

# AVCO

*Alloy Valves and Control*

## BALL VALVES 1100 SERIES



### Size

1/4" - 4" (Full Port up to Class 600)  
1500 or 2000 WOG (size dependent)  
3000 WOG Option

### End Connections

NPT  
Butt Weld  
Socket Weld  
Flanged (150#, 300#, 600#)

### Valve Materials

316 Stainless Steel  
Carbon Steel  
Hastelloy C  
Monel  
Alloy 20  
Duplex/Super Duplex

### Ball and Stem Materials

316 Stainless Steel  
Hastelloy C  
Monel 400  
Alloy 20  
Duplex/Super Duplex

### Seat Materials

Teflon (PTFE)  
25% Carbon Filled Teflon  
15% Glass Filled Teflon  
Kel-F® (PCTFE)  
PEEK  
TFM (Cavity Filled Option)  
UHMWPE  
Metals

### Service Applications

Chemical  
Dry/Liquid Chlorine  
Food Processing  
Hydraulic  
Oxygen  
Steam  
Thermal Fluids  
Vacuum  
Water/Oil/Gas

### Applicable Standards

ASME B16.34  
API 598  
API 607 (7th Edition)  
CRN (All Provinces)  
NACE MR0175/ISO 15156

## *Alloy Valves and Control*

### **About the 1100 Series Ball Valve**

The AVCO 1100 series ball valve is made for high performance and quality. The investment cast, precision machined, 3-piece design gives great flexibility for butt weld, socket weld, NPT, flanged and various other end styles up to ANSI class 600 or 3000 WOG. It is designed in-house to meet or exceed ASME B16.34 and fully tested to API 598. Materials of construction are stainless steel, carbon steel and various alloys including Hastelloy, Alloy 20, Monel, Duplex and Super Duplex. The floating full port ball lies between seats encapsulated in metal retainer rings. The encapsulation of the seat also gives an option for fire safe trim that meets API 607. Seats are available in TFE, RTFE, CTFE, TFM, UHMWPE, PEEK, PCTFE and Stellite metal to satisfy harsh environment and high temperature applications. Cavity filled seat options are available for many of the seat materials. 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 5211 mount pad allows for many actuator styles (electric, pneumatic, etc.) to be mounted with ease. Whether for use in the oil, gas, chemical or steam industry, this valve will deliver performance, quality and ease of use.

### **Design**

- The valve body has three cast sections (body and two end caps).
- The three cast sections are bolted together and fully conform to ASME B16.34.
- Body bolts are encapsulated to minimize corrosion in hazardous or harsh locations.
- The valve is bidirectional design.
- Valves are available up to class 600 per ASME B16.34 or 2000/3000 WOG
- The end to end dimensions conform to ASME B16.10 for flanged versions and to AVCO standards for all other styles.
- Butt weld ends conform to ASME B16.25.
- Flange ends conform to ASME B16.5.
- Threaded ends conform to ASME B1.20.1, B16.11 & B16.34.
- Socket weld ends conform to ASME B16.11 & B16.34
- The ball is full port.
- The seats are encapsulated for greater durability.
- The valve is available for fire safe installations and tested per API 607 (7th Edition).
- The valve is designed for minimal pressure drop across the valve.
- The valve body has an integral mounting pad conforming to ISO 5211.
- The stem has blow-out prevention and anti-static design.
- The body gasket material is available in several materials to cover different media types.
- The seat material is available in several materials to cover different media types
- The stem assembly enables online adjustment of the packing.
- The valves are tested to API 598 and ASME B16.34.
- Valve sizes available are 1/4" thru 4".

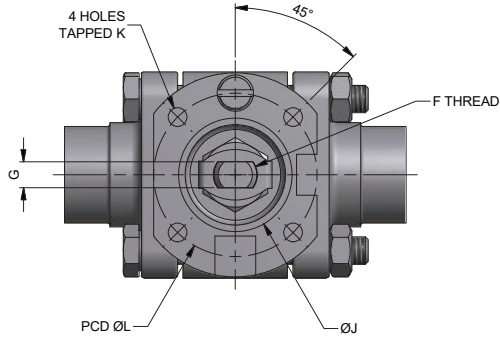
### **Operation**

The following operators can be utilized on the valve:

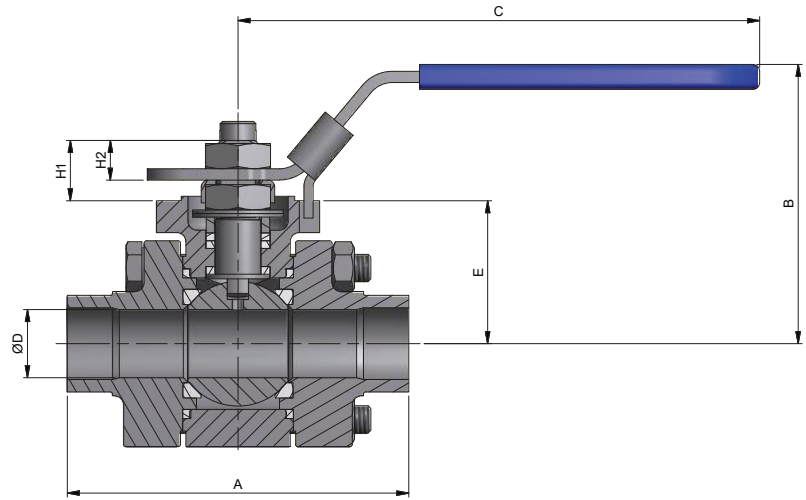
- Various manual handles (Lever, Tee, Oval)
- Chain wheel operator.
- Worm Gear operator.
- Pneumatic actuator.
- Hydraulic actuator.
- Electric motor actuator.

### Alloy Valves and Control

#### 1/4" THRU 3/4"

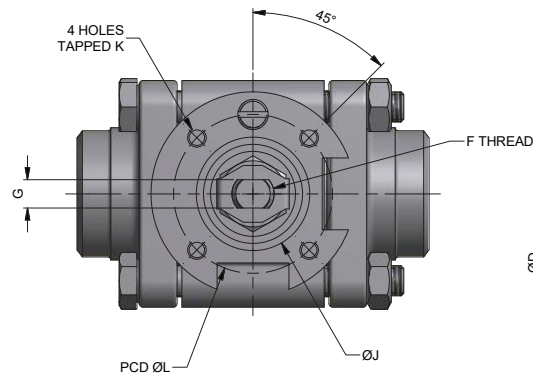


Plan View with Handle Removed

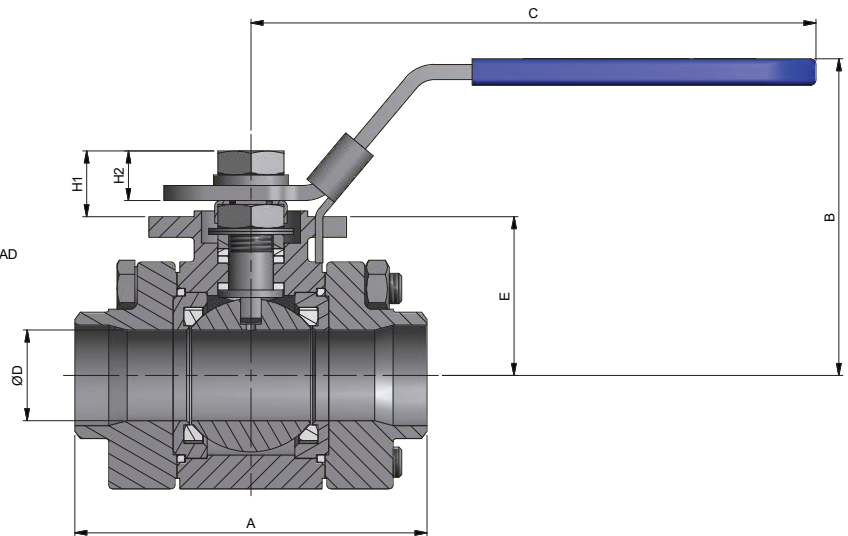


SIZE	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Cv	Weight (lbs)
1/4"	2.61	2.48	4.53	0.36	1.240	3/8-24 UNF	0.224	0.524	0.344	0.984	M5	1.417	F03	9	2
3/8"	2.61	2.48	4.53	0.49	1.240	3/8-24 UNF	0.224	0.524	0.344	0.984	M5	1.417	F03	18	2
1/2"	2.97	2.48	4.53	0.59	1.240	3/8-24 UNF	0.224	0.524	0.344	0.984	M5	1.417	F03	28	2
3/4"	3.18	2.56	4.53	0.75	1.319	3/8-24 UNF	0.224	0.524	0.344	0.984	M5	1.417	F03	49	2.5

#### 1" THRU 2"



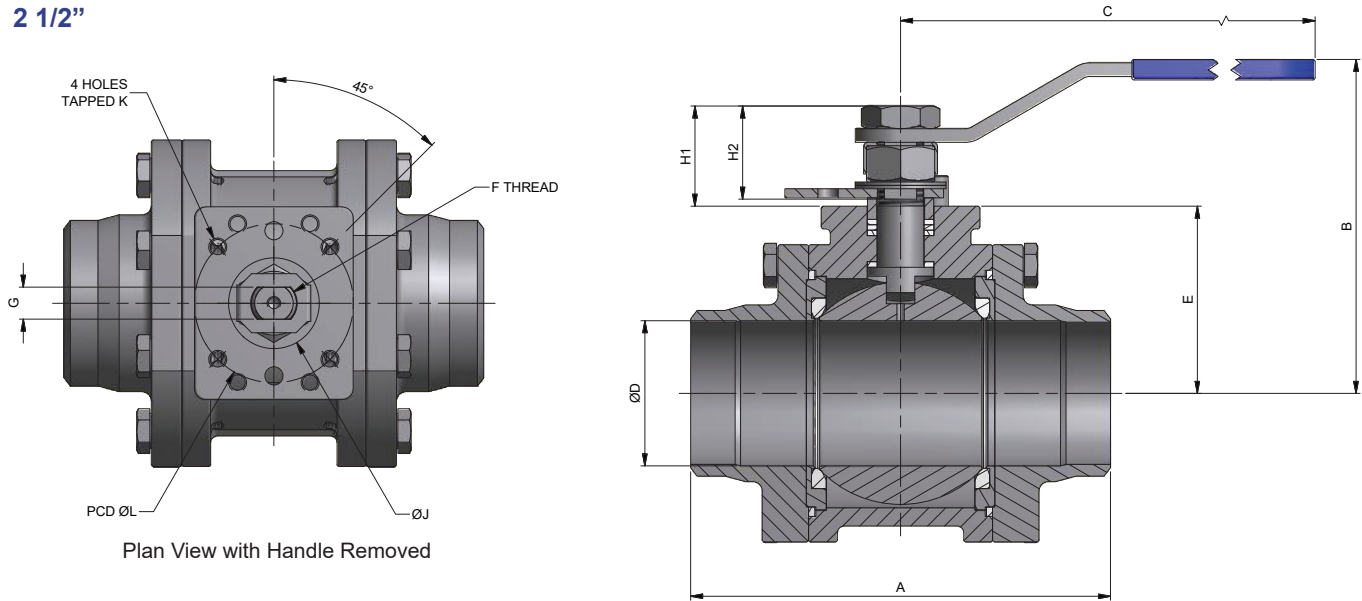
Plan View with Handle Removed



SIZE	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Cv	Weight (lbs)
1"	3.67	3.38	5.91	0.95	1.654	7/16-20 UNF	0.295	0.654	0.478	1.181	M5	1.654	F04	82	4
1 1/4"	4.37	3.50	5.91	1.18	1.850	7/16-20 UNF	0.295	0.654	0.478	1.181	M5	1.654	F04	135	6
1 1/2"	4.72	3.92	6.85	1.50	1.909	0.563	0.339	1.122	0.660	1.378	M6	1.969	F05	225	8
2"	5.53	4.25	6.85	1.97	2.264	0.563	0.339	1.122	0.660	1.378	M6	1.969	F05	400	14

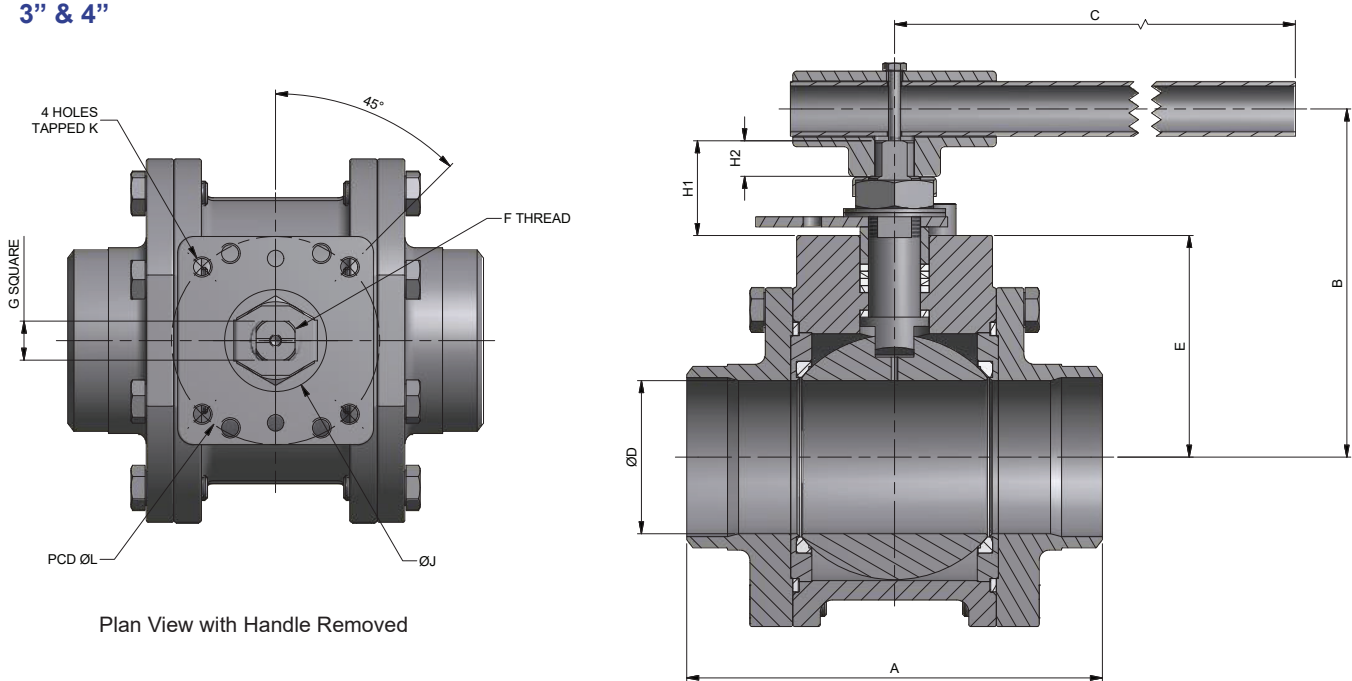
### Alloy Valves and Control

#### 2 1/2"



SIZE	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Cv	Weight (lbs)
2 1/2"	7.27	5.28	8.84	2.52	3.248	0.787	0.551	1.673	0.728	1.575	M8	2.756	F07	665	22

#### 3" & 4"

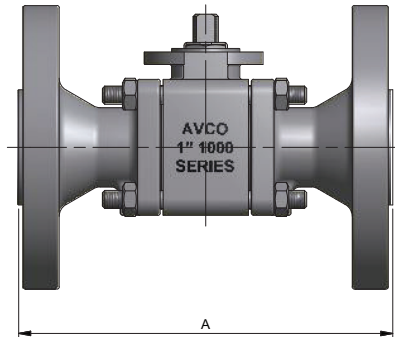


SIZE	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Cv	Weight (lbs)
3"	8.02	6.84	13.74	2.95	4.276	0.748	0.748	1.823	0.685	1.969	M10	4.016	F10	935	35
4"	9.46	7.37	13.74	3.78	4.807	0.748	0.748	1.823	0.685	1.969	M10	4.016	F10	1575	55

### Alloy Valves and Control

#### Flanged Ends (150#, 300#, 600#)

SIZE	A (in.)		
	150#	300#	600#
1/2"	5.50	5.50	6.50
3/4"	6.00	6.00	7.50
1"	6.50	6.50	8.50
1 1/4"	7.00	7.00	9.00
1 1/2"	7.50	7.50	9.50*
2"	8.50	8.50	11.50*
2 1/2"	9.50	9.50	13.00*
3"	11.12	11.12	14.00*
4"	12.00	12.00	17.00*



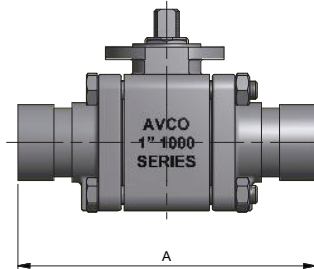
#### Note

Flanged ends are raised face per ASME B16.5. End to end dimensions meet ASME B16.10 for class 300 and 600. Please contact AVCO if you require flanged ends other than raised face or custom end to end dimensions.

\* Valve sizes 1 1/2" thru 4" with class 600 flanges do not meet ASME B16.34.

#### Grooved Ends

SIZE	A (in.)
3/4"	4.63
1"	5.17
1 1/4"	6.00
1 1/2"	6.50
2"	6.99
2 1/2"	7.88
3"	8.50
4"	10.00



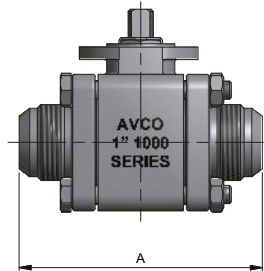
#### Note

Grooved Ends are furnished with standard cut grooves meeting AWWA C-606. End seal grooved ends are available upon request.

Pressure ratings are restricted to the grooved end ratings and associated clamps.

#### AN Fitting Ends

SIZE	A (in.)
1/4"	2.77
3/8"	2.77
1/2"	2.96
3/4"	3.61
1"	4.22
1 1/4"	5.04
1 1/2"	5.55
2"	6.99

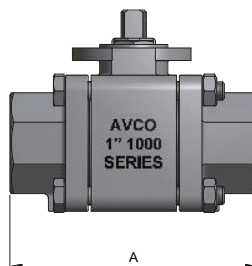


#### Note

AN Fitting ends are 37° flare type meeting SAE AS4395. They are designed for use with fittings per SAE AS4841.

#### Internal Straight Thread Ends

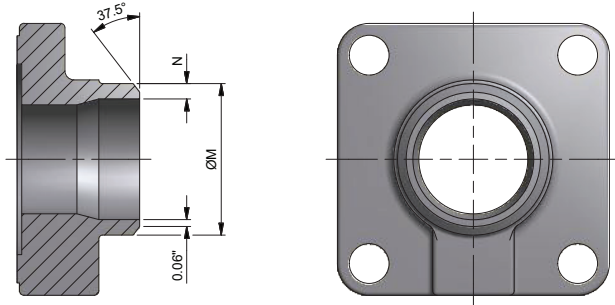
SIZE	A (in.)
1/4"	3.04
3/8"	3.04
1/2"	3.04
3/4"	3.73
1"	4.30
1 1/4"	4.98
1 1/2"	5.32
2"	6.44



#### Note

Internal Straight Thread ends meet SAE AS5202. They are designed for use with fittings per SAE AS4875.

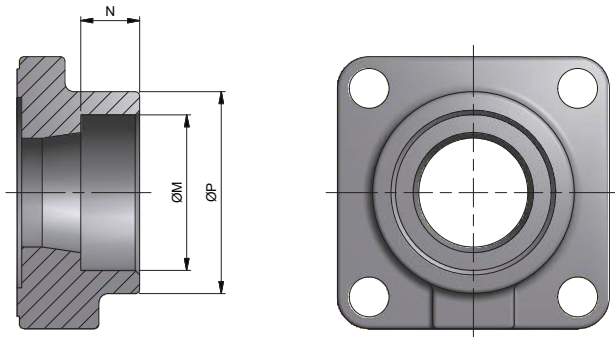
### BUTT WELD END STYLE (SCH 10, SCH 40, SCH 80)



Note: As stated in ASME B16.25, paragraphs 3.1a and 3.2a, butt weld ends are square cut where N is less than or equal to 0.12".

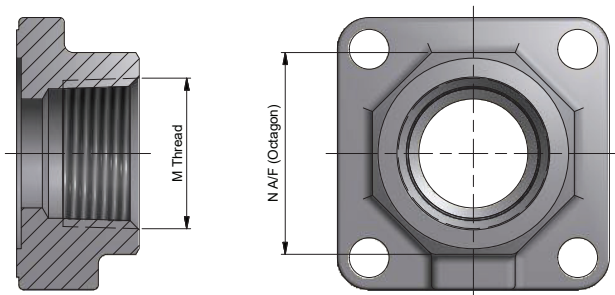
SIZE	M (in.)	N (in.)		
		Sch 10	Sch 40	Sch 80
1/4"	0.540	0.065	0.088	0.119
3/8"	0.675	0.065	0.091	0.126
1/2"	0.840	0.083	0.109	0.147
3/4"	1.050	0.083	0.113	0.154
1"	1.315	0.109	0.133	0.179
1 1/4"	1.660	0.109	0.140	0.191
1 1/2"	1.900	0.109	0.145	0.200
2"	2.375	0.109	0.154	0.218
2 1/2"	2.875	0.120	0.203	0.276
3"	3.500	0.120	0.216	0.300
4"	4.500	0.120	0.237	0.337

### SOCKET WELD END STYLE



SIZE	M (in.)	N (in.)	P (in.)
1/4"	0.57	0.39	1.00
3/8"	0.71	0.39	1.00
1/2"	0.87	0.39	1.20
3/4"	1.07	0.51	1.42
1"	1.35	0.51	1.75
1 1/4"	1.70	0.51	2.13
1 1/2"	1.94	0.51	2.44
2"	2.43	0.65	2.99
2 1/2"	2.93	0.65	3.62
3"	3.56	0.65	4.33
4"	4.56	0.79	5.59

### THREADED NPT END STYLE



SIZE	M (NPT)	N (in.)
1/4"	1/4	1.00
3/8"	3/8	1.00
1/2"	1/2	1.20
3/4"	3/4	1.42
1"	1	1.75
1 1/4"	1 1/4	2.13
1 1/2"	1 1/2	2.44
2"	2	2.99
2 1/2"	2 1/2	3.62
3"	3	4.33
4"	4	5.59

## Alloy Valves and Control

### Valve Pressure Ratings

The AVCO 1100 series ball valve can be supplied with WOG or ASME B16.34 pressure ratings. ASME B16.34 restricts the allowable bolt stress to 20,000 psi, whereas WOG has no restrictions on bolting allowing us to achieve greater pressure ratings within the same valve pattern. The WOG rated valves also use the standardized ASME allowable stress values to determine wall thickness, thereby resulting in a safe and reliable design. For ASME B16.34 rated valves, the 1100 series is fully compliant when used within the pressure/temperature limits defined on the next page.

The pressure ratings are available as follows:

#### WOG Ratings

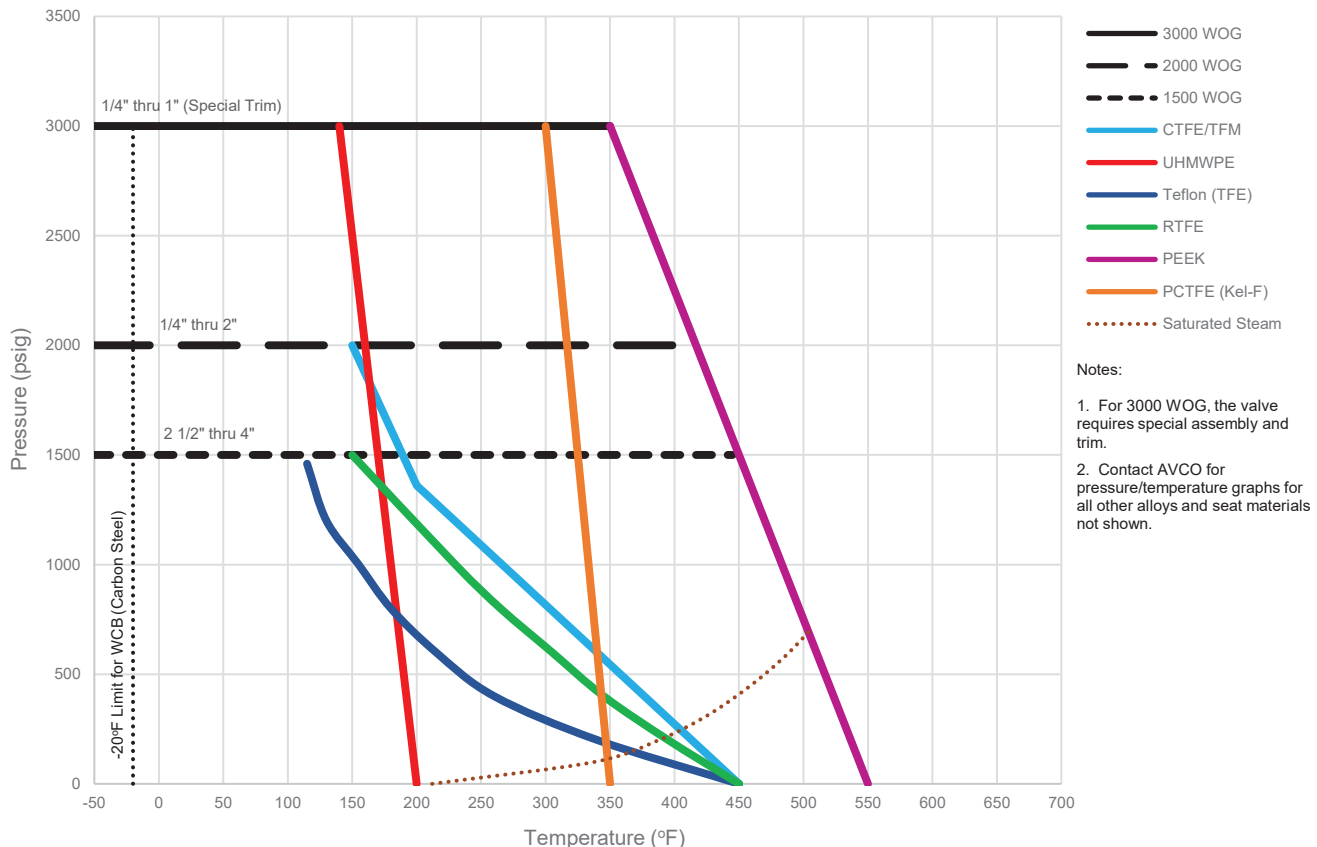
3000 WOG - 1/4" thru 1" (with special trim)  
 2000 WOG - 1/4" thru 2"  
 1500 WOG - 2 1/2" thru 4"

#### ASME B16.34 Ratings

Class 600 - 1/4" thru 1 1/4"  
 Class 300 - 1 1/2" thru 4"

Unless otherwise requested, the 1100 series will be supplied with WOG ratings on the valve tag.

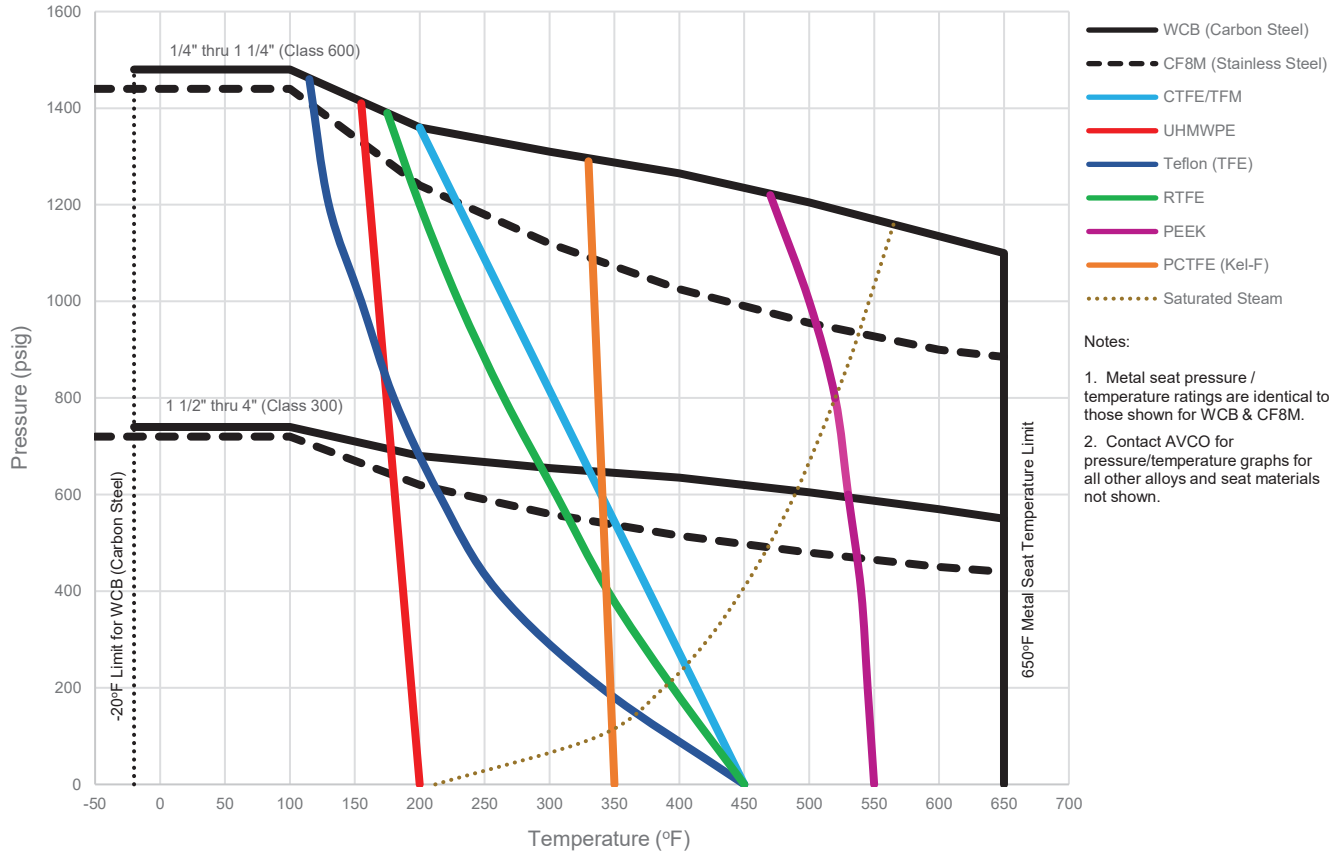
**Pressure/Temperature Rating Graph for WOG rated valves**



**Notes:**

1. For 3000 WOG, the valve requires special assembly and trim.
2. Contact AVCO for pressure/temperature graphs for all other alloys and seat materials not shown.

Pressure/Temperature Rating Graph Per ASME B16.34



Torque Table (in.lbs)

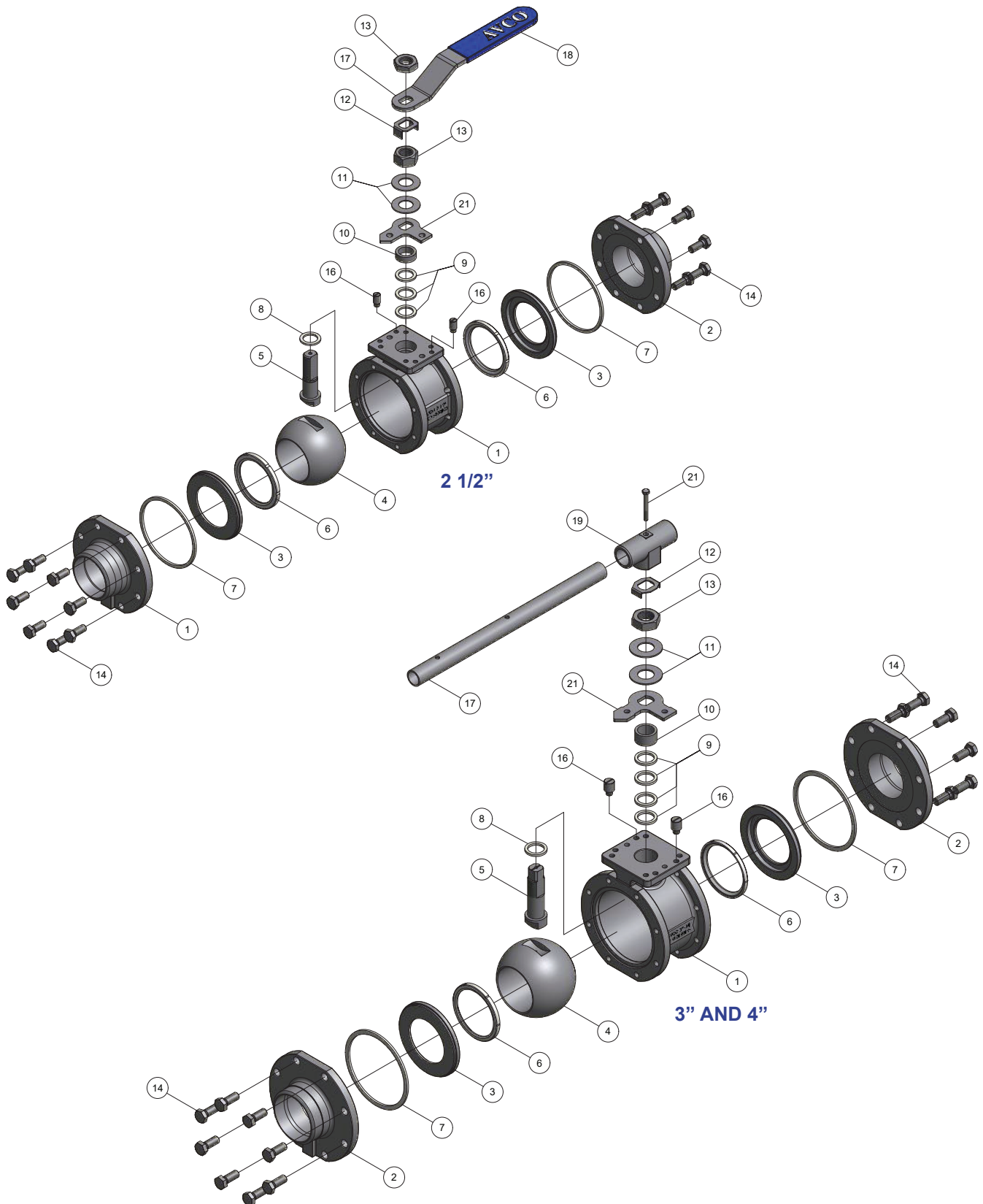
SEAT MATERIAL	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
TFE	30	30	30	60	90	140	150	720	900	1000	1100
TFM	30	30	30	40	55	125	135	600	900	1000	1700
RTFE	30	30	30	75	80	175	225	800	1000	1100	1450
CTFE	78	78	78	110	160	240	500	900	1000	1620	2750
UHMWPE	140	140	140	150	160	220	360	720	840	1560	1860
PCTFE	205	205	205	220	230	265	1000	1200	1450	2600	3000
PEEK	160	160	160	170	360	700	960	1320	1200	2100	3800
METAL	140	140	140	285	495	755	1295	1450	2500	4010	6800

**Notes**

1. Torque shown is actual measured maximum values, using water, at the maximum valve pressure rating and ambient temperature. Actual operating conditions and media type will affect torque values. If in doubt, please contact AVCO.







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 CF8M	A216 WCB
2	End Cap	Yes	Yes	Yes	Yes	A351 CF8M	A216 WCB
3	Retainer	No	Yes	Yes	Yes	A276 316	A276 316
4	Ball	Yes	Yes	Yes	Yes	A276 316	A276 316
5	Stem	Yes	Yes	Yes	Yes	A276 316 or ASTM A594 17-4	A276 316 or ASTM A594 17-4
6	Seat	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
7	Body Seal	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
8	Thrust Washer	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
9	Packing	Yes	Yes	Yes	Yes	Varies by Trim	Varies by Trim
10	Gland Ring	Yes	Yes	Yes	Yes	A276 316	A276-316
11	Disc Spring	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
12	Lock Washer	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
13	Stem Nut	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
14	Body Bolt	Yes	Yes	Yes	Yes	A2-70 or A193 B8	A2-70 or A193 B8
15	Body Nut	Yes	Yes	No	No	A2-70 or A194 2H	A2-70 or A194 2H
16	Stop Pin	Yes	Yes	Yes	Yes	Stainless Steel	Stainless Steel
17	Handle	Yes	Yes	Yes	No	Stainless Steel	Stainless Steel
18	Handle Sleeve	Yes	Yes	Yes	No	Vinyl	Vinyl
19	Wrench Block	No	No	No	Yes	Stainless Steel	Stainless Steel
20	Handle Bolt	No	No	No	Yes	Stainless Steel	Stainless Steel
21	Stop Pad	No	No	Yes	Yes	Stainless Steel	Stainless Steel

### Maintenance & Repair

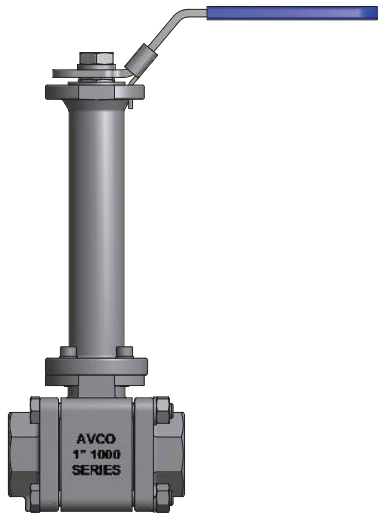
The AVCO 1100 series ball valve is a very reliable and robust design, but as with all resilient seated valves, the 'soft' parts are subject to wear over time. Replacing a whole valve is an unnecessarily high cost and as such, the 1100 series is fully repairable while in-line. Repair and maintenance kits 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.

### Fire Safe Design

When supplied with graphoil seals most AVCO 1100 series ball valves meet the requirements of API 607 (7th Edition) for fire safe applications. Please contact AVCO for full details of applicable valve materials and trim details.

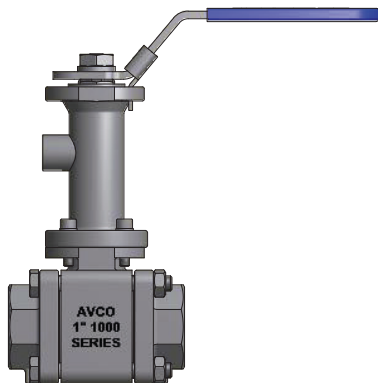
### OPTIONAL FEATURES



#### **Cryogenic Option**

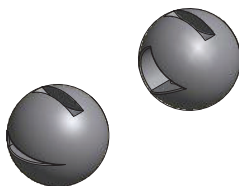
The AVCO 1000 series ball valves are available for cryogenic service with an extended bonnet. The extended bonnet can be shortened or lengthened to suit many applications and is also available 'off the shelf' in standard lengths. Most options and end styles available for the regular 1100 series valves are also available for the 1500 series valves.

[Click here for more information.](#)



#### **Fugitive Emissions Option**

The AVCO 1000 series ball valves can be supplied with fugitive emissions (sniffer) bonnets. These bonnets give an early warning system when the valve stem packing is becoming worn and ready for adjustment or renewal, thus preventing dangerous chemicals/gases from entering the surrounding environment.



#### **Characterized Ball Option**

The AVCO 1000 series ball valves can be supplied with vee port or slotted balls for greater control and accuracy. Many configurations are available to suit the needs of the customer to produce the required flow characteristics.

[Click here for more information.](#)



### 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  
Digital 'Intelligent' Positioner  
Dec clutchable Manual Override



### Manual Valves

Lever Handle  
Oval Handle  
Spring Return  
Fusible Link  
Locking Device  
Gear Operators

## HOW TO ORDER

11	3	3	T	T	SE	100	BAVT
Series	Body & End Material	Ball & Stem Material	Seat Material	Seal Material	End Style	Size	Options
1100 Series 3 Piece Ball Valve	1 - Carbon Steel	2 - Alloy 20	T - Teflon (PTFE)	T - Teflon (PTFE)	SE - NPT	025 - 1/4"	None - Bare Stem
	2 - Alloy 20	3 - 316 SS	R - 15% Glass PTFE	C - 25% Carbon PTFE	SW - Socket Weld	038 - 3/8"	BAHL - Hardened Ball
	3 - 316 SS	4 - Monel 400	C - 25% Carbon PTFE	G - Graphoil	BW - Butt Weld	050 - 1/2"	IE - Emissions Bonnet
	4 - Monel 400	6 - Hastelloy C	P - PEEK	U - UHMWPE	GR - Grooved	075 - 3/4"	BAVT - Vented Balls
	6 - Hastelloy C	8 - Titanium	U - UHMWPE		TP - Tank Pad	100 - 1"	O2CB - O2 Clean/Bagged
	8 - Titanium	9 - Aluminum	K - Kel-F® (PCTFE)		AN - SAE 4395	125 - 1 1/4"	CF - Cavity Filled
	9 - Aluminum	E - Super Duplex	S - Stellite		150 - 150# Flange	150 - 1 1/2"	LH - Locking Lever Handle
	E - Super Duplex (2507)	G - Duplex	E - TFM		300 - 300# Flange	200 - 2"	OH - Oval Handle
	G - Duplex (2205)		D - Delrin		600 - 600# Flange	250 - 2 1/2"	
					AS5202 - SAE Ends	300 - 3"	
						400 - 4"	
					Variations of the above or special ends can be supplied upon request		

### Example ordering codes:

1133TT-SE-100-LH = 1" ball valve with stainless steel body/ball, Teflon seats/seals, NPT ends & locking lever handle

1144PG-300-100-BAVT = 1" ball valve with Monel 400 body/vented ball, PEEK seats, Graphoil seals, 300# RF Flanged ends and bare stem