



Materials and Manufacturing Processes >

Volume 26, 2011 - [Issue 2](#)

914 | 49 | 0
Views | CrossRef citations to date | Altmetric

Original Articles

Investigating the Effects of Injection Molding Parameters on the Mechanical Properties of Recycled Plastic Parts Using the Taguchi Method

Nik Mizamzul Mehat & Shahrul Kamaruddin

Pages 202-209 | Received 22 Jul 2010, Accepted 28 Sep 2010, Published online: 24 Mar 2011

Cite this article <https://doi.org/10.1080/10426914.2010.529587>

Sample our
Engineering & Technology
Journals
>> **Sign in here** to start your access
to the latest two volumes for 14 days

Full Article Figures & data References Citations Metrics
 Reprints & Permissions [Read this article](#) [Share](#)

Abstract

The growing amount of plastic parts produced nowadays makes the search for alternatives in recycling and the further use of these nonbiodegradable materials imperative. The degradation of the mechanical properties of recycled plastic products poses the primary limitation for the usage of recycled plastic. One of the foremost causes of mechanical property degradation is variation in processing parameters. An appropriate optimization method that effectively controls all influential processing parameters during manufacturing is therefore critical. This study investigates the effects of injection molding parameters on the mechanical properties of recycled plastic parts. The preliminary experiment is conducted by using Moldflow Plastic Insight (MPI) integrated with the L_{18} Taguchi orthogonal array (OA). The significant processing

parameters obtained from the preliminary experiment were used to conduct the principal experiment. By adopting L₉ Taguchi OA, the parts made from recycled plastic were produced by injection molding. ANOVA confirms that the most significant factor for flexural modulus of a recycled toolbox tray is injection time (~40.49% percentage contribution). For stress at yield, the most significant factor is melt temperature with percentage contribution of about 43.34%.

Keywords:

Flexural modulus

Injection molding

Recycled plastic

Simulation

Stress at yield

Taguchi method

ACKNOWLEDGMENT

The authors acknowledge the Short-term Research Grant provided by University Sains Malaysia, Pulau Pinang, for funding the study that resulted in this article.

Related Research Data

[Effective Compressibility and Permeability of Multi-Layer Non-Crimp Fiberglass Reinforcements](#)

Source: Journal of Reinforced Plastics and Composites

[Application of Statistic Estimation to Weldline Strength of Injectionmolded Thermoplastic Composites](#)

Source: Journal of Reinforced Plastics and Composites

[The use of Taguchi method in the design of plastic injection mould for reducing warpage](#)

Source: Journal of Materials Processing Technology

[Application of Taguchi's method on the optimal process design of an injection molded PC/PBT automobile bumper](#)

Source: Composite Structures

[A study of the effects of process parameters for injection molding on surface quality of optical lenses](#)

Source: Journal of Materials Processing Technology

People also read

Recommended articles

Cited by
49

Information for

Authors

R&D professionals

Editors

Librarians

Societies

Opportunities

Reprints and e-prints

Advertising solutions

Accelerated publication

Corporate access solutions

Open access

Overview

Open journals

Open Select

Dove Medical Press

F1000Research

Help and information

Help and contact

Newsroom

All journals

Books

Keep up to date

Register to receive personalised research and resources by email

 Sign me up



Copyright © 2026 Informa UK Limited [Privacy policy](#)

[Cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG