

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2017

DateRun: 06/14/2017

Experimenters: George Liang, Vinh Tran, Kevin Smith

ClientType:

ProjectNumber: Project #1

Substrates: Glass/Quartz

PartType: Coupon

Contaminants: Films, Soaps

Cleaning Methods: Manual Wipe

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate supplied product for glass soil removal from glass surfaces.

Experimental Procedure: The following experimental procedure follows TURI's cleaning standard for SCL 2 glass soap scum.

Soiling Process:
Pre-weighed glass coupons were soiled with SSL Soil 2 glass soap scum using a hand held swab. The glass soap scum is made from a blend of water 51.5%, hair gel 25.6%, Toothpaste 10.4%, shaving cream 5.3%, hair spray 3.7% and spray deodorant 3.5%. The coupons were allowed to dry for 24 hours at room temperature before re-weighing for the amount of contaminated added onto the coupons.

Cleaning Process:
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 once with the same cleaning solution. Each cleaning solutions were diluted to the suggested dilution provided by the vendor. The SWR One was diluted to a concentration of 2% (50:1), and the Suma Break-Up HD Degreaser was diluted to a concentration of 5% (20:1). The solution was allowed to penetrate for 30 seconds followed by cleaning in the SLW unit for 5 cycles (~10 seconds).

Efficacy Rating Process:
The coupons were left to sit at room temperature in time intervals of: 1 hour, 1 day after the cleaning process before re-weighing the coupons for the amount of contaminants removed. Three testers were used to do a visual ranking to measure the efficacy of the cleaning agents. The visual ranking of the cleaned substrates was in accordance to the following ratings:

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" where:

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

Results: Table pertaining to the amount of contaminant added and removed using a gravimetric scale to measure the efficacy of the respective cleaners.

Comparative Analysis
All efficacy rating mentioned in the following comparative analysis is from the overnight sit drying time, because there was no significant increase in glass soap scum removal between the 1 hour drying time and from the overnight sit.

The sample cleaner: SWR One had a similar efficacy rating as the comparative cleaner: Suma Break-Up HD Degreaser when removing glass soap scum from glass coupon; with respective efficacy ratings of: 97.97% and 99.53%. Similarly, the filming on the glass coupons were observed to not be significantly greater than the comparative cleaner; with respective filming ratings of 2.1 in comparison to 1.4. Likewise, the sampled cleaner was observed to be comparable to the comparative cleaner in terms of the visual streaking rating; with respective streaking ratings of 2.1 as opposed to 1.4.

| Gravimetric Result: After Time Interval: 1 hour | | | | |
|---|--------------------------|------------------------|-------------------|------------------------|
| Cleaner | Initial wt. of cont. (g) | Final wt. of cont. (g) | Cont. Removed (g) | Avg. Cont. Removed (%) |
| SWR One_Glass | 0.0939 | 0.0013 | 98.62 | 97.25 |
| | 0.0921 | 0.0029 | 96.85 | |
| | 0.0783 | 0.0029 | 96.30 | |
| SWR One_Chrome Plated Aluminum | 0.0848 | 0.0017 | 98.00 | 93.89 |

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|---|--------------------------|------------------------|-------------------|------------------------|
| | 0.0926 | 0.0024 | 97.41 | |
| | 0.0707 | 0.0097 | 86.28 | |
| Suma Break-Up HD Degreaser_Glass | 0.0922 | 0.0016 | 98.26 | 98.92 |
| | 0.1085 | 0.0011 | 98.99 | |
| | 0.1025 | 0.0005 | 99.51 | |
| Suma Break-Up HD Degreaser_Chrome Plated Aluminum | 0.1034 | 0.0010 | 99.03 | 98.06 |
| | 0.1064 | 0.0022 | 97.93 | |
| | 0.1081 | 0.0030 | 97.22 | |
| Gravimetric Result: After Time Interval: 24 hour | | | | |
| Cleaner | Initial wt. of cont. (g) | Final wt. of cont. (g) | Cont. Removed (g) | Avg. Cont. Removed (%) |
| SWR One_Glass | 0.0939 | 0.0008 | 99.15 | 97.97 |
| | 0.0921 | 0.0020 | 97.83 | |
| | 0.0783 | 0.0024 | 96.93 | |
| SWR One_Chrome Plated Aluminum | 0.0848 | 0.0013 | 98.47 | 94.70 |
| | 0.0926 | 0.0023 | 97.52 | |
| | 0.0707 | 0.0084 | 88.12 | |
| Suma Break-Up HD Degreaser_Glass | 0.0922 | 0.0008 | 99.13 | 99.53 |
| | 0.1085 | 0.0006 | 99.45 | |
| | 0.1025 | 0.0000 | 100.00 | |
| Suma Break-Up HD Degreaser_Chrome Plated Aluminum | 0.1034 | 0.0006 | 99.42 | 98.50 |
| | 0.1064 | 0.0018 | 98.31 | |
| | 0.1081 | 0.0024 | 97.78 | |

Filming Visual Results: Table pertaining to visual haziness or milkiness ranking from respective cleaning agents.

| | | | | |
|---|-------------|-------------|-------------|--------------|
| Film | | | | |
| Cleaner | Filming (1) | Filming (2) | Filming (3) | Avg. Filming |
| SWR One_Glass | 2.0 | 1.5 | 2.0 | 2.1 |
| | 2.0 | 3.0 | 2.0 | |
| | 3.0 | 1.5 | 1.5 | |
| SWR One_Chrome Plated Aluminum | 2.0 | 1.0 | 2.5 | 2.1 |
| | 2.0 | 2.0 | 2.0 | |
| | 2.0 | 2.5 | 3.0 | |
| Suma Break-Up HD Degreaser_Glass | 3.0 | 1.5 | 2.0 | 1.4 |
| | 1.0 | 1.0 | 1.5 | |
| | 1.0 | 1.0 | 1.0 | |
| Suma Break-Up HD Degreaser_Chrome Plated Aluminum | 2.0 | 2.0 | 1.5 | 2.3 |
| | 4.0 | 2.5 | 1.5 | |
| | 3.0 | 2.0 | 2.0 | |

Streaking Visual Results: Table pertaining to visual dried droplets or "spotting", usually found strung together into thin white lines ranking from respective cleaning agents.

| | | | | |
|---|--------------|--------------|--------------|---------------|
| Cleaner | Spotting (1) | Spotting (2) | Spotting (3) | Avg. Spotting |
| SWR One_Glass | 3.0 | 1.5 | 2.5 | 2.7 |
| | 4.0 | 2.0 | 5.0 | |
| | 2.0 | 2.0 | 2.5 | |
| SWR One_Chrome Plated Aluminum | 3.0 | 1.0 | 3.5 | 2.6 |
| | 3.0 | 2.0 | 4.5 | |
| | 1.0 | 1.5 | 4.0 | |
| Suma Break-Up HD Degreaser_Glass | 3.0 | 1.0 | 2.5 | 1.7 |
| | 2.0 | 1.0 | 1.5 | |
| | 1.5 | 1.0 | 1.5 | |
| Suma Break-Up HD Degreaser_Chrome Plated Aluminum | 2.0 | 1.5 | 2.5 | 2.3 |
| | 2.0 | 2.0 | 3.5 | |
| | 2.0 | 2.0 | 3.5 | |

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|----------------------|----------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Glass/Quartz | | | | |
| Contaminants: | Films, Soaps | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| SWR Corporation | SWR One | 2 | 97.97 | <input checked="" type="checkbox"/> | F - 2.1; S - 2.7 |
| Diversey Corporation | Suma Break-Up HD Degreaser | 5 | 99.53 | <input checked="" type="checkbox"/> | F - 1.4; S - 1.7 |

Conclusion:

In conclusion, the sampled cleaner: SWR One was just as effective as the comparative cleaner: Suma Break-Up HD Degreaser.