

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2001  
 DateRun: 03/22/2001  
 Experimenters: Jason Marshall  
 ClientType: Electronics Manufacturer  
 ProjectNumber: Project #3  
 Substrates: Plastic  
 PartType: Part  
 Contaminants: Carbon Deposits, Resins/Rosins  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Visual

Purpose: To evaluate selected cleaners for the removal of epoxy resin and rubber gasket.

Experimental Procedure: Three products were selected for evaluation. All three were used at full strength and room temperature. A 500 ml beaker was filled with each solution. One part with gasket was immersed in the beaker. Observations were made at 5 minutes, 2, 3 and 4 hours. At each observation time, the part was removed from the beaker. The rubber gasket was checked for swelling and was removed when the gasket was easily separated from the potting fixture. The epoxy resin was wiped with a paper towel to determine if any epoxy could be removed.  
 SUBSTRATE MATERIAL: Potting fixture (Deiron plastic)  
 CONTAMINANTS: Emerson & Cuming Stycast 1090 Black, epoxy resin (DGEBA 1675-54-3, Carbon black 1333-86-4)

Results: Both Bio T Max and the D-limonene caused swelling of the rubber gasket after the first five minutes of soaking. The Ionox HC 2 required four hours for easy removal of the gasket. The epoxy was removed from the parts soaked in the Bio T Max after 4 hours of soaking. The resin was peeled off in one piece. The D-limonene did not remove the epoxy even after soaking overnight. Ionox HC 2 was successful in removing the epoxy after two hours. Table 2 lists the observations made at each time interval.

| Product    | 5 min  | 2 hours   | 3 hours                        | 4 hours                      | Overnight                    |
|------------|--|---|--------------------------------|------------------------------|------------------------------|
| Bio T Max  | Swelling of ring-removed                       | Some removal of epoxy (flakes)                      | Some removal of epoxy (flakes) | Removal of epoxy (one piece) | N/A                          |
| Ionox HC 2 | No swelling of ring<br>flecks of epoxy removed | No swelling of ring<br>Removal of epoxy (one piece) | Starting to swell              | Ring removed                 | N/A                          |
| D-Limonene | Swelling of ring-removed                       | Some removal of epoxy (flakes)                      | Some removal of epoxy (flakes) | Bigger pieces removed        | No complete removal of epoxy |

Summary:

| <b>Substrates:</b>       |               | Plastic                        |             |                                     |               |  |
|--------------------------|---------------|--------------------------------|-------------|-------------------------------------|---------------|--|
| <b>Contaminants:</b>     |               | Carbon Deposits, Resins/Rosins |             |                                     |               |  |
| Company Name:            | Product Name: | Conc.:                         | Efficiency: | Effective:                          | Observations: |  |
| Bio Chem Systems         | Bio T Max     | 100                            |             | <input checked="" type="checkbox"/> |               |  |
| Kyzen Corporation        | Ionox HC 2    | 100                            |             | <input checked="" type="checkbox"/> |               |  |
| Florida Chemical Company | D-Limonene    | 100                            |             | <input type="checkbox"/>            |               |  |

Conclusion: The two products from the previous trials, Bio T Max and Ionox HC 2, were successful in removing the rubber gasket and the epoxy resin within 4 hours of soaking.