CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020

DateRun: 03/27/2020

Experimenters: Sabrina Apel, Othon Pagounes, Harry Rankin

ClientType: Brass Instrument Manufacturer

ProjectNumber: Project #1

Substrates: Brass, Copper, Nickel

PartType: Part

Contaminants: Lubricating/Lapping Oils

Cleaning Methods: Immersion/Soak

Analytical Methods: Visual

Purpose: To evaluate the effectiveness of aqueous-based and solvent-based cleaners at the removal of American Lapping Compound by S.E Shires using heated immersion on copper, brass, and copper/nickel (90/10) substrates by gravimetric and visual analysis.

Experimental Procedure: Three pre-weighed coupons per substrate were soiled with American Lapping Compound, using a cotton swab. Each set of coupons were immersed into a beaker with one of the six cleaners for 30 minutes at the recommended temperature. During this process, any noticeable soil removal was observed at five minute intervals. After immersing, final weights were recorded and efficiency was calculated for each coupon cleaned.

Results: The soil visually was not removed from each substrate for each cleaner. After drying for 24 hours, some coupons were still wet from the cleaner, indicating the soil may have absorbed moisture causing a negative percent contaminant removal.

Cleaner	Temperature (ºF)	Substrate	Initial wt of cont.	Final wt of cont.	%Cont Removed	% Average	Overall % Removal
Aquavantage 1400 10%	130	Copper	0.5628	0.5622	0.11	0.07	-0.46
			0.4427	0.4425	0.05		
			0.6854	0.6851	0.04		
		Brass	0.5269	0.5269	0.00	-0.03	
			0.6078	0.6078	0.00		
			0.6471	0.6476	-0.08		
		Copper/ Nickel	0.2655	0.2740	-3.20	-1.43	
			0.3271	0.3288	-0.52		
			0.2418	0.2432	-0.58		
Surface Cleanse 930 5%	130	Copper	0.3485	0.3946	-13.23	-10.78	-10.23
			0.4546	0.4951	-8.91		
			0.3292	0.3628	-10.21		
		Brass	0.4083	0.4505	-10.34	-7.52	
			0.4678	0.4887	-4.47		
			0.3742	0.4032	-7.75		
		Copper/ Nickel	0.2624	0.2970	-13.19	-12.38	
			0.2464	0.2949	-19.68		
			0.2720	0.2836	-4.26		
SC Aircraft & Metal Cleaner 5%	130	Copper	0.4271	0.4263	0.19	0.45	0.77
			0.5026	0.5014	0.24		
			0.4486	0.4445	0.91		
		Brass	0.3207	0.3198	0.28	0.32	
			0.3558	0.3545	0.37		
			0.7226	0.7204	0.30		
		Copper/ Nickel	0.5181	0.4963	4.21	1.55	
			0.2987	0.2981	0.20		
			0.3003	0.2996	0.23		
Micro 90 2%	130	Copper	0.4578	0.4535	0.94	1.38	2.10
			0.4464	0.4401	1.41		

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			0.3718	0.3651	1.80		
		Brass	0.3912	0.3855	1.46	2.47	
			0.4484	0.4396	1.96		
			0.5194	0.4987	3.99		
		Copper/ Nickel	0.3278	0.3245	1.01	2.46	
			0.2653	0.2606	1.77		
			0.2832	0.2702	4.59		
LF2100 5%	130	Copper	0.4916	0.4887	0.59	-4.88	-2.65
			0.6743	0.4938	26.77		
			0.4232	0.6009	-41.99		
		Brass	0.5039	0.6260	-24.23	-3.08	
			0.6477	0.5730	11.53		
			0.4210	0.4064	3.47		
		Copper/ Nickel	0.3576	0.3619	-1.20	0.02	
			0.4790	0.4805	-0.31		
			0.2877	0.2832	1.56		
Liquinox	130	Copper	0.3873	0.3808	1.68	4.38	3.48
			0.3714	0.3361	9.50		
			0.6031	0.5913	1.96		
		Brass	0.5064	0.5011	1.05	3.05	
			0.4938	0.4810	2.59		
			0.4466	0.4220	5.51		
		Copper/ Nickel	0.4393	0.4365	0.64	3.01	
			0.3918	0.3904	0.36		
			0.2599	0.2390	8.04		

Summary:

Conclusion: Each cleaner was not effective in removing American Lapping Compound contaminant from copper, brass, and copper/nickel (90/10) coupons. Next step is to only test only on copper coupons with a higher dilution unheated based on vendor recommendation before adding ultrasonics.