

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2001
 DateRun: 09/20/2001
 Experimenters: Jason Marshall
 ClientType: Electronics Manufacturer
 ProjectNumber: Project #1
 Substrates: Ceramics
 PartType: Coupon
 Contaminants: Abrasive
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric
 Purpose: Evaluating cleaners for removal.

Experimental Procedure: Ten cleaners were selected based on previous trials and lab databases. Solutions that were diluted to 5% using DI water in 250 ml beakers. All solutions were heated to 120 F on a hot plate. Twenty-one preweighed coupons were coated with the supplied slurry using a plastic eye dropper and allowed to dry for 2 hours. These coupons were then weighed again. Three coupons were immersed into each beaker to be cleaned for 15 minutes. After the cleaning, the coupons were rinsed in DI water and dried using air blow off. Coupons were then weighed a final time and percent efficiencies were calculated for each cleaner.

Nalco Chemical Co Nalco 2350 Polishing Slurry

Results: The increase in cleaning increased the efficiencies of all of the products. Efficiencies ranged from 99.36 to 99.88%. The following table lists the calculated efficiencies for each product tested. Safety First had the highest efficiency even with a decrease in the products concentration. In the previous trial, Safety First was at 15% by volume and in this trial, the product was further diluted to 5%.

Table 1. Cleaning Efficiencies

| Cleaner | Coupon 1 | Coupon 2 | Coupon 3 | Average | Std Dev | Rank |
|--------------|----------|----------|----------|---------|---------|------|
| Amberclean | 99.53 | 99.77 | 99.87 | 99.72 | 0.18 | 2 |
| Micro 90 | 99.86 | 99.34 | 98.95 | 99.38 | 0.46 | 6 |
| LPS | 99.58 | 99.31 | 99.60 | 99.50 | 0.16 | 4 |
| ND 17 | 99.84 | 99.57 | 99.46 | 99.62 | 0.19 | 3 |
| Inproclean | 99.53 | 99.28 | 99.26 | 99.36 | 0.15 | 7 |
| Polyspray | 99.26 | 99.27 | 99.72 | 99.42 | 0.26 | 5 |
| Safety First | 99.91 | 99.86 | 99.88 | 99.88 | 0.03 | 1 |

Summary:

| Substrates: | | Ceramics | | | | |
|------------------------------------|--|-----------------------------|--------|-------------|-------------------------------------|---------------|
| Contaminants: | | Abrasive | | | | |
| Company Name: | | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Innovative Organics Inc | | Amberclean L 12 | 5 | 99.72 | <input checked="" type="checkbox"/> | |
| International Products Corporation | | Micro 90 Conc. | 5 | 99.38 | <input checked="" type="checkbox"/> | |
| LPS Laboratories | | Precision Clean Concentrate | 5 | 99.50 | <input checked="" type="checkbox"/> | |
| MacDermid Industrial Products | | ND 17 | 5 | 99.62 | <input checked="" type="checkbox"/> | |
| Oakite Products | | Inproclean 3800 | 5 | 99.36 | <input checked="" type="checkbox"/> | |
| US Polychem Corporation | | Polyspray Jet 790 XS | 5 | 99.42 | <input checked="" type="checkbox"/> | |
| Amax Corporation | | Safety First | 15 | 99.88 | <input checked="" type="checkbox"/> | |

Conclusion: These seven cleaners will be evaluated on the second supplied polishing compound, Saint-Gobain Industrial Ceramics Water Based Alumina. Operating conditions will remain the same.