ELECTROSTATIC PRECIPITATOR

ELEX
FOR BETTER AIR

ELEX – EXCELLENT INDUSTRIAL GAS CLEANING SINCE 1934

ELEX is the globally recognised leader for the cleaning of industrial gases and recovery of reusable materials. Each of the more than 7‘000 plants installed worldwide since 1934 focuses on specific customer needs. Depending on stated requirements, the plants are either completely manufactured by ELEX or within the parameters of project-related cooperation agreements, as new units or extensions to existing plants.

We are dedicated not only to cutting-edge technology but also to the utmost reliability and durability of our products. This commitment lies at the heart of our product design, making our name synonymous with the flawless purification of industrial gases. Our expertise in crafting integrated solutions assures our customers that they can trust us both now and in the future. ELEX stands unrivaled in quality and our innovative spirit will undoubtedly continue to shape the next 7‘000 units and beyond.

HIGH QUALITY ASSURANCE - YOUR WORRY FREE SOLUTION

When we talk about quality, we mean much more than just flawless technology, customer-oriented solutions and products that are reliable and durable. Our passion for quality runs like a red thread through every aspect of our collaboration – be it before, during or after the production and installation of your plants.

Our business philosophy is shaped by years of experience, highly skilled and flexible employees and our comprehensive expertise, which allows us to optimize your plant to meet your specific requirements throughout its entire lifecycle. Our goal is to always provide you with tailored solutions that meet your needs.

MINIMUM EFFORT DURING THE EVALUATION PHASE

Lightening your work load begins as early as the project-planning stage. We place great emphasis on listening to you and asking the right questions to provide you with the best possible solution in the shortest time and with the least effort on your part.

UNINTERRUPTED OPERATION DURING THE IMPLEMENTATION PHASE

With Swiss reliability and thoroughness, we meticulously conduct our preliminary clarifications and holistic project planning to ensure that the installation of your plant leaves you entirely satisfied. We prioritize punctuality and cost adherence, while minimizing any impact on your operations until the handover of the facility.

MAXIMUM RUNNING TIMES DURING THE OPERATING PHASE

After our highly qualified engineers have installed the plants with their expertise and carefully trained your technical staff, it is extremely rare. You will also experience this level of reliability. Our plants are known for their remarkable dependability and enduring performance. However, should you ever require our assistance, whether for comprehensive maintenance, integrating new components or consulting on modernizing the plant, we will be readily available to help.

Calcination of $CaCO_3$, Japan
Electrostatic Precipitator

Cement works, Germany
Clinker cooler

ELECTROSTATIC PRECIPITATOR

The electrostatic precipitator remains to this day the most cost-effective method for the removal of dust from industrial gases. Primarily, the electrostatic precipitator distinguishes itself through its comparatively low energy consumption when compared to other systems. Furthermore, maintenance and spare part costs are extremely low, making it an attractive solution. Another outstanding characteristic of the electrostatic precipitator is its impressive lifespan, which typically surpasses that of the upstream production units, such as kilns, mills, driers and coolers. With ELEX's electrostatic precipitator, a proven solution is available that can reduce dust levels from over 1'000 g/m^3 to any required residual content. Over 7'000 ELEX electrostatic precipitators worldwide have been demonstrating their efficiency and durability since 1934.

SCOPE OF APPLICATION

Electrostatic precipitators can be crafted in a diverse array of configurations and you'll discover the ideal solution for your needs within our offerings. We offer both dry and wet electrostatic precipitators in horizontal or vertical designs, tailored to your specifications and demands. Our electrostatic precipitators find extensive utilization within production facilities for cement, lime and gypsum. Nevertheless, their versatility extends to coal- and biomass-fired steam boilers as well as waste and sludge incineration furnaces. Moreover, we extend an array of additional application possibilities. At ELEX, our unwavering commitment to perfection drives us to engineer solutions that are not only technologically superior but also highly cost-effective, fully meeting all of your requirements.

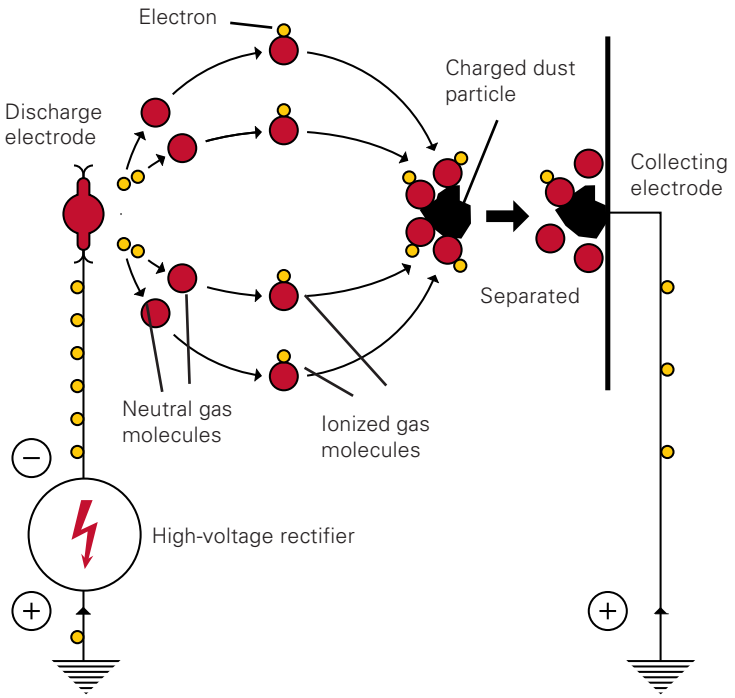
SUCESS FIGURES

>7'000 ELECTROSTATIC PRECIPITATORS

43'680 m² MAX. PRECIPITATION AREA

2'800'000 m³/h MAX. VOLUME

ACHIEVE THE LOWEST EMISSIONS WITH THE HIGHEST COST-EFFECTIVENESS THROUGH ELEX'S METHOD OF OPERATION



Electrons are emitted from discharge electrodes which have been charged with a rectified negative high voltage. These electrons migrate towards the collecting electrodes, causing the dust particles to acquire a negative charge as they accumulate. The electric field then guides these charged particles towards the grounded collecting electrodes for deposition.

In the ELEX electrostatic precipitator, the collecting electrodes take the form of profiled plates, creating a system of passages through which the exhaust gas flows. The robust ELEX discharge electrodes, known as the "RS" type, are arranged along the central axis of the 400 mm-wide passages. Periodic mechanical rapping is employed to clean the collecting electrodes. These robust RS electrodes, coupled with a user-friendly maintenance design, exemplify just a couple of the key attributes of the ELEX electrostatic precipitator.

EFFICIENCY AND DURABILITY THANKS TO OPTIMAL DIMENSIONING

ELEX plants are distinguished by their tailored design, precisely aligned with the customer's needs, avoiding both over- and under-sizing. This approach guarantees an optimal cost-benefit ratio, achieved through dependable calculations built on years of experience.

The migration velocity represents a highly crucial empirical value for the sizing process. With this value, the efficiency of the dust removal can be calculated. Through precise and meticulous calculations, we ensure that the plant operates optimally to guarantee the highest degree of efficiency.

$$w = \frac{-V}{NF} \times \ln(\varepsilon)$$

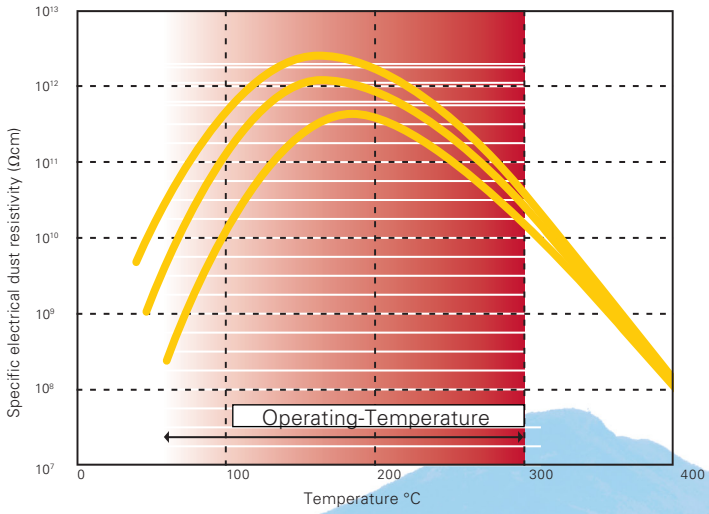
w	= migration velocity
V	= gas volume
NF	= filter size
ε	= efficiency

Formula used to calculate migration velocity

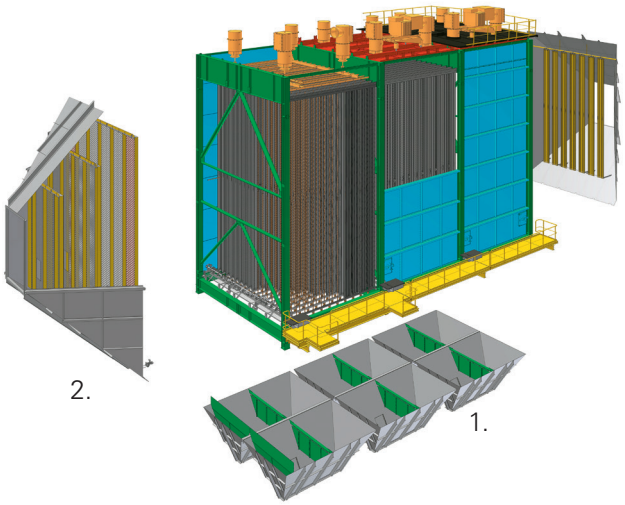
The electrical resistivity of the dust is one of the most critical values. It is primarily material-dependent and in most cases changes by several orders of magnitude depending on the temperature and humidity.

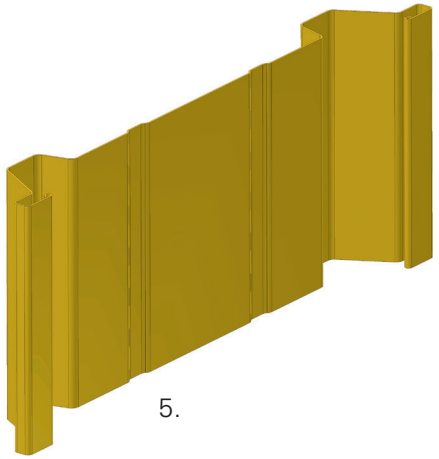
Significant factors, which to a certain degree, exert a reciprocal influence on the parameters that govern migration velocity:

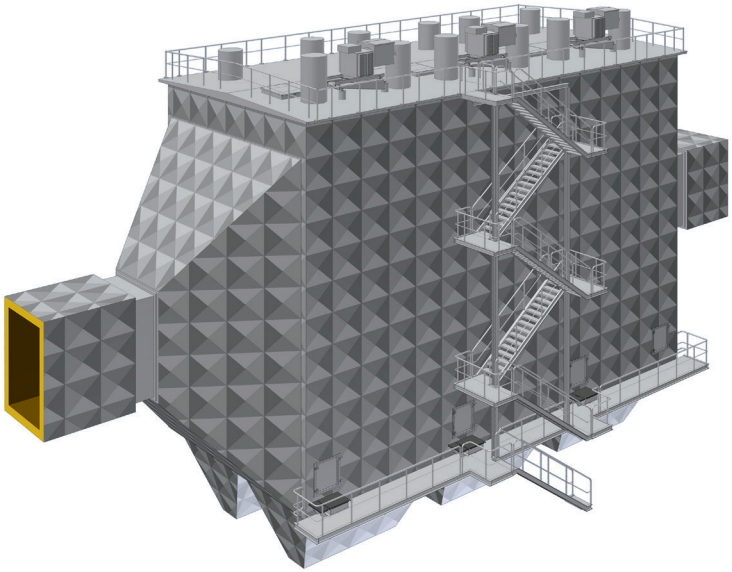
- Electrical resistivity of the dust
- Dust content at the precipitator inlet
- Dust content at the precipitator outlet
- Grain size
- Chemical composition of the dust
- Gas composition
- Gas temperature
- Gas humidity
- Gas velocity

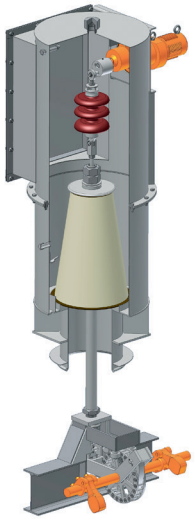


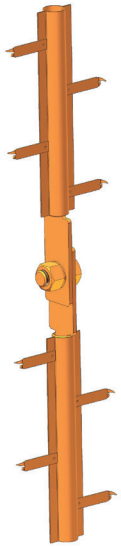
Measurement of dust resistivity dependent on temperature

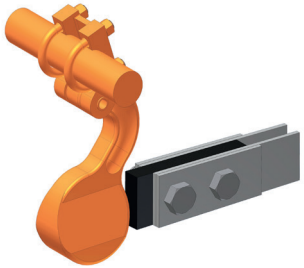












1 Dust collection hopper
2 Gas inlet with gas distribution
3 Discharge electrode rapping
4 Discharge electrode
5 Collecting electrode
6 Collecting electrode rapping

SAFETY AND TROUBLE-FREE OPERATION THANKS TO THE BEST ELECTRICAL COMPONENTS

The strength of a chain is significantly contingent upon its weakest link. To meet the stringent demands we place on our plants, we rely exclusively on components of the highest quality. Our profound understanding of optimal sizing ensures that costs remain within reasonable bounds.

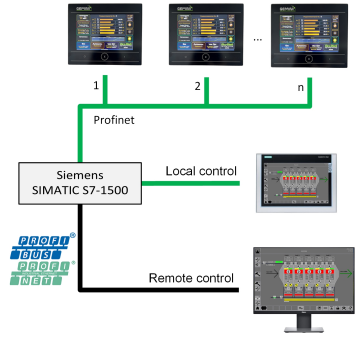
The most important electro-technical components:

- Microprocessor-controlled high-voltage rectifier
- Control cabinet with automatic voltage control and thyristor with current-limiting reactor for:
  - Accurate recording of signal values, i.e. rapid and refined diagnosis of sparks and arcs
  - Regulation of the output values so that optimum adaptation to the constantly changing conditions is ensured
  - Modulation of one or several half-waves for the purpose of high dust resistance and/or saving energy
  - Easy-to-understand failure diagnosis
  - Simple adaptation to new operating conditions
- Hand-operated earthing switch and, for certain applications, electro-magnetically 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)
- Low-voltage switch-gear cabinet for the auxiliary equipment (e.g. rapping mechanisms, insulators, and hopper heating and dust-conveying equipment)

Individually controllable controls (so-called SPS) ensure an efficient connection to the microprocessor-controlled high-voltage equipment.

High-voltage control cabinets with microprocessor controls

High-voltage rectifier



Connection of high-voltage control cabinets by means of bus systems

WE WILL NOT SETTLE FOR LESS THAN THE BEST WORLDWIDE

For a list of references and for more information, please visit our website at www.elex.ch.

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