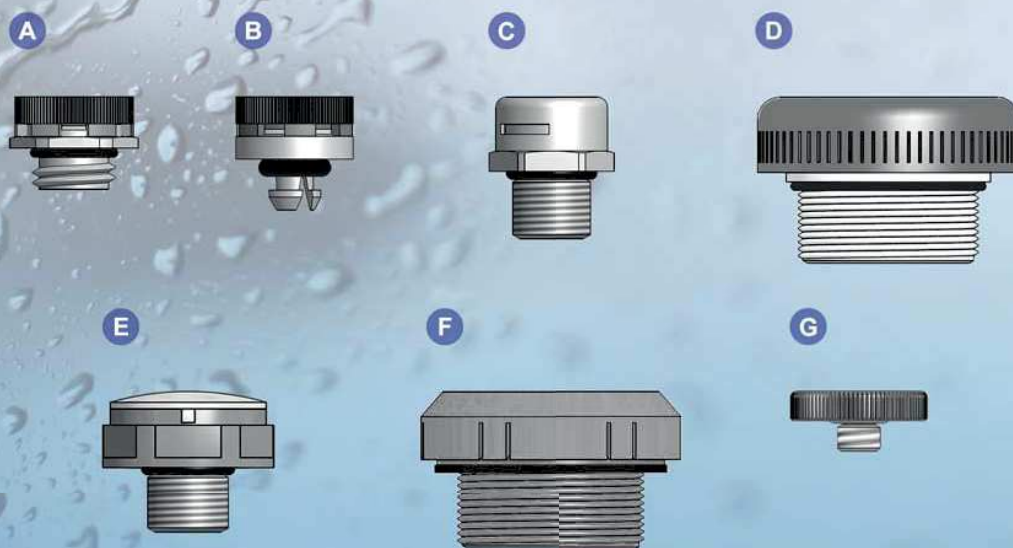


Ventilation Plugs

Pressure Balance Elements

Technical Details		
Material	Housing Material	PA6 - V2 or Stainless Steel
	Membrane Material	Acrylic co-polymer on nylon support
	Membrane Feature	Hydrophobic - Oleophobic
	O-rings	NBR
Protection Degree	IP 66/67/68*/69K	
Air Flow Rates	Refer to the chart	
Working Temperatures	-20°C to +80°C	
Available Membrane Perm.	S (standard) M (medium) H (high) UH (ultra high)	
Remarks	*IP68 is valid where the water intrusion pressure is higher than 0.1 Bars. Please refer to the chart.	

Perm. Code	Thread Size	Dimensions (mm)					« P = 1 Psi = 70 m Bar Average Air Permeability in lt/hour					Water Intrusion pressure in bar				Plug Type	Rec. Hole Diam. (mm)	Plastic version Codes																		
		TD	TL	H	D	SW	S	M	H	UH	S	M	H	UH	RAL 7001			RAL 7035	RAL 9005																	
		According to the chosen air permeability One of the letters (S-M-H-UH) Have to be added before the code number																		M12X1,0	12,0	6,6	7,5	17,0	17	16	25	120	300	0,9	0,5	0,2	0,1	A	12,5	BVPA-01
M12X1,5	12,0																			6,0	7,5	17,0	17	16	25	120	300	0,9	0,5	0,2	0,1	A	12,5	BVPB-01	BVPB-11	BVPB-21
M12X1,5	12,0																			10,0	7,5	17,0	17	16	25	120	300	0,9	0,5	0,2	0,1	A	12,5	BVPB-01L	BVPB-11L	BVPB-21L
QUICK FIT	5,5																			7,5	9,3	17,0	-	16	25	120	300	0,9	0,5	0,2	0,1	B	6,4	BVQ-M01	BVQ-M11	BVQ-M21
M12X1,5	12,0																			10,0	11,7	23,7	24	42	120	450	750	0,9	0,5	0,2	0,1	E	12,5	BVPD-01	BVPD-11	BVPD-21
M16X1,5	16,0																			10,0	11,7	23,7	24	42	120	450	750	0,9	0,5	0,2	0,1	E	16,5	BVPF-01	BVPF-11	BVPF-21
M20X1,5	20,0																			10,0	11,7	23,7	24	42	120	450	750	0,9	0,5	0,2	0,1	E	20,5	BVPE-01	BVPE-11	BVPE-21
M40X1,5	40,0																			18,0	19,0	59,5	-	120	375	1350	2200	0,9	0,5	0,2	0,1	F	40,5	BVPX-08S	BVPX-18S	BVPX-28S
Metalic version Codes																																				
M4X0,7	4,0																			3,0	2,7	12,3	-	4	7	35	100	0,9	0,5	0,2	0,1	G	4,3	BAVP-01	Aluminium	
Pg7	12,5																			10,5	11,0	17,0	17	16	25	120	300	0,9	0,5	0,2	0,1	C	13,2	BBVP-05	Stainless Steel	
M12X1,0	12,0																			10,0	11,0	17,0	17	16	25	120	300	0,9	0,5	0,2	0,1	C	12,5	BBVP-01S	Stainless Steel	
M12X1,5	12,0																			6,0	11,0	17,0	17	16	25	120	300	0,9	0,5	0,2	0,1	C	12,5	BBVP-01	Stainless Steel	
M12X1,5	12,0																			10,0	11,0	17,0	17	16	25	120	300	0,9	0,5	0,2	0,1	C	12,5	BBVP-01 L	Stainless Steel	
M16X1,5	16,0	6,0	12,0	17,0	18	16	25	120	300	0,9	0,5	0,2	0,1	C	16,5	BBVP-02	Stainless Steel																			
M16X1,5	16,0	6,0	16,0	17,0	18	16	25	120	300	0,9	0,5	0,2	0,1	C	16,5	BBVP-02L	Stainless Steel																			
M20X1,5	20,0	6,0	13,0	17,0	22	16	25	120	300	0,9	0,5	0,2	0,1	C	20,5	BBVP-03	Stainless Steel																			
M20X1,5	20,0	6,0	17,0	17,0	22	16	25	120	300	0,9	0,5	0,2	0,1	C	20,5	BBVP-03L	Stainless Steel																			
M40X1,5	40,0	10,0	21,0	58,0	-	120	375	1350	2200	0,9	0,5	0,2	0,1	D	40,5	BBVPX-05	Stainless Steel																			



Ventilation Plugs Pressure Balance Elements

In order to choose the right ventilation plug unit (pressure balance elements) for a specific application, the working principles of the unit must be known first.

Ventilation plugs are permeable to "gases and vapours, e.g. air" but impermeable to "liquids and dust, e.g. water". The permeability resistance to liquids depends on the pore size and structure of the membrane inside these devices.

If the working conditions of water (the most common liquid) are studied, it is possible to say that the water intrusion pressure goes down as air permeability increases. The relevant specifications are collected in tabulated data.

Of the relevant parameters, the "Pressure Balance" function depends on the differential pressure between the inner and the outer environments of the enclosure. As a reference pressure, 70 mBar (70mBar = 1 Psi) value is chosen to present data. Under normal conditions, air circulation exists for all differential pressure levels. But the volume flow rate is very low for smaller values and obviously increases with increasing pressure values. Of course the air flow rate also depends on the properties of the membrane (classified as standard, medium, high and ultra high permeability types).

If there is no water pressure danger (if the device is not immersed in the water), it is always better to choose highly permeable elements for good circulation even for low differential pressure levels.

In essence, there is air circulation in the enclosure from the inside to the outside when the device is heating up due to its operation. Similarly, a circulation in reverse direction occurs during the cooling period. It should also be noted that there is always a level of humidity in air, hence some water in the form of vapour is also circulated with air. However condensed water is blocked by the water repellent membrane unless the differential pressure exceeds the intrusion pressure threshold.

After this technical overview, the utility of the "Ventilation Plugs" can be listed as follows;

- ñ Prevention of pressure increase inside the enclosure. The pressure sensitive elements are not threatened.
- ñ Limiting of temperature increase by the air circulation. The temperature sensitive elements are not threatened.
- ñ Added flexibility for maintenance. In traditional units, when the enclosures are heated, generally the dilated air goes out from the seals but can not return back when the device is colder. Because of the vacuum formed inside the enclosure, the gaskets are exposed to large pressure levels. In result, it is very difficult to open the covers for maintenance. Especially in "luminaires" it is obligatory to change the bulbs when the device is cold. The ventilation plugs in our system prevent these kind of limitations.
- ñ Prevention of accidental water suction into the system. During the cooling period, we know that there is air circulation from the outside to the inside. Hence, if the enclosure is wet from rain or due to other reasons, some water may be sucked inside the enclosure if there is no ventilation plug.
- ñ Prevention of exposure to hot, humid, compressed gases. There is always a level of humidity in the enclosure due to atmospheric conditions. Hence when the device is hot, all the components will be exposed to a hot, humid and compressed environment without the ventilation plug.

To conclude, the ventilation plug can reduce and even fully eliminate the adverse effects of humidity in the environment. Water drops on the bottom of the enclosure are normal, but the inherent damage becomes insignificant due to the existence of a ventilation plug.

