Clean Technologies

DUPONT™

MECS® Dynawave® SRU scrubber

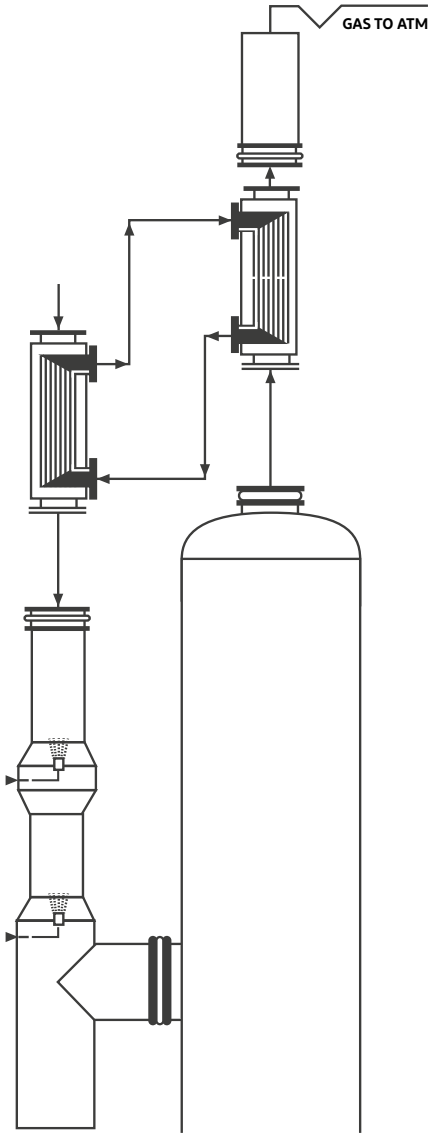
Sennuba™ Plume Suppression Technology

Sennuba™ Plume Suppression Technology*

All wet scrubbers generate steam. While a visible steam plume from the stack is harmless, it is visually unappealing and contributes to a public perception of pollution.

The traditional solution to suppress steam plume formation from SRU tailgas scrubbers relied on gas-to-gas heat (GGH) exchangers. The MECS® DynaWave® Sennuba™ Plume Suppression Technology* offers several advantages over conventional GGH technology:

- **Low capital expenditure**
- **Minimal risk of plugging**
- **Improved corrosion control**
- **Based on standard refinery shell and tube ASME TEMA exchanger design**



How it works:

There are three common methods to suppress steam plume formation from SRU tailgas scrubbers: subcooling the gas, diluting the gas or reheating the gas stack.

Subcooling of the gas requires the use of cooling water in the scrubber circulation loop to cool the gas to 30 °C or lower. This typically requires a redesign of the scrubbing system.

Gas dilution entails mixing of hot air or combustion gases with the stack gas to lower the gas dew point. This option may not be viable in some cases due to local regulations.

The third option is to reheat the gas. This can be achieved using an external energy source and a gas-to-gas heat exchanger which would translate into high operating costs. The Sennuba™ Plume Suppression Technology however reheats the gas by exchanging the stack gas with the gas coming into the scrubber using two heat exchangers and a heat transfer medium. The technology therefore does not need an external energy source nor result in high running costs.

The Sennuba™ technology uses two separate thermosyphon shell and tube heat exchangers as well as steam and condensate as a heat transfer medium. Incoming hot gas vaporizes the condensate and creates steam in the Hot Side Exchanger. This steam heats the scrubber exit gas and condenses in the Cold Side Exchanger before returning to the Hot Side Exchanger.

This design means there is no forced circulation of the heat transfer medium. The process gas/stack gas flow through the tube side. Steam is kept on the shell side. There is no chance of leakage of the process gas directly to the stack gas.

* Patent pending

The Benefits of Sennuba™ Plume Suppression Technology

Low Capital Expenditure

The unique design of the Sennuba™ Plume Suppression Technology exchangers allows for the use of cost-effective 316L stainless steel in the fabrication of the Sennuba™ exchangers. Because Sennuba™ uses steam as a heat transfer media, it avoids exposing construction materials to a corrosive environment as gas-to-gas heat exchangers do when cold gas condenses SO_2 and SO_3 on the Hot Side Exchanger. Many GGH exchangers must therefore be fabricated out of a high cost alloy such as Duplex 2205 stainless steel or a 5% molybdenum alloy such as AL6XN.

Minimal Risk of Plugging

Sennuba™ is far less liable to plugging because the gas is kept to the tube side of the heat exchanger. The technology is designed with 1.25" diameter tubes (almost 32 mm) making it very difficult for solids to accumulate. In the unlikely event that the tubes do plug, they can be cleaned very easily by hydroblasting. Gas-to-gas plate heat exchangers are designed with very small plate openings. They are therefore at much greater risk of plugging. If they do, the plates on a GGH exchanger cannot be cleaned.

Corrosion Control

The construction of a typical gas-to-gas heat exchanger contains a section in the exchanger that exposes the hot side gas to the cold side gas. This may result in lowering the temperature of the incoming gas below the dew point, thereby causing dew point corrosion. The Sennuba™ design separates the two gas streams using steam as a heat transfer medium. As the temperature of the steam always remains above the dew point, no part of the heat exchanger will be at risk of corrosion caused by temperatures that fall below the dew point.

Refinery Tried and Tested Heat Exchangers

The heat exchangers used in the design of the Sennuba™ Plume Suppression System are standard shell and tube ASME TEMA exchangers of the type used throughout refineries. This design is well known in the refinery industry and has proven its effectiveness whereas conventional gas-to-gas exchangers are not as common in the refining industry.

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About DuPont Clean Technologies

The Clean Technologies division of DuPont is a global leader in process technology licensing & engineering, offering critical process equipment, products and services that enable an array of industrial markets, including phosphate fertilizer, non-ferrous metals, oil refining, petrochemicals and chemicals, to minimize their environmental impact. We provide extensive global expertise across our portfolio of offerings in key applications – MECS® sulfuric acid production, STRATCO® alkylation, BELCO® wet scrubbing, and IsoTherming® hydroprocessing. We are dedicated to helping our customers produce high-quality products used in everyday life in the safest, most environmentally-sound way possible, with a vision to make the world a better place by creating clean alternatives to traditional industrial processes. We make everyday life better, safer, cleaner.
www.cleantechnologies.dupont.com

About DuPont

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