

# PIPE VALVES AND FITTINGS

**BuTech Pipe Valves** are designed for liquid and gas flow control in petroleum, chemical, power generating and general industrial applications.

Available in a variety of body styles, the valves are designed for manual operation in temperatures ranging from -100° to +600°F (-73° to +315°C). Optional packings and/or extended stuffing boxes increase the range to -423° to +1200°F (-253° to +648°C).

Their rugged construction provides assurance of fail-safe operation at pressures ranging to 15,000 PSI (1030 bar).

## Needle Valve Features:

- Non-rotating stem prevents galling and scoring
- Five stem styles:
  - Vee                    •Metering
  - Regulating           •Micro-Metering
  - Soft Tip
- 17-4PH Stem for longer service life. 316 wetted parts are also available by specifying option **-316WP** (see page NPT-3)
- Glass-filled teflon packing for temperatures to 600°F (315°C)
- Integral through holes for bracket mounting. A panel-mounting option is also available (see page NPT-3)
- Wide range of options allow customizing of valve

## Materials of Construction

Standard materials of construction include 316 cold-worked stainless steel, 17-4PH, Ampco 45, and glass-filled teflon. All BuTech equipment may also be produced in any machinable metal. Some of the more common exotic materials used are:

Hastelloy™

Inconel™

Titanium

Monel 400™

**Pipe Sizes: 1/8" through 1"**  
**Pressures to 15,000 PSI (1030 bar)**  
**Type: NPT**

| Pipe Size | Connection | SFPV/FPV Series  |      | DHP Series       |      | MAWP+               |
|-----------|------------|------------------|------|------------------|------|---------------------|
|           |            | Orifice          | Cv*  | Orifice          | Cv*  |                     |
| 1/8"      | 1/8" NPT   | 0.187" (4.7 mm)  | 0.65 | 0.187" (4.7 mm)  | 0.60 | 15,000 PSI 1030 bar |
| 1/4"      | 1/4" NPT   | 0.250" (6.4 mm)  | 0.75 | 0.250" (6.4 mm)  | 0.73 | 15,000 PSI 1030 bar |
| 3/8"      | 3/8" NPT   | 0.312" (7.9 mm)  | 1.75 | 0.250" (6.4 mm)  | 0.73 | 15,000 PSI 1030 bar |
| 1/2"      | 1/2" NPT   | 0.312" (7.9 mm)  | 1.75 | 0.250" (6.4 mm)  | 1.75 | 15,000 PSI 1030 bar |
| 3/4"      | 3/4" NPT   | 0.562" (14.3 mm) | 3.40 | 0.687" (17.4 mm) | 5.20 | 10,000 PSI 690 bar  |
| 1"        | 1" NPT     | 0.562" (14.3 mm) | 3.40 | 0.687" (17.4 mm) | 5.20 | 10,000 PSI 690 bar  |

\*Cv values listed are for 2-way straight pattern valves excluding metering valves.

For 2-way angle pattern valves, increase Cv value by 50%.

For Metering Valves: Cv=.004, Port size=0.062" (1.57 mm)

+Maximum allowable working pressure at 72° F (22° C)

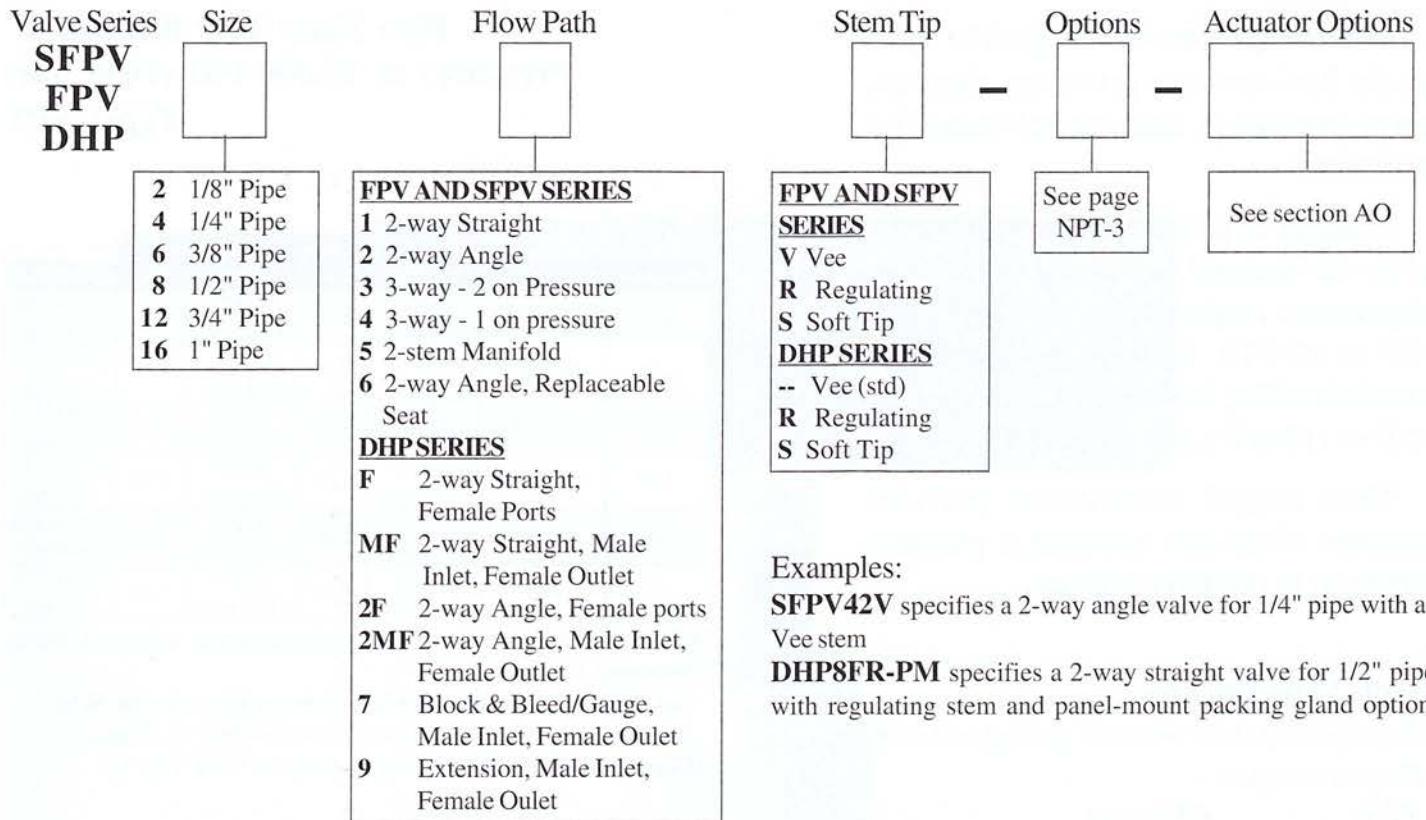
| Equipment                        | Page   |
|----------------------------------|--------|
| Adapters                         | NPT-21 |
| Bulkhead Couplings               | NPT-20 |
| Caps                             | NPT-23 |
| Check Valves                     | NPT-25 |
| Couplings                        | NPT-22 |
| Crosses                          | NPT-20 |
| Elbows                           | NPT-18 |
| Filters                          | NPT-27 |
| Manifold Valves                  | NPT-16 |
| Metering and Needle Valves, 1/8" | NPT-4  |
| Metering and Needle Valves, 1/4" | NPT-6  |
| Metering and Needle Valves, 3/8" | NPT-8  |
| Needle Valves, 1/2"              | NPT-10 |
| Needle Valves, 3/4"              | NPT-12 |
| Needle Valves, 1"                | NPT-14 |
| Nipples                          | NPT-24 |
| Options                          | NPT-3  |
| Plugs                            | NPT-23 |
| Replaceable Seat Valves          | NPT-17 |
| Safety Heads                     | NPT-28 |
| Tees                             | NPT-19 |
| Zero-Clearance Unions            | NPT-23 |

All dimensions are for reference only and are subject to change.  
 Dimensions in parentheses are millimeters (mm)

**Page NPT-1**



# ORDERING INFORMATION & REPLACEMENT PARTS



## Examples:

**SFPV42V** specifies a 2-way angle valve for 1/4" pipe with a Vee stem

**DHP8FR-PM** specifies a 2-way straight valve for 1/2" pipe with regulating stem and panel-mount packing gland option

## Replacement Parts

BuTech offers replacement parts in a variety of packages so you can purchase just the parts you need.

**Replacement Stem** Kit contains just the stem

**Replacement Packing** Kit contains all soft packing rings

**Repair Kits** contain stem, stem sleeve, stem nuts and washers, packings and packing washers (replacement seat where applicable)

| Repair Kits  |            | Replacement Stem | Replacement Packings | Replacement Valve Body |          |
|--------------|------------|------------------|----------------------|------------------------|----------|
| Valve Series | All others | Replaceable Seat |                      |                        |          |
| SFPV2        | RK-SFPV2*  | RK-SFPV26*       | FPS2*                | FPPK2                  | SFPV2+   |
| SFPV4        | RK-SFPV4*  | RK-SFPV46*       | FPS4*                | FPPK4                  | SFPV4+   |
| SFPV6        | RK-SFPV6*  | RK-SFPV66*       | FPS6*                | FPPK6                  | SFPV6+   |
| SFPV8        | RK-SFPV8*  | RK-SFPV86*       | FPS8*                | FPPK8                  | SFPV8+   |
| FPV12        | RK-FPV12*  | RK-FPV126*       | FPS12*               | FPPK12                 | FPV12+   |
| FPV16        | RK-FPV16*  | RK-FPV166*       | FPS16*               | FPPK16                 | FPV16+   |
| DHP          | RK-DHP**   | ----             | DHPS**               | DHPPK**                | DHP++-BO |

\*Complete catalog number by adding the following:

**V**, **R** or **S** for stem type

**Suffix** for special packing materials (see page NPT-3)  
(ex. **-GR** for Grafoil packings)

**Suffix** for special materials  
(ex. **-HC** for Hastelloy)

**-LT** or **-HT** for cryogenic or high-temperature service

**-WAO** for a valve fitted with an actuator

\*\*Complete catalog number by adding the size designator from above

+Complete catalog number by adding the flow path designator:

- 1** 2-way straight
- 2** 2-way angle
- 3** 3-way, 2 connections on pressure
- 4** 3-way, 1 connection on pressure
- 5** 2-stem manifold
- 6** 2-way angle with replaceable seat

++Complete catalog number by adding the flow path designator:

- F** 2-way straight, female ports
- MF** 2-way straight male inlet, female outlet
- 2F** 2-way angle, female ports
- 2MF** 2-way angle male inlet, female outlet
- 7** Block & Bleed/Gauge, male inlet, female outlet
- 9** Extension male inlet, female outlet

# NEEDLE VALVE OPTIONS

## Packing and Stem Materials

- GR** Grafoil packings for service to 800°F (426°C)
- TFE** Virgin Teflon packing for service to 450°F (232°C)
- 316WP** 316 wetted parts
- STS** Stellite tipped stem
- SRS** Stellite replaceable seat (Replaceable seat valves only)

## Handle Options

- PH** Round plastic handle in place of aluminum (available on 1/8" through 1/2" sizes)
- SS** Stainless steel handle in place of aluminum (available on 1/8" through 1/2" sizes, on 3/4" and 1" SS is standard)
- EXT** Handle extended above valve body, specify number of inches of extra height desired (Ex: **EXT6** is a 6" extension)

## Security Options

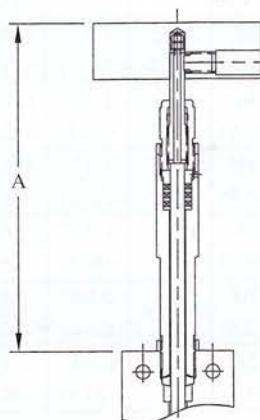
- HLD** Handle locking device (prevents unauthorized opening/closing of valve)
- SLD** Stem locking device (prevents stem from turning due to vibration)

## Extreme Service

- O2** Cleaned for oxygen service
- HT** Extended stuffing box and special materials for high-temperature service to 1200°F (648°C)
- HIF** Finned extended stuffing box and special materials for high-temperature service to 1200°F (648°C)
- LT** Extended stuffing box and special materials for cryogenic service to -423°F (-251°C)
- LTF** Finned extended stuffing box and special materials for cryogenic service to -423°F (-251°C)

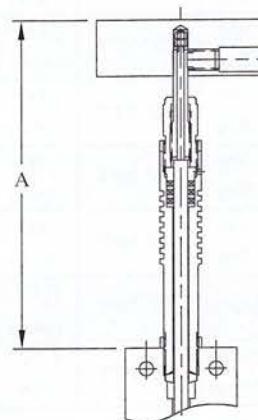
| Valve Model | A              |
|-------------|----------------|
| SFPV2       | 5.82" (147.8)  |
| SFPV4       | 5.82" (147.8)  |
| SFPV6       | 7.22" (183.4)  |
| SFPV8       | 7.22" (183.4)  |
| FPV12       | 10.76" (273.3) |
| FPV16       | 10.76" (273.3) |
| DHP2        |                |
| DHP4        | 5.82" (147.8)  |
| DHP6        | 5.82" (147.8)  |
| DHP8        | 5.82" (147.8)  |
| DHP12       | 10.85" (275.6) |
| DHP16       | 10.85" (275.6) |

### -HT or -LT Options



Cylindrical Bonnet

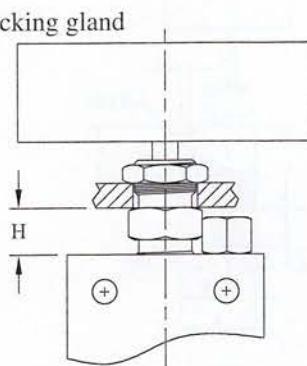
### -HTF or -LTF Options



Finned Bonnet

## Panel Mount

- PM** Panel-mount packing gland



| Valve Model | Panel Hole Size | Max Panel Thickness | H            |
|-------------|-----------------|---------------------|--------------|
| SFPV2       | 0.66" (16.8)    | 0.25" (6.4)         | 0.54" (13.7) |
| SFPV6       | 0.78" (19.8)    | 0.44" (11.2)        | 0.50" (12.7) |
| SFPV8       | 0.78" (19.8)    | 0.44" (11.2)        | 0.50" (12.7) |
| FPV12       | 1.41" (35.8)    | 0.62" (15.7)        | 0.97" (24.6) |
| FPV16       | 1.41" (35.8)    | 0.62" (15.7)        | 0.97" (24.6) |
| DHP2        |                 |                     |              |
| DHP4        | 0.64" (16.3)    | 0.44" (11.2)        | 0.50" (12.7) |
| DHP6        | 0.64" (16.3)    | 0.44" (11.2)        | 0.50" (12.7) |
| DHP8        | 0.64" (16.3)    | 0.44" (11.2)        | 0.50" (12.7) |
| DHP12       | 1.41" (35.8)    | 0.62" (15.7)        | 1.03" (26.2) |
| DHP16       | 1.41" (35.8)    | 0.62" (15.7)        | 1.03" (26.2) |

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Dimensions in parentheses are millimeters (mm)

# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

## 1/8" PIPE

### 2-way Straight

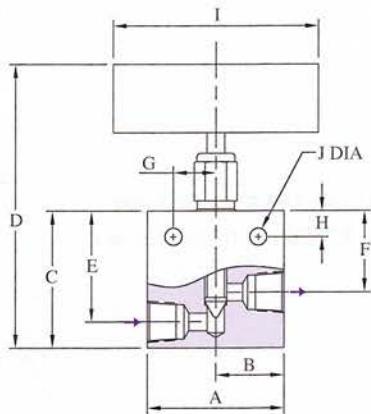


Figure 1

### 2-way Angle

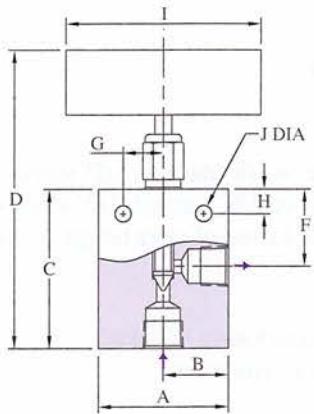


Figure 2

### 3-way Two on Pressure

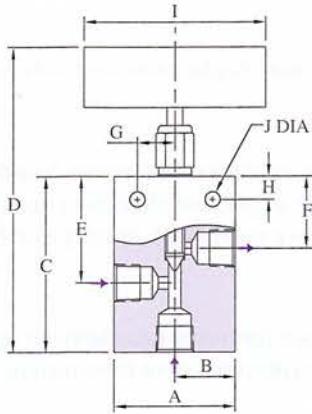


Figure 3

### 3-way One on Pressure

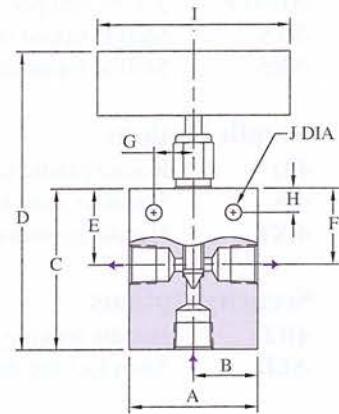


Figure 4

| Catalog Number | Stem Style  | Connection | A      | B      | C      | D       | E      | F      | G      | H     | I      | J     | K      | L      | Thk.         | Fig |
|----------------|-------------|------------|--------|--------|--------|---------|--------|--------|--------|-------|--------|-------|--------|--------|--------------|-----|
| SFPV21V        | Vee Reg     | 1/8" NPT   | 2.00"  | 1.00"  | 2.00"  | 4.50"   | 1.62"  | 1.19"  | 0.62"  | 0.38" | 3.00"  | 0.25" | ---    | ---    | 0.75" (19.1) | 1   |
| SFPV21R        |             |            | (50.8) | (25.4) | (50.8) | (114.3) | (41.1) | (30.2) | (15.7) | (9.7) | (76.2) | (6.4) |        |        |              |     |
| SFPV22V        | Vee Reg     | 1/8" NPT   | 2.00"  | 1.00"  | 2.44"  | 4.94"   | ---    | 1.19"  | 0.62"  | 0.38" | 3.00"  | 0.25" | ---    | ---    | 0.75" (19.1) | 2   |
| SFPV22R        |             |            | (50.8) | (25.4) | (62.0) | (125.5) |        | (30.2) | (15.7) | (9.7) | (76.2) | (6.4) |        |        |              |     |
| SFPV23V        | Vee Reg     | 1/8" NPT   | 2.00"  | 1.00"  | 2.62"  | 5.12"   | 1.62"  | 1.19"  | 0.62"  | 0.38" | 3.00"  | 0.25" | ---    | ---    | 0.75" (19.1) | 3   |
| SFPV23R        |             |            | (50.8) | (25.4) | (66.5) | (130.0) | (41.1) | (30.2) | (15.7) | (9.7) | (76.2) | (6.4) |        |        |              |     |
| SFPV24V        | Vee Reg     | 1/8" NPT   | 2.00"  | 1.00"  | 2.44"  | 4.94"   | 1.19"  | 1.19"  | 0.62"  | 0.38" | 3.00"  | 0.25" | ---    | ---    | 0.75" (19.1) | 4   |
| SFPV24R        |             |            | (50.8) | (25.4) | (62.0) | (125.5) | (30.2) | (30.2) | (15.7) | (9.7) | (76.2) | (6.4) |        |        |              |     |
| SFPV25V        | Vee Reg     | 1/8" NPT   | 2.00"  | 1.00"  | 3.38"  | 8.38"   | 1.68"  | 1.19"  | 0.62"  | 0.38" | 3.00"  | 0.25" | ---    | ---    | 0.75" (19.1) | 5   |
| SFPV25R        |             |            | (50.8) | (25.4) | (85.9) | (212.9) | (42.7) | (30.2) | (15.7) | (9.7) | (76.2) | (6.4) |        |        |              |     |
| SFPV26V        | Vee Reg     | 1/8" NPT   | 2.00"  | 1.00"  | 2.25"  | 4.75"   | ---    | 1.19"  | 0.62"  | 0.38" | 3.00"  | 0.25" | 0.75"  | 0.87"  | 0.75" (19.1) | 6   |
| SFPV26R        |             |            | (50.8) | (25.4) | (57.2) | (120.7) |        | (30.2) | (15.7) | (9.7) | (76.2) | (6.4) | (19.1) | (22.1) |              |     |
| SFPMV26V       | Meter       | 1/8" NPT   | 1.37"  | 0.87"  | 1.56"  | 4.70"   | ---    | 0.94"  | 1.19"  | 0.44" | 2.37"  | 0.16" | 0.62"  | 0.71"  | 0.75" (19.1) | 7   |
| SFPMMV26V      | Micro-Meter | 1/8" NPT   | 1.37"  | 0.87"  | 1.56"  | 5.24"   | ---    | 0.94"  | 1.19"  | 0.44" | 2.37"  | 0.16" | 0.62"  | 0.71"  | 0.75" (19.1) | 8   |

See page NPT-1 for orifice and Cv

### 2-stem Manifold

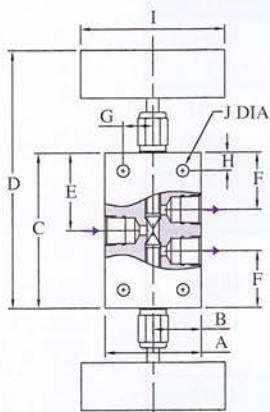


Figure 5

### Replaceable Seat

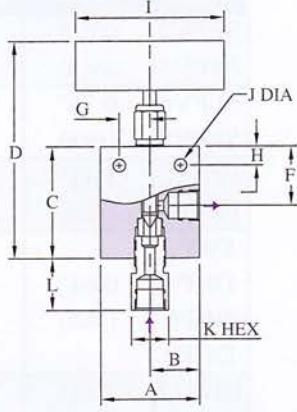


Figure 6

### Metering

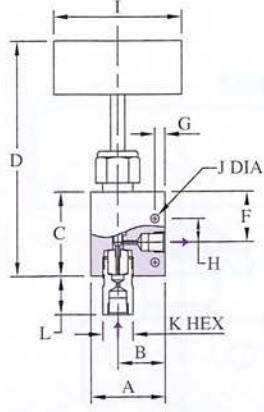


Figure 7

### Micro-Metering

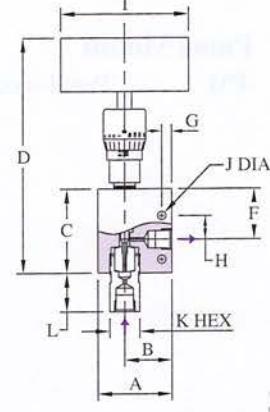


Figure 8

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

1/8" PIPE

2-way Straight  
Female Ports

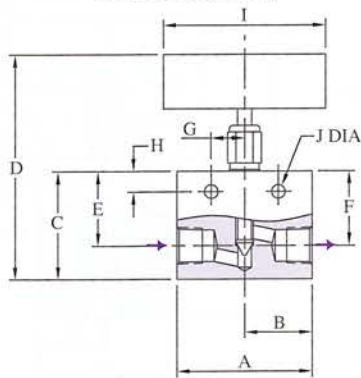


Figure 9

2-way Straight  
Male Inlet, Female Outlet

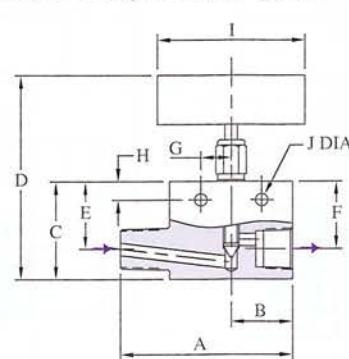


Figure 10

2-way Angle  
Male Inlet, Female Outlet

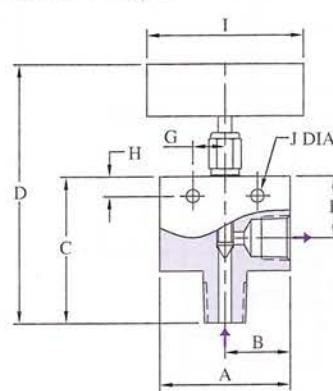


Figure 11

| Catalog Number | Connection | A                | B               | C               | D                | E               | F               | G               | H              | I               | J              | K               | L            | Thk.            | Fig |
|----------------|------------|------------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|--------------|-----------------|-----|
| DHP2F          | 1/8" NPT   | 2.50"<br>(63.5)  | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.38"<br>(35.1) | 1.38"<br>(35.1) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---          | 1.00"<br>(25.4) | 9   |
| DHP2MF         | 1/8" NPT   | 3.06"<br>(77.7)  | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.38"<br>(35.1) | 1.38"<br>(35.1) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---          | 1.00"<br>(25.4) | 10  |
| DHP22MF        | 1/8" NPT   | 2.00"<br>(50.8)  | 1.00"<br>(25.4) | 2.43"<br>(61.7) | 4.93"<br>(125.2) | ---             | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---          | 1.00"<br>(25.4) | 11  |
| DHP27          | 1/8" NPT   | 5.38"<br>(136.7) | 1.50"<br>(38.1) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.19"<br>(30.2) | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 2.97"<br>(75.4) | 1/8"<br>FNPT | 1.25"<br>(31.8) | 12  |
| DHP29          | 1/8" NPT   | 6.10"<br>(154.9) | 1.25"<br>(31.8) | 1.19"<br>(30.2) | 4.50"<br>(114.3) | 2.00"<br>(50.8) | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 2.87"<br>(72.9) | ---          | 1.00"<br>(25.4) | 13  |

See page NPT-1 for orifice and Cv

Block & Bleed/Gauge  
Male Inlet, Female Outlet

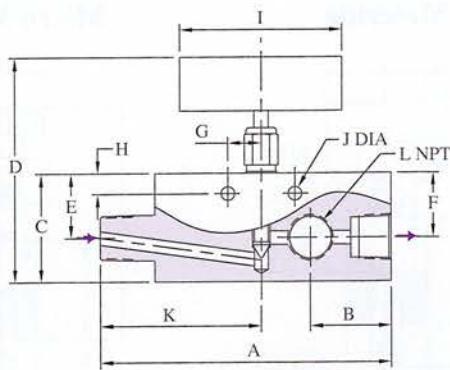


Figure 12

Extension  
Male Inlet, Female Outlet

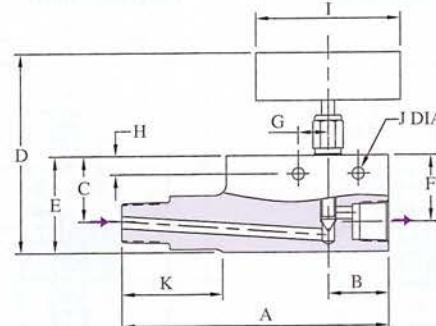


Figure 13

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

Page NPT-5



# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

## 1/4" PIPE

2-way Straight

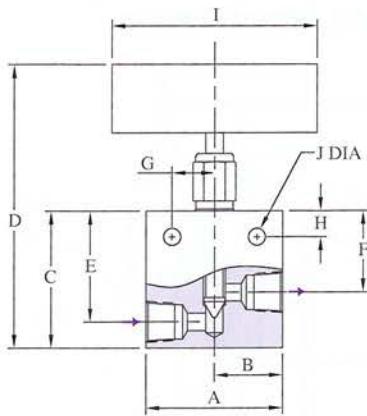


Figure 1

2-way Angle

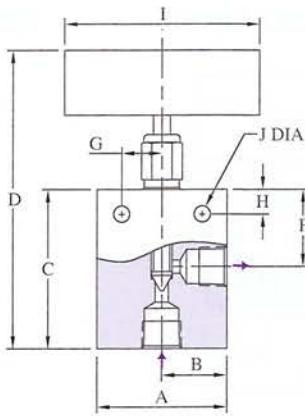


Figure 2

3-way Two on Pressure

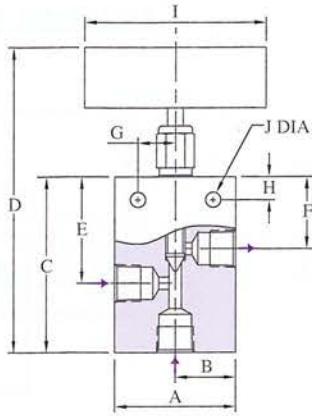


Figure 3

3-way One on Pressure

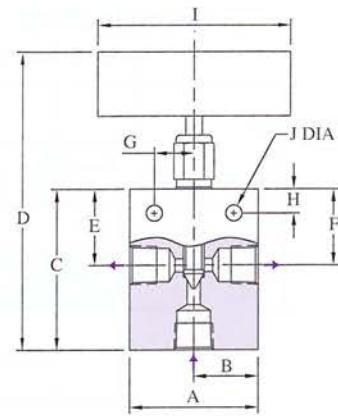


Figure 4

| Catalog Number | Stem Style  | Connection | A            | B            | C            | D             | E            | F            | G            | H           | I            | J           | K            | L            | Thk.         | Fig |
|----------------|-------------|------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|-------------|--------------|-------------|--------------|--------------|--------------|-----|
| SFPV41V        | Vee Reg     | 1/4" NPT   | 2.00" (50.8) | 1.00" (25.4) | 2.00" (50.8) | 4.50" (114.3) | 1.62" (41.1) | 1.19" (30.2) | 0.62" (15.7) | 0.38" (9.7) | 3.00" (76.2) | 0.25" (6.4) | ---          | ---          | 0.75" (19.1) | 1   |
| SFPV41R        |             |            |              |              |              |               |              |              |              |             |              |             |              |              |              |     |
| SFPV42V        | Vee Reg     | 1/4" NPT   | 2.00" (50.8) | 1.00" (25.4) | 2.44" (62.0) | 4.94" (125.5) | ---          | 1.19" (30.2) | 0.62" (15.7) | 0.38" (9.7) | 3.00" (76.2) | 0.25" (6.4) | ---          | ---          | 0.75" (19.1) | 2   |
| SFPV42R        |             |            |              |              |              |               |              |              |              |             |              |             |              |              |              |     |
| SFPV43V        | Vee Reg     | 1/4" NPT   | 2.00" (50.8) | 1.00" (25.4) | 2.62" (66.5) | 5.12" (130.0) | 1.62" (41.1) | 1.19" (30.2) | 0.62" (15.7) | 0.38" (9.7) | 3.00" (76.2) | 0.25" (6.4) | ---          | ---          | 0.75" (19.1) | 3   |
| SFPV43R        |             |            |              |              |              |               |              |              |              |             |              |             |              |              |              |     |
| SFPV44V        | Vee Reg     | 1/4" NPT   | 2.00" (50.8) | 1.00" (25.4) | 2.44" (62.0) | 4.94" (125.5) | 1.19" (30.2) | 1.19" (30.2) | 0.62" (15.7) | 0.38" (9.7) | 3.00" (76.2) | 0.25" (6.4) | ---          | ---          | 0.75" (19.1) | 4   |
| SFPV44R        |             |            |              |              |              |               |              |              |              |             |              |             |              |              |              |     |
| SFPV45V        | Vee Reg     | 1/4" NPT   | 2.00" (50.8) | 1.00" (25.4) | 3.38" (85.9) | 8.38" (212.9) | 1.69" (42.9) | 1.19" (30.2) | 0.62" (15.7) | 0.38" (9.7) | 3.00" (76.2) | 0.25" (6.4) | ---          | ---          | 0.75" (19.1) | 5   |
| SFPV45R        |             |            |              |              |              |               |              |              |              |             |              |             |              |              |              |     |
| SFPV46V        | Vee Reg     | 1/4" NPT   | 2.00" (50.8) | 1.00" (25.4) | 2.25" (57.2) | 4.75" (120.7) | ---          | 1.19" (30.2) | 0.62" (15.7) | 0.38" (9.7) | 3.00" (76.2) | 0.25" (6.4) | 0.75" (19.1) | 0.87" (22.1) | 0.75" (19.1) | 6   |
| SFPV46R        |             |            |              |              |              |               |              |              |              |             |              |             |              |              |              |     |
| SFPMV46V       | Meter       | 1/4" NPT   | 2.50" (63.5) | 1.25" (31.8) | 2.62" (66.5) | 5.66" (143.8) | ---          | 1.31" (33.3) | 0.69" (17.5) | 0.38" (9.7) | 3.00" (76.2) | 0.25" (6.4) | 0.75" (19.1) | 1.02" (25.9) | 1.00" (25.4) | 7   |
| SFPMMV46V      | Micro-Meter | 1/4" NPT   | 2.50" (63.5) | 1.25" (31.8) | 2.62" (66.5) | 6.30" (160.0) | ---          | 1.31" (33.3) | 0.69" (17.5) | 0.38" (9.7) | 2.35" (59.7) | 0.25" (6.4) | 0.75" (19.1) | 1.02" (25.9) | 1.00" (25.4) | 8   |

See page NPT-1 for orifice and Cv

2-stem Manifold

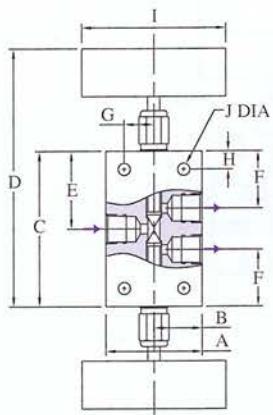


Figure 5

Replaceable Seat

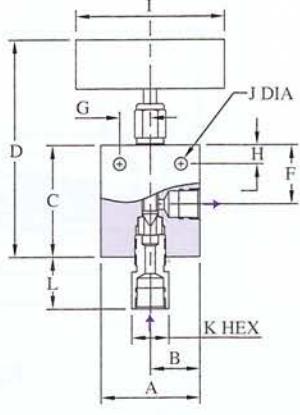


Figure 6

Metering

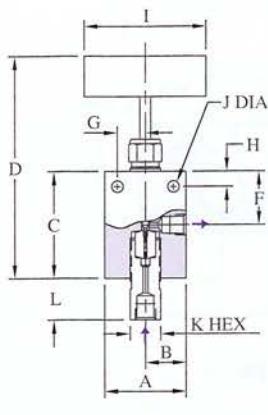


Figure 7

Micro-Metering

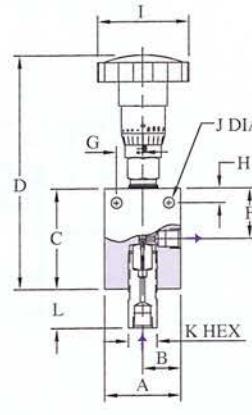


Figure 8

# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

1/4" PIPE

2-way Straight  
Female Ports

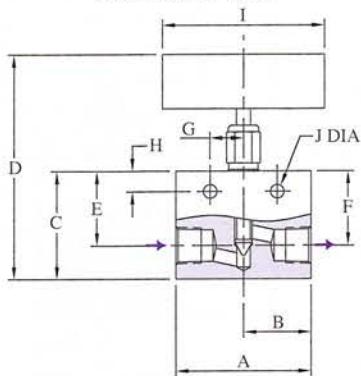


Figure 9

2-way Straight  
Male Inlet, Female Outlet

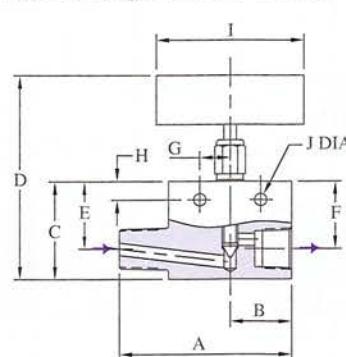


Figure 10

2-way Angle  
Male Inlet, Female Outlet

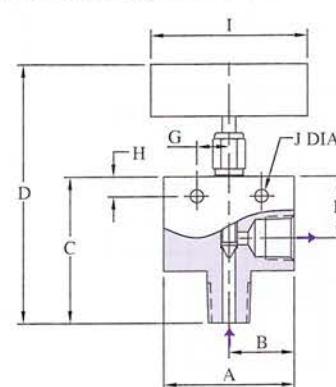


Figure 11

| Catalog Number | Connection | A                | B               | C               | D                | E               | F               | G               | H              | I               | J              | K               | L            | Thk.            | Fig |
|----------------|------------|------------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|--------------|-----------------|-----|
| DHP4F          | 1/4" NPT   | 2.50"<br>(63.5)  | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.38"<br>(35.1) | 1.38"<br>(35.1) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---          | 1.00"<br>(25.4) | 9   |
| DHP4MF         | 1/4" NPT   | 3.50"<br>(88.9)  | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.38"<br>(35.1) | 1.38"<br>(35.1) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---          | 1.00"<br>(25.4) | 10  |
| DHP42MF        | 1/4" NPT   | 2.00"<br>(50.8)  | 1.00"<br>(25.4) | 2.43"<br>(61.7) | 4.93"<br>(125.2) | ---             | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---          | 1.00"<br>(25.4) | 11  |
| DHP47          | 1/4" NPT   | 4.50"<br>(114.3) | 1.34"<br>(34.0) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.37"<br>(34.8) | 1.37"<br>(34.8) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 2.25"<br>(57.2) | 1/4"<br>FNPT | 1.25"<br>(31.8) | 12  |
| DHP49          | 1/4" NPT   | 6.10"<br>(154.9) | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.19"<br>(30.2) | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 2.87"<br>(72.9) | ---          | 1.00"<br>(25.4) | 13  |

See page NPT-1 for orifice and Cv

Block & Bleed/Gauge  
Male Inlet, Female Outlet

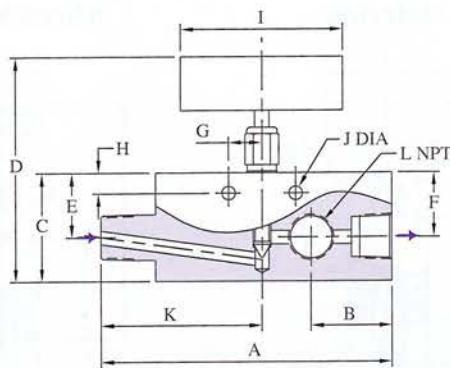


Figure 12

Extension  
Male Inlet, Female Outlet

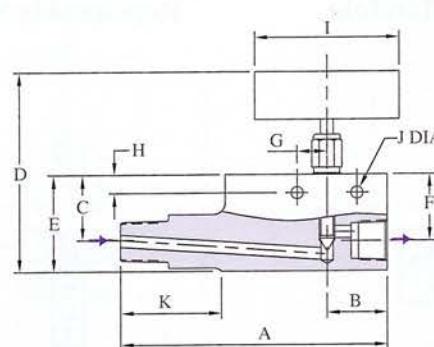


Figure 13

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

Page NPT-7



# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

## 3/8" PIPE

2-way Straight

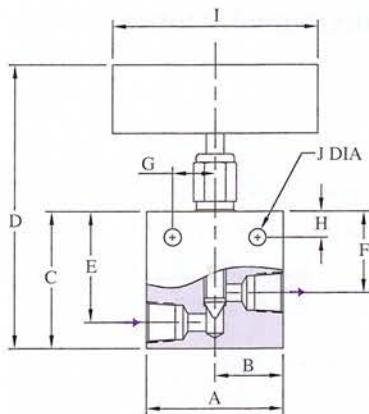


Figure 1

2-way Angle

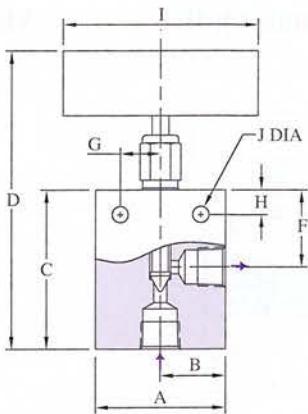


Figure 2

3-way Two on Pressure

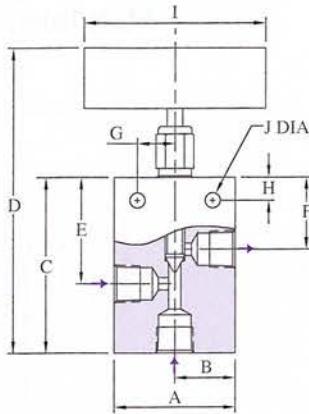


Figure 3

3-way One on Pressure

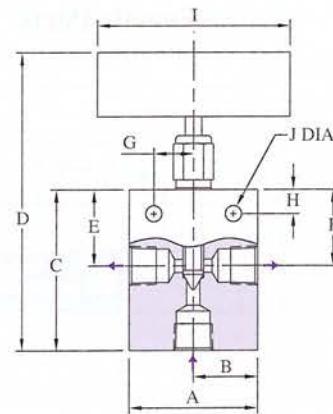


Figure 4

| Catalog Number | Stem Style  | Connection | A      | B      | C       | D       | E      | F      | G      | H      | I       | J     | K      | L      | Thk.         | Fig |
|----------------|-------------|------------|--------|--------|---------|---------|--------|--------|--------|--------|---------|-------|--------|--------|--------------|-----|
| SFPV61V        | Vee Reg     | 3/8" NPT   | 2.50"  | 1.25"  | 2.88"   | 6.32"   | 2.38"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.00" (25.4) | 1   |
| SFPV61R        |             |            | (63.5) | (31.8) | (73.2)  | (160.5) | (60.5) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        |              |     |
| SFPV62V        | Vee Reg     | 3/8" NPT   | 2.50"  | 1.25"  | 3.38"   | 6.82"   | ---    | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.00" (25.4) | 2   |
| SFPV62R        |             |            | (63.5) | (31.8) | (85.9)  | (173.2) |        | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        |              |     |
| SFPV63V        | Vee Reg     | 3/8" NPT   | 2.50"  | 1.25"  | 3.62"   | 7.06"   | 2.38"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.00" (25.4) | 3   |
| SFPV63R        |             |            | (63.5) | (31.8) | (91.9)  | (179.3) | (60.5) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        |              |     |
| SFPV64V        | Vee Reg     | 3/8" NPT   | 2.50"  | 1.25"  | 3.38"   | 6.82"   | 1.75"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.00" (25.4) | 4   |
| SFPV64R        |             |            | (63.5) | (31.8) | (85.9)  | (173.2) | (44.5) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        |              |     |
| SFPV65V        | Vee Reg     | 3/8" NPT   | 2.50"  | 1.25"  | 5.12"   | 12.00"  | 2.56"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.00" (25.4) | 5   |
| SFPV65R        |             |            | (63.5) | (31.8) | (130.0) | (304.8) | (65.0) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        |              |     |
| SFPV66V        | Vee Reg     | 3/8" NPT   | 2.50"  | 1.25"  | 3.25"   | 6.69"   | ---    | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | 1.00"  | 1.22"  | 1.00" (25.4) | 6   |
| SFPV66R        |             |            | (63.5) | (31.8) | (82.6)  | (169.9) |        | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) | (25.4) | (31.0) |              |     |
| SFPMV66V       | Meter       | 3/8" NPT   | 2.50"  | 1.25"  | 2.62"   | 5.66"   | ---    | 1.31"  | 0.69"  | 0.38"  | 4.00"   | 0.25" | 1.00"  | 1.12"  | 1.00" (25.4) | 7   |
| SFPMMV66V      | Micro-Meter | 3/8" NPT   | 2.50"  | 1.25"  | 2.62"   | 6.30"   | ---    | 1.31"  | 0.69"  | 0.38"  | 2.35"   | 0.25" | 1.00"  | 1.12"  | 1.00" (25.4) | 8   |

See page NPT-1 for orifice and Cv

2-stem Manifold

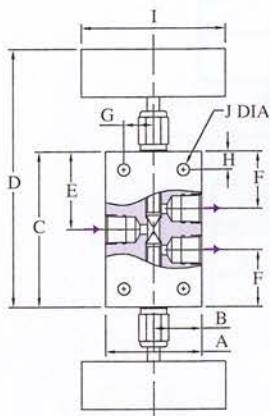


Figure 5

Replaceable Seat

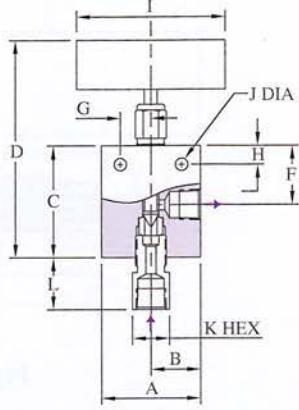


Figure 6

Metering

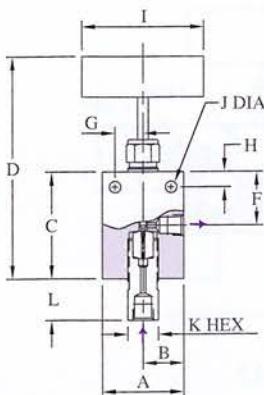


Figure 7

Micro-Metering

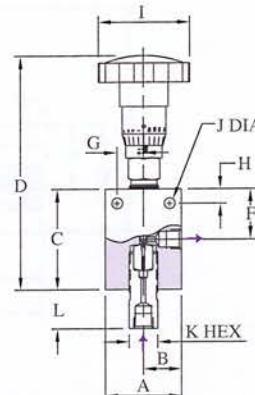


Figure 8

# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

3/8" PIPE

**2-way Straight  
Female Ports**

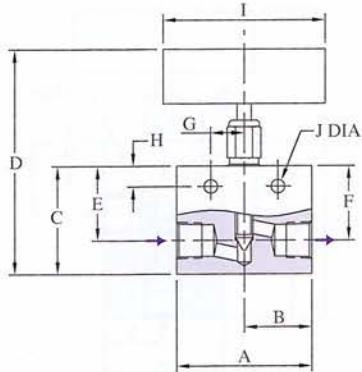


Figure 9

**2-way Straight  
Male Inlet, Female Outlet**

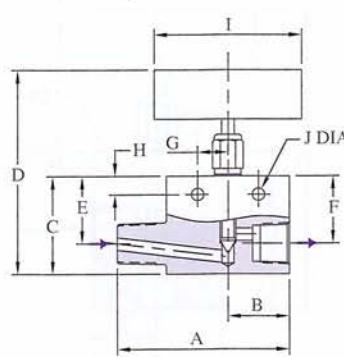


Figure 10

**2-way Angle  
Male Inlet, Female Outlet**

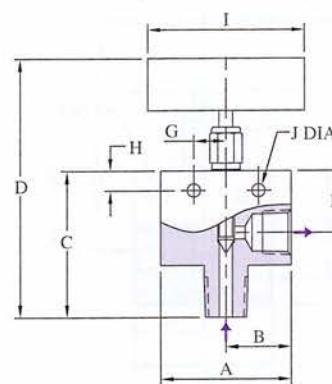


Figure 11

| Catalog Number | Connection | A                | B               | C               | D                | E               | F               | G               | H              | I               | J              | K               | L         | Thk.            | Fig |
|----------------|------------|------------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|-----------|-----------------|-----|
| DHP6F          | 3/8" NPT   | 2.50"<br>(63.5)  | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.38"<br>(35.1) | 1.38"<br>(35.1) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---       | 1.00"<br>(25.4) | 9   |
| DHP6MF         | 3/8" NPT   | 3.50"<br>(88.9)  | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.38"<br>(35.1) | 1.38"<br>(35.1) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---       | 1.00"<br>(25.4) | 10  |
| DHP62MF        | 3/8" NPT   | 2.50"<br>(63.5)  | 1.25"<br>(31.8) | 2.43"<br>(61.7) | 4.93"<br>(125.2) | ---             | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | ---             | ---       | 1.00"<br>(25.4) | 11  |
| DHP67          | 3/8" NPT   | 5.38"<br>(136.7) | 1.50"<br>(38.1) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.19"<br>(30.2) | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 2.97"<br>(75.4) | 3/8" FNPT | 1.25"<br>(31.8) | 12  |
| DHP69          | 3/8" NPT   | 6.10"<br>(154.9) | 1.25"<br>(31.8) | 2.00"<br>(50.8) | 4.50"<br>(114.3) | 1.19"<br>(30.2) | 1.19"<br>(30.2) | 0.62"<br>(15.7) | 0.38"<br>(9.7) | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 2.87"<br>(72.9) | ---       | 1.00"<br>(25.4) | 13  |

See page NPT-1 for orifice and Cv

**Block & Bleed/Gauge  
Male Inlet, Female Outlet**

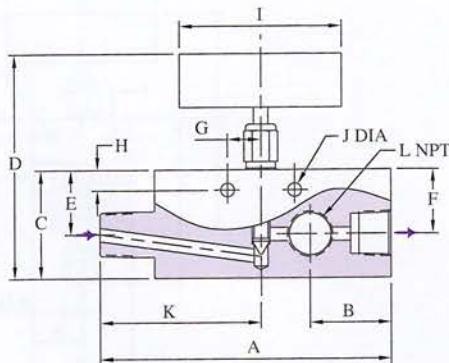


Figure 12

**Extension  
Male Inlet, Female Outlet**

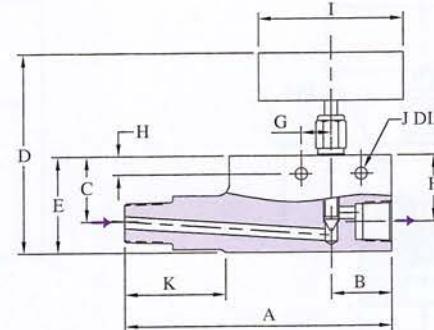


Figure 13

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

Page NPT-9



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A **Haskel** Product

# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

## 1/2" PIPE

### 2-way Straight

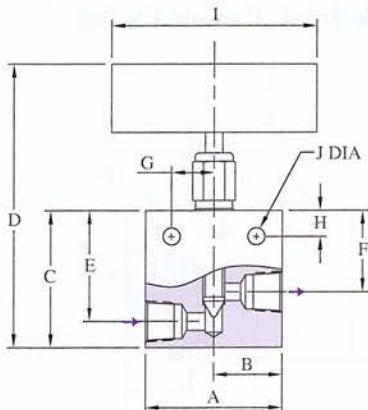


Figure 1

### 2-way Angle

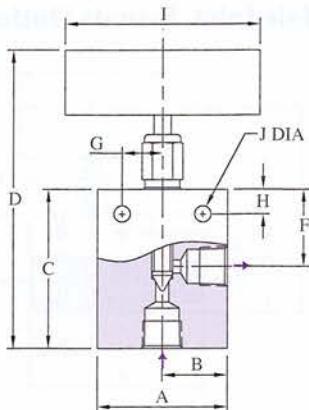


Figure 2

### 3-way Two on Pressure

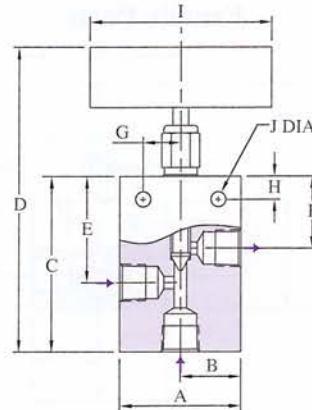


Figure 3

| Catalog Number | Stem Style | Connection | A      | B      | C       | D       | E      | F      | G      | H      | I       | J     | K      | L      | Thk.   | Fig |
|----------------|------------|------------|--------|--------|---------|---------|--------|--------|--------|--------|---------|-------|--------|--------|--------|-----|
| SFPV81V        | Vee        | 1/2" NPT   | 2.50"  | 1.25"  | 3.00"   | 6.44"   | 2.38"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.25"  | 1   |
| SFPV81R        | Reg        |            | (63.5) | (31.8) | (76.2)  | (163.6) | (60.5) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        | (31.8) |     |
| SFPV82V        | Vee        | 1/2" NPT   | 2.50"  | 1.25"  | 3.38"   | 6.82"   | ---    | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.25"  | 2   |
| SFPV82R        | Reg        |            | (63.5) | (31.8) | (85.9)  | (173.2) |        | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        | (31.8) |     |
| SFPV83V        | Vee        | 1/2" NPT   | 2.50"  | 1.25"  | 3.62"   | 7.06"   | 2.38"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.25"  | 3   |
| SFPV83R        | Reg        |            | (63.5) | (31.8) | (91.9)  | (179.3) | (60.5) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        | (31.8) |     |
| SFPV84V        | Vee        | 1/2" NPT   | 2.50"  | 1.25"  | 3.38"   | 6.44"   | 1.75"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.25"  | 4   |
| SFPV84R        | Reg        |            | (63.5) | (31.8) | (85.9)  | (163.6) | (44.5) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        | (31.8) |     |
| SFPV85V        | Vee        | 1/2" NPT   | 2.50"  | 1.25"  | 5.12"   | 12.00"  | 2.56"  | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | ---    | ---    | 1.25"  | 5   |
| SFPV85R        | Reg        |            | (63.5) | (31.8) | (130.0) | (304.8) | (65.0) | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) |        |        | (31.8) |     |
| SFPV86V        | Vee        | 1/2" NPT   | 2.50"  | 1.25"  | 3.25"   | 6.69"   | ---    | 1.75"  | 0.69"  | 0.50"  | 4.00"   | 0.34" | 1.38"  | 1.00"  | 1.25"  | 6   |
| SFPV86R        | Reg        |            | (63.5) | (31.8) | (82.6)  | (169.9) |        | (44.5) | (17.5) | (12.7) | (101.6) | (8.6) | (35.1) | (25.4) | (31.8) |     |

See page NPT-1 for orifice and Cv

### 3-way One on Pressure

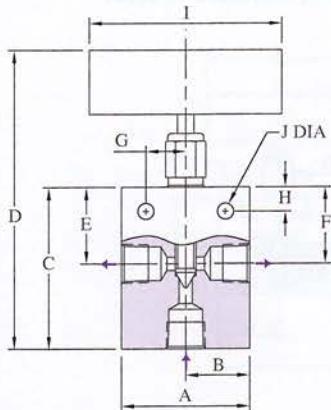


Figure 4

### 2-stem Manifold

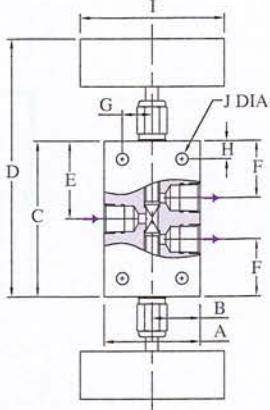


Figure 5

### Replaceable Seat

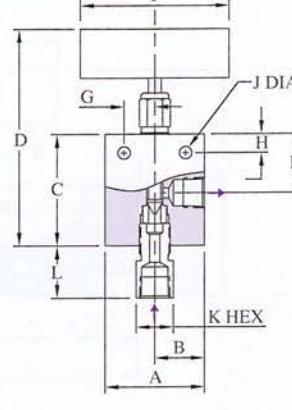


Figure 6

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

# NEEDLE VALVES FOR 15,000 PSI (1030 BAR)

1/2" PIPE

## 2-way Straight Female Ports

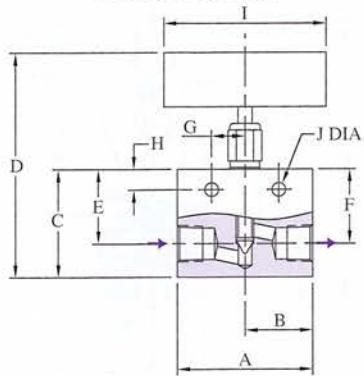


Figure 7

## 2-way Straight Male Inlet, Female Outlet

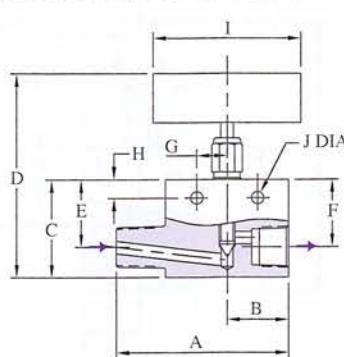


Figure 8

## 2-way Angle Male Inlet, Female Outlet

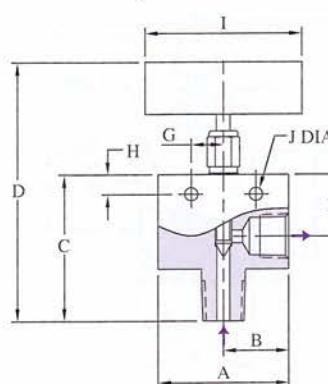


Figure 9

| Catalog Number | Connection | A     | B     | C     | D     | E     | F     | G     | H     | I     | J     | K     | L            | Thk.            | Fig |
|----------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|-----------------|-----|
| DHP8F          | 1/2" NPT   | 2.50" | 1.25" | 2.00" | 4.50" | 1.38" | 1.38" | 0.62" | 0.38" | 3.00" | 0.25" | ---   | ---          | 1.25"<br>(31.8) | 7   |
| DHP8MF         | 1/2" NPT   | 3.50" | 1.25" | 2.00" | 4.50" | 1.38" | 1.38" | 0.62" | 0.38" | 3.00" | 0.25" | ---   | ---          | 1.25"<br>(31.8) | 8   |
| DHP82MF        | 1/2" NPT   | 2.50" | 1.25" | 2.81" | 5.31" | ---   | 1.19" | 0.62" | 0.38" | 3.00" | 0.25" | ---   | ---          | 1.25"<br>(31.8) | 9   |
| DHP87          | 1/2" NPT   | 5.38" | 1.50" | 2.00" | 4.50" | 1.19" | 1.19" | 0.62" | 0.38" | 3.00" | 0.25" | 2.97" | 1/2"<br>FNPT | 1.25"<br>(31.8) | 10  |
| DHP89          | 1/2" NPT   | 6.10" | 1.25" | 2.00" | 4.50" | 1.19" | 1.19" | 0.62" | 0.38" | 3.00" | 0.25" | 2.87" | ---          | 1.25"<br>(31.8) | 11  |

See page NPT-1 for orifice and Cv

## Block & Bleed/Gauge Male Inlet, Female Outlet

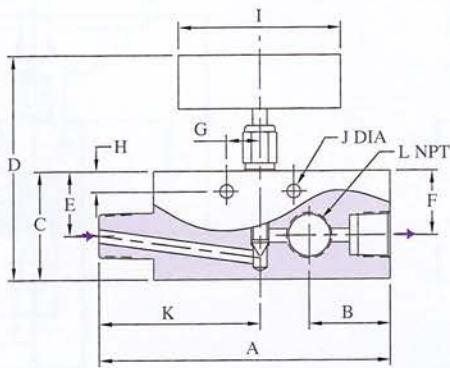


Figure 10

## Extension Male Inlet, Female Outlet

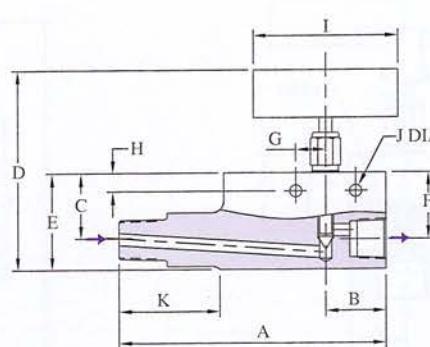


Figure 11

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

# NEEDLE VALVES FOR 10,000 PSI (690 BAR)

## 3/4" PIPE

### 2-way Straight

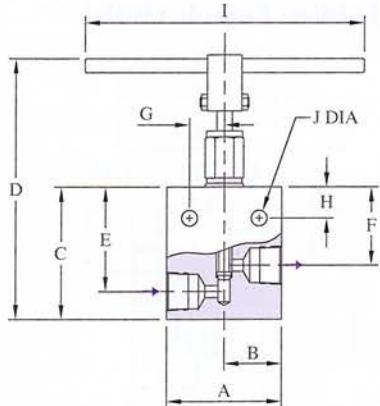


Figure 1

### 2-way Angle

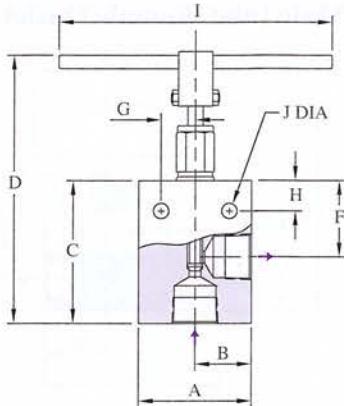


Figure 2

### 3-way Two on Pressure

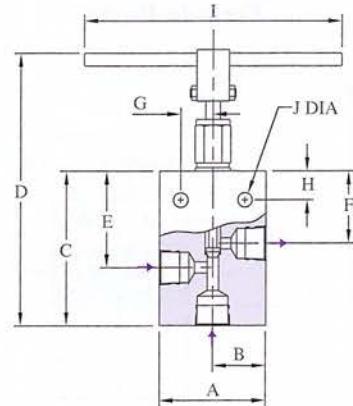


Figure 3

| Catalog Number | Stem Style | Connection | A       | B      | C       | D       | E       | F      | G      | H      | I       | J      | K      | L      | Thk.   | Fig |
|----------------|------------|------------|---------|--------|---------|---------|---------|--------|--------|--------|---------|--------|--------|--------|--------|-----|
| FPV121V        | Vee        | 3/4" NPT   | 4.12"   | 2.06"  | 5.50"   | 10.94"  | 3.75"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 1   |
| FPV121R        | Reg        | 3/4" NPT   | (104.6) | (52.3) | (139.7) | (277.9) | (95.3)  | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) | ---    | ---    | (44.5) |     |
| FPV122V        | Vee        | 3/4" NPT   | 4.12"   | 2.06"  | 5.50"   | 10.94"  | ---     | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 2   |
| FPV122R        | Reg        | 3/4" NPT   | (104.6) | (52.3) | (139.7) | (277.9) | (71.4)  | (31.8) | (31.8) | (28.4) | (254.0) | (14.2) | ---    | ---    | (44.5) |     |
| FPV123V        | Vee        | 3/4" NPT   | 4.12"   | 2.06"  | 5.50"   | 10.94"  | 3.75"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 3   |
| FPV123R        | Reg        | 3/4" NPT   | (104.6) | (52.3) | (139.7) | (277.9) | (95.3)  | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) | ---    | ---    | (44.5) |     |
| FPV124V        | Vee        | 3/4" NPT   | 4.12"   | 2.06"  | 5.50"   | 10.94"  | 2.81"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 4   |
| FPV124R        | Reg        | 3/4" NPT   | (104.6) | (52.3) | (139.7) | (277.9) | (71.4)  | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) | ---    | ---    | (44.5) |     |
| FPV125V        | Vee        | 3/4" NPT   | 4.12"   | 2.06"  | 8.00"   | 18.88"  | 4.00"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 5   |
| FPV125R        | Reg        | 3/4" NPT   | (104.6) | (52.3) | (203.2) | (479.6) | (101.6) | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) | ---    | ---    | (44.5) |     |
| FPV126V        | Vee        | 3/4" NPT   | 4.12"   | 2.06"  | 4.81"   | 10.25"  | ---     | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | 1.75"  | 1.75"  | 1.75"  | 6   |
| FPV126R        | Reg        | 3/4" NPT   | (104.6) | (52.3) | (122.2) | (260.4) | (71.4)  | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) | (44.5) | (44.5) | (44.5) |     |

See page NPT-1 for orifice and Cv

### 3-way One on Pressure

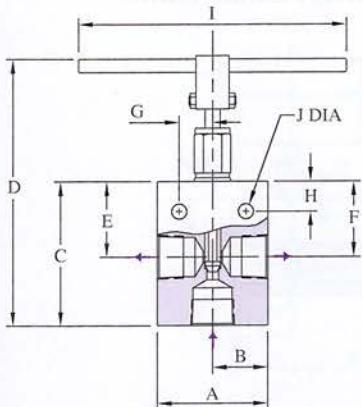


Figure 4

### 2-stem Manifold

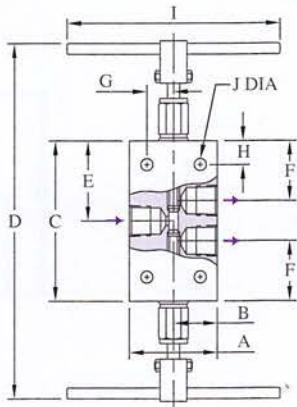


Figure 5

### Replaceable Seat

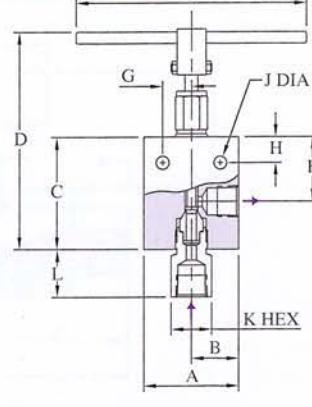


Figure 6

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

# NEEDLE VALVES FOR 10,000 PSI (690 BAR)

3/4" PIPE

## 2-way Straight Female Ports

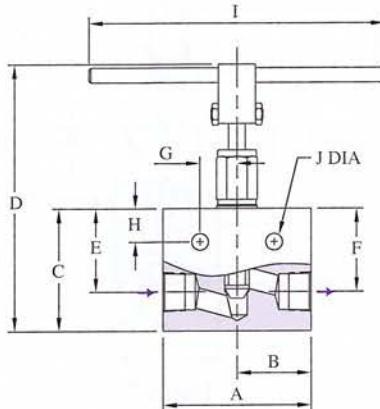


Figure 7

## 2-way Straight Male Inlet, Female Outlet

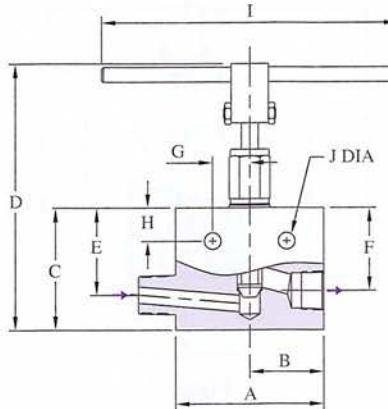


Figure 8

## 2-way Angle Male Inlet, Female Outlet

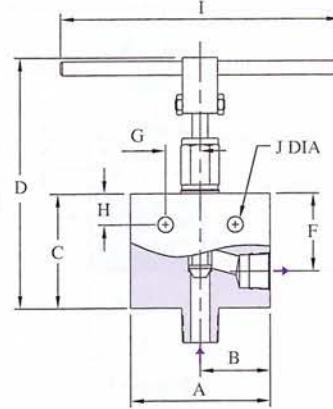


Figure 9

| Catalog Number | Connection | A                | B               | C                | D                | E               | F               | G               | H               | I                 | J               | Thk.            | Fig |
|----------------|------------|------------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-------------------|-----------------|-----------------|-----|
| DHP12F         | 3/4" NPT   | 5.00"<br>(127.0) | 2.50"<br>(63.5) | 4.12"<br>(104.6) | 9.56"<br>(242.8) | 2.81"<br>(71.4) | 2.81"<br>(71.4) | 1.25"<br>(31.8) | 1.12"<br>(28.4) | 10.00"<br>(254.0) | 0.56"<br>(14.2) | 1.75"<br>(44.5) | 7   |
| DHP12MF        | 3/4" NPT   | 6.00"<br>(152.4) | 2.50"<br>(63.5) | 4.12"<br>(104.6) | 9.56"<br>(242.8) | 2.81"<br>(71.4) | 2.81"<br>(71.4) | 1.25"<br>(31.8) | 1.12"<br>(28.4) | 10.00"<br>(254.0) | 0.56"<br>(14.2) | 1.75"<br>(44.5) | 8   |
| DHP122MF       | 3/4" NPT   | 4.12"<br>(104.6) | 2.06"<br>(52.3) | 4.25"<br>(108.0) | 9.56"<br>(242.8) | ---             | 2.36"<br>(59.9) | 1.25"<br>(31.8) | 1.12"<br>(28.4) | 10.00"<br>(254.0) | 0.56"<br>(14.2) | 1.75"<br>(44.5) | 9   |

See page NPT-1 for orifice and Cv



All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

Page NPT-13

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**BuTech**  
A **Haskel** Product

# NEEDLE VALVES FOR 10,000 PSI (690 BAR)

## 1" PIPE

### 2-way Straight

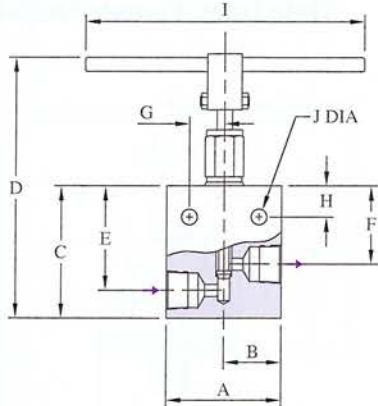


Figure 1

### 2-way Angle

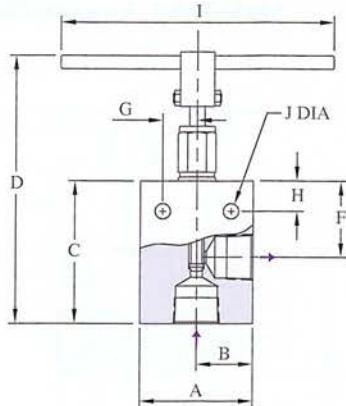


Figure 2

### 3-way Two on Pressure

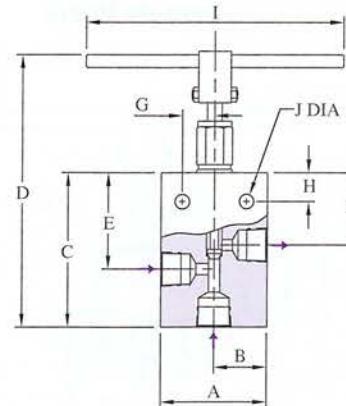


Figure 3

| Catalog Number | Stem Style | Connection | A       | B      | C       | D       | E       | F      | G      | H      | I       | J      | K      | L      | Thk.   | Fig |
|----------------|------------|------------|---------|--------|---------|---------|---------|--------|--------|--------|---------|--------|--------|--------|--------|-----|
| FPV161V        | Vee        | 1" NPT     | 4.12"   | 2.06"  | 5.50"   | 10.94"  | 3.75"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 1   |
| FPV161R        | Reg        |            | (104.6) | (52.3) | (139.7) | (277.9) | (95.3)  | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) |        |        | (44.5) |     |
| FPV162V        | Vee        | 1" NPT     | 4.12"   | 2.06"  | 5.50"   | 10.94"  | ---     | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 2   |
| FPV162R        | Reg        |            | (104.6) | (52.3) | (139.7) | (277.9) |         | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) |        |        | (44.5) |     |
| FPV163V        | Vee        | 1" NPT     | 4.12"   | 2.06"  | 5.75"   | 11.19"  | 3.75"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 3   |
| FPV163R        | Reg        |            | (104.6) | (52.3) | (146.1) | (284.2) | (95.3)  | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) |        |        | (44.5) |     |
| FPV164V        | Vee        | 1" NPT     | 4.12"   | 2.06"  | 5.50"   | 10.94"  | 2.81"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 4   |
| FPV164R        | Reg        |            | (104.6) | (52.3) | (139.7) | (277.9) | (71.4)  | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) |        |        | (44.5) |     |
| FPV165V        | Vee        | 1" NPT     | 4.12"   | 2.06"  | 8.00"   | 18.88"  | 4.00"   | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | ---    | ---    | 1.75"  | 5   |
| FPV165R        | Reg        |            | (104.6) | (52.3) | (203.2) | (479.6) | (101.6) | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) |        |        | (44.5) |     |
| FPV166V        | Vee        | 1" NPT     | 4.12"   | 2.06"  | 5.50"   | 10.94"  | ---     | 2.81"  | 1.25"  | 1.12"  | 10.00"  | 0.56"  | 1.75"  | 2.08"  | 1.75"  | 6   |
| FPV166R        | Reg        |            | (104.6) | (52.3) | (139.7) | (277.9) |         | (71.4) | (31.8) | (28.4) | (254.0) | (14.2) | (44.5) | (52.8) | (44.5) |     |

See page NPT-1 for orifice and Cv

### 3-way One on Pressure

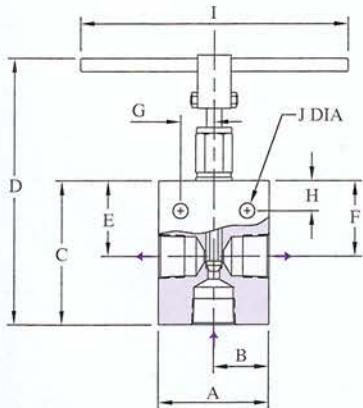


Figure 4

### 2-stem Manifold

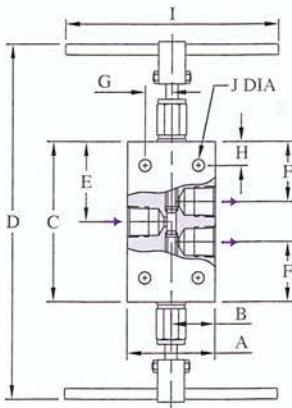


Figure 5

### Replaceable Seat

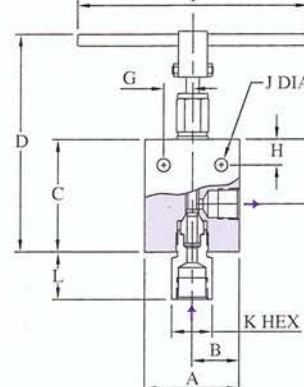


Figure 6

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

# NEEDLE VALVES FOR 10,000 PSI (690 BAR)

1" PIPE

2-way Straight  
Female Ports

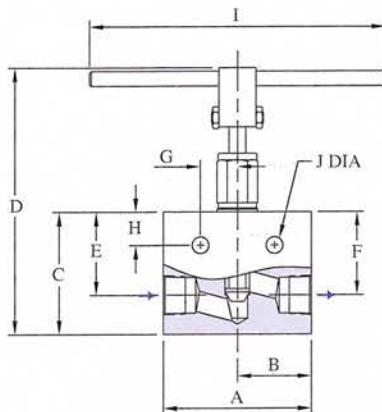


Figure8

2-way Straight  
Male Inlet, Female Outlet

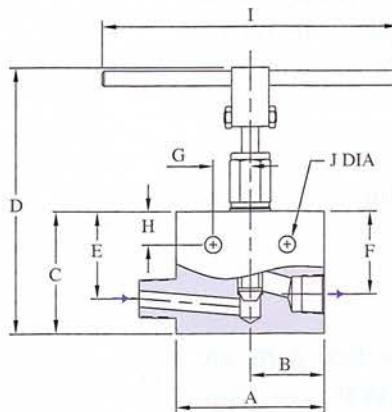


Figure 8

2-way Angle  
Male Inlet, Female Outlet

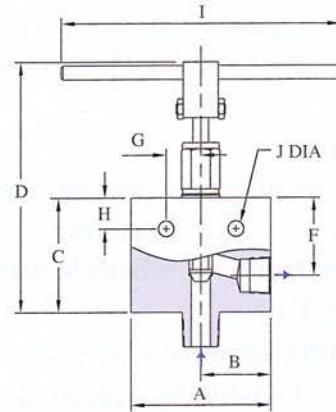


Figure9

| Catalog Number | Connection | A                | B               | C                | D                | E               | F               | G               | H               | I                 | J               | Thk.            | Fig |
|----------------|------------|------------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-------------------|-----------------|-----------------|-----|
| DHP16F         | 1" NPT     | 5.00"<br>(127.0) | 2.50"<br>(63.5) | 4.12"<br>(104.6) | 9.56"<br>(242.8) | 2.81"<br>(71.4) | 2.81"<br>(71.4) | 1.25"<br>(31.8) | 1.12"<br>(28.4) | 10.00"<br>(254.0) | 0.56"<br>(14.2) | 1.75"<br>(44.5) | 7   |
| DHP16MF        | 1" NPT     | 6.25"<br>(158.8) | 2.50"<br>(63.5) | 4.12"<br>(104.6) | 9.56"<br>(242.8) | 2.94"<br>(74.7) | 2.94"<br>(74.7) | 1.25"<br>(31.8) | 1.12"<br>(28.4) | 10.00"<br>(254.0) | 0.56"<br>(14.2) | 1.75"<br>(44.5) | 8   |
| DHP162MF       | 1" NPT     | 4.12"<br>(104.6) | 2.06"<br>(52.3) | 4.50"<br>(114.3) | 9.94"<br>(252.5) | ---             | 2.36"<br>(59.9) | 1.25"<br>(31.8) | 1.12"<br>(28.4) | 10.00"<br>(254.0) | 0.56"<br>(14.2) | 1.75"<br>(44.5) | 9   |

See page NPT-1 for orifice and Cv



All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

Page NPT-15

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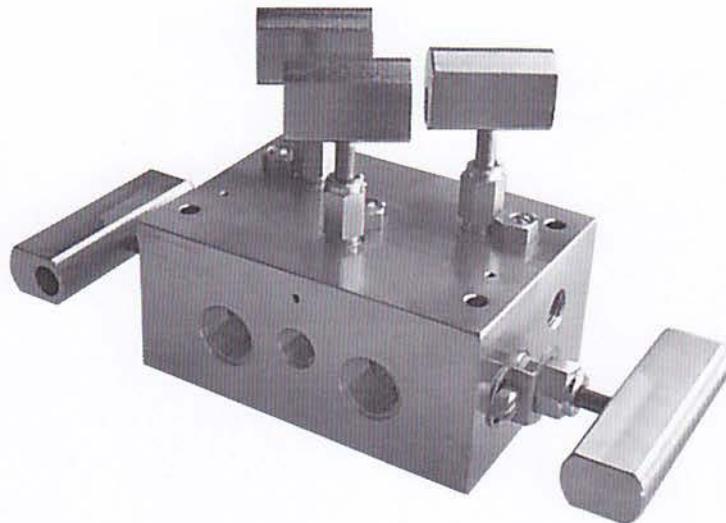
**BuTech**  
A *Hastel*® Product

# 3- AND 5-STEM MANIFOLD VALVES

Three and Five-valve manifolds are used for applications requiring multiple ports for pressure testing and line sampling. BuTech can custom design manifolds to meet your specific requirements. Our manifolds are engineered with the same expertise, quality features and options found in all of our valves. For complete details, please consult the factory.

## **Features:**

- Non-rotating stem prevents galling and scoring
  - Vee
  - Regulating
  - Soft Tip
  - Metering
  - Micro-Metering
- 17-4PH Stem for longer service life. 316 wetted parts are also available by specifying option **-316WP** (see page NPT-3)
- Low operating torque
- Pressures to 10,000 PSI (690 bar)
- 1/2" FNPT connections standard
- Standard body material: 316 stainless steel. Exotic materials available on request
- Available in Pipe-to-Pipe or Instrument Flange Mounting

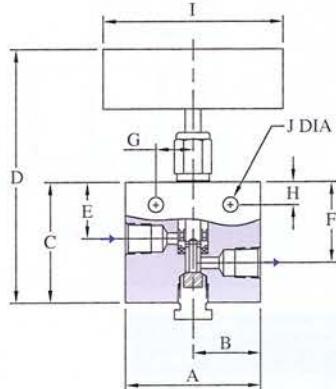


All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

**Page NPT-16**

# REPLACEABLE SEAT VALVES

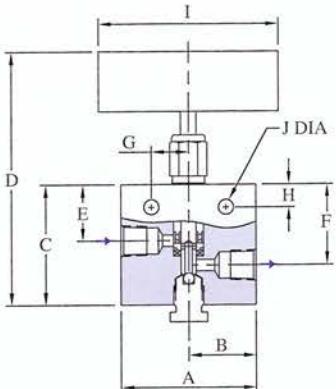
## Soft Seat



- Designed to permit replacement of the seat without removing the valve from the system.
- Non-rotating stem
- Shut-off and metering service capability
- Glass-filled Teflon Packing
- PEEK seat standard, Teflon, Torlon, Delrin, UHMWPE and other materials available

| Catalog Number | Connection | A               | B               | C               | D                | E               | F               | G               | H               | I               | J              | Thk.            |
|----------------|------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|
| JSV-P2         | 1/8" NPT   | 2.25"<br>(57.2) | 1.12"<br>(28.4) | 2.00"<br>(50.8) | 4.34"<br>(110.2) | 0.94"<br>(23.9) | 1.34"<br>(34.0) | 0.62"<br>(15.7) | 0.38"<br>(9.7)  | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 0.75"<br>(19.1) |
| JSV-P4         | 1/4" NPT   | 2.25"<br>(57.2) | 1.12"<br>(28.4) | 2.00"<br>(50.8) | 4.34"<br>(110.2) | 0.94"<br>(23.9) | 1.34"<br>(34.0) | 0.62"<br>(15.7) | 0.38"<br>(9.7)  | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 0.75"<br>(19.1) |
| JSV-P6         | 3/8" NPT   | 2.25"<br>(57.2) | 1.12"<br>(28.4) | 2.00"<br>(50.8) | 4.34"<br>(110.2) | 0.94"<br>(23.9) | 1.34"<br>(34.0) | 0.62"<br>(15.7) | 0.38"<br>(9.7)  | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 1.00"<br>(25.4) |
| JSV-P8         | 1/2" NPT   | 2.50"<br>(63.5) | 1.25"<br>(31.8) | 3.12"<br>(79.2) | 6.60"<br>(167.6) | 1.35"<br>(34.3) | 2.00"<br>(50.8) | 0.69"<br>(17.5) | 0.50"<br>(12.7) | 3.00"<br>(76.2) | 0.34"<br>(8.6) | 1.25"<br>(31.8) |

## Ball Seat



- Designed to permit replacement of the seat without removing the valve from the system
- Non-rotating stem
- Shut-off and metering service capability
- Glass-filled Teflon Packing
- 316SS seat standard, Stellite, Brass, and all other machineable materials available

| Catalog Number | Connection | A               | B               | C               | D                | E               | F               | G               | H               | I               | J              | Thk.            |
|----------------|------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|
| JBV-P2         | 1/8" NPT   | 2.25"<br>(57.2) | 1.12"<br>(28.4) | 2.00"<br>(50.8) | 4.34"<br>(110.2) | 0.94"<br>(23.9) | 1.34"<br>(34.0) | 0.62"<br>(15.7) | 0.38"<br>(9.7)  | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 0.75"<br>(19.1) |
| JBV-P4         | 1/4" NPT   | 2.25"<br>(57.2) | 1.12"<br>(28.4) | 2.00"<br>(50.8) | 4.34"<br>(110.2) | 0.94"<br>(23.9) | 1.34"<br>(34.0) | 0.62"<br>(15.7) | 0.38"<br>(9.7)  | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 0.75"<br>(19.1) |
| JBV-P6         | 3/8" NPT   | 2.25"<br>(57.2) | 1.12"<br>(28.4) | 2.00"<br>(50.8) | 4.34"<br>(110.2) | 0.94"<br>(23.9) | 1.34"<br>(34.0) | 0.62"<br>(15.7) | 0.38"<br>(9.7)  | 3.00"<br>(76.2) | 0.25"<br>(6.4) | 1.00"<br>(25.4) |
| JBV-P8         | 1/2" NPT   | 2.50"<br>(63.5) | 1.25"<br>(31.8) | 3.12"<br>(79.2) | 6.62"<br>(168.1) | 1.35"<br>(34.3) | 2.00"<br>(50.8) | 0.69"<br>(17.5) | 0.50"<br>(12.7) | 3.00"<br>(76.2) | 0.34"<br>(8.6) | 1.25"<br>(31.8) |

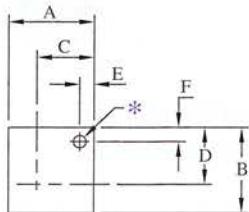
All dimensions are for reference only and are subject to change.

Dimensions in parentheses are millimeters (mm)

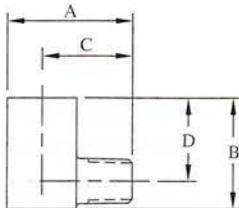
Page NPT-17



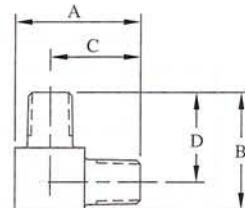
# PIPE ELBOWS



Female Elbow



Street Elbow



Male Elbow

## FEMALE ELBOW

| Catalog Number | Connection | Port          | MAWP                   | Block        |              |              |              |              | Mounting Holes* |              |             |
|----------------|------------|---------------|------------------------|--------------|--------------|--------------|--------------|--------------|-----------------|--------------|-------------|
|                |            |               |                        | A            | B            | C            | D            | Thickness    | E               | F            | Dia.        |
| FPL2           | 1/8" NPT   | 0.187" (4.7)  | 15,000 PSI<br>1030 bar | 1.13" (28.7) | 1.00" (25.4) | 0.75" (19.1) | 0.62" (15.7) | 0.62" (15.7) | 0.25" (6.4)     | 0.20" (5.1)  | 0.22" (5.6) |
| FPL4           | 1/4" NPT   | 0.250" (6.4)  | 15,000 PSI<br>1030 bar | 1.50" (38.1) | 1.25" (31.8) | 1.00" (25.4) | 0.81" (20.6) | 0.75" (19.1) | 0.38" (9.7)     | 0.25" (6.4)  | 0.22" (5.6) |
| FPL6           | 3/8" NPT   | 0.375" (9.5)  | 15,000 PSI<br>1030 bar | 1.50" (38.1) | 1.50" (38.1) | 1.00" (25.4) | 1.00" (25.4) | 1.00" (25.4) | 0.25" (6.4)     | 0.25" (6.4)  | 0.22" (5.6) |
| FPL8           | 1/2" NPT   | 0.500" (12.7) | 15,000 PSI<br>1030 bar | 1.75" (44.5) | 1.75" (44.5) | 1.25" (31.8) | 1.25" (31.8) | 1.25" (31.8) | 0.37" (9.4)     | 0.37" (9.4)  | 0.28" (7.1) |
| FPL12          | 3/4" NPT   | 0.922" (23.4) | 10,000 PSI<br>690 bar  | 2.62" (66.5) | 2.12" (53.8) | 1.31" (33.3) | 1.38" (35.1) | 1.50" (38.1) | N/A             | N/A          | N/A         |
| FPL16          | 1" NPT     | 0.687" (17.4) | 10,000 PSI<br>690 bar  | 3.00" (76.2) | 2.56" (65.0) | 1.69" (42.9) | 1.69" (42.9) | 1.75" (44.5) | 0.50" (12.7)    | 0.50" (12.7) | 0.22" (5.6) |

\*Mounting hole provided when the catalog number is suffixed by “-MH” when ordering.

## STREET ELBOW

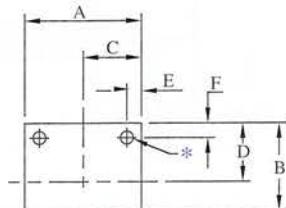
| Catalog Number | Connection | Port          | MAWP                   | Block        |              |              |              |              | E | F | Dia. |
|----------------|------------|---------------|------------------------|--------------|--------------|--------------|--------------|--------------|---|---|------|
|                |            |               |                        | A            | B            | C            | D            | Thickness    |   |   |      |
| MSPL2          | 1/8" NPT   | 0.187" (4.7)  | 15,000 PSI<br>1030 bar | 1.12" (28.4) | 1.00" (25.4) | 0.81" (20.6) | 0.75" (19.1) | 0.62" (15.7) |   |   |      |
| MSPL4          | 1/4" NPT   | 0.250" (6.4)  | 15,000 PSI<br>1030 bar | 1.50" (38.1) | 1.50" (38.1) | 1.13" (28.7) | 1.00" (25.4) | 1.00" (25.4) |   |   |      |
| MSPL6          | 3/8" NPT   | 0.375" (9.5)  | 15,000 PSI<br>1030 bar | 1.75" (44.5) | 1.50" (38.1) | 1.25" (31.8) | 1.00" (25.4) | 1.00" (25.4) |   |   |      |
| MSPL8          | 1/2" NPT   | 0.500" (12.7) | 15,000 PSI<br>1030 bar | 2.25" (57.2) | 2.00" (50.8) | 1.63" (41.4) | 1.25" (31.8) | 1.25" (31.8) |   |   |      |
| MSPL12         | 3/4" NPT   | 0.625" (15.9) | 10,000 PSI<br>690 bar  | 2.50" (63.5) | 2.62" (66.5) | 1.75" (44.5) | 1.31" (33.3) | 1.50" (38.1) |   |   |      |
| MSPL16         | 1" NPT     | 0.687" (17.4) | 10,000 PSI<br>690 bar  | 3.00" (76.2) | 2.88" (73.2) | 2.12" (53.8) | 1.68" (42.7) | 1.75" (44.5) |   |   |      |

## MALE ELBOW

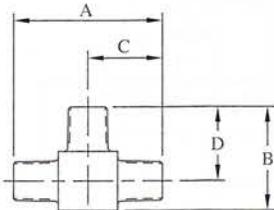
| Catalog Number | Connection | Port          | MAWP                   | Block        |              |              |              |              | E | F | Dia. |
|----------------|------------|---------------|------------------------|--------------|--------------|--------------|--------------|--------------|---|---|------|
|                |            |               |                        | A            | B            | C            | D            | Thickness    |   |   |      |
| MPL2           | 1/8" NPT   | 0.187" (4.7)  | 15,000 PSI<br>1030 bar | 1.00" (25.4) | 1.13" (28.7) | 0.75" (19.1) | 0.81" (20.6) | 0.62" (15.7) |   |   |      |
| MPL4           | 1/4" NPT   | 0.250" (6.4)  | 15,000 PSI<br>1030 bar | 1.50" (38.1) | 1.50" (38.1) | 1.13" (28.7) | 1.13" (28.7) | 0.75" (19.1) |   |   |      |
| MPL6           | 3/8" NPT   | 0.375" (9.5)  | 15,000 PSI<br>1030 bar | 1.75" (44.5) | 1.75" (44.5) | 1.25" (31.8) | 1.25" (31.8) | 1.00" (25.4) |   |   |      |
| MPL8           | 1/2" NPT   | 0.500" (12.7) | 15,000 PSI<br>1030 bar | 2.00" (50.8) | 2.00" (50.8) | 1.50" (38.1) | 1.50" (38.1) | 1.00" (25.4) |   |   |      |
| MPL12          | 3/4" NPT   | 0.625" (15.9) | 10,000 PSI<br>690 bar  | 2.62" (66.5) | 2.62" (66.5) | 1.75" (44.5) | 1.75" (44.5) | 1.50" (38.1) |   |   |      |
| MPL16          | 1" NPT     | 0.687" (17.4) | 10,000 PSI<br>690 bar  | 3.00" (76.2) | 3.00" (76.2) | 2.13" (54.1) | 2.13" (54.1) | 1.75" (44.5) |   |   |      |

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

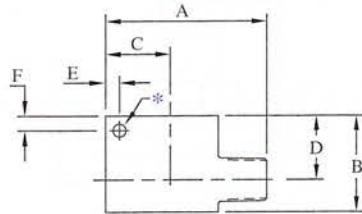
# PIPE TEES



Female Tee



Male Tee



Male Street Tee

## FEMALE TEES

| Catalog |          | Number | Connection | Port      | MAWP   | Block  |        |        |        |        | Mounting Holes* |  |  |
|---------|----------|--------|------------|-----------|--------|--------|--------|--------|--------|--------|-----------------|--|--|
| A       | B        | C      | D          | Thickness | E      | F      | Dia.   |        |        |        |                 |  |  |
| FPT2    | 1/8" NPT | 0.187" | 15,000 PSI | 1.50"     | 1.00"  | 0.75"  | 0.62"  | 0.62"  | 0.25"  | 0.20"  | 0.22"           |  |  |
|         |          | (4.7)  | 1030 bar   | (38.1)    | (25.4) | (19.1) | (15.7) | (15.7) | (6.4)  | (5.1)  | (5.6)           |  |  |
| FPT4    | 1/4" NPT | 0.437" | 15,000 PSI | 2.00"     | 1.25"  | 1.00"  | 0.81"  | 0.75"  | 0.38"  | 0.25"  | 0.22"           |  |  |
|         |          | (11.1) | 1030 bar   | (50.8)    | (31.8) | (25.4) | (20.6) | (19.1) | (9.7)  | (6.4)  | (5.6)           |  |  |
| FPT6    | 3/8" NPT | 0.375" | 15,000 PSI | 2.00"     | 1.50"  | 1.00"  | 1.00"  | 1.00"  | 0.25"  | 0.25"  | 0.22"           |  |  |
|         |          | (9.5)  | 1030 bar   | (50.8)    | (38.1) | (25.4) | (25.4) | (25.4) | (6.4)  | (6.4)  | (5.6)           |  |  |
| FPT8    | 1/2" NPT | 0.500" | 15,000 PSI | 2.50"     | 1.75"  | 1.25"  | 1.25"  | 1.25"  | 0.38"  | 0.38"  | 0.28"           |  |  |
|         |          | (12.7) | 1030 bar   | (63.5)    | (44.5) | (31.8) | (31.8) | (31.8) | (9.7)  | (9.7)  | (7.1)           |  |  |
| FPT12   | 3/4" NPT | 0.922" | 10,000 PSI | 2.62"     | 2.12"  | 1.31"  | 1.38"  | 1.50"  | N/A    | N/A    | N/A             |  |  |
|         |          | (23.4) | 690 bar    | (66.5)    | (53.8) | (33.3) | (35.1) | (38.1) |        |        |                 |  |  |
| FPT16   | 1" NPT   | 0.687" | 10,000 PSI | 3.38"     | 2.56"  | 1.69"  | 1.69"  | 1.75"  | 0.50"  | 0.50"  | 0.22"           |  |  |
|         |          | (17.4) | 690 bar    | (85.9)    | (65.0) | (42.9) | (42.9) | (44.5) | (12.7) | (12.7) | (5.6)           |  |  |

## MALE TEES

| Catalog |          | Number | Connection | Port      | MAWP   | Block  |        |        |       |        | Mounting Holes* |       |  |
|---------|----------|--------|------------|-----------|--------|--------|--------|--------|-------|--------|-----------------|-------|--|
| A       | B        | C      | D          | Thickness | E      | F      | Dia.   |        |       |        |                 |       |  |
| MPT2    | 1/8" NPT | 0.187" | 15,000 PSI | 1.50"     | 1.13"  | 0.75"  | 0.81"  | 0.62"  | MPT2  | 0.25"  | 0.20"           | 0.22" |  |
|         |          | (4.7)  | 1030 bar   | (38.1)    | (28.7) | (19.1) | (20.6) | (15.7) |       | (6.4)  | (5.1)           | (5.6) |  |
| MPT4    | 1/4" NPT | 0.250" | 15,000 PSI | 2.25"     | 1.50"  | 1.13"  | 1.13"  | 0.75"  | MPT4  | 0.38"  | 0.25"           | 0.22" |  |
|         |          | (6.4)  | 1030 bar   | (57.2)    | (38.1) | (28.7) | (28.7) | (19.1) |       | (9.7)  | (6.4)           | (5.6) |  |
| MPT6    | 3/8" NPT | 0.375" | 15,000 PSI | 2.50"     | 1.75"  | 1.25"  | 1.25"  | 1.00"  | MPT6  | 0.25"  | 0.25"           | 0.22" |  |
|         |          | (9.5)  | 1030 bar   | (63.5)    | (44.5) | (31.8) | (31.8) | (25.4) |       | (6.4)  | (6.4)           | (5.6) |  |
| MPT8    | 1/2" NPT | 0.500" | 15,000 PSI | 3.00"     | 2.00"  | 1.50"  | 1.50"  | 1.00"  | MPT8  | 0.38"  | 0.38"           | 0.28" |  |
|         |          | (12.7) | 1030 bar   | (76.2)    | (50.8) | (38.1) | (38.1) | (25.4) |       | (9.7)  | (9.7)           | (7.1) |  |
| MPT12   | 3/4" NPT | 0.625" | 10,000 PSI | 3.50"     | 2.62"  | 1.75"  | 1.75"  | 1.50"  | MPT12 | N/A    | N/A             | N/A   |  |
|         |          | (15.9) | 690 bar    | (88.9)    | (66.5) | (44.5) | (44.5) | (38.1) |       |        |                 |       |  |
| MPT16   | 1" NPT   | 0.687" | 10,000 PSI | 4.25"     | 3.00"  | 2.13"  | 2.13"  | 1.75"  | MPT16 | 0.50"  | 0.50"           | 0.22" |  |
|         |          | (17.4) | 690 bar    | (108.0)   | (76.2) | (54.1) | (54.1) | (44.5) |       | (12.7) | (12.7)          | (5.6) |  |

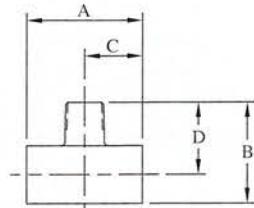
## MALE STREET TEES

| Catalog |          | Number | Connection | Port      | MAWP   | Block  |        |        |        |        | Mounting Holes* |       |  |
|---------|----------|--------|------------|-----------|--------|--------|--------|--------|--------|--------|-----------------|-------|--|
| A       | B        | C      | D          | Thickness | E      | F      | Dia.   |        |        |        |                 |       |  |
| MSPT2   | 1/8" NPT | 0.187" | 15,000 PSI | 1.50"     | 1.12"  | 0.63"  | 0.75"  | 0.62"  | MSPT2  | N/A    | N/A             | N/A   |  |
|         |          | (4.7)  | 1030 bar   | (38.1)    | (28.4) | (16.0) | (19.1) | (15.7) |        |        |                 |       |  |
| MSPT4   | 1/4" NPT | 0.250" | 15,000 PSI | 2.00"     | 1.37"  | 0.81"  | 1.00"  | 0.75"  | MSPT4  | 0.25"  | 0.37"           | 0.22" |  |
|         |          | (6.4)  | 1030 bar   | (50.8)    | (34.8) | (20.6) | (25.4) | (19.1) |        | (6.4)  | (9.4)           | (5.6) |  |
| MSPT6   | 3/8" NPT | 0.375" | 15,000 PSI | 2.50"     | 1.50"  | 1.00"  | 1.00"  | 1.00"  | MSPT6  | N/A    | N/A             | N/A   |  |
|         |          | (9.5)  | 1030 bar   | (63.5)    | (38.1) | (25.4) | (25.4) | (25.4) |        |        |                 |       |  |
| MSPT8   | 1/2" NPT | 0.500" | 15,000 PSI | 2.75"     | 1.75"  | 1.25"  | 1.25"  | 1.25"  | MSPT8  | 0.37"  | 0.37"           | 0.34" |  |
|         |          | (12.7) | 1030 bar   | (69.9)    | (44.5) | (31.8) | (31.8) | (31.8) |        | (9.4)  | (9.4)           | (8.6) |  |
| MSPT12  | 3/4" NPT | 0.625" | 10,000 PSI | 3.12"     | 2.62"  | 1.38"  | 1.31"  | 1.50"  | MSPT12 | 0.37"  | 0.37"           | 0.34" |  |
|         |          | (15.9) | 690 bar    | (79.2)    | (66.5) | (35.1) | (33.3) | (38.1) |        | (9.4)  | (9.4)           | (8.6) |  |
| MSPT16  | 1" NPT   | 0.687" | 10,000 PSI | 4.25"     | 3.00"  | 2.13"  | 2.13"  | 1.75"  | MSPT16 | 0.50"  | 0.50"           | 0.34" |  |
|         |          | (17.4) | 690 bar    | (108.0)   | (76.2) | (54.1) | (54.1) | (44.5) |        | (12.7) | (12.7)          | (8.6) |  |

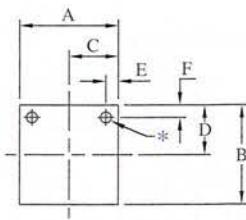
\*Mounting holes provided when the catalog number is suffixed by "-MH" when ordering.

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

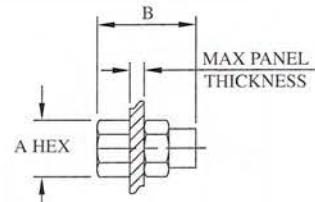
# PIPE TEES, CROSSES AND BULKHEADS



Male Branch Tee



Female Cross



See bulkhead table below  
for panel hole drill size

## MALE BRANCH TEES

| Catalog Number | Connection | Port   | MAWP                             | A     | B     | C                         | D               | Block Thickness |
|----------------|------------|--------|----------------------------------|-------|-------|---------------------------|-----------------|-----------------|
| MBPT2          | 1/8" NPT   | 0.187" | 15,000 PSI<br>(4.7)<br>1030 bar  | 1.50" | 1.13" | 0.75"<br>(19.1)<br>(28.7) | 0.81"<br>(20.6) | 0.62"<br>(15.7) |
| MBPT4          | 1/4" NPT   | 0.250" | 15,000 PSI<br>(6.4)<br>1030 bar  | 2.00" | 1.50" | 1.00"<br>(25.4)<br>(38.1) | 1.13"<br>(28.7) | 1.00"<br>(25.4) |
| MBPT6          | 3/8" NPT   | 0.375" | 15,000 PSI<br>(9.5)<br>1030 bar  | 2.00" | 1.75" | 1.00"<br>(25.4)<br>(44.5) | 1.25"<br>(31.8) | 1.00"<br>(25.4) |
| MBPT8          | 1/2" NPT   | 0.500" | 15,000 PSI<br>(12.7)<br>1030 bar | 2.50" | 2.25" | 1.25"<br>(31.8)<br>(57.2) | 1.63"<br>(41.4) | 1.25"<br>(31.8) |
| MBPT12         | 3/4" NPT   | 0.625" | 10,000 PSI<br>(15.9)<br>690 bar  | 2.62" | 2.50" | 1.31"<br>(33.3)<br>(63.5) | 1.75"<br>(44.5) | 1.50"<br>(38.1) |
| MBPT16         | 1" NPT     | 0.687" | 10,000 PSI<br>(17.4)<br>690 bar  | 3.37" | 3.00" | 1.69"<br>(42.9)<br>(85.6) | 2.13"<br>(54.1) | 1.75"<br>(44.5) |

## FEMALE CROSSES

| Catalog Number | Connection | Port   | MAWP                             | Block            |                  |                            |                            | Mounting Holes* |                |                |
|----------------|------------|--------|----------------------------------|------------------|------------------|----------------------------|----------------------------|-----------------|----------------|----------------|
|                |            |        |                                  | A                | B                | C                          | D                          | E               | F              | Dia.           |
| FPX2           | 1/8" NPT   | 0.187" | 15,000 PSI<br>(4.7)<br>1030 bar  | 1.50"<br>(38.1)  | 1.50"<br>(38.1)  | 0.75"<br>(19.1)            | 0.75"<br>(19.1)            | 0.25"<br>(6.4)  | 0.25"<br>(6.4) | 0.22"<br>(5.6) |
| FPX4           | 1/4" NPT   | 0.250" | 15,000 PSI<br>(6.4)<br>1030 bar  | 2.00"            | 2.00"            | 1.00"<br>(25.4)<br>(50.8)  | 1.00"<br>(25.4)<br>(50.8)  | 0.38"<br>(9.7)  | 0.25"<br>(6.4) | 0.22"<br>(5.6) |
| FPX6           | 3/8" NPT   | 0.375" | 15,000 PSI<br>(9.5)<br>1030 bar  | 2.00"            | 2.00"            | 1.00"<br>(25.4)<br>(50.8)  | 1.00"<br>(25.4)<br>(50.8)  | 0.25"<br>(6.4)  | 0.25"<br>(6.4) | 0.22"<br>(5.6) |
| FPX8           | 1/2" NPT   | 0.500" | 15,000 PSI<br>(12.7)<br>1030 bar | 2.50"<br>(63.5)  | 2.50"<br>(63.5)  | 1.25"<br>(31.8)<br>(63.5)  | 1.25"<br>(31.8)<br>(63.5)  | 0.38"<br>(9.7)  | 0.38"<br>(9.7) | 0.28"<br>(7.1) |
| FPX12          | 3/4" NPT   | 0.922" | 10,000 PSI<br>(23.4)<br>690 bar  | 2.62"<br>(66.5)  | 2.75"<br>(69.9)  | 1.31"<br>(33.3)<br>(66.5)  | 1.38"<br>(35.1)<br>(69.9)  | N/A             | N/A            | N/A            |
| FPX16          | 1" NPT     | 0.687" | 10,000 PSI<br>(17.4)<br>690 bar  | 4.12"<br>(104.6) | 4.12"<br>(104.6) | 2.06"<br>(52.3)<br>(104.6) | 2.06"<br>(52.3)<br>(104.6) | N/A             | N/A            | N/A            |

\*Mounting holes provided when the catalog number is suffixed by "-MH" when ordering.

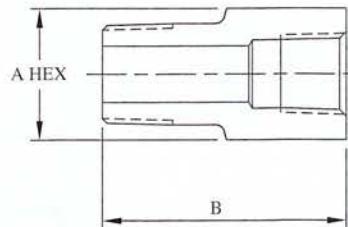
## BULKHEADS

| Catalog Number | Connection | Port   | MAWP                             | A               | B               | Panel Hole      | Panel Thickness |
|----------------|------------|--------|----------------------------------|-----------------|-----------------|-----------------|-----------------|
| FPBF2          | 1/8" NPT   | 0.339" | 15,000 PSI<br>(8.6)<br>1030 bar  | 1.00"<br>(25.4) | 2.00"<br>(50.8) | 0.81"<br>(20.6) | 0.38"<br>(9.7)  |
| FPBF4          | 1/4" NPT   | 0.437" | 15,000 PSI<br>(11.1)<br>1030 bar | 1.00"<br>(25.4) | 2.00"<br>(50.8) | 0.94"<br>(23.9) | 0.38"<br>(9.7)  |
| FPBF6          | 3/8" NPT   | 0.578" | 15,000 PSI<br>(14.7)<br>1030 bar | 1.37"<br>(34.8) | 2.62"<br>(66.5) | 1.25"<br>(31.8) | 0.50"<br>(12.7) |
| FPBF8          | 1/2" NPT   | 0.703" | 15,000 PSI<br>(17.9)<br>1030 bar | 1.50"<br>(38.1) | 2.62"<br>(66.5) | 1.37"<br>(34.8) | 0.50"<br>(12.7) |
| FPBF12         | 3/4" NPT   | 0.625" | 10,000 PSI<br>(15.9)<br>690 bar  | 1.88"<br>(47.8) | 2.62"<br>(66.5) | 1.69"<br>(42.9) | 0.50"<br>(12.7) |
| FPBF16         | 1" NPT     | 0.687" | 10,000 PSI<br>(17.4)<br>690 bar  | 2.12"<br>(53.8) | 3.50"<br>(88.9) | 1.94"<br>(49.3) | 0.50"<br>(12.7) |

All dimensions are for reference only and are subject to change.

Dimensions in parentheses are millimeters (mm)

# PIPE ADAPTERS



| Catalog Number | Male NPT | Female NPT | Port   | MAWP                            | A               | B               |
|----------------|----------|------------|--------|---------------------------------|-----------------|-----------------|
| 10A2P4P        | 1/8"     | 1/4"       | 0.187" | 15,000 PSI<br>(4.7)<br>1030 bar | 0.75"<br>(19.1) | 1.38"<br>(35.1) |
| 10A2P6P        | 1/8"     | 3/8"       | 0.187" | 15,000 PSI<br>(4.7)<br>1030 bar | 1.00"<br>(25.4) | 1.56"<br>(39.6) |
| 10A2P8P        | 1/8"     | 1/2"       | 0.187" | 15,000 PSI<br>(4.7)<br>1030 bar | 1.38"<br>(35.1) | 1.56"<br>(39.6) |
| 10A2P12P       | 1/8"     | 3/4"       | 0.187" | 10,000 PSI<br>(4.7)<br>690 bar  | 1.38"<br>(35.1) | 2.12"<br>(53.8) |
| 10A2P16P       | 1/8"     | 1"         | 0.187" | 10,000 PSI<br>(4.7)<br>690 bar  | 1.75"<br>(44.5) | 2.25"<br>(57.2) |
| 10A4P2P        | 1/4"     | 1/8"       | 0.187" | 15,000 PSI<br>(4.7)<br>1030 bar | 0.75"<br>(19.1) | 1.50"<br>(38.1) |
| 10A4P6P        | 1/4"     | 3/8"       | 0.250" | 15,000 PSI<br>(6.4)<br>1030 bar | 0.88"<br>(22.4) | 1.75"<br>(44.5) |
| 10A4P8P        | 1/4"     | 1/2"       | 0.250" | 15,000 PSI<br>(6.4)<br>1030 bar | 1.38"<br>(35.1) | 1.75"<br>(44.5) |
| 10A4P12P       | 1/4"     | 3/4"       | 0.250" | 10,000 PSI<br>(6.4)<br>690 bar  | 1.38"<br>(35.1) | 2.25"<br>(57.2) |
| 10A4P16P       | 1/4"     | 1"         | 0.250" | 10,000 PSI<br>(6.4)<br>690 bar  | 1.75"<br>(44.5) | 2.38"<br>(60.5) |
| 10A6P2P        | 3/8"     | 1/8"       | 0.339" | 15,000 PSI<br>(8.6)<br>1030 bar | 0.88"<br>(22.4) | 1.50"<br>(38.1) |
| 10A6P4P        | 3/8"     | 1/4"       | 0.375" | 15,000 PSI<br>(9.5)<br>1030 bar | 0.88"<br>(22.4) | 1.62"<br>(41.1) |
| 10A6P8P        | 3/8"     | 1/2"       | 0.375" | 15,000 PSI<br>(9.5)<br>1030 bar | 1.38"<br>(35.1) | 2.00"<br>(50.8) |
| 10A6P12P       | 3/8"     | 3/4"       | 0.375" | 10,000 PSI<br>(9.5)<br>690 bar  | 1.38"<br>(35.1) | 2.00"<br>(50.8) |
| 10A6P16P       | 3/8"     | 1"         | 0.375" | 10,000 PSI<br>(9.5)<br>690 bar  | 1.75"<br>(44.5) | 2.56"<br>(65.0) |

| Catalog Number | Male NPT | Female NPT | Port   | MAWP                             | A               | B               |
|----------------|----------|------------|--------|----------------------------------|-----------------|-----------------|
| 10A8P2P        | 1/2"     | 1/8"       | 0.339" | 15,000 PSI<br>(8.6)<br>1030 bar  | 1.00"<br>(25.4) | 1.75"<br>(44.5) |
| 10A8P4P        | 1/2"     | 1/4"       | 0.250" | 15,000 PSI<br>(6.4)<br>1030 bar  | 1.00"<br>(25.4) | 1.81"<br>(46.0) |
| 10A8P6P        | 1/2"     | 3/8"       | 0.500" | 15,000 PSI<br>(12.7)<br>1030 bar | 1.00"<br>(25.4) | 2.00"<br>(50.8) |
| 10A8P12P       | 1/2"     | 3/4"       | 0.500" | 10,000 PSI<br>(12.7)<br>690 bar  | 1.38"<br>(35.1) | 2.50"<br>(63.5) |
| 10A8P16P       | 1/2"     | 1"         | 0.500" | 10,000 PSI<br>(12.7)<br>690 bar  | 1.75"<br>(44.5) | 2.56"<br>(65.0) |
| 10A12P2P       | 3/4"     | 1/8"       | 0.339" | 10,000 PSI<br>(8.6)<br>690 bar   | 1.13"<br>(28.7) | 1.51"<br>(38.4) |
| 10A12P4P       | 3/4"     | 1/4"       | 0.437" | 10,000 PSI<br>(11.1)<br>690 bar  | 1.13"<br>(28.7) | 1.51"<br>(38.4) |
| 10A12P6P       | 3/4"     | 3/8"       | 0.578" | 10,000 PSI<br>(14.7)<br>690 bar  | 1.13"<br>(28.7) | 2.00"<br>(50.8) |
| 10A12P8P       | 3/4"     | 1/2"       | 0.625" | 10,000 PSI<br>(15.9)<br>690 bar  | 1.38"<br>(35.1) | 2.00"<br>(50.8) |
| 10A12P16P      | 3/4"     | 1"         | 0.625" | 10,000 PSI<br>(15.9)<br>690 bar  | 1.75"<br>(44.5) | 2.56"<br>(65.0) |
| 10A16P2P       | 1"       | 1/8"       | 0.339" | 10,000 PSI<br>(8.6)<br>690 bar   | 1.38"<br>(35.1) | 2.00"<br>(50.8) |
| 10A16P4P       | 1"       | 1/4"       | 0.250" | 10,000 PSI<br>(6.4)<br>690 bar   | 1.38"<br>(35.1) | 1.88"<br>(47.8) |
| 10A16P6P       | 1"       | 3/8"       | 0.578" | 10,000 PSI<br>(14.7)<br>690 bar  | 1.38"<br>(35.1) | 2.25"<br>(57.2) |
| 10A16P8P       | 1"       | 1/2"       | 0.500" | 10,000 PSI<br>(12.7)<br>690 bar  | 1.38"<br>(35.1) | 2.37"<br>(60.2) |
| 10A16P12P      | 1"       | 3/4"       | 0.625" | 10,000 PSI<br>(15.9)<br>690 bar  | 1.38"<br>(35.1) | 2.75"<br>(69.9) |

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

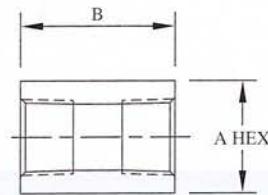
Page NPT-21



# PIPE COUPLINGS

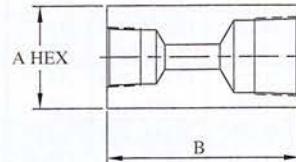
## COUPLINGS

| Catalog |            |               |                        |              |              |  |
|---------|------------|---------------|------------------------|--------------|--------------|--|
| Number  | Connection | Port          | MAWP                   | A            | B            |  |
| FPF2    | 1/8" NPT   | 0.339" (8.6)  | 15,000 PSI<br>1030 bar | 0.63" (16.0) | 1.00" (25.4) |  |
| FPF4    | 1/4" NPT   | 0.437" (11.1) | 15,000 PSI<br>1030 bar | 0.75" (19.1) | 1.25" (31.8) |  |
| FPF6    | 3/8" NPT   | 0.578" (14.7) | 15,000 PSI<br>1030 bar | 1.00" (25.4) | 1.38" (35.1) |  |
| FPF8    | 1/2" NPT   | 0.703" (17.9) | 15,000 PSI<br>1030 bar | 1.38" (35.1) | 1.50" (38.1) |  |
| FPF12   | 3/4" NPT   | 0.922" (23.4) | 10,000 PSI<br>690 bar  | 1.38" (35.1) | 1.75" (44.5) |  |
| FPF16   | 1" NPT     | 1.156" (29.4) | 10,000 PSI<br>690 bar  | 1.75" (44.5) | 2.18" (55.4) |  |



## REDUCER COUPLINGS

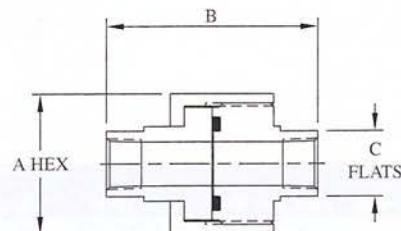
| Catalog   |           |           |               |                        |              |              |
|-----------|-----------|-----------|---------------|------------------------|--------------|--------------|
| Number    | End 1     | End 2     | Port          | MAWP                   | A            | B            |
| 10F2P4P   | 1/8" FNPT | 1/4" FNPT | 0.339" (8.6)  | 15,000 PSI<br>1030 bar | 0.75" (19.1) | 1.25" (31.8) |
| 10F2P6P   | 1/8" FNPT | 3/8" FNPT | 0.339" (8.6)  | 15,000 PSI<br>1030 bar | 1.00" (25.4) | 1.38" (35.1) |
| 10F2P8P   | 1/8" FNPT | 1/2" FNPT | 0.339" (8.6)  | 15,000 PSI<br>1030 bar | 1.38" (31.8) | 1.50" (38.1) |
| 10F2P12P  | 1/8" FNPT | 3/4" FNPT | 0.339" (8.6)  | 10,000 PSI<br>690 bar  | 1.38" (35.1) | 1.62" (41.1) |
| 10F2P16P  | 1/8" FNPT | 1" FNPT   | 0.339" (8.6)  | 10,000 PSI<br>690 bar  | 1.75" (44.5) | 2.00" (50.8) |
| 10F4P6P   | 1/4" FNPT | 3/8" FNPT | 0.437" (11.1) | 15,000 PSI<br>1030 bar | 1.00" (25.4) | 1.38" (35.1) |
| 10F4P8P   | 1/4" FNPT | 1/2" FNPT | 0.437" (11.1) | 15,000 PSI<br>1030 bar | 1.38" (35.1) | 1.62" (41.1) |
| 10F4P12P  | 1/4" FNPT | 3/4" FNPT | 0.374" (11.1) | 10,000 PSI<br>690 bar  | 1.38" (35.1) | 1.75" (44.5) |
| 10F4P16P  | 1/4" FNPT | 1" FNPT   | 0.437" (11.1) | 10,000 PSI<br>690 bar  | 1.75" (44.5) | 2.00" (50.8) |
| 10F6P8P   | 3/8" FNPT | 1/2" FNPT | 0.578" (14.7) | 15,000 PSI<br>1030 bar | 1.38" (35.1) | 1.63" (41.4) |
| 10F6P12P  | 3/8" FNPT | 3/4" FNPT | 0.578" (14.7) | 10,000 PSI<br>690 bar  | 1.38" (35.1) | 1.75" (44.5) |
| 10F6P16P  | 3/8" FNPT | 1" FNPT   | 0.578" (14.7) | 10,000 PSI<br>690 bar  | 1.75" (44.5) | 2.00" (50.8) |
| 10F8P12P  | 1/2" FNPT | 3/4" FNPT | 0.703" (17.9) | 10,000 PSI<br>690 bar  | 1.38" (35.1) | 1.75" (44.5) |
| 10F8P16P  | 1/2" FNPT | 1" FNPT   | 0.703" (17.9) | 10,000 PSI<br>690 bar  | 1.75" (44.5) | 2.19" (55.6) |
| 10F12P16P | 3/4" FNPT | 1" FNPT   | 0.922" (23.4) | 10,000 PSI<br>690 bar  | 1.75" (44.5) | 2.18" (55.4) |



# PIPE ACCESSORIES

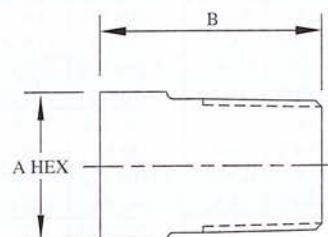
## ZERO-CLEARANCE UNIONS

| Catalog Number | Connection | Port             | MAWP                   | A               | B               | C               |
|----------------|------------|------------------|------------------------|-----------------|-----------------|-----------------|
| FPUF2          | 1/8" NPT   | 0.339"<br>(8.6)  | 15,000 PSI<br>1030 bar | 1.50"<br>(38.1) | 2.38"<br>(60.5) | 0.62"<br>(15.7) |
| FPUF4          | 1/4" NPT   | 0.437"<br>(11.1) | 15,000 PSI<br>1030 bar | 1.75"<br>(44.5) | 2.56"<br>(65.0) | 0.75"<br>(19.1) |
| FPUF6          | 3/8" NPT   | 0.578"<br>(14.7) | 15,000 PSI<br>1030 bar | 1.87"<br>(47.5) | 2.83"<br>(71.9) | 0.87"<br>(22.1) |
| FPUF8          | 1/2" NPT   | 0.703"<br>(17.9) | 15,000 PSI<br>1030 bar | 1.87"<br>(47.5) | 2.83"<br>(71.9) | 1.00"<br>(25.4) |
| FPUF12         | 3/4" NPT   | 0.921"<br>(23.4) | 10,000 PSI<br>690 bar  | 2.12"<br>(53.8) | 3.12"<br>(79.2) | 1.38"<br>(35.1) |



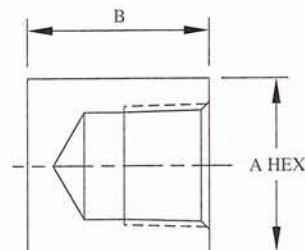
## PLUGS

| Catalog Number | Connection | MAWP                   | A               | B               |
|----------------|------------|------------------------|-----------------|-----------------|
| MPP2           | 1/8" NPT   | 15,000 PSI<br>1030 bar | 0.50"<br>(12.7) | 1.00"<br>(25.4) |
| MPP4           | 1/4" NPT   | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 1.12"<br>(28.4) |
| MPP6           | 3/8" NPT   | 15,000 PSI<br>1030 bar | 0.75"<br>(19.1) | 1.12"<br>(28.4) |
| MPP8           | 1/2" NPT   | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 1.50"<br>(38.1) |
| MPP12          | 3/4" NPT   | 10,000 PSI<br>690 bar  | 1.38"<br>(35.1) | 1.50"<br>(38.1) |
| MPP16          | 1" NPT     | 10,000 PSI<br>690 bar  | 1.38"<br>(35.1) | 1.88"<br>(47.8) |

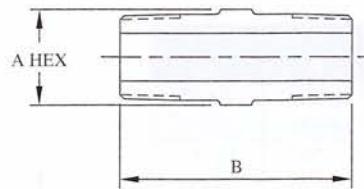


## CAPS

| Catalog Number | Connection | MAWP                   | A               | B               |
|----------------|------------|------------------------|-----------------|-----------------|
| FPCA2          | 1/8" NPT   | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 0.75"<br>(19.1) |
| FPCA4          | 1/4" NPT   | 15,000 PSI<br>1030 bar | 0.75"<br>(19.1) | 1.00"<br>(25.4) |
| FPCA6          | 3/8" NPT   | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 1.00"<br>(25.4) |
| FPCA8          | 1/2" NPT   | 15,000 PSI<br>1030 bar | 1.38"<br>(35.1) | 1.25"<br>(31.8) |
| FPCA12         | 3/4" NPT   | 10,000 PSI<br>690 bar  | 1.38"<br>(35.1) | 1.50"<br>(38.1) |
| FPCA16         | 1" NPT     | 10,000 PSI<br>690 bar  | 1.75"<br>(44.5) | 1.68"<br>(42.7) |



# PIPE NIPPLES



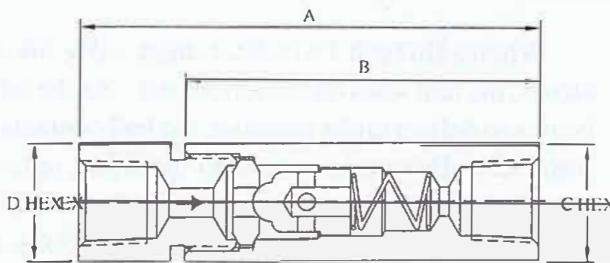
| Catalog Number | End 1 | End 2 | Port   | MAWP                   | A               | B                |
|----------------|-------|-------|--------|------------------------|-----------------|------------------|
| MA2P2P         | 1/8"  | 1/8"  | 0.125" | 15,000 PSI<br>1030 bar | 0.50"<br>(12.7) | 1.38"<br>(35.1)  |
| MA2P2P4        | 1/8"  | 1/8"  | 0.125" | 15,000 PSI<br>1030 bar | 0.50"<br>(12.7) | 4.00"<br>(101.6) |
| MA4P2P         | 1/4"  | 1/8"  | 0.187" | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 1.62"<br>(41.1)  |
| MA4P4P         | 1/4"  | 1/4"  | 0.250" | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 1.75"<br>(44.5)  |
| MA4P4P2        | 1/4"  | 1/4"  | 0.250" | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 2.00"<br>(50.8)  |
| MA4P4P3        | 1/4"  | 1/4"  | 0.250" | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 3.00"<br>(76.2)  |
| MA4P4P4        | 1/4"  | 1/4"  | 0.250" | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 4.00"<br>(101.6) |
| MA4P4P6        | 1/4"  | 1/4"  | 0.250" | 15,000 PSI<br>1030 bar | 0.63"<br>(16.0) | 6.00"<br>(152.4) |
| MA6P2P         | 3/8"  | 1/8"  | 0.187" | 15,000 PSI<br>1030 bar | 0.75"<br>(19.1) | 1.62"<br>(41.1)  |
| MA6P4P         | 3/8"  | 1/4"  | 0.250" | 15,000 PSI<br>1030 bar | 0.75"<br>(19.1) | 1.81"<br>(46.0)  |
| MA6P6P         | 3/8"  | 3/8"  | 0.375" | 15,000 PSI<br>1030 bar | 0.75"<br>(19.1) | 1.81"<br>(46.0)  |
| MA6P6P3        | 3/8"  | 3/8"  | 0.375" | 15,000 PSI<br>1030 bar | 0.75"<br>(19.1) | 3.00"<br>(76.2)  |
| MA8P2P         | 1/2"  | 1/8"  | 0.187" | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 1.94"<br>(49.3)  |
| MA8P4P         | 1/2"  | 1/4"  | 0.250" | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 2.12"<br>(53.8)  |
| MA8P6P         | 1/2"  | 3/8"  | 0.375" | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 2.12"<br>(53.8)  |
| MA8P8P         | 1/2"  | 1/2"  | 0.500" | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 2.50"<br>(63.5)  |
| MA8P8P4        | 1/2"  | 1/2"  | 0.500" | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 4.00"<br>(101.6) |
| MA8P8P6        | 1/2"  | 1/2"  | 0.500" | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 6.00"<br>(152.4) |

| Catalog Number | End 1 | End 2 | Port   | MAWP                  | A               | B                |
|----------------|-------|-------|--------|-----------------------|-----------------|------------------|
| MA12P2P        | 3/4"  | 1/8"  | 0.187" | 10,000 PSI<br>690 bar | 1.13"<br>(28.7) | 2.00"<br>(50.8)  |
| MA12P4P        | 3/4"  | 1/4"  | 0.250" | 10,000 PSI<br>690 bar | 1.13"<br>(28.7) | 2.25"<br>(57.2)  |
| MA12P6P        | 3/4"  | 3/8"  | 0.375" | 10,000 PSI<br>690 bar | 1.13"<br>(28.7) | 2.25"<br>(57.2)  |
| MA12P8P        | 3/4"  | 1/2"  | 0.500" | 10,000 PSI<br>690 bar | 1.18"<br>(30.0) | 2.50"<br>(63.5)  |
| MA12P8P4       | 3/4"  | 1/2"  | 0.500" | 10,000 PSI<br>690 bar | 1.18"<br>(30.0) | 4.00"<br>(101.6) |
| MA12P12P2      | 3/4"  | 3/4"  | 0.625" | 10,000 PSI<br>690 bar | 1.13"<br>(28.7) | 2.00"<br>(50.8)  |
| MA12P12P6      | 3/4"  | 3/4"  | 0.625" | 10,000 PSI<br>690 bar | 1.13"<br>(28.7) | 6.00"<br>(152.4) |
| MA16P2P        | 1"    | 1/8"  | 0.187" | 10,000 PSI<br>690 bar | 1.38"<br>(35.1) | 2.25"<br>(57.2)  |
| MA16P4P        | 1"    | 1/4"  | 0.250" | 10,000 PSI<br>690 bar | 1.38"<br>(35.1) | 2.50"<br>(63.5)  |
| MA16P6P        | 1"    | 3/8"  | 0.375" | 10,000 PSI<br>690 bar | 1.38"<br>(35.1) | 2.50"<br>(63.5)  |
| MA16P8P        | 1"    | 1/2"  | 0.500" | 10,000 PSI<br>690 bar | 1.38"<br>(35.1) | 2.75"<br>(69.9)  |
| MA16P12P       | 1"    | 3/4"  | 0.625" | 10,000 PSI<br>690 bar | 1.38"<br>(35.1) | 2.75"<br>(69.9)  |
| MA16P16P       | 1"    | 1"    | 0.687" | 10,000 PSI<br>690 bar | 1.38"<br>(35.1) | 3.00"<br>(76.2)  |

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Dimensions in parentheses are millimeters (mm)

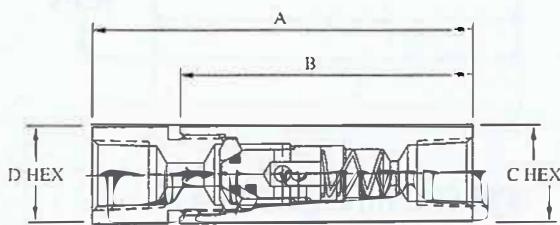
Page NPT-24

# PIPE CHECK VALVES



## BALL CHECK VALVES

| Catalog Number | Connection | MAWP                   | Cv   | A                | B                | C               | D               |
|----------------|------------|------------------------|------|------------------|------------------|-----------------|-----------------|
| FPBC2          | 1/8" NPT   | 15,000 PSI<br>1030 bar | 0.15 | 2.62"<br>(66.5)  | 2.12"<br>(53.8)  | 0.63"<br>(16.0) | 0.50"<br>(12.7) |
| FPBC4          | 1/4" NPT   | 15,000 PSI<br>1030 bar | 0.63 | 2.94"<br>(74.7)  | 2.26"<br>(57.4)  | 0.75"<br>(19.1) | 0.75"<br>(19.1) |
| FPBC6          | 3/8" NPT   | 15,000 PSI<br>1030 bar | 0.80 | 3.54"<br>(89.9)  | 2.62"<br>(66.5)  | 1.12"<br>(28.4) | 1.00"<br>(25.4) |
| FPBC8          | 1/2" NPT   | 15,000 PSI<br>1030 bar | 2.30 | 4.32"<br>(109.7) | 3.50"<br>(88.9)  | 1.38"<br>(35.1) | 1.38"<br>(35.1) |
| FPBC12         | 3/4" NPT   | 10,000 PSI<br>690 bar  | 3.40 | 5.89"<br>(149.6) | 4.75"<br>(120.7) | 1.75"<br>(44.5) | 1.50"<br>(38.1) |
| FPBC16         | 1" NPT     | 10,000 PSI<br>690 bar  | 5.20 | 7.29"<br>(185.2) | 5.75"<br>(146.1) | 2.12"<br>(53.8) | 1.75"<br>(44.5) |



## O-RING CHECK VALVES

| Catalog Number | Connection | MAWP                   | Cv   | A                | B                | C               | D               |
|----------------|------------|------------------------|------|------------------|------------------|-----------------|-----------------|
| FPSC2          | 1/8" NPT   | 15,000 PSI<br>1030 bar | 0.15 | 2.62"<br>(66.5)  | 2.12"<br>(53.8)  | 0.63"<br>(16.0) | 0.50"<br>(12.7) |
| FPSC4          | 1/4" NPT   | 15,000 PSI<br>1030 bar | 0.63 | 2.94"<br>(74.7)  | 2.26"<br>(57.4)  | 0.75"<br>(19.1) | 0.75"<br>(19.1) |
| FPSC6          | 3/8" NPT   | 15,000 PSI<br>1030 bar | 0.80 | 3.54"<br>(89.9)  | 2.62"<br>(66.5)  | 1.12"<br>(28.4) | 1.00"<br>(25.4) |
| FPSC8          | 1/2" NPT   | 15,000 PSI<br>1030 bar | 2.30 | 4.32"<br>(109.7) | 3.50"<br>(88.9)  | 1.38"<br>(35.1) | 1.38"<br>(35.1) |
| FPSC12         | 3/4" NPT   | 10,000 PSI<br>690 bar  | 3.40 | 5.89"<br>(149.6) | 4.75"<br>(120.7) | 1.75"<br>(44.5) | 1.50"<br>(38.1) |
| FPSC16         | 1" NPT     | 10,000 PSI<br>690 bar  | 5.20 | 7.29"<br>(185.2) | 5.75"<br>(146.1) | 2.12"<br>(53.8) | 1.75"<br>(44.5) |

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)



BuTech ball check valves prevent reverse flow where leak-tight shutoff is not necessary. Standard materials of construction are 316 stainless steel with 17-4PH poppet for longer life, and 300 series stainless steel spring.

Note: For 316 stainless steel wetted parts, add **-316WP** to the catalog number.

Cracking pressure: 15 PSI (1 bar) approximate

Operating Temperature Range:

-420° to +1200°F

(-251° to +648°C)

To order a valve with a cracking pressure other than the standard 15 PSI, add the cracking pressure to the end of the catalog number. Example: An FPBC8 with 50 PSI cracking pressure would be ordered as **FPBC8-50**.

Cracking pressures available up to 100 PSI (7 bar)

BuTech o-ring check valves reliably prevent backflow where leak-tight shutoff for liquids or gases is required. Standard materials of construction are 316 stainless steel with Buna-N o-ring and 300 series stainless steel spring.

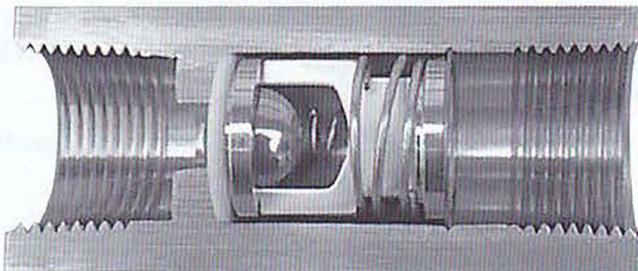
Cracking pressure: 15 PSI (1 bar) approximate  
Operating Temperature Ranges:

| O-ring Material | Operating Temperature Range       | Catalog Suffix |
|-----------------|-----------------------------------|----------------|
| Buna-N          | -65° to +250°F (-54° to +121°C)   | ----           |
| Viton           | -40° to +500°F (-40° to +260°C)   | -VA            |
| Teflon          | -320° to +400°F (-195° to +204°C) | -TFE           |
| Kalrez          | -20° to +550°F (-29° to +288°C)   | -HT            |

To order a valve with a cracking pressure other than the standard 15 PSI, add the cracking pressure to the end of the catalog number. Example: A FPSC4 with 40 PSI cracking pressure would be ordered as **FPSC4-40**.

Cracking pressures available up to 100 PSI (7 bar)

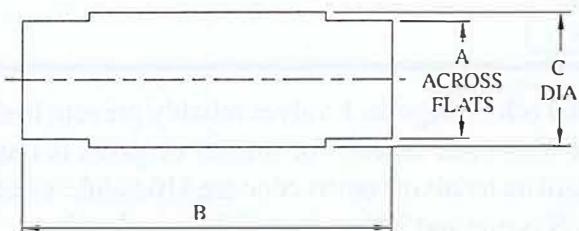
# TWIN SEAL CHECK VALVES



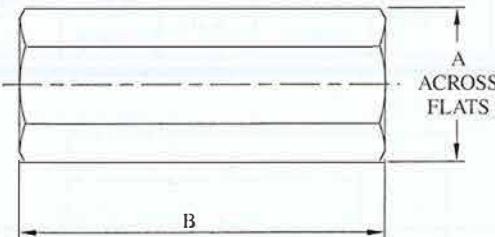
When a BuTech Twin-Seal check valve initially closes, the ball seals on the teflon seat. As the teflon begins to deflect under pressure, the ball contacts the metal seat. This creates a metal-to-metal seal, relieving the teflon of the full pressure load. Standard materials of construction are 316 stainless steel with 300 series stainless steel spring. Note: For 316 stainless steel wetted parts, add **-316WP** to the catalog number. Other seat materials are available, please consult factory.

Cracking pressure: 15 PSI (1 bar) approximate  
Operating Temperature Range:

-320° to +400°F  
(-195° to +204°C)



FPSSC4



FPSSC6 through FPSSC16

| Catalog Number | Connection | MAWP                   | Cv   | A               | B                | C               |
|----------------|------------|------------------------|------|-----------------|------------------|-----------------|
| FPSSC4         | 1/4" NPT   | 15,000 PSI<br>1030 bar | 1.25 | 0.88"<br>(22.4) | 3.00"<br>(76.2)  | 1.00"<br>(25.4) |
| FPSSC6         | 3/8" NPT   | 15,000 PSI<br>1030 bar | 1.25 | 1.00"<br>(25.4) | 2.75"<br>(69.9)  | —               |
| FPSSC8         | 1/2" NPT   | 15,000 PSI<br>1030 bar | 2.16 | 1.18"<br>(30.0) | 3.12"<br>(79.2)  | —               |
| FPSSC12        | 3/4" NPT   | 10,000 PSI<br>690 bar  | 4.00 | 1.38"<br>(35.1) | 3.25"<br>(82.6)  | —               |
| FPSSC16        | 1" NPT     | 9,000 PSI<br>620 bar   | 5.00 | 1.75"<br>(44.5) | 4.25"<br>(108.0) | —               |

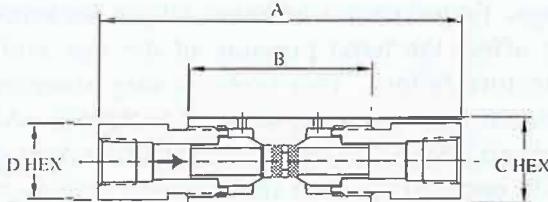
To order a valve with a cracking pressure other than the standard 15 PSI, add the cracking pressure to the end of the catalog number. Example: A FPSSC4 with 50 PSI cracking pressure would be ordered as **FPSSC4-50**.

Cracking pressures available up to 100 PSI (7 bar)

All dimensions are for reference only and are subject to change.  
Dimensions in parentheses are millimeters (mm)

Page NPT-26

# PIPE FILTERS



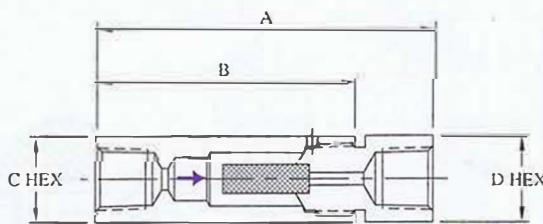
BuTech line filters are used in system lines to remove contaminating particles from the system fluid. Upstream filter of larger micron rating than downstream filter to prevent clogging of downstream filter.

Standard materials of construction are 316 stainless steel with 300 series stainless steel filter discs. Available in nominal ratings of: 0.5, 2, 5, 10, 20, 40, and 100 micron.

## LINE FILTERS

| Catalog Number | Connection | MAWP                   | Area*                                       | A                | B               | C               | D               |
|----------------|------------|------------------------|---|------------------|-----------------|-----------------|-----------------|
| FPLF2          | 1/8" NPT   | 15,000 PSI<br>1030 bar | 0.06 in <sup>2</sup><br>39 mm <sup>2</sup>  | 3.62"<br>(91.9)  | 1.75"<br>(44.5) | 0.75"<br>(19.1) | 0.63"<br>(16.0) |
| FPLF4          | 1/4" NPT   | 15,000 PSI<br>1030 bar | 0.15 in <sup>2</sup><br>97 mm <sup>2</sup>  | 4.19"<br>(106.4) | 2.12"<br>(53.8) | 0.88"<br>(22.4) | 1.00"<br>(25.4) |
| FPLF6          | 3/8" NPT   | 15,000 PSI<br>1030 bar | 0.15 in <sup>2</sup><br>97 mm <sup>2</sup>  | 5.20"<br>(132.1) | 2.12"<br>(53.8) | 1.00"<br>(25.4) | 1.00"<br>(25.4) |
| FPLF8          | 1/2" NPT   | 15,000 PSI<br>1030 bar | 0.30 in <sup>2</sup><br>194 mm <sup>2</sup> | 5.80"<br>(147.3) | 2.50"<br>(63.5) | 1.38"<br>(35.1) | 1.38"<br>(35.1) |
| FPLF12         | 3/4" NPT   | 10,000 PSI<br>690 bar  | 0.50 in <sup>2</sup><br>323 mm <sup>2</sup> | 6.67"<br>(169.4) | 3.50"<br>(88.9) | 1.75"<br>(44.5) | 1.75"<br>(44.5) |
| FPLF16         | 1" NPT     | 10,000 PSI<br>690 bar  | 0.50 in <sup>2</sup><br>323 mm <sup>2</sup> | 7.17"<br>(182.1) | 3.50"<br>(88.9) | 1.75"<br>(44.5) | 2.12"<br>(53.8) |

\*Effective area of filter element



BuTech sintered cup filters offer maximum filtration surface area for removal of contaminating particles from the fluid system. They may be used in systems which require high flow rates with minimum pressure drop.

Standard materials of construction are 316 stainless steel with 300 series stainless steel filter discs. Available in nominal ratings of: 5, 10, 20, 40, and 100 micron.

## SINTERED CUP FILTERS

| Catalog Number | Connection | MAWP                   | Area*  | A                | B                | C               | D               |
|----------------|------------|------------------------|--|------------------|------------------|-----------------|-----------------|
| FPSCF2         | 1/8" NPT   | 15,000 PSI<br>1030 bar | 0.54 in <sup>2</sup><br>348 mm <sup>2</sup>  | 2.62"<br>(66.5)  | 2.12"<br>(53.8)  | 0.62"<br>(15.7) | 0.62"<br>(15.7) |
| FPSCF4         | 1/4" NPT   | 15,000 PSI<br>1030 bar | 0.54 in <sup>2</sup><br>348 mm <sup>2</sup>  | 2.94"<br>(74.7)  | 2.26"<br>(57.4)  | 0.75"<br>(19.1) | 0.75"<br>(19.1) |
| FPSCF6         | 3/8" NPT   | 15,000 PSI<br>1030 bar | 1.47 in <sup>2</sup><br>948 mm <sup>2</sup>  | 3.44"<br>(87.4)  | 2.62"<br>(66.5)  | 1.12"<br>(28.4) | 1.12"<br>(28.4) |
| FPSCF8         | 1/2" NPT   | 15,000 PSI<br>1030 bar | 1.47 in <sup>2</sup><br>948 mm <sup>2</sup>  | 4.23"<br>(107.4) | 3.50"<br>(88.9)  | 1.38"<br>(35.1) | 1.38"<br>(35.1) |
| FPSCF12        | 3/4" NPT   | 10,000 PSI<br>690 bar  | 1.75 in <sup>2</sup><br>1129 mm <sup>2</sup> | 5.94"<br>(150.9) | 4.75"<br>(120.7) | 1.75"<br>(44.5) | 1.75"<br>(44.5) |
| FPSCF16        | 1" NPT     | 10,000 PSI<br>690 bar  | 4.60 in <sup>2</sup><br>2968 mm <sup>2</sup> | 8.09"<br>(205.5) | 5.75"<br>(146.1) | 2.12"<br>(53.8) | 2.12"<br>(53.8) |

\*Effective area of filter element

Micron rating of filter must be specified. To order, complete the catalog number with the desired micron rating:

**FPSCF4-20**

specifies a line filter with 1/4" NPT connections and a 20 micron filter.

# PIPE SAFETY HEADS & RUPTURE DISCS

BuTech safety head assemblies serve as holders for standard rupture discs (sold separately). Safety heads with rupture discs are used as simple and inexpensive overpressure relief devices. System pressure is relieved as a result of rupture of the replaceable disc.

The safety head assemblies shown are designed for use in high pressure systems up to 15,000 PSI (1030 bar). They can be installed directly into any of our standard couplings, elbows, tees, or crosses. Their versatility also allows direct installation into a standard 3-way valve. The result is a combination valve/safety head with beneficial cost and space advantages.

Standard material of construction is 316 stainless steel.

Safety head assemblies and rupture discs are available in two styles:

The **1/4A** style features a 1/4" blow-out diameter, an angular seat and can be ordered in pressures from 900 to 60,000 PSI (62 to 4140 bar).

The **1/2F** style features a 1/2" blow-out diameter, a flat seat and can be ordered in pressures from 500 to 10,000 PSI (34 to 689 bar). This style also has a reversible hold-down ring which greatly reduces the possibility of premature disc failure associated with installation errors inherent in some designs.

Rupture discs are available in a wide range of burst ratings. Factors such as corrosion, fatigue and temperature may affect the burst pressure of the disc and cause premature failure. This problem may sometimes be overcome by frequent replacement of the disc. All discs rated over 500 PSI (34 bar) have a manufacturing tolerance of 3% under to 6% over the specified rupture pressure rating.

Rupture Discs are not included in the safety head assembly. To order discs separately, use the following part numbering system:

| Style         | Material    | Pressure:                                    |
|---------------|-------------|--|
| 4=1/4" Angled | AL=Aluminum | List desired pressure at 72°F (21°C) in KSI. |
| 8=1/2" Flat   | IN=Inconel  |  |
|               | MO=Monel    |  |
|               | NI=Nickel   |  |
|               | SI=Silver   |  |
|               | SS=316SS    |  |
|               | TI=Titanium |  |

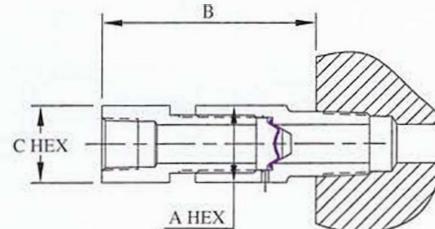
Examples:

An Inconel disc rated for 18,000 PSI in 1/4" Angled style would be ordered as **4IN18.00**

An Aluminum disc rated for 750 PSI in 1/2" Flat style would be ordered as **8AL0.750**

## SAFETY HEADS - 1/4" ANGLED DISC

| Catalog Number | Connection | MAWP                   | A               | B               | C               | Discharge |
|----------------|------------|------------------------|-----------------|-----------------|-----------------|-----------|
| FPSH2-1/4A     | 1/8" NPT   | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 2.62"<br>(66.5) | 1.00"<br>(25.4) | 3/8" FNPT |
| FPSH4-1/4A     | 1/4" NPT   | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 2.87"<br>(72.9) | 1.00"<br>(25.4) | 3/8" FNPT |
| FPSH6-1/4A     | 3/8" NPT   | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 2.87"<br>(72.9) | 1.00"<br>(25.4) | 3/8" FNPT |
| FPSH8-1/4A     | 1/2" NPT   | 15,000 PSI<br>1030 bar | 1.00"<br>(25.4) | 2.68"<br>(68.1) | 1.00"<br>(25.4) | 3/8" FNPT |



## SAFETY HEADS - 1/2" FLAT DISC

| Catalog Number | Connection | MAWP                  | A               | B               | C               | Discharge |
|----------------|------------|-----------------------|-----------------|-----------------|-----------------|-----------|
| FPSH2-1/2F     | 1/8" NPT   | 10,000 PSI<br>689 bar | 1.00"<br>(25.4) | 2.62"<br>(66.5) | 1.00"<br>(25.4) | 3/8" FNPT |
| FPSH4-1/2F     | 1/4" NPT   | 10,000 PSI<br>689 bar | 1.00"<br>(25.4) | 2.87"<br>(72.9) | 1.00"<br>(25.4) | 3/8" FNPT |
| FPSH6-1/2F     | 3/8" NPT   | 10,000 PSI<br>689 bar | 1.00"<br>(25.4) | 2.87"<br>(72.9) | 1.00"<br>(25.4) | 3/8" FNPT |
| FPSH8-1/2F     | 1/2" NPT   | 10,000 PSI<br>689 bar | 1.00"<br>(25.4) | 2.68"<br>(68.1) | 1.00"<br>(25.4) | 3/8" FNPT |

