

THE MOST COMPREHENSIVE INDUSTRIAL SOLUTION FOR FORGED STEEL AND CAST STEEL
BALL, GATE, GLOBE, CHECK, PLUG, BUTTERFLY AND PIG VALVES

COMPLETE SOLUTIONS

YOU CAN TRUST



CHENGFENG FLOW-TECH GROUP

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CCFV-SG-1601



SLAB GATE VALVES



CHV INTERNATIONAL, INC.
CHENGDU CHENGGAO VALVE CO., LTD.
CHENGDU CHENGFENG VALVE CO., LTD.

PROFILE

CHENGFENG FLOW-TECH GROUP

Chengfeng Flow-Tech Group, headquartered in Chengdu, China, is the leading flow technology company in China. Being a high-tech group specialized in R&D, manufacturing of industrial valves, and being one of the core suppliers to Petro-China, SINOPEC and CNOOC for decades, it has transformed into a multi-dimensional group that is committed to providing the most complete solutions to the oil&gas markets. With industry-leading facilities, innovative technical teams and highly professional engineers, its top-notch services cover various realms in the energy sector – valve manufacturing and maintenance, fluids equipment solutions, flow control solutions and industrial data analytics, etc.

Chengfeng's products have been widely used in the oil&gas pipelines, petrochemical industries, aerospace industry and power stations, etc. Chengfeng's top two brands, CHV and CCFV, have established the nationwide reputation for their quality and service. Now, Chengfeng Flow-Tech Group has begun its new adventure – serving the world market.

CHENGDU CHENGGAO VALVE CO., LTD. (CHV)

CHV was founded in 1993, and has been specialized in the R&D and manufacturing of mid&high end ball valves ever since. CHV offers complete ball valve product lines. Among all the product lines, the High Pressure Large Diameter Fully Welded Ball Valves have captured more than half the domestic fully welded ball valve market. High Temperature Metal-Seated Oxygen Ball Valve and NACE Ball Valve are also leading the domestic market.

CHENGDU CHENGFENG VALVE CO., LTD. (CCFV)

CCFV was founded in 1966. Its main product lines include slab gate valves, expanding gate valves, tri-eccentric butterfly valves, check valves, globe valves and plug valves, etc. CCFV is leading the domestic slab gate valve market, taking up 70% of the oil transportation and storage sector.

CHV INTERNATIONAL, INC.

CHV International, Inc. is the newest branch of Chengfeng Flow-Tech Group. Based in Houston, Texas, U.S.A, its mission is to shorten the distance between the Group and the international market by providing faster response and better service to our customers around the globe.

CERTIFICATION

Chengfeng Flow-Tech Group's quality program is fully compliant with the industry's most stringent standards. The group holds all major certifications, including but not limited to API 6D, ISO 9001, ISO 14001, OHS 18001, CE, API 6FA, API 607 fire safety inspection certificate.

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PRODUCT RANGE

RANGE

SERVICE	SIZE (NPS/DN) – PRESSURE RANGE				
	ASME CLASS 150	ASME CLASS 300–600	ASME CLASS 900	ASME CLASS 1500	ASME CLASS 2500
Cast Steel Slab Gate valve (Z10 Series)					
Standard	1–60 25–1500	1–60 25–1500	1–48 25–1200	1–36 25–900	1–20 25–500
Low Temperature –46°C / –50°F	1–60 25–1500	1–60 25–1500	1–48 25–1200	1–36 25–900	1–20 25–500
Underground	1–60 25–1500	1–60 25–1500	1–48 25–1200	1–36 25–900	1–20 25–500
Underground – Low Temperature –46°C / –50°F	1–60 25–1500	1–60 25–1500	1–48 25–1200	1–36 25–900	1–20 25–500
High Temperature 350°C / 662°F	1–32 25–800	1–32 25–800	1–32 25–800	1–32 25–800	1–20 25–500
Compact Slab Gate Valve (Z11 Series)					
Standard	1–60 25–1500	N/A	N/A	N/A	N/A
Forged Steel Slab Gate valve (Z12 Series)					
Standard	N/A	1–60 25–1500	1–32 25–800	1–24 25–600	1–20 25–500
Low Temperature –46°C / –50°F	N/A	1–60 25–1500	1–32 25–800	1–24 25–600	1–20 25–500
Underground	N/A	1–60 25–1500	1–32 25–800	1–24 25–600	1–20 25–500
Underground – Low Temperature –46°C / –50°F	N/A	1–60 25–1500	1–32 25–800	1–24 25–600	1–20 25–500
High Temperature 350°C / 662°F	N/A	1–32 25–800	1–52 25–800	1–24 25–600	1–20 25–500

STANDARD & SPECIFICATIONS

Design Standard	API 6D, ASME B16.34
Test Standard	API 6D, API 598
End Connection	ASME B16.5, ASME B16.47, MS SP-44, ASME B31.8, ASME B16.25, etc.
Face-to-Face	API 6D, ASME B16.10
Fire Test	API 6FA
Anti-Corrosion, Acid-Resisting*	NACE MR0103, NACE MR0175, ISO 15156

*Optional, available upon request.

DESIGN FEATURES

CCFV provides high-performance products with its own patented technologies.

SPECIAL BACKSEAT DESIGN AND BLOW-OUT PROOF FUNCTION

Backseat seal design, to protect packing against washout, to prevent blow-out accidents, without stopping to transport medium, online maintenance.

DOUBLE BLOCK & BLEED

When downstream seat and gate sealing at the same time, medium pressure push upstream seat moving to downstream, upstream seat can be sealed with gate.

STEM SEALING FUNCTION

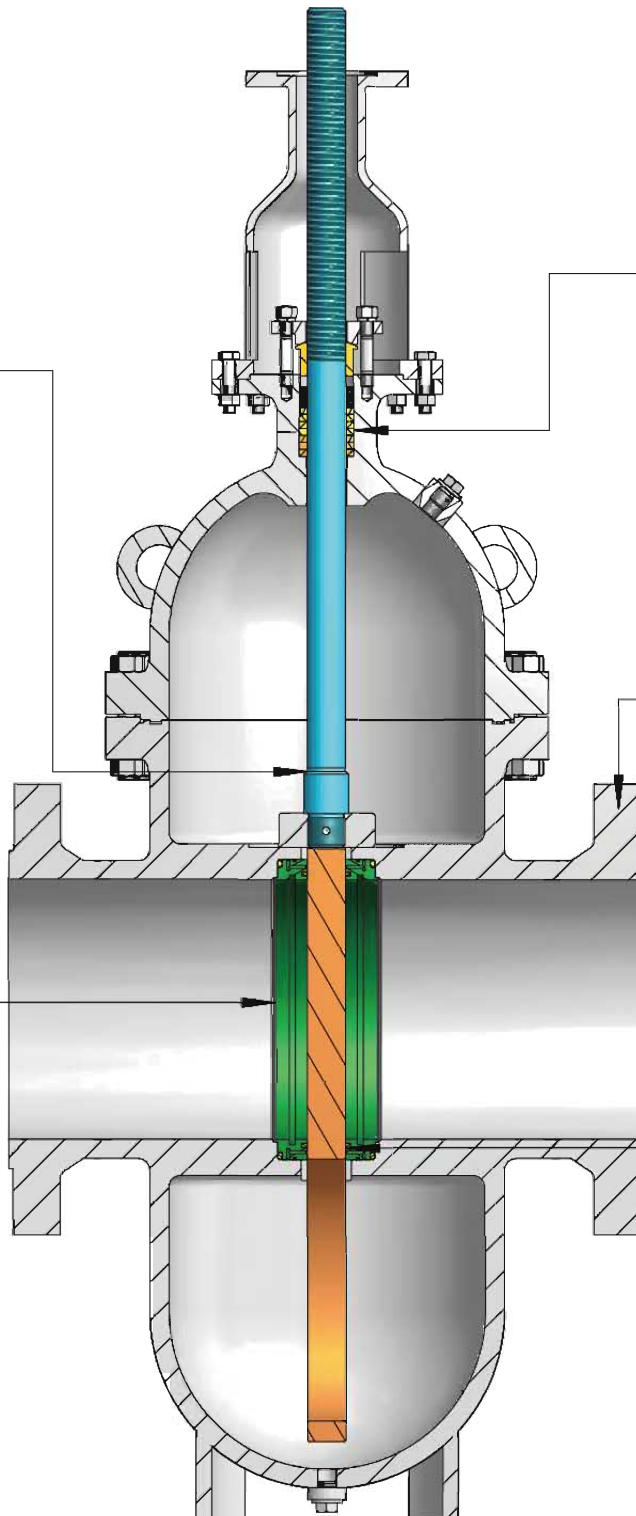
Special stem design, ensure stem sealing.

MULTIPLE BODY TYPES

Customers can select different body designs according to specific needs, from cast steel (Z10), forged steel (Z12) to compact (Z11).

SEAT SEALING & PROTECTION

With through conduit design, sealing surface is not exposed the flow passage. Sealing surface is protected, and product life is increased.



DRIVE MODES

Configurable drive modes based on customer requirements.

MULTI PURPOSES

Pipeline transport Storage Device Reservoir & Dam Irrigating...

DESIGN FEATURES

FEATURE	CAST STEEL	COMPACT	FORGED STEEL
Independent Stem & Seats	Standard	Standard	Standard
Independent Floating Seats	Standard	Standard	Standard
Soft Seat	Standard	Standard	Standard
Primary Metal Seat – Secondary Soft Seat	On Request	On Request	On Request
Metal to Metal Seat	On Request	On Request	On Request
Self Relieving Seats	Standard	Standard	Standard
API 6D Design and Construction	Standard	As Required	Standard
Face to Face Dimensions to API 6D and ASME B16.10	Standard	N/A	Standard
Fire Safe Design to API 6FA	Standard	Standard	Standard
Full, Reduced or Venturi Port	As Required	As Required	As Required
Flanged Ends – Welded Ends – Hub Ends	As Required	As Required	As Required
Transition Pups for Welded Ends Valves	On Request	On Request	On Request
Antistatic	Standard	Standard	Standard
Anti-Blowout Stem	Standard	Standard	Standard
Double Block and Bleed	Standard	Standard	Standard
Possibility to Check Seat Integrity in Line with Slab in Open or Closed Position	Standard	Standard	Standard
Double Body Seals	Standard	Standard	Standard
Triple Stem Seals	Standard	Standard	Standard
Drain Plug	Standard	Standard	Standard
Drain Valve	On Request	On Request	On Request
Vent Plug (on 6" & larger)	Standard	Standard	Standard
Vent Valve(on 6" & larger)	On Request	On Request	On Request
Emergency Sealant Injection on Stem	Standard	Standard	Standard
Emergency Sealant Injection on Seats (on 6" & larger)	Standard	On Request	Standard
Seat Pocket Overlay	On Request	On Request	On Request
Seals Area Overlay	On Request	On Request	On Request
Wetted Parts Overlay	On Request	On Request	On Request
Body Internal Lining	On Request	On Request	On Request
Extended Stem for Underground Installation	As Required	As Required	As Required
Extended Bonnet for Low or High Temperature	As Required	As Required	As Required
Locking Device	On Request	On Request	On Request
Lifting Lugs	Standard on 6" and Larger		
Supporting Feet	Standard on 6" and Larger		
Manual or Motorized Operation	As Required	As Required	As Required
In-line Maintenance	Yes	Yes	Yes
On site Maintenance	Yes	Yes	Yes

Note: Other features are available on request.

DESIGN FEATURES

SEAT SEALING DESIGN

(a) SOFT SEAT DESIGN

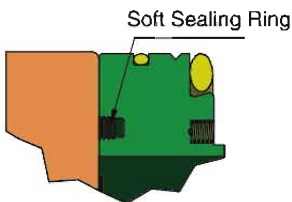
In valves designed for standard service, a resilient material is inserted into the metal seat holder to provide a soft seating action in addition to the metal to metal seating between the gate and the seat rings.

(b) METAL SEAT DESIGN

Valves designed for abrasive service or for operation in temperatures that prohibit the use of a resilient material have seating action provided by the metal to metal contact between the gate and the seat rings. According to customer's conditions and requirements, the surface of seat and gate will be surface hardening treatment by surfacing, supersonic spray, flame spray method, etc., to maintain a certain difference between the sealing surface hardness to protect the gate in switching process.

(c) PMSS SEAT DESIGN

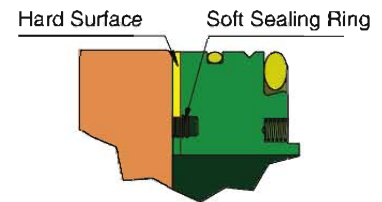
In valves designed for standard service, a resilient material is inserted into the metal seat holder to provide a soft seating action in addition to the metal to metal seating between the gate and the seat rings. meanwhile, According to customer's conditions and requirements, the surface of seat and gate will be surface hardening treatment by surfacing, supersonic spray, flame spray method, etc., to maintain a certain difference between the sealing surface hardness to protect the gate in switching process.



(a) Soft Seat Design



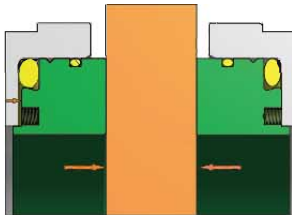
(b) Metal Seat Design



(c) PMSS Seat Design

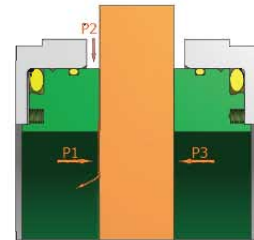
DBB DESIGN

When downstream seat and gate sealing at the same time, medium pressure push upstream seat moving to downstream, upstream seat can be sealed with gate.



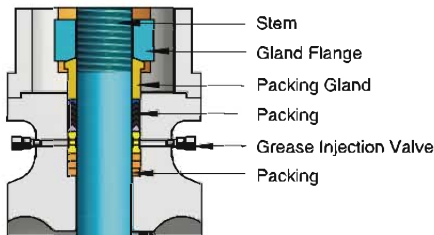
AUTOMATIC PRESSURE RELIEF

When pressure P2 increasing, $P2 > P1 > P3$, Pressure P2 push seat away from gate to release pressure in chamber.



STEM PACKING DESIGN

Unique multi-adjustable sealing structure to ensure packing sealing.

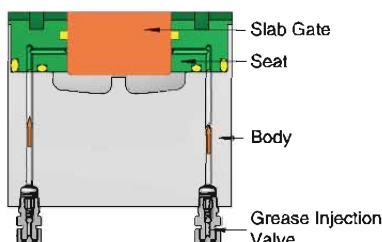


EXTENSION DESIGN

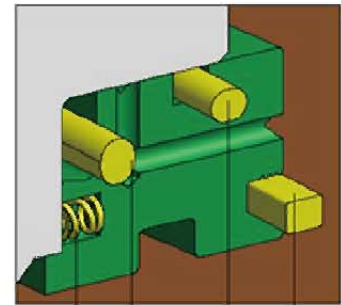
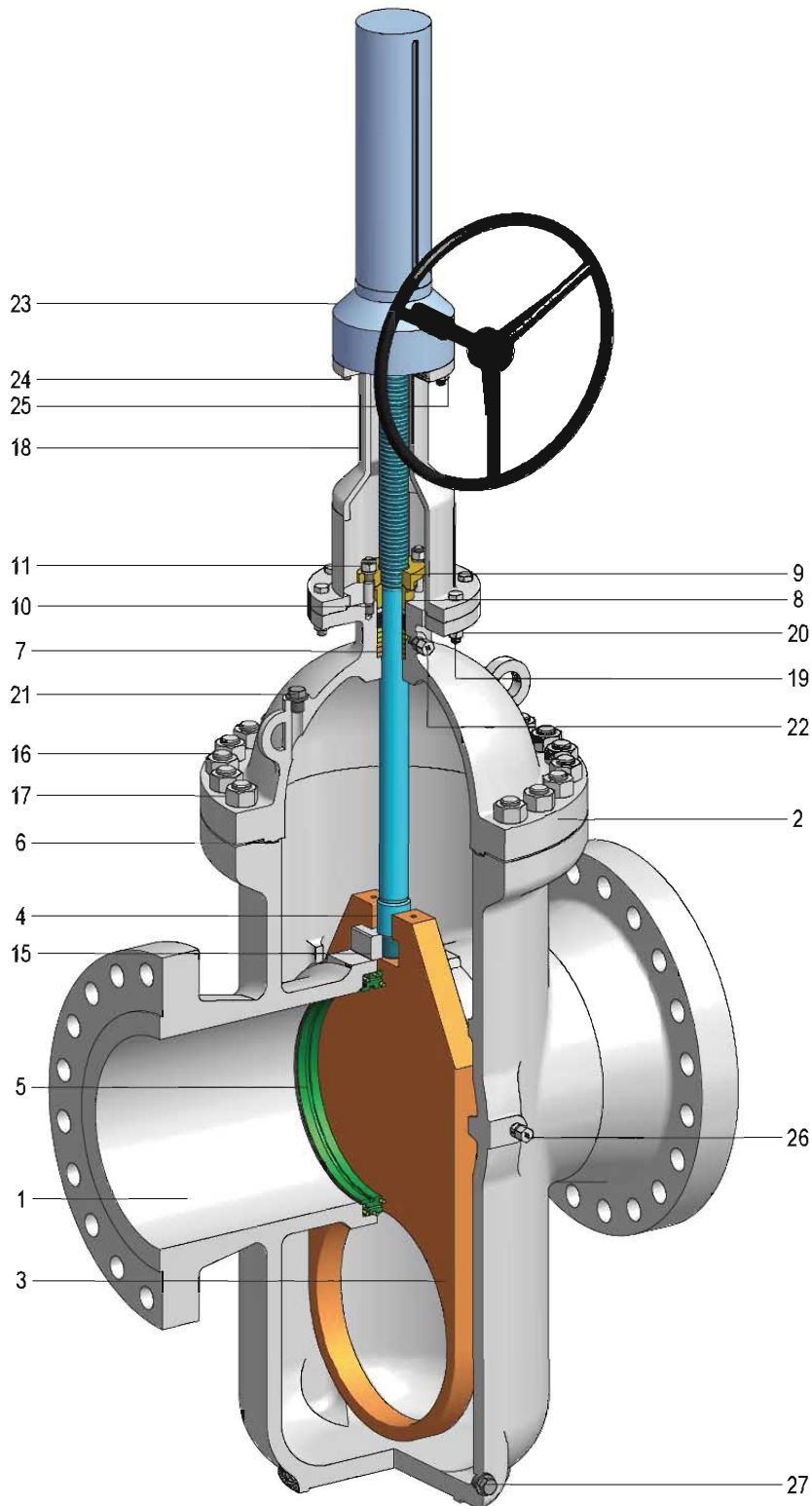
Extension design allows valve to be used or required in remote operating conditions. Stem, grease, vent and drain with extension structure can be easy to using or operation.

SEAT INJECTION DESIGN

In abnormal condition, sealant can be injected to guarantee the sealing performance.



Z10 SERIES PARTS LIST

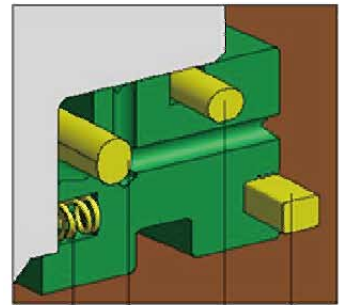
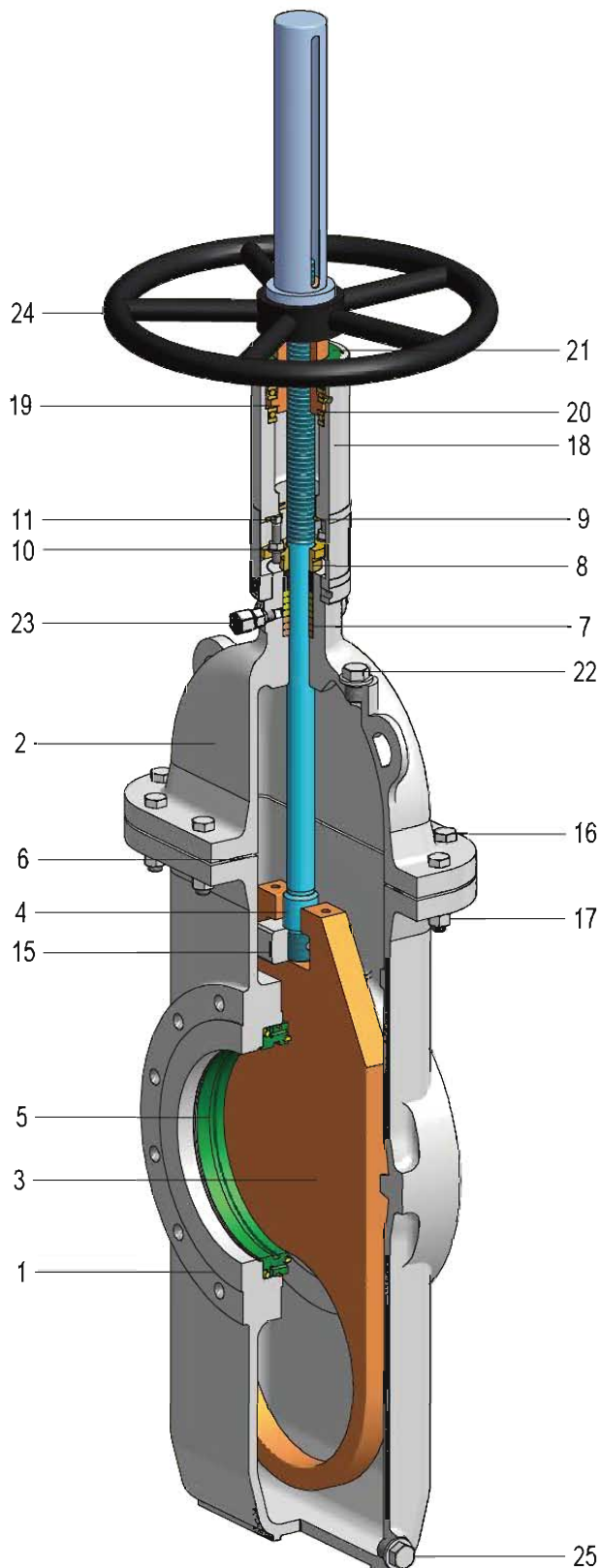


14 13a 13b 12

PART LIST	
1	Body
2	Bonnet
3	Gate
4	Stem
5	Seat
6*	Spiral Wound Gasket
7*	Packing
8	Packing Ring
9	Gland Flange
10	Stud
11	Nut
12	Seat Insert
13a*	O-ring
13b*	O-ring
14	Spring
15	Support Block
16	Stud
17	Nut
18	Yoke
19	Bolt
20	Nut
21	Vent Valve
22	Grease Injection Valve
23	Gear
24	Stud
25	Nut
26	Grease Injection Valve
27	Drain Valve

* Recommended spare parts.

Z11 SERIES PARTS LIST

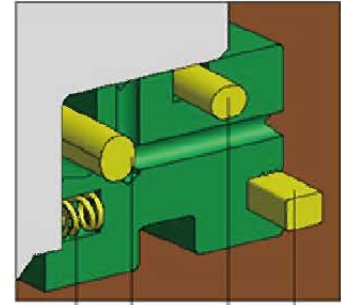
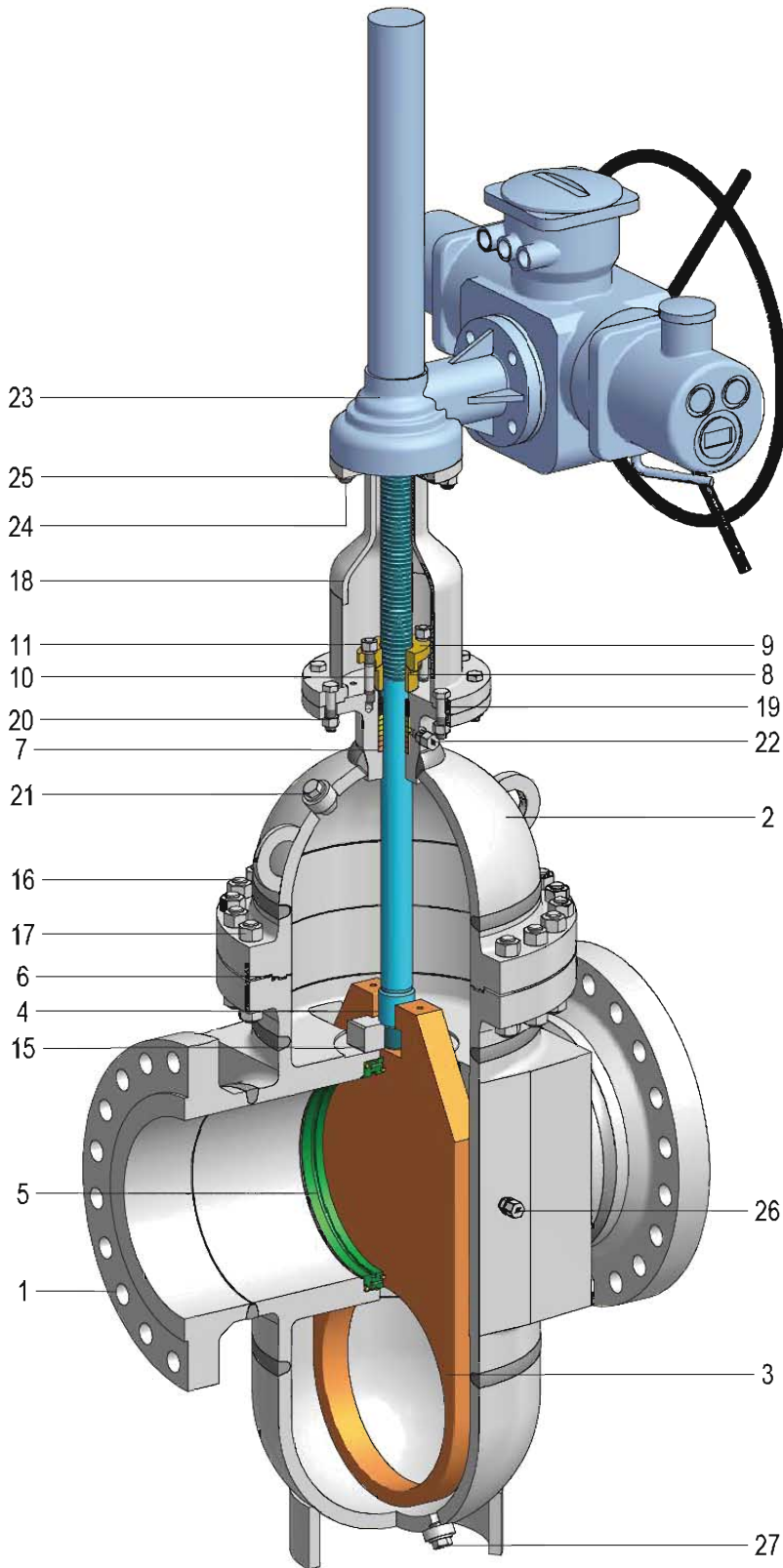


14 13a 13b 12

PART LIST	
1	Body
2	Bonnet
3	Gate
4	Stem
5	Seat
6*	Spiral Wound Gasket
7*	Packing
8	Gland Flange
9	Apron
10	Nut
11	Screws
12	Seat Insert
13a*	O-ring
13b*	O-ring
14	Spring
15	Support Block
16	Stud
17	Nut
18	Yoke
19	Stem Nut
20	Thrust Bearing
21	Bearing Gland
22	Vent Valve
23	Grease Injection Valve
24	Hand wheel
25	Drain Valve

* Recommended spare parts.

Z12 SERIES PARTS LIST

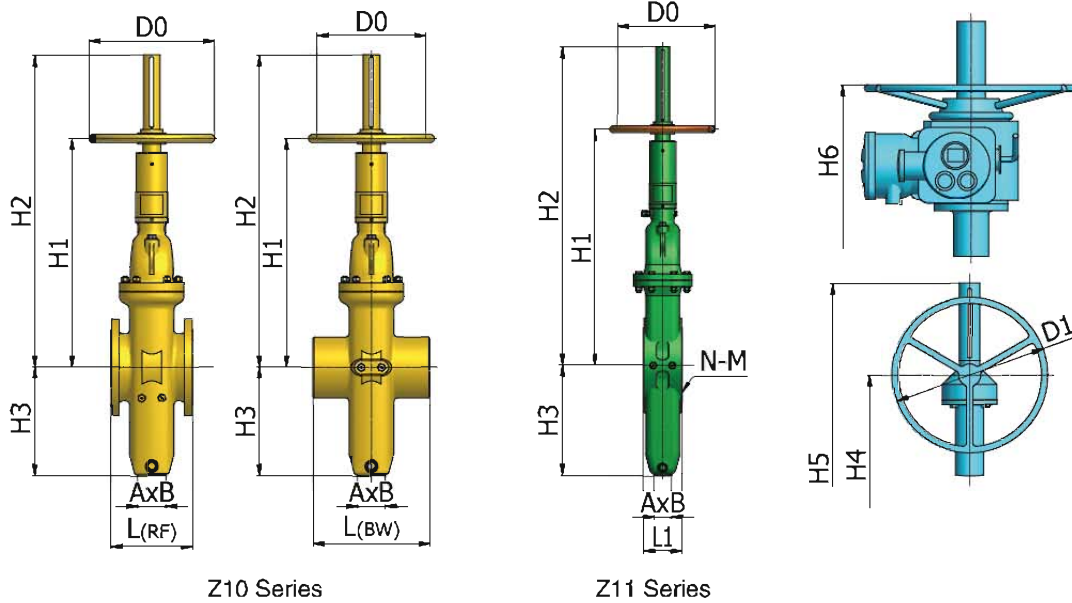


14 13a 13b 12

PART LIST	
1	Body
2	Bonnet
3	Gate
4	Stem
5	Seat
6*	Spiral Wound Gasket
7*	Packing
8	Packing Ring
9	Gland Flange
10	Stud
11	Nut
12	Seat Insert
13a*	O-ring
13b*	O-ring
14	Spring
15	Support Block
16	Stud
17	Nut
18	Yoke
19	Bolt
20	Nut
21	Vent Valve
22	Grease Injection Valve
23	Electric Actuator
24	Stud
25	Nut
26	Grease Injection Valve
27	Drain Valve

* Recommended spare parts.

DIMENSIONS & WEIGHTS



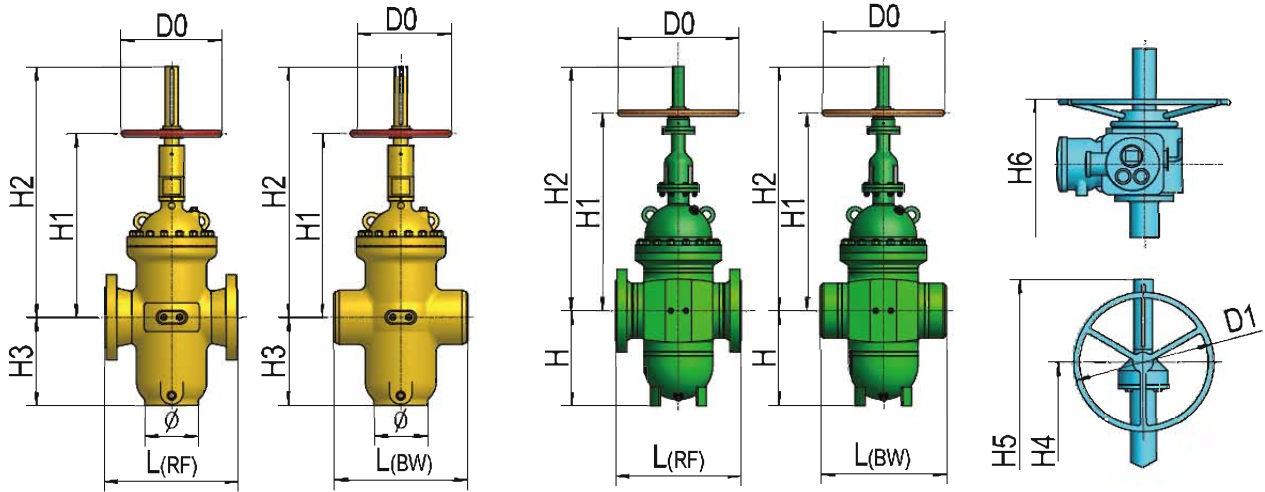
ASME CLASS 150 FULL BORE

NPS	DN	L(RF)	L(BW)	L1	N-M	H	H1	H2	H3	H4	H5	H6	Ax/B	D0	D1	APPROX. Wet(kg)		
																Z10(RF)	Z10(BW)	Z11
1	25	127	127	-	-	86	200	334	80	-	-	*	64x82	140	-	12	10	-
1-1/4	32	140	140	-	-	119	305	343	110	-	-	*	83x89	140	-	20	18	-
1-1/2	40	165	165	-	-	151	320	493	140	-	-	*	45x80	140	-	30	28	-
2	50	178	216	-	-	164	352	510	148	-	-	*	45x100	250	-	50	38	-
2-1/2	65	190	241	-	-	187	372	571	171	-	-	*	45x115	250	-	63	50	-
3	80	203	282	-	-	237	398	595	219	-	-	*	60x130	250	-	68	65	-
4	100	229	305	127	8-M16	281	518	681	257	-	-	*	70x140	250	-	99	98	70
5	125	254	381	140	8-M20	312	634	800	278	-	-	*	70x190	250	-	138	130	100
6	150	267	403	140	8-M20	346	654	890	313	-	-	*	70x200	350	-	176	160	120
8	200	292	419	152	8-M20	451	788	1074	410	-	-	*	100x230	350	-	290	268	210
10	250	330	457	165	12-M22	532	930	1303	490	-	-	*	100x260	450	-	330	300	240
12	300	356	502	178	12-M22	612	1074	1488	570	-	-	*	100x300	450	-	480	385	340
14	350	381	572	190	12-M27	687	-	-	640	1175	1455	*	110x340	-	550	730	650	430
16	400	406	610	216	16-M27	763	-	-	710	1410	1810	*	120x350	-	550	990	898	580
18	450	432	660	222	16-M30	864	-	-	800	1504	1924	*	140x450	-	650	1270	1180	600
20	500	457	711	229	20-M30	942	-	-	877	1738	2165	*	160x500	-	650	1630	1500	700
22	550	508	762	267	20-M33	1022	-	-	960	1760	2205	*	200x600	-	650	2090	1840	800
24	600	508	813	267	20-M33	1108	-	-	1030	2009	2486	*	260x600	-	650	2630	2480	980
26	650	559	864	292	24-M33	1196	-	-	1110	2040	2566	*	165x700	-	650	3060	2760	1200
28	700	610	914	292	28-M33	1274	-	-	1190	2197	2694	*	200x700	-	650	3640	3200	1380
30	750	660	914	318	28-M33	1331	-	-	1260	2320	2834	*	180x720	-	650	4280	3760	2240
32	800	711	965	318	28-M39	1423	-	-	1340	2565	3072	*	350x800	-	650	5160	4540	2600
34	850	762	1016	330	32-M39	1507	-	-	1420	2600	3192	*	210x900	-	750	6150	5410	3090
36	900	813	1016	330	32-M39	1614	-	-	1530	2740	3290	*	250x1050	-	750	7060	6210	3500
38	950	<u>864</u>	<u>1067</u>	410	32-M39	1662	-	-	1570	2895	3491	*	230x1000	-	800	7700	6780	3970
40	1000	<u>914</u>	<u>1118</u>	410	36-M39	1734	-	-	1650	3055	3654	*	300x1000	-	800	8300	7300	4120
42	1050	<u>965</u>	<u>1168</u>	410	36-M39	1834	-	-	1730	3225	3872	*	280x1050	-	800	10190	8970	5035
48	1200	<u>1110</u>	<u>1321</u>	470	44-M39	2074	-	-	1950	3545	4216	*	495x1050	-	890	12600	11200	6380
54	1350	<u>1915</u>	<u>2124</u>	530	44-M45	2300	-	-	2190	3920	4624	*	500x1052	-	900	14800	13780	8840
56	1400	<u>2032</u>	<u>2266</u>	530	44-M45	2440	-	-	2290	4075	4779	*	520x1080	-	900	16200	15200	9940
60	1500	<u>2415</u>	<u>2635</u>	600	52-M45	2632	-	-	2410	4355	5164	*	400x1320	-	950	18900	17800	11360

1 Underline data according to manufacturer's standards.

2 "*" Configuration of different manufacturers products, the size has a slight difference to the final configuration.

DIMENSIONS & WEIGHTS



Z10 Series

Z12 Series

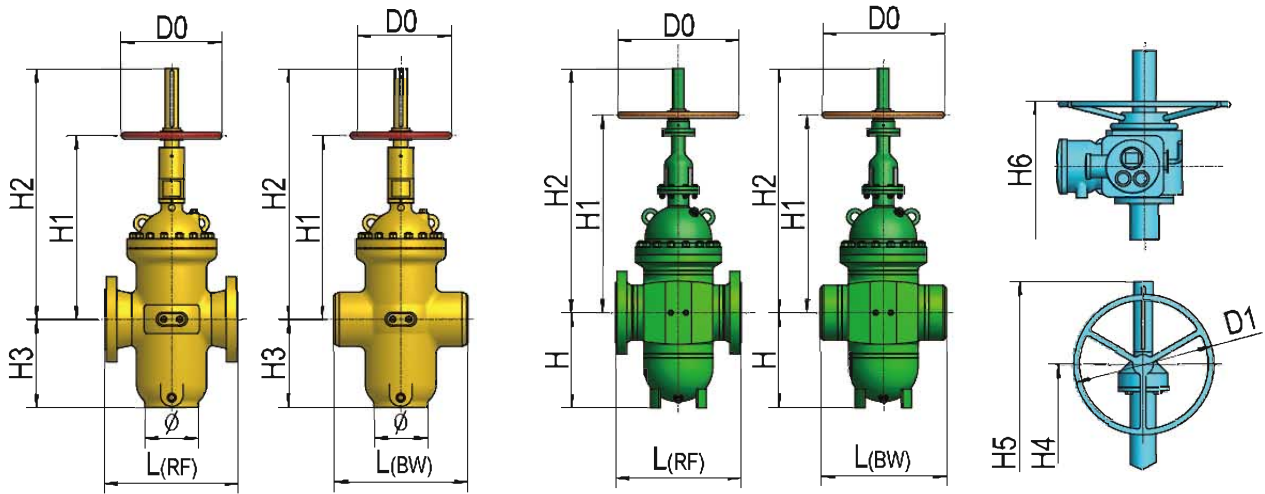
ASME CLASS 300 FULL BORE

NPS	DN	L(RF)	L(BW)	H	H1	H2	H3	H4	H5	H6	Φ	D0	D1	APPROX. Wet(kg)	
														RF	BW
1	25	216	216	73	200	334	80	-	-	*	Φ69	140	-	14	12
1-1/4	32	229	229	95	305	343	110	-	-	*	Φ75	140	-	25	20
1-1/2	40	241	241	130	320	493	140	-	-	*	45 × 80	140	-	32	30
2	50	292	292	142	352	510	155	-	-	*	Φ90	250	-	55	54
2-1/2	65	330	330	165	380	580	171	-	-	*	Φ100	250	-	60	58
3	80	356	356	192	298	595	219	-	-	*	Φ110	250	-	75	70
4	100	406	406	230	526	696	257	-	-	*	Φ130	250	-	155	145
5	125	457	457	280	634	825	278	-	-	*	Φ160	350	-	160	150
6	150	495	495	335	654	950	313	-	-	*	Φ180	350	-	190	170
8	200	597	597	400	788	1074	430	-	-	*	110 × 250	350	-	330	290
10	250	673	673	490	930	1258	498	-	-	*	120 × 260	450	-	490	430
12	300	762	762	570	1105	1565	572	-	-	*	160 × 300	450	-	690	625
14	350	826	826	610	-	-	649	1305	1625	*	Φ340	-	400	1000	890
16	400	902	902	695	-	-	737	1568	1975	*	Φ400	-	400	1410	1260
18	450	978	978	780	-	-	803	1735	2100	*	Φ350	-	450	1910	1620
20	500	1054	1054	870	-	-	877	1820	2250	*	Φ450	-	500	2410	2110
22	550	1143	1143	960	-	-	960	1945	2420	*	Φ550	-	600	2990	2720
24	600	1232	1232	1040	-	-	1080	2150	2690	*	Φ500	-	750	3750	3410
26	650	1308	1308	1115	-	-	1170	2202	2840	*	Φ550	-	750	4390	3970
28	700	1397	1397	1180	-	-	1230	2415	3110	*	Φ600	-	750	5280	4710
30	750	1524	1524	1275	-	-	1320	2498	3230	*	Φ700	-	800	6190	5540
32	800	1651	1651	1310	-	-	1410	2706	3420	*	Φ800	-	800	7420	6690
34	850	1778	1778	1450	-	-	1480	2835	3760	*	Φ850	-	850	8850	8030
36	900	1880	1880	1590	-	-	1550	2935	3915	*	Φ900	-	850	10180	9230
38	950	<u>1981</u>	<u>1981</u>	1720	-	-	1650	3100	4055	*	Φ1000	-	850	11200	9870
40	1000	<u>2028</u>	<u>2028</u>	1840	-	-	1690	3230	4166	*	Φ1100	-	900	11980	10470
42	1050	<u>2260</u>	<u>2260</u>	1935	-	-	1790	3356	4294	*	Φ1150	-	900	12550	10930
48	1200	<u>2464</u>	<u>2464</u>	2105	-	-	2040	3805	4876	*	Φ1200	-	1000	18800	17600
54	1350	<u>2542</u>	<u>2542</u>	2295	-	-	2270	4247	5184	*	Φ1350	-	1000	21550	19960
56	1400	<u>2624</u>	<u>2624</u>	2385	-	-	2350	4305	5374	*	Φ1450	-	1050	22700	21000
60	1500	<u>2700</u>	<u>2700</u>	2520	-	-	2499	4450	5575	*	Φ1500	-	1050	26500	24950

1 Underline data according to manufacturer's standards.

2 "*" Configuration of different manufacturers products, the size has a slight difference to the final configuration.

DIMENSIONS & WEIGHTS



Z10 Series

Z12 Series

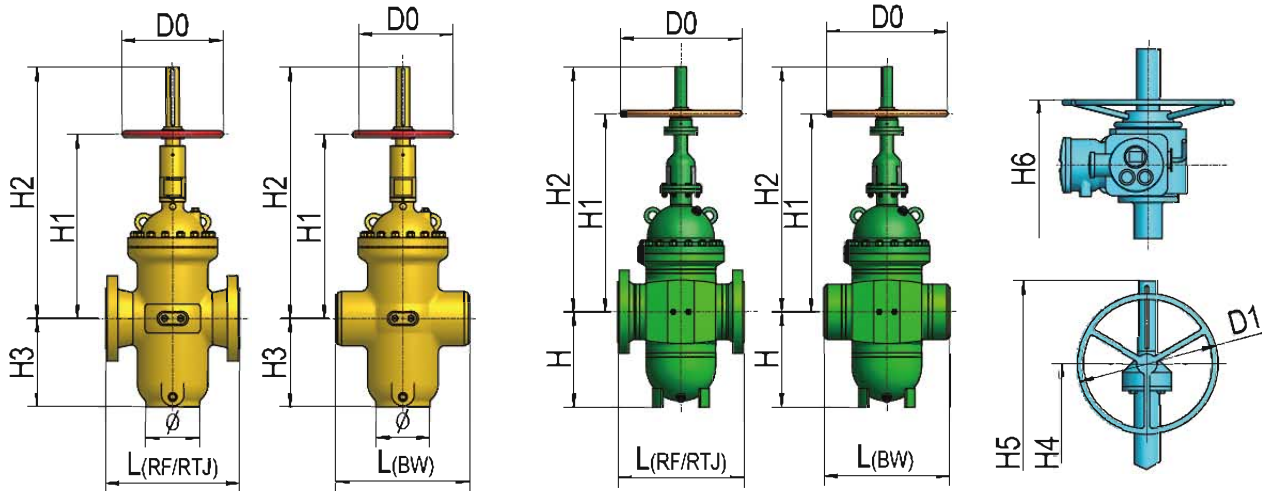
ASME CLASS 400 FULL BORE

NPS	DN	L(RF)	L(BW)	H	H1	H2	H3	H4	H5	H6	Φ	D0	D1	APPROX. Wet(kg)	
														RF	BW
1	25	216	216	85	268	346	80	-	-	*	Φ 75	250	-	18	16
1-1/4	32	229	229	122	325	350	113	-	-	*	Φ 75	250	-	30	26
1-1/2	40	241	241	146	385	493	132	-	-	*	Φ 80	250	-	50	46
2	50	292	292	150	424	550	142	-	-	*	Φ 90	250	-	80	74
2-1/2	65	330	330	170	472	611	165	-	-	*	Φ 100	250	-	96	96
3	80	356	356	219	498	647	192	-	-	*	Φ 110	250	-	105	68
4	100	406	406	257	530	700	230	-	-	*	Φ 130	350	-	160	120
5	125	457	457	285	634	825	270	-	-	*	Φ 160	350	-	240	150
6	150	495	495	339	654	950	335	-	-	*	Φ 180	450	-	260	200
8	200	597	597	433	793	1096	400	-	-	*	Φ 240	550	-	470	400
10	250	673	673	508	935	1360	490	-	-	*	Φ 280	650	-	640	430
12	300	762	762	580	-	-	570	1228	1587	*	Φ 300	-	460	820	700
14	350	826	826	654	-	-	610	1320	1790	*	Φ 340	-	640	1180	900
16	400	902	902	742	-	-	677	1570	1995	*	Φ 400	-	640	1580	1100
18	450	978	978	840	-	-	780	1640	2150	*	Φ 350	-	640	2120	1780
20	500	1054	1054	978	-	-	914	1805	2380	*	Φ 450	-	640	2550	2100
22	550	1143	1143	1164	-	-	1000	1864	2520	*	Φ 550	-	640	3170	2900
24	600	1232	1232	1205	-	-	1120	2160	2825	*	Φ 500	-	860	4050	3200
26	650	1308	1308	1286	-	-	1200	2216	3040	*	Φ 550	-	860	4700	4390
28	700	1397	1397	1342	-	-	1260	2425	3280	*	Φ 600	-	860	5700	4500
30	750	1524	1524	1448	-	-	1350	2480	3500	*	Φ 700	-	860	6780	5100
32	800	1651	1651	1536	-	-	1450	2725	3750	*	Φ 800	-	860	7550	6100
34	850	1778	1778	1624	-	-	1510	2778	4000	*	Φ 850	-	860	9480	7830
36	900	1880	1880	1744	-	-	1620	3140	4230	*	Φ 900	-	860	9600	8800
38	950	<u>1981</u>	<u>1981</u>	1802	-	-	1680	3205	4460	*	Φ 950	-	860	10200	9000
40	1000	<u>2028</u>	<u>2028</u>	1882	-	-	1720	3350	4700	*	Φ 1050	-	860	12100	11000
42	1050	<u>2260</u>	<u>2260</u>	1974	-	-	1830	3398	4950	*	Φ 1050	-	860	13900	11500
48	1200	<u>2464</u>	<u>2464</u>	2252	-	-	2100	3496	5670	*	Φ 1200	-	860	19500	18700
54	1350	<u>2542</u>	<u>2542</u>	2374	-	-	2245	3974	6132	*	Φ 1350	-	900	24300	22560
56	1400	<u>2624</u>	<u>2624</u>	2534	-	-	2394	4352	6614	*	Φ 1410	-	950	27450	26120
60	1500	<u>2700</u>	<u>2700</u>	2618	-	-	2500	5565	6960	*	Φ 1500	-	1000	31000	29450

1 Underline data according to manufacturer's standards.

2 "*" Configuration of different manufacturers products, the size has a slight difference to the final configuration.

DIMENSIONS & WEIGHTS



Z10 Series

Z12 Series

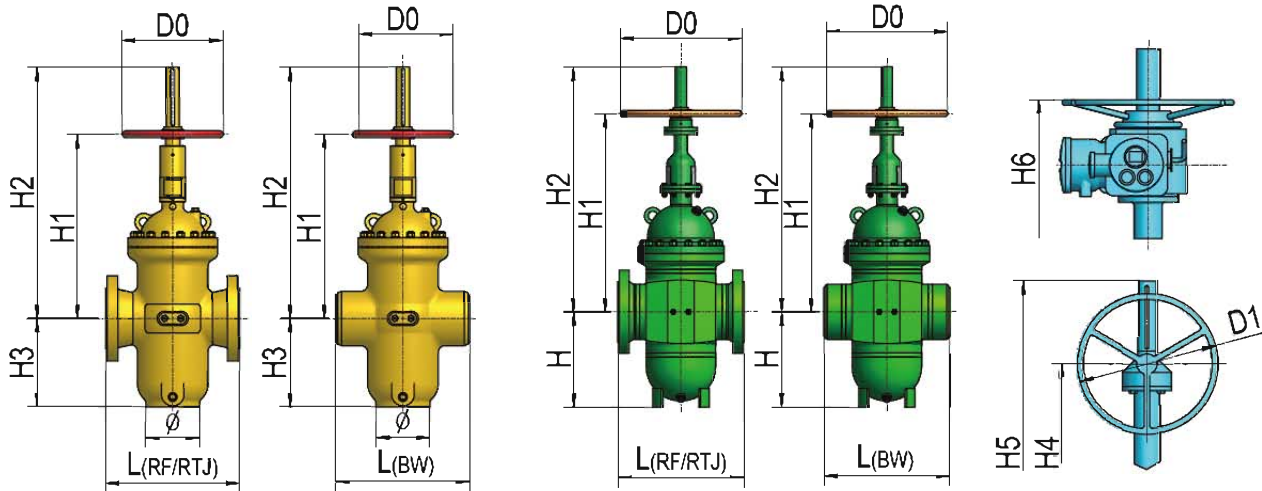
ASME CLASS 600 FULL BORE

NPS	DN	L(RF)	L(RTJ)	L(BW)	H	H1	H2	H3	H4	H5	H6	Φ	D0	D1	APPROX. Wet(kg)		
															RF	RTJ	BW
1	25	216	216	216	89	268	346	85	-	-	*	Φ92	250	-	18	16	16
1-1/4	32	229	229	229	124	332	355	115	-	-	*	Φ100	250	-	30	26	26
1-1/2	40	241	241	241	141	395	520	135	-	-	*	Φ185	250	-	50	46	46
2	50	292	295	292	153	455	605	142	-	-	*	Φ110	250	-	80	80	65
2-1/2	65	330	333	330	170	500	626	165	-	-	*	Φ115	250	-	105	105	100
3	80	356	359	356	229	525	647	192	-	-	*	Φ112	350	-	110	110	95
4	100	432	435	432	254	550	793	230	-	-	*	Φ140	450	-	155	155	125
5	125	508	511	508	300	658	888	280	-	-	*	Φ160	450	-	260	260	190
6	150	559	562	559	340	660	950	335	-	-	*	Φ180	550	-	308	308	260
8	200	660	664	660	415	793	1096	405	-	-	*	Φ250	650	-	484	484	380
10	250	787	791	787	520	935	1360	500	-	-	*	Φ280	750	-	750	750	580
12	300	838	841	838	590	-	-	580	1250	1587	*	Φ304	-	640	1350	1350	950
14	350	889	892	889	700	-	-	620	1350	1790	*	Φ340	-	640	1680	1680	1390
16	400	991	994	991	780	-	-	700	1570	2032	*	Φ420	-	800	2015	2015	1650
18	450	1092	1095	1092	850	-	-	800	1640	2150	*	Φ450	-	800	2680	2680	2150
20	500	1194	1200	1194	989	-	-	950	1820	2380	*	Φ450	-	800	2995	2995	2580
22	550	1295	1305	1295	1102	-	-	1040	1920	2520	*	Φ520	-	800	3890	3895	3270
24	600	1397	1407	1397	1220	-	-	1150	2160	2825	*	Φ600	-	860	4840	4850	3980
26	650	1448	1461	1448	1312	-	-	1230	2340	3040	*	Φ700	-	860	5680	5685	4990
28	700	1549	1562	1549	1392	-	-	1310	2425	3380	*	Φ750	-	860	6890	6910	6100
30	750	1651	1664	1651	1514	-	-	1430	2530	3620	*	Φ760	-	860	7990	7995	7190
32	800	1778	1794	1778	1596	-	-	1500	2725	3880	*	Φ780	-	860	9510	9516	8550
34	850	1930	1946	1930	1683	-	-	1580	2875	4150	*	Φ785	-	860	11300	11320	10300
36	900	2083	2099	2083	1774	-	-	1663	3140	4380	*	Φ805	-	860	12000	12020	10800
38	950	<u>2235</u>	<u>2251</u>	<u>2235</u>	1866	-	-	1750	3280	4600	*	Φ830	-	860	13200	13220	12500
40	1000	<u>2387</u>	<u>2403</u>	<u>2387</u>	1956	-	-	1830	3350	4880	*	Φ1050	-	860	14800	14820	13700
42	1050	<u>2489</u>	<u>2507</u>	<u>2489</u>	2088	-	-	1920	3460	5150	*	Φ1120	-	860	16400	16420	14500
48	1200	<u>2692</u>	<u>2709</u>	<u>2692</u>	2332	-	-	2170	3896	5870	*	Φ1180	-	860	18500	18530	16800
60	1500	<u>2900</u>	<u>2917</u>	<u>2900</u>	2742	-	-	2550	5615	7010	*	Φ1500	-	1000	36000	36025	34200

1 Underline data according to manufacturer's standards.

2 "*" Configuration of different manufacturers products, the size has a slight difference to the final configuration.

DIMENSIONS & WEIGHTS



Z10 Series

Z12 Series

ASME CLASS 900 FULL BORE

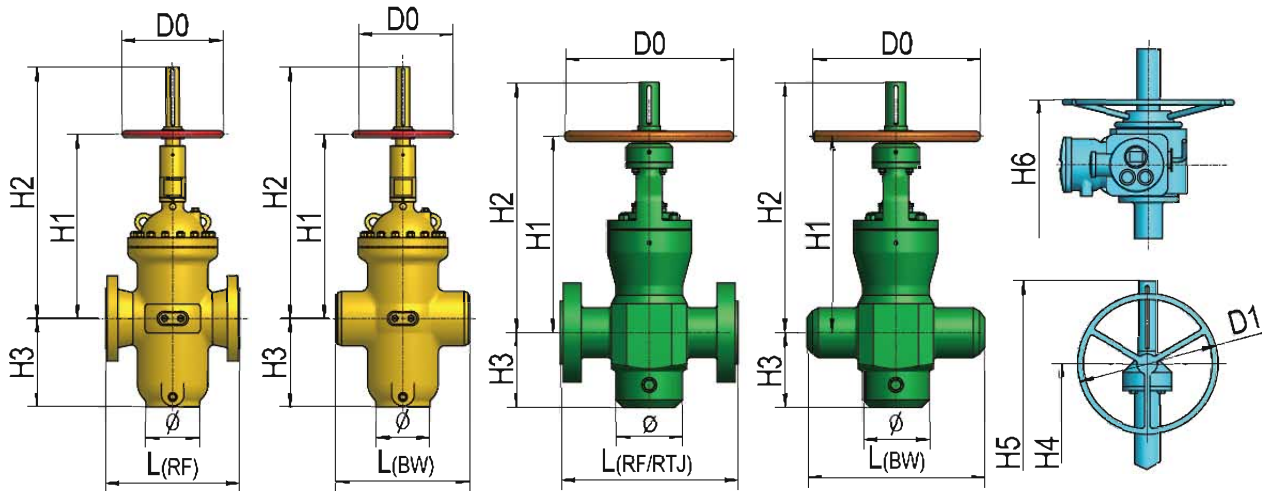
NPS	DN	L(RF)	L(RTJ)	L(BW)	H	H1	H2	H3	H4	H5	H6	Φ	D0	D1	APPROX. Wet(kg)		
															RF	RTJ	BW
1	25	254	254	254	103	275	352	92	-	-	*	Φ91	250	-	40	40	32
1-1/4	32	279	279	279	142	350	450	130	-	-	*	Φ105	250	-	50	50	40
1-1/2	40	305	305	305	166	410	550	150	-	-	*	Φ110	250	-	80	80	70
2	50	368	371	368	190	586	725	185	-	-	*	Φ145	350	-	100	100	88
2-1/2	65	419	422	419	214	612	760	209	-	-	*	Φ170	350	-	143	143	130
3	80	381	384	381	229	630	794	225	-	-	*	Φ180	350	-	186	186	170
4	100	457	460	457	287	707	860	280	-	-	*	Φ180	450	-	240	240	218
5	125	559	562	559	322	785	975	315	-	-	*	Φ220	550	-	342	342	330
6	150	610	613	610	383	862	1090	370	-	-	*	Φ240	550	-	443	443	421
8	200	737	740	737	474	-	-	460	1172	1380	*	Φ260	-	450	707	707	672
10	250	838	841	838	563	-	-	550	1320	1680	*	Φ340	-	450	1034	1034	983
12	300	965	968	965	655	-	-	640	1400	2159	*	Φ360	-	610	1720	1720	1634
14	350	1029	1039	1029	726	-	-	710	1520	2442	*	Φ400	-	610	2476	2480	2353
16	400	1130	1140	1130	778	-	-	760	1635	2625	*	Φ440	-	610	2750	2760	2613
18	450	1219	1232	1219	921	-	-	900	1840	3036	*	Φ480	-	800	3763	3768	3575
20	500	1321	1334	1321	1012	-	-	980	2050	3344	*	Φ500	-	800	4559	4560	4331
22	550	●	●	●	1120	-	-	1080	2350	●	*	Φ650	-	860	●	●	●
24	600	1549	1568	1549	1312	-	-	1170	2650	3927	*	Φ800	-	860	7320	7320	6954
26	650	<u>1651</u>	<u>1668</u>	<u>1651</u>	1426	-	-	1260	3080	4235	*	Φ900	-	860	8614	8620	8184
28	700	<u>1705</u>	<u>1723</u>	<u>1723</u>	1544	-	-	1350	3496	4488	*	Φ980	-	860	10358	10362	9840
30	750	<u>1850</u>	<u>1868</u>	<u>1850</u>	1682	-	-	1440	3600	4664	*	Φ1050	-	860	12412	12417	11792
32	800	<u>1920</u>	<u>1938</u>	<u>1920</u>	1822	-	-	1310	3880	4812	*	Φ750	-	900	14900	14910	14150
36	900	<u>2010</u>	<u>2028</u>	<u>2010</u>	1984	-	-	1700	4415	5230	*	Φ1000	-	900	15600	15620	13200
40	1000	<u>2100</u>	<u>2118</u>	<u>2100</u>	2114	-	-	1844	4685	5780	*	Φ1000	-	900	16100	16125	14800
48	1200	<u>2300</u>	<u>2318</u>	<u>2300</u>	2456	-	-	2264	5135	6140	*	Φ1200	-	900	29000	29030	26000

1 "●" According to customer's requirements.

2 Underline data according to manufacturer's standards.

3 "*" Configuration of different manufacturers products, the size has a slight difference to the final configuration.

DIMENSIONS & WEIGHTS



Z10 Series

Z12 Series

ASME CLASS 1500/2500 FULL BORE

NPS	DN	ASME CLASS 1500 FULL BORE														ASME CLASS 2500 FULL BORE														
		L (RF)	L (RTJ)	L (BW)	H	H1	H2	H3	H4	H5	H6	φ	D0	D1	APPROX. Wet(kg)			L (BW)	L (RTJ)	H1	H2	H3	H4	H5	H6	φ	D0	D1	APPROX. Wet(ThD/ Flgd) (kg)	
																RF	RTJ	BW												RTJ
1	25	254	254	254	90	230	280	90	-	-	*	φ92	250	-	40	40	32	451	454	700	610	200	-	-	*	φ130	250	-	195	120
1-1/4	32	279	279	279	115	300	350	130	-	-	*	φ102	250	-	60	60	42	508	514	715	750	235	-	-	*	φ160	500	-	260	160
1-1/2	40	305	305	305	150	450	600	170	-	-	*	φ120	250	-	80	80	70	578	584	-	-	255	735	904	*	φ245	-	400	373	230
2	50	368	371	368	182	600	725	185	-	-	*	φ125	350	-	170	170	140	673	683	-	-	280	784	1014	*	φ320	-	400	457	275
2-1/2	65	419	422	419	185	615	760	215	-	-	*	φ130	450	-	278	278	245	914	927	-	-	420	1080	1150	*	φ400	-	500	922	585
3	80	470	473	470	228	630	794	250	-	-	*	φ185	450	-	383	383	350	1022	1038	-	-	530	1280	1650	*	φ400	-	500	1236	766
4	100	546	549	546	260	707	860	300	-	-	*	φ200	550	-	445	445	432	1270	1288	-	-	565	1430	1340	*	φ500	-	500	1656	1027
5	125	673	676	673	315	-	-	315	820	975	*	φ220	-	450	660	660	620	1422	1442	-	-	605	1630	1430	*	φ550	-	600	2219	1376
6	150	705	711	705	400	-	-	400	1080	1090	*	φ230	-	450	840	840	798	●	●	-	-	630	1810	1547	*	φ550	-	600	-	-
8	200	832	842	832	517	-	-	517	1280	1551	*	φ420	-	860	1341	1341	1274	●	●	-	-	710	1970	1638	*	φ600	-	700	-	-
10	250	991	1001	991	605	-	-	605	1550	1859	*	φ520	-	860	1961	1961	1863	●	●	-	-	802	2200	1736	*	φ600	-	700	-	-
12	300	1130	1146	1130	649	-	-	649	1780	2159	*	φ580	-	860	3261	3261	3098	●	●	-	-	906	2464	1840	*	φ600	-	800	-	-
14	350	1257	1276	1257	770	-	-	770	1950	2442	*	φ720	-	860	4696	4696	4461													
16	400	1384	1406	1384	796	-	-	796	2100	2625	*	φ780	-	860	5215	5215	4954													
18	450	1537	1559	1537	990	-	-	990	2350	3036	*	φ800	-	860	7137	7137	6780													
20	500	1664	1686	1664	1228	-	-	1090	2560	3344	*	φ860	-	860	8646	8646	8213													
22	550	●	●	●	1495	-	-	1190	2800	3630	*	φ860	-	1000	-	-	-													
24	600	1943	1971	1943	1586	-	-	1290	2980	3927	*	φ900	-	1000	13880	13880	13186													
26	650	●	●	●	1621	-	-	1380	3285	4235	*	φ950	-	1000	-	-	-													
28	700	●	●	●	1742	-	-	1495	3460	4488	*	φ990	-	1000	-	-	-													
30	750	●	●	●	1798	-	-	1595	3660	4664	*	φ1120	-	1000	-	-	-													
32	800	●	●	●	1842	-	-	1568	3787	4854	*	φ1160	-	1000	-	-	-													
36	900	●	●	●	1966	-	-	1694	4090	5244	*	φ1210	-	1000	-	-	-													

1 "●" According to customer's requirements.

2 "*" Configuration of different manufacturers products, the size has a slight difference to the final configuration.

ENGINEERING DATA

BODY & TRIM MATERIAL

CARBON	AUSTENITIC STAINLESS STEEL	NICKEL ALLOYS
A105 A216 WCB A216 WCC	A182 F304 A182 F316	Incoloy 825 (UNS N08825)
LOW TEMPERATURE STEEL	A182 F304L A182 F316L	Incoloy 925 (UNS N09925)
A350 LF2 A352 LCB A352 LCC	A182 F347 A182 FXM-19(Nitronic 50)	Inconel 625 (UNS N06625)
LOW ALLOY STEEL	A351 CF8M A351 CF3 A351 CF3M	Inconel 718 (UNS N07718)
AISI 4140 A694 F65 A694 F52	PRECIPITATION HARDENING STAINLESS STEEL	Inconel 750 (UNS N07750)
A694 F60 A350 LF3	A564 Gr.630 (UNS S17400)	Monel 400
MARTENSITIC STAINLESS STEEL	DUPLEX STAINLESS	Monel K500
A182 F6A A182 F6NM	A182 F51(UNS S31803) A182 F53(UNS S31750)	
A217 CA15 A487 CA6NM	A182 F55(UNS S31760) A995 4A(UNS J92205)	
	A995 5A(UNS J93404)	

VALVE TESTING

All valves manufactured by CCFV are tested in compliance of API 6D requirements prior to shipping.

LEAKAGE RATES

Standard	SoftSeated	Metal-Seated	Cryogenic
API 6D	ISO 5208 Rate A	ISO 5208 Rate D	(1)

(1) Please consult the factory.

STANDARD PERFORMANCE TESTS

- Visual & dimensional check.
- High pressure hydrostatic shell test.
- High pressure hydrostatic seats test.
- Low pressure air seats test.
- Stem torque check.

RATING & TEST PRESSURES AT AMBIENT TEMPERATURE (ASME B16.34 GROUP 1.1 MATERIALS)

ASME CLASS	RATING(1)			BODY TEST			H.P. SEAT TEST			AIR SEAT TEST		
	psi	bar	kgf/cm ²	psi	bar	kgf/cm ²	psi	bar	kgf/cm ²	psi	bar	kgf/cm ²
150	285	19.6	20	428	29.4	30	314	21.6	22	100	6.9	7
300	740	51.1	52	1110	76.7	78	814	56.2	57	100	6.9	7
600	1480	102.1	104	2220	153.2	156	1628	112.3	115	100	6.9	7
900	2220	153.2	156	3330	229.8	234	2442	168.5	172	100	6.9	7
1500	3705	255.3	261	5558	383.0	391	4076	280.8	287	100	6.9	7
2500	6170	425.5	434	9255	638.3	651	6787	468.1	477	100	6.9	7

(1) Typical only – Rating pressure may change for different materials.

Conversion Factors 1 bar = 14.50 psi 1 kgf/cm² = 0.981 bar 1 bar = 100 kpa 1 kgf/cm² = 14.22 psi
 1 °F = (1.8 × °C) + 32 1 °C = (°F - 32) / 1.8

SEAT SEAL & O-RING TEMPERATURE-PRESSURE RATINGS

Seat Seal

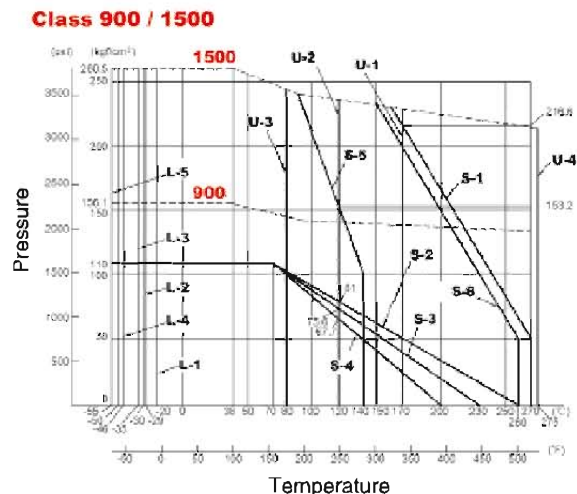
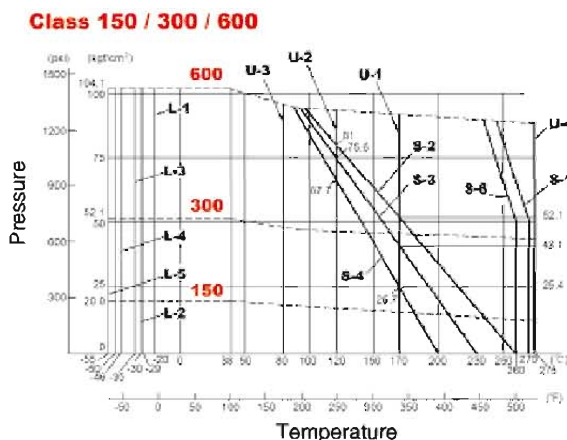
- S-1: PEEK
- S-2: Carbon Fiber+PTFE
- S-3: (1)Glass Fiber+PTFE
(2)Glass Fiber+PTFE+MoS2
- S-4: Virgin PTFE
- S-5: Nylon+MoS2
- S-6: PPL

O-Ring Upper Temperature Limit

- U-1: (1)FPM
(2)FPM-LT
- U-2: (1)EPDM (2)ECO
- U-3: (1)NBR (2)NBR-LT
- U-4: Kalrez-6375

O-Ring Lower Temperature Limit

- L-1: FPM
- L-2: (1)EPDM (2)NBR
- L-3: FPM-LT
- L-4: ECO
- L-5: NBR-LT



PRODUCT PHOTOS



12" Class 150 Compact Slab Gate Valve



14" Class 600 Forged Steel Slab Gate Valve



16" Class 150 Cast Steel Slab Gate Valve



3" Class 1500 Self Sealing Slab Gate Valve



36" Class 150 Cast Steel Slab Gate Valve



20" Class 900 Cast Steel Slab Gate Valve



12" Class 900 Forged Steel Self Sealing Flat Gate Valve



32" Class 600 Cast Steel Slab Gate Valve



6" Class 150 Pneumatic Slab Gate Valve

HOW TO ORDER

PLEASE PROVIDE FOLLOWING INFORMATION:

1. Max./Min. Operating Pressure, Max. /Min. Service Temp, Special Flow/Service Environment Requirements.
2. Design Standard (API 6D, ASME B16.34 or Other).
3. Test Requirements (Standard Package, UT, PT, MT, RT, High Pressure (N2/Air), Low Emission, Low Temp. or other).
4. Other Requirements (Mating Flange, PUP, Third-party Inspection or other).

A	—	B	—	C		D	—	E	—	F		G		H		I		J	—	K
MODEL		SIZE		PRESSURE RATING		CONNECTION		ACTUATION		BODY MATERIAL		SEALS		TRIM MATERIAL		TRIM COATING		BOLTS&NUTS		SPECIAL REQUIREMENTS
Z10		20		150		RF		G		C1		FV		33B		1		B2		BZ

EXAMPLE:Z10-20-150RF-G-C1FV33B1B2-BZ

Cast steel slab gate valve, 20" full bore, ASME 150, Flanged RF, Gear actuator, A216 WCB body, RPTFE/VITON-B seals, A105/A105/420 trim, ENP trim coating, B7/2H bolts & nuts with zinc coating.

A MODEL	
CODE	TYPE
Z10	Cast Steel Slab Gate Valve
Z11	Compact Slab Gate Valve
Z12	Forged Steel Slab Gate Valve

B SIZE											
CODE	NPS(DN)	CODE	NPS(DN)	CODE	NPS(DN)	CODE	NPS(DN)	CODE	NPS(DN)	CODE	NPS(DN)
1	1(25)	3	3(80)	12	12(300)	22	22(550)	32	32(800)	42	42(1050)
1-1/4	1-1/4(32)	4	4(100)	14	14(350)	24	24(600)	34	34(850)	48	48(1200)
1-1/2	1-1/2(40)	6	6(150)	16	16(400)	26	26(650)	36	36(900)	54	54(1350)
2	2(50)	8	8(200)	18	18(450)	28	28(700)	38	38(950)	56	56(1400)
2-1/2	2-1/2(65)	10	10(250)	20	20(500)	30	30(750)	40	40(1000)	60	60(1500)

C PRESSURE RATING				D CONNECTION			
CODE	TYPE	CODE	TYPE	CODE	TYPE	CODE	TYPE
150	ASME 150	1.6P	PN 16	RF	Flanged RF-B16.5(NPS 1/2-NPS 24)	RFB	Flanged RF-B16.47(NPS 26-NPS 60) Series B
300	ASME 300	3.2P	PN 32		Flanged RF-MSS SP 44(NPS 22)	RJB	Flanged RJ-B16.47(NPS 26-NPS 60) Series B
400	ASME 400	6.4P	PN 64		Flanged RF-B16.47(NPS 26-NPS 60) Series A	SW	Socket Weld-ASME B16.11
600	ASME 600	8.0P	PN 80	RJ	Flanged RTJ-B16.5(NPS 1/2-NPS 24)	ET	External Thread-ASME B1.20.1
900	ASME 900	10.0P	PN 100		Flanged RTJ-MSS SP 44(NPS 22)	BW	Butt Weld-ASME B31.8*
1500	ASME 1500	16.0P	PN 160		Flanged RTJ-B16.47(NPS 26-NPS 60) Series A	XX	Others
2500	ASME 2500	25.0P	PN 250				
		32.0P	PN 320				

*For weld end valves, specify ID or OD, wall thickness and grade of pipe.

E ACTUATION				
CODE	TYPE	CODE	TYPE	Type operator desired (electric, hydraulic, pneumatic), provide following information: 1. Speed of opening and closing, probable frequency of operation. 2. Accessories and controls (limit switches, valving, instrumentation, tanks, pumps, etc). 3. Information on operating medium. (If electric: voltage, frequency, single-or three-phase, open-or explosion-proof motor, If hydraulic or pneumatic: operating medium and pressure. etc.)
B	Bare Stem	S	Pneumatic-Spring Return	
W	Hand Wheel	D	Pneumatic-Double Acting	
G	Gear	M	Gas- Hydraulic	
E	Electric	N	Electro-Hydraulic	
H	Hydraulic	X	Others	

F BODY MATERIAL								
CODE	BODY	END CONNECTION	CODE	BODY	END CONNECTION	CODE	BODY	END CONNECTION
C1	A216 WCB	A216 WCB	S0	A351 CF8	A351 CF8	D0	A995 4A(UNS J92205)	A995 4A(UNS J92205)
C2	A216 WCC	A216 WCC	S1	A351 CF3	A351 CF3	D1	A995 5A(UNS J93404)	A995 5A(UNS J93404)
C5	A105	A105	S2	A351 CF8M	A351 CF8M	I7	CW6MC(UNSN26625)	(UNSN26625)
L1	A352 LCB	A352 LCB	S3	A351 CF3M	A351 CF3M	XX	Others	Others
L2	A352 LCC	A352 LCC	S5	A182 F304	A182 F304			

G SEALS(1)								
CODE	SEAT INSERT	O-Ring	CODE	SEAT INSERT	O-Ring	CODE	SEAT INSERT	O-Ring
FV	RPTFE	VITON-B	KH	PEEK	HNBR	YG	N/A(1)	VITON-GF
FH	RPTFE	HNBR	KG	PEEK	VITON-GF	YT	N/A(1)	VITON-GLT
FG	RPTFE	VITON-GF	KT	PEEK	VITON-GLT	YQ	N/A(1)	PTFE-Elgiloy Spring
FT	RPTFE	VITON-GLT	KQ	PEEK	PTFE-Elgiloy Spring	YS	N/A(1)	Graphite
FQ	RPTFE	PTFE-Elgiloy Spring	YV	N/A(1)	VITON-B	XX	Others	Others
KV	PEEK	VITON-B	YH	N/A(1)	HNBR	(1) Metal-to-Metal.		

H TRIM MATERIAL							
CODE	GATE	SEAT	STEM	CODE	GATE	SEAT	STEM
11B	A572 Gr.50	A572 Gr.50	A276 420	666	A182 F316	A182 F316	A276 316
113	A572 Gr.50	A572 Gr.50	A276 410	665	A182 F316	A182 F316	A276 304(UNS S30400)
228	AISI 1045	AISI 1020	A564 GR.630 (UNS S17400)	663	A182 F316	A182 F316	A276 410
22A	AISI 1045	AISI 1020	AISI 4140	66A	A182 F316	A182 F316	AISI 4140
22B	AISI 1045	AISI 1020	A276 420	66B	A182 F316	A182 F316	A276 420
223	AISI 1045	AISI 1020	A276 410	668	A182 F316	A182 F316	A564 GR.630 (UNS S17400)
333	A105	A105	A276 410	888	A350 LF2	A350 LF2	A564 GR.630 (UNS S17400)
338	A105	A105	A564 GR.630 (UNS S17400)	88A	A350 LF2	A350 LF2	AISI 4140
33B	A105	A105	A276 420	AAA	INCONEL 718 (UNS N07718)	INCONEL 718 (UNS N07718)	INCONEL 718 (UNS N07718)
443	A182 F6A	A182 F6A	A276 410	BBB	INCOLOY 825 (UNS N08825)	INCOLOY 825 (UNS N08825)	INCOLOY 825 (UNS N08825)
44A	A182 F6A	A182 F6A	AISI 4140	BBA	INCOLOY 825 (UNS N08825)	INCOLOY 825 (UNS N08825)	INCONEL 718 (UNS N07718)
44B	A182 F6A	A182 F6A	A276 420	CC6	A182 F304L	A182 F304L	A276 316
448	A182 F6A	A182 F6A	A564 GR.630 (UNS S17400)	CC3	A182 F304L	A182 F304L	A276 410
445	A182 F6A	A182 F6A	A276 304 (UNS S30400)	CC5	A182 F304L	A182 F304L	A276 304(UNS S30400)
446	A182 F6A	A182 F6A	A276 316	CCB	A182 F304L	A182 F304L	A276 420
555	A182 F304	A182 F304	A276 304 (UNS S30400)	DDB	A182 F316L	A182 F316L	A276 420
556	A182 F304	A182 F304	A276 316	DD6	A182 F316L	A182 F316L	A276 316
553	A182 F304	A182 F304	A276 410	DD3	A182 F316L	A182 F316L	A276 410
55B	A182 F304	A182 F304	A276 420	XXX	Others	Others	Others

I TRIM COATING			
CODE	GATE	SEAT RINGS	STEM/TRUNNION
0	N/A	N/A	N/A
1	ENP	ENP	N/A
2	GDN	ENP	N/A
3	GDN	GDN	N/A
4	ENP	GDN	N/A
5	ENP	ENP	ENP
6	GDN	ENP	ENP
7	GDN	GDN	ENP
X	Others	Others	Others

J BOLTS & NUTS					
CODE	BOLT	NUT	CODE	BOLT	NUT
B1	A193 B7M	A194 2HM	N5	A320 B8M CL.2	A194 Gr.8M-S1
B2	A193 B7	A194 2H	N6	A320 B8M CL.1	A194 Gr.8MA
B3	A320 L7M	A194 7M	XX	Others	Others
B4	A320 L7	A194 Gr.7			
B5	A193 B8M	A194 Gr.8M			
B6	A193 B8	A194 Gr.8			
B7	A193 B16	A194 Gr.7			
B8	A320 L7	A194 Gr.4			

K SPECIAL REQUIREMENTS,Misc (Multiple Choice)	
CODE	SPECIAL NOTES
E-	Specify distance from valve centerline to top of power operator mounting flange for direct-buried ball valve. Example, E2500 means the specify distance is 2500mm.
K	Anti-corrosion, acid-resisting regs are in compliance with NACE MR0103, NACE MR0175, ISO15156. Please provide detailed medium composition.
B-	Bolts & nuts coating, BE: ENP, BZ: Zinc Plating, BT: PTFE, BC: Cadmium+PTFE.
X	Others special requirements.

Notes: If you are uncertain about some categories, we will make suggestions based on your working conditions or your special requirement. The item marked with default will be used if no item is selected in that category unless it doesn't meet the working requirements.