 psi	100 psi
30-**HF4	30,000 psi	60 psi
30-**HF6	30,000 psi	85 psi
30-**HF9	30,000 psi	85 psi
40-**HF9	30,000 psi	85 psi
60-**HF4	60,000 psi	70 psi
60-**HF6	60,000 psi	70 psi
60-**HF9	60,000 psi	70 psi

Normally Closed *(Air To Open/Spring To Close)*

Valve Series	Maximum Operating Pressure	Minimum Adjusting Screw Torque	Approximate Air Pressure to Unseat Valve	Approximate Air Pressure to Fully Open Valve
10-**AF4	10,000 psi	20 in. lb.	30 psi	45 psi
10-**AF6	10,000 psi	20 in. lb.	30 psi	45 psi
10-**NFA	10,000 psi	20 in. lb.	30 psi	45 psi
10-**NFB	10,000 psi	20 in. lb.	30 psi	45 psi
10-**NFC	10,000 psi	20 in. lb.	30 psi	45 psi
15F-**NFA	15,000 psi	60 in. lb.	80 psi	100 psi
15F-**NFB	15,000 psi	60 in. lb.	80 psi	100 psi
15F-**NFC	10,000 psi	75 in. lb.	95 psi	100 psi
15F-**NFD	10,000 psi	75 in. lb.	95 psi	100 psi
20-**LF4	20,000 psi	40 in. lb.	55 psi	90 psi
20-**LF6	15,000 psi	60 in. lb.	80 psi	100 psi
20-**LF9	10,000 psi	75 in. lb.	95 psi	100 psi
30-**HF4	30,000 psi	40 in. lb.	55 psi	75 psi
30-**HF6	30,000 psi	60 in. lb.	80 psi	100 psi
30-**HF9	30,000 psi	60 in. lb.	80 psi	100 psi
40-**HF9	30,000 psi	60 in. lb.	80 psi	100 psi
60-**HF4	60,000 psi	50 in. lb.	65 psi	85 psi
60-**HF6	60,000 psi	50 in. lb.	65 psi	85 psi
60-**HF9	60,000 psi	50 in. lb.	65 psi	85 psi

** Standard Valve Patterns (reference Page 1.4)

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Remarco Diaphragm Operated Valves for Remote Operation

To 100,000 psi

Remarco air operated valves are available for both normally open service (spring to open/air to close) and for normally closed service (air to open/spring to close). These diaphragm operated valves provide remote operation up to 100,000 psi by means of an air input supply ranging from 25 to 90 psi to the air actuator.

An electrical solenoid valve for the air supply is provided with all Remarco valves and is mounted directly to the valve. The standard solenoid is 120 volt, 60 cycle, 11 watts with 1/8" NPT air inlet. (Other voltages available at additional charge—consult factory). The solenoid is normally closed and when energized allows air into the diaphragm casing to activate the valve. In the event of an electrical or air line failure, the valve will return to its "normal" position.

The Remarco valve features removable stem seats. Valve bodies are 316 stainless steel. Valve stems are hardened 17-4PH stainless steel. Standard packing on the 30,000 psi and 60,000 psi Remarco valves is Teflon O-ring with Buna-N, Viton, or Silicone, available at no additional cost.

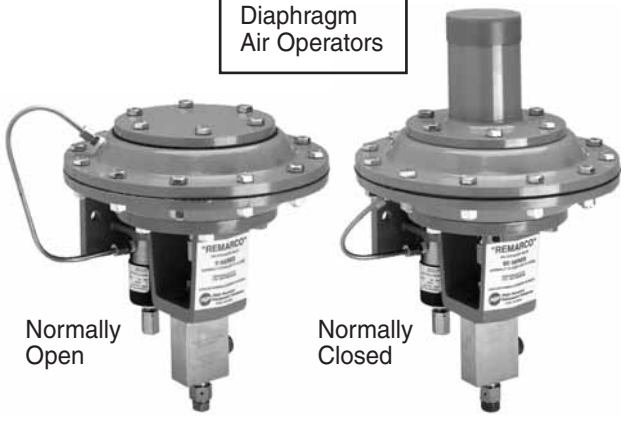
Normally Open *(Spring To Open/Air To Close)*

Valve Series	Maximum Operating Pressure	Approximate Air Pressure to Seat Valve	Orifice	Connections	Tubing Size	
					O.D.	I.D.
D10R12LF9R	10,000 psi	60 psi	1/4"	LF9	9/16"	5/16"
D20R12LF9R	20,000 psi	75 psi	1/4"	LF9	9/16"	5/16"
D30R12HF4R	30,000 psi	65 psi	1/8"	HF4	1/4"	.083"
D30R12HF6R	30,000 psi	65 psi	1/8"	HF6	3/8"	1/8"
D30R12HF9R	30,000 psi	65 psi	1/8"	HF9	9/16"	3/16"
D10R12HF9R	10,000 psi	60 psi	1/4"	HF9	9/16"	5/16"
D60R12HF4R	60,000 psi	55 psi	1/16"	HF4	1/4"	1/16"
D60R12HF6R	60,000 psi	55 psi	1/16"	HF6	3/8"	1/8"
D60R12HF9R	60,000 psi	55 psi	1/16"	HF9	9/16"	3/16"
D100R12XF4R	100,000 psi	90 psi	1/16"	XF4	1/4"	1/16"
D100R12XF6R	100,000 psi	90 psi	1/16"	XF6	3/8"	1/16"

Normally Closed *(Air To Open/Spring To Close)*

Valve Series	Maximum Operating Pressure	Lock Nut Torque Setting	Approximate Air Pressure to Unseat Valve	Approximate Air Pressure to Fully Open Valve	Orifice	Connections	Tubing Size	
							O.D.	I.D.
SD10R12LF9R	10,000 psi	20 ft. lb.	55 psi	90 psi	1/4"	LF9	9/16"	5/16"
SD20R12LF9R	20,000 psi	40 ft. lb.	70 psi	90 psi	1/4"	LF9	9/16"	5/16"
SD30R12HF4R	30,000 psi	20 ft. lb.	60 psi	75 psi	1/8"	HF4	1/4"	.083"
SD30R12HF6R	30,000 psi	20 ft. lb.	60 psi	75 psi	1/8"	HF6	3/8"	1/8"
SD30R12HF9R	30,000 psi	20 ft. lb.	60 psi	75 psi	1/8"	HF9	9/16"	3/16"
SD10R12HF9R	10,000 psi	20 ft. lb.	55 psi	90 psi	1/4"	HF9	9/16"	5/16"
SD60R12HF4R	60,000 psi	20 ft. lb.	50 psi	65 psi	1/16"	HF4	1/4"	1/16"
SD60R12HF6R	60,000 psi	20 ft. lb.	50 psi	65 psi	1/16"	HF6	3/8"	1/8"
SD60R12HF9R	60,000 psi	20 ft. lb.	50 psi	65 psi	1/16"	HF9	9/16"	3/16"
SD100R12XF4R	100,000 psi	30 ft. lb.	85 psi	100 psi	1/16"	XF4	1/4"	1/16"
SD100R12XF6R	100,000 psi	30 ft. lb.	85 psi	100 psi	1/16"	XF6	3/8"	1/16"

9 7/8" Diameter Diaphragm Air Operators



Normally Open

Normally Closed

OPTIONS:

Stems & Seats . . . . Carbide (for cyclic service)
Stellite (for cyclic service)

Valve Bodies . . . . . Hastelloy C, Hastelloy B
Inconel 600, Inconel 625
Incoloy 800, Incoloy 825
Titanium Grade 2, Titanium 6AL4V
Nickel
Monel

Packing . . . . . PolyPak

Temperature Considerations. . . . Extended stuffing box for temperatures from -423°F to 1,200°F (medium and high pressure connections only)



Air Operated Valves

Hippo Piston Air Operators for Remote Operation

To 60,000 psi

Hippo Piston Air Operators are available for both normally open service (spring to open/air to close) and for normally closed service (air to open/spring to close). These piston air operators provide remote automatic on/off operation of valves and can be controlled by means of an air regulator, an electrical solenoid, or a manual low pressure valve in the user's air supply line. Air inlet is 1/8" NPT. Air pressure requirement ranges from 35 psi to 120 psi.

These operators may be supplied with the valves and operating pressures shown in table.

Normally Closed
(Air To Open/Spring To Close)

Medium Duty

Valve Series	Maximum Operating Pressure	Orifice Size	Minimum Adjusting Screw Torque	Approximate Air Pressure to Unseat Valve	Approximate Air Pressure to Fully Open	Part Number Suffix
10-**AF4	10,000 psi	1/8"	25 in.lb.	30 psi	40 psi	MPO-NC
10-**AF6	10,000 psi	1/8"	25 in.lb.	30 psi	40 psi	MPO-NC
15F-**NFA	15,000 psi	13/64"	45 in.lb.	55 psi	75 psi	MPO-NC
15F-**NFB	15,000 psi	13/64"	45 in.lb.	55 psi	75 psi	MPO-NC
15F-**NFC	10,000 psi	5/16"	55 in.lb.	70 psi	95 psi	MPO-NC
15F-**NFD	10,000 psi	5/16"	55 in.lb.	70 psi	95 psi	MPO-NC
20-**LF4	20,000 psi	1/8"	50 in.lb.	70 psi	95 psi	MPO-NC
20-**LF6	20,000 psi	13/64"	55 in.lb.	70 psi	95 psi	MPO-NC
20-**LF9	10,000 psi	5/16"	55 in.lb.	70 psi	95 psi	MPO-NC
30-**HF4	30,000 psi	3/32"	50 in.lb.	60 psi	75 psi	MPO-NC
30-**HF6	30,000 psi	1/8"	55 in.lb.	60 psi	75 psi	MPO-NC
30-**HF9	30,000 psi	1/8"	55 in.lb.	60 psi	75 psi	MPO-NC
60-**HF4	60,000 psi	1/16"	50 in.lb.	50 psi	65 psi	MPO-NC
60-**HF6	60,000 psi	1/16"	50 in.lb.	50 psi	65 psi	MPO-NC
60-**HF9	60,000 psi	1/16"	50 in.lb.	50 psi	65 psi	MPO-NC
Heavy Duty						
15F-**NFC	15,000 psi	5/16"	85 in.lb.	60 psi	75 psi	HPO-NC
15F-**NFD	15,000 psi	5/16"	85 in.lb.	60 psi	75 psi	HPO-NC
20-**LF4	20,000 psi	1/8"	55 in.lb.	35 psi	50 psi	HPO-NC
20-**LF6	20,000 psi	13/64"	60 in.lb.	35 psi	50 psi	HPO-NC
20-**LF9	16,000 psi	5/16"	85 in.lb.	60 psi	75 psi	HPO-NC
20-**LF12	9,000 psi	7/16"	85 in.lb.	60 psi	75 psi	HPO-NC
20-**LF16	6,000 psi	9/16"	85 in.lb.	60 psi	75 psi	HPO-NC
30-**HF4	30,000 psi	3/32"	50 in.lb.	30 psi	40 psi	HPO-NC
30-**HF6	30,000 psi	1/8"	55 in.lb.	30 psi	40 psi	HPO-NC
30-**HF9	30,000 psi	1/8"	55 in.lb.	30 psi	40 psi	HPO-NC
60-**HF4	60,000 psi	1/16"	50 in.lb.	25 psi	35 psi	HPO-NC
60-**HF6	60,000 psi	1/16"	50 in.lb.	25 psi	35 psi	HPO-NC
60-**HF9	60,000 psi	1/16"	50 in.lb.	25 psi	35 psi	HPO-NC
Extra Heavy Duty						
20-**LF12	20,000 psi	7/16"	60 ft.lb.	35 psi	60 psi	EHPO-NC
10-**NFF	10,000 psi	11/16"	75 ft.lb.	45 psi	70 psi	EHPO-NC
10-**NFH	10,000 psi	11/16"	75 ft.lb.	45 psi	70 psi	EHPO-NC
10-**LF16	10,000 psi	11/16"	75 ft.lb.	45 psi	70 psi	EHPO-NC
20-**LF16	20,000 psi	9/16"	95 ft.lb.	55 psi	95 psi	EHPO-NC
30-**LF16	30,000 psi	7/16"	90 ft.lb.	50 psi	85 psi	EHPO-NC

To order simply specify catalog number of valve and appropriate suffix of operator required.

EXAMPLES: Hippo 20-11LF4-MPO-NC (normally closed)
Hippo 20-12LF6-HPO-NO (normally open)

OPTIONS:

Stems & Seat . . . Carbide, ceramic or Stellite (for cyclic service)

Valve Bodies . . . Hastelloy C, Hastelloy B
Inconel 600, Inconel 625
Incoloy 800, Incoloy 825
Titanium Grade 2, Titanium 6AL4V
Nickel
Monel

Packing . . . . . PolyPak

Temperature Consideration . . . Extended stuffing box for temperatures from -423°F to 1,200°F (medium and high pressure connections only)

Normally Open
(Spring To Open/Air To Close)

Medium Duty

Valve Series	Maximum Operating Pressure	Orifice Size	Approximate Air Pressure to Seat Valve	Part Number Suffix
10-**AF4	10,000 psi	1/8"	35 psi	MPO-NO
10-**AF6	10,000 psi	1/8"	35 psi	MPO-NO
15F-**NFA	15,000 psi	13/64"	75 psi	MPO-NO
15F-**NFB	15,000 psi	13/64"	75 psi	MPO-NO
15F-**NFC	10,000 psi	5/16"	100 psi	MPO-NO
15F-**NFD	10,000 psi	5/16"	100 psi	MPO-NO
20-**LF4	20,000 psi	1/8"	95 psi	MPO-NO
20-**LF6	20,000 psi	13/64"	100 psi	MPO-NO
20-**LF9	10,000 psi	5/16"	100 psi	MPO-NO
20-**LF12	6,000 psi	7/16"	100 psi	MPO-NO
30-**HF4	30,000 psi	3/32"	60 psi	MPO-NO
30-**HF6	30,000 psi	1/8"	60 psi	MPO-NO
30-**HF9	30,000 psi	1/8"	60 psi	MPO-NO
60-**HF4	60,000 psi	1/16"	55 psi	MPO-NO
60-**HF6	60,000 psi	1/16"	55 psi	MPO-NO
60-**HF9	60,000 psi	1/16"	55 psi	MPO-NO
Heavy Duty				
15F-**NFC	15,000 psi	5/16"	75 psi	HPO-NO
15F-**NFD	15,000 psi	5/16"	75 psi	HPO-NO
20-**LF4	20,000 psi	1/8"	55 psi	HPO-NO
20-**LF6	20,000 psi	13/64"	55 psi	HPO-NO
20-**LF9	20,000 psi	5/16"	95 psi	HPO-NO
20-**LF12	13,000 psi	7/16"	100 psi	HPO-NO
20-**LF16	8,800 psi	9/16"	100 psi	HPO-NO
30-**HF4	30,000 psi	3/32"	35 psi	HPO-NO
30-**HF6	30,000 psi	1/8"	35 psi	HPO-NO
30-**HF9	30,000 psi	1/8"	35 psi	HPO-NO
60-**HF4	60,000 psi	1/16"	30 psi	HPO-NO
60-**HF6	60,000 psi	1/16"	30 psi	HPO-NO
60-**HF9	60,000 psi	1/16"	30 psi	HPO-NO
Extra Heavy Duty				
20-**LF12	20,000 psi	7/16"	55 psi	EHPO-NO
10-**NFF	10,000 psi	11/16"	45 psi	EHPO-NO
10-**NFH	10,000 psi	11/16"	45 psi	EHPO-NO
10-**LF16	10,000 psi	11/16"	45 psi	EHPO-NO
20-**LF16	20,000 psi	9/16"	55 psi	EHPO-NO
30-**LF16	30,000 psi	7/16"	50 psi	EHPO-NO

** Standard Valve Patterns (reference Page 1.4)

High Pressure Equipment Company
P.O. Box 8248 • 1222 Linden Ave. • Erie, PA 16505 U.S.A. • Phone: (814) 838-2028 • 1-800-289-7447 • Fax: (814) 838-6075 • E-Mail: sales@highpressure.com

R6 1/07

Remetco Piston Operated Fine Metering Valves

For Liquids or Gases

Precise control with fast response is possible in fine metering applications to 60,000 psi with Remetco Valves. Pinpoint accuracy and repeatability are assured by a unique stem travel control device working in concert with a Conoflow operator, which is actuated by an input air pressure on only 15 psi.

Body material is Type 316 stainless steel, with both stem and removable seat of 17-4PH. The stem tip is ground to a 9° included taper, with orifice sizes as listed in the ordering table.

Installation requires only connection to an air supply of 20 to 100 psi. This is connected both to the supply air connection and to the instrument air inlet. The latter is regulated between 3 and 15 psi to actuate the valve to the desired position.

Regulation is effected by the user's instrument or by the optional instrument panel at lower left. Thus the valve is in its full open position with a 3 psi air input and in the closed position with a 15 psi air input.

Failsafe operation. In standard configuration, the valve OPENS upon failure of the air supply. It may also be supplied to close upon air failure, to open upon an increase in air signal, or any combination of these specifications.

Remote Valve Positioner "RVP." Optional instrument panel shown at bottom can be ordered as an accessory. It is a manually operated remote air signal valve positioner which permits positioning the stem at any desired point within the $1\frac{1}{8}$" travel of the stem. The dial indicator is graduated into 100 increments; thus each dial increment moves the stem 0.0112".

Standard inlet and outlet connections to the Remetco Valve are for $\frac{9}{16}$" OD coned and threaded tubing. Adapters may be supplied for other tubing sizes upon request.

Shutoff not recommended. While this valve is capable of on-off operation, it is designed as a fine metering instrument. To assure maximum stem life, a manual on-off valve should be used in the line upstream of the Remetco Valve.

To order, use assembly number in table and specify if operation is to be other than the standard closure upon air failure. Add "RVP" as suffix if remote air signal valve positioner is desired.

Ordering Table

Assembly Number	Pressure Rating	Orifice Size
10M-12HF9R	10,000 psi	$\frac{1}{4}$"
30M-12HF9R	30,000 psi	$\frac{1}{8}$"
60M-12HF9R	60,000 psi	$\frac{1}{16}$"

OPTIONS:

Stems & Seats . . . Carbide (for cyclic service)
Stellite (for cyclic service)

Valve Bodies . . . . . Hastelloy-C, Hastelloy B
Inconel 600, Inconel 625
Incoloy 800, Incoloy 825
Titanium Grade 2, Titanium GAL4V
Nickel
Monel

Packing . . . . . PolyPak

Temperature Considerations . . . Extended stuffing box for temperatures from -423°F to 1,200°F (medium and high pressure connections only)





Remote Valve Stem Positioner "RVP" above permits remote positioning of valve stem in increments of 0.0112". To order, add suffix "RVP" to base order number.

Accessories

High Pressure Equipment Company offers an extensive selection of accessory components to enable you to completely plumb a fluid system. These accessories allow you to move from tube to tube, tube to pipe, facilitate system pressure changes and monitor the temperatures and pressures within your system.

Adapters are available in both female to male and male to male configurations. Adapter models exist for all HiP connections and in the various pressure ranges to complement our valve and fitting lines.

Couplings enable you to make a wide variety of female to female connections. As with our adapters, couplings accommodate our complete line of valves and fittings. In addition, reducer couplings allow you to reduce line size within a given pressure range.

Thermocouple adapters are an excellent method to provide for temperature measurement in pressure systems up to 15,000 psi.

Pressure gauges are available in seven models to monitor system pressures ranging from atmosphere to 100,000 psi.



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- Female to Male Adapters 8.4-8.5
- Male to Male Adapters 8.6-8.7

Adapters:
- Female to Male 8.8-8.14

Adapters:
- Male to Male 8.15-8.18

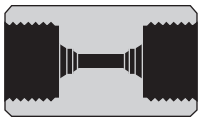
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Female to Female



		AF1	AF2	AF4	AF6
		1/16" Taper Seal	1/8" Taper Seal	1/4" Taper Seal	3/8" Taper Seal
1/16" TAPER SEAL	AF1	15-21AF1	15-21AF1AF2	10-21AF1AF4	10-21AF1AF6
1/8" TAPER SEAL	AF2	15-21AF1AF2	15-21AF2	10-21AF2AF4	10-21AF2AF6
1/4" TAPER SEAL	AF4	10-21AF1AF4	10-21AF2AF4	10-21AF4	10-21AF4AF6
3/8" TAPER SEAL	AF6	10-21AF1AF6	10-21AF2AF6	10-21AF4AF6	10-21AF6
1/4" MEDIUM PRESSURE	LF4	15-21AF1LF4	15-21AF2LF4	10-21AF4LF4	10-21AF6LF4
3/8" MEDIUM PRESSURE	LF6	15-21AF1LF6	15-21AF2LF6	10-21AF4LF6	10-21AF6LF6
9/16" MEDIUM PRESSURE	LF9	15-21AF1LF9	15-21AF2LF9	10-21AF4LF9	10-21AF6LF9
3/4" MEDIUM PRESSURE	LF12	15-21AF1LF12	15-21AF2LF12	10-21AF4LF12	10-21AF6LF12
1" MEDIUM PRESSURE	LF16	15-21AF1LF16	15-21AF2LF16	10-21AF4LF16	10-21AF6LF16
1/8" HIGH PRESSURE	HF2	15-21AF1HF2	15-21AF2HF2	10-21AF4HF2	10-21AF6HF2
1/4" HIGH PRESSURE	HF4	15-21AF1HF4	15-21AF2HF4	10-21AF4HF4	10-21AF6HF4
3/8" HIGH PRESSURE	HF6	15-21AF1HF6	15-21AF2HF6	10-21AF4HF6	10-21AF6HF6
9/16" HIGH PRESSURE	HF9	15-21AF1HF9	15-21AF2HF9	10-21AF4HF9	10-21AF6HF9
1" HIGH PRESSURE	HF16	15-21AF1HF16	15-21AF2HF16	10-21AF4HF16	10-21AF6HF16
1/4" ULTRA HIGH PRESSURE	XF4	15-21AF1XF4	15-21AF2XF4	10-21AF4XF4	10-21AF6XF4
3/8" ULTRA HIGH PRESSURE	XF6	15-21AF1XF6	15-21AF2XF6	10-21AF4XF6	10-21AF6XF6
1/8" NPT PIPE	NFA	15-21AF1NFA	15-21AF2NFA	10-21AF4NFA	10-21AF6NFA
1/4" NPT PIPE	NFB	15-21AF1NFB	15-21AF2NFB	10-21AF4NFB	10-21AF6NFB
3/8" NPT PIPE	NFC	15-21AF1NFC	15-21AF2NFC	10-21AF4NFC	10-21AF6NFC
1/2" NPT PIPE	NFD	15-21AF1NFD	15-21AF2NFD	10-21AF4NFD	10-21AF6NFD
3/4" NPT PIPE	NFF	10-21AF1NFF	10-21AF2NFF	10-21AF4NFF	10-21AF6NFF
1" NPT PIPE	NFH	10-21AF1NFH	10-21AF2NFH	10-21AF4NFH	10-21AF6NFH

Female to Female *(continued)*

		HF6	HF9	HF16	XF4
		3/8" High Pressure	9/16" High Pressure	1" High Pressure	1/4" Ultra High Pressure
1/16" TAPER SEAL	AF1	15-21AF1HF6	15-21AF1HF9	15-21AF1HF16	15-21AF1XF4
1/8" TAPER SEAL	AF2	15-21AF2HF6	15-21AF2HF9	15-21AF2HF16	15-21AF2XF4
1/4" TAPER SEAL	AF4	10-21AF4HF6	10-21AF4HF9	10-21AF4HF16	10-21AF4XF4
3/8" TAPER SEAL	AF6	10-21AF6HF6	10-21AF6HF9	10- 21AF6HF16	10-21AF6XF4
1/4" MEDIUM PRESSURE	LF4	20-21LF4HF6	20-21LF4HF9	20-21LF4HF16	20-21LF4XF4
3/8" MEDIUM PRESSURE	LF6	20-21LF6HF6	20-21LF6HF9	20-21LF6HF16	20-21LF6XF4
9/16" MEDIUM PRESSURE	LF9	20-21LF9HF6	20-21LF9HF9	20-21LF9HF16	20-21LF9XF4
3/4" MEDIUM PRESSURE	LF12	20-21LF12HF6	20-21LF12HF9	20-21LF12HF16	20-21LF12XF4
1" MEDIUM PRESSURE	LF16	20-21LF16HF6	20-21LF16HF9	20-21LF16HF16	20-21LF16XF4
1/8" HIGH PRESSURE	HF2	60-21HF2HF6	60-21HF2HF9	30-21HF2HF16	60-21HF2XF4
1/4" HIGH PRESSURE	HF4	60-21HF4HF6	60-21HF4HF9	30-21HF4HF16	60-21HF4XF4
3/8" HIGH PRESSURE	HF6	60-21HF6	60-21HF6HF9	30-21HF6HF16	60-21HF6XF4
9/16" HIGH PRESSURE	HF9	60-21HF6HF9	60-21HF9	30-21HF9HF16	60-21HF9XF4
1" HIGH PRESSURE	HF16	30 21HF6HF16	30-21HF9HF16	30-21HF16	30-21HF16XF4
1/4" ULTRA HIGH PRESSURE	XF4	60-21HF6XF4	60-21HF9XF4	30-21HF16XF4	100-21XF4
3/8" ULTRA HIGH PRESSURE	XF6	60-21HF6XF6	60-21HF9XF6	30-21HF16XF6	100-21XF4XF6
1/8" NPT PIPE	NFA	30-21HF6NFA	30-21HF9NFA	30-21HF16NFA	30-21XF4NFA
1/4" NPT PIPE	NFB	30-21HF6NFB	30-21HF9NFB	30-21HF16NFB	30-21XF4NFB
3/8" NPT PIPE	NFC	30-21HF6NFC	30-21HF9NFC	30-21HF16NFC	30-21XF4NFC
1/2" NPT PIPE	NFD	30-21HF6NFD	30-21HF9NFD	30-21HF16NFD	30-21XF4NFD
3/4" NPT PIPE	NFF	10-21HF6NFF	10-21HF9NFF	10-21HF16NFF	10-21XF4NFF
1" NPT PIPE	NFH	10-21HF6NFH	10-21HF9NFH	10-21HF16NFH	10-21XF4NFH

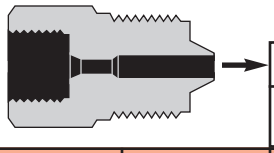
Coupling Selection Guide

LF4	LF6	LF9	LF12	LF16	HF2	HF4
1/4" Medium Pressure	3/8" Medium Pressure	9/16" Medium Pressure	3/4" Medium Pressure	1" Medium Pressure	1/8" High Pressure	1/4" High Pressure
15-21AF1LF4	15-21AF1LF6	15-21AF1LF9	15-21AF1LF12	15-21AF1LF16	15-21AF1HF2	15-21AF1HF4
15-21AF2LF4	15-21AF2LF6	15-21AF2LF9	15-21AF2LF12	15-21AF2LF16	15-21AF2HF2	15-21AF2HF4
10-21AF4LF4	10-21AF4LF6	10-21AF4LF9	10-21AF4LF12	10-21AF4LF16	10-21AF4HF2	10-21AF4HF4
10-21AF6LF4	10-21AF6LF6	10-21AF6LF9	10-21AF6LF12	10-21AF6LF16	10-21AF6HF2	10-21AF6HF4
20-21LF4	20-21LF4LF6	10-21LF4LF9	20-21LF4LF12	20-21LF4LF16	20-21LF4HF2	20-21LF4HF4
20-21LF4LF6	20-21LF6	20-21LF6LF9	20-21LF6LF12	20-21LF6LF16	20-21LF6HF2	20-21LF6HF4
20-21LF4LF9	20-21LF6LF9	20-21LF9	20-21LF9LF12	20-21LF9LF16	20-21LF9HF2	20-21LF9HF4
20-21LF4LF12	20-21LF6LF12	20-21LF9LF12	20-21LF12	20-21LF12LF16	20-21LF12HF2	20-21LF12HF4
20-21LF4LF16	20-21LF6LF16	20-21LF9LF16	20-21LF12LF16	20-21LF16	20-21LF16HF2	20-21LF16HF4
20-21LF4HF2	20-21LF6HF2	20-21LF9HF2	20-21LF12HF2	20-21LF16HF2	60-21HF2	60-21HF2HF4
20-21LF4HF4	20-21LF6HF4	20-21LF9HF4	20-21LF12HF4	20-21LF16HF4	60-21HF2HF4	60-21HF4
20-21LF4HF6	20-21LF6HF6	20-21LF9HF6	20-21LF12HF6	20-21LF16HF6	60-21HF2HF6	60-21HF4HF6
20-21LF4HF9	20-21LF6HF9	20-21LF9HF9	20-21LF12HF9	20-21LF16HF9	60-21HF2HF9	60-21HF4HF9
20-21LF4HF16	20-21LF6HF16	20-21LF9HF16	20-21LF12HF16	20 21LF16HF16	30-21HF2HF16	30-21HF4HF16
20-21LF4XF4	20-21LF6XF4	20-21LF9XF4	20-21LF12XF4	20-21LF16XF4	60-21HF2XF4	60-21HF4XF4
20-21LF4XF6	20-21LF6XF6	20-21LF9XF6	20-21LF12XF6	20-21LF16XF6	60-21HF2XF6	60-21HF4XF6
20-21LF4NFA	20-21LF6NFA	20-21LF9NFA	20-21LF12NFA	20-21LF16NFA	30-21HF2NFA	30-21HF4NFA
20-21LF4NFB	20-21LF6NFB	20-21LF9NFB	20-21LF12NFB	20-21LF16NFB	30-21HF2NFB	30-21HF4NFB
20-21LF4NFC	20-21LF6NFC	20-21LF9NFC	20-21LF12NFC	20-21LF16NFC	30-21HF2NFC	30-21HF4NFC
20-21LF4NFD	20-21LF6NFD	20-21LF9NFD	20-21LF12NFD	20-21LF16NFD	30-21HF2NFD	30-21HF4NFD
10-21LF4NFF	10-21LF6NFF	10-21LF9NFF	10-21LF12NFF	10-21LF16NFF	10-21HF2NFF	10-21HF4NFF
10-21LF4NFH	10-21LF6NFH	10-21LF9NFH	10-21LF12NFH	10-21LF16NFH	10-21HF2NFH	10-21HF4NFH

XF6	NFA	NFB	NFC	NFD	NFF	NFH
3/8" Ultra High Pressure	1/8" NPT Pipe	1/4" NPT Pipe	3/8" NPT Pipe	1/2" NPT Pipe	3/4" NPT Pipe	1" NPT Pipe
15-21AF1XF6	15-21AF1NFA	15-21AF1NFB	15-21AF1NFC	15-21AF1NFD	10-21AF1NFF	10-21AF1NFH
15-21AF2XF6	15-21AF2NFA	15-21AF2NFB	15-21AF2NFC	15-21AF2NFD	10-21AF2NFF	10-21AF2NFH
10-21AF4XF6	10-21AF4NFA	10-21AF4NFB	10-21AF4NFC	10-21AF4NFD	10-21AF4NFF	10-21AF4NFH
10-21AF6XF6	10-21AF6NFA	10-21AF6NFB	10-21AF6NFC	10-21AF6NFD	10-21AF6NFF	10-21AF6NFH
20-21LF4XF6	20-21LF4NFA	20-21LF4NFB	20-21LF4NFC	20-21LF4NFD	10-21LF4NFF	10-21LF4NFH
20-21LF6XF6	20-21LF6NFA	20-21LF6NFB	20-21LF6NFC	20-21LF6NFD	10-21LF6NFF	10-21LF6NFH
20-21LF9XF6	20-21LF9NFA	20-21LF9NFB	20-21LF9NFC	20-21LF9NFD	10-21LF9NFF	10-21LF9NFH
20-21LF12XF6	20-21LF12NFA	20-21LF12NFB	20-21LF12NFC	20-21LF12NFD	10-21LF12NFF	10-21LF12NFH
20-21LF16XF6	20-21LF16NFA	20-21LF16NFB	20-21LF16NFC	20-21LF16NFD	10-21LF16NFF	10-21LF16NFH
60-21HF2XF6	30-21HF2NFA	30-21HF2NFB	30-21HF2NFC	30-21HF2NFD	10-21HF2NFF	10-21HF2NFH
60-21HF4XF6	30-21HF4NFA	30-21HF4NFB	30-21HF4NFC	30-21HF4NFD	10-21HF4NFF	10-21HF4NFH
60-21HF6XF6	30-21HF6NFA	30-21HF6NFB	30-21HF6NFC	30-21HF6NFD	10-21HF6NFF	10-21HF6NFH
60-21HF9XF6	30-21HF9NFA	30-21HF9NFB	30-21HF9NFC	30-21HF9NFD	10-21HF9NFF	10-21HF9NFH
30-21HF16XF6	30-21HF16NFA	30-21HF16NFB	30-21HF16NFC	30-21HF16NFD	10-21HF16NFF	10-21HF16NFH
100-21XF4XF6	30-21XF4NFA	30-21XF4NFB	30-21XF4NFC	30-21XF4NFD	10-21XF4NFF	10-21XF4NFH
150-21XF6	30-21XF6NFA	30-21XF6NFB	30-21XF6NFC	30-21XF6NFD	10-21XF6NFF	10-21XF6NFH
30-21XF6NFA	15-21NFA	15-21NFANFB	15-21NFANFC	15-21NFANFD	10-21NFANFF	10-21NFANFH
30-21XF6NFB	15-21NFANFB	15-21NFB	15-21NFBNFC	15-21NFBNFD	10-21NFBNFF	10-21NFBNFH
30-21XF6NFC	15-21NFANFC	15-21NFBNFC	15-21NFC	15-21NFCNFD	10-21NFCNFF	10-21NFCNFH
30-21XF6NFD	15-21NFANFD	15-21NFBNFD	15-21NFCNFD	15-21NFD	10-21NFDNFF	10-21NFDNFH
10-21XF6NFF	10-21NFANFF	10-21NFBNFF	10-21NFCNFF	10-21NFDNFF	10-21NFF	10-21NFFNFH
10-21XF6NFH	10-21NFANFH	10-21NFBNFH	10-21NFCNFH	10-21NFDNFH	10-21NFFNFH	10-21NFH

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Female to Male



		AM1	AM2	AM4	AM6
		1/16" Taper Seal	1/8" Taper Seal	1/4" Taper Seal	3/8" Taper Seal
1/16" TAPER SEAL	AF1	15-21AF1AM1	15-21AF1AM2	10-21AF1AM4	10-21AF1AM6
1/8" TAPER SEAL	AF2	15-21AF2AM1	15-21AF2AM2	10-21AF2AM4	10-21AF2AM6
1/4" TAPER SEAL	AF4	10-21AF4AM1	10-21AF4AM2	10-21AF4AM4	10-21AF4AM6
3/8" TAPER SEAL	AF6	10-21AF6AM1	10-21AF6AM2	10-21AF6AM4	10-21AF6AM6
1/4" MEDIUM PRESSURE	LF4	15-21LF4AM1	15-21LF4AM2	10-21LF4AM4	10-21LF4AM6
3/8" MEDIUM PRESSURE	LF6	15-21LF6AM1	15-21LF6AM2	10-21LF6AM4	10-21LF6AM6
9/16" MEDIUM PRESSURE	LF9	15-21LF9AM1	15-21LF9AM2	10-21LF9AM4	10-21LF9AM6
3/4" MEDIUM PRESSURE	LF12	15-21LF12AM1	15-21LF12AM2	10-21LF12AM4	10-21LF12AM6
1" MEDIUM PRESSURE	LF16	15-21LF16AM1	15-21LF16AM2	10-21LF16AM4	10-21LF16AM6
1/8" HIGH PRESSURE	HF2	15-21HF2AM1	15-21HF2AM2	10-21HF2AM4	10-21HF2AM6
1/4" HIGH PRESSURE	HF4	15-21HF4AM1	15-21HF4AM2	10-21HF4AM4	10-21HF4AM6
3/8" HIGH PRESSURE	HF6	15-21HF6AM1	15-21HF6AM2	10-21HF6AM4	10-21HF6AM6
9/16" HIGH PRESSURE	HF9	15-21HF9AM1	15-21HF9AM2	10-21HF9AM4	10-21HF9AM6
1" HIGH PRESSURE	HF16	15-21HF16AM1	15-21HF16AM2	10-21HF16AM4	10-21HF16AM6
1/4" ULTRA HIGH PRESSURE	XF4	15-21XF4AM1	15-21XF4AM2	10-21XF4AM4	10-21XF4AM6
3/8" ULTRA HIGH PRESSURE	XF6	15-21XF6AM1	15-21XF6AM2	10-21XF6AM4	10-21XF6AM6
1/8" NPT PIPE	NFA	15-21NFAAM1	15-21NFAAM2	10-21NFAAM4	10-21NFAAM6
1/4" NPT PIPE	NFB	15-21NFBAM1	15-21NFBAM2	10-21NFBAM4	10-21NFBAM6
3/8" NPT PIPE	NFC	15-21NFCAM1	15-21NFCAM2	10-21NFCAM4	10-21NFCAM6
1/2" NPT PIPE	NFD	15-21NFDAM1	15-21NFDAM2	10-21NFDAM4	10-21NFDAM6
3/4" NPT PIPE	NFF	10-21NFFAM1	10-21NFFAM2	10-21NFFAM4	10-21NFFAM6
1" NPT PIPE	NFH	10-21NFHAM1	10-21NFHAM2	10-21NFHAM4	10-21NFHAM6

Female to Male *(continued)*

		HM6	HM9	HM16	XM4
		3/8" High Pressure	9/16" High Pressure	1" High Pressure	1/4" Ultra High Pressure
1/16" TAPER SEAL	AF1	15-21AF1HM6	15-21AF1HM9	15-21AF1HM16	15-21AF1XM4
1/8" TAPER SEAL	AF2	15-21AF2HM6	15-21AF2HM9	15-21AF2HM16	15-21AF2XM4
1/4" TAPER SEAL	AF4	10-21AF4HM6	10-21AF4HM9	10-21AF4HM16	10-21AF4XM4
3/8" TAPER SEAL	AF6	10-21AF6HM6	10-21AF6HM9	10-21AF6HM16	10-21AF6XM4
1/4" MEDIUM PRESSURE	LF4	20-21LF4HM6	20-21LF4HM9	20-21LF4HM16	20-21LF4XM4
3/8" MEDIUM PRESSURE	LF6	20-21LF6HM6	20-21LF6HM9	20-21LF6HM16	20-21LF6XM4
9/16" MEDIUM PRESSURE	LF9	20-21LF9HM6	20-21LF9HM9	20-21LF9HM16	20-21LF9XM4
3/4" MEDIUM PRESSURE	LF12	20-21LF12HM6	20-21LF12HM9	20-21LF12HM16	20-21LF12XM4
1" MEDIUM PRESSURE	LF16	20-21LF16HM6	20-21LF16HM9	20-21LF16HM16	20-21LF16XM4
1/8" HIGH PRESSURE	HF2	60-21HF2HM6	60-21HF2HM9	30-21HF2HM16	60-21HF2XM4
1/4" HIGH PRESSURE	HF4	60-21HF4HM6	60-21HF4HM9	30-21HF4HM16	60-21HF4XM4
3/8" HIGH PRESSURE	HF6	60-21HF6HM6	60-21HF6HM9	30-21HF6HM16	60-21HF6XM4
9/16" HIGH PRESSURE	HF9	60-21HF9HM6	60-21HF9HM9	30-21HF9HM16	60-21HF9XM4
1" HIGH PRESSURE	HF16	30-21HF16HM6	30-21HF16HM9	30-21HF16HM16	30-21HF16XM4
1/4" ULTRA HIGH PRESSURE	XF4	60-21XF4HM6	60-21XF4HM9	30-21XF4HM16	100-21XF4XM4
3/8" ULTRA HIGH PRESSURE	XF6	60-21XF6HM6	60-21XF6HM9	30-21XF6HM16	100-21XF6XM4
1/8" NPT PIPE	NFA	30-21NFAHM6	30-21NFAHM9	30-21NFAHM16	30-21NFAXM4
1/4" NPT PIPE	NFB	30-21NFBHM6	30-21NFBHM9	30-21NFBHM16	30-21NFBXM4
3/8" NPT PIPE	NFC	30-21NFCHM6	30-21NFCHM9	30-21NFCHM16	30-21NFCXM4
1/2" NPT PIPE	NFD	30-21NFDHM6	30-21NFDHM9	30-21NFDHM16	30-21NFDXM4
3/4" NPT PIPE	NFF	10-21NFFHM6	10-21NFFHM9	10-21NFFHM16	10-21NFFXM4
1" NPT PIPE	NFH	10-21NFHHM6	10-21NFHHM9	10-21NFHHM16	10-21NFHXM4

Adapter Selection Guide

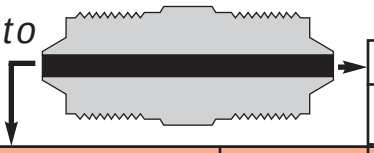
LM4	LM6	LM9	LM12	LM16	HM2	HM4
1/4" Medium Pressure	3/8" Medium Pressure	9/16" Medium Pressure	3/4" Medium Pressure	1" Medium Pressure	1/8" High Pressure	1/4" High Pressure
15-21AF1LM4	15-21AF1LM6	15-21AF1LM9	15-21AF1LM12	15-21AF1LM16	15-21AF1HM2	15-21AF1HM4
15-21AF2LM4	15-21AF2LM6	15-21AF2LM9	15-21AF2LM12	15-21AF2LM16	15-21AF2HM2	15-21AF2HM4
10-21AF4LM4	10-21AF4LM6	10-21AF4LM9	10-21AF4LM12	10-21AF4LM16	10-21AF4HM2	10-21AF4HM4
10-21AF6LM4	10-21AF6LM6	10-21AF6LM9	10-21AF6LM12	10-21AF6LM16	10-21AF6HM2	10-21AF6HM4
20-21LF4LM4	20-21LF4LM6	20-21LF4LM9	20-21LF4LM12	20-21LF4LM16	20-21LF4HM2	20-21LF4HM4
20-21LF6LM4	20-21LF6LM6	20-21LF6LM9	20-21LF6LM12	20-21LF6LM16	20-21LF6HM2	20-21LF6HM4
20-21LF9LM4	20-21LF9LM6	20-21LF9LM9	20-21LF9LM12	20-21LF9LM16	20-21LF9HM2	20-21LF9HM4
20-21LF12LM4	20-21LF12LM6	20-21LF12LM9	20-21LF12LM12	20-21LF12LM16	20-21LF12HM2	20-21LF12HM4
20-21LF16LM4	20-21LF16LM6	20-21LF16LM9	20-21LF16LM12	20-21LF16LM16	20-21LF16HM2	20-21LF16HM4
20-21HF2LM4	20-21HF2LM6	20-21HF2LM9	20-21HF2LM12	20-21HF2LM16	60-21HF2HM2	60-21HF2HM4
20-21HF4LM4	20-21HF4LM6	20-21HF4LM9	20-21HF4LM12	20-21HF4LM16	60-21HF4HM2	60-21HF4HM4
20-21HF6LM4	20-21HF6LM6	20-21HF6LM9	20-21HF6LM12	20-21HF6LM16	60-21HF6HM2	60-21HF6HM4
20-21HF9LM4	20-21HF9LM6	20-21HF9LM9	20-21HF9LM12	20-21HF9LM16	60-21HF9HM2	60-21HF9HM4
20 21HF16LM4	20-21HF16LM6	20-21HF16LM9	20-21HF16LM12	20-21HF16LM16	30-21HF16HM2	30-21HF16HM4
20-21XF4LM4	20-21XF4LM6	20-21XF4LM9	20-21XF4LM12	20-21XF4LM16	60-21XF4HM2	60-21XF4HM4
20-21XF6LM4	20-21XF6LM6	20-21XF6LM9	20-21XF6LM12	20-21XF6LM16	60-21XF6HM2	60-21XF6HM4
20-21NFALM4	20-21NFALM6	20-21NFALM9	20-21NFALM12	20-21NFALM16	30-21NFAHM2	30-21NFAHM4
20-21NFBLM4	20-21NFBLM6	20-21NFBLM9	20-21NFBLM12	20-21NFBLM16	30-21NFBHM2	30-21NFBHM4
20-21NFCLM4	20-21NFCLM6	20-21NFCLM9	20-21NFCLM12	20-21NFCLM16	30-21NFCHM2	30-21NFCHM4
20-21NFDLM4	20-21NFDLM6	20-21NFDLM9	20-21NFDLM12	20-21NFDLM16	30-21NFDHM2	30-21NFDHM4
10-21NFFLM4	10-21NFFLM6	10-21NFFLM9	10-21NFFLM12	10-21NFFLM16	10-21NFFHM2	10-21NFFHM4
10-21NFHLM4	10-21NFHLM6	10-21NFHLM9	10-21NFHLM12	10-21NFHLM16	10-21NFHHM2	10-21NFHHM4

XM6	NMA	NMB	NMC	NMD	NMF	NMH
3/8" Ultra High Pressure	1/8" NPT Pipe	1/4" NPT Pipe	3/8" NPT Pipe	1/2" NPT Pipe	3/4" NPT Pipe	1" NPT Pipe
15-21AF1XM6	15-21AF1NMA	15-21AF1NMB	15-21AF1NMC	15-21AF1NMD	10-21AF1NMF	10-21AF1NMH
15-21AF2XM6	15-21AF2NMA	15-21AF2NMB	15-21AF2NMC	15-21AF2NMD	10-21AF2NMF	10-21AF2NMH
10-21AF4XM6	10-21AF4NMA	10-21AF4NMB	10-21AF4NMC	10-21AF4NMD	10-21AF4NMF	10-21AF4NMH
10-21AF6XM6	10-21AF6NMA	10-21AF6NMB	10-21AF6NMC	10-21AF6NMD	10-21AF6NMF	10-21AF6NMH
20-21LF4XM6	20-21LF4NMA	20-21LF4NMB	20-21LF4NMC	20-21LF4NMD	10-21LF4NMF	10-21LF4NMH
20-21LF6XM6	20-21LF6NMA	20-21LF6NMB	20-21LF6NMC	20-21LF6NMD	10-21LF6NMF	10-21LF6NMH
20-21LF9XM6	20-21LF9NMA	20-21LF9NMB	20-21LF9NMC	20-21LF9NMD	10-21LF9NMF	10-21LF9NMH
20-21LF12XM6	20-21LF12NMA	20-21LF12NMB	20-21LF12NMC	20-21LF12NMD	10-21LF12NMF	10-21LF12NMH
20-21LF16XM6	20-21LF16NMA	20-21LF16NMB	20-21LF16NMC	20-21LF16NMD	10-21LF16NMF	10-21LF16NMH
60-21HF2XM6	30-21HF2NMA	30-21HF2NMB	30-21HF2NMC	30-21HF2NMD	10-21HF2NMF	10-21HF2NMH
60-21HF4XM6	30-21HF4NMA	30-21HF4NMB	30-21HF4NMC	30-21HF4NMD	10-21HF4NMF	10-21HF4NMH
60-21HF6XM6	30-21HF6NMA	30-21HF6NMB	30-21HF6NMC	30-21HF6NMD	10-21HF6NMF	10-21HF6NMH
60-21HF9XM6	30-21HF9NMA	30-21HF9NMB	30-21HF9NMC	30-21HF9NMD	10-21HF9NMF	10-21HF9NMH
30-21HF16XM6	30-21HF16NMA	30-21HF16NMB	30-21HF16NMC	30-21HF16NMD	10-21HF16NMF	10-21HF16NMH
100-21XF4XM6	30-21XF4NMA	30-21XF4NMB	30-21XF4NMC	30-21XF4NMD	10-21XF4NMF	10-21XF4NMH
150-21XF6XM6	30-21XF6NMA	30-21XF6NMB	30-21XF6NMC	30-21XF6NMD	10-21XF6NMF	10-21XF6NMH
30-21NFAXM6	15-21NFANMA	15-21NFANMB	15-21NFANMC	15-21NFANMD	10-21NFANMF	10-21NFANMH
30-21NFBXM6	15-21NFBNMA	15-21NFBNMB	15-21NFBNMC	15-21NFBNMD	10-21NFBNMF	10-21NFBNMH
30-21NFCXM6	15-21NFCNMA	15-21NFCNMB	15-21NFCNMC	15-21NFCNMD	10-21NFCNMF	10-21NFCNMH
30-21NFDXM6	15-21NFDNMA	15-21NFDNMB	15-21NFDNMC	15-21NFDNMD	10-21NFDNMF	10-21NFDNMH
10-21NFFXM6	10-21NFFNMA	10-21NFFNMB	10-21NFFNMC	10-21NFFNMD	10-21NFFNMF	10-21NFFNMH
10-21NFHXM6	10-21NFHNMA	10-21NFHNMB	10-21NFHNMC	10-21NFHNMD	10-21NFHNMF	10-21NFHNMH

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R4 2/02

Male to Male



		AM1	AM2	AM4	AM6
		1/16" Taper Seal	1/8" Taper Seal	1/4" Taper Seal	3/8" Taper Seal
1/16" TAPER SEAL	AM1	15-21AM1AM1	15-21AM1AM2	10-21AM1AM4	10-21AM1AM6
1/8" TAPER SEAL	AM2	15-21AM1AM2	15-21AM2AM2	10-21AM2AM4	10-21AM2AM6
1/4" TAPER SEAL	AM4	10-21AM1AM4	10-21AM2AM4	10-21AM4AM4	10-21AM4AM6
3/8" TAPER SEAL	AM6	10-21AM1AM6	10-21AM2AM6	10-21AM4AM6	10-21AM6AM6
1/4" MEDIUM PRESSURE	LM4	15-21AM1LM4	15-21AM2LM4	10-21AM4LM4	10-21AM6LM4
3/8" MEDIUM PRESSURE	LM6	15-21AM1LM6	15-21AM2LM6	10-21AM4LM6	10-21AM6LM6
9/16" MEDIUM PRESSURE	LM9	15-21AM1LM9	5-21AM2LM9	10-21AM4LM9	10-21AM6LM9
3/4" MEDIUM PRESSURE	LM12	15-21AM1LM12	15-21AM2LM12	10-21AM4LM12	10-21AM6LM12
1" MEDIUM PRESSURE	LM16	15-21AM1LM16	15-21AM2LM16	10-21AM4LM16	10-21AM6LM16
1/8" HIGH PRESSURE	HM2	15-21AM1HM2	15-21AM2HM2	10-21AM4HM2	10-21AM6HM2
1/4" HIGH PRESSURE	HM4	15-21AM1HM4	15-21AM2HM4	10-21AM4HM4	10-21AM6HM4
3/8" HIGH PRESSURE	HM6	15-21AM1HM6	15-21AM2HM6	10-21AM4HM6	10-21AM6HM6
9/16" HIGH PRESSURE	HM9	15-21AM1HM9	15-21AM2HM9	10-21AM4HM9	10-21AM6HM9
1" HIGH PRESSURE	HM16	15-21AM1HM16	15-21AM2HM16	10-21AM4HM16	10-21AM6HM16
1/4" ULTRA HIGH PRESSURE	XM4	15-21AM1XM4	15-21AM2XM4	10-21AM4XM4	10-21AM6XM4
3/8" ULTRA HIGH PRESSURE	XM6	15-21AM1XM6	15-21AM2XM6	10-21AM4XM6	10-21AM6XM6
1/8" NPT PIPE	NMA	15-21AM1NMA	15-21AM2NMA	10-21AM4NMA	10-21AM6NMA
1/4" NPT PIPE	NMB	15-21AM1NMB	15-21AM2NMB	10-21AM4NMB	10-21AM6NMB
3/8" NPT PIPE	NMC	15-21AM1NMC	15-21AM2NMC	10-21AM4NMC	10-21AM6NMC
1/2" NPT PIPE	NMD	15-21AM1NMD	15-21AM2NMD	10-21AM4NMD	10-21AM6NMD
3/4" NPT PIPE	NMF	10-21AM1NMF	10-21AM2NMF	10-21AM4NMF	10-21AM6NMF
1" NPT PIPE	NMH	10-21AM1NMH	10-21AM2NMH	10-21AM4NMH	10-21AM6NMH

Male to Male *(continued)*

		HM6	HM9	HM16	XM4
		3/8" High Pressure	9/16" High Pressure	1" High Pressure	1/4" Ultra High Pressure
1/16" TAPER SEAL	AM1	15-21AM1HM6	15-21AM1HM9	15-21AM1HM16	15-21AM1XM4
1/8" TAPER SEAL	AM2	15-21AM2HM6	15-21AM2HM9	15-21AM2HM16	15-21AM2XM4
1/4" TAPER SEAL	AM4	10-21AM4HM6	10-21AM4HM9	10-21AM4HM16	10-21AM4XM4
3/8" TAPER SEAL	AM6	10-21AM6HM6	10-21AM6HM9	10-21AM6HM16	10-21AM6XM4
1/4" MEDIUM PRESSURE	LM4	20-21LM4HM6	20-21LM4HM9	20-21LM4HM16	20-21LM4XM4
3/8" MEDIUM PRESSURE	LM6	20-21LM6HM6	20-21LM6HM9	20-21LM6HM16	20-21LM6XM4
9/16" MEDIUM PRESSURE	LM9	20-21LM9HM6	20-21LM9HM9	20-21LM9HM16	20-21LM9XM4
3/4" MEDIUM PRESSURE	LM12	20-21LM12HM6	20-21LM12HM9	20-21LM12HM16	20-21LM12XM4
1" MEDIUM PRESSURE	LM16	20-21LM16HM6	20-21LM16HM9	20-21LM16HM16	20-21LM16XM4
1/8" HIGH PRESSURE	HM2	60-21HM2HM6	60-21HM2HM9	60-21HM2HM16	60-21HM2XM4
1/4" HIGH PRESSURE	HM4	60-21HM4HM6	60-21HM4HM9	60-21HM4HM16	60-21HM4XM4
3/8" HIGH PRESSURE	HM6	60-21HM6HM6	60-21HM6HM9	60-21HM6HM16	60-21HM6XM4
9/16" HIGH PRESSURE	HM9	60-21HM9HM6	60-21HM9HM9	30-21HM9HM16	60-21HM9XM4
1" HIGH PRESSURE	HM16	30-21HM6HM16	30-21HM9HM16	30-21HM16HM16	30-21HM16XM4
1/4" ULTRA HIGH PRESSURE	XM4	60-21HM6XM4	60-21HM9XM4	60-21HM16XM4	100-21XM4XM4
3/8" ULTRA HIGH PRESSURE	XM6	60-21HM6XM6	60-21HM9XM6	60-21HM16XM6	100-21XM4XM6
1/8" NPT PIPE	NMA	30-21HM6NMA	30-21HM9NMA	30-21HM16NMA	30-21XM4NMA
1/4" NPT PIPE	NMB	30-21HM6NMB	30-21HM9NMB	30-21HM16NMB	30-21XM4NMB
3/8" NPT PIPE	NMC	30-21HM6NMC	30-21HM9NMC	30-21HM16NMC	30-21XM4NMC
1/2" NPT PIPE	NMD	30-21HM6NMD	30-21HM9NMD	30-21HM16NMD	30-21XM4NMD
3/4" NPT PIPE	NMF	10-21HM6NMF	10-21HM9NMF	10-21HM16NMF	10-21XM4NMF
1" NPT PIPE	NMH	10-21HM6NMH	10-21HM9NMH	10-21HM16NMH	10-21XM4NMH

Adapter Selection Guide

LM4	LM6	LM9	LM12	LM16	HM2	HM4
1/4" Medium Pressure	3/8" Medium Pressure	9/16" Medium Pressure	3/4" Medium Pressure	1" Medium Pressure	1/8" High Pressure	1/4" High Pressure
15-21AM1LM4	15-21AM1LM6	15-21AM1LM9	15-21AM1LM12	15-21AM1LM16	15-21AM1HM2	15-21AM1HM4
15-21AM2LM4	15-21AM2LM6	15-21AM2LM9	15-21AM2LM12	15-21AM2LM16	15-21AM2HM2	15-21AM2HM4
10-21AM4LM4	10-21AM4LM6	10-21AM4LM9	10-21AM4LM12	10-21AM4LM16	10-21AM4HM2	10-21AM4HM4
10-21AM6LM4	10-21AM6LM6	10-21AM6LM9	10-21AM6LM12	10-21AM6LM16	10-21AM6HM2	10-21AM6HM4
20-21LM4LM4	20-21LM4LM6	10-21LM4LM9	20-21LM4LM12	20-21LM4LM16	20-21LM4HM2	20-21LM4HM4
20-21LM4LM6	20-21LM6LM6	20-21LM6LM9	20-21LM6LM12	20-21LM6LM16	20-21LM6HM2	20-21LM6HM4
20-21LM4LM9	20-21LM6LM9	20-21LM9LM9	20-21LM9LM12	20-21LM9LM16	20-21LM9HM2	20-21LM9HM4
20-21LM4LM12	20-21LM6LM12	20-21LM9LM12	20-21LM12LM12	20-21LM12LM16	20-21LM12HM2	20-21LM12HM4
20-21LM4LM16	20-21LM6LM16	20-21LM9LM16	20-21LM12LM16	20-21LM16LM16	20-21LM16HM2	20-21LM16HM4
20-21LM4HM2	20-21LM6HM2	20-21LM9HM2	20-21LM12HM2	20-21LM16HM2	60-21HM2HM2	60-21HM2HM4
20-21LM4HM4	20-21LM6HM4	20-21LM9HM4	20-21LM12HM4	20-21LM16HM4	60-21HM2HM4	60-21HM4HM4
20-21LM4HM6	20-21LM6HM6	20-21LM9HM6	20-21LM12HM6	20-21LM16HM6	60-21HM2HM6	60-21HM4HM6
20-21LM4HM9	20-21LM6HM9	20-21LM9HM9	20-21LM12HM9	20-21LM16HM9	60-21HM2HM9	60-21HM4HM9
20-21LM4HM16	20-21LM6HM16	20-21LM9HM16	20-21LM12HM16	20-21LM16HM16	30-21HM2HM16	30-21HM4HM16
20-21LM4XM4	20-21LM6XM4	20-21LM9XM4	20-21LM12XM4	20-21LM16XM4	60-21HM2XM4	60-21HM4XM4
20-21LM4XM6	20-21LM6XM6	20-21LM9XM6	20-21LM12XM6	20-21LM16XM6	60-21HM2XM6	60-21HM4XM6
20-21LM4NMA	20-21LM6NMA	20-21LM9NMA	20-21LM12NMA	20-21LM16NMA	30-21HM2NMA	30-21HM4NMA
20-21LM4NMB	20-21LM6NMB	20-21LM9NMB	20-21LM12NMB	20-21LM16NMB	30-21HM2NMB	30-21HM4NMB
20-21LM4NMC	20-21LM6NMC	20-21LM9NMC	20-21LM12NMC	20-21LM16NMC	30-21HM2NMC	30-21HM4NMC
20-21LM4NMD	20-21LM6NMD	20-21LM9NMD	20-21LM12NMD	20-21LM16NMD	30-21HM2NMD	30-21HM4NMD
10-21LM4NMF	10-21LM6NMF	10-21LM9NMF	10-21LM12NMF	10-21LM16NMF	10-21HM2NMF	10-21HM4NMF
10-21LM4NMH	10-21LM6NMH	10-21LM9NMH	10-21LM12NMH	10-21LM16NMH	10-21HM2NMH	10-21HM4NMH

XM6	NMA	NMB	NMC	NMD	NMF	NMH
3/8" Ultra High Pressure	1/8" NPT Pipe	1/4" NPT Pipe	3/8" NPT Pipe	1/2" NPT Pipe	3/4" NPT Pipe	1" NPT Pipe
15-21AM1XM6	15-21AM1NMA	15-21AM1NMB	15-21AMANMC	15-21AMANMD	10-21AM1NMF	10-21AM1NMH
15-21AM2XM6	15-21AM2NMA	15-21AM2NMB	15-21AM2NMC	15-21AM2NMD	10-21AM2NMF	10-21AM2NMH
10-21AM4XM6	10-21AM4NMA	10-21AM4NMB	10-21AM4NMC	10-21AM4NMD	10-21AM4NMF	10-21AM4NMH
10-21AM6XM6	10-21AM6NMA	10-21AM6NMB	10-21AM6NMC	10-21AM6NMD	10-21AM6NMF	10-21AM6NMH
20-21LM4XM6	20-21LM4NMA	20-21LM4NMB	20-21LM4NMC	20-21LM4NMD	10-21LM4NMF	10-21LM4NMH
20-21LM6XM6	20-21LM6NMA	20-21LM6NMB	20-21LM6NMC	20-21LM6NMD	10-21LM6NMF	10-21LM6NMH
20-21LM9XM6	20-21LM9NMA	20-21LM9NMB	20-21LM9NMC	20-21LM9NMD	10-21LM9NMF	10-21LM9NMH
20-21LM12XM6	20-21LM12NMA	20-21LM12NMB	20-21LM12NMC	20-21LM12NMD	10-21LM12NMF	10-21LM12NMH
20-21LM16XM6	20-21LM16NMA	20-21LM16NMB	20-21LM16NMC	20-21LM16NMD	10-21LM16NMF	10-21LM16NMH
60-21HM2XM6	30-21HM2NMA	30-21HM2NMB	30-21HM2NMC	30-21HM2NMD	10-21HM2NMF	10-21HM2NMH
60-21HM4XM6	30-21HM4NMA	30-21HM4NMB	30-21HM4NMC	30-21HM4NMD	10-21HM4NMF	10-21HM4NMH
60-21HM6XM6	30-21HM6NMA	30-21HM6NMB	30-21HM6NMC	30-21HM6NMD	10-21HM6NMF	10-21HM6NMH
60-21HM9XM6	30-21HM9NMA	30-21HM9NMB	30-21HM9NMC	30-21HM9NMD	10-21HM9NMF	10-21HM9NMH
30-21HM16XM6	30-21HM16NMA	30-21HM16NMB	30-21HM16NMC	30-21HM16NMD	10-21HM16NMF	10-21HM16NMH
100-21XM4XM6	30-21XM4NMA	30-21XM4NMB	30-21XM4NMC	30-21XM4NMD	10-21XM4NMF	10-21XM4NMH
150-21XM6XM6	30-21XM6NMA	30-21XM6NMB	30-21XM6NMC	30-21XM6NMD	10-21XM6NMF	10-21XM6NMH
30-21XM6NMA	15-21NMANMA	15-21NMANMA	15-21NMANMC	15-21NMANMD	10-21NMANMF	10-21NMANMH
30-21XM6NMB	15-21NMANMB	15-21NMBNMB	15-21NMBNMC	15-21NMBNMD	10-21NMBNMF	10-21NMBNMH
30-21XM6NMC	15-21NMANMC	15-21NMBNMC	15-21NMCNMC	15-21NMCNMD	10-21NMCNMF	10-21NMCNMH
30-21XM6NMD	15-21NMANMD	15-21NMBNMD	15-21NMCNMD	15-21NMDNMD	10-21NMDNMF	10-21NMDNMH
10-21XM6NMF	10-21NMANMF	10-21NMBNMF	10-21NMCNMF	10-21NMDNMF	10-21NMFNMF	10-21NMFNMH
10-21XM6NMH	10-21NMANMH	10-21NMBNMH	10-21NMCNMH	10-21NMDNMH	10-21NMFNMH	10-21NMHNMH

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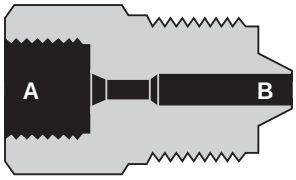


Adapters: Female to Male

A complete range of adapters is offered for flexibility in going from tube to tube and from tube to pipe.

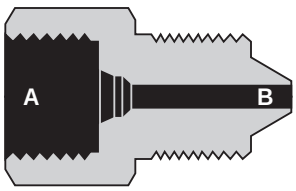
All standard adapter bodies are made from high tensile 316 stainless steel. Standard tubing glands and collars (sleeves) are provided with adapters unless otherwise specified.

Female Taper Seal to Male Taper Seal



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AF1AM2	15,000	1/16" O.D. TUBE TO 1/8" TAPER SEAL	AF1	AM2	15/16"	5/8"
10-21AF1AM4	10,000	1/16" O.D. TUBE TO 1/4" TAPER SEAL	AF1	AM4	1 1/4"	3/4"
10-21AF1AM6	10,000	1/16" O.D. TUBE TO 3/8" TAPER SEAL	AF1	AM6	1 1/4"	3/4"
10-21AF2AM4	10,000	1/8" O.D. TUBE TO 1/4" TAPER SEAL	AF2	AM4	1 1/4"	3/4"
10-21AF2AM6	10,000	1/8" O.D. TUBE TO 3/8" TAPER SEAL	AF2	AM6	1 1/4"	3/4"

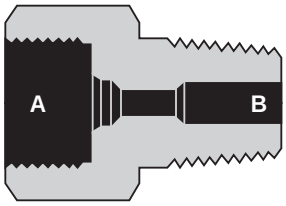
Female Taper Seal to Male High Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AF1HM2	15,000	1/16" T.S. TO 1/8" H.P. MALE	AF1	HM2	7/8"	1/2"
15-21AF1HM4	15,000	1/16" T.S. TO 1/4" H.P. MALE	AF1	HM4	1 1/4"	5/8"
15-21AF1HM6	15,000	1/16" T.S. TO 3/8" H.P. MALE	AF1	HM6	1 3/4"	3/4"
15-21AF1HM9	15,000	1/16" T.S. TO 9/16" H.P. MALE	AF1	HM9	2 1/8"	1 1/8"
15-21AF2HM2	15,000	1/8" T.S. TO 1/8" H.P. MALE	AF2	HM2	1 1/8"	5/8"
15-21AF2HM4	15,000	1/8" T.S. TO 1/4" H.P. MALE	AF2	HM4	1 1/4"	5/8"
15-21AF2HM6	15,000	1/8" T.S. TO 3/8" H.P. MALE	AF2	HM6	1 3/4"	3/4"
15-21AF2HM9	15,000	1/8" T.S. TO 9/16" H.P. MALE	AF2	HM9	2 1/8"	1 1/8"
10-21AF4HM2	10,000	1/4" T.S. TO 1/8" H.P. MALE	AF4	HM2	1 7/16"	1"
10-21AF4HM4	10,000	1/4" T.S. TO 1/4" H.P. MALE	AF4	HM4	1 1/2"	1"
10-21AF4HM6	10,000	1/4" T.S. TO 3/8" H.P. MALE	AF4	HM6	1 5/8"	1"
10-21AF4HM9	10,000	1/4" T.S. TO 9/16" H.P. MALE	AF4	HM9	2 1/8"	1 1/8"
10-21AF6HM2	10,000	3/8" T.S. TO 1/8" H.P. MALE	AF6	HM2	1 1/2"	1"
10-21AF6HM4	10,000	3/8" T.S. TO 1/4" H.P. MALE	AF6	HM4	1 1/2"	1"
10-21AF6HM6	10,000	3/8" T.S. TO 3/8" H.P. MALE	AF6	HM6	1 3/4"	1"
10-21AF6HM9	10,000	3/8" T.S. TO 9/16" H.P. MALE	AF6	HM9	2 1/8"	1 1/8"

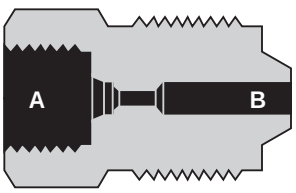
Female Taper Seal to Male Pipe

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AF1NMA	15,000	1/16" T.S. TO 1/8" NPT MALE	AF1	NMA	1"	1/2"
15-21AF1NMB	15,000	1/16" T.S. TO 1/4" NPT MALE	AF1	NMB	1 1/4"	5/8"
15-21AF1NMC	15,000	1/16" T.S. TO 3/8" NPT MALE	AF1	NMC	1 3/8"	3/4"
15-21AF1NMD	15,000	1/16" T.S. TO 1/2" NPT MALE	AF1	NMD	1 3/4"	1"
15-21AF1NMF	15,000	1/16" T.S. TO 3/4" NPT MALE	AF1	NMF	1 5/8"	1 3/8"
15-21AF1NMH	15,000	1/16" T.S. TO 1" NPT MALE	AF1	NMH	1 5/8"	1 3/8"
15-21AF2NMA	15,000	1/8" T.S. TO 1/8" NPT MALE	AF2	NMA	1 1/4"	3/4"
15-21AF2NMB	15,000	1/8" T.S. TO 1/4" NPT MALE	AF2	NMB	1 1/4"	5/8"
15-21AF2NMC	15,000	1/8" T.S. TO 3/8" NPT MALE	AF2	NMC	1 3/8"	3/4"
15-21AF2NMD	15,000	1/8" T.S. TO 1/2" NPT MALE	AF2	NMD	1 3/4"	1"
15-21AF2NMF	15,000	1/8" T.S. TO 3/4" NPT MALE	AF2	NMF	1 5/8"	1 3/8"
15-21AF2NMH	15,000	1/8" T.S. TO 1" NPT MALE	AF2	NMH	1 5/8"	1 3/8"
10-21AF4NMA	10,000	1/4" T.S. TO 1/8" NPT MALE	AF4	NMA	1 1/2"	1"
10-21AF4NMB	10,000	1/4" T.S. TO 1/4" NPT MALE	AF4	NMB	1 5/8"	1"
10-21AF4NMC	10,000	1/4" T.S. TO 3/8" NPT MALE	AF4	NMC	1 5/8"	1"
10-21AF4NMD	10,000	1/4" T.S. TO 1/2" NPT MALE	AF4	NMD	1 3/4"	1"
10-21AF4NMF	10,000	1/4" T.S. TO 3/4" NPT MALE	AF4	NMF	1 1/2"	1 3/8"
10-21AF4NMH	10,000	1/4" T.S. TO 1" NPT MALE	AF4	NMH	1 7/8"	1 3/8"
10-21AF6NMA	10,000	3/8" T.S. TO 1/8" NPT MALE	AF6	NMA	1 1/2"	1"
10-21AF6NMB	10,000	3/8" T.S. TO 1/4" NPT MALE	AF6	NMB	1 5/8"	1"
10-21AF6NMC	10,000	3/8" T.S. TO 3/8" NPT MALE	AF6	NMC	1 5/8"	1"
10-21AF6NMD	10,000	3/8" T.S. TO 1/2" NPT MALE	AF6	NMD	1 3/4"	1"
10-21AF6NMF	10,000	3/8" T.S. TO 3/4" NPT MALE	AF6	NMF	1 7/8"	1 3/8"
10-21AF6NMH	10,000	3/8" T.S. TO 1" NPT MALE	AF6	NMH	1 7/8"	1 3/8"



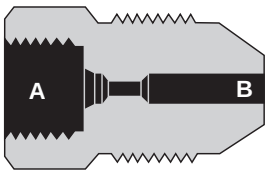
Female High Pressure to Male High Pressure

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
60-21HF2HM4	60,000	1/8" O.D. TUBE TO 1/4" H.P.	HF2	HM4	1 1/4"	3/4"
60-21HF2HM6	60,000	1/8" O.D. TUBE TO 3/8" H.P.	HF2	HM6	1 3/4"	3/4"
60-21HF2HM9	60,000	1/8" O.D. TUBE TO 9/16" H.P.	HF2	HM9	2 1/8"	1 1/8"
60-21HF4HM2	60,000	1/4" O.D. TUBE TO 1/8" H.P.	HF4	HM2	1 3/8"	3/4"
60-21HF4HM6	60,000	1/4" O.D. TUBE TO 3/8" H.P.	HF4	HM6	1 3/4"	3/4"
60-21HF4HM9	60,000	1/4" O.D. TUBE TO 9/16" H.P.	HF4	HM9	2 1/8"	1 1/8"
60-21HF6HM2	60,000	1/4" O.D. TUBE TO 1/8" H.P.	HF6	HM2	1 1/2"	1"
60-21HF6HM4	60,000	3/8" O.D. TUBE TO 1/4" H.P.	HF6	HM4	1 1/2"	1"
60-21HF6HM9	60,000	3/8" O.D. TUBE TO 9/16" H.P.	HF6	HM9	2 1/8"	1 1/8"
60-21HF9HM4	60,000	9/16" O.D. TUBE TO 1/4" H.P.	HF9	HM4	1 3/4"	1 3/8"
60-21HF9HM6	60,000	9/16" O.D. TUBE TO 3/8" H.P.	HF9	HM6	1 7/8"	1 3/8"



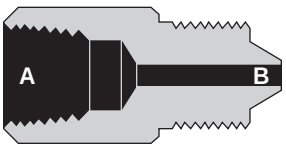
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Female Medium Pressure to Male Medium Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LF4LM6	20,000	1/4" M.P. FEMALE to 3/8" M.P. MALE	LF4	LM6	1 3/4"	3/4"
20-21LF4LM9	20,000	1/4" M.P. FEMALE to 9/16" M.P. MALE	LF4	LM9	1 7/8"	7/8"
20-21LF6LM4	20,000	3/8" M.P. FEMALE to 1/4" M.P. MALE	LF6	LM4	1 3/4"	3/4"
20-21LF6LM9	20,000	3/8" M.P. FEMALE to 9/16" M.P. MALE	LF6	LM9	1 7/8"	7/8"
20-21LF9LM4	20,000	9/16" M.P. FEMALE to 1/4" M.P. MALE	LF9	LM4	2 1/8"	1"
20-21LF9LM6	20,000	9/16" M.P. FEMALE to 3/8" M.P. MALE	LF9	LM6	2 1/8"	1"
20-21LF12LM4	20,000	3/4" M.P. FEMALE to 1/4" M.P. MALE	LF12	LM4	2 1/4"	1 3/8"
20-21LF12LM6	20,000	3/4" M.P. FEMALE to 3/8" M.P. MALE	LF12	LM6	2 3/8"	1 3/8"
20-21LF12LM9	20,000	3/4" M.P. FEMALE to 9/16" M.P. MALE	LF12	LM9	2 7/8"	1 3/8"
20-21LF12LM16	20,000	3/4" M.P. FEMALE to 1" M.P. MALE	LF12	LM16	3 3/4"	1 3/8"
20-21LF4LM12	20,000	1/4" M.P. FEMALE to 3/4" M.P. MALE	LF4	LM12	2"	1 1/8"
20-21LF6LM12	20,000	3/8" M.P. FEMALE to 3/4" M.P. MALE	LF6	LM12	2"	1 1/8"
20-21LF9LM12	20,000	9/16" M.P. FEMALE to 3/4" M.P. MALE	LF9	LM12	2 1/2"	1 1/8"
20-21LF16LM4	20,000	1" M.P. FEMALE to 1/4" M.P. MALE	LF16-30	LM4	2 3/4"	1 3/4"
20-21LF16LM6	20,000	1" M.P. FEMALE to 3/8" M.P. MALE	LF16-30	LM6	2 7/8"	1 3/4"
20-21LF16LM9	20,000	1" M.P. FEMALE to 9/16" M.P. MALE	LF16-30	LM9	3"	1 3/4"
20-21LF16LM12	20,000	1" M.P. FEMALE to 3/4" M.P. MALE	LF16-30	LM12	3 1/4"	1 3/4"
20-21LF4LM16	20,000	1/4" M.P. FEMALE to 1" M.P. MALE	LF4	LM16	3"	1"
20-21LF6LM16	20,000	3/8" M.P. FEMALE to 1" M.P. MALE	LF6	LM16	3 1/8"	1"
20-21LF9LM16	20,000	9/16" M.P. FEMALE to 1" M.P. MALE	LF9	LM16	3 3/8"	1"

Female Medium Pressure to Male High Pressure

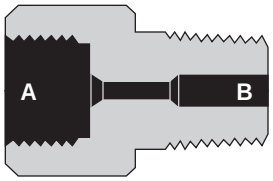


Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LF4HM4	20,000	1/4" M.P. FEMALE to 1/4" H.P. MALE	LF4	HM4	1 3/8"	3/4"
20-21LF4HM6	20,000	1/4" M.P. FEMALE to 3/8" H.P. MALE	LF4	HM6	1 3/4"	3/4"
20-21LF4HM9	20,000	1/4" M.P. FEMALE to 9/16" H.P. MALE	LF4	HM9	2 1/8"	1 1/8"
20-21LF6HM4	20,000	3/8" M.P. FEMALE to 1/4" H.P. MALE	LF6	HM4	1 3/4"	3/4"
20-21LF6HM6	20,000	3/8" M.P. FEMALE to 3/8" H.P. MALE	LF6	HM6	1 3/4"	3/4"
20-21LF6HM9	20,000	3/8" M.P. FEMALE to 9/16" H.P. MALE	LF6	HM9	2 1/8"	1 1/8"
20-21LF9HM4	20,000	9/16" M.P. FEMALE to 1/4" H.P. MALE	LF9	HM4	1 7/8"	1"
20-21LF9HM6	20,000	9/16" M.P. FEMALE to 3/8" H.P. MALE	LF9	HM6	2 1/8"	1"
20-21LF9HM9	20,000	9/16" M.P. FEMALE to 9/16" H.P. MALE	LF9	HM9	2 1/8"	1 1/8"
20-21LF12HM4	20,000	3/4" M.P. FEMALE to 1/4" H.P. MALE	LF12	HM4	2 1/2"	1 3/8"
20-21LF12HM6	20,000	3/4" M.P. FEMALE to 3/8" H.P. MALE	LF12	HM6	2 3/8"	1 3/8"
20-21LF12HM9	20,000	3/4" M.P. FEMALE to 9/16" H.P. MALE	LF12	HM9	2 5/8"	1 3/8"
*20-21LF16HM4	20,000	1" M.P. FEMALE to 1/4" H.P. MALE	LF16	HM4	2 5/8"	1 3/4"
*20-21LF16HM6	20,000	1" M.P. FEMALE to 3/8" H.P. MALE	LF16	HM6	2 7/8"	1 3/4"
*20-21LF16HM9	20,000	1" M.P. FEMALE to 9/16" H.P. MALE	LF16	HM9	3 1/8"	1 3/4"

*Can be rated to 30,000 psi if used with 1" O.D. x 7/16" I.D. tubing.

Female Medium Pressure to Male Pipe

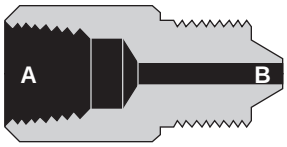
Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LF4NMA	15,000	1/4" M.P. FEMALE to 1/8" NPT MALE	LF4	NMA	1 7/16"	3/4"
20-21LF4NMB	15,000	1/4" M.P. FEMALE to 1/4" NPT MALE	LF4	NMB	1 5/8"	3/4"
20-21LF4NMC	15,000	1/4" M.P. FEMALE to 3/8" NPT MALE	LF4	NMC	1 5/8"	3/4"
20-21LF4NMD	15,000	1/4" M.P. FEMALE to 1/2" NPT MALE	LF4	NMD	1 3/4"	1"
10-21LF4NMF	10,000	1/4" M.P. FEMALE to 3/4" NPT MALE	LF4	NMF	1 7/8"	1 3/8"
10-21LF4NMH	10,000	1/4" M.P. FEMALE to 1" NPT MALE	LF4	NMH	1 7/8"	1 3/8"
20-21LF6NMA	15,000	3/8" M.P. FEMALE to 1/8" NPT MALE	LF6	NMA	1 7/16"	3/4"
20-21LF6NMB	15,000	3/8" M.P. FEMALE to 1/4" NPT MALE	LF6	NMB	1 5/8"	3/4"
20-21LF6NMC	15,000	3/8" M.P. FEMALE to 3/8" NPT MALE	LF6	NMC	1 5/8"	3/4"
20-21LF6NMD	15,000	3/8" M.P. FEMALE to 1/2" NPT MALE	LF6	NMD	1 3/4"	1"
10-21LF6NMF	10,000	3/8" M.P. FEMALE to 3/4" NPT MALE	LF6	NMF	1 7/8"	1 3/8"
10-21LF6NMH	10,000	3/8" M.P. FEMALE to 1" NPT MALE	LF6	NMH	1 7/8"	1 3/8"
20-21LF9NMA	15,000	9/16" M.P. FEMALE to 1/8" NPT MALE	LF9	NMA	1 7/8"	1"
20-21LF9NMB	15,000	9/16" M.P. FEMALE to 1/4" NPT MALE	LF9	NMB	1 7/8"	1"
20-21LF9NMC	15,000	9/16" M.P. FEMALE to 3/8" NPT MALE	LF9	NMC	1 7/8"	1"
20-21LF9NMD	15,000	9/16" M.P. FEMALE to 1/2" NPT MALE	LF9	NMD	1 7/8"	1"
10-21LF9NMF	10,000	9/16" M.P. FEMALE to 3/4" NPT MALE	LF9	NMF	1 7/8"	1 3/8"
10-21LF9NMH	10,000	9/16" M.P. FEMALE to 1" NPT MALE	LF9	NMH	1 7/8"	1 3/8"
20-21LF12NMA	15,000	3/4" M.P. FEMALE to 1/8" NPT MALE	LF12	NMA	2 1/2"	1 3/8"
20-21LF12NMB	15,000	3/4" M.P. FEMALE to 1/4" NPT MALE	LF12	NMB	2 1/2"	1 3/8"
20-21LF12NMC	15,000	3/4" M.P. FEMALE to 3/8" NPT MALE	LF12	NMC	2 1/2"	1 3/8"
20-21LF12NMD	15,000	3/4" M.P. FEMALE to 1/2" NPT MALE	LF12	NMD	2 1/2"	1 3/8"
10-21LF12NMF	10,000	3/4" M.P. FEMALE to 3/4" NPT MALE	LF12	NMF	2 1/2"	1 3/8"
10-21LF12NMH	10,000	3/4" M.P. FEMALE to 1" NPT MALE	LF12	NMH	2 1/2"	1 3/8"
20-21LF16NMA	15,000	1" M.P. FEMALE to 1/8" NPT MALE	LF16-30	NMA	2 1/2"	1 3/8"
20-21LF16NMB	15,000	1" M.P. FEMALE to 1/4" NPT MALE	LF16-30	NMB	2 1/2"	1 3/8"
20-21LF16NMC	15,000	1" M.P. FEMALE to 3/8" NPT MALE	LF16-30	NMC	2 1/2"	1 3/8"
20-21LF16NMD	15,000	1" M.P. FEMALE to 1/2" NPT MALE	LF16-30	NMD	2 1/2"	1 3/8"
10-21LF16NMF	10,000	1" M.P. FEMALE to 3/4" NPT MALE	LF16-30	NMF	2 1/2"	1 3/8"
10-21LF16NMH	10,000	1" M.P. FEMALE to 1" NPT MALE	LF16-30	NMH	2 1/2"	1 3/8"



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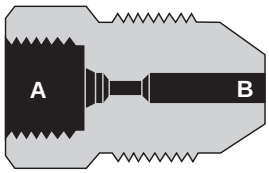
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Female Pipe to Male High Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
30-21NFAHM2	15,000	1/8" NPT TO 1/8" H.P. MALE	NFA	HM2	1 5/8"	3/4"
30-21NFBHM2	15,000	1/4" NPT TO 1/8" H.P. MALE	NFB	HM2	1 5/8"	3/4"
30-21NFCHM2	15,000	3/8" NPT TO 1/8" H.P. MALE	NFC	HM2	1 3/4"	1"
30-21NFAHM4	15,000	1/8" NPT TO 1/4" H.P. MALE	NFA	HM4	1 5/8"	3/4"
30-21NFBHM4	15,000	1/4" NPT TO 1/4" H.P. MALE	NFB	HM4	1 3/4"	3/4"
30-21NFCHM4	15,000	3/8" NPT TO 1/4" H.P. MALE	NFC	HM4	1 3/4"	1"
30-21NFDHM4	15,000	1/2" NPT TO 1/4" H.P. MALE	NFD	HM4	2 1/8"	1 1/8"
30-21NFAHM6	15,000	1/8" NPT TO 3/8" H.P. MALE	NFA	HM6	1 5/8"	3/4"
30-21NFBHM6	15,000	1/4" NPT TO 3/8" H.P. MALE	NFB	HM6	1 3/4"	3/4"
30-21NFCHM6	15,000	3/8" NPT TO 3/8" H.P. MALE	NFC	HM6	1 3/4"	1"
30-21NFDHM6	15,000	1/2" NPT TO 3/8" H.P. MALE	NFD	HM6	2 1/8"	1 1/8"
10-21NFFHM6	10,000	3/4" NPT TO 3/8" H.P. MALE	NFF	HM6	2 1/2"	1 5/8"
30-21NFAHM9	15,000	1/8" NPT TO 9/16" H.P. MALE	NFA	HM9	2 1/8"	1 1/8"
30-21NFBHM9	15,000	1/4" NPT TO 9/16" H.P. MALE	NFB	HM9	2 1/8"	1 1/8"
30-21NFCHM9	15,000	3/8" NPT TO 9/16" H.P. MALE	NFC	HM9	2 1/8"	1 1/8"
30-21NFDHM9	15,000	1/2" NPT TO 9/16" H.P. MALE	NFD	HM9	2 1/8"	1 1/8"
10-21NFFHM9	10,000	3/4" NPT TO 9/16" H.P. MALE	NFF	HM9	2 1/4"	1 3/8"
10-21NFHHM9	10,000	1" NPT TO 9/16" H.P. MALE	NFH	HM9	2"	1 7/8"

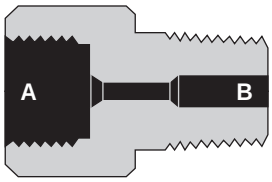
Female High Pressure to Male Medium Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21HF4LM4	20,000	1/4" H.P. FEMALE to 1/4" M.P. MALE	HF4	LM4	1 3/4"	3/4"
20-21HF4LM6	20,000	1/4" H.P. FEMALE to 3/8" M.P. MALE	HF4	LM6	1 3/4"	3/4"
20-21HF4LM9	20,000	1/4" H.P. FEMALE to 9/16" M.P. MALE	HF4	LM9	1 7/8"	7/8"
20-21HF6LM4	20,000	3/8" H.P. FEMALE to 1/4" M.P. MALE	HF6	LM4	1 7/8"	1"
20-21HF6LM6	20,000	3/8" H.P. FEMALE to 3/8" M.P. MALE	HF6	LM6	1 7/8"	1"
20-21HF6LM9	20,000	3/8" H.P. FEMALE to 9/16" M.P. MALE	HF6	LM9	2"	1"
20-21HF9LM4	20,000	9/16" H.P. FEMALE to 1/4" M.P. MALE	HF9	LM4	2 1/8"	1 3/8"
20-21HF9LM6	20,000	9/16" H.P. FEMALE to 3/8" M.P. MALE	HF9	LM6	2 1/8"	1 3/8"
20-21HF9LM9	20,000	9/16" H.P. FEMALE to 9/16" M.P. MALE	HF9	LM9	2 3/8"	1 3/8"
20-21HF4LM12	20,000	1/4" H.P. FEMALE to 3/4" M.P. MALE	HF4	LM12	2 1/4"	1 1/8"
20-21HF6LM12	20,000	3/8" H.P. FEMALE to 3/4" M.P. MALE	HF6	LM12	2 1/4"	1 1/8"
20-21HF9LM12	20,000	9/16" H.P. FEMALE to 3/4" M.P. MALE	HF9	LM12	2 1/2"	1 3/8"
20-21HF4LM16	20,000	1/4" H.P. FEMALE to 1" M.P. MALE	HF4	LM16	3"	1"
20-21HF6LM16	20,000	3/8" H.P. FEMALE to 1" M.P. MALE	HF6	LM16	3 1/4"	1"
20-21HF9LM16	20,000	9/16" H.P. FEMALE to 1" M.P. MALE	HF9	LM16	3 5/8"	1 3/8"
20-21HF4LM16	20,000	1/4" H.P. FEMALE to 1" M.P. MALE	HF4	LM16-30	3"	1"
20-21HF6LM16	20,000	3/8" H.P. FEMALE to 1" M.P. MALE	HF6	LM16-30	3 1/4"	1"
20-21HF9LM16	20,000	9/16" H.P. FEMALE to 1" M.P. MALE	HF9	LM16-30	3 5/8"	1 3/8"

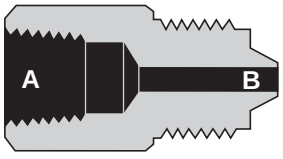
Female High Pressure to Male Pipe

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
30-21HF2NMA	15,000	1/8" H.P. TO 1/8" NPT MALE	HF2	NMA	1 1/4"	5/8"
30-21HF2NMB	15,000	1/8" H.P. TO 1/4" NPT MALE	HF2	NMB	1 1/4"	5/8"
30-21HF2NMC	15,000	1/8" H.P. TO 3/8" NPT MALE	HF2	NMC	1 3/8"	3/4"
30-21HF2NMD	15,000	1/8" H.P. TO 1/2" NPT MALE	HF2	NMD	1 1/2"	1"
10-21HF2NMF	10,000	1/8" H.P. TO 3/4" NPT MALE	HF2	NMF	1 3/4"	1 3/8"
10-21HF2NMH	10,000	1/8" H.P. TO 1" NPT MALE	HF2	NMH	1 3/4"	1 3/8"
30-21HF4NMA	15,000	1/4" H.P. TO 1/8" NPT MALE	HF4	NMA	1 1/4"	3/4"
30-21HF4NMB	15,000	1/4" H.P. TO 1/4" NPT MALE	HF4	NMB	1 3/8"	3/4"
30-21HF4NMC	15,000	1/4" H.P. TO 3/8" NPT MALE	HF4	NMC	1 3/8"	3/4"
30-21HF4NMD	15,000	1/4" H.P. TO 1/2" NPT MALE	HF4	NMD	1 3/4"	1"
10-21HF4NMF	10,000	1/4" H.P. TO 3/4" NPT MALE	HF4	NMF	1 3/4"	1 3/8"
10-21HF4NMH	10,000	1/4" H.P. TO 1" NPT MALE	HF4	NMH	1 5/8"	1 3/8"
30-21HF6NMA	15,000	3/8" H.P. TO 1/8" NPT MALE	HF6	NMA	1 1/2"	1"
30-21HF6NMB	15,000	3/8" H.P. TO 1/4" NPT MALE	HF6	NMB	1 5/8"	1"
30-21HF6NMC	15,000	3/8" H.P. TO 3/8" NPT MALE	HF6	NMC	1 5/8"	1"
30-21HF6NMD	15,000	3/8" H.P. TO 1/2" NPT MALE	HF6	NMD	1 3/4"	1"
10-21HF6NMF	10,000	3/8" H.P. TO 3/4" NPT MALE	HF6	NMF	1 7/8"	1 3/8"
10-21HF6NMH	10,000	3/8" H.P. TO 1" NPT MALE	HF6	NMH	1 7/8"	1 3/8"
30-21HF9NMA	15,000	9/16" H.P. TO 1/8" NPT MALE	HF9	NMA	1 1/2"	1 3/8"
30-21HF9NMB	15,000	9/16" H.P. TO 1/4" NPT MALE	HF9	NMB	1 5/8"	1 3/8"
30-21HF9NMC	15,000	9/16" H.P. TO 3/8" NPT MALE	HF9	NMC	1 3/4"	1 3/8"
30-21HF9NMD	15,000	9/16" H.P. TO 1/2" NPT MALE	HF9	NMD	1 7/8"	1 3/8"
10-21HF9NMF	10,000	9/16" H.P. TO 3/4" NPT MALE	HF9	NMF	1 7/8"	1 3/8"
10-21HF9NMH	10,000	9/16" H.P. TO 1" NPT MALE	HF9	NMH	2"	1 3/8"



Female Pipe to Male Taper Seal

Catalog No.	Pressure Rating psi	Connections	A	B	Hex Length	Size
15-21NFAAM2	15,000	1/8" FNPT TO 1/8" MALE T.S.	NFA	AM2	1 1/2"	5/8"
15-21NFBAM2	15,000	1/4" FNPT TO 1/8" MALE T.S.	NFB	AM2	1 5/8"	3/4"
15-21NFCAM2	15,000	3/8" FNPT TO 1/8" MALE T.S.	NFC	AM2	1 3/4"	1"
10-21NFAAM4	10,000	1/8" FNPT TO 1/4" MALE T.S.	NFA	AM4	1 3/4"	7/8"
10-21NFBAM4	10,000	1/4" FNPT TO 1/4" MALE T.S.	NFB	AM4	1 3/4"	1"
10-21NFCAM4	10,000	3/8" FNPT TO 1/4" MALE T.S.	NFC	AM4	1 3/4"	1"
10-21NFDAM4	10,000	1/2" FNPT TO 1/4" MALE T.S.	NFD	AM4	2 1/8"	1 1/8"
10-21NFAAM6	10,000	1/8" FNPT TO 3/8" MALE T.S.	NFA	AM6	2"	1"
10-21NFBAM6	10,000	1/4" FNPT TO 3/8" MALE T.S.	NFB	AM6	2"	1"
10-21NFCAM6	10,000	3/8" FNPT TO 3/8" MALE T.S.	NFC	AM6	2"	1"
10-21NFDAM6	10,000	1/2" FNPT TO 3/8" MALE T.S.	NFD	AM6	2 1/8"	1 1/8"

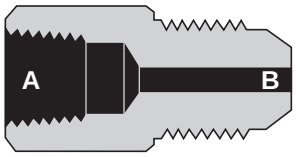


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R3 12/00

Female Pipe to Male Medium Pressure

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21NFALM4	15,000	1/8" N.P.T. FEMALE to 1/4" M.P. MALE	NFA	LM4	1 3/4"	3/4"
20-21NFBLM4	15,000	1/4" N.P.T. FEMALE to 1/4" M.P. MALE	NFB	LM4	1 3/4"	3/4"
20-21NFCLM4	15,000	3/8" N.P.T. FEMALE to 1/4" M.P. MALE	NFC	LM4	2"	1"
20-21NFDLM4	15,000	1/2" N.P.T. FEMALE to 1/4" M.P. MALE	NFD	LM4	2 1/8"	1 1/8"
10-21NFFLM4	10,000	3/4" N.P.T. FEMALE to 1/4" M.P. MALE	NFF	LM4	2 3/8"	1 3/8"
20-21NFALM6	15,000	1/8" N.P.T. FEMALE to 3/8" M.P. MALE	NFA	LM6	1 7/8"	3/4"
20-21NFBLM6	15,000	1/4" N.P.T. FEMALE to 3/8" M.P. MALE	NFB	LM6	1 7/8"	3/4"
20-21NFCLM6	15,000	3/8" N.P.T. FEMALE to 3/8" M.P. MALE	NFC	LM6	2 1/8"	1"
20-21NFDLM6	15,000	1/2" N.P.T. FEMALE to 3/8" M.P. MALE	NFD	LM6	2 1/4"	1 1/8"
10-21NFFLM6	10,000	3/4" N.P.T. FEMALE to 3/8" M.P. MALE	NFF	LM6	2 1/2"	1 3/8"
10-21NFHLM6	10,000	1" N.P.T. FEMALE to 3/8" M.P. MALE	NFH	LM6	2 7/8"	1 7/8"
20-21NFALM9	15,000	1/8" N.P.T. FEMALE to 9/16" M.P. MALE	NFA	LM9	1 7/8"	7/8"
20-21NFBLM9	15,000	1/4" N.P.T. FEMALE to 9/16" M.P. MALE	NFB	LM9	1 7/8"	7/8"
20-21NFCLM9	15,000	3/8" N.P.T. FEMALE to 9/16" M.P. MALE	NFC	LM9	2 1/4"	1"
20-21NFDLM9	15,000	1/2" N.P.T. FEMALE to 9/16" M.P. MALE	NFD	LM9	2 3/8"	1 1/8"
10-21NFFLM9	10,000	3/4" N.P.T. FEMALE to 9/16" M.P. MALE	NFF	LM9	2 5/8"	1 3/8"
10-21NFHLM9	10,000	1" N.P.T. FEMALE to 9/16" M.P. MALE	NFH	LM9	3"	1 7/8"
20-21NFALM12	15,000	1/8" N.P.T. FEMALE to 3/4" M.P. MALE	NFA	LM12	2"	1 1/8"
20-21NFBLM12	15,000	1/4" N.P.T. FEMALE to 3/4" M.P. MALE	NFB	LM12	2"	1 1/8"
20-21NFCLM12	15,000	3/8" N.P.T. FEMALE to 3/4" M.P. MALE	NFC	LM12	2"	1 1/8"
20-21NFDLM12	15,000	1/2" N.P.T. FEMALE to 3/4" M.P. MALE	NFD	LM12	2 1/2"	1 1/8"
10-21NFFLM12	10,000	3/4" N.P.T. FEMALE to 3/4" M.P. MALE	NFF	LM12	2 3/4"	1 1/2"
10-21NFHLM12	10,000	1" N.P.T. FEMALE to 3/4" M.P. MALE	NFH	LM12	3"	1 7/8"
20-21NFALM16	15,000	1/8" N.P.T. FEMALE to 1" M.P. MALE	NFA	LM16	3"	1"
20-21NFBLM16	15,000	1/4" N.P.T. FEMALE to 1" M.P. MALE	NFB	LM16	3"	1"
20-21NFCLM16	15,000	3/8" N.P.T. FEMALE to 1" M.P. MALE	NFC	LM16	3"	1"
20-21NFDLM16	15,000	1/2" N.P.T. FEMALE to 1" M.P. MALE	NFD	LM16	3 3/4"	1 1/8"
10-21NFFLM16	10,000	3/4" N.P.T. FEMALE to 1" M.P. MALE	NFF	LM16	4 1/8"	1 1/2"
10-21NFHLM16	10,000	1" N.P.T. FEMALE to 1" M.P. MALE	NFH	LM16	4 3/8"	1 7/8"



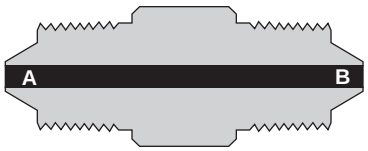
Adapters: Male to Male

Male to Male Adapters are available in the most commonly used sizes as listed below. These adapters permit the user to convert female connections to male connections, and are especially useful in confined installations or where rigidity is required. **Standard material** is high tensile Type 316 stainless steel.



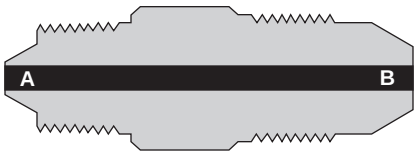
Male Taper Seal to Male Taper Seal

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AM1AM1	15,000	1/16" T.S. to 1/16" T.S.	AM1	AM1	1 3/8"	1/2"
15-21AM2AM2	15,000	1/8" T.S. to 1/8" T.S.	AM2	AM2	1 5/8"	5/8"
10-21AM2AM4	10,000	1/8" T.S. to 1/8" T.S.	AM2	AM4	1 7/8"	7/8"
10-21AM4AM4	10,000	1/4" T.S. to 1/4" T.S.	AM4	AM4	2 1/8"	7/8"
10-21AM4AM6	10,000	1/4" T.S. to 3/8" T.S.	AM4	AM6	2 1/8"	3/4"
10-21AM6AM6	10,000	3/8" T.S. to 3/8" T.S.	AM6	AM6	2 1/8"	3/4"



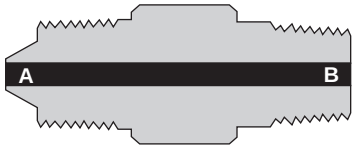
Male Taper Seal to Male Medium Pressure

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
10-21AM4LM4	10,000	1/4" T.S. to 1/4" M.P.	AM4	LM4	2 1/8"	7/8"
10-21AM4LM6	10,000	1/4" T.S. to 3/8" M.P.	AM4	LM6	2 3/16"	7/8"
10-21AM4LM9	10,000	1/4" T.S. to 9/16" M.P.	AM4	LM9	2 3/8"	7/8"
10-21AM6LM4	10,000	3/8" T.S. to 1/4" M.P.	AM6	LM4	2 1/8"	7/8"
10-21AM6LM6	10,000	3/8" T.S. to 3/8" M.P.	AM6	LM6	2 3/16"	7/8"
10-21AM6LM9	10,000	3/8" T.S. to 9/16" M.P.	AM6	LM9	2 3/8"	7/8"
15-21AM2LM4	15,000	1/8" T.S. to 1/4" M.P.	AM2	LM4	1 7/8"	1/2"
15-21AM2LM6	15,000	1/8" T.S. to 3/8" M.P.	AM2	LM6	2"	5/8"
15-21AM2LM9	15,000	1/8" T.S. to 9/16" M.P.	AM2	LM9	2 1/8"	7/8"



Male Taper Seal to Male Pipe

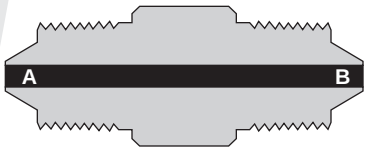
Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AM1NMA	15,000	1/16" T.S. to 1/8" NPT MALE	AM1	NMA	1 7/16"	1/2"
15-21AM1NMB	15,000	1/16" T.S. to 1/4" NPT MALE	AM1	NMB	1 9/16"	5/8"
15-21AM2NMA	15,000	1/8" T.S. to 1/8" NPT MALE	AM2	NMA	1 5/8"	1/2"
15-21AM2NMB	15,000	1/8" T.S. to 1/4" NPT MALE	AM2	NMB	1 3/4"	5/8"
15-21AM4NMB	15,000	1/4" T.S. to 1/4" NPT MALE	AM4	NMB	2"	3/4"



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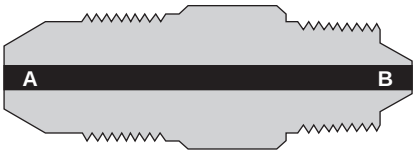
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Male Taper Seal to Male High Pressure



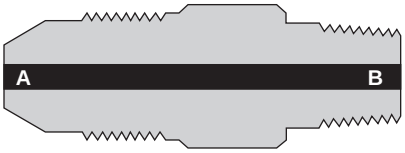
Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AM2HM2	15,000	1/8" T.S. to 1/8" H.P.	AM2	HM2	1 9/16"	5/8"
15-21AM2HM4	15,000	1/8" T.S. to 1/4" H.P.	AM2	HM4	1 5/8"	3/4"
10-21AM4HM4	10,000	1/4" T.S. to 1/4" H.P.	AM4	HM4	2"	3/4"

Male Medium Pressure to Male High Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LM4HM2	20,000	1/4" M.P. to 1/8" H.P.	LM4	HM2	1 7/8"	5/8"
20-21LM4HM9	20,000	1/4" M.P. to 9/16" H.P.	LM4	HM9	2 3/8"	1 1/8"
20-21LM9HM4	20,000	9/16" M.P. to 1/4" H.P.	LM9	HM4	2 1/4"	7/8"
20-21LM9HM9	20,000	9/16" M.P. to 9/16" H.P.	LM9	HM9	2 5/8"	1 1/8"
20-21LM6HM4	20,000	3/8" M.P. to 1/4" H.P.	LM6	HM4	2 1/8"	5/8"
20-21LM6HM9	20,000	3/8" M.P. to 9/16" H.P.	LM6	HM9	2 1/2"	1 1/8"

Male Medium Pressure to Male Pipe (NPT)



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LM4NMB	15,000	1/4" M.P. to 1/4" NPT MALE	LM4	NMB	2"	5/8"
20-21LM4NMD	15,000	1/4" M.P. to 1/2" NPT MALE	LM4	NMD	2 1/8"	7/8"
20-21LM6NMB	15,000	3/8" M.P. to 1/4" NPT MALE	LM6	NMB	2 1/16"	3/4"
20-21LM6NMC	15,000	3/8" M.P. to 3/8" NPT MALE	LM6	NMC	2 1/16"	3/4"
20-21LM6NMD	15,000	3/8" M.P. to 1/2" NPT MALE	LM6	NMD	2 3/16"	7/8"
20-21LM9NMA	15,000	9/16" M.P. to 1/8" NPT MALE	LM9	NMA	2 1/8"	7/8"
20-21LM9NMB	15,000	9/16" M.P. to 1/4" NPT MALE	LM9	NMB	2 1/4"	7/8"
20-21LM9NMC	15,000	9/16" M.P. to 3/8" NPT MALE	LM9	NMC	2 1/4"	7/8"
20-21LM9NMD	15,000	9/16" M.P. to 1/2" NPT MALE	LM9	NMD	2 3/8"	7/8"
10-21LM9NMF	10,000	9/16" M.P. to 3/4" NPT MALE	LM9	NMF	2 5/8"	1 1/8"
10-21LM9NMH	10,000	9/16" M.P. to 1" NPT MALE	LM9	NMH	2 5/8"	1 3/8"
20-21LM12NMA	15,000	3/4" M.P. to 1/8" NPT MALE	LM12	NMA	2 3/8"	1 1/8"
20-21LM12NMB	15,000	3/4" M.P. to 1/4" NPT MALE	LM12	NMB	2 1/2"	1 1/8"
20-21LM12NMC	15,000	3/4" M.P. to 3/8" NPT MALE	LM12	NMC	2 1/2"	1 1/8"
20-21LM12NMD	15,000	3/4" M.P. to 1/2" NPT MALE	LM12	NMD	2 5/8"	1 1/8"
10-21LM12NMF	10,000	3/4" M.P. to 3/4" NPT MALE	LM12	NMF	2 3/4"	1 1/8"
10-21LM12NMH	10,000	3/4" M.P. to 1" NPT MALE	LM12	NMH	3"	1 3/8"
20-21LM16NMA	15,000	1" M.P. to 1/8" NPT MALE	LM16	NMA	3 5/8"	1"
20-21LM16NMB	15,000	1" M.P. to 1/4" NPT MALE	LM16	NMB	3 3/4"	1"
20-21LM16NMC	15,000	1" M.P. to 3/8" NPT MALE	LM16	NMC	3 3/4"	1"
20-21LM16NMD	15,000	1" M.P. to 1/2" NPT MALE	LM16	NMD	3 7/8"	1"
10-21LM16NMF	10,000	1" M.P. to 3/4" NPT MALE	LM16	NMF	3 7/8"	1 1/8"
10-21LM16NMH	10,000	1" M.P. to 1" NPT MALE	LM16	NMH	4"	1 3/8"

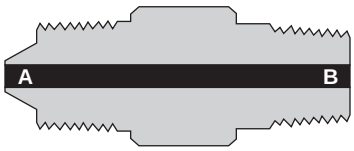
Male Medium Pressure to Male Medium Pressure

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LM4LM4	20,000	1/4" M.P. to 1/4" M.P.	LM4	LM4	2"	5/8"
20-21LM4LM6	20,000	1/4" M.P. to 3/8" M.P.	LM4	LM4	2 1/8"	3/4"
20-21LM6LM6	20,000	3/8" M.P. to 3/8" M.P.	LM6	LM6	2 1/4"	3/4"
20-21LM6LM9	20,000	3/8" M.P. to 9/16" M.P.	LM6	LM6	2 1/2"	7/8"
20-21LM9LM9	20,000	9/16" M.P. to 9/16" M.P.	LM9	LM9	2 5/8	7/8"
20-21LM4LM12	20,000	1/4" M.P. to 3/4" M.P.	LM4	LM12	2 1/2"	1 1/8"
20-21LM6LM12	20,000	3/8" M.P. to 3/4" M.P.	LM6	LM12	2 5/8"	1 1/8"
20-21LM9LM12	20,000	9/16" M.P. to 3/4" M.P.	LM9	LM12	2 7/8"	1 1/8"
20-21LM4LM16	20,000	1/4" M.P. to "1" M.P.	LM4	LM16	3 5/8"	1"
20-21LM6LM16	20,000	3/8" M.P. to "1" M.P.	LM6	LM16	3 3/4"	1"
20-21LM9LM16	20,000	9/16" M.P. to "1" M.P.	LM9	LM16	4"	1"
20-21LM12LM12	20,000	3/4" M.P. to 3/4" M.P.	LM12	LM12	3"	1 1/8"
20-21LM12LM16	20,000	3/4" M.P. to "1" M.P.	LM12	LM12	4 1/4"	1 1/8"



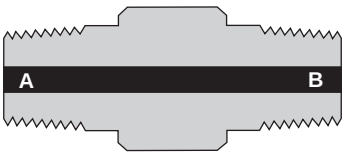
Male High Pressure to Male Pipe (NPT)

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
30-21HM2NMA	15,000	1/8" H.P. to 1/8" NPT MALE	HM2	NMA	1 5/8"	1/2"
30-21HM2NMB	15,000	1/8" H.P. to 1/4" NPT MALE	HM2	NMB	1 3/4"	5/8"
30-21HM4NMA	15,000	1/4" H.P. to 1/8" NPT MALE	HM4	NMA	1 7/8"	5/8"
30-21HM4NMB	15,000	1/4" H.P. to 1/4" NPT MALE	HM4	NMB	2"	5/8"
30-21HM4NMC	15,000	1/4" H.P. to 3/8" NPT MALE	HM4	NMC	2"	3/4"
30-21HM4NMD	15,000	1/4" H.P. to 1/2" NPT MALE	HM4	NMD	2 1/8"	7/8"
10-21HM4NMF	10,000	1/4" H.P. to 3/4" NPT MALE	HM4	NMF	2 1/4"	1 1/8"
30-21HM6NMB	15,000	3/8" H.P. to 1/4" NPT MALE	HM6	NMB	2 1/8"	7/8"
30-21HM6NMC	15,000	3/8" H.P. to 3/8" NPT MALE	HM6	NMC	2 1/8"	7/8"
30-21HM9NMB	15,000	9/16" H.P. to 1/4" NPT MALE	HM9	NMB	2 3/8"	1 1/8"
30-21HM9NMC	15,000	9/16" H.P. to 3/8" NPT MALE	HM9	NMC	2 3/8"	1 1/8"
30-21HM9NMD	15,000	9/16" H.P. to 1/2" NPT MALE	HM9	NMD	2 1/2"	1 1/8"
10-21HM9NMF	10,000	9/16" H.P. to 3/4" NPT MALE	HM9	NMF	2 5/8"	1 1/8"
10-21HM9NMH	10,000	9/16" H.P. to 1" NPT MALE	HM9	NMH	2 3/4"	1 3/8"



Male Pipe to Male Pipe

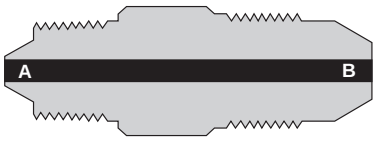
Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21NMBNMB	15,000	1/4" NPT MALE to 1/4" NPT MALE	NMB	NMB	1 7/8"	5/8"
15-21NMBNMC	15,000	1/4" NPT MALE to 3/8" NPT MALE	NMB	NMB	2"	3/4"
15-21NMCNMC	15,000	3/8" NPT MALE to 3/8" NPT MALE	NMC	NMC	2"	3/4"
15-21NMDNMD	15,000	1/2" NPT MALE to 1/2" NPT MALE	NMD	NMD	2 1/8"	1"



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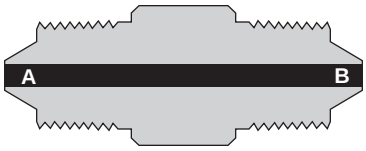
R5 8/04

Male High Pressure to Male Medium Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21HM4LM12	20,000	1/4" H.P. to 3/4" M.P.	HM4	LM12	2 5/8"	1 1/8"
20-21HM6LM12	20,000	3/8" H.P. to 3/4" M.P.	HM6	LM12	2 3/4"	1 1/8"
20-21HM9LM12	20,000	9/16" H.P. to 3/4" M.P.	HM9	LM12	3"	1 1/8"
20-21HM4LM16	20,000	1/4" H.P. to 1" M.P.	HM4	LM16	3 5/8"	1"
20-21HM6LM16	20,000	3/8" H.P. to 1" M.P.	HM6	LM16	4"	1"
20-21HM9LM16	20,000	9/16" H.P. to 1" M.P.	HM9	LM16	4"	1 1/8"

Male High Pressure to Male High Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
60-21HM2HM2	60,000	1/8" H.P. to 1/8" H.P.	HM2	HM2	1 1/2"	1/2"
60-21HM2HM4	60,000	1/8" H.P. to 1/4" H.P.	HM2	HM4	1 5/8"	5/8"
60-21HM4HM4	60,000	1/4" H.P. to 1/4" H.P.	HM4	HM4	1 11/16"	5/8"
60-21HM4HM6	60,000	1/4" H.P. to 3/8" H.P.	HM4	HM6	2 1/16"	3/4"
60-21HM4HM9	60,000	1/4" H.P. to 9/16" H.P.	HM4	HM9	2 1/4"	1 1/8"
60-21HM6HM6	60,000	3/8" H.P. to 3/8" H.P.	HM6	HM6	2 1/4"	3/4"
60-21HM6HM9	60,000	3/8" H.P. to 9/16" H.P.	HM6	HM9	2 1/2"	1 1/8"
60-21HM9HM9	60,000	9/16" H.P. to 9/16" H.P.	HM9	HM9	2 5/8"	1 1/8"
30-21HM4HM16	30,000	1/4" H.P. to 1" M.P.	HM4	HM16	3 5/8"	1"
30-21HM6HM16	30,000	3/8" H.P. to 1" M.P.	HM6	HM16	4"	1"
30-21HM9HM16	30,000	9/16" H.P. to 1" M.P.	HM9	HM16	4"	1 1/8"

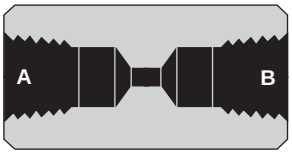
NPT Fittings

A complete line of couplings and adapters with NPT threaded connections are now available. These fittings feature 316 cold-worked stainless steel construction, with other materials available. HiP maintains an inventory of these fittings for quick ship requirements.



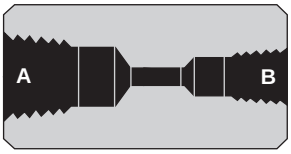
NPT Straight Couplings

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21NFA	15,000	1/8" FEMALE NPT x 1/8" FEMALE NPT	NFA	NFA	1 1/4"	3/4"
15-21NFB	15,000	1/4" FEMALE NPT x 1/4" FEMALE NPT	NFB	NFB	1 3/4"	1"
15-21NFC	15,000	3/8" FEMALE NPT x 3/8" FEMALE NPT	NFC	NFC	1 3/8"	1"
15-21NFD	15,000	1/2" FEMALE NPT x 1/2" FEMALE NPT	NFD	NFD	1 7/8"	1 3/8"
10-21NFF	10,000	3/4" FEMALE NPT x 3/4" FEMALE NPT	NFF	NFF	2 1/2"	1 3/8"
10-21NFH	10,000	1" FEMALE NPT x 1" FEMALE NPT	NFH	NFH	2 1/2"	1 3/4"



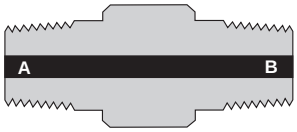
NPT Reducer Couplings

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21NFBNFC	15,000	1/4" FEMALE NPT x 3/8" FEMALE NPT	NFB	NFC	1 1/2"	1"
15-21NFBNFD	15,000	1/4" FEMALE NPT x 1/2" FEMALE NPT	NFB	NFD	2"	1 3/8"
15-21NFCNFD	15,000	3/8" FEMALE NPT x 1/2" FEMALE NPT	NFC	NFD	2"	1 3/8"



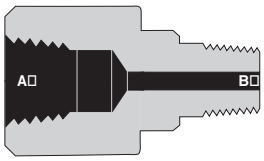
Adapters: Male to Male NPT

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21NMANMA	15,000	1/8" MALE NPT x 1/8" MALE NPT	NMA	NMA	1 3/4"	1/2"
15-21NMBNMB	15,000	1/4" MALE NPT x 1/4" MALE NPT	NMB	NMB	1 7/8"	5/8"
15-21NMCNMC	15,000	3/8" MALE NPT x 3/8" MALE NPT	NMC	NMC	2"	3/4"
15-21NMDNMD	15,000	1/2" MALE NPT x 1/2" MALE NPT	NMD	NMD	2 1/8"	1"
10-21NMFNMF	10,000	3/4" MALE NPT x 3/4" MALE NPT	NMF	NMF	2 3/8"	1 1/8"
10-21NMHNMH	10,000	1" MALE NPT x 1" MALE NPT	NMH	NMH	2 5/8"	1 3/8"
15-21NMBNMC	15,000	1/4" MALE NPT x 3/8" MALE NPT	NMB	NMC	2"	3/4"
15-21NMBNMD	15,000	1/4" MALE NPT x 1/2" MALE NPT	NMB	NMD	2"	7/8"
15-21NMCNMD	15,000	3/8" MALE NPT x 1/2" MALE NPT	NMC	NMD	2"	1"



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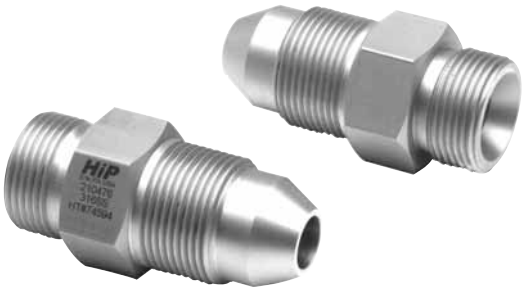
Adapters: Female to Male NPT



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21NFANMA	15,000	1/8" FEMALE NPT x 1/8" MALE NPT	NFA	NMA	1 1/2"	3/4"
15-21NFANMB	15,000	1/8" FEMALE NPT x 1/4" MALE NPT	NFA	NMB	1 3/4"	3/4"
15-21NFANMC	15,000	1/8" FEMALE NPT x 3/8" MALE NPT	NFA	NMC	1 5/8"	3/4"
15-21NFANMD	15,000	1/8" FEMALE NPT x 1/2" MALE NPT	NFA	NMD	1 3/4"	7/8"
15-21NFBNMA	15,000	1/8" FEMALE NPT x 1/8" MALE NPT	NFB	NMA	1 5/8"	3/4"
15-21NFBNMB	15,000	1/4" FEMALE NPT x 1/4" MALE NPT	NFB	NMB	1 5/8"	1"
15-21NFBNMC	15,000	1/4" FEMALE NPT x 3/8" MALE NPT	NFB	NMC	1 5/8"	1"
15-21NFBNMD	15,000	1/4" FEMALE NPT x 1/2" MALE NPT	NFB	NMD	1 3/4"	1"
15-21NFCNMB	15,000	3/8" FEMALE NPT x 1/4" MALE NPT	NFC	NMB	1 7/8"	1"
15-21NFCNMD	15,000	3/8" FEMALE NPT x 1/2" MALE NPT	NFC	NMD	1 3/4"	1"
15-21NFDNMA	15,000	1/2" FEMALE NPT x 1/8" MALE NPT	NFD	NMA	2"	1 3/8"
15-21NFDNMB	15,000	1/2" FEMALE NPT x 1/4" MALE NPT	NFD	NMB	2"	1 3/8"
15-21NFDNMC	15,000	1/2" FEMALE NPT x 3/8" MALE NPT	NFD	NMC	1 3/4"	1 3/8"
15-21NFDNMD	15,000	1/2" FEMALE NPT x 1/2" MALE NPT	NFD	NMD	2 1/4"	1 1/8"
10-21NFFNMD	10,000	3/4" FEMALE NPT x 1/2" MALE NPT	NFF	NMD	2 3/8"	1 3/8"
10-21NFFNMH	10,000	3/4" FEMALE NPT x 1" MALE NPT	NFF	NMH	2 3/8"	1 3/8"
10-21NFHNMD	10,000	1" FEMALE NPT x 1/2" MALE NPT	NFH	NMD	2 3/4"	1 7/8"
10-21NFHNMF	10,000	1" FEMALE NPT x 3/4" MALE NPT	NFH	NMF	2 3/4"	1 7/8"

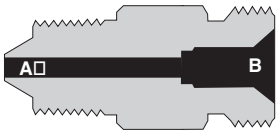
Hose Fittings

We now offer a line of hose adapters designed to easily and safely mate with standard type “M” fittings. Our new hose adapters are rated to the maximum working pressure of the hose or hose-end connection. Our hose fittings are constructed of 316 cold-worked stainless steel with other materials available. HiP maintains an inventory of these fittings for quick ship requirements.



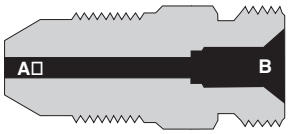
High Pressure to Hose

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
40-21HM4HA9	40,000	1/4" H.P. x 9/16" HOSE	HM4	9/16"	1 3/4"	3/4"
30-21HM4HA12	30,000	1/4" H.P. x 3/4" HOSE	HM4	3/4"	1 7/8"	7/8"
26-21HM4HA16	26,000	1/4" H.P. x 1" HOSE	HM4	1"	2"	1 1/8"
40-21HM6HA9	40,000	3/8" H.P. x 9/16" HOSE	HM6	9/16"	2"	7/8"
30-21HM6HA12	30,000	3/8" H.P. x 3/4" HOSE	HM6	3/4"	2 1/8"	7/8"
26-21HM6HA16	26,000	3/8" H.P. x 1" HOSE	HM6	1"	2 1/4"	1 1/8"
40-21HM9HA9	40,000	9/16" H.P. x 9/16" HOSE	HM9	9/16"	2 1/4"	1 1/8"
30-21HM9HA12	30,000	9/16" H.P. x 3/4" HOSE	HM9	3/4"	2 3/8"	1 1/8"
26-21HM9HA16	26,000	9/16" H.P. x 1" HOSE	HM9	1"	2 3/8"	1 1/8"



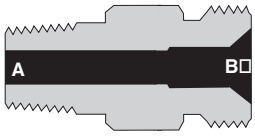
Medium Pressure to Hose

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LM4HA9	20,000	1/4" M.P. x 9/16" HOSE	LM4	9/16"	1 7/8"	3/4"
20-21LM4HA12	20,000	1/4" M.P. x 3/4" HOSE	LM4	3/4"	2"	1"
20-21LM4HA16	20,000	1/4" M.P. x 1" HOSE	LM4	1"	2 1/8"	1 1/8"
20-21LM6HA9	20,000	3/8" M.P. x 9/16" HOSE	LM6	9/16"	1 7/8"	3/4"
20-21LM6HA12	20,000	3/8" M.P. x 3/4" HOSE	LM6	3/4"	2"	1"
20-21LM6HA16	20,000	3/8" M.P. x 1" HOSE	LM6	1"	2 1/8"	1 1/8"
20-21LM9HA9	20,000	9/16" M.P. x 9/16" HOSE	LM9	9/16"	2 1/8"	1"
20-21LM9HA12	20,000	9/16" M.P. x 3/4" HOSE	LM9	3/4"	2 1/4"	1"
20-21LM9HA16	20,000	9/16" M.P. x 1" HOSE	LM9	1"	2 1/4"	1 1/8"
20-21LM12HA9	20,000	3/4" M.P. x 9/16" HOSE	LM12	9/16"	2 1/4"	1 1/8"
20-21LM12HA12	20,000	3/4" M.P. x 3/4" HOSE	LM12	3/4"	2 3/8"	1 1/8"
20-21LM12HA16	20,000	3/4" M.P. x 1" HOSE	LM12	1"	2 3/8"	1 1/8"
20-21LM12HA21	20,000	3/4" M.P. x 1 5/16" HOSE	LM12	1 5/16"	2 3/4"	1 1/2"
20-21LM16HA9	20,000	1" M.P. x 9/16" HOSE	LM16	9/16"	3 5/8"	1 1/8"
20-21LM16HA12	20,000	1" M.P. x 3/4" HOSE	LM16	3/4"	3 3/4"	1 1/8"
20-21LM16HA16	20,000	1" M.P. x 1" HOSE	LM16	1"	3 3/4"	1 1/8"
20-21LM16HA21	20,000	1" M.P. x 1 5/16" HOSE	LM16	1 5/16"	4"	1 1/2"



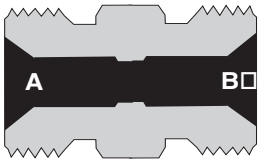
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NPT to Hose



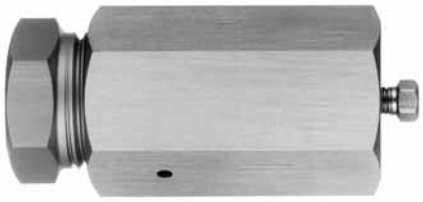
Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21NMBHA9	15,000	1/4" NPT MALE x 9/16" HOSE	NMB	9/16"	1 5/8"	5/8"
15-21NMBHA12	15,000	1/4" NPT MALE x 3/4" HOSE	NMB	3/4"	1 7/8"	7/8"
15-21NMBHA16	15,000	1/4" NPT MALE x 1" HOSE	NMB	1"	1 7/8"	1"
15-21NMCHA9	15,000	3/8" NPT MALE x 9/16" HOSE	NMC	9/16"	1 5/8"	3/4"
15-21NMCHA12	15,000	3/8" NPT MALE x 3/4" HOSE	NMC	3/4"	1 7/8"	7/8"
15-21NMCHA16	15,000	3/8" NPT MALE x 1" HOSE	NMC	1"	1 7/8"	1"
15-21NMDHA9	15,000	1/2" NPT MALE x 9/16" HOSE	NMD	9/16"	1 7/8"	7/8"
15-21NMDHA12	15,000	1/2" NPT MALE x 3/4" HOSE	NMD	3/4"	2"	7/8"
15-21NMDHA16	15,000	1/2" NPT MALE x 1" HOSE	NMD	1"	2"	1"
10-21NMFHA12	10,000	3/4" NPT MALE x 3/4" HOSE	NMF	3/4"	2"	1 1/8"
10-21NMFHA16	10,000	3/4" NPT MALE x 1" HOSE	NMF	1"	2"	1 1/8"
10-21NMHHA16	10,000	1" NPT MALE x 1" HOSE	NMH	1"	2 1/4"	1 3/8"

Hose to Hose



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
26-21HA9HA9	26,000	9/16" HOSE x 9/16" HOSE	9/16"	9/16"	1 1/2"	3/4"
26-21HA9HA12	26,000	9/16" HOSE x 3/4" HOSE	9/16"	3/4"	1 5/8"	7/8"
26-21HA9HA16	26,000	9/16" HOSE x 1" HOSE	9/16"	1"	1 3/4"	1 1/8"
26-21HA12HA12	26,000	3/4" HOSE x 3/4" HOSE	3/4"	3/4"	1 3/4"	7/8"
26-21HA12HA16	26,000	3/4" HOSE x 1" HOSE	3/4"	1"	1 7/8"	1 1/8"
26-21HA16HA16	26,000	1" HOSE x 1" HOSE	1"	1"	1 7/8"	1 1/8"





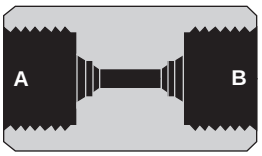
Straight Couplings
Reducer Couplings

A complete range of couplings is offered for flexibility in going from tube to tube and from tube to pipe.

All standard coupling bodies are made from high tensile 316 stainless steel. Standard tubing glands and collars (sleeves) are provided with adapters unless otherwise specified.

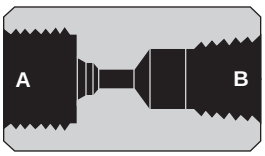
Taper Seal Straight Couplings

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AF1	15,000	1/16" O.D. TUBING	AF1	AF1	1"	3/8"
15-21AF2	15,000	1/8" O.D. TUBING	AF2	AF2	1 1/8"	3/4"
10-21AF4	10,000	1/4" O.D. TUBING	AF4	AF4	1 3/4"	1"
10-21AF6	10,000	3/8" O.D. TUBING	AF6	AF6	1 3/4"	1"



Female Taper Seal to Female NPT

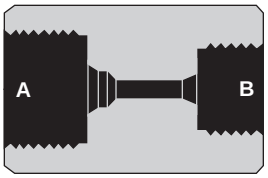
Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AF1NFA	15,000	1/16" O.D. TUBE TO 1/8" NPT	AF1	NFA	1 1/8"	5/8"
15-21AF1NFB	15,000	1/16" O.D. TUBE TO 1/4" NPT	AF1	NFB	1 1/8"	3/4"
15-21AF1NFC	15,000	1/16" O.D. TUBE TO 3/8" NPT	AF1	NFC	1 3/8"	1"
15-21AF1NFD	15,000	1/16" O.D. TUBE TO 1/2" NPT	AF1	NFD	1 3/4"	1 1/8"
15-21AF2NFA	15,000	1/8" O.D. TUBE TO 1/8" NPT	AF2	NFA	1 1/4"	5/8"
15-21AF2NFB	15,000	1/8" O.D. TUBE TO 1/4" NPT	AF2	NFB	1 1/4"	3/4"
15-21AF2NFC	15,000	1/8" O.D. TUBE TO 3/8" NPT	AF2	NFC	1 1/2"	1"
15-21AF2NFD	15,000	1/8" O.D. TUBE TO 1/2" NPT	AF2	NFD	1 3/4"	1 1/8"
10-21AF4NFA	10,000	1/4" O.D. TUBE TO 1/8" NPT	AF4	NFA	1 5/8"	1"
10-21AF4NFB	10,000	1/4" O.D. TUBE TO 1/4" NPT	AF4	NFB	1 3/4"	1"
10-21AF4NFC	10,000	1/4" O.D. TUBE TO 3/8" NPT	AF4	NFC	1 7/8"	1"
10-21AF4NFD	10,000	1/4" O.D. TUBE TO 1/2" NPT	AF4	NFD	1 7/8"	1 1/8"
10-21AF4NFF	10,000	1/4" O.D. TUBE TO 3/4" NPT	AF4	NFF	2 3/8"	1 3/8"
10-21AF4NFH	10,000	1/4" O.D. TUBE TO 1" NPT	AF4	NFH	2 5/8"	1 7/8"
10-21AF6NFA	10,000	3/8" O.D. TUBE TO 1/8" NPT	AF6	NFA	1 5/8"	1"
10-21AF6NFB	10,000	3/8" O.D. TUBE TO 1/4" NPT	AF6	NFB	1 3/4"	1"
10-21AF6NFC	10,000	3/8" O.D. TUBE TO 3/8" NPT	AF6	NFC	1 7/8"	1"
10-21AF6NFD	10,000	3/8" O.D. TUBE TO 1/2" NPT	AF6	NFD	2 1/8"	1 1/8"
10-21AF6NFF	10,000	3/8" O.D. TUBE TO 3/4" NPT	AF6	NFF	2 3/8"	1 3/8"
10-21AF6NFH	10,000	3/8" O.D. TUBE TO 1" NPT	AF6	NFH	2 5/8"	1 7/8"



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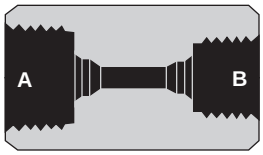
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Female Taper Seal to Female Female High Pressure



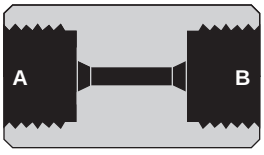
Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AF1HF2	15,000	1/16" O.D. TUBE TO 1/8" H.P.	AF1	HF2	1 1/8"	5/8"
15-21AF1HF4	15,000	1/16" O.D. TUBE TO 1/4" H.P.	AF1	HF4	1 1/4"	3/4"
15-21AF1HF6	15,000	1/16" O.D. TUBE TO 3/8" H.P.	AF1	HF6	1 3/8"	1"
15-21AF1HF9	15,000	1/16" O.D. TUBE TO 9/16" H.P.	AF1	HF9	2 3/8"	1 3/8"
15-21AF2HF2	15,000	1/8" O.D. TUBE TO 1/8" H.P.	AF2	HF2	1 1/8"	3/4"
15-21AF2HF4	15,000	1/8" O.D. TUBE TO 1/4" H.P.	AF2	HF4	1 1/4"	3/4"
15-21AF2HF6	15,000	1/8" O.D. TUBE TO 3/8" H.P.	AF2	HF6	1 7/8"	1"
15-21AF2HF9	15,000	1/8" O.D. TUBE TO 9/16" H.P.	AF2	HF9	2 3/8"	1 3/8"
10-21AF4HF2	10,000	1/4" O.D. TUBE TO 1/8" H.P.	AF4	HF2	1 3/8"	1"
10-21AF4HF4	10,000	1/4" O.D. TUBE TO 1/4" H.P.	AF4	HF4	1 1/2"	1"
10-21AF4HF6	10,000	1/4" O.D. TUBE TO 3/8" H.P.	AF4	HF6	1 7/8"	1"
10-21AF4HF9	10,000	1/4" O.D. TUBE TO 9/16" H.P.	AF4	HF9	2 3/8"	1 3/8"
10-21AF6HF2	10,000	1/4" O.D. TUBE TO 1/8" H.P.	AF6	HF2	1 1/2"	1"
10-21AF6HF4	10,000	3/8" O.D. TUBE TO 1/4" H.P.	AF6	HF4	1 3/4"	1"
10-21AF6HF6	10,000	3/8" O.D. TUBE TO 3/8" H.P.	AF6	HF6	1 7/8"	1"
10-21AF6HF9	10,000	3/8" O.D. TUBE TO 9/16" H.P.	AF6	HF9	2 3/8"	1 3/8"

Taper Seal Reducer Couplings



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
15-21AF1AF2	15,000	1/16" O.D. TO 1/8" O.D. TUBE	AF1	AF2	1 1/8"	5/8"
10-21AF1AF4	10,000	1/16" O.D. TO 1/4" O.D. TUBE	AF1	AF4	1 3/8"	1"
10-21AF1AF6	10,000	1/16" O.D. TO 3/8" O.D. TUBE	AF1	AF6	1 3/8"	1"
10-21AF2AF4	10,000	1/8" O.D. TO 1/4" O.D. TUBE	AF2	AF4	1 1/2"	1"
10-21AF2AF6	10,000	1/8" O.D. TO 3/8" O.D. TUBE	AF2	AF6	1 1/2"	1"
10-21AF4AF6	10,000	1/4" O.D. TO 3/8" O.D. TUBE	AF4	AF6	1 3/4"	1"

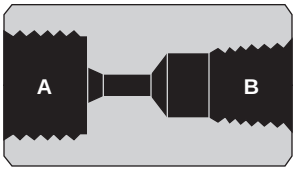
Female Medium Pressure to Female Medium Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LF4LF6	20,000	1/4" M.P. to 3/8" M.P.	LF4	LF6	1 3/4"	3/4"
20-21LF4LF9	20,000	1/4" M.P. to 9/16" M.P.	LF4	LF9	2 1/8"	1"
20-21LF6LF9	20,000	3/8" M.P. to 9/16" M.P.	LF6	LF9	2 1/8"	1"
20-21LF4LF12	20,000	1/4" M.P. to 3/4" M.P.	LF4	LF12	2 1/2"	1 3/8"
20-21LF6LF12	20,000	3/8" M.P. to 3/4" M.P.	LF6	LF12	2 1/2"	1 3/8"
20-21LF9LF12	20,000	9/16" M.P. to 3/4" M.P.	LF9	LF12	2 1/2"	1 3/8"
20-21LF4LF16	20,000	1/4" M.P. to 1" M.P.	LF4	LF16	3 1/2"	1 3/4"
20-21LF6LF16	20,000	3/8" M.P. to 1" M.P.	LF6	LF16	3 1/2"	1 3/4"
20-21LF9LF16	20,000	9/16" M.P. to 1" M.P.	LF9	LF16	3 1/2"	1 3/4"
20-21LF12LF16	20,000	3/4" M.P. to 1" M.P.	LF12	LF16	3 1/2"	1 3/4"

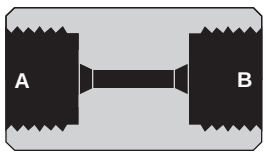
Female Medium Pressure to Female Pipe

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LF4NFA	15,000	1/4" M.P. to 1/8" NPT FEMALE	LF4	NFA	1 5/8"	3/4"
20-21LF4NFB	15,000	1/4" M.P. to 1/4" NPT FEMALE	LF4	NFB	1 5/8"	3/4"
20-21LF4NFC	15,000	1/4" M.P. to 3/8" NPT FEMALE	LF4	NFC	2"	1"
20-21LF4NFD	15,000	1/4" M.P. to 1/2" NPT FEMALE	LF4	NFD	2"	1 1/8"
10-21LF4NFF	10,000	1/4" M.P. to 3/4" NPT FEMALE	LF4	NFF	2 3/8"	1 3/8"
10-21LF4NFH	10,000	1/4" M.P. to 1" NPT FEMALE	LF4	NFH	2 5/8"	1 7/8"
20-21LF6NFA	15,000	3/8" M.P. to 1/8" NPT FEMALE	LF6	NFA	1 3/4"	3/4"
20-21LF6NFB	15,000	3/8" M.P. to 1/4" NPT FEMALE	LF6	NFB	1 3/4"	3/4"
20-21LF6NFC	15,000	3/8" M.P. to 3/8" NPT FEMALE	LF6	NFC	2 1/8"	1"
20-21LF6NFD	15,000	3/8" M.P. to 1/2" NPT FEMALE	LF6	NFD	2 1/8"	1 1/8"
10-21LF6NFF	10,000	3/8" M.P. to 3/4" NPT FEMALE	LF6	NFIF	2 3/8"	1 3/8"
10-21LF6NFH	10,000	3/8" M.P. to 1" NPT FEMALE	LF6	NFH	2 3/4"	1 7/8"
20-21LF9NFA	15,000	9/16" M.P. to 1/8" NPT FEMALE	LF9	NFA	2 1/8"	1"
20-21LF9NFB	15,000	9/16" M.P. to 1/4" NPT FEMALE	LF9	NFB	2 1/8"	1"
20-21LF9NFC	15,000	9/16" M.P. to 3/8" NPT FEMALE	LF9	NFC	2 1/8"	1"
20-21LF9NFD	15,000	9/16" M.P. to 1/2" NPT FEMALE	LF9	NFD	2 1/4"	1 1/8"
10-21LF9NFF	10,000	9/16" M.P. to 3/4" NPT FEMALE	LF9	NFF	2 1/2"	1 3/8"
10-21LF9NFH	10,000	9/16" M.P. to 1" NPT FEMALE	LF9	NFH	2 7/8"	1 7/8"
20-21LF12NFA	15,000	3/4" M.P. to 1/8" NPT FEMALE	LF12	NFA	2 1/2"	1 3/8"
20-21LF12NFB	15,000	3/4" M.P. to 1/4" NPT FEMALE	LF12	NFB	2 1/2"	1 3/8"
20-21LF12NFC	15,000	3/4" M.P. to 3/8" NPT FEMALE	LF12	NFC	2 1/2"	1 3/8"
20-21LF12NFD	15,000	3/4" M.P. to 1/2" NPT FEMALE	LF12	NFD	2 1/2"	1 3/8"
10-21LF12NFF	10,000	3/4" M.P. to 3/4" NPT FEMALE	LF12	NFF	2 3/4"	1 1/2"
10-21LF12NFH	10,000	3/4" M.P. to 1" NPT FEMALE	LF12	NFH	3"	1 7/8"
20-21LF16NFA	15,000	1" M.P. to 1/8" NPT FEMALE	LF16	NFA	3"	1 3/4"
20-21LF16NFB	15,000	1" M.P. to 1/4" NPT FEMALE	LF16	NFB	3"	1 3/4"
20-21LF16NFC	15,000	1" M.P. to 3/8" NPT FEMALE	LF16	NFC	3"	1 3/4"
20-21LF16NFD	15,000	1" M.P. to 1/2" NPT FEMALE	LF16	NFD	3"	1 3/4"
10-21LF16NFF	10,000	1" M.P. to 3/4" NPT FEMALE	LF16	NFF	3 1/4"	1 3/4"
10-21LF16NFH	10,000	1" M.P. to 1" NPT FEMALE	LF16	NFH	3 1/4"	1 3/4"



Medium Pressure Straight Couplings

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LF4	20,000	1/4" O.D. TUBING	LF4	LF4	1 9/16"	5/8"
20-21LF6	20,000	3/8" O.D. TUBING	LF6	LF6	1 3/4"	3/4"
20-21LF9	20,000	9/16" O.D. TUBING	LF9	LF9	2 1/8"	1
20-21LF12	20,000	3/4" O.D. TUBING	LF12	LF12	2 1/2"	1 3/8"
20-21LF16	20,000	1" O.D. TUBING	LF16	LF16	3 1/2"	1 3/4"

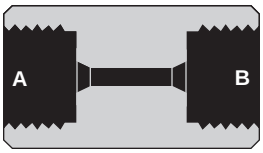


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High Pressure Equipment

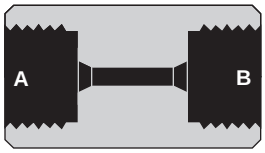
Female Medium Pressure to Female High Pressure



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
20-21LF4HF4	20,000	1/4" M.P. to 1/4" H.P.	LF4	HF4	1 5/8"	3/4"
20-21LF4HF6	20,000	1/4" M.P. to 3/8" H.P.	LF4	HF6	1 7/8"	1"
20-21LF4HF9	20,000	1/4" M.P. to 9/16" H.P.	LF4	HF9	2 3/8"	1 3/8"
20-21LF6HF4	20,000	3/8" M.P. to 1/4" H.P.	LF6	HF4	1 3/4"	3/4"
20-21LF6HF6	20,000	3/8" M.P. to 3/8" H.P.	LF6	HF6	1 7/8"	1"
20-21LF6HF9	20,000	3/8" M.P. to 9/16" H.P.	LF6	HF9	2 3/8"	1 3/8"
20-21LF9HF4	20,000	9/16" M.P. to 1/4" H.P.	LF9	HF4	2 1/8"	1"
20-21LF9HF6	20,000	9/16" M.P. to 3/8" H.P.	LF9	HF6	2 1/8"	1"
20-21LF9HF9	20,000	9/16" M.P. to 9/16" H.P.	LF9	HF9	2 3/8"	1 3/8"
20-21LF12HF4	20,000	3/4" M.P. to 1/4" H.P.	LF12	HF4	2 1/2"	1 3/8"
20-21LF12HF6	20,000	3/4" M.P. to 3/8" H.P.	LF12	HF6	2 1/2"	1 3/8"
20-21LF12HF9	20,000	3/4" M.P. to 9/16" H.P.	LF12	HF9	2 1/2"	1 3/8"
*20-21HF16HF4	20,000	1" M.P. to 1/4" H.P	HF16	HF4	3 1/2"	1 3/8"
*20-21HF16HF6	20,000	1" M.P. to 3/8" H.P	HF16	HF6	3 1/2"	1 3/8"
*20-21HF16HF9	20,000	1" M.P. to 9/16" H.P.	HF16	HF9	3 1/2"	1 3/8"

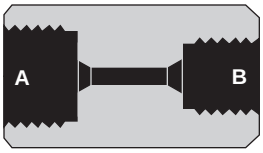
*Can be rated to 30,000 psi if used with 1" O.D. x 7/16" I.D. tubing.

High Pressure Straight Couplings



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
60-21HF2	60,000	1/8" O.D. TUBING	HF2	HF2	1 1/8"	3/4"
60-21HF4	60,000	1/4" O.D. TUBING	HF4	HF4	1 3/4"	1"
60-21HF6	60,000	3/8" O.D. TUBING	HF6	HF6	2"	1"
60-21HF9	60,000	9/16" O.D. TUBING	HF9	HF9	2 3/8"	1 3/8"
30-21HF16	30,000	1" O.D. TUBING	HF16	HF16	3 1/2"	1 3/4"

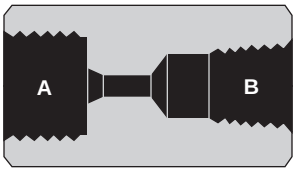
High Pressure Reducer Couplings



Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
60-21HF2HF4	60,000	1/8" O.D. TO 1/4" O.D. TUBE	HF2	HF4	1 1/4"	3/4"
60-21HF2HF6	60,000	1/8" O.D. TO 3/8" O.D. TUBE	HF2	HF6	1 5/8"	1"
60-21HF2HF9	60,000	1/16" O.D. TO 9/16" O.D. TUBE	HF2	HF9	1 3/4"	1 3/8"
60-21HF4HF6	60,000	1/4" O.D. TO 3/8" O.D. TUBE	HF4	HF6	1 5/8"	1"
60-21HF4HF9	60,000	1/4" O.D. TO 9/16" O.D. TUBE	HF4	HF9	1 3/4"	1 3/8"
60-21HF6HF9	60,000	3/8" O.D. TO 9/16" O.D. TUBE	HF6	HF9	2"	1 3/8"

Female High Pressure to Female NPT Pipe

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
30-21HF2NFA	15,000	1/8" O.D. TUBE TO 1/8" NPT	HF2	NFA	1 1/2"	3/4"
30-21HF2NFB	15,000	1/8" O.D. TUBE TO 1/4" NPT	HF2	NFB	1 1/2"	3/4"
30-21HF2NFC	15,000	1/8" O.D. TUBE TO 3/8" NPT	HF2	NFC	1 1/2"	1"
30-21HF2NFD	15,000	1/8" O.D. TUBE TO 1/2" NPT	HF2	NFD	1 3/4"	1 1/8"
10-21HF2NFF	10,000	1/8" O.D. TUBE TO 3/4" NPT	HF2	NFF	2"	1 3/8"
10-21HF2NFH	10,000	1/8" O.D. TUBE TO 1" NPT	HF2	NFH	2 1/2"	1 3/4"
30-21HF4NFA	15,000	1/4" O.D. TUBE TO 1/8" NPT	HF4	NFA	1 1/2"	1"
30-21HF4NFB	15,000	1/4" O.D. TUBE TO 1/4" NPT	HF4	NFB	1 1/2"	1"
30-21HF4NFC	15,000	1/4" O.D. TUBE TO 3/8" NPT	HF4	NFC	1 7/8"	1"
30-21HF4NFD	15,000	1/4" O.D. TUBE TO 1/2" NPT	HF4	NFD	1 7/8"	1 1/8"
10-21HF4NFF	10,000	1/4" O.D. TUBE TO 3/4" NPT	HF4	NFF	2"	1 3/8"
10-21HF4NFH	10,000	1/4" O.D. TUBE TO 1" NPT	HF4	NFH	2 1/2"	1 3/4"
30-21HF6NFA	15,000	3/8" O.D. TUBE TO 1/8" NPT	HF6	NFA	1 7/8"	1"
30-21HF6NFB	15,000	3/8" O.D. TUBE TO 1/4" NPT	HF6	NFB	1 7/8"	1"
30-21HF6NFC	15,000	3/8" O.D. TUBE TO 3/8" NPT	HF6	NFC	1 7/8"	1"
30-21HF6NFD	15,000	3/8" O.D. TUBE TO 1/2" NPT	HF6	NFD	1 7/8"	1 1/8"
10-21HF6NFF	10,000	3/8" O.D. TUBE TO 3/4" NPT	HF6	NFF	2 1/8"	1 3/8"
10-21HF6NFH	10,000	3/8" O.D. TUBE TO 1" NPT	HF6	NFH	2 5/8"	1 7/8"
30-21HF9NFA	15,000	9/16" O.D. TUBE TO 1/8" NPT	HF9	NFA	2 3/8"	1 3/8"
30-21HF9NFB	15,000	9/16" O.D. TUBE TO 1/4" NPT	HF9	NFB	2 3/8"	1 3/8"
30-21HF9NFC	15,000	9/16" O.D. TUBE TO 3/8" NPT	HF9	NFC	2 3/8"	1 3/8"
30-21HF9NFD	15,000	9/16" O.D. TUBE TO 1/2" NPT	HF9	NFD	2 3/8"	1 3/8"
10-21HF9NFF	10,000	9/16" O.D. TUBE TO 3/4" NPT	HF9	NFF	2 3/8"	1 3/8"
10-21HF9NFH	10,000	9/16" O.D. TUBE TO 1" NPT	HF9	NFH	2 5/8"	2"



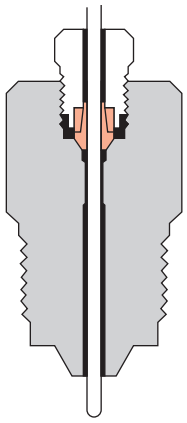


High Pressure Equipment offers an extensive selection of couplings and adapters to meet virtually every requirement.

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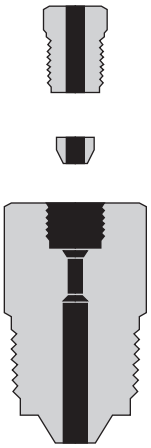
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Thermocouple Adapters



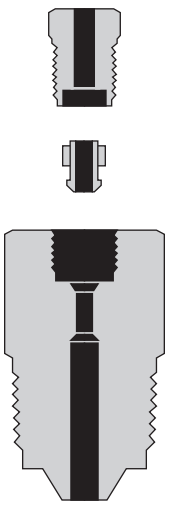
The 1/16" O.D. and 1/8" O.D. tubing sizes of the Taper Seal connections are ideally suited for use with thermocouples for pressures up to 15,000 psi.

These connectors do not bite into the outer wall of the thermocouple, but rather clamp onto the tubing (or thermocouple) similar to a machine collet. A thread lubricant is recommended on the gland nut when initially making up the connection, but such lubrication can later be removed if desired. Material is high tensile 316 stainless steel. Standard glands and sleeves are provided unless otherwise specified.



Adapters for 1/16" TC's

Catalog No.	Pressure Rating psi	Male End of Adapter	Length	Hex Size
15-21AF1AM2-T	15,000	1/8" TAPER SEAL	7/8"	1/2"
10-21AF1AM4-T	10,000	1/4" TAPER SEAL	1 1/4"	3/4"
10-21AF1AM6-T	10,000	3/8" TAPER SEAL	1 1/4"	3/4"
15-21AF1HM2-T	15,000	1/8" HIGH PRESSURE	7/8"	1/2"
15-21AF1HM4-T	15,000	1/4" HIGH PRESSURE	1 1/4"	5/8"
15-21AF1HM6-T	15,000	3/8" HIGH PRESSURE	1 3/4"	3/4"
15-21AF1HM9-T	15,000	9/16" HIGH PRESSURE	2 1/8"	1 1/8"
15-21AF1NMA-T	15,000	1/8" NPT	1"	1/2"
15-21AF1NMB-T	15,000	1/4" NPT	1 1/4"	5/8"
15-21AF1NMC-T	15,000	3/8" NPT	1 3/8"	3/4"
15-21AF1NMD-T	15,000	1/2" NPT	1 3/4"	1"
10-21AF1NMF-T	10,000	3/4" NPT	1 7/8"	1 3/8"
10-21AF1NMH-T	10,000	1" NPT	1 5/8"	1 3/8"



Adapters for 1/8" TC's

Catalog No.	Pressure Rating psi	Male End of Adapter	Length	Hex Size
10-21AF2AM4-T	10,000	1/4" TAPER SEAL	1 1/4"	3/4"
10-21AF2AM6-T	10,000	3/8" TAPER SEAL	1 1/4"	3/4"
15-21AF2HM4-T	15,000	1/4" HIGH PRESSURE	1 1/4"	5/8"
15-21AF2HM6-T	15,000	3/8" HIGH PRESSURE	1 3/4"	3/4"
15-21AF2HM9-T	15,000	9/16" HIGH PRESSURE	2 1/8"	1 1/8"
15-21AF2NMA-T	15,000	1/8" NPT	1 1/4"	3/4"
15-21AF2NMB-T	15,000	1/4" NPT	1 1/4"	5/8"
15-21AF2NMC-T	15,000	3/8" NPT	1 3/8"	3/4"
15-21AF2NMD-T	15,000	1/2" NPT	1 3/4"	1"
10-21AF2NMF-T	10,000	3/4" NPT	1 7/8"	1 3/8"
10-21AF3NMH-T	10,000	1" NPT	1 5/8"	1 3/8"

Pressure Gauges



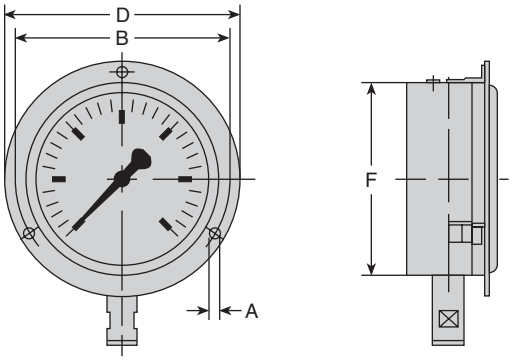
Standard pressure gauges as shown are available from stock for immediate delivery. Gauge models 4PG5 through 6PG50 are standard with a High Pressure ¼" O.D. tubing connection (HF4), while models 6PG75, 6PG100 and 6PG150 have a Ultra High Pressure ⅜" O.D. tubing connection (XF6). These coned and threaded connections are machined directly into the bottom inlet of the gauges. Adapters for other size connections are available from stock.

These gauges have a solid front separating the dial face from the pressure tube in order to provide maximum safety. Bourdon tube and socket are 316 S.S. on all gauges. Both styles include a safety blowout back. 5,000 psi to 30,000 psi gauges have laminated safety glass, while the 50,000 psi to 150,000 psi style have a removable polycarbonate plastic front window.

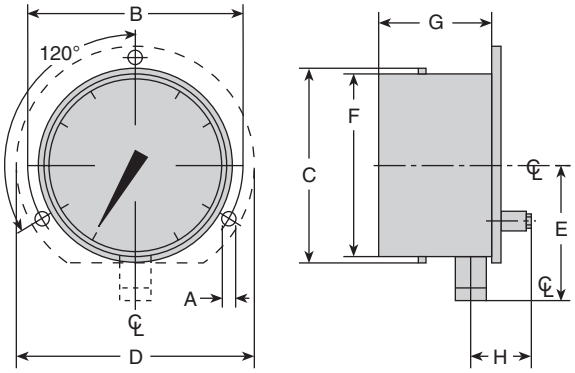
Gauges may be used intermittently to 100 percent of dial reading.

Accuracy on 5,000 psi and 10,000 psi models is ½% of full scale reading. Accuracy on 20,000 psi through 30,000 psi models is 1% of full scale reading. Accuracy on 50,000 psi through 150,000 psi models is ½% of full scale reading.

PANEL MOUNTING: 4PG5, 4PG10, 6PG20, 6PG30



SURFACE MOUNTING: 6PG50, 6PG75, 6PG100



Standard Gauges In Stock

Gauge Size						Materials	
Catalog No.	Range psi	Dial Size	Graduations			Mounting	Case
4PG5	0-5,000	4"	500	100	50	Panel	316 S.S.
4PG10	0-10,000	4"	1,000	500	100		
6PG20	0-20,000	6"	2,000	1,000	200		
6PG30	0-30,000	6"	3,000	1,000	200		
6PG50	0-50,000	6"	5,000	2,500	500	* Surface	Heavy Duty Alum.
6PG75	0-75,000	6"	10,000	2,500	500		
6PG100	0-100,000	6"	10,000	5,000	1,000		
6PG150	0-150,000	6"	20,000	10,000	1,000		

* Panel mount kit available. Contact factory.

Dimensions

Dial Size	A	B	C	D	E	F	G	H
4" 4PG5, 4PG10	3/16"	4 35/64"	—	5 3/16"	—	3 7/8"	—	—
6" 6PG20, 6PG30	7/32"	7"	—	7 11/16"	—	6 1/4" – 6 5/16"	—	—
6" 6PG50, 6PG75, 6PG100, 6PG150	9/32"	7"	6 5/8"	7 5/8"	4 3/8"	6 3/8"	3 5/8"	1 3/4"

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Tooling

To ensure safe and leak-free operation of your pressure system, High Pressure Equipment Company provides complete installation instructions for the make-up of a coned and threaded connection. In addition to outlining the correct procedures, we offer coning and threading tools and female tubing connection tools.



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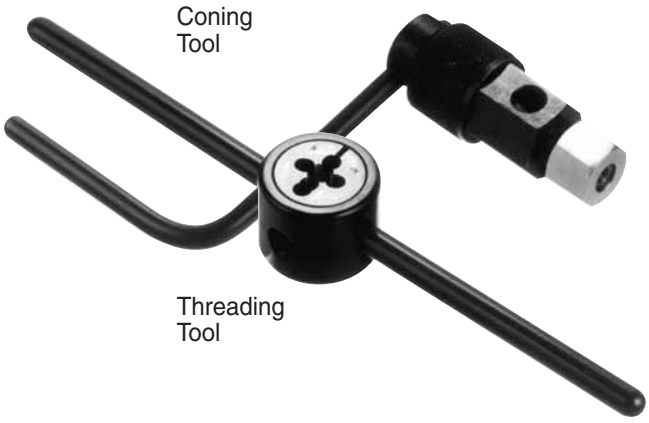
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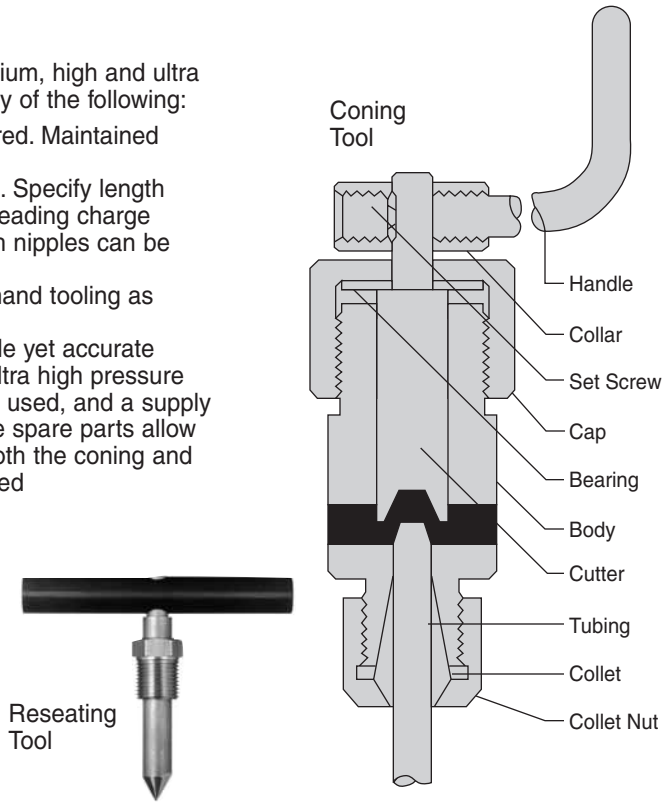
Tooling

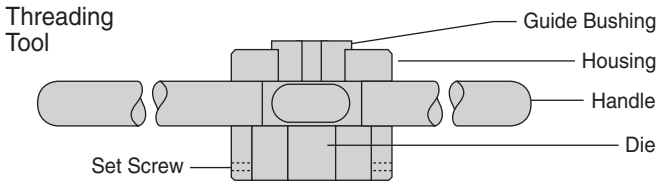
The coned and threaded tubing ends for the medium, high and ultra high pressure connections may be supplied by any of the following:

1. Standard length tubing nipples with ends prepared. Maintained in stock—ready for shipment.
2. Special length tubing nipples with ends prepared. Specify length required (up to 22 feet long). Add coning and threading charge to tubing price. (While not in stock, special length nipples can be furnished quickly for prompt delivery).
3. Preparation of tubing ends at your own facility by hand tooling as described in this section.

The coning and threading tools are designed for simple yet accurate preparation of tubing ends for the medium, high and ultra high pressure connections. A liberal amount of cutting fluid should be used, and a supply is furnished with each order for tooling. Interchangeable spare parts allow easy change over from one size tubing to another on both the coning and threading tools. Note that the reseating tool is not required for tubing preparation.



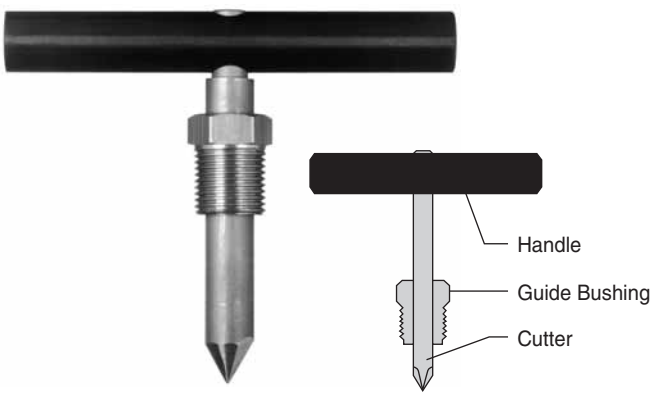




Reseating Tools

The reseating tools are available for repairing old or damaged tubing connection seats in valves or fittings. This tool is not required for tubing preparation.

Catalog No.	For Tubing Connection
RTLF4	LF4
RTLF6	LF6
RTLF9	LF9
RTHF2	HF2
RTHF4	HF4
RTHF6	HF6
RTHF9	HF9
RTXF4	XF4
RTXF6	XF6

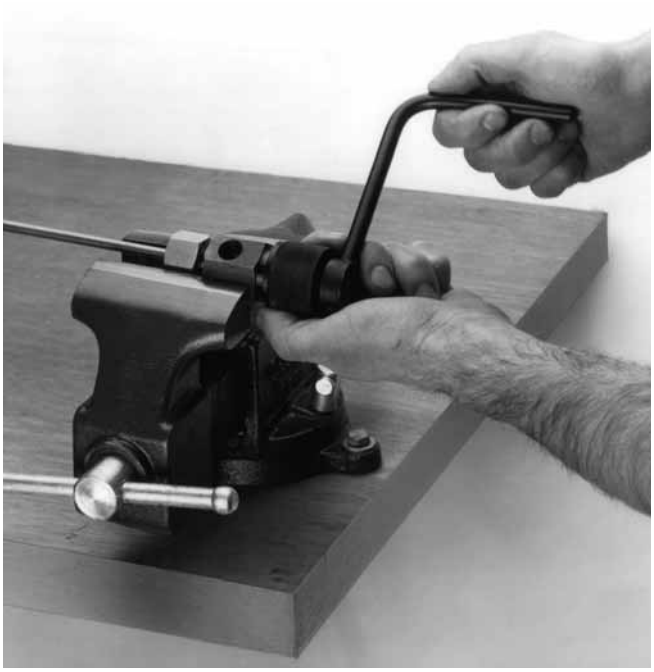


Coning Tools

The coning tool is designed for preparing a “cone” on the ends of Medium, High and Ultra High Pressure tubing. Included angle of the cone is approximately 57 to 59 degrees. The cutter and collet are interchangeable on all of the assemblies (except 2-HF9 and 2-LF9) to permit changing from one size tubing to another.

Catalog No.	Tubing Size	Spare Cutter	Spare Collet
2-LF4	(1/4" O.D. x .109" I.D. (20.000 psi)	2-LF4L	2-LF4P
2-LF6	(3/8" O.D. x .203 I.D. (20,000 psi)	2-LF6L	2-LF6P
2-LF9	(9/16" O.D. x .312 I.D. (20,000 psi)	2-LF9L*	2-LF9P
2-HF2	(1/8" O.D. x .020 I.D. (60,000 psi) (1/8" O.D. x .040 I.D. (30,000 psi)	2-HF2L	2-HF2P
2-HF4	(1/4" O.D. x .083 I.D. (60,000 psi)	2-HF4L	2-HF4P
2-HF6	(3/8" O.D. x 1/8" I.D. (60,000 psi)	2-HF6L	2-HF6P
2-HF9	(9/16" O.D. x 3/16" I.D. x (60,000 psi)	2-HF9L*	2-HF9P
2-XF4	(1/4" O.D. x 1/16" I.D. (100,000 psi)	2-XF4L	2-XF4P
2-XF6	(3/8" O.D. x 1/16" I.D. (150,000 psi)	2-XF6L	2-XF6P

* Not interchangeable

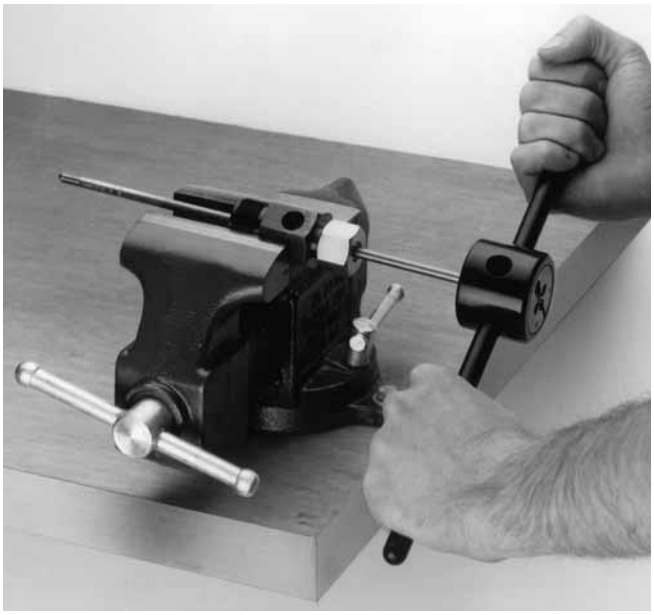


Threading Tools

The threading tool is designed for preparing a left-hand thread onto Medium, High and Ultra High Pressure tubing ends. The threaded die and guide bushings are interchangeable on all of the assemblies (except 2-MHF2) to permit changing from one size tubing to another.

Catalog No.	Tubing Size	Spare Threading Die	Spare Guide Bushing
2-MLF4	1/4" O.D.	1/4"- 28LH	2-MLF4P
2-MLF6	3/8" O.D.	3/8"- 24LH	2-MLF6P
2-MLF9	9/16" O.D.	9/16"- 18LH	2-MLF9P
2-MHF2	1/8" O.D.	1/8"- 40LH*	2-MHF2P*
2-MHF4	1/4" O.D.	1/4"- 28LH	2-MHF4P
2-MHF6	3/8" O.D.	3/8"- 24LH	2-MHF6P
2-MHF9	9/16" O.D.	9/16"- 18LH	2-MHF9P
2-MXF4	1/4" O.D.	1/4"- 28LH	2-MXF4P
2-MXF6	3/8" O.D.	3/8"- 24LH	2-MXF6P

* Not interchangeable



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Coning and Threading Instructions

Coning Tubing Ends

The coning tool is designed for preparing a "cone" having an included angle of approximately 57 to 59 degrees on the ends of tubing. Operation is as follows:

1. Secure coning tool body in suitable vise. You may wish to angle the tool in the vise in order to facilitate access to the collet nut and knurled cap.
2. Cut off tubing to desired length and deburr ends.
3. Rotate knurled cap clockwise into tool as far as it will go.
4. "Back off" knurled cap by rotating counterclockwise a number of complete rotations as indicated in the chart below. (A mark on the knurled cap may be useful).

Tubing Size	"Back Off Turns"
1/8" O.D.	3 turns
1/4" O.D.	4 1/2 turns
3/8" O.D.	4 1/2 turns
9/16" O.D.	8 turns

5. Insert tubing thru collet nut and collet until tubing stops up against inside cutter.
6. Tighten collet nut to secure tubing into position.
7. Turn knurled cap counterclockwise to remove cap and cutter from tool.
8. Apply a very liberal amount of "Sulflo" (sulphur based cutting compound) to the end of the cutter.
9. Screw cap and cutter back into the body until the cutter contacts the end of the tubing.
10. Rotate handle of cutting tool clockwise fairly rapidly with one hand while slowly rotating the knurled cap clockwise with the other hand in order to continuously feed the cutter into the tubing. Do not overly force the cutter against the tubing as it will bind. (You will quickly develop the proper feel). You will need to rotate the knurled cap a complete number of turns as per the chart below in order to complete the cone on the end of the tubing.

Tubing Size	"Back Off Turns"
1/8" O.D.	2 1/2 turns
1/4" O.D.	3 1/2 turns
3/8" O.D.	4 turns
9/16" O.D.	7 1/2 turns

11. After coning the tubing end, loosen the collet nut and remove tubing from the tool. Remove the knurled cap and cutter from the tool in order to clean off the Sulflo compound and steel chips in preparation for the next tube.

NOTES:

A. Steps 3 and 4 (on left) are primarily a help in properly positioning the tubing in the tool. As you gain experience with the tool, you will be able to judge the proper position by sight in order to eliminate these steps.

B. The 1/4" O.D. and 3/8" O.D. tubing sizes are relatively easy to cone. The 1/8" O.D. size is "delicate" (be especially careful not to force the cutter). The 9/16" O.D. size requires the most amount of firmness in the cutting.

C. As with other tools, it is not uncommon for a collet to "stick" even after the collet nut has been released. Should this occur, simply tap the side of the collet nut firmly with the wrench to release the collet.

Threading the Tubing

The threading tool is designed to put a left hand thread onto the end of the tubing. Operation is as follows:

1. The coning tool (with the knurled cap and cutter removed) provides an ideal way to hold the tubing for the threading operation (see photo).
2. After securing the tubing, apply a liberal amount of Sulflo to the end of the tubing.
3. Place the threading tool (guide bushing side first) onto the tubing.
4. Place the palm of your hand firmly against the center of the threading tool and rotate your wrist counterclockwise. This will help "start" the die onto the tube. After you feel the die start onto the tubing, continue to rotate the threading tool using the handles.
5. Remove the threading tool and clean off Sulflo and chips.

NOTE:

The tubing collar should easily screw onto the tubing. If it feels too tight or loose, the die should be adjusted accordingly. Simply remove the die from the holder by loosening the outer set screw. The small adjustment screw located on the side of the die can be turned to precisely set the die.

Pressure Vessels and Reactors

High Pressure Equipment Company designs and manufactures a broad range of pressure vessels and reactors for both bench-scale and pilot plant applications. We have over 250 standard reactor designs which address varied size, material, pressure and temperature requirements.

There are many applications that demand ASME approval for work involving pressure vessels. To satisfy this need, HiP produces a variety of pressure vessels and reactors that meet the requirements of the ASME Pressure Vessel Code.

Complementing our standard product offering is our capability to provide a custom reactor designed to meet your specific needs. Our engineering and technical support will help you identify the specific options you need, ranging from exotic materials to unusual sizes and connections, and then incorporate the appropriate approvals, including ASME.



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Pressure Vessel Selection . . .10.2-10.3

O-Ring Seal Reactors
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Confined Gasket Closure
Reactors - Series GC 10.5

Bolted Closure Reactors 10.6

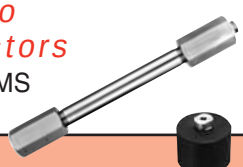
Clover Leaf Reactors 10.7

O-Ring Closure Reactors
Series R 10.8-10.9

Tubular Reactors
Series TOC 10.10-10.11

Micro Reactors
Series MS 10.12

Reactor Selection Guide

Reactor Design	Description	Standard Material	Maximum Temperature (degrees F)	Maximum Working Pressure (psi)	Standard Capacity
O-ring Seal Series OC 	Simple closure design allows for easy assembly/disassembly and reliable operation. Series OC are economical reactors ideal for low temperature gas or liquid service.	316SS	250	16,000	125 mL to 6,750 mL
Confined Gasket Closure Series GC 	Series GC is designed for studying high temperature and pressure reactions. The vessels utilize thrust bolts and a thrust ring to ensure positive seating of the gasket.	316SS	800	16,000	125 mL to 6,750 mL
Bolted Closure Series BC 	These versatile reactors are the standard of the industry for applications involving moderate pressure ranges. Standard O-rings may be used in place of the metal gasket for lower temperatures.	316SS	650	5,000	300 mL to 2 gal.
Clover Leaf Series CL 	Quick opening cover design needs only one-eighth of a turn rotation for sealing. Ideal for high pressure operations requiring repetitive opening/closing.	4340 alloy steel	250	30,000	1,000 mL to 3,700 mL
O-ring Closure Series R 	Designed for extremely high pressure/low temperature operation, series R reactors feature a threaded closure for easy assembly and disassembly.	4340 alloy steel	250	150,000	77 mL to 30 liters
Micro Reactors Series MS 	Series MS are fixed bed tubular reactors designed for a variety of applications such as small volume testing of components and miniature scale reaction tests.	316SS	800	30,000	2 mL to 64 mL
Tubular Reactors Series TOC 	This line of economical and versatile reactors satisfy many moderate pressure applications. Accumulators can be customized through a variety of options including piston separators.	304SS	O-ring 250 confined gasket 800	10,000	50 mL to 15 liters
Custom Reactors	HiP makes every reactor to order, allowing for economical and timely customizing. We offer a broad range of exotic metals, sizes and connections to meet virtually any requirement.	—	—	—	—

Note: For ASME code stamping of HiP vessels, please consult factory for available reactor designs, materials, and pressure ratings.



Pressure Vessel Volume Table (cubic inches)

Inside Depth (inches)	Inside Diameter (inches)												
	1/2"	1"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	7"	8"	9"	10"
4"	0.7856	3.142	7.068	12.57	19.63	28.27	50.26	78.54	113.1	153.9	201.1	254.5	314.2
6"	1.178	4.712	10.60	18.85	29.45	42.41	75.40	117.8	169.6	230.9	301.6	381.7	471.2
8"	1.571	6.283	14.14	25.13	39.27	56.55	100.5	157.1	226.2	307.9	402.1	508.9	628.4
10"	1.964	7.854	17.67	31.42	49.09	70.69	125.7	196.3	282.7	384.8	502.6	636.2	785.2
12"	2.357	9.425	21.21	37.70	58.90	84.82	150.8	235.6	339.3	461.8	603.2	763.4	942.4
14"	2.749	11.00	24.74	43.98	68.72	98.96	175.9	274.9	395.8	538.8	703.7	890.6	1100
16"	3.142	12.57	28.27	50.27	78.54	113.1	201.1	314.2	452.4	615.8	804.2	1018	1257
18"	3.535	14.14	31.81	56.55	88.36	127.2	226.2	353.4	508.9	692.7	904.8	1145	1415
20"	3.928	15.71	35.34	62.83	98.17	141.4	251.3	392.7	565.5	769.7	1005	1272	1571
22"	4.231	17.28	38.88	69.12	108.0	155.5	276.5	432.0	622.0	846.7	1106	1400	1728
24"	4.714	18.85	42.41	75.40	117.8	169.6	301.6	471.2	678.6	923.6	1206	1527	1885
26"	5.106	20.42	45.94	81.68	127.6	183.8	326.7	510.5	735.1	1001	1307	1654	2042
28"	5.499	21.99	49.48	87.96	137.4	197.9	351.8	549.8	791.7	1078	1407	1781	2199

Volume Equivalents

1 in^3 = 16.39 mL
1 mL = 0.061 in^3
1 gal = 231 in^3 = 0.134 ft^3
1 ft^3 = 1728 in^3 = 7.481 gal
1 L = 61.02 in^3 = 0.264 gal

Pressure Conversions

	psi	atm	kg/cm^2
psi	1	0.068	0.070
atm	14.696	1	1.033
kg/cm^2	14.224	0.968	1

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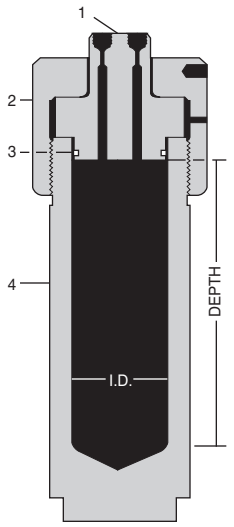
OC Series O-Ring Seal Reactors

The OC Series provide a simple closure that is reliable and easy to assemble and disassemble. Standard material for the body and cover is Type 316 stainless steel. The standard O-ring material is BUNA-N. Temperature is limited by the O-ring to 250°F.

These reactors are suitable for either gas or liquid service. Capacities range from 125 mL to 6,750 mL.

Standard connections are for ¼" O.D. high pressure (coned and threaded) tubing (HF4). Models OC-1 and OC-3 have one connection in the cover. All other models have two connections in the cover. Contact factory if other connections and/or locations are preferred.





1. COVER — 316 S.S.
2. CAP — ALLOY STEEL
3. "O" RING — BUNA-N
4. BODY — 316 S.S.

Series OC Reactors

Catalog No.	I.D.	O.D.	Inside Depth	Capacity	Material	Working Pressure psi
OC-1*	1″	2 1/2″	10″	125 mL	316 S.S.	13,800
OC-3*	1 1/2″	2 1/2″	10″	280 mL	316 S.S.	7,750
OC-5	1 1/2″	4 3/8″	10″	280 mL	316 S.S.	16,000
OC-7	1 1/2″	4 3/8″	21″	600 mL	316 S.S.	16,000
OC-9	2″	4 3/8″	10″	500 mL	316 S.S.	12,500
OC-11	2″	4 3/8″	21″	1,040 mL	316 S.S.	12,500
OC-13	2 1/2″	4 3/8″	10″	800 mL	316 S.S.	9,200
OC-15	2 1/2″	4 3/8″	21″	1,160 mL	316 S.S.	9,200
OC-17	3″	6 7/8″	10″	1,150 mL	316 S.S.	13,000
OC-19	3″	6 7/8″	21″	2,430 mL	316 S.S.	13,000
OC-21	3 1/2″	6 7/8″	10″	1,575 mL	316 S.S.	10,500
OC-23	3 1/2″	6 7/8″	21″	3,300 mL	316 S.S.	10,500
OC-25	4″	6 7/8″	10″	2,060 mL	316 S.S.	8,500
OC-27	4″	6 7/8″	21″	4,325 mL	316 S.S.	8,500
OC-29	4 1/2″	6 7/8″	10″	2,600 mL	316 S.S.	6,500
OC-31	4 1/2″	6 7/8″	21″	5,475 mL	316 S.S.	6,500
OC-33	5″	6 7/8″	10″	3,200 mL	316 S.S.	5,000
OC-35	5″	6 7/8″	21″	6,750 mL	316 S.S.	5,000

* One (1) opening only in cover

Confined Gasket Closure Reactors



The Confined Gasket Closure reactors listed below are ideally suited for use at elevated temperatures and pressures as shown in the chart. Thrust bolts with a hardened thrust ring are supplied to insure positive seating of the gasket. Torque required on thrust bolts will range from 70 to 125 foot pounds, depending upon size of reactor, pressure, temperature and media being pressurized. Torquing of bolts should be done in a crisscross staggered pattern to insure uniform seating. A commercial high temperature lubricant should always be applied to the bolt threads and outside cap threads to facilitate removal of the closure.

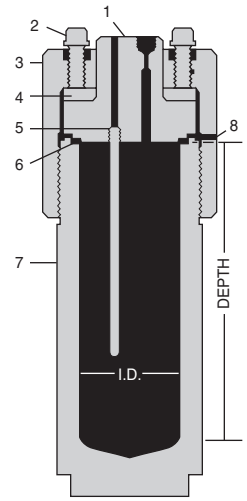
Standard material for the body, cover and gasket is Type 316 stainless steel. These reactors are suitable for either gas or liquid service and capacities range from 125mL to 6,750 mL.

Standard connections supplied are for ¼" O.D. high pressure (coned and threaded) tubing (HF4). Models GC-1 and GC-3 have one connection in the cover. All other models have two connections in the cover and a thermowell that extends two-thirds of the inside depth.

Included with each reactor are eye bolts for lifting and necessary collars and glands for the connections. Vise flats are machined on to the bottom of the body for securing while assembling or disassembling closure.

Series GC Reactors

Catalog No.	I.D.	O.D.	Inside Depth	Capacity	Material	Working Pressure (psi) 100°F	650°F	800°F
GC-1	1″	2½″	10″	125 mL	316 S.S.	13,800	12,500	12,000
GC-3	1½″	2½″	10″	280 mL	316 S.S.	7,750	7,000	6,900
GC-5	1½″	4⅜″	10″	280 mL	316 S.S.	16,000	14,500	14,000
GC-7	1½″	4⅜″	21″	600 mL	316 S.S.	16,000	14,500	14,000
GC-9	2″	4⅜″	10″	500 mL	316 S.S.	12,500	11,400	11,000
GC-11	2″	4⅜″	21″	1,040 mL	316 S.S.	12,500	11,400	11,000
GC-13	2½″	4⅜″	10″	800 mL	316 S.S.	9,200	8,400	8,200
GC-15	2½″	4⅜″	21″	1,160 mL	316 S.S.	9,200	8,400	8,200
GC-17	3″	6⅞″	10″	1,150 mL	316 S.S.	13,000	11,000	10,000
GC-19	3″	6⅞″	21″	2,430 mL	316 S.S.	13,000	11,000	10,000
GC-21	3½″	6⅞″	10″	1,575 mL	316 S.S.	10,500	9,000	8,000
GC-23	3½″	6⅞″	21″	3,300 mL	316 S.S.	10,500	9,000	8,000
GC-25	4″	6⅞″	10″	2,060 mL	316 S.S.	8,500	7,300	6,500
GC-27	4″	6⅞″	21″	4,325 mL	316 S.S.	8,500	7,300	6,500
GC-29	4½″	6⅞″	10″	2,600 mL	316 S.S.	6,500	5,500	5,000
GC-31	4½″	6⅞″	21″	5,475 mL	316 S.S.	6,500	5,500	5,000
GC-33	5″	6⅞″	10″	3,200 mL	316 S.S.	5,000	4,300	4,000
GC-35	5″	6⅞″	21″	6,750 mL	316 S.S.	5,000	4,300	4,000



1. COVER	316 S.S.
2. SET SCREW	COMM.
3. CAP	ALLOY ST'L
4. THRUST RING	TOOL ST'L
5. GASKET	COPPER
6. GASKET	316 S.S.
7. BODY	316 S.S.
8. WEEP HOLE	

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Bolted Closure Reactors

The Bolted Closure Reactors are designed for use up to 650°F (343°C) at the working pressures indicated. Standard material for the body, cover and gasket is Type 316 stainless steel. Standard O-rings may be used in place of the metal gasket when temperatures permit.

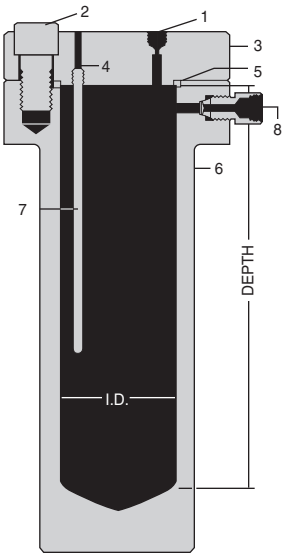
Standard connections include two high pressure (coned and threaded) tubing connections for 1/4" O.D. tubing (HF4) located in the cover. Contact factory if other connections and/or locations are preferred.

Other items available include:

- Heating mantle. Removable quartz fabric cylinder column type. 110 volt, single phase. Bolted closure reactors are supplied with mounting bolt holes on the bottom surface.
- Thermowell for use with 1/16" thermocouple
- Safety head located in side flange with rupture disc (see Page 3.7)

1. PRESSURE CONNECTION (2)
2. SOCKET CAP SCREW
3. COVER
4. GASKET
5. MAIN SEAL
6. BODY
7. THERMOCOUPLE WELL*
8. SAFETY HEAD*

* SUPPLIED AS EXTRA WHEN SPECIFIED



Bolted Closure Reactors

Catalog No.	Capacity	Working Pressure psi	Temperature Rating °F	Inside Diameter	Inside Depth	Approx. Weight (pounds)	Approx. Torque (ft-lb) per Bolt	Material
BC-1	300 mL	5,000	650	2″	6″	21	45	316 S.S.
BC-2	1 liter	5,000	650	3″	9″	50	125	316 S.S.
BC-3	2 liter	5,000	650	3 1/2″	12 1/2″	68	185	316 S.S.
BC-4	1 gallon	3,000	650	5″	12″	97	220	316 S.S.
BC-5	1 gallon	5,000	650	5″	12″	152	280	316 S.S.
BC-6	2 gallon	3,000	650	6 1/2″	14″	245	280	316 S.S.

Clover Leaf Reactors

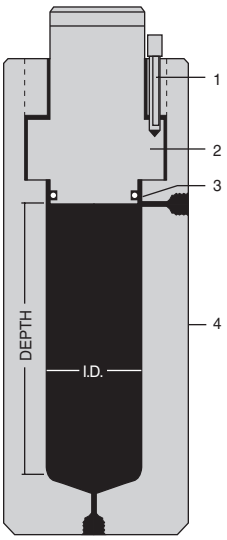
The “Clover Leaf” Closure Reactors provide maximum ease for quick opening or closing of the cover. The cover is simply inserted into the body and then rotated one-eighth of a turn. A safety locking pin is provided to insure that the cover is properly positioned and locked.

Standard material of construction for these reactors is heat treated 4340 alloy steel. Standard connections include two high pressure (coned and threaded) ¼" O.D. tubing connections (HF4).

Mounting holes are provided in the top and bottom of the body for securing or lifting.







1. LOCK PIN
2. COVER
3. O-RING
4. BODY

Clover Leaf Closure Reactors

Catalog No.	Inside Diameter	Outside Diameter	Inside Depth	Working Pressure psi	Temperature Rating °F	Capacity	Material
CL-1 CL-2 CL-3	3″	6½″	9″ 18″ 22″	30,000	250	1,000 mL 2,000 mL 2,500 mL	Alloy Steel
CL-8 CL-9	4″	9½″	9″ 18″	30,000	250	1,850 mL 3,700 mL	Alloy Steel

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Series "R" Reactors
O-Ring Closure





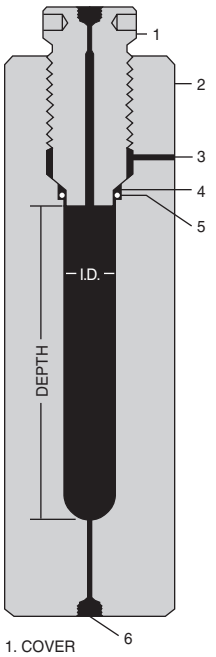
The Series "R" O-ring Closure Reactors are easily assembled and disassembled with minimal torque required for complete engagement.

Material of construction for standard models is Type 4340 alloy steel (or equivalent) properly heat treated for use at elevated pressures. (Some models can be provided in stainless steel construction at reduced pressures — consult factory).

Sealing is accomplished by a highly reliable combination of O-ring and separate metal back-up ring. The wedge shaped back-up ring is designed to expand and contract as pressure increases or decreases. Consequently, the O-ring is continuously confined with no clearance for extrusion. Minimal initial torque is required to effect a positive seal.

Temperature on these vessels must be restricted to 250°F maximum, due to the BUNA-N (nitrile) O-ring.

(continued on page 10.9)



1. COVER
2. BODY
3. VENT HOLE
4. BACK UP RING
5. "O" RING
6. PRESSURE CONNECTION

O-Ring Closure Reactors *(one piece cover)*

I.D.	O.D.	Pressure Rating psi	Material	Inside Depth 6"	10"	12"	16"	20"	24"
1"	3 1/8"	30,000	4340 Alloy Steel or equivalent	R1-6-30	R1-10-30	R1-12-30	R1-16-30		
	3 1/2"	40,000		R1-6-40	R1-10-40	R1-12-40	R1-16-40		
	4 1/4"	60,000		R1-6-60	R1-10-60	R1-12-60	R1-16-60		
	5 1/2"	100,000		R1-6-100	R1-10-100	R1-12-100	R1-16-100		
	6 3/4"	150,000		R1-6-150	R1-10-150	R1-12-150	R1-16-150		
1 1/2"	3 5/8"	20,000	4340 Alloy Steel or equivalent	R1.5-6-20	R1.5-10-20	R1.5-12-20	R1.5-16-20		
	4 1/8"	30,000		R1.5-6-30	R1.5-10-30	R1.5-12-30	R1.5-16-30		
	4 3/4"	40,000		R1.5-6-40	R1.5-10-40	R1.5-12-40	R1.5-16-40		
	6 1/2"	60,000		R1.5-6-60	R1.5-10-60	R1.5-12-60	R1.5-16-60		
	8"	100,000		R1.5-6-100	R1.5-10-100	R1.5-12-100	R1.5-16-100		
	10 1/2"	150,000		R1.5-6-150	R1.5-10-150	R1.5-12-150	R1.5-16-150		
2"	4 1/4"	20,000	4340 Alloy Steel or equivalent	R2-6-20	R2-10-20	R2-12-20	R2-16-20	R2-20-20	R2-24-20
	5"	30,000		R2-6-30	R2-10-30	R2-12-30	R2-16-30	R2-20-30	R2-24-30
	6 1/2"	40,000		R2-6-40	R2-10-40	R2-12-40	R2-16-40	R2-20-40	R2-24-40
	8 1/2"	60,000		R2-6-60	R2-10-60	R2-12-60	R2-16-60	R2-20-60	R2-24-60
	12"	100,000		R2-6-100	R2-10-100	R2-12-100	R2-16-100	R2-20-100	R2-24-100





Included with each vessel is a Tony Bar for removal of the cover nut and necessary eye bolt holes for lifting of the body and components. Outer surfaces are blackened to prevent rusting.

Vent holes are provided to prevent pressure build up behind the closure in the event of a worn or damaged seal.

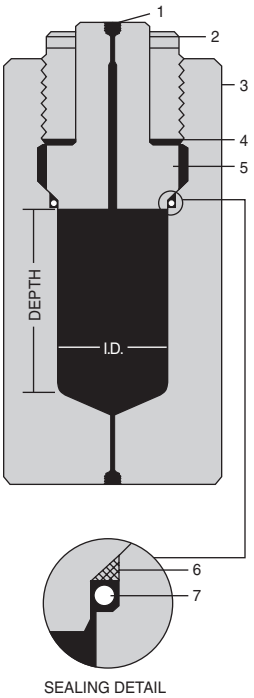
Connections include a top and bottom high pressure coned and threaded ¼" O.D. (HF4) tubing connection. Other sizes or locations for connections can easily be provided when preferred. Consult factory.

Closures are designed in one-piece (cover) for vessels up to 2" I.D. and two-piece (cover and main nut) for vessels larger than 2" I.D.

O-Ring Closure Reactors *(two piece cover)*

I.D.	O.D.	Pressure Rating psi	Material	Inside Depth					
				6"	10"	12"	16"	20"	24"
3″	6″	20,000	4340 Alloy Steel or equivalent	R3-6-20	R3-10-20	R3-12-20	R3-16-20	R3-20-20	R3-24-20
	7″	30,000		R3-6-30	R3-10-30	R3-12-30	R3-16-30	R3-20-30	R3-24-30
	8½″	40,000		R3-6-40	R3-10-40	R3-12-40	R3-16-40	R3-20-40	R3-24-40
	11½″	60,000		R3-6-60	R3-10-60	R3-12-60	R3-16-60	R3-20-60	R3-24-60
	15″	100,000		R3-6-100	R3-10-100	R3-12-100	R3-16-100	R3-20-100	R3-24-100
4″	8″	20,000		R4-6-20	R4-10-20	R4-12-20	R4-16-20	R4-20-20	R4-24-20
	9¼″	30,000		R4-6-30	R4-10-30	R4-12-30	R4-16-30	R4-20-30	R4-24-30
	11″	40,000		R4-6-40	R4-10-40	R4-12-40	R4-16-40	R4-20-40	R4-24-40
	13″	50,000		R4-6-50	R4-10-50	R4-12-50	R4-16-50	R4-20-50	R4-24-50
	15″	60,000		R4-6-60	R4-10-60	R4-12-60	R4-16-60	R4-60-60	R4-24-60
5″	9¼″	20,000		R5-6-20	R5-10-20	R5-12-20	R5-16-20	R5-20-20	R5-24-20
	11¼″	30,000		R5-6-30	R5-10-30	R5-12-30	R5-16-30	R5-20-30	R5-24-30
	13¼″	40,000		R5-6-40	R5-10-40	R5-12-40	R5-16-40	R5-20-40	R5-24-40
	15¼″	50,000		R5-6-50	R5-10-50	R5-12-50	R5-16-50	R5-20-50	R5-24-50
6″	9½″	10,000		R6-6-10	R6-10-10	R6-12-10	R6-16-10	R6-20-10	R6-24-10
	11½″	20,000		R6-6-20	R6-10-20	R6-12-20	R6-16-20	R6-20-20	R6-24-20
	13¼″	30,000		R6-6-30	R6-10-30	R6-12-30	R6-16-30	R6-20-30	R6-24-30
	15″	40,000		R6-6-40	R6-10-40	R6-12-40	R6-16-40	R6-20-40	R6-24-40
7″	10¾″	10,000		R7-6-10	R7-10-10	R7-12-10	R7-16-10	R7-20-10	
	13″	20,000		R7-6-20	R7-10-20	R7-12-20	R7-16-20	R7-20-20	
	15¼″	30,000		R7-6-30	R7-10-30	R7-12-30	R7-16-30	R7-20-30	
8″	12½″	10,000		R8-6-10	R8-10-10	R8-12-10	R8-16-10	R8-20-10	
	14¼″	20,000		R8-6-20	R8-10-20	R8-12-20	R8-16-20	R8-20-20	
9″	13″	10,000		R9-6-10	R9-10-10	R9-12-10	R9-16-10	R9-20-10	
10″	14¾″	10,000		R10-6-10	R10-10-10	R10-12-10	R10-16-10	R10-20-10	

1. PRESSURE CONNECTION
2. MAIN UNIT NUT
3. BODY
4. VENT HOLE
5. COVER
6. BACK UP RING
7. "O" RING



SEALING DETAIL

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Tubular Series Reactors

The Tubular Series Reactors are double ended pressure vessels made from commercial quality cold drawn Type 304 stainless steel seamless tubing. Outside (non-wetted) caps are alloy steel. These are both economical and versatile vessels proven in demand for many applications. Finishes are commercial cold drawn finishes, with honed internal finishes.

Standard sizes are shown in the chart on page 10.11, but special lengths and modifications are easily supplied on request. One pressure connection for ¼" O.D. high pressure coned and threaded tubing at each end is standard. Additional end connections are possible on the larger size models. Also, side connections and end cover thermowells can be supplied when required. Consult factory for special requirements.

O-Ring Closures are standard when temperatures do not exceed 250°F. This is an easily assembled closure requiring minimal torque for positive sealing. The standard O-ring material used is BUNA-N (nitrile) with various other O-ring materials available on request.

Confined Gasket Closures are available for temperatures up to 800°F. A 15% reduction in the listed working pressure is required at this elevated temperature level. These closures utilize a metal gasket (304 stainless steel) which can be torqued down for positive sealing. Torque requirements on the thrust bolts will range from 60 to 110 foot pounds depending on size, pressure, temperature and media being pressurized. These confined gasket closures are available for all models except the TOC1 and TOC3 series. When ordering, simply specify catalog number and add suffix “(W/Gasket)”.

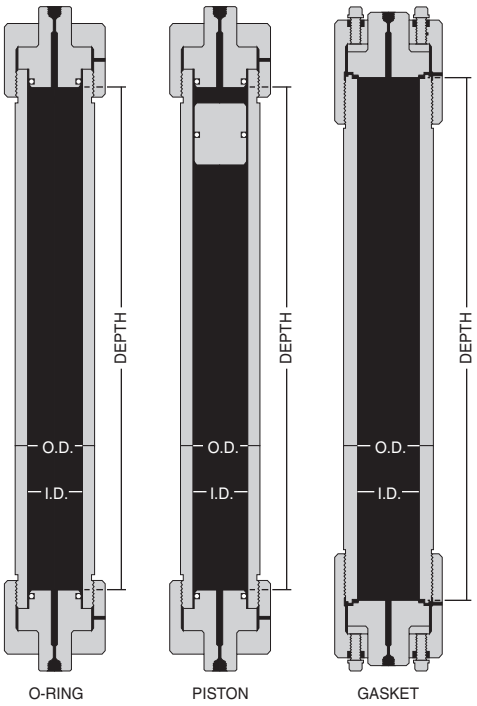
Piston Separators can be supplied with the O-ring closure vessels for use as compression cylinders. These are ideal for separating a liquid from a gas and other similar applications. The tubing body is supplied with a honed inside diameter surface to accommodate the piston. When ordering, simply specify catalog number and add suffix “(W/Piston)”.

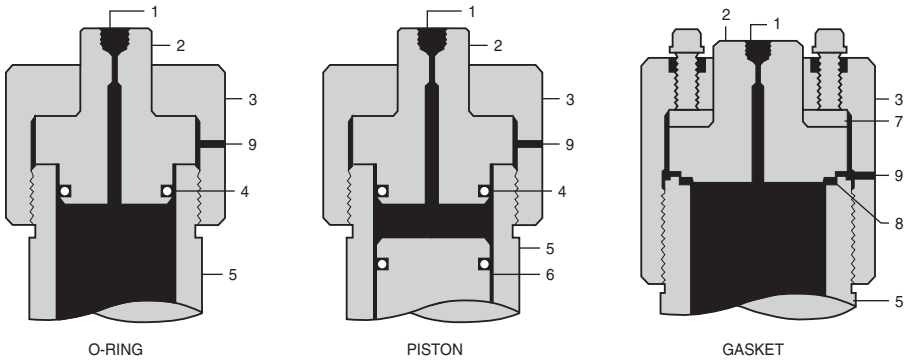




Tubular Series Reactors

Tubing Size		Pressure Rating psi	Material	Catalog Number (O-Ring Closure)			
I.D.	O.D.			20"IL	40"IL	60"IL	72"IL
1″	1 1/2″	5,000	Body 304 S.S. Covers 316 S.S.	TOC1-20	TOC1-40	TOC1-60	TOC1-72
3/4″	1 1/2″	10,000		TOC3-20	TOC3-40	TOC3-60	TOC3-72
1 1/4″	2″	6,000		TOC5-20	TOC5-40	TOC5-60	TOC5-72
1″	2″	10,000		TOC7-20	TOC7-40	TOC7-60	TOC7-72
1 3/4″	2 1/2″	4,000		TOC9-20	TOC9-40	TOC9-60	TOC9-72
1 1/2″	2 1/2″	7,000		TOC11-20	TOC11-40	TOC11-60	TOC11-72
2 1/4″	3″	3,000		TOC13-20	TOC13-40	TOC13-60	TOC13-72
2″	3″	5,000		TOC15-20	TOC15-40	TOC15-60	TOC15-72
2 3/4″	3 1/2″	3,000		TOC17-20	TOC17-40	TOC17-60	TOC17-72
2 1/2″	3 1/2″	4,500		TOC19-20	TOC19-40	TOC19-60	TOC19-72
3 1/4″	4″	2,500		TOC21-20	TOC21-40	TOC21-60	TOC21-72
3″	4″	4,000		TOC23-20	TOC23-40	TOC23-60	TOC23-72
3 1/2″	4 1/2″	3,000		TOC25-20	TOC25-40	TOC25-60	TOC25-72
3″	4 1/2″	5,000		TOC27-20	TOC27-40	TOC27-60	TOC27-72
4″	5″	3,000		TOC29-20	TOC29-40	TOC29-60	TOC29-72
3 1/2″	5″	5,000		TOC31-20	TOC31-40	TOC31-60	TOC31-72





1. PRESSURE CONNECTION
2. COVER
3. CAP
4. "O" RING
5. BODY (BOTH ENDS ALIKE)
6. PISTON
7. THRUST RING
8. GASKET
9. WEEP HOLE

How To Order Tubular Series Reactors

With O-Ring Closure:

Specify catalog number, see ordering table above.

Note: Use of Buna-N O-ring limits maximum working temperature to 250°F. For higher temperatures to 800°F, order gasket closure.

With Piston Separators:

Specify catalog number, see ordering table above and add "(W/Piston)" as suffix.

Because of temperature limitations pistons are not normally ordered in combination with the gasket closure.

With Gasket Closure:

Specify catalog number, see ordering table above and add "W/Gasket)" as suffix.
* Gasket closure is not available on 1 1/2" O.D. tubing size vessels.

Example:
TOC15-20 (W/Gasket).

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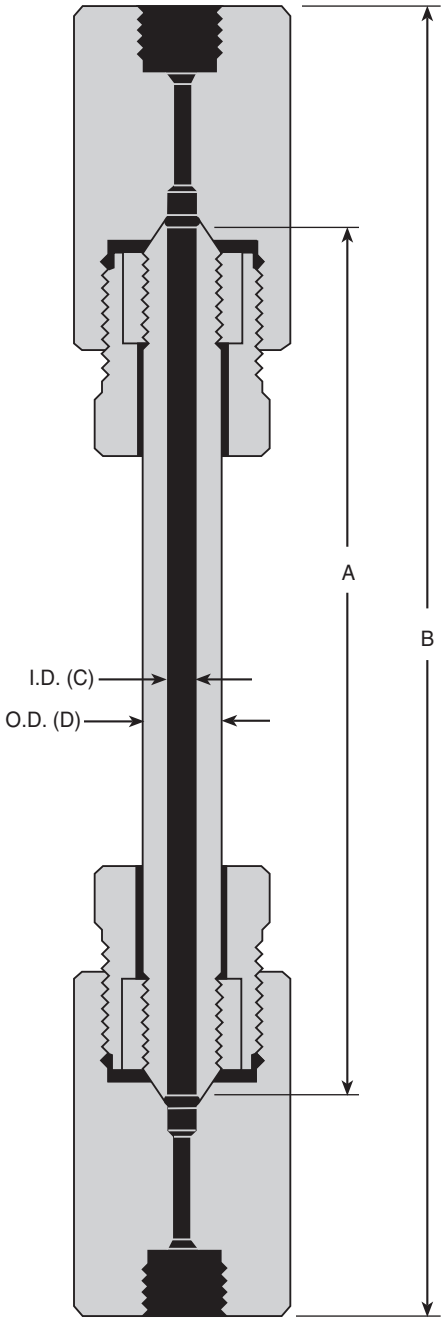
Series "MS" Micro Reactors

The Micro Reactors shown are designed for numerous applications including small volume testing of components and miniature scale reaction tests.

Standard material of construction is Type 316 stainless steel.

Operation at temperatures up to 800°F is made possible by the metal to metal seal construction. Working pressures should be reduced by approximately 15% at the maximum 800°F temperature level.

Connections are for 1/4" O.D. high pressure coned and threaded tubing (HF4). One connection is provided at each end. Other sizes or types of connections can be provided. Thermocouples can easily be installed with the use of thermocouple adapters (refer to section 8.0).



Catalog No.	Capacity	Working Pressure psi	(C) Inside Diameter	(D) Outside Diameter	(A) Inside Depth	(B) Overall Length
MS-1	2 mL	60,000	3/16"	9/16"	4"	7"
MS-2	3 mL				6"	9"
MS-3	4 mL				8"	11"
MS-4	5 mL				10"	13"
MS-5	6 mL				12"	15"
MS-11	5 mL	20,000	5/16"	9/16"	4"	6 1/2"
MS-12	7 1/2 mL				6"	8 1/2"
MS-13	10 mL				8"	10 1/2"
MS-14	12 1/2 mL				10"	12 1/2"
MS-15	15 mL				12"	14 1/2"
MS-16	24 mL	20,000	9/16"	1"	6"	9"
MS-17	41 mL				10"	13"
MS-18	65 mL				16"	19"
MS-19	81 mL				20"	23"

High Pressure Equipment

Pumping Systems, Intensifiers, Gas Boosters and High Pressure Generators

High Pressure Equipment Company produces a number of components and systems for general industrial, elevated pressure applications.

Pumping Systems are air operated, hydraulic systems capable of producing output pressures up to 50,000 psi. These pumping systems are complete, self-contained and ready to operate; just connect to shop air supply.

Hydraulic Intensifiers feature a compression ratio of 10 to 1, which allows for output pressures as high as 150,000 psi when used in conjunction with a commercially available lower pressure pump (15,000 psi).

Gas Boosters and gas booster systems are an excellent method for increasing the pressures or flow rates for a variety of gases. These units offer compression ratios as high as 30 to 1 and output pressures up to 60,000 psi.

High Pressure Generators are manually operated piston screw pumps for compressing liquids and some gases in small volumes to develop pressure.



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Gas Boosters	11.6-11.7
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Air Operated Hydraulic Pumping Systems to 50,000 psi



- Model PS-10: 10,000 psi
- Model PS-20: 20,000 psi
- Model PS-30: 30,000 psi
- Model PS-40: 40,000 psi
- Model PS-50: 50,000 psi
- Model PS-90: 90,000 psi

High Pressure air operated hydraulic pumping systems are complete, self-contained units and ready to operate. Just hook up standard shop air supply (maximum 100 psi) to connection supplied on the side of the console. Discharge capacities range to 64 in^3/min.

Standard Features

System includes hydraulic oil reservoir, oil filter, air operated hydraulic pump, pressure gauge, panel mounted high pressure valves, safety head assembly, panel mounted air regulator and gauge and air line filter and lubricator.

All components are enclosed in a steel console with only the back exposed.

Dimensions of standard systems are 26" wide, 24" deep and 40" high.

System Capabilities

The output pressure is predetermined by adjustment to the air regulator setting.

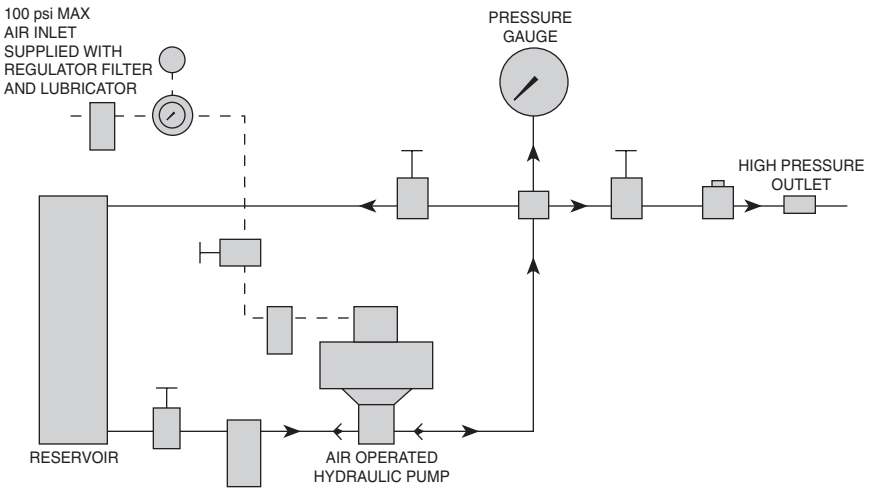
Output pressure is maintained constantly and pump compensates for pressure drops or losses.

Hydraulic input is gravity fed, however, if pump is used alone, the feed can be pressurized to the limit of the pump.

Within the pump the large diameter air piston drives a smaller piston to provide fluid flow at high pressure.

Air consumption will be approximately 56 CFM of free air at 100 psi input.

Reservoir = 4 gallon capacity, do not pressurize.



Standard Pumping System Specifications

Approximate Air to Hydraulic Pressure Ratio — Static Conditions

	Model No.	Air psi										
		10	20	30	40	50	60	70	80	90	100	110
Hydraulic Pressure psi	PS-10	1,500	3,200	5,200	7,100	9,000	10,800	12,500	14,500	16,300	18,000	19,800
	PS-20	3,000	6,000	9,500	12,600	16,000	19,100	22,300	25,600	29,000	32,300	35,600
	PS-30	4,000	8,800	13,700	18,000	22,500	27,000	31,500	36,500	41,400	45,800	50,300
	PS-40	6,000	13,000	21,000	27,000	34,000	40,500	46,000	52,000	59,000	65,000	70,000
	PS-50	6,000	13,000	21,000	27,000	34,000	40,500	46,000	52,000	59,000	65,000	70,000
	PS-90	Uses Dual Pump			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Approximate Rate of Discharge — CIPM

Model →		PS-10			PS-20			PS-30			PS-40			PS-50		
Air psi →		60	80	100	60	80	100	60	80	100	60	80	100	60	80	100
Pressure →	10,000 psi	27	52	64	31	40	44	28	33	35	19	23	24	19	23	24
	30,000 psi	0	0	0	0	0	14	0	16	21	12	15	17	12	15	17
	40,000 psi	0	0	0	0	0	0	0	0	14	2	12	15	2	12	15
	50,000 psi	0	0	0	0	0	0	0	0	0	0	6	11	0	6	11

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150,000 psi Pumping System

Model PS-150

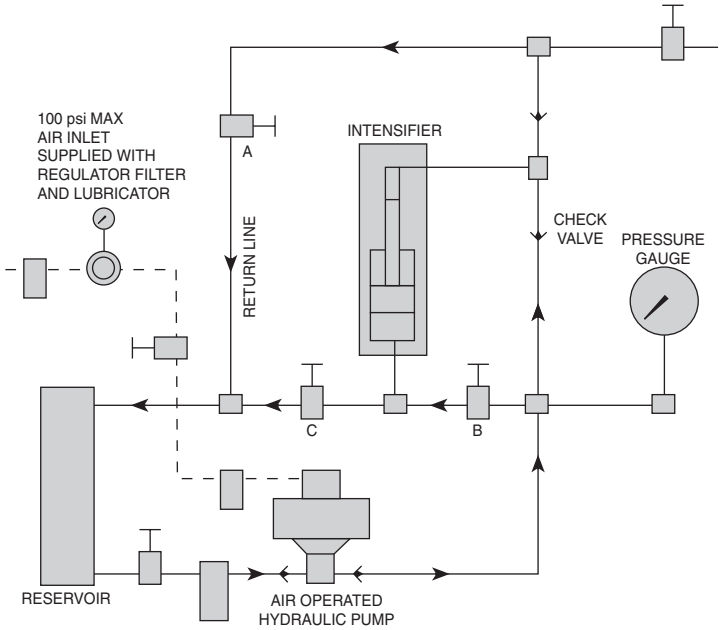
The Model PS-150 Pumping System is designed for generating hydraulic pressure up to 150,000 psi by means of an air operated hydraulic pump and an intensifier. The 10 to 1 ratio intensifier is fully illustrated on facing page 11.5. This system is complete and ready to operate requiring only the connection of an air supply of approximately 80 psi.

The steel console is 26" wide, 24" deep, 40" high and includes manual valves, air regulator, filter and lubricator, air gauge, high pressure gauge, reservoir, oil filter, pump (0-16,000 psi), related high pressure tubing and fittings.

The 0-20,000 psi pressure gauge is connected to the low pressure side of the intensifier which has a ratio of 10 to 1. Pressure on the high pressure side of the intensifier is thus determined by multiplying the gauge reading by 10. A small variation must be allowed for friction from the intensifier packing.

The air operated hydraulic pump pressurizes the system to 16,000 psi with valves “A” and “B” closed and the intensifier piston is automatically positioned to the low pressure end of its stroke. With valves “A” and “C” closed, valve “B” is opened to allow the pump to pressurize the low pressure end of the intensifier. The fluid in the high pressure end of the intensifier is thus pressurized with a 10 to 1 ratio. If the intensifier reaches the end of its stroke before the desired pressure is achieved, the intensifier may be recycled. The intensifier output is approximately 1.2 cubic inches per stroke.





150,000 psi Hydraulic Intensifiers

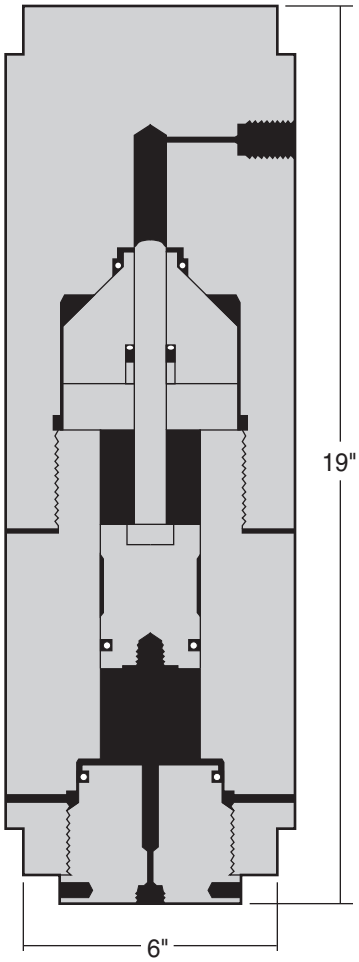
The 150,000 psi Hydraulic Intensifier is designed with a ratio of areas on the two pistons of 10 to 1. Consequently, pressures up to 150,000 psi can be achieved by using a commercially available lower pressure (15,000 psi) pump.

Operation of this intensifier is illustrated in the typical installation shown in the schematic on facing page 11.4.

Material of construction for the pressure containing parts is 4340 alloy steel (or equivalent) properly heat treated for use at elevated pressures. Only non-corrosive type fluids should be used. The high pressure packing is housed in a separate removable stuffing box. This design permits improved concentricity and facilitates close tolerance machining of the packing area.

Capacity per stroke at the high pressure end is 1.2 cubic inches. Capacity at the low pressure end is 12.6 cubic inches per stroke. Piston travel is 4 inches. Weight is approximately 150 pounds.

Standard connections are for $^{1}/_{4}$" O.D. tubing (HF4) on the low pressure end and $^{3}/_{8}$" O.D. x $^{1}/_{16}$" I.D. tubing (XF6) on the high pressure end.



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Gas Boosters

MODEL GBS - 30

30,000 psi Gas Booster System
(One-to-one ratio — 112 cubic inch per stroke displacement)
(17-4PH stainless steel construction)

MODEL GBS - 60

60,000 psi Gas Booster System
(Thirty-to-one ratio — 4.7 cubic inch per stroke displacement)
(4340 alloy steel construction)



The Model GBS-30 and GBS-60 Gas Booster Systems are complete and ready to operate. All that is required is an air supply for the pump (approximately 70 psi) and a commercially available container of compressed gas.

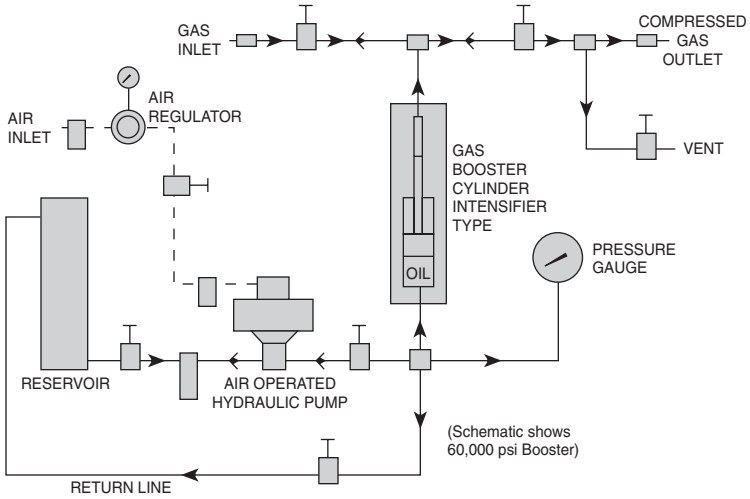
The steel console is 26" wide, 24" deep, 40" high and includes manual valves, air regulator, filter and lubricator, air gauge, high pressure gauge, reservoir, oil filter, pump, gas booster and related high pressure tubing and fittings.

Operation is by means of an air operated hydraulic pump which pressurizes one end of the gas booster which then compresses the gas in the opposite end of the booster. To accomplish this, the gas inlet valve is opened to permit gas to fill the gas end of the booster. Check valves are provided to permit gas flow in one direction only. With the gas outlet valve open, the hydraulic pump is operated in order to pressurize the hydraulic end of the booster. Thus, the gas is compressed in the booster. If required pressure is not reached by the end of the stroke, the gas booster can easily be recycled for additional strokes.

Note the gauge on these systems is connected to the hydraulic side of the booster. On the Model GBS-30 which has a 1 to 1 ratio, there is a direct reading of the pressure in the gas end of the booster. The Model GBS-60 has a 30 to 1 ratio and the gauge will accordingly indicate a reading of one-thirtieth (1/30) of the actual pressure in the gas end of the booster. An additional gauge can be furnished for connection to the gas end of the booster to provide direct pressure readings of the gas pressure.

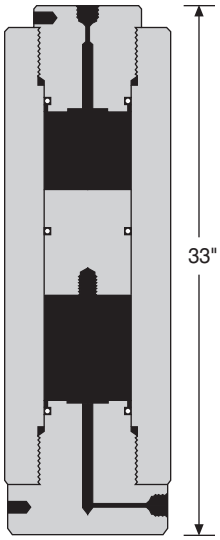
Details of the gas boosters are shown on facing page 117.

These systems should not be used with hydrogen or oxygen.



Model GB-30

30,000 psi



The Model GB-30 Gas Booster is rated for use up to 30,000 psi and has a one-to-one ratio. Displacement per stroke is 112 cubic inches (1835 ml).

Material of construction is 17-4PH stainless steel for the body and covers. The piston is supplied in brass with other materials available as an option. Standard O-ring material for the covers and piston is BUNA-N (nitrile).

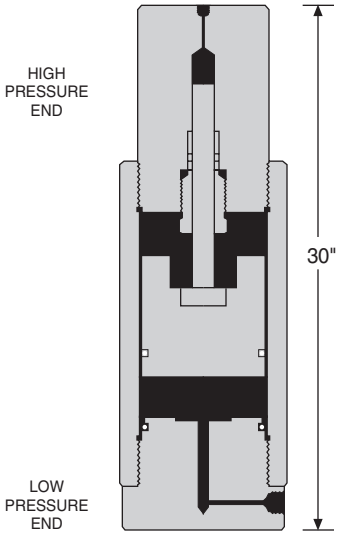
Standard connections supplied are for ¼" O.D. High Pressure tubing (HF4 connection) at each end.

The Model GB-30 can be supplied as a separate unit or with the complete system (Model GBS-30) shown on page 11.6.

The Model GB-30 should not be used with hydrogen or oxygen.

Model GB-60

60,000 psi



Piston travel - 6"

The Model GB-60 Gas Booster is rated for use up to 60,000 psi and has a thirty-to-one (30-1) ratio. Thus, 60,000 psi can be obtained at the high pressure end using only 2,000 psi inlet pressure. Displacement per stroke is 4.7 cubic inches (77 ml).

Material of construction is Type 4340 alloy steel (or equivalent) properly heat treated for use at high pressure. Other internal materials include 17-4PH stainless steel and aluminum bronze. Seals include BUNA-N (nitrile) O-rings and a Parker Poly Pak®.

Standard connections supplied are for ¼" O.D. High Pressure tubing (HF4 on the high pressure end and AF4 on the low pressure end).

The Model GB-60 can be supplied as a separate unit or with the complete system (Model GBS-60) shown on page 11.6.

The Model GB-60 should not be used with hydrogen or oxygen.

Special Gas Boosters and Intensifiers

High Pressure Equipment Company has designed and supplied numerous gas boosters and intensifiers to meet the customer's special requirements. A price quotation can be made by advising us of the requirements including: media (gas or liquid) to be pressurized, maximum outlet pressure required, available inlet pressure and required displacement per stroke.

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High Pressure Generators

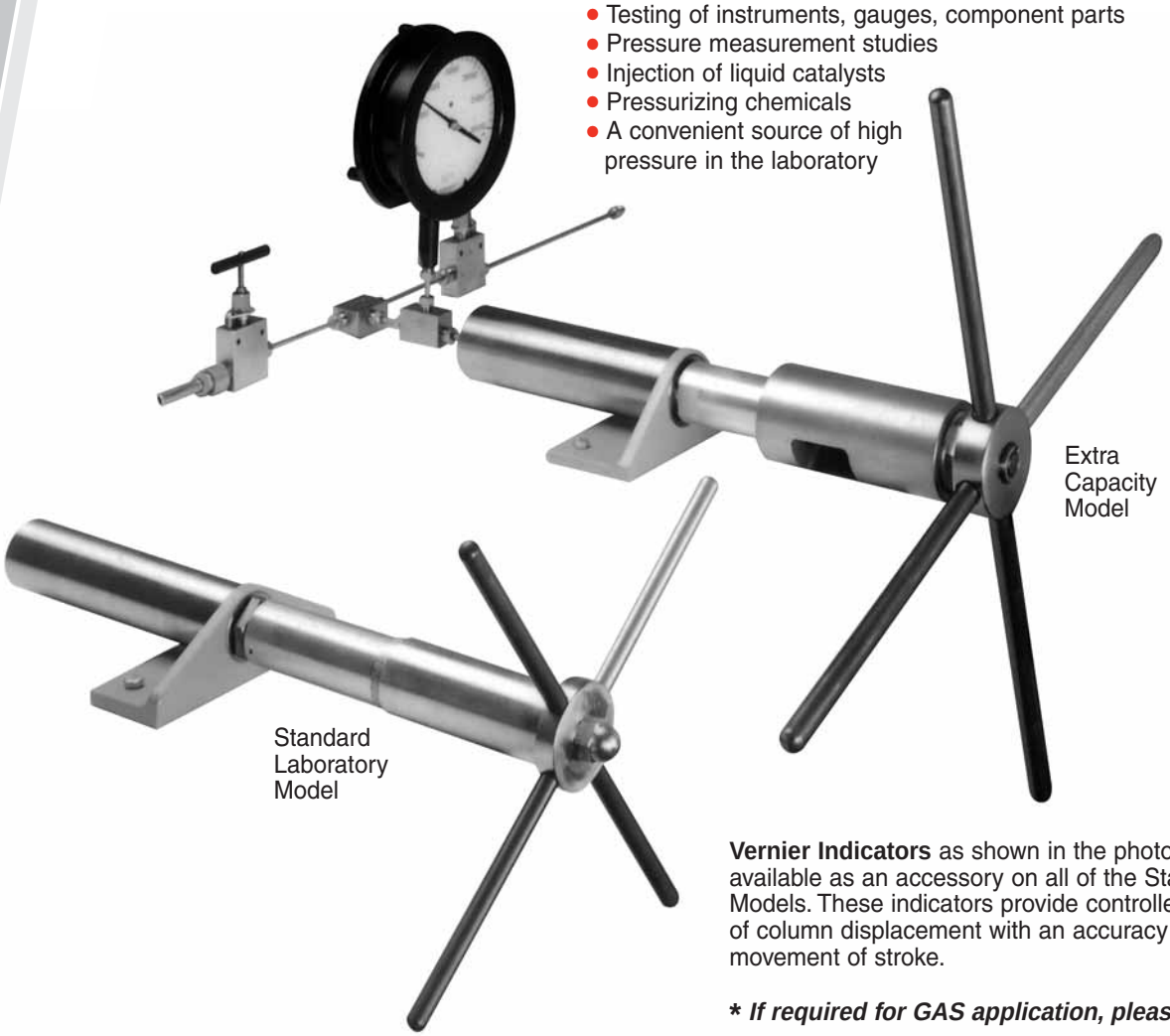
The HiP High Pressure Generator is a manually operated piston screw pump. It is designed for any application where a liquid* is to be compressed within a small volume to develop pressure.

Pressure Ranges:
- 0-5,000 psi
- 0-10,000 psi
- 0-15,000 psi
- 0-30,000 psi
- 0-60,000 psi
- 0-75,000 psi
- 0-100,000 psi

All wetted parts are of 316 stainless steel and 17-4PH stainless steel. Parker Poly Pak® is standard .

The High Pressure Generator is easily mounted to a work bench and maximum pressures may be obtained with a minimum amount of effort by the operator. The standard connection is a High Pressure coned-and-threaded (HF4) opening for ¼" O.D. tubing up to 60,000 psi and XF4 connections for pressures above 60,000 psi. Adapters are available with optional Teflon packing at no additional cost for other type connections including pipe.

Typical Applications:
- Testing of instruments, gauges, component parts
- Pressure measurement studies
- Injection of liquid catalysts
- Pressurizing chemicals
- A convenient source of high pressure in the laboratory



Extra Capacity Model

Standard Laboratory Model

Vernier Indicators as shown in the photo at left are available as an accessory on all of the Standard Laboratory Models. These indicators provide controlled measurement of column displacement with an accuracy of ± 0.003" movement of stroke.

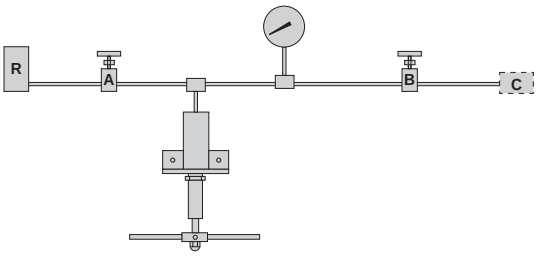
**** If required for GAS application, please consult factory.***

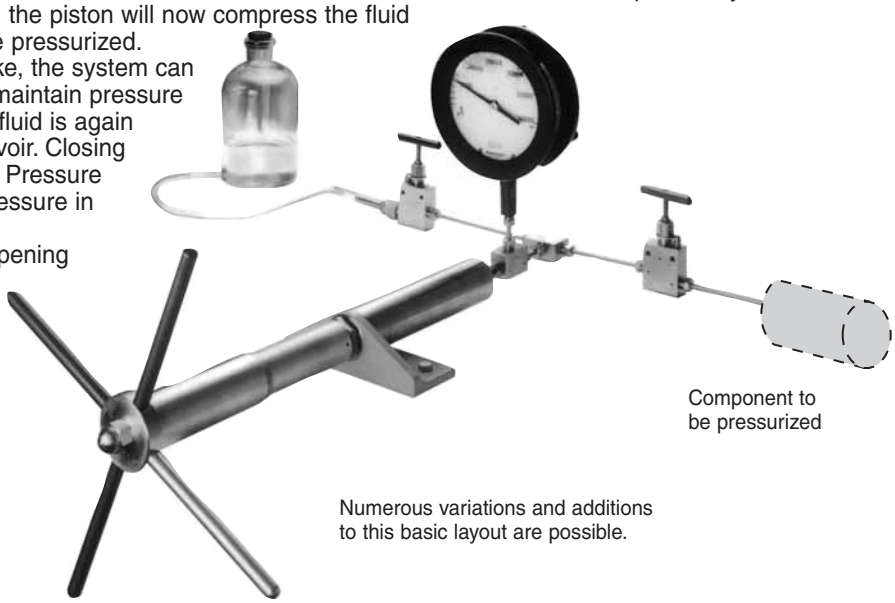
The schematic illustrates a very basic layout for using a Pressure Generator. A reservoir (R) is shown connected by means of valves and fittings to a component (C) that is to be pressurized. A gauge has been included for determining pressure.

With valve “B” closed and valve “A” open, the handle of the Pressure Generator is rotated counter-clockwise to draw fluid from the reservoir into the cylinder body of the Pressure Generator. Valve “A” is then closed and valve “B” is opened. By rotating the Pressure Generator handle clockwise, the piston will now compress the fluid to develop pressure in the component that is to be pressurized.

If sufficient pressure is not reached in one stroke, the system can be “recycled.” Valve “B” can be closed in order to maintain pressure in the components. Valve “A” is then opened, and fluid is again drawn into the Pressure Generator from the reservoir. Closing Valve “A” and opening Valve “B” will now allow the Pressure Generator to be operated to develop increased pressure in the component.

Pressure in the component can be vented by opening both valves.

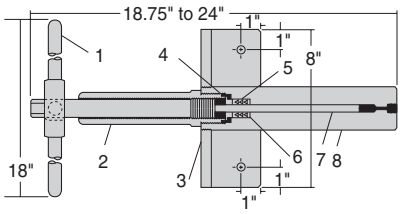




Component to be pressurized

Numerous variations and additions to this basic layout are possible.

Standard Laboratory Models



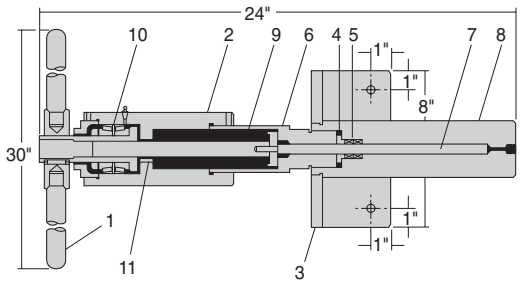
1. Handle
2. Gland Nut
3. Mounting Bracket
4. Top Packing Washer
5. Packing
* 6. Bottom Packing Washer
7. Shaft
8. Body

Model	Pressure Rating psi	Capacity per Stroke	Shaft Diameter
87-6-5	5,000	60 mL	7/8"
62-6-10	10,000	30 mL	5/8"
50-6-15	15,000	20 mL	1/2"
37-6-30	30,000	11 mL	3/8"

Length of stroke: 6 inches. 14 revolutions of handle produces one inch travel of shaft.

* Use item six only with optional Chevron Teflon packing.

Extra Capacity Models



1. Handle
2. Housing
3. Mounting Bracket
4. Packing Washer
5. Packing
6. Extension Gland
7. Shaft
8. Body
9. Stem Screw with Keyway
10. Bearing Assembly
11. Key

Model	Pressure Rating psi	Capacity per Stroke	Shaft Diameter
112-5.75-5	5,000	93 mL	1 1/8"
81-5.75-10	10,000	48 mL	13/16"
68-5.75-15	15,000	35 mL	11/16"
50-5.75-30	30,000	18 mL	1/2"
37-5.75-60	60,000	10 mL	3/8"
31-5.75-75	75,000	7 mL	5/16"
25-5.75-100	100,000	4.5 mL	1/4"

Length of stroke: 5 3/4 inches. 14 revolutions of handle produces one inch travel of shaft.

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High Pressure Equipment

Technical Information

Selecting the right product to plumb your pressure system or conduct your research project is a critical decision. In this section, High Pressure Equipment Company provides a variety of technical information to assist you in this selection process. We have included a number of English to Metric conversion charts, flow coefficient formulas and valve ratings, reactor pressure ratings, and recommended torque values for our air operated valves and tubing connections.

As you work with this data, it is important to consider that it is general in nature and may vary depending on the actual parameters of your application. If you have any questions concerning this information or would like assistance in selecting an HiP product, our engineering staff is available and ready to help.



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Minimum Recommended Bend Radius For High Pressure Tubing 12.6

Pressure

	Pa	kPa	psi	kg/cm^2	bar	atm	MPa
Pa	1	0.001	1.450×10^{-4}	1.020×10^{-5}	1×10^{-5}	9.869×10^{-6}	1×10^{-6}
kPa	1000	1	0.145	0.01	0.01	0.01	0.001
psi	6.895×10^{3}	6.895	1	0.07	0.069	0.068	0.007
kg/cm^2	9.807×10^{4}	98.07	14.22	1	0.981	0.968	0.098
bar	1×10^{5}	100	14.50	1.02	1	0.987	0.1
atm	101.3×10^{5}	101.3	14.7	1.033	1.013	1	0.101
MPa	1×10^{6}	1000	145	10.2	10	9.869	1

Flow

	mL/min	in^3/min	ft^3/hr	liter/min	gal/min
mL/min	1	0.061	0.002	0.001	6.242×10^{-4}
in^3/min	16.39	1	0.035	0.016	0.004
ft^3/hr	472	28.8	1	0.472	0.125
liter/min	1000	61.02	2.119	1	0.264
gal/min	3785	231	8.021	3.785	1

Weight/Mass

	gram	oz	lb	kg
gram	1	0.035	0.002	0.001
oz	28.35	1	0.063	0.028
lb	453.6	16	1	0.454
kg	1000	35.28	2.205	1

Volume

	mL	in^3	liter	gal	ft^3	m^3
mL	1	0.061	0.001	2.642×10^{-4}	3.531×10^{-5}	1×10^{6}
in^3	16.39	1	0.016	0.004	5.787×10^{-4}	1.639×10^{5}
liter	1000	61.02	1	0.264	0.035	0.001
gal	3.785×10^{3}	231	3.785	1	0.134	0.004
ft^3	2.832×10^{4}	1.728×10^{3}	28.32	7.481	1	0.028
m^3	1×10^{6}	6.102×10^{4}	1000	264.2	35.32	1

Linear

	micron	millimeter	centimeter	inch	foot	meter
micron	1	0.001	1×10^{-4}	3.937×10^{-5}	3.281×10^{-6}	1×10^{-10}
millimeter	1000	1	0.1	0.03937	0.003	0.001
centimeter	1×10^{-4}	10	1	0.394	0.033	0.01
inch	2.540×10^{4}	25.4	2.54	1	0.083	0.025
foot	3.048×10^{5}	304.8	30.48	12	1	0.305
meter	1×10^{6}	1000	100	39.37	3.281	1

Temperature

Fahrenheit to Celsius

°F	°C	°F	°C	°F	°C
-440	-262	260	127	820	438
-420	-251	270	132	840	449
-400	-240	280	138	860	460
-380	-229	290	143	880	471
-360	-218	300	149	900	482
-340	-207	310	154	920	493
-320	-196	320	160	940	504
-300	-184	330	166	960	516
-280	-173	340	171	980	527
-260	-162	350	177	1000	538
-240	-151	360	182	1020	549
-220	-140	370	188	1040	560
-200	-129	380	193	1060	571
-180	-118	390	199	1080	582
-160	-107	400	204	1100	593
-140	-96	410	210	1120	604
-120	-84	420	216	1140	616
-100	-73	430	221	1160	627
-80	-62	440	227	1180	638
-60	-51	450	232	1200	649
-40	-40	460	238	1220	660
-30	-34	470	243	1240	671
-20	-29	480	249	1260	682
-10	-23	490	254	1280	693
0	-18	500	260	1300	704
10	-12	510	266	1320	716
20	-7	520	271	1340	727
30	-1	530	277	1360	738
40	4	540	282	1380	749
50	10	550	288	1400	760
60	16	560	293	1420	771
70	21	570	299	1440	782
80	27	580	304	1460	793
90	32	590	310	1480	804
100	38	600	316	1500	816
110	43	610	321	1520	827
120	49	620	327	1540	838
130	54	630	332	1560	849
140	60	640	338	1580	860
150	66	650	343	1600	871
160	71	660	349	1620	882
170	77	670	354	1640	893
180	82	680	360	1660	904
190	88	690	366	1680	916
200	93	700	371	1700	927
210	99	720	382	1720	938
220	104	740	393	1740	949
230	110	760	404	1760	960
240	116	780	416	1780	971
250	121	800	427	1800	982

Celsius to Fahrenheit

°C	°F	°C	°F	°C	°F
-270	-454	230	446	730	1346
-260	-436	240	464	740	1364
-250	-418	250	482	750	1382
-240	-400	260	500	760	1400
-230	-382	270	518	770	1418
-220	-364	280	536	780	1436
-210	-346	290	554	790	1454
-200	-328	300	572	800	1472
-190	-310	310	590	810	1490
-180	-292	320	608	820	1508
-170	-274	330	626	830	1526
-160	-256	340	644	840	1544
-150	-238	350	662	850	1562
-140	-220	360	680	860	1580
-130	-202	370	698	870	1598
-120	-184	380	716	880	1616
-110	-166	390	734	890	1634
-100	-148	400	752	900	1652
-90	-130	410	770	910	1670
-80	-112	420	788	920	1688
-70	-94	430	806	930	1706
-60	-76	440	824	940	1724
-50	-58	450	842	950	1742
-40	-40	460	860	960	1760
-30	-22	470	878	970	1778
-20	-4	480	896	980	1796
-10	14	490	914	990	1814
0	32	500	932	1000	1832
10	50	510	950		
20	68	520	968		
30	86	530	986		
40	104	540	1004		
50	122	550	1022		
60	140	560	1040		
70	158	570	1058		
80	176	580	1076		
90	194	590	1094		
100	212	600	1112		
110	230	610	1130		
120	248	620	1148		
130	266	630	1166		
140	284	640	1184		
150	302	650	1202		
160	320	660	1220		
170	338	670	1238		
180	356	680	1256		
190	374	690	1274		
200	392	700	1292		
210	410	710	1310		
220	428	720	1328		

°F = $^{9}/_{5}$ °C + 32
°C = $^{5}/_{9}$ (°F - 32)
°R = °F + 459.67
K = °C + 273.15

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Flow Coefficients

The flow coefficient Cv is a valve sizing designation commonly determined by laboratory test. It corresponds to the flow rate of water through a valve in US gallons per minute at 60˚F with a differential pressure drop of one psi.

With the Cv coefficient known, the following values can be calculated:

1. Liquid flow capacity in US gallons per minute

$$Ql = Cv \cdot \sqrt{\frac{\Delta P}{G}}$$

2. Pressure drop across valve (liquid flow)

$$\Delta P = G \cdot \frac{Ql^2}{Cv^2}$$

3. Gas flow capacity in standard cubic feet per hour (SCFH)

$$Qg = 1360 \cdot Cv \cdot \sqrt{\frac{P \cdot \Delta P}{T \cdot G \cdot Z}}$$

4. Pressure drop across valve (gas flow)

$$\Delta P = \frac{T \cdot G \cdot Z}{P} \cdot \left(\frac{Qg}{1360 \cdot Cv}\right)^2$$

Where:

- Cv = Valve flow coefficient
- G = Specific gravity of fluid
- ΔP = Differential pressure drop across valve (psi)
- P = System pressure at valve inlet (psia)
- Ql = Liquid flow in US gallons per minute (GPM)
- Qg = Gas flow in standard cubic feet per hour (SCFH)
- T = System temperature (˚R)
- Z = Gas compressibility factor at operating conditions

Flow coefficients of various HiP valves

Valve	C_V
15-11AF1	0.05
15-11AF2	0.06
10-11AF4	0.22
10-11AF6	0.22
20-11LF4	0.41
20-11LF6	0.62
20-11LF9	1.47
20-11LF12	4.01
20-11LF16	4.78
30-11HF2	0.06
30-11HF4	0.17
30-11HF6	0.22
30-11HF9	0.22
30-11HF16	2.89

Valve	C_V
40-11HF9	0.23
60-11HF2	0.06
60-11HF4	0.09
60-11HF6	0.13
60-11HF9	0.13
100-11XF4	0.09
150-11XF6	0.09
10-11NFA	0.22
10-11NFB	0.22
10-11NFC	0.22
10-11NFD	1.47

Pressure Ratings

Bolted Closure Reactors (psi) at Elevated Temperatures

Temperature °F (°C)	BC-1	BC-2, BC-3, BC-5	BC-4, BC-6
100 (38)	5600	5250	3150
200 (93)	5600	5250	3150
300 (149)	5500	5100	3100
400 (204)	5400	5050	3050
500 (260)	5350	5050	3050
600 (316)	5100	5050	3050
650 (343)	5000	5000	3000

Temperature °F (°C)	BC-1	BC-2, BC-3, BC-5	BC-4, BC-6
700 (371)	4900	4900	2950
750 (399)	4800	4800	2850
800 (427)	4200	4200	2500
850 (454)	3400	3400	2050
900 (482)	2500	2500	1500
950 (510)	1700	1700	1000
1000 (538)	900	900	550

Recommended Torque

Tubing Connections

Connection	Recommended Torque
AF1	55 inch pounds
AF2	10 foot pounds initial to compress sleeve onto tube 25 foot pounds to tighten connection
AF4	30 foot pounds initial to compress sleeve onto tube 50 foot pounds to tighten connection
AF6	40 foot pounds initial to compress sleeve onto tube 60 foot pounds to tighten connection
LF4	20 foot pounds
LF6	30 foot pounds
LF9	50 foot pounds
LF12	90 foot pounds
LF16	125 foot pounds
HF2	75 inch pounds
HF4	25 foot pounds
HF6	50 foot pounds
HF9	110 foot pounds
HF16	150 foot pounds
XF4	45 foot pounds
XF6	70 foot pounds

Minimum Packing Gland Torque for Valves

Valve Series	Pressure Rating	Packing Gland Torque
15-**AF1 15-**AF2	15,000 psi	15 foot pounds
10-**AF4 10-**AF6	10,000 psi	30 foot pounds
10-**NFA 10-**NFB 10-**NFC	10,000 psi	35 foot pounds
10-**NFD	10,000 psi	50 foot pounds
20-**LF4 20-**LF6	20,000 psi 20,000 psi	35 foot pounds
20-**LF9	20,000 psi	70 foot pounds
30-**HF2 30-**HF4 30-**HF6 30-**HF9	30,000 psi	30 foot pounds
60-**HF2 60-**HF4 60-**HF6 60-**HF9	60,000 psi	40 foot pounds
100-**XF4	100,000 psi	60 foot pounds
150-**XF6	150,000 psi	90 foot pounds

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Minimum Safety Head Hold Down Nut Torque

Pressure psi	Torque foot pounds
10,000	40
15,000	45
20,000	50
25,000	55
30,000	60
35,000	65
40,000	70
45,000	75
50,000	80
55,000	85
60,000	90

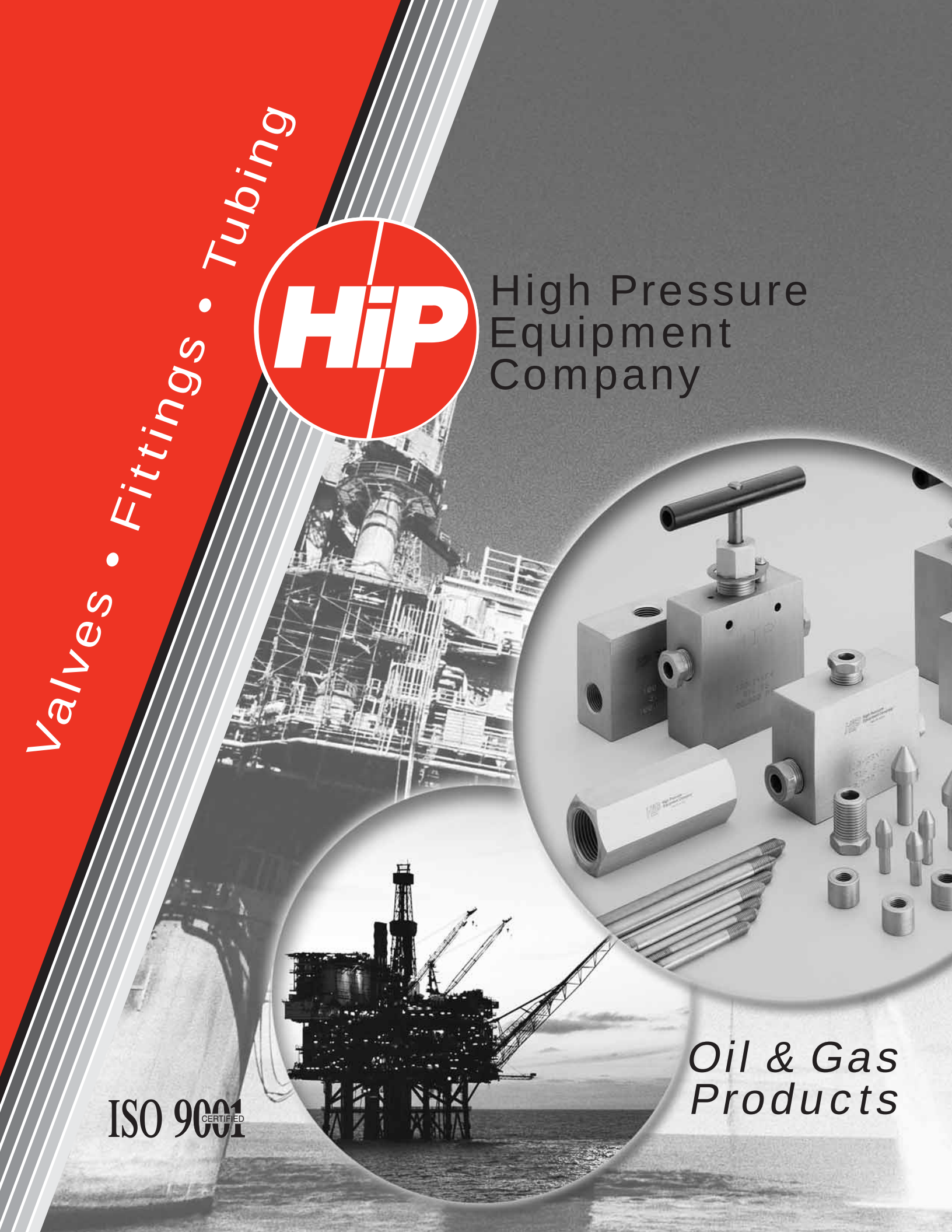
Minimum Recommended Bend Radius For High Pressure Tubing

Tube Size O.D. x I.D.	Minimum Bend Radius
0.250 x 0.062 0.250 x 0.083 0.250 x 0.109 0.250 x 0.125	1.25 in
0.375 x 0.062 0.375 x 0.125 0.375 x 0.203 0.375 x 0.250	1.75 in
0.562 x 0.188 0.562 x 0.250 0.562 x 0.312	2.62 in
0.750 x 0.438 0.750 x 0.516	3.50 in
1" x 0.438 1" x 0.562 1" x 0.688	4.62 in

Valves • Fittings • Tubing

HiP

High Pressure Equipment Company



Oil & Gas Products

ISO 9001 CERTIFIED

Oil and Gas Products

High Pressure Equipment Company has developed a complete line of valves and affiliated components specifically for the unique requirements of the oil and gas industry. We offer valves, fittings and tubing for use with sour oil and gas (H_2S) in a 10,000 psi, 20,000 psi and 30,000 psi series. Our "SGS" products are constructed of annealed 316 stainless steel and meet or exceed all requirements of NACE MR0175 and the American Petroleum Institute. For those applications where H_2S is not present, our standard line of valves, fittings and tubing will accommodate pressures to 150,000 psi.

Since 1954, HiP has been designing and manufacturing the highest quality and most dependable high pressure oil field products. Our ISO 9001 certified operation is part of a quality focus that has helped us gain the trust of many new oil and gas customers. And our on-time delivery and competitive pricing have made us integral partners in our customers' cost-reduction efforts.

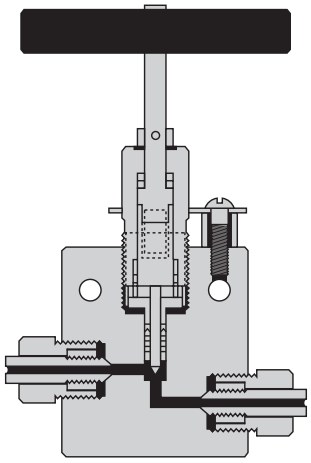


Hastelloy & Other Exotic Material Products in Stock

We know that some oil and gas applications demand material performance beyond our "SGS" stainless steel products. In an effort to provide our customers with their material of choice and meet tight shipping deadlines, we maintain an inventory of Hastelloy and Monel valves and fittings.

Sour Oil & Gas Valves

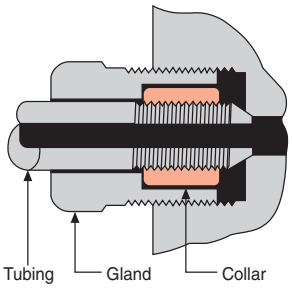
- 1/4, 3/8 & 9/16" O.D. tube connections
- 10,000, 20,000 & 30,000 psi series
- Vee and regulating stem types
- Annealed 316 stainless steel construction
- Meet or exceed requirements of NACE MR0175



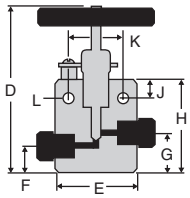
HF4 ($^1/_4$"), HF6 ($^3/_8$") and HF9 ($^9/_{16}$")

High Pressure Coned and Threaded Connections

HiP oil field products use a high pressure coned and threaded connection which accommodates the high temperatures, high pressures and extreme conditions common in these applications. These connections may be disassembled and retightened indefinitely.

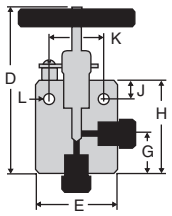


Two Way Straight Valves



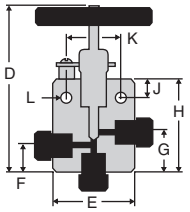
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	30-11HF4-SGS	20,000	HF4	3/32"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-11HF6-SGS	20,000	HF6	1/8"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-11HF9-SGS	20,000	HF9	1/8"	5 5/8"	2 5/8"	1"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1/4" O.D.	60-11HF4-SGS	30,000	HF4	1/16"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-11HF6-SGS	30,000	HF6	1/16"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-11HF9-SGS	30,000	HF9	1/16"	5 5/8"	2 5/8"	1"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"

Two Way Angle Valves



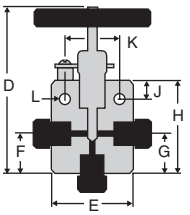
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	30-12HF4-SGS	20,000	HF4	3/32"	5 3/16"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-12HF6-SGS	20,000	HF6	1/8"	5 9/16"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-12HF9-SGS	20,000	HF9	1/8"	5 5/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1/4" O.D.	60-12HF4-SGS	30,000	HF4	1/16"	5 3/16"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-12HF6-SGS	30,000	HF6	1/16"	5 9/16"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-12HF9-SGS	30,000	HF9	1/16"	5 5/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"

Three Way Valves / Two Pressure Connections



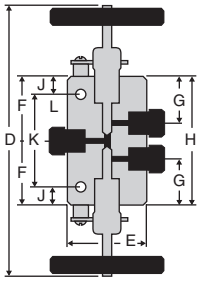
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	30-13HF4-SGS	20,000	HF4	3/32"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-13HF6-SGS	20,000	HF6	1/8"	5 9/16"	2"	1"	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-13HF9-SGS	20,000	HF9	1/8"	6 1/16"	2 5/8"	1 7/16"	1 7/8"	3 5/16"	1/2"	1 3/8"	7/32"	1 1/2"
1/4" O.D.	60-13HF4-SGS	30,000	HF4	1/16"	5 3/16"	2"	5/8"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-13HF6-SGS	30,000	HF6	1/16"	5 9/16"	2"	1"	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-13HF9-SGS	30,000	HF9	1/16"	6 1/16"	2 5/8"	1 7/16"	1 7/8"	2 5/16"	1/2"	1 3/8"	7/32"	1 1/2"

Three Way Valves / One Pressure Connection



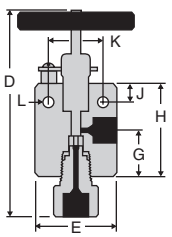
Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	30-14HF4-SGS	20,000	HF4	3/32"	5 3/16"	2"	1"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-14HF6-SGS	20,000	HF6	1/8"	5 9/16"	2"	2"	1 7/16"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-14HF9-SGS	20,000	HF9	1/8"	5 5/8"	2 5/8"	2 3/16"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1/4" O.D.	60-14HF4-SGS	30,000	HF4	1/16"	5 3/16"	2"	1"	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-14HF6-SGS	30,000	HF6	1/16"	5 9/16"	2"	1 3/8"	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-14HF9-SGS	30,000	HF9	1/16"	5 5/8"	2 5/8"	1 7/16"	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"

Three Way / Two Stem Connection Valves



Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	30-15HF4-SGS	20,000	HF4	3/32"	9 1/4"	2"	1"	1 7/16"	3 3/4"	1/2"	2 3/4"	7/32"	1"
3/8" O.D.	30-15HF6-SGS	20,000	HF6	1/8"	9 1/2"	2"	2"	1 7/16"	4"	1/2"	3"	7/32"	1"
9/16" O.D.	30-15HF9-SGS	20,000	HF9	1/8"	9 7/8"	2 5/8"	2 3/16"	1 7/16"	4 3/8"	1/2"	3 3/8"	7/32"	1 1/2"
1/4" O.D.	60-15HF4-SGS	30,000	HF4	1/16"	9 1/4"	2"	1 7/8"	1 7/16"	3 3/4"	1/2"	2 3/4"	7/32"	1"
3/8" O.D.	60-15HF6-SGS	30,000	HF6	1/16"	9 1/2"	2"	2"	1 7/16"	4"	1/2"	3"	7/32"	1"
9/16" O.D.	60-15HF9-SGS	30,000	HF9	1/16"	9 7/8"	2 5/8"	2 3/16"	1 7/16"	4 3/8"	1/2"	3 3/8"	7/32"	1 1/2"

Replaceable Seat Valves



Tubing	Catalog No.	psi	Connection	Orifice	D	E	F	G	H	J	K	L	Thickness
1/4" O.D.	30-12HF4-R-SGS	20,000	HF4	3/32"	5 3/16"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	30-12HF6-R-SGS	20,000	HF6	1/8"	5 9/16"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	30-12HF9-R-SGS	20,000	HF9	1/8"	5 5/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"
1/4" O.D.	60-12HF4-R-SGS	30,000	HF4	1/16"	5 3/16"	2"	–	1"	2 7/16"	1/2"	1 3/8"	7/32"	1"
3/8" O.D.	60-12HF6-R-SGS	30,000	HF6	1/16"	5 9/16"	2"	–	1 3/8"	2 13/16"	1/2"	1 3/8"	7/32"	1"
9/16" O.D.	60-12HF9-R-SGS	30,000	HF9	1/16"	5 5/8"	2 5/8"	–	1 7/16"	2 7/8"	1/2"	1 3/8"	7/32"	1 1/2"

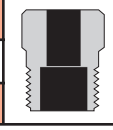
High Pressure Equipment Company
P.O. Box 8248 • 1222 Linden Ave. • Erie, PA 16505 U.S.A. • Phone: (814) 838-2028 • 1-800-289-7447 • Fax: (814) 838-6075 • E-Mail: sales@highpressure.com

Oil and Gas Accessories

Glands/Sleeves/Plugs/Elbows/Tees/Crosses

A complete range of elbows, tees, and crosses is available for use with sour oil and gas. Material is annealed 316 stainless steel. All connection components and fittings are rated for 30,000 psi service. Standard tubing glands and collars are provided unless otherwise specified.

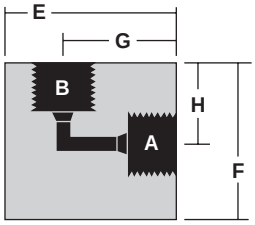
Connection Components

Catalog No.	Tube Size	Gland
60-2HM4-SGS	1/4"	
60-2HM6-SGS	3/8"	
60-2HM9-SGS	9/16"	

Catalog No.	Tube Size	Collar
60-2H4-SGS	1/4"	
60-2H6-SGS	3/8"	
60-2H9-SGS	9/16"	

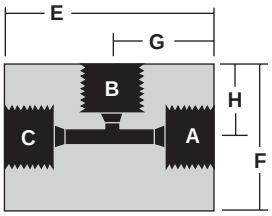
Catalog No.	Tube Size	Plug
60-7HM4-SGS	1/4"	
60-7HM6-SGS	3/8"	
60-7HM9-SGS	9/16"	

High Pressure Elbows



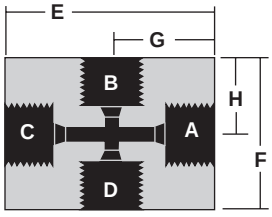
Catalog No.	Pressure Rating psi	Connections	A-B	E	F	G	H	Thickness
60-22HF4-SGS	30,000	1/4" O.D. TUBE	HF4	1 3/8"	1 1/2"	7/8"	1"	1"
60-22HF6-SGS	30,000	3/8" O.D. TUBE	HF6	1 3/4"	1 1/2"	1 1/4"	1"	1"
60-22HF9-SGS	30,000	9/16" O.D. TUBE	HF9	2 5/8"	1 7/8"	1 7/8"	1 1/8"	1 1/2"

High Pressure Tees



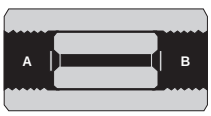
Catalog No.	Pressure Rating psi	Connections	A-B-C	E	F	G	H	Thickness
60-23HF4-SGS	30,000	1/4" O.D.TUBE	HF4	2"	1 3/8"	1"	7/8"	1"
60-23HF6-SGS	30,000	3/8" O.D.TUBE	HF6	2"	1 9/16"	1"	1 1/16"	1"
60-23HF9-SGS	30,000	9/16" O.D.TUBE	HF9	2 5/8"	2 1/8"	1 5/8"	1 3/8"	1 1/2"

High Pressure Crosses



Catalog No.	Pressure Rating psi	Connections	A-B-C-D	E	F	G	H	Thickness
60-24HF4-SGS	30,000	1/4" O.D. TUBE	HF4	2"	1 1/2"	1"	3/4"	1"
60-24HF6-SGS	30,000	3/8" O.D. TUBE	HF6	2 1/8"	2"	1 1/16"	1"	1"
60-24HF9-SGS	30,000	9/16" O.D. TUBE	HF9	2 3/4"	2 5/8"	1 3/8"	1 5/16"	1 1/2"

Union Couplings (Slip Type)



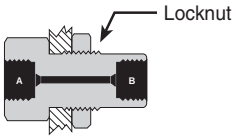
Union (slip Type) couplings are ideal for use in confined space installations. This design allows the entire coupling to be disconnected and slipped back over the tubing to facilitate assembly and disassembly. In installations where tubing is easily assembled, it is preferable (and less expensive) to use standard straight couplings (see accessories section). Sour oil and gas material is annealed 316 stainless steel. Standard tubing collars and glands are provided unless otherwise specified.

Catalog No.	Pressure Rating psi	Connections	A	B	Length	Hex Size
60-21HF4-U-SGS	30,000	1/4" O.D. TUBING	HF4	HF4	1 3/4"	1"
60-21HF6-U-SGS	30,000	3/8" O.D. TUBING	HF6	HF6	2"	1"
60-21HF9-U-SGS	30,000	9/16" O.D. TUBING	HF9	HF9	2 3/8"	1 3/8"

Bulkhead Couplings

Bulkhead couplings are designed specifically for passing a tubing connection through a panel or steel barricade. These couplings include a locknut as shown. Material is annealed 316 stainless steel. Standard tubing collars and glands are included unless otherwise specified.

Catalog No.	Pressure Rating psi	Connections	Panel Hole	A	B	Length	Hex Size	Outside Thread
60-21HF4-B-SGS	30,000	1/4" O.D. TUBING	15/16"	HF4	HF4	2"	1"	7/8" - 14
60-21HF6-B-SGS	30,000	3/8" O.D. TUBING	1 1/8"	HF6	HF6	2 3/8"	1 3/8"	1 1/16" - 12
60-21HF9-B-SGS	30,000	9/16" O.D. TUBING	1 11/16"	HF9	HF9	2 3/4"	1 7/8"	1 5/8" - 12



Caps

Tubing end caps are offered for use in sealing off tubing ends either for temporary use or permanent use such as on small volume reservoirs. Standard material is annealed 316 stainless steel. Standard tubing collars and glands are provided unless otherwise specified.

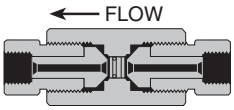
Catalog No.	Pressure Rating psi	Connections	A	Length	Hex Size
60-21HF4-C-SGS	30,000	1/4" O.D. TUBING	HF4	7/8"	3/4"
60-21HF6-C-SGS	30,000	3/8" O.D. TUBING	HF6	1 1/4"	1"
60-21HF9-C-SGS	30,000	9/16" O.D. TUBING	HF9	1 1/2"	1 3/8"



Line Filters

The line filters as shown utilize sintered stainless steel filter discs 3 pc./set. Porosities are available as per the chart to the right. If not otherwise specified, 100 micron filter discs are supplied. (One micron = 0.001 millimeters). Material of bodies and end covers is annealed 316 stainless steel. Standard tubing glands and collars are provided unless otherwise specified.

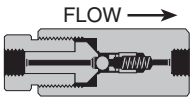
Catalog No.	Pressure Rating psi	Connections	Length	Hex Size	Micron Size Filter Available					
					0.5	2	5	10	40	100
60F-51HF4-SGS	30,000	1/4" HIGH PRESSURE	5 1/4"	1 1/2"	●	●	●	●	●	●
60F-51HF6-SGS	30,000	3/8" HIGH PRESSURE	5 1/4"	1 1/2"	●	●	●	●	●	●
60F-51HF9-SGS	30,000	9/16" HIGH PRESSURE	5 1/4"	1 1/2"	●	●	●	●	●	●



Ball Check Valves

Ball type check valves insure flow in one direction only. Material for bodies and covers is annealed 316 stainless steel, the ball is 17-4PH. Standard tubing glands and collars are provided unless otherwise specified.

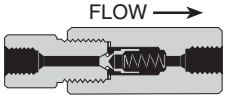
Catalog No.	psi	Connections	Length	Hex
60-41HF4-SGS	30,000	1/4" HIGH PRESSURE	4 1/4"	1 1/2"
60-41HF6-SGS	30,000	3/8" HIGH PRESSURE	4 5/8"	1 1/2"
60-41HF9-SGS	30,000	9/16" HIGH PRESSURE	5 1/8"	1 1/2"



Soft Seat Check Valves

Soft seat check valves insure flow in one direction only and can be mounted in any position. These are highly reliable for both gas and liquid service. Standard O-ring (soft seat) material for the sealing surface is Buna-N (nitrile) with other materials including Teflon and Viton available on request. Temperature is limited by the choice of O-ring material. Material of all other parts is annealed 316 stainless steel. Standard glands and collars are provided unless otherwise specified.

Catalog No.	psi	Connections	Length	Hex
30-41HF4-T-SGS	20,000	1/4" HIGH PRESSURE	3 7/8"	1"
30-41HF6-T-SGS	20,000	3/8" HIGH PRESSURE	3 7/8"	1"
30-41HF9-T-SGS	20,000	9/16" HIGH PRESSURE	4 1/4"	1 3/8"
60-41HF4-T-SGS	30,000	1/4" HIGH PRESSURE	4 9/16"	1 1/2"
60-41HF6-T-SGS	30,000	3/8" HIGH PRESSURE	4 9/16"	1 1/2"
60-41HF9-T-SGS	30,000	9/16" HIGH PRESSURE	5 1/16"	1 1/2"

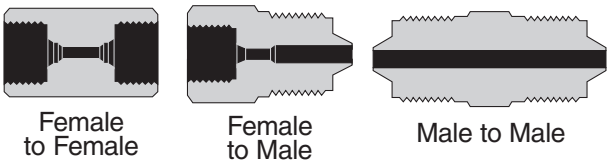


High Pressure Equipment Company
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Oil and Gas Products

Adapters

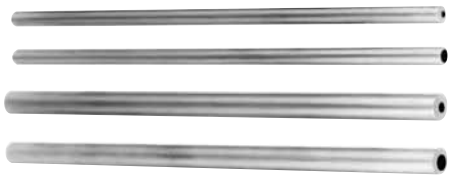
Connect different sizes of tubing or tubing and pipe with our female-to-female couplings, female-to-male adapters, male-to-male adapters, reducer couplings and thermocouple adapters. For complete adapter information, see accessories section of full line catalog.



Tubing

For sour gas applications, our tubing is annealed stainless steel, available for all standard valve and fitting sizes, and in any length specified.

For sweet applications, HiP tubing is cold drawn, seamless and supplied in the hard condition (not annealed). Tubing is stocked in lengths of 18 to 22 feet but may be ordered in shorter lengths with **no additional cutting charge**.



	Tubing Size	Working Pressure psi	Type of Connection Used	Material	Catalog Order Number
1/4"	1/4" O.D. x 0.083" I.D.	30,000	1/4" HIGH PRESSURE (HF4)	316 SS	60-9H4-316-SGS
				304 SS	60-9H4-304-SGS
3/8"	3/8" O.D. x 1/8" I.D.	30,000	3/8" HIGH PRESSURE (HF6)	316 SS	60-9H6-316-SGS
				304 SS	60-9H6-304-SGS
9/16"	9/16" O.D. x 3/16" I.D.	30,000	9/16" HIGH PRESSURE (HF9)	316 SS	60-9H9-316-SGS
				304 SS	60-9H9-304-SGS

Coned and Threaded Nipples

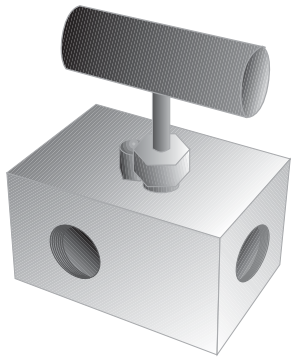
Connection-ready nipples are available in annealed and standard tubing for all valve and fitting sizes, and in any length specified. Nipples are not furnished with collars and glands, unless specified at time of order. Sour gas nipples are annealed 316 SS.



Length ↓	Tubing Size (O.D. x I.D.)		
	1/4" x 0.083"	3/8" x 1/8"	9/16" x 3/16"
psi →	30,000 psi	30,000 psi	30,000 psi
2 3/4"	60-HM4-2.75-SGS		
3"		60-HM6-3-SGS	
4"			60-HM9-4-SGS
6"	60-HM4-6-SGS	60-HM6-6-SGS	60-HM9-6-SGS
8"	60-HM4-8-SGS	60-HM6-8-SGS	60-HM9-8-SGS
10"	60-HM4-10-SGS	60-HM6-10-SGS	60-HM9-10-SGS
12"	60-HM4-12-SGS	60-HM6-12-SGS	60-HM9-12-SGS

Wellhead Gauge Valves

- One inlet and three outlet ports
- Packing located below stem threads
- Metal-to-metal seat for bubble tight shut-off
- Two piece non-rotating stem for standard service valves
- One piece stem for sour gas service
- Designed for line sampling or instrument calibration



Catalog No.	Pressure Rating psi	Service	Connections	Material	Inlet Port	Outlet Port
30GVHF9	30,000	Standard	$^{9}/_{16}$" HIGH PRESSURE	316 SS	HF9	HF9
30GVHF9-SGS	20,000	H_2S		Annealed 316 SS		

Bleed Valves

- Tee handle for easy operation
- Vent port tapped for safe plumbing
- Positive blow-out prevention on stem
- Metal-to-metal seat for bubble tight shut-off
- One piece hex construction for easy installation
- Compatible with standard API test and gauge connections for 20,000 psi
- Designed for pressure bleeding



Catalog No.	Pressure Rating psi	Service	Connections	Material	Inlet Port	Outlet Port
30BVHM9	30,000	Standard	$^{9}/_{16}$" HIGH PRESSURE x $^{1}/_{8}$" Female NPT	316 SS	HM9	NFA
30BVHM9-SGS	20,000	H_2S		Annealed 316 SS		

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Specialty Valves

HiP produces many valves engineered for specific requirements and operating conditions. Among the specialty valves we offer are high temperature valves, micro control metering valves, pipe connection valves and male bottom connection valves. Our two most popular oil and gas specialty valves are described below.

Ball Valves

These valves provide shut-off of oil, liquid or gas flow through 20,000 psi. HiP ball valves are available in two way and three way configurations.

Relief Valves

Relief valves protect a system from over-pressure damage and failure. These valves are offered in pressures from 3,000 to 30,000 psi.



Call for our 130 page catalog also available on CD Rom or see it on-line www.highpressure.com

Represented by:

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