



**GLOBE CONTROL VALVE
CRYOGENIC COLD BOX**

Cryogenic Globe Control Valve

Introduction

The Series is the result of years of ex-perience in cryogenic industrial processes. Its design comprises a globe cryogenic control valve with single seat ring, sturdy trim and cryogenic extension welded to the body, making them the ideal choice for cold boxes in industrial gas plants, where operating temperatures may reach -425°F (-253°C).

The design of the bonnet cryogenic extension allows easy access to the valve's trim, making any maintenance task easier and quicker. As the trim is assembled from the upper extension area (top entry), removal and replacement of internal components are carried out without affecting the integrity of the cold box.

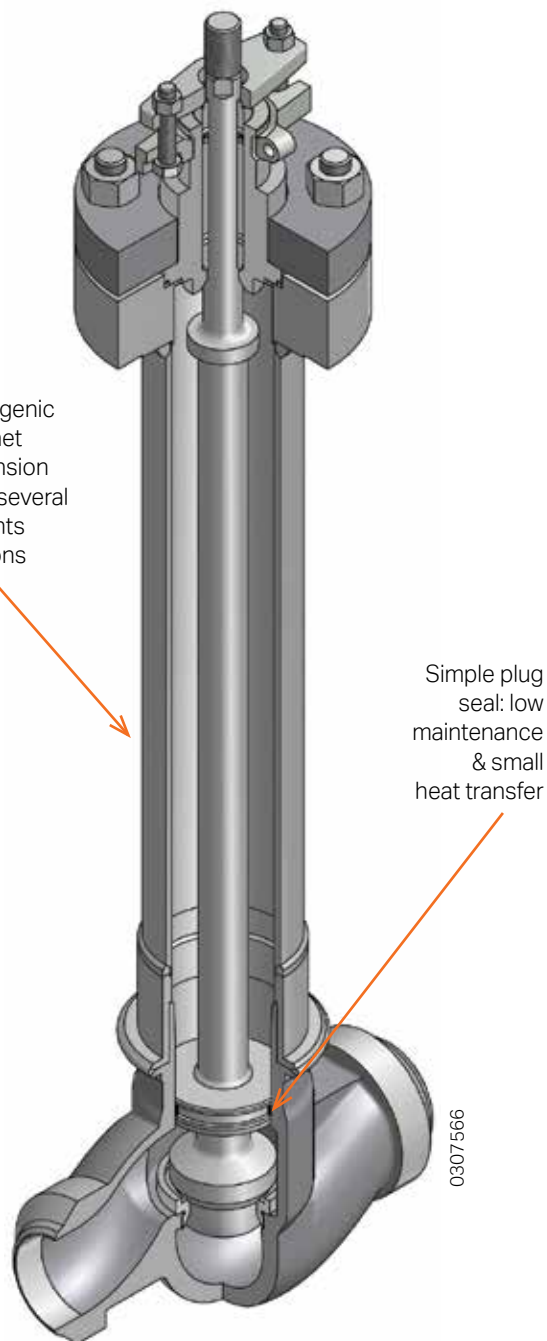
During operation, a small fraction of the liquefied gas goes into the inner part of the extension, where it is vaporized. This gas barrier created between the cryogenic liquid that flows through the body and the top of the extension isolates the valve packing, protecting it from the ultra-low temperatures and preventing its freezing.

The pressure resulting from part of the liquid that is vaporized prevents that additional quantities of liquefied gas continue entering into the inner part of the extension. The design of the extension, plug and the sealing assures a minimum vaporization of the fluid during the valve cooling process.

The Series is available in sizes from ½ to 10 inches and pressure classes from ANSI 150 to 600. Bodies of conventional globe-style or anglestyle are designed with uniform wall thicknesses to reduce the total weight of the valve.

A piston-cylinder actuator offers excellent positioning accuracy and high actuating thrusts, which increases even more the notable sealing capacity of the Series.

Adopting interchangeable components and many design solutions already proven in the renowned valves, the Series becomes one of the most reliable and versatile cryogenic control valves in the market.



Body Subassembly

Rangeability: 30:1

Tightness ANSI Class IV - Metal Seat

Tightness ANSI Class VI - Soft Seat

Body Subassembly Manufacturing Characteristics

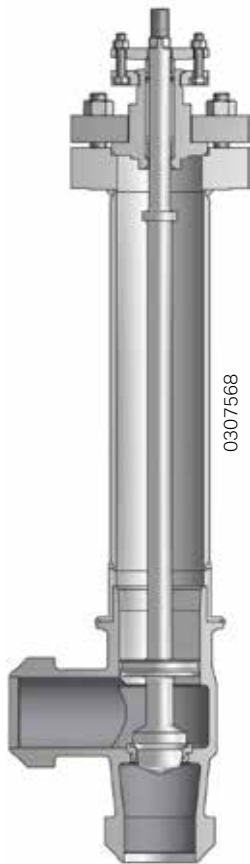
Body

The optimized geometry of the Series valve bodies presents smooth curves and a flow passageway nearly constant, which reduce the flowing fluid turbulence and increase the valve flow rate capacity.

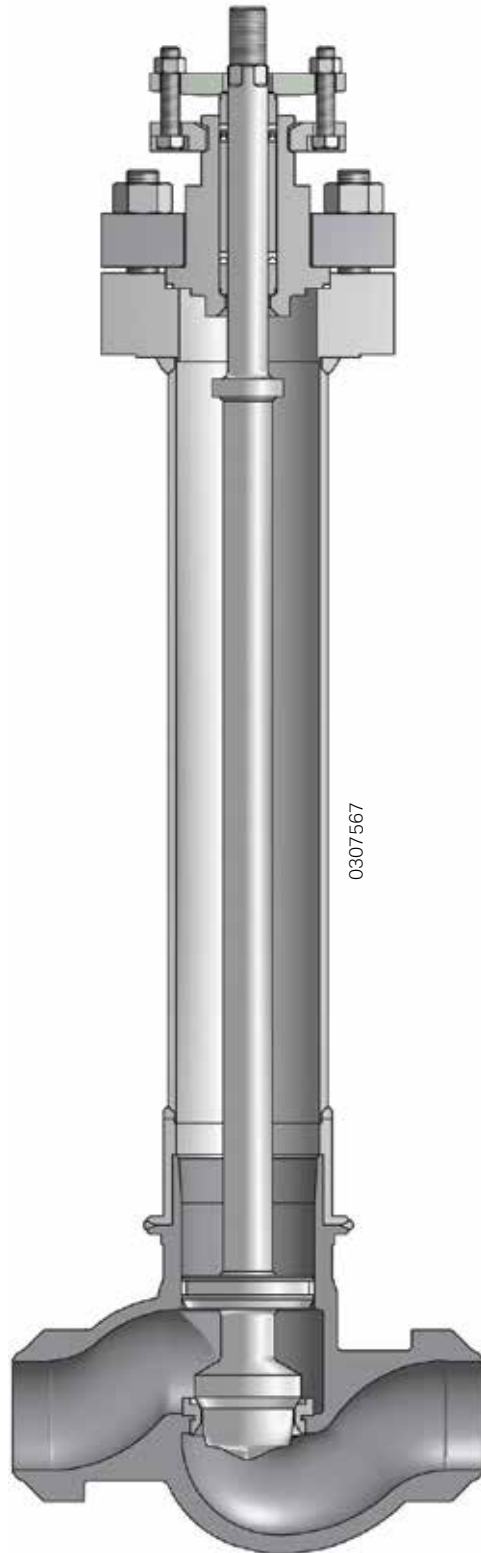
In addition to the cryogenic extension welded to the body, the small quantity and reduced weight of the internal components enable that the heat transfers during the valve operation are kept to minimum levels, increasing the process thermal efficiency.

The manufacturing of the body and the cryogenic extension as a single piece, with no gaskets or flanged connections, eliminates the risk of leakage inside the cold box.

valve bodies are usually manufactured in austenitic stainless steel, cubic crystalline structure materials and face centered, presenting high yield and rupture stress, as well as high impact resistance at cryogenic temperatures.

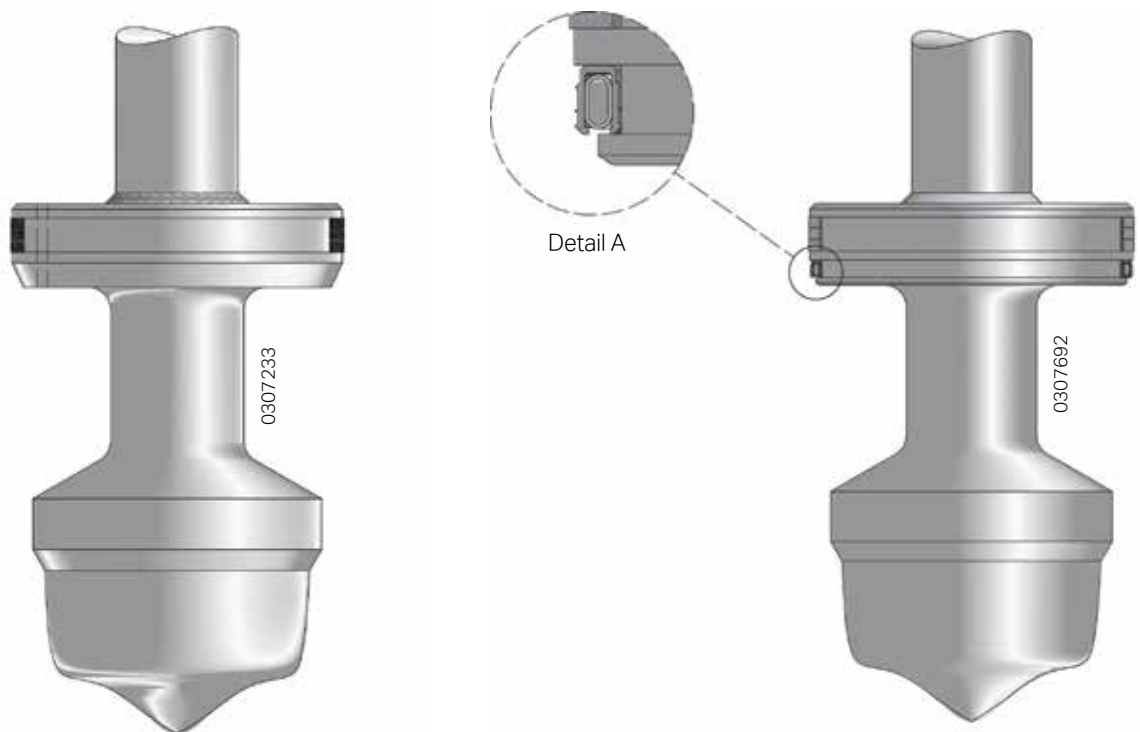


Valve with Angle-Style Body



Valve with In-line Body

Body Subassembly Trim - Plug



**Plug with Pressure
Balance Orifices**

Plug Sealing

The simple design of the plug seal enables an efficient barrier of vapor to be created between the liquefied gas and the valve packing: a small fraction of the liquefied gas is vaporized when it enters into the bonnet cryogenic extension and the resulting pressure from this vapor barrier prevents that additional quantities of liquid penetrate the cryogenic extension.

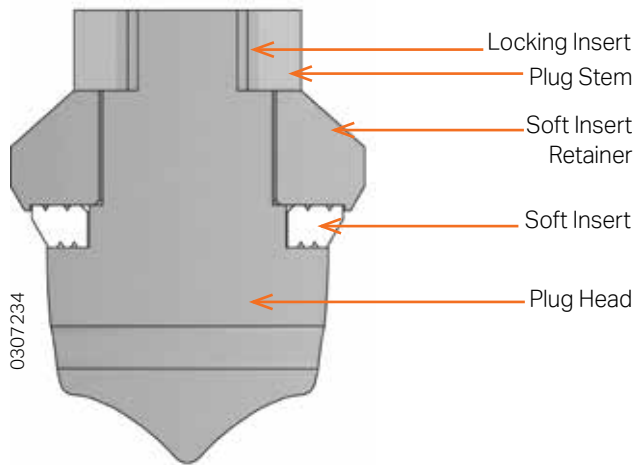
In plugs provided with the pressure balance orifices, a small fraction of the liquid is vaporized when it penetrates the cryogenic extension through the small vent holes in the plug head. In valves equipped with plugs assembled with soft seal ring spring-energized, the seal ring allows the passage of small quantities of liquid into Body Subassembly Trim - Plug the

cryogenic extension during a certain period of time, and a period of up to 24 hours may be required for the pressure inside the extension to be equalized with the pressure of the fluid that flows through the valve body. In both instances, a soft seal ring guides the plug head in the polished bore of the valve body.

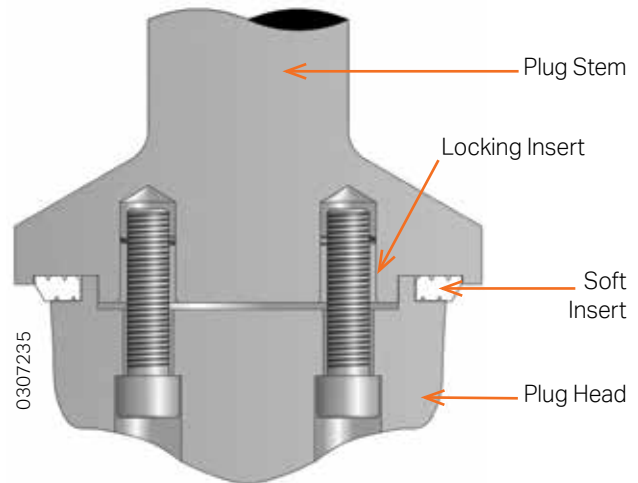
Since the plug sealing comprises only a few parts, the heat transfer to the process fluid is minimized. A fully retained bonnet gasket prevents the process fluid leakage to the atmosphere.

In addition to the standard trim, the Series may be supplied with anti-cavitation trim, soft seated trim and non-sparking trim.

Body Subassembly Trim



Soft Seated Plug
Valves with sizes up to 1,5"



Soft Seated Plug
Valves with sizes of 2" and larger

Plug with Soft Sealing

The sealing Class VI can be obtained using a PTFE or KEL-F (PCTFE) insert assembled in the plug seating surface. Valves with sizes up to 1.5 inch use a plug design with threaded head that secures the polymer soft insert between the head and the insert retainer. Plugs of valves with sizes 2 inches and larger are designed with bolts that secure the head and the insert in the plug stem. In both versions, selflocking elements are used to prevent that the plug head is released from the stem. Plugs with soft inserts are interchangeable with metal-to-metal type plugs.

Seat Ring

Most of the control valves use threaded seats, and the variation of nominal CV is preferably obtained by changing the plug head contour. If a higher flow coefficient is necessary, integral seats, machined in the valve body, are available as an option.

Packing

Valve packing can be easily accessed from the external side of the cold box, as well as the bonnet flange studs and nuts.

The standard packing consists of virgin PTFE V-rings, but optionally can be supplied with fiberglass reinforced PTFE (PTFEG) V-rings.

Guides

The two guides used in the packing box of the GLC valves can be easily removed, and the upper guide acts also as a packing gland. The guides are widely spaced, providing great stability for the plug stem. Solid bronze guides or guides manufactured in stainless steel PTFEG-lined completely eliminate the possibility of galling between the guides and the plug stem. Solid guides manufactured with Alloy #6 are available as requested.

Bonnet Gasket

The bonnet seats metal-to-metal in the valve body, keeping its gasket thoroughly retained. The compression of the gasket is determined by the depth of a step in the bottom of the bonnet, which is machined with precise tolerances to assure the proper compression required by the gasket. valves can be supplied with PTFE or KEL-F (PCTFE) flat gaskets.

Body Sub-Assembly General Specification Chart

Specification & Manufacturing Materials

Body	Sizes		0.5 to 10 inches
	ANSI Class		150, 300 and 600
	Styles		Globe, Angle
	Manufacturing Materials		AISI-316 Stainless Steels (standard), AISI-316L, AISI-304 and AISI-304L
	End Connections		Socketweld (0.5 to 2 inch)
			Buttweld (all sizes)
Integral Flanges (all sizes)			
Flat Gaskets		PTFE, PCTFE (KEL-F)	
Bonnet	Type		Cryogenic bonnet extension welded to valve body (see table V for length options)
	Materials		Same as body
	Bonnet Flange		Separable, made from AISI-316 stainless steel
	Guides	Type	Double upper guide on plug stem, out of flow path
		Materials	AISI-316 with PTFEG* insert or solid bronze guides
	Packing	Type	Standard with "V" rings, twin seal, packing for vacuum applications, packing for fugitive emissions control
Materials		PTFE, PTFEG and other materials upon request	
Trim	Type		Unbalanced. Plugs with pressure communication orifices or energized seal rings
	Flow Characteristics		Equal Percentage, Linear or Quick Open
	Plug Materials		AISI- 316, AISI-316L, 17-4PH, 17-4PH Nitrided, Monel
	Plug Sealing		PTFE, PCTFE (KEL-F), FEP/316 SS energized by spring
	Seat Materials		17-4PH, 17-4PH Nitrided, Monel
	Hard Facings	Material	Alloy #6
		Type	H Hardening of seat surfaces, Full hardening of the plug contour and seat bore
Soft Seat Insert	Materials	PTFE or PCTFE (KEL-F), mounted on plug seating surface	
Actuator	Types	Pneumatic	Double-acting piston-cylinder, with failsafe spring. Field reversible and available on sizes 25, 50, 100 and 200 (larger sizes upon request). Options: manual handwheel, limit stops and others (see the technical bulletin of actuators).
		Others	Manual, electro-mechanical or electro-hydraulic upon request
Positioner	Types		Pneumatic, analog electro-pneumatic or digital electro-pneumatic with multiple communication protocols available

* PTFEG Glass-filled PTFE;

Body Sub-Assembly Flow Characteristics

Equal Percentage

The Equal Percentage is the most common characteristic used in processes control. The change in flow per unit of valve stroke is directly proportional to the flow occurring just before the change is made.

When installed, a valve with an Equal Percentage characteristic will produce in most control loops, a characteristic close to the Linear characteristic, whenever the total differential pressure of the system is large compared to the differential pressure through the valve.

Linear

The Linear characteristic creates equal changes in flow rate per unit of valve stroke, regardless of plug position. Linear plugs are frequently used in systems where the differential pressure through the valve corresponds to the major part of the total differential pressure of the system.

Quick-open

Quick-open plugs are used in on-off services and are designed to create large increments of flow rate, even from small opening percentages.

Trim Sizes

There are three trim sizes available for the valves: standard trim, with full area; reduced trim, available in a large range of sizes, and trim with integral area, whose seat ring is machined in the valve body.

Alpha Anti-Cavitation Trim

Alpha trim lowers cavitation damage by controlling the location and concentration of cavitation vapor bubble implosions directing them to the center of the plug/seat in an area away from metal parts. Alpha trim uses a certain number of small holes diametrically opposed and carefully distributed along the plug head.

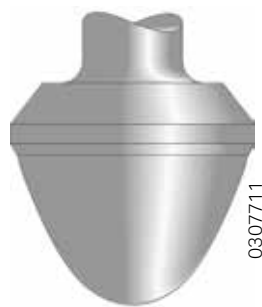
As the plug moves away from the seat, an increasing number of hole pairs is opened, and the cavitating jet of liquid that passes through each hole collides at the center of the plug head with the jet that enters through the opposite hole. The design of this special plug enables the creation of a noncavitating fluid barrier around metallic surfaces, while moving away the pressure recovery area and the subsequent bubbles collapsing.



Contour =%



Alpha =%



Linear Contour



Linear Alpha

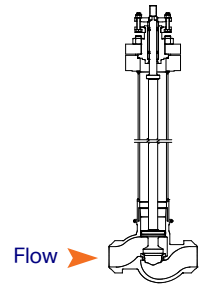
Equal Percentage Characteristic

Linear Characteristic

Typical Configuration of Valve Trim

Body Sub-Assembly Flow Coefficients - C_v

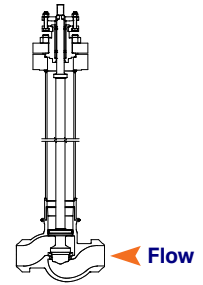
Valve Type: Cryogenic Globe Valve
ANSI Class: 150-300-600
Flow Characteristic: Equal Percentage
Flow Direction: Flow Over



Valve Size (in.)	Nominal Trim Size (T.N.)	Stroke		Opening Percentage									
		in.	mm	100	90	80	70	60	50	40	30	20	10
0.75	25-3 (1.00-3)	0.75	19.05	9.0	8.3	7.1	5.6	4.1	2.6	1.7	1.2	0.81	0.54
	25-2 (1.00-2)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	25-1 (1.00-1)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
	10-3 (0.38-3)	0.75	19.05	2.5	2.3	2.0	1.6	1.1	0.72	0.47	0.32	0.23	0.15
	10-2 (0.38-2)	0.75	19.05	1.9	1.7	1.5	1.2	0.85	0.55	0.36	0.25	0.17	0.11
	10-1 (0.38-1)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.090
	6.5-18 (0.25-18)	0.75	19.05	1.1	1.0	0.87	0.68	0.50	0.32	0.21	0.14	0.10	0.066
	3.2-2 (0.12-2)	0.50	12.70	0.5	0.46	0.40	0.31	0.22	0.15	0.10	0.065	0.045	0.030
3.2-1 (0.12-1)	0.50	12.70	0.3	0.28	0.24	0.19	0.14	0.087	0.057	0.039	0.027	0.018	
1.00	25-5 (1.00-5)	0.75	19.05	16	14	12	9.6	7.0	4.5	2.9	2.0	1.4	0.93
	25-4 (1.00-4)	0.75	19.05	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	25-3 (1.00-3)	0.75	19.05	9.0	8.3	7.1	5.6	4.0	2.6	1.7	1.2	0.81	0.54
	25-2 (1.00-2)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	25-1 (1.00-1)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
	10-4 (0.38-4)	0.75	19.05	1.9	1.8	1.5	1.2	0.85	0.55	0.36	0.25	0.17	0.11
	10-3 (0.38-3)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.09
	10-2 (0.38-2)	0.75	19.05	1.0	0.92	0.79	0.62	0.45	0.29	0.19	0.13	0.09	0.06
	3-2 (0.12-2)	0.50	12.70	0.5	0.46	0.40	0.31	0.22	0.15	0.10	0.07	0.05	0.03
3-1 (0.12-1)	0.50	12.70	0.3	0.28	0.24	0.19	0.14	0.09	0.06	0.04	0.03	0.02	
1.50	38 (1.50)	1.00	25.40	35	32	28	22	16	10	6.6	4.5	3.1	2.1
	32-4 (1.25-4)	1.00	25.40	31	29	24	19	14	9.0	5.9	4.0	2.8	1.9
	32-3 (1.25-3)	1.00	25.40	15	14	12	9.0	6.7	4.3	2.8	1.9	1.3	0.90
	32-2 (1.25-2)	1.00	25.40	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	32-1 (1.25-1)	1.00	25.40	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
2.00	50 (2.00)	1.50	38.10	65	60	51	40	29	19	12	8.4	5.8	3.9
	41-5 (1.63-5)	1.50	38.10	46	42	36	29	21	13	8.7	6.0	4.1	2.8
	41-4 (1.63-4)	1.50	38.10	30	28	24	19	14	8.7	5.7	3.9	2.7	1.8
	41-3 (1.63-3)	1.50	38.10	20	18	15	12	9.0	5.8	3.8	2.6	1.8	1.2
	41-2 (1.63-2)	1.50	38.10	15	14	12	9.3	6.7	4.3	2.8	1.9	1.3	0.90
	41-1 (1.63-1)	1.00	25.40	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
3.00	67-4 (2.63-4)	2.00	50.80	116	107	92	72	52	34	22	15	10	7.0
	67-3 (2.63-3)	2.00	50.80	80	74	63	50	36	23	15	10	7.2	4.8
	67-2 (2.63-2)	2.00	50.80	60	55	47	37	27	17	11	7.8	5.4	3.6
	67-1 (2.63-1)	2.00	50.80	30	28	24	19	14	8.7	5.7	3.9	2.7	1.8
4.00	90-5 (3.50-5)	2.50	63.50	225	207	178	140	101	65	43	29	20	14
	90-4 (3.50-4)	2.50	63.50	195	179	154	121	88	57	37	25	18	12
	90-3 (3.50-3)	2.50	63.50	133	122	105	82	60	39	25	17	12	8.0
	90-2 (3.50-2)	2.50	63.50	120	110	95	74	54	35	23	16	11	7.2
	90-1 (3.50-1)	2.50	63.50	60	55	47	37	27	17	11	7.8	5.4	3.6
6.00	102-3 (4.00-3)	3.00	76.20	400	368	316	248	180	116	76	52	36	24
	102-2 (4.00-2)	3.00	76.20	260	239	205	161	117	75	49	34	23	16
	102-1 (4.00-1)	3.00	76.20	200	184	158	124	90	58	38	26	18	12
8.00	188-3 (7.45-3)	4.00	101.60	860	808	731	629	504	355	184	95	57	40
	188-2 (7.45-2)	4.00	101.60	600	552	477	369	265	157	93	64	43	30
	188-1 (7.45-1)	4.00	101.60	515	473	401	302	210	130	62	35	21	15

Body Sub-Assembly Flow Coefficients - C_v

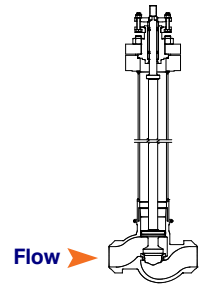
Valve Type: Cryogenic Globe Valve
ANSI Class: 150-300-600
Flow Characteristic: Equal Percentage
Flow Direction: Flow Under



Valve Size (in.)	Nominal Trim Size (T.N.)	Stroke		Opening Percentage									
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	10-3 (0.38-3)	0.75	19.05	2.5	2.3	2.0	1.6	1.1	0.72	0.47	0.32	0.23	0.15
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	3.2-2 (0.12-2)	0.50	12.70	0.5	0.46	0.40	0.31	0.22	0.15	0.095	0.065	0.045	0.030
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	25-4 (1.00-4)	0.75	19.05	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	25-3 (1.00-3)	0.75	19.05	9.0	8.3	7.1	5.6	4.0	2.6	1.7	1.2	0.81	0.54
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	10-4 (0.38-4)	0.75	19.05	1.9	1.7	1.5	1.2	0.85	0.55	0.36	0.25	0.17	0.11
	10-3 (0.38-3)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.09
	10-2 (0.38-2)	0.75	19.05	1.0	0.92	0.87	0.68	0.50	0.32	0.21	0.14	0.09	0.07
	3-2 (0.12-2)	0.50	12.70	0.50	0.46	0.40	0.31	0.22	0.15	0.095	0.065	0.045	0.03
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1.50	38 (1.50)	1.00	25.40	35	32	28	22	16	10	6.7	4.5	3.2	2.1
	32-4 (1.25-4)	1.00	25.40	31	29	24	19	14	9.1	5.9	4.0	2.8	1.9
	32-3 (1.25-3)	1.00	25.40	15	14	12	9.3	6.8	4.3	2.8	1.9	1.4	0.90
	32-2 (1.25-2)	1.00	25.40	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	32-1 (1.25-1)	1.00	25.40	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
2.00	50 (2.00)	1.50	38.10	65	60	51	40	29	19	12	8.4	5.9	3.9
	41-5 (1.63-5)	1.50	38.10	46	42	36	29	21	13	8.7	6.0	4.1	2.8
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3.00	67-4 (2.63-4)	2.00	50.80	116	107	92	72	52	34	22	15	10	7.0
	67-3 (2.63-3)	2.00	50.80	80	74	63	50	36	23	15	10	7.2	4.8
	67-2 (2.63-2)	2.00	50.80	60	55	47	37	27	17	11	7.8	5.4	3.6
	67-1 (2.63-1)	2.00	50.80	30	28	24	19	14	8.7	5.7	3.9	2.7	1.8
4.00	90-5 (3.50-5)	2.50	63.50	225	207	178	140	101	65	43	29	20	14
	90-4 (3.50-4)	2.50	63.50	195	179	154	121	88	57	37	25	18	12
	90-3 (3.50-3)	2.50	63.50	133	122	105	82	60	39	25	17	12	8.0
	90-2 (3.50-2)	2.50	63.50	120	110	95	74	54	35	23	16	11	7.2
	90-1 (3.50-1)	2.50	63.50	60	55	47	37	27	17	11	7.8	5.4	3.6
6.00	102-3 (4.00-3)	3.00	76.20	400	368	316	248	180	116	76	52	36	24
	102-2 (4.00-2)	3.00	76.20	260	239	205	161	117	75	49	34	23	16
	102-1 (4.00-1)	3.00	76.20	200	184	158	124	90	58	38	26	18	12
8.00	188-3 (7.45-3)	4.00	101.60	860	808	731	629	504	355	184	95	57	40
	188-2 (7.45-2)	4.00	101.60	600	552	477	369	265	157	93	64	43	30
	188-1 (7.45-1)	4.00	101.60	515	473	401	302	210	130	62	35	21	15

Body Sub-Assembly Flow Coefficients - C_v

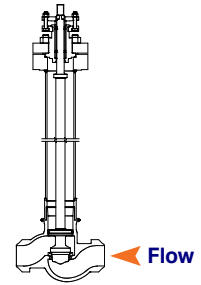
Valve Type: Cryogenic Globe Valve, unbalanced
ANSI Class: 150-300-600
Flow Characteristic: Linear
Flow Direction: Flow Over



Valve Size (in.)	Nominal Trim Size (T.N.)	Stroke		Opening Percentage									
		in.	mm	100	90	80	70	60	50	40	30	20	10
0.75	25-3 (1.00-3)	0.75	19.05	9.0	8.3	7.1	5.6	4.1	2.6	1.7	1.2	0.81	0.54
	25-2 (1.00-2)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	25-1 (1.00-1)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
	10-3 (0.38-3)	0.75	19.05	2.5	2.3	2.0	1.6	1.1	0.72	0.47	0.32	0.23	0.15
	10-2 (0.38-2)	0.75	19.05	1.9	1.7	1.5	1.2	0.85	0.55	0.36	0.25	0.17	0.11
	10-1 (0.38-1)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.090
	6.5-18 (0.25-18)	0.75	19.05	1.1	1.0	0.87	0.68	0.50	0.32	0.21	0.14	0.10	0.066
	3.2-2 (0.12-2)	0.50	12.70	0.5	0.46	0.40	0.31	0.22	0.15	0.10	0.065	0.045	0.030
3.2-1 (0.12-1)	0.50	12.70	0.3	0.28	0.24	0.19	0.14	0.087	0.057	0.039	0.027	0.018	
1.00	25-5 (1.00-5)	0.75	19.05	16	14	12	9.6	7.0	4.5	2.9	2.0	1.4	0.93
	25-4 (1.00-4)	0.75	19.05	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	25-3 (1.00-3)	0.75	19.05	9.0	8.3	7.1	5.6	4.0	2.6	1.7	1.2	0.81	0.54
	25-2 (1.00-2)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	25-1 (1.00-1)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
	10-4 (0.38-4)	0.75	19.05	1.9	1.8	1.5	1.2	0.85	0.55	0.36	0.25	0.17	0.11
	10-3 (0.38-3)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.09
	10-2 (0.38-2)	0.75	19.05	1.0	0.92	0.79	0.62	0.45	0.29	0.19	0.13	0.09	0.06
	3-2 (0.12-2)	0.50	12.70	0.5	0.46	0.40	0.31	0.22	0.15	0.10	0.07	0.05	0.03
3-1 (0.12-1)	0.50	12.70	0.3	0.28	0.24	0.19	0.14	0.09	0.06	0.04	0.03	0.02	
1.50	38 (1.50)	1.00	25.40	35	32	28	22	16	10	6.6	4.5	3.1	2.1
	32-4 (1.25-4)	1.00	25.40	31	29	24	19	14	9.0	5.9	4.0	2.8	1.9
	32-3 (1.25-3)	1.00	25.40	15	14	12	9.0	6.7	4.3	2.8	1.9	1.3	0.90
	32-2 (1.25-2)	1.00	25.40	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	32-1 (1.25-1)	1.00	25.40	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
2.00	50 (2.00)	1.50	38.10	76	73	69	62	55	46	37	28	18	8.4
	41-5 (1.63-5)	1.50	38.10	51	48	45	42	36	32	25	19	12	6.0
	41-4 (1.63-4)	1.50	38.10	32	30	28	26	23	20	16	12	7.7	3.7
	41-3 (1.63-3)	1.50	38.10	20	18	15	12	9.0	5.8	3.8	2.6	1.8	1.2
	41-2 (1.63-2)	1.50	38.10	15	14	12	9.3	6.7	4.3	2.8	1.9	1.3	0.90
	41-1 (1.63-1)	1.00	25.40	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
3.00	67-4 (2.63-4)	2.00	50.80	129	126	122	117	106	92	79	62	42	19
	67-3 (2.63-3)	2.00	50.80	82	80	76	72	64	56	46	34	23	13
	67-2 (2.63-2)	2.00	50.80	60	55	47	37	27	17	11	7.8	5.4	3.6
	67-1 (2.63-1)	2.00	50.80	30	28	24	19	14	8.7	5.7	3.9	2.7	1.8
4.00	90-5 (3.50-5)	2.50	63.50	243	232	222	214	208	193	166	128	84	38
	90-4 (3.50-4)	2.50	63.50	199	190	181	175	170	158	136	105	69	31
	90-3 (3.50-3)	2.50	63.50	140	136	129	118	105	89	71	51	34	16
	90-2 (3.50-2)	2.50	63.50	120	110	95	74	54	35	23	16	11	7.2
	90-1 (3.50-1)	2.50	63.50	60	55	47	37	27	17	11	7.8	5.4	3.6
6.00	102-3 (4.00-3)	3.00	76.20	472	455	430	399	360	315	265	207	131	64
	102-2 (4.00-2)	3.00	76.20	280	266	249	229	206	180	151	117	79	41
	102-1 (4.00-1)	3.00	76.20	206	192	177	160	141	121	99	76	52	26
8.00	188-3 (7.45-3)	4.00	101.60	980	944	891	825	744	651	546	427	297	154
	188-2 (7.45-2)	4.00	101.60	630	584	535	481	424	362	297	229	157	80
	188-1 (7.45-1)	4.00	101.60	577	535	490	431	389	332	272	211	145	75

Body Sub-Assembly Flow Coefficients - C_v

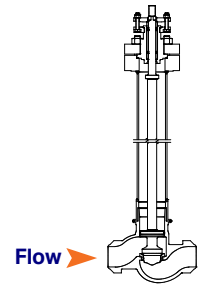
Valve Type: Cryogenic Globe Valve, unbalanced
ANSI Class: 150-300-600
Flow Characteristic: Linear
Flow Direction: Flow Under



Valve Size (in.)	Nominal Trim Size (T.N.)	Stroke		Opening Percentage									
		in.	mm	100	90	80	70	60	50	40	30	20	10
0.75	25-3 (1.00-3)	0.75	19.05	9.0	8.3	7.1	5.6	4.1	2.6	1.7	1.2	0.81	0.54
	25-2 (1.00-2)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	25-1 (1.00-1)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
	10-3 (0.38-3)	0.75	19.05	2.5	2.3	2.0	1.6	1.1	0.72	0.47	0.32	0.23	0.15
	10-2 (0.38-2)	0.75	19.05	1.9	1.7	1.5	1.2	0.85	0.55	0.36	0.25	0.17	0.11
	10-1 (0.38-1)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.090
	6.5-18 (0.25-18)	0.75	19.05	1.1	1.0	0.87	0.68	0.50	0.32	0.21	0.14	0.10	0.066
	3.2-2 (0.12-2)	0.50	12.70	0.5	0.46	0.40	0.31	0.22	0.15	0.10	0.065	0.045	0.030
3.2-1 (0.12-1)	0.50	12.70	0.3	0.28	0.24	0.19	0.14	0.087	0.057	0.039	0.027	0.018	
1.00	25-5 (1.00-5)	0.75	19.05	16	14	12	9.6	7.0	4.5	2.9	2.0	1.4	0.93
	25-4 (1.00-4)	0.75	19.05	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	25-3 (1.00-3)	0.75	19.05	9.0	8.3	7.1	5.6	4.0	2.6	1.7	1.2	0.81	0.54
	25-2 (1.00-2)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	25-1 (1.00-1)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
	10-4 (0.38-4)	0.75	19.05	1.9	1.8	1.5	1.2	0.85	0.55	0.36	0.25	0.17	0.11
	10-3 (0.38-3)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.09
	10-2 (0.38-2)	0.75	19.05	1.0	0.92	0.79	0.62	0.45	0.29	0.19	0.13	0.09	0.06
	3-2 (0.12-2)	0.50	12.70	0.5	0.46	0.40	0.31	0.22	0.15	0.10	0.07	0.05	0.03
3-1 (0.12-1)	0.50	12.70	0.3	0.28	0.24	0.19	0.14	0.09	0.06	0.04	0.03	0.02	
1.50	38 (1.50)	1.00	25.40	35	32	28	22	16	10	6.6	4.5	3.1	2.1
	32-4 (1.25-4)	1.00	25.40	31	29	24	19	14	9.0	5.9	4.0	2.8	1.9
	32-3 (1.25-3)	1.00	25.40	15	14	12	9.0	6.7	4.3	2.8	1.9	1.3	0.90
	32-2 (1.25-2)	1.00	25.40	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
	32-1 (1.25-1)	1.00	25.40	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
2.00	50 (2.00)	1.50	38.10	76	73	69	62	55	46	37	28	18	8.4
	41-5 (1.63-5)	1.50	38.10	51	48	45	42	36	32	25	19	12	6.0
	41-4 (1.63-4)	1.50	38.10	32	30	28	26	23	20	16	12	7.7	3.7
	41-3 (1.63-3)	1.50	38.10	20	18	15	12	9.0	5.8	3.8	2.6	1.8	1.2
	41-2 (1.63-2)	1.50	38.10	15	14	12	9.3	6.7	4.3	2.8	1.9	1.3	0.90
	41-1 (1.63-1)	1.00	25.40	12	11	9.5	7.4	5.4	3.5	2.3	1.6	1.1	0.72
3.00	67-4 (2.63-4)	2.00	50.80	129	126	122	117	106	92	79	62	42	19
	67-3 (2.63-3)	2.00	50.80	82	80	76	72	64	56	46	34	23	13
	67-2 (2.63-2)	2.00	50.80	60	55	47	37	27	17	11	7.8	5.4	3.6
	67-1 (2.63-1)	2.00	50.80	30	28	24	19	14	8.7	5.7	3.9	2.7	1.8
4.00	90-5 (3.50-5)	2.50	63.50	243	232	222	214	208	193	166	128	84	38
	90-4 (3.50-4)	2.50	63.50	199	190	181	175	170	158	136	105	69	31
	90-3 (3.50-3)	2.50	63.50	140	136	129	118	105	89	71	51	34	16
	90-2 (3.50-2)	2.50	63.50	120	110	95	74	54	35	23	16	11	7.2
	90-1 (3.50-1)	2.50	63.50	60	55	47	37	27	17	11	7.8	5.4	3.6
6.00	102-3 (4.00-3)	3.00	76.20	472	455	430	399	360	315	265	207	131	64
	102-2 (4.00-2)	3.00	76.20	280	266	249	229	206	180	151	117	79	41
	102-1 (4.00-1)	3.00	76.20	206	192	177	160	141	121	99	76	52	26
8.00	188-3 (7.45-3)	4.00	101.60	980	944	891	825	744	651	546	427	297	154
	188-2 (7.45-2)	4.00	101.60	630	584	535	481	424	362	297	229	157	80
	188-1 (7.45-1)	4.00	101.60	577	535	490	431	389	332	272	211	145	75

Body Sub-Assembly Flow Coefficients - C_v

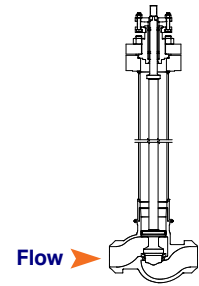
Valve Type: Cryogenic Globe Valve
ANSI Class: 150-300-600
Flow Characteristic: Equal Percentage - Alpha
Flow Direction: Flow Over



Valve Size (in.)	Nominal Trim Size (T.N.)	Stroke		Opening Percentage									
		in.	mm	100	90	80	70	60	50	40	30	20	10
0.50 & 0.75 & 1.00	20-50 (0.75-50)	1.00	25.40	9.0	8.3	7.1	5.6	4.0	2.6	1.7	1.2	0.81	0.54
	20-40 (0.75-40)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	20-30 (0.75-30)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
	20-20 (0.75-20)	0.75	19.05	2.5	2.3	2.0	1.6	1.1	0.72	0.47	0.32	0.23	0.15
	20-10 (0.75-10)	0.75	19.05	1.5	1.4	1.2	0.93	0.67	0.44	0.29	0.19	0.14	0.09
1.50	32-30 (1.25-30)	0.75	19.05	10	9.2	7.9	6.2	4.5	2.9	1.9	1.3	0.90	0.40
	32-20 (1.25-20)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	32-10 (1.25-10)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
2.00	41-30 (1.63-30)	1.50	38.10	35	32	28	22	16	10	6.7	4.6	3.2	2.1
	41-20 (1.63-20)	1.00	25.40	24	22	19	14	11	7.0	4.6	3.1	2.2	1.4
	41-10 (1.63-10)	1.00	25.40	15	14	12	9.0	6.8	4.4	2.9	2.0	1.4	0.90
	32-30 (1.25-30)	0.75	19.05	10	9.2	7.9	6.2	4.5	2.9	1.9	1.3	0.90	0.40
	32-20 (1.25-20)	0.75	19.05	6.0	5.5	4.7	3.7	2.7	1.7	1.1	0.78	0.54	0.36
	32-10 (1.25-10)	0.75	19.05	4.0	3.7	3.2	2.5	1.8	1.2	0.76	0.52	0.36	0.24
3.00	55-20 (2.50)	2.00	50.80	70	65	55	43	31	20	13	9.1	6.3	4.2
	55-10 (2.25)	1.50	38.10	45	41	35	28	20	13	8.7	6.0	4.1	2.8
	45-20 (1.85-20)	1.00	25.40	24	22	19	14	11	7.0	4.6	3.1	2.2	1.4
	45-10 (1.85-10)	1.00	25.40	15	14	12	9.0	6.8	4.4	2.9	2.0	1.4	0.90
	38-10 (1.50-10)	0.75	19.05	10	9.2	7.9	6.2	4.5	2.9	1.9	1.3	0.90	0.40
4.00	75-20 (3.00-2)	2.00	50.80	95	88	75	59	43	27	18	12	8.6	5.7
	75-10 (3.00-1)	2.00	50.80	65	60	51	40	29	18	12	8.4	5.8	3.9
	45-20 (1.85-20)	1.50	38.10	46	42	36	29	21	13	8.7	6.0	4.1	2.3
	45-10 (1.85-10)	1.50	38.10	30	28	24	19	14	8.7	5.7	3.9	2.7	1.8
6.00	120-30 (4.75-30)	3.00	76.20	310	285	244	192	140	89	58	40	27	19
	120-20 (4.75-20)	2.50	63.50	190	174	150	118	86	56	36	17	12	5.7
	120-10 (4.75-10)	2.50	63.50	160	147	129	99	72	47	30	21	15	9.8
	82-10 (3.25-10)	2.00	50.80	110	101	87	68	50	32	21	15	10	6.6

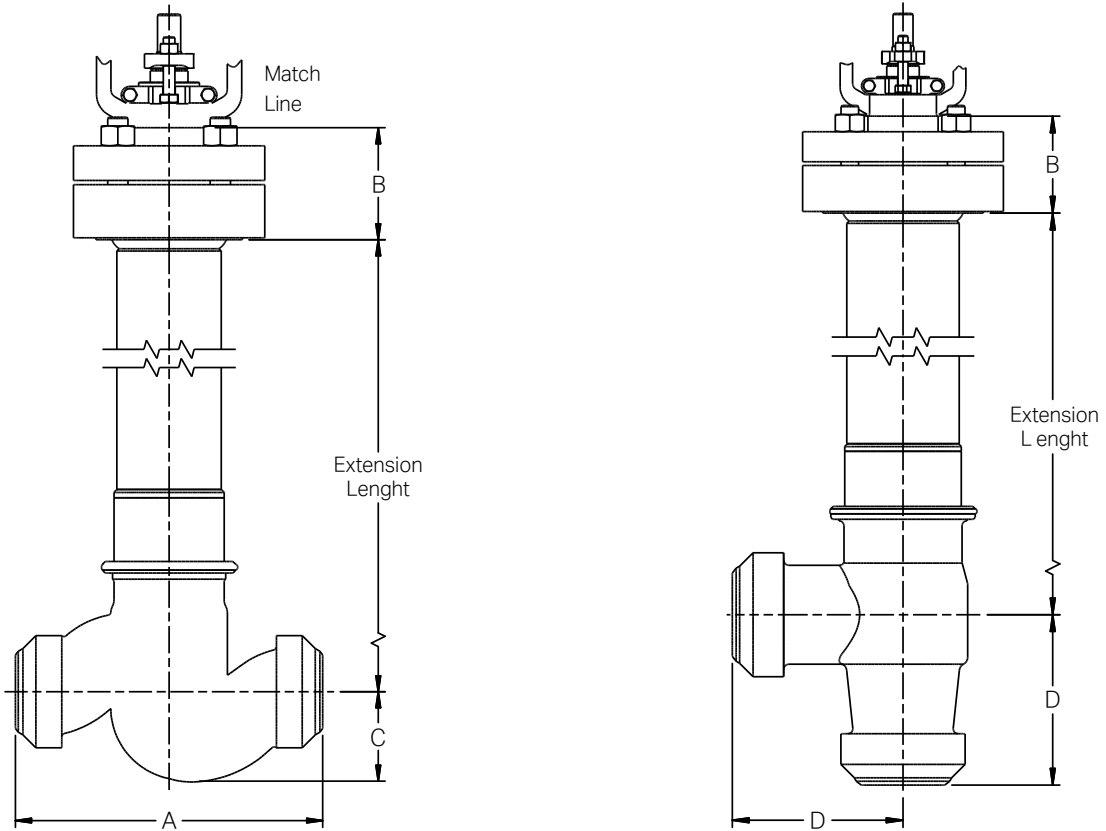
Body Sub-Assembly Flow Coefficients - C_v

Valve Type: Cryogenic Globe Valve
ANSI Class: 150-300-600
Flow Characteristic: Linear - Alpha
Flow Direction: Flow Over



Valve Size (Pol.)	Nominal Trim Size (T.N.)	Stroke		Opening Percentage									
		in.	mm	100	90	80	70	60	50	40	30	20	10
0.50 & 0.75 & 1.00	20-60 (0.75-60)	1.00	25.40	10	9.9	9.6	9.2	8.8	8.1	7.2	5.4	3.6	1.5
	20-50 (0.75-50)	0.75	19.05	8.0	7.8	7.5	7.2	6.7	5.4	4.3	3.3	2.1	1.1
	20-40 (0.75-40)	0.75	19.05	6.0	5.7	5.3	4.8	4.2	3.5	2.9	2.1	1.5	0.64
	20-30 (0.75-30)	0.75	19.05	4.0	4.0	3.4	3.0	2.6	2.3	1.9	1.4	1.0	0.51
	20-20 (0.75-20)	0.75	19.05	2.5	2.5	2.4	2.1	1.9	1.5	1.2	0.89	0.56	0.24
	20-10 (0.75-10)	0.75	19.05	1.5	1.4	1.2	1.1	0.96	0.81	0.64	0.49	0.32	0.15
1.50	32-30 (1.25-30)	0.75	19.05	10	9.9	9.6	9.2	8.8	8.1	7.2	5.4	3.6	1.5
	32-20 (1.25-20)	0.75	19.05	6.0	5.7	5.3	4.8	4.2	3.5	2.9	2.1	1.5	0.64
	32-10 (1.25-10)	0.75	19.05	4.0	4.0	3.4	3.0	2.6	2.3	1.9	1.4	1.0	0.51
2.00	41-30 (1.63-30)	1.50	38.10	35	33	31	29	25	22	17	13	8.4	4.1
	41-20 (1.63-20)	1.00	25.40	24	23	22	20	18	16	13	9.0	5.7	2.7
	41-10 (1.63-10)	1.00	25.40	15	15	14	13	11	10	7.7	5.7	3.7	1.9
	32-30 (1.25-30)	0.75	19.05	10	9.9	9.6	9.2	8.8	8.1	7.2	5.4	3.6	1.5
	32-20 (1.25-20)	0.75	19.05	6.0	5.7	5.3	4.8	4.2	3.5	2.9	2.1	1.5	0.64
	32-10 (1.25-10)	0.75	19.05	4.0	4.0	3.4	3.0	2.6	2.3	1.9	1.4	1.0	0.51
3.00	64 (2.50)	2.00	50.80	90	88	83	77	71	61	50	38	25	15
	55-20 (2.50-10)	1.50	38.10	65	63	58	54	47	39	31	24	16	7.4
	55-10 (2.25-10)	1.50	38.10	45	43	40	37	32	27	21	17	11	5.1
	45-20 (1.85-20)	1.00	25.40	24	23	22	20	18	16	13	9.0	5.7	2.7
	45-10 (1.85-10)	1.00	25.40	15	15	14	13	11	10	7.7	5.7	3.7	1.9
	38-10 (1.50-10)	0.75	19.05	10	9.9	9.6	9.2	8.8	8.1	7.2	5.4	3.6	1.5
4.00	75-20 (3.00-2)	2.00	50.80	95	88	80	73	63	54	44	33	23	11
	75-10 (3.00-1)	2.00	50.80	65	63	58	54	47	39	31	24	16	7.4
	45-20 (1.85-20)	1.50	38.10	46	44	41	38	33	28	22	17	11	5.2
	45-10 (1.85-10)	1.50	38.10	30	29	27	24	22	18	15	12	8.0	3.7
6.00	120-30 (4.75-30)	3.00	76.20	345	317	287	256	223	189	153	118	77	35
	120-20 (4.75-20)	2.50	63.50	240	228	214	196	177	112	91	70	48	24
	120-10 (4.75-10)	2.50	63.50	160	148	133	120	102	86	68	49	32	16
	82-10 (3.25-10)	2.00	50.80	110	101	93	84	73	62	51	39	26	13

Body Subassembly Dimensions



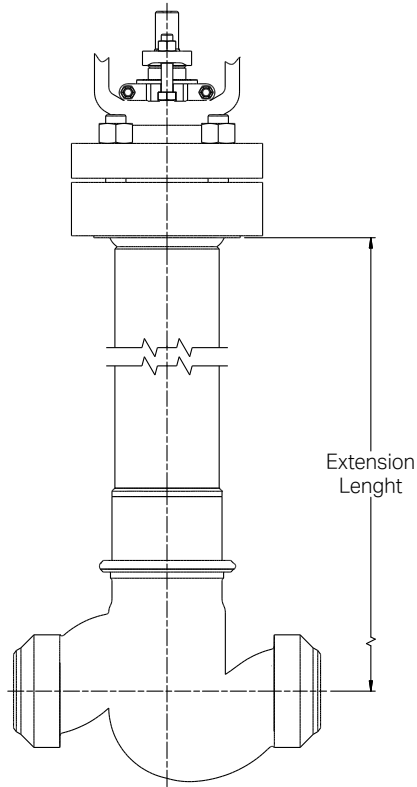
Dimensions - Globe⁽¹⁾ and Angle-Style⁽¹⁾ Valves - ANSI Class 150, 300 & 600

Valve Size (inches)	ANSI Class	A ⁽²⁾		B		C		D		Clearance Required Above Actuator for Disassembly	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
0.50	150-600	8.00	203	3.80	97	1.77	45			6.8	173
0.75	150-600	8.25	210	3.80	97	1.75	44			6.8	173
1.0	150-600	8.25	210	3.80	97	1.75	44	4.25	108	6.8	173
1.5	150-600	9.88	251	3.93	100	2.31	59	4.75	121	8.9	226
2.0	150-600	11.25	286	4.06	103	2.25	57	5.75	146	9.1	231
3.0	150-600	13.25	337	5.34	136	3.39	86	7.00	178	11.3	287
4.0	150-600	15.50	394	6.06	154	5.22	133	8.75	222	14.1	358
6.0	150	20.00	508	6.04	153	5.48	139	8.88	226	16.1	409
6.0	300-600	20.00	508	8.19	208	5.75	146	11.0	279	18.2	462
8.0	150	24.00	610	6.94	176	7.08	180	13.0	330	20.0	508
8.0	300-600	24.00	610	8.75	222	7.48	190	13.0	330	21.8	554
10	150	29.62	752	7.37	187	8.44	214			21.4	544
10	300-600	29.62	752	7.37	187	8.93	227			21.4	544

⁽¹⁾ valves equipped with plugs having vent holes should always be installed with a maximum angle of 15° in relation to vertical and actuators should be pointing upwards.

⁽²⁾ According to ANSI/ISA-75-08-05, latest edition.

Body Subassembly Dimensions - Weight



Estimated Shipping Weights*

Valve Size (in)	Class 150		Class 300		Class 600	
	lbs	kg	lbs	kg	lbs	kg
0.50	70	32	70	32	70	32
0.75	70	32	70	32	70	32
1.0	70	32	70	32	70	32
1.5	85	39	85	39	85	39
2.0	95	43	95	43	95	43
3.0	190	86	200	91	210	95
4.0	275	125	285	129	300	136
6.0	400	181	610	277	640	290
8.0	640	290	840	381	880	399
10	1110	504	1465	665	1660	753

* Globe-style valve equipped with standard size actuator and Chronos positioner.

Dimensions - Cryogenic Extension Lengths

Valve Size (in.)	ANSI Class	Standard Cryogenic Extension Length		Optional Extension Length					
		in.	mm	in.	mm	in.	mm	in.	mm
0.50	150-600	27	686	15	381	18	457	24	610
0.75	150-600	27	686	15	381	18	457	24	610
1.0	150-600	27	686	15	381	18	457	24	610
1.5	150-600	27	686	18	457	24	610	30	762
2.0	150-600	30	762	18	457	24	610	36	914
3.0	150-600	30	762	21	533	24	610	36	914
4.0	150-600	36	914	21	533	24	610	30	762
6.0	150	36	914	24	610	27	686	30	762
6.0	300-600	36	914	24	610	27	686	30	762
8.0	150	36	914	24	610	27	686	30	762
8.0	300-600	36	914	24	610	27	686	30	762
10	150	36	914	30	762	33	838	42	1067
10	300-600	36	914	30	762	33	838	42	1067

Additional Weight for Oversized Actuators

Standard Original Size	Oversized Actuator Required	Add	
		lbs	kg
25	50	30	14
50	100	90	41
100	200	125	57

The information and specifications contained in this literature are considered accurate. However, they are supplied for informative purposes and should not be considered certified. The products of BOMAFA Group are continually being improved and the specifications, dimensions and information contained in this catalogue are subject to change without notice. For additional information or confirmation, please consult your BOMAFA Group representative.

Quality Management System



ISO 9001-2015

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