CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020

DateRun: 09/08/2020

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 test the effectiveness of 4 cleaners in removing Vanishing Oil from cold rolled steel coupons provided by the company and comparing the contact angles to solvent cleaned coupons.

Experimental Procedure: Four cold rolled steel coupons provided by the company were obtained for each of the cleaners being tested. Cleaners were prepared to the following concentrations: Liquinox 1%, Surface Cleanse 930 5%, Sta Sol ESS 160 100%, and Smart Solve 605 100%. Cleaners were heated to 100°F. An initial weight was obtained for each coupon, then coupons were soiled with the Vanishing Oil and a dirty weight was recorded. When solutions reached the proper temperature, coupons were submerged into their respective cleaners for 15 minutes. After 15 minutes had passed, coupons we placed into a deionized water bath at 100°F for 30 seconds. Coupons were then dried with an air gun on the cool setting. Once dried, clean weights were obtained, and three contact angles were determined and averaged together for each coupon. Effectiveness of the cleaners was then determined.

Results:

Cleaner	Initial wt of cont	Final wt of cont	%Cont Removed	Contact Angle	Average Contact Angle
Liquinox	0.0129	0.0056	56.59	55.02	52.08
				51.69	
				49.52	
Surface Cleanse 930	0.0098	0.0090	8.16	5.15	4.94
				4.79	
				4.89	
Sta Sol ESS 160	0.0149	0.0024	83.89	55.04	40.55
				37.64	
				28.98	
Smart Solve 605	0.0143	0.0027	81.12	1.23	5.45
				11.7	
				3.43	

Summary:

Substrates:	Steel				
Contaminants:	Oil				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Alconox Inc	Liquinox	1%	56.59	☐	Average contact angle of 52.08
International Products Corporation	Surface Cleanse Concentrated Neutral 930	5%	8.16	☐	Average contact angle of 4.94
JR Hess & Co., Inc.	Sta-Sol ESS 160	100%	83.89	☐	Ineffective due to a contact angle of 40.55
United Laboratories International	Smart Solve 605	100%	81.12	☐	Ineffective due to a contact angle of 5.45

Conclusion: Sta Sol ESS 160 had the highest % removal of soil at 83.89%. However, no cleaner was able to reach an average contact angle value to surpass the current solvent. Next steps would be to reevaluate the list of cleaners to determine more options.