

“Soft” Metal Staining, Post Cleaning

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I work with many metal finishers that clean the “soft” metals, specifically aluminum and copper alloys. One common, and more recurring issue I see, is staining of these alloys after the forming lubricants are removed in a cleaning step. In the push to go green, many fabricators are switching to water emulsifiable metal working fluids. The formulators of these lubes use different additives, for the lube to perform properly.

Certain commonly used additives, such as amine compounds, have a high pH and will readily react with these alloys which results in oxidation, etching, and staining. Some will bind directly to the metal surface. These formulas generally all contain inhibitors to prevent attack of the metals surface, but these have limits. The two most common causes of staining are:

Improper dilution of the base lube in water.

Excessive amount of time between when the parts are formed until they are cleaned.

In the first case, work with your lube supplier to insure you run at the optimal concentration.

Your lube supplier also may be able to provide an alternate product that is less chemically aggressive to your alloy. Allowing these types of lubes to sit and dry on the surface of parts will almost always result in these surface stains or damage.

So, what can I do to prevent or fix this?

Insure you are processing your parts first in, first out. If possible, clean directly after formation. Consider a pre-wash step. This could be simply a water flush of the parts to remove excess lube while they wait to go through your cleaning line.

Most cleaners used to clean these alloys, are inhibited, alkaline based formulations. While these are excellent for removing the organic lube, they will not remove these lube stains very effectively. Acid cleaners however are excellent for deoxidizing the surface and can remove these stains effectively. Selecting the correct acid based cleaner however, requires a better understanding of the alloys and cleaning equipment being used, to prevent further damage to the parts and or the equipment.