

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021
 DateRun: 07/19/2021
 Experimenters: Zoe Lawson, Justin Kiander
 ClientType: Metal Finishing
 ProjectNumber: Project #3
 Substrates: Stainless Steel
 PartType: Coupon
 Contaminants: Oil
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric, Visual
 Purpose: The purpose of this experiment was to determine the effectiveness of alternatives with an added deionized water rinse step.

Experimental Procedure: Cleaners were prepared to the following concentrations: Citranox 2%, Mirachem 500 20%, Water Works Heavy Duty Degreaser 7:1, SC Aircraft & Metal 20%, Aquaease 732 5%, Aquavantage 3800 GD 5%. Three stainless steel coupons were obtained and weighed for each of the cleaners being tested. Coupons were then soiled with an oil provided by the company and a dirty weight was recorded. Coupons were submerged into their respective cleaners for 15 minutes at room temperature. After 15 minutes had passed coupons were rinsed in a deionized water bath for 30 seconds. Coupons were allowed to dry in air for 24 hours. Following the drying process, coupons were weighed again and a clean weight was recorded. Effectiveness of the cleaners was determined.

Results:

| Cleaner | Initial wt of cont. | Final wt of cont. | %Cont Removed | % AVG |
|---------------------|---------------------|-------------------|---------------|-------|
| Citranox | 0.0135 | 0.0111 | 17.78 | 11.05 |
| | 0.0102 | 0.0152 | -49.02 | |
| | 0.0472 | 0.0168 | 64.41 | |
| Mirachem 500 | 0.0468 | 0.0173 | 63.03 | 68.38 |
| | 0.0631 | 0.0168 | 73.38 | |
| | 0.0550 | 0.0172 | 68.73 | |
| Water Works | 0.0435 | 0.0210 | 51.72 | 53.25 |
| | 0.0349 | 0.0195 | 44.13 | |
| | 0.0565 | 0.0204 | 63.89 | |
| SC Aircraft & Metal | 0.0904 | 0.0172 | 80.97 | 67.42 |
| | 0.0481 | 0.0162 | 66.32 | |
| | 0.0353 | 0.0159 | 54.96 | |
| Aquaease 732 | 0.0777 | 0.0191 | 75.42 | 51.59 |
| | 0.0494 | 0.0184 | 62.75 | |
| | 0.0235 | 0.0196 | 16.60 | |
| Aquavantage 3800 GD | 0.0913 | 0.0154 | 83.13 | 70.57 |
| | 0.0370 | 0.0179 | 51.62 | |
| | 0.0755 | 0.0174 | 76.95 | |

All cleaners, with the exception of SC Aircraft & Metal, performed significantly worse with the added deionized water rinse step. Oil residues were visibly present on all coupons following the cleaning process. The decreased performance could be attributed to oil re-coating the coupon as they were being pulled from the water bath. Next steps would be to progress all cleaners to heated immersion and remove the deionized water bath for all cleaners except SC Aircraft & Metal.

Summary:

| Substrates: | | Stainless Steel | | | |
|----------------------|---------------|-----------------|-------------|--------------------------|---------------|
| Contaminants: | | Oil | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Alconox Inc | Citranox | 2% | 11.05 | <input type="checkbox"/> | |
| Mirachem Corporation | Mirachem 500 | 20% | 68.38 | <input type="checkbox"/> | |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | | | |
|--------------------|---|-----|-------|--------------------------|--|
| Keteca USA | Water Works Heavy Duty Degreaser | 7:1 | 53.25 | <input type="checkbox"/> | |
| Gemtek Products | SC Aircraft & Metal Cleaner Super Concentrate | 20% | 67.42 | <input type="checkbox"/> | Only cleaner to improve with deionized water rinse |
| Hubbard Hall Inc | Aquaease PL 732 | 5% | 51.59 | <input type="checkbox"/> | |
| Brulin Corporation | Aquavantage 3800 GD | 5% | 70.57 | <input type="checkbox"/> | |

Conclusion:

Upon completion of testing, it was determined that almost all cleaners performed worse with the added deionized water rinse. The only cleaner to show improvements with the rinse was SC Aircraft & Metal. Next steps would be to progress all cleaners to heated immersion trials and remove the rinse step for all except SC Aircraft & Metal.