CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	1995
DateRun:	11/06/1995
Experimenters:	Jay Jankauskas
ClientType:	Silversmith
ProjectNumber:	Project #1
Substrates:	Copper, Sterling/Silver
PartType:	Coupon
Contaminants:	Buffing/Polishing Compounds
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	Test 5 cleaners against current chemistry
Experimental Procedure:	The purpose of this trial is to find a chemistry that is suitable for Silversmith's needs. This trial will test five different cleaning chemistries against Silversmith's current chemistry (Texo Corp. Texolite 1734SL.) The five cleaners selected were Calgon Geo-Guard 2215 (5%), Matchless MC 135 (4%), Matchless MC 580 (4%), Novamax Spectrum BCR (5%) and Calgon AK 6215 (4%). For each cleaner, 3 silver plated coupons will be cleaned for a total of 18 coupons. Cleaning will be performed at 134-143 F for ten minutes in a beaker agitated with a stir-bar. Identical stir-bar settings will be used on all cleaning solutions to ensure that all parts receive equal agitation. The coupons were rinsed for 30 seconds in a static tap water rinse set at 100 F. All coupons were weighed before and after contamination and after drying to obtain a percentage removal. The coupons were also visually inspected for any films that might have remained from ineffective rinsing. The three best cleaners will be used in an ultrasonic run with some contaminated silverware obtained from Silversmith. The parts were cleaned for 5 minutes at 140 F. Rinsing was performed for 30 seconds in a tap water bath at 100 F.

Results:

GRAVIMETRIC RESULTS					
Cleaning Solution: 4% Matchless MC 135					
Cleaning Temperature (F): 143					
Tap Water Rinse Temperature (F): 102					
sample # / substrate	clean mass (g)	mass with cont (g)	mass after cleaning (g)	contaminant removed (g)	Percent Removal
833	36.1331	36.3513	36.1426	0.2087	95.65%
9696	36.1995	36.4386	36.2628	0.1758	73.53%
7634	35.9915	36.1024	35.9984	0.104	93.78%
Average		87.65%			
StDev.		12.27%			
Cleaning Solution: 5% Solution of Calgon Geo-Guard 2215					
Cleaning Temperature (F): 134					
Tap Water Rinse Temperature (F): 102					
sample # / substrate	clean mass (g)	mass with cont (g)	mass after	contaminant cleaning (g)	Percent removed (g)
6169	36.1093	36.3447	36.1126	0.2321	98.60%
9477	36.1331	36.3513	36.1426	0.2087	95.65%
8840	36.1132	36.3226	36.1151	0.2075	99.09%
Average	97.78%				
StDev.	1.86%				
Cleaning Solution: 4% Solution of Matchless MC580					
Cleaning Temperature (F): 141					
Tap Water Rinse Temperature (F): 102					
sample #	clean mass	mass with	mass after	contaminant	Percent

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substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
1447	36.3757	36.5388	36.3754	0.1634	100.18%
8028	36.031	36.2547	36.0331	0.2216	99.06%
6502	35.8792	36.2758	35.8954	0.3804	95.92%
Average	98.39%				
StDev.	2.21%				
Cleaning Solution: 4% Solution of Calgon AK-6215					
Cleaning Temperature (F): 143					
Tap Water Rinse Temperature (F): 102					
sample #	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
6282	35.8571	36.0822	35.8563	0.2259	100.36%
578	36.2884	36.4821	36.2888	0.1933	99.79%
6968	35.9252	36.0917	35.9234	0.1683	101.08%
Average	100.41%				
StDev	0.65%				
Cleaning Solution: 5% Solution of Novamax Spectrum BCR					
Cleaning Temperature (F): 140					
Tap Water Rinse Temperature (F): 100					
sample # /	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
268	36.2572	36.4275	36.259	0.1685	98.94%
1843	36.4164	36.5713	36.4189	0.1524	98.39%
9967	36.2268	36.3532	36.2268	0.1264	100.00%
Average	99.11%				
StDev	0.82%				
Cleaning Solution: 2% Solution of Texo Corp Texolite 1734SL					
Cleaning Temperature (F): 137					
Tap Water Rinse Temperature (F): 99					
sample #	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
239	36.2552	36.4109	36.3018	0.1091	70.07%
1450	36.3759	36.5232	36.4176	0.1056	71.69%
9354	36.1662	36.3143	36.2236	0.0907	61.24%
Average	67.67%				
StDev.	5.62%				

Summary:

Substrates:	Copper, Sterling/Silver
Contaminants:	Buffing/Polishing Compounds

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Calgon Corporation	Geo Guard 2215	5	97.78	☑	
Matchless Metal Polish Company	MC 132	4	87.65	☐	
Matchless Metal Polish Company	MC 580	4	98.39	☑	
Novamax Technologies Inc	Spectrum BCR	5	99.11	☑	
Calgon Corporation	AK 6215	4	100.41	☐	
Texo Corporation	Texolite 1734 XL	2	67.67	☐	

Conclusion:

Three chemistries were found to be the best performers (Matchless MC 580, Calgon AK- 6215 and Novamax Spectrum BCR). The Matchless MC 580 was visually the most effective cleaner especially when used with ultrasonics. The Calgon AK-6215 was the only low foaming cleaner out of the three. However, due to the

fatty acids contained in the buffing compound, saponification took place and the Calgon AK-6215 had a higher foam level as the soil loading had increased.