OP-6-780

Thursday, May 12, 2011, 06:20-06:40 pm
Room: Karam 1

ULTRASOUND FOR MICROMOULDING CHARACTERISATION

E.C Brown*, B.R. Whiteside, C. Tunea-Bobe, P.D. Coates

University of Bradford, School of Engineering, Design & Technology, Bradford, UK

*.*Corresponding author: e.brown@bradford.ac.uk*

Ultrasonic techniques provide a powerful, non-invasive method for measuring flow front propagation and shrinkage/cooling behaviour of polymer melts in micromoulding processing systems where the physical size of the mould can restrict the use of conventional sensor technologies. This paper presents work performed to validate ultrasonic measurements using a novel micromoulding system which combines ultrasonic data with high speed flow visualisation and high speed thermocouples with piezo cavity pressure sensors. This system allows simultaneous data collection during injection and cooling, allowing the ultrasound data to be interpreted for key phases of the process. Monitoring of the transmission time and attenuation of the through cavity signal provides information describing the morphological development of semi-crystalline polymers during cooling. The relationship of this measurement with the thermal environment has been investigated using a design of experiments approach, and results validated though off-line investigation of internal crystal structures using DSC and polarised light microscopy techniques.