SUFA

SUFA TECHNOLOGY INDUSTRY CO. LTD., CNNC

Add:501 Zhujiang Road,SND Suzhou 215129,China
Tel:86-512-66672540 66672550
E-mail : sales_526wu@163.com
Http://www.chinasufa.com

WEDGE GATE VALVES

PRODUCT MANUALS

CLASS 150
300
600
800
900
1500
2500

ENTERPRISE · PRODUCT · MARKET

CONTENTS

INTRODUCTION

Gate valves as shut off valves are used in the industrial area most commonly today. They are used where minimum pressure drop and bi-directional on-off service is required. Throttling is not recommended because partially open gate valves exhibit flow characteristics not conducive to accurate and consistent flow control. Also, the valves may be damaged by the high velocity across the seats. They function best fully open or fully closed.

This sample includes bolted bonnet forged steel gate valves (as shown figure 1), bolted bonnet cast steel gate valves(as shown figure 2), pressure seal forged steel gate valves(as shown figure 3) and pressure seal cast steel gate valve(as shown figure 4).

INDUSTRY STANDARDS

Pressure/Temperature Ratings	ASME B16.34
Basic Design	API 600/API 602
Face-to-Face/End- to- End	ASME B16.10
Flange Dimensions	ASME B16.5/ASME B16.47
Butt-Welding End	ASME B16.25
Socket Welding End	ASME B16.11
Threaded End	ASME B1.20.1
Testing	API 598

Figure 1

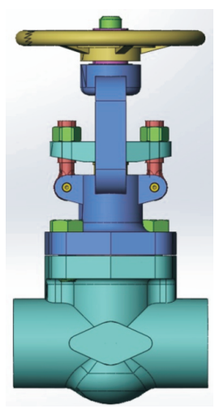


Figure 2

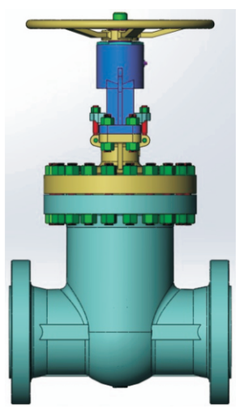


Figure 3

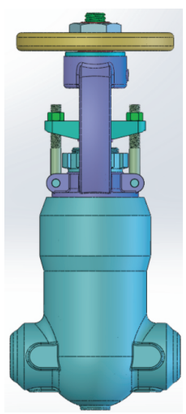
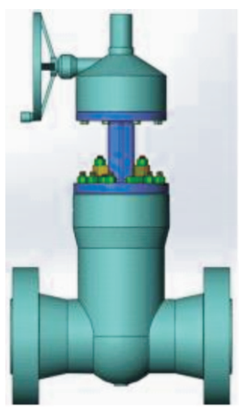
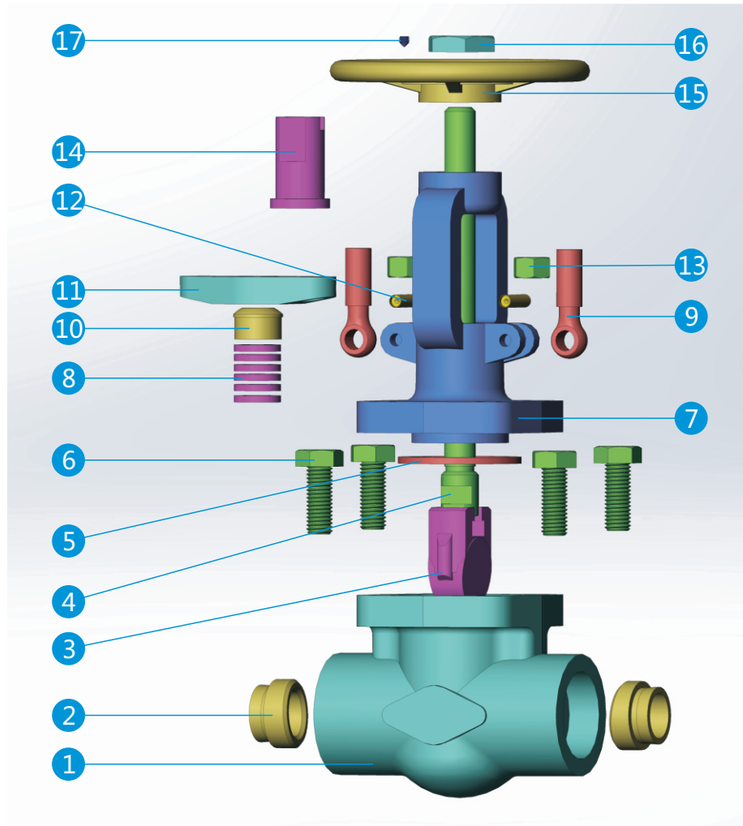


Figure 4



MAJOR FEATURE

BOLTED BONNET FORGED STEEL GATE VALVES



NO.	Name
1	Body
2	Seat Ring
3	Wedge
4	Stem
5	Gasket
6	Bolts
7	Bonnet
8	Packing
9	Eyebolt
10	Gland
11	Gland Flange
12	Pins
13	Nuts
14	Stem Nut
15	Handwheel
16	Handwheel Nut
17	Screw

PRODUCT RANGE

CLASS 150	1/2" -2"
CLASS 300	1/2" -2"
CLASS 600	1/2" -2"
CLASS 800	1/2" -2"
CLASS 900	1/2" -1-1/2"
CLASS 1500	1/2" -1-1/2"

DESIGN STANDARDS

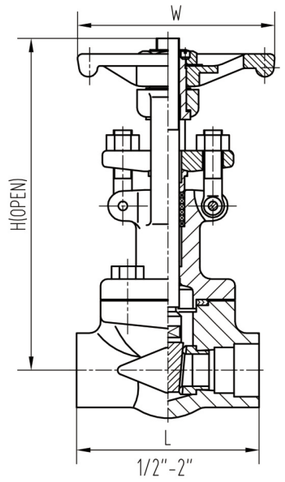
API 602

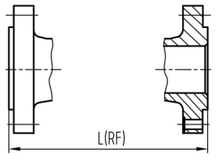
DESIGN FEATURES

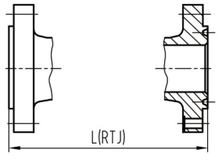
Soild Wedge
Bolted Bonnet
OS&Y
Rising Stem
Non- Rising Handwheel

DIMENSIONS AND WEIGHTS

BOLTED BONNET CAST STEEL GATE VALVES
CLASS 150~1500







CLASS 150/300/600/800

Note:Torque calculation pressure:14MPa

NPS	In	1/2	3/4	1	1-1/2	2
DN	mm	15	20	25	40	50
L(SW)	mm	76	86	102	117	133
L(RF)150/300/600	mm	108/140/165	117/152/190	127/165/216	165/190/241	178/216/292
L(RTJ)150/300/600	mm	--/151/163	--/165/194	140/178/216	178/203/241	191/235/295
H(OPEN)	mm	146	154	195	242	257
W	mm	80	80	100	120	150
WT(BW)	Kg	1.6	1.7	3.2	5.1	8
WT(RF/RTJ)	Kg	3.2	3.5	5.8	8.6	12.3
Torque	N.m	25	25	35	60	70
C.V		8	13	15	32	45

CLASS 900

Note:Torque calculation pressure:15MPa

NPS	In	1/2	3/4	1	1-1/2
DN	mm	15	20	25	40
L(SW)	mm	97	97	116	127
L(RF/RTJ)	mm	216	229	254	305
H(OPEN)	mm	247	260	318	402
W	mm	180	180	250	250
WT(BW)	Kg	8.2	11	13	34
WT(RF/RTJ)	Kg	11.2	15.2	17.5	40.8
Torque	N.m	30	41	70	125
C.V		8	13	15	32

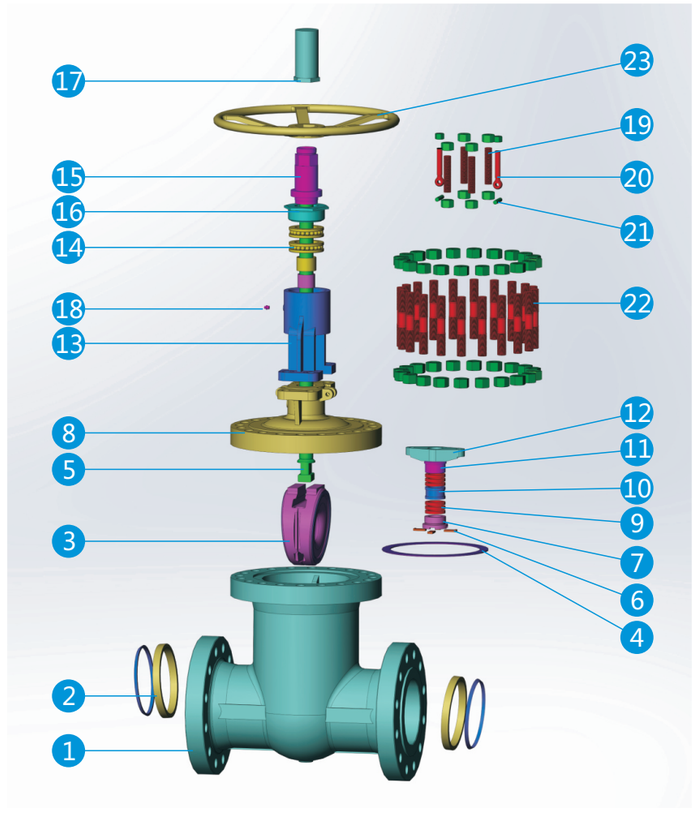
CLASS 1500

Note:Torque calculation pressure:25MPa

NPS	In	1/2	3/4	1	1-1/2
DN	mm	15	20	25	40
L(SW)	mm	126	126	176	170
L(RF/RTJ)	mm	216	229	254	305
H(OPEN)	mm	309	313	373	412
W	mm	180	180	200	250
WT(BW)	Kg	10	11	13	20
WT(RF/RTJ)	Kg	13	15.2	17.5	26.8
Torque	N.m	50	71	125	220
C.V		8	13	15	32

MAJOR FEATURE

BOLTED BONNET CAST STEEL GATE VALVES



NO.	Name
1	Body
2	Seat Ring
3	Wedge
4	Gasket
5	Stem
6	Tabs
7	Back Seat
8	Bonnet
9	Packing
10	Lantern
11	Gland
12	Gland Flange
13	Yoke
14	Bearing
15	Stem Nut
16	Retaining nut
17	Handwheel nut
18	Lubricator
19	Bolts/Nuts
20	Gland Eyebolts/Nuts
21	Pins
22	Bolts/Nuts
23	Handwheel

PRODUCT RANGE

CLASS 150	2" -60"
CLASS 300	2" -42"
CLASS 600	2" -36"
CLASS 900	2" -24"
CLASS 1500	2" -24"
CLASS 2500	2" -10"

DESIGN STANDARDS

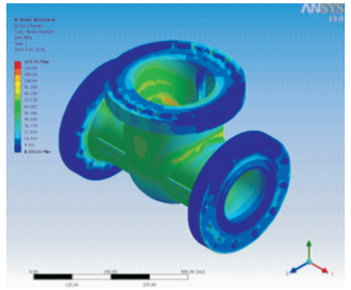
API 600
ASME B16.34

DESIGN FEATURES

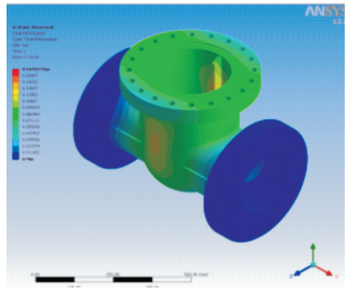
Full Port
Flexible/ Split Wedge
Bolted Bonnet
OS&Y
Rising Stem
Non- Rising Handwheel

FINITE ELEMENT ANALYSIS

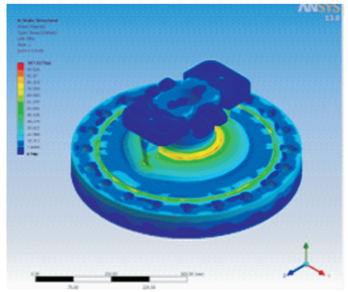
Analyze stress and strain of body and bonnet, observe the position and value of the maximum stress and strain, in order to get the most appropriate design.



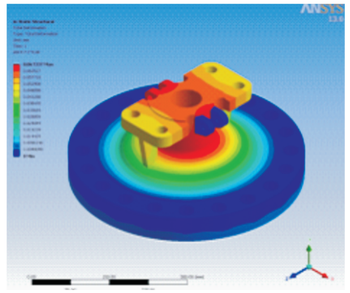
Body stress analysis



Body strain analysis

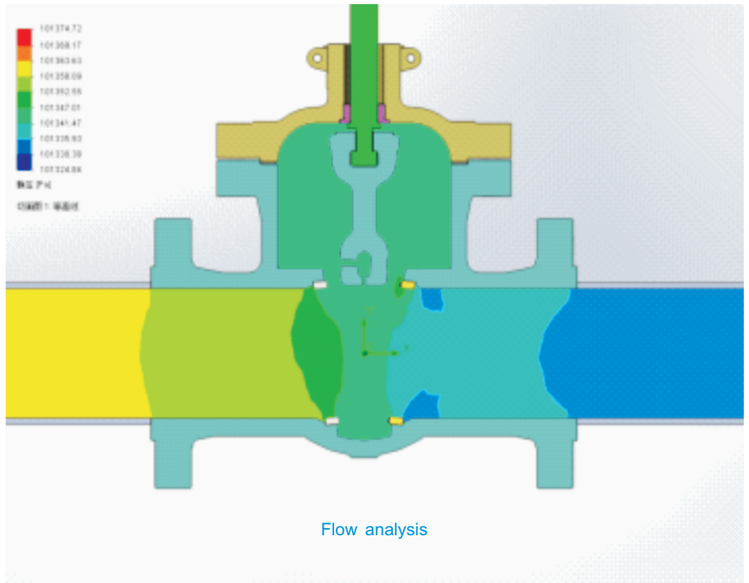


Stuffing Box stress analysis



Stuffing Box strain analysis

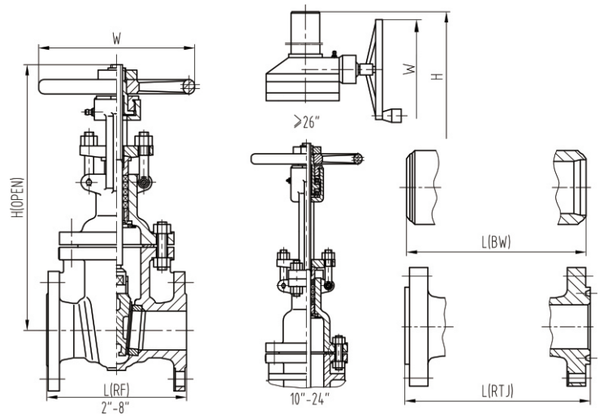
Flow analysis is to get the valve' s flow resistance coefficient an C.V values, which is to achieve the purpose of optimizing the valve design.



Flow analysis

DIMENSIONS AND WEIGHTS

BOLTED BONNET CAST STEEL GATE VALVES CLASS 150



Handwheel Operation

NPS	In	2	2-1/2	3	4	5	6	8	10	12	14	16	18	20	24
DN	mm	50	65	80	100	125	150	200	250	300	350	400	450	500	600
L(RF)	mm	178	190	203	229	254	267	292	330	356	381	406	432	457	508
L(BW)	mm	216	241	283	305	381	403	419	457	502	572	610	660	711	813
L(RTJ)	mm	191	203	216	241	267	279	305	343	368	394	419	445	470	521
H(OPEN)	mm	409	472	532	612	710	806	990	1186	1405	1615	1811	1986	2100	2500
W	mm	200	200	250	250	300	300	350	450	500	560	640	720	800	900
WT(RF/RTJ)	Kg	19	25	31	46	62	73	111	179	262	332	429	523	680	963
WT(BW)	Kg	17	22	27	40	55	64	99	162	240	303	388	440	570	960
Torque	N.m	22	25	40	60	95	135	210	185	285	345	475	595	815	1180
C.V		310	480	710	1300	1950	3100	5720	8940	13350	16275	21560	28720	35760	52165

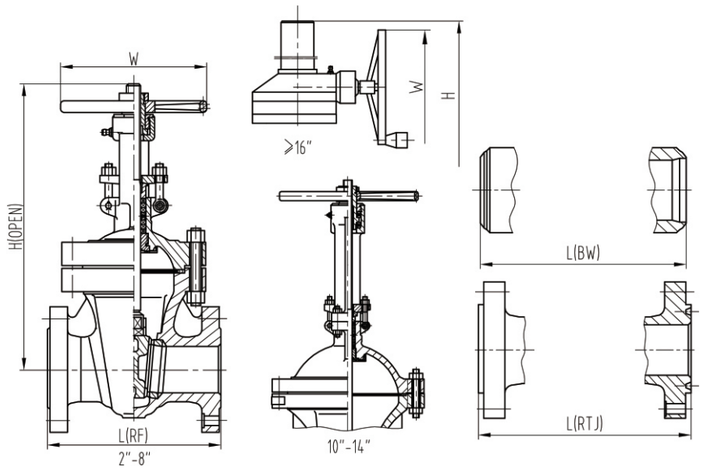
Gear operation

Note:Torque calculation pressure:2MPa

NPS	In	26	28	30	32	34	36	40	42	44	48	56	60
DN	mm	650	700	750	800	850	900	1000	1050	1100	1200	1400	1500
L(RF)	mm	559	610	610	660	711	711	762	813	813	864	965	1217
L(BW)	mm	864	914	914	965	1016	1016	--	--	--	--	--	--
L(RTJ)	mm	572	623	623	673	724	724	--	--	--	--	--	--
H(OPEN)	mm	2880	3030	3415	3500	3950	4050	4330	4785	4815	5600	6150	6220
W	mm	610	610	760	760	760	810	810	810	810	1000	1000	1000
WT(RF/RTJ)	Kg	1422	1637	2380	2578	3013	3673	4650	5073	6000	7150	11100	14800
WT(BW)	Kg	1302	1508	2030	2355	3000	3420	--	--	--	--	--	--
Torque	N.m	1420	1690	1835	2120	2400	2620	3555	3840	4160	5705	9400	11150
C.V		63500	74800	86235	103000	117374	129500	175860	223300	240884	335500	465934	533777

DIMENSIONS AND WEIGHTS

BOLTED BONNET CAST STEEL GATE VALVES CLASS 300



Handwheel Operation

NPS	In	2	2-1/2	3	4	5	6	8	10	12	14
DN	mm	50	65	80	100	125	150	200	250	300	350
L(RF/BW)	mm	216	241	283	305	381	403	419	457	502	762
L(RTJ)	mm	232	257	298	321	297	419	435	473	518	778
H(OPEN)	mm	433	477	543	650	770	880	1037	1275	1438	1600
W	mm	200	250	250	300	350	350	450	500	560	640
WT(RF/RTJ)	Kg	26	36	48	73	101	139	207	311	427	616
WT(BW)	Kg	22	31	40	58	85	120	175	250	335	515
Torque	N.m	45	55	75	120	190	295	275	450	620	820
C.V		310	480	710	1300	1950	3100	5720	8940	13350	16275

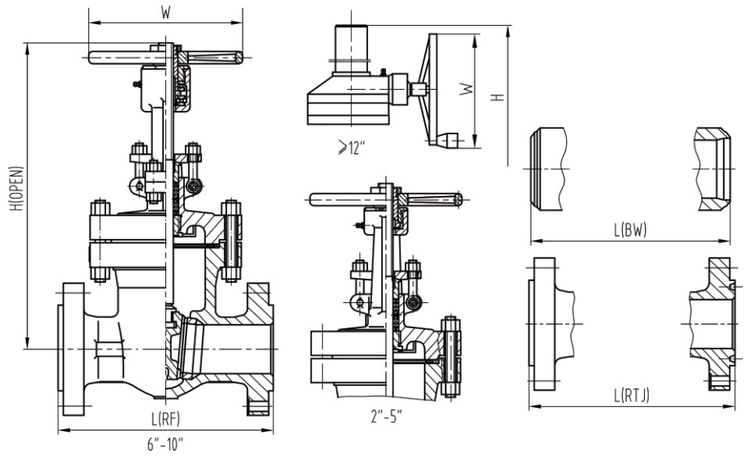
Gear operation

Note:Torque calculation pressure:5MPa.

NPS	In	16	18	20	24	26	28	30	32	34	36	40	42
DN	mm	400	450	500	600	650	700	750	800	850	900	1000	1050
L(RF/BW)	mm	838	914	991	1143	1245	1346	1397	1524	1626	1727	1930	1981
L(RTJ)	mm	854	930	1010	1165	1270	1371	1422	1552	1654	1755	--	--
H(OPEN)	mm	1790	1960	2160	2600	3050	3175	3465	3600	3800	4000	4550	4675
W	mm	460	610	610	610	610	610	610	610	760	810	1000	1000
WT(RF/RTJ)	Kg	767	969	1211	1929	3170	3510	3880	4580	5580	6535	8820	9120
WT(BW)	Kg	605	790	1010	1580	2750	3010	3350	4200	5230	5735	7820	8520
Torque	N.m	970	1240	1610	2580	3320	3785	4900	5370	5505	6785	9100	10500
C.V		21560	27890	34840	51050	62011	73046	84765	100580	117687	125825	171740	217000

DIMENSIONS AND WEIGHTS

BOLTED BONNET CAST STEEL GATE VALVES CLASS 600



Handwheel Operation

NPS	In	2	2-1/2	3	4	5	6	8	10
DN	mm	50	65	80	100	125	150	200	250
L(RF/BW)	mm	292	330	356	432	508	559	660	787
L(RTJ)	mm	295	333	359	435	511	562	663	790
H(OPEN)	mm	436	497	546	689	786	900	1037	1251
W	mm	250	250	300	350	450	500	560	720
WT(RF/RTJ)	Kg	39.3	50.9	67.5	121.2	191	254.4	399.9	637.7
WT(BW)	Kg	32.6	41.1	54.1	94.6	145.6	202.7	323.6	512.9
Torque	N.m	75	120	165	275	475	780	1170	1850
C.V		310	480	710	1300	1950	3110	5500	8485

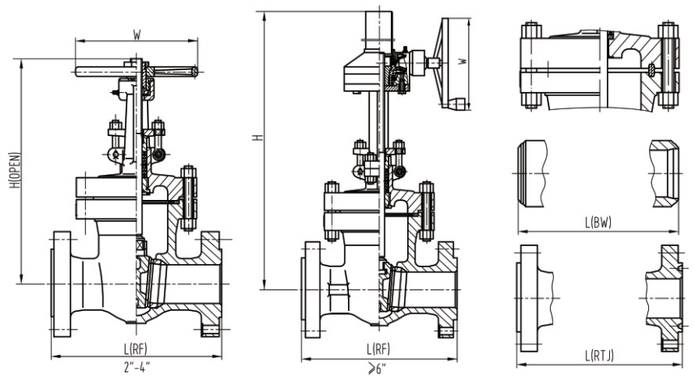
Gear operation

Note:Torque calculation pressure:10MPa.

NPS	In	12	14	16	18	20	24	26	28	30	32	34	36
DN	mm	300	350	400	450	500	600	650	700	750	800	850	900
L(RF/BW)	mm	838	889	991	1092	1194	1397	1448	1549	1651	1778	1930	2083
L(RTJ)	mm	841	892	994	1095	1200	1407	1461	1562	1664	1794	1946	2099
H(OPEN)	mm	1470	1620	1825	1990	2167	2548	2860	3300	3382	3512	3927	4134
W	mm	610	610	610	610	610	760	810	810	1000	1000	1200	1200
WT(RF/RTJ)	Kg	851.2	1089	1487	1874	2671	3828	4549	5200	7525	11077	12135	14723
WT(BW)	Kg	706.7	918	1239	1570	2287	3280	3848	4423	6426	8410	10267	13553
Torque	N.m	1400	1900	2600	3060	3850	5850	7350	8950	10500	13500	18000	20000
C.V		12850	15370	20170	26200	32100	46750	56300	65900	75520	85180	103400	114250

DIMENSIONS AND WEIGHTS

BOLTED BONNET CAST STEEL GATE VALVES
CLASS 900~1500



CLASS 900

Note:Torque calculation pressure:15MPa.

NPS	In	2	2-1/2	3	4	6	8	10	12	14	16	18	20	24
DN	mm	50	65	80	100	150	200	250	300	350	400	450	500	600
L(RF/BW)	mm	368	419	381	457	610	737	838	965	1029	1130	1219	1321	1549
L(RTJ)	mm	371	422	384	360	613	740	841	968	1039	1140	1232	1334	1568
H(OPEN)	mm	547	600	648	729	1041	1260	1590	1795	2025	2170	2362	2463	3048
W	mm	300	350	350	350	460	460	460	460	460	710	710	810	810
WT(RF/RTJ)	Kg	90	110	123	148	420	650	1160	1700	2300	2750	3000	3800	4900
WT(BW)	Kg	82	93	108	122	359	566	980	1450	2000	2390	2640	3500	4350
Torque	N.m	185	210	170	245	685	1050	1690	2345	2700	3650	5750	7350	11000
C.V		290	460	650	1200	2850	5025	7850	11500	13900	18150	23910	29550	42570

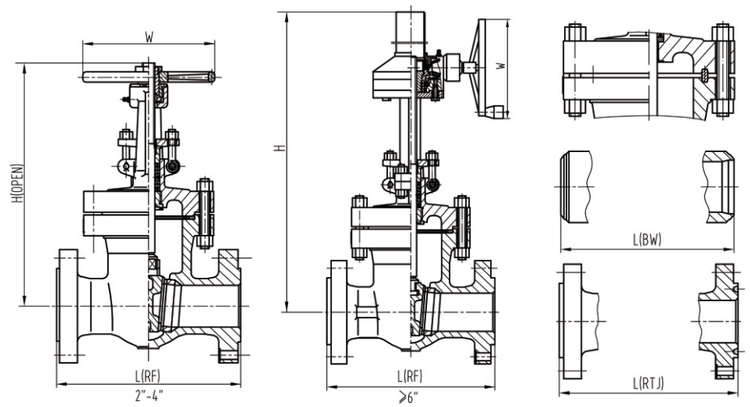
CLASS 1500

Note:Torque calculation pressure:25MPa.

NPS	In	2	2-1/2	3	4	6	8	10	12	14	16	18	20	24
DN	mm	50	65	80	100	150	200	250	300	350	400	450	500	600
L(RF/BW)	mm	368	419	470	546	705	832	991	1130	1257	1384	1537	1664	1943
L(RTJ)	mm	371	422	473	549	711	842	1001	1146	1276	1406	1559	1686	1972
H(OPEN)	mm	574	700	806	887	1079	1370	1520	1651	1945	2250	2438	2590	2946
W	mm	350	400	350	450	460	460	460	710	710	810	810	810	810
WT(RF/RTJ)	Kg	117	175	240	337	680	1228	2278	3260	4100	5960	6890	8200	9500
WT(BW)	Kg	93	144	185	285	584	978	1990	2850	3320	4890	5780	6990	8100
Torque	N.m	145	165	285	440	1125	2000	3330	4475	5910	7100	12775	13000	19000
C.V		280	450	600	1070	2500	4370	6850	9980	12000	15675	20640	25880	37175

DIMENSIONS AND WEIGHTS

BOLTED BONNET CAST STEEL GATE VALVES CLASS 2500



CLASS 2500

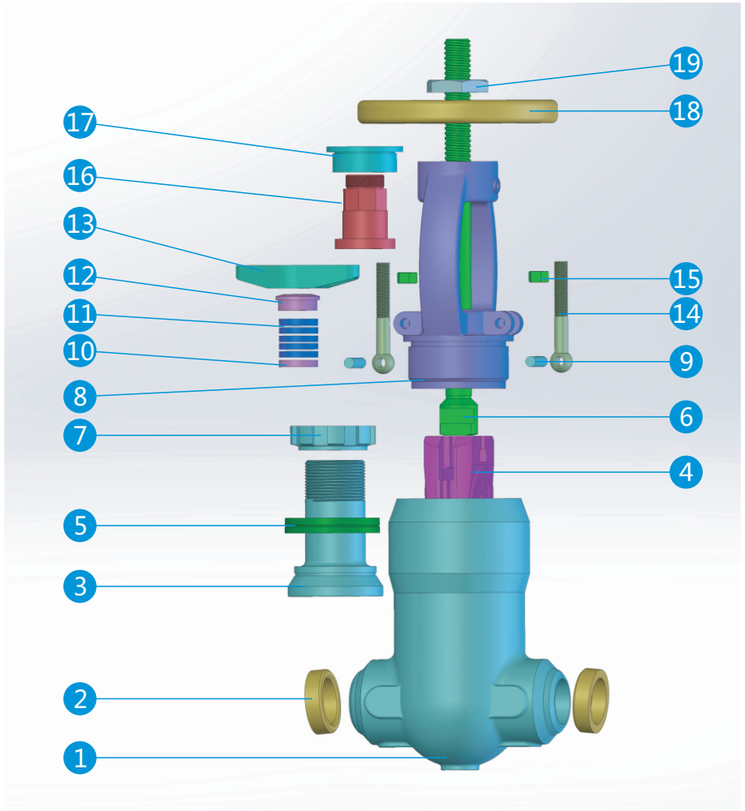
Note:Torque calculation pressure:42MPa.

NPS	In	2	2-1/2	3	4	6	8	10
DN	mm	50	65	80	100	150	200	250
L(RF/BW)	mm	451	508	578	673	914	1022	1270
L(RTJ)	mm	454	514	584	683	927	1038	1292
H(OPEN)	mm	700	750	887	1079	1370	1530	2045
W	mm	350	450	560	720	460	610	760
WT(RF/RTJ)	Kg	132	206	256	498	1550	2395	4460
WT(BW)	Kg	99	155	192	390	1230	1980	3700
Torque	N.m	230	330	400	600	1805	3400	6100
C.V		100	155	275	460	1100	1970	3130

MAJOR FEATURE

PRESSURE SEAL FORGED STEEL GATE VALVES

NO.	Name
1	Body
2	Seat Ring
3	Stuffing Box
4	Wedge
5	Sealing Ring
6	Stem
7	Nut
8	Yoke
9	Pins
10	Packing Spacer
11	Packing
12	Gland
13	Gland Flange
14	Eyebolt
15	Nuts
16	Stem Nut
17	Retaining Nut
18	Handwheel
19	Handwheel Nut



PRODUCT RANGE

CLASS 900	1/2″ -4″
CLASS 1500	1/2″ -4″
CLASS 2500	1/2″ -4″

DESIGN STANDARDS

API 600

API 602

DESIGN FEATURES

Full Port

Soild /Flexible Wedge

Pressure Seal

OS&Y

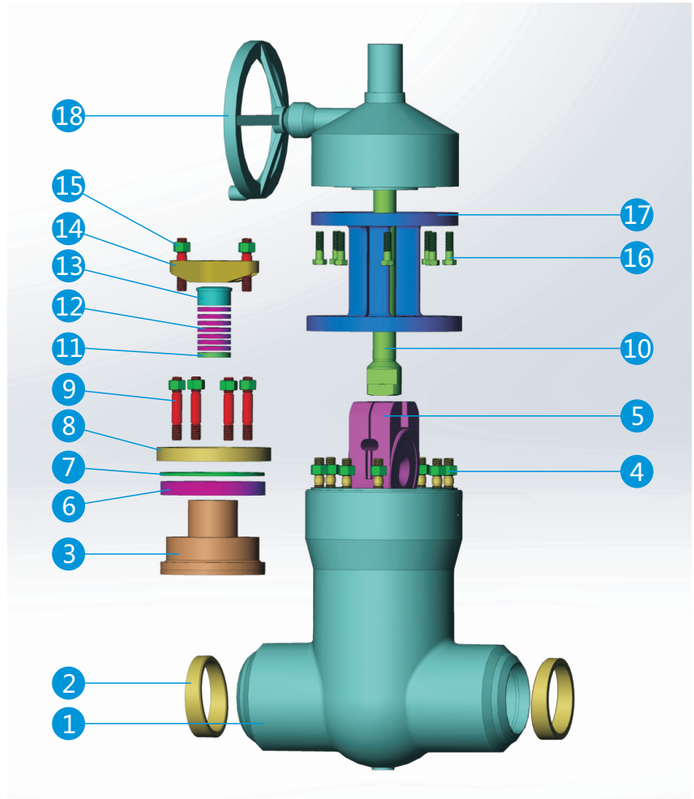
Rising Stem

Non- Rising Handwheel

MAJOR FEATURE

PRESSURE SEAL FORGED STEEL GATE VALVES

NO.	Name
1	Body
2	Seat Ring
3	Stuffing Box
4	Studs/Nuts
5	Wedge
6	Sealing Ring
7	Ring
8	Segment Ring
9	Studs/Nuts
10	Stem
11	Packing Spacer
12	Packing
13	Gland
14	Gland Flange
15	Studs/Nuts
16	Bolts
17	Yoke
18	Gear Box



PRODUCT RANGE

CLASS 900	6″ -8″
CLASS 1500	6″ -8″
CLASS 2500	6″ -8″

DESIGN STANDARDS

API 600

DESIGN FEATURES

Full Port

Flexible/ Split Wedge

Pressure Seal

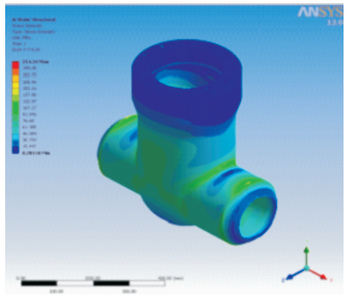
OS&Y

Rising Stem

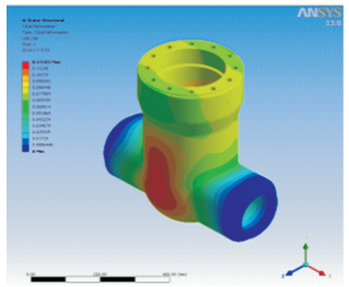
Non- Rising Handwheel

FINITE ELEMENT ANALYSIS

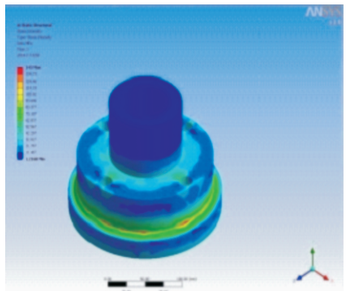
Analyze body and bonnet stress and strain,observe the position and value of the maximum stress and strain,in order to get the most appropriate design.



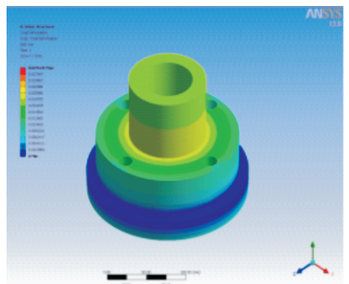
Body stress analysis



Body strain analysis

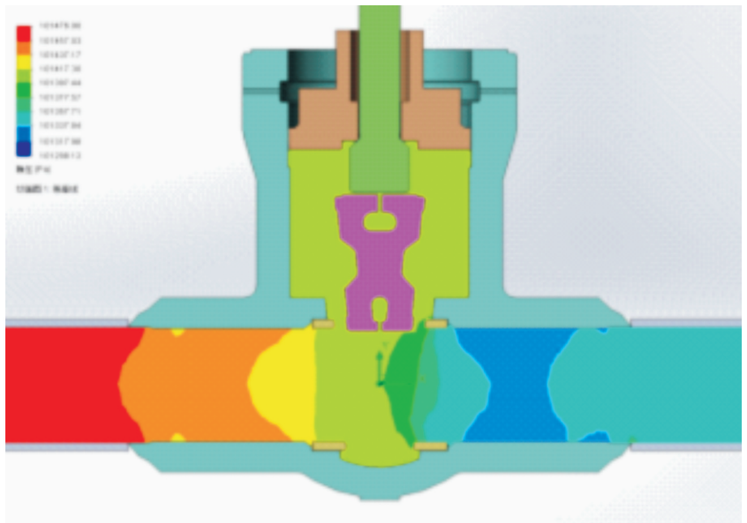


Stuffing Box stress analysis



Stuffing Box strain analysis

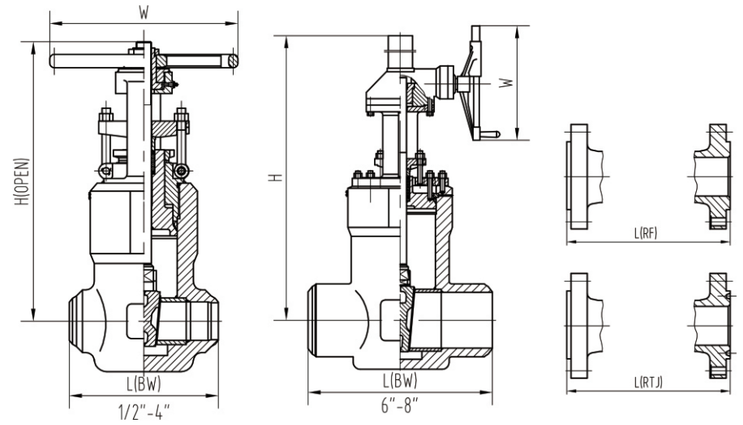
Flow analysis is to get the valve' s flow resistance coefficient an C.V values,which is to achieve the purpose of optimizing the valve design.



Flow analysis

DIMENSIONS AND WEIGHTS

FORGED STEEL GATE VALVES CLASS 900~1500



CLASS 900

Note:Torque calculation pressure:15MPa.

NPS	In	1/2	3/4	1	1-1/2	2	3	4	6	8
DN	mm	15	20	25	40	50	80	100	150	200
L(BW)	mm	92	94	100	134	216	305	356	508	660
L(RF)	mm	216	229	254	305	368	381	457	610	737
L(RTJ)	mm	216	229	254	305	371	384	460	613	740
H(OPEN)	mm	295	312	361	452	497	671	766	900	1120
W	mm	180	180	200	250	300	350	350	305	460
WT(BW)	Kg	10	11	13	20	35	64	93	275	711
WT(RF/RTJ)	Kg	13	17.5	16.2	26.8	45.8	84.6	123	350	811
Torque	N.m	30	41	70	125	185	170	245	685	1050
C.V		8	13	15	32	290	650	1200	2850	5025

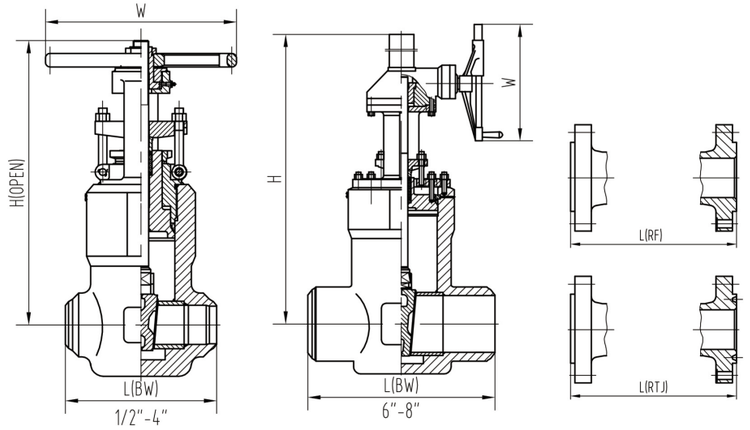
CLASS 1500

Note:Torque calculation pressure:25MPa.

NPS	In	1/2	3/4	1	1-1/2	2	3	4	6	8
DN	mm	15	20	25	40	50	80	100	150	200
L(RF)	mm	92	94	100	134	216	305	406	559	711
L(BW)	mm	216	229	254	305	368	470	546	705	832
L(RTJ)	mm	216	229	254	305	371	473	549	711	842
H(OPEN)	mm	295	312	361	452	565	705	810	950	1147
W	mm	180	180	200	250	300	350	450	460	460
WT(RF/RTJ)	Kg	10	11	13	20	56	101	176	390	910
WT(BW)	Kg	13	17.5	16.2	26.8	66.8	128.6	206	500	1100
Torque	N.m	50	71	125	220	145	285	440	1125	2000
C.V		8	13	15	32	280	600	1070	2500	4370

DIMENSIONS AND WEIGHTS

FORGED STEEL GATE VALVES CLASS 2500



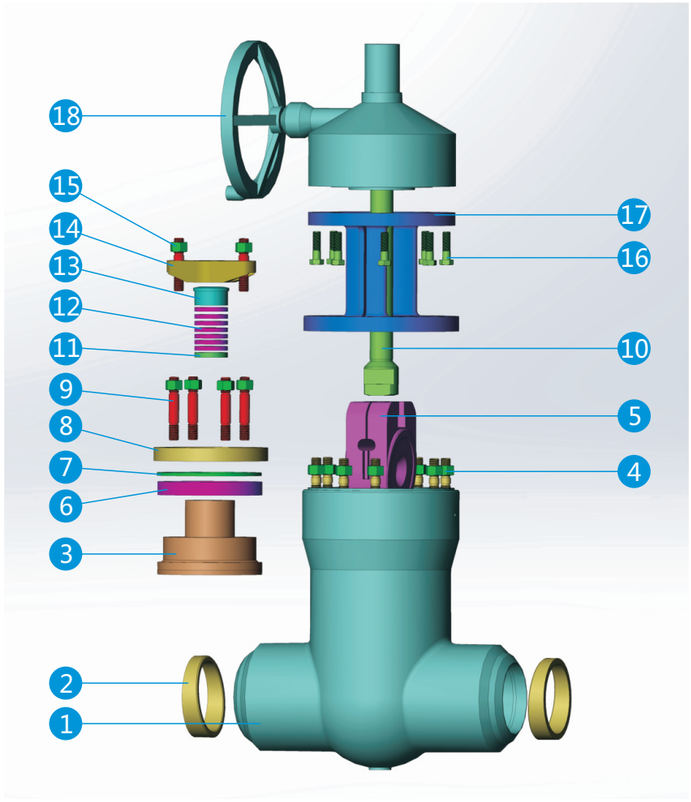
CLASS 2500

Note:Torque calculation pressure:42MPa.

NPS	In	1/2	3/4	1	1-1/2	2	3	4	6	8
DN	mm	15	20	25	40	50	80	100	150	200
L(BW)	mm	138	138	186	232	279	368	457	610	762
L(RF)	mm	264	273	308	384	451	578	673	914	1022
L(RTJ)	mm	264	273	308	387	454	584	683	927	1038
H(OPEN)	mm	377	377	451	535	648	758	812	1035	1241
W	mm	250	250	250	300	500	460	460	460	610
WT(BW)	Kg	19	19	29	40	86	190	265	640	1350
WT(RF/RTJ)	Kg	31	36	49	75	128	260	365	790	2050
Torque	N.m	145	156	85	140	230	400	600	1805	3400
C.V		5	10	11	25	100	275	460	1100	1970

MAJOR FEATURE

PRESSURE SEAL CAST STEEL GATE VALVES



NO.	Name
1	Body
2	Seat Ring
3	Stuffing Box
4	Studs/Nuts
5	Wedge
6	Sealing Ring
7	Ring
8	Segment Ring
9	Studs/Nuts
10	Stem
11	Packing Spacer
12	Packing
13	Gland
14	Gland Flange
15	Studs/Nuts
16	Bolts
17	Yoke
18	Gear Box

PRODUCT RANGE

CLASS 900	2" -24"
CLASS 1500	2" -20"
CLASS 2500	2" -20"

DESIGN STANDARDS

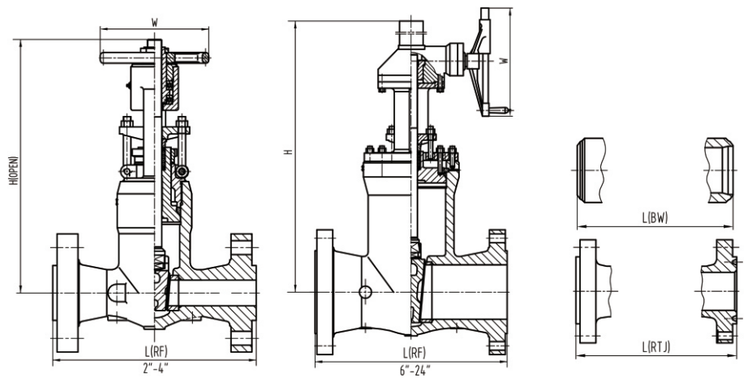
API 600

DESIGN FEATURES

- Full Port
- Flexible/ Split Wedge
- Pressure Seal
- OS&Y
- Rising Stem
- Non- Rising Handwheel

DIMENSIONS AND WEIGHTS

PRESSURE SEAL CAST STEEL GATE VALVES CLASS 900~1500



CLASS 900

Note:Torque calculation pressure:15MPa.

NPS	In	2	3	4	6	8	10	12	14	16	18	20	24
DN	mm	50	80	100	150	200	250	300	350	400	450	500	600
L(RF)	mm	368	381	457	610	737	838	965	1029	1130	1219	1321	1549
L(RTJ)	mm	371	384	460	613	740	841	968	1039	1140	1232	1334	1568
L(BW)	mm	216	305	356	508	660	787	914	991	1092	1219	1321	1549
H(OPEN)	mm	497	671	766	900	1115	1328	1518	1659	1839	2265	2411	2835
W	mm	300	350	350	460	460	460	460	460	710	710	810	810
WT(RF/RTJ)	Kg	57.2	87.7	133	221.2	505	760	1161	1411	2072	3532	4898	6677
WT(BW)	Kg	34.9	63.4	92.4	210	371	578	908	1148	1775	2989	3604	5644
Torque	N.m	185	170	245	685	1050	1690	2345	2700	3650	5750	7350	11000
C.V		290	650	1200	2850	5025	7850	11500	13900	18150	23910	29550	42570

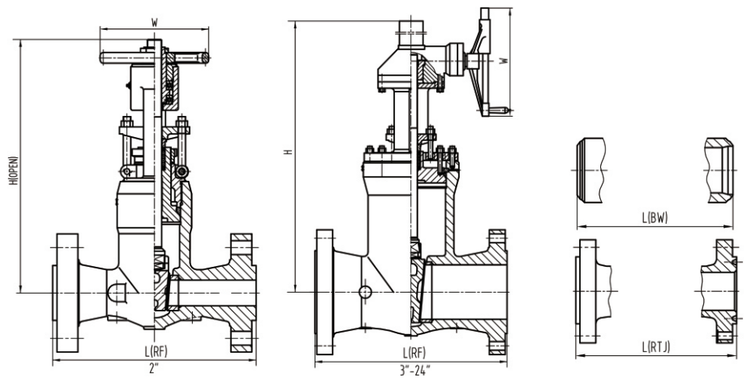
CLASS 1500

Note:Torque calculation pressure:25MPa.

NPS	In	2	3	4	6	8	10	12	14	16	18	20
DN	mm	50	80	100	150	200	250	300	350	400	450	500
L(RF)	mm	368	470	546	705	832	991	1130	1257	1384	1537	1664
L(RTJ)	mm	371	473	549	711	842	1001	1146	1276	1406	1559	1686
L(BW)	mm	216	305	406	559	711	864	991	1067	1194	1346	1473
H(OPEN)	mm	560	705	810	935	1134	1357	1559	1731	1917	2229	2378
W	mm	300	350	450	460	460	460	710	710	810	810	810
WT(RF/RTJ)	Kg	62	117.4	192.5	441	735	1312	1962	2736	3562	4200	6608
WT(BW)	Kg	39.5	77.6	135.1	317	560	981	1478	2053	2687	3176	5505
Torque	N.m	145	285	440	1125	2000	3330	4475	5910	7100	12775	13000
C.V		280	600	1070	2500	4370	6850	9980	12000	15675	20640	25880

DIMENSIONS AND WEIGHTS

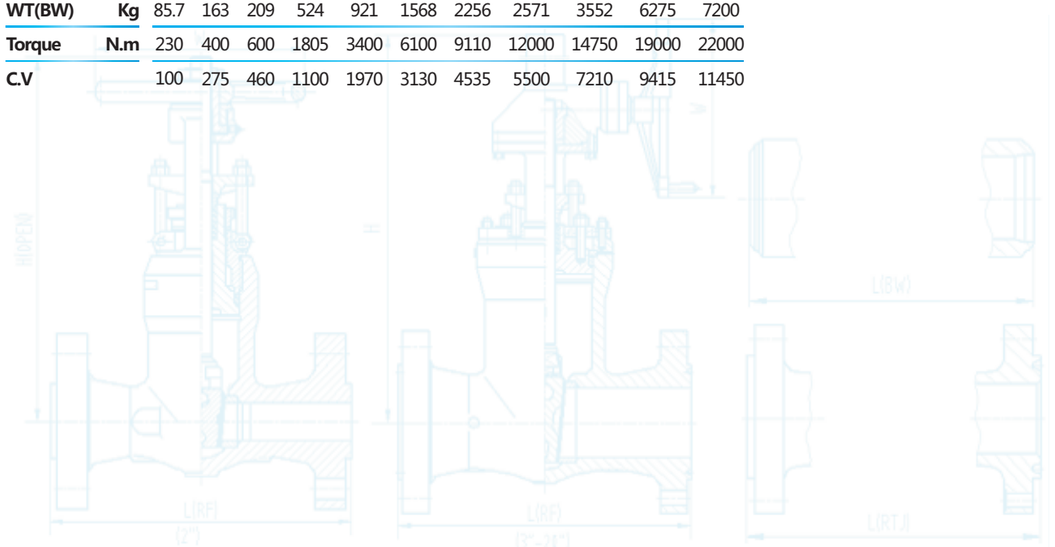
PRESSURE SEAL CAST STEEL GATE VALVES CLASS 2500



CLASS 2500

Note:Torque calculation pressure:42MPa.

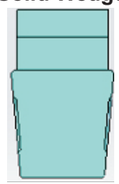
NPS	In	2	3	4	6	8	10	12	14	16	18	20
DN	mm	50	80	100	150	200	250	300	350	400	450	500
L(RF)	mm	451	578	673	914	1022	1270	1422	--	--	--	--
L(RTJ)	mm	454	584	683	927	1038	1292	1444	--	--	--	--
L(BW)	mm	279	368	457	610	762	914	1041	1118	1245	1397	1524
H(OPEN)	mm	648	753	807	1035	1168	1570	1628	2052	2098	2245	2527
W	mm	500	458	458	458	710	610	810	1000	1000	1000	1000
WT(RF/RTJ)	Kg	90.3	236	336	820	1335	2360	3516	--	--	--	--
WT(BW)	Kg	85.7	163	209	524	921	1568	2256	2571	3552	6275	7200
Torque	N.m	230	400	600	1805	3400	6100	9110	12000	14750	19000	22000
C.V		100	275	460	1100	1970	3130	4535	5500	7210	9415	11450



TYPE OF CONSTRUCTION

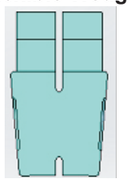
WEDGE

Solid Wedge



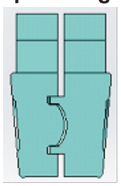
This is the most simplest wedge type and only apply to less than or equal to NPS 2. The advantages of this wedge are that it is highly resistant to corrosion and vibration. Disadvantages are that it is not self-compensating to seat distortion caused by high temperature thermal expansion or bending moments applied to the valve by piping loads which may cause the wedge to stick in the seats.

Flexible Wedge



The flexible wedge is cast or machined with a circumferential groove to allow the seating faces to move independently and adjust to movement of the body seats. It is used where line loads or thermal expansion of the system is likely to distort the seat face in the valve. This type of wedge is ideally suited for steam or other high temperature services.

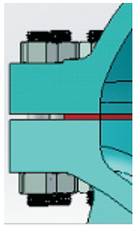
Split Wedge



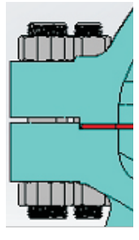
The split wedge provides complete flexibility between the two halves of the wedge to compensate for seat distortion, especially in light weight, low pressure valves. This style is also used for high pressure gas or corrosive services. It is not recommended for high velocity flow or services where suspended particles can foul the wedge.

BODY-TO-BONNET JOINT

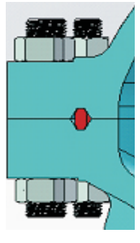
Flat Face
ONLY FOR CLASS 150



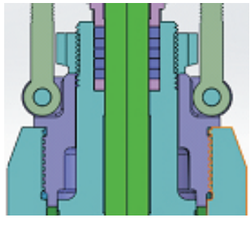
Raised Face
CLASS 300-CLASS 2500



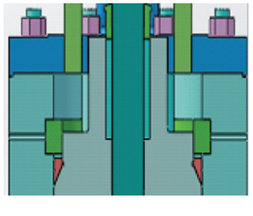
Ring Joint
CLASS 600-CLASS2500



Pressure Seal
CLASS 900-CLASS 2500 FOR ⩽4”
Sealing material:Graphite or Metal

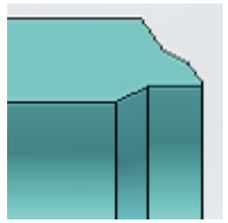


Pressure Seal
CLASS 900-CLASS 2500 FOR ⩾ 6”
Sealing material:Graphite or Metal

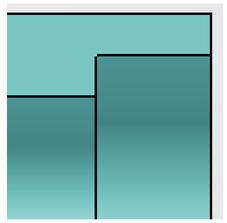


TYPE OF CONSTRUCTION

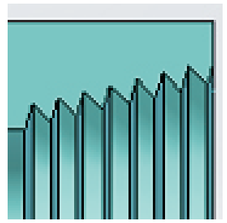
END CONNECTIONS



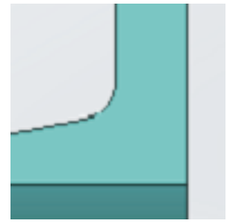
Butt-Welding End



Socket Welding End



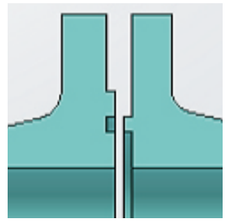
Threaded End



Flat Face

Raised Face

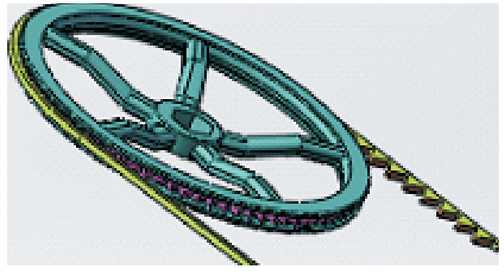
Ring Joint



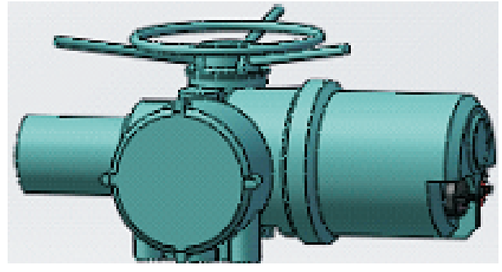
Tongue and Groove Face

Spigot Face

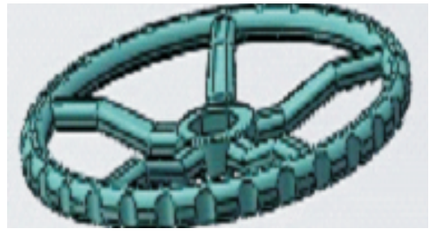
OPERATION



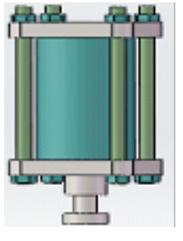
Chain wheel



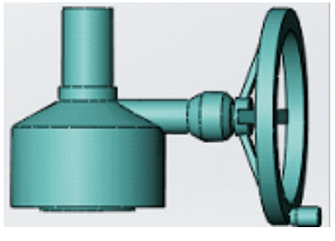
Electric Actuator



Handwheel



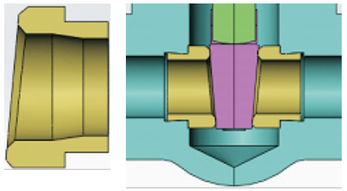
Pneumatic Actuator



Gear Box

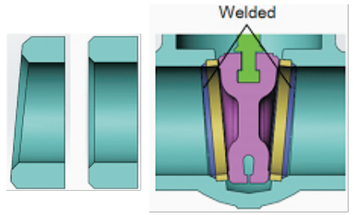
TYPE OF CONSTRUCTION

SEAT RING



Expanding Seat Ring

This expanding seat ring is suitable for the GATE VALVE, which NPS is 1/2" —2" and CLASS is 150—800.

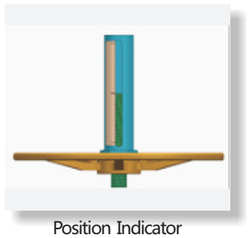


Welded Seat Ring

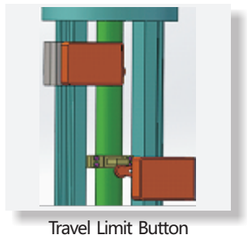
Welded seat ring ,which surface is inclined 5°is suitable for CLASS 900 and more pressure. And the vertical surface (after the assembly is inclined 5°) is suitable for CLASS 600 and less pressure.

SPECIAL REQUIREMENTS

Pressure Relief Tapping

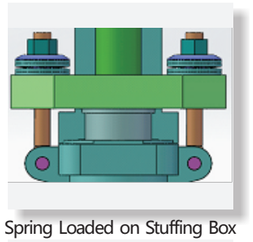


Position Indicator

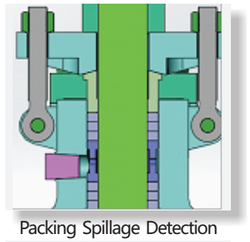


Travel Limit Button

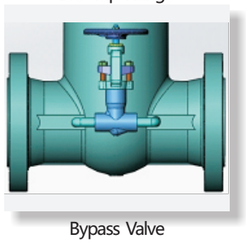
ISO Top Flange



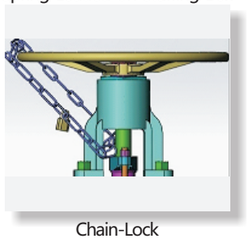
Spring Loaded on Stuffing Box



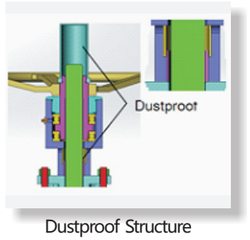
Packing Spillage Detection



Bypass Valve



Chain-Lock



Dustproof Structure

Bypass valve can apply to inlet and outlet,or inlet and cavity,in order to balance the pressure of the two ends.

SPECIAL SERVICE

NACE Valves

SUFA NACE valves are applicable to the oil exploration and natural gas where contain hydrocarbon medium, such as H2 and H2S. The NACE valves can prevent materials crack including sulfide stress cracking (SSC), stress corrosion cracking (SCC) and hydrogen induced cracking (HIC), which are caused by H2S, since a long time under acidic conditions.

The quality control of SUFA NACE valves:

1. Material and heat treatment are in strict accordance with NACE MR0175 standard requirements, without using material which is untested proved.
2. Strengthen heat treatment quality control of materials, with particular emphasis on the hardness control of the weldment' s base and heat-affected zone, ensuring the hardness of the base and the heat-affected zone are similar, and the welding parts should be annealing to reduce the sensitivity of the SSC.
3. The hardness of the base material, weld and heat-affected zone should be less than or equal 22HRC(after heat treatment to eliminate stress).

Valve Parts	ASTM Specification	NACE Hardness	API 600 Hardness
Body/Bonnet	A216 WCB	≤HRC 22(234HB)	---
Wedge	A216 WCB+13Crdeposit**	≤HRC 22(234HB)	≥250HB*
Seat Rings	A105+13Crdeposit**	≤HRC 22(234HB)	≥250HB*
Stem	A276 410	≤HRC 22(234HB)	≥200HB
Gland	A276 410	≤HRC 22(234HB)	---
Back seat	A276 410	≤HRC 22(234HB)	≥250HB
Bonnet Bolts	A193 B7M	≤HRC 22	---
Bonnet Nuts	A194 2HM	≤HRC 22	—

* Hardness differential of 50 HB is required between the seats.

** Double Tempered

Hydrogenation Valves

SUFA Hydrogenation valves are applicable to the hydrotreater where include oil, hydrogen, sulfide, and their mixture or other conditions. They can protect the valves' reliability from harsh conditions, which include Metallic materials' variability caused by hydrogen ions and H2S stress corrosion cracking under the room temperature (SSC), Hydrogen ions to the inside and outside of
the metal decarbonization, rapid and uniform corrosion caused by H2S, Stress corrosion cracking is accelerated by hydrogen and chloridion together under the high temperature(HIC).

The quality control of SUFA Hydrogenation valves:

1. Using reasonable structure design, the maximum to avoid stress concentration and stress corrosion generation in the harsh conditions.
2. Material and heat treatment are in strict accordance with hydrogenation

standard requirements, without using material which is untested proved.
3. Carbon steel and alloy steel use the electric furnace + VOD or furnace + AOD smelting method. And strictly control the material' s chemical composition and mechanical properties, such as the content of sulfur, phosphorus and other harmful impurities elements, grain size, non-metallic entrainment and other indicators.
4. Body and bonnet of SUFA hydrogenation valves not only apply RT or UT inspection, but also apply the whole surface MT or PT.
5. In addition to routine factory tests, and increase low pressure gas seals test, micro-leakage test, and high-pressure gas strength test according to user requirements.

THE SELECTION RECOMMENDATION TABLE OF SUFA HYDROGENATION VALVE BODY MATERIAL.

Medium	Temperature	Body Material
Oil	≤260℃	ASTM A105、ASTM A216 WCB
Oil	261-350℃	ASTM A105、ASTM A216 WCB
Oil	261-350℃	ASTM A182 F321 or F347、ASTM A351 CF8C
H2	≤260℃	ASTM A105、ASTM A216 WCB
H2+H2S	≤200℃	ASTM A105、ASTM A216 WCB
H2+H2S	201-280℃	ASTM A182 F11、ASTM A217 WC6
H2+H2S	281-350℃	ASTM A182 F22、ASTM A217 WC9
H2+H2S	≥351℃	ASTM A182 F321 or F347、ASTM A351 CF8C
Oil+H2+H2S	≤200℃	ASTM A105、ASTM A216 WCB
Oil+H2+H2S	201-280℃	ASTM A182 F11、ASTM A217 WC6
Oil+H2+H2S	281-350℃	ASTM A182 F22、ASTM A217 WC9
Oil+H2+H2S	≥351℃	ASTM A182 F321 or F347、ASTM A351 CF8C

TESTING AND INSPECTION

TESTING

General valve, NACE Valves and Hydrogenation Valves testing are according to the API598.However, Hydrogenation Valves testing time is two times of the requirements, and full (100%) valves must be done high pressure seal testing with liquid and gas seal testing with 0.6MPa.Hydrogenation valves' micro leak testing is according to requirements of the ISO 15848.The testing of various valve are as follows.

Test Description	Valve Type		
	General valve	NACE Valves	Hydrogenation Valves
shell	√	√	√
backseat	√	√	√
low-pressure closure	a	a	√
high-pressure closure	a	a	√
Micro leak testing	—	—	√

NOTE:

a—When DN（NPS）≤DN100（NPS4）and ASME class≤1500，or DN（NPS）＞DN100（NPS4）and ASME class≤600，low-pressure closure is required，high-pressure closure is optional. And when DN（NPS）≤DN100（NPS4）and ASME class＞1500，or DN（NPS）＞DN100（NPS4）and ASME class＞600，low-pressure closure is optional，high-pressure closure is required.
1. The high-pressure closure include seat ring and wedge seal, body and bonnet flange seal, and stem packing seal.
2. When the purchaser specifies an "optional" test, the test shall be performed in addition to the required tests.
3. When there are clear requirements for the testing items in the order, the testing must be carried out with requirements of the order.

INSPECTION

The inspections of SUFA various types of valves are in accordance with ASME and other related code requirements. According to the different operating conditions and quality controls, the inspection items of the bearing pressure components (including stem) are shown in the following table.

Inspection Items	Valve Type			Normative References
	General valve	NACE Valves	Hydrogenation Valves	
Visual inspection	√	√	√	MSS SP-55
Dimensions	√	√	√	Design Requirements
Hardness control	a	√	√	NACE MR0175
Chemical composition	√	√	√	Relevant Material specifications of ASTM
mechanical properties	√	√	√	Relevant Material specifications of ASTM
Forging ultrasonic testing	b	b	√	ASTM A388
Casting ray testing	c	c	√	ASME B16.34
Surface magnetic particleand penetrant testing	—	—	d	MT：ASTM A275, ASTM E709；PT：ASTM E165
Surfacing sealing surface penetrant testing	√	√	√	ASME BPVC Ⅷ
Butt end beveling ray testing and surface penetration testing	√	√	√	ASME B16.34
others	—	—	e	

NOTE:

1. When there are clear requirements for the inspection items in the order , the inspection must be carried out with requirements of the order.
a—The bearing pressure components of General valve' hardness reference requirements of the ASTM code.
b—General valves and NACE valves, which pressure rating is CLASS≥900, the forgings do the ultrasonic testing, however hydrogenation valves are all done in all pressure ratings.
c—General valves and NACE valves, which pressure rating is CLASS≥900, the Castings do ray testing, however hydrogenation valves are all done in all pressure ratings.
d—The outer surface and the inner surface which can be reached of the carbon steel and alloy steel bearing pressure components shall be magnetic particle testing everyone, and penetrant testing for stainless steel. Of course, penetrant testing can take the place of magnetic particle testing for carbon steel and alloy steel.
e—The hydrogenation valves also need to inspect the content of harmful elements(such as S and P),grain size, metallurgical structure and so on.