

## Combination Air Valve

### Model C70

BERMAD C70 is a high quality combination air valve for a variety of water networks and operating conditions. It evacuates air during pipeline filling, allows efficient release of air pockets from pressurized pipes, and enables large volume air intake in the event of network draining.

With its advanced aerodynamic design, double orifice and anti-slam/slow closing device, this valve provides excellent protection against air accumulation, vacuum formation and pressure surges, with improved sealing in low pressure conditions. The valve minimizes water spraying during air release.



### Typical Applications

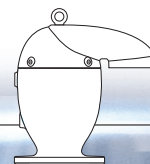
- Pumping stations and deep well pumps – Air relief, surge protection and vacuum prevention.
- Pipelines – Protection against air accumulation and vacuum formation at elevations, slope change points and at road/river crossings.
- Water networks – Protection against vacuum formation, surge and water hammers at points likely to experience water column separation.

### Features & Benefits

- Straight flow body with nominal (equal) inlet and outlet size – Higher than usual flow rates.
- Aerodynamic full-body kinetic shield – Prevents premature closing without disturbing air intake or discharge.
- Dynamic sealing – Prevents leakage under low pressure conditions (0.1 bar).
- Minimizes water spraying during air release – Innovative 2-step function, automatic orifice (Patent Pending).
- Three optional outlets (sideways, downwards, circular-surround mushroom configuration) that can swivel 360° – Easy to install in a variety of site conditions.
- Compact, simple, robust and reliable structure with fully corrosion-resistant parts – Lower maintenance and increased life span.
- Designed in compliance with WRAS, AS4596, EN-1074/4, AWWA C-512 standards and water service standards.
- Factory approval and Quality Control – Performance and specification tested and measured with specialized test bench, including vacuum pressure conditions.

### Additional Features

- Built in Adjustable Surge Protection (anti-slam) – Smoother operation, preventing damage to the valve and the system. The conditions for partially closing the kinetic orifice (the “switching value”) can be adjusted according to the specific system requirements (C70-SP, C70-AS).
- Inflow Prevention – Prevents intake of atmospheric air in cases where this could lead to damaged pumps, required re-priming, or disruption of siphons; prevents intake of flood water or contaminated water into potable water networks (C70-IP).
- Two service ports for drainage and pressure gauge.
- Drainage Valve.
- Insect Screen.



### Principles of Operation

#### Pipeline Filling:

During the filling process of a pipeline, high air flow is forced out through the kinetic orifice of the air valve. Once water enters the valve's chamber, the float buoyed upwards causes the kinetic orifice to close. The unique aerodynamic structure of the valve body and float ensures that the float cannot be closed before water reaches the valve.

#### Pressurized Operation:

During pressurized operation of the pipeline, air accumulates in the upper part of the air valve chamber, causing the float to gravitate downwards. The automatic orifice opens in a two-step function, forming an air gap between the water level and the air release orifice and then releasing the accumulated air, while minimizing the spray effect. Once the air is discharged, the water level and float rise, causing the automatic orifice to close.

#### Surge Protection (anti-slam):

In the event of a pressure surge, the surge protection disc rises, partially closing the valve's orifice. The approaching water column decelerates due to the resistance of the rising air pressure in the valve. This is typically used on pump stations and at specific pipeline locations to minimise pressure surges during pipe filling or power failure conditions at the pump station.

#### Pipeline Draining:

When a pipeline is drained, a negative differential pressure is created causing atmospheric air to push the float down. The kinetic orifice stays open and air enters the valve chamber, preventing vacuum formation in the pipe.

#### Inflow Prevention:

The inflow prevention mechanism is a Normally Closed check disc mounted on the top of the valve's orifice preventing flow of atmospheric air into the valve. Typically used to prime pump suction lines or on pipelines requiring only air discharge and no air re-entry such as siphons.

### Valve Selection

- Body Material:
  - Standard – Cast ductile iron
  - Optional – Stainless Steel, Bronze
- Coating – Fusion Bonded Epoxy, Blue
- Inlet sizes:
  - DN50, DN80, DN100, DN150, DN200
  - 2", 3", 4", 6", 8"
- Connections:
  - Threaded Female BSPT – only for DN50 (2")
  - Flanged ISO PN16/25/40
- Outlets configuration :
  - Sideways DN50-80 (2-3") BSP threaded, DN100-200 (4-8") Victualic connection.
  - Downwards
  - Mushroom
- Additional features:
  - Surge Protection (C70-SP, C70-AS)
  - Inflow Prevention (C70-IP)

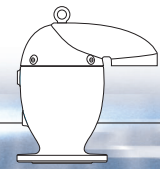
### Operational Data

- Pressure rating: ISO PN16, PN25, PN40
- Operating pressure range: 0.1 - 16 bar, 0.1 - 25 bar, 0.1 - 40 bar
- Operating temperature: Water up to 60°C

### Orifice Specifications

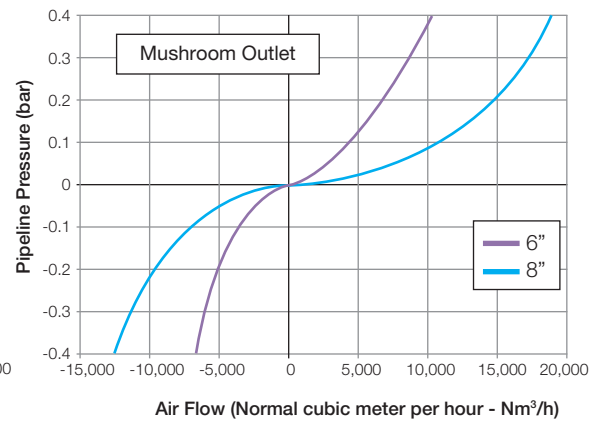
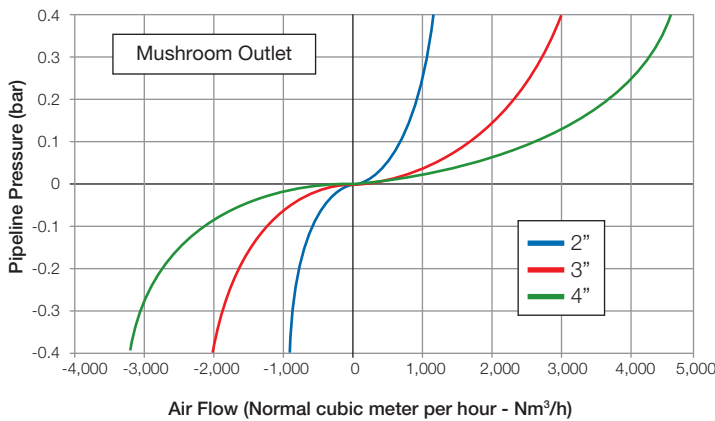
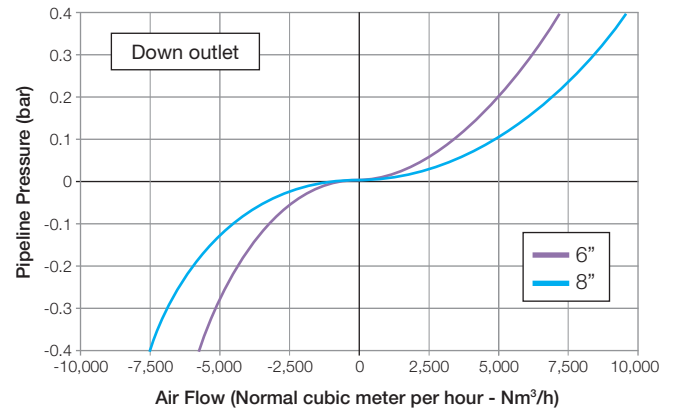
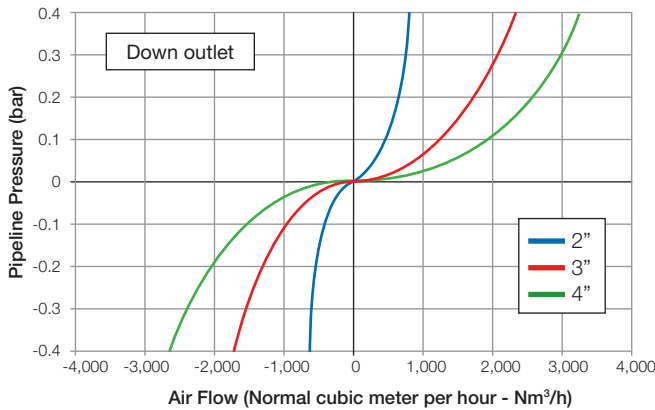
Size		Kinetic		Surge Prototion	
DN	Inch	D (mm)	Ad [mm <sup>2</sup> ]	D (mm)	Ad [mm <sup>2</sup> ]
DN50	2"	50	1,963	5x4	79
DN80	3"	80	5,027	8x4	201
DN100	4"	100	7,854	10x4	314
DN150	6"	150	17,671	15x4	707
DN200	8"	200	31,416	20x4	1,257

Size		Automatic		
DN	Inch	PN 16 Ad [mm <sup>2</sup> ]	PN 25 Ad [mm <sup>2</sup> ]	PN 40 Ad [mm <sup>2</sup> ]
DN50	2"	1.1	0.6	0.4
DN80	3"	2.5	1.5	1.0
DN100	4"	3.1	2.0	1.3
DN150	6"	9.1	5.7	3.5
DN200	8"	22.1	14.5	8.0

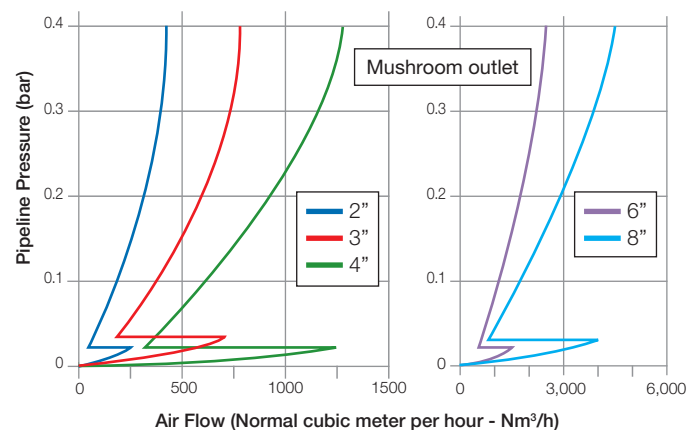
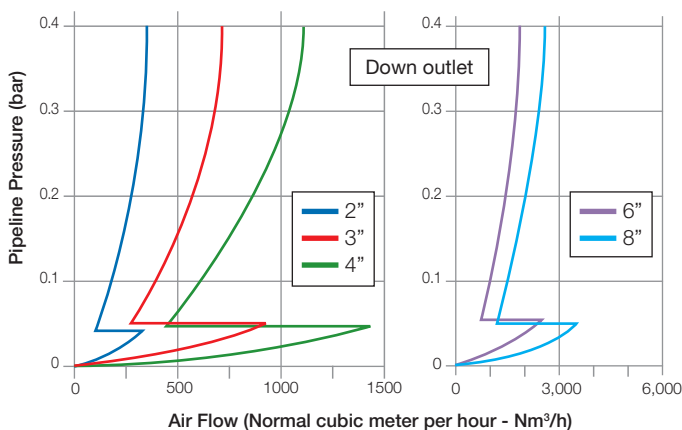


## Air Flow Performance Charts

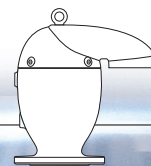
### Air Relief and Intake (Pipeline Filling, Draining and Vacuum Conditions)



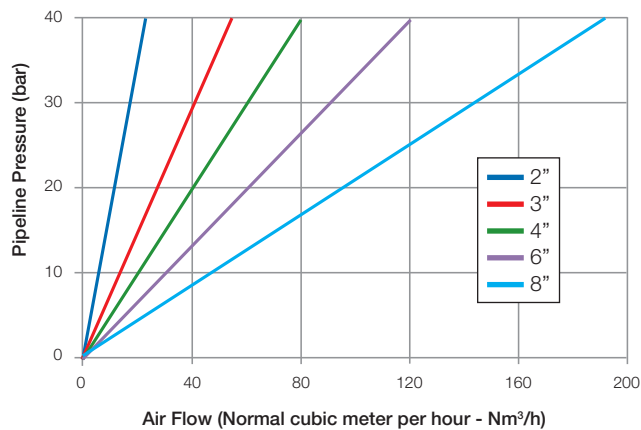
### Air Relief with Surge Protection



Air relief and intake charts are based on actual measurements, made during 2014-2015 in Bermad Air Flow test bench, according to EN-1074/4 standard and certified to AS-4598 (2008) standard. For Side outlet air flow performance, please consult with BERMAD. Use Bermad Air software ([www.bermad-air.com](http://www.bermad-air.com)) for optimized Sizing & Positioning of Air Valves

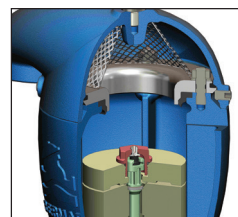
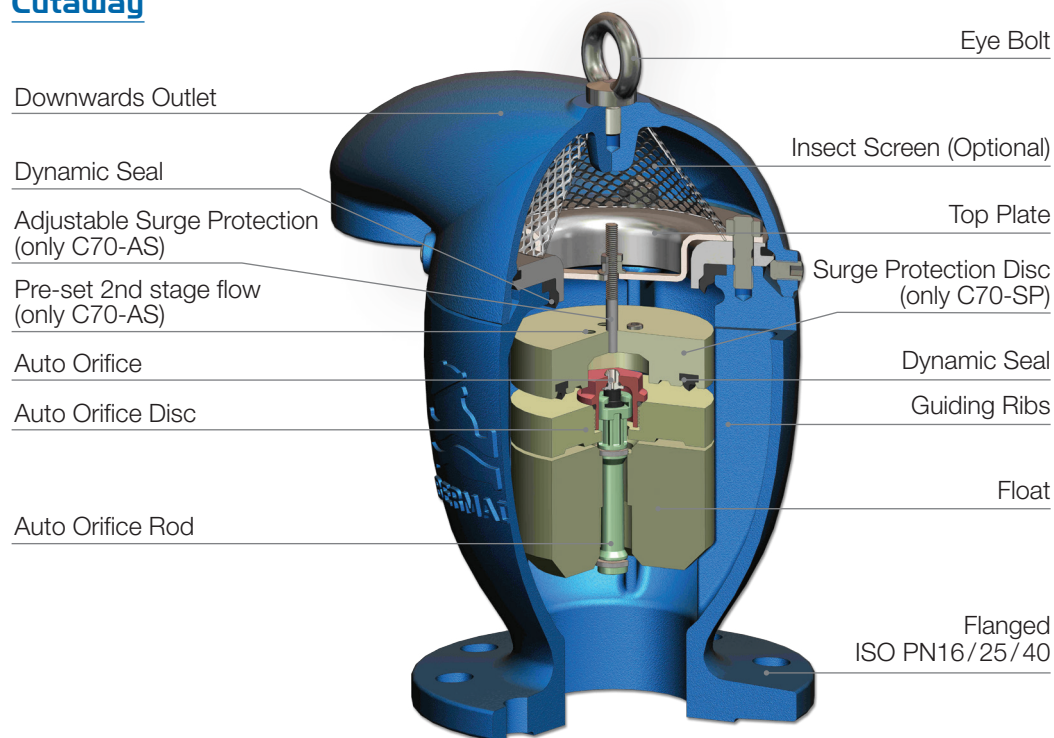


### Air Release (Pressurized Operation)

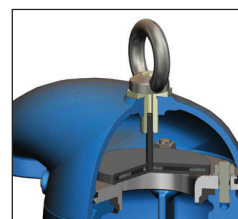


For higher automatic air release capacity, Please consult with BERMAD.

### Cutaway

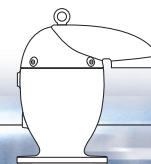


Without Surge Protection (C70)



With Inflow Prevention (C70-IP)





### Dimensions & Weights

Size			Side Outlet			Down Outlet			Mushroom Outlet		
DN	Inch	Connection	D (mm)	H (mm)	Weight (Kg)	D (mm)	H (mm)	Weight (Kg)	D (mm)	H (mm)	Weight (Kg)
50	2"	Threaded	181	284	8	225	282	8	175	268	8
50	2"	Flanged	187	302	10	232	300	11	175	286	10
80	3"	Flanged	245	356	17	311	356	17	229	327	16
100	4"	Flanged	283	410	22	371	410	23	272	380	22
150	6"	Flanged	368	571	50	493	569	53	381	572	51
200	8"	Flanged	475	770	121	661	770	125	506	709	120

### Parts List and Materials

	Description	Material	Standards/Remarks
1	Body-Flange/Threaded	Cast, Ductile Iron	ASTM A536 GR. 65-45-12 (EN-GJS 450-10 DIN EN1563)
2	Outlet side, down, mushroom	Cast, Ductile Iron	ASTM A536 GR. 65-45-12 (EN-GJS 450-10 DIN EN1563)
3	Top Plate Seal	EPDM	For Drinking Water
4	Surge Protection Disc	Polypropylene	For Drinking Water, Only C70-SP
5	Surge Protection Disc Seal	EPDM	For Drinking Water, Only C70-SP
6	Surge Protection Adjustable Shutter	Stainless Steel	AISI 304 (only C70-AS)
7	Auto Orifice Disc	Polypropylene	For Drinking Water
8	Float	Polypropylene	For Drinking Water
9	Top Plate	Stainless Steel	ASTM A744 Gr. CF8M
10	Insect Screen	Stainless Steel	AISI 304 (Optional)
11	Check Disk (Inflow Prevention)	Stainless Steel + EPDM	Only C70-IP
12	Cover O-Ring	EPDM	For Drinking Water
13	Auto Orifice	Stainless Steel	AISI 304
14	Auto Orifice O-Ring	EPDM	For Drinking Water
15	Auto Orifice Plug	Glass Reinforced Nylon	For Drinking Water
16	Auto Orifice Plug O-Ring	EPDM	For Drinking Water
17	Auto Orifice Seal	EPDM	For Drinking Water
18	Auto Orifice Rod	Reinforced Polyamide	For Drinking Water
19	Snap Ring	Reinforced Polyamide	For Drinking Water
20	Cover Screw	Stainless Steel	AISI 304
21	Stud	Stainless Steel	AISI 304
22	Nut	Stainless Steel	AISI 304
23	Washer	Stainless Steel	AISI 304
24	Eye Bolt	Stainless Steel	AISI 304