Effects of PVD and Nitriding Treatment on H13 Hot Work Die Steel for Zinc Die Casting

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ABSTRACT

Die Casting in which molten zinc alloy is injected into a cooled metallic mold or die under high velocity and high pressure of production, the die surface is affect to repeatedly continuous impact by the molten zinc alloy, cause the die been placed heat cooling circulation appearance over a long period of time under. Die failure is mostly caused by soldering, washout, thermal cracks, the influence castings the fine goods rate and production cost of the piece the waste, for improving the die failure, usually exert the way of the surface treatment to the die surface, the creation of the since low die failure and increase the die life. This research makes use PVD and Nitriding treatment, study surface treatment effects of PVD and Nitriding treatment on H13 hot work die steel for zinc die casting, wanting the solution what surface processing has the better holdout zinc soldering, thermal cracks and washout , to promote the die steel life. The results show that die casting cycles 1000, 3000 and 5000 times after, the PVD coating of H13 hot work die steel has best resistance of zinc soldering, thermal cracks and washout. Although surface of hardness is higher on the nitriding treatment, but not has better resistance on PVD, and nitriding coating is obvious of change. H13 did not do any surface treatment, the zinc soldering will grow up with the multiple, and produce the thermal cracks and washout.

Keywords : H13 Hot Work Die Steel, PVD, Nitriding, Soldering, Washout, Thermal Fatigue

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