

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2014
 DateRun: 08/11/2014
 Experimenters: Loc Nguyen, George Liang
 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 three supplied products for all purpose cleaning following GS 37 requirements

Experimental Procedure: Three sets of nine ceramic, stainless steel, and polycarbonate coupons were weighed and then coated with the 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%, saline solution 2.7%) using a handheld swab and allowed to dry for 2 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 Wypal x60 reinforced paper towel was attached to the cleaning sled and soaked with 1 spray of cleaning solution. Each coupon was sprayed 1 time with the same cleaning solution. The cleaning unit was run for 20 cycles (~33 seconds). Final weights were recorded, efficiencies were calculated and recorded.

ChemistriesEvaluated: Zbioscience A1+; Clorox 409; Greenworks;

Results: All three products were effective at removing the Hucker's soil from some surfaces using manual wiping. Zbioscience resulted in the lowest efficiency average, removing just below 85% of the Hucker's soil. The table lists the amount of soil added, the amount remaining after cleaning and the calculated efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed | % Average |
|---|------------|----------|-----------|-----------|
| Z Bio new formula 1:50_painted aluminum | 0.2769 | 0.0879 | 68.26 | |
| Z Bio new formula 1:50 painted aluminum | 0.2752 | 0.0180 | 93.46 | |
| Z Bio new formula 1:50 painted aluminum | 0.2734 | 0.0458 | 83.25 | 81.65 |
| Z Bio new formula 1:50 plastic | 0.2712 | 0.0419 | 84.55 | |
| Z Bio new formula 1:50 plastic | 0.2734 | 0.0130 | 95.25 | |
| Z Bio new formula 1:50 plastic | 0.2660 | 0.0137 | 94.85 | 91.55 |
| Z Bio new formula 1:50 ceramic | 0.2710 | 0.0384 | 85.83 | |
| Z Bio new formula 1:50 ceramic | 0.2691 | 0.0473 | 82.42 | |
| Z Bio new formula 1:50 ceramic | 0.2666 | 0.0742 | 72.17 | 80.14 |
| | 0.3248 | 0.1047 | 67.76 | |

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|-----------------------------|--------|--------|-------|-------|
| 409 painted aluminum | | | | |
| 409 painted aluminum | 0.2833 | 0.0465 | 83.59 | |
| 409 painted aluminum | 0.2997 | 0.0483 | 83.88 | 78.41 |
| 409 plastic | 0.3350 | 0.0278 | 91.70 | |
| 409 plastic | 0.3243 | 0.0158 | 95.13 | |
| 409 plastic | 0.3334 | 0.0549 | 83.53 | 90.12 |
| 409 ceramic | 0.3066 | 0.0230 | 92.50 | |
| 409 ceramic | 0.3346 | 0.0274 | 91.81 | |
| 409 ceramic | 0.3401 | 0.0773 | 77.27 | 87.19 |
| Greenworks painted aluminum | 0.3586 | 0.0719 | 79.95 | |
| Greenworks painted aluminum | 0.3853 | 0.0119 | 96.91 | |
| Greenworks painted aluminum | 0.3716 | 0.0275 | 92.60 | 89.82 |
| Greenworks plastic | 0.4060 | 0.0082 | 97.98 | |
| Greenworks plastic | 0.3866 | 0.0045 | 98.84 | |
| Greenworks plastic | 0.3644 | 0.0179 | 95.09 | 97.30 |
| Greenworks ceramic | 0.3273 | 0.0363 | 88.91 | |
| Greenworks ceramic | 0.3198 | 0.0157 | 95.09 | |
| Greenworks ceramic | 0.2461 | 0.0638 | 74.08 | 86.03 |

Summary:

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|----------------------|---|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Ceramics, Plastic, Steel | | | | |
| Contaminants: | Hucker's Soil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Fisher Scientific | Absolute Ethanol | 0 | 0.00 | <input type="checkbox"/> | |
| Bio Science | Z Biosurfactant Cleaner A-1 | 2 | 73.87 | <input checked="" type="checkbox"/> | |
| Clorox Company | Green Works General Purpose Cleaner Concentrate | 100 | 91.00 | <input checked="" type="checkbox"/> | |
| Clorox Company | Formula 409 All Purpose Cleaner | 100 | 0.00 | <input checked="" type="checkbox"/> | |

Conclusion:

Conclusion: Greenwork All Purpose was found to be most effective for removing the Hucker's soil from various surfaces using manual wiping with a 91% average. Zbioscience was effective in removing Hucker's soil from plastic but not from painted aluminum or ceramic.