G08.02

Advances in Gas- and Water Injection Technique

W. Michaeli, *C. Lettowsky, O. Grönlund

Institute of Plastics Processing at RWTH Aachen University, Germany

Gas- (GIT) and Water Injection Technique (WIT) allow channels to be formed in the molten regions of an injection moulded part by displacing the molten core into cavity regions that are first unfilled or additionally opened. New possibilities to produce innovative plastic hollow bodies can be realised by combining GIT/WIT with sandwich injection moulding. The process combination can be employed to produce double-layered articles. The inner component, which should be highly suitable for the GIT/WIT, serves as a mean to form the channel. In addition it may offer a particular function like barrier or media resistance or a smooth inner surface. The outer component determines the mechanical and optical part properties and can be selected independently on the suitability for GIT/WIT. The different variants for manufacturing double-layered hollow articles are presented within the paper. However, the most important quality criterion is the residual wall thickness (RWT). In case of double-layered parts the RWT of both, the inner and outer component has to be discussed. On the one hand, the RWT is influenced by the process variant and process parameters, on the other hand it is particularly affected by the rheological properties of the processed material. Up to now, only a few studies of the influences on RWT for WIT have been done in case of single-layered articles. In case of double-layered articles, no studies concerning the influences on the RWT were done. Thus, in GIT and WIT trials, both single- and double-layered flow helixes were produced and RWT were determined. A compendium of the results is presented in this paper. The shear viscosity and the pseudoplasticity turn out to be important material properties influencing the RWT. An increase of these characteristics leads to a decreasing residual wall thicknesses. Moreover a higher melt elasticity causes an increasing residual wall thickness.