

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004
 DateRun: 11/23/2004
 Experimenters: Jason Marshall, Heidi Wilcox
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #1
 Substrates: Ceramics, Glass/Quartz, Plastic
 PartType: Coupon
 Contaminants: Hucker's Soil
 Cleaning Methods: Low Pressure Spray
 Analytical Methods: Gravimetric
 Purpose: To evaluate products using a home dishwasher in place of an industrial research spray washer

Experimental Procedure: Three substrates were selected to represent possible materials that would be cleaned in a dishwasher. Two cleaning products were tested and compared to each other and to water. One scoop of a product was added to the Maytag home dishwasher. Jet-Dry rinse aid was added to the machine.

Six coupons of each substrate were contaminated with Hucker's soil using a hand held swab and allowed to sit for 24 hours. A second set of weights were recorded to determine the amount of soil added to each coupon. In addition to the six coupons that were contaminated, three uncontaminated coupons were included in the washing cycle as a way to determine redeposition of the contaminant onto the surface of the coupons. Therefore nine coupons per substrate were cleaned in the dishwasher (27 total). The cleaning cycle operated at 160 F and run for 50 minutes. At the end of the cleaning/rinsing, the coupons were removed from the unit and allowed to air dry for 48 hours. At the end of the air drying, final weights were recorded and efficiencies were calculated.

Results: Both dishwashing products worked better than water alone on the Hucker's soil under the cleaning conditions. The table lists the amount of soil added, the amount remaining and the efficiency for each coupon and substrate cleaned.

| Cleaner | Initial wt | Final wt | Ceramic % | Initial wt | Final wt | Glass % | Initial wt | Final wt | Plastic % |
|---------|------------|----------|-----------|------------|----------|---------|------------|----------|-----------|
| Water | 0.3460 | 0.0814 | 76.47 | 0.1803 | 0.0004 | 99.78 | 0.2474 | 0.0238 | 90.38 |
| | 0.2251 | 0.0431 | 80.85 | 0.211 | 0.0015 | 99.29 | 0.1375 | 0.0054 | 96.07 |
| | 2.1914 | 0.3131 | 85.71 | 0.1774 | 0.0017 | 99.04 | 0.3809 | 0.0153 | 95.98 |
| | 0.6356 | 0.0725 | 88.59 | 0.2527 | 0.0023 | 99.09 | 0.2473 | 0.0135 | 94.54 |
| | 1.0981 | 0.2328 | 78.80 | 0.1706 | 0.0008 | 99.53 | 0.2994 | 0.0050 | 98.33 |
| | 0.4674 | 0.0476 | 89.82 | 0.1632 | 0.0010 | 99.39 | 0.2021 | 0.0085 | 95.79 |
| Cascade | 0.3065 | 0.0092 | 97.00 | 0.2457 | 0.0003 | 99.88 | 0.3112 | 0.0079 | 97.46 |
| | 0.3138 | 0.0124 | 96.05 | 0.4853 | 0.0006 | 99.88 | 0.0978 | 0.0058 | 94.07 |
| | 0.8656 | 0.2287 | 73.58 | 0.2321 | 0.0003 | 99.87 | 0.1922 | 0.0037 | 98.07 |
| | 0.395 | 0.0292 | 92.61 | 0.3312 | 0.0001 | 99.97 | 0.2749 | 0.0036 | 98.69 |
| | 2.0125 | 0.2045 | 89.84 | 0.2054 | 0.0007 | 99.66 | 0.1877 | 0.0012 | 99.36 |
| | 0.3751 | 0.0248 | 93.39 | 0.2652 | 0.0016 | 99.40 | 0.9729 | 0.0010 | 99.90 |
| Cogent | 0.3224 | 0.0316 | 90.20 | 0.3096 | 0.0000 | 100.00 | 0.2464 | 0.0157 | 93.63 |
| | 0.5518 | 0.0409 | 92.59 | 0.1429 | 0.0006 | 99.58 | 0.2279 | 0.0021 | 99.08 |
| | 0.4962 | 0.0297 | 94.01 | 0.2544 | 0.0011 | 99.57 | 0.2887 | 0.0086 | 97.02 |
| | 1.1471 | 0.286 | 75.07 | 0.2722 | 0.0009 | 99.67 | 0.3457 | 0.0018 | 99.48 |
| | 0.4596 | 0.0547 | 88.10 | 0.2489 | 0.0004 | 99.84 | 0.2337 | 0.0047 | 97.99 |
| | 1.2510 | 0.1396 | 88.84 | 0.2584 | 0.0009 | 99.64 | 0.2960 | 0.0077 | 97.40 |

Substrate Summary

| | Ceramic % | Glass % | Plastic % |
|---------|-----------|---------|-----------|
| Water | 83.37 | 99.35 | 95.18 |
| Cascade | 90.41 | 99.78 | 97.93 |
| Cogent | 88.13 | 99.72 | 97.43 |

Again the ceramic coupons cleaned with the Cascade were the only control coupons to gain substantial weight during cleaning.

| | Ceramic | Glass | Plastic |
|-------|---------|--------|---------|
| Water | -0.0562 | 0.0018 | 0.0042 |

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|---------|--------|--------|--------|
| Cascade | 0.0283 | 0.0005 | 0.0011 |
| Cogent | 0.0169 | 0.0003 | 0.0017 |

Summary:

| | | | | | |
|--------------------------------|-------------------------|---------------------------------|--------------------|-------------------------------------|----------------------|
| Substrates: | | Ceramics, Glass/Quartz, Plastic | | | |
| Contaminants: | | Hucker's Soil | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Water | Water | 100 | 92.64 | <input checked="" type="checkbox"/> | |
| Procter & Gamble | Cascade Complete (Dawn) | | 96.04 | <input checked="" type="checkbox"/> | 1 scoop |
| Cogent Environmental Solutions | F103 | | 95.09 | <input checked="" type="checkbox"/> | 1 scoop |

Conclusion:

The Cogent and Cascade products compared very closely to each other when cleaning was performed in the Maytag dishwasher.