

TWS Series

"Uni-Body, Top Entry, Trunnion Mounted Ball, Valves"

Standard Service :

Use in natural gas, LNG, crude oil, refined products transmission lines as well as in many other general and oil&gas applications.

- Transmission pipelines,
- Pumping, compression and reinjection units
- Offshore platforms
- Onshore terminals
- Pig traps
- Metering stations
- Surge-relief skids
- Blowdown

Special Service :

- HIPPS
- ESD
- SSIV
- HIGH/LOW TEMPERATURE
- CRYOGENIC
- DIRTY/ ABRASIVE SERVICE
- BURIED

The most important feature of top entry design is:

"FULLY MAINTAINABLE IN LINE"

Complete valve maintenance is extremely quick and safe, by removing the bonnet to have access to the main components of the valves

GENERAL DESIGN FEATURES

- One-piece body, Top entry design
- Double block and bleed
- Trunnion supported design reduces operating torque
- Antistatic device for grounding of the ball, stem and body
- Two sets of O'ring plus fire safe stem packing prevents leakage
- Trunnion supported design reduces operating torque
- Corrosion resistant low friction bearing
- Inconel seat springs
- Sealant injection fittings for emergency stem or seal sealing
- Direct mount top works mounting pad for actuator or gear operator
- 8" and larger valves are equipped with lifting lugs.
- Locking device (lock not included)
- **NACE standard MR 0175**

MATERIAL SPECIFICATION

FORCE Top entry ball valves have been designed for use with various combinations of materials which are selected to better suit service conditions.

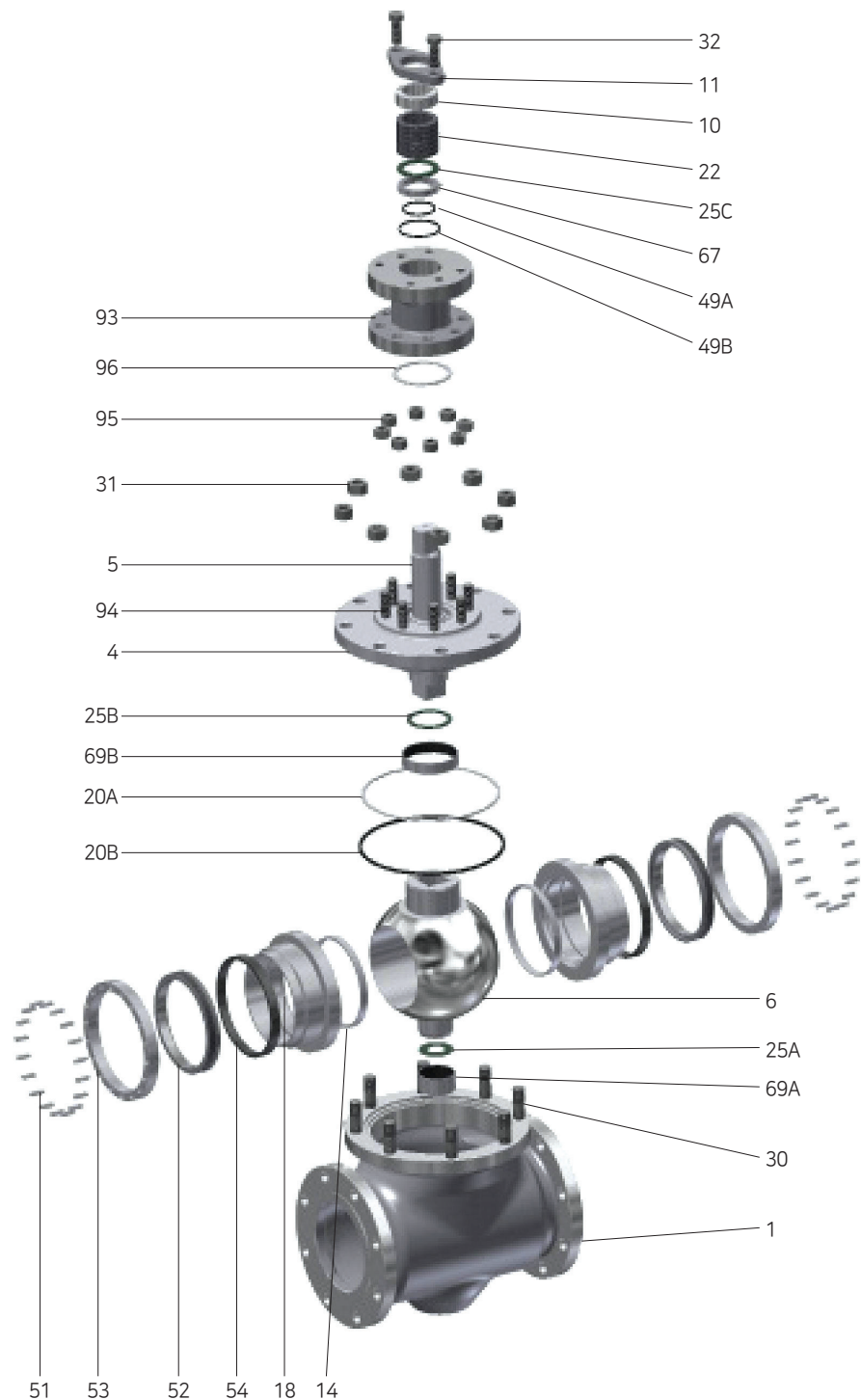
Carbon Steel (CS)	A216-WCB/WCC, A105	Duplex SSSt	A995-4A, A182-F51
Low Temp. CS	A352-LCB/LCC, A350-LF2	Super Duplex SS	A995-6A, A182-F53/F55
Low Alloy Steel (LAS)	A352-LC3, A350-LF3	Ni Alloys	UNS N08825, UNS N06625
Martensitic SS	A182-F6a/F6NM, AISI 410	Cu Alloys	MONEL 400/K500
Austenitic SS	A351-CF8/CF3/CF8M/CF3M	Co Alloys	Hastelloy
	A182-F304/ F304L/F316/F316L		



TWS Series

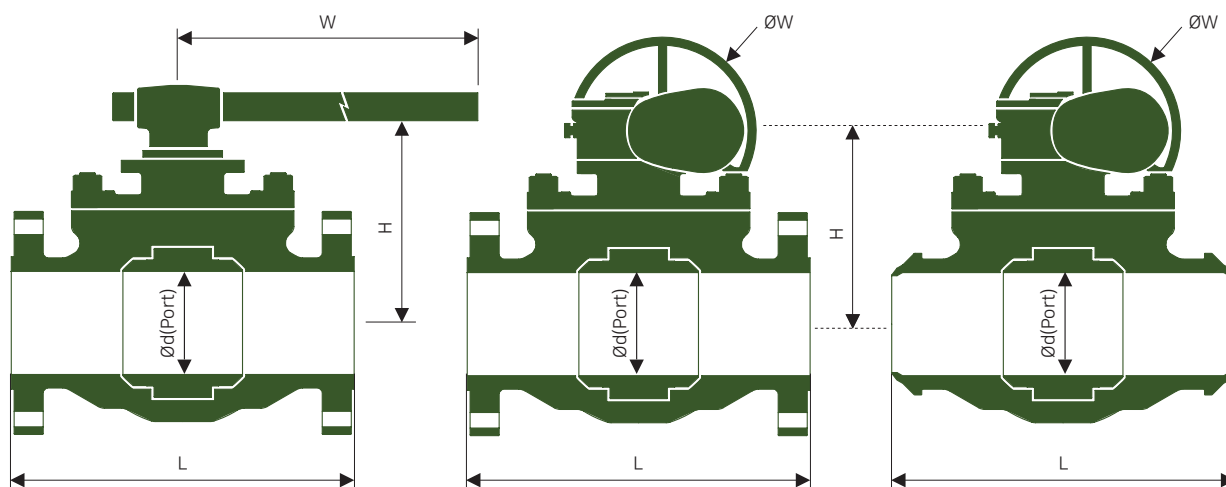
“Uni-Body, Top Entry, Trunnion Mounted Ball Valves”

Part No.	Part Name
1	Body
4	Bonnet
5	Stem
6	Ball
10	Gland Flange
11	Gland
14	Seat Ring
18	Seat Retainer
20A	Bonnet Seal
20B	Bonnet Gasket
22	Gland Packing
25A	Thrust Washer-A
25B	Thrust Washer-B
25C	Thrust Washer-C
30	Bonnet Bolts
31	Bonnet Nuts
32	Gland Bolts
49A	O'ring-A
49B	O'ring-B
51	Spring
52	Retainer Ring
53	Spring Holder
54	Retainer Seal
67	Stem Bushing
69A	DU-BUSH
69B	DU-BUSH
93	Connector
94	Connector Bolts
95	Connector Nuts
96	Connector Gasket
101	Sealant Fitting
103	Bleed Fitting



TWS Series

"Uni-Body, Top entry, Trunnion mounted ball valves"

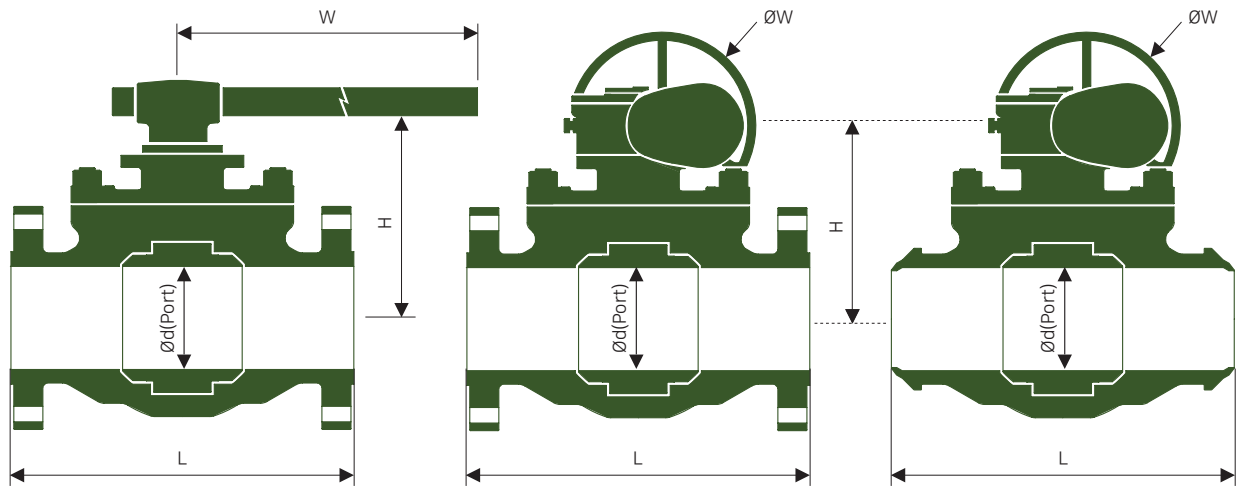


DIMENSIONS

Class 150

Valve Size	Ød (Ball port)		L		H		W		Approx Weight	
	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	2.01	51	11.50	292	6.69	170	14.96	380	66	30
3" x 2"	2.01	51	14.02	356	6.69	170	14.96	380	99	45
3"	2.99	76	14.02	356	8.35	212	14.96	380	154	70
4" x 3"	2.99	76	17.01	432	8.35	212	14.96	380	176	80
4"	4.02	102	17.01	432	9.29	236	14.96	380	243	110
6" x 4"	4.02	102	22.01	559	9.29	236	17.72	450	287	130
6"	5.98	152	22.01	559	13.31	338	19.69	500	485	220
8" x 6"	5.98	152	25.98	660	13.31	338	19.69	500	562	255
8"	7.99	203	25.98	660	14.76	375	19.69	500	772	350
10" x 8"	7.99	203	30.98	787	14.76	375	19.69	500	948	430
10"	10.00	254	30.98	787	16.34	415	19.69	500	1,102	500
12" x 10"	10.00	254	32.99	838	16.34	415	27.95	710	1,323	600
12"	12.01	305	32.99	838	17.80	452	27.95	710	1,631	740
14" x 12"	12.01	305	35.00	889	17.80	452	27.95	710	1,896	860
14"	13.27	337	35.00	889	18.62	473	27.95	710	1,984	900
16" x 14"	13.27	337	39.02	991	18.62	473	27.95	710	2,315	1,050
16"	15.24	387	39.02	991	19.61	498	27.95	710	2,535	1,150
18" x 16"	15.24	387	43.03	1,093	19.61	498	31.50	800	2,866	1,300
18"	17.24	438	43.03	1,093	21.46	545	31.50	800	3,417	1,550
20" x 18"	17.24	438	47.01	1,194	21.46	545	31.50	800	3,924	1,780
20"	19.25	489	47.01	1,194	23.74	603	31.50	800	4,519	2,050
24" x 20"	19.25	489	55.00	1,397	23.74	603	31.50	800	5,291	2,400
24"	23.27	591	55.00	1,397	29.21	742	31.50	800	7,937	3,600
30"	29.02	737	65.00	1,651	32.76	832	31.50	800	14,991	6,800
36"	34.49	876	82.01	2,083	37.24	946	31.50	800	23,149	10,500
40"	38.50	978	92.01	2,337	40.79	1,036	35.43	900	28,660	13,000

* Valve sizes 6" and larger are gear operated.



DIMENSIONS

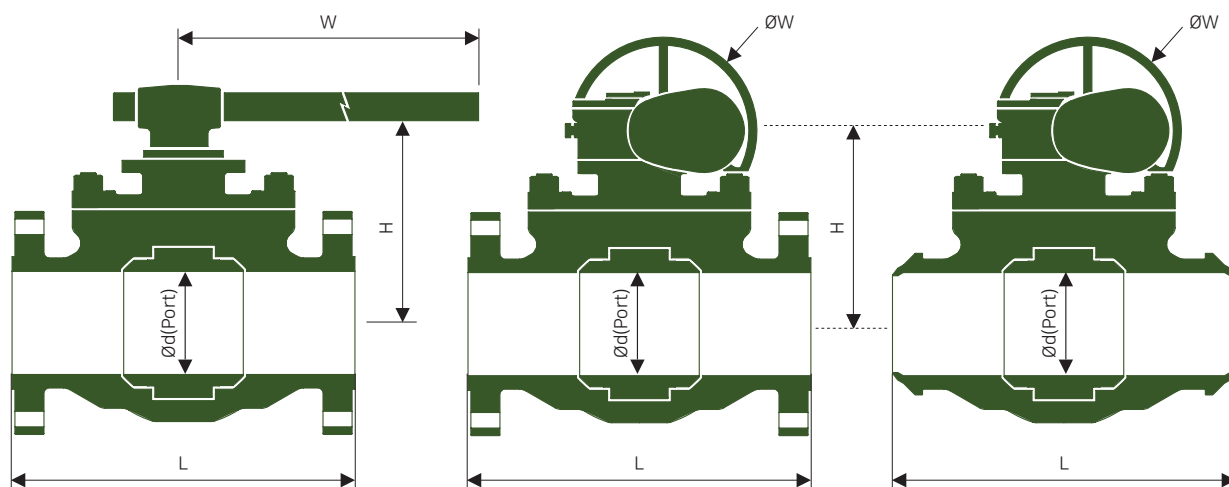
Class 300

Valve Size	Ød (Ball port)		L		H		W		Approx Weight	
	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	2.01	51	11.50	292	6.69	170	14.96	380	93	42
3" x 2"	2.01	51	14.02	356	6.69	170	14.96	380	110	50
3"	2.99	76	14.02	356	8.35	212	14.96	380	154	70
4" x 3"	2.99	76	17.01	432	8.35	212	14.96	380	209	95
4"	4.02	102	17.01	432	9.29	236	14.96	380	265	120
6" x 4"	4.02	102	22.01	559	9.29	236	17.72	450	342	155
6"	5.98	152	22.01	559	13.31	338	19.69	500	551	250
8" x 6"	5.98	152	25.98	660	13.31	338	19.69	500	617	280
8"	7.99	203	25.98	660	14.76	375	19.69	500	794	360
10" x 8"	7.99	203	30.98	787	14.76	375	19.69	500	992	450
10"	10.00	254	30.98	787	16.34	415	19.69	500	1,190	540
12" x 10"	10.00	254	32.99	838	16.34	415	27.95	710	1,433	650
12"	12.01	305	32.99	838	17.80	452	27.95	710	1,720	780
14" x 12"	12.01	305	35.00	889	17.80	452	27.95	710	2,006	910
14"	13.27	337	35.00	889	18.62	473	27.95	710	2,535	1,150
16" x 14"	13.27	337	39.02	991	18.62	473	27.95	710	2,690	1,220
16"	15.24	387	39.02	991	19.61	498	27.95	710	3,197	1,450
18" x 16"	15.24	387	43.03	1,093	19.61	498	31.50	800	3,748	1,700
18"	17.24	438	43.03	1,093	21.46	545	31.50	800	4,409	2,000
20" x 18"	17.24	438	47.01	1,194	21.46	545	31.50	800	4,960	2,250
20"	19.25	489	47.01	1,194	23.74	603	31.50	800	5,732	2,600
24" x 20"	19.25	489	55.00	1,397	23.74	603	31.50	800	6,393	2,900
24"	23.27	591	55.00	1,397	29.21	742	31.50	800	9,259	4,200
30"	29.02	737	65.00	1,651	32.76	832	31.50	800	16,535	7,500
36"	34.49	876	82.01	2,083	37.24	946	31.50	800	27,778	12,600
40"	38.50	978	92.01	2,337	40.79	1,036	35.43	900	33,510	15,200

* Valve sizes 6" and larger are gear operated.

TWS Series

"Uni-Body, Top entry, Trunnion mounted ball valves"

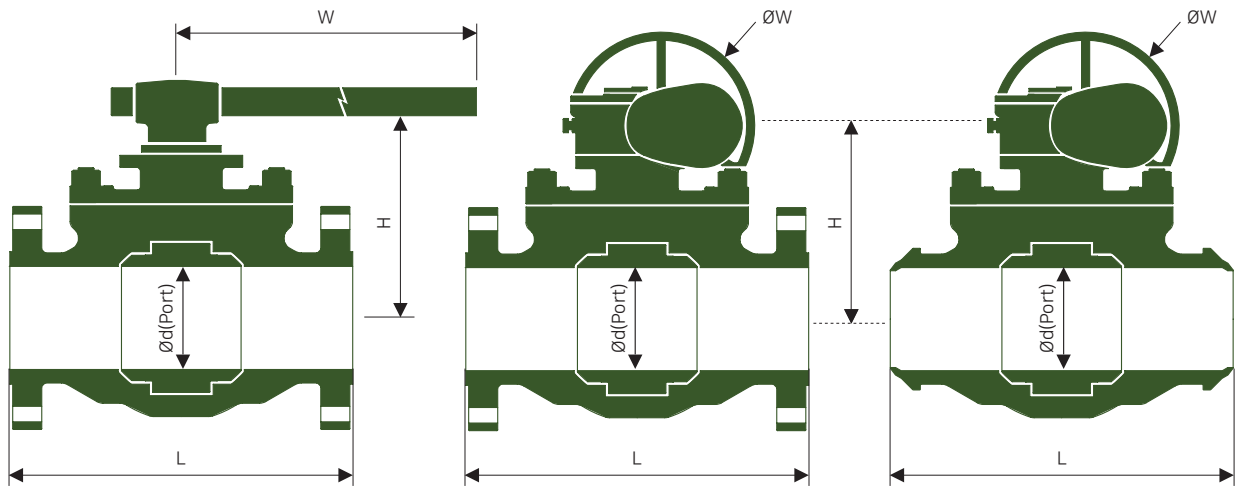


DIMENSIONS

Class 600

Valve Size	Ød (Ball port)		L				H		W		Approx Weight	
			RF/BW		RTJ							
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	2.01	51	11.50	292	11.61	295	6.69	170	14.96	380	104	47
3" x 2"	2.01	51	14.02	356	14.13	359	6.69	170	14.96	380	121	55
3"	2.99	76	14.02	356	14.13	359	8.35	212	23.62	600	165	75
4" x 3"	2.99	76	17.01	432	17.13	435	8.35	212	23.62	600	231	105
4"	4.02	102	17.01	432	17.13	435	11.93	303	15.75	400	353	160
6" x 4"	4.02	102	22.01	559	22.13	562	11.93	303	15.75	400	430	195
6"	5.98	152	22.01	559	22.13	562	13.31	338	19.69	500	595	270
8" x 6"	5.98	152	25.98	660	26.14	664	13.31	338	19.69	500	750	340
8"	7.99	203	25.98	660	26.14	664	15.08	383	24.80	630	1,102	500
10" x 8"	7.99	203	30.98	787	31.14	791	15.08	383	24.80	630	1,323	600
10"	10.00	254	30.98	787	31.14	791	16.65	423	24.80	630	1,676	760
12" x 10"	10.00	254	32.99	838	33.11	841	16.65	423	24.80	630	1,874	850
12"	12.01	305	32.99	838	33.11	841	18.11	460	24.80	630	2,315	1,050
14" x 12"	12.01	305	35.00	889	35.12	892	18.11	460	24.80	630	2,712	1,230
14"	13.27	337	35.00	889	35.12	892	19.69	500	27.95	710	3,197	1,450
16" x 14"	13.27	337	39.02	991	39.13	994	19.69	500	27.95	710	3,638	1,650
16"	15.24	387	39.02	991	39.13	994	23.82	605	27.95	710	4,277	1,940
18" x 16"	15.24	387	42.99	1,092	43.15	1,096	23.82	605	27.95	710	4,729	2,145
18"	17.24	438	42.99	1,092	43.15	1,096	25.28	642	27.95	710	5,512	2,500
20"x 18"	17.24	438	47.01	1,194	47.28	1,201	25.28	642	27.95	710	6,283	2,850
20"	19.25	489	47.01	1,194	47.28	1,201	27.56	700	31.50	800	6,724	3,050
24"x 20"	19.25	489	55.00	1,397	55.39	1,407	27.56	700	31.50	800	9,149	4,150
24"	23.27	591	55.00	1,397	55.39	1,407	32.09	815	31.50	800	11,023	5,000

* Valve sizes 4" and larger are gear operated.



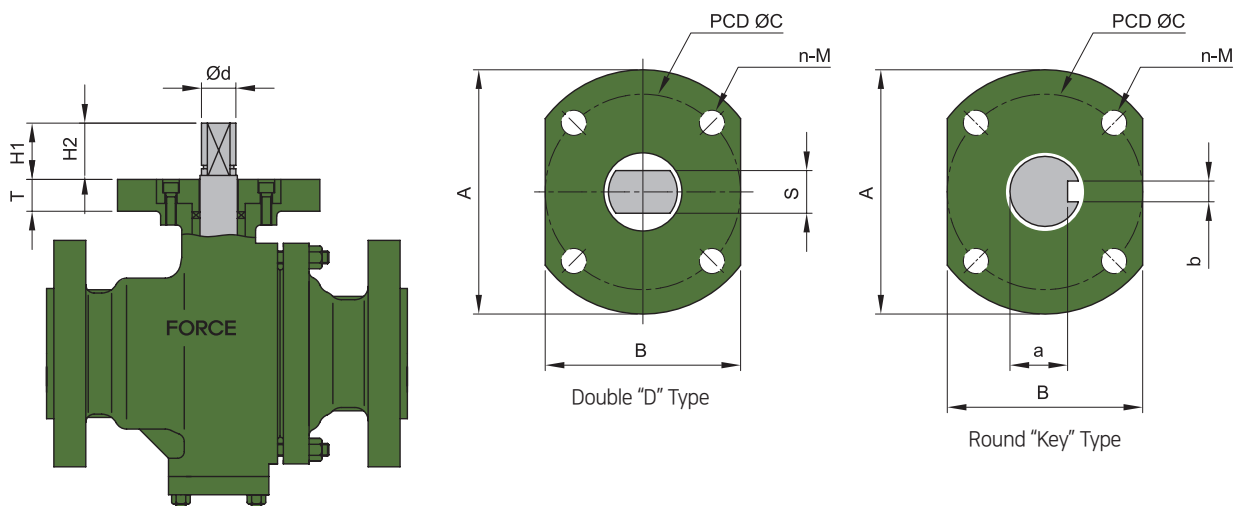
DIMENSIONS

Class 900

Valve Size	Ød (Ball port)		L				H		W		Approx Weight	
			RF/BW		RTJ							
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	2.01	51	14.49	368	14.61	371	7.48	190	23.62	600	134	61
3" x 2"	2.01	51	15.00	381	15.12	384	7.48	190	23.62	600	170	77
3"	2.99	76	15.00	381	15.12	384	8.86	225	15.75	400	249	113
4" x 3"	2.99	76	17.99	457	18.11	460	8.86	225	15.75	400	353	160
4"	4.02	102	17.99	457	18.11	460	13.19	335	19.69	500	492	223
6" x 4"	4.02	102	24.02	610	24.13	613	13.19	335	19.69	500	659	299
6"	5.98	152	24.02	610	24.13	613	15.59	396	22.05	560	937	425
8" x 6"	5.98	152	29.02	737	29.13	740	15.59	396	22.05	560	1,098	498
8"	7.99	203	29.02	737	29.13	740	17.17	436	24.80	630	1,634	741
10" x 8"	7.99	203	32.99	838	33.11	841	17.17	436	24.80	630	1,905	864
10"	10.00	254	32.99	838	33.11	841	17.44	443	24.80	630	2,282	1,035
12" x 10"	10.00	254	37.99	965	38.11	968	17.44	443	24.80	630	2,736	1,241
12"	12.01	305	37.99	965	38.11	968	21.06	535	24.80	630	3,111	1,411
14" x 12"	12.01	305	40.51	1,029	40.87	1,038	21.06	535	24.80	630	3,366	1,527
14"	12.76	324	40.51	1,029	40.87	1,038	21.65	550	27.95	710	3,929	1,782
16" x 14"	12.76	324	44.49	1,130	44.88	1,140	21.65	550	27.95	710	4,519	2,050
16"	14.76	375	44.49	1,130	44.88	1,140	24.21	615	31.50	800	5,732	2,600
18" x 16"	14.76	375	47.99	1,219	48.50	1,232	24.21	615	31.50	800	6,437	2,920
18"	16.73	425	47.99	1,219	48.50	1,232	27.64	702	31.50	800	8,135	3,690
20" x 18"	16.73	425	52.01	1,321	52.52	1,334	27.64	702	31.50	800	8,929	4,050
20"	18.62	473	52.01	1,321	52.52	1,334	31.54	801	31.50	800	10,913	4,950
24" x 20"	18.62	473	60.98	1,549	61.73	1,568	31.54	801	31.50	800	15,146	6,870
24"	22.52	572	60.98	1,549	61.73	1,568	37.52	953	35.43	900	17,417	7,900

* Valve sizes 3" and larger are gear operated.

TOP WORKS DIMENSIONS



	Size	$\varnothing d$	S	a	b	A	B	C	n-M	H1	H2	T	ISO 5211	Remark
Class 150 & 300	2"x1 1/2"	27	17	-	-	125	93	102	4- $\varnothing 12$	25.0	23.0	18.0	F10	
	2"	27	17	-	-	125	93	102	4- $\varnothing 12$	25.0	23.0	18.0	F10	
	3"	27	17	-	-	125	102	102	4- $\varnothing 12$	25.0	23.0	21.5	F10	
	4"	34	22	-	-	150	125	125	4- $\varnothing 14$	32.0	30.0	24.0	F12	
	6"	46	-	40.5	14.0	175	140	140	4- $\varnothing 18$	55.5	-	26.0	F14	
	8"	46	-	40.5	14.0	175	140	140	4- $\varnothing 18$	83.0	-	29.0	F14	
	10"	55	-	49.0	16.0	210	165	165	4- $\varnothing 22$	79.5	-	22.0	F16	Class 150
				49.0	16.0	240	-	200	4- $\varnothing 22$	79.5	-	22.0	F20	Class 300
	12"	55	-	49.0	16.0	210	165	165	4- $\varnothing 22$	79.5	-	22.0	F16	Class 150
				49.0	16.0	240	200	200	4- $\varnothing 22$	79.5	-	22.0	F20	Class 300
Class 600	2"x1 1/2"	27	17	-	-	125	102	102	4- $\varnothing 12$	24.0	23.0	18.0	F10	
	2"	27	17	-	-	125	102	102	4- $\varnothing 12$	24.0	23.0	18.0	F10	
	3"	34	22	-	-	150	125	125	4- $\varnothing 14$	31.0	30.0	22.5	F12	
	4"	44	26	-	-	175	140	140	4- $\varnothing 18$	36.0	34.0	27.0	F14	
	6"	50	-	44.0	16.0	210	165	165	4- $\varnothing 22$	58.0	-	32.0	F16	
	8"	55	-	49.0	16.0	250	200	200	4- $\varnothing 22$	73.0	-	33.0	F20	
	10"	65	-	57.5	20.0	300	-	254	8- $\varnothing 18$	79.5	-	45.5	F25	
	12"	70	-	62.5	20.0	300	-	254	8- $\varnothing 18$	79.5	-	45.5	F25	
Class 900	2"x1 1/2"	27	17	-	-	125	102	102	4- $\varnothing 12$	24.0	23.0	18.0	F10	
	2"	27	17	-	-	125	102	102	4- $\varnothing 12$	24.0	23.0	18.0	F10	
	3"	34	22	-	-	150	125	125	4- $\varnothing 14$	31.0	30.0	22.5	F12	
	4"	45	-	39.5	14.0	175	145	140	4- $\varnothing 18$	52.0	-	30.0	F14	
	6"	55	-	49.0	16.0	250	200	200	4- $\varnothing 22$	72.0	-	34.0	F20	
	8"	70	-	62.5	20.0	300	-	254	8- $\varnothing 18$	79.5	-	38.5	F25	
	10"	80	-	72.0	24.0	300	-	254	8- $\varnothing 18$	95.0	-	45.5	F25	
				72.0	24.0	300	-	254	8- $\varnothing 18$	95.0	-	45.5	F25	
Class 1500	2"x1 1/2"	27	17	-	-	125	102	102	4- $\varnothing 12$	24.0	23.0	18.0	F10	
	2"	27	17	-	-	125	102	102	4- $\varnothing 12$	24.0	23.0	18.0	F10	
	3"	34	22	-	-	150	125	125	4- $\varnothing 14$	31.0	30.0	22.5	F12	
	4"	45	-	39.5	14.0	175	145	140	4- $\varnothing 18$	52.0	-	30.0	F14	
	6"	55	-	49.0	16.0	250	200	200	4- $\varnothing 22$	72.0	-	34.0	F20	

* This technical data is for the BTS Series. For the Reduced Port, refer to the one size below Full-port.

Unit : mm