

AVCO

Alloy Valves and Control

BALL VALVES 1900 SERIES

INSTRUMENTS • CONTROLS • VALVES

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ARCO

Engineering, Inc.

SINCE 1954

www.arcoengineering.com

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Louisville, KY 40213

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Size

1/4" - 4" (Full Port)
2000 WOG

End Connections

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

Valve Materials

316 Stainless Steel
Carbon Steel
Hastelloy C
Monel

Ball and Stem Materials

316 Stainless Steel
Hastelloy B & C
Monel 400
Alloy 20

Seat Materials

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

Service Applications

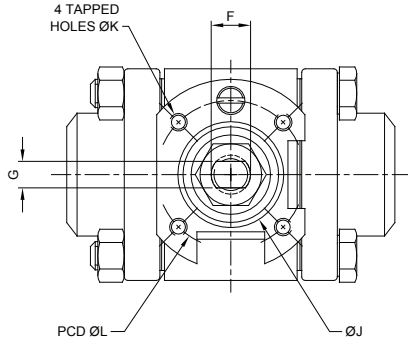
Chemical
Dry/Liquid Chlorine
Food Processing
Hydraulic
Oxygen
Steam
Thermal Fluids
Vacuum
Water/Oil/Gas

Applicable Standards

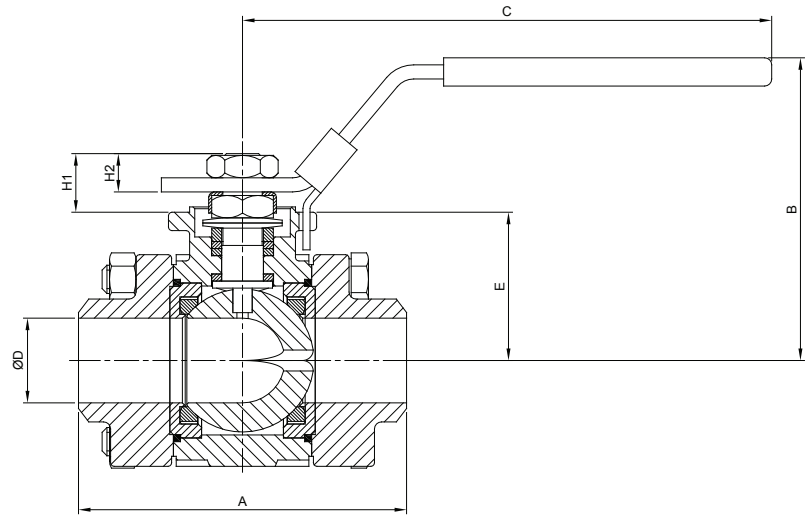
ASME B16.34
API 598
API 607 4th Edition

Alloy Valves and Control

1/4" THRU 2"

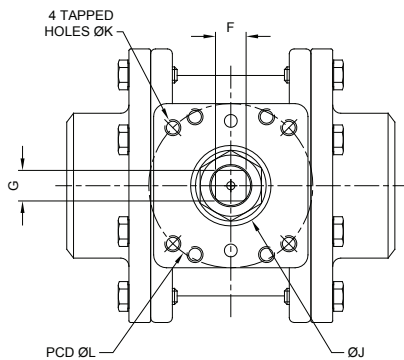


Plan View with Handle Removed

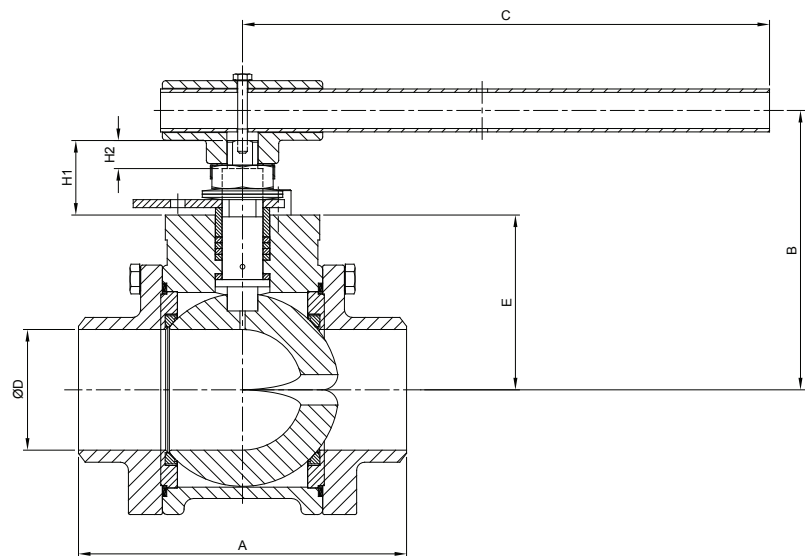


SIZE	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H1 (in.)	H2 (in.)	J (in.)	K	L (in.)	ISO 5211	Weight (lbs)	TORQUE (in-lbs)
1/4"	2.61	2.48	4.53	0.36	1.24	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2	65
3/8"	2.61	2.48	4.53	0.49	1.24	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2	65
1/2"	2.97	2.48	4.53	0.59	1.24	0.38	0.22	0.52	0.28	0.98	M5	1.42	F03	2	65
3/4"	3.17	2.56	4.53	0.75	1.32	0.38	0.22	0.52	0.29	0.98	M5	1.42	F03	2.5	80
1"	3.67	3.38	5.91	0.95	1.65	0.44	0.30	0.65	0.43	1.18	M5	1.65	F04	4	120
1 1/4"	4.37	3.50	5.91	1.18	1.82	0.44	0.30	0.67	0.47	1.18	M5	1.65	F04	6	235
1 1/2"	4.72	3.92	6.85	1.50	1.90	0.57	0.34	1.14	0.60	1.38	M6	1.97	F05	8	290
2"	5.53	4.25	6.85	1.97	2.22	0.57	0.34	1.14	0.60	1.38	M6	1.97	F05	14	450

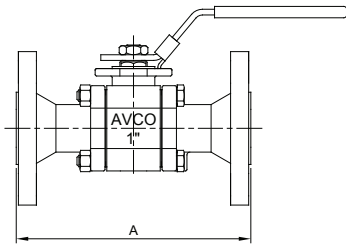
2 1/2" THRU 4"



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)	TORQUE (in-lbs)
2 1/2"	7.27	5.28	8.84	2.52	3.25	0.79	0.55	1.65	0.72	1.58	M8	2.76	F07	22	685
3"	8.02	6.84	13.74	2.95	4.28	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	35	1200
4"	9.46	7.37	13.74	3.78	4.81	0.75	0.75	1.82	0.69	1.97	M10	4.02	F10	55	2000



Standard 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

See tables on pages 2 & 3 for all other dimensions

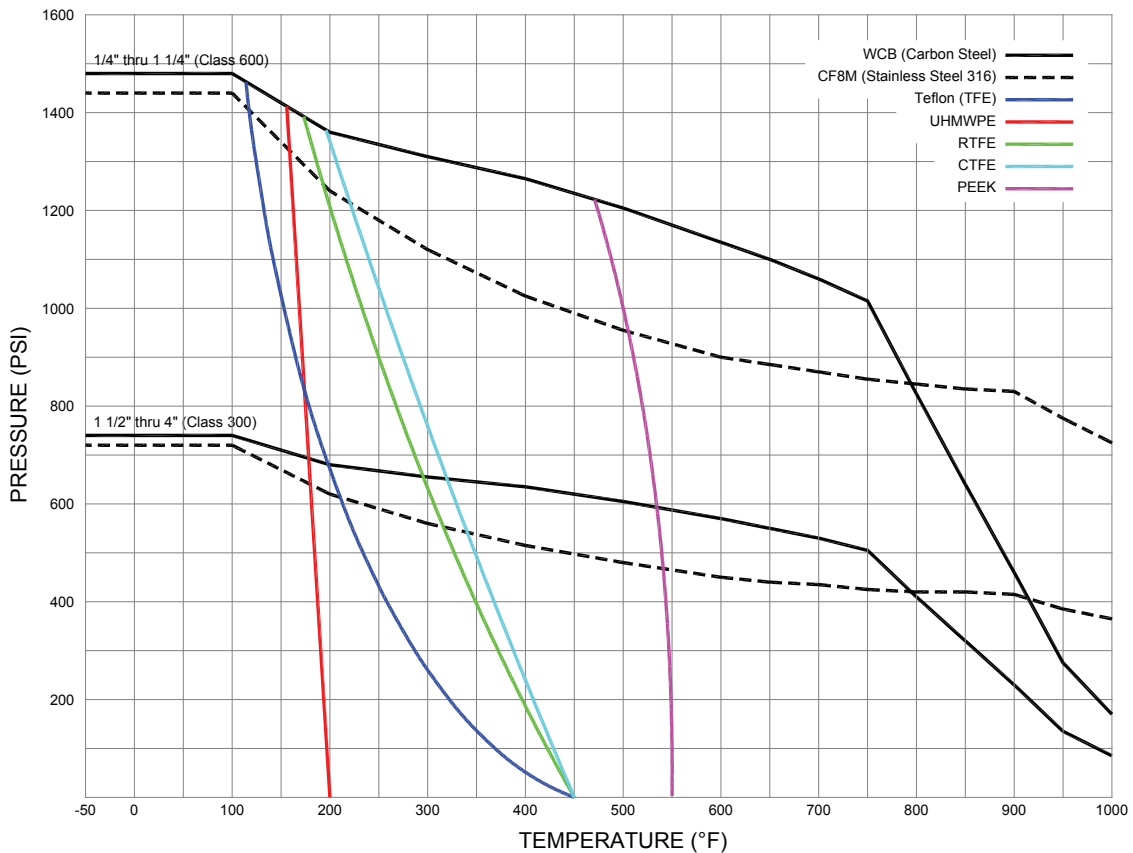
Note

Please contact AVCO if you require flanged ends to be other than standard raised face.

Notes

Please contact AVCO if you require customized versions of our valves. CAD drawings are available for most variations, including actuators etc.

Pressure/Temperature Rating Graph Per ASME B16.34

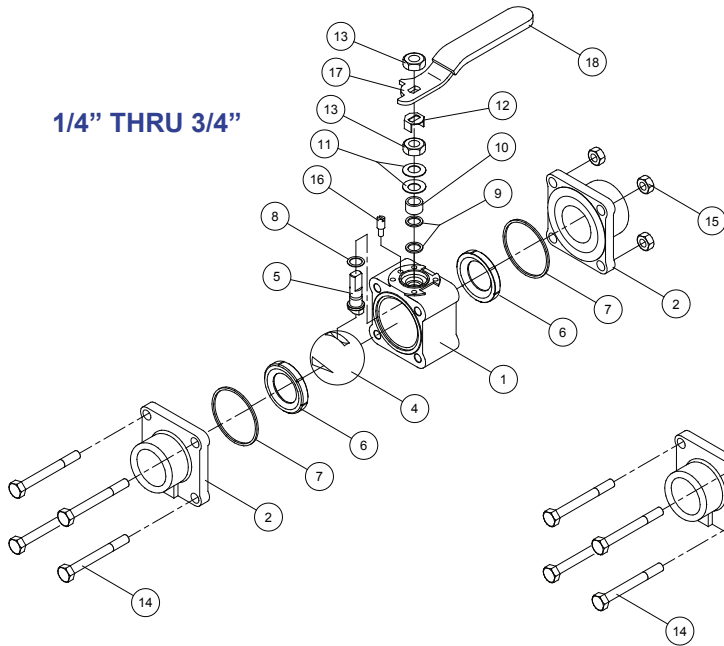


Notes

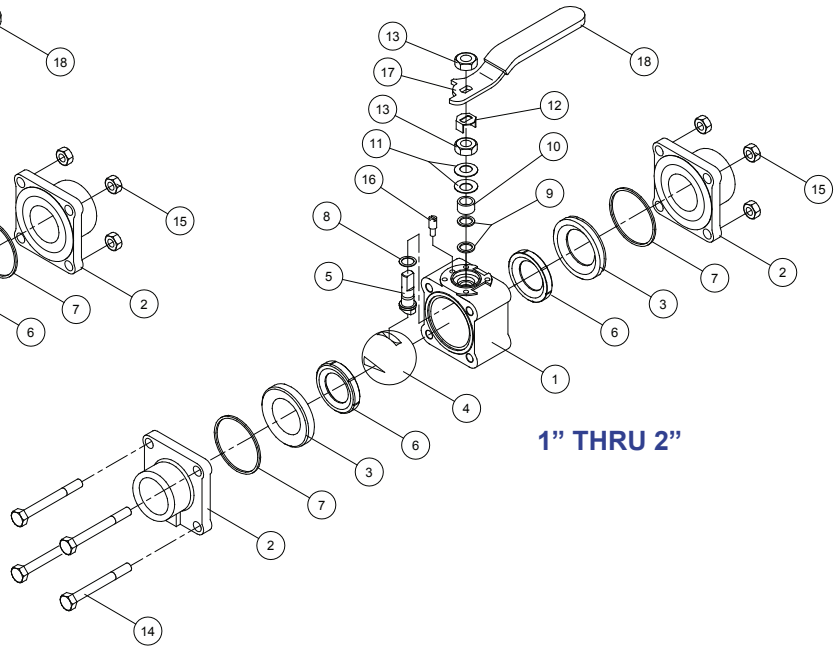
1. Metal seat pressure/temperature ratings are identical to those shown for WCB & CF8M.
2. Contact AVCO for 2000/3000 WOG pressure/temperature rating graphs.
3. Contact AVCO for Alloy 20, Hastelloy C, Inconel 625 and other alloy pressure temperature graphs.

Alloy Valves and Control

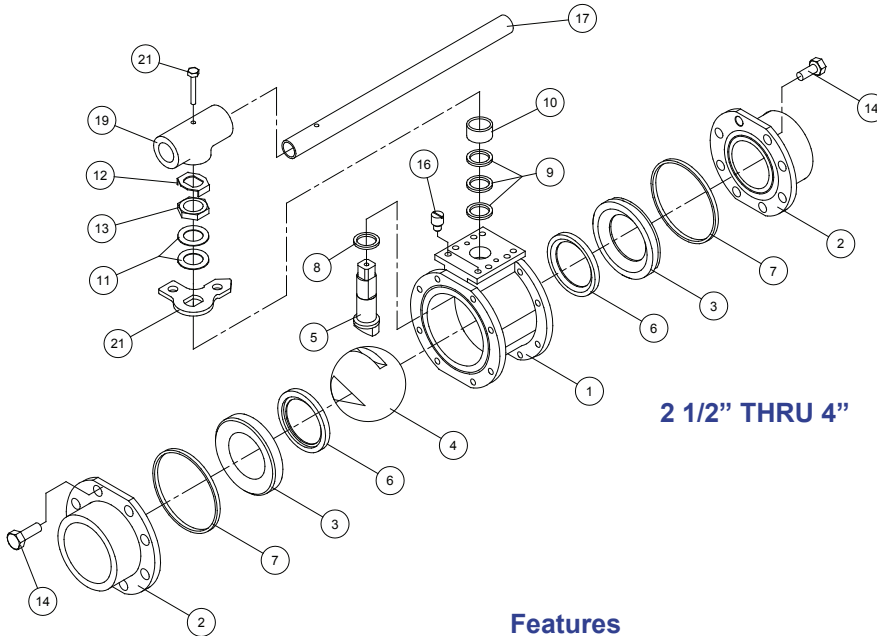
1/4" THRU 3/4"



1" THRU 2"



2 1/2" THRU 4"



Features

ANSI Class 150#, 300# & 600#
2000 WOG
Encapsulated Seats, Seals & Body Bolts
Spring Loaded Stem Packing
Bottom Entry Stem to Prevent Blow-Out
ISO 5211 Mounting Pad
Locking Handle
Inter-Changeable End Connections

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

15° Vee Port - Cv Table

SIZE	PERCENTAGE OPEN								
	20	30	40	50	60	70	80	90	100
1/4"	N/A	0.01	0.03	0.10	0.22	0.40	0.62	0.90	1.23
3/8"	N/A	0.01	0.03	0.10	0.22	0.40	0.62	0.90	1.23
1/2"	N/A	0.01	0.03	0.10	0.22	0.40	0.62	0.90	1.23
3/4"	N/A	0.02	0.10	0.24	0.44	0.72	1.06	1.46	1.91
1"	N/A	0.03	0.16	0.38	0.70	1.13	1.68	2.31	3.02
1 1/4"	N/A	0.04	0.27	0.62	1.12	1.79	2.62	3.57	4.63
1 1/2"	N/A	0.16	0.50	1.07	1.90	2.99	4.32	5.87	7.57
2"	N/A	0.43	1.12	2.18	3.65	5.53	7.79	10.36	13.14
2 1/2"	N/A	0.84	2.02	3.80	6.23	9.29	12.92	17.02	21.39
3"	N/A	0.76	2.18	4.49	7.75	11.97	17.12	23.05	29.53
4"	N/A	1.89	4.53	8.53	13.97	20.82	28.96	38.10	47.88

Cv values below 20% open and marked N/A are negligible and not recommended.

30° Vee Port - Cv Table

SIZE	PERCENTAGE OPEN								
	20	30	40	50	60	70	80	90	100
1/4"	N/A	0.01	0.06	0.21	0.46	0.83	1.35	2.04	2.93
3/8"	N/A	0.01	0.06	0.21	0.46	0.83	1.35	2.04	2.93
1/2"	N/A	0.01	0.06	0.21	0.46	0.83	1.35	2.04	2.93
3/4"	N/A	0.05	0.21	0.49	0.92	1.51	2.29	3.26	4.42
1"	N/A	0.08	0.33	0.77	1.45	2.38	3.60	5.12	6.92
1 1/4"	N/A	0.15	0.55	1.26	2.31	3.74	5.56	7.77	10.34
1 1/2"	N/A	0.32	1.02	2.20	3.94	6.30	9.33	13.03	17.40
2"	0.17	0.88	2.28	4.49	7.61	11.73	16.93	23.18	30.43
2 1/2"	0.41	1.71	4.11	7.81	12.96	19.67	27.99	37.90	49.24
3"	N/A	1.54	4.44	9.21	16.10	25.35	37.12	51.52	68.46
4"	0.92	3.83	9.23	17.53	29.04	44.02	62.56	84.54	109.57

Cv values below 20% open and marked N/A are negligible and not recommended.

45° Vee Port - Cv Table

SIZE	PERCENTAGE OPEN								
	20	30	40	50	60	70	80	90	100
1/4"	N/A	0.02	0.10	0.32	0.71	1.32	2.21	3.52	5.52
3/8"	N/A	0.02	0.10	0.32	0.71	1.32	2.21	3.52	5.52
1/2"	N/A	0.02	0.10	0.32	0.71	1.32	2.21	3.52	5.52
3/4"	N/A	0.08	0.32	0.75	1.43	2.39	3.70	5.47	7.83
1"	N/A	0.12	0.50	1.19	2.25	3.76	5.81	8.53	12.10
1 1/4"	N/A	0.23	0.84	1.93	3.57	5.85	8.85	12.68	17.45
1 1/2"	N/A	0.49	1.56	3.40	6.14	9.97	15.10	21.85	30.62
2"	0.26	1.36	3.50	6.94	11.89	18.66	27.63	39.30	54.28
2 1/2"	0.63	2.62	6.32	12.07	20.24	31.25	45.59	63.88	86.84
3"	N/A	2.36	6.83	14.22	25.13	40.24	60.53	87.31	122.34
4"	1.41	5.89	14.19	27.07	45.29	69.77	101.53	141.78	191.75

Cv values below 20% open and marked N/A are negligible and not recommended.

60° Vee Port - Cv Table

SIZE	PERCENTAGE OPEN								
	20	30	40	50	60	70	80	90	100
1/4"	N/A	0.03	0.13	0.44	0.99	1.86	3.24	5.53	9.93
3/8"	N/A	0.03	0.13	0.44	0.99	1.86	3.24	5.53	9.93
1/2"	N/A	0.03	0.13	0.44	0.99	1.86	3.24	5.53	9.93
3/4"	N/A	0.11	0.44	1.03	1.98	3.36	5.36	8.27	12.74
1"	N/A	0.17	0.69	1.63	3.11	5.27	8.34	12.74	19.27
1 1/4"	N/A	0.32	1.16	2.65	4.91	8.12	12.50	18.40	26.37
1 1/2"	N/A	0.67	2.14	4.67	8.50	14.01	21.80	32.92	49.32
2"	0.36	1.86	4.81	9.55	16.54	26.42	40.29	60.08	89.17
2 1/2"	0.87	3.60	8.67	16.63	28.13	44.16	66.23	96.92	140.28
3"	0.41	3.25	9.37	19.58	34.88	56.88	88.14	133.45	201.90
4"	1.95	8.09	19.47	37.22	62.86	98.40	146.92	213.52	306.23

Cv values below 20% open and marked N/A are negligible and not recommended.

90° Vee Port - Cv Table

SIZE	PERCENTAGE OPEN								
	20	30	40	50	60	70	80	90	100
1/4"	N/A	0.04	0.22	0.71	1.57	2.95	5.23	9.43	19.04
3/8"	N/A	0.04	0.22	0.71	1.57	2.95	5.23	9.43	19.04
1/2"	N/A	0.04	0.22	0.71	1.57	2.95	5.23	9.43	19.04
3/4"	N/A	0.19	0.71	1.67	3.21	5.61	9.51	16.55	32.07
1"	N/A	0.30	1.12	2.63	5.03	8.72	14.55	24.57	44.53
1 1/4"	N/A	0.52	1.87	4.24	7.86	13.15	20.90	32.60	51.14
1 1/2"	N/A	1.10	3.47	7.52	13.81	23.41	38.66	65.10	118.69
2"	0.61	3.05	7.78	15.44	27.11	44.90	73.54	124.50	233.32
2 1/2"	1.45	5.89	14.06	27.04	46.66	76.59	124.94	211.29	398.80
3"	0.70	5.34	15.19	31.63	57.08	96.35	160.37	276.68	537.12
4"	3.25	13.20	31.39	59.96	102.46	165.40	262.05	421.05	711.22

Cv values below 20% open and marked N/A are negligible and not recommended.

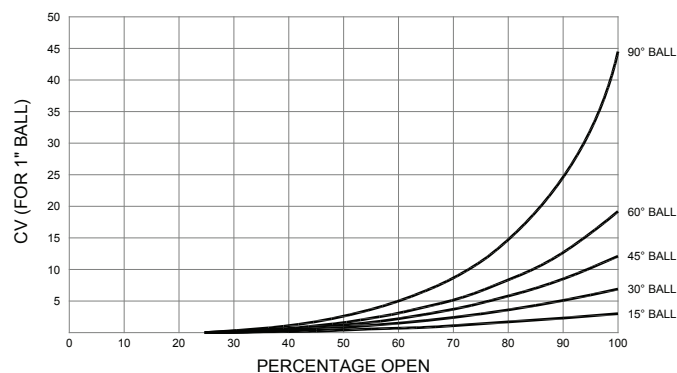
Liquid Pressure Recovery & Pressure Drop Ratio Factors

SIZE	PERCENTAGE OPEN								
	20	30	40	50	60	70	80	90	100
F_L	0.95	0.94	0.93	0.92	0.90	0.88	0.86	0.82	0.75
X_T	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

How to use tables

- Calculate required maximum and minimum Cv using appropriate formulas for gas or liquid (AVCO can provide assistance if required).
- Select a valve size based upon the maximum Cv whilst ensuring the percentage open is less than 90 percent.
- Check that the minimum Cv is greater than the figure for 30 percent open.
- If the values fall between these criteria then the valve should be suitable for the application.
- Please check with AVCO if further help or confirmation is required.

Typical Ball Characteristics





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
Lock Device
Gear Operators

HOW TO ORDER

19	3	3	T	T	SE	100	BAV60
Series	Body & End Material	Ball & Stem Material	Seat Material	Seal Material	End Style	Size	Options
1900 Series 3 Piece Vee Port Ball Valve	1 - Carbon Steel 1L - Low Grade Carbon 2 - Alloy 20 3 - 316 SS 4 - Monel 400 5 - Hastelloy B 6 - Hastelloy C 7 - Inconel 625 8 - Titanium 9 - Aluminum	2 - Alloy 20 3 - 316 SS 4 - Monel 400 5 - Hastelloy B 6 - Hastelloy C 7 - Inconel 625 8 - Titanium 9 - Aluminum	T - Teflon (PTFE) R - 15% Glass PTFE C - 25% Carbon PTFE P - PEEK U - UHMWPE K - Kel-F (PCTFE) B - Bronze S - Stellite I - Inconel	T - Teflon (PTFE) C - 25% Carbon PTFE G - Graphoil B - BUNA N E - EPDM V - Viton N - Neoprene	SE - NPT SW - Socket Weld BW - Butt Weld GR - Grooved FBT - Flush Bottom Tank BSP - British Standard Pipe AN - Army Navy 150 - 150# Flange 300 - 300# Flange 600 - 600# Flange	025 - 1/4" 038 - 3/8" 050 - 1/2" 075 - 3/4" 100 - 1" 125 - 1 1/4" 150 - 1 1/2" 200 - 2" 250 - 2 1/2" 300 - 3" 400 - 4"	BAV15 - 15° Vee Port BAV30 - 30° Vee Port BAV45 - 45° Vee Port BAV60 - 60° Vee Port BAV90 - 90° Vee Port BAVT - Vented Balls BAHL - Hardened Ball BNIE - Emissions Bonnet FS - Fire Safe O2CB - O2 Clean/Bagged LH - Locking Lever Handle OH - Oval Handle Customized Ports are available upon request
					Variations of the above or special ends can be supplied upon request		

Example ordering codes:

1933TT-SE-100-BAV60-LH = 1" ball valve with 316 SS body/ball, Teflon seats/seals, NPT ends, 60° Vee Ball & locking lever handle

1944PG-300-100-BAV15 = 1" ball valve with Monel 400 body/ball, PEEK seats, Graphoil Seals, 300# RF Flange, 15° Vee Ball and bare stem

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