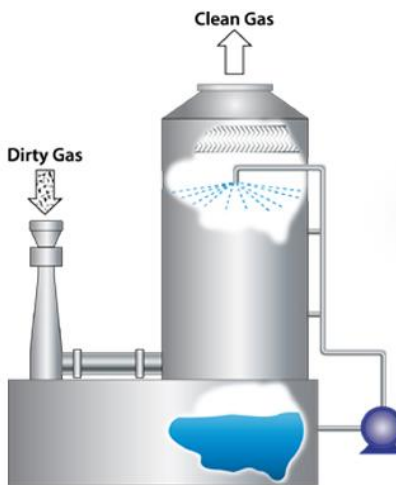


Scrubbers

Environmental pollution by airborne vapors, gases, fumes, odors and particles is becoming increasingly unacceptable. Kara Sanat designs and manufactures a complete range of wet scrubbing systems to meet statutory emission limitations.

Wet Scrubbers include a variety of devices that remove pollutants from gas streams by a dispersed liquid. The scrubbing liquid performs this separation by dissolving, trapping or chemically reacting with the contaminant. The difference in the design of various scrubbers is preliminary due to the mechanism by which the liquid is dispersed.



General Usage

Scrubbers are used for removing noxious gases, particulates, odors, fumes, dusts, ... from gas streams.

Typical Applications in Industries

- ❖ Aerosol and fine dust separation from a gas stream at power, petrochemical, paper and process industries
- ❖ Absorbing noxious substances and gaseous pollutants
- ❖ Gas conveyance
- ❖ Gas saturation and cooling
- ❖ Vapors condensation
- ❖ Solids separation (de-dusting) from gas streams
- ❖ Hot gas quenching
- ❖ Flue gas and process gas cleaning
- ❖ Cleaning exhaust air from chemical reaction processes, production buildings, container de-aeration, tank wagon emptying, ...
- ❖ Cleaning lime furnace gases upstream compressors at sugar industry, soda production
- ❖ Cleaning flare gas and pyrolysis gases upstream compressors at petrochemical industry
- ❖ Pre-cooling and inter-cooling in compression units
- ❖ Simultaneous quenching and absorption of large quantities of harmful gases
- ❖ Odor control in edible oil processing
- ❖ HCl loading removal from off-gas stream

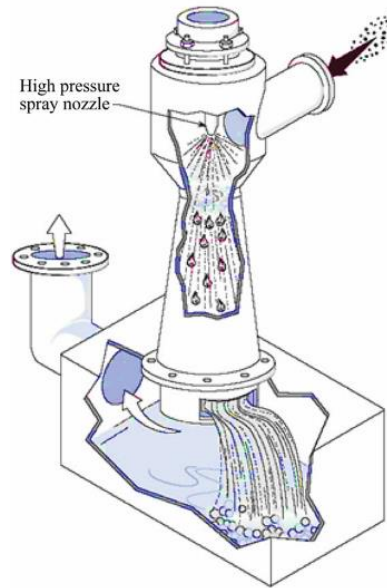
<u>Advantages</u>	<ul style="list-style-type: none"> ❖ Collecting flammable and explosive dusts safely ❖ Ability to handle high temperatures and moisture ❖ Removing both gases and particulate matter ❖ Wide area of application ❖ Long lifetime ❖ Safe and reliable operation ❖ Manufactured from various materials ❖ Low maintenance cost
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<u>Applicable Materials</u>	<ul style="list-style-type: none"> ❖ Stainless Steel ❖ Carbon Steel ❖ PTFE ❖ Hastelloy
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<u>Design Codes/ Standards</u>	<u>Quality Assurance</u>
<ul style="list-style-type: none"> ❖ ASME Sec.VIII ❖ ASME B.31.1 ❖ ASME B.31.3 	

<u>Kara Sanat Scrubbers Advantages</u>	<ul style="list-style-type: none"> ❖ High operational safety and little maintenance ❖ Wide load range ❖ Custom design ❖ Ability to produce the scrubbers with different types of materials proportional to corrosive/erosive medium or environment ❖ Wide area of application ❖ Long lifetime ❖ Easy to install ❖ High Efficiency ❖ Resistant to fouling ❖ Economical
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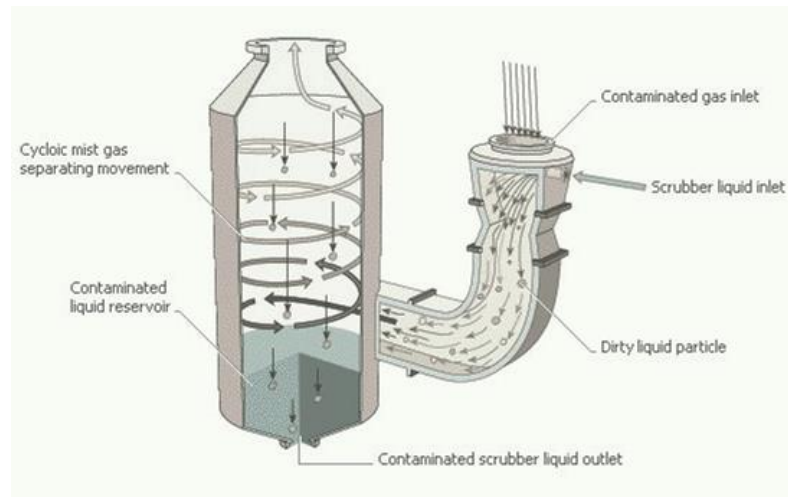
<u>Kara Sanat Scrubbers Types</u>	<p>There are numerous configurations of scrubbers and scrubbing systems, all designed to provide good contact between the liquid and polluted gas stream. Depending on the size of particle and the kind of gas which shall be removed, a special type will be selected. Kara Sanat scrubbers contain a wide range of applications for collecting different sized particulates and removing pollutants.</p>
<u>Jet Venturi Scrubber</u>	<p>Ejector makes the gas enter the scrubber and motive nozzle inside the ejector removes pollutants. It is unique among available scrubbing systems because of no need to a blower or fan.</p> <ul style="list-style-type: none"> ❖ Capable of handling a wide range of corrosive and/or sticky particles ❖ Effective in removing particles larger than 1.0 μm in diameter ❖ Higher liquid to gas ratios than most other particulate scrubbers ❖ Can be effective if the gas is very soluble or if a very reactive scrubbing reagent is used



Venturi Scrubber

They use a change in gas velocity to shear liquid streams into tiny target droplets which particulate and soluble gases are transferred.

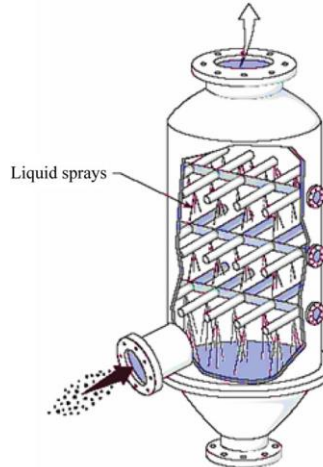
- ❖ Effective in removing particles larger than $0.6 \mu\text{m}$ in diameter
- ❖ Simple configuration and reliability
- ❖ Can be effective if the gas is very soluble or if a very reactive scrubbing reagent is used



Spray Tower Scrubber

Spray towers use spray nozzles to extend the surface area of the scrubbing liquid and enhance mass transfer of contaminant gas into the liquid.

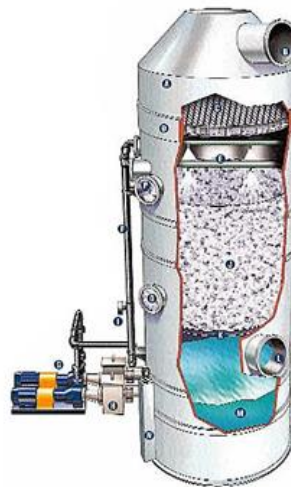
- ❖ Open vessel design where plugging or scaling may occur
- ❖ Lower cost alternate for high gas volume scrubbing applications
- ❖ Removing particles larger than $10 \mu\text{m}$ in diameter
- ❖ Capable of a small amount of gas absorption



Packed Tower Scrubber

Packed towers are gas absorption devices that utilize internal media of a variety types to enhance the mass transfer of gases into an absorbing liquid.

- ❖ Both air pollution control and recovery of process gases
- ❖ Control of soluble gases such as halide acids and to remove soluble organic compounds such as alcohols and aldehydes



Specifications of one Type

Item			
Project			
Purchaser			



Previous Projects

Equipment photos / Operation photos / Applications photos