



LoSO₄TM

Sulfate Reduction Technology
for Mine Water

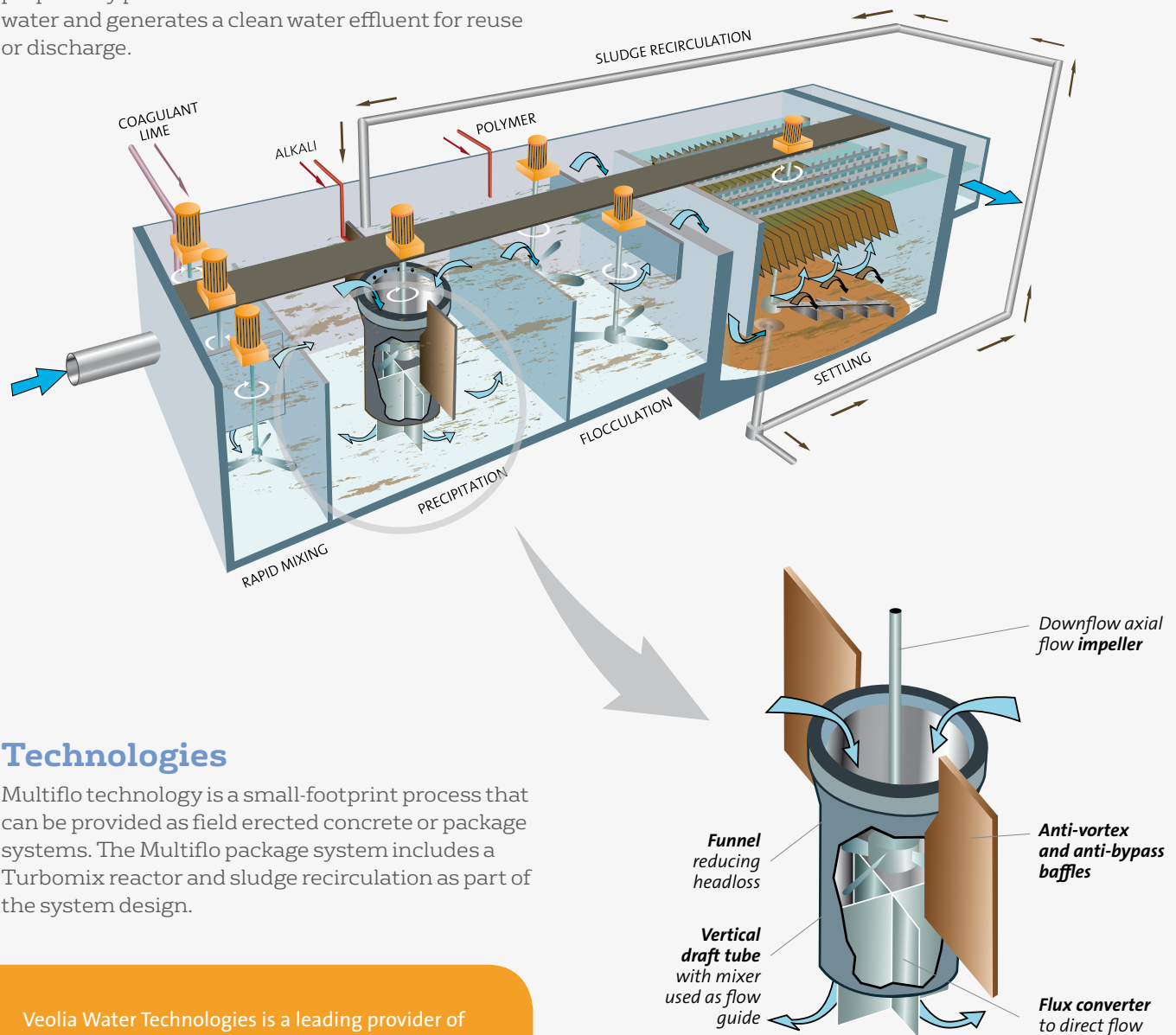
WATER TECHNOLOGIES

LoSO₄[™] is a sulfate removal process that generates a clean water effluent for reuse or discharge

New regulations limiting sulfates in surface water discharges and increased interest in the reuse of mine water for beneficial purposes are causing the mining industry to seek improved methods for sulfate reduction.

This patent-pending solution utilizes a two-stage precipitation process enhanced by Veolia technologies – Multiflo[™] and Turbomix[®] – to reduce sulfate in mine water to <100 mg/l.

Veolia Water Technologies has developed a proprietary process that removes sulfate from mine water and generates a clean water effluent for reuse or discharge.

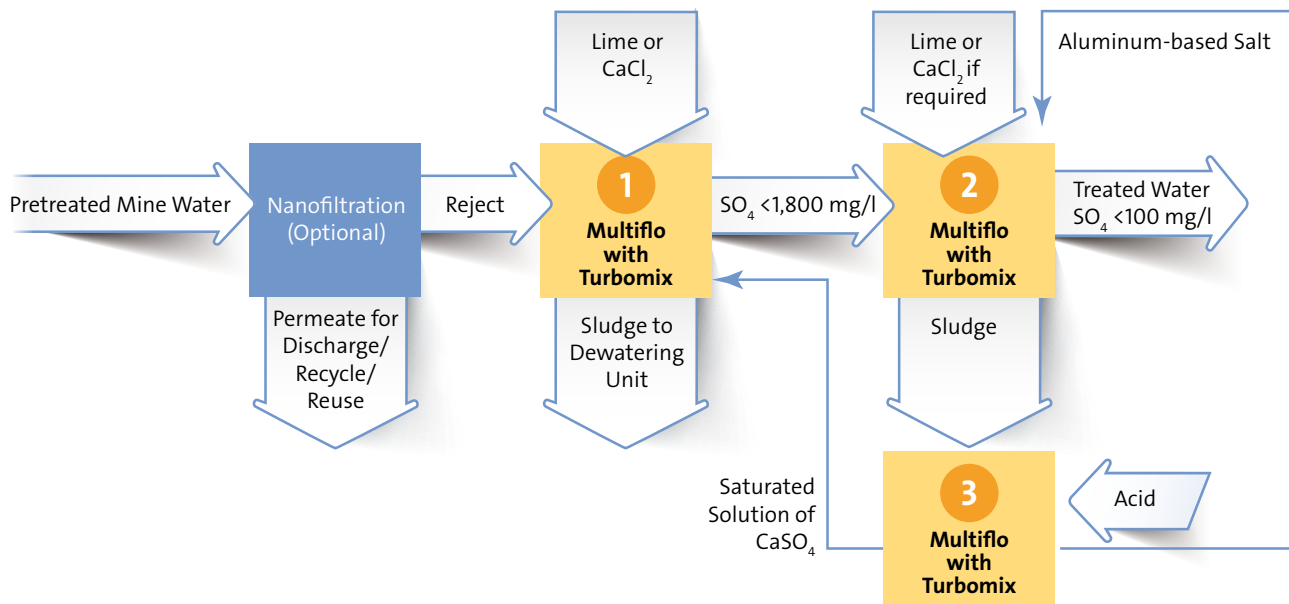


Technologies

Multiflo technology is a small-footprint process that can be provided as field erected concrete or package systems. The Multiflo package system includes a Turbomix reactor and sludge recirculation as part of the system design.

Veolia Water Technologies is a leading provider of technological solutions and design-build services for mine water treatment. With mining projects around the globe and more than 165 years of experience, we have the expertise to meet your project requirements.

The Turbomix reactor optimizes mixing efficiency to ensure complete utilization of treatment chemicals and enhanced reaction kinetics.



LoSO4™ Process Description

- 1 The first step in the process uses a Multiflo system equipped with a Turbomix reactor to reduce sulfate to less than 1,800 mg/l. The chemical precipitation/adsorption reactions in the Multiflo system are enhanced by sludge recirculation in the presence of a seed material. **The seed material is added only once during start-up** to aid the initial calcium sulfate crystal growth kinetics.
- 2 The first-stage effluent is then treated with calcium and an aluminum-based salt in a second Multiflo/Turbomix system. This second-stage process precipitates sulfate as a highly insoluble calcium sulfoaluminate mineral known as Ettringite. This step **reduces the dissolved sulfate in the effluent to less than 100 mg/l**.
- 3 The excess sludge from the second Multiflo/Turbomix system is pumped to a third smaller Multiflo/Turbomix, which serves as a chemical regeneration tank. This step **recovers more than 95% of the aluminum-based salt** from the precipitated sludge for reuse in the treatment process.

The effectiveness of the process relies upon the complete mixing, solids settling and sludge recirculation of the combined Turbomix and Multiflo technologies at each stage of the treatment train.

For high flow rates with lower sulfate concentrations, nanofiltration can be implemented, with the sulfate reduction technology applied to the membrane reject. This option minimizes flow to the sulfate reduction process and thereby **reduces the cost of the process**.



Benefits

- > Increases water recovery to >98%
- > Produces clean water effluent suitable for discharge (<100 mg/l sulfate)
- > Recycle/reuse of 95% of the aluminum-based treatment chemical
- > Economical method of handling nanofiltration reject
- > Generates a non-hazardous calcium sulfate waste for easy disposal
- > Utilizes proven, small-footprint technologies in the process

