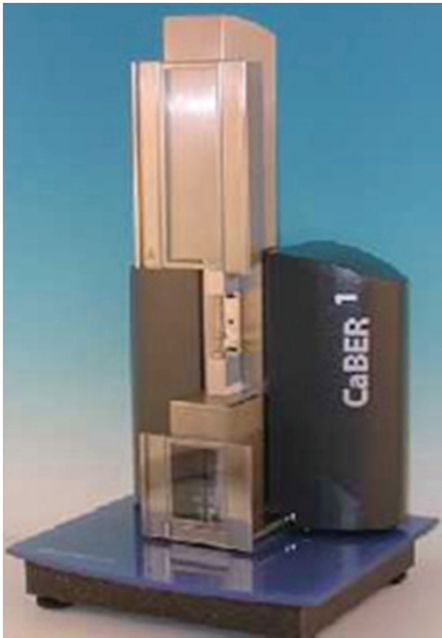


Droplet breakup in sprays and coatings

Summary

The Capillary Breakup Extensional Rheometer (CaBER®) was initially developed at Cambridge Polymer Group under a Small Business Innovation and Research (SBIR) grant. The instrument has since been commercialized in collaboration with Thermo Haake (Germany) and is now the only commercially available solution extensional rheometer available. This instrument will find utility in a broad range of fields as diverse as inks and paints, adhesives and polymer solutions, as well as food stuffs and beverages.

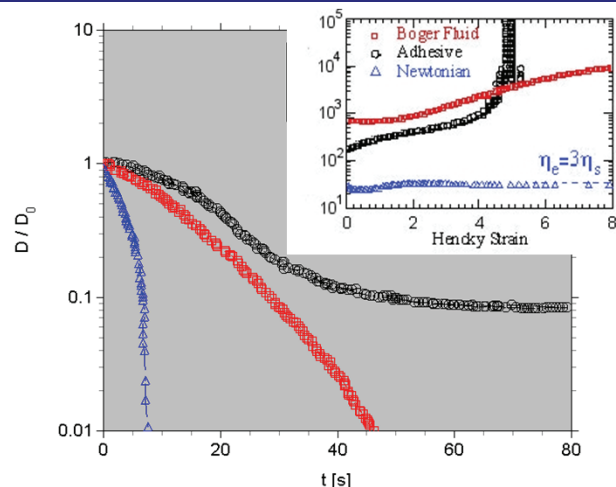


Description

Conventional shear rheometers are extremely well developed and represent a very mature technology. These instruments deform and measure fluids in shear, allowing the determination of fluid properties in a sliding deformation. However, many fluids exhibit markedly different properties when stretched and measuring fluids in this mode is not straightforward. The Capillary Breakup Extensional Rheometer (CaBER®), developed by CPG and sold by Thermo Haake, is currently the only available rheometer capable of examining the properties of solutions and liquids in pure extension. This instrument is useful for analyzing almost any fluid where the flow involves coating, deposition, pumping or spraying. In fact, the behavior of fluids in any free-surface extensional flow can be clarified using this instrument.

Specifications

- Hencky strain : up to $\epsilon_0 = 10$ (i.e. $R_0/R = 148$)
- Strain rate range
 - Imposed strain rate : $0.01 < \dot{\epsilon} < 300 \text{ s}^{-1}$
 - Strain rate in sample : $10^{-5} < \dot{\epsilon} < 10 \text{ s}^{-1}$
- Shear viscosity range : $50 - 10^6 \text{ mPa}\cdot\text{s}$
- Plate diameter : 4 - 8 mm, standard = 6 mm
- Temperature range : 0 – 80 °C
- Laser micrometer resolution : 10 μm
- Data acquisition rate : 30,000 Hz
- Dimensions : 40 x 34 x 60 cm



Markets

- Inks
- Coatings and sprays
- Biological fluids
- Polymer solutions
- Adhesives
- Medical solutions and treatments



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ANALYZE • RESEARCH • CREATE

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We work with clients throughout the product life cycle to:

- **Develop new materials**
- **Design prototypes for proof-of-concept studies**
- **Create and execute experimental design**
- **Validate and verify manufacturing processes**
- **Perform root-cause analysis in product failures**

Cambridge Polymer Group, Inc. was founded in 1996 to provide a cost-effective resource for testing, research and development to clients who need periodic access to Ph.D.-level scientists and their support structure. We have developed a host of testing methods and materials for our clients, which number more than 300.



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