



## YOUR PARTNER IN RHEOLOGY

The flow of matter is created by Force, Deformation and Time. The Symbol of Bohlin Instruments represents this infinite process as the three links of a chain, just as our quality, service and support are invaluable to materials testing. The competitive edge which Rheology offers industry is the driving force for Bohlin innovation. As more and more industrial applications demand the information which only rheology and rheological measurements can provide, Bohlin Instruments responds with the knowledge and experience to offer practical rheology solutions.

### Bohlin Instruments' Rheology Support Package

Bohlin Instruments has direct sales and service facilities in the USA, the UK, Germany and France, as well as a global network of distributors. To ensure that customers get the most from their instrumentation, Bohlin offers rheometer and viscometer usage training, contract testing, consultancy, applications advice, seminars, application notes, service support and guaranteed response service contracts.

**Rotational Rheometers**  
**Capillary Rheometers**  
**Viscometers**

**Contract Testing**  
**Consultancy**  
**Training**



**ROTATIONAL TEMPERATURE CONTROL UNITS,  
MEASURING SYSTEMS & ACCESSORIES**



# Temperature Control Units

Almost all rheological measurements require accurate temperature measurement and control and the Bohlin rotational rheometers have been designed to accept a variety of different units to cover all applications which are easily interchangeable. Using the unique mounting system which avoids adapters or 'clip on top' accessories, space and access for sample loading and trimming are not compromised. Each Bohlin temperature control unit is fully controlled and regulated by the computer. The hardware is automatically able to detect which type of unit is installed which considerably simplifies installation.



## Peltier Plate (-20°C to +180°C)

The Peltier System is suitable for most fluids applications requiring parallel plate or cone and plate measurements. For applications where changes in setpoint are required, peltier systems are able to change setpoint extremely rapidly (up to 60°C per minute) and offer extremely stable temperature control via a PT100 sensor (DIN standard).

## CP180 Cylinder Peltier (-20°C to 180°C)

For the vast majority of fluids applications, the CP180 cylinder peltier dispenses with the need for a separate fluids circulator for use with cylinder measuring systems. The new system differs from conventional units in its ability to effect very rapid changes in the test temperature. Ramping rates of up to 30°C per minute can be achieved with the new unit with a maximum temperature of 180°C. This makes the CP180 especially suitable for applications where very rapid changes in temperature are required in order to simulate processing conditions. Several removable sample cup sizes are available for flexibility and ease of cleaning. (Also available is a Wide Gap Cylinder Peltier and a lower flat plate for use with the CP180)



## Extended Temperature Cell - ETC and optional Low Temperature Unit (LTU) (-150°C to 550°C)

The ETC is a forced gas oven. The use of inert gas avoids sample degradation and the forced gas technique ensures rapid temperature changes with excellent conductivity and therefore minimal thermal gradients within the sample. A broad temperature range to 550°C makes the ETC suitable for testing a variety of materials including polymer melts and composites as well as solid samples, giving a DMTA capability. The optional LTU extends the lower temperature from ambient down to -150°C using a liquid nitrogen based system. Re-useable and easily interchangeable plates are

supplied as standard, and special measuring systems are available for solids and fibre films. An exhaust system removes any hazardous fumes from an illuminated sample chamber for enhanced operator safety.

## Extended Temperature Option - ETO (-10°C to +300°C)

The Extended Temperature Option offers a broad temperature range in excess of that usually obtainable with fluid circulation systems. It also offers a compact alternative to a fluids circulator where parallel plate or cone and plate measurements are required. Rapid heating and cooling rates are available for applications requiring temperature cycles. For accuracy, temperature is measured and controlled by a thermocouple sensor embedded into the lower measuring plate. Additionally a thermal enclose ensures a uniform sample temperature. For applications such as thermosets a version of the ETO is available with disposable plates.



## Melts Oven (up to +450°C)

The Melts Oven is an enclosed high temperature system intended for both polymer melts and thermoset applications requiring extremely accurate temperature control with minimal thermal gradients. Conductive and radiative heating of the test sample gives uniform sample temperature across the measurement gap. A raised lower plate ensures that sample trimming is both simple and easy. For samples which might degenerate a nitrogen purge is incorporated into the oven design. A disposable plate version is also available for thermoset and other applications which might bond the lower and upper plates during measurement.

## Fluid Circulator (-40°C to +250°C)

A range of fluid circulators is available to interface with the Bohlin Rheometer hardware dependent on heating and cooling performance and the temperature range required. Fluid circulators offer extremely stable temperature control as well as the possibility to measure with both cone/plate configurations as well as coaxial cylinders (cup and bob). The design of the rheometer water jacket ensures superb fluids circulation to eliminate temperature gradients allowing the use of large double gaps for extremely sensitive measurements on low viscosity systems.



# Measuring Systems and Accessories

## Measuring systems

A wide range of standard sensor systems is available depending on the temperature control including:

Parallel Plate	Small Sample Cell
Cone & Plate	Serrated Plates
Coaxial Cylinders (DIN)	Vane Tool
Double Gap	Roughened Systems
Solids Fixtures	Fibre Film Fixtures
Rectangular Torsion	Solvent Trap



## Vacuum disposable systems - ETO, Melts Oven & Peltier Plate

An inexpensive disposable plate is available for the Melts Oven, Peltier Plate and the ETO system, which is suitable for use with thermosets and other samples where the plates may become bonded together. The lower plate is simply retained using a vacuum fitting for ease of removal and replacement.



## DSR Water Jacket system

For applications involving Asphalt materials, the standard Gemini water jacket may be replaced by an alternative design which completely immerses the test sample in the circulating fluid. The key to accurate measurements is temperature control and the Bohlin patented principle completely eliminates thermal gradients as well as giving excellent accuracy and stability. The design meets industry standards for asphalt test equipment (AASHTO TP5 and SHRP B003).



## Optical cell - UV Curing accessory

An optical cell is available for samples such as dental cements, which can be cured using a UV light source. The UV cell simply replaces the standard Gemini water jacket and gives excellent temperature control of the test sample. The cell uses removable quartz discs.



## Electro-Rheology Cell

The electro-rheology cell allows the characterisation of the rheology of a sample in an electric field. Typical applications are electro-rheological fluids used for creating a physical resistance, liquid crystals and other electrically sensitive samples. The cell can accommodate 40mm parallel plates or a cup and bob system. A DC voltage of up to 2KV may be applied to the upper measuring system via an electrolyte solution and the lower plate is earthed. Any type of rheological test can then be carried out within a specific electric field. (power supply not included)



## High Pressure (closed) Cell

The high pressure cell (HPC) is a closed system incorporating a bob assembly which is driven by a magnetic coupling. Suitable for a range of fluids applications, the HPC can be used for steady shear and low frequency oscillation tests. Two ports are incorporated into the HPC's design for sample filling and cleaning without disassembly of the unit. The cell can be pressurised from either an external pressure source or from the test material's vapour pressure.

