



## APCO CSC SILENT CHECK VALVES

### Design & Construction

APCO CSC Silent Check Valves are designed to prevent 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" (15-1100mm). 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 firefighting 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 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

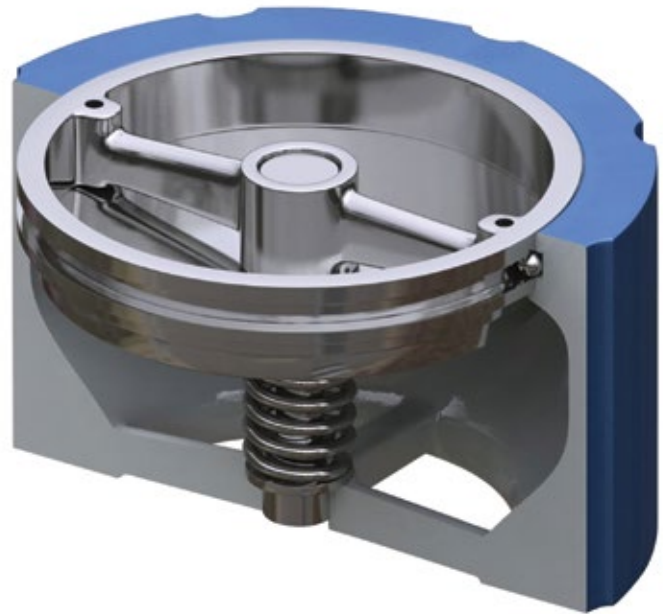
If maintenance is ever required, the seat and plug are hand replaceable in the field. The bushing is held in place by the spring so that it can be easily removed if required.

## Factory Mutual System Approved



★ APPROVED

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

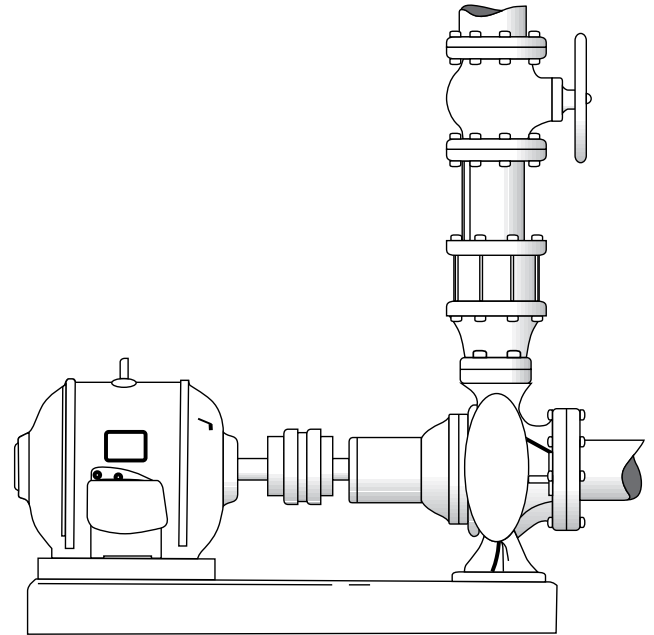


## Prevents Water Hammer Before it Starts

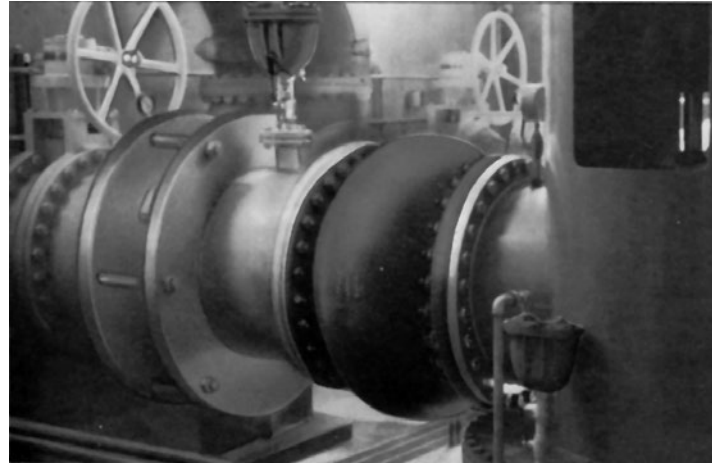
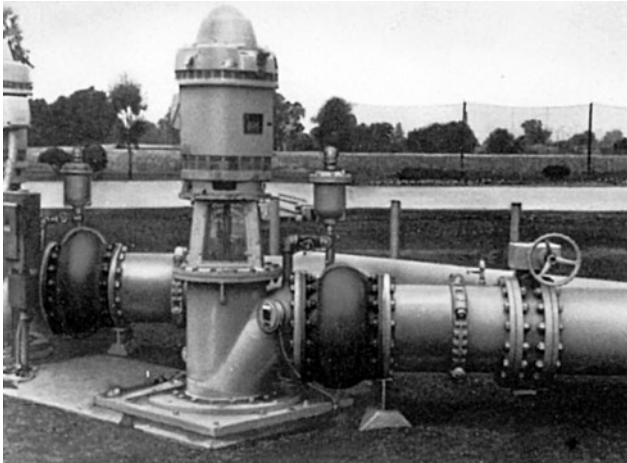
The Silent Check Valve was designed to open at approximately  $\frac{1}{4}$  to  $\frac{1}{2}$  psi (2-3 kPa). This means that when a pump is shut down, a Silent Check Valve will completely close while there is still positive head on the inlet side of approximately  $\frac{1}{2}$  psi (3 kPa). In this simple manner reverse flow, which is a major cause of water hammer, is prevented.

## Installing Silent Check Valves on the Discharge Side of the Pump

Water hammer can be both destructive and annoying. It is caused 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 a Silent Check Valve on the discharge side of the pump, reverse flow never has a chance to start.



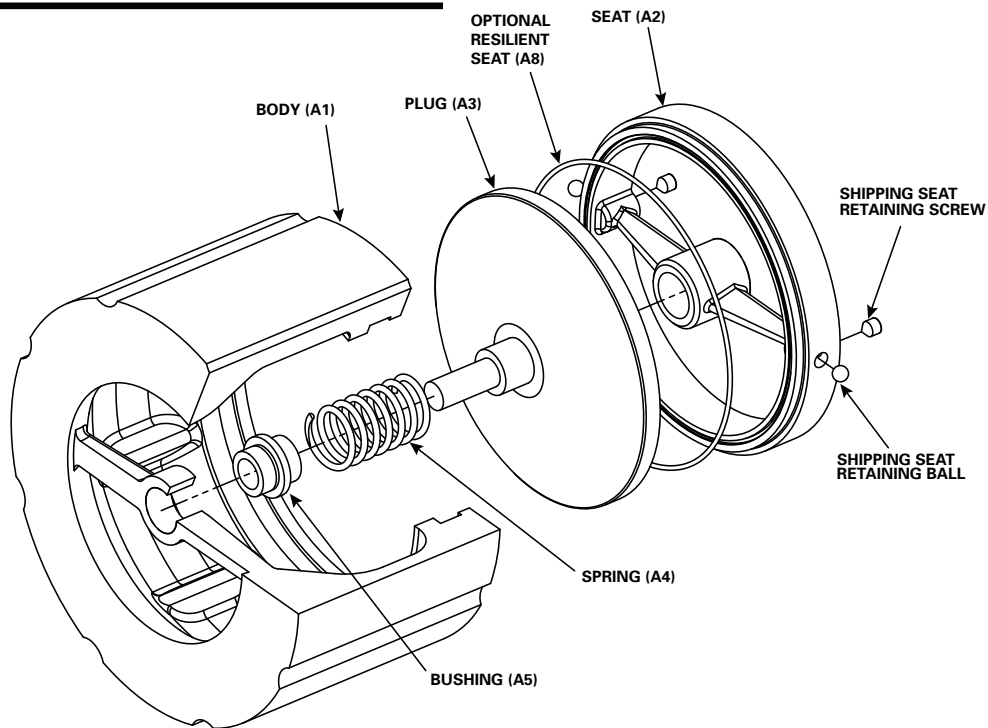
## Typical Silent Check Valve Installations on Vertical Turbine Pumps



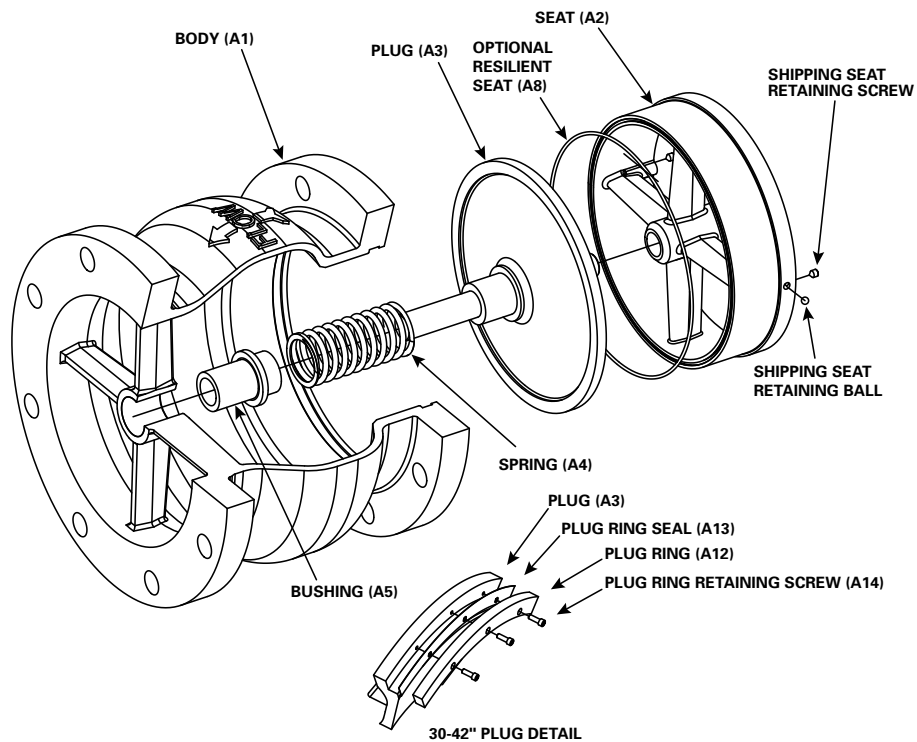
# Materials of Construction

Item	Description	Material
A1	Body	Ductile Iron, ASTM A536, Grade 65-45-12
		Cast Iron, ASTM A126, Grade B
		Carbon Steel, ASTM A216 Grade WCB
		316 Stainless Steel, ASTM A351 CF8M
A2	Seat	316 Stainless Steel, ASTM A351, GRCF-8M
A3	Plug	316 Stainless Steel, ASTM A351, GRCF-8M
A4	Spring	Ductile Iron with 316 Stainless Steel Ring
A5	Bushing	Stainless Steel ASTM A313, Type 316
A8	Resilient Seat	NBR, Acrylonitrile-Butadiene
		EPDM, Terpolymer of Ethylene Propylene & A Diene
		FKM, Fluoro Rubber

## Wafer Style



## Globe Style



# 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 and 12 ft/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 325° (163° 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).

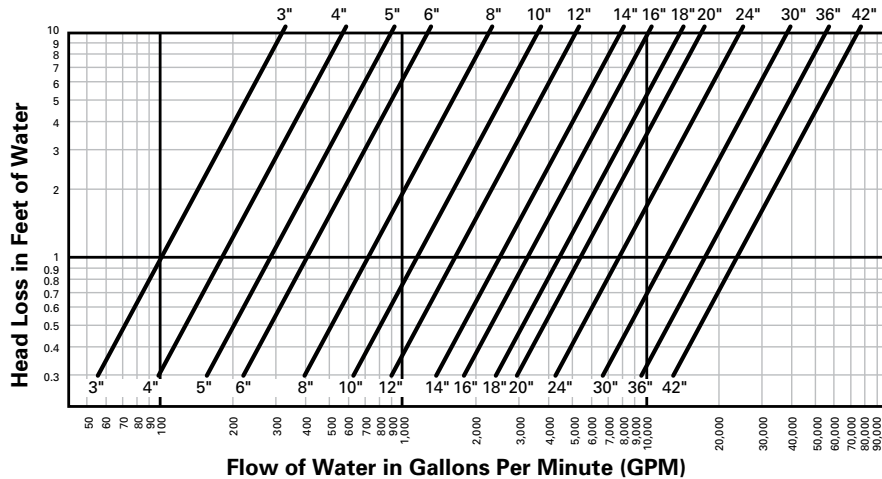
## Applicable Standards

**APCO CSC Silent Check Valves are designed and tested to meet the following standards:**

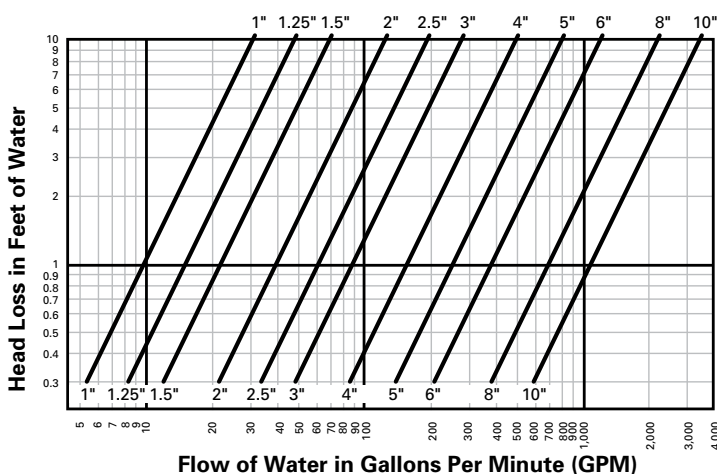
ASME B16.42	Conforms to flat faced, flange drilling
Factory Mutual Approved	FM 1230 Anti-water Hammer Check Valves. When specified, DI Body Material and Metal Seat; 4-10" 300A W1W2 or W1 or 4-12" 600A F1

## 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"	2	
15mm	1	
1.25"	3	
32mm	1	
1.5"	4	
40mm	2	
2"	5	
50mm	2	
2.5"	8	
65mm	4	
3"	11	
80mm	5	
4"	18	
100mm	8	
5"	27	
125mm	12	
6"	39	
150mm	18	
Valve Size	Class 125/150 (W1)	Class 250/300 (W2)
8"	86	86
200mm	39	39
10"	129	129
250mm	59	59

Pounds  
Kilograms

### Globe Body Style 600A

Valve Size	Class 125/150 (F1)	Class 250/300 (F2)
3"	28	31
80mm	13	14
4"	54	54
100mm	24	24
6"	70	96
150mm	32	44
8"	116	159
200mm	53	72
10"	168	247
250mm	76	112
12"	300	325
300mm	136	147
14"	392	440
350mm	178	200
16"	510	613
400mm	231	278
18"	594	800
450mm	269	363
20"	745	970
500mm	338	440
24"	1395	1745
600mm	633	792
30"	1770	2100
750mm	803	953
36"	3660	4600
900mm	1660	2087
42"	5760	—
1100mm	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"	15mm	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)

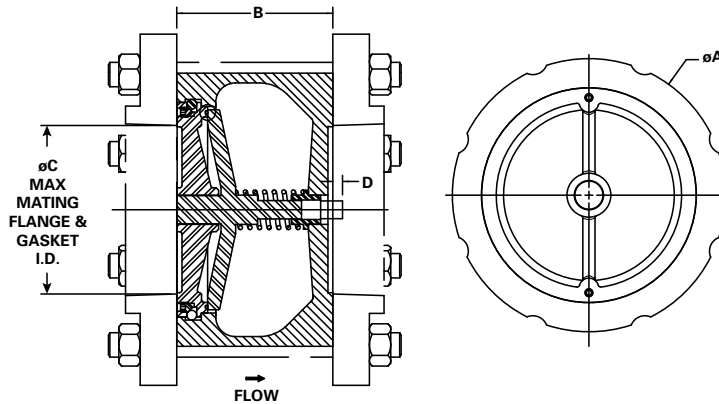
### Ordering Example:

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

# Dimensions

## Basic Valve - 300A Wafer

Valve Size	Dimensions			
	A	B	C	D
1"	2.75	2.06	1.25	0.06
15mm	70	52	32	1.6
1.25"	3.13	2.06	1.50	0
32mm	80	52	38	0
1.5"	3.63	2.38	1.81	0.09
40mm	92	60	46	2.4
2"	4.25	2.63	2.38	0
50mm	108	67	60	0
2.5"	5.00	2.88	2.88	0
65mm	127	73	73	0
3"	5.75	3.13	3.38	0.06
80mm	146	80	86	1.6
4"	7.00	4.00	4.75	0.06
100mm	178	102	121	1.6
6"	9.75	5.50	6.50	0.88
150mm	248	140	165	22
8"	13.38	6.50	8.50	1.88
200mm	340	165	216	48
10"	16.00	8.25	10.50	1.19
250mm	406	210	267	30

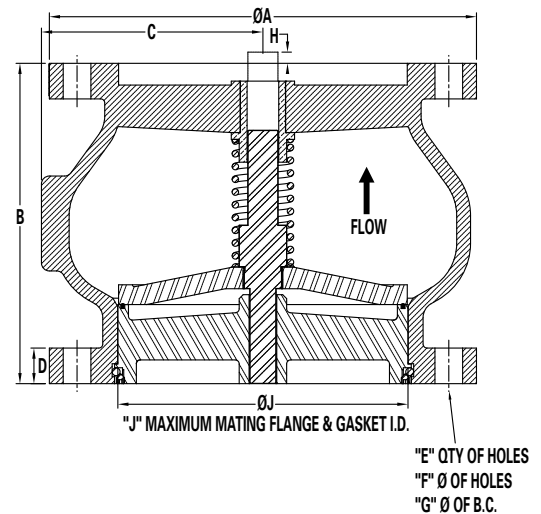


Inches  
Millimeters

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 ring OD.

## Basic Valve - 600A Globe

Valve Size	All Valves				Class 125/150 (F1)					Class 250/300 (F2)				
	B	C	H	J	A	D	E	F	G	A	D	E	F	G
3"	6.00	3.25	0	3.38	7.50	0.94	4	0.75	6.00	8.25	1.13	8	0.88	6.63
80mm	152	83	0	86	191	24	4	19	152	210	29	8	22	168
4"	7.25	4.13	0	4.75	9.00	0.94	8	0.75	7.50	10.00	1.25	8	0.88	7.88
100mm	184	105	0	121	229	24	8	19	191	254	32	8	22	200
6"	9.00	5.63	0	6.50	11.00	1.00	8	0.88	9.50	12.50	1.44	12	0.88	10.56
150mm	229	143	0	165	279	25	8	22	241	318	37	12	22	268
8"	10.13	7.00	0	8.50	13.50	1.13	8	0.88	11.75	15.00	1.63	12	1.00	13.00
200mm	257	178	0	216	343	29	8	22	299	381	41	12	25	330
10"	12.00	9.06	0.16	10.75	16.00	1.19	12	1.00	14.25	17.50	1.88	16	1.13	15.25
250mm	315	230	4	273	406	30	12	25	362	445	48	16	29	387
12"	14.38	10.38	0.31	12.88	19.00	1.25	12	1.00	17.00	20.50	2.00	16	1.25	17.75
300mm	365	264	7.9	327	483	32	12	25	432	521	51	16	32	451
14"	15.75	12.00	0	14.75	21.00	1.38	12	1.13	18.75	23.00	2.13	20	1.25	20.25
350mm	400	305	0	375	533	35	12	29	476	584	54	20	32	514
16"	17.63	13.31	0.69	16.50	23.50	1.44	16	1.13	21.25	25.50	2.25	20	1.38	22.50
400mm	448	338	18	419	597	37	16	29	540	648	57	20	35	572
18"	18.75	15.19	1.38	18.75	25.00	1.56	16	1.25	22.75	28.00	2.38	24	1.38	24.75
450mm	476	386	35	476	635	40	16	32	578	711	60	24	35	629
20"	20.63	16.75	1.13	20.63	27.50	1.69	20	1.25	25.00	30.50	2.50	24	1.38	27.00
500mm	524	425	29	524	699	43	20	32	635	775	64	24	35	686
24"	24.00	19.00	2.25	24.75	32.00	1.88	20	1.38	29.50	36.00	2.75	24	1.63	32.00
600mm	610	483	57	629	813	48	20	35	749	914	70	24	41	813
30"	29.25	23.38	3.56	29.50	38.75	2.13	28	1.38	36.00	43.00	3.00	28	1.88	39.25
750mm	743	594	91	749	984	54	28	35	914	1092	76	28	48	997
36"	45.00	26.63	0	36.00	46.00	2.38	32	1.63	42.75	50.00	3.38	32	2.25	46.00
900mm	1143	676	0	914	1168	60	32	41	1086	1270	86	32	57	1168
42"	50.00	33.00	1.00	42.00	53.00	2.63	36	1.63	49.50	—	—	—	—	—
1100mm	1270	838	25	1067	1346	67	36	41	1257	—	—	—	—	—



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. If special mating flanges are used, ID of the mating flange (seat side only) should never be greater than seat ring OD.

## **Sales and Service**

For information about our worldwide locations, approvals, certifications and local representative:

Web Site: [www.dezurik.com](http://www.dezurik.com) E-Mail: [info@dezurik.com](mailto:info@dezurik.com)



250 Riverside Ave. N. Sartell, Minnesota 56377 • Phone: 320-259-2000 • Fax: 320-259-2227

*DeZURIK, Inc. reserves the right to incorporate our latest design and material changes without notice or obligation. Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing by DeZURIK, Inc. Certified drawings are available upon request.*