

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004
DateRun: 02/11/2004
Experimenters: Jason Marshall
ClientType: Manufacturer of Ceramic Capacitors
ProjectNumber: Project #1
Substrates: Ceramics
PartType: Coupon
Contaminants: Waxes
Cleaning Methods: Immersion/Soak
Analytical Methods: Gravimetric
Purpose: To evaluate successful cleaners using elevated temperatures

Experimental Procedure: Four cleaners were selected from the past trials for this wax. All products were used at full strength also in 250 ml beakers. All products were heated to 100 F on a hot plate. Twelve preweighed ceramic coupons were coated with client supplied wax, Zopher Mills Inc No 1563 Wax (mixture of waxes and resins). The wax was first melted using a Master Appliance heat gun in a beaker and applied directly to the coupon surface. The coupons were allowed to cool to room temperature before weighing a second time. Three coupons were cleaned in each solution for 30 minutes using stir-bar agitation. Coupons were rinsed in tap water for 15 seconds at 120 F, followed by air blow off at room temperature. Once dry, coupons were weighed a final time and efficiencies for each cleaner were calculated.

Results: All four products removed over 75% of the wax within 30 minutes. Two products, Uni Clear and Bio T 300 B, removed over 90% of the soil. The table lists the amount of soil applied and remaining after cleaning.

| Cleaner | Initial wt | Final wt | % Removed |
|-------------|------------|----------|-----------|
| Uni Clear | 0.4814 | 0.0282 | 94.14 |
| | 0.4273 | 0.0356 | 91.67 |
| | 0.2427 | 0.0021 | 99.13 |
| Bio T 300 B | 0.3305 | 0.0168 | 94.92 |
| | 0.2039 | 0.0031 | 98.48 |
| | 0.3736 | 0.0712 | 80.94 |
| D Limonene | 0.4211 | 0.0934 | 77.82 |
| | 0.2797 | 0.0769 | 72.51 |
| | 0.4047 | 0.0899 | 77.79 |
| Citrus Pure | 0.5213 | 0.1064 | 79.59 |
| | 0.3546 | 0.0032 | 99.10 |
| | 0.3142 | 0.0631 | 79.92 |

Summary:

| Substrates: | Ceramics | | | | |
|--------------------------|-------------------|--------|-------------|-------------------------------------|---------------|
| Contaminants: | Waxes | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Universal Photonics | Uni Clear | 100 | 94.98 | <input checked="" type="checkbox"/> | |
| Bio Chem Systems | Bio T 300 B | 100 | 91.45 | <input checked="" type="checkbox"/> | |
| Florida Chemical Company | D-Limonene | 100 | 76.04 | <input checked="" type="checkbox"/> | |
| Abatement Technologies | Citrus Pure AS850 | 100 | 86.20 | <input checked="" type="checkbox"/> | |

Conclusion: All four products will be tested at room temperature using ultrasonic energy.