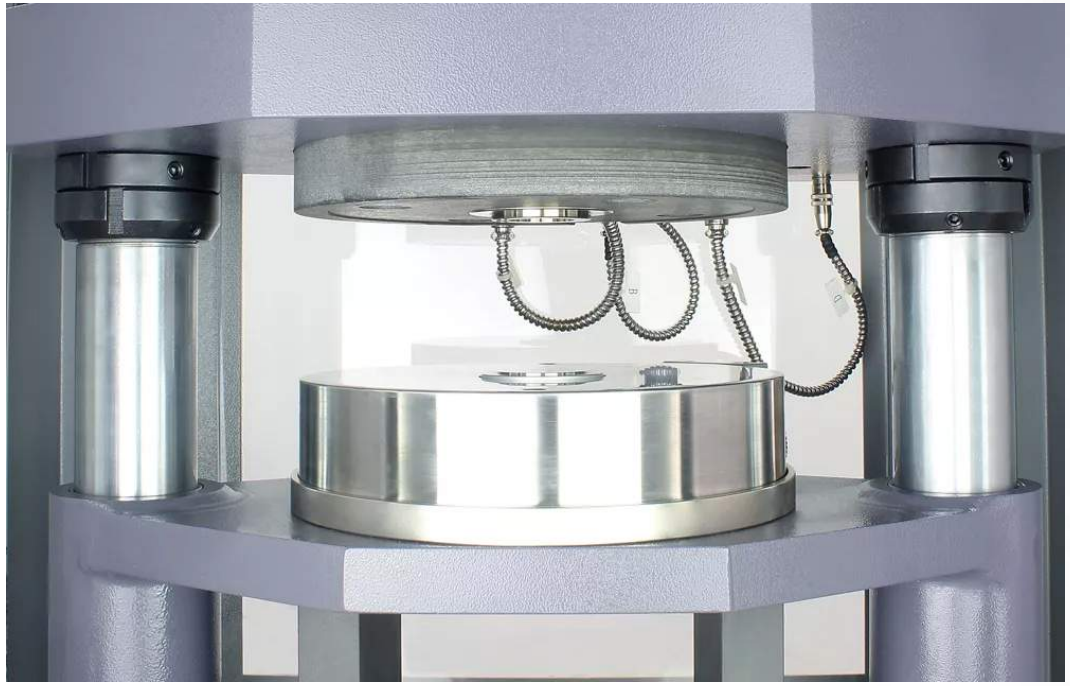
QUALITEST™



CAPILLARY RHEOMETER

STANDARDS

ASTM D3835
ASTM D5099
ISO 11443
ISO 17744

Capillary Rheometers: Advanced Melt Flow Analysis for Polymer and Material Testing

A capillary rheometer is a high-precision instrument used to measure the flow behavior of polymers, molten plastics, rubbers, and other viscous materials under different shear conditions. By simulating real-world processing environments, capillary rheometers provide critical data for quality control, research, and material development.

How Does a Capillary Rheometer Work?

Capillary rheometers operate by forcing a sample material through a precisely engineered die using a piston. The resulting flow rate and pressure drop allow for the calculation of viscosity, shear stress, and shear rate. These measurements are essential for understanding how materials behave under processing conditions such as extrusion, injection molding, and blow molding.

Applications of Capillary Rheometers

Capillary rheometers play a crucial role in various industries, including:

- Plastics & Polymers: Evaluating melt flow properties to optimize processing parameters in extrusion, injection molding, and film blowing.
- Rubber & Elastomers: Characterizing flow behavior for improved material formulation and performance.
- Food & Pharmaceuticals: Assessing the rheological properties of food pastes, gels, and pharmaceutical formulations.
- Coatings & Adhesives: Measuring viscosity and flow characteristics to ensure product consistency.

Key Benefits of Using a Capillary Rheometer

- Accurate Viscosity Measurements: Provides precise shear-dependent viscosity data for process optimization.
- Wide Shear Rate Range: Simulates real-world processing conditions.
- Material Behavior Analysis: Evaluates shear thinning, melt fracture, and other flow-related characteristics.
- Quality Control: Ensures consistency in polymer manufacturing and processing.

Standards for Capillary Rheometer Testing

Capillary rheometers comply with various international standards to ensure reliable and repeatable measurements, including:

- ISO 11443 – Determination of the viscosity of polymers in the melt using a capillary rheometer.
- ASTM D3835 – Standard test method for measuring the rheological properties of thermoplastics.
- ISO 17744 – Guidelines for measuring viscosity and elasticity of polymer melts.
- ASTM D5099 – Standard practice for evaluating thermoplastic flow properties using a capillary rheometer.

Qualitest offers two series of capillary rheometers: the LCR7000 series as well as the QualiCR™ 6000 model. These high-performance instruments provide accurate and reliable melt flow analysis for a wide range of applications. With advanced features such as automated data analysis, high-speed testing, and multiple pressure sensors, Qualitest capillary rheometers ensure superior material characterization and processing optimization.

Choosing the Right Capillary Rheometer

Selecting the right capillary rheometer depends on your testing requirements, including temperature range, pressure capacity, and die configurations. Advanced models offer automated data analysis, high-speed testing, and multiple pressure sensors for enhanced accuracy.

For laboratories and industries requiring precise melt flow analysis, investing in a high-performance capillary rheometer ensures accurate material characterization, optimized processing conditions, and superior product quality.

THEORY & METHOD

Core Operating Principles

Our capillary rheometer method works by forcing a heated viscous substance through a highly polished metal nozzle, measuring the precise force and flow rate to extract true material behavior under actual factory conditions. This straightforward test evaluates pressure-driven friction, giving you the exact data you need to prevent devastating machinery jams and ruined manufacturing batches. Secure highly reliable viscosity profiles for your production line by integrating a Qualitest capillary rheometer into your quality control workflow.

Product Configurations & Technical Features

To execute these evaluations with peak operational speed, selecting the exact hardware setup changes everything. Our primary industrial testing units are constructed to survive the non-stop, intense requirements of a facility operating around the clock.

Our LCR7000 series and the QualiCR™ 6000 model utilize a climate-controlled holding chamber, an industrial-strength pressing arm, and an ultra-precise exit nozzle. The pressing arm drives downward with massive, unwavering strength to

record pure fluid resistance with astonishing repeatability.

These top-tier testing stations arrive fully equipped with self-running calculation software, high-speed evaluation routines, and an array of sensitive pressure monitors to guarantee top-tier material profiling.

Analytical Corrections & Standards Compliance

Unprocessed evaluation output is frequently quite disorganized, but running mandatory mathematical refinements stops expensive machinery stalls and preserves thousands of dollars that would otherwise be wasted on ruined manufacturing batches. Our self-running calculation software manages these intricate equations in a split second, making sure your ultimate figures completely match up with rigid international guidelines such as ASTM D3835, ASTM D5099, ISO 11443, and ISO 17744:

- **Bagley Adjustment (Entrance Pressure Correction):** The moment your heated polymer forces its way into a microscopic opening, it experiences a massive pinch, which completely distorts the internal stress numbers. A properly engineered capillary rheometer testing procedure automatically removes that added compression to uncover the genuine, completely unaltered flow rate.
- **Thermal Correction (Viscous Heating Compensation):** Intense rubbing at extreme flow speeds generates brief bursts of unexpected heat. Intelligent calculation protocols determine the middle-ground temperature right next to the steel barrier to keep your thickness readings flawlessly steady.
- **Wall Slip Correction (Flow Anomaly Detection):** Specific mixtures, such as heavy-duty rubber blends, tend to glide smoothly across the steel boundaries rather than moving the way they are supposed to. Purpose-built slip-adjusting formulas spot this sneaky movement so you receive absolutely nothing except truthful, dependable testing data.

QUALITEST™

ADVANCED TESTING TECHNOLOGIES

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