CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2019

DateRun: 06/17/2019

Experimenters: Julia Doyle

ClientType: Machinery Manufacturer

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate the effectiveness of aqueous cleaners at the removal of gundrill oil/coolant from stainless steel alloy using heated ultrasonics.

Experimental Procedure: Initial weights were obtained for fifteen 2”x2” stainless steel alloy coupons. All coupons were soiled with gundrill oil/coolant mixture on half of the coupon on one side. All coupons were reweighed to obtain a dirty weight. One set of three coupons was immersed in each of the five cleaners. Cleaners and coupons were placed in heated ultrasonic machine for 25 minutes. Coupons were removed from cleaners and rinsed with DI water by dunking each coupon three times. Coupons were air dried for 1.5hrs at room temperature (68 F)

Chemistries Evaluated:

1. Buckeye Immersion Cleaner
2. Liquinox Critical Cleaning Detergent
3. Alconox Powdered Precision Cleaner
4. Micro 90 Concentrated Cleaning Solution
5. CB100

Company Name	Product Name	Concentration	Temperature
Buckeye International	Buckeye Immersion Cleaner	2:10	125 F
Alconox Inc.	Liquinox Critical Cleaning Detergent	1:100	100 F
Alconox Inc.	Alconox Powdered Precision Cleaner	1:100	100 F
International Products	Micro 90	2:100	100 F
Walter Chem.	CB 100	100%	100 F

Results: Both the Alconox and Liquinox cleaners appeared to have one coupon that was much cleaner than the other two; this is especially evident in the data for the Liquinox cleaner. This could be due to a smaller initial amount of soil on the coupon, but for the Alconox cleaner, the coupon with the least amount of initial soil was not the coupon that appeared the cleanest. Coupons that were immersed in the CB100 cleaner appeared to be clean, however after air drying, it was evident that there was a large amount of cleaner residue on the coupons. It may be helpful to re-test this cleaner with a different rinse step. Alconox and Micro 90 performed the best with percentage removal over 97%. Buckeye Immersion Cleaner also was efficient at 97.85% removal. Both Liquinox and CB100 were not efficient for the removal of oil/coolant on stainless steel and were below 90% removal.

Cleaner	Initial Weight of Contaminant	Final Weight of Contaminant	% Contaminant Removed	Average
Buckeye Immersion Cleaner	0.0109	0.0002	98.17	97.85
	0.0092	0.0003	96.74	
	0.0074	0.0001	98.65	
Liquinox	0.0076	0.0013	82.89	85.84
	0.0068	0.0016	76.47	

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	0.0054	0.0001	98.15	
Alconox	0.0057	0.0000	100.00	99.37
	0.0053	0.0001	98.11	
	0.0093	0.0000	100.00	
Micro 90	0.0116	0.0001	99.13	98.18
	0.0087	0.0004	95.40	
	0.0080	0.0000	100.00	
CB100	0.0070	0.0024	65.71	64.70
	0.0078	0.0025	67.95	
	0.0048	0.0019	60.45	

Summary:

Substrates:	Stainless Steel
Contaminants:	Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Buckeye International	Immersion Cleaner	1:5	97.85	☑	Buckeye Immersion Cleaner was effective for the removal of oil/coolant from stainless steel coupons.
Alconox Inc	Liquinox	1:100	85.84	☐	Liquinox was not effective for the removal of oil/coolant from stainless steel coupons.
Alconox Inc	Alconox	1:100	99.37	☑	Alconox was effective for the removal of oil/coolant from stainless steel coupons.
International Products Corporation	Micro 90 Conc.	1:50	98.18	☑	Micro 90 was effective for the removal of oil/coolant from stainless steel coupons.
J Walter Inc.	Bio Circle CB 100 ALU	100%	64.69	☐	CB 100 was not effective for the removal of oil/coolant from stainless steel coupons.

Conclusion:

Results show that Buckeye Immersion Cleaner, Alconox Powdered Precision Cleaner, and Micro 90 Concentrated Cleaning Solution were all effective in removing gundrill oil and coolant from stainless steel alloy. Next step is to test Buckeye Immersion Cleaner, Alconox Powdered Precision Cleaner, Micro 90 Concentrated Cleaning Solution, Ozzy Juice SW3, and Ozzy Juice SW4 on contaminated parts provided by Synventive due to their effective results of 90% or higher removal overall. A rinse and dry step will need to be identified.