CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2024
DateRun:	11/06/2024
Experimenters:	Tatyanna Moreland Junior, Amelia Wagner, Rachael Rososky
ClientType:	Brass Instrument Manufacturer
ProjectNumber:	Project #3
Substrates:	Brass
PartType:	Coupon
Contaminants:	Buffing/Polishing Compounds, Greases, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	To test the efficacy of several solvents and aqueous cleaners in removing three types of soils from brass coupons.
Experimental Procedure:	Three brass coupons were used per each soil for each of the cleaners tested. Each coupon was weighed with a mass balance scale and had their initial weights recorded. Each coupon was then soiled with one of the three soil, Slide Gel no. 7, American Lapping compound, or Honing oil, by applying an equal amount of each soil to the bottom third of each coupon with a swab. The coupons were then weighed again and had their dirty weights recorded. Coupons were cleaned in groups of three. The coupons were subjected to 30 mins of heated immersion at 130F with a stir bar set to 300 rpm. After removing the coupons from immersion, the coupons were immediately rinsed by holding the coupons under a stream of room temperature tap water for 30 seconds. The residual water was then removed from each coupon using an air blowoff method to dry the coupons. After the coupons were dried, their final weights were recorded.

Results:

Cleaner	Soil	Initial wt of cont.	Final wt of cont.	%Cont Removed	% AVG	% Overall
Methyl Acetate 100%	Slide Gel No.7	0.0872	0.0033	96.2156	77.39	21.01
		0.0183	0.0022	87.9781		
		0.0371	0.0193	47.9784		
	American Lapping Compound	0.0262	0.0286	-9.1603	-8.57	
		0.0614	0.0635	-3.4202		
		0.0175	0.0198	-13.1429		
	Honing Oil	0.0134	0.0142	-5.9701	-5.78	
		0.0114	0.0124	-8.7719		
		0.0192	0.0197	-2.6042		
Dipropylene Glycol Methyl Ether 100%	Slide Gel No.7	0.0389	0.0132	66.0668	66.76	78.45
		0.0762	0.0085	88.8451		
		0.0238	0.0130	45.3782		
	American Lapping Compound	0.0408	0.0020	95.0980	85.29	
		0.0223	0.0021	90.5830		
		0.0161	0.0048	70.1863		
	Honing Oil	0.0229	0.0029	87.3362	83.29	
		0.0329	0.0056	82.9787		
		0.0132	0.0027	79.5455		
Emerald ICP 1 5%	Slide Gel No.7	0.0526	0.0261	50.3802	52.74	63.69
		0.0216	0.0108	50.0000		
		0.0166	0.0070	57.8313		
	American Lapping Compound	0.0251	0.0193	23.1076	32.57	
		0.0109	0.0058	46.7890		
		0.0241	0.0174	27.8008		
	Honing Oil	0.0344	-0.0014	104.0698	105.76	
		0.0467	0.0000	100.0000		
		0.0159	-0.0021	113.2075		
BG clean 402 10%	Slide Gel No.7	0.0302	0.0162	46.3576	73.81	100.45
		0.0199	0.0029	85.4271		
		0.0502	0.0052	89.6414		
	American Lapping Compound	0.0177	0.0052	70.6215	64.09	

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		0.0199	0.0061	69.3467		
		0.0216	0.0103	52.3148		
	Honing Oil	0.0345	0.0000	100.0000	163.45	
		0.0108	-0.0113	204.6296		
		0.0098	-0.0084	185.7143		
Propylene Carbonate	Slide Gel No.7	0.0533	0.0142	73.3583	58.80	72.28
		0.0575	0.0385	33.0435		
		0.0750	0.0225	70.0000		
	American Lapping Compound	0.0892	0.0323	63.7892	57.49	
		0.1114	0.0300	73.0700		
		0.0660	0.0425	35.6061		
	Honing Oil	0.0142	-0.0001	100.7042	100.56	
		0.0149	0.0000	100.0000		
		0.0101	-0.0001	100.9901		

Methyl Acetate began to evaporate at 130F, as this is very close to the boiling point.

Summary:

Substrates:	Brass
Contaminants:	Buffing/Polishing Compounds, Greases, Lubricating/Lapping Oils, Oil

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Alfa Aesar	Methyl Acetate	100%	21.01	☐	
Dow Chemical Company	Dipropylene Glycol Methyl Ester	100%	78.45	☐	American Lapping Compound 85.29% Honing Oil 83.29%
Hubbard Hall Inc	Emerald IC P 1	5%	63.69	☐	Honing Oil 105.76%
Amiran BioChemicals	BG-Clean 402	10%	100.45	☐	Slide Gel no. 7 73.81% American Lapping Compound 64.09% Honing Oil 163.45% ?
Fisher Scientific	Propylene carbonate 99.5% (CAS: 108-32-7)	100%	72.28	☐	Honing Oil 100.56%

Conclusion:

None of the cleaners tested were effective in removing all three soils.

Propylene Carbonate was very effective in removing honing oil from brass. Emerald ICP 1 was very effective in removing honing oil from brass. Dipropylene Glycol Methyl Ether was somewhat effective in removing the american lapping compound and honing oil from brass.

The American lapping compound seems to be the most difficult soil to remove, and often ends up absorbing the cleaner increasing the final weights.