

 *Chemineer*™  *Kenics*™  *Prochem*™

**Mixing Technologies for**

**Mining** and

**Mineral Processing**

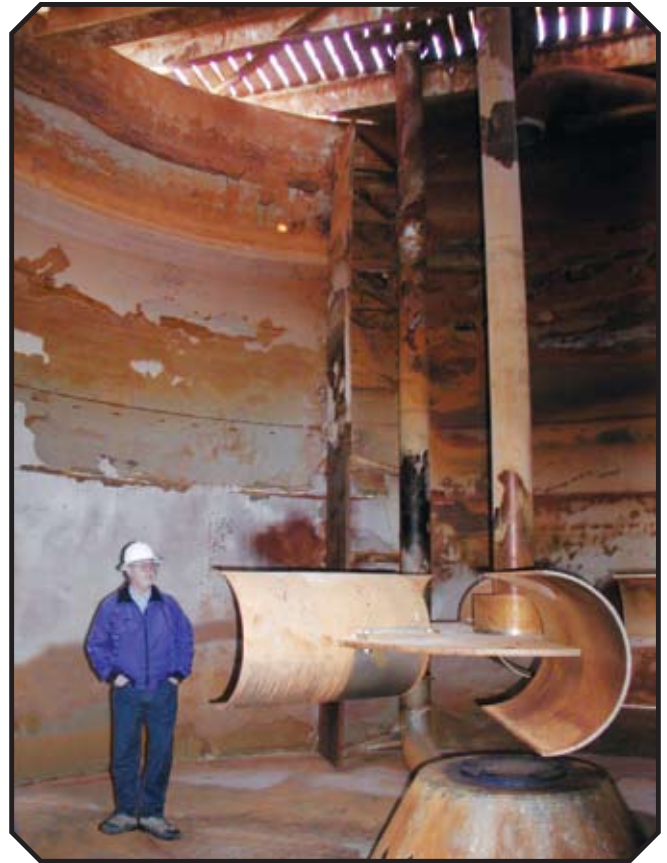


# Reliability in Mining Applications

Chemineer is a global supplier of heavy-duty products and services for the mining industry. Chemineer has been a leading manufacturer for over 60 years and is associated with reliability and technology. By utilizing industry-leading process and mechanical design technology, as well as laboratory testing, Chemineer consistently designs optimal mixing systems for hydrometallurgical processes.

Chemineer's successful state-of-the-art impeller technology and robust mechanical principles are integrated into the proprietary design software, AgSolver, that is used when designing mixing solutions. AgSolver was created by, and is continually maintained and optimized by in-house experts. This ensures the Chemineer supplied equipment achieves the process objectives and will withstand the rigorous conditions present in minerals processing environments.

The dedication and focus provided by the Chemineer team to the mining industry goes beyond original equipment supply. With Manufacturing and Express (aftermarket sales and service) facilities and services around the world, Chemineer provides prompt customer focused service worldwide to meet the timely needs in the mining industry.



CD-6 Impeller



Mine Processing Infrastructure



AgSolver Software

# Reliability in Mineral Processing

## Mechanical Design

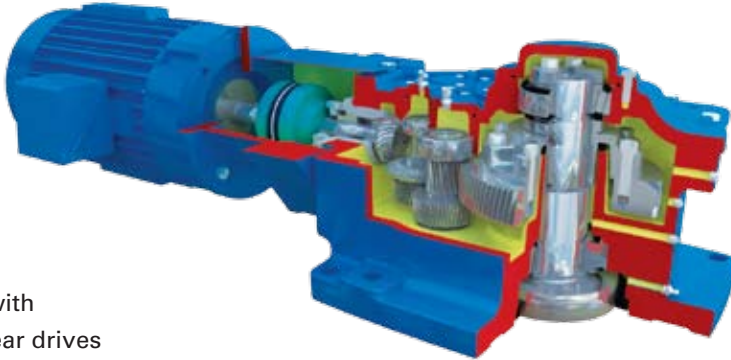
Chemineer provides heavy-duty top, side and bottom entering rotating agitators specific to achieving required process results.

Mechanical integrity is multi-faceted and can be complicated with excessive hydraulic forces, solids loading, gas injection or proximity to tank internals. Chemineer's designs go beyond torque transmission alone and are prepared for upset conditions including power outages with resuspension of settled solids. Our mixer gear drives are specifically designed for fluid mixing service.

Chemineer's robust gear and belt drives, large in-tank shaft diameters, and thick-bladed impellers are guaranteed to last.

Manufacturing capabilities:

- Gear drives built in-house
- Unlimited sizes for shafts and impellers
- Custom designs to your specifications
- Strict quality standards and tolerances
- Round-the-clock production



*Model 20 HT Gearbox*



*Chemineer Installed HT Agitator*

## Lab Testing

The Chemineer Research and Development Laboratory has the capability to model any mining mixing application, including top- and side-entry agitator orientations. Test capabilities include solids suspension, flow velocity, torque and power draw, resuspension, and mass transfer testing. Actual ore samples or representative solids for scale-up purposes can be tested.

The Chemineer test facility features a wide variety of tank geometries and sizes available along with a full line of standard and custom impellers. Our test vessels range from 18 inches to 12 feet in diameter and can be modified to duplicate your process. Video recordings of lab tests are available and customers are always welcome to observe.

# Products for Minerals Processing

- **GT/HT** feature rich agitators for long, maintenance free operation
- **MR** agitators when heavy-duty, parallel shaft gear drives are required
- **VM** top entry belt drive agitators for applications requiring high output
- **Heat exchangers** used in explosives production for cooling (stabilizing) ammonia nitrate to keep micro beads in suspension
- **Static mixers** for continuous processing
- **Mechanical seals** for closed tank applications
- **MD** side entry belt drive agitators used for large vessels
- **Impellers** that can handle any minerals processing application



Model 20 GT



MR Mixer



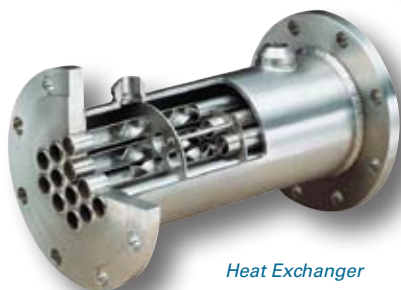
HT Agitator



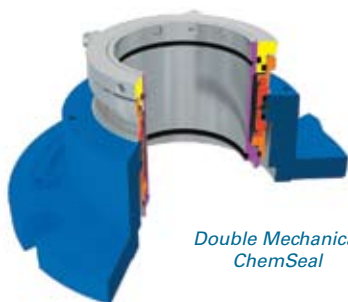
VM Agitator



KM Static Mixer



Heat Exchanger



Double Mechanical ChemSeal



MD Agitator



Impeller Bulletin 710

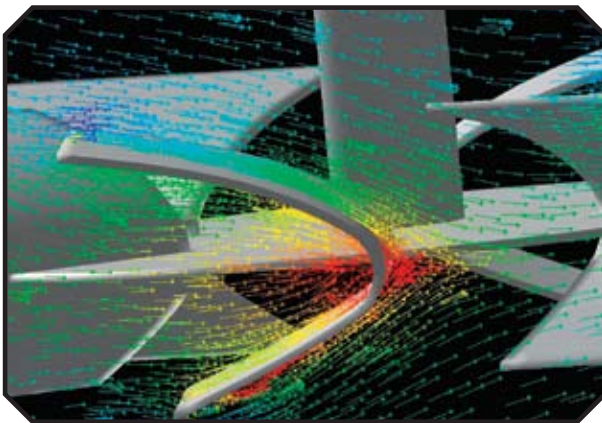
# Process Technology

## Application Expertise

**Flow-controlled applications:** Varying degrees of solids suspension and gas dispersion are required when using batch or continuous processes. The desired process results are achieved utilizing high efficiency, axial flow impellers. This technology provides low shear characteristics, critical in maintaining particle size for maximum recovery. Typical applications include leaching and adsorption circuits, slurry make-down, pipeline slurry storage and tailings & wastewater disposal applications. Chemineer provides high efficiency impellers with the ability to achieve optimal results.

**Autoclaves:** In conventional leaching circuits, when recovery drops below 80%, the ore is considered refractory in nature. Higher recovery requires a pretreatment process such as pressure oxidation (POX). POX applications involve gas-liquid-solids contacting in a high temperature/pressure environment. Chemineer has the capability to provide optimal solutions that maximize uptime for effective processing of refractory ores.

**Solvent extraction:** Solvent extraction is usually a counter-current, multi-stage contacting process used with processes such as heap leaching. Chemineer's mixer technology, pumper and auxiliary, are utilized in the mixer-settler portion of the solvent extraction circuit.



*Example of CFD Modeled Flow Fields*



*XE-3 Impeller*

## Process Design Considerations

Over the past 60 years, Chemineer has gained tremendous knowledge in the mining industry. Mixing solutions are designed with many variables taken into consideration.

- Mixers are engineered to keep pump suctions and overflow outlets clear, maximizing up-time for target metal recovery and re-start in high-percent solids applications.
- Innovative impeller technology allows for favorable process results in any solids suspension, blending, or gas-liquid-solid contacting application due to the range of process specific impellers available.
- When gas injection for mass transfer is required, Chemineer utilizes a shaft sparging system integral to the drive and wetted parts.

**CFD:** Process modeling is possible with Computational Fluid Dynamics (CFD). Chemineer can model the fluid flow in your tank through computational fluid dynamics software. This highly visual analysis can provide theoretical representations of blending and motion, solids suspension, chemical reaction, and heat transfer processes. CFD is useful for optimizing flow patterns in mining applications.

