

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2016

DateRun: 02/02/2016

Experimenters: Russell Curtis, Francisco Abreau, Vinh Tran, Catherine York, Alicia McCarthy, Selena Bui

ClientType: Cleaner Manufacturer

ProjectNumber: Project #5

Substrates: Ceramics, Plastic, White Board

PartType: Coupon

Contaminants: Greases, Food

Cleaning Methods: Manual Wipe

Analytical Methods: Gravimetric

Purpose: To evaluate 11 supplied samples and one competitor sample for an all purpose cleaning efficacy test.

Experimental Procedure: Nine coupons for each sample (three ceramic, three plastic, and three painted steel) were weighed for initial weights. Using a swab, coupons were then dirtied with .5 grams of DCC17 and air dried at 68F overnight.

Dirty weights were then collected the next day and cleaning samples were placed into a lab testing spray bottle. Three coupons were placed into a Gardner Straight Line Washability unit. A Wypall X60 reinforced wipe was attached to the cleaning sled and soaked with two sprays of cleaning solutions. Each coupon was sprayed two times with the same cleaning solution. The solution was allowed to penetrate for 30 seconds followed by cleaning in the SLW unit for 20 cycles (30 seconds of cleaning).

Coupons were placed back on the tray and then weighed for a final weight. If coupon's gravimetric final results were off, coupons were reweighed the next day to allow for air drying.

Results: Cleaner Substrate Initial Wt. Final Wt. %Cont Removed %Average %Overall

| NAPCD-5 | | | | | | |
|---------|---------------|------------|----------|---------|---------|-------------|
| '1:128 | | Initial wt | Final wt | Removal | Average | Overall Ave |
| | Ceramic | 0.5137 | 0.1062 | 79.33 | 90.35 | |
| | | 0.5566 | 0.0627 | 99.41 | | |
| | | 0.5179 | 0.0398 | 92.32 | | |
| | Plastic | 0.5457 | 0.1549 | 71.61 | 91.48 | 91.18 |
| | | 0.543 | 0.0417 | 92.32 | | |
| | | 0.5067 | -0.0532 | 110.5 | | |
| | Painted Steel | 0.5111 | 0.033 | 93.54 | 91.72 | |
| | | 0.535 | 0.0308 | 94.24 | | |
| | | 0.5353 | 0.0676 | 87.37 | | |
| NAPCD-5 | | | | | | |
| '1:64 | | | | | | |
| | Ceramic | 0.5337 | 0.0395 | 92.6 | 91.35 | |
| | | 0.5458 | 0.0585 | 89.28 | | |
| | | 0.5427 | 0.0425 | 92.16 | | |
| | Plastic | 0.5627 | 0.0274 | 95.13 | 94.04 | 92.81 |
| | | 0.5222 | 0.0186 | 96.43 | | |
| | | 0.5119 | 0.0483 | 90.56 | | |
| | Painted Steel | 0.5122 | 0.0268 | 94.76 | 93.06 | |
| | | 0.5372 | 0.026 | 95.16 | | |
| | | 0.5353 | 0.0575 | 89.25 | | |
| NAPCD-6 | | | | | | |
| '1:64 | | | | | | |
| | Ceramic | 0.4665 | 0.0936 | 79.93 | 72.69 | |
| | | 0.4128 | 0.1383 | 66.49 | | |
| | | 0.4552 | 0.129 | 71.66 | | |
| | Plastic | 0.5251 | 0.1136 | 78.36 | 80.71 | 75.86 |
| | | 0.5334 | 0.1206 | 77.39 | | |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | | | | |
|----------------|---------------|--------|--------|--------|-------|-------|
| | | 0.5128 | 0.0698 | 86.38 | | |
| | Painted Steel | 0.5057 | 0.1099 | 78.26 | 74.18 | |
| | | 0.4957 | 0.1481 | 70.12 | | |
| | | 0.5416 | 0.14 | 74.15 | | |
| NAPCD-6 | | | | | | |
| '1:128 | | | | | | |
| | Ceramic | 0.5825 | 0.0853 | 85.35 | 87.74 | |
| | | 0.5813 | 0.1109 | 80.92 | | |
| | | 0.5371 | 0.0163 | 96.96 | | |
| | Plastic | 0.5286 | 0.1594 | 69.84 | 75.08 | 84.53 |
| | | 0.5722 | 0.1328 | 76.79 | | |
| | | 0.5298 | 0.1133 | 78.61 | | |
| | Painted Steel | 0.4856 | 0.034 | 92.99 | 90.76 | |
| | | 0.5792 | 0.0713 | 87.68 | | |
| | | 0.5058 | 0.0424 | 91.61 | | |
| NAPCD-7 | | | | | | |
| '1:64 | | | | | | |
| | Ceramic | 0.3843 | 0.0547 | 85.76 | 92.15 | |
| | | 0.3561 | 0.006 | 98.31 | | |
| | | 0.411 | 0.0313 | 92.38 | | |
| | Plastic | 0.4295 | 0.0121 | 97.18 | 95.84 | 93.74 |
| | | 0.4394 | 0.0296 | 93.26 | | |
| | | 0.4268 | 0.0124 | 97.09 | | |
| | Painted Steel | 0.4781 | 0.0195 | 95.92 | 93.25 | |
| | | 0.4235 | 0.0351 | 91.71 | | |
| | | 0.3972 | 0.0312 | 92.14 | | |
| NAPCD-8 | | | | | | |
| '1:64 | | | | | | |
| | Ceramic | 0.2802 | 0.0138 | 104.92 | 99.1 | |
| | | 0.3755 | 0.0089 | 97.62 | | |
| | | 0.3959 | 0.0208 | 94.74 | | |
| | Plastic | 0.476 | 0.0399 | 91.61 | 88.42 | 99.84 |
| | | 0.373 | 0.0389 | 89.57 | | |
| | | 0.3879 | 0.0617 | 84.09 | | |
| | Painted Steel | 0.3249 | 0.0107 | 96.7 | 96.16 | |
| | | 0.3238 | 0.0053 | 98.36 | | |
| | | 0.3508 | 0.0231 | 93.41 | | |
| NAPCD-8 | | | | | | |
| '1:128 | | | | | | |
| | Ceramic | 0.3934 | 0.0377 | 90.41 | 96.55 | |
| | | 0.3774 | 0.0024 | 99.36 | | |
| | | 0.4658 | 0.0158 | 96.6 | | |
| | Plastic | 0.4098 | 0.0007 | 99.82 | 95.45 | 96.34 |
| | | 0.4936 | 0.0052 | 98.94 | | |
| | | 0.3886 | 0.0482 | 87.59 | | |
| | Painted Steel | 0.2911 | 0.0111 | 103.81 | 97.03 | |
| | | 0.4274 | 0.0377 | 91.17 | | |
| | | 0.5088 | 0.0198 | 96.1 | | |
| 7th Generation | | | | | | |
| All Purpose | | | | | | |
| | Ceramic | 0.5902 | 0.0335 | 94.32 | 90.97 | |
| | | 0.2096 | 0.0264 | 87.4 | | |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | | | | |
|-------|---------------|--------|---------|--------|-------|-------|
| | | 0.3391 | 0.0299 | 91.18 | | |
| | Plastic | 0.4997 | 0.16 | 67.98 | 81.48 | 88.94 |
| | | 0.4034 | 0.0204 | 94.94 | | |
| | | 0.3435 | 0.0634 | 81.54 | | |
| | Painted Steel | 0.3595 | -0.001 | 100.27 | 94.95 | |
| | | 0.2565 | 0.0445 | 82.65 | | |
| | | 0.226 | -0.0044 | 101.94 | | |
| DG-23 | | | | | | |
| 1:64 | | | | | | |
| | Ceramic | 0.5059 | 0.0712 | 85.92 | 81.61 | |
| | | 0.4363 | 0.0726 | 83.36 | | |
| | | 0.4068 | 0.0994 | 75.56 | | |
| | Plastic | 0.4297 | 0.0454 | 89.43 | 81.22 | 84.49 |
| | | 0.4948 | 0.0576 | 88.35 | | |
| | | 0.4459 | 0.1522 | 65.86 | | |
| | Painted Steel | 0.4471 | 0.036 | 91.94 | 90.64 | |
| | | 0.4056 | 0.0377 | 90.7 | | |
| | | 0.4389 | 0.047 | 89.29 | | |
| DG-23 | | | | | | |
| 1:128 | | | | | | |
| | Ceramic | 0.4471 | 0.0696 | 84.43 | 85.22 | |
| | | 0.409 | 0.0994 | 75.69 | | |
| | | 0.3929 | 0.0176 | 95.52 | | |
| | Plastic | 0.4005 | 0.0535 | 86.64 | 84.59 | 86.95 |
| | | 0.4096 | 0.1162 | 71.63 | | |
| | | 0.3842 | 0.0172 | 95.52 | | |
| | Painted Steel | 0.428 | 0.0374 | 91.26 | 91.05 | |
| | | 0.4435 | 0.0257 | 94.2 | | |
| | | 0.3442 | 0.0424 | 87.68 | | |

Summary:

| | | | | | | |
|-----------------------|--------------------------------|---------------|--------------------|-------------------------------------|----------------------|--|
| Substrates: | Ceramics, Plastic, White Board | | | | | |
| Contaminants: | Greases, Food | | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: | |
| ProNatural Brands LLC | NAPCD-5 All Purpose Cleaner | 0.8 | 91.18 | <input checked="" type="checkbox"/> | | |
| ProNatural Brands LLC | NAPCD-5 All Purpose Cleaner | 1.6 | 92.81 | <input checked="" type="checkbox"/> | | |
| ProNatural Brands LLC | NAPCD-6 All Purpose Cleaner | 0.8 | 75.86 | <input type="checkbox"/> | | |
| ProNatural Brands LLC | NAPCD-6 All Purpose Cleaner | 0.8 | 84.53 | <input checked="" type="checkbox"/> | | |
| ProNatural Brands LLC | NAPCD-7 All Surface Cleaner | 1.6 | 93.74 | <input checked="" type="checkbox"/> | | |
| ProNatural Brands LLC | NAPCD-7 All Surface Cleaner | 0.78 | 92.92 | <input checked="" type="checkbox"/> | | |
| ProNatural Brands LLC | NAPCD-8 All Surface Cleaner | 1.6 | 99.84 | <input checked="" type="checkbox"/> | | |
| ProNatural Brands LLC | NAPCD-8 All Surface Cleaner | 0.78 | 96.34 | <input checked="" type="checkbox"/> | | |
| Fisher Scientific | Absolute Ethanol | 0 | 0.00 | <input type="checkbox"/> | | |
| Seventh Generation | Free & Clear All Purpose | 100 | 88.94 | <input checked="" type="checkbox"/> | | |
| Fisher Scientific | Absolute Ethanol | 0 | 0.00 | <input type="checkbox"/> | | |
| ProNatural Brands LLC | DG-23 | 1.6 | 84.49 | <input checked="" type="checkbox"/> | | |
| ProNatural Brands LLC | DG-23 | 0.78 | 86.95 | <input checked="" type="checkbox"/> | | |

Conclusion:

The cleaner that performed the best for removal of DCC17 was NAPCD-8 1:64. NAPCD-6 1:64 performed the worst at removing DCC17. In comparison to the competitor sample 7th Generation All Purpose Cleaner, both dilution versions of NAPCD-5, NAPCD-7, NAPCD-8 performed equal or better.