The Outotec Sulfate Removal Process is a solution for managing sulfate and calcium in process streams for the production of water that meets discharge water quality requirements and allows the recycling of treated water for reuse. The process consists of a sulfate precipitation stage at pH 11-13 using lime milk and aluminum, followed by a final neutralization stage using carbon dioxide. Gypsum precipitation can be included before the sulfate removal stage, when required.

Our process is easy and flexible with simple and understandable chemistry. It can be applied for sulfate removal from gypsum saturated waters. More importantly, sulfate can be precipitated even when it is associated with highly soluble sodium and potassium sulfates. The sulfate concentration after treatment is typically 200-1000 mg/L. A level below 200 mg/L can be achieved with enhanced precipitation chemistry. In addition to sulfate removal, the process includes advanced removal of metal impurities such as Ni, Cd, Cu and Zn as metal hydroxides. The final products of the process are treated water with a low sulfate concentration for discharge to the environment or re-use and stable, solid precipitate with a high buffer capacity.

**BENEFITS**

- High quality treated water (for recycling)
- Easy integration to other processes and plants
- Easy to expand for further treatment needs
- Process guarantees and tailoring via client water testing
Our offering

- Tailored and optimized water treatment solutions for improving environmental quality and reducing scaling potential
- Based on globally available aluminum and calcium chemicals, which are selected specifically for each case
- One-stop-shop concept from testing up to EPC
- Highly automated solution minimizing operational costs
- High-quality treated water (for recycling)
- Process guarantees and tailoring via testing of client’s water
- Environmental benefits:
  - Optimized chemical consumption
  - Water recycling
  - Control of sulfate discharged to environment

Process solution examples

- Control of sulfate in discharge water: effluent treatment plant to manage sulfate concentration in concentrators, mines and process effluents
- Reduction of scaling to improve plant availability: removal of sulfate and calcium prevents scaling and reduce scaling-related maintenance costs
- Efficient water recycling: removal of gypsum saturation enables water recycling within the process and decreased fresh water intake requirements. Also effluent volumes can be optimized by efficient overall plant water management.

Typical industrial areas

- Non-ferrous concentrators
- Gold plants
- Coal mining
- All mine sites with sulfidic ore

Key offering includes

- Tailored water treatment solutions to optimize the entire plant’s water recycling and reuse
- Engineering and implementation
  - Research and development (e.g. conceptual and feasibility studies)
  - Plant engineering
  - Project implementation (up to EPC)
- Life cycle services