

Milled groove square shape conformal cooling channels in injection molding process

Abstract

In designing molds for injection molding process, it is very difficult to achieve efficient cooling with uniform thermal distribution. To overcome these issues, the uses to conformal cooling channels with the uniform distance between the center of the cooling channels and the mold surfaces have more advantages, offering a better thermal distribution and reducing the cooling time. This article presents Milled Grooved Square Shape (MGSS) conformal cooling channels which have a more effective cooling surface area and are more efficient in cooling compared to circular and other types of cooling channels with similar cross-sections. A case study on front panel housing is investigated, and the possibility of fabricating the conformal cooling channels on hard tooling for injection molding process, which is easier to design, fabricate, and assemble compared to other methods, is presented. The performance designs of straight drilled are compared with two types of MGSS conformal cooling channels by using Autodesk Mold flow Insight (AMI) 2012. The results show that the variations of thermal distributions were improved within 12 to 50%, and cooling time was shortened within 6 to 8%. Thus, the capabilities of MGSS conformal cooling channels should not be underestimated by molding industries.

Keywords

Analysis; Cooling; Efficiency; Injection; Manufacturing; Milling; Mold; Plastics; Polymer; Processing; Techniques