CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2010
DateRun:	10/17/2010
Experimenters:	Junhee Cho, Timothy Weil
ClientType:	Cleaning Equipment Mfr
ProjectNumber:	Project #1
Substrates:	Textile
PartType:	Coupon
Contaminants:	Inks, Dirt, Food
Cleaning Methods:	Steam
Analytical Methods:	Visual
Purpose:	To evaluate supplied equipment (steam cleaners) for carpet stain removal as compared with water.

Experimental Procedure:

The purpose of this evaluation was to assess effectiveness of spot and stain removal chemicals by rating the removal of specific staining agents. Three almond white tufted cut pile test carpet measuring 18 inch by 24 inch were stained with eight staining mixtures. Each staining agent was applied to the test carpet in triplicate, spaced out at 2.5 inches. The staining mixture was applied to the surface using a trigger pump spray bottle capable of delivering 2.5 +/- 0.5 ml of stain mixture. The spray was focused within a staining ring measuring 1.5 inches wide by 1.2 inches high. The eight staining agents included mustard, catsup, coffee, grape juice, black permanent marker (2 1” lines instead of 2.5 ml), dirty motor oil, AATCC synthetic soil and chocolate syrup. These staining mixtures were used according to the dilution ratios listed in the table below.

Staining Agent Dilution ratio
Mustard 1:2 mustard: water
Catsup 1:3 catsup: water
Hot Coffee 60 deg +/-3C 1 teaspoon coffee to 175 ml water
Purple Grape Juice Full concentration
Black Permanent Marker-Chisel Point N/A
Chocolate Syrup 1:4 chocolate: water
Dirty Motor Oil 1:1 oil: heptane*
AATCC Synthetic Soil 0.5 grams/100 ml water

The staining mixture was poured into the spray bottle. The nozzle of the bottle was centered inside the staining ring and three pumps of the spray bottle were performed to deliver the 2.5 ml of mixture to the test carpet. The staining ring was left in place until the staining agent was completely soaked into the test carpet. The ring was rinsed in between each staining application. The three completed test carpets were allowed to dry for 24 hours +/- 2 hours before conducting the stain removal procedure.
Following the overnight drying, any excess solid staining agent was removed from the test carpet. The cleaning agent was applied to the surface so that the stain was saturated. The solution was allowed to sit on the stain for 2 minutes. The saturated stain was blotted with a clean dry Kimberly Clark Reinforced wiper towel. Any transfer of the stain/cleaning agent to the towel was noted. Blotting continued until all evidence of liquid transfer was gone. At this point, the cleaning solution was applied to the surface and blotted until the stain was completely removed or three applications of the cleaning solution were performed. The total number of applications was recorded for each stain. The test carpet was allowed to sit for another 24 +/-2 hours to dry before evaluating the stains.

A minimum of three lab personnel were used to evaluate the stain removal efficacy which were then averaged together for the final rating. The evaluations were based on the following scale:
Rating Key
5 No Stain
4 Slight Stain
3 Noticeable Stain
2 Considerable Stain
1 Severe Stain

Results:

The AVT Steam cleaner removed more of the stains than regular water except Chocolate Syrup. The ORECK Steaming system showed relatively low removal efficacy than regular water and AVT Steam cleaner.

AVT Steam Cleaner	Lab 1			Lab 2			Lab 3			AVG
Mustard	4	4	3	4	3	3	4	3	3	3.4
Catsup	4	4	4	4	4	4	4	4	4	4
Hot Coffee 60 deg +/-3C	4	4	4	5	4	4	4	4	4	4.1
Purple Grape Juice	3	3	3	4	4	4	4	4	4	3.7
	1	1	1	1	1	1	2	2	2	1.3

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Black Permanent Marker									
Chocolate Syrup	3	3	3	4	4	4	3	4	3	3.4
Dirty Motor Oil	4	5	4	5	5	5	4	4	4	4.4
AATCC Synthetic Soil	1	1	1	1	1	3	2	2	2	1.6
WATER										AVG
Mustard	4	3	2	2	3	3	3	3	3	3
Catsup	3	3	4	4	4	3	3	3	3	3.4
Hot Coffee 60 deg +/-3C	4	4	4	4	4	4	4	4	4	4
Purple Grape Juice	3	3	3	4	4	4	4	4	4	3.7
Black Permanent Marker	1	1	1	1	1	1	1	1	1	1
Chocolate Syrup	4	4	4	4	4	4	4	4	4	4
Dirty Motor Oil	3	3	3	3	3	3	3	3	3	2.9
AATCC Synthetic Soil	1	1	1	1	1	2	2	2	2	1.4
ORECK										AVG
Mustard	1	2	1	1	1	2	2	2	2	1.4
Catsup	4	3	2	2	2	2	3	2	2	2.7
Hot Coffee 60 deg +/-3C	3	3	4	3	3	3	3	3	4	3.2
Purple Grape Juice	3	3	3	1	1	1	3	3	3	2.3
Black Permanent Marker	1	1	1	1	1	1	2	2	2	1.3
Chocolate Syrup	3	3	3	3	3	3	4	3	3	3.1
Dirty Motor Oil	4	4	2	2	2	4	4	4	4	3.3
AATCC Synthetic Soil	1	1	1	1	1	1	2	2	2	1.3

Overall Averages

	AVT Steam Cleaner	Water	ORECK Steam Cleaner
Mustard	3.4 Noticeable	3.0 Noticeable	1.4 Severe
Catsup	4.0 Slight Stain	3.4 Noticeable	2.7 Considerable
Hot Coffee	4.1 Slight Stain	4.0 Slight Stain	3.2 Noticeable
Grape Juice	3.7 Noticeable	3.7 Noticeable	2.3 Considerable
Black Marker	1.3 Severe	1.0 Severe	1.3 Severe
Chocolate Syrup	3.4 Noticeable	4.0 Slight Stain	3.1 Noticeable
Dirty Motor Oil	4.4 Slight Stain	2.9 Considerable	3.3 Noticeable
Synthetic Soil	1.6 Severe	1.4 Severe	1.3 Severe

Summary:

Substrates:	Textile				
Contaminants:	Inks, Dirt, Food				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Water	Steam	100	0.00	☑	AVT System
Water	Steam	100	0.00	☐	Oreck
Water	Water	100	0.00	☐	

Conclusion: Using the modified cleaning process resulted in the AVT Steam cleaner achieving higher stain removal scores. Three stains resulted in a ranking in the slight stain level and two stains resulted in the noticeable

stain. Due to the attachment of the ORECK steaming system there was not enough delivery to the stained area to steam the stain completely, resulting in less stain removal.