# CLEANING LABORATORY EVALUATION SUMMARY

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|---|---|
| SCL #: | 2008 |
| DateRun: | 11/19/2008 |
| Experimenters: | Jason Marshall, Junhee Cho |
| ClientType: | Cleaner Manufacturer |
| ProjectNumber: | Project #1 |
| Substrates: | Ceramics, Plastic, Steel |
| PartType: | Coupon |
| Contaminants: | Hucker's Soil |
| Cleaning Methods: | Manual Wipe |
| Analytical Methods: | Gravimetric |
| Purpose: | To evaluate supplied products for ASTM D4488-95 or GS 37 standard to qualify for EPA DfE program |

Experimental Procedure:

Two of the supplied cleaning products were diluted to the requested concentrations (25% and 20% by weight) and the third requested product was used at full strength.

Preweighed ceramic, plastic G-10 and painted steel coupons were coated with Hucker's Soil Formulation (Jif Creamy Peanut Butter 9.2%, Salted Butter 9.2%, Arrowhead Mills stone ground wheat flour 9.2%, Egg Yolk 9.2%, Evaporated milk 13.8%, Distilled water 45.8%, Printer's ink with boiled linseed oil 0.9%, Shaws saline solution 2.7%) using a handheld swab and allowed to dry for 24 hours at room temperature. The contaminated coupons were weighed again to determine the amount of soil added.

Three coupons were placed into a Gardner Straight Line Washability unit. A Kimberly-Clark Wypall reinforced paper towel was attached to the cleaning sled and soaked with 5-7 sprays of cleaning solutions. Each coupon was sprayed 7-10 times with the same cleaning solution. The cleaning unit was run for 20 cycles (~33 seconds).

At the end of the cleaning, coupons were wiped once with a dry paper towel. Final weights were recorded, efficiencies were calculated and recorded.

Results:

The two supplied products removed over 85% of the Hucker's soil using manual wiping. All three products performed comparably to the selected industry standard product. The table lists the substrate cleaned, the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|---|---|---|---|
| Green Force - ceramic | 0.5077 | 0.0049 | 99.03 |
| | 0.2808 | 0.0090 | 96.79 |
| | 0.1597 | 0.0088 | 94.49 |
| Green Force - painted steel | 0.2510 | 0.0191 | 92.39 |
| | 0.9002 | 0.0093 | 98.97 |
| | 0.1734 | 0.0133 | 92.33 |
| Green Force - plastic | 0.1524 | 0.0060 | 96.06 |
| | 0.2127 | 0.0053 | 97.51 |
| | 0.1565 | 0.0096 | 93.87 |
| 5261 - ceramic | 0.1724 | 0.0098 | 94.32 |
| | 0.2865 | 0.0167 | 94.17 |
| | 0.1674 | 0.0062 | 96.30 |
| 5261 - painted steel | 0.1627 | 0.0181 | 88.88 |
| | 0.3113 | 0.0254 | 91.84 |
| | 0.1822 | 0.0256 | 85.95 |
| 5261 - plastic | 0.1890 | 0.0156 | 91.75 |
| | 0.1657 | 0.0063 | 96.20 |
| | 0.1925 | 0.0043 | 97.77 |
| Green Works - ceramic | 0.2425 | 0.0083 | 96.58 |
| | 0.2274 | 0.0143 | 93.71 |
| | 0.1945 | 0.0047 | 97.58 |

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| Green Works - painted steel | 0.2086 | 0.0316 | 84.85 |
| | 0.1625 | 0.0409 | 74.83 |
| | 0.2931 | 0.0106 | 96.38 |
| Green Works - plastic | 0.2028 | 0.0085 | 95.81 |
| | 0.3177 | 0.0102 | 96.79 |
| | 0.2606 | 0.0130 | 95.01 |

Summary:

| **Substrates:** | Ceramics, Plastic, Steel | | | | |
|---|---|---|---|---|---|
| **Contaminants:** | Hucker's Soil | | | | |
| **Company Name:** | **Product Name:** | **Conc.:** | **Efficiency:** | **Effective:** | **Observations:** |
| Alex C Ferguson Inc | Green Force Ultra | 25 | 95.72 | ☑ | |
| Alex C Ferguson Inc | AFCO 5261 Liquid Terg | 20 | 93.02 | ☑ | |
| Clorox Company | Green Works Multi-Surface Cleaner | 100 | 92.39 | ☑ | |

Conclusion: Two products had overall average efficiencies greater than 85% and would be considered effective based on the SSL testing methodology.