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Colorfastness to Sodium Hypochlorite of a Textile Floor Covering

Developed in 2011 by AATCC Committee RA57; reaffirmed 2012, 2013.

1. Purpose and Scope

1.1 This test method is used to determine the fastness of colored pile yarn floor coverings to the effects of a sodium hypochlorite solution, commonly called chlorine bleach. It is applicable to predyed, postdyed, printed, or other otherwise colored pile yarn floor coverings.

2. Principle

2.1 A specimen of pile yarn floor covering is treated with a small volume of sodium hypochlorite bleach. After allowing the treated specimen to remain at controlled conditions for a specific time, it is rinsed in water to remove all of the bleach. Any color loss is assessed after drying.

3. Terminology

3.1 **color change**, *n.*—a change in color of any kind whether in lightness, hue or chroma or any combination of these, discernible by comparing the test specimen with a corresponding untested specimen.

3.2 **colorfastness**, *n.*—the resistance of a material to change in any of its color characteristics, to transfer of its colorant(s) to adjacent materials or both as a result of the exposure of the material to any environment that might be encountered during the processing, testing, storage or use of material.

3.3 **sodium hypochlorite bleach**, *n.*—4-6% solution of sodium hypochlorite (NaOCl), pH 9.8-12.8, commonly called “chlorine bleach.”

4. Safety Precautions

NOTE: These safety precautions are for information purposes only. The precautions are ancillary to the testing procedures and are not intended to be all-inclusive. It is the user's responsibility to use safe and proper techniques in the handling of materials in this test method. Manufacturers MUST be consulted for specific details such as material safety data sheets and other manufacturer's recommendations. All OSHA standards and rules must also be consulted and followed.

4.1 Good laboratory practices should be followed. Caution should be used

when cutting specimens. All chemicals should be handled with care.

4.2 In preparing, dispensing and handling aqueous chemical solutions, use chemical goggles or face shield, impervious gloves and an impervious apron.

4.7 An eyewash/safety shower should be located nearby and an organic vapor respirator should be available for emergency use.

4.8 Exposure to chemicals used in this procedure must be controlled at or below levels set by governmental authorities (e.g., Occupational Safety and Health Administration's [OSHA] permissible exposure limits [PEL] as found in 29 CFR 1910.1000; (see web site: www.osha.gov for latest version). In addition, the American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Values (TLVs) comprised of time weighted averages (TLV-TWA), short term exposure limits (TLV-STEL) and ceiling limits (TLV-C) are recommended as a general guide for air contaminant exposure which should be met (see 12.1).

5. Apparatus and Materials

5.1 AATCC Stain Cup and 50 mm (2.0 in.) Diameter Staining Ring (see 12.2).

5.2 Gray Scale for Color Change (AATCC Evaluation Procedure 1) (see 12.2).

5.3 Water, deionized.

5.4 Sodium Bisulfite (NaHSO_3) (see 6.2).

5.5 Balance, capable of weighing to the nearest 0.01 g.

5.6 Sodium Hypochlorite Bleach Standards, (NaOCl).

5.7 Illumination conditions. The source under which the comparison is made shall be determined prior to evaluation. Sources simulating any of the following CIE illuminants may be utilized (see 12.3 and 12.4):

Color Illuminant	Description	Temperature
D ₆₅	Daylight	6500K ± 200
D ₇₅	Daylight	7500K ± 200
A	Incandescent	2856K ± 200
CWF	Cool White	4150K ± 350
	Fluorescent	

Note: Additional illuminants or changes in color temperature can be negotiated between contractual parties.

6. Preparation of Standard Sodium Hypochlorite Bleach Solution

6.1 Sodium Hypochlorite Bleach standards with traceable certificates shall be

used without titration. The solution must be used within 36 h after exposure to atmospheric conditions. Titration is necessary if the purchased standard is diluted to another strength.

6.2 The Sodium Bisulfite Solution used to neutralize the treated specimens should be prepared by diluting 17.25 g in 1000 mL of deionized water.

7. Test Specimens

7.1 Cut two test specimens from the finished pile yarn floor covering. The specimens shall be a minimum of 150 mm (6 in.) square.

7.2 Remove any extraneous surface materials by brushing and/or vacuuming.

8. Test Procedure

8.1 Condition all test specimens, pile side up, on a non-absorbent surface for 24 h at standard conditions of $21 \pm 1^\circ\text{C}$ ($70 \pm 2^\circ\text{F}$) and $65 \pm 2\%$ RH. Avoid contamination or contact with extraneous materials.

8.2 Place the 50 mm (2 in.) diameter-staining ring in the center of one of the test specimens. The other specimen is a control used for rating. While pressing down on the ring, pour 20 mL of the sodium hypochlorite bleach solution into the center of the ring, taking care not to splatter bleach outside of the staining ring. Press the bottom of the stain cup through the ring into the pile, moving it up and down five times to facilitate wetting of the pile fiber from top to bottom. Do not rotate or twist the cup inside the ring as surface abrasion shall affect the results. Carefully remove the staining ring and stain cup.

8.3 Recondition the treated specimen for 24 ± 4 h in a flat position, pile side up, at standard conditions of $21 \pm 1^\circ\text{C}$ ($70 \pm 2^\circ\text{F}$) and $65 \pm 2\%$ RH. Avoid any air draft which could result in an accelerated drying.

8.4 Neutralize the bleached specimens in a bath containing the prepared Sodium Bisulfite solution for a minimum of 5 mins.

8.5 Rinse the bleached specimen with running water at $21 \pm 6^\circ\text{C}$ ($70 \pm 10^\circ\text{F}$) until rinse water indicates removal of all unfixed dye. Removal of unfixed dye is enhanced by the use of a laboratory wringer.

8.6 Extract (centrifuge or vacuum) the wet specimen to remove excess water.

8.7 Allow specimens to air dry at room temperature in conditioning racks.