



PART OF G&O MARITIME GROUP ■

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## PRES-VAC Engineering AS

is pleased to announce the launch of the new **Air Vent Head** the **M4** version 2019 edition.

The **M4** was launched first time in 1972 and have endurance much success during the last 47 years. We have now updated the design to meet the latest rules and regulations specified by:

IACS-P3:2016 / IMO/MSC/Circ.677 / IMO/MSC/Circ.3573.



The **Air Vent Head M4** delivers in the following editions:

- **M4(S) without bug screen inline/end of line version**
- **M4(S) with bug screen inline/end of line version**
- **M4(S) with flame screen end of line version.**

Kind regards/Med venlig hilsen

**Pres-Vac Engineering AS**

Please write to [sales@pres-vac.com](mailto:sales@pres-vac.com) or [aftersales@pres-vac.com](mailto:aftersales@pres-vac.com)

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GERTSEN & OLUFSEN 

**PRES-VAC**

**ATLAS**  
INCINERATORS 

**HECO**®

# Air Vent Head - A tough life on deck

Air Vent Head lives a tough life on the deck of merchant's vessels. They are exposed to the outdoor environment on deck and ballast water and other liquids that are found in tanks. This tough and corrosive setting puts a great demand on the design on these types of vents to comply with marine safety regulations.

Pres-vac has designed a range of roughed Air Vent Heads (M4) that meet these demands.

The purpose of the Air Vent Head (as defined in IACS UR P3.2.6:2016) is:

- to prevent the free entry of water into the tanks
- to allow the passage of air or liquid to prevent excessive pressure or vacuum coming on the tank

***Malfunctioning Air Vent Heads are a common finding, for both the Class surveyors and the Port State Control inspectors.....***

The Air Vent Head allows air to enter and leave the tank freely, to prevent excessive pressure in the tank. At the same time, the device prevents the ingress of seawater into the tank but allow passage of liquid from the tank in case of overfilling. Basically, it protects tanks from filling up with seawater or overpressure.

The typical application areas are:

- Water ballast tanks
- Freshwater tanks
- Marine oil tanks
- Gas oil tanks
- HFO tanks

## Type approval equipment

Air Vent Heads require type approval to legally be mounted on merchant's vessels.

In the effort to drive down prices on a newbuilding, this snip of information that Air Vent Head must be type approved has been lost in some cases and the quality of Air Vent Heads has dropped.

## Test according to IACS UR P3.2.6:2016 latest edition

IACS P3:2016 describes design features that the Air Vent Head must fulfill and the test that it must pass to be certified. Some of the features that the Air Vent Head must have are:

- Possibility to inspect the internals and exchange parts
- Self-draining
- Minimum 6 mm wall thickness
- The outlet must be minimum as big as inlet
- Materials must be able to withstand corrosion

- If galvanized material is used, the layer must be between 70 to 100 microns
- The internals should have an additional harder coating applied
- The float should be able to withstand temperatures between -25 to +85 degrees C



The tests that are defined describe that the Air Vent Head must be:

- Watertight test at an inclination of 40 degrees in two directions
- Submerged underwater for at least 5 minutes without soaking water
- Leaking at a maximum rate of 2 ml/mm of nominal diameter (e.g. DN50 =100 ml/5 minutes)
- Compression and impact test for float

In addition to the certification compliance with IACS.P3. Pres-Vac Air Vent Heads are certified to comply with IMO3573.

## Service experience

Malfunctioning Air Vent Heads are a common finding, for both the Class surveyors and the Port State Control inspectors. Each Air Vent Head is an essential safety feature on board and should be kept in good condition. A broken Air Vent Head will most probably result in a PSC deficiency which must be rectified before leaving port.

Pres-Vac Air Vent Head is designed strong and will last for many years if kept in mint condition.

It is therefore recommended that there are a regular inspection and maintenance program in place for the Air Vent Heads on board. Since



some design of Air Vent Heads may be broken after only a few years in operation, some classes recommend inspecting each Air Vent Head annually. Such a program should include the general condition (rust, dirt, functionality) and especially the condition of the float/ball/disc, guiding pin, seat and wire mesh (if installed).

Special attention shall be paid to Air Vent Heads located in the foredeck due to seawater and the ship's movement. They live a tougher life than other Air Vent Heads.

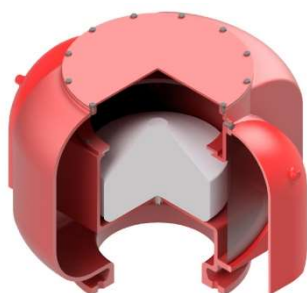
***...the valve body should be a casted metallic design, made in corrosion resistant material....***

### Material selection

Many relatively inexpensive Air Vent Heads are designed using a welded plate to keep the cost down. In some cases, the material thickness is below 6 mm and the material are normal steel plates. These Air Vent Heads have a tendency not to last the required 5 years and the corrosion rate is high.



It is recommended that due to the applications areas of the Air Vent Head, that the valve body should be a casted metallic design, made in corrosion resistant material or be applied a coating that prevents corrosion. This could be cast ductile iron (Pres-Vac preferred material), or seawater resistant aluminum even though some authorities do not accept sea resistant aluminum. Stainless steel has also been abandoned as body material due to high corrosion rates.



A design in seawater resistant aluminum is lighter than that cast iron or stainless steel, but a steel body has high resisters towards mechanical impact. Aluminum Nickle bronze alloy is better than both cast

iron and aluminum when looking at both corrosion and durability, but it is also expensive.

It is suggested that a coating should be according to corrosion category 4/5, marine standard (offshore application) to protect both exterior and interior parts against corrosion.

Pres-Vac has chosen as standard a roughed cast metal design in ductile cast iron (GGG40) with corrosion category painting 4 internally and category 5 on the outside.

### Flame screens requirements

In the past, a flame screen has not been mandatory for Air Vent Heads mounted on tanks containing flammable liquids, but this practice has been changed in the way the ship can require Air Vent Heads to be fitted with flame screens according to IASC P3:2016. Especially for the Air Vent Heads positioned on water ballast tanks positioned next to cargo tanks, it is prudent to install Air Vent Heads with flame screens. Bug screens are used to keep

particles and debris out of tanks and typically installed on freshwater tanks.

Pres-Vac has obtained type approval certificate including Flame screens that are tested and certified in accordance with ISO 16852:2016 for Apparatus Group IIA and IIB (MESG ≥0,65mm) are available on the market.



### Internals

The internals of an Air Vent Head are typically very simple. In most cases only a float/ball and a sealing ring. Both items should be easy to exchange when maintaining the Air Vent Head.

The float that prevents the ingress of seawater into the tank, but allows passage of liquid from the tank in case of overfilling, is typically designed as a ball or a float. The material chosen can be both a polymer or a metal surface.

Pres-Vac has designed a unique inner design chamber and the design of the float allows for higher air speed through the valve and a quicker closing of the valve that a ball design allows.

The internals are often the components that are not maintained because they are not clearly visible and therefore it is recommended that internal components are exchanged every 5 years.

### Sizing

Class requirements describe that suppliers should provide pressure resistance curves based on water. Taking SOLAS into consideration. Practically this means that the maximum flow should be added a 25% margin.

## Recommendations

- ***Only use Air Vent Heads approved in accordance with IASC P3:2016 with valid classifications certificates***
- ***Choose valves in a casted durable material***
- ***Choose flame screens if flammable liquids are stored in the tank***
- ***Inspect all Air Vent Heads to ensure flawless performance as required by Recognized Organizations.***



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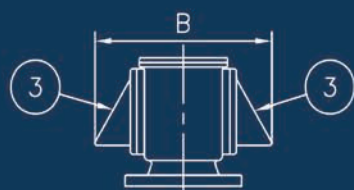
# **AIR VENT HEAD TYPE M4**

Air Pipe Automatic Closing Device  
in compliance with IACS P3 (2016)

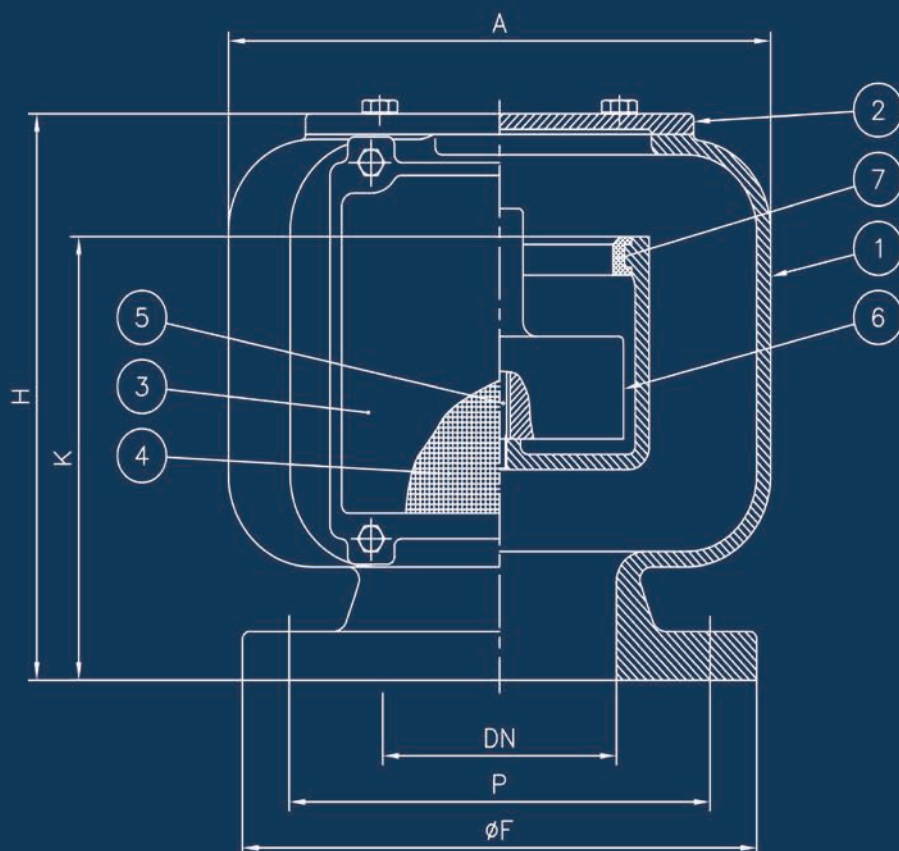


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**MARINE LIFE WITHOUT FOOTPRINTS**



| Item | Description         |
|------|---------------------|
| 1    | Valve body          |
| 2    | Top cover           |
| 3    | Side cover          |
| 4    | Protecting screen   |
| 5    | Guide pin for float |
| 6    | Float               |
| 7    | Seat                |



| Other standards available |      |     |     |     |     |     |                     |        |  |
|---------------------------|------|-----|-----|-----|-----|-----|---------------------|--------|--|
| 400                       | 16   | 850 | 915 | 670 | 490 | 565 | 515                 | 16xØ26 |  |
| 350                       | 14   | 850 | 915 | 670 | 490 | 505 | 460                 | 16xØ22 |  |
| 300                       | 12   | 625 | 745 | 635 | 400 | 445 | 400                 | 12xØ22 |  |
| 250                       | 10   | 550 | 604 | 495 | 370 | 395 | 350                 | 12xØ22 |  |
| 200                       | 8    | 430 | 568 | 410 | 310 | 340 | 295                 | 8xØ22  |  |
| 175                       | 7    | 380 | 520 | 370 | 280 | 315 | 270                 | 8xØ22  |  |
| 150                       | 6    | 340 | 422 | 330 | 242 | 285 | 240                 | 8xØ22  |  |
| 125                       | 5    | 280 | 384 | 280 | 202 | 250 | 210                 | 8xØ18  |  |
| 100                       | 4    | 235 | 344 | 245 | 173 | 220 | 180                 | 8xØ18  |  |
| 80                        | 3    | 185 | 270 | 205 | 147 | 200 | 160                 | 8xØ18  |  |
| 65                        | 2½   | 170 | 222 | 175 | 125 | 185 | 145                 | 4xØ18  |  |
| 50                        | 2    | 130 | 176 | 170 | 130 | 165 | 125                 | 4xØ18  |  |
| DN                        | DN   | A   | B   | H   | K   | ØF  | P—mm holes drilling |        |  |
| mm                        | inch | mm  | mm  | mm  | mm  | mm  |                     |        |  |

# AIR VENT HEAD TYPE M4

## Application and specification

The Air Vent Head type M4 is intended for end-of-line installations on air pipes of non-pressurized water or oil tanks (except cargo tanks) onboard ships. The function of the Air Vent Head is to allow air to enter and leave the tank freely when necessary, in order to prevent excessive pressure in the tank. At the same time the device shall prevent the ingress of seawater into the tank, but allow passage of liquid from the tank in case of overfilling.

## Approvals

Pres-Vac Air Vent Head is one of few Air Vent Heads in the world meeting the strict requirements of IMO Circular no. 3573, and hence being characterized as an Automatic closing device Preventing progressive Flooding (APF). This means that the Air Vent Head closes watertight if submerged thereby protecting the tank against flooding.

Each type of air vent head is tested and approved in accordance with the latest IACS requirements (2015) and the Classification Societies mutual recognition scheme (2016).

## Sizing

For sizing, please refer to class requirements and request pressure resistance curves based on water.

## Features

- Protecting screen in stainless steel
- Float of polyethylene
- Seat of neoprene (other materials available)
- Small outside dimensions
- Solid one piece castings with heavy duty coating
- Suitable for operating at ambient temperatures between -25 °C and 85 °C

## Benefits:

- Competitive pricing
- Easy maintenance
- No class requirements for spare parts on board
- Small outside dimensions
- Longer lifetime

## Options

All sizes can be fitted with bug or flame screen easily removable for cleaning, inspection or renewal, yet fully protected behind a cover. The flame screens are tested and certified in compliance with ISO 16852 for Apparatus Group IIA and IIB (MESG  $\geq 0,65\text{mm}$ ).

## Design and material

All Pres-Vac Air Vent Head / Air Cap / Air Pipe automatic closing device is made in solid iron castings for longer lifetime and feature compact dimensions. The casing can be made in any material required for a specific project. The flange is per standard DIN or JIS flat face but is obtainable in any flange connection required. The only moving parts is the float, which is made in PE HD1000 polymer. For special material features please clearly specify.

## Maintenance

The air vent head is in general low on maintenance. When necessary it is easy to maintain through the top lid or through the inspection port at the side of the air vent head which is removed by loosening four bolts. Cleaning and replacement is done through this lid/port and the air vent head can quickly be operational again.

In order to fulfill required regulation or project requirements, one must note that the frequency of cleaning will depend on the cargo (vapor) and a procedure for the cleaning interval must be made.



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G&O Maritime Group provide value, safety and reliability to the global maritime industry through green, innovative quality solutions.