



Cryogenic Butterfly Valve

Technical brochure

COMPANY PROFILE

AMPO is an **international leader** in highly engineered valves for the most severe applications and industries as well as in stainless steel and high alloy castings.

Through our AMPO SERVICE team **we guarantee a prompt** response to customer needs wherever they are throughout the world: technical support in start-up stages, equipment selection, predictive and preventive maintenance, training, etc.



Fully inhouse manufacturing process



Worldwide references



Project based on people



Innovative spirit



700+ people



In more than 60 countries



Most important partners in the industry



Cutting edge technologies



Our commitment: the best service



Customer focus



Since 1964



American Petroleum Institute
Certificate No. 91-1170
Certificate No. 91-1167



APPLICATION

Cryogenic service valves main applications are focused in LNG and LPG terminals and transportation ships. AMPO manufactures valves for the **complete LNG and LPG chain**, as gas is obtained from gas cameras, transportation pipelines, liquefaction, carrier vessels, FPSO's, regasification terminals, peak saving plants, storage tanks, etc. Moreover, our valves are also used for low temperatures, offering the best solution for applications such as: **Ethylene, Oxygen, Nitrogen, petrochemical plants, special processes on refineries, etc.**

As a result of over 30 years of experience in the manufacturing of cryogenic valves, AMPO POYAM VALVES is the leading manufacturer of high specification valves for the LNG market, especially with top entry or split body cryogenic ball valves, cryogenic gate, globe and check valves as well as cryogenic triple eccentric butterfly valves.



CRYOGENIC TRIPLE ECCENTRIC BUTTERFLY VALVE



BUTTERFLY VALVE

CHARACTERISTICS

Sizes: 8" up to 72"

Pressure: 150 LBS up to 600 LBS

Temperature: Down to -196°C

Design types: Side Entry and Double Flange

Standards: API609

Cryogenic service bonnet length as per BS6364 & MESC SPE 77/200

Fire Safe certificate as per API 607

Shell and Seat testing procedure as per API 598

Materials: CF3, CF3M, CF8, CF8C, CF8M, CK-3MCUN, ...

Seals: Seats:

Soft Seat in PCTFE material

Metallic Laminar Seat (Steel & Graphite)

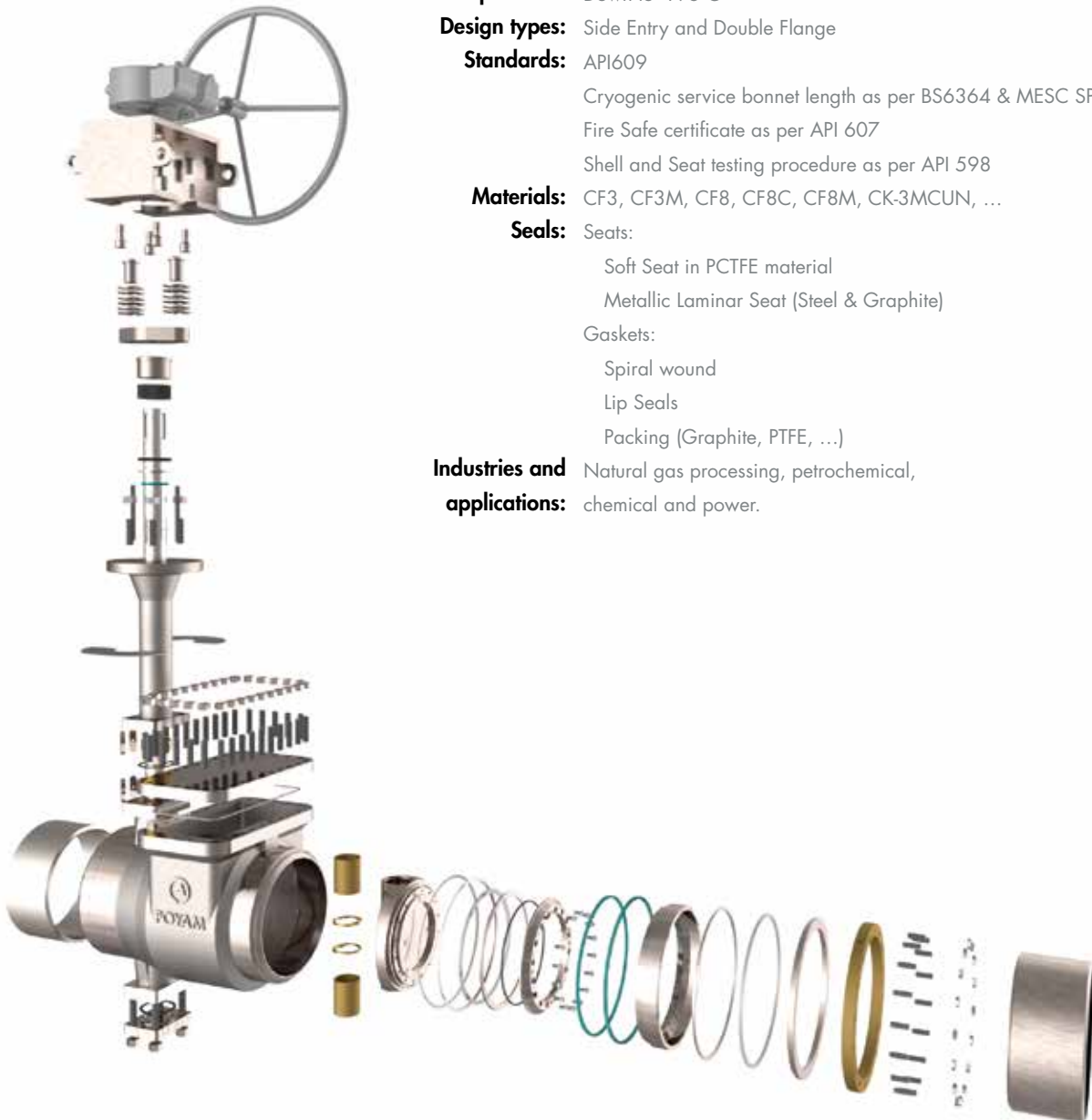
Gaskets:

Spiral wound

Lip Seals

Packing (Graphite, PTFE, ...)

Industries and applications: Natural gas processing, petrochemical, chemical and power.



WHY CHOOSE OUR CRYOGENIC BUTTERFLY VALVE?

Floating seat design that achieves **A REAL BI-DIRECTIONAL TIGHTNESS.**



Geometric design of sealing components provides friction-free stroking throughout the valve. This **EXTENDS THE VALVE LIFE.**



ZERO LEAKAGE with preferential and non-preferential flow



LOW FUGITIVE EMISSIONS due to quarter turn technology.



Low end to close torque
▶ **COST SAVING** in operation systems.

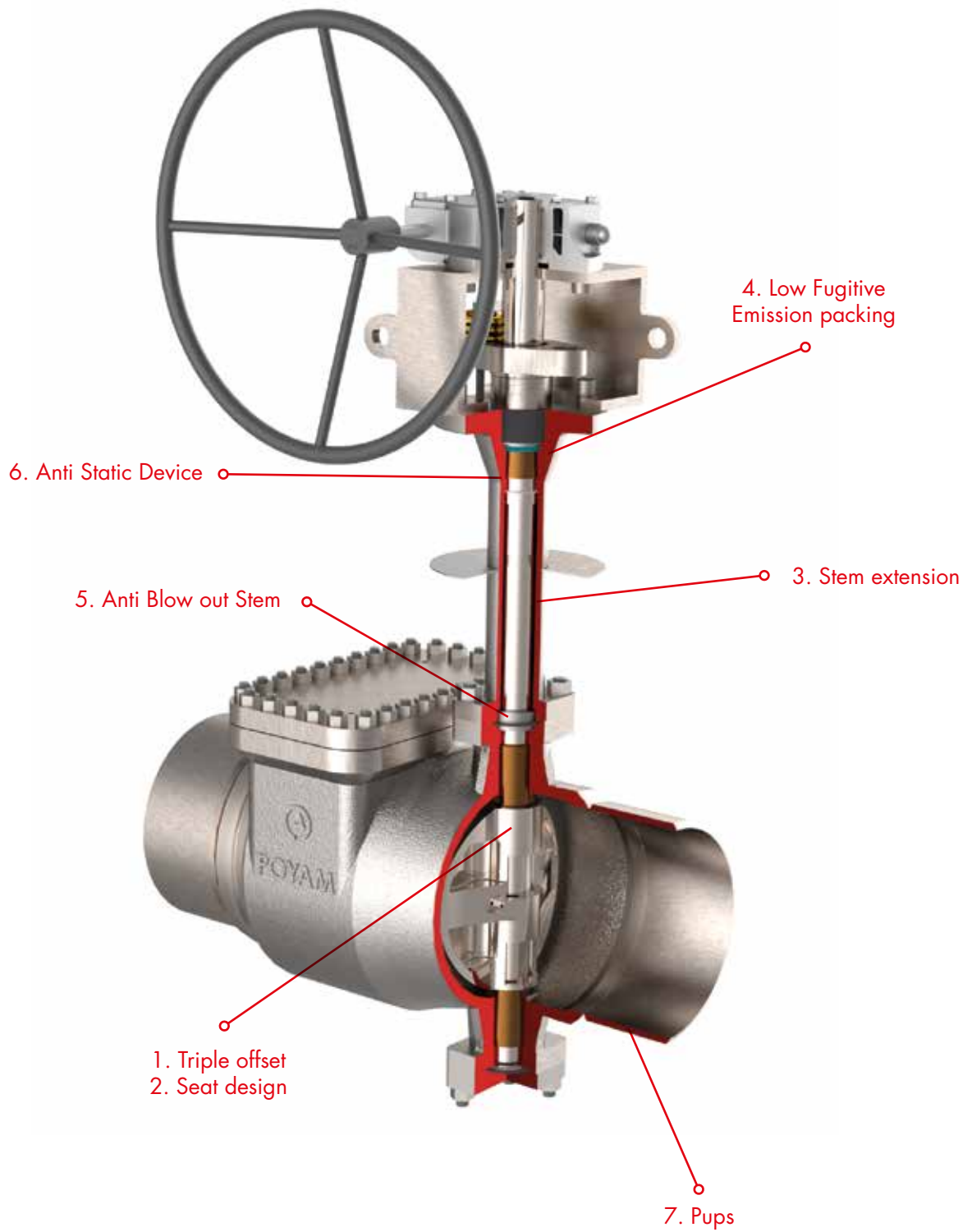


EASY MAINTENANCE:

- Side entry valve maintenance tasks can be done with the valve in line.
- The disc is not disassembled from the valve for seal replacement.
- Fast replacement of internals from side window (side entry).
- Whole disc can be disassembled if needed with the valve in line (side entry).
- Robust design for maintenance works: Pins are not used for torque transmission from stem to disc.



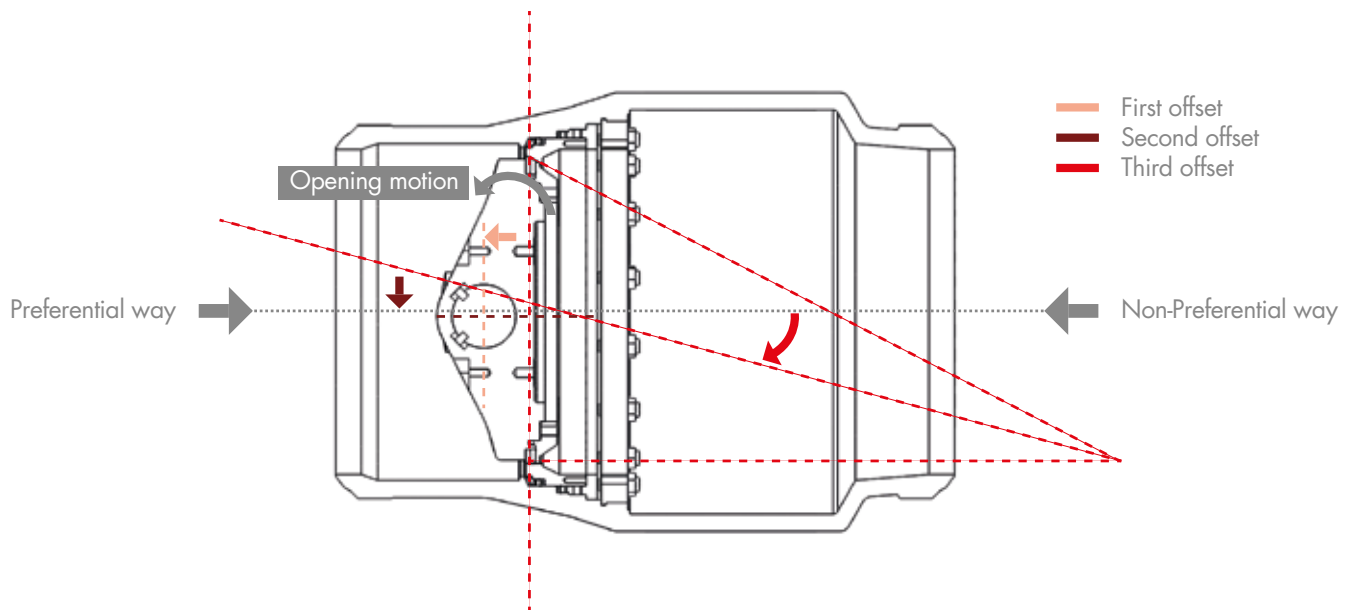
TECHNICAL FEATURES



1. TRIPLE OFFSET:

Nowadays, high performance applications in demanding temperature and pressure process conditions are required. As far as the use of tough plastic or metallic seals is required to withstand flow conditions, AMPO POYAM cryogenic butterfly valve design shall be provided with "offsets" in order to prevent excessive operation interference between seat and seal.

This makes the design of the sealing device to be non-symmetric and to provide a different sealing capability depending on the flow direction. On the following picture are represented the three offsets that are provided in our triple eccentric cryogenic butterfly valves:



2. SEAT DESIGN

AMPO POYAM VALVES has developed a new seat design concept. Each and every customer knows that one of the first problems to be solved is the motion of the disc due to the differential pressure in both directions. Manufacturers providing bidirectional shutoff with a double eccentric design tends to use complex metallic seals provided with structural flexibility and fixed to the body. Some other manufacturers try by means of a triple eccentric design with

a laminar seal, fixed sometimes to the body and sometimes to the disc, and providing a high closing torque in order to compensate disc motion when pressure is being applied in non-preferential way.

On following figure 1 and 2 can be seen this effect when pressure is pushing the seat with a preferential and non-preferential flow:

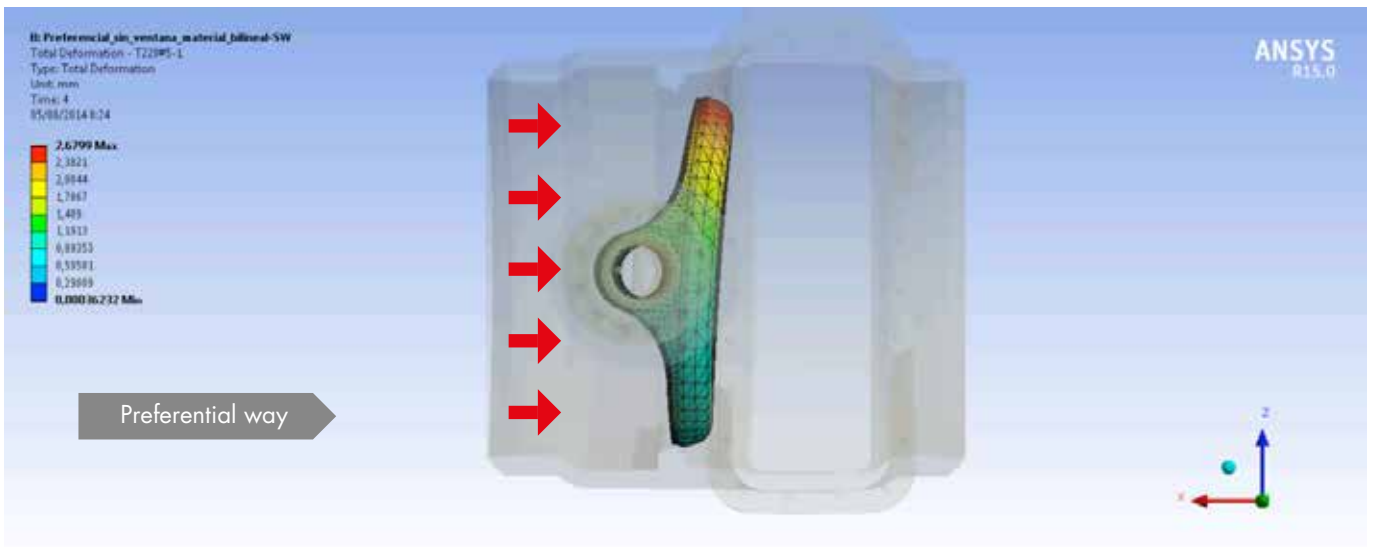


Figure 1

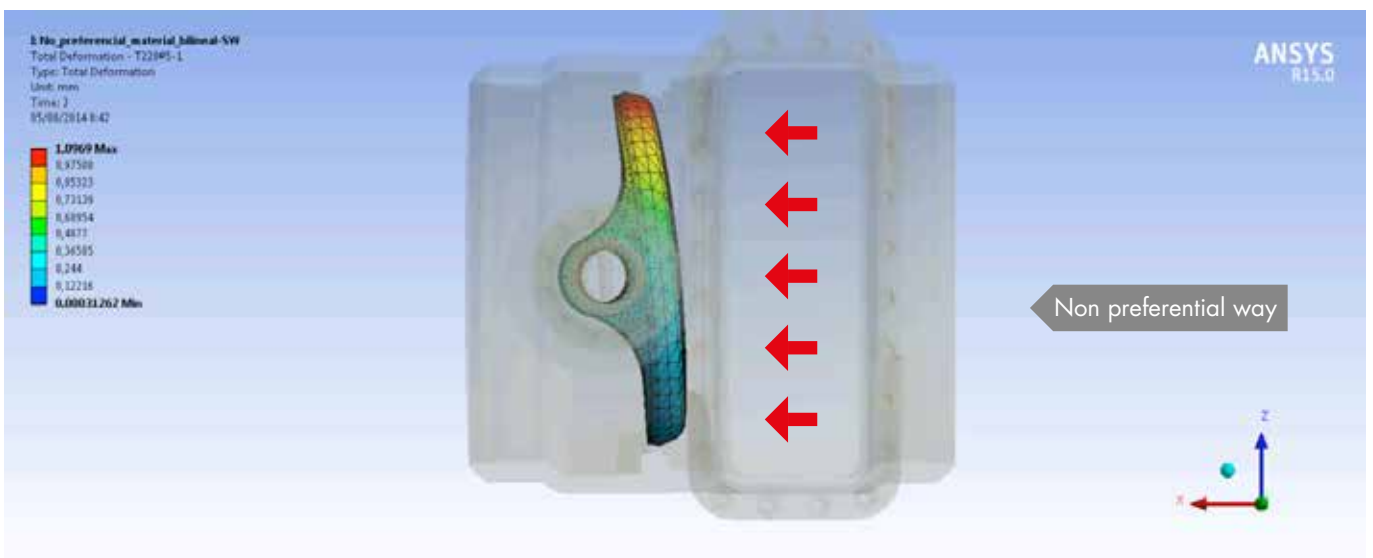
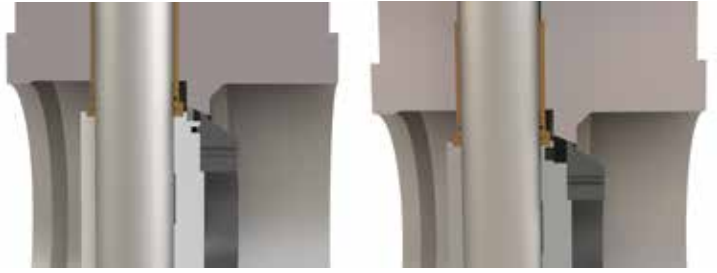


Figure 2

AMPO POYAM VALVES proposal is a triple eccentric design with an in house manufactured resilient seal provided with best sealing capabilities in cryogenic application. This seal shall be fixed to the disc and body shall be provided with a floating seat (which is hard-faced for metallic type seats) that is able to

compensate disc motion in non-preferential way, in such a way that high operating torques to close the valve are no longer needed. This new seat design is based on the Ball valve sealing concept.



Floating seat: (new sealing)

Integral seat:



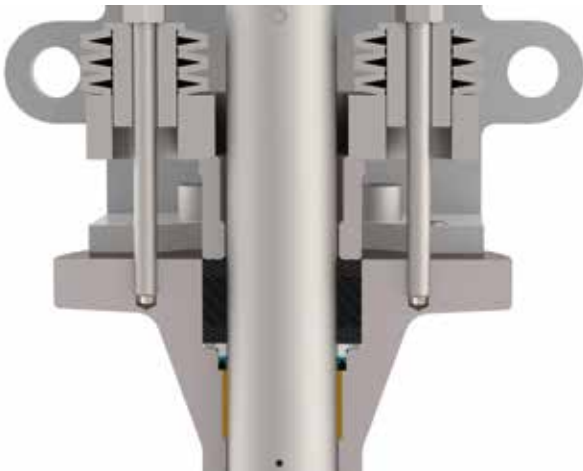
3. STEM EXTENSION:

Cryogenic application requires an extended bonnet design. AMPO POYAM VALVES follows bonnet length as per MESG SPE 77/200.



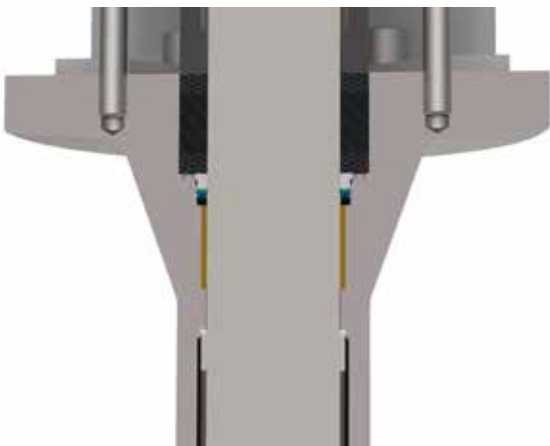
4. LOW FUGITIVE EMISSION PACKING:

Lip seal ring and packing rings are provided to avoid any emission to the atmosphere. Furthermore, life load packing option is available.



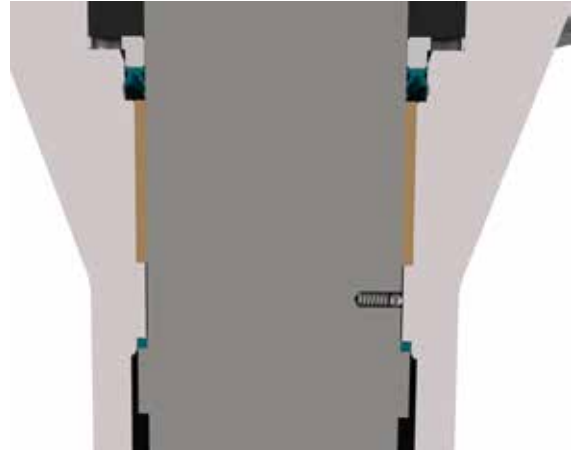
5. ANTI BLOW OUT STEM:

All our valves are designed with a shouldered stem to prevent the stem, under certain operating conditions could blow out. Furthermore, in the event of the gland being removed while the valve is under pressure, stem will never blow out of the body.



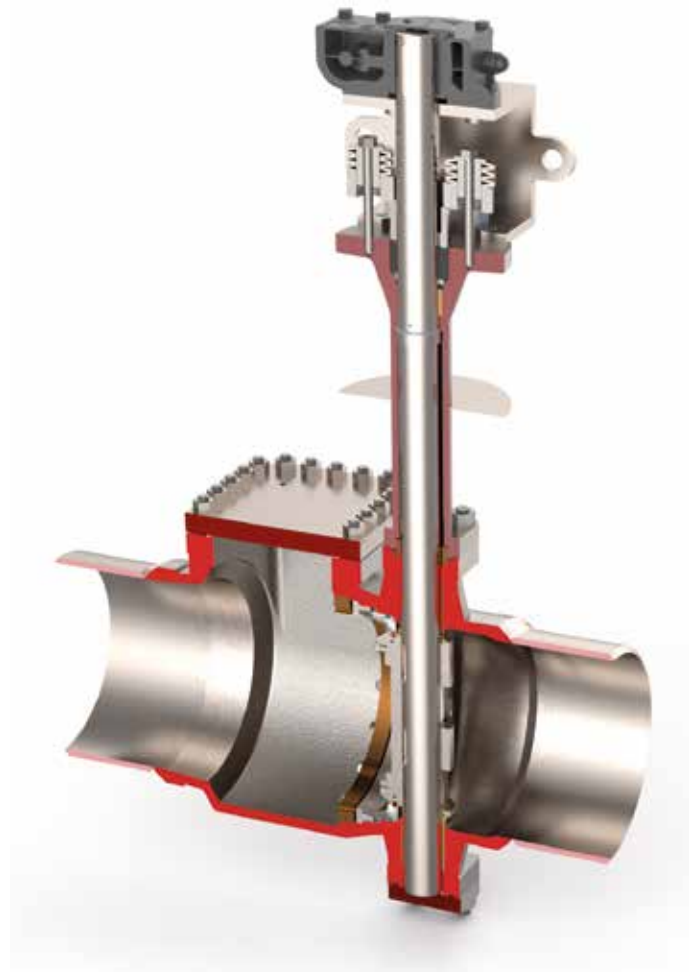
6. ANTI-STATIC DEVICE:

The electrical continuity between all metallic components of body and trim is achieved by an anti-static spring loaded device.



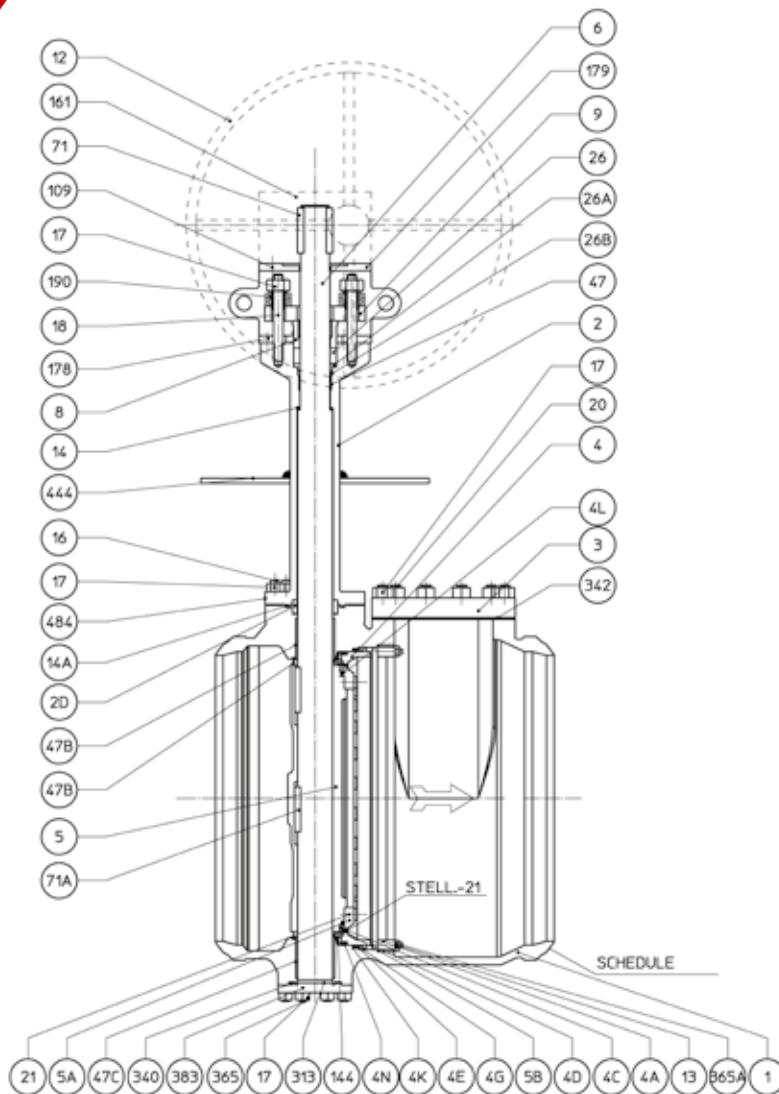
7. PUPS:

Transition pieces are available for butt weld end valves in order to avoid any possible damage of sealing components during the welding activities at site.



MATERIAL SELECTION

SIDE ENTRY DESIGN (Floating seat) Sample drawing

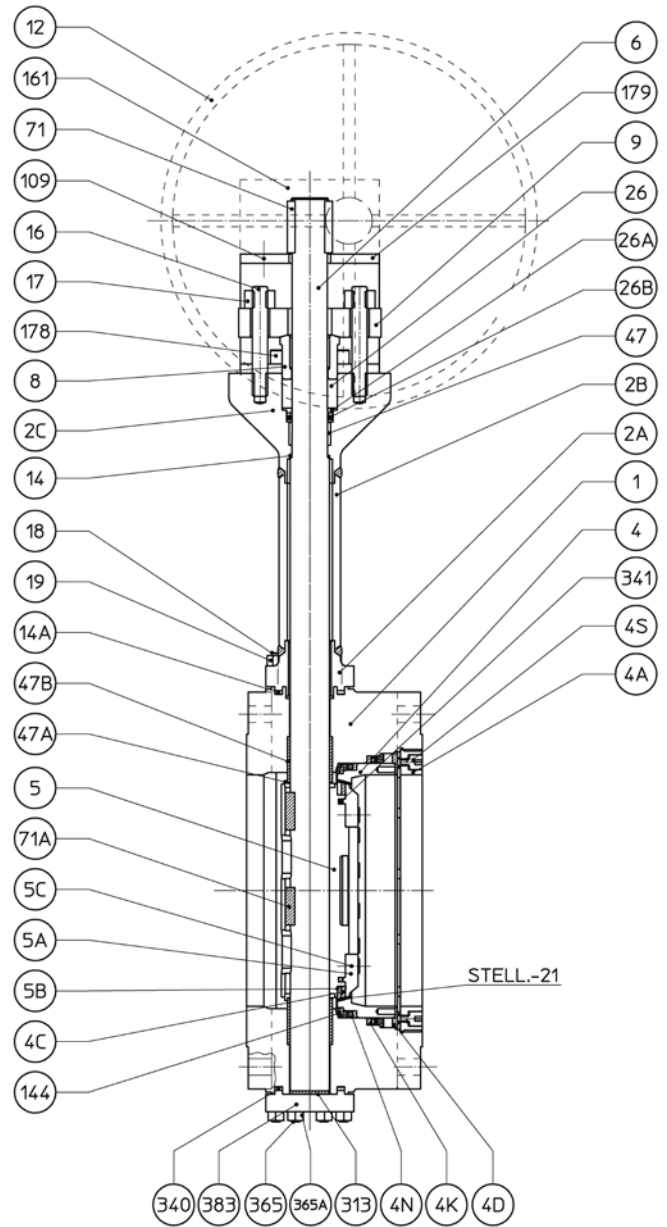


CF8 304 MATERIAL

NO.	PART	MATERIAL	NO.	PART	MATERIAL
1	BODY	ASTM A 351 CF8	20	STUD BOLT	ASTM A 320 B8 CLASS 2
2	BONNET	ASTM A 351 CF8	21	SOCKET BOLT	A4-70
2D	BUSHING	ASTM A 479 Gr. 304	26	PACKING	GRAPHOIL
3	BONNET	ASTM A 240 Gr. 316	26A	BUSHING	ASTM A 479 Gr. 316
4	SEAT RING	ASTM A 351 CF8 + STELL-21	26B	GASKET	TURCON
4A	RETAINING RING	ASTM B 148 9A	47	BUSHING	ASTM B 148 9A
4C	SEAT RING	KEL-F/316 + LAMINAR	47A	BUSHING	ASTM B 148 9A
4D	WASHER	ASTM A 351 CF8	47B	BUSHING	ASTM B 148 9A
4E	WASHER	ASTM A 351 CF8	47C	BUSHING	ASTM B 148 9A
4G	PACKING	SUPAGRAF PREMIER	48	PIN	ASTM A 479 Gr. 316
4J	WASHER	ASTM A 351 CF8	71	KEY	ASTM A 479 Gr. 316
4K	GASKET	TURCON	71A	KEY	ASTM A 29 Gr. 1045
4L	GASKET	GRAPHOIL	109	SOCKET BOLT	A4-70
4N	GASKET	TURCON	144	SPRING WASHER	ASTM A 693 (UNS S15500)
5	DISC	ASTM A 351 CF8	161	GEAR (INPUT SAFT SS316)	COMMERCIAL
5A	RETAINING DISC	ASTM A 351 CF8	178	SOCKET BOLT	ASTM A 479 Gr. 316
5B	SUPPORT DISC	ASTM A 351 CF8	179	COUPLING	ASTM A 240 Gr. 316
6	STEM	ASTM A 479 Gr. 304	190	SPRING WASHER	ASTM A 693 (UNS S15500)
8	GLAND BUSHING	ASTM A 479 Gr. 304	313	WASHER	KEL-F
9	GLAND FLANGE	ASTM A 240 Gr. 316	340	GASKET	SPIRAL WOUND 316 + GRAPHOIL
12	HANDWHEEL	ASTM A 240 Gr. 316	342	GASKET	INOXGRAP.
13	STUD BOLT	A4-70	365	STUD BOLT	ASTM A 320 B8 CLASS 2
14	GASKET	KEL-F	365A	NUT	A4-70
14B	GASKET	SPIRAL WOUND 316 + GRAPHOIL	383	FLANGE	ASTM A 479 Gr. 316
16	STUD BOLT	ASTM A 320 B8 CLASS 2	444	COLLAR DRIP	ASTM A 240 Gr. 316
17	NUT	ASTM A 194 Gr. 8	484	NAME PLATE	ASTM A 240 Gr. 316
18	STUD BOLT	ASTM A 320 B8 CLASS 2			

MATERIAL SELECTION

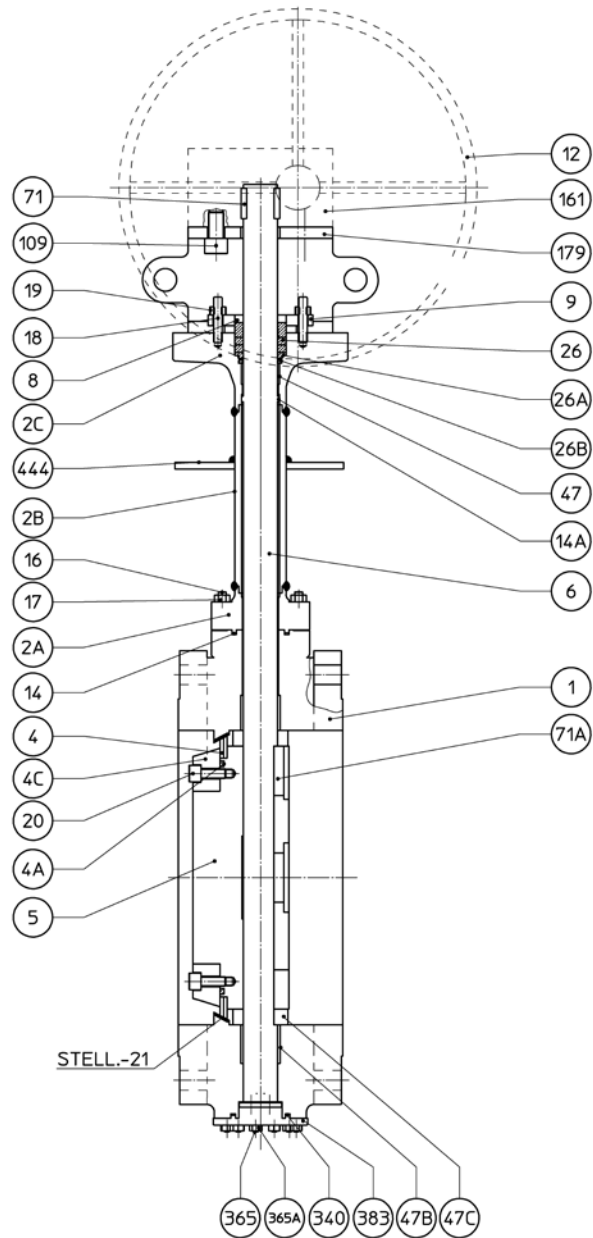
DOUBLE FLANGE DESIGN (Floating seat) Sample drawing



CF8M 316 MATERIAL

NO.	PART	MATERIAL	NO.	PART	MATERIAL
1	BODY	ASTM A 351 CF8M	17	NUT	ASTM A 194 Gr. 8A
2A	LOWER BONNET	ASTM A 479 Gr. 316	18	STUD BOLT	ASTM A 320 B8M CLASS 2
2B	PIPE	ASTM A 312 TP 316	19	NUT	ASTM A 194 Gr. 8A
2C	UPPER BONNET	ASTM A 479 Gr. 316	26	PACKING	GRAPHOIL
4	SEAT RING	ASTM A 351 CF8M + STELL.-21	26A	BUSHING	ASTM A 479 Gr. 316
4A	RETAINING RING	ASTM B 148 9A	26B	GASKET	TURCON
4C	SEAT RING	KEL-F/ 316SS + LAMINAR	47	BUSHING	DU "GLACIER"
4D	WASHER	ASTM A 351 CF8M	47A	BUSHING	ASTM B 148 9A
4K	GASKET	TURCON	47B	BUSHING	ASTM B 148 9A
4N	GASKET	TURCON	71	KEY	ASTM A 29 Gr. 1045
4S	STUD BOLT	ASTM A 320 B8M CLASS 2	71A	KEY	ASTM A 479 Gr. 316
5	DISC	ASTM A 351 CF8M	109	SOCKET BOLT	ASTM A 479 Gr. 316
5A	RETAINING DISC	ASTM A 479 Gr. 316	144	SPRING WASHER	ASTM A 693 (UNS S15500)
5B	SUPPORT DISC	ASTM A 479 Gr. 316	161	GEAR	COMMERCIAL
5C	SOCKET BOLT	ASTM A 320 B8M CLASS 2	178	SOCKET BOLT	ASTM A 479 Gr. 316
6	STEM	ASTM A 479 Gr. 316	179	COUPLING	ASTM A 36
8	GLAND BUSHING	ASTM A 479 Gr. 316	313	WASHER	KEL-F
9	GLAND FLANGE	ASTM A 240 Gr. 316	340	GASKET	SPIRAL WOUND 316 + GRAPHOIL
12	HANDWHEEL	ASTM A 29 Gr. 1518	341	GASKET	GRAPHOIL
14	GASKET	KEL-F	365	STUD BOLT	ASTM A 320 B8M CLASS 2
14B	GASKET	SPIRAL WOUND 316 + GRAPHOIL	365A	NUT	ASTM A 194 Gr. 8A
16	STUD BOLT	ASTM A 320 B8M CLASS 2	383	FLANGE	ASTM A 479 Gr. 316

**DOUBLE FLANGE DESIGN
(Integral seat)
Sample drawing**



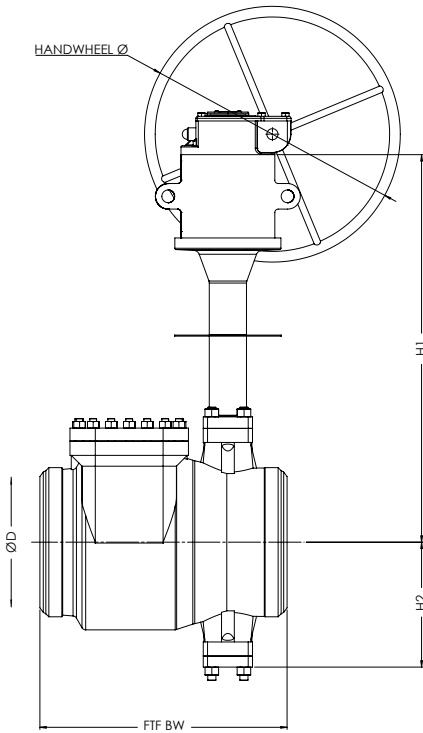
CF8M 316 MATERIAL

NO.	PART	MATERIAL	NO.	PART	MATERIAL
1	BODY	ASTM A 351 CF8M + STELL.-21	20	SOCKET BOLT	ASTM A 320 B8 CLASS 2
2A	LOWER BONNET	ASTM A 479 Gr. 316	26	PACKING	GRAPHOIL
2B	PIPE	ASTM A 312 TP 316	26A	WASHER	ASTM A 479 Gr. 316
2C	UPPER BONNET	ASTM A 479 Gr. 316	26B	GASKET	TURCON
4	GASKET	KEL-F/ 316SS + LAMINAR	47	BUSHING	ASTM B 148 9A
4A	GASKET	GRAPHITE	47B	BUSHING	ASTM B 148 9A
4C	RING	ASTM A 479 Gr. 316	47C	BUSHING	ASTM B 148 9A
5	DISC	ASTM A 351 CF8M	71	KEY	ASTM A 29 Gr. 1045
6	STEM	ASTM A 479 XM-19HS	71A	KEY	ASTM A 479 XM-19HS
8	GLAND BUSHING	ASTM A 479 Gr. 316	109	SOCKET BOLT	ASTM A 479 Gr. 316
9	GLAND FLANGE	ASTM A 240 Gr. 316	161	GEAR	COMMERCIAL
12	HANDWHEEL	ASTM A 29 Gr. 1518	179	COUPLING	ASTM A 36
14	GASKET	SPIRAL WOUND 316 + GRAPHOIL	340	GASKET	SPIRAL WOUND 316 + GRAPHOIL
14A	GASKET	KEL-F	365	STUD BOLT	ASTM A 320 B8 CLASS 2
16	STUD BOLT	ASTM A 320 B8 CLASS 2	365A	NUT	ASTM A 194 Gr. 8A
17	NUT	ASTM A 194 Gr. 8A	383	FLANGE	ASTM A 479 Gr. 316
18	STUD BOLT	ASTM A 320 B8 CLASS 2	444	COLLAR DRIP	ASTM A 240 Gr. 316
19	NUT	ASTM A 194 Gr. 8A			

DIMENSIONAL TABLES

150 LBS

SIZE	FTF-BW	Ø D	H1	H2	HAND-WHEEL Ø	WEIGHT (KG) -BW
8	431	200	681	176	300	82
10	457	254	733	208	300	130
12	502	305	803	247	500	202
14	545	337	837	273	500	210
16	548	388	903	306	500	294
18	611	438	987	325	800	331
20	629	489	1034	358	800	405
24	691	591	1113	417	800	604
26	710	635	1152	403	900	780
28	750	686	1249	429	900	932
30	795	737	1269	455	900	1127
32	830	781	1341	482	900	1286
36	900	876	1429	542	900	1558
38	1100	927	1439	576	900	1986
40	1190	978	1489	602	900	2414
42	1190	1022	1502	628	900	2842
48	1225	1168	1672	713	900	3658



300 LBS

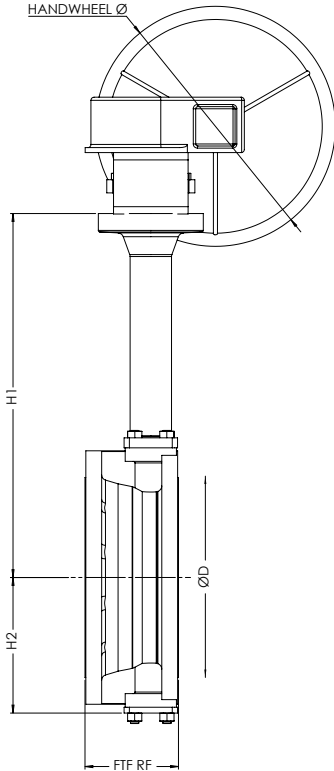
SIZE	FTF-BW	Ø D	H1	H2	HAND-WHEEL Ø	WEIGHT (KG) -BW
8	496	200	717	195	500	111
10	543	254	778	228	800	215
12	580	305	864	267	800	283
14	633	337	935	299	800	390
16	690	388	998	332	900	466
18	698	438	1092	364	900	689
20	767	489	1174	397	900	791
24	865	591	1214	469	900	1202
26	887	635	1240	444	900	1503
28	943	686	1369	472	900	1657
30	966	737	1429	508	900	1973
32	1038	781	1475	540	900	2372
36	1107	876	1554	600	900	2659
38	1160	927	1621	600	900	3124
40	1215	978	1743	636	900	3589
42	1265	1022	1758	661	900	4053
48	1387	1168	1876	751	900	5795

SIDE ENTRY DESIGN

600 LBS

SIZE	FTF-BW	Ø D	H1	H2	HAND-WHEEL Ø	WEIGHT (KG) -BW
8	602	200	822	215	800	274
10	672	254	858	260	800	436
12	749	305	978	286	900	614
14	811	337	1060	309	900	712
16	914	388	1125	351	900	1097
18	996	438	1136	381	900	1305
20	1079	489	1334	417	900	1962
24	1295	591	1472	482	900	2872
26	1345	635	1410	456	900	3062
28	1370	686	1453	488	900	3496
30	1493	737	1624	524	900	4174
32	1524	781	1697	556	900	5356
36	1651	876	1863	622	900	8641

150 LBS



DOUBLE FLANGE DESIGN

SIZE	FTF-RF	Ø D	H1	H2	HAND-WHEEL Ø	WEIGHT (KG) -RF
8	152	200	681	176	300	69
10	165	254	733	208	300	98
12	178	305	803	247	500	145
14	190	337	837	273	500	170
16	216	388	903	306	500	230
18	222	438	987	325	800	288
20	229	489	1034	358	800	382
24	267	591	1113	417	800	507
26	292	635	1152	403	900	711
28	292	686	1249	429	900	786
30	318	737	1269	455	900	988
32	318	781	1341	482	900	1189
36	330	876	1429	542	900	1510
38	410	927	1439	576	900	1830
40	410	978	1489	602	900	2150
42	410	1022	1502	628	900	2469
48	470	1168	1672	713	900	3120

300 LBS

SIZE	FTF-RF	Ø D	H1	H2	HAND-WHEEL Ø	WEIGHT (KG) -RF
8	230	200	717	195	500	111
10	250	254	778	228	800	178
12	270	305	864	267	800	259
14	290	337	935	299	800	418
16	310	388	998	332	900	438
18	330	438	1092	364	900	582
20	350	489	1174	397	900	713
24	390	591	1214	469	900	1080
26	410	635	1240	444	900	1243
28	430	686	1369	472	900	1370
30	450	737	1429	508	900	1585
32	470	781	1475	540	900	1758
36	510	876	1554	600	900	2348
38	530	927	1621	600	900	2645
40	550	978	1743	636	900	2942
42	570	1022	1758	661	900	3238
48	630	1168	1876	751	900	4727

600 LBS

SIZE	FTF-RF	Ø D	H1	H2	HAND-WHEEL Ø	WEIGHT (KG) -RF
8	230	200	822	215	800	223
10	250	254	858	260	800	346
12	270	305	978	286	900	481
14	381	337	1060	309	900	555
16	406	388	1125	351	900	828
18	432	438	1136	381	900	947
20	457	489	1334	417	900	1405
24	508	591	1472	482	900	1878
26	559	635	1410	456	900	2182
28	610	686	1453	488	900	2525
30	610	737	1624	524	900	2956
32	660	781	1697	556	900	4102
36	711	876	1863	622	900	5668

“Due to engineering activities, all the above dimensions and weights could be subjected to changes by AMPO POYAM VALVES without any notification. Therefore, please consult us for confirmation on the above data as well as for other dimensions and weights not reported in the tables”.

AMPO SERVICE

- Predictive and preventive maintenance
- Technical support
- Technical training
- Valve condition monitoring
- Spare parts and valve supply

On-site support within the shortest time.

Experience in executing global maintenance service for complete projects.



Commitment made of steel

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