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Colorfastness to Sodium Hypochlorite Bleach in Home Laundering

Developed in 2000 by AATCC Committee RA60; editorially revised and reaffirmed 2001, 2008; reaffirmed 2002, 2017; revised 2003, 2010; editorially revised 2004, 2012, 2013, 2016.

1. Purpose and Scope

1.1 This test method is used to determine the colorfastness to sodium hypochlorite bleach, commonly called "chlorine bleach," in home laundering of textiles which are expected to withstand frequent laundering.

1.2 Results of this test method may be used in combination with other testing for establishing care instructions (see 5.1, 9.6 and 12.8).

1.3 If a chlorine bleach contains ingredients other than the sodium hypochlorite, it is the total effect of these chemicals on the color change that is being evaluated.

1.4 This test method is designed for home laundering devices. An accelerated colorfastness test simulating multiple home laundering (including those with sodium hypochlorite) is described in AATCC Test Method (TM) 61, Colorfastness to Laundering: Accelerated. There is no known correlation between those sections of TM61 and this method.

2. Principle

2.1 Specimens are laundered under appropriate conditions of temperature, detergent solution, chlorine bleach solution and abrasive action for five home laundering cycles. The laundered specimens are evaluated for color change.

3. Terminology

3.1 **bleach,** n.—*in home laundering*, a product that will clean, whiten, brighten and aid in the removal of soils and stains from textile materials by oxidation that is inclusive of chlorine and non-chlorine products.

3.2 **care instructions,** n.—*in textiles*, a series of directions describing which care practices should refurbish a product without adverse effects and warning of those care practices expected to have a harmful effect (see 12.1).

3.3 **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 the materials.

3.4 **laundering,** n.—*of textile materials*, a process intended to remove soil and/or stains by treatment (washing) with an aqueous detergent solution and normally including subsequent rinsing, extracting and drying.

3.5 **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 handling 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. Wear safety glasses in all laboratory areas.

4.2 Manufacturer's safety recommendations should be followed when operating laboratory testing equipment.

4.3 The 1993 AATCC Standard Reference Detergent WOB and the 2003 AATCC Standard Reference Liquid Detergent WOB may cause irritation. Care should be taken to prevent exposure to skin and eyes.

4.4 All chemicals should be handled with care.

4.5 In preparing, dispensing and handling bleach and detergent, use chemical goggles or face shield, impervious gloves and an impervious apron.

4.6 If concentrated sulfuric acid is diluted to prepare the 10% acid (see 14.8.1 and 14.8.3), use chemical goggles or face shield, impervious gloves and an impervious apron. Concentrated acids should be handled only in an adequately ventilated hood. CAUTION: Always add acid to water.

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 14.1).

5. Uses and Limitations

5.1 Specimens may be tested using these procedures, but without sodium hypochlorite bleach, to determine the effect of laundering with water and/or water and detergent alone (see 9.6 and 12.8). To test for colorfastness to non-chlorine bleach, see TM172, Colorfastness to Powdered Non-Chlorine Bleach in Home Laundering (see 14.2).

6. Apparatus and Materials (see 14.3)

6.1 Automatic washing machine (see 14.4).

6.2 Automatic tumble dryer (see 14.5).

6.3 Conditioning/drying racks with pull-out screens or perforated shelves (see 14.6).

6.4 Ballast of 920 × 920 mm (± 30 mm) hemmed pieces of cloth. Choose one of the following.

6.4.1 Ballast type 1, bleached cotton sheeting.

6.4.2 Wash load ballast type 3, 50/50 polyester/cotton plain weave.

6.5 1993 AATCC Standard Reference Detergent WOB or 2003 AATCC Standard Reference Liquid Detergent WOB (see 14.7).

6.6 Drip and line drying facilities.

6.7 Balance with at least 5 kg minimum capacity and sensitivity to ± 0.1 g.

6.8 Lab timer.

6.9 Gray Scale for Color Change (AATCC Evaluation Procedure 1) (see 14.7) or suitable colorimeter or spectrophotometer for color change.

7. Reagents

7.1 Sodium hypochlorite (NaOCl), 4-6%.

7.2 Distilled water.

7.3 Sulfuric acid, H_2SO_4, (10% solution).

7.4 Potassium iodide, KI, (10% solution).

7.5 Sodium thiosulfate, $Na_2S_2O_3$, (0.1*N*).

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