GENERAL REQUIREMENTS
Clauses 1.7 (Basic Considerations), 1.8 (Workstations, Tools, Materials and Processes) and 1.9 (Lead Free) provide important information and guidance about the use of this procedure, including but not limited to tin-lead and lead-free alloys. This procedure is also applicable to lead free products.

OUTLINE
This procedure covers the techniques for identifying various coatings so that the appropriate coating removal method can be selected.

Conformal Coating Types
IPC-CC-830 has superseded MIL-I-46058 as the primary specification for printed circuit assembly conformal coatings, and covers the following types of conformal coatings:
1. Type AR – Acrylic resin (includes lacquers and varnishes)
2. Type ER – Epoxy resin
3. Type SR – Silicone resin
4. Type UR – Polyurethane resin
5. Type XY – Paraxylylene

REFERENCES
2.1 Handling Electronic Assemblies
2.2 Cleaning
2.5 Baking and Preheating
2.6 Epoxy Mixing and Handling
IPC - CC-830

TOOLS AND MATERIALS
Abrasive Discs
Brush
Cleaner
Cleaner Wipes
Cotton Swab
Dental Style Drill
Heated Blade
Knife
Solvent
Thermal Parting Tool
Wood Stick

PROCEDURE
To determine the appropriate coating removal procedure the coating must first be identified. During original manufacture the specific coating is usually known. Consequently, the coating removal methods can usually be specified and based on the known coatings being used. Labels conforming to Standards such as IPC-1066 (superseded by IPC/JEDEC J-STD-609) and IPC/JEDEC J-STD-609 may be present on the assembly to identify the coating material.

When identification of the coating is not available, simple observation and testing will help identify the coating characteristics so that the proper removal procedure can be specified.

NOTE
The generic or commercial identification of the coating material is not necessary to accomplish coating removal.

1. Hardness
Penetration test in a non-critical area to determine relative hardness. The harder the coating the more suitable to pure abrasive techniques. The softer and gummier the coatings the more suitable to the brushing removal procedures.

2. Transparency
Obviously transparent coatings are usually more suitable for removal than the opaque type. Removal methods used with opaque coatings must be far more controllable and less sensitive to damaging the covered components and printed board surfaces and are usually slower.

3. Solubility
Most coatings are soluble; however, the solvent required to dissolve a specific coating may also attack the board and/or components. Unless directed by other maintenance actions, the solubility test and solvent use should be limited to isopropyl alcohol. Test coat the surface in a noncritical area by brushing on a small quantity and observing the solubility action.

CAUTION
Printed board assemblies should not be immersed in harsh solvents.

4. Thermal Removal
Use a thermal parting device with controlled heating and without a cutting edge to determine whether the coating can be thermally removed. Start with a low temperature, approximately 100°C, and increase the temperature until the coating is removed. If the coating flows or gums up,
the temperature is too hot or the coating is not suitable for thermal removal.

5. Stripability
   Carefully slit the coating with a sharp blade in a non-critical area and try to peel back from the surface to determine if this method is feasible. Due to the adhesion required of coating materials, stripable techniques without chemical aids is usually very limited.

6. Thickness
   Coating thickness is determined by visual inspection. Thin coatings show sharp outlines of the components and almost no fillet at intersection points of part leads to the circuit board. Thick coatings reduce these sharp outlines and show fillets where part leads intersect with the board. Coatings thinner than 0.064 cm [0.025 in] are considered thin. Coatings thicker than 0.064 cm [0.025 in] are classed as thick.

The specific coating to be removed may have one or more of these characteristics and consequently the removal method selected should consider the composite characteristics.

See Figure 1 for Conformal Coating Identification.
See Table 1 for Conformal Coating Characteristics.
See Table 2 for Conformal Coating Removal Methods.

INSPECTION GUIDANCE
1. Visual examination or UV light may be used to verify removal of coating.
2. Visually inspect PWA for damage from removal of conformal coating.

NOTES
CONFORMAL COATING IDENTIFICATION

START

DOES THE COATING FEEL SOFT/RUBBERY/SPONGY

YES

DOES THE COATING HAVE A NOTICEABLE REACTION TO HEAT

YES

IS THE COATING THICK AND HAVE A DULL SURFACE

YES

POLYURETHANE

NO

IS THERE A REACTION TO ALCOHOL

YES

SILICON RESIN

NO

DOES THE COATING HAVE A NOTICEABLE REACTION TO HEAT

NO

IS THE COATING THICK AND HAVE A DULL SURFACE

YES

RTV ENCAPSULATION

NO

ACRYLIC LACQUER

YES

DOES THE REACTION FORM A WHITE POWDER

NO

POLYURETHANE

YES

EPoxy

IDENTIFICATION COMPLETE USE TABLE 1 FOR CONFIRMATION

Figure 1 Conformal Coating Identification
### Table 1 Conformal Coating Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Epoxy</th>
<th>Acrylic</th>
<th>Polyurethane</th>
<th>Silicone Resin</th>
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<tbody>
<tr>
<td>Hard</td>
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<td></td>
<td>✔</td>
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<tr>
<td>Medium Hard</td>
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<tr>
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### Table 2 Conformal Coating Removal Methods

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<tr>
<td>Silicone Thick</td>
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**NOTE:** The preferred order for applying removal methods to specific coatings is numerically indicated. These removal methods are listed in ascending order. More than one method may be required.