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Plastic | Linings

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**STEULER** Plastic | Linings

## COMPONENTS FOR PLASTIC WET ELECTROSTATIC PRECIPITATOR

All data relate to our current state of knowledge; they do not represent quality specifications.  
Technical details subject to change. KT 0079 1811 EN 250 Printed in Germany

FOCUS ON PROGRESS

# COMPONENTS FOR PLASTIC WET ELECTROSTATIC PRECIPITATOR

Steuler plastic fitted parts for wet electrostatic precipitators are used to filter aerosols (e.g.  $H_2SO_4$ ,  $SO_3$ ,  $TiO_2$  and tar) as well as fine dust from gas mixes, and are used in many sectors e.g.:

- **Chemical industry**
- **Non-ferrous metal recovery**
- **Waste incineration**
- **Power stations**

# AEROSOL AND FINE PARTICULATE MATTER FILTER OUTPUT



Wet electrostatic precipitators bind up to 99.% of the dusts and filter up to 99.9% of the aerosols in the exhaust gas - even very small particles smaller than micrometres ( $1.0 \mu m$ ) are recorded.

This high level of filtering depends on the complex operating conditions of the system. A decisive factor, is the mutually impacting optimum interaction of exhaust gas volumes, loading of the gas flow and temperatures. We are looking for a broad, flexible operating window, at the same time also optimum synergy effects of operating factors to maintain or even exceed the high filtration levels. And it is precisely for this that Steuler supplies the matching materials, designs and the special detail expertise.

# REVAMP TECHNOLOGY

New materials, that are used specifically, and also innovative designs expand the application options of the plastics and lead to more efficient system outputs. We check the operating conditions and therefore the overall load of the apparatus. The respective chemical, thermal and mechanical loads are extensively queried, analysed and reviewed for corresponding technology concepts. Based on the loads, we select the best suited material combination. Accordingly, the parts are designed and the overall concept optimised.

We are specialists for revamping or generally overhauling existing systems. We maintain cooperations that allow us access to the necessary process engineering. Instead of investing in a completely new system, it is often worthwhile integrating new developments and more efficient concepts into existing systems to upgrade to the state of the art. There are often manageable investments that often pay off very quickly thanks to higher process and filtering output levels, as well as higher system security.

# TAILOR-MADE SOLUTIONS



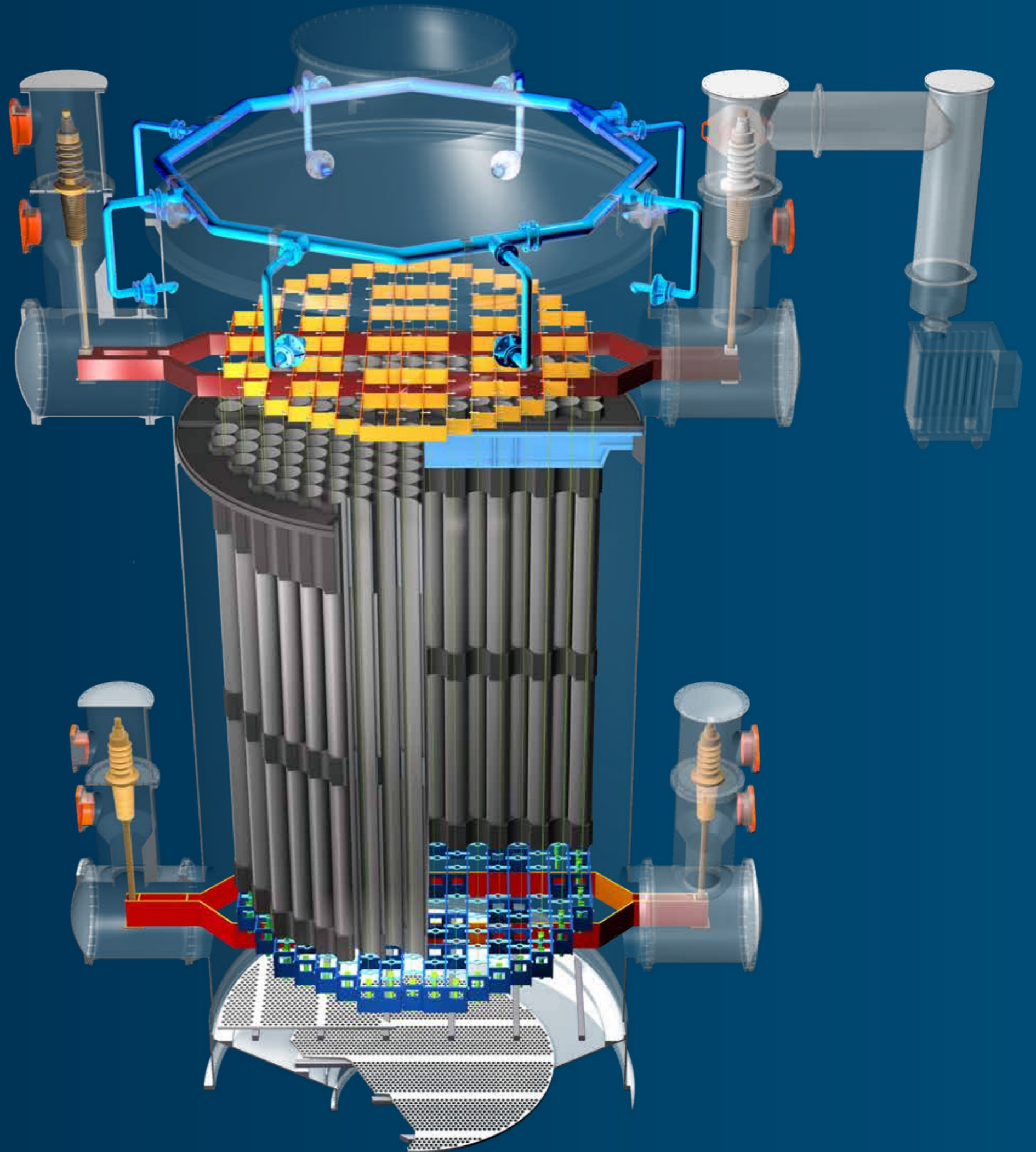
There is no such thing as a universal wet electrostatic precipitator – each filter is designed for a defined performance profile. The filter cross-sections are standardised and/or optimised to defined casing sizes. The filter output is defined by the number and length of the pipes. All necessary filter cross-sections and pipe lengths can be realised in particular when existing systems are revamped.



# BASIC TECHNOLOGY

The wet electrostatic precipitators have vertically arranged pipes as a filter surface in the centre of which there is a discharging electrode in a coaxial direction. Due to the applied negative high voltage on these electrodes, an electrical field toward the pipe wall is created. This causes electrical negative charging of the aerosols and/or dust particles (adhesion of electrons). Following the electrical field lines, these negatively charged parts change into positively charged pipe walls, where they are filtered and/or the pipe walls are wetted and form the necessary current pathway to close the current circuit.

The electrons are collected via a grounding on one of the pipe ends and returned to the high voltage generator.



# FILTER CASING FOR WET ELECTROSTATIC PRECIPITATOR

Depending on the project, Steuler can also supply filter casings. Material combinations for filter casings are:

- **Composite material polyvinyl chloride (hard PVC) / FRP** can bear loads of up to 70°C
- **Composite material low flammable polypropylene (PPs) / FRP** can bear loads of up to 80°C
- **Composite material polyvinyl chloride after-chlorinated (PVC-C) / FRP** can bear loads of up to 90°C
- **Pure FRP version with an additional chemical layer** can bear loads of up to 100°C
- **Composite material polyvinylidene fluoride (PVDF) / FRP** can bear loads of up to 120°C

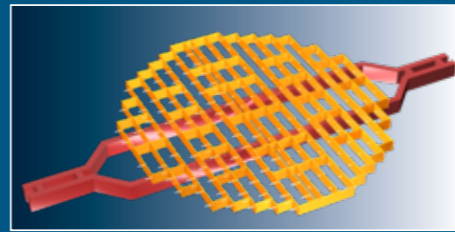
All cladding / chemical protection layers are low-flammable and self-extinguishing. The load-bearing FRP wall structure with e-glass and/or ECR-glass as a reinforcement material is based on isophthalic acid resins and/or vinyl ester resins. We also supply steel housings with a FRP coating (can bear loads of up to 100°C) or rubber-coated steel constructions (can bear loads of up to 80°C).

The outsides of the FRP filter housing have an electrically conductive coating and grounding connections to discharge electrostatic charging.

# TUBE BUNDLE FOR WET ELECTROSTATIC PRECIPITATOR



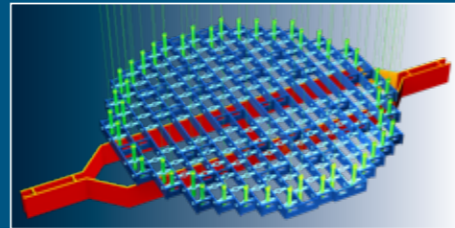
Ring line with nozzles for surge water rinsing of the tube bundle filter surface. Optionally, a ring line with nozzles and mist nozzles for additional wetting of the filter can be supplied.



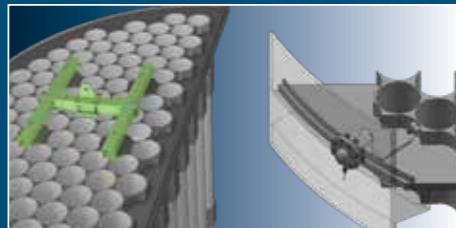
Electrically-insulated upper bearing beam with inserted grid to discharge the discharging electrodes. In addition to rubberised-steel, lead-coated steel and stainless steel, also available in plastic.



Ready-to-install tube bundle including several redundant grounding of the tube bundle ends with carbon inserts.



Electrically insulated lower beam with a PVC-C guide grid and integrated electrode guides for defined, stable positioning of the discharging electrodes.



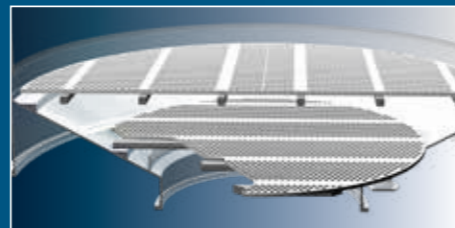
Specially certified lifting beams. Ground line with connection to the tube bundle.



Two-level thermoplastic upper gas distribution. Plates with freely definable hole pattern for optimum gas distribution.



Plastic tension weights for stainless steel discharging electrodes. Air correction nozzles. Insulated cleaning hold lids with a conductive coating.



Two-level thermoplastic lower gas distribution. Plates with freely definable hole pattern for optimum gas distribution.

Steuler supplies thermoplastic tube bundles in various materials:

- **Polyvinyl chloride (hard PVC)** can bear loads of up to 60°C
- **Low flammable polypropylene (PPs)** can bear loads of up to 80°C
- **Polyvinyl chloride after-chlorinated (PVC-C) / FRP** can bear loads of up to 90°C
- **Polyvinylidene fluoride (PVDF)** can bear loads of up to 120°C

But plastic is not just plastic. In addition to these material classes, special grades are also used. The range is enormous. We know how to use and process these special materials correctly, and to optimise the benefit of the added material quality.

All tube bundles are self-supporting, modular designs made of low-flammable and self-extinguishing materials. Low-flammable polypropylene (PPs) satisfies this requirement up to a value of 28% oxygen in the exhaust gas. The tube bundles are available with or without electrically conductive graphite-based inner layers in a round and hexagonal form. The inside surfaces of the pipes are roughened for better wetting and to maintain the current pathway.

In the case of very unfavourable, fluctuating operating behaviour and therefore the drying of the filtering surfaces, the pipes with the conductive inside layer form an emergency current pathway and therefore protect the overall obstruction effectively. The pipe ends are equipped with multiple redundant carbon earths of a very low resistance. This type of grounding has been used very successfully for almost 30 years and is essential for the smooth and efficient operation of a plastic filter.

Pipes with a diameter of 160 to 400 mm are used; the outer diameters 200, 240, 250 and 400 mm are standardised. Steuler delivers tube bundle sizes precisely designed to the respective system concept.

Even tube bundles that are 7 m long are used successfully.

One special specification are the Steuler tube bundles with additional water cooling. These composite offer design benefits:

- **Composite material polyvinyl chloride / FRP** can bear loads of up to 65°C
- **Composite material low flammable polypropylene / FRP** can bear loads of up to 80°C
- **Composite material polyvinyl chloride-C / FRP** can bear loads of up to 90°C

## TUBE BUNDLE VARIANTS

