Ask Larry...

The Latest in Coating Technology

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Since the terms "plating", "coating" and "finishing" have been used interchangeably throughout the fastener industry, I feel it necessary to clarify the difference between these terms before we move forward. "Plating" is the method or process used to deposit a coating on the fastener substrate. "Coating" is the actual material applied to the fastener substrate during the plating process. "Finishing" encompasses all the processes and coatings used to create the completed (finished) product. The fastener substrate is simply the base fastener that has not yet received a coating material having different physical properties than the base material of the fastener. That being said let's talk coatings.

It's common knowledge that coatings are applied to fasteners for both functional and decorative purposes. Some companies apply fastener coatings to provide color blending between the fastener and their end product making it more appealing to their target market. Other companies utilize fastener coatings to fulfill both an asthetic and functional purpose, and still others don't care what it looks like as long as the coating helps to prevent fastener corrosion. Functional uses of fastener coatings could be as simple as color coding for identification purposes, or it could have multiple functions. For instance, military communications equipment require a color coating that blends well with the environment in which it is used, but it also must prevent sunlight reflection, must not be easily seen day or night, and must provide an additional barrier against the corrosion associated with product usage in harsh environments. Fastener coatings are a part of the backbone of the fastener industry, and you can bet that as the fastener industry continues to evolve we will see new coating inventions designed to tackle the challenges of the future.

Some coatings, that had once achieved great popularity due to their unique corrosion resistant properties, such as Cadmium, have since been listed as hazardous substances with the **U.S. EPA** and the European Union Restriction of Hazardous Substances Directive (RoHS). Cadmium's ability to absorb neutrons made it an ideal coating to provide a stable barrier in the control of nuclear fission. That coupled with its ability to provide complete protection against harsh marine environments quickly caused Cadmium to be a desirable coating for use with defense related products. Unfortunately, it has been discovered that prolonged exposure to Cadmium is harmful to the environment and could cause liver, kidney or other organ failure potentially resulting in the loss of human and animal life. Since this discovery coating providers have been attempting to invent a successful alternative to Cadmium coating.

Out of the multitude of coating products invented, there are two that stand out above the rest. These are FluoroKote #1® produced by the **Metal Coatings Corporation** out of Houston, TX, USA, and AlumiPlate™ produced by **AlumiPlate™ Incorporated** out of Minneapolis, MN, USA.

According to Metal Coatings Corporation, the FluoroKote #1 product greatly outperforms industry standard fastener coatings including Cadmium. FluoroKote #1 has a temperature range up to +500°F compared to the +321°F melting point of Cadmium. Regardless of claims by Metal Coatings Corporation, the proof is in the testing.

Figure 1 shows the comparative results of a 1000-hour salt spray test performed in accordance with *ASTM B117* requirements. From left in **Figure 1** are FluoroKote #1, zinc plated, Cadmium plated, hot dip galvanized, uncoated.

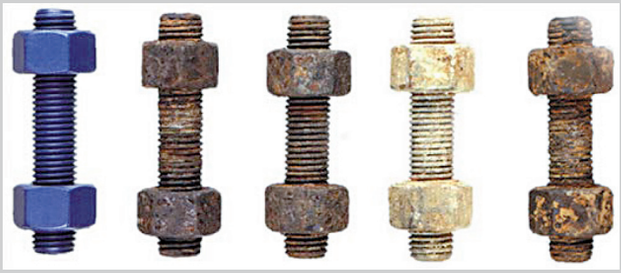

Fig. 1 — Comparative results of a 1000-hour salt spray test performed in accordance with *ASTM B117*.

Like FluoroKote #1, the AlumiPlate product has been tested in accordance with *ASTM B117* requirements. The results of these tests are demonstrated in **Figure 2**, **Figure 3** and **Figure 4**.

Boeing Corporation has requested an in-depth report from the **Army Research Laboratory** where AlumiPlate has been undergoing rigorous testing to determine if AlumiPlate is a good alternative to products that would normally use Cadmium plating. And while the final report is currently being released, AlumiPlate representatives have received very favorable preliminary results. That coupled with the temperature capabilities of 1000°F (twice that of the FluoroKote#1), Alu-

Fig. 2 — AlumiPlate™ after a 2500 hour salt spray test in accordance with *ASTM B117*.

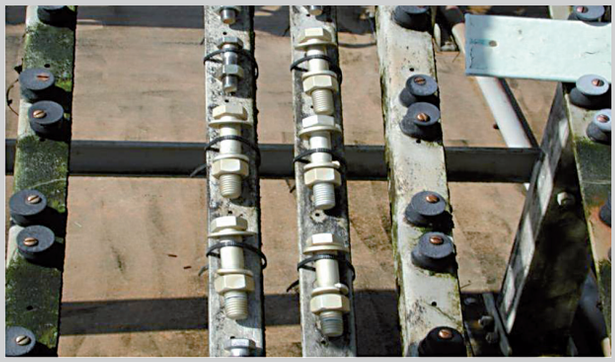

Fig. 3 — AlumiPlate™ applied to Grade 8 fasteners after 6600 hr. of exposure to sea water (10 minutes per hour).

miPlate may well be the winner of the Cadmium replacement contest. One thing is for sure, regardless of which of these products prevail, the true winner will be our planet!

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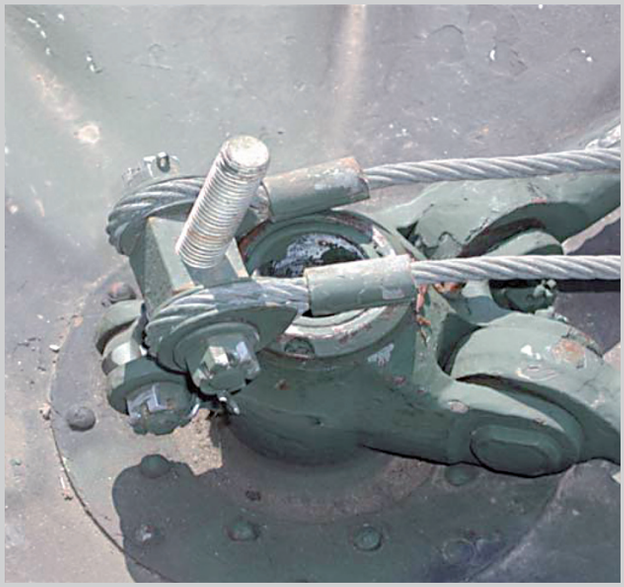

Fig. 4 — AlumiPlate™ after 22 months of sea exposure.