

CM400- Catalyst mixer

Dedicated to the small-scale production of industrially relevant shaped catalysts.



The CM400 – Catalyst Mixer is a precision-engineered laboratory unit dedicated to the small-scale production of industrially relevant shaped catalysts. Designed for research and development centers as well as pilot laboratories, the CM400 enables controlled preparation of catalyst pastes prior to extrusion, pelletizing, tableting, or other shaping processes. In catalyst manufacturing, the mixing stage is fundamental to ensuring uniform dispersion of active phases, controlled pore structure development, and optimal mechanical resistance of the final catalyst body. The CM400 has therefore been developed to deliver highly reproducible and homogeneous mixing results under strictly controlled mechanical and thermal conditions.

With a working volume ranging from 100 to 400 cubic centimeters, the CM400 is particularly suited for formulation screening, optimization studies, and pre-industrial validation. This scale allows researchers to work efficiently with limited quantities of raw materials while maintaining sufficient batch size for forming trials and mechanical characterization. The system is capable of mixing, blending, and intensive kneading of paste-like and highly viscous materials such as metal oxides, hydroxides, binders, peptizing agents, water, and specialty additives. Its mixing mechanism applies controlled shear and compressive forces to ensure uniform distribution of solids and liquids throughout the paste, eliminating local inhomogeneities that could affect shaping behavior or catalyst strength.

Constructed entirely from stainless steel, the CM400 offers excellent chemical resistance and durability when handling acidic or alkaline formulations commonly encountered in catalyst preparation. The mixing trough is jacketed, enabling precise heating or cooling via circulating thermal fluids. The wide operating temperature range of 5 to 170 °C provides flexibility for viscosity control, solvent evaporation management, binder activation, and conditioning of reactive components. Because catalyst paste rheology is highly temperature-dependent, this feature ensures consistent and reproducible processing conditions.

A major advantage of the CM400 is its vacuum-capable operation. Mixing under reduced pressure allows removal of entrapped air and volatile components, resulting in improved paste densification and reduced internal void formation. This enhances the mechanical integrity of extrudates or pellets after shaping and drying. Vacuum processing also provides a cleaner and more controlled environment, particularly valuable when handling moisture-sensitive or oxidation-prone materials.

The CM400 incorporates variable blade speed control to accommodate different rheological behaviors. Lower speeds are suitable for initial blending and gentle homogenization, while higher speeds generate stronger shear forces required for highly viscous or cohesive systems. This adaptability makes the unit compatible with a wide range of catalyst formulations, from moderately plastic alumina-based systems to highly viscous silica- or zeolite-rich compositions.

Operational efficiency has been carefully integrated into the design. The CM400 features a compact footprint and plug-and-play configuration requiring only a single electrical connection, enabling rapid installation in laboratory settings. Quick disassembly facilitates thorough cleaning between batches, minimizing cross-contamination risks and reducing downtime during formulation changes.

By combining controlled mechanical energy input, thermal regulation, vacuum capability, and corrosion-resistant construction, the CM400 provides a reliable and reproducible platform for advanced catalyst paste preparation. It supports seamless scale-up from laboratory research to pilot production, ensuring consistent paste quality and improved mechanical performance of shaped catalysts in industrial applications.