



Cryogenic Ball Valve

Technical brochure




Commitment made of steel


1. 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



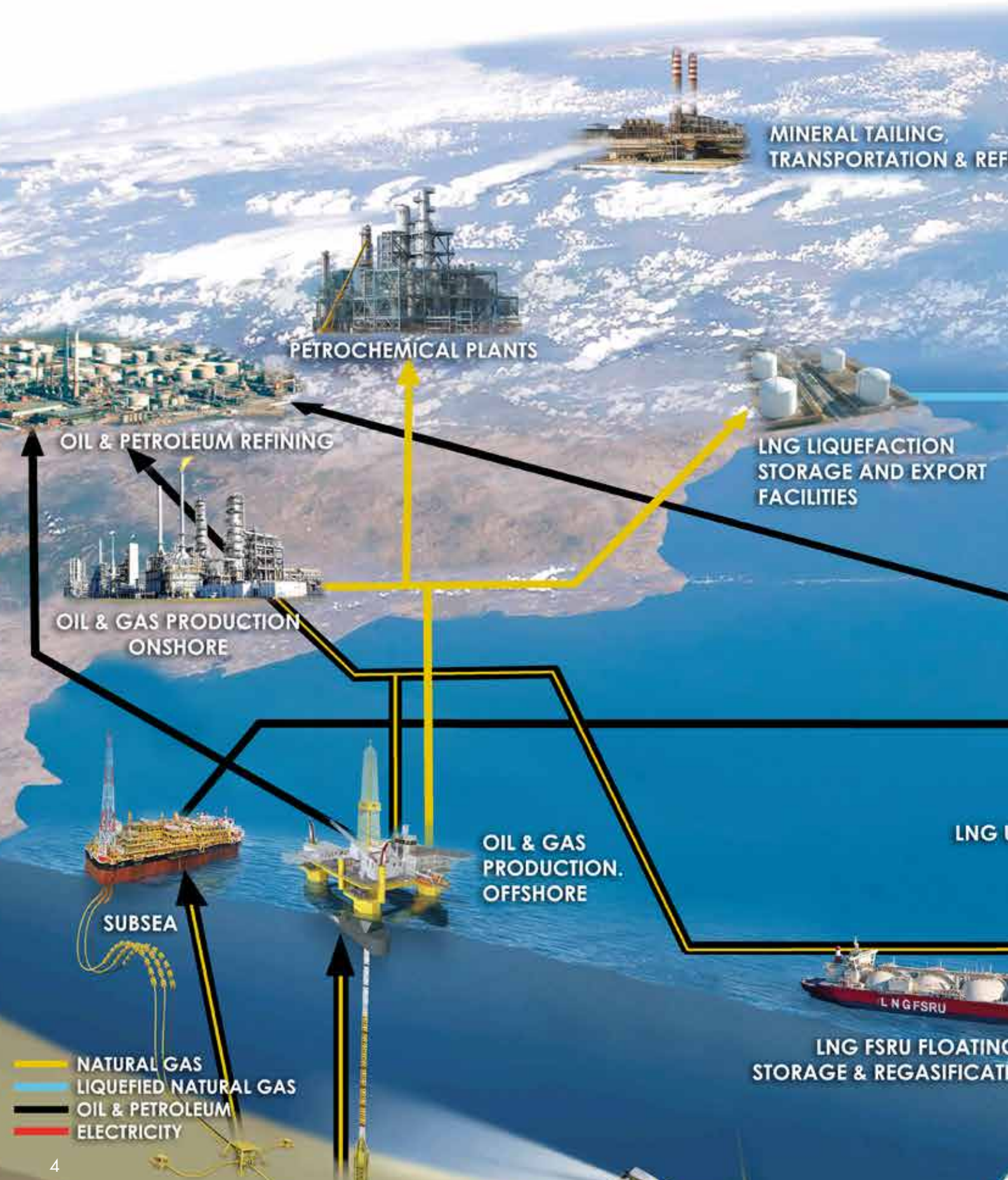
2. APPLICATION

Cryogenic service valves main applications are focused in LNG and LPG terminals and transportation ships. AMPO POYAM VALVES 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.**

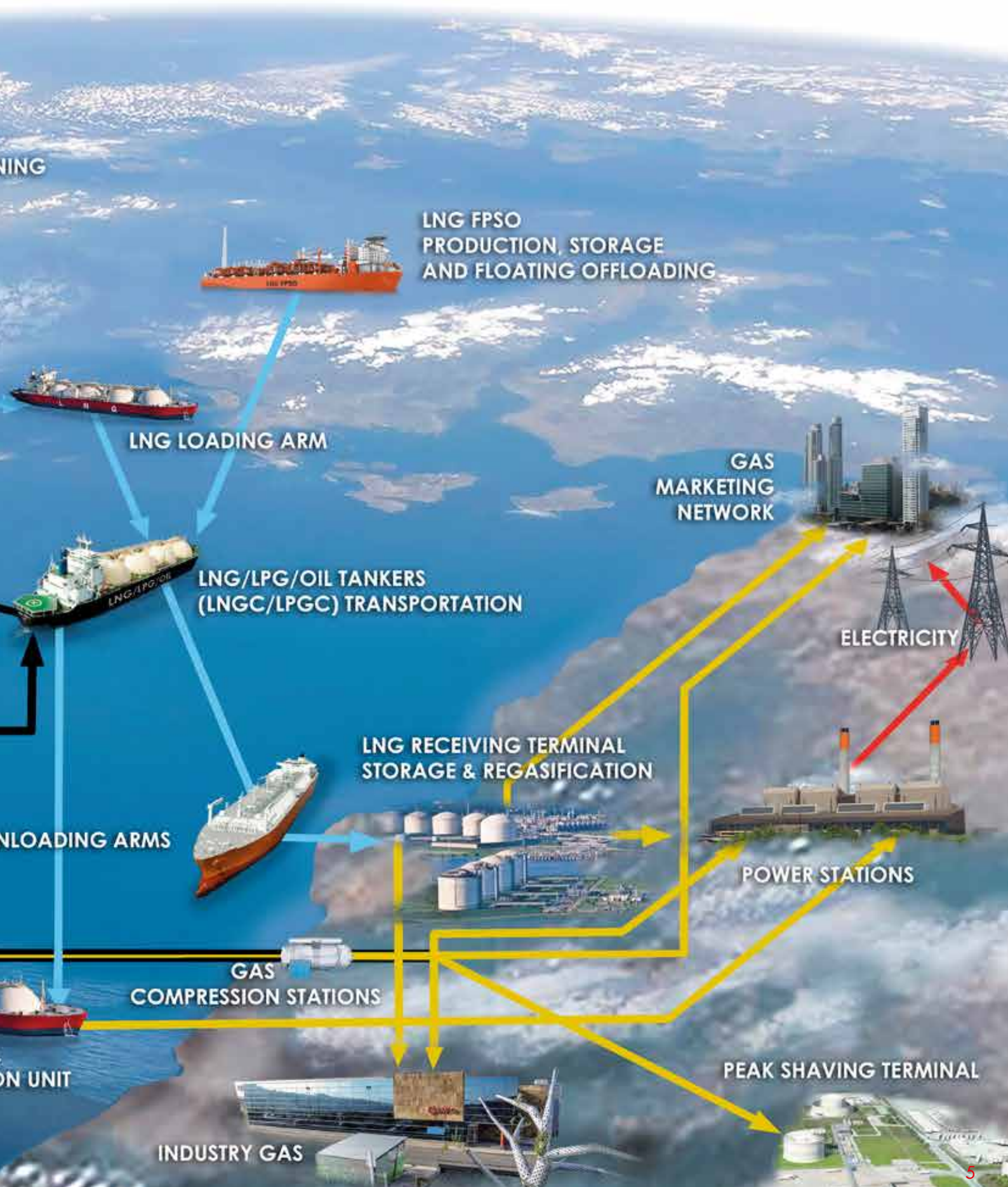
As a result of over 40 years of experience in the manufacturing of cryogenic valves, AMPO POYAM VALVES is the **leading manufacturer of highly engineered valves for the LNG market**, especially with top entry or split body cryogenic ball valves, cryogenic gate, globe and check valves as well as cryogenic butterfly valves.



AMPO POYAM VALVES IN THE COMPLETE ENERGY CHAIN

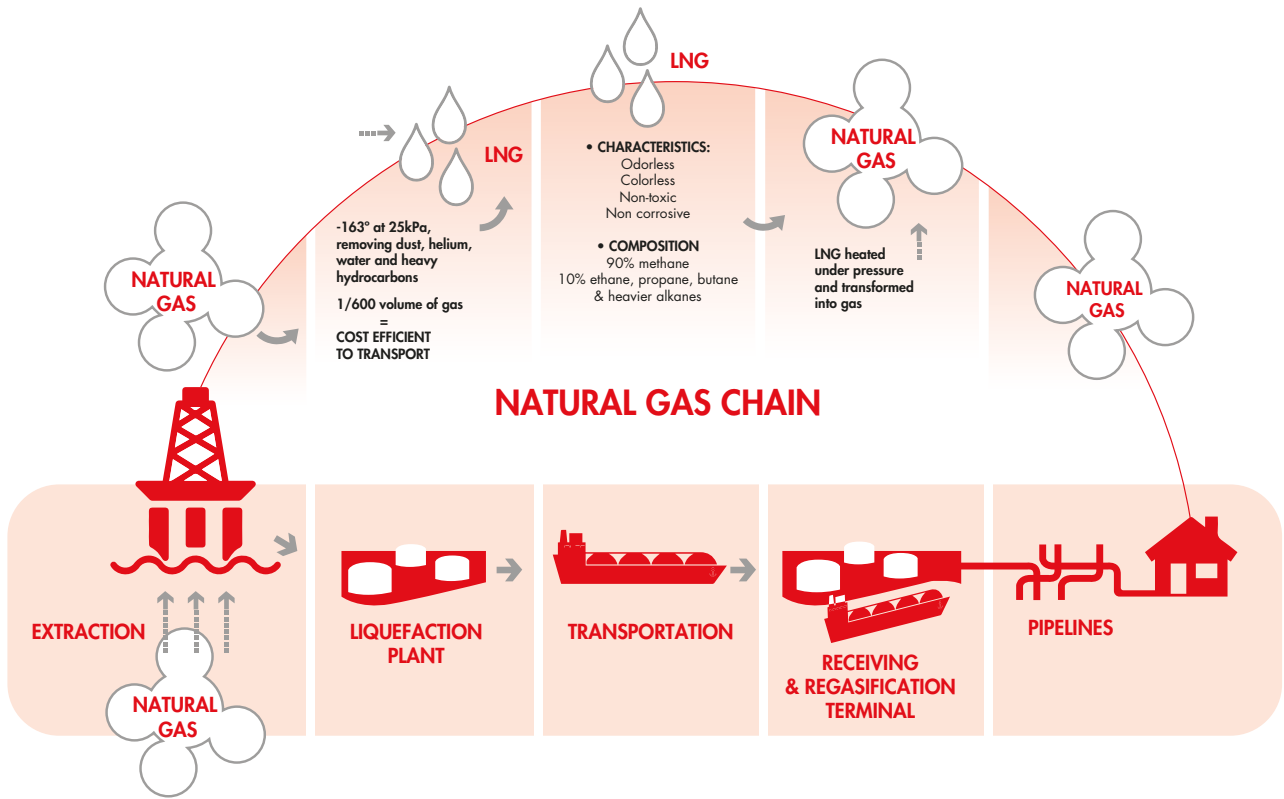


AMPO POYAM valves are currently installed and in safe and reliable operation in more than the 90% of the worldwide LNG plants.



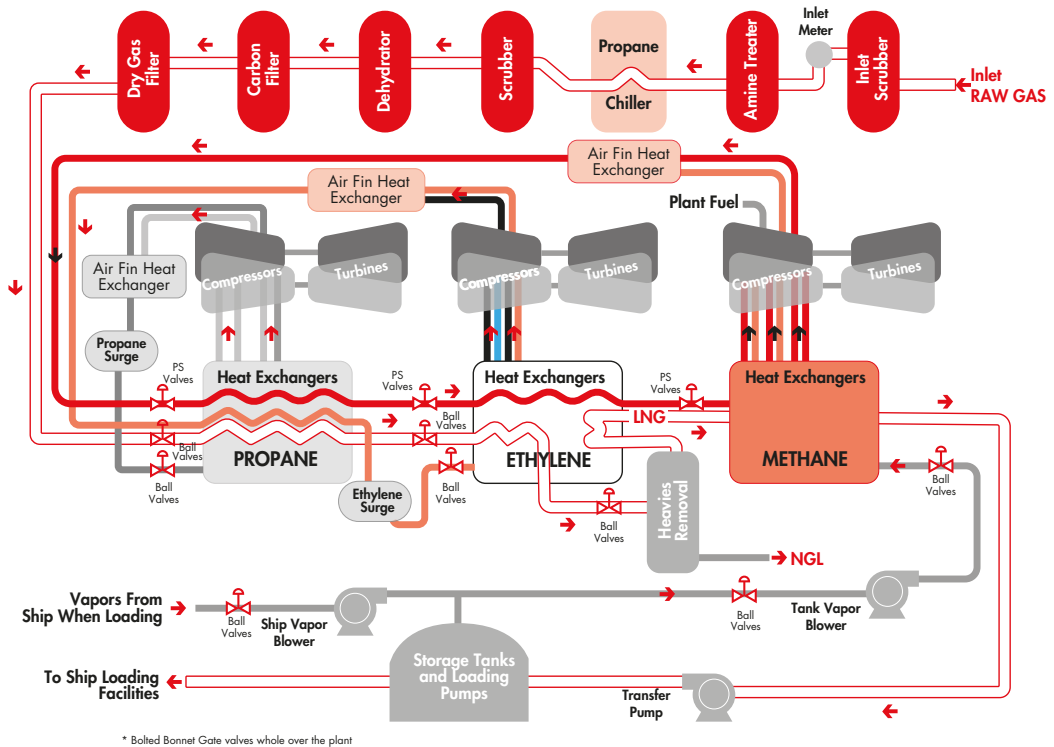
2. APPLICATION

Which is the natural gas chain?

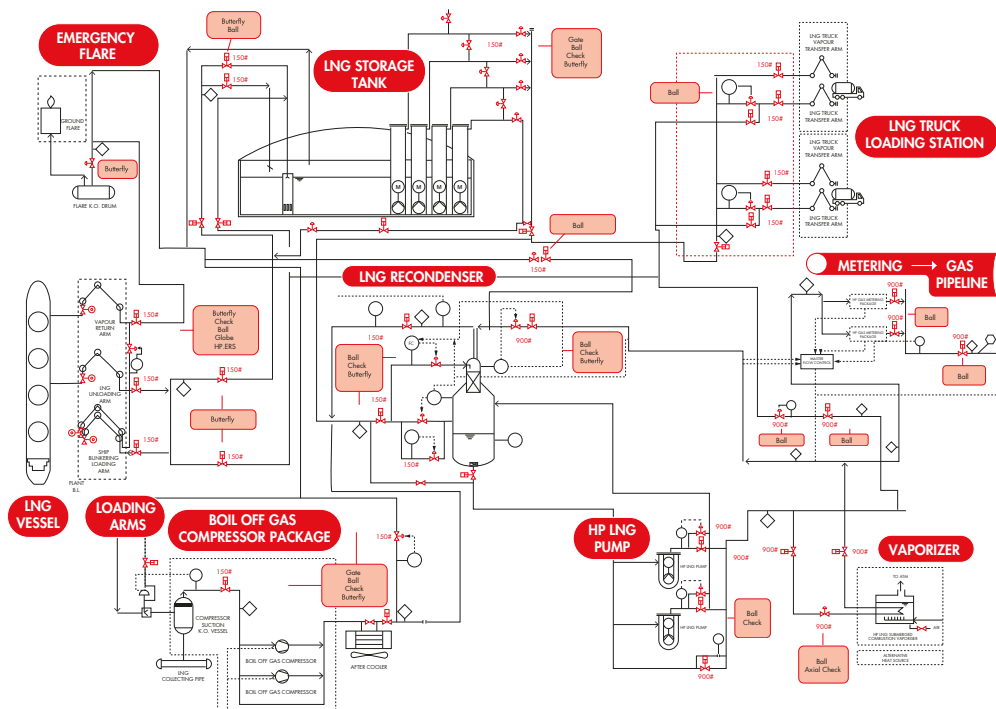




LIQUEFACTION TERMINAL SAMPLE:



RECEIVING TERMINAL SAMPLE:



3. CRYOGENIC BALL VALVES

CRYOGENIC TOP ENTRY BALL VALVE

Sizes: 1/2 up to 60"

Pressure: 150 lbs up to 2500 lbs

Temperature: Down to -196°C

Design types: Trunnion or Floating
Two balls one body option also available

Standards: API, BS, MSS, ANSI, ASME, ASTM, DIN

Materials: CF3, CF3M, CF8, CF8C, CF8M, 316, 316L, 304, 304L,

Seals: Seats: KELF; RPTFE; PEEK; METAL TC/CC COATING

Gaskets: SPIRAL WOUND, LIP SEAL

End connections: BW, RF, FF, NPT, RTJ, SW; CLAMPS

- Actuation:**
- ACTUATOR: Pneumatic, electric, hydraulic, pneumo-hydraulic, HIPPS, etc.
 - GEARBOX
 - LEVER
 - HANDWHEEL

- Industries and applications:**
- Natural Gas Processing
 - Oil & Petroleum refining
 - Petrochemical
 - Chemical & power



CRYOGENIC SPLIT BODY BALL VALVE

Sizes: 1/2 up to 60"

Pressure: 150 lbs up to 2500 lbs

Temperature: Down to -196°C

Design types: Trunnion or Floating
Two balls one body option also available

Standards: API, BS, MSS, ANSI, ASME, ASTM, DIN

Materials: CF3, CF3M, CF8, CF8C, CF8M, 316, 316L, 304, 304L,

Seals: Seats: KELF; RPTFE; PEEK; METAL TC/CC COATING

Gaskets: SPIRAL WOUND, LIP SEAL

End connections: BW, RF, FF, NPT, RTJ, SW; CLAMPS

- Actuation:**
- ACTUATOR : Pneumatic, electric, hydraulic, pneumo-hydraulic, HIPPS, etc.
 - GEARBOX
 - LEVER
 - HANDWHEEL

- Industries and applications:**
- Natural Gas Processing
 - Oil & Petroleum refining
 - Petrochemical
 - Chemical & power



4. WHY CHOOSE OUR CRYOGENIC BALL VALVES?



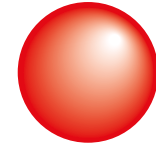
More than 500k valves in safe and reliable operation in more than the 90% of the **WORLDWIDE LNG PLANTS**



LONG SERVICE LIFE due to our proven cryogenic sealing technology of more than 40 years.



The valve construction is in compliance with **INTERNATIONAL STANDARDS**.



PIGGABLE due to **ONE-PIECE SOLID** ball construction.



The cylindrical geometry of the valve cavity **AVOIDS TURBULENCES OR VIBRATIONS**.



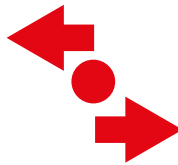
MINIMUM PRESSURE-DROP is ensured.



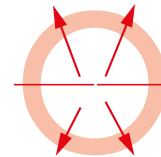
FIRE SAFE DESIGN in compliance with API 607 and API 6FA, due to a metal to metal contact between seat and ball.



Seats are always **PROTECTED** in the open and close position, with a perfect ball contact; resulting in **LONGER LIFE OF INTERNAL PARTS**, due to the minimum friction stress and sealing stress.



REAL BI-DIRECTIONAL SEALING thanks to self-relieving seats, following API 6D standard. No torque seated.



AD HOC DESIGN SOLUTIONS: Different pressure relief systems and seat design configurations (DBB, DIB-1, DIB-2 and Relief Hole-DPE).



LOW OPERATION TORQUE with consequent cost savings.



ZERO LEAKAGE with preferential and non-preferential flow.



LOW FUGITIVE EMISSIONS, achieving a **ZERO LEAKAGE** solution and increasing plant safety.



EASY MAINTENANCE AND HIGH INTERCHANGEABILITY, due to components' standardization.



SAFE AND FLEXIBLE valve handling systems, even with large actuators.

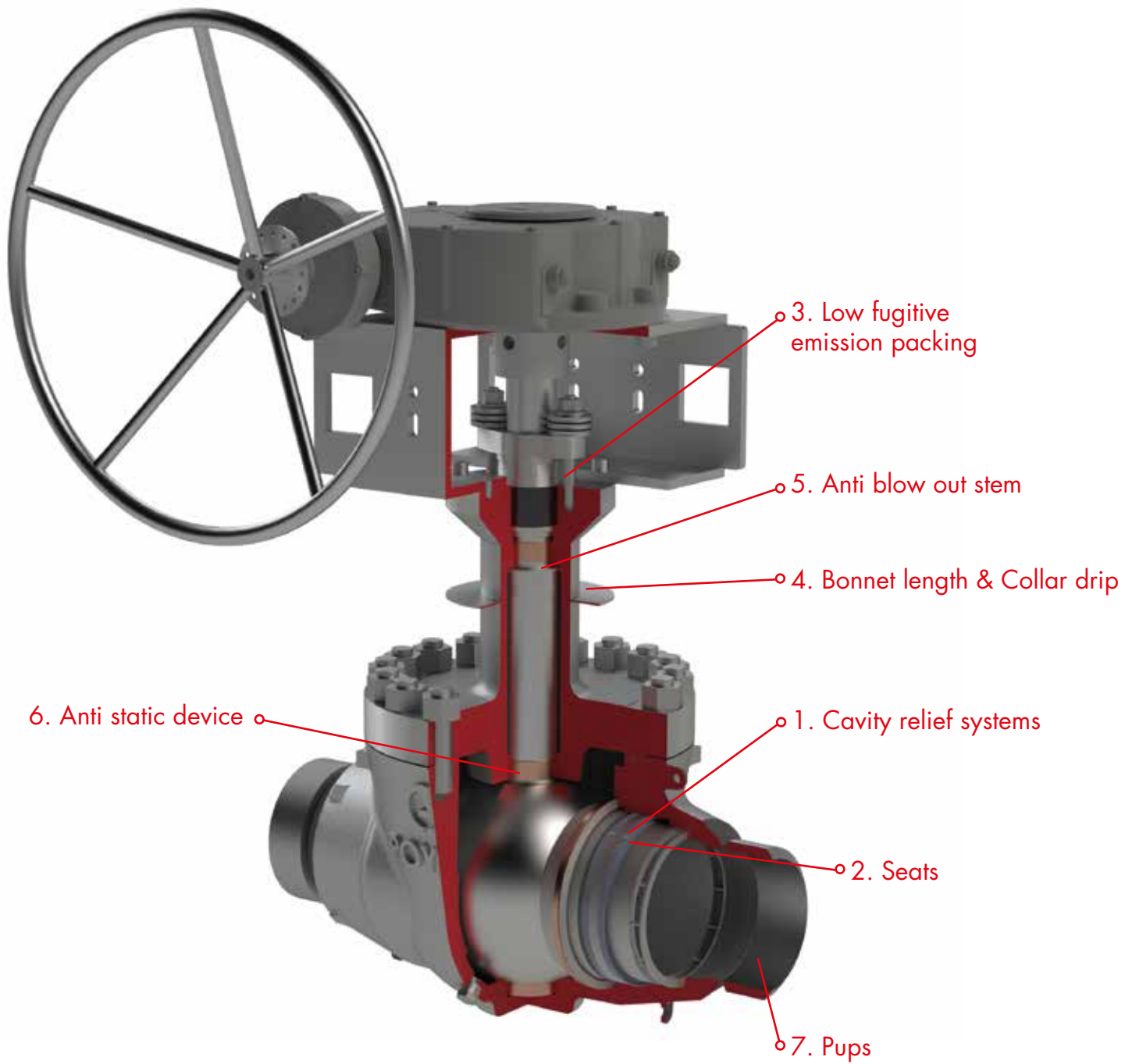


TAILOR MADE DESIGN: Body, TRIM components and springs are selected and designed for each project and application, considering fluid/flow properties of each service.



34x52
150
POYAN
CF3M
01008

5. TECHNICAL FEATURES



5.1. CAVITY RELIEF SYSTEMS:

AMPO POYAM VALVES can offer different seat design configurations for relieving purposes.

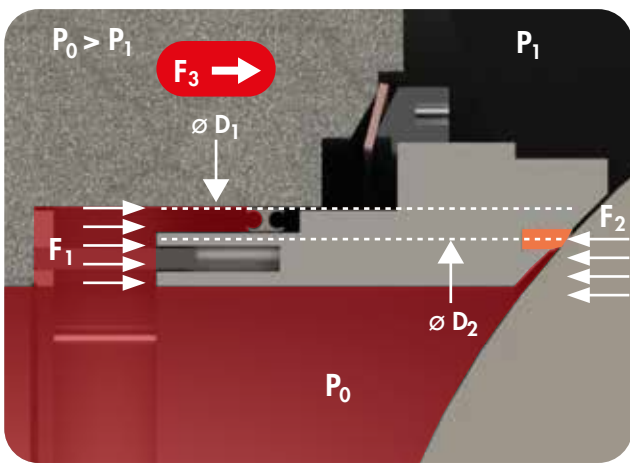
PRESSURE RELIEF SYSTEMS:

There are different seat design options in terms of relief:

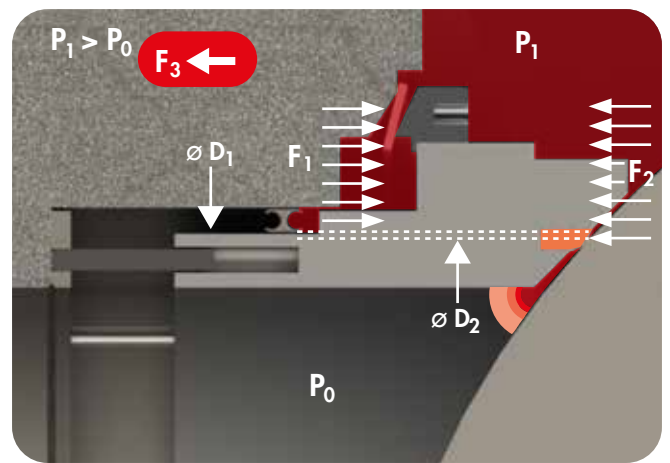
SPE (SINGLE PISTON EFFECT):

- SPE is a pressure energized sealing and bleeding system.
- Performance:
 - Pressure coming from the valve end (due to the seat areas exposed to the pressure, this load will be transmitted to the sealing area and the seat will accomplish the sealing):

- Pressure coming from the cavity (when the pressure force overcomes the spring force the seat bleeds):



$$F_3 = P_0 \times (\varnothing D_1^2 - \varnothing D_2^2) \times \pi / 4$$

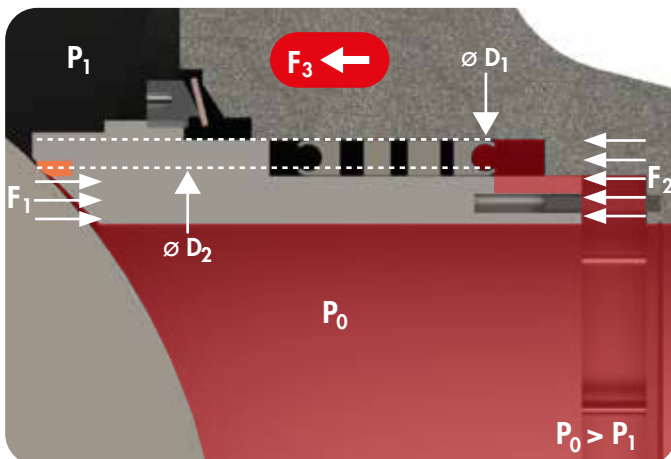


$$F_3 = P_1 \times (\varnothing D_1^2 - \varnothing D_2^2) \times \pi / 4$$

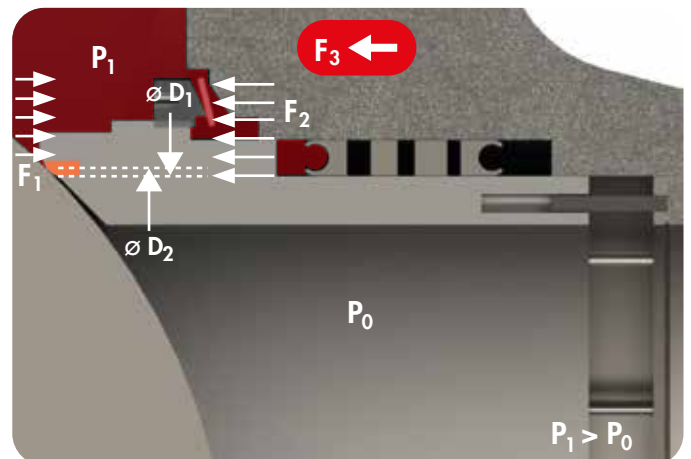
DPE (DOUBLE PISTON EFFECT):

- DPE is a pressure energized sealing system.
- Performance:
 - Pressure coming from the valve end (due to the seat areas exposed to the pressure, this load is transmitted to the sealing area achieving the sealing):

- Pressure coming from the cavity (owing to the seat areas exposed to the pressure, this load is transmitted to the sealing area achieving the sealing):



$$F_3 = P_0 \times (\varnothing D_1^2 - \varnothing D_2^2) \times \pi / 4$$

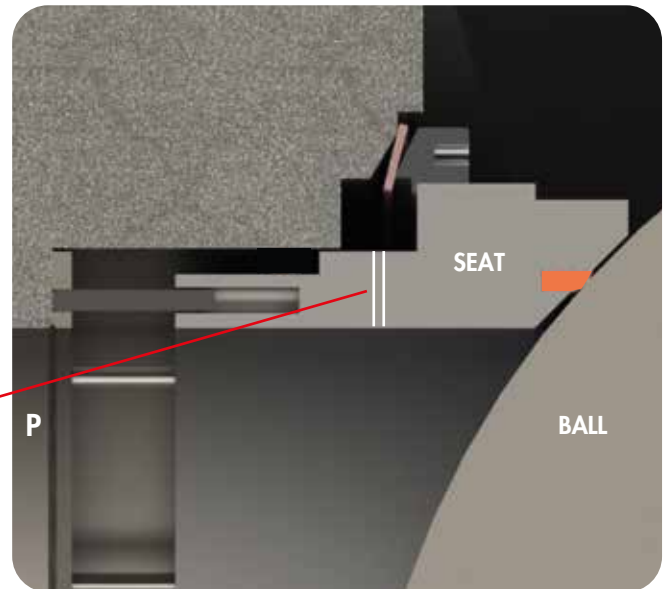


$$F_3 = P_1 \times (\varnothing D_1^2 - \varnothing D_2^2) \times \pi / 4$$

RH (RELIEF HOLE SEAT):

- Relief hole is done in the seat.
- In any case (pressure from the valve end or cavity) the seat will get the sealing, it will be always bleeding.

Relief hole
in the seat



SEALING CONSTRUCTIONS:

Four bidirectional sealing constructions, based on the previously described seat design types:

• DBB -Double Block and Bleed- (SPE-SPE):

- SPE seat design in both upstream/downstream sides.
- The pressure relief is obtained in the side specified by the customer, an adjustment is done for this purpose.
- Each SPE seat (upstream and downstream) will close in each direction.

• DIB-1 -Double Isolation and Bleed- (DPE-DPE):

- DPE seat design in both upstream/downstream sides.
- Drain valves must be applied in the valve cavity, to assure the pressure relief since DPE seat will close in both directions.

• DIB-2 -Double Isolation and Bleed- (SPE-DPE or DPE-SPE):

- SPE seat design in upstream side and DPE seat design in downstream side or vice versa.
- The pressure relief is done by the SPE seat.
- DPE seat is the one closing in both directions.

• Relief Hole – DPE or DPE – Relief Hole:

- RH seat design in upstream side and DPE seat design in downstream side or vice versa.
- The pressure relief is done by the RH seat.
- DPE seat is the one closing in both directions.

5.2 SEATS:

SOFT SEATED VALVES:

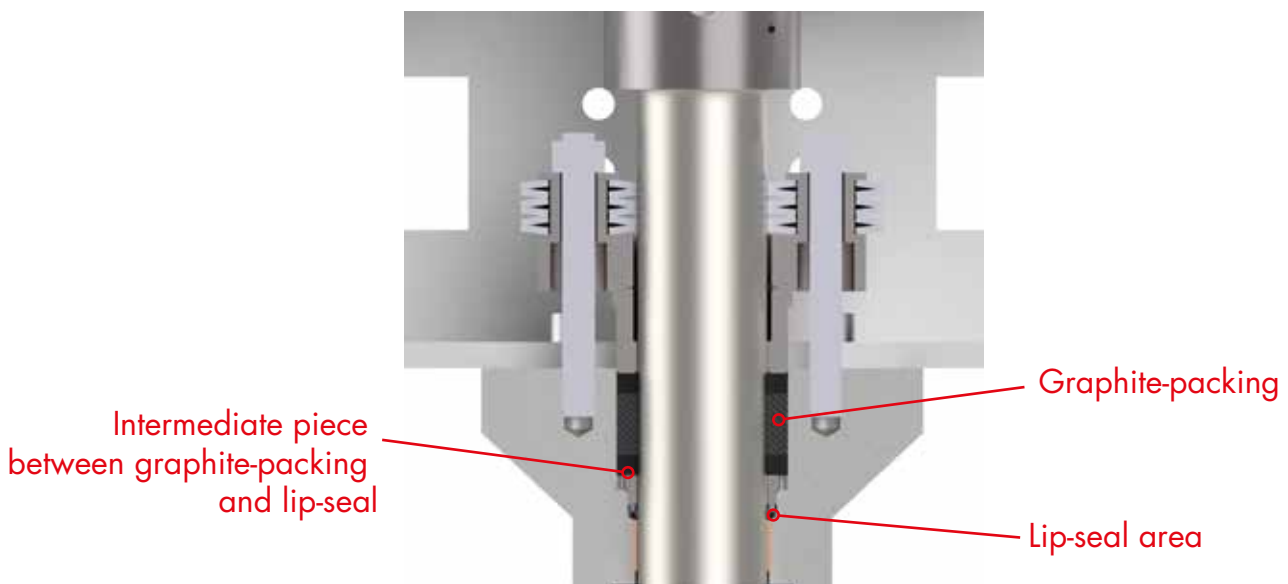
Soft seated ball valves have a resilient insert firmly installed into a metallic seat for granting a perfect tightness and sealing under different service conditions. Depending on fluid media, pressure and temperature, different soft seats can be applied, such as PCTFE, PTFE, PEEK, etc.

METAL SEATED VALVES:

Metal to metal sealing between the ball and seat ring is also available. Depending on fluid media, different coatings can be applied such as Tungsten Carbide or Chromium Carbide through a welding process called HVOF (High Velocity Oxygen Fuel).

5.3. LOW FUGITIVE EMISSION PACKING:

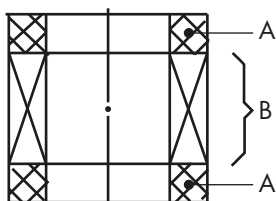
- **LIP-SEAL** is applied in all valve designs before graphite packing (two sealing points).



- **GRINDING** in the stem is applied in all sealing areas (lip-seal and graphite-packing).

• GRAPHITE RINGS:

- Braided Graphite Inner and Upper rings → A



- Die Formed Corrosion Inhibited graphite rings → B
- This configuration is defined by international standards.

• LIVE-LOADING SYSTEM:

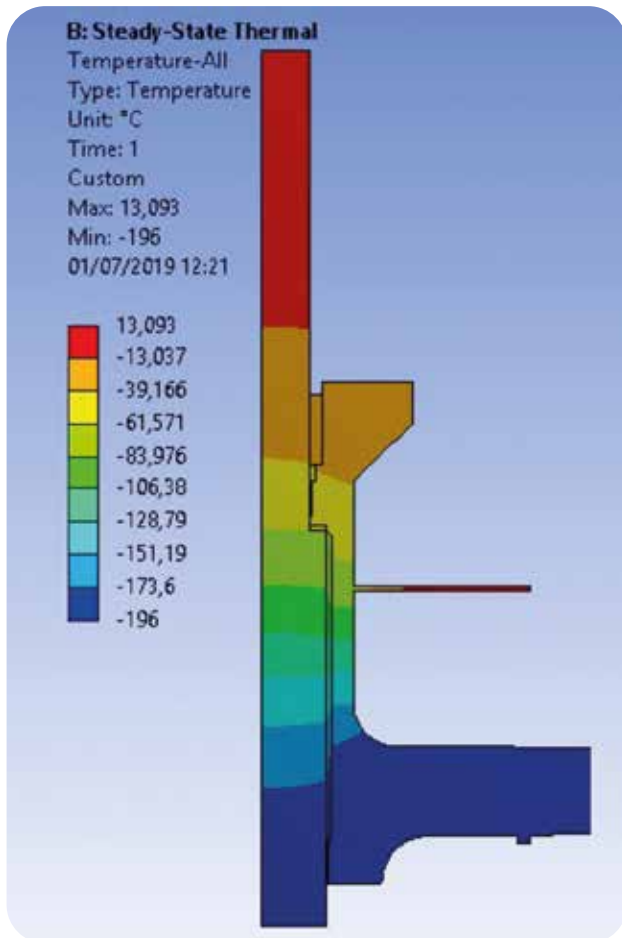
A live-loading system is also available with belleville springs, to avoid any preload relaxation in the bolting:



5.4 BONNET LENGTH AND COLLAR DRIP:

BONNET LENGTH:

- International standards are followed to define bonnet length:
 - BS 6364
 - Non-cold box.
 - Cold-box.
 - ISO 28921-1:2013
 - MSS SP 134_2014
- Most restrictive one is considered and double-checked by thermal Finite Element Analysis, in order to guarantee temperatures higher than -50°C in the packing:



COLLAR-DRIP:

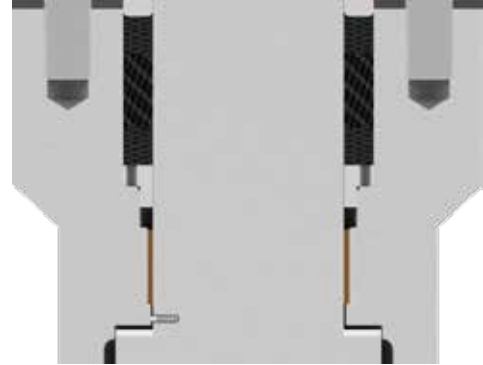
Thermal Finite Element Analysis are carried out to guarantee correct heat dissipation:

- Collar-drip external diameter.
- Collar-drip position.



5.5 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.



5.6 ANTI-STATIC DEVICE:

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



5.7 PUPS:

Transition pieces are available upon request.



6. QUALIFICATION

AMPO POYAM VALVES values quality and therefore our operating and production processes are implemented and controlled by a quality assurance system, certified since 1991 under the ISO 9001 Standard and accredited by the most important external organizations. Moreover AMPO POYAM VALVES holds international standard approvals and completely fulfills international standard requirements, reinforcing its leading position on the LNG market.

A summary of the most demanded standards is presented hereafter, although the qualification list can be extended upon each customer request:

General Standards:

API6D, ISO 14313, ASME B16.34, API 608, ISO 17292, JIS, 2014/68/UE (CE), SIL, B16.5, MSS SP-44, B16.47, B16.10, ISO 5752, B16.25, B16.11, ISO 5210/5211, etc.

Fire Safe: API 607 & API 6FA.

Fugitive Emission: API 641, API 622, ISO 15848 Part 1&2 up to Class A.

Testing: API 598, ISO 5208, BS6364, ISO 28921 Part 1&2, MSS SP-134, etc.

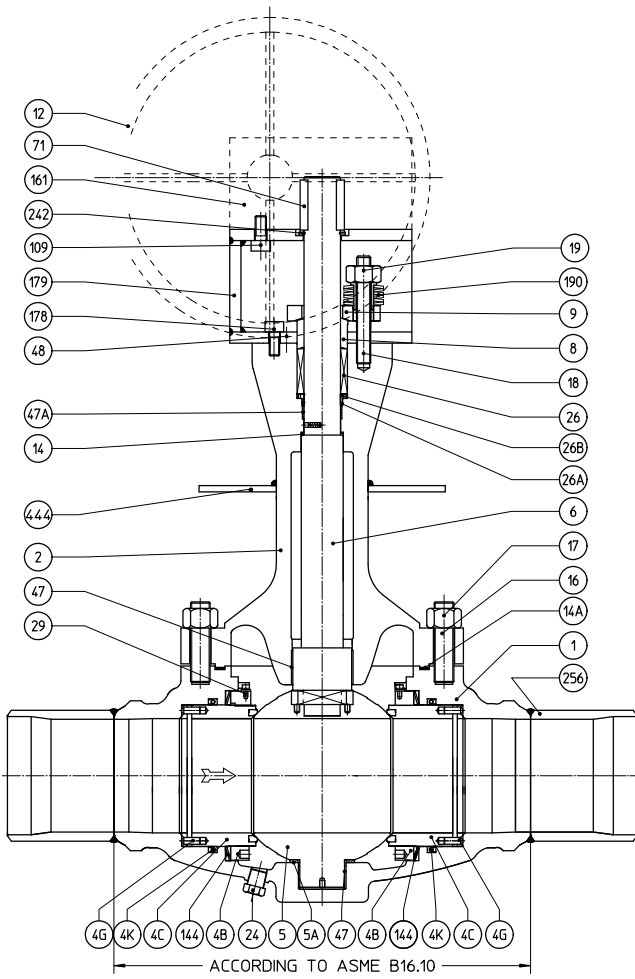
Type Approvals (for marine service too): Bureau Veritas, ABS, Lloyds, TUV, DNV, NORSOK, etc.

Country based certifications: GOST, TSG, CRN, KGS, 2014/34/EU (ATEX), PESO, etc.



7. MATERIAL SELECTION

TOP ENTRY CRYOGENIC BALL VALVE Sample drawing 1

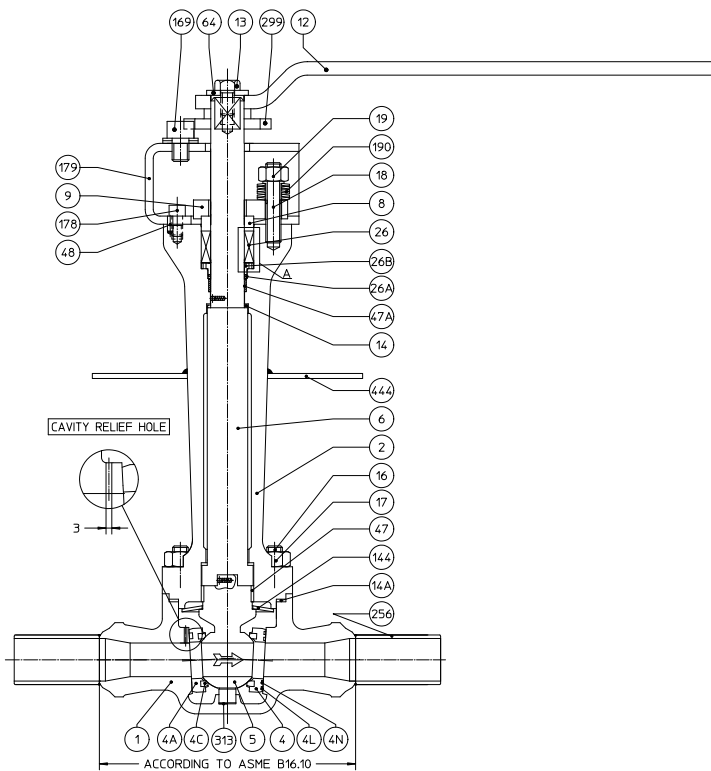


CF8-316 MATERIAL

NO.	PART	MATERIAL
1	BODY	ASTM A 351 CF8
2	BONNET	ASTM A 351 CF8
4C	SEAT	ASTM A 182 F-316 + KELF
4B	RETAINING RING	ASTM B 148 9A
4G	NONSPINING SEAT	ASTM A 240 Gr. 316
4K	SEAL	LIP SEAL
5	BALL	ASTM A 182 F-316
5A	WASHER	PTFE
6	STEM	ASTM A 182 F-316
8	GLAND BUSHING	ASTM A 479 Gr. 316
9	GLAND FLANGE	ASTM A 240 Gr. 304
12	HANDWHEEL	CARBON STEEL
14	GASKET	PCTFE
14A	GASKET	SPIRAL WOUND 304+GRAPHOIL
16	STUD BOLT	ASTM A 320 B8 CLASS 2
17	NUT	ASTM A 194 Gr. 8
18	STUD BOLT	ASTM A 320 B8 CLASS 2
19	NUT	ASTM A 194 Gr. 8
24	PLUG	ASTM A 182 F-304
26	PACKING	GRAPHOIL
26A	SEAL	LIP SEAL
26B	BUSHING	ASTM A 479 Gr. 316
29	SOCKET BOLT	ASTM A 479 Gr. 316
47	BUSHING	DU (GLACIERI)
47A	BUSHING	DU (GLACIERI)
48	PIN	ASTM A 479 Gr. 316
71	KEY	ASTM A 479 Gr. 316
109	SOCKET BOLT	ASTM A 479 Gr. 316
144	SPRING WASHER	INCONEL X-750
161	ACTUATOR	COMMERCIAL
178	SOCKET BOLT	ASTM A 479 Gr. 316
179	COUPLING	ASTM A 36
190	SPRING WASHER	ASTM A 29 Gr. 6150 + GEOMET
242	SPRING WASHER	ASTM A 29 Gr. 6150
256	TRANSITION PIECE	ASTM A 312 TP 304/304L
444	COLLAR DRIP	ASTM A 240 Gr. 316

TOP ENTRY CRYOGENIC BALL VALVE

Sample drawing 2

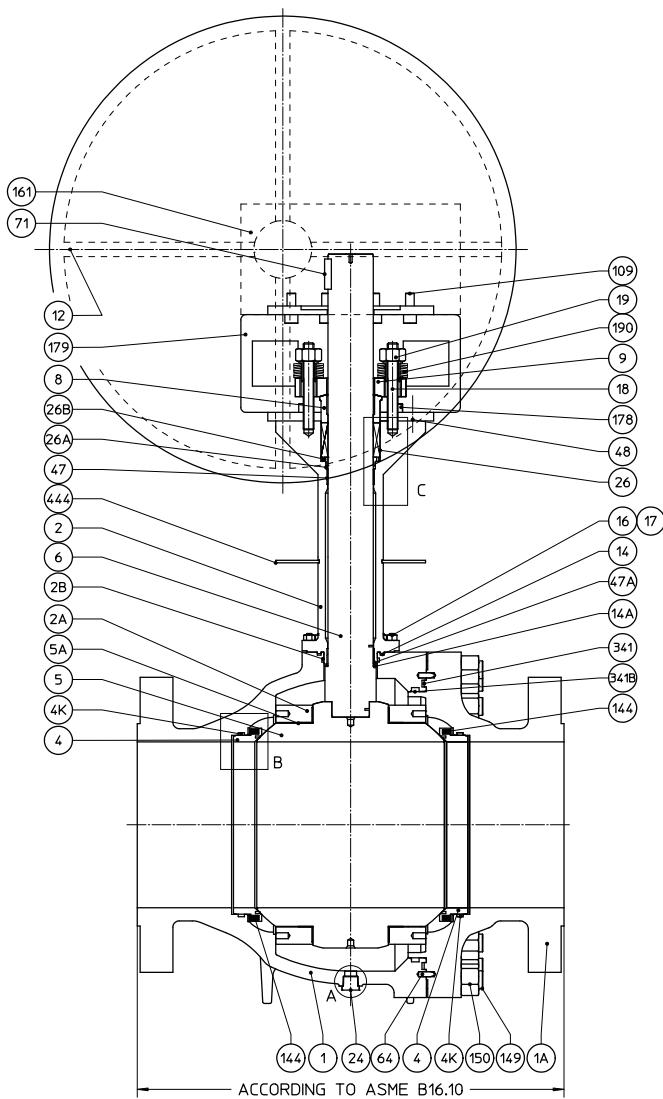


CF8-316 MATERIAL

NO.	PART	MATERIAL
1	BODY	ASTM A 351 CF8
2	BONNET	ASTM A 351 CF8
4	SEAT	ASTM A 479 Gr. 316
4A	SEAT	ASTM A 479 Gr. 316
4C	SEAT RING	KEL-F
4L	GASKET	GRAPHITE
4N	SEAL	LIP SEAL
5	BALL	ASTM A 479 Gr. 316
6	STEM	ASTM A 479 Gr. 316
8	GLAND BUSHING	ASTM A 479 Gr. 316
9	GLAND FLANGE	ASTM A 240 Gr. 316
12	WRENCH	ASTM A 351 CF8M
13	CAP SCREW	ASTM A 479 Gr. 316
14	GASKET	KEL-F
14A	GASKET	SPIRAL WOUND 304 + GRAPHITE
16	STUD BOL T	ASTM A 320 B8 CLASS 2
17	NUT	ASTM A 194 Gr. 8
18	STUD BOL T	ASTM A 320 B8 CLASS 2
19	NUT	ASTM A 194 Gr. 8
26	PACKING	GRAPHITE
26A	SEAL	LIP SEAL
26B	BUSHING	ASTM A 479 Gr. 316
47	BUSHING	DU (GLACIER)
47A	BUSHING	DU (GLACIER)
48	PIN	ASTM A 479 Gr. 316
64	WASHER	ASTM A 240 Gr. 316
144	SPRING WASHER	INCONEL X-718
169	STOP BOL T	ASTM A 479 Gr. 316
178	SOCKET BOL T	ASTM A 479 Gr. 316
179	COUPLING	ASTM A 240 Gr. 316
190	SPRING WASHER	ASTM A 29 Gr. 6150 + GEOMET
256	TRANSITION PIECE	ASTM A 312 TP. 304/304L
299	STOP COLLAR	ASTM A 240 Gr. 316
313	WASHER	KEL-F
444	COLLAR DRIP	ASTM A 240 Gr. 316

SPLIT BODY CRYOGENIC BALL VALVE

Sample drawing 1

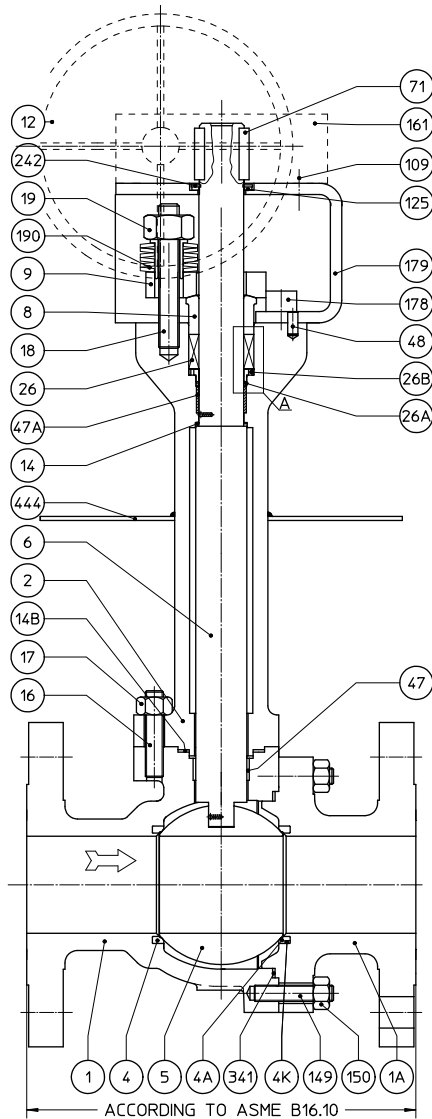


CF8M-316 MATERIAL

NO.	PART	MATERIAL
1	BODY	ASTM A 351 CF8M
1A	BODY	ASTM A 351 CF8M
2	BONNET	ASTM A 351 CF8M
2A	TILE	ASTM A 240 Gr. 316
2B	SEAL	LIP SEAL
4	SEAT	ASTM A 182 F-316 + KEL-F
4K	SEAL	LIP SEAL
5	BALL	ASTM A 182 F-316
5A	WASHER	PTFE
6	STEM	ASTM A 182 F-316
8	GLAND BUSHING	ASTM A 479 Gr. 316
9	GLAND FLANGE	ASTM A 351 CF8M
12	HANDWHEEL	CARBON STEEL
14	GASKET	SPIRAL WOUND 316L + GRAPHITE
14A	GASKET	KEL-F
16	STUD BOLT	ASTM A 320 B8 CLASS 2
17	NUT	ASTM A 194 Gr. 8
18	STUD BOLT	ASTM A 320 B8 CLASS 2
19	NUT	ASTM A 194 Gr. 8
24	PLUG	ASTM A 182 F-316L
26	PACKING	GRAPHITE
26A	SEAL	LIP SEAL
26B	BUSHING	ASTM A 479 Gr. 316
47	BUSHING	DU (GLACIER)
47A	BUSHING	DU (GLACIER)
48	PIN	ASTM A 479 Gr. 316
64	PIN	ASTM A 479 Gr. 316
71	KEY	ASTM A 29 G 1045
109	SOCKET BOLT	ASTM A 479 Gr. 316
144	SPRING WASHER	INCONEL X-750
149	STUD BOLT	ASTM A 320 B8 CLASS 2
150	NUT	ASTM A 194 Gr. 8
161	GEAR BOX	COMMERCIAL
178	SOCKET BOLT	ASTM A 479 Gr. 316
179	COUPLING	ASTM A 36
190	SPRING WASHER	ASTM A 29 Gr. 6150 + GEOMET
341	GASKET	SPIRAL WOUND 316L + GRAPHITE
341B	SEAL	LIP SEAL
444	COLLAR DRIP	ASTM A 240 Gr. 316

SPLIT BODY CRYOGENIC BALL VALVE

Sample drawing 2

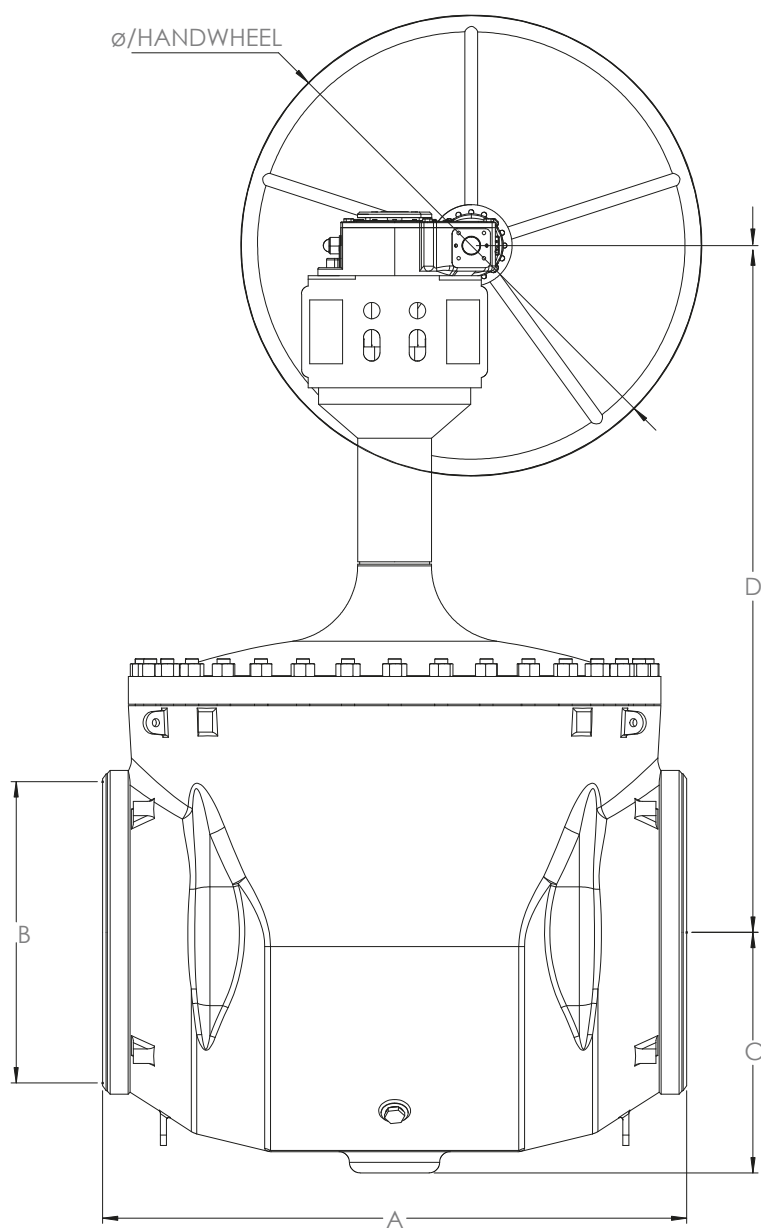


CF8M-316 MATERIAL

NO.	PART	MATERIAL
1	BODY	ASTM A 351 CF8M
1A	BODY	ASTM A 351 CF8M
2	BONNET	ASTM A 351 CF8M
4	SEAT RING	KELF
4A	SEAT RING	KELF
4K	SEAL	LIP SEAL
5	BALL	ASTM A 351 CF8M
6	STEM	ASTM A 479 Gr. 316
8	GLAND BUSHING	ASTM A 479 Gr. 316
9	GLAND FLANGE	ASTM A 240 Gr. 304
12	HANDWHEEL	ASTM A 29 Gr. 1518
14	GASKET	KELF
14B	GASKET	SPIRAL WOUND 316L + GRAPHITE
16	STUD BOLT	ASTM A 320 B8 CLASS 2
17	NUT	ASTM A 194 Gr. 8
18	STUD BOLT	ASTM A 320 B8 CLASS 2
19	NUT	ASTM A 194 Gr. 8
26	PACKING	GRAPHITE
26A	SEAL	LIP SEAL
26B	BUSHING	ASTM A 479 Gr. 316
47	BUSHING	DU "GLACIER"
47A	BUSHING	DU "GLACIER"
48	PIN	ASTM A 479 Gr. 316
71	KEY	ASTM A 29 Gr. 1045
109	SOCKET BOLT	ASTM A 479 Gr. 316
125	WASHER	ASTM B 62 4A
149	STUD BOLT	ASTM A 320 B8 CLASS 2
150	NUT	ASTM A 194 Gr. 8
161	GEAR	COMMERCIAL
178	SOCKET BOLT	ASTM A 479 Gr. 316
179	COUPLING	ASTM A 240 Gr. 316
190	SPRING WASHER	ASTM A 29 Gr. 6150 + GEOMET
242	CIRCLIP	COMMERCIAL
341	GASKET	SPIRAL WOUND 316L + GRAPHITE
444	COLLAR DRIP	ASTM A 240 Gr. 316

8. DIMENSIONAL TABLES

TOP ENTRY CRYOGENIC BALL VALVE



SIZE	A_BW	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
150 LBS							
2	215,9	49	70,4	580,5	100	23	481
3	282,4	74	86,8	619,9	100	46	1168
4	304,8	100	104,6	677,1	300	77	2174
6	457,2	150	139,4	782	700	183	5042
8	520,7	201	174,1	855,6	1000	311	8984
10	558,8	252	210,9	930,8	1000	455	14848
12	635	303	248,5	997,1	600	670	21803
14	762	334	273,2	1059,6	600	952	26881
16	838,2	385	313,7	1112,6	600	1283	36125
18	914,4	436	353,7	1207,1	600	1724	46575
20	990,6	487	391,7	1250,7	900	2219	58663
22	1092,2	538	433,6	1295,7	900	2828	72209
24	1143	589	473,7	1344,5	900	3393	87223
26	1244,6	633	507,8	1380,6	700	4112	101366
28	1346,2	684	548,2	1509,1	900	5327	119145
30	1397	735	588,4	1547,6	900	6140	138422
32	1524	779	624	1599,9	900	7355	156264
34	1625,6	830	663,8	1686,5	900	8800	178354
36	1727,2	874	698,2	1717,1	900	10091	198634
38	1777	925	738,1	1797,9	900	11622	223563
40	1862,8	976	773,1	1836,1	900	13187	250027
42	1948,7	1020	807,9	1926	1000	15068	274096
44	2034,8	1069	846,2	1922,2	1000	16666	302845
46	2120,6	1118	884,2	1997,4	1000	18922	326917
48	2206,5	1166	921,5	2068,2	1000	21260	362228
50	2292,6	1208	954,4	2151,8	1000	23773	379925
52	2378,5	1250	987	2222,6	1000	26330	417332
54	2464,3	1312	1035,2	2291,5	1000	29783	463896
56	2550,4	1360	1072,7	2362,6	1000	32937	497631
58	2636,3	1415	1115,6	2414,8	1000	36348	540535
60	2722,1	1458	1149	2832,1	1000	43502	577010

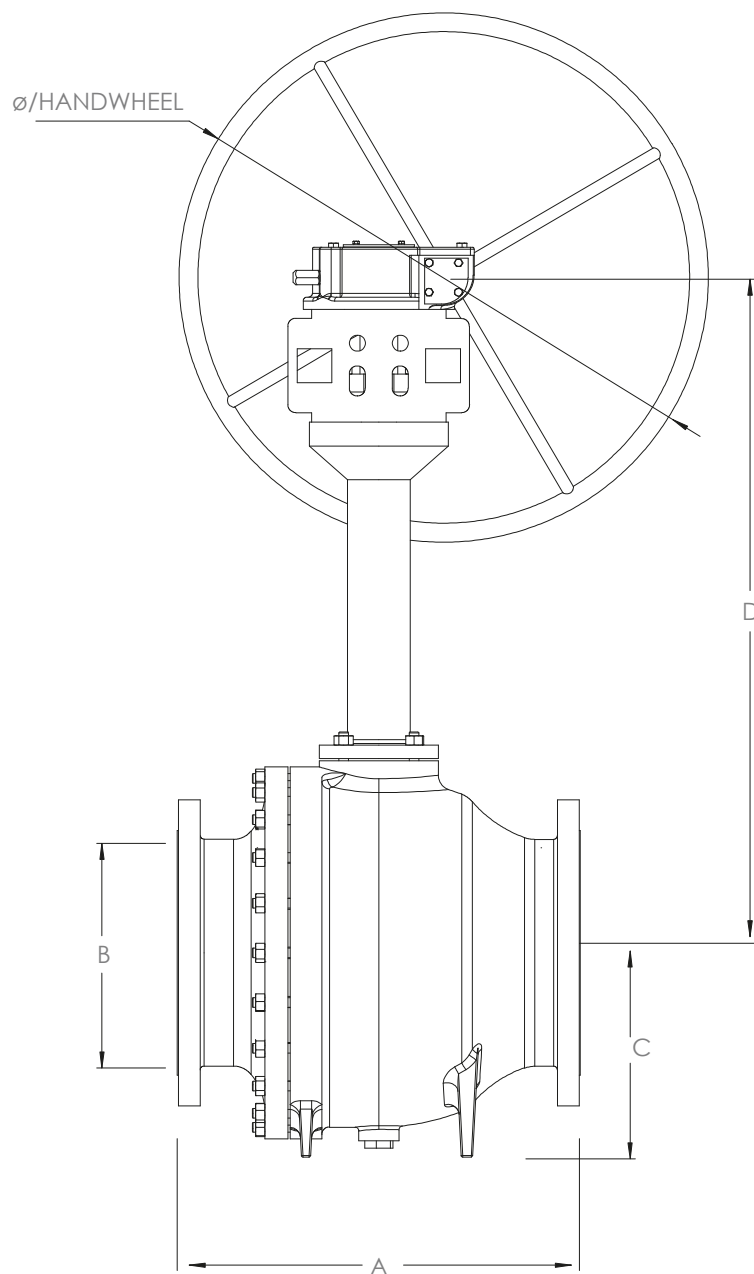
SIZE	A_BW	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
600 LBS							
2	292,1	49	71	613,7	300	49	481
3	355,6	74	88,5	661,2	700	87	1168
4	431,8	100	112,5	723,2	1000	156	2174
6	558,8	150	143	839,3	600	334	5042
8	660,4	201	179,4	944,8	600	603	8984
10	787,4	252	223	1045,8	900	1030	14848
12	838,2	303	264	1007	900	1303	20840
14	889	334	294	1087	900	1637	26881
16	990,6	385	331,1	1180,5	900	2387	36125
18	1092,2	436	371,1	1277,6	900	3186	46575
20	1193,8	487	407,4	1334,5	900	4060	52462
22	1295,4	538	450,4	1421,8	900	5291	72209
24	1397	589	492,5	1506,5	1000	6599	87223
26	1447,8	633	528,4	1574	1000	7680	101366
28	1549,4	684	570,5	1685,2	1000	9547	119145
30	1651	735	611,9	1736,5	1000	11462	138422
32	1778	779	649,3	1792,9	1000	13507	156264
34	1930,4	830	690,7	1869,1	1000	16475	178354
36	2082,8	874	726,6	2015,9	1000	20673	198634
38	2100,6	925	768,6	2052,1	1000	22546	223563
40	2200,4	976	805	2165,5	1000	25994	250027
42	2300,2	1020	841,4	2251,6	1000	29372	274096
44	2400,3	1069	881,87	2394,2	1000	33782	302845
46	2500,1	1118	921,1	2480,4	1000	38007	326917
48	2599,9	1166	959,7	2550,8	1000	43685	362228
50	2699,8	1208	994,5	2690,2	1000	49091	379925
52	2799,6	1250	1028,8	2799,8	1000	54388	417332
54	2899,7	1312	1079,3	2927,7	1000	62511	463896
56	2999,5	1360	1118	3049,3	1000	69245	467583
58	3099,3	1415	1162,7	3126,5	1000	76190	540535
60	3199,1	1458	1197,5	3229,4	1000	83242	577010

SIZE	A_BW	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
1500 LBS							
2	3368,3	49	78,2	634,2	700	91	481
3	469,9	74	103,5	713,5	1000	194	1168
4	546,1	100	130,7	851,1	600	363	2174
6	704,9	144	166,5	949,2	900	763	4632
8	831,9	192	212,2	1073,2	900	1443	8426
10	990,6	239	263,2	1162,5	900	2261	13296
12	1130,3	287	315,8	1275,2	900	3475	19472
14	1257,3	315	335,9	1356,2	800	4429	23643
16	1384,3	360	371,5	1448,9	1000	5946	31235
18	1460,2	406	441,7	1655,8	900	8213	41177
20	1663,7	454	491,2	1729,6	900	11106	50676
22	1721,1	500	534,2	1855,5	900	14229	61461
24	1821,7	546	556,5	2052,7	900	17557	73899
26	1938,3	594	612,2	2169,1	1000	21321	88152
28	2019,3	641	667,3	2258,6	1000	24935	103380
30	2243,1	686	704,8	2322,8	1000	30321	119145
32	2373,6	730	789,8	2413,5	1000	37287	135687
34	2504,2	775	794,5	2485,9	1000	42328	153765
36	2634,7	819	823,2	2717,1	1000	51233	172579
38	2765,3	866	870,2	2798	1000	58309	186513
40	2895,6	915	913,9	2922,6	1000	66838	223060
42	3026,2	963	961,2	3039	1000	76192	250027
44	3156,7	1003	1001,4	3105,1	1000	84499	263561
46	3287,3	1049	1046,6	3209,7	1000	94852	289435

SIZE	A_BW	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
300 LBS							
2	215,9	49	70,9	588,1	100	29	481
3	282,4	74	87,7	637,8	300	62	1168
4	304,8	100	105,9	691,3	700	92	2174
6	457,2	150	141,3	781,8	700	224	5042
8	520,7	201	176,5	877,3	1000	386	8984
10	558,8	252	219,4	978,7	600	592	14848
12	635	303	251,5	1041,2	600	862	21773
14	762	334	276,8	1090,6	600	1193	26815
16	838,2	385	317,7	1175,8	900	1673	36125
18	914,4	436	358,6	1252,3	900	2207	46575
20	990,6	487	396,7	1307,4	700	2811	57067
22	1092,2	538	439,4	1410,6	900	3804	72209
24	1143	589	479,7	1475,7	900	4570	87223
26	1244,6	633	514,6	1512	900	5506	101366
28	1346,2	684	555,4	1572,4	900	6716	119145
30	1397	735	596,1	1671,8	900	8060	138422
32	1524	779	632,1	1758,7	1000	9764	156264
34	1625,6	830	672,8	1758,9	1000	11242	178354
36	1727,2	874	707,6	1821,3	1000	13086	198634
38	1777	925	747,9	1880,1	1000	14799	223563
40	1862,8	976	783,5	1974,8	1000	17273	250027
42	1948,7	1020	818,5	2020,2	1000	19369	274096
44	2034,8	1069	857,6	2077,5	1000	22056	302845
46	2120,6	1118	895,9	2179,2	1000	25081	326917
48	2206,5	1166	933,9	2286,7	1000	29158	362228
50	2292,6	1208	967,1	2415,7	1000	32799	379925
52	2378,5	1250	1000	2526,8	1000	36529	417332
54	2464,3	1312	1048,9	2632,5	1000	41259	463896
56	2550,4	1360	1087	2705,3	1000	45436	467583
58	2636,3	1415	1130,8	2776,9	1000	50201	540535
60	2722,1	1458	1164,6	2878,8	1000	55111	577010

SIZE	A_BW	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
900 LBS							
2	368,3	49	73,7	634,1	700	75	481
3	381	74	96,9	692,4	1000	129	1168
4	457,2	100	116,8	754,7	1000	216	2174
6	609,6	150	150,3	861,1	600	490	5042
8	736,6	201	190,4	962,7	900	911	8984
10	838,2	252	251,2	1047,9	900	1426	14848
12	965,2	303	299,5	1129,3	900	2249	21803
14	1028,7	322	302,3	1165,2	900	2588	24752
16	1130,3	373	351,7	1239,2	900	3505	33634
18	1219,2	423	392,8	1346,4	900	4737	43725
20	1320,8	471	430,7	1449,8	900	6096	54715
22	1423,9	522	474,9	1551,7	900	7855	67802
24	1549,4	570	514,1	1631	900	9935	81457
26	1633,7	617	556,7	1711,7	1000	11881	96095
28	1738,9	665	595,3	1859,1	1000	15584	112347
30	1843,8	712	635,9	1982,2	1000	18582	129543
32	1948,7	760	680,2	2086,3	1000	21860	148421
34	2053,8	808	718,5	2153	1000	25176	168639
36	2082,8	855	759,9	2225,8	1000	27928	189737
38	2263,9	904	802,9	2324,7	1000	33309	211152
40	2368,8	956	847,7	2425,3	1000	39654	236863
42	2473,7	1006	887,4	2506,7	1000	44919	263562
44	2578,9	1048	923,4	2634,9	1000	51770	289436
46	2683,8	1096	965,5	2742,9	1000	58179	299903
48	2788,9	1149	1012,1	2815	1000	64909	350036
50	2893,8	1184	1043,1	2927,8	1000	71569	372661
52	2998,7	1220	1074,5	3053,1	1000	78991	396702
54	3103,9	1286	1131,6	3198,9	1000	89968	445684
56	3208,8	1333	1173,1	3266,5	1000	98427	486250
58	3313,7	1387	1219,8	3337,5	1000	108138	518463

SPLIT BODY CRYOGENIC BALL VALVE



SIZE	A_RF	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
150 LBS							
2	177,8	49	152	600,2	160	21	481
3	203,2	74	167	624,8	160	34	1168
4	228,6	100	188,8	672,7	500	60	2174
6	393,7	150	204,9	726,3	500	146	5042
8	457,2	201	243	791,1	900	250	8984
10	533,4	252	255,7	894,3	900	395	14848
12	609,6	303	297,2	951,8	1000	592	21803
14	685,8	334	325,1	1047	800	797	26881
16	762	385	375	1092,1	800	1080	36125
18	863,6	436	415,5	1197,5	800	1512	46575
20	914,4	487	474,6	1262,6	700	1950	58663
22	1009,6	538	521,3	1309,8	700	2488	72209
24	1066,8	589	577,9	1378,3	700	3060	87223
26	1143	633	599,7	1472	600	3721	101366
28	1244,6	684	641,1	1595,8	700	4818	119145
30	1295,4	735	681,9	1635,1	700	5554	138422
32	1371,6	779	723	1699,6	700	6486	156264
34	1473,2	830	763,8	1758,9	700	7696	178354
36	1524	874	798,8	1862,5	700	8818	198634
38	1667	925	848,4	1934,8	800	10750	223563
40	1749,2	976	883,9	1987,9	1000	12242	250027
42	1831,4	1020	919,8	2042,4	1000	13780	274096
44	1913,5	1069	959	2090,1	1000	15496	302845
46	1995,7	1118	1003,5	2168	1000	17594	326917
48	2077,9	1166	1042	2246	1000	19800	362228
50	2160,1	1208	1075,5	2338,2	1000	22095	379925
52	2242,2	1250	1113,8	2411	1000	24618	417332
54	2324,4	1312	1163,2	2468,5	1000	27535	463896
56	2406,6	1360	1197,9	2556,3	1000	30489	497631
58	2488,8	1415	1237,8	2628,8	1000	33940	540535
60	2571,0	1458	1277,6	2701,2	1000	37106	577010

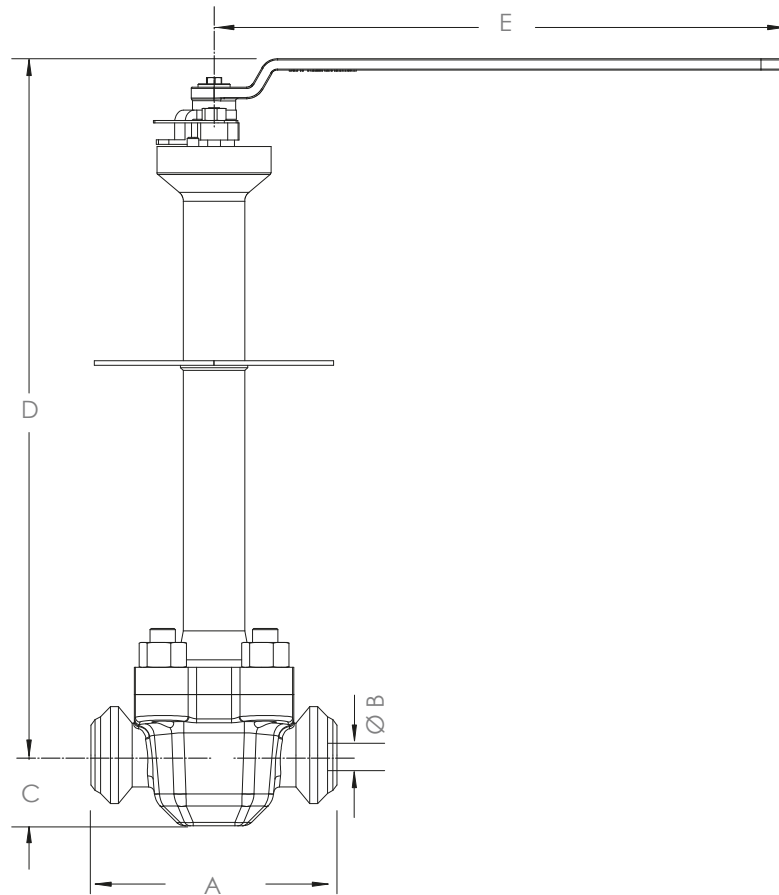
SIZE	A_RF	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
600 LBS							
2	292,1	49	151,5	636,5	500	51	481
3	355,6	74	171,7	675,2	500	87	1168
4	431,8	100	195,8	706,5	900	151	2174
6	558,8	150	248,8	809,1	900	320	5042
8	660,4	201	278,2	882,2	800	555	8984
10	787,4	252	296,6	1016,3	700	950	14848
12	838,2	303	346,6	1066,1	700	1284	20840
14	889	334	376,6	1151,9	600	1611	26881
16	990,6	385	422,2	1278,3	700	2382	36125
18	1092,2	436	467,7	1387	700	3180	46575
20	1193,8	487	515,3	1447,8	700	4057	52462
22	1295,4	538	565,9	1503,1	800	5191	72209
24	1397	589	616,5	1600,8	900	6496	87223
26	1447,8	633	661,3	1693,9	1000	7632	101366
28	1549,4	684	701,8	1798,8	1000	9394	119145
30	1651	735	762,5	1873,2	1000	11411	138422
32	1778	779	797,7	1937,1	1000	13417	156264
34	1930,4	830	848,3	1981,7	1000	16168	178354
36	2082,8	874	883,1	2190,1	1000	20554	198634
38	2100,6	925	933,9	2264	1000	22662	223563
40	2200,4	976	979,7	2363,6	1000	25949	250027
42	2300,2	1020	1015,5	2418	1000	28942	274096
44	2400,3	1069	1054,8	2485,8	1000	32443	302845
46	2500,1	1118	1155,5	2617,6	1000	37415	326917
48	2600	1166	1225,4	2709,8	1000	43447	362228
50	2699,8	1208	1295,2	2932,7	1000	49902	379925
52	2799,6	1250	1365,1	2999,9	1000	54960	417332
54	2899,7	1312	1505	3159,4	1000	64403	463896
56	2999,5	1360	1560,9	3115,1	1000	68927	467583
58	3099,3	1415	1644,7	3208,2	1000	76439	540535
60	3199,1	1458	1728,6	3301,2	1000	83849	577010

SIZE	A_RF	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
1500 LBS							
2	368,3	49	188,5	758,6	1000	146	481
3	469,9	74	201,5	795,4	1000	267	1168
4	546,1	100	246,6	878,3	800	452	2174
6	704,9	144	305,1	998,5	700	971	4632
8	831,9	192	388,3	1104,7	700	1810	8426
10	990,6	239	376,5	1273,8	700	2854	13296
12	1130,3	287	447,8	1361	800	4310	19472
14	1257,3	315	470,4	1457,8	800	5525	23643
16	1384,3	360	519,7	1539,3	800	7414	31235
18	1549,9	406	602,4	1756,2	900	10708	41177
20	1694,2	454	670,5	1784,9	900	13481	50676
22	1838,2	500	808,1	2056,9	900	19578	61461
24	1982,2	546	946,7	2215,9	900	24993	73899
26	2126,2	594	1085,8	2474,9	1000	32373	88152
28	2270,3	641	1225,4	2632,7	1000	40035	103380
30	2414,3	686	1365,1	2858,9	1000	50833	119145
32	2558,3	730	1016,2	2533,1	1000	48445	135687
34	2702,6	775	1085,8	2682,8	1000	58158	153765
36	2846,6	819	1225,4	2882	1000	69696	172579
38	2990,6	866	1365,1	3091,4	1000	83175	186513
40	3134,6	915	1505	3260,9	1000	97768	223060
42	3278,6	963	1645,1	3455,6	1000	114596	250027
44	3422,7	1003	1715,2	3548	1000	128060	263561
46	3566,9	1049	1925,5	3770,2	1000	150302	289435

SIZE	A_RF	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
300 LBS							
2	215,9	49	148,5	606,3	160	30	481
3	282,5	74	168,5	654,5	500	65	1168
4	304,8	100	190,5	680,6	500	95	2174
6	403,4	150	208,3	754,2	500	194	5042
8	501,7	201	247,9	815,3	900	354	8984
10	568,5	252	268,9	937,5	1000	569	14848
12	647,7	303	311,8	996,3	800	833	21773
14	762	334	341,7	1093,6	800	1174	26815
16	838,2	385	391,7	1145,9	700	1615	36125
18	914,4	436	432,2	1244,1	700	2153	46575
20	990,6	487	477,2	1296,4	600	2742	57067
22	1092,2	538	522,7	1411,4	700	3728	72209
24	1143	589	563,2	1460,3	700	4434	87223
26	1244,6	633	602,9	1564,2	700	5513	101366
28	1346,2	684	671,6	1670,2	700	6917	119145
30	1397	735	729,5	1735,5	800	8199	138422
32	1524	779	772,8	1821,1	1000	9918	156264
34	1625,6	830	823,6	1889,9	1000	11735	178354
36	1727,2	874	847	1967,4	1000	13624	198634
38	1777	925	894,6	2054,2	1000	15531	223563
40	1862,8	976	930,7	2125	1000	17901	250027
42	1948,7	1020	986,4	2208,5	1000	20385	274096
44	2034,8	1069	1026,2	2222,8	1000	22837	302845
46	2120,7	1118	1065,5	2385,6	1000	27078	326917
48	2206,5	1166	1123,8	2441,6	1000	30202	362228
50	2292,6	1208	1163,6	2564,9	1000	33807	379925
52	2378,5	1250	1197,7	2638,2	1000	37177	417332
54	2464,3	1312	1248,2	2721,7	1000	41652	463896
56	2550,4	1360	1282,5	2779,7	1000	45588	467583
58	2636,3	1415	1325,9	2860,6	1000	50362	540535
60	2722,1	1458	1369,2	2941,6	1000	55028	577010

SIZE	A_RF	B	C	D	HAND-WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
900 LBS							
2	368,3	49	159,8	674,4	500	77	481
3	381	74	188,6	718,4	1000	159	1168
4	457,2	100	220	768,6	900	250	2174
6	609,6	150	277,2	895,8	800	566	5042
8	736,6	201	331,7	973,4	700	1004	8984
10	838,2	252	327,2	1090,5	600	1594	14848
12	965,2	303	382,5	1193,5	700	2348	21803
14	1028,7	322	409,1	1284,8	700	2807	24752
16	1130,3	373	461,9	1355,5	700	3821	33634
18	1219,2	423	514,5	1457,2	800	5230	43725
20	1320,8	471	579,4	1581,9	900	6886	54715
22	1461,5	522	630	1679,6	900	8856	67802
24	1549,4	570	667,3	1721,5	900	10856	81457
26	1682,3	617	716,8	1843,4	1000	12947	96095
28	1792,5	665	763,6	1874,4	1000	15284	112347
30	1903	712	802,5	2046,8	1000	19702	129543
32	2013,2	760	946,7	2231,3	1000	24834	148421
34	2123,7	808	1016,2	2328,1	1000	29839	168639
36	2233,9	855	1085,8	2480,1	1000	36007	189737
38	2344,2	904	1225,4	2669,3	1000	41683	211152
40	2454,7	956	1365,1	2848,6	1000	50980	236863
42	2564,9	1006	1036,3	2578,2	1000	48396	263562
44	2675,4	1048	1085,8	2690,8	1000	55604	289436
46	2785,6	1096	1155,5	2814,9	1000	63092	299903
48	2896,1	1149	1225,4	2957	1000	71858	350036
50	3006,4	1184	1295,2	3084,2	1000	80025	372661
52	3116,8	1220	1365,1	3176,4	1000	88238	396702
54	3227,1	1286	1505	3385,9	1000	103171	445684
56	3337,6	1333	1539,0	3410,4	1000	111592	486250
58	3447,8	1387	1614,2	3512,0	1000		

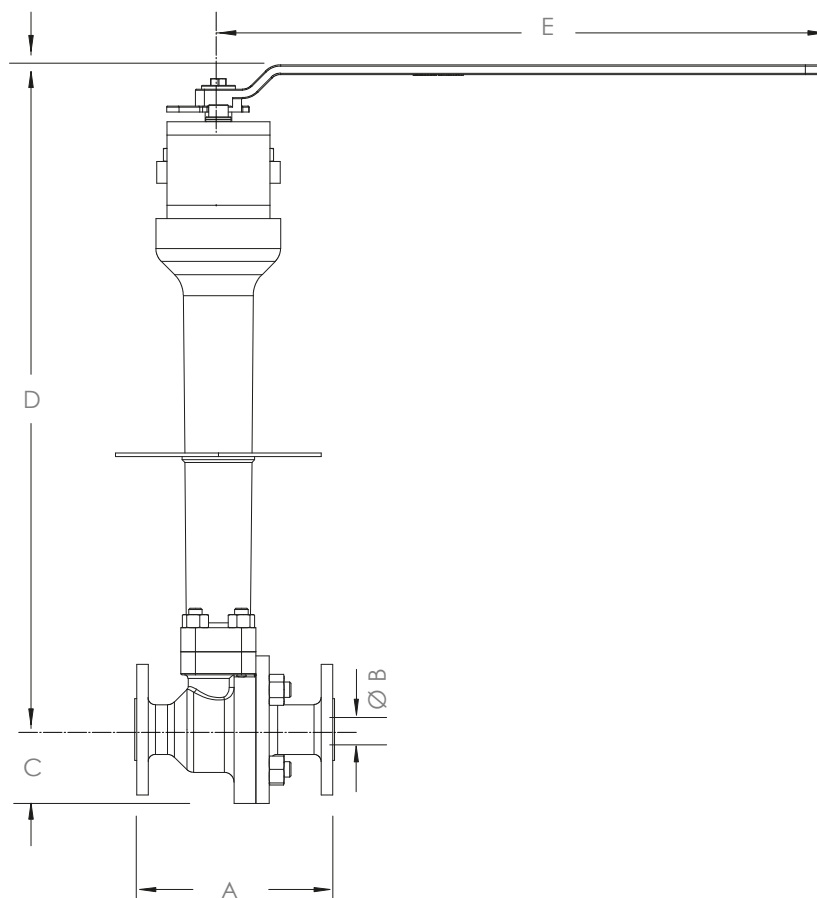
TOP ENTRY CRYOGENIC BALL VALVE



SIZE	A_BW	B	C	D	E	WEIGHT (KG)	CV (FULL BORE)
150 LBS							
1/2"	139,7	15	30,5	327	250	7	37
3/4"	152,4	19	37,5	364	250	8	76
1"	165,1	25	48	385	350	17	130
1 1/4"	177,8	32	61	424,7	350	23	212
1 1/2"	190,5	38	62	464	500	29	300
600 LBS							
1/2"	165,1	15	30,5	327	250	7	37
3/4"	190,5	19	37,5	364	250	8	76
1"	215,9	25	48	385	350	17	130
1 1/2"	241,3	38	62	464	500	30	300
2"	292,1	50	83	557	500	52	481
1500 LBS							
1/2"	215,9	13	35	327	350	16	37
3/4"	228,6	17	45	364	500	20	76
1"	254	22	37,26	385	650	36	84
1 1/2"	304,8	35	68	464	800	62	226
2"	368,3	50	91	557	450	91	481

SIZE	A_BW	B	C	D	E	WEIGHT (KG)	CV (FULL BORE)
300 LBS							
1/2"	139,7	15	30,5	327	250	7	37
3/4"	152,4	19	37,5	364	250	9	76
1"	165,1	25	48	384,5	350	17	130
1 1/2"	190,5	38	62	463,7	500	17	300
900 LBS							
1/2"	215,9	13	35	464	350	16	37
3/4"	228,6	17	31,8	364	500	20	76
1"	254	22	57	385	650	36	84
1 1/2"	304,8	35	68	464	800	62	226
2"	368,3	50	91	557	450	78	481
2500 LBS							
1/2"	215,9	12	50,25	449,5	500	42	37
3/4"	273	15	50,25	449,5	500	44	76
1 1/2"	381	29	82	537,5	500	151	151

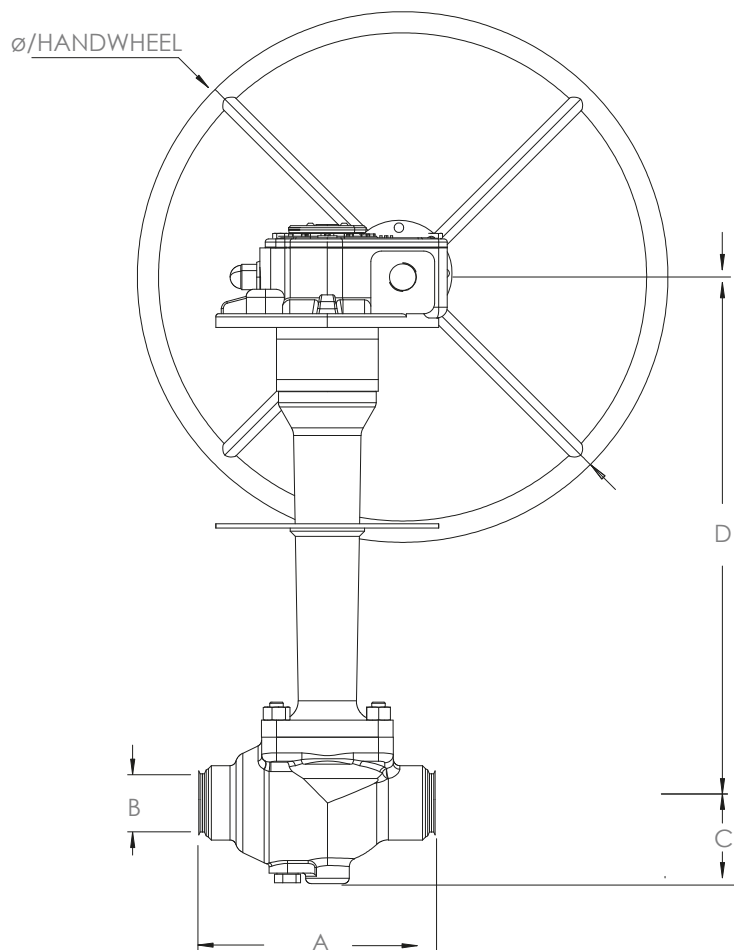
SPLIT BODY CRYOGENIC BALL VALVE



SIZE	A _{RF}	B	C	D	E	WEIGHT (KG)	CV (FULL BORE)
150 LBS							
1/2"x3/8"	108	11	44,5	509,5	250	10	-
1/2"	108	13	44,5	485,4	250	10	37
3/4"	127	20	53,5	466,8	500	17	76
1"	165,1	25	61	466,8	500	25	130
1 1/2"	165,1	38	76,2	560	500	30	300
2"	177,8	50	77	601,5	457	49	481
3"	203,2	76	100	667,5	457	85	1168
4"	228,6	102	124,5	686,9	457	111	2174
6"	394	152	172	924,9	450	130	5042
600 LBS							
1/2"x3/8"	139,7	11	47,6	261,8	250	14	-
1/2"	139,7	13	47,6	490	250	14	37
3/4"	152,4	20	58,7	526	500	17	76
1"	165,1	25	62	562,2	500	30	130
1500 LBS							
1/2"	241,5	15	73,5	460	300	31	37
3/4"	244,5	19	74,5	695	500	42	76
1"	266,7	25	81	863,5	600	60	84
1 1/2"	304,8	38	108	671,5	600	85	226

SIZE	A _{RF}	B	C	D	E	WEIGHT (KG)	CV (FULL BORE)
300 LBS							
1/2"x3/8"	139,7	11	48	510	250	13	-
1/2"	139,7	13	48	490	250	13	37
3/4"	152,4	20	59	706,3	500	18	76
1"	165,1	25	62	568,2	500	25	130
1 1/2"	190,5	38	77,7	579	500	33	300
2"	215,9	50	72,5	600	457	52	481
3"	282,6	76	105	667,5	457	98	1168
4"	304,8	102	135	804,9	457	163	2174
6"	403	152	180	1004,4	500	234	5042
900 LBS							
1/2"	241,5	15	73,5	465,8	300	31	37
3/4"	244,5	19	74,5	574,8	500	42	76
1"	266,7	25	89	487	600	60	84
2500 LBS							
3/4"	308	15	86,5	626,7	400	52	76
1"	308	19	90,5	511,7	400	78	61

TOP ENTRY CRYOGENIC BALL VALVE



SIZE	A_BW	B	C	D	HAND - WHEEL Ø	WEIGHT (KG)	CV (FULL BORE)
150 LBS							
2"	215,9	50	57,5	485,5	457	52	481
3"	282,6	76	75	538	457	78	1168
3"x2"	282,6	50	57,5	485,5	457	45,5	-
4"	393,7	102	94	635	457	110,5	2174
4"x3"	304,8	76	75	538	457	78	-
6"	457,2	150	-	639	610	234	5042
6"x4"	457,2	102	94	635	457	130	-
8"x6"	520,7	150	94	689	610	260	-

"Due to engineering activities, all the above dimensions, weights and cv values 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, weights and cv values 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 72 hours.
Experience in executing global maintenance service for complete projects.



Commitment made of steel

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