TRUNNION BALL VALVE

Valves & Automation

Product Range

Valves & Automation

ST3- 3 PIECE FORGED TRUNNION MOUNTED- SIDE ENTRY

- FORGED ST310 Full Bore Class 150 from 2″ to 36″
- FORGED ST320 Full Bore Class 300 from 2″ to 36″
- FORGED ST330 Full Bore Class 600 from 2″ to 36″
- FORGED ST350 Full Bore Class 900 from 2″ to 36″
- FORGED ST360 Full Bore Class 1500 from 2″ to 30"
- FORGED ST390 Full Bore Class 2500 from 2″ to 16"
- FORGED ST315 Reduced Bore Class 150 from 3" to 36"
- FORGED ST325 Reduced Bore Class 300 from 3" to 36"
- FORGED ST335 Reduced Bore Class 600 from 3" to 36"
- FORGED ST355 Reduced Bore Class 900 from 3" to 36"
- FORGED ST365 Reduced Bore Class 1500 from 3" to 30"
- FORGED ST395 Reduced Bore Class 2500 from 3" to 16"

ST2- 2 PIECE CAST TRUNNION MOUNTED- SIDE ENTRY

- CAST ST215 Full Bore Class 150 from 2″ to 16″
- CAST ST230 Full Bore Class 300 from 2″ to 16″
- CAST ST260 Full Bore Class 600 from 2″ to 10″

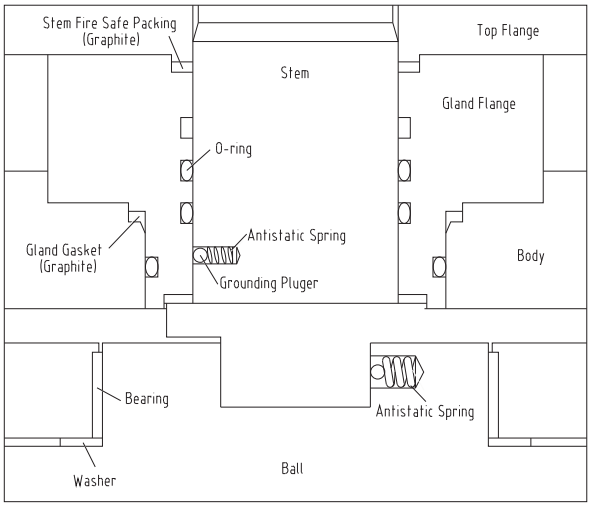
Design and Manufacturing Standards

Basic Design: API 6D
Wall Thickness: API 6D
Face-to-Face Dimension: API 6D
Flange End Dimension: ANSI/ASME B16.5 (2” to 24”) ANSI/ASME B16.47 (26” & up)
Butt-Weld End Dimension: ANSI/ASME B16.25
Inspection & Testing: API 6D/ API 598
Fire Safe Design: API 607

DESIGN FEATURE

BLOW-OUT PROOF STEM

The stem is made separately from the ball. The lower end of the stem is designed with an integral T-type round shoulder to be blowout-proof.

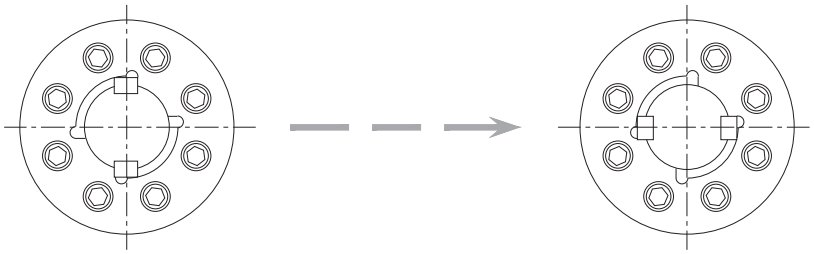


ANTI-STATIC DEVICE

A spring-loaded ball assures the electrical continuity between the ball, stem and body, to avoid sparking during the turning of the stem to open and close the valve.

INTERNAL STEM STOP DESIGN

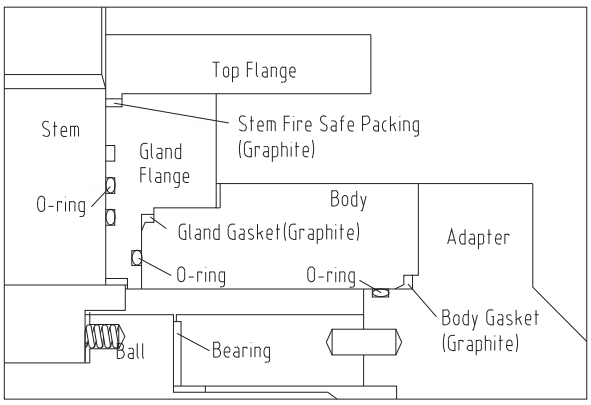
Mechanical stops are equipped on all valves to ensure the ball is never to be over rotated.



SUPER FIRE SAFE DESIGN

a) External leakage prevention

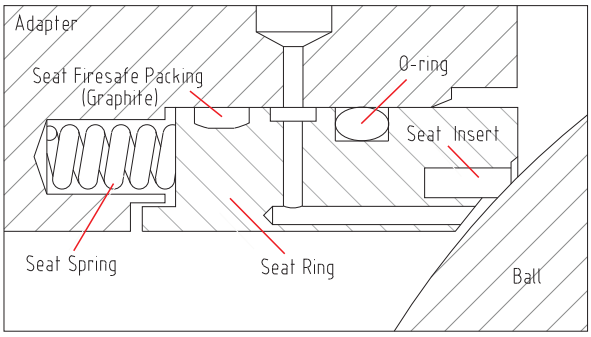
All the possible external leakage point between stem and gland flange, gland flange and body, body and adapter are sealed with primary O-ring then secondary graphite gasket. When fire burned out the primary O-ring seal, the secondary graphite gasket seal still can prevent the process medium from external leakage.



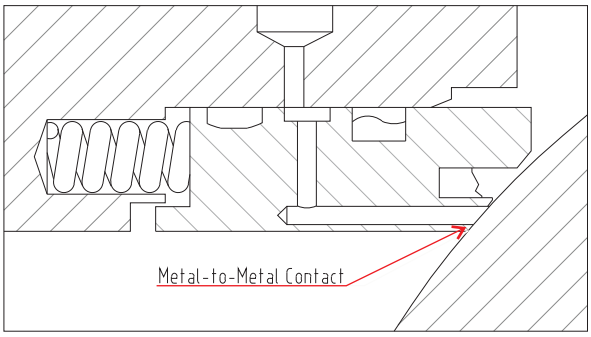
b) Internal leakage prevention

When fire burned out the primary O-ring seal between the floating seat ring and adapter, also the seat insert between seat ring and ball, the secondary graphite seal between seat ring and adapter, and seat ring & ball metal to metal contact preloaded by spring will minimize the internal process medium leakage.

Before Fire

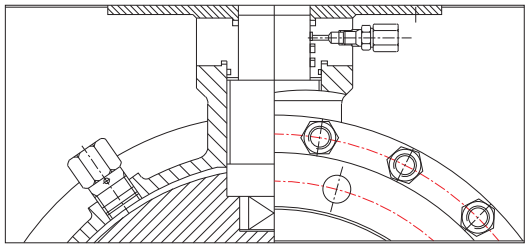


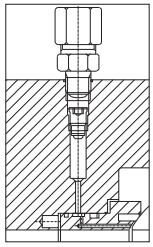
AfterFire



EMERGENCY SEALANT INJECTION SYSTEM

For 6" and larger size is equipped with sealant injection located at stem and seats area. The injection is integrated with check valve to provide backup sealing, also a check valve is equipped at front of seat sealant injection to avoid blowing out in case wrong operation. When the soft sealing materials (seat inserts and o- rings) are damaged and leakage happened by fire or other accident, the sealant can be injected through the injection fittings. Smaller size can be also equipment upon request.





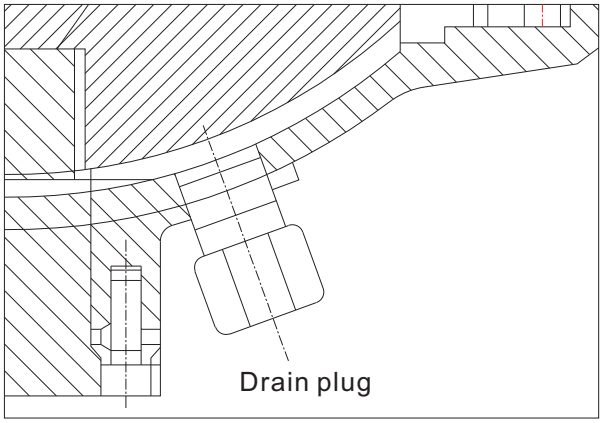
ENVIRONMENT FRIENDLY (LOW EMISSION)

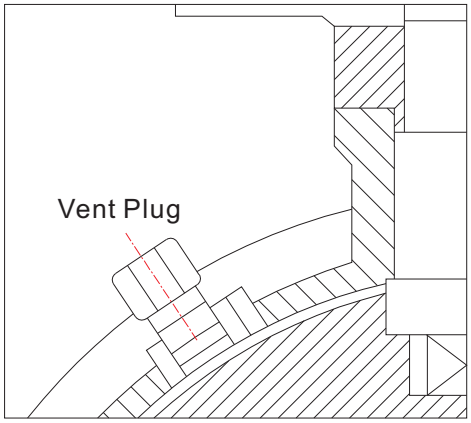
Accurate machining of stem, gland and body sealing surfaces with double sealing (O-ring primary seal plus graphite gasket seal) ensure the low emission which is complying with the most severe pollution-control regulations. The test certifications are available on request.

DESIGN FEATURE

DOUBLE BLOCK & BLEED (DBB)

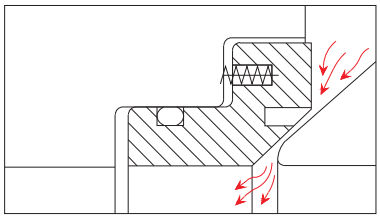
When the ball is in the closed position, each seat seals off the process medium independently at the same time between the up/down stream and body cavity; it allows bleeding of the trapped cavity pressure (DBB) through drain or vent valve. The double block and bleed function makes it possible to flush the valve under pressure and verify that the seats are sealing properly.



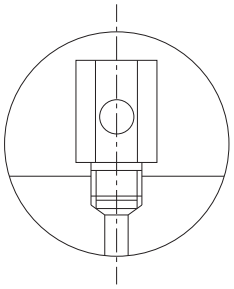


CAVITY PRESSURE RELIEF

When the pressure in cavity is increasing abnormally, the single piston effective seat can release the overloaded pressure automatically, while for the double piston effective seat designed ball valves, the overloaded pressure will be released through the automatic pressure relief device installed on the valve body.



SPE SEATS -SELF-RELIEVING



Safety Valve for DIB-1 Seat

DESIGN FEATURE

SEAT DESIGN

Standard seat design is primary soft seal, and secondary metal to metal seal. Seat insert is designed as pressed-in type which is easy for maintenance. (Fig. 1) Optional design with primary metal to metal seal and secondary soft seal seat design is also available upon request. (Fig. 2)

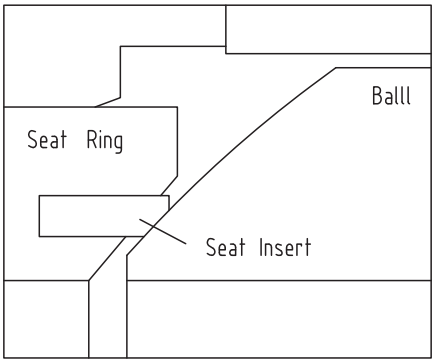


Fig. 1

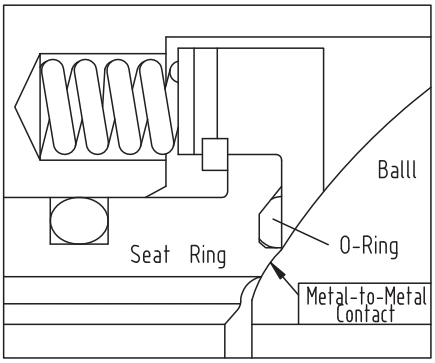
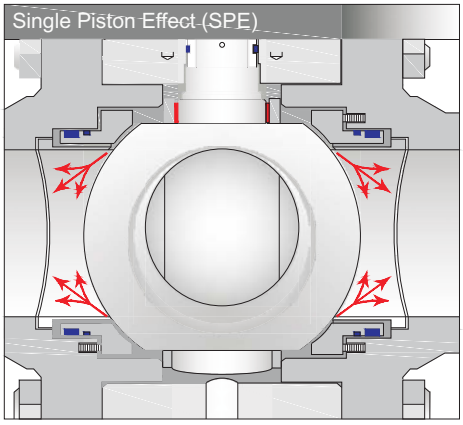
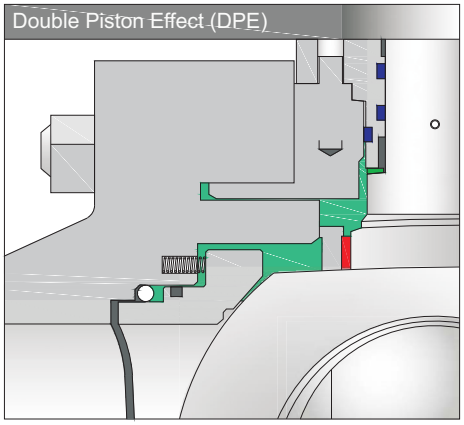


Fig. 2

SPE-SINGLE PISTON EFFECT (SELF-RELIEVING SEATS)

The single piston effect is the standard design for SIO trunnion mounted ball valves. Pressure from both upstream and downstream sides pushes the seat rings against the ball.
If the force created by the body cavity pressure is greater than the preloaded spring force plus the force created by the pressure from upstream or downstream side, the seats are pushed away from the ball. Thus, any overpressure in the body cavity is released automatically in the valves' fully open or fully closed position.





DPE- DOUBLE PISTON EFFECT

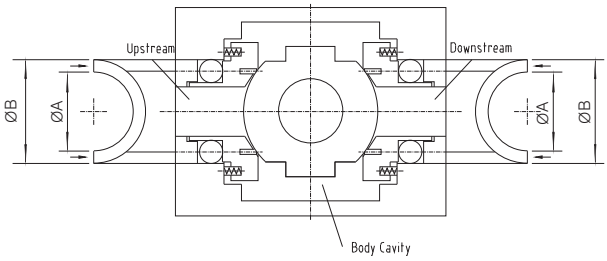
Double piston effect seats are pressure energized in both directions. So, the seat rings are always pushed against the ball by the pressure from upstream/ downstream or from the cavity.
If the upstream seat fails, the downstream seat can still ensure a tight seal.

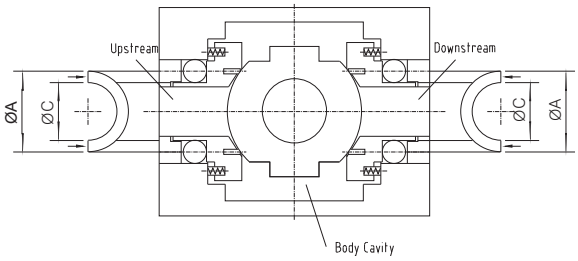
DPE seats do not relieve the internal volume (cavity) pressure build-up caused by thermal expansion. The force generated by the fluid contained in the cavity will be balanced and will not affect the seat contact with the ball. When the valve is equipped with 2 identical DPE seats, the cavity relief must be realized by a specific external system (external safety or bleed valve).

DESIGN FEATURE

DIB-1 (BOTH DPE SEATS)

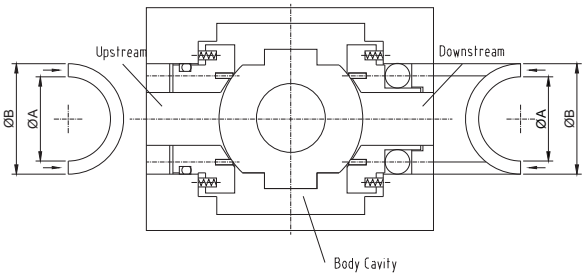
DIB-1 valve design both seats are double piston effective seats (DPE seat). Each seat can independently withstand the medium pressure from upstream or downstream. The seat of DIB-1 Ball Valve does not have the automatic pressure relief function. So, the DIB-1 ball valve requires to install automatic pressure relief device on the body, when the cavity pressure is higher than 1.25 to 1.33 times valve NPS, overloaded pressure can be released through the automatic pressure relief device to ensure the safety operation.

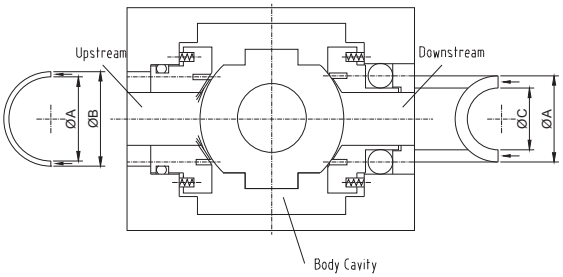




DIB-2(ONE SPE AND ONE DPE)

DIB-2 Valve design, one seat is double piston effective Seat, the other seat has self-relieving function. The self-relieving function seat only can withstand the medium pressure from the upstream to realize sealing function. Double piston effective seat can withstand the medium pressure from both directions. When the cavity pressure is increasing abnormally, the double piston effective seat will be pushed toward to ball by the medium pressure. The self-relieving function seat will be pushed away from the ball to realize the pressure self-relief function.





ST2

2 PIECE CAST TRUNNION MOUNTED- SIDE ENTRY

Valves & Automation

Product Range

- CAST ST215 Full Bore
  Class 150 from 2″ to 16″
- CAST ST230 Full Bore
  Class 300 from 2″ to 16″
- CAST ST260 Full Bore
  Class 600 from 2″ to 10″

Design and Manufacturing Standards

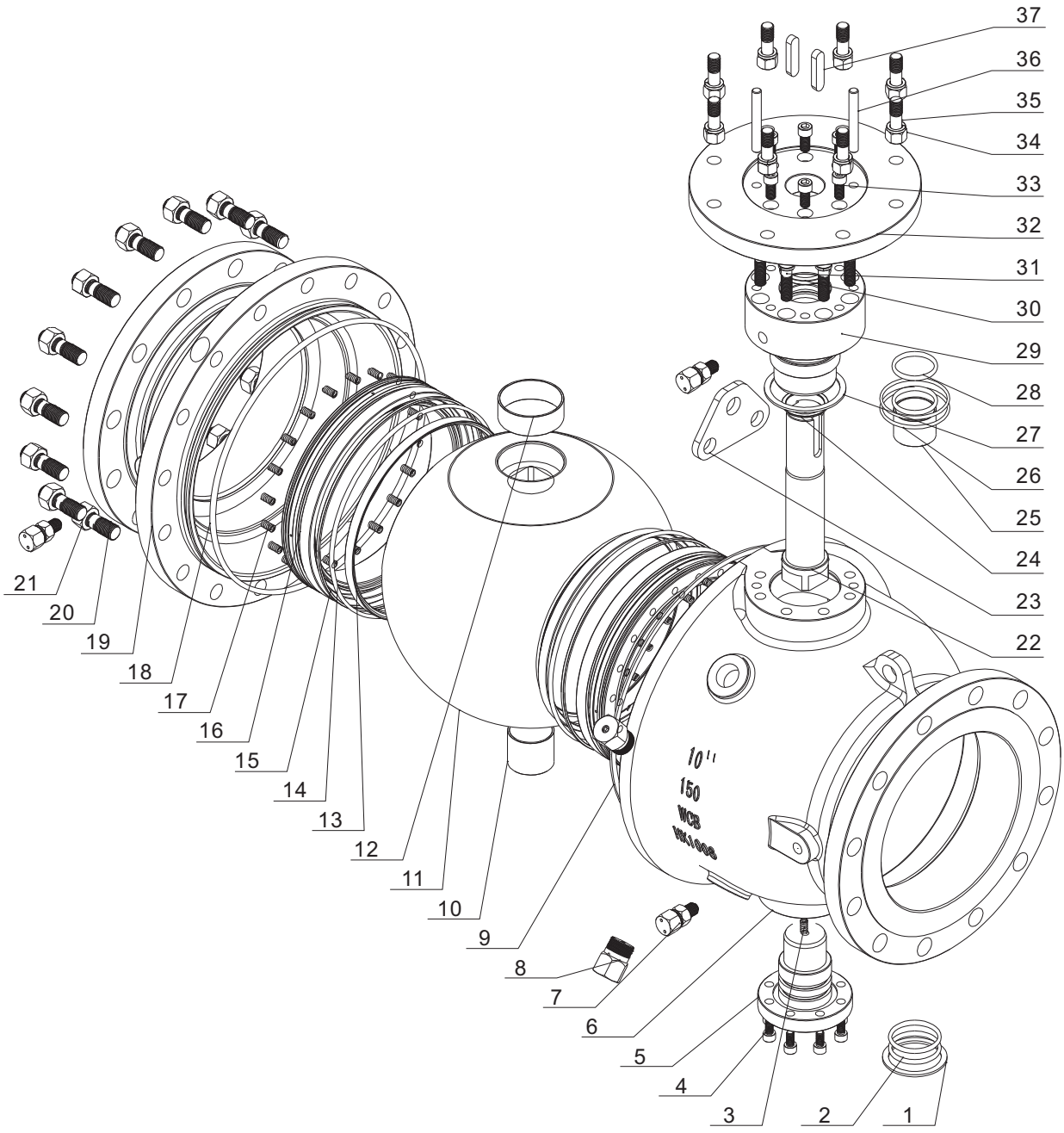
Basic Design: API 6D
Wall Thickness: API 6D
Face-to-Face Dimension: API 6D
Flange End Dimension: ANSI/ASME B16.5
Inspection & Testing: API 6D/ API 598
Fire Safe Design: API 607

ST2

2 PIECE CAST TRUNNION MOUNTED- SIDE ENTRY

Valves & Automation

COMPONENTS AND MATERIALS LIST



Note: SIO reserves the right to make any modifications without notice.

ST2

2 PIECE CAST TRUNNION MOUNTED- SIDE ENTRY

SIO Valves & Automation

Main Material List

Code	Part Name	Standard	Stainless Steel	Lower temperature
1	TRUNNION GASKET		SS+GRAPHITE	
2	TRUNNION O-RING		VITON	
3	ANTI-STATIC SPRING		SS	
4	HEX BOLT	B7	B8M	B8M
5	TRUNNION	A105ENP F304	F316	F316
6	BODY	WCB	CF8M	CF8M
7	INJECTION	CS+ZN	F316	F316
8	VENT/DRAIN	CS+ZN	F316	F316
9	BODY GASKET		SS+GRAPHITE	
10	TRUNNION BEARING		SS+PTFE	
11	BALL	A105+ENP	F316	F316
12	GLAND BEARING		SS+PTFE	
13	SEAT INSERT		RPTFE/DEVLON/PEEK	
14	SEAT O-RING		VITON	
15	SEAT GASKET		GRAPHITE	
16	SEAT RETAINER	A105+ZN	F316	F316
17	SEAT RETAINER SPRING	17-4PH	inconel X750	inconel X750
18	BODY-ORING		VITON	
19	BONNET	WCB	CF8M	LCB
20	STUD	B7	B8M	B8M
21	NUTS	2H	8M	8M
22	STEM	F6a	F316	17-4PH
23	LIFT PLATE		CS+ZN	
24	THRUST WASHER		RPTFE	
25	GLAND BEARING		SS+PTFE	
26	GLAND ORING		VITON	
27	GLAND GASKET		SS+GRAPHITE	
28	GLAND O RING		VITON	
29	GLAND	A105	F316	F316
30	HEX BOLT	B7	B8M	B8M
31	PACKING		GRAPHITE	
32	TOP MOUNTING PAD	A105	F316	F316
33	HEX BOLT	B7	B8M	B8M
34	NUTS	2H	8M	8M
35	STUD	B7	B8M	B8M
36	POSITIONER		1045	
37	PIN		1045	

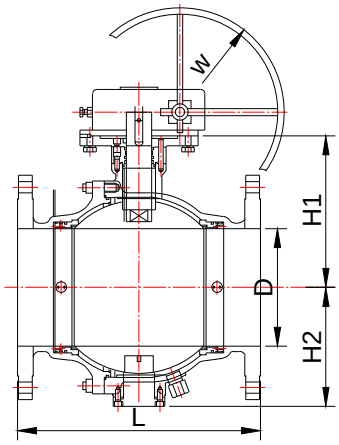
Note: SIO reserves the right to make any modifications without notice.

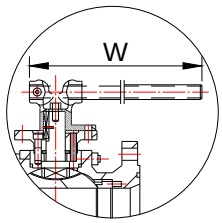
ST2

2 PIECE CAST TRUNNION MOUNTED - SIDE ENTRY

Valves & Automation

Dimensions





Handle

Full Bore — ST210 CLASS 150

Size		D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
2	50	51	178	200	110	265
3	80	76	203	300	126	285
4	100	102	229	315	165	285
6	150	152	394	335	165	*300
8	200	203	457	405	200	*300
10	250	254	534	427	220	*300
12	300	305	610	465	262	*500
14	350	337	686	506	293	*600
16	400	387	762	622	341	*600

Full Bore — ST230 CLASS 300

Size		D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
2	50	51	216	206	113	265
3	80	76	283	315	129	400
4	100	102	305	330	169	750
6	150	152	403	345	148	*300
8	200	203	502	415	185	*300
10	250	254	568	427	226	*400
12	300	305	648	465	269	*500
14	350	337	762	519	300	*600
16	400	387	838	638	350	*600

Full Bore — ST260 CLASS 600

Size		D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
2	50	51	178	200	110	265
3	80	76	203	300	126	285
4	100	102	229	315	165	285
6	150	152	394	335	165	*300
8	200	203	457	405	200	*300
10	250	254	534	427	220	*300

Note: SIO reserves the right to make any modifications without notice.

*Gear Operated

ST3

3 PIECE FORGED TRUNNION MOUNTED- SIDE ENTRY

Valves & Automation

Product Range

- FORGED ST310 Full Bore Class 150 from 2″ to 36″
- FORGED ST315 Reduced Bore Class 150 from 3" to 36"
- FORGED ST320 Full Bore Class 300 from 2″ to 36″
- FORGED ST325 Reduced Bore Class 300 from 3" to 36"
- FORGED ST330 Full Bore Class 600 from 2″ to 36″
- FORGED ST335 Reduced Bore Class 600 from 3" to 36"
- FORGED ST350 Full Bore Class 900 from 2″ to 36″
- FORGED ST355 Reduced Bore Class 900 from 3" to 36"
- FORGED ST360 Full Bore Class 1500 from 2″ to 30"
- FORGED ST365 Reduced Bore Class 1500 from 3" to 30"
- FORGED ST390 Full Bore Class 2500 from 2″ to 16"
- FORGED ST395 Reduced Bore Class 2500 from 3" to 16"

Design and Manufacturing Standards

Basic Design: API 6D

Wall Thickness: API 6D

Face-to-Face Dimension: API 6D

Flange End Dimension: ANSI/ASME B16.5 (2” to 24”) ANSI/ASME B16.47 (26” & up)

Butt-Weld End Dimension: ANSI/ASME B16.25

Inspection & Testing: API 6D/ API 598

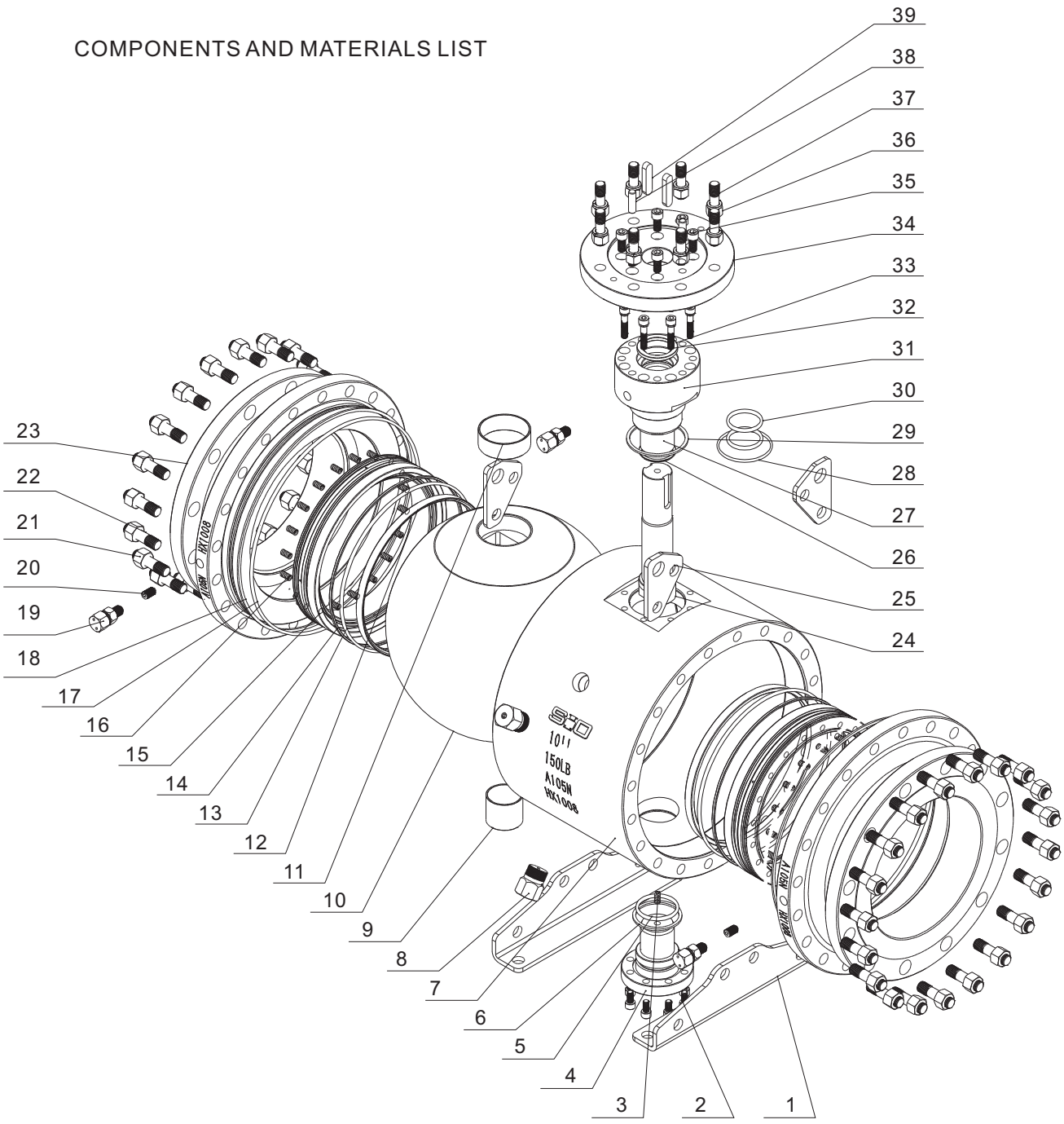
Fire Safe Design: API 607

ST3

3 PIECE FORGED TRUNNION MOUNTED- SIDE ENTRY

Valves & Automation

COMPONENTS AND MATERIALS LIST



Note: SIO reserves the right to make any modifications without notice.

ST3

3 PIECE FORGED TRUNNION MOUNTED- SIDE ENTRY

Valves & Automation

Main Material List

Code	Part Name	Standard	Lower Temperature	Stainless Steel
		Material		
1	FOOT PLATE	CS+ZN		
2	HEX BOLT	B7	A320 L7M	B8M
3	ANTI-STATIC SPRING	SS		
4	TRUNNION	A105+ENP	A350 LF2 ENP	F316
5	TRUNNION O RING	VITON		
6	TRUNNION GAKSET	SS+GRAPHITE		
7	BODY	A105	A350 LF2	F316
8	VENT/DRAIN	CS+ZN	CS+ZN	F316
9	TRUNNION BEARING	SS+PTFE		
10	BALL	A105+ENP	A350 LF2 ENP	F316
11	GLAND BEARING	SS+PTFE		
12	SEAT INSERT	RPTFE/DEVLON/PEEK		
13	SEAT ORING	VITON		
14	SEAT GASKET	GRAPHITE		
15	SEAT RETAINER	A105+ENP	A350 LF2 ENP	F316
16	SEAT SPING	17-7PH	inconel X750	inconel X750
17	BODY ORING	VITON		
18	BODY GASKET	SS+GRAPHITE		
19	INJECTION	CS+ZN	F316	F316
20	CHECK VALVE	SS		
21	NUTS	2H	A194 7M	8M
22	STUD	B7	A320L7M	B8M
23	BONNET	A105N	A350 LF2	F316
24	STEM	F6a	F316	F316
25	LIFT PLATE	CS+ZN		
26	THRUST WASHER	RPTFE		
27	GLAND BEARING	SS+PTFE		
28	GLAND O RING	VITON		
29	GLAND GASKET	SS+GRAPHITE		
30	GALND O RING	VITON		
31	GLAND	A105	A350 LF2	F316
32	GLAND BOLT	B7	A320L7M	B8M
33	PACKING	GRAPHITE		
34	MOUTING PAD	A105	A350 LF2	F316
35	BOLT	B7	A320L7M	B8M
36	NUTS	2H	A194 7M	8M
37	STUD	B7	A320L7M	B8M
38	POSITIONER	1045		
39	PIN	1045		

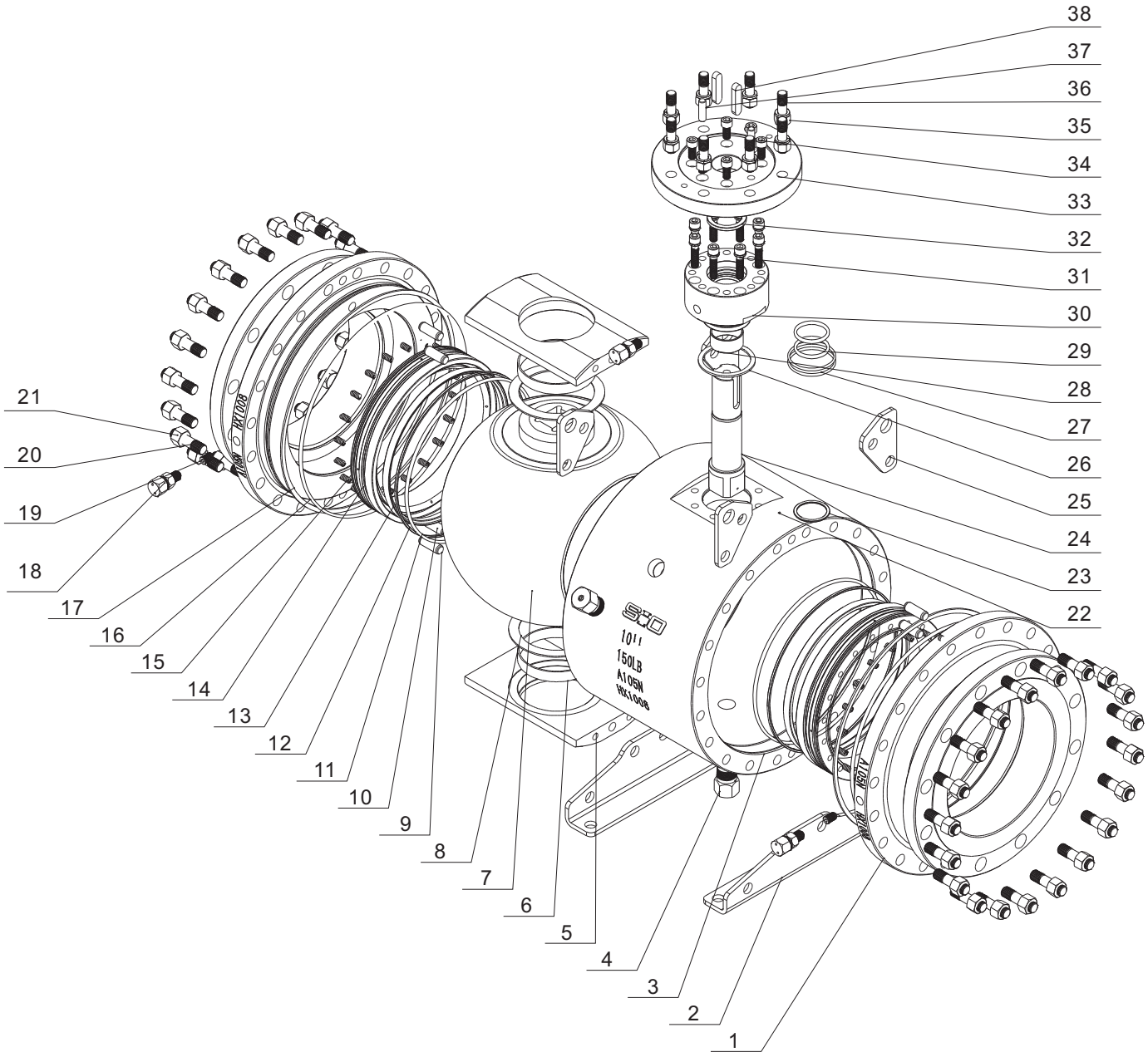
Note: SIO reserves the right to make any modifications without notice.

ST3

3 PIECE FORGED TRUNNION MOUNTED- SIDE ENTRY

Valves & Automation

COMPONENTS AND MATERIALS LIST



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ST3

3 PIECE FORGED TRUNNION MOUNTED- SIDE ENTRY

Valves & Automation

Main Material List

Code	Part Name	Standard	Lower Temperature	Stainless Steel
		Material		
1	BONNET	A105	A350 LF2	A182 F316
2	FOOT PLATE		CS+ZN	
3	BODY	A105	A350 LF2	A182 F316
4	VENT/DRAIN	CS+ZN	CS+ZN	F316
5	TRUNNION	A105+ENP	A350 LF2 ENP	F316
6	TRUNNION SLIDING BEARING		SS+PTFE	
7	BALL	A105+ENP	A350 LF2 ENP	F316
8	TRUNNION PLANE BEARING		SS+PTFE	
9	FLANGE POSITIONING PIN		SS	
10	TRUNNION POSITIONING PIN		SS	
11	SEAT O-RING		VITON	
12	SEAT SEAL		GRAPHITE	
13	SEAT INSERT		RPTFE	
14	SEAT RETAINER	A105+ENP	A350 LF2 ENP	F316
15	SEAT SPRING		17-4PH/inconel X750	
16	BONNET O-RING		VITON	
17	BODY GASKET		SS+GRAPHITE	
18	INJECTION	CS+ZN	CS+ZN	F316
19	CHECK VALVE	CS+ZN	CS+ZN	F316
20	STUD	B7	A320L7M	B8M
21	HEX NUTS	2H	A194 7M	8M
22	ANTI-STATIC		SS316	
23	THRUST WASHER		RPTFE	
24	STEM	F6a	F316	F316
25	LIFT PLATE		CS+ZN	
26	GLAND GASKET		SS+GRAPHITE	
27	FLANGE O RINIG		VITON	
28	GLAND BEARING		SS+PTFE	
29	GLAND O RING		VITON	
30	GLAND	A105	A350 LF2	F316
31	HEX BOLT	B7	A320L7M	B8M
32	PACKING		GRAPHITE	
33	MOUNTING PLATE	A105	A350 LF2	F316
34	HEX BOLT	B7	A320L7M	B8M
35	BUTS	2H	A194 7M	8M
36	STUD	B7	A320L7M	B8M
37	POSITIONER		1045	
38	PIN		1045	

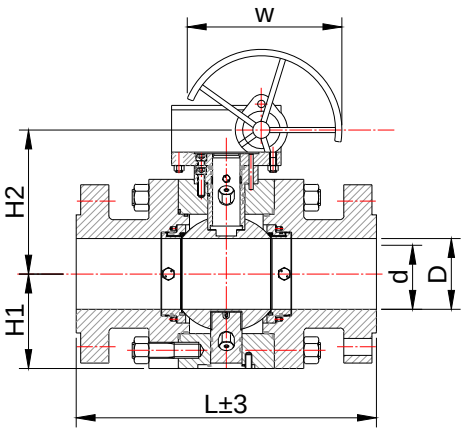
Note: SIO reserves the right to make any modifications without notice.

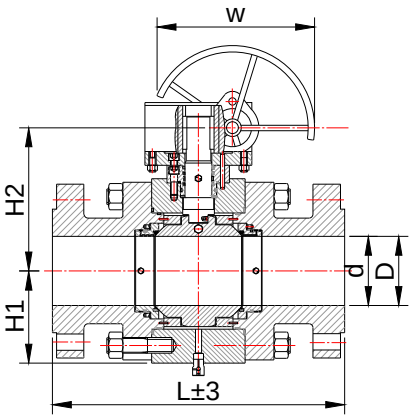
ST3

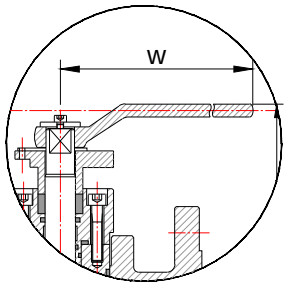
3 PIECE FORGED TRUNNION MOUNTED - SIDE ENTRY

Valves & Automation

Dimensions







Handle

Full Bore

ST310 Class 150

Size	d	L	H1	H2	W
in	mm	mm	mm	mm	mm
2	51	178	155	85	350
3	76	203	191	110	400
4	102	229	211	130	450
6	152	394	231	160	*305
8	203	457	282	235	*406
10	254	533	336	290	*406
12	305	610	373	315	*406
14	337	686	413	345	*406
16	387	762	457	383	*600
18	438	864	501	485	*600
20	489	914	551	495	*600
22	540	991	600	555	*600
24	591	1067	635	590	*700
26	635	1143	710	620	*700
28	686	1245	760	670	*760
30	737	1295	800	710	*760
32	781	1372	840	745	*760
34	832	1473	890	775	*760
36	876	1524	930	805	*760

Reduced Bore

ST315 Class 150

Size	d	D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
3*2	51	76	203	155	85	350
4*3	76	102	229	191	110	400
6*4	102	152	394	211	130	450
8*6	152	203	457	231	160	*305
10*8	203	254	533	282	235	*406
12*10	254	305	610	336	290	*406
14*10	254	337	686	336	290	*406
14*12	305	337	686	373	315	*406
16*12	305	387	762	373	315	*406
16*14	337	387	762	413	345	*406
18*14	337	438	864	413	345	*406
18*16	387	438	864	457	383	*600
20*16	387	489	914	457	383	*600
20*18	438	489	914	501	435	*600
22*18	438	540	991	501	435	*600
24*20	489	591	1067	551	495	*600
26*22	540	635	1143	600	555	*600
28*24	591	686	1245	635	590	*700
30*24	591	737	1295	635	590	*700
32*26	635	781	1372	710	620	*700
34*28	686	832	1473	760	670	*760
36*30	737	876	1524	820	710	*760

Note: SIO reserves the right to make any modifications without notice.

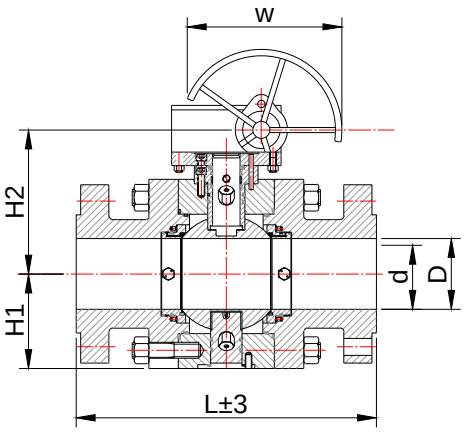
*Gear Operated

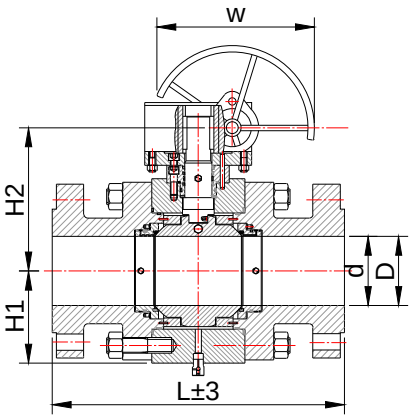
ST3

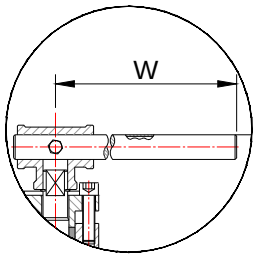
3 PIECE FORGED TRUNNION MOUNTED - SIDE ENTRY

Valves & Automation

Dimensions







Handle

Full Bore

ST320 Class 300

Size	d	L	H1	H2	W
in	mm	mm	mm	mm	mm
2	51	216	155	85	400
3	76	283	191	110	450
4	102	305	211	130	500
6	152	403	229	160	*305
8	203	502	291	235	*406
10	254	568	340	290	*406
12	305	648	375	315	*500
14	337	762	417	345	*600
16	387	838	466	400	*600
18	438	914	506	440	*600
20	489	991	563	495	*600
22	540	1092	605	560	*700
24	591	1143	684	590	*760
28	686	1346	770	680	*760
30	737	1397	810	720	*760
32	781	1524	850	760	*800
34	832	1626	900	790	*800
36	876	1727	940	820	*800

Reduced Bore

ST325 Class 300

Size	d	D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
3*2	51	76	283	155	85	400
4*3	76	102	305	191	110	450
6*4	102	152	403	211	130	500
8*6	152	203	502	229	160	*305
10*8	203	254	568	291	235	*406
12*10	254	305	648	340	290	*406
14*10	254	337	762	340	315	*406
14*12	305	337	762	375	315	*500
16*12	305	387	838	375	360	*500
16*14	337	387	838	417	360	*600
18*14	337	438	914	417	400	*600
18*16	387	438	914	466	400	*600
20*16	387	489	991	466	420	*600
20*18	438	489	991	506	440	*600
22*18	438	540	1092	506	440	*600
24*20	489	591	1143	563	495	*600
28*24	591	686	1346	684	590	*760
30*24	591	737	1397	684	590	*760
34*28	686	832	1626	770	680	*760
36*30	737	876	1727	810	720	*760

Note: SIO reserves the right to make any modifications without notice.

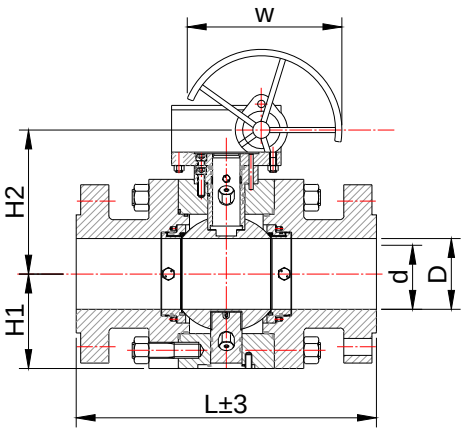
*Gear Operated

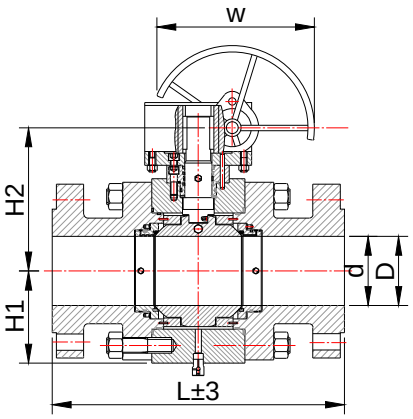
ST3

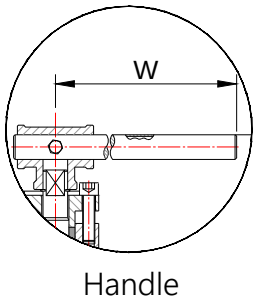
3 PIECE FORGED TRUNNION MOUNTED - SIDE ENTRY

Valves & Automation

Dimensions







Handle

Full Bore

ST330 Class 600

Size	d	L	H1	H2	W
in	mm	mm	mm	mm	mm
2	51	292	155	85	400
3	76	356	193	112	500
4	102	432	239	140	700
6	152	559	266	175	*406
8	203	660	310	250	*406
10	254	787	354	290	*600
12	305	838	411	345	*600
14	337	889	435	370	*600
16	387	991	493	420	*600
18	438	1092	544	462	*700
20	489	1194	629	515	*760
22	540	1295	683	570	*800
24	591	1397	728	610	*800
28	686	1549	810	695	*800
30	737	1651	863	735	*800
32	781	1778	900	775	*800
34	832	1930	940	820	*800
36	876	2083	990	885	*800

Reduced Bore

ST335 Class 600

Size	d	D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
3*2	51	76	356	155	85	400
4*3	76	102	432	193	112	600
6*4	102	152	559	239	140	700
8*6	152	203	660	266	175	*406
10*8	203	254	787	310	250	*406
12*10	254	305	838	354	290	*600
14*10	254	337	889	354	345	*600
14*12	305	337	889	411	345	*600
16*12	305	387	991	411	370	*600
16*14	337	387	991	435	370	*600
18*14	337	438	1092	435	410	*600
18*16	387	438	1092	493	420	*600
20*16	387	489	1194	493	440	*600
20*18	438	489	1194	544	462	*700
22*18	438	540	1295	544	462	*700
24*20	489	591	1397	629	515	*760
28*24	591	686	1549	728	610	*800
30*24	591	737	1651	728	610	*800
34*28	686	832	1930	810	695	*800
36*30	737	876	2083	863	735	*800

Note: SIO reserves the right to make any modifications without notice.

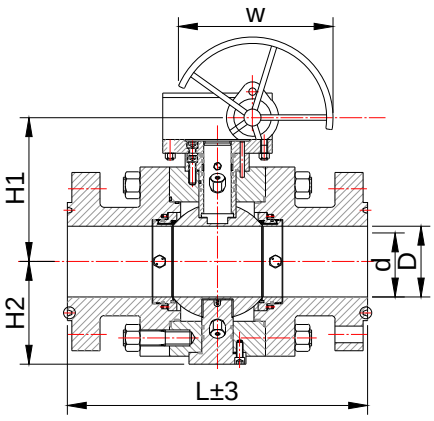
*Gear Operated

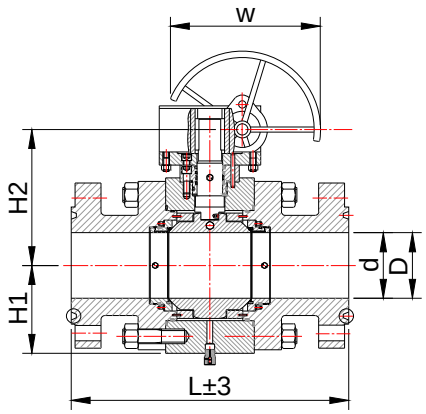
ST3

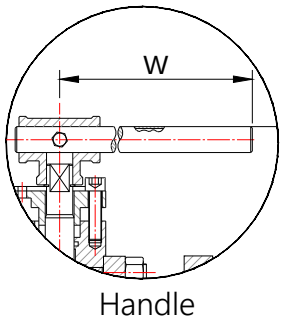
3 PIECE FORGED TRUNNION MOUNTED - SIDE ENTRY

Valves & Automation

Dimensions







Full Bore

ST350 Class 900LB

Size	d	L	H1	H2	W
in	mm	mm	mm	mm	mm
2	51	368	178	100	450
3	76	381	221	125	600
4	102	457	215	150	*605
6	152	610	268	215	*406
8	203	737	324	260	*600
10	254	838	371	305	*600
12	305	965	425	360	*600
14	324	1029	463	390	*600
16	375	1130	513	440	*710
18	425	1219	614	500	*760
20	473	1321	644	530	*760
24	572	1549	746	630	*800
28	667	1753	830	720	*800
30	714	1880	880	755	*800
34	810	2159	970	850	*900
36	857	2286	1030	930	*900

Reduced Bore

ST355 Class 900LB

Size	d	D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
2*1-1/2	38	84	368	152	80	400
3*2	51	76	381	178	100	450
4*3	76	102	457	221	125	600
6*4	102	152	610	215	150	*305
8*6	152	203	737	268	260	*406
10*8	203	254	838	324	305	*600
12*10	254	305	965	371	335	*600
14*10	254	324	1029	371	360	*600
14*12	305	324	1029	425	360	*600
16*12	305	375	1130	425	390	*600
16*14	324	375	1130	463	390	*600
18*14	375	425	1219	513	440	*710
20*16	375	473	1321	513	470	*710
20*18	425	473	1321	614	500	*760
24*20	473	572	1549	644	550	*760
28*24	572	667	1753	745	630	*800
30*24	572	714	1880	745	665	*800
34*28	667	810	2159	830	750	*800
36*30	714	857	2286	880	780	*800

Note: SIO reserves the right to make any modifications without notice.

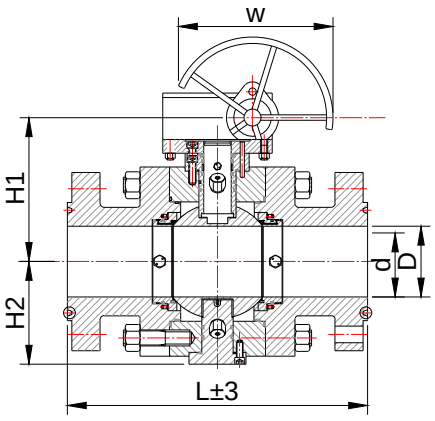
*Gear Operated

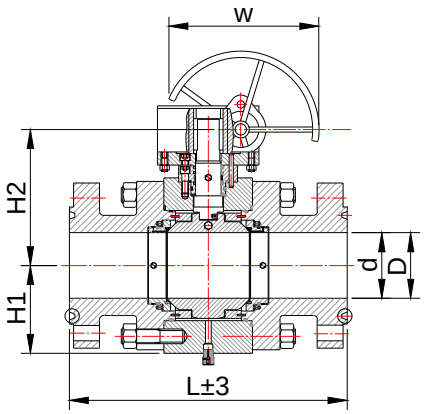
ST3

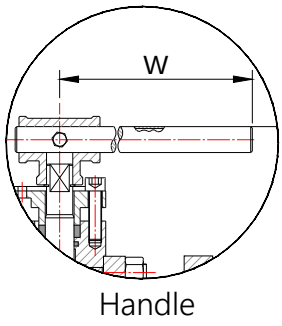
3 PIECE FORGED TRUNNION MOUNTED - SIDE ENTRY

Valves & Automation

Dimensions







Full Bore

ST360 Class 1500

Size	d	L	H1	H2	W
in	mm	mm	mm	mm	mm
2	51	368	178	100	450
3	76	470	226	130	700
4	102	546	241	162	*406
6	146	705	319	255	*600
8	194	832	345	280	*600
10	241	991	411	345	*600
12	289	1130	478	405	*600
14	318	1257	517	435	*700
16	362	1384	599	485	*760
18	407	1537	663	545	*800
20	457	1664	695	580	*800
24	548	2045	842	730	*900

Reduced Bore

ST365 Class 1500

Size	d	D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
3*2	51	76	470	178	100	450
4*2	76	102	546	226	130	700
6*4	102	146	705	241	162	*406
8*6	146	194	832	319	270	*600
10*8	194	241	991	345	325	*600
12*10	241	289	1130	411	370	*600
14*10	241	318	1257	411	405	*600
14*12	289	318	1257	478	405	*600
16*12	289	362	1384	478	435	*600
16*14	318	362	1384	517	435	*700
18*16	362	407	1537	599	485	*760
20*16	362	457	1664	599	545	*760
20*18	407	457	1664	663	545	*800
24*20	457	548	2045	695	640	*800

Note: SIO reserves the right to make any modifications without notice.

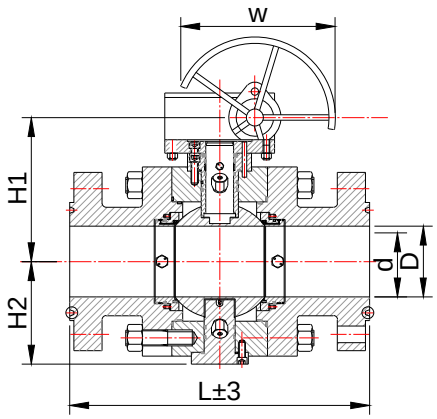
*Gear Operated

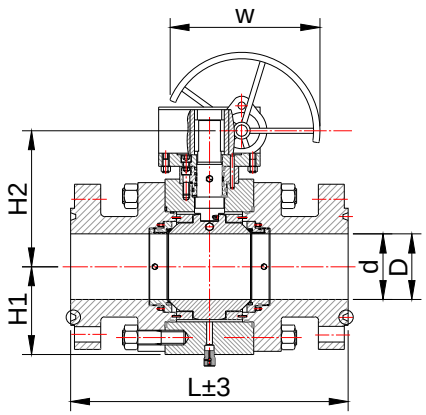
ST3

3 PIECE FORGED TRUNNION MOUNTED - SIDE ENTRY

Valves & Automation

Dimensions





Full Bore — **ST390 Class 2500**

Size	d	L	H1	H2	W
in	mm	mm	mm	mm	mm
2	44	454	214	118	700
3	64	584	216	150	*406
4	89	683	265	180	*406
6	133	927	371	305	*600
8	181	1038	426	360	*600
10	225	1292	463	390	*710
12	267	1445	550	465	*760

Reduced Bore — **ST395 Class 2500**

Size	d	D	L	H1	H2	W
in	mm	mm	mm	mm	mm	mm
3*2	44	64	584	214	118	700
4*3	64	89	683	216	150	*406
6*4	89	133	927	265	270	*406
8*6	133	181	1038	371	305	*600
10*8	181	225	1292	426	370	*600
12*10	225	267	1445	463	415	*710

Note: SIO reserves the right to make any modifications without notice.

*Gear Operated

FLOW COEFFICENT

Nominal Size in/mm	Class 150 PN 20		Class 300 PN 50		Class 600 PN 100		Class 900 PN 150		Class 1500 PN 250	
	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv
½ 15	25	21	25	18	20	17	16	14	16	14
□ 20	56	48	56	40	4	3	34	29	34	29
1 25	95	81	95	69	64	54	55	47	55	47
1 ½ 40	308	262	308	223	308	262	165	140	165	140
2 50	500	425	430	361	370	315	320	272	320	272
3 80	1,360	1,156	1,100	983	1,020	867	920	782	820	697
4 100	2,500	2,125	2,000	1,806	1,850	1,573	1,760	1,496	1,600	1,360
6 150	4,060	3,451	4,056	2,933	3,410	2,899	4,300	3,655	4,150	3,528
8 200	8,090	6,877	7,700	5,845	6,730	5,721	8,475	7,204	8,010	6,809
10 250	13,510	11,484	13,090	9,761	11,120	9,452	14,160	12,036	13,220	11,237
12 300	20,440	17,374	19,830	14,768	17,440	14,824	21,200	18,020	18,800	15,980
14 350	25,050	21,293	23,770	18,099	22,010	18,709	26,700	22,695	24,180	20,553
16 400	34,200	29,070	32,595	24,710	29,980	25,483	36,600	31,110	33,150	28,178
18 450	44,430	37,766	43,200	32,101	39,520	33,592	49,000	41,650	45,703	38,848
20 500	57,665	49,015	55,380	41,663	50,450	42,883	64,600	54,910	60,750	51,638
22 550	70,080	59,568	70,080	50,633	68,900	58,565				
24 600	87,680	74,528	84,720	63,349	76,630	65,136				
28 700	120,000	102,000	115,350	86,700	107,510	91,384				
30 750	141,850	120,573	136,600	102,487	125,630	106,786				
32 800	160,390	136,332	152,200	115,882	140,900	119,765				
36 900	205,450	174,633	192,995	148,438	239,160	203,286				
40 1000	248,700	211,395	248,700	179,686	239,160	203,286				
42 1050	275,260	233,971	275,260	198,875	275,260	233,971				
48 1200	364,180	309,553	364,180	263,120	364,180	309,553				
56 1400	529,430	450,016	529,430	382,513	520,500	442,425				

CALCULATION OF FLOW COEFFICIENT

Flow coefficient Cv (Kv is the metric equivalent) is the rate of flow in gallon per minute with the pressure drop of 1 psi across the valve. The flow coefficients shown in the above table are determined with equations as follows:

Forliquids:

$$Q_1 = C_v(AP / SG)^{1/2}$$

Where:

Q_1 = Flow of liquid (gallon/minute)

ΔP = Pressure drop in psi (P_1-P_2)

SG = Specific gravity (1 for liquid)

Forgases (non-critical):

$$Q_g = 61 \cdot C_v(P_2 \cdot P_1 / SG)^{1/2}$$

Where:

Q_g = Flow of gases (SFH at STP)

P_2 = Outlet pressure (psi)

P_1 = Inlet pressure (psi)

SG = Specific gravity (1 for gas)

HOW TO ORDER

Production Selection Code

Valve Size

For full port design 3 inch means NPS 3 inch, and for reduced port design 3 inch means NPS 3*2

Valve type

Please see the detail on the product range.

End Connection

Code	Type
R	Rased Face Flanged
J	RTJ FLANGE
F	FLAT FACE FLANGED
B	BUTT-WELD

ST3- 3 PIECE FORGED TRUNNION MOUNTED- SIDE ENTRY

- FORGED ST310 Full Bore Class 150 from 2″ to 36″
- FORGED ST320 Full Bore Class 300 from 2″ to 36″
- FORGED ST330 Full Bore Class 600 from 2″ to 36″
- FORGED ST350 Full Bore Class 900 from 2″ to 36″
- FORGED ST360 Full Bore Class 1500 from 2″ to 30"
- FORGED ST390 Full Bore Class 2500 from 2″ to 16"
- FORGED ST315 Reduced Bore Class 150 from 3" to 36"
- FORGED ST325 Reduced Bore Class 300 from 3" to 36"
- FORGED ST335 Reduced Bore Class 600 from 3" to 36"
- FORGED ST355 Reduced Bore Class 900 from 3" to 36"
- FORGED ST365 Reduced Bore Class 1500 from 3" to 30"
- FORGED ST395 Reduced Bore Class 2500 from 3" to 16"

ST2- 2 PIECE CAST TRUNNION MOUNTED- SIDE ENTRY

- CAST ST215 Full Bore Class 150 from 2″ to 16″
- CAST ST230 Full Bore Class 300 from 2″ to 16″
- CAST ST260 Full Bore Class 600 from 2″ to 10″

Operator

Code	Type	Code	Type
L	Lever	B	Bare Shaft
G	Gear Operator	D	Double Acting Penumatic Actuator
E	Electric Actuator	S	Single Acting Pneumatic Actuator

HOW TO ORDER

Body Material

Code	Material	Code	Material	Code	Material	Code	Material	Code	Material
1	A105	6	CF8M	U	Duplex SS	B	254SMO	O	Other than above
2	LCC	7	WCC	I	Inconel	D	904L		
3	F304	8	Lf2	W	Super Duplex	H	Hastelloy		
4	Cf8	L	LCB	T	Titanium	E	Incoloy		
5	F316	C	WCB	A	Alloy 20	M	Monel		

Trim Matrial

Ball		Stem		Seat		Seat Insert		O-ring	
Code	Material	Code	Material	Code	Material	Code	Material	Code	Material
1	A105+ENP	1	F304	1	A105+ENP	T	PTFE	0	None
2	A105+ECR	2	F316	2	A105+ECR	G	RPTFE(Glass filled)	1	Viton
3	A105+TCC	3	F6A	3	A105+TCC	C	RPTFE(Carbon Filled)	2	Teflon
4	A105+CCC	4	ANSI 4140	4	A105+CCC	N	Nylon	3	HNBR
5	A105+STL	5	17-4PH	5	A105+STL	L	Devlon	4	NBR
6	LF2+ENP	6	A105+ENP	6	LF2+ENP	P	PEEK	5	EPDM
7	F304	7	LF2+ENP	7	F304	E	PCTFE	6	FVMQ
8	F316	U	Duplex SS	8	F316	V	VITON	7	FFKM
L	F6A	I	Inconel	L	F6A	M	Metal	8	AFLAS
C	ANSI 4140	W	Super Duplex	C	ANSI 4140	O	Other than above	9	Lip Seal
U	Duplex SS	T	Titanium	U	Duplex SS			S	Special
I	Inconel	A	Alloy 20	I	Inconel				
W	Super Duplex	B	254SMO	W	Super Duplex				
T	Titanium	D	904L	T	Titanium				
A	Alloy 20	H	Hastelloy	A	Alloy 20				
B	254SMO	E	Incoloy	B	254SMO				
D	904L	M	Monel	D	904L				
H	Hastelloy	O	Other than above	H	Hastelloy				
E	Incoloy			E	Incoloy				
M	Monel			M	Monel				
O	Other than above			O	Other than above				

Special Requirement

Code	Description
D	DIB-1 both Double Piston Effect Seat
C	DIB -2 one Double Piston Effect Seat + one Single Pistion Effect Seats

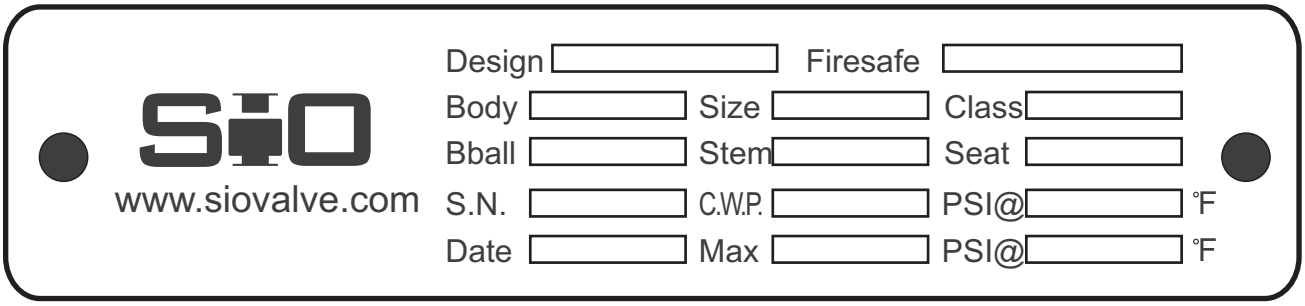
Example

12	ST 310	R	G	1	131G1	D

3 Piece Forged Trunnion ball valve Full Port Class 150 Size 12" Rased Face flanged Gear Operator
Body Material A105, Ball A105 ENP, Stem F6A,Seat A105 ENP, Seat Insert RPTFE G,O-ring Viton, DIB-1

Valve ID Tag & Valve Markings Identification

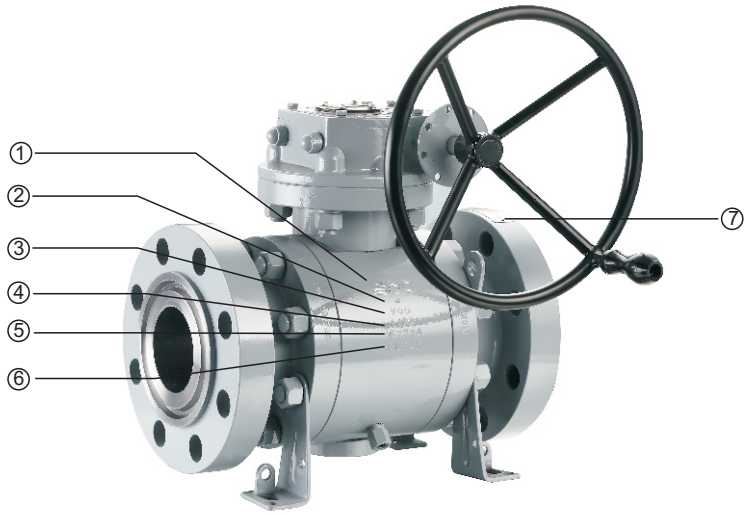
Valve ID Tag



No	Name	Description
1	Design Standard	Identifies Design and Manufacturing conformance(API 6D, ISO 17292, ASME B16.34)
2	Firesafe Standard	Identifies Firesafe Standard conformance(API 607,API 6A)
3	Body Material	Identifies the body material
4	Size	Identifies the valve size
5	Pressure Class	Identifies pessure classification per ANSI Class or PSI
6	Ball Material	Identifies the Ball material
7	Stem Material	Identifies the Stem material
8	Seat Material	Identifies the Seat material
9	Serial No	Identifies certified manacturers serial number
10	C.W.P	Identifies the maximum opeating pressure in PSI and minimum operating temperature in Fahrenheit
11	Max	Identifies the maximum opeating pressure in PSI and maximum operating temperature in Fahrenheit
12	Date	Identifies the date thevalve manufacturing completion date

Valve Markings

No	Description
1	Brand
2	Size
3	Pressure Class
4	Body Material
5	Heat No
6	Serial No
7	ID Tag Plate



Valves & Automation

Authorized distributor

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