

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004
 DateRun: 02/17/2004
 Experimenters: Jason Marshall
 ClientType: Aircraft Parts Manufacturer
 ProjectNumber: Project #2
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Abrasive, Cutting/Tapping Fluids
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric
 Purpose: To evaluate products form removal of machining fluid

Experimental Procedure: Seven cleaners were selected from the laboratory's database of past testing based on supplied data from client. Six 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. An eight product was added as the client's current cleaner. All of the products were heated to 120 F on a hot plate. Twenty-four preweighed aluminum coupons were coated with client supplied cutting fluid, Speedfam Vehicle 210 mixed with an abrasive. The oil and abrasive were first mixed in a bottle. The mixture was added 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: Four of the eight products removed over 74% of the oil/abrasive mix within five minutes using no rinsing. The Bio T 300 B removed over 97%. Most of the coupons had an oil film remaining except the Bio T 300 B. The client's current cleaner, Bruilin 815 GD removed 68% of the oil. The following table lists the amount of soil added, the amount remaining after cleaning and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|-----------------------------|------------|----------|-----------|
| 815 GD | 0.1454 | 0.0712 | 51.03 |
| | 0.1641 | 0.0213 | 87.02 |
| | 0.1869 | 0.0619 | 66.88 |
| Aquavantage 1400 | 0.1094 | 0.0549 | 49.82 |
| | 0.1592 | 0.0742 | 53.39 |
| | 0.1775 | 0.0587 | 66.93 |
| Ozzy Juice SW1 | 0.2170 | 0.0771 | 64.47 |
| | 0.1594 | 0.0730 | 54.20 |
| | 0.1524 | 0.0887 | 41.80 |
| SC Aircraft & Metal Cleaner | 0.1355 | 0.0203 | 85.02 |
| | 0.1070 | 0.0268 | 74.95 |
| | 0.1045 | 0.0156 | 85.07 |
| Multi-Kleen 1568 | 0.2380 | 0.0507 | 78.70 |
| | 0.1321 | 0.0506 | 61.70 |
| | 0.0890 | 0.0398 | 55.28 |
| Metalnox M6314 | 0.1229 | 0.0365 | 70.30 |
| | 0.1085 | 0.0394 | 63.69 |
| | 0.1694 | 0.0200 | 88.19 |
| Hurrisafe 9450 | 0.2034 | 0.0461 | 77.34 |
| | 0.1724 | 0.0077 | 95.53 |
| | 0.1444 | 0.0048 | 96.68 |
| Bio T 300 B | 0.1161 | 0.0039 | 96.64 |
| | 0.1333 | 0.0039 | 97.07 |
| | 0.1927 | 0.0037 | 98.08 |

Summary:

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| Substrates: | Aluminum |
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| Contaminants: | | Abrasive, Cutting/Tapping Fluids | | | |
|-----------------------|---|----------------------------------|--------------------|-------------------------------------|----------------------|
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Brulin Corporation | Formula 815 GD | 10 | 68.31 | <input type="checkbox"/> | |
| Brulin Corporation | Aquavantage 1400 | 10 | 56.71 | <input type="checkbox"/> | |
| Chem Free Corporation | SW-1 Ozzy Juice | 10 | 53.49 | <input type="checkbox"/> | |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 10 | 81.68 | <input checked="" type="checkbox"/> | |
| Heatbath Corporation | Multi-Kleen 1568 | 10 | 65.22 | <input type="checkbox"/> | |
| Kyzen Corporation | Metalnox M6314 (For Comparison Only) | 10 | 74.06 | <input checked="" type="checkbox"/> | |
| PCI of America | Hurrisafe 9450 | 10 | 89.85 | <input checked="" type="checkbox"/> | |
| Bio Chem Systems | Bio T 300 B | 50 | 97.27 | <input checked="" type="checkbox"/> | |

Conclusion: The four effective products and the current cleaner will be tested under the same conditions except a water rinse will be added.