CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2024

DateRun: 12/04/2024

Experimenters: Amelia Wagner

ClientType: Textile Mfr

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Coatings, Plastic

Cleaning Methods: Manual Wipe

Analytical Methods: Gravimetric, Visual

Purpose: To test the efficacy of other solvents to manually remove three types of polymers from stainless steel

Experimental Procedure: Three 304 stainless steel coupons were assigned to each of the soils per solvent resulting in a total of 27 coupons total. Each coupon was weighed with a mass balance and had their initial weights recorded. Each coupon was then soiled with its respective polymer and catalyst mixture. To soil each coupon, a pipette was used to apply a 0.5ml of the correct polymer catalyst mixture in a stripe across the middle of the coupons. The stripe of soil was then spread with a paint scraper to apply a thin coating to the bottom half of the coupon. After drying for 30 seconds, the next layer was applied. Each coupon was soiled with a total of 5 layers. After the soil was applied, the coupons were placed in the oven at 325F for 5 mins to cure the polymers. Each coupon had their dirty weights recorded. Each coupon was then timed while manually wiped with a cotton rag dipped in the respective solvent with circular motions. Manual wiping was ceased when all visible soil was removed from a coupon. If all visible soil was not able to be fully removed at 5 mins (300 seconds), cleaning was ceased. Coupons were then left to air dry for 30 mins before recording their clean weights.

Results:

Cleaner	Soil	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall	Time until clean	Secs AVG	Secs Overall
Ethylene Glycol	7159NF Alum	0.0617	0.0089	85.5754	82.86	78.35	30	27	39
		0.0971	0.0019	98.0433			24		
		0.0719	0.0252	64.9513			28		
	7229	0.0716	0.0346	51.6760	60.24		34	56	
		0.0474	0.0223	52.9536			67		
		0.0983	0.0235	76.0936			68		
	7223	0.1684	0.0015	99.1093	91.95		35	33	
		0.1455	0.0288	80.2062			41		
		0.1817	0.0063	96.5327			22		
Isopropanol	7195NF Alum	0.0695	0.0002	99.7122	99.62	99.65	22	16	20
		0.0668	0.0002	99.7006			14		
		0.0724	0.0004	99.4475			11		
	7229	0.0901	0.0006	99.3341	99.51		31	35	
		0.1024	0.0004	99.6094			40		
		0.1217	0.0005	99.5892			34		
	7223	0.1950	0.0003	99.8462	99.82		10	9	
		0.1823	0.0004	99.7806			8		
		0.1999	0.0003	99.8499			8		

The Ethylene Glycol did not air dry in 30 mins after the cleaning concluded, so the coupons were dried with a heat gun before taking clean weights.

Summary:

Substrates:	Stainless Steel				
Contaminants:	Coatings, Plastic				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Alfa Aesar	Ethylene Glycol	100%	78.35	☐	39 seconds until clean
Fisher Scientific	Isopropanol (CAS:67-63-0)	99%	99.65	☑	20 seconds until clean

Conclusion: Isopropanol (rubbing alcohol) is highly effective in removing all soils from the stainless steel coupons. Ethylene Glycol was effective in removing the 7159 NF Alum and 7223 polymers but was unsuccessful in removing the 7229 polymer.

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