

Optimization of Injection Molding Process for Tensile and Wear Properties
of Polypropylene Composite Components via Taguchi and Design of
Experiments Method

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Abstract

This study analyzes the wear and the tensile properties of polypropylene (PP) components, which are applied to the interior coffer of automobiles. The specimens are prepared under different injection molding conditions by changing the melting temperature, the injection speed, and the injection pressure via three computercontrolled progressive strokes. The wear and tensile properties are adopted as the quality targets. Experiments of 16 experimental runs are based on an orthogonal array table, and apply the Taguchi method and the design of experiments (DOE) approach to determine an optimal parameter setting. In addition, a side-by-side comparison of two different approaches is provided. In this study, regression models that link the controlled parameters and the targeted outputs are developed, and the identified models can be used to predict the tensile and wear properties at various injection molding conditions.

Keyword : DOE; Injection molding; Optimization; Taguchi;
Tensile stress; Wear