

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1995
 DateRun: 10/04/1995
 Experimenters: Donald Garlotta, Jay Jankauskas
 ClientType: Silversmith
 ProjectNumber: Project #1
 Substrates: Sterling/Silver
 PartType: Coupon
 Contaminants: Buffing/Polishing Compounds
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric
 Purpose: Find chemistry that meets clients needs

Experimental Procedure: This trial will test five different cleaning chemistries against the Calgon Geo-Guard 2215 (the most effective cleaner tested to date). The five cleaners selected were Gemtek SC1000 (5%), Abatement Tech. Bio-Might (5%), Valtech Valtron SP2275 (4%), Valtech Valtron SP2001 (4%) and CSI Release (5%). All cleaners will be compared to a 5% solution of Calgon. For each cleaner, 3 silver plated coupons will be cleaned for a total of 18 coupons. Cleaning will be performed at 126-140 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. For each set of three coupons, two were rinsed in a tap water bath, while the third was rinsed in a DI water bath. Both rinses were for one minute and at 140 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.

Results: Cleaning Solution: 5% solution of Abatement Technologies Bio Might 100.
 Cleaning Temperature (F): 127
 Tap Water Rinse Temperature (F): 140
 DI Water Rinse Temperature (F): 138
 GRAVIMETRIC ANALYSIS

sample # /	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
8641	36.0927	36.1138	36.0919	0.0219	103.79%
9039	36.1334	36.176	36.1337	0.0423	99.30
0268*	36.2572	36.2904	36.257	0.0334	100.60%
Average					101.23%
StDev.					2.31%

Cleaning Solution: 5% Solution of Gemtek SC1000

Cleaning Temperature (F): 128

Tap Water Rinse Temperature (F): 145

DI Water Rinse Temperature (F): 140

GRAVIMETRIC ANALYSIS

sample # /	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
6169	35.8442	35.8708	35.8451	0.0257	96.62%
9477	36.1767	36.2059	36.1782	0.0277	94.86%
0920*	36.3223	36.3722	36.3256	0.0466	93.39%
Average					94.96%
StDev.					1.62%

Cleaning Solution: 5% solution of Cleaning Systems Inc. Release

Cleaning Temperature (F): 136

Tap Water Rinse Temperature (F): 144

DI Water Rinse Temperature (F): 138

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GRAVIMETRIC ANALYSIS					
sample # /	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
8803	36.1093	36.1384	36.1095	0.0289	99.31%
7634	35.992	36.0519	35.9916	0.0603	100.67%
9967*	36.2262	36.2621	36.2264	0.0357	99.44%
Average					99.81%
StDev.					0.75%

Cleaning Solution: 4% Solution of Valtech Valtron SP 2275

Cleaning Temperature (F): 137

Tap Water Rinse Temperature (F): 142

DI Water Rinse Temperature (F): 141

GRAVIMETRIC ANALYSIS

sample # /	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
8345	36.0630	36.0928	36.0645	0.0283	96.92%
6257	35.8533	35.8768	35.8532	0.0236	100.43%
7133*	35.9418	35.9667	35.9419	0.0248	99.60%
Average					98.98%
StDev.					1.83%

Cleaning Solution: Calgon Geo-Guard #2215

Cleaning Temperature (F): 139

Tap Water Rinse Temperature (F): 140

DI Water Rinse Temperature (F): 139

GRAVIMETRIC ANALYSIS

sample #	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
8385	36.0679	36.0965	36.0676	0.0289	101.05%
8840	36.1134	36.1451	36.1130	0.0321	101.26%
6968*	35.9251	35.9422	35.9242	0.0180	105.26%
Average					102.52%
StDev.					2.37%

Cleaning Solution: Valtech Valtron 2201

Cleaning Temperature (F): 146

Tap Water Rinse Temperature (F): 142

DI Water Rinse Temperature (F): 138

GRAVIMETRIC ANALYSIS

sample # /	clean mass	mass with	mass after	contaminant	Percent
substrate	(g)	cont (g)	cleaning (g)	removed (g)	Removal
9854	36.2155	36.2550	36.2153	0.0397	100.51%
6643	35.8927	35.9254	35.8918	0.0336	102.75%
8028*	36.0314	36.0491	36.0307	0.0184	103.95%
Average					102.40%
StDev.					1.75%

Summary:

Substrates:	Sterling/Silver				
Contaminants:	Buffing/Polishing Compounds				
Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Gemtek Products	SC 1000 Aqueous Cleaner Concentrate	5	94.96	<input type="checkbox"/>	

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Abatement Technologies	Bio Might 100 Cleaner - Degreaser	5	101.23	<input type="checkbox"/>	
Valtech Corporation	Valtron SP 2275	4	98.98	<input type="checkbox"/>	
Valtech Corporation	Valtron SP 2201	4	102.40	<input type="checkbox"/>	
Cleaning Systems	Release	5	99.81	<input type="checkbox"/>	

Conclusion:

The Abatement Bio-Might 100 performed identical to the Geo-Guard 2215. The only drawback was the foam generation in the cleaning bath. All other cleaners were ineffective in removing the buffing compound, especially from the lettering on the coupons.

All tap water rinses came out with a yellowish residue. Usually water spotting from hard water agents shows up as a white film. This film could be the result of the rinse bath being contaminated with an excessive amount of buffing compound. Tap water rinse may be successful if performed in a two stage method. The deionized bath was very effective in performing a clean rinse.

Future testing will be done on some new cleaners that will be arriving in the lab in the near future (Calgon AK-6015, Matchless MC132 and MC 580). A multistage rinsing technique will also be tested out.