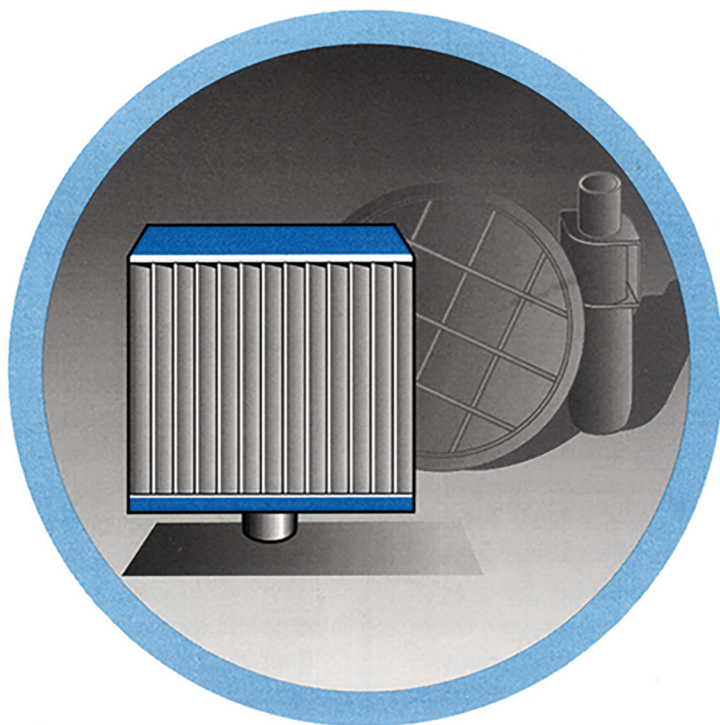


**BASED ON
THE COMPARATIVE
PERFORMANCE FEATURES
OF MIST EXTRACTOR
SYSTEMS...**



**SOME DEVICES ARE
SIMPLY LEFT IN THE
SHADE.**

A CLOSER LOOK INTO WHY **KingTool** SPECIFIES VANE

Of the various impingement devices, or mist extractor systems for dealing with the removal of liquid particles in a natural gas/liquid stream, the most commonly used in separator systems are:

Vane, Wire Mesh Pad, and Centrifugal type. Although the system designer may have some flexibility to the one he chooses, specifying one type over another can often result from preference for a particular method, and not always based on analytical assessment of efficiency, or consideration of the longer term effects of reliability. At KingTool Company however, we take *all* factors into consideration, like our design engineers did when they first investigated the attributes of each and discovered the overall benefits of the vane type mist extractor.

Since then, in fact since KingTool began manufacturing separator systems, virtually every separator we have built has employed the vane mist extractor system. But do not just take our word for endorsing the virtues of this superior device - the facts speak for themselves, proven by the thousands of KingTool units in successful operation throughout the world today.

KingTool
COMPANY
Making Separator Systems work for their money.

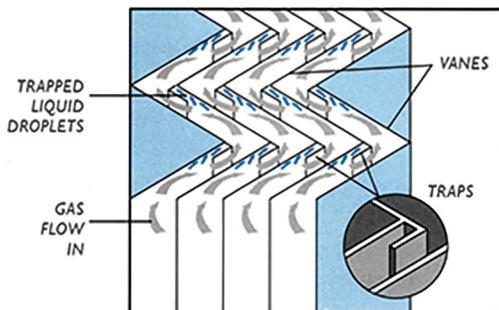
Outwardly, the King Vane Mist Extractor leaves the observer with an impression of being a sturdily-built example of precision engineering. Once its remarkable operating features are revealed however, it becomes apparent there is even more to its construction than meets the eye. Grown out of the need for greater efficiency and reliability in mist extraction systems, the King vane device is the culmination of many years of design development and experience gained from the results of field operation.

Advanced computer technology allied to sophisticated analysis techniques enables KingTool to predict how much of a certain type of liquid can be removed and also to predict the size required to remove excessive mist during slugging without significant carryover from the upset condition.

Because each unit is built to meet the precise requirements of its particular application, optimum performance and dependability is assured throughout its long operating life.

VANE MIST EXTRACTOR operation

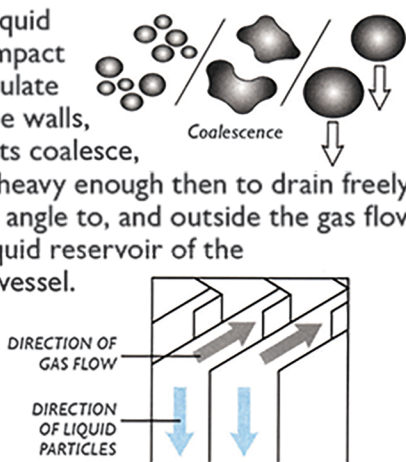
As the mist-entrained gas enters the extractor unit, the liquid particles impinge against the vane walls after being thrown out of the gas by the centrifugal force and turbulence created by the flow. Once disengaged from the gas (which continues its turbulent passage through the labyrinth of vanes), the mist particles or droplets momentarily cling to the vane walls, their duration being dependent on the surface tension and viscosity of the liquid.



Unlike the mesh pad, liquid drainage occurs outside, and perpendicular to the gas flow - a significant factor in the prevention of liquid re-entrainment.

MIST EXTRACTORS IN ITS GAS/LIQUID SEPARATOR SYSTEMS.

As more liquid particles impact and accumulate on the vane walls, the droplets coalesce, becoming heavy enough then to drain freely - at a right angle to, and outside the gas flow, into the liquid reservoir of the separator vessel.



An important feature of the vane mist extractor are the vertical traps positioned at each flow reversal corner. These prevent the liquid particles from re-entraining into the gas flow, further assisting in droplet removal. One of the biggest advantages of the King vane mist extractor, in particular over its mesh pad counterpart, is its ability to handle all types of liquids found in natural gas streams.

MESH PAD operation

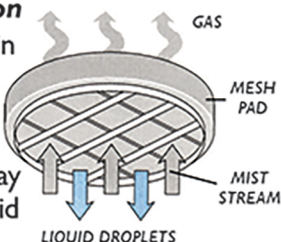
Differing considerably in construction from the vane type, the mesh pad mist extractor operates in a similar way in terms of being a liquid impingement device.

The mist entrained in the gas is carried upwards until it meets the mesh pad, at which point the liquid droplets impinge on the pad's wire mesh. The gas continues to flow through the pad and out of the vessel.

The similarity however ends there, due to:

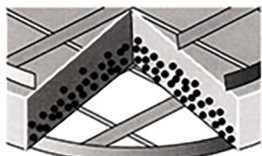
1...HANDLING CAPABILITIES BEING LIMITED TO LOW VISCOSITY LIQUIDS.

The very nature of its construction gives an indication of a mesh pad's characteristics when handling viscous liquids. The wire mesh structure consists of many densely packed, low volume voids through which the gas passes.



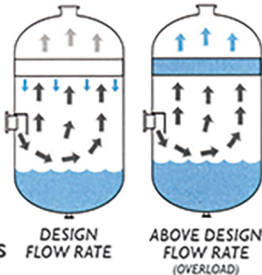
For the viscous liquid however, it is not so easy due to the longer time required for the stickier particles to coalesce and fall from the wire mesh.

As more liquid continues to permeate the body of mesh, the voids, or pockets become filled, resulting in an increase in pressure drop.



2...INABILITY TO MAINTAIN CONTINUED SEPARATION IN AN OVERLOAD SITUATION.

Any increase in the gas stream velocity, and the corresponding increase in the volume of liquid beyond the operating range of the unit, causes the mesh pad to flood, in which case the unit ceases to remove any liquid.

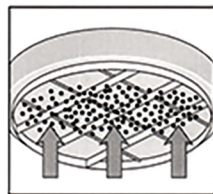


Under overload conditions, the King vane mist extractor will still continue to operate - unlike the mesh pad's complete failure - with only a gradual reduction in efficiency.

3...PRONE TO PLUGGING.

Most of the problems associated with mesh pad mist extractors in operation is their inability to pass solid particles of those found in a gas/liquid stream. By virtue of their construction, no comparison can be drawn between the vane type extractor's free, open area and the pad's densely constructed mesh section.

Even the smallest solid particles can be trapped, building up in the fine wire mesh and leading to the inevitable breakdown of the pad's inherent separation properties.

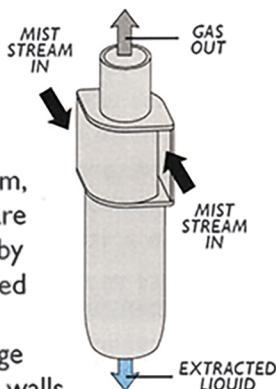


4...SHORT LIFE.

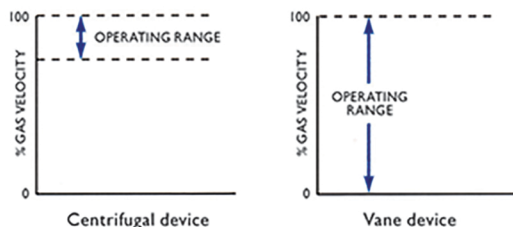
Another contributing factor to the relatively short life of the mesh pad is that of metal fatigue. This can give rise to a multitude of problems further down the line due to the break-up, and subsequent escape of small particles of wire into critical operating equipment.

CENTRIFUGAL TYPE operation

As its name implies, the centrifugal type device operates on the principles of centrifugal force, in this case set up by the incoming gas stream, whereby liquid particles are thrown from the stream by the swirling motion created within the cyclone tube. While the droplets impinge on the tube's lower inner walls to coalesce and fall into the liquid reservoir, the gas reverses direction to rise through, and out of the upper body of the unit.



Generally accepted as a satisfactory impingement device where the extraction of viscous liquids are concerned, one of the centrifugal design's disadvantages is its inability to maintain effective operation beyond the region of 20 to 25% of its design rated capacity.



The vane mist extractor's turndown ratio of 0-100% is a major benefit over that of the centrifugal type, allowing the unit to maintain continued operation in widely fluctuating gas flow pressures.

Where the gas velocity drops below these figures, the force will not be generated to throw the liquid particles out of the gas stream, and the unit will cease to function. Conversely, where an increase in gas velocity occurs, severe turbulence develops within the system - enough to create more liquid particles smaller than 8 microns than are actually coming into it. Another factor to be taken into account is the relatively high pressure drop associated with this type of device. Pressure loss can be as high as 5 psi - ten times more than in a vane unit (typically 0.5 psi flange to flange), and is an important consideration in any situation, particularly in gas transmission applications.

Due to the sharply differing methods of their operating characteristics, no *direct* comparison can ever be achieved from these devices, except those of their efficiency while in operation, and their reliability in service over time. In these respects, the King Vane Mist Extractor has been proven beyond doubt - based on the pure evidence of comparative performance evaluation, and over forty years of repeated specification - to be the most technically advanced and mechanically durable means of separating liquid particles, 10 microns and larger, from a natural gas stream.

KingTool VANE MIST EXTRACTORS...

- **...ARE MORE ECONOMICAL** - For equal gas input pressures etc., a smaller diameter separator vessel can be used than required by a mesh pad.
- **...ARE STRUCTURALLY PERMANENT** - All-welded construction insures the units' ability to withstand the most rigorous operating conditions.
- **...HAVE A LOW PRESSURE DROP** - Typically lower than 0.5 psi flange to flange and up to 10 times less than the pressure loss of a centrifugal unit.
- **...HAVE AN EXCELLENT TURNDOWN RATIO** - 0 to 100%.
- **...STILL OPERATE IN OVERLOAD CONDITIONS** - Unlike both the mesh pad and centrifugal devices, the vane mist extractor will continue to remove liquid in most overload conditions.

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