

Optimization of Casting Conditions for Semi-Solid A356 Aluminum Alloy

RSM and DOEs approach were used to optimize parameters for hypoeutectic A356 Alloy. Statistical analysis of variance (ANOVA) was adopted to identify the effects of process parameters on the performance characteristics in the inclined plate casting process of semisolid A356 alloy which are developed using the Response surface methodology (RSM) to explain the influences of two processing parameters (tilting angle and cooling length) on the performance characteristics of the Mean Particle Size (MPS) of α -Al solid phase and to obtain optimal level of the process parameters. The residuals for the particle size were found to be of significant effect on the response and the predicted regression model has extracted all available information from the experimental data. By applying regression analysis, a mathematical predictive model of the particle size was developed as a function of the inclined plate casting process parameters. In this study, the DOEs results indicated that the optimum setting was approx. (44) degree tilt angle and (42) cm cooling length with particle size (30.5) μm