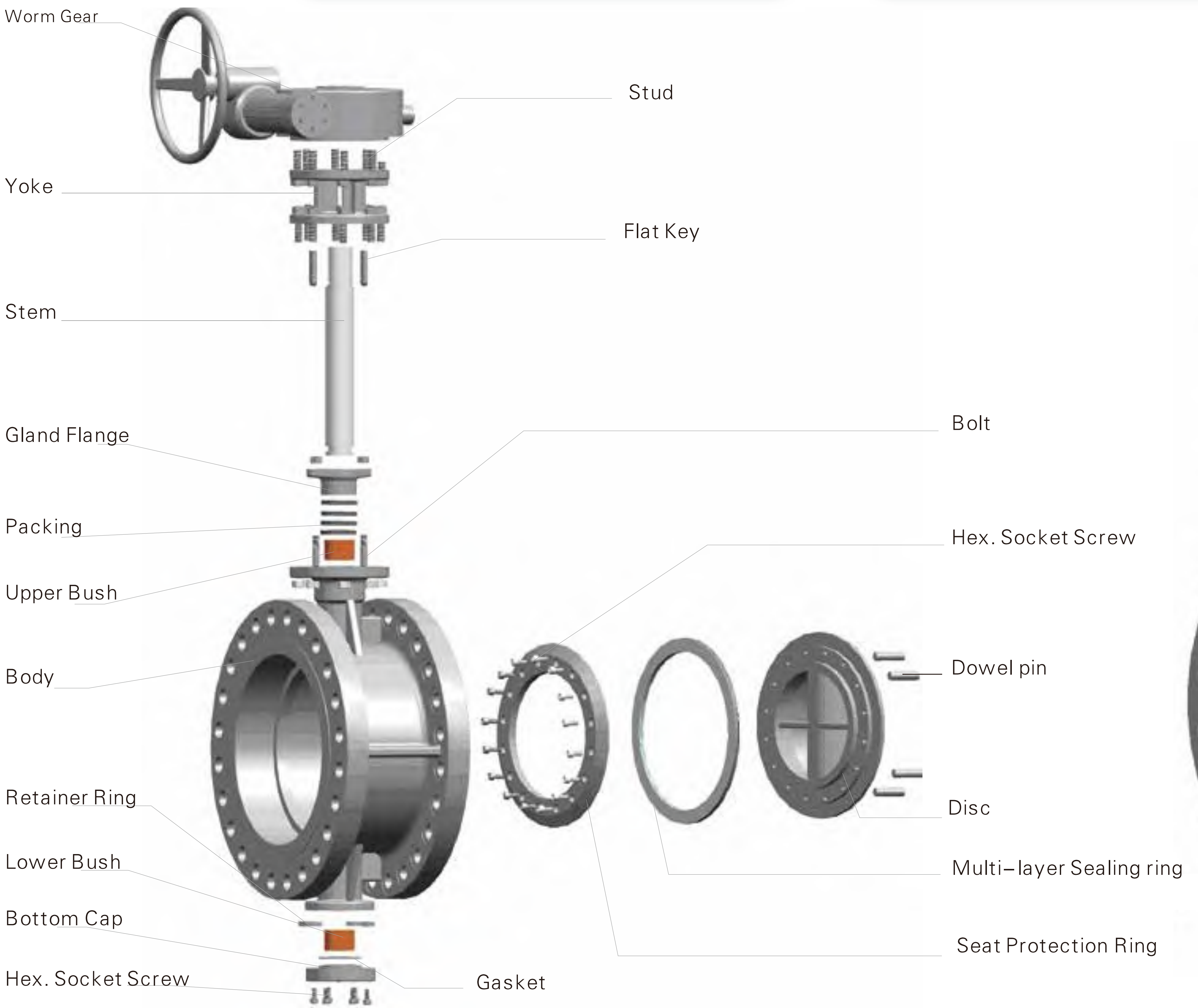
3D DIAGRAM & PART NAMES OF THE BUTTERFLY VALVE

SENSO



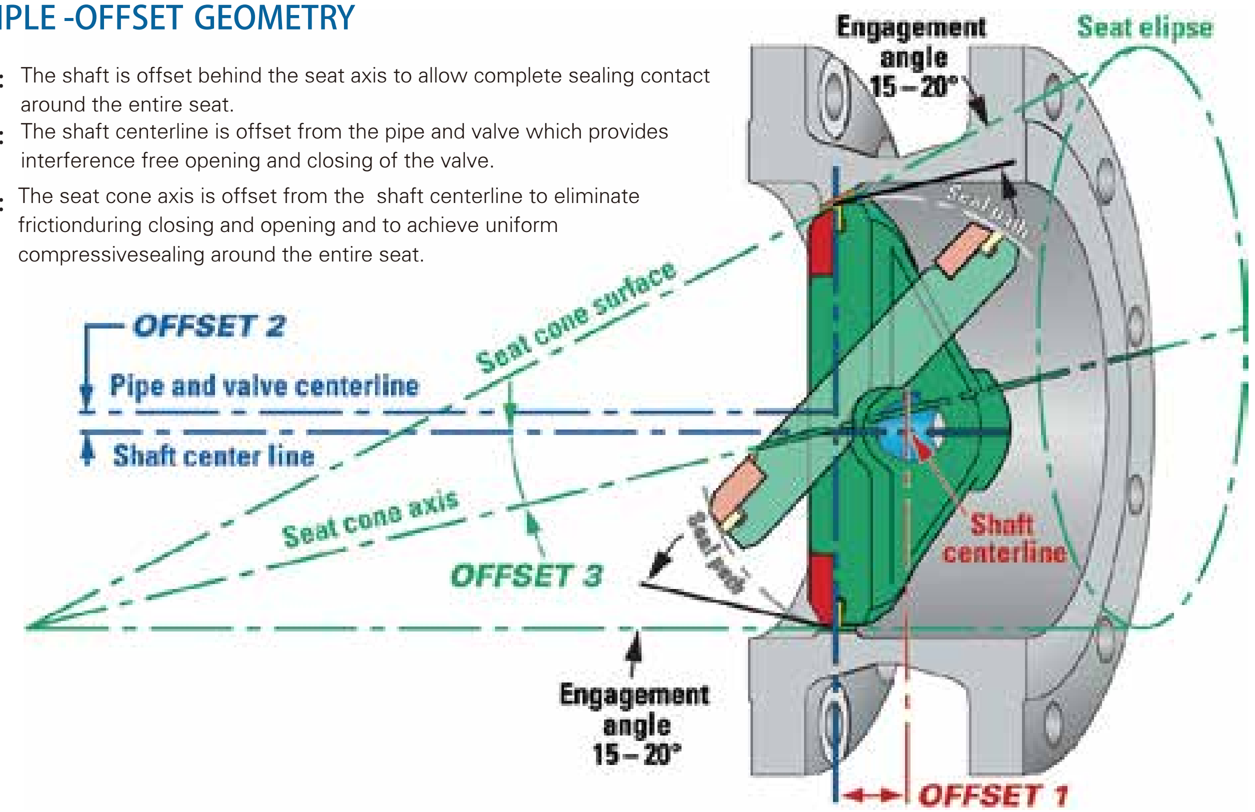
The **SENSI** Triple–Offset Butterfly Valve provides a bi–directional bubble tight shut–off. This geometry ensuresthat the disc seal contacts the body seat only at the final shut–off position without rubbing or galling, providing atorque generated resilient seal with sufficient "wedging" to ensure a uniform seal contact.

THE TRIPLE -OFFSET GEOMETRY

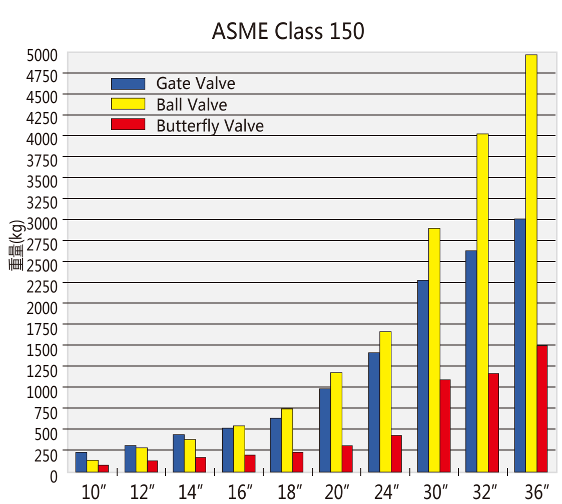
OFFSET 1: The shaft is offset behind the seat axis to allow complete sealing contact around the entire seat.

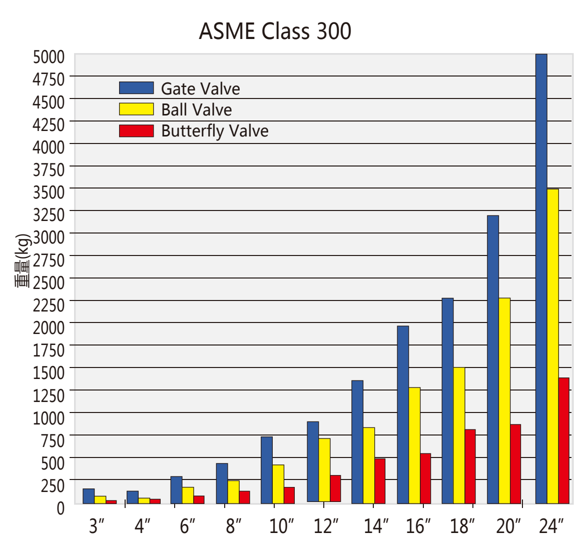
OFFSET 2: The shaft centerline is offset from the pipe and valve which provides interference free opening and closing of the valve.

OFFSET 3: The seat cone axis is offset from the shaft centerline to eliminate frictionduring closing and opening and to achieve uniform compressivesealing around the entire seat.

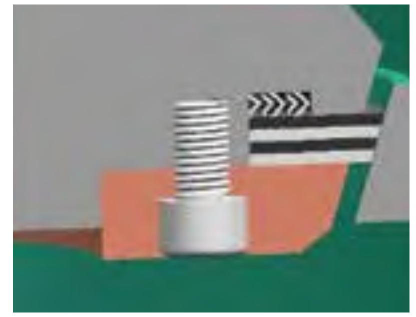


COMPARE THE WEIGHTS

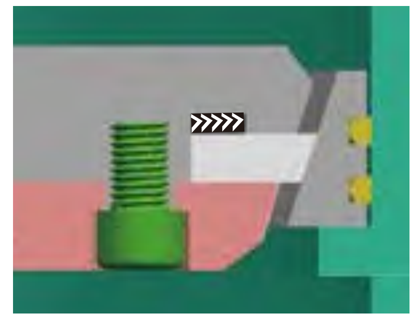




FEATURE FOR BI-DIRECTIONAL

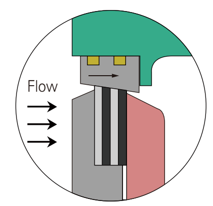


SENSI provides a multi–layer seal ring with extra rigid retaining ring with bolting on the disc,designed in responseto ASME stress calculations.
(1) The seat is hardfaced with Stellite, frication free sealing for long cycle life
(2) The gasket is spiral wound SS/Graphite for zero leakage.
(3) Carbon/Stainless Steel construction and metallic seal provide Inherent Fire Safe Function.



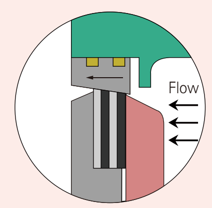
SENSI provides an extra active seat ring with O–Rings in the body
(1) A Stainless Steel seat ring with electroplated Chrome, frication free sealing against the seal ring with seat for a long cycle life.
(2) The seat ring can active and adjust by itself to match the seal ring from disc
(3) The O–Ring is made of Rubber or Fluoroplastic for different projects Maximal temperature is: 325℃ / 608 ℉
(4) Performance: Multi–Layer SS/Graphite Seal Ring can be zero leakage from 100% bi–directional

DESIGN FOR BI-DIRECTIONAL



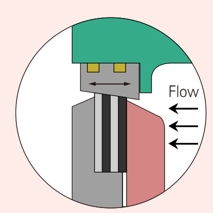
Preferential Side

Preferential Side
When valve is closing, discal ring been moved to contact the seat.
With the same eccentric angle, seal ring contact seat closely, drive the seat move towards body seat.O–Rings provide a tight seal between seat and body
Seal ring provide a tight seal between seat and seal



Reversed Side(A)
Big pressure Difference

Reversed Side (A)
A big pressure difference, stem force hold the disc/ seal ring not moved, flow pressure drive the seatcontact seal ring closely.
O–Rings provide a tight seal between seat and body
Seal ring provide a tight seal between seat and seal



Reversed Side(B)
Small Pressure Difference

Reversed Side (B)
A small pressure difference, flow pressure didn't have enough power to drive the seat to seal ring.Keep closing disc / seal to contact the seat, drive the seat move towards body seat.
O–Rings provide a tight seal between seat and body
Seal ring provide a tight seal between seat and seal

TRIPLE OFFSET BUTTERFLY VALVE
FEATURE AND BENEFITS
SENSI

Feature and Benefits.

1. **Triple Offset Design**
Eliminates wear associated with sealing surface contact and maintains sealing integrity and high cycle life

2. **Wide Angle Seat Design**
Eliminates wedging and binding of the seat / disc engagement

3. **Torque Seated Resilient Multi-Layer Seal Ring**
Provides reliable zero leakage and bi-directional

4. **Bubble – Tight Closure**
Provides process efficiency with reduced cost of maintenance

5. **New Seat Ring Construction for Bi-Directional**
New independent and oneself adjust seat can match with seal ring in the disc from eccentric design

6. **Robust Single–Piece Shaft**
Minimizes shaft deflection and permits bi-directional sealing bubble-tight closure

7. **Optional Stellite Seat**
Offer optimum resistance to erosion in abrasive and high velocity applications

8. **No Plastics or Elastomers**
Prevent fire-safe system security at extreme temperatures

9. **Blowout – Proof Shaft**
Complies with API609 to improve safety for operating personnel

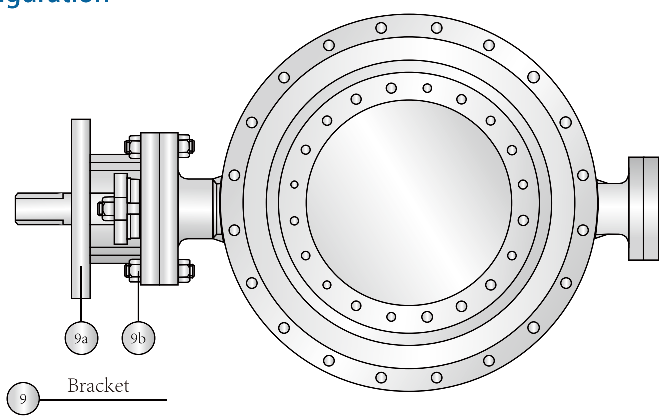
10. **Optional ASME B16.10 Flange**
Interchangeable with Gate Valve and Ball Valve lay lengths

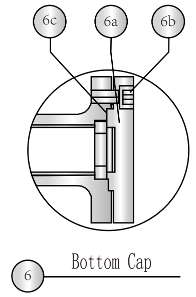
11. **Quarter Turn Design**
Reduces emissions and improves containment integrity from packing.

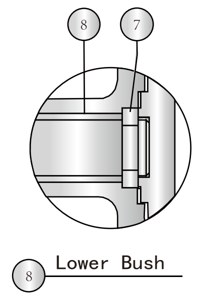
12. **90°Low Torque Actuation**
Enables simplified, cost-effective automation

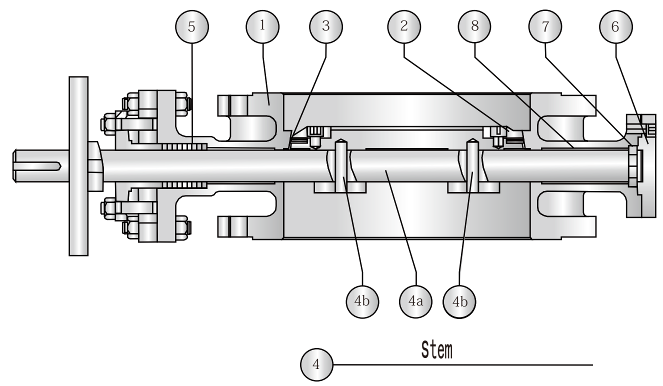
13. **Inherent Fire Safe Function**
Carbon/Stainless Steel construction and metallic seal provide Inherent Fire Safe Function.

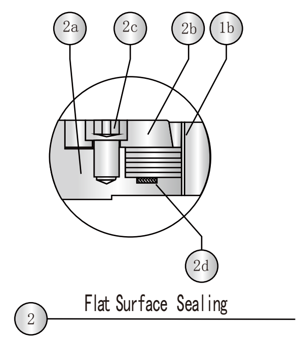
Basic Configuration
Optional

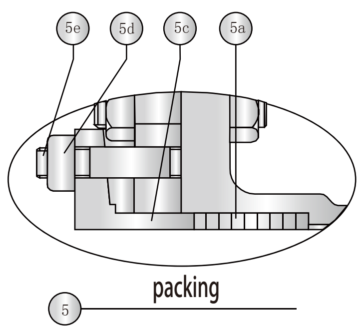


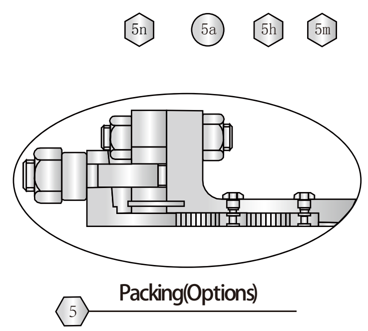


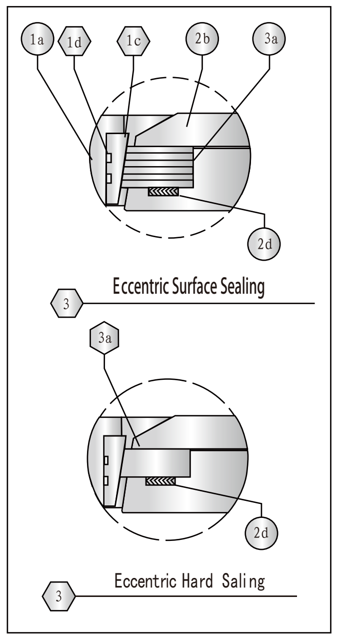




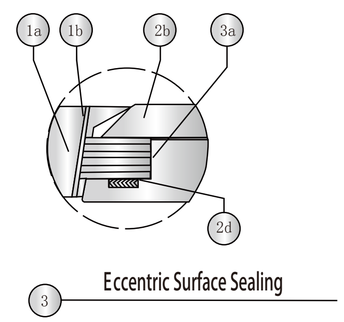


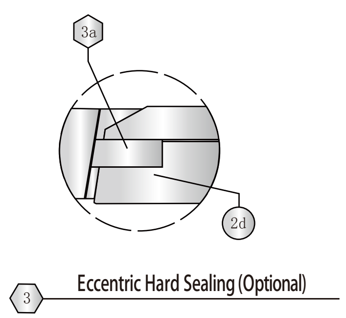






New design for Bi-Directional





Material List,according to ASTM Standard

Item	Part Name	Material List	Material List
1a	Body	ASTM A216 WCB	ASTM A351 CF8
1b	Body Seat	Overlay 13%Cr / Stellite	Integral Body / Overlay Stellite
2a	Disc	ASTM A216 WCB	ASTM A351 CF8
2b	Seat Protection Ring	ASTM A105	ASTM A182 F304
2c	Hex. Socket Screw	Stainless Steel A2	Stainless Steel A2
2d	Fire Safe Gasket	AISI 304+Graphite	AISI 304+Graphite
3a	Mulit-Layer Seal Ring	AISI 304+Graphite	AISI 304+Graphite
4a	Stem	ASTM A182 420	ASTM A182 F304
4b	Dowel Pin	ASTM A105	AISI 304
5a	Packing	Graphite	Graphite
		PTFE(RPTFE)	PTFE(RPTFE)
5c	Packing Gland	ASTM A216 WCB	ASTM A351 CF8
5d	Nut	ASTM A194 2H	ASTM A194 8
5e	Bolt	ASTM A193 B7	ASTM A193 B8
6a	Botton Cap	ASTM A105	ASTM A182 F304
6b	Hex. Socket Screw	Carbon Steel	Stainless Steel A2
6c	Gasket	AISI 304+Graphite	AISI 304+Graphite
7	Retainer Ring	ASTM A182 F6a	ASTM A182 F304
8a	Bush	SF -1B	AISI 304
		AISI 316	******
9a	Bracket	ASTM A216 WCB	ASTM A216 WCB
		******	ASTM A351 CF8
9b	Bracket Nut	ASTM A193 B7	ASTM A193 B8

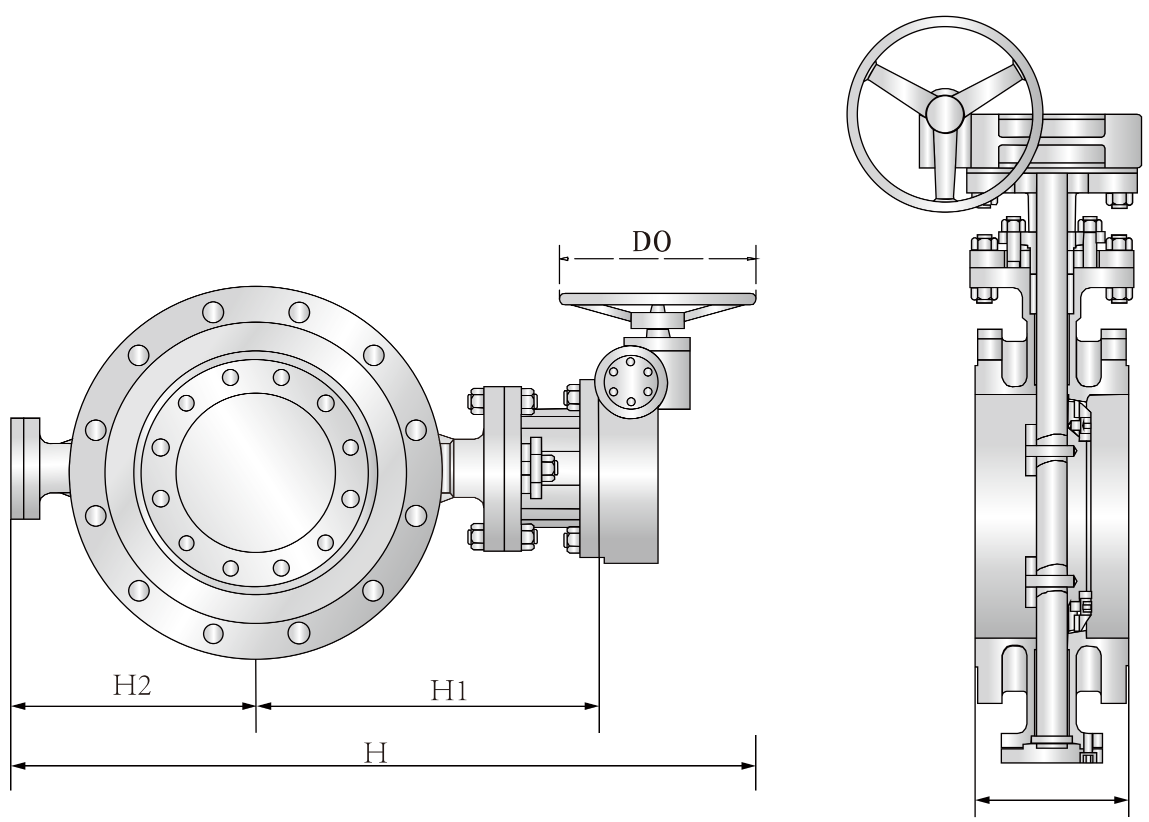
Options availbable upon request

Lubrication		Material List	Material List
5h	Lantern Ring	AISI 410	AISI 304
5m	Plug Valve	Stainless Steel	AISI 304
Live Loading Packing			
5n	Belleville Spring	Stainless Steel or Spring Steel Nickel Plated	
Fire Safe Design			
2d	Gasket	AISI 304+Graphite	AISI 304+Graphite
Hard Sealing Design			
3a	Hard Sealing Ring	ASTM A182 F304	ASTM A182 F304
New Seat Ring Design (temperature upto 250)			
1d	O-Ring	NBR / VITON	NBR / VITON
1c	New Seat Ring	ASTM A182 F304	ASTM A182 F304

API/ANSI BUTTERFLY VALVE -
DOUBLE FLANGES SHORT PATTERN

SPECIFICATION :

- Design Code :
  ASME B16.34 / API 609 Catalog B
- Face to face (Double Flange Short Pattern):
  API 609 Catalog B Short Pattern
  ISO5752 Basic Series 13
  EN 558–2 & EN 593
- Flange Connection :
  NPS 2"~24" ASME B16.5
  Above 24" ASME B16.47 A/B
- Testing / Inspection :
  API 598



150LB

Size	DN	L	H	H1	H2	D0
2"	50	108	415	200	110	160
2.5"	65	112	445	215	125	160
3"	80	114	460	225	130	160
4"	100	127	490	240	145	160
5"	125	140	605	270	165	280
6"	150	140	635	290	175	280
8"	200	152	740	340	245	230
10"	250	165	815	375	280	250
12"	300	178	935	425	315	300
14"	350	190	1005	455	350	300
16"	400	216	1095	495	380	320
18"	450	222	1135	510	395	320
20"	500	229	1250	560	435	350
24"	600	267	1360	635	495	350
28"	700	292	1410	650	500	400
30"	750	318	1450	660	520	400
32"	800	318	1555	715	550	450
36"	900	330	1740	815	630	450
40"	1000	410	1880	880	680	500
42"	1050	410	1975	920	720	500
48"	1200	470	2130	995	795	500
56"	1400	530	2440	1155	900	550
60"	1500	530	2580	1255	965	550

300LB

Size	DN	L	H	H1	H2	D0
2"	50	150	485	200	115	280
2.5"	65	170	515	220	125	280
3"	80	180	535	230	135	280
4"	100	190	580	255	155	280
5"	125	200	650	260	185	250
6"	150	210	705	330	215	250
8"	200	230	800	370	250	250
10"	250	250	925	425	290	300
12"	300	270	990	455	325	320
14"	350	290	1070	500	360	320
16"	400	310	1175	550	395	350
18"	450	330	1230	585	415	350
20"	500	350	1385	655	470	400
24"	600	390	1570	735	545	450
28"	700	430	1640	780	540	500
30"	750	450	1690	790	580	500
32"	800	470	1805	855	630	500
36"	900	510	1930	910	685	500
40"	1000	550	2090	1000	680	500
42"	1050	570	2145	1030	785	550
48"	1200	630	2350	1140	875	550

600LB

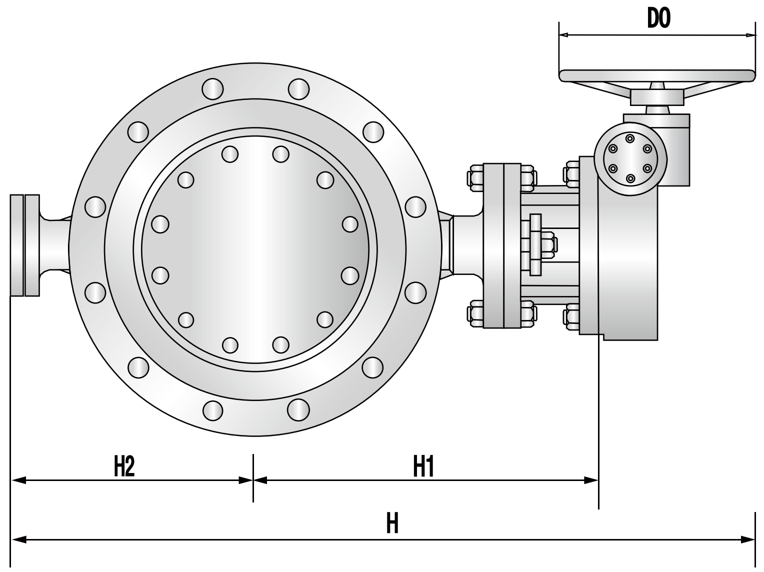
Size	DN	L	H	H1	H2	D0
6"	150	210	795	355	250	300
8"	200	230	910	410	290	320
10"	250	250	1000	455	335	320
12"	300	270	1140	530	380	350
14"	350	290	1170	550	390	350
16"	400	310	1330	625	445	400
18"	450	330	1430	665	475	450
20"	500	350	1530	715	520	450
24"	600	390	1735	815	585	500

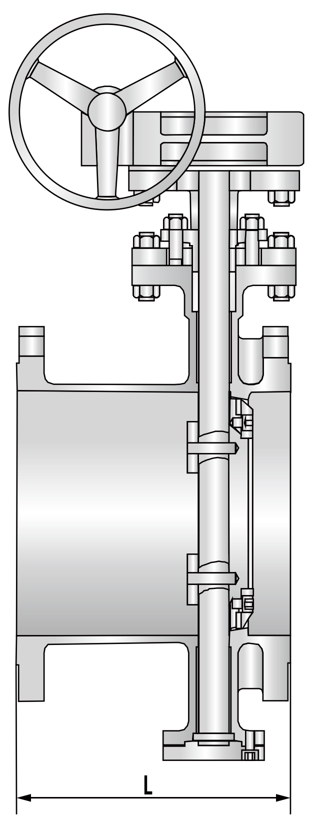
900LB

Size	DN	L	H	H1	H2	D0
6"	150	267	930	400	270	500
8"	200	292	1080	500	315	500
10"	250	330	1170	505	365	500
12"	300	356	1310	580	400	700
14"	350	381	1350	600	420	700
16"	400	406	1430	630	455	700
18"	450	432	1570	690	505	700
20"	500	457	1640	730	535	800
24"	600	508	1840	840	620	800

SPECIFICATION:

- Design Code:
  ASME B16.34 / API 609 Catalog B
- Face to face (Double Flange Long Pattern):
  API 609 Catalog B Short Pattern
  ISO5752 Basic Series 13
  EN 558-2 & EN 593
- Flange Connection:
  NPS 2"~24" ASME B16.5
  Above 24" ASME B16.47 A/B
- Testing / Inspection:
  API 598





150LB

Size	DN	L	H	H1	H2	D0
2"	50	178	415	200	110	160
2.5"	65	191	445	215	125	160
3"	80	203	460	225	130	160
4"	100	229	490	240	145	160
5"	125	254	610	270	165	280
6"	150	267	635	290	175	280
8"	200	292	740	340	245	230
10"	250	330	815	375	280	250
12"	300	356	935	425	315	300
14"	350	381	1005	455	350	300
16"	400	406	1095	495	380	320
18"	450	432	1135	510	395	320
20"	500	457	1250	560	435	350
24"	600	508	1360	635	495	350
28"	700	610	1410	650	500	400
30"	750	610	1450	660	520	400
32"	800	660	1555	715	550	450
36"	900	711	1740	815	630	450

300LB

Size	DN	L	H	H1	H2	D0
2"	50	216	485	200	115	280
2.5"	65	241	515	220	125	280
3"	80	282	535	230	135	280
4"	100	305	580	255	155	280
5"	125	381	625	300	185	250
6"	150	403	705	330	215	250
8"	200	408	800	370	250	250
10"	250	457	925	425	290	300
12"	300	502	990	455	325	320
14"	350	762	1070	500	360	320
16"	400	838	1175	550	395	350
18"	450	614	1230	585	415	350
20"	500	991	1385	655	470	400
24"	600	1143	1570	735	545	450
28"	700	1346	1640	780	540	500
30"	7450	1397	1690	790	580	500
32"	800	1524	1805	855	630	500
36"	900	1727	1930	910	685	500

600LB

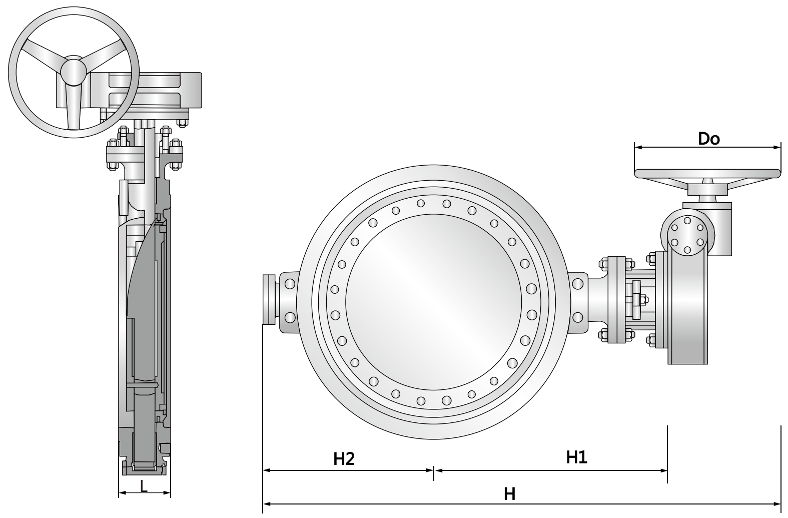
Size	DN	L	H	H1	H2	D0
6"	150	559	795	355	250	300
8"	200	660	910	410	290	320
10"	250	787	1000	455	335	320
12"	300	838	1140	530	380	350
14"	350	889	1170	550	390	350
16"	400	991	1330	625	445	400
18"	450	1092	1430	665	475	450
20"	500	1194	1530	715	520	450
24"	600	1397	1735	815	585	500

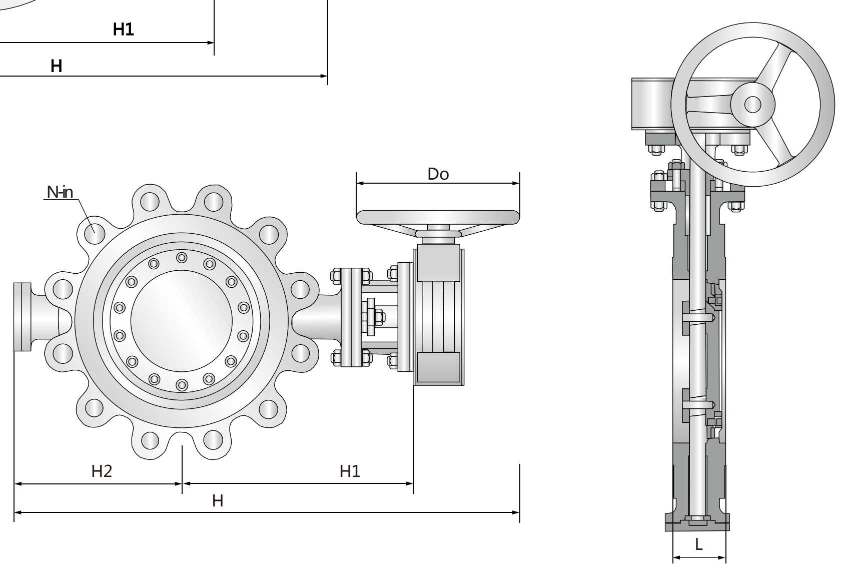
900LB-

Size	DN	L	H	H1	H2	D0
6"	150	610	930	400	270	500
8"	200	737	1080	500	315	500
10"	250	838	1170	505	365	500
12"	300	965	1310	580	400	700
14"	350	1029	1350	600	420	700
16"	400	1130	1430	630	455	700
18"	450	1219	1570	690	505	700
20"	500	1321	1640	730	535	800
24"	600	1549	1840	840	620	800

SPECIFICATION

- Design Code
  ASME B16.34 / API 609 Catalog B
- Face to face
  API 609 Catalog B Short Pattern
  ISO5752 Basic Series 13
  EN 558-2 & EN 593
- Flange Connection
  NPS 2"~24" ASME B16.5
  Above 24" ASME B16.47 A/B
- Testing / Inspection
  API 598





API/ANSI BUTTERFLY VALVE -
WAFER & LUG
SENSO

150LB

Size	DN	L	H	H1	H2	D0
2”	50	43	415	200	110	160
2.5”	65	46	445	215	125	160
3”	80	48	460	225	130	160
4”	100	54	490	240	145	160
5”	125	57	610	285	165	280
6”	150	57	635	290	175	280
8”	200	64	740	340	245	230
10”	250	71	815	375	280	250
12”	300	81	935	425	315	300
14”	350	92	1005	455	350	300
16”	400	102	1095	495	380	320
18”	450	114	1135	510	395	320
20”	500	127	1250	560	435	350
24”	600	1540	1360	635	495	350
28”	700	165	1410	650	500	400
30”	750	165	1450	660	520	400
32”	800	190	1555	715	550	450
36”	900	203	1740	815	630	450
40”	1000	216	1880	880	680	500
42”	1050	251	1975	920	720	500
48”	1200	254	2130	995	795	500
56”	1400	390	2440	1155	900	550
60”	1500	390	2580	1255	965	550

300LB-

Size	DN	L	H	H1	H2	D0
2”	50	43	485	200	110	280
2.5”	65	46	515	220	125	280
3”	80	48	535	230	135	280
4”	100	54	580	255	155	280
5”	125	59	670	305	190	250
6”	150	59	705	330	215	250
8”	200	73	800	370	250	250
10”	250	83	925	425	290	300
12”	300	92	990	455	325	320
14”	350	117	1070	500	360	320
16”	400	133	1175	550	395	350
18”	450	149	1230	585	415	350
20”	500	159	1385	655	470	400
24”	600	181	1570	735	545	450
28”	700	229	1640	780	540	500
30”	750	241	1690	790	580	500
32”	800	241	1805	855	630	500
36”	900	241	1930	910	685	500
40”	1000	300	2090	1000	680	500
42”	1050	315	2145	1030	785	550
48”	1200	360	2350	1140	875	550

600LB

Size	DN	L	H	H1	H2	D0
6”	150	78	795	355	250	300
8”	200	102	910	410	290	320
10”	250	114	1000	455	335	320
12”	300	140	1140	530	380	350
14”	350	155	1170	550	390	350
16”	400	178	1330	625	445	400
18”	450	200	1430	665	475	450
20”	500	216	1530	715	520	450
24”	600	232	1735	815	585	500

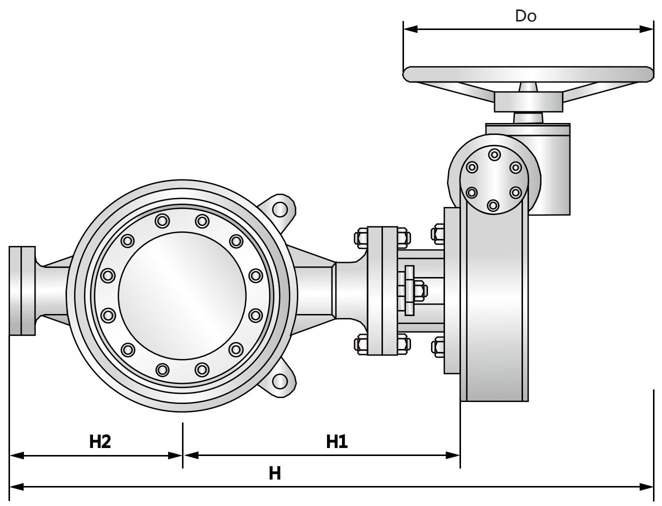
900LB

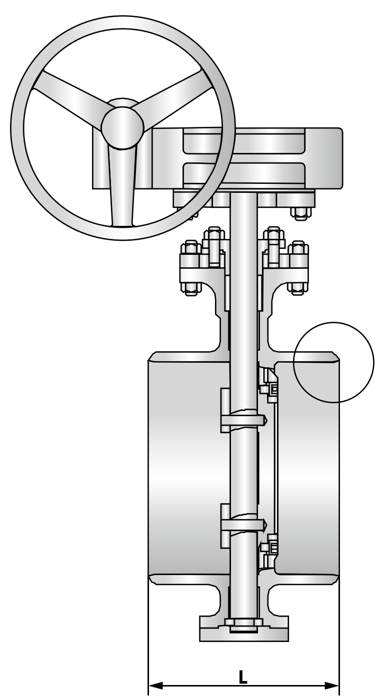
Size	DN	L	H	H1	H2	D0
6”	150	102	930	400	270	500
8”	200	140	1080	500	315	500
10”	250	155	1170	505	365	500
12”	300	178	1310	580	400	700
14”	350	290	1350	600	420	700
16”	400	310	1430	630	455	700
18”	450	330	1570	690	505	700
20”	500	350	1640	730	535	800
24”	600	350	1840	840	620	800

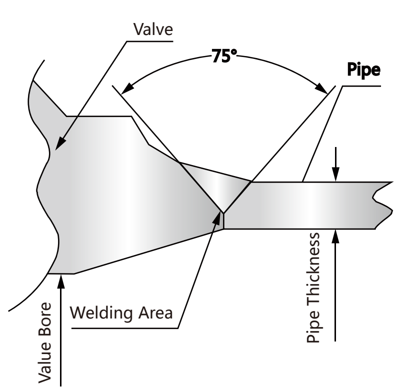
14

SPECIFICATION

- Design Code
  ASME B16.34 / API 609 Catalog B
- Face to face
  API 609 Catalog B Short Pattern
  ISO5752 Basic Series 13
  EN 558-2 & EN 593
- Ends Connection
  ASME B16.25
- Testing / Inspection
  API 598







API/ANSI BUTTERFLY VALVE - BUTT WELDING

150LB

Size	DN	L	H	H1	H2	D0
3”	80	180	460	225	130	160
4”	100	190	490	240	145	160
5”	125	200	610	280	165	280
6”	150	210	635	290	175	280
8”	200	230	740	340	245	230
10”	250	250	815	375	580	250
12”	300	270	935	425	315	300
14”	350	290	1005	455	350	300
16”	400	310	1095	495	380	320
18”	450	330	1135	510	395	320
20”	500	350	1250	560	435	350
24”	600	390	1360	635	495	350
28”	700	430	1410	650	500	400
30”	750	450	1450	660	520	400
32”	800	470	1555	715	550	450
36”	900	510	1740	815	630	450
40”	1000	550	1880	880	680	500
42”	1050	570	1975	920	720	500
48”	1200	630	2130	995	795	500

300LB

Size	DN	L	H	H1	H2	D0
3”	80	180	535	230	135	280
4”	100	190	580	255	155	280
5”	125	200	620	270	165	250
6”	150	210	705	330	215	250
8”	200	230	800	370	250	250
10”	250	250	925	425	290	300
12”	300	270	990	455	325	320
14”	350	290	1070	500	360	320
16”	400	310	1175	550	395	350
18”	450	330	1230	585	415	350
20”	500	350	1385	655	470	400
24”	600	390	1570	735	545	450
28”	700	430	1640	780	540	500
30”	750	450	1690	790	580	500
32”	800	470	1805	855	630	500
36”	900	510	1930	910	685	500
40”	1000	550	2090	1000	680	500
42”	1050	570	2145	1030	785	550
48”	1200	630	2350	1140	875	550

600LB

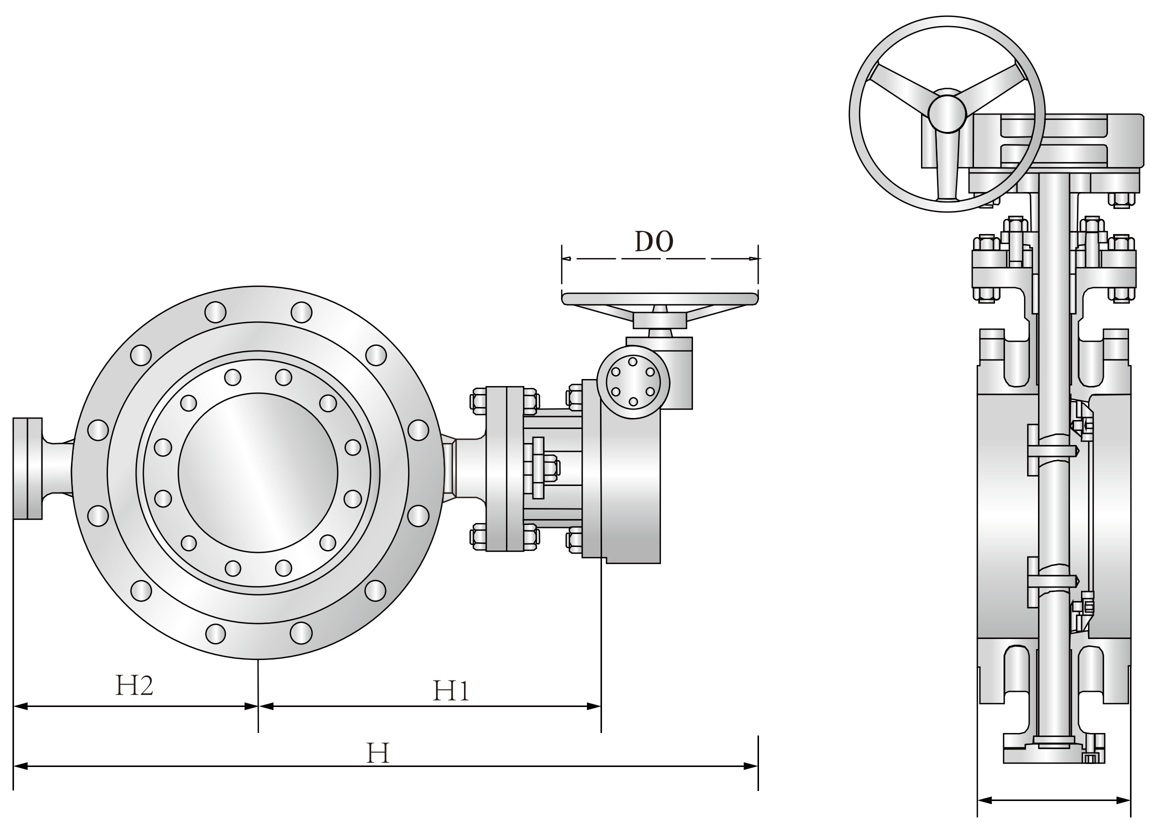
Size	DN	L	H	H1	H2	D0
6”	150	210	795	355	250	300
8”	200	230	910	410	290	320
10”	250	250	1000	455	335	320
12”	300	270	1140	530	380	350
14”	350	290	1170	550	390	350
16”	400	310	1330	625	445	400
18”	450	330	1430	665	475	450
20”	500	350	1530	715	520	450
24”	600	390	1735	815	585	500

900LB

Size	DN	L	H	H1	H2	D0
6”	150	267	930	400	270	500
8”	200	292	1080	500	315	500
10”	250	330	1170	505	365	500
12”	300	356	1310	580	400	700
14”	350	381	1350	600	420	700
16”	400	406	1430	630	455	700
18”	450	432	1570	690	505	700
20”	500	457	1640	730	535	800
24”	600	508	1840	840	620	800

SPECIFICATION

- Design Code
  EN 593
- Face to face
  ISO 5752 Basic Series 13
  EN 558-2 & EN 593
- Flange Connection
  EN 1092-1
- Testing / Inspection
  EN 12266 / EN593



DIN/EN BUTTERFLY VALVE - DOUBLE FLANGES

PN 16

Size	DN	L	H	H1	H2	DO
2"	50	108	420	205	115	160
2.5"	65	112	445	215	125	160
3"	80	114	460	225	130	160
4"	100	127	500	240	155	160
5"	125	140	605	270	165	280
6"	150	140	640	295	175	280
8"	200	152	725	340	230	230
10"	250	165	810	375	275	250
12"	300	178	930	430	310	300
14"	350	190	990	455	345	300
16"	400	216	1070	490	370	320
18"	450	222	1145	515	410	320
20"	500	229	1240	565	440	350
24"	600	267	1355	625	495	350
28"	700	292	1450	660	530	400
32"	800	318	1600	755	585	400
36"	900	330	1745	830	635	450
40"	1000	410	1935	900	715	500
48"	1200	470	2110	970	815	500
56"	1400	530	2405	1155	925	500
64"	1600	600	2750	1310	1055	550
72"	1800	670	2985	1440	1160	550

PN 25

Size	DN	L	H	H1	H2	DO
2"	50	108	430	210	115	160
2.5"	65	112	450	220	125	160
3"	80	114	480	230	130	160
4"	100	127	505	245	155	160
5"	125	140	625	280	175	280
6"	150	140	660	305	185	280
8"	200	152	760	355	245	280
10"	250	165	855	390	275	300
12"	300	178	940	425	310	320
14"	350	190	1030	470	350	320
16"	400	216	1120	515	395	320
18"	450	220	1190	565	415	320
20"	500	229	1260	590	440	350
24"	600	267	1380	650	495	350
28"	700	292	1535	710	565	400
32"	800	318	1700	790	620	450
36"	900	330	1880	890	670	450
40"	1000	410	2045	965	745	500
48"	1200	470	2280	1115	845	500

PN 40

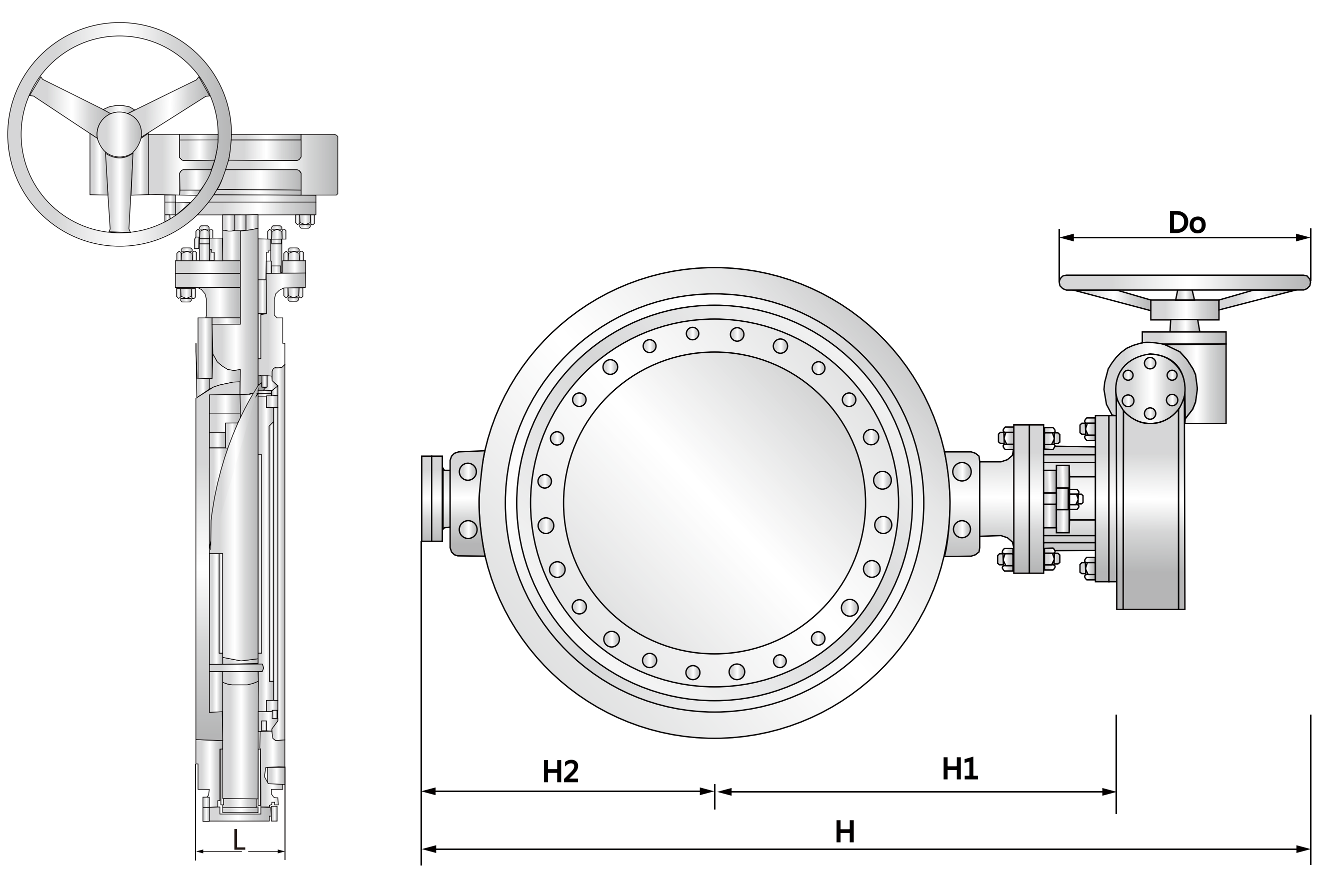
Size	DN	L	H	H1	H2	DO
2"	50	150	490	210	130	250
2.5"	65	170	520	230	140	250
3"	80	180	550	240	150	250
4"	100	190	595	265	160	250
5"	125	200	635	290	185	250
6"	150	210	680	305	215	250
8"	200	230	795	355	250	300
10"	250	250	910	415	285	320
12"	300	270	1005	460	335	320
14"	350	290	1070	485	355	320
16"	400	310	1170	545	395	350
18"	450	330	1210	570	410	350
20"	500	350	1340	635	445	400
24"	600	390	1520	710	520	450
28"	700	430	1630	740	575	500
32"	800	470	1785	835	650	500

PN 63

Size	DN	L	H	H1	H2	DO
4"	100	190	650	290	180	250
5"	125	200	730	330	210	250
6"	150	210	785	340	240	250
8"	200	230	915	380	275	320
10"	250	250	950	400	290	320
12"	300	270	1050	460	325	320
14"	350	290	1195	495	380	400
16"	400	310	1250	540	405	400
18"	450	330	1400	600	445	450
20"	500	350	1470	640	480	450
24"	600	390	1680	750	540	500

SPECIFICATION

- Design Code
  EN 593
- Face to face
  ISO 5752 Basic Series 13
  EN 558-2 & EN 593
- Flange Connection
  EN 1092-1
- Testing / Inspection
  EN 12266 / EN593



DIN/EN BUTTERFLY VALVE - WAFER SERIES

PN16

Size	DN	L	H	H1	H2	DO
2"	50	43	420	205	110	160
2.5"	65	46	450	220	125	160
3"	80	49	465	240	130	160
4"	100	56	485	240	145	160
5"	125	64	615	270	170	280
6"	150	76	640	295	180	280
8"	200	89	715	335	230	230
10"	250	114	775	355	260	250
12"	300	114	880	405	285	300
14"	350	127	965	450	325	300
16"	400	140	1040	480	360	320
18"	450	152	1115	510	395	320
20"	500	152	1230	656	435	350
24"	600	154	1350	625	495	350
28"	700	165	1475	690	525	400
32"	800	190	1635	780	595	450
36"	900	203	1770	830	650	500
40"	1000	216	1955	910	725	500
48"	1200	254	2140	990	815	500
56"	1400	279	2460	1180	940	500
64"	1600	318	2795	1325	1065	550

PN25

Size	DN	L	H	H1	H2	DO
2"	50	43	430	205	115	160
2.5"	65	46	460	220	130	160
3"	80	49	480	240	140	160
4"	100	56	500	240	155	160
5"	125	64	620	290	175	280
6"	150	76	660	300	190	280
8"	200	89	715	335	230	280
10"	250	114	830	370	270	300
12"	300	114	955	430	315	320
14"	350	127	1015	460	345	320
16"	400	140	1100	508	385	320
18"	450	152	1145	525	410	320
20"	500	152	1245	575	441	350
24"	600	154	1360	630	500	350
28"	700	165	1530	705	565	400
32"	800	190	1680	765	625	450
36"	900	203	1855	865	670	450
40"	1000	216	2025	940	750	500
48"	1200	254	2280	1085	855	500
56"	1400	279	2515	1185	940	550

PN40

Size	DN	L	H	H1	H2	DO
2"	50	43	480	205	115	250
2.5"	65	46	520	220	130	250
3"	80	49	540	240	140	250
4"	100	56	575	250	155	280
5"	125	64	640	290	175	280
6"	150	76	685	320	205	280
8"	200	89	805	335	260	300
10"	250	114	925	415	300	320
12"	300	114	980	440	330	320
14"	350	127	1045	475	360	320
16"	400	140	1165	540	410	350
18"	450	152	1200	550	420	350
20"	500	152	1360	625	455	400
24"	600	178	1560	725	530	450
28"	700	229	1695	785	585	500
32"	800	241	1945	865	665	500

PN63

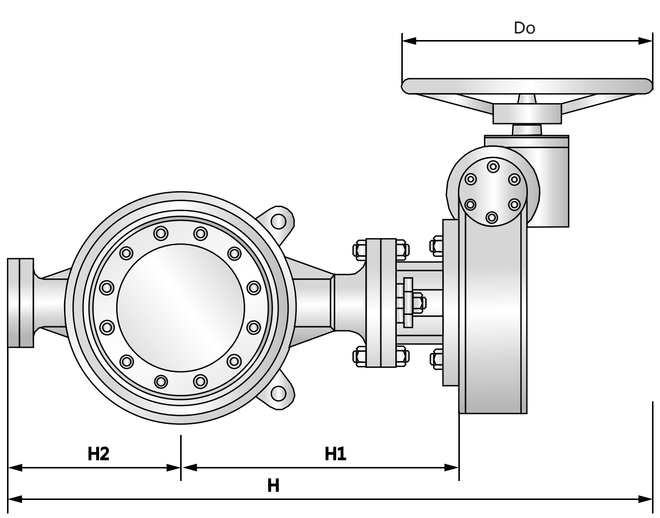
Size	DN	L	H	H1	H2	DO
4"	100	56	660	320	210	250
5"	125	64	730	330	220	250
6"	150	76	785	340	240	250
8"	200	89	915	380	275	320
10"	250	114	950	400	290	320
12"	300	114	1050	460	325	320
14"	350	127	1195	495	380	400
16"	400	140	1250	540	405	400
18"	450	152	1400	600	445	450
20"	500	152	1470	640	480	450
24"	600	178	1680	750	540	500

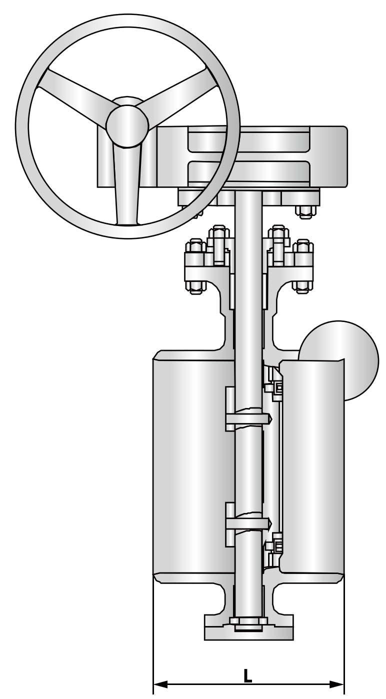
DIN/EN BUTTERFLY VALVE - BUTT WELDING

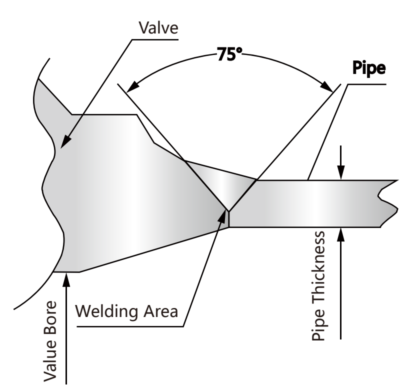
DIN/EN BUTTERFLY VALVE - BUTT WELDING

SPECIFICATION :

- Design Code:
  EN 593
- Face to face :
  ISO 5752 Basic Series 13
  EN 558-2 & EN 593
- Ends Connection:
  ASME B16.25
- Testing / Inspection
  EN 12266 / EN 593







PN16

Size	DN	L	H	H1	H2	DO
4”	100	190	500	240	155	160
5”	125	200	605	270	165	280
6”	150	210	640	295	175	280
8”	200	230	725	340	230	230
10”	250	250	810	375	275	250
12”	300	270	930	430	310	300
14”	350	290	990	455	345	300
16”	400	310	1070	490	370	320
18”	450	330	1145	515	410	320
20”	500	350	1240	565	440	350
24”	600	390	1355	625	495	350
28”	700	450	1450	660	530	400
32”	800	470	1600	755	585	400
36”	900	510	1745	830	635	450
40”	1000	550	1935	900	715	500
48”	1200	630	2110	970	718	500

PN25

Size	DN	L	H	H1	H2	DO
4”	100	190	500	240	155	160
5”	125	200	625	280	175	280
6”	150	210	660	300	190	280
8”	200	230	715	335	230	280
10”	250	250	830	370	270	300
12”	300	270	955	430	315	320
14”	350	290	1015	460	345	320
16”	400	310	1100	508	385	320
18”	450	330	1145	525	410	320
20”	500	350	1245	575	441	350
24”	600	390	1360	630	500	350
28”	700	450	1530	705	565	400
32”	800	470	1680	765	625	450
36”	900	510	1855	865	670	450
40”	1000	550	2025	940	750	500
48”	1200	630	2515	1085	855	500

PN40

Size	DN	L	H	H1	H2	DO
4”	100	190	595	265	160	280
5”	125	200	635	290	185	250
6”	150	210	680	305	215	250
8”	200	230	795	355	250	300
10”	250	250	910	415	285	320
12”	300	270	1005	460	335	320
14”	350	290	1070	485	355	320
16”	400	310	1170	545	395	350
18”	450	330	1210	570	410	350
20”	500	350	1340	635	445	400
24”	600	390	1520	710	520	450
28”	700	450	1630	740	575	500
32”	800	470	1785	835	650	500

PN63

Size	DN	L	H	H1	H2	DO
6”	150	210	785	340	240	250
8”	200	230	915	380	275	320
10”	250	250	950	400	290	320
12”	300	270	1050	460	325	320
14”	350	290	1195	495	380	400
16”	400	310	1250	540	405	400
18”	450	330	1400	600	445	450
20”	500	350	1470	640	480	450
24”	600	390	1680	750	540	500

TRIPLE ECCCENTRIC BUTTERFLY VALVE
-LOW / HIGH TEMPERATURE

Features:

1.Valve design, including the extended bonnet, enables pipe insulation of the body
2.The actuator remains protected from the extremely low/high line temperature.
3.Operability is not affected by temperature
4.Production test API 598 to customer specification
5.In-house testing in the fully equipped facilities at CZV plant.
6.The fully metal-to-meal torque seated design eliminates unpredictabil ity related to the use of polymers in cryogenic configuration
7.Cryogenic butt weld body style also available with tope entry flange for inline access requirements

General application

Cryogenic valves

Isolation, flow & pressure control, ON-OFF, emergency/safety operations, HIPPS, major equipment protective function (including: turbine expander, pump and compressor) in: LNG plants, carrier & terminal, air separation, gas treatment (e.g. molecular sieve), hydrocarbon cryogenic distillation, aerospace.

Fluids:

Liquid propane, oxygen, liquid nitrogen, liquid hydrogen, glycol, ethylene glycol, ethylene.

Technical Date

Design Standard:
API 609 & EN 593; ASME B16.34 & EN 12516
Ends Connection Standard:
ASME B16.5; ASME B16.47; EN 1092-1; ISO 7005; ASME B16.25
Size:
DN50 to DN1800 (2" to 72")
Face to face:
ISO 5752; EN558; ASME B16.10; API609
Pressure Ratings:
ASME from class 150LB to 900LB; EN from PN10 to PN160
Temperature: from -254℃ to +250℃ (–425.2 ℉ to +482 ℉)
from : +450℃ to +815℃ (+842 ℉ to +1500 ℉)

High temperature valves

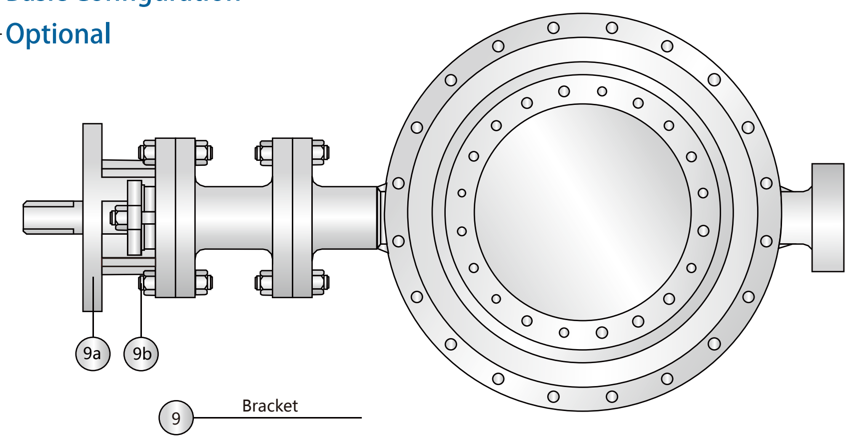
Isolation, flow & pressure control, ON-OFF, switching, emergency/safety operations, HIPPS, major equipment protective function (including: turbo expander and gas turbine) in: heat exchanger, fuel cell, FCC (Fluid Catalytic Cracking), TRT (Top pressure Recovery Turbine), coal gasification, coal chemical, fertilizer plant, power plant, gas turbine, steam turbine, steel plant, solar power plant, aerospace.

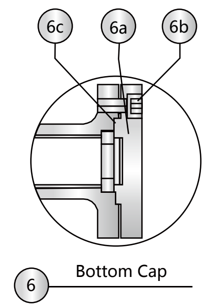
Fluid:

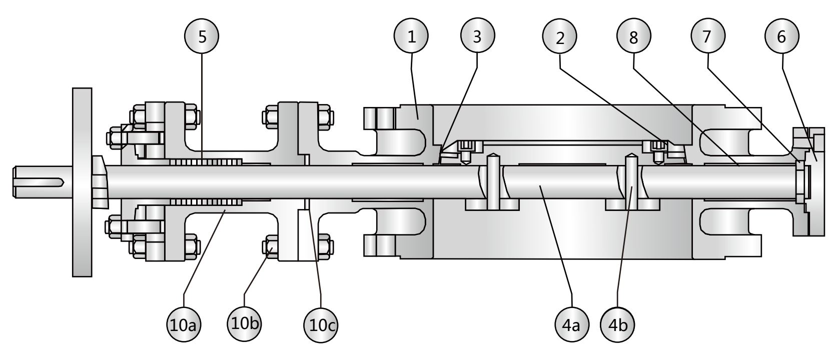
Super-heated steam, flue gas, exhaust gas, syngas, molten salt, coke oven gas, blast furnace gas, coal gas, combustion gas, HTF (Heat Transfer Fluid), hot air.

BASIC CONFIGURATION SECTIONAL DRAWING LOW TEMPERATURE SERIES

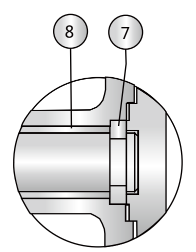
◯ Basic Configuration
⬡ Optional



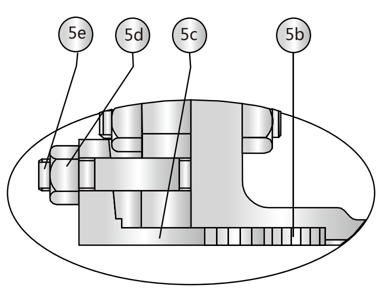




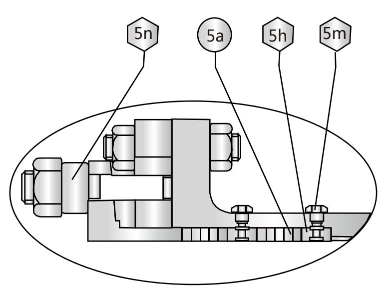
4 Stem



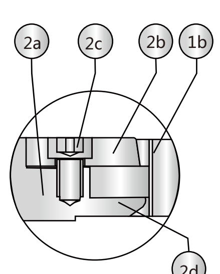
8 Lower Bush



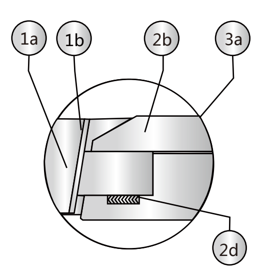
5 Packing



5 Packing (Options)



2 Flat Surface Sealing



3 Eccetric Surface Sealing

TYPICAL MATERIAL SELECTION -LOW TEMPERATURE

Material List, according to ASTMStandard

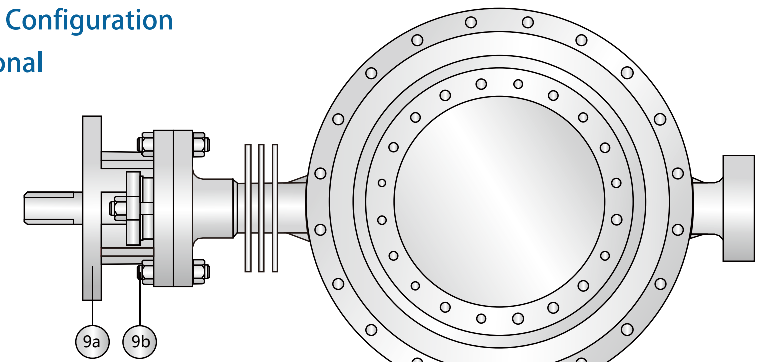
Item	Part Name	Material List(Low Temperature)	Material List(Stainless Steel)
1a	Body	ASTM A352 LCB	ASTM A351 CF8M
1b	Body Seat	overlay 13%Cr / Stellite	Ingetral body / overlay Stellite
2a	Disc	ASTM A352 LCB	ASTM A351 CF8M
2b	Seat Protection Ring	ASTM A350 LF2	ASTM A182 F316
2c	Hex. Socket Screw	Stainless Steel A2	Stainless Steel A4
2d	Gasket	AISI 304+Graphite	AISI 316+Graphite
3a	Hard Seal Ring	ASTM A182 F304	ASTM A182 F316
	Multi-Layer Seal Ring	AISI 304+Graphite/PTFE	AISI 316+Graphite/PTFE
4a	Stem	ASTM A182 LF2	ASTM A182 F316
4b	Dowel Pin	AISI A350 LF2	AISI 316
5a	Specer	AISI 316	AISI 316
5b	Packing	Graphite	Graphite
5c	Packing Gland	ASTM A352 LCB	ASTM A351 CF8M
5d	Nut	ASTM A194 7M	ASTM A194 8M
5e	Bolt	ASTM A320 L7M	ASTM A193 B8M
6a	Bottom Cap	ASTM A350 LF2	ASTM A182 F316
6b	Hex. Socket Screw	ASTM A320 L7M	ASTM A193 B8M
6c	Gasket	ASI 304+Graphite	AISI 316+Graphite
7	Retainer Ring	ASTM A350 LF2	ASTM A182 F316
8	Bush	AISI 304	AISI 316
9a	Top Flange	ASTM A352 LCB	ASTM A351 C8FM
9b	Nut	ASTM A352 L7M	ASTM A193 B8M
10a	Bracket	ASTM A194 7M	ASTM A194 8M
10b	Bolt	ASTM A320 L7M	ASTM A193 B8M
10c	Gasket	SS 304+Graphite	SS 316+Graphite

Options availbable upon request

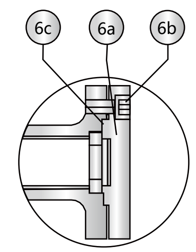
Item	Part Name	Material List(Low Temperature)	Material List(Stainless Steel)
	Lubrication	Stainless Steel	Stainless Steel
5h	Lantern Ring	AISI 304	AISI 316
5m	Plug Valve	ANSI 304	ANSI 316
	Live Loading Packing		
5n	Belleville Spring	Stainless Steel or Spring Steel Nickel Plated	

BASIC CONFIGURATION SECTIONAL DRAWING HIGH TEMPERATURE SERIES

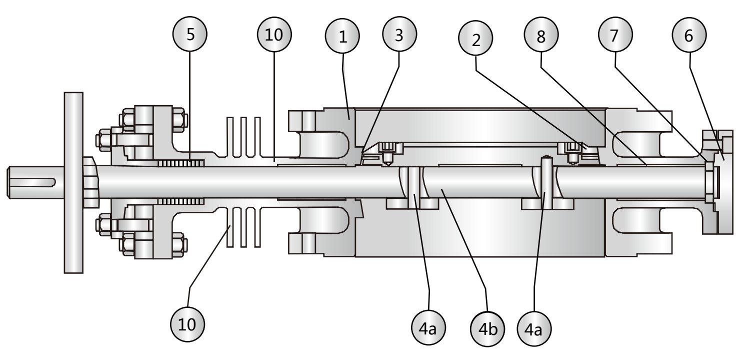
Basic Configuration
Optional



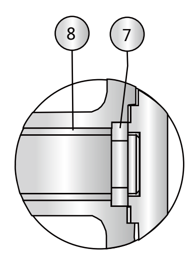
9 Bracket



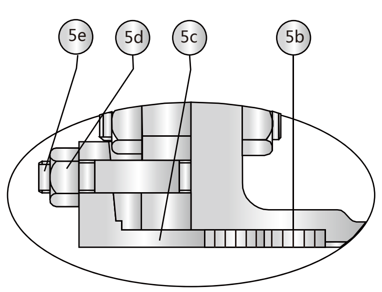
6 Bottom Cap



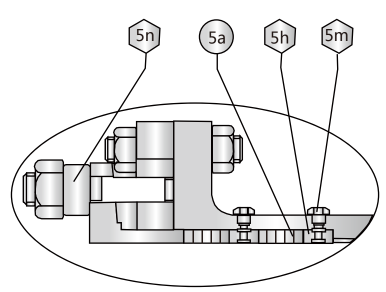
4 Stem



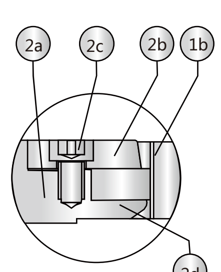
8 Lower Bush



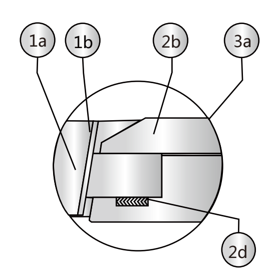
5 Packing



5 Packing (Options)



2 Flat Surface Sealing



3 Eccetric Surface Sealing

TYPICAL MATERIAL SELECTION -HIGH TEMPERATURE

Material List, according to ASTMStandard

Item	Part Name	Material List (Low Temperature)	Material List (Stainless Steel)
1a	Body	ASTM A217 WC6	ASTM A351 CF8M
1b	Body Seat	Overlay 13%Cr / Stellite	Integral Body / Overlay Stellite
2a	Disc	ASTM A217 WC6	ASTM A351 CF8M
2b	Seat Protection Ring	ASTM A182 F11	ASTM A182 F316
2c	Hex. Socket Screen	Stainless Steel A2	Stainless Steel A4
2d	Gasket	AISI 316+Graphite	AISI 316+Graphite
3a	Hard Seal Ring	ASTM A182 F304	ASTM A182 F316
4a	Stem	ASTM A182 F11	ASTM A182 F316
4b	Dowel Pin	ASTM A182 F11	ASTM A182 F316
5a	Spacer	AISI 304	AISI 316
5b	Packing	Graphite	Graphite
5c	Packing Gland	ASTM A217 WC6	ASTM A351 CF8M
5d	Nut	ASTM A194 4	ASTM A194 8M
5e	Bolt	ASTM A193 B16	ASTM A193 B8M
6a	Bottom Flange	ASTM A182 F11	ASTM A182 F316
6b	Hex. Socket Screen	ASTM A193 B16	ASTM A193 B8M
6c	Gasket	SS 304+Graphite	SS 316+Graphite
7	Retainer Ring	ASTM A182 F11	ASTM A182 F316
8	Bushing	AISI 304	AISI 316
9a	Bracket (top flange)	ASTM A217 WC6	ASTM A351 C8FM
9b	Bracket (top flange) Nut	ASTM A193 B16	ASTM A193 B8M
10	Cooling Fin	ASTM A217 WC6	ASTM A351 C8FM

Options availbable upon request

Item	Part Name	Material List(High Temperature)	Material List(Stainless Steel)
	Lubrication	Stainless Steel	Stainless Steel
5h	Lantern Ring	AISI 304	AISI 316
5m	Plug Valve	ANSI 304	ANSI 316
	Live Loading Packing		
5n	Belleville Spring	Stainless Steel or Spring Steel Nickel Plated	

FLOW COEFFICIENT CV VALUE

CLASS 150LB

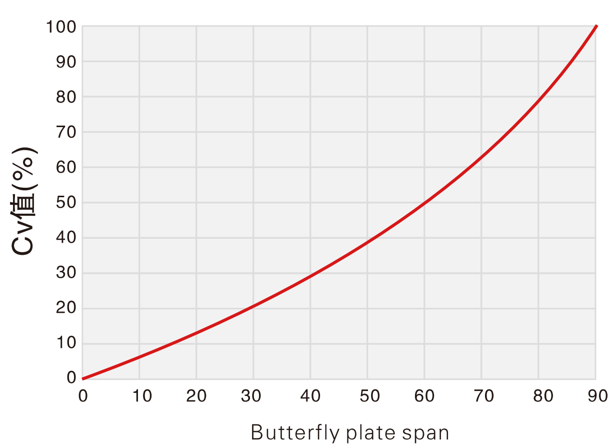
Size		Disc Opening Angle								
Inch	mm	10°	20°	30°	40°	50°	60°	70°	80°	90°
3"	80	5	11	17	22	33	50	72	99	110
4"	100	12	25	38	50	76	113	164	227	252
6"	150	44	96	143	191	287	430	621	860	956
8"	200	75	163	244	326	488	733	1058	1465	1628
10"	250	124	270	405	541	811	1216	1757	2433	2703
12"	300	249	542	813	1084	1627	2440	3524	4880	5422
14"	350	287	624	936	1247	1871	2807	4054	5613	6237
16"	400	380	826	1239	1652	2478	3717	5368	7433	8259
18"	450	482	1049	1573	2097	3146	4719	6817	9438	10487
20"	500	556	1209	1814	2419	3628	5442	7860	10884	12093
24"	600	839	1825	2737	3650	5474	8212	11861	16423	18248
28"	700	1371	2980	4470	5960	8940	13410	19370	26820	29800
30"	750	1642	3570	5355	7140	10710	16065	23205	32130	35700
32"	800	1886	4100	6150	8200	12300	18450	26650	36900	41000
36"	900	2466	5360	8040	10720	16080	24120	34840	48240	53600
40"	1000	3031	6590	9885	13180	19770	29655	42835	59310	65900
42"	1050	3307	7190	10785	14380	21570	32355	46735	64710	71900
48"	1200	4476	9730	14595	19460	29190	43785	63245	87570	97300

CLASS 300LB

Size		Disc Opening Angle								
Inch	mm	10°	20°	30°	40°	50°	60°	70°	80°	90°
3"	80	5	11	17	22	33	50	72	99	110
4"	100	12	25	38	50	76	113	164	227	252
6"	150	35	77	116	154	231	347	502	694	772
8"	200	68	148	222	296	444	666	962	1332	1480
10"	250	110	238	357	476	715	1072	1548	2144	2382
12"	300	164	355	533	711	1066	1600	2310	3199	3555
14"	350	217	472	708	945	1417	2125	3070	4251	4723
16"	400	306	665	998	1330	1995	2993	4323	5985	6650
18"	450	396	861	1291	1722	2582	3874	5595	7747	8608
20"	500	486	1056	1584	2112	3168	4752	6864	9504	10560
24"	600	775	1685	2528	3370	5055	7583	10953	15165	16850
28"	700	1118	2430	3645	4860	7290	10935	15795	21870	24300
30"	750	1426	3100	4650	6200	9300	13950	20150	27900	31000
32"	800	1546	3360	5040	6720	10080	15120	21840	30240	33600
36"	900	1969	4280	6420	8560	12840	19260	27820	38520	42800
40"	1000	2420	5260	7890	10520	15780	23670	34190	47340	52600

CLASS 600LB

Size		Disc Opening Angle								
Inch	mm	10°	20°	30°	40°	50°	60°	70°	80°	90°
3"	80	4	9	14	19	28	42	61	85	94
4"	100	10	22	33	44	66	99	144	199	221
6"	150	31	67	101	134	202	302	437	605	672
8"	200	49	105	158	211	216	475	685	949	1054
10"	250	81	177	266	354	531	797	1151	1593	1770
12"	300	132	287	430	573	860	1290	1863	2580	2867
14"	350	188	409	614	818	1227	1841	2659	3681	4090
16"	400	260	566	849	1132	1699	2548	3680	5096	5662
18"	450	362	788	1182	1576	2363	3545	5121	7090	7878
20"	500	461	1003	1504	2005	3008	4512	6518	9024	10027
24"	600	695	1510	2265	3020	4530	6795	9815	13590	15100



MATERIAL LIST CHEMICAL COMPOSITIONS/MECHANICAL

ASTM	Chemical Compositions %											Mechanical			Hardness Charpy		
Code	C ⩽	Mn ⩽	P ⩽	S ⩽	Si ⩽	Cr ⩽	Mo ⩽	Ni ⩽	Cu ⩽	V ⩽	Nb ⩽	Tensile MPa,⩾	Yield MPa,⩾	ElonGation %,⩾	Reduce %,⩾	Brinell HB,⩽	J,⩾
A105	0.35	0.60~1.05	0.035	0.040	0.010~0.35	0.30	0.12	0.4	0.40	0.08	0.02	485	250	30	30	187	
A182F11	0.05~0.15	0.30~0.60	0.030	0.030	0.50~1.00	1.00~1.50	0.44~0.65					415	205	20	45	121~174	
A182F22	0.05~0.15	0.30~0.60	0.040	0.040	0.50	2.00~2.50	0.87~14.13					415	205	20	35	170	
A182F304	0.08	2.00	0.045	0.030	1.00	18.0~20.0		8.0~11.0				515	205	30	50		
A182F304L	0.030	2.00	0.045	0.030	1.00	18.0~20.0		8.0~13.0				485	170	30	50		
A182F316	0.08	2.00	0.045	0.030	1.00	16.0~18.0	2.00~3.00	10.0~14.0				515	205	30	50		
A182F316L	0.030	2.00	0.045	0.030	1.00	16.0~18.0	2.00~3.00	10.0~15.0				485	170	30	50		
A182F51	0.030	2.00	0.030	0.020	1.00	21.0~23.0	2.5~3.5	4.5~6.5				620	450	25	45		
A182F6a	0.15	1.00	0.040	0.030	1.00	11.5~13.5		0.50				585	380	18	35	167~229	
A193B7	0.37~0.49	0.65~1.10	0.035	0.040	0.15~0.35	0.75~1.20	0.15~0.25					860	720	16	50	321	
A193B7M	0.37~0.49	0.65~1.10	0.035	0.040	0.15~0.35	0.75~1.20	0.15~0.25	8.0~11.0				690	550	18	50	235	
A193B8	0.08	2.00	0.045	0.030	1.00	18.0~20.0		10.0~14.0		0.25~0.35		515	205	30	50	223	
A193B8M	0.08	2.00	0.045	0.030	1.00	16.0~18.0	2.00~3.00					515	205	30	50	223	
A193B16	0.36~0.47	0.45~0.70	0.035	0.040	0.15~0.35	0.80~1.15	0.50~0.65					860	720	18	50	321	
A1942H	⩾0.40	1.00	0.040	0.050	0.04											248~352	
A1942HM	⩾0.40	1.00	0.040	0.050	0.04			8.0~11.0								159~237	
A1948	0.08	2.00	0.045	0.030	1.00	18.0~20.0		10.0~14.0								126~300	
A1948M	0.08	2.00	0.045	0.030	1.00	16.0~18.0	2.00~3.00									126~300	
A216WCB	0.30	1.00	0.04	0.045	0.60	0.50	0.20	0.50	0.30	0.03		485~655	250	22	35		
A216WCC	0.25	1.20	0.04	0.045	0.60	0.50	0.2	0.50	0.30	0.03		485~655	275	22	35		
A217C5	0.20	0.40~0.70	0.04	0.045	0.75	4.00~6.50	0.45~0.65	0.50	0.50			620~795	415	18	35		
A217CA15	0.15	1.00	0.040	0.040	1.50	11.5~14.0	0.50	1.00				620~795	450	18	30		
A217WC6	0.05~0.20	0.50~0.80	0.04	0.045	0.60	1.00~1.50	0.45~0.65	0.50	0.50			485~655	275	20	35		
A217WC9	0.05~0.18	0.40~0.70	0.04	0.045	0.60	2.00~2.75	0.90~1.250		0.50			485~655	275	20	35		
A276410	0.08~0.15	1.00	0.040	0.030	1.00	11.5~13.5						480	275	20	45		
A276420	⩾0.15	1.00	0.040	0.030	1.00	12.0~14.0										241	
A320L7	0.38~0.048	0.75~1.00	0.035	0.040	0.15~0.35	0.80~1.10	0.15~0.25					860	725	16	50		Avg:27; min:20
A320L7M	0.38~0.048	0.75~1.00	0.035	0.040	0.15~0.358	0.80~1.10	0.15~0.25					690	550	18	50	235	Avg:27; min:20
A336F22	0.05~0.15	0.30~0.60	0.025	0.025	0.50	2.00~2.50	0.90~1.10					515~690	310	19	40		
A350LF1	0.30	0.60~1.35	0.035	0.040	0.15~0.30	0.30	0.12	0.40	0.40	0.08	0.02	415~585	205	28	38		Avg:18; min:14
A350LF2	0.30	0.60~1.35	0.035	0.040	0.15~0.30	0.30	0.12	0.40	0.40	0.08	0.02	485~655	250	30	30		Avg:20; min:16
A351CF3	0.03	1.50	0.040	0.040	2.00	1.70~21.0	0.50	8.0~12.0				485	205	35.0			
A351CF3M	0.03	1.50	0.040	0.040	1.50	17.0~21.0	2.0~3.00	9.0~13.0				485	205	30.0			
A351CF8	0.08	1.50	0.040	0.040	2.00	18.0~21.0	0.50	8.0~11.0				485	205	35.0			
A351CF8M	0.08	1.50	0.040	0.040	1.50	18.0~21.0	2.0~3.00	9.0~12.0				485	205	30.0			
A351CF8C	0.08	1.50	0.040	0.040	2.00	18.0~21.0	0.50	9.0~12.0	03.0~4.0			485	2085	30.0			
A351CN7M	0.07	1.50	0.040	0.040	1.50	19.0~22.0	2.0~3.00	27.5~30.5				425	170	35			
A352LC1	0.25	0.50~0.80	0.04	0.045	0.60		0.45~0.65					450~620	240	24	35		
A352LC2	0.25	0.50~0.80	0.04	0.045	0.60			2.00~3.00				485~655	275	24	35		Avg:18; min:14
A352LC3	0.15	0.50~0.80	0.04	0.045	0.60			3.00~4.00				485~655	275	24	35		Avg:20; min:16
A352LCB	0.30	1.00	0.04	0.045	0.60	0.50	0.20	0.50	0.30	0.03		450~620	240	24	35		Avg:20; min:16
A352LCC	0.25	1.20	0.04	0.045	0.60	0.50	0.20	0.50		0.03		485~655	275	22	35	139~202	Avg:18; min:14
A439D2	3.00	0.70~14.25	0.08		1.50~3.00	1.75~2.75		18.00~22.00				400	207	8.0			Avg:20; min:16

ASTM	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14
Material	A216WCB, A350Lf2	A216WCC, A352LCC, A352LC2, A352Lc3	A352 LCB	A352 Lf1	A182F1, A352Lc1, A217Wc1	A217 Wc6	A217Wc9	A217 C5	A182F304, A351CF8, A351Cf8	A182 F316, A351 CF3M, A351 CF8M	A182F304L, A182F316L	A351 CF8C	A182 F51	A351 CN7M
Temp.	Working Pressure(Mpa.)													
Pressure: ANSI 150lb														
-29~38	1.96	1.98	1.84	1.63	1.84	1.98	1.98	2	1.9	1.9	1.59	1.9	2	1.59
50	1.92	1.95	1.82	1.6	1.84	1.95	1.95	1.95	1.83	1.84	1.53	1.87	1.95	1.54
100	1.77	1.77	1.74	1.49	1.77	1.77	1.77	1.77	1.57	1.62	1.33	1.74	1.77	1.35
150	1.58	1.58	1.58	1.44	1.58	1.58	1.58	1.58	1.42	1.48	12	1.58	1.58	1.23
200	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.32	1.37	1.12	1.38	1.38	1.13
250	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.05	1.21	1.21	1.04
300	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1	1.02	1.02	0.97
325	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
350	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	
375	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	
400	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	
425	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55		
450	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46		
475	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37		0.37		
500	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28		0.28		
538	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14		0.14		
Pressure: ANSI 300lb														
-29~38	5.11	5.17	4.8	4.26	4.8	5.17	5.17	5.17	4.96	4.96	4.14	4.96	5.17	4.14
50	5.01	5.17	4.75	4.18	4.8	5.17	5.17	5.17	4.78	4.81	4	4.88	5.17	4.01
100	4.66	5.15	4.53	3.88	4.79	5.15	5.15	5.15	4.09	4.22	3.48	4.53	5.07	3.53
150	4.51	5.02	4.39	3.76	4.73	4.97	5.03	5.03	3.7	3.85	3.14	4.25	4.59	3.2
200	4.38	4.86	4.25	3.64	4.58	4.8	4.86	4.86	3.45	3.57	2.92	3.99	4.27	2.94
250	4.19	4.63	4.08	3.49	4.45	4.63	4.63	4.63	3.25	3.34	2.75	3.78	4.05	2.72
300	3.98	4.29	3.87	3.32	4.29	4.29	4.29	4.29	3.09	3.16	2.61	3.61	3.89	2.54
325	3.87	4.14	3.76	3.22	4.14	4.14	4.14	4.14	3.02	3.09	2.55	3.54	3.82	2.44
350	3.76	4	3.64	3.12	4.03	4.03	4.03	4.03	2.96	3.03	2.51	3.48	3.76	
375	6.64	3.78	3.5	3.04	3.89	3.89	3.89	3.89	2.9	2.99	2.48	3.42	3.74	
400	3.47	3.47	3.26	2.93	3.65	3.65	3.65	3.65	2.84	2.94	2.43	3.39	3.65	
425	2.88	2.88	2.73	2.58	3.52	3.52	3.52	3.52	2.8	2.91	2.39	3.36		
450	2.3	2.3	2.16	2.14	3.37	3.37	3.37	3.37	2.74	2.88	2.34	3.35		
475	1.74	1.71	1.57	1.41	3.17	3.17	3.17	2.79	2.69	2.87		3.17		
500	1.18	1.16	1.11	1.03	2.41	2.57	2.82	2.14	2.65	2.82		2.82		
538	0.59	0.59	0.59	0.59	1.13	1.49	1.84	1.37	2.44	2.52		2.52		
550						1.27	1.56	1.2	2.36	2.5		2.5		
575						0.88	1.05	0.89	2.08	2.4		2.4		
600						0.61	0.69	0.62	1.69	1.99		2.16		
625						0.43	0.45	0.4	1.38	1.58		1.83		
650						0.28	0.28	0.24	1.13	1.27		1.41		
675									0.93	1.03		1.24		
700									0.8	1.84		1.01		
725									0.68	0.7		0.79		
750									0.58	0.59		0.59		
775									0.46	0.46		0.46		
800									0.35	0.35		0.35		
816									0.28	0.28		0.28		

TEMPERATURE PRESSURE GRADE

ASTM	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14
Material	A216WCB, A350Lf2	A216WCC, A352LCC, A352LC2, A352Lc3	A352 LCB	A352 Lf1	A182F1, A352Lc1, A217Wc1	A217 Wc6	A217Wc9	A217 C5	A182F304, A351CF8, A351Cf8	A182 F316, A351 CF3M, A351 CF8M	A182F304L, A182F316L	A351 CF8C	A182 F51	A351 CN7M
Temp.	Working Pressure(Mpa.)													
Pressure: ANSI 600lb														
-29~38	10.21	10.34	9.6	8.51	9.6	10.34	10.34	10.34	9.93	9.93	8.27	9.93	10.34	8.27
50	10.02	10.34	9.49	8.35	9.6	10.34	10.34	10.34	9.56	9.62	8	9.75	10.34	8.03
100	9.32	10.3	9.07	7.77	9.59	10.3	10.3	10.3	8.17	8.44	6.96	9.06	10.13	7.06
150	9.02	10.03	8.79	7.51	9.47	9.95	10.03	10.03	7.4	7.7	6.28	8.49	9.19	6.41
200	8.76	9.72	8.51	7.28	9.16	9.59	9.72	9.72	6.9	7.13	5.83	7.99	8.53	5.87
250	8.39	9.27	8.16	6.98	8.9	9.27	9.27	9.27	6.5	6.68	5.49	7.56	8.09	5.44
300	7.96	8.57	7.74	6.64	8.57	8.57	8.57	8.57	6.18	6.32	5.21	7.22	7.77	5.08
325	7.74	8.26	7.52	6.45	8.26	8.26	8.26	8.26	6.04	6.18	51	7.07	7.63	4.88
350	7.51	8	7.28	6.25	8.04	8.04	8.04	8.04	5.93	6.07	5.01	6.95	7.53	
375	7.27	7.57	6.99	6.07	7.76	7.76	7.76	7.76	5.81	5.98	4.95	6.84	7.47	
400	6.94	6.94	6.52	5.87	7.33	7.33	7.33	7.33	5.69	5.89	4.86	6.78	7.33	
425	5.75	5.75	5.46	5.15	7	7	7	7	5.6	5.83	4.77	6.72		
450	4.6	4.6	4.32	4.27	6.77	6.77	6.77	6.77	5.48	5.77	4.68	6.69		
475	3.49	3.42	3.13	2.82	6.34	6.34	6.34	5.57	5.39	5.73		6.34		
500	2.35	2.32	2.21	2.06	4.81	5.15	5.65	4.28	5.3	5.65		5.65		
538	1.18	1.18	1.18	1.18	2.27	2.98	3.69	2.74	4.89	5		5		
550						2.54	3.13	2.41	4.71	4.98		4.98		
575						1.76	2.11	1.78	4.17	4.79		4.79		
600						1.22	1.38	1.25	3.38	3.98		4.29		
625						0.85	0.89	0.8	2.76	3.16		3.66		
650						0.57	0.57	0.47	2.25	2.53		2.81		
Pressure: ANSI 900lb														
-29~38	15.32	15.51	14.41	12.77	14.41	15.51	15.51	15.51	14.89	14.89	12.41	14.89	15.51	12.41
50	15.04	15.51	14.24	12.53	14.41	15.51	15.51	15.51	14.35	14.43	12.01	14.63	15.51	12.04
100	13.98	15.46	13.6	11.65	14.38	15.44	15.46	15.46	12.26	12.66	10.44	13.59	15.2	10.59
150	13.52	15.05	13.18	11.27	14.2	14.92	15.06	15.06	11.1	11.55	9.42	12.74	13.78	9.61
200	13.14	14.58	12.76	10.92	13.74	14.39	14.58	14.58	10.34	10.7	8.75	11.98	12.8	8.81
250	12.58	13.9	12.23	10.47	13.35	13.9	13.9	13.9	9.75	10.01	8.24	11.34	12.14	8.17
300	11.95	12.86	11.61	9.95	12.86	12.86	12.86	12.86	9.27	9.49	7.82	10.83	11.66	7.61
325	11.61	12.4	11.27	9.67	12.4	12.4	12.4	12.4	9.07	9.27	7.64	10.61	11.45	7.33
350	11.27	12.01	10.92	9.37	12.07	12.07	12.07	12.07	8.89	9.1	7.52	10.43	11.29	
375	10.91	11.35	10.49	9.11	11.65	11.65	11.65	11.65	8.71	8.96	7.43	10.26	11.21	
400	10.42	10.42	9.79	8.8	10.98	10.98	10.98	10.98	8.53	8.83	7.29	10.17	10.98	
425	8.63	8.63	8.19	7.73	10.51	10.51	10.51	10.51	8.4	8.74	7.16	10.08		
450	6.9	6.9	6.48	6.41	10.14	10.14	10.14	10.14	8.22	8.65	7.02	10.04		
475	5.23	5.13	4.7	4.23	9.51	9.51	9.51	8.36	8.08	8.6		9.51		
500	3.53	3.47	3.32	3.09	7.22	7.72	8.47	6.41	7.95	8.47		8.47		
538	1.77	1.77	1.77	1.77	3.4	4.47	5.53	4.11	7.33	7.52		7.52		
550						3.81	4.69	3.61	7.07	7.48		7.48		
575						2.64	3.16	2.67	6.25	7.18		7.18		
600						1.83	2.07	1.87	5.06	5.97		6.42		
625						1.28	1.34	1.2	4.14	4.74		5.49		
650						0.85	0.85	0.71	3.38	3.8		4.25		
675									2.8	3.1		3.76		