

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004

DateRun: 03/15/2004

Experimenters: Jason Marshall

ClientType: Aircraft Parts Manufacturer

ProjectNumber: Project #2

Substrates: Aluminum

PartType: Coupon

Contaminants: Cutting/Tapping Fluids

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate longer cleaning time without rinsing

Experimental Procedure: Four cleaners were selected from previous trial. Three aqueous based cleaners were diluted to 10% using DI water in 600 ml beakers. One semi-aqueous product was used at 50% diluted with DI water. All of the products were heated to 120 F on a hot plate. Twelve preweighed aluminum coupons were coated with the second client supplied oil, Castrol Moly Dee Tapping Fluid. The oil was applied to coupons using a swab and then heated for 10 minutes using a Master Appliance heat gun. The coupons were allowed to cool to room temperature before weighing a second time. Three coupons were cleaned in each solution for 10 minutes using stir-bar agitation. Coupons were not rinsed but were dried using air blow off at room temperature. Once dry, coupons were weighed a final time and efficiencies for each cleaner were calculated.

Results: Cleaning the soiled coupons for a longer time without rinsing was equal to the cleaning at five minutes with a rinse for all four products. The table lists the amount of soil initially added, the amount remaining after cleaning and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|----------------|------------|----------|-----------|
| 815 GD | 0.2238 | 0.0618 | 72.39 |
| | 0.5161 | 0.0770 | 85.08 |
| | 0.8064 | 0.2130 | 73.59 |
| Metalnox M6314 | 1.0076 | 0.1547 | 84.65 |
| | 0.8464 | 0.1180 | 86.06 |
| | 0.9557 | 0.1098 | 88.51 |
| Hurrisafe 9450 | 0.7028 | 0.1164 | 83.44 |
| | 0.7693 | 0.0831 | 89.20 |
| | 0.8761 | 0.0455 | 94.81 |
| Bio T 300 B | 0.7309 | 0.0061 | 99.17 |
| | 0.7656 | 0.0104 | 98.64 |
| | 0.7574 | 0.0099 | 98.69 |
| 815 GD | 0.6043 | 0.0001 | 99.98 |
| | 0.4247 | -0.0001 | 100.02 |
| | 0.5094 | 0.0001 | 99.98 |
| Metalnox M6314 | 0.5104 | 0.0273 | 94.65 |
| | 0.5762 | 0.0126 | 97.81 |
| | 0.6401 | 0.1132 | 82.32 |
| Hurrisafe 9450 | 0.6360 | 0.0155 | 97.56 |
| | 0.8197 | 0.0051 | 99.38 |
| | 0.5099 | 0.0075 | 98.53 |
| Bio T 300 B | 0.6065 | 0.0031 | 99.49 |
| | 0.5907 | 0.0065 | 98.90 |
| | 0.4515 | 0.0071 | 98.43 |

Summary:

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|----------------------|------------------------|---------------|--------------------|-------------------|----------------------|
| Substrates: | Aluminum | | | | |
| Contaminants: | Cutting/Tapping Fluids | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |

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|--------------------|--------------------------------------|----|-------|-------------------------------------|-----------------------------|
| Brulin Corporation | Formula 815 GD | 10 | 77.02 | <input type="checkbox"/> | 76.02 with rinsing at 5 min |
| Kyzen Corporation | Metalnox M6314 (For Comparison Only) | 10 | 86.41 | <input checked="" type="checkbox"/> | 83.95 with rinsing at 5 min |
| PCI of America | Hurrisafe 9450 | 10 | 89.15 | <input checked="" type="checkbox"/> | 88.26 with rinsing at 5 min |
| Bio Chem Systems | Bio T 300 B | 50 | 98.83 | <input checked="" type="checkbox"/> | 99.82 with rinsing at 5 min |

Conclusion: These four products will be tested using ultrasonic cleaning with rinsing.