



EVERON

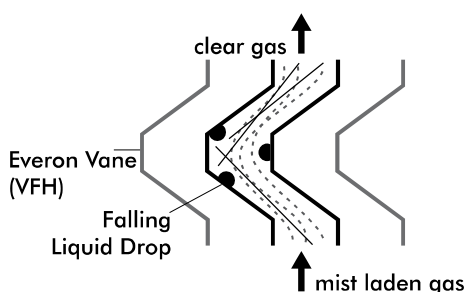
MIST ELIMINATOR

EVERON MIST ELIMINATORS

The EVERON range of mist eliminators are Vane type (or commonly referred to as Chevron type) mist eliminators which consist of a set of specially designed vanes with a well defined geometry. Gas streams with entrained liquid droplets flow between the vanes of the EVERON Separator. The gas can easily manoeuvre the zig-zag contours of the vanes, in contrast to the liquid particles which impinge upon the walls of the vanes due to their higher inertia. These impinged particles coalesce to form much larger particles which can subsequently be easily collected and removed.

Two broad classification of EVERON (VANE) mist eliminators used are

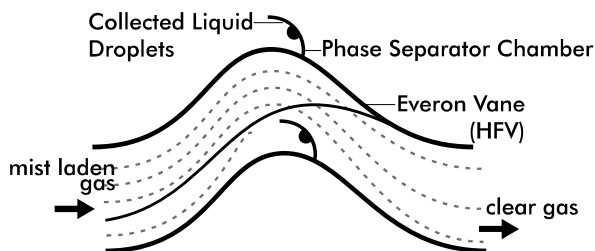
1. EVERON VFH (Vertical Flow-Horizontally Placed)
2. EVERON HFV (Horizontal Flow-Vertically Placed)



EVERON VFH

Vertical Flow - Horizontally Placed

This mist eliminator is designed for vertical gas flow. In this configuration the vanes are designed to provide optimum deflection to the gas containing entrained liquid particles. The entrained particles cannot follow the deflected gas path and are collected as they accumulate along the wall of the mist eliminator. Collected liquid runs down counter current to the direction of gas flow.



EVERON HFV

Horizontal Flow - Vertically Placed

This mist eliminator is designed for horizontal gas flow. In this configuration, specially designed sinusoidal vanes having a provision for a phase separation chamber are employed. The gas flow is split by these vanes and the entrained liquid particles are driven by inertial forces to the walls in the phase separation chambers. Reentrainment is avoided as a separate liquid drainage path is provided in the phase separation chamber.

DESIGN VELOCITY

The maximum allowable vapour velocity 'U' for most systems is calculated according to the Souder-Brown equation given below

$$U = K \sqrt{\frac{\rho_L - \rho_G}{\rho_G}}$$

U = Velocity, m/sec
 K = Constant (in m/sec)
 ρ_L = Liquid Density, kg/m³
 ρ_G = Vapour density, kg/m³

The operating velocity is obtained by a force balance between the gravitational, drag and surface tension forces acting on the entrained droplets. A wide operating velocity range is possible and the capacity of the EVERON is only limited by the phenomenon of re-entrainment of the coalesced droplets and hence the design velocity has to be kept well below a critical velocity which leads to re-entrainment.



VANE MIST ELIMINATOR STANDARD DESIGN 'K' VALUES:

For high pressure and vacuum services the constant K will need to be customised according to the application.

SERVICE	K (m/sec) units
Vertical Flow	0.12
Horizontal Flow	0.18
Double Pocket (Horizontal or Vertical Flow)	0.26

EFFICIENCY

EVERONS were historically used for the separation of coarse mist (or spray) from gases and vapours. A limit drop size (D_p) is used to characterize them and it is designed as the smallest particle which can be removed to the extent of 99%. The normal D_p is in the region of 25 microns and higher for the VFH versions. However, special designs are available for applications requiring removal of particles smaller than this size and newer versions are available (especially of HFV design) with D_p in the region of 5 microns.

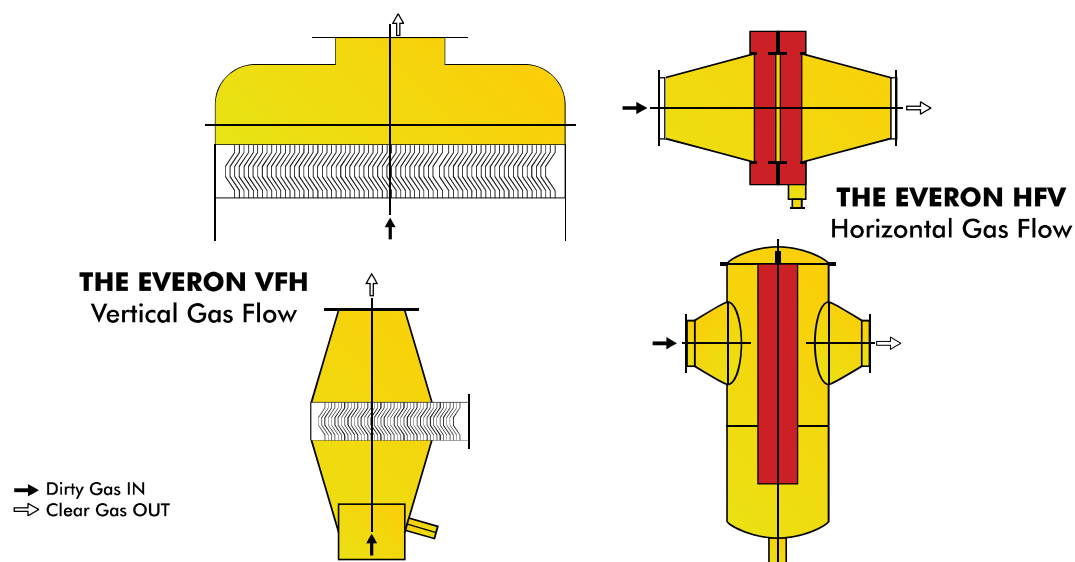
PRESSURE DROP

Due to the large cross sectional area available for gas flow, the clean pressure drop for a vast majority of applications does not exceed 25-50 mm WG. As mentioned above, for high efficiency applications, a larger pressure drop is to be expected and a suitable EVERON type mist eliminator can be custom designed.

PERFORMANCE FEATURES

Due to its constructional features, the EVERON suffers from low fouling. Recommended areas of operation would therefore include:

- Applications where the droplets are sticky or viscous and they plug conventional Knitted / Fibre Bed Mist Eliminators.
- For systems containing certain solids it would be possible to carry out intermittent cleaning with a spray nozzle.
- Situations where a wide range of flow rates are possible, which render the cyclonic type systems unsuitable.
- Coarse pre-separation of small droplets, high efficiency on 25+ micron diameter droplets.
- Typical pressure drop < 1 mbar, lowest of any mist eliminator type for general clean applications.
- Capable of handling high gas & liquid loads, especially at high operating pressures.
- Good turndown characteristics.



SPECIAL DESIGNS FOR HIGH PRESSURE / HIGH EFFICIENCY APPLICATIONS

● EVERGREEN has designed a range of EVERON mist eliminators for critical high pressure (> 10 bar) applications in the oil and gas sector. These are primarily of the EVERON HFV-IV configuration with collection efficiency of essentially 100% for particles larger than 8 microns, and pressure drops below 0.1 kg/cm². These are compact designs which are useful in high-pressure installations (such as offshore platforms) due to their reduced size. EVERON mist eliminators have been operating for critical duties at operating pressures as high as 100 bar with guaranteed exit liquid loads < 0.1 USG/MMSCF in the gas outlet.

● In addition to these products, EVERGREEN also offers variants for horizontal and vertical gas flow, wherein the EVERMESH media is used as a coalescer for fine aerosols which are subsequently fed into an EVERON VFH/HFV vane mist eliminator for removal in the form of larger drops (these are effective for upto 5 microns particulate removal).

Alternatively, for vertical gas flows an EVERON VFH mist eliminator is placed as the first stage coarse separator for situations where a high inlet liquid load or a fouling situation is envisaged. An EVERMESH unit is then used to effectively clean/polish these gases downstream of the vane mist eliminator.

● The EVERON VFH IIa version is available as a retrofit for applications using the Euroform T 271/Munters DV 270 family of mist eliminators.

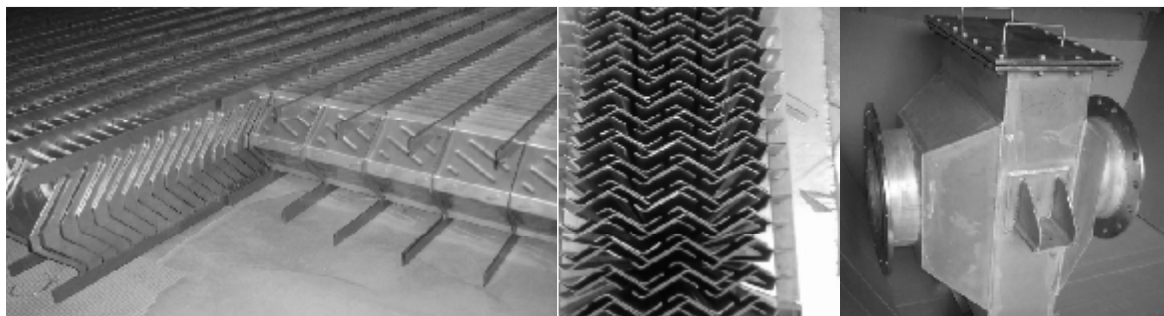
● EVERGREEN has also launched its range of EVERON HFV-DP (double pocket) vane mist eliminators. These find wide uses in new greenfield applications where high efficiency requirements need to be met with a smaller equipment footprint, or for revamp scenarios where large gas loads need to be processed in the same vessel in which only a change of internals is permitted.

MATERIAL OF CONSTRUCTION

The standard materials of construction for the EVERON VFH series are polypropylene and stainless steel, whereas for the EVERON HFV series they are PVC, polypropylene and stainless steel. Other materials such as PVDF, FRP in plastic as well as aluminum and higher alloys in metals can be used for fabrication upon request.

APPLICATION

Successful areas of application include Evaporators, Exhaust Air, Cleaning, Chemical Process Equipment, Air Conditioning & Steam Drying, Air Intake Systems, Natural Gas operations, etc.



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