Analysis of Cavity Pressure and Warpage of Polyoxymethylene Thin Walled Injection Molded Parts: Experiments and Simulations - DTU Orbit (23/12/2018)

Analysis of Cavity Pressure and Warpage of Polyoxymethylene Thin Walled Injection Molded Parts: Experiments and Simulations

Process analysis and simulations on molding experiments of 3D thin shell parts have been conducted. Moldings were carried out with polyoxymethylene (POM). The moldings were performed with cavity pressure sensors in order to compare experimental process results with simulations. The warpage was characterized by measuring distances using a tactile coordinate measuring machine (CMM). Molding simulations have been executed taking into account actual processing conditions. Various aspects have been considered in the simulation: machine barrel geometry, injection speed profiles, cavity injection pressure, melt and mold temperatures, material rheological and pvT characterization. Factors investigated for comparisons were: injection pressure profile, short shots length, flow pattern, and warpage. A reliable molding experimental database was obtained, accurate simulations were conducted and a number of conclusions concerning improvements to simulation accuracy are presented regarding: pvT data, mesh, short shots, cavity pressure for process control validation as well as molding machine geometry modelling. Eventually, a methodology for improved molding simulations of cavity injection pressure, filling pattern and warpage was established.

General information
State: Published
Organisations: Department of Mechanical Engineering, Manufacturing Engineering
Contributors: Guerrier, P., Tosello, G., Hattel, J. H.
Number of pages: 5
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: A I P Conference Proceedings Series
Volume: 1664
Article number: 110006
ISSN (Print): 0094-243X
Ratings:
BFI (2018): BFI-level 1
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 0.26 SJR 0.165 SNIP 0.3
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 0.21 SJR 0.165 SNIP 0.246
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 0.18 SJR 0.18 SNIP 0.218
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 0.17 SJR 0.171 SNIP 0.202
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 0.16 SJR 0.164 SNIP 0.187
ISI indexed (2013): ISI indexed no
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 0.14 SJR 0.176 SNIP 0.193
ISI indexed (2012): ISI indexed no
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 0.12 SJR 0.161 SNIP 0.16
ISI indexed (2011): ISI indexed no
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.166 SNIP 0.158
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.163 SNIP 0.156
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.17 SNIP 0.132
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.171 SNIP 0.176
Scopus rating (2006): SJR 0.184 SNIP 0.187
Scopus rating (2005): SJR 0.217 SNIP 0.416
Scopus rating (2004): SJR 0.198 SNIP 0.249
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.153 SNIP 0.063
Scopus rating (2002): SJR 0.288 SNIP 0.084
Scopus rating (2001): SJR 0.103 SNIP 0.078
Web of Science (2001): Indexed yes
Original language: English
Keywords: Thin-wall injection molding, Process simulation, Warpage, Optimization
Electronic versions:
Analysis_of_Cavity_Pressure.pdf
DOIs:
10.1063/1.4918481
Source: PublicationPreSubmission
Source-ID: 93558551
Research output: Research - peer-review › Conference article – Annual report year: 2014