BRITISH STANDARD

BS 5131 :
Section 4.4 :
1990

Methods of test for

Footwear and footwear materials

Part 4. Other components

Section 4.4 Heel pin holding strength of fibreboard

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 chaussures
Partie 4. Autres composants
Section 4.4 Résistance à la tenue de la tige de talon sur le carton dur

Prüfung von Schuhwerk und Schuhwerkstoffen
Teil 4. Weitere Einzelteile
Abschnitt 4.4 Prüfung der Nagelausreißfestigkeit 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 It supersedes BS 5131 : Section 4.4 : 1975, which is withdrawn.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 measuring the ability of a fibreboard to hold a heel pin and to prevent the pin head from being pulled through the fibreboard.

The procedure is applicable to fibreboard used in the seat of footwear with inside attached heels, and also to seat components where outside heel attachments are used and the heel pin is clenched.

The method may also be applied to plastics shoe backparts.

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

2 Principle

The force required to push a simulated heel pin head through the fibreboard is measured both for the dry and the wet fibreboard.

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 twist drill bit of nominal diameter 2.05 mm, actual diameter between 2.040 mm and 2.065 mm inclusive.

3.3 *Tensile testing machine,* with a range of 0 kN to 2 kN (0 kgf to 200 kgf) and a jaw separation rate of 100 ± 20 mm/min.

3.4 *Attachment for the tensile testing machine,* consisting of the following two essential parts.

(a) Rigid supporting plate for the test specimen, with a 12 ± 1 mm diameter circular hole and a means of attachment to the upper clamp of the machine, so that the line of action of the force applied during testing passes through the centre of the hole and is perpendicular to the plate.

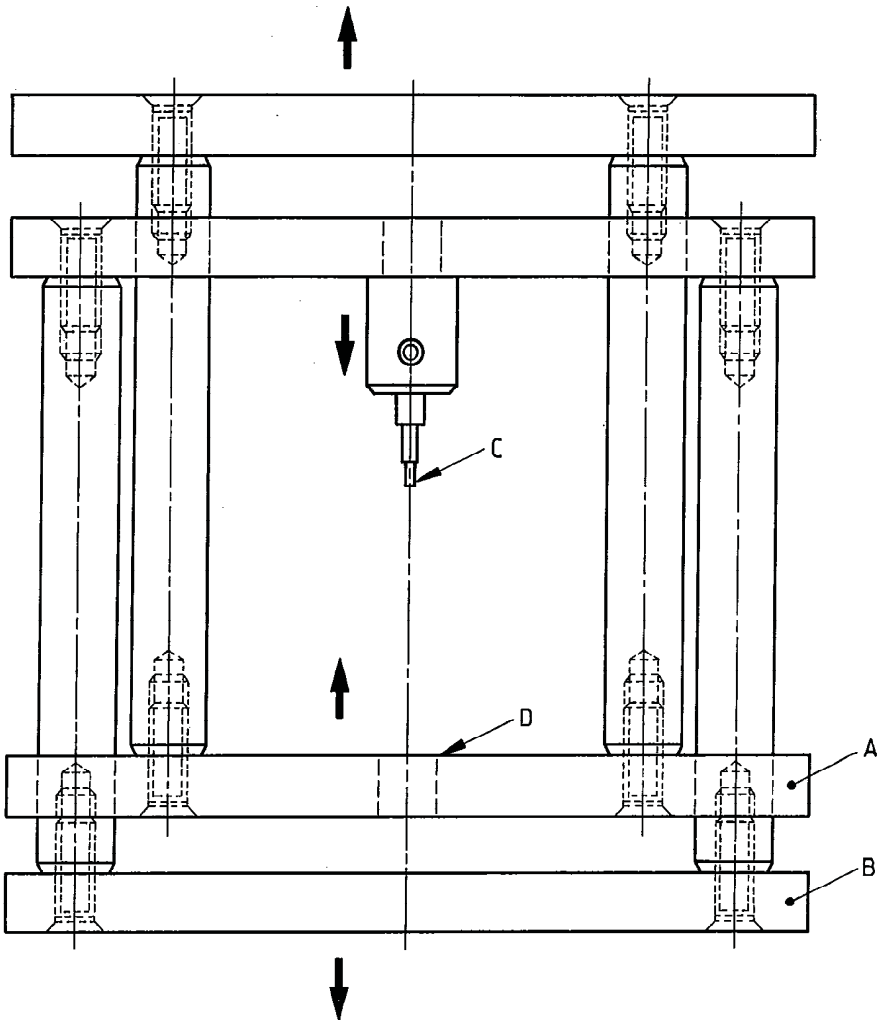
(b) Fitting, providing a means of pushing a rod through the test specimen; the leading part of the rod consists of a 2.0 ± 0.1 mm diameter shank, and the remainder a head of 4.06 ± 0.05 mm diameter. The two sections join at a shoulder in the form of a plane perpendicular to the axis of the rod. (These dimensions correspond to those of a 8 × 14 gauge heel pin.)

The attachment is designed to ensure that the axis of the rod passes through the centre of the hole in the test specimen supporting plate.

In order for the tensile testing machine to produce the compression forces, the above two parts of the attachment may conveniently be combined in the form of a compression cage, as illustrated in figure 4.4/1. The rigid supporting plate (A) for the test specimen is suspended from the top clamp of the tensile testing machine. The fitting (B) is supported by the lower clamp so that the rod (C) (representing the gauge heel pin) is above the supporting plate for the test specimen, and the axis of the rod (C) passes through the centre of the circular hole (D).

3.5 *Dial micrometer gauge,* standing on a firm base and dead-weight loaded 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 meets the accuracy requirements of BS 907 and has scale divisions of 0.01 mm.

[1)]For information on the availability 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 item(s) concerned. Enclose a stamped addressed envelope for reply.



NOTE. The arrows indicate the directions of travel to cause compression.

Figure 4.4/1. Compression cage, combining the two parts of the attachment for the tensile testing machine

4 Conditioning

Place the fibreboard in the conditioning cabinet or room (**3.1**). After 48 h, cut the test specimens (see clause **5** for dimensions).

5 Preparation of test specimens

Cut from the fibreboard two rectangular test specimens each approximately 80 mm by 20 mm, one test specimen for dry testing (see **6.1**) and the other for wet testing (see **6.2**).

6 Procedure

6.1 Dry testing

6.1.1 Carry out the dry test in the conditioning atmosphere.

6.1.2 Measure the thickness of the first test specimen, using the dial micrometer gauge (**3.5**), at three points on the centreline parallel to the 80 mm side, at distances of 20 mm, 40 mm and 60 mm from one end.

6.1.3 Using the 2.05 mm diameter drill bit (**3.2**), make three holes along the centreline of the test specimen parallel to the 80 mm side, at distances not less than 20 mm apart and not less than 10 mm from any edge.

6.1.4 Fit the attachment (**3.4**) to the tensile testing machine (**3.3**). Place the test specimen on its supporting plate so that the hole drilled in it is concentric with the hole in this plate. Lower the rod fitted to the drive system by operating the tensile testing machine until the leading part of the rod is inside the hole of the test specimen. Then operate the machine at a jaw separation rate of 100 ± 20 mm/min, continuously observing the force, until the head of the rod has been pushed through the test specimen. Note the maximum force exerted. If the weight of the test attachment contributes to the recorded force, correct this value to obtain the net force exerted on the test specimen.

6.1.5 Repeat the procedure described in **6.1.4** using each of the other two holes in the test specimen.

6.2 Wet testing

NOTE. It is not necessary to carry out the wet test in the conditioning atmosphere.

6.2.1 Using the procedure described in **6.1.2** measure the thickness of the second test specimen. Soak the test specimen in distilled or deionized water at 20 ± 2 °C for 6 h. Remove it from the water and blot the surface. Immediately after soaking, using the 2.05 mm diameter drill bit, make three holes along the centre parallel to the 80 mm side at distances of not less than 20 mm apart and not less than 10 mm from any edge.

6.2.2 Without delay, carry out the procedure described in **6.1.4** and **6.1.5**.

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 heel pin holding strength of the dry and the wet board respectively.

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) results, for the wet and the dry board, expressed in accordance with **7.1**;

(b) thickness of the board, 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 4.4;

(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

First published February 1975
Second edition December 1990

The following BSI references relate to the work on this standard:
Committee reference TCM/39
Draft for comment 89/36227 DC

ISBN 0 580 18822 1

Amendments issued since publication

Amd. No.	Date	Text affected

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