

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2009

DateRun: 10/04/2009

Experimenters: Junhee Cho, Khoa Pham

ClientType: Biomedical Device Manufacturer

ProjectNumber: Project #1

Substrates: Glass/Quartz

PartType: Coupon

Contaminants: Waxes

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate top performing products using heated ultrasonic cleaning for wax removal.

Experimental Procedure: Eight cleaners were selected from the previous trial based on effective cleaning of the wax. Seven aqueous cleaners were diluted to 5% using DI water in 600 ml beakers. One powder cleaner (Uniclean KC 3000) was diluted to 2% using DI water in 600 ml beaker. All eight cleaners were heated to 150 F in a Crest 40 kHz Ultrasonic tank filled with water.

Twenty-four preweighed glass coupons were coated with wax by heating the coupons with a Master Appliance heat gun and wiping solid wax across the surface. Once coupons were cooled, a second weight was recorded. Three coupons were cleaned in each solution. All cleaners were used for 10 minutes.

Following cleaning, the coupons were rinsed in a DI water spray at 60 F for 15 seconds and dried one day at room temperature. Final weights were recorded and efficiencies were calculated. Observations were made on bath conditions following cleaning to determine which products could be reused more effectively.

| Cleaner | Initial wt | Final wt | % Removed | Bath life observation |
|----------------------|------------|----------|-----------|--|
| Valtron sp 2200 5% | 0.369 | 0.0001 | 99.97 | wax lump is located on bottom |
| | 0.3781 | -0.0002 | 100.05 | |
| | 0.4813 | 0.0003 | 99.94 | |
| Contrad 70 5% | 0.5945 | 0.0035 | 99.41 | wax was dissolved in cleaner |
| | 0.5682 | 0.0065 | 98.86 | |
| | 0.7296 | 0.0067 | 99.08 | |
| Uniclean - kc3000 2% | 0.8632 | 0.0072 | 99.17 | wax layer is located on the surface of cleaner |
| | 0.8536 | -0.0004 | 100.05 | |
| | 0.6926 | 0.0126 | 98.18 | |
| Polychem 2000p 5% | 0.8153 | 0.0106 | 98.70 | wax was dissolved in cleaner |
| | 0.7273 | -0.0010 | 100.14 | |
| | 0.4025 | 0.0000 | 100.00 | |
| Inproclean 3800 5% | 0.5235 | -0.0009 | 100.17 | wax was dissolved in cleaner |
| | 0.6236 | -0.0016 | 100.26 | |
| | 0.4138 | 0.0073 | 98.24 | |
| Valtron dpan031 5% | 0.5398 | 0.0002 | 99.96 | wax lump is relatively bigger |
| | 0.4787 | 0.0035 | 99.27 | and it is located on bottom |

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|------------------|--------|---------|--------|------------------------------------|
| | 0.3221 | 0.0000 | 100.00 | |
| Daraclean 212 5% | 0.3534 | -0.0002 | 100.06 | wax was dissolved in cleaner |
| | 0.4252 | 0.0003 | 99.93 | |
| | 0.4596 | -0.0005 | 100.11 | |
| Daraclean 235 5% | 0.3131 | 0.0011 | 99.65 | wax made a mass and layer which is |
| | 0.4669 | -0.0005 | 100.11 | on the surface of cleaner |
| | 0.4737 | -0.0013 | 100.27 | |

Summary:

| Substrates: | | Glass/Quartz | | | |
|-------------------------|----------------------|--------------|-------------|-------------------------------------|---------------|
| Contaminants: | | Waxes | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Valtech Corporation | Valtron SP 2200 | 5 | 99.99 | <input checked="" type="checkbox"/> | |
| Decon Laboratories Inc | Contrad 70 | 5 | 99.12 | <input checked="" type="checkbox"/> | |
| US Polychem Corporation | Polychem A 2000 P | 5 | 99.61 | <input checked="" type="checkbox"/> | |
| Oakite Products | Inproclean 3800 | 5 | 99.56 | <input checked="" type="checkbox"/> | |
| Valtech Corporation | Valtron DP 97031 | 5 | 99.74 | <input checked="" type="checkbox"/> | |
| Magnaflux | Daraclean 212 | 5 | 100.03 | <input checked="" type="checkbox"/> | |
| Magnaflux | Daraclean 235 | 5 | 100.01 | <input checked="" type="checkbox"/> | |
| Universal Photonics | Uni Clean 9.0-KC3000 | 2 | 99.13 | <input checked="" type="checkbox"/> | |

Conclusion:

The ultrasonic cleaning was successful for all cleaners. All products will be tested on supplied dirty parts.