

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2017

DateRun: 07/26/2017

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ClientType: General

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Coupon

Contaminants: Waxes

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate the effectiveness of seven TCE alternatives at removing lubricant from aluminum alloys.

Experimental Procedure: Pre-weighed aluminum coupons were tested for each aqueous cleaner. Coupons were soiled with Lenox Lube Tube Wax (CAS:8002-74-2; 57-11-4; 5989-27-5) using a swab to cover the bottom third of the substrate and dirty weights were recorded. Chemistries were prepared with a five percent dilution except for Micro 90, which had a two percent dilution based on vendor recommendations. Coupons were immersed, three at a time, in a beaker filled with 200ml of the chosen cleaner at room temperature (68 F) for five minutes. Final weights were taken after cleaning.

Results:

| Cleaner | Initial wt. | Final wt. | % Removed | Average % Removed |
|-----------------------------|-------------|-----------|-----------|-------------------|
| SC Aircraft & Metal Cleaner | 0.3824 | 0.4914 | -28.50 | -25.35 |
| | 0.3109 | 0.3881 | -24.83 | |
| | 0.3780 | 0.4639 | -22.72 | |
| Amberclean 527L | 0.3243 | 0.4011 | -23.68 | -29.67 |
| | 0.3315 | 0.3961 | -19.49 | |
| | 0.2517 | 0.3671 | -45.85 | |
| Surface Cleanse 930 | 0.2929 | 0.3610 | -23.25 | -18.28 |
| | 0.2936 | 0.3099 | -5.55 | |
| | 0.3120 | 0.3932 | -26.03 | |
| Micro 90 | 0.3828 | 0.4502 | -17.61 | -42.16 |
| | 0.1592 | 0.2525 | -58.61 | |
| | 0.1800 | 0.2705 | -50.28 | |
| Solution 2000 | 0.3203 | 0.3651 | -13.99 | -13.95 |
| | 0.4090 | 0.4697 | -14.84 | |
| | 0.4523 | 0.5112 | -13.02 | |
| Shopmaster | 0.4192 | 0.5134 | -22.47 | -27.55 |
| | 0.3231 | 0.4038 | -24.98 | |
| | 0.2262 | 0.3058 | -35.19 | |
| Crystal Simple Green | 0.4231 | 0.4663 | -10.21 | 2.96 |
| | 0.2196 | 0.2133 | 2.870 | |
| | 0.3505 | 0.2936 | 16.23 | |

The Lenox Lube Tube Wax looked saturated with the aqueous cleaners which could have led to having negative final weights. Coupons visually looked cleaner, but it was not reflected in gravimetric results.

Summary:

| Substrates: | Aluminum | | | | |
|------------------------------------|---|--------|-------------|--------------------------|---------------|
| Contaminants: | Waxes | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 5 | -25.35 | <input type="checkbox"/> | |
| Innovative Organics Inc | Amberclean 527 L | 5 | -29.67 | <input type="checkbox"/> | |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5 | -18.28 | <input type="checkbox"/> | |
| International Products Corporation | Micro 90 Conc. | 2 | -42.16 | <input type="checkbox"/> | |

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|------------------------|---|---|--------|--------------------------|--|
| EnviroSan Products Ltd | Solution 2000 | 5 | -13.95 | <input type="checkbox"/> | |
| Buckeye International | Shopmaster | 5 | -27.55 | <input type="checkbox"/> | |
| Simple Green | Crystal Simple Green Industrial Cleaner & Degreaser | 5 | 2.96 | <input type="checkbox"/> | |

Conclusion: None of the products were very effective at removing Lenox Lube Tube Wax gravimetrically, but signs of removal were observed visually. Next step is to try unheated ultrasonics for five minutes to compare with the drop-in solvents.