CAPCE

Center for Advanced Polymer and Composite Engineering

THE OHIO STATE UNIVERSITY

RHEOLOGICAL MEASUREMENT LABORATORY

OVERVIEW

This testing facility helps researchers understand the behavior of materials by accurately characterizing their rheology. The viscous, elastic and viscoelastic properties of polymers are measured in the testing facility, consisting of four computerized Rheometrics instruments.

Testing is possible on a variety of samples, from rigid solids to low viscosity liquids and even to reacting systems. Instruments are equipped to run experiments at high or low temperatures. Numerous tests and geometries are available to optimize material characterization.

RFX: Fluids Extensional Analyzer

RMS 800: Mechanical Spectrometer

- **RMS-800: Mechanical Spectrometer**

The RMS-800 represents state of the art technology in rheological instrumentation. It is a complete, flexible test system that is the most accurate and precise instrument of its kind. The RMS-800 has the capability to evaluate the material properties of almost any kind of material. Melts, solids, films, and liquids may be tested in a variety of geometries over a broad range of conditions. It may be operated in either dynamic or steady mode, yielding material properties such as the modulus, viscosity, compliance, and first normal stress difference.

Instrument Specifications

viscosity range: 10^{-1} to 10^{6} P *temperature range:* -150 to 600°C
steady rates: $2x10^{-6}$ to $1x10^{3}$ rad/s *dynamic rates:* $1x10^{-5}$ to $1x10^{2}$ rad/s

- **RFX: Fluids Extensional Analyzer**

Understanding complex flow behavior of non-Newtonian liquids requires that both shear and extensional properties of a material be measured. These properties govern its processing and performance in end use applications. The RFX is the only instrument capable of measuring both the shear and extensional behavior. In the extension mode, the RFX operates on the opposed-jets principle. It is capable of measuring the apparent extensional viscosity of fluids from $3x10^{-1}$ to 10^{4}P. When the jets are replaced with the shear cylinder, the RFX becomes a high rate shear viscometer, able to test fluids at shear rates from 1 to 10^{6} reciprocal seconds. In this mode, the RFX can measure shear viscosities from 10^{-2} to 10^{4} P.