

Australian Standard®

Methods of test for textiles

Method 2.21: Physical tests— Determination of seam opening due to the application of force in the transverse direction

PREFACE

This Standard was prepared by the Standards Australia Committee on Testing of Textiles, under the direction of the Textile Standards Board.

The Standard describes a procedure for establishing the potential of a seam to open or 'gape' when force is applied within the fabric plane at the seam and perpendicular to the seam direction.

For the purpose of this Standard, seam opening is regarded as the combination of two properties as follows:

- (a) The opening caused by the extension of the seam itself due to factors such as seam type, stitches per unit length, sewing thread tension and sewing thread properties.
- (b) The opening caused by the slippage of yarn within a fabric, adjacent to the seam as is the case with certain woven fabrics. This can be due to several factors including weave type, fabric sett, yarn properties and seam allowance (the distance between the seam and the cut edge of the fabric).

This Standard relates specifically to seams prepared by a manufacturer and is therefore distinctly different from AS 2001.2.22, *Methods of test for textiles, Method 2.22: Physical tests—Determination of yarn slippage in woven fabrics at a standard stitched seam*.

At the time that this Standard was published a Standard (AS 2001.1.2) setting out procedures for sampling textiles was also being prepared. When available this Standard should be used in the absence of other sampling options.

METHOD

1 SCOPE. This Standard sets out a method for determining the seam opening of a given seam, due to the application of a standard force within the fabric plane at the seam, and perpendicular to the seam direction.

This method is applicable to single seams made in woven, non-woven and knitted fabrics for apparel and furnishing end-uses.

NOTES:

- 1. The application may be extended to seams of other end-use products as required by the selection of appropriate forces consistent with those encountered during the normal use of such products.
- 2. When it is required to measure the seam opening of a multiple seam, reference should be made to Appendix A of this Standard.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS	
2001	Methods of test for textiles
2001.1	Method 1: Conditioning procedures

- AS
2193 Methods for calibration and grading of force-measuring systems testing machines
2859 Textiles—Seam types—Classification and terminology

3 DEFINITIONS. For the purpose of this Standard the definitions below apply.

3.1 Seam—the line of junction between fabric pieces joined together by sewing.

3.2 Seam opening—the distance by which a seam opens due to the application of a standard force within the fabric plane at the seam, and perpendicular to the seam direction. In the case of woven fabrics, seam opening includes yarn slippage adjacent to the seam.

3.3 Residual seam opening—the seam opening remaining upon reduction of the applied force from maximum to 2.5 N.

4 PRINCIPLE. Test specimens incorporating the seam to be tested are cut from a textile assembly and reference marks placed either side of the seam on the face side. The specimens are pre-tensioned by a minimal force applied perpendicular to the seam direction prior to the distance between the reference marks being measured.

Upon increasing the applied force to a specified level, the distance between the reference marks is remeasured and the seam opening is calculated.

5 APPARATUS.

5.1 Conditioning facility. Means of providing and maintaining a standard atmosphere as described in AS 2001.1.

5.2 Force application device. Either a constant rate of extension tensile testing machine or a deadweight testing machine may be used as follows:

- (a) Tensile testing machine (CRE):
 - (i) The machine shall comply with the requirements of Grade B machines as specified in AS 2193. The error in the measurement of length shall not exceed 1.0 mm.
 - (ii) The machine shall provide means for indicating the force applied to the test specimens clearly and continuously on a dial, scale or chart.
 - (iii) The capacity of the machine or the range selected shall be such that the force required to stress the test specimens shall be not less than 20 percent of the selected range of the machine.
 - (iv) The machine shall be capable of extending the specimen at a constant rate.
 - (v) The force measuring mechanism of the machine shall allow little or no movement of the fixed jaws in the direction of the applied force.
 - (vi) The fixed and moving jaws of the machine shall be in the same plane, parallel to one another and at right angles to the direction of application of the force.
- (b) Deadweight testing machine:

A means of gradually applying the selected force to the test specimen by the use of deadweights.

5.3 Clamping device. Means of clamping the test specimens above and below the seam. The width of the front jaw face of each specimen clamp shall be 25 mm. The other jaw face of each clamp shall be at least as large as its mate. The jaws shall be constructed in such a way that they do not damage the test specimen.

NOTE: Suitable packing materials or embedding techniques may be used whenever necessary to prevent test specimens slipping in the jaws.

5.4 Measuring device. A small transparent rule with 0.5 mm graduations or other suitable device for measuring the seam opening.

6 SAMPLE AND TEST SPECIMENS.

6.1 General. Care should be taken to ensure that the operator's hands are dry. Excessive handling of the sample and test specimens should be avoided.

6.2 Sample. The sample shall be selected in one of the following ways:

- (a) According to the directions given in the relevant material specification.
- (b) According to the procedure agreed upon by the interested parties, if such directions are not included in the material specification.
- (c) According to the procedures prepared by the Standards Australia for textile products (see Preface), if directions on sampling are not included in the material specifications.

6.3 Conditioning. Condition the fabric sample in accordance with AS 2001.1. Prepare test specimens from the sample and conduct subsequent testing without removal from the standard atmosphere.

6.4 Test specimens. Test specimens shall be prepared as follows:

- (a) Prepare a minimum of three test specimens per seam type.
- (b) Cut rectangular test specimens with dimensions of 100 mm in the direction parallel to the seam by 150 mm perpendicular to the seam, preferably with the seam at the middle of the test specimen (see Figure 1).

The seam shall be the full width of the test specimen.

- (c) In the centre of the test specimen on the seam face, draw reference lines 25 mm long, parallel and adjacent to both sides of the seam (see Figure 1). Mark the inside edge of the threads adjacent to, but not held by, the seam. For non-woven fabrics the reference marks shall be placed no more than 0.5 mm from either side of the seam.

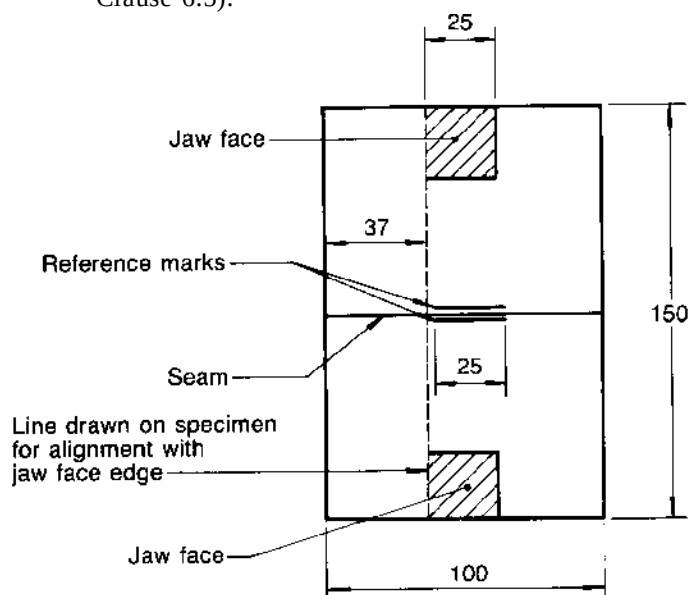
6.5 Selection of test force. The choice of force to be applied to the test specimen is dependent upon the end use of the product from which the specimen was taken. Selection of force shall be made in one of the following ways:

- (a) According to the relevant material specification.
- (b) According to agreement between the interested parties, if such directions are not included in the material specification.

NOTE: A force of 80 N is recommended for the most lightly stressed articles such as ladies' dresses, cushions and tickings, 120 N for seams likely to be subjected to greater stress such as in overcoats, suits, overalls and foundation garments, and 180 N for end uses such as upholstery where considerable force is applied in use.

7 PROCEDURE. The procedure for each test specimen shall be as follows according to Method A or B:

- (a) Method A—Tensile testing machine—constant rate of extension type (CRE).
 - (i) Testing shall be carried out in the standard atmosphere for testing as described in AS 2001.1.
 - (ii) Adjust the machine to operate at a rate of jaw separation of 50 ± 5 mm/min with the jaw separation distance at the commencement of test set at $75 \text{ mm} \pm 1 \text{ mm}$.
 - (iii) Mount the specimen centrally in the width of each set of jaws so that the line drawn perpendicular to the seam coincides with one of the vertical edges of the two 25 mm jaw faces. The seam shall be located preferably midway between the pairs of jaws (see Figure 1).
 - (iv) Apply a pre-tensioning force of 2 ± 0.5 N and measure the distance between the reference marks on either side of the seam (see Figure 1) to the nearest 0.5 mm. (Measurement 1.)
 - (v) Increase the load on the specimen until the selected force is applied (see Clause 6.5).



DIMENSIONS IN MILLIMETRES

FIGURE 1 TEST SPECIMEN

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