

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2013

DateRun: 12/10/2013

Experimenters: Jason Marshall, Junhee Cho

ClientType: Cleaner Manufacturer

ProjectNumber: Project #1

Substrates: Glass/Quartz, Chrome

PartType: Coupon

Contaminants: Films, Soaps

Cleaning Methods: Manual Wipe

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate the supplied products for glass cleaning using manual cleaning

Experimental Procedure: The supplied cleaning product was used at the recommended concentration (0.25 oz/gal, ~0.2%). The two comparative products were used at the supplied ready to use concentration.

Prewrite weighed chrome, ceramic and fiberglass, coupons were coated with SSL Soil 2 (Glass soap scum) 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 Wypall X60 reinforced wipe was attached to the cleaning sled and soaked with 1-2 sprays of cleaning solutions. Each coupon was sprayed 1 time with the same cleaning solution. The solution was allowed to penetrate for 30 seconds followed by cleaning in the SLW unit for 20 cycles (~33 seconds). At the end of the cleaning, coupons were blotted once with a dry paper towel. Final weights were measured and efficiencies were calculated and recorded.

Visual observations were made on the coupons for spotting and filming following the general guidelines set forth in the CSPA DCC 09A. Filming is best recognized as "haziness" or overall "miliness", while streaking is best identified as dried droplets or "spotting", usually found strung together into thin white lines. Three technicians recorded observations and the overall average was calculated. Each coupon was evaluated separately for filming and streaking, (i.e., product residues without added soil), according to a scale of "1" to "7" where:

Filming Streaking
7 = high filming 7 = high streaking poor (performance)
1 = no visible filming 1 = no visible streaking (excellent performance)

Chemistries Evaluated: nClean; Windex; Seventh Generation Free & Clear Glass and Surface Cleaner

Results: The supplied product removed over 85% of the bathroom soap scum soil from the surfaces using manual cleaning. The two commercially available products removed more than 90%. The table lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|-----------------------|------------|----------|-----------|
| nCleans - glass | | | |
| | 0.0561 | 0.0020 | 96.43 |
| | 0.0398 | 0.0038 | 90.45 |
| | 0.0570 | 0.0050 | 91.23 |
| nCleans - chrome | | | |
| | 0.0696 | 0.0113 | 83.76 |
| | 0.0589 | 0.0098 | 83.36 |
| | 0.0480 | 0.0065 | 86.46 |
| Windex - glass | | | |
| | 0.0344 | 0.0009 | 97.38 |
| | 0.0221 | 0.0016 | 92.76 |
| | 0.0243 | 0.0016 | 93.42 |
| Windex - chrome | | | |
| | 0.0810 | 0.0048 | 94.07 |
| | 0.0510 | 0.0044 | 91.37 |
| | 0.0348 | 0.0002 | 99.43 |
| 7th Gen Glass - glass | | | |
| | 0.0708 | 0.0026 | 96.33 |

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|------------------------|--------|--------|-------|
| | 0.0336 | 0.0009 | 97.32 |
| | 0.0321 | 0.0044 | 86.29 |
| 7th Gen Glass - chrome | | | |
| | 0.0705 | 0.0062 | 91.21 |
| | 0.0715 | 0.0092 | 87.13 |
| | 0.0553 | 0.0046 | 91.68 |

Visual inspection of the glass coupons showed that the Windex had the lowest amount of filming and streaking followed by nCleans. The table lists the individual and average scores for the three products.

| Visual | Filming | Average | Streaking | Average |
|---------|---------|---------|-----------|---------|
| nCleans | 2 2 2 | 3.3 | 2 2 2 | 3.0 |
| | 7 6 5 | | 4 6 4 | |
| | 2 2 2 | | 2 3 2 | |
| Windex | 2 5 2 | 2.9 | 2 4 2 | 2.2 |
| | 3 2 2 | | 2 2 2 | |
| | 2 3 5 | | 2 2 2 | |
| 7th Gen | 4 5 6 | 4.1 | 3 6 6 | 4.4 |
| | 4 6 6 | | 3 7 6 | |
| | 2 2 2 | | 3 3 3 | |

Summary:

| | | | | | |
|----------------------|-------------------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Glass/Quartz, Chrome | | | | |
| Contaminants: | Films, Soaps | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Geophia | nClean | 0.21 | 88.62 | <input checked="" type="checkbox"/> | |
| SC Johnson & Son Inc | Windex Glass & More Cleaner (Spray) | 100 | 94.74 | <input checked="" type="checkbox"/> | |
| Seventh Generation | Natural Glass and Surface Cleaner | 100 | 91.66 | <input checked="" type="checkbox"/> | |

Conclusion:

The supplied product was comparable with the "green" commercial product and slightly lower than the conventional product for soil removal. It compared well with the conventional product for the filming and streaking assessment and outperformed the green commercial product.