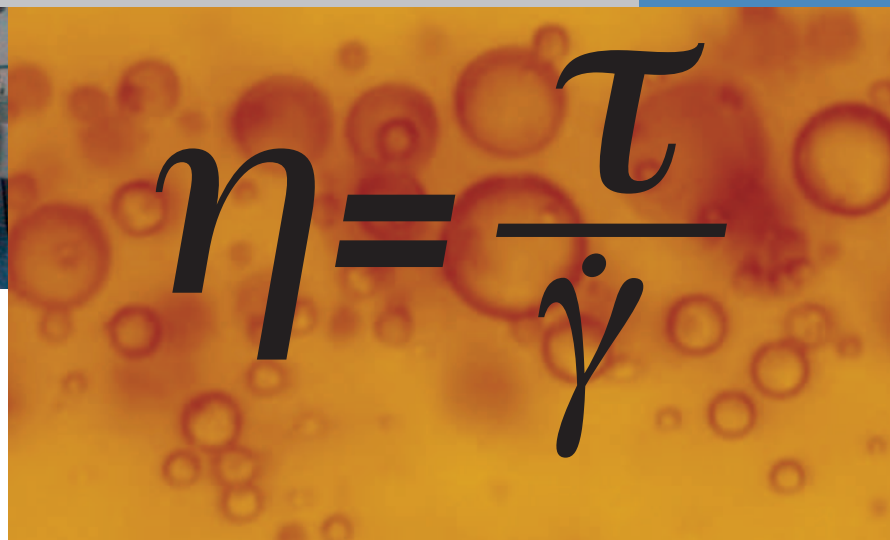


The Thermo Scientific RheoScope module for the HAAKE MARS rheometer platform simultaneously measures rheological properties and changes in the microscopic structure of the tested sample. The results allow researchers to speed formulation development, process optimization and product processability.

Thermo Scientific RheoScope Module For HAAKE MARS Rheometer

Rheological measurement with optical analysis



Applications/Examples

- **Food:** fat, starch
- **Polymer:** solution, melt
- **Pharma/Cosmetic:** creme, lotion
- **Paint/Inks:** printing paste, thickening agents
- **Petrochemical:** crude oil, drilling fluid
- **Others:** medical

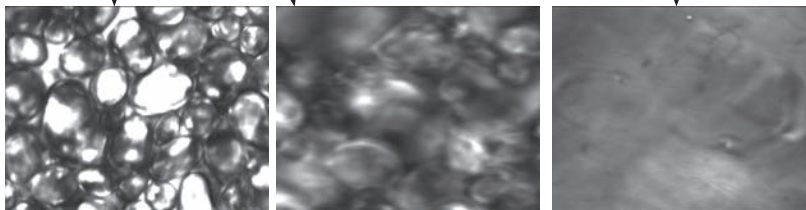
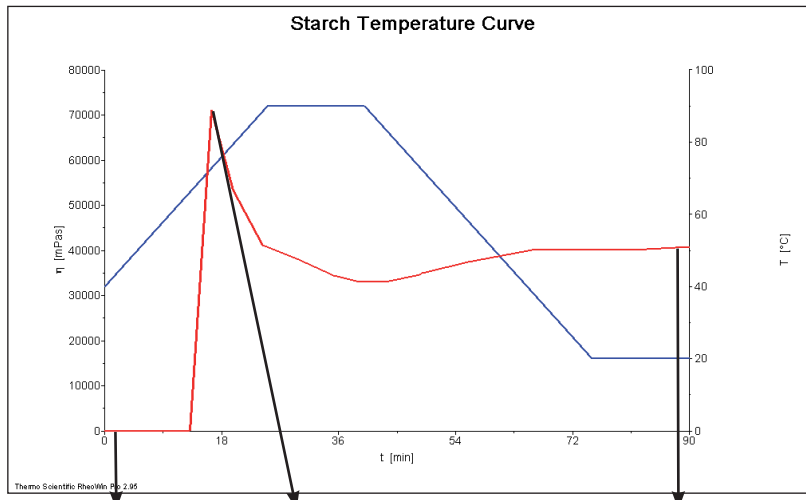
Formulations

- **Gels**
- **Suspensions**
- **Solutions**
- **Emulsions/Dispersions**
- **Foam**
- **Melts**

Rheology and Microscopy

The Thermo Scientific RheoScope module simultaneously records rheological properties and changes in the microscopic structure of the tested sample at a macroscopic level. Understanding micro structures enables researchers to characterize a product's mechanical properties. The module is comprised of an optical microscope, digital video camera and temperature control unit that is used in conjunction with the Thermo Scientific HAAKE MARS rheometer platform.

The Thermo Scientific HAAKE RheoWin software used to control the rheometer also positions and focuses the scope and polarization filter. Rheological data and images (video sequences) can be viewed on line next to each other. In addition, the data and images can be stored in various formats for further evaluation and export. The RheoScope's architecture allows the module to be adapted quickly for customized user configurations. The RheoScope module is available in two versions. The temperature range of the standard version is -5 to 120°C. In the high-temperature version the temperature is extended to 300°C.



Temperature ramp measured on potato wild type starch in water

Specifications:	
Optic	
Microscope	Servo motor-driven focus and position adjustments controlled via software
Lenses ¹⁾	Magnification: 5x, 10x, 20x and 50x
Light source ¹⁾	150 W, 12 V, wave length range: 380 – 750 nm
Resolution	1 μm (20x lenses)
Field depth	5 μm (20x lenses)
Contrast improvement	Motor-driven polarization filter
Camera ¹⁾	Progressive-scan CCD camera with 1024 x 768 pixels, C-connection and IEEE 1394 (Firewire) interface
Data acquisition and storage	
Data acquisition	Up to 15 images per second ²⁾ with HAAKE RheoWin 3 software
Storage	Maximum 15 images/second with standard image format (e.g. TIFF) or video acquisition with user-define definable data compression
Temperature Range	
Standard Version	-5 ³⁾ – 120°C (liquid temperature controlled unit)
High Temperature Version	-5 ³⁾ – 300°C (electrical temperature control unit)
Measuring Geometries	
A range of plate/plate and cone/plate measuring geometries made of titanium with polished surfaces is available (PP60, C60/1°, PP35, C35/1°, custom dimensions are available on request). Measuring geometries with ceramic shaft are recommended for high temperature measurements.	

¹⁾ Components with standard interfaces are used, individual components can be adapted

²⁾ Depending on the specifications of the computer used

³⁾ Depending on the circulator used

Rheological phenomena and structural changes that can be observed:

- Shear thinning
- Dilatancy
- Thixotropy
- Aging
- Emulsification
- Gelification
- Disaggregation
- Flocculation
- Homogeneity
- Orientation
- Melting behaviour
- Mixing

Benefits:

- Compact and full integration in the HAAKE MARS rheometer platform
- All measuring modes including normal force measurement available with simultaneous recording of microscopic properties
- Camera and microscope control via software
- Simultaneous rheological and optical measurements
- Visualization of data and images in one software package
- Analysis of structural changes under shear
- Image analysis software for determination of particle sizes, particle size distribution and structure analysis

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