

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2016

DateRun: 09/25/2016

Experimenters: Francisco Abreau, Carla De La Cruz

ClientType: Jewelry Mfr

ProjectNumber: Project #3

Substrates: Copper, Stainless Steel

PartType: Coupon

Contaminants: Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: To find the best fit product for cleaning Leach Garner's #9 Marvel Mystery 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 | 0.0559 | 0.0046 | 91.77 | |
| | Stainless | 0.0635 | 0.0044 | 93.07 | 92.90 |
| | Stainless | 0.0667 | 0.0041 | 93.85 | |
| | Copper | 0.0545 | 0.0041 | 92.48 | |
| | Copper | 0.0479 | 0.0039 | 91.86 | 92.16 |
| | Copper | 0.0508 | 0.0040 | 92.13 | |
| Fluosolv NC | Stainless | 0.0339 | 0.0037 | 89.09 | |
| | Stainless | 0.0951 | 0.0083 | 91.27 | 90.41 |
| | Stainless | 0.0471 | 0.0043 | 90.87 | |
| | Copper | 0.0590 | 0.0049 | 91.69 | |
| | Copper | 0.0667 | 0.0045 | 93.25 | 92.28 |
| | Copper | 0.0494 | 0.0040 | 91.90 | |
| Vertrel Sion | Stainless | 0.0786 | 0.0010 | 98.73 | |
| | Stainless | 0.0567 | 0.0002 | 99.65 | 99.38 |
| | Stainless | 0.0433 | 0.0001 | 99.77 | |
| | Copper | 0.0323 | 0.0012 | 96.28 | |
| | Copper | 0.0382 | 0.0011 | 97.12 | 97.39 |
| | Copper | 0.0804 | 0.0010 | 98.76 | |
| Solstice PF | Stainless | 0.0384 | 0.0000 | 100.00 | |
| | Stainless | 0.0448 | 0.0005 | 98.88 | 99.32 |
| | Stainless | 0.0216 | 0.0002 | 99.07 | |
| | Copper | 0.0377 | 0.0000 | 100.00 | |
| | Copper | 0.0346 | 0.0002 | 99.42 | 99.59 |
| | Copper | 0.0459 | 0.0003 | 99.35 | |

| | | | | | | |
|----------|--------------------------------|-------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Summary: | Substrates: | Copper, Stainless Steel | | | | |
| | Contaminants: | Oil | | | | |
| | Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| | NuGeneration Technologies, LLC | FluoSolv CX | 100 | 92.53 | <input checked="" type="checkbox"/> | |
| | NuGeneration Technologies, LLC | FluoSolv NC 786 | 100 | 91.35 | <input checked="" type="checkbox"/> | |
| | DuPont | Vertrel Sion | 100 | 98.39 | <input checked="" type="checkbox"/> | |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | | | |
|-----------|---------------------|-----|-------|--------------------------|--|
| Honeywell | Solstice PF with N2 | 100 | 99.46 | <input type="checkbox"/> | |
|-----------|---------------------|-----|-------|--------------------------|--|

Conclusion:

The cleaners selected worked well in dissolving the oil. There was some filming and streaking present, especially with FluoSolv CX and FluoSolv NC. Vertrel Sion and Solstice PF were the better of the cleaners, even though they did have some streaking and some residue in the case of Solstice PF. Of the two better cleaners, Vertrel Sion showed the least visual streaking.