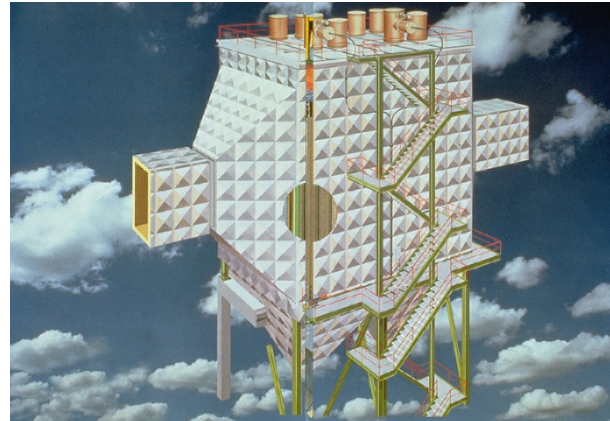


Electrostatic precipitators are more economical than other dust removal systems. Operating costs are reduced due to low energy consumption, reduced spare parts costs and minimal maintenance requirements. Optimum availability of the ELEX electrostatic precipitator is assured, which is as good or better as that of upstream equipment such as kilns, boilers and mills.



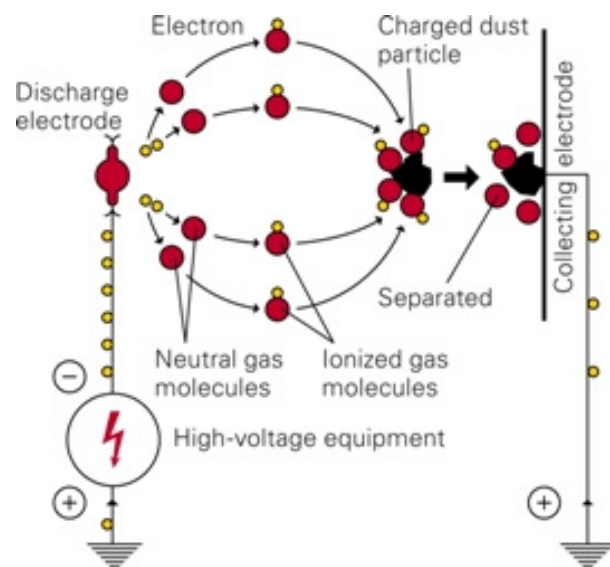
The typical applications for electrostatic precipitators are:

- Production plants for cement and limestone
- Coal- and oil-fired boilers
- Biomass fired boilers
- Refuse and sludge incinerators
- Gas production plants
- Production plants for iron and steel
- Production plants in the electro-metallurgical, chemical and cellulose industry

Method of operation

The electrostatic precipitator is suitable for the separation of solid particles from gas.

Electrons are emitted from discharge electrodes which have been charged with a rectified negative high voltage. These electrons migrate to the collecting electrodes and meet thereby gas molecules and dust particles. As the electrons accumulate on the dust particles, the latter become negatively charged; the electric field transports them to the earthed collecting electrodes where they remain.



In the ELEX horizontal electrostatic precipitator, the collecting electrodes consist of profiled plates. These form a system of passages through which the exhaust gases flow. The robust and unbreakable discharge electrodes - type RS - are arranged along the central axis of the 400 mm wide passages. Mechanical rapping equipment cleans the collecting as well as the discharge electrodes by means of periodic rapping.

Sizing

The velocity component at which the particles move in the gas stream towards the collecting electrodes is known as the migration velocity. It is a theoretical value only but it is a very important empirical factor for sizing. With the formula developed by W. Deutsch in 1922, the dust removal efficiency can be calculated.

Important parameters, which determine the migration velocity, are:

- Electrical resistivity of the dust
- Dust content at the precipitator inlet
- Dust content at the precipitator outlet
- Granulometry
- Chemical composition of the dust
- Gas analysis
- Gas temperature
- Gas humidity
- Gas velocity and many more

The electrical resistivity of the dust is one of the most critical values. It is primarily material-dependent and in most cases changes in several orders of magnitude depending on the temperature and humidity.

Electrical equipment

Electrical equipment must be adapted to the prevailing operating conditions to achieve the high dust removal efficiencies required today. The components installed by ELEX guarantee reliable operation with a correspondingly high degree of availability. The power supply system of an electrostatic precipitator consists of:

- Thyristor-controlled high voltage rectifier
- Control cabinet with automatic voltage control and thyristor with current limiting reactor
- Hand-operated disconnecting switches and, for certain applications, additional electromagnetically or pneumatically operated fast response earth switches. (These components can be located with the high voltage equipment in the HV-room or on the roof of the precipitator)
- The low voltage switch gear cabinet for the auxiliary equipment (e.g. rapping mechanisms, insulators and hopper heating as well as dust conveying equipment).

High voltage control

The objective of ELEX is always to achieve the technical and most economical optimum solution for each application. For that reason, stringent demands are placed on the high voltage microprocessor:

- Perfect collection of the signal values, what means quick and differentiated recognition of flash-overs and arcs.

- Compensating the signal values, so that an optimal adjustment of the current supply is ensured to the constantly changing physical requirements.
- Possibility of the modulation of one or several half waves for high dust resistivity operation and/or for energy conservation and clear fault tracing
- Simple adjustment to new operating conditions
- Automatic handling of back corona conditions

Low voltage switchgear cabinet

For control purposes, programmable logic controllers (PLC's) are used, which guarantee efficient connection to the microprocessor controlled high voltage equipment.