


FRS 1600
FRS 1800



Furnace
Rheometer
Systems

The image shows a high-precision industrial rheometer system. A large, white, dome-shaped protective hood is mounted on a black metal frame. The hood has a red stripe with the text "DSR 502" on its side. Below the hood, a vertical assembly is visible, including a cylindrical component and a thin, glowing orange rod. This rod is positioned above a circular, perforated metal plate. The plate has a warning symbol (a triangle with three wavy lines) and the text "100 °C" on it. The entire setup is housed within a metal enclosure with a wire mesh door. The background is a bright, blue-tinted industrial environment.

Rheological measurements at high temperatures

FRS – Furnace Rheometer Systems

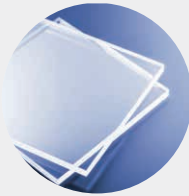
Materials of regular use in everyday life, such as glasses, ceramics, and metals are processed or refined as melts at temperatures above 1000 °C. By determining the melt viscosity of these materials with the FRS, a consistent high quality of the final product and an optimization of the energy-intensive production process can be ensured. Furthermore, this system opens up new ways in R&D of materials with a high melting point. The Furnace Rheometer Systems each combine a rheometer and a lab furnace for viscosity measurements of melts at furnace temperatures up to 1800 °C (1700 °C sample temperature).



FRS provides solutions for the following industries



Metal industry: metals, slags, and coal ash



Glass industry



Ceramic industry



Mining industry



Volcanology (research)

Your benefits

1

Highest safety and easy sample loading

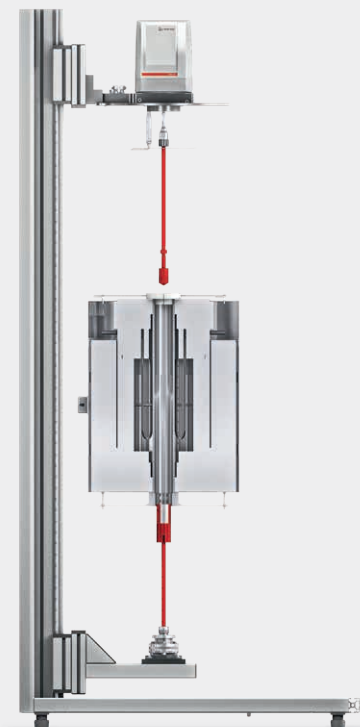
2

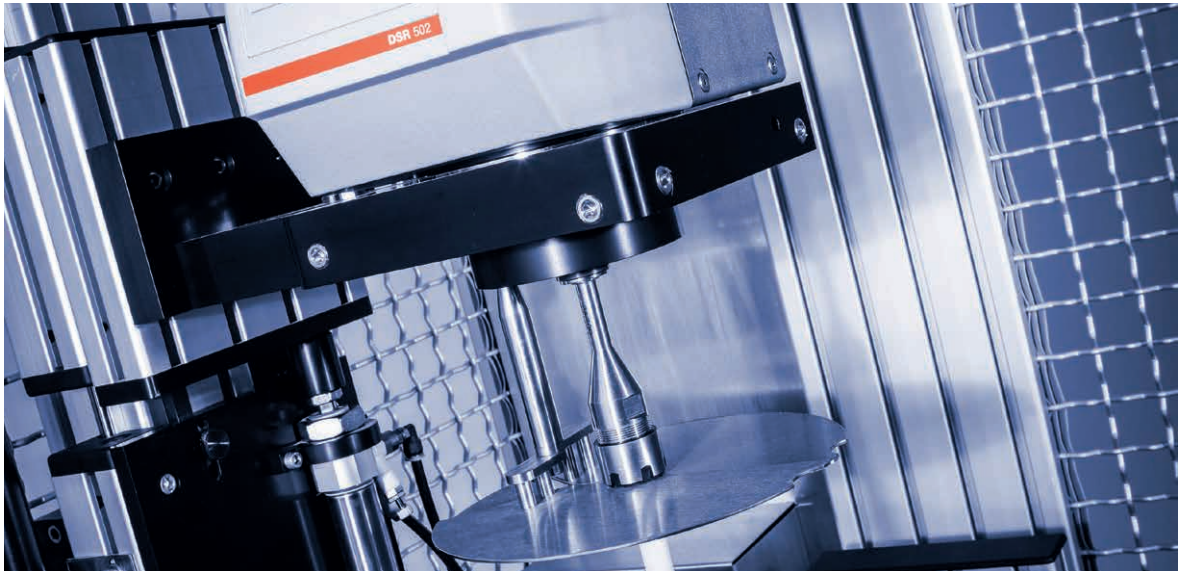
Measurements of low viscosities with the unique air-bearing motor

The setup

The Furnace Rheometer Systems consist of a lab furnace (Carbolite) and the DSR 502 rheometer head, which features the established EC motor and air-bearing technology of the MCR rheometer series. The system is air- and water-cooled to ensure a constant sample temperature. The combination of pneumatic pre-positioning and the stepper-motor-driven fine positioning ensures a controlled and accurate immersion of the measuring system into the sample in the molten state. The normal force sensor in the rheometer head allows for precise detection of the melting point during the measurement in rotation.

REFERENCE POSITION



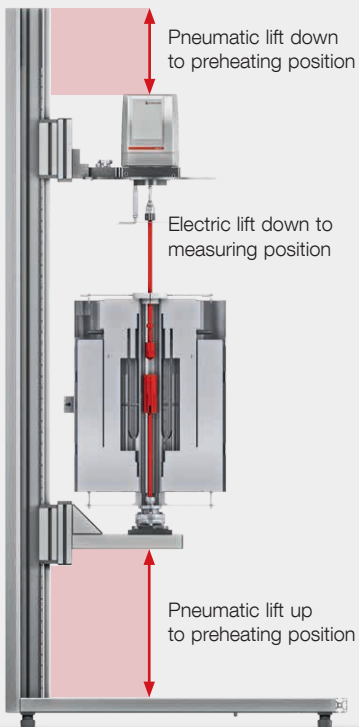


3 Normal force control for detecting the melting point

4 Measurements under inert gas atmosphere

5 Compliance with the international standards ASTM C1276, ASTM C965, and ISO 7884-2

PREHEATING & MEASURING POSITION



The EC motor technology – your key to accuracy

25 years of experience in one motor – you only get this with rheometers from Anton Paar. The air-bearing-supported synchronous EC motor deploys a frictionless synchronous movement of the rotor inside which enables the most sensitive and therefore most precise movements in rotational and oscillatory mode – for accurate results across a wide shear rate range. In this way even low viscous samples can be measured with an unprecedented precision.

Specifications

	Unit	FRS 1600	FRS 1800
Air-bearing EC motor (brushless DC) with high resolution optical encoder	-		✓
Rotation and oscillation mode	-		✓
Measuring of newtonian samples	-		✓
Measuring of non-newtonian samples	-		✓
Maximum torque	mNm	230	
Minimum torque, rotation	nNm	10	
Minimum torque, oscillation	nNm	2	
Viscosity range	Pa.s	0.001–10 ⁷	
Minimum angular velocity	rad/s	10 ⁻⁹	
Maximum angular velocity	rad/s	314	
Minimum speed	1/min	10 ⁻⁹	
Maximum speed FRS	1/min	300	
Maximum speed measuring head	1/min	3000	
Minimum angular frequency	rad/s	10 ⁻⁷	
Maximum angular frequency	rad/s	628	
Normal force range	N	0.005 to 50	
Oven temperature range	°C	20, 300 to 1600	20, 600 to 1800
Minimum sample temperature	°C	Room temperature	
Maximum sample temperature	°C	1530	1730
Temperature gradient optimized	-		✓
Temperature resolution	°C	0.1	
Safety housing	-		✓
Inert gas atmosphere possible	-		✓
Dimensions	mm	680 x 1950 x 920	
Measuring system material	-	Al ₂ O ₃ , graphite, Pt, and customized	
Measuring system rotor diameter	mm	8 to 35	
Maximum measuring system cup height	mm	100	
Compliant standards ASTM C1276, ASTM C965, ISO 7884-2	-		✓

