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MIL 36000 - On-Off Ball Valves

Applications

- Oil & Gas
- Gas Transportation
- Refineries
- Petrochemical Industry
- Chemical Industry
- Marine
- Offshore / Tankers

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Trunnion EST/FST Ball valve

Pendular Ball valve

Top entry VET ball valve

Your contact:

“TRUNNION”

EST/FST ball valve

- Bi-directional tight seal
- Double block and bleed
- Energized seats
- Bearings with permanent lubrication
- Full bore (reduced bore on request)
- Automatic relief of internal pressure
- Soft seat or metal-to-metal seat
- General use (EST) or “Fire-Safe” (FST) construction

Application

EST/FST trunnion ball valves, due to its “Double block and bleed” construction, are appropriate for operation under severe conditions in the areas of oil, petrochemical, storage and transfer of fluids, natural gas, corrosive services and general services. They operate under pressures up to 430 bar (class 2500) and temperature from -101 to 600°C.

Construction standards

Trunnion ball valves, model EST/FST, are designed to comply with API Spec 6D requirements in conduction of different types of fluids and processes, in services up to class 2500.

- API SPEC 6D
- ASME B16.5
- ASME B16.10
- ASME B16.25
- ASME B16.34
- MSS SP-44
- MSS SP-72
- ISO 10497

The dimensions presented in this catalog, when not established by standards, are guiding sizes subject to changes without notice. Upon request, specific dimensional drawings may be provided for each order.

CONSTRUCTION

Rigid body

The body is built in two asymmetric pieces, cast, with homogeneous structure highly resistant to the line tensions. It may be built with flanges or with butt weld ends.

Ball and stem

The stem is of expulsion proof type and the fixation of the ball is carried out by means of two cylindrical pins. In the valves with metal-to-metal seal, the ball surface is coated with hard chromium or chemical nickel. The ball is supported by bearings with permanent lubrication.

Packing

The stem gasket may be tightened while the valve is under pressure, and replaced without removing the actuator.
In special cases, “Chevron” packing is used. In these cases, the replacement of packing set requires the removal of actuator.

Sealing seats

The seats are floating type, energized by springs that ensure constant tightness of the seal, even under low pressures. The seat design allows bi-directional sealing and complies with the Double block and bleed construction.

When the valve is closed, sealing occurs at both seats. The body cavity can be opened through relief/drain valve.
The seats are designed to allow automatic relief of internal pressure of the fluid retained between the ball and the body when reaching levels higher to the upstream or downstream fluid.

The seats can be metal seats coated with Stellite® or soft seat. Upon order, they are supplied with sealant injection. Soft seats are firmly encapsulated on metal seat support and therefore protected against abrasive particles of the fluid.

Grounding service

The valves are supplied with grounding devices that guarantee electric continuity between body, ball and stem.

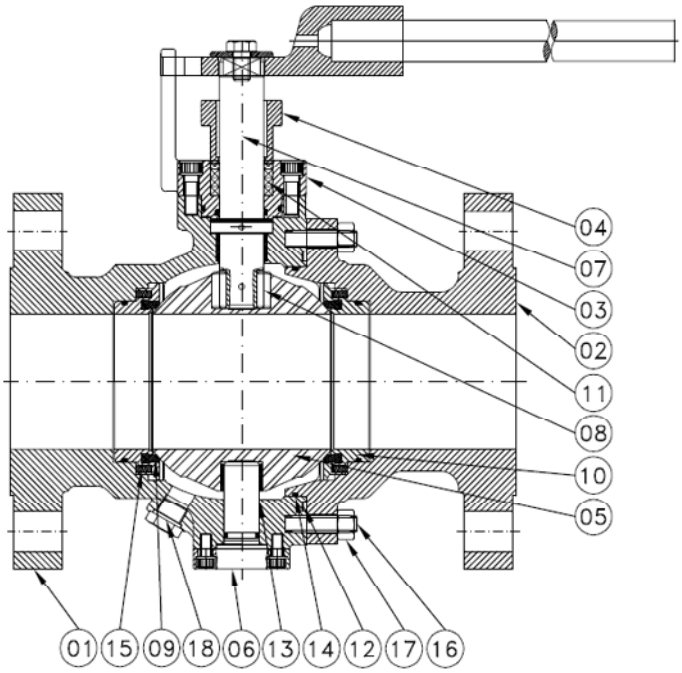
Actuation

The valves can be operated by lever, gearbox, electric or pneumatic actuator. They can feature an electro-pneumatic or pneumatic positioner, a solenoid valve, a limit switch and an inductive or magnetic proximity sensor, allowing automatic or remote control.
For valves featuring a lever, when safety operation is required, the valve may be provided with a locking device.

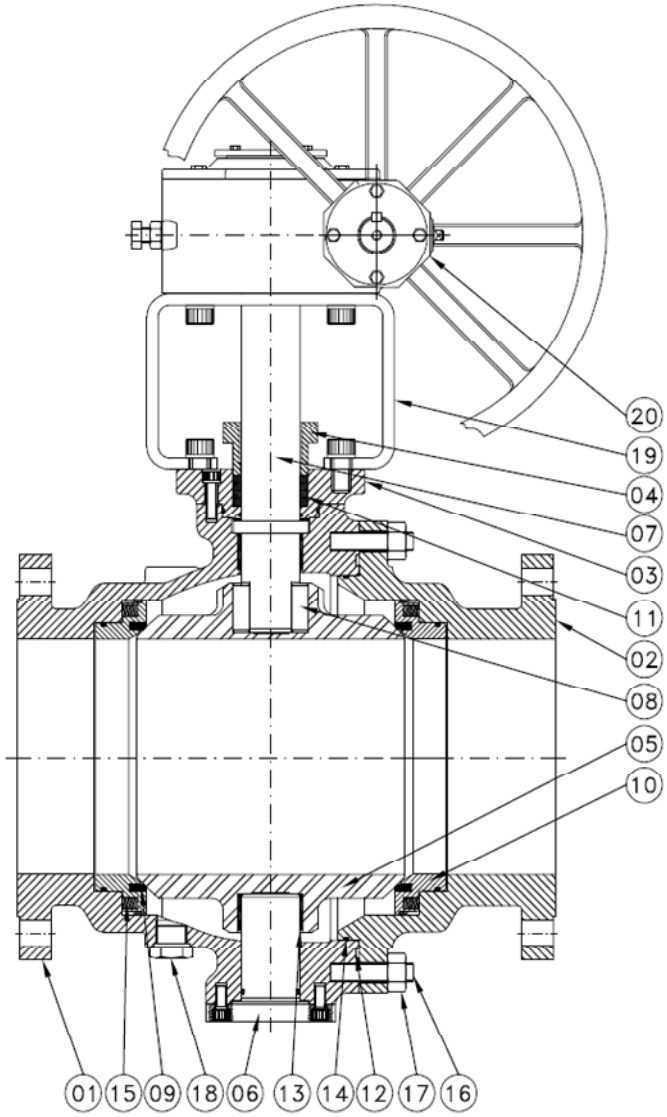
Maintenance

EST/FST Trunnion ball valve need to be removed from the line for occasional maintenance and seat replacement.
Upon removal of the gearbox or lever, it is possible to identify the “open or closed” position of the valve, installed in the line, by means of the stem key position, which indicates “open” if longitudinal in line with the piping, and “closed” if the stem key is perpendicular in relation to the piping.

TYPICAL PART LIST - EST/FST TRUNNION BALL VALVE

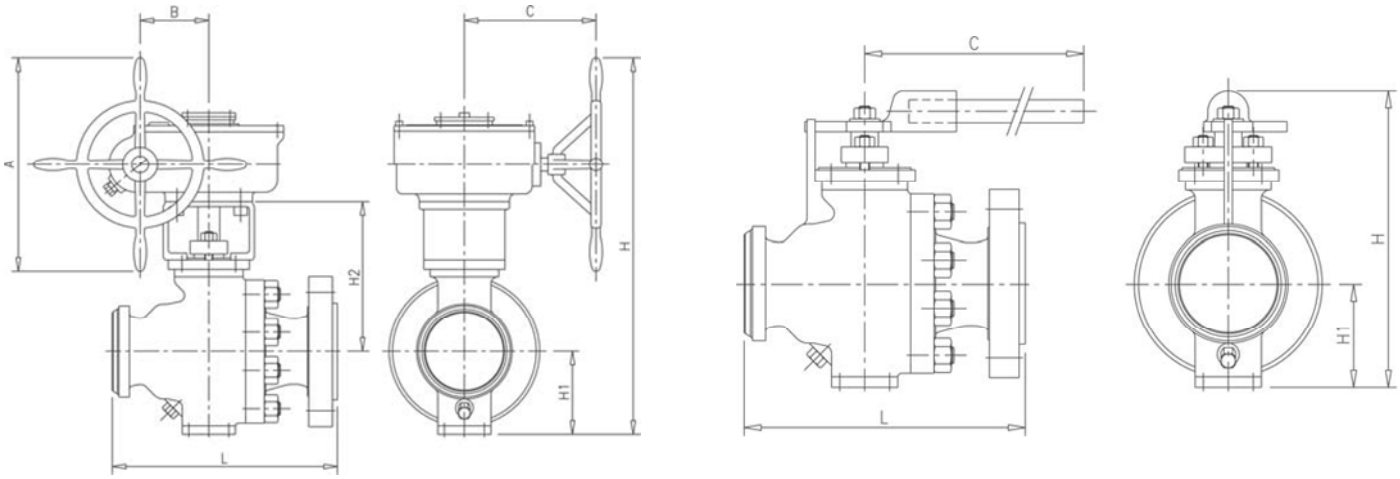


ITEM	PART NAME
18	PLUG
17	HEX NUT
16	BOLT
15	SPRING
14	O-RING
13	BEARING BUSHING
12	GASKET
11	PACKING
10	SEAT
09	SOFT INSERT
08	PIN
07	STEM
06	TRUNNION
05	BALL
04	GLAND PACKING
03	UPPER COVER
02	COVER
01	BODY



ITEM	PART NAME
20	GEARBOX
19	BRACKET
18	PLUG
17	HEX NUT
16	BOLT
15	SPRING
14	O-RING
13	BEARING BUSHING
12	GASKET
11	PACKING
10	SEAT
09	SOFT INSERT
08	PIN
07	STEM
06	TRUNNION
05	BALL
04	GLAND PACKING
03	UPPER COVER
02	COVER
01	BODY

DIMENSIONS

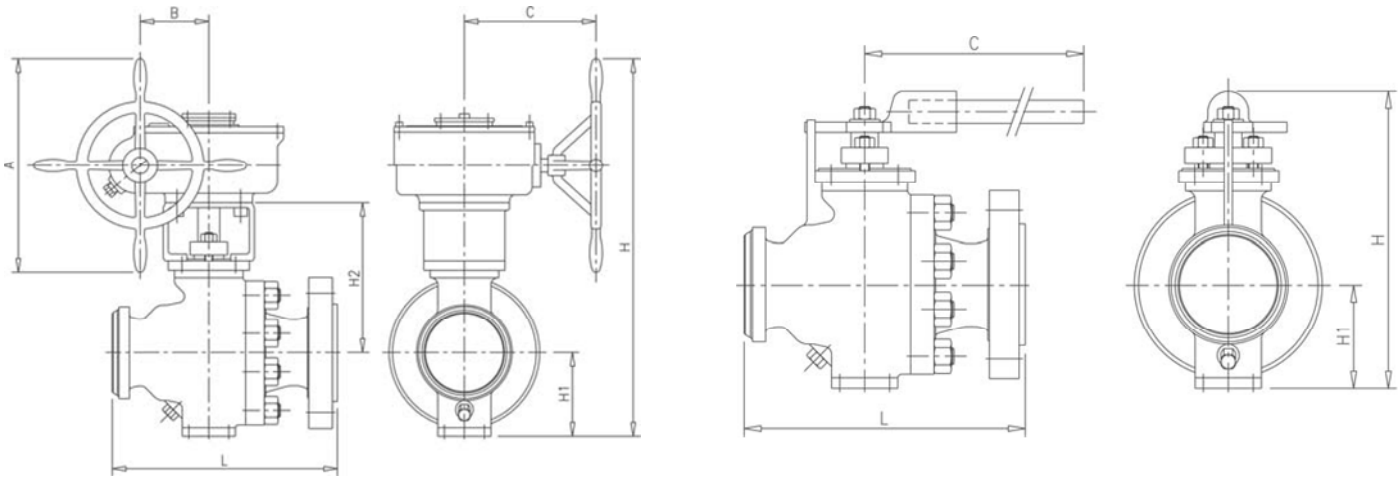


FULL PORT - ASME CLASS 150											
Size	A	B	C	H	H1	H2	L		OPERATOR	WEIGHT [kg] (2)	
							RF	BW		RF	BW
2	-	-	200	236	92	-	178	216	LEVER	12	9
3	-	-	600	300	125	-	203	283	LEVER	17	14
4	500	110	800/280	334	140	225	229	305	LEVER/CM6	45	39
6	500	110	900/280	733	160	265	394	457	LEVER/CM6	132	76
8	500	150	280	846	225	315	457	521	CM8	202	175
10	500	150	280	981	278	397	533	559	CM8	300	290
12	600	200	310	1140	297	460	610	635	CM16	420	380
14	600	200	310	1255	367	506	686	762	CM16	573	533
16	600	200	310	1363	420	561	762	838	CM16	790	730
18	600	200	310	1448	450	616	864	914	CM16	1018	908
20	600	270	380	1638	510	740	914	991	CM32	1530	1450
24	600	270	380	1828	600	840	1067	1143	CM32	2740	2567
26	-	-	-	-	550	840	1143	1245	(1)	3492	3350
28	-	-	-	-	600	855	1245	1346	-	4037	3880
30	-	-	-	-	650	880	1295	1397	-	4805	4785
32	-	-	-	-	664	915	1372	1524	-	5495	5380
34	-	-	-	-	770	950	1473	1626	-	6743	6310
36	-	-	-	-	731	995	1524	1727	-	7705	7280
40	-	-	-	-	807	1080	1753	1956	-	10325	9750
42	-	-	-	-	842	1140	1855	2083	-	12095	11485
48	-	-	-	-	972	1305	2134	2388	-	18420	17910

(1) In the sizes where model (CM) if gearbox is not indicated, this will be defined case by case (upon request).
(2) Indicated weights refers to the set of valve/gearbox where indicates the option lever or gearbox.

FULL PORT - ASME CLASS 300												
Size	A	B	C	H	H1	H2	L			OPERATOR	WEIGHT [kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	200	236	92	-	216	216	-	LEVER	17	13
3	-	-	600	300	120	-	283	283	-	LEVER	32	29
4	500	110	800/280	334	140	225	305	305	-	LEVER/CM6	68	60
6	500	110	900/280	732	160	264	403	457	-	LEVER/CM6	128	103
8	500	150	280	866	245	315	502	521	-	CM8	256	212
10	500	150	280	981	278	397	568	559	-	CM8	344	292
12	600	200	310	1168	315	471	648	635	-	CM16	680	590
14	600	200	310	1255	367	506	762	762	-	CM16	800	730
16	600	200	310	1368	420	566	834	838	-	CM16	1157	937
18	600	270	380	1502	450	662	914	914	-	CM32	1680	1475
20	600	270	380	1627	480	760	991	991	-	CM32	2035	1796
24	600	270	380	1705	515	804	1143	1143	-	CM32	3043	2691
26	-	-	-	-	547	830	1245	1245	1270	(1)	3795	3364
28	-	-	-	-	594	854	1346	1346	1372	-	4510	3996
30	-	-	-	-	650	880	1397	1397	1422	-	5427	4813
32	-	-	-	-	664	914	1524	1524	1553	-	6025	5400
34	-	-	-	-	700	950	1626	1626	1654	-	7120	6336
36	-	-	-	-	731	994	1727	1727	1756	-	8160	7307
40	-	-	-	-	807	1080	1930	1930	-	-	10790	9780
42	-	-	-	-	842	1140	2032	2032	-	-	12620	11514
48	-	-	-	-	972	1300	2337	2337	-	-	19000	17930

(1) In the sizes where model (CM) if gearbox is not indicated, this will be defined case by case (upon request).
(2) Indicated weights refers to the set of valve/gearbox where indicates the option lever or gearbox.

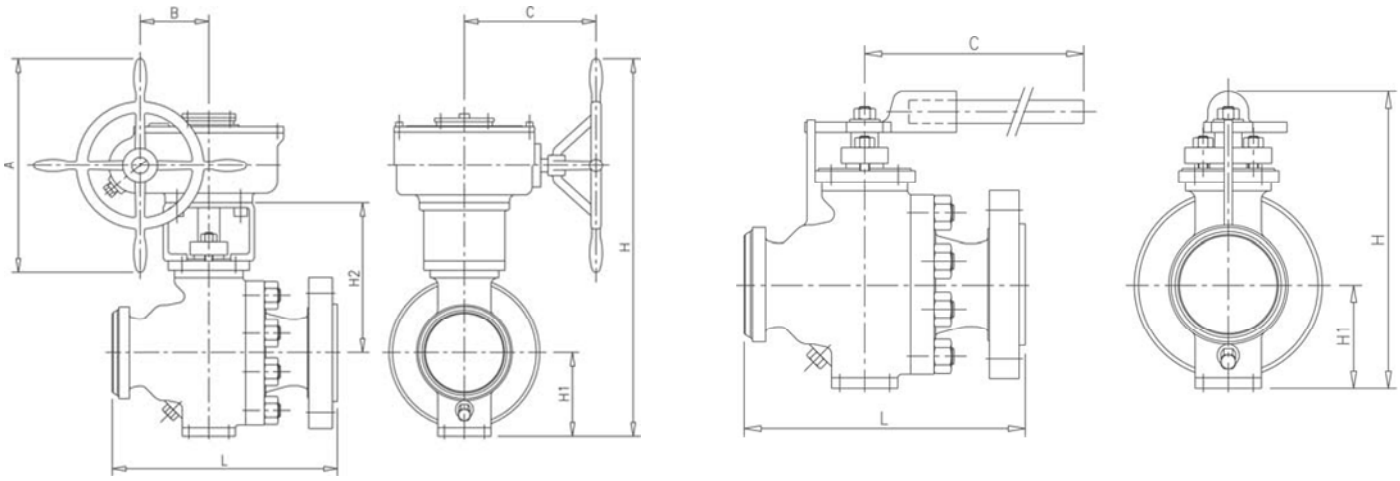


FULL PORT - ASME CLASS 600												
Size	A	B	C	H	H1	H2	L			OPERATOR	WEIGHT [kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	600	250	85	-	292	292	295	LEVER	32	23
3	-	-	700	320	130	-	356	356	359	LEVER	60	51
4	500	110	800/280	370	155	240	432	432	435	LEVER/CM 6	100	73
6	500	150	280	841	220	315	559	559	562	CM 8	256	211
8	500	150	280	939	278	355	660	660	664	CM 8	433	373
10	600	200	310	1145	312	451	787	787	791	CM 16	710	600
12	600	200	310	1278	375	521	838	838	841	CM 16	905	757
14	600	200	310	1468	415	671	889	889	892	CM 16	1220	1050
16	600	270	380	1505	470	647	991	991	994	CM 32	1690	1415
18	600	270	380	1622	500	734	1092	1092	1095	CM 32	2267	1995
20	600	270	380	1562	450	725	1194	1194	1200	CM 32	2873	2555
24	-	-	-	-	550	826	1397	1397	1407	(1)	3950	3455
26	-	-	-	-	582	854	1448	1448	1461	-	5090	4450
28	-	-	-	-	643	901	1549	1549	1562	-	6050	5550
30	-	-	-	-	691	924	1651	1651	1664	-	6660	6120
32	-	-	-	-	709	968	1778	1778	1794	-	7810	7310
34	-	-	-	-	751	1011	1930	1930	1946	-	8470	7520
36	-	-	-	-	771	1036	2083	2083	2099	-	10640	9490
40	-	-	-	-	847	1144	2083	2083	-	-	-	-
42	-	-	-	-	888	1199	2184	2184	-	-	-	-
48	-	-	-	-	1020	1401	2438	2438	-	-	-	-

(1) In the sizes where model (CM) if gearbox is not indicated, this will be defined case by case (upon request).
(2) Indicated weights refers to the set of valve/gearbox where indicates the option lever or gearbox.

FULL PORT - ASME CLASS 900												
Size	A	B	C	H	H1	H2	L			OPERATOR	WEIGHT [kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	600	286	116	-	368	368	371	LEVER	56	41
3	-	-	800	332	134	-	381	381	384	LEVER	71	60
4	500	110	1000/280	368	155	240	457	457	460	LEVER/CM 6	125	76
6	500	150	280	860	225	330	610	610	613	CM 8	360	276
8	500	150	280	990	305	380	737	737	740	CM 16	656	532
10	600	200	310	1175	320	473	838	838	841	CM 16	917	737
12	600	200	310	1300	375	541	965	965	968	CM 32	1255	1060
14	600	200	310	1333	370	580	1029	1029	1038	CM 32	1681	1337
16	600	270	380	1530	470	674	1130	1130	1140	CM 32	2175	2039
18	600	270	380	1620	500	734	1219	1219	1232	CM 32	3006	2428
20	-	-	-	-	479	746	1321	1321	1334	(1)	3596	2926
24	-	-	-	-	573	1223	1549	1549	1568	-	4430	4320
26	-	-	-	-	611	1262	1651	1651	1674	-	5500	4170
28	-	-	-	-	671	1340	1753	1753	1775	-	7180	5870
30	-	-	-	-	796	1367	1880	1880	1902	-	9220	7720

(1) In the sizes where model (CM) if gearbox is not indicated, this will be defined case by case (upon request).
(2) Indicated weights refers to the set of valve/gearbox where indicates the option lever or gearbox.



FULL PORT - ASME CLASS 1500												
Size	A	B	C	H	H1	H2	L			OPERATOR	WEIGHT [kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	700	286	116	-	368	368	371	LEVER	56	41
3	-	-	1000	360	155	-	470	470	473	LEVER	120	90
4	500	110	280	745	173	262	546	546	549	CM 6	210	180
6	500	150	280	940	275	360	705	705	711	CM 16	550	450
8	600	200	310	1160	327	450	832	832	841	CM 16	830	620
10	600	270	380	1230	311	530	991	991	1000	CM 32	1586	1236
12	600	270	380	1442	420	634	1130	1130	1146	CM 32	1876	1376
14	600	270	380	1442	400	675	1257	1257	1276	CM 32	2230	1530
16	600	270	380	1442	446	700	1384	1384	1407	CM 32	2760	1830
18	-	-	-	-	500	730	1537	1537	1555	(1)	5020	4220
20	-	-	-	-	531	793	1664	1664	1686	-	7060	6040
24	-	-	-	-	590	852	2043	2043	2071	-	10520	9300
28	-	-	-	-	690	965	2210	2210	2238	-	16870	16000
30	-	-	-	-	749	1030	-	-	2472	-	19700	-

(1) In the sizes where model (CM) if gearbox is not indicated, this will be defined case by case (upon request).
(2) Indicated weights refers to the set of valve/gearbox.

FULL PORT - ASME CLASS 2500												
Size	A	B	C	H	H1	H2	L			OPERATOR	WEIGHT [kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	800	335	140	-	451	451	454	LEVER	112	94
3	500	110	280	716	166	242	578	578	584	CM 6	258	218
4	500	150	280	805	213	285	673	673	683	CM 8	409	361
6	600	200	310	1082	296	404	914	914	927	CM 16	975	860
8	600	270	380	1100	300	474	1022	1022	1038	CM 32	1000	910
10	600	270	380	1100	317	541	1270	1270	1292	CM 32	1580	1070
12	-	-	-	-	365	633	1422	1422	1445	(1)	2060	1490

(1) In the sizes where model (CM) if gearbox is not indicated, this will be defined case by case (upon request).
(2) Indicated weights refers to the set of valve/gearbox.

"TRUNNION"
EST ball valve

- Bi-directional tight seal.
- "Double Block and Bleed".
- Energized seats.
- Bearings with permanent lubrication.
- Full bore.
- Internal pressure automatic relief.
- Resilient or metal-metal seal.
- General use or "Fire-Safe" construction.

Application:
EST trunnion ball valves, due to its "Double Block and Bleed" construction, are appropriate for operation under severe conditions in the areas of Oil, Petrochemical, storage and transfer of fluids, natural gas, corrosive services and general services. They operate under pressures up to 2500 psi with temperatures ranging from - 101ºC to + 600 ºC.

Construction standards:
Trunnion ball valves, model EST, are designed to comply with API 6D standard requirements in conduction of different types of fluids and processes, in services up to the class ANSI 2500.

- API 6D
- ASME/ANSI B16.5
- ASME/ANSI B16.10
- ASME/ANSI B16.25
- ASME/ANSI B16.34
MSS-SP 44
MSS-SP 72
- ISO 10497

The dimensions presented in this catalog, when not established by standards, are guiding sizes subject to changes without notice. Upon request, specific dimensional drawings may be provided for each order.

Construction

Rigid body
The body is built in two asymmetric pieces, cast, with homogeneous structure highly resistant to the line tensions. It may be built with flanges or with butt weld ends.

Ball and stem
The stem is of expulsion proof type and the fixation of the ball is carried out by means of two cylindrical pins. In the valves with metal-metal seal, the ball surface is coated with hard chromium or chemical nickel. The ball is supported by bearings with permanent lubrication.

Gasket
The stem gasket may be tightened while the valve is under pressure, and replaced without removing the actuator.

In special cases, "Chevron" gasket is used. In these cases, the replacement of the gasket requires the removal of actuator.

Sealing Seats
The seats are floating type, energized by springs that ensure constant tightness of the seal, even under low pressures. The seat design allows bi-directional sealing and complies with the "Double Block and Bleed" construction.

When the valve is closed, sealing occurs at both seats. The body cavity can be opened through relief/drain valve.

The seats are designed to allow automatic relief of internal pressure of the fluid retained between the ball and the body when reaching levels higher to the upstream or downstream fluid.

The seats can be metal seats coated with Stellite® or resilient. Upon order, they are supplied with sealant injection. Resilient seats are firmly encapsulated on metal seat support and therefore protected against abrasive particles of the fluid.

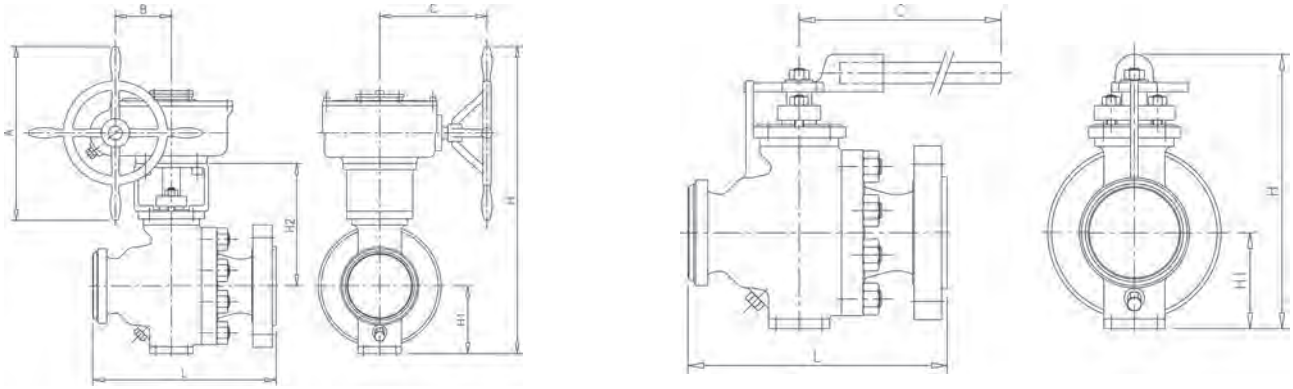
Grounding device
The valves are supplied with grounding devices that guarantee electric continuity between body, ball and stem.

Actuation
The valves can be operated by lever, steering wheel with reducer, electric or pneumatic actuator. They can feature an electro-pneumatic or pneumatic positioner, a solenoid valve, a limit switch and an inductive or magnetic proximity sensor, allowing automatic or remote control.

For valves featuring a lever, when operation safety is required, the valve may be provided with a locking device.

Maintenance
EST "Trunnion" ball valve needs to be removed from the line for occasional maintenance and seat replacement.

Upon removal of the reduction or lever, it is possible to identify the "open or closed" position of the valve installed in the line, by means of the stem key position, which indicates "open" if longitudinally in line with the piping, and "closed" if the stem key is perpendicular in relation to the piping.

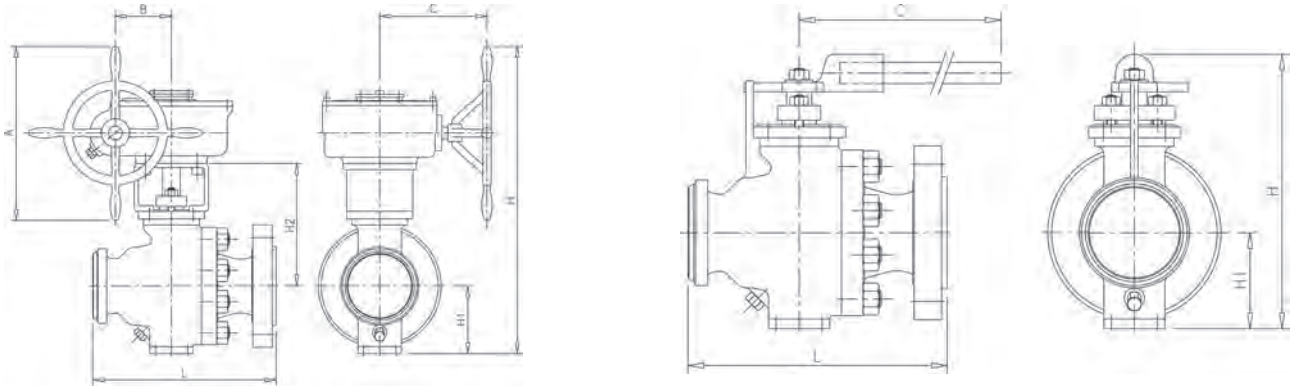


Full port series ANSI 150											
DIAMETER	A	B	C	H	H1	H2	L		OPERATION	Weight [Kg] (2)	
							RF	BW		RF	BW
2	-	-	200	236	92	-	178	216	Lever	12	9
3	-	-	600	300	125	-	203	283	Lever	17	14
4	500	110	800/280	334	140	225	229	305	Lever/Red. CM6	45	39
6	500	110	900/280	733	160	265	394	457	Lever/Red. CM6	132	76
8	500	150	280	846	225	315	457	521	Red.CM8	202	175
10	500	150	280	981	278	397	533	559	Red.CM8	300	290
12	600	200	310	1140	297	460	610	635	Red.CM16	420	380
14	600	200	310	1255	367	506	686	762	Red.CM16	573	533
16	600	200	310	1363	420	561	762	838	Red.CM16	790	730
18	600	200	310	1448	450	616	864	914	Red.CM16	1018	908
20	600	270	380	1638	510	740	914	991	Red.CM32	1530	1450
24	600	270	380	1828	600	840	1067	1143	Red.CM32	2740	2567
26	-	-	-	-	550	840	1143	1245	(1)	3492	3350
28	-	-	-	-	600	855	1245	1346	-	4037	3880
30	-	-	-	-	650	880	1295	1397	-	4805	4785
32	-	-	-	-	664	915	1372	1524	-	5495	5380
34	-	-	-	-	700	950	1473	1626	-	6743	6310
36	-	-	-	-	731	995	1524	1727	-	7705	7280
40	-	-	-	-	807	1080	1753	1956	-	10325	9750
42	-	-	-	-	842	1140	1855	2083	-	12095	11485
48	-	-	-	-	972	1305	2134	2388	-	18420	17910

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.

Full port series ANSI 300												
DIAMETER	A	B	C	H	H1	H2	L			OPERATION	Weight [Kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	200	236	92	-	216	216	-	Lever	17	13
3	-	-	600	300	120	-	283	283	-	Lever	32	29
4	500	110	800/280	334	140	225	305	305	-	Lever/Red. CM6	68	60
6	500	110	900/280	732	160	264	403	457	-	Lever/Red. CM6	128	103
8	500	150	280	866	245	315	502	521	-	Red.CM8	256	212
10	500	150	280	981	278	397	568	559	-	Red.CM8	344	292
12	600	200	310	1168	315	471	648	635	-	Red.CM16	680	590
14	600	200	310	1255	367	506	762	762	-	Red.CM16	800	730
16	600	200	310	1368	420	566	834	838	-	Red.CM16	1157	937
18	600	270	380	1502	450	664	914	914	-	Red.CM32	1680	1475
20	600	270	380	1627	480	760	991	991	-	Red.CM32	2035	1796
24	600	270	380	1705	515	804	1143	1143	-	Red.CM32	3043	2691
26	-	-	-	-	547	830	1245	1245	1270	(1)	3795	3364
28	-	-	-	-	594	854	1346	1346	1372	-	4510	3996
30	-	-	-	-	650	880	1397	1397	1422	-	5427	4813
32	-	-	-	-	664	914	1524	1524	1553	-	6025	5400
34	-	-	-	-	700	950	1626	1626	1654	-	7120	6336
36	-	-	-	-	731	994	1727	1727	1756	-	8160	7307
40	-	-	-	-	807	1080	1930	1930	-	-	10790	9780
42	-	-	-	-	842	1140	2032	2032	-	-	12620	11514
48	-	-	-	-	972	1300	2337	2337	-	-	19000	17930

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.

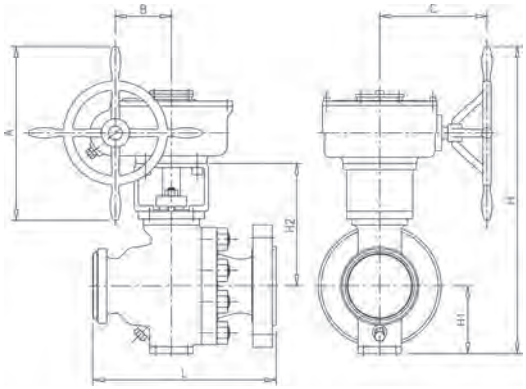


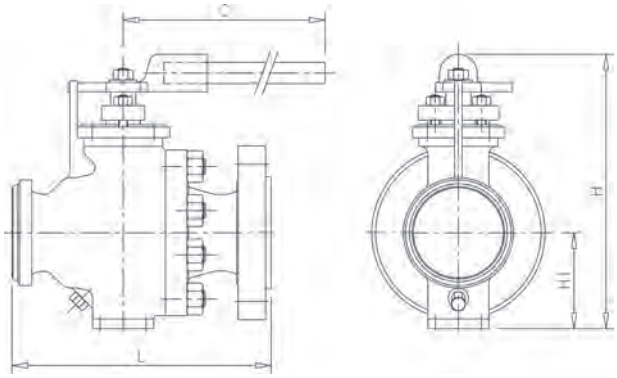
Full port series ANSI 600												
DIAMETER	A	B	C	H	H1	H2	L			OPERATION	Weight [Kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	600	250	85	-	292	292	295	Lever	32	23
3	-	-	700	320	130	-	356	356	359	Lever	60	51
4	500	110	800/280	370	155	240	432	432	435	Lever/Red. CM6	100	73
6	500	150	280	841	220	315	559	559	562	Red.CM8	256	211
8	500	150	280	939	278	355	660	660	664	Red.CM8	433	373
10	600	200	310	1145	312	451	787	787	791	Red.CM16	710	600
12	600	200	310	1278	375	521	838	838	841	Red.CM16	905	757
14	600	200	310	1468	415	671	889	889	892	Red.CM16	1220	1050
16	600	270	380	1505	470	647	991	991	994	Red.CM32	1690	1415
18	600	270	380	1622	500	734	1092	1092	1095	Red.CM32	2267	1995
20	600	270	380	1562	450	725	1194	1194	1200	Red.CM32	2873	2555
24	-	-	-	-	550	826	1397	1397	1407	(1)	3950	3455
26	-	-	-	-	582	854	1448	1448	1461	-	5090	4450
28	-	-	-	-	643	901	1549	1549	1562	-	6050	5550
30	-	-	-	-	691	924	1651	1651	1664	-	6660	6120
32	-	-	-	-	709	968	1778	1778	1794	-	7810	7310
34	-	-	-	-	751	1011	1930	1930	1946	-	8470	7520
36	-	-	-	-	771	1036	2083	2083	2099	-	10640	9490
40	-	-	-	-	847	1144	2083	2083	-	-	-	-
42	-	-	-	-	888	1199	2184	2184	-	-	-	-
48	-	-	-	-	1020	1401	2438	2438	-	-	-	-

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.

Full port series ANSI 900												
DIAMETER	A	B	C	H	H1	H2	L			OPERATION	Weight [Kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	600	286	116	-	368	368	371	Lever	56	41
3	-	-	800	332	134	-	381	381	384	Lever	71	50
4	500	110	1000/280	368	155	240	457	457	460	Lever/Red. CM6	125	76
6	500	150	280	860	225	330	610	610	613	Red. CM8	360	276
8	500	150	280	990	305	380	737	737	740	Red. CM16	656	532
10	600	200	310	1175	320	473	838	838	841	Red. CM16	917	737
12	600	200	310	1300	375	541	965	965	968	Red. CM32	1255	1060
14	600	200	310	1333	370	580	1029	1029	1038	Red. CM32	1681	1337
16	600	270	380	1530	470	674	1130	1130	1140	Red. CM32	2175	2039
18	600	270	380	1620	500	734	1219	1219	1232	Red. CM32	3006	2428
20	-	-	-	-	479	746	1321	1321	1334	(1)	3596	2926
24	-	-	-	-	573	1223	1549	1549	1568	-	4430	4320
26	-	-	-	-	611	1262	1651	1651	1674	-	5500	4170
28	-	-	-	-	671	1340	1753	1753	1775	-	7180	5870
30	-	-	-	-	796	1367	1880	1880	1902	-	9220	7720

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.





Full port series ANSI 1500												
DIAMETER	A	B	C	H	H1	H2	L			OPERATION	Weight [Kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	700	286	116	-	368	368	371	Lever	56	41
3	-	-	1000	360	155	-	470	470	473	Lever	120	90
4	500	110	280	745	173	262	546	546	549	Red.CM6	210	180
6	500	150	280	940	275	360	705	705	711	Red. CM16	550	450
8	600	200	310	1160	327	450	832	832	841	Red. CM16	830	620
10	600	270	380	1230	311	530	991	991	1000	Red. CM32	1586	1236
12	600	270	380	1442	420	634	1130	1130	1146	Red. CM32	1876	1376
14	600	270	380	1442	400	675	1257	1257	1276	Red.CM32	2230	1530
16	600	270	380	1442	446	700	1384	1384	1407	Red.CM32	2760	1830
18	-	-	-	-	500	730	1537	1537	1555	(1)	5020	4220
20	-	-	-	-	531	793	1664	1664	1686	-	7060	6040
24	-	-	-	-	590	852	2043	2043	2071	-	10520	9300
28	-	-	-	-	690	965	2210	2210	2238	-	16870	16000
30	-	-	-	-	749	1030	-	-	2472	-	19700	-

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weight refers to the valve/reductor set.

Full port series ANSI 2500												
DIAMETER	A	B	C	H	H1	H2	L			OPERATION	Weight [Kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	800	335	140	-	451	451	454	Lever	112	94
3	500	110	280	716	166	242	578	578	584	Red. CM6	258	218
4	500	150	280	805	213	285	673	673	683	Red. CM8	409	361
6	600	200	310	1082	296	404	914	914	927	Red. CM16	975	860
8	600	270	380	1100	300	474	1022	1022	1038	Red. CM32	1000	910
10	600	270	380	1100	317	541	1270	1270	1292	Red. CM32	1580	1070
12	-	-	-	-	365	633	1422	1422	1445	(1)	2060	1490

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weight refers to the valve/reductor set.

PENDULAR BALL VALVES

Symmetrical Model
with Metallic or Resilient seats
ANSI Class 150 diameter 1”... 14”
ANSI Class 300 diameter 1”... 14”

Full port ball valves for...
- Pulp and paper mass.
- Liquid, gases, mud and solids.
- Oil and hydrocarbons.
- Severe operation conditions.
- Control and block services.

The Symmetrical VEP valves have been designed for demanding process applications, being operational as control and block valves.The Symmetrical VEP valves can be used for:

- ***Pulp and paper mass***
- ***Liquid, gases, vapor, mud and solids, at high or low temperature of operation***
- ***Oil and hydrocarbons***

There is a wide range of construction variations appropriate for special applications

Constructive standards
The Symmetrical VEP valves are designed and constructed according to the standards:

ASME/ANSI B 16.5
ASME/ANSI B 16.10
ASME/ANSI B 16.34
MSS-SP 72

Characteristics of construction

Monolithic Ball
Absence of clearance and hysteresis.
The overdimensioned ball and stem form a single piece that ensures hysteresis-free operation. The monolithic construction of the ball ensures its perfect positioning and valve operation under the most severe operation conditions.

The inner part of the ball is concave for diameters greater than 3”, and cylindrical for smaller diameters.
The surface of the ball with seats made of stellite alloy is coated with hard chrome.
When used in abrasive works, the ball surface is coated with stellite alloy.

Rigid Body
The flanged spherical body is very resistant and can support all tensions caused by the piping. Both halves of the body are symmetrical and linked through a central flange, making the maintenance services easier. For abrasive fluids, the inner part of the valve inlet and outlet can be coated with stellite jacket.
The cavity between body and ball is minimal, which reduces impurities or product cumulated inside the valve.

Stellite Alloy Seats
The contact surface of the stellite alloy seats ensures appropriate tightness under the most severe service conditions.

PTFE Seats
The graphite PTFE seats are housed into channels in the body, and as such, they are duly protected against strange materials. The special seat profile ensures appropriate tightness even under low-pressure conditions.

Gasket
The stem gasket can be tightened with the valve under pressure, and replaced without removing the actuator.

Construction Options
VEP valves rely on the following construction features:
• ball coated with stellite alloy for abrasive applications.
• construction resistant to operational temperature up to 600°C.
• cryogenic construction for operational temperature ranging from 50°C to 200°C.
• scraper seats for encrusted products.

Valves Ready to Be Installed
KSB ball valves can be supplied with many kinds of specific actuators and accessories, such as positioners, limit switches*, solenoid valves, special actuation system.

*position monitors, proximity sensors, etc...

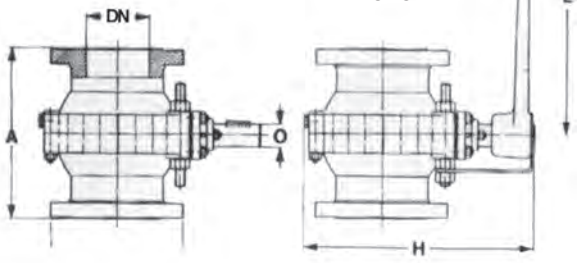


Fig. 1

Fig. 2

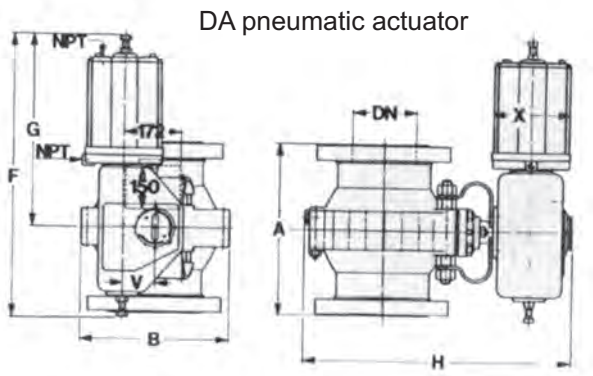


Fig. 3

CLASS ANSI 150
VALVE (Fig. 1)

VALVE WITH LEVER (Fig. 2)

Size in.	Type of valve	Dimensions			Valve weight, kg	Dimensions, mm	
		A	B	O		H	L
01″	VEP01	127	108	15	5	152	220
01½″	VEP01½	165	148	25	11	189	350
02″	VEP02	178	177	25	14	325	350
03″	VEP03	203	220	35	25	385	500
04″	VEP04	229	262	40	40	445	500
06″	VEP06	394	350	55	85	570	700
08″	VEP08	457	425	55	125	685	700
10″	VEP10	533	524	70	200	820	700
12″	VEP12	610	596	95	330	-	-
14″	VEP14	686	648	95	425	-	-

The maximum difference in operational pressure allowed through a completely closed valve is in line with ANSI B 16:34 Class 150.

VALVE WITH ACTUATOR (Fig. 3) (Fig. 4) (Fig. 5)

Type of valve	Pneu-matic	Valve with DA pneumatic actuator			Weight kg.	Pneu-matic with spring	Valve with RM pneumatic actuator			Weight kg.	Manual operator	Valve with CM manual control, with reducer						Weight kg.
		F	G	H			F	G	H			F	G	H	J	V	Z	
VEP01	DA1	400	260	280	11	RM1	560	420	428	20	-	-	-	-	-	-	-	-
VEP01½	DA1	400	260	333	17	RM1	560	420	481	26	-	-	-	-	-	-	-	-
VEP02	DA1	400	260	329	20	RM1	560	420	367	35	-	-	-	-	-	-	-	-
VEP02	DA2	455	315	347	24	RM2	650	490	386	45	-	-	-	-	-	-	-	-
VEP02	DA3	540	375	365	30	-	-	-	-	-	-	-	-	-	-		-	-
VEP03	DA2	455	315	392	35	RM1	560	420	412	46	CM6	310	195	424	260	110	400	31
VEP03	DA3	540	375	411	41	RM2	650	490	431	56	-	-	-	-	-	-	-	-
VEP03	DA4	635	445	447	56	RM3	800	620	467	82	-	-	-	-	-	-	-	-
VEP04	DA3	540	375	464	56	RM2	650	490	484	71	CM6	310	195	466	280	110	400	46
VEP04	DA4	635	445	500	71	RM3	800	620	520	96	-	-	-	-	-	-	-	-
VEP04	DA5	770	545	535	96	RM4	990	760	560	142	-	-	-	-	-	-	-	-
VEP06	DA4	635	445	599	118	RM3	800	620	619	143	CM8	370	238	564	335	148	500	102
VEP06	DA5	770	545	636	143	RM4	990	760	661	188	-	-	-	-	-	-	-	-
VEP06	DA6	840	575	653	150	RM5	1200	935	743	260	-	-	-	-	-	-	-	-
VEP06	DA7	1040	710	703	192	-	-	-	-	-	-	-	-	-	-	-		-
VEP08	DA5	770	545	750	185	RM4	990	760	775	230	CM8	370	228	640	372	148	500	144
VEP08	DA6	840	575	747	190	RM5	1200	935	837	300	-	-	-	-	-	-	-	-
VEP08	DA7	1040	710	797	232	RM6	1530	1200	917	452	-	-	-	-	-	-	-	-
VEP10	DA6	840	575	885	268	RM5	1200	935	975	378	CM16	465	280	784	454	196	600	238
VEP10	DA7	1040	710	910	317	RM6	1530	1200	1053	537	-	-	-	-	-	-	-	-
VEP10	DA8	1330	910	1014	443	-	-	-	-	-	-	-	-	-	-	-	-	-
VEP12	DA7	1040	710	1010	445	RM6	1530	1200	1130	665	CM32	465	280	946	856	490	196	385
VEP12	DA8	1330	910	1112	584	-	-	-	-	-	-	-	-	-	-	-	-	-
VEP14	DA8	1330	910	1188	682	RM7	1830	1410	1614	1340	CM32	-	-	-	-	-	-	-
VEP14	DA9	1660	1150	1288	845	-	-	-	-	-	-	-	-	-	-	-	-	-

Dimensions in mm

Pneumatic actuator RM with spring

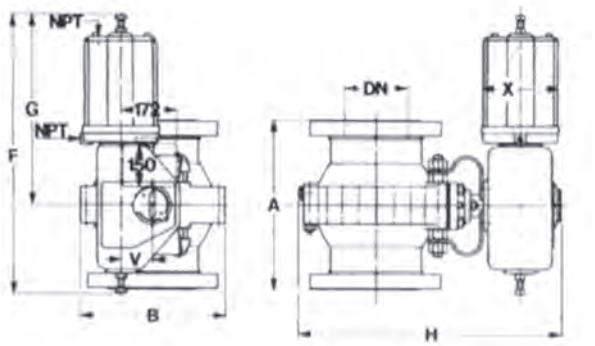


Fig. 4

CM manual control with reducer

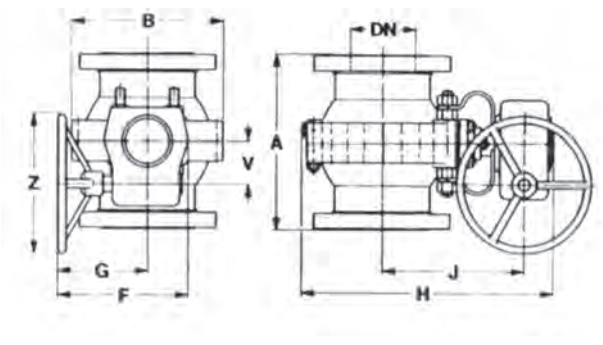


Fig. 5

CLASS ANSI 300
VALVE (Fig. 1)

VALVE WITH LEVER (Fig. 2)

Size in.	Type of valve	Dimensions			Valve weight, kg	Dimensions, mm	
		A	B	O		H	L
01″	VEP01	165	124	15	6	235	220
01½″	VEP01½	190	160	25	13	315	350
02″	VEP02	216	178	25	16	325	350
03″	VEP03	283	220	35	36	385	500
04″	VEP04	305	263	40	58	445	500
06″	VEP06	403	368	55	118	575	700
08″	VEP08	502	454	70	195	695	700
10″	VEP10	568	558	85	320	-	-
12″	VEP12	648	630	95	470	-	-

The maximum difference of operational pressure allowed through a completely closed valve is in line with the curve shown in figures 6 and 7.

VALVE WITH ACTUATOR (Fig. 3) (Fig. 4) (Fig. 5)

Type of valve	Pneu-matic	Valve with DA pneumatic actuator			Weight kg.	Pneu-matic with spring	Valve with RM pneumatic actuator			Weight kg.	Manual operator	Valve with CM manual control, with reducer						Weight kg.
		F	G	H			F	G	H			F	G	H	J	V	Z	
VEP01	DA1	400	260	280	16	RM1	560	420	428	25	-	-	-	-	-	-	-	-
VEP01½	DA1	400	260	333	24	RM1	560	420	481	33	-	-	-	-	-	-	-	-
VEP01½	DA2	455	315	341	26	RM2	650	490	500	45	-	-	-	-	-	-	-	-
VEP02	DA1	400	260	342	27	RM1	560	420	490	37	-	-	-	-	-	-	-	-
VEP02	DA2	455	315	350	32	RM2	650	490	509	50	-	-	-	-	-	-	-	-
VEP02	DA3	540	375	369	38	RM3	800	620	585	75	-	-	-	-	-	-	-	-
VEP03	DA2	455	315	395	53	RM2	650	490	554	65	CM6	310	195	458	276	110	400	45
VEP03	DA3	540	375	414	59	RM3	800	620	630	90	-	-	-	-	-	-	-	-
VEP03	DA4	635	445	450	74	RM4	990	760	670	130	-	-	-	-	-	-	-	-
VEP03	DA5	770	545	485	99	-	-	-	-	-	-	-	-	-	-	-	-	-
VEP04	DA4	635	445	504	90	RM3	800	620	684	110	CM6	310	195	500	298	110	400	73
VEP04	DA5	770	545	539	115	RM4	990	760	724	150	-	-	-	-	-	-	-	-
VEP04	DA6	840	575	558	120	RM5	1200	935	848	220	-	-	-	-	-	-	-	-
VEP06	DA5	770	545	656	180	RM4	990	760	841	215	CM8	370	228	582	344	148	500	140
VEP06	DA6	840	575	675	185	RM5	1220	935	965	285	-	-	-	-	-	-	-	-
VEP06	DA7	1040	710	723	230	RM6	1530	1200	1093	440	-	-	-	-	-	-	-	-
VEP06	DA8	1330	910	825	355	RM7	1830	1410	1217	830	-	-	-	-	-	-	-	-
VEP08	DA6	840	575	775	275	RM5	1200	935	1065	375	CM16	465	280	715	420	196	600	250
VEP08	DA7	1040	710	823	320	RM6	1530	1200	1193	530	-	-	-	-	-	-	-	-
VEP08	DA8	1330	910	925	445	RM7	1830	1410	1317	920	-	-	-	-	-	-	-	-
VEP10	DA7	1040	710	942	430	RM6	1530	1200	1312	640	CM16	465	280	820	472	196	600	380
VEP10	DA8	1330	910	1044	555	RM7	1830	1410	1436	1035	-	-	-	-	-	-	-	-
VEP12	DA7	1040	710	1031	570	RM6	1530	1200	1401	780	CM16	465	280	890	508	196	600	530
VEP12	DA8	1330	910	1133	695	RM7	1830	1410	1525	1175	-	-	-	-	-	-	-	-

Dimensions em mm

"TOP ENTRY"
VET ball valve

- Bi-directional.
- “Double Block and Bleed”.
- Energized seats.
- “Trunnion” mounting.
- Bearings with permanent lubrication.
- Internal automatic relief.
- Easily reparable in the line even when welded to the piping.
- General use or “fire-safe” construction.

Application:
Usually applied in Oil and Natural Gas-related services. Due to its constructive characteristics and easy maintenance, it is the most appropriate to be welded to aerial or underground piping.

Construction standards:
“Top Entry” ball valves, VET model, comply with API 6D standard requirements and others mentioned below, being built with materials compatible with most fluids, gases or liquids, mainly in the production and distribution of oil and by-products.

- API 6D
- ASME/ANSI B16.5
- ASME/ANSI B16.10
- ASME/ANSI B16.25
- ASME/ANSI B16.34
MSS-SP 44
MSS-SP 72
- ISO 10497

The dimensions presented in this catalog, when not established by standards, are guiding sizes subject to changes without notice. Upon request, specific dimensional drawings may be provided for each order.

Construction

Rigid body
The body is cast in one piece, resistant to the piping tensions. It may be built with flanges or with butt weld ends.

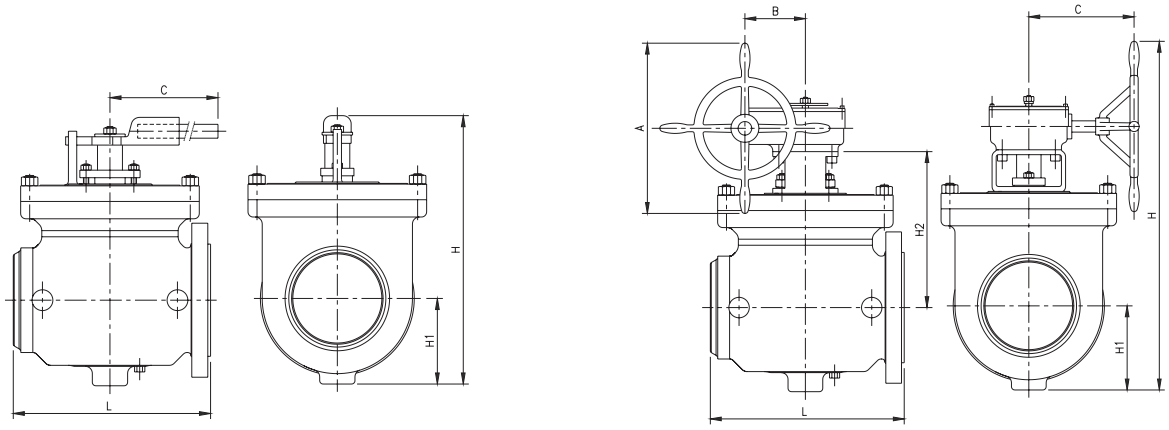
Ball and stem
The ball relies on monolithic construction, ball stem and lower shaft, in one piece up to 8". In larger sizes, the stem is separated and mounted on the ball by means of cylindrical pins. The stem mounting is of expulsion proof type. In the valves with metal-metal seal, the ball surface is coated with hard chromium or chemical nickel. In all cases, the balls are supported by bearings with permanent lubrication.

Sealing Seats
The seats are floating type, energized by springs that ensure constant tightness of the seal, even under low pressures. The seat design allows bi-directional sealing and complies with the "Double Block and Bleed" construction; when the valve is closed, sealing occurs at both seats (the body cavity can be opened to the atmosphere through relief/drain valve, as required).
The seats are designed to allow automatic relief of internal pressure in the body.
The seats can be metal seats coated with Stellite® or resilient; upon order, they are supplied with sealant injection. Resilient seats are firmly encapsulated on metal seat support and therefore protected against abrasive particles of the fluid.

Grounding device
The valves featuring resilient seats are supplied with a grounding device that guarantees electric continuity between body, ball and stem.

Actuation
The valves can be operated by lever, steering wheel with reducer, electric or pneumatic actuator. They can feature a positioner, a solenoid valve, a limit switch and a proximity sensor, whether inductive or magnetic, allowing automatic or remote control.

Maintenance
“Top Entry” ball valve does not need to be removed from the line for occasional maintenance. The replacement of the sealing seats is accomplished after removal of the cap and utilization of retreat system of seats for ball removal.
Upon removal of the reduction gear or lever gear, the position "open or closed" will be identified through the stem key position: open valve - key aligned with the piping; closed valve key perpendicular in relation to the piping.

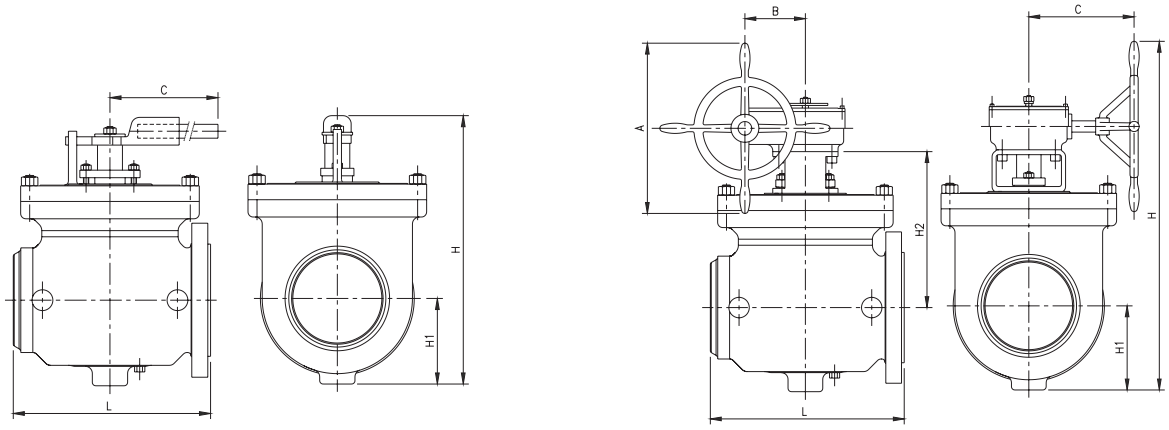


Full port series ANSI 150											
DIAMETER	A	B	C	H	H1	H2	L		OPERATION	Weight [Kg] (2)	
							RF	BW		RF	BW
2	-	-	200	272	97	-	178	216	Lever	35	32
3	-	-	600	340	120	-	203	283	Lever	65	62
4	500	110	800/280	700	130	280	229	305	Lever/Red. CM6	135	130
6	500	110	900/280	803	163	330	394	457	Lever/Red. CM6	221	213
8	500	150	280	910	215	390	457	521	Red.CM8	385	358
10	500	150	280	996	255	435	533	559	Red.CM8	532	520
12	600	200	420	1150	310	458	610	635	Red.CM16	710	670
14	600	200	420	1210	328	500	686	762	Red.CM16	930	890
16	600	200	480	1383	370	630	762	838	Red.CM16	1230	1170
18	600	200	540	1505	394	680	864	914	Red.CM16	1545	1435
20	600	270	580	1627	480	760	914	991	Red.CM32	2066	1986
24	600	270	700	1705	515	804	1067	1143	Red.CM32	2990	2816
26	-	-	-	-	547	830	1143	1245	(1)	3500	3360
28	-	-	-	-	594	855	1245	1346	-	4050	3890
30	-	-	-	-	650	880	1295	1397	-	4815	4800
32	-	-	-	-	664	915	1372	1524	-	5510	5390
34	-	-	-	-	700	950	1473	1626	-	6750	6320
36	-	-	-	-	731	995	1524	1727	-	7720	7290
40	-	-	-	-	807	1080	1753	1956	-	10340	9760
42	-	-	-	-	842	1140	1855	2083	-	12100	11500
48	-	-	-	-	972	1305	2134	2388	-	18430	17920

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.

Full port series ANSI 300											
DIAMETER	A	B	C	H	H1	H2	L		OPERATION	Weight [Kg] (2)	
							RF	BW		RF	BW
2	-	-	200	272	97	-	216	216	Lever	36	32
3	-	-	600	340	120	-	283	283	Lever	67	64
4	500	110	800/280	700	130	280	305	305	Lever/Red. CM6	137	131
6	500	110	900/280	803	163	330	403	457	Lever/Red. CM6	238	213
8	500	150	280	910	215	390	502	521	Red.CM8	403	360
10	500	150	280	996	255	435	568	559	Red.CM8	588	530
12	600	200	420	1150	310	458	648	635	Red.CM16	760	670
14	600	200	420	1210	328	500	762	762	Red.CM16	970	825
16	600	200	480	1383	370	630	838	838	Red.CM16	1430	1210
18	600	270	540	1540	394	700	914	914	Red.CM16	1816	1611
20	600	270	580	1627	480	760	991	991	Red.CM32	2171	1932
24	600	270	700	1705	515	804	1143	1143	Red.CM32	3180	2827
26	-	-	-	-	547	830	1245	1245	(1)	3800	3370
28	-	-	-	-	594	854	1346	1346	-	4520	4000
30	-	-	-	-	650	880	1397	1397	-	5440	4820
32	-	-	-	-	664	914	1524	1524	-	6040	5410
34	-	-	-	-	700	950	1626	1626	-	7130	6345
36	-	-	-	-	731	994	1727	1727	-	8170	7320
40	-	-	-	-	807	1080	1930	1930	-	10600	9790
42	-	-	-	-	842	1140	2032	2032	-	12630	11525
48	-	-	-	-	972	1300	2337	2337	-	19000	17940

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.

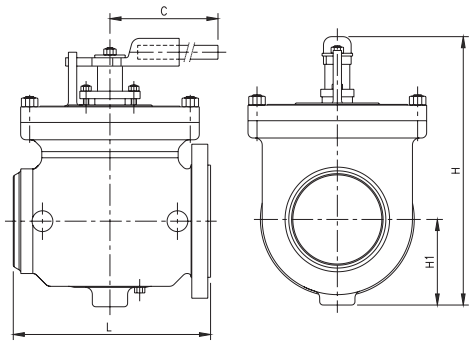


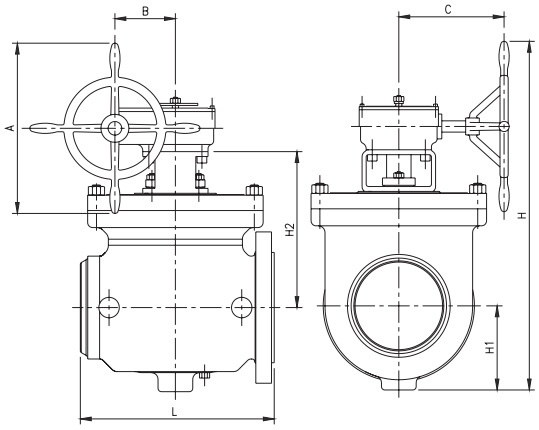
Full port series ANSI 600												
DIAMETER	A	B	C	H	H1	H2	L			OPERATION	Weight [Kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	600	290	97	-	292	292	295	Lever	43	34
3	-	-	700	340	105	-	356	356	359	Lever	80	70
4	500	110	800/280	680	130	260	432	432	435	Lever/Red. CM6	180	155
6	500	150	330	836	180	350	559	559	562	Red.CM8	290	245
8	500	150	330	906	210	390	660	660	664	Red.CM8	460	400
10	600	200	390	1163	300	480	787	787	791	Red.CM16	790	680
12	600	200	390	1237	342	513	838	838	841	Red.CM16	985	837
14	600	200	440	1276	353	540	889	889	892	Red.CM16	1300	1130
16	600	270	490	1411	390	633	991	991	994	Red.CM32	1690	1415
18	600	270	540	1485	432	665	1092	1092	1095	Red.CM32	2267	1995
20	600	270	540	1562	450	725	1194	1194	1200	Red.CM32	2873	2555
24	-	-	-	-	550	826	1397	1397	1407	(1)	3950	3435
26	-	-	-	-	582	854	1448	1448	1461	-	5090	4450
28	-	-	-	-	643	901	1549	1549	1562	-	6050	5550
30	-	-	-	-	691	924	1651	1651	1664	-	6660	6120
32	-	-	-	-	709	968	1778	1778	1794	-	7810	7310
34	-	-	-	-	751	1011	1930	1930	1946	-	8470	7520
36	-	-	-	-	771	1036	2083	2083	2099	-	10640	9490
40	-	-	-	-	847	1144	2083	2083	-	-	-	-
42	-	-	-	-	888	1199	2184	2184	-	-	-	-
48	-	-	-	-	1020	1401	2438	2438	-	-	-	-

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.

Full port series ANSI 900												
DIAMETER	A	B	C	H	H1	H2	L			OPERATION	Weight [Kg] (2)	
							RF	BW	RTJ		RF/RTJ	BW
2	-	-	600	290	97	-	368	368	371	Lever	60	45
3	-	-	800	350	120	-	381	381	384	Lever	93	72
4	500	110	1000/280	700	125	280	457	457	460	Lever/Red. CM6	210	160
6	500	150	330	860	200	355	610	610	613	Red.CM8	410	326
8	500	150	390	926	230	390	737	737	740	Red.CM16	597	473
10	600	200	390	1190	311	496	838	838	841	Red.CM16	885	705
12	600	200	440	1250	330	538	965	965	968	Red.CM32	1255	1060
14	600	200	440	1333	370	580	1029	1029	1038	Red.CM32	1681	1337
16	600	270	490	1455	412	655	1130	1130	1140	Red.CM32	2136	1736
18	600	270	540	1550	462	702	1219	1219	1232	Red.CM32	3000	2430
20	-	-	-	-	479	746	1321	1321	1334	(1)	3600	2930
24	-	-	-	-	573	1223	1549	1549	1568		4430	4320
26	-	-	-	-	611	1262	1651	1651	1674	-	5500	4170
28	-	-	-	-	671	1340	1753	1753	1775	-	7180	5870
30	-	-	-	-	796	1367	1880	1880	1902	-	9220	7720

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weights refer to the set of valve/reductor where indicates the options lever/reductor.





Full port series ANSI 1500												
DIAMETER	A	B	C	H	H1	H2	L RF	L BW	L RTJ	OPERATION	Weight [Kg] (2) RF/RTJ	Weight [Kg] (2) BW
2	-	-	700	290	97	-	368	368	371	Lever	62	45
3	-	-	1000	370	135	-	470	470	473	Lever	120	90
4	500	110	280	765	165	292	546	546	549	Red.CM6	230	170
6	500	200	390	846	185	355	705	705	711	Red.CM16	550	450
8	600	200	390	1043	230	430	832	832	841	Red.CM16	830	620
10	600	270	490	1230	311	530	991	991	1000	Red.CM32	1586	1236
12	600	270	490	1335	353	595	1130	1130	1146	Red.CM32	1876	1376
14	600	270	540	1400	396	675	1257	1257	1276	Red.CM32	2230	1530
16	600	270	540	1550	446	700	1384	1384	1407	Red.CM32	2760	1830
18	-	-	-	-	500	730	1537	1537	1555	(1)	5020	4220
20	-	-	-	-	531	793	1664	1664	1686	-	7060	6040
24	-	-	-	-	590	852	2043	2043	2071	-	10520	9300
28	-	-	-	-	690	965	2210	2210	2238	-	16870	16000
30	-	-	-	-	749	1030	-	-	2472	-	19700	-

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weight refers to the valve/reductor set.

Full port series ANSI 2500												
DIAMETER	A	B	C	H	H1	H2	L RF	L BW	L RTJ	OPERATION	Weight [Kg] (2) RF/RTJ	Weight [Kg] (2) BW
2	-	-	800	310	106	-	451	451	454	Lever	75	57
3	500	110	280	720	140	272	578	578	584	Red.CM6	186	146
4	500	150	330	800	178	315	673	673	683	Red.CM8	268	220
6	600	200	390	975	193	403	914	914	927	Red.CM16	687	572
8	600	270	540	1000	242	474	1022	1022	1038	Red.CM32	978	738
10	600	270	540	1200	317	541	1270	1270	1292	Red.CM32	1580	1070
12	-	-	-	-	365	633	1422	1422	1445	(1)	2060	1490

(1) - In the sizes where the model(CM) of the reducer is not indicated, this will be defined case by case. (upon request)
(2) - The indicated weight refers to the valve/reductor set.

Technology that **makes its mark**

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