

PRODUCT BULLETIN

Mist Eliminators

Mesh and vane demisters, combined systems and vane inlet devices, tailor made for your vessels and applications.

Techim, Versailles, France

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The separation of liquid droplets entrained in a vapour (gas) stream is a key requirement in many process operations to improve the (capacity and 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 demister type RHO-145-9030
Pad thickness 100 mm, MOC 304L SS
Column Ø 2800 mm

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 to drain from the pad by gravity.

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 0.28 mm, 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 of 0.15 mm 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 with vertical flow, thus the demister can be smaller.

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

SAS with share capital of EUR 125,000 | RCS Versailles B 305 419 574 | VAT FR32305419574

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Mesh demister type RHO-100-PP-9008
Pad thickness 150 mm, MOC PP
Column Ø 6500 mm

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

Materials

The Techim range of mesh demisters is 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 thickness 150 mm, MOC 316L
Column Ø 1600 mm

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	97.8%	175	320-350	For general use
RHO-145-9030	98%	145	270-300	Standard general purpose media
RHO-110-9036	98.6%	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
Polypropylene	RHO-80-PP-9030	92%	80	880	Acid mists and marine engine
Polypropylene	RHO-70-PP-9031	92%	70	770-820	Acid mists and marine engine
Polypropylene	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

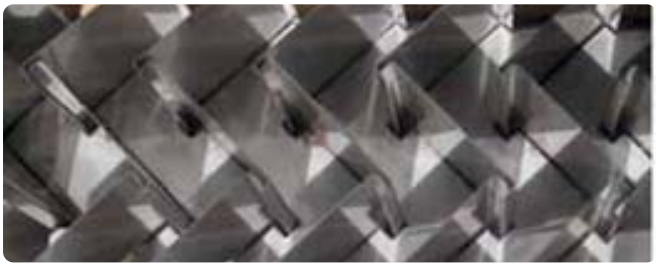


Vane demister type 3-2-NH
1600-2400 mm Ø IPA absorber column
MOC Nickel 200

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 droplets which then drain away.



4 pass blades with hooks, MOC 316L



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 give 30% more capacity than a mesh demister, blades with hooks 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

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



Vane demister type 4-1-WH
Column Ø 2700 mm, MOC 316L

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Vane pack type 4-1-WH
Face area 1800 mm x 2000 mm, MOC 304L

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

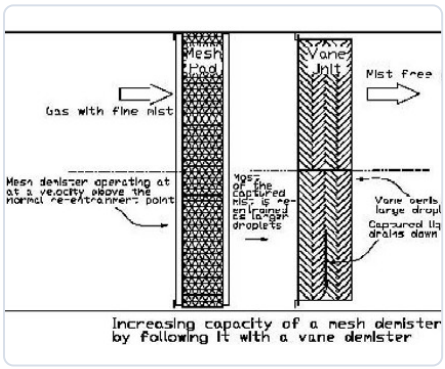
Flow configuration is either for vertical or horizontal gas flow through the chevron demister. In some applications an inclined arrangement is used to facilitate the drainage of liquid. For horizontal gas flow the capacity is 30% greater than for vertical flow.

Construction is normally in segments for installation through column man-holes. 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.

Combined (Mesh and Vane) Demister Systems

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



Increasing the capacity of a mesh demister by following it with a vane demister

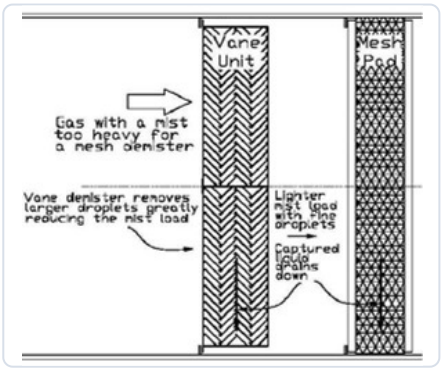
Mesh + Vane Combination

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.

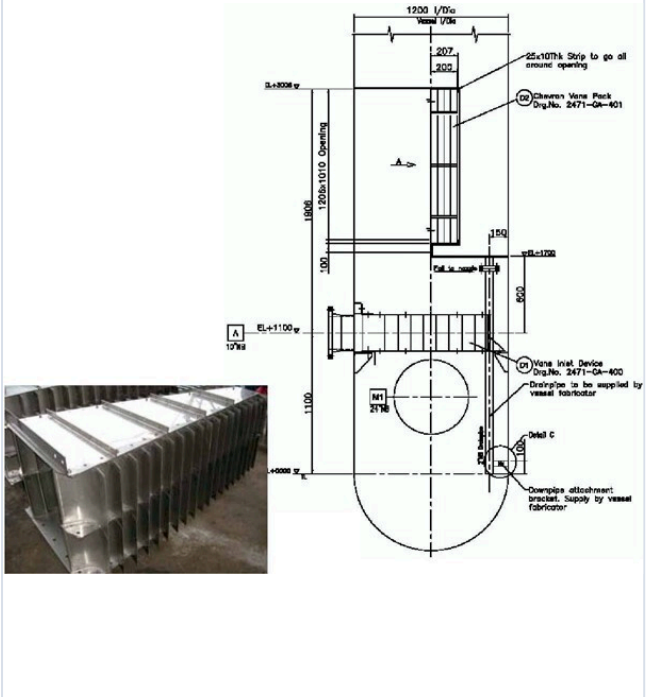
When the mesh demister is operated at a higher velocity than the normal design limit, the mesh pads act as an agglomerator or coalescer of fine mist droplets. The liquid droplets captured in the mesh are re-entrained as larger droplets, which are subsequently removed by the vane unit since their sizes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



Protecting a mesh demister from a very heavy mist load with a vane demister before it



Arrangement of TEG inlet
2 tier VID, nozzle Ø 28" nb
Column Ø 2200 mm

Vane Inlet Device

As with 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. Maldistribution 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

Talk to us about your project

Send us your column data and operating conditions: our engineers will propose the most appropriate design.

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