

Investigation on Nylon PA66 side arms using Taguchi and ANOVA analysis in reducing cost of producing urinary catheters

Abstract

This article discusses on a research experience and finding based on a collaboration with a medical equipment manufacturer in producing urinary catheters. The manufacturer had been spending high cost yearly to replace more than 1,000 units of side arms on each design of catheter. It is found that new side arms made from Nylon PA66 using an injection molding process is much more cost effective. While producing the new side arms using an injection molding process, this article also discusses on an analysis made in predicting the most significant injection molding process parameters involved in producing Nylon PA66 side arms that led to a popular warpage issue. The parameters concerned are melt temperature, filling time, packing pressure and packing time. A model of side arm is designed and simulated using simulation software to imitate the real operation of an injection moulding process. These parameters are then analyzed with respect to the deflections occurred using Taguchi method and further verified by using Analysis of Variance (ANOVA) technique. At the end of this study, it is found that melt temperature and packing time play the most significant role to the existence of warpage of side arms made from Nylon PA66. At the end of this research, it is found that nylon can be an alternative material in manufacturing side arms in reducing cost of manufacturing at 83.3% which is used in manufacturing urinary catheters.

Keywords; Nylon PA66, Injection molding, Warpage, Taguchi, ANOVA, Catheter.

