A NEW HYBRID TEMPERATURE CONTROL CHAMBER FOR SEMI-SOLIDS AND POLYMER MELTS

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Thermo Electron recently announced the launch of its new HAAKE MARS rheometer. In this presentation we will introduce an entirely new, wide range, temperature control chamber. This device was especially designed for the HAAKE MARS rheometer to measure polymer melts and semi-solids. The unit consists of two “clam-shells” mounted on sliding rails. This allows an easy movement of the “clam-shells” in two dimensions, sideward and backwards. When slid backwards completely, the unit can be closed and the temperature inside the unit kept at the desired level. At the same time the sample fixtures are easily accessible for cleaning and loading new test specimens.

The advantages of radiant heat transfer (fast temperature changes) with those of convection heat transfer (uniform temperature distribution) are clever combined in this new hybrid temperature control chamber. The two heat transfer systems are monitored by a state of the art “model predictive” digital temperature controller. With an optional nitrogen evaporator the temperature range is from -150 °C up to + 600 °C. The maximum heating and cooling rates are up to 20 K/min. Double walled, vacuum insulated tubing used for the cold nitrogen gas, prevent the forming of ice on the outside of the unit.

The entirely new solid clamping fixtures provide self centering and automatic clamping force adaptation for the sample as well as a very simple semi-automatic gap adjustment for a wide range of sample thicknesses with just one fixture.

In this presentation we will show the performance of the MARS rheometer in combination with the new temperature control chamber and the new sample fixtures for polymer melts and semi-solids. We will show the results of the measurements on some typical and some less typical, rather interesting polymers.