

PRATT

Henry Pratt Company

***AirPro* Max[®]**

Air Valves

Patent Pending



**Engineering Creative Solutions
for Fluid Systems Since 1901**

A Tradition of Excellence

With the development of the first rubber seated butterfly valve more than 70 years ago, the Henry Pratt Company became a trusted name in the flow control industry, setting the standard for product quality and customer service. Today Pratt provides the following range of superior products to the water, wastewater and power generation industries.

Butterfly Valves: from 3" to 162"

Rectangular Valves: 1' x 1' to 14' x 16'

Ball Valves –

Rubber Seated: from 4" to 60"

Metal Seated: from 6" to 48"

Plug Valves: from 1/2" to 72", 100% port available up to 48", 3 ways

Air Valves for Water and Wastewater: from 1/2" to 20"

Hydraulic Control Systems

Valve Controls

Energy Dissipating Valves and Fixed Energy Dissipaters

Cone Valves

Check Valves

Plunger Valves

A Commitment to Meeting The Customers' Needs

Henry Pratt valves represent a long-term commitment to both the customer and to a tradition of product excellence. This commitment is evident in the number of innovations we have brought to the industries we serve. In fact, the Henry Pratt Company was the first to introduce many of the flow control products in use today, including the first rubber seated butterfly valve, one of the first nuclear N-Stamp valves, and the bonded seat butterfly valve.

Innovative Products For Unique Applications

Though many of the standard valves we produce are used in water filtration and distribution applications, Pratt has built a reputation on the ability to develop specialized products that help customers to meet their individual operational challenges.

Creative Engineering for Fluid Systems

Pratt's ability to provide practical solutions to complex issues is demonstrated by the following case histories.

Earthquake Proof Valves

Pratt designed and manufactured hydraulically actuated valves for a water storage application so that the valves would automatically operate in the event of earthquakes. This led to the development of a valve that will withstand acceleration forces of up to 6gs.

Custom Actuation/Isolation Valves

Pratt has designed and manufactured nuclear quality quarter-turn valves and parts since the first nuclear-powered generating plants were built. Our custom valves are able to close in a millisecond, using specially designed Pratt electro-pneumatic actuators.

Valves Designed for Harsh Environments

Pratt designed and manufactured a 144" diameter butterfly valve for the emergency cooling system at a jet engine test facility. The valve was designed to supply water to help dissipate the tremendous heat generated by the engines during testing.



PRATT
Henry Pratt Company

Through experience, commitment and creative engineering, Pratt is uniquely suited to provide superior products for our customers' special needs. For more information, contact our corporate headquarters in Aurora, Illinois.

Table of Contents

AirPro Max® Air Valves

Air Release Valve Data & Sizing Guide 2

Air Vacuum Valve Data and Sizing Guide..... 3-4

Air Valves for Water

Air Release Valve Series WAR (1/2" to 6")..... 5
 Introduction..... 5
 Scope of Line (Design Specifications) 5
 Air Release Valve Specifications..... 5
 Drawings/Parts Lists 6-8

Air Vacuum Valve Series WAV and Optional Well Service Features (1/2" to 20") 9
 Introduction..... 9
 Scope of Line (Design Specifications) 9
 Air Vacuum Valve Specifications..... 9
 Drawings/Parts Lists 10-15

Deep Well Service 16

Anti-Shock Check Valve Series WAVASD 17

Combination Air Valve Series WCV (1" to 16") 18
 Introduction..... 18
 Scope of Line (Design Specifications) 18
 Combination Air Valve Specifications..... 18
 Drawings/Parts Lists 19-24
 Single Body Configuration..... 19-20
 Dual Body Configuration 21-24

Vacuum Breaker Valve Series WAVVB..... 25

Air Valves for Wastewater

Wastewater Air Release Valve Series WWAR (2"-4") 26
 Introduction..... 26
 Scope of Line (Design Specifications) 26
 Wastewater Air Release Valve Specifications..... 26
 Drawings/Parts Lists 27-28

Wastewater Air Vacuum Valve Series WWAV (2" to 8") 29
 Introduction..... 29
 Scope of Line (Design Specifications) 29
 Wastewater Air Vacuum Valve Specification..... 29
 Drawings/Parts Lists 30-31

Combination Air Valve Series WWCV (2" to 8")..... 32
 Introduction..... 32
 Scope of Line (Design Specifications) 32
 Wastewater Combination Valve Specifications..... 32
 Drawings/Parts Lists 33-35
 Single Body Configuration..... 33
 Dual Body Configuration 34-35

Optional Wastewater Backflush Kit 36

Valve Data and Sizing Guide

Air Release Valves for Water and Wastewater

Sizing Guide

1. Sizing Air Release Valves is based upon the diameter of the pipeline and volume of air that must be released from high points on the pipeline during normal operation. Since AirPro Max® Air Release Valves from Pratt are designed to continuously release air pockets from high points on the pipeline, it's not essential to calculate a precise volume of air that must be released. Use Air Release Valve Sizing Charts below.
2. When the volume of air to be vented is known, refer to the Standard Orifice Sizes with Venting Capacities chart on page 3. Use maximum pipeline operating pressure and flow (in psi & SCFM) to identify the correct orifice size.

Installation Guide:

1. The maximum effectiveness of an AirPro Max® Air Release Valves is dependent upon it being placed on predetermined pipeline high points. On horizontal pipelines, Air Release Valves should be placed at uniform intervals of approximately every 1/4 - 1/2 miles.
2. Three conditions can cause an air pocket to form slightly downstream of a true high point (exceeding 2-3 pipe diameters) within a piping system.
 1. Changes in velocity and temperature of the liquid
 2. Angle of the slope adjacent to the high point or a change of the gradient
 3. Inside surface texture of the piping system

When any of these conditions occur, it is recommended an AirPro Max® Air Release Valve be installed downstream of the high point to eliminate the air pocket.

3. Henry Pratt has developed the AirPro Max® sizing selector to assist you in the correct sizing of air valves. Call or e-mail Henry Pratt to receive your free AirPro Max® sizing selector – (877) 436-7977 or sales@henrypratt.com

Series WAR Air Release Valve Sizing Chart Water Pipelines

Pipeline Dia. (inches)	Pumping Cap. (GPM)	1 - 175 psi			100 - 300 psi		
		Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size
2" - 3" - 4" Diameter	200/800 gpm	050505/116	1/2"	1/16"	050505/116	1/2"	1/16"
		757505/116	3/4"		751005/116	3/4"	
		101005/116	1"		101005/116	1"	
6" - 8" - 10" Diameter	800/2200 gpm	1 - 175 psi			100 - 300 psi		
		Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size
6" - 8" - 10" Diameter	800/2200 gpm	057505/332	1/2"	3/32"	050505/116	1/2"	1/16"
		757505/332	3/4"		751005/116	3/4"	
		101005/332	1"		101005/116	1"	
12" - 14" - 16" Diameter	2000/5000 gpm	1 - 150 psi			1 - 300 psi		
		Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size
12" - 14" - 16" Diameter	2000/5000 gpm	751005/018	3/4"	1/8"	751005/332	3/4"	3/32"
		101005/018	1"		101005/332	1"	
		1 - 150 psi			1 - 300 psi		
18" - 20" Diameter	5000/15000 gpm	Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size
		101005/316	1"	3/16"	101005/332	1"	3/32"
202005/316	2"	202005/532	2"		5/32"		
24+" Diameter	15000/50000 gpm	1 - 150 psi			1 - 300 psi		
		Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size
24+" Diameter	15000/50000 gpm	202010/2364	2"	23/64"	202010/732	2"	7/32"
		303010/2364	3"		303010/732	3"	
		1 - 150 psi			1 - 300 psi		

Pipeline Dia. (inches)	Pumping Cap. (GPM)	1 - 75 psi			1 - 150 psi			1 - 300 psi		
		Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size
4" - 12" Diameter	0-4000 gpm	202005/516	2"	5/16"	202005/316	2"	3/16"	202005/532	2"	5/32"
		303005/516	3"		303005/316	3"		303005/532	3"	
		404005/516	4"		404005/316	4"		404005/532	4"	
14+" Diameter	4100+ gpm	1 - 75 psi			1 - 150 psi			1 - 300 psi		
		Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size	Model No.	Inlet Size	Orifice Size
14+" Diameter	4100+ gpm	202010/012	2"	1/2"	202010/716	2"	7/16"	202010/732	2"	7/32"
		303010/012	3"		303010/716	3"		303010/732	3"	
		404010/012	4"		404010/716	4"		404010/732	4"	

Note: To lessen the possibility of clogged inlets for wastewater applications, 2" is the smallest inlet size.
Backwash Kit option: The AirPro Max® Backwash Kit is recommended for routine maintenance.

Valve Data and Sizing Guide

Air Vacuum Valves for Water and Wastewater

Air Vacuum Valve Sizing - Combination Air Vacuum Valves - Vacuum Breaker Valves

1. AirPro Max[®] Air Vacuum Valves should be sized to handle the maximum amount of air to be exhausted or admitted into the pipeline and not exceed an acceptable pressure differential across the valve.
2. Each high point or change in grade must be examined independently when determining valve size. Use the steepest slope for calculations.
3. Use the flow capacity charts on page 6 to assist in sizing AirPro Max[®] Air Vacuum Valves.
4. Determine the smallest valve size capable of exhausting air equal to the filling rate of the pipeline in CFS while not exceeding a pressure differential of 2 psi across the valve orifice. (Based on pump capacity).

The following formula is recommended to calculate the rate of flow in CFS for filling the pipeline:

$$CFS = \frac{GPM}{448.83} \quad \text{Where: } CFS = \text{Cubic feet per second} \\ GPM = \text{Gallons per minute}$$

5. Determine the smallest valve size capable of admitting air equal to the potential flow in CFS while not exceeding a pressure differential of 5 psi across the valve orifice. (Based on gravity flow).

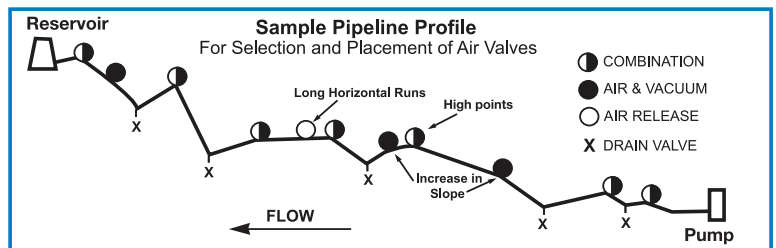
The following formula should be used to calculate the rate of flow in CFS that can occur within the pipeline under gravity flow conditions. (During Initial Filling • During Intentional Draining • During A Pipeline Rupture)

$$Q = .0007872 C \sqrt{S D^5} \quad \text{Where: } Q = \text{Flow of water in cubic feet per second} \\ C = \text{Coefficient in Chezy's formula} = 110 \\ S = \text{Slope in feet per foot of length} \\ D = \text{Inside pipe diameter in inches}$$

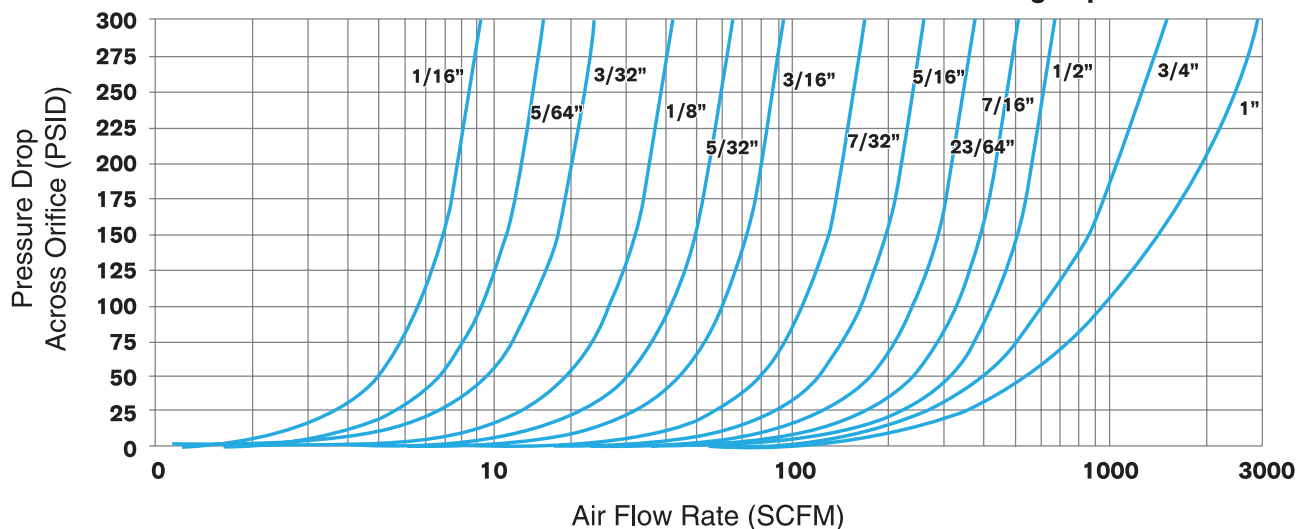
6. If thin wall pipe is being used, the risk of pipeline collapse due to the formation of vacuum must be considered. The following formula may be used to calculate the collapsing pressure of thin walled cylindrical steel pipe using a safety factor of four:

$$P = 12,500,000 \left(\frac{T}{D} \right)^3 \quad \text{Where: } P = \text{Collapsing pressure in psi} \\ T = \text{Thickness of pipe in inches} \\ D = \text{Diameter of pipe in inches}$$

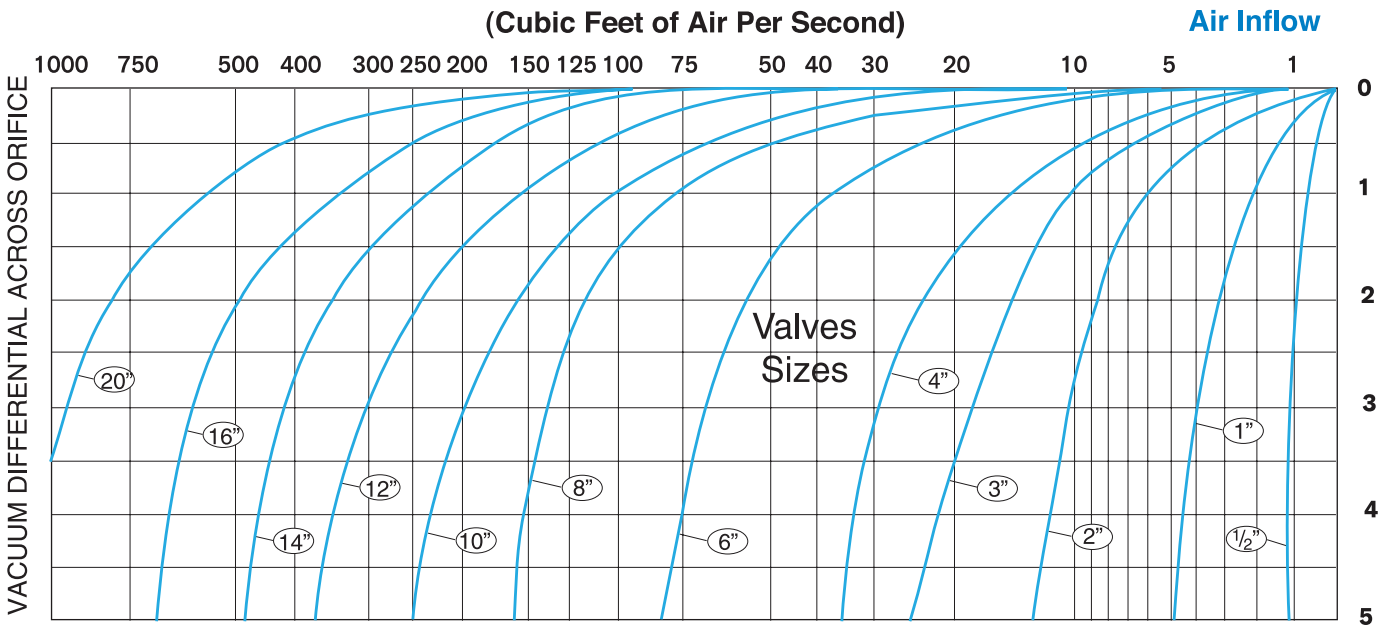
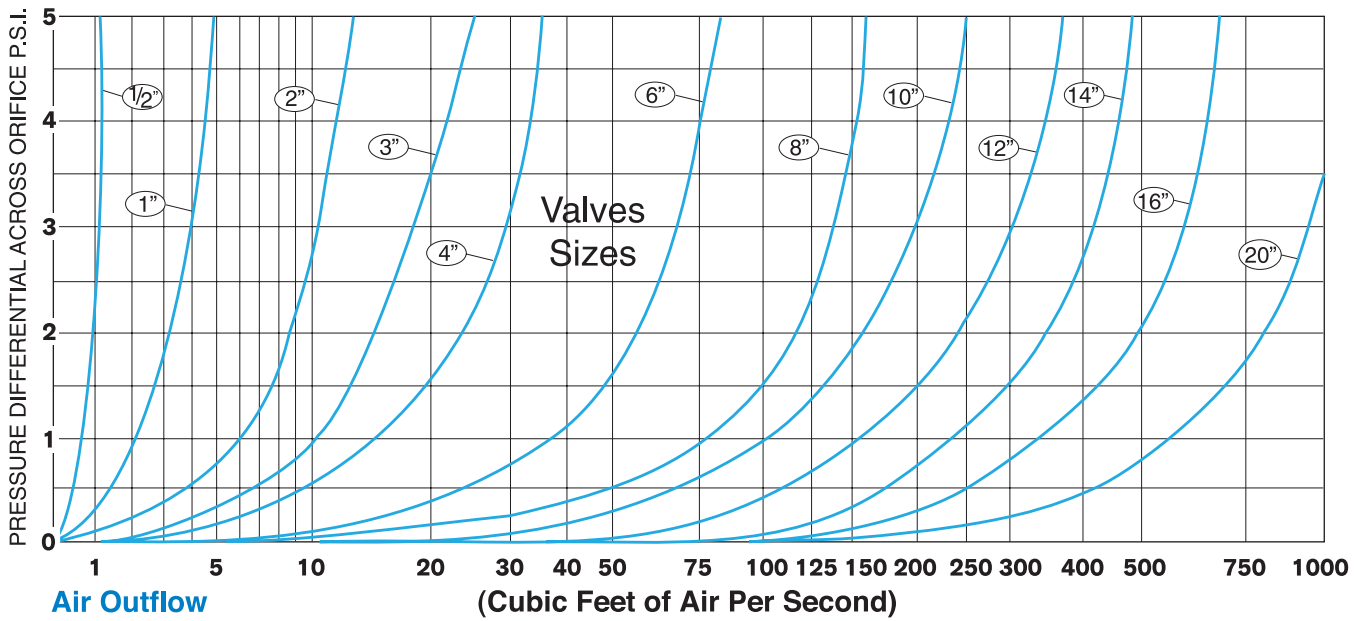
7. For other pipe materials or thickness, consult the pipe manufacturer for pipe collapsing pressure.
8. Determine the smallest valve size capable of admitting the required air in CFS (as found in step 5) without exceeding the collapsing pressure (as found in step 6) or 5 psi, whichever is less. Do not exceed a pressure differential greater than 5 psi
9. Finally, compare the valve size determined in step 4 with the valve size determined in steps 5 or 6. If they differ, always select the larger valve size.



AirPro Max Air Release Valves Standard Orifice Sizes With Venting Capacities



Air Outflow Capacities in Standard Cubic Feet of Free Air Per Second, (SCFS) for Above Air Valves



Capacities at 14.7 psi atmospheric pressure and ambient temperature

Note: Manufactured to meet ANSI/AWWA C512

Series WAR Water Air Release Valves

Introduction

- All 316 Stainless Steel Trim Standard
- All 316 Stainless Steel Floats Standard
- Ductile Iron Bodies and Covers Standard
- Vent Caps Included as Standard
- Meets or Exceeds ANSI/AWWA C512 Standard/ NSF61/372 Certified
- Drop Tight Shut-off at Low Pressures

AirPro Max® Series WAR Air Release Valves are designed to vent trapped air that collects at high points in a pipeline. These valves continuously release air from systems thereby preventing large air pockets to form which can cause damaging pressure surge to the system. In many installations lacking Air Release Valves, large pockets of air in the pipeline will cause power consumption to increase, and flow to decrease, possibly completely. Another possible result of excessive air accumulation is the inexplicable pipeline rupture that is mistakenly attributed to ground settling or defective pipe. In reality unusually large air pockets can greatly increase the pressure of normally occurring surges to the point where sudden stops and starts of flow can cause a pipe to rupture.

As air accumulates in the air valve, water is displaced, causing the stainless steel float to drop to a point where the valve orifice opens and the accumulated air is exhausted into the atmosphere. The water level in the air valve then rises and closes the valve orifice once again. This cycle repeats as needed and avoids the formation of potentially destructive air pockets.

Scope of Line Sizes

1/2", 3/4", 1", 2", 3" NPT; 6" #125 Flg.

Pressure Ratings (See Note)

150 psi
175 psi
300 psi

Note: Specify when operating pressure will be below 10 psi

Temperature Range

Water to 180°F

Standard Materials

Body and Cover: Ductile Iron ASTM A536 65-45-12
Float: 316 Stainless Steel
Internal Trim: 316 Stainless Steel
Seat: Buna-N
External Cover Bolts: ASTM F593 316SS
Coating: 2-Part Liquid Epoxy

Installation

Series WAR AirPro Max® Air Release Valves must be installed at high points in pipelines, and also at regular intervals (approximately every 1/4 to 1/2 mile) along uniform grade lines.

Air Valves should be mounted in the vertical position at high points of the pipe, with an isolation valve installed below each valve in the event servicing is required. A valve vault with adequate air venting and drainage is recommended.

Air Release Valve Specification

The Air Release Valve shall be float operated, simple lever or compound lever type, designed to automatically vent accumulated air from the pipeline while the system is pressurized and operating.

An adjustable designed orifice button shall be used to seal the valve discharge port with drip-tight shut-off. The diameter of the orifice must be sized to vent air within a given operating pressure range to insure maximum air venting capacity.

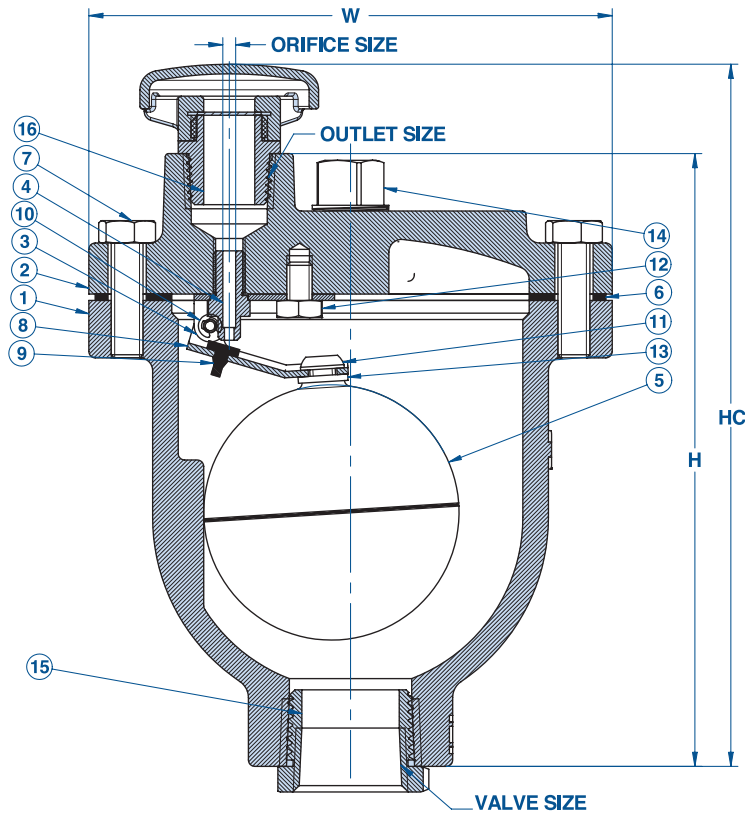
The float and connection shall be all 316 stainless steel construction and guaranteed to withstand the designed system surge pressure without failure. The body and cover shall be ductile iron construction and valve internal parts and cover bolts shall be 316 stainless steel. The rubber seat shall be Buna-N for water tight shut-off. A vent cap with screen must be provided to prevent debris from entering the valve.

The Air Release Valve shall be manufactured per ANSI/AWWA C512 and shall be Series WAR AirPro Max® Air Release Valves manufactured by the Henry Pratt Company, Aurora, IL USA.

Series WAR 01 Air Release Valves – Simple Lever

Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt (Lbs.)
1/2"	1/2"	1/16"	175	NPT	4-3/4"	5-1/4"	6-1/8"	WAR050505-116-175	6.3
3/4"	1/2"	1/16"	175	NPT	4-3/4"	5-1/4"	6-1/8"	WAR757505-116-175	6.3
1/2" *	1/2"	3/32"	175	NPT	5-1/8"	6"	6-7/8"	WAR057505-332-175	8.2
1/2"	1/2"	1/16"	300	NPT	5-1/8"	6"	6-7/8"	WAR050505-116-300	8.2
1/2" *	1/2"	1/16"	300	NPT	5-1/8"	6"	6-7/8"	WAR051005-116-300	8.2
3/4"	1/2"	3/32"	175	NPT	5-1/8"	6"	6-7/8"	WAR757505-332-175	8.2
3/4" *	1/2"	1/16"	300	NPT	5-1/8"	6"	6-7/8"	WAR751005-116-300	8.2
1"	1/2"	1/16"	300	NPT	5-1/8"	6"	6-7/8"	WAR101005-116-300	8.2
3/4" *	1/2"	1/8"	150	NPT	6-1/8"	7"	7-7/8"	WAR751005-018-150	12.4
3/4" *	1/2"	3/32"	300	NPT	6-1/8"	7"	7-7/8"	WAR751005-332-300	12.4
1"	1/2"	1/8"	150	NPT	6-1/8"	7"	7-7/8"	WAR101005-018-150	12.4
1"	1/2"	3/32"	300	NPT	6-1/8"	7"	7-7/8"	WAR101005-332-300	12.4

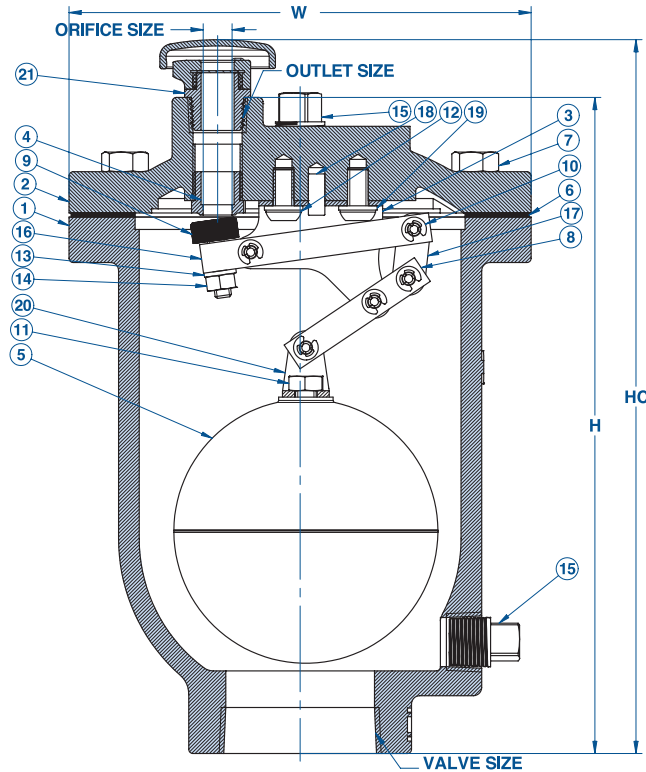
* = Reducer Bushing Included



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Lever Bracket	ASTM A582 316SS
4	Seat	ASTM A582 316SS
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Lever Arm	ASTM A240 316SS
9	Button	Buna-N
10	Pivot Pin & Retaining Ring	Stainless Steel
11	Float Retainer	ASTM F879 316SS
12	Positioner	ASTM A593 316SS
13	Lock Washer	ASTM A240 316SS
14	Pipe Plug	Steel
15	Reducer Bushing (* if required)	ASTM A582 316SS
16	Vent Cap	ASTM A536 65-45-12

Series WAR 02 Air Release Valves – Compound Lever

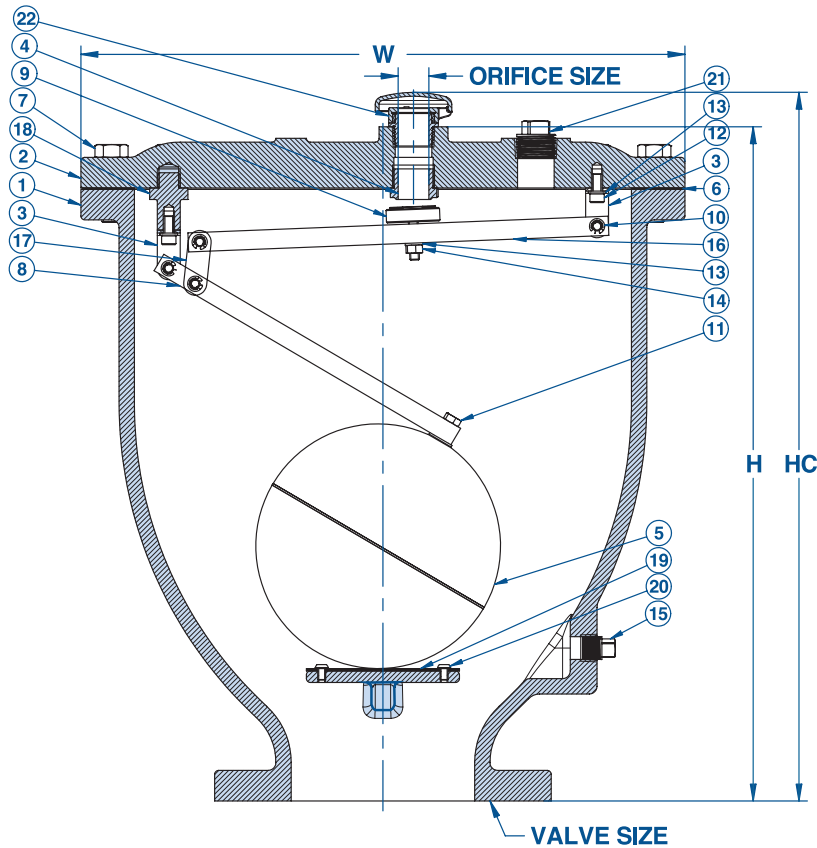
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
1"	1/2"	3/16"	150	NPT	7"	9-15/16"	10-13/16"	WAR101005-316-150	23.2
1"	1/2"	5/32"	300	NPT	7"	9-15/16"	10-13/16"	WAR101005-532-300	23.2
2"	1/2"	3/16"	150	NPT	7"	9-15/16"	10-13/16"	WAR202005-316-150	23.2
2"	1/2"	5/32"	300	NPT	7"	9-15/16"	10-13/16"	WAR202005-532-300	23.2
2"	1"	23/64"	150	NPT	9-1/2"	12-1/4"	13-11/32"	WAR202010-2364-150	48.1
2"	1"	7/32"	300	NPT	9-1/2"	12-1/4"	13-11/32"	WAR202010-732-300	48.1
3"	1"	23/64"	150	NPT	9-1/2"	12-1/4"	13-11/32"	WAR303010-2364-150	48.1
3"	1"	7/32"	300	NPT	9-1/2"	12-1/4"	13-11/32"	WAR303010-732-300	48.1



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Lever Bracket	ASTM A240 316SS
4	Seat	ASTM A582 316SS
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Short Lever Arm	ASTM A582 316SS
9	Button	Stainless Steel & Buna-N
10	Pivot Pin & Retaining Ring	Stainless Steel
11	Float Retainer	ASTM F593 316SS
12	Positioner	ASTM F879 316SS
13	Lock Washer	ASTM A240 316SS
14	Lock Nut	ASTM F594 316SS
15	Pipe Plug	Steel
16	Long Lever Arm	ASTM A582 316SS
17	Arm Link	ASTM A240 316SS
18	Positioning Pin	420SS
19	Lock Washer	ASTM A240 316SS
20	Clevis	ASTM A240 316SS
21	Vent Cap	ASTM A536 65-45-12

Series WAR 03 Air Release Valves – Compound Lever

Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
6"	1"	1"	150	#125 Flg	19-3/4"	22"	23-1/4"	WAR-060610F	200.9



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Lever Bracket	ASTM A240 316SS
4	Seat	ASTM A276 316SS
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Short Lever Arm	ASTM A276 316SS
9	Button	Stainless Steel & Buna-N
10	Pivot Pin & Retaining Ring	Stainless Steel
11	Float Retainer	ASTM F593 316SS
12	Positioner	ASTM F879 316SS
13	Lock Washer	ASTM A240 316SS
14	Lock Nut	ASTM F593 316SS
15	Pipe Plug	Steel
16	Long Lever Arm	ASTM A276 316SS
17	Arm Link	ASTM A240 316SS
18	Lever Bracket Base	ASTM A276 316SS
19	Cushion	Buna-N
20	Cushion Retainer	ASTM F879 316SS
21	Pipe Plug	Steel
22	Vent Cap	ASTM A536 65-45-12

Series WAV Water Air Vacuum Valves

Introduction

- All 316 Stainless Steel Trim Standard
- All 316 Stainless Steel Floats Standard
- Ductile Iron Bodies and Covers Standard
- Vent Cap or Hood Included as Standard
- Meets or Exceeds ANSI/AWWA C512 Standard/NSF61/372 Certified
- Optional Well Service Features Available

AirPro Max® Series WAV Air Vacuum Valves are high capacity air venting and intake valves designed to provide two separate functions. First, as the line is being filled with water they allow large quantities of air to be vented from the pipeline. When air has been completely vented, water enters the valve causing the stainless steel float to rise and seal tightly against the seat to prevent leakage. Second, when the line is drained, either intentionally or as a result of power failure or pipeline breakage, the air vacuum valve responds to a negative pressure and opens, allowing air to re-enter the valve and line preventing a vacuum from forming which could lead to damaging the pipeline.

Series WAV Air Vacuum Valves do not open when closed and pressurized to exhaust any air that collects at high points during operation of the system. Series WAR Air Release Valves are needed for this function.

Series WAV Air Vacuum valves can be fitted with internal diffusers and/or throttling devices for well service applications. Internal diffusers and throttling devices are available for valves sized 1/2" – 3". Please specify these options when ordering.

Note: For valve sizing, see page 3.

Scope of Line

Sizes

1/2", 1", 2", 3" NPT

4" through 20" 125 lb or 250 lb ANSI Flanged

Pressure Ratings (See Note)

150 psi

300 psi

Note: Specify when operating pressure will be below 10 psi

Temperature Range

Water to 180°F

Standard Materials

Body and Cover: Ductile Iron ASTM A536 65-45-12

Float: 316 Stainless Steel

Internal Trim: 316 Stainless Steel

Seat: Buna-N

External Cover Bolts: ASTM F593 316SS

Coating: 2-Part Liquid Epoxy

Installation

Series WAV AirPro Max® Air Vacuum Valves should be installed at pipeline high points, grade changes and regular intervals of approximately every 1/4 to 1/2 mile along uniform grade line of the pipeline. Mount each valve vertically on top of the pipe with an isolation valve below each valve in the event servicing is required. A vault with adequate venting and drainage should be provided.

Air Vacuum Valve Specifications

Air Vacuum valve shall allow large volumes of air to be exhausted from the pipeline during filling and large volumes of air to re-enter when draining the pipeline occurs for any reason.

The outlet size of the Air Vacuum Valve shall have the same cross-section area as the valve inlet size. A stainless steel single bottom guide shaft shall guide the float. The 4" and larger air vacuum valve floats shall have top and bottom guide shafts to accurately guide the float, without hunting, into the seat for shut-off. A steel valve hood shall be provided to protect the valve discharge orifice from debris.

The float shall be of all stainless steel construction guaranteed to withstand the design system surge pressure without failure. The body and cover shall be concentrically located for vertical float rising accurately into the seat shut-off position to prevent water spilling. The valve body and cover shall be constructed of ductile iron and the valve internal parts shall be of 316 Stainless Steel with Buna-N rubber seat.

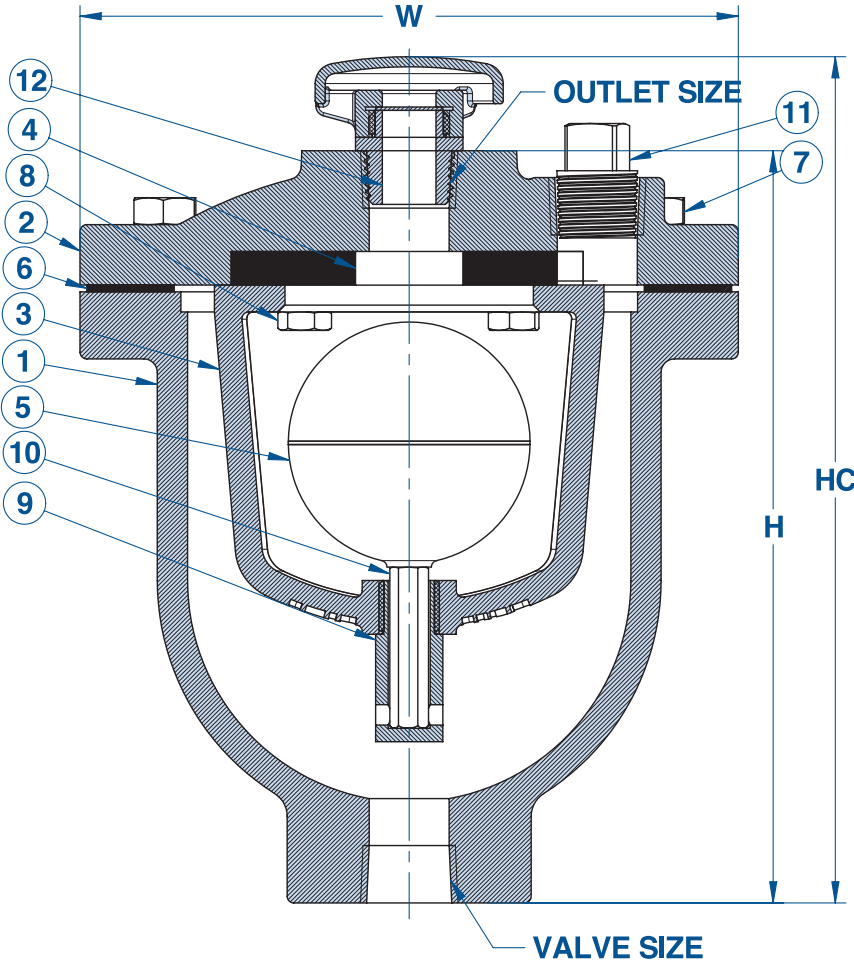
The Air Vacuum Valve shall be manufactured per ANSI/AWWA C512 and shall be Series WAV AirPro Max® Air Vacuum Valves manufactured by the Henry Pratt Company, Aurora, IL USA.

When Ordering, Please Specify:

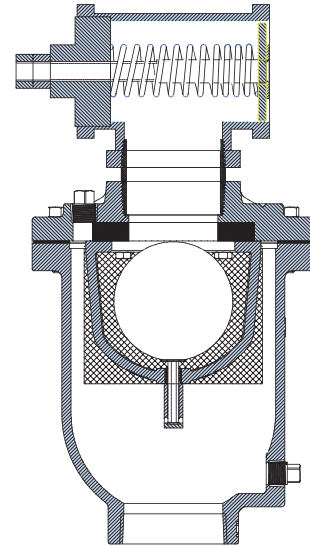
1. Model Number
2. Inlet Size - NPT or Flanged
3. Inlet Pressure Rating
4. Specify when operating pressure will be below 10 psi.

Series WAV 01 Air Vacuum Valve

Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
1/2"	1/2"	300	NPT	6-1/8"	7"	7-7/8"	WAV05-300	14



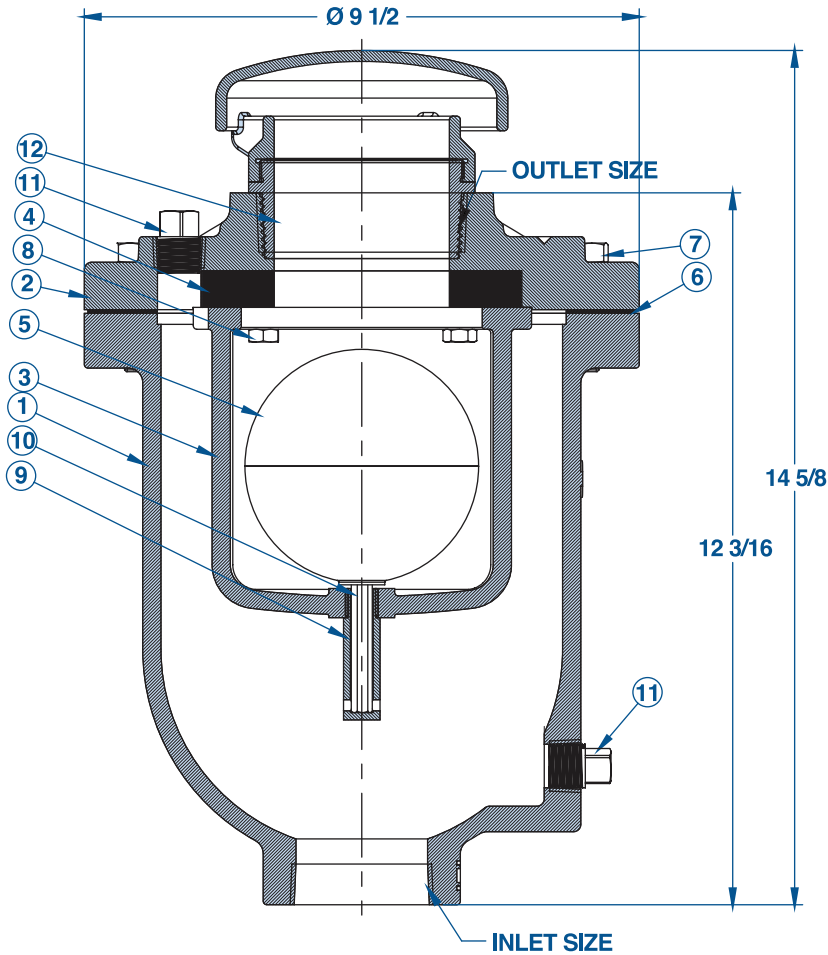
WAV01 Air Vacuum with Optional Well Service Equipment



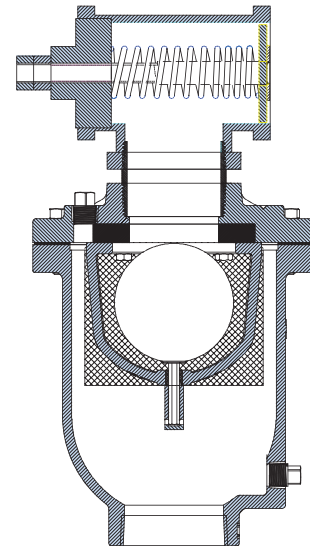
Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Baffle	ASTM A536 65-45-12
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Baffle Bracket	ASTM F593 316SS
9	Guide Bushing	ASTM A276 316SS
10	Guide Shaft	ASTM A276 316SS
11	Pipe Plug	Steel
12	Vent Cap	ASTM A536 65-45-12
Optional	Diffuser	ASTM A276 316SS
Optional	Throttling Device	ASTM A536 65-45-12

Series WAV 02 Air Vacuum Valve

Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
1"	1"	300	NPT	7"	9-1/2"	10-5/8"	WAV10-300	23.5
2"	2"	300	NPT	9-1/2"	11-15/16"	13-13/16"	WAV20-300	50.1
3"	3"	300	NPT	9-1/2"	12-3/16"	14-5/8"	WAV30-300	50.4



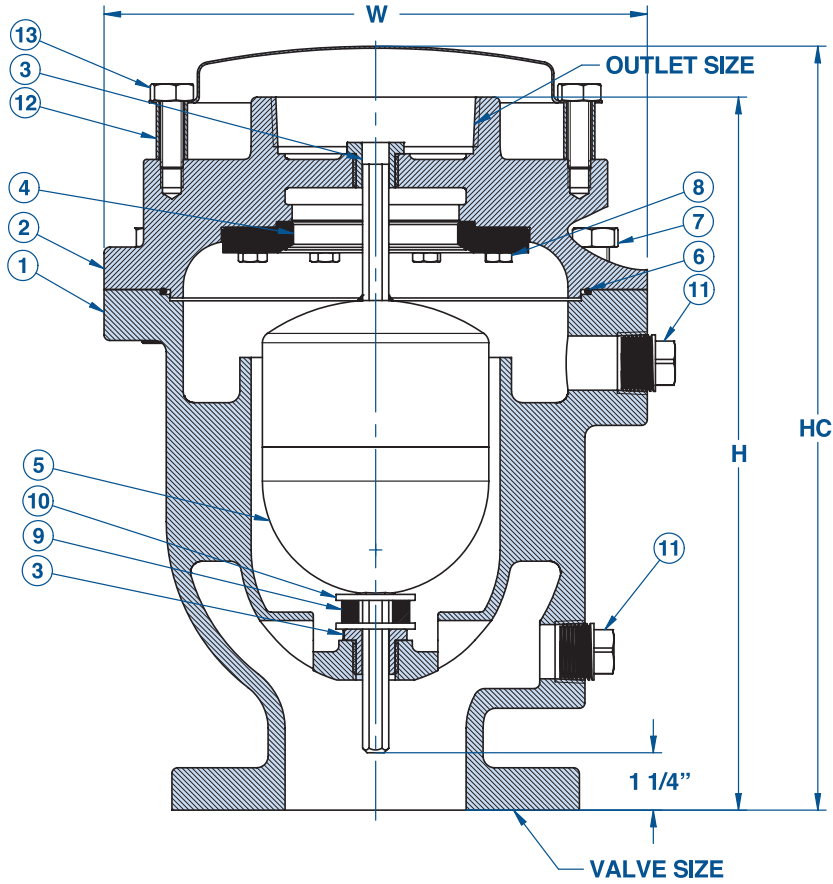
WAV02 Air Vacuum with Optional Well Service Equipment



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Baffle	ASTM A536 65-45-12
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Baffle Bracket	ASTM F593 316SS
9	Guide Bushing	ASTM A240 316SS
10	Washer	ASTM A240 316SS
11	Pipe Plug	Steel
12	Vent Cap	ASTM A536 65-45-12
Optional	Diffuser	ASTM A276 316SS
Optional	Throttling Device	ASTM A536 65-45-12

Series WAV 03 Air Vacuum Valve

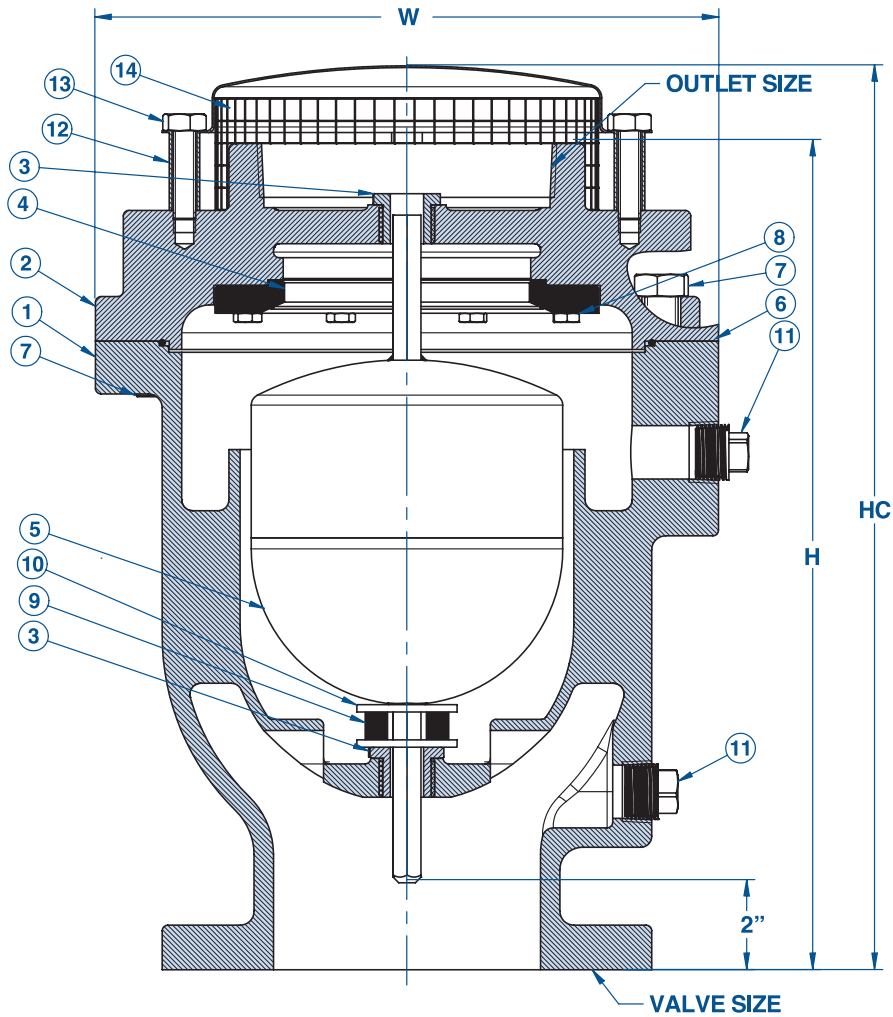
Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
4"	4"	150	#125 Flg	12"	15-3/4"	16-7/8"	WAV40-150F	104
4"	4"	300	#250 Flg	12"	15-3/4"	16-7/8"	WAV40-300F	104



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Guide Bushing	ASTM A276 316SS
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	O-Ring	Buna-N
7	Cover Bolt	ASTM F593 316SS
8	Shoulder Screw	ASTM F593 316SS
9	Cushion Bumper	Buna-N
10	Washer	316SS
11	Pipe Plug	Steel
12	Hood	Steel
13	Hood Bolt	Steel

Series WAV 04 Air Vacuum Valve

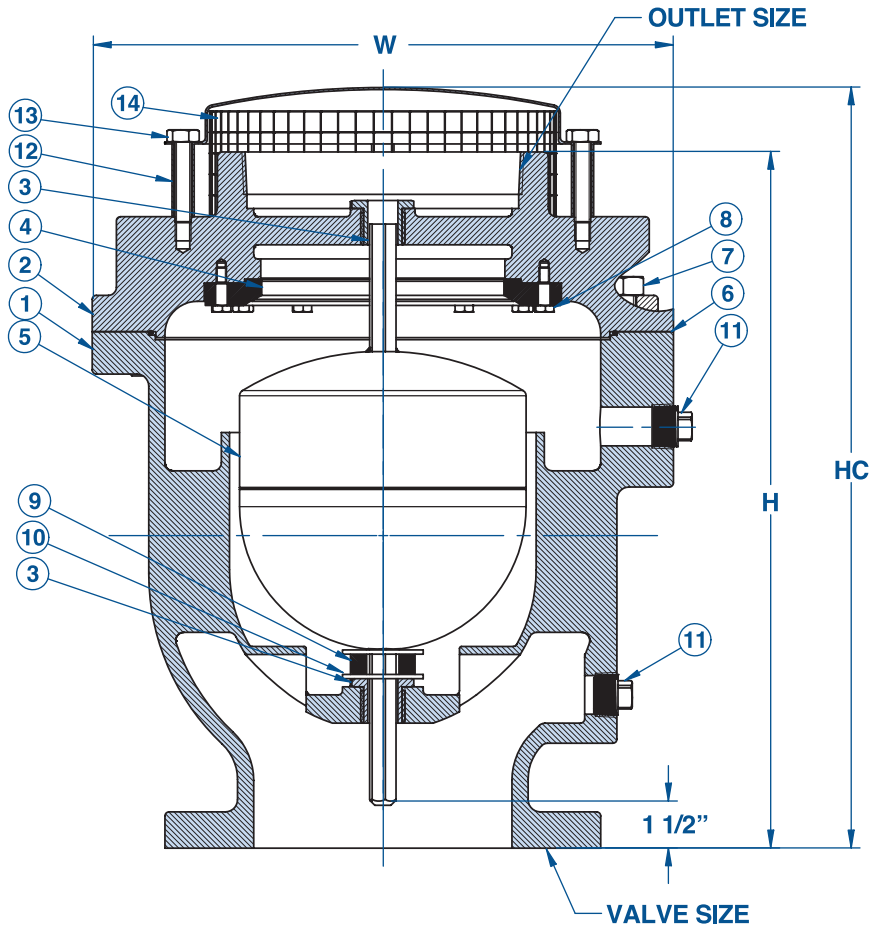
Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
6"	6"	150	#125 Flg	14"	18-9/16"	20-5/16"	WAV60-150F	158
6"	6"	300	#250 Flg	14"	18-9/16"	20-5/16"	WAV60-300F	158



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Bushing	ASTM A276 316SS
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	O-Ring	Buna-N
7	Cover Bolt	ASTM F593 316SS
8	Shoulder Screw	ASTM F593 316SS
9	Cushion Bumper	Buna-N
10	Washer	316SS
11	Pipe Plug	Steel
12	Hood	Steel
13	Hood Bolt	Steel
14	Screen	Steel

Series WAV 05 Air Vacuum Valve

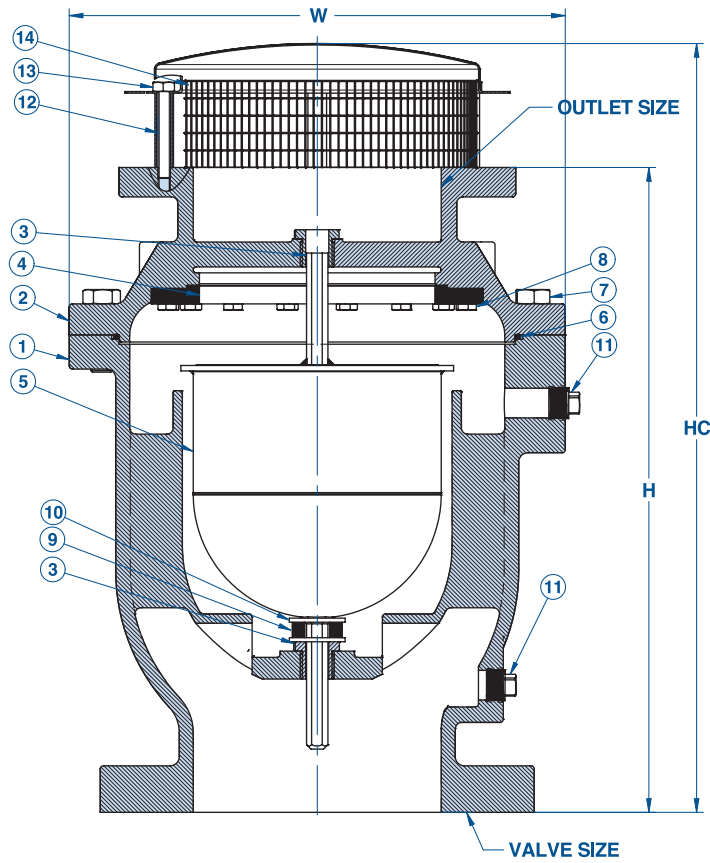
Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
8"	8"	150	#125 Flg	18"	21-9/16"	23-9/16"	WAV80-150F	284
8"	8"	300	#250 Flg	18"	21-9/16"	23-9/16"	WAV80-300F	284



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Guide Bushing	ASTM A276 316SS
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	O-Ring	Buna-N
7	Cover Bolt	ASTM F593 316SS
8	Shoulder Screw	ASTM F593 316SS
9	Cushion Bumper	Buna-N
10	Washer	316SS
11	Pipe Plug	Steel
12	Hood	Steel
13	Hood Bolt	Steel
14	Screen	Steel

Series WAV 06 Air Vacuum Valve

Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
10"	10"	150	#125 FLG	20"	26"	31"	WAV100-150F	468
10"	10"	300	#250 FLG	20"	26"	31"	WAV100-300F	468
12"	12"	150	#125 FLG	24"	30"	35"	WAV120-150F	711
12"	12"	300	#250 FLG	24"	30"	35"	WAV120-300F	711
14"	14"	150	#125 FLG	27"	32"	38"	WAV140-150F	945
14"	14"	300	#250 FLG	27"	32"	38"	WAV140-300F	945
16"	16"	150	#125 FLG	30-1/2"	34"	41"	WAV160-150F	1275
16"	16"	300	#250 FLG	30-1/2"	34"	41"	WAV160-300F	1275
20"	20"	150	#125 FLG	38-1/4"	42"	51"	WAV200-150F	2081
20"	20"	300	#250 FLG	38-1/4"	42"	51"	WAV200-300F	2081



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Guide Bushing	ASTM A582 316SS
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	O-Ring	Buna-N
7	Cover Bolt	ASTM F593 316SS
8	Shoulder Screw	ASTM F593 316SS
9	Cushion Bumper	Buna-N
10	Washer	316SS
11	Pipe Plug	Steel
12	Hood	Steel
13	Hood Bolt	Steel
14	Screen	Steel

Series WAV-D Water Air/Vacuum Valve (Deep-well Service)

Provides for Deep Well Pump Flow Optimization

Well service pumps start up with low water level and a long column of air which results in little or no head (backpressure) while the pump fills the casing.

At pump start, conditions may exist which allow water flow to exceed 10 feet per second as it moves up with little resistance inside a well casing while air is being discharged from the line.

Since a fast water column is rising immediately following the escaping air column, it is critical to protect the float from the in-rushing water column which is 800 times denser than air.

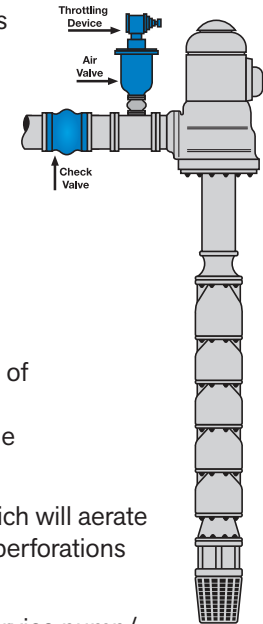
If the float is not shielded the fast moving water column will strike the float and push it or slam it shut prematurely, sometimes closing the valve prematurely before all air escapes.

There are various means to protect the air valve float and system. Each device is ranked in order of increasing degree of protection:

- Diffuser (perforated basket which aerates and moderates water flow)
- Anti-Shock Slow Closing Surge Check Air Valve (perforated disc "sprung open" to allow slow fill of float chamber)
- Double-Acting Throttling Device (device which controls outflowing air backpressure with variable plug closure- but allows free air in)

Positive control of the water flow is provided by a Diffuser – a float-enclosing, perforated basket which will aerate and disperse a fast straight-on column impact into steady, slower flow. Water is forced through the perforations and aerated as it streams through to buoy up the float in a controlled manner.

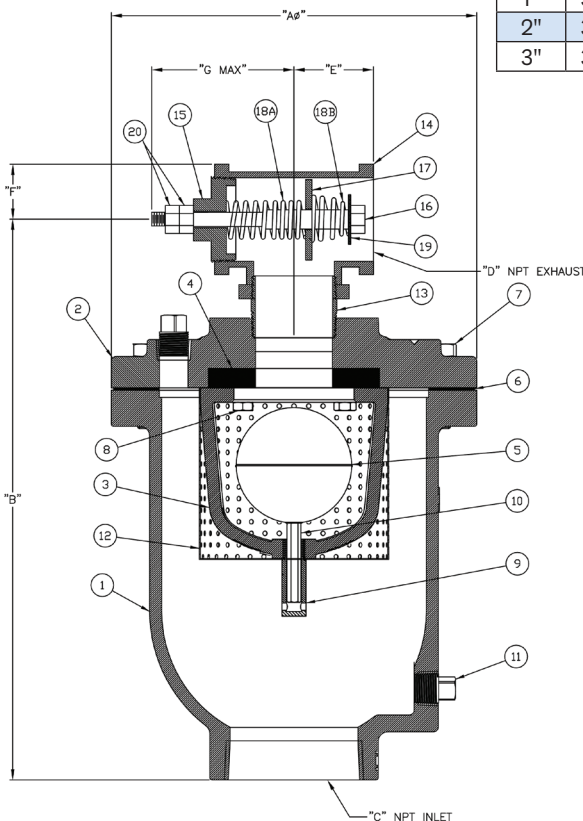
The Henry Pratt throttling device is the final level of protection that can be provided for deep well service pump/pipeline systems. This proven design is the maximum protection that can be provided for slowing down the water column.



Well Service Air Valve General Specification

For a CSI formatted specification describing the AirPro Max Well Service Valves, please contact your local sales representative.

Valve	CWP	AØ	B	C NPT	D NPT	E	F	G	Part #	Wt.
1/2 "	300	9-3/8	1/2"	1/2"	1-1/8	5/8	5/8	2-5/8	WAV05-300D	15
1 "	300	12-1/8	1"	1"	1-1/2	7/8	7/8	3-5/8	WAV10-300D	25
2 "	300	15-15/16	2"	2"	2-1/4	1-1/2	1-1/2	5-3/4	WAV20-300D	54
3 "	300	16-7/16	3"	3"	3-1/16	2-1/8	2-1/8	7-11/16	WAV30-300D	55



Item #	Description	Material
1	Body	Ductile Iron
2	Cover	Ductile Iron
3	Baffle	Ductile Iron
4	Seat	Rubber (BUNA-N) (See Note 1), Rubber (EPDM)
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolts	ASTM F593 316SS
8	Baffle Bracket Bolts	ASTM F593 316SS
9	Guide Bushing	ASTM A240 316SS (See Note 2)
10	Guide Shaft	ASTM A240 316SS (See Note 2)
11	Pipe Plug	Carbon Steel (See Note 3)
12	Diffuser	Perforated 316SS
13	Pipe Nipple	Carbon Steel
14	Tee Pipe Fitting	Cast Iron
15	Plug	Cast Iron ASTM A-126
16	Bolt	ASTM A276 316SS
17	Throttle Disc	ASTM D4181 Delrin
18a	Spring	ASTM A276 316SS (See Note 5)
18b	Antishock Spring	ASTM A276 316SS (See Note 6)
19	Flat Washer	ASTM A276 316SS
20	Hex Lock Nut	Nylon Insert Steel Nut

Notes: (1) BUNA-N is standard rubber seat (2) 1/2" valve comes with ASTM A276 316SS (3) 1/2" valve comes with only one pipe plug on cover (4) Customers to indicate if operating pressure to be below 10psi (5) Double acting throttle spring (6) Optional antishock throttle spring

Anti-Shock Air Vacuum Valves – Series WAVASD

Henry Pratt AirPro Max® Anti-Shock Air Vacuum Valves are equipped with a measured closing, Anti-Shock Check Valve which regulates the flow of water into the Air Vacuum Valve. This regulation of flow provides additional protection by preventing the Air Vacuum Valve from slamming shut during critical operations. This controlled closure of the valve prevents surge or water hammer conditions from occurring and helps eliminate the possibility of damage to the valve caused by excessive pressure forces.

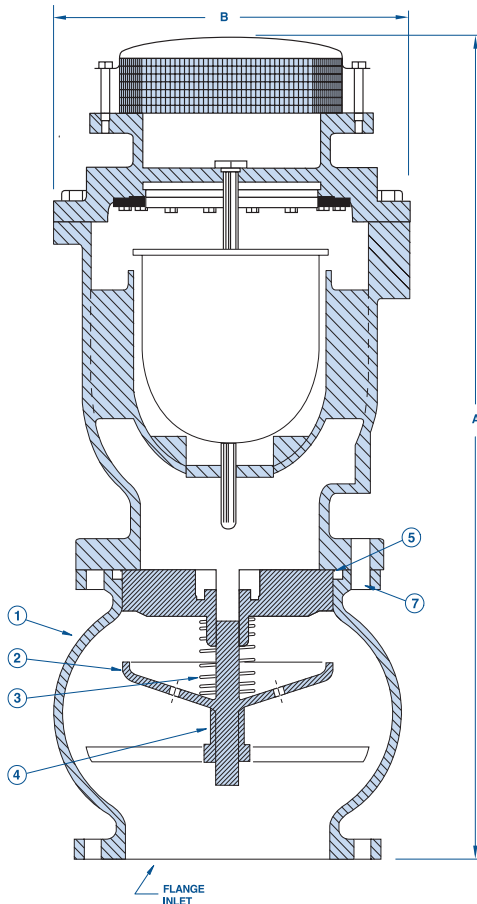
The Series WAVAS Anti-Shock Check Valve, mounted on the inlet of the Air Vacuum Valve, is a normally open valve. The disc is held open by a flexible spring allowing air to pass through unrestricted. As the Anti-Shock Valve fills with water the disc quickly closes preventing fluid surge against the internal components of the Air Vacuum Valve. The disc of the Anti-Shock Valve is drilled with adjustable flow ports which allow water to enter the Air Vacuum Valve at a measured rate. This regulated flow closes the Air Vacuum Valve without excessive force caused by surge or water hammer.

When the Air Vacuum Valve is closed the pressure on both sides of the Anti-Shock Check Valve disc equalize, returning the disc to the open position. This allows the Air Vacuum Valve to open at any time the water level drops and line pressure approaches atmospheric, permitting air to re-enter the pipeline before a vacuum can form.

Series WAVAS Anti-Shock check valves should be used:

- At high points in pipelines where the hydraulic gradient and flow conditions are such that a negative pressure can possibly form.
- High points on sections of the pipeline having velocities in excess of 7-10 f/s.
- Adjacent to any quick closing valve in a pipeline where a vacuum can be formed when closed.
- On the discharge of larger deep well turbine pumps, between the pump and the check valve.

Anti-Shock Check Valve Assembly Drawing



A.V. Pipe Size	Combo #	Air Vacuum Model	Anti-Shock Part #	A	B	CWP
2"	WAVASD-20-125	WAV20-300*	WAVAS-20	17-7/8"	9-1/2"	150
3"	WAVASD-30-125	WAV30-300*	WAVAS-30	20-11/16"	9-1/2"	150
4"	WAVASD-40-125	WAV40-150F	WAVAS-40	23-1/4"	12"	150**
6"	WAVASD-60-125	WAV60-150F	WAVAS-60	30-1/2"	14"	150
8"	WAVASD-80-125	WAV80-150F	WAVAS-80	35-5/8"	18"	150
10"	WAVASD-100-125	WAV100-150F	WAVAS-100	41-5/8"	20"	150
12"	WAVASD-120-125	WAV120-150F	WAVAS-120	45-3/8"	24"	150
14"	WAVASD-140-125	WAV140-150F	WAVAS-140	49-7/8"	27"	150
16"	WAVASD-160-125	WAV160-150F	WAVAS-160	51-3/4"	30-1/2"	150
20"	WAVASD-200-125	WAV200-150F	WAVAS-200	57"	38-1/4"	150

*Threaded inlet with flange adapter

**300 CWP available, contact factory for information

Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Guide Bushing	ASTM A582 316SS
4	Seat	Buna-N
5	Float	ASTM A240 316SS
7	Cover Bolt	ASTM F593 316SS

For WAV drawing details, reference WAV series Valve Water Air Vacuum Valves (Pages 12-16).

Series WCV Combination Air Valves

Introduction

- All 316 Stainless Steel Trim Standard
- All 316 Stainless Steel Floats Standard
- Vent Cap or Hood Included as Standard
- Meets or Exceeds ANSI/AWWA C512 Standard/ NSF61/372 Certified
- Drop Tight Shut-off At Low Pressures

The AirPro Max® Series WCV Combination Air Valve combines the functions of both the Air Release Valve and Air Vacuum Valve. Our Series WCV Combination Valve allows a large volume of air to be vented when filling, or a large volume of air intake when draining the pipeline. The Combination Air Valve also vents small pockets of air that accumulate after the line is filled, pressurized and operating. Series WCV Combination Air Valves are offered in both single body and dual body designs.

Note: For valve sizing, see page 5.

Scope of Line

Sizes

Single Body Design

1", 2", 3", 4" NPT

3" through 8" Flanged ANSI Class 125 & 250

Dual Body Design

1", 2", 3" NPT

4" through 16" Flanged ANSI Class 125 & 250

Pressure Ratings (See Note)

150 psi

300 psi

Note: Specify when operating pressure will be below 10 psi

Temperature Range

Water to 180°F

Standard Materials

Body and Cover: Ductile Iron ASTM A536 65-45-12

Float: 316 Stainless Steel

Internal Trim: 316 Stainless Steel

Seat: Buna-N

External Cover Bolts: ASTM F593 316SS

Coating: 2-Part Liquid Epoxy

Installation

Series WCV AirPro Max® Combination Air Valves should be installed at high points and change of gradients and regular intervals of approximately every 1/4 to 1/2 miles along lines without clearly defined high points. Install valves vertically on top of the pipeline with an isolation valve under each valve should servicing be required. A vault with adequate venting and drainage is highly recommended.

Suggested Specifications

The Combination Air Valve shall function as an air vacuum valve and air release valve in a single or dual body design. The large air vacuum orifice shall allow large volumes of air to be exhausted during pipeline filling and large volume of air intake while draining, or in the event of a break in the pipeline, to prevent a vacuum from forming.

The inlet/outlet and seat of the valve shall have the same flow area. The stainless steel poppet shall be guided by a stainless steel guide shaft and seal drip tight against a Buna-N seat. 4" and larger valves shall have dual guided stainless steel shafts of hexagonal cross section and a protective discharge hood.

The float shall be of all stainless steel construction and capable of withstanding maximum system surge pressure without failure. The body and cover shall be concentrically located and of ductile iron and the valve internal trim shall be of 316 Stainless Steel. Seat shall be Buna-N for water tight shut off.

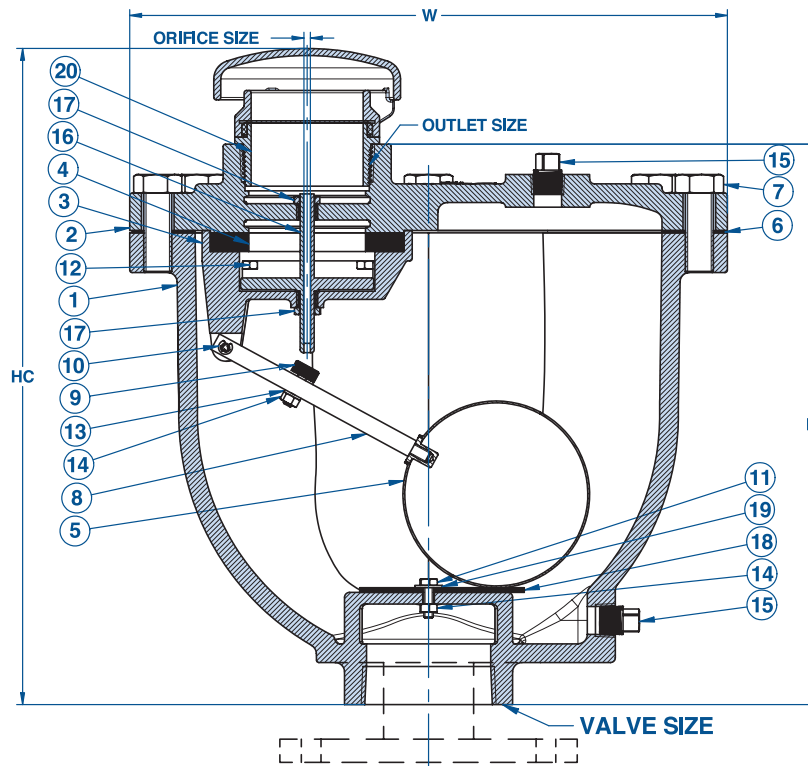
The Combination Air Valve shall be manufactured per ANSI/AWWA C512 and shall be Series WCV AirPro Max® Combination Air Valves manufactured by the Henry Pratt Company, Aurora, IL USA.

When Ordering, Please Specify

1. Model Number
2. Inlet/Outlet Size & Connection
3. Valve Pressure Rating

Series WCV 01 Combination Air Valves

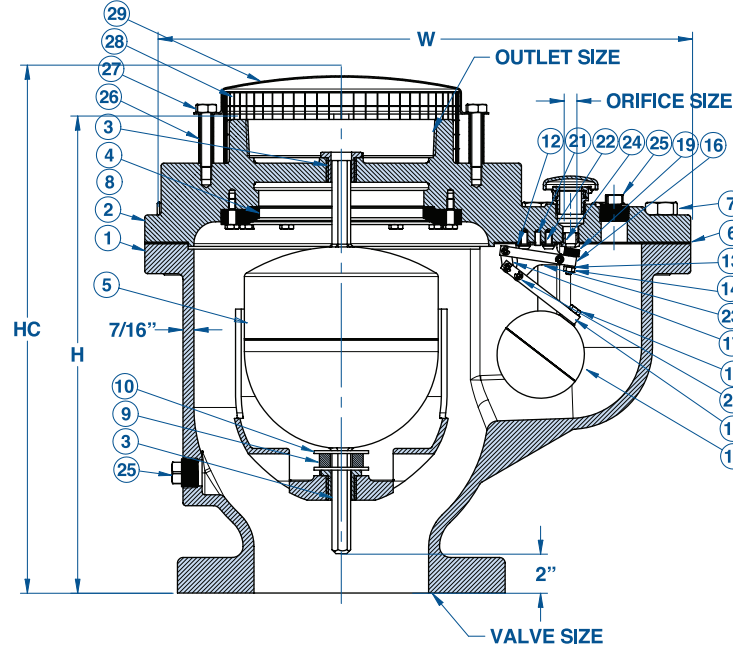
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
1"	1"	5/64"	300	NPT	11-3/8"	10-1/2"	11-5/8"	WCV10-564-300	40.6
2"	2"	3/32"	300	NPT	14"	13"	14-7/8"	WCV20-332-300	75.5
3"	3"	3/32"	300	NPT	16"	15"	17-9/16"	WCV30-332-300	114
3"	3"	3/32"	150	#125 Flg	16"	17"	19-9/16"	WCV30-332-150F	114
3"	3"	3/32"	300	#250 Flg	16"	17-1/2"	20-1/16"	WCV30-332-300F	114
4"	4"	3/32"	300	NPT	18-1/2"	17"	20"	WCV40-332-300	161.9
4"	4"	3/32"	150	#125 Flg	18-1/2"	19"	22"	WCV40-332-150F	161.9
4"	4"	3/32"	300	#250 Flg	18-1/2"	19-1/2"	22-1/2"	WCV40-332-300F	161.9



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Lever Frame	ASTM A536 65-45-12
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Lever Arm	ASTM A582 316SS
9	Button	Stainless Steel & Buna-N
10	Pivot Pin & Retaining Ring	316SS
11	Cushion Retainer	ASTM F593 316SS
12	Lever Frame Bracket	ASTM F879 316SS
13	Lock Washer	ASTM A240 316SS
14	Lock Nut	ASTM F594 316SS
15	Pipe Plug	Steel
16	Poppet	ASTM A582 316SS
17	Guide Bushing	ASTM A582 316SS
18	Cushion	Buna-N
19	Washer	ASTM A240 316SS
20	Vent Cap	ASTM A536 65-45-12

Series WCV 02 Combination Air Valves

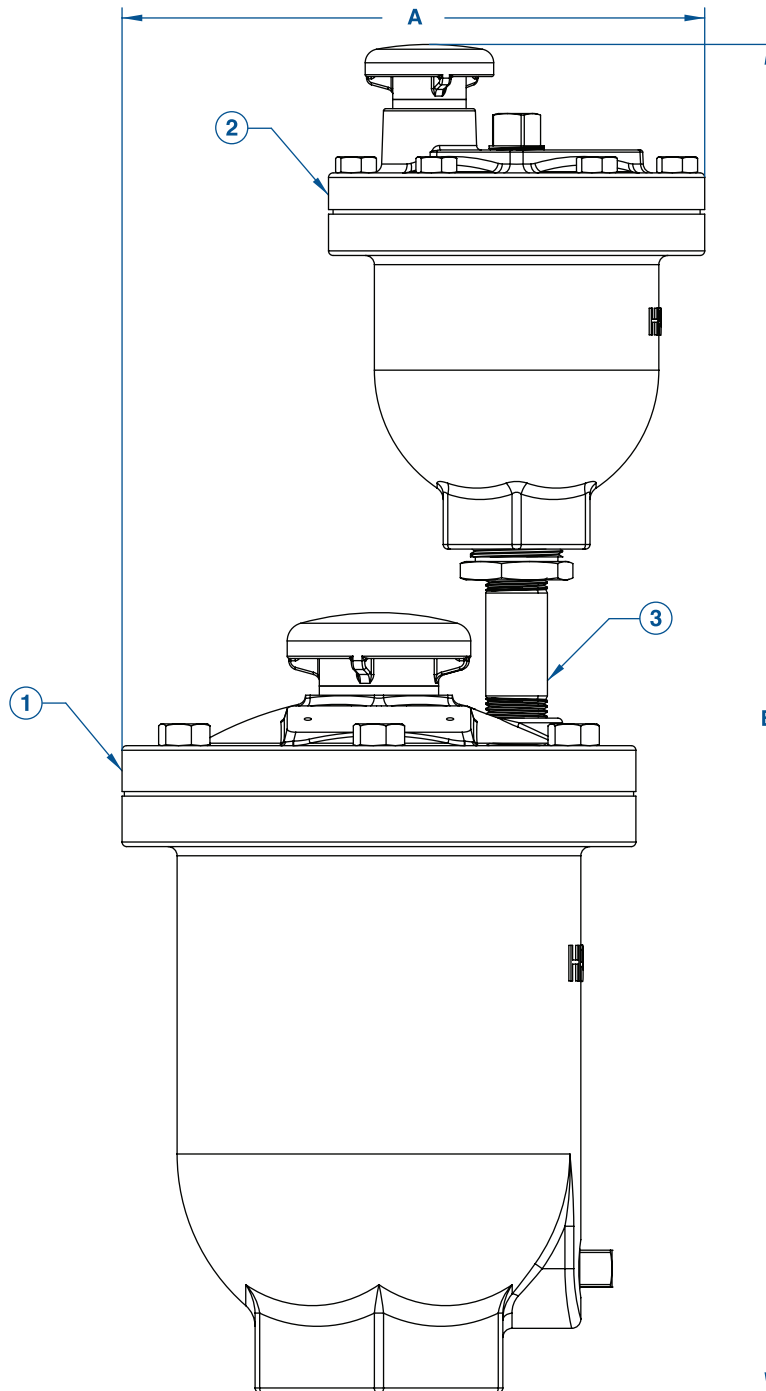
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Inlet Connection	W	H	HC	Pratt Model #	Wt. (Lbs.)
6"	6"	3/8"	150	#125 Flg	21"	18-3/4"	20-1/2"	WCV60-038-150F	231
6"	6"	7/32"	300	#250 Flg	21"	18-3/4"	20-1/2"	WCV60-732-300F	231
8"	8"	3/8"	150	#125 Flg	25"	21-11/16"	23-11/16"	WCV80-038-150F	373
8"	8"	7/32"	300	#250 Flg	25"	21-11/16"	23-11/16"	WCV80-732-300F	373



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Bushing	ASTM A582 316SS
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	Gasket	ASTM A536 65-45-12
7	Cover Bolt	ASTM F593 316SS
8	Shoulder Screw	ASTM F593 316SS
9	Cushion Bumper	Buna-N
10	Washer	ASTM A240 316SS
11	Float Retainer	ASTM F593 316SS
12	Lock Washer	ASTM A240 316SS
13	Lock Washer	ASTM A240 316SS
14	Lock Nut	ASTM F594 316SS
15	Float	ASTM A240 316SS
16	Long Lever Arm	ASTM A582 316SS
17	Arm Link	ASTM A240 316SS
18	Short Lever Arm	ASTM A582 316SS
19	Button	316SS & Buna-N
20	Pivot Pin & Retaining Ring	Stainless Steel
21	Positioning Pin	420SS
22	Positioner	ASTM F879 316SS
23	Lever Bracket	ASTM A240 316SS
24	Seat	ASTM A582 316SS
25	Pipe Plug	Steel
26	Hood	Steel
27	Hood Bolt	Steel
28	Screen	Steel
29	Vent Cap	ASTM A536 65-45-12

Series WCVD 01 Combination Air Valves (Dual Body)

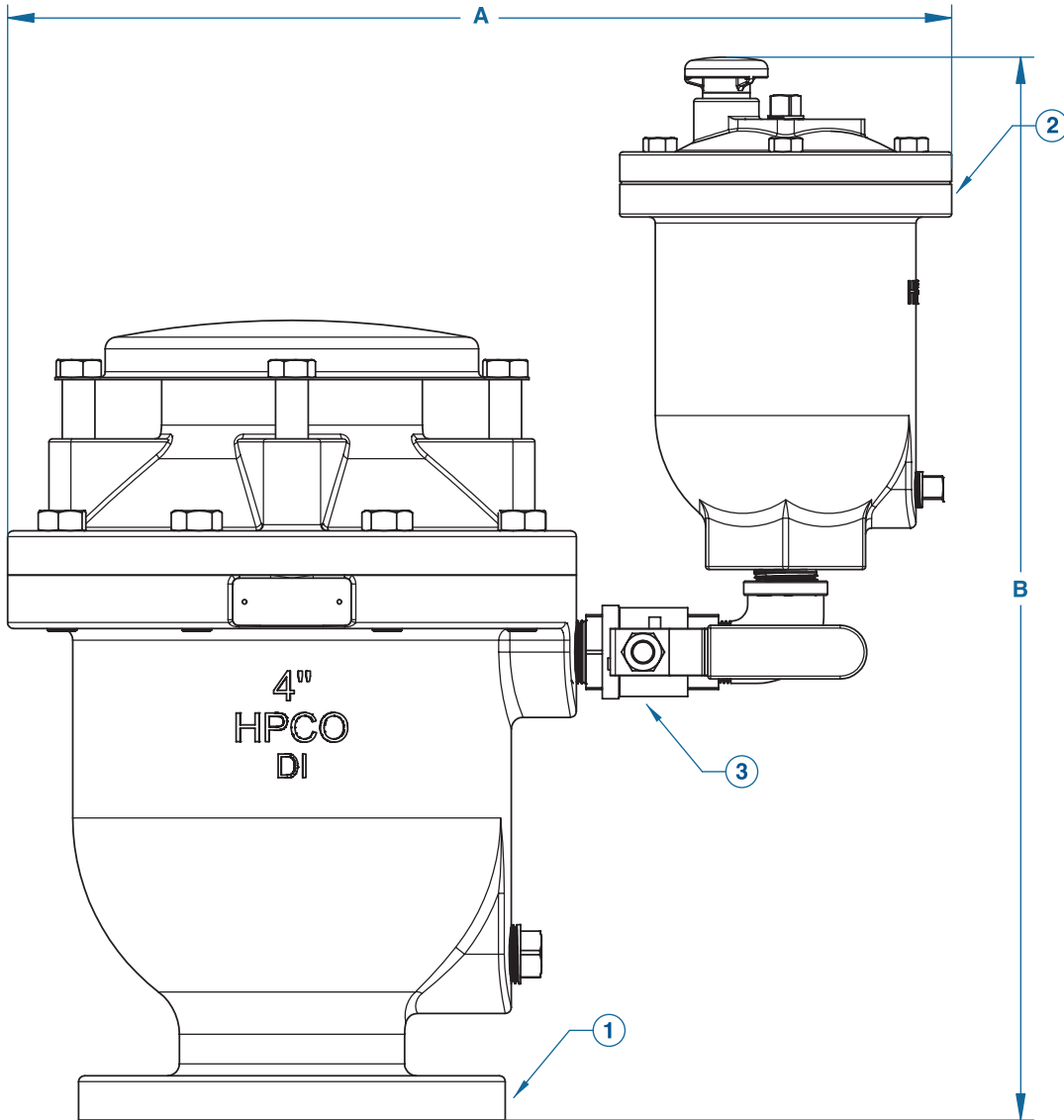
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Air Vacuum Valve	Air Release Valve	A	B	Wt. (lbs)	Pratt Model #
1"	1"	1/16"	300 PSI	WAV10-300	WAR101005-116-300	8"	17"	33	WCVD-10-116-300
2"	2"	1/16"	300 PSI	WAV20-300	WAR101005-116-300	10-1/2"	19"	60	WCVD-20-116-300
3"	3"	1/16"	300 PSI	WAV30-300	WAR101005-116-300	10-1/2"	19"	62	WCVD-30-116-300



No.	Part Name/Drawing No.	Valve Specs.
1	Air Vacuum Valve	See Series WAV 02 Page 13
2	Air Release Valve	See Series WAR 02 Page 9
3	Dual Body Pipe Nipple	

Series WCVD 02 Combination Air Valves (Dual Body)

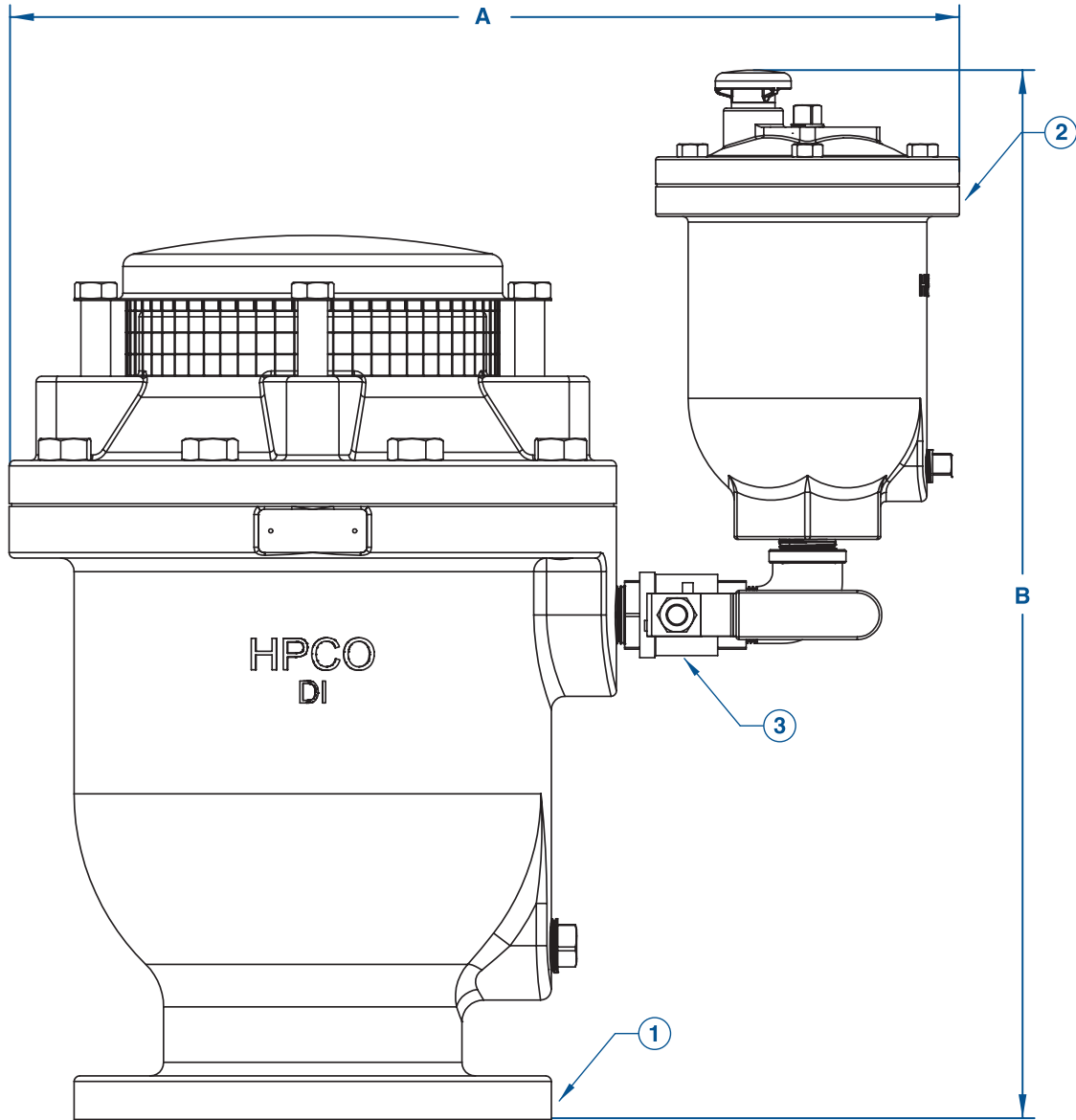
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Air Vacuum Valve	Air Release Valve	A	B	Wt. (Lbs.)	Pratt Model #
4"	4"	3/16"	150 PSI	WAV40-150F	WAR101005-316-150	20"	22-1/2"	131	WCVD-40-316-150
4"	4"	5/32"	300 PSI	WAV40-300F	WAR101005-532-300	20"	22-1/2"	139	WCVD-40-532-300



No.	Part Name/Drawing No.	Valve Specs.
1	Air Vacuum Valve	See Series WAV 03 Page 14
2	Air Release Valve	See Series WAR 02 Page 9
3	Dual Body Piping Kit	

Series WCVD 03 Combination Air Valves (Dual Body)

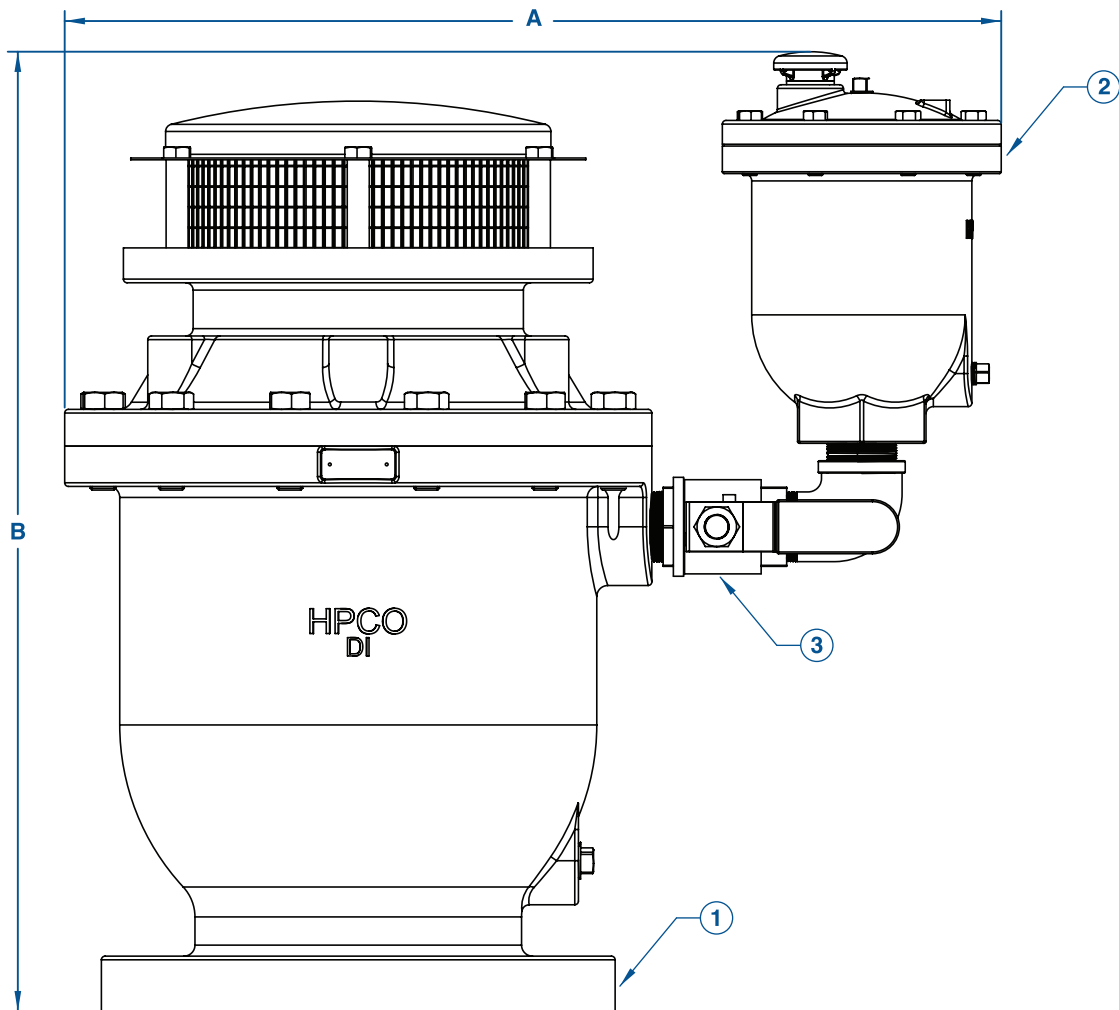
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Air Vacuum Valve	Air Release Valve	Bypass	A	B	Wt. (Lbs.)	Pratt Model #
6"	6"	3/16"	150 PSI	WAV60-150F	WAR101005-316-150	1"	22"	24-1/4"	187	WCVD-60-316-150
6"	6"	5/32"	300 PSI	WAV60-300F	WAR101005-532-300	1"	22"	24-1/4"	217	WCVD-60-532-300
8"	8"	3/16"	150 PSI	WAV80-150F	WAR101005-316-150	1"	26"	25-1/2"	316	WCVD-80-316-150
8"	8"	5/32"	300 PSI	WAV80-300F	WAR101005-532-300	1"	26"	25-1/2"	346	WCVD-80-532-300
8"	8"	23/64"	150 PSI	WAV80-150F	WAR202005-2364-150	2"	30"	29"	344	WCVD-80-2364-150
8"	8"	7/32"	300 PSI	WAV80-300F	WAR202005-732-300	2"	30"	29"	374	WCVD-80-732-300



No.	Part Name/Drawing No.	Valve Specs.
1	Air Vacuum Valve	See Series WAV 04/05 Pages 15 & 16
2	Air Release Valve	See Series WAR 02 Page 9
3	Dual Body Piping Kit	

Series WCVD 04 Combination Air Valves (Dual Body)

Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Air Vacuum Valve	Air Release Valve	A	B	Wt. (Lbs.)	Pratt Model #
10"	10"	3/16"	150 PSI	WAV100-150F	WAR101005-316-150	28"	31"	465	WCVD-100-316-150
10"	10"	5/32"	300 PSI	WAV100-300F	WAR101005-532-300	28"	31"	490	WCVD-100-532-300
10"	10"	23/64"	150 PSI	WAV100-150F	WAR202010-2364-150	32"	32-1/2"	495	WCVD-100-2364-150
10"	10"	7/32"	300 PSI	WAV100-300F	WAR202010-732-300	32"	32-1/2"	520	WCVD-100-732-300
12"	12"	3/16"	150 PSI	WAV120-150F	WAR101005-316-150	32"	35"	715	WCVD-120-316-150
12"	12"	5/32"	300 PSI	WAV120-300F	WAR101005-532-300	32"	35"	740	WCVD-120-532-300
12"	12"	23/64"	150 PSI	WAV120-150F	WAR202010-2364-150	36"	36"	745	WCVD-120-2364-150
12"	12"	7/32"	300 PSI	WAV120-300F	WAR202010-732-300	36"	36"	765	WCVD-120-732-300
14"	14"	3/16"	150 PSI	WAV140-150F	WAR101005-316-150	35"	38"	950	WCVD-140-316-150
14"	14"	5/32"	300 PSI	WAV140-300F	WAR101005-532-300	35"	38"	975	WCVD-140-532-300
14"	14"	23/64"	150 PSI	WAV140-150F	WAR202010-2364-150	39"	38"	975	WCVD-140-2364-150
14"	14"	7/32"	300 PSI	WAV140-300F	WAR202010-732-300	39"	38"	1000	WCVD-140-732-300
16"	16"	3/16"	150 PSI	WAV160-150F	WAR101005-316-150	38-1/2"	41"	1280	WCVD-160-316-150
16"	16"	5/32"	300 PSI	WAV160-300F	WAR101005-532-300	38-1/2"	41"	1300	WCVD-160-532-300
16"	16"	23/64"	150 PSI	WAV160-150F	WAR202010-2364-150	42-1/2"	41"	1310	WCVD-160-2364-150
16"	16"	7/32"	300 PSI	WAV160-300F	WAR202010-732-300	42-1/2"	41"	1330	WCVD-160-732-300



No.	Part Name/Drawing No.	Valve Specs.
1	Air Vacuum Valve	See Series WAV 06 Page 17
2	Air Release Valve	See Series WAR 02 Page 9
3	Dual Body Piping Kit	

Series WAVVB Vacuum Breaker Air Inlet Valve

Henry Pratt AirPro Max® Vacuum Breaker Valves (Series WAVVB) are designed as large orifice, one way, spring loaded valves that allow air flow in only one direction (air flowing in to the pipeline). All standard valves begin admitting air at a minimal 1/4 - 1/2 PSI vacuum to maximize vacuum breaking potential. When the vacuum condition ceases, the vacuum breaker valve disc is instantly closed against the body seat, thereby trapping air at the high point. The fast closure of the valve disc avoids any slamming which could be caused when the water column rejoins.

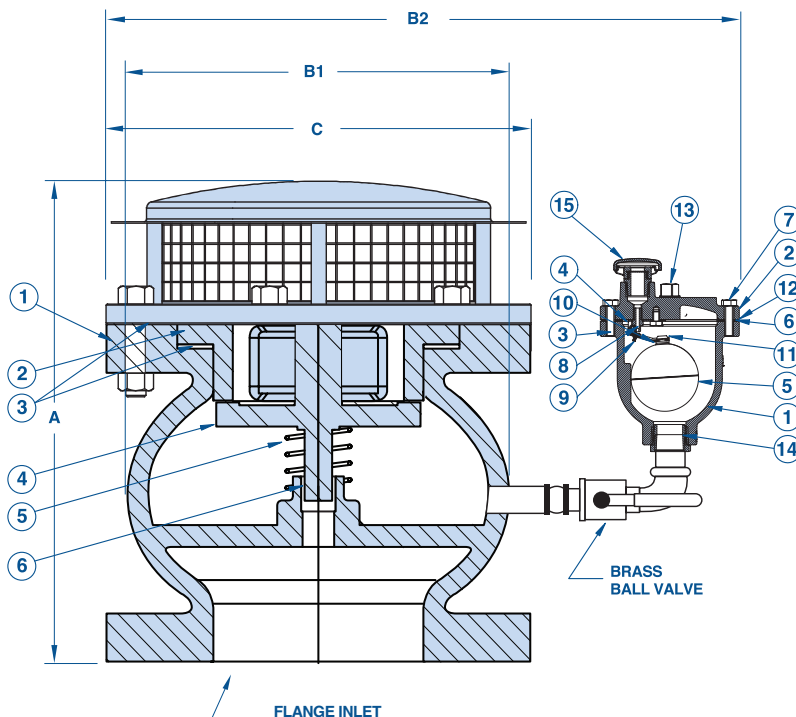
By equipping the Vacuum Breaker Valve with an optional AirPro Max® Series WAR Air Release valve as a special combination setup, the assembly acts as a “free air in – controlled air out” regulator. After a vacuum condition ceases and the line returns to positive pressure – the Air Release valve slowly releases the trapped air and bleeds it to atmosphere. In this manner, the pipeline is fully restored in a controlled manner to normal operating condition (pipeline fully charged with liquid media).

Series WAVVB Vacuum Breaker Valves should be used:

- For high vacuum break capacity required to protect critical infrastructure (like a penstock, etc.)
- At high points in pipelines where the hydraulic gradient and flow conditions are such that a negative pressure can possibly form but where some trapped air is desired for cushioning (until bled off).
- Where water column separation is expected which may result in water hammer.
- Adjacent to any quick closing valve in a pipeline where a severe vacuum can be formed when closed.

Vacuum Breaker Valve

A.V. Pipe Size	Vacuum Breaker Model	Air Release Model	A	B1	B2	C
3"	WAVVB-30	WAR101005-316-150	9"	6-7/8"	16-1/8"	7-1/2"
4"	WAVVB-40	WAR101005-316-150	10-1/4"	8-1/2"	17-3/4"	9"
6"	WAVVB-60	WAR101005-316-150	13-1/2"	11-1/8"	20-3/8"	12-1/2"
8"	WAVVB-80	WAR101005-316-150	17"	16-1/8"	25-3/8"	16-1/4"
10"	WAVVB-100	WAR101005-316-150	21"	17-7/8"	27-1/8"	16"
12"	WAVVB-120	WAR101005-316-150	19-1/4"	19-1/8"	28-3/8"	19"
14"	WAVVB-140	WAR101005-316-150	22-1/4"	22-1/2"	31-3/4"	21"
16"	WAVVB-160	WAR101005-316-150	24-1/8"	26"	35-1/4"	23-1/2"
18"	WAVVB-180	WAR101005-316-150	26-1/4"	29"	38-1/4"	25"
20"	WAVVB-200	WAR101005-316-150	30-1/8"	32-3/4"	42"	27-1/2"



Vacuum Breaker Valve		
1	Body	Ductile Iron
2	Seat	304 Stainless Steel/EPDM
3	Gasket	EPDM
4	Disc	304 Stainless Steel
5	Spring	304 Stainless Steel
6	Bushing	304 Stainless Steel

Air Release Valve		
1	Body	ASTM A536 (65-45-12)
2	Cover	ASTM A536 (65-45-12)
3	Lever Bracket	ASTM A582 316 S.S.
4	Seat	ASTM A582 316 S.S.
5	Float	ASTM A240 316 S.S.
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM A593 316 S.S.
8	Lever Arm	ASTM A240 316 S.S.
9	Button	BUNA-N
10	Pivot Pin & Rtnr Ring	Stainless Steel
11	Float Retainer	ASTM A879 316 S.S.
12	Positioner	ASTM A593 316 S.S.
13	Pipe Plug	Steel
14	Reducer Bushing	ASTM A582 316 S.S.
15	Vent Cap	ASTM A536 (65-45-12)

WAR-01 Series Air Release Valve shown as typical.
For other Air Release Valve Series, see appropriate page number.

Series WWAR Wastewater Air Release Valves

Introduction

- All 316 Stainless Steel Trim Standard
- All 316 Stainless Steel Floats Standard
- Ductile Iron Bodies and Covers Standard
- Service Without Removal from Pipeline
- Drop Tight Shut-off at Low Pressures
- Optional Backwash Kit Available

AirPro Max® Series WWAR Wastewater Air Release Valves are specifically designed for wastewater having an elongated valve body to prevent the collection of waste in the linkage area of the air valve. Series WWAR valves prevent disruption of service by venting pockets of air that collect at high points in a pipeline. These valves continuously eliminate air from systems by releasing small pockets of air before large air pockets can occur. In many installations lacking Air Release Valves accumulations of air in the pipeline will cause flow to decrease, and power consumption to increase, due to air blocks in the system. Another possible result of excessive air accumulation may be an inexplicable pipeline rupture. These ruptures are often falsely attributed to ground settling or defective pipe. In reality, unusually large air pockets can greatly increase the pressure of normally occurring surges to the point where sudden stops and starts of flow can cause a pipe collapse.

As air accumulates at a high point in the pipeline, liquid is displaced within the air valve, lowering the water level, causing the stainless steel float to drop. When the float drops to a pre-determined point the valve orifice opens and permits accumulated air to be exhausted into the atmosphere. The liquid level in the air valve then rises and closes the valve orifice once again. This cycle repeats as needed and avoids the formation of potentially destructive air pockets.

Scope of Line

Sizes

2", 3", 4" NPT

Pressure Ratings (See Note)

75 psi
150 psi
300 psi

Note: Specify when operating pressure will be below 10 psi

Standard Materials

Body and Cover: Ductile Iron ASTM A536 65-45-12

Float: 316 Stainless Steel

Internal Trim: 316 Stainless Steel

Seat: Buna-N

External Cover Bolts: ASTM F593 316SS

Coating: 2-Part Liquid Epoxy Coated Interior and Exterior

Installation

Series WWAR AirPro Max® Wastewater Air Release Valves should be installed at high points in pipelines and also at regular intervals (approximately every 1/4 to 1/2 mile) along uniform grade lines.

Valves should be mounted in the vertical position on top of the pipe with an isolation valve installed below each valve in the event servicing is required. A vault with adequate air venting and drainage is recommended.

An optional customer-installed Backwash Kit is available. This kit is used for regular cleaning to keep equipment in good working condition. It includes a back flushing hose and quick disconnect couplings.

Wastewater Air Release Valve Specifications

The Air Release Valve shall be of the float operated, compound lever type, and capable of automatically venting accumulated air, gas or vapor from a fluid system while the system is pressurized and operating.

An adjustable designed orifice button shall be used to seal the valve discharge port with drip-tight shut-off. The diameter of the orifice must be sized for use within a given operating pressure range to insure maximum air venting capacity.

The float shall be of all stainless steel construction and guaranteed to withstand the maximum system surge pressure without failure. The body and the cover shall be of ductile iron and all valve internal parts shall be of stainless steel. The rubber seat is Buna-N for water tight shut-off.

The air release valve shall be manufactured per ANSI/AWWA C512 and shall be Series WWAR AirPro Max® Wastewater Air Release Valves manufactured by the Henry Pratt Company, Aurora, IL USA.

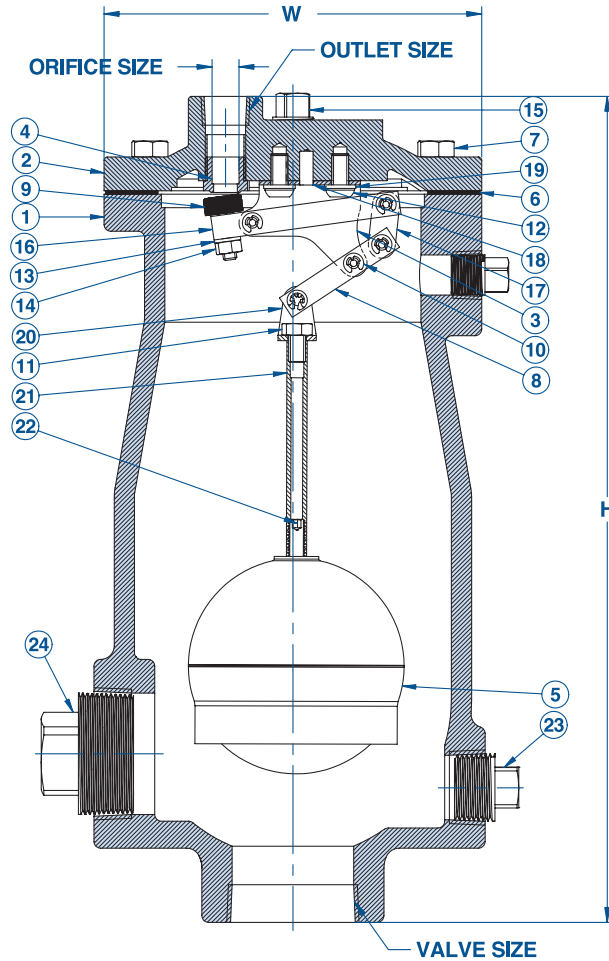
Series WWAR 01 Wastewater Air Release Valves

Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Inlet Connection	W	H	Pratt Model #	Wt. (Lbs.)
2"	1/2"	5/16"	75	NPT	7"	15-5/16"	WWAR202005-516-75	40
2"	1/2"	3/16"	150	NPT	7"	15-5/16"	WWAR202005-316-150	40
2"	1/2"	5/32"	300	NPT	7"	15-5/16"	WWAR202005-532-300	40
2"	1"	1/2"	75	NPT	9-1/2"	17-9/16"	WWAR202010-012-75	66.7
2"	1"	7/16"	150	NPT	9-1/2"	17-9/16"	WWAR202010-716-150	66.7
2"	1"	7/32"	300	NPT	9-1/2"	17-9/16"	WWAR202010-732-300	66.7
3"	1/2"	5/16"	75	NPT	7"	15-5/16"	WWAR303005-516-150	40
3"	1/2"	3/16"	150	NPT	7"	15-5/16"	WWAR303005-316-150	40
3"	1/2"	5/32"	300	NPT	7"	15-5/16"	WWAR303005-532-300	40
3"	1"	1/2"	75	NPT	9-1/2"	17-9/16"	WWAR303010-012-75	66.7
3"	1"	7/16"	150	NPT	9-1/2"	17-9/16"	WWAR303010-716-150	66.7
3"	1"	7/32"	300	NPT	9-1/2"	17-9/16"	WWAR303010-732-300	66.7
4"	1/2"	5/16"	75	NPT	7"	15-5/16"	WWAR404005-516-75	40
4"	1/2"	3/16"	150	NPT	7"	15-5/16"	WWAR404005-316-150	40
4"	1/2"	5/32"	300	NPT	7"	15-5/16"	WWAR404005-532-300	40
4"	1"	1/2"	75	NPT	9-1/2"	17-9/16"	WWAR404010-012-75	66.7
4"	1"	7/16"	150	NPT	9-1/2"	17-9/16"	WWAR404010-716-150	66.7
4"	1"	7/32"	300	NPT	9-1/2"	17-9/16"	WWAR404010-732-300	66.7

Note: Please see next page for drawing and chart.



Series WWAR 01 Wastewater Air Release Valves



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Lever Bracket	ASTM A240 316SS
4	Seat	ASTM A582 316SS
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Short Lever Arm	ASTM A582 316SS
9	Button	Stainless Steel & Buna-N
10	Pivot Pin & Retaining Ring	316SS
11	Float Retainer	ASTM F593 316SS
12	Positioner	ASTM F879 316SS
13	Lock Washer	ASTM A240 316SS
14	Lock Nut	ASTM F594 316SS
15	Pipe Plug	Steel
16	Long Lever Arm	ASTM A582 316SS
17	Arm Link	ASTM A240 316SS
18	Positioning Pin	420SS
19	Lock Washer	ASTM A240 316SS
20	Clevis	ASTM A240 316SS
21	Extension Shaft	ASTM A240 316SS
22	Socket Set Screw	ASTM A240 316SS
23	Pipe Plug	Steel
24	Pipe Plug	Steel

Series WWAV Wastewater Air Vacuum Valves

Introduction

- All 316 Stainless Steel Trim Standard
- All 316 Stainless Steel Floats Standard
- Fully Ported Valves - No Restrictions
- Drop Tight Shut-off At Low Pressures
- Optional Backwash Kit Available

The AirPro Max® Series WWAV Wastewater Air Vacuum Valves are specifically designed with elongated valve bodies. The purpose of the elongated bodies is to increase the gap between the float and the mechanical linkage inside and top of the valve body. The valve is designed to perform two critical functions. First, as the line is being filled with water they expel large quantities of air from the pipeline. When air has been completely vented, water enters the valve causing the float to seal tightly against the seat to prevent leakage. Second, when the line is drained, either intentionally or as a result of pipeline breakage, the Air Vacuum Valve responds to the drop in pressure and opens. Air then re-enters the valve and line eliminating the conditions which could lead to a damaging vacuum developing in the pipeline.

Air Vacuum Valves do not open when under pressure to exhaust small quantities of air that may collect at high points during operation of the system. A Series WWAV Air Release Valve is required for this function.

Scope of Line

Sizes

2" & 3" NPT

4", 6", 8" flanged ANSI Class 125

Pressure Rating (See Note)

150 psi

Note: Specify when operating pressure will be below 10 psi

Standard Materials

Body and Cover: Ductile Iron ASTM A536 65-45-12

Float: 316 Stainless Steel

Internal Trim: 316 Stainless Steel

Seat: Buna-N

External Cover Bolts: ASTM F593 316SS

Coating: 2-Part Liquid Epoxy Coated Interior and Exterior

Installation

Series WWAV AirPro Max® Wastewater Air Vacuum Valves are typically installed at high points and at grade changes along the pipeline. Mount each unit vertically on top of the pipe with an isolation valve below each valve in the event servicing is required. A vault with adequate venting and drainage should be provided.

An optional customer-installed Backwash Kit is available. This kit is used for regular cleaning to keep equipment in good working condition. It includes a back flushing hose and quick disconnect couplings.

Wastewater Air Vacuum Valve Specifications

The Wastewater Air Vacuum Valve shall be able to automatically exhaust large quantities of air during filling of a pipeline and allow air to re-enter pipeline during the draining or when a negative pressure occurs.

The inlet and outlet of the Air Vacuum Valve shall have the same cross-section area as the valve size. A stainless steel bottom guide shaft shall guide the float. The 4" and larger valve floats shall have top and bottom guide shafts of hexagonal cross section and have a protective steel discharge hood.

The float shall be of all stainless steel construction and capable of withstanding maximum system surge pressure without failure. The body and cover shall be concentrically located and of ductile iron and the valve internal parts shall be of 316 stainless steel with Buna-N rubber seat.

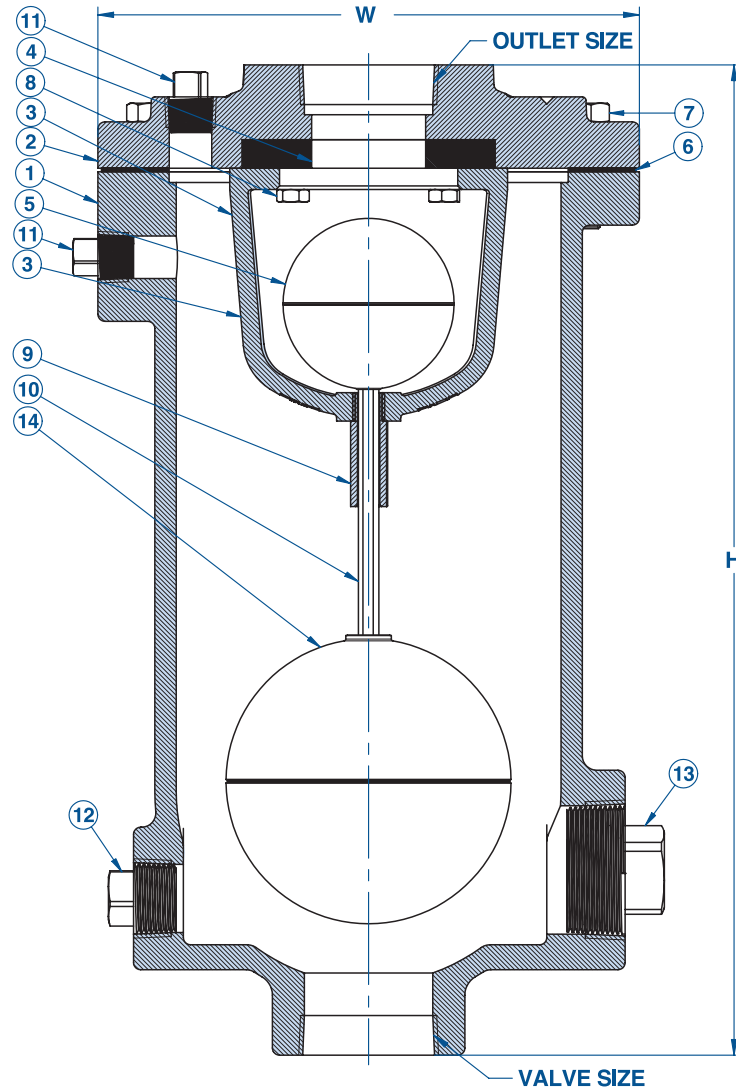
The Wastewater Air Vacuum Valve shall be manufactured per ANSI/AWWA C512 and shall be Series WWAV AirPro Max® Air Vacuum Valves manufactured by the Henry Pratt Company, Aurora, IL USA.

When Ordering, Please Specify:

1. Model Number
2. Inlet Size
3. Optional Backwash Kit (See page 37)

Series WWAV 01 Wastewater Air Vacuum Valves

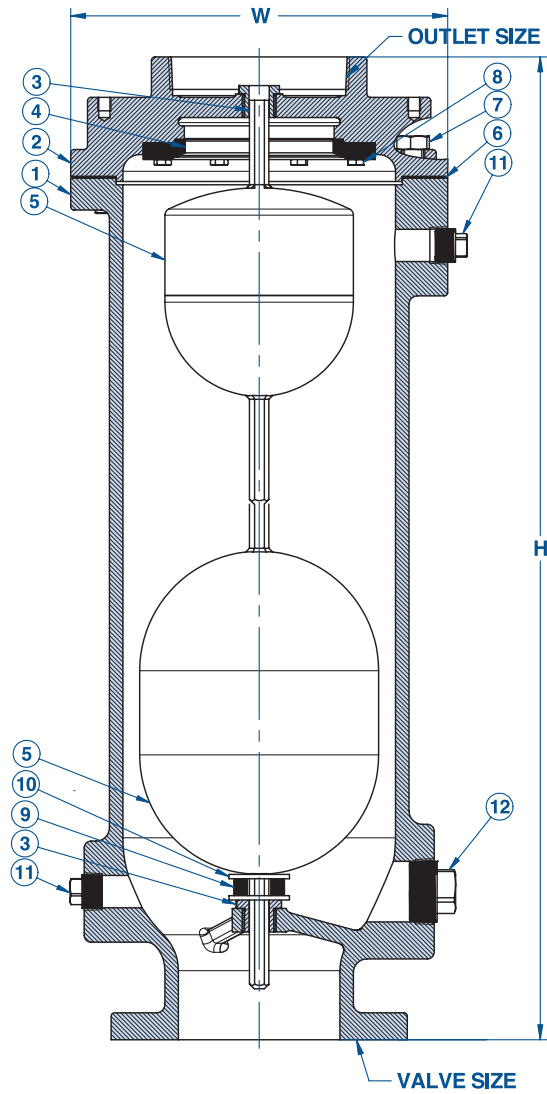
Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	Pratt Model #	Wt. (Lbs.)
2"	1"	150	NPT	7"	14-7/8"	WWAV20-1-150	40.6
2"	2"	150	NPT	9-1/2"	17-5/16"	WWAV20-150	65.8
3"	3"	150	NPT	9-1/2"	17-5/8"	WWAV30-150	69.5



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Baffle	ASTM A536 65-45-12
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Baffle Bracket	ASTM F593 316SS
9	Guide Bushing	ASTM A582 316SS
10	Guide Shaft	ASTM A240 316SS
11	Pipe Plug	Steel
12	Pipe Plug	Steel
13	Pipe Plug	Steel
14	Float	ASTM A240 316SS

Series WWAV 02 Wastewater Air Vacuum Valves

Valve Size	Outlet Size	Max C.W.P.	Inlet Connection	W	H	Pratt Model #	Wt. (Lbs.)
4"	4"	150	#125 Flg	12"	36-1/2"	WWAV40-150F	178
6"	6"	150	#125 Flg	14"	36-1/2"	WWAV60-150F	250
8"	8"	150	#125 Flg	18"	41-1/4"	WWAV80-150F	417



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Bushing	ASTM A582 316SS
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	O-Ring	Buna-N
7	Cover Bolt	ASTM F593 316SS
8	Shoulder Screw	ASTM F593 316SS
9	Cushion Bumper	Buna-N
10	Washer	316SS
11	Pipe Plug	Steel
12	Pipe Plug	Steel

Series WWCV Wastewater Combination Air Valves

Introduction

- All 316 Stainless Steel Trim Standard
- All 316 Stainless Steel Floats Standard
- Fully Ported Valves - No Restrictions
- Drop Tight Shut-off At Low Pressures
- Optional Backwash Kit Available

The AirPro Max® Series WWCV Wastewater Combination Air Valve is a multipurpose valve that combines the operation of both the Air Release Valve and Air Vacuum Valve for wastewater applications. Our Series WWCV Combination Valve has two functions: to exhaust large quantities of air in the pipeline during the filling cycle and to admit air, as needed, to prevent a potentially dangerous vacuum from forming when being emptied either intentionally or from a pipeline breakage.

Scope of Line

Sizes

Single Body Design

1", 2", 3", 4" NPT

Dual Body Design

2" & 3" NPT

4", 6", 8" Flanged ANSI Class 125

Pressure Rating (See Note)

150 psi

Note: Specify when operating pressure will be below 10 psi

Materials

Body and Cover: Ductile Iron ASTM A536 65-45-12

Float: 316 Stainless Steel

Internal Parts: 316 Stainless Steel

Seat: Buna-N

Coating: 2-Part Liquid Epoxy Coated Interior and Exterior

Installation

Series WWCV AirPro Max® Combination Air Valves should be installed at high points, grade changes and along level pipelines without clearly defined high points at approximately 1/4 to 1/2 mile intervals. Mount each unit vertically on top of the pipe with an isolation valve below each valve in the event servicing is required. A vault with adequate venting and drainage should be provided.

Optional customer installed Backwash Kit is available. This kit is used for regular cleaning to keep equipment in good working condition. It includes a back flushing hose and quick disconnect couplings.

Wastewater Combination Air Valve Specifications

The Combination Air Valve shall combine the operating features of both the large orifice Air Vacuum Valve and the small orifice Air Release Valve into one unit. The large orifice Air Vacuum Valve portion shall automatically exhaust large quantities of air during the filling of the pipeline and automatically allow large volumes of air to reenter the pipeline when the internal pressure of the pipeline approaches a negative value due to vacuum column separation, draining of the pipeline, or other emergency condition. The small orifice Air Release Valve portion shall automatically release small pockets of air from the pipeline while it is under pressure.

The inlet and outlet of the valve shall have the same size and cross section flow area. The float shall be center guided by a single or double stainless steel guide shaft and shut drop tight against a resilient Buna-N seat.

The float shall be of all stainless steel construction and capable of withstanding maximum system surge pressure without failure. The body and cover shall be concentrically located to accurately guide the float, without hunting, to shut-off to prevent spillage. The body and cover shall be ductile iron and the valve internal parts shall be of 316 stainless steel with Buna-N rubber seat.

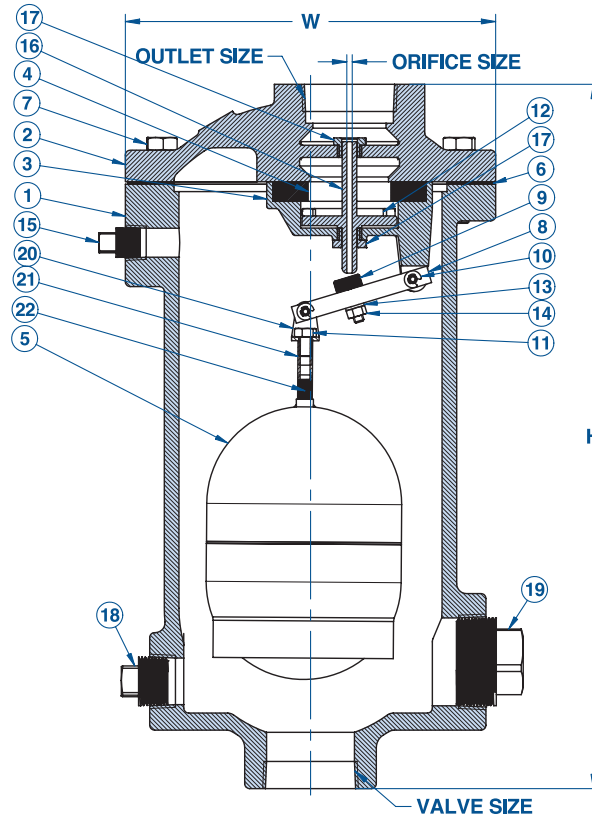
The Combination Air Release and Vacuum Valve shall be manufactured per ANSI/AWWA C512 and shall be Series WWCV AirPro Max® Combination Air Valves manufactured by the Henry Pratt Company, Aurora, IL USA.

When Ordering, Please Specify

1. Model Number
2. Inlet
3. Pipeline Pressure Rating
4. Valve Size
5. Optional Backwash Kit (See page 37.)

Series WWCV 01 Wastewater Combination Air Valves

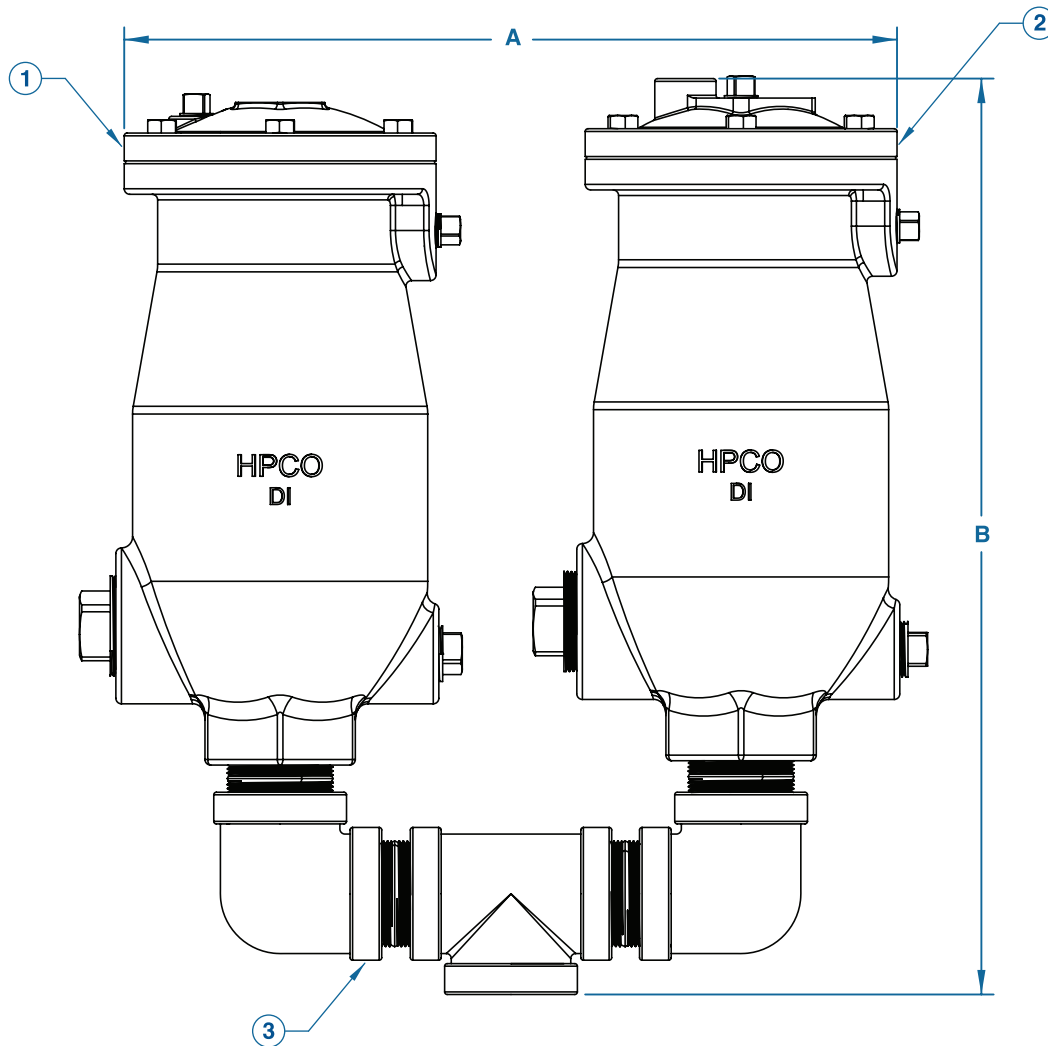
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Inlet Connection	W	H	Pratt Model #	Wt. (Lbs.)
2"	1"	1/8"	150	NPT	7"	14-15/16"	WWCV20-018-150	40.57
2"	2"	9/64"	150	NPT	9-1/2"	18-1/16"	WWCV20-964-150	67.35
3"	3"	11/64"	150	NPT	11"	23-1/4"	WWCV30-1164-150	112.6
4"	4"	11/64"	150	NPT	11"	23-1/4"	WWCV40-1164-150	113



Part #	Description	Material
1	Body	ASTM A536 65-45-12
2	Cover	ASTM A536 65-45-12
3	Lever Frame	ASTM A536 65-45-12
4	Seat	Buna-N
5	Float	ASTM A240 316SS
6	Gasket	Non-Asbestos Fiber
7	Cover Bolt	ASTM F593 316SS
8	Lever Arm	ASTM A276 316SS
9	Button	Stainless Steel & Buna-N
10	Pivot Pin & Retaining Ring	316SS
11	Float Retainer	ASTM F593 316SS
12	Lever Frame Bracket	ASTM F593 316SS
13	Lock Washer	ASTM A240 316SS
14	Lock Nut	ASTM F594 316SS
15	Pipe Plug	Steel
16	Poppet	ASTM A276 316SS
17	Guide Bushing	ASTM A276 316SS
18	Pipe Plug	Steel
19	Pipe Plug	Steel
20	Clevis	ASTM A240 316SS
21	Extension Shaft	ASTM A276 316SS
22	Socket Set Screw	ASTM F880 316SS

Series WWCVD 01 Wastewater Combination Air Valves (Dual Body)

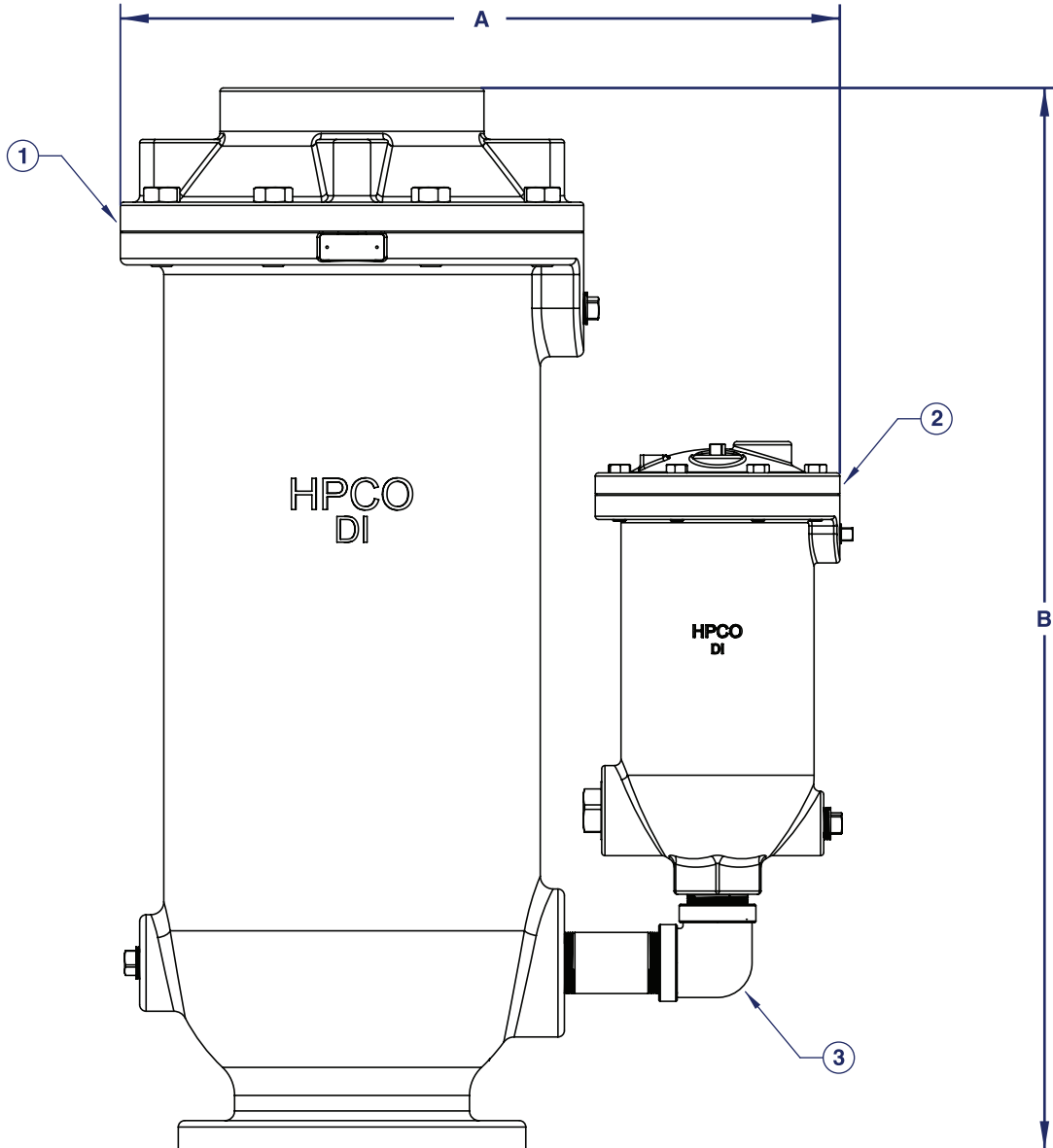
Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Air Vacuum Valve	Air Release Valve	Pipe	A	B	Wt. (lbs)	Pratt Model #
2" x 1"	1"	3/16"	150	WWAV20-1-150	WWAR202005-316-150	2"	17-1/4"	20-1/4"	86	WWCVD-20x10-316-150
2"	2"	3/16"	150	WWAV20-150	WWAR202005-316-150	2"	18-1/2"	20-1/4"	112	WWCVD-20-316-150
2"	2"	7/16"	150	WWAV20-150	WWAR202010-716-150	2"	19-3/4"	22-3/4"	140	WWCVD-20-716-150
3"	3"	3/16"	150	WWAV30-150	WWAR202005-316-150	3"	18-1/2"	22-3/4"	112	WWCVD-30-316-150
3"	3"	7/16"	150	WWAV30-150	WWAR202010-716-150	3"	19-3/4"	22-3/4"	140	WWCVD-30-716-150



No.	Part Name/Drawing No.	Valve Specs.
1	Air Vacuum Valve	See Series WWAV 01 Page 31
2	Air Release Valve	See Series WWAR 01 Pages 28-29
3	Dual Body Piping Kit	

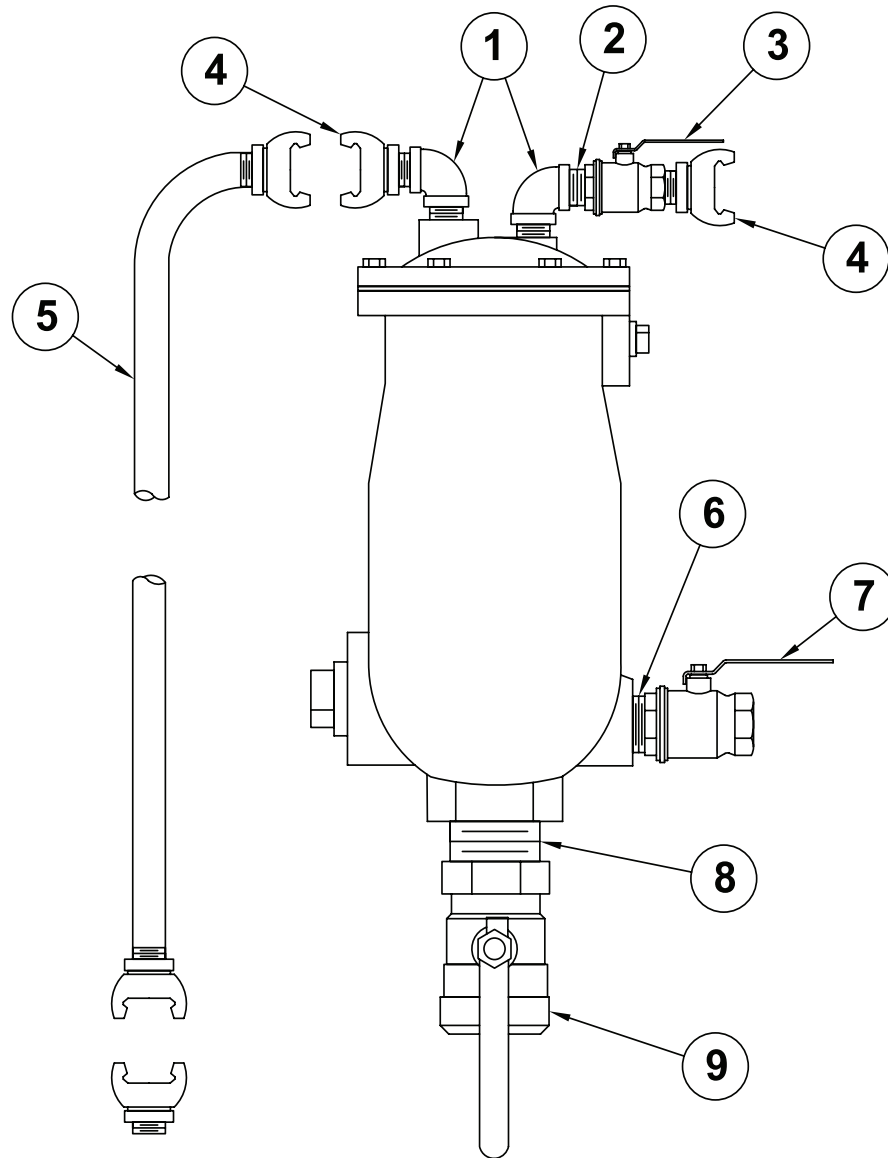
Series WWCVD 02 Wastewater Combination Air Valves (Dual Body)

Valve Size	Outlet Size	Orifice Size	Max C.W.P.	Air Vacuum Valve	Air Release Valve	Pipe	A	B	Wt. (lbs)	Pratt Model #
4"	4"	3/16"	150	WWAV40-150F	WWAR202005-316-150	2"	21"	36-1/2"	220	WWCVD-40-316-150
4"	4"	7/16"	150	WWAV40-150F	WWAR202010-716-150	2"	22-1/8"	36-1/2"	250	WWCVD-40-716-150
6"	6"	3/16"	150	WWAV60-150F	WWAR202005-316-150	2"	23-5/8"	36-1/2"	294	WWCVD-60-316-150
6"	6"	7/16"	150	WWAV60-150F	WWAR202010-716-150	2"	24-1/8"	36-1/2"	320	WWCVD-60-716-150
8"	8"	3/16"	150	WWAV80-150F	WWAR202005-316-150	2"	26-3/4"	41-1/4"	468	WWCVD-80-316-150
8"	8"	7/16"	150	WWAV80-150F	WWAR202010-716-150	2"	28"	41-1/4"	495	WWCVD-80-716-150



No.	Part Name/Drawing No.	Valve Specs.
1	Air Vacuum Valve	See Series WWAV 02 Page 32
2	Air Release Valve	See Series WWAR 01 Pages 28-29
3	Dual Body Piping Kit	

Backwash Kit for Wastewater Air Valves



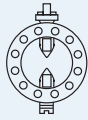
Backwash Kit Components

- 1= 1/2" Brass 90° Street Elbow
- 2= 1/2" x 1-1/8" Brass Pipe Nipple
- 3= 1/2" Brass Ball Valve
- 4= 1/2" Quick Disconnect Hose Fitting
- 5= 1/2" Backflush Hose
- 6= 1x1-1/2 Brass Close Pipe Nipple
- 7= 1" Brass Ball Valve
- 8= 1" Brass Pipe Nipple
- 9= 2"x3" or 4" Brass Ball Valve (not incl. for Kit #2353188)

Kit #	Description	Wt.
2345464	2" Wastewater Backwash Kit	6
2344628	3" Wastewater Backwash Kit	7
2344640	4" Wastewater Backwash Kit	8
2353189	10' Hose Extension Accessory	5
2353188	2" Wastewater Backwash Kit (ISO valve not included)	4

Notes

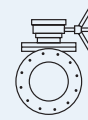
PRATT PRODUCT GUIDE



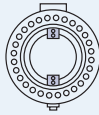
**Model
2FII**



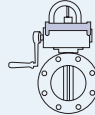
**Monoflange
MKII**



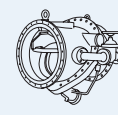
**Plug
Valve**



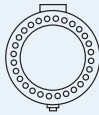
**Triton®
XR70**



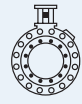
**Indicating Butterfly Valve
UL & FM approved**



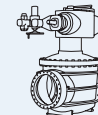
**Tilting Disc
Check Valve**



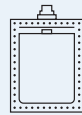
**Triton®
XL**



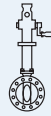
**N-Stamp Nuclear
Butterfly Valve**



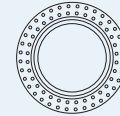
**Cone
Valve**



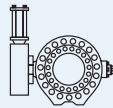
Rectangular



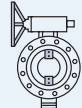
**PIVA Post Indicating Valve Assembly
UL & FM approved**



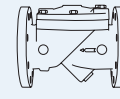
**Sleeve
Valve**



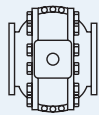
**Rubber Seated
Ball Valve**



**Triton®
HP250**



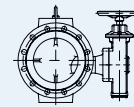
**Check
Valve**



**Metal Seated
Ball Valve**

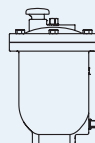


**Control
Systems**



Plunger Valve

PRATT



Air Valve

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