CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2023

DateRun: 09/25/2023

Experimenters: Alexander Symko, Amelia Wagner

ClientType: University

ProjectNumber: Project #2

Substrates: Aluminum

PartType: Coupon

Contaminants: Greases, Waxes

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: To evaluate the effectiveness of multiple cleaners in removing both the grease and wax contaminants from aluminum coupons.

Experimental Procedure: Three cleaning products were chosen using previous testing data on their performance for removing other waxes and greases. Three pre weighed aluminum coupons were assigned to each cleaner for each substrate for a total of 18 aluminum coupons. Half of 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. The other half of the coupons were soiled with the royco 27A grease (about 0.5 grams) by applying to soil to the bottom third of the coupons with a swab. After soiling, the dirty weights of the coupons were recorded. The coupons were then subjected to 20 mins of unheated ultrasonics in their respective cleaners. The coupons were left to air dry overnight before the clean weights were recorded.

Results:

Cleaner	Soil	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall
Metalnox M6324R	Glyconol Wax	0.3536	0.1054	70.19	77.63	152.06
		0.3104	0.0821	73.55		
		0.2656	0.0288	89.16		
	Royco 27A Grease	0.0768	-0.1380	279.69	226.48	
		0.1856	-0.1519	181.84		
		0.2207	-0.2602	217.90		
Shopmaster LPH	Glyconol Wax	0.4065	0.3470	14.64	50.44	65.18
		0.2870	0.0206	92.82		
		0.6323	0.3550	43.86		
	Royco 27A Grease	0.1767	0.0291	83.53	79.92	
		0.0825	0.0216	73.82		
		0.2105	0.0370	82.42		
Soyclear 1500	Glyconol Wax	0.2270	0.0169	92.56	92.81	89.82
		0.4814	0.0410	91.48		
		0.2945	0.0165	94.40		
	Royco 27A Grease	0.1583	0.0006	99.62	86.83	
		0.1382	0.0143	89.65		
		0.1202	0.0346	71.21		

Metalnox M6324R attacked and stripped the substrate of aluminum. This is why the clean weights for the Royco grease soiled coupons are significantly lower than the initial weights. The only reason that the coupons soiled with the wax do not exhibit this also, is because while the metalnox did also strip these substrates, it also failed to remove the wax leading to higher clean weights than initial weights.

Summary:

Conclusion: Metalnox M6324R is not and effective cleaner for aluminum substrates because it attacks aluminum. Shopmaster LPH is not an effective cleaner in removing wax but it is a somewhat effective cleaner in removing the royco grease. Soyclear 1500 is an effective cleaner in removing both soils, however it would require a manual wiping step post cleaning to remove all of the wax which may not be the most efficient process for the client.