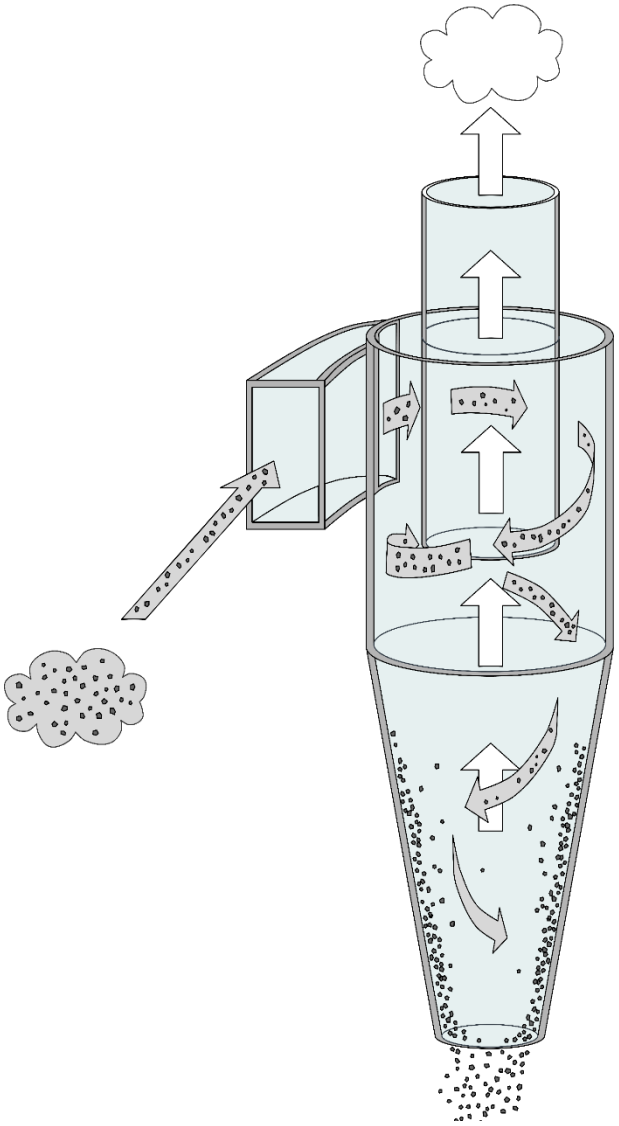
LOCAL VENTILATION SYSTEMS

Air cleaners for particles

The air cleaners for particles must be effective to remove the airborne contaminants from the air before it is re-circulated to the workplace or outside air.



Types of air cleaners

- **Fabric filters** are suitable for dry dusts. Dusty air passes in one direction through a layer of flexible, porous fabric. The fabric can be constructed and treated to carry an electrostatic charge that helps attract and hold dust. The pore size of the fabric will be crucial for the effectiveness
- **Cyclones** are used to collect dry dust and consist of a circular chamber, tapered at the base. The dusty air enters at a tangent at the top of the cyclone and swirls around the chamber. The particles are thus thrown towards the wall by centrifugal action. The speed of the particles decreases and they fall into a collection hopper at the base of the cyclone. The purified air passes through a central outlet at the top of the cyclone. The larger the particle, the easier it is for a cyclone to remove it from the air.
- **Electrostatic precipitators** are suitable for fine dust, but not for heavy contamination. They give dust and smoke particles an electrical charge and attract them to oppositely charged collecting surfaces. The cleaned air leaves the unit.
- **Wet scrubber** (venturi, spray collector and wet cyclone) are designed to wet and wash particles from a contaminant cloud.

Resources

Controlling airborne contaminants at work: a guide to local exhaust ventilation (LEV), Third edition. Norwich: TSO, 2017.

Air cleaners efficiency

Type	*Approximate efficiency*	*Comments*
Fabric filter	Can rise to over 99%	They are suitable for dry dusts. Mass loading to be considered.
Cyclone	0% for 2µm, 50% for 5µm and 100% for 8µm	The larger the particles are, the more efficient the system is.
Electrostatic precipitator	80% to 99% for 1 to 5µm >99% for 5 to 10µm	They are suitable for fine dusts but unsuitable for heavy contamination. They are not designed for ATEX situations.
Wet scrubber	96% for >5µm 20% to 80% for 1 to 5 µm	Numerous designs exist to wet and wash the contamination.

Back to LEV