

Gate Valves

Operation Instruction

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1. Forewords

- 1.1 Thanks for your selection of Geko's gate 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
- Gate valve are designed as standard product, no consideration of each specific service condition since its too wide.
 - Gate valve is designed to API 600, valve has adequate strength according to ASME B16.34 pressure-temperature rating. The gate valve was EC-type approved by European Notified Body.
 - Valve has different sealing materials in accordance with API 600, 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 shut off or connection of pipeline.

3.2 Technical Parameters:

Design standard: API600, ASME B16.34
 Flange dimension: ASME B16.5
 Structure length: ASME B16.10
 Nominal pipeline size: 50~900 mm (2~36")
 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 1,2and 3 for valve structure, Table 1 to 6 for connection and main outline dimensions.

Table 1 DN50~900 (2~36") 20bars(150LB) gate valve connection and outline dimensions

DN	L	d	G	C	D	b	n-d1	W	H open	H close	Weigh kg
50	178	51	92	120.5	152	15.9	4-19	200	386.5	326.7	18
65	190	64	105	139.5	178	17.6	4-19	200	472	401.6	25
80	203	76	127	152.5	190	19.1	4-19	250	480.5	393.9	32
100	229	102	157	190.5	229	23.9	8-19	250	584.5	471.4	50
125	254	127	186	216	254	23.9	8-22	300	710	570.3	64
150	267	152	216	241.5	279	25.4	8-22	300	765.1	601.1	77
200	292	203	270	298.5	343	28.5	8-22	350	956.1	737.6	121
250	330	254	324	362	406	30.3	12-25	400	1149	879.2	178
300	356	305	381	432	483	31.8	12-25	450	1350.5	1027.9	265
350	381	337	413	476	533	35.1	12-29	500	1519	1160	362
400	406	387	470	539.5	597	36.6	16-29	550	1718	1307	463
450	432	438	533	578	635	39.7	16-32	600	1986	1307	621
500	457	489	584	635	698	43	20-32	680	2118	1504	792
550	483	540	641	692	750	46	20-35	760	2436	1842	902
600	508	591	692	739.5	813	47.8	20-35	760	2698	2048	1190
700	610	692	800	863.5	927	71.4	24-35	610	2789	2050	1838
750	610	743	857	914.5	984	74.7	28-35	610	3148	2318	2261
800	660	781	914	978	1060	80.8	28-41	610	3281	2411	2490
900	711	876	1022	1086	1168	90.4	32-41	610	3721	2691	3310

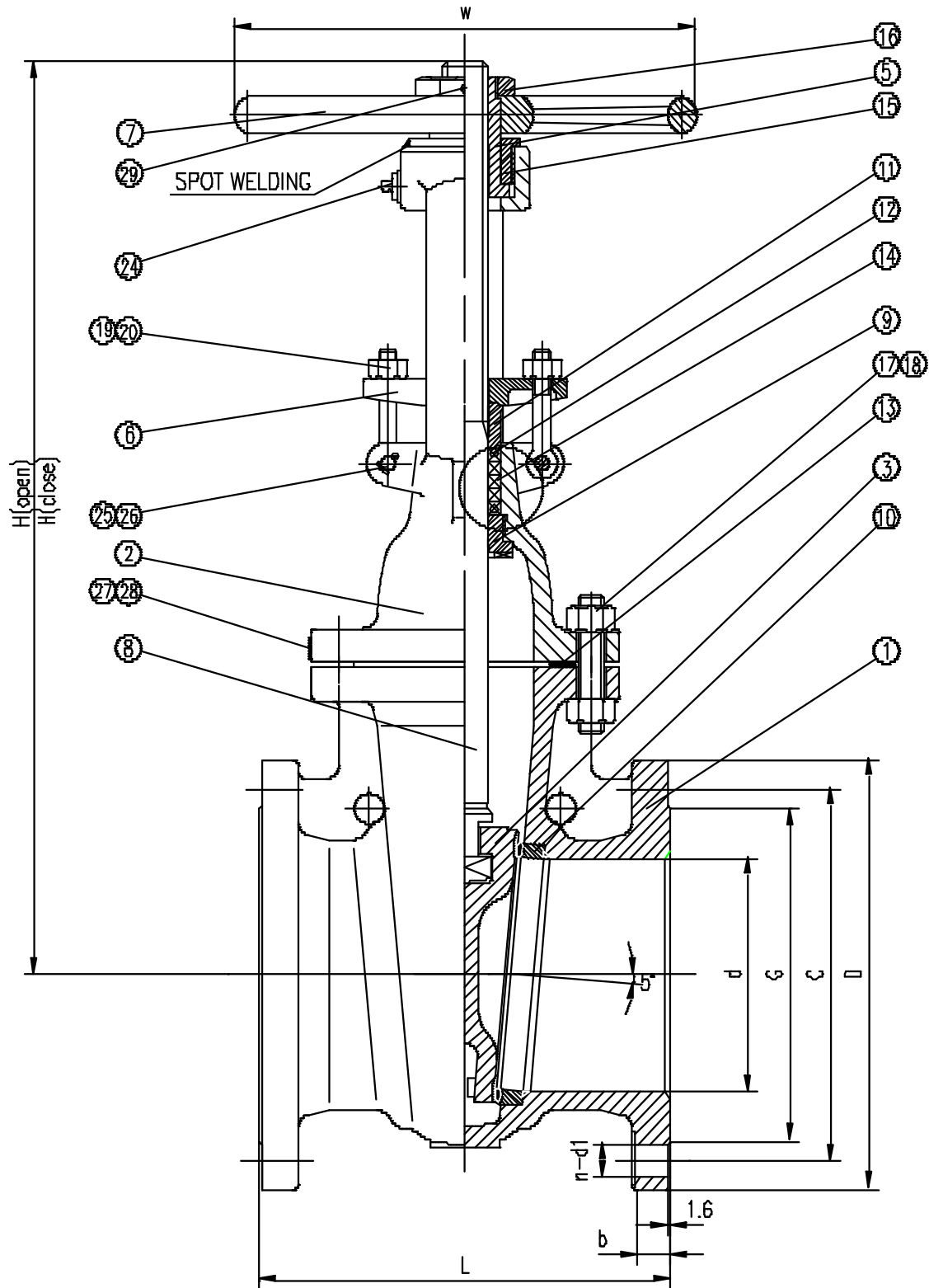


FIG.1 150LB GATE VALVE STRUCTURE

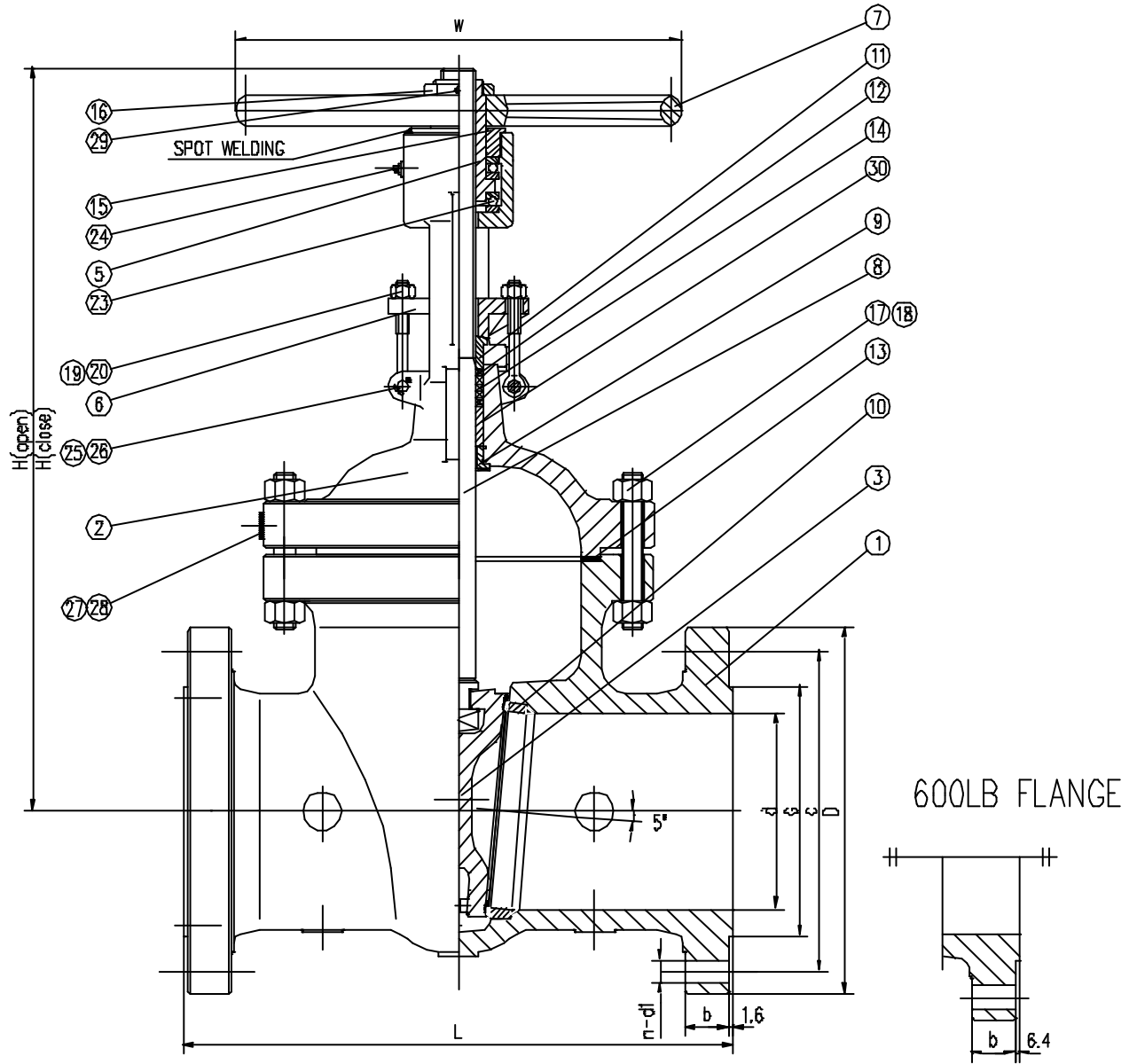


FIG.2 300,600LB GATE VALVE STRUCTURE

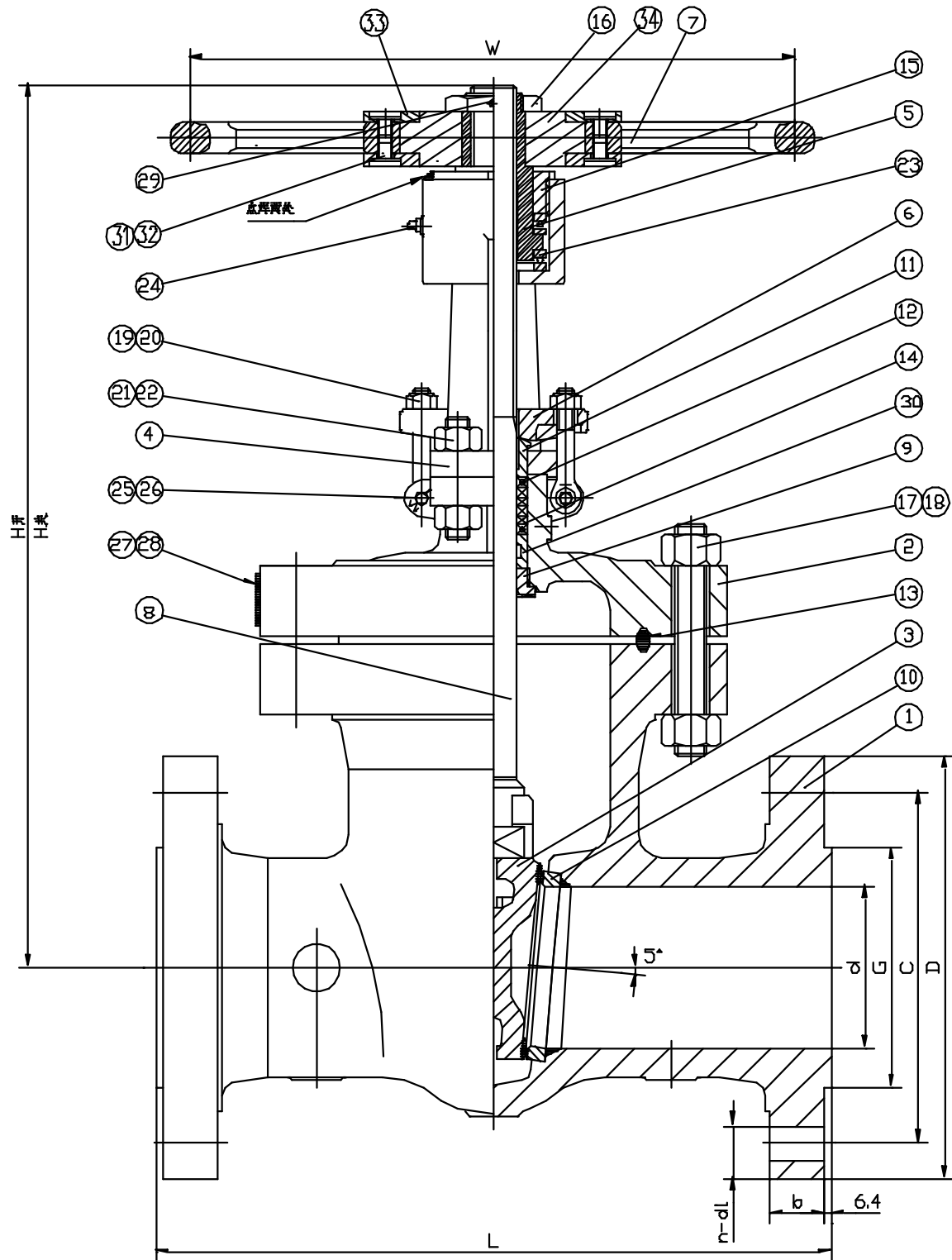


FIG.3 900,1500LB GATE VALVE STRUCTURE

Table2 DN50~750(2~30") 50bars(300LB) gate valve connection and outline dimensions

DN	L	d	G	C	D	b	n-d1	W	H Open	H Close	Weigh kg
50	216	51	92	127	165	22.4	8-19	200	410	349	23
65	241	64	105	149.5	190	25.4	8-22	200	453	378	35
80	283	76	127	168	210	28.5	8-22	250	509	422	50
100	305	102	157	200	254	31.8	8-22	250	612	497	71
125	381	127	186	235	279	35.1	8-22	300	770	630	100
150	403	152	216	270	318	36.6	12-22	350	805	639	144
200	419	203	270	330	381	41.2	12-25	400	1000	780	209
250	457	254	324	387.5	444	47.8	16-29	450	1209	937	322
300	502	305	381	451	521	50.8	22-25	500	1415	1091	482
350	762	337	413	514.5	584	53.9	20-32	460	1650	1279	683
400	838	387	470	571.5	648	57.2	20-35	460	1840	1414	950
450	914	432	533	628.5	711	60.5	24-35	610	2030	1559	1145
500	991	483	584	686	775	63.5	24-35	610	2240	1708	1634
550	1092	533	641	743	840	66.6	24-41	610	2630	2043	2141
600	1143	584	692	813	914	69.9	24-41	610	2900	2257	2660
700	1346	686	800	940	1035	90.5	28-45	610	3110	2210	3312
750	1396	737	857	997	1092	92	28-48	610	3205	2310	3597

Table 3 DN50~600 (2~24") 100bars(600LB) gate 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	200	418	357	36
65	330	64	105	149.5	190	28.5	8-22	250	476	401	52
80	356	76	127	168	210	31.8	8-22	250	518	431	67
100	432	102	157	216	273	38.1	8-25	300	646	531	112
125	508	127	186	266.5	330	44.5	8-29	400	770	627	170
150	559	152	216	292	356	47.8	12-29	450	839	671	234
200	660	200	270	349	419	55.7	12-32	500	1024	808	393
250	787	248	324	432	508	63.5	16-35	600	1229	963	610
300	838	298	381	489	559	66.6	20-35	680	1450	1133	890
350	889	327	413	527	603	69.9	20-38	610	1730	1370	1245
400	991	375	470	603	686	76.2	20-41	610	1835	1422	1530
450	1092	419	533	654	743	82.6	20-45	610	2290	1829	1967
500	1194	464	584	724	813	88.9	24-45	760	2510	2000	2450
550	1295	511	641	778	870	95.3	24-47	760	2760	2178	3010
600	1397	559	692	838	940	102.0	24-51	760	3022	2407	3620

Table4 DN50~400(2~16") 150bars(900LB) gate 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	250	498	446	74
65	419	57	105	190.5	244	41.2	8-29	300	547	484	131
80	381	73	127	190.5	241	38.1	8-25	300	573	496	101
100	457	98	157	235.0	292	44.5	8-32	350	678	575	172
125	559	121	186	279.5	349	50.8	8-35	450	780	657	283
150	610	146	216	317.5	381	55.7	12-32	500	957	731	335
200	737	191	270	393.5	470	63.5	12-38	600	1103	902	640
250	838	238	324	470.0	546	69.9	16-38	610	1345	1066	1100
300	965	282	381	533.5	610	79.3	20-38	610	1520	1197	1600
350	1029	311	413	559.0	641	85.9	20-41	610	1902	1575	2250
400	1130	356	470	616.0	705	88.9	20-45	610	2051	1677	2850

Table5 DN50~400(2~16") 250bars(1500LB) gate 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	250	498	446	74
65	419	57	105	190.5	244	41.2	8-29	300	547	484	131
80	470	70	127	203.0	267	47.8	8-32	350	603	526	165
100	546	92	157	241.5	311	53.9	8-35	500	700	608	248
125	673	111	186	292.0	375	73.2	8-41	600	840	723	
150	705	136	216	317.5	394	82.6	12-38	600	984	841	510
200	832	178	270	393.5	483	92.0	12-45	610	1146	959	921
250	991	222	324	482.5	584	108.0	12-51	610	1371	1138	1910
300	1130	263	381	571.5	673	124.0	16-54	610	1633	1357	3145
350	1257	289	413	635.0	749	133.4	16-60	610	1798	1494	4100
400	1384	330	470	705.0	826	146.1	16-67	610	1963	1616	6200

Table6 DN50~300(2~12") 420bars(2500LB) gate 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	300	563	521	130
65	508	47.0	105	197.0	267	57.2	8-32	350	573	521	200
80	578	57.0	127	228.5	305	66.6	8-35	450	582	522	245
100	673	73.0	157	273.0	356	76.2	8-41	550	870	773	490
125	794	92.0	186	324.0	419	92.0	8-48	600	950	853	702
150	914	111.0	216	368.0	483	108.0	8-54	610	1129	879	1600
200	1022	146.0	270	438.0	552	127.0	12-54	610	1389	1094	2450
250	1270	184.0	324	540.0	673	165.1	12-67	610	1748	1373	4570
300	1422	219.0	381	619.5	962	184.2	12-73	610	1873	1453	7150

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 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.

6. Working Principle and Structure Description

6.1 Working principle

The series valve is straight pattern one. When hand-wheel rotate clockwise, the gate descends and the valve shuts off; when rotate counter clockwise, the gate 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 valves use a reinforced flexible graphite gasket while 300 to 600LB valves use stainless steel graphite winding gasket and 900 to 1500LB valves use loop

metal gasket.

6.2.4 Wedge seal 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.

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										
15 Grand	CARBON STEEL					ASTM A276 304					
16 Hand- wheel nut	CARBON STEEL					ASTM A276 304					
17 Bolt	ASTM A193 B7	ASTM A320 L7M	ASTM A320 L7M	ASTM A193 B16	ASTM A193 B16	ASTM A193 B8					
18 Nut	ASTM A194 2H	ASTM A320 7M	ASTM A320 7M	ASTM A194 4	ASTM A194 4	ASTM A194 8					
19 Eyebolt	ASTM A193 B7	ASTM A320 L7M	ASTM A320 L7M	ASTM A193 B16	ASTM A193 B16	ASTM A193 B8					
20 Nut	ASTM A194 2H	ASTM A320 7M	ASTM A320 7M	ASTM A194 4	ASTM A194 4	ASTM A194 8					
21 Bolt	ASTM A193 B7	ASTM A320 L7M	ASTM A320 L7M	ASTM A193 B16	ASTM A193 B16	ASTM A193 B8					
22 Nut	ASTM A194 2H	ASTM A320 7M	ASTM A320 7M	ASTM A194 4	ASTM A194 4	ASTM A194 8					
23 Thrust bearing											
24 Grease fitting	CARBON STEEL					STAINLESS STEEL					
25 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.

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 rain and dust.

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.

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 sensibility 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 inconvenient for operation and maintenance, as well the valve is liable to corrosion. If the ground valve slant installed, operation and maintenance shall also be inconvenient.
- 9.6 When valves are installed in pipeline side by side, enough space shall be considered 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 wedge must be fully opened or fully closed. It is not recommended to partly open the valve for 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 gate valves have no heat insulation structure, never touch the surface of valves to prevent burn when the process fluid has a high/low working temperature.
- 10.3 Dust, grease and medium residual tend 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 to ensure safety operation at an interval of three months. Where the thickness is less than value in Table10, the valve must be scrapped.
- 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 performed every three months provided the fluid is water or oil, every month or to local law provided the fluid is strong corrosive.

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	26.93	43.69	65.79
DN300(12")	9.66	14.23	23.12	31.75	50.80	76.97
DN350(14")	10.42	15.75	24.64	35.06	55.63	
DN400(16")	11.18	17.53	27.69	39.63	63.50	
DN450(18")	11.94	19.05	31.00			
DN500(20")	12.70	20.58	34.04			
DN600(24")	14.48	23.88	40.39			
DN700(28")	15.75	27.18				
DN750(30")	16.77	28.96				
DN800(32")	18.2					
DN900(36")	18.93					

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

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.
- 10.12 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	<ol style="list-style-type: none"> 1. Gland flange nuts loose 2. Rings of packing not enough 3. Packing aged or failure 4. Stem sealing damaged 	<ol style="list-style-type: none"> 1. Equally tighten eyebolt nuts 2. Add packing 3. Replace packing 4. Stem shall be maintained periodically
Leakage between sealing surfaces	<ol style="list-style-type: none"> 1. Dirties between sealing surfaces 2. Sealing surfaces damaged 	<ol style="list-style-type: none"> 1. Clean sealing surface 2. Repair the sealing surfaces
Operation failure	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Proper loose gland flange nuts 2. Replace stem nut 3. Rectify or replace stem 4. Clean foreign matter
Leakage between bonnet flanges	<ol style="list-style-type: none"> 1. Bonnet bolts loose 2. Bonnet gasket failure 	<ol style="list-style-type: none"> 1. Proper tighten bonnet nuts 2. Replace bonnet gasket
Body and bonnet broken and leaked	<ol style="list-style-type: none"> 1. Water hammer 2. Fatigue 3. Freezing broken 	<ol style="list-style-type: none"> 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
Disc failed to open	<ol style="list-style-type: none"> 1. Disc blocked in the body. 2. Stem is overheated and blocks the disc. 	<ol style="list-style-type: none"> 1. Use proper torque 2. When the valve is closed and the pipeline is heated, rotate the hand-wheel some bit counter clockwise for unload at interval.

12. Quality Warrant

- 12.1 Hondel 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.
- GEKO will trace the quality of sold valve and provide service to customer requirements.

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