

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2017

DateRun: 07/26/2017

Experimenters: Alicia McCarthy, Hayley Byra

ClientType: General

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Coupon

Contaminants: Waxes

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: To evaluate the effectiveness of seven TCE alternatives at removing wax 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) and cleaned with ultrasonics for five minutes. Final weights and observations were recorded after cleaning.

| Cleaner | Initial wt. | Final wt. | % Removed | Average % Removed |
|-----------------------------|-------------|-----------|-----------|-------------------|
| SC Aircraft & Metal Cleaner | 0.0714 | 0.0054 | 92.44 | 96.10 |
| | 0.0715 | -0.0002 | 100.28 | |
| | 0.0840 | 0.0037 | 95.60 | |
| Amberclean 527L | 0.0340 | 0.0139 | 59.12 | 49.89 |
| | 0.0480 | 0.0161 | 66.46 | |
| | 0.1170 | 0.0888 | 24.10 | |
| Surface Cleanse 930 | 0.0804 | 0.0033 | 95.90 | 96.11 |
| | 0.1153 | 0.0037 | 96.79 | |
| | 0.0938 | 0.0041 | 95.63 | |
| Micro 90 | 0.0367 | 0.0169 | 53.95 | 51.45 |
| | 0.0250 | 0.0055 | 78.00 | |
| | 0.0451 | 0.0350 | 22.39 | |
| Solution 2000 | 0.0212 | 0.0201 | 5.19 | 15.75 |
| | 0.0286 | 0.0264 | 7.69 | |
| | 0.0582 | 0.0382 | 34.36 | |
| Shopmaster | 0.0290 | 0.0115 | 60.34 | 65.64 |
| | 0.0495 | 0.0182 | 63.23 | |
| | 0.0270 | 0.0072 | 73.33 | |
| Crystal Simple Green | 0.0729 | 0.0427 | 41.43 | 39.32 |
| | 0.0472 | 0.0291 | 38.35 | |
| | 0.0822 | 0.0508 | 38.20 | |

The wax was harder to remove compared to the lubricant, and some of the coupons varied in final percent removal. This could be due to the movement and spacing of the coupons in the ultrasonic tank. Retesting of the cleaners that had a wider range in removal for each coupon showed similar results.

Summary:

| | | | | | |
|------------------------------------|---|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Aluminum | | | | |
| Contaminants: | Waxes | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 5 | 96.10 | <input checked="" type="checkbox"/> | |
| Innovative Organics Inc | Amberclean 527 L | 5 | 49.89 | <input type="checkbox"/> | |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5 | 96.11 | <input checked="" type="checkbox"/> | |

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|------------------------------------|---|---|-------|--------------------------|--|
| International Products Corporation | Micro 90 Conc. | 2 | 51.45 | <input type="checkbox"/> | |
| EnviroSan Products Ltd | Solution 2000 | 5 | 15.75 | <input type="checkbox"/> | |
| Buckeye International | Shopmaster | 5 | 65.64 | <input type="checkbox"/> | |
| Simple Green | Crystal Simple Green Industrial Cleaner & Degreaser | 5 | 39.32 | <input type="checkbox"/> | |

Conclusion:

SC Aircraft & Metal Cleaner and Surface Cleanse 930 were both very effective at removing Lenox Lube Tube Wax from aluminum coupons. Other cleaners showed an improvement in removal when ultrasonics was introduced. Next step would be to increase the ultrasonics cleaning time.