

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2016

DateRun: 06/07/2016

Experimenters: Francisco Abreau

ClientType: Cleaner Manufacturer

ProjectNumber: Project #1

Substrates: Ceramics, Plastic, White Board

PartType: Coupon

Contaminants: Hucker's Soil

Cleaning Methods: Manual Wipe

Analytical Methods: Gravimetric

Purpose: To evaluate the supplied products for ceramic, plastic, and painted steel surface cleaning effectiveness.

Experimental Procedure: First, a total set of 45 coupon tiles were obtained, 3 coupons each for the three substrates used times the five supplied cleaners. The initial weights of the coupons were acquired in order to use it as a standard and also to determine how much soil was removed after cleaning. The coupons were then soiled using 0.5g of Hucker's soil. Hucker's soil consists of: Distilled water 44.2%, Evaporated milk 13.5%, Creamy peanut butter 8.8%, Salted butter 8.8%, Stone ground wheat flour 8.8%, Egg yolk 8.8%, Printer's ink with boiled linseed oil 0.9%, Saline solution 2.7%, and India Ink 3.5%. The soiled coupons were then allowed to sit overnight for 24 hours in order for the soil to age. The next day, the dry dirty weight was then recorded for each coupon. The specified cleaners were used to test their cleaning effectiveness on the ceramic, plastic, and painted steel coupons. The manner in which they were cleaned was as follows. 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 spray of cleaning solutions. Each coupon was sprayed 2 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 (~33 seconds). At the end of the cleaning, coupons were wiped once with a dry paper towel to assist in drying. Final weights were recorded and efficiencies were calculated and recorded.

Results: It had an averaged cleaning efficiency of 56.17%. The Nat Surfact C product did a little better at a cleaner efficiency average of 73.19%. The Nat Surfact B product fared around the same with a cleaner efficiency of 78.06%. The Nat Surfact D worked better with a cleaning efficiency of 81.72%. The best cleaning product for the ceramic surfaces was found to be the 7th Generation All Purpose product with an averaged cleaner efficiency of 83.18%.

As for the plastic surface coupons, the best cleaning product was found to be 7th Generation with an average cleaning efficiency of 91.36%. The Nat Surfact D product trailed behind with a cleaner efficiency rating of 86.65%. The Nat Surfact B product and the Nat Surfact A products fared similarly with average cleaning efficiency ratings of 85.22% and 83.35% respectively. Nat Surfact C was found to be the worst cleaner for the plastic coupon surfaces with a cleaner efficiency of 70.44%.

For the painted steel surfaces, the worst cleaner was found to be the Nat Surfact A product with a cleaning efficiency rating of 57.57%. The Nat Surfact B product did a little better with a cleaning efficiency of 75.36%. Nat Surfact C as well as the 7th Generation products fared very similarly with average cleaning efficiencies of 79.38% and 77.33% respectively. The only product for the painted steel surface coupons with a satisfactory cleaning efficiency rating over 85% was found to be Nat Surfact D; it even outperformed the 7th Generation All Purpose product.

The results from the testing are reported in the table below:

| Cleaner | Initial wt | Final wt | % Removed | %Average | Overall Ae |
|-----------------------|------------|----------|-----------|----------|------------|
| Nat Surfact A Ceramic | 0.2329 | 0.0982 | 57.84 | | |
| | 0.2120 | 0.0915 | 56.84 | | |
| | 0.2147 | 0.0991 | 53.84 | 56.17 | |
| Nat Surfact B Ceramic | 0.2663 | 0.0487 | 81.71 | | |
| | 0.2364 | 0.0439 | 81.43 | | |
| | 0.3055 | 0.0885 | 71.03 | 78.06 | |
| Nat Surfact C Ceramic | 0.2446 | 0.0846 | 65.41 | | |
| | 0.2778 | 0.0636 | 77.11 | | |
| | 0.3016 | 0.0692 | 77.06 | 73.19 | 72.29 |
| Nat Surfact D Ceramic | 0.2581 | 0.0632 | 75.51 | | |

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|------------------------------|--------|--------|-------|-------|-------|
| | 0.2502 | 0.0268 | 89.29 | | |
| | 0.2841 | 0.0558 | 80.36 | 81.72 | |
| 7th Generation Ceramic | 0.2476 | 0.0466 | 81.18 | | |
| | 0.2802 | 0.0418 | 85.08 | | |
| | 0.2423 | 0.0405 | 83.29 | 83.18 | |
| Nat Surfact A Plastic | 0.2687 | 0.0470 | 82.51 | | |
| | 0.3190 | 0.0519 | 83.73 | | |
| | 0.2823 | 0.0457 | 83.81 | 83.35 | 81.42 |
| Nat Surfact B Plastic | 0.2538 | 0.0315 | 87.59 | | |
| | 0.1989 | 0.0106 | 94.67 | | |
| | 0.2554 | 0.0679 | 73.41 | 85.22 | |
| Nat Surfact C Plastic | 0.2512 | 0.0981 | 60.95 | | |
| | 0.3560 | 0.0377 | 89.41 | | |
| | 0.2962 | 0.1156 | 60.97 | 70.44 | |
| Nat Surfact D Plastic | 0.2381 | 0.0345 | 85.51 | | |
| | 0.3112 | 0.0279 | 91.03 | | |
| | 0.2583 | 0.0429 | 83.39 | 86.65 | |
| 7th Generation Plastic | 0.3688 | 0.0236 | 93.60 | | |
| | 0.2909 | 0.0229 | 92.13 | | |
| | 0.2908 | 0.0339 | 88.34 | 91.36 | |
| Nat Surfact A Painted Steel | 0.2533 | 0.1197 | 52.74 | | |
| | 0.2942 | 0.1335 | 54.62 | | |
| | 0.2697 | 0.0935 | 65.33 | 57.57 | |
| Nat Surfact B Painted Steel | 0.2725 | 0.0961 | 64.73 | | |
| | 0.2473 | 0.0207 | 91.63 | | |
| | 0.2438 | 0.0738 | 69.73 | 75.36 | 76.24 |
| Nat Surfact C Painted Steel | 0.2567 | 0.0415 | 83.83 | | |
| | 0.31 | 0.0261 | 91.58 | | |
| | 0.2248 | 0.0838 | 62.72 | 79.38 | |
| Nat Surfact D Painted Steel | 0.2329 | 0.0168 | 92.79 | | |
| | 0.2588 | 0.0179 | 93.08 | | |
| | 0.2793 | 0.0222 | 92.05 | 92.64 | |
| 7th Generation Painted Steel | 0.2864 | 0.1124 | 60.75 | | |
| | 0.305 | 0.0316 | 89.64 | | |
| | 0.22 | 0.0405 | 81.59 | 77.33 | |

Summary:

| | | | | | |
|----------------------|--------------------------------|---------------|--------------------|--------------------------|----------------------|
| Substrates: | Ceramics, Plastic, White Board | | | | |
| Contaminants: | Hucker's Soil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Logos Technologies | NatSurFact A | 100 | 65.69 | <input type="checkbox"/> | |
| Logos Technologies | NatSurFact B | 100 | 79.55 | <input type="checkbox"/> | |
| Logos Technologies | NatSurFact C | 100 | 74.34 | <input type="checkbox"/> | |

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|--------------------|--------------------------|-----|-------|-------------------------------------|--|
| Logos Technologies | NatSurFact D | 100 | 87.03 | <input checked="" type="checkbox"/> | |
| Seventh Generation | Free & Clear All Purpose | 100 | 83.96 | <input type="checkbox"/> | |

Conclusion:

The best cleaner found during our testing was found to be Nat Surfact D at an overall cleaning average of 87.03%; it even surpassed the industry comparative 7th Generation All Purpose product.

It was found that the worst performing cleaner was the Nat Surfact A product with an overall cleaning average of 65.69%. Nat Surfact C performed better with an overall cleaning efficiency of 74.34%. Nat Surfact B demonstrated improved cleaning when compared to Nat Surfact A as well as Nat Surfact C with an overall cleaning average of 79.55%