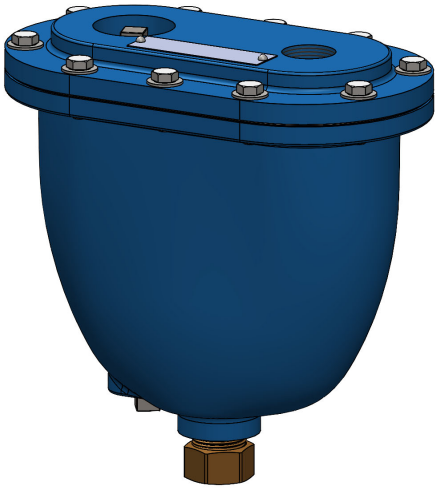
DeZURIK

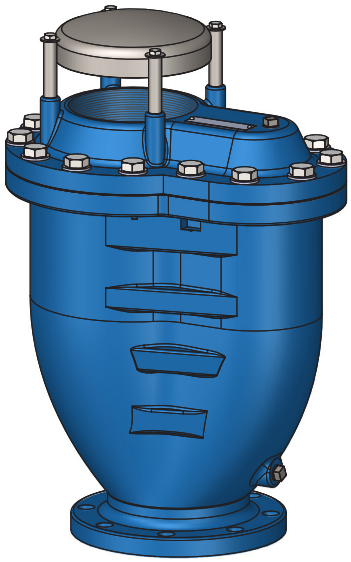
BULLETIN 623
OCTOBER 2024

APCO AVC SINGLE BODY COMBINATION AIR VALVES

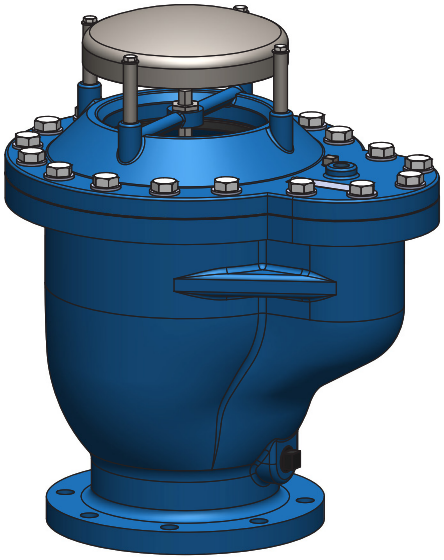
BODY STYLES 143C/145C/147C/149C AND 150C/151C



Body Styles 143C/145C/147C/149C
1-4” (25-100mm)



Body Style 150C
6” (150mm)



Body Style 151C
8” (200mm)

How Do Single Body Combination Air Valves Work?

Sizes 1-6" (25-150mm) incorporate a plug which rests freely inside the lever frame. The plug's central stem contains a small orifice. When water enters the main valve body it raises the float and float arm which puts the needle, attached to the arm, in contact with the plug stem while lifting the plug to the shut-off position against the large orifice.

As air accumulates inside the main valve body the water is displaced. The float arm falls away from the plug stem to expose the small orifice and the pocket of air is vented. Water re-enters the main valve body lifting the float arm back to the shut-off position and the cycle repeats as air accumulates. As long as the main valve body is under pressure, the plug stays closed because the pressure differential across the large orifice is more than the plug can overcome.

If, however, a negative pressure occurs inside the main valve body, the plug will drop open to allow air in and prevent a vacuum from forming in the pipeline.

Size 8" (200mm) functions in the same manner, but, instead of a plug, a small float is used for shutting off the large orifice and a separate large float operated lever mechanism is incorporated with a small orifice for venting smaller pockets of air when the system is pressurized.

Body Style 143C
1" (25mm)

Design & Construction

The Single Body Combination Air Valve consists of a body, cover, plug, seat and stainless steel float.

The following body styles are available:

- **AVC Single Body Combination Air Valve Body Style 143C/145C/147C/149C**
  The APCO AVC Valves in Body Styles 143C/145C/147C/149C, in sizes 1-4" (25-100mm), are available in ductile iron bodies with a threaded NPT inlet and outlet. ASME 125/150 or 250/300 flanged inlet are also available.

- **AVC Single Body Combination Air Valve Body Style 150C/151C**
  The APCO AVC Valves in Body Styles 150C/151C, in sizes 6" & 8" (150 & 200mm) are available in ductile iron bodies with flanged inlet in ASME 125/150 or 250/300 and a plain outlet with steel protector hood as standard.

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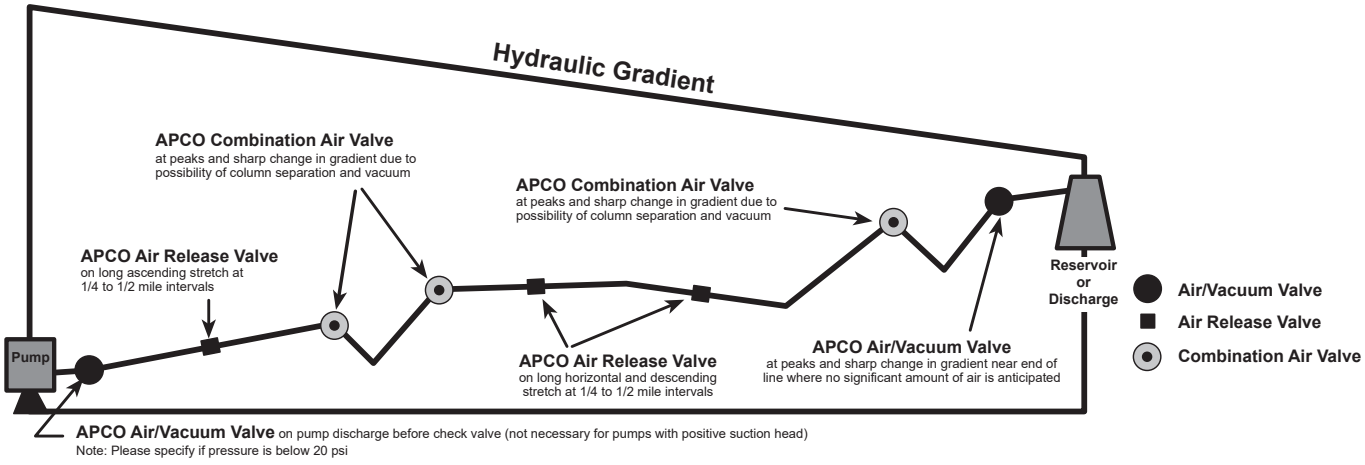
Single Body Combination Air Valves

APCO AVC Single Body Combination Air Valves are used when compactness is preferred and/or where risk of tampering exists due to accessibility of the installation.

The small orifice prevents small air pockets from accumulating at the high points of the pipeline that can restrict flow. The small orifice operates under pressure to release entrapped air in the pipeline. The small orifice stays normally closed to prevent the pipeline fluid from escaping. When enough air accumulates to form a pocket, the float lowers and opens the valve orifice to release air. The small orifice then closes until more air accumulates and the opening cycle repeats automatically. By relieving air pockets that restrict flow, a Combination Air Valve can quickly pay for itself in minimizing head loss, which results in reduced energy costs.

The large orifice protects pipelines from risk of collapsing due to vacuum. The large orifice exhausts air during pipeline filling and immediately allows air re-entry when the line drains. If negative pressure occurs, the large orifice opens to admit air and prevent a vacuum from forming in the pipeline.

Where to Install



Options & Accessories

Double Acting Throttling Device (DAT)

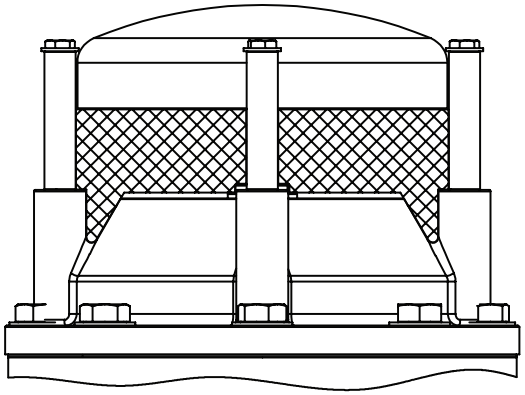
The Double Acting Throttling Device (DAT) is fitted on the discharge orifice of the Single Body Combination Air Valve to provide both throttling air out and full flow air in.

Single Body Combination Air Valves efficiently discharge air from deep well pump columns when combined with an APCO Double Acting Throttling Device (DAT). Available on valves sizes 1-8” (25-200mm) valve sizes.

Double Acting Throttling Device (DAT)

Bug Screen or Rock Screen (HSB/HSR)

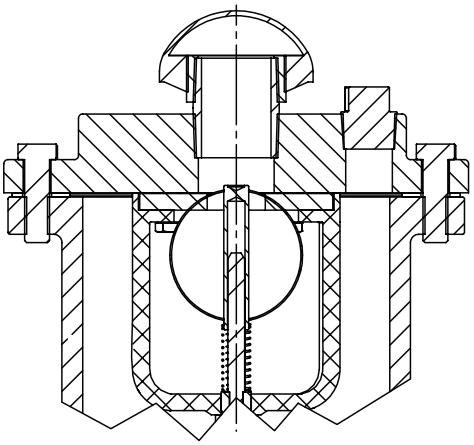
Standard outlets on Single Body Combination Air Valves in sizes 6" & 8" (150 & 200mm) are plain with a steel protector hood. Bug and rock screens are available as an option to provide additional protection to prevent debris from entering the Single Body Combination Air Valve.



Bug Screen or Rock Screen (HSB/HSR)

Mushroom Cap (MRC)

Mushroom Caps are available as an option on 1-4” (25-100mm) valves. They are installed in the threaded outlet for discharge protection.

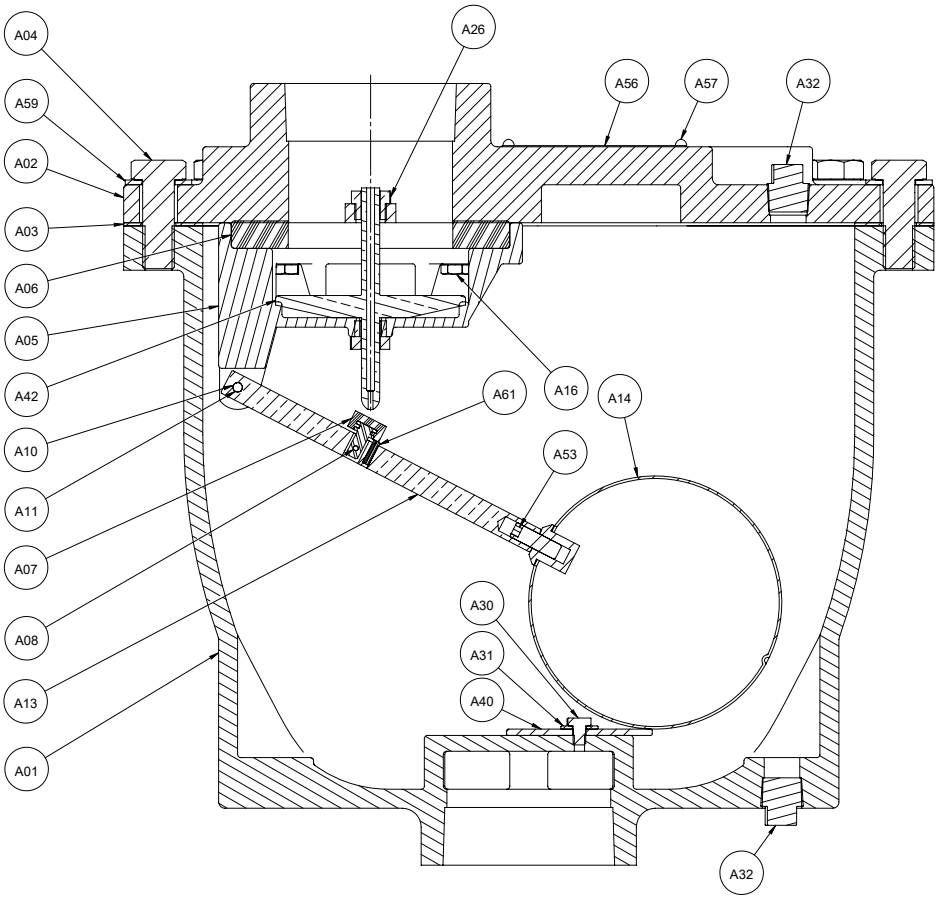


Mushroom Cap (MRC)

Materials of Construction

Body Styles 143C/145C/147C/149C

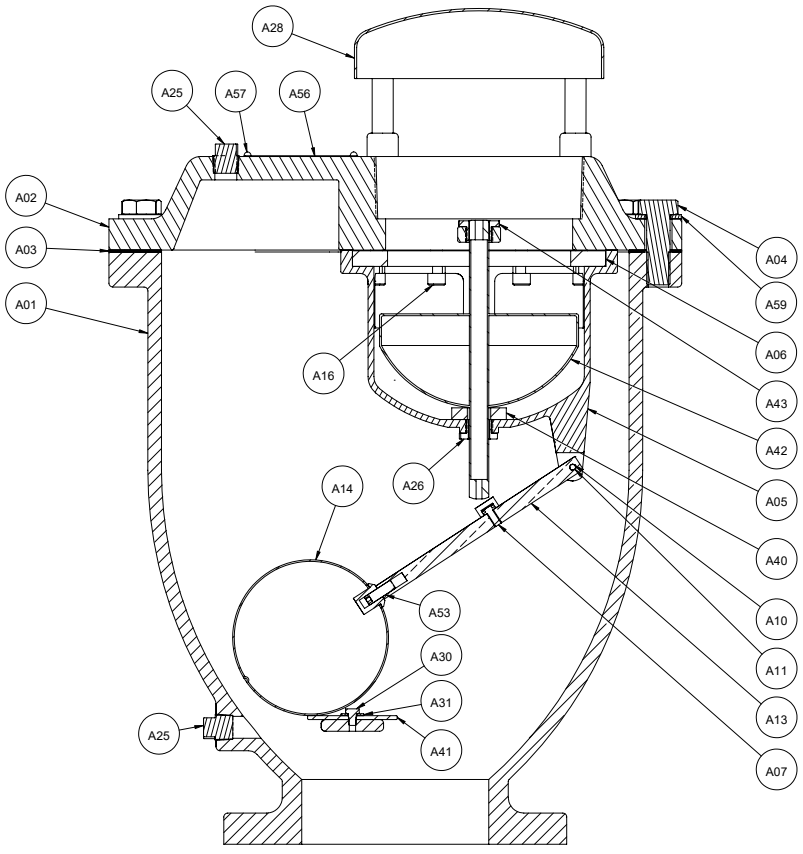
Item	Description	Material
A01	Body	Ductile Iron, ASTM A536, Grade 65-45-12
A02	Cover	Ductile Iron, ASTM A536, Grade 65-45-12
A03	Cover Gasket	CS-301 Cell Cork Fiber
A04	Cover Bolts	Carbon Steel, Zinc Plated
		Stainless Steel, Type 316
A05	Leverage Frame	Stainless Steel, Type CF-8M, ASTM A743
A06	Seat	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A07	Needle	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A08	Needle Pin (3 & 4" only)	Stainless Steel, Type 420
A10	Lever Pin	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A11	Retaining Ring/Cotter Pin	Stainless Steel, Type 632 (15-7PH), ASTM A564/A693
A13	Float Lever	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A14	Float	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A16	Leverage Frame Screw	Stainless Steel, Type 316
A26	Guide Bushing	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A30	Bumper Screw	Stainless Steel, Type 316
A31	Bumper Washer	Stainless Steel, Type 316
A32	Pipe Plug	Steel Alloy, Heat Treated, SAE J502
A40	Bumper	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A42	Plug	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A53	Float Retaining Screw	Steel
A56	Data Plate	Stainless Steel, Type 18-8
A57	Drive Screw	Carbon Steel, Zinc Plated
A59	Cover Bolt Washer	Stainless Steel, Type 316
A61	Needle Support Pin (3” only)	Stainless Steel, Type 420



Materials of Construction

Body Style 150C

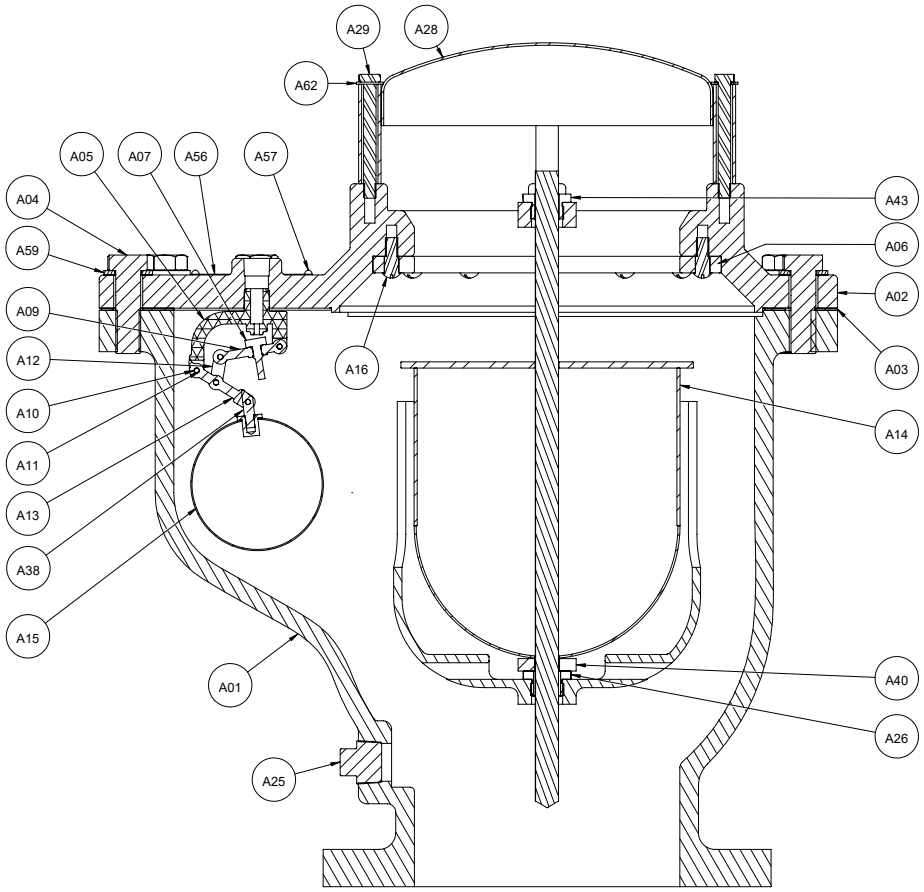
Item	Description	Material
A01	Body	Ductile Iron, ASTM A536, Grade 65-45-12
A02	Cover	Ductile Iron, ASTM A536, Grade 65-45-12
A03	Cover Gasket	Cellulose Cork fiber Non-Asbestos Gasket Material
		CS-301 Cell Cork Fiber
A04	Cover Bolts	Carbon Steel, Zinc Plated
		Stainless Steel, Type 316
A05	Leverage Frame	Stainless Steel, Type CF-8M, ASTM A743
A06	Seat	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A07	Needle	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A10	Lever Pin	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A11	Cotter Pin	Stainless Steel, Type 632 (15-7PH), ASTM A564/A693
A13	Float Lever	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A14	Float	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A16	Frame Screw	Stainless Steel, Type 316
A25	Pipe Plug	Steel
A26	Lower Guide Bushing	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A28	Hood	Steel, Wrought, 1010 ASTM A108/A635/A830
A30	Bumper Screw	Stainless Steel, Type 316
A31	Bumper Washer	Stainless Steel, Type 316
A40	Bumper	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A41	Bumper	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A42	Plug	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A43	Upper Guide Bushing	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A53	Float Retaining Screw	Stainless Steel, Type 316
A56	Data Plate	Stainless Steel, Type 316
A57	Drive Screw	Stainless Steel, Type 18-8
A59	Cover Bolt Washer	Carbon Steel, Zinc Plated
		Stainless Steel, Type 316



Materials of Construction

Body Style 151C

Item	Description	Material
A01	Body	Ductile Iron, ASTM A536, Grade 65-45-12
A02	Cover	Ductile Iron, ASTM A536, Grade 65-45-12
A03	Cover Gasket	Cellulose Cork fiber Non-Asbestos Gasket Material
A04	Cover Bolts	Carbon Steel, Zinc Plated
		Stainless Steel, Type 316
A05	Leverage Frame	Stainless Steel, Type CF-8M, ASTM A743
A06	Seat	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A07	Needle	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A09	Needle Lever	Stainless Steel, Type CF-8M, ASTM A743
A10	Lever Pin	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A11	Retaining Ring	Stainless Steel, Type 632 (15-7PH), ASTM A564/A693
A12	Connecting Link	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A13	Float Lever	Stainless Steel, Type CF-8M, ASTM A743
A14	Large Float	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A15	Small Float	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A16	Seat Screw	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A17	Pipe Plug	Steel
A25	Drain Plug	Iron, ASTM A197
A26	Lower Guide Bushing	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A28	Hood	Steel 1010, ASTM A108/A635/A830
A29	Hood Screws	Carbon Steel, Zinc Plated
		Stainless Steel, Type 316
A38	Float Spud Adaptor	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A40	Bumper	Acrylonitrile-Butadience (NBR)
		Terpolymer of Ethylene Propylene and a Diene (EPDM)
		Fluoro Rubber (FKM)
A43	Upper Guide Bushing	Stainless Steel, Type 316, ASTM A213/A182/A240/A276/F593
A56	Data Plate	Stainless Steel, Type 316
A57	Drive Screw	Stainless Steel, Type 18-8
A59	Cover Bolt Washer	Carbon Steel, Zinc Plated
		Stainless Steel, Type 316
A62	Hood Washer	Carbon Steel, Zinc Plated
		Stainless Steel, Type 316



Valve Selection

Applicable Standards

APCO AVC Single Body Combination Air Valves are designed and/or tested to meet the following standards:	
AWWA C-512	Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
ASME B16.42	F1/ASME Class 150 & F2/ASME Class 300 style flanged valves made from ductile iron.

Valve Weights

Body Styles 143C/145C/147C/149C

Valve Size	Threaded Outlet
1" 25mm	35 16
2" 50mm	75 34
3" 80mm	100 45
4" 100mm	170 77

Pounds
Kilograms

Body Styles 150C/151C

Valve Size	Plain Outlet with Hood
6" 150mm	205 93
8" 200mm	300 136

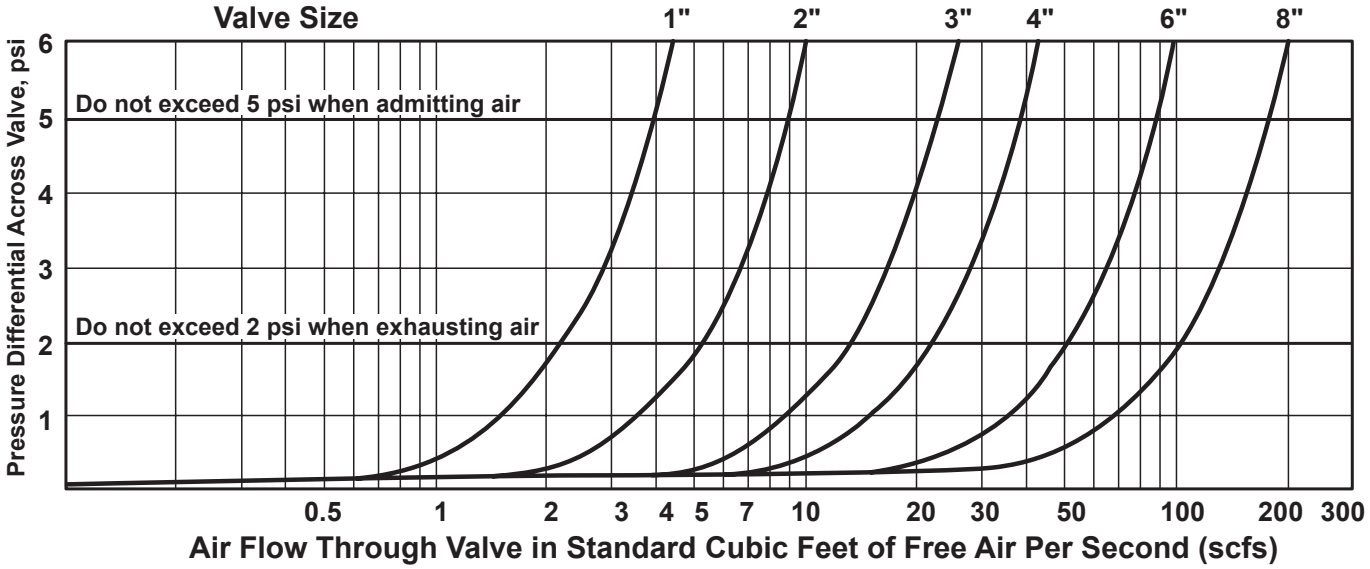
Orifice Sizes

Orifice Sizes up to 300 psi (2070 kpa) Working Pressure		
Valve Size	Large Orifice	Small Orifice
1" 25mm	1" 25	.078 2
2" 50mm	2" 50	.094 2
3" 80mm	3" 80	.094 2
4" 100mm	4" 100	.094 2
6" 150mm	5" 125	.125 3
8" 200mm	6" 150	.156 4

Inch
Millimeter

Discharge Capacities For Combination Air Valve

Curves shown are actual flow capacities at 14.7 psi barometric pressure and 70° F temperature based on actual test. These figures are not only the flow capacities across the orifice but flow across the entire valve. In the test set-up, approach velocity to the valve is negligible therefore actual capacity exceeds the values shown on chart.



Note: Moist air may require large sizes

Ordering

Orders should specify quantity and order code identification, in proper sequence, as shown.

Valve Style
Give valve style code as follows:

AVC	=	Single Body Combination Air Valves

Valve Size
Give valve size code as follows:

1	=	1"	25mm
2	=	2"	50mm
3	=	3"	80mm
4	=	4"	100mm
6	=	6"	150mm
8	=	8"	200mm

Body Style
Give body style code as follows:

143C	=	1" Single Body, 1" NPT Outlet
145C	=	2" Single Body, 2" NPT Outlet
147C	=	3" Single Body, 3" NPT Outlet
149C	=	4" Single Body, 4" NPT Outlet
150C	=	6" Single Body, 6" Plain Outlet with Hood
151C	=	8" Single Body, 8" Plain Outlet with Hood

End Connection
Give inlet connection code as follows:

T1	=	Threaded Inlet NPT (1-4")
F1N	=	Flanged Inlet ASME 125/150 (1-4") Nipple & Flange
F2N	=	Flanged Inlet ASME 250/300 (1-4") Nipple & Flange
F1	=	Flanged Inlet ASME 125/150 (3-8") Integral Cast
F2	=	Flanged Inlet ASME 250/300 (3-8") Integral Cast

Note: Nipple & Flanges are Carbon Steel for F1N or F2N.

Body Material
Give body material code as follows:

DI	=	Ductile Iron

Note: For special body materials, see AVV dual body options

Trim Combination
Orifice Size

L564	=	5/64" 3-15 psi (1")
R564	=	5/64" 11- 300 psi (1")
L332	=	3/32" 3-15 psi (2, 3 or 4")
H332	=	3/32" 11-300 psi (2, 3 or 4")
L18	=	1/8" 3-15 psi (6")
R18	=	1/8" 11-300 psi (6")
L316	=	3/16" 3-15 psi (6&8")
R316	=	3/16" 11-150 psi (6&8")
L532	=	5/32" 3-15 psi (8")
R532	=	5/32" 11-300 psi (8")

Note: Limiting factor for working pressure is lowest pressure rating of end connection or orifice size.

Seat/Needle Material
Give seating material code as follows:

NBR	=	Acrylonitrile-Butadiene
EPDM	=	Terpolymer of Ethylene Propylene & A Diene
FKM	=	Fluoro Rubber

Plug and Float Material
Give plug & float material code as follows:

S2	=	316 Stainless Steel

Note: 1-6" uses one plug & one float; 8" uses two floats.

Float Lever Material
Give float lever material code as follows:

S2	=	316 Stainless Steel

Leverage Frame Material
Give float material code as follows:

S2	=	316 Stainless Steel

Options
Give option code as follows:

DTR	=	DeZURIK Standard Certified Production Hydrostatic Shell & Seat Test Report (See Price Sheet 100.02-1)
F/L	=	Flanged Outlets ASME 125/150 Sizes 1-6" are CS nipple and CI flange; 8" has a DI flanged cast cover assembly.
HSB	=	Bug Screen - 304 Stainless Steel - with hood (6&8")
HSR	=	Rock Screen - 304 Stainless Steel - with hood (6&8")
SB16	=	316 Stainless Steel Bolting
TH	=	Threaded Outlet NPT, Same Material as the Body (6&8")
----	=	Coatings, Contact DeZURIK

Accessories
Give accessory code as follows if required

DAT	=	Double Acting Throttling Device
MRC	=	Mushroom Cap - (1-4") (Not Available with FL Option)

Ordering Example:

AVC,2,145C,T1,DI,L332-NBR-S2-S2-S2*MRC

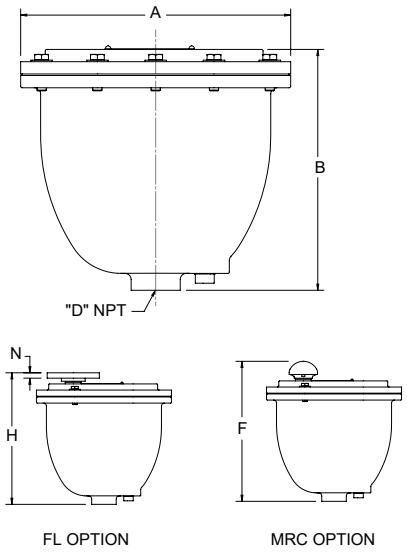
Note:

Maximum operating temperature is a function of the materials used in the valve. All valves are rated to a maximum temperature of 250° F (121° C). Contact Application Engineering if the valve is required to operate above this temperature.

Dimensions
Body Styles 143C/145C/147C/149C

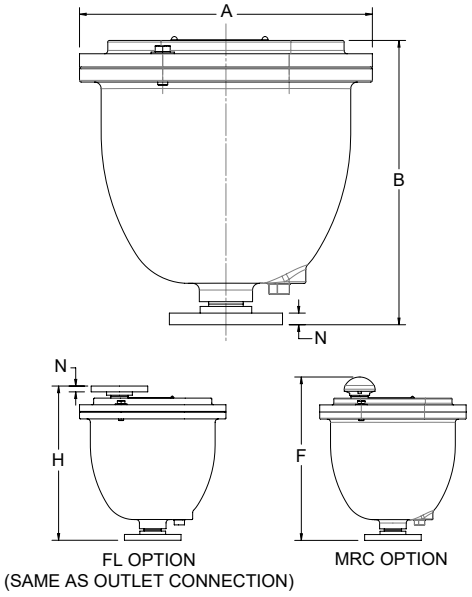
T1 End Connection

Valve Size	A	B	D	F	H	N
1" 25mm	11.00 279	9.88 251	1.00 25	11.76 299	11.20 284	0.44 11
2" 50mm	14.00 355	12.16 309	2.00 50	15.03 382	14.28 363	0.63 16
3" 80mm	16.00 406	15.44 392	3.00 75	19.53 496	17.72 450	0.75 19
4" 100mm	18.50 470	17.06 433	4.00 100	21.25 540	19.56 497	0.94 24



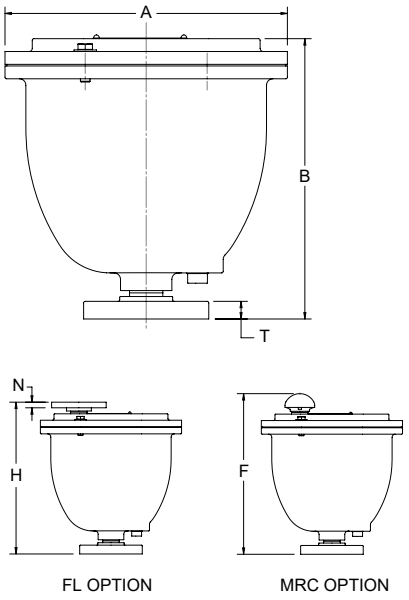
F1N End Connection

Valve Size	A	B	F	H	N
1" 25mm	11.00 279	11.20 284	13.15 334	12.59 320	0.44 11
2" 50mm	14.00 356	14.28 363	17.16 436	16.41 417	0.63 16
3" 80mm	16.00 406	17.72 450	21.81 554	20.00 508	0.75 19
4" 100mm	18.50 470	19.56 497	23.75 603	22.06 560	0.94 24



F2N End Connection

Valve Size	A	B	F	H	N	T
1" 25mm	11.00 279	11.58 294	13.53 344	12.96 329	0.44 11	0.75 19
2" 50mm	14.00 356	14.60 371	17.47 444	16.72 425	0.63 16	1.06 27
3" 80mm	16.00 406	18.22 463	22.31 567	20.50 521	0.75 19	1.25 32
4" 100mm	18.50 470	20.12 511	24.31 617	22.62 574	0.94 24	1.38 35



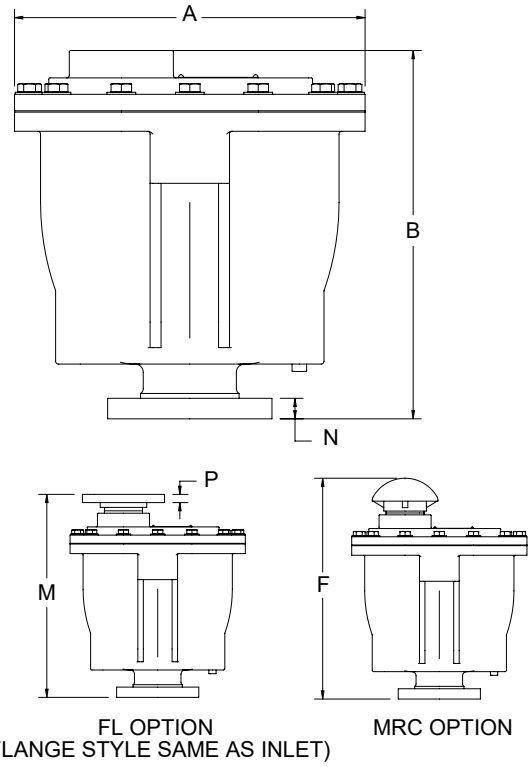
Dimensions

Body Styles 147C/149C & 150C/151C

F1 Inlet

Valve Size	A	B	F	M	N	P
3" 80mm	16.00 406	16.81 427	20.90 531	19.09 485	0.75 19	0.94 24
4" 100mm	18.50 470	18.94 481	23.13 587	21.44 545	0.94 24	0.94 24
6" 150mm	18.38 467	26.81 681	22.81 579	24.93 633	1.00 25	-
8" 200mm	22.25 565	25.44 646	25.63 651	24.31 617	1.13 29	1.13 29

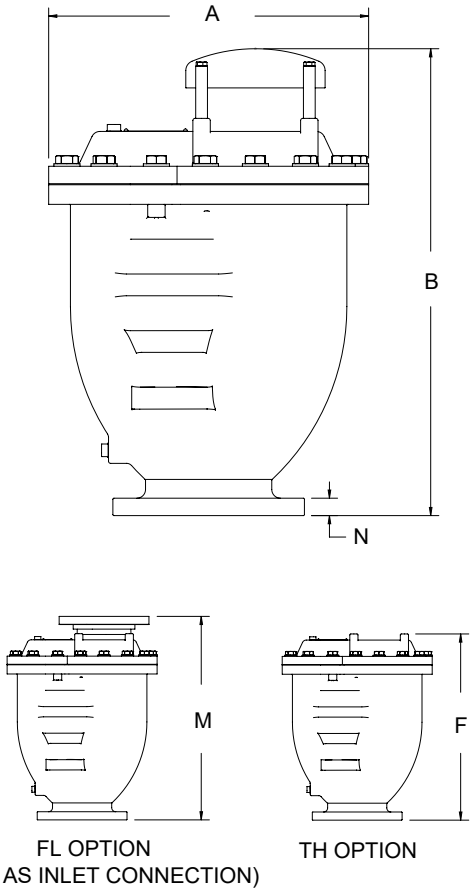
3" & 4" (75 & 100mm)



FL OPTION
(FLANGE STYLE SAME AS INLET)

MRC OPTION

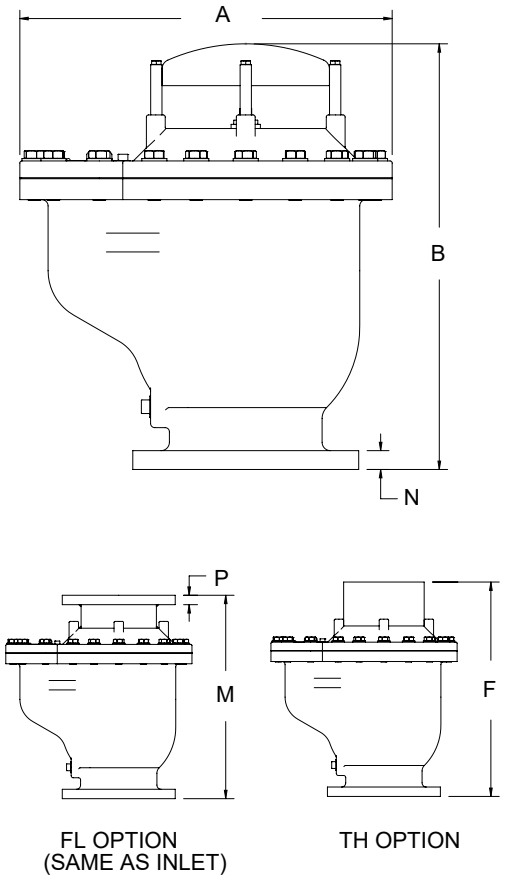
6" (150mm)



FL OPTION
(SAME AS INLET CONNECTION)

TH OPTION

8" (200mm)



FL OPTION
(SAME AS INLET)

TH OPTION

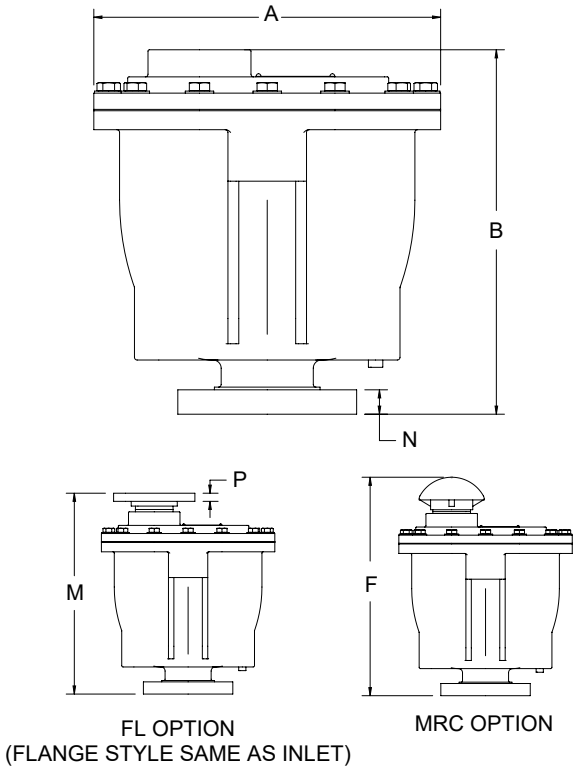
Dimensions

Body Styles 147C/149C & 150C/151C

F2 Inlet

Valve Size	A	B	F	M	N	P
3" 80mm	16.00 406	16.81 427	20.90 531	19.09 485	1.13 29	0.75 19
4" 100mm	18.50 470	18.94 481	23.13 587	21.44 545	1.25 32	0.94 24
6" 150mm	18.38 467	26.81 681	22.81 579	24.93 633	1.44 36	1.00 25
8" 200mm	22.25 565	25.44 646	25.63 651	24.31 617	1.63 41	1.13 29

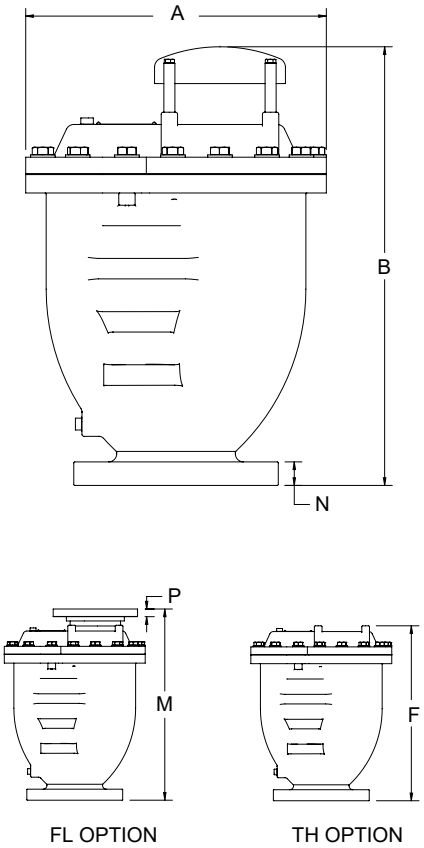
3" & 4" (75 & 100mm)



FL OPTION
(FLANGE STYLE SAME AS INLET)

MRC OPTION

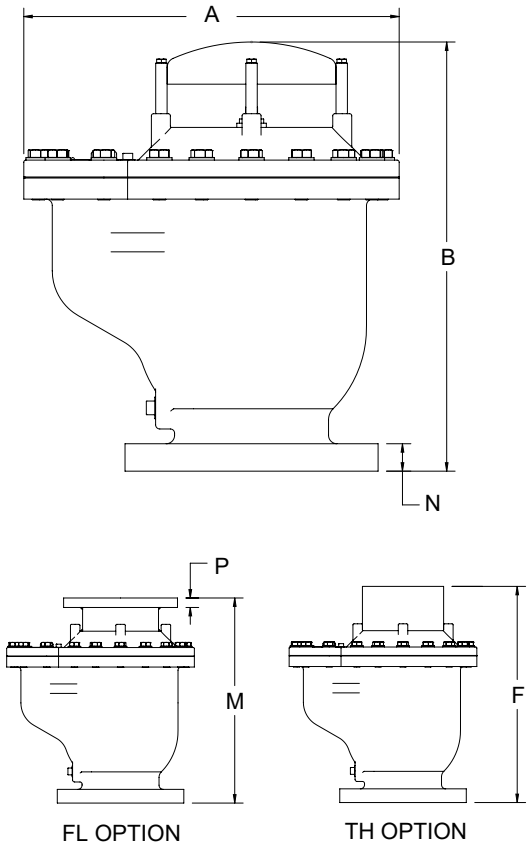
6" (150mm)



FL OPTION

TH OPTION

8" (200mm)



FL OPTION

TH OPTION

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:
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