

HCl Oxidation

The HCl Oxidation technology produces a high purity chlorine, while offering an economical and highly reliable operation that uses little power and steam. The unique technology developed by Sumitomo Chemical Company offers a robust process using an active and thermally stable catalyst.

The HCl Oxidation process was piloted following Sumitomo's discovery and development of a robust catalyst. The development of a bench-scale process was followed by a demonstration plant. The first commercial plant was brought onstream in 2003. Seven trains have been commissioned, with a capacity up to 120 ktpy and a total production capacity of 760 ktpy as of 2019. These units have produced more than 3,500 kilotons of chlorine product.

HCl Oxidation process scheme

REACTION

A fixed-bed tubular reactor converts oxygen (O₂) and hydrogen chloride gas (HCl) to chlorine (Cl₂) and steam. Recycled oxygen from the downstream separation reduces the fresh O₂-feedstock rate.

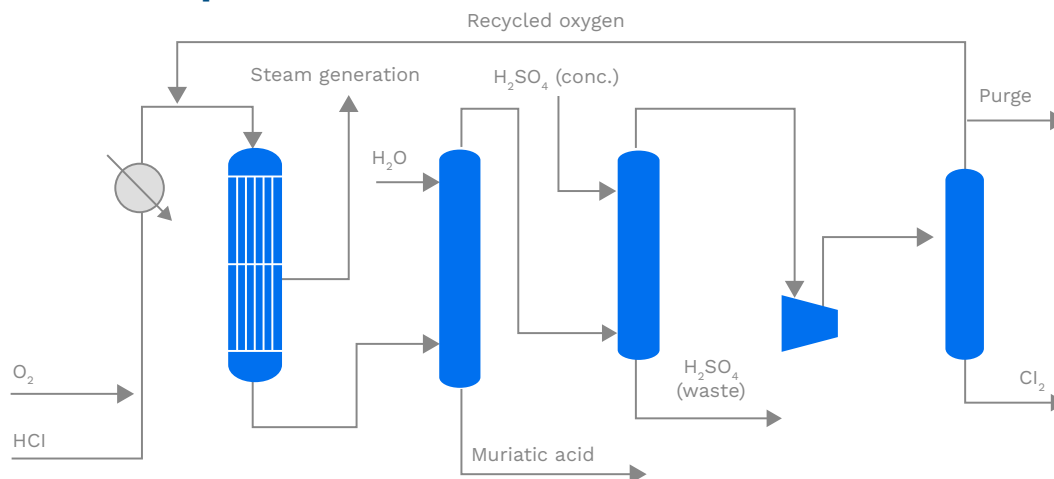
WASHING

The reactor effluent is cooled and washed to remove unreacted HCl which is sold as aqueous muriatic acid by-product. The HCl-free reactor effluent gas is then dried with sulfuric acid to remove any moisture.

SEPARATION

The moisture-free reactor effluent is then compressed and separated into a chlorine product and O₂ recycle stream. The high-purity chlorine product is vaporized and superheated for use in the chemical complex.

HCl Oxidation process scheme



HCl Oxidation technology highlights

LOW VARIABLE OPERATING COST

- Unit consumption of electrical power is very low compared to unit consumption by the electrolysis method
- Total power and steam consumption per ton of chlorine produced is less than competing technologies

SUPERIOR TECHNOLOGY

- Produces chlorine with comparable purity to that produced by brine electrolysis but with lower operating costs
- High catalyst activity and long life

CATALYST HIGHLIGHTS

- Sumitomo has discovered that higher activity can be achieved using RuO₂ type catalysts
- Further studies revealed an improvement in catalyst activity by supporting the RuO₂ on TiO₂
- The catalyst possesses outstanding thermal conductivity. This improvement reduces hot spots in the catalyst layer and has allowed the use of a fixed bed reactor system

Exclusive licensor

Technip Energies has an exclusive collaboration agreement with Sumitomo Chemical Company to license this hydrogen chloride (HCl) oxidation technology.



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