

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008
 DateRun: 07/10/2008
 Experimenters: Jason Marshall, Heidi Wilcox, Shweta Bansal
 ClientType: Chemical Company
 ProjectNumber: Project #1
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Resins/Rosins
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric, Visual

Purpose: To evaluate different cleaning parameters for resin cleaning

Experimental Procedure: The top six products from the previous trials were selected based on successful removal of the resin were used at full strength in 300 ml glass beakers. Solutions were used at room temperature. Twenty-four preweighed aluminum coupons were coated with the Mereco ECN 809 Base Black resin using a swab. Coupons were weighed a second time to determine the amount of soil added. Three coupons were immersed into each product and cleaned for 60 minutes using no agitation. The coupons were rinsed with tap water for 15 seconds at 68 F and were allowed to air dry for one hour at room temperature. Final weights were recorded, and efficiencies were calculated. Coupons also were visually analyzed to determine the level of residue left on the coupons.

Results: All of the products removed more than 98% of the resin from the aluminum coupons. The Green Solutions floor stripper removed over 100% which could signify that the product was damaging the aluminum coupons. No visual damage was noted however. The table lists the amount of soil added, the amount remaining after cleaning and the calculated efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed | Visual Residue Rank |
|----------------------|------------|----------|-----------|---------------------|
| EZ Solv | 2.5759 | 0.0242 | 99.06 | 1 best |
| | 1.8430 | 0.0307 | 98.33 | |
| | 1.9669 | 0.0336 | 98.29 | |
| Maxi Solv | 1.8140 | 0.0118 | 99.35 | 5 |
| | 1.7501 | 0.0373 | 97.87 | |
| | 1.4985 | 0.0352 | 97.65 | |
| Graffiti Remover SAC | 1.8031 | 0.0137 | 99.24 | 2 |
| | 2.0562 | 0.0125 | 99.39 | |
| | 1.6080 | 0.0105 | 99.35 | |
| Green Solutions | 3.1035 | -0.1226 | 103.95 | 6 |
| | 2.2383 | -0.1207 | 105.39 | |
| | 1.4439 | -0.1328 | 109.2 | |
| Bio T Max | 3.4519 | 0.0074 | 99.79 | 3 |
| | 3.4223 | 0.0297 | 99.13 | |
| | 3.0610 | 0.0080 | 99.74 | |
| Smart Solve 605 | 2.3706 | 0.0396 | 98.33 | 4 |
| | 2.4653 | 0.0312 | 98.73 | |
| | 3.0237 | 0.0458 | 98.49 | |

Summary:

| | | | | | | |
|--------------------------|--|---------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | | Aluminum | | | | |
| Contaminants: | | Resins/Rosins | | | | |
| Company Name: | | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Gemtek Products | | SC EZ Solv Safety Solvent | 100 | 98.56 | <input checked="" type="checkbox"/> | |
| Gemtek Products | | Safe Care (SC) Maxi Solv | 100 | 98.09 | <input checked="" type="checkbox"/> | |
| Spartan Chemical Company | | Graffiti Remover SAC | 100 | 99.33 | <input checked="" type="checkbox"/> | |

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|-----------------------------------|--------------------------------|-----|--------|-------------------------------------|--|
| Spartan Chemical Company | Green Solutions Floor Stripper | 100 | 106.18 | <input type="checkbox"/> | |
| Bio Chem Systems | Bio T Max | 100 | 99.55 | <input checked="" type="checkbox"/> | |
| United Laboratories International | Smart Solve 605 | 100 | 98.52 | <input checked="" type="checkbox"/> | |

Conclusion:

All six products will be tested again using no rinse, but air blow off drying.