GWC ITALIA

Proven technology
for individual valve solutions
worldwide

CRYOGENIC TRUNNION MOUNTED BALL VALVES API 6D

CTBV-1002

GWC ITALIA

Worldwide Network

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GWC Italia SpA with its Headquarters in Milan, Italy fully designs, manufactures and markets valves with one of the most extensive Trunnion Mounted Ball Valve lines you will find in the Industry today. GWC Italia which was founded by an Italian Group & USA Entrepreneurial Management team has a history of building and managing successful valve Manufacturing companies over the past 40 years. GWC Italia Valves are used in major applications for Upstream, Downstream & Transportation Segments of the Oil & Gas Industry, E&P, Petrochemical, Chemical, Mining/Minerals, Power, Marine and Industrial markets.

GWC Italia's extensive line of valve and flow control products include:

- Trunnion Mounted Ball Valves (soft & metal seated)
  - Split Body
  - Top Entry
  - Welded Body
  - Subsea
  - Cryogenic & High Temperature
  - Compact Body (Twin Ball)
- Floating Ball Valves
- Pipeline Check Valves
- Gate, Globe and Check Valves including Cast & Forged
- Needle & Gauge Valves

Proven technology for individual valve solutions worldwide

CERTIFICATIONS & STANDARDS

American Standards

American Petroleum Institute

API-6D	Specification for Pipeline Valves
API-6D SS	Specification for Subsea Pipeline Valves
API-6A	Specification for Wellhead and Christmas Tree Equipment
API-6FA	Specification for Fire Test for Valves
API-607	Fire Test for Soft-Seated Quarter-Turn Valves
API-608	Metal Ball Valves - Flanged, Threaded, and Welding End
API-Q1	Specification for Quality Programs for the Petroleum, Petrochemical & Natural Gas

International Standards

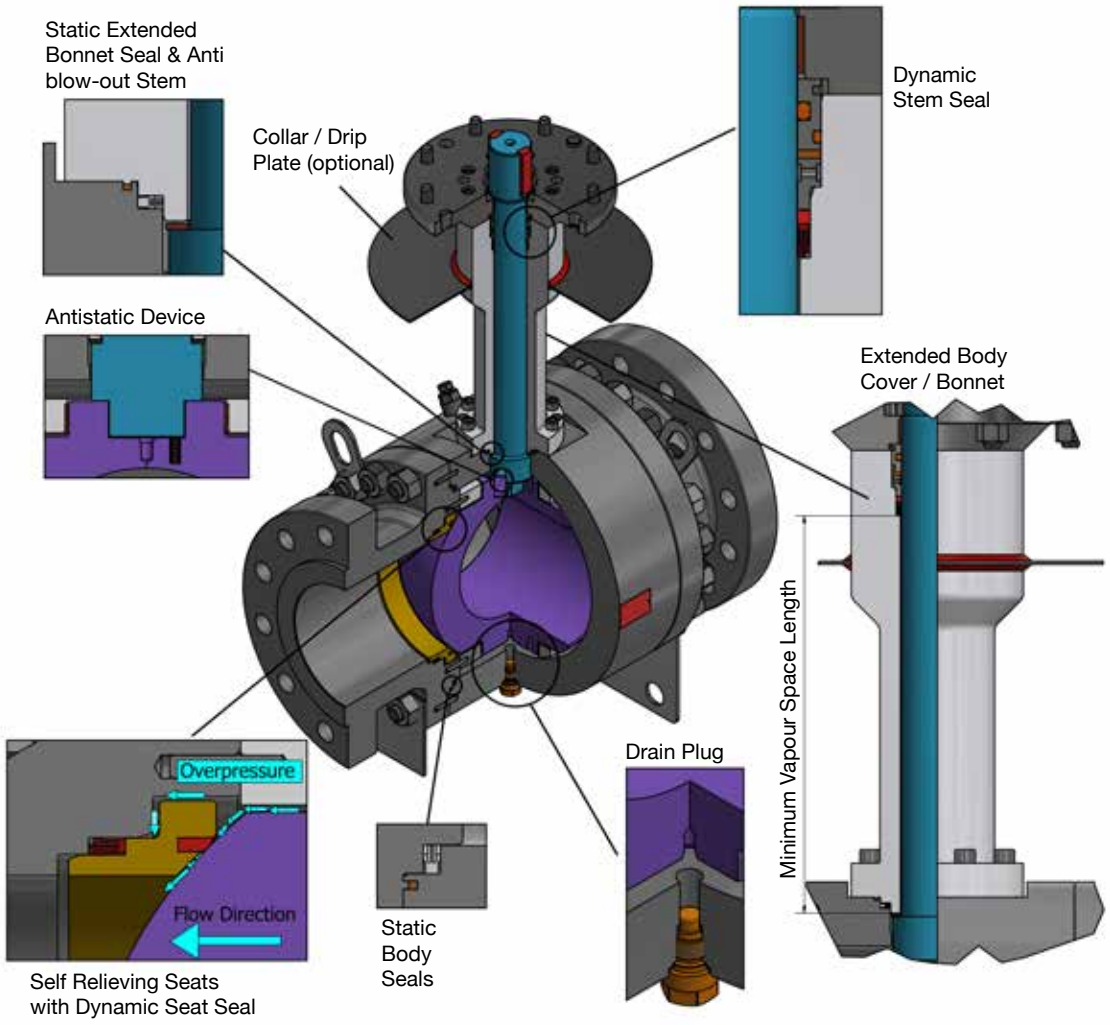
ISO 9001:2008	Quality Management Systems
ISO 14001	Environmental Management
OHSAS 18001:2007	Occupational Health and Safety Management System
ISO/TS 29001	Petroleum, Petrochemical and Natural Gas Industries - Sector Specific Quality Management Systems
CE/PED	Pressure Equipment Directive
CU-TR	Technical Reglament Conformity Certificate TRCU
CRN	Canadian Registration Number
Z245.15.96	Pipeline Steel Valves
ATEX	European for explosive atmosphere
SIL3	Measurement of performance required for safety instrument function
ABS	American Bureau of Shipping

GWC ITALIA CRYOGENIC BALL VALVE DESIGN

GWC Italia soft and metal seated Cryogenic Ball Valves may be used in processes involving cryogenic fluids, or that have exposure to extreme low temperature conditions; -50°C to -200°C (-58°F to -328°F).

Design Guidelines

- Design & Construction as per API-6D
- Pressure & Temperature Ratings as per B16.34
- Bolting as per ASME VIII
- Ends according to B16.5 / B16.47 Series A or B B16.25 and/or B16.11
- Fire Safe as per API-607 or API-6FA
- BS 6364
- MESC SPE 77/200
- MSS SP 134
- Customer Specifications



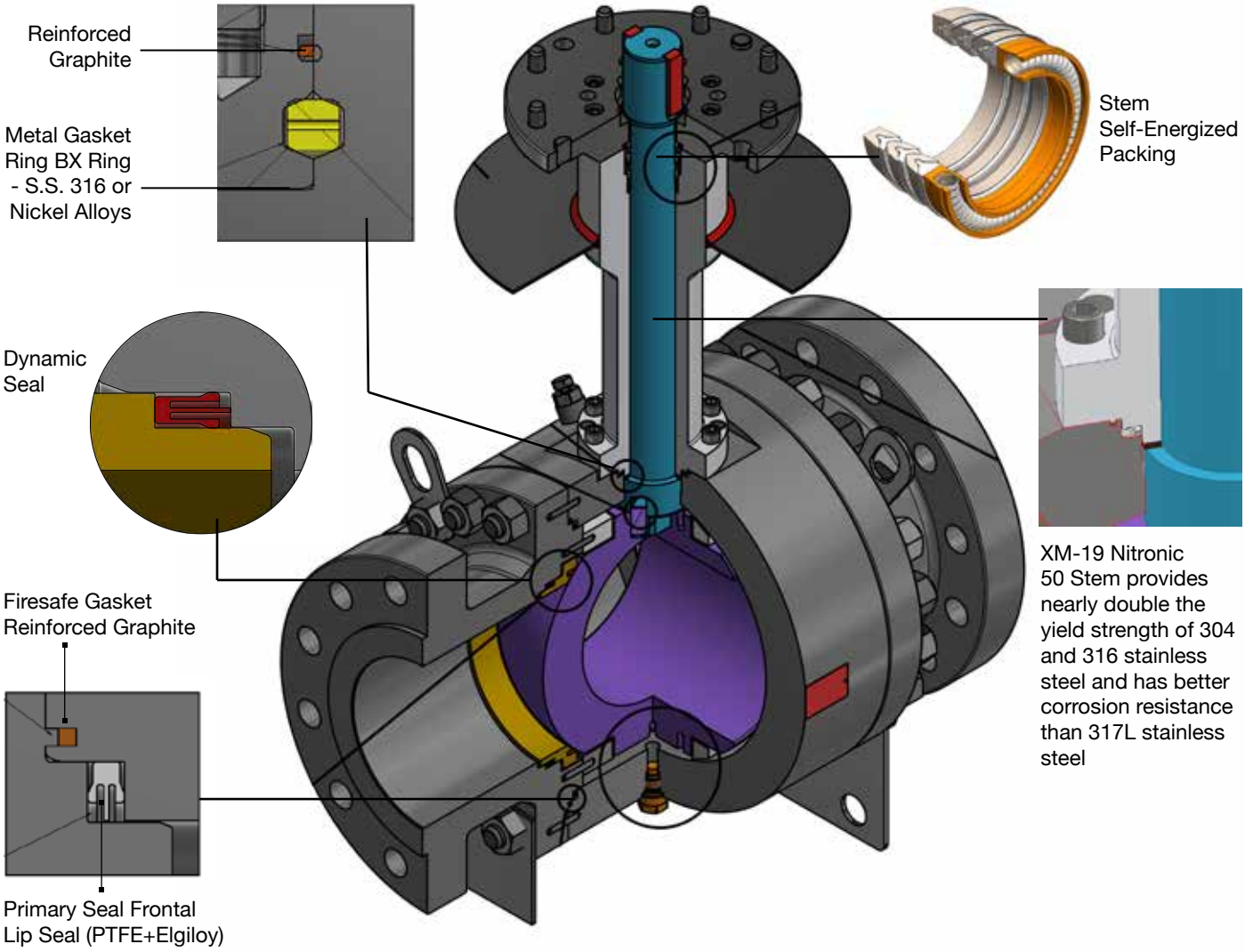
Applications

- LNG Liquefaction
- LNG Regasification
- LNG Peak Shavers
- Small Scale LNG
- Cryogenic Gas Processing Plants
- Fractionation Plants
- ESDV
- Air Separation
- LNG Fueling
- FLNG & FSRU
- LNG Carriers

GWC ITALIA CRYOGENIC BALL VALVES MAIN DESIGN FEATURES

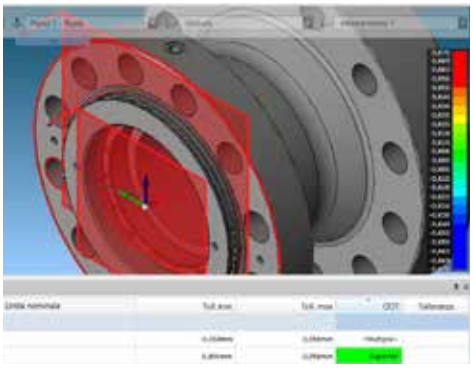
Our field proven design is the result of over 50 years of engineering evolution

GWC Italia's from-the-ground-up cryogenic ball valve design combines specially designed seals with very close mechanical tolerances to achieve optimal performance at cryogenic temperatures and to maintain positive sealing during thermal swings.



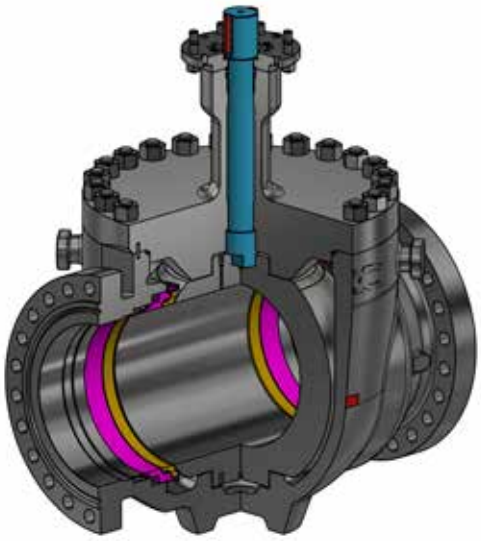
XM-19 Nitronic 50 Stem provides nearly double the yield strength of 304 and 316 stainless steel and has better corrosion resistance than 317L stainless steel

An electronic arm (CMM) is used to perform a 3D measurement of the critical cryogenic valve components. The readings are then compared against the digital CAD files in order to ensure tolerances are within the required limits that will guarantee sealing in demanding cryogenic applications.



CRYOGENIC VALVE PRODUCT OVERVIEW

Model FT
Top Entry Bolted Bonnet

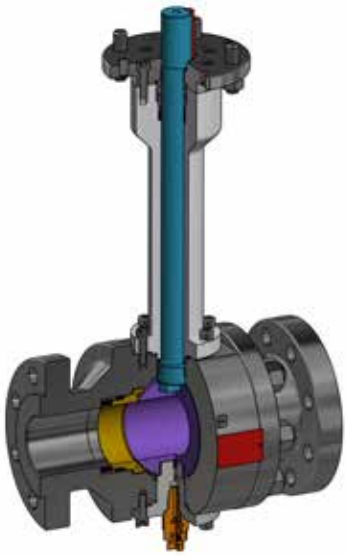


The Top Entry design permits full maintenance in-line and allows for the valve to be welded to the pipeline. Its one-piece-body minimizes potential leakage paths.

FEATURES

- 1-Piece Body
- Full and Reduced Bore
- Trunnion Mounted
- Double Block and Bleed
- Single or Double Piston Effect Seat Design
- Anti-blow Out Stem
- Anti-static Device
- Firesafe To API-607 / 6FA / ISO 10497
- Spring Loaded Seats

Model F or FF
Side Entry Bolted Body



The Side Entry design allows for simple on-site disassembly and re-assembly, and it's components are easy to align.

FEATURES

- 2-3-Piece Body
- Full and Reduced Bore
- Trunnion Mounted
- Double Block and Bleed
- Single or Double Piston Effect Seat Design
- Anti-blow Out Stem Anti-static Device
- Firesafe To API-607 / 6FA / ISO 10497
- Spring Loaded Seats

PRESSURE CLASS / SIZE (in/mm)			
ASME 150-600	**ASME 900**	**ASME 1500**	**ASME 2500**
2 " -56 " 50-1400	2"- 30” 50-750	2”-24” 50-600	2"-16” 50-400

ORDERING GUIDE

Example: 12” Figure # FF600-1-LF-M7-GO

FF	60	0	–	1	–	LF	–	M	7	–	GO
1.	2.	3.		4.		5.		6.	7.		8.

12” CLASS 600 TRUNNION BALL VALVE, FULL BORE, 3-PC, FLG-RF, SINGLE PISTON EFFECT, F316 BODY X SS 316 TRIM, METAL TO METAL SEAT, PTFE+ELGILOY SEAL, NACE, FIRESAFE, GEAR OP.

1. MODEL

F - TRUNNION BALL, 2 PIECE, SPLIT BODY, FULL BORE
G - TRUNNION BALL, 2 PIECE, SPLIT BODY, REDUCED BORE
FF - TRUNNION BALL, 3 PIECE, SPLIT BODY, FULL BORE
GG - TRUNNION BALL, 3 PIECE, SPLIT BODY, REDUCED BORE
FT - TRUNNION BALL, 1 PIECE, TOP ENTRY, FULL BORE
GT - TRUNNION BALL, 1 PIECE, TOP ENTRY, REDUCED BORE

2. RATING

15 - CLASS 150
30 - CLASS 300
60 - CLASS 600
90 - CLASS 900
150 - CLASS 1500
250 - CLASS 2500

3. END CONNECTION

0 - RF FLANGED
7 - BUTTWELD (SCHEDULE REQUIRED)
8 - BUTTWELD X RF ENDS
9 - RING JOINT
X - SPECIAL

4. TYPE

1 – SINGLE PISTON EFFECT (SPE)
2 – DOUBLE PISTON EFFECT (DPE)
3 – SINGLE X DOUBLE PISTON EFFECT (SPE x DPE)

5. MATERIAL (BODY + TRIM)

KC - CF8 + 304
KF - F304 + 304
LC - CF8M + 316
LF - F316 + 316
MC - CF3 + 304L
MF - F304L + 304L
NC - CF3M + 316L
NF - F316L + 316L
X - SPECIAL

6. MATERIAL (SEAT)

M - METAL TO METAL
U - PCTFE (KEL-F)®
V - PEEK
X - SPECIAL

7. MATERIAL (O-RING SEAL)

7 - PTFE + ELGILOY
X - SPECIAL

8. OPERATOR

L - LEVER
GO - GEAR
B - BARE STEM

9. SPECIAL REQUIREMENTS

S - SUPPLY COMPLETE INFORMATION

RIGOROUS IN-HOUSE CRYOGENIC TESTING

GWC Italia's own 20,000 liter (5,284 gallon) liquid nitrogen tank, regasification system and cryogenic pump

GWC Italia's Milan Plant has two modern Cryogenic test benches that are remotely operated and monitored from outside their bunkers.

Our test procedure includes accurate torque measurement to validate valve operability under cryogenic conditions.

STANDARD MATERIALS

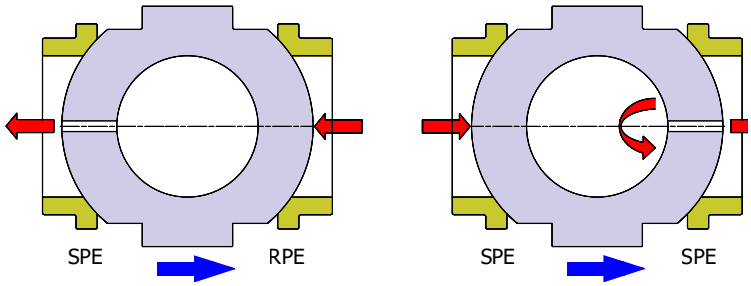
Body and Cover	■ ASTM A479 Tp316/316L ■ ASTM A182 F316/316L ■ ASTM A351 CF8M/CF3M	■ ASTM A479 Tp304/304L ■ ASTM A182 F304/304L ■ ASTM A351 CF8/CF3
Ball	■ ASTM A479 Tp316/316L ■ ASTM A182 F316/316L ■ ASTM A182 FXM19[2] ■ ASTM A351 CF8M/CF3M	■ ASTM A479 Tp304/304L ■ ASTM A182 F304/304L ■ ASTM A182 FXM19[2] ■ ASTM A351 CF8/CF3
Seat	■ ASTM A479 Tp316/316L ■ ASTM A182 F316/316L ■ ASTM A182 FXM19[2] ■ ASTM A351 CF8M/CF3M	■ ASTM A479 Tp304/304L ■ ASTM A182 F304/304L ■ ASTM A182 FXM19[2] ■ ASTM A351 CF8/CF3
Seat Insert	■ PCTFE / KEL-F®[1] ■ Metal Seats	
Stem	■ ASTM A479 XM19 (Nitronic 50)[2] ■ ASTM A479 Tp316/316L	■ ASTM A479 XM19 (Nitronic 50)[2] ■ ASTM A479 Tp316/316L
Stem Dynamic Seals	■ Primary Seal: V-Pack Self-Energized Packing[2] ■ Primary Seal: Lip Seal ■ Firesafe Gasket: Reinforced Graphite	
Extended Bonnet	■ ASTM A479 Tp316/316L ■ ASTM A182 F316/316L	■ ASTM A479 Tp304/304L ■ ASTM A182 F304/304L[2]
Bolting	■ ASTM A320 B8M Cl.2 ■ ASTM A194 8M	■ ASTM A320 B8 Cl.2 ■ ASTM A194 8
Plug & Bleeder	■ ASTM A479 Tp. 316/316L	

General Notes: The valve components shown on the left can be supplied in different material combinations dependent on valve size and class.
[1] Please consult the factory for soft seat valve size/class breakdown.
[2] Dependent on valve size and class.

CRYOGENIC BALL VALVE SEAT CONFIGURATION OPTIONS

UNDIRECTIONAL VALVE

Type		Seat (1)	Seat (2)	Sealing Side	Double Barrier Side	Pressure Relief Side
1	SPE-RPE	Single Piston Effect (*)	Reverse Piston Effect	Upstream /Downstream	N/A	Upstream
2	SPE-SPE	Single Piston Effect	Single Piston Effect (**)	Upstream	N/A	Downstream

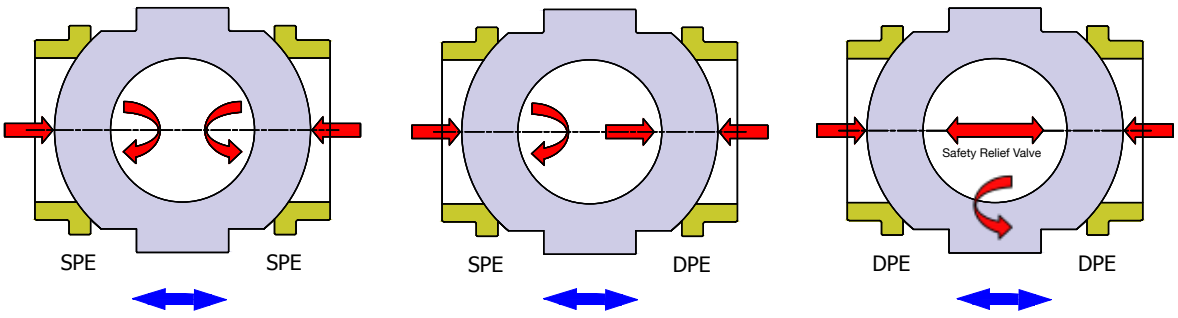


With equalizing / cavity vent orifice

1. **2.**

BIDIRECTIONAL VALVE

Type		Seat (1)	Seat (2)	Sealing Side	Double Barrier Side	Pressure Relief Side
3	SPE-SPE	Single Piston Effect	Single Piston Effect	Both sides	Missing	Downstream Seat side
4	SPE-DPE	Single Piston Effect	Double Piston Effect	Both sides	Double Piston Seat side	Single Piston Seat side
5	DPE-DPE (DIB-1)	Double Piston Effect	Double Piston Effect	Both sides	Both sides	Safety Relief Valve shall be installed



Bidirectional Flow Direction

3. **4.** **5.**

TEST PRESSURE & CV DATA

RATING AND TEST PRESSURES AT AMBIENT TEMPERATURE												
ASME CLASS	RATING [1]			BODY TEST			H.P. SEAT TEST			AIR SEAT TEST		
	Psi	Bar	MPa	Psi	Bar	MPa	Psi	Bar	MPa	Psi	Bar	MPa
150	285	19,6	2.0	427.5	29.4	2.9	313.5	21.6	2.2	100	7	0.7
300	740	51,1	5.1	1110	76.7	7.7	814	56.2	5.6	100	7	0.7
600	1480	102,1	10.2	2220	153.2	15.3	1628	112.3	11.2	100	7	0.7
900	2220	153,2	15.3	3330	229.8	23.0	2442	168.5	16.9	100	7	0.7
1500	3705	255,3	25.5	5557.5	383.0	38.3	4075.5	280.8	28.1	100	7	0.7
2500	6170	425,5	42.6	9255	638.3	63.8	6787	468.1	46.8	100	7	0.7

[1] Ratings for Group 1.1 Materials of ASME B16.34

Cv FLOW COEFFICIENTS (API6D)						
BORE (INCHES)	ASME CLASSES					
	150	300	600	900	1500	2500
	[gal/min]					
2	490	430	360	320	320	190
3 x 2	320	290	260	260	240	150
3	1300	1060	930	900	800	460
4 x 3	760	700	630	620	590	360
4	2620	2220	1820	1770	1610	1020
6 x 4	1330	1320	1200	1170	1110	740
6	5540	5470	4570	4370	3650	2510
8 x 6	3130	3070	2880	2800	2470	1870
8	10970	10430	9000	8490	7100	5350
10 x 8	5890	5820	5430	5350	4640	3690
10	18080	17470	14690	14220	11410	8440
12 x 10	9710	9600	9120	8840	7560	6100
14 x 10	9120	8940	8680	8450	7120	-
12	27170	26300	22960	21330	17160	-
14 x 12	16440	16050	15460	16300	12520	-
16 x 12	13530	13310	12900	12740	10680	-
14	33200	31400	28960	24490	20900	-
16 x 14	18330	18010	17410	15500	14280	-
16	45160	42960	39350	33960	27990	-
18 x 16	25230	24960	24070	21850	19210	-
20 x 16	22230	21950	21250	19470	17130	-
18	58410	56710	51690	45270	36260	-
20 x 18	33860	33340	32080	29500	25180	-
20	75730	72600	65910	57540	46620	-
24 x 20	37260	36870	35660	32520	-	-
24	113360	109380	98610	86160	-	-
30 x 24	53330	52760	51400	46770	-	-
26	132120	126410	116940	102550	-	-
28	154110	148030	137710	125230	-	-
30	182380	175390	160980	139120	-	-
36 x 30	87620	86030	83440	75850	-	-
36	264700	248260	225600	203660	-	-

Cv: Flow rate of water is expressed in gallons per minute, at 60 ºF with a pressure drop of one psig across the valve.

Cryogenic ball valve ready to be pressure tested

WHY GWC ITALIA?

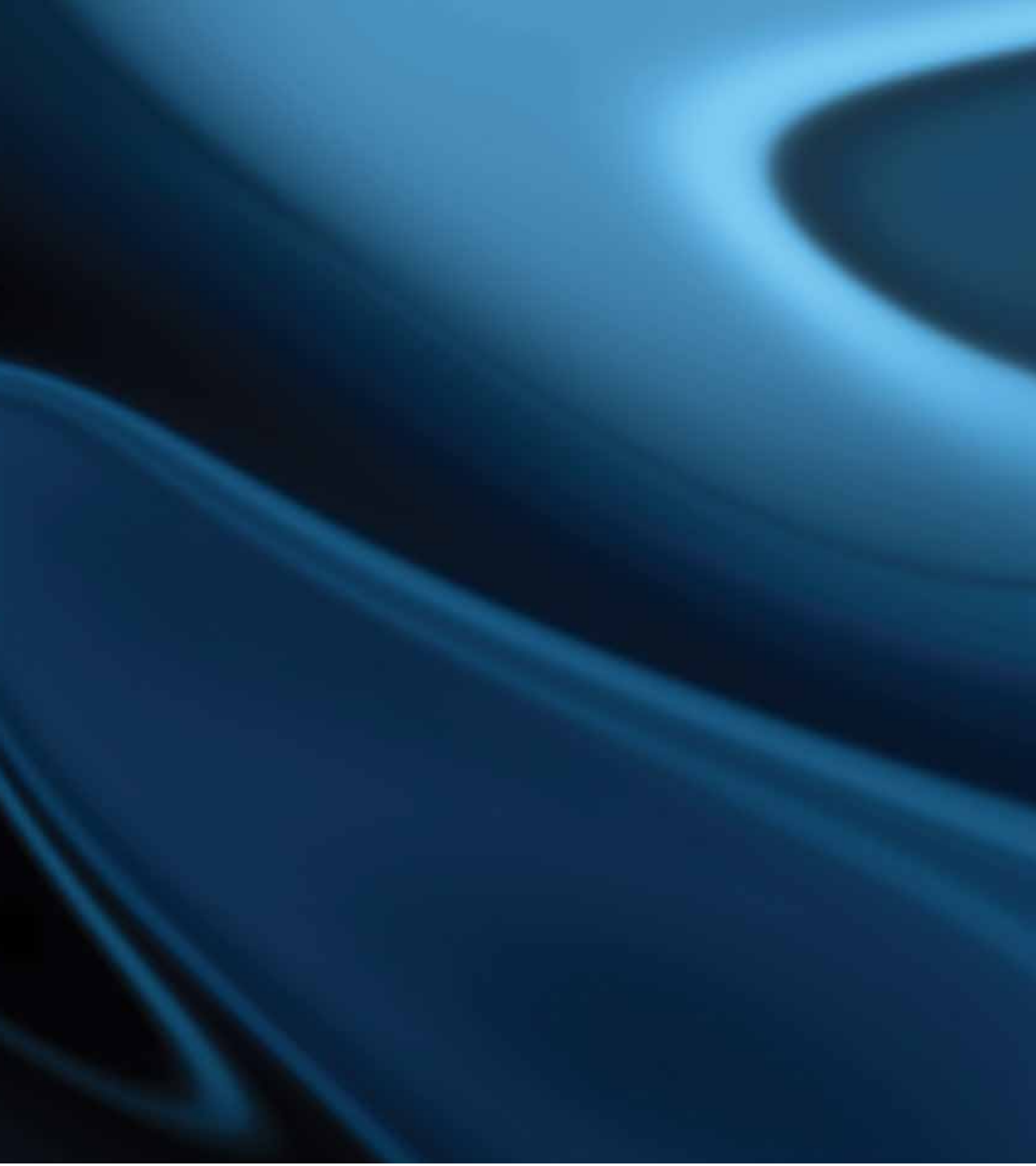
While valves only represent a small percentage of the spend in major oil and gas capital projects, valve vendor related issues can certainly delay a project.

Selecting valves for your project is much more than ensuring that the product meets the specifications at the right price point. At the end of the day, the success of a project depends on the performance of its many vendors and contractors. GWC Italia is a project driven organization that puts equal emphasis on product quality, compliance and project management execution.

Our ValvCertainty program* is designed to provide peace of mind to both EPC contractors and end users by reducing the liability (risk) associated with project valve procurement activities by contractually guaranteeing the key elements of the order execution process and field service response.

Please contact us for more details at sales@gwcitalia-usa.com

NOTES



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