

# Two-Way B Series Ball Valves

## Introduction

Parker manually, pneumatically, and electrically actuated two-way B Series Ball Valves provide quick 1/4 turn on-off control of fluids utilized in process and instrumentation applications. A broad selection of valve body, seat, and seal materials provide a wide range of pressures and temperatures at which the valve may be used.

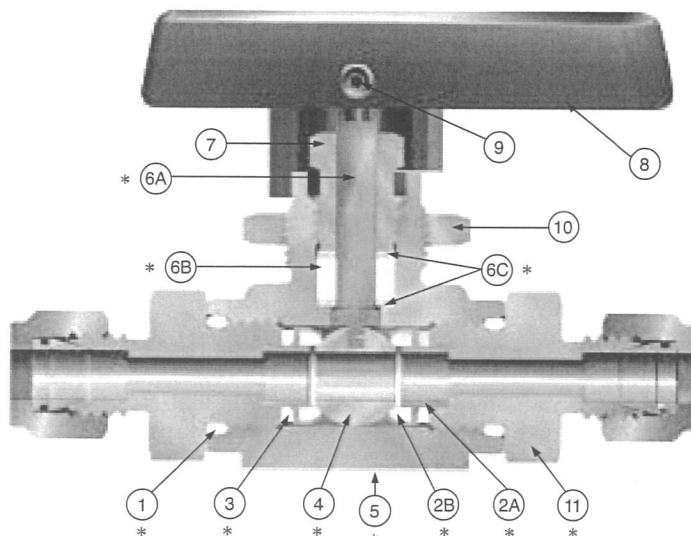
## Features

- Free floating ball design provides seat wear compensation
- Available in 316 stainless steel and brass construction. Alloy N24135 and Alloy N30002 construction available upon request
- Micro-finished ball provides a positive seal
- Straight through flow path for minimum pressure drop
- Bi-directional flow
- Wide variety of US Customary and SI ports
- 90 degree actuation
- Panel mountable
- Adjustable PTFE stem seal can be maintained in-line
- Handle indicates flow direction
- Low operating torques
- Positive handle stops
- Color coded handles
- Optional pneumatic and electric actuation
- Optional live-loaded PTFE stem seals
- Optional non-adjustable O-ring stem seals
- Optional upstream and downstream drain models
- Optional stainless steel and extended handles

## Specifications

- Pressure Ratings:
  - 316 Stainless Steel**
    - 6000 psig (414 bar) CWP\*
    - 1500 psig (103 bar) with PTFE seats
  - Brass**
    - 3000 psig (207 bar) CWP
    - 1500 psig (103 bar) with PTFE seats
  - Alloy N24135 (400)**
    - B2 and B6:
      - 3000 psig (207 bar) CWP
      - 1500 psig (103 bar) with PTFE seats
    - B8:
      - 2000 psig (138 bar) CWP
      - 1500 psig (103 bar) with PTFE seats
  - Alloy N30002 (C-276)**
    - B2 and B6:
      - 4000 psig (276 bar) CWP
      - 1500 psig (103 bar) with PTFE seats
    - B8:
      - 3000 psig (207 bar) CWP
      - 1500 psig (103 bar) with PTFE seats

\* B8 Series: 6000 psig rating or 4400 psig (303 bar) CWP



Model Shown: 6A-B6LJ-SSP

## Pressure Rating and Tubing Selection

For working pressures of A-LOK® and CPI™ tube connections, please see the Instrument Tubing Selection Guide (Bulletin 4200-TS), found in the Technical Section of the Parker Instrumentation Products Master Binder, or the Parker Instrument Fitting Installation Manual (Bulletin 4200-B4).

For working pressures of valves with external or internal pipe threads, please see Catalog 4260, Instrumentation Pipe Fittings.

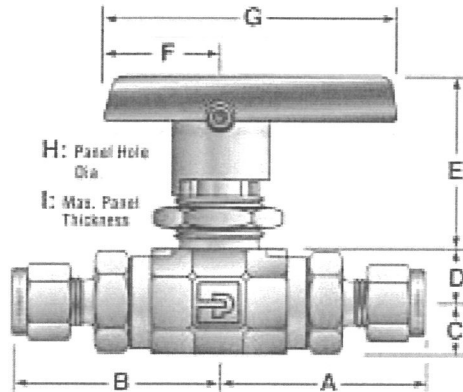
## Materials of Construction

Item #	Part Description	Stainless Steel	Brass
*1	Connector O-Ring	PTFE**	
*2A	Seat Retainer	ASTM A 276 Type 316	ASTM B 16 Alloy C36000
*2B	Seat	PTFE, PCTFE, PEEK	
*3	Retainer Seal	PTFE**	
*4	Ball	316 Stainless Steel	
*5	Body	ASTM A 351 Grade CF3M	ASTM B 283 Alloy C37700
*6A	Stem (PTFE Coated)	ASTM A 276 Type 316	
*6B	Stem Seal	PTFE**	
*6C	Stem Washer	316 Stainless Steel	
7	Packing Nut	ASTM A 479 Type 316	ASTM B 453 Alloy C34000
8	Handle	Nylon 6/6	
9	Handle Set Screw	Stainless Steel	
10	Panel Nut	316 Stainless Steel	
*11	End Connector	ASTM A 479 Type 316	ASTM B 16 Alloy C36000

\* Wetted Parts

\*\* Optional stem seal and body seal materials are described in the How to Order section  
Lubrication: Perfluorinated Polyether

## Two-Way B Series Ball Valves



Model Shown: 4A-B6LJ-SSP

### Two-Way Valve Dimensions / Flow Data

Port Size	Basic Part No.	Flow Data				End Connections		Dimensions Inches (mm)																																					
		Orifice		C <sub>v</sub>	X <sub>T</sub> <sup>*</sup>			Port 1	Port 2	A <sup>†</sup>	B <sup>†</sup>	C	D	E	F	G	H	I																											
Inch	mm	1/16" A-LOK®	1/16" CPI™			1/8" A-LOK®	1/8" CPI™												1/8" Female NPT	1/8" Male NPT	1/4" A-LOK®	1/4" CPI™	1/4" Male NPT	1/4" UltraSeal	1/4" VacuSeal	3mm A-LOK®	3mm CPI™	1/8" A-LOK®	1/8" CPI™	1/4" A-LOK®	1/4" CPI™	1/4" Female NPT	1/4" Male NPT	1/4" UltraSeal	1/4" VacuSeal	3/8" A-LOK®	3/8" CPI™	3/8" Male NPT	3/8" UltraSeal	6mm A-LOK®	6mm CPI™	8mm A-LOK®	8mm CPI™	10mm A-LOK®	10mm CPI™
1A	B2L	0.052	1.3	0.06	0.45			1.30	1.30	0.33 (8.4)	0.33 (8.4)	0.94 (23.9)	0.75 (19.1)	1.88 (47.8)	0.58 (14.7)	0.13 (3.3)																													
1Z								(33.0)	(33.0)																																				
2A		0.093	2.4	0.21	0.47			1.36	1.36																																				
2Z								(34.5)	(34.5)																																				
2F		0.165	4.2	0.93	0.43			1.07	1.07																																				
								(27.2)	(27.2)																																				
2M		0.165	4.2	0.93	0.43			1.18	1.18																																				
								(30.0)	(30.0)																																				
4A		0.165	4.2	0.93	0.43			1.48	1.48																																				
4Z								(37.6)	(37.6)																																				
4M	B6L	0.165	4.2	0.93	0.43			1.35	1.35	0.42 (10.7)	0.47 (11.9)	1.53 (38.9)	1.00 (25.4)	2.50 (63.5)	0.77 (19.6)	0.25 (6.4)																													
								(34.3)	(34.3)																																				
4Q		0.165	4.2	0.93	0.43			1.25	1.25																																				
								(31.8)	(31.8)																																				
4V		0.165	4.2	0.93	0.43			1.38	1.38																																				
								(35.1)	(35.1)																																				
M3A		0.086	2.2	0.18	0.44			1.37	1.37																																				
M3Z								(34.8)	(34.8)																																				
2A		0.093	2.4	0.26	0.46			1.65	1.65																																				
2Z								(41.9)	(41.9)																																				
4A	B8L	0.187	4.7	1.04	0.42			1.74	1.74	0.69 (17.5)	0.70 (17.8)	1.74 (44.2)	1.50 (38.1)	4.00 (101.6)	0.90 (22.9)	0.38 (9.7)																													
4Z								(44.2)	(44.2)																																				
4F		0.250	6.4	2.34	0.29			1.51	1.51																																				
								(38.4)	(38.4)																																				
4M		0.250	6.4	2.34	0.29			1.62	1.62																																				
								(41.1)	(41.1)																																				
4Q		0.180	4.6	1.03	0.42			1.51	1.51																																				
								(38.4)	(38.4)																																				
4V		0.188	4.8	1.04	0.42			1.75	1.75																																				
								(44.5)	(44.5)																																				
6A	B8L	0.250	6.4	2.34	0.29			1.80	1.80	0.69 (17.5)	0.70 (17.8)	1.74 (44.2)	1.50 (38.1)	4.00 (101.6)	0.90 (22.9)	0.38 (9.7)																													
6Z								(45.7)	(45.7)																																				
6M		0.250	6.4	2.34	0.29			1.62	1.62																																				
								(41.1)	(41.1)																																				
6Q		0.250	6.4	2.34	0.29			1.51	1.51																																				
								(38.4)	(38.4)																																				
M6A		0.187	4.7	1.04	0.42			1.75	1.75																																				
M6Z								(44.5)	(44.5)																																				
M8A		0.250	6.4	2.34	0.42			1.78	1.78																																				
M8Z								(45.2)	(45.2)																																				
M10A	B8L	0.250	6.4	2.34	0.42			1.81	1.81	0.69 (17.5)	0.70 (17.8)	1.74 (44.2)	1.50 (38.1)	4.00 (101.6)	0.90 (22.9)	0.38 (9.7)																													
M10Z								(46.0)	(46.0)																																				
6F		0.406	10.3	6.42	0.37			1.95	1.95																																				
								(49.5)	(49.5)																																				
8F		0.406	10.3	6.42	0.37			2.15	2.15																																				
								(54.6)	(54.6)																																				
8A		0.406	10.3	6.42	0.37			2.34	2.34																																				
8Z								(59.4)	(59.4)																																				
8M		0.406	10.3	6.42	0.37			2.22	2.22																																				
								(56.4)	(56.4)																																				
8Q	B8L	0.375	9.5	5.57	0.37			1.92	1.92	0.69 (17.5)	0.70 (17.8)	1.74 (44.2)	1.50 (38.1)	4.00 (101.6)	0.90 (22.9)	0.38 (9.7)																													
								(48.8)	(48.8)																																				
8V		0.406	10.3	6.42	0.37			2.21	2.21																																				
								(56.1)	(56.1)																																				
12A		0.406	10.3	6.42	0.37			2.33	2.33																																				
12Z								(59.2)	(59.2)																																				
M12A		0.375	9.5	5.57	0.37			2.33	2.33																																				
M12Z								(59.2)	(59.2)																																				
M16A		0.406	10.3	6.42	0.37			2.33	2.33																																				
M16Z								(59.2)	(59.2)																																				

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$   
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position

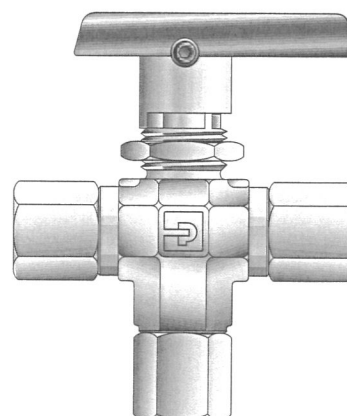
# Three-Way B Series Ball Valves

## Introduction

Parker manually, pneumatically, and electrically actuated three-way B Series Ball Valves may be used as diverting or selecting valves for fluids utilized in process and instrumentation applications. The standard three-way diverter valve is designed to accept media through the bottom port and direct it out of two outlet ports. When equipped with spring-loaded seats, the three-way valve may be used as a selector valve, alternately accepting media from either of two inlet sources (side ports) and directing it through a single outlet (bottom port).

## Features

- Available in 316 stainless steel and brass construction. Alloy N24135 and Alloy N30002 construction available for Diverter Valves upon request
- Micro-finished ball provides a positive seal
- Wide variety of US Customary and SI ports
- 180 degree actuation
- Panel mountable
- Adjustable PTFE stem seal can be maintained in-line
- Handle indicates flow direction
- Low operating torques
- Positive handle stops
- Color coded handles
- Optional pneumatic and electric actuation
- Optional live-loaded PTFE stem seals
- Optional non-adjustable O-ring stem seals
- Optional stainless steel and extended handles



Model Shown: 4F-B6XJ2-BP

## Diverter Valve Specifications

- Pressure Ratings with bottom port as inlet:

### 316 Stainless Steel

6000 psig (414 bar) CWP\*

1500 psig (103 bar) with PTFE seats

### Brass

3000 psig (207 bar) CWP

1500 psig (103 bar) with PTFE seats

### Alloy N24135 (400)

#### B2 and B6:

3000 psig (207 bar) CWP

1500 psig (103 bar) with PTFE seats

#### B8:

2000 psig (138 bar) CWP

1500 psig (103 bar) with PTFE seats

### Alloy N30002 (C-276)

#### B2 and B6:

4000 psig (276 bar) CWP

1500 psig (103 bar) with PTFE seats

#### B8:

3000 psig (207 bar) CWP

1500 psig (103 bar) with PTFE seats

- Pressure Rating with side ports as inlet:  
150 psig (10 bar)

\* B8 Series: 6000 psig rating or 4400 psig (303 bar) CWP

## Selector Valve Specifications

(Spring Loaded – B6 and B8 models only)

- Pressure Rating with bottom port as inlet:

### 316 Stainless Steel

6000 psig (414 bar) CWP\*

### Brass

3000 psig (207 bar) CWP

- Pressure Rating with side ports as inlet:

### 316 Stainless Steel and Brass

3000 psig (207 bar) CWP

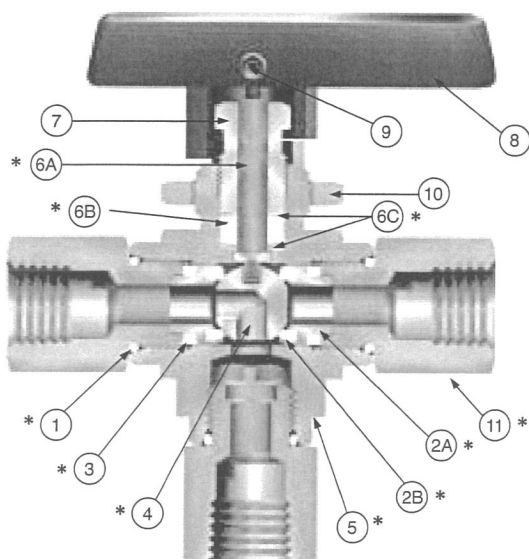
## Pressure Rating and Tubing Selection

For working pressures of A-LOK® and CPI™ tube connections, please see the Instrument Tubing Selection Guide (Bulletin 4200-TS), found in the Technical Section of the Parker Instrumentation Products Master Binder, or the Parker Instrument Fitting Installation Manual (Bulletin 4200-B4).

For working pressures of valves with external or internal pipe threads, please see Catalog 4260, Instrumentation Pipe Fittings.

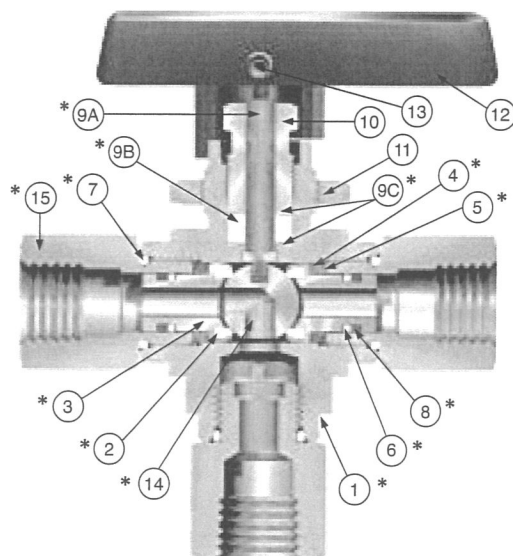
## Three-Way B Series Ball Valves

### Diverter Valve



Model Shown: 4F-B6XJ-SSP

### Selector Valve



Model Shown: 4F-B6XS2-SSP

### Materials of Construction

Item #	Part Description	Stainless Steel	Brass
*1	Connector O-Ring	PTFE**	
*2A	Seat Retainer	ASTM A 276 Type 316	ASTM B 16 Alloy C36000
*2B	Seat	PTFE, PCTFE, PEEK	
*3	Retainer Seal	PTFE**	
*4	Ball	316 Stainless Steel	
*5	Body	ASTM A 351 Grade CF3M	ASTM B 283 Alloy C37700
*6A	Stem (PTFE Coated)	ASTM A 276 Type 316	
*6B	Stem Seal	PTFE**	
*6C	Stem Washer	316 Stainless Steel	
7	Packing Nut	ASTM A 479 Type 316	ASTM B 453 Alloy C34000
8	Handle	Nylon 6/6	
9	Handle Set Screw	Stainless Steel	
10	Panel Nut	316 Stainless Steel	
*11	End Connector	ASTM A 479 Type 316	ASTM B 16 Alloy C36000

\* Wetted Parts

\*\* Optional stem seal and body seal materials are located in the How to Order section  
Lubrication: Perfluorinated polyether

### Materials of Construction

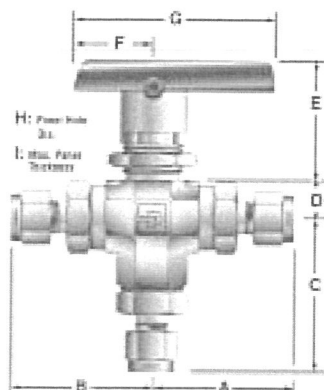
Item #	Part Description	Stainless Steel	Brass
*1	Body	ASTM A 351 Grade CF3M	ASTM B 283 Alloy C37700
*2	Seat	PCTFE, PEEK	
*3	Seat Retainer	ASTM A 276 Type 316	
*4	Spring	ASTM A 564 Type 360	
*5	Seat Retainer Washer	316 Stainless Steel	
*6	Back-up Ring	PTFE	
*7	Connector O-ring	PTFE**	
*8	Seat Retainer O-ring	Fluorocarbon Rubber**	
*9A	Stem (PTFE Coated)	ASTM A 276 Type 316	
*9B	Stem Seal	PTFE*	
*9C	Stem Washer	316 Stainless Steel***	
10	Packing Nut	ASTM A 479 Type 316	ASTM B 453 Alloy C34000
11	Panel Nut	316 Stainless Steel	
12	Handle	Nylon 6/6	
13	Handle Set Screw	Stainless Steel	
*14	Ball	316 Stainless Steel	
*15	End Connector	ASTM A 479 Type 316	ASTM B 16 Alloy C36000

\* Wetted Parts

\*\* Optional stem seal, seat retainer, and body seal materials are located in the How to Order section  
\*\*\* The lower stem washer material is PEEK for B8 Selector Valves

Lubrication: Perfluorinated polyether

# Three-Way B Series Ball Valves



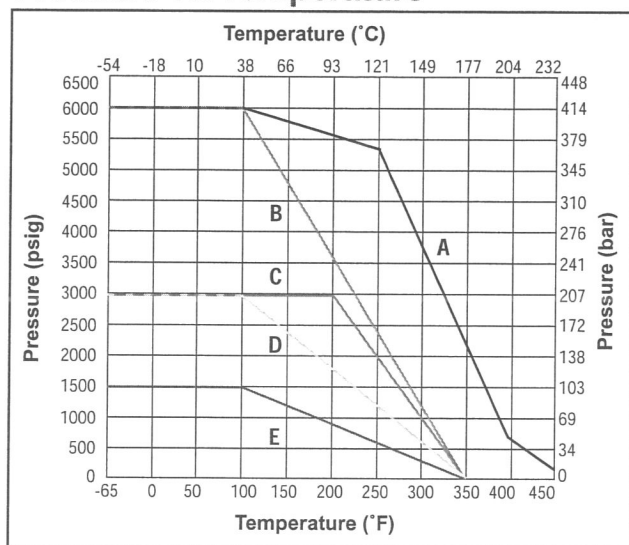
Model Shown: 4Z-B6XSPKR-V-SSP

## Three-Way Valve Dimensions / Flow Data

Port Size	Basic Part No.	Flow Data				End Connections			Dimensions Inches (mm)								
		Inch	mm	C <sub>v</sub>	X <sub>T</sub> * inches	Port 1	Port 2	Port 3	A†	B†	C	D	E	F	G	H	I
1A	B2X	0.052	1.3	0.06	0.56	1/16" A-LOK®			1.30	1.30	1.39	0.33 (8.4)	0.94 (23.9)	0.75 (19.1)	1.88 (47.8)	0.58 (14.7)	0.13 (3.3)
1Z		1/16" CPI™			(33.0)	(33.0)	(35.3)										
2A		0.093	2.4	0.21	0.64	1/8" A-LOK®			1.36	1.36	1.45						
2Z		1/8" CPI™			(34.5)	(34.5)	(36.8)										
2F		0.165	4.2	0.63	0.59	1/8" Female NPT			1.07	1.07	1.15						
					(27.2)	(27.2)	(29.2)										
2M		0.165	4.2	0.63	0.59	1/8" Male NPT			1.18	1.18	1.26						
					(30.0)	(30.0)	(32.0)										
4A		0.165	4.2	0.63	0.59	1/4" A-LOK®			1.48	1.48	1.56						
4Z		1/4" CPI™			(37.6)	(37.6)	(39.6)										
4M	0.165	4.2	0.63	0.59	1/4" Male NPT			1.35	1.35	1.43							
				(34.3)	(34.3)	(36.3)											
4Q	0.165	4.2	0.63	0.59	1/4" UltraSeal			1.25	1.25	1.33							
				(31.8)	(31.8)	(33.8)											
4V	0.165	4.2	0.63	0.59	1/4" VacuSeal			1.38	1.38	1.46							
				(35.1)	(35.1)	(37.1)											
M3A	B6X	0.086	2.2	0.18	0.63	3mm A-LOK®			1.37	1.37	1.45	0.47 (11.9)	1.53 (38.9)	1.00 (25.4)	2.50 (63.5)	0.77 (19.6)	0.25 (6.4)
M3Z		3mm CPI™			(34.8)	(34.8)	(36.8)										
2A		0.093	2.4	0.21	0.38	1/8" A-LOK®			1.65	1.65	1.79						
2Z		1/8" CPI™			(41.9)	(41.9)	(45.5)										
4A		0.187	4.7	0.70	0.69	1/4" A-LOK®			1.74	1.74	1.88						
4Z		1/4" CPI™			(44.2)	(44.2)	(47.8)										
4F		0.196	5.0	0.87	0.74	1/4" Female NPT			1.51	1.51	1.65						
					(38.4)	(38.4)	(41.9)										
4M		0.196	5.0	0.87	0.74	1/4" Male NPT			1.62	1.62	1.76						
					(41.1)	(41.1)	(44.7)										
4Q	0.180	4.6	0.68	0.67	1/4" UltraSeal			1.51	1.51	1.65							
				(31.8)	(31.8)	(33.8)											
4V	0.188	4.8	0.70	0.69	1/4" VacuSeal			1.75	1.75	1.89							
				(35.1)	(35.1)	(37.1)											
6A	B8X	0.196	5.0	0.87	0.74	3/8" A-LOK®			1.80	1.80	1.94	0.47 (11.9)	1.53 (38.9)	1.00 (25.4)	2.50 (63.5)	0.77 (19.6)	0.25 (6.4)
6Z		3/8" CPI™			(45.7)	(45.7)	(49.3)										
6M		0.196	5.0	0.87	0.74	3/8" Male NPT			1.62	1.62	1.76						
					(41.1)	(41.1)	(44.7)										
6Q		0.196	5.0	0.87	0.74	3/8" UltraSeal			1.52	1.52	1.65						
					(38.6)	(38.6)	(41.9)										
M6A		0.187	4.7	0.70	0.69	6mm A-LOK®			1.75	1.75	1.88						
M6Z		6mm CPI™			(44.5)	(44.5)	(47.8)										
M8A		0.196	5.0	0.87	0.74	8mm A-LOK®			1.78	1.78	1.91						
M8Z		8mm CPI™			(45.2)	(45.2)	(48.5)										
M10A	B10X	0.196	5.0	0.87	0.74	10mm A-LOK®			1.81	1.81	1.95	0.47 (11.9)	1.53 (38.9)	1.00 (25.4)	2.50 (63.5)	0.77 (19.6)	0.25 (6.4)
M10Z		10mm CPI™			(46.0)	(46.0)	(49.5)										
6F		0.406	10.3	3.62	0.64	3/8" Female NPT			1.95	1.95	2.29						
					(49.5)	(49.5)	(58.2)										
8A		0.406	10.3	3.62	0.64	1/2" A-LOK®			2.34	2.34	2.68						
8Z		1/2" CPI™			(59.4)	(59.4)	(68.1)										
8F		0.406	10.3	3.62	0.64	1/2" Female NPT			2.15	2.15	2.49						
					(54.6)	(54.6)	(63.2)										
8M		0.406	10.3	3.62	0.64	1/2" Male NPT			2.22	2.22	2.59						
					(56.4)	(56.4)	(65.8)										
8Q	B12X	0.375	9.5	3.46	0.62	1/2" UltraSeal			1.93	1.93	2.27	0.70 (17.8)	1.74 (44.2)	1.50 (38.1)	4.00 (101.6)	0.90 (22.9)	0.38 (9.7)
					(49.5)	(49.5)	(57.7)										
8V		0.406	10.3	3.62	0.64	1/2" VacuSeal			2.21	2.21	2.55						
					(56.1)	(56.1)	(65.0)										
12A		0.406	10.3	3.62	0.64	3/4" A-LOK®			2.33	2.33	2.68						
12Z		3/4" CPI™			(59.2)	(59.2)	(68.1)										
M12A		0.375	9.5	3.46	0.62	12mm A-LOK®			2.33	2.33	2.67						
M12Z		12mm CPI™			(59.2)	(59.2)	(67.8)										
M16A		0.406	10.3	3.62	0.64	16mm A-LOK®			2.33	2.33	2.67						
M16Z		16mm CPI™			(56.9)	(56.9)	(65.5)										

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_2 - P_1 / P_1 = X_T$   
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position

## Pressure vs. Temperature



**Legend:** A – PEEK Seats; B – PCTFE Seats;  
C – Selector Valves; D – Brass Valves; E – PTFE Seats  
**Note:** To determine MPa, multiply bar by 0.1

**Note:** This Pressure versus Temperature chart reflects the maximum temperature range of indicated materials.

When combining seat and seal materials, the most restrictive temperature rating of the seats or seals becomes the limiting factor on valve temperature range.

Elastomeric stem packing and seals are recommended if the application subjects the valve to thermal cycling.

### • Temperature Ratings:

#### PTFE:

-65 °F to 350 °F (-54 °C to 177 °C)

#### PCTFE:

-65 °F to 350 °F (-54 °C to 177 °C)

#### PEEK:

-65 °F to 450 °F (-54 °C to 232 °C)

#### Buna-N Rubber:

-40 °F to 250 °F (-40 °C to 121 °C)

#### Fluorocarbon Rubber:

-15 °F to 450 °F (-26 °C to 232 °C)

#### Ethylene Propylene Rubber:

-65 °F to 300 °F (-54 °C to 149 °C)

## Flow Calculations with 1000 psig (69 bar) Inlet Pressure (Two-Way)

Valve Series	Maximum $C_v$	Pressure Drop $\Delta p$		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
		psig	bar	gpm	m <sup>3</sup> /hr	scfm	m <sup>3</sup> /hr
B2L	0.93	10	0.7	2.9	0.7	92.4	156.2
		50	3.5	6.6	1.5	200.3	338.3
		100	6.9	9.3	2.1	272.0	458.9
B6L	2.34	10	0.7	7.4	1.7	231.7	391.5
		50	3.5	16.5	3.8	494.2	834.7
		100	6.9	23.4	5.3	657.0	1107.9
B8L	6.42	10	0.7	20.3	4.6	637.1	1076.8
		50	3.5	45.4	10.3	1373.6	2320.3
		100	6.9	64.2	14.6	1852.3	3124.8

## Flow Calculations with 1000 psig (69 bar) Inlet Pressure (Three-Way)

Valve Series	Maximum $C_v$	Pressure Drop $\Delta p$		Water @ 60 °F (16 °C)		Air @ 60 °F (16 °C)	
		psig	bar	gpm	m <sup>3</sup> /hr	scfm	m <sup>3</sup> /hr
B2X	0.63	10	0.7	2.0	0.5	62.7	106.0
		50	3.5	4.5	1.0	137.1	231.7
		100	6.9	6.3	1.4	188.4	317.9
B6X	0.87	10	0.7	2.8	0.6	86.7	146.6
		50	3.5	6.2	1.4	190.5	321.8
		100	6.9	8.7	2.0	263.2	444.4
B8X	3.62	10	0.7	11.5	2.6	360.6	609.5
		50	3.5	25.6	5.9	789.7	1343.5
		100	6.9	36.2	8.2	1087.4	1836.6