CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 01/24/2021

Experimenters: Justin Kiander

ClientType: Precision Instrument Manufacturer

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Coupon

Contaminants: Greases

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: The purpose of this experiment was to determine the effectiveness of cleaners in removing soil via heated immersion.

Experimental Procedure: Cleaners were prepared to the following concentrations: Metalnox 6386 100%, Dimethyl Glutarate 100%, Water Works Heavy Duty Degreaser 7:1, SC Aircraft & Metal Cleaner 20%, Crystal Simple Green Industrial 30 parts water. All cleaners except SC Aircraft were heated to 100°F. SC Aircraft was heated to 120°F. Three aluminum coupons were obtained and weighed for each of the cleaners being tested. Coupons were soiled with aviation grease and a dirty weight was recorded. Once solutions reached the proper temperature, coupons were submerged into their respective cleaners for 15 minutes. After 15 minutes, coupons cleaned with SC Aircraft were rinsed in a deionized water bath at 120°F for 30 seconds. All coupons were initially dried with a heat gun and allowed to finish drying in air. Following the drying process, coupons were weighed again and a clean weight was recorded. Effectiveness of the cleaners was then determined.

Results:

Cleaner	Initial wt of cont	Final wt of cont	%Cont Removed	%AVG
Metalnox 6386	0.3015	0.2027	32.77	32.28%
	0.2376	0.1458	38.64	
	0.3377	0.2518	25.44	
Dimethyl Glutarate	0.2665	0.2154	19.17	7.96%
	0.1654	0.1549	6.35	
	0.1213	0.1233	-1.65	
Water Works	0.1483	0.1203	18.88	5.32%
	0.131	0.129	1.53	
	0.133	0.1389	-4.44	
SC Aircraft & Metal	0.1772	0.1407	20.6	7.72%
	0.137	0.1313	4.16	
	0.1624	0.165	-1.6	
Crystal Simple Green	0.1509	0.1533	-1.59	3.37%
	0.1797	0.167	7.07	
	0.2763	0.2635	4.63	

Overall, no cleaner was successful in removing the grease from aluminum substrates. All products, except for Crystal Simple Green, had very minimal improvements in percent removals. For most cleaners, there was no color change and very little visible soil dissolved during the cleaning process. Metalnox 6386 and Dimethyl Glutarate developed a deeper pink color indicating removal of soil again in this trial. Next steps would be to increase heat for all cleaners to 120°F and adding a stir bar for agitation. Crystal Simple Green will be kept at 100°F with a stir bar for the cleaner cannot exceed 105°F.

Summary:

Substrates:	Aluminum				
Contaminants:	Greases				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Kyzen Corporation	Metalnox M6386	100%	32.28	☐	Color change indicating the cleaner is working
Fisher Scientific	Dimethyl glutarate (CAS: 1119-40-0)	100%	7.96	☐	Color change indicating the cleaner is working
Keteca USA	Water Works Heavy Duty Degreaser	7:1	5.32	☐	

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Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	20%	7.72	☐	
Simple Green	Crystal Simple Green Industrial Cleaner & Degreaser	30 parts water	3.37	☐	

Conclusion: Upon completion of testing, it was determined that no cleaner was successful in removing the soil from aluminum substrates. Almost all cleaners only had very slight improvements to removal percentages. Next steps will be to increase temperature and add a stir bar for agitation.