CRANE

TECHNICAL DATASHEET

CRANE CRYOGENIC VALVES

CRANE® Cryogenic Products
High Performance
Globe Valves

CRANE

Figure Number System

Globe & Check Valves

Figure number definition for Crane Globe & Check valves.

CF1H		T		3		A		Q		1		A		HW		V		ST	
1	Size	2	TYPE	3	MAWP	4	MOC	5	DISC TYPE	6	GASKET MOC	7	END CONNECTION	8	ACTUATION	9	JACKETING	10	SPECIAL FEATURE

Top headers identified as order example.

			in	mm
1	**SIZE**	CF0H	½"	10
		CF0Q	¾"	20
		CF01	1"	25
		CF1Q	1 ¼"	30
		CF1H	1 ½"	40
		CF02	2"	50
		CF2H	2 ½"	65
		CF03	3"	80
		CF04	4"	100
		CF05	5"	125
		CF06	6"	150
2	**VALVE TYPE**	T	Bellow Seal T-Globe Valve	
		Y	Bellow Seal Y-Globe Valve	
		L	Lift Check Valve	
		R	Bellow Seal Angle Valve	
3	**MAWP**	1	150 psi	
		3	300 psi	
		6	600 psi	
4	**MOC**	A	CF8M body, 304ss Disc, 304/304L pipe	
		B	CF8M body, 304ss disc, 316/316L pipe	
		C	CF8M body, 316/316L disc & pipe	
		D	CF3M body, 316Lss disc & pipe	
5	**DISC TYPE**	Q	PCTFE	Quick opening
		L	PCTFE	Linear
		E	PCTFE	Equal Percent
6	**GASKET MATERIAL**	1	Graphite	
		2	PTFE	
7	**END CONNECTION**	A	SWE + Pipe End, Sch. 10	
		B	SWE + Pipe End, Sch. 5	
		C	SWE + Pipe End, Sch. 40	
		D	SWE + Pipe End, Sch. 80	
		S	Socket, pipe	
		T	Socket, tube	
		U	Butt Weld Schedule 5	
		V	Butt Weld Schedule 10	
		W	Butt Weld Schedule 40	
		Y	Butt Weld Schedule 80	
		R	RF Flanged, 125-250 Ra	
		F	Flat Face Flanged	
		H	Hub Ends	
		Z	RTJ	
		X	Custom	
8	**ACTUATION TYPE VACUMM JACKETED**	HW	Handwheel	
		BS	Bare Stem	
		A1 to Z9	Pneumatic Actuators	
		01 to 99	Electric Actuators	
		00	None (Lift Check)	
9	**JACKETING**	N	Non-Jacketed	
10	**SPECIAL FEATURE**	ST	Manufacturer standard bonnet length, non-cold box	
		S2	Manufacturer standard bonnet length, non-cold box, O2 Clean	
		CB	Cold Box Cuff	
		CL	Custom bonnet length, length included in extended description.	
		XX	Special or multiple custom requirements, included in extended Description.	
		MC	Cold box, non-O2 Clean	
		M2	Cold box, O2 Clean	

Overview

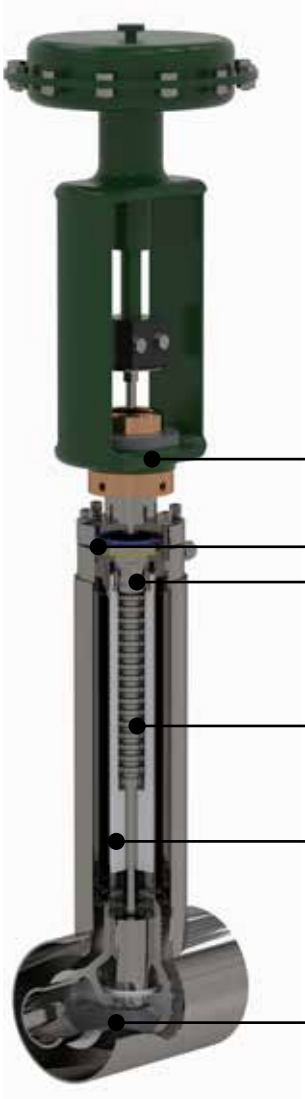
T-Bellows Seal Globe Valve

- Globe valves are normally installed with flow and pressure under the disc. Always consult with the factory before installing valves with flow in the other direction.
- Globe valves are suitable for most throttling applications; however, they should not be used for throttling at less than 10-20% open. This can cause excessive vibration, noise, and damage to disc and seats. Use of smaller valves with lower flow capacity may permit the valve to be open a greater percentage, thus avoiding damage.

CRANE® Bellows Seal T-Globe Valves minimizes Hydrogen loss by improving heat transfer rates, reducing pipeline latency in liquid transfer applications and leveraging a robust zero-leak design.

Key features of the Bellows Seal Globe valve include:

- Enhanced engineered design offers best-in-class heat transfer, greatly reducing Hydrogen loss.
- Innovative valve internals deliver improved Cv in your application, improving liquid transfer times
- Unique cartridge replacement system allows for in-line repair, reducing down-time and increasing productivity



Easily convert from manual handwheel to actuation.

Improved bonnet seal design to ensure zero fugitive emission

Unique cartridge replacement system for efficient in-line maintenance.

Proven bellows design for high life cycle.

Vacuum barrier and Improved design minimizes heat leak and media boil-off.

Innovative valve internals deliver improved Cv while maintaining highest industry bubble-tight shut-off standards.

CRANE

Bellows Seal Globe Valve Design Details

Styles
- T-Globe, Y-Globe and Angle Body Configurations

Size Range
- ½" - 6" NPS

Pressure Ratings
- 300 psi MAWP

Materials of Construction
- CF8M body, 304 disc, 316/316L pipe
- CF8M body, 304 disc, 304/304L pipe
- CF8M body, 316/316L disc & pipe
- CF3M body, 316L disc & pipe
- Other materials available upon request.

Design Standards & Compliance
- MSS-SP-134
- ISO-28921
- ASME B16.34
- Korean Gas Safety (KGS) Approval
- Canadian Registration (CRN)
- PED/T-PED Approval (Pending)
- API-598
- Oxygen clean option per CGA G-4.1

Temperature Range
- Designed for -269°C to 100°C (-452°F to 212°F)

End Connections
- Socket Weld + Pipe End
- Socket Weld ends
- Butt Weld ends with varied pipe schedules

Assembly Configurations
- Vacuum Jacketed and Non-Jacketed
- Extended bonnet/stem per MSS-SP-134 and ISO 28921
- Customized stem length available

Valve Installation Orientation
- Stem vertical with horizontal pipe
- Stem 45° to vertical with horizontal pipe

Valve Sealing and Packaging
- Bellows design to eliminate fugitive emissions
- Bellows tested to 10,000 cycles
- Self-Centering PCTFE Seat
- ANSI Class VI Leak Rate

Standard Features
- Proven valve design for high flow capacity and low heat leak
- Light Weight design optimizes cool down weight
- Spiral wound bonnet flange gasket for improved valve sealing

Actuator Mounting
- Easy conversion between handwheel and actuator
- Fits most common actuator solutions

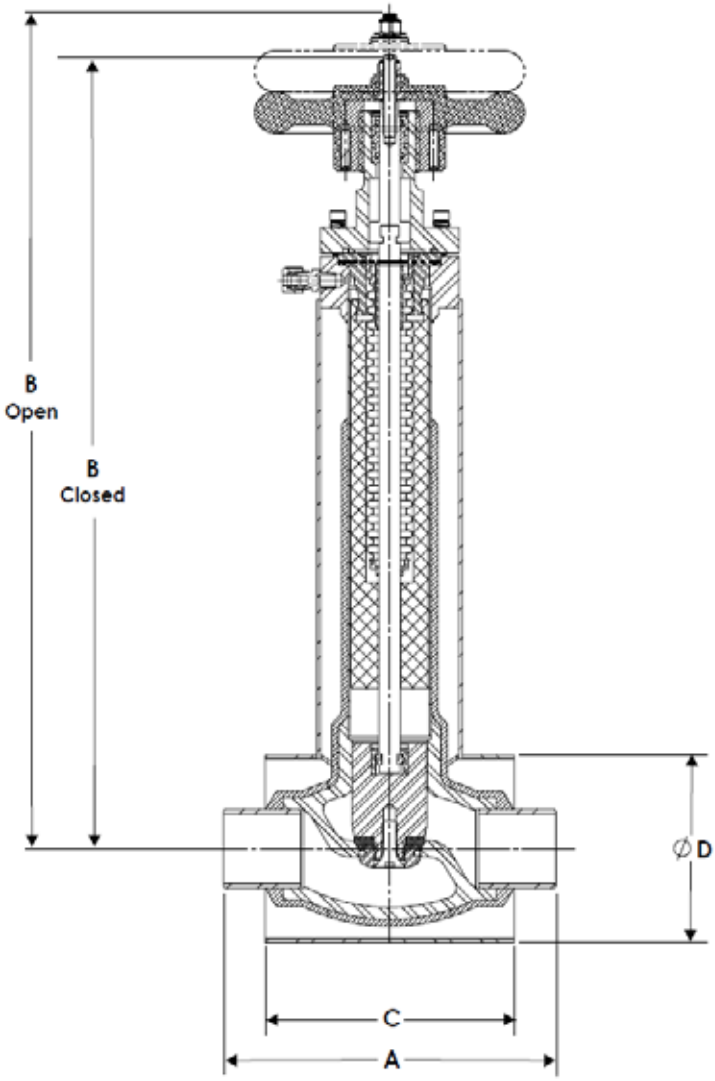
Options
- Oxygen cleaning (Process clean standard for LH2 service) for Oxygen system compatibility per CGA G-4.1
- Cold Box Cuff
- Custom Extended Bonnet & Stem lengths available
- Replacement Cartridge System available
- Soft Goods Repair Kit available

Applications
- Liquid Hydrogen production, transportation, transfer, and storage.
- Liquid Helium
- LIN, LAR, LOX, LNG, L-CO2

Bellows Seal T-Globe Valve

Materials of Construction

Description	Material
BODY	ASTM A351 CF8M
BODY STUB PIPE	ASTM A312 TP304
TOP PIPE FLANGE	ASTM A479 SS316
BODY NECK PIPE	ASTM A312 TP304
DISC	ASTM A479 SS304
SEAT	PCTFE
PTFE SLEEVE	PTFE
METAL BELLOW	1.4404
SLEEVE HOLDER	ASTM A479 SS316
SPIRAL WOUND GASKET	SS316 + GRAPHITE + PTFE
BONNET	ASTM A276 SS304
SOCKET HEAD CAP SCREW	ASTM A320 B8 CL.2
O RING	VITON
HANDWHEEL	LM-25
HANDWHEEL NUT	SS 18-8



Dimensions

Size		Pipe Ends		(Open)		(Closed)							Weight (lbs)		Flow Coefficient	Heat Flux
in	mm	A		B		B		C		ØD		Jacket Size NPS	Non Jacketed	Jacketed	Cv	(BTU/HR)
½ "	10	4.75	120.65	16.2	411.48	15.4	391.16	3.75	95.25	2.875	73.025	2.5	11.4	14	7.1	6.1
¾"	20	5.375	136.525	16.3	414.02	15.5	393.7	4.375	111.125	3.5	88.9	3	12.3	15.1	13	6.1
1"	25	6.0	152.4	16.3	414.02	15.5	393.7	5.0	127	3.5	88.9	3	12.7	16	15	6.1
1 ½"	40	8.0	203.2	20.0	508	19.1	485.14	6.0	152.4	4.5	114.3	4	19.7	25.3	34	9.6
2"	50	8.5	215.9	22.1	561.34	20.6	523.24	6.5	165.1	5.56	141.224	5	28.7	36	54	13
3"	80	14.0	355.6	28.0	711.2	26.0	660.4	12.0	304.8	5.56	141.224	5	71.5	95	136	58
4"	100	15.5	393.7	35.9	911.86	33.4	848.36	13.25	336.55	8.63	219.202	8	130	158	182	73

Overview

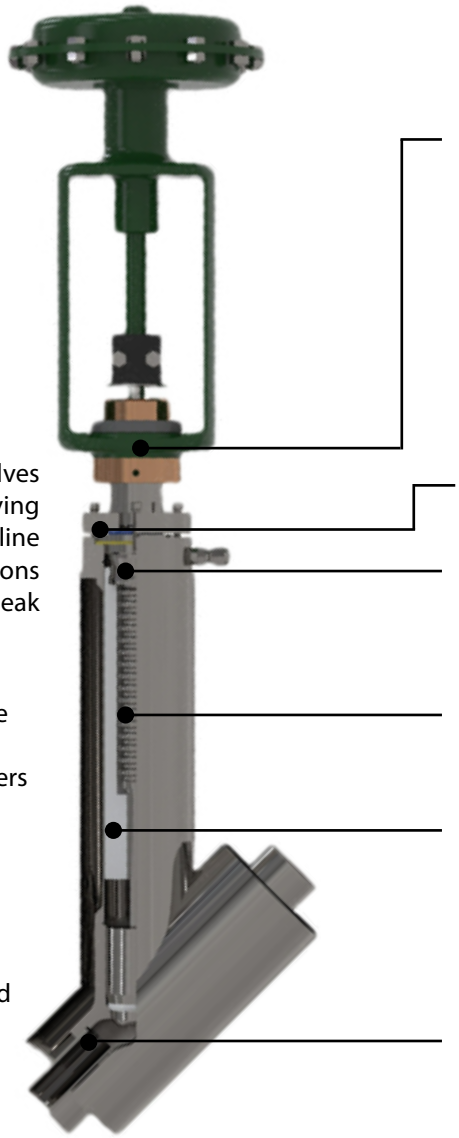
Y-Bellows Seal Globe Valve

- CRANE® Bellows Seal Y-Globe Valve features lower pressure drop, tight shut-off, and enhanced durability, all contributing to overall improved efficiencies.

CRANE® Bellows Seal Y-Globe Valves minimizes Hydrogen loss by improving heat transfer rates, reducing pipeline latency in liquid transfer applications and leveraging a robust zero-leak design.

Key features of the Bellows Seal Globe valve include:

- Enhanced engineered design offers best-in-class heat transfer, greatly reducing Hydrogen loss.
- Innovative valve internals deliver improved Cv in your application, improving liquid transfer times
- Unique cartridge replacement system allows for in-line repair, reducing down-time and increasing productivity



Easily convert from manual handwheel to actuation.

Improved bonnet seal design to ensure zero fugitive emission

Unique cartridge replacement system for efficient in-line maintenance.

Proven bellows design for high life cycle.

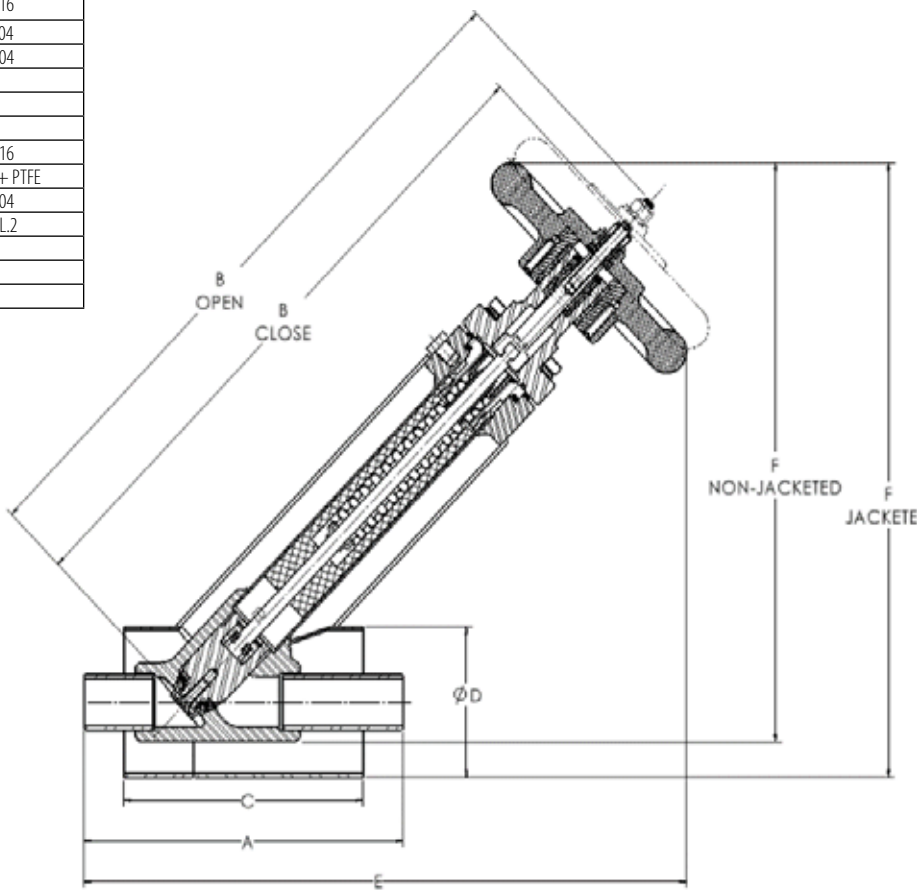
Vacuum barrier and Improved design minimizes heat leak and media boil-off.

Innovative valve internals deliver improved Cv while maintaining highest industry bubble-tight shut-off standards.

Bellows Seal Y-Globe Valve

Materials of Construction

Description	Material
BODY	ASTM A351 CF8M
BODY STUB PIPE	ASTM A312 TP304
TOP PIPE FLANGE	ASTM A479 SS316
BODY NECK PIPE	ASTM A312 TP304
DISC	ASTM A479 SS304
SEAT	PCTFE
PTFE SLEEVE	PTFE
METAL BELLOW	1.4404
SLEEVE HOLDER	ASTM A479 SS316
SPIRAL WOUND GASKET	SS316 + GRAPHITE + PTFE
BONNET	ASTM A276 SS304
SOCKET HEAD CAP SCREW	ASTM A320 B8 CL.2
O RING	VITON
HANDWHEEL	LM-25
HANDWHEEL NUT	SS 18-8



Size		Pipe Ends		(Open)		(Closed)		Valve Body		Vacuum Jacketed			Valve Envelope F				Weight (lbs)		Flow Coefficient	Heat Flux at 20K
in	mm	A		B		B		C		ØD		Jacket Size	Jacketed		Non-Jacketed		Jacketed	Non-Jacketed	Cv	(BTU/HR)
½ "	10	7.875	200.025	16.7	424.18	15.9	403.86	5.875	149.225	3.5	88.9	3	14.5	368.3	13.5	342.9	14.4	11.3	9	6.1
¾"	20	7.875	200.025	16.7	424.18	15.9	403.86	5.875	149.225	3.5	88.9	3	14.5	368.3	13.5	342.9	15.2	12	13	6.1
1"	25	8	203.2	16.5	419.1	15.7	393.7	6	152.4	3.5	88.9	3	14.5	368.3	13.5	342.9	15.5	12	22	6.1
1 ½"	40	10.5	266.7	20.5	520.7	19.5	495.3	8.5	215.9	4.5	114.3	4	17.5	444.5	16.5	419.1	24.6	19.2	47	9.6
2"	50	10.5	266.7	23	584.2	21.5	546.6	8.5	215.9	5.563	141.3	5	20	508	18.5	469.9	33.5	26.7	96	13

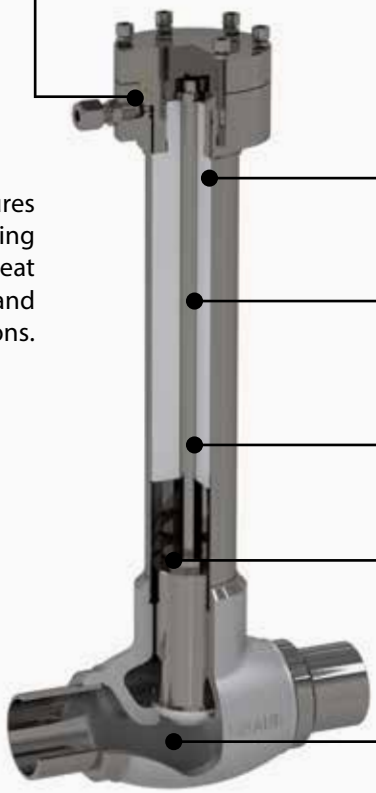
Overview

Lift Check Valve

- Lift Check Valves are engineered for unidirectional fluid flow and backflow prevention, designed specifically for hydrogen applications with a precision cone seat to ensure zero leakage.
- Ideal for liquid hydrogen storage and transfer systems, pipelines, and cryogenic processing, ensuring reliable operation in extreme cryogenic temperatures.
- Features innovative valve internals for improved Cv and a design that eliminates potential leak paths, ensuring maximum safety and durability.

Improved bonnet seal design to ensure zero fugitive emission

Innovative valve internals deliver improved Cv while maintaining highest industry bubble- tight shut-off at working pressure standards.



CRANE® Lift Check Valves ensures unidirectional fluid flow and preventing backflow, utilizing a precision cone seat design to eliminate hydrogen loss and enhance safety in hydrogen applications.

Key features of the Lift Check Valve include:

- Enhanced trim design to prevent backflow of the media while maintaining tight shut off.
- Engineered design offers best-in-class to reduce heat leak, greatly reducing Hydrogen loss.
- Innovative valve internals deliver improved Cv in your application, improving liquid transfer times.

Unique cartridge replacement system allows for in- line repair, reducing down-time and increasing productivity

Engineered to eliminate all potential leak paths through the seat.

Vacuum barrier and Improved design minimizes heat leak and media boil-off.

Innovative valve internals deliver improved Cv while maintaining highest industry bubble- tight shut-off at working pressure standards.

Lift Check Valve Design Details

Styles
• Lift Check

Size Range
• ½" - 6"

Pressure Ratings
• 300 psi MAWP

Materials of Construction
• CF8M body, 304 disc, 316/316L pipe
• CF8M body, 304 disc, 304/304L pipe
• CF8M body, 316/316L disc & pipe
• CF3M body, 316L disc & pipe
• Other materials available upon request.

Design Standards & Compliance
• ASME B16.34
• MSS-SP-134
• ISO-28921
• Korean Gas Safety (KGS) Approval
• Canadian Registration (CRN)
• Oxygen clean option per CGA G-4.1
• PED/T-PED Approval (Pending)

Temperature Range
• Designed for -269°C to 100°C (-452°F to 212°F)

End Connections
• Socket Weld + Pipe End
• Socket Weld ends
• Butt Weld ends with varied pipe schedules

Assembly Configurations
• Vacuum Jacketed and Non-Jacketed
• Extended bonnet/stem per MSS-SP-134 and ISO 28921
• Customized stem length available

Sealing and Packaging
• Self-Centering PCTFE Seat
• ANSI Class VI Leak Rate

Standard Features
• Proven valve design for high flow capacity and low heat leak
• Metal-to-metal secondary seat seal
• Spiral wound bonnet flange gasket for improved sealing

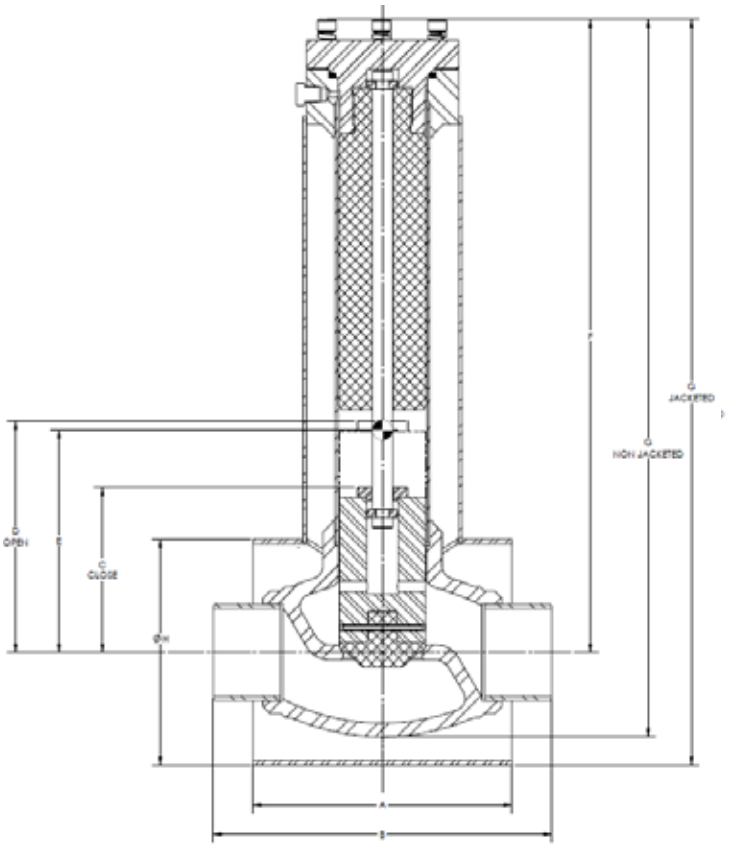
Options
• Oxygen cleaning (Process clean standard for LH2 service) for Oxygen system compatibility
• Cold Box Cuff
• Extended Bonnet & Stem lengths

Applications
• Liquid Hydrogen production, transportation, transfer, and storage
• Liquid Helium
• LIN, LAR, LOX, LNG, L-CO2

Lift Check Globe Valve

Materials of Construction

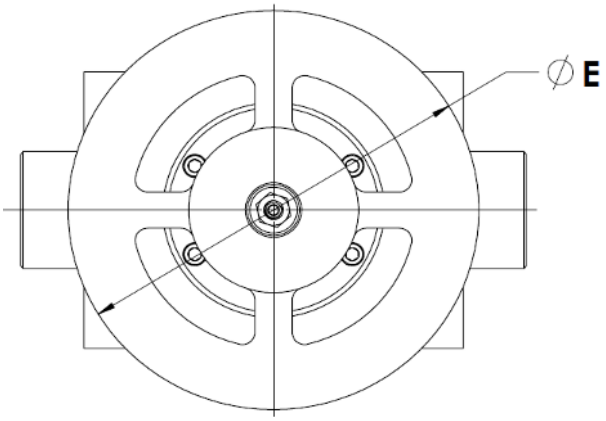
Description	Material
BODY	ASTM A351 CF8M
BODY STUB PIPE	ASTM A312 TP304
TOP PIPE FLANGE	ASTM A479 SS316
BODY NECK PIPE	ASTM A312 TP304
C-WASHER	ASTM A479 SS304
PTFE SLEEVE	PTFE
COVER	ASTM A479 SS316
DISC	ASTM A479 SS304
SEAT	PCTFE
STEM	1.4404/ASTM A479 SS316
DISC COVER PLATE	ASTM A479 SS304
SPIRAL WOUND GASKET	SS316 + GRAPHITE + PTFE
SLOTTED SPRING PIN	SS316
LOCK WASHER	SS316
SOCKET HEAD CAP SCREW	ASTM A320 B8 CL.2
NPT PLUG	SS316
INSULATION PIPE (HORIZONTAL)	ASTM A312 TP316
JACKETING PIPE (VERTICAL)	ASTM A312 TP316



Size		CLASS	MAWP	A	B	C	D	E	F	G		ØH		Weight (lbs)		Flow Coefficient
in	mm									Jacketed	Non Jacketed	Jacketed	Non Jacketed	Jacketed	Non Jacketed	Cv
½ "	10	300	300	3.75	4.75	2.96	3.96	5.52	12	13.4	13	2.875	2.5	9.6	7.2	9.7
¾"	20	300	300	4.38	5.38	2.96	3.96	4.94	12	13.7	13.3	3.5	3	10.7	8	14
1"	25	300	300	5.0	6.0	2.96	3.96	4.55	12	13.7	13.4	3.5	3	11.6	8.7	18
1 ½"	40	300	300	6.0	8.0	3.71	5.21	5.87	15.4	17.7	17.1	4.5	4	20.5	15.8	39
2"	50	300	300	6.5	8.5	4.07	5.47	5.7	15.6	18.4	17.17	5.57	5	30	23.3	58

Ancillary Components

Handwheel (Lightweight).

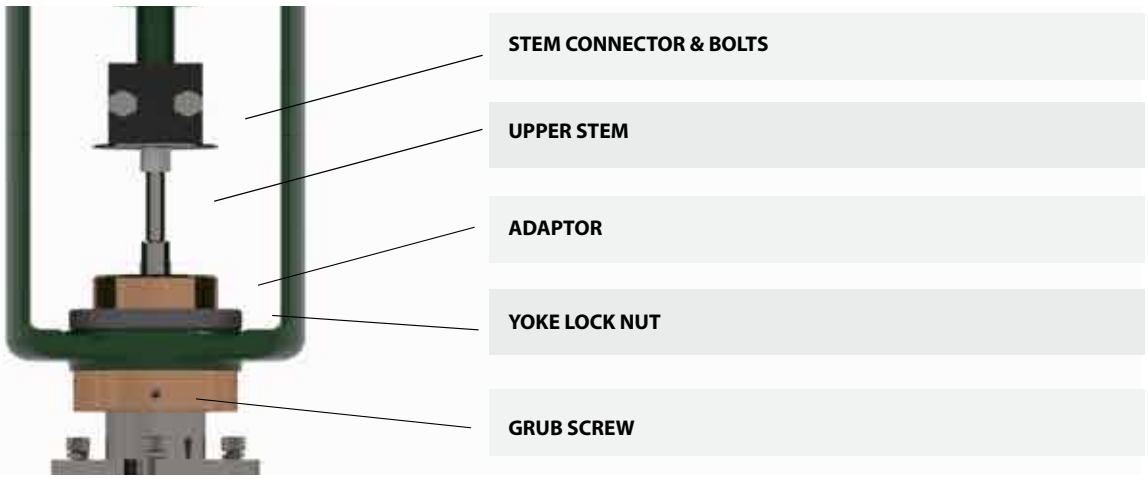


"T Globe," Handwheel dimensions and valve weight

Size (inches)	ØE *(inches)*	T Globe, Jacketed with Handwheel Gross Weight (lbs)	T Globe, Non-Jacketed with Handwheel Gross Weight (lbs)	T Globe, Bare Stem Jacketed Gross Weight (lbs)	T Globe, Bare Stem Non- Jacketed Gross Weight (lbs)
½ "	6.5	14.0	11.4	13.2	10.7
¾"	6.5	15.1	12.3	14.4	11.6
1"	6.5	16.0	12.7	15.2	12.3
1 ½"	6.5	25.3	19.7	27.0	22.3
2"	8	36.0	28.7	36.8	30.4
3"	9.4	95.0	71.5	92.4	75.2
4"	10.75	158	130.0	158.5	130.7

"Y Globe," Handwheel dimensions and valve weight

Size (inches)	ØE *(inches)*	Y Globe, Jacketed with Handwheel Gross Weight (lbs)	Y Globe, Non-Jacketed with Handwheel Gross Weight (lbs)	Y Globe, Non-Jacketed with Handwheel Gross Weight (lbs)	Y Globe, Bare Stem Non- Jacketed Gross Weight (lbs)
½ "	6.5	14.4	11.3	13.7	10.6
¾"	6.5	15.2	12	14.4	11.3
1"	6.5	15.5	12	16.7	11.3
1 ½"	6.5	24.6	19.2	26.4	21.0
2"	8	33.5	26.7	35.4	28.1



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