

Test Method for Seam Smoothness in Fabrics after Home Laundering

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Foreword

This test method and its accompanying photographic scales were developed for evaluation of woven fabrics with a durable-press finish. It is common industry practice to use the method and scales for evaluation of other textile materials although some specimens may have different appearance characteristics due to different fabric or seam construction.

Standard laundering procedures remain consistent to allow valid comparison of results. Standard procedures represent, but may not exactly replicate, current consumer practices, which vary over time and among households. Alternate laundering procedures and machine parameters may be found in AATCC LP1, Laboratory Procedure for Home Laundering: Machine Washing (see 12.3) and ISO 6330, Textiles — Domestic washing and drying procedures for textile testing (see 12.8).

1. Purpose and Scope

1.1 This test method is intended to determine the smoothness appearance of seams in fabrics after being subjected to home laundering procedures. Several washing and drying procedures provide standard parameters to represent common home care options.

1.2 Seams in any washable fabric (woven, knitted, or nonwoven) may be evaluated for smoothness using this method.

1.3 Techniques for seaming are not outlined, since the purpose is to evaluate seams as they will be supplied from manufacturing or as ready for use. Furthermore, seaming techniques would be controlled by fabric properties.

2. Principle

2.1 Seamed fabric specimens are subjected to standard home laundering practices. Appearance of specimens is evaluated in a standard viewing area by

visually comparing the specimen seam smoothness after laundering with grades represented by the appropriate AATCC Photographic Seam Smoothness Scale. Results are reported as a seam smoothness (SS) grade of 1 to 5, with 1 representing the least smoothness (most puckering) and 5 representing most smoothness.

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 **grade**, n.—the number assigned to a test specimen resulting from comparison to a scale.

3.4 **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.

3.5 **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 the washer or the dryer.

3.6 **seam smoothness**, n.—*in fabrics*, the visual impression of planarity of a seamed 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 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 seamed fabrics after home laundering.

5.2 In general, it is preferable to conduct the test under relatively severe laundering conditions. It is recognized that special cycles or features are available on current washing machines and dryers to achieve improved performance on certain items; e.g., gentle cycles with reduced agitation to protect delicately constructed items, and durable press cycles, with cool-down or cold rinses and reduced spin speeds, to minimize wrinkling.

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

5.4 The Seam Smoothness Scales were photographed from woven fabrics. It is understood that the photographs do not duplicate other fabric or seam possibilities. The scales are to be used as guides that represent various levels of seam smoothness.

5.5 Small specimen sizes will occasionally result in wrinkles or creases. These may not be characteristic of actual performance, in use.

5.6 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 Tables I-IV.

6. Apparatus and Materials (see 12.1)

6.1 Steam or dry iron with appropriate fabric temperature settings.

6.2 Standard washing machine (see Table I, 12.2), for machine washing.

6.3 Wash tub, 9.5-L, for hand washing.

6.4 White towel, large enough to accommodate test specimen, any weight, for hand washing.

6.5 Standard tumble dryer (see Table IV, 12.2), or facilities for drip, screen or line drying.

6.6 Conditioning facilities and conditioning/drying racks with pull-out, perforated shelves (see 12.3).

6.7 Scale with at least 5-kg or 10-lb capacity.

6.8 AATCC 1993 Standard Reference

Table I—Standard Washing Machine Parameters (see 12.2, 12.7)

Cycle	(1) Normal	(2) Delicate	(3) Permanent Press
Water Level, L (gal)	72 ± 4 (19 ± 1)	72 ± 4 (19 ± 1)	72 ± 4 (19 ± 1)
Agitation Speed, strokes/min.	86 ± 2	27 ± 2	86 ± 2
Washing Time, min.	16 ± 1	8.5 ± 1	12 ± 1
Final Spin Speed, rpm	660 ± 15	500 ± 15	500 ± 15
Final Spin Time, min.	5 ± 1	5 ± 1	5 ± 1
Wash Temp, °C (°F) ¹	(II) Cold: 27 ± 3 (80 ± 5) (III) Warm: 41 ± 3 (105 ± 5) (IV) Hot: 49 ± 3 (120 ± 5) (V) Very Hot: 60 ± 3 (140 ± 5)	(II) Cold: 27 ± 3 (80 ± 5) (III) Warm: 41 ± 3 (105 ± 5) (IV) Hot: 49 ± 3 (120 ± 5) (V) Very Hot: 60 ± 3 (140 ± 5)	(II) Cold: 27 ± 3 (80 ± 5) (III) Warm: 41 ± 3 (105 ± 5) (IV) Hot: 49 ± 3 (120 ± 5) (V) Very Hot: 60 ± 3 (140 ± 5)

¹ The temperatures in this table are similar to those specified by the US Federal Trade Commission for care label verification (see Table VIII). Due to US Department of Energy requirements, many consumer washing machines use cooler water. An external control box may be used to override the machine set temperatures.

Table II—Standard Hand Washing and Rinsing Temperatures

Designation	Wash Temp, °C (°F)	Rinse Temp, °C (°F)
Very Cold	16 ± 3 (60 ± 5)	< 18 (< 65)
Cold	27 ± 3 (80 ± 5)	< 29 (< 85)
Warm	41 ± 3 (105 ± 5)	< 29 (< 85)
Hot ¹	49 ± 3 (120 ± 5)	< 29 (< 85)

¹ Hot water may not be a reasonable selection for hand washing or for the delicate items typically requiring hand washing.

Table III—Standard Drying Conditions

(A)	Tumble Dry
(Ai)	Tumble Dry Normal
(Aii)	Tumble Dry Delicate
(Aiii)	Tumble Dry Permanent Press
(B)	Line/Hang Dry
(C)	Drip Dry
(D)	Screen Dry/Dry Flat

Detergent (powder, with brightener, see 12.3).

6.9 Laundering ballast Type 1 or Type 3 (see Table V).

6.10 Evaluation area, as described in Appendix A.

6.11 AATCC Photographic Seam Smoothness Scales, for single- and double-needle seams (see Fig. 1, 12.3). The reproduction shown in Fig. 1 may not be used for rating.

7. Test Specimens

7.1 Cut three 380 x 380 mm (15 x 15 in) specimens, sides parallel to the length and width fabric directions such that existing seams run through the middle of each specimen. Where possible, each specimen should contain different groups of lengthwise and widthwise yarns. The specimens should be marked to indicate the lengthwise direction.

7.1.1 If fraying is expected in laundering, see 12.4.

7.1.2 If the fabric is wrinkled, it may be smoothed by appropriate ironing prior

Table IV—Standard Tumble Dryer Parameters (see 12.2)

Cycle	(Ai) Normal	(Aii) Delicate	(Aiii) Permanent Press
Max. Exhaust Temp, °C (°F)	68 ± 6 (155 ± 10)	60 ± 6 (140 ± 10)	68 ± 6 (155 ± 10)
Cool Down Time, min.	≤ 10	≤ 10	≤ 10

Table V—Laundering Ballast Parameters

	Type 1	Type 3
Fiber Content	100% cotton	50% cotton/50% polyester ± 3%
Greige Fabric Yarns	16/1 ring spun	16/1 or 30/2 ring spun
Greige Fabric Construction	52 x 48 ± 5 yarns/in., plain weave	52 x 48 ± 5 yarns/in., plain weave
Finished Fabric Weight	155 ± 10 g/m ²	155 ± 10 g/m ²
Edges	All edges hemmed or over-edged	All edges hemmed or over-edged
Finished Piece Size	920 x 920 ± 30 mm (36.0 x 36.0 ± 1 in.)	920 x 920 ± 30 mm (36.0 x 36.0 ± 1 in.)
Finished Piece Weight	130 ± 10 g	130 ± 10 g

to laundering. See Table I, Safe Ironing Temperature Guide, in AATCC TM133, Test Method for Colorfastness to Heat: Hot Pressing (see 12.3). Take care to avoid altering quality of the seam itself.

8. Laundering Procedure

8.1 Machine Washing.

8.1.1 Select washing conditions for testing from Table I. Normal cycle is recommended. Set washing machine controls to generate the selected cycle parameters.

8.1.2 Load for laundering shall consist of all specimens, plus enough laundering ballast pieces to make a total load weight of 1.8 ± 0.1 kg (4.0 ± 0.2 lb). For very critical evaluation and in arbitration, limit the number of specimens per washer load to those from one sample.

8.1.3 Begin selected wash cycle. Allow machine to fill to specified water level.

8.1.4 Add 66 ± 1 g of AATCC 1993 Standard Reference Detergent to washing machine as directed by washing machine manufacturer's instructions. If detergent is added directly to wash water, agitate briefly to dissolve completely. Stop agitation before adding wash load.

8.1.5 Add wash load (test specimens and ballast), distributing evenly around

center agitator. Restart wash cycle.

8.1.6 For specimens to be drip dried (drying procedure C), stop wash cycle before the water begins to drain from the final rinse cycle. Remove specimens soaking wet. For specimens to be tumble (A), line (B), or screen/flat (D) dried, allow washing to proceed through the final spin cycle.

8.1.7 After each washing cycle, separate tangled specimens and ballast pieces, taking care to minimize distortion.

8.1.8 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.

8.1.9 Proceed to appropriate drying procedure.

8.2 Hand Washing.

8.2.1 Select washing temperature from Table II. Add 7.6 ± 1.9 L (2.0 ± 0.5 gal) of water at this temperature to the wash tub.

8.2.2 Add 20 ± 1 g of AATCC 1993 Standard Reference Detergent to wash tub.

8.2.3 Agitate by hand to dissolve detergent.

8.2.4 Add specimen(s) to water and gently squeeze to distribute detergent solution. Do not twist or wring.

8.2.5 Let specimen(s) soak for 2 min.