CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020

DateRun: 10/14/2020

Experimenters: Nicole Kebler

ClientType: Bolt, Screw & Nut Manufacturer

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Coupon

Contaminants: Greases

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate the effectiveness of cleaners/solvents for the removal of grease on aluminum substrate for 24-hour unheated immersion.

Experimental Procedure: Four of eight cleaning products were diluted with tap water at room temperature to vendor recommended concentration. Three cleaning products were used at the recommended 100% dilution and the solvent option was also used at 100% for industrial testing; all cleaners and solutions were measured for 200 mL. Pre-weighed aluminum coupons were coated over 1/3 of the surface with grease that has been provided by the company by using a metal spatula; three coupons were used for each cleaner/solvent. They were allowed a 24-hour dry time at room temperature; their dirty weights were recorded. The coupons were immersed in the cleaners/solvents at room temperature for 24-hours then were taken out and placed on trays with paper towels; they were left to dry for 24 hours. Final weights and observations were recorded and evaluated.

Cleaners/Solvents used:

1. Liquinox (1%)
2. Dimethyl Glutarate (100%)
3. Mirachem (20%)
4. Metalnox (100%)
5. Micro 90 (1%)
6. Smart Solve (100%)
7. SC-Aircraft (5%)
8. Ozzy Juice 3 (100%)

Results: Removal was seen for Dimethyl Glutarate, Metalnox, Smart Solve, SC-Aircraft and Ozzy Juice. Metalnox was over 50% removal but grease that was left on the coupon hardened and was difficult to remove. Smart Solve was also over 50% removal. The coupon deteriorates when left in Micro 90 at 1% for 24 hours; coupons were destroyed and the percentage removal shows weight lost.

Solvent/ Cleaner	initial weight of soil	final weight of soil	% Removal	Average
Liquinox 1%	0.5234	0.5009	4.30	4.31
	0.6426	0.6129	4.62	
	0.6719	0.6450	4.00	
Dimethyl Glutarate 100%	0.4548	0.3306	27.31	29.99
	0.8017	0.4582	42.85	
	0.5917	0.4745	19.81	
Mirachem 20%	0.8699	0.8670	0.33	2.19
	0.9730	0.9407	3.32	
	0.6113	0.5934	2.93	
Metalnox 100%	0.5268	0.1306	75.21	60.16
	1.1302	0.6341	43.90	
	0.6818	0.2633	61.38	
Micro 90 1%	0.6699	0.6509	2.84	-51.54
	0.7701	0.7222	6.22	
	0.5944	1.5673	-163.68	
Smart Solve 100%	1.1647	0.9291	20.23	56.05
	0.6869	0.0059	99.14	
	0.8449	0.4328	48.78	
	1.5931	0.5808	63.54	21.03

CLEANING LABORATORY EVALUATION SUMMARY

SC-Aircraft 5%	0.7455	0.7493	-0.51	
	0.7039	0.7036	0.04	
Ozzy Juice 3 100%	0.7000	0.3617	48.33	46.71
	0.8333	0.5392	35.29	
	0.9857	0.4288	56.50	

Summary:

Substrates:	Aluminum
Contaminants:	Greases

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Alconox Inc	Liquinox	1	4.31	☐	
Fisher Scientific	Dimethyl glutarate (CAS: 1119-40-0)	100	29.99	☐	
Mirachem Corporation	Mirachem 500	20	2.19	☐	
Kyzen Corporation	Metalnox M6960	100	60.16	☐	
International Products Corporation	Micro 90 Conc.	1	-51.51	☐	
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	5	21.03	☐	
Chem Free Corporation	SW-3 Ozzy Juice (Improved Low Odor)	100	46.71	☐	

Conclusion:

There was some removal of grease from the coupons, but it was not over 80% effective, additional testing is required. Next steps are to add agitation via stir-bar for 15 minutes, 30 minutes, and 1-hour intervals. Metalnox will be taken out of evaluation because of the hardening of grease when coupons were left in for 24 hours. Super Solve will take its place and will be evaluated at 50% concentration. Micro 90 1% will not be evaluated for times lasting over 1 hour due to its reaction with aluminum seen at 24 hours.