
Evaluation Procedures for CRI Carpet Spot Cleaning Product Certification

1. Scope
 - 1.1 This Technical Bulletin describes laboratory procedures used for evaluating spot cleaning products available to consumers and users of these products.
 - 1.2 This bulletin details procedures specific to the following attributes of acceptable use of spot cleaners on pile carpet:
 - 1.1.1 Evaluating Stain Removal Agents (Section 1)
 - 1.1.2 Resoiling Characteristics (Section 2)
 - 1.1.3 Optical Brightener Presence (Section 3)
 - 1.1.4 Lightfastness Assessment (Section 4)
 - 1.1.5 pH Determination (Section 5)
 - 1.3 These procedures may involve hazardous materials. This document does not purport to address all of the safety precautions associated with its use. It is the responsibility of the user to establish appropriate safe laboratory procedures and techniques.

Section 1

Evaluation of Stain Removal Efficacy

1. Scope
 - 1.1 The ability to remove spots and stains from pile yarn floor coverings contributes to long term performance and consumer satisfaction. The evaluation of the effectiveness of spot and stain removal chemicals is achieved by means of rating specific staining agents which have been cleaned with a particular cleaning chemical.
 - 1.2 This practice may be used for the purpose of evaluating the performance of a cleaning agent in removing specific stains.
 - 1.3 This practice may also be used in evaluating the staining characteristics of carpet fibers and/or the effectiveness of stain resistance chemical treatments.
 - 1.4 This practice is applicable to all pile yarn floor coverings and all spot and stain removal products.
2. Referenced Documents
 - 2.1 AATCC Evaluation Procedure 2 – Gray Scale for Staining
 - 2.2 Terminology Relating to Textiles
 - 2.3 ASTM D5684 Terminology Relating to Pile Yarn Floor Coverings
3. Terminology
 - 3.1 Definitions
 - 3.1.1 stain: colorant transferred to a substrate as a result of contamination by contact of a substance containing dyes or pigments.
 - 3.1.2 rating: the determination of the numeric assignment most closely representing the degree of contrast in correspondence to the steps of the Standard Rating Scale.
4. Apparatus
 - 4.1 Staining Ring – 3.8 cm (1.5 in) diameter 3.0 cm (1.2 in) height

- 4.2 Trigger pump spray bottle - adjustable spray nozzle.
 - 4.3 Measuring cup or beaker - capable of measuring 0.5 ml increments
 - 4.4 Paper Towels - White absorbent paper towels
 - 4.5 Digital Thermometer (capable of measuring range 40°to 80° C)
 - 4.6 AATCC Gray Scale for Staining
 - 4.7 Illumination System - Capable of providing a minimum of 1000 ± 50 lux (100 lumens/sq. ft) of north sky light or equivalent light source.
5. Test Specimen
- 5.1 A test carpet shall be taken of appropriate size to accommodate a minimum of eight (8) staining agents. A sample 46 cm x 66 cm (18 in x 26 in) or larger is recommended.
 - 5.2 Carpet Description:

Construction:	Tufted Cut Pile
Color:	Almond White
Pile Yarn Weight:	848 gm/m ² (25 oz/sq yd)
Yarn Type:	100% Spun Nylon 6,6
Pile Height:	12 mm (.470 Inch)
Surface Treatment:	None
6. Procedure
- 6.1 Staining agents and the application quantities for each are listed in Table 1.
 - 6.2 For thicker, semi-solid staining agents, dilute with tap water at the ratio listed in Table 1.
 - 6.3 Pour the staining agents which have been diluted in accordance with Table 1 into the spray bottle and adjust the nozzle to achieve a fine mist. Hold the spray nozzle in the center of the staining ring close enough to avoid over spraying outside the ring. Two full pumps of the spray trigger should apply 2.5 ± 0.5 ml of the liquid staining agents.
- NOTE: It may be necessary to test the stain application quantity by pre-spraying into a measuring tube or cup.
- 6.4 The staining ring should be held in place until the staining agent has been absorbed into the carpet pile. Rinse staining ring with water to remove residual staining agents between each application.
 - 6.5 For stain removal evaluations it is recommended that each staining agent be applied intriplicate. Stains should be at least 6.5 cm (2.5 inches) apart.
 - 6.6 Repeat the identical stain application process on another carpet panel to be later cleaned with only water and compared to the stain remover chemical.
 - 6.7 Place stained carpet panel on a non-absorbent surface and allow 24 ± 2 hours for substrate to dry before beginning the stain removal procedure.

Table 1

Staining Agents	Application	Dilution Ratio
Mustard	2.5 ± 0.5 ml	1:2 mustard:H ₂ O
Catsup	2.5 ± 0.5 ml	1:3 catsup:H ₂ O
Hot Coffee 60° ± 3° C	2.5±0.5 ml	Full Concentration
Purple Grape Juice	2.5 ± 0.5 ml	Full Concentration
Black Permanent Ink (Chisel Point)	draw 2 1" lines across ring	N/A
Dirty Motor Oil	2.5 ± 0.5 ml	1:1 oil:tetradecane
AATCC Synthetic Soil *	2.5 ± 0.5 ml	0.5 grams/100 ml
Chocolate Syrup	2.5 ± 0.5 ml	1:4 chocolate:H ₂ O

* Soil requires sifting through 100 mesh screen prior to mixing with water.

7. Stain Removal

- 7.1 Remove any solid staining agent residues which may have formed on the pile surface as a result of drying. A bone scraper, spatula or equivalent tool can be used to gently scrape away the solid residue without damage to the pile fiber.
- 7.2 The selected cleaning agent is applied to each stain and cleaning is done in accordance with the chemical manufacturers cleaning instructions.
- 7.3 In the absence of specific cleaning instructions, the following technique is recommended.
 - 7.3.1 Clean each stain individually and completely before proceeding to another stain. Saturate the stain with the cleaning agent and allow to dwell for 2 – 3 minutes.
 - 7.3.2 Blot the stained area by pressing with a clean white absorbent paper towel. Observe the transfer of both cleaning agent and stain residue to the paper towel. Continue blotting with clean dry paper towels until all evidence of liquid transfer is gone.
 - 7.3.3 Re-apply cleaning agent to stain and blot with clean dry paper towels until stain is completely removed or there is no evidence of stain transfer to the clean paper towel or for a maximum of three applications.
 - 7.3.4 Record the number of applications used for each stain.
- 7.4 Place test material on a non-absorbent surface and allow 24 ± 2 hours for substrate to dry before evaluating stains.

8. Evaluation

- 8.1 Rate each stain in accordance with AATCC Evaluation Procedure 2 using the Gray Scale for Staining.
- 8.2 A minimum of three trained technicians separately assess the stains and assign individual ratings which are averaged upon completion of the rating process.

9. Report

- 9.1 The average rating for each staining agent.
- 9.2 The identifying information for the cleaning agent.
- 9.3 Any deviations from this test practice.
- 9.4 Use applicable section of Test Summary, Appendix 1, for final assessment reporting.

Section 2

The Evaluation of Resoiling Characteristics of Spot and Stain Removal Products

1. Scope
 - 1.1 This test method is intended to evaluate the resoiling characteristics of spot and stain remover chemical residue on a standard carpet sample.
 - 1.2 This method is applicable to all liquid cleaning chemicals employing a spray application.
2. Significance & Use
 - 2.1 The propensity of cleaning chemical(s) residue to attract soil at an accelerated rate is measured by first applying the chemical to control material then using ASTM D6540-2000 Accelerated Soiling of Pile Yarn Floor Covering, to soil both the chemically treated and non-treated control samples. The differential soil level between the chemically treated and control samples indicates the level of accelerated soiling contributed by the cleaning chemical.
3. General Principle
 - 3.1 A section of the standard carpet sample is treated with a specified application of the test chemical and allowed to dry.
 - 3.2 The treated standard carpet sample is then subjected to a standardized accelerated soiling process to a predetermined level of soiling using a standard soil formula.
 - 3.3 Any differential soil level visible in the treated area versus the untreated area is visually assessed.
4. Referenced Documents
 - 4.1 AATCC Evaluation Procedure 2 – Gray Scale for Staining.
 - 4.2 ASTM D6540-00 Accelerated Resoiling of Pile Yarn Floor Coverings
5. Standard Test Carpet
 - 5.1 A test specimen ten (10) inches wide and forty (40) inches long is selected from the standard test carpet.
 - 5.2 Carpet Description:

Construction:	Tufted Cut Pile
Color:	Almond White
Pile Yarn Weight:	848gm/m ² (25 oz/sq yd)
Yarn Type:	100% Spun Nylon 6,6
Pile Height:	12mm (.470 Inch)
Surface Treatment:	None
- 6.0 Procedure
 - 6.1 The liquid spot and stain remover chemical is applied by spraying the surface of the standard test carpet in the center portion of the carpet sample in a circular area 152 mm (6 inches) in diameter. This can be accomplished by means of a template that only exposes the circular area to be treated.
 - 6.2 An application rate of 0.02 ml/cm² (0.64 oz/ft²) should be used.

NOTE: Due to the mechanical differences and variations used in the spot and stain remover chemical applicators, it may be necessary to pre-measure the application rate of each particular product by test spraying the chemical into a

- graduated measuring cup or cylinder.
- 6.3 Place the treated test carpet on a rack in ambient conditions until the treated area is dry.
 - 6.4 After drying at least 24 hours, the treated standard test carpet is soiled in accordance with ASTM D6540-00 using the AATCC synthetic soil formula.
 - 6.5 The soiled carpet sample is vacuumed using a control vacuum making 4 passes at 55cm/second (1.8 feet/second.)
 - 6.6 Visual ratings are given for the treated area of the carpet sample in accordance with the AATCC Gray Scale for Evaluating Staining.
- 7.0 Report
- 7.1 Report rating for the treated area of the carpet.
 - 7.2 Report the spot and stain remover chemical descriptive information such as manufacturer, brand name or item and or sample number.
 - 7.3 Use applicable Test Summary, Appendix 1, for final assessment reporting.

Section 3

Presence of Optical Brighteners in Carpet Spot Removal Products

1. Significance & Use
The presence of optical brighteners in carpet cleaning chemicals has been known to adversely affect fiber color, appearance and long term performance.
2. Procedure
Pour or spray three (3) to five (5) ml of test chemical through a 152MM (6 inch) circle template onto a white absorbent paper towel or filter paper. Allow chemical to dry in ambient air, rinse with tap water (30) seconds then allow to dry.
3. Assessment
 - 3.1 View the chemically sprayed/rinsed paper towel/filter paper using an Ultraviolet light source and compare to an untreated control of the same paper towel/filter paper.
 - 3.2 A fluorescent glow of the chemically treated towel indicates the presence of optical brighteners in the residual chemical on the absorbent paper towel/filter paper.
4. Report
 - 4.1 If a fluorescent glow is visible in the treated test material then report a positive test result for the presence of optical brighteners.
 - 4.2 Use applicable Test Summary, Appendix 1, for final assessment reporting.

Section 4

Lightfastness Assessment of Carpet Spot Removal Products on a Standard Carpet Sample

1. Significance & Use
 - 1.1 Cleaning chemical residues present on pile yarn floor coverings have been known to adversely affect dyes and accelerate color change. The level to which a chemical residue contributes to color change is determined by exposing a chemically treated standard test carpet with an untreated control sample to accelerated light in accordance with AATCC Test Method 16.
2. Procedure
 - 2.1 Treat a test specimen 57 X 120 mm (2 ¼ inch x 4 ¾ inches) from the standard

- carpet sample by evenly spraying the surface with three (3) grams of the cleaning chemical.
- 2.2 Allow the treated sample to dry.
 - 2.3 Subject the treated sample and an untreated "control" sample to accelerated lightfastness testing in accordance with AATCC 16 Option 3 (Xenon Arc Continuous light) for 40 AATCC fading units.
 - 2.4 Remove and rate the test specimens in accordance with AATCC Evaluation Procedure One using the AATCC Gray Scale for Color Change.
3. Results
 - 3.1 Record the Gray Scale ratings for each test specimen, treated and untreated.
 - 3.2 A lower Gray Scale rating on the treated test carpet indicates an adverse effect of the chemical treatment on the lightfastness of the carpet.
 - 3.3 Use applicable section of Test Summary, Appendix 1, for final assessment reporting.

Section 5

Method for Determining The pH of Carpet Spot Removal Products

1. Scope
 - 1.1 Chemicals which are extremely acidic or alkaline have been known to adversely affect dyes and certain fibers. Chemicals with a more neutral pH are generally considered safer to use when cleaning carpets or rugs.
 - 1.2 This method is applicable to liquid chemicals.
2. Apparatus
 - 2.1 Portable or benchtop pH meter.
 - 2.2 4 pH Buffer Solution
 - 2.3 10 pH Buffer Solution
 - 2.4 100 ml glass beaker or similar suitable container.
3. Procedure
 - 3.1 Follow the manufacturer's instructions for use of the pH meter.
 - 3.2 Measure the pH of the 4 pH and 10 pH buffer solutions to confirm meter standardization. Adjust meter if necessary to achieve correct readings.
 - 3.3 Pour an adequate quantity of the chemical to be tested into a clean beaker or other appropriate container compatible for use with the pH meter electrode.
NOTE: Test the chemical in the same dilution strength that is intended to be used.
 - 3.4 Measure the pH of the chemical in accordance with the equipment manufacturer's instructions allowing adequate time for the reading to stabilize.
4. Report
 - 4.1 Record the identification of the chemical being tested.
 - 4.2 Record the dilution ratio, if applicable, of the chemical being tested.
 - 4.3 Record the pH of the chemical being tested to the nearest 0.1 decimal point.
 - 4.4 Use applicable Test Summary, Appendix 1, for final assessment reporting.

APPENDIX 1

TEST SUMMARY FOR EVALUATION OF SPOT AND STAIN REMOVAL PRODUCTS

TEST NUMBER:

DATE: / /

CLIENT	
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CHEMICAL IDENTIFICATION	
CARPET SUBSTRATE USED	

STAINING AGENT	STAIN RATINGS		PASS/FAIL
	CHEMICAL	WATER	
Mustard			
Catsup			
Coffee			
Grape Juice			
Black Marker			
Chocolate Syrup			
Dirty Motor Oil			
Soil			
COMPOSITE SCORE			
RESOILING RATING			
LIGHT RATING			
pH			
OPTICAL BRIGHTENERS			

NOTE: Stains are rated in accordance with the AATCC Gray Scale for staining.

Rating Key	
5	No Stain
4	Slight Stain
3	Noticeable Stain
2	Considerable Stain
1	Severe Stain