

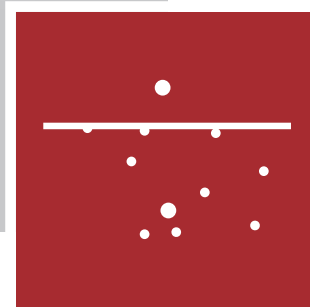
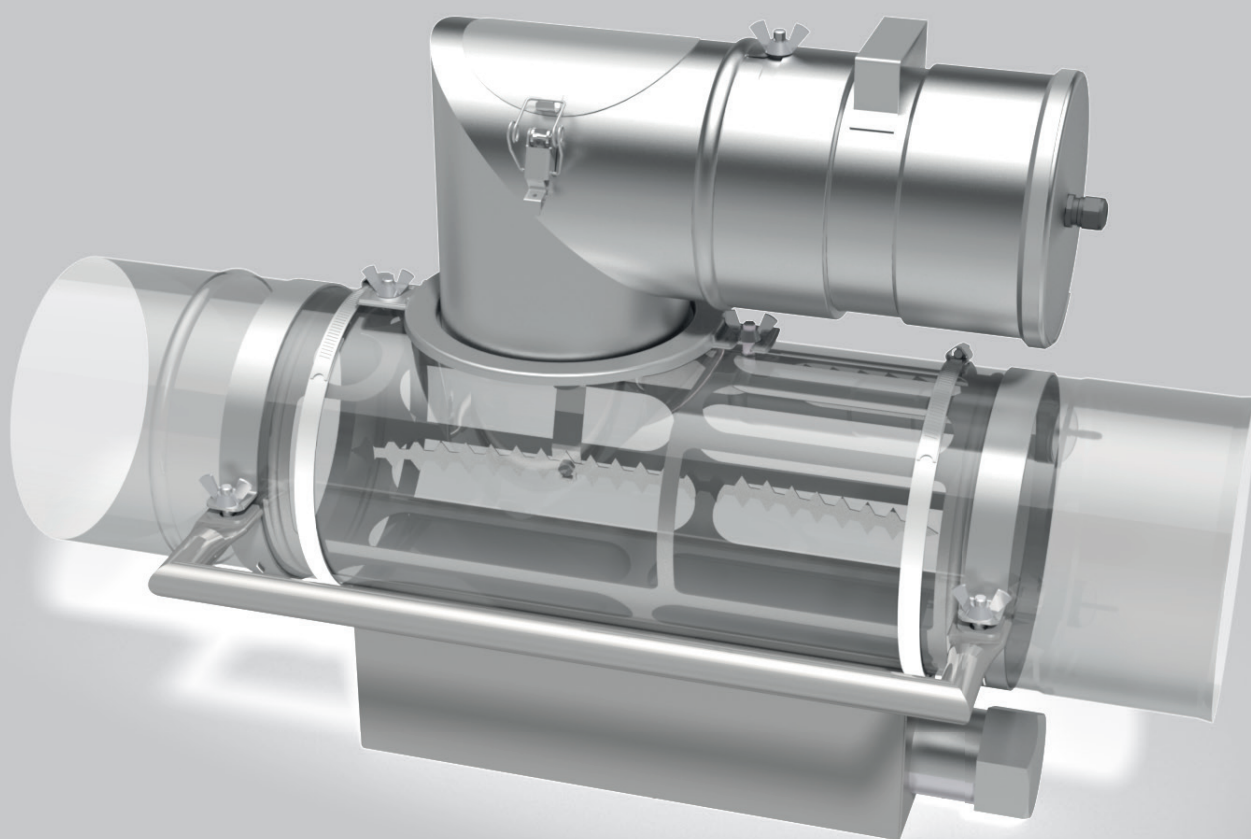
Hearth—Kitchen—Domestic

**KW**  
Kutzner + Weber

**EPS**

Electrostatic Particle Separator  
Solutions for fine dust reduction

Overview



# Fine dust

## What is fine dust?

Fine dust consists of tiny particles that have a diameter of less than 10 micrometers ( $\mu\text{m}$ ), i.e. less than 10 thousandths of a millimeter. For comparison: a human hair has a diameter of 70 micrometers. The particles also known as  $\text{PM}_{10}$  (fine dust) and  $\text{PM}_{2.5}$  (ultra-fine dust) are released to a large extent by combustion processes. Manufacturing, transportation, and heating are mainly responsible for their formation.

## Dangers due to fine dust

The problem of fine particles in the atmosphere is not new. However, their effects on our health have only been known for a few years. Mainly affected are urban areas with a high population and traffic density as well as regions where topography and climate facilitate the accumulation of particulate matter in the atmosphere.

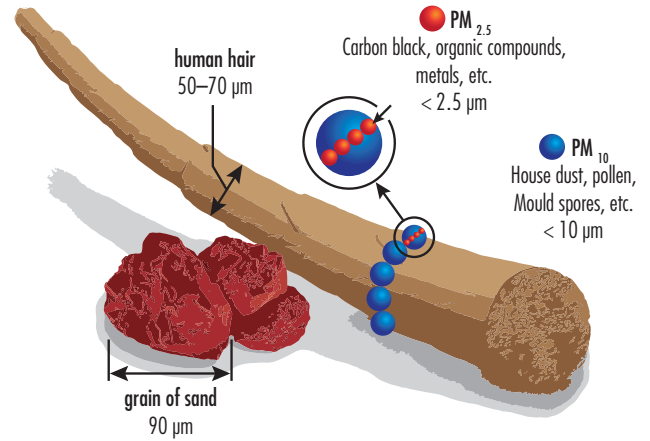
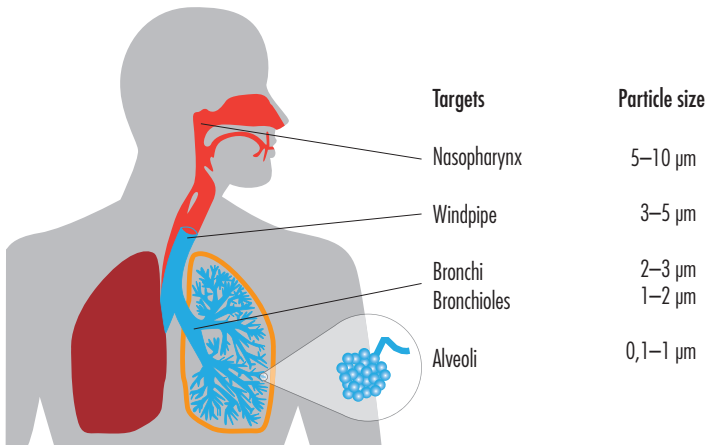
Due to their extremely small size and chemical composition, fine dust particles are dangerous to our health. They penetrate deep into our lungs and cause various diseases, ranging from chronic cough to lung cancer. In highly exposed areas, humans absorb about 50 million particles with every breath!

Our respiratory system is naturally equipped for larger dust particles. Much is absorbed in the nose or mouth and then coughed out or blown out again. Even particles that are already considered fine dust and are breathable can usually be removed by the body itself.

The situation is different in the medium and lower size range. The fine and ultra-fine particles penetrate the lungs and alveoli. Particles with a size of 0.1 to 1  $\mu\text{m}$  can even enter the bloodstream and body tissue via the alveoli, where they settle, react and mark the beginning of a carcinogenic infestation (cancer). In addition, the fine or ultra-fine particles are present in much larger numbers within the flue gas. For example, only 50  $\mu\text{g}$  of dust contains 12 million particles with a diameter of 10  $\mu\text{m}$  and 12 trillion particles with a diameter of less than 0.1  $\mu\text{m}$ . It is clear that the fine and ultra-fine dusts and connected aerosols in the air should be filtered out.

## Targets of fine dust in the respiratory tract:

The smaller the particles, the deeper they penetrate the lung system.



## The fuel wood and its effect on emissions:

### Today, wood is offered and burnt in three different forms:

- logs
- wood chips
- pellets

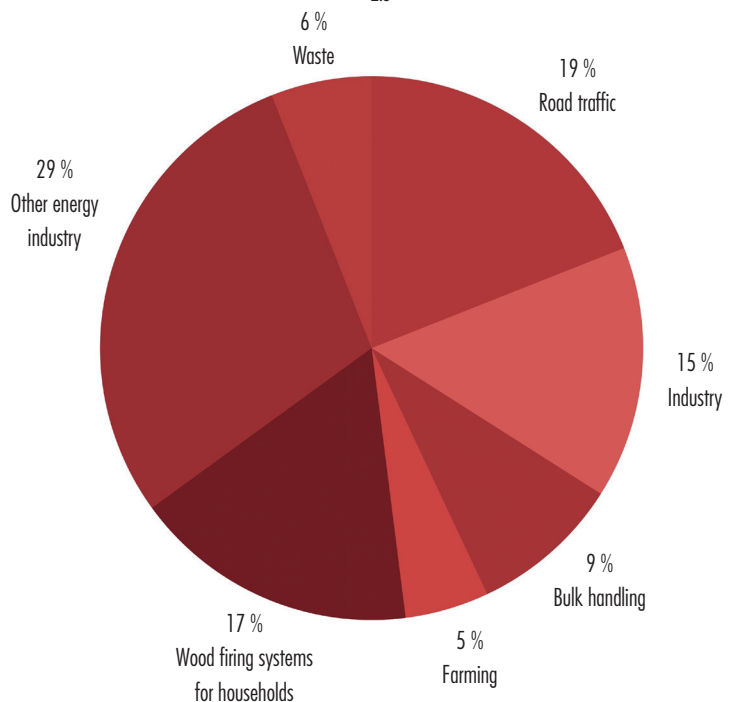
The vast majority of wood-burning appliances are single room fireplaces and stoves. Due to their high dust output, wood and pellet stoves are therefore known as the "mud-slinger" of wood combustion. But the majority of fine dust emissions come from industrial processes.

While modern plants typically comply with the current dust limit values during proper operation, it is becoming increasingly difficult for many existing plants to comply with the transitional limit values for dust. The installation of a particle separator is necessary in order to be able to continue to operate these plants without restrictions.

With the successive tightening of government restrictions and regulations, it will become increasingly difficult to comply with the limit values without a particle separator.

## $\text{PM}_{2.5}$ – total emission: 101 kt

### Distribution of sources of $\text{PM}_{2.5}$ emissions



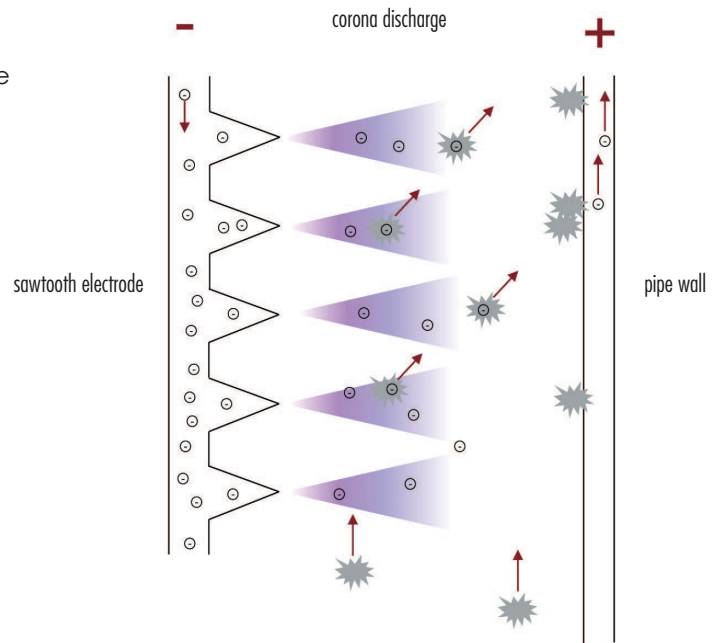
# Function

## How it Works

The principle of electrostatic particle separation is based on the following processes:

1. Generation of charge carriers
2. Charging of the particles
3. Separation of particles by electrostatic forces

An electric field is generated around a sawtooth electrode as soon as an electric voltage is applied to the electrode. If the voltage is sufficiently high, the electric field strength becomes so high that a corona discharge occurs. This creates charge carriers that charge the molecules in the exhaust gas. When the gas ions thus formed collide with the particles in the exhaust gas stream, the dust particles are finally charged. Due to the electric field, the charged particles are then forced onto the walls of the exhaust pipe, where they can be removed effectively.

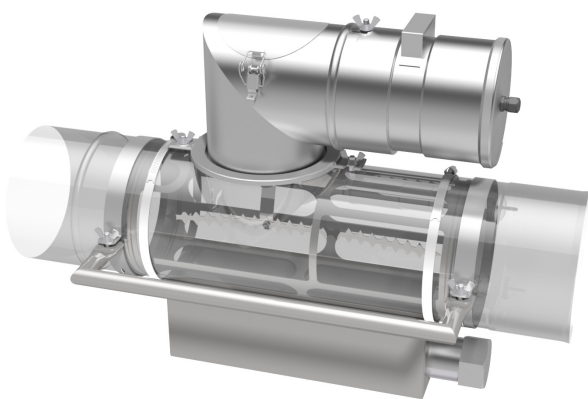


## The Benefits

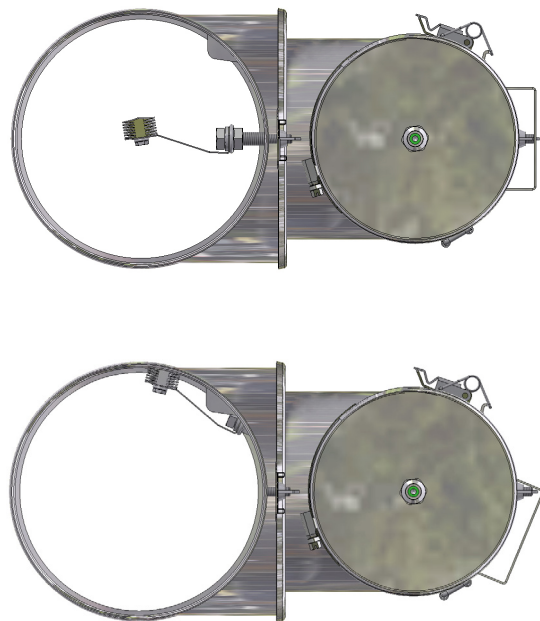
- ✓ Can be used in manually charged wood combustion systems up to 25 kW / automatically charged wood combustion systems up to 50 kW / metallic and ceramic flue gas systems
- ✓ Up to 90 % separation efficiency possible
- ✓ Proven efficiency
- ✓ DIBt approval, number Z-7.4-3442
- ✓ Trouble-free maintenance
- ✓ Can be integrated into existing systems
- ✓ Low operating costs
- ✓ Easy to get up and running and works automatically
- ✓ Technology tested and approved according to international directives
- ✓ EPS Top with automatic cleaning available
- ✓ Rotating electrode for easy cleaning
- ✓ No disassembly necessary for cleaning

## Also for ovens, open and closed combustion chambers, and wood-burning boiler systems

The principle of electrostatic particle separation of the EPS is universal and can be used with most types of small wood-firing plants, regardless of the brand and system. The particle separator works with manually charged wood-firing systems with a power range up to 25 kW / automatically charged wood-firing systems with a power range up to 50 kW and a flue gas pipe diameter of 130 mm to 250 mm.

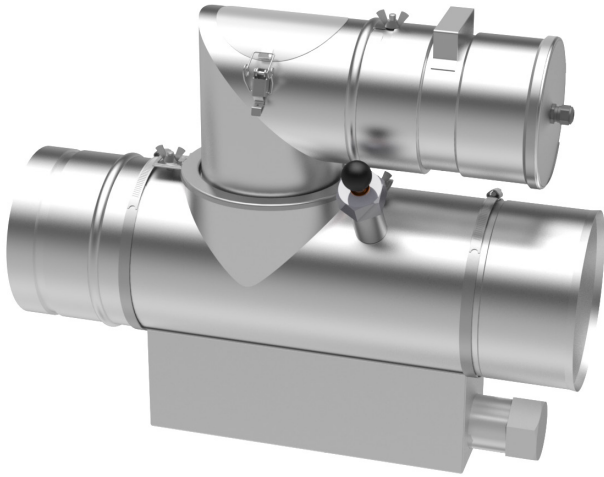


*The EPS Indoor has a movable cage for easy removal of the dust into the collecting container.*



*Rotating electrode for easy cleaning by the chimney sweep. No removal necessary!*

# The EPS



## For indoor use

### EPS Indoor

The standard solution for the indoor room with integrated cleaning mechanism. Separated particles can be collected outside the exhaust path and removed with an ash extractor.

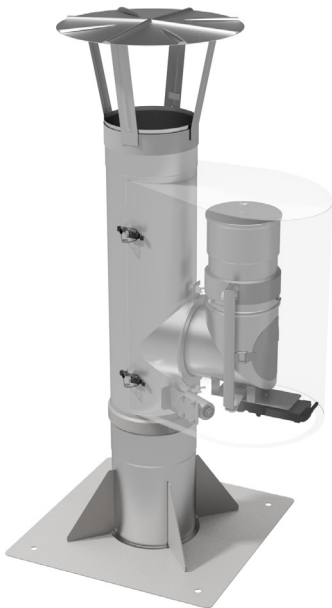
No removal necessary!



## For outdoor use

### EPS Outside

The solution outside the living room. Can be integrated into double-walled chimney systems. Weather protection by sheathing. Rotating electrode for easy sweeping of the chimney.



## For the chimney outlet

### EPS Top

The solution for the chimney termination. The proven system for special installation situations. Automatic rotation of the electrode against the wall for easy sweeping of the chimney.

**KW**

Kutzner + Weber

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Kutzner + Weber USA  
Distributed by RM Manifold Group  
120 S. Sylvania Ave. Suite A  
Fort Worth, TX 76111  
(817) 393-4029

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