

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2018

DateRun: 01/29/2018

Experimenters: Carla De La Cruz, James Keats, Kevin Smith, Justin Rainaud

ClientType: Cleaner Manufacturer

ProjectNumber: Project #14

Substrates: Glass/Quartz, Chrome

PartType: Coupon

Contaminants: Stickies, Soaps

Cleaning Methods: Manual Wipe

Analytical Methods: Gravimetric, Visual

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

Experimental Procedure: Pre-weighed Glass and Chrome coupons were coated with SSL Soil 2 (Glass soap scum: Water 51.5%, Hair gel 25.6%, Toothpaste 10.4%, Shaving cream 5.3%, Hair spray 3.7% and Spray deodorant 3.5%) using a hand held 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 L60 reinforced wipe was attached to the cleaning sled and soaked with 1 spray 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 5 cycles (~10 seconds). Coupons were left to dry overnight before final weights and efficiencies were 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. Each coupon was evaluated separately for filming and streaking, (i.e., product residues without added soil), according to a scale of "1" to "7" with:

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

Results: Both cleaners were effective at removing the SSL Soil 2 from both glass and chrome surfaces. Foaming Glass Cleaner Clorox had the highest efficiency at 94.35% removal on chrome. The following table lists the initial and final soil weight, and the percent weight of soil removed.

Table 1: Gravimetric Results

| Cleaner | Substrate | Initial wt | Final wt | % Removed | % Average Removed |
|------------------------------|-----------|------------|----------|-----------|-------------------|
| Foaming Glass Cleaner Clorox | Glass | 0.1086 | 0.0089 | 91.80 | 90.89 |
| | | 0.1063 | 0.0081 | 92.38 | |
| | | 0.1180 | 0.0136 | 88.47 | |
| | Chrome | 0.1263 | 0.0077 | 93.90 | 94.35 |
| | | 0.1109 | 0.0067 | 93.96 | |
| | | 0.1099 | 0.0053 | 95.18 | |
| Foaming Glass Cleaner Windex | Glass | 0.1042 | 0.0127 | 87.81 | 88.26 |
| | | 0.1179 | 0.0110 | 90.67 | |
| | | 0.1123 | 0.0154 | 86.29 | |
| | Chrome | 0.1109 | 0.0051 | 95.40 | 93.61 |
| | | 0.1079 | 0.0075 | 93.05 | |
| | | 0.1023 | 0.0078 | 92.38 | |

Table 2: Visual Ratings

| Cleaner | Coupon Type | Streaking | | | Average Streaking | Filming | | | Average Filming |
|------------------------------|-------------|-----------|-----|---|-------------------|---------|-----|---|-----------------|
| Foaming Glass Cleaner Clorox | Glass | 5 | 2 | 3 | 3.28 | 2 | 3 | 3 | 2.67 |
| | | 4 | 2 | 2 | | 2 | 2.5 | 3 | |
| | | 6 | 3.5 | 2 | | 2 | 2.5 | 4 | |

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|------------------------------|--------|---|-----|---|------|---|-----|---|------|
| Foaming Glass Cleaner Windex | Chrome | 4 | 4 | 3 | 3.50 | 4 | 4.5 | 2 | 3.56 |
| | | 3 | 4 | 4 | | 4 | 5 | 3 | |
| | | 3 | 3.5 | 3 | | 3 | 3.5 | 3 | |
| | Glass | 4 | 2 | 2 | 2.89 | 1 | 2.5 | 3 | 2.22 |
| | | 4 | 2 | 2 | | 1 | 2.5 | 3 | |
| | | 5 | 2 | 3 | | 2 | 2 | 3 | |
| | Chrome | 2 | 1.5 | 1 | 1.39 | 1 | 1.5 | 1 | 1.11 |
| | | 2 | 1.5 | 1 | | 1 | 1 | 1 | |
| | | 1 | 1.5 | 1 | | 1 | 1.5 | 1 | |

Table 3: Overall Average Visual Ratings Per Substrate

| Cleaner - Substrate | Substrate | Average S | Average F |
|------------------------------|-----------|-----------|-----------|
| Foaming Glass Cleaner Clorox | Glass | 3.28 | 2.67 |
| | Chrome | 3.50 | 3.56 |
| Foaming Glass Cleaner Windex | Glass | 2.89 | 2.22 |
| | Chrome | 1.39 | 1.11 |

Summary:

| | | | | | |
|----------------------|------------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Glass/Quartz, Chrome | | | | |
| Contaminants: | Stickies, Soaps | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Brand Buzz | Clorox Foaming Glass Cleaner | 100% | 92.62 | <input checked="" type="checkbox"/> | |
| SC Johnson & Son Inc | Windex Foaming Glass Cleaner | 100% | 90.94 | <input checked="" type="checkbox"/> | |

Conclusion:

Each of the cleaners was effective in soil removal of above 80% for each surface. Foaming Glass Cleaner Clorox resulted with the highest soil removal efficiency at 94.35% on chrome, and the highest on glass at 90.89%. Based on the filming and streaking table, we can see that overall Foaming Glass Cleaner Windex was the highest performing glass cleaner, doing significantly better on chrome in both filming and streaking, and moderately better on glass.