

عنوان مقاله:

Optimization of Pressure Profile and V/P Switchover Point to Minimizing the Warpage in a Thin-Wall Plastic Injection Molded Part

محل انتشار:

نهمین کنفرانس بین المللی مهندسی صنایع و سیستم ها (سال: 1402)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

This research has focused on the minimization of warping in plastic-injected parts by optimizing the shape of the pressure profile. The importance of this method is that the mutual effects of the input parameters are seen and the location of the V/P switchover point is also determined. For this purpose, 5 input parameters including flow velocity, filling time, packing pressure, packing time, and cooling time have been considered in 4 levels and in Taguchi L₁₆ format. The results for a polypropylene belt as a case study have been done using FDM analysis in the SolidWorks Plastics plugin. Variance analysis of the results led to the signal-to-noise diagram, which was used to determine the optimal values and finally the desired pressure profile shape. The results show that cooling time and filling time have 57% and 27% effects on the warpage, respectively, and other inputs have no significant effect. Also, the pressure phase is about 9 times more effective than the velocity phase. On the other hand, reducing the warpage requires an increase in cooling and packaging times, which leads to an increase in the cycle time which is costly. Therefore, it is necessary to make a technical compromise between the cycle time and the targeted warping amount.

کلمات کلیدی:

Injection Molding, Thin-Wall, Warpage, Pressure Profile, Switchover Point

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