OP-6-229

Thursday, May 12, 2011, 09:25-09:45 am
Room: Karam 1

ONLINE QUALITY MANAGEMENT FOR INJECTION MOULDING COMPOUNDERS

T. Erb*, C. Bonten

University of Stuttgart, Institute of Polymer Technology, Böblinger Straße 70, 70199 Stuttgart, Germany

**Corresponding author: thomas.erb@ikt.uni-stuttgart.de*

Irregularities in the compounding process influence rheological and mechanical properties of the compounded resin. For quality control of compounds, samples can be taken right after the conventional compounding process and before the following shape forming operation. By this, the influence of the compounding step can be separated from the influence of the following process step. In the past decade one-step-processes became more and more important and quality control can hardly be separated.

One example for a one-step-process is the injection moulding compounder, which is a combination of a twin screw extruder and an injection moulding machine. To separate the compounding influence from the injection moulding influence on the moulded part, an online melt rheology is recommended.

A method was developed to use online melt rheology for a reliable detection of irregularities in the compounding process as a quality control system for the injection moulding compounder. For this purpose, a part of the polymer melt is leaded through a bypass to an online rheometer, where the shear viscosity of the polymer melt is measured at different shear rates from about 100 1/s to 1000 1/s. In order to avoid a misdetection of an irregularity due to acceptable variations in temperature, the measured viscosity data is shifted to a reference temperature and afterwards compared to a previously determined master curve.

The new method was tested with a typical compounding process under systematic variation of different boundary conditions like screw rotation speed or under- or overfeeding of chemicals. Mechanical properties of the injection moulded samples were determined to define acceptable boundaries in which the process is running stable.