

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2016
 DateRun: 02/29/2016
 Experimenters: Jason Marshall, Abigail Giarrosso, Catherine York, Sabrina Apel
 ClientType: Lab
 ProjectNumber: Project #1
 Substrates: Aluminum, Brass, Ceramics, Stainless Steel, Marble, Porcelain
 PartType: Coupon
 Contaminants: Lubricating/Lapping Oils, Glass
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric

Purpose: To evaluate possible immersion cleaning process for Brookfield compared to other cleaning solutions.

Experimental Procedure: Basic cleaning performance testing was conducted using ASTM G122 as the bases for cleaning. Four cleaners were tested at room temperature on aluminum, brass, and stainless-steel coupons to evaluate how the Navi Guard Way Lube 32 soil was cleaned. Preweighed coupons were coated with the supplied Navi Guard soil using a handheld swab 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 calculated for each coupon cleaned.

| Cleaner | Substrate | Initial Wt. | Final Wt. | % Removed |
|-------------|-----------|-------------|-----------|-----------|
| Fluosolv CX | Aluminum | 21.5357 | 21.5362 | 98.73 |
| | Aluminum | 21.5777 | 21.5790 | 96.95 |
| | Aluminum | 21.6689 | 21.6689 | 100.00 |
| | Brass | 69.4516 | 69.4517 | 99.51 |
| | Brass | 69.5391 | 69.5396 | 98.05 |
| | Brass | 69.6129 | 69.6129 | 100.00 |
| | Stainless | 60.1003 | 60.1009 | 97.35 |
| | Stainless | 63.9329 | 63.9331 | 99.45 |
| | Stainless | 63.8901 | 63.8941 | 90.85 |
| Fluosolv NC | Aluminum | 21.0619 | 21.0619 | 100.00 |

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|----------|--------------------------------|---|----------------------|---------------|-------------------------------------|-------------------|
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| | | Company Name: | Product Name: | Conc.: | Efficiency: | Effective: |
| | NuGeneration Technologies, LLC | FluoSolv CX | 100 | 97.87 | <input checked="" type="checkbox"/> | |
| | NuGeneration Technologies, LLC | FluoSolv NC 786 | 100 | 98.25 | <input checked="" type="checkbox"/> | |

Conclusion: All four cleaners efficiently removed the Navi Guard soil on all three substrates at room temperature. The least efficient cleaner used was Solstice 2A from Honeywell, with the lowest cleaning average on the stainless-steel substrate. The Solstice 2A was still an efficient cleaner with a 97.52% efficiency but was less efficient than the other cleaners used. The most efficient cleaner would be Solstice PF from Honeywell which had an efficiency of 98.48%. All cleaners worked extremely well.