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MetalLife NEWS ThermalLife

Coating Compatibilities

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The Holiday Season will soon be upon us. Many plants will be shutdown for extended periods during this time. This provides the perfect time to get your tooling to us for proactive maintenance. We will remain open for this purpose.

Question:
What special methods for processing should be considered when processing Dievar material?

We estimate there are between 100,000 and 150,000 existing die casting dies in the field that have been processed with either Metallife and/or Thermallife over the past 20 years. Some customers are now asking "If I decide to additionally apply a coating to one of these previously treated surfaces, will the coating be compatible?" In many instances the current owner or possessor of the die does not know what has previously been done to a tool that is inherited.

Since this could cause a huge problem, we decided to do some evaluation to see how well a subsequent coating would adhere to one of our previously treated surfaces.

We configured some coupon samples of pre-hardened Viscount 44 hot work die material. These were subsequently processed with four different versions of Metallife. On top of each of these Metallife treated coupons we diffused our Thermallife FNC process making sure that an adequate compound layer was formed during the fluidized bed treatment.

HRc indentations were made in three locations to each of the specimens. A total of 12 points were marked on each coupon. Evaluation by photography and X-ray diffraction was done to determine adhesion characteristics of the applied coatings. Hardness readings were also taken at each location and charted along with each coating's thickness.

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Titanium Aluminum Nitride
TiAlN

Chromium Nitride
CrN

Titanium Nitride
TiN

Chromium Carbide
CrC

The sample coupons measure 4" x 1" x .50"

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With the exception of the CrC, all coatings applied had good to excellent adhesion and

TiN coating, because of its low oxidation temperature and limited expansion

Our December issue will address this question.

uniform coating thickness. HRc hardness readings indicate that the 12ea indentations on each coupon penetrated the coating as well at going partially into the diffusion layer.

The TiAlN coating and CrN coating showed good adhesion with only minor anomolies.

capability, does not permit this coating to be used on die casting die inserts or high temperature applications.

CrC not only had poor adhesion characteristics, but also varying thickness from 1.4 to 8.8 microns.

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Conclusions: Based on our tests using commercially available treatments from Balzers, all but CrC coating proved a viable coating to apply over a previously applied Thermallife and/or Metallife surface.

The coating thickness of the TiAlN, CrN, and TiN were uniform with little to no inclusions or anomolies. The CrC coating, however, since adhesion appeared to be poor with varying thickness, is not a good choice for a coating to be appled over any of our processes.

In our next issue we will discuss and examine the properties of the new popular Dievar material and how these properties relate to proper application of our Thermallife process.

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