CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 06/29/2021

Experimenters: Zoe Lawson

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 in removing a placeholder oil from stainless steel substrates.

Experimental Procedure: Cleaners were prepared to the following concentrations: Citranox 2%, SC Aircraft & Metal 20%, Water Works Heavy Duty Degreaser 7:1, Mirachem 500 20%, Aquaease 732 5%, and Aquavantage 3800 GD 5%. Three stainless steel coupons were obtained and weighed for each of the cleaners being tested. Coupons were then soiled with a placeholder oil and a dirty weight was recorded. A placeholder oil was used because the company's soil had not arrived yet, and the laboratory had a very similar oil in stock. Once soiled, coupons were placed into their respective cleaners for 15 minutes at room temperature. After 15 minutes had passed, coupons were allowed to dry in air for 24 hours. Following the drying process, coupons were weighed once 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	0.0519	0.0286	44.89	40.76
	0.0456	0.0291	36.18	
	0.0296	0.0174	41.22	
SC Aircraft & Metal	0.0394	0.0154	60.91	67.84
	0.0441	0.0154	65.08	
	0.0276	0.0062	77.54	
Water Works	0.0274	0.0084	69.34	77.19
	0.0441	0.0114	74.15	
	0.0445	0.0053	88.09	
Mirachem 500	0.0438	0.0048	89.04	85.08
	0.0362	0.0061	83.15	
	0.0419	0.0071	83.05	
Aquaease	0.1226	0.0434	64.60	74.29
	0.1433	0.0329	77.04	
	0.1464	0.0275	81.22	
Aquavantage	0.1088	0.0300	72.43	78.82
	0.1222	0.0295	75.86	
	0.1615	0.0191	88.17	

Mirachem 500 was the most effective cleaner in removing oil from stainless steel substrates with an average removal of 85.08%. However, all cleaners would benefit from heated immersion. Coupons cleaned with Citranox and SC Aircraft & Metal both possessed a residue following the cleaning process. Potential rinse steps for these cleaners may be necessary in future testing. It should be noted that significantly more oil was added to coupons cleaned with the Aquaease and Aquavantage products which could have negatively impacted removal performance. Future testing will strive to add equivalent amounts of soil to ensure consistent performance for all cleaners. Next steps would be to progress all cleaners to heated immersion trials with the placeholder soil, or to retest unheated immersion once the company soil arrives.

Summary:

Conclusion: Mirachem 500 was the most effective cleaner removing an average of 85.08% of the oil from stainless steel substrates. Next steps would be to progress all cleaners to heated immersion trials with the placeholder soil, or to retest unheated immersion once the company soil arrives.