CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2016
DateRun:	08/28/2016
Experimenters:	Carla De La Cruz
ClientType:	Jewelry Mfr
ProjectNumber:	Project #3
Substrates:	Copper, Stainless Steel
PartType:	Coupon
Contaminants:	Waxes
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric, Visual
Purpose:	To find the best fit product for cleaning Leach Garner's #4 Master draw 419TT from copper and stainless steel surfaces meant to resemble the cleaning of precious metals.
Experimental Procedure:	Coupons of stainless steel and copper were selected and arranged on trays, so that each cleaner had an assigned set of each surface. Before taking initial weights coupons were wiped down with Kimwipes. After taking weights the coupons were promptly soiled and reweighed. All cleaners were gathered in respective bottles and beakers. A stir bar was used in conjunction with a heating plate equipped to stir the solutions. The coupons were added to the beakers three of a kind at one time, and then allowed to sit in the stirred solution at room temperature for 15 minutes, in 5 minute increments while observations were taken. Finally, clean weights were taken at the end of all the testing.

Results:

Cleaner	Substrate	Initial wt.	Final wt.	% Cont Removed	% Overall
Fluosolv CX	Stainless steel	0.2041	0.0165	91.92	
Fluosolv CX	Stainless steel	0.2693	0.0233	91.35	94.30
Fluosolv CX	Stainless steel	0.3391	0.0013	99.62	
Fluosolv CX	Copper	0.2048	0.0297	85.5	
Fluosolv CX	Copper	0.2924	0.0431	85.26	90.02
Fluosolv CX	Copper	0.1567	0.0011	99.3	
Fluosolv NC	Stainless steel	0.2559	0.0431	83.16	
Fluosolv NC	Stainless steel	0.2239	0.0478	78.65	84.40
Fluosolv NC	Stainless steel	0.1695	0.0146	91.39	
Fluosolv NC	Copper	0.1929	0.0349	81.91	
Fluosolv NC	Copper	0.2416	0.0440	81.79	81.88
Fluosolv NC	Copper	0.1673	0.0302	81.95	
Vetrel Sion	Stainless steel	0.1358	0.0006	99.56	
Vetrel Sion	Stainless steel	0.1155	0.0005	99.57	99.59
Vertel Sion	Stainless steel	0.1335	0.0005	99.63	
Vertrel Sion	Copper	0.0629	0.0101	83.94	
Vertrel Sion	Copper	0.1927	0.0112	94.19	89.40
Vertrel Sion	Copper	0.1593	0.0158	90.08	
		0.2087	0.0861	58.74	

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Honeywell PF	Stainless steel				
Honeywell PF	Stainless steel	0.1095	0.0317	71.05	65.7
Honeywell PF	Stainless steel	0.1845	0.0603	67.32	
Honeywell PF	Copper	0.2050	0.1010	50.73	
Honeywell PF	Copper	0.3218	0.2171	32.54	48.69
Honeywell PF	Copper	0.1951	0.0726	62.79	

Summary:

Substrates:	Copper, Stainless Steel
Contaminants:	Waxes

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
NuGeneration Technologies, LLC	FluoSolv CX	100	92.16	☑	
NuGeneration Technologies, LLC	FluoSolv NC 786	100	83.14	☑	
DuPont	Vertrel Sion	100	94.50	☑	
Honeywell	Solstice PF with N2	100	57.20	☐	

Conclusion:

When the experiment began, the first batch of coupons cleaned still contained wet soil and therefore the removal was easier. The rest of the coupons dried and removal was less facilitated, then. Many of the cleaners left a film behind and white residue after drying. Honeywell's Solstice PF performed the worst, perhaps because it was cleaned last and the soil had dried so much by then. White residue was visible while the coupons were in the solution, there were no signs of peeling and white residue persisted once the coupons dried. It seemed that not the entire surface was penetrated by the cleaner, as patches of soil were still visible on the coupons. Although percent removals were quite high for most of the cleaners, the visuals were not nearly as satisfactory. In conclusion, the experiment was unsuccessful and further testing will be required. In this case, the next step will be heated immersion with stir bar.