

A photograph of an industrial facility with several tall smokestacks emitting thick plumes of dark smoke. The scene is set against a sunset sky with warm orange and yellow tones. The smokestacks are silhouetted against the bright sky.

Wet Scrubber

Minimizing environmental impact is not only important for meeting legal requirements and ethical obligations, but it can also provide financial benefits for companies in the long run. Wet scrubbers provide an effective and efficient solution for air pollution control, offering a contained system that eliminates unwanted pollutants from the air. Removing these pollutants from the environment helps to reduce human exposure to harmful substances and promotes ecosystem health.

As Your **Reliable Partner**

PANTAN has provided numerous process packages and equipment to different customers, tailored to meet their individual demands. The company has experience in emission control, by implementing pollution control projects in all industries. Offering the scrubber packages as an effective solution to remove pollution in various industries, is a way to protect the environment.

Our team designs, manufactures, and assembles these packages as per the client's requirements.





CONTROL of HAZARDOUS EMISSION

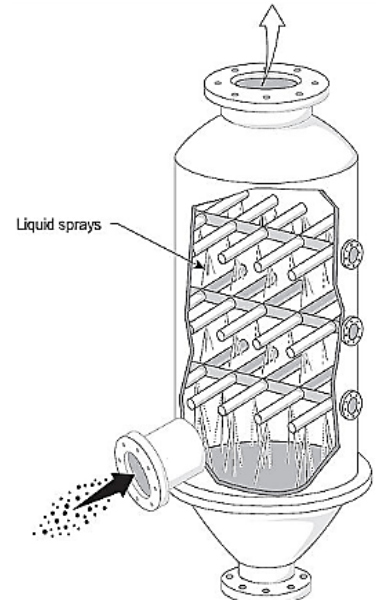
Type of Scrubbers

- Spray Scrubbers
- Packed Bed Scrubbers
- Impingement Scrubbers (Tray Scrubbers)
- Ejector-Venturi Scrubbers

Spray Scrubbers

Operating Principles

Gas streams are introduced into spray towers or spray chambers, where they come into contact with scrubbing liquid ejected from spray nozzles. The size of the droplets is regulated to ensure maximum particle contact and to remove droplets from the gas stream. The orientation of the chambers can be cross-flow, countercurrent flow, or concurrent (co-current) flow, and they may include baffles to enhance gas-liquid interaction



Pollutant Removed

Particulate matter down to 1 micron in aerodynamic diameter, Acid gases, Volatile organic compounds (VOCs), Chemical fumes

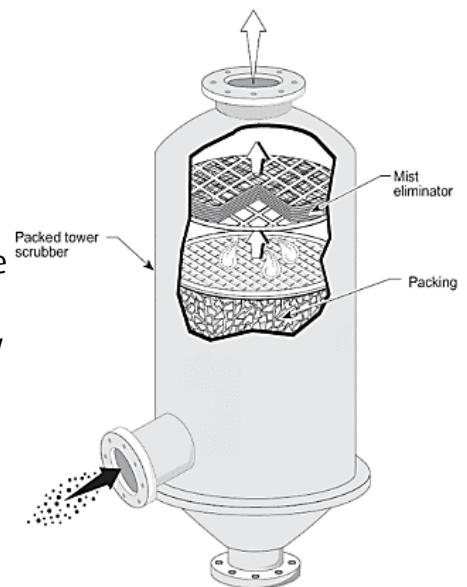
Packed Bed Scrubbers

Operating Principles

As the gas flows through the packing material, the scrubbing liquid captures and removes any contaminants or pollutants that are present in the gas stream.

In a countercurrent flow scrubber, the gas and liquid flow in opposite directions, which allows for efficient contact between the gas and the scrubbing liquid. In a cross-flow scrubber, the gas and liquid flow perpendicular to each other, which can be effective for removing larger particles from the gas stream.

Once the gas has passed through the packing material and has been cleaned by the scrubbing liquid, it passes through a mist eliminator. The mist eliminator removes any remaining liquid droplets from the gas stream before it is released into the atmosphere.



Pollutant Removed

Acid gasses, Hydrogen Sulphide, Ammonia, Sulfur Oxides, Halogen vapors, Chromic Acids, Ethylene Oxide, N-Methyl pyrrolidone, Formaldehyde, Caustics and Hydroxides, Ethylene Glycol, VOC abatement, NOx removal

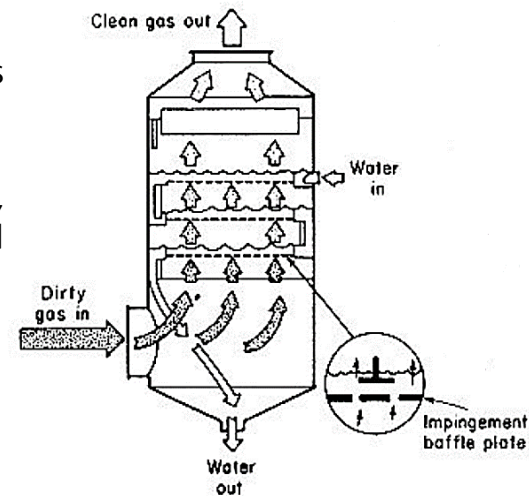
Impingement Scrubbers (Tray Scrubbers)

Operating Principles

In impingement scrubber, the gas stream enters at the bottom of the unit and passes through a perforated tray which is contained or sprayed with a layer of liquid. As the gas stream passes through the liquid layer, droplets of liquid are entrained in the gas stream. Mass transfer is achieved within the forth generated by the gas passing through the liquid layer. Then, these droplets collide with the impingement plate located above the liquid layer, causing them to be separated from the gas stream. The separated liquid then flows down the impingement plate and is collected at the bottom of the unit.

Pollutant Removed

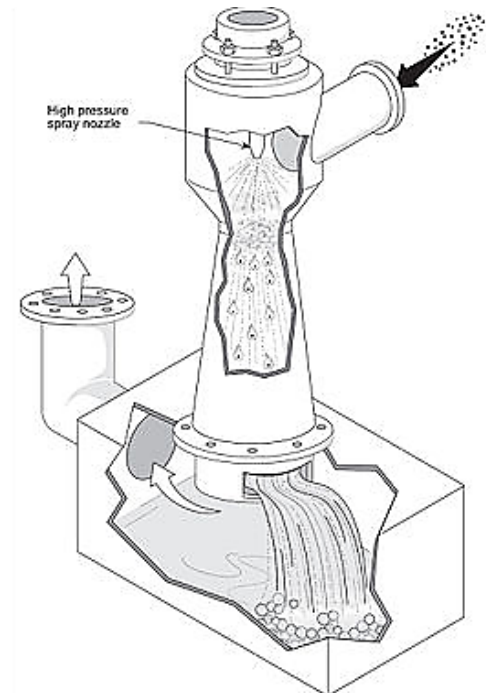
Particulate matter 2.5-10 aerodynamic diameter, hazardous air pollutant(HAP) (e.g., benzene, perchloroethylene, methylene chloride), inorganic fumes, vapors and gases (e.g. Chromic acid, hydrogen sulfide, ammonia, chlorides, fluorides, and SO₂), VOCs



Ejector-Venturi Scrubbers

Operating Principles

The high-pressure spray nozzle plays a crucial role in the operation of an ejector-venturi scrubber by creating the necessary vacuum and generating the scrubbing droplets that effectively remove pollutants from the process gas. This decrease in pressure draws gas from the facility's process system into the scrubber. The advantage of ejector scrubber is that there is no need to other rotary equipment to force process fluid into the scrubber. The high pressure sprays passing through the venturi throat form numerous fine liquid droplets that provide turbulent mixing between the gas and liquid phases. The turbulence created by the droplets also enhances the mass transfer between the gas and liquid phases, leading to faster transfer of contaminants from the gas phase to the liquid phase.



Pollutant Removed

Remove particulate matter 3-10 micron in aerodynamic diameter, VOCs, H₂S, HCl, HF, HBr, HCN, HNO₃, NH₃, Formic acid, Chromic acid, SO₂, Cl₂, F₂, Br₂, BCl₃, BF₃, Formaldehyde, odor, acid mist.

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