

YOUR QUICK GUIDE TO TYPES OF GAS SCRUBBER

www.spray-nozzle.co.uk

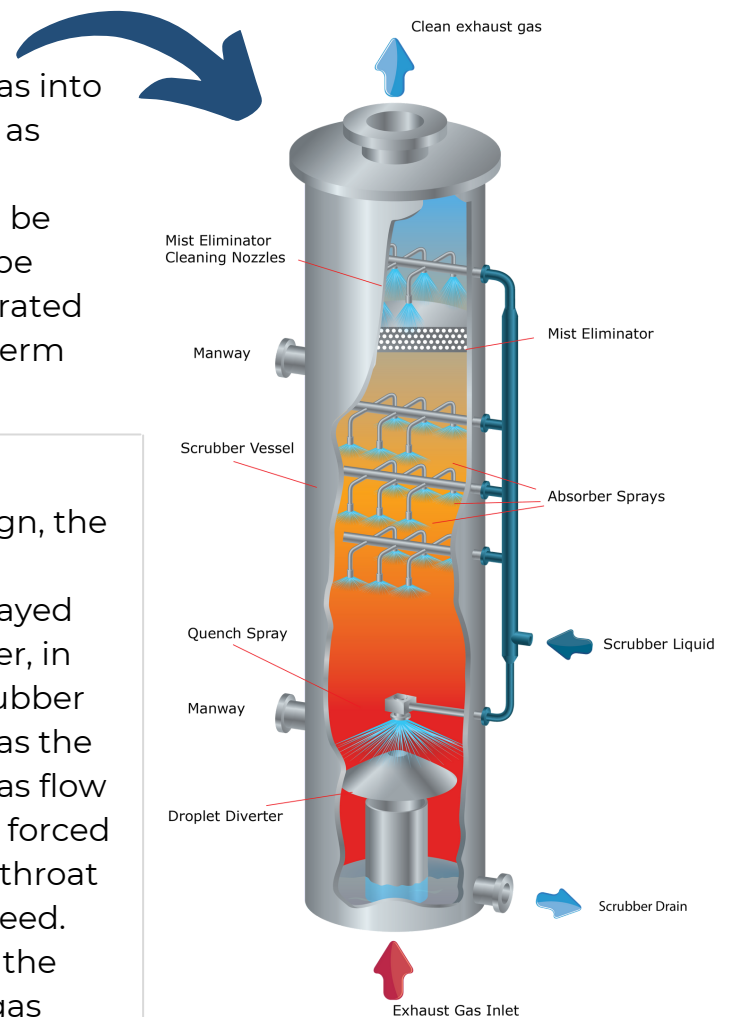
W E T S C R U B B E R S

Wet scrubbers allow gas to come into contact with a large volume of scrubbing liquid which will remove contaminants. These contaminants can be solids, liquids or gases and this is one of the main advantages of wet scrubbers; this scrubber design can get rid of all 3 different types of contaminants.

The main objective is to get as much of the gas into contact with as much of the scrubbing liquid as possible and the resulting gas which passes through the liquid will then be cleaned. It will be saturated with liquid and in many cases, will be cooled significantly which results in that saturated water condensing out of the gas. Hence the term wet scrubber.

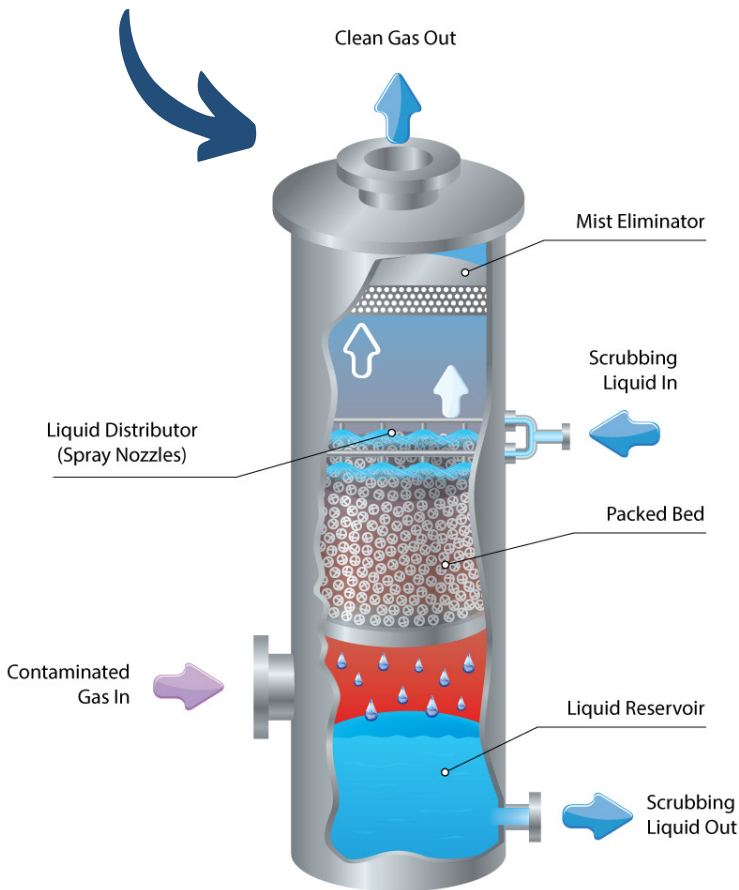


In a basic wet scrubber design, the gas is passed through a sprayed liquid. However, in other wet scrubber designs such as the Venturi, the gas flow is deliberately forced into a narrow throat to increase speed. By increasing the speed of the gas flow, the atomisation of the sprayed liquid is improved.



www.spray-nozzle.co.uk

Another design of wet scrubber in which several of our spray nozzles are deployed, is a packed bed scrubber.



This model uses a different principle to increase the surface area and contact between the scrubbing liquid on the gas.

In this design of scrubber, the liquid is sprayed onto a packed bed media. The liquid will then proceed to trickle through this and at the same time, the gas passes up through the media bed.

The media is made of geometrically complex shapes which serve to increase the surface area of the liquid as it trickles through and thus increase the contact with the gas.

DRY SCRUBBERS

A true dry scrubber will use powdered reagents to react with contaminants and remove them from the gas, and so do not require spray nozzles to spray the reagent into the gas flow.

However, in most designs, it is necessary and highly desirable to pre-cool the gas before it is reactive with the dry reagent. This is normally achieved by spraying water into the gas and using the evaporation of the water to rapidly cool the gas.

In these dry scrubber designs, only enough water is put into the gas so that it doesn't become over saturation point when cooled and condensate – it remains dry.

www.spray-nozzle.co.uk

The purpose of pre-cooling the gas or quenching the gas for a dry scrubber is twofold.

Firstly, it contracts the gas down, so it occupies a smaller volume and slows down the gas.

This creates more time for the reaction to occur and remove contaminants.

Secondly, these gases can be extremely hot and so cooling them down serves to protect the scrubbing part of the scrubber from the intense heat.

Whilst spray nozzles aren't used directly in true dry scrubbers to actually scrub the gas, they are an exceptionally important component in the pre-quench part of the scrubbers.

SEMI-DRY SCRUBBERS

In a semi-dry scrubber, a wet slurry is sprayed into the gas flow to react with other contaminants in the gas to form a solid; the gas remains dry despite the wet slurry being sprayed into it.

The most common type of scrubber is what we call Flue Gas Desulphurisation (FGD) which removes sulfur dioxide gas from a gas flow by spraying a lime slurry or lime liquid into the gas. This will react with the sulfur dioxide to form a solid calcium sulfide dihydrate, otherwise known as gypsum which will then fall out of the gas and removes the contaminant.

It's known as semi-dry because you're spraying a liquid into it, but the actual contaminants being knocked out get turned into a solid.

Our spray nozzles are therefore key components in all these gas scrubber types; here at The Spray Nozzle People, we advise engineering companies all over the world on correct nozzle selection for all the different types of gas scrubber mentioned in this article.