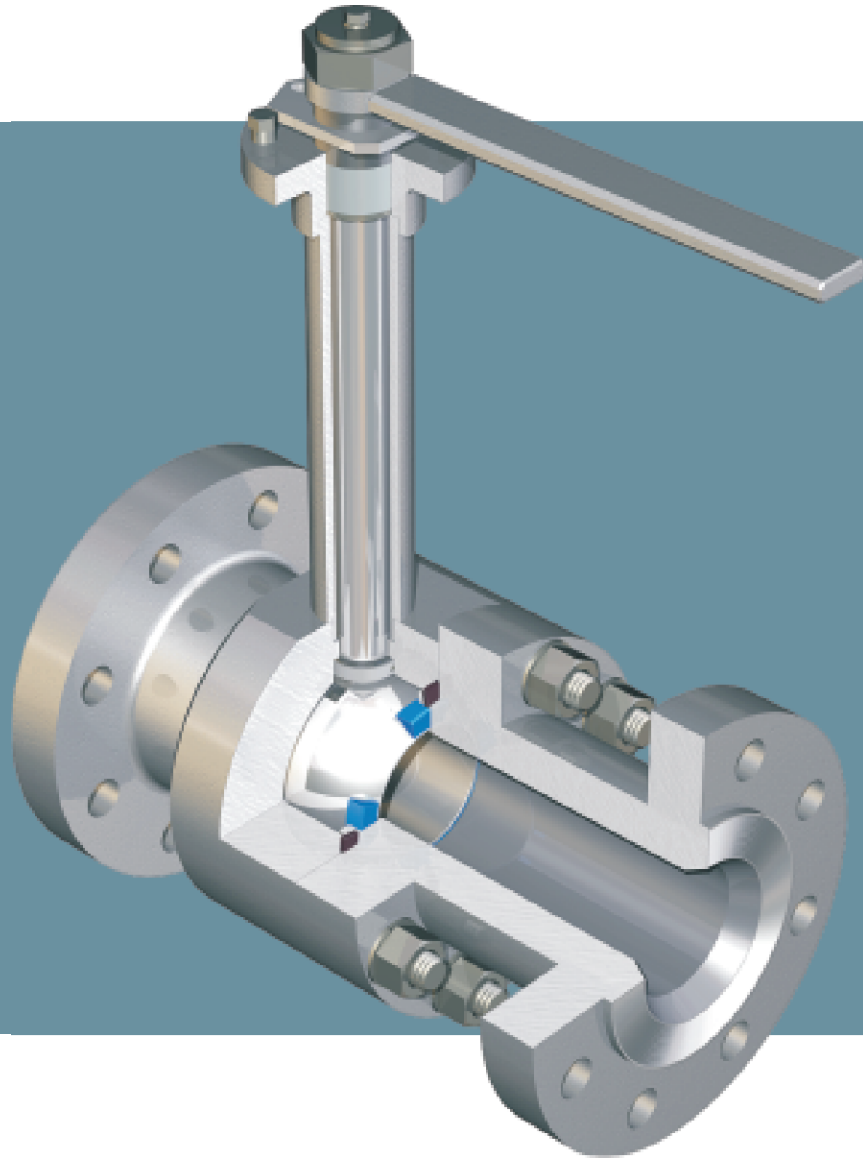


TBV™ Series 21/18 Cryogenic Flanged Ball Valve



SERIES 21/18 CRYOGENIC FLANGED BALL VALVE



The TBV™ Series 21/18 Two-Piece, Standard or Full Port, Flanged, Cryogenic Ball Valve is specifically designed for cryogenic applications.

The Series 21/18 offers unsurpassed reliability with a body **machined from solid wrought materials**, providing maximum strength and virtually eliminating porosity. Materials include Stainless Steel, Monel, Titanium and others as required.

The 21/18 utilizes a split body design. The body seal is totally encapsulated to prevent cold flow. Positive cavity venting into the upstream piping is accomplished by a relief hole in the ball.

The 21/18 is available in ASME 150-900 pressure ratings and low torque operation down to -452°F (-269°C), a result of our exclusively designed Cryofil seats.

The leak-proof integrity of the valve is further enhanced by a welded bonnet design and Chevron V-ring packing, which can be adjusted by a simple turn of the stem nut.

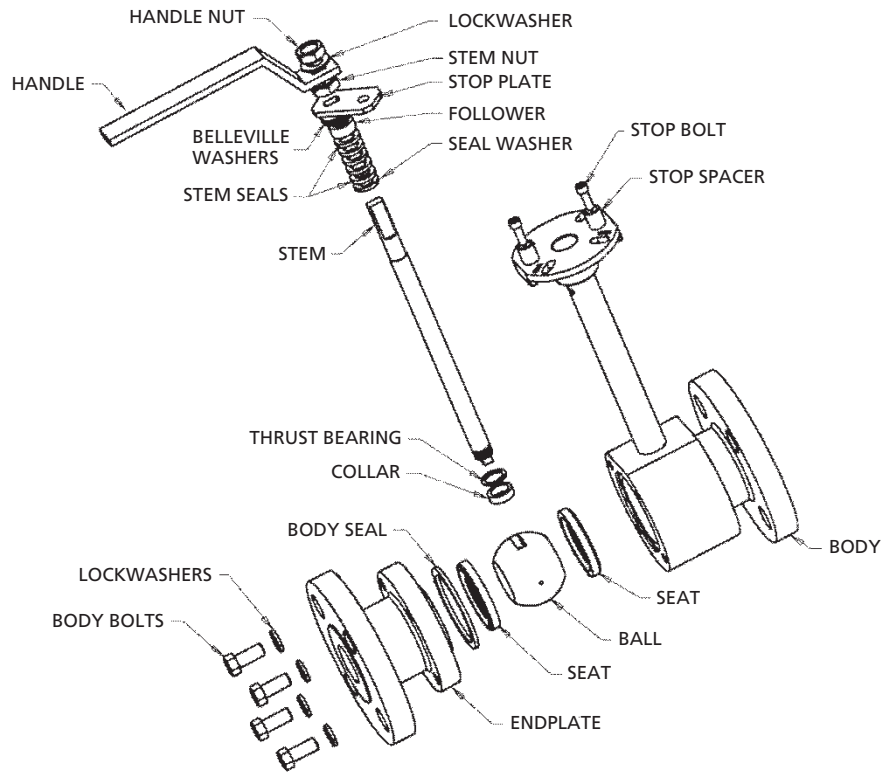
The Series 21/18 combines TBV's proven sealing technology and design expertise, along with the versatility to solve even the most demanding applications. This technology is widely used in the cryogenic industries as well as many others where valve reliability is of the utmost importance.

As with all TBV brand valves, quality, flexibility, long service life, and safety make the Series 21/18 the ultimate choice for your critical applications.

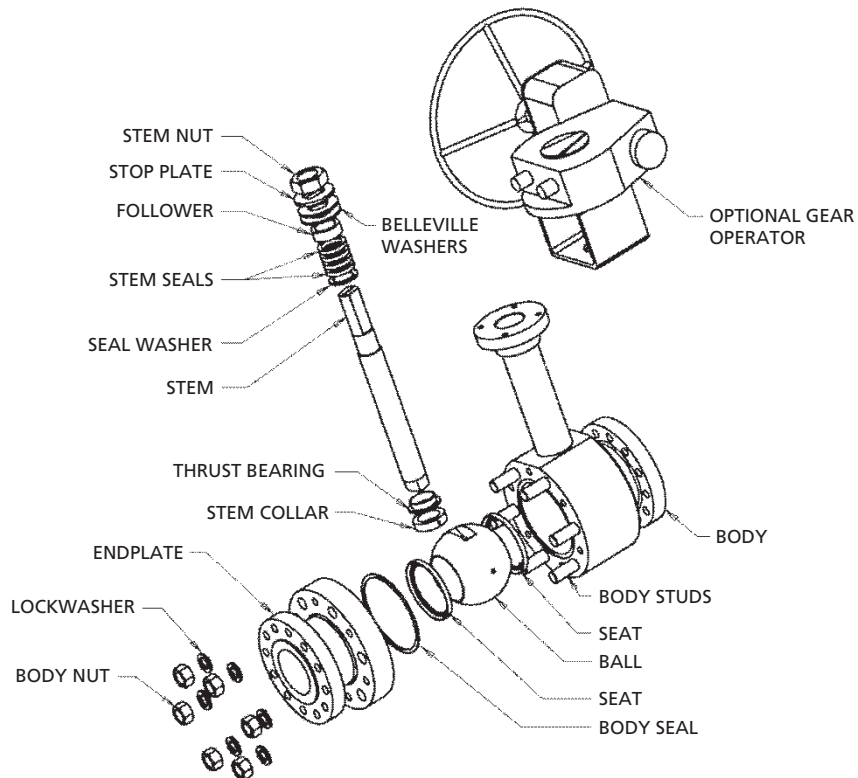
- **1/2 inch through 12 inch sizes**
- **Low operating torque to -452°F (-269°C)**
- **ASME 150 - 900 available**
- **Exclusive Cryofil seats**
- **Actuator mounting capability standard**
- **Padlocking device standard**
- **Oxygen cleaning is standard**

SERIES 21/18 CRYOGENIC FLANGED BALL VALVE

1/2 inch - 2 inch



3 inch - 12 inch



SERIES 21/18 CRYOGENIC FLANGED BALL VALVE

1/2 inch - 12 inch ASME 150, 300, 600 & 900

ENGINEERING DATA & DRAWINGS

ENGINEERING DATA

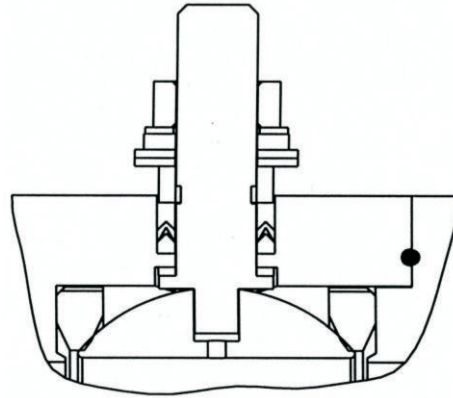
The TBV Series 21/18 Flanged Split Body Cryogenic Ball Valve provides the features and versatility to meet the requirements of virtually all cryogenic applications.

STEM SEAL

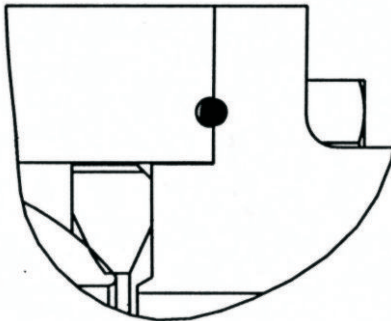
Leak-Free stem sealing of the series 21/18 is provided by a unified stem sealing system.

The 5 rings of PTFE V-ring packing sit on a shoulder machined on the blowout-proof stem, allowing the packing and stem to move as a unit during thermal cycles. In addition, the packing is live-loaded, retained by self-compensating Belleville spring washers and a packing adjustment nut.

These features coupled with close tolerance machining and finish of the packing bore, provide maximum stem seal life with the minimum maintenance.



BODY SEAL



The leak tight integrity of the Series 21/18 is further enhanced through the use of a fully-encapsulated, O-ring body seal. The body seal is contained on all four sides, preventing cold flow or blow out. Correct seal compression is assured through positive, metal-to-metal contact of the body and endplate. No special assembly tools or techniques are required. A spiral wound body gasket is available as an option. The raised face surface finish meets the latest ASME B16.5 requirements and is uninterrupted, facilitating leak tight installation.

The Series 21/18 may be ordered as Fire Safe to API 607 with the addition of graphite packing and graphite body seals.

SEATS

TBV's exclusive Cryofil seat material was developed in conjunction with a major elastomer producer. It is essentially a refined grade of Virgin PTFE with no fillers and therefore, does not represent a potential source of contamination. It is extremely stable at cryogenic temperatures.

The Cryofil seat utilizes a flexible lip design which allows the seat to follow the floating ball as the valve goes through pressure fluctuations, maintaining tight shut-off while minimizing operating torque through the full range of pressure and temperatures.

TBV's Series 21/18 is normally a unidirectional valve since a vent hole in the upstream side of the ball is utilized to prevent trapped media from building up pressure in the body cavity. If bidirectional shut-off is required, the vent hole may be eliminated through the use of an optional self-relieving seat.

ACTUATION

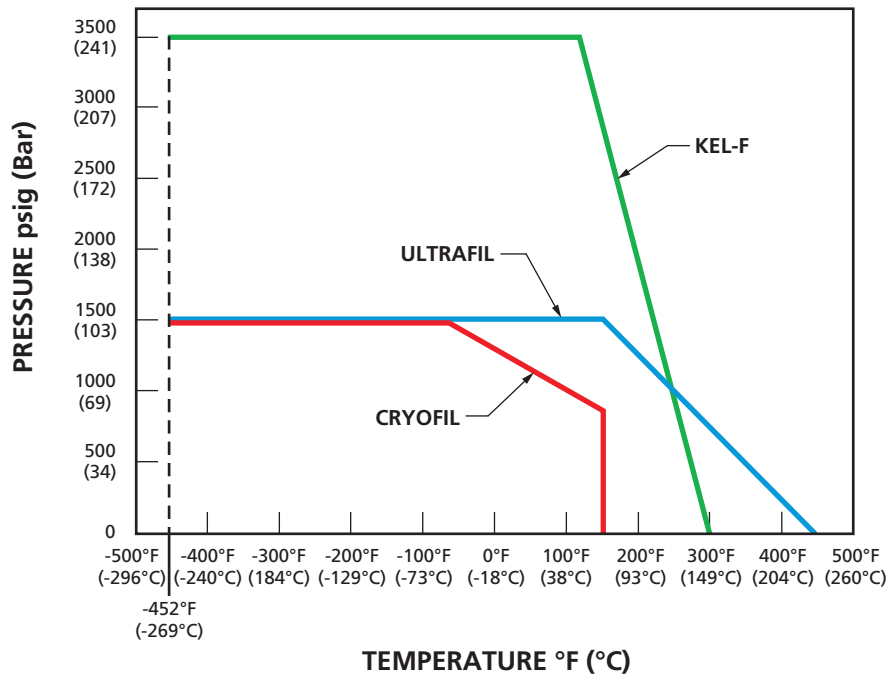
The Series 21/18 includes a rugged actuator mounting pad as standard, allowing pneumatic, electric or gear operator actuators to be easily and securely installed utilizing a four-bolt mounting pattern. TBV's exclusive Cryofil seats provide low torque operation, minimizing the size of the actuator required.

SERIES 21/18 CRYOGENIC FLANGED BALL VALVE

FEATURES	BENEFITS
Wrought bar stock materials	No voids or inclusions, quick deliveries.
Flexible lip seat design	Low operating torque.
Integral actuator mounting pad	Ease of automation.
Live loaded stem	Pressure and temperature recovery, stem seal integrity with a low operating torque.
Blow-out proof stem	Operator safety.
Heavy duty handle and stop	Ease of operation, long life.
Fully traceable materials	Certification of all pressure retaining parts available for stringent specification requirements.
5 ring chevron packing	Stem seal integrity.
Cryofil seats	Specially designed to provide leakproof operation to -452°F (-269°C).
Welded bonnet construction	No leak paths or exposed gaskets.
Stainless Steel internals	Atmospheric corrosion resistance.
No lubrication used	Contamination resistant.

Note: Valve should not be installed more than 30 degrees from the vertical position.

SEAT RATING CHART



Extended pressures and temperatures may be achieved by altering design for specific applications. Consult factory with service conditions.

The valve rating is the lesser of the body rating and the seat rating. TBV manufactures an extensive line of high pressure valves capable of the full seat ratings shown. Consult factory for details.

SERIES 21/18 CRYOGENIC FLANGED BALL VALVE

HOW TO ORDER

SIZE	PORTING	SERIES	END CONNECTIONS	BODY/END MATERIAL	BALL/ STEM MATERIAL	SEAT MATERIAL	SEAL MATERIAL	BOLTING	MODIFIERS
05 = 1/2" 07 = 3/4" 10 = 1" 12 = 1 1/4" 15 = 1 1/2" 20 = 2" 25 = 2 1/2" 30 = 3" 40 = 4" 60 = 6" 80 = 8" X0 = 10" X2 = 12"	S = Standard Port F = Full Port	2G = Series 21/18 Cryogenic Ball Valve		6L = 316L SS	BR = Brass 36 = 316 SS 6L = 316L SS M4 = Monel 400	C = Cryofil K = CTFE U = Ultrafil	H = Grafoil T = Virgin PTFE	2 = 300 SS 4 = ASTM A193, B8M x A194 8M Y3 = ASTM A320 B8M	AI = Actuator Installed AP = Prep for Actuation FS = Fire Safe GO = Gear Operator LV = Lever Handle NE = Non Extended OH = Oval Handle RS = Self Relieving Seats VS = Vacuum Service W1 = Spiral Wound Body Seal 316 SS PTFE W2 = Spiral Wound Body Seal 316 SS Grafoil
			150 = ASME/ANSI Class 150 RF 300 = ASME/ANSI Class 300 RF 600 = ASME/ANSI Class 600 RF 900 = ASME/ANSI Class 900 RF						

If ball and stem are different materials, expand code to show ball first, stem second.
For additional ordering information, see the TBV General Brochure, Corrosion Resistant and Cryogenic Valves.

Example:

05S 2G 150 6L36 CT2 = 1/2" Standard Port Cryogenic ASME 150, 316L body and endplates, 316 stainless steel ball and stem, with Cryofil seats and PTFE body seals with stainless steel bolting.



Other TBV Cryogenic Valves
(from left to right):

- Series 21/20**
Cryogenic Flanged Ball Valve
- Series 21/51A**
Multiport High Flow Cryogenic Diverter Valve
- Series 2100**
Three Piece Cryogenic Ball Valve
- Series 21/51**
Three Piece Cryogenic Diverter Valve

CERTIFICATIONS



**VALVES & MEASUREMENT**

3250 Briarpark Drive, Suite 300
Houston, Texas 77042
USA Toll Free 800 323 9160

For the most current contact and location information go to: www.c-a-m.com/valvesandmeasurement