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A Study on Influence of Resin Temperature and Material Kind on Filling Balance of Multi-cavity Molds with H-shaped Runner

Jingbo Chen (a), *Yoshinori Kanetoh (b), Hidetoshi Yokoi (c)

(a) *Center for Advanced Polymer Processing Technologies, Zhengzhou University, China*(b) *Institute of Industry Science, The University of Tokyo, Japan*(c) *Center for Collaborative Research, The University of Tokyo, Japan*

Multi-cavity molding is used widely in injection molding for realizing high productivity, and filling balance is recognized as the most important problem in multi-cavity molding. Some of the authors have to date conducted measurements of changes in the resin temperature after runner branching and visualization of flow behavior into the cavity using PP and GPPS on 4-cavity H-shaped isometric runners. The results of these experiments have clarified that changes in resin temperature in the runner directly controls filling balance. In this study, to investigate the influence of resin type used, we conducted correlative analysis on elastomer, glass fiber reinforced resin, and PC. As a result, we found that unlike general resin, the correlation between changes in filling balance and changes in resin temperature after branching differs. Specifically, it was clarified that filling progresses towards the upper cavity for elastomer and towards the lower cavity for long glass fiber reinforced PP. This shift of resin flow center in the secondary runner after branching to the upper or lower sides may be due to retardation time of resin and the stagnating resin at the flow front based on mutual interference of glass fibers. These results confirmed that not only resin temperature changes in the runner but also the flow of resins at the branching point are important factors controlling filling balance.