

Touch-N-Prep Alodine Pen Implementation At Boeing St. Louis: Lessons Learned

Boeing-St. Louis has implemented a new method to apply chemical conversion coatings on aluminum and aluminum alloys. This new method involves the use of an applicator pen called Touch-N-Prep Alodine 1132, manufactured by Henkel Surface Technologies, Madison Heights, Michigan. The pen is a special felt tip marker that contains the Alodine 1132 conversion coating solution and works like a highlighter pen, making it very user friendly (See Figure 1). The pen has several noteworthy advantages over the other application methods such as spray, brush, and immersion.

Conversion coatings are important and serve several purposes. When the conversion coating solution is applied to aluminum, it converts the oxide on the aluminum to a chromium/aluminum oxide. This newly formed chromium/aluminum oxide layer provides increased corrosion resistance and improves paint adhesion. This oxide layer also provides a conductive corrosion resistant film for electrical bonding and grounding applications where low electrical contact resistance is required.



Figure 1 - Touch-N-Prep Alodine 1132 Pen

There are two important military specifications that are used for specifying conversion coatings. MIL-DTL-81706 covers the requirements for the

chemical materials used in the formation of conversion coatings by the reaction of the material and the surfaces of aluminum and aluminum alloys. This specification does list the applicator pen as an option under methods of application. MIL-C-5541 covers the requirements for chemical conversion coatings formed by the reaction of chemical conversion materials (MIL-DTL-81706) and the surfaces of aluminum and aluminum alloys. Boeing Process Specification (PS) 13204, Conversion Coating, Brush and Spray, is also important. This specification establishes the requirements and procedures for conversion coating metal substrates with chemical conversion materials in accordance with MIL-C-5541. PS 13204 has recently been revised, and is approved, to add the Touch-N-Prep Alodine 1132 pens as an option to apply conversion coating solution.

The Touch-N-Prep pens have the distinct advantage of a 24-month shelf life over all other methods of applying conversion coating per PS 13204. Conversion coating application methods such as spray, brush, and immersion typically have a 12-month shelf life. However, when a thickening agent, Cab-O-Sil, is added to the conversion coating solution to create a

thixotropic solution, (the Cab-O-Sil material increases the viscosity of the solution and minimizes dripping and flow when applying the conversion coating solution to surfaces oriented in a vertical position), the shelf life is only 21 days.

Other advantages for using the Touch-N-Prep pens include: reduced operator exposure to the conversion coating solution, logistics advantages such as in field repair to aircraft, reduced labor time, and the elimination of hazardous waste being generated. This elimination of hazardous waste and reduced labor are significant advantages. Even though the Touch-N-Prep pens cost more than the old brush-on method, a cost savings analysis estimate showed an approximate savings of \$250,000 for the first year of pen usage at Boeing St. Louis.

The other methods of applying conversion coating solution require excess solution to be rinsed off with water and blotted up with a cloth because it contains hazardous chromic acid. The brushes and the cloths must then be disposed of as a hazardous waste because they contain a chromium compound. The rinse water is also considered a hazardous waste and must be treated as such. Applying conversion coatings using the Touch-N-Prep pens does NOT require any rinsing or wiping. The solution simply dries in place. Therefore, there are no brushes, rinse water, or cloths, which need to be disposed (See Figure 2).

Alodine 1132 is similar to the other conversion coating materials because it contains chromates, which are hazardous materials. Therefore, proper precautions, such as the use of appropriate personal protective equipment, need to be taken in order to ensure operator exposure to such hazardous materials is minimized. Applying conversion coating solution with the Touch-N-Prep pens helps reduce and eliminate some of the concerns in regard to operator exposure to hazardous materials. The operator does not have to worry about dripping solution, even when applying conversion coating overhead (See

Figure 3). There are no contaminated cloths, brushes, or rinse water which can expose the operator to the chromic acid. The pens are very efficient at applying the proper amount of conversion coating solution, which results in reduced amounts of conversion coating being used and a minimal amount being wasted.

To aid in the implementation of the Touch-N-Prep pens and educate the production floor operators on proper pen usage, Boeing-St. Louis Environmental Assurance conducted training classes. As part of the training, an actual demonstration of how the pen works was given to the floor operators, as an aluminum test panel was conversion coated using the Touch-N-Prep pen. This class provided an excellent opportunity for the operators to ask questions and express their concerns about the process and pen. A tip sheet was also handed out to each operator. This tip sheet is a training aid that shows the step-by-step process in which an aluminum surface is to be cleaned, deoxidized, and conversion coated with the Alodine 1132 pens. Approximately 1000 production floor operators received this training.



Figure 2 - Applying Alodine 1132 with Touch-N-Prep Pen to Restore Coating on Repair Area

The feedback and comments of the operators in regard to the training class are as follows:

“The tip sheets are good and increase operator awareness...”

“Shelf life of 24 months is great...”

“Elimination of rinsing and wiping is a big advantage...”

“The Touch-N-Prep pen provides me with more accuracy because the coating does not run or drip onto adjacent surfaces...”

The following are some typical questions from the operators with answers given during the training classes:

“The color of the coating is not as deep as the other processes, is this acceptable?”

Color is no indication of how a conversion coat will perform, a light brown color is acceptable per PS 13204.

“There are streak/overlap marks on the test panel, is this cause for rejection?”

Color shades, lines or coating overlap marks are acceptable per PS 13204.



Figure 3 - Operator Applying Conversion Coating Overhead with Touch-N-Prep Pen

“Are the Touch-N-Prep pens a replacement for the other methods, or can we still brush or spray the alodine material?”

The Touch-N-Prep pens are not a replacement, but offer an option to apply conversion coat per PS 13204.

“What is the dry time, how soon can we apply paint (primer/topcoat) to the Alodine?”

Dry time is usually 5 minutes or less, and paint coatings can be applied after this time.

“Can we use the Touch-N-Prep pens for electrical bond applications?”

The Touch-N-Prep pens are approved per MIL-DTL-81706, Class 3, for protection against corrosion where low electrical resistance is required.

“Do we have to apply two coats of conversion coatings?”

No, two coats are not a requirement, but two coats are recommended as to provide maximum corrosion protection.

“What about confined and restrictive areas, how do we get the felt tip marker in such areas?”

The felt tip on the Touch-N-Prep pen can be trimmed to fit small areas.

Feedback was also obtained from the floor operators after one month of using the Touch-N-Prep pens. Some of the feedback comments are as follows:

“The Touch-N-Prep pens are great, no rinsing and wiping and thus no waste to get rid of...”

“The conversion coating does not migrate and get on surrounding areas; the Touch-N-Prep pens are easy to use...”

“Using the Touch-N-Prep pen saves me time and makes my job a lot easier...”

“It’s nice to be able to use the Touch-N-Prep pens when working overhead, and not worry about alodine dripping on me...”

“I wish I could use the Touch-N-Prep pen on titanium, and also on stainless steel...” NOTE: Alodine 1132 is only allowed to conversion coat aluminum at this time.

The implementation of the Touch-N-Prep pens here in St. Louis is proving to be beneficial. These pens are a good alternative to reduce chromium exposure and waste. There are some issues to be addressed, but with the continued

effort and support of Environmental Assurance and the vendor, Henkel Surface Technologies, these issues will be resolved.

For additional information or questions concerning the use of Touch-N-Prep Alodine 1132 pens, contact

George S Giulvezan Jr. at 314-234-6213, or E-mail george.s.giulvezan@boeing.com or Steve Gaydos at 314-233-3451, or E-mail stephen.p.gaydos@boeing.com

States Are Determining New Ozone Non-attainment Areas Now

In December 2002, state governors received letters from the U.S. Environmental Protection Agency asking each state to determine those areas that fail to meet a new, more stringent, ambient air quality standard for ozone. The new "8-hour ozone standard" is based on an 8-hour averaging time. The new 85-part per billion limit is more difficult to meet than the earlier one hour standard of 125 ppb. Some areas that achieved the old standard are not meeting the new standard. Newly designated non-attainment areas are likely to face future emission controls on volatile organic compounds and nitrogen oxides that were not previously required.

Recent data indicate that 291 U.S. counties have air quality monitors that exceed the 8-hour ozone standard. States will not simply declare non-attainment area boundaries based on monitoring data, however. EPA guidance directs the states to consider boundaries based on Metropolitan Statistical Areas or Consolidated Metropolitan Statistical Areas (C/SMA). The C/SMA are Census Bureau boundaries that often include multiple counties in and near urban areas. From the EPA's perspective, C/SMA boundaries are the presumptive non-attainment area boundaries for the 8-hour ozone standard. States may, however, propose non-attainment areas larger or smaller than the C/SMA. If a state believes that areas outside the C/SMA contribute significantly to urban ozone levels, or will do so in the future,

the state may create a non-attainment area larger than the C/SMA. On the other hand, if some areas of the C/SMA are topographically isolated, rural, and have low stationary and mobile source emissions, the state may propose to exclude them from the non-attainment area.

Future emission control requirements will be more stringent within the non-attainment area than outside it. As a result, non-attainment boundary decisions generate great concern and interest and by state and local officials, environmental advocates, industrial and military facilities, and exurban commuters who may face new vehicle inspection requirements, clean fuel costs, etc. Many states are now engaged in stakeholder meetings or public hearings to determine what the boundaries will be. State and local non-attainment designations are due to the EPA in April 2003. EPA will review the proposed designations, seek public comment, and approve or disapprove them by April 2004. In the meantime, EPA will complete rulemaking to determine what emission control strategies will be required for 8-hour non-attainment areas. SIPs (State Implementation Plans) for achieving the 8-hour ozone standard will be due to EPA around 2007, though many states are already engaging the industrial community and citizens in efforts to achieve earlier emission reductions.

For additional information, contact Dave Shanks at 314-234- 4351, or E-mail david.l.shanks@boeing.com

Your comments are important to us! Contact Paul Rempes at (314) 233-1541 or e-mail: paul.e.rempes@boeing.com

Archived issues are located on the Boeing Intranet at: <http://engmil.stl.mo.boeing.com/engmil/ea/>

For questions regarding access, call Craig Scott at (314) 234-1736, e-mail: craig.w.scott@boeing.com