

D-060 NS PN 16

D-060-C NS PN 16

D-062 NS PN 25

D-065 NS PN 40



Combination Air Valve for High Flow - Non Slam

Description

The D-060 NS series Combination Air Valve has the features of both an air release valve and an air & vacuum valve.

The air release component is designed to automatically release small pockets of air to the atmosphere as they accumulate along a pipeline or piping system when it is full and operating under pressure.

The air & vacuum component is designed to automatically discharge or admit large volumes of air during the filling or draining of a pipeline or piping system. This valve will open to relieve negative pressures whenever water column separation occurs.

Applications

- Water pipelines with anticipated conditions of surge and water hammer.
- On the peaks of water pipelines with steep slopes.
- Water pipelines where water column separation occurs.

D-060-C - additional applications

- Water pipelines vulnerable to vandalism and/or water theft.
- Water systems found in remote areas.

D-062 NS and D-065 NS - additional applications

- Water systems with pressure demands of 25 bar and 40 bar (D-062 NS and D-065 NS respectively).

Operation

The D-060 HF NS series Combination Non Slam Air Valve is a surge-dampening, slam-preventing, 3-stage combination air valve. The air valve provides high capacity vacuum protection and, at the same time, efficient surge suppression. At sudden drainage and/or water column separation (sudden pump trips or valve closure, for instance), the air & vacuum orifice admits air at high flow rates, thus preventing vacuum. As the water column and/or pressure wave returns, large volumes of air are discharged at high velocities, raising the non-slam disc, partially closing the air & vacuum orifice and allowing air to exhaust slowly through the smaller orifice of the non-slam disc. This slowly exhausting air pocket dampens the slam of the returning water column, thus suppressing the pressure surge. As the water flow arrives at a much slower rate, dampened by the slower air discharge, it buoys up the main float, gently closing the air & vacuum component of the air valve.

The S-050-C, S-052, S-015 air release component continues releasing air while the pipeline and the air valve are pressurized.

Main Features

- Working pressure range:
 - D-060 NS: 0.2 - 16 bar
 - D-060-C NS: 0.2 - 16 bar
 - D-062 NS: 0.2 - 25 bar
 - D-065 NS: 0.2 - 40 bar
- Testing pressure for the air valve is 1.5 times its working pressure.
- Maximum working temperature: 60° C.
- Maximum intermittent temperature: 90° C.
- All main flow cross-sections are equal or greater than the nominal port area.
- Aerodynamic design enables high flow rates of air both at intake and at discharge.
- Reliable operation reduces water hammer incidents.
- Dynamic design allows for high velocity air discharge while preventing premature closure.
- Special orifice seat design: bronze and E.P.D.M. rubber, assures long-term maintenance-free operation.
- Screen protected outlet.
- The upper screen is protected with a protective cover.
- FBE coating, both interior & exterior, according to the standard DIN 30677-2.

Air Release Component

- Body made of high strength materials.
- All operating parts are made of specially selected corrosion-resistant polymer materials.
- Large sized air release orifice:
 - Dramatically reduces the possibility of obstruction by debris.
 - Discharges high air flow rates.
 - One size orifice for a wide pressure range (up to 40 bar), achieved by the A.R.I. patented rolling seal mechanism.

Valve Selection

- Size Range: 1" - 10"
 - 2" - 8" (for model D-065 NS only)
- D-060 NS, for 16 bar
- D-060-C NS vandalism protected by a metal shell covering the air release component, made for 16 bar.
- D-062 NS vandalism protected by a metal shell covering the air release component, made for 25 bar.
- D-065 NS, made for 40 bar.
- These valves are manufactured with flanged ends to meet any requested standard.

- The 2" valve is also available with a threaded BSP or NPT connection.
- Valve coating: fusion bonded epoxy coating according to the standard DIN 30677-2.
- Other coatings are available upon request.
- The automatic air release component and the air & vacuum component are available as separate units.
- For best suitability, it is recommended to send the fluid chemical properties along with the valve request.

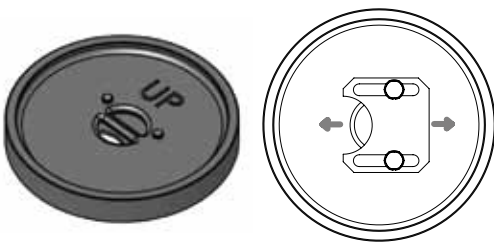
Upon ordering, please specify: model, size, working pressure, threads standard and type of liquid.

Non-Slam Disc

The built-in throttling device on the Non-Slam disc of the D-060 HF NS Combination Air Valves will allow for the graduated opening and closing of the disc orifice.

Advantages:

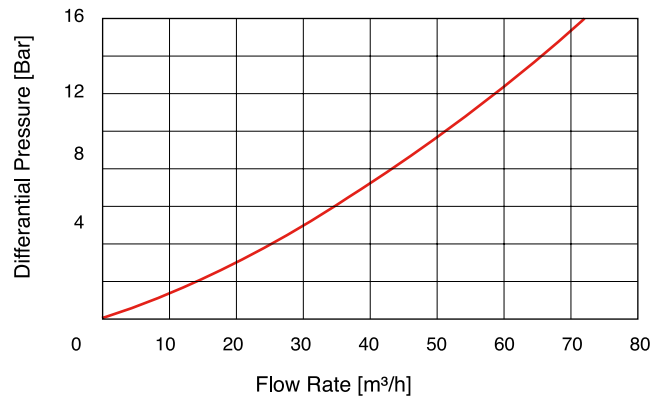
1. The orifice size of the disc can be adjusted to control and throttle the discharge of air during pipeline filling and during the return of the water column after separation.
2. The controlled discharge of air will reduce surge effects and provide for a silent closure of the air valve.
3. The closure of the orifice can be determined by running a surge analysis or by a decision taken in the field.
4. The orifice throttling device allows for a wide range of options from 100% open, partially open, partially closed to 100% closed.



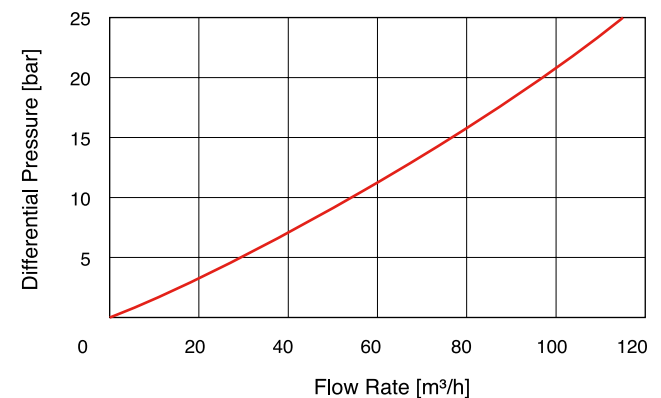
D-060 Non-Slam Orifice Data Table

Nominal Size	Discharge orifice mm	Total NS area mm ²	NS orifice mm	Switching point cm	Flow at 0.4 bar m ³ /h
1" (25 mm)	37.5	12.6	4	Spring loaded normally closed	17.5
2" (50mm)	50	63	9	10	90
3" (80mm)	75	175.4	15	23	240
4" (100mm)	100	476.4	24.5	23	350
6" (150mm)	150	900.6	34	23	600
8" (200mm)	200	1696.9	46.5	30	1200
10" (250mm)	250	1575.7	45	25	5100

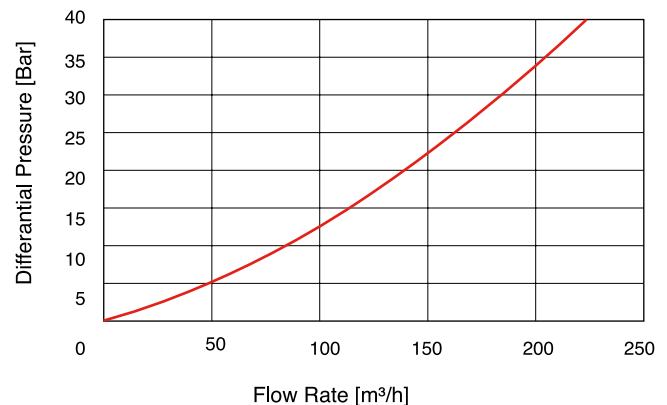
D-060 NS / D-060-C NS AUTOMATIC AIR RELEASE FLOW RATE



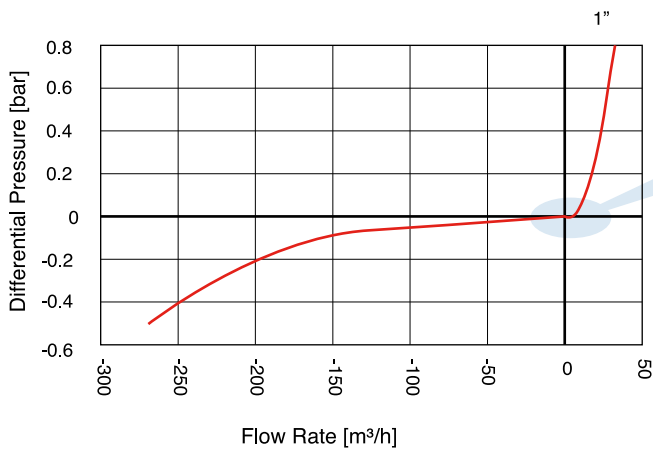
D-062 NS AUTOMATIC AIR RELEASE FLOW RATE



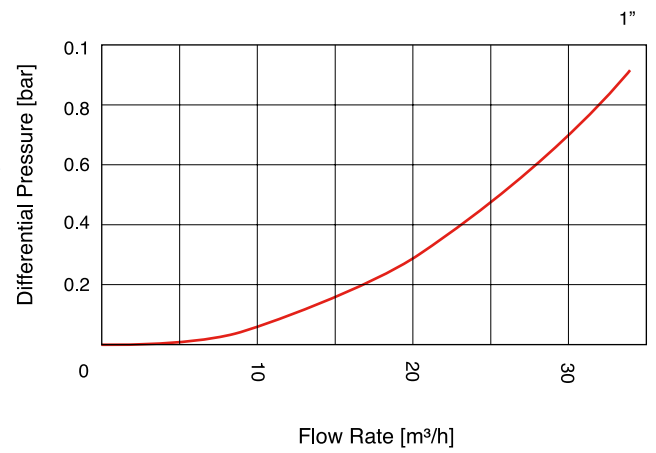
D-065 NS AUTOMATIC AIR RELEASE FLOW RATE



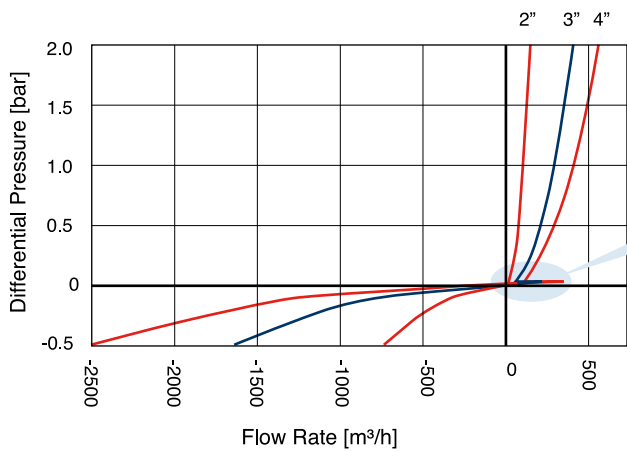
AIR & VACUUM FLOW RATE



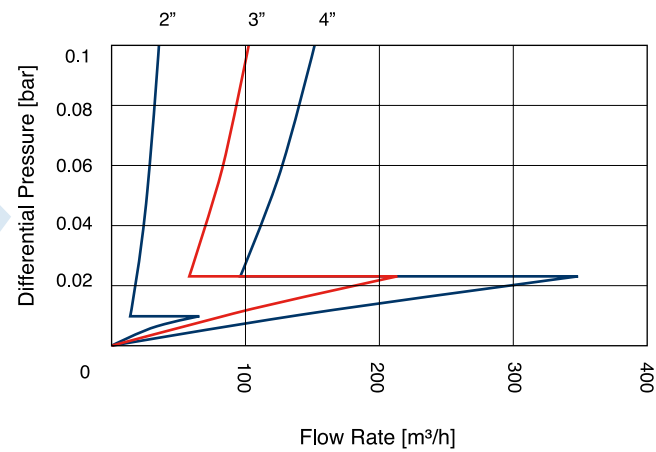
AIR DISCHARGE SWITCHING REGION



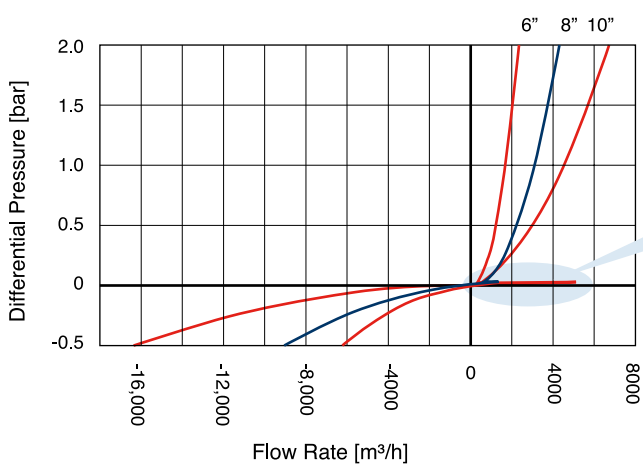
AIR & VACUUM FLOW RATE



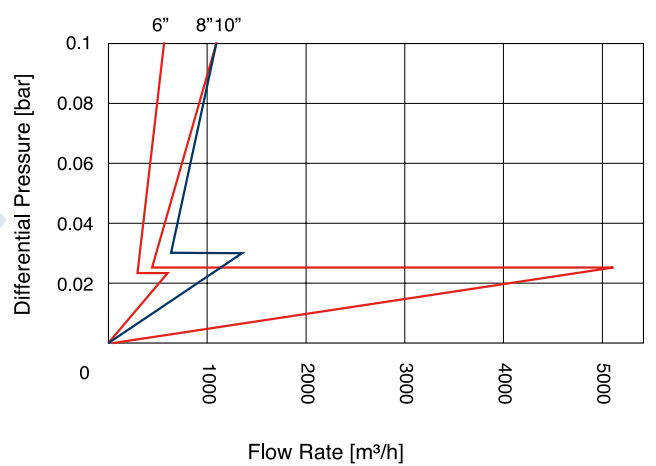
AIR DISCHARGE SWITCHING REGION



AIR & VACUUM FLOW RATE



AIR DISCHARGE SWITCHING REGION



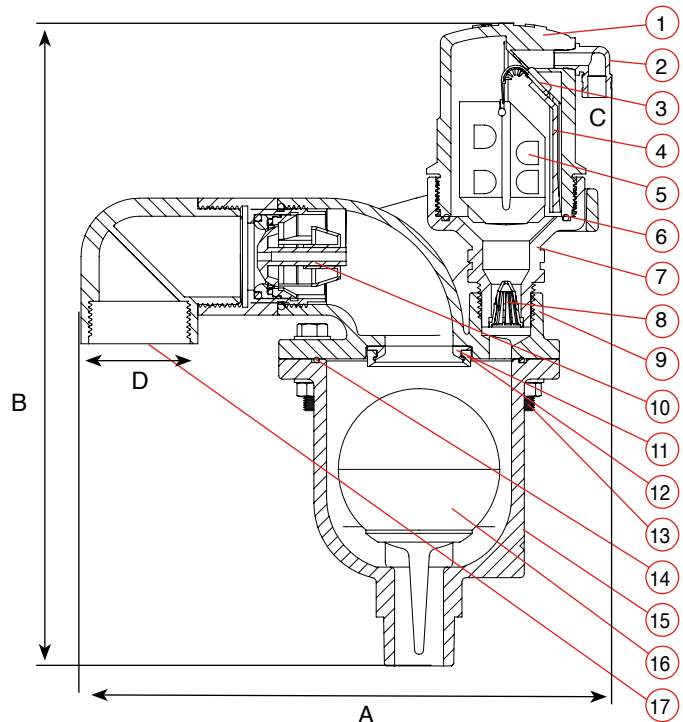
DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions mm		Connections		Weight Kg.	Orifice Area mm ²	
	A	B	C	D		A / V	Auto.
1" (25mm) Threaded	250	303	1/8" BSP Female	1 1/2" BSP Female	4.4	506.7	12
1" (25mm) Flanged	250	303	1/8" BSP Female	1 1/2" BSP Female	5.4	506.7	12

Nominal Size	Dimensions mm		Connection C	Weight Kg.	Orifice Area mm ²	
	A	B			A / V	Auto.
2" (50mm) Threaded	215	367	1/8" BSP Female	14	1960	12
2" (50mm) Flanged	215	350	1/8" BSP Female	14	1960	12
3" (80mm)	249	422	1/8" BSP Female	21	5030	12
4" (100mm)	286	465	1/8" BSP Female	29	7850	12
6" (150mm)	375	689	1/8" BSP Female	78	17662	12
8" (200mm)	463	849	1/8" BSP Female	156	31400	12
10" (250mm)	586	993	1/8" BSP Female	291	49087	12

1" PARTS LIST AND SPECIFICATION

No. Part	Material
1. Body	Reinforced Nylon
2. Discharge Outlet	Polypropylene
3. Rolling Seal	E.P.D.M.
4. Clamping Stem	Reinforced Nylon
5. Float	Foamed Polypropylene
6. O-Ring	BUNA-N
7. Base	Reinforced Nylon
8. Strainer	Nylon
9. Cover	Ductile Iron ASTM A-536 60-40-18
10. One Way Check Valve	Acetal
11. Orifice Seat	Bronze
12. Orifice Seal	E.P.D.M.
13. Bolt, Nut & Washer	Steel, Zinc Cobalt Coated
14. O-Ring	BUNA-N
15. Body	Ductile Iron ASTM A-536 60-40-18
16. Float	Polycarbonate /Stainless Steel
17. Discharge Outlet	Polypropylene

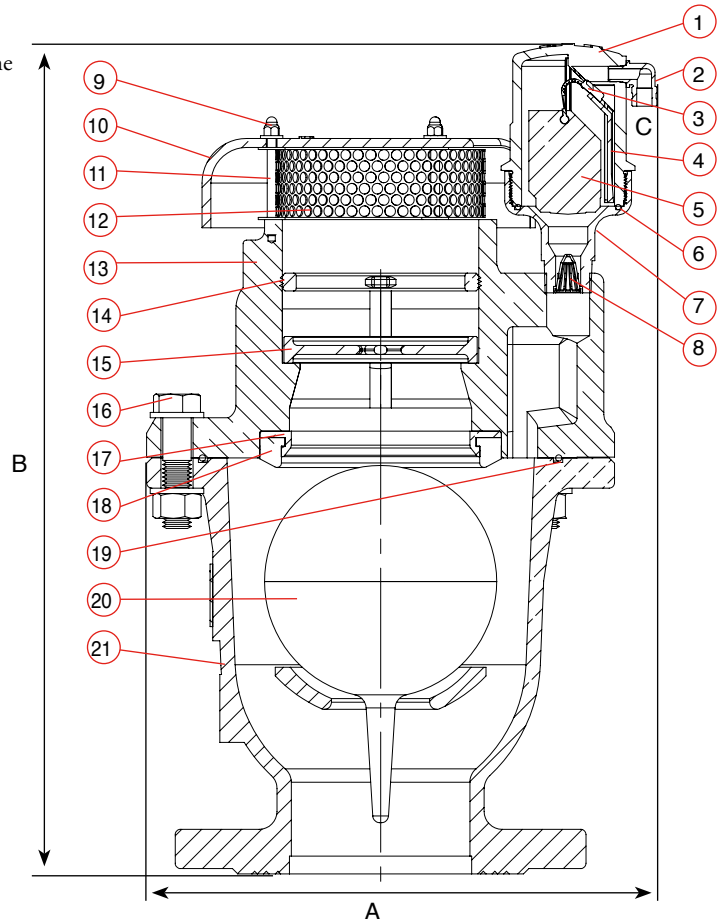
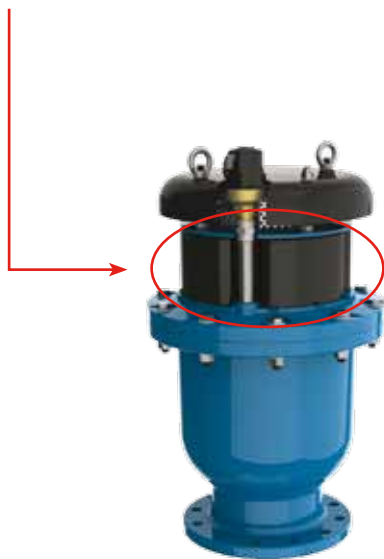


2"-10" PARTS LIST AND SPECIFICATION

No. Part	Material
1. Body	Reinforced Nylon
2. Discharge Outlet	Polypropylene
3. Rolling Seal	E.P.D.M.
4. Clamping Stem	Reinforced Nylon
5. Float	Foamed Polypropylene
6. O-Ring	BUNA-N
7. Base	Brass ASTM B-124
8. Strainer	Nylon
9. Domed Nut & Washer	Stainless Steel SAE 304
10. Screen Cover 2"-4"	Ductile Iron / Cast Iron
6"-10"	Polyethylene / Cast Iron / Ductile Iron
11. Threaded Rod	Stainless Steel SAE 304
12. Screen	Stainless Steel SAE 304
13. Cover	Ductile Iron ASTM A-536 60-40-18
6", 8" NS Housing	Polyethylene
Cover	Ductile Iron ASTM A-536 60-40-18
14. Ring 2"-4"	Stainless Steel SAE 316
6"-10"	Steel DIN ST.37
15. Non-Slam Disc 2"-4"	Stainless Steel SAE 316
6"-10"	Cast Iron ASTM A-48 CL.35B / Ductile Iron
16. Bolt, Nut & Washer	Steel, Zinc Cobalt Coated
17. Orifice Seat	Bronze
18. Orifice Seal	E.P.D.M.
19. O-Ring	BUNA-N
20. Float	Polycarbonate / Stainless Steel
21. Body	Ductile Iron ASTM A-536 60-40-18



* In 6", 8" the house of the Non Slam Disc is made of Polyethylene



DIMENSIONS AND WEIGHTS

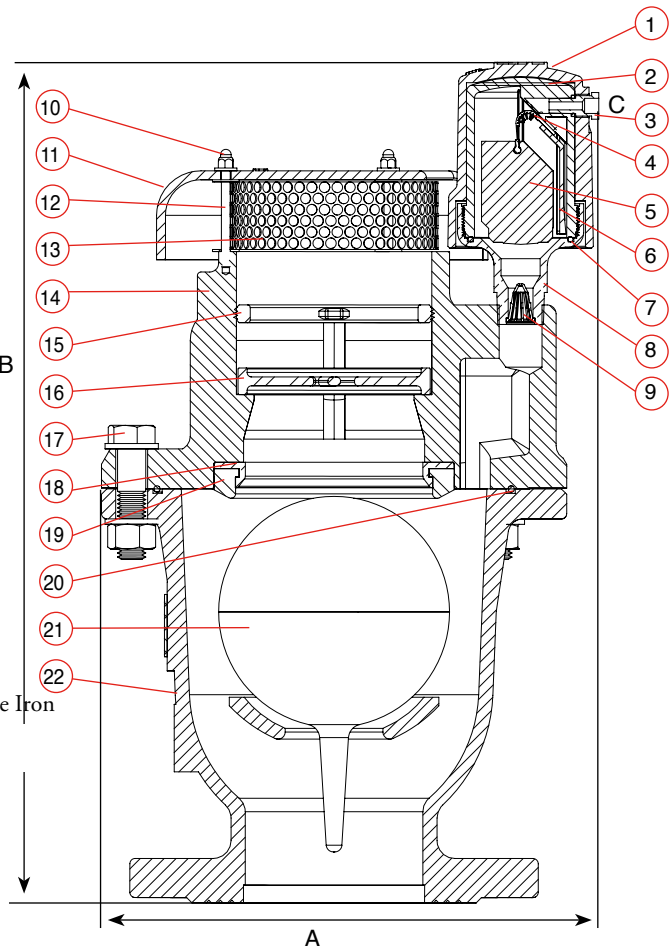
Nominal Size	Dimensions mm		Connections		Weight Kg.	Orifice Area mm ²		
	A	B	C	D		A / V	D-060-C Auto.	D-062
1" (25mm) Threaded	250	311	1/8" BSP Female	1/2" BSP Female	5.3	506.7	12	9
1" (25mm) Flanged	250	311	1/8" BSP Female	1/2" BSP Female	6.3	506.7	12	9

Nominal Size	Dimensions mm		Connection C	Weight Kg.	Orifice Area mm ²		
	A	B			A / V	D-060-C Auto.	D-062
2" (50mm) Threaded	209	375	1/8" BSP Female	15	1960	12	9
2" (50mm) Flanged	209	362	1/8" BSP Female	15	1960	12	9
3" (80mm)	243	430	1/8" BSP Female	22	5030	12	9
4" (100mm)	280	473	1/8" BSP Female	30	7850	12	9
6" (150mm)	375	700	1/8" BSP Female	93	17662	12	9
8" (200mm)	463	800	1/8" BSP Female	157	31400	12	9
10" (250mm)	586	987	1/8" BSP Female	292	49087	12	9



PARTS LIST AND SPECIFICATION

No. Part	Material
1. Shell	
D-060-C NS	Cast Iron ASTM A-48 CL35B
D-060-C NS, D-062 NS	Ductile Iron ASTM A-536-60-40-18
2. Body	Reinforced Nylon
3. Discharge Outlet	Brass ASTM B-124
4. Rolling Seal	E.P.D.M.
5. Float	Foamed Polypropylene
6. Clamping Stem	Reinforced Nylon
7. O-Ring	BUNA-N
8. Base	Brass ASTM B124
9. Strainer	Nylon
10. Domed Nut & Washer	Stainless Steel SAE 304
11. Screen Cover	2"-4" Ductile Iron / Cast Iron
6"-10"	Polyethylene / Cast Iron / Ductile Iron
12. Threaded Rod	Stainless Steel SAE 304
13. Screen	Stainless Steel SAE 304
14. Cover	Ductile Iron ASTM A-536 60-40-18
6", 8" NS Housing	Polyethylene
Cover	Ductile Iron ASTM A-536 60-40-18
15. Ring	2"-4" Stainless Steel SAE 316
6"-10"	Steel DIN ST.37
16. Non-Slam Disc	2"-4" Stainless Steel SAE 316
6"-10"	Cast Iron ASTM A-48 CL.35B / Ductile Iron
17. Bolt, Nut & Washer	Steel, Zinc Cobalt Coated
18. Orifice Seat	Bronze
19. Orifice Seal	E.P.D.M.
20. O-Ring	BUNA-N
21. Float	Polycarbonate / Stainless Steel
D-062 NS 8" Stainless Steel only	
22. Body	Ductile Iron ASTM A-536 60-40-18



* In 6", 8" the house of the Non Slam Disc is made of Polyethylene

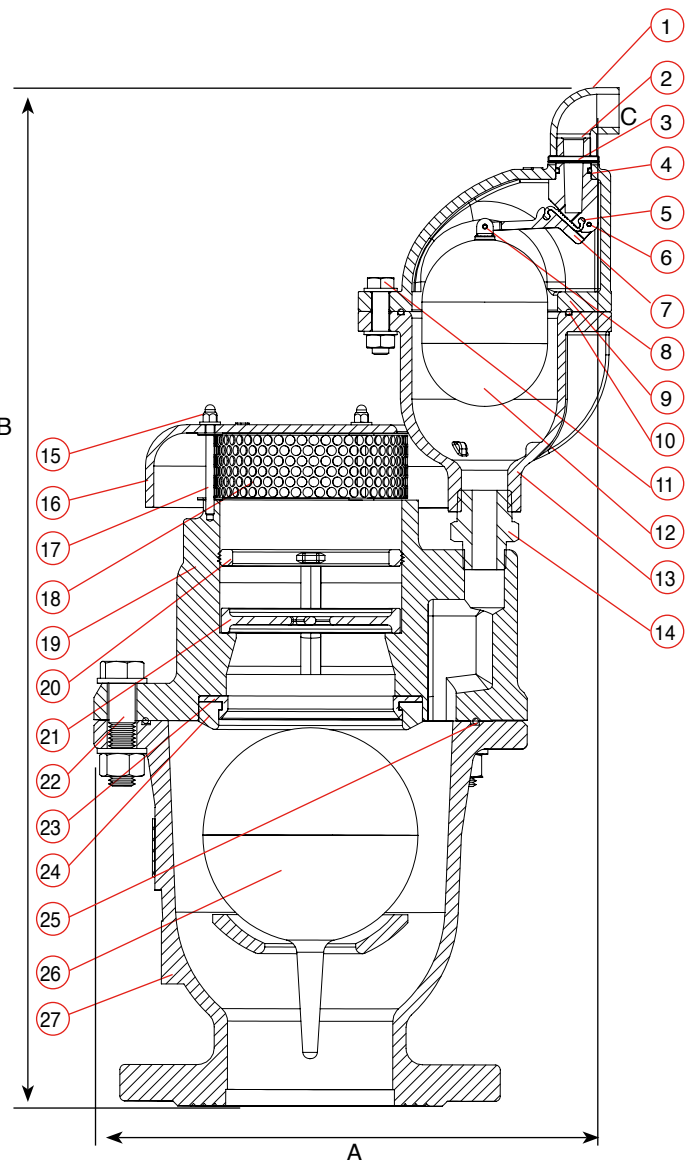
DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions mm		Connection C	Weight Kg.	Orifice Area mm ²	
	A	B			A / V	Auto.
2" (50mm) Threaded	246	519	1/2" BSP Female	15.3	1960	15
2" (50mm) Flanged	246	506	1/2" BSP Female	16.9	1960	15
3" (80mm)	280	572	1/2" BSP Female	25.5	5030	15
4" (100mm)	317	616	1/2" BSP Female	35	7850	15
6" (150mm)	382	774	1/2" BSP Female	94.9	17662	15
8" (200mm)	476	973	1/2" BSP Female	151.9	31400	15



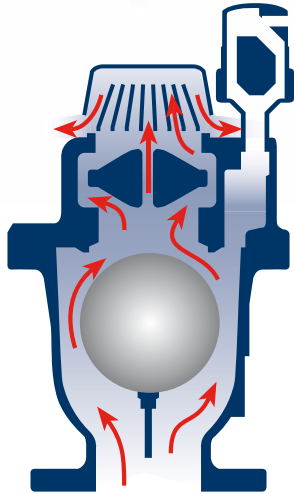
PARTS LIST AND SPECIFICATION

No. Part		Material
1.	Discharge Outlet	PVC
2.	Orifice	Reinforced Nylon
3.	Rollpin	Stainless Steel SAE 304
4.	O-Ring	BUNA-N
5.	Rolling Seal	E.P.D.M.
6.	Rollpin	Stainless Steel SAE 304
7.	Lever	Reinforced Nylon
8.	Rollpin	Stainless Steel SAE 304
9.	Cover	Ductile Iron ASTM A536 60-40-18
10.	O-Ring	BUNA-N
11.	Bolt Nut & Washer	Steel, Zinc Cobalt Coated
12.	Float	Polycarbonate / Stainless Steel
13.	Body	Ductile Iron ASTM A536 60-40-18
14.	Adaptor	Brass
15.	Domed Nut & Washer	Stainless Steel SAE 304
16.	Screen Cover	2"-4" Ductile Iron / Cast Iron
	6"-8"	Polyethylene / Cast Iron / Ductile Iron
17.	Threaded Rod	Stainless Steel SAE 304
18.	Screen	Stainless Steel SAE 304
19.	Cover	Ductile Iron ASTM A-536 60-40-18
	6", 8" NS Housing	Polyethylene
	Cover	Ductile Iron ASTM A-536 60-40-18
20.	Ring	2"-4" Stainless Steel SAE 316
	6"-8"	Steel DIN ST.37
21.	Non-Slam Disc	2"-4" Stainless Steel SAE 316
	6"-8"	Cast Iron ASTM A-48 CL.35B / Ductile Iron
22.	Bolt, Nut & Washer	Steel, Zinc Cobalt Coated
23.	Orifice Seat	Bronze
24.	Orifice Seal	E.P.D.M.
25.	O-Ring	BUNA-N
26.	Float	2"-4" Polycarbonate / Stainless Steel SAE 304
	6"-8"	Stainless Steel
27.	Body	Ductile Iron ASTM A-536 60-40-18

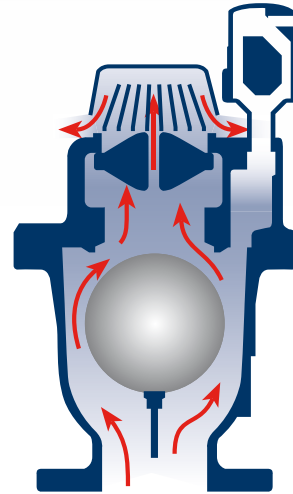


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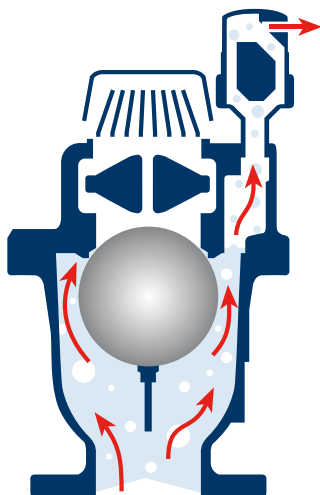
Operation in Rapid Filling of the Pipeline:



1. When water, rapidly filling the pipe line, pushes the air out through the Air Valve, a differential air pressure is created across the valve orifice.

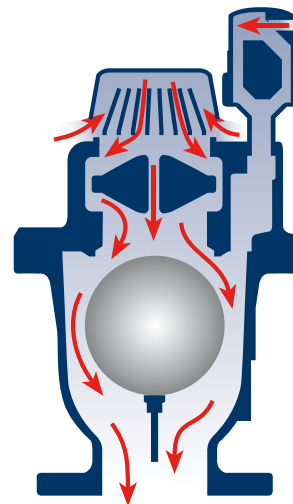


2. When this differential pressure reaches a prefixed level (usually it will be prefixed at 0.02 - 0.03 bar) the orifice disc will close.
3. Air will continue to come out through the small orifice disc - until all the air will be exhausted and water will reach the kinetic float. This double stage kinetic air discharge prevents the slam effect and therefore suppresses water hammer.



4. When water reaches the kinetic float, it lifts it up, closing the kinetic orifice and completing the kinetic cycle.

5. The «vented Check Valve Orifice Disc» will come back to its normal open position.



6. When water is drained out of the pipe line, the resulting pressure drop lets the kinetic float fall down, opening the orifice fully for intake of high volume of air into the line.