WALWORTH®

Since 1842

Ball Valves

Class 150 to 1500

Carbon Steel

Stainless Steel

www.walworthmx.com

INTRODUCTION

WALWORTH® is one of the most important industrial valve manufacturers in Mexico and the world. Founded in 1842, **WALWORTH®** has dedicated itself to the design and manufacture of an array of valves for fluid control. We satisfy varied industry and customer requirements by adhering to the highest quality standards. **WALWORTH®** relies on its broad experience in supplying valves to the petrochemical, chemical, gas, petroleum, nuclear energy generation, pulp and paper, water, cryogenic and geothermal industries, among others.

WALWORTH® has developed an extensive range of production and products in order to satisfy the different needs of the world valve market, including Gate, Globe, Check, Trunnion Mounted, Floating Ball, Plug, Safety and Relief, Pressure Seal and Slab Gate valves in materials such as Cast and Forged Steel, Iron, Bronze, special alloys with different trims and any requirement that may be requested by our customers.

Our Quality Assurance System has allowed **WALWORTH®** to be certified under strict international standards such as API, ANSI, ASME, ASTM, MSS, NACE, AWWA, BSI, CSA and ISO-9001:2000, among others. The system requires a rigorous quality control and selection of raw materials from approved vendors, as well as control over the manufacturing process. **WALWORTH®** has been granted the right by API (American Petroleum Institute) to use the official API monogram on its products manufactured to API Specification 6A and API Specification 6D.

Another important element of **WALWORTH®** valves is their identification and traceability. Each valve is issued an identification number and an identification plate with the part information. The identification number enables **WALWORTH®** to monitor the product as it goes through the production process and provides traceability to materials used in the manufacturing process.

The **WALWORTH®** team relies on extensive experience. **WALWORTH®'s** main manufacturing facility located in Mexico consists of more than 500 employees, state-of-the-art technology and sophisticated equipment, manufacturing the highest quality product at competitive prices.

Index

NUMBERING SYSTEM FOR Walworth® BALL VALVE FIGURES

X X X X

MODEL
7 = Floating Ball
8 = API-6D Ball

PRESSURE
1 = 150
3 = 300
6 = 600
9 = 900
5 = 1500
2 = 2500

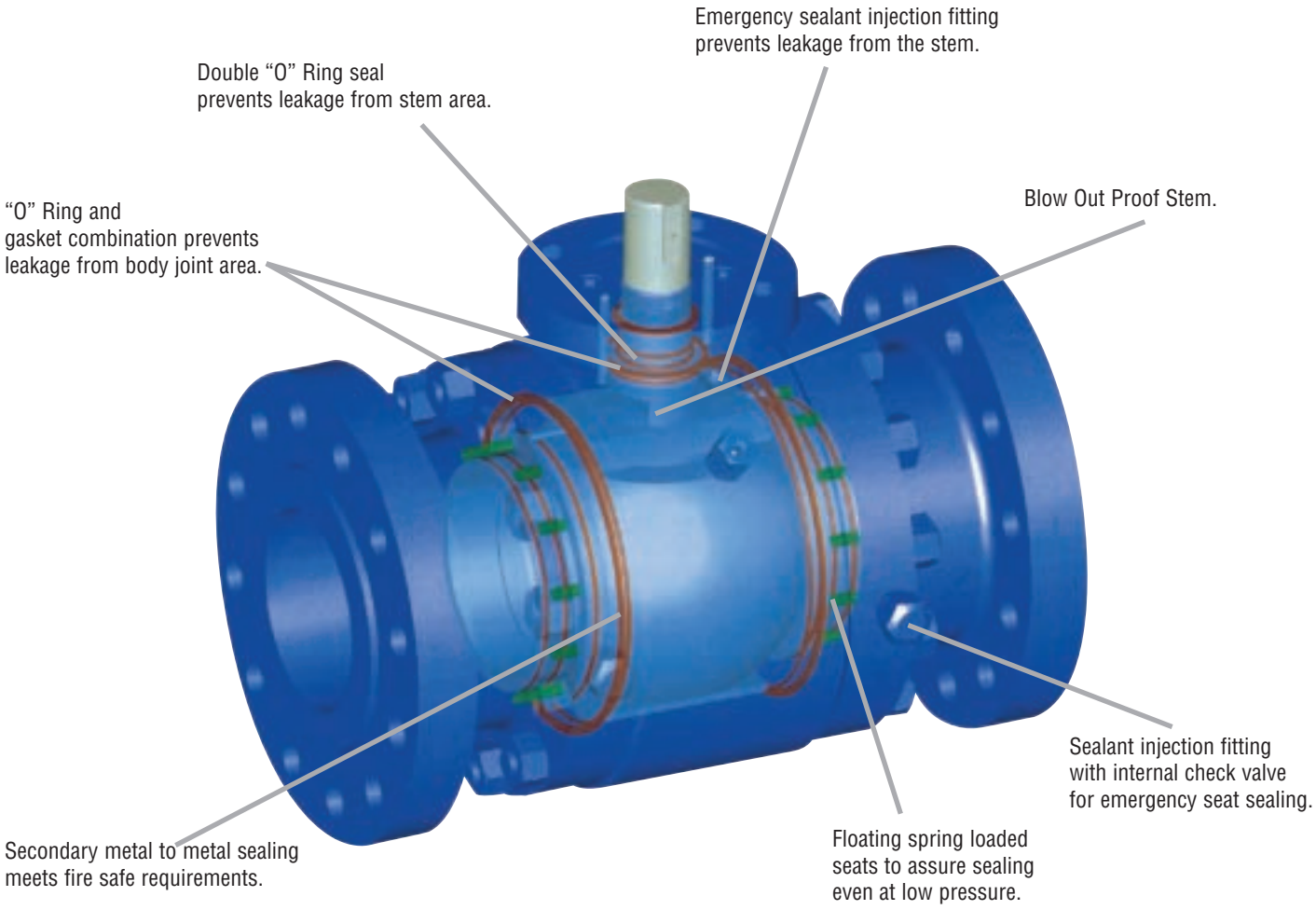
OPERATOR
1 = Wrench
2 = Gear Operator
3 = Pneumatic Actuator
Electric Actuator
Hydropneumatic Actuator

ENDS
2 = Raised Face Flange
3 = Ring Type Joint Flange
4 = Butt Weld (WE)

API 6D TRUNNION MOUNTED BALL VALVES

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- API-6FA/API-607 Fire-Tested



WALWORTH® Ball valve design with steel Trunnions and Teflon-Moly coated steel bearings to assure low torque operation.

The stem has an Anti-Static System to prevent sparks when opening and closing the valve.

The WALWORTH® Ball valve is designed with a Continuous Full Bore which allows passage of tools while avoiding turbulence and fluid pressure drop through the valve.

The valve does not need lubrication in normal operating conditions. However, a leak through the seat seal can be stopped by injecting light grease sealant through the seat sealant fittings in the valve body.

DESIGN FEATURES

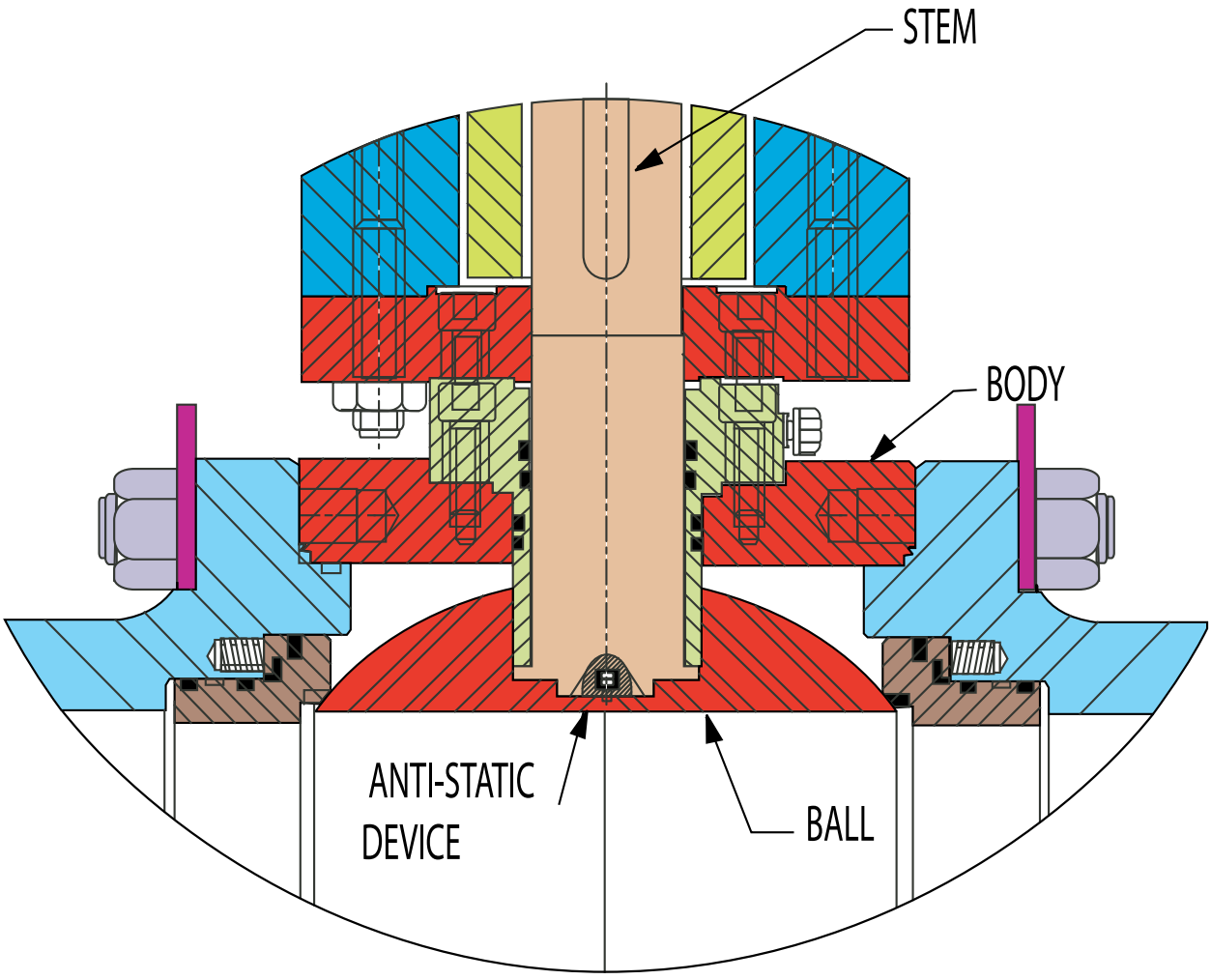
DESIGN FEATURES

Blow Out Proof Stem

- The Stem is separated from the Ball.
- The lower end of the Stem has an integral T-shape designed to be blow out proof.

Anti-Static Device

- A spring loaded grounding ball ensures the electrical continuity between the Ball, Stem and Body to avoid sparks during the opening and closing of the valve.

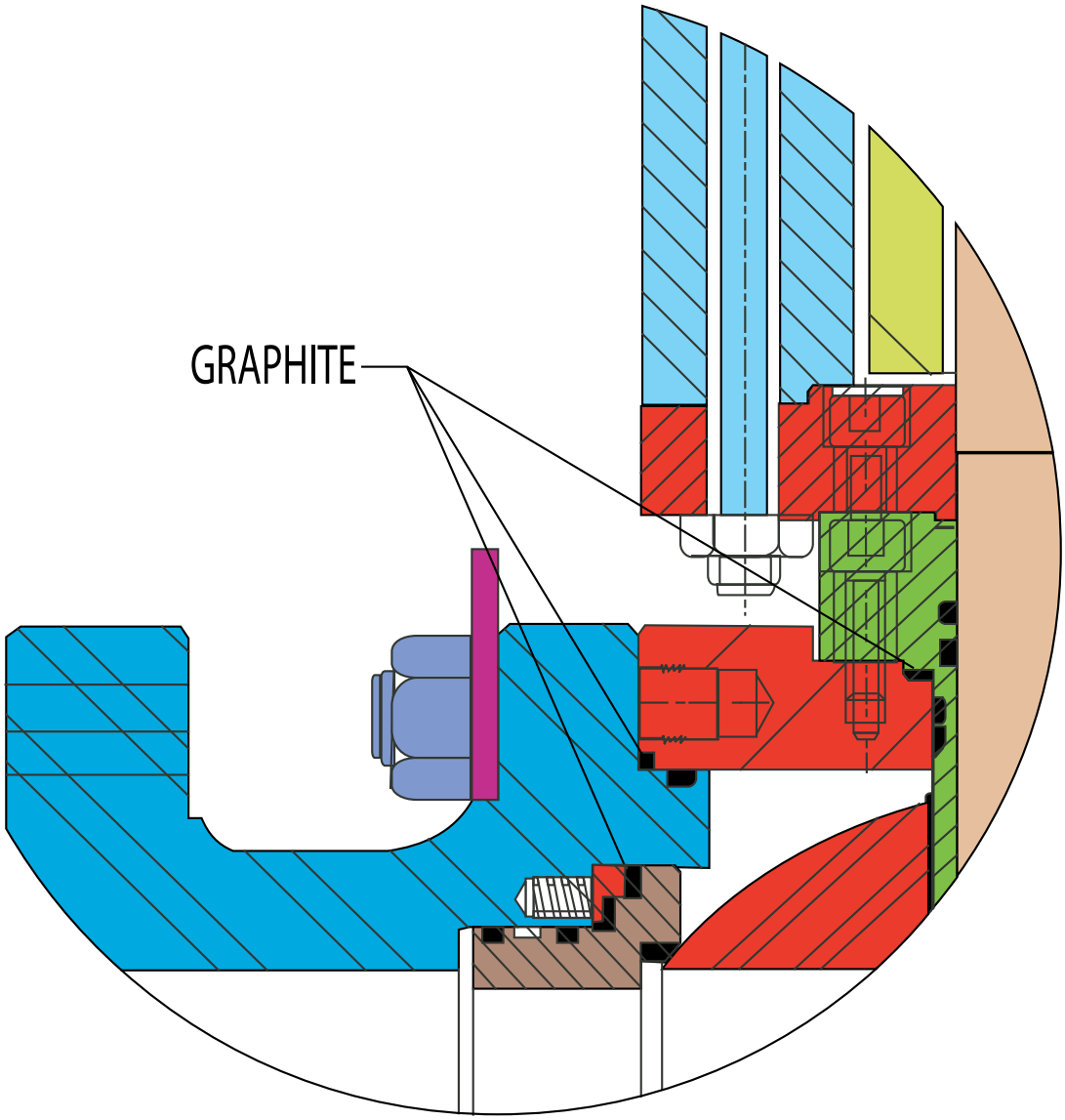


DESIGN FEATURES

DESIGN FEATURES

Fire Safe Design

- The gaskets and stem seals are long lasting and resistant to high temperature. However, the seat has a secondary metal to metal seal which minimizes leaks in case of erosion of the seat seal or fire.

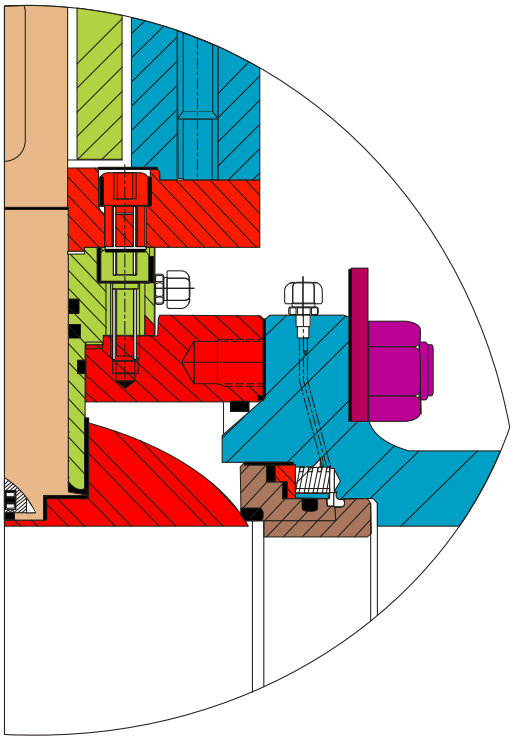


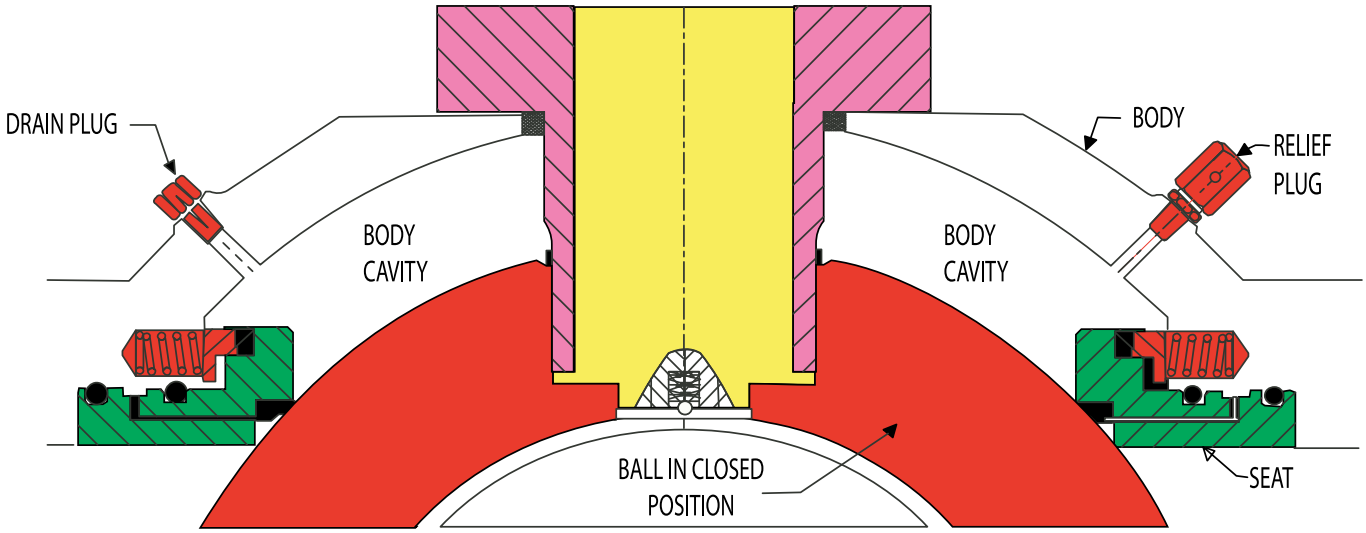
DESIGN FEATURES

Emergency Seal System

Emergency Seal System

- For 6" and greater the valves are supplied with a stem sealant fitting and a seat sealant fitting for each seat. Internal or external leaks may be eliminated by injecting plastic packing through the stem sealant fitting or light grease sealant through the seat sealant fitting. Each sealant fitting has a double ball check valve under each fitting that eliminates the back pressure due to the internal pressure.





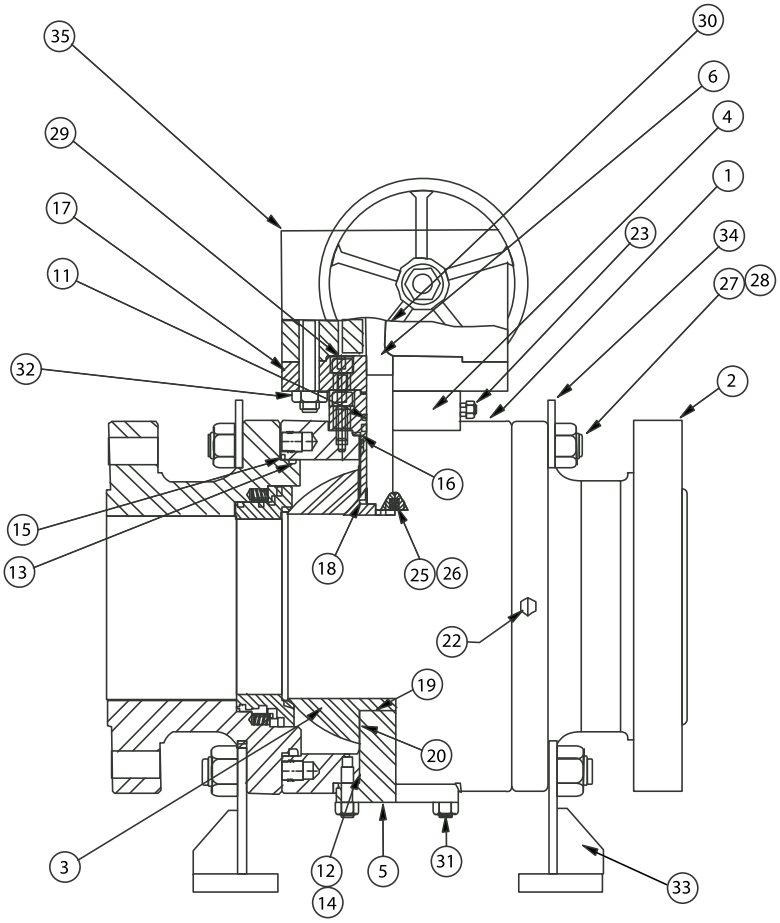
DESIGN FEATURES

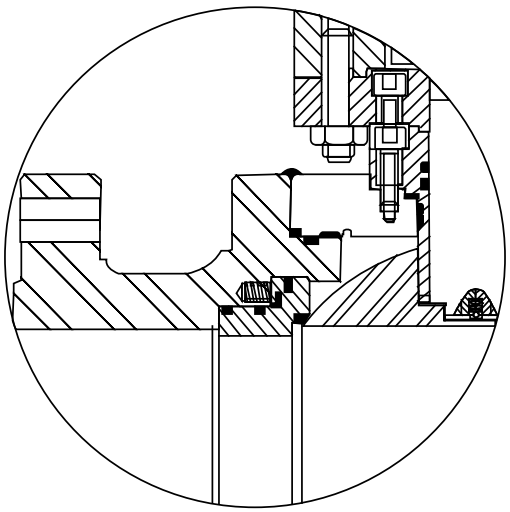
Double Block and Bleed

- Walworth Trunnion Ball valves provide a positive seal at both upstream and downstream independently.
  Since pressure on each side of the Ball is blocked from the body cavity, a pressure releasing device can be used by an operator to check the integrity of the upsteam and downstream seats.

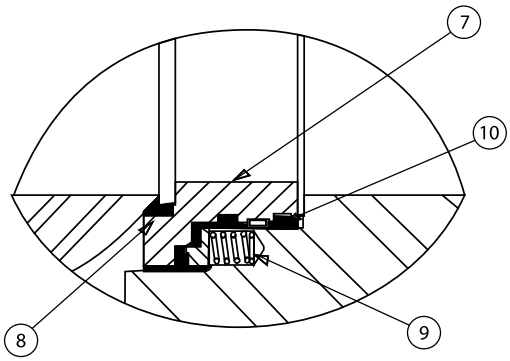
DESIGN FEATURES

DESIGN FEATURES





Welded Body Detail
(Optional)



TRIM MATERIALS

TRIM MATERIALS

No.	Part	Standard	Stainless Steel	Sour Service (NACE)	Low Temperature Service
1		ASTM A105	ASTM A182 F316	ASTM A105	ASTM A350 LF2
	BODY	ASTM A216 WCB	ASTM A351 CF8M	ASTM A216 WCB	ASTM A352 LCB
2		ASTM A105	ASTM A182 F316	ASTM A105	ASTM A350 LF2
	END	ASTM A216 WCB	ASTM A351 CF8M	ASTM A216 WCB	ASTM A352 LCB
3		ASTM A105/ENP	ASTM A182 F316	ASTM A105/ENP	ASTM A350 LF2/ENP
	BALL	ASTM A216 WCB/ENP	ASTM A351 CF8M	ASTM A216 WCB/ENP	ASTM A352 LCB/ENP
4	UPPER TRUNNION	AISI 4140/ENP	ASTM A182 F316	AISI 4140/ENP	AISI 4140/ENP
5	LOWER TRUNNION	AISI 4140/ENP	ASTM A182 F316	AISI 4140/ENP	AISI 4140/ENP
6	STEM	AISI 4140/ENP	ASTM A564 Gr. 630 17-4PH	AISI 4140/ENP	AISI 4140/ENP
7	RING	ASTM A105/ENP	ASTM A182 F316	ASTM A105/ENP	ASTM A350 LF2/ENP
8	RING INSERT	PTFE, NYLON	PTFE, NYLON	PTFE, NYLON	PTFE, NYLON
9	SEAT SPRING	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
10	SEAT "O" RING	VITON	VITON	VITON	VITON
11	STEM "O" RING	VITON	VITON	VITON	VITON
12	TRUNNION "O" RING	VITON	VITON	VITON	VITON
13	BODY "O" RING	VITON	VITON	VITON	VITON
14	BACK UP	TEFLON	TEFLON	TEFLON	TEFLON
15	BODY GASKET	GRAPHITE	GRAPHITE	GRAPHITE	GRAPHITE
16	PACKING BOX	ASTM A105	ASTM A182 F316	ASTM A105	ASTM A350 LF2
17	ADAPTER PLATE	ASTM A105	ASTM A182 F316	ASTM A105	ASTM A350 LF2
18	STEM WASHER	316+TEFLON+MOLY	316+TEFLON+MOLY	316+TEFLON+MOLY	316+TEFLON+MOLY
19	TRUNNION BEARING	316+TEFLON+MOLY	316+TEFLON+MOLY	316+TEFLON+MOLY	316+TEFLON+MOLY
20	BEARING	316+TEFLON+MOLY	316+TEFLON+MOLY	316+TEFLON+MOLY	316+TEFLON+MOLY
* 21	RELIEF PLUG	CARBON STEEL	STAINLESS STEEL	CARBON STEEL	CARBON STEEL
22	SEAT SEALANT FITTING	CARBON STEEL	STAINLESS STEEL	CARBON STEEL	CARBON STEEL
23	STEM SEALANT FITTING	CARBON STEEL	STAINLESS STEEL	CARBON STEEL	CARBON STEEL
* 24	DRAIN PLUG	CARBON STEEL	STAINLESS STEEL	CARBON STEEL	CARBON STEEL
25	ANTI-STATIC SPRING	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
26	ANTI-STATIC BALL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
27	STUD BOLT	ASTM A193 B7	ASTM A193 B8	ASTM A193 B7M	ASTM A320 L7M
28	HEX NUT	ASTM A194 2H	ASTM A194 8	ASTM A194 2HM	ASTM A194 7M
29	SOCKET BOLT	ASTM A574	STAINLESS STEEL	ASTM A574	ASTM A574
30	KEY	CARBON STEEL	STAINLESS STEEL	CARBON STEEL	ASTM A182 F304
31	STUDS AND NUTS	ASTM A193 B7/ ASTM A194 2H	ASTM A193 B8M/ASTM A194 8	ASTM A193 B7M/ASTM A194 2HM	ASTM A320 L7M/ ASTM A194 7M
32	STUDS AND NUTS	ASTM A193 B7/ ASTM A194 2H	ASTM A193 B8M/ASTM A194 8	ASTM A193 B7M/ASTM A194 2HM	ASTM A320 L7M/ ASTM A194 7M
33	SUPPORT	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL
34	LIFT EYE	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL
35	GEAR OPERATOR	IRON/CARBON STEEL	IRON/CARBON STEEL	IRON/CARBON STEEL	IRON/CARBON STEEL
* 36	IDENTIFICATION PLATE	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
* 37	LOGO PLATE	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL

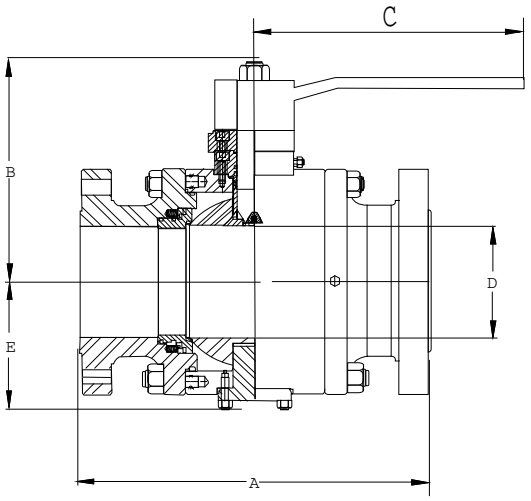
ENP = ELECTROLESS NICKEL PLATED
* NOT SHOWN

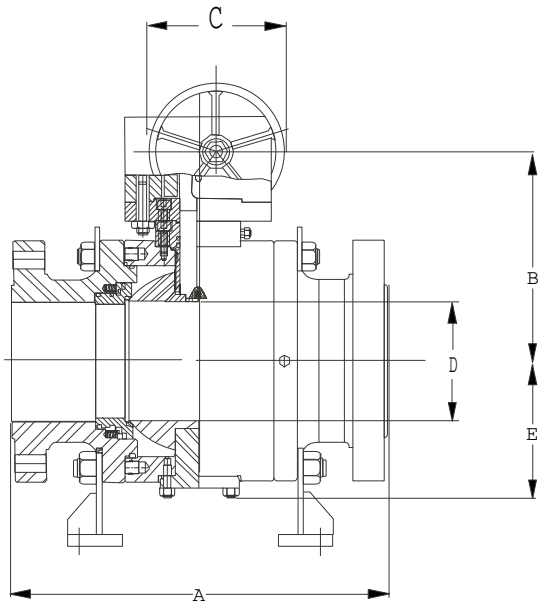
API 6D TRUNNION MOUNTED BALL VALVES

CLASS 150

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 6" and Larger





LEVER		GEAR OPERATOR	
Figure	End	Figure	End
8112	Raised Face	8122	Raised Face
8113	Ring Joint	8123	Ring Joint

DIMENSIONS AND WEIGHTS

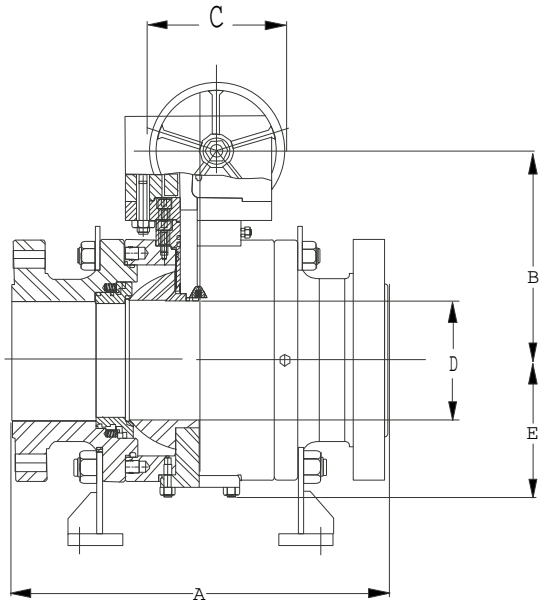
VALVE SIZE	MM INCHES	51 2	76 3	102 4	152 6	203 8	254 10	305 12	356 14
D	MM	51	76	102	152	203	254	305	337
	INCHES	2.00	3.00	4.00	6.00	8.00	10.00	12.00	13.25
A RF	MM	178	203	229	394	457	533	610	686
	INCHES	7.00	8.00	9.00	15.50	18.00	21.00	24.00	27.00
A RTJ	MM	191	216	241	406	470	546	622	699
	INCHES	7.52	8.50	9.49	15.98	18.50	21.50	24.49	27.52
B	MM	159	197	216	305	343	381	419	457
	INCHES	6.25	7.75	8.50	12.00	13.50	15.00	16.50	18.00
E	MM	168	206	219	219	226	259	311	348
	INCHES	6.63	8.13	8.62	8.62	8.90	10.20	12.24	13.70
C	MM	400	600	850	461	461	461	705	705
	INCHES	15.75	23.62	33.46	18.13	18.13	18.13	27.75	27.75
WEIGHT	KG	28	54	80	203	289	450	588	814
	LB	62	119	176	448	637	992	1296	1795

API 6D TRUNNION MOUNTED BALL VALVES

CLASS 150

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 6" and Larger



GEAR OPERATOR

Figure	End
8122	Raised Face
8123	Ring Joint

DIMENSIONS AND WEIGHTS

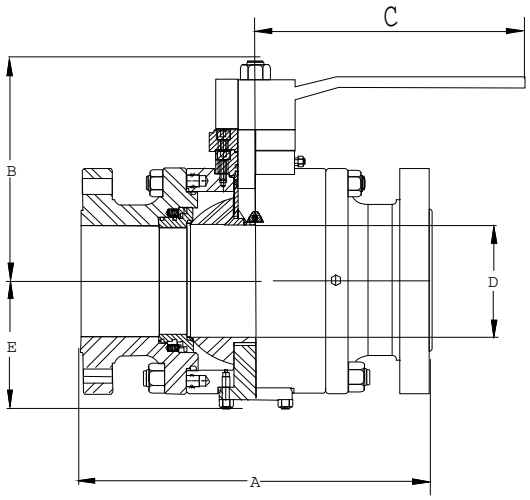
VALVE SIZE	MM INCHES	406 16	457 18	508 20	610 24	660 26	711 28	762 30	813 32
D	MM	387	438	489	591	635	686	737	781
	INCHES	15.25	17.25	19.25	23.25	25.00	27.00	29.00	30.75
A RF	MM	762	864	914	1067	1143	1245	1295	1372
	INCHES	30.00	34.00	36.00	42.00	45.00	49.00	51.00	54.00
A RTJ	MM	775	876	927	1080	--	--	--	--
	INCHES	30.51	34.49	36.50	42.52	--	--	--	--
B	MM	559	600	635	711	762	803	864	914
	INCHES	22.00	23.63	25.00	28.00	30.00	31.63	34.00	36.00
E	MM	417	453	479	587	676	650	692	737
	INCHES	16.42	17.83	18.86	23.13	26.63	25.59	27.24	29.00
C	MM	800	800	800	800	800	800	800	800
	INCHES	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
WEIGHT	KG	1580	2434	2600	4200	5112	6262	7343	8909
	LB	3483	5366	5732	9259	11270	13805	16188	19641

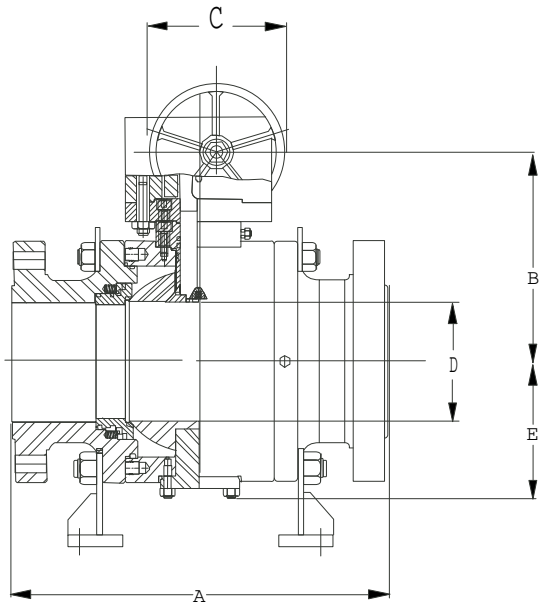
API 6D TRUNNION MOUNTED BALL VALVES

CLASS 300

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 6" and Larger





LEVER		GEAR OPERATOR	
Figure	End	Figure	End
8312	Raised Face	8322	Raised Face
8313	Ring Joint	8323	Ring Joint

DIMENSIONS AND WEIGHTS

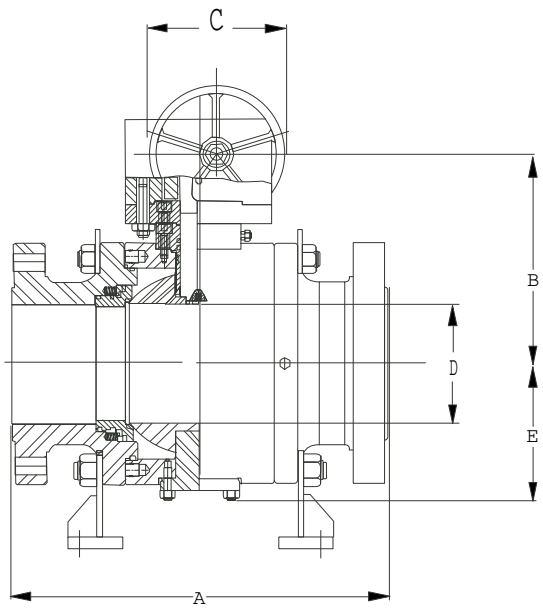
VALVE SIZE	MM INCHES	51 2	76 3	102 4	152 6	203 8	254 10	305 12	356 14
D	MM	51	76	102	152	203	254	305	337
	INCHES	2.00	3.00	4.00	6.00	8.00	10.00	12.00	13.25
A RF	MM	216	283	305	403	502	568	648	762
	INCHES	8.50	11.13	12.00	15.87	19.75	22.37	25.50	30.00
A RTJ	MM	232	298	321	419	518	584	664	778
	INCHES	9.13	11.73	12.64	16.50	20.39	22.99	26.14	30.63
B	MM	152	197	216	305	349	381	419	457
	INCHES	6.00	7.75	8.50	12.00	13.75	15.00	16.50	18.00
E	MM	165	203	160	187	229	276	311	349
	INCHES	6.50	8.00	6.30	7.37	9.00	10.87	12.25	13.75
C	MM	400	603	851	460	460	705	705	705
	INCHES	15.75	23.75	33.50	18.13	18.13	27.75	27.75	27.75
WEIGHT	KG	30	60	100	211	322	450	588	814
	LB	66	132	220	465	710	992	1296	1794

API 6D TRUNNION MOUNTED BALL VALVES

CLASS 300

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 6" and Larger



GEAR OPERATOR

Figure	End
8322	Raised Face
8323	Ring Joint

DIMENSIONS AND WEIGHTS

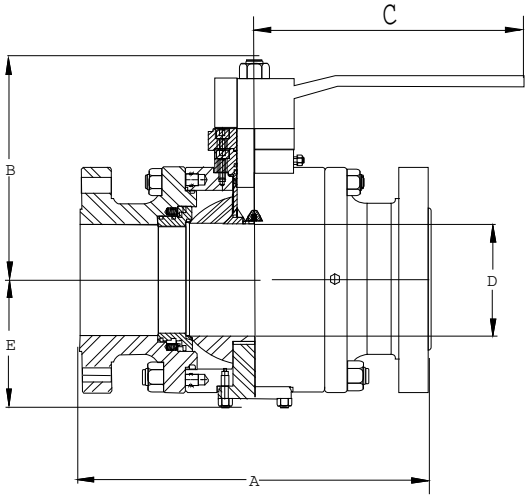
VALVE SIZE	MM INCHES	406 16	457 18	508 20	559 22	610 24	660 26	711 28	762 30	813 32
D	MM	387	438	489	540	591	635	686	737	781
	INCHES	15.25	17.25	19.25	21.25	23.25	25.00	27.00	29.00	30.75
A RF	MM	838	914	991	1092	1143	1245	1346	1397	1524
	INCHES	33.00	36.00	39.00	43.00	45.00	49.00	53.00	55.00	60.00
A RTJ	MM	854	930	1010	1114	1165	1270	1372	1422	1553
	INCHES	33.62	36.61	39.76	43.86	45.87	50.00	54.02	55.98	61.14
B	MM	559	603	635	673	711	778	800	864	902
	INCHES	22.00	23.75	25.00	26.50	28.00	30.63	31.50	34.00	35.50
E	MM	419	457	483	521	591	603	651	692	737
	INCHES	16.50	18.00	19.00	20.50	23.25	23.75	25.63	27.25	29.00
C	MM	800	800	800	800	800	800	800	800	800
	INCHES	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
WEIGHT	KG	1870	2754	2967	3360	4684	5655	6773	7900	9549
	LB	4122	6070	6540	7406	10324	12464	14928	17412	21047

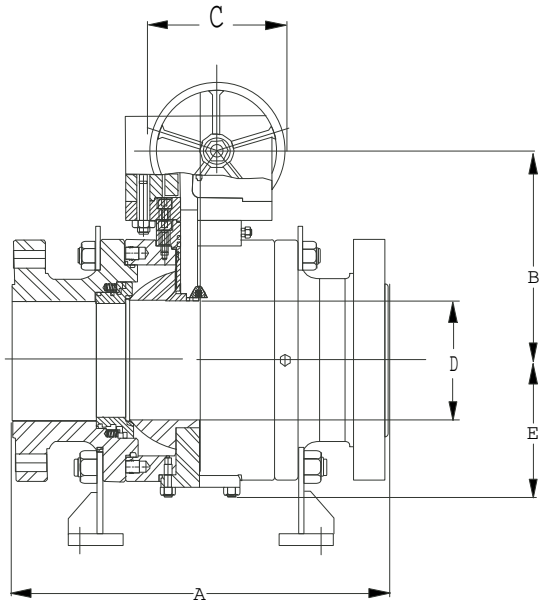
API 6D TRUNNION MOUNTED BALL VALVES

CLASS 600

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 6" and Larger





LEVER		GEAR OPERATOR	
Figure	End	Figure	End
8612	Raised Face	8622	Raised Face
8613	Ring Joint	8623	Ring Joint

DIMENSIONS AND WEIGHTS

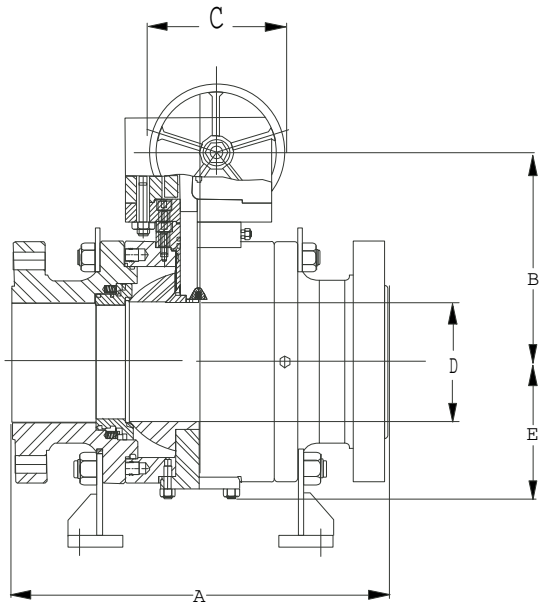
VALVE SIZE	MM INCHES	51 2	76 3	102 4	152 6	203 8	254 10	305 12	356 14
D	MM	51	76	102	152	203	254	305	337
	INCHES	2.00	3.00	4.00	6.00	8.00	10.00	12.00	13.25
A RF	MM	292	356	432	559	660	787	838	889
	INCHES	11.50	14.00	17.00	22.00	26.00	31.00	33.00	35.00
A RTJ	MM	295	359	435	562	664	791	841	892
	INCHES	11.61	14.13	17.13	22.13	26.14	31.14	33.11	35.12
B	MM	171	213	248	311	359	410	476	502
	INCHES	6.75	8.38	9.75	12.25	14.13	16.13	18.75	19.75
E	MM	143	168	203	194	254	292	343	381
	INCHES	5.63	6.63	8.00	7.63	10.00	11.50	13.50	15.00
C	MM	587	1251	1302	460	460	705	705	705
	INCHES	23.13	49.25	51.25	18.13	18.13	27.75	27.75	27.75
WEIGHT	KG	32	64	122	267	521	773	1118	1563
	LB	71	141	269	588	1148	1704	2464	3445

API 6D TRUNNION MOUNTED BALL VALVES

CLASS 600

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 6" and Larger



GEAR OPERATOR

Figure	End
8622	Raised Face
8623	Ring Joint

DIMENSIONS AND WEIGHTS

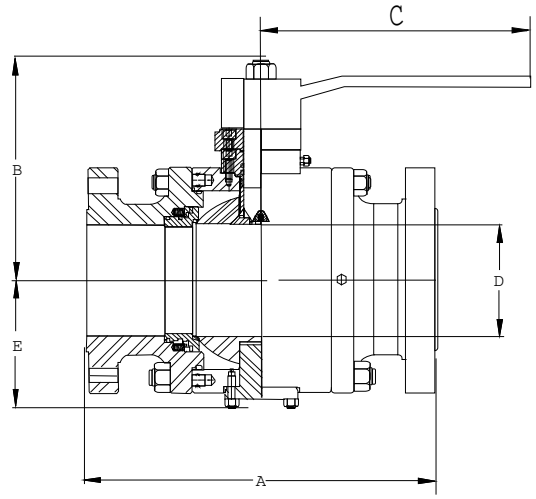
VALVE SIZE	MM INCHES	406 16	457 18	508 20	559 22	610 24	762 30	914 36	1219 48
D	MM	387	438	489	540	591	735	874	1168
	INCHES	15.25	17.25	19.25	21.25	23.25	28.94	34.41	45.98
A RF	MM	991	1092	1194	1295	1397	1651	2083	2845
	INCHES	39.00	43.00	47.00	51.00	55.00	65.00	82.01	112.01
A RTJ	MM	994	1095	1200	1305	1407	1664	2099	2855
	INCHES	39.13	43.11	47.24	51.38	55.39	65.51	82.64	112.40
B	MM	533	638	679	724	768	889	991	1765
	INCHES	21.00	25.13	26.75	28.50	30.25	35.00	39.00	39.00
E	MM	429	495	521	578	651	737	813	1068
	INCHES	16.88	19.50	20.50	22.75	25.63	29.00	32.00	32.00
C	MM	800	800	800	800	800	1067	1067	1067
	INCHES	31.50	31.50	31.50	31.50	31.50	42.00	42.00	42.00
WEIGHT	KG	2400	3396	3925	4899	6620	7200	10614	24200
	LB	5290	7485	8651	10798	14591	15869	23394	53339

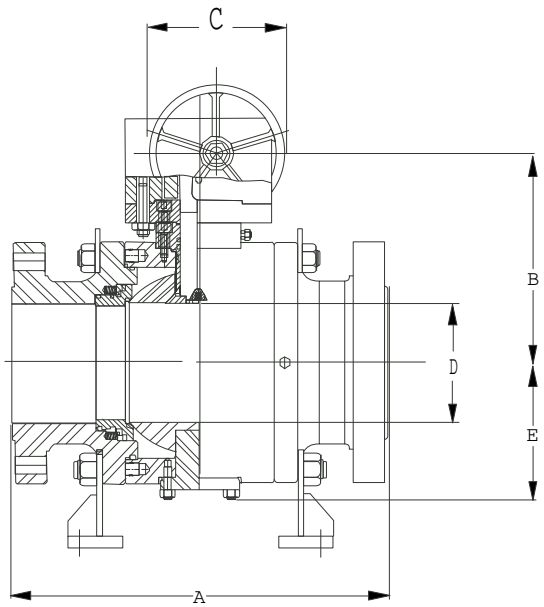
API 6D TRUNNION MOUNTED BALL VALVES

CLASS 900

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 4” and Larger





LEVER		GEAR OPERATOR	
Figure	End	Figure	End
8912	Raised Face	8922	Raised Face
8913	Ring Joint	8923	Ring Joint

DIMENSIONS AND WEIGHTS

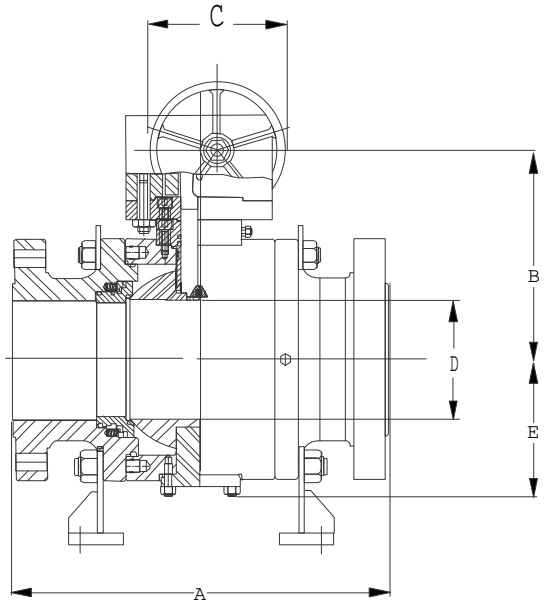
VALVE SIZE	MM INCHES	51 2	76 3	102 4	152 6	203 8	254 10
D	MM	51	76	102	152	203	254
	INCHES	2.00	3.00	4.00	6.00	8.00	10.00
A RF	MM	368	381	457	610	737	838
	INCHES	14.50	15.00	18.00	24.00	29.00	33.00
A RTJ	MM	371	384	460	613	740	841
	INCHES	14.61	15.12	18.11	24.13	29.13	33.11
B	MM	168	210	248	305	394	432
	INCHES	6.63	8.25	9.75	12.00	15.50	17.00
E	MM	143	168	203	203	260	292
	INCHES	5.63	6.63	8.00	8.00	10.25	11.50
C	MM	587	1251	1251	705	800	800
	INCHES	23.13	49.25	49.25	27.75	31.50	31.50
WEIGHT	KG	106	172	304	390	700	1100
	LB	234	379	670	860	1543	2424

API 6D TRUNNION MOUNTED BALL VALVES

CLASS 900

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 4" and Larger



GEAR OPERATOR

Figure	End
8922	Raised Face
8923	Ring Joint

DIMENSIONS AND WEIGHTS

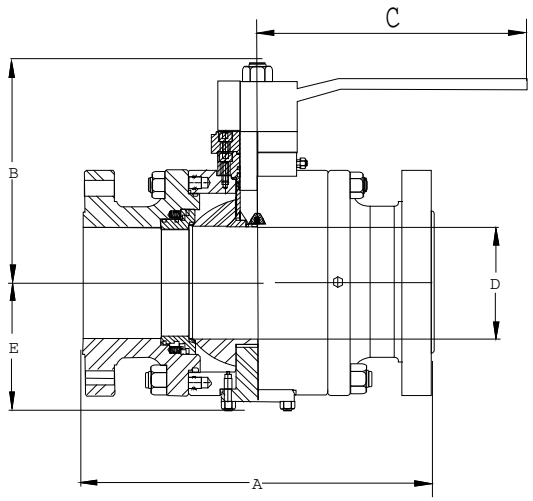
VALVE SIZE	MM INCHES	305 12	406 14	457 16	508 18	559 20	610 24
D	MM	305	322	373	423	471	570
	INCHES	12.00	12.68	14.68	16.65	18.54	22.44
A RF	MM	965	1029	1130	1219	1321	1549
	INCHES	38.00	40.50	44.50	48.00	52.00	61.00
A RTJ	MM	968	1038	1140	1232	1334	1568
	INCHES	39.67	42.54	46.72	50.49	54.67	64.26
B	MM	470	546	616	673	705	797
	INCHES	18.50	21.50	24.25	26.50	27.75	31.38
E	MM	359	411	492	546	575	670
	INCHES	14.13	16.19	19.38	21.50	22.63	26.38
C	MM	800	800	800	800	800	800
	INCHES	31.50	31.50	31.50	31.50	31.50	31.50
WEIGHT	KG	1750	2300	3500	4727	5542	9745
	LB	3857	5069	7714	10419	12215	21479

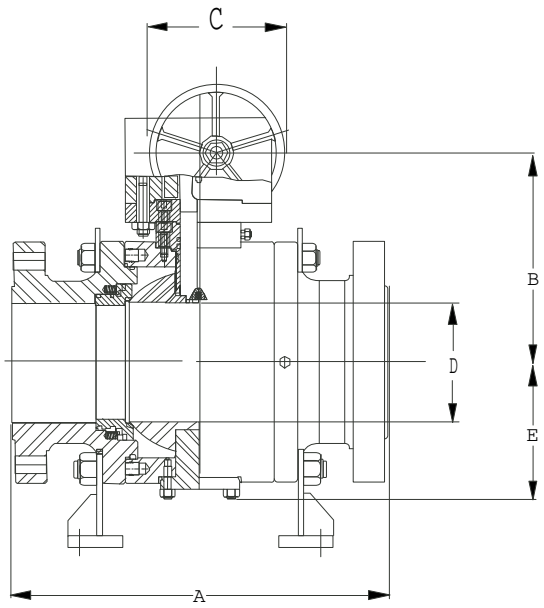
API 6D TRUNNION MOUNTED BALL VALVES

CLASS 1500

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Three-piece body
- Forged Steel or Cast Steel Construction
- Bolted Body
- Integral Welded Body (Optional)
- Trunnion Mounted Design
- Gear Operator 3” and Larger





LEVER		GEAR OPERATOR	
Figure	**End**	**Figure**	**End**
8512	Raised Face	8522	Raised Face
8513	Ring Joint	8523	Ring Joint

DIMENSIONS AND WEIGHTS

VALVE SIZE	MM INCHES	51 2	76 3	102 4	152 6	203 8	254 10	305 12	356 14	406 16
D	MM	51	76	102	146	194	241	289	318	362
	INCHES	2.00	3.00	4.00	5.75	7.63	9.50	11.38	12.50	14.25
A RF	MM	368	470	546	705	832	991	1130	1257	1384
	INCHES	14.50	18.50	21.50	27.75	32.75	39.00	44.50	49.50	54.50
A RTJ	MM	371	473	549	711	841	1000	1146	1276	1407
	INCHES	14.61	18.62	21.61	27.99	33.11	39.37	45.12	50.24	55.39
B	MM	168	210	248	657	791	829	962	1032	1086
	INCHES	6.63	8.25	9.75	25.88	31.13	32.63	37.88	40.63	42.75
E	MM	143	168	203	203	260	295	419	473	530
	INCHES	5.63	6.63	8.00	8.00	10.25	11.63	16.50	18.63	20.88
C	MM	587	1251	1251	705	800	800	800	800	800
	INCHES	23.13	49.25	49.25	27.75	31.50	31.50	31.50	31.50	31.50
WEIGHT	KG	121	213	356	592	932	1900	2282	3939	5433
	LB	267	469	785	1305	2054	4188	5030	8682	11975

CLASS 150/300 FLOATING BALL VALVES

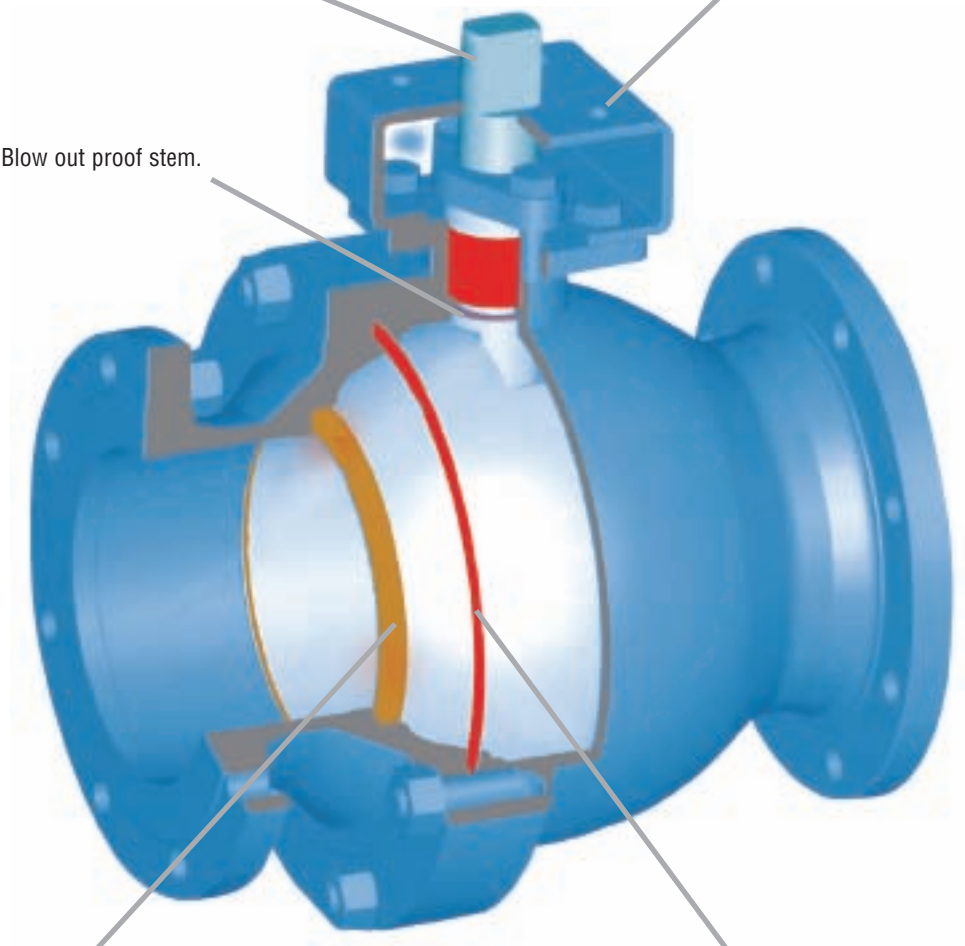
DESIGN FEATURES

- Full Bore
- Two-piece Cast Steel body
- API-607/6FA Fire Tested

Stem with two double d flats on stem assures mounting of the lever handles always parallel to flow passage.

Mounting base for easy installation of Gear Operator, Pneumatic or Electric Actuator.

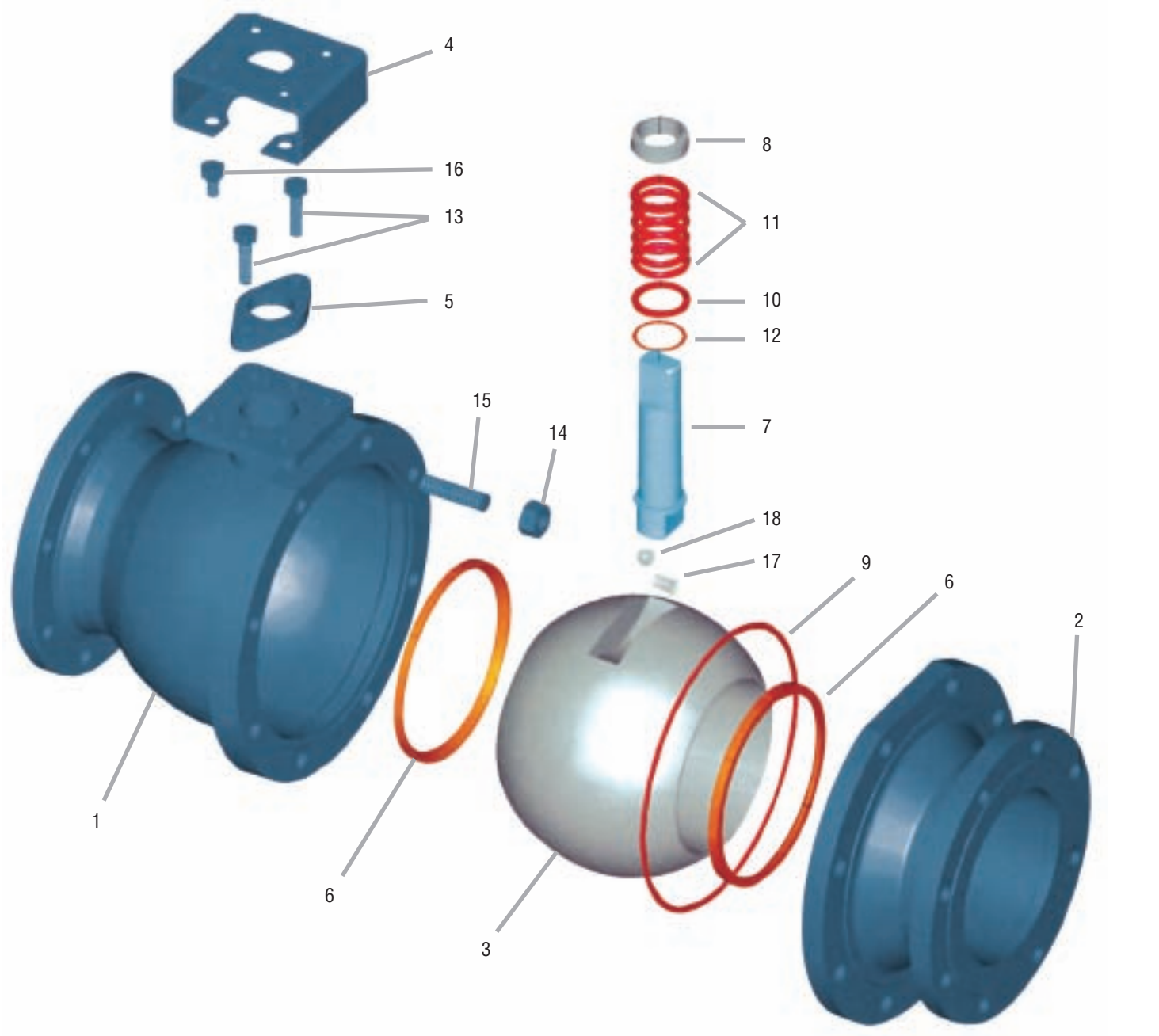
Blow out proof stem.



Fire safe Metal to Metal sealing back-up for non-metallic seals, ball floats to shut off the line fluid when the soft seal wears out.

Gasket
Soft seal assures low emissions.

CLASS 150/300 FLOATING BALL VALVES



CLASS 150/300 FLOATING BALL VALVES

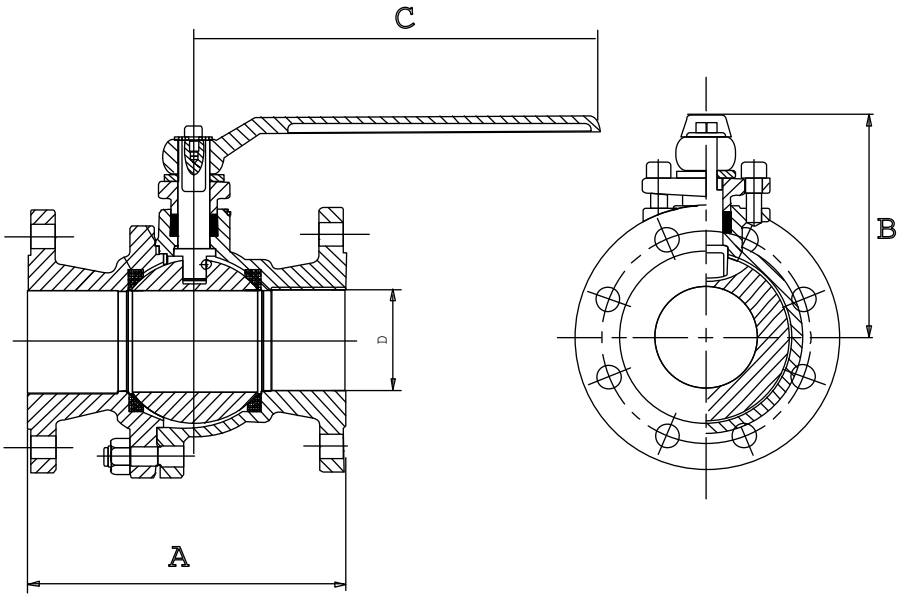
TRIM MATERIAL					
No.	**Name**	**Standard**	**Stainless Steel 316**	**NACE Service**	**Low Temperature Service**
1	BODY	ASTM A216-WCB	ASTM A351-CF8M	ASTM A216-WCB	ASTM A352-LCB
2	END	ASTM A216-WCB	ASTM A351-CF8M	ASTM A216-WCB	ASTM A352-LCB
3	BALL	ASTM A105/ENP	ASTM A182-F316	ASTM A105/ENP	A350-LF2/ENP
4	BASE MOUNTING	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL
5	GLAND FLANGE	ASTM A216-WCB	ASTM A351-CF8M	ASTM A216-WCB	ASTM A352-LCB
6	SEAT RING	TEFLON	TEFLON	TEFLON	TEFLON
7	STEM	STAINLESS STEEL 410	STAINLESS STEEL 316	STAINLESS STEEL 410	STAINLESS STEEL 316
8	GLAND BUSHING	ASTM A216-WCB	ASTM A351-CF8M	ASTM A216-WCB	ASTM A352-LCB
9	GASKET	316 + GRAPHITE	316 + GRAPHITE	316 + GRAPHITE	316 + GRAPHITE
10	WASHER	GRAPHITE	GRAPHITE	GRAPHITE	GRAPHITE
11	STEM PACKING	TEFLON	TEFLON	TEFLON	TEFLON
12	THRUST WASHER	TEFLON	TEFLON	TEFLON	TEFLON
13	EYE BOLT	ASTM A193-B7	ASTM A193-B8	ASTM A193-B7M	ASTM A320-L7M
14	NUT	ASTM A194-2H	ASTM A194-8	ASTM A194-2HM	ASTM A194-7M
15	STUD	ASTM A193-B7	ASTM A193-B8	ASTM A193-B7M	ASTM A320-L7M
16	BOLT	ASTM A193-B7	ASTM A193-B8	ASTM A193-B7M	ASTM A320-L7M
17	ANTI-STATIC SPRING	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
18	STEEL BALL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL

FLOATING BALL VALVES

CLASS 150

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Two-piece body
- Cast Steel Construction
- Bolted Body
- Gear Operator 6" and Larger



LEVER		GEAR OPERATOR	
Figure	End	Figure	End
7112	Raised Face	7122	Raised Face
7113	Ring Joint	7123	Ring Joint

DIMENSIONS AND WEIGHTS

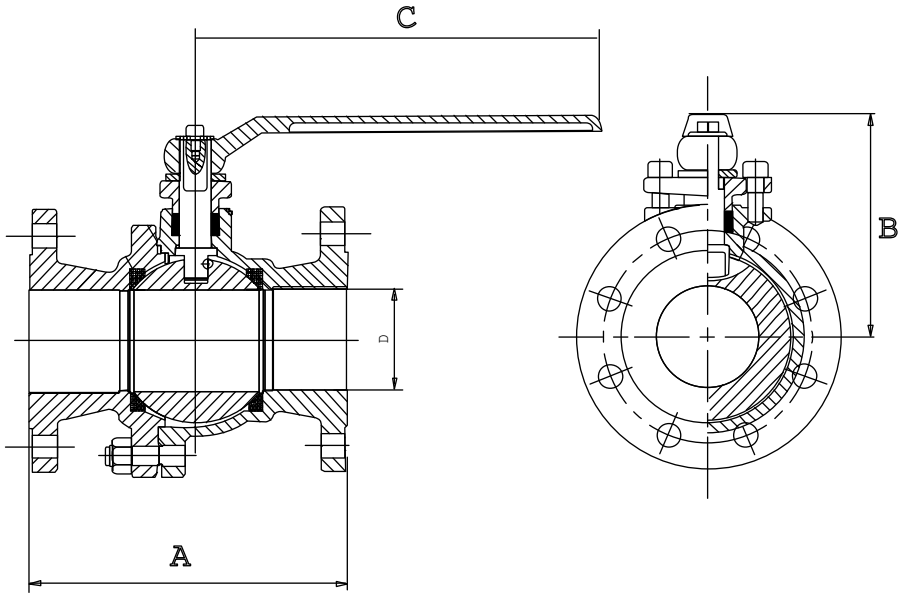
VALVE SIZE	MM INCHES	13 1/2	19 3/4	25 1	38 1 1/2	51 2	64 2 1/2	76 3	102 4	152 6	203 8
D	MM	13	19	25	38	51	64	76	102	152	203
	INCHES	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
A RF	MM	108	117	127	165	178	191	203	229	394	457
	INCHES	4.25	4.60	5.00	6.50	7.00	7.99	7.99	9.01	15.50	18.00
A RTJ	MM	-	-	-	-	191	203	216	241	406	470
	INCHES	-	-	-	-	7.52	7.99	8.50	9.49	15.98	18.50
B	MM	59	63	76	97	137	142	170	217	300	370
	INCHES	2.32	2.48	3.00	3.81	5.39	5.59	6.69	8.54	11.81	14.56
C	MM	130	130	160	229	350	380	380	500	300	400
	INCHES	5.11	5.11	6.30	9.00	13.79	14.96	14.96	19.68	11.81	15.75
WEIGHT	KG	2.30	3.00	4.50	7.00	9.50	15.00	19.00	33.00	93.00	60.00
	LB	5.1	6.6	9.9	15.4	20.9	33.1	41.9	72.7	205.0	352.7

FLOATING BALL VALVES

CLASS 300

DESIGN FEATURES

- Full Bore
- Reduced Bore (Optional)
- Two-piece body
- Cast Steel Construction
- Bolted Body
- Gear Operator 6" and Larger



LEVER		GEAR OPERATOR	
Figure	**End**	**Figure**	**End**
7312	Raised Face	7322	Raised Face
7313	Ring Joint	7323	Ring Joint

DIMENSIONS AND WEIGHTS

VALVE SIZE	MM INCHES	13 1/2	19 3/4	25 1	38 1 1/2	51 2	64 2 1/2	76 3	102 4	152 6	203 8
D	MM	13	19	25	38	51	64	76	102	152	203
	INCHES	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	6.00	8.00
A RF	MM	140	152	165	190	216	241	283	305	403	502
	INCHES	5.50	5.98	6.50	7.48	8.50	9.49	11.14	12.00	15.86	19.76
A RTJ	MM	-	-	-	-	232	257	298	321	419	518
	INCHES	-	-	-	-	9.13	10.12	11.73	12.64	16.50	20.39
B	MM	59	63	76	97	137	142	170	217	306	397
	INCHES	2.32	2.48	3.00	3.81	5.39	5.59	6.69	8.54	12.04	15.62
C	MM	130	130	160	229	350	380	380	500	300	400
	INCHES	5.11	5.11	6.30	9.00	13.79	14.96	14.96	19.68	11.81	15.75
WEIGHT	KG	2.5	3.5	5.5	10.0	15.0	26	35	56	116	233
	LB	6	8	12	22	33	57	77	123	256	514

PRESSURE-TEMPERATURE RATING

BODY, ENDS AND BALL MATERIALS

Forged Steel A-105

Cast Steel A216 WCB

Temperature		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSI BY CLASS				
°F	°C	150	300	600	900	1500
- 20 TO 100	-29 TO 38	285	740	1480	2220	3705
200	93	260	675	1350	2025	3375
300	149	230	655	1315	1970	3280
400	204	200	635	1270	1900	3170
500	260	170	600	1200	1795	2995
600	316	140	550	1095	1640	2735
650	343	125	535	1075	1610	2685
700	371	110	535	1065	1600	2665
750	399	95	505	1010	1510	2520
800	427	80	410	825	1235	2060
850	454	65	270	535	805	1340
900	482	50	170	345	515	860
950	510	35	105	205	310	515
1000	538	20	50	105	155	260

For prolonged usage at temperatures above 427°C (800°F), consideration should be given to the possibility of graphite formation in carbon steel.

Forged Steel A-182 Gr. F316

Cast Steel A351 CF8M

Temperature		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSI BY CLASS				
°F	°C	150	300	600	900	1500
- 20 TO 100	-29 TO 38	285	740	1480	2220	3705
200	93	260	675	1350	2025	3375
300	149	230	655	1315	1970	3280
400	204	200	635	1270	1900	3170
500	260	170	600	1200	1795	2995
600	316	140	550	1095	1640	2735
650	343	125	535	1075	1610	2685
700	371	110	535	1065	1600	2665
750	399	95	505	1010	1510	2520
800	427	80	410	825	1235	2060
850	454	65	270	535	805	1340
900	482	50	170	345	515	860
950	510	35	105	205	310	515
1000	538	20	50	105	155	260

Forged Steel A-350 Gr. LF2

Cast Steel A352 LCB

Temperature		MAXIMUM ALLOWABLE WORKING PRESSURE IN PSI BY CLASS				
°F	°C	150	300	600	900	1500
- 20 TO 100	-29 TO 38	275	720	1440	2160	3600
200	93	235	620	1240	1860	3095
300	149	215	560	1120	1680	2795
400	204	195	515	1025	1540	2570
500	260	170	480	955	1435	2390
600	316	140	450	900	1355	2255
650	343	125	445	890	1330	2220
700	371	110	430	870	1305	2170
750	399	95	425	855	1280	2135
800	427	80	420	845	1265	2110
850	454	65	420	835	1255	2090
900	482	50	415	830	1245	2075
950	510	35	385	775	1160	1930
1000	538	20	350	700	1050	1750

SEAT MATERIAL

PRESSURE-TEMPERATURE SEAT GRAPH

PROPERTIES		Nylon -70 - 200 900 - 1500	Heavy Duty Teflon -100 - 425 150 - 600	Peek -25 - 500 150 - 1500	Derlin -50 - 180 150 - 1500
TEMPERATURE RANGE °F					
PRESSURE RATING					
	HARDNESS	D75	D60	D85	R120
MECHANICAL PROPERTIES	TENSILE STRENGTH (PSI)	8000 min	4640 min	11000 min	6600 - 7500 min
	ELONGATION %	250 - 290	240 - 250	650	190 - 230
PHYSICAL PROPERTIES	SPECIFIC GRAVITY	1.04	2.22 - 2.30	1.30 - 1.34	1.40 - 1.42
	WATER ABSORPTION	0.2	<0.01	0.18	0.15
	COLOR	Natural	White	Grey - Black	White

SEAT MATERIALS (ELASTOMER "O" RING)

PROPERTIES	VITON	BUNA N	EPDM	AFLAS
TEMPERATURE RANGE °F	-20 TO 400	-15 TO 250	-60 TO 500	+32 TO 500
SPECIFIC GRAVITY	1.85	1.31	1.31	- -
HARDNESS	D75	D90	D90	D79
TENSILE STRENGTH	- -	- -	- -	2680 min

PACKINGS

TYPE	GRAPHITE	GRAPHITE + 316	GRAPHITE 316 + PTFE
TEMPERATURE RANGE °F	-328 TO 500	-328 TO 500	-328 TO 500
SERVICE APPLICATION	100%	100%	Cryogenic
	Fire Safe	Fire Safe	Highly Corrosive
PH	0 - 14	0 - 14	0 - 14

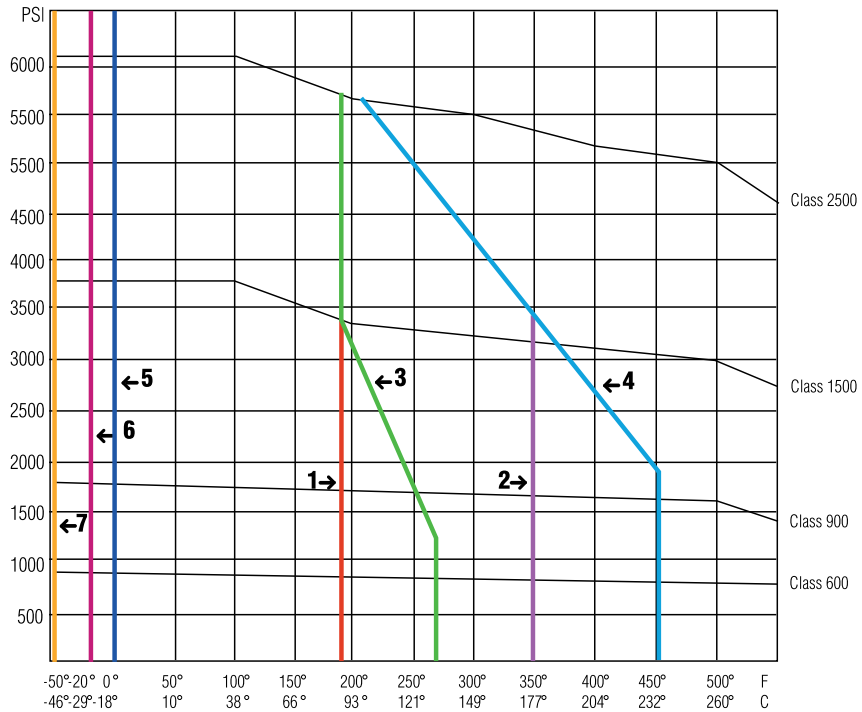
CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

ELEMENTS & PROPERTIES	CARBON STEEL				STAINLESS STEEL		
	ASTM A105	ASTM A216		ASTM A350	ASTM A182	ASTM A351	ASTM A351
		Gr. WCB	Gr. WCC	LF2	F316	Gr. CF8	Gr. CF8M
CARBON	0.35 MAX	0.30	0.25	0.30	0.08 MAX	0.08	0.08
MANGANESE	0.60 - 1.05	1.00	1.20	0.60 - 1.35	2.00 MAX	1.50	1.50
PHOSPHORUS	0.035 MAX	0.04	0.04	0.04	0.045	0.04	0.04
SULFUR	0.040 MAX	0.05	0.05	0.04	0.030	0.04	0.04
SILICON	0.10 - 0.35	0.60	0.60	0.15 - 0.30	1.00 MAX	2.00	1.50
NICKEL	0.40 MAX	0.50	0.50	0.40 MAX	10.00 - 14.00	8.00 - 11.00	9.00 - 12.00
CHROMIUM	0.30 MAX	0.50	0.50	0.30 MAX	16.00 - 18.00	18.00 - 21.00	18.00- 21.00
MOLYBDENUM	0.12 MAX	0.20	0.20	0.12 MAX	2.00 - 3.00	0.5	2.00 - 3.00
COPPER	0.40 MAX	0.30	0.30	40 MAX	--	--	--
COLUMBIUM	0.02 MAX	--	--	0.02 MAX	--	--	--
VANADIUM	0.08 MAX	0.03	0.03	0.05 MAX	--	--	--
TENSILE STRENGTH PSI MIN	70 000	70 000 95 000	70 000	70 000 95 000	75 000	70 000	70 000
YIELD STRENGTH PSI MIN	36 000	36 000	40 000	36 000	30 000	30 000	30 000
ELONGATION IN 2 % MIN.	22	22	22	22	30	35	30
REDUCTION AREA %MIN	30	35	35	30	--	--	--
HARDNESS (HB) MAX.	187	185	185	--	--	--	--

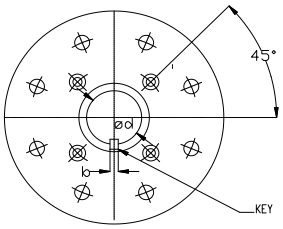
* THE PERCENTAGE (%) SHOWN FOR THE ELEMENTS IS THE MAXIMUM, EXCEPT WHERE RANGES ARE INDICATED.

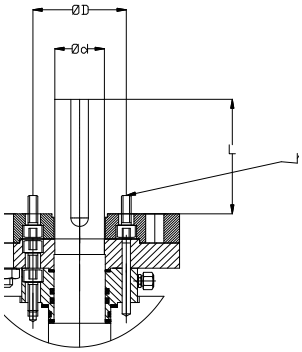
PRESSURE / TEMPERATURE RATING

1 NBR
2 Viton, Viton GLT
3 Nylon+MoS
4 PEEK
5 Low Temperature Limit of Viton
6 Low Temperature Limit of NBR
7 Low Temperature Limit of LT NBR, Viton GLT

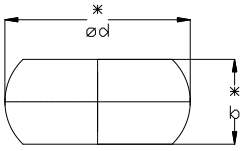


TOP MOUNTING DIMENSIONS AND STEM TORQUE





TOPWORKS



2" CLASS 150 & 300
3" CLASS 150 & 300
4" CLASS 150 & 300

Valve Size	Class	Torque			D.C.B. Flange Adapter	Stem Diameter	Key Way Width	Stem Length	No. Bolt Holes
		N.M.	Lb-Foot	Lb-In	ø D	ø d	b	L	n-M
	150	70	52	620					
	300	120	89	1062	4,016	* 0,945	* 0,630	--	4-M10
	600	160	118	1416	4,016	0,945	0,315	--	4-M10
2	900	230	170	2036	4,016	0,945	0,315	--	4-M10
	150	150	111	1328	4,016	* 1,259	* 0,866	--	4-M10
	300	250	184	2213	4,016	* 1,259	* 0,866	--	4-M10
	600	360	266	3186	4,016	1,417	0,394	--	4-M10
3	900	550	406	4868	4,016	1,417	0,394	1,772	4-M10
	150	240	177	2124	4,016	* 1,417	* 0,944	--	4-M10
	300	440	325	3894	4,016	* 1,417	* 0,944	--	4-M10
	600	700	516	6196	4,921	1,496	0,394	--	4-M12
4	900	1040	767	9205	5,512	1,772	0,551	2,559	4-M16
	150	500	369	4425	4,921	1,654	0,472	2,559	4-M12
	300	700	516	6196	4,921	1,654	0,472	2,559	4-M12
	600	1200	885	10621	5,512	1,654	0,472	2,559	4-M16
6	900	1700	1254	15046	5,512	1,772	0,551	2,559	4-M16
	150	800	590	7081	4,921	1,772	0,551	2,677	4-M12
	300	1200	885	10621	5,512	1,772	0,551	2,677	4-M16
	600	2000	1475	17701	5,512	1,772	0,551	2,677	4-M16
8	900	3000	2213	26552	6,496	2,126	0,630	3,150	4-M20
	150	1200	885	10621	3,684	1,772	0,551	2,677	4-M16
	300	2250	1660	19914	6,496	1,772	0,551	2,677	4-M20
	600	3500	2581	30978	6,496	2,126	0,630	3,150	4-M20
10	900	6000	4425	53104	10,000	2,362	0,709	4,291	8-M16
	150	2000	1475	17701	6,496	2,126	0,630	3,150	4-M20
	300	3290	2427	29119	6,496	2,126	0,630	3,150	4-M20
	600	6000	4425	53104	10,000	2,362	0,709	3,937	8-M16
12	900	12500	9220	110634	11,732	3,858	1,102	5,118	8-M20
	150	2500	1844	22127	6,496	2,362	0,709	3,150	4-M20
	300	3500	2581	30978	10,000	2,598	0,787	4,331	8-M16
	600	7000	5163	61955	10,000	2,598	0,787	4,862	8-M16
14	900	13500	9957	119485	11,732	3,858	1,102	5,118	8-M20
	150	4500	3319	39828	10,000	3,071	0,866	4,528	8-M16
	300	6700	4942	59300	10,000	3,071	0,866	4,528	8-M16
	600	11000	8113	97358	10,000	3,071	0,866	4,528	8-M16
16	900	25000	18439	221269	14,016	4,724	1,260	6,299	8-M30
	150	5000	3688	44254	10,000	3,071	0,866	4,331	8-M16
	300	8000	5900	70806	10,000	3,071	0,866	4,331	8-M16
	600	15000	11063	132761	11,732	3,858	1,102	4,528	8-M20
18	900	26000	19177	230119	14,016	4,724	1,260	6,299	8-M30
	150	5500	4057	48679	10,000	3,071	0,866	4,331	8-M16
	300	10000	7376	88507	11,732	3,071	0,866	4,528	8-M20
	600	24000	17701	212418	14,016	4,724	1,260	6,299	8-M30
20	900	34000	25077	300925	14,016	6,299	1,575	7,087	8-M30
	150	10000	7376	88507	11,732	3,858	1,102	5,472	8-M20
	300	15000	11063	132761	11,732	3,858	1,102	5,472	8-M20
	600	35000	25815	309776	14,016	6,299	1,575	7,087	8-M30
24	900	51000	37616	451388	15,984	7,087	1,772	7,874	8-M36
	150	13250	9773	117272	11,732	3,858	1,102	5,472	8-M20
	300	24000	17701	212418	14,016	6,299	1,575	7,087	8-M30
	600	48000	35403	424836	15,984	7,087	1,772	7,874	8-M36
30	900	90000	66381	796567	19,016	8,661	1,969	9,843	8-M36
	150	15000	11063	132761	11,732	3,858	1,102	5,472	8-M20
	300	28000	20652	247821	14,016	6,299	1,575	7,087	8-M30
	600	55000	40566	486791	15,984	7,087	1,772	7,874	8-M36
32	900	100000	73756	885074	19,016	8,661	1,969	9,843	8-M36
	150	20625	15212	182547	14,016	6,299	1,575	7,087	8-M30
	300	37000	27290	327478	15,984	7,087	1,772	7,874	8-M36
	600	63000	46466	557597	15,984	7,087	1,772	7,874	8-M36
36	900	120000	88507	1062089	19,016	8,661	1,969	9,843	8-M36

NACE SERVICE VALVES

The National Association of Corrosion Engineers (NACE) establishes standards for materials resistant to sulfide stress cracking (SSC) to be used in hydrogen sulfide (H_2S) bearing hydrocarbon service.

NACE standard MR0175-2002 defines a sulfide stress cracking region based on the relationship of H_2S present to the total operating pressure.

This must be considered when specifying valves for service where H_2S is present as a proper selection of materials is a customer responsibility.

Sulfide stress cracking in materials not suitable for H_2S service can result in a sudden failure with damage to equipment and harm to personnel.

IMPORTANT CONSIDERATIONS WHEN SPECIFYING NACE SERVICE:

1. Hydrogen Ion Concentration (PH)
2. Concentration and Total Pressure of Hydrogen Sulfide (H_2S)
3. Water, Carbon Dioxide (CO_2) and Chloride Concentration
4. Service Temperature

The customer may select valves made out of alloy or carbon steel material with controlled hardness and/or stainless steel material depending on the severity of the fluid. For valves that have bodies with a controlled hardness of RC 22, B7M studs and 2H nuts may be combined with a customer selection trim and manufactured to meet NACE MR0175-2002 requirements.

ACCESSORIES

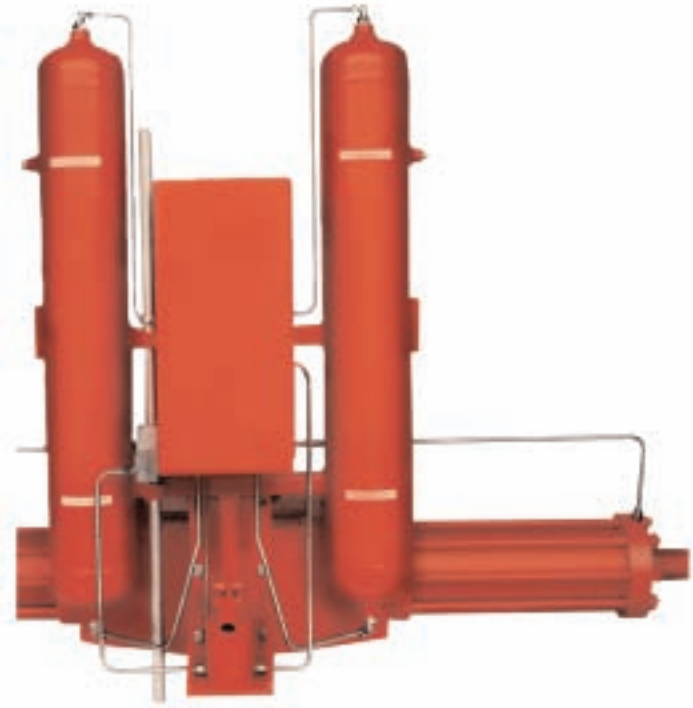
The **WALWORTH®** standard cast steel product line includes a varied array of valves designed to meet a variety of applications.

Special adaptations can be made to meet specific customer requirements. Valves can be supplied with a choice of manual handle, gear operator or chain wheel operator as well as electric, pneumatic and hydraulic actuators.

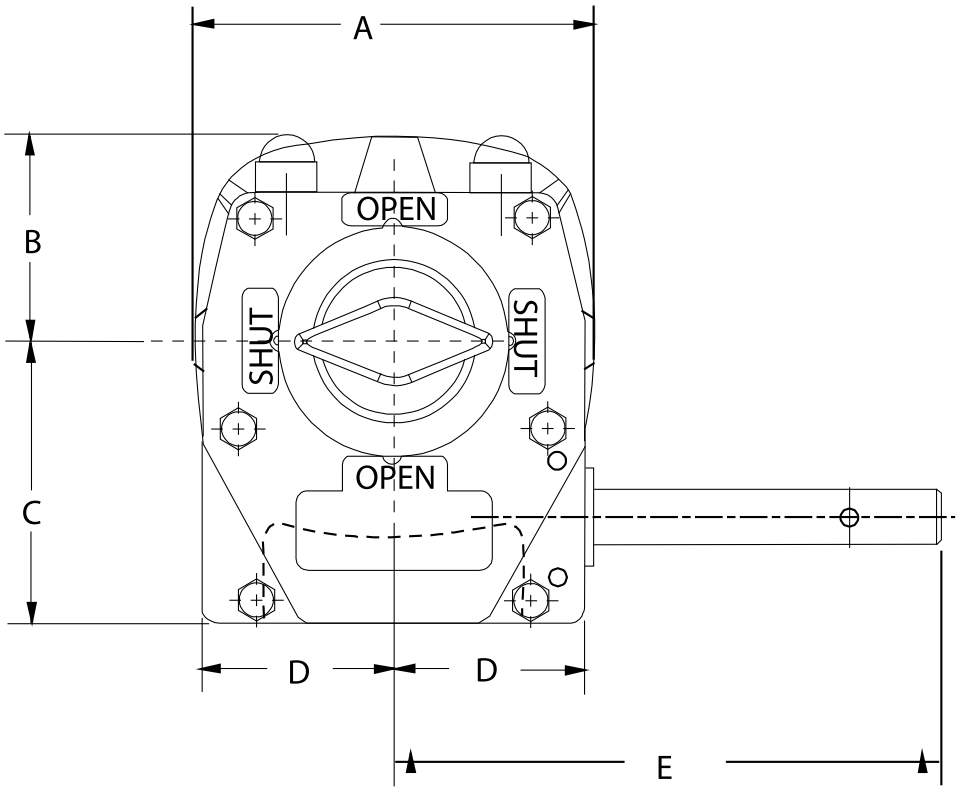
Manual Gear Operators
The manual gear operator design takes advantage of the high gear ratios of a worm gear to provide the mechanical advantage to transmit the required opening/closing torque with normal operator effort on the handwheel.
A square operating nut is also available. The gears are also available as waterproof units and can be used for underground installation.

Valves can also be supplied with a bypass, drain or vent connection, stem extension, position indicators, and floor stand mounting to provide controlled opening/closing from a remote installation. This enables **WALWORTH®** to furnish valves tailored to the customer's special needs.

Actuators
Valves can be furnished with a choice of electric, pneumatic or hydraulic actuators. The actuators are also available as waterproof and/or explosion proof. In order to be assured of superior performance, the opening/closing speed, maximum differential pressure, service temperature, type of voltage-phase-frequency, air or gas pressure for pneumatic actuators and flow characteristics for hydraulic actuators need to be specified.



GEAR OPERATORS



Model	Unit	A	B	C	D	E	Gear Ratio	Torque	
	inch	5,906	2,953	4,134	2,598	6,614		N.M.	1000
WJS-2	mm	150	75	105	66	168	42:1	Inch Lb	8851
	inch	7,795	3,386	5,157	3,248	7,283		N.M.	1800
WJS-3	mm	198	86	131	82,5	185	60:1	Inch Lb	15931
	inch	9,921	4,528	7,008	4,370	9,843		N.M.	3400
WJS-4	mm	252	115	178	111	250	68:1	Inch Lb	30093
	inch	12,323	4,606	8,228	4,941	10,827		N.M.	4500
WJS-5	mm	313	117	209	125,5	275	88:1	Inch Lb	39828
	inch	18,898	8,898	12,283	9,449	16,339		N.M.	13300
308W	mm	480	226	312	240	415	275:1	Inch Lb	117715
	inch	20,276	10,079	3,583	10,157	17,047		N.M.	43400
408W	mm	515	256	91	258	433	700:1	Inch Lb	384122
	inch	22,008	11,024	14,134	11,024	20,512		N.M.	62700
555W	mm	559	280	359	280	521	610:1	Inch Lb	554942

MATERIAL SELECTION

MATERIAL SELECTION

SELECTION CODE: A= Excellent B= May be used C= Use with caution D= Do not use	MATERIALS					SEATS AND ELASTOMERS			
	Iron Foundry	Aluminum 356	Carbon Steel	Stainless Steel 303	Stainless Steel 316	Buna N	Neoprene	Viton	Teflon
OIL	B	A	B	A	A	A	B	A	A
ANIMAL FAT	A	A	A	A	A	A	B		A
HOT COMBUSTIBLE OIL	C	B	C	A	A	D	D	C	A
BITTER CRUDE OIL	C	A	B	A	A	A	B	A	A
SWEET CRUDE OIL	B	A	B	A	A	A	B	A	A
TAR OIL	A	A	A	A	A	B	C	A	A
CASTOR OIL	B	A	B	A	A	A	B	A	A
COCONUT OIL	C	B	C	B	B	A	B	A	A
LINSEED OIL	A	A	A	A	A	A	B	A	A
GASOLINE (SOUR)	C	A	B	A	A	A	B	A	A
REFINED PETROLEUM	B	A	A	A	A	A	B	A	A
PETROLEUM-BASE HYDRAULIC OIL	B	A	A	A	A	A	B	A	A
LUBRICANT OIL	A	A	A	A	A	A	B	A	A
LARD OIL	C	A	C	A	A	A	B	A	A
MINERAL OIL	B	A	B	A	A	A	B	A	A
DRYING OIL	B	B	B	A	A	C	C	A	A
METHYL ACETATE	B	A	B	A	A	D	D	D	A
ETHYL ACETATE	C	A	B	B	B	D	D	D	A
ACETYLENE	A	A	A	A	A	A	A	A	A
ACETONE	A	A	A	A	A	D	D	D	A
METHYL ACETONE	A	A	A	A	A	D	D	D	A
ACETIC ACID	D	B	D	A	A	C	C	D	A
ACETIC ACID (10%)	C	B	C	A	A	D	D	D	A
ACETIC ACID (80%)	C	B	D	B	B	D	D	D	A
ACETIC ACID (AIR FREE)	D	B	D	A	A	C	C	D	A
ACETIC ACID (CRUDE)	C	B	C	A	A	D	C	D	A
ACETIC ACID (PURE)	C	B	C	A	A	D	D	D	A
ANHYDRIC ACID	D	B	A	A	A	C	C	D	A
ARSENIC ACID	D	D	D	B	B	A	A	A	A

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BENZOIC ACID	D	B	D	A	A	D	A	D	A
BORIC ACID	D	B	D	B	B	A	A	A	A
BROMHIDRIC ACID	D	D	D	D	D	C	C		A
CARBONIC ACID	D	A	D	B	B	D	D	B	A
NICOTINE ACID	B	A	B	A	A				A
PHOSPHORIC ACID (10%) HOT	D	D	D	D	D	B	A	A	A
PHOSPHORIC ACID (10%) COLD	D	D	D	B	B	B	A	A	A
PHOSPHORIC ACID (50%) HOT	D	D	D	D	D	B	B	A	A
PHOSPHORIC ACID (50%) COLD	D	D	D	B	B	B	B	A	A
PHOSPHORIC ACID (80%) HOT	C	D	C	A	A	C	B		A
PHOSPHORIC ACID (80%) COLD	B	D	B	A	A	C	B		A
GALLIC ACID	D	A	D	B	B	A	A		A
HYDROCARBONIC ACID	D	D	D	D	D	B	C		A
MURIATIC ACID	D	D	D	D	D	B	B	A	A
NITRIC ACID (10%)	D	D	D	A	A	C	B	A	A
NITRIC ACID (100%)	A	B	A	A	A	D	D	B	A
NITRIC ACID (30%)	D	D	D	A	A	C	C	A	A
NITRIC ACID (80%)	D	B	D	A	A	D	D	B	A
NITROUS ACID (10%)	D	D	D	B	B	C	A	A	A
SULFURIC ACID (0-7%)	D	B	D	C	B	B	A	A	A
SULFURIC ACID (100%)	B	D	B	A	A	D	D	B	A
SULFURIC ACID (20%)	D	D	D	D	D	C	B	A	A
SULFURIC ACID (50%)	D	D	D	D	D	C	C	A	A
SULFUROUS ACID	D	C	D	B	B	C	C	A	A
ACRYLONITRILE	C	B	A	A	A	D	D	C	A
SEA WATER	D	C	D	A	A	A	A	A	A
IRRIGATION WATER	D	B	D	A	A	A	A	A	A
DISTILLED WATER	D	A	D	A	A	A	A	A	A
FRESH WATER	C	A	C	A	A	A	A	A	A

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	Iron Foundry	Aluminum 356	Carbon Steel	Stainless Steel 303	Stainless Steel 316	Buna N	Neoprene	Viton	Teflon
AIR	A	A	A	A	A	A	A	A	A
AMYLIC ALCOHOL	B	A	B	A	A	A	A	A	A
BUTYL ALCOHOL	B	A	B	A	A	A	A	A	A
METHYL ETHYL ALCOHOL	B	A	B	A	A	A	A	A	A
STARCH	A	A	A	A	A	A	A	A	A
SODIUM ALUMINATE	C	C	C	B	B	A	A	A	A
AMMONIUM MONOPHOSPHATE	D	B	D	B	B	A	A	A	A
AMMONIA	A	B	A	A	A	B	B	A	A
AMYL ACETATE	C	B	C	B	B	D	D	D	A
AMMONIUM ANHYDRIDE	B	B	A	A	A	B	B	C	A
ANILINE	C	C	C	B	B	C	A	C	A
ANILINE DYES	C	C	C	A	C	A	A	B	A
SULFUR	C	A	C	B	B	D			A
VARNISH	A	C	A	A	A	C	A		A
BENZENE (BENZOL)	B	A	B	A	A	A	A	A	A
SODIUM BICARBONATE	C	B	C	B	B	A	A	A	A
SODIUM BICARBONATE (10%)	D	D	D	A	A	A	A	A	A
POTASSIUM DICHROMATE	B	A	B	A	A	A	A	A	A
MAGNESIUM BISULFATE	B	B	B	A	A				A
SODIUM BISULFATE (10%)	D	D	D	A	A	A	A	A	A
CALCIUM BISULFIDE	D	C	D	C	B	A	A	A	A
POTASSIUM BISULFIDE	D	C	D	B	B	A	A	A	A
SODIUM BORATE	C	B	C	B	B	A	A	A	A
POTASSIUM BROMIDE	D	C	D	A	A	A	A	A	A
SODIUM BROMIDE (10%)	D	B	C	B	B	A	A	A	A
BUTANE	B	A	B	A	A	A	B	A	A
AMMONIUM CARBONATE	B	B	B	B	B	B	A	B	A
BARIUM CARBONATE	B	B	B	B	B	A	A	A	A

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CALCIUM CARBONATE	D	C	D	B	B	A	A	A	A
POTASSIUM CARBONATE	B	C	B	B	B	A	A	A	A
SODIUM CARBONATE	A	D	A	A	A	A	A	A	A
WAX	A	A	A	A	A	A	B	A	A
MERCURIC CYANIDE	D	D	D	A	A				A
POTASSIUM CYANIDE	B	D	B	B	B	A	A	A	A
SODIUM CYANIDE	A	D	A	A	A	A	A	A	A
POTASSIUM CHLORATE	B	C	B	B	B	A	A	A	A
SODIUM CHLORATE	C	B	C	A	A	A	A	A	A
CHLOROFORM (DRY)	B	D	B	A	D	D	D	B	A
ALUMINUM CHLORIDE	B	B	B	A	A	B	B	A	A
AMMONIUM CHLORIDE	D	C	D	C	C	B	A	A	A
BARIUM CHLORIDE	C	D	C	C	C	A	A	A	A
CALCIUM CHLORIDE	C	C	C	C	B	A	A	A	A
ETHYL CHLORIDE	B	B	B	A	A	C	C		A
IRON CHLORIDE	D	D	D	D	D	A	A	A	A
MAGNESIUM CHLORIDE	D	D	C	B	B	A	A	A	A
MERCURY CHLORIDE	D	D	D	D	C		A		A
METHYL CHLORIDE	B	D	B	B	A	C	C		A
NICKEL CHLORIDE	D	D	D	B	B	A	A	A	A
POTASSIUM CHLORIDE	B	B	C	C	C	A	A	A	A
SODIUM CHLORIDE	C	B	C	B	B	A	A	A	A
ZINC CHLORIDE	C	D	D	D	D	B	A	A	A
SODIUM CHROMATE	B	D	B	A	A	A	A	A	A
DIESEL	A	A	A	A	A	A	C	A	A
SULFUR DIOXIDE	B	A	B	A	A	C	C	A	A
ASPHALT EMULSION	A	C	A	A	A	B	A	A	A
RUBBER LATEX EMULSIONS	B	A	B	A	A			A	A
ETHANE	A	A	A	A	A	A	B	A	A

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ETHER	B	A	A	A	A	C	C	C	
FLUORINE	D	D	D	D	D				C
SODIUM FLUORIDE	D	C	D	B	B	A	A	A	A
AMMONIUM PHOSPHATE (DIBASIC)	D	B	D	B	A	A	A	A	A
AMMONIUM PHOSPHATE (TRIBASIC)	D	B	D	B	A	A	A	A	A
SODIUM PHOSPHATE (DIBASIC)	B	D	B	A	A	A	A	A	A
SODIUM PHOSPHATE (TRIBASIC)	B	D	B	A	A	B	B	A	A
FREON	B	B	B	A	A	C	C	C	A
HYDROGEN GAS (COLD)	B	A	B	A	A		B		A
LIQUIFIED PETROLEUM GAS (LPG)	B	A	B	B	B	A	B	A	A
NATURAL GAS	B	B	B	A	A	A	A	A	A
GASOLINE (SOUR)	B	A	B	A	A	C	D	A	A
GASOLINE (AVIATION)	B	A	A	A	A	C	D	A	A
GASOLINE (LEADED)	B	A	A	A	A	C	D	A	A
GASOLINE (MOTOR)	B	A	A	A	A	C	D	A	A
GASOLINE (UNLEADED)	B	A	A	A	A	C	D	A	A
GREASE	A	A	A	A	A	A	B	A	A
HEPTANE	B	A	B	A	A	A	B	A	A
HEXANE	B	A	B	B	B	A	C	A	A
ZINC HYDROSULFATE	B	D	A	A	A	A	A	A	A
AMMONIUM HYDROXIDE (28%)	C	C	C	B	B	B	A	A	A
AMMONIUM HYDROXIDE (CONC.)	C	C	C	B	C	A	A	A	A
MAGNESIUM HYDROXIDE	B	D	B	A	A	A	A	A	A
POTASSIUM HYDROXIDE	A	D	A	A	A	A	A		A
SODIUM HYDROXIDE (HOT) 20%	B	D	B	A	A	B	B	C	A
SODIUM HYDROXIDE (HOT) 50%	B	D	B	A	A	B	B	C	A
SODIUM HYDROXIDE (HOT) 70%	B	D	B	A	A			C	A
SODIUM HYDROXIDE (COLD) 20%	A	D	A	A	A	A	A	B	A
SODIUM HYDROXIDE (COLD) 50%	A	D	A	A	A	A	A	C	A

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SODIUM HYDROXIDE (COLD) 70%	A	D	A	A	A			C	A
SODIUM HYPOCHLORITE	D	D	D	D	D		D		A
ASPHALT LIQUID	A	C	A	A	A	C	A	A	A
METHANE	B	A	B	B	B	A	B	A	A
CRUDE MOLASSES	A	A	A	A	A	A	A	A	A
MERCURY	A	C	A	A	A	A	A	A	A
NAPHTHA	B	A	B	B	B	A	C	A	A
AMMONIUM NITRATE	D	B	D	A	A	A	A	A	A
COPPER NITRATE	D	C	D	A	A				A
NICKEL NITRATE	D	C	D	B	B	A	A	A	A
SILVER NITRATE	D	D	D	A	A	C	C	A	A
POTASSIUM NITRATE	B	A	B	A	A	A	A	A	A
SODIUM NITRATE	B	A	B	B	B	C	A	A	A
FERRITIC NITRATE	D	D	D	C	C	A	A	A	A
NITROBENZENE	B	C	B	B	B	D	D	C	A
NITROGEN	A	A	A	A	A	A	A	A	A
ETHYLENE OXIDE	C	A	B	B	B	D	D	D	A
NITROUS OXIDE	C	C	B	B	B	B	B		A
OXYGEN	B	A	B	A	A	C	C	B	A
OZONE	C	B	C	A	A				A
PARAFFIN	B	A	B	A	A	A	B	A	A
HYDROGEN PEROXIDE	D	A	D	B	B	A	A	A	A
SODIUM PEROXIDE	C	C	C	B	B	C	A	A	A
PROPANE	B	A	B	B	B	A	B	A	A
KEROSENE	B	A	B	A	A	A	C	A	A
SALT	C	B	C	B	B	A	A	A	A
EPSOM SALT	C	A	C	B	B	A	A	A	A
BRINE	C	B	C	B	B	A	A	A	A

MATERIAL SELECTION

MATERIAL SELECTION

SELECTION CODE: A= Excellent B= May be used C= Use with caution D= Do not use	MATERIALS					SEATS AND ELASTOMERS			
	Iron Foundry	Aluminum 356	Carbon Steel	Stainless Steel 303	Stainless Steel 316	Buna N	Neoprene	Viton	Teflon
SODIUM SILICATE (HOT)	B	C	B	B	B				A
SODIUM SILICATE	A	B	A	A	A	A	A	A	A
AMMONIA SOLUTION	B	D	B	A	A	B	B	A	A
ACETATE SOLVENTS	B	A	A	A	A	D	D	D	A
RUBBER SOLVENTS	A	A	A	A	A	D	C	D	A
ALUMINUM SULFATE	C	B	C	A	A	A	A	A	A
AMMONIUM SULFATE	C	B	C	B	A	A	A	A	A
BARIUM SULFATE	B	D	C	B	B	A	A	A	A
IRON SULFATE	D	D	D	B	B	A	A	A	A
HYDROGEN SULFATE	B	B	B	B	A	C	A	A	A
MAGNESIUM SULFATE	B	B	B	B	B	A	A	A	A
NICKEL SULFATE	D	D	B	B	B	A	A	A	A
POTASSIUM SULFITE	B	B	B	A	A	A			A
POTASSIUM SULFATE	C	A	B	A	A	A	A	A	A
SODIUM SULFATE	B	A	B	A	A	A	A	A	A
ZINC SULFATE	D	D	D	B	B	A	A	A	A
TOLUENE	A	A	A	A	A	D	D	B	A
TRICHLORETHYLENE	C	A	B	B	B	D	D	B	A
ANTIMONY TRICHLORIDE	D	D	D	D	D	D	C	A	A
SULFUR TRIOXIDE	B	A	B	A	A	C	D		A
UREA	C	B	C	B	B				A
STEAM (212°F)	A	A	A	A	A	C	D	B	A
VINEGAR	D	C	D	A	A	D	D	D	A
XYLENE	A	A	A	A	A	D	D	A	A
IODINE	D	D	D	D	D	B	B	A	A

APPLICABLE STANDARDS AND CODES

API Standards	American Petroleum Institute
API-598	Valve Inspection and Testing
API-6D	Pipeline Valves (Gate, Ball and Check)
API-6FA	Valve Fire Test Specification
API-607	Fire Test for 1/4 Turn Soft-Seated Valves

ANSI Standards	National Standards Institute
ANSI B1.20.1	NPT General Purpose Pipe Threads (Inches)
ANSI B16.5	Pipeline Flanges and Flanged Fittings
ANSI B16.10	Face to Face and End to End Valve Dimensions
ANSI B16.25	Butt Weld Ends
ANSI B16.34	Flanged, Threaded and Butt Weld End Valves

MSS Standards	Manufacturer's Standardization Society
MSS SP-6	Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings
MSS SP-9	Spot Facing for Bronze, Iron and Steel Flanges
MSS SP-25	Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-44	Steel Pipeline Flanges
MSS SP-55	Quality Standard for Steel Castings for Valves, Flanges, Fittings and Other Piping Components/Visual Method for Evaluation of Surface Irregularities
MSS SP-61	Pressure Testing of Steel Valves

ASTM Standards	American Society for Testing and Materials
ASTM A-105	Standard Specification for Carbon Steel Forgings for Piping Applications
ASTM A-182	Standard Specification for Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings and Valves and Parts for High Temperature Service
ASTM A-193	Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
ASTM A-194	Standard Specification for Carbon and Alloy Steel Nuts for High Pressure and High Temperature Service
ASTM A-216	Standard Specification for Carbon Steel Castings, Suitable for Fusion Welding and High Temperature Service
ASTM A-276	Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A-320	Standard Specification for Alloy Steel Bolting Materials for Low Temperature Service
ASTM A-350	Standard Specification for Carbon and Low Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components
ASTM A-351	Standard Specification for Steel Austenitic and Austenitic-Ferritic (Duplex) Castings for Pressure Containing Parts
ASTM A-352	Standard Specification for Steel, Ferritic and Martensitic Castings for Pressure Containing Parts, Suitable for Low Temperature Service
ASTM A-515	Standard Specification for Carbon Steel Pressure Vessel Plates for Intermediate and High Temperature Service

NACE Standard	National Association of Corrosion Engineers
NACE MR0175 - 2002	Sulfide Stress Corrosion Cracking Resistant Metallic Materials for Oil Field Equipment

ASME Code	American Society of Mechanical Engineers:
ANSI/ASME B31.1	Power Piping
ANSI/ASME B31.2	Fuel Gas Piping
ASME/ANSI B31.3	Process Piping

BOILER AND PRESSURE VESSEL CODE:	
Section II	Part A - Ferrous Material Specifications
Section II	Part B - Non - Ferrous Material Specifications
Section II	Part C - Specifications for Welding Rods, Electrodes and Filler Metals
Section V	Non - Destructive Examination
Section VIII	Rules for Construction of Pressure Vessels, Divisions 1 and 2
Section IX	Welding and Brazing Qualifications

TERMS AND CONDITIONS

Acceptance: All quotations for acceptance within 30 days from date of quotation unless extended in writing. In the event a purchase order is placed after this period of time, TWC The Valve Company reserves the right to requote base prices of all valves offered. All order and contracts are subject to credit approval and acceptance by TWC The Valve Company.

Freight: When prices are F.O.B. point of shipment – no freight allowance, Walworth will attempt to route shipments in the method which will result in the lowest cost unless otherwise instructed. All shipments will be freight charges collect except when stipulated on the purchase order in which case the buyer will be invoiced for all transportation charges.

Delivery of material to a common carrier shall be considered to be delivery to Buyer and shall be at Buyer's risk thereafter.

The Buyer shall file claims of loss or damage to material in transit directly with the carrier.

Prices: There will be added to all prices quoted, any sales, use, occupation, excise or similar tax which Seller may be required to pay or collect in connection with the sale. Seller reserves the right to cancel any order in the event that selling price(s) shall be established by the Federal, State or other government regulation with respect to the product(s) covered by the order which shall be lower than the price(s) specified in the order.

Escalation Terms: Price shown in the price schedule reflects the cost in effect at the time of publication.

These prices will remain firm on all products with a quoted delivery of twenty-six (26) weeks or less.

On products which have a scheduled delivery of more than twenty-six (26) weeks the goods will be invoiced.

Based on the applicable price sheet in effect at the time of the shipment. In no event will the invoiced price be less than the price originally quoted.

Purchased Components: (i.e. motors, gearing, etc.) Prices are quoted on supplier price in effect at time of quotation. Actual invoice price may be adjusted in accordance with the supplier's escalation policy.

Deferred Shipments: If for any reason the customer desires to delay shipments more than 30 days after manufacturing is complete or to place a hold or stop to the order during the manufacturing cycle, TWC The Valve Company reserves the right to consider the order cancelled and to invoke cancellation charges per the schedule below.

Cancellation: After order acceptance by Walworth, items or complete orders may be cancelled and Buyer will be charged for work performed, based on the following schedule:

Five (5%) percent of price of stock items.

Ten (10%) percent of price of stock items ordered in quantities which exceed normal inventory levels.

Five (5%) percent of price prior to drawing submittal on made to order items.

Fifteen (15%) percent drawing approval, but prior to the start of castings.

Thirty (30%) to Fifty (50%) percent during casting cycle, depending on the state of completion.

Fifty-Five (55%) to Seventy-Five (75%) percent during machining and assembly operations, depending on the state of completion.

One hundred (100%) percent after final assembly and test.

Remittances: Remittances must be made to the address indicated on the invoice.

Credit Terms: As quote. Invoices on balances overdue will be subject to a service charge of one and a half ($1\frac{1}{2}$%) percent per month on such indebtedness.

Deliveries: Shipments and deliveries shall at all times be subject to the approval of Seller's Credit Department. If the Buyer shall fail to make any payments according to the terms of the contract, Seller may in addition to and not in limitation of its other rights and remedies, at its option, cancel all or any part of Buyer's contracts with Seller except upon receipt of satisfactory security or for cash before shipment.

All schedules of shipment are estimated as closely as possible and Seller will use its best efforts to ship within the time scheduled, but does not guarantee to do so. Schedules commence with the date Seller receives authorization to proceed with the order, subject to the provisions of the next sentence. The order will not be released for manufacture until complete specifications and approved drawings (if drawings approval is required) are received at the plant of manufacture and the estimated schedule of shipment will commence with the date of such receipt.

Seller shall not be liable for any direct, indirect or consequential damage or loss caused by any delay in delivery, regardless of the cause of delay. Without limiting the generality of the foregoing, Seller assumes no responsibility for delays in delivery resulting from fire, flood, accidents, riots, strikes, transportation delays, labor or material shortages, existing or future laws, acts of any governmental authority, or any other cause beyond Seller's control. Items offered from stock are subject to prior sale.

Inspection: Final inspection and acceptance of products must be made at the plant facility, unless otherwise provided in the order and/or agreed upon specifications. Prices do not include charges for special tests or inspections performed at the request of the Buyer, unless called for in the order and/or in agreed upon specifications.

Returns: Permission in writing and return tagging instructions must be obtained from Seller before any goods returned for credit or adjustment will be accepted. Where returned goods are accepted, a minimum charge of twenty-five percent (25%) of the invoice price will be made, plus freight from both directions and costs of reconditioning the material for resale as new.

Warranty: Seller will replace without charge or refund the purchase price of products manufactured by Seller which prove to be defective in material or workmanship, provided in each case that the product is properly installed and is used in the service for which the Seller recommends it and that a written claim, specifying the alleged defect, is presented to Seller within one year from date of shipment. Seller shall in no event be responsible for (a) claims for labor, expenses or other damages occasioned by defective products or (b) for consequential or secondary damages. **THE WARRANTY STATED IN THIS PARAGRAPH IS IN LIEU OF ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED. WITH RESPECT TO WARRANTIES THIS PARAGRAPH STATES BUYER'S EXCLUSIVE REMEDY AND SELLER'S EXCLUSIVE LIABILITY.**

Design, etc.: Seller reserves the right to change design, materials or specifications without notice. There will be a charge for modifying an order after it has been entered when such change or modification results in additional engineering or clerical work for either TWC The Valve Company or our suppliers.

Minimum charge: Orders totaling less than $100.00 (one hundred 00/100 U.S. CY) net will be billed at a minimum charge of $50.00 (fifty 00/100 U.S. CY).

Note: We reserve the right to correct obvious clerical errors in quotations, invoices and other contracts.

WALWORTH®

Since 1842

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