

## Visualization of Flow Behaviour in Micro-Cavities during Micro Injection Moulding

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**Abstract :** Polymeric micro-cantilevers (Cs) are rapidly becoming popular for MEMS applications such as chemo- and bio-sensing as well as purely electromechanical applications such as microrelays. Polymer materials present suitable physical and chemical properties combined with low-cost mass production. Hence, micro-cantilevers made of polymers indicate much more biocompatibility and adaptability of rapid prototyping along with mechanical properties. This research studies the effects of three process and one size factors on the filling behaviour in micro cavity, and the role of each in the replication of micro parts using different polymer materials i.e. polypropylene (PP) SABIC 56M10 and acrylonitrile butadiene styrene (ABS) Magnum 8434. In particular, the following factors are considered: barrel temperature, mould temperature, injection speed and the thickness of micro features. The study revealed that the barrel temperature and the injection speed are the key factors affecting the flow length of micro features replicated in PP and ABS. For both materials, an increase of feature sizes improves the melt flow. However, the melt fill of micro features does not increase linearly with the increase of their thickness.

**Keywords :** flow length, micro cantilevers, micro injection moulding, microfabrication

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