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Colorfastness to Laundering: Accelerated

Developed in 1950 by AATCC Committee RA60; revised 1952, 1954, 1957, 1960, 1961, 1970, 1972, 1986 (title change), 1989, 1993, 1994, 1996, 2003, 2006 (title change), 2007, 2009, 2010, 2013; reaffirmed 1956, 1962, 1965, 1968, 1969, 1975, 1980, 1985; editorially revised 1973, 1974, 1975, 1976, 1981, 1983, 1984, 1991, 1995, 1998, 2002, 2004, 2008, 2012; editorially revised and reaffirmed 2001. Partly equivalent to ISO 105-C06.

1. Purpose and Scope

1.1 These accelerated laundering tests are to evaluate the colorfastness to laundering of textiles which are expected to withstand frequent laundering. The fabric color loss and surface changes resulting from detergent solution and abrasive action of five typical hand or home launderings, with or without chlorine, are roughly approximated by one 45 min test (see 9.2-9.6). However, the staining effect produced by five typical hand or home launderings cannot always be predicted by the 45 min test. Staining is a function of the ratio of colored to undyed fabrics, fiber content of fabrics in the wash load and other end-use conditions which are not always predictable.

1.2 When this test method was originally developed, various options of this method were intended to evaluate the color change and staining by five home or commercial launderings, on an accelerated basis. Throughout the years, commercial laundering procedures have changed and commercial cleaning today involves many different types of processes, dependent on the type of product being cleaned that cannot be duplicated by one accelerated laboratory procedure. In 2005, all references to commercial laundering were removed as it is not known if these procedures accurately replicate typical commercial laundering processes used today.

2. Principle

2.1 Specimens are tested under appropriate conditions of temperature, detergent solution, bleaching and abrasive action such that the color change is similar to that occurring in five hand or home launderings. The color change is obtained in a conveniently short time. The abrasive action is a result of the frictional effects of fabric against canister, the low liquor ratio and the impact of the steel balls on the fabric.

3. Terminology

3.1 **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 material.

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

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 the 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 All chemicals should be handled with care.

4.3 The 1993 AATCC Standard Reference Detergent (with and without optical brighteners) and the 2003 AATCC Standard Reference Liquid Detergent (with and without optical brighteners) may cause irritation. Care should be taken to prevent exposure to skin and eyes.

4.4 An eyewash/safety shower should be located nearby for emergency use.

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

5. Apparatus, Reagents and Materials (see 12.1)

5.1 Accelerated laundering machine.

5.1.1 A laundering machine for rotating closed canisters in a thermostatically controlled water bath at 40 ± 2 rpm.

5.1.2 Stainless steel lever lock canisters Type 1 500 mL (1 pt), 75×125 mm (3.0×5.0 in.) for Test No. 1A.

5.1.3 Stainless steel lever lock canisters Type 2 1200 mL, 90×200 mm (3.5×8.0 in.) for Tests No. 1B, 2A, 3A, 4A and 5A.

5.1.4 Adapter plates for holding canisters (see 5.1.3) on laundering machine shaft.

5.1.5 Stainless steel balls, 6 mm (0.25 in.) in diameter.

5.1.6 White Synthetic (SBR) Rubber Balls 9-10 mm ($3/8$ in.) dia. 70 Durometer hardness for Test 1B (see 12.1)

5.1.7 Teflon fluorocarbon gaskets (see 7.4.2 and 12.2).

5.1.8 Preheater/storage module (see 7.4, 12.1 and 12.3).

5.2 Scales for rating test results.

5.2.1 AATCC 9-Step Chromatic Transference Scale (AATCC Evaluation Procedure 8) (see 12.4).

5.2.2 Gray Scale for Color Change (AATCC Evaluation Procedure 1) (see 12.4).

5.2.3 Gray Scale for Staining (AATCC Evaluation Procedure 2) (see 12.4).

5.3 Reagents and materials.

5.3.1 Multifiber test fabrics (8 mm [0.33 in.] bands) containing acetate, cotton, nylon, silk, viscose rayon and wool. Multifiber test fabrics (8 mm [0.33 in.] bands) and (15 mm [0.6 in.] bands) containing acetate, cotton, nylon, polyester, acrylic and wool (see 12.5).

5.3.2 Bleached cotton test fabric, 32×32 ends $\times$ picks/cm (80×80 ends $\times$ picks/in.) construction, 100 ± 3 g/m² (3.0 ± 0.1 oz/yd²), desized without optical brightener (see 12.5).

5.3.3 1993 AATCC Standard Reference Detergent WOB (without optical brightener and without phosphate) or 2003 AATCC Standard Reference Liquid Detergent WOB (without optical brighteners) (see 10.5 and 12.6).

5.3.4 1993 AATCC Standard Reference Detergent (with optical brighteners) or 2003 AATCC Standard Reference Liquid Detergent (with optical brighteners) (see 10.5 and 12.6).

5.3.5 Water, distilled or deionized (see 12.7).

5.3.6 Sodium hypochlorite (NaOCl) bleach (see 12.8).

5.3.7 Sulfuric acid (H₂SO₄), 10% (see 12.8.1).

5.3.8 Potassium iodide (KI), 10% (see 12.8.1).

5.3.9 Sodium thiosulfate (Na₂S₂O₃), 0.1N (see 12.8.1).

5.3.10 Crockmeter test cloth cut in 50 mm (2 in.) squares (see 12.9).

5.3.11 White cards (specimen mounts) with Y tristimulus value at least 85%.

6. Test Specimens

6.1 The sizes of the specimens required for the various tests are as follows:

50 $\times$ 100 mm (2.0×4.0 in.) for Test No. 1A,