



Mechanimix

RC-L Series | Reactors

Professional Mixing Technologies

Mechanimix RC-L Series Overview

The Mechanimix heat- and coolable pressure reactor ensures efficient mixing, precise temperature control, and reliable operation for demanding applications. Its robust design with double-jacket heating and cooling provides versatility for cosmetics, pharmaceuticals, food, and chemical industries. The system's hygienic structure, optional vacuum and homogenizer integration, and durable construction guarantee consistent performance and easy maintenance.

Working Capacity	500–5000 [L]
Design Pressure (Vessel)	-1–4 [Bar]
Design Pressure (Jacket)	up to 6[Bar]
Working Temperature	20–160 [°C]
Speed Range	5–60 [RPM]
Motor Power	5–25 [kW]
Mechanical seal	Single Acting
Material (Product Contact)	AISI 316L / PTFE Scrapers
External Surface	AISI 304 / AISI 316L / etc.
Industries	Cosmetics, Pharmaceuticals, Food, Chemicals



Heatable-Coolable, High-Performance Reactors

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FEATURES

- **Double-Jacketed Vessel for Precise Heating & Cooling**
Provides accurate temperature control through dual-layer thermal circulation, ideal for heating or cooling sensitive formulations.
- **Top-Mounted Anchor Agitator with PTFE Scrapers**
Ensures complete product blending and prevents residue build-up on vessel walls, improving mixing efficiency.
- **Optional Vacuum & Homogenization System**
Supports vacuum deaeration and high-shear homogenization for smooth, air-free, and uniform products.
- **Stainless-Steel (AISI 316L) Contact Parts**
Corrosion-resistant and suitable for pharmaceutical and food-grade applications, ensuring durability and hygiene.
- **CIP/SIP Compatible Hygienic Design**
Allows complete in-place cleaning and sterilization, minimizing downtime and ensuring GMP compliance.



Applications & Industries Served

Cosmetics & Personal Care

- Processing of high-viscosity creams, lotions, and gels
- Stable texture and smooth finish under precise thermal control
- Suitable for emulsions, wax-based or oil-phase formulations

Pharmaceutical Industry

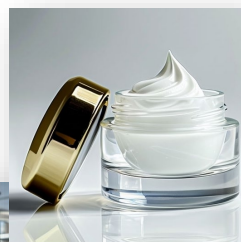
- Mixing and emulsifying ointments, gels, and suspensions
- Vacuum operation for air-free semi-solid dosage forms
- Cleanroom-compatible hygienic design

Food Industry

- Homogenizing sauces, pastes, and emulsions
- Controlled heating/cooling for consistent texture and flavor
- Ideal for viscous, temperature-sensitive products

Chemical Processing

- Blending and dissolving resins, adhesives, and specialty chemicals
- Controlled reaction under pressure or vacuum
- Reliable performance for small- and large-scale batches



Precision Mixing & Smart Cleaning Systems

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Mixing System Highlights

Hydraulic Lid Lifting System

- Advanced hydraulic mechanism for smooth, effortless vertical opening.
- Full top access for cleaning, inspection, and maintenance.
- Reduces manual handling, improves safety, and shortens downtime.

Manual Clamp Ring Locking System

- Stainless-steel clamp ring ensures secure lid sealing.
- Manually tightened for uniform, leak-proof connection.
- Prevents accidental opening and ensures process safety.

Dual Fixed Impellers

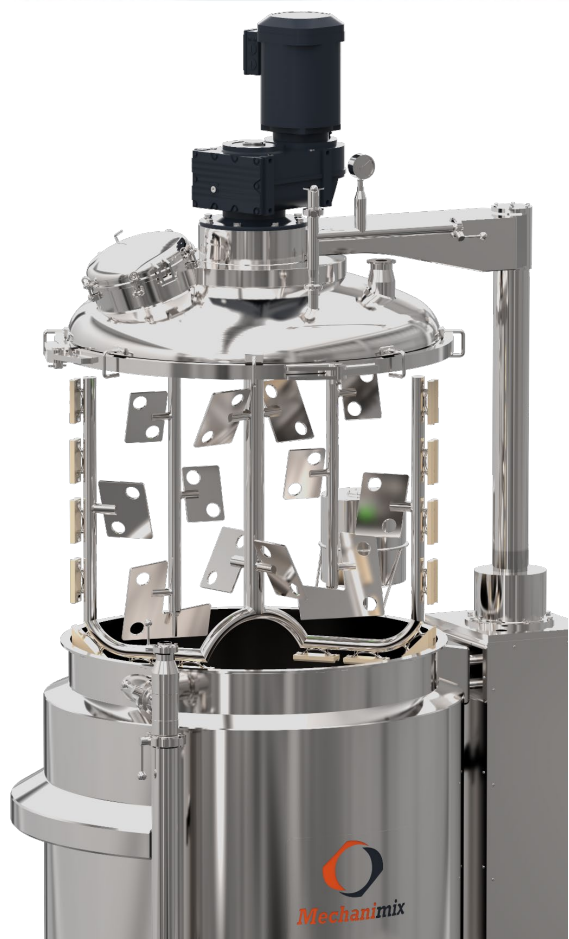
- Two precisely positioned impellers maintain stable and continuous product circulation.
- Optimized flow enhances heat and mass transfer efficiency.
- Guarantees uniform processing and consistent batch quality.

Anchor-Type Agitator

- Heavy-duty top-mounted anchor agitator designed for high-viscosity materials.
- Provides powerful, even mixing with minimal shear stress.
- Ideal for emulsions, creams, and temperature-sensitive compounds.

PTFE (Teflon) Scrapers

- Self-adjusting scrapers continuously clean vessel walls during operation.
- Prevent product build-up and improve heat transfer efficiency.



Spray Nozzle System

Dual-Function Design

- Combines material distribution and internal CIP cleaning.
- Improves process reliability and hygiene.

Efficient Material Dispersion

- Evenly distributes liquids or additives.
- Enhances mixing uniformity and product consistency.

Maximum Surface Coverage

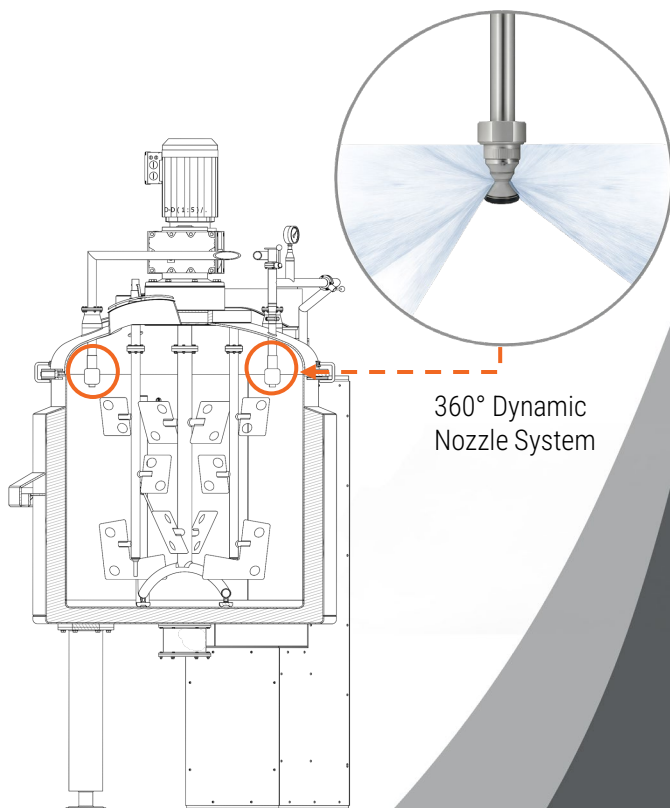
- Optimized spray pattern ensures full interior cleaning.
- Supports quick and effective CIP operations.

High-Pressure Cleaning Without Disassembly

- Cleans entire vessel automatically without opening parts.
- Reduces downtime and maintenance effort.

Hygienic & Time-Efficient

- Ideal for pharmaceutical, cosmetic, and food processes.
- Supports GMP compliance and ensures safe operations.



Computational Fluid Dynamics (CFD)

CFD simulations provide detailed analysis of fluid behavior inside reactors and real tanks. These simulations help verify and optimize process performance in a virtual environment before physical trials. With years of field experience, Mechanimix uses advanced CFD tools to enhance equipment efficiency, improve mixing patterns, and eliminate dead zones, ensuring reliable and homogeneous drying results in reactors.

Advanced Mixing System Features

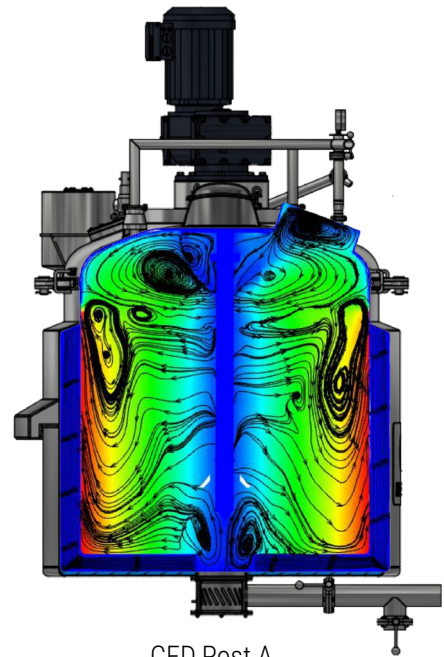
CFD Post A – Velocity Distribution & Flow Pattern

At CFD Post A, the fluid flow analysis inside the reactor is presented using Computational Fluid Dynamics (CFD) simulation. The analysis illustrates the fluid flow paths and velocity variations throughout the reactor using streamlines and a velocity contour map. Red regions indicate higher flow velocities, while blue regions represent lower velocities. The results at Post A provide a clear understanding of the internal flow behavior, help identify potential non-uniform flow or turbulence zones, and support the optimization of the reactor design and overall performance.

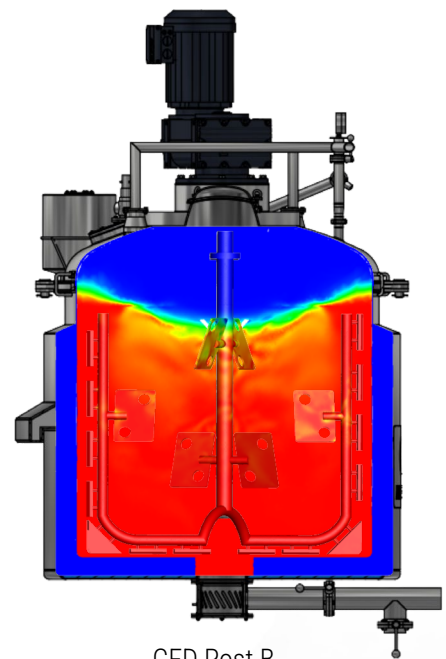
CFD Post B – Homogeneous Fluid Distribution

At CFD Post B, this analysis shows the fluid volume fraction inside the reactor. The colors represent the fluid concentration at different points within the reactor. Red indicates the highest fluid concentration (1.00), while blue shows the lowest concentration (0.00). The varying colors in between represent the fluid volume in different parts of the reactor. This simulation provides valuable insights into the distribution of fluid, helping us identify areas of higher and lower fluid presence. Such data is crucial for optimizing reactor performance, enhancing mixing efficiency, and improving heat and mass transfer processes.

Mechanimix engineers have utilized detailed CFD analyses to design their systems so that homogenization occurs evenly and efficiently throughout all tank regions – even at the edges.



CFD Post A



CFD Post B

Advanced Processing & Thermal Control Systems

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Recirculation & Processing Loop

➤ Product Circulation Path

A dedicated piping loop ensures continuous circulation of the product, enhancing mixing efficiency and process uniformity.

➤ Inline Filtration

The product first passes through a high-performance inline filter, removing impurities and solid particles to maintain product purity and protect downstream components.

➤ Lobe Pump Transfer

A lobe pump then transfers the filtered product back into the reactor. Its gentle, low-shear pumping action preserves product integrity, even with viscous or shear-sensitive materials.

➤ Return to Reactor

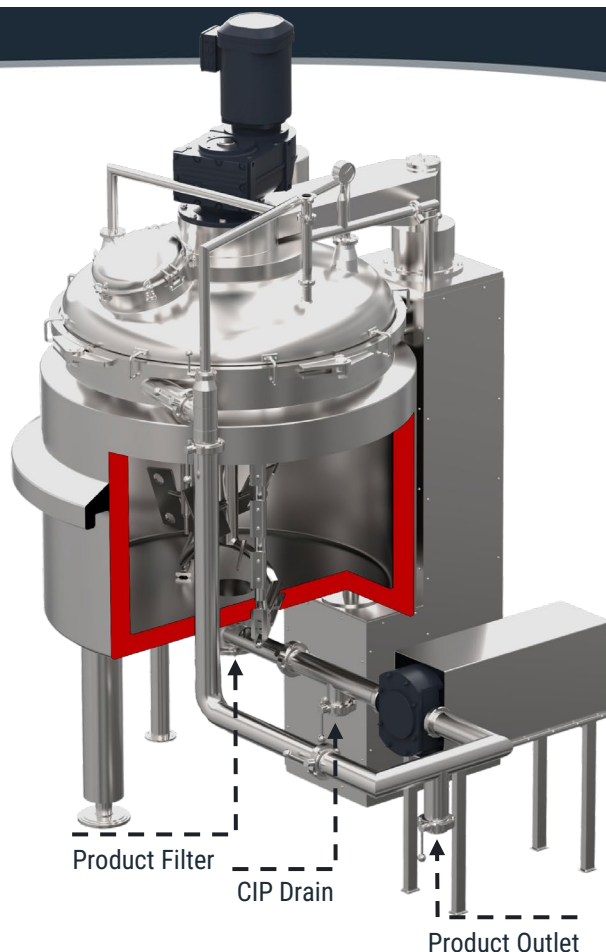
The product is reintroduced into the vessel, where it blends thoroughly with the batch, improving homogeneity, accelerating mixing time, and enhancing overall process performance.

❖ Optional Bottom-Mounted High-Shear Homogenizer

This option can be added for enhanced dispersion and particle size reduction.

Mounted at the vessel bottom, it provides high-shear mixing, improves product circulation, and ensures uniform homogenization.

Ideal for viscous emulsions, creams, and formulations requiring fine texture and fast processing.



Key Advantages

- Intensive high-shear dispersion
- Reduced particle size and processing time
- Improved product homogeneity
- Optional integration into recirculation system

Double-Jacket Heating & Cooling System

Precise Thermal Control

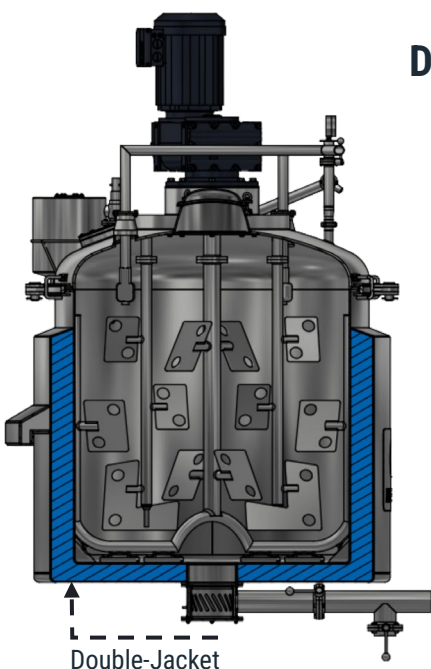
- Dual-layer jacket provides accurate and uniform heat distribution.
- Supports both heating and cooling cycles for flexible operation.
- Designed for excellent thermal efficiency and minimal energy loss.

Compatible Heating Media

- Water / Water-Glycol: Standard cooling and moderate heating.
- Thermal Oil: High-temperature applications.
- Steam: Fast and efficient heating.

System Benefits

- Stable temperature control for consistent product quality.
- Shorter processing time and improved energy utilization.
- Fully compatible with CIP/SIP cleaning systems.
- Reliable and hygienic design for pharmaceutical, food, and cosmetic use.



Functional Components & Safety Features

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➤ Motor & Gearbox

Delivers consistent torque and adjustable speed for reliable mixing of even the most viscous products. Designed for continuous operation and long-term durability.

➤ Manhole

The top-mounted manhole (Ø 440 mm) provides easy and hygienic access for inspection, cleaning, and maintenance. It can also be used for the safe addition of raw materials, additives, or samples during processing, enhancing flexibility and operator convenience.

➤ Vacuum System

The integrated vacuum system efficiently removes air from the product, enabling bubble-free mixing and protecting temperature-sensitive materials. It is essential for creating stable emulsions, improving texture, and enhancing final product quality.

➤ Sight Glass

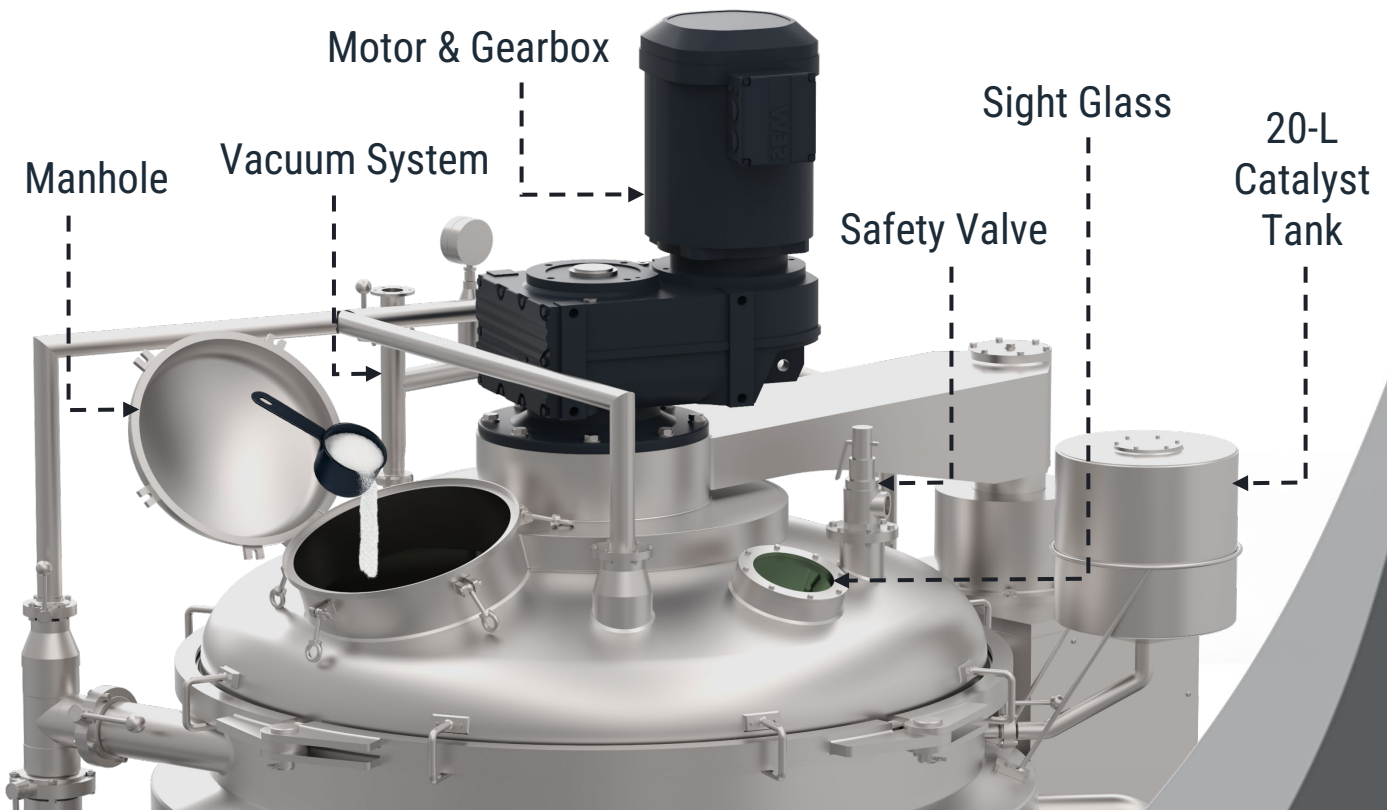
The integrated sight glass allows real-time visual monitoring of the mixing process without interrupting operation. It improves process control, enhances safety, and ensures consistent product quality.

➤ Safety Valve

The safety valve ensures reliable protection against overpressure by automatically relieves pressure, safeguarding both equipment and operators. This feature guarantees safe operation during pressurized processes.

➤ 20-L Catalyst Tank

The auxiliary 20-liter catalyst tank enables precise dosing of additives and catalysts during processing. This ensures accurate formulation, improved reaction control, and enhanced product consistency.



Intelligent Control, Monitoring & Safety Systems

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Control & Automation

➤ PLC-Based Control

Automatic regulation of temperature, pressure, vacuum, and mixing speed for consistent process control.

➤ HMI Touchscreen

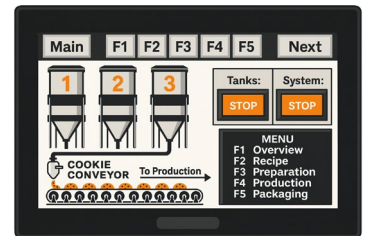
Real-time visualization of all process parameters with easy access to alarms and batch data.

➤ Recipe & Data Management

Store, recall, and log process recipes to ensure traceability and GMP compliance.

➤ Safety Interlocks

Prevents lid opening under pressure; includes overpressure and overtemperature protection.



Smart Monitoring & Process Intelligence

➤ Real-Time Tracking

Continuous monitoring of critical parameters such as temperature, torque, pressure, and vacuum.

➤ Predictive Maintenance

Early detection of mechanical wear or seal failure through sensor feedback.

➤ Data Analysis

Optimizes heating/cooling cycles and mixing efficiency for reduced downtime.

➤ Remote Access (Optional)

Online monitoring and reporting for Industry 4.0 integration.



Explosion-Proof (EX-Proof) Design – Optional

➤ Certified Safety

Available for hazardous zones (Zone 1 & Zone 2) according to ATEX & IECEx standards.

➤ EX Components

Flameproof motors, sensors, and control panels for chemical and solvent-based operations.

➤ Durability

Corrosion-resistant design ensures safe, long-term operation in demanding environments.

➤ Customization

Optional flameproof cabinets and inert gas blanketing systems available on request.



Learn More: Comprehensive brochure with technical specifications & [monitoring control service](#) details

Technical Configurations

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Mechanimix Heated / Cooled Pressure Reactor

Model Name	R-500353	R-500354	R-500355	R-500356
Effective Volume (min.) [L]	1500	2000	2500	3000
Effective Volume (max.) [L]	2000	2500	3000	3500
Feed Inlet [DN]	DN 100	DN125	DN150	DN200
Manohla [mm]	300	350	400	450
Swing Diameter [mm]	2200	2450	2650	2850
Discharge Type	Manual	Manual	Manual	Automatic
Control System	✘	✔	✔	✔
CIP - Clean-In-Place Spray Nozzles	✔	✔	✔	✔
Explosion-proof	✘	✘	✔	✔
Vacuum System	✔	✔	✔	✔
Hot Water or Hot Oil Temperature Control Systems	✔	✔	✔	✔
Bottom-Mounted High-Shear Homogenizer	✘	✘	✔	✔

- The features listed under "Design Options" (e.g., Control System, Ex-proof, etc.) are configurable based on customer requirements. ✔ indicates the feature is included, ✘ indicates it is not included by default, and availability may vary depending on the specific model configuration or customization.

- Technical Configurations Overview**

Mechanimix reactors are available in a range of standard sizes and configurations to meet diverse process requirements.

Each model can be customized with optional systems such as CIP, vacuum operation, explosion-proof execution, and automation controls.

Technical parameters may vary depending on vessel capacity and selected design features



Mechanimix

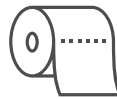
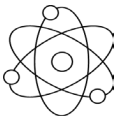
High-Performance RC-L Series Reactors

Professional Mixing Technologies



Mechanimix designs and manufactures industrial anchor-agitated reactors with capacities from **500–5000 [L]**, engineered for pressures up to **+6 bar(g)** and temperatures from **20–160 [°C]**.

Standard specifications may vary based on configuration or customization. Tailored to your process needs, these reactors ensure safe and homogeneous mixing of high-viscosity materials, ideal for cosmetic, pharmaceutical, food, and chemical applications



Mechanimix delivers advanced anchor-agitated reactors engineered for efficient mixing, precise temperature control, and consistent product quality across cosmetics, pharmaceutical, food, and chemical industries.