CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 03/02/2021

Experimenters: Zoe Lawson, Justin Kiander

ClientType: Chemical Company

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Lubricating/Lapping Oils

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: The purpose of this experiment was to determine the effectiveness of cleaners on the third company soil.

Experimental Procedure: Cleaners were prepared to the following concentrations: Metalnox 6386 100%, Dimethyl Glutarate 100%, Water Works Heavy Duty 7:1, Mirachem 500 20%, Citranox 2%. Three stainless steel coupons were obtained and weighed for each of the cleaners being tested. Coupons were then soiled with a lubricating oil provided by the company and a dirty weight was recorded. Coupons were submerged into their respective cleaners at room temperature for 15 minutes. After 15 minutes had passed, coupons were dried with a heat gun at the ambient setting to remove excess solution and allowed to finish drying in air for 24 hours. Following the drying period, coupons were weighed again and a clean weight was recorded. Effectiveness of the coupons was determined.

Results:

Cleaner	Initial wt of cont	Final wt of cont	%Cont Removed	%AVG
Metalnox 6386	0.0287	0.0002	99.30	100.07%
	0.0625	0.0000	100.00	
	0.0217	-0.0002	100.92	
Dimethyl Glutarate	0.0560	0.0151	73.04	84.25%
	0.0316	0.0054	82.91	
	0.0840	0.0027	96.79	
Water Works	0.0351	0.0036	89.74	88.27%
	0.0592	0.0070	88.18	
	0.0504	0.0066	86.90	
Mirachem 500	0.0860	0.0138	83.95	86.81%
	0.0387	0.0050	87.08	
	0.0867	0.0092	89.39	
Citranox	0.0300	0.0037	87.67	92.02%
	0.0756	0.0034	95.50	
	0.0577	0.0041	92.89	

Metalnox 6386 was the most effective cleaner removing an average of 100.07% of the lubricating oil from stainless steel coupons. Citranox was the second most effective removing an average of 92.02%. After the cleaning and drying process, there appeared to be a slight oil residue present on coupons cleaned with both Water Works and Mirachem 500. Coupons cleaned with Citranox and Dimethyl Glutarate still appeared to be wet, but there was no oil residue remaining. This could be due to insufficient time under the heat gun. Next steps would be to progress Water Works and Mirachem 500 to heated immersion trials at 100°F. A retest of Citranox and Dimethyl Glutarate ensuring a full dry would also be beneficial. Metalnox 6386 has performed well for all company soils at room temperature and no further optimization is necessary.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Lubricating/Lapping Oils				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Kyzen Corporation	Metalnox M6386	100%	100.07	☑	
Fisher Scientific	Dimethyl glutarate (CAS: 1119-40-0)	100%	84.25	☐	Appeared wet after the drying process, but with no residue. Retesting with a full dry to ensure performance would be beneficial.

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Keteca USA	Water Works Heavy Duty Degreaser	7:1	88.27	☐	A dried oil residue remained on the coupons. Heated immersion to ensure a full removal would be beneficial.
Mirachem Corporation	Mirachem 500	20%	86.81	☐	A dried oil residue was present after the cleaning process. Testing under heated immersion to ensure a full removal would be beneficial.
Alconox Inc	Citranox	2%	92.02	☑	Appeared to still be wet following the drying process. Repeating unheated immersion and ensuring a full dry would be beneficial to verify performance.

Conclusion: Upon completion of testing, it was determined that Metalnox 6386 was the most effective cleaner in removing the lubricating oil from stainless steel coupons. Coupons cleaned with Dimethyl Glutarate and Citranox appeared to still be wet, but with no oil residue after the drying process. A retest of unheated immersion ensuring a full dry would be beneficial. Coupons cleaned with Water Works and Mirachem 500 possessed a slight oil residue. Progressing those cleaners to heated immersion could show improvement in removal.