

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004
 DateRun: 04/30/2004
 Experimenters: Jason Marshall
 ClientType: Capacitor Manufacturer
 ProjectNumber: Project #1
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Oil
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric

Purpose: To evaluate five new products on the first supplied soil.

Experimental Procedure: Five products were selected based on client request for vapor degreasing solvents. Each product was used at full strength in a 250 ml beaker and heated to 96 F on a hot plate. Fifteen preweighed aluminum coupons were coated with the Soltex Polybutene 32 (9003-29-6) using a hand held swab. Coupons were weighed a second time to determine the amount of soil added to each coupon. Three coupons were cleaned in each solution for 5 minutes using stir-bar agitation. After cleaning parts were weighed a final time and efficiencies were calculated.

Results: All five products removed over 90% of the contaminant within five minutes. The table lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|------------------------|------------|----------|-----------|
| Ensolv | 0.6136 | 0.0022 | 99.64 |
| | 0.4494 | 0.0015 | 99.67 |
| | 0.7979 | 0.0010 | 99.87 |
| Ensolv A | 0.3651 | 0.0012 | 99.67 |
| | 0.9078 | 0.0012 | 99.87 |
| | 0.6264 | 0.0007 | 99.89 |
| Metalnox M6960 | 0.4272 | -0.0001 | 100.02 |
| | 0.5370 | 0.0010 | 99.81 |
| | 0.4079 | 0.0277 | 93.21 |
| Flux Remover | 0.5576 | 0.0002 | 99.96 |
| | 0.3500 | 0.0000 | 100.00 |
| | 0.6874 | 0.0068 | 99.01 |
| Heavy Duty Degreaser C | 0.6942 | 0.0388 | 94.41 |
| | 0.3433 | 0.0555 | 83.83 |
| | 0.5158 | 0.0378 | 92.67 |

Summary:

| Substrates: | Aluminum | | | | |
|-------------------------------|------------------------|--------|-------------|-------------------------------------|-------------------------|
| Contaminants: | Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Enviro Tech International Inc | Ensolv | 100 | 99.73 | <input checked="" type="checkbox"/> | |
| Enviro Tech International Inc | Ensolv A | 100 | 99.81 | <input checked="" type="checkbox"/> | |
| Kyzen Corporation | Metalnox M6960 | 100 | 97.68 | <input checked="" type="checkbox"/> | |
| Micro Care | Flux Remover C | 100 | 99.66 | <input checked="" type="checkbox"/> | |
| Micro Care | Heavy Duty Degreaser C | 100 | 90.31 | <input checked="" type="checkbox"/> | Resoiling upon drag out |

Conclusion: All five will be tested on the second soil.