

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2016
 DateRun: 09/07/2016
 Experimenters: Sabrina Apel
 ClientType: Jewelry Mfr
 ProjectNumber: Project #3
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Oil
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric, Visual

Purpose: To evaluate the effectiveness of various cleaners in removing Marvel Mystery Oil from aluminum.

Experimental Procedure: Four cleaners were tested at room temperature on aluminum coupons to evaluate how Marvel Mystery oil soil was cleaned. Prewedged coupons were coated with each supplied soil using a hand held swab for each substrate and weighed a second time to determine the amount of soil added. Each cleaner was put in a beaker and three coupons were immersed into the solution for 5 minutes. The coupons were then stood upright to air dry for 15 minutes and then placed on a tray. There was no rinse. Once dry, final weights were recorded and efficiency was calculated for each coupon cleaned.

| Cleaner | Initial wt of cont. | Final wt of cont. | %Cont Removed |
|--------------|---------------------|-------------------|---------------|
| Fluosolv CX | 0.2182 | 0.0059 | 97.30 |
| | 0.2095 | 0.0028 | 98.66 |
| | 0.1540 | 0.0017 | 98.90 |
| Fluosolv NC | 0.1686 | 0.0027 | 98.40 |
| | 0.1786 | 0.0243 | 86.39 |
| | 0.1500 | 0.0094 | 93.73 |
| Vertrel Sion | 0.2775 | 0.0015 | 99.46 |
| | 0.2763 | 0.0016 | 99.42 |
| | 0.1941 | 0.0024 | 98.76 |
| Solstice PF | 0.1868 | 0.0143 | 92.34 |
| | 0.1220 | 0.0176 | 85.57 |
| | 0.2476 | 0.0272 | 89.01 |

| Summary: | | Substrates: Aluminum | | | | |
|--------------------------------|--|-----------------------------|--------|-------------|-------------------------------------|---------------|
| | | Contaminants: Oil | | | | |
| Company Name: | | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| NuGeneration Technologies, LLC | | FluoSolv CX | 100 | 98.29 | <input checked="" type="checkbox"/> | |
| NuGeneration Technologies, LLC | | FluoSolv NC 786 | 100 | 92.84 | <input checked="" type="checkbox"/> | |
| DuPont | | Vertrel Sion | 100 | 99.21 | <input checked="" type="checkbox"/> | |
| Honeywell | | Solstice PF with N2 | 100 | 88.98 | <input checked="" type="checkbox"/> | |

Conclusion: Ecolink Fluosolv CX, Ecolink Fluosolv NC, and DuPont Vertrel Sion efficiently removed #9 Marvel Mystery Oil on aluminum at room temperature using immersion. Honeywell Solstice PF cleaned least efficiently. DuPont Vertrel Sion cleaned most efficiently with an overall efficiency of 99.21%.