CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020

DateRun: 10/27/2020

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 and solvents for the removal of grease on aluminum coupons using a stir bar at 300 rpm with unheated immersion for 30 minutes.

Experimental Procedure: Five of eight cleaning products were diluted with tap water at room temperature to vendor recommended concentrations, SC-Aircraft increased concentration to 1:1. Two cleaning products were used at the recommended 100% dilution and the solvent option was also used at 100% concentration for industrial testing; all cleaners and solutions were measured for 200 mL and poured into beakers. 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 72-hour dry time at room temperature; their dirty weights were recorded. A stir bar was added to each beaker and was set to 300 RPM. The coupons were immersed in the cleaners/solvents at room temperature for 30-minutes, then were taken out and placed on trays with paper towels; they were blown dry for 2 minutes and then left to finish drying for 24 hours. Final weights and observations were recorded and evaluated. The removal goal based on client needs is between 70-90%.

Cleaner/Solvents used and their concentration:

1. Liquinox (1%)
2. Dimethyl Glutarate (100%)
3. Mirachem (20%)
4. Super Solve (50%)
5. Micro 90 (1%)
6. Smart Solve (100%)
7. SC-Aircraft (5%)
8. Ozzy Juice 3 (100%)

Results: The cleaner with the highest percentage removal was Ozzy Juice 3 with 12.8% removal effectiveness. Grease was left on all coupons; Ozzy Juice coupons had a little less grease than before it was cleaned. Both Dimethyl Glutarate and Smart Solve had 9% removal effectiveness and the amount of grease visually did not change. SC-Aircraft had 7.3% removal and visually did not change. The rest of the cleaners had below 5% removal and were not effective in removing grease from the coupons. Super Solve was below 0% and may have still been wet when final weights were taken. No cleaner or solvent reached the 70-90% removal.

Summary:

Substrates:	Aluminum				
Contaminants:	Greases				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Alconox Inc	Liquinox	1%	1.21	☑	This was not effective for the removal of grease on aluminum coupons.
Fisher Scientific	Dimethyl glutarate (CAS:1119-40-0)	100%	9.47	☑	This was not effective for the removal of grease on aluminum coupons.
Mirachem Corporation	Mirachem 500	20%	2.89	☑	This was not effective for the removal of grease on aluminum coupons.
AW Chesterton	278 Super Solv	50%	-0.16	☑	This was not effective for the removal of grease on aluminum coupons.
International Products Corporation	Micro 90 Conc.	1%	3.60	☑	This was not effective for the removal of grease on aluminum coupons.
	Smart Solve 605	100%	9.25		

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United Laboratories International				☑	This was not effective for the removal of grease on aluminum coupons.
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	50%	7.31	☑	This was not effective for the removal of grease on aluminum coupons.
Chem Free Corporation	SW-3 Ozzy Juice (Improved Low Odor)	100%	12.78	☑	This was not effective for the removal of grease on aluminum coupons.

Conclusion: No cleaners were effective for the removal of grease on aluminum coupons. The cleaner that was most effective was Ozzy Juice and this was the only cleaner that visually showed less grease after cleaning. None were considered effective for the removal of grease. Increasing agitation by increasing the RPM and increasing SC-Aircraft cleaner to 1:1 are the next steps.