CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 07/28/2021

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 in removing oil via heated immersion with a stir bar added to simulate agitation.

Experimental Procedure: Cleaners were prepared to the following concentrations: Citranox 2%, Mirachem 500 20%, Water Works Heavy Duty 7:1, SC Aircraft & Metal 20%, Aquaease 732 5%, Aquavantage 3800 GD 5%. All cleaners were heated to 110°F. A stir bar was added to each solution to simulate agitation. Three stainless steel coupons were obtained and weighed for each of the cleaners being tested. Company provided oil was then placed onto the coupons and a dirty weight was recorded. Once solutions reached the proper temperature, coupons were placed into their respective cleaners and heated immersion with agitation was conducted for 15 minutes. After 15 minutes had passed, all coupons were rinsed in a deionized bath at 110°F. Coupons were then dried 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	0.0401	0.0012	97.01	97.93
	0.1249	0.0027	97.84	
	0.1147	0.0012	98.95	
Mirachem 500	0.1213	0.0030	97.53	97.98
	0.1080	0.0019	98.24	
	0.1366	0.0025	98.17	
Water Works	0.1536	0.0006	99.61	99.58
	0.1690	0.0002	99.88	
	0.1045	0.0008	99.23	
SC Aircraft & Metal	0.2011	0.0031	98.46	97.44
	0.1071	0.0037	96.55	
	0.1856	0.0050	97.31	
Aquaease 732	0.1258	0.0079	93.72	92.14
	0.1849	0.0088	95.24	
	0.0958	0.0120	87.47	
Aquavantage 3800 GD	0.1563	0.0068	95.65	95.25
	0.1272	0.0078	93.87	
	0.1489	0.0056	96.24	

Water Works was the most effective cleaner removing an average of 99.58% of the soil from stainless steel substrates. It was visibly observed that coupons cleaned with Water Works possessed the least amount of post clean residue by far. Adding agitation to the process was extremely effective at increasing performance and decreasing the amount of residue present following the cleaning process. However, not all pockets of residue were removed, even on coupons cleaned with Water Works. Therefore, next steps will be to progress all cleaners to ultrasonic cleaning.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Alconox Inc	Citranox	2%	97.93	☑	
Mirachem Corporation	Mirachem 500	20%	97.98	☑	

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Keteca USA	Water Works Heavy Duty Degreaser	7:1	99.58	☑	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	20%	97.44	☑	
Hubbard Hall Inc	Aquaease PL 732	5%	92.14	☑	
Brulin Corporation	Aquavantage 3800 GD	5%	95.25	☑	

Conclusion:

Upon completion of testing, it was determined that Water Works was the most effective cleaner removing an average of 99.58% of oil from stainless steel substrates. Incorporating agitation into the cleaning process has been the most successful method to reduce the amount of residue present after cleaning. However, there are still patches of residue present on all coupons. Next steps will be to progress all cleaners to ultrasonic cleaning.