CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2023

DateRun: 10/05/2023

Experimenters: Alexander Symko, Amelia Wagner

ClientType: University

ProjectNumber: Project #2

Substrates: Aluminum

PartType: Coupon

Contaminants: Waxes

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric

Purpose: To evaluate the effectiveness of the previously identified successful solvents utilizing methods other than ultrasonics.

Experimental Procedure: Four solvents were chosen using previous testing data on their performance for removing other waxes and greases. Three pre weighed aluminum coupons were assigned to each solvent for each substrate for a total of 12 aluminum coupons. The coupons were soiled with the glyconol wax soil (about 0.5 grams) by placing a small ball of wax onto the bottom third of the coupon, heating it with a heat gun to melt the wax, and then spreading the wax into a strip across the bottom third of the coupons. After soiling, the dirty weights of the coupons were recorded. The coupons were then subjected to 20 mins of unheated immersion with a stir bar set at 300 rpm in their respective cleaners. The coupons were left to air dry overnight before the clean weights were recorded.

Results:

Cleaner	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG
1-Propanol	0.0610	0.0002	99.67	99.56
	0.0561	0.0003	99.47	
	0.0448	0.0002	99.55	
Thiophene	0.0774	0.0001	99.87	99.69
	0.0663	0.0003	99.55	
	0.0576	0.0002	99.65	
1-Butanol	0.0457	0.0016	96.50	91.53
	0.0518	0.0014	97.30	
	0.0890	0.0171	80.79	
Dowanol PnBGE	0.0245	0.0023	90.61	71.68
	0.0549	0.0142	74.13	
	0.0819	0.0407	50.31	

Although 1-Propanol, and 1-Butanol removed a high percentage of the wax soil, some wax visibly remained on the coupons after cleaning. Coupon cleaned with Thiophene were completely void of any remaining wax.

Summary:

Conclusion: 1-Propnaol and 1-Butanol are somewhat effective cleaners in removing the wax soil using unheated immersion methods. Thiophene is a very effective cleaner in removing the wax soil using unheated immersion methods. Dowanol PnBGE is not an effective cleaner in removing the wax soil using unheated immersion methods.