CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2014
DateRun:	09/15/2014
Experimenters:	George Liang
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Glass/Quartz
PartType:	Coupon
Contaminants:	Films, Soaps
Cleaning Methods:	Manual Wipe
Analytical Methods:	Gravimetric, Visual
Purpose:	To evaluate supplied products for glass cleaning using manual cleaning
Experimental Procedure:	Supplied products were diluted used at the recommended/provided concentration for glass cleaning. Preweighed glass, and mirror 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 handheld 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 X60 reinforced wipe was attached to the cleaning sled and soaked with 5-7 sprays of cleaning solutions. Each coupon was sprayed 7-10 times with the same cleaning solution. Then solution was allowed to penetrate for 30 seconds followed by cleaning in the SLW unit for 5 cycles (~10 seconds). At the end of the cleaning, coupons were wiped once with dried with paper towel. Final weights were measured and efficiencies 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 "milkiness", 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) Chemistries Evaluated: PUREti Clean & Fresh; Conventional Glass Cleaner
Results:	Soil removal for the provided product and comparison product had very similar results. Both products removed more than 85% of the soil from glass and mirrored surfaces. The conventional product had a slight edge in removal 93 to 89%. When using a visual comparison, the filming assessment resulted in the PUREti having an average of 3.0 and the conventional product coming in at 2.7. Streaking/spotting were very close, with PUREti at 2.3 and the conventional product 2.0. The tables below list the cleaning results for removal, filming and streaking.

Cleaner	Initial wt	Final wt	% Removed	Average	Total Average
Pure Ti - Glass					
	0.0543	0.0078	85.64	91.83	85.82
	0.0684	0.0053	92.25		
	0.0586	0.0014	97.61		
Pure Ti - Chrome					
	0.1392	0.0288	79.31	78.62	
	0.1472	0.0351	76.15		
	0.1500	0.0294	80.40		
Pure Ti - Mirror					
	0.0979	0.0155	84.17	87.01	
	0.0811	0.0134	83.48		
	0.1163	0.0077	93.38		
Windex -Glass					

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	0.0297	0.0027	90.91	94.49	92.70
	0.0342	0.0023	93.27		
	0.0564	0.0004	99.29		
Windex - Chrome					
	0.0491	0.0072	85.34	91.38	
	0.0829	0.0058	93.00		
	0.0712	0.0030	95.79		
Windex - Mirror					
	0.0633	0.0050	92.10	92.23	
	0.0657	0.0066	89.95		
	0.0579	0.0031	94.65		

Visual Results

Cleaners	Substrate	S1	F1	S2	F2	S3	F3	S4	F4	Avg. S	Avg. F
Pure Ti	Glass	2.00	2.00	2.00	1.00	3.00	3.50	4.00	3.00	2.75	2.38
Pure Ti	Glass	2.00	2.00	2.00	1.00	2.00	2.00	2.00	2.00	2.00	1.75
Pure Ti	Glass	2.00	2.00	2.00	1.00	2.00	2.50	2.00	2.50	2.00	2.00
Pure Ti	Mirror	3.00	2.00	4.00	1.00	4.00	5.00	4.00	4.00	3.75	3.00
Pure Ti	Mirror	3.00	2.00	4.00	1.00	5.50	3.00	5.00	3.50	4.38	2.38
Pure Ti	Mirror	3.00	2.00	4.00	1.00	3.00	3.00	4.00	3.00	3.50	2.25
Windex	Glass	3.00	3.00	3.00	1.00	3.50	2.00	3.00	2.00	3.13	2.00
Windex	Glass	3.00	3.00	3.00	1.00	1.50	1.50	2.00	1.50	2.38	1.75
Windex	Glass	3.00	3.00	3.00	1.00	2.50	1.50	2.00	1.50	2.63	1.75
Windex	Mirror	3.00	3.00	3.00	2.00	3.00	2.00	3.00	2.00	3.00	2.25
Windex	Mirror	3.00	3.00	3.00	2.00	2.00	1.50	2.50	1.50	2.63	2.00
Windex	Mirror	2.00	3.00	3.00	2.00	1.50	1.50	3.00	2.00	2.38	2.13

Summary:

Substrates:	Glass/Quartz				
Contaminants:	Films, Soaps				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
PURETi Group LLC	Pureti Clean & Fresh, Window Cleaner	100	86.00	☑	F - 3.2, S -1.94
SC Johnson & Son Inc	Windex Glass & More Cleaner (Spray)	100	92.69	☑	F - 2.7, S - 2

Conclusion: The soil removal, filming and streaking levels for the PUREti was found to be comparable to the conventional cleaning product and would be considered as an effective glass cleaner.