BRITISH STANDARD

BS 5131 :
Section 4.5 :
1990

Methods of test for

Footwear and footwear materials

Part 4. Other components

Section 4.5 Tensile 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 4.5 Résistance à la traction du carton dur

Prüfung von Schuhewerk und Schuhwerkstoffen
Teil 4. Weitere Einzelteile
Abschnitt 4.5 Bestimmung der Zugfestigkeit 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 It supersedes BS 5131: Section 4.5: 1976, which is withdrawn.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 the determination of the tensile strength of fibreboard both in the air-conditioned state and in the wet state. Information provided by the results of the test is considered to provide a good guide to the general quality of the fibreboard.

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

2 Principle

Test specimens, cut from the fibreboard, are tested in a tensile testing machine after air conditioning or soaking with water. The force required to break the test specimen is determined in each case.

3 Apparatus[1)]

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

3.2 *Tensile testing machine,* with a range of 0 kN to 5 kN (0 kgf to 500 kgf) plus one or more lower ranges (see **6.3**) and a rate of extension of 100 ± 20 mm/min.

3.3 *Measuring device,* capable of measuring the width of the test specimens to an accuracy of 0.1 mm.

3.4 *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 complies with the accuracy requirements of BS 907 and has scale divisions of 0.01 mm.

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

5.1 From the conditioned sample of fibreboard cut six test specimens parallel to the machine direction of the board, and six test specimens parallel to the cross direction. Mark the twelve test specimens to show their orientation. Reserve three test specimens from each direction for testing in the air-conditioned state and three for testing after soaking in water.

5.2 Cut each test specimen in the shape of a dumb-bell having the preferred dimensions shown in figure 4.5/1. If the dimensions of the test specimen are such that the tolerances shown in figure 4.5/1 are exceeded, the result of the test may be affected. Therefore, if for any reason test specimens of different dimensions are tested by this procedure, include in the test report the dimensions of the test specimens, and ensure that these dimensions meet the following conditions.

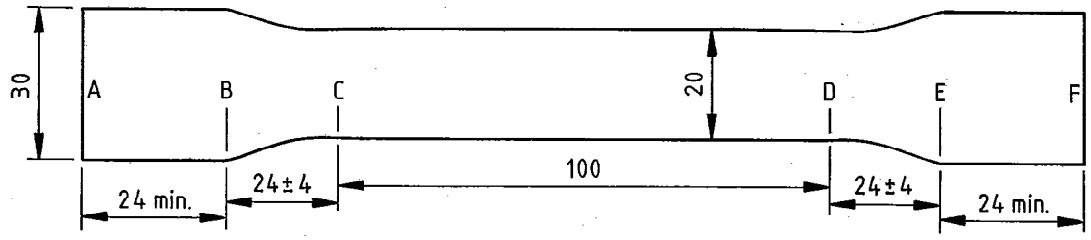
(a) The width of the central narrow section is between 10 mm and 30 mm.

(b) The ratio of the length of the central section to its width is between 3.5 and 6.5.

(c) The width of the ends is at least 1.2 times the width of the central section.

(d) The ends are long enough to be properly gripped by the testing machine.

(e) The shoulders between the ends and the central section are rounded.



All dimensions are in millimetres.

All tolerances are ± 10 % except where otherwise stated.

NOTE. The radii of curvature of the concave and convex curves which form the edge of the shoulders of the test specimen are equal, as judged by eye.

Figure 4.5/1. Test specimen

[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.

5.3 After cutting, examine the test specimens and reject any that show signs of damage.

6 Procedure

6.1 Thickness

Measure the thickness of each test specimen, using the dial micrometer gauge (**3.4**), at the centre of the narrow portion and at two points midway between the centre and the shoulders.

6.2 Width

Measure the width to the nearest 0.1 mm, on one surface of each test specimen at the centre of the narrow portion and at two points midway between the centre and the shoulders, using a suitable device (**3.3**), thereby obtaining three width measurements. If the sides of the narrow portion of the test specimen are not at right angles to the surface, take three such width readings for each surface, thereby obtaining six width measurements.

6.3 Dry test

For each of the six test specimens to be tested dry, proceed as follows.

Set the tensile testing machine to a range such that the breakage of the test specimen is anticipated to lie at a point between 30 % and 100 % of the range. Clamp the test specimen centrally in the jaws of the tensile testing machine (**3.2**). Start the tensile testing machine, and run it until the test specimen breaks. Record the breaking force, and stop the tensile testing machine. If the break does not occur within the narrow portion of the test specimen, prepare another test specimen as described in **5.1** and repeat the test. If the break does not occur between 10 % and 100 % of the range, prepare another test specimen as described in **5.1**, set the tensile testing machine to a lower range and repeat the test. Repeat the test until six valid test results are obtained.

6.4 Wet test

Soak the six test specimens for wet testing in distilled or deionized water at 20 ± 2 °C for 6 h, keeping them fully immersed but clear of the bottom of the vessel and of each other. Remove the test specimens from the water one at a time, blot their surfaces, and immediately carry out on each the procedure described in **6.3**.

7 Calculation and expression of results

7.1 Calculate the mean of the measurements obtained in **6.1** to give the thickness of each test specimen.

7.2 Calculate the mean of the measurements obtained in **6.2** to give the width of each test specimen.

7.3 Calculate the area of the cross section of each test specimen by multiplying the mean thickness by the mean width.

7.4 Calculate the tensile strength by dividing the force at breaking point (see **6.3**) by the area of cross section (see **7.3**) for each of the following categories:

(a) air conditioned test specimens cut in the machine direction;

(b) air conditioned test specimens cut in the cross direction;

(c) soaked test specimens cut in the machine direction;

(d) soaked test specimens cut in the cross direction.

Express each result correct to three significant figures.

8 Test report

The test report shall include the following items:

(a) results expressed in accordance with **7.4**;

(b) nature and full identification of the sample;

(c) reference to this method of test, i.e. BS 5131 : Section 4.5;

(d) details of any deviation from the preferred test specimen (see **5.2**);

(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 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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