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REAL-TIME INJECTION MOULDING PRODUCT MASS PREDICTION

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Injection moulding is an extremely complex, time variant, non-linear process which places high demands on control algorithms. This batch process has the capability to produce high added value products and represents the major polymer processing sector. To maintain product quality in production real-time prediction of part quality is more beneficial than monitoring of machine or process measurements. A methodology is presented for predicting moulded part mass from a combination of process measurement and polymer material pressure-specific volume-Temperature (pvT) characteristics. The methodology determines the mass of melt that has been delivered to the mould cavity through the swept volume of the injection screw, coupled with the melt compressibility through material pvT data. Validation of this technique is presented over a range of processing conditions. This technique has shown to be able to track natural changes, such as drifts in the melt and mould temperatures, which occurs during moulding operation. In addition the prediction of mass can be used to track the start – up period, and this technique provides the potential for implementing a control algorithm to reduce the start – up period as well as maintain product quality stability.