

Appearance of Fabrics after Repeated Home Laundering

Developed in 1967 by AATCC Committee RA61; revised 1969, 1975, 1982, 1989 (with title change), 1992, 1996, 2005, 2006; editorially revised 1974, 1983, 1985, 1988, 1991, 1997, 2004; reaffirmed 1973; editorially revised and reaffirmed 1978, 1984, 2001. Technically equivalent to ISO 7768.

1. Purpose and Scope

1.1 This test method is designed to evaluate the smoothness appearance of flat fabric specimens after repeated home laundering.

1.2 Any washable fabric may be evaluated for smoothness appearance using this method.

1.3 Fabrics of any construction, such as woven, knit and nonwoven, may be evaluated according to this method.

2. Principle

2.1 Fabric specimens are subjected to standard home laundering practices. A choice of hand or machine washing with alternative machine wash cycles and temperatures, and alternative drying procedures being provided. Evaluation is performed using a standard lighting and viewing area by rating the appearance of specimens in comparison with appropriate reference standards.

3. Terminology

3.1 **ballast**, *n.*—*in procedures for processing or testing of textiles*, material that is used to bring the total weight or volume of the textiles to an amount specified in the procedure.

3.2 **durable press**, *adj.*—having the ability to retain substantially the initial shape, flat seams, pressed-in creases and unwrinkled appearance during use and after laundering or drycleaning.

3.3 **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 rinsing, extracting and drying.

3.4 **laundering creases**, *n.*—sharp folds or lines running in any direction in a washed or dried specimen.

NOTE: Laundering creases are an unintended result of restricted movement of specimens in a washer or the dryer.

3.5 **smoothness appearance**, *n.*—*in fabrics*, the visual impression of planarity of a specimen quantified by comparison with a set of reference standards.

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

4.3 All chemicals should be handled with care.

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

5. Uses and Limitations

5.1 This test method is designed to be used only for evaluating the appearance of washable fabrics after repeated home laundering.

5.2 The test procedure is designed to reflect the capabilities of home laundry equipment which is currently used by consumers. In general, it is preferable to conduct the test under relatively severe laundering conditions.

5.3 Prints and patterns may mask the mussiness present in fabrics. The rating process is, however, based on the visual appearance of specimens including such effects.

5.4 The small specimen sizes used for fabric tests occasionally will cause wrinkles or creases (dryer creases) to develop which are not considered to be characteristic of fabric performance in use. Precautions are given in the text of the method to reduce the occurrence of dryer creases.

5.5 The interlaboratory reproducibility of the results of this test method depends upon mutual agreement by users of the method on the washing and drying conditions as outlined in 8.1.

6. Apparatus and Materials

6.1 Automatic washing machine (see 12.1).

6.2 Automatic tumble dryer (see 12.1).

6.3 Drip dry and line dry facilities.

6.4 A 9.5 L (10.0 qt) pail.

6.5 Detergents.

6.5.1 1993 AATCC Standard Reference Detergent, powder (see 12.2 and 12.8).

6.5.2 2003 Standard Reference Detergent, liquid (see 12.2).

6.6 Ballast of $92 \times 92 \pm 3$ cm ($36 \times 36 \pm 1$ in.) hemmed pieces of bleached cotton sheeting (Wash load ballast type 1) or 50/50 polyester/cotton plain weave (Wash load ballast type 3) (see 12.3).

6.7 Lighting and evaluation area in an otherwise darkened room using the overhead lighting arrangement shown in Fig. 1 (see 12.4). It has been the experience of many observers that light reflected from the side walls near the viewing board can interfere with the rating results. It is recommended that the side walls be painted matte black (85° gloss less than 5 units) or that blackout curtains be mounted on both sides of the viewing board to eliminate the reflective interference.

6.8 Standard AATCC Three-Dimensional Smoothness Appearance Replicas, set of six (see Fig. 2 and 12.2).

6.9 Steam or dry iron with appropriate fabric temperature settings.

6.10 Detergent (for hand wash).

6.11 Scale with at least 5 kg or 10 lb capacity.

7. Test Specimens

7.1 Three representative 38×38 cm (15×15 in.) fabric specimens cut parallel to the fabric length and width are prepared. Where possible, each specimen should contain different groups of lengthwise and widthwise yarns. The specimens should be marked to indicate the lengthwise direction. If fraying is expected in laundering, see 12.5.

8. Procedure

8.1 Tables II, III and IV summarize the alternate washing and drying conditions and settings. Additional information on the machine and laundering conditions may be found in the monograph, *Standardization of Home Laundry Test Conditions*, elsewhere in this TECHNICAL MANUAL.

8.1.1 It is recognized that special cycles or features are available on current washing machines and dryers to achieve improved performance on certain items; i.e., gentle cycles with reduced agitation to protect delicately constructed items, and durable press cycles, with cool-down

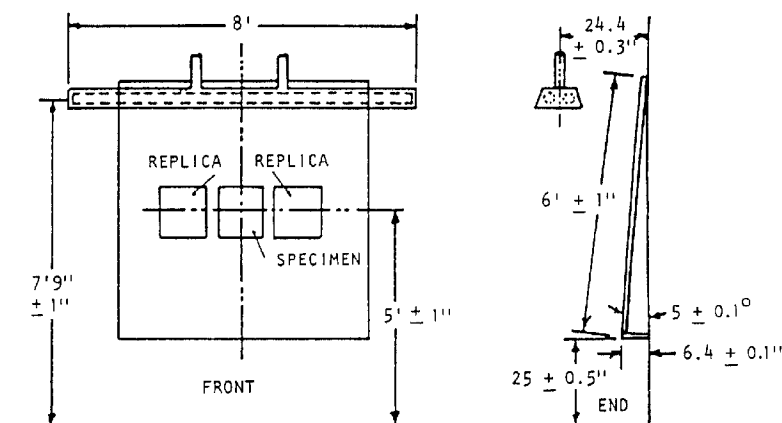


Fig. 1—Lighting equipment for viewing test specimens.

Materials list: (a) Two 8-ft Type F96 CW (Cool White) preheat Rapid Start fluorescent lamps (without baffle or glass). (b) One white enamel reflector (without baffle or glass). (c) One general type swatch mount, spring loaded. Fabricate using light sheet metal (22 ga.). (d) One 1/4 in. plywood mounting board painted to match No. 2 gray chip on AATCC Gray Scale for Staining.



Fig. 2—AATCC 3-D smoothness appearance replicas.

or cold rinses and reduced spin speeds, to minimize wrinkling. In evaluating appearance retention, however, the more severe Normal or Cotton Sturdy machine cycle is considered most appropriate. If modifications to any of the cycles (see 8.2) are used, these must be reported in the results (see Section 10).

8.2 Standard washing.

8.2.1 Hand Wash—(see 12.6). Dissolve 20.0 ± 0.1 g of 1993 AATCC Standard Reference Detergent or 30.3 g of 2003 AATCC Standard Reference Liquid Detergent in 7.57 ± 0.06 L (2.00 ± 0.02 gal) of water at $41 \pm 3^\circ\text{C}$ ($105 \pm 5^\circ\text{F}$) in a 9.5 L (10.0 qt) pail and then add the three fabric test specimens. Wash for 2.0 ± 0.1 min with no twisting or wringing. Rinse

once using 7.57 ± 0.06 L (2.00 ± 0.02 gal) of water at $41 \pm 3^\circ\text{C}$ ($105 \pm 5^\circ\text{F}$). Remove the specimens and dry by Procedure C, Drip (see 8.3.3).

8.2.2 Machine Wash—Use specified water level, the selected water temperature for the washing cycle and a rinse temperature of less than 29°C (85°F). If this rinse temperature is not attainable, record available rinse temperature.

8.2.3 Add 66 ± 0.1 g of 1993 AATCC Standard Reference Detergent or 100 ± 0.1 g of 2003 AATCC Standard Reference Liquid Detergent. In soft water areas this may be reduced to avoid excessive sudsing, but in that case the amount should be stated in the report of test results.

8.2.4 Add test specimens and enough ballast to make a 1.8 ± 0.06 kg (4.00 ± 0.13 lb) load. Set the washer for the selected washing cycle and time (see Tables II and III). Normal or Cotton Sturdy is recommended. For very critical evaluations and in arbitration, limit the number of specimens per washer load to those from one sample.

8.2.5 For specimens to be dried by Procedures A, B or D, allow washing to proceed automatically through the final spin cycle. Remove the test specimens *immediately* after the final spin cycle, separate tangled pieces, taking care to minimize distortion, and dry by Procedure A, B or D (see Tables II and IV).

8.2.6 For specimens to be dried by Procedure C, Drip Dry, remove the specimens from the washer just before the water begins to drain for the final rinse cycle. Remove specimens soaking wet.

8.2.7 Washer creases. Specimens may be in a folded or creased state after washing. Such folds or creases should be removed by hand prior to drying.

8.3 Drying.

8.3.1 (A) Tumble Dry. Place the washed load (test specimens and ballast) in the tumble dryer and set the temperature control to generate the correct exhaust temperatures as specified in Table IV. For fibers that are heat sensitive, lower temperatures consistent with producers' recommendations are required, and must be reported. Operate the dryer until the total load is dry. Remove the load immediately after the machine stops. Avoid overdrying. Static cling becomes a problem with overdrying, particularly with lightweight fabrics, because it prevents the specimens from tumbling freely.

8.3.2 (B) Line Dry. Hang each fabric specimen by two corners with the fabric length in the vertical direction. Allow specimens to hang in still air at room temperature until dry.

8.3.3 (C) Drip Dry. Hang each dripping wet fabric specimen by two corners with the fabric length in the vertical direction. Allow specimens to hang in still air at room temperature until dry.

8.3.4 (D) Screen Dry. Spread each specimen on a horizontal screen or perforated surface, removing wrinkles but not distorting or stretching the specimen. Allow the specimen to dry in still air at room temperature.

8.3.5 Laundering creases. If specimens are folded or creased after any drying cycle but the last, they should be re-wet and an attempt made to remove the creases by ironing with a hand iron at a temperature suitable for the fabric being tested prior to the specimens being subjected to additional washing and drying cycles. No attempt to remove wrinkles or creases by hand ironing should be made after the final drying cycle.