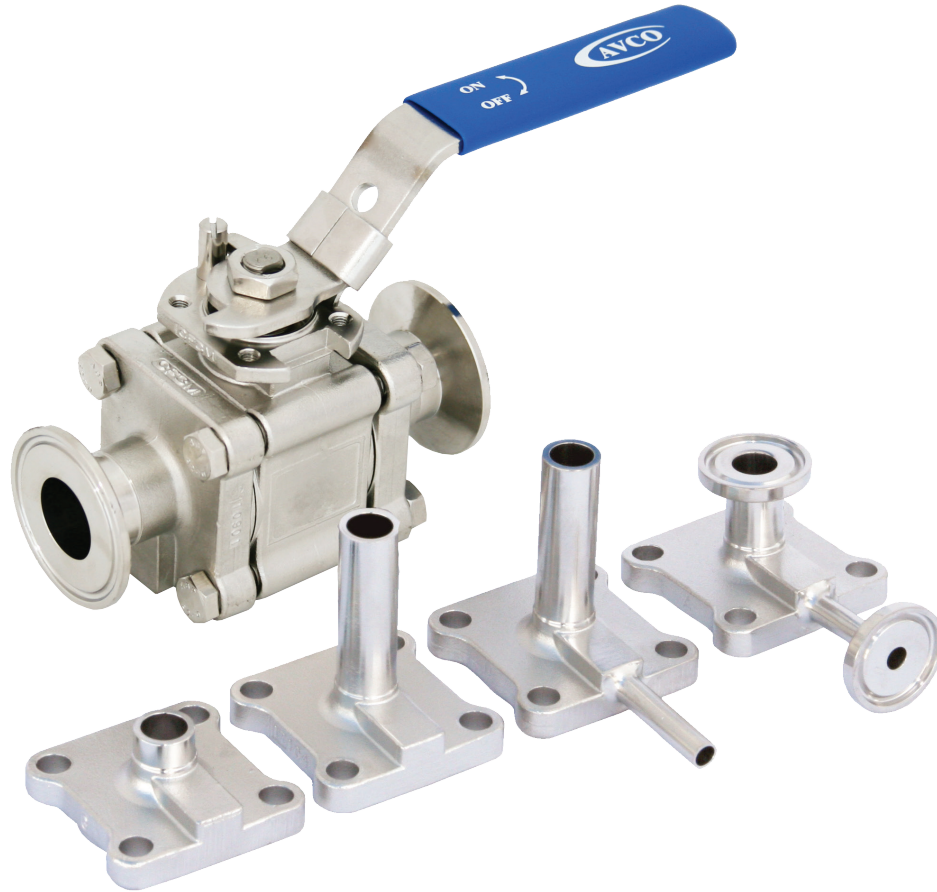


# AVCO

*Alloy Valves and Control*

## BALL VALVES 2100/F2100 SERIES



### Size

1/4" - 4" (Full Port Tube OD)  
1500 WOG

### End Connections

Extended Tube OD  
Short Tube OD  
Socket Weld Tube OD  
Clamp Ends  
Flush Bottom Tank Pad  
Compression Tube Fitting  
Vacuum Fitting

### 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  
Electro-Polish  
Mechanical Polish to 10 Ra

### Service Applications

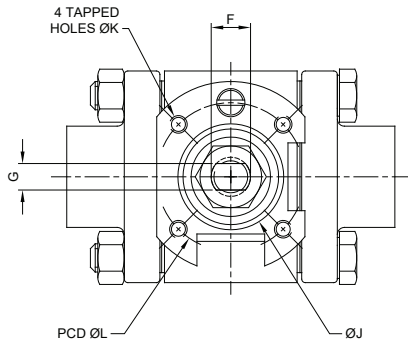
Biotech  
Clean Steam  
Cleaning Solutions  
Detergents  
Gas and Air Delivery  
High Purity Gases  
High Purity Water/Oils  
Pharmaceutical  
Vacuum  
Waxes

### Applicable Standards

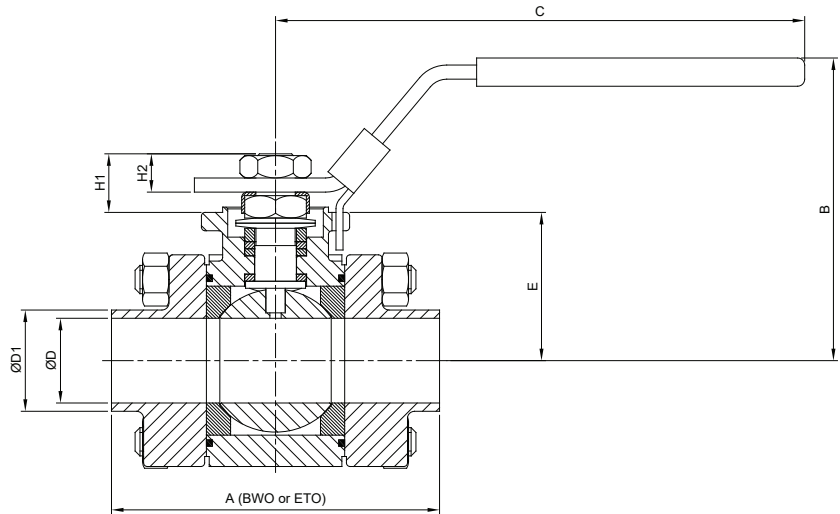
ASME B16.34  
ASME-BPE  
CRN (All Provinces)  
ISO 5211

### Alloy Valves and Control

#### 1/2" THRU 2" Butt Weld OD & Extended Tube OD

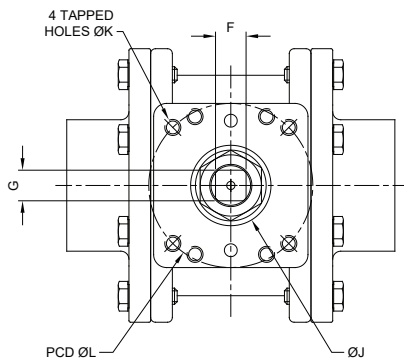


Plan View with Handle Removed

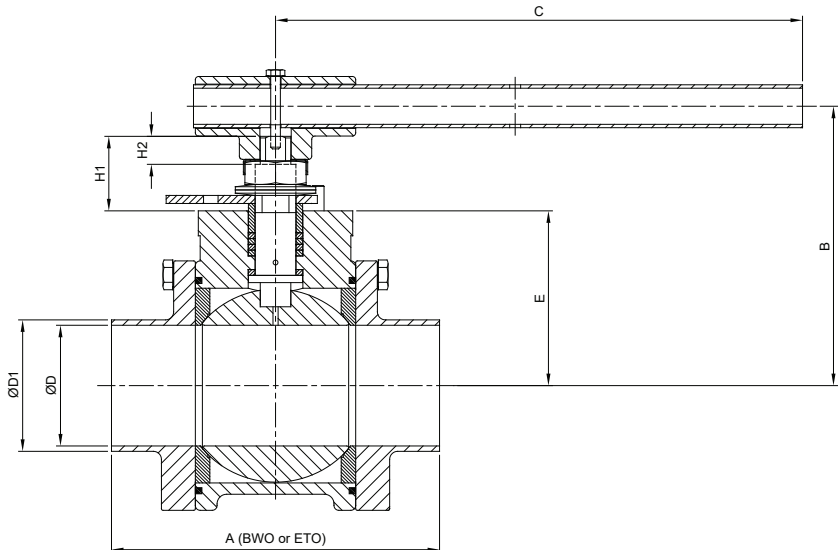


SIZE	A (in.)		B (in.)	C (in.)	D (in.)	D1 (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
	BWO	ETO														
1/2"	2.61	5.50	2.35	4.53	0.37	0.50	1.09	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
3/4"	3.03	6.00	2.41	4.53	0.62	0.75	1.15	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2.5
1"	4.06	6.50	3.33	5.91	0.87	1.00	1.64	0.44	0.30	0.65	0.46	1.18	M5	1.65	F04	4
1 1/2"	5.50	7.50	3.92	6.85	1.37	1.50	1.90	0.57	0.34	1.12	0.61	1.38	M6	1.97	F05	8
2"	6.25	8.50	4.26	6.85	1.87	2.00	2.24	0.57	0.34	1.12	0.60	1.38	M6	1.97	F05	14

#### 2 1/2" THRU 4" Butt Weld OD & Extended Tube OD



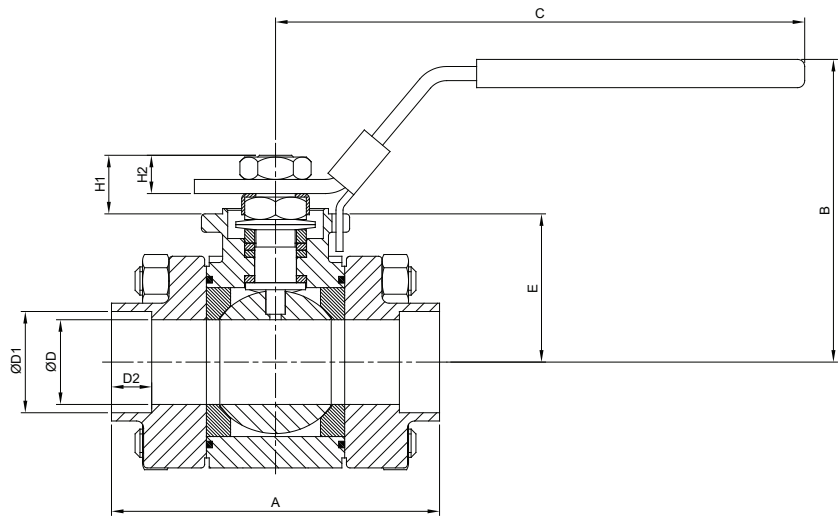
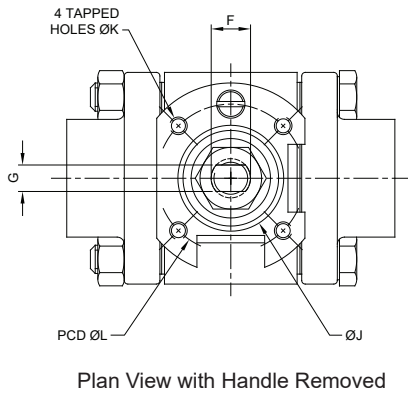
Plan View with Handle Removed



SIZE	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)
	BWO	ETO														
2 1/2"	6.26	10.00	5.28	8.84	2.37	2.50	3.25	0.79	0.55	1.65	0.72	1.58	M8	2.76	F07	22
3"	7.00	10.00	6.84	13.74	2.87	3.00	4.28	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	35
4"	8.50	11.00	7.37	13.74	3.83	4.00	4.81	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	55

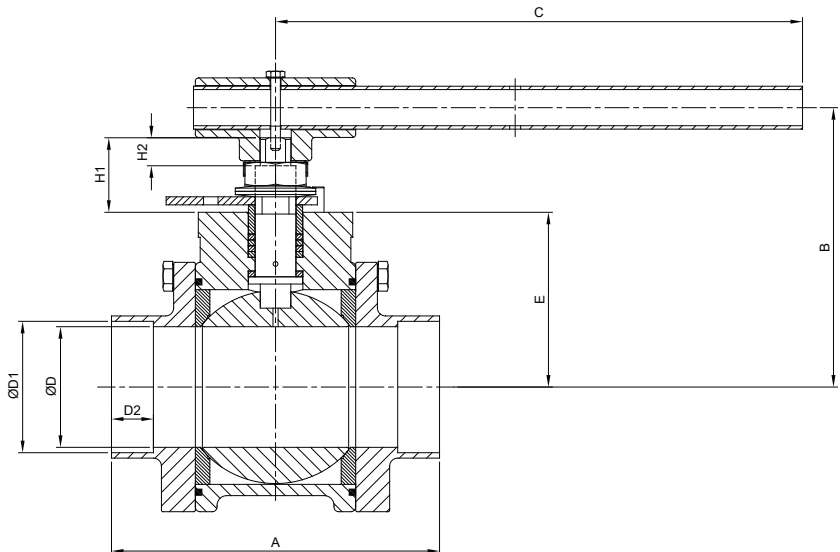
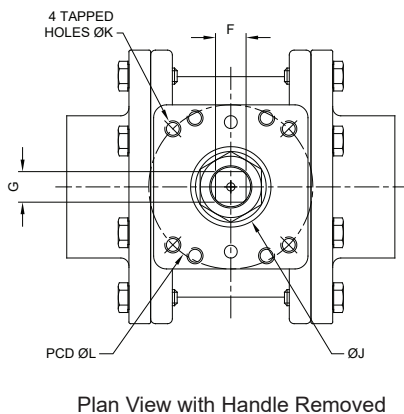
### Alloy Valves and Control

#### 1/2" THRU 2" Socket Weld Tube OD



SIZE	A (in.)	B (in.)	C (in.)	D (in.)	D1 (in.)	D2 (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
1/2"	2.61	2.35	4.53	0.37	0.51	0.43	1.09	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
3/4"	3.03	2.41	4.53	0.62	0.76	0.51	1.15	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2.5
1"	4.06	3.33	5.91	0.87	1.01	0.51	1.64	0.44	0.30	0.65	0.46	1.18	M5	1.65	F04	4
1 1/2"	5.50	3.92	6.85	1.37	1.52	0.51	1.90	0.57	0.34	1.12	0.61	1.38	M6	1.97	F05	8
2"	6.25	4.26	6.85	1.87	2.02	0.63	2.24	0.57	0.34	1.12	0.60	1.38	M6	1.97	F05	14

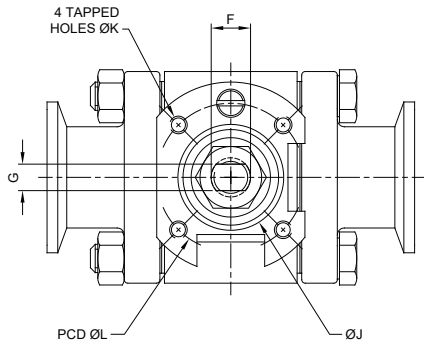
#### 2 1/2" THRU 4" Socket Weld Tube OD



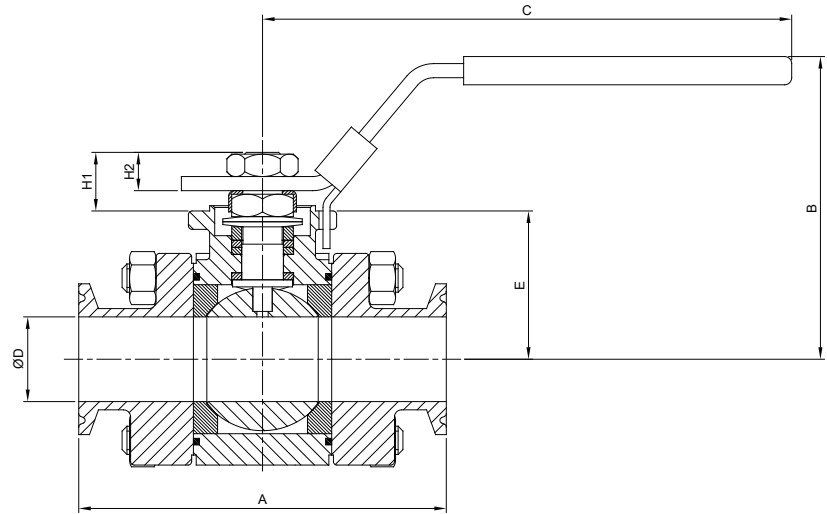
SIZE	A (in.)	B (in.)	C (in.)	D (in.)	D1 (in.)	D2 (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
2 1/2"	6.26	5.28	8.84	2.37	2.52	0.63	3.25	0.79	0.55	1.65	0.72	1.58	M8	2.76	F07	22
3"	7.00	6.84	13.74	2.87	3.02	0.63	4.28	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	35
4"	8.50	7.37	13.74	3.83	4.02	0.79	4.81	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	55

### Alloy Valves and Control

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

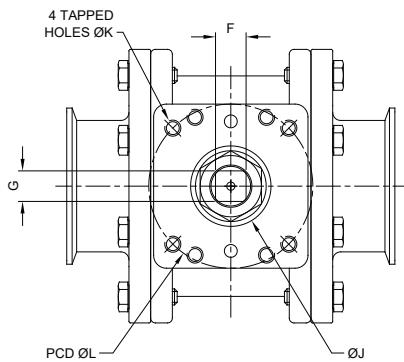


Plan View with Handle Removed

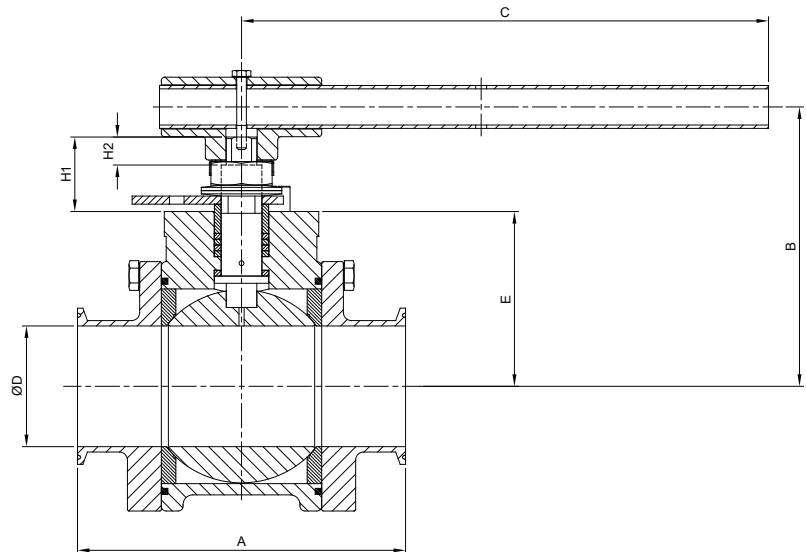


SIZE	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
1/2"	3.50	2.35	4.53	0.37	1.09	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
3/4"	4.00	2.41	4.53	0.62	1.15	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2.5
1"	4.50	3.33	5.91	0.87	1.64	0.44	0.30	0.65	0.46	1.18	M5	1.65	F04	4
1 1/2"	5.50	3.92	6.85	1.37	1.90	0.57	0.34	1.12	0.61	1.38	M6	1.97	F05	8
2"	6.25	4.26	6.85	1.87	2.24	0.57	0.34	1.12	0.60	1.38	M6	1.97	F05	14

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

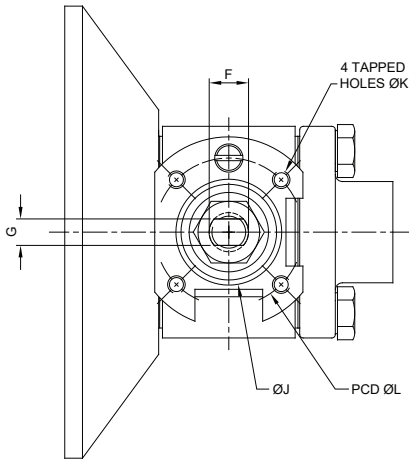


Plan View with Handle Removed

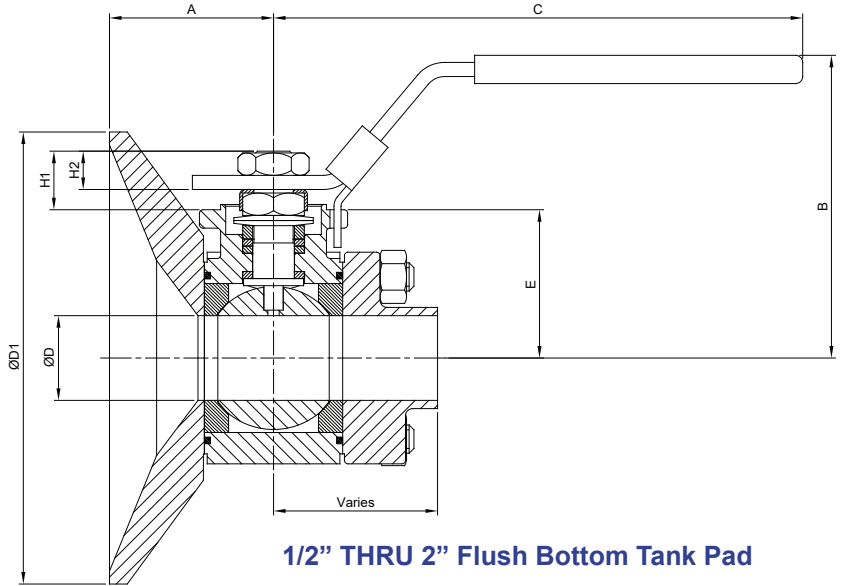


SIZE	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
2 1/2"	6.26	5.28	8.84	2.37	3.25	0.79	0.55	1.65	0.72	1.58	M8	2.76	F07	22
3"	7.00	6.84	13.74	2.87	4.28	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	35
4"	8.50	7.37	13.74	3.83	4.81	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	55

### Alloy Valves and Control

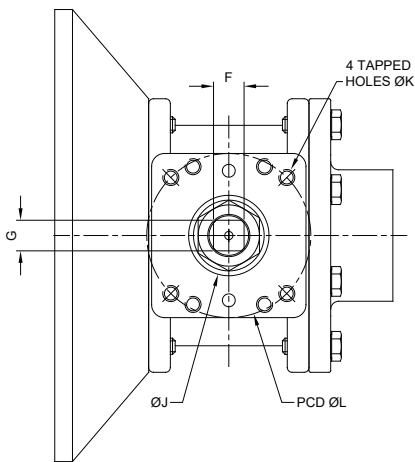


Plan View with Handle Removed

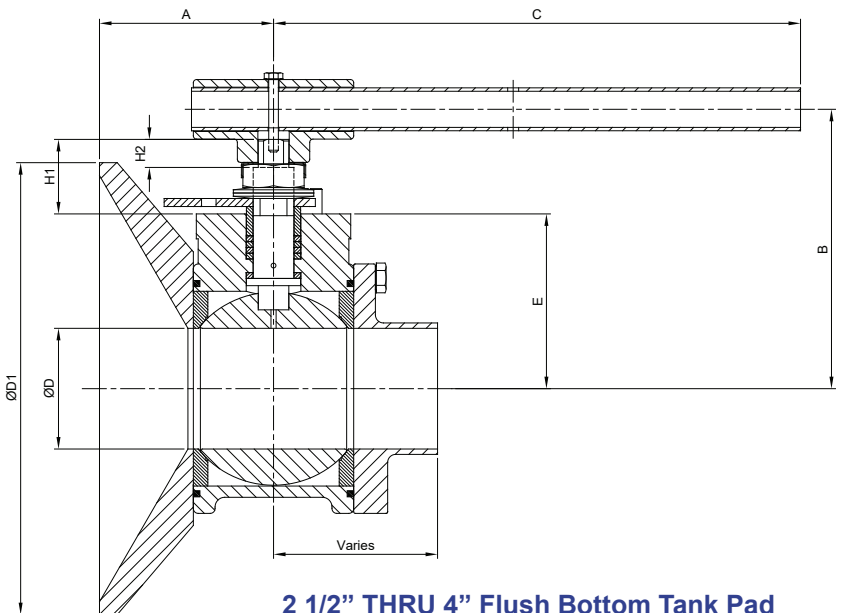


1/2" THRU 2" Flush Bottom Tank Pad

SIZE	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)
1/2"	1.31	2.35	4.53	0.37	3.07	1.09	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
3/4"	1.35	2.41	4.53	0.62	3.00	1.15	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
1"	1.71	3.33	5.91	0.87	3.75	1.64	0.44	0.30	0.65	0.46	1.18	M5	1.65	F04	5
1 1/2"	2.39	3.92	6.85	1.37	5.50	1.90	0.57	0.34	1.12	0.61	1.38	M6	1.97	F05	9
2"	2.66	4.26	6.85	1.87	6.50	2.24	0.57	0.34	1.12	0.60	1.38	M6	1.97	F05	16



Plan View with Handle Removed

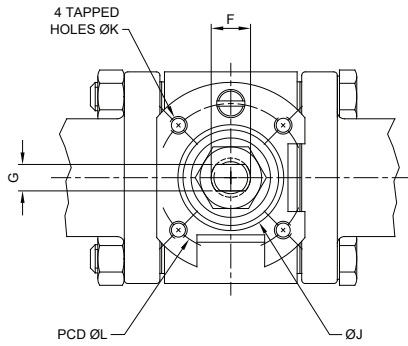


2 1/2" THRU 4" Flush Bottom Tank Pad

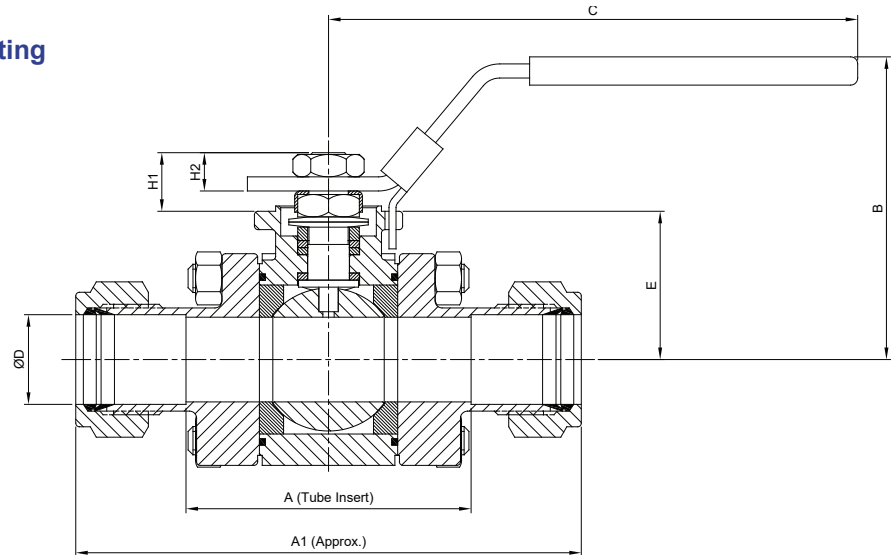
SIZE	A (in.)	B (in.)	C (in.)	D (in.)	D1 (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)
2 1/2"	3.25	5.28	8.84	2.37	8.00	3.25	0.79	0.55	1.65	0.72	1.58	M8	2.76	F07	25
3"	3.88	6.84	13.74	2.87	9.00	4.28	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	39
4"	4.50	7.37	13.74	3.83	11.50	4.81	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	61

## Alloy Valves and Control

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



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)
1/4"	2.44	3.64	2.35	4.53	0.37	1.09	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
3/8"	2.46	3.78	2.35	4.53	0.37	1.09	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
1/2"	2.20	4.00	2.35	4.53	0.37	1.09	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2
3/4"	2.33	4.25	2.41	4.53	0.62	1.15	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2.5
1"	2.79	5.25	3.33	5.91	0.87	1.64	0.44	0.30	0.65	0.46	1.18	M5	1.65	F04	4

### Common to all Valves

Size	Torque (in.lbs)	Cv
1/4"	65	12
3/8"	65	12
1/2"	65	12
3/4"	80	36
1"	120	71
1 1/2"	290	178
2"	450	437
2 1/2"	685	729
3"	1200	1118
4"	2000	2237

### 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.

#### Flush Bottom Tank Pads

1. The tank pad can be supplied with a radius to suit the actual tank diameter in most cases, thus reducing welding stresses.
2. The opposite end to the tank pad can be any other fitting type shown within this brochure or a customized one.

#### 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

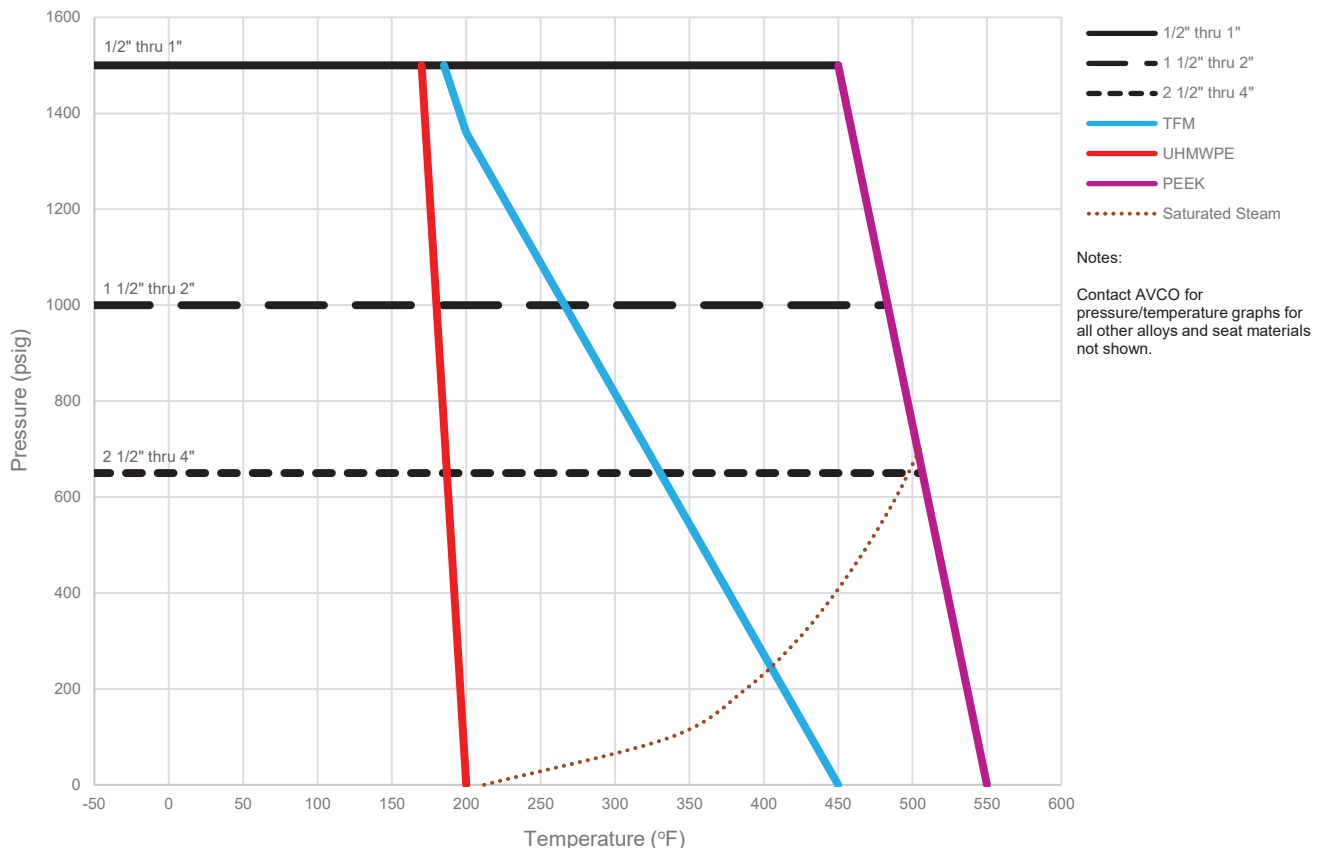
The AVCO 2100 series ball valve utilizes wall thicknesses specified in ASME BPE table DT-4-1 and as such the pressure ratings are based upon these tube wall thicknesses. The pressure ratings are calculated using ASME B31.3 and based upon cast CF3M with an allowable stress of 20,000 psi @ 100°F. The resultant pressure ratings exceed the minimum requirements for clamp end fittings as listed in ASME BPE table DT2-2-1. Pressure ratings for adjoining tube can exceed the valve ratings, although valve sizes 2" thru 4" will typically exceed pressure ratings for tube grades TP316L per ASTM A213, A269, A270 & A312

The standard valve pressure ratings are as follows:

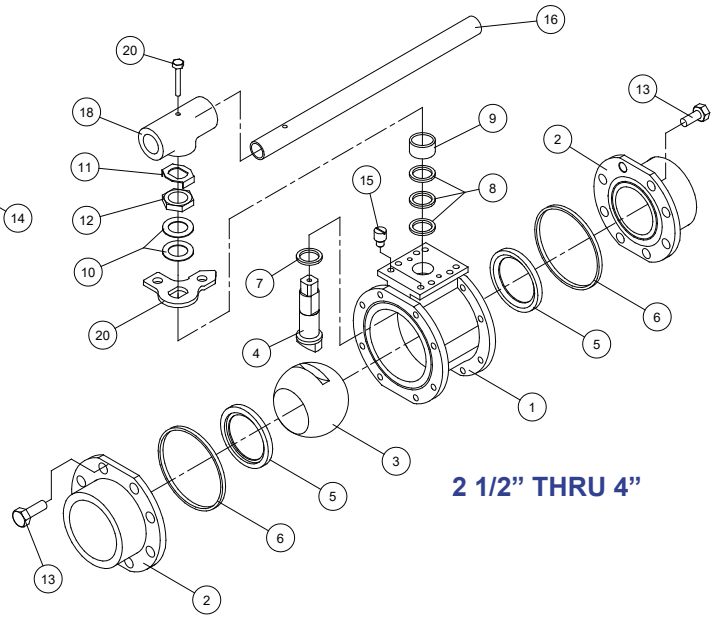
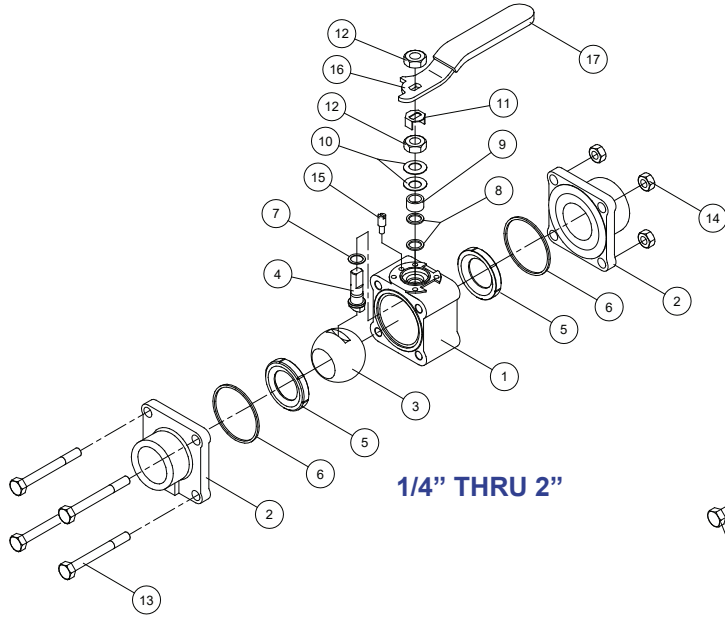
- 1/4" thru 1" - 1500 psig
- 1 1/2" thru 2" - 1000 psig
- 2 1/2" thru 4" - 650 psig

Unless otherwise requested, the 2100 series ball valves will be supplied with these pressure ratings. Please contact AVCO engineering for pressure ratings for custom end styles and tube wall thicknesses thicker than those listed in ASME BPE.

**Pressure/Temperature Rating Graph**



*Alloy Valves and Control*



Item	Parts
1	Body
2	End Cap
3	Ball
4	Stem
5	Ball Seat
6	Body Seal
7	Thrust Washer
8	Packing
9	Gland Ring
10	Disc Spring
11	Lock Tab
12	Stem Nut
13	Body Bolt
14	Body Nut
15	Stop Pin
16	Handle
17	Handle Sleeve
18	Wrench Block
19	Handle Bolt
20	Lock Pad

### Features

- 3 Piece Design
- Tube OD Bore
- 316L Stainless Body, Ball, Stem & Ends
- Inter-changeable Ends
- Standard Seats
- FDA21 CFR177 approved seat and seal materials
- Cavity Filled Seats
- Internal Bore to SF1 (Ra20)
- Optional Electro-Polished Internal Bore to SF4 (Ra15)
- ISO 5211 Mounting Pad
- ASME-BPE Compliant



*Alloy Valves and Control*



### 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

21	3	3	E	T	ETO	100	LH
Series	Body & End Material	Ball & Stem Material	Seat Material	Seal Material	End Style	Size	Options
2100 Series - Cast 3 Piece High Performance Full Port Tube OD Ball Valve	3 - 316L SS	3 - 316L SS	E - TFM P - PEEK U - UHMWPE	P - PEEK T - PTFE U - UHMWPE	ETO - Extended Tube OD BWO - Butt Weld Tube OD SWO - Socket Weld 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"	10 - 10 Ra EP - Electro-Polish CF - Cavity Filled O2CB - O <sub>2</sub> Clean/Bagged LH - Locking Handle
F2100 Series - Forged 3 Piece High Performance Full Port Tube OD Ball Valve					Variations of the above or special ends can be supplied upon request		

### Example ordering codes:

2133ET-ETO-100-LH = 1" cast ball valve with stainless steel body/ball, TFM seats, Extended Tube OD ends & locking lever handle  
F2133ET-TR-100-CF = 1" forged ball valve with stainless steel body/ball, Cavity Filled TFM seats, Extended Tube OD ends & bare stem

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