

# AVCO

*Alloy Valves and Control*

## BALL VALVES 2800 SERIES

**INSTRUMENTS • CONTROLS • VALVES**

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**AVCO**

Engineering, Inc.

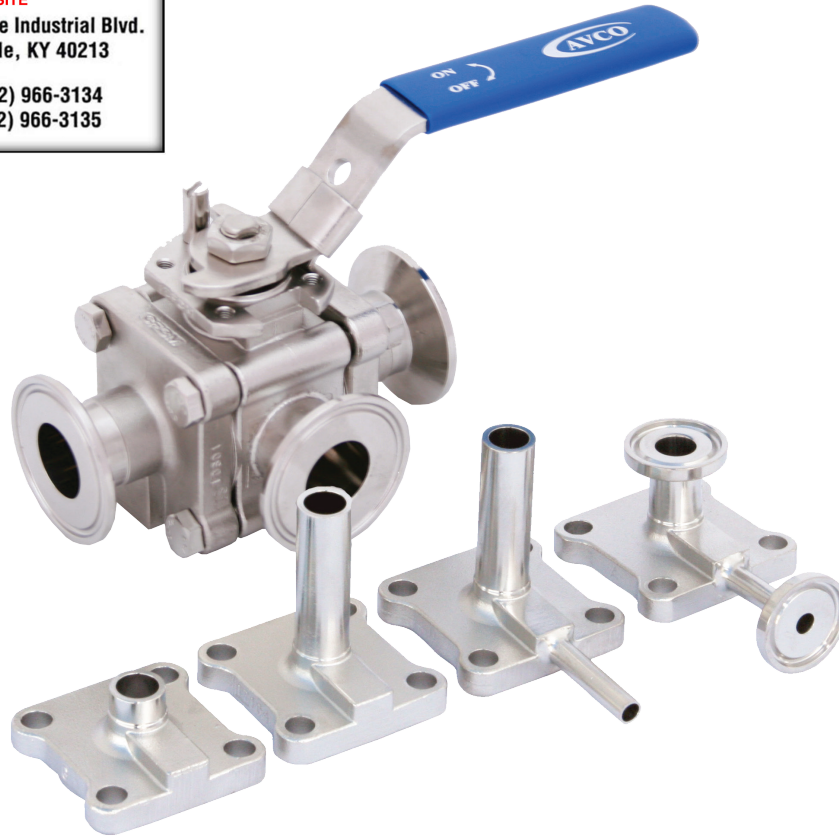
SINCE 1954

[www.arcoengineering.com](http://www.arcoengineering.com)

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Louisville, KY 40213

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Fx: (502) 966-3135



### Size

1/4" - 4" (Full Port Tube OD)  
Up to 1500 psig

### End Connections

Extended Tube OD  
Clamp Ends  
Compression Tube Fitting  
KF Vacuum Fitting  
Flush Bottom Tank Pad

### Valve Materials

316L Stainless Steel  
Various Alloys

### Ball and Stem Materials

316L Stainless Steel  
Various Alloys

### Seat Materials

TFM  
PEEK  
UHMWPE

### Options

Cavity Filled Seats  
Purge Ports  
Electropolish Finish  
10 Ra Finish  
O<sub>2</sub> Cleaned

### Service Applications

Biotech  
Clean Steam  
Cleaning Solutions  
Detergents  
Gas and Air Delivery  
High Purity Gases  
High Purity Water/Oils  
Pharmaceutical  
Vacuum  
Waxes

### Applicable Standards

ASME BPE  
ASME B31.3  
ISO 5211

***Alloy Valves and Control*****About the 2800 Series Ball Valve**

The AVCO 2800 series side entry diverter sanitary ball valve uses a 90-degree ball to swap or divert flow from one port to another or change one media flow to another media flow through a common port. This gives an easy solution to flush systems via one control point or a single point entry into a mix tank and offers long life service in the most demanding conditions. Available end connections include clamp end, extended butt weld tube OD, compression fittings and others. The stem is live loaded with blow out prevention and has online adjustment capability. Sealing occurs at the thrust washer inside the body to reduce the potential for leakage. The ISO mount pad gives the ability to actuate this valve with many standard products like electric spring return actuators, thus allowing remote and rapid operation such as that required in blow-down or exhaust vent systems. Available with all the same options as most of our entire 2000 series range, these valves offer flexibility in materials and end styles for use in many applications that require a valve that meets ASME BPE and/or sanitary requirements.

**Design**

- The valve body has three cast sections (body and two end caps) with minimum wall thicknesses calculated per ASME B31.3 and ASME BPE.
- The three cast sections are bolted together with stainless steel nuts and bolts.
- Valve pressure ratings up to 1500 psig.
- Automatic Welding ends meet the requirements of ASME BPE DT-8.
- Hygienic Clamp ends meet the requirements of ASME BPE DT-9.
- Compression Fitting ends are inter-changeable with other popular brands of dual ferrule instrumentation tube fittings.
- Custom end styles are available upon request.
- The valve bore is full port for minimal interference to the flow.
- The valve body and ends have purge port options for CIP & SIP capability.
- Cavity filled seats are available to minimize dead space.
- All internal contact surfaces meet ASME BPE mechanically polished surface designation SF1 (Ra20) as a minimum with an option to meet electropolished surface designation SF4 (Ra15) or better.
- The valve body has an integral mounting pad conforming to ISO 5211.
- The stem has full blow-out prevention.
- The body seal is fully encapsulated.
- FDA21 CFR177 approved seat and seal materials are utilized as standard.
- Documentation available per ASME BPE GR-5.
- Valves marking per ASME BPE DT-11.2.
- The stem assembly enables online adjustment of the packing.
- All valves are pressure tested.
- Valve sizes available are 1/4" thru 4".

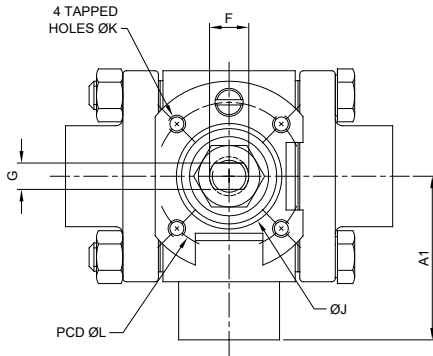
**Operation**

The following operators can be utilized on the valve:

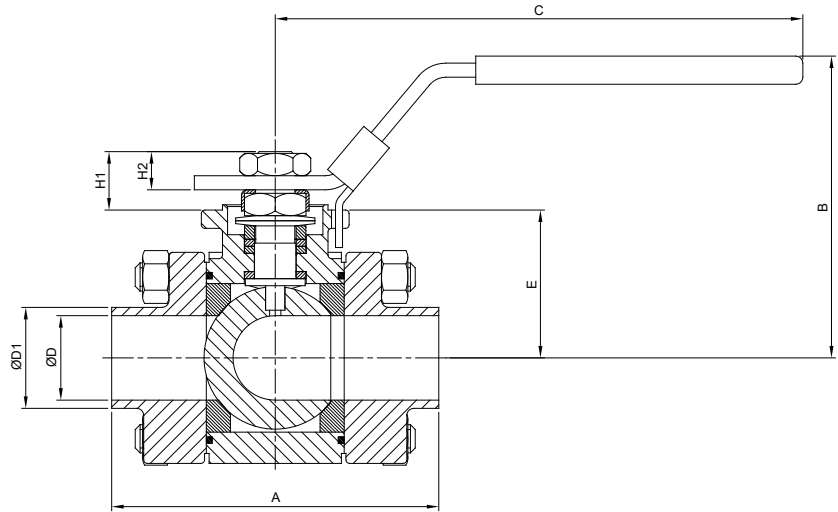
- Oval Handles
- Spring Return Handles
- Lockable Handles
- Pneumatic Actuators.
- Electric Actuators.
- Positioners
- Limit Switches
- Proximity Sensors

### Alloy Valves and Control

#### 1/2" THRU 2" with Extended Tube OD Ends

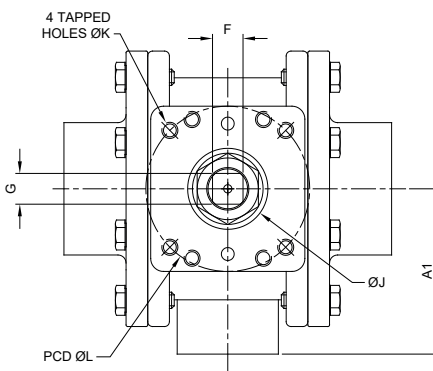


Plan View with Handle Removed

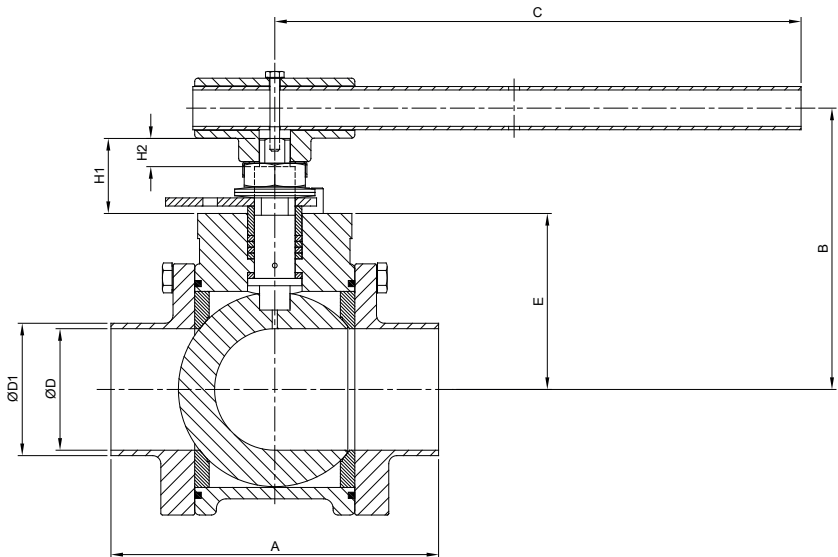


SIZE	A (in.)	A1 (in.)	B (in.)	C (in.)	D (in.)	D1 (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
1/2"	5.50	2.75	2.35	4.53	0.37	0.50	1.20	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2
3/4"	6.00	3.00	2.41	4.53	0.62	0.75	1.26	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2.5
1"	6.50	3.25	3.33	5.91	0.87	1.00	1.65	0.438	0.295	0.66	0.49	1.181	M5	1.654	F04	4
1 1/2"	7.50	3.75	3.92	6.85	1.37	1.50	1.91	0.563	0.339	1.13	0.67	1.378	M6	1.969	F05	8
2"	8.50	4.25	4.26	6.85	1.87	2.00	2.26	0.563	0.339	1.13	0.67	1.378	M6	1.969	F05	14

#### 2 1/2" THRU 4" with Extended Tube OD Ends



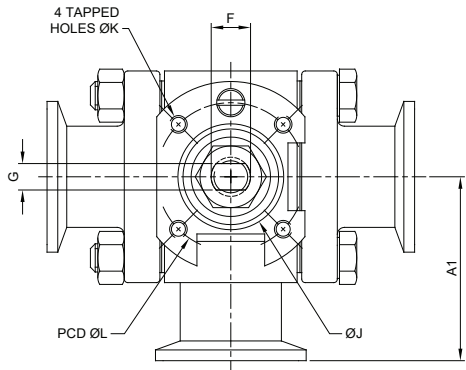
Plan View with Handle Removed



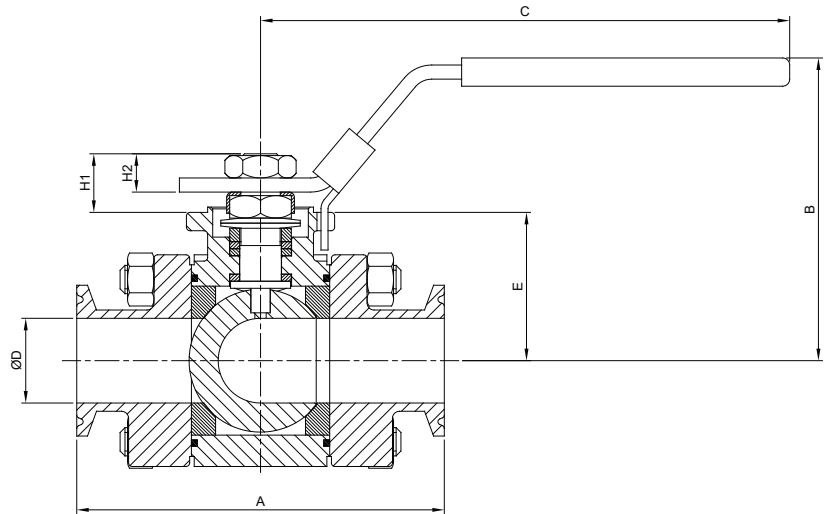
SIZE	A (in.)	A (in.)	B (in.)	C (in.)	D (in.)	D1 (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
2 1/2"	10.00	5.00	5.28	8.84	2.37	2.50	3.25	0.787	0.551	1.68	0.72	1.575	M8	2.756	F07	22
3"	10.00	5.00	6.84	13.74	2.87	3.00	4.28	0.748	0.748	1.83	0.69	1.969	M10	4.016	F10	35
4"	11.00	5.50	7.37	13.74	3.83	4.00	4.81	0.748	0.748	1.83	0.69	1.969	M10	4.016	F10	55

### Alloy Valves and Control

#### 1/2" THRU 2" Clamp Ends

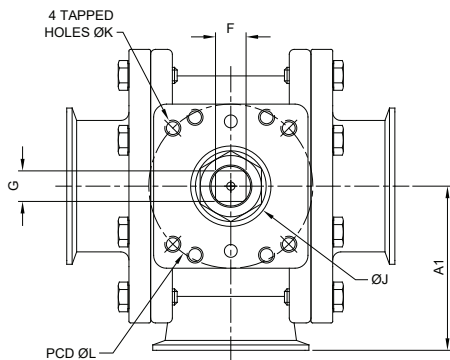


Plan View with Handle Removed

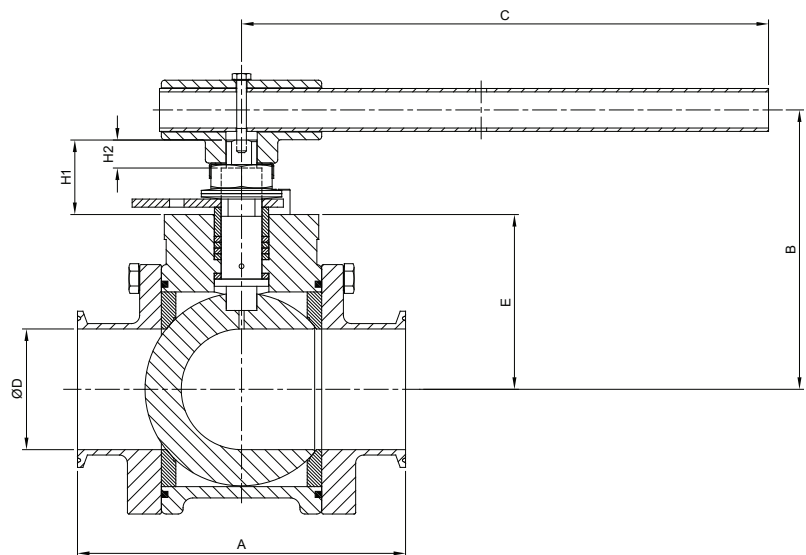


SIZE	A (in.)	A1 (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
1/2"	3.50	1.75	2.35	4.53	0.37	1.20	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2
3/4"	4.00	2.00	2.41	4.53	0.62	1.26	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2.5
1"	4.50	2.25	3.33	5.91	0.87	1.65	0.438	0.295	0.66	0.49	1.181	M5	1.654	F04	4
1 1/2"	5.50	2.75	3.92	6.85	1.37	1.91	0.563	0.339	1.13	0.67	1.378	M6	1.969	F05	8
2"	6.25	3.13	4.26	6.85	1.87	2.26	0.563	0.339	1.13	0.67	1.378	M6	1.969	F05	14

#### 2 1/2" THRU 4" Clamp Ends



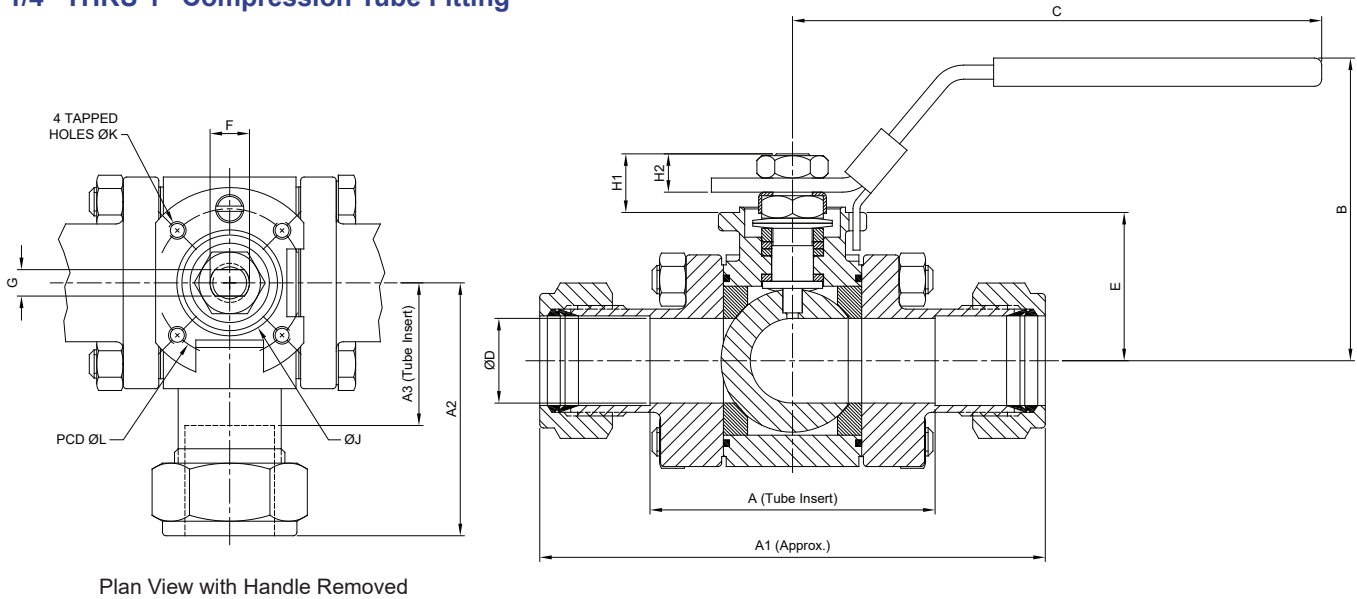
Plan View with Handle Removed



SIZE	A (in.)	A1 (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
2 1/2"	6.25	4.44	5.28	8.84	2.37	3.25	0.787	0.551	1.68	0.72	1.575	M8	2.756	F07	22
3"	7.00	4.25	6.84	13.74	2.87	4.28	0.748	0.748	1.83	0.69	1.969	M10	4.016	F10	35
4"	8.50	5.56	7.37	13.74	3.83	4.81	0.748	0.748	1.83	0.69	1.969	M10	4.016	F10	55

### Alloy Valves and Control

#### 1/4" THRU 1" Compression Tube Fitting



SIZE	A (in.)	A1 (in.)	A2 (in.)	A3 (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
1/4"	2.44	3.64	1.82	1.22	2.35	4.53	0.37	1.20	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2
3/8"	2.46	3.78	1.89	1.23	2.35	4.53	0.37	1.20	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2
1/2"	2.20	4.00	2.00	1.10	2.35	4.53	0.37	1.20	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2
3/4"	2.33	4.25	2.13	1.17	2.41	4.53	0.62	1.26	0.375	0.224	0.52	0.34	0.984	M5	1.417	F03	2.5
1"	2.79	5.25	2.63	1.40	3.33	5.91	0.87	1.65	0.438	0.295	0.66	0.49	1.181	M5	1.654	F04	4

#### Common to all Valves

Size	Torque (in.lbs)	Cv
1/4"	70	2
3/8"	70	2.5
1/2"	70	3.3
3/4"	80	7.9
1"	100	15.3
1 1/2"	290	39
2"	450	76
2 1/2"	900	130
3"	1200	196
4"	2000	365

#### General Notes

##### All Valves

1. Special customized end connections can be supplied to all valves upon request.
2. All valves can be adapted for cryogenic use.
3. All valves can have bonnet extensions added, which is particularly useful for flush tank pad applications.
4. Torque values are based upon TFM seats at full maximum differential. Please contact AVCO for other seat torques.

##### Compression Tube Fitting Ends

1. Valve sizes 1/4" and 3/8" can be supplied with a bracket to prevent tube twist upon valve operation.

### Alloy Valves and Control

#### Valve Pressure Ratings

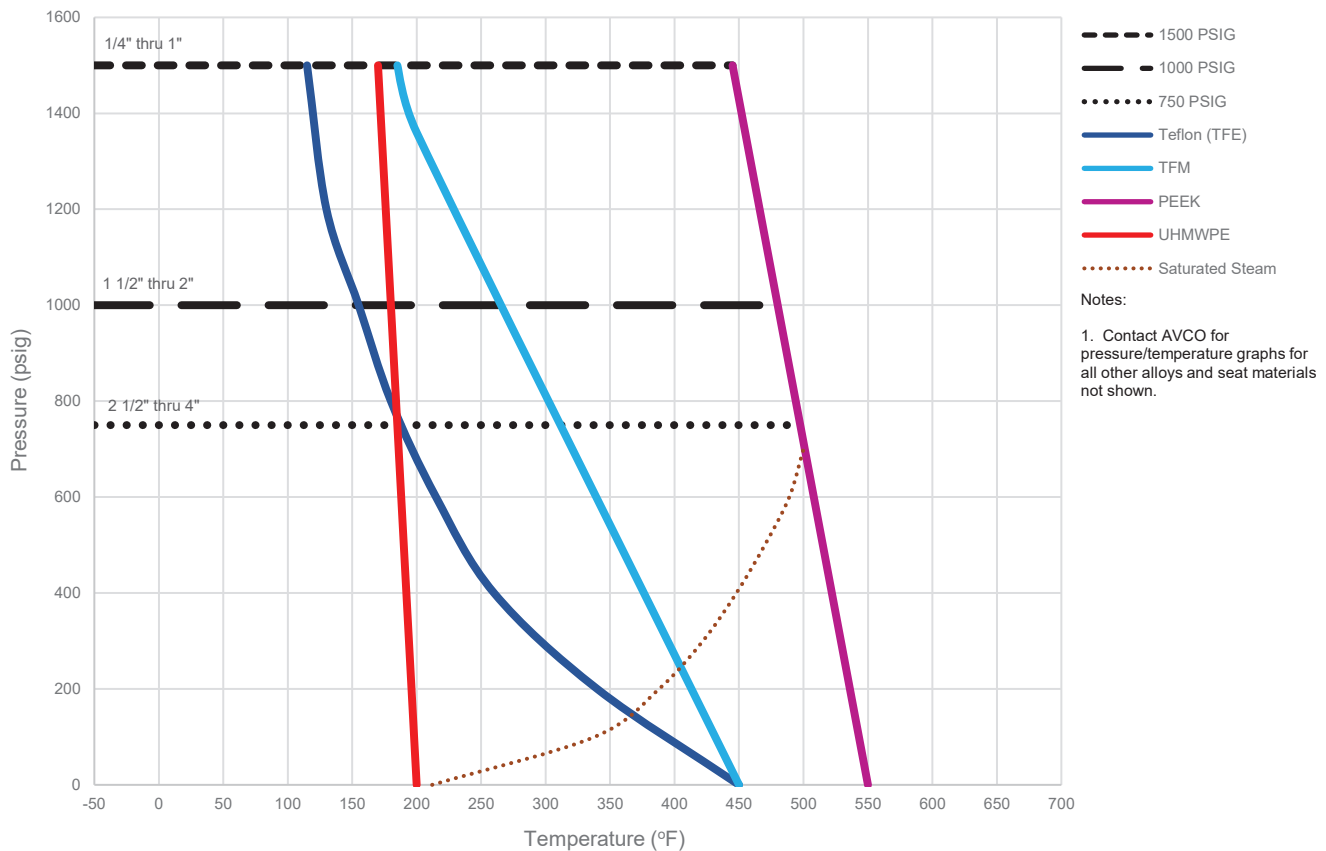
The AVCO 2800 series ball valve pressure ratings are determined using maximum allowable stresses and calculations, as specified in ASME B31.3 (Process Piping), based upon wall thicknesses as listed in ASME BPE for Extended Tube OD (ETO) ends. In addition the pressure ratings are checked against the ASME BPE requirements for an ambient temperature bursting strength of at least three times the rated internal pressure. For other end styles, such as compression fitting ends, the pressure rating can be increased - please contact AVCO for more information.

The standard pressure ratings are available as follows:

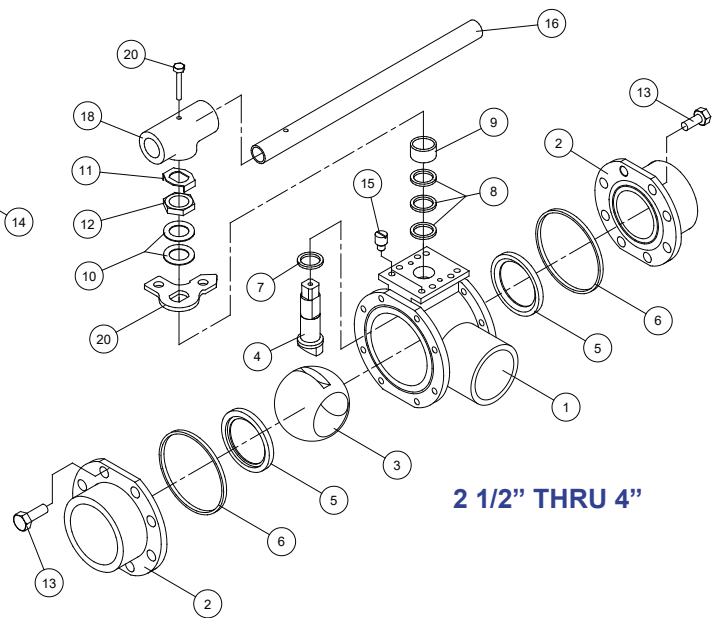
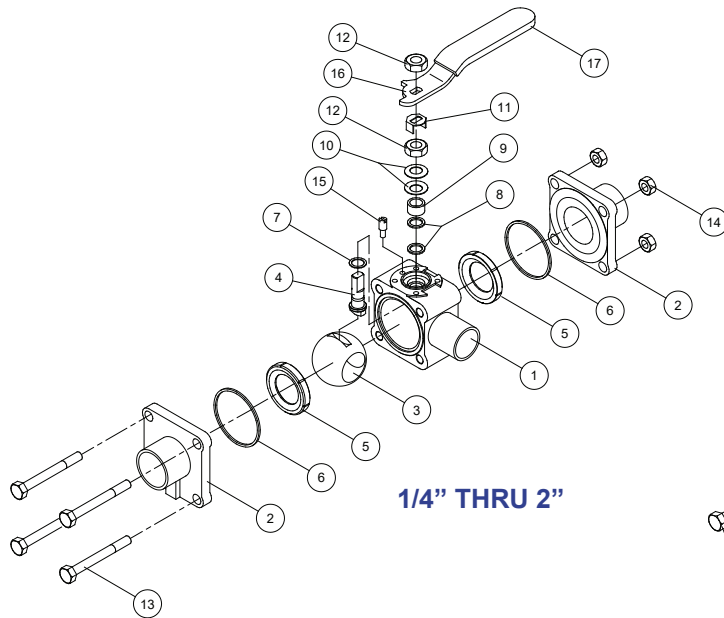
- 1500 PSIG - 1/4" thru 1"
- 1000 PSIG - 1 1/2" thru 2"
- 750 PSIG - 2 1/2" thru 4"

Unless otherwise requested, the 2800 series will be supplied with the standard pressure ratings on the valve tag.

**Standard Pressure/Temperature Rating Graph**



Alloy Valves and Control



Item	Description	Included in Valve Assembly				Material	
		1/4" thru 3/4"	1" thru 2"	2 1/2"	3" thru 4"	Stainless Steel	Carbon Steel
1	Body	Yes	Yes	Yes	Yes	A351 CF3M	A494 CW12MW
2	End Cap	Yes	Yes	Yes	Yes	A351 CF3M	A494 CW12MW
3	Ball	Yes	Yes	Yes	Yes	A276 316L	Hastelloy C
4	Stem	Yes	Yes	Yes	Yes	A276 316 or A594 17-4	Hastelloy C
5	Seat	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
6	Body Seal	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
7	Thrust Washer	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
8	Packing	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
9	Gland Ring	Yes	Yes	Yes	Yes	A276 316	A276-316
10	Disc Spring	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
11	Lock Washer	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
12	Stem Nut	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
13	Body Bolt	Yes	Yes	Yes	Yes	A2-70	A2-70
14	Body Nut	Yes	Yes	No	No	A2-70	A2-70
15	Stop Pin	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
16	Handle	Yes	Yes	Yes	No	Stainless Steel	Stainless Steel
17	Handle Sleeve	Yes	Yes	Yes	No	Vinyl	Vinyl
18	Wrench Block	No	No	No	Yes	Stainless Steel	Stainless Steel
19	Handle Bolt	No	No	No	Yes	Stainless Steel	Stainless Steel
20	Stop Pad	No	No	Yes	Yes	Stainless Steel	Stainless Steel

### *Alloy Valves and Control*

#### **Maintenance & Repair**

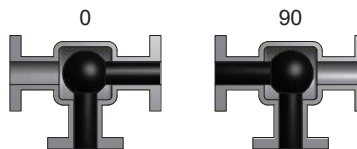
The AVCO 2800 series ball valve is a very reliable and robust design, but as with all resilient seated valves, the 'soft' parts are subject to wear over time. Replacing a whole valve is an unnecessarily high cost and as such, the 2800 series is fully repairable while in-line. Repair and maintenance kits are usually available for same day shipping and are easy to install when following the IOM manual.

AVCO is committed to ensuring repair and maintenance kits are available for your valves for many years service and even when we make design improvements to our products, we ensure all changes are backwards compatible.

#### **Flow Plans**

The only Flow Plan available is shown below. The Flow Plan is shown as viewed from the top of the valve with clockwise rotation (as viewed from above) based upon manual operation. '0' denotes the starting position of the sequence for clockwise rotation.

**\*\*\*IMPORTANT\*\*\*** The Flow Plan sequences will be reversed with '90' being the starting position for most pneumatic and electric actuators. Contact AVCO if actuated clockwise rotation as shown below is required.



**FLOW PLAN 1**  
**3 Way L-Port - 90°**





### Electric Actuator

120 VAC  
12/24 VDC  
NEMA 4/7  
Positioners 4-20 mA  
Reversing  
Telemetry  
Battery Back-up  
Spring Return



### Pneumatic Actuator

Double Acting  
Spring Return  
Solenoid Valves  
Limit Switches  
Positioners 3-15 psi  
Positioners 4-20 mA  
Intelligent Positioner  
Dec clutchable Manual Override



### Manual Valves

Oval Handle  
Spring Return  
Fusible Link  
Locking Device  
Gear Operators  
Stem Extensions  
Wing Handle

## HOW TO ORDER

28	3	3	E	E	ETO	100	LH
Series	Body & End Material	Ball & Stem Material	Seat Material	Seal Material	End Style	Size	Options
2800 Series 3 Piece Side Entry, High Performance, Full Port Tube OD Diverter Ball Valve	3 - 316L SS 6 - Hastelloy C	3 - 316L SS 6 - Hastelloy C	E - TFM P - PEEK T - PTFE U - UHMWPE	E - TFM P - PEEK T - PTFE U - UHMWPE	ETO - Extended Tube OD TR - Clamp Ends TP - Tank Pad CTF - Compression Fitting KF - Vacuum Ends	025 - 1/4" 038 - 3/8" 050 - 1/2" 075 - 3/4" 100 - 1" 150 - 1 1/2" 200 - 2" 250 - 2 1/2" 300 - 3" 400 - 4"	3L90 - 90° Rotation Ball 10 - 10 Ra EP - Electropolish CF - Cavity Filled O2CB - O <sub>2</sub> Clean/Bagged LH - Locking Handle
					Variations of the above or special ends can be supplied upon request		

### Example ordering codes:

2833EE-ETO-100-3L90-LH = 1" ball valve with stainless steel body/ball, TFM seats/seals, ETO ends, 90° rotation ball & locking lever handle  
2833ET-TR-100-3L90 = 1" ball valve with stainless steel body/ball, TFM seats, PTFE seals, clamp ends, 90° rotation ball & bare stem

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