

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2010
 DateRun: 12/15/2010
 Experimenters: Jason Marshall, Heidi Wilcox, Fred Youngs, Timothy Weil, Kathleen Tenaglia
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #1
 Substrates: Glass/Quartz
 PartType: Coupon
 Contaminants: Films
 Cleaning Methods: Manual Wipe
 Analytical Methods: Visual
 Purpose: To evaluate supplied products for glass streaking and smearing

Experimental Procedure: Supplied products were used at the supplied dilution at room temperature. The standard used for this test was the Consumer Specialty Products Association DCC- 09A (CSPA) Standard Guide for Evaluating Filming and Streaking of Glass Cleaners. Two products were included for comparative purposes, one conventional and one green product.

For this test, five mirrored glass panels measuring 4"x4" in size (for each solution) were cleaned and then coated with the test solutions using a cheese cloth wipe. Mirror panels are cleaned sequentially as follows:

1. Wash in warm water with hand dishwashing liquid, using a clean piece of cheesecloth as a washcloth.
2. Rinse with deionized water.
3. Rinse with acetone, reagent grade.

After the acetone rinse, any residual water was wiped off the mirror with a piece of new, dry cheesecloth. Water droplets were not allowed to dry on the panels.

Preparation of Standard Reference Streaking Solutions:
 Three reference solutions were made fresh on the day of testing. The standard for a rating of "7" was made using 0.75% (actives) sodium lauryl sulfate in deionized water. For the "5" rating 0.5% (actives) sodium lauryl sulfate in deionized water was used. The final standard, "3" was made using 0.25% (actives) sodium lauryl sulfate in deionized water.

Preparation of Standard Reference Filming Solutions:
 Three reference solutions were made fresh on the day of testing. First a stock solution comprised of 1.25 grams C9-C11-2.5EO nonionic surfactant was added to 1 liter of deionized water. The resulting 0.125% nonionic surfactant mixture was turbid and was kept stirred while making the following, subsequent dilutions:
 The standard for a rating of "7" was made using 20 mL of nonionic stock solution added to 40 mL deionized water. The "5" standard was made using 20 mL of nonionic stock solution added to 60 mL deionized water. The final standard, "3" was made using 20 mL of nonionic stock solution is added to 80 mL deionized water.

On a clean 4-inch square mirror, 10 drops of test product were placed on the surface using a disposable pipette, with 8 drops forming approximately a 2½-inch circle, and the last 2 drops added side-by-side to the center of the circle. Immediately after application, the surface was wiped in 5 back and forth cycles of the cheesecloth wiper (total of 10 passes).

Five replicate tests were used to evaluate each test product and each reference. A new cheesecloth pad assembly was used for every mirror. A minimum of fifteen minutes was allowed for complete drying, and the panels were evaluated for filming and streaking performance within 4 to 6 hours. Evaluation was conducted against the prepared streaking and filming reference standards by a group of 5 panelists. Grading was on a scale of 1-7 (no visible streaking / high streaking and no visible filming/ high filming).

Results: The three cleaning product that resulted in the lowest rating for streaking were Windex, 7Th Generation Glass Cleaner and Glasscene Pro. For filming, the top products were Glasscene Pro, Sanimaster and Windex. The two tap water samples were similar in performance resulting in little streaking or filming. The table lists the cleaners and the ranking given by panelists.

| Streaking | | | | | | | | | |
|-------------------------|--------|--------|--------|--------|--------|--------------|-------------|---------|--|
| Product Name | | | | | | | | | |
| Glasscene Pro 12oz/ gal | Tile 1 | Tile 2 | Tile 3 | Tile 4 | Tile 5 | Panelist Ave | Overall Ave | Std Dev | |
| Panelist 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1.88 | 0.67 | |
| Panelist 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | |
| Panelist 3 | 2 | 3 | 3 | 3 | 3 | 2.8 | | | |

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|---------------------------------------|---|---|---|---|---|-----|------|------|
| Panelist 4 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Panelist 5 | 1 | 2 | 2 | 1 | 2 | 1.6 | | |
| Windex RTU | | | | | | | | |
| Panelist 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.44 | 0.58 |
| Panelist 2 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Panelist 3 | 3 | 2 | 2 | 2 | 2 | 2.2 | | |
| Panelist 4 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 5 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Moby 1800µs pH-10.2 | | | | | | | | |
| Panelist 1 | 4 | 5 | 2 | 2 | 2 | 3 | 3.96 | 1.51 |
| Panelist 2 | 4 | 4 | 3 | 3 | 3 | 3.4 | | |
| Panelist 3 | 6 | 7 | 5 | 3 | 3 | 4.8 | | |
| Panelist 4 | 3 | 4 | 3 | 2 | 3 | 3 | | |
| Panelist 5 | 6 | 7 | 5 | 5 | 5 | 5.6 | | |
| 7Th Generation Glass Cleaner | | | | | | | | |
| Panelist 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.6 | 1.23 |
| Panelist 2 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 3 | 2 | 2 | 2 | 2 | 7 | 3 | | |
| Panelist 4 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Panelist 5 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Sanimaster 4 -1 oz/gal | | | | | | | | |
| Panelist 1 | 2 | 3 | 2 | 2 | 3 | 2.4 | 5.24 | 1.86 |
| Panelist 2 | 6 | 6 | 6 | 5 | 6 | 5.8 | | |
| Panelist 3 | 6 | 7 | 7 | 7 | 7 | 6.8 | | |
| Panelist 4 | 4 | 6 | 4 | 4 | 3 | 4.2 | | |
| Panelist 5 | 7 | 7 | 7 | 7 | 7 | 7 | | |
| Anolyte 300ppm pH 6.4 | | | | | | | | |
| Panelist 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2.24 | 0.88 |
| Panelist 2 | 3 | 3 | 3 | 2 | 3 | 2.8 | | |
| Panelist 3 | 3 | 3 | 3 | 2 | 2 | 2.6 | | |
| Panelist 4 | 2 | 2 | 2 | 1 | 2 | 1.8 | | |
| Panelist 5 | 3 | 3 | 4 | 2 | 3 | 3 | | |
| All Purpose CL2-5oz/ gal | | | | | | | | |
| Panelist 1 | 2 | 2 | 3 | 4 | 3 | 2.8 | 3.68 | 1.41 |
| Panelist 2 | 6 | 5 | 4 | 6 | 4 | 5 | | |
| Panelist 3 | 5 | 5 | 5 | 5 | 5 | 5 | | |
| Panelist 4 | 3 | 2 | 2 | 1 | 2 | 2 | | |
| Panelist 5 | 4 | 4 | 2 | 4 | 4 | 3.6 | | |
| Moby 1750 pH-10.2 | | | | | | | | |
| Panelist 1 | 6 | 3 | 2 | 6 | 7 | 4.8 | 5.36 | 1.71 |
| Panelist 2 | 5 | 6 | 6 | 7 | 7 | 6.2 | | |
| Panelist 3 | 7 | 6 | 7 | 7 | 7 | 6.8 | | |
| Panelist 4 | 2 | 3 | 3 | 3 | 4 | 3 | | |
| Panelist 5 | 6 | 6 | 6 | 6 | 6 | 6 | | |
| Tap Water- Orbio | | | | | | | | |
| Panelist 1 | 1 | 2 | 1 | 2 | 3 | 1.8 | 2 | 0.71 |
| Panelist 2 | 2 | 3 | 2 | 3 | 2 | 2.4 | | |
| Panelist 3 | 2 | 3 | 3 | 2 | 3 | 2.6 | | |

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|------------------|---|---|---|---|---|-----|------|------|
| Panelist 4 | 1 | 1 | 2 | 1 | 1 | 1.2 | | |
| Panelist 5 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Tap Water (TURI) | | | | | | | | |
| Panelist 1 | 2 | 1 | 2 | 2 | 2 | 1.8 | 2.12 | 0.73 |
| Panelist 2 | 3 | 2 | 3 | 2 | 3 | 2.6 | | |
| Panelist 3 | 3 | 2 | 3 | 3 | 2 | 2.6 | | |
| Panelist 4 | 1 | 2 | 1 | 1 | 1 | 1.2 | | |
| Panelist 5 | 3 | 2 | 3 | 2 | 2 | 2.4 | | |

Filming

| Product Name | | | | | | | | |
|------------------------------|--------|--------|--------|--------|--------|--------------|-------------|---------|
| Glassclene Pro 12oz/gal | Tile 1 | Tile 2 | Tile 3 | Tile 4 | Tile 5 | Panelist Ave | Overall Ave | Std Dev |
| Panelist 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.28 | 0.46 |
| Panelist 2 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Panelist 3 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 4 | 2 | 2 | 1 | 1 | 1 | 1.4 | | |
| Panelist 5 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Windex RTU | | | | | | | | |
| Panelist 1 | 3 | 2 | 2 | 1 | 2 | 2 | 2.48 | 0.59 |
| Panelist 2 | 3 | 3 | 2 | 3 | 3 | 2.8 | | |
| Panelist 3 | 3 | 3 | 2 | 2 | 3 | 2.6 | | |
| Panelist 4 | 3 | 2 | 2 | 2 | 3 | 2.4 | | |
| Panelist 5 | 2 | 2 | 3 | 3 | 3 | 2.6 | | |
| Moby 1800µs pH-10.2 | | | | | | | | |
| Panelist 1 | 2 | 1 | 2 | 1 | 1 | 1.4 | 2.44 | 0.92 |
| Panelist 2 | 3 | 3 | 3 | 2 | 2 | 2.6 | | |
| Panelist 3 | 2 | 3 | 3 | 2 | 2 | 2.4 | | |
| Panelist 4 | 4 | 5 | 3 | 3 | 3 | 3.6 | | |
| Panelist 5 | 2 | 3 | 2 | 2 | 2 | 2.2 | | |
| 7th Generation Glass Cleaner | | | | | | | | |
| Panelist 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3.48 | 1.61 |
| Panelist 2 | 4 | 6 | 5 | 6 | 7 | 5.6 | | |
| Panelist 3 | 3 | 3 | 3 | 4 | 5 | 3.6 | | |
| Panelist 4 | 1 | 2 | 2 | 2 | 2 | 1.8 | | |
| Panelist 5 | 4 | 4 | 5 | 4 | 5 | 4.4 | | |
| Sanimaster 4 -1 oz/gal | | | | | | | | |
| Panelist 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3.32 | 1.07 |
| Panelist 2 | 2 | 3 | 4 | 3 | 5 | 3.4 | | |
| Panelist 3 | 3 | 4 | 4 | 3 | 5 | 3.8 | | |
| Panelist 4 | 4 | 5 | 5 | 3 | 5 | 4.4 | | |
| Panelist 5 | 3 | 3 | 3 | 3 | 3 | 3 | | |
| Anolyte 300ppm pH 6.4 | | | | | | | | |
| Panelist 1 | 1 | 1 | 2 | 1 | 1 | 1.2 | 2.08 | 0.70 |

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|-------------------------|---|---|---|---|---|-----|------|------|
| Panelist 2 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 3 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 4 | 3 | 3 | 4 | 3 | 3 | 3.2 | | |
| Panelist 5 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| | | | | | | | | |
| All Purpose CL2-5oz/gal | | | | | | | | |
| Panelist 1 | 3 | 5 | 3 | 3 | 2 | 3.2 | 2.76 | 0.72 |
| Panelist 2 | 3 | 3 | 3 | 3 | 2 | 2.8 | | |
| Panelist 3 | 3 | 3 | 2 | 2 | 2 | 2.4 | | |
| Panelist 4 | 4 | 3 | 2 | 3 | 3 | 3 | | |
| Panelist 5 | 3 | 2 | 2 | 3 | 2 | 2.4 | | |
| | | | | | | | | |
| Moby 1750 pH-10.2 | | | | | | | | |
| Panelist 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2.72 | 1.24 |
| Panelist 2 | 3 | 3 | 3 | 3 | 3 | 3 | | |
| Panelist 3 | 3 | 3 | 3 | 3 | 4 | 3.2 | | |
| Panelist 4 | 4 | 5 | 3 | 5 | 5 | 4.4 | | |
| Panelist 5 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| | | | | | | | | |
| Tap Water-Orbio | | | | | | | | |
| Panelist 1 | 1 | 2 | 2 | 2 | 2 | 1.8 | 1.96 | 0.20 |
| Panelist 2 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 3 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 4 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 5 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| | | | | | | | | |
| Tap Water (TURI) | | | | | | | | |
| Panelist 1 | 1 | 1 | 2 | 2 | 1 | 1.4 | 1.8 | 0.41 |
| Panelist 2 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 3 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 4 | 2 | 2 | 2 | 2 | 2 | 2 | | |
| Panelist 5 | 2 | 1 | 2 | 2 | 1 | 1.6 | | |

Summary

| Product Name | Streaking | Filming |
|------------------------------|-----------|---------|
| Glassclene Pro 12oz/gal | 1.9 | 1.3 |
| Windex RTU | 1.4 | 2.1 |
| Moby 1800µs pH-10.2 | 4.0 | 3.0 |
| 7Th Generation Glass Cleaner | 1.6 | 3.0 |
| Anolyte 300ppm pH 6.4 | 5.2 | 4.0 |
| Sanimaster 4 -1 oz/gal | 2.2 | 2.0 |
| All Purpose CL2-5oz/gal | 3.7 | 2.8 |
| Moby 1750 pH-10.2 | 5.4 | 3.2 |
| Tap Water-Orbio | 2.0 | 1.8 |
| Tap Water (TURI) | 2.1 | 1.8 |

Summary:

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

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|---------------------|----------------|-----|--|-------------------------------------|--|
| Servicemaster Clean | Glasscene Pro | 10 | | <input checked="" type="checkbox"/> | |
| Orbio Technologies | Orbio Annolyte | 100 | | <input type="checkbox"/> | |
| Orbio Technologies | Orbio Moby | 100 | | <input type="checkbox"/> | |
| EcoLink | Sanimaster | 100 | | <input checked="" type="checkbox"/> | |

Conclusion:

The top three supplied products for the least amount of streaking and filming on the mirror were Glasscene Pro, Sanimaster 4 and All Purpose CL2.