



PROCESS DEVELOPMENT OF THE PROJECTILE INJECTION TECHNIQUE (PIT)

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The projectile injection technique (PIT) is an innovative, powerful process variant of the established fluid-assisted injection technique (FIT) for producing hollow polymer parts. Compared to the conventional FIT, a solid projectile – driven by the fluid pressure – is used for displacing the melt and forming the hollow space. Due to this projectile, the process runs very reproducible and the parts produced by this method have much thinner and uniform residual walls compared to parts made by other FIT processes. Therefore, the PIT offers the opportunity to reduce the weight of the produced parts as well as the material consumption and the cooling time. Thus, both the economic and the ecologic efficiency can be increased. In contrast to other FIT process variants, for the PIT, the hollow space formation is nearly independent of the rheological properties of the used polymers, as first investigations indicate. Furthermore, it is possible to use common polymer grades instead of (expensive) specially modified polymer grades for the FIT.

Even though the first results approve the large potential of the PIT, both the options and limitations of the new process have not been identified, yet. Therefore, the IKV does systematic investigations on the PIT. On the one hand, the influence of the projectile design has to be analysed. In order to form a constant hollow space, the projectile has to run through the component straight and centrically. Errors like a rollover or jamming of the projectile or the "overtaking" of the process fluid must be prevented in any case. On the other hand, basic design guidelines and geometrical limitations for the part design have to be determined. These investigations have to be linked to the projectile design and the materials used, as both have an impact on the hollow space formation and the stability of the process.