

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

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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 verify top cleaner performance via unheated immersion and improve remaining cleaners via heated immersion.

Experimental Procedure: Cleaners were prepared to the following concentrations: Metalnox 6386 100%, Dimethyl Glutarate 100%, Ozzy Juice SW-3 100%, SC Aircraft and Metal Cleaner 20%, SC Supersolve 20%, Crystal Simple Green Industrial 30 parts water. Ozzy Juice SW-3, SC Aircraft & Metal, and SC Supersolve were heated to 100°F. 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 15 minutes. After 15 minutes, coupons cleaned with SC Aircraft & Metal and SC Supersolve were rinsed in a heated deionized water bath, also at 100°F, for 30 seconds. All coupons were then dried with a heat gun to remove excess solution and finished drying in air for 24 hours. 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	0.0090	-0.0013	114.44	114.56%
	0.0061	-0.0010	116.39	
	0.0070	-0.0009	112.86	
Dimethyl Glutarate	0.0056	-0.0010	117.86	115.08%
	0.0055	-0.0010	118.18	
	0.0087	-0.0008	109.20	
Ozzy Juice SW-3	0.0040	0.0024	40.00	43.47%
	0.0047	0.0028	40.42	
	0.0038	0.0019	50.00	
SC Aircraft & Metal	0.0043	-0.0009	120.93	129.64%
	0.0050	-0.0009	118.00	
	0.0040	-0.0020	150.00	
SC Supersolve	0.0047	-0.0029	161.70	172.86%
	0.0033	-0.0023	169.70	
	0.0039	-0.0034	187.18	
Crystal Simple Green Industrial	0.0028	-0.0011	139.29	127.53%
	0.0066	-0.0005	107.58	
	0.0014	-0.0005	135.71	

Many of the cleaners tested performed over 100% removal. SC Supersolve was the only cleaner to show visual damage of the coupon. There was a distinctive dark line between the cleaned area and the uncleaned area following the rinse step. The damage to the coupon could have been caused by the rinse step which another test of SC Supersolve without a rinse could verify. The performance of Ozzy Juice decreased compared to the unheated trial and will be dropped from further testing. The performance of SC Aircraft significantly increased with heated immersion and a rinse step. However, it is unknown as to why the percent removals all exceed 100. There is the potential that cleaners are still removing soils embedded in the coupons from previous experiments. Though the cleaners should all be compatible with aluminum substrates, a verification of compatibility would be beneficial.

## Summary:

<b>Substrates:</b>	Aluminum
<b>Contaminants:</b>	Oil

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Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Kyzen Corporation	Metalnox M6386	100%	114.56	<input checked="" type="checkbox"/>	
Fisher Scientific	Dimethyl glutarate (CAS: 1119-40-0)	100%	115.08	<input checked="" type="checkbox"/>	
Chem Free Corporation	SW-3 Ozzy Juice (Improved Low Odor)	100%	43.47	<input type="checkbox"/>	Will be dropped from further testing.
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	20%	129.64	<input checked="" type="checkbox"/>	
Gemtek Products	SC Supersolve Safety Solvent	20%	172.86	<input checked="" type="checkbox"/>	
Simple Green	Crystal Simple Green Industrial Cleaner & Degreaser	30 parts water	127.53	<input checked="" type="checkbox"/>	

**Conclusion:**

Upon completion of testing, it was determined that all cleaners excluding Ozzy Juice SW-3 were successful at removing the oil. However, cleaners performed consistently above 100%. Further optimization is required for SC Supersolve to determine if the rinse step was the cause of damage to the substrate. Additional compatibility testing is required for the remaining cleaners.