

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020
 DateRun: 10/07/2020
 Experimenters: Justin Kiander
 ClientType: Metal Working
 ProjectNumber: Project #1
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Buffing/Polishing Compounds
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric, Visual
 Purpose: The purpose of this experiment was to determine the effectiveness of a new set of cleaners in removing the buffing compound via unheated immersion.

Experimental Procedure: Four cleaning solutions were obtained and prepared to the following concentrations: Metalnox 6396 100%, Emerald ICP 1 5%, SC Aircraft & Metal Cleaner 20%, Mirachem 500 20%, Crystal Simple Green 30 parts water. Three aluminum coupons were obtained for each cleaner being tested. After an initial weight, coupons were soiled with the white buffing compound by rubbing the soil onto the bottom third of the substrate. The white buffing compound was chosen as it was proven to be the hardest of the three to remove. A soiled weight was obtained, and coupons were submerged into their respective cleaners for 15 minutes at room temperature. After 15 minutes, coupons were dried in air for 24 hours and a clean weight was obtained. Effectiveness of the cleaners was determined.

| Cleaner | Initial wt of Cont | Final wt of Cont | %Cont Removed | %AVG |
|-----------------------------|--------------------|------------------|---------------|---------|
| Metalnox 6386 | 0.0033 | 0.0031 | 6.06 | 9.04% |
| | 0.003 | 0.0023 | 23.33 | |
| | 0.0044 | 0.0045 | -2.27 | |
| Emerald ICP 1 | 0.0008 | 0.0019 | -137.5 | -50.92% |
| | 0.0049 | 0.005 | -2.04 | |
| | 0.0053 | 0.006 | -13.21 | |
| SC Aircraft & Metal Cleaner | 0.0061 | 0.0075 | -22.95 | -36.74% |
| | 0.0034 | 0.0041 | -20.59 | |
| | 0.0015 | 0.0025 | -66.67 | |
| Mirachem 500 | 0.0016 | 0.0018 | -12.5 | -83.31% |
| | 0.0005 | 0.0018 | -260 | |
| | 0.0031 | 0.0024 | 22.58 | |
| Crystal Simple Green | 0.0018 | 0.0012 | 33.33 | 32.32% |
| | 0.0019 | 0.0016 | 15.79 | |
| | 0.0023 | 0.0012 | 47.83 | |

| Substrates: | | Aluminum | | | |
|----------------------|---|-----------------------------|-------------|--------------------------|---------------|
| Contaminants: | | Buffing/Polishing Compounds | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Kyzen Corporation | Metalnox M6386 | 100% | 9.04 | <input type="checkbox"/> | |
| Hubbard Hall Inc | Emerald ICP 1 | 5% | -50.92 | <input type="checkbox"/> | |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 20% | -36.74 | <input type="checkbox"/> | |
| Mirachem Corporation | Mirachem 500 | 20% | -83.31 | <input type="checkbox"/> | |
| Simple Green | Crystal Simple Green Industrial Cleaner & Degreaser | 30 Parts Water | 32.32 | <input type="checkbox"/> | |

Conclusion: Crystal Simple Green was the most effective of the list removing an average of 32.32% of the white buffing compound from aluminum substrates. In an effort to clean the substrates for further testing, coupons were run through unheated with agitation, heated, and heated with agitation trials, yet soil visibly remained after all trials. Crystal Simple Green was eliminated in this process, as testing needed to

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go beyond its temperature range. The company was contacted to verify if the substrates had been cleaned and this visual change was just to be expected from the buffing compound. The company stated that the buffing compound had not been removed but requested that testing proceed to aluminum mirror polish parts they had sent to TURI. Therefore, per the company's request, next steps will be heated immersion on aluminum mirror polish parts.