

Instruction and Operation Manual

Bellows Sealed Globe Valve

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1. General

Thanks for your selection of DAGO's globe valve. As a type of pressure equipment, valve has potential hazards of pressure and creation of explosive atmosphere resulting from leakage of process fluid. For the safety purpose, user shall read this instruction to know what DAGO has already taken into account in our design and manufacture, and what action shall be taken by user according to essential health and safety requirements of European Directive 2014/68/UE(PED).

2. Product description

For Thermal oil system and steam system, we design bellows sealed valves, Double wall bellows seal as standard, zone leakage and long working life, all those advantages guarantee your system more safety. Below we introduce DAGO bellows sealed valves:

Bellow construction

The bellow cartridge is welded to both the Valve Bonnet and the Valve stem. The bellow cartridge has a number of convolutions and these convolutions become compressed or expanded depending upon the movement of Valve stem. (Scientifically speaking the bellow gets compressed when the Valve is in the open position and expanded when the Valve is in the closed condition). It is important to properly install the Valve bodies. The bellow can be sealed to the Valves in two different ways. Firstly, the bellow can be welded to the Valve stem at the top and the Valve body on the bottom. In this case the process fluid is contained inside the bellow or in second method the bellow is welded to the Valve stem at the bottom and the body on the top. In this case the process fluid is contained in the annular region between the Valve Bonnet and bellow (from the outside).

The bellow is a critical component and forms the heart of the bellow seal Valves. To avoid any twisting of the bellow the Valve must have a stem with linear movement only. This can be achieved using a so-called sleeve-nut at the Yoke portion of the Valve Bonnet. A handwheel is fitted into the sleeve-nut which effectively transfers a rotary motion of the handwheel into a linear motion in the Valve stem.

Bellow design

The multi-ply bellow design is preferred for handling higher pressure fluids (generally two or three plies of the metal wall). A two ply bellow can increase its pressure rating by 80% to 100% as compared to a single ply bellow of the same thickness. Alternatively, if a single ply bellow of a thickness equivalent to a pressure rating of a two ply bellow is used, the stroke length is reduced. Thus, a multi-ply bellow design offers a distinct advantage over a single ply bellow. It is clear that the bellow is subject to metal fatigue and this fatigue can induce weld failure. The bellow fatigue life is affected by the material of construction, fabrication technique, stroke length and stroke frequency, in addition to the usual parameters such as fluid temperature and pressure.

3. Application Scope and Technical Parameters

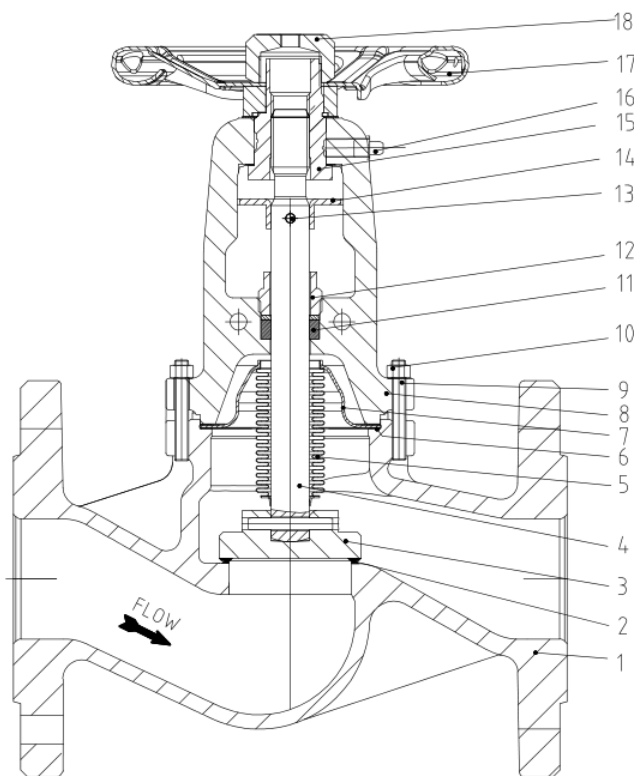
3.1 Application Scope

- industry
- heating
- refrigeration and air conditioning
- hot and cold industrial water
- industrial oils
- steam
- compressed air

3.2 Technical Parameters

Design standard:	DIN EN 13709 : 2003
Face to face:	DIN EN 558-1 : 1995
Flange connection :	DIN EN 1092-1 : 2002
Test & inspection:	DIN EN 12266 : 2003
Nominal size:	DN15 to DN400
Nominal pressure:	PN16,PN25,PN40
Body materials:	Pls see table 1
Working temperature:	Pls see table 2

4. Valve Structure



5. Main Parts and Material

The user or the pipeline system designer must select valve body material and the class according to the working temperature, working pressure, the fluid and standard temperature-pressure rating as specified in Table 2. The manufacturer takes only the responsibilities for use the order material and the valve class, no responsibility for incoherence of user selected material and valve class with the working condition.

Table 1: Main parts and material

PART NAME		MATERIAL		
1	Body	WCB GS-C25/1.0619	CF8 1.4308	CF8M 1.4408
2	Seat	X20Cr13(Overaly)	Stellite.6	Stellite.6
3	Disc seat surface	X20Cr13(Overaly)	SS304	SS316
4	Stem	X20Cr13	F304	F316
5	Bellows	SS304/SS316 /SS321/SS316Ti	SS304/SS316 /SS321/SS316Ti	SS304/SS316 /SS321/SS316Ti
6	Gasket	SS+Grapihite	SS+Grapihite	SS+Grapihite
7	Bellows cover	SS304/316	SS304	SS316
8	Bonnet	GS-C25/1.0619	CF8/1.4308	CF8M/1.4408
9	Nut	A194 2H	A194 8	A194 8M
10	Bolt	A193 B7	A193 B8	A193 B8M
11	Packing	Graphite	Graphite	Graphite
12	Gland	SS410	SS410	SS410
13	Pin	SS410	SS410	SS410
14	Guide piece	C.S	C.S	C.S
15	Stem nut	GGG40.3	Cu-alloy	Cu-alloy
16	Grease nipple	Cu-alloy	Cu-alloy	Cu-alloy
17	Handwheel	Steel	Steel	Steel
18	Lock nut	C.S	C.S	C.S

6. P/T DATA

Working pressure should be adapted to maximum medium temperature according to the table as below.

Table 2: P/T Data

Material	PN	DIN EN PRESSURE(BAR) /TEMPERATURE RATINGS VALVE BODY MATERIALS															
		-29 to 38 °C	50	100	150	200	250	300	350	400	425	450	500	538	550	575	600
1.0619 GS-C25	PN 16	15.9	15.7	15.3	14.8	14.1	13.2	12.2	10.8	9.8	8.8	-	-	-	-	-	-
	PN 25	24.8	24.6	24.0	23.8	23.2	21.6	19.6	17.6	15.7	13.7	-	-	-	-	-	-
	PN 40	39.8	39.1	37.3	34.7	30.2	28.4	25.8	24.0	23.1	21.6	-	-	-	-	-	-
1.7357 WC6	PN 16	15.9	15.3	16.3	15.8	14.9	14.3	13.3	12.3	11.5	11.1	10.7	8.9	6.8	3.5	2.8	2
	PN 25	24.6	23.8	25.4	24.8	23.3	22.3	20.8	19.3	18	17.4	16.7	13.9	10.6	5.5	4.3	3.2
	PN 40	39.8	39.1	40.7	39.6	37.4	35.7	33.3	30.9	28.9	27.7	26.7	22.3	17	8.8	6.9	5.2
1.4408 CF8M	PN 16	15.2	14.3	13.3	12	11	10.2	9.6	9.1	8.7	8.6	8.6	8.3	-	-	-	-
	PN 25	24.3	23.1	20.7	18.7	17.2	16	15	14.2	13.6	13.5	13.4	13	-	-	-	-
	PN 40	39.4	37.6	33.2	29.9	27.6	25.6	24.1	22.7	21.8	21.6	21.4	20.8	-	-	-	-

The kind of working medium makes some materials to be use or to be prohibited for use. Valves were designed for normal working conditions. In the case that working conditions exceed these requirements (for example for aggressive or abrasive medium) user should ask manufacturer before placing an order. When selecting the valve for specific medium, "List of Chemical Resistance" can be helpful. It can be found at manufacturer website near catalogue cards.

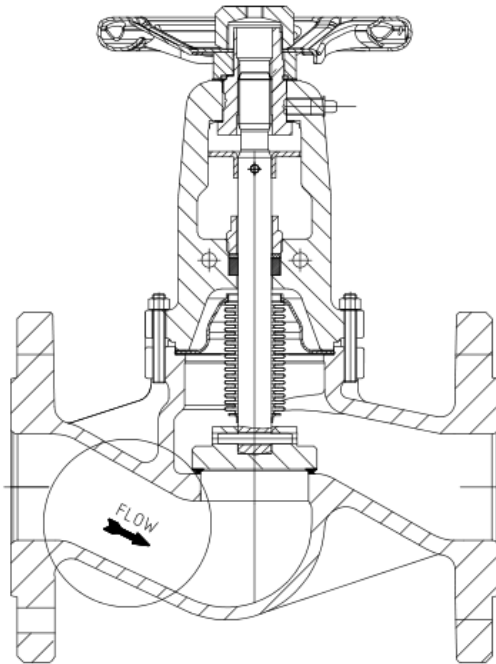
7. Potential Failure and Troubleshooting

Failure	Causes	Solutions
No flow	Valve closed	Open the valve
	Flange dust caps were not removed	Remove dust caps on the flanges
Poor flow	Valve is not open enough	Open the valve
	Dirty filter	Clean or replace the screen
	Clogged pipeline	Check the pipeline
Control difficulties	Dry stem	Grease the stem
	Gland packing tighten too much	Slightly slacken gland nuts. Put attention to keep stuffing box tightness
Stem leakage	Bellow damage	Tighten the gland until tightness will be reached. Replace upper part of the valve as soon as possible.
Seat leakage	Shut off not correct	Tighten the handwheels without any auxiliary tools
	Seat or disc damage	Replace the valve and contact supplier or manufacturer
	Pressure difference too much	Apply valve with balancing disc. Check if the valve was assembled according to arrow direction marked on the valve.
	Medium polluted with solid particles	Clean the valve. Fit strainer before the valve.
Broken connecting flange	Bolts tighten unevenly	Replace the valve with new one

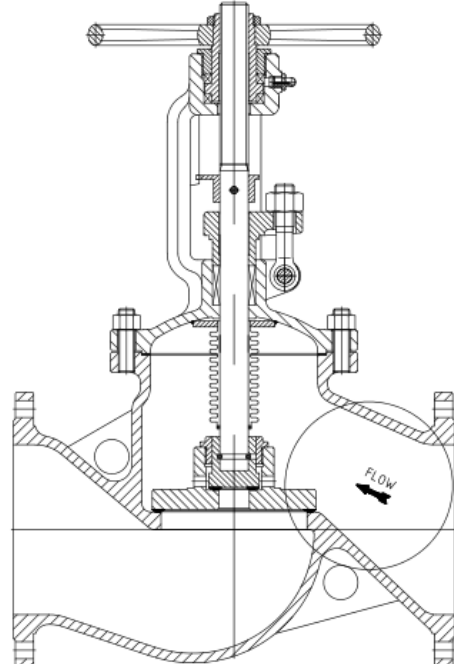
8. Arrow on body

It should be take note of medium flow direction, marked with an arrow on the body and flow direction is established by the followings rules:

DN15 TO DN200



DN250 TO DN400



9. Valve Installation

9.1 Carefully check valve identification against valve specifications before installation. Always keep the fluid flow direction with the arrow identified on the body.

9.2 Check the inside of bore and the sealing surface before installation, any attached dirty shall be removed with clean soft cloth.

9.3 Check the operational of actuator to prevent block before installation.

9.4 Valve operation device is recommended to be installed at location 1.2m from the ground for convenient of operation. Where the center of valve and the hand-wheel is over 1.8m from the ground, a platform shall be built for the frequently operated valve. For pipeline with Operation and Maintenance Manual off. DAGO is not responsible for damage, loss or expense arising out of.

9.5 numbers of valves, valves shall be installed on the same platform as likely as possible for convenient of operation. For single valve installed at location over 1.8m and less operated, apparatus may be used such as chain-wheel, extension bar, move platform and move ladder etc. Where valve is installed underground, extension bar or ground-well shall be set. For safety reason, the ground-well shall be covered.

9.6 For valve installed on horizontal pipeline, the stem is suitable at uprightness position; or, the downward stem shall be inconvenience for operation and maintenance, as well the

valve is liable to corrosion. If the ground valve slant installed, operation and maintenance shall also be inconvenience.

9.7 When valves are installed in pipeline side by side, enough space shall be considerate for operation, maintenance and dismantle. The clearance of hand-wheels shall not less than 100mm; in case of narrow clearance, valves shall be installed interleaving.

9.8 For valve with flange end, user shall select proper bolt, gasket according to the working temperature, working pressure and fluid, equally fasten the bolts and nuts. Bolt shall be with full thread and 8UN serial thread shall be used for bolt over 1 inch in diameter.

9.9 For valve with butt-welding end, user shall perform welding and post welding heat treatment using qualified WPS and welder in accordance with the requirements of ASME B31.3.

10. Valve Operation and Maintenance

10.1 After installation and for the pressure test of the pipeline or the system, the disc must be fully opened. It is not recommended to use the valve as adjustment of flow rate or emergent pressure relief blow-such usage.

10.2 Usually globe valves have no heat insulation structure, never touch the surface of valves to prevent burn when the valve has a high/low surface temperature.

10.3 Dust, grease and medium residual trend to accumulate at the surfaces of body, and moving parts such as stem, gearbox, the guide of yoke etc., wear and erode the valve, and even generate friction heat that is dangerous in explosive atmosphere, and shall be cleaned frequently according to the working conditions.

10.4 After put into service, valve shall be checked and maintained periodically especially for the situation of sealing surfaces and worn, the age of packing and the corrosion of body. In Operation and Maintenance Manual for loss caused out of part produced other than DAGO. he part to DAGO's technical documentation. DAGO takes no responsibility case of such situation, valve shall be repaired or replaced. It is suggested that inspection and maintenance of valve shall be perform every three months provided the fluid is water or oil, every month or to local law provided the fluid is strong corrosive.

10.5 When performing Repair/maintenance operations, user shall use valve packing, gasket, bolt and nut of the same size and material as the original one. Valve packing and gasket may be ordered as spare parts for maintenance and replacement. It is forbidden to open the bonnet or replace the bolt, nut or packing when the valve contains pressure. After replacement of packing, gasket, bolt and nut, valve shall be closure test prior to reuse.

10.7 User may repair the valve-sealing surface providing a successful closure test is performed and the sealing is ok.

10.8 Generally valve trim prefers replacement to reparation. It is better to use provided part as replacement. If part produced by valve manufacturer is not available due to emergency, user shall produce t

10.9 It is not recommended for reparation of valve pressure-containing part by user. If the pressure-containing part is used for a long time and consequently defection occurs and affect safety use, user shall replace the valve with a new one.

10.10 Welding repair on valve online is forbidden.

10.11 The online valve shall not be knocked, walked on or used as weight support.

11. Quality Warranty

12.1 DAGO warrants its valves to the original purchaser for a period of 18 months from and after the date of delivery to the original customers, against defects in material and workmanship under proper and normal use and service and not caused or resulting from improper application or usage, improper installation, improper maintenance and repairs, modifications or alterations.

12.2 Purchaser shall give notice to DAGO upon finding of any defect or assuming defect, DAGO has privilege to check the facts of the defect.

12.3 DAGO sole obligation under this warranty shall be limited to the follows:

- Repair of the material or,

- Replacement of the parts and materials or,

- Refund the purchase price or collect the defected products from the original purchaser.

12.4 DAGO is not responsible to claims caused from unexpected natural disaster such as earthquake, typhoon of any kind arising out of the defect.

12.5 The scope and limitation of warranty can be changed through the agreement between DAGO and purchaser.

13. Servicing

13.1 Where contractually specified, DAGO may provide field installation and adjustment.

13.2 DAGO will trace the quality of sold valves and provide service to customer requirements.