CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2015

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ClientType: Cleaner Manufacturer

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate the efficiency one cleaner on GS 34 Soil-1 from stainless steel coupons using immersion technique.

Experimental Procedure: Eleven sets of stainless-steel coupons were weighed; each set consist of three coupons. The sets of coupons were soiled with GS 34 Soil-1. Both soils were applied at the loading of ~100mg. The soiled coupons were oven dried for 30 minutes at 40 °C for GS 34 Soil-1. Dirty weights were recorded for all of coupons after 15 minutes of cooling. Cooled coupons were then immersed into 500 mL of each cleaning agent for 30 minutes standing up and soiled side facing away from one another inside the beaker. After immersion, coupons were left to bake for an additional 30 minutes at 40 oC. It was left out to cool for another additional 15 minutes then weighed for final weights. After sitting out overnight, the cleaned coupons were applied with a pressured towel manually onto each set of three coupons then weighted again for a second final weight.

Soil 1: Maintenance soil = 10 grams of carbon black, 10 grams iron oxide, 100 ml WD-40, 100 ml hydraulic oil, and 100 ml gear oil.

Chemistries evaluated: BioCircle_L; BioCircle_Ultra; BioCircle_Aero; BioCircle_CB 100; BioCircle_CB 100_ALU; BioCircle_UNO SF; Simple Green; Chem Free SW4; Aquantene 330; LPS T91; Keteca

Results:

Cleaners	Initial	Final#1	Final#2	Final#3	%Removed#1	%Removed#2	%Removed#3	%Ave#1	%Ave#2	%Av
BioCircle_L										
	0.1017	0.1180	0.1155	0.0505	-16.03	-13.57	50.34			
	0.1039	0.1184	0.1153	0.0513	-13.96	-10.97	50.63			
	0.0991	0.1452	0.1226	0.0486	-46.52	-23.71	50.96	-25.5	-16.08	50.
BioCircle_Ultra										
	0.1022	0.2827	0.186	0.0616	-176.61	-82	39.73			
	0.107	0.2044	0.1624	0.0515	-91.03	-51.78	51.87			
	0.1024	0.2412	0.1704	0.0609	-135.55	-66.41	40.53	-134.4	-66.73	44.
BioCircle_Aero										
	0.0989	0.1277	0.1148	0.0519	-29.12	-16.08	47.52			
	0.1039	0.1638	0.114	0.0463	-57.65	-9.72	55.44			
	0.1049	0.1177	0.111	0.0314	-12.2	-5.82	70.07	-32.99	-10.54	57.
BioCircle_CB	100									
	0.1139	0.1959	0.1694	0.061	-71.99	-48.73	46.44			
	0.105	0.2232	0.1524	0.0593	-112.57	-45.14	43.52			
	0.1109	0.2309	0.1714	0.0523	-108.21	-54.55	52.84	-97.59	-49.47	47
BioCircle_CB	100_ALU									
	0.1032	0.1911	0.1352	0.0419	-85.17	-31.01	59.4			
	0.0974	0.173	0.1189	0.0322	-77.62	-22.07	66.94			
	0.1164	0.2336	0.1505	0.0239	-100.69	-29.3	79.47	-87.83	-27.46	68
BioCircle_UNO	SF									
	0.1150	0.3531	0.2586	0.0838	-207.04	-124.87	27.13			
	0.1077	0.3339	0.2233	0.0834	-210.03	-107.34	22.56			
	0.0841	0.2697	0.2053	0.073	-220.69	-144.11	13.2	-212.59	-125.44	20.
Simple	Green									
	0.0934	0.1268	0.1102	0.0404	-35.76	-17.99	56.75			
	0.0943	0.1441	0.108	0.0342	-52.81	-14.53	63.73			
	0.0980	0.1278	0.1131	0.0396	-30.41	-15.41	59.59	-39.66	-15.97	60.

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Chem	Free	SW4								
	0.0924	0.1201	0.1103	0.0328	-29.98	-19.37	64.5			
	0.1026	0.1445	0.1293	0.0368	-40.84	-26.02	64.13			
	0.1037	0.1401	0.1246	0.0276	-35.1	-20.15	73.38	-35.31	-21.85	67.
Aquantene	330									
	0.0930	0.8305	0.1975	0.1722	-793.01	-793.01	-112.37			
	0.0951	0.071	0.1815	0.1439	25.34	25.34	-90.85			
	0.1031	0.2709	0.181	0.145	-162.75	-162.75	-75.56	-310.14	-310.14	-92
LPS	T91									
	0.0900	0.0081	0.007	0.0063	91	92.22	93			
	0.0921	0.0219	0.006	0.0063	76.22	93.49	93.16			
	0.0926	0.019	0.0165	0.0158	79.48	82.18	82.94	82.23	89.3	89
Kreussler										
	0.1009	0.2485	0.1654	0.0691	-146.28	-63.92	31.52			
	0.0901	0.2775	0.1646	0.0625	-207.99	-82.69	30.63			
	0.0947	0.1483	0.1285	0.0429	-56.6	-35.69	54.7	-136.96	-60.77	38.

Summary:

Substrates:	Stainless Steel
Contaminants:	Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Fisher Scientific	Absolute Ethanol	0	0.00	☐	
J Walter Inc.	Bio Circle Ultra	100	0.00	☐	
J Walter Inc.	Bio Circle L	100	0.00	☐	
J Walter Inc.	Bio Circle Aero	100	0.00	☐	
J Walter Inc.	Bio Circle CB 100	100	0.00	☐	
Fisher Scientific	Absolute Ethanol	0	0.00	☐	
J Walter Inc.	Bio Circle CB 100 ALU	100	0.00	☐	
J Walter Inc.	Bio Circle UNO SF	100	0.00	☐	
Fisher Scientific	Absolute Ethanol	0	0.00	☐	
Chem Free Corporation	SW-4 Ozzy Juice Degreasing Solution	100	0.00	☐	
Environmental Inteligence	Simple Green Cleaner & Degreaser	100	0.00	☐	
Gray Mills	Aquatene 360	100	0.00	☐	
LPS Laboratories	T-91, Non Solvent degreaser	100	0.00	☑	
Kreussler	Kreussler K 4	100	0.00	☐	

Conclusion:

The cleaner that worked the best at removing GS-34 Soil 1 is T-91 with an efficiency of 89.70%. In comparison between all the Bio Circle products, the one that worked the best was Bio Circle CB 100 ALU with an efficiency of 68.60%. In addition to that the least effective Bio Circle cleaner is Bio Circle UNO SF with an efficiency of 20.96%. However, the cleaner Aquantene 330 was not effective at removing any of the soil with an efficiency of -92.93%. Nearly all the soil had remained after immersion. But in addition to that it had also left a green residue after the substrates have been dried and resulted in additional excess weight on the substrates resulting to a negative efficiency. Overall, the three best cleaners would be as follows: T-91, Bio Circle CB 100 ALU and Chem Free SW4.