

The effect of temperature increase, holding time and number of layers on ceramic shells using the investment casting process

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Abstrak

This study aimed to determine the effect of using acrylonitrile butadiene styrene in place of conventional wax material on treatment pattern removal in the investment casting process. There are three controllable process variables that can affect treatment pattern removal, which include temperature increase, holding time and the number of layers of ceramic shell that have been considered for comparison. Comparison among the effects of temperature increase, holding time and numbers of ceramic shell layers on the ceramic shell was analyzed using ANOVA. It was found that temperature increase (T_x), holding time (t) and number of layers of ceramic shell (N) contribute significantly to the length of the crack (l) on the ceramic shell. The crack in the ceramic shell's surface was analyzed using scanning electron microscope photos. Less layers number cause the increase of crack length. The combination between temperature upraise and longer holding time cause cracking delay. The experimental is conducted by using 3 (three) variants for each of layers number, temperature and holding time. The layers number is ranging between 7-9 layers. Temperature increase from room temperature until 1300oC. The layers number variant is ranging between 180-300 seconds. It was concluded that a longer holding time will result in a more intact ceramic shell, as longer holding times yield short crack lengths.