

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 fourth 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 C.P. Hall Co. Plasthall ESO oil (8013-07-8) 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 allowed to sit for 10 minutes for drying at room temperature. The coupons were weighed a final time and efficiencies were calculated.

Results: All five products removed over 98% of the second soil. 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 | 0.2123 | 0.0006 | 99.72 |
| | 0.0666 | 0.0000 | 99.92 |
| | 0.1815 | 0.0013 | 99.28 |
| Ensolv A | 0.0677 | 0.0023 | 96.60 |
| | 0.4607 | 0.0009 | 99.80 |
| | 0.2123 | 0.0021 | 99.01 |
| Metalnox M6960 | 0.3355 | 0.0022 | 99.34 |
| | 0.1881 | 0.0004 | 99.79 |
| | 0.2439 | 0.0011 | 99.55 |
| Flux Remover | 0.4319 | 0.0030 | 99.31 |
| | 0.1482 | 0.0045 | 96.96 |
| | 0.1594 | 0.0032 | 97.99 |
| Heavy DutyDegreaser C | 0.2590 | 0.0032 | 98.76 |
| | 0.1133 | 0.0042 | 96.29 |
| | 0.2668 | 0.0005 | 99.81 |

Summary:

| Substrates: | | Aluminum | | | | |
|-------------------------------|------------------------|----------|-------------|-------------------------------------|---------------|--|
| Contaminants: | | Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: | |
| Enviro Tech International Inc | Ensolv | 100 | 99.64 | <input checked="" type="checkbox"/> | | |
| Enviro Tech International Inc | Ensolv A | 100 | 98.47 | <input checked="" type="checkbox"/> | | |
| Kyzen Corporation | Metalnox M6960 | 100 | 99.56 | <input checked="" type="checkbox"/> | | |
| Micro Care | Flux Remover C | 100 | 98.09 | <input checked="" type="checkbox"/> | | |
| Micro Care | Heavy Duty Degreaser C | 100 | 98.29 | <input checked="" type="checkbox"/> | | |

Conclusion: Eleven products have been tested on four soils using immersion cleaning. The next step in the evaluation will be to test products via vapor degreasing.