



FORM FILLING SIMULATION IN THE INJECTION MOULDING OF HIGHLY FILLED THERMOPLASTICS

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The Simulation of mould filling processes in injection moulding of highly filled thermoplastics requires different adjustments compared to the use of conventional thermoplastics. By using graphite, carbon nanotubes (CNT) or carbon black as fillers to realize better electrical conductivity one has to handle the unwanted increasing of the thermal conductivity. The objective of this work is to develop a new material model for injection moulding processes taking into account the differing characteristics of highly filled compounds compared to standard thermoplastics. First of all, it is important to create an adequate characterization setup for measuring rheological data. Due to the used compounds, it is necessary to differ from the norm methods for measuring rheological data. For measuring the pVT-behaviour (e.g.), it makes sense to use the characteristic for the cooling process instead of the heating process because of the different crystallization points. In addition to this it is required to increase the cooling-rate in comparison to standard thermoplastics due to the high cooling rate of the used compounds quite above 80 K/sec. Based on the measurement of the injection pressure, the cavity pressure and the quality of cavity filling, the new material model can be verified. A comparison between the numerical results of the conventional and the improved material model will be shown just as well as the results of measurements in real injection moulding processes. In a form filling study the ability to validate the quality of calculating the melt flow in the cavity is proven. The shown results can accelerate the development of new injection-moulds for processing highly filled thermoplastics.