MetaLLife.

Die Casting Frequently Asked Questions

Print Newsletter on this topic

Compressive Stress benefits of applying MetaLLife® after ThermaLLife® to NEW tooling validated by Lambda labs.

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Here are some facts regarding **MetaLLife®** that should answer common questions relat treatment. **MetaLLife®** is unique in that it is the only surface treatment capable of closing t cracks. It is available since 1983, only from Badger Metal Tech, Inc. in Menomonee Fall certificate of compliance assures your satisfaction. Make sure you request this when placin

Questions/Topic	Response
How does the topography of the surface quality of MetaLLife® help me?	**In addition to trapping lubricant which helps casting releas metal flow, 2006 studies by Case Western University sho retention helps to increase die life. The residual die lubrica the surface of the die from direct contact with the molten me the maximum surface temperature. This promotes longer di confirmed in Case Western's standardized dip tank test. Clicl summary. The complete report is available on the Badger Metal DMC-CD - 200602dmc2.**
How will MetaLLife® help my porosity problems when casting magnesium parts with thin walls or	**A tool after MetaLLife® processing has a slightly changed top surface can vary depending on the "T" process applied. Beca topography, molten metal coming into the die becomes more forces a roll over action on the active face of the tool. This pe filling during the die casting cycle. The molten metal flow is e**

hard to fill shapes?

interrupted so that any trapped gases that are present are bro the micro topography into smaller and more homogeneous le

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Coatings and Diffusion

Do I need to do anything else to my tooling? What about coatings, platings, and diffusion processes? Is it important to prepare the substrate before a coating is applied.

MetaLife®, by itself, provides excellent protection against he also reduces soldering, slows gate erosion, improves metal fl characteristics, reduces porosity pocket concentrations, and allows reduced casting pressures. If so desired, MetaLife® ca subsequently coated, treated, or welded (reprocessing of the zone or complete casting area of the die may be necessary). W against the use of any subsequent treatment that involves the extended high heat (1800-1900 degrees F) condition. X-ray di show no degradation of the compressive stress benefits when coatings such as the popular Titanium Aluminum Nitride (TiAl Nano) are applied. Compressive Stress Evaluation MetaLife® and TiA

Prior to applying a coating, it is extremely important to protec substrate failure of the tool which will also cause the coating Compressive stress with MetaLife® or ThermaLife® is an exc doing this. It also cleans the tool so that the coating is not co undesirable foreign elements. We have also tested our ferritic carburizing process (ThermaLife®) and found it to combine w MetaLife® process. See our coupon sampling for more detai a lot of choices.

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Applying to New tooling

I know* MetaLife® *provides benefits when done to old tooling by closing heat checks and protecting welded areas. Will I see benefits if I apply it to my new tools?

This is actually the preferred method. A good proac Maintenance program for new tooling is applying MetaL sample approval and then repeating at determined interv proven by X-ray diffraction and micro analysis that small crac tensile stress develop even after only a few hundred shots w done during the sampling and PPAP approval process. It is in these cracks and convert these stresses to compression pri tool for production purposes. The application interval for M be anywhere from 20,000 to 40,000 shots.
A prior heat stress temper is also recommended. We offer th is done on an overnight basis using our Service Heat Treatin Milwaukee, WI. Some customers do an extra stress tempe MetaL ife® treatment. This stress temper, which is usual degree F, does not remove all of the compressive stress be grain boundary structure and topography improved me affected.

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Still see Heat Checks

After processing a used heat checked tool, why is it I can still see areas on the die that appear to have not been effectively closed?

There are limitations to the size of the cracks that MetaLife® The cracks that do not close are put into compression on retards further propagation of these cracks. Also some di breakout condition in the cracked areas of the tool. This in crack has circumvented an area on the tool causing a piec out. Although MetaLife® can sometimes blend these breakou it cannot replace the missing metal. Breakout then shows up on the casting. The die should be properly welded (with no

weld) in the needed areas prior to processing.

MetaLLife® also checks this weld integrity. Any unwante (which would have failed during production) is immediately MetaLLife® processing. Even though MetaLLife® may not co and close all cracks in a tool due to their size or location, t the induced compressive stress, prevent further propagation of the cracked area. It is not unusual to restore an uncastable condition and run another 30,000 - 40,000 shots.

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Topography v/s Drag
Won't the surface topography cause the tool to drag if the draft angle is minimum or the casting shrinks to the* MetaLLife® *side?

Although this may occur after processing the shrink side of a zero draft with a our T-41H process, there are some alternativ eliminate this concern in these areas.

- The tool may be processed with a lesser topography i minor polishing with fine emery or Scotch-Brite® ca processing to remove the rounded peaks on the surfac removes some of the peaks generated during treatme remove the beneficial compressive stress layer which is depth.
- The tool could have ThermaLLife® applied first which extremely hard case that does not show very much t subsequently MetaLLife® processed.
- More effective crack closure is possible when the high T-40H process is used. Using the new T-41 process desirable solution, since this process still offers a compression but less topography than the T-41H proces

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My tooling has an acid etched finish. Will MetaLLife® damage or remove it?

Our experience since 1983 with acid etched surfaces shows to, in most cases, apply the MetaLLife® treatment witho removing special etched finishes that are applied for cosm Each case is treated and evaluated on an individual basis. It regarding your concern so that your specific requirement can

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Runner/Gate and *Partial Processing.*
Need only certain areas of the die casting insert or slide area done. Do I need to do the gate or runner?

Doing only part of the die could set up possible stress r unprocessed zone meets a processed area. Badger, for this entire wet area (casting area) including the runner/gate ar When an area is specified to receive no processing due t requirements, we still like to apply the minimum T-10 proces for this reason. Since the topography of this area enhances reduces possible washout effect due to cavitation during fil runner section is also processed . For the same reason we re both the Cover and Ejector sides of the tool. After all, meta sides of the tool, so it's important to protect and enhance bo even if one side of the casting does not have a cosmetic requ

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Thermal Transfer
Won't the topography change decrease my thermal transfer coefficient by causing excessive lube build-up on the tool?

Tests at The Ohio State University performed through NAD that the topography actually increases the thermal tra increased surface area resulting from the micro topogra increased heat dissipation at the die's surface. Increased translates to longer tool life.

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Painted Castings
I am concerned about how my casting will look when it is painted?

Paint adheres better to this topography. Powder painted sur to no difference in appearance even when a varied topograph T-41H, T-61 or T-71 is applied. Field tests confirm this fac surface of the tool actually enhances the coverage, and ap paint especially with powder paint processes along with pr surface for adhesion. Castings that are "E" coated and mu topography can also be obtained. Please contact us re requirements if this is the case.

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BMT Sample Casting
Will some of the topography shown on the Badger Sample Casting be too much for my application?

The sample casting, that can be requested from Badger, sh processes. The cover side of this tool (topography side) was material (47Rc) while the ejector (MetaLife® Logo side) wa P-20 material. A visual examination of the P-20 side will s this run of only 5000 pcs has caused heat checking to deve which was not MetaLife® protected. The most common used are the T-41 and T-41H. If your tool has very little dra side of the casting, the walls can be processed to produce l This area can also be polished to remove the peaks that ar MetaLife®. Doing so will not compromise the compressi induced by the T-41H process. Very few of our customers fin do any polishing or rework after the T-41H process had be rapidly this run of only 5000 pcs has caused heat checking to side which was not MetaLife® protected. The most common used are the T-41 and T-41H. If your tool has very little dra side of the casting, the walls can be processed to produce l This area can also be polished to remove the peaks that ar MetaLife®. Doing so will not compromise the compressi induced by the T-41H process. Very few of our customers fin do any polishing or rework after the T-41H process had been

Most tooling produced after 1996 exhibits rockwells in the r This casting is very representative of what you might e surface finish on your casting. Please be aware that topography on the surface has no relationship to the deg compressive stress that was induced. In actuality the hi compression for a specific tool steel is induced when there is This has been confirmed by processing test coupon sampl which were subsequently ferritic-nitro carburized prior to M 41H. Even though these steel surfaces were extremely hard (no topography, our X-ray diffraction measurements showed a compression on the surface with measurable significant depth

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Stress Relieving

No! MetaLife® is a proprietary process that is designed to

Methods Is MetaLife® similar or the same as processes that are advertised to relieve stresses using vibration or other mechanical means?

rather than relieve them. The stresses we induce are compre as opposed to tensile (destructive). Other processes that adv do just that but do not generate the necessary compressive s protect tooling from failure. An examination of these diffraction curves will attest to this.
Our process has nothing in common with the vibration me stress except both starting with the name "Metal..." Meta involve vibrating the tool in an anyway. Also the vibratory close cracks, induce compressive stress levels, or add topog corporate association with NADCA's Die Material Committe members and testing that was done, they prefer to recommen tempering prior to MetaLL ifeÒ.

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Welded Areas
My die has been welded in certain areas, will this be detrimental to the* MetaLife® *application?

Quite to the contrary, MetaLife® is an excellent method for c integrity of welded areas of dies. Not only does it induce a hi compression, but it also relieves any stresses in the heat affe there is porosity in the weld, MetaLife® will expose these are save a tremendous amount of additional downtime to fix thes the welded area. Because of welded areas inherent additiona virgin metal, there will be a difference in the topography of th welded area.

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Application over previously Hardened Surfaces
My die has been Rocklinized or nitrided, how will this affect the application of* MetaLife®*?

Anything that hardens the surface beyond the normal hardne H-13 or maraging materials will impede the topography effect that closes cracks.
MetaLife® will still induce high levels of compression, howe counter any tendency the surface has to prematurely heat che cracks that develop in the nitrided, ferritic nitrided, or Rocklin will difficult to impossible. Previously applied Solvenite appli have this problem.

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After we had the die* MetaLife® *processed it did not appear to retain the compressive stress benefits and cracking started to occur again after only a few thousand shots.

There are two possible reasons for this isolated occurrence. steel has a poor micro-structure or was improperly heat treate will not correct this condition. This situation can be easily co doing a metallurgical examination of a coupon sample from th confirm the condition of the tool steel. 2. Even though we inc resistance by 30-40%, sometimes the actual operating stress the tool steel is still above this increase which would not prev type of premature failure one was experiencing before MetaL example of this would be improperly preheating the die, remo casting with a torch, or some other type of non-standard SPC

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Does the processing with* MetaLife® *to NEW or USED tooling cause dimensional changes that would

MetaLife® and ThermaLife® do not affect the tolerances or for casting parts in the die casting process. Our process is plating that causes dimensional growth changes to tooling v die cast parts unacceptable.

cause unacceptable out of spec parts? Return to top

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