FLOWSERVE

TECHNICAL BULLETIN

Valtek® FlowTop V750 / V752 General Service Control Valve

NPS ½ to 12, Class 150 and 300



Experience In Motion

Engineered for maximum performance and value

The newly redesigned Valtek FlowTop general service control valve provides process plant operators with the perfect balance of high-efficiency performance, low total cost of ownership (TCO) and versatility. A new standardized globe body assembly as well as multiple pre-engineered seating and packing options make the Valtek FlowTop control valve highly configurable and a good value for general service applications in the oil and gas, chemical, power and general industries.

A complete integrated solution

The Valtek FlowTop linear control valve is a fully integrated valve package. Available globally, it includes:

- Standardized FlowTop globe body assembly
- Logix™ digital positioner (with automatic calibration) option
- FlowAct pneumatic diaphragm actuator

Designed to deliver continuous process flow control throughout the plant, the Valtek FlowTop valve's integrated design delivers best-in-class performance with:

- Quick installation and simple setup
- Finite flow control accuracy
- Direct-mounted digital positioner without tubing (air-to-open)
- Trim and material options to handle virtually all general service requirements
- Severe service trim options to manage noise and cavitation
- Excellent rangeability, repeatability and high flow rates

Optimized design

Building on the proven FlowTop GS and Valtek GS control valves, the Valtek FlowTop valve now provides one model with proven efficiency and more versatility; a standardized globe body assembly and multiple trim and packing options are available to meet a broad range of general service requirements. Without any concession to product quality or reliability, the new FlowTop valve offers the same performance and options in a simplified product that's extremely easy to size, select, order and configure. What's more, its also an economical solution to buy, install, operate and maintain. The fully integrated valve, actuator and positioner package is available globally and includes an inline or angle globe-style body plus a cost-competitive digital positioner with automatic calibration and a FlowAct pneumatic diaphragm actuator.

Benefits

- **Maximum-capacity flow rates:** The FlowTop valve handles a wide selection of process control applications for high-flow applications in the oil and gas, chemical, power and general service industries.
- **Smaller, lighter and more cost-effective:** Achieves maximum-flow capacity that outperforms competing brands with a smaller, lighter and cost-effective control valve
- **Deep packing box:** Permits a variety of packing configurations in addition to the standard ISO 15848-1 and optional live-loaded emission control packing. The packing set is positioned far enough away from the flow in the body to avoid damage from the flowing medium.
- **Contoured plug design:** Is readily adaptable for modified equal percentage, linear and quick-open flow characteristics. And it can be matched to a variety of trim types, providing excellent rangeability, repeatability and resolution.
- **Guiding solutions:** Post guiding ensures stabilized plug and stem during valve travel; minimizes vibration and wear.
- **Clamped seat ring:** Offers tight shutoff and easy removal without special tools or the galling problems associated with threaded seat rings.
- **Ease of maintenance:** Maintenance is simplified due to the unified design with compatible parts; global technical and engineering service provide fast and dependable support.

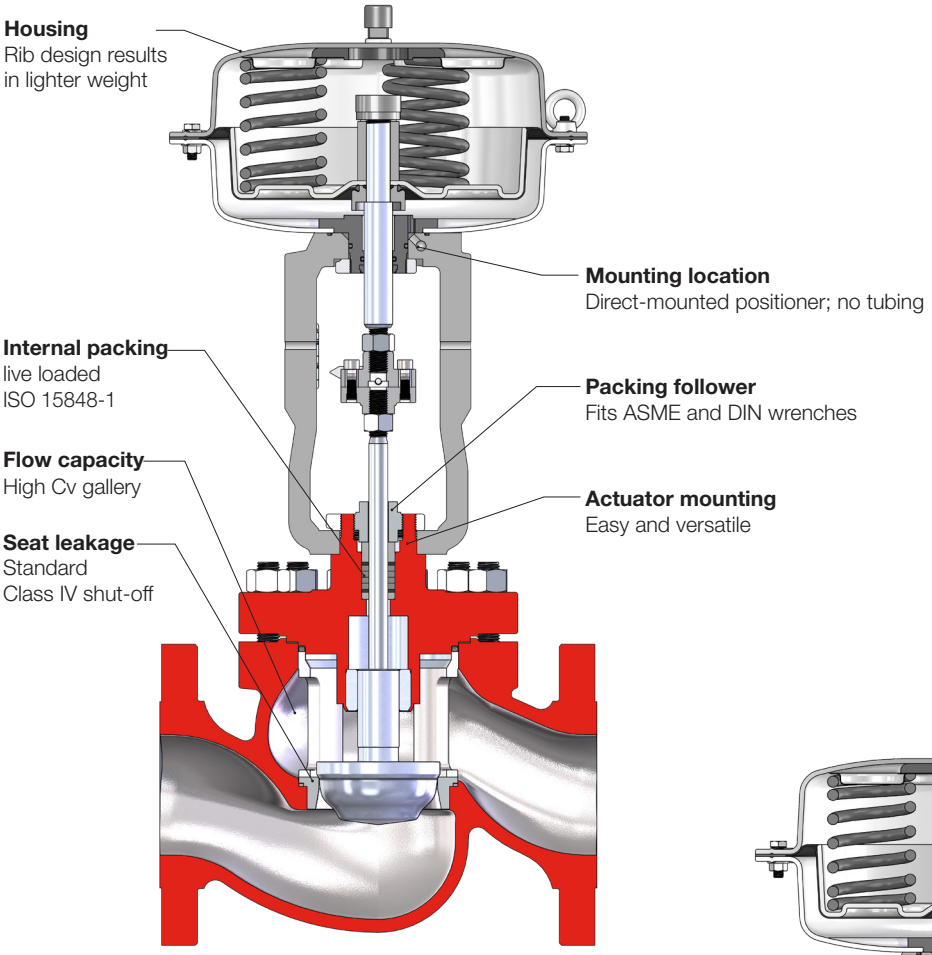


Figure 1: *Clamped seat ring design V752*

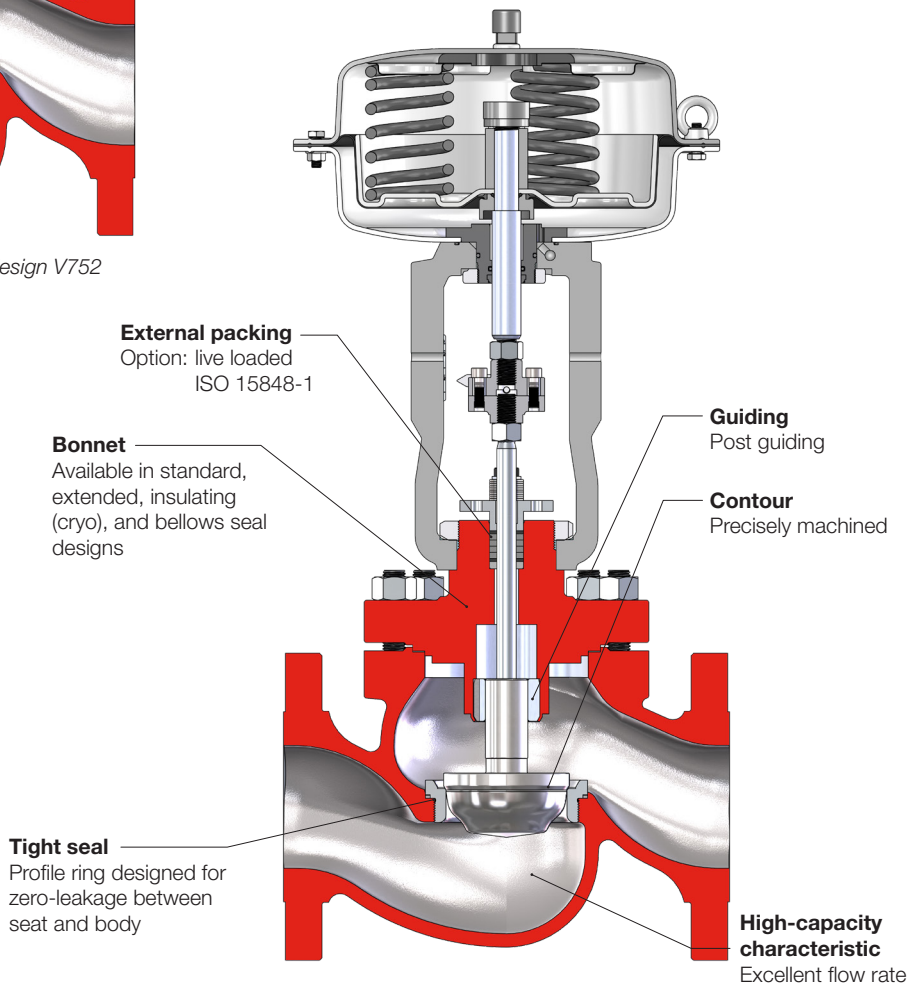


Figure 2: *Threaded seat ring design V750*

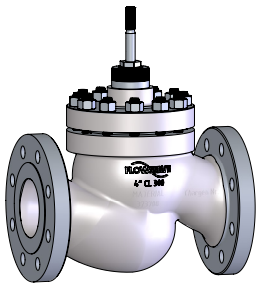
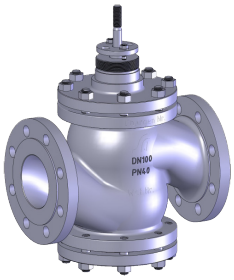
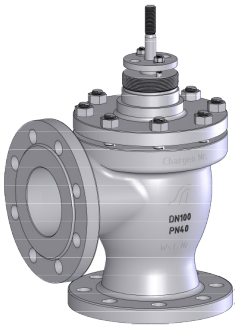
Specifications

Style	Globe, angle, integral flange, ASME B16.34
Sizes	NPS ½ to 12
Pressure classes	ASME Class 150 and 300
End connection	Flanged, raised face (RF) (other end connections may be available upon request)
Body materials	ASTM A216 grade WCC, ASTM A351 grade CF8M, ASTM A351 grade CF3M, ASTM A352 LCC, ASTM A217 WC6, ASTM A494 M35-1
Face-to-face	ISA 75.08.01
Bonnet	Standard, extended, bellows seal or cryogenic bonnet
Packing	Internal or external, PTFE and graphite, live loaded, ISO 15848-1 or vacuum

Trim material	316 SS, 316L SS, 416 SS HT, 420 SS HT, WC9, 1.4122, 1.4922, Monel 400, Monel K500
Trim types	Standard, pressure balanced
Plug and seat facing	Seat or full contour Alloy 6 or alloy 21 hardened
Characteristic	Modified equal percent, linear or quick open
Low noise and anti-cavitation	MegaStream™ one and 2 stages (V752 only) CavStream™ one-stage CavControl™ one stage (V752 only) DiamondBack™ 3 stages (V752 only)
Leakage rates	Class IV, V or VI with optional soft seat
Actuator	Pneumatic diaphragm spring actuator
Standard positioner	Digital positioner; also available as integrally mounted to yoke for fail-close/air-to-open configuration; no tubing or bracket required

Note: Standard configurations for oxygen have been evaluated and documented in the Flowserve Oxygen Valve Guidelines. Consult Factory for additional information.

Body design — integral flange

Body Design	Pressure Class	Size	Body Material	Bonnet Design	Packing Design	Trim Design
Integral Flange, 3 Flange 	Class 150 300	NPS ½ ¾ 1 1½ 2 3 4 6 8	A216 WCC A351 CF8M A351 CF3M A352 LCC A217 WC6 A494 M35-1	**Unbalanced:** Standard bonnet Bellows seal bonnet Extended bonnet **Pressure balanced:** Standard bonnet Extended bonnet *See pages 6 and 7*	**Adjustable:** PTFE and graphite **Live loaded:** PTFE and graphite ISO 15848-1 vacuum *See page 8*	**Contoured plug – standard** Soft seated (not available for oxygen) **Severe service trim options:** MegaStream (1 and 2 stages, only 1 stage for oxygen) CavStream (1-stage) CavControl (1 stage) DiamondBack (3 stages) **limitations:** MegaStream (1 and 2 stages, sizes up to 8”) CavStream (1 stage, size 1.5-6”, pressure balanced) CavControl (1 stage, sizes 1.5”-8”, pressure balanced) DiamondBack (3 stages, sizes 3”-8”, pressure balanced, not available for oxygen) *See page 10*
Integral Flange, 4 Flange 		1-12“				
Integral Flange, Angle 		1-6“				
Integral Flange, 3-Way 		1-12“				**Mixing or Distributing Options:** See 3-way trim design table

Body connecting design detail

Body Design	Face-to-Face	End Connections		
Integral flange	ASME/ISA 75.08.01-2016	ASME B16.5	Raised-face (RF)	R_a = 3.2 to 6.3 µm (125 to 250 µin.)

Body pressure/temperature ratings

Pressure Class	Body Material	Maximum Allowable Working Pressure, bar													
		Service Temperature in °C													
		-196	-46	-29	50	100	150	200	250	300	350	400	425	450	500	538
150	ASTM A216 WCC	—	—	19.8	19.5	17.7	15.8	13.8	12.1	10.2	8.4	6.5	5.5	—	—	—
	ASTM A352 LCC	—	19.8	19.8	19.5	17.7	15.8	13.8	12.1	10.2	—	—	—	—	—	—
	ASTM A217 WC6	—	—	19.8	19.5	17.7	15.8	13.8	12.1	10.2	8.4	6.5	5.5	4.6	2.8	1.4
	ASTM A315 CF8M	19	19	19	18.4	16.2	14.8	13.7	12.1	10.2	8.4	6.5	5.5	—	—	—
	ASTM A351 CF3M	19	19	19	18.4	16.2	14.8	13.7	12.1	10.2	8.4	6.5	5.5	—	—	—
	ASTM A494 M35-1[1]	—	—	15.9	15.4	13.8	12.9	12.5	—	—	—	—	—	—	—	—
300	ASTM A216 WCC	—	—	51.7	51.7	51.5	50.2	48.6	46.3	42.9	40	34.7	28.8	—	—	—
	ASTM A352 LCC	—	51.7	51.7	51.7	51.5	50.2	48.6	46.3	42.9	—	—	—	—	—	—
	ASTM A217 WC6	—	—	51.7	51.7	51.5	49.7	48	46.3	42.9	40.3	36.5	35.2	33.7	25.7	14.9
	ASTM A315 CF8M	49.6	49.6	49.6	48.1	42.2	38.5	35.7	33.4	31.6	30.3	29.4	29.1	—	—	—
	ASTM A351 CF3M	49.6	49.6	49.6	48.1	42.2	38.5	35.7	33.4	31.6	30.3	29.4	29.1	—	—	—
	ASTM A494 M35-1[1]	—	—	41.4	40.2	35.9	33.7	32.7	—	—	—	—	—	—	—	—

Pressure Class	Body Material	Maximum Allowable Working Pressure, psig													
		Service Temperature in °F													
		-320	-50	-20	100	200	300	400	500	600	650	700	800	900	1000
150	ASTM A216 WCC	—	—	290	290	260	230	200	170	140	125	110	80	—	—
	ASTM A352 LCC	—	290	290	290	260	230	200	170	140	—	—	—	—	—
	ASTM A217 WC6	—	—	290	290	260	230	200	170	140	125	110	80	50	20
	ASTM A315 CF8M	275	275	275	275	235	215	195	170	140	125	110	80	—	—
	ASTM A351 CF3M	275	275	275	275	235	215	195	170	140	125	110	80	—	—
	ASTM A494 M35-1[1]	—	—	230	230	200	190	180	—	—	—	—	—	—	—
300	ASTM A216 WCC	—	—	750	750	750	730	705	665	605	590	555	410	—	—
	ASTM A352 LCC	—	750	750	750	750	730	705	665	605	—	—	—	—	—
	ASTM A217 WC6	—	—	750	750	750	720	695	665	605	590	570	510	450	215
	ASTM A315 CF8M	720	720	720	720	620	560	515	480	450	440	435	420	—	—
	ASTM A351 CF3M	720	720	720	720	620	560	515	480	450	440	435	420	—	—
	ASTM A494 M35-1[1]	—	—	600	600	525	490	475	—	—	—	—	—	—	—

From ASME B16.34 Working Pressure Rating Tables

1) Monel M35-1 is most often used for oxygen service applications with a temperature limit of 200°C (392°F). For non-oxygen applications above 200°C (392°F), refer to ASME B16.34 tables.

Body Bolting Temperature Guidelines

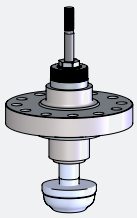
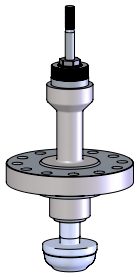
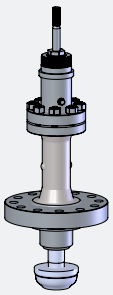
Body Material	Studs[3]	Nuts[3]	Temperature Range[1]	NACE[2]
ASTM A216 WCC	ASTM A193 B7	ASTM A194 2H	-29°C to 427°C (-20°F to 800°F)	B7M-2HM
ASTM A352 LCC	ASTM A320 L7	ASTM A194 7L	-46°C to 315°C (-50°F to 600°F)	L7M-7ML
ASTM A217 WC6	ASTM A193 B16	A194 7L	-29°C to 538°C (-20°F to 1000°F)	B7M-2HM
ASTM A351 CF8M	ASTM A193 B8 Cl2 or B8M CL2	ASTM A194 8 or 8M	-196°C to 538°C (-320°F to 1000°F)	B8 CL1-8A or B8M Cl1-8MA
ASTM A351 CF3M				
ASTM A494 M35-1				

1) Temperature limit of bolting material for non-NACE applications.

2) NACE temperature limit is 250°C (482°F).

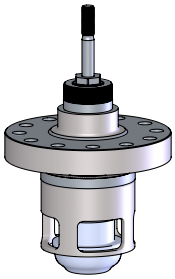
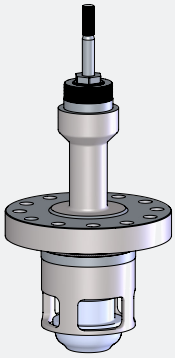
3) Plating for carbon steel studs & nuts should be zinc plated up to 315°C (600°F) and oxide coated for higher temperatures.

Bonnet design — unbalanced, NPS ½ to 12

Bonnet Type		Body Material	Bonnet Material	Temperature Range[1]	Application
Standard bonnet		ASTM A216 WCC	ASTM A216 WCC or ASTM A105	-29°C to 250°C (-20°F to 482°F)	Universal use
		ASTM A352 LCC	ASTM A352 LCC or ASTM A350 LF2 Cl1		
		ASTM A217 WC6	ASTM A217 WC6 or ASTM A182 F11 Cl2		
		ASTM A351 CF8M	ASTM A351 CF8M or ASTM A182 F316		
		ASTM A351 CF3M	ASTM A351 CF3M		
		ASTM A494 M35-1	ASTM A494 M35-1 or ASTM B564 N04400	-29°C to 200°C (-20°F to 392°F)	Oxygen
Extended bonnet		ASTM A216 WCC	ASTM A216 WCC or ASTM A105	251°C to 425°C (438°F to 797°F)	Extends the upper temperature limitations
		ASTM A217 WC6	ASTM A217 WC6 or ASTM A182 F11 Cl2		
		ASTM A352 LCC	ASTM A352 LCC or ASTM A350 LF2 Cl1	251°C to 345°C (438°F to 650°F)	
		ASTM A351 CF8M	ASTM A351 CF8M or ASTM A182 F316	-60°C to 427°C (-76°F to 800°F)	
		ASTM A351 CF3M	ASTM A351 CF3M		
Bellows seal bonnet		ASTM A216 WCC	ASTM A216 WCC or ASTM A105	-29°C to 400°C (-20°F to 750°F)	Use for hazardous media, costly media or vacuum service
		ASTM A352 LCC	ASTM A352 LCC or ASTM A350 LF2 Cl1	-46°C to 345°C (-50°F to 650°F)	
		ASTM A351 CF8M	ASTM A351 CF8M or ASTM A182 F316	-196°C to 400°C (-320°F to 750°F)	
		ASTM A351 CF3M	ASTM A351 CF3M		
Cryogenic Bonnet (V750 only)		ASTM A351 CF8M	ASTM A351 CF8M or ASTM A182 F316	-196°C to 250°C (-320°F to 482°F)	Use for cryogenic service
		ASTM A351 CF3M	ASTM A351 CF3M		

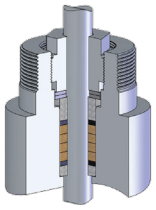
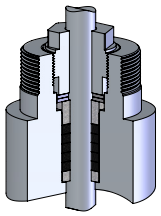
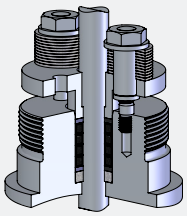
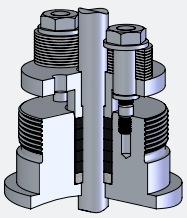
1) The actual temperature range is limited by the selected packing material - see Packing Design table.

Bonnet design — pressure balanced, NPS 3 to 12

Bonnet Type		Balance Type	Seal Material	Temperature Range[2]	Application
Standard bonnet		O-ring[3]	Buna-N & Filled PTFE	-29°C to 121°C (-20°F to 250°F)	Universal Use
			EPDM & Filled PTFE	-29°C to 177°C (-20°F to 350°F)	
			EPDM & PEEK	-29°C to 177°C (-20°F to 350°F)	
			Viton & Filled PTFE	-26°C to 204°C (-15°F to 400°F)	
			Viton & PEEK	-26°C to 204°C (-15°F to 400°F)	
			Chemraz 555 & Filled PEEK	-12°C to 250°C (10°F to 482°F)	
			Kalrez 4079 & Filled PEEK	-12°C to 250°C (10°F to 482°F)	
		Spring Energized[3]	Metal spring & TFM jacket	-29°C to 204°C (-20°F to 400°F)	
Extended bonnet		O-ring	Buna-N & Filled PTFE	-40°C to 121°C (-40°F to 250°F)	Extendes the temperature range
			EPDM & Filled PTFE	-46°C to 177°C (-50°F to 350°F)	
			EPDM & PEEK	-46°C to 177°C (-50°F to 350°F)	
			Chemraz 555 & Filled PEEK	-12°C to 315°C (10°F to 600°F)	
			Kalrez 4079 & Filled PEEK	-12°C to 315°C (10°F to 600°F)	
		Spring Energized	Metal spring & TFM jacket	-60°C to 204°C (-76°F to 400°F)	
		Piston Ring	Metal	-60°C to 454°C (-76°F to 850°F)	

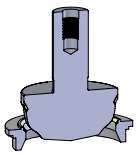
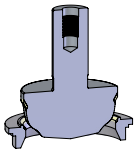
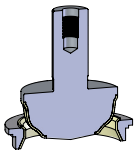
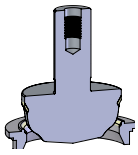
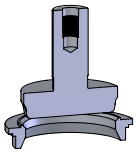
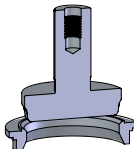
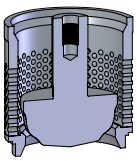
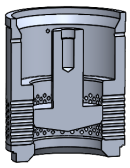
1) The material options and temperature lmits for standard and extended bonnets are listed in the unbalanced bonnet design table.
2) The temperature range in this table is for the pressure balance seal. The actual temperature range is also limited by the combination of the selected packing material (see Packing table) and bonnet material (see unbalaned bonnet table).
3) Oxygen pressure balance options include O-ring or spring energized seal. Consult factory for additional information.

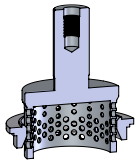
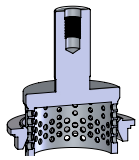
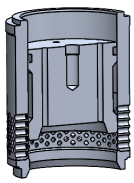
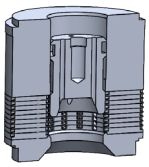
Packing design — detail

Packing Design	Packing Configuration[4]		Packing Material	Temperature Range	Application	Approvals
Internal Live Load (only up to 6“)	Braided PTFE		Braided PTFE & Carbon-filled PTFE end rings	Standard Bonnet: -29°C to 250°C (-20°F to 482°F) Extended Bonnet: -60°C to 300°C (-76°F to 572°F) Bellows Seal Bonnet: -196°C to 300°C (-320°F to 572°F)	Universal chemical resistance Vacuum: <0.3 mbar	NA
			Lattyflon 3260 LM & Carbon-filled PTFE end rings	Standard Bonnet: -29°C to 250°C (-20°F to 482°F) Extended Bonnet: -29°C to 300°C (-20°F to 572°F)		ISO 15848-1 Tightness Class: B Endurance Class: CC1
	Braided Graphite or Graphite Rib/ Braid		Braided Graphite or Braided Graphite & Formed Graphite	Standard Bonnet: -29°C to 425°C (-20°F to 797°F) Extended Bonnet: -60°C to 538°C (-76°F to 1000°F) Bellows Seal Bonnet: -60°C to 400°C (-76°F to 750°F)	Universal chemical resistance	NA
			Lattygraf 6940EF/ Lattygraf EF NG	Extended Bonnet: -29°C to 400°C (-20°F to 752°F)		ISO 15848-1 Tightness Class:CH Endurance Class: CC1
External Live Load	Braided PTFE		Braided PTFE & Carbon-filled PTFE end rings	Standard Bonnet: -29°C to 250°C (-20°F to 482°F) Extended Bonnet: -60°C to 300°C (-76°F to 572°F) Bellows Seal Bonnet: -196°C to 300°C (-320°F to 572°F)	Universal chemical resistance Vacuum: <0.3 mbar	NA
			Lattyflon 3260 LM & Carbon-filled PTFE end rings	Standard Bonnet: -29°C to 250°C (-20°F to 482°F)		ISO 15848-1 Tightness Class: B Endurance Class: CC1
	Braided Graphite or Graphite Rib/ Braid		Braided Graphite or Braided Graphite & Formed Graphite	Standard Bonnet: -29°C to 425°C (-20°F to 797°F) Extended Bonnet: -60°C to 538°C (-76°F to 1000°F) Bellows Seal Bonnet: -60°C to 400°C (-76°F to 750°F)	Universal chemical resistance	NA
			Supagraf Control	Extended Bonnet: -29°C to 425°C (-20°F to 797°F)		ISO 15848-1 Tightness Class: BH Endurance Class: CC3

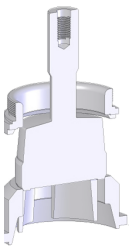
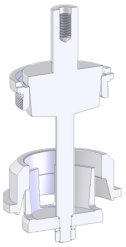
1) When cryogenic (insulating) bonnet extensions are used, lower temperature limit is -196C (320F).
2) Other packing options, like FDA and UHP V-ring, may be available upon request. Contact factory for additional information.
3) Internal (threaded) packing follower requires live loading. External packing follower (2 studs & nuts) can be used with or without live loading with the exception that ISO certified packing configurations require live loading.
4) Oxygen packing options include Braided PTFE or a combination of Braided PTFE and Braided Graphite. Consult factory for additional information.

Trim design - Standard and Severe Service

Trim Type	Trim Material		Medium		Flow Direction	Max. Allowable Differential Pressure	Noise Reduction
Contoured plug Characteristic: Modified equal percent or linear	Standard: 316 SS, 316L SS, 416 SS HT, 420 SS HT, WC9, 1.4122, 1.4922, Monel 400, Monel K500		• Clean • Marginally contaminated with particles • Low clogging potential for dirty service	Gases, vapors and liquids	Under the plug	Contact Flowserve	None - Noise insulating provided by customer
	Seat surface: 316 SS w/ Alloy 6 WC9 w/ Alloy 21 (From seat Ø 53 mm)						
	Full contour: 316 SS w/ Alloy 6 WC9 w/ Alloy 21						
	Soft seated: 416 SS, 316 SS +PTFE						
Quick-open with throttle lip Characteristic: On/off	Standard: 316 SS, 316L SS, 416 SS HT, 420 SS HT, WC9, 1.4122, 1.4922				Under the plug; flow over the plug possible for gases and vapors		
	Soft seated: 416 SS, 316 SS +PTFE						
Contoured plug with MegaStream	All standard trim (1 stage) weldable trim options (2 stage)		• Clean • High clogging potential for dirty service	Gases and vapors	Under the plug		Maximum = 15 dB(A)
MegaStream Cage Guide	See Trim Combinations for Severe Service Table						

Trim Type	Trim Material		Medium		Flow Direction	Max. Allowable Differential Pressure	Noise Reduction
CavStream	Standard: 416 SS HT 316 SS tenifer treated		• Clean • High clogging potential for dirty service	Liquids	Over the plug	Contact Flowserve	NA
	Full contour: Alloy 6 316 SS						
CavControl	See Trim Combinations for Severe Service Table						
DiamondBack							

Trim design - 3-Way (V750 only)

Trim Type	Trim Material		Medium		Flow Direction	Max. Allowable Differential Pressure	Noise Reduction
Mixing Plug	QPQ Nitride treated 316SS or 1.4571		• Clean • Marginally contaminated with particles • Low clogging potential for dirty service	Gases, vapors and liquids	Flow direction under the plug	$\Delta p_I < x_{FZ} \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	None - or Noise insulating provided by customer
	Standard 1.4122					$\Delta p_I < (x_{FZ} + 0{,}10) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
Distributing Plug	QPQ Nitride treated 316SS or 1.4571					$\Delta p_I < x_{FZ} \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	
	Standard 1.4122					$\Delta p_I < (x_{FZ} + 0{,}10) \cdot (p_1 - p_V)$ $\Delta p_C < x_T \cdot p_1$	

Trim details - contoured plug with standard trim; modified equal percent and linear

Cv by NPS, stroke and seat diameter

Seat Ø (mm)	Cv											
	Pressure Balanced	NPS and Stroke Length										
		½	¾	1	1½	2	3	4	6	8	10	12
		20 mm (0.79 in.)					40 mm (1.57 in.)		60 mm (2.36 in.)	80 mm (3.15 in)		
8		1.16	1.16	1.16								
8		1.8	1.8	1.8								
10		2.9	2.9	2.9								
12		4.6	4.6	4.6								
16		6.5										
16			7.3	7.3	7.3							
20			9.2									
20				11.6	11.6	11.6						
25				16.2								
25					18.5	18.5						
34					29	29	29	29				
40					36							
42						46	46					
50						55						
53	Optional						73	73				
67	Optional						116	116				
67	Optional								116			
80	Optional						145					
84	Optional							185	185			
100	Optional							208		231		
105	Optional								289			
125	Optional									410	410	
130	Optional								410			
150	Optional									520	520	520
160	Optional									763		
200	Optional										821	821
250	Optional											1156

Trim details—quick open; on/off

Cv by NPS, stroke and seat diameter

Seat Ø (mm)	Cv											
	Pressure Balanced	NPS and Stroke Length										
		½	¾	1	1½	2	3	4	6	8	10	12
		20 mm (0.79 in.)					40 mm (1.57 in.)		60 mm (2.36 in.)	80 mm (3.15 in)		
16		7.3										
20			10.4									
25				18.5								
40					41							
50						61						
80	Optional						162					
100	Optional							231				
130	Optional								410			
150	Optional									728		
200	Optional										1156	
250	Optional											1850

Trim details—3-Way Distributing Plug; linear

Seat Ø (mm)	Cv								
	NPS and Stroke Length								
	1	1½	2	3	4	6	8	10	12
	20 mm (0.79 in.)			40 mm (1.57 in.)		60 mm (2.36 in.)	80 mm (3.15 in)		
25	7.3								
25	11.6								
40		18.5							
40		29							
50			29						
50			46						
80				73					
80				116					
100					116				
100					185				
130						208			
130						289			
150							520		
200								821	
250									1156

Trim details—3-Way Mixing Plug; linear

Seat Ø (mm)	Cv								
	NPS and Stroke Length								
	1	1½	2	3	4	6	8	10	12
	20 mm (0.79 in.)			40 mm (1.57 in)		60 mm (2.36 in.)	80 mm (3.15 in)		
25	7.3								
25	11.6								
40		18.5							
40		29							
50			29						
50			46						
50			55						
80				73					
80				116					
80				145					
100					116				
100					185				
100					208				
130						208			
130						289			
130						410			
150							520		
200								821	
250									1156

Trim details—contoured plug with MegaStream trim; modified equal percent and linear

Cv by NPS, stroke and seat diameter

Seat Ø (mm)	Pressure Balanced	103Cv257											
		NPS and Stroke Length											
		1		1½		2		3		4		6	
		1 Stage	2 Stage	1 Stage	2 Stage	1 Stage	2 Stage	1 Stage	2 Stage	1 Stage	2 Stage	1 Stage	2 Stage
		20 mm (0.79 in.)						40 mm (1.57 in)				60 mm (2.36 in)	
8			1.1[1]										
8			1.6[1]										
12			3.7										
16		6.4			6.5								
20		10			10.5		11						
25		14		16	15		17						
34				26		26	24		26				
40				33									
42						41		41	42		42		
50						50			54				
53	Optional							65		65	67		
67	Optional							103		103	96	103	103
80	Optional							132					
84	Optional									165		165	167
100	Optional									193			198
105	Optional											257	
130	Optional											370	

1) Not available for linear (only applicable for modified equal percent)

Trim details— Cage Guided MegaStream linear or bilinear

Seat (mm)	Pressure Balanced	Cv							
		NPS and Stroke Length							
		6				8			
		60 mm (2.36 in)				80 mm (3.15 in)			
		Linear		Bilinear		Linear		Bilinear	
		1 Stage	2 Stage	1 Stage	2 Stage	1 Stage	2 Stage	1 Stage	2 Stage
70	Optional		116		93				
70	Optional		149		115				
88	Optional	165	178	133	148				
88	Optional	206		167					
100	Optional	243		191					
105	Optional		202		174		217		170
105	Optional						268		220
110	Optional					267		207	
110	Optional					337		260	
115	Optional	279		220			307		254
120	Optional		236		198				
130	Optional	324		263		385		305	
135	Optional						361		299
145	Optional					443		346	
160	Optional						422		344
165	Optional					516		392	

Trim details—CavStream trim; modified equal percent or linear

Cv by NPS, stroke and seat diameter

Seat (mm)	Pressure Balanced	Cv									
		NPS and Stroke Length									
		1.5		2		3		4		6	
		20 mm (0.79 in.)				40 mm (1.57 in.)				60 mm (2.36 in.)	
		Linear	Modified Equal Percent	Linear	Modified Equal Percent	Linear	Modified Equal Percent	Linear	Modified Equal Percent	Linear	Modified Equal Percent
34	Required	15	12								
34	Required			17	13						
40	Required	20	16								
42	Required			21	17						
50	Required			30	25						
42	Required					37	29				
53	Required					57	46				
53	Required							60	48		
67	Required					73	58				
80	Required					92	68				
67	Required							79	61		
84	Required							104	84		
100	Required							145	110		
67	Required									100	86
84	Required									145	116
105	Required									203	163
130	Required									271	218

Trim details—CavControl; modified equal percent or linear

Seat (mm)	Pressure Balanced	Cv											
		NPS and Stroke Length											
		1.5		2		3		4		6		8	
		20 mm (0.79 in.)				40 mm (1.57 in.)				60 mm (2.36 in.)		80 mm (3.15 in)	
		Linear	Modified Equal Percent	Linear	Modified Equal Percent	Linear	Modified Equal Percent	Linear	Modified Equal Percent	Linear	Modified Equal Percent	Linear	Modified Equal Percent
34	Required	16	11	17	13								
40	Required	21	15										
42	Required			22	16	55	42						
50	Required			29	21								
53	Required					68	54	72	58				
67	Required					87	71	92	76	127	115		
80	Required					112	94			169	143		
84	Required							120	101				
100	Required							139	115	209	183		
105	Required											309	249
118	Required											369	297
130	Required									270	239		
135	Required											433	362
160	Required											493	410

Trim details—DiamondBack linear or bilinear

Seat (mm)	Pressure Balanced	Cv							
		NPS and Stroke Length							
		3		4		6		8	
		40 mm (1.57 in.)				60 mm (2.36 in.)		80 mm (3.15 in)	
		Linear	Bilinear	Linear	Bilinear	Linear	Bilinear	Linear	Bilinear
35	Required	13	13						
35	Required	22	17						
42	Required			17	17				
42	Required			22	21				
45	Required	27	22						
45	Required	35	27						
53	Required			29	27				
53	Required			39	35				
60	Required	44	35			40	38		
60	Required	56	44			51	46		
67	Required			51	44				
67	Required			67	56				
80	Required					66	55		
80	Required					84	66		
84	Required			88	72				
84	Required			116	92				
95	Required							62	56
95	Required							74	63
100	Required					106	79		
100	Required					136	95		
105	Required							88	71
105	Required							106	80
115	Required					172	114		
115	Required					220	136		
118	Required							127	90
118	Required							152	101
135	Required							182	114
135	Required							218	128
150	Required							260	142
150	Required							311	160

Temperature Guidelines for Trim Materials

Trim Material	Temperature Range	Typical Components				
		Seat Ring	Seat Retainer	Plug Head	Plug Stem	Application Notes
CF8M/316 SS	-196°C to 427°C (-320°F to 800°F)	•	•	•		nitrided retainer/sleeve is required for pressure balance valve with standard trim
316 SS + alloy 6 overlay	-196°C to 427°C (-320°F to 800°F)	•		•		alloy 6 recommended above 315°C/600°F
WC9/F22	-29°C to 538°C (-20°F to 1000°F)		•			nitrided retainer/sleeve is required for pressure balance valve with standard trim
WC9/F22 + alloy 21 overlay	-29°C to 538°C (-20°F to 1000°F)	•		•		
316 SS SH L2	-196°C to 427°C (-320°F to 800°F)				•	Used only for standard bonnets. For NACE standard bonnets use XM19 plug stem
XM19-H	-196°C to 427°C (-320°F to 800°F)				•	Used for extended, bellows, and cryogenic bonnets[1]
416 SS HT	-29°C to 427°C (-20°F to 800°F)	•	•	•	•	
420 SS HT	-29°C to 427°C (-20°F to 800°F)	•		•		
1.4122 HT	-29°C to 482°C (-20°F to 900°F)	•		•	•	
1.4922 HT	-29°C to 538°C (-20°F to 1000°F)	•		•	•	
Inconel 718 HT	-196°C to 538°C (-320°F to 1000°F)	•		•	•	
CA15 HT	-29°C to 427°C (-20°F to 800°F)		•			If used at elevated temperature with a SS body, thermal growth should be evaluated
CA6NM HT	-29°C to 427°C (-20°F to 800°F)		•			If used at elevated temperature with a SS body, thermal growth should be evaluated
Monel 400	-29°C to 200°C (-20°F to 392°F)	•	•	•		Used for oxygen service
Monel K500	-29°C to 200°C (-20°F to 392°F)	•		•	•	Used for oxygen service
Toughmet3 AT110	-29°C to 200°C (-20°F to 392°F)	•	•			Used for oxygen service
410 SS annealed	-29°C to 427°C (-20°F to 800°F)		•			Used for 2 stage MegaStream

1) Consult factory for NACE applications with an extended bonnet, bellows bonnet, or cryogenic bonnet.

2) Maximum working temperature for PTFE soft seat is -46°C to 250°C (482°F)

Trim Combinations for Standard Trim

Body Material	Bonnet Type	Seat Ring	Plug Head	Plug Stem	Seat Retainer[3]
ASTM A216 WCC	Standard	316 SS[2]	316 SS[2]	316 SS SH L2	CF8M[4]
	Extended			XM19-H	
	Bellows			XM19-H	
ASTM A352 LCC	Standard	316 SS[2]	316 SS[2]	316 SS SH L2	CF8M[4]
	Extended			XM19-H	
	Bellows			XM19-H	
ASTM A217 WC6	Standard	WC9/F22 + alloy 21 overlay		316 SS SH L2	WC9
	Extended			XM19-H	
ASTM A351 CF8M & ASTM A351 CF3M	Standard	316 SS[2]	316 SS[2]	316 SS SH L2	CF8M
	Extended			XM19-H	
	Bellows			XM19-H	
	Cryogenic			XM19-H	
ASTM A494 M35-1	Standard	Bronze C93200	Monel 400 or K500	Monel K500	Monel 400

1) The above table shows standard trim combinations. Consult factory for additional available options.

2) Use alloy 6 overlay for the seat ring and plug as required for the application. Seat surface alloy 6 is only available above TN 50mm.

3) Nitrided reatiner is required for pressure balance configurations (seat retainer is combined with sleeve)

4) For valve sizes above 2" with design conditions higher than 115°C (240°F), consider using CA15 HT or CA6NM HT retainer for similar thermal growth with the body.

Trim Combinations for Severe Service Trim

CavStream		DiamondBack and CavControl		
Seat Ring	**Plug Head**	**Seat Ring**	**Seat Retainer**	**Plug Head**
416 SS HT	416 SS HT	416 SS HT	416 SS HT	416 SS HT
1.4122 HT	1.4122 HT	316 SS +Full Bore Alloy 6	316 SS	316 SS + Full Contour Alloy 6
316/316L SS	316/316L SS Nitrided	316 SS +Full Bore Alloy 6	316 SS Nitrided	316 SS + Full Contour Alloy 6
316 SS +Full Bore Alloy 6	316 SS +Seat Surface Alloy 6[2]			

MegaStream (Post Guided)		MegaStream (Cage Guided)			
1 stage	**2 stage**	**1 stage**		**2 stage**	
Seat Retainer		**Seat Retainer**	**Plug Head**	**Seat Retainer**	**Plug Head**
See Standard Trim combination Table	316/316L SS	316/316L SS	316/316L SS + Full Contour Alloy 6	316/316L SS	316/316L SS + Full Contour Alloy 6
	410 SS Annealed	416 SS HT	416 SS HT	410 SS Annealed Nitrided	416 SS HT
	WC9/F22	1.4122 HT	1.4122 HT	WC9/F22 Nitrided	WC9/F22 + Full Contour Alloy 21
		WC9/F22 Nitrided	WC9/F22 + Full Contour Alloy 21		

1) For components not listed above, refer to the tables for standard trim material options
2) For added caviation protection, QPQ Nitrided treatment can be used for the plug head in place of "seat surface alloy 6" overlay
3) For severe service oxygen trim combinations, refer to the Flowserve Oxygen Guidelines. Consult Factory for additional information.

Seat leakage, per ASME/FCI 70-2

Pressure Balanced	Plug Design	Leakage Class	Test Medium	Test Pressure	Maximum Seat Leakage	Leakage Code
No	Metal to metal seated	IV	Liquid	Working pressure	0.000 1 · Kvs 0.000 1 · Cv	IV L 2
			Gas	Working pressure, maximum 3.5 bar	0.000 1 · Kvs	IV G 1
				Working pressure, maximum 50.7 psi	0.000 1 · Cv	
	Metal to metal seated, lapped seat, increased seal force	V	Liquid	Working pressure	0.000 018 · Δp · Ø d [1]	V L 2
			Gas	Working pressure, maximum 3.5 bar	0.000 010 8 · Ø d	V G 1
				Working pressure, maximum 50.7 psi		
	Soft seated	VI	Gas	Working pressure, maximum 3.5 bar	0.3 · Δp · LF [2]	VI G 1
				Working pressure, maximum 50.7 psi		
Yes (O-ring)	Metal to metal seated	IV	Liquid	Working pressure	0.000 1 · Kvs 0.000 1 · Cv	IV L 2
			Gas	Working pressure, maximum 3.5 bar	0.000 1 · Kvs	IV G 1
				Working pressure, maximum 50.7 psi	0.000 1 · Cv	
	Metal to metal seated, lapped seat, increased seal force	V	Liquid	Working pressure	0.000 018 · Δp · Ø d	V L 2
			Gas	Working pressure, maximum 3.5 bar	0.000 010 8 · Ø d	V G 1
				Working pressure, maximum 50.7 psi		
	Soft seated	VI	Gas	Working pressure, maximum 3.5 bar	0.3 · Δp · LF	VI G 1
				Working pressure, maximum 50.7 psi		

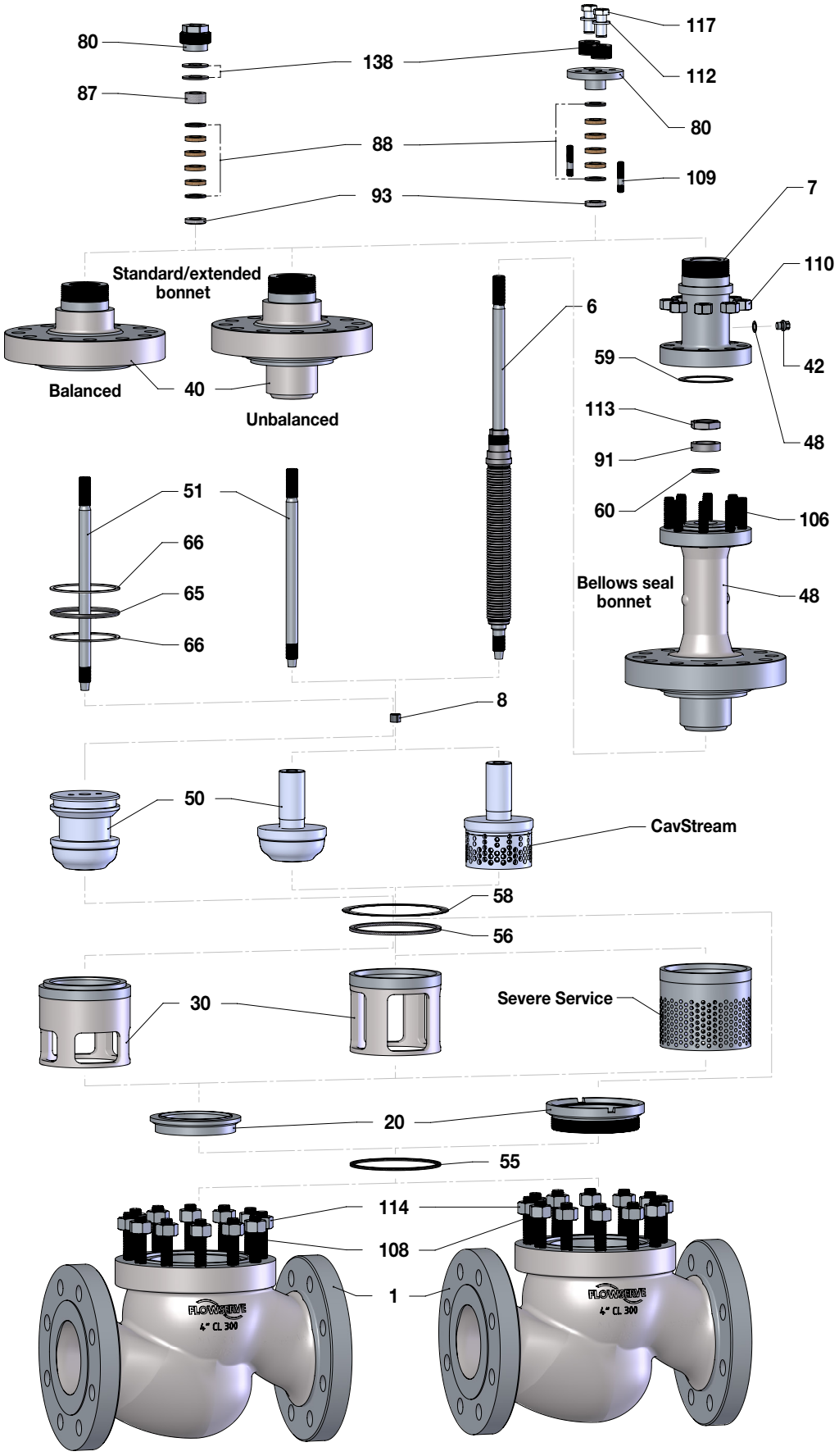
1) Ø d = seat Ø

2) LF = Leakage factor; see IEC 60534-4, remark 2

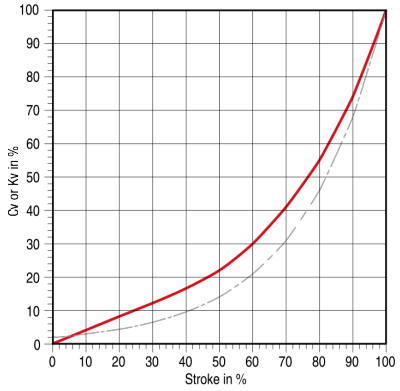
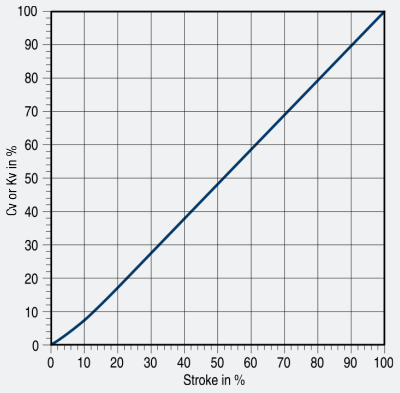
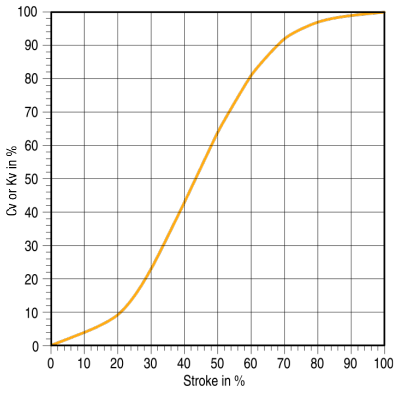
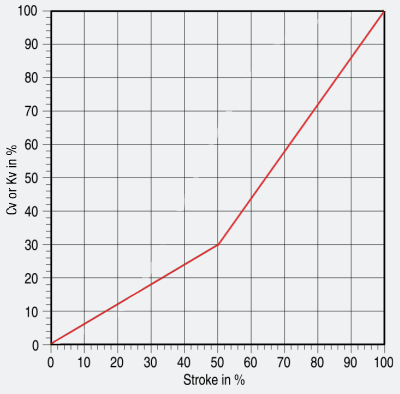
Parts list

Standard materials of construction *(for rough orientation only, non-NACE)*

Item	Part	Materials					
1	Body	ASTM A216 WCC	ASTM A352 LCC	ASTM A217 WC6	ASTM A351 CF8M	ASTM A351 CF3M	ASTM A494 M35-1
20	Seat Ring	316 SS	316 SS	A182 F22 CL3 + alloy 21	316 SS	316L SS	Bronze C93200
30	Seat Retainer/ Sleeve			ASTM A217 WC9			Monel 400
40	Bonnet	ASTM A105 or ASTM A216 WCC	ASTM A350 LF2 CL1 or ASTM A352 LCC	ASTM A182 F11 Cl2 or ASTM A217 WC6	ASTM A182 F316 or ASTM A351 CF8M	ASTM A182 F316L or ASTM A351 CF3M	ASTM A494 M35-1 or ASTM B564 N04400
42	Bellows Bonnet Plug	304 SS					—
48	Bellows Plug Gasket	Graphite					—
50	Plug Head	316 SS	316 SS	A182 F22 CL3 + alloy 21	316 SS	316L SS	Monel 400 or K500
51	Plug Stem	316 SS Strain Hardened L2					Monel K500
52	Lock Bushing	316 SS (nitrided)					
55	Seat Gasket (profile ring)	Graphite					Graphite (BAM)
56	Seat Retainer Gasket	316 SS Spiral Wound Graphite					Monel Spiral Wound Graphite (BAM)
58	Bonnet Gasket	316 SS - Graphite Layer					Graphite (BAM)
59	Bellows Head Gasket	Graphite					—
60	Bellows Profile Ring						—
65	Pressure Balance Seal	O-ring, Spring Energized Seal, or Piston Ring depending on application					PB O2 options
66	Backup Ring	Filled PTFE or PEEK depending on application					
80	Packing Follower	316 SS					Monel 400
87	Upper Guide						
88	Packing	PTFE or Graphite					Packing O2 options
91	Bellows Seal Carrier	316 SS					—
93	Packing Spacer						Monel 400
104	Hex Nut	316 SS					
106	Stud	ASTM A193 Grade B7	ASTM A320 Grade L7	ASTM A193 Grade B16	ASTM A193 Grade B8 CL2		—
108	Stud				ASTM A193 Grade B8 CL2		
109	Stud	ASTM A193 Grade B8M2 Class 2B					—
110	Hex Nut	ASTM A194 Grade 2H	ASTM A194 Grade 7L	ASTM A194 Grade 7L	ASTM A194 Grade 8		—
112	Washer	316 SS					
114	Hex Nut	ASTM A194 Grade 2H	ASTM A194 Grade 7L	ASTM A194 Grade 7L	ASTM A194 Grade 8		
117	Hex Nut	316L SS					
138	Belleville Spring	1.4310					

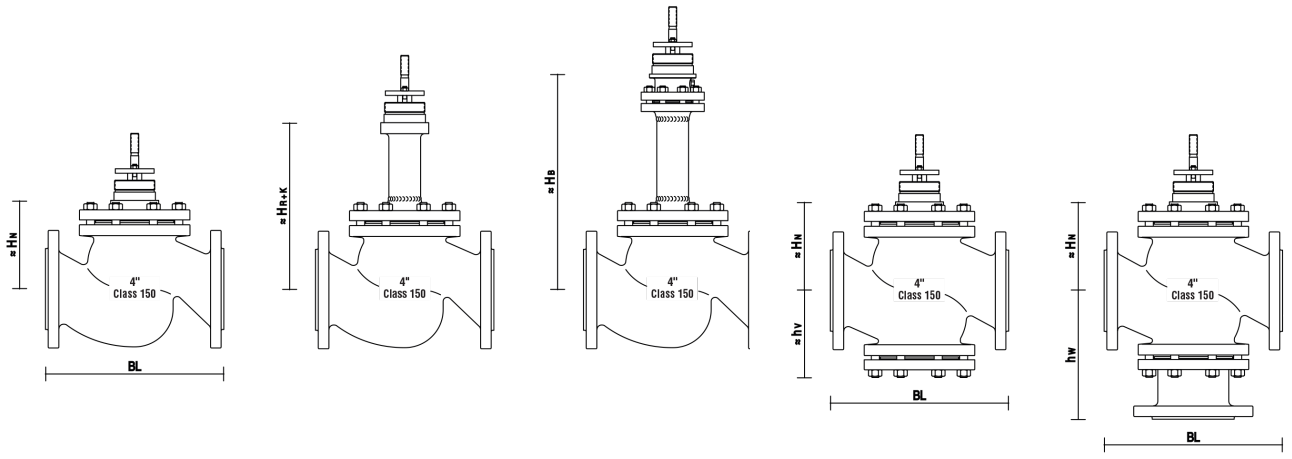

80
87
138
88
93
117
112
80
109
7
110
42
59
48
113
91
60
106
Bellows seal bonnet
48
Standard/extended bonnet
Balanced
40
Unbalanced
6
51
66
65
66
8
50
CavStream
58
56
30
Severe Service
20
55
114
108
1
FLOWSERVE
4" CL 300
FLOWSERVE
4" CL 300

Valve Characteristic

Type (Trim)		Application
Modified equal percentage Flow Characteristic (Equal Percentage 1:50 only on request and shown as an example)		• The equal percentage characteristic is used for highly changeable differential pressure. • A „soft“ inlet characteristic alleviates pressure impulses for short closing times. • The equal percentage characteristic relates equal increments of travel to equal percentage increments of the corresponding kv-value. • The equal percentage characteristic is recommended for a pressure ratio of Δp0 / Δp100 > 2
Linear Flow Characteristic		• The linear characteristic is used for constant differential pressure under different loads. • The linear characteristic relates equal increments of travel to equal increments of the Kv-value. • The linear characteristic is recommended for a pressure ratio of Δp0 / Δp100 1 - 2
On / Off Flow Characteristic with Throttle Lip		• On / Off characteristic is mainly used for closing operations. • The stroke of the On / Off characteristic shows an approximate linear run up to a 1/4 of the seat diameter and furthermore enables the full flow area when open.
Bilinear Flow Characteristic		• Severe Service trim options (similar to modified equal percentage for standard trim)

Dimensions and Weights - Class 150

Three Flange, Four Flange, 3-Way Valve

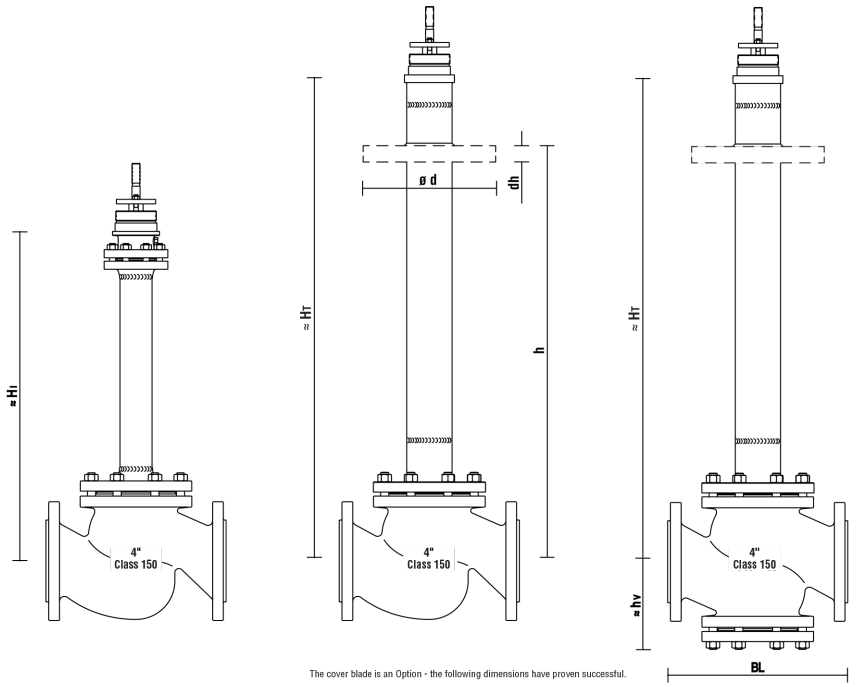


dimensions in mm, weights in kg

Description		Nominal Size NPS										
		½	¾	1	1½	2	3	4	6	8	10	12
		20 mm (0.79 in.)					40 mm (1.574in.)		60 mm (2.36 in.)	80 mm (3.15 in.)		
BL Face to Face Dimensions acc. to ISA 75.08.01		184	184	184	222	254	298	352	451	543	673	737
≈ hv Centerline to Bottom Flange Dimension		—	—	100	120	125	180	200	285	345	430	470
hw Centerline to Flange Tube Dimension		—	—	160	185	190	260	290	370	550	650	660
≈ Height	HN for Standard Bonnet	105	105	105	120	120	170	175	270	370	460	490
	HB for Bellows Seal Bonnet	265	265	265	265	265	420	420	660	760	765	770
	HR + K for High / Low Temperature Bonnet	220	220	220	220	220	310	310	445	510	600	630
≈ Weight for Valves with Three-Flange Body	and Standard Bonnet	5	6	7	13	16	39	51	103	202	—	—
	and Bellows Seal Bonnet	9	10	11	16	19	47	59	121	223	—	—
	and High / Low Temperature Bonnet	7	8	9	15	18	42	55	108	207	—	—
≈ Weight for Valves with Four-Flange Body	and Standard Bonnet	—	—	8	16	21	45	57	127	257	532	746
	and Bellows Seal Bonnet	—	—	12	19	24	52	63	141	278	555	768
	and High / Low Temperature Bonnet	—	—	10	18	23	47	59	128	262	536	750
≈ Weight for 3-Way Valves	and Standard Bonnet	—	—	11	21	25	57	79	144	285	503	716
	and Bellows Seal Bonnet	—	—	15	24	28	65	87	162	306	526	738
	and High / Low Temperature Bonnet	—	—	13	23	27	60	83	149	290	507	720
Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF										
Welded ends comply with		ASME 16.25										

Dimensions and Weights - Class 150

Cryogenic Bonnet (V750 only) for Three Flange and Four Flange

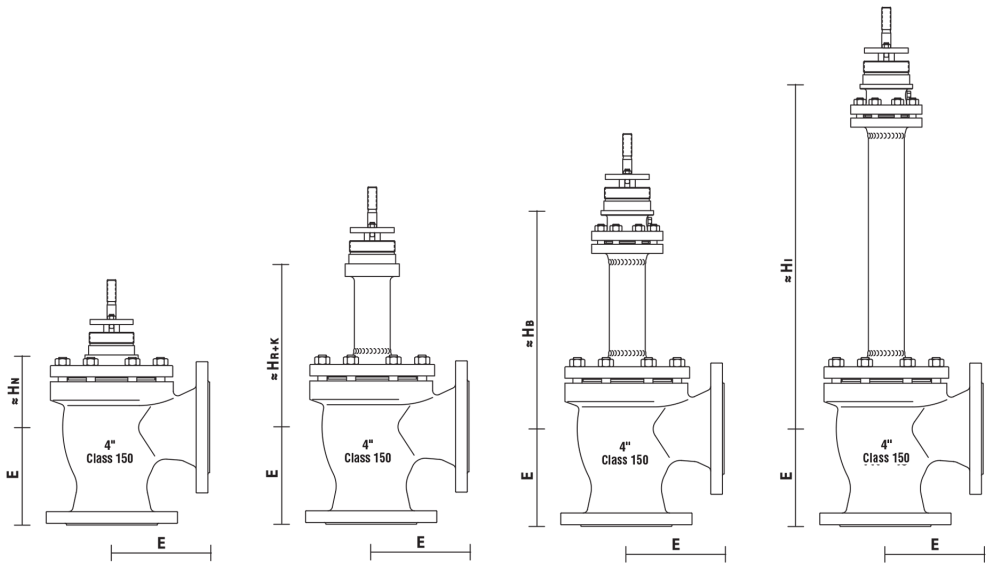


dimensions in mm, weights in kg

Description		Nominal Size NPS										
		½	¾	1	1½	2	3	4	6	8	10	12
		20 mm (0.79 in.)					40 mm (1.57 in.)		60 mm (2.36 in.)	80 mm (3.15 in.)		
BL Face to Face Dimensions acc. to ISA 75.08.01		184	184	184	222	254	298	352	451	543	673	737
≈ hv Centerline to Bottom Flange Dimension		—	—	100	120	125	180	200	285	345	430	470
hw Centerline to Flange Tube Dimension		—	—	160	185	190	260	290	370	550	650	660
≈ Height	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	800	800	800
	HT for Cryogenic Bonnet	755	755	755	760	760	825	825	955	—	—	—
	h for Cover-plate	610	610	610	610	610	686	686	839	—	—	—
ø d Cover-plate Diameter		152	152	152	152	152	203	203	254	—	—	—
dh Cover-plate High		40	40	40	40	40	40	40	40	—	—	—
≈ Weight for Valves with Three-Flange Body	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	219	—	—
	HT for Cryogenic Bonnet	10	11	12	21	25	56	68	124	—	—	—
≈ Weight for Valves with Four-Flange Body	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	262	536	750
	HT for Cryogenic Bonnet	—	—	13	24	29	61	73	144	—	—	—
≈ Weight for 3-Way Valves	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	302	524	736
Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF										
Welded ends comply with		ASME 16.25										

Dimensions and Weights - Class 150

Angle Valve

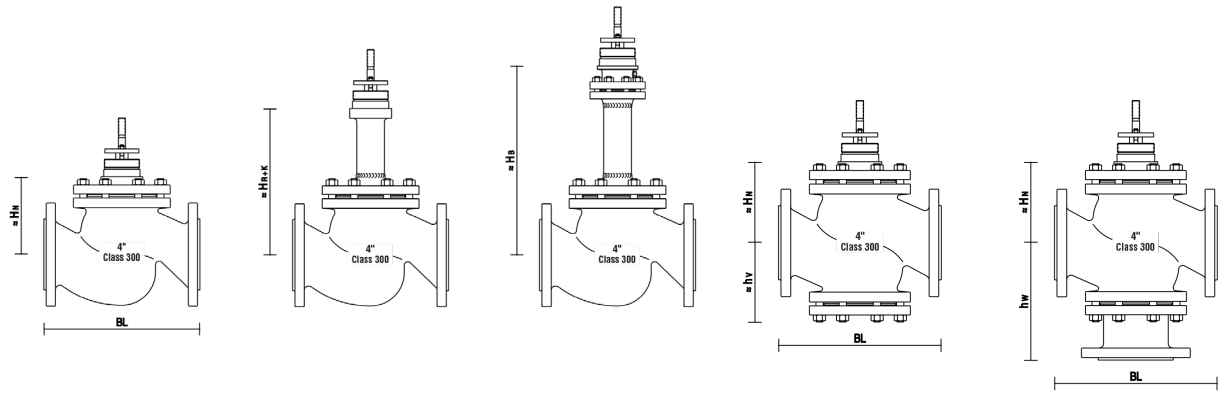


dimensions in mm, weights in kg

Description		Nominal Size NPS					
		1	1½	2	3	4	6
		20 mm (0.79 in.)			40 mm (1.57 in.)		60 mm (2.36 in.)
E Centerline to Face Dimensions acc. to ISA 75.08.08		92	111	127	149	176	225
≈ Height	H_N for Standard Bonnet	85	90	90	120	130	205
	H_B for Bellows Seal Bonnet	245	235	230	370	375	600
	H_{R+K} for High/Low Temperature Bonnet	200	190	185	260	265	380
	H_I for Cryogenic Bonnet	—	—	—	—	—	—
	H_T for Cryogenic Bonnet	755	760	760	825	825	955
	h for Cover-plate	610	610	610	686	686	838
ø d Cover-plate Diameter		152	152	152	203	203	254
dh Cover-plate High		40	40	40	40	40	40
≈ Weight for Valves with Angle Body	H_N for Standard-Bonnet	7	12	16	34	41	86
	H_B for Bellows Seal Bonnet	11	15	19	42	49	104
	H_{R+K} for High/Low Temperature Bonnet	9	14	18	37	45	91
	H_I for Cryogenic Bonnet	—	—	—	—	—	—
Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF					
Welded ends comply with		ASME 16.25					

Dimensions and Weights - Class 300

Three Flange, Four Flange, 3-Way Valve

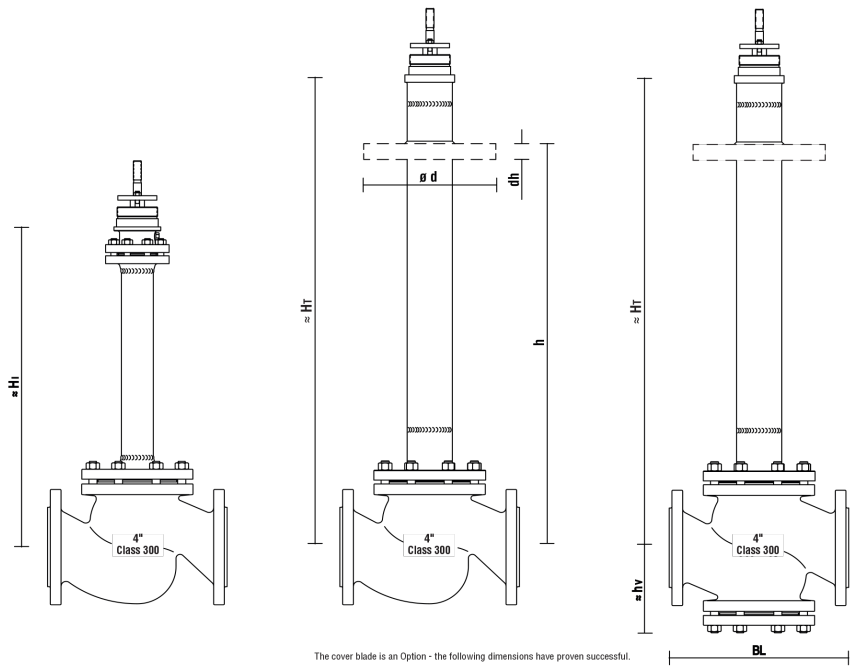


dimensions in mm, weights in kg

Description		Nominal Size NPS										
		½	¾	1	1½	2	3	4	6	8	10	12
		20 mm (0.79 in.)					40 mm (1.57 in.)		60 mm (2.36 in.)	80 mm (3.15 in.)		
BL Face to Face Dimensions acc. to ISA 75.08.01		191	194	197	235	267	317	368	473	568	708	775
BL Face to Face Dimensions acc. to EN 558-1 Basic Line 38 J		209.7	209.7	209.7	247.7	282.9	332.9	383.9	488.9	583.9	723.9	790.9
≈ hv Centerline to Bottom Flange Dimension		—	—	100	120	125	180	200	285	345	430	470
hw Centerline to Flange Tube Dimension		—	—	160	185	190	260	290	370	550	650	660
≈ Height	HN for Standard Bonnet	105	105	105	120	120	170	175	270	370	460	490
	HB for Bellows Seal Bonnet	265	265	265	165	265	420	420	660	760	765	770
	HR + K for High / Low Temperature Bonnet	220	220	220	220	220	310	310	445	510	600	630
≈ Weight for Valves with Three-Flange Body	and Standard Bonnet	7	7	8	17	19	44	64	122	232	—	—
	and Bellows Seal Bonnet	11	11	12	20	22	51	70	136	253	—	—
	and High / Low Temperature Bonnet	9	9	10	19	21	46	66	123	237	—	—
≈ Weight for Valves with Four-Flange Body	and Standard Bonnet	—	—	9	19	21	48	73	136	281	569	794
	and Bellows Seal Bonnet	—	—	13	22	24	55	79	150	302	592	816
	and High / Low Temperature Bonnet	—	—	11	21	23	50	75	137	286	573	798
≈ Weight for 3-Way Valves	and Standard Bonnet	—	—	12	25	28	62	95	171	321	554	782
	and Bellows Seal Bonnet	—	—	16	28	31	69	101	185	342	577	804
	and High / Low Temperature Bonnet	—	—	14	27	30	64	97	172	326	558	786
Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF										
Welded ends comply with		ASME 16.25										

Dimensions and Weights - Class 300

Cryogenic Bonnet (V750 only) for Three Flange and Four Flange



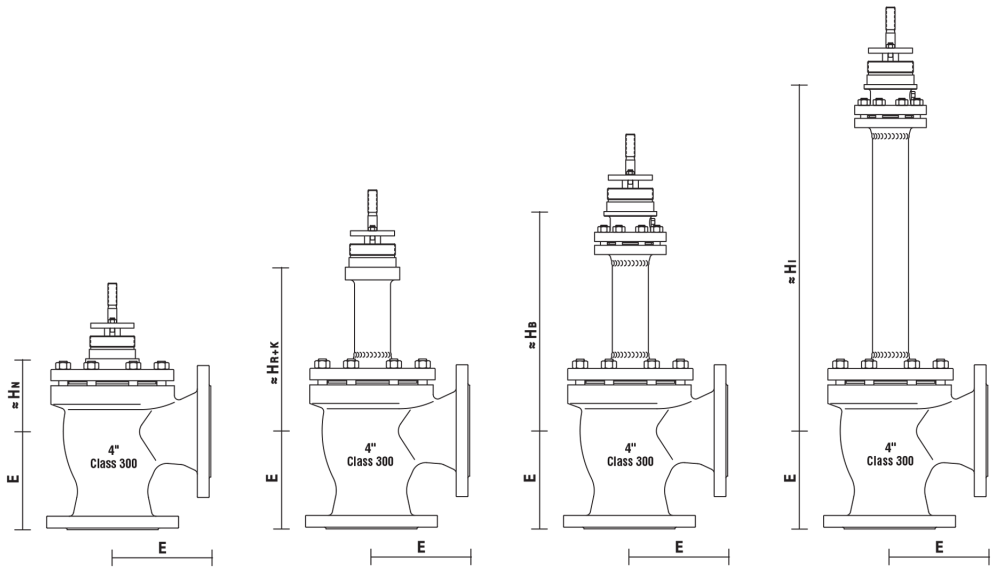
The cover blade is an Option - the following dimensions have proven successful.

dimensions in mm, weights in kg

Description		Nominal Size NPS										
		½	¾	1	1½	2	3	4	6	8	10	12
		20 mm (0.79 in.)					40 mm (1.57 in.)		60 mm (2.36 in.)	80 mm (3.15 in.)		
BL Face to Face Dimensions acc. to ISA 75.08.01		191	194	197	235	267	317	368	473	568	708	775
BL Face to Face Dimensions acc. to EN 558-1 Basic Line 38 J		209.7	209.7	209.7	247.7	282.9	332.9	383.9	488.9	583.9	723.9	790.9
≈ hv Centerline to Bottom Flange Dimension		—	—	95	110	120	165	180	265	340	430	470
hw Centerline to Flange Tube Dimension		—	—	160	185	190	260	290	370	550	650	660
≈ Height	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	800	800	800
	HT for Cryogenic Bonnet	755	755	755	760	760	825	825	955	—	—	—
	h for Cover-plate	610	610	610	610	610	686	686	838	—	—	—
ø d Cover-plate Diameter		152	152	152	152	152	203	203	254	—	—	—
dh Cover-plate High		40	40	40	40	40	40	40	40	—	—	—
≈ Weight for Valves with Three-Flange Body	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	249	—	—
	HT for Cryogenic Bonnet	12	12	12	25	28	61	83	143	—	—	—
≈ Weight for Valves with Four-Flange Body	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	298	590	814
	HT for Cryogenic Bonnet	—	—	14	27	30	65	92	157	—	—	—
≈ Weight for 3-Way Valves	HI for Cryogenic Bonnet	—	—	—	—	—	—	—	—	338	575	802
Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF										
Welded ends comply with		ASME 16.25										

Dimensions and Weights - Class 300

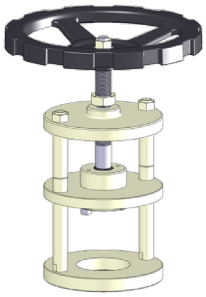
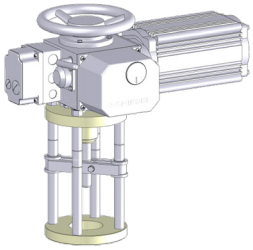
Angle Valve



dimensions in mm, weights in kg

Description		Nominal Size NPS					
		1	1½	2	3	4	6
		20 mm (0.79 in.)			40 mm (1.57 in.)		60 mm (2.36 in.)
E Centerline to Face Dimensions acc. to ISA 75.08.08		98	117	133	159	184	236
E Centerline to Face Dimensions acc. to EN 558-1 Basic Line 40 J		104.4	123.4	141	167	192	244
≈ Height	H_N for Standard Bonnet	85	90	90	120	130	205
	H_B for Bellows Seal Bonnet	245	235	230	370	375	600
	H_{R+K} for High/Low Temperature Bonnet	200	190	185	260	265	380
	H_I for Cryogenic Bonnet	–	–	–	–	–	–
	H_T for Cryogenic Bonnet	755	760	760	825	825	955
	h for Cover-plate	610	610	610	686	686	838
ø d Cover-plate Diameter		152	152	152	203	203	254
dh Cover-plate High		40	40	40	40	40	40
≈ Weight for Valves with Angle Body	H_N for Standard-Bonnet	7.5	15	16	39	58	90
	H_B for Bellows Seal Bonnet	11.5	18	19	46	64	104
	H_{R+K} for High/Low Temperature Bonnet	9.5	17	18	41	60	91
	H_I for Cryogenic Bonnet	–	–	–	–	–	–
Flanges drilled and dimensioned acc. to		ANSI B16.5, Form RF or RTJ					
Welded ends comply with		ASME 16.25					

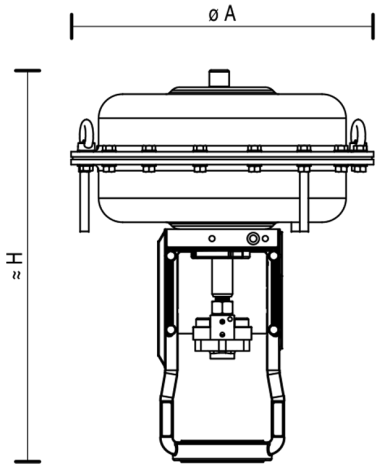
Actuators

Actuator Design	Type (Actuator)/Size		max. Force	Air/Power Supply	Failure Position	Hand Wheel
pneumatic operated	**IJ/IY** 253 503 701 **PB** 253 503 701 1502 3002		250 N ÷ 60 000 N depending on Actuator Size	1,2 bar ÷ 6,0 bar depending on Actuator Size	**Stem:** retracted extended	without top mounted (option) side mounted (option) depending on Actuator Size
hand operated	**HB** 12 16 20		13 00 N ÷ 30 000 N depending on Actuator Size	bi-manual Hand operating Force 200 N	**Stem:** locked	top mounted
Linear thrust Unit	**LB** 12 16 20		10 400 N ÷ 27 700 N depending on Linear thrust Unit Size	30 Nm ÷ 80 Nm depending on Linear thrust Unit Size	Output drive ISO 5210 A Connection Flange ISO 5210 F10	adapted for electrical multi turn actuators with output drives version “stem nut” with trapezoid thread 24 x 5 left

Pneumatic linear Actuators with multi-function Yoke

Description	Area (cm²)	250	500		700	
	Stroke	10 / 20	20	40	20	40
Ø A		265	352	352	405	405
≈ H		335	455	460	545	550
≈ Weight		16	31	40	46	46

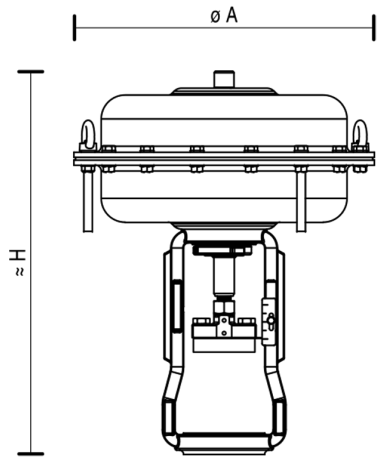
dimensions in mm, weights in kg



Pneumatic linear Actuators with NAMUR-Yoke

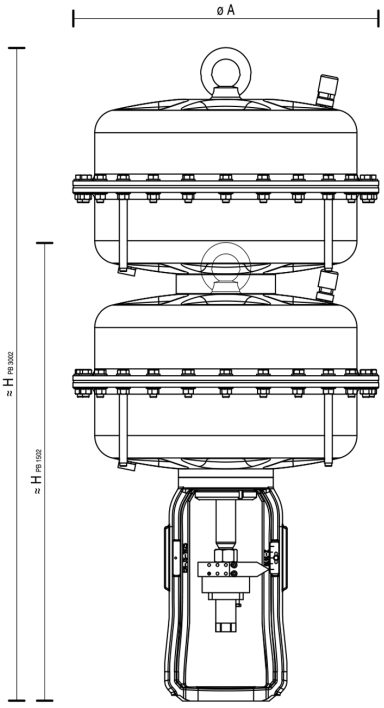
Description	Area (cm²)	250	500		700		
	Stroke	10 / 20	20	40	20	40	60
Ø A		265	352	352	405	405	405
≈ H		330	420	450	545	545	600
≈ Weight		16	31	40	46	46	46

dimensions in mm, weights in kg



Description	Area (cm²)	1500	3000
	Stroke	40 / 60 / 80 / 100	40 / 60 / 80 / 100
Ø A		548	548
≈ H		800	1140
≈ Weight		124	240

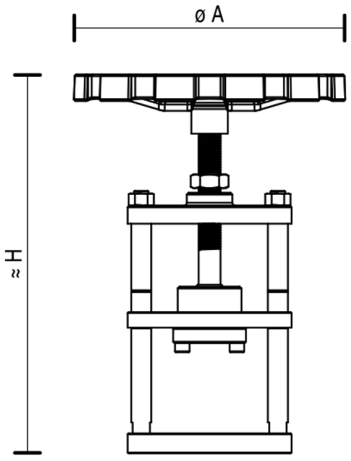
dimensions in mm, weights in kg



Manual Operation

Description	Manual Operation	HB 12	HB 16	HB 20
	Stroke	20	40	60 / 80
Ø A		300	300	400
≈ H		400	450	480
≈ Weight		17	17	18

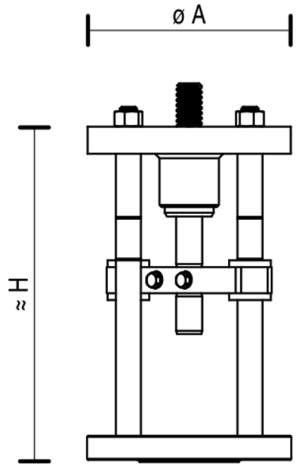
dimensions in mm, weights in kg



Linear Thrust Unit

Description	Linear Thrust Unit	LB 12	LB 16	LB 20
	Stroke	20	40	60 / 80
Ø A		196	196	196
≈ H		240	320	407
≈ Weight		12	17	20

dimensions in mm, weights in kg



General service control valve — order code

FlowTop			Type						Size	Class	Body Material/Certificate					Plug							Seat	Cv	Trim
			V750	D	F	V	N	A	2 in	300	A216WCC	O	O	A	O	P	O	N	P	1	G	G	50	55	316SS
Valve type	Screwed seat design	V750																							
	Clamped seat design	V752																							
Body design	Globe 3-Flange (1/2-8")			D																					
	Globe 4-Flange			V																					
	Angle (1-6")			E																					
	3-Way			W																					
Body connection	Flange	Raised face (standard)			F																				
		Ring joint			J																				
	Butt welded ends B16.25, Sch 40				W																				
	Other butt welded ends				Z																				
Balancing	Without					V																			
	V-ring balancing (spring energized)					O																			
	Piston ring balancing					K																			
	P/B O-Ring design	Buna-N and Filled PTFE				A																			
		Viton and Filled PTFE				B																			
		Viton and PEEK				D																			
		EPDM & Filled PTFE				W																			
		EPDM and PEEK				H																			
		Kalrez 4079 and Filled PEEK				I																			
		Chemraz 555 and Filled PEEK				M																			
Bonnet	Normal-Aufsatz / Standard-bonnet						N																		
	Faltenbalg-Aufsatz / Bellows seal-bonnet						B																		
	Kühl-Aufsatz / High temp. Extension-bonnet						R																		
	Verlängerter-Aufsatz / Low temp. Extension-bonnet						K																		
	Cryogenic (Insulating) bonnet						I																		
							T																		
Packing	Braided PTFE	adjustable	non-ISO	external			A																		
	Braided Graphite						B																		
	SUPAGRAF Ctrl						H																		
	Oxygen Packing PTFE-Graphite						Y																		
	Oxygen Packing PTFE-Graphite						W																		
	Braided PTFE						N																		
	FDA V-Ring system						F																		
	UHP V-Ring system						G																		
	V-Ring system	live loaded					S																		
	Lattyflon 3260 LM						Q																		
	Lattygraf 6940 EF						V																		
	SUPAGRAF Ctrl		ISO 15848-1				J																		
	Lattyflon 3260 LM			internal			U																		
	Lattygraf 6940 EF/Lattygraf EF NG						K																		
Nominal size									½ to 12 in.																
Nominal pressure	Class 150									150															
	Class 300									300															
Body material											A216WCC														
											A352LCC														
											A217WC6														
											A351CF8M														
											A351CF3M														
											Monel 400														
Regulation for material	DGRL / PED	Standard										O													
Material certificate	Without certificate												O												
	EN 10204	2.2											Z												
		3.1 with list of certificates											B												
		3.1 with CMTR (Body+Bonnet)											D												
		3.1 with CMTR (Body+Bonnet+Bolting)											E												
		3.1 Code E/ +Trim											H												
		3.2											A												
Regulation for final test	EN 1349 (IEC-534 / FCI 70-2)	Standard (SIL certificate available)												A											
		SIL (Safety Function, PED Cat. IV)												M											
Final test certificate	Without certificate														O										
	EN 10204	2.2													Z										
		3.1													B										
		3.2													A										
Plug type	Parabolic plug															P									
	Tellerkegel / Disk plug (Quick Open)															T									
	Mixing plug															M									
	Distributing plug															V									
	CavStream (1.5-6“, 1 stage, PB)															K									
Trim equipment	Without additional trim equipment (V750)																O								
	Standard Retainer (V752)																S								
	MegaStream, (1-6”, 1 stage)																M								
	MegaStream, (1-6”, 2 stage, V752 only)																N								
	CavControl (1.5-8”, 1 stage, PB, V752 only)																J								
	DiamondBack (3-8“, 3 stage, PB, V752 only)																L								

General service control valve — order code continued

FlowTop		Type						Size	Class	Body Material/Certificate					Plug						Seat	Cv	Trim
		V750	D	F	V	N	A	2 in	300	A216WCC	O	O	A	O	P	O	N	P	1	G	G	50	55	316SS
Trim design	Standard																N							
	Seat surface Alloy 6																D							
	Full contour Alloy 6																K							
	Soft seated		PTFE														W							
			PCTFE														C							
	Seat in bronze																B							
	Hardened																H							
	Tenifer treated																T							
Seat leakage	Class III	IEC / FCI	(Testmedium: Water)															O						
	Class IV	IEC / FCI	(Testmedium: Water)															P						
			(Testmedium: Gas)															D						
	Class V	IEC / FCI	(Testmedium: Water)															S						
			(Testmedium: Gas)															F						
	Class VI	IEC / FCI	(Testmedium: Gas)															T						
Plug Guiding	Top guided (post guided)																		1					
	Top and bottom guided																		2					
	Cage guided (Cavcont, MGSTRM, Diamond)																		3					
Characteristic	Modified Equal %																			G				
	Linear																			L				
	On - Off																			A				
	BiLinear																			B				
Flow direction	Flow to open (Flow Under)																				G			
	Flow to close (Flow Over)																				I			
Seat diameter	[mm]																					8 - 250		
Cv value	[gpm]																					1.16 - 1156		
Trim material																								316SS
																								1.4122
																								1.4922
	Plug in Monel K500 for Oxygen application in combination with seat in Bronze																							K500
	NACE and seat Ø ≤ 10 mm: Plug and seat in 2.4668 heat-treated (INCONEL 718 HT)																							2.4668
Special design	X																							
Possib. actuator mounting	FlowAct							with multi function yoke (direct mounting)							external Packing System									IJ ..
															internal Packing System									
								with NAMUR yoke							external Packing System									PB ..
	Electric multi turn actuator							Linear thrust unit „light“																LB ...

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