Thermal Fatigue and Soldering of Mold Materials Used for AG40A Zinc Die Casting

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ABSTRACT

The mold life of die-casting is a very important character in the zinc die casting process because of mass production and highly repeated pressure of die casting. The intense thermal fatigue and soldering of mold caused by die casting is a main factor affecting the production rate and the good yield of AG40A zinc die-castings. In the literature, researches involving to improve the mold life of aluminum die casting were often conducted, but research of zinc die casting about the same topic was seldom conducted. For example, the increase of mold life for aluminum die casting about the HWM, H19, H10 and H13 mold materials coated by PVD, the increase in the ability of anti-HF of aluminum extrusion mold by plating TiAlN PVD, the extension of mold life by plating CrC, CrCN, CrN, (Cr,Al)N PVD on the surface of die. But, the study of increase of mold life of the zinc die casting is scarce. The main goal of this study is focused on seeking of method to increase mold life of AG40A zinc die casting. The experimental methods include the PVD coating and the nitriding treatment on the surface of SKD61,TDAC,P20 and S50C mold materials. The results show that the PVD coating of these mold materials has best resistance of soldering and hot checking. The nitriding of mold materials has the better oxidation-resistant than the PVD coating treatment, but the former treatment has the worse resistance of hot checking than the later treatment.

Keywords : die casting, mold life, AG40A zinc alloy, PVD, nitriding, thermal fatigue, soldering

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