

Hex Chrome Is Also On The Hit List

For the last year or so we have been talking about the July 2006 RoHS deadline, that puts a ban on the use of three common metals used in the surface engineering industry. We have touched on both lead and cadmium recently and the new emphasis will be on educating our customers on the use (or non use) of hexavalent chrome. Its use as a chromate film on zinc and cadmium has been discussed in previous issues of Anoplate News but little discussion has taken place about the ban with regard to chemical conversion films on aluminum. This is that iridescent, rainbow film used for both corrosion resistant purposes as well as paint adhesion on aluminum. For those of you that live and die by specifications, these are the films covered by MIL-C-5541. There has been lots of activity among our suppliers to provide an acceptable substitute, one that has all of the characteristics of the hex chrome film, Alodine or Iridite for example. This has not been an easy task however. Some of the requirements involve salt spray exposure, low electric contact resistance, paint adhesion properties and not a requirement, but hopefully, that rainbow color.

We have good news and bad news. First the good news. After 18 months of testing the Navy has approved the material which is used in our AnoChem TCP process. It has met the qualification requirements for MIL-DTL-81706B, Type 2 Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys. This material meets all the technical requirements, but it does not have that iridescent film that we are used to. That is the bad news. It is also important to note that very stringent cleaning requirements have to be adhered to when processing certain aluminum alloys. Historically MIL-C-5541 only pertained to hex chrome coatings but now pertains to both hex chrome and chrome free coatings.

Listed here are AnoChem TCP properties:

- * 100% hexavalent chromium free conversion coating for aluminum and RoHS compliant.
- * Harder, denser and more abrasion resistant finish than the chromate version it replaces.
- * Highly corrosion resistant, exceeding salt spray requirements of MIL-C-5541, MIL-DTL-81706B and AMS 2473.
- * Outperforms conventional chromate coatings in corrosion resistance testing on high copper bearing aluminum alloys.

2006 Formula SAE Competition



The Formula SAE competition was held this year from May 17-21 at the Ford Proving Grounds in Romeo, Michigan. Each year Anoplate volunteers its metal finishing services to several collegiate engineering schools including Cornell, Georgia Tech, Penn State, RPI and RIT. We provide finishes for various needs such as corrosion, wear resistance and cosmetic purposes. This is part of the early training these engineering students get to expose them to the benefits provided by America's job shop surface finishing industry.

Formula SAE challenges teams to conceive, design, fabricate and compete with small formula style racing cars. It is but one of five Design Series competition, Snowmobile, Mini Baja, Aero and Supermileage being the others. For more than 25 years these competitions have not only enhanced the educational experiences as engineering

EARTH DAY 2006

Earth Day, 2006 was celebrated by a group of dedicated employees and family members, who collected accumulated winter debris in a large area bordering our facilities. On Saturday, April 22, Judee Piquet and Joan Murphy spearheaded the volunteers on a miserable, rainy day, tackling our complete block over to the 690 Interstate Ramp entrance. They were part of the 294 groups that attracted 5629 volunteers in the cleanup of Onondaga County. The final countywide collection tally was 700 old tires along with 70,000 pounds of litter. These folks showed the Central New York community another one of Anoplate's "green side".



Rich Stetes and Marcel Soucy, with over 46 years of total service, pitching in during our rain soaked Earth Day clean up.

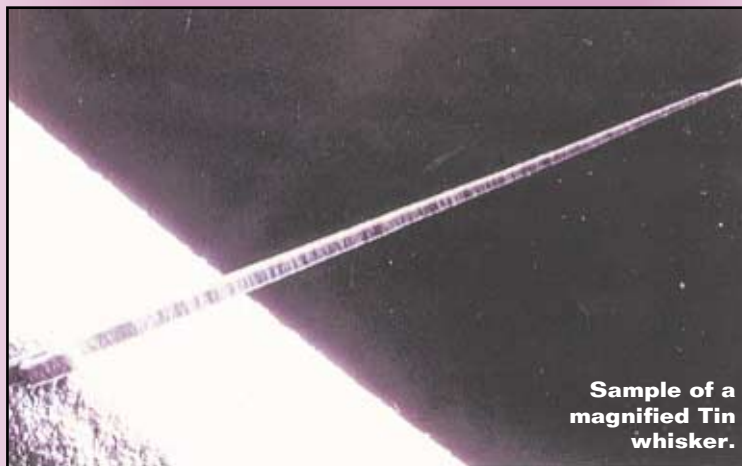
Is the LEAD out yet?

July 2006 was the mandated date by the European Union's Restriction of Hazardous Substances (RoHS) Act for the removal of several substances, one of which was lead. Rest assured much of this will be copied by entities in the United States and we will have similar local regulations (some exist right now). The metal finishing industry has accomplished this task with regard to many electroless nickel processes, and the new products, without cadmium and lead, are working without a hitch. A degree of confusion exists however in the tin and tin-lead deposit requirements for the non-exempt electronics industries. Most are now creating components without lead and developing catalogs and services that help their customers cope with which part is compliant or not. The non-exempt industries manufacture consumer items from TV's down to electronic toys. The feeling is that these items have a relatively short useful life, so if the tin plated parts develop whiskers and short out, just replace the consumer item or maybe they will just say the unit is out of warranty.

Let's talk for a moment about those exempt industries, those folks that produce the medical, aerospace and defense items that do not fall under the RoHS ban. The products which they produce must have very high reliability, for extended years, pressures and temperature, and cannot have a chance of not working due to whisker growth. This is a "no-brainer" on custom made parts for those industries, just plate them with old 60/40 tin-lead. There is a small rub however. Many parts used by the exempt industries have been certain "off the shelf" items, manufactured by reliable companies, tested and used in medical or military items. In

other words everything going into these products was not "custom" made and "custom plated". Will these companies now maintain two types of stock, with and without lead? An article (4/27/06) in Electronic News states, " We've already seen a little bit of end-of-life notices from suppliers who are phasing out non-compliant parts".

As a result of these non exempt companies efforts (removal of lead bearing solder), exempt companies are making efforts to mitigate their concerns and try and find a way to live with the problem. There are many efforts going on by Associations such as iNEMI and JEDEC to create standards that are meaningful and helpful to industry. Their efforts have resulted in two documents JESD201 and JP002 that pertain to whisker formation and mitigation.



Sample of a magnified Tin whisker.

After all of this discussion, where does Anoplate fit into the picture? Various solutions that will work for any application are available. You our customer must help us determine the final deposit that we plate for you and the potential risk. Several lead bearing solder deposits are plated daily. Pure tin and tin doped with bismuth are lead free options. For a discussion of whiskers and their growth, contact Mandy in our sales

office and she can forward some back Anoplate News issues that cover the history of whiskers. There is also a discussion on our WEB site (anoplate.com) To get an outside view on the potential trouble in the use of pure tin, check out the NASA WEB (nepp.nasa.gov/whisker) site pertaining to tin whiskers. Just scroll to whisker failures and you will find references to commercial satellite, medical and military failures. Anoplate is justly proud that one of our Anoplate News articles is posted on this NASA WEB site.

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Continued from page 1

- * Unlike chromate conversion coatings, corrosion resistant properties do not degrade upon exposure to temperatures above 140 degrees F.
- * Blue-bright finish, not iridescent rainbow color.
- * Compliant with IBM 41-218A and Lucent WL-2156 (#571).

We suggest the possible use of this wording on your finishing requests; "apply hexavalent chrome free MIL-C-5541 film" (providing proper class as appropriate). As mentioned above, just using a material qualified under MIL-DTL specification does not mean that the resulting coating will meet MIL-C-5541. Certain modifications in the cleaning cycle are necessary for certain alloys so be careful of which metal finisher you choose. Sorry about loosing that nice rainbow, but you will have some explaining to do with your customer. That is the bottom line why we wrote this article, to better educate you and your end user and give you options. Good luck! We just increased the size of our TCP process tank to accommodate your needs.

SPAM FILTER ALERT!!!

Anoplate Corporation has had a spam filter as part of our e-mail system for a considerable time. This is an attempt on our part to be diligent in the removal of unwanted e-mail. An analysis was performed recently of well over 2000 captured e-mails and found a loss rate of under 1% legitimate business messages. If you have had any trouble with no response to your e-mail, please contact us by phone so we can rectify the filtering of legitimate e-mail. We are truly sorry for any inconvenience this may have caused you but in the end it is so that we can be more focused on serving you the customer in the most timely and cost effective way.

2006 Formula SAE Competition

Continued from page 1

students, but also put them into contact with career recruiters. More than 25,000 engineering students have graduated with SAE collegiate design experience and have benefited from their participation.

How did "our" teams do this year? Penn State moved up from last years fifth place finish to take second place. Not bad when you figure 137 teams competed from all over the world. As a matter of fact, an Australian team from University of Wollongong placed first in the 2003 competition. Cornell had a "building year", coming in 35th place. Don't feel too sorry for Cornell when you realize they were after their tenth win. Rochester Institute of Technology improved from their 22nd place in 2004, 16th place in 2005 and this years 13th place. Take time to check out the ORANGE Anoplate Logo on the photographs of these "top cars". Yes, even on the Nittany Lions vehicle.

Let's offer a challenge to our readers around the world. Call your local college or university and see if there are any design teams at your school. Offer to help in the

Penn State's Formula SAE car moved up to second place in 2006, also featuring our logo up front.



machining and or metal finishing requirements if they are building a vehicle. Don't exclude your local Community College. Monroe Community College in Rochester, New York had an entry this year and took 104th place, well ahead of many prestigious engineering schools.

Plating Thickness Variations

This article is a short response to the eternal question, where do you measure the plating thickness. As a result of this question, a longer article is already in the works for inclusion in the fall issue of Anoplate News. Let us get a quick, short reply to our Syracuse customer that raised the question.

First of all, we sent him an old issue of the "News" which talks about the theory of "more plating on the edge" of parts. The problem was closely held dimensions on a hole within 0.125 inches of the edge. The thickness range on the print was 0.0002" - 0.0004" and a good operator will shoot for 0.00028" to 0.00034 in the center of the larger side panel. The very edges may get somewhat above 0.00040" and a location of a hole, that close to the edge can create

problems. That same hole, 0.250" or 0.375" from the edge most likely would not have that higher thickness condition. A possible solution would be to ask for the thickness measurements to be made next to the hole. Placing on the print or purchase order the location of thickness measurements is a good engineering practice, but very seldom done. Also keep in mind that parts will vary slightly from one to another due to placement in the tank.

One of the topics that will be presented within the fall issue is the variation in thickness due to use of different thickness testers. On long run contracts it is good to discuss both location of thickness testing and using the same type of thickness tester.

Fast Facts

- ▶ On May 12th, as well as countless other years, Anoplate participated in the Junior Achievement Bowl-a-thon. We had 6 teams with 30 bowlers helping to raise over \$1600 for JA. The organization's focus is hands-on experiences to help young people understand the economics of life. In partnership with business and educators, JA brings the real world to students, opening their minds to their potential.
- ▶ A team of employees, family, and friends participated in the Susan G. Komen CNY Race for the Cure on May 13th. As a corporate sponsor of the race, we were thrilled when our employees pulled together to help raise over \$3500. Since it's creation, the CNY Affiliate of the Susan G. Komen Breast Cancer Foundation has provided over \$2.5 million in grant funding for community breast health care programs.
- ▶ Anoplate recognized our employees for all of their efforts at a company sponsored Awards Party. On May 6th, we recognized 18 people with service awards totaling 220 years of service. A fun time was had by all with recognition to those who serve on various teams and committees, attendance awards, prize drawings, as well as some dancing.
- ▶ Our Sales and Business Development Team were busy exhibiting at multiple regional trade shows this spring. They were deployed to Fort Washington, PA for a Job Shop Show as well as Eastec in Springfield, MA. They reported seeing many current and prospective customers in these markets, with lots of follow up to occur during the summer months.



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