Anton Paar

::: Intelligence in Rheometry

Convection Temperature Device CTD 450

Temperature control in the range of -100 to 450 °C and optional sample monitoring through CCD camera (Digital Eye).

Convection Temperature Device CTD 450

The Convection Temperature Device CTD 450 is based on the same established and successful principle as CTD 600 and CTD 1000. All CTD devices work with the combination of convection heating (uniform temperature distribution through gas circulation) and radiation heating (high temperatures, fast heating rates) for swift and virtually gradient-free temperature control.

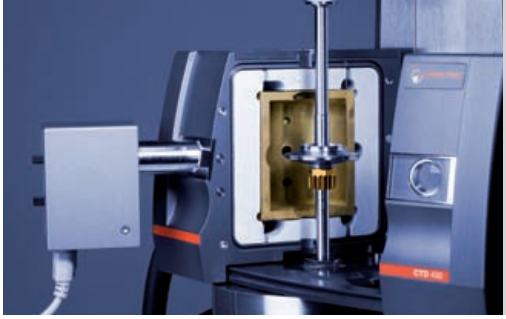
CTD 450 is a fully integrated accessory of the Physica MCR Rheometer. It is directly controlled by MCR and does not require any external controller. Liquid nitrogen cooling can be provided by an optional attachment, enabling a temperature range from -100 °C to 450 °C that perfectly covers the field of polymer applications. Beside the standard rheological geometries (plate/plate, cone/plate) and the TruGap™ measuring systems, a solid torsion bar fixture (SRF) as well as a film and fiber fixture (FFF) are available. The unique Extensional Rheology System (SER) designed by Martin Sentmanat can be mounted into the chamber, for extensional rheology experiments and for measuring the so-called “strain hardening effect” of branched polymers.

CTD 450 is easy to use, since it comes with full Toolmaster™ functionality. The instrument automatically recognizes the chamber and the integrated geometry. An electronic switch ensures that the optimized temperature control parameters are kept while the system is open for trimming of the sample. After it is closed, the ideal parameters are applied in order to prevent temperature overshoots while returning to the set temperature.

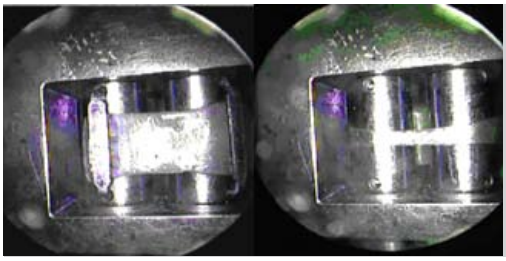
Sample monitoring with CCD camera (Digital Eye)

A new CTD 450 feature is the camera option (‘Digital Eye’), which enables image or movie capturing during the measurement. The camera is fully integrated in the Rheometer system and draws its illumination power from it. It can be connected to a computer via USB 2.0, where the pictures or movies can be displayed directly in the rheometer software RheoPlus, in relation to the rheological data. A constant air flow ensures the consistent independence of the lens system’s optical distance from the chamber temperature. Focus and illumination control are possible as well. The lens system, which has been specifically designed for the camera, records wide-angle images at small distances with an excellent depth of field.

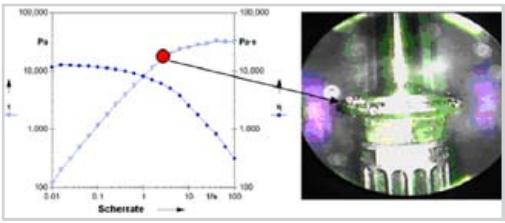
The new camera system not only allows the observation of gap draining, it can also be used to monitor transition points in solid torsion bar tests or for breakups in film and fiber tests. In addition the camera is especially suitable to record tests with the Extensional Rheology System (SER), as the area of deformation stays in the field of view throughout the entire measurement.



CTD 450 with Digital Eye



Images of SER test captured with the Digital Eye



Gap draining monitored with Digital Eye and related to the rheological data

Specifications CTD 450:

Temperature:	
Temperature range:	-100 to 450 °C
Max. heating rate:	40 K/min
Max. cooling rate (nitrogen):	47 K/min
Air/Gas Supply:	
Gas volume heating:	14 L/min
Gas volume shaft cooling:	20 L/min
Liquid Nitrogen	
Nitrogen consumption:	6-9 L/h
Temperature Sensor	
Pt 100 class B	
Digital Eye (CCD camera)	
CCD Sensor:	1/4“ CCD
Max. pixels (USB 2.0, 30 fps):	720 x 576 pixels
Max. frame rate:	30 fps
Sensitivity:	< 0.5 Lux
Power supply via USB bus	
Twain and DirectX compliant	

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