

# GLc®

**GLOBE  
CONTROL VALVE  
CRYOGENIC COLD BOX**



**VALTEKSUL™**

# GLC<sup>®</sup> Cryogenic Globe Control Valve

## Introduction

The ValtekSul GLc Series is the result of years of experience 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.

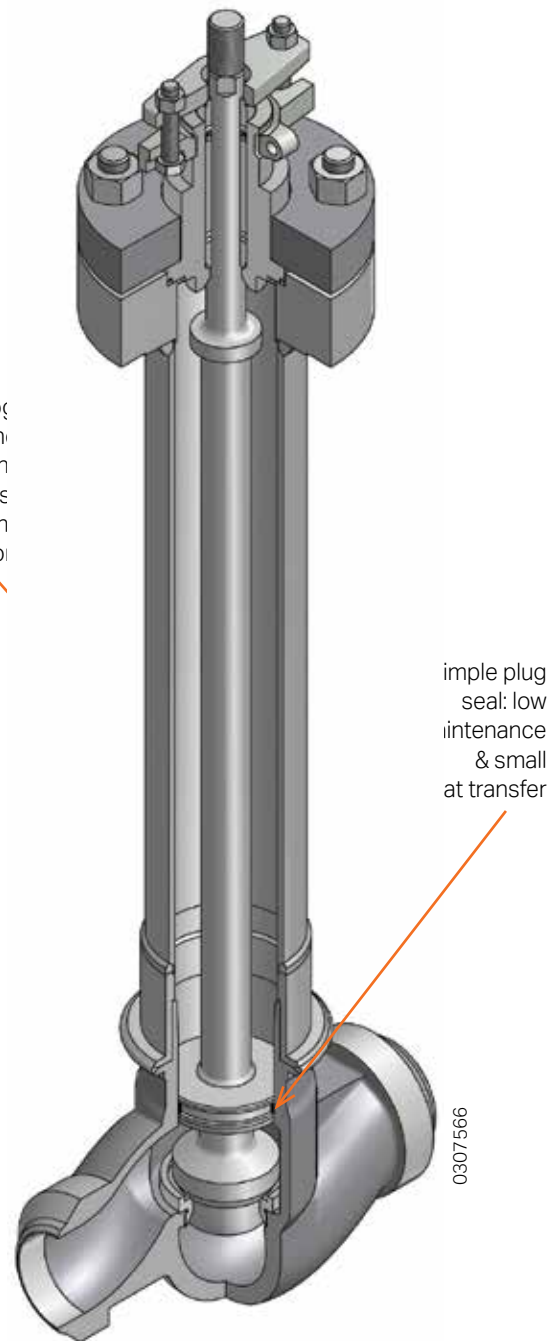
During operation, a small fraction of the liquefied gas goes into the inner part of the extension, where it is vaporized. This gas barrier created between the cryogenic liquid that flows through the body and the top of the extension isolates the valve packing, protecting it from the ultra-low temperatures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

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



## GLc Series – Body Subassembly

**Rangeability: 30:1**

**Tightness ANSI Class IV - Metal Seat**

**Tightness ANSI Class VI - Soft Seat**

# GLc - Body Subassembly Manufacturing Characteristics

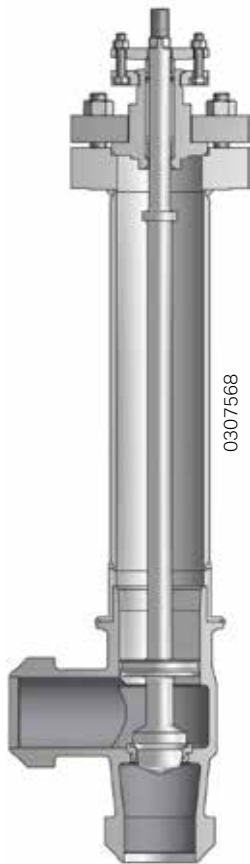
## Body

The optimized geometry of the GLc 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.

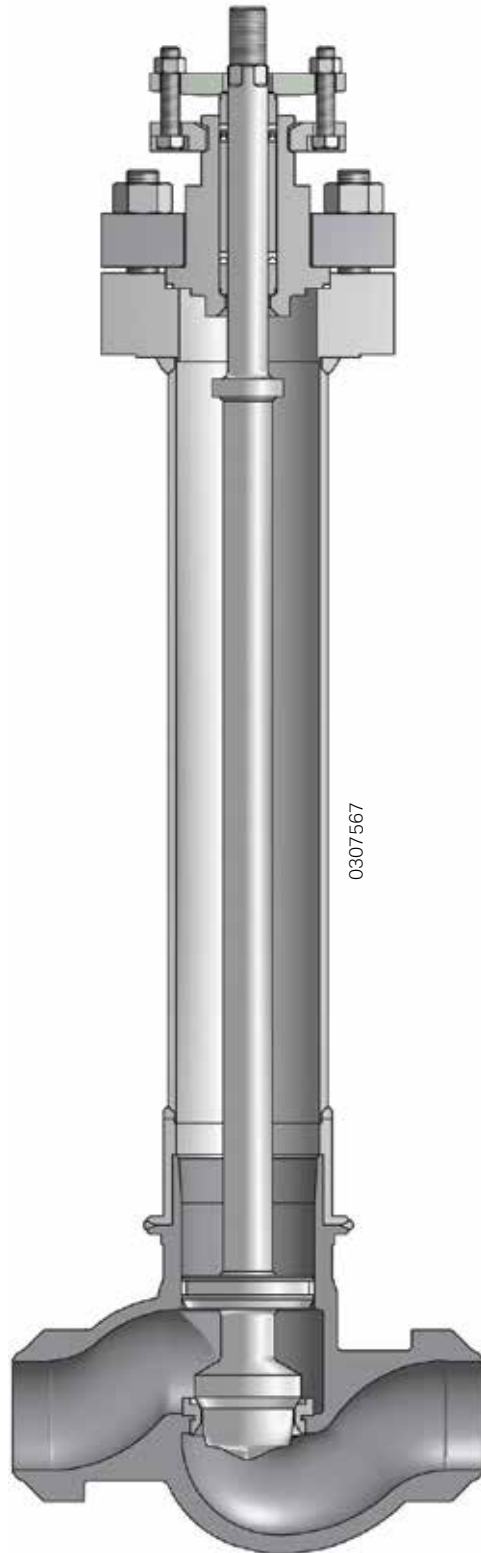
In addition to the cryogenic extension welded to the body, the small quantity and reduced weight of the internal components enable that the heat transfers during the valve operation are kept to minimum levels, increasing the process thermal efficiency.

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.

GLc 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.

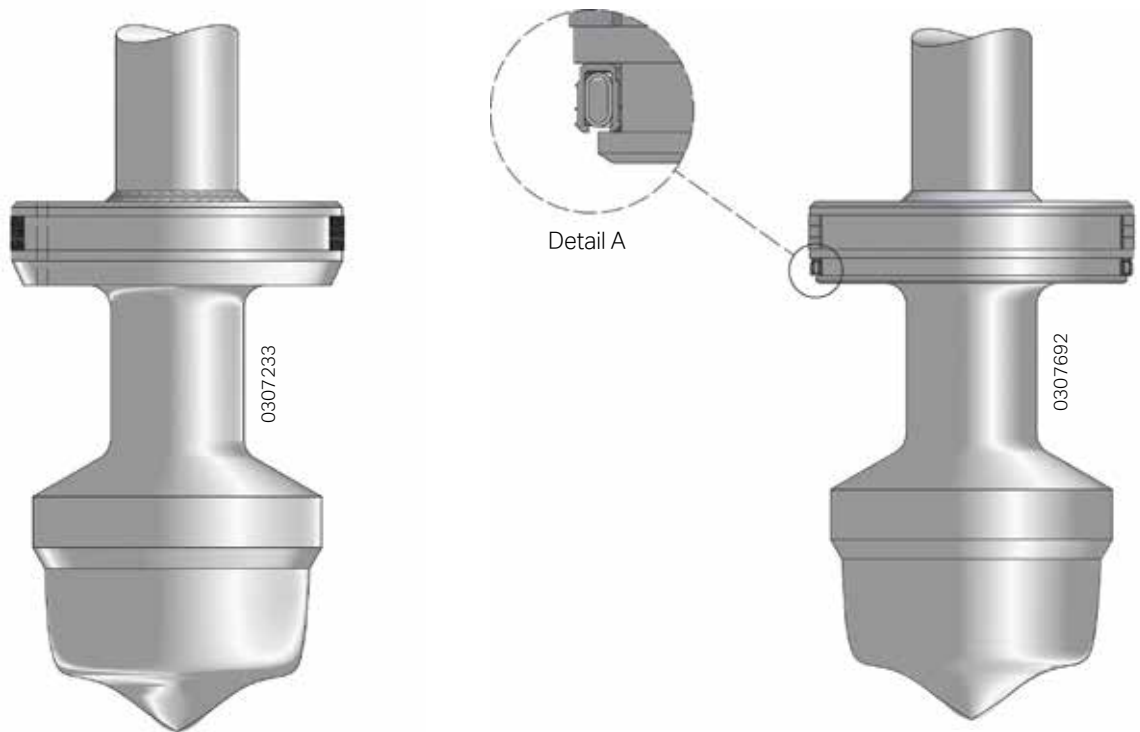


**GLc Valve with Angle-Style Body**



**GLc Valve with In-line Body**

## GLc - 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.

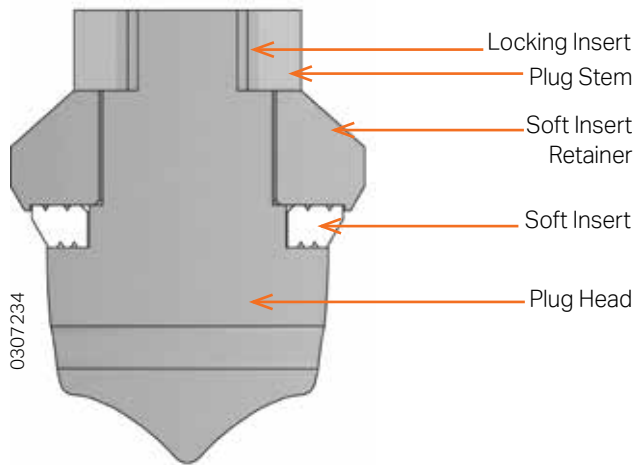
In plugs provided with the pressure balance orifices, a small fraction of the liquid is vaporized when it penetrates the cryogenic extension through the small vent holes in the plug head. In valves equipped with plugs assembled with soft seal ring spring-energized, the seal ring allows the passage of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

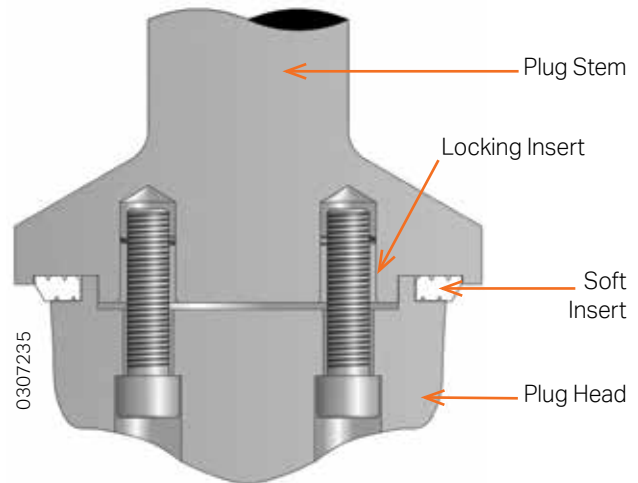
Since the plug sealing comprises only a few parts, the heat transfer to the process fluid is minimized. A fully retained bonnet gasket prevents the process fluid leakage to the atmosphere.

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

## GLc - 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 GLc Series 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 GLc Series 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. GLc valves can be supplied with PTFE or KEL-F (PCTFE) flat gaskets.

# GLc - Body Sub-Assembly General Specification Chart

## GLc Series - Specification & Manufacturing Materials

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

\* PTFEG Glass-filled PTFE;

# GLc - 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 GLc Series 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.

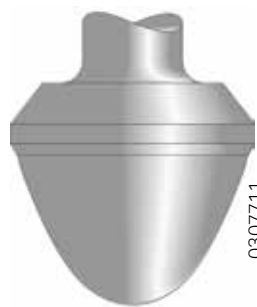
As the plug moves away from the seat, an increasing number of hole pairs is opened, and the cavitating jet of liquid that passes through each hole collides at the center of the plug head with the jet that enters through the opposite hole. The design of this special plug enables the creation of a noncavitating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



Contour =%



Alpha =%



Linear Contour



Linear Alpha

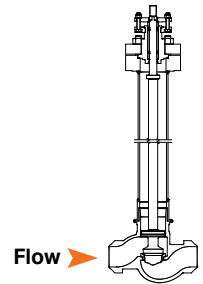
## Equal Percentage Characteristic

## Linear Characteristic

## Typical Configuration of GLc Valve Trim

# GLc - Body Sub-Assembly Flow Coefficients - $C_v$

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

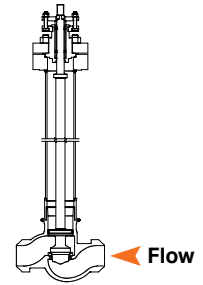


| Valve Size (in.) | Nominal Trim Size (T.N.) | Stroke |        | Opening Percentage |      |      |      |       |       |       |       |       |       |
|------------------|--------------------------|--------|--------|--------------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                  |                          | 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    |



# GLc - Body Sub-Assembly Flow Coefficients - $C_v$

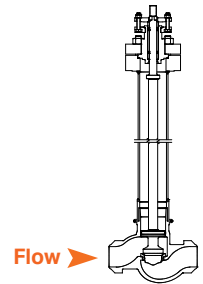
**Valve Type:** GLc, Cryogenic Globe Valve  
**ANSI Class:** 150-300-600  
**Flow Characteristic:** Equal Percentage  
**Flow Direction:** Flow Under



| Valve Size (in.) | Nominal Trim Size (T.N.) | Stroke |        | Opening Percentage |      |      |      |       |       |       |       |       |       |
|------------------|--------------------------|--------|--------|--------------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                  |                          | 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  | 4.0   | 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  |
|                  | 10-3 (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  | 0.099 | 0.066 |
|                  | 3.2-2 (0.12-2)           | 0.50   | 12.70  | 0.5                | 0.46 | 0.40 | 0.31 | 0.22  | 0.15  | 0.095 | 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                | 1.7  | 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  |
| 3-1 (0.12-1)     | 0.50                     | 12.70  | 0.30   | 0.28               | 0.24 | 0.19 | 0.14 | 0.087 | 0.057 | 0.039 | 0.027 | 0.02  |       |
| 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   |
|                  | 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   | 16   | 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  | 6.8   | 4.3   | 2.8   | 1.9   | 1.4   | 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    |

# GLc - Body Sub-Assembly Flow Coefficients - $C_v$

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

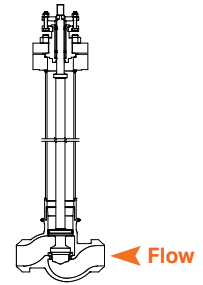


| Valve Size (in.) | Nominal Trim Size (T.N.) | Stroke |        | Opening Percentage |      |      |      |       |       |       |       |       |       |
|------------------|--------------------------|--------|--------|--------------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                  |                          | 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    |

# GLc - Body Sub-Assembly

## Flow Coefficients - $C_v$

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

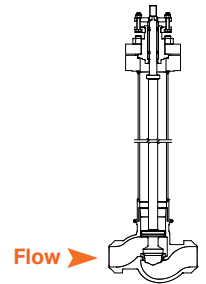


| Valve Size (in.) | Nominal Trim Size (T.N.) | Stroke |        | Opening Percentage |      |      |      |       |       |       |       |       |       |
|------------------|--------------------------|--------|--------|--------------------|------|------|------|-------|-------|-------|-------|-------|-------|
|                  |                          | 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    |

# GLc - Body Sub-Assembly

## Flow Coefficients - $C_v$

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

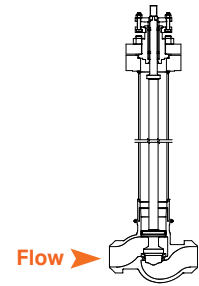


| Valve Size (in.)                  | Nominal Trim Size (T.N.) | Stroke |       | Opening Percentage |     |     |      |      |      |      |      |      |      |
|-----------------------------------|--------------------------|--------|-------|--------------------|-----|-----|------|------|------|------|------|------|------|
|                                   |                          | in.    | mm    | 100                | 90  | 80  | 70   | 60   | 50   | 40   | 30   | 20   | 10   |
| <b>0.50 &amp; 0.75 &amp; 1.00</b> | 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 |
| <b>1.50</b>                       | 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 |
| <b>2.00</b>                       | 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 |
| <b>3.00</b>                       | 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 |
| <b>4.00</b>                       | 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  |
| <b>6.00</b>                       | 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  |

# GLc - Body Sub-Assembly

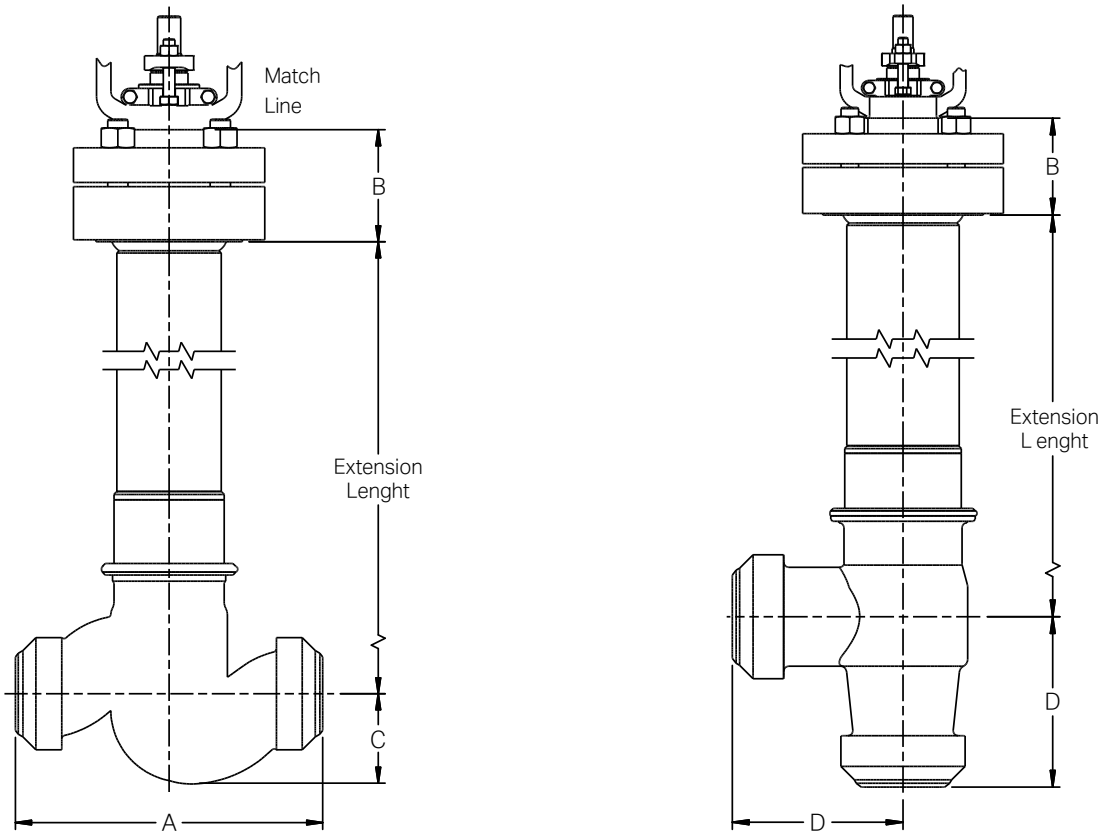
## Flow Coefficients - $C_v$

**Valve Type:** GLc, 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   |
| <b>0.50 &amp; 0.75 &amp; 1.00</b> | 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 |
| <b>1.50</b>                       | 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 |
| <b>2.00</b>                       | 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 |
| <b>3.00</b>                       | 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  |
| <b>4.00</b>                       | 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  |
| <b>6.00</b>                       | 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   |

# GLc - Body Subassembly Dimensions



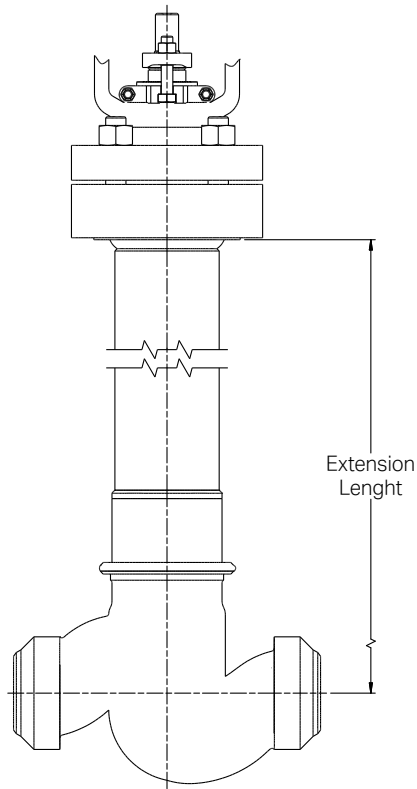
## Dimensions - Globe<sup>(1)</sup> and Angle-Style<sup>(1)</sup> Valves - ANSI Class 150, 300 & 600

| Valve Size<br>(inches) | ANSI Class | A <sup>(2)</sup> |     | B    |     | C    |     | D    |     | Clearance Required<br>Above Actuator<br>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 |

<sup>(1)</sup> GLc 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.

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

# GLc - 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.

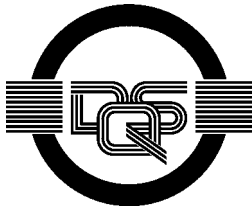
## Dimensions - Cryogenic Extension Lengths

| 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 |

## Quality Management System



**ISO 9001-2015**  
Certificate nº 31001 QM 15  
DQS GmbH  
DQS Brazil  
ISO 14001™ Certified

### ValtekSul Brasil

#### Central Office and Factory

Rua Goiás, 345 - Diadema - SP - Brazil

Phone number: 55 11 4072-8600

[www.valteksul.com.br](http://www.valteksul.com.br)

[www.valteksul.com](http://www.valteksul.com)

**VALTEK™**  
**SULAMERICANA**  
THE CONTROL VALVES COMPANY

The information and specification contained in this bulletin are considered accurate. However, they are provided only for information purposes and should not be considered as certified. Valtek Sulamericana products are continuously improved and upgraded and the specification, dimensions and information contained herein are subject to change without notice. For further information or to confirm these presented here, contact your Valtek Sulamericana representative. The specific instructions for installation, operation and maintenance of the GLC control valve are provided in the Maintenance Bulletin #8.

Kalrez e Zymax are registered trademarks of E.I. Du Pont Company

Monel is a registered trademark of Special Metals.

Hastelloy C and Hastelloy B are registered trademarks of Haynes Int'l.

Buna N and Viton A are registered trademarks of Du Pont Dow Elastomers

Kel-F is a registered trademark of 3M Corporation.

GLC is a registered trademark of Valtek Sulamericana.

ValtekSul is a registered trademark.

Valtek Sulamericana is a registered trademark.