CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2009
DateRun:	10/29/2009
Experimenters:	Junhee Cho
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Textile
PartType:	Coupon
Contaminants:	Dirt
Cleaning Methods:	Manual Wipe
Analytical Methods:	Gloss-Color Meter
Purpose:	To evaluate supplied product for carpet cleaning for GS 37 requirements.
Experimental Procedure:	The procedure followed is a modified version of the Institute of Inspection Cleaning and Restoration Certification (IICRC) Standard and Reference Guide S100. Much of the testing was modeled after Appendix D, IICRC Carpet Cleaning Methods Testing Protocol. The carpet substrate was donated by Shaw Industries of Dalton, GA. This carpet type is specifically designated in the IICRC Appendix method. An AATCC (Research Triangle Park, NC) soil was obtained from Textile Innovators, a division of SDL Atlas of Charlotte, NC, as suggested by DuPont Antron of Kennesaw, GA. Prior to soiling, BYK Spectra Guide was used to measure L values from the surface of the carpet. Each carpet was marked-off into 6 sections measuring 3.5 in wide and 6 in long. (The carpeting was not cut into individual pieces as it would be too difficult to physically soil and clean smaller carpet sections.) Five readings were taken in each grid area to obtain baseline readings. Modifications to the above-mentioned standard included: (1) omitting the use of milling stones and (2) replacing the Zytel Type 6,6 nylon pellets with Nalgene tubing cut into 1/8 inch pieces, or 'pellets'. According to the standard, approximately 1000 grams of pellets should be used for every 12 grams of soil or, 83 grams of pellets used per gram of soil. S100 also suggests using 500 grams of pellets for each soil under investigation (in this case, one) for carpet measuring 10.375 inch x 39.375 inch (408.5 sq. in.). This equals 1.22 (500/408.5 = 1.22) grams of pellets per square inch of carpet. Since the Lab had 174 grams of tubing/pellets at its disposal, two grams of the AATCC soil were needed to artificially contaminate the carpet. The carpet was cut into 7.375 inch x 19.6 inch (144.54 sq. in.) pieces. The carpet pieces were soiled by placing one piece of carpet into a 1-gallon can, making sure the carpet lined the inner wall of the can. The plastic-tubing pieces were poured into the bucket and the soil was distributed along the width of the can. The can was lidded and placed into a harness attached to a crank shaft. The crank was turned at an average rate of 42 rpm by hand for 5 minutes in one direction, followed by 5 minutes of rotation in the opposite direction. At the end of the 10-minute soiling regime, the carpet was placed onto a carpet template and vacuumed with a vacuum cleaner for 3 strokes in the forward direction followed by 3 strokes in the backward direction. The carpet pieces were evaluated again for L values. The carpet sections were then cut down the middle, lengthwise to allow carpet samples to fit into the Gardner Straight Line Washability Unit. Each piece was marked-off into three sections. Each section was sprayed 15 times with the cleaning product and allowed to soak for 30 seconds. A Kimberly-Clark Wypall reinforced paper towel was attached to the cleaning sled. The towel was also sprayed with the same cleaning product until the towel was saturated (approx. 15 sprays). After soaking, the towel/sled was placed on one end of the carpet section and the Unit run for 91 cycles (approx. 2.5 minutes). Every 30 cycles, each section of carpet was sprayed 6 times with the cleaning solution. The carpet was removed from the Unit and allowed to dry overnight. A third and final series of L value readings were recorded for each cleaned section. Carpet pieces that were previously soiled and cleaned with the Super H2O2 (supplied product) and Liquid Formula 90 (industry standard product) were resoiled by placing the carpet sections into the 1-gallon can, making sure the carpet lined the inner wall of the can. Nalgene® tubing cut into 1/8" pieces were poured into the bucket and 2 grams of the AATCC soil was distributed along the width of the can. The can was lidded and placed into a harness attached to a crank shaft. The crank was turned at an average rate of 42 rpm by hand for 5 minutes in one direction, followed by 5 minutes of rotation in the opposite direction. At the end of the 10-minute soiling, the carpet was placed onto a carpet template and vacuumed with a Eureka SuperBroom (Brush-Up, Motor-Driven/Brush-Roll) vacuum for 5 strokes in the forward direction followed by the same number of strokes in the backward direction. The carpet pieces were evaluated again using a BYK Spectra Guide used to measure L values from the surface of the carpet.
Results:	Carpet soil removal was limited for the supplied product at the 2.5 minute cleaning with only a 6.5% improvement. The Liquid 90 had a 21% improvement. However, after the full five minutes of cleaning,

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Super H2O2 had a 43% improvement in color readings where the Liquid 90 had a 33% increase. Resoiling values where similar for both products with Super H2O2 having a slight advantage over the Liquid 90.

The first table lists the L values recorded using the BYK Spectra Guide.

Carpet Soil Removal	Initial Unsoiled carpet	Dirty Carpet	2.5 minute cleaning	5 minute cleaning	resoiling vacuumed
Super H2O2					
Reading 1	86.95	60.94	71.49	78.42	70.44
Reading 2	86.79	64.52	68.45	74.11	62.33
Reading 3	86.55	77.05	66.37	75.04	60.33
Average	86.76	67.50	68.77	75.86	64.37
Liquid 90					
Reading 1	85.21	53.25	60.36	64.99	49.12
Reading 2	85.83	59.94	63.6	66.53	52.04
Reading 3	85.83	61.69	68.2	70.42	59.39
Average	85.62	58.29	64.05	67.31	53.52

Carpet Soil Removal

The second table lists the calculations
Calculations

Product (time)	Base	Dirty	Clean	L clean - L soiled	L unsoiled - L soiled	([Lclean - Lsoiled]/ [Lunsoiled - Lsoiled]) *100
Super H2O2 (2.5 min)	86.76	67.50	68.77	1.27	19.26	6.58
Liquid 90 (2.5 min)	85.62	58.29	64.05	5.76	27.33	21.08
Super H2O2 (5 min)	86.76	67.50	75.86	8.35	19.26	43.37
Liquid 90 (5 min)	85.62	58.29	67.31	9.02	27.33	33.00

Resoil Test
Resoil-vacuumed

Super H2O2	Liquid 90
7.98	15.87
11.78	14.49
14.71	11.03
11.49	13.80

Summary:

Substrates:	Textile				
Contaminants:	Dirt				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Cleanline Products	H2O2 Super Citrus Concentrate	0.78	0.00	☑	
Chemspec	Liquid Formula 90	0.16	0.00	☑	

Conclusion: The supplied product was found to have comparable cleaning results for both soil removal and resoiling as the conventional product.