Damage of TDAC Free-cut Die Material Happened on AG40A Zinc Alloys Die Casting

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ABSTRACT

Zinc die-casting is a casting method of mass-producing zine casting with near-net shape and complex thin wall by ejecting zine metal die under high speed and high pressure. die failure is mostly caused by thermal cracks, washout, and soldering on its surfaces which contacted with the liquid molten metals. This research TDAC free-cut die material after nitriding and PVD coating actual AG40A zinc die-casting, discussion TDAC free-cut die material each kind surface treatment Microstructure superficial organization change. Experimental technique using degree of hardness survey, weight survey, contact angle survey, soldering observation, washout observation, corrosion observation, thermal fatigue observation, microstructure observation、SEM ingredient analysis. Findings demonstration TDAC free-cut die material PVD coating change least, surface trifle zinc soldering and weight increase. But not coating and nitriding change obvious. Die life direct effect production costs, and influence tool dimensional precision, and die material surface conduct different, for soldering, washout and thermal fatigue checking direct influence Die life length,discussion improvement die material , die surface processing (nitriding, PVD coating), and reduction machinery binding force intensity, reduction surface roughness, better lubricating ability, seeks influence die life fluctuation mechanism.

Keywords : zinc alloy die-castings, AG40A zinc alloy, TDAC free-cut die material, die life, soldering, washout, thermal fatigue checking, PVD coating

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