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MIST Eliminators

The separation of liquid droplets entrained in a vapour (gas) stream is a key requirement in many process operations to improve the (capacity & separation) performance of the plant, to protect downstream equipment, to reduce the loss of valuable chemicals or to comply with stringent environmental protection regulations.

At Techim we have a full range of mist eliminators (demisters) to ensure tailor made solutions for your applications.

Both mesh and vane type demisters are designed to achieve an optimum gas velocity to maximise removal efficiency. Too high a velocity will result in re-entrainment of the liquid droplets whilst too low a velocity will allow very small droplets to pass straight through the demister.

MESH Mist Eliminators

Mesh pad mist eliminators remove liquid droplets by impingement of the droplets on the wire surface. The droplets agglomerate and increase in size until they are sufficiently large enough to drain from the pad by gravity.



Mesh Demister Type RHO-145-9030
 Pad tck100mm - MOC 304L SS
 Column Ø 2800mm

Mesh demister efficiency is primarily a function of droplet size, wire size, specific surface area of the mesh, pad thickness and physical properties of the system.

For a standard specification mesh demister (wire Ø 0.28mm, density 145 kg/m³, surface area 300 m²/m³) removal efficiency is typically 100% for droplets 5 µm and greater in diameter. Higher surface area mesh demisters 500 m²/m³ using a reduced wire diameter 0.15mm can be used to improve the removal efficiency.

Mesh demisters can be installed either horizontally or vertically. With horizontal gas flow through the demister the capacity is 30% greater than compared to vertical flow, thus the demister can be smaller.

Mesh pads are typically 150mm thick with 25mm thick grids on either side making an overall thickness of 200mm. Many years of experience have shown that a 150mm pad thickness provides optimum performance in hydrocarbon processes with a vertical gas flow configuration.



Mesh Demister Type RHO-100-PP-9008
 Pad tck 150MM - MOC: PPL
 Column Ø 6500mm

Mesh demisters are made from pads of knitted metal wire or plastic wire. The pads are held between top and bottom grids. For vessel diameters greater than 600mm the demister is split into segments to allow installation through column man-holes. The overall diameter of the assembled pads is greater than the vessel diameter to ensure a snug fit thus eliminating any vapour bypass at the periphery or between adjacent segments.

Standard grids are made from 25mm x 3mm thick bar c/w 6mm diameter rods on a spacing of 150mm. Heavy duty grids can be provided for special applications. The grids have been specially developed to give a very high percentage open area.



The Techim range of mesh demisters are made in a wide range of materials both metal and plastic:

Stainless Steels (e.g. 304/304L, 316/316L, 321)
Duplex Stainless Steels (e.g.2205)
Higher Alloys (e.g. 904L, nickel, alloy C276, alloy 400, alloy 625)

Glass Wool or Fibre
Polypropylene,
PVC, PVDF, FEP,
ETFE ...



Mesh Demister Type RHO-145-9030
Pad tck 150mm - MOC 316L
Column Ø 1600mm

Metal Mesh Pads : Values for Stainless Steel. a variety of other metals are available

Type number	Free volume	Density kg/m3	Surface area m2/m3	Application
RHO-240-9001	97%	240	450	Very high efficiency, very clean service
RHO-192-9033	97.5%	192	350-400	Heavy duty
RHO-175-9032	97.80%	175	320-350	For general use
RHO-145-9030	98%	145	270-300	Standard general purpose media
RHO-110-9036	98.60%	110	200	High velocity, dirty service
RHO-80-4536	99%	80	145-150	Minimum pressure drop, dirty service

Other Mesh Pads

Material	Type number	Free volume	Density kg/m3	Surface area m2/m3	Application
Polypropylene	RHO-100-PP-9008	95%	100	1050-1100	High performance-acid mists
	RHO-80-PP-9030	92%	80	880	Acid mists and marine engine
	RHO-70-PP-9031	92%	70	770-820	Acid mists and marine engine
	RHO-50-PP-9036	95%	50	500-550	Intakes with minimum pressure drop
PVDF	RHO-80-PVDF-9048	96%	80	665	Highly corrosive conditions
PVC	RHO-100-PVC-9048	93%	100	950	Highly corrosive conditions

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VANE Mist Eliminators

Vane (chevron) mist eliminators are widely used for the separation of liquid droplets from a gas stream. They consist of zig-zag chevron blades spaced usually on a 1", 1.5" or 2" pitch.

The blade profile can be smooth (for non fouling services) or with hooks (for greater removal efficiency and capacity).

The blades are normally 2 pass, 3 pass or 4 pass. The number of passes corresponding to the number of times the gas flow changes direction. As the gas passes through the demister and changes direction the liquid droplets due to their momentum are unable to change direction as quickly and thus impact on the chevron blades where they coalesce and form larger droplet which then drain away.



4 Pass Blades with Hooks, MOC 316L



Vane Demister Type 3-2-NH
1600--2400mm Ø IPA Absorber Column
MOC Nickel200



4 Pass Blades with Hooks
MOC Polypropylene

Compared to mesh demisters Techim vane type demisters offer the following advantages:

Higher capacity

Blades with a smooth profile will give 30% more capacity than a mesh demister
Blades with hooks will give 100% more capacity than a mesh demister

Higher liquid loading

Less risk of fouling

Lower pressure drop

Longer lasting in service

Suitable for foaming systems

Suitable for high liquid viscosity systems

Stronger construction



Vane Demister Type 4-1- WH
Column Ø 2700mm
MOC 316L

With smooth profile blades typical removal efficiency is 100% removal of droplets 17µm and greater in diameter. Using blades with hooks the normal removal efficiency is 100% of droplets 10µm and greater in diameter.



Vane Pack Type 4-1- WH
Face Area 1800mm x 2000mm
MOC304L

As with the mesh demisters the vane demisters are supplied in a wide range of materials both in metal and plastic.

Flow configuration is either for vertical or horizontal gas flow through the chevron demister. In some application an inclined arrangement is used to facilitate the drainage of liquid. For horizontal gas flow the capacity is 30% greater than in for vertical flow.

Construction normally is in segments for installation through column manholes. In such cases the demister is supported on a full support ring welded to the column shell.

Alternatively, the vane demister can be supplied completely enclosed in a frame as a "Vane Pack" which can be flanged for direct attachment to a baffle plate within the vessel.



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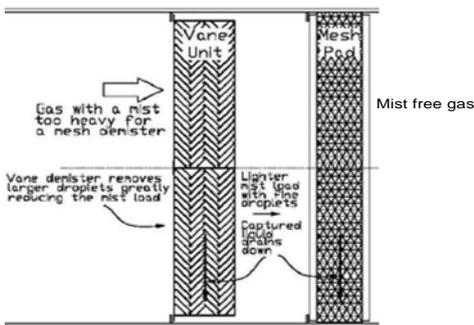
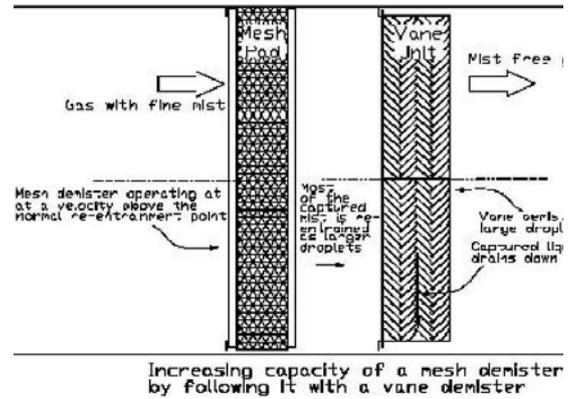
COMBINED (Mesh & Vane) Demister Systems

The characteristics of each type of demister can be used to good effect in a combination:

Mesh + Vane Combination

Using a vane demister downstream of a mesh type combines the higher efficiency of the mesh type with the superior capacity of the vane type.

When the mesh demister is operated at a higher velocity than the normal design limit, the mesh pads will act as an agglomerator or coalescer of fine mist droplets. The liquid droplets captured in the mesh will be re-entrained as larger droplets which will be subsequently removed by the vane unit since the sizes now will be well above the lower limit of a vane demister. In addition the higher velocity will also improve the efficiency.



Vane + Mesh Combination

The alternative arrangement where a vane unit is installed upstream of a mesh demister combines the higher efficiency of the mesh type with the superior liquid load and fouling resistance capability of the vane demister.

Thus the mesh demister is shielded from a heavy mist load which would in normal circumstances flood it.

Vane Inlet Device

As with a packed or tray towers, the importance of vapour distribution to the mesh or vane demister cannot be over-stressed.

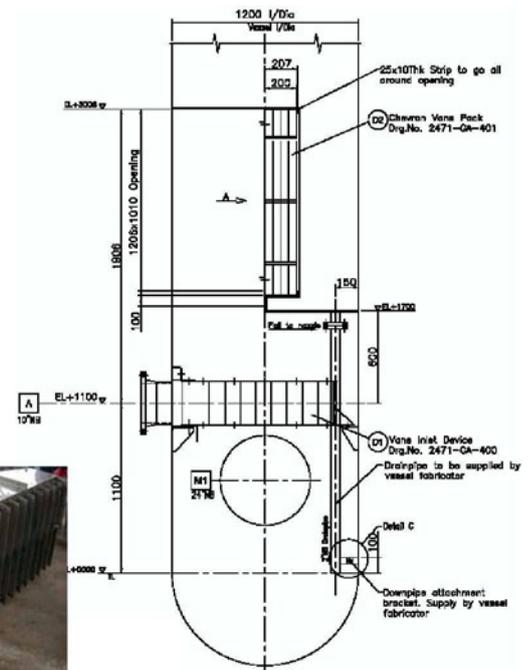
To achieve the maximum performance from the demister unit, the vapour going through it must be distributed evenly. Mal-distribution will result in poor capacity and efficiency performance.

Where necessary a vane inlet device (VID) should be used offering the following advantages:

- Eliminates high liquid loads on the demister
- Dissipates high inlet gas velocity (momentum)
- Prevents re-entrainment of liquid droplets from the liquid held in the column sump
- Provides a uniform gas distribution to the demister



2 Tier VID, Nozzle Ø28"nb
Column Ø 2200mm



Arrangement of TEG Inlet
Filter Coalescer