

# Simulation-based optimization of plastic injection molding parameters for mini centrifugal pump body using response surface methodology

## Abstract

Control parameters of the injection molding and fabrication process are essential to the success of any micro-molding product fabrication. The goal of the study is to simulate and optimise the parameter for the plastic mini micro centrifugal pump body by using Response Surface Methodology. The material for this micro part is Polyphenylene Sulphide (PPS). This study is also investigating the impact of design parameters and processing parameters on the quality of a plastic moulded part to obtain optimal response and meets the requirement specification. The control factors chosen for this study are melting temperature, cooling time and injection pressure. Based on the complex shape of the body part of mini micro pump, volumetric shrinkage and warpage are selected as the essential quality that needs to be controlled. The selected processing parameter are melting temperature, cooling time and injection pressure. As a result, the optimum values suggested by the software are melt temperature of 315.98 C, cooling time of 362s and injection pressure of 62MPa. With small differences error value between solution and simulation, 0.27% for volumetric shrinkage and 0.19% for warpage, the result was acceptable.