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The Most Crucial Factors for the Warpage Prediction in Injection Molding

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The desired quality of the modern plastic products is higher and higher during the recent years. It pushes many new developments to consider design and functionality simultaneously. However, from product design, to the fabrication process, and to the final product, many factors will dominate this demand. Among them, warpage is one of the key phenomena. Warpage is one of the crucial design and manufacture factors in making high precision and high standard injection molded products. Basically, warpage can be due to unequal volumetric shrinkage of the material throughout the geometry of mold, accumulating from the filling stage in the mold till the part is ejected from the mold and is cooling to room temperature. Misleading predictions in warpage will result in poor performance, and in considerable loss of time and money for the design and fabrication. In this study we have systematically investigated various key factors for the warpage predictions by theoretical analysis and experimental studies. Results show in a good agreement for both theoretical prediction and experimental investigation. Hence, it can help us identify the crucial factors for the warpage predictions to enhance the design of injection molded products.