Rheology Solutions

Rheology Solutions is the sole Australian distributor of this product range and we welcome the opportunity of discussing your application requirements.

We hope the information you are seeking is contained within this file. If you have any questions, or require further information please contact us. We look forward to being of further service.

Regards from the Team at Rheology Solutions.

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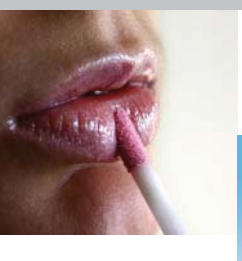
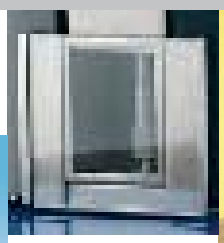
Product Specifications

Many different experimental techniques for measuring the elongational properties of non-Newtonian fluids have been developed over the last 30 years. All these techniques were difficult to operate and generated complex flows ensuing confusing results. The Thermo Scientific HAAKE CaBER 1 (system CPG*) is the first commercially available instrument to change this.

Thermo Scientific HAAKE CaBER™ 1

Quantifying extensional properties of fluids





Applications

- **Adhesives**
  - **solvent loss or gain**
- **Food products**
  - **stringiness/strand formation**
  - **time to breakup**
  - **relaxation of doughs**
  - **elastic instabilities**
  - **mouthfeeling**
- **Consumer goods**
  - **filling of bottles**
  - **time to breakup**
  - **solvent loss**
  - **processability**
- **Industrial resins**
  - **relaxation time spectrum**
  - **constitutive modeling**
  - **spinnability**
- **Printer inks**
  - **stringiness/strand formation**

Extensional Rheometry

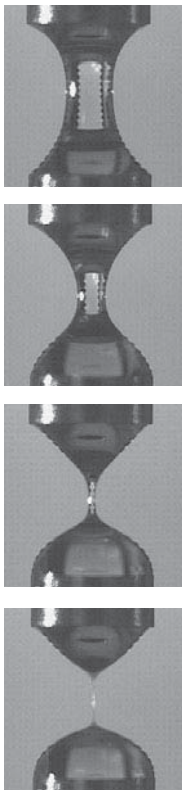
Complex flows that contain strong extensional components occur in many industrial processes and applications. Some examples are extrusion flows, coating flows, contraction flows and fiber spinning flows. Materials that behave identical or similar in a shearing flow can behave completely different in an extensional flow. Therefore, the knowledge of the elongational behavior of fluids is important. The thinning and breakup of a fluid filament that is analyzed with the HAAKE CaBER provides valuable information on a material's physical properties that rotational rheometers simply cannot provide!

The Capillary Breakup Extensional Rheometer

The HAAKE CaBER was developed by Cambridge Polymer Group (CPG) based on the pioneering work of Russian scientists Entov, Rozhkov and co-workers in capillary breakup rheometry. The HAAKE CaBER system is an easy-to-use extensional rheometer for examining polymer solutions, suspensions, adhesives and a variety of other materials. The system can be used as an analytical instrument or in quality control.

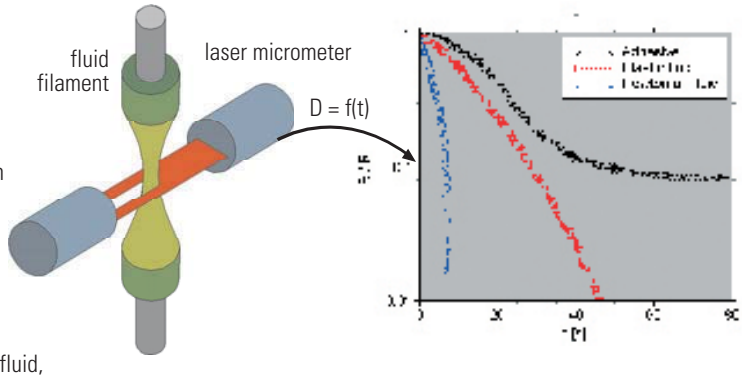
*) CPG = Cambridge Polymer Group

Product Specifications



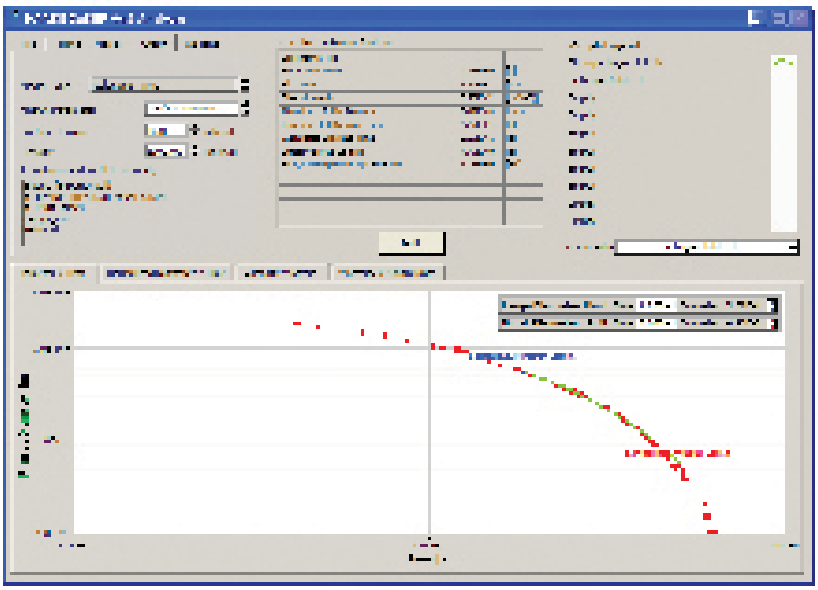
Principles of Operation

A small quantity of sample (< 0.2 ml) is placed between two circular plates. The top plate is rapidly separated from the bottom plate at a user-selected strain rate, thereby forming an unstable fluid filament by imposing an instantaneous level of extensional strain on the fluid sample. After cessation of stretching, the fluid, at the mid-point of the filament, undergoes an extensional strain rate defined by the extensional properties of the fluid. A laser micrometer monitors the midpoint diameter of the gradually thinning fluid filament as a function of time. The competing effects of surface tension, viscosity, mass transfer and elasticity can be quantified using the model fitting analysis included in the software. The automated experimental analysis and model comparison provides rapid determination of the following parameters: Viscosity, surface tension, elasticity, relaxation times and filament breakup time.



Specifications	HAAKE CaBER 1
Hencky strains	up to $\varepsilon_0 = 10$
Strain rate range:	
Imposed strain rate	$0.01 < \varepsilon_0 < 300\ s^{-1}$
Fluid strain rate	$10^{-5} < \varepsilon_0 < 10\ s^{-1}$
Shear Viscosity range	10^{*}- 10^{6} mPas
Plate diameter	$4 < D_{plate} < 8$ mm, standard: 6 mm
Sample volume	< 0,2 ml
Sample rate	< 0,1 ms
Temperature range	0 - 80°C**
Diameter resolution	8 µm
System response time	10 ms
Dimension (instrument only)	40 x 34 x 60 cm

* Depending on the elasticity of the sample.
** Necessary accessory: circulator.



Features

- Completely computer controlled
- Easy to operate
- Easy sample loading and cleaning
- Class 1 laser micrometer
- Linear motor drive with variable speed
- Automatic repeated testing
- Closed temperature-controlled sample chamber
- Exchangeable geometries
- User defined strains
- Small sample volume (< 0.2 ml)

Software

- Windows 95/98/NT/2000/XP compatible software
- Range of models for parameter extraction
- Data export to ASCII file

Process Instruments

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