



Standard Test Method for Failure in Sewn Seams of Woven Apparel Fabrics¹

This standard is issued under the fixed designation D 1683; 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 test method measures the sewn seam strength in woven fabrics by applying a force perpendicular to the sewn seams.

NOTE 1—The grab test procedure in Test Method D 5034 shall be used to determine any characteristic in fabric that can affect the measurement of sewn seam strength.

1.1.1 This test method is applicable to sewn seams obtained from a previously sewn article or seams sewn with fabric samples using either a specific seam assembly (see Table 1), or production seam assemblies.

1.2 This test method is used when a breaking force to rupture, a minimum elongation, or both are required to determine the sewn seam strength, seam slippage, or seam integrity of a particular fabric for a specified end use.

NOTE 2—This test method is used in conjunction with Test Method D 5034, which is used to measure breaking force and elongation of textile fabrics. Sewn seams in woven fabrics can fail due to rupture, slippage, or any combination thereof. Rupture can be further categorized as failure of fabric, or sewing thread, or seam slippage.

1.3 This test method does not predict actual wear performance of a seam.

1.4 The values stated in either acceptable metric units (SI) or in other units shall be regarded separately as standard. The values expressed in each system may not be exact equivalents; therefore each system must be used independently of the other, without combining values in any way.

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:²

D 76 Specification for Tensile Testing Machines for Textiles

D 123 Terminology Relating to Textiles
D 434 Test Method for Resistance to Slippage of Yarns in Woven Fabrics Using a Standard Seam
D 1776 Practice for Conditioning Textiles for Testing and Testing Textiles
D 5034 Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
D 6193 Practice for Stitches and Seams

3. Terminology

3.1 Definitions:

3.1.1 *needle damage, n—in sewn fabrics*, the partial or complete yarn severance or fiber fusing caused by a needle passing through a fabric during sewing.

3.1.2 *seam allowance, n—in sewn fabrics*, the distance from the edge of a fabric to the parallel stitch line furthest from that edge.

3.1.3 *seam assembly, n*—the composite structure obtained when fabric(s) are joined by means of a seam.

3.1.3.1 *Discussion*—A seam assembly may be described in terms of fabric orientation, seam direction, seam type, stitch type, seam allowance, sewing thread tex number(s) and type(s) stitch density, stitch gage, and rows of stitching.

3.1.4 *seam efficiency, n—in sewn fabrics*, the ratio, expressed as a percentage, of the breaking force required to rupture a sewn seam to that required to rupture the fabric.

3.1.5 *seam engineering, n—in sewn fabrics*, the procedures used to select a specific combination of sewing thread, stitch type, seam type, and stitch density to achieve the maximum sewn seam strength for a particular fabric type.

3.1.6 *seam failure, n—in sewn fabrics*, that point at which an external force (1) ruptures the sewing thread, (2) ruptures the fabric, (3) causes excessive yarn slippage adjacent to the stitches, or (4) causes any combination of these unacceptable conditions.

3.1.6.1 *Discussion*—Despite the lack of rupture, excessive seam slippage will either significantly reduce seam efficiency, or, result in an unsightly appearance thus creating seam failure.

3.1.7 *seam slippage, n—in sewn fabrics*, a mode of failure in production seams.

3.1.7.1 *Discussion*—Shown as a transverse ratio of junction strength to fabric strength including the ratio of elongation of fabric to the ratio of elongation at the junction. Seam slippage, occurs when fabric yarns parallel to the stitch line move away

¹ This test method is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.54 on Subassemblies.

Current edition approved March 1, 2004. Published April 2004. Originally approved in 1990. Discontinued in 1999 and reinstated in 2004 as D 1683–04.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.