BRITISH STANDARD

BS 5131 :
Section 4.3 :
1990

Methods of test for

Footwear and footwear materials

Part 4. Other components

Section 4.3 Resistance of fibreboard to stitch-tear

NOTE. It is recommended that this Section should be read in conjunction with BS 5131 : Part 0, published separately.

Méthodes d'essai des chaussures et matériaux pour chassures
Partie 4. Autres composants
Section 4.3 Résistance des cartons durs à l'arrachage des points

Prüfung von Schuhwerk und Schuhwerkstoffen
Teil 4. Weitere Einzelteile
Abschnitt 4.3 Stichausreißfestigkeit von Faserpappe

STANDARDS

Foreword

This Section of BS 5131 has been prepared under the direction of the Textiles and Clothing Standards Policy Committee. It supersedes BS 5131 : Section 4.3 : 1975, which is withdrawn.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Method

1 Scope

This Section of BS 5131 describes a method for evaluating the ability of a fibreboard to hold stitches, or to take clenched metal fastenings. The method has become accepted as a general quality criterion for fibreboard even where attachment is by means of adhesives.

NOTE. The title of the publication referred to in this standard is given on the inside back cover.

2 Principle

A loop of wire of specified dimensions is pulled through a test specimen of fibreboard, and the force required to do this is measured.

3 Apparatus[1)]

3.1 *Conditioning cabinet or room,* maintaining an atmosphere of 20 ± 2 °C and 65 ± 2 % r.h.

3.2 *Drill,* fitted with a twist drill bit, nominal 1.6 mm diameter, actual diameter between 1.59 mm and 1.62 mm.

3.3 *Drilling jig,* to ensure accurate spacing of 8.0 ± 0.2 mm between the centres of each pair of holes (see figure 4.3/1) in the test specimen.

3.4 *Steel wire,* 15 cm length, nominal diameter 0.9 mm (20 SWG), actual diameter between 0.89 mm and 0.92 mm. This is formed over a 7 mm diameter mandrel into a loop with parallel arms of equal length by applying a force of 1.5 kN to 2 kN (150 kgf to 200 kgf) to each end of the wire in order that the shape of the loop conforms to that of the mandrel.

NOTE. Loops which have become mis-shapen by use can be reused, provided that the irregularities are removed over the forming mandrel.

3.5 *Tensile testing machine,* with a range of 0 N to 500 N (0 kgf to 50 kgf) and a jaw separation rate of 100 ± 20 mm/min.

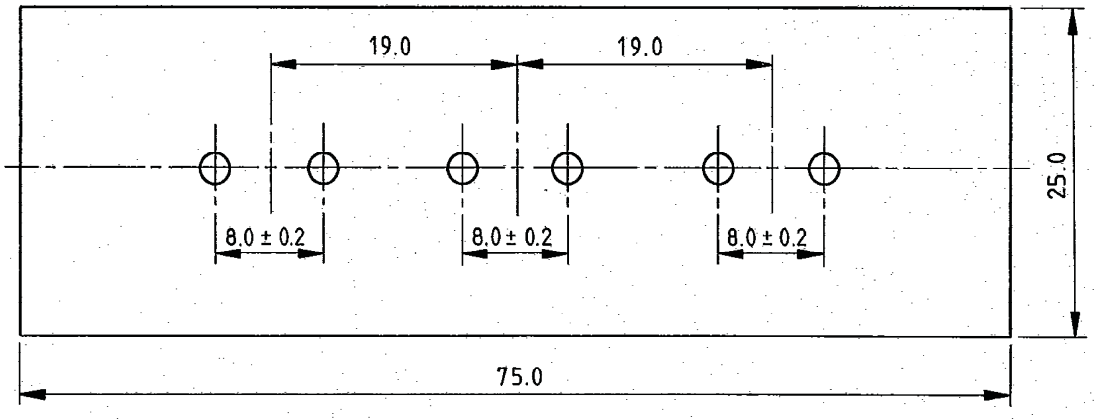
3.6 *Attachment to the tensile testing machine,* consisting of the following two parts.

(a) Upper jaw, consisting of a rigid supporting plate for the test specimen, with a rectangular aperture 12.0 ± 0.5 mm by 6.0 ± 0.5 mm and a means of attachment to the force-measuring system so that the line of action of the force passes through the centre of the aperture and is perpendicular to the plate.

(b) Lower jaw, containing a means of attaching the steel wire loop to the drive system so that the two arms of the loop are held parallel by two guide holes 8 mm apart and equidistant from the line of action of the force applied during the test.

The attachment is designed to ensure that in the test the loop is drawn through the centre of the aperture in the rigid supporting plate for the test specimen, with the plane of the loop parallel to the longer side of the aperture.

3.7 *Dial micrometer gauge,* standing on a firm base and loaded with a dead weight such that the presser foot applies a pressure of 49 ± 5 kPa (5.0 ± 0.5 gf/mm^2). The gauge has a presser foot which is flat, circular and 10.0 mm in diameter. The gauge complies with the accuracy requirements of BS 907 and has scale divisions of 0.01 mm.



NOTE. All dimensions shown are in millimetres.

Figure 4.3/1 Test specimen

[1)] For information on the avilability of suitable apparatus to perform this test, apply to Enquiry Section, BSI, Linford Wood, Milton Keynes, MK14 6LE quoting the number of this standard and the clause number referring to the items concerned. Enclose a stamped addressed envelope for reply.

4 Conditioning

Place the sample of fibreboard in the conditioning cabinet or room (**3.1**). After 48 h cut the test specimens (see clause **5**). Carry out the test in this atmosphere.

5 Preparation of test specimens

From the conditioned sample cut one rectangular test specimen approximately 75 mm by 25 mm with its longer side in the machine direction of the board and another similar rectangular test specimen with its longer side in the cross direction. Mark both test specimens to show their orientation.

6 Procedure

6.1 Measure the thickness (in mm) of each test specimen at three points equally spaced along the centreline parallel to the 75 mm side, using the dial micrometer gauge (**3.7**).

6.2 Using the drill fitted with a 1.6 mm twist drill bit (**3.2**), drill each test specimen from the face side with three pairs of holes along the centreline parallel to the 75 mm side. Use the drilling jig (**3.3**) to ensure that the holes of each pair are accurately spaced 8.0 ± 0.2 mm apart. Drill one pair of holes in the centre and the other two pairs midway between the centre pair and the ends of the test specimen as shown in figure 4.3/1.

6.3 Thread the wire loop (**3.4**) through a pair of holes in one test specimen from the face side. Keeping the arms of the loop parallel, pass them through the aperture in the test specimen supporting plate (**3.6**(a)), and through the guide holes (8 mm apart) in the lower jaw attachment (**3.6**(b)). Clamp the ends firmly in position.

Operate the tensile testing machine (**3.5**) at a jaw separation rate of 100 ± 20 mm/min while continuously observing the force exerted until the board fails.

Note the maximum force (in N (kgf)) exerted. If the weight of the stitch-tear attachment contributes to the recorded force, correct this value to obtain the net force exerted on the test specimen.

6.4 Repeat the procedure on the remaining two pairs of holes in the test specimen. Carry out this procedure similarly on the second test specimen.

7 Expression of results

7.1 For each test specimen calculate the mean of the three maximum forces noted. Report these two values as the stitch-tear forces for the principal directions.

7.2 For each test specimen calculate the mean value of the three thickness measurements.

8 Test report

The test report shall include the following items :

(a) stitch-tear force, for each principal direction, expressed in accordance with **7.1**;

(b) thickness of each test specimen, expressed in accordance with **7.2**;

(c) nature and full identification of the sample;

(d) reference to this method of test, i.e. BS 5131 : Section 4.3;

(e) date of testing.

Publication referred to

BS 907 Specification for dial gauges for linear measurement

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Textiles and Clothing Standards Policy Committee (TCM/-) to Technical Committee TCM/39, upon which the following bodies were represented:

British Footwear Manufacturers' Federation
British Leather Confederation
British Rubber Manufacturers' Association
British Steel plc
Consumer Standards Advisory Committee of BSI
Cork Industry Federation
Footwear Components Federation
Footwear Distributors' Federation
Institute of Trading Standards Administration
Iron and Steel Trades Confederation
Lancashire Footwear Manufacturers' Association
Mail Order Traders Association of Great Britain
Ministry of Defence
National Union of Footwear, Leather and Allied Trades
Office of Fair Trading
SATRA Footwear Technology Centre

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

British Adhesives and Sealants Association
British Paper and Board Industry Federation
British Plastics Federation
Multiple Shoe Retailers' Association
RAPRA Technology Ltd.

This British Standard, having been prepared under the direction of the Textiles and Clothing Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 31 December 1990

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The following BSI references relate to the work on this standard:
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Amendments issued since publication

Amd. No.	Date	Text affected

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