

Improving warpage on thin shallow parts in two-plate moulds with conformal cooling channels

Abstract

Nowadays, the trend of consumer products designed is getting smaller and most of cover is made from plastic which was produced by using injection molding process. Thus, the demand of thin shallow plastic parts in global industries is increasing today. In addition, manufacturing engineers have difficulties to control the parameters during processing the 1 mm thickness of the thin shallow parts where the warpage defect is the common issue especially for the thin parts. Therefore this study is performed purposely to evaluate the performance of conformal cooling channels compared to the straight drilled cooling channels in order to minimize the warpage on the thin shallow parts. The type of gating systems used in this study is side gate, which is commonly gate in 2-plate mold. The results from simulation through Autodesk Moldflow Insight (AMI) 2013 are analyzed by using Taguchi Method and Analysis of Variance (ANOVA). Results from this study show that conformal cooling channels are able to improve the quality of the molded parts in term of warpage compared to the conventional straight drilled cooling channels. This is beneficial for the molding industries especially for the precise parts.

Keywords

Analysis of variance (ANOVA); Conformal cooling channels and injection molding; Taguchi; Thin shallow shell