CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 01/18/2021

Experimenters: Justin Kiander

ClientType: Precision Instrument Manufacturer

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: The purpose of this experiment was to determine the effectiveness of cleaning after decreasing the total time from 15 minutes to 10 minutes.

Experimental Procedure: Cleaners were prepared to the following concentrations: Metalnox 6386 100%, Dimethyl Glutarate 100%, SC Aircraft & Metal 20%, Crystal Simple Green Industrial 30 parts water, Water Works Heavy Duty Degreaser 7:1 (Water:Cleaner). SC Aircraft was heated to 100°F while the remaining cleaners were kept at room temperature. Three aluminum coupons were obtained and weighed for each of the cleaners being tested. Coupons were then soiled with V-4B oil and a dirty weight was recorded. Once solutions reached the proper temperature, coupons were submerged into their respective cleaners for 10 minutes. After 10 minutes, coupons cleaned with SC Aircraft were rinsed in a deionized water bath at 100°F for 30 seconds. All coupons were then dried with a heat gun to remove excess solvent and allowed to finish drying in air for 24 hours. Following the drying step, coupons were weighed again and a clean weight was recorded. Effectiveness of the cleaners was determined.

Results:

Cleaner	Initial wt of cont	Final wt of cont	%Cont Removed	%AVG
Metalnox 6386	0.0205	-0.0015	107.32	104.82%
	0.0270	-0.0008	102.96	
	0.0167	-0.0007	104.19	
Dimethyl Glutarate	0.0150	-0.0007	104.67	107.77%
	0.0090	-0.0009	110.00	
	0.0104	-0.0009	108.65	
SC Aircraft & Metal	0.0094	-0.0007	107.45	108.68%
	0.0080	-0.0007	108.75	
	0.0061	-0.0006	109.84	
Crystal Simple Green	0.0074	-0.0007	109.46	105.18%
	0.0046	-0.0002	104.35	
	0.0058	-0.0001	101.72	
Water Works	0.0077	-0.0008	110.39	107.13%
	0.0175	-0.0006	103.43	
	0.0066	-0.0005	107.58	

All cleaners were effective at removing the oil from aluminum substrates. Although percent removals are still above 100, decreasing the total cleaning time to 10 minutes was effective in reducing the removal values compared to previous trials at 15 minutes. Coupons were also not washed with water and soap before testing as this could have been impacting the initial weights. Pre-wash steps will also not be carried out in subsequent trials. Next steps would be to reduce total cleaning time again down to 5 minutes and determine the impact on percent removal.

Summary:

Substrates:	Aluminum				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Kyzen Corporation	Metalnox M6386	100%	104.82	☑	
Fisher Scientific	Dimethyl glutarate (CAS: 1119-40-0)	100%	107.77	☑	
		20%	108.68	☑	

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Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate				
Simple Green	Crystal Simple Green Industrial Cleaner & Degreaser	30 parts water	105.18	☑	
Keteca USA	Water Works Heavy Duty Degreaser	7:1 (Water:Cleaner)	107.13	☑	

Conclusion: All cleaners were effective at removing the oil, but percent removals still slightly exceeded 100. Next steps would be to reduce the total cleaning time down to 5 minutes and determine the impact on performance.