

Curing check

Instrument system "US-plus®" for the process control on cross-linking molding compounds



As a result of a close cooperation between the Federal Institution for Materials Research and Inspection (Bundesanstalt für Materialforschung und -prüfung, BAM), Agfa NDT GmbH/Krautkramer Ultrasonic Systems, the University of Applied Sciences at Iserlohn (Plastic Processing Laboratory I), and the company Iserlohner Kunststoff-Technologie GmbH (ISK), an instrument system has been developed which has meanwhile reached market maturity.

The instrument system "US-plus®" is at first meant to be used by raw material producers and the processing industry for duroplastic molding compounds for monitoring purposes. Other applications in the range of liquid resins (e. g. RTM) are currently being tested.

Using ultrasonic probes especially developed for these requirements, which are inserted into the corresponding molds, and the newly developed software, it is possible to determine ("online") in a nondestructive way the flow properties/progression of the hardness process of each molding compound in question during processing.

Any changes in the flow properties/progression of the hardness process (e.g. compared with other batches and compounds), irregularities in the production process, etc., can be directly recognized by means of this method.

The test system enables to optimize hardening times, to minimize reject numbers, and to document the characteristic ultrasonic curves for each molded component checked.

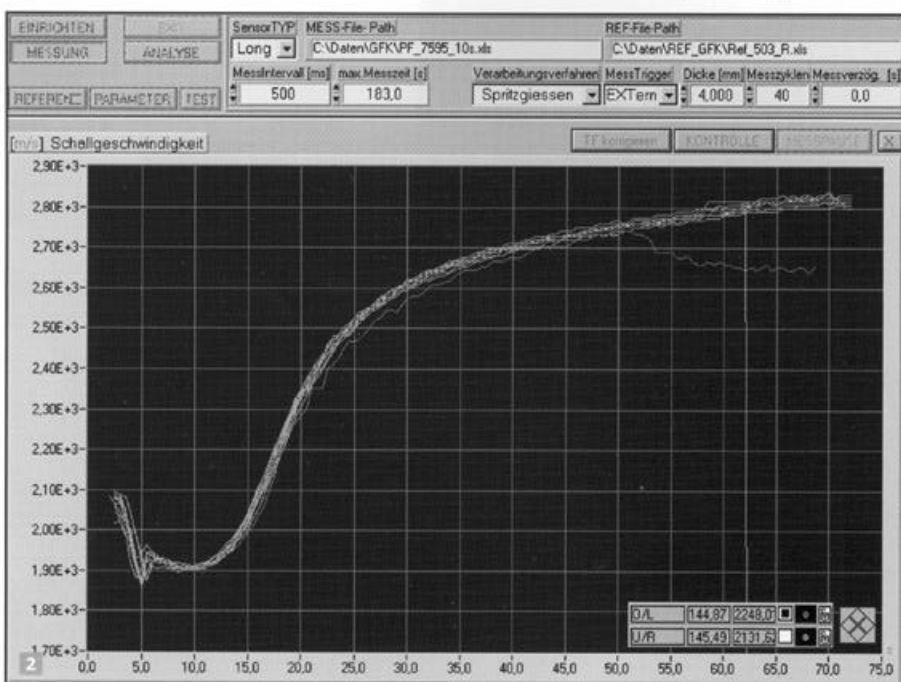
In an extension stage, this system is also

meant to enable, besides "pure" monitoring, a status-dependent removal from the mold on the basis of a connection between the instrument system and the processing machine – molded parts are ejected from the mold as soon as the same cross-linking status is reached. Slight variations in the machining process (mold wall temperature, changes in the progression of hardness process, etc.) can be compensated for in each cycle by adapting the hardening time accordingly. The instrument system "US-plus®" consists of a mobile ultrasonic measuring system (USLT 2000) suitable for industrial use, ultrasonic probes, and the required software.

The instrument system and the software are sold by the company ISK Iserlohner Kunststoff-Technologie GmbH.

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Remark by the editors: This application was made possible by the Krautkramer development platform UltraWORKS for the USLT 2000.



- 1 Instrument system "US-plus®"
- 2 Representation of several successive cycles during the measurement of a PF molding compound