



Designation: **D 4118 – 95a01**

Standard Performance Specification for Women’s Woven Coverall, Dungaree, Overall, and Shop Coat Fabrics¹

This standard is issued under the fixed designation D 4118; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This performance specification covers woven fabrics, composed of any textile fiber or mixture of textile fibers, to be used in the manufacture of women’s coveralls, dungarees, overalls and shop coats.

1.2 This performance specification recognizes two levels of wearing severity relative to performance requirements for these fabrics.

1.3 This performance specification is not applicable to woven fabrics intended for use in the manufacture of industrial-protective clothing.

1.4 These requirements apply to the length and width directions for those properties where fabric direction is pertinent.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

¹ This specification is under the jurisdiction of ASTM Committee D-13 on Textiles and is the direct responsibility of Subcommittee D13.561 on Performance Standards for Textile Fabrics—Apparel.

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D 123 Terminology Relating to Textiles²

D 1424 Test Method for ~~Tear Resistance~~ Tearing Strength of Woven Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus²

D 2261 Test Method for Tearing Strength of ~~Woven~~ Fabrics by the Tongue (Single Rip) ~~Method~~ Procedure (Constant-Rate-of-Extension Tensile Testing Machine)²

D 2262 Test Method for Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Traverse Tensile Testing Machine)³

D 2724 Test Methods for Bonded, Fused, and Laminated Apparel Fabrics²

D 2905 Practice for Statements on Number of Specimens for Textiles²

D 5034 Test Method for ~~Breaking Force~~ Strength and Elongation of Textile Fabrics (Grab Test)⁴

2.2 *AATCC Test Methods:*⁵

8 Colorfastness to Crocking: AATCC Crockmeter Method

15 Colorfastness to Perspiration

16 Colorfastness to Light

23 Colorfastness to Burnt Gas Fumes

61 Colorfastness to Washing, Domestic, and Laundering, Commercial: Accelerated

96 Dimensional Changes in Laundering of Woven and Knitted Textiles Except Wool

116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method

124 Appearance of Durable Press Fabrics After Repeated Home Launderings

132 Colorfastness to Drycleaning

135 Dimensional Changes in Automatic Home Laundering of Woven or Knit Fabrics

172 Colorfastness to Non-chlorine Bleach in Home Laundering

188 Colorfastness to Chlorine Bleach in Home Laundering

Evaluation Procedure No. 1 Gray Scale for Color Change

Evaluation Procedure No. 2 Gray Scale for Staining

Evaluation Procedure No. 3 Chromatic Transference Scale.

2.3 *Federal Standard:*⁶

16 CFR, Chapter II—Consumer Product Safety Commission Subchapter D—Flammable Fabrics Act Regulations

2.4 *Military Standard:*⁷

MIL-STD-105D Sampling Procedure and Tables for Inspection by Attributes

NOTE 1—Reference to test methods in this specification give only the permanent part of the designation of ASTM, AATCC, or other test methods. The current editions of each test method cited shall prevail.

3. Terminology

3.1 For definitions of textile terms used in this specification, refer to the individual ASTM and AATCC methods and to Terminology D 123.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *Type I apparel*—designed for generally heavy work. It may be subjected to severe exposure to breaking and tearing stresses indoors or out.

3.2.2 *Type II apparel*—designed for light work or leisure activities. It may not be expected to undergo severe physical stresses.

3.3 Definitions of terms found in a dictionary of common terms are suitable for this performance specification.

4. Specification Requirements

4.1 The properties of fabrics for women's coverall, dungaree, overall, and shop coats shall conform to the specification requirements in Table 1.

5. Significance and Use

5.1 Upon agreement between the purchaser and the supplier, fabrics intended for this end use should meet all of the requirements listed in Table 1 of this specification.

² *Annual Book of ASTM Standards*, Vol 07.01.

³ Discontinued; see *1994 Annual Book of ASTM Standards*, Vol 07.021.

⁴ AATCC Technical Manual, available from American Association

⁴ *Annual Book of Textile Chemists and Colorists*, P. O. Box 12215, Research Triangle Park, NC 27709; *ASTM Standards*, Vol 07.02.

⁵ AATCC Technical Manual, available from Superintendent American Association of Documents, Government Printing Office, Washington, DC 20402; *Textile Chemists and Colorists*, P. O. Box 12215, Research Triangle Park, NC 27709.

⁶ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS; Superintendent of Documents, Government Printing Office, Washington, DC 20402.

⁷ The development of a method has been referred to Subcommittee D13.59 on Fabric Test Methods, General.

⁷ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

TABLE 1 Specification Requirements

NOTE 1—Class for colorfastness and DP rating is based on a numerical scale of 5 for negligible or no color change, color transfer, or wrinkle to 1 for very severe color change, color transfer, or wrinkle. The numerical rating in Table 1 or a higher numerical rating is acceptable.

| Characteristic | Requirements | | Section |
|---|----------------------------|----------------------------|---------|
| <i>Breaking strength (load)(CRT):</i> | | | 7.1 |
| Type I | 222 N (50 lbf), min | | |
| Type II | 178 N (40 lbf), min | | |
| <i>Tongue-tear strength(CRT):</i> | | | 7.2 |
| Type I | 11 N (2.5 lbf), min | | |
| Type II | 9 N (2.0 lbf), min | | |
| <i>Dimensional change</i> | | | |
| Pressing and Finishing (DP fabrics) | 2 % max | | 7.3.1 |
| Laundering (DP fabrics) | 2.5 % max | | 7.3.2 |
| Laundering (non-DP fabrics) | 3.0 % max | | 7.3.2.1 |
| Drycleaning | 2.5 % max | | 7.3.3 |
| <i>Colorfastness:</i> | Non-Indigo Dyed | Indigo-Dyed | |
| Burnt gas fumes—2 cycles: | | | 7.4.1 |
| Shade change, original fabric | Class 4 ^A , min | Class 4 ^A , min | |
| Shade change, after 1 laundering or drycleaning | Class 4 ^A , min | Class 4 ^A , min | |
| Laundering: | | | 7.4.2 |
| Shade change | Class 4 ^A , min | Class 2 ^A , min | |
| Staining | Class 3 ^B , min | Class 2 ^B , min | |
| Crocking: | | | 7.4.3 |
| Dry | Class 4 ^C , min | Class 3 ^C , min | |
| Wet | Class 3 ^C , min | Class 2 ^C , min | |
| Perspiration: | | | 7.4.4 |
| Shade change | Class 4 ^A , min | Class 3 ^A , min | |
| Staining | Class 3 ^B , min | Class 3 ^B , min | |
| Light (20 AATCC FU) (xenon-arc) | Step 4 ^A , min | Step 4 ^A , min | 7.4.5 |
| Drycleaning | | | |
| Shade change | Class 4 ^A , min | Class 3 ^A , min | 7.4.6 |
| Chlorine Bleach | Class 4 ^A , min | Class 4 ^A , min | 7.4.7 |
| Non-chlorine Bleach | Class 4 ^A , min | Class 4 ^A , min | 7.4.8 |
| <i>Fabric appearance (see 7.5.1.1)</i> | DP 3.5 min | DP 3.5 min | 7.5 |
| <i>Flammability</i> | pass | pass | 7.6 |

^A AATCC Gray Scale for Color change.

^B AATCC Gray Scale for Staining.

^C AATCC Chromatic Transference Scale.

5.2 It is recognized that for purposes of fashion or aesthetics the ultimate consumer of articles made from these fabrics may find acceptable fabrics that do not conform to all of the requirements in Table 1. Therefore, one or more of the requirements listed in Table 1 may be modified upon agreement between the purchaser and the supplier.

5.2.1 In such cases, any references to the specification shall specify that: “This fabric meets ASTM Specification D 4118 except for the following characteristic(s).”

5.3 Where no prepurchase agreement has been reached between the purchaser and the supplier, and in case of controversy, the requirements listed in Table 1 are intended to be used as a guide only. As noted in 5.2, ultimate consumer demands dictate varying performance parameters for any particular style of fabric.

5.4 The uses and significance of particular properties and methods are discussed in the appropriate sections of the specified methods.

6. Sampling

6.1 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of rolls as directed in an applicable specification or other agreement between the purchaser and the supplier, such as an agreement to use MIL-STD-105D.

6.2 *Laboratory Sample*—From each roll or piece in the lot sample, cut two laboratory samples the full width of the fabric and at least 375 mm (15 in.) along the selvage.

7. Test Method (See Note 1)

7.1 *Breaking Force*—Determine the dry breaking force, in the standard atmosphere for testing textiles, as directed in Test Method D 5034, using a constant rate of traverse (CRT) tensile-testing machine with the speed of the pulling clamp at 300 ± 10 mm (12 ± 0.5 in.)/min.

NOTE 2—If preferred, the use of a constant-rate-of-extension (CRE) tensile-testing machine is permitted. The crosshead speed should be as agreed upon between the purchaser and the supplier. There may be no overall correlation between the results obtained with the CRT and the CRE machines. Consequently, these two machines may not be used interchangeably. In case of controversy, the CRT machine shall prevail.

7.2 *Tearing Strength*—Determine the tearing strength as directed in Test Method D 2262.

NOTE 3—If preferred, the use of Test Methods D 1424 and D 2261 is permitted with existing requirements as given in this specification. There may be no overall correlation between the results obtained with the tongue-tear methods and the Elmendorf method. Consequently, these three methods cannot be used interchangeably. In case of controversy, Test Method D 2262 shall prevail.

7.3 Dimensional Change:

7.3.1 *Pressing and Finishing During Garment Manufacturing*⁸—Mark specimen(s) as directed in 4.3.1 of AATCC Test Method 135. Press and finish specimen(s) as agreed upon between the purchaser and the supplier with respect to time cycles, temperature, steam, vacuum, and mechanical pressure of the press head. Measure the specimen(s) and calculate the dimensional change as directed in Sections 6 and 7 of AATCC Test Method 135.

7.3.2 *Laundrying*—Determine the maximum-dimensional change after 5 laundryings as directed in the applicable procedure in AATCC Test Method 135 or as agreed upon between the purchaser and the supplier.

7.3.2.1 Non-durable press fabrics shall be ironed before measuring as directed in Section 5.12 of AATCC Test Method 96.

7.3.2.2 The wash conditions and drying procedure shall be as specified by the supplier.

NOTE 4—Launderable fabrics are expected to be dry-cleanable except where all or part of the fabric is not dry-cleanable and is so labeled. For example, the fabric could contain a functional finish that is soluble in the solvent, or the fiber could be degraded by the solvent, which would be the case with poly(vinyl chloride) fiber. “Dry-cleanable” goods are to be drycleaned only.

NOTE 5—Specimens prepared for 7.3.1 may be used for 7.3.2 or 7.3.3 as desired. When this is done, the dimensional change due to laundrying or drycleaning is calculated using Eq 1. The dimensional change to pressing and finishing is determined on the fabric as it will reach the user. It is not additive to the dimensional change to laundrying or drycleaning of the fabric as it will reach the consumer (see 6.1).

$$\text{Percent Dimensional Change} = 100(D_1 - D_2)/D_2 \quad (1)$$

where:

D_1 = the measurement after laundrying and drycleaning, and

D_2 = the measurement after pressing and finishing.

7.3.3 *Drycleaning*—Determine the maximum-dimensional change after three drycleanings as directed in 10.1.1 through 10.1.5 of Test Methods D 2724.

7.4 Colorfastness:

7.4.1 *Burnt Gas Fumes*—Determine the colorfastness to burnt gas fumes on the original fabric and after one laundrying or one drycleaning as directed in AATCC Test Method 23.

NOTE 6—Washing conditions shall be the same as those used in 7.3.2.2.

7.4.2 *Laundrying*—Determine the colorfastness to laundrying as directed in the applicable procedure to AATCC Test Method 61. The test conditions shall be as specified by the supplier (Note 5).

7.4.3 *Crocking*—Determine colorfastness to dry and wet crocking as directed in AATCC Test Method 8 for solid shades and AATCC Test Method 116 for prints, or as agreed upon between the purchaser and the supplier.

7.4.4 *Perspiration*—Determine colorfastness to perspiration as directed in AATCC Test Method 15.

7.4.5 *Light*—Determine colorfastness to light as directed in AATCC Test Method 16.

NOTE 7—There are distinct differences in spectral distribution between the various types of machines listed in AATCC Test Method 16, with no overall correlations between them. Consequently, these machines cannot be used interchangeably. In case of controversy, results obtained with the Water Cooled Xenon Arc machine listed in Option E shall prevail.

7.4.6 *Drycleaning*—Determine colorfastness to drycleaning as directed in AATCC Test Method 132.

7.4.7 *Colorfastness to Chlorine Bleach*—Determine colorfastness to light as directed in AATCC Test Method 16.

7.4.8 *Colorfastness to Non-chlorine Bleach*—Determine colorfastness to light as directed in AATCC Test Method 16.

7.5 *Fabric Appearance*—Determine the fabric appearance as directed in AATCC Test Method 124 after laundrying using the wash-and-wear cycle or the normal cycle as agreed upon between the purchaser and the supplier as specified in 7.3.2.2 or drycleaning as specified in 7.3.3 for dry-cleanable fabrics (Note 5).

7.5.1 For fabrics not intended for use in durable press garments determine the fabric smoothness after pressing as specified in 7.3.2.1.

7.5.1.1 The fabric smoothness or durable press (DP) rating of such fabrics, and the DP rating of dry-cleaned fabrics shall have decreased no more than ½ DP rating from that of the fabric before it is laundryed or drycleaned.

7.6 *Flammability*—The flammability requirements shall be as agreed upon between purchaser and supplier, provided they meet or exceed those of Part 1610 of the Flammable Fabric Act Regulations.

8. Keywords

8.1 career apparel; fabric; pants; performance; specification

⁸ The development of a method has been referred to Subcommittee D13.59 on Fabric Test Methods, General.

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