



# Application Guide

## AC-®130

### Metal Alloy Surface Preparation For Bonding

#### SCOPE

This document describes the process for the application of AC-®130 pre-bond surface treatment to facilitate adhesive bonding to Metal Alloys such as; Aluminum, Titanium, Stainless Steel, and Nickel.

This process is recommended on metal alloys in the following forms: sheet, plate, foil, forging, and honeycomb core. This formulation is applicable for parts subsequently bonded with epoxy-based adhesive systems.

**NOTE:** Subject matter contained in this document is covered by patents pending and by the following United States patents: 5,814,137; 5,849,110; and 5,939,197. Advanced Chemistry & Technology, Inc. is a Licensee of the Boeing Company. **AC-®130 is a Boeing Company Licensed Product under Boegel-EPII.**

#### MATERIALS

AC-®130, Advanced Chemistry and Technology (AC-TECH), 7341 Anaconda Avenue, Garden Grove, CA 92841, 1-800-732-4470.

Wipers, cheesecloth, gauze or clean cotton rags

3M Scotch-Brite 2- or 3-inch medium grit "Roloc" discs, 3M Center, St. Paul, MN 55144-1000, 1-800-742-9546

Aluminum oxide abrasive grit, 50-80 micron (#280 to #180 grit)

Solvents, in order of preference: acetone, methyl ethyl ketone (MEK), methyl propyl ketone (MPK), a blend of MEK and MPK, acetone, isopropyl alcohol (IPA)

Bonding Primer

#### STORAGE

Materials included in this document that are considered to be time and temperature sensitive shall be stored in accordance with local requirements from time of receipt through use.

#### FACILITIES CONTROL

Air used for drying, air-water rinsing, and blow off shall be treated and filtered so that it is free of moisture, oil, and solid particles.

AC-®130 and primer application shall be conducted in an area provided with ventilation.

Temperature shall be  $75 \pm 10^{\circ}\text{F}$  and relative humidity shall not exceed 85 percent.

Grinders used shall have a rear exhaust with an attachment to deliver the exhaust away from the part surface. A recommended model is the Florida Model No. FP-759-R  $\frac{1}{4}''$  air powered grinder, configured with a 2" or 3" 3M

Roloc backing pad or Merit Type II roll-on system. Another recommended model is the Myton Model No. MAS-20B ¼" air powered grinder.

Sanding tools shall have a random orbital movement. A recommended model is the Dotco Model No. 12L1800-03, air powered, manufactured by Cooper Power Tools, Dynabrade Model No. 57016, air powered, or a DeWalt Model No. DW420, electrically powered.

## **DEFINITIONS**

The following definitions shall apply to terms that are uncommon or have special meanings as used in this specification:

**Water-Break-Free Surface** - A surface that maintains a continuous water film for a period of at least 30 seconds after having been spray or immersion rinsed in clean water at a temperature below 100°F.

**Spray-Drench** - Spraying of the surface with AC-®130 solution such that the entire sprayed surface remains consistently wet over a controlled period of time. There may be a small amount of excess material that will run off of the part during this application.

**Homogeneous** - Of a uniform or similar nature throughout. A homogeneous solution will have the same uniform consistency throughout the mixture.

**Induction Time** – The time after which all of the AC-®130 components were combined, but before the mixed solution is active. Do not treat the part with the solution before the elapsed induction time is complete.

**Pot-Life** – The limited time period, after all of the AC-®130 components were mixed, within which the coating material must be used. Do not treat the part with the solution after the pot-life time has expired.

## **MANUFACTURING CONTROL**

Hardware to be processed shall be handled with minimal contact area.

Protect parts from oil, grease, and fingerprints. Solvent clean parts if they become contaminated during handling and transport.

Orient parts for processing to maximize drainage and minimize contact points during cleaning and spray drenching with AC-®130 solution.

Parts shall be water-break free.

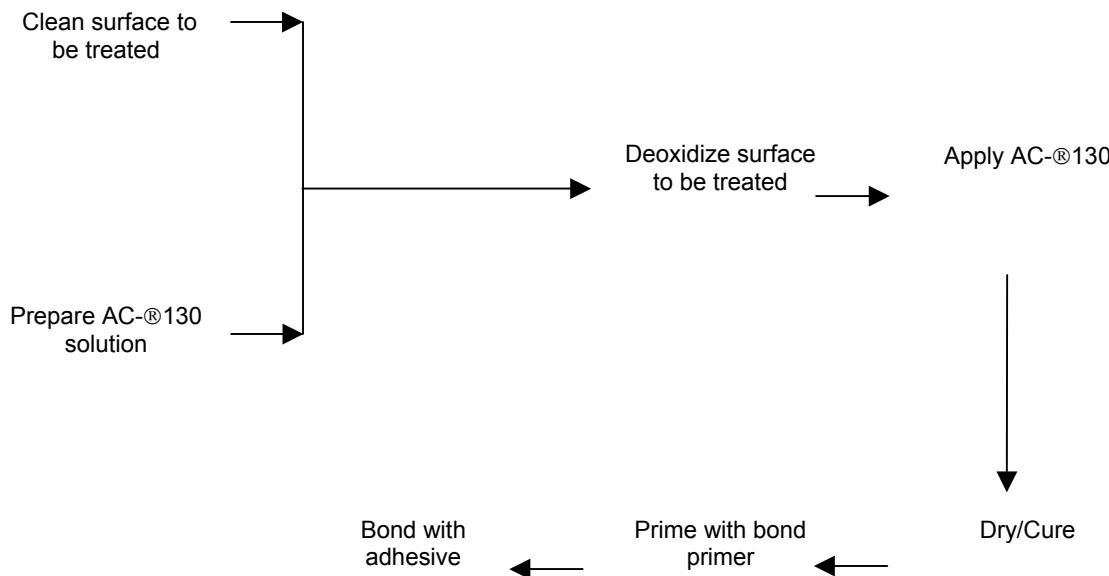
Mask dissimilar metals and neighboring regions where appropriate.

Apply bond primer within 24 hours of AC-®130. Cool parts to room temperature, prior to application of organic finishes.

If necessary, contain grit and dust residues generated during the mechanical deoxidization processes

Examples of acceptable equipment include HVLP guns, airless sprayers, prevail sprayers, and conventional garden sprayers.

Process parts in accordance with the flow chart depicted in Figure 1.



**FIGURE 1. PROCESS FLOW FOR AC-®130**

#### CLEAN AND PREPARE SURFACE TO BE TREATED

Solvents clean the part surface areas to be bonded and adjacent surfaces. Remove all surface coatings and residual adhesive residues down to bare metal using locally approved procedures. Re-clean the bare metal surface by solvent wiping. Remove all contaminants.

**CAUTION** - Proper protective equipment, such as protective gloves, respirators, and eye protection must be worn during these operations.

#### GRIT BLAST DEOXIDIZATION

Using alumina grit, grit blast a region slightly larger than the bond area. Use 30-80 psi oil-free compressed air or nitrogen. Slightly overlap blast area with each pass across the surface until a uniform matte appearance has been achieved. Ideal blast pressure is dependent on the angle of the nozzle to the surface and the speed at which the blaster traverses over the surface.

Remove loose grit residue with a clean, dry, natural bristle brush or with clean, oil-free compressed nitrogen or air.

Apply AC-®130 coating as soon as possible after completion of the grit blast process. Time between completion of grit blast deoxidization and application of AC-®130 shall not exceed 8 hours. Avoid contamination of the freshly abraded surface.

#### SANDING DEOXIDIZATION

Connect sander or a high-speed grinder to an oil-free nitrogen or compressed air line. Thoroughly abrade the surface by sanding with abrasive paper for one to two minutes over 6" x 6" sections, covering the entire surface uniformly. A preferred method would be to guide the sander from side to side across the entire 6" x 6" area and then change the direction of travel of the sanding by 90 degrees to achieve one cross coat. Change the sandpaper when it becomes worn, as evidenced by tears, seizing of the tool, and

clogging. At a minimum, use one fresh piece of sandpaper for each 6" x 6" area. Sanding speed should be adjusted in order to complete all passes within a one to two minute period over a 6" x 6" area. With proper airflow, the sanding disc should maintain free rotation with lightly applied pressure during the entire procedure. After the area has been abraded in sections, re-sand the entire surface using a fresh piece of sandpaper.

Remove loose grit residue with a clean, dry, natural bristle brush or with clean, oil-free compressed nitrogen or air.

Apply AC-®130 coating as soon as possible after completion of the sanding process. Time between completion of sanding deoxidization and application of AC-®130 shall not exceed 30 minutes. Avoid contamination of the freshly abraded surface.

### **SCOTCHBRITE DEOXIDIZATION**

Connect high-speed grinder to an oil-free nitrogen or compressed air line. Thoroughly abrade the surface with an abrasive disc for a minimum of one to two minutes over each 6" x 6" section, covering the entire surface uniformly. Change the abrasive disc when it becomes worn, as evidenced by seizing of the tool or clogging of the pad. Use a fresh disc for each 6" x 6" area. After the area has been abraded in sections, abrade the entire surface again using a fresh Roloc disc.

Remove loose grit residue with a clean, dry, natural bristle brush or with clean, oil-free compressed nitrogen or air.

Apply AC-®130 as soon as possible after completion of the Scotch-Brite abrasion process. Time between completion of Scotch-Brite deoxidization and application of AC-®130 shall not exceed 30 minutes. Avoid contamination of the freshly abraded surface.

### **APPLICATION OF AC-®130**

#### **SPRAY APPLICATION**

Apply AC-®130 solution by spraying onto the metal surface. Spray solution generously, allowing excess to run off the surface. Keep part surface continuously wet with the solution for a minimum of 2 minutes. Part surfaces must not be allowed to dry and should be drenched with solution at least five times during the solution application period. For large areas, treat smaller sections at a time for the minimum application time progressing over the entirety of the part to ensure the treated surface does not dry between spray coats.

Allow the coated hardware to drain for 5-10 minutes. If there is any surplus AC-®130 solution collected in crevices, pockets, or other contained areas, use filtered compressed air to lightly blow off excess solution while leaving a wet film behind. Do not splatter this excess solution onto adjoining part surfaces. Alternatively, the excess sol-gel solution may be gently blotted, not rubbed, off the surface using a clean wiper that has been pre-wetted with the sol-gel mixture. Do not dry off areas of the part that are able to freely drain. The part may still be wet after only 5-10 minutes of air-drying.

Let the coated parts dry under ambient conditions for a minimum of 60 minutes. Minimize contact with the part during this time, as the coating may be easily damaged until fully cured. Exact drying time will depend on the configuration of the part and room conditions.

Apply bond primer within 24 hours of AC-®130 application. Keep part surface clean during entire operation. If the coated part becomes soiled prior to priming, solvent wipe and apply bond primer.

#### **MANUAL APPLICATION**

Apply AC-®130 solution by brushing with a natural bristle brush or swabbing with a clean wiper, cheesecloth or gauze. Apply solution generously, keeping the part surface continuously wet with the solution for a minimum period of 2 minutes. Part surfaces must not be allowed to dry and should be covered with fresh solution at least five times during the solution application period.

Allow the coated parts to drain for 5-10 minutes. If there is any surplus AC-®130 solution collected in crevices, pockets, or other contained areas, use filtered compressed air to lightly blow off excess solution while leaving a wet film behind. Do not splatter this excess solution onto adjoining part surfaces.

Alternatively, the excess sol-gel solution may be gently blotted, not rubbed, off of the surface using a clean wiper that has been pre-wetted with the sol-gel mixture. Do not dry off other areas of the part that are able to freely drain. The part may still be wet after only 5-10 minutes of air-drying.

Let the coated parts dry under ambient conditions for a minimum of 60 minutes. Minimize contact with the part during this time, as the coating may be easily damaged until fully cured. Exact drying time will depend on the configuration of the part and room conditions.

Apply bond primer within 24 hours of sol-gel application. Keep part surface clean during entire operation. If the sol-gel coated part becomes soiled prior to priming, solvent wipe and apply bond primer.

#### **AC-®130-MIXING PROCEDURE**

The AC-®130 solution shall be prepared according to AC TECH's mixing instructions provided in each kit. Use kit size appropriate for size of area to be treated. For example, approximately 100 ml of the sol-gel solution will be enough to coat about 5 square feet of bond zone. Scale up as required.

#### **ACCEPTABLE RESULTS**

An acceptable AC-®130 coating is smooth and continuous without evidence of water breaks or other evidence of surface contamination.

Dark areas caused by draining and uneven drying of the sol-gel solutions are acceptable.