CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2019

DateRun: 06/10/2019

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 at vendor recommended temperatures.

Experimental Procedure: Initial weights were obtained for 15 stainless steel coupons, three for each cleaner, before soiling with gundrill oil/coolant mixture on half of the coupon on one side. Coupons were immediately weighed to obtain the dirty weight. Three coupons were immersed in each cleaner for 25 minutes in their recommended temperature by the vendor while making observations every five minutes. Coupons were removed from cleaners, immersed in deionized (DI) water and allowed to air dry for one hour at room temperature (68 F) before taking final weights.

Chemistries Evaluated:

1. Buckeye Immersion Cleaner
2. Liquinox Critical Cleaning Detergent
3. Alconox Powdered Precision Cleaner

Company Name	Product Name	Concentration	Temperature
Buckeye International	Buckeye Immersion Cleaner	2:10	125 F
Alconox Inc.	Liquinox Critical Cleaning Detergent	1:100	80 F
Alconox Inc.	Liquinox Critical Cleaning Detergent	1:100	100 F
Alconox Inc.	Alconox Powdered Precision Cleaner	1:100	80 F
Alconox Inc.	Alconox Powdered Precision Cleaner	1:100	100 F

Results: After air drying at room temperature (68F), it appeared there was some cleaner residue on the coupons, so coupons were patted dry once. Liquinox for both 80F and 100F temperatures were effective at removing oil/coolant and were at 91.81% and 94.85% respectively. Alconox was effective at the higher temperature of 100F at 96.40% effectiveness but not at 80F which was 85.01% effectiveness. Buckeye immersion cleaner was 94.56% effective at 125F with a higher concentration of 2:10 (1:5) when compared to the last test.

Chemical Name	Initial Weight of Cont	Final Weight of Cont	% Removed	Average
Buckeye Immersion Cleaner	0.0053	0.0001	98.11	94.56
	0.0052	0.0001	98.07	
	0.0104	0.0013	87.50	
Liquinox (80F)	0.0070	0.0005	92.85	91.81
	0.0081	0.0005	93.82	
	0.0080	0.0009	88.75	

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Alconox (80F)	0.0050	0.0008	84.00	85.01
	0.0072	0.0013	81.94	
	0.0055	0.0006	89.09	
Liquinox (100F)	0.0069	0.0002	97.10	94.85
	0.0108	0.0007	93.51	
	0.0099	0.0006	93.94	
Alconox (100F)	0.0088	0.0002	97.72	96.40
	0.0073	0.0001	98.63	
	0.0070	0.0005	92.86	

Summary:

Substrates:	Stainless Steel
Contaminants:	Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Buckeye International	Immersion Cleaner	1:5	94.56	☑	Buckeye Immersion Cleaner was effective for removing oil/coolant from stainless steel coupons.
Alconox Inc	Liquinox	1:100	91.81	☑	Liquinox was effective for removing oil/ coolant from stainless steel coupons.
Alconox Inc	Liquinox	1:100	94.85	☑	Liquinox was effective for removing oil/ coolant from stainless steel coupons.
Alconox Inc	Alconox	1:100	85.01	☐	Alconox was not effective for removing oil/ coolant from stainless steel coupons.
Alconox Inc	Alconox	1:100	96.40	☑	Alconox was effective for removing oil/ coolant from stainless steel coupons.

Conclusion:

Coupons appeared clean once they were patted dry, which removed some apparent chemical residue. Coupons may benefit from a spray rinse instead of dipping coupon into DI water. Increasing the heat with the Alconox and Liquinox cleaners appeared to increase the percent removal of contaminant. Of note, when using the ultrasonic cleaner, it appeared that one coupon in each set had more oil droplets on it during the cleaning than the other two; not clear whether this is related to how much soil was added to the coupon or the placement in the ultrasonic cleaner.