

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008
 DateRun: 03/13/2008
 Experimenters: Heidi Wilcox, Shweta Bansal
 ClientType: Electronics Manufacturer
 ProjectNumber: Project #1
 Substrates: Copper
 PartType: Coupon
 Contaminants: Oil
 Cleaning Methods: Mechanical Agitation
 Analytical Methods: Gravimetric

Purpose: To evaluate possible alternatives for solvent cleaning of oil

Experimental Procedure: Two new product samples of solvents recently received were tested at room temperature to use as a possible substitute for the clients current cleaning solvent.

Six preweighed coupons were coated with Hangsterfer Laboratories Hard Cut 5418 cutting fluid using a handheld 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 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: Metalnox M6381 removed over 99% of the cutting fluid within one minute. The M6310 removed over 85% of the cutting fluid within one minute. The table below lists the amount of oil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|----------------|------------|----------|-----------|
| Metalnox M6381 | 0.3170 | 0.0017 | 99.46 |
| | 0.3319 | 0.0000 | 100.00 |
| | 0.3769 | 0.0006 | 99.84 |
| Metalnox M6310 | 0.2933 | 0.0520 | 82.27 |
| | 0.3380 | 0.0510 | 84.91 |
| | 0.5223 | 0.0542 | 89.62 |

Summary:

| Substrates: | Copper | | | | |
|----------------------|--------------------------------------|--------|-------------|-------------------------------------|---------------|
| Contaminants: | Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Kyzen Corporation | Metalnox M6381 (For Comparison Only) | 100 | 99.77 | <input checked="" type="checkbox"/> | |
| Kyzen Corporation | Metalnox M6310 (For Comparison Only) | 100 | 85.60 | <input checked="" type="checkbox"/> | |

Conclusion: The two products may be used in further testing on client supplied parts.