CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2021

DateRun: 08/08/2021

Experimenters: Zoe Lawson, Nicole Kebler, Justin Kiander, Edward Judge

ClientType: Metal Finishing

ProjectNumber: Project #3

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric, Visual

Purpose: The purpose of this experiment was to determine the effectiveness of top cleaners at increased concentrations.

Experimental Procedure: Cleaners were prepared to the following concentrations: Mirachem 500 30%, Water Works Heavy Duty 2:1, SC Aircraft & Metal 30%. The remaining cleaners (Citranox, Aquaease, Aquavantage) were not tested because they were at their maximum concentrations. All cleaners and an ultrasonic bath were heated to 110°F. Three stainless steel coupons were obtained and weighed for each of the cleaners being tested. Coupons were then soiled with oil provided by the company and a dirty weight was recorded. Once solutions reached the proper temperature, coupons were submerged into their respective cleaners and ultrasonic cleaning was conducted for 15 minutes. After 15 minutes had passed, all coupons were rinsed in a deionized water bath, also at 110°F, for 5 minutes. Coupons were then allowed to dry in air for 24 hours. Following the drying period, 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
Mirachem 500	0.2342	0.0016	99.32	99.14
	0.1181	0.0014	98.81	
	0.2006	0.0014	99.30	
Water Works	0.0814	0.0020	97.54	98.53
	0.1912	0.0017	99.11	
	0.1855	0.0020	98.92	
SC Aircraft & Metal	0.0446	0.0018	95.96	95.72
	0.0658	0.0029	95.59	
	0.0707	0.0031	95.62	

Increasing the concentration of top performing cleaners was very effective. For both Mirachem and Water Works, the only remaining oil residues were located on the surface line and streaks that traveled up the edge of the coupon. These would have been removed if full submersion was possible. Coupons cleaned with SC Aircraft still possessed pockets of residue within the cleaned area. With a method identified that can remove the lingering residue, next steps would be to determine if additional soil testing is required for the client before moving on to parts testing.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Mirachem Corporation	Mirachem 500	30%	99.14	☑	No residue in the cleaned area
Keteca USA	Water Works Heavy Duty Degreaser	2:1	98.53	☑	No residue in the cleaned area
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	30%	95.72	☑	Some residue patches still in the cleaned area

Conclusion: Upon completion of testing, it was determined that increasing the concentration for Mirachem and Water Works was extremely effective. The only remaining residue with these two cleaners was located outside of the cleaning are, and would have been removed if full submersion was possible. Next steps will be to determine if additional soil testing is required from the company before moving on to parts testing.