Quench tower

The Quench Tower solution is used for rapid cooling of sulphur dioxide gas, minimizing the formation of additional SO_3. By using a recirculating water stream, the need for cooling water is reduced. With extensive experience in handling corrosive media and gas quenching, NORAM ensures a reliable and stable operation of sulphur dioxide gas cooling.

Gas quenching

When burning sulphur to produce SO_2 gas, the furnace exhaust reaches very high temperatures, often exceeding 1200°C. Regardless of application, the SO_2 gas nearly always requires cooling before being delivered to downstream operations. NORAM offers a tailored cooling solution, utilizing a waste heat boiler in combination with gas quenching—or, in certain cases, gas quenching alone in a quench tower—to efficiently control outlet temperature.

How it works

Hot SO_2 gas enters the quench tower, which operates without packing. The primary cooling is achieved through water quenching, where sprayed water rapidly lowers the gas temperature. Adiabatic cooling via water evaporation saturates the SO_2 gas and reduces its temperature to 80–85°C. Further cooling to 30–60°C can be achieved through external heat exchange, depending on the cooling water temperature. Some SO_2 dissolves in the cooled water, forming a weak SO_2 solution that exits the quench tower.
To ensure process stability, a sublimation sensor in the circulating water pipe interlocks with the sulphur burning system. Most sublimated sulphur, which may form due to burner maloperation, is captured in strainers upstream of the circulating water pump.

The tower is constructed entirely of steel, without a brick lining. This design simplifies maintenance, as potential corrosion issues can be detected early and easily repaired. In contrast, a brick lining can make it difficult to locate SO_2 leaks and corrosion, often leading to significant damage by the time they are discovered, necessitating tower replacement. Additionally, eliminating the brick layer reduces the tower's weight, making transportation after fabrication easier and reducing foundation requirements.

To mitigate corrosion risks from small amounts of sulfuric and sulphurous acid formed within the quench tower, various grades of stainless steel are carefully selected. Special attention is given to the gas inlet section, where the temperature drops rapidly from over 1200°C to below 80°C in systems without a waste heat boiler, requiring a particularly robust design.

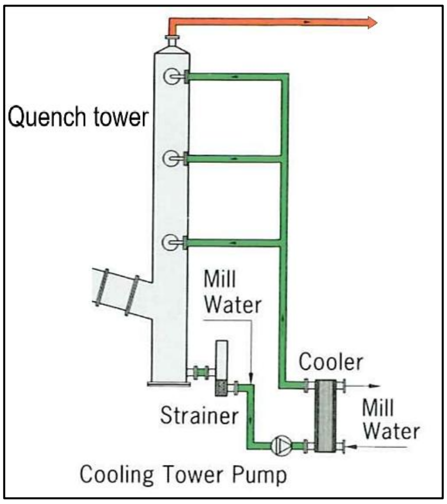

Figure 1 Quench tower system

The benefits

- Essential cooling of sulphur dioxide gas
- Minimizes additional formation of SO3
- Optimized design to minimize corrosion

NORAM End-to-End Process Expertise

At NORAM we are experienced with designing complete systems from sulphur to end product. Our expertise enables us to optimize the process design and mechanical configurations of the process to minimize the risk of corrosion and meet the requirements by the client in an efficient way.

NORAM International AB
Gruvgatan 35A
421 30 Västra Frölunda, Sweden

+46 31 757 40 10

info@noram-intl.com

https://noram-intl.com