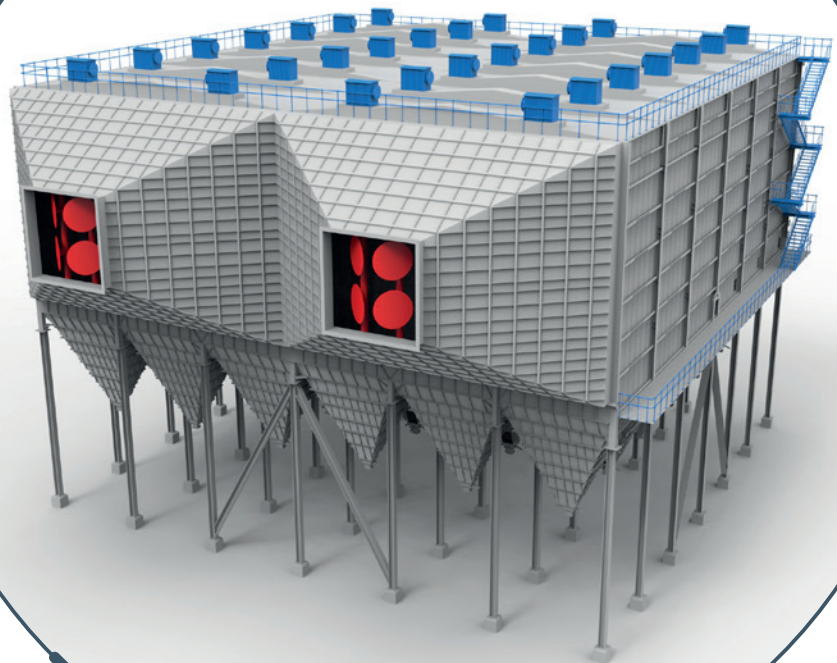


Rothemühle electrostatic precipitators

Optimised emissions control
through ESP enhancement



Increased emissions control through enhanced ESP operations

Electrostatic precipitators are a vital contributor to lowering emissions from plant operations as they capture particles from waste gas streams.

With the growing focus on controlling emissions for environmental protection, it is vital that the technology performs to its maximum level.

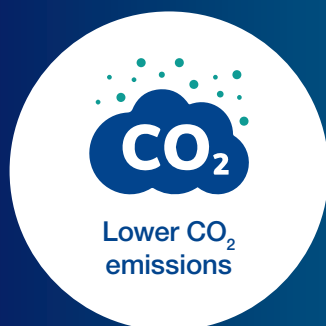
Howden, a Chart Industries Company, can leverage more than 70 years of experience from the development of our Rothemühle product range. We provide operators with consulting on gas cleaning, dedusting and environment protection techniques.

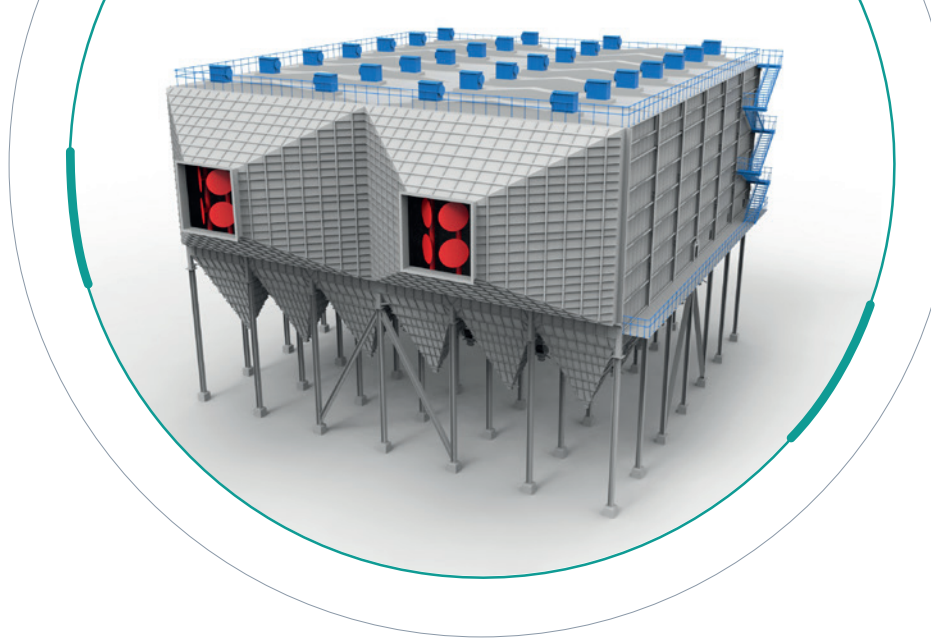
This involves conducting of measurements and analyses at operating plants for aerodynamic optimization of existing systems.

Based on the results of analysis, Howden offers a range of upgrades, refurbishments and enhancements to meet operator targets.

All projects are fully managed from design engineering, through execution and commissioning.

Ongoing support through maintenance and service framework agreements gives assurance of performance along with responsive parts provision.





Full refurbishment of the ESP with new internals

New internals bring the ESP up to standard with the latest in technological advancements without the cost of a full replacement or impacting the broader installation and operation.

The refurbishment targets key aspects of the system:

Collecting and discharge electrode (CE/DE) systems

- The system is optimized by installing a new shape and pipe and spikes design based on Howden's in-depth industry experience
- Spacing of pipes and spikes are set according to operating conditions to best match process and emissions requirements

Dedusting/rapping system

- The rapping mechanism is simple and robust to ensure reliable continuous operation

Transformer/rectifier (T/R) system plus controller

- The latest systems available provide improved controller performance as well as enhanced energy management

Separation performance upgrades to the ESP

Increased performance of the ESP is possible by focusing on a number of components within the ESP that influence the capture of dust or substances.

Upgrades can be applied to some or all of these features:

Modification of casing height, width and/or length

- Reuses the casing while increasing performance

Increased height of collecting electrodes (up to 16m)

- The large electrode height offers minimal footprint with constant collecting area

Higher sectionalisation (double the number of T/R sets)

- Improved adjustment of local separation efficiency

Replacement of HV aggregates by SMPS

- Increased mean value of ESP voltage and ESP current due to improved form factor and faster acting voltage controller

Additional zone

- Increase of separation space

Efficiency upgrades with DELTA WING™ static gas mixers

DELTA WING™ advanced static gas mixers increase the efficiency of an ESP by homogenizing the inflow of process gas along with any conditioning agents. An optimized flow is achieved regardless of load and with minimal pressure loss.

Static gas mixing to address flow issues

- Improved flow through the ESP by up to 75% minimizing flow separation
- Improved in-flow by better distribution of dust across whole ESP cross section
- Flow improvements avoids settlement of dust/particles in sections of the ESP

Gaseous or liquid absorbents and reactants (e.g. NH₃ or SO₂) can be injected into the flue gas

- Improved dust removal from the flue gas

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