

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1998
 DateRun: 07/12/1998
 Experimenters: Jason Marshall
 ClientType: Aluminum Job Shop
 ProjectNumber: Project #1
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Black light, Gravimetric

Purpose: To find a cleaner to replace their current use of Aliphatic Petroleum Distillates

Experimental Procedure: Six cleaning chemistries were selected from the Lab's databases based on past use and vendor information. Five percent solutions were made into 500 mL beakers using DI water. Each cleaner was heated to 130 F on a hot plate. Eighteen pre-weighed coupons were over contaminated with the oil using a hand-held swab. The contaminated coupons were weighed again. Three coupons were placed into each cleaner for 5 minutes with stir-bar agitation. Parts were rinsed in tap water at 120 F for 30 seconds. After the coupons air dried, final weights were measured. Coupons were then viewed under a black light.

SUBSTRATE MATERIAL: Al #202-3003 H-14
 CONTAMINANTS: Oil

Results: With the amount of contaminant remaining on all coupons, the requested analysis of the cleanliness was limited to gravimetric and black light fluorescence. Table 1 list the cleaning efficiencies of the six cleaners selected.

Table 1. Cleaning Efficiencies 5%

| | Simple Green | Safe CleanUp | Calgon | WR Grace | Oakite | EMKAY |
|----------|--------------|--------------|--------|----------|--------|-------|
| Coupon 1 | 79.6 | 56.7 | 79.7 | 97 | 54.1 | 59.6 |
| Coupon 2 | 81.9 | 53.1 | 82 | 67 | 64.8 | 63.9 |
| Coupon 3 | 79.9 | 58.6 | 75.4 | 80.8 | 64.8 | 51.9 |
| Ave | 80.5 | 56.1 | 79 | 81.6 | 61.2 | 58.5 |
| Std Dev | 1.25 | 2.79 | 3.35 | 15 | 6.18 | 6.08 |

Three cleaners had moderate success in removing the oil from the coupons. Increasing the time or the concentrations may improve the cleaning efficiencies of the cleaners. Simple Green, Calgon and WR Grace products will be tested in the next experiment.

Summary:

| Substrates: | Aluminum | | | | |
|------------------------|--|--------|-------------|-------------------------------------|---------------|
| Contaminants: | Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Simple Green | Concentrated Industrial Strength Cleaner and Degreaser | 5 | 80.50 | <input checked="" type="checkbox"/> | |
| Safe CleanUp Solutions | Super Neutral | 5 | 56.10 | <input type="checkbox"/> | |
| Magnaflux | Daraclean 282 | 5 | 81.60 | <input checked="" type="checkbox"/> | |
| Oakite Products | Inproclean 3800 | 5 | 61.20 | <input type="checkbox"/> | |
| Emkay Chemical Company | Safety Wash CRC | 5 | 58.50 | <input type="checkbox"/> | |
| Calgon Corporation | Geo Guard 2215 | 5 | 79.00 | <input checked="" type="checkbox"/> | |

Conclusion:

Despite being unable to conduct all of the requested analysis techniques, three cleaners were determined to have moderate cleaning efficiencies. These three cleaners will be tested again using two variations to the experimental procedures. The first will be to run the experiment for 15 minutes and the second will be to run for the 5 minutes but using a higher cleaner concentration.