CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 07/12/2021

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 company soil from stainless steel substrates.

Experimental Procedure: Cleaners were prepared to the following concentrations: Citranox 2%, Mirachem 500 20%, Water Works Heavy Duty Degreaser 7:1, SC Aircraft & Metal Cleaner 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 oil provided by the company and a dirty weight was recorded. Coupons were then submerged 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 period, 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	0.1868	0.0161	91.38	85.57
	0.1442	0.0307	78.71	
	0.1195	0.0160	86.61	
Mirachem 500	0.1553	0.0184	88.15	85.90
	0.1495	0.0189	87.36	
	0.1180	0.0210	82.20	
Water Works Heavy Duty Degreaser	0.0964	0.0130	86.51	90.27
	0.1454	0.0127	91.27	
	0.1422	0.0099	93.04	
SC Aircraft & Metal Cleaner	0.0319	0.0165	48.28	45.96
	0.0215	0.0109	49.30	
	0.0201	0.0120	40.30	
Aquaease 732	0.0297	0.0217	26.94	69.65
	0.1372	0.0156	88.63	
	0.1998	0.0132	93.39	
Aquavantage 3800 GD	0.2016	0.0084	95.83	95.54
	0.2144	0.0056	97.39	
	0.1666	0.0110	93.40	

Aquavantage 3800 GD was the most effective cleaner in removing company soil from stainless steel substrates, removing an average of 95.54%. Water Works was the second most effective removing an average of 90.27%. However, all coupons still possess a residue of oil following the cleaning process. This residue could potentially be eliminated by heated immersion, or by adding a rinse step to unheated immersion. Additionally, it was observed that when coating the metal substrates, the soil would diffuse across the entire surface resulting in many coupons with soil outside of the cleaning area. Next steps would be to progress all cleaners to heated immersion.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Alconox Inc	Citranox	2%	85.57	☑	
Mirachem Corporation	Mirachem 500	20%	85.90	☑	
Keteca USA	Water Works Heavy Duty Degreaser	7:1	90.27	☑	

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Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	20%	45.96	☐	
Hubbard Hall Inc	Aquaease PL 732	5%	69.65	☐	
Brulin Corporation	Aquavantage 3800 GD	5%	95.54	☑	

Conclusion:

Aquavantage 3800 GD was the most effective cleaner removing an average of 95.45% oil from stainless steel substrates followed closely by Water Works Heavy Duty Degreaser removing an average of 90.27%. All cleaners still possessed a residue of oil following the cleaning process. Next steps would be to progress all cleaners to heated immersion trials to improve removal results and potentially eliminate the post cleaning residue.