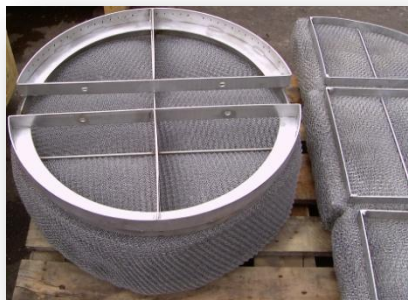


# K-Sep<sup>®</sup> Separator Internals

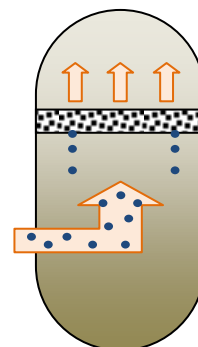
## KWM Wire Mesh Mist Eliminators

KIRK's **KWM** mesh pad type mist eliminators remove droplets by impingement on the wire surface. The liquid collected on the filaments is then able to drain from the pad under gravity. They have a limited range of useful operation in which they provide almost complete **removal of droplets down to about 3-5 microns**. Turndown range of the vapour rate is around 3:1. At excessively high vapour velocities, the liquid droplets that impinge on the wire surface are sheared off by the vapour and re-entrained before they are able to drain. At very low vapour velocities, all but the larger droplets are able to follow the vapour path through the mesh and thus avoid impingement; however the inherent design of the separator vessel means that in most applications an effective **turndown performance of 10:1 or better** can be achieved.



Wire mesh mist eliminators are well suited to remove mechanically formed entrainment from packed and trayed process towers, spray columns, venturi scrubbers and other gas scrubbing devices. They are also a widely used de-entrainment device in knock out drums and separators.

KWM mesh mist eliminators are manufactured in a wide variety of metals and synthetics including stainless steels and special alloys, polypropylene and teflon/PTFE.



*The wire mesh may be knitted and formed to provide a wide range of specific properties to suit various applications:*

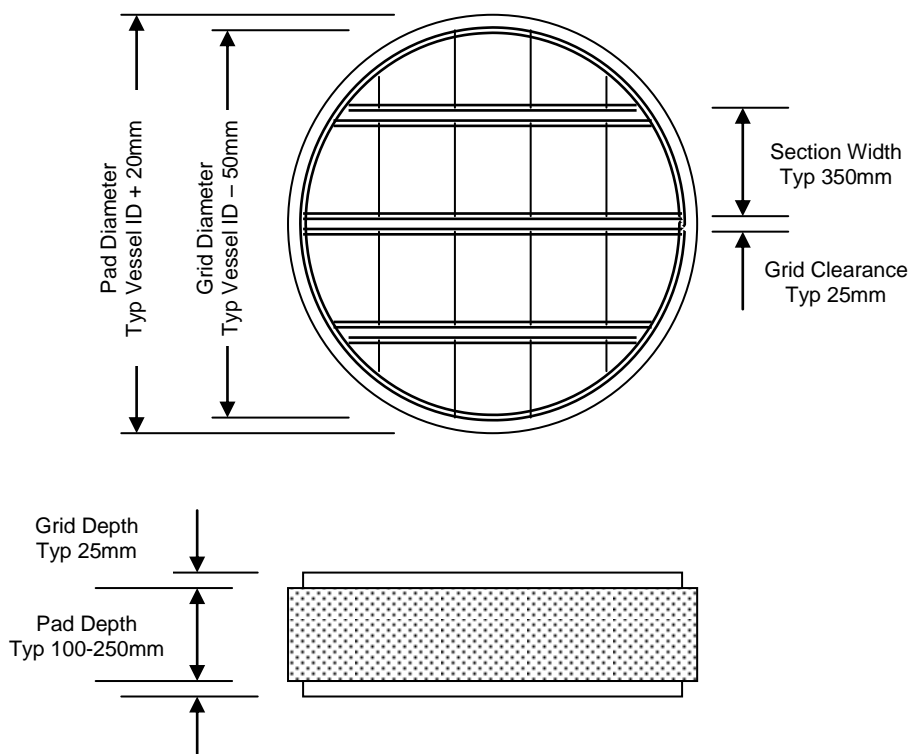
STYLE	FEATURES	APPLICATIONS
<b>KWM-A Series</b>	Fine wire diameter and medium-high density weave	High efficiency for removal of fine mists
<b>KWM-B Series</b>	Medium wire diameter and pad density	General purpose (maximum efficiency with low pressure loss)
<b>KWM-C Series</b>	Medium wire diameter and low pad weave density	Dirty service where fouling is an issue

# K-Sep<sup>®</sup> Separator Internals

## KWM Wire Mesh Mist Eliminators

KWM mesh demisters consist of a pad of knitted metal or plastic wire mesh usually sandwiched between grids for mechanical support. Except for units less than about 600mm diameter, they are normally split into sections of between 300 to 400mm wide to facilitate installation through a normal vessel manway. The pads are cut slightly oversize to ensure a snug fit and thus eliminate any possible vapour by-pass either between sections or between pad and vessel wall (or shroud). Each mesh pad is formed from crimped layers of fabric knitted from monofilament with the direction of the crimp rotated 90 degrees in each adjacent layer to provide a uniform voidage together with a high ratio of filament surface per unit volume of pad.

Standard support grids consist of a framework of 25mm x 3mm thick flat bar fixed to a grid consisting of 6mm rods usually spaced on 150mm centres to retain the mesh with minimum obstruction of the face of the pad. The top and bottom grids are connected by spacer rods passing through the mesh that are welded to each grid to ensure the dimensional stability of the pad. Mesh pads can also be furnished with special heavy duty support grids where these are required to provide a working platform inside the vessel.



KWM mesh pads can be installed either horizontally for vertical vapour flow or vertically for horizontal vapour flow. For vertical vapour flow, mesh pads are normally either 100mm or 150mm thick and for horizontal flow are normally greater at 150 to 200mm+ thick. Where mesh pad thickness exceeds 300mm, the unit is usually divided into 2 separate layers so that the sections will pass through normal vessel manways and in such cases wire screens are fitted between layers to maintain pad integrity during installation.

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## KWM Wire Mesh Mist Eliminators

### Mist Eliminator Design

Mesh pads should be sized so that the face area provides a vapour rate of approximately 80% of the maximum allowable re-entrainment velocity. For estimation purposes, suitable design velocities occur at a K-factor of 0.107 m/s for vertical flow, or 0.150 for horizontal gas flow (due to better drainage) where:

$$V_s = K \cdot \sqrt{(\rho_L - \rho_V) / \rho_V}$$

where

$V_s$	=	Actual vapour velocity (m/s)
$\rho_V$	=	Vapour density (kg/m <sup>3</sup> )
$\rho_L$	=	Liquid density (kg/m <sup>3</sup> )

Operating pressure loss across the pad within the above design range is normally less than 0.5 kPa depending upon mesh density, pad thickness, liquid loading and vapour rate. An approximate pressure drop can be estimated from the formula:

$$\text{Wet } \Delta P \text{ (kPa)} = C \cdot (\rho_L - \rho_V) \cdot K^2 \cdot t$$

Where C = 0.20 for a typical 'KWM-B' style mesh demister, and t is the pad thickness in metres. Note that the dry pressure drop is about half of the wet figure.

For optimum designs the K-factor should be modified to take into account the operating pressure, liquid viscosity, surface tension, liquid entrainment, etc, so please confirm sizing against KIRK's proprietary design program.

### KIRK KWM™ WIRE MESH SPECIFICATION CHART

Style	Materials	Application	Wire Diameter mm	Mesh Density kg/m <sup>3</sup>	Surface Area m <sup>2</sup> /m <sup>3</sup>	Voidage %	Nominal Micron Rating*
KWM-A1	Metals	Very high efficiency in clean service	0.15	195	650	97.5	3 μ
KWM-A2	Metals	Fine droplet removal in clean service	0.15	145	480	98.2	4 μ
KWM-A3	Metals	General purpose, clean service	0.15	112	375	98.6	5 μ
KWM-B1	Metals	Optimum efficiency & pressure drop	0.275	195	355	97.6	5 μ
KWM-B2	Metals	General purpose, not totally clean	0.275	170	310	97.9	6 μ
KWM-B3	Metals	Heavy duty e.g. oil & gas separators	0.275	145	265	98.2	8 μ
KWM-C1	Metals	Light fouling	0.275	110	200	98.6	10 μ
KWM-C2	Metals	Moderate fouling	0.275	80	145	99.0	12 μ
KWM-C3	Metals	Heavy fouling e.g. evaporators	0.275	50	90	99.4	15 μ
KWM-A1P	Polypropylene	Acid mists	0.25	75	1120	93.0	3 μ
KWM-A1X	Metal/PP Mix	Mist removal of polar / non-polar mixtures	0.25	200	625	95.6	5 μ
KWM-B1P	Polypropylene	Chemical scrubber towers	0.25	50	750	95.3	6 μ
KWM-B1T	Teflon	Very corrosive services	0.25	64	480	97.0	8 μ
KWM-C1P	Polypropylene	Low pressure drop e.g. air scrubbers	0.25	33	490	96.9	10 μ

\* 99% Removal at optimum velocity through a 150mm pad