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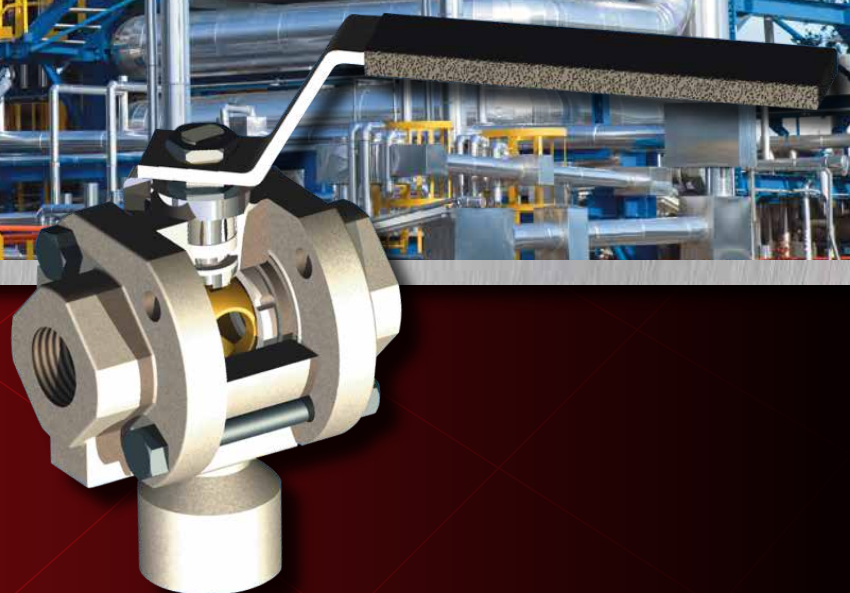


HSSE Policy Statement

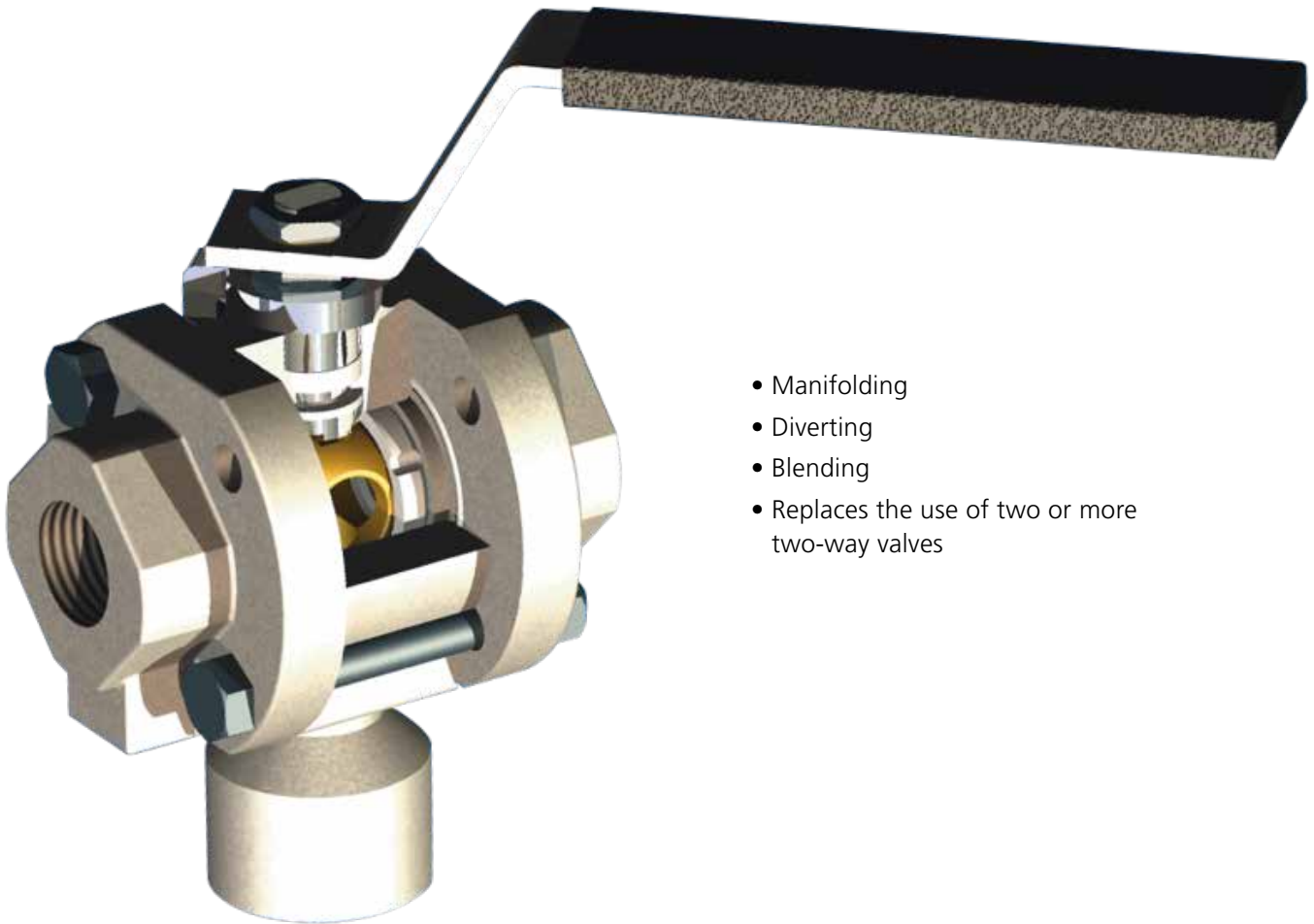
At Cameron, we are committed ethically, financially and personally to a working environment where no one gets hurt and nothing gets harmed.

TBV Series 5100 Diverter/Three-Way Ball Valve

TECHNOLOGY



TBV Series 5100 Ball Valve



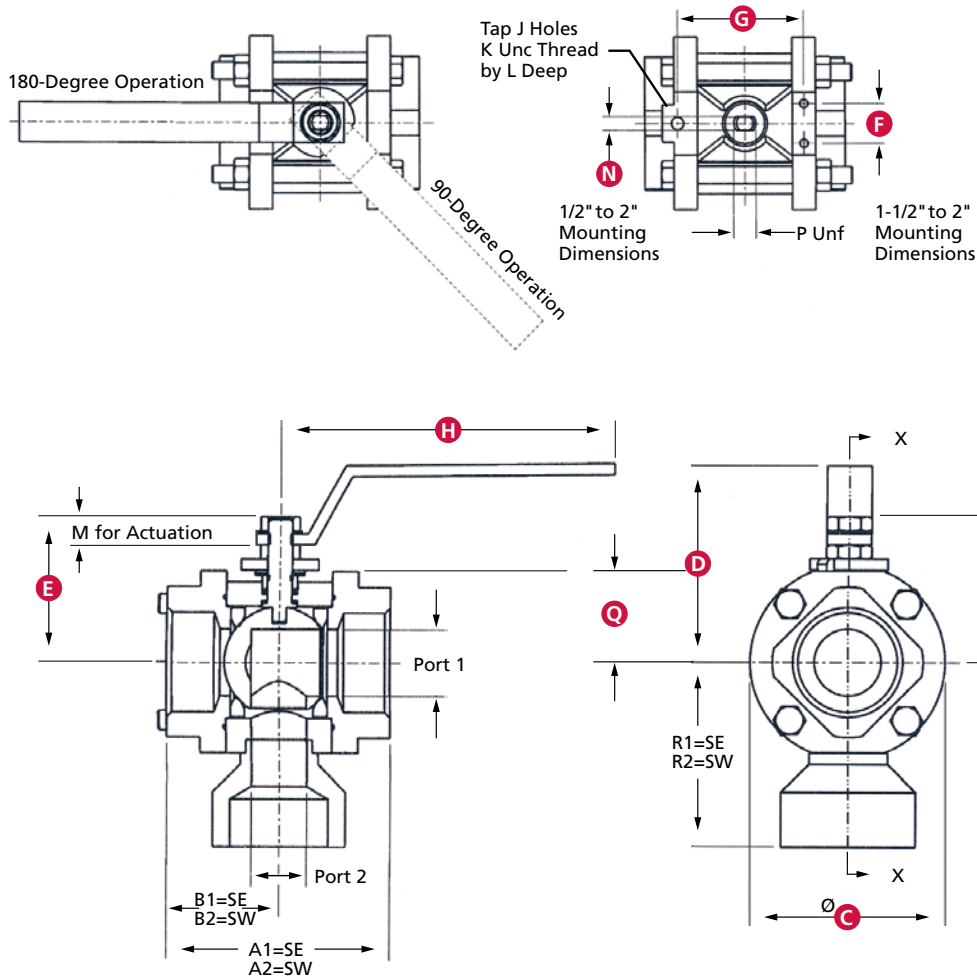
- Manifolding
- Diverting
- Blending
- Replaces the use of two or more two-way valves

Cameron's TBV™ brand offers the Series 5100 diverter/three-way ball valve to accomplish what would otherwise require two or more two-way valves.

The diverter valve utilizes all of the benefits of the two-way valve: a blowout-proof stem, raised face endplates to eliminate radial piping stresses that could cause body seal leakage, a wide variety of seats and seals and a large selection of end connections.

The TBV Series 5100 diverter/three-way ball valve is available in either a diverter or a three-way format, with bottom or side porting and for 90 or 180 degree operation, making it valuable for a multitude of applications.

DIMENSIONAL DATA



Major Dimensions

Valve Size	PORT 1	PORT 2	A1	A2	B1	B2	C	D	E	F	G
1/2"	0.50	0.50	3.14	3.08	1.57	1.54	2.50	2.93	1.81	-	1.77
3/4"	0.50	0.50	3.14	3.08	1.57	1.54	2.50	2.93	1.81	-	1.77
1"	0.81	0.66	3.75	3.69	1.88	1.85	3.25	3.32	2.29	-	1.77
1-1/2"	1.25	1.25	4.76	4.70	2.38	2.35	4.12	4.20	2.99	1.00	2.68
2"	1.50	1.25	5.06	4.92	2.53	2.50	4.36	4.36	3.18	1.00	2.98

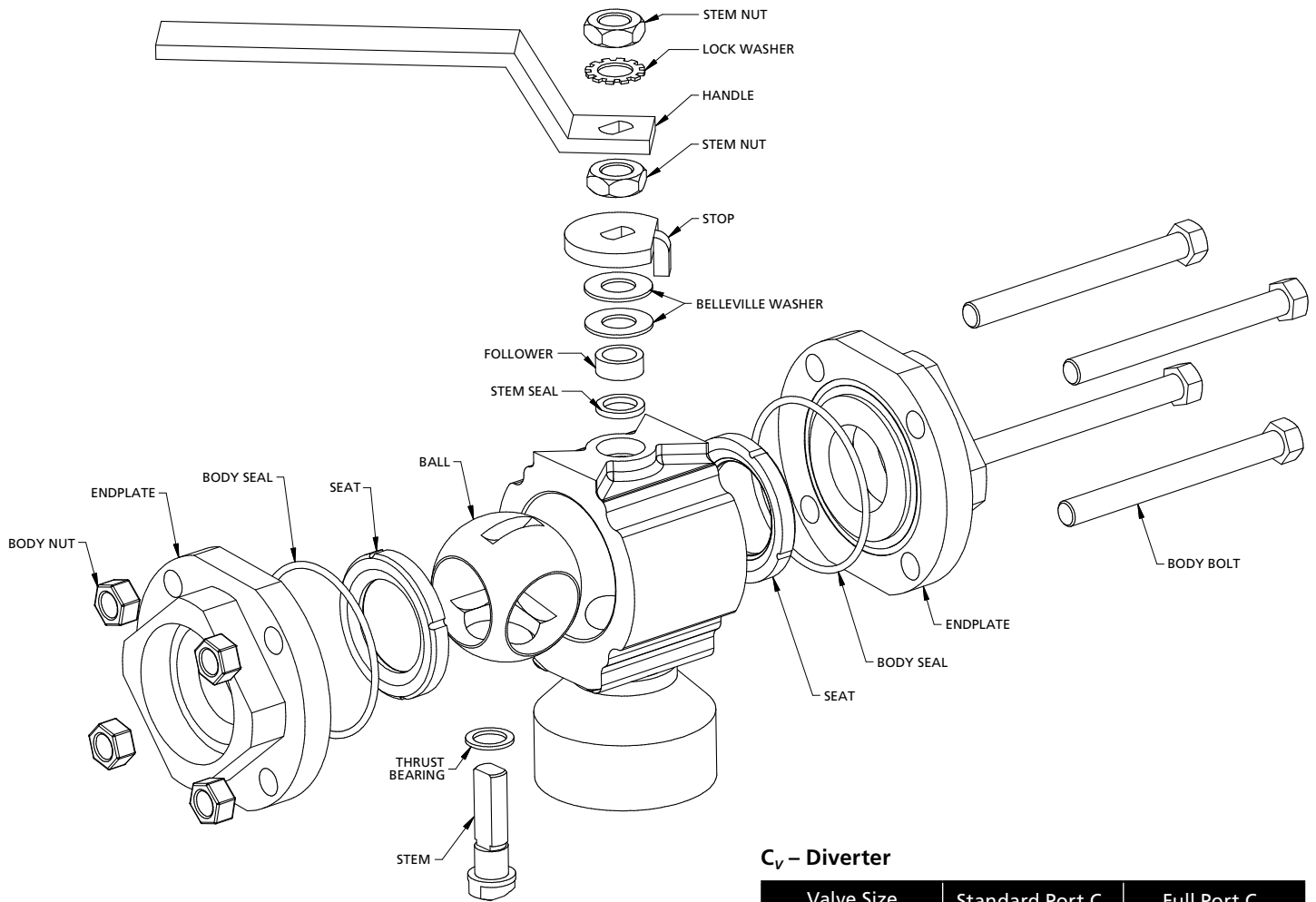
Major Dimensions

Valve Size	H	J	K UNC	L	M	N	P UNF	Q	R1	R2	øS
1/2"	5.50	2	5/16 to 18	0.31	0.30	0.230	3/8 to 24	1.09	2.31	2.31	0.75
3/4"	5.50	2	5/16 to 18	0.31	0.30	0.230	3/8 to 24	1.09	2.31	2.31	0.75
1"	5.50	2	5/16 to 18	0.40	0.48	0.296	7/16 to 20	1.56	3.43	3.05	0.875
1-1/2"	7.55	4	1/4 to 20	0.50	0.65	0.340	9/16 to 18	1.90	3.67	3.60	1.12
2"	7.55	4	1/4 to 20	0.50	0.71	0.340	9/16 to 18	2.03	4.12	4.12	1.12

NOTE: Dimensions are reference only and do not include tolerances.
Contact Cameron for manufacturing dimensions required for mounting kits or other ancillary items.

ENGINEERING DATA

Series 5100 90-Degree Configuration

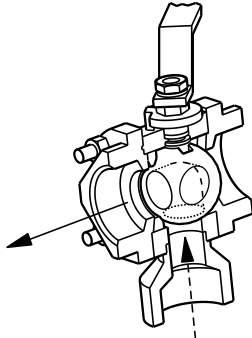


C_v – Diverter

Valve Size	Standard Port C_v	Full Port C_v
1/2"	3	4
3/4"	4	12
1"	12	30
1-1/4"	30	30
1-1/2"	30	47
2"	47	84

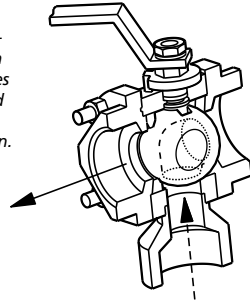
OPTIONS FOR OPERATION

90-Degree Operation



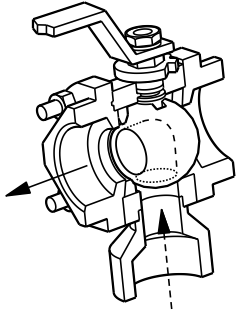
0-Degree Position

NOTE:
The handle of the 90-degree configuration is offset by 45 degrees with the pipeline and aligns with the open port during operation.

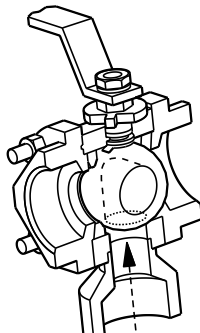


90-Degree Position

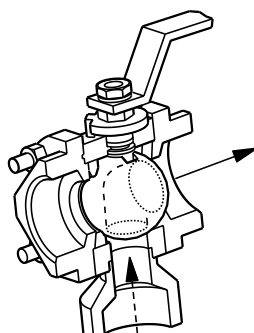
180-Degree Operation



0-Degree Position

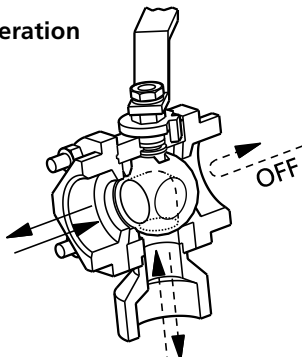


90-Degree Position
Flow Shutoff

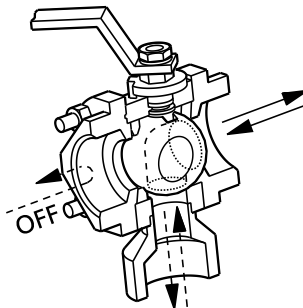


180-Degree Position

90-Degree Operation

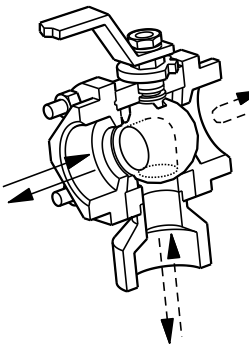


0-Degree Position

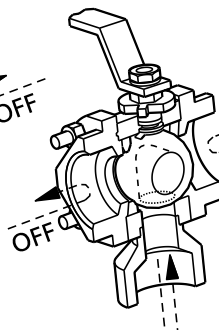


90-Degree Position

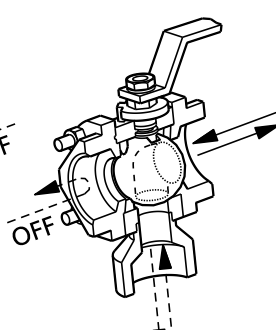
180-Degree Operation



0-Degree Position



90-Degree Position
Flow Shutoff



180-Degree Position

Diverter configuration

The TBV Series 5100 ball valve finds uses in many applications including manifolding, diverting and blending. It reduces costs by requiring the operation of only one valve. The diverter valve is designed to accept media flow from one common port (on the side or the bottom) and seals only on the downstream seat. The TBV Series 5100 ball valve is available in two styles, the 90- or 180-degree operation. The 90-degree operation redirects the flow from the bottom port to either side port. There is no mechanical stop to locate the off position in the 180-degree operation, but flow may be shut off completely at the 90-degree position.

Three-way configuration (option "TW")

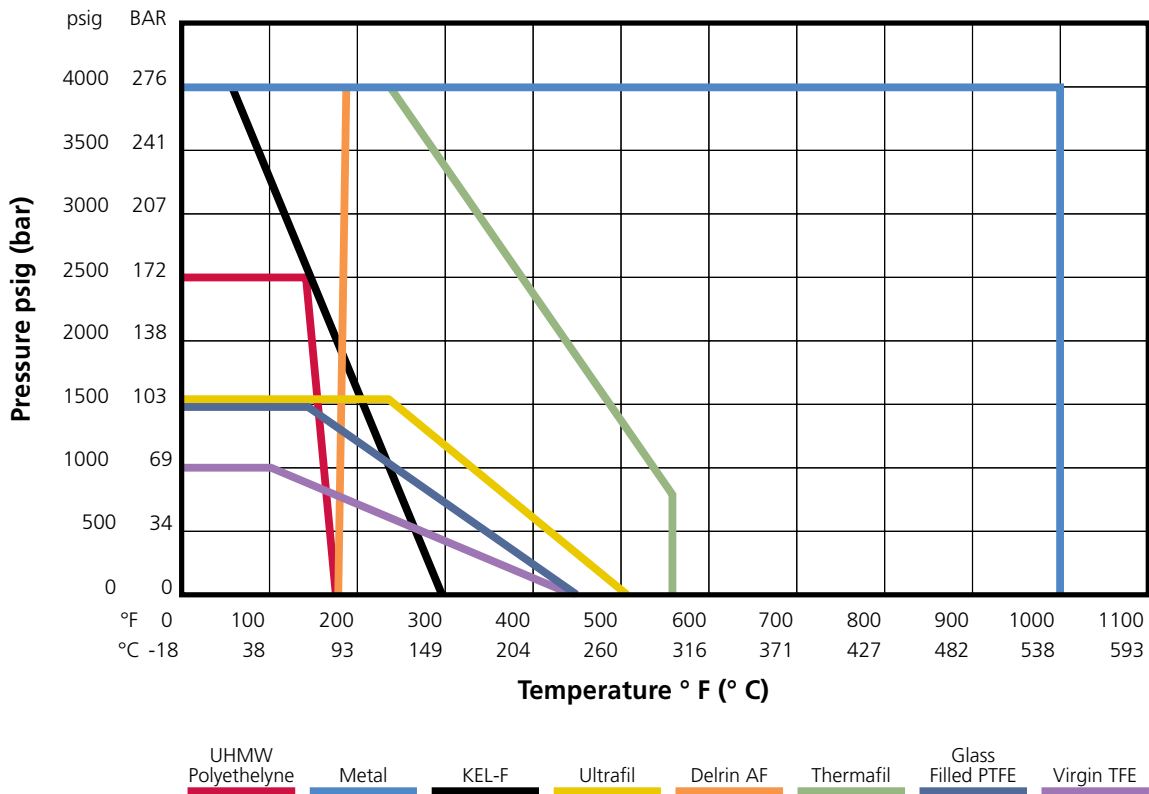
The TBV Series 5100 ball valve is also available in a three-way configuration. The three-way offers all of the benefits of the diverter, but incorporates specially loaded seats that use a higher preload to keep the ball seated on the upstream side. The special seats prevent the ball from being pushed off the seat from upstream pressure, preventing leakage into the body cavity. The added benefit of this design allows the three-way to accept flow from any of the three ports, increasing the number of possible flow directions. The three-way configuration is also available in 90-degree or 180-degree operation.

SERIES 5100 BALL VALVE

Features	Benefits
Raised face endplates	Positive alignment; elimination of radial stresses
Totally encapsulated body seals	Elimination of cold flow; high performance over wide temperature and pressure range
Configuration options	Available in 90- and 180-degree operations in both two and three-way configurations
Variety of seating materials*	Wide range of process media and service conditions
Flexible lip seat design*	Low operating torque
Integral actuation bosses (optional)	Ease of automation
Live loaded stem	Pressure and temperature recovery, stem seal integrity with a low operating torque
Blowout-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
Metal and graphite seats*	Available for abrasive services and temperatures to 1000° F (538° C) Consult Cameron for recommendation
Modular design	Diverse valve configurations to meet a variety of piping requirements
Oxygen service	Includes cleaning with an appropriate degreaser, black light inspection tagging for oxygen service and double bagging and sealing in 4 mil polyethylene bags
Chlorine service	Requires cleaning with an appropriate degreaser, tagging for chlorine service and double bagging and sealing in 4 mil polyethylene bags

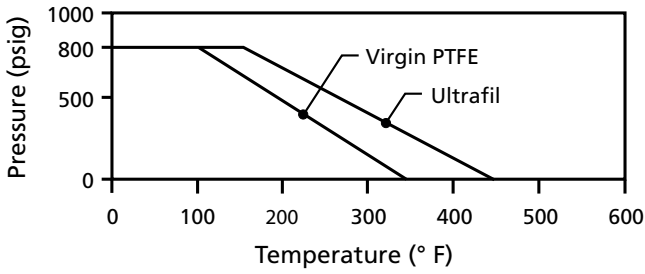
* Diverter model only

Seat Rating Chart



- Extended pressures and temperatures may be achieved by altering design for specific applications. Consult Cameron with service conditions.
- The valve rating is the lesser of the body rating and the seat rating.
- Cameron manufactures an extensive line of high-pressure TBV valves capable of the full seat ratings shown. Consult Cameron for details.

Seat Rating Chart (Three-Way Seat Configuration)



Series 5100 Engineering Data

Seat Material Identification Code	
T – Virgin PTFE	White
G – Reinforced PTFE	White with Red Speckles
U – Ultrafil	Black
F – Thermafil (Carbon Filled PEEK)	Black
P – UHMWPE	Translucent White
D – Delrin	Dark Brown
K – CTFE	Translucent
M – Metal	Silver
H – Graphite	Black

HOW TO ORDER

Size	Porting	Series	End Connections	Ball/Stem Material Body/End Material	Seat Material	Seal Material	Bolting	Modifiers
02 = 1/4" 03 = 3/8" 05 = 1/2" 07 = 3/4" 10 = 1" 15 = 1-1/2" 20 = 2"	S = Standard Port F = Full Port	51 = Series 5100 Three-piece	BWT = Butt-weld Tube Butt weld B__ = Butt weld + Sched (B40 = Sched 40) FSE = Female NPT FSW = Female Socket Weld TCE = Ladish End TE_ = Tube End (K,L,M)	A2 = Alloy 20 CS = Carbon Steel DS = Duplex ST STL CS = Carbon Steel DS = Duplex ST STL HB = Hastelloy B HC = Hastelloy C IN = Inconel M4 = Monel 400 N2 = Nickel T2 = Titanium Gr.2 T5 = Titanium Gr.5 ZR = Zirconium 34 = 304 SS 36 = 316 SS 37 = 317 SS 4L = 304L SS 6L = 316L SS	F = Thermafil G = 15% GF PTFE K = CTFE P = UHMWPE T = Virgin PTFE U = Ultrafil	H = Grafoil T = Virgin PTFE 1 = Carbon Steel 2 = 300 SS <i>(Other Bolt Materials Available)</i>		AP = Prepared for Actuation CF = Cavity Filler CL = Chlorine Cleaning EP = Electro Polish ES = Extended Stem FE = Fugitive Emissions GO = Gear Operator GS = Grounding Spring LH = Locking Handle OH = Oval Handle OX = Oxygen Cleaned SC = Split Collar Stem SP = Side Port SR = Spring Return Handle TW = Three-Way Seating 01 = 90-Degree Operation 02 = 180-Degree Operation

For additional ordering information on flanged diverters, see the TBV General Brochure *TBV VALVES*.

Example:
10S 51 FSE 3636 UT 201AP = 1" Standard Port, Series 5100, Female NPT, 316 Stainless Steel Body/End, 316 Stainless Steel Ball/Stem, Ultrafil Seats, Virgin PTFE Body Seals with Stainless Steel Bolting, 90-Degree Operation, Prepared for Actuation.

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 – Diverter Model Only Standard TBV valves rated up to 20 microns of absolute pressure, specially prepared valves rated to 0.01 microns.
Oxygen, chlorine cleaning and other special service cleanings 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.

Special Services
Chlorine
Hydrofluoric Acid
Steam
Oxygen Service
Vacuum Service
High Pressure
High Temperature
Thermal Fluids
Hydraulics
Extended pressures and temperatures may be achieved by altering designs for specific applications. Consult Cameron with service conditions.