

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008
 DateRun: 02/21/2008
 Experimenters: Heidi Wilcox, Shweta Bansal
 ClientType: Electronics Manufacturer
 ProjectNumber: Project #1
 Substrates: Copper
 PartType: Coupon
 Contaminants: Cutting/Tapping Fluids
 Cleaning Methods: Mechanical Agitation
 Analytical Methods: Gravimetric
 Purpose: To evaluate products on second supplied cutting fluid

Experimental Procedure: Four new product samples of solvents used for hand dipping applications at room temperature were chosen. Twelve preweighed coupons were coated with Master Chemical Corporation Trim Sol sf (8002-05-9, 61789-85-3, 68410-99-1, 68991-48-0, 68603-15-6) cutting fluid using a hand held swab. The contaminated coupons were weighed a second time to determine the amount of soil added. Three coupons were immersed into each cleaning solution and manual raised and lowered in the cleaning solution to provide minimal mechanical agitation. After one minute of cleaning, the coupons were removed and dried for 30 seconds using compressed air at room temperature. Following air drying, the coupons were weighed a final time to determine the amount of soil remaining. Efficiency for each coupon was determined and average cleaning results for each product were calculated.

Results: All four products removed over 99% of the cutting fluid within one minute. The table below lists the amount of soil added, the amount remaining and the affiance for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|-----------|------------|----------|-----------|
| Dysol 104 | 0.1174 | 0.0000 | 100.00 |
| | 0.0808 | 0.0002 | 99.75 |
| | 0.0932 | 0.0001 | 99.89 |
| Dysol 108 | 0.1227 | 0.0001 | 99.92 |
| | 0.0632 | -0.0001 | 100.16 |
| | 0.1578 | 0.0001 | 99.94 |
| Dysol 144 | 0.0614 | 0.0002 | 99.67 |
| | 0.1348 | 0.0002 | 99.85 |
| | 0.1096 | 0.0002 | 99.82 |
| Dysol 800 | 0.0159 | 0.0000 | 100.00 |
| | 0.1068 | 0.0003 | 99.72 |
| | 0.1106 | 0.0002 | 99.82 |

Summary:

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|----------------------|------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Copper | | | | |
| Contaminants: | Cutting/Tapping Fluids | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Dysol | DS 104 Wipe Solvent | 100 | 99.88 | <input checked="" type="checkbox"/> | |
| Dysol | DS 108 Wipe Solvent | 100 | 100.00 | <input checked="" type="checkbox"/> | |
| Dysol | DS 144S Wipe Solvent | 100 | 99.78 | <input checked="" type="checkbox"/> | |
| Dysol | DS 800 Solvent | 100 | 99.85 | <input checked="" type="checkbox"/> | |

Conclusion: All four products removed over 98% of the contaminant. The top products will be used on supplied parts and other client supplied soils.