Vane Type Mist Eliminators
Vane or baffle Type Mist Eliminator

Air Water Soil Corporation offers a full range of air pollution control technologies, waste and primary water treatments and industrial fluids purification systems.

The “fluids purification system division” is specialized in the design of mist eliminators, liquid-liquid separators, coalescers, solid-liquid separators, static mixers.

These mist eliminator types are widely used in industry to separate liquid droplets from gas streams.

In all the applications where a contact between liquid and flowing gas is involved, tiny mist droplets are carried away with the gas.

TYDE VANE type mist eliminators of AWS are specifically made to remove mainly liquid droplets together with solid particles from an air or gas stream.

Unlike filters, which hold particles indefinitely, TADE VANES mist eliminators of AWS separate fine droplets and drain the liquid away from the gas stream.

Definitions: Mist and Spray

Mist and spray can be included in the main family of aerosol that are suspended particulate, either solid or liquid, which is slow to settle by gravity. The particle sizes is from the submicrometer range up to 10 to 20 μm.

Mists are fine suspended liquid dispersions usually resulting from condensation and ranging upward in particle size from around 0,1 μm.

Spray refers to entrained liquid droplets. The droplets may be entrained from atomizing process (i.e. absorption towers). Size will range from the finest 10 μm up to a particle whose terminal settling velocity is equal to the entraining gas velocity (if some settling volume is provided).
Typical droplet size removal

TIDE VANES have a wide open area which render them true candidates for removal of high liquid amounts combined with high gas flow rates. Due to their high resistance to fouling, they can work perfectly when in presence of sticky or insoluble solids.

However, TIDE VANES show good removal efficiency when the mass of the droplets to be removed is in the range of 10 micron and larger. Below 10 micron they still show reasonable efficiency which is higher, the higher is the face gas velocity.

Our process engineers are skilled to provide customers with all information regarding efficiency curves of our TIDE VANES for specific applications and installations.

Collection mechanism of VANE TYPE mist eliminators

TIDE VANE mist eliminators of AWS are made of zig-zag baffles that cause the mist laden gas to change direction quickly as it flows through the oriented baffles or blades.

The liquid droplets, due to their momentum, impact on the baffles and are separated from the gas flow as they are unable to follow the gas streamlines.

TIDE VANE are inertial separators because liquid droplets are removed due to their inertial momentum. Particles which are too small (less than 5 micron in diameter) are therefore not to be considered as a good candidate for this type of mist eliminator.

In case of upward gas flow as in the above picture, collected liquid droplets disengage from the bottom of the vanes as droplets are large enough to fall down through the rising gas.

In the case of horizontal gas flow as shown below, the collected liquid droplets trickle down the vanes to a drain below.

For liquid particles size lower than 10 \( \mu m \), AWS can engineer combined mist separators which foresee a coalescing stage followed by a separation stage, as illustrated in the above drawing.
Installation

TIDE VANES can perfectly work both for vertical or horizontal flow depending on type of service.

In vacuum pans and evaporators they are usually installed at the column top in horizontal position i.e. working for vertical flow.

In cooler – condensers and in compressed gas services, they are normally installed in vertical position i.e. working for horizontal flow.

In horizontal flow (vertical position) the face gas velocity can be higher than vertical flow because the collected liquid flows down orthogonal to the gas direction thus reducing the possibility of liquid re-entrainment.

Horizontal flow installation is therefore preferred where a smaller TIDE VANES area is needed to be accommodated inside vessels or drums with space limitations.

Features

The advantages of using vane type mist eliminators are the following:

* **Capacity**

Due to their open geometry, these separators can work at higher face velocities as compared to wire mesh separators without causing any re-entrainment of liquid.

In fact, the critical velocity, which is the velocity above which re-entrainment occurs, is much higher and therefore these separators can handle large amounts of gas and liquid loads without getting flooded.

* **Resistance to plugging**

Due to their construction layout made by zig-zag baffles with open space among them, the resistance to fouling even in severe applications is guaranteed. Solids accumulation on baffles or blades can be easily washed out with the use of spray nozzles which are located upstream or downstream the vane pack depending from the specific process.

* **Pressure drop**

The main characteristic of vane type mist eliminators is their extremely low pressure drop which is mostly in the range of a few millimeters of water column.

The pressure drop is proportional to the distance of the blades, to the gas face velocity, to the number of direction changes (passes) and to the gas density.
VANE packs from AWS

Our TIDE VANE panels have been studied to accomplish several applications, namely:

- evaporators
- vacuum evaporators
- concentrators
- cooling towers
- scrubbers
- packed towers
- cooler condensers
- high pressure separators
- knock out drums
- FGD scrubbers

The industry we serve includes:

- pulp and paper
- sugar
- food
- chemical and petrochemical
- geothermal power stations
- coal and oil power stations
- gas compression stations

TIDE VANE panels can be manufactured in different materials:

- carbon steel
- stainless steel
- special alloy steel
- P.V.D.F.
- Polypropylene
- Reinforced polypropylene
- Titanium

Typical installation in a K.O. drum evaporator
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