

AVCO

Alloy Valves and Control

BALL VALVES 11500 SERIES



Size

2" - 28" (Full Port)
Fire Safe as Standard

End Connections

150# RF Flanged
300# RF Flanged
600# RF or RTJ Flanged
900# RF or RTJ Flanged
1500# RF or RTJ Flanged
2500# RF or RTJ Flanged
Butt Weld
Grayloc®

Valve Materials

A182-F316 Stainless Steel

Ball and Stem Materials

A182-F316/XM-19

Seat Materials

PCTFE (Kel-F®)

Service Applications

Aerospace
Cryogenic Service
Food Processing
Liquid N₂
Liquid O₂
LNG
Petro-Chemical

Applicable Standards

ASME B16.34
ASME B16.25
ASME B16.10
ASME B16.5
API 607
API 6D

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About the 11500 Series Ball Valve

The AVCO 11500 series is a 3-piece trunnion ball valve designed for cryogenic service. This cryogenic trunnion valve is the better selection for larger line sizes and higher pressures compared to our cryogenic floating ball series. Made from forged 316 stainless steel (A182-F316), it is available from 2" through 28" with a full port ball to minimize the pressure drop across the valve. The valves are available with a choice of ANSI Class 150 through Class 2500 RF or RTJ flanges, butt weld & Grayloc® end connections. The extended bonnet adds a level of safety by ensuring that the operator is sufficiently removed from the cold service lines. Larger valves will require a gear operator, pneumatic or electric actuator to ensure smooth and effortless operation. AVCO can add these and other automation options to the valves as required. The valve design and fire safe feature conform to API 607, API 6D and ASTM standards B16.34, B16.25, B16.5 and B16.10. This valve is the perfect choice for large line LN2, natural gas and other cold applications.

Design

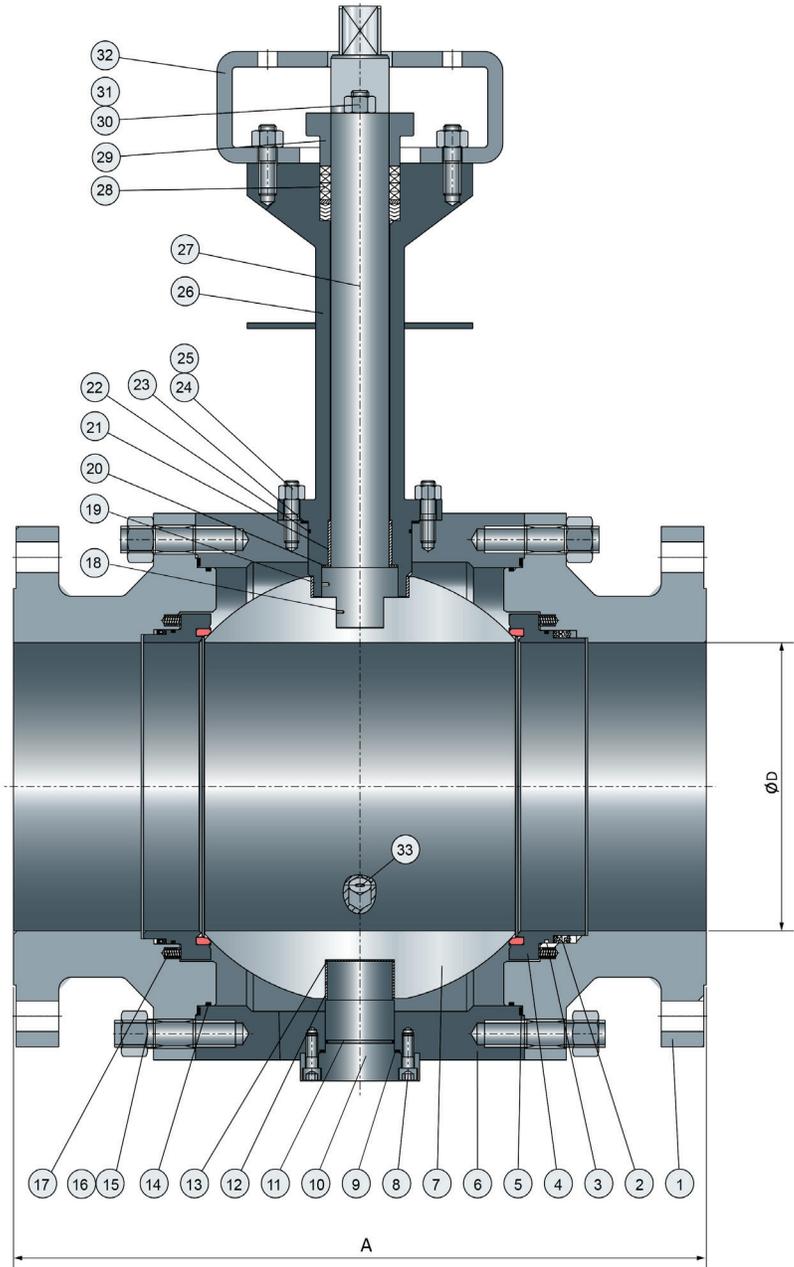
- The valve design meets API 6D.
- The valve body has three forged sections (body and two end caps).
- The three forged sections are bolted together and conform to ASME B16.34.
- The bonnet is an engineered single piece bolted to the valve body.
- Valves are available up to class 2500 per ASME B16.34.
- Cavity over pressure protection is standard.
- The end to end dimensions conform to ASME B16.10 for RF & RTJ flanged and butt weld versions.
- Butt weld ends conform to ASME B16.25.
- Flanged ends conform to ASME B16.5.
- Grayloc® fitting ends are available.
- The ball is full port.
- The seats are encapsulated for greater durability.
- The valve is fire safe as standard per API 607.
- 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 is bottom entry and has blow-out prevention.
- The stem has a lower guide bearing for increased stability.
- The bonnet gasket is stainless steel 316 spiral wound with graphite filler.
- 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.
- Anti-Static features are standard within the valve design.
- The valves are tested to API 598 and ASME B16.34.
- Valve sizes available are 2" thru 28".

Operation

The following operators can be utilized on the valve:

- Chain wheel operator.
- Electric motor actuator.
- Hydraulic actuator.
- Manual (Lever handles etc.)
- Pneumatic actuator.
- Worm Gear operator.

Item	Description	Materials
1	Closure	ASTM A182-F316
2	Lip Seal	Elgiloy + TFM/RPTFE
3	Gasket	Graphite
4	Seat	A182-F316 + PCTFE Inserts
5	Seal Gasket	SS 316 + Graphite
6	Body	ASTM A182-F316
7	Ball	A182-F316
8	Screw	A2-70
9	Seal Gasket	SS 316 + Graphite
10	Lower Cover	ASTM A182-F316
11	Gasket	Graphite + SS 316 Wire
12	Sliding Bearing	SS 316N
13	Thrust Washer	SS 316N
14	Gasket	Graphite + SS 316 Wire
15	Stud	A320-B8
16	Nut	A194-8
17	Device Spring	Inconel X-718
18	Anti-Static	Assembly
19	Sliding Bearing	SS 316N
20	Thrust Washer	SS 316N
21	Sliding Bearing	SS 316N
22	Gasket	Graphite + SS 316 Wire
23	Seal Gasket	SS 316 + Graphite
24	Stud	A320-B8
25	Nut	A194-8
26	Seal Cover	A182-F316
27	Stem	XM-19
28	Packing	Graphite
29	Packing Gland	SS 316
30	Stud	A320-B8
31	Nut	A194-8
32	Bracket	SS 316
33	Drain Valve	Assembly



ANSI Class 150, 300 & 600 Dimensions

SIZE	Class 150				Class 300				Class 600			
	A (mm)		D (mm)	Cv	A (mm)		D (mm)	Cv	A (mm)		D (mm)	Cv
	RF Flanged	Butt Weld			RF Flanged	Butt Weld			RF Flanged/ Butt Weld	RTJ Flanged		
2"	178	216	49	500	216	216	49	470	292	295	49	400
2 1/2"	191	241	62	1050	241	241	62	850	330	333	62	875
3"	203	283	74	1300	283	283	74	1100	356	359	74	1000
4"	229	305	100	2300	305	305	100	2200	432	435	100	1800
6"	394	457	150	5400	403	457	150	5400	559	562	150	4500
8"	457	521	201	10000	502	521	201	10000	660	664	201	8900
10"	533	559	252	17800	568	559	252	17100	787	791	252	14500
12"	610	635	303	26000	648	635	303	25000	838	841	303	22000
14"	686	762	335	32000	762	762	335	31000	889	892	335	28000
16"	762	838	385	44000	838	838	385	42000	991	994	385	39000
18"	864	914	436	58000	914	914	436	56000	1092	1095	436	51000
20"	914	991	487	75000	991	991	487	72000	1194	1200	487	66000
24"	1067	1143	589	111200	1143	1143	589	102000	1397	1407	589	92000
28"	1245	1346	684	143000	1346	1346	684	123000	1549	1562	684	122000

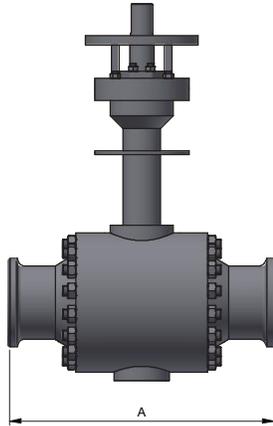
ANSI Class 900, 1500 & 2500 Dimensions

SIZE	Class 900				Class 1500				Class 2500			
	A (mm)		D (mm)	Cv	A (mm)		D (mm)	Cv	A (mm)		D (mm)	Cv
	RF Flanged/ Butt Weld	RTJ Flanged			RF Flanged/ Butt Weld	RTJ Flanged			RF Flanged/ Butt Weld	RTJ Flanged		
2"	368	371	49	360	368	371	49	360	451	454	43	285
2 1/2"	419	422	62	750	419	422	62	690	508	514	50	525
3"	381	384	74	1000	470	473	74	900	578	584	63	825
4"	457	460	100	1800	546	549	100	1600	673	683	88	1510
6"	610	613	150	4300	705	711	144	4000	914	927	132	3590
8"	737	740	201	8400	832	841	192	7900	1022	1038	180	7160
10"	838	841	252	14000	991	1000	239	13000				
12"	965	968	303	21000	1130	1146	287	19000				
14"	1029	1038	322	26000	1257	1276	316	24000				
16"	1130	1140	373	36000	1384	1407	360	33000				
18"	1219	1232	424	47500								
20"	1321	1334	471	60000								
24"	1549	1569	570	86000								

All dimensions in the above tables are for guidance only and can be subject to change dependant upon actual operating conditions and design parameters specified at point of sale. Accurate drawings are available for each valve size and can be supplied once an order is placed.

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Grayloc® Ends



Note

Grayloc® hub fitting ends are available upon request. They can either be based upon ASME pressure classes per the Grayloc® Selection Chart for the ANSI flange series, or per design pressures as required using ASME B31.3 as the design code. End to end dimensions can be based upon ASME B16.10 or custom lengths.

Please contact AVCO for further information including hub selection if required.

Valve Pressure Ratings

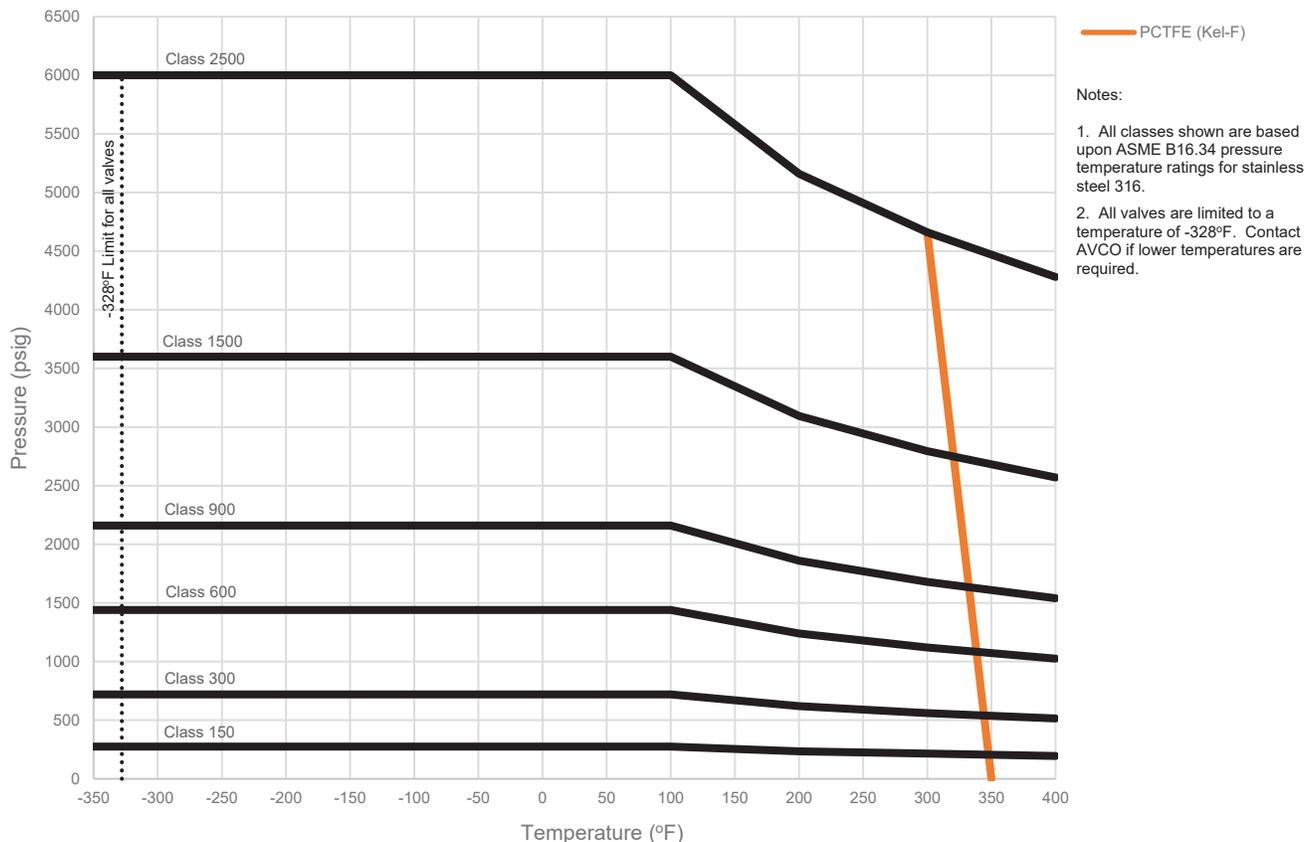
The AVCO 11500 series ball valve meets ASME B16.34 pressure ratings in the following size ranges:

Class 150, 300 & 600 - 2" thru 28"

Class 900 - 2" thru 24"

Class 1500 - 2" thru 16"

Class 2500 - 2" thru 8"



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Bi-directional Upstream Sealing

This valve is equipped with two spring energized seats which provide pre-loading and thereby effective sealing at low pressures. Sealing is enhanced at higher pressures as the upstream pressure creates a piston effect on the seat. Both seats are usually identical and always give true bi-directional operation.

Anti-Static Design

A number of metal components are isolated by non-metal packing and bearing materials which can cause electrical conductance continuity to be lost. To overcome this, spring energized balls are installed to maintain continuity and prevent the possibility of sparking resulting from static.

Seat Design Variations

These valves are supplied with single piston effect (SPE) seats as standard. This is also known as a DBB configuration per API 6D. DIB-1 & DIB-2 are also available as options. Each seat configuration is detailed below.

DBB

These valves have two single piston effect (SPE) seats which can only seal in one direction with the valve itself being bidirectional, meaning it can isolate pressure from either side. The primary sealing occurs on the upstream seat. Any trapped cryogenic fluid in the valve body cavity will vent through the downstream seat in the event of over-pressure due to flashing. There is a body cavity bleed port, but this is primarily for testing purposes and should remain closed during normal operation.

DIB-1

These valves have two double piston effect (DPE) seats, each capable of sealing in both directions. If the upstream seat fails, upstream pressure moves into the valve body cavity and is sealed by the downstream seat, ensuring double isolation. This adds an extra layer of safety for downstream equipment or operations. However, because both seats can seal in both directions, any cavity over pressure is contained and can build beyond the rating of the valve. A pressure safety valve (PSV) MUST be installed on the body to relieve any trapped pressure, which could otherwise lead to valve failure.

DIB-2

These valves combine one SPE seat and one DPE seat. The SPE seat is normally upstream and allows pressure relief, while the DPE seat is downstream and provides bi-directional sealing. If the upstream seat fails, the downstream seat will hold pressure. In the event pressure builds up in the body cavity, it will automatically vent to the upstream side. However, when flow is reversed, the valve functions more like a DBB, as the DPE seat is now on the downstream side.

Blow-Out Prevention Stem

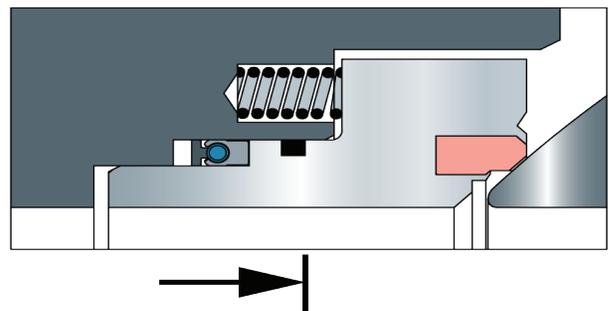
The stem has an integral shoulder as part of the design to prevent blow-out if excess pressure is encountered during operation.

Fire-Safe Design

In the event of a fire, several safety features are in place to prevent leakage. The seats have a metal lip that is pushed against the ball after the main seat melts away to effect temporary sealing. The main external joints have graphite based spiral wound gaskets to withstand the high temperatures encountered during a fire.

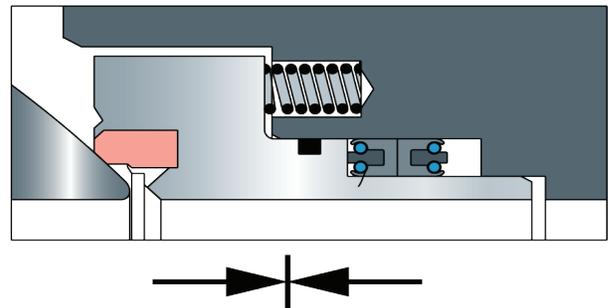
Single Piston Effect (SPE)

The single piston effect (SPE) seat utilizes a single spring energized seal which can only seal in one direction. When pressure builds upstream of the seal it pushes the seat toward the ball thereby effecting a seal. If pressure builds within the body cavity, the pressure will simply leak past the seal. This design allows for self relieving of the body cavity.



Double Piston Effect (DPE)

The double piston effect (DPE) seat utilizes two back to back spring energized seals giving a seal in both directions. When pressure builds upstream of the seal it pushes the seat toward the ball thereby effecting a seal. If pressure builds within the body cavity, the pressure will also push the seat toward the ball and maintain a seal. This design allows for double (backup) isolation.



HOW TO ORDER

115	3	3	K	G	150	200	LH
Series	Body & End Material	Ball & Stem Material	Seat Material	Seal Material	End Style	Size	Options
11500 Series 3 Piece Forged Fire-Safe Full Port Trunnion Mounted Cryogenic Ball Valve	3 - 316 SS	3 - 316 SS/XM-19	K - Kel-F (PCTFE)	G - Graphoil	150 - 150# RF Flange 300 - 300# RF Flange 600 - 600# RF Flange 900 - 900# RF Flange 1500 - 1500# RF Flange 2500 - 2500# RF Flange BW - Butt Weld 600RTJ - 600# RTJ Flange 900RTJ - 900# RTJ Flange 1500RTJ - 1500# RTJ Flange 2500RTJ - 2500# RTJ Flange GL600 - 600# GrayLoc® GL900 - 900# GrayLoc® GL1500 - 1500# GrayLoc® GL2500 - 2500# GrayLoc® GLxxx - Other GrayLoc®	200 - 2" 250 - 2 1/2" 300 - 3" 400 - 4" 600 - 6" 800 - 8" 1000 - 10" 1200 - 12" 1400 - 14" 1600 - 16" 1800 - 18" 2000 - 20" 2400 - 24" 2800 - 28"	LH - Lever Handle GO - Gear Operator CDA - Direct Acting Actuator CSR - Spring Return Actuator P - Electric Actuator SY - Scotch Yoke Actuator DIB1 - DIB-1 Seat Configuration DIB2 - DIB-2 Seat Configuration

Example ordering codes:

11533KG-150-200-LH = 2" cryogenic trunnion ball valve with stainless steel 316 body/ball, PCTFE seats, graphoil seals, 150# RF flanged ends & lever handle.

11533KG-GL1500-300-DIB1-GO = 3" cryogenic trunnion ball valve with stainless steel 316 body/ball, PCTFE seats, graphoil seals, 1500# Grayloc® ends, DIB-1 seat configuration & gear operator.