CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020

DateRun: 09/13/2020

Experimenters: Justin Kiander

ClientType: Metal Finishing

ProjectNumber: Project #1

Substrates: Steel

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual, Contact Angle (Surface Tension)

Purpose: The purpose of this experiment was to determine the effectiveness of the new set of cleaners in removing Vanishing Oil from company provided cold rolled steel coupons.

Experimental Procedure: One cold rolled steel coupon provided by the client was tested for each of the four cleaners. Cleaners were prepared to the following conditions: Metalnox 6386 100% concentration at room temperature, Mirachem 500 20% concentration at 110°F, SC Aircraft & Metal Cleaner 20% concentration at 130°F, and Shopmaster LPH 20% concentration at 130°F. Cold rolled steel coupons were weighed to obtain an initial measurement, then soiled with the Vanishing Oil and a dirty weight was recorded. Once solutions reached the proper temperatures, coupons were submerged into their respective cleaners for 15 minutes. After 15 minutes, coupons were submerged into a deionized water bath at 115°F for 20 seconds. Coupons were then dried using an air gun on the hot setting. Once dry, the coupons were allowed to cool, and a clean weight was recorded. Finally contact angle analysis was conducted on each coupon. Three different angles were obtained at different spots along the cleaned coupon and averaged together. Effectiveness of the cleaners was then determined.

Results:

Cleaner	Initial wt of cont	Final wt of cont	%Cont Removed	Contact Angle	AVG Contact Angle
Metalnox 6386	0.0385	-0.0011	102.86	74.77	79.28
				87.99	
				75.07	
Mirachem 500	0.0523	-0.0024	104.59	81.16	83.17
				94.88	
				73.47	
SC Aircraft & Metal	0.0294	-0.001	103.4	62.05	65.82
				62.82	
				72.58	
Shopmaster LPH	0.0509	0.0035	93.12	92.48	86.70
				85.17	
				82.44	

Summary:

Substrates:	Steel				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Kyzen Corporation	Metalnox M6386	100%	102.86	☑	Average Contact Angle of 79.28
Mirachem Corporation	Mirachem 500	20%	104.59	☑	Average Contact Angle of 83.17
Gemtek Products	SC Aircraft & Metal Cleaner Super Concentrate	20%	103.40	☑	Average Contact Angle of 65.82
Buckeye International	Shopmaster LPH	20%	93.12	☑	Average Contact Angle of 86.70

Conclusion: In terms of soil removed, all cleaners were effective with Mirachem 500 being the most effective removing 104.59% of soil. In terms of contact angle, Shopmaster LPH was the most effective with an average contact angle of 86.70. Mirachem was the second most effective with an average contact angle of 83.17. Note that the average contact angle for solvent cleaned coupons was 75.16. Next steps would be to test on parts provided by the company.