

Metso

High Efficiency Scrubber (HES) Optimizer





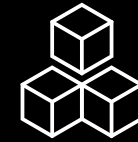
Metso High Efficiency Scrubber (HES) optimizer combines internal process calculations with measurements available at site to estimate the pressure drop needed to meet performance targets, and enable power savings whenever possible.

Metso High Efficiency Scrubber

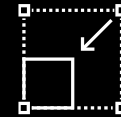
The Metso HES is a wet gas cleaning equipment designed for scrubbing and removal of small solid particles from process gas.

Scrubbing liquid is introduced at the top of the scrubber together with the gas. A deflector plate forms a circular gap through which the gas is accelerated. In the turbulent flow regime produced, solid particles are captured by the scrubbing liquid through the high relative velocity between the particles and the droplets.

The size of the gap is automatically adjusted to maintain the desired and required pressure drop for the removal of the impurities. This adjustment makes the HES perfect for scrubbing gases with varying volumes and dust loads, with a large turn-down ratio.



Removes even submicron particles



Compact and relatively small even for high gas flows



The pressure drop is adjustable, ensuring good performance at varying gas flows



Designed for operation in very harsh and corrosive environments



Easy maintenance and prolonged lifetime thanks to changeable scrubbing zone



Metso HES Optimizer

With many decades of wet gas cleaning experience, Metso specialists have built a vast technical knowledge which allows for continuous improvement to the performance and operation of both single equipment and entire gas cleaning plants. This knowledge is being transferred into the digital solutions offered by Metso, providing assistance to both operators and maintenance staff.

The HES Optimizer is created in Metso's own advanced control solution, the ACT platform. It utilizes real-time assessment of the load to the HES scrubber section combined with internal removal efficiency calculations to determine the required pressure drop and to meet performance targets. Whenever there is a spare capacity in the wet gas cleaning, the pressure drop is automatically adjusted by the HES Optimizer to enable energy savings.

The Optimization is based on 3 different areas of calculations:

- Load assessment: assessing the overall wet gas cleaning duty with regards to acid mist aerosols and dust particles
- Removal efficiency: assessing the overall wet gas cleaning capacity with regards to acid mist aerosols and dust particles
- Energy savings: joint optimization of HES and WESP section to match duty and capacity to maximize potential energy savings



Optimization

HES Optimizer uses plant data in the DCS to understand process variations and adjust the pressure drop set point accordingly.

Particles are effectively captured in the HES, but the pressure drop required makes up a big portion of the overall power consumed by the blower of the gas cleaning plant. Adapting the pressure drop to process conditions, and the capacity of the wet gas cleaning in general, can enable substantial energy savings.

Finding the appropriate pressure drop over the HES is dependent on the incoming load as well as the capacity and cleaning requirement of downstream equipment, in particular the WESP section. The Metso WESP Optimizer provides calculations of the spare capacity of the WESP section, which can be used by the HES Optimizer for determining acceptable slip.

As soon as a spare capacity is identified in the wet gas cleaning, saving power becomes possible. This power can be saved either in the HES pressure drop or the WESP section power input, or even as a combination of both. Energy saving calculations, sharp boundaries placed on the optimization of each equipment (e.g., limiting the amount of dust entering a packed tower between the HES and WESP section) as well as

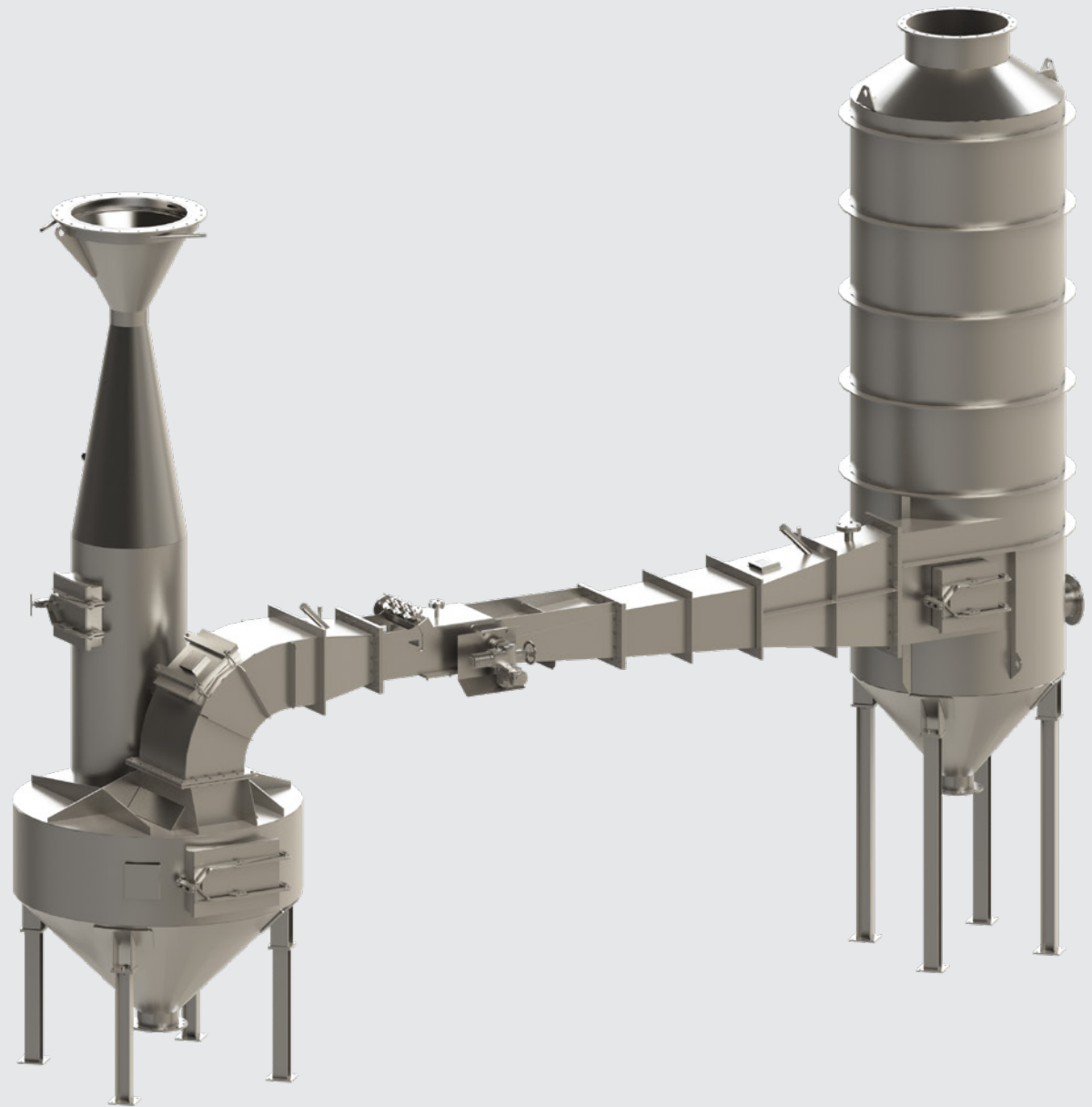
removal efficiency calculations, form the basis for deciding where, and to what extent, this spare capacity is best utilized for energy savings.

With spare capacity in design, or at close to nominal conditions, most power is almost always saved in the HES. At lower gas flows, each kPa of pressure drop will require less and less power to compensate, whereas the power consumed in the WESP section without limitation is likely to increase. For that reason, at some point it is better to shift the power saving to, or at least include, the WESP section. This is particularly important for plastic WESPs, where the lowered power input will serve the additional purpose of protecting the tubes from damage.

The HES Optimizer can run independently from the WESP Optimizer, but in doing so it will require more instrumentation and measurement to function accurately. Because of the shared duty for removal of fine particles and acid mist aerosols, the equipment is an excellent candidate for joint optimization, enabled by the comprehensive process know-how of the Metso specialists.

Venturi scrubber optimization

In addition to the Metso High Efficiency Scrubber, the optimizer can easily be adjusted to fit other venturi type scrubbers, such as the horizontal scrubber system or compact venturi scrubber, in the Metso product portfolio.





HES Optimizer webpage

Read more about HES Optimizer



HES webpage

Read more about High Efficiency Scrubber



WESP Optimizer webpage

Learn about EDITUBE WESP Optimizer and its features



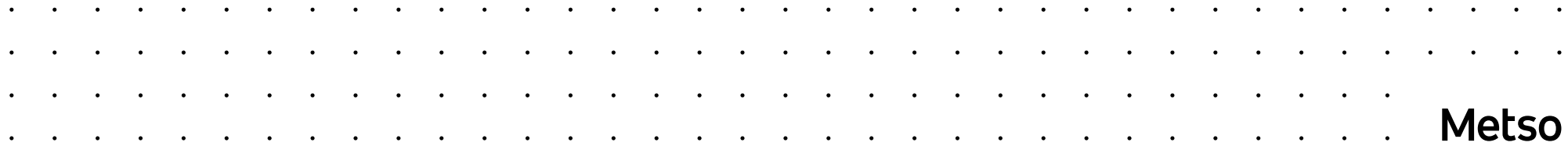
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Metso is a frontrunner in providing sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. By helping our customers increase their productivity, improve their energy and water efficiency and environmental performance with our process and product expertise, we are the **partner for positive change**.

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