

Test Method for Colorfastness to Steam Pleating

1. Purpose and Scope

1.1 This test method is intended for assessing the colorfastness of textiles of all kinds and in all forms to the action of steam pleating processes. The materials are not pleated during the test, and it is emphasized that the test is not intended for assessing the quality of the pleating process (see 12.1).

1.2 Three (3) tests, differing in severity, are provided; one (1) or more of them may be used.

1.3 The severe test is intended primarily for wholly manufactured textiles such as those made from polyamide and polyester fibers. It should not be used for textiles containing wool.

2. Principle

2.1 A specimen of the textile in contact with specified undyed cloths is steamed under specific conditions of pressure and time and then dried. The color change of the specimen and staining on the undyed cloths are assessed with standard gray scales. Color change and staining results are reported as a grade from 5 to 1, with 5 representing no color change or staining and 1 representing the most color change or staining.

3. Referenced Documents

NOTE: Use current versions of all publications unless otherwise specified.

3.1 AATCC EP1, Evaluation Procedure for Gray Scale for Color Change (see 12.2).

3.2 AATCC EP2, Evaluation Procedure for Gray Scale for Staining (see 12.2).

4. Terminology

4.1 **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.

4.2 **pleating**, n.—the process of making one or more desirable folds in a cloth by doubling the material over on itself.

5. Safety Precautions

NOTE: These safety statements 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. Users MUST consult manufacturers for specific details such as safety data sheets and other recommendations. Consult and follow all applicable OSHA standards and rules.

5.1 Follow good laboratory practices. Wear safety glasses in all laboratory areas.

5.2 Follow manufacturer's safety recommendations when operating laboratory testing equipment.

6. Apparatus and Materials (see 12.3)

6.1 Specimen holder (see Fig. 1 and 12.4).

6.2 Jacketed steamer (see 12.5) or pressure cooker (see 12.6).

6.3 Two (2) undyed scoured cloths, each measuring 5×4 cm (2.0×1.6 in.), made of the same kind of fiber as that of the textile to be tested or as otherwise specified. In the case of blends, two different undyed scoured cloths are required, corresponding to the two predom-

inating fibers (see 12.7).

6.4 Gray Scale for Color Change (see 12.2). Refer to AATCC EP1 for additional materials, environment and use of gray scale.

6.5 Gray Scale for Staining (see 12.2). Refer to AATCC EP2 for additional materials, environment and use of the gray scale.

7. Specimens

7.1 If the textile to be tested is fabric, cut a specimen 5×4 cm (2.0×1.6 in.)

7.1.1 Place fabric specimen between two (2) pieces of undyed cloth and sew along one side to form a composite specimen.

7.2 If the textile to be tested is yarn, knit it into fabric and treat it as in 7.1, or form a layer of parallel lengths of yarn between the two (2) pieces of undyed cloth, the amount of yarn taken being approximately equal to half the combined mass of the undyed cloths. Sew along one side to hold the yarn in place and to form a composite specimen.

7.3 If the textile to be tested is loose fiber, comb and compress an amount approximately equal to half the combined mass of the undyed cloths into a sheet $5 \times$

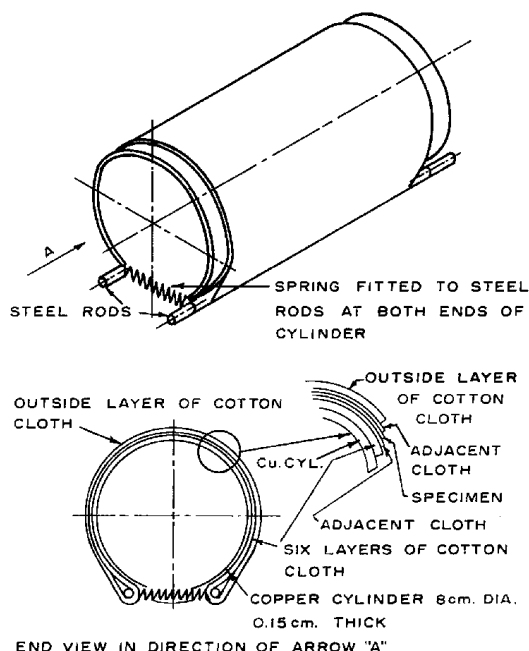


Fig. 1—Specimen holder.

Table I—Steaming Conditions

Test	Duration	Pressure (Gauge)	Temperature
I. Mild	5 min	0.35 kg/cm ² (5 lb/in. ²)	108°C (226°F)
II. Intermediate	10 min	0.7 kg/cm ² (10 lb/in. ²)	115°C (239°F)
III. Severe	20 min	1.76 kg/cm ² (25 lb/in. ²)	130°C (266°F)

4 cm (2.0 × 1.6 in.) Place the sheet between the two (2) undyed cloths, and sew along all sides to form a composite specimen.

8. Procedure

8.1 Mount the composite specimen in the holder between the two undyed cloths (see 6.3) as shown in Fig. 1.

8.2 Place the holder containing the composite specimen in a jacketed steamer or a pressure cooker.

8.3 Steam under one of the sets of conditions listed in Table I.

8.4 When steaming is complete, release the pressure over a period not exceeding 2 min.

8.5 Separate layers of the composite specimen layers so they are in contact only at one line of stitching. Dry in air at a temperature not exceeding 60°C (140°F). Condition at 20 ± 2°C (68 ± 3°F) and 65 ± 2% RH for 4 h.

8.6 Test specimens that liberate formaldehyde under steam pleating conditions separately.

9. Evaluation

9.1 Evaluate the color change of the test specimen as directed in AATCC EP1.

9.2 Evaluate the staining on each undyed adjacent cloth as directed in AATCC EP2.

10. Report

10.1 Describe or identify the sample tested.

10.2 Report that the sample was tested using AATCC TM131-2019.

10.3 Report the testing conditions:

10.3.1 Test number (I, II or III).

10.3.2 Nominal fiber content of test sample and undyed adjacent cloth(s).

10.4 Report the test results:

10.4.1 Color change grade for tested specimen.

10.4.2 Staining grades for the undyed adjacent cloth(s). If the two cloths are identical and show different degrees of staining, only the heavier should be reported.

10.5 Describe any modification(s) of the published method.

11. Precision and Bias

11.1 *Precision.* Precision for this test method has not been established. Until a precision statement is generated for this test method, use standard statistical techniques in making any comparisons of test results for either *within-laboratory* or *between-laboratory* averages.

11.2 *Bias.* Colorfastness to steam pleating can be defined only in terms of a test method. There is no independent method for determining the true value. As a means of estimating this property, the method has no known bias.

12. Notes

12.1 Papers used in commercial pleating occasionally contain reducing agents, that with certain coloring matters, can produce a much greater change in color than occurs under the test conditions.

12.2 Available from AATCC, PO Box 12215, Research Triangle Park NC 27709, USA; +1.919.549.8141; ordering@aatcc.org; www.aatcc.org.

12.3 For potential equipment information pertaining to this test method, please visit the online AATCC Buyer's Guide at www.aatcc.org/bg. AATCC provides the possibility of listing equipment and materials sold by its

Corporate members, but AATCC does not qualify, or in any way approve, endorse or certify that any of the listed equipment or materials meets the requirements in its test methods.

12.4 The specimen holder consists of a copper tube 8 cm (3 in.) in external diameter. The thickness of the copper is 0.15 cm (0.06 in.) The copper tube is wrapped with six layers of bleached cotton cloth weighing 125 g/m² (3.7 oz/yd²). The outside layer is made from bleached cotton cloth weighing 186 g/m² (5.5 oz/yd²). The edge of the outside layer is folded back and sewn to provide a place for insertion of the rods. The rods at each end are made from 0.6-cm (0.25-in.) diameter soft steel. The strength of the springs is not critical, but it should be sufficient to hold the layer tightly against the tube. The springs are fastened to one of the steel rods and should hook easily onto the other steel rod (see Fig. 1). A 15.2-cm (6-in.) long specimen holder is preferred.

12.5 A jacketed steamer may be used, provided that the pressure can be accurately determined and that no water splashes on the specimen during the test.

12.6 A domestic pressure cooker may be used as an alternative to a jacketed steamer. Its dimensions should be sufficiently large to avoid water splashing onto the specimen during the test; it is suggested that the minimum size should be 23 cm (9 in.) in diameter and 26 cm (10 in.) high. It should be fitted with an accurate pressure gauge. If a domestic pressure cooker is used, the specimen holder should be loosely wrapped in one layer of polyester film, which projects 1 cm (0.5 in.) over each end of the tube and is not closed at the ends. The specimen holder (see Fig. 2) should then be placed in a rectangular metal container containing 10 0.1 cm (0.06 in.) holes equally spaced along the center of the bottom. The container should be sufficiently deep to reach to 1 cm (0.5 in.) from the top of the specimen

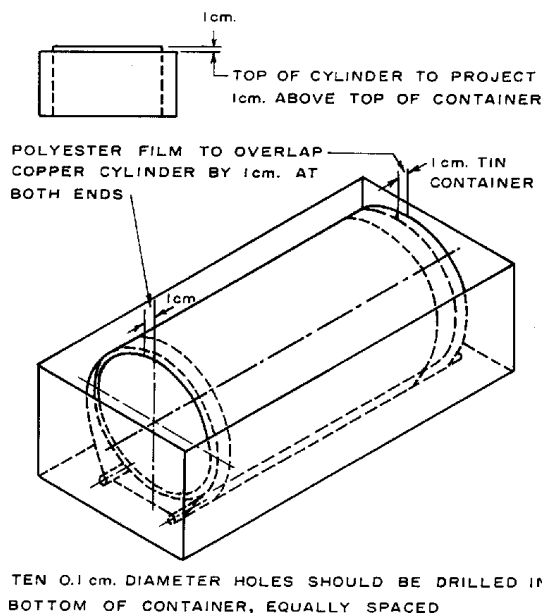


Fig. 2—Specimen holder in the container (for testing in pressure cooker).