

## ELECTROSTATIC PRECIPITATOR

### FUNCTIONALITY

In an electrostatic precipitator, particles suspended in the air stream are given an electric charge as they enter the unit and are then removed by the influence of an electric field. A high DC voltage (as much as 100,000 volts) is applied to the discharge electrodes to charge the particles, which then are attracted to oppositely charged collection electrodes, on which they become trapped.

Particles that stick to the collection plates are removed periodically when the plates are shaken or “rapped.” Rapping is a mechanical technique for separating the trapped particles from the plates, which typically become covered with a 6-mm (0.2 inch) layer of dust. An electrostatic precipitator can remove particulates as small as 1  $\mu\text{m}$  (0.00004 inch) with an efficiency exceeding 99%. The effectiveness of electrostatic precipitators in removing fly ash from the combustion gases of fossil-fuel furnaces accounts for their high frequency of use at power stations.

### EXPLOSION HISTORY

- Loss history for the past ten years due to dust explosions from FM Global Data Sheet 7-76:
  - Four in electrostatic precipitators for a loss of \$2,988,000

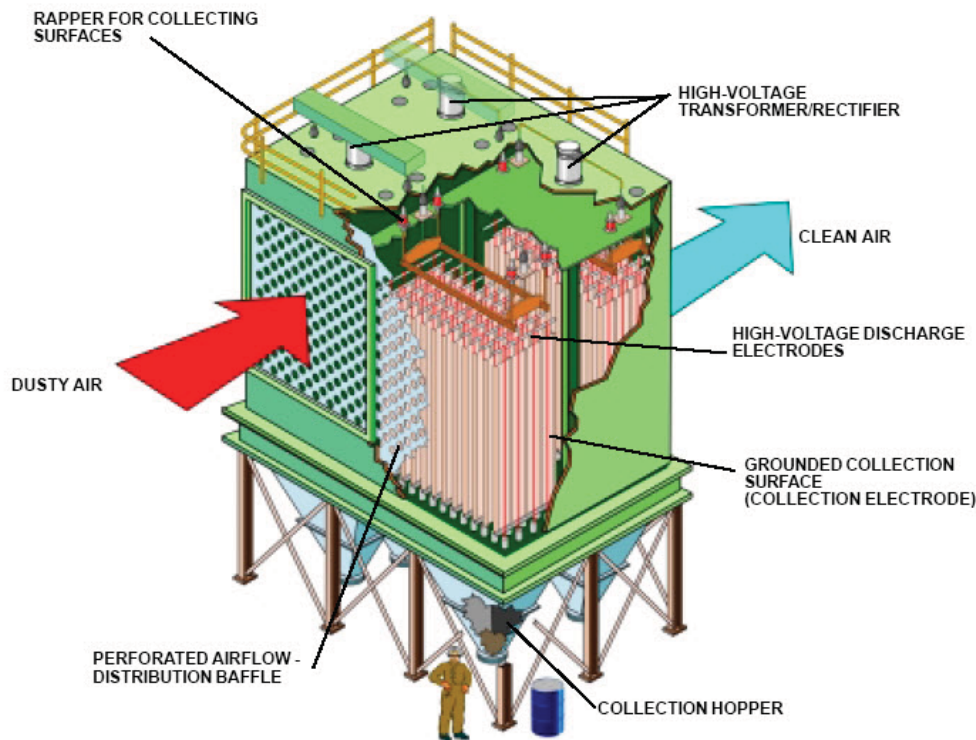


Figure 1: Sectional View of an Electrostatic Precipitator

## SOURCES OF IGNITION

Due to continuous spark generation and mechanical rapping, ignition sources are readily present in the electrostatic precipitator. Because electrostatic precipitators are designed to handle material produced elsewhere, the ignition source does not have to come from within the electrostatic precipitator.

## SOLUTION

One way of protecting electrostatic precipitators is through the use of explosion venting. Chemical isolation should be used on the inlet to prevent flame propagation to other equipment.

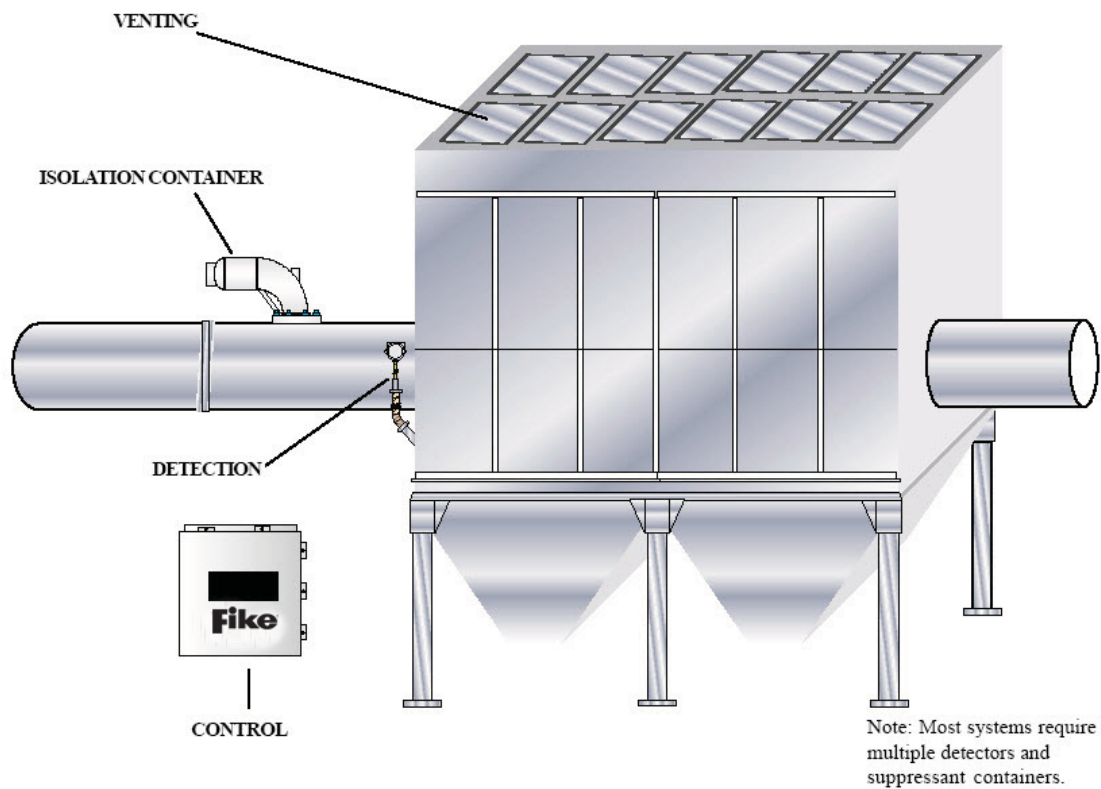


Figure 2: Electrostatic Precipitator Protected by Explosion Venting and Chemical Isolation

