

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2009

DateRun: 09/15/2009

Experimenters: Jason Marshall, Junhee Cho

ClientType: Cleaner Manufacturer

ProjectNumber: Project #1

Substrates: Marble

PartType: Coupon

Contaminants: Calcium/lime

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: To determine how well products work on hard water stains.

Experimental Procedure: To test the descaling performance, the marble block test method was used. In this test, a marble block is submerged for period of time in a test solution. The weight is measured before and after. Marble is chemically similar to hard water stains in that they both are made up of calcium carbonate. Results can be expressed in grams lost over time. This method is widely used due to its simplicity but has some restrictions. One such limitation is how other soils typically mixed with hard water stains are not taken into consideration.

Several marble chips of similar size and shape were weighed to determine the baseline weight of each piece. The selected chips were then immersed in the two supplied products at vendor recommended dilutions and allowed to soak for 18 hours. The marble chips were removed from the products and rinsed in a tap water spray at 120 F for 3 minutes to remove loose material from the chips. Then the chips were dried for 15 minutes using a Master Appliance Heat gun at 500 F. When the chips cooled to room temperature, final weights were recorded to determine weight loss, if any. Observations were made and photographs were taken after the initial immersion of the chips into solutions (5 minutes), at 60 minutes and then following the overnight immersion.

Results: The two supplied products all showed signs of removing the calcium from the marble block. The two comparative products had less obvious changes. The non-acid comparative product resulted in a net weight gain over the 18 hours of soaking, although only minor in magnitude. For the supplied all-purpose cleaner at various dilutions, the most dilute solution was the only dilution that performed significantly lower than the comparative product.

| Product | Marble piece | Initial wt | Final wt | wt loss/gain | % change |
|--------------|--------------|------------|----------|--------------|----------|
| PC 116 | small | 9.4224 | 8.6152 | 0.8072 | 8.57 |
| | large | 22.3224 | 21.2112 | 1.1112 | 4.98 |
| PC 120 1-64 | small | 6.6252 | 6.4836 | 0.1416 | 2.14 |
| | large | 26.8356 | 26.6639 | 0.1717 | 0.64 |
| PC 120 1-128 | small | 10.8646 | 10.8489 | 0.0157 | 0.14 |
| | large | 34.4596 | 34.2204 | 0.2392 | 0.69 |
| PC 120 1-256 | small | 14.3193 | 14.2733 | 0.0460 | 0.32 |
| | large | 38.6275 | 38.5665 | 0.0610 | 0.16 |
| 3M 19 | small | 7.9570 | 7.9644 | -0.0074 | -0.09 |
| | large | 26.4420 | 26.4470 | -0.0050 | -0.02 |
| Lav Safe | small | 7.3452 | 7.2906 | 0.0546 | 0.74 |
| | large | 36.4784 | 36.4173 | 0.0611 | 0.17 |
| Water | small | 14.0765 | 14.0728 | 0.0037 | 0.03 |
| | large | 35.3339 | 35.3237 | 0.0102 | 0.03 |

Summary by Type of Cleaning Product

| | Average wt loss |
|----------------------------------|-----------------|
| PC 116 non acid bathroom cleaner | 6.77 |

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|---------------------------------|-------|
| 3M 19 non acid bathroom cleaner | -0.06 |
| | |
| PC 120 1:64 | 1.39 |
| PC 120 1:128 | 0.42 |
| PC 120 1:256 | 0.24 |
| Lav Safe | 0.46 |
| | |
| Water | 0.03 |

Summary:

| Substrates: | | Marble | | | |
|-----------------------|---|--------------|-------------|-------------------------------------|-------------------------------|
| Contaminants: | | Calcium/lime | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Next-Gen Supply Group | PC 116 Non-acid restroom and shower cleaner | 2 | | <input checked="" type="checkbox"/> | 0.96 g lost per 18 hours soak |
| Next-Gen Supply Group | PC 120 Peroxide Multisurface Cleaner | 1.6 | | <input checked="" type="checkbox"/> | 0.16 g lost per 18 hours soak |
| Next-Gen Supply Group | PC 120 Peroxide Multisurface Cleaner | 0.78 | | <input checked="" type="checkbox"/> | 0.13 g lost per 18 hours soak |
| Next-Gen Supply Group | PC 120 Peroxide Multisurface Cleaner | 0.39 | | <input type="checkbox"/> | 0.05 g lost per 18 hours soak |
| Next-Gen Supply Group | LAV Safe 8 | 100 | | <input type="checkbox"/> | 0.05 g lost per 18 hours soak |
| Water | Water | 100 | | <input type="checkbox"/> | 0.01 g lost per 18 hours soak |

Conclusion:

The two supplied products had the greater weight loss over time when compared to conventional products of the same field of cleaning products.