AMC

AMERICAN METALCASTING CONSORTIUM

Solder Resistant Coating Improves Productivity and Reduces Scrap

As part of the American Metalcasting Consortium (AMC), the North American Die Casting Association (NADCA) sponsored the development of new coating technologies for die casting die components. One such coating is a duplex AlCrN deposited over nitride, which was developed collaboratively by the Colorado School of Mines and Phygen Coatings, Inc. Under evaluation as a potential lube-free coating under the AMC Castings for Superior Solutions for Readiness (CSR) Program, it has already shown benefits such as reduced soldering, higher productivity through scrap reduction, and less downtime. Benefits such as these will result in shorter lead times, lower costs, and a stronger supply chain. If proven as a lube-free coating, the benefits will be further enhanced.

Success Story

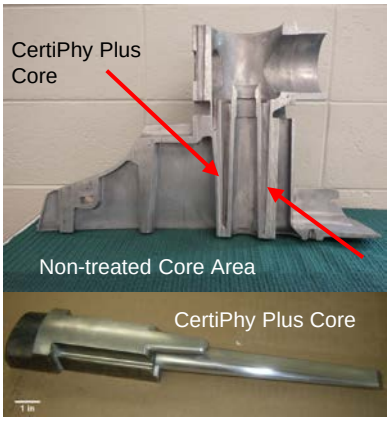
Problem: Mercury Castings, a division of the Mercury Marine Company, was experiencing soldering problems on die cast engine drive shaft housings for their outboard motors. Due to the soldering, the casting would distort when ejected from the die resulting in a scrap castings. In addition, solder build-up on the die component causes downtime as the solder needs to be removed from the die and eventually leads to the die being replaced. Various die coatings were tested in an attempt to combat the soldering, however, soldering still occurred.

Solution: Phygen Coatings, Inc. suggested coating the die with the duplex AlCrN coating in an effort to reduce the soldering, associated downtime, and scrap. Mercury supplied Phygen with a new steel die to coat. The die was assembled at Mercury and a production trial was conducted. (The duplex AlCrN coating as applied by the Phygen is now marketed as CertiPhy Plus).

Benefits: After implementation of duplex AlCrN coating technology on the die, Mercury's engineers immediately noted a significant improvement in operations. Two years later, the same coated die insert was still running accumulating over 16,000 shots, whereas un-coated dies have been retired after as few as 1,500 shots. The AlCrN die has substantially outlasted all other die coatings that have been tested. Mercury will be using this technology on future dies of this and similar configurations. An estimated annual savings of over $60,000 was realized through reductions in internal scrap, not including the savings due to downtime reduction and die component replacement.

Engine drive shaft housing casting

Casting cross-section



"The effect was dramatic and the reduction in scrap getting to my customer continues to be substantial."
Pat LaDuke, Parts Mechanical Engineer, Mercury Castings

"The change was dramatic with utilization of the AlCrN duplex coating. The die component has not soldered since being coated with the AlCrN as compared to soldering almost immediately in the past."
Steven Knickel, Tooling Mechanical Engineer, Mercury Castings

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MERCURY

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