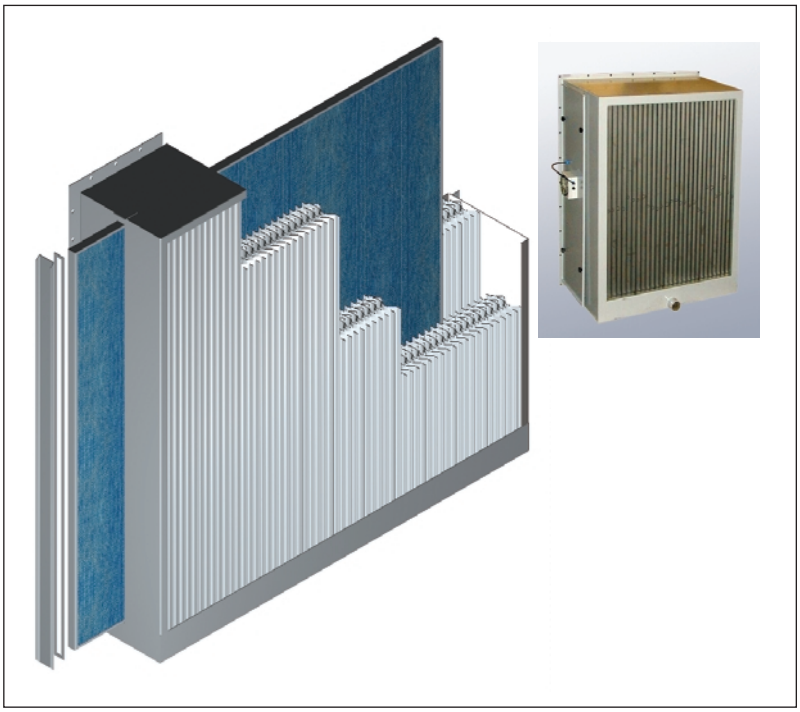
DFF

Air intake systems
Three-stage



EQUIPMENT

DFF

- High separation efficiency; removes heavy rain, fog and high loads of sea spray bound salt particles, solution or dry crystalline
- Provides clean air for people and machinery
- Anti-icing devices
- Wide face velocity ranges
- Marine grade materials
- High corrosion resistance
- Tailor made sizes and designs
- In house ISO9001 certified manufacturing

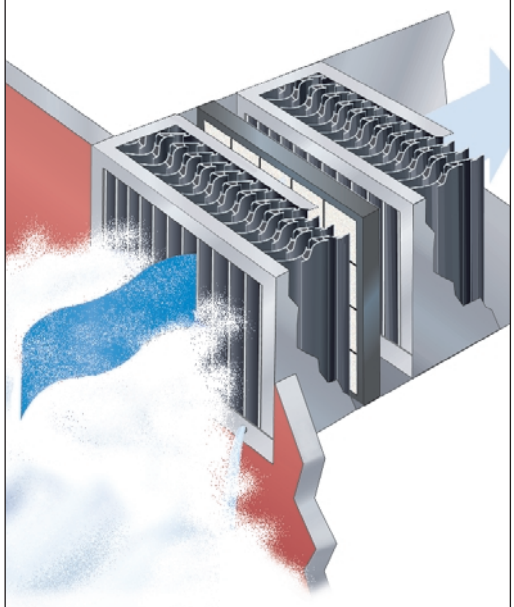
DFF is a series of ready to install, tailor made, three stage air intake systems for use in special application areas. The DFF series not only provides excellent protection against all types of droplets but will also filter particles at high air velocities.

DFF has been designed for the supply air in marine propulsion systems and auxiliary equipment and for the provision of clean air for ventilation in marine and offshore environments.

Harmful salts from the ambient air (solid particles as well as salt dissolved in water) are removed before entering the propulsion system. Air that has passed through the DFF system enters the engine containing less than 0.01 ppm salt (w). As a particle filtration system DFF provides high air quality, high efficiency filters clean the air of numerous particles that occur in offshore environments.

DFF comprises of a range of mist elimination profiles and filters to meet precise application requirements, offering an optimum balance between the required separation efficiency, water loading capacity and available pressure drop to ensure energy efficient operation.

Efficiency is fully independent of wind direction and relative humidity levels. DFF air intake systems provide effective elimination of the smallest “morning” mist droplets. They help to improve the climate for people, interior furnishings, cargo spaces and sensitive equipment. Optional filter stages with anti-sand functions are also available in order to meet demanding operating conditions. Each DFF system is fully configurable, options include various marine grade materials, flange positions, drainage systems, bird screens, anti-icing devices and many others.



Principle illustration.

Munters

Technology

DFF air intake systems are three-stage separation systems. In the first stage a high performance vane type mist eliminator is used. The second stage comprises various filter/coalescer types, depending on salt stripping and particle filtration requirements. The third stage is either an additional filter stage for fine filtration of particles or a mist eliminator that takes coalesced droplets that have passed through the second stage out of the air stream.

Performance

DFF air intake systems are characterised by the following key performance criteria;

1. Liquid load
Liquid load is an air intake system's capacity to eliminate liquid from the air stream. It is stated in litre per square meter per hour. Depending on the application liquid loading can vary enormously, over an intake face from a few litres/m^2/hour up to several hundred litres/m^2/hour. The liquid load capacity is given for each individual DFF design.

2. Efficiency
The limit drop size defines the liquid separation efficiency. It is the smallest droplet that is completely removed. Fractional efficiency indicates the percentage of droplets removed from an air stream which are smaller than the limit drop size. Average particle filtration efficiency is given according to the EN779. Efficiency is given for each individual DFF design.

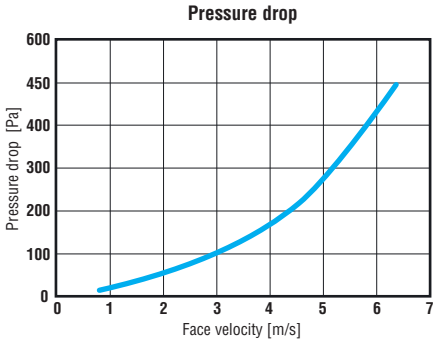
3. Pressure drop
Pressure drop is defined as the resistance to airflow measured in Pa. The lower the pressure drop, the lower the energy consumed. A typical pressure drop curve is shown in the diagram. The pressure drop is given for each individual DFF design.

Tested
Munters' air intake systems are tested under conditions of 100 % relative humidity and charged with multiple liquid loads similar to those experienced under operating conditions.

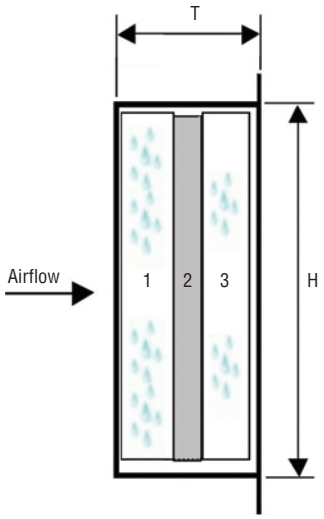
DFF designs

All DFF air intake systems are designed to meet individual environmental and application requirements. Therefore, the information concerning design given below should only be seen as basic alternatives.

Basic types
Type 1
Vane type separator followed by extended surface panel filter/coalescers and followed by a vane type mist eliminator. Filter/coalescers are available in classes from G2 to F6 according to EN779. This design is for example suitable for the supply air for diesel engines and compressors.

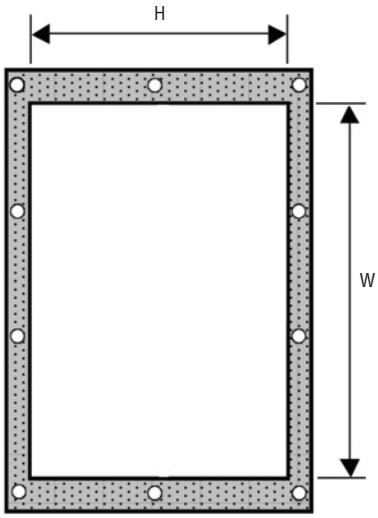


Typical pressure drop of a DFF type 1 with a F7 compact filter/coalescer.

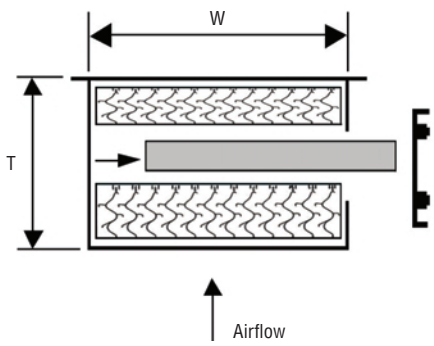


First stage mist eliminator
Second stage filter/coalescer
Third stage mist eliminator

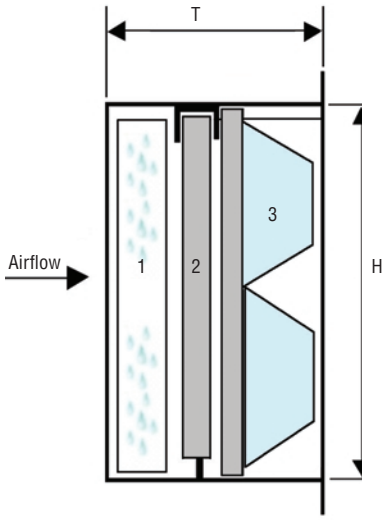
Principle drawings.



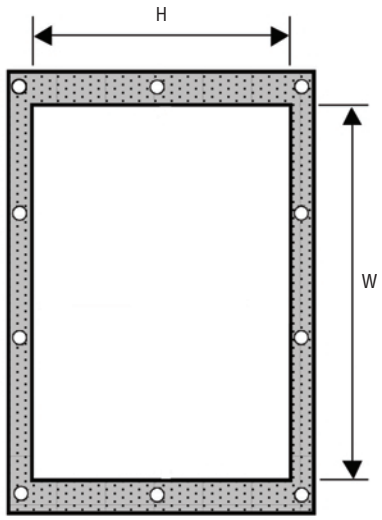
Side panel removable (example)



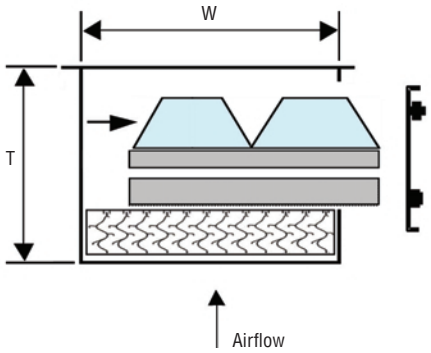
Type 2
Vane type separator followed by flat panel or bag filter and followed by a final compact filter for more dust holding capacities. Filter/coalescers are available in classes from G4 to F9 according to EN779. This design is suitable for example for clean air for accomondation areas on offshore platforms.



First stage mist eliminator
Second stage filter/coalescer
Third stage filter panels



Side panel removable (example)



Principle drawings.

Material
Standard material (other alternatives on request)
- Marine grade aluminium alloys (AlMg3, AlMgMn4.5 and AlMgSi0.5).
- Optional anodising of aluminium
- Marine grade stainless steel (AISI 316L, DIN 1.4404).
- Optional powder coating or painting in most RAL colours.
- Optional brushed or polished surface.

Other standard options
Examples only
- Different water drainage designs are available.
- Flanges according to Eurovent, DIN 24193, Norsok or other trade, national or international standards.
- Air intake performance according to ISO 15138 – 2000.
- Optional entry side (left, right, top, bottom) for maintenance access door for service of filter/coalescer.
- Differential pressure gauges (magnehelic type).
- Different certification options.
- Special naval shock-load resistant equipment.

DFF
DFF tailor made air intake systems are supplied for a wide range of applications. They are typically used for protection of HVAC/ventilation in the marine and offshore sectors. Also for the protection of ventilation systems and diesel engines for commercial applications.

Product nomenclature
DFF – type – material – filter class – width – height.

DFF are developed and produced by Munters Euroform GmbH, Germany.



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