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SOLVING PART WARPAGR FOR INJECTION MOLDING UNDER ASYMMETRY MOLD COOLING CONDITIONS

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In conventional injection molding and innovative injection moldings such as two component injection molding, in-mold decoration, the significant difference in mechanical design and/or heat transfer for mold core and cavity sides usually leads to unbalanced asymmetrical mold cooling, that in turn resulting in a significant part warpage that becomes an important issue to be solved. In this study, discontinuous variations in part thickness were designed to match with various mold temperature difference between the mold core and mold cavity sides and their influences on part wargare were investigated. Part thickness was varied in a pitched manner and the thickness reduction performed were 10%, 20%, 30% up to 40% of the original part thickness. The result reveals that when there is mold temperature difference between core and cavity, a proper design by discontinuous thickness reduction, part warpage can be greatly reduced or even eliminated. For uniform thickness part molded under unbalanced cooling, the neutral axis (where the maximum melt temperature locates) will deviate from the gap center toward mold wall side of higher temperature. Variation in thickness will pull the deviated neutral axis back to the center line leading to a reduction of part warpage.