

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999  
 DateRun: 06/29/1999  
 Experimenters: Jason Marshall  
 ClientType: Plating Job Shop  
 ProjectNumber: Project #2  
 Substrates: Aluminum  
 PartType: Coupon  
 Contaminants: Waxes  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric

Purpose: To find a replacement for TCE in wax removal from multiple substrates.

Experimental Procedure: Seven cleaners were selected based on vendor supplied information and using the lab's Effective Tests Conditions Database. Five of the seven were made into 5% solutions using DI water in 400 mL beakers. The beakers were heated to 130 F on a hot plate. The remaining two chemistries were used at full strength and at room temperature. Table 1 lists the products used and their dilutions. Twenty-one preweighed coupons were coated with wax and weighed again after returning to room temperature. Three coupons were immersed in the cleaning solutions and soaked for five minutes. Coupons were rinsed in tap water at 120 F for 30 seconds and air dried for two hours. Final weights were recorded, and cleaning efficiencies were calculated.

CONTAMINATING PROCESS USED: Wax was heated using a Master Appliance Corp, Hot-air gun model HG at 500 F. Coupons were allowed to cool to room temperature.

Results: The cleaners selected had limited success in the removal of the contaminant from the coupons. A couple of the cleaners started to dissolve the wax at the end of the five minutes. Only one cleaner, Envirosolutions, showed any definite signs of removing the wax. Table 2 lists the cleaning efficiencies and the observations made during the experiment.

|                | AW Chest.     | Calgon        | Oakite          | US Poly.        | Gemtek       | Savogran      | Envirosolutions |
|----------------|---------------|---------------|-----------------|-----------------|--------------|---------------|-----------------|
| Coupon 1       | -0.465        | -0.740        | -0.249          | 0.205           | 0.691        | 0.020         | 2.166           |
| Coupon 2       | 0.252         | -1.483        | 0.000           | 0.198           | 0.025        | -0.046        | 0.841           |
| Coupon 3       | -0.104        | -0.437        | -1.256          | 0.190           | -0.132       | -0.146        | 1.342           |
| <b>Ave</b>     | <b>-0.106</b> | <b>-0.887</b> | <b>-0.502</b>   | <b>0.198</b>    | <b>0.195</b> | <b>-0.057</b> | <b>1.449</b>    |
| <b>Std Dev</b> | <b>0.358</b>  | <b>0.538</b>  | <b>0.665</b>    | <b>0.007</b>    | <b>0.437</b> | <b>0.084</b>  | <b>0.669</b>    |
| Observation    |               |               | Some dissolving | Some dissolving |              |               | wipe off        |

Summary:

|                         |   |               |                    |                          |                      |
|-------------------------|---|---------------|--------------------|--------------------------|----------------------|
| <b>Substrates:</b>      | Aluminum                                      |               |                    |                          |                      |
| <b>Contaminants:</b>    | Waxes   |               |                    |                          |                      |
| <b>Company Name:</b>    | <b>Product Name:</b>                          | <b>Conc.:</b> | <b>Efficiency:</b> | <b>Effective:</b>        | <b>Observations:</b> |
| AW Chesterton           | KPC 820 N                                     | 5             | -0.11              | <input type="checkbox"/> |                      |
| Calgon Corporation      | Geo Guard 2215                                | 5             | -0.89              | <input type="checkbox"/> |                      |
| Oakite Products         | Inproclean 3800                               | 5             | -0.50              | <input type="checkbox"/> |                      |
| US Polychem Corporation | Polyspray Jet 790 P                           | 5             | 0.20               | <input type="checkbox"/> |                      |
| Gemtek Products         | SC Aircraft & Metal Cleaner Super Concentrate | 5             | 0.20               | <input type="checkbox"/> |                      |
| Savogran Company        | HD-34 Cleaner Degreaser                       | 100           | -0.06              | <input type="checkbox"/> |                      |
| Bio Chem Systems        | Bio T Max                                     | 100           | 1.45               | <input type="checkbox"/> |                      |

Conclusion: Envirosolutions Bio-T Max was the only product tested to show any success in removing the wax from the coupon after five minutes of soaking. Additional tests will be conducted using the Bio-T Max product altering the time, temperature and agitation in order to increase the cleaning efficiency.