CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2024

DateRun: 02/09/2024

Experimenters: Amelia Wagner

ClientType: Coatings Manufacturer

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Adhesive

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To test the efficacy of four previously identified solvents in removing two types of glue adhesives from stainless steel coupons using unheated immersion methods.

Experimental Procedure: Three pre weighed stainless steel coupons were used per each soil per cleaner for a total of 24 coupons. The coupons were then soiled with their respective adhesives, half being soiled with adhesive 5017 and half being soiled with adhesive 5024. The soils were heated to 245 degrees F in order to melt the adhesives to a degree that would allow for a small amount of adhesive to be picked up using a spatula. The adhesive on the spatula was then reheated using a heat gun in order for the adhesive to be able to spread on bottom third of the coupons. The dirty weights of the coupons were then recorded.

The coupons soiled with adhesive 5017 were subjected to 25 mins of unheated immersion with a stir bar set to 200 rpm in their respective cleaners. After the coupons were removed from the cleaner after 25 minutes, it was observed whether or not to continue with a manual wiping step (a singular wipe using a paper towel). The coupons soiled with adhesive 5024 were subjected to 45 minutes of unheated immersion with a stir bar set to 200 rpm. All coupons soiled with adhesive 5024 were subjected to a manual wiping step (a singular wipe with a paper towel) after being removed from their cleaners.

All coupons were allowed to air dry for 10 minutes before having their final weights recorded.

Results:

Cleaner	Soil	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall
anisole	adhesive 5017	0.2001	0.0130	93.50	93.94	95.63
		0.3363	0.0178	94.71		
		0.2223	0.0142	93.61		
	adhesive 5024	0.3312	0.0070	97.89	97.32	
		0.2549	0.0070	97.25		
		0.2075	0.0066	96.82		
methyl acetate	adhesive 5017	0.2242	0.0020	99.11	97.97	95.87
		0.2800	0.0121	95.68		
		0.2642	0.0023	99.13		
	adhesive 5024	0.2709	0.0095	96.49	95.87	
		0.2300	0.0128	94.43		
		0.1483	0.0049	96.70		
ethyl acetate	adhesive 5017	0.2039	0.0038	98.14	98.74	98.24
		0.2274	0.0010	99.56		
		0.1081	0.0016	98.52		
	adhesive 5024	0.1594	0.0005	99.69	97.74	
		0.4201	0.0254	93.95		
		0.2318	0.0010	99.57		
diethyl carbonate	adhesive 5017	0.5141	0.0026	99.49	99.81	98.22
		0.1976	0.0001	99.95		
		0.2453	0.0000	100.00		
	adhesive 5024	0.2127	0.0032	98.50	96.62	
		0.1056	0.0014	98.67		
		0.2491	0.0182	92.69		

Manual Wipe Required for Adhesive 5017?:

anisole: yes

methyl acetate: no

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ethyl acetate: no

diethyl carbonate: yes

Summary:

Conclusion: All solvents tested, anisole, methyl acetate, ethyl acetate, and diethyl carbonate, are highly effective in removing both adhesive soils from stainless steel coupons utilizing unheated immersion methods.