

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2016

DateRun: 09/08/2016

Experimenters: Carla De La Cruz

ClientType: Jewelry Mfr

ProjectNumber: Project #3

Substrates: Copper, Stainless Steel

PartType: Coupon

Contaminants:

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: To find the best fit product for cleaning Leach Garner's #1 Masterdraw 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 5 minutes while observations were taken. Finally, clean weights were taken at the end of all the testing.

| Cleaner | Substrate | Initial wt. | Final wt. | % Cont Removed | % Overall |
|--------------|-----------|-------------|-----------|----------------|-----------|
| Fluosolv CX | Stainless | 0.0727 | 0.0037 | 94.91 | |
| | Stainless | 0.0395 | 0.0034 | 91.39 | 94.03 |
| | Stainless | 0.0810 | 0.0034 | 95.80 | |
| | Copper | 0.1005 | 0.0037 | 96.32 | |
| | Copper | 0.0460 | 0.0031 | 93.26 | 95.13 |
| | Copper | 0.0861 | 0.0036 | 95.82 | |
| FluoSolv NC | Stainless | 0.0884 | 0.0034 | 96.15 | |
| | Stainless | 0.0436 | 0.0025 | 94.27 | 95.45 |
| | Stainless | 0.0689 | 0.0028 | 95.94 | |
| | Copper | 0.0865 | 0.0018 | 97.92 | |
| | Copper | 0.0588 | 0.0026 | 95.58 | 95.68 |
| | Copper | 0.0790 | 0.0051 | 93.54 | |
| Vertrel Sion | Stainless | 0.0681 | 0.0019 | 97.21 | |
| | Stainless | 0.0451 | 0.0036 | 92.02 | 95.48 |
| | Stainless | 0.0644 | 0.0018 | 97.20 | |
| | Copper | 0.0965 | 0.0016 | 98.34 | |
| | Copper | 0.0880 | 0.0017 | 98.07 | 98.19 |
| | Copper | 0.0760 | 0.0014 | 98.16 | |
| Solstice PF | Stainless | 0.0572 | 0.0037 | 93.53 | |
| | Stainless | 0.1256 | 0.0039 | 96.89 | 95.49 |
| | Stainless | 0.0759 | 0.0030 | 96.05 | |
| | Copper | 0.0860 | 0.0060 | 93.02 | |
| | Copper | 0.0730 | 0.0055 | 92.47 | 93.38 |
| | Copper | 0.1123 | 0.0060 | 94.66 | |

| | | | | | | |
|-------------|--------------------------------|--|-------------------------|---------------|--------------------|-------------------------------------|
| Summary: | Substrates: | | Copper, Stainless Steel | | | |
| | Contaminants: | | | | | |
| | Company Name: | | Product Name: | Conc.: | Efficiency: | Effective: |
| | NuGeneration Technologies, LLC | | FluoSolv CX | 100 | 94.58 | <input checked="" type="checkbox"/> |
| | NuGeneration Technologies, LLC | | FluoSolv NC 786 | 100 | 95.57 | <input checked="" type="checkbox"/> |
| Conclusion: | DuPont | | Vertrel Sion | 100 | 96.84 | <input checked="" type="checkbox"/> |
| | Honeywell | | Solstice PF with N2 | 100 | 94.44 | <input checked="" type="checkbox"/> |

CLEANING LABORATORY EVALUATION SUMMARY

The percent removal for all the cleaners were quite high, yet there was streaking and some filming left behind for every coupon. Overall, Honeywell's Solstice PF did not perform as well as some of the others, as it left behind significantly more content than any other cleaner. There was no cleaner that was effective in cleaning without leaving a film or streaks, but of those used Vertrel Sion was the best candidate. The coupons seemed to resist streaking better if they were pulled from the solution slowly, rather than just pulling them out.