

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2000  
 DateRun: 02/06/2000  
 Experimenters: Jason Marshall  
 ClientType: Mfr Boating Accessories  
 ProjectNumber: Project #3  
 Substrates: Plastic, Electronics  
 PartType: Coupon  
 Contaminants: Fluxes, Solder  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric

Purpose: To evaluate selected cleaners for the removal of the solder flux.

Experimental Procedure: Five cleaners were selected from the previous trial. Three solutions were diluted with DI water to five percent by volume in a 600 ml beaker. The other two products were diluted to 10% as suggested by the vendor. All eight solutions were heated to 130 F on a hot plate. Fifteen preweighed coupons were coated with the supplied flux and weighed again. Three coupons were cleaned in a solution for five minutes at room temperature using stir-bar agitation. After cleaning the coupons were rinsed for 15 second in tap water at 120 F and dried using a Master Appliance Corp, Hot-air gun model HG-301A at 500 F for one minute. Following the drying, final clean weights were recorded and efficiencies were calculated.

SUBSTRATE MATERIAL: Circuit Board coupons  
 CONTAMINANTS: Flux-Kester Solder 1544 Rosin Solder flux (CAS#s: 64-17-5, 78-92-2, 8050-09-7)  
 CONTAMINATING PROCESS USED: Coupons were coated with oil using a hand held swab.

Results: Only SWR Corp and Envirosolutions were effective in removing over 85% of the flux from the coupons. Valtech removed just over 75% with the other two cleaners cleaning less than 35%. Table 2 lists the calculated contaminant removal rates for each cleaner tested.

Table 2. Cleaning Efficiencies

| Cleaner  | Chrisal | SWR Corp | Valtech | Oakite | Envirosolutions* |
|----------|---------|----------|---------|--------|------------------|
| Coupon 1 | 23.18   | 86.30    | 72.53   | 2.66   | 93.43            |
| Coupon 2 | 45.74   | 83.35    | 80.66   | 10.08  | 99.39            |
| Coupon 3 | 35.45   | 87.81    | 72.57   | 70.95  | 95.99            |
| Average  | 34.79   | 85.82    | 75.25   | 27.90  | 96.27            |

As noted in the table, when Envirosolutions Bio-T Max was heated at the 10% dilution, a white particulate matter was formed. Rinsing this white material off the coupons was some what difficult and a second tap water spray was used for 20 seconds.

Summary:

| <b>Substrates:</b>   |                     | Plastic, Electronics |             |                                     |               |
|----------------------|---------------------|----------------------|-------------|-------------------------------------|---------------|
| <b>Contaminants:</b> |                     | Fluxes, Solder       |             |                                     |               |
| Company Name:        | Product Name:       | Conc.:               | Efficiency: | Effective:                          | Observations: |
| Chrisal USA Inc      | Super CMF 240       | 5                    | 34.79       | <input type="checkbox"/>            |               |
| SWR Corporation      | SWR One             | 5                    | 85.82       | <input checked="" type="checkbox"/> |               |
| Valtech Corporation  | Valtron SP 2250 2LF | 5                    | 75.25       | <input type="checkbox"/>            |               |
| Oakite Products      | Inproclean 4000 T   | 10                   | 27.90       | <input type="checkbox"/>            |               |
| Bio Chem Systems     | Bio T Max           | 10                   | 96.27       | <input checked="" type="checkbox"/> |               |

Conclusion: SWR Corp SWR One and Envirosolutions Bio-T Max were both moderately successful in removing the flux from the circuit board coupons. A follow test will be conducted to evaluate SWR Corp and Valtech at higher concentrations (10%) and Bio-T Max at room temperature.