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СИСТЕМЫ КОНТРОЛЯ ВЫБРОСОВ

Система удаления тяжелых металлов

Технические характеристики



HEAVY METAL REMOVAL

Environmental pollution of heavy metals is increasingly becoming a problem and has become of great concern due to the adverse effects it is causing around the world. These inorganic pollutants are being discarded in our waters, soils and into the atmosphere due to the rapidly growing agriculture and metal industries, improper waste disposal, fertilizers and pesticides.

The right application for every case

In addition to the calomel process, often used in the field of non-ferrous metal production, GEA is using the following products

Calomel process

Wet Electrostatic precipitators (WESP)

Spray drying absorption (SDA)

Candle filters

to reduce heavy metals from flue gas.

The calomel process

heavy-metal-removal-calomel-process

The calomel process is based on the oxidation of mercury vapour by mercuric chloride to form mercurous chloride (calomel).

A solution of mercuric chloride containing HgCl_2 is circulated over a packed tower. The process gas containing mercury passes through the packing where the mercury reacts with mercuric chloride to form mercurous chloride. Mercurous chloride is insoluble and precipitates out of the solution. A side stream from the main tower circulating stream is directed to the primary settler where the mercurous chloride settles to the bottom of a conical tank. The clarified solution overflows back to the scrubbing tower pump tank. The collected solids from the bottom of the primary settler flows to the secondary settler where further concentration of the mercurous chloride.

In the secondary settler, zinc dust can be added to further aid in the precipitation of mercury from the solution. The solids from the secondary settler are discharged to storage drums for sale or further processing. The scrubbing process removes mercuric chloride from the scrubbing solution.

Wet electrostatic precipitators (WESP)

heavy-metal-removal-wet-electrostatic-precipitators-2d

Wet electrostatic precipitators are used in a wide range of applications including, hazardous and medical waste incinerators, metals refining, sulfite pulp mill recovery boilers, copper roasters, sulfuric acid plants, and wood dryers including oriented strand board, medium density fiber board, or pellet mill dryers.

GEA's wet electrostatic precipitator (WESP) use electrostatic force to remove particulate. It is used treat gas streams with sub-micron particulate, aerosol, or fumes. These can include heavy metals such as lead, arsenic or cadmium, condensed acid aerosols like sulfur trioxide (SO_3), or condensed volatile organic compounds (VOC's). The use of electrostatic forces minimizes energy costs compared to other technologies, which require large amounts of energy to overcome resistance to air flow.

Spray drying absorption (SDA) process

heavy-metal-removal-sda-2d

GEA SDA process is based on a simple concept, honed over the years into a precise, effective system. Hot, untreated flue gas is fed into a spray drying absorption chamber and comes immediately into contact with a fine spray.

Precise control of the gas distribution, slurry flow rate and droplet size ensure that all droplets are converted into a fine powder. The injection of activated carbon into the flue gas can be used to enhance the removal of mercury and dioxins. Some fly ash and reaction products drop to the bottom of the absorber and are discharged.

The treated flue gas continues on to a dust collector, where any remaining suspended solids are removed. The cleaned outlet gases are then expelled through the stack. Meanwhile the dry powder from the bottom of the absorber and dust collector is conveyed to a silo.

The SDA process can optionally include a partial recycling of the reaction products to the feed slurry to improve absorption and drying performance.

Candle filter

heavy-metal-removal-candle-filter-2d

GEA high temperature filters with ceramic elements remove particulates and are now available as ceramic filters with an embedded catalyst matrix allowing removal of NO_x, dioxins, mercury and VOC.

The filter elements are chemically inert and corrosion resistant. Ceramic filter elements show very low dust emissions < 2 mg/Nm³ and are thermally stable up to high operating temperatures. No cooling of flue gases is required, and no thermal heat energy is wasted.

Filter elements are cleaned online during operation by means of separate, compressed air jet pulses. The filter elements are placed in a single or multi-compartment housing to handle large volumetric flow rates. This construction technique allows for maintenance of a single module while others continue to operate, without interruption of the process itself.

The injection of reagents and / or absorbents allows for control of various gaseous emissions.

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