

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2012
 DateRun: 11/02/2012
 Experimenters: Nathalie Regis, Anni Geng
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #1
 Substrates: Ceramics, Plastic, Steel
 PartType: Coupon
 Contaminants: Greases, Oil, Food
 Cleaning Methods: Manual Wipe
 Analytical Methods: Gravimetric
 Purpose: To evaluate three supplied products for all purpose cleaning following EPA DfE requirements

Experimental Procedure: The four supplied cleaning products were diluted with DI water at room temperature to vendor recommended concentration for all purpose cleaning (32:1, 8:1 and 1:1). The fourth product was used at the RTU concentration.

Prewriteed ceramic, plastic and painted steel coupons were coated with a mixture of three cooking oils/greases. The mix was blend of 33% vegetable shortening, 33% lard, 33% vegetable oil and 1% carbon black. Care was taken in the application of the soil onto the coupons so that light and heavy areas were avoided. The soiled coupons were 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 Wypal 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.

Table Key
 Substrate
 A Ceramic
 B Plastic
 C Painted Steel
 Product
 1 Tub, Basin, Tile
 2 Heavy Duty D&C
 3 Super Citrus
 4 Cycle Degreaser
 5 Formula 409

Results: Two of the three supplied products were effective at removing the all-purpose soil from the three surfaces using manual wiping. Each of these compared closely with the conventional product. Only one product removed less than 85% of the 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 |
|---------|------------|----------|-----------|
| 1A | | | |
| | 0.4597 | 0.0615 | 86.62 |
| | 0.6314 | 0.0447 | 92.92 |
| | 0.3191 | 0.0339 | 89.38 |
| 1B | | | |
| | 0.0520 | 0.0001 | 99.81 |
| | 0.0763 | 0.0073 | 90.43 |
| | 0.0839 | 0.0059 | 92.97 |
| 1C | | | |
| | 0.0823 | 0.0061 | 92.59 |
| | 0.1515 | 0.0034 | 97.76 |
| | 0.1283 | 0.0032 | 97.51 |
| 2A | | | |
| | 0.1832 | 0.0338 | 81.55 |
| | 0.2276 | 0.0159 | 93.01 |
| | 0.2435 | 0.0408 | 83.24 |
| 2B | | | |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | |
|----|--------|--------|-------|
| | 0.0974 | 0.0048 | 95.07 |
| | 0.0651 | 0.0027 | 95.85 |
| | 0.0650 | 0.0042 | 93.54 |
| 2C | | | |
| | 0.0740 | 0.0031 | 95.81 |
| | 0.0704 | 0.0014 | 98.01 |
| | 0.1124 | 0.0020 | 98.22 |
| 3A | | | |
| | 0.1397 | 0.0091 | 93.49 |
| | 0.3995 | 0.0048 | 98.80 |
| | 0.3805 | 0.0123 | 96.77 |
| 3B | | | |
| | 0.0797 | 0.0034 | 95.73 |
| | 0.1143 | 0.0056 | 95.10 |
| | 0.0824 | 0.0021 | 97.45 |
| 3C | | | |
| | 0.0783 | 0.0050 | 93.61 |
| | 0.0929 | 0.0032 | 96.56 |
| | 0.1206 | 0.0021 | 98.26 |
| 4A | | | |
| | 0.0745 | 0.0129 | 82.68 |
| | 0.0327 | 0.0070 | 78.59 |
| | 0.0458 | 0.0080 | 82.53 |
| 4B | | | |
| | 0.0409 | 0.0028 | 93.15 |
| | 0.0343 | 0.0084 | 75.51 |
| | 0.0587 | 0.0023 | 96.08 |
| 4C | | | |
| | 0.0458 | 0.0136 | 70.31 |
| | 0.0472 | 0.0101 | 78.60 |
| | 0.0367 | 0.0092 | 74.93 |
| 5A | | | |
| | 0.2346 | 0.0082 | 96.50 |
| | 0.2109 | 0.0113 | 94.64 |
| | 0.3179 | 0.0063 | 98.02 |
| 5B | | | |
| | 0.1166 | 0.0048 | 95.88 |
| | 0.0937 | 0.0098 | 89.54 |
| | 0.0808 | 0.0053 | 93.44 |
| 5C | | | |
| | 0.1107 | 0.0016 | 98.55 |
| | 0.0949 | 0.0002 | 99.79 |
| | 0.0992 | 0.0012 | 98.79 |

Summary:

| | | | | | |
|--------------------------|---|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Ceramics, Plastic, Steel | | | | |
| Contaminants: | Greases, Oil, Food | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| The Clean Environment Co | Super Citrus Clean N 46 | 3.125 | 96.20 | <input checked="" type="checkbox"/> | |
| Clorox Company | Formula 409 All Purpose Cleaner | 100 | 96.13 | <input checked="" type="checkbox"/> | |
| The Clean Environment Co | N-7 (the Natural) Basin, Tub and Tile Cleaner | 50 | 93.33 | <input checked="" type="checkbox"/> | |
| The Clean Environment Co | Natural N-14 Heavy Duty Degreaser and Cleaner | 12.5 | 92.70 | <input checked="" type="checkbox"/> | |
| The Clean Environment Co | Cycle Degrease C-2 | 12.5 | 81.38 | <input type="checkbox"/> | |

Conclusion:

The Super Citrus product was the most effective of the five products tested for manual all-purpose cleaning.