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MetalLife NEWS ThermalLife

Solder Prevention - Present & Future

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Since July 2001, Badger has been offering a fluidized bed ferritic nitrocarburizing treatment for tool steels that addresses quite effectively the problem of soldering (aluminum adhering to the composition) of die casting dies. The success of this treatment has been validated by both field and lab testing. Unique to our Thermallife process is that it is not a coating but a highly controlled diffusion treatment that along with adding hardness and improved wear resistance, also develops a compound layer. This compound layer is what provides the barrier between the iron in the tool steel and aluminum in the molten metal from interacting and forming inter-metallic bonds.

With each passing day, we are realizing more how common this problem is and its negative effect on the bottom line to the die casting industry.

Universities such as Case Western, The Colorado School of Mines, and The Ohio State University are engaged in detailed testing to find the better mouse trap for this problem.

NADCA has a special Die Materials Committee (DMC) task force engaged in focused lab projects and field tests to assist in this endeavor.

Up until a few years ago, coatings offered the best solution to the soldering phenomena. Unfortunately coatings collapse due to the failure of the substrate. Along with this has been the problem of getting the coating to adhere properly to the treated surface.

If there was only a way to overcome these shortcomings. New technology from Australia may be the solution.

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Quality Heat Technologies (Australia) has developed the next stage of fluidized bed treatments, whereby, the elements common to today's coatings are not deposited but rather diffused into the surface of the steel. The equipment to support this new technology is available on a commercial basis.

Imagine a surface treatment that acts like a coating but is diffused rather than deposited on the surface.

This solves the problem of adhesion and substrate failure that PVD coatings experience.

Just like Thermallife, the **Qab** process (as it is called) is done at a sub-critical temperatures so there is no danger of core softening or distortion to the treated material. Various treatments can be provided that diffuse metallic elements of various composition i.e. **Qab**-chromium or **Qab**-titanium into the tool steel.

The **Qab** equipment incorporates a number of significant design changes to their fluidized bed equipment utilizing protective atmosphere transfer hoods to maintain surface integrity, computer control, and special bed seals.

A press release on this new technology was issued January 21st 2002.

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OK, OK, these are significant advances in what is available for the immediate future, however, what can be done to address the present.

Solder Happens! So how do you remove it effectively? You can try polishing, but this also removes some of the tool steel.

Some use a caustic bath being careful not to leave it in solution so long that it also attacks the tool steel.

Another common way is to use NaOH but even this will not always clean all the solder that has formed on the surface.

Now from Paris, France comes technology and commercial machinery that removes solder by using chemicals and special ultrasonics in combination.

This technology is **NEW** to the United States. In Europe, though, most die cast shops have at least one of the **FISA** cleaning machines.

Call us if you have an interest in sending a heavily soldered tool to have cleaned by a **FISA** machine.

Then have us Thermallife it to protect the die for the future.

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