

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2002
 DateRun: 07/02/2002
 Experimenters: Jason Marshall
 ClientType: Chemical Company
 ProjectNumber: Project #1
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Adhesive, Resins/Rosins
 Cleaning Methods: Ultrasonics
 Analytical Methods: Gravimetric
 Purpose: To evaluate successful cleaners on second adhesive.

Experimental Procedure: Two semi aqueous products and two aqueous products were selected based on the previous trial results. The two semi aqueous products were used at full strength and the two aqueous products were diluted to 10% using DI water in 600 ml beakers. Each solution was heated to 130F in a Crest 40 kHz Ultrasonic unit and degassed for 5 minutes prior to cleaning. Twelve preweighed coupons were coated with Emerson & Cuming Stycast 4952 Red (silicone resin, ethyl silicate, mineral filler and pigments) using a hand held swab. Coupons were allowed to sit overnight and reweighed to determine the amount of resin applied. Three coupons were immersed into each solution at 130 F for 5 minutes using ultrasonic energy. Observations were made every minute during cleaning to determine the time required to achieve effective cleaning. Following cleaning, coupons were rinsed in a tap water bath for 15 seconds at 120 F then a tap water spray rinse also at 120 F and finally dried using a Master Appliance Heat Gun at 500 F for 30 seconds. Once coupons were at room temperature, final clean weights were recorded and cleaning efficiencies were calculated for each product.

Results: Both the semi aqueous products required less than the 5 minutes to remove over 99% of the contaminant. Both were removed from the bath after 3 minutes of cleaning. The aqueous based products had limited success in removing the adhesive after the 5 minutes of cleaning. The table below shows the amounts of adhesive added and removed by each cleaning solution.

| Cleaner | Initial wt of cont. | Final wt of cont. | %Cont Removed |
|-----------------|---------------------|-------------------|---------------|
| Bio T Max | 0.9479 | -0.0002 | 100.02 |
| | 0.5144 | 0.0004 | 99.92 |
| | 0.5617 | 0.0000 | 100.00 |
| Solsafe | 0.5646 | 0.0008 | 99.86 |
| | 1.0390 | 0.0006 | 99.94 |
| | 0.2627 | 0.0012 | 99.54 |
| Surface Cleanse | 0.7756 | 0.0759 | 90.21 |
| | 0.7710 | 0.3324 | 56.89 |
| | 0.4353 | 0.1344 | 69.12 |
| Inproclean | 0.3781 | 0.1028 | 72.81 |
| | 0.9600 | 0.3768 | 60.75 |
| | 0.4220 | 0.1073 | 74.57 |

Summary:

| Substrates: | | Aluminum | | | | |
|------------------------------------|--|-------------------------|-------------|-------------------------------------|---------------|--|
| Contaminants: | | Adhesive, Resins/Rosins | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: | |
| Bio Chem Systems | Bio T Max | 100 | 99.98 | <input checked="" type="checkbox"/> | | |
| Bio Chem Systems | Solsafe 245 | 100 | 99.78 | <input checked="" type="checkbox"/> | | |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 10 | 72.08 | <input type="checkbox"/> | | |
| Oakite Products | Inproclean 3800 | 10 | 69.38 | <input type="checkbox"/> | | |

Conclusion: Both Bio Chem Systems products were successful in removing the red adhesive in three minutes of ultrasonic cleaning.