

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2010
 DateRun: 09/08/2010
 Experimenters: Jason Marshall, Timothy Weil
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #1
 Substrates: Ceramics, Plastic, Steel, Porcelain
 PartType: Coupon
 Contaminants: Greases, Hucker's Soil, Food
 Cleaning Methods: Manual Wipe
 Analytical Methods: Gravimetric
 Purpose: To evaluate solvents in formulation for all purpose cleaning

Experimental Procedure: The previous two supplied solvent were used in supplied three formulations at full strength. A set of preweighed ceramic, porcelain, plastic G-10 and painted steel coupons were coated with Hucker's Soil Formulation (Jiffy 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. A second set of coupons were coated with DCC 17 grease soil mix (33% vegetable oil, 33% shortening, 33% lard, 15 carbon black). 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.

Results: The APC formulation one worked well on the Hucker's soil, removing more than 85%. The third formulation removed just under 85%. The second formulation was the weakest removing less than 75%. No product left a residue behind on the surface. Similar results were obtained for the DCC 17 grease mix, except the third formulation worked slightly better than the first.

Interesting observation was that when visually inspecting the coupons, the second formulation looked cleaner than the other two formulations for both soils. The table below lists the amount of soil added, remaining and efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|---------------------|------------|----------|-----------|
| Hucker's Soil | | | |
| APC 1 Porcelain | | | |
| | 0.0683 | 0.0111 | 83.75 |
| | 0.0516 | 0.0111 | 78.49 |
| | 0.0708 | 0.0069 | 90.25 |
| APC 1 Ceramic | | | |
| | 0.1094 | 0.0153 | 86.01 |
| | 0.1115 | 0.0196 | 82.42 |
| | 0.0844 | 0.0149 | 82.35 |
| APC 1 Plastic | | | |
| | 0.0750 | 0.0104 | 86.13 |
| | 0.1692 | 0.0083 | 95.09 |
| | 0.0846 | 0.0116 | 86.29 |
| APC 1 Painted steel | | | |
| | 0.0989 | 0.0072 | 92.72 |
| | 0.1018 | 0.0092 | 90.96 |
| | 0.0926 | 0.0091 | 90.17 |
| APC 2 Porcelain | | | |
| | 0.0308 | 0.0098 | 68.18 |
| | 0.0426 | 0.0086 | 79.81 |
| | 0.0461 | 0.0107 | 76.79 |

CLEANING LABORATORY EVALUATION SUMMARY

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|---------------------|--------|--------|-------|
| APC 2 Ceramic | | | |
| | 0.0534 | 0.0224 | 58.05 |
| | 0.0447 | 0.0270 | 39.60 |
| | 0.0580 | 0.0250 | 56.90 |
| APC 2 Plastic | | | |
| | 0.0507 | 0.0045 | 91.12 |
| | 0.0546 | 0.0094 | 82.69 |
| | 0.0312 | 0.0066 | 78.85 |
| APC 2 Painted steel | | | |
| | 0.0416 | 0.0102 | 75.48 |
| | 0.0513 | 0.0082 | 84.02 |
| | 0.0682 | 0.0096 | 85.92 |
| APC 3 Porcelain | | | |
| | 0.0643 | 0.0129 | 79.94 |
| | 0.0558 | 0.0096 | 82.80 |
| | 0.0692 | 0.0131 | 81.07 |
| APC 3 Ceramic | | | |
| | 0.0974 | 0.0097 | 90.04 |
| | 0.3128 | 0.0481 | 84.62 |
| | 0.1088 | 0.0343 | 68.47 |
| APC 3 Plastic | | | |
| | 0.0625 | 0.0077 | 87.68 |
| | 0.0767 | 0.0061 | 92.05 |
| | 0.0550 | 0.0094 | 82.91 |
| APC 3 Painted steel | | | |
| | 0.0709 | 0.0089 | 87.45 |
| | 0.0739 | 0.0083 | 88.77 |
| | 0.0835 | 0.0076 | 90.90 |
| DCC 17 Grease | | | |
| APC 1 Porcelain | | | |
| | 0.0738 | 0.0037 | 94.99 |
| | 0.1137 | 0.0145 | 87.25 |
| | 0.1434 | 0.0001 | 99.93 |
| APC 1 Ceramic | | | |
| | 0.3160 | 0.0039 | 98.77 |
| | 0.1902 | 0.0040 | 97.90 |
| | 0.2857 | 0.0049 | 98.28 |
| APC 1 Plastic | | | |
| | 0.0899 | 0.0110 | 87.76 |
| | 0.1650 | 0.0007 | 99.58 |
| | 0.1092 | 0.0023 | 97.89 |
| APC 1 Painted steel | | | |
| | 0.1616 | 0.0206 | 87.25 |
| | 1.0791 | 0.1825 | 83.09 |
| | 0.3619 | 0.0087 | 97.60 |
| APC 2 Porcelain | | | |
| | 0.1216 | 0.0042 | 96.55 |
| | 0.0971 | 0.0038 | 96.09 |
| | 0.0924 | 0.0007 | 99.24 |
| APC 2 Ceramic | | | |
| | 0.2784 | 0.0066 | 97.63 |
| | 0.2918 | 0.0075 | 97.43 |
| | 0.2606 | 0.0048 | 98.16 |
| APC 2 Plastic | | | |
| | 0.0767 | 0.0079 | 89.70 |
| | 0.0925 | 0.0070 | 92.43 |

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|---------------------|--------|---------|--------|
| | 0.0919 | 0.0043 | 95.32 |
| APC 2 Painted steel | | | |
| | 0.1058 | 0.0071 | 93.29 |
| | 0.1479 | 0.0156 | 89.45 |
| | 0.1173 | 0.0300 | 74.42 |
| APC 3 Porcelain | | | |
| | 0.1459 | 0.0053 | 96.37 |
| | 0.1570 | 0.0033 | 97.90 |
| | 0.1154 | 0.0094 | 91.85 |
| APC 3 Ceramic | | | |
| | 0.2199 | 0.0066 | 97.00 |
| | 0.1764 | 0.0072 | 95.92 |
| | 0.0966 | -0.0413 | 142.75 |
| APC 3 Plastic | | | |
| | 0.0957 | 0.0078 | 91.85 |
| | 0.1170 | 0.0021 | 98.21 |
| | 0.1087 | 0.0075 | 93.10 |
| APC 3 Painted steel | | | |
| | 0.1409 | 0.0128 | 90.92 |
| | 0.0976 | 0.0067 | 93.14 |
| | 0.1607 | 0.0077 | 95.21 |

Summary:

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|----------------------|----------------------|-------------------------------------|--------------------|-------------------------------------|----------------------|
| Substrates: | | Ceramics, Plastic, Steel, Porcelain | | | |
| Contaminants: | | Greases, Hucker's Soil, Food | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Segetis | Segetis APC 1 | 100 | 90.62 | <input checked="" type="checkbox"/> | |
| Segetis | Segetis APC 2 | 100 | 83.22 | <input type="checkbox"/> | |
| Segetis | Segetis APC 3 | 100 | 91.70 | <input checked="" type="checkbox"/> | |

Conclusion:

Formulations 1 and 3 appear to be effective all-purpose cleaners based on the combined results for both soils tested.