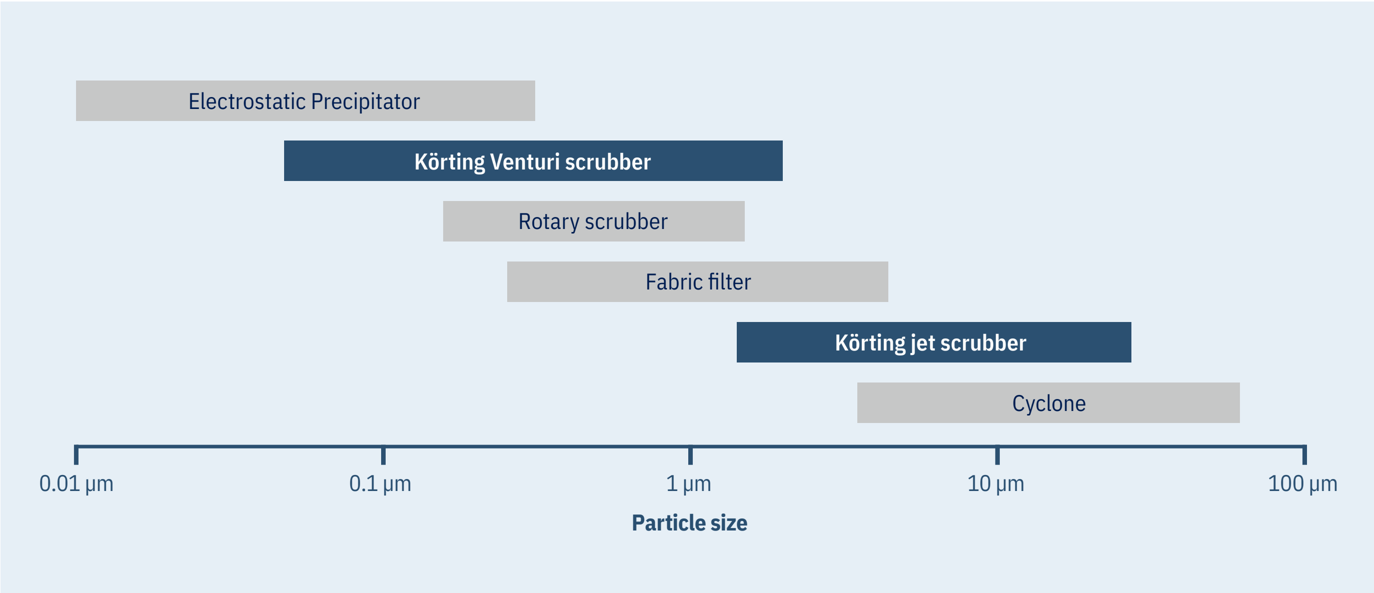
Leaflet

Dust separation

DEDUSTING PERFORMANCE OF JET AND VENTURI SCRUBBERS

A variety of scrubbers and filter systems are used for dedusting exhaust air or exhaust gas streams. Körting jet scrubbers and Venturi scrubbers cover a wide range of applications and are stand apart for their exceptional efficiency, long service lives and resistance to persistent contaminants.

WHERE THEY WORK BEST



Jet scrubbers and Venturi scrubbers work along a similar principle, but differ significantly in the gas-side differential pressure Δp: Jet scrubbers are used to separate particles > 3 µm and can provide a certain pressure gain on the gas side and convey the gas just like to a mechanical blower (Δp > 0).

Venturi scrubbers, which are by nature always subject to pressure loss (Δp > 0), are used for very high degrees of dedusting and separation of particles <3 µm.

Δp = Differential pressure of the wet scrubber
Δp > 0 → Pressure gain/conveying
Δp < 0 → Pressure loss

Some of the factors that affect the achievable dedusting performance of wet scrubbers are:

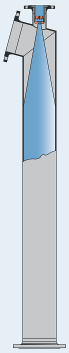
- Diameter and density of the particles
- Droplet diameter
- Number of droplets
- Relative velocity between droplets and particles

The greater the dust density, the diameter of the particles, the relative speed to the droplet and the higher the number of the finest possible droplets, the better the separation.

THE **EJECTOR** COMPANY

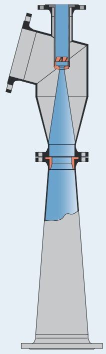
JET SCRUBBER

Particle size	Δp	> 0 mbar
	0.1 µm	0 %
	0.5 µm	3.5 %
	1.0 µm	55.0 %
	2.0 µm	94.0 %
	5.0 µm	98.0 %
	10.0 µm	≥ 99.0 %



VENTURI SCRUBBER

Particle size	Δp	-10 mbar	-20 mbar	-50 mbar	-100 mbar
	0.1 µm	0 %	0 %	30.0 %	85.0 %
	0.5 µm	3.5 %	80.0 %	94.0 %	98.0 %
	1.0 µm	55.0 %	92.0 %	96.0 %	99.1 %
	2.0 µm	94.0 %	96.0 %	98.5 %	≥ 99.5 %
	5.0 µm	98.0 %	99.0 %	≥ 99.5 %	≥ 99.5 %
	10.0 µm	≥ 99.0 %	99.4 %	≥ 99.5 %	≥ 99.5 %



If the particle size distribution (PSD) is known, the total degree of dedusting can be calculated as a function of the Venturi scrubber's pressure loss. The pressure loss is a metric indicating the energy required for dedusting. This energy is usually introduced into the system as fan power.

If the particle size distribution isn't known or is just a rough estimate, the actual total degree of dedusting can't be calculated, but only estimated.

The tables above show reference separation efficiencies of jet scrubbers and Venturi scrubbers, valid for a dust load of 1 g/m³ and a dust density of 2.6 kg/dm³. Higher dust loads and densities improve separation efficiency, lower ones worsen it. The values for the jet scrubber are almost independent of the level of pressure gain.

ADJUSTMENT DEVICE

To adapt to variable volume flow rates, or optimise dedusting performance, an adjustment device can be fitted to the Venturi scrubber. This allows precision adjustment of the dedusting zone's cross section and regulation of the pressure loss.

Dedusting system at Beta Renewables for bioethanol production from agricultural waste.

koerting.de/en/scrubbers.html

Find more information and the practical questionnaire for a quick quote request here.

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