



GLE

Erosive Applications

Globe Control Valve

VSI CONTROLS
A PETROLVALVES COMPANY

INTRODUCTION

The GL \bar{E} Series Control Valve is an advanced and reliable alternative for application in severe services where conventional control valves would last only few weeks.

Developed specifically for applications in erosive, corrosive or severe flashing flow conditions, the GL \bar{E} valve design incorporates innovative solutions that make this valve the optimum choice to overcome challenges presented under such conditions of use.

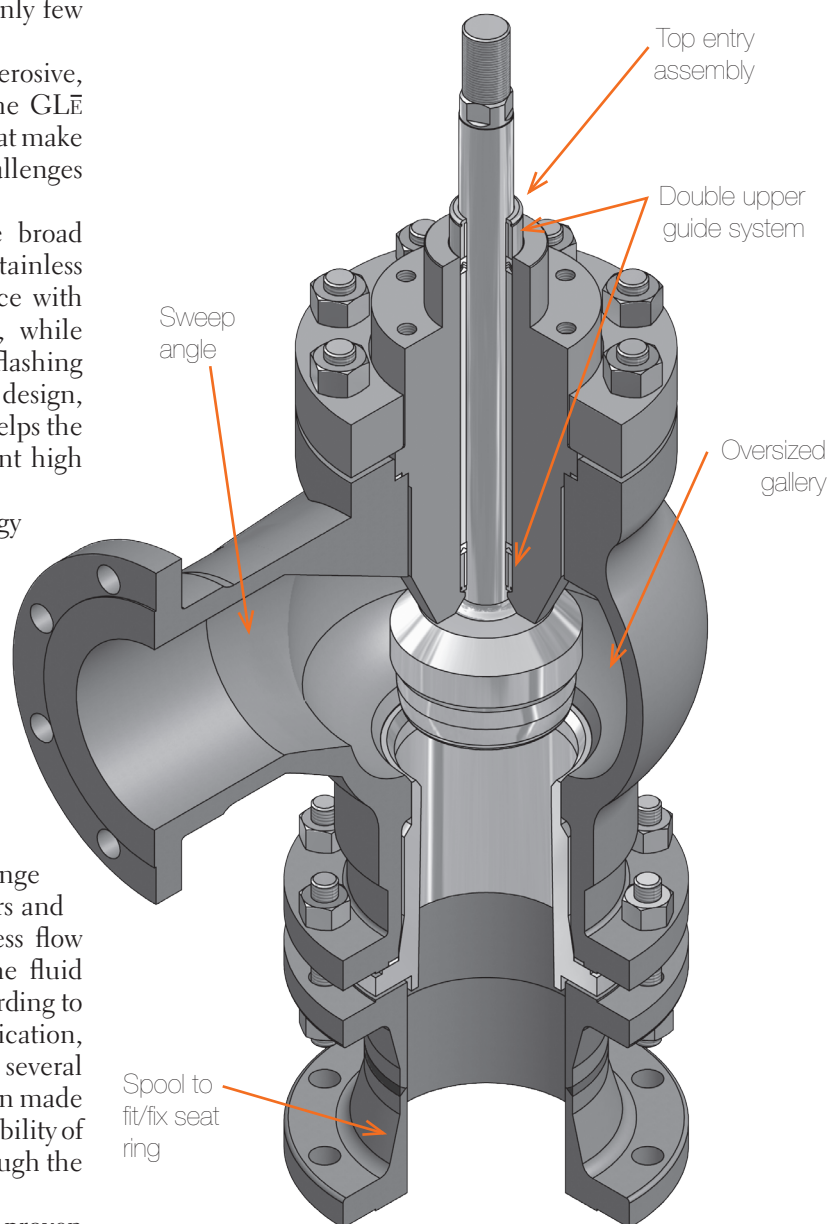
In the case of corrosive applications, the broad option of construction materials, ranging from stainless steel to titanium, practically assures compliance with the requirements of any industrial processes, while for applications with erosive, abrasive or flashing condition fluids, this valve presents a precise design, with an hydrodynamic internal geometry, that helps the flow of slurries, dirty fluids or fluids that present high concentrations of suspended solids.

The modern design incorporates technology resources that considerably extend the service life and the maintenance intervals for the GL \bar{E} Series, when compared to conventional control valves: the angle body has a sweep internal curve and a significantly greater gallery, larger than traditional angle valves, that minimizes wear caused by aggressive fluids or fluids flowing at high velocities. The bonnet bottom configuration significantly helps the flow of slime and scale-forming fluids

The GL \bar{E} valve seat is fitted and fixed by a flange system that: does not require the use of retainers and the guide system in the seat retainer; offers less flow restriction; prevents creating pockets where the fluid gets trapped, and; facilitates maintenance. According to the level of requirements for each specific application, the valve trim can be manufactured with several metallic alloys that withstand wearing out or even made using ceramic material, and there is also the possibility of using extended ventury-type seats, that pass through the body outlet.

Sharing many design solutions already proven in the well known VSI Controls GL \bar{S} valves, such as: top entry assembly; double upper guide system on the plug stem, and; spring-cylinder actuators, with high actuation thrust and accurate positioning, the GL \bar{E} Series present reliable operation and low maintenance cost, being the Best choice for applications in extremely severe processes.

GL \bar{E} SERIES – BODY SUB-ASSEMBLY (FIGURE 1)



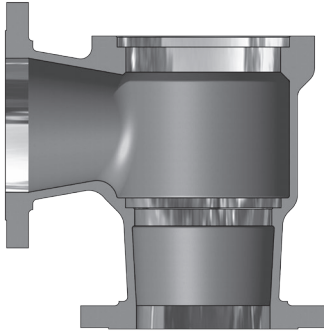
Rangeability 30:1 (Typical)

ANSI Class II Shutoff – Ceramic Trim*

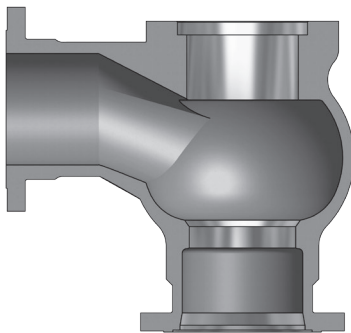
ANSI Class IV Shutoff – Metal Trim*

* The GL \bar{E} valve is available only with unbalanced trim.

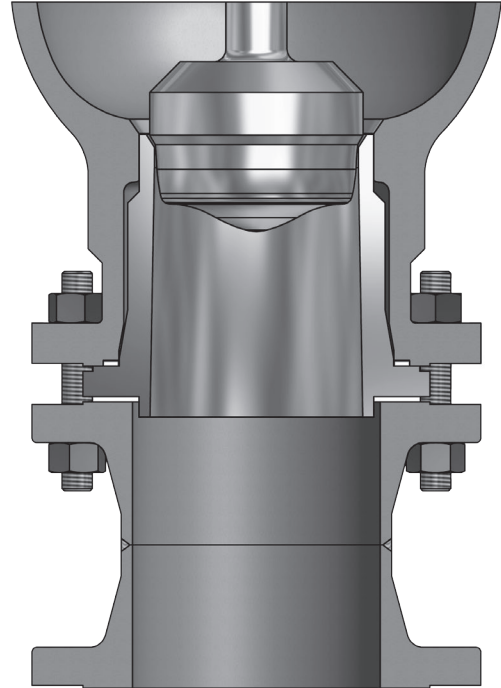
CONVENTIONAL ANGLE BODY (FIGURE 2)



ANGLE BODY WITH SWEEP ANGLE AND OVERSIZED GALLERY OF THE GLĒ SERIES (FIGURE 3)



SEAT FIXATION SYSTEM (FIGURE 4)



Reliability

The exclusive design of the GLĒ Series angle valve, with its sweep angle and oversized gallery, presents by itself, significant advantages regarding applications with erosive, abrasive or flashing fluids: while the sweep angle of the body provides a more orderly flow, preventing turbulences caused by sharp corners and the sudden change of flow direction, which is specially desired when handling erosive fluids, the body oversized gallery, with large dimensions, provides a reduction of the flow velocity just on more sensitive points of an angle valve, that is, in the region where the fluid changes its direction and in the areas around the choking point. In applications with flashing fluids, the geometry of the valve ensures that the energy dissipated under these conditions of flow is directed far from the critical components.

In addition to these characteristics, the GLĒ Series present also intelligent solutions for handling difficult fluids that cause excessive wear, such as: the

hydrodynamic body, which does not present sharp turns or stagnant points, preventing the buildup of scale-forming materials; seat system fixed by spool or by the pipeline, which eliminated the need for traditional seat retainers, reducing turbulences and increasing flow coefficients, plus the possibility to use extended venturi-type seats to protect the body and discharge vessel entries against the action of slurries in severe applications or from premature wear caused by high velocities. The exclusive bonnet design, with an extra-deep packing box, enables the assembly of all packing options and has a wiper set that removes impurities carried by the plug stem, contributing to a longer service life of all bonnet internal components.

By putting together such advanced characteristics in a single product, VSI Controls offers to the market the most modern control valve technology for erosive or corrosive applications.

GLE OVERVIEW / FLOW COEFFICIENTS

GLE SERIES - SPECIFICATIONS & MATERIALS OF CONSTRUCTION
(TABLE I)

BODY	Sizes	1 to 18 inches	
	ANSI Ratings	150, 300, 600, 900 & 1500	
	Form	Angle body, with sweep angle and oversized gallery	
	Materials	Carbon steel, stainless steels, Hastelloy, Inconel, titanium and other castable alloys upon request	
	End Connections	Separable Flanges (1 to 4 inches)	
		Integral flanges (all sizes)	
	Separable Flanges	Carbon steel, 316 stainless steel or other materials upon request	
	Gaskets	Flat	PTFE, PTFEG ⁽¹⁾
		Spiral Wound	316 or 304 spiral wound with graphite, PTFE or other filler materials free of asbestos (AFG)
		O-Rings	Inconel X-750 / silver plated hollow O-Ring
BONNET	Types	Standard, extended	
	Materials	Same as body	
	Bonnet Flange	Separable, made from carbon steel or 316 stainless steel	
TRIM	Type	Unbalanced	
	Flow Characteristics	Equal Percentage, Linear	
	Materials	316 SS with Alloy #6 overlay, solid Alloy #6, 316 SS with tungsten carbide, 316 SS with silicon carbide, ceramic	
PNEUMATIC ACTUATOR	Type⁽²⁾	Double-acting cylinder with positive spring for failsafe action. Field reversible.	
	Sizes	25, 50, 100, 200, 300, 400, 500 and 600	
	Options	Manual handwheel, limit stops and others	
POSITIONER	Types	Pneumatic, analog electro-pneumatic or digital electro-pneumatic with multiple communication protocols	

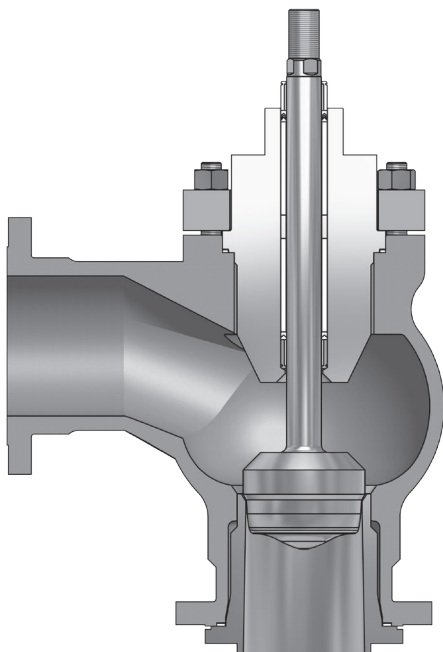
⁽¹⁾ PTFEG: Glass-Filled PTFE. ⁽²⁾ Other type of actuators available upon request.

FLOW COEFFICIENTS - C_v
(TABLE II)

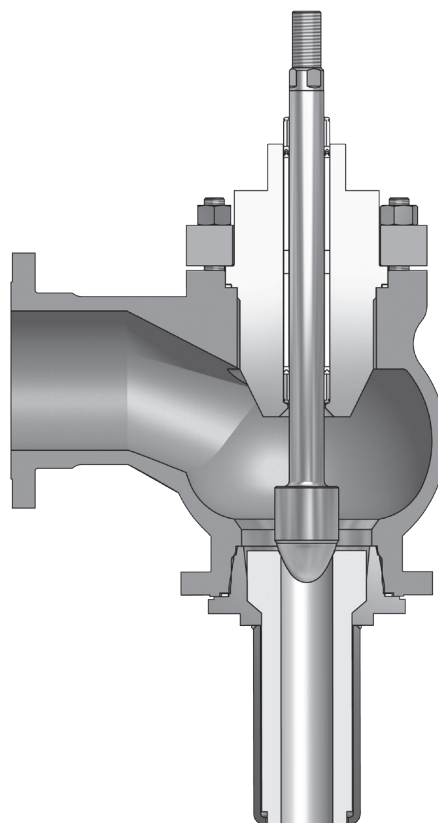
VALVE SIZE (inches)	TRIM SIZE (T.N.)	STROKE		RATED C_v (3)(4)(5)(6)
		in.	mm	
1	20 (0.75)	0.75	19.1	18.2
	16 (0.63)	0.75	19.1	12.9
	13 (0.51)	0.75	19.1	8.1
	10 (0.38)	0.75	19.1	5.1
1.5	32 (1.25)	1.00	25.4	50
	25 (1.00)	0.75	19.1	33
	20 (0.75)	0.75	19.1	18.2
	13 (0.51)	0.75	19.1	8.1
2	10 (0.38)	0.75	19.1	5.1
	41 (1.63)	1.50	38.1	86
	32 (1.25)	1.00	25.4	50
	25 (1.00)	0.75	19.1	33
3	20 (0.75)	0.75	19.1	18.2
	13 (0.51)	0.75	19.1	8.1
	60 (2.38)	2.00	50.8	180
	47 (1.88)	1.50	38.1	113
4	38 (1.50)	1.00	25.4	72
	25 (1.00)	0.75	19.1	33
	20 (0.75)	0.75	19.1	18.2
	76 (3.00)	2.50	63.5	280
6	60 (2.38)	2.00	50.8	180
	47 (1.88)	1.50	38.1	113
	35 (1.38)	1.00	25.4	61
	25 (1.00)	0.75	19.1	33
8	124 (4.88)	3.00	76.2	675
	95 (3.75)	2.50	63.5	424
	79 (3.12)	2.50	63.5	301
	54 (2.12)	2.00	50.8	145
10	38 (1.50)	1.00	25.4	79
	184 (7.25)	4.00	101.6	1325
	143 (5.63)	3.00	76.2	868
	118 (4.63)	3.00	76.2	616
12	82 (3.25)	2.50	63.5	324
	219 (8.63)	4.00	101.6	1783
	168 (6.63)	4.00	101.6	1140
	140 (5.50)	3.00	76.2	834
14	257 (10.13)	6.00	152.4	2419
	200 (7.88)	4.00	101.6	1525
	162 (6.38)	4.00	101.6	1070
	302 (11.88)	6.00	152.4	3435
18	235 (9.25)	4.00	101.6	2026
	190 (7.50)	4.00	101.6	1402
18	394 (15.50)	6.00	152.4	3850

⁽³⁾ Rated C_v's at 100% opening, valids for ANSI ratings 150 to 600. Consult the manufacturer for higher pressure classes. ⁽⁴⁾ Valid for "Linear" and "Equal Percentage" flow characteristics. ⁽⁵⁾ Flow over is mandatory. ⁽⁶⁾ Ceramic trim available only with "Linear" characteristic.

TRIM, MATERIALS



**TRIM WITH STANDARD SEAT RING
(FIGURE 5)**



**TRIM WITH EXTENDED VENTURI-TYPE SEAT RING
(FIGURE 6)**

**CHARACTERISTICS OF TRIM MATERIALS
(TABLE III)**

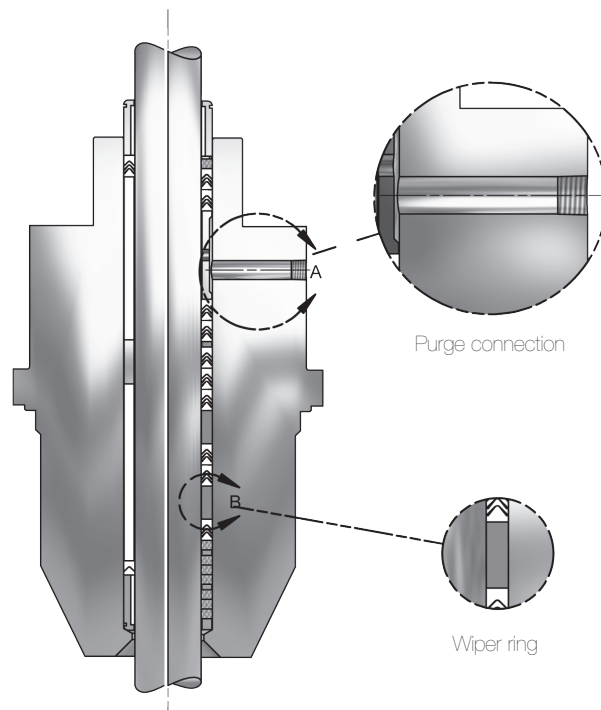
TRIM MATERIALS	HARDNESS R_c	IMPACT STRENGTH	CORROSION RESISTANCE	EROSION RESISTANCE	ABRASION RESISTANCE
416 Stainless Steel	40	Good	Fair	Good	Good
17-4PH H900	44	Good	Good to Excellent	Good	Good
Alloy #6	44	Excellent	Excellent	Good	Good
Colmonoy #5	45 to 50	Good	Fair	Good	Good
440C Stainless Steel	55 to 60	Fair	Fair	Excellent	Excellent
Ceramic (PSZ)	69	Moderate	Good to Excellent	Excellent	Excellent
Ceramic (Tungsten Carbide)	72	Moderate	Good on Bases, Poor on Acids	Excellent	Excellent

Packing Box

In addition to well-proven characteristics incorporated to other linear valves developed by VSI Controls, such as the double upper guide system, with oversized plug stem and guides widely spaced and upper packing set not wetted by the process fluid, the GLĒ valve packing box present also two special features that makes it the ideal choice for using with scale-forming or slurry fluids:

1. Wiper rings, that prevents scales from reaching the packing box and damages to the packing, and;
2. Purge connection, which may be used for detection of emissions or for pressurizing the packing box, providing additional protection to the assembly.

GLĒ SERIES – STANDARD BONNET (FIGURE 7)



BONNETS (TABLE IV)

BONNET TYPE	TEMPERATURE LIMITS	
	°F	°C
Standard	-20 to 750	-28 to 400
Extended	-150 to 1500	-100 to 815

GUIDES & WIPER RINGS (TABLE V)

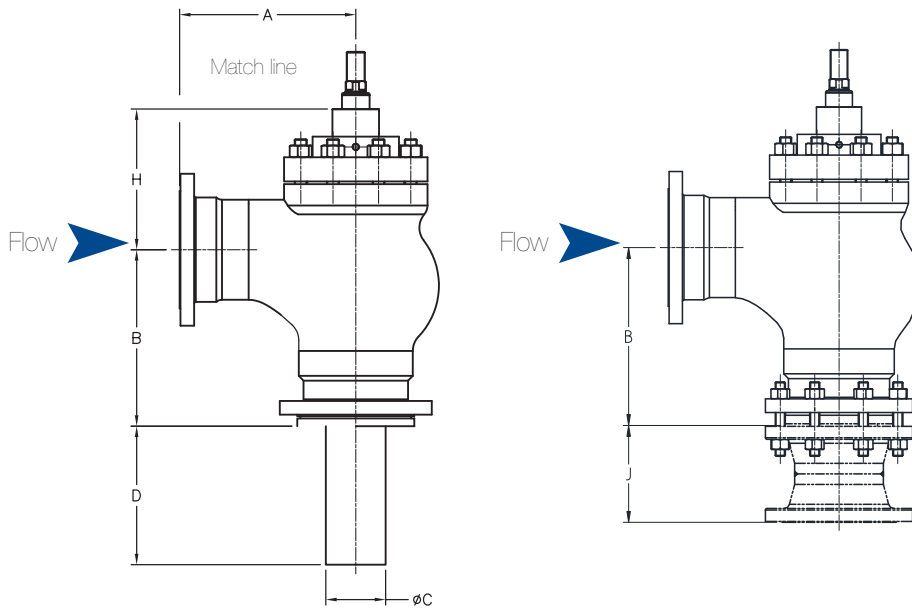
ITEM	MATERIALS
Guides	316 SS with PTFEG or graphite inserts, solid guides manufactured with bronze or Alloy #6
Wiper Rings	Alloy #6, PSZ, Inconel

PACKING TEMPERATURE LIMITS (TABLE VI)

PACKING MATERIAL	TEMPERATURE LIMITS ⁽¹⁾			
	STANDARD BONNET ⁽²⁾		EXTENDED BONNET ⁽²⁾	
	°F	°C	°F	°C
PTFE “V” rings	-20 to 450	-28 to 232	-150 to 600	-100 to 316
PT and PTG	-20 to 450	-28 to 232	-20 to 600	-28 to 316
Braided PTFE	-20 to 500	-28 to 260	-150 to 600	-100 to 316
Glass-filled PTFE (PTFEG)	-20 to 500	-28 to 260	-150 to 600	-100 to 316
PTG XT	-20 to 550	-28 to 288	-20 to 700	-28 to 371
Graphite/AFP ⁽³⁾	-20 to 750	-28 to 400	-20 to 1200	-28 to 650
Graphite/AFP ⁽³⁾ , Inconel wire	-20 to 750 ⁽⁴⁾	-28 to 400 ⁽⁴⁾	-20 to 1200	-28 to 650
Graphite ⁽⁵⁾	-20 to 750 ⁽⁴⁾	-28 to 400 ⁽⁴⁾	-20 to 1500	-28 to 815

⁽¹⁾ ANSI B16.34 specifies acceptable pressure and temperature limits for pressure retaining materials. Contact manufacturer for additional information about the pressure vs. temperature limits of packings. ⁽²⁾ Temperature limits are valid provided that pressure vs. temperature limits of body, bonnet and remaining parts are respected. ⁽³⁾ High temperature packing, free of asbestos. ⁽⁴⁾ For sizes from 8 to 12 inches, the maximum temperature limit is 850°F (454°C). ⁽⁵⁾ Do not use graphite packing in oxidizing services such as air or oxygen with operating temperatures higher than 800°F (426°C). Due to the increased friction, the use of graphite packing may require the use of extra-strong springs and/or oversized actuators.

DIMENSIONS



DIMENSIONS⁽¹⁾⁽²⁾ (TABLE VII)

Valve Size (inches)	ANSI Class	A		B		C (Max.)		D (Max.)		H				Clearance Required Above Actuator for Disassembly	
										Standard Bonnet		Standard Bonnet			
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
1	150 - 600	4.25	108	4.25	108	0.88	22	4.50	114	3.3	84	7.8	198	2.5	64
	900, 1500	5.50	140	5.50	140	0.75	19	3.75	95	4.7	119	9.2	234	3.6	92
1.5	150 - 600	4.75	121	4.75	121	1.38	35	7.50	191	3.9	100	8.4	214	4.0	102
	900, 1500	6.50	165	6.50	165	1.25	32	6.25	159	6.5	165	11.0	279	5.6	142
2	150 - 600	5.80	146	5.80	146	1.88	48	9.50	241	3.9	100	8.4	214	4.5	114
	900, 1500	7.3	185	7.3	185	1.75	44	8.75	222	7.8	198	12.3	312	6.1	155
3	150 - 600	7.0	178	7.0	178	2.88	73	14.5	368	5.8	147	11.3	287	5.8	147
	900, 1500	9.3	236	9.3	236	2.63	67	13.15	334	10.0	254	17.0	432	8.4	213
4	150 - 600	8.8	222	7.8	197	3.88	98	19.40	493	7.6	193	13.1	333	7.5	191
	900, 1500	12.5	318	12.5	318	3.50	89	14.7	373	10.4	264	17.4	442	9.7	246
6	150	12.8	324	12.8	324	5.88	149	17.75	451	7.6	193	13.1	333	10.0	254
	300, 600	12.8	324	10.9	276	5.88	149	17.75	451	8.2	208	13.7	348	10.0	254
	900, 1500	13.9	353	13.9	353	5.25	133	14.75	375	13.3	338	20.3	516	12.2	310
8	300, 600	15.5	394	15.5	394	7.75	197	19.31	490	10.8	275	16.3	414	13.8	351
	900, 1500	16.4	417	16.4	417	6.88	175	14.63	372	14.5	368	21.5	547	16.7	424
10	300, 600	14.8	376	14.8	376	9.63	244	19.25	489	12.2	310	18.7	475	17.5	445
	900, 1500	19.5	495	19.5	495	8.63	219	14.65	372	14.4	366	21.4	544	18.3	465
12	300, 600	16.1	409	16.1	409	11.63	295	16.88	429	12.8	326	19.3	491	18.9	480
14	150	17.5	445	17.5	445	13.15	334	15.75	400	12.8	326	18.3	464	20.0	508
18	150	21	533	21	533	17.15	436	19.31	490	15.8	401	23.5	597	26.0	661

⁽¹⁾ Consult factory for sizes and pressure classes not listed above.

⁽²⁾ Special versions are available. Consult factory for certified dimensional drawings.

SPOOL DIMENSIONS⁽¹⁾ (TABLE VIII)

Valve Size (inches)	ANSI Class	J	
		in.	mm
1	150	4.38	111.2
	300	4.87	123.8
	600	4.87	123.8
	900	5.75	146.0
	1500	5.75	146.0
1.5	150	4.87	123.8
	300	5.38	136.6
	600	5.50	139.6
	900	6.50	165.0
	1500	6.50	165.0
2	150	5.00	127.0
	300	5.50	139.6
	600	5.75	146.0
	900	8.00	203.2
	1500	8.00	203.2
3	150	5.50	139.6
	300	6.25	158.8
	600	6.50	165.0
	900	8.00	203.2
	1500	9.25	235.0
4	150	6.00	152.4
	300	6.75	171.4
	600	8.00	203.2
	900	9.00	228.6
	1500	9.69	246.0
6	150	7.00	177.8
	300	7.75	196.8
	600	9.25	235.0
	900	11.00	279.4
	1500	13.50	342.8
8	150	8.00	203.2
	300	8.75	222.2
	600	10.50	266.7
	900	12.75	323.8
	1500	16.75	425.4
10	150	8.00	203.2
	300	9.25	235.0
	600	12.00	304.8
	900	14.50	368.3
	1500	20.00	508.0
12	150	9.00	228.6
	300	10.25	260.4
	600	12.25	311.2
14	150	10.00	254.0
18	150	11.00	279.4

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. VSI Controls 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 VSI Controls representative. The specific instructions for installation, operation and maintenance of the GLE control valve are provided in Maintenance Bulletin #04.



WorldWide presence through the Companies of the Group:
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