DeZURIK

BULLETIN 640
MAY 2024

APCO CSC SILENT CHECK VALVES

Design & Construction

APCO CSC Silent Check Valves are designed to mitigate water hammer by positively closing before reversal of flow can occur. The valve closes silently, is low in cost, reliable and requires no regular maintenance.

Available with wafer or globe style bodies, sizes range from 1-42" (25-1100mm). They are available with Ductile Iron, Cast Iron, Carbon Steel or 316 Stainless Steel bodies with ASME 125/150 or ASME 250/300 end connections.

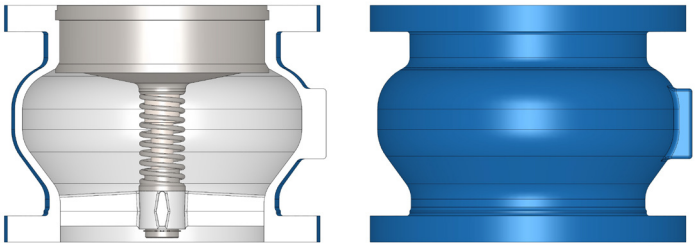
Silent check valves are commonly used in vertical turbine pump installations when pumping from a well to an elevated reservoir. They are also recommended for commercial and industrial HVAC applications such as heating systems and condensate return lines. When specified, the APCO CSC Silent Check Valves are Factory Mutual System Approved for use on hazardous fire fighting equipment and fire protection systems.

Compact Design Saves Space

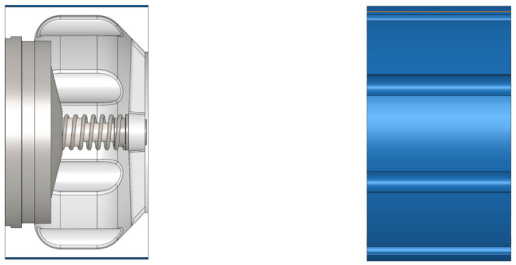
The short face-to-face dimensions of APCO Silent Check Valves offer a compact solution in equipment room piping layouts. APCO Silent Check Valves are capable of silent operation when installed in vertical flow up or flow down, or horizontal position.

Metal or Resilient Seats Available

Valves can be metal seated or have an optional resilient seat of Acrylonitrile-Butadiene (NBR), Terpolymer of Ethylene Propylene & A Diene (EPDM) or Fluoro Rubber (FKM). The resilient seat ring can be easily added in the field to convert a metal seated valve to a resilient seated valve.



CSC - 600A Globe Style



CSC - 300A Wafer Style

Full Flow Area

Both the wafer style and the globe style valves provide full flow area. Flow area of wafer style valves is 3% greater than pipe area while globe style valves are 10% greater than pipe area.

Designed for Superior Performance

The contours of the valve body are designed for smooth flow and minimum loss. The full cross-sectional area of critical points in the body is greater than the cross-sectional area of the same size pipe, giving the APCO Silent Check Valve lower head loss than many other brands of silent check valves.

Spring Loaded for Silent Shutoff

When the pump stops, the stainless steel coil spring forces the disc closed against slight to no pump head at zero velocity which results in silent closure.

Plug Guided at Both Ends

The plug is center guided at both ends by the shaft. The stainless steel bushing and shaft protect against electrolytic action and provides long valve service life.

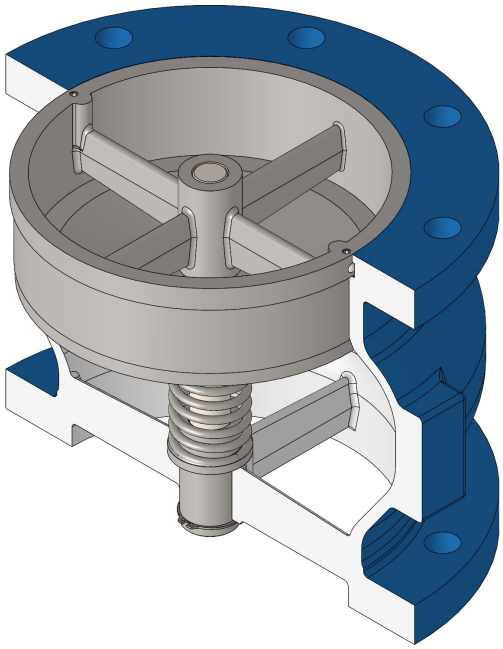
Ease of Maintenance

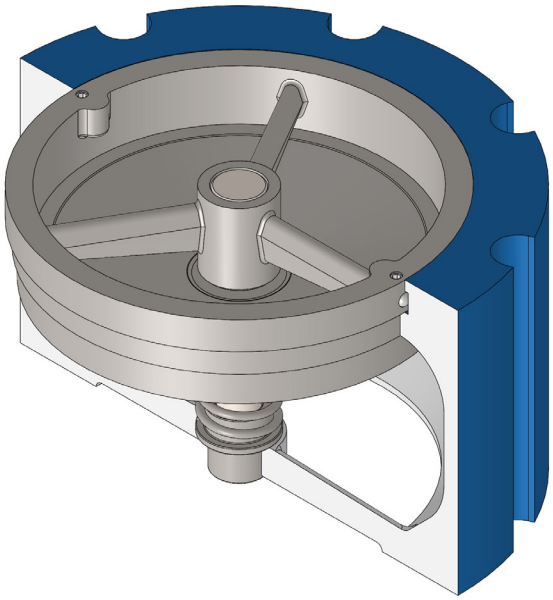
If maintenance is ever required, the seat and plug are hand replaceable in the field. The bushing is held in place by the spring and retaining ring so that it can be easily removed if required.

Factory Mutual System Approved

Factory Mutual System ✶ APPROVED

APCO Silent Check Valves have been thoroughly tested by Factory Mutual Research Corporation and are approved for use on hazardous fire fighting equipment and fire protection systems. Refer to ordering information for available configurations.



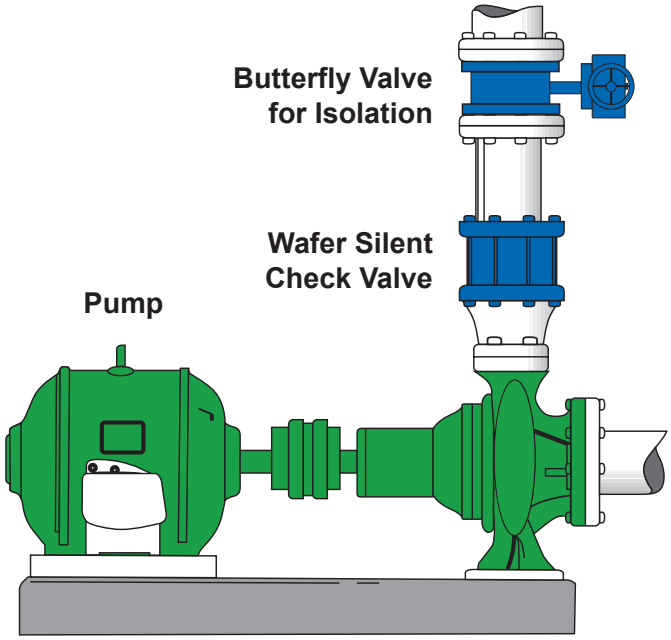


Prevents Water Hammer Before it Starts

The APCO Silent Check Valve was designed to open at approximately ¼ to ½ psi (2-3 kPa). When a pump is shut down, an APCO Silent Check Valve will completely close while there is still positive head on the inlet side. The closing of the check valve prevents reverse flow, which is a major cause of water hammer, and protects the pump.

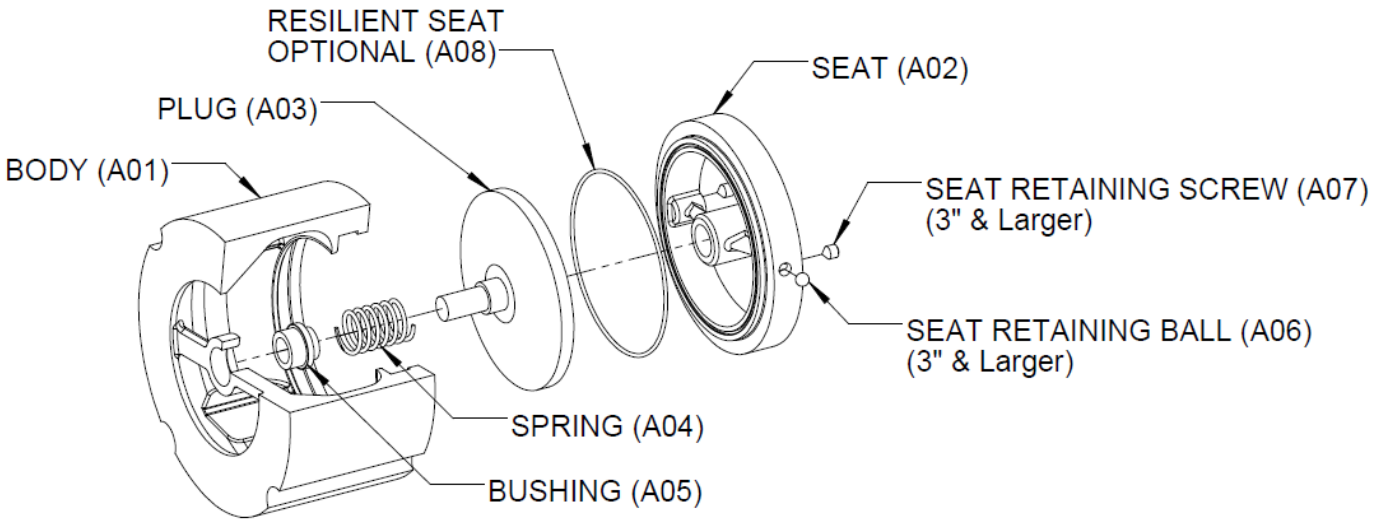
Installing Silent Check Valves on the Discharge Side of the Pump

Water hammer can be both destructive and disruptive. Water hammer occurs when a pump shuts down and the forward flow of water is allowed to reverse and is then suddenly stopped by the check valve. By positioning an APCO Silent Check Valve on the discharge side of the pump, reverse flow toward the pump is eliminated and water hammer is prevented.



Typical Silent Check Valve Installations on Vertical Turbine Pumps

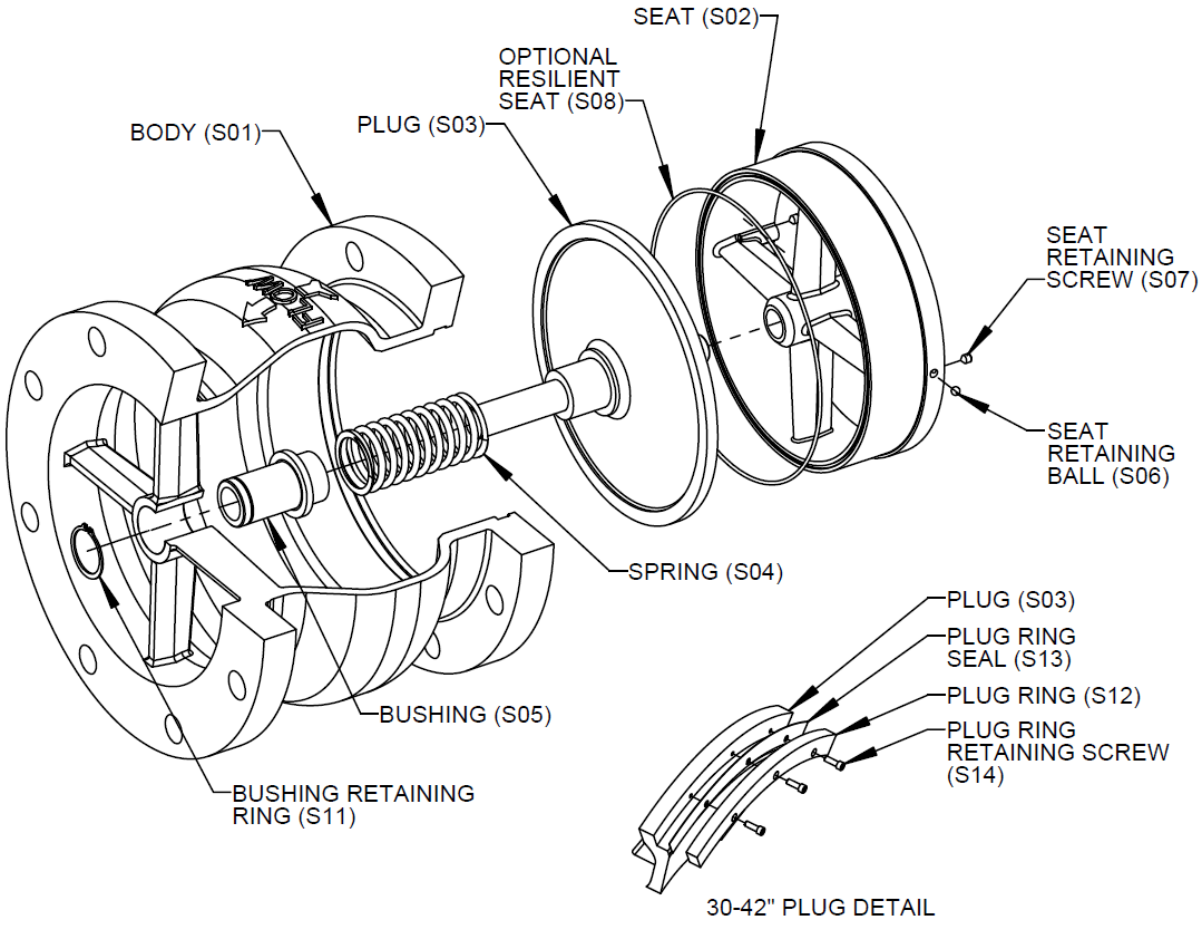
Wafer Style



Materials of Construction - CSC Wafer Style

Item	Description	Material
A01	Body	Ductile Iron, ASTM A536
		Carbon Steel, ASTM A216
		316 Stainless Steel, ASTM A743, A351
A02	Seat	316 Stainless Steel, ASTM A743, A351
A03	Plug	316 Stainless Steel, ASTM A743, A351
A04	Spring	316 Stainless Steel, ASTM A313
A05	Bushing	316 Stainless Steel, ASTM A213
A06	Seat Retaining Ball	440 Stainless Steel
A07	Seat Retaining Screw	18-8 Stainless Steel
A08	Resilient Seat	Acrylonitrile-Butadiene
		Terpolymer of Ethylene Propylene & A Diene
		Fluoro Rubber

Globe Style



Materials of Construction - CSC Globe Style

Item	Description	Material
S01	Body	Ductile Iron, ASTM A536
		Carbon Steel, ASTM A216
		316 Stainless Steel, ASTM A743, A351
		Cast Iron, ASTM A126
S02	Seat	316 Stainless Steel, ASTM A743, A351
S03	Plug	316 Stainless Steel, ASTM A743, A351
		Ductile Iron, ASTM A536 with 316 Stainless Steel Plug Shaft, ASTM A276 (30-42")
S04	Spring	316 Stainless Steel, ASTM A313
		17-7 PH Stainless Steel, ASTM A313 (24-30")
S05	Bushing	316 Stainless Steel, ASTM A213
		316 Stainless Steel, ASTM A743 (36")
		Aluminum Bronze, ASTM B148, B271, B505 (42")
S06	Seat Retaining Ball	440 Stainless Steel
S07	Seat Retaining Screw	18-8 Stainless Steel
		316 Stainless Steel
S08	Resilient Seat	Acrylonitrile-Butadiene
		Terpolymer of Ethylene Propylene & A Diene
		Fluoro Rubber
S11	Bushing Retaining Ring	316 Stainless Steel ASTM A240
		15-7PH Stainless Steel, ASTM A564, A693
S12	Plug Seat Ring	316 Stainless Steel, ASTM A240
S13	Plug Seat Ring Seal	Acrylonitrile-Butadiene
		Terpolymer of Ethylene Propylene & A Diene
		Fluoro Rubber
		Cellulose Cork Fiber Non-Asbestos Gasket Material
S14	Plug Ring Screw	316 Stainless Steel

Valve Selection

Pressure Ratings (at ambient temperature)

Wafer Body Style 300A

Body Material	End Connection Order Code	
	W1W2 & W2	W1
Ductile Iron	400 psi (2760 kPa)	250 psi (1720 kPa)
Carbon Steel	450 psi (3100 kPa)	285 psi (1960 kPa)
316 Stainless Steel	425 psi (2930 kPa)	275 psi (1900 kPa)

Globe Body Style 600A

Body Material	End Connection Order Code			
	F1		F2	
	Valve Size		Valve Size	
	3-24"	30-42"	3-12"	14-36"
Cast Iron	—	150 psi (1030 kPa)	—	Contact DeZURIK
Ductile Iron	250 psi (1720 kPa)	—	400 psi (2760 kPa)	300 psi (2070 kPa)
Carbon Steel	285 psi (1960 kPa)		450 psi (3100 kPa)	350 psi (2410 kPa)
316 Stainless Steel	275 psi (1900 kPa)		425 psi (2930 kPa)	350 psi (2410 kPa)

Pipeline Velocity Range

Recommended between 4 ft/s (1.4 m/s) and 12 ft/s (4.1 m/s)

Temperature Ratings:

Material	Temperature Range*
NBR, Acrylonitrile-Butadiene	-70 to 250° F (-57 to 121° C)
EPDM, Terpolymer of Ethylene Propylene & A Diene	-20 to 300° F (-29 to 150° C)
FKM, Fluoro Rubber	-40 to 325° F (-40 to 163° C)
Metal Seats	to 325º (163º C)

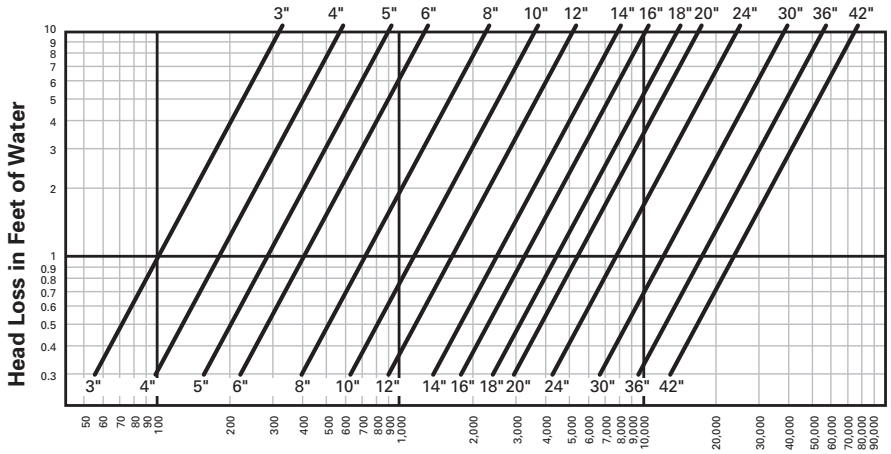
* Maximum operating temperature is a function of the materials used in the valve. All valves are rated to a maximum temperature of at least 250° F (121° C). Contact application engineering if the valve is required to operate above 325° F (163° C).

Applicable Standards

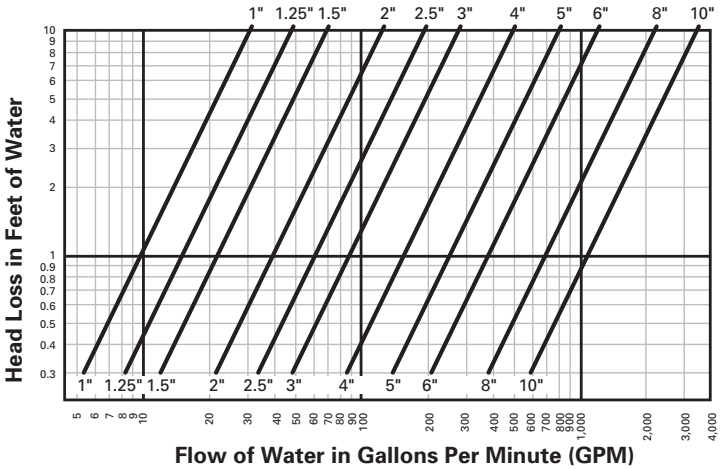
APCO CSC Silent Check Valves are designed and tested to meet the following standards:	
ASME B16.42	Conforms to flat faced, flange drilling
Factory Mutual Approved	FM 1230 Anti-water Hammer Check Valves. When specified, DI Body Material and Metal Seat; 4-10" 300A W1W2 or W1 or 4-12" 600A F1

Head Loss Characteristics

CSC 600A Globe Style Silent Check Valve



CSC 300A Wafer Style Silent Check Valve



Valve Selection

Valve Weights

Wafer Body Style 300A

Valve Size	Class 125/150 (W1W2)
1" 25mm	2 1
1.25" 32mm	3 1
1.5" 40mm	4 2
2" 50mm	5 2
2.5" 65mm	8 4
3" 80mm	11 5
4" 100mm	18 8
5" 125mm	27 12
6" 150mm	39 18

Valve Size	Class 125/150 (W1)	Class 250/300 (W2)
8" 200mm	86 39	86 39
10" 250mm	129 59	129 59

Pounds
Kilograms

Globe Body Style 600A

Valve Size	Class 125/150 (F1)	Class 250/300 (F2)
3" 80mm	28 13	31 14
4" 100mm	54 24	54 24
6" 150mm	70 32	96 44
8" 200mm	116 53	159 72
10" 250mm	168 76	247 112
12" 300mm	300 136	325 147
14" 350mm	392 178	440 200
16" 400mm	510 231	613 278
18" 450mm	594 269	800 363
20" 500mm	745 338	970 440
24" 600mm	1395 633	1745 792
30" 750mm	1770 803	2100 953
36" 900mm	3660 1660	4600 2087
42" 1100mm	5760 2618	—

Ordering

To order, simply complete the valve order code from information shown. An ordering example is shown for your reference.

Valve Style
Give valve style code as follows:

CSC = Silent Check Valves

Valve Size
Give valve size code as follows:

1	=	1"	25mm	12	=	12"	300mm
1.25	=	1.25"	32mm	14	=	14"	350mm
1.5	=	1.5"	40mm	16	=	16"	400mm
2	=	2"	50mm	18	=	18"	450mm
2.5	=	2.5"	65mm	20	=	20"	500mm
3	=	3"	80mm	24	=	24"	600mm
4	=	4"	100mm	30	=	30"	750mm
6	=	6"	150mm	36	=	36"	900mm
8	=	8"	200mm	42	=	42"	1100mm
10	=	10"	250mm				

Body Style
Give body style code as follows:

300A = Wafer (1-10")
600A = Globe (3-42")

End Connection
Give end connection code as follows:

Wafer Style

W1W2 = Wafer, ASME 125/150/250/300 (1-6")
W1 = Wafer, ASME 125/150 (8-10")
W2 = Wafer, ASME 250/300 (8-10")

Globe Style

F1 = Flanged, ASME 125/150 (3-42")
F2 = Flanged, ASME 250/300 (3-36")

Body Material
Give body material code as follows:

DI = Ductile Iron (1-24")
CI = Cast Iron (30-42")
CS = Carbon Steel
S2 = 316 Stainless Steel

Trim Combination
Plug & Seat Material
Give plug & seat material code as follows:

S2 = 316 Stainless Steel (1-24")
DIS2 = Ductile Iron Plug with 316 Stainless Steel Plug Ring & Seat (30-42")

Seating Surface
Give seating surface material code as follows:

M = Metal
NBR = Acrylonitrile-Butadiene
FKM = Fluoro Rubber
EPDM = Terpolymer of Ethylene Propylene & A Diene

Options
Give option code as follows:

DTR = DeZURIK Standard Certified Hydrostatic Shell & Seat Test Report
FM = FM Approved (DI Body Material and Metal Seat)
(4-10" 300A W1W2 or W1)
(4-12" 600A F1)

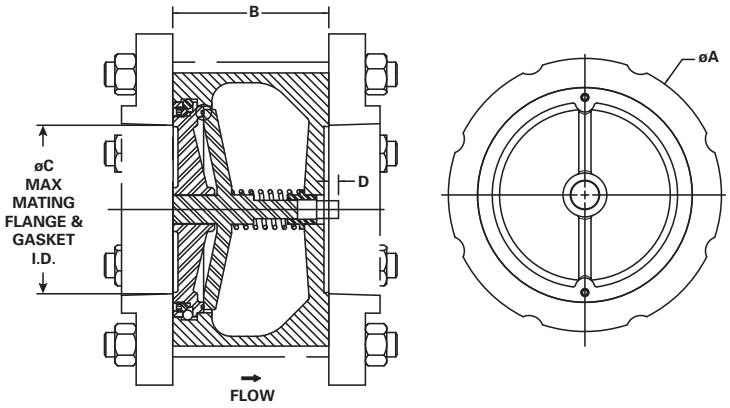
Ordering Example:

CSC,10,600A,F1,DI,S2-M*

Dimensions

Basic Valve - 300A Wafer
ASME 125/150

Valve Size	Dimensions			
	A	B	C	D
1" 25mm	2.75 70	2.06 52	1.25 32	0.06 1.6
1.25" 32mm	3.13 80	2.06 52	1.50 38	0
1.5" 40mm	3.63 92	2.38 60	1.81 46	0.09 2.4
2" 50mm	4.25 108	2.63 67	2.38 60	0
2.5" 65mm	5.00 127	2.88 73	2.88 73	0
3" 80mm	5.75 146	3.13 80	3.38 86	0.06 1.6
4" 100mm	7.00 178	4.00 102	4.75 121	0.06 1.6
6" 150mm	9.75 248	5.50 140	6.50 165	0.88 22
8" 200mm	13.38 340	6.50 165	8.50 216	1.88 48
10" 250mm	16.00 406	8.25 210	10.50 267	1.19 30

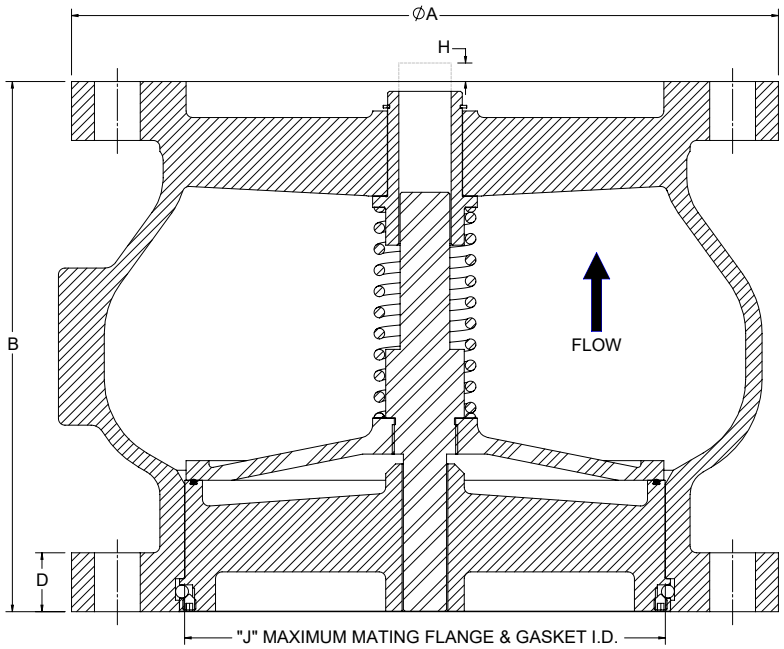


Inches
Millimeters

Valves are furnished with flat face flanges and must be mated to flat face flanges with full face gaskets.
Use only Flat Face Flange and Full Face Gasket.
ID of mating flange (seat side only) should never be greater than seat OD.

Basic Valve - 600A Globe

Valve Size	All Valves			ASME 125/150 (F1)		ASME 250/300 (F2)	
	B	H	J	A	D	A	D
3" 80mm	6.00 152	-	3.38 86	7.50 191	0.94 24	8.25 210	1.13 29
4" 100mm	7.25 184	-	4.75 121	9.00 229	0.94 24	10.00 254	1.25 32
6" 150mm	9.00 229	-	6.50 165	11.00 279	1.00 25	12.50 318	1.44 37
8" 200mm	10.13 257	-	8.50 216	13.50 343	1.13 29	15.00 381	1.63 41
10" 250mm	12.00 305	0.31 8	10.75 273	16.00 406	1.19 30	17.50 445	1.88 48
12" 300mm	14.38 365	0.31 8	12.88 327	19.00 483	1.25 32	20.50 521	2.00 51
14" 350mm	15.75 400	-	14.75 375	21.00 533	1.38 35	23.00 584	2.13 54
16" 400mm	17.63 448	0.69 17	16.50 419	23.50 597	1.44 37	25.50 648	2.25 57
18" 450mm	18.75 476	1.38 35	18.75 476	25.00 635	1.56 40	28.00 711	2.38 60
20" 500mm	20.63 524	1.13 29	20.63 524	27.50 699	1.69 43	30.50 775	2.50 64
24" 600mm	24.00 610	2.25 57	24.75 629	32.00 813	1.88 48	36.00 914	2.75 70
30" 750mm	29.25 743	3.56 90	29.50 749	38.75 984	2.13 54	43.00 1092	3.00 76
36" 900mm	45.00 1143	-	36.00 914	46.00 1168	2.38 60	50.00 1270	3.38 86
42" 1100mm	50.00 1270	1.00 25	42.00 1067	53.00 1346	2.63 67	-	-



Inches
Millimeters

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Use only Flat Face Flange and Full Face Gasket.
If special mating flanges are used, ID of the mating flange (seat side only) should never be greater than seat OD.

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:
Web Site: DeZURIK.com E-Mail: info@DeZURIK.com

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