

Globe Valves

Operation Instruction

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1. Forewords

- 1.1 Thanks for your selection of Geko'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 Geko 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 97/23/EC(PED) and 94/9/EC (Atex).

2. Essential health & safety requirements of PED/Atex and solution

- 2.1 What's Geko design idea
- Globe valve is designed as standard product, no consideration of each specific service condition since its too wide.
 - Globe valve is designed to BS1873, valve has adequate strength according to ASME B16.34 pressure-temperature rating. The globe valve was EC-type approved by European Notified Body.
 - Valve has different sealing materials in accordance with BS1873, which are corrosion/wear resistance to certain type of fluid.
 - Valve contains no light metal (such as Mg) and all parts are electricity conductive and connected together to prevent ignite resource.
 - Valve is designed with hand wheel, or gear operator or electric actuator according to its size and torque, and operation requirements.
- 2.2 What action user shall taken
- 2.2.1 General
- 2.2.1.1 In any occurrence, first ensure personnel safety.
- 2.2.1.2 Use the valves in accordance with ASME B16.34 pressure-temperature rating.
- 2.2.1.3 Make sure that the selected valve materials are corrosion/wear resistance to the service fluid.
- 2.2.1.4 Where the service fluid is flammable/explosive, to limit the working temperature.
- 2.2.1.5 When performing Repair/maintenance operations, make sure that the valves are always depressurized, vented and drained.
- 2.2.1.6 For actuator operated valves, make sure all supply lines (Electrical, hydraulic, Air) are disconnected before starting any operation.
- 2.2.1.7 When performing Repair/maintenance operations, always use appropriate protection e.g. protective clothing, (oxygen) masks, gloves, etc.
- 2.2.1.8 When performing Repair/maintenance operations, do not smoke, do not use any portable no-Ex-proof electrical device in the area and do not use open fire without a valid work permit.
- 2.2.1.9 Valve must periodically checked on:

- Tightness of bolted connection (body/bonnet, gland, flange connection).
- Corrosion/wear damages (crack, pitting, thickness of the valve).
- Make sure the valves are in fully open/fully closed position.

2.2.2

Specifics

Risk	Preventive Action
Accidental contact with dangerous service fluid* Due to: Gasket or Packing Blow out	1. See 2.2.1 General
	2. Immediately replace Gasket and packing after a Blow-out (use approved/suitable materials only)
	3. Use recommended torque as in Table 11 and Table 12
Accidental contact with dangerous service fluid* during disassembly or maintenance operations	1. See 2.2.1 General
	2. After removal from the production line, open and close valve to guarantee depressurized cavity.
	3. Drain any remainder fluid or substances with suitable devices before disassembly.
Structural yielding of valves body with consequent risk of contact with dangerous service medium*, explosion or fire	1. See 2.2.1 General
	2. Create precautions to avoid additional forces on the valves
	3. Avoid absolutely water hammer: install precaution devices if necessary (e.g. brakes, anti shock devices, etc.)
	4. Avoid submitting excessive vibrations to the valves.
	5. Avoid quick Pressure and/or Temperature deviations.
Accidental contact with High or Low temperature parts	1. See 2.2.1 General
	2. Predispose apposite insulation on the valve.
	3. Alert by means of warning signs about risk of burns.
	4. For Cryogenic-/High Temperature service use only valves equipped with Cryogenic-/High Temp. Extension.
Fire or explosion in case of service with flammable fluids	1. See 2.2.1 General
	2. Install only Ex-proof electrical devices in the area
	3. While performing maintenance in the area, shut down all electrical devices.
Explosion in case of oxygen service	1. See 2.2.1 General
	2. Install only Ex-proof electrical devices in the area
	3. Install and use only valves completely degreased.
	4. Use valves only made with materials suitable for oxygen service (see EN 1797-1)

* Dangerous service fluid as there are: Toxic-, Corrosive-, Flammable-, High- or Low temperature etc. fluid

3. Scope and Technical Parameters

3.1 Scope

The series valves are widely used in petroleum, chemical, power plant and allied industries for normal operation of pipeline system by cut off or connect the pipeline.

3.2 Technical Parameters:

Design standard: BS1873, ASME B16.34

Flange dimension: ASME B16.5
 Structure length: ASME B16.10
 Nominal pipeline size: 50~450 mm (2~18")
 Nominal pressure: 20~420 bars (150~2500LB)
 Temperature range: see Table 9
 Medium: see Table 9
 Body material: ASTM material, see Table 7
 Trim material: API 600 trim material, see Table 8
 Valve testing: API598

4. Valve Structure

Please refer to Figure 1 and 2 for valve structure, Table 1 to 6 for connection and main outline dimensions.

Table 1 DN50~450 (2~18") 20bars(150LB) globe valve connection and outline dimensions

DN	L	d	G	C	D	B	n-d1	W	H Open	H Close	Weigh kg
50	203	51	92	120.5	152	15.9	4-19	200	338	317	21
65	216	64	105	139.5	178	17.6	4-19	250	373	348	28
80	241	76	127	152.5	190	19.1	4-19	250	396	368	35
100	292	102	157	190.5	229	23.9	8-19	300	467	430	58
125	356	127	186	216	254	23.9	8-22	350	497	454	82
150	406	152	216	241.5	279	25.4	8-22	350	524	473	100
200	495	203	270	298.5	343	28.5	8-22	400	588	525	160
250	622	254	324	362	406	30.3	12-25	500	738	662	253
300	698	305	381	432	483	31.8	12-25	560	862	772	398
350	787	337	413	476	533	35.1	12-29	610	950	830	550
400	914	387	470	539.5	597	36.6	16-29	610	994	860	724
450	978	438	533	578	635	39.7	16-32	610	1140	994	1400

Table2 DN50~400 (2~16") 50bars(300LB) globe valve connection and outline dimensions

DN	L	d	G	C	D	B	n-d1	W	H Open	H Close	Weigh kg
50	267	51	92	127	165	22.4	8-19	200	534	332	25
65	292	64	105	149.5	190	25.4	8-22	250	436	410	38
80	318	76	127	168	210	28.5	8-22	250	421	392	49
100	356	102	157	200	254	31.8	8-22	350	496	459	76
125	400	127	186	235	279	35.1	8-22	450	620	570	125
150	444	152	216	270	318	36.6	12.22	500	675	625	168
200	559	203	270	330	381	41.2	12-25	560	912	845	282
250	622	254	324	387.5	444	47.8	16-29	600	949	873	385
300	711	305	381	451	521	50.8	22-25	650	1032	943	724
350	838	337	413	514.5	584	53.9	20-32	610	1130	1015	1125
400	864	387	470	571.5	648	57.2	20-35	610	1310	1112	1650

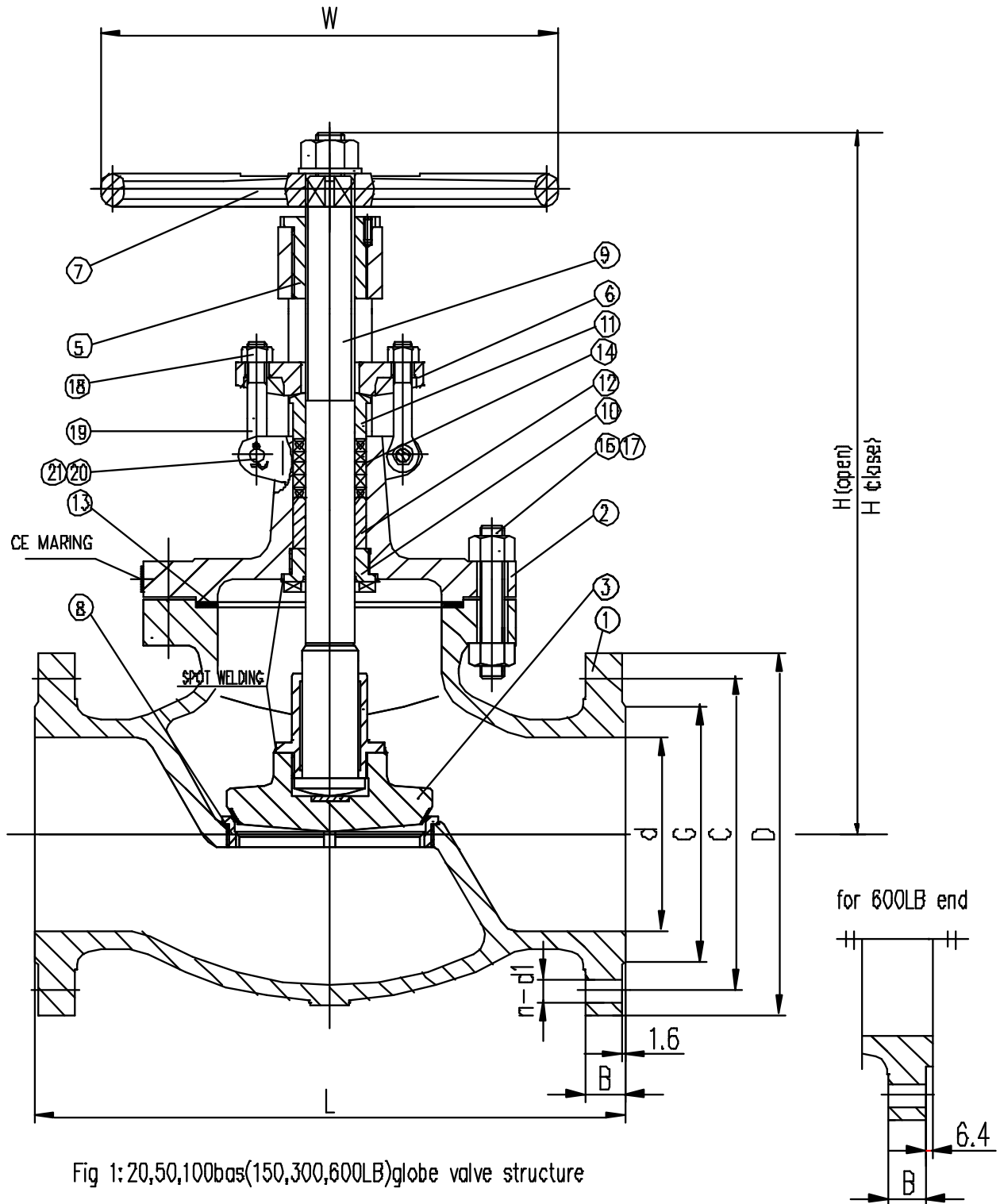


Fig 1: 20,50,100bas(150,300,600LB)globe valve structure

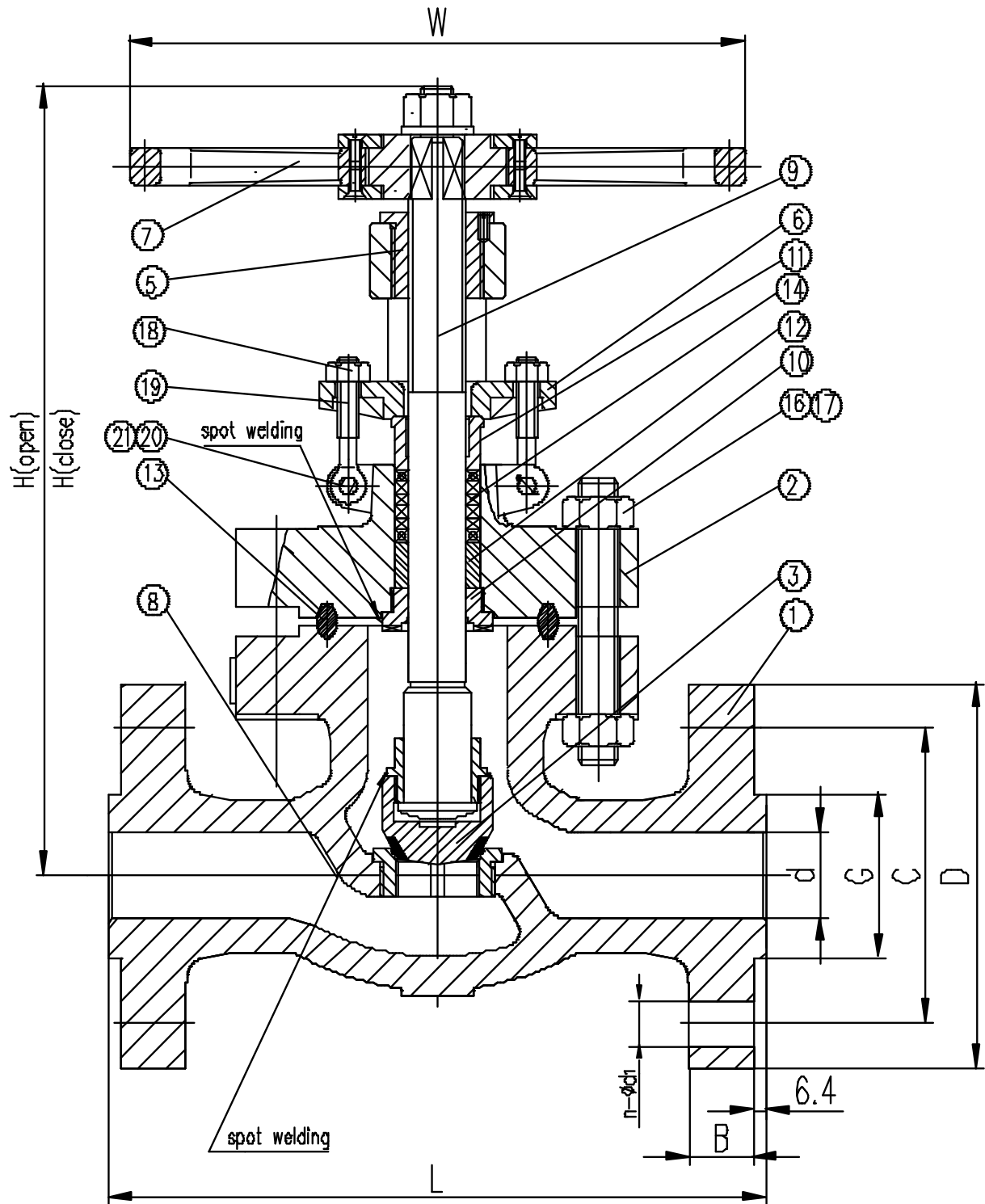


Fig 2:150,250,420bas(900,1500,2500LB)globe valve structure

Table3 DN50~400 (2~16") 100bars(600LB) globe valve connection and outline dimensions

DN	L	d	G	C	D	B	n-d1	W	H Open	H Close	Weigh kg
50	292	51	92	127	165	25.4	8-19	250	397	375	36
65	330	64	105	149.5	190	28.5	8-22	300	502	476	50
80	356	76	127	168	210	31.8	8-22	350	496	467	78
100	432	102	157	216	273	38.1	8-25	450	599	562	120
125	508	127	186	266.5	330	44.5	8-29	500	701	652	187
150	559	152	216	292	356	47.8	12-29	560	791	741	284
200	660	200	270	349	419	55.7	12-32	458	932	872	543
250	787	248	324	432	508	63.5	16-35	700	1040	965	700
300	838	298	381	489	559	66.6	20-35	610	1280	1190	900
350	889	327	413	527	603	69.9	20-38	610	1450	1281	1620
400	991	375	470	603	686	76.2	20-41	610	1610	1482	2160

Table4 DN50~200(2~8") 150bars(900LB) globe valve connection and outline dimensions

DN	L	d	G	C	D	B	n-d1	W	H Open	H Close	Weigh kg
50	368	47	92	165.0	216	38.1	8-25	350	590	563	75
65	419	57	105	190.5	244	41.2	8-29	350	660	625	112
80	381	73	127	190.5	241	38.1	8-25	450	699	670	85
100	457	98	157	235.0	292	44.5	8-32	500	795	758	158
125	559	121	186	279.5	349	50.8	8-35	610	907	861	250
150	610	146	216	317.5	381	55.7	12-32	610	1108	1051	360
200	737	191	270	393.5	470	63.5	12-38	610	1184	1113	597

Table 5 DN50~200(2~8") 250bars(1500LB) globe valve connection and outline dimensions

DN	L	d	G	C	D	B	n-d1	W	H Open	H Close	Weigh kg
50	368	47.5	92	165.0	216	38.1	8-25	350	592	573	75
65	419	57	105	190.5	244	41.2	8-29	350	660	637	112
80	470	70	127	203.0	267	47.8	8-32	500	692	664	179
100	546	92	157	241.5	311	53.9	8-35	560	795	760	299
125	673	111	186	292.0	375	73.2	8-41	610	853	816	332
150	705	136	216	317.5	394	82.6	12-38	610	1278	1225	462
200	832	178	270	393.5	483	92.0	12-45	610	1960	1894	830

Table 6 DN50~200(2~8") 420bars(2500LB) globe valve connection and outline dimensions

DN	L	d	G	C	D	B	n-d1	W	H Open	H Close	Weigh kg
50	451	38.1	92	171.5	235	50.8	8-29	400	720	700	141
65	508	47.0	105	197.0	267	57.2	8-32	500	800	778	214
80	578	57.0	127	228.5	305	66.6	8-35	560	885	862	238
100	673	73.0	157	273.0	356	76.2	8-41	610	1260	1232	644
125	794	92.0	186	324.0	419	92.0	8-48	610	1505	1474	1203
150	914	111.0	216	368.0	483	108.0	8-54	610	1905	1865	1700
200	1022	146.0	270	438.0	552	127.0	12-54	610	2645	2692	3950

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 type of fluid and standard temperature-pressure rating as specified in ASME B16.34. 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.

Table7 Valve main parts and material

No Parts Name	Materials								
1 Body	ASTM A216-WCB	ASTM A352-LCB	ASTM A352-LCC	ASTM A217-WC6	ASTM A217-WC9	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
2 Bonnet	ASTM A216-WCB	ASTM A352-LCB	ASTM A352-LCC	ASTM A217-WC6	ASTM A217-WC9	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
4 Yoke	ASTM A216-WCB	ASTM A352-LCB	ASTM A352-LCC	ASTM A217-WC6	ASTM A217-WC9	ASTM A351 CF8			
5 Stem nut	ASTM A439-D2								
6 Grand flange	ASTM A216-WCB	ASTM A352-LCB	ASTM A352-LCC	ASTM A217-WC6	ASTM A217-WC9	ASTM A351 CF8			
7 Hand-wheel	DUCTILEIRON								
11 Grand	ASTM A276 420								
13 Gasket	150~600LB, STAINLESS STEEL WINDING GASKET					900~1500LB, METAL GASKET			
14 Packing	GRAPHITE								
15Retaining nut	CARBON STEEL					ASTM A276 304			
16 Bolt	ASTM A193 B7	ASTM A320 L7M	ASTM A320 L7M	ASTM A193 B16	ASTM A193 B16	ASTM A193 B8			
17 Nut	ASTM A194 2H	ASTM A320 7M	ASTM A320 7M	ASTM A194 4	ASTM A194 4	ASTM A194 8			
18 Eyebolt	ASTM A193 B7	ASTM A320 L7M	ASTM A320 L7M	ASTM A193 B16	ASTM A193 B16	ASTM A193 B8			
19 Nut	ASTM A194 2H	ASTM A320 7M	ASTM A320 7M	ASTM A194 4	ASTM A194 4	ASTM A194 8			
24 Pin	CARBON STEEL	STAINLES S STEEL	STAINLES S STEEL	STAINLES S STEEL	STAINLES S STEEL	STAINLESS STEEL			

Table8 Common used trim material

API 600 Trim No.	Seat ring	Disc sealing	Stem	Back seat	Lantern ring
1	ER410	ER410	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
2	304	304	ASTM A182 F304	ASTM A182 F304	ASTM A182 F304
5	STL	STL	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
8	STL	ER410	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
9	Monel	Monel	Monel	Monel	Monel
10	316	316	ASTM A182 F316	ASTM A182 F316	ASTM A182 F316
12	STL	316	ASTM A182 F316	ASTM A182 F316	ASTM A182 F316

Table9 body material suitable for fluid and temperature range

	ASTM A216-WCB	ASTM A352-LCB	ASTM A352-LCC	ASTM A217-WC6	ASTM A217-WC9	ASTM A351-CF8	ASTM A351-CF8M	ASTM A351-CF3	ASTM A351-CF3M
RECOMMEND TEMPERATURE LIMITS	-29~427 (T2~T6) EN13463-2001(E)	-46~343 (T2~T6) EN13463-2001(E)	-46~343 (T2~T6) EN13463-2001(E)	-29~593 (T1~T6) EN13463-2001(E)	-29~593 (T1~T6) EN13463-2001(E)	-29~537 (T1~T6) EN13463-2001(E)	-29~537 (T1~T6) EN13463-2001(E)	-29~427 (T2~T6) EN13463-2001(E)	-29~454 (T1~T6) EN13463-2001(E)
APPLICATION	STEAM, WATER, OIL VAPOUR, GAS and GENERAL SERVICE	LOW TEMPERATURE SERVICE STEAM, WATER, OIL VAPOUR, GAS		HIGH TEMPERATURE SERVICE STEAM, WATER, OIL VAPOUR, GAS		HIGH and LOW TEMPERATURE SERVICE CORROSION RESISTANCE			

Note: where the process fluid is flammable/explosive, it must limit the working temperature of the pipeline system.

6. Working Principle and Structure Description

6.1 Working principle

The series is globe valves. When hand-wheel rotate clockwise, the disc descends and the valve shuts off; when rotate counter clockwise, the disc ascends and the valve opens.

6.2 Structure description

6.2.1 Flange end or but welding end may be selected as to purchaser optimum.

6.2.2 Packing seal structure and flexible graphite combination packing is used for the series valve.

6.2.3 Class 150LB to 600LB valves use stainless steel graphite winding gasket and 900 to 1500LB valves use loop metal gasket.

6.2.4 Cone sealing is used for the valve and the seal material is selected to API 600 or to the customer requirements.

6.2.5 For big valve, hand-wheel is replaced by gear operator, electric actuator, hydraulic or pneumatic actuator that shall conform to associated EC Directive and bear CE marking.

7. Valve Transportation

Valves are heavy and metal products, care shall be taken to avoid physical injury during transportation. Cord and lift device and transportation tool shall be ready, valve package inspected and broken package repaired. Packaging shall conform to specification requirements, it is forbidden to rotate the hand-wheel when valve is packaged. Valve shall be in full-close status. For mis-opened valve, the sealing surface shall be cleaned and valve re-closed and ends of bore blocked. Actuator and valve shall be packaged separately.

During transportation or lifting, cord shall be tied to the yoke, no tied to the hand-wheel or stem. Valve shall be handled with care, no bump to other thing.

The paint, nameplate and flange sealing surface shall be protected during transportation, no drag valve on the ground especially with the end sealing surface contacted the ground.

Don't unpack when the valve is not ready for installation at the construction field. The valve shall be placed at a safety location against weather.

8. Valve Storage

8.1 Valve shall be stored in air and dry room with bore blanked for protection.

8.2 Long-time-stored valve shall be re-inspected prior to use. Close attention shall be paid against sealing damage when removal of dirties for the cleanness of sealing surface. Of necessary, valve shall be pressure tested once more.

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 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.
- 9.5 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.
- 9.6 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.
- 9.7 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.
- 9.8 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-off. Geko is not responsible for damage, loss or expense arising out of 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 The thickness of body and bonnet must be checked at an interval of every three months. Where the thickness is less than value in Table10, the valve must be scrapped.

Table 10 Body minimum wall thickness

	20bars 150lb	50bars 300lb	100bars 600lb	150bars 900lb	250bars 1500lb	420bars 2500lb
DN50(2")	5.59	6.35	6.35	7.88	11.18	15.75
DN65(2-1/2")	5.59	6.35	7.12	8.64	12.70	19.05
DN80(3")	5.59	7.12	7.88	10.42	15.75	22.36
DN100(4")	6.35	7.88	9.40	12.70	20.58	27.69
DN125(5")	7.12	8.64	11.18	15.00	23.12	34.04
DN150(6")	7.12	9.66	12.70	18.29	27.69	40.39
DN200(8")	7.88	11.18	15.75	22.36	35.82	52.33
DN250(10")	8.64	12.70	19.05			
DN300(12")	9.66	14.23	23.12			
DN350(14")	10.42	15.75	24.64			
DN400(16")	11.18	17.53	27.69			
DN450(18")	11.94					

- 10.5 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 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.
- 10.6 After reparation, valve shall be re-assembled and adjusted using recommended torque as listed in Table 11 and Table 12. After reassembly, valve shall be pressure tested.

Table 11 Recommended torque for flange connection bolting

Thread size	Torque (N.M)	Thread size	Torque (N.M)
1/2-13UNC	50~60	1-1/4 -8UN	850~1000
9/16-12 UNC	70~80	1-3/8-8 UN	1100~1300
5/8-11 UNC	100~130	1-1/2-8 UN	1400~1800
3/4-10 UNC	160~210	1-5/8-8 UN	1800~2200
7/8-9 UNC	280~330	1-3/4-8 UN	2200~2600
1-8 UNC	420~500	1-7/8-8 UN	2800~3300
1-1/8-8 UN	500~600	2-8 UN	3500~4200

Table 12 Recommended torque for stuff box bolting

Thread size	Torque (N.M)	Thread size	Torque (N.M)
3/8	10~20	3/4	90~110
1/2	20~30	7/8	130~150
9/16	30~40	1	160~180

5/8	50~60	1-1/8	220~250
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- 10.7 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.
- 10.8 User may repair the valve-sealing surface providing a successful closure test is performed and the sealing is ok.
- 10.9 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 the part to Geko's technical documentation. Geko takes no responsibility for loss caused out of part produced other than Geko.
- 10.10 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.
- 10.11 Welding repair on valve online is forbidden.

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

11. Potential Failure and Troubleshooting

Failure (risk)	Cause	Troubleshooting
Leakage of packing	1. Gland flange nuts loose 2. Rings of packing not enough 3. Packing aged or failure 4. Stem sealing damaged	1. Equally tighten eyebolt nuts 2. Add packing 3. Replace packing 4. Stem shall be maintained periodically by reparation or replacement conjunction with the maintenance of pipeline facilities
Leakage between sealing surfaces	1. Dirties between sealing surfaces 2. Sealing surfaces damaged	1. Clean sealing surface 2. Repair the sealing surfaces
Operation failure	1. Packing too tight 2. Thread of stem nut over worn 3. Stem bent 4. Foreigner existence between stem and stem nut or gland or gland flange	1. Proper loose gland flange nuts 2. Replace stem nut 3. Rectify or replace stem 4. Clean foreign matter
Leakage between bonnet flanges	1. Bonnet bolts loose 2. Bonnet gasket failure	1. Proper tighten bonnet nuts 2. Replace bonnet gasket
Body and bonnet broken and leaked	1. Water hammer 2. Fatigue 3. Freezing broken	1. Carefully operation to prevent suddenly stopping pumping and rapidly shutting. 2. Replace valve that exceeds guarantee period or is found with early fatigue defection 3. Drain away water in winter when valve is not used

12. Quality Warrant

- 12.1 Geko warrants its valves to the original purchaser for a period of 18 months from and after the date of delivery to the original customer, against defects in material and workmanship under proper and normal use and service and not caused of resulting from improper application or usage, improper installations, improper maintenance and repairs, modifications or alterations.
- 12.2 Purchaser shall give notice to Geko upon finding of any defect or assuming defect, Geko has privilege to check the facts of the defect.
- 12.3 Geko 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 Geko 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 Geko and purchaser.

13. Servicing

- 13.1 Where contractually specified, Geko may provide field installation and adjustment.
- 13.2 Geko will trace the quality of sold valve and provide service to customer requirements..

Service Contact:

Geko Flow Control Technology (Changzhou) Co., Ltd

Tel:0515-85503155 Fax:0515-85503133

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