Accessory catalog



Rheometer accessory catalog

Thermo Scientific HAAKE MARS Rheometers

thermo scientific

Introduction





As a world leader in serving science, Thermo Fisher Scientific brings high performance rheometers to scientists working in advanced quality control and applied research.

Discover the full potential of our Thermo Scientific™ HAAKE™ MARS™ iQ (Air) and Thermo Scientific™ HAAKE™ MARS™ 40/60 Rheometers with our comprehensive range of accessories and application-specific solutions. Designed to enhance precision, versatility, and ease of use, our accessories ensure you achieve the most accurate and reliable results in your material testing and research.

Our extensive selection includes temperature modules, specialized measuring geometries, and advanced Thermo Scientific™ HAAKE™ RheoWin™ Software options, all crafted to meet the highest standards of quality and performance. Whether you are working in pharmaceuticals, cosmetics, food, polymers, or any other industry, our application-specific solutions are tailored to address your unique testing requirements.

Explore our selection and elevate your rheological experiments to new heights with accessories that are engineered to optimize your workflows and deliver consistent, reproducible results. With the HAAKE MARS Rheometers, you have the tools you need to push the boundaries of material science.

Discover the Thermo Scientific Rheometer models

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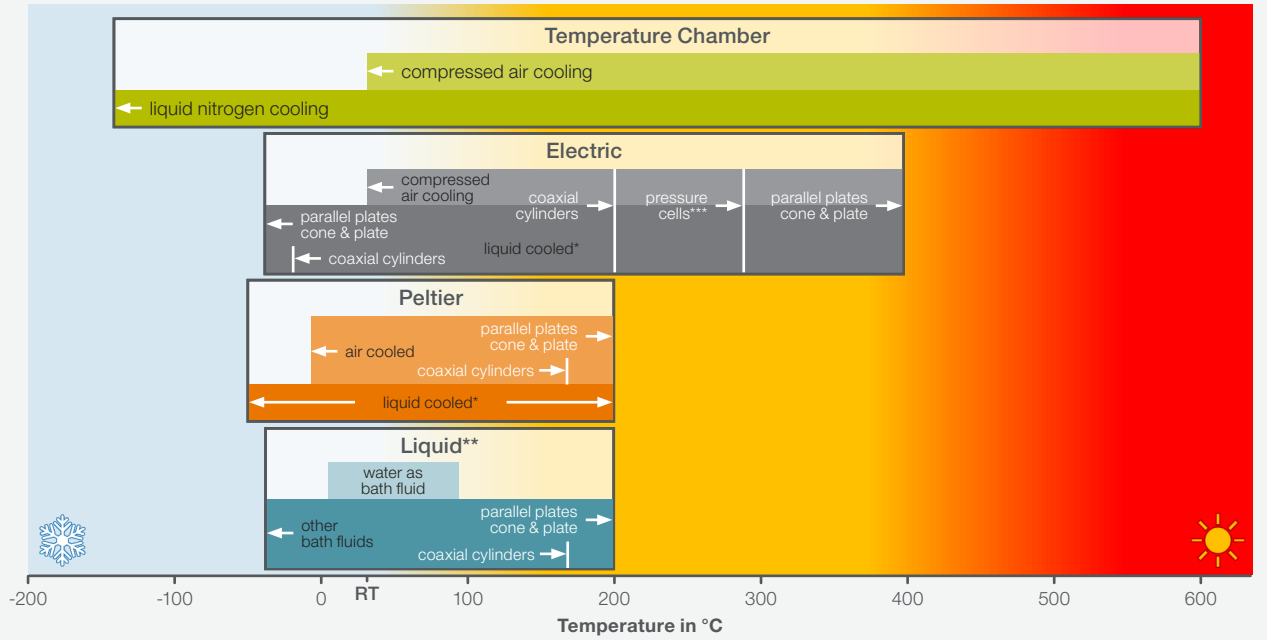
Temperature control from –150 °C up to 600 °C

Temperature modules – common features

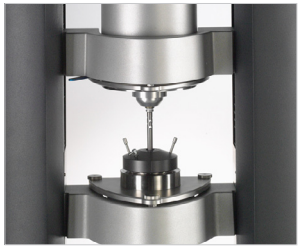
- Plug-and-play temperature modules include quick coupling and automatic recognition
- All connections are visible from operator position
- Universal modules enable the switch between coaxial cylinders and parallel plates or cone and plate measuring geometries in seconds; more information
- High heat transfer materials guarantee fast temperature equilibration and enable rapid temperature changes
- Automatic temperature calibration tool ensures correct sample temperature
- Easy installation can be done in seconds without tools or adjustments
- Integrated base—the dismounted unit can be parked on the lab bench

Universal active and passive upper temperature modules – common features

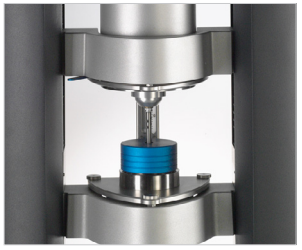
- Individual combination with lower temperature module; more information
- Trimming position stop
- Purge gas connectors for testing under inert atmosphere
- Integrated solvent trap



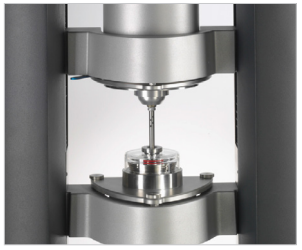
* Lowest temperature depends on thermostat performance and selected bath liquid
** Available temperature range depends on thermostat performance and selected bath liquid
***Depending on the pressure cell model



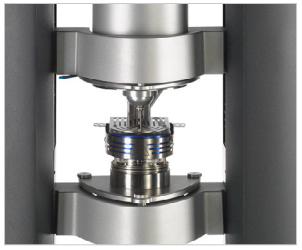
Two-piece sample cover made of PEEK



Insulated sample hood



Transparent sample cover made of glass



Upper active hood for parallel plates and cone & plate

Temperature chamber for HAAKE MARS iQ Rheometer

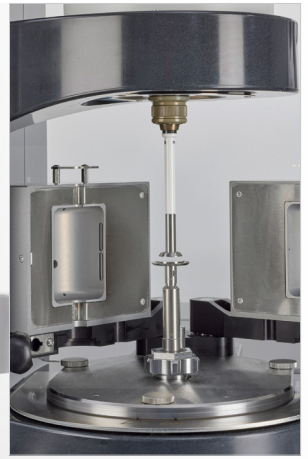
Benefits at a glance

- The temperature chamber for HAAKE MARS iQ Rheometer offers maximum opening angle half-shells: >90 ° for convenient sample handling
- Available temperature range between -150 °C* and +450 °C
- Changing the rheometer configuration between temperature chamber and other temperature module within 1 minute without additional tools or alignment
- “View Assist” – Camera option for sample observation during tests

Broad selection of accessories for temperature chamber

- Parallel plates and cone & plate measuring geometries with diameters up to 35 mm
- Self-centering and self-adjusting clamps for Dynamic Mechanical Thermal Analysis (DMTA) of solid specimens and measurements according to DIN/ISO 6721-1
- SER (Sentmanat Extension Rheometer) tool for extensional rheological measurements of polymer films
- Tribo-rheometry geometries for temperature-controlled friction tests. For more information view the tribology chapter
- Powder rheology at elevated temperature. For more information view the powder rheology chapter

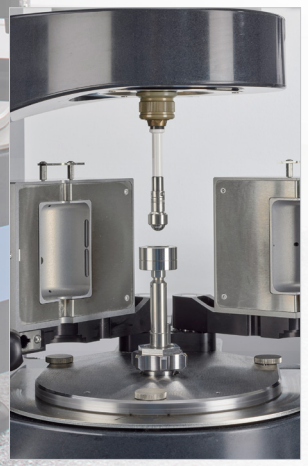




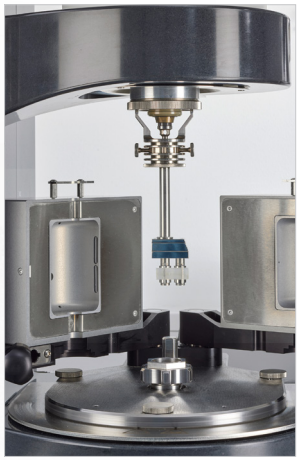
Parallel plates / cone and plate



Solids clamping fixture (rectangular specimen)



Tribology



Sentmanat Extensional Rheometer (SER) tool

Temperature chamber with extended measuring capabilities over the widest temperature range

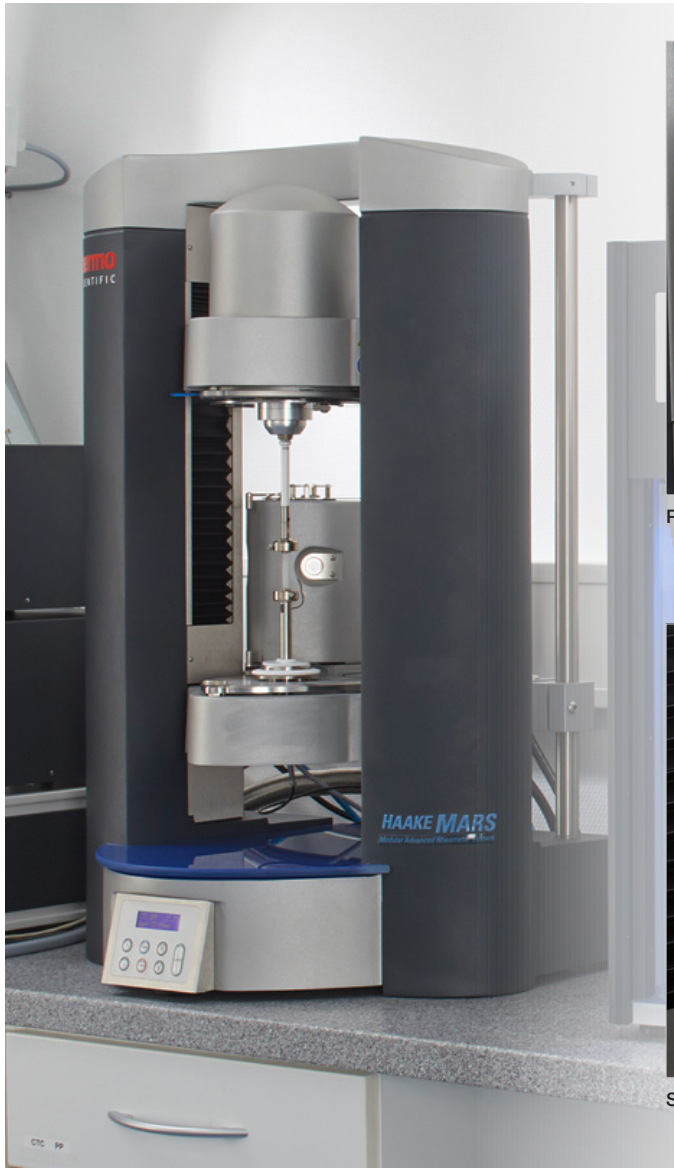
The Controlled Test Chamber (CTC) features a unique combination of convection and radiation heat transfer for very fast temperature changes and homogeneous temperature distribution from 30 °C to 600 °C, can be extended to -150 °C with the premium low temperature option.

The CTC consists of two independently movable half-shells with the following advantages:

- Good access to the sample for easy sample loading, trimming, cleaning
- The chamber can be closed behind the sample while temperature is stilled controlled
- With the CTC in park position, other temperature modules can be used

Broad selection of accessories for CTC

- Parallel plates and cone & plate measuring geometries with diameters up to 35 mm
- Self-centering and self-adjusting clamps for Dynamic Mechanical Thermal Analysis (DMTA) of solid specimens and measurements according to DIN/ISO 6721-1
- SER (Sentmanat Extension Rheometer) tool for extensional rheological measurements of polymer films
- Tribo-rheometry geometries for temperature-controlled friction tests. For more information view the tribology chapter





Parallel plates / cone and plate



Parallel plates as disposable version



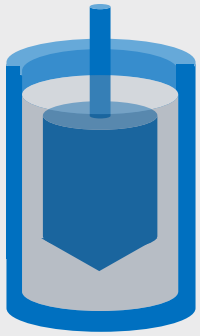
Solids clamping fixture



Sentmanat Extensional Rheometer (SER)

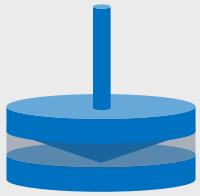
Broad selection of measuring geometries – most common types





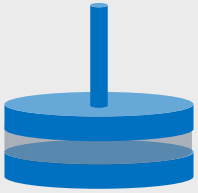
For low to medium viscous samples

Coaxial cylinder



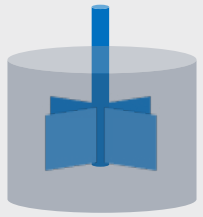
For low to high viscous samples without particles

Cone and plate



For low to high viscous samples with small particles as well as gels

Parallel plates



For low to high viscous samples with larger particles (relative data only)

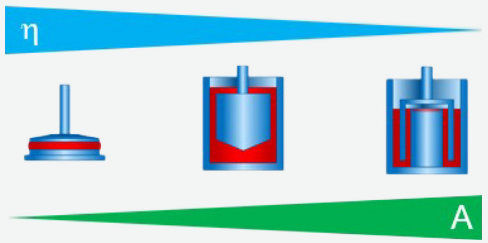
Vane rotors

Measurements of water-like samples up to solids can be performed using individual measuring geometries. Features of our system simplify the process:

- “Connect Assist” technology for quick exchange of measuring geometries and automatic rotor identification
- Integrated solvent trap ring used in combination with a sample cover to avoid dry-out
- Ceramic shaft for minimized heat transfer

Recommendation for selecting a measuring geometry

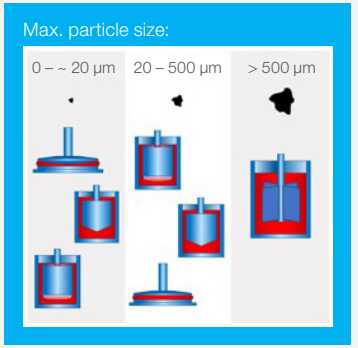
The higher the viscosity η of a sample the smaller should be the surface area A of the measuring geometry



Pastes, ointments, polymer melts

Water-like samples, ultra diluted solutions

For ideal rheological measurements, the ratio of maximum particle size and measuring gap should be 1/10

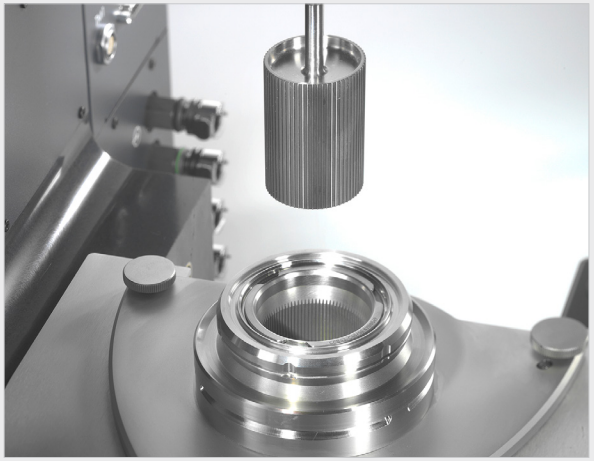


Coaxial cylinder

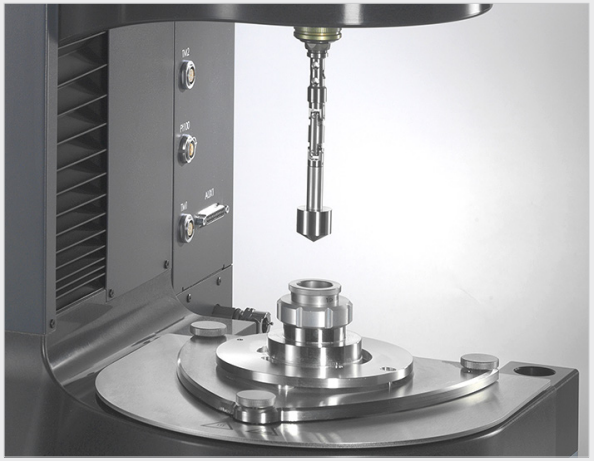
- Different types of coaxial cylinders of various materials and in multiple sizes
- Surface finish options include serrated, sandblasted or with helical grooving to avoid sedimentation
- High-shear geometries with cardan coupling for measurements up to 120 000 s^{-1}; more information
- Double gap cylinder geometry for measuring low viscous fluids
- Disposable cups for testing sticky samples that are difficult to remove



Laboratory holder with selection of cylinder geometries

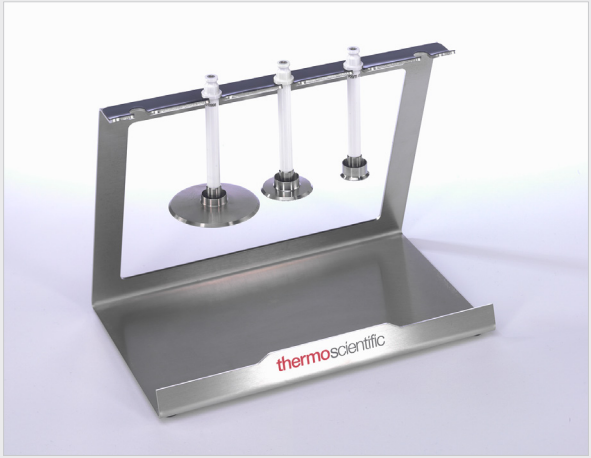

Serrated geometry to prevent slippage


Double gap cylinder geometry

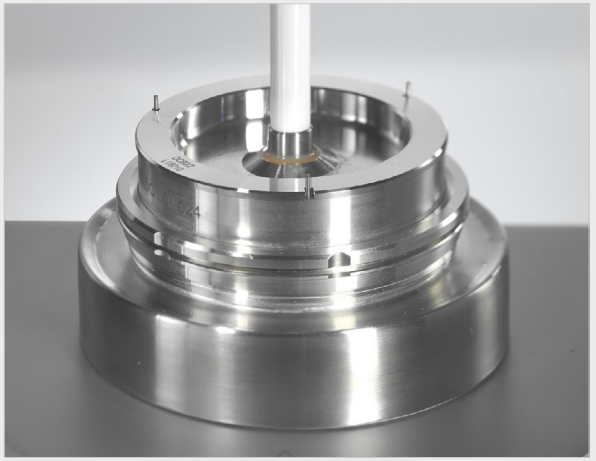

High-shear setup

Cone and plate

- Available in diameters between 8 mm and 60 mm and cone angles between 0.5° and 4°
  - Different surface finishes available (e.g., sandblasted)
  - Made out of different materials
- Double cone geometry for testing very low-viscous samples
- Lower plates matching the upper rotor in diameter, for precise sample loading and trimming



Laboratory holder with selection of plates and cones



Double cone

Parallel plates

- Diameters available between 8 mm and 60 mm
  - Different surfaces available (e.g., serrated or sandblasted)
  - Available in different materials
- Lower plates matching the upper rotor in diameter, for precise sample loading and trimming
- Disposable plates for testing hardening samples



Universal shaft with selection of disposable plate inserts and corresponding lower plates



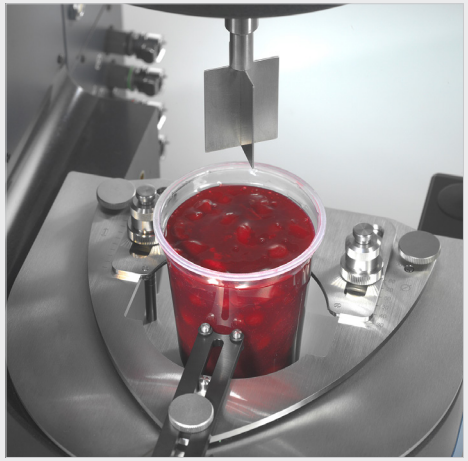
Serrated upper and lower plates

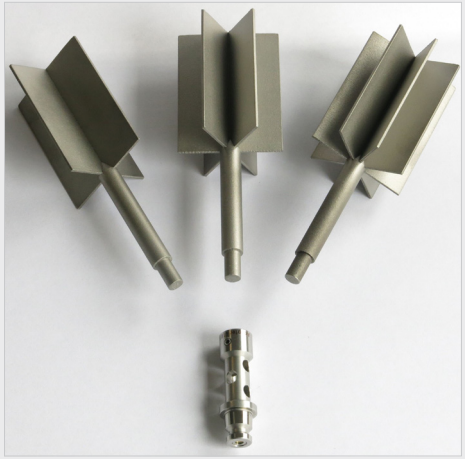
Vane rotors and special geometries

- For reliable measurements of highly filled or inhomogeneous samples that can also contain larger particles as well as for measurements in original containers
- For measurements according to
  - ISO 2555 with spindle in 600 ml beaker; more information
  - ISO 2884 with ball or disc rotors in a paint can; more information
- Customized 3D printed vane rotors for maximum design flexibility; more information



Laboratory holder with selection of relative rotors


Universal container holder for measurements in original sample containers


Selection of 3D printed rotors and universal adapter


Rotors acc. to ISO 2884-2

Universal holder for individual containers

A universal holder for sample containers has been developed. Thanks to the three individually adjustable clamps, sample containers like glass jars, cans, beakers, cups, etc., can be mounted securely onto the rheometer. This allows the insertion of a (vane) measuring geometry into the sample without comprising its structure.

Vane rotors with different diameters are available. The universal adapter shaft can be used to adapt any individually designed measuring geometry; more information.

Measuring cell for building materials

A unique special measuring cell with a flexible profile for measurements on building materials is available. This measuring cell with a volume of 570 ml can be equipped with interchangeable vertical metal stripes (lamellas) protruding from the inner wall into the cell's volume. Using different lamellas of 0 mm, 1 mm or 2 mm depth, the user can create quickly a multitude of patterns to fit the individual samples properties. The design avoids slippage layer formation.

More information on rheological measuring cell for building materials



Measuring cell for building materials

Interfacial rheology

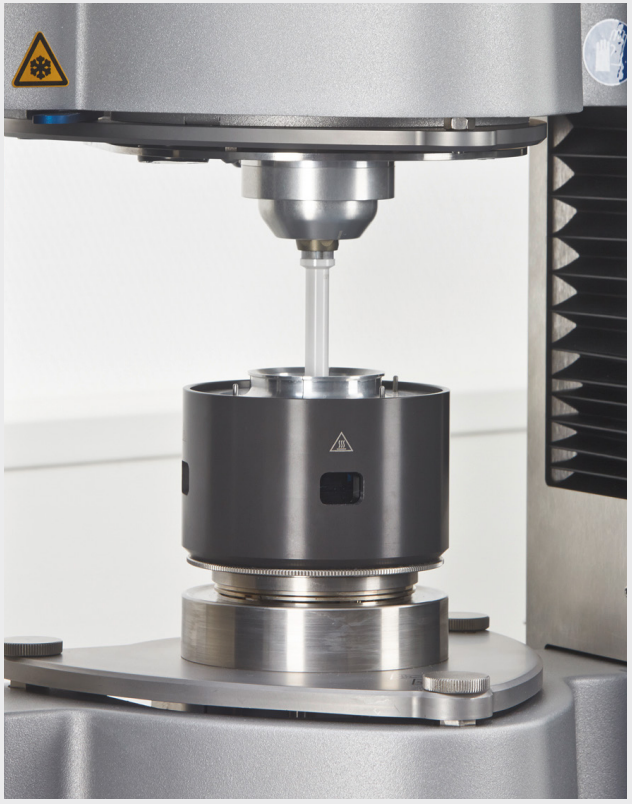
Two different types of geometries are available to measure the rheological properties of interfaces: the Du Noüy ring and the Bicone setup.

Du Noüy ring: This setup features a small wire ring made of a special alloy, attached to an adapter shaft via a clamping mechanism. When placed at the surface of a liquid, it measures the rheological properties of thin surface layers, such as those formed by surfactants or proteins. More information



Du Noüy ring

Bicone setup: This more robust geometry measures the rheological properties of stiffer interfacial layers formed between two immiscible liquids. Unlike the Du Noüy setup, results from the Bicone require mathematical corrections to account for torque contributions from the cone surface(s) submerged in the subphase(s). More information



BiCone measuring cup

Powder rheology

Powders are crucial in many industries, where their flow behavior affects manufacturing efficiency and product consistency. Characterizing powder materials during new product formulations ensures desirable product characteristics and optimizes processes like mixing, granulation, and compaction. Powder rheology measures flow and shear properties, as well as density, compressibility, and permeability, providing essential insights for improving product quality and process efficiency.



Compression test

Pre-conditioned powder is subjected to incrementally increasing normal stresses. The decrease in sample volume is monitored as the powder is compressed, and the percentage compressibility is measured under specified normal stress.



Powder flow test

A twisted blade rotor is moved helically through the powder, measuring torque and force to report unconfined and confined Total Flowability Energy.



Powder shear test

The powder is consolidated in a cup with a profiled base over an upper profiled plate, and then slowly sheared under varying normal stresses until it yields. This process reports cohesion, yield strength, flow function, and additional properties.

More information about powder rheology, applications and solutions:

thermofisher.com/powder-rheology

Standardized measurements for powder characterization product information

Pressure cells and related accessories

For testing samples at elevated pressures, different pressure cells are available for HAAKE Rheometers. They are designed as closed systems, which can be filled with the sample and pressurized. Depending on the measurement conditions that are to be simulated with the pressure cell, different types are available. For example, one could be made out of titanium for pressures up to 600 bar and temperatures up to 300 °C, or made out of Hastelloy® for measurements on chemically aggressive samples.

The pressure can be increased by either increasing the temperature or using an external pressurization, e.g., a pump to compress the sample volume during the filling process.

Depending on the sample different measuring geometries are available: coaxial cylinder geometries, double gap, or vane rotors.

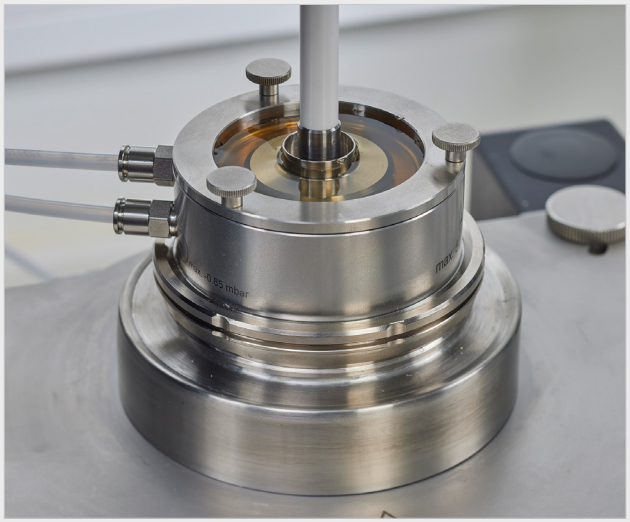
Overview of pressure cells

Cylinder rotors for pressure cells	Double gap geometry for pressure cells	Serrated coaxial cylinder geometry for pressure cell D600/250	Vane rotors for pressure cell
For measuring the absolute viscosity of a sample under different conditions, all pressure cells (acting as the stator) can be used with cylinder rotors to form a coaxial cylinder measuring geometry	For homogeneous fluids with low viscosity values	For materials showing wall slipping behavior. Serrated measuring geometries provide relative rheological results only.	For inhomogeneous samples or fluids which containing large, suspended particles
			
Cylinder rotor with mounted inner magnet for insertion into the pressure cell	**Double gap geometry CC38 DG-PC consisting of the lower part / bottom lid of the cup and rotor / upper part.**	**Serrated coaxial cylinder geometry for pressure cell D600/250 consisting of rotor (left) and serrated insert (right).**	**Vane rotors with a blade height of 8.8 mm with different diameters of 25, 30, 36 mm and vane rotor with a blade height of 93 mm and a diameter of 25 mm.**
More information	More information	More information	More information

Submersion flow cell / immobilization cell

A submersion flow cell is a measuring cell for measurements of semi-solids with liquid contact. It includes interchangeable lower plates (serrated, perforated, or porous frit) for various applications, designed for 5 °C to 50 °C. The serrated plate can be used to analyze the viscoelastic properties of a semi-solid material under ”ambient conditions,” i.e., in contact with a liquid. For the immobilization test, a porous frit or perforated plate is used as the lower plate. The sample on a carrier material, like paper, undergoes solvent removal by negative pressure during measurement, simulating drying conditions.

The measuring cell, with its interchangeable lower plate, is versatile enough for applications across pharmaceuticals, cosmetics, and food analysis. It investigates cream-skin interactions, plaster stickiness, and food rheology based on pH or simulates chewing processes and analyzes coating drying behavior, such as paper coatings.
More information



Submersion flow cell

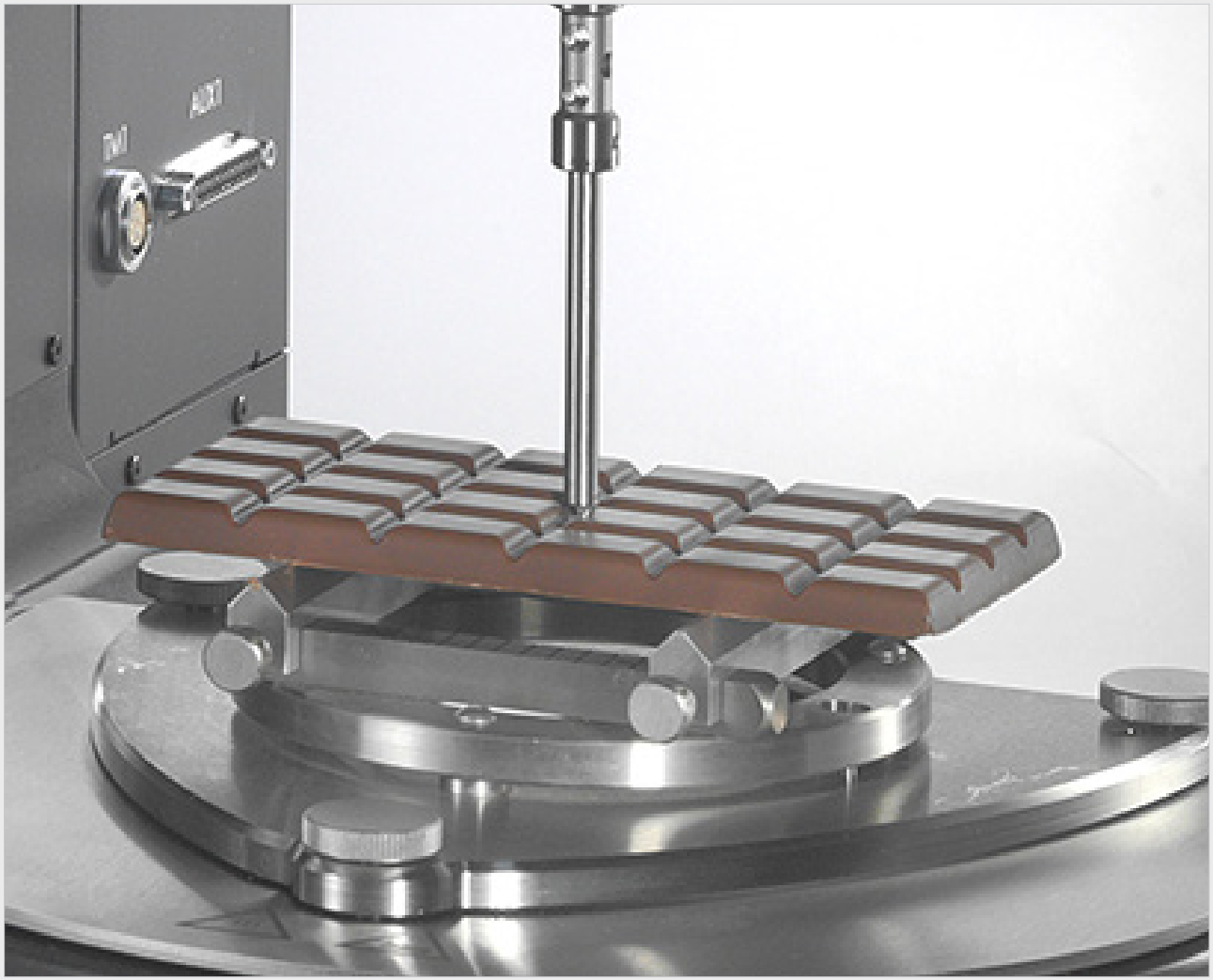


Immobilization cell

Texture analysis

The HAAKE MARS Rheometers, equipped with a highly sensitive normal force sensor and a very precise lift motor, allows the application of controlled axial forces to the sample, pushing or pulling the material.

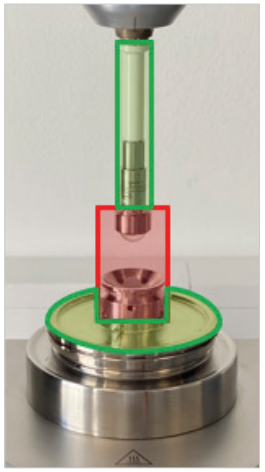
A sample fixture is available to investigate the bending and breaking behavior of a wide range of materials. This tool consists of a support plate with two parallel bars with an adjustable distance between 1 cm and 7 cm. An individually designed piston can be lowered onto the sample. The piston is mounted to the rheometer using a 6 mm universal adapter. Thanks to this universal adapter any kind of piston design can be attached to the rheometer. More information

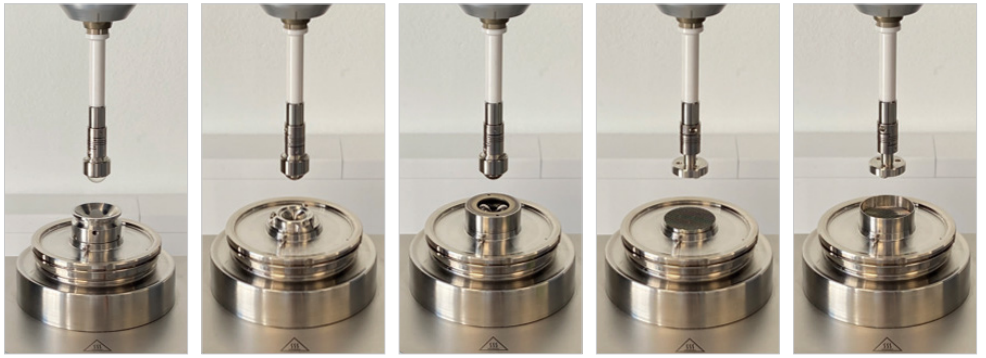


Sample fixture for bending and breaking tests (3 point bending tool)

Tribo-rheometry

Tribology is the science of interacting surfaces in relative motion and includes the study of friction, wear, and lubrication. Tribology and rheology (the science of flow and deformation of matter) are closely linked and play an important role in industries such as automotive, construction, food, and personal care. The HAAKE MARS Rheometers can be equipped with different tribo-rheometry geometries which consist of an upper rotor with quick coupling, automatic recognition (“Connect Assist”), and a flexible spring element that guarantees self-alignment, as well as a lower attachment into which a lubricating substance can be filled. The rotor and the lower attachment are modular so that various combinations of different contact surfaces are possible. Temperature control options enable tribological tests over a wide temperature range.





Ball-on-Three-Discs	Ball-on-Three-Plates	Ball-on-Three-Balls	Three-Balls-on-Plate
Food	Lubricants	Lubricants	Food
Lubricants			Cosmetics

Left: Modular design of the tribo-rheometry measuring geometry with interchangeable inserts for the rotor and the lower plate.
Right: Various combinations and typical areas of application.

More information about tribo-rheometry application and solutions:

thermofisher.com/tribo-rheometry

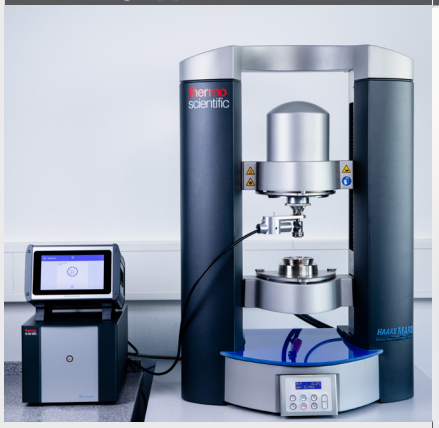
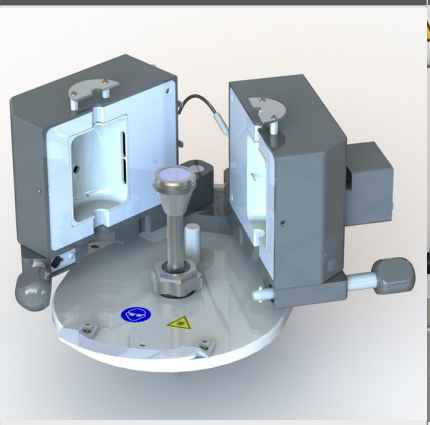
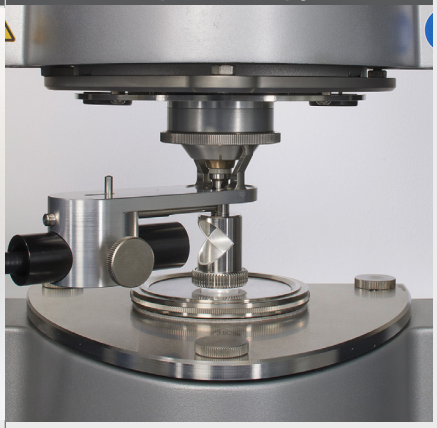
Tribo-rheometry acessories for HAAKE MARS Rheometers product information

UV light curing

UV-curable materials are widely used in coatings, adhesives, sealants, potting compounds, and inks, which are used in various industries such as automotive, 3D printing, medical, and electronics. A comprehensive portfolio of tailor-made UV curing measuring cells is available, including thermally assisted UV curing at elevated temperatures and the unique combination of simultaneous rheology and FTIR spectroscopy. Additional advantages of the UV curing configurations with the HAAKE MARS Rheometers include simple, reproducible measurements, modular adapter solutions for various configurations, LED or mercury light sources, disposable measuring geometries for testing up to the fully cured state, and a unique pneumatic geometry release function for easy exchange and hassle-free removal of glued geometries.

Watch video

UV light curing options

Universal Peltier temperature module for UV curing applications	UV-assisted thermal curing at elevated temperatures	UV curing for advanced measurements with combined spectroscopy
		
A flexible UV curing module with built-in Peltier temperature control enabling a fast exchange between the UV curing setup and regular rheological configurations for coaxial cylinder or parallel plate / cone and plate measuring geometries. The UV light source is triggered automatically by HAAKE RheoWin Software.	A UV light adapter for the temperature chamber enables UV-assisted thermal curing over a very wide temperature range. HAAKE RheoWin Software programs automatic routines for UV pre-curing followed by thermal curing, ensuring fast temperature changes and even distribution within the oven.	The HAAKE MARS 40/ 60 Rheometer with the Thermo Scientific™ Rheonaut Module enables simultaneous rheological data and FTIR spectra collection for R&D, allowing investigation of structural changes during UV curing.
Up to 180 °C*	Up to 600 °C*	Up to 200 °C*

* Highest temperature for HAAKE MARS 40 / 60 rheometer for the UV modules. For HAAKE MARS iQ rheometers max. temperature 450 °C
Note: This temperature range may be limited by the maximum temperature for which the UV light source and the components used with it (e.g., light guides) were designed.

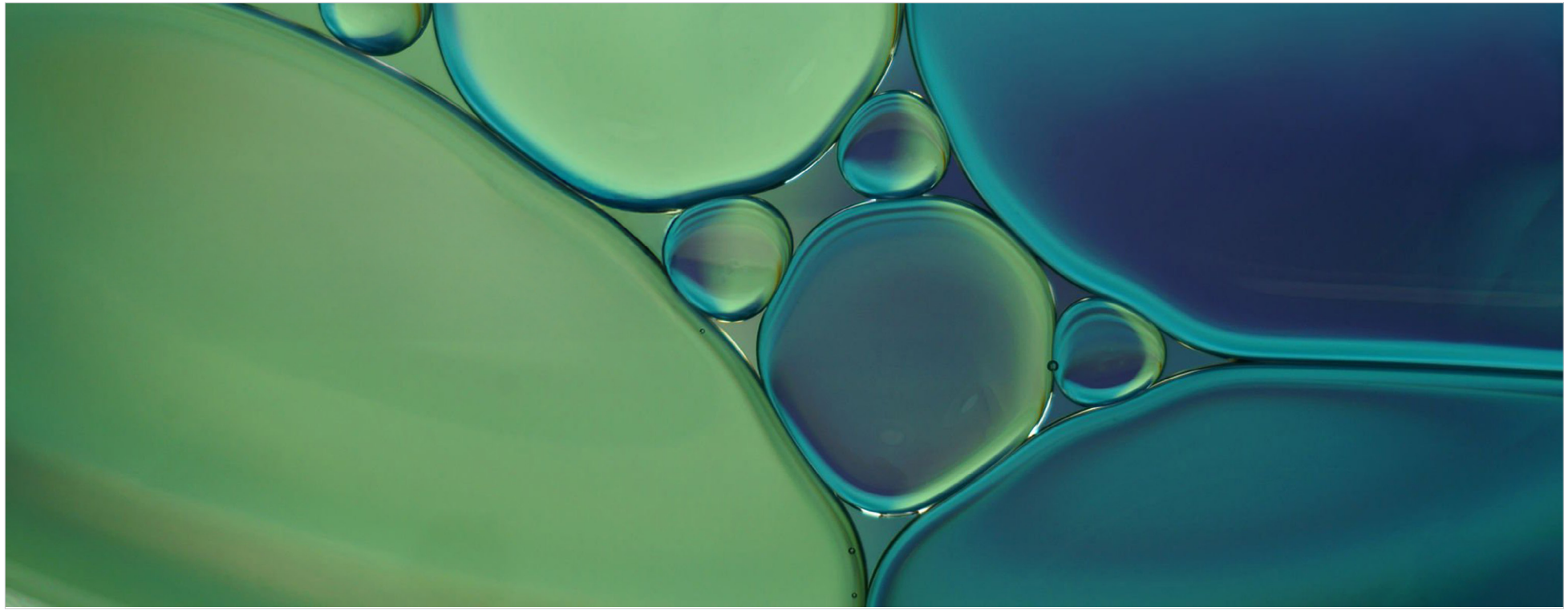
More information about UV curing solutions and application notes: **thermofisher.com/uvcuring**

Two measurements at the same time – advantages at a glance

Rheology is a “macroscopic” method that provides information on the behavior of a sample under specified conditions. The mechanical properties of a material depend on its structure at the microscopic level. In order to be able to determine the reasons for the rheological properties, macroscopic rheological measurements must be combined with tests on the microscopic level, using FTIR, Raman or microscopy. Benefits of this combination of methods include the use of the same sample preparation and measuring conditions, as well as shorter test times and perfect correlation of results.

The following options are available:

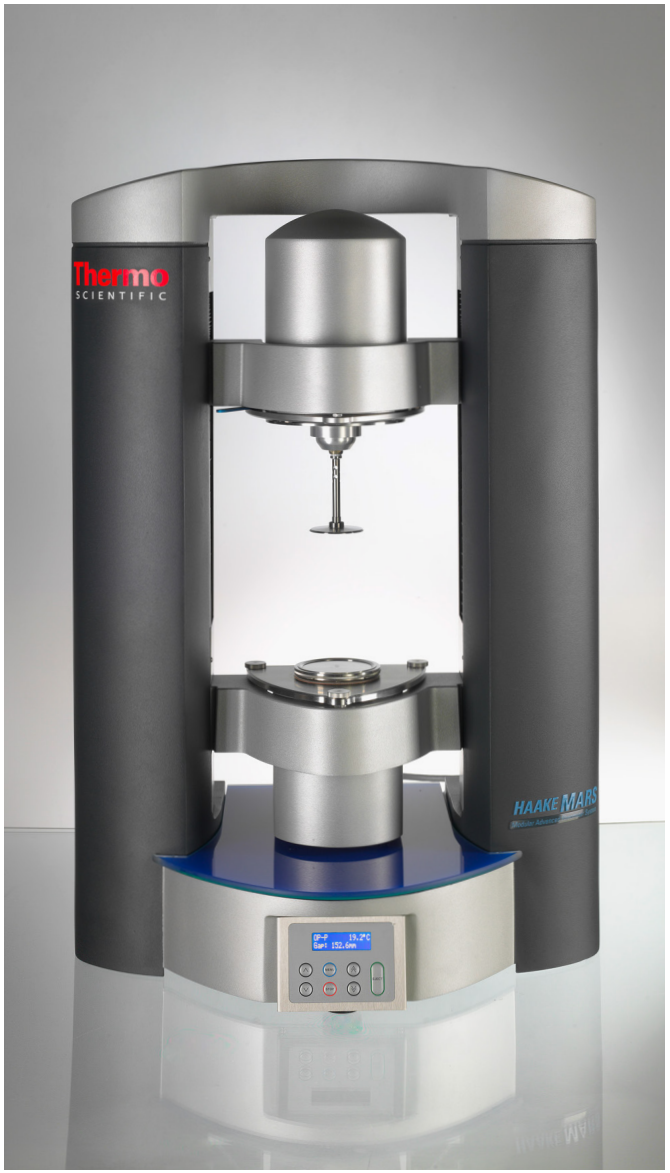
- Rheology + microscopy to see morphology changes
- Rheology + FTIR spectroscopy to understand chemical reactions
- Rheology + Raman spectroscopy to understand structural changes



RheoScope: rheology + microscopy

The Thermo Scientific™ HAAKE™ RheoScope Module provides multiple advantages:

- Simultaneous rheological measurements and image acquisition
- Fully integrated compact modular unit for the HAAKE MARS 40/60 Rheometer
- Visualization of data and images in the same software package
- Analysis of structural changes under shear
- Image analysis software to determine particle sizes, particle size distributions, and structural analysis.



More product and application information:

HAAKE RheoScope Module for HAAKE MARS 40/60 Rheometer platform

Investigating wax deposition in crude oil with rheooptical methods

Rheonaut and RheoRaman: rheology + spectroscopy (FTIR / Raman)

The modular HAAKE MARS 40/60 Rheometer platform offers the unique capability to couple FTIR spectroscopy (Rheonaut Modul) and Raman spectroscopy (Thermo Scientific™ RheoRaman Modul). A switch between FTIR and Raman spectroscopy is easy and fast. Coupling spectroscopy techniques enables a new level of understanding of rheological properties and processes, which depend on changes on the molecular structure. On the one hand, deformations and orientations of molecules as function of shear can be monitored. On the other hand, in situ spectroscopy enables the investigation of chemical reactions in the measuring gap, such as chemical or thermal curing.

- Simultaneous rheological and FTIR / Raman spectra measurement
- Analysis of structural changes on the molecular level under shear/deformation
- Extensive investigation of thermal/UV curing reactions with a special measuring cell and FTIR spectroscopy.



HAAKE MARS 40/60 Rheometer with FTIR spectrometer (left side) and Raman spectrometer (right side)

More application information:

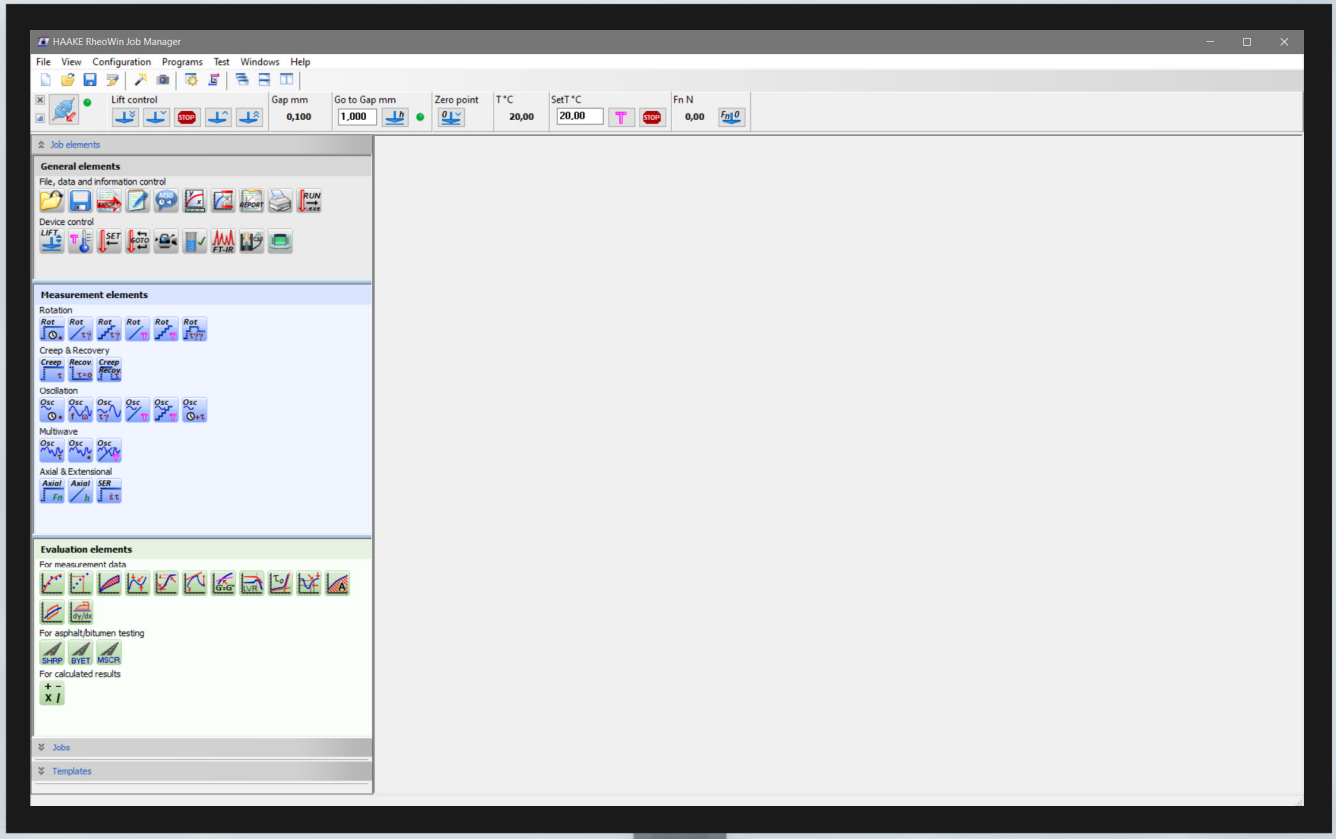
Curing of an acrylate – Rheology with simultaneous FTIR spectroscopy

Rheology-Raman spectroscopy during the melting and recrystallization of polypropylene

HAAKE RheoWin Software and software modules

HAAKE MARS rheometers are fully software-controlled via HAAKE RheoWin PC Software.
This allows operations to be optimized for individual requirements.

- Multilingual user interface
- Select from a broad range of predefined testing methods and SOPs
- Convenient creation of individual measuring routines via “drag and drop”
- Numerous functionalities for data analysis and evaluation



- Free configurable data export (ASCII, Microsoft® Excel®,XML, etc.)
- User management for granting individual user privileges
- Range calculator shows optimal measuring range for utilized setup
- Additional software modules available

HAAKE RheoWin Software tutorials

Ensure precise results with the HAAKE RheoWin Rheometer software, which also enables the creation of automated SOPs.



HAAKE RheoWin Software General Settings

A walk-through of how to set up and adjust HAAKE RheoWin software settings



HAAKE RheoWin Software Test Procedure Library

Walk-through of the test procedure library including how to access the library, job types, job descriptions, and how to change settings



Creating a test procedure with HAAKE RheoWin Software.

A walk through how to create a rheological test procedure from sample loading step, to rheological job creation and data evaluation.

View mini tutorials

Industry standard compliance

Which rheometer fulfills which industry standard? Whether you need an entry-level rheometer for absolute viscosity measurements with integrated temperature control, or advanced rheometers for extended material characterization over the largest measuring range, we have you covered.

Find an overview of the compliance of various Thermo Scientific™ Rheometers with selected industry standards

Rheometers & viscometers

Industry standards compliance

Which rheometer fulfills which industry standard? Entry-level rheometer for absolute viscosity measurements with integrated temperature control. Advanced rheometers for extended material characterization over the largest measuring range.

The following table provides an overview of the compliance of various Thermo Scientific™ HAAKE™ Rheometers with selected industry standards.





Standard	Industry / sample type	HAAKE Viscotester iQ	HAAKE Viscotester iQ Air	HAAKE MARS iQ	HAAKE MARS iQ Air	HAAKE MARS 40 / 60	Required accessory / measuring geometry
ASTM® D2556	Adhesives (apparent viscosity)	●	●	●	●	●	Viscometers spindles for relative viscosity, universal container holder
ASTM D4092 (similar to ISO® 6721-1)	Polymers (Standard terminology for dynamic mechanical properties of plastics)	✖	✖	●	●	●	Parallel plates or solids clamping tool, parallel plates, upper and lower electrical temperature modules, or temperature chamber
ASTM D4440 (equivalent to ISO 6721-10)	Polymers (oscillatory measurements)	✖	✖	●	●	●	Parallel plates, upper and lower electrical temperature modules or temperature chamber
ASTM D4473	Polymers (oscillatory measurements, curing of thermosetting resins)	✖	✖	✖	●	●	Parallel plates, TM-PE-P, PEEK cover, TM-IN-H or TM-EL-H depending on temperature range. Cone and plate only in the case of isothermal tests. Solids clamping tool for composites

View industry standards

Selection guide for rheometers and software features

Rheology, the study of flow behavior and material deformation, is crucial for product development and quality control. By measuring rheological properties, scientists can do everything from predicting cosmetic shelf life, improving food texture, or controlling drying of paints, to determining curing times of adhesives, measuring viscosity of crude oil under elevated pressure and temperature, or determining the viscoelastic properties of polymers.

As novel materials and formulations are developed and the turnaround times for product batches accelerate, lab scientists are under pressure to produce consistently high-quality products and rapidly bring them to market. Thermo Scientific rheometers and viscometers, designed for both beginners and advanced users, provide fast and consistent results across diverse sample types. Discover the perfect rheometer for Quality Control (QC) and R&D.

View full selection guide

	HAAKE Viscotester 3	HAAKE Viscotester iQ/iQ Air	HAAKE MARS iQ/iQ Air	HAAKE MARS 40/60
				
Type of rheometer	handheld viscometer	rotational rheometer	rotational rheometer	rotational rheometer
Portable	Yes	Yes		
Temperature control options		Yes	Yes	Yes
Automatic lift functionality			Yes	Yes
Standalone operation	Yes	Yes		
Software control operation		Yes	Yes	Yes
Tests in stress controlled (CS) mode		Yes	Yes	Yes
Tests in oscillation mode (CD & CS)		iQ Air only	iQ Air only	Yes
Tests in controlled rate mode (CR)	Yes	Yes	Yes	Yes
Normal force capabilities			Yes	Yes
Min rotational speed (rpm)	62.5	0.01[a]	0.001[b]	10-8[c]
Maximum rotational speed (rpm)	62.5	1500	2000	4500
Dimensions (L x W x H)	180 x 90 x 175 mm[d]	270 x 500 x 500 mm	480 x 390 x 670 mm	600 x 600 x 890 mm
Software	No	RheoWin	RheoWin	RheoWin

Rheology resources

Application laboratories

In our fully equipped application laboratories, we stand ready to demonstrate the performance of our instruments through test measurements with customer samples. Additionally, we support our customers in the development of future-oriented applications or in establishing robust and reliable routine measurement protocols. We provide a broad range of product and application solutions, and our team of application scientist and interdisciplinary technology specialists is on hand to answer your questions (**contact us**).

Register for application and product information at **thermofisher.com/specoptin** to gain access to the latest resources to accelerate your research and improve laboratory productivity.



Seminars and trainings

Comprehensive training programs, in-house seminars, and practical rheology and extrusion courses are available at various locations around the world. We support our customers with comprehensive on-demand trainings (webinars, videos, and application notes) by our experts, and provide benefits arising from our interdisciplinary knowledge in polymer science and technologies (**thermofisher.com/learnwithus**).

More information at **thermofisher.com/rheometers**

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