

TBV™ Series 3100 Three-Piece Wafer Valves

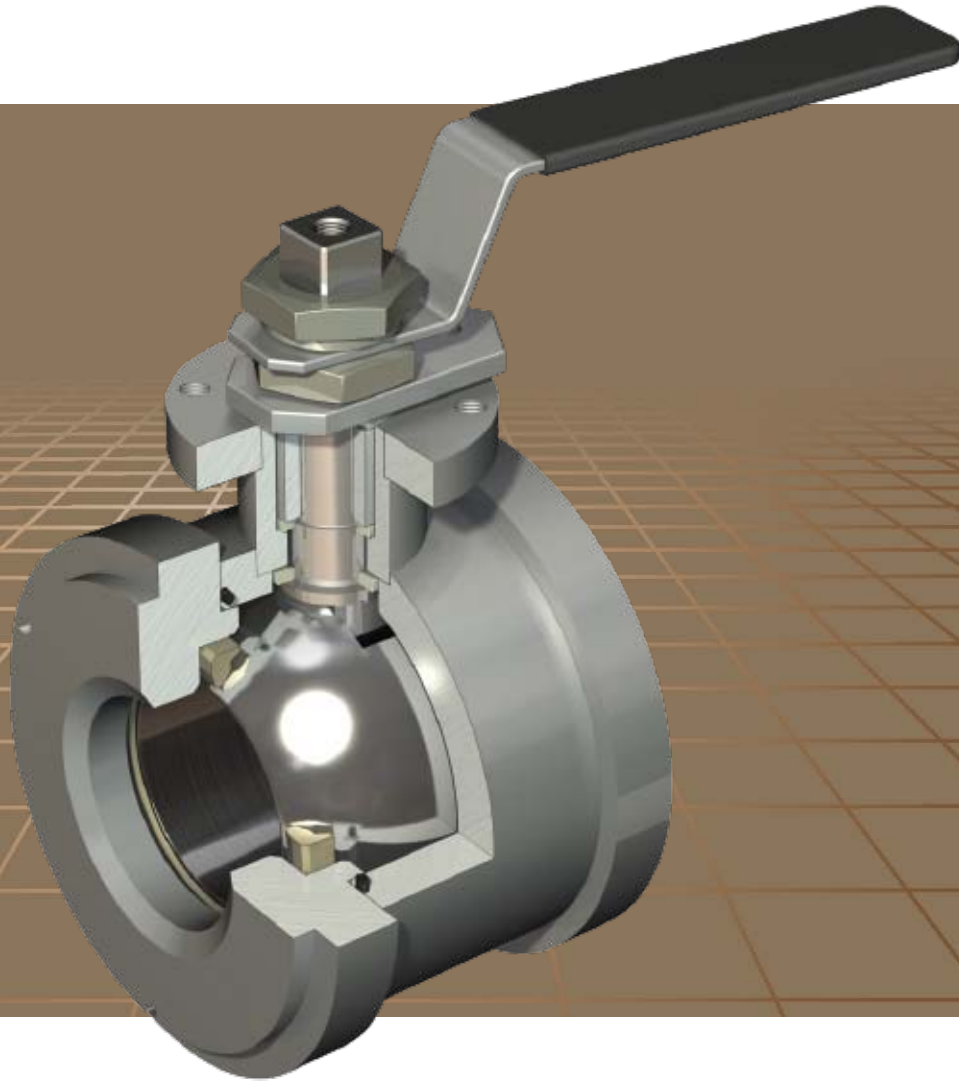


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Millbury, Massachusetts

Cameron's Valves & Measurement (V&M) group is a leading provider of valves and measurement systems to the oil and gas industry. The group's products are primarily used to control, direct and measure the flow of oil and gas as it is moved to refineries, petrochemical plants and industrial centers for processing.

The Engineered & Process Valves division provides a wide range of valves for use in natural gas, LNG, crude oil and refined products transmission lines. The traditional CAMERON® fully-welded ball valve product line has been combined with the GROVE®, RING-O®, TEXSTEAM™, TOM WHEATLEY®, ENTECH™ and TK® product lines. This broad offering has significantly strengthened Cameron's ability to serve as a single source for a wide scope of customer requirements. The division also provides critical service valves for refinery, chemical and petrochemical processing businesses and for associated storage terminal applications, particularly through the ORBIT® and GENERAL VALVE®. These brands are complimented by WKM® and TBV™ valve products and considerably expand the scope of this division's product offerings.

TBV valve products are manufactured and assembled at Cameron's new facility in Millbury, Massachusetts. The TBV facility offers 100,000 ft² of space of which 80,000 ft² is dedicated to manufacturing, assembling, testing, shipping, and quality assurance. The increased manufacturing space has afforded Cameron the opportunity to expand its product offering and size ranges. TBV is now competitive in the LNG, Mining and Petrochemical markets with its ability to offer larger size ranges in its line of products.

TBV™ SERIES 3100 THREE-PIECE WAFER VALVES

FEATURES

Cameron's TBV™ Series 3100 is a Wafer Valve Design that provides all of the benefits of a flanged ball valve while reducing both weight and cost.

This unique configuration can be installed between ASME Class 150 through ASME Class 900 Flanges, utilizing the appropriate bolting supplied by TBV.

The design is further enhanced by a bottom entry, Blowout Proof Stem that utilizes Belleville Washers to maintain a constant packing load.

Raised Face End Plates interlock with the body to reduce radial piping stresses and protect body seals.

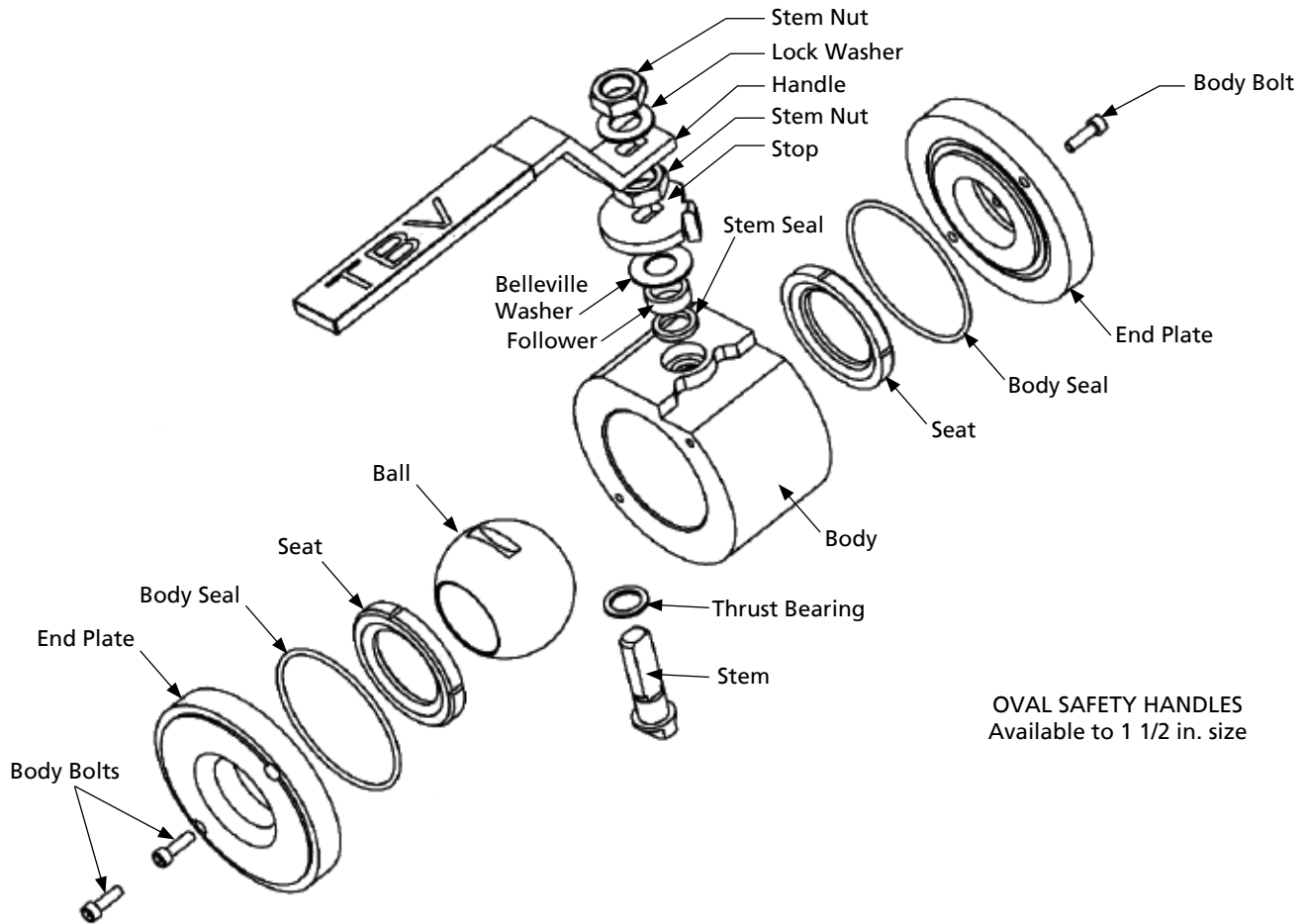
The 3100 Series is available in a wide range of Body, Ball and Stem materials, as well as a variety of Seat and Seal materials to further widen its range of applications.



- Wafer design reduces weight and cost
- 1/2 in. through 3 in. sizes
- ASME rated for use between 150 through 900 ASME class flanges
- Wide variety of materials available for body, ball, stem, and seats

TBV™ SERIES 3100 THREE-PIECE WAFER VALVES

MATERIALS LIST



OVAL SAFETY HANDLES
 Available to 1 1/2 in. size

Materials List

ITEM	QTY.	PART DESCRIPTION	MATERIAL
1	1	Body	See "How to Order" Section
2	2	Endplate	See "How to Order" Section
3	1	Ball	See "How to Order" Section
4	1	Stem	See "How to Order" Section
5*	2	Seat	See "How to Order" Section
6	1	Follower	See Note 6, Page 6
7*	1	Stem Seal	See Note 3, Page 6
8*	2	Body Seal	Virgin PTFE
9	1	Stop	300 SS
10	1	Handle	300 SS
11*	1	Thrust Bearing	Glass Filled PTFE
12	2	Stem Nut	300 SS
13	4	Shipping Screw	300 SS
14	1	Lock Washer	300 SS
15	2	Belleville Washer	17-7 SS

Seat Material Identification Code

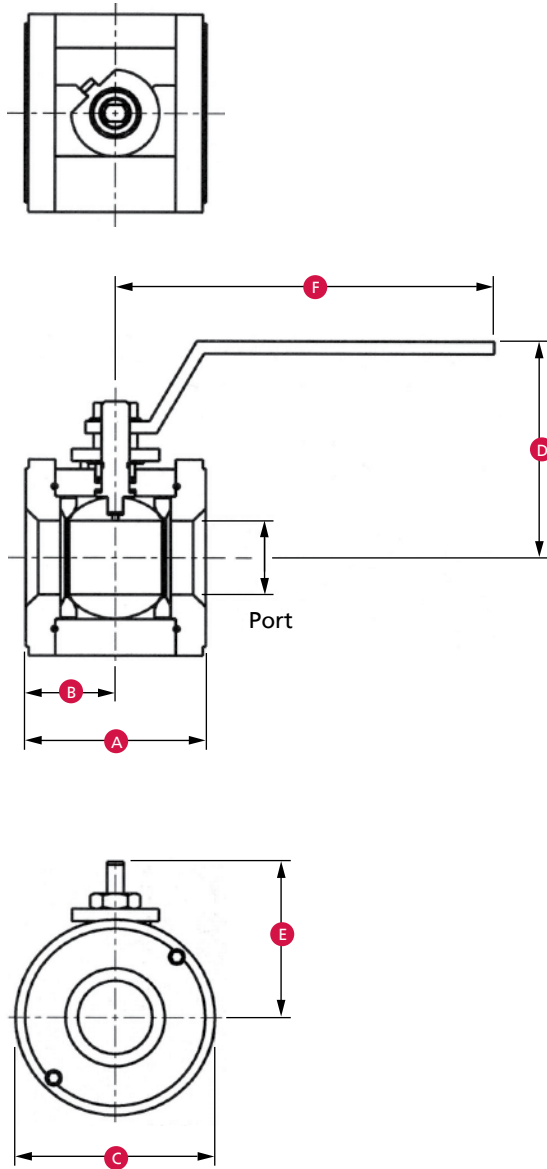
T	-	Virgin PTFE	White
C	-	Cryofil	White
G	-	Reinforced PTFE	White with Red Speckles
U	-	Ultrafil	Black
F	-	Thermafил	(Carbon Filled PEEK) Black
P	-	UHMWP	Translucent White
D	-	Delrin	Dark Brown
K	-	CTFE	Translucent
M	-	Metal	Silver
H	-	Graphite	Black

* Repair Kit items: Seats, Stem Seal, Body Seals and Thrust Bearing.
 When ordering a repair kit, customer must provide Valve Code and Sales Order Number stamped on body of valve.
 Example: Repair kit for: 10S 31 150 6L36 TT 0 (Part Number).

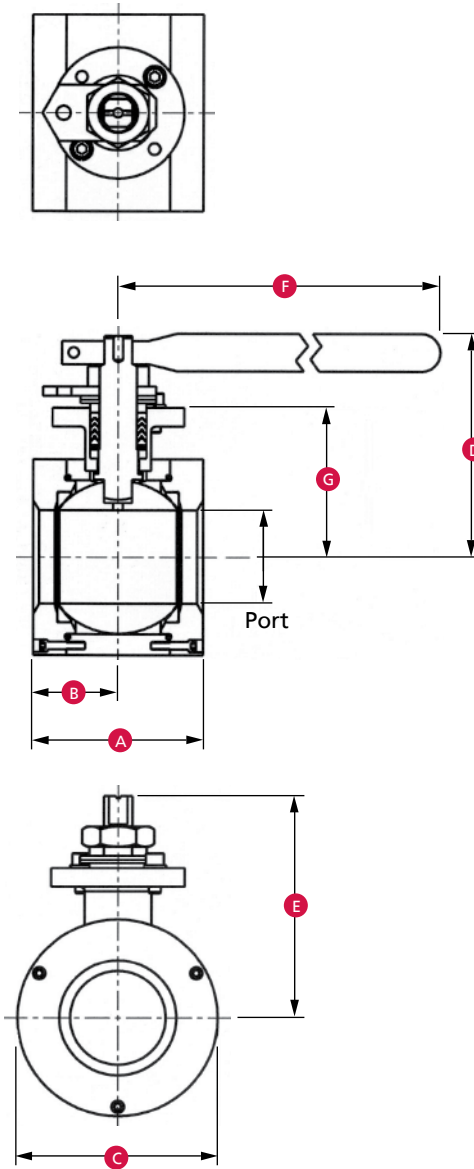
TBV™ SERIES 3100 THREE-PIECE WAFER VALVES

DIMENSIONS DATA

1/2 in. - 2 in. Series



3 in. Series



Dimensions Data

Valve Size in.	Port	A	B	C	D	E	F
1/2	0.50	2.46	1.23	2.18	2.94	1.81	5.50
3/4	0.50	2.46	1.23	2.18	2.94	1.81	5.50
1	0.81	2.65	1.32	2.50	3.25	2.29	5.50
1 1/2	1.25	3.40	1.70	3.20	4.13	2.99	7.55
2	1.50	3.60	1.80	4.00	4.32	3.18	7.55
3	2.50	4.25	2.13	5.25	5.91	5.91	18.50

Series 3100 is available to 6 inch. Consult factory for dimensions above 3 inch.

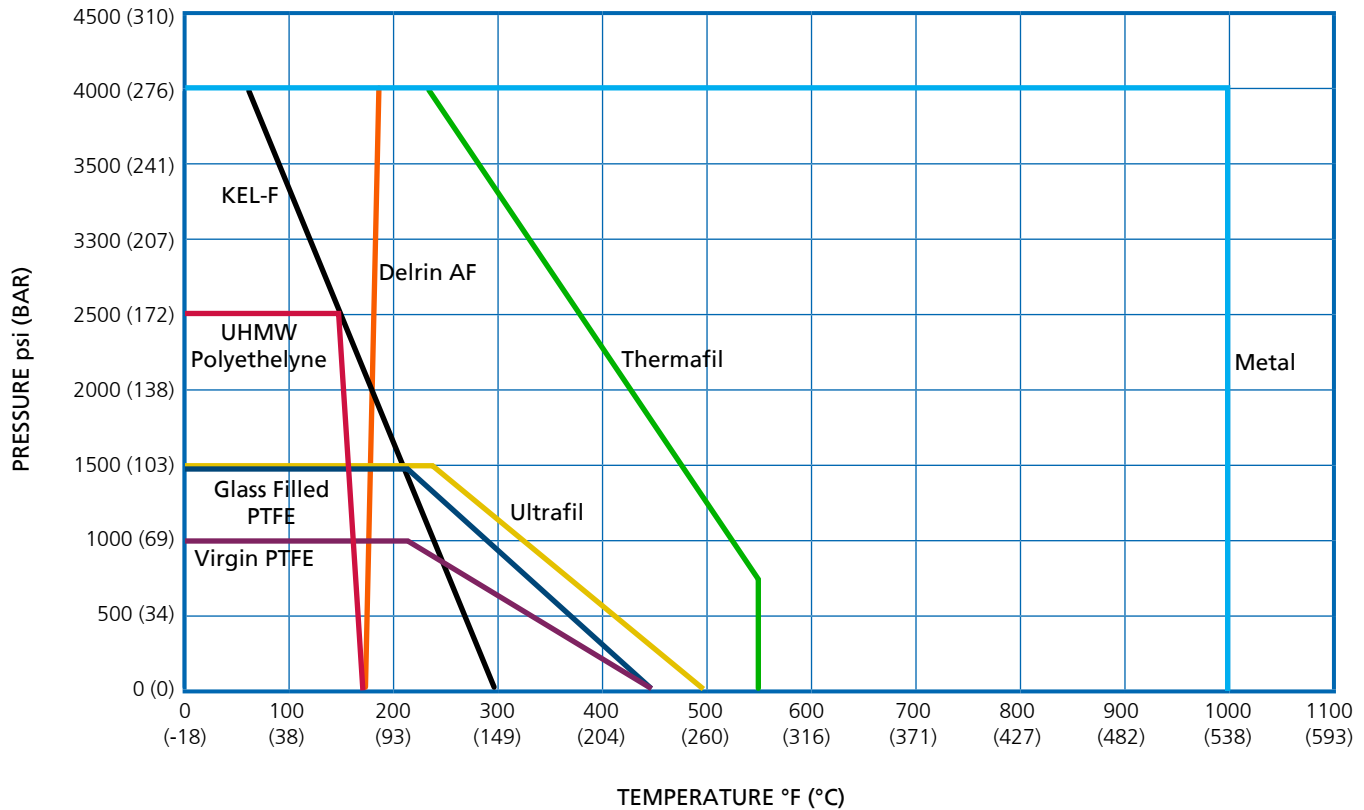
1/2 inch valves are full port as standard.

For control seats and fire safe valves, consult factory for overall length dimensions.

TBV™ SERIES 3100 THREE-PIECE WAFER VALVES

ENGINEERING SPECIFICATIONS

Seat Rating Chart



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

Features

- Wafer Design
- Bi-Directional Flow
- Raised Face End Plates
- Totally Encapsulated
- Variety of Seating Materials
- Flexible Lip Seat Design
- Live Loaded Stem
- Blowout Proof Stem
- Heavy Duty Handle and Stop
- Fully Traceable Materials
- Metal and Graphite Seats

Benefits

- Reduces both weight and cost
- Allows installation in either direction
- Positive alignment, elimination of radial stresses
- Elimination of cold flow. High performance over wide seals Body Temperature and pressure range
- Wide range of process media and service conditions
- Low operating torque
- Pressure and temperature recovery, stem seal integrity with a low operating torque
- Operator safety
- Ease of operation, long life
- Certification of all pressure retaining parts available for stringent specification requirements
- Available for abrasive services and temperatures to 1000°F. Consult factory for recommendation

In addition to the options and features shown, Cameron specializes in designing and manufacturing TBV™ brand ball valves for a wide variety of special applications. Cameron is known for its ability to solve difficult applications with severe service valves that perform where others valves failed.

TBV™ SERIES 3100 THREE-PIECE WAFER VALVES

ENGINEERING SPECIFICATIONS

Important Note for Body and Seat Ratings

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.

C_v and Maximum Torque (in-lb)

Size in.	C_v	Virgin PTFE	Reinforced PTFE	Ultrafil	Thermafil (Carbon Filled PEEK)	UHMWPE	Delrin	CTFE	Metal	Graphite
1/2	8	30	55	50	65	60	70	120	90	75
3/4	12	45	75	70	91	84	98	150	126	105
1	33	80	130	120	156	144	168	300	216	180
1 1/2	85	280	450	350	455	420	490	450	630	525
2	133	425	640	600	780	720	840	732	1080	900
3	370	1050	2280	1900	2470	2280	2660	1620	3420	2850

Notes for Torque information

1. All torque values are based on maximum rated pressure, clean service, and frequent operation (more than once per month)
2. The recommended safety margin for sizing purposes is a minimum of 25%
3. For valves with torques above 1440 inch lbs., gear operator or actuation should be considered
4. Lower working pressures will reduce operating torque. Consult factory for further assistance
5. C_v values are based on the flow of water at 60°F through the valve in US gallons per minute at a pressure drop of 1 psi

Material and Construction Notes

1. Standard materials for these components include Titanium, Monel, Hastelloy, Alloy 20 and 316L. Other materials are available on request.
2. Standard soft seat materials include PTFE (Virgin and Filled), Thermafil, Delrin, CTFE, and UHMWPE Polyethylene. Other seat materials are available including metal seats. Consult factory.
3. Packing utilizes Chevron V-rings.
4. Lubrication: A non-silicone fluorocarbon grease is normally applied to seats and seals. An anti-galling substance is applied to external threads where necessary. No other lubrication is used or recommended.
5. Optional static grounding springs can be supplied between stem and body.
6. Follower material is the same as stem material.

Design Specifications Available

ASME B16.5	Flanged Face Finish Designed for installation between flanges designed to ASME B16.5
ASME B16.34	Steel Valves (ratings, materials, wall thickness)
MSS SP25	Valve Marking

Body Rating

MATERIAL	RATING (psi)
Carbon Steel	1480
Stainless Steel	1440
Titanium	1230
Alloy 20	1200
Monel	1200
Hastelloy C	1500
Nickel	720

Above ratings are based on ASME Class 600 limits and are for standard cast products.

TBV™ SERIES 3100 THREE-PIECE WAFER VALVES

HOW TO ORDER

Size	Porting	Series	End Connections	Ball / Stem Material* Body / End Material	Seat Material	Seal Material	Bolting	Modifiers
05 = 1/2"	S = Standard Port	31 = Series 3100 Wafer		A2 = Alloy 20	H = Grafoil T = Virgin PTFE			
07 = 3/4"				CS = Carbon Steel				
10 = 1"				HB = Hastelloy B	C = Cryofil D = Delrin AF F = Thermafil G = 15% Glass Filled PTFE K = CTFE M = Metal P = UHMWP T = Virgin PTFE U = Ultrafil			AP = Prepared for Actuation
15 = 1 1/2"				HC = Hastelloy C				CF = Cavity Filler
20 = 2"				IN = Inconel	1 = Carbon Steel 2 = 300 SS 3 = ASTM A193 B7 x A194 2H 4 = ASTM A193 B8M x A194 8M 5 = Monel K-500 6 = Hastelloy C 7 = 316 SS 8 = Gr. 5 Titanium			CL = Chlorine Cleaning
25 = 2 1/2"		150 = ASME Class 150		M4 = Monel 400				EC = Corrosion Evaluation
30 = 3"		300 = ASME Class 300		T2 = Titanium Gr. 2				EP = Electro Polish
40 = 4"		600 = ASME Class 600		T5 = Titanium Gr. 5				FE = Fugitive Emissions
60 = 6"		900 = ASME Class 900		T7 = Titanium Gr. 7				GO = Gear Operator
				ZR = Zirconium				GS = Grounding Spring
				34 = 304 SS				LH = Locking Handle
				36 = 316 SS				OH = Oval Handle
				4L = 304L SS				OX = Oxygen Cleaned
				6L = 316L SS				VB = Vented Ball

* For additional ordering information, see the TBV General Brochure, Corrosion Resistant and Cryogenic Valves.

Example:

10S 31 150 6LHC UT2 = 1" Standard Port 3100 Series Wafer Ball Valve for use between ASME Class 150 Flanges, with 316 Stainless Steel Body and End Plate, Hastelloy C Ball and Stem, Ultrafil Seats, Virgin PTFE Body Seals and 300 Stainless Steel Bolting.

Service Related Options

Steam Service	Saturated steam can be handled within the following limits: 250 psi/406°F with Ultrafil seats 450 psi/459°F with Thermafil seats Super heated steam up to 489°F can be handled at lower pressures
Vacuum Service	Standard TBV valves rated up to 20 microns of absolute pressure, specially prepared valves rated to .01 microns. Oxygen, chlorine cleaning and other special service cleaning are available. Actuation and actuator prepping available - Consult Factory
Leakage Rates	Soft seats are bubble-tight exceeding API 598 and Class VI requirements of ASME B16.104 standard.
Fugitive Emission	Bonnet available for critical applications. Bellows seal Bonnets are also available for Fugitive emissions service.

Special Services

Chlorine Service	Body Cavity Fillers
Oxygen Service	Vacuum Sealing
Hydrofluoric Acid	Toxic Service
High Temp to 1000°F	Erosive Media
Monomers	Category M
Slurries	Cryogenic Option
Throttling Control with characterized seats	

CAMSERV™ AFTERMARKET SERVICES



Cameron's Aftermarket Services' goal is to help our customers lower the total cost of valve ownership. To that end we offer a full range of services from over twenty-five Service Centers worldwide and can provide experienced personnel trained to meet the specific service requirements of each valve type.

Aftermarket Services

- Supplies replacement valves and parts:
 - Maintains a full inventory of new and reconditioned valves for immediate delivery
 - Provides factory warranty support for all Cameron OEM brands as well as service for most other valves
- Field Service & Technical Support
 - Field service technicians on call 24 hours a day 7 days a week to handle service issues wherever they arise
 - Provides equipment installation, field repairs, as well as track and perform scheduled maintenance
- Customer Property Repair
 - The Customer Property Repair program allows Cameron valve customers to store assets at our service centers throughout the world
 - Valves tracked in electronic database accessible through the Internet
- Remanufactured Products
 - Offers a broad range of API-compliant reconditioned equipment with fast delivery
- Total Valve Management
 - Supply and service automation and control packages
 - Assist with valve installation, commissioning and start-up



CERTIFICATIONS



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

Cameron strives for continuous improvement in all aspects of our business. Cameron reserves the right to modify designs and specifications without notice or obligation. Nothing contained in this brochure is intended to extend any type of warranty, expressed or implied.