

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2006

DateRun: 08/14/2006

Experimenters: Jason Marshall

ClientType: Metal Working

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Lubricating/Lapping Oils, Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate possible alternatives to TCE for first supplied oil.

Experimental Procedure: Eight alternative products were selected from the lab's database of testing results based on supplied client information. Products were selected based on oil removal potential and compatibility with various metal substrates. Each product was diluted to 5% in 600 ml beakers using DI water and heated to 130 F on a hot plate.

Twenty-four preweighed coupons were coated with US Oil Company US Draw 1517 (petroleum oil) using a hand held swab. Coupons were weighed a second time to determine the amount of oil added. Three coupons were cleaned in each solution for five minutes using minimal stir bar agitation. Coupons were rinsed for 15 seconds in a tap water bath at 120 F and dried using a Master Appliance Heat gun at 500 F for 30 seconds. Once dry coupons were weighed a final time and product efficiencies were calculated.

Results: Four of the eight selected products removed over 85% of the oil from the stainless-steel coupons within the five minutes of immersion cleaning. One product, Sea Wash Blue, removed over 95% of the oil. The follow table lists the amount of oil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|---------------------|------------|----------|-----------|
| SC Aircraft & Metal | 0.1014 | 0.0708 | 30.18 |
| | 0.1888 | 0.0858 | 54.56 |
| | 0.2943 | 0.1044 | 64.53 |
| Surface Cleanse 930 | 0.3772 | 0.0449 | 88.10 |
| | 0.2622 | 0.0293 | 88.83 |
| | 0.1642 | 0.0286 | 82.58 |
| Daraclean 283 | 0.2194 | 0.0593 | 72.97 |
| | 0.4346 | 0.0801 | 81.57 |
| | 0.3446 | 0.1001 | 70.95 |
| Aquavantage 1400 | 0.3483 | 0.0487 | 86.02 |
| | 0.3483 | 0.0443 | 87.28 |
| | 0.3023 | 0.0435 | 85.61 |
| M Aero NS | 0.2269 | 0.0604 | 73.38 |
| | 0.2705 | 0.0471 | 82.59 |
| | 0.2567 | 0.0702 | 72.65 |
| Beyond 2001 | 0.3296 | 0.0453 | 86.26 |
| | 0.3189 | 0.0772 | 75.79 |
| | 0.3351 | 0.0813 | 75.74 |
| Inproclean 3800 | 0.3067 | 0.0357 | 88.36 |
| | 0.2583 | 0.0537 | 79.21 |
| | 0.3394 | 0.0184 | 94.58 |
| Sea Wash Blue | 0.3669 | 0.0048 | 98.69 |
| | 0.4242 | 0.0149 | 96.49 |
| | 0.5201 | 0.0233 | 95.52 |

Summary:

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|----------------------|-------------------------------|
| Substrates: | Stainless Steel |
| Contaminants: | Lubricating/Lapping Oils, Oil |

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| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
|------------------------------------|---|--------|-------------|-------------------------------------|---------------|
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 5 | 49.75 | <input type="checkbox"/> | |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5 | 86.50 | <input checked="" type="checkbox"/> | |
| Magnaflux | Daraclean 283 | 5 | 75.16 | <input type="checkbox"/> | |
| Brulin Corporation | Aquavantage 1400 | 5 | 86.30 | <input checked="" type="checkbox"/> | |
| Church & Dwight Co Inc. | Armakleen M Aero NS | 5 | 76.21 | <input type="checkbox"/> | |
| Today & Beyond | Beyond 2001 | 5 | 79.26 | <input type="checkbox"/> | |
| Oakite Products | Inproclean 3800 | 5 | 87.38 | <input checked="" type="checkbox"/> | |
| Warren Chemical Company | Sea Wash Blue | 5 | 96.90 | <input checked="" type="checkbox"/> | |

Conclusion: The four effective products will be used on the next supplied oil.