



G08.17

Rapid Mold Surface Temperature Controls and Their Effects on the Injection Molded Parts' Qualities

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Rapid mold surface temperature control methods including mold surface coating, induction heating, infrared heating and suitable combinations of surface coating with different surface heating are utilized to achieve a rapid mold surface temperature controls. Surface coating with thermally insulated materials can introduce heat hysteresis effect and the plastics melt-mold surface contact temperature may sustain high temperature for about one second leading to the elimination of weld line marks for ABS parts. For rapid mold surface heating with temperature rise ranging from between 50°C and 100°C or higher, induction heating seems to be the most efficient method (within 2 to 4 seconds). Infrared heating combined with surface coating although can achieve the same effect as compared with that of induction heating, however; it takes longer time (about 15 seconds). Both heating methods can definitely eliminate weld line marks, reduce residual stress and enhance the associated weld line strengths. For molding micro-featured parts, induction heating also exhibits a significant assist in melt flow within micro channels and improves the molding accuracy in the micro-features.