CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2016

DateRun: 08/29/2016

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 plates were preheated to about 40°C and thermometers were kept in them to monitor the temperature, except Honeywell's Solstice PF which boils at room temperature and was kept at about 20°C. The coupons were added to the beakers three of a kind at one time, and then allowed to sit in the heated stirred solution 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	0.2931	0.0011	99.62	
Fluosolv CX	Stainless Steel	0.2286	0.0016	99.3	99.54
Fluosolv CX	Stainless Steel	0.3030	0.0009	99.7	
Fluosolv CX	Copper	0.2231	0.0245	89.02	
Fluosolv CX	Copper	0.2441	0.0233	90.45	89.28
Fluosolv CX	Copper	0.2419	0.0281	88.38	
Fluosolv NC	Stainless Steel	0.2847	0.0331	88.36	
Fluosolv NC	Stainless Steel	0.2649	0.0282	89.35	89.19
Fluosolv NC	Stainless Steel	0.2456	0.0249	89.86	
Fluosolv NC	Copper	0.2372	0.0390	83.56	
Fluosolv NC	Copper	0.2671	0.0433	83.79	82.91
Fluosolv NC	Copper	0.2471	0.0460	81.38	
Vetrel Sion	Stainless Steel	0.2554	0.0004	99.84	
Vetrel Sion	Stainless Steel	0.2622	0.0002	99.92	99.59
Vertel Sion	Stainless Steel	0.3239	0.0003	99.91	
Vertrel Sion	Copper	0.2556	0.0020	99.22	
Vertrel Sion	Copper	0.2701	0.0006	99.78	99.66
Vertrel Sion	Copper	0.2637	0.0000	100.00	

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Honeywell PF	Stainless Steel	0.2564	0.0987	61.51	
Honeywell PF	Stainless Steel	0.2636	0.1024	61.15	62.10
Honeywell PF	Stainless Steel	0.2849	0.1063	63.64	
Honeywell PF	Copper	0.2513	0.1274	49.30	
Honeywell PF	Copper	0.2275	0.1025	54.95	54.01
Honeywell PF	Copper	0.1951	0.0726	57.78	

Summary:

Substrates:	Copper, Stainless Steel
Contaminants:	Waxes

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
NuGeneration Technologies, LLC	FluoSolv CX	100	94.41	☑	
NuGeneration Technologies, LLC	FluoSolv NC 786	100	86.05	☑	
DuPont	Vertrel Sion	100	99.63	☑	
Honeywell	Solstice PF with N2	100	58.10	☐	

Conclusion:

The addition of heat, significantly improved the results from the previous round of testing. While before none of the cleaners cleaned well, visually, with heat at least two performed well. The FluoSolv CX being one of these, only worked on the stainless steel given that it left a substantial amount of white residue behind on the copper surfaces. The only one that worked well on both substrates was Vertrel Sion which was able to remove most of the contaminant, leaving behind little to no residue. The worst cleaner was again Honeywell's Solstice PF which did not visibly remove any contaminant, mostly just turned it a white-green color. Lastly, FluoSolv NC did not perform nearly as well as FluoSolv CX or Vertrel Sion, but did have some peeling and debris with stainless steel. It can be concluded that the best cleaner for this task was Vertrel Sion, because it was able to perform well for both substrates.