

# Masoneilan® 21000 Series Control Valves

Specification Data

CH21000

01/07

**Complete Line of  
Rugged, Top Guided,  
Globe Valves with  
Lo-dB®/Anti-Cavitation  
Capabilities**



**DRESSER®**

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## Features

21000 Series single ported unbalanced trim, heavy top guided control valves are designed with built in versatility making them well-suited to handle a wide variety of process applications. Standard features include:

### Top Guided

Rugged, heavy top plug guiding provides maximum support to ensure plug stability.

### Single and Double Stage Lo-dB®/Anti-cavitation Trim

Replacing the conventional plug with the Lo-dB®/Anti-cavitation design provides excellent noise attenuation or cavitation control.

### Reduced Capacity and Low Flow Trim

A series of reduced area trim is available to provide wide flow range capabilities in all valve sizes. Optional trim to meet low flow requirements is also available.

### High Pressure Capability

A variety of actuators are available to handle low to high pressure drop requirements. Allowable pressure drops for specific leakage classes are available in Masoneilan document PH1080, or can be calculated using the Masoneilan Sizing and Selection Program.

### Tight Shutoff

Class IV leakage is standard. Optional constructions meet IEC 534-4 and ANSI/FCI 70.2 Class V and VI.

### Hardened Trim

Provided as standard to handle high pressure drop applications.

### Trim Type

Standard construction offers either a quick change or threaded seat ring. This trim is unbalanced and uses no seals or pilots.

### Environmental Packing

Low emission LE® Packing is available to assure compliance with latest environmental regulations.

### Emissions Free

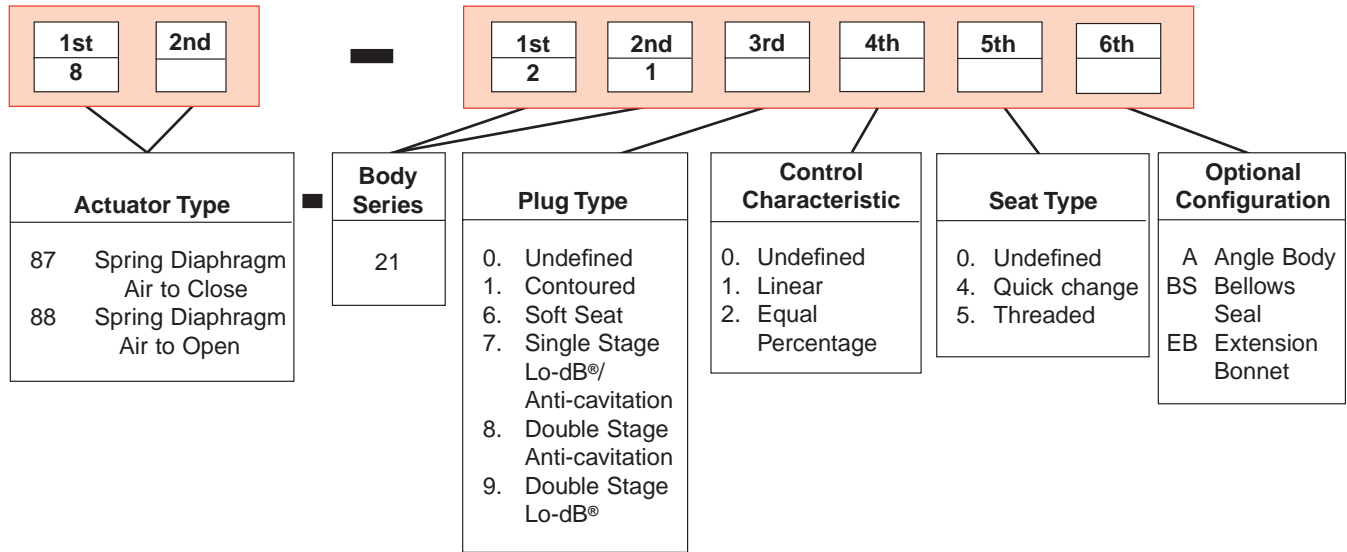
Bellows seal design option is available to meet zero emissions requirements.

### NACE Compliance

The 21000 Series is available for Sour Service Applications using design and construction methods in accordance with NACE Standard MR 0103. Applications requiring compliance to MR 0175, 2003 Rev or ISO 15156 require engineering review.

Trade names noted throughout are for reference only. Masoneilan reserves the right to supply trade named material or its equivalent.

## Numbering System



## General Data

- **Flow Direction**

contoured: flow-to-open  
Lo-dB®: flow-to-open  
anti-cavitation: flow-to-close

- **Body**

type: high capacity globe  
high capacity angle

- **Bonnet**

type: bolted standard  
bolted extension

- **Body and Bonnet**

materials: carbon steel  
316 stainless steel  
chrome-molybdenum steel  
others

- **Trim**

plug type: contoured  
soft seat  
Lo-dB® (1 or 2 stages)  
anti-cavitation (1 or 2 stages)

seat ring: threaded  
quick change

guide: heavy top guided

capacity: full area  
reduced capacity in all sizes

C<sub>v</sub> ratio: 50:1

flow characteristic: linear  
equal percentage

- **Actuator**

type: spring diaphragm  
handwheel: optional

## Temperature Range/Seat Leakage

### Contoured Trim

Valve Size		Body <sup>(1)</sup> Rating	Seat Type	Packing Material	Temperature Range <sup>(2)</sup>				Seat Leakage, IEC 534-4 and ANSI/FCI 70.2 Class	
					Standard Bonnet		Extension Bonnet			
inch	mm				min.	max.	min.	max.		
.75 to 6	20 to 150	ANSI Class 150 to 2500 and equivalent PN	Metal	PTFE or LE <sup>®</sup> Packing <sup>(5)</sup>	-20°F (-29°C)	+450°F (+232°C)	-20°F (-29°C)	+800°F (+427°C)	IV	V
				Flexible Graphite	-20°F (-29°C)	+800°F (+427°C)	-20°F (-29°C)	+800°F (+427°C)		
			Soft Seat	Any	-20°F (-29°C)	+450°F (+232°C)	-20°F (-29°C)	+450°F (+232°C)	VI	

### Lo-dB<sup>®</sup>/Anti-Cavitation Trim (1 or 2 Stage Design)<sup>(3)</sup>

Valve <sup>(4)</sup> Size		Body <sup>(1)</sup> Rating	Seat Type	Packing Material	Temperature Range <sup>(2)</sup>				Seat Leakage, IEC 534-4 and ANSI/FCI 70.2 Class	
					Standard Bonnet		Extension Bonnet			
inch	mm				min.	max.	min.	max.		
.75 to 6	20 to 150	ANSI Class 150 to 2500 and equivalent PN	Metal	PTFE or LE <sup>®</sup> Packing <sup>(5)</sup>	-20°F (-29°C)	+450°F (+232°C)	-20°F (-29°C)	+800°F (+427°C)	IV	V
				Flexible Graphite	-20°F (-29°C)	+800°F (+427°C)	-20°F (-29°C)	+800°F (+427°C)		

1. ANSI Class 900 to 2500 available only in .75 to 2 inch (20 to 50 mm) sizes.
2. See Materials of Construction Tables for other temperature limitations.
3. 2-Stage design only available with Quick Change seat rings.
4. 2-Stage Anti-Cavitation Trim not available in 6 inch (150 mm) size.
5. LE Packing for low emissions applications is limited to maximum pressure and temperature as shown in the chart on page 14.

## Ratings/Connections<sup>(1)</sup>

RF Flanged     
 • Socket Weld     
 ○ Threaded     
 △ RT Joint     
 ■ Butt Weld

Valve <sup>(2)</sup> Size		ANSI Class 150 to 600 <sup>(3)</sup> and equivalent PN				ANSI Class 900 to 2500 <sup>(3)</sup> and equivalent PN				
inch	mm	<input type="checkbox"/>	•	○	△	■	<input type="checkbox"/>	•	△	■
.75 to 2	20 to 50	<input type="checkbox"/>	•	○	△	■	<input type="checkbox"/>	•	△	■
3 to 6	80 to 150	<input type="checkbox"/>			△	■	See 41005 Series			

1. Standard flange finish of Ra 125-250. Other flange facings and surface finishes available.
2. Sizes, ratings and end connections available in both globe and angle body styles.
3. Butt weld end connections available only in 2 inch (50 mm) size.

# C<sub>V</sub> and F<sub>L</sub> versus Travel for 21100 and 21600 Series

## Contoured Trim

Body Rating: ANSI Class 150 to 600  
 Sizes: DN 20 to DN 150 - .75" through 6"

Direction: **FLOW-TO-OPEN (FTO)**

Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100				
F <sub>L</sub>						0.93	0.93	0.92	0.92	0.91	0.91	0.91	0.90	0.90	0.90				
Valve Size		Orifice Diameter		Travel		Rated C <sub>V</sub>													
																inches	mm	inches	mm
<b>.75 &amp; 1</b>	<b>20 &amp; 25</b>	0.125	3.2	0.8	20.3	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.08	0.09	0.1				
						0.02	0.04	0.06	0.07	0.09	0.11	0.13	0.15	0.18	0.2				
						0.03	0.06	0.08	0.11	0.13	0.16	0.19	0.23	0.27	0.3				
		0.250	6.4	0.8	20.3	0.04	0.08	0.11	0.14	0.18	0.22	0.26	0.30	0.36	0.4				
						0.06	0.12	0.17	0.22	0.27	0.32	0.38	0.45	0.54	0.6				
						0.08	0.16	0.22	0.29	0.36	0.43	0.51	0.60	0.72	0.8				
						0.10	0.20	0.28	0.36	0.45	0.54	0.64	0.76	0.90	1				
						0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7				
						0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8				
0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6						
				0.812	20.6	0.8	20.3	1.1	2.2	3.2	4.3	5.4	6.7	7.9	9.2	11	<b>12</b>		
<b>1.5</b>	<b>40</b>	0.250	6.4	0.8	20.3	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.11				
						0.03	0.06	0.08	0.11	0.13	0.16	0.19	0.23	0.27	0.3				
						0.06	0.12	0.17	0.22	0.27	0.32	0.38	0.45	0.54	0.6				
						0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7				
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8				
						0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
						0.812	20.6	0.8	20.3	1.2	2.3	3.5	4.6	5.9	7.2	8.6	10	11	13
						1.250	31.8	0.8	20.3	2.3	4.5	6.8	8.9	11	14	17	19	22	25
1.625	41.3	0.8	20.3	3.2	6.3	9.5	12	16	19	23	27	31	<b>35</b>						
<b>2</b>	<b>50</b>	0.250	6.4	0.8	20.3	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.11				
						0.03	0.06	0.08	0.11	0.13	0.16	0.19	0.23	0.27	0.3				
						0.06	0.12	0.17	0.22	0.27	0.32	0.38	0.45	0.54	0.6				
						0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7				
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8				
						0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
						0.812	20.6	0.8	20.3	1.4	2.7	4.1	5.3	6.8	8.3	9.9	12	13	15
						1.250	31.8	0.8	20.3	2.3	4.7	7.0	9.2	12	14	17	20	23	26
1.625	41.3	0.8	20.3	4.1	8.3	12	16	21	26	30	35	40	<b>46</b>						
<b>3</b>	<b>80</b>	1.250	31.8	1.5	38.1	2.8	5.6	8.4	11	14	17	20	24	27	31				
		1.625	41.3	1.5	38.1	4.2	8.5	13	17	21	26	31	36	41	47				
		2.625	66.7	1.5	38.1	9.9	20	30	39	50	61	73	85	97	<b>110</b>				
<b>4</b>	<b>100</b>	1.625	41.3	1.5	38.1	4.4	8.8	13	17	22	27	32	38	43	49				
		2.625	66.7	1.5	38.1	10	20	31	40	51	63	75	87	99	113				
		3.500	88.9	1.5	38.1	18	35	53	69	88	108	129	150	172	<b>195</b>				
<b>6</b>	<b>150</b>	2.625	66.7	2.0	50.8	11	23	34	45	57	70	83	97	111	126				
		3.500	88.9	2.0	50.8	19	37	56	74	94	115	137	160	183	208				
		5.000	127.0	2.0	50.8	36	72	108	142	180	222	264	308	352	<b>400</b>				

Standard Bellows Seal construction available for ANSI Class 150 - 300 and capacities of C<sub>V</sub> = 1.7 and higher

  Quick Change Trim Only

  Note: Close Clearance Trim construction used for low flow capacities (C<sub>V</sub> < 1.7) in valve sizes .75 & 1 inches (20 & 25 mm).

## C<sub>V</sub> and F<sub>L</sub> versus Travel for 21100 and 21600 Series

### Contoured Trim

Body Rating: ANSI Class 150 to 600

Sizes: DN 20 to DN 150 - .75" to 6"

Direction: **FLOW-TO-OPEN (FTO)**

Flow Characteristic: **EQUAL PERCENTAGE**

Percent of Travel						10	20	30	40	50	60	70	80	90	100
F <sub>L</sub>						0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.91	0.91	0.9
Valve Size		Orifice Diameter		Travel		Rated C <sub>V</sub>									
inches	mm	inches	mm	inches	mm										
<b>.75 &amp; 1.00</b>	<b>20 &amp; 25</b>	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.3	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.0	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.43	0.61	0.84	1.3	2.3	4.3	6.8	8.9	11	12
<b>1.50</b>	<b>40</b>	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.3	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.05	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.39	0.58	0.86	1.36	2.3	3.9	6.1	8.6	11	13
		1.250	31.8	0.8	20.3	0.90	1.28	1.76	2.8	4.7	9.0	14	19	22	25
		1.625	41.3	0.8	20.3	1.27	1.79	2.46	3.9	6.6	12.6	20	26	31	35
<b>2</b>	<b>50</b>	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.3	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.0	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.45	0.67	0.99	1.6	2.6	4.5	7.0	9.9	13	15
		1.250	31.8	0.8	20.3	0.77	1.2	1.7	2.7	4.5	7.7	12	17	23	26
		1.625	41.3	0.8	20.3	1.7	2.3	3.2	5.1	8.7	17	26	34	41	46
<b>3</b>	<b>80</b>	1.250	31.8	1.5	38.1	0.92	1.4	2.0	3.2	5.4	9.2	15	20	27	31
		1.625	41.3	1.5	38.1	1.4	2.1	3.1	4.9	8.2	14	22	31	41	47
		2.625	66.7	1.5	38.1	4.0	5.6	7.7	12	21	40	62	82	98	110
<b>4</b>	<b>100</b>	1.625	41.3	1.5	38.1	1.5	2.2	3.2	5.1	8.5	15	23	32	43	49
		2.625	66.7	1.5	38.1	3.4	5.0	7.5	12	20	34	53	75	99	113
		3.500	88.9	1.5	38.1	7.1	10.0	13.7	22	37	70	110	145	174	195
<b>6</b>	<b>150</b>	2.625	66.7	2.0	50.8	3.8	5.6	8.3	13	22	38	59	83	110	126
		3.500	88.9	2.0	50.8	6.2	9.3	14	22	36	62	97	137	181	208
		5.000	127.0	2.0	50.8	14	20	28	44	76	144	226	298	357	400

☐ Quick Change Trim Only

## 21700 Series

### Single Stage Lo-dB®/Anti-Cavitation Trim

Body Rating: ANSI Class 150 to 600

Sizes: DN 20 to DN 150 - .75" to 6"

Direction: **FLOW-TO-OPEN (FTO)**

& **FLOW-TO-CLOSE (FTC)**

Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100
F <sub>L</sub>						0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Valve Size		Orifice Diameter		Travel		Rated C <sub>V</sub>									
inches	mm	inches	mm	inches	mm										
<b>.75 &amp; 1</b>	<b>20 &amp; 25</b>	0.812	20.6	0.8	20.3	0.40	0.80	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4
						0.80	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8
<b>1.5</b>	<b>40</b>	1.250	31.8	0.8	20.3	0.80	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8
						1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15
<b>2</b>	<b>50</b>	1.250	31.8	0.8	20.3	0.80	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8
						1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15
						1.625	41.3	0.8	20.3	2.5	5.0	7.5	10.0	12.5	15.0
<b>3</b>	<b>80</b>	2.625	66.7	1.5	38.1	4.8	9.6	14.4	19.2	24.0	28.8	33.6	38.4	43.2	48
						7.5	15.0	22.5	30.0	37.5	45.0	52.5	60.0	67.5	75
<b>4</b>	<b>100</b>	2.625	66.7	1.5	38.1	6.3	12.6	18.9	25.2	31.5	37.8	44.1	50.4	56.7	63
						10	20	30	40	50	60	70	80	90	100
<b>6</b>	<b>150</b>	5.000	127.0	2.0	50.8	15	30	45	60	75	90	105	120	135	150
						20	40	60	80	100	120	140	160	180	200

☐ Quick Change Trim Only

## C<sub>V</sub> and F<sub>L</sub> versus Travel for 21800 Series

### Double Stage Anti-Cavitation Trim

Body Rating: ANSI Class 150 to 600

Sizes: DN 20 to DN 100 - .75" to 4"

Direction: **FLOW-TO-CLOSE (FTC)**

Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100	
F <sub>L</sub>						0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
Valve Size		Orifice Diameter		Travel		Rated C <sub>V</sub>										
inches	mm	inches	mm	inches	mm											
<b>.75 &amp; 1</b>	<b>20 &amp; 25</b>	0.812	20.6	0.8	20.3	0.23	0.46	0.7	0.9	1.2	1.4	1.6	1.8	2.1	2.3	
						0.45	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	<b>4.5</b>	
<b>1.5</b>	<b>40</b>	0.812	20.6	0.8	20.3	0.23	0.5	0.7	0.9	1.2	1.4	1.6	1.8	2.1	2.3	
						0.45	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	
						0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	<b>8.5</b>	
<b>2</b>	<b>50</b>	1.250	31.8	0.8	20.3	0.45	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	
						0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	
						1.625	41.3	0.8	20.3	1.4	2.8	4.2	5.6	7.0	8.4	9.8
<b>3</b>	<b>80</b>	2.625	66.7	1.5	38.1	2.7	5.4	8.1	10.8	13.5	16.2	18.9	21.6	24.3	27	
						4.2	8.4	12.6	16.8	21	25.2	29.4	33.6	37.8	<b>42</b>	
<b>4</b>	<b>100</b>	2.625	66.7	1.5	38.1	4	8	12	16	20	24	28	32	36	40	
						3.500	88.9	1.5	38.1	6	12	19	25	31	37	43

Double stage anti-cavitation trim not available with Bellows Seal construction.

## 21900 Series

### Double Stage Lo-dB<sup>®</sup> Trim

Body Rating: ANSI Class 150 to 600

Sizes: DN 20 to DN 150 - .75" to 6"

Direction: **FLOW-TO-OPEN (FTO)**

Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100	
F <sub>L</sub>						0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
Valve Size		Orifice Diameter		Travel		Rated C <sub>V</sub>										
inches	mm	inches	mm	inches	mm											
<b>.75 &amp; 1</b>	<b>20 &amp; 25</b>	0.812	20.6	0.8	20.3	0.35	0.70	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	
						0.57	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.1	<b>5.7</b>	
<b>1.5</b>	<b>40</b>	1.250	31.8	0.8	20.3	0.70	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7	
						1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	<b>13</b>	
<b>2</b>	<b>50</b>	1.250	31.8	0.8	20.3	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13	
						1.625	41.3	0.8	20.3	2.1	4.2	6.3	8.4	10.5	12.6	14.7
<b>3</b>	<b>80</b>	2.625	66.7	1.5	38.1	4	8	12	16	20	24	28	32	36	40	
						6.3	12.6	18.9	25.2	31.5	37.8	44.1	50.4	56.7	<b>63</b>	
<b>4</b>	<b>100</b>	2.625	66.7	1.5	38.1	5.3	10.6	15.9	21.2	26.5	31.8	37.1	42.4	47.7	53	
						3.500	88.9	1.5	38.1	8	17	25	33	42	50	58
<b>6</b>	<b>150</b>	5.000	127	2.0	50.8	13	25	38	50	63	75	88	100	113	<b>125</b>	

# C<sub>v</sub> and F<sub>L</sub> versus Travel for 21100 and 21600 Series

## Contoured Trim

Body Rating: ANSI Class 900 to 1500  
 Sizes: DN 20 to DN 50 - .75" through 2"

Direction: **FLOW-TO-OPEN (FTO)**  
 Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100
F <sub>L</sub>						0.93	0.93	0.92	0.92	0.91	0.91	0.91	0.90	0.90	0.90
Valve Size		Orifice Diameter		Travel		Rated C <sub>v</sub>									
inches	mm	inches	mm	inches	mm										
<b>.75 &amp; 1</b>	<b>20 &amp; 25</b>	0.250	6.4	0.8	20.3	0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8
		0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
		0.812	20.6	0.8	20.3	1.1	2.2	3.2	4.3	5.4	6.7	7.9	9.2	11	<b>12</b>
<b>1.5</b>	<b>40</b>	0.250	6.4	0.8	20.3	0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8
		0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
		0.812	20.6	0.8	20.3	1.2	2.3	3.5	4.6	5.9	7.2	8.6	10	11	13
		1.250	31.8	0.8	20.3	2.3	4.5	6.8	8.9	11	14	17	19	22	25
		1.625	41.3	0.8	20.3	3.2	6.3	9.5	12	16	19	23	27	31	<b>35</b>
<b>2</b>	<b>50</b>	0.250	6.4	0.8	20.3	0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8
		0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
		0.812	20.6	0.8	20.3	1.4	2.7	4.1	5.3	6.8	8.3	9.9	12	13	15
		1.250	31.8	0.8	20.3	2.3	4.7	7.0	9.2	12	14	17	20	23	26
		1.625	41.3	0.8	20.3	4.1	8.3	12	16	21	26	30	35	40	<b>46</b>

☐ Quick Change Trim Only

## Contoured Trim

Body Rating: ANSI Class 900 to 1500  
 Sizes: DN 20 to DN 50 - .75" to 2"

Direction: **FLOW-TO-OPEN (FTO)**  
 Flow Characteristic: **EQUAL PERCENTAGE**

Percent of Travel						10	20	30	40	50	60	70	80	90	100
F <sub>L</sub>						0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.91	0.91	0.9
Valve Size		Orifice Diameter		Travel		Rated C <sub>v</sub>									
inches	mm	inches	mm	inches	mm										
<b>.75 &amp; 1.00</b>	<b>20 &amp; 25</b>	0.250	6.4	0.8	20.32	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.32	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.0	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.43	0.61	0.84	1.3	2.3	4.3	6.8	8.9	11	<b>12</b>
<b>1.50</b>	<b>40</b>	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.3	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.05	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.39	0.58	0.86	1.36	2.3	3.9	6.1	8.6	11	13
		1.250	31.8	0.8	20.3	0.90	1.28	1.76	2.8	4.7	9.0	14	19	22	25
		1.625	41.3	0.8	20.3	1.27	1.79	2.46	3.9	6.6	12.6	20	26	31	<b>35</b>
<b>2</b>	<b>50</b>	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.3	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.0	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.45	0.67	0.99	1.6	2.6	4.5	7.0	9.9	13	15
		1.250	31.8	0.8	20.3	0.77	1.2	1.7	2.7	4.5	7.7	12	17	23	26
		1.625	41.3	0.8	20.3	1.7	2.3	3.2	5.1	8.7	17	26	34	41	<b>46</b>

ANSI Class 900 to 1500 available only in sizes .75" to 2".

☐ Quick Change Trim Only



# C<sub>v</sub> and F<sub>L</sub> versus Travel for 21100 and 21600 Series

## Contoured Trim

Body Rating: ANSI Class 2500

Sizes: DN 20 to DN 50 - .75" through 2"

Direction: **FLOW-TO-OPEN (FTO)**

Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100
F <sub>L</sub>						0.93	0.96	0.92	0.92	0.91	0.91	0.91	0.9	0.9	0.9
Valve Size		Orifice Diameter		Travel		Rated C <sub>v</sub>									
.75	20	0.250	6.4	0.8	20.3	0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8
		0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
		0.812	20.6	0.8	20.3	0.7	1.4	2.2	2.8	3.6	4.4	5.3	6.2	7	<b>8</b>
1	25	0.250	6.4	0.8	20.3	0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8
		0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
		0.812	20.6	0.8	20.3	0.9	1.8	2.7	3.6	4.5	5.6	6.6	7.7	9	<b>10</b>
1.5	40	0.250	6.4	0.8	20.3	0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8
		0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
		0.812	20.6	0.8	20.3	1.2	2.3	3.5	4.6	5.9	7.2	8.6	10	11	13
		1.250	31.8	0.8	20.3	1.8	3.6	5.4	7.1	9	11	13	15	18	20
1.625	41.3	0.8	20.3	2.3	4.5	6.8	9	11	14	17	19	22	<b>25</b>		
2	50	0.250	6.4	0.8	20.3	0.15	0.31	0.46	0.60	0.77	0.94	1.1	1.3	1.5	1.7
		0.375	9.5	0.8	20.3	0.34	0.68	1.0	1.3	1.7	2.1	2.5	2.9	3.3	3.8
		0.500	12.7	0.8	20.3	0.54	1.1	1.6	2.1	2.7	3.3	4.0	4.6	5.3	6
		0.812	20.6	0.8	20.3	1.4	2.7	4.1	5.3	6.8	8.3	9.9	12	13	15
		1.250	31.8	0.8	20.3	2.3	4.7	7.0	9.2	12	14	17	20	23	26
1.625	41.3	0.8	20.3	3.2	6.3	9	12	16	19	23	27	31	<b>35</b>		

▬ Quick Change Trim Only

## Contoured Trim

Body Rating: ANSI Class 2500

Sizes: DN 20 to DN 50 - .75" through 2"

Direction: **FLOW-TO-OPEN (FTO)**

Flow Characteristic: **EQUAL PERCENTAGE**

Percent of Travel						10	20	30	40	50	60	70	80	90	100
F <sub>L</sub>						0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.91	0.91	0.9
Valve Size		Orifice Diameter		Travel		Rated C <sub>v</sub>									
.75	20	0.250	6.4	0.8	20.32	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.32	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.1	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.29	0.41	0.56	0.9	1.5	2.9	4.5	6.0	7	<b>8</b>
1	25	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.32	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.1	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.36	0.51	0.70	1.1	1.9	3.6	5.6	7.4	9	<b>10</b>
1.5	40	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.3	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.05	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.39	0.58	0.86	1.36	2.3	3.9	6.1	8.6	11	13
		1.250	31.8	0.8	20.3	0.72	1.02	1.40	2.2	3.8	7.2	11	15	18	20
1.625	41.3	0.8	20.3	0.90	1.28	1.76	2.8	4.7	9.0	14	19	22	<b>25</b>		
2	50	0.250	6.4	0.8	20.3	0.05	0.08	0.11	0.18	0.30	0.5	0.8	1.1	1.5	1.7
		0.375	9.5	0.8	20.3	0.11	0.17	0.25	0.40	0.66	1.1	1.8	2.5	3.3	3.8
		0.500	12.7	0.8	20.3	0.18	0.27	0.40	0.63	1.0	1.8	2.8	4.0	5.2	6
		0.812	20.6	0.8	20.3	0.45	0.67	0.99	1.6	2.6	4.5	7.0	9.9	13	15
		1.250	31.8	0.8	20.3	0.77	1.2	1.7	2.7	4.5	7.7	12	17	23	26
1.625	41.3	0.8	20.3	1.3	1.8	2.5	3.9	6.6	13	20	26	31	<b>35</b>		

ANSI Class 2500 available only in sizes .75" to 2".

▬ Quick Change Trim Only

## C<sub>V</sub> and F<sub>L</sub> versus Travel for 21700 Series

### Single Stage Lo-dB®/Anti-Cavitation Trim

Body Rating: ANSI Class 900 to 2500

Sizes: DN 20 to DN 50 - .75" to 2"

Direction: **FLOW-TO-OPEN (FTO)**

& **FLOW-TO-CLOSE (FTC)**

Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100	
F <sub>L</sub>						0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Valve Size		Orifice Diameter		Travel		Rated C <sub>v</sub>										
inches	mm	inches	mm	inches	mm											
.75 & 1	20 & 25	0.812	20.6	0.8	20.3	0.40	0.80	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4	
						0.80	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8	
1.5	40	1.250	31.8	0.8	20.3	0.80	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8	
						1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15	
2	50	1.250	31.8	0.8	20.3	0.80	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8	
						1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15	
		1.625	41.3	0.8	20.3	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25	

□ Quick Change Trim Only

## 21800 Series

### Double Stage Anti-Cavitation Trim

Body Rating: ANSI Class 900 to 2500

Sizes: DN 20 to DN 50 - .75" to 2"

Direction: **FLOW-TO-CLOSE (FTC)**

Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100	
F <sub>L</sub>						0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
Valve Size		Orifice Diameter		Travel		Rated C <sub>v</sub>										
inches	mm	inches	mm	inches	mm											
.75 & 1	20 & 25	0.812	20.6	0.8	20.3	0.23	0.46	0.7	0.9	1.2	1.4	1.6	1.8	2.1	2.3	
						0.45	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	
1.5	40	0.812	20.6	0.8	20.3	0.23	0.5	0.7	0.9	1.2	1.4	1.6	1.8	2.1	2.3	
						0.45	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	
		1.250	31.8	0.8	20.3	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	
2	50	1.250	31.8	0.8	20.3	0.45	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	
						0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	
		1.625	41.3	0.8	20.3	1.4	2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14	

## 21900 Series

### Double Stage Lo-dB® Trim

Body Rating: ANSI Class 900 to 2500

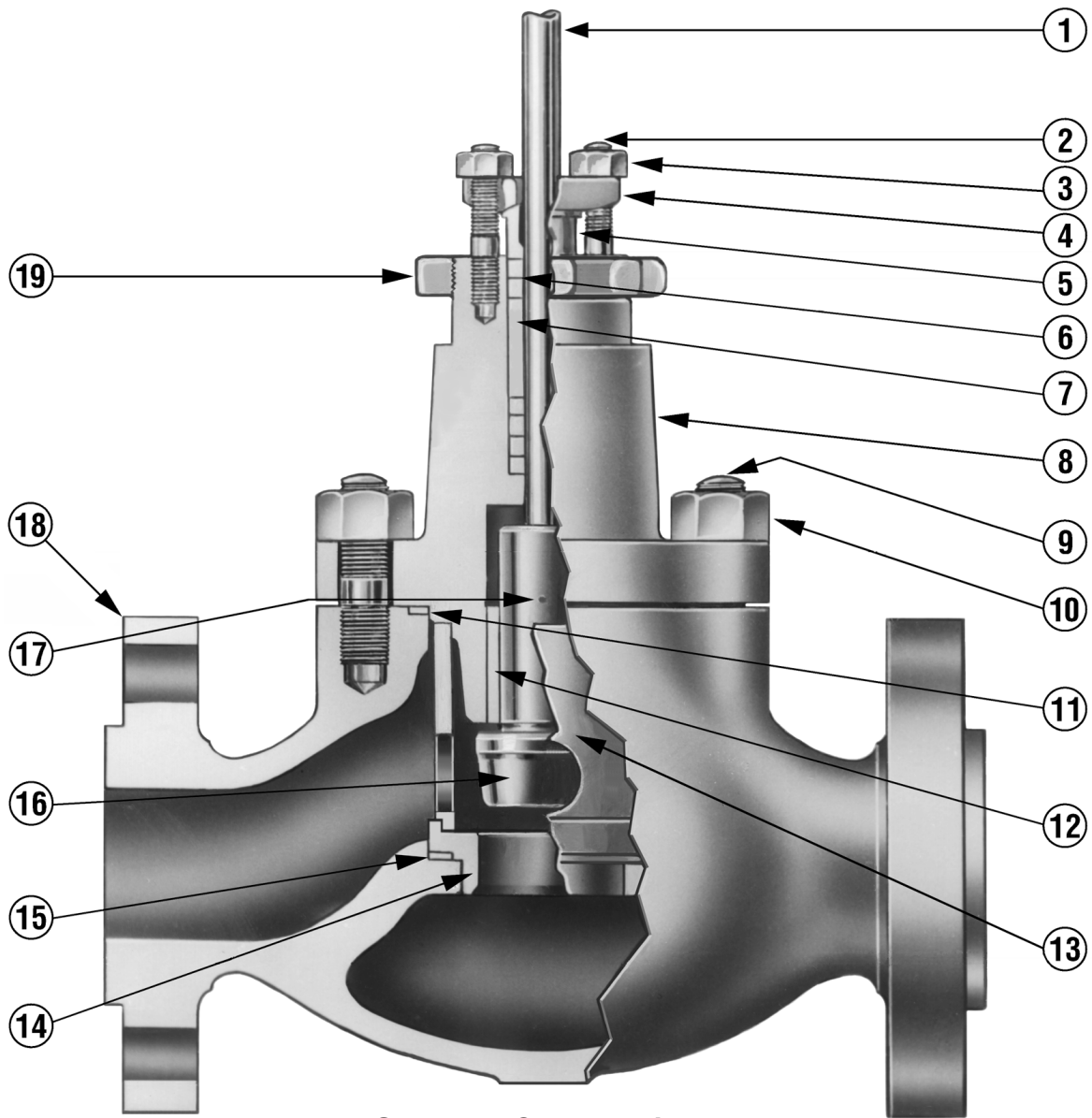
Sizes: DN 20 to DN 50 - .75" to 2"

Direction: **FLOW-TO-OPEN (FTO)**

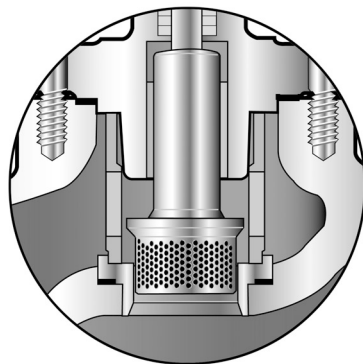
Flow Characteristic: **LINEAR**

Percent of Travel						10	20	30	40	50	60	70	80	90	100	
F <sub>L</sub>						0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975	0.975
Valve Size		Orifice Diameter		Travel		Rated C <sub>v</sub>										
inches	mm	inches	mm	inches	mm											
.75 & 1	20 & 25	0.812	20.6	0.8	20.3	0.35	0.70	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	
						0.57	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.1	5.7	
1.5	40	1.250	31.8	0.8	20.3	0.70	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7	
						1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13	
2	50	1.250	31.8	0.8	20.3	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13	
						1.625	41.3	0.8	20.3	2.1	4.2	6.3	8.4	10.5	12.6	14.7

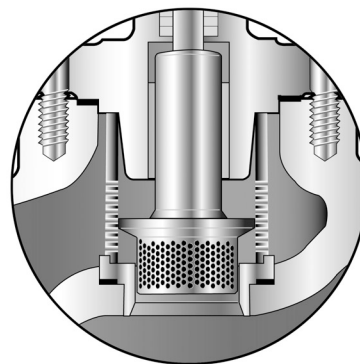
# Materials of Construction



Standard Construction



Single Stage Lo-dB®  
Anti-Cavitation Trim



Double Stage Lo-dB®  
Anti-Cavitation Trim

# Materials of Construction

## Standard Carbon Steel Version

Ref. No.	Temperature Range	-20°F	450°F	650°F	800°F
	Description	Standard Materials			
1	Plug Stem	17-4 PH St. St. ASTM A564 Gr 630			See optional mat'ls
2	Packing Flange Stud	304 St. St. ASTM A193 GR B8			
3	Packing Flange Nut	304 St. St. ASTM A194 GR 8			
4	Packing Flange	Carbon Steel ASTM A668 CL B or ASTM A216 GR WCC			
5	Packing Follower	300 Series Austenitic Stainless Steel			
6	Packing	Kevlar PTFE (Crane 285K) with Std. Bonnet			See optional materials
		Kevlar PTFE (Crane 285K) with Ext. Bonnet			
7	Lantern Ring (Optional)	300 Series Austenitic Stainless Steel			
8	Valve Bonnet	Carbon Steel ASTM A216 Grade WCC or ASTM A105			
9	Body Stud	Alloy Steel ASTM A193 GR B7			
10	Body Stud Nut	Carbon Steel ASTM A194 GR 2H			
11	Body Gasket	316L St. St. w/Flexible Graphite Filler (Spiral Wound)			
12	Guide Bushing	440C St. St. ASTM A276 TY 440C <sup>(1)</sup>			
13	Cage <sup>(2)</sup> /Retainer	304 St. St. ASTM A351 GR CF8			
14	Seat Ring	400 Series Martensitic Stainless Steel			See optional mat'ls
15	Seat Ring Gasket	316L St. St. w/Flexible Graphite Filler (Spiral Wound)			
16	Plug	400 Series Martensitic Stainless Steel			See optional mat'ls
17	Plug Pin	303 St. St. ASTM A582 TY 303			
18	Valve Body	Carbon Steel ASTM A216 Grade WCC			
19	Drive Nut	Carbon Steel SAE 1117 or ASTM A216 GR WCC			
Ref. No.	Temperature Range	-29°C	232°C	343°C	427°C

1. 440C bushing not supplied with Stainless Steel Body/Bonnet or in combination with 316 Trim.  
 2. Required for Quick Change Trim option only.

## Standard Stainless Steel Version <sup>(1)</sup>

Ref. No.	Temperature Range	-20°F	650°F	800°F	
	Description	Standard Materials			
1	Plug Stem	316 St. St. ASTM A479 TY 316			See optional mat'ls
8	Valve Bonnet	316 St. St. ASTM A351 GR CF8M			
18	Valve Body	316 St. St. ASTM A351 GR CF8M			
12	Guide Bushing	Nitronic 60 ASTM A479 TY 21800			See optional mat'ls
14	Seat Ring	316 St. St. ASTM A479 TY 316			
16	Plug	316 St. St. ASTM A479 TY 316			See optional mat'ls
Ref. No.	Temperature Range	-29°C	343°C	427°C	

1. Materials for other components are same as listed for Standard Carbon Steel Version.  
 2. Consult Masoneilan for material combinations for temperatures below -20°F (-29°C) or above 800°F (427°C).

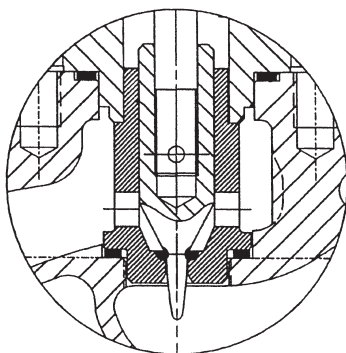
Review use of optional materials and configurations for temperature ranges indicated. Standard materials listed may still be applicable depending on specific service conditions. Consult Masoneilan for appropriate material combinations.

# Materials of Construction

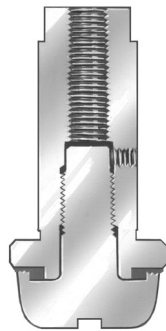
## Optional Configurations & Materials

Ref. No.	Temperature Range	-20°F	450°F	650°F	800°F
Ref. No.	Description	Standard Materials			
1	Plug Stem	A286 Super Alloy ASTM A638 GR 660 Inconel X-750 ASTM B637 GR 688			
6	Packing	LE® Packing <sup>(1)</sup> with Std. Bonnet LE® Packing <sup>(1)</sup> with Ext. Bonnet Flexible Graphite			
8	Valve Bonnet	Chrome-Moly Steel ASTM A217 Grade WC9			
18	Valve Body	Chrome-Moly Steel ASTM A217 Grade WC9			
9	Body Stud <sup>(2)</sup>	304 St. St. ASTM A193 GR B8 CL 2			
10	Body Stud Nut <sup>(2)</sup>	304 St. St. ASTM A194 GR 8			
12	Guide Bushing	Stellite 6 UNS 30006			
13	Cage / Retainer <sup>(3)</sup>	Martensitic St. St. ASTM A487 GR CA6NM CL B			
	Cage/ Seat <sup>(6)</sup>	400 Series Martensitic Stainless Steel			
		Monel K 500 Stellite 6 UNS 30006			
14	Seat Ring	316 St. St. ASTM A479 TY 316 with Hardfaced Seat			
16	Plug	316 St. St. ASTM A479 TY 316 with Teflon Soft Seat			
		316 St. St. ASTM A479 TY 316 with Hardfaced Seat			
		316 St. St. ASTM A479 TY 316 with Hardfaced Seat & Guide <sup>(4) (6)</sup>			
		Monel K 500 <sup>(6)</sup>			
		Stellite 6 UNS 30006 <sup>(4) (6)</sup>			
Ref. No.	Temperature Range	-29°C	232°C	343°C	427°C

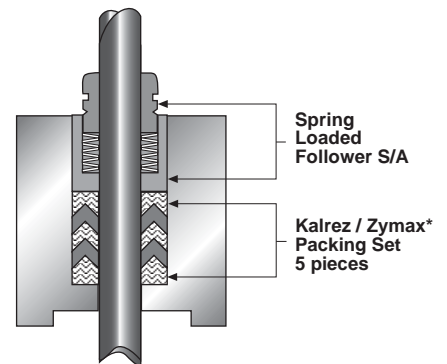
1. LE Packing for low emissions applications is limited to maximum operating pressure and temperature as shown in the chart on page 14.
2. Optional stainless steel bolting materials for corrosive ambient environments. Consult Masoneilan for specific pressure and temperature limitations.
3. Required for Quick Change Trim option only. Recommended material option for ANSI Class 900 and above.
4. Recommended material for use along with solid Stellite bushing for applications above 650°F (343°C).
5. Consult Masoneilan for material combinations for temperatures below -20°F (-29°C) or above 800°F (427°C).
6. Optional component and materials for Close Clearance low flow trim options.



**21000 Close Clearance  
Low Flow Trim**



**Soft Seated  
Plug S/A**



**LE® Packing System (Optional)  
Low Emission Stem Packing**

# Bellows Seal Design Features - 21000 BS Series

### Standard Construction

Bellows seal configuration is fully compatible with the standard 21000 Series trim and actuator options providing equivalent capacity capabilities for each valve size. The standard packing box design and packing design options are used as a secondary stem seal.

### Rugged Design

The formed bellows construction is an externally pressurized design that is capable of operating up to the full valve ANSI B16.34 pressure rating. Guides are located above and below the bellows providing excellent stability to withstand flow induced and mechanical vibration.

### Maximum Life

The bellows assembly is designed for 50% compression/extension to achieve zero stress at the valve mid-stroke position for maximum cycle life. Bellows torsional stresses are also minimized with the anti-rotation feature provided by flats on the plug stem.

### High Quality

Each bellows subassembly is helium leak tested to verify weld integrity, and is also hydro-statically tested as part of the

complete valve assembly. Mechanical travel stops are also designed into both the bellows and valve assemblies to prevent over compression or extension.

### Smart Solution

Bellows installed cycle life can be monitored in the field by utilizing Masoneilan's SVI® Digital Positioner with actual process data. This unique preventative maintenance option will help improve plant safety by identifying potential hazardous failures before they happen, and reduce cost by eliminating premature Bellows replacement.

### Bellows Materials

#### Standard Material

316/316L Stainless Steel

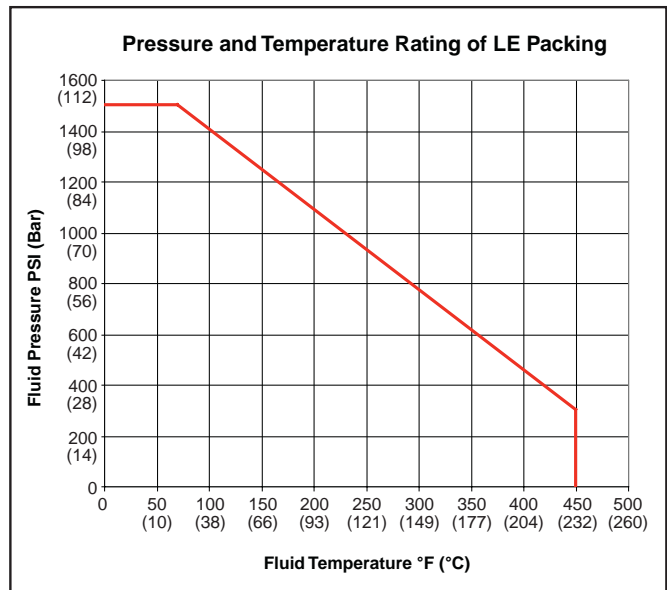
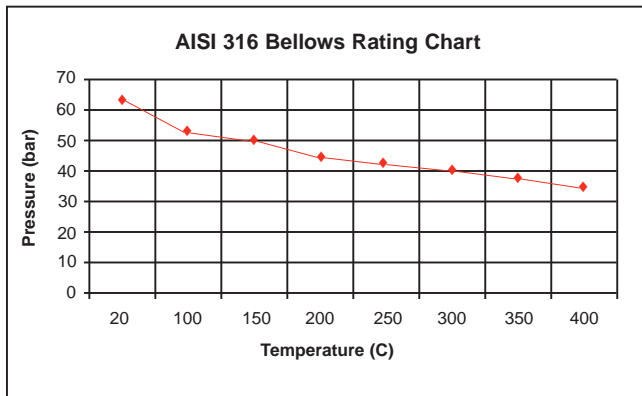
#### Optional Materials

Hastelloy C276

Monel 400

Inconel 625

See pages 15 and 16 for full materials listing.

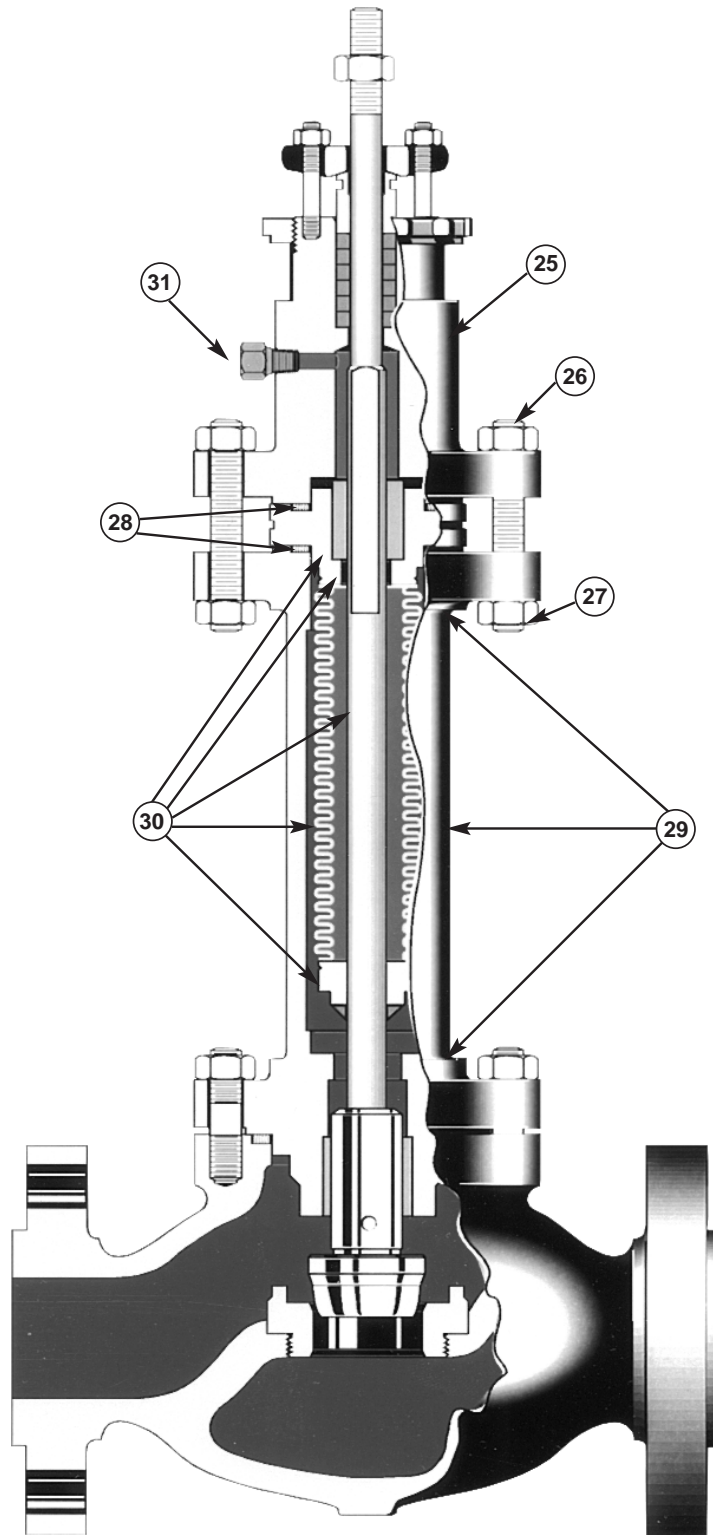


## Size and Ratings

Pressure Ratings: ANSI Class 150 and 300 – PN 10 and PN 50

Valve Size	Bellows Design Stroke		Life Cycle Ratings <sup>(1)</sup>		
	inches	mm	Maximum Stroke		
			100%	50%	25%
.75"-2"	.75	19	100,000 Full Cycles	600,000 Full Cycles	3,000,000 Full Cycles
3"-4"	1.50	38.1			
6"	2.00	50.8			

1. Minimum expected average cycle life for Class 300 bellows operating at constant pressure.
2. Consult Masoneilan for Bellows applications above ANSI Class 300.



**Bellows Seal Construction**

## Materials of Construction

### Bellows Seal - Carbon Steel Body Version <sup>(1)</sup>

Valve Sizes: .75" to 6"

Body Ratings: ANSI Class 150 to 300

Ref. No.	Temperature Range	-20°F	800°F
Description	Standard and Optional Materials		
25	Valve Bonnet	Carbon Steel ASTM A216 GR WCC or ASTM A105	
26	Bonnet Stud	304 St. St. ASTM A193 GR B7	
27	Bonnet Stud Nut	Alloy Steel ASTM A194 GR 2H	
28	Bonnet Spacer Gasket	316L St. St. w/Flexible Graphite Filler (Spiral Wound)	
29	Bonnet Extension Assembly		
	Upper Flange	Carbon Steel ASTM A216 GR WCC or ASTM A105	
	Spacer	Carbon Steel ASTM A106 GR B	
	Lower Flange	Carbon Steel ASTM A216 GR WCC	
30	Bellows and Stem Assembly	Stainless Steel Bellows	
	Stem	316 St. St. ASTM A479 TY 316	
	Guide Bushing	Nitronic 60 ASTM A479 TY21800	
	Bellows	316/316L St. St. ASTM A240/A312	
	Upper Adapter	316L St. St. ASTM A479 TY 316L	
	Lower Adapter		
30	Bellows and Stem Assembly	Hastelloy Bellows	
	Stem	Hastelloy C ASTM B574	
	Guide Bushing	Stellite 6 UNS 30006	
	Bellows	Hastelloy C276 ASTM B575/B622	
	Upper Adapter	Hastelloy C ASTM B574	
	Lower Adapter		
31	1/8" NPT Plug	300 Series Stainless Steel	
Ref. No.	Temperature Range	-29°C	427°C

- Notes:
1. Materials for other components are same as listed for Standard Carbon Steel Version.
  2. Items No. 1 and 8 in Standard Materials of Construction tables are replaced by items above.

### Bellows Seal - Stainless Steel Body Version <sup>(1)</sup>

Ref. No.	Temperature Range	-20°F	800°F
Description	Standard and Optional Materials		
25	Valve Bonnet	316 St. St. ASTM A351 GR CF8M	
29	Bonnet Extension Assembly		
	Upper Flange	316 St. St. ASTM A351 GR CF8M or ASTM A182 GR F316	
	Spacer	316 St. St. ASTM A269 TY 316	
	Lower Flange	316 St. St. ASTM A351 GR CF8M	
Ref. No.	Temperature Range	-29°C	427°C

1. Materials for other Bellows components are same as listed for Carbon Steel Body – Bellows Seal Version.  
 2. Materials for other components are same as listed for Standard Stainless Steel Version.



## Materials of Construction

### NACE<sup>(1)</sup> Configuration and Material Options

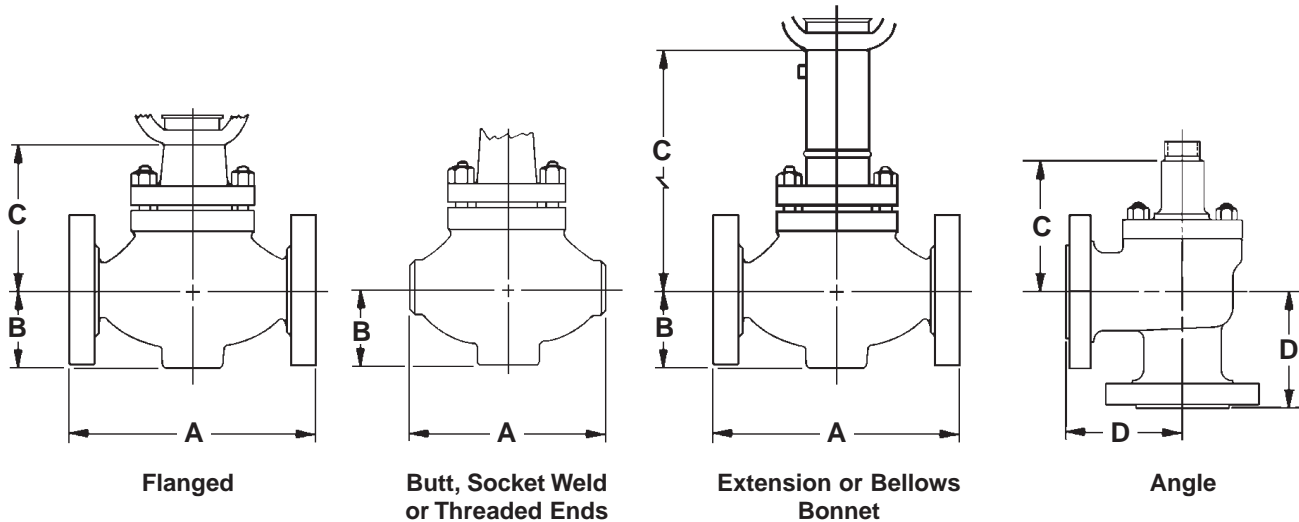
Valve Sizes: .75" to 6"

Body Ratings: ANSI Class 150 to 600 <sup>(4)</sup>

Ref. No.	Temperature Range	-20°F	450°F
Ref. No.	Description	Standard and Optional Materials	
1	Plug Stem	316 St. St. ASTM A479 TY 316 (HRC 22 Max.)	
2	Packing Flange Stud	304 St. St. ASTM A193 GR B8 <sup>(2)</sup>	
		Alloy Steel ASTM A193 Gr B7M <sup>(3)</sup>	
3	Packing Flange Nut	304 St. St. ASTM A194 GR B8 <sup>(2)</sup>	
		Alloy Steel ASTM A194 Gr 2HM <sup>(3)</sup>	
4	Packing Flange	Carbon Steel ASTM A668 CL B	
5	Packing Follower	304 St. St. ASTM A479 TY 304	
6	Packing	Kevlar PTFE (Crane 285K)	
7	Lantern Ring (Optional)	304 St. St. ASTM A479 TY 304	
8	Valve Bonnet	Carbon Steel ASTM A216 Grade WCC (HRC 22 Max.)	
		Carbon Steel ASTM A105 (HRC 22 Max.)	
		316 St. St. ASTM A351 Gr CF8M (HRC 22 Max.)	
9	Body Stud	Alloy Steel ASTM A193 GR B7 <sup>(2)</sup>	
		Alloy Steel ASTM A193 Gr B7M <sup>(3)</sup>	
10	Body Stud Nut	Alloy Steel ASTM A194 GR 2H <sup>(2)</sup>	
		Alloy Steel ASTM A194 Gr 2HM <sup>(3)</sup>	
11	Body Gasket	316L St. St. w/Flexible Graphite Filler (Spiral Wound)	
12	Guide Bushing	Stellite 6 UNS 30006	
		316 St. St. ASTM A479 TY 316 with Hardfacing <sup>(5)</sup> (HRC 22 Max.)	
13	Cage	304 St. St. ASTM A351 CF8 (HRC 22 Max.)	
	Cage/Seat <sup>(5)</sup>	Monel K 500	
		Stellite 6 UNS 30006	
14	Seat Ring	316 St. St. ASTM A479 TY 316 (HRC 22 Max.)	
		316 St. St. ASTM A479 TY 316 with Hardfaced Seat (HRC 22 Max.)	
15	Seat Ring Gasket	316L St. St. w/Flexible Graphite Filler (Spiral Wound)	
16	Plug	316 St. St. ASTM A479 TY 316 (HRC 22 Max.)	
		316 St. St. ASTM A479 TY 316 with Hardfaced Seat (HRC 22 Max.)	
		316 St. St. ASTM A479 TY 316 with Hardfaced Seat & Guide <sup>(5)</sup>	
		Monel K 500 <sup>(5)</sup>	
		Stellite 6 UNS 30006 <sup>(5)</sup>	
17	Plug Pin	316 St. St. ASTM A479 TY 316 (HRC 22 Max.)	
18	Valve Body	Carbon Steel ASTM A216 Grade WCC (HRC 22 Max.)	
		316 St. St. ASTM A351 Gr CF8M (HRC 22 Max.)	
19	Drive Nut	Carbon Steel SAE 1117 <sup>(2)</sup>	
		Carbon Steel ASTM A105 or SAE 1010-1025 <sup>(3)</sup>	
Ref. No.	Temperature Range	-29°C	232°C

1. Materials and processes in accordance with the requirements of NACE specification MR0103.  
Applications requiring compliance to MR0175, 2003 Rev. or ISO 15156 would require engineering review.
2. Materials designated for these parts conform to NACE Class III (unexposed) bolting requirements.
3. Materials designated for these parts conform to NACE Class I or Class II (exposed) bolting requirements.
4. Consult Masoneilan for NACE Applications above ANSI Class 600 rating.
5. Optional component and materials for Close Clearance low flow trim option.

## Dimensions (inches)



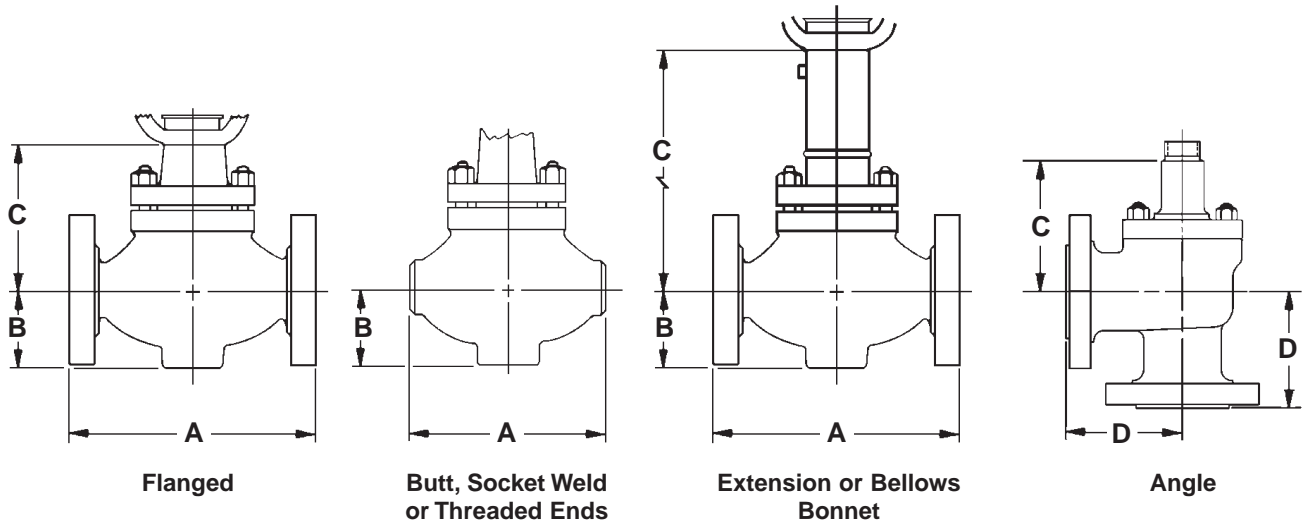
### 21000 Series Dimensions (inches)

ANSI Class 150 through 2500 and equivalent PN

Valve Size (inches)	A															
	ANSI Class 150-600		ANSI Class 900-1500		ANSI Class 2500		ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 900-1500		ANSI Class 2500	
	BW	SW & THD	SW	BW	SW	BW	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ
0.75		8.25	8.50		12.50		7.24		7.62	8.12	8.12	8.12	10.75	10.75	12.12	12.12
1		8.25	8.50		12.50		7.25	7.75	7.75	8.25	8.25	8.25	11.50	11.50	12.50	12.50
1.5		9.88	9.25		13.00		8.75	9.25	9.25	9.75	9.88	9.90	13.12	13.12	14.12	14.24
2	11.25	11.25	11.50	11.50	14.75	14.75	10.00	10.50	10.50	11.12	11.25	11.38	14.75	14.88	16.25	16.37
3	13.24						11.75	12.25	12.50	13.12	13.25	13.38				
4	15.50						13.88	14.38	14.50	15.12	15.50	15.62				
6	20.00						17.75	18.12	18.62	19.24	20.00	20.12				

Valve Size (inches)	B												
	ANSI Class 150-300	ANSI Class 600	ANSI Class 150-600	ANSI Class 900-1500		ANSI Class 2500		ANSI Class 150		ANSI Class 300	ANSI Class 600	ANSI Class 900-1500	ANSI Class 2500
	BW	BW	SW & THD	BW	SW	BW	SW	RF	RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ
0.75			1.83		1.76		1.87	1.94		2.32	2.32	2.56	2.75
1			1.83		2.06		2.22	2.13	2.45	2.45	2.45	2.94	3.13
1.5			2.50		2.68		2.93	2.50	3.06	3.06	3.06	3.50	4.00
2	3.00	3.00	3.00	3.37	3.37	3.70	3.70	3.00	3.25	3.25	3.25	4.25	4.63
3	3.69	3.69						3.75	4.13	4.13	4.13		
4	4.63	5.50						4.50	5.00	5.00	5.38		
6	6.26	7.38						5.50	6.25	6.25	7.00		

## Dimensions (inches)



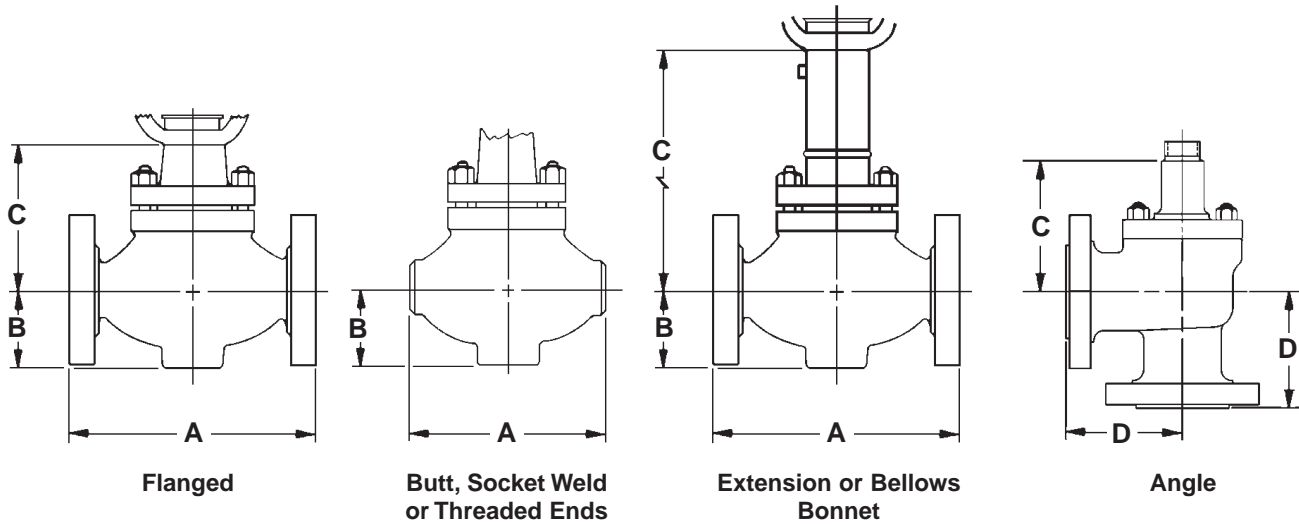
### 21000 Series Dimensions (inches)

ANSI Class 150 through 2500 and equivalent PN

Valve Size (inches)	C								
	Standard Bonnet				Extension Bonnet				Bellows Bonnet
	ANSI Class 150-300	ANSI Class 600	ANSI Class 900-1500	ANSI Class 2500	ANSI Class 150-300	ANSI Class 600	ANSI Class 900-1500	ANSI Class 2500	ANSI Class 150-300
0.75	5.60	5.60	7.60	7.60	9.80	9.80	10.70	10.70	16.83
1	5.60	5.60	7.60	7.60	9.80	9.80	10.70	10.70	16.83
1.5	5.50	5.50	9.00	9.00	10.00	10.00	11.70	11.70	15.22
2	5.50	5.50	9.00	10.70	10.00	10.00	11.70	12.30	15.22
3	8.00	8.00			12.50	12.50			23.75
4	8.10	9.40			12.60	12.60			23.87
6	11.20	11.10			16.70	16.60			29.76

Valve Size (inches)	D												
	ANSI Class 150-600	ANSI Class 900-1500	ANSI Class 2500	ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 900-1500		ANSI Class 2500	
	BW, SW & THD	BW, SW & THD	BW, SW & THD	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ
0.75	4.13	4.25	6.25	3.62		3.88	4.13	4.13	4.13	5.38	5.38	6.06	6.06
1	4.12	4.25	6.25	3.62		3.87	4.13	4.13	4.13	5.75	5.75	6.25	6.25
1.5	4.94	4.63	6.50	4.38		4.63	4.88	4.95	4.94	6.56	6.56	7.06	7.12
2	5.63	5.57	7.38	5.00		5.25	5.56	5.63	5.69	7.38	7.44	8.13	8.19
3	6.63			5.88		6.25	6.56	6.63	6.69				
4	7.75			6.94		7.25	7.56	7.75	7.81				
6	10.00			8.88		9.31	9.63	10.00	10.06				

## Dimensions (mm)



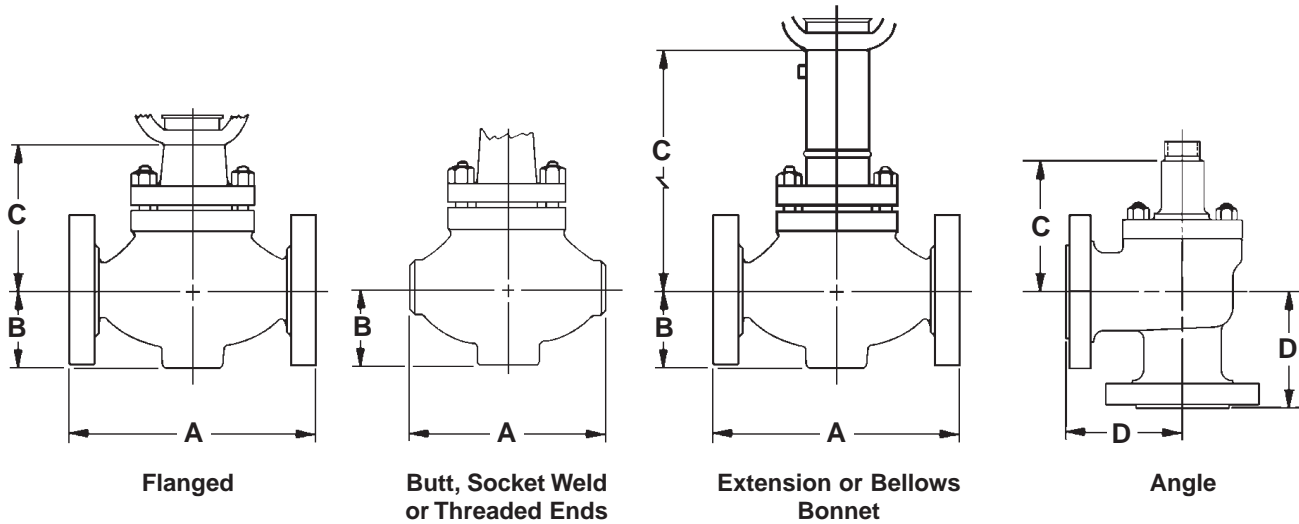
### 21000 Series Dimensions (mm)

ANSI Class 150 through 2500 and equivalent PN

Valve Size (mm)	A															
	ANSI Class 150-600		ANSI Class 900-1500		ANSI Class 2500		ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 900-1500		ANSI Class 2500	
	BW	SW & THD	SW	BW	SW	BW	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ
0.75		210	216		318		184		194	206	206	206	273	273	308	308
1		210	216		318		184	197	197	210	210	210	292	292	318	318
1.5		251	235		330		222	235	235	248	251	251	333	333	359	362
2	286	286	292	292	375	286	254	267	267	282	286	289	375	378	413	416
3	336						298	311	318	333	337	340				
4	394						353	365	368	384	394	397				
6	508						451	460	473	489	508	511				

Valve Size (mm)	B																			
	ANSI Class 150-300		ANSI Class 600		ANSI Class 150-600		ANSI Class 900-1500		ANSI Class 2500		ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 900-1500		ANSI Class 2500	
	BW	BW	SW & THD	BW	SW	BW	SW	RF	RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ	RF & RTJ	
0.75			46		45		47	49		59	59	65	70							
1			46		52		56	54	62	62	62	75	80							
1.5			64		68		74	64	78	78	78	89	102							
2	76	76	76	86	86	94	94	76	83	83	83	108	118							
3	94	94						95	105	105	105									
4	118	140						114	127	127	137									
6	159	187						140	159	159	178									

## Dimensions (mm)



### 21000 Series Dimensions (mm)

ANSI Class 150 through 2500 and equivalent PN

Valve Size (mm)	C								
	Standard Bonnet				Extension Bonnet				Bellows Bonnet
	ANSI Class 150-300	ANSI Class 600	ANSI Class 900-1500	ANSI Class 2500	ANSI Class 150-300	ANSI Class 600	ANSI Class 900-1500	ANSI Class 2500	ANSI Class 150-300
0.75	142	142	193	193	249	249	272	272	427
1	142	142	193	193	249	249	272	272	427
1.5	140	140	229	229	254	254	297	297	387
2	140	140	229	272	254	254	297	312	387
3	203	203			318	318			603
4	206	239			320	320			606
6	284	282			424	422			756

Valve Size (mm)	D												
	ANSI Class 150-600	ANSI Class 900-1500	ANSI Class 2500	ANSI Class 150		ANSI Class 300		ANSI Class 600		ANSI Class 900-1500		ANSI Class 2500	
	BW, SW & THD	BW, SW & THD	BW, SW & THD	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ	RF	RTJ
0.75	105	108	159	92		99	105	105	105	137	137	154	154
1	105	108	159	92		98	105	105	105	146	146	159	159
1.5	125	118	165	111		118	124	126	125	167	167	179	181
2	143	141	187	127		133	141	143	145	187	189	207	208
3	168			149		159	167	168	170				
4	197			176		184	192	197	198				
6	254			226		236	245	254	256				

# Weights

## Body S/A (lbs)

Valve Size (inches)	ANSI Class 150 – 300		ANSI Class 600		ANSI Class 900 – 1500		ANSI Class 2500	
	FLG	BW, SW & THD	FLG	BW, SW & THD	FLG	BW, SW & THD	FLG	BW, SW & THD
0.75	36	27	38	27	57	44	70	44
1	36	27	38	27	75	44	90	44
1.5	49	36	53	36	100	57	118	57
2	57	44	64	44	144	82	255	154
3	127	73	128	99	—	—	—	—
4	196	121	216	135	—	—	—	—
6	355	238	450	272	—	—	—	—

## Body S/A (kg)

Valve Size (mm)	ANSI Class 150 – 300		ANSI Class 600		ANSI Class 900 – 1500		ANSI Class 2500	
	FLG	BW, SW & THD	FLG	BW, SW & THD	FLG	BW, SW & THD	FLG	BW, SW & THD
20	16	12	17	12	26	20	32	20
25	16	12	17	12	34	20	41	20
40	22	16	24	16	45	26	53	26
50	26	20	29	20	65	37	116	70
80	58	33	58	45	—	—	—	—
100	89	55	98	61	—	—	—	—
150	161	108	204	123	—	—	—	—

## Body/Actuator Volume (cu.ft)

Valve Size (inches)	ANSI Class 150 to 2500 and equivalent PN
.75	10.0
1	10.0
1.5	10.0
2	10.0
3	22.0
4	22.0
6	22.0

## Body/Actuator Volume (dm<sup>3</sup>)

Valve Size (mm)	ANSI Class 150 to 2500 and equivalent PN
20	283
25	283
40	283
50	283
80	623
100	623
150	623

## Bellows Seal Assembly

Valve Size		Estimated Additional Weight	
inches	mm	lbs	kg
.75 to 2	20 to 50	18	8
3 & 4	80 & 100	35	16
6	150	75	33

## Options

### Options

Extension Bonnets
Environmental Capabilities (LE Packing)
Lubricator & Isolation Valve
Other Flange Facings
Limit Stops
Body Drain Plug
Reducer and Nipple Connections
NACE Compliance
Custom Trim Materials
U.O.P. Trim Materials
Other Materials
Non-Destructive Examination
Oxygen Cleaning
Electric Actuators
High-temperature Service Construction (up to 1050 °F)

For additional Accessories and Options, consult Masoneilan.

# Sales Office Locations

## BELGIUM

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207 B2 Vorstlaan,  
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