BRITISH STANDARD

BS 5131 :
Section 4.2 :
1990

Methods of test for

Footwear and footwear materials

Part 4. Other components

Section 4.2 Flexing index of fibreboard

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

Méthodes d'essais des chaussures et matériaux pour chaussures
Partie 4. Autres composants
Section 4.2 Indice de flexion du carton dur

Prüfung von Schuhwerk und Schuhwerkstoffen
Teil 4. Weitere Einzelteile
Abschnitt 4.2 Bestimmung des Biegekoeffizienten 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 It supersedes BS 5131: Section 4.2: 1975, which is withdrawn.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 assessing the flexing endurance of fibreboards. Results of the method provide a good guide to the general quality of the fibreboards used in footwear. The method is applicable to all fibreboards other than those used for insole seats and heel lifts.

2 Principle

Fibreboard is flexed mechanically and repeatedly until failure occurs. From the number of flex cycles to failure, a flexing index is calculated.

3 Apparatus[1)]

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

3.2 *Flexing apparatus,* with accommodation for the simultaneous testing of three test specimens, each test station having the following essential features.

(a) *Jaw system,* in which the upper end of a vertical test specimen can be clamped, and which can be mechanically rocked about an axis immediately below the jaws in a plane perpendicular to the plane of the vertical test specimen, and to 90 ± 1 ° each side of the vertical, at a rate of 60 ± 10 cycles per minute. The tips of the jaws are wedge shaped with a wedge angle of 38 ° and with the wedge line rounded to a radius of 0.8 ± 0.1 mm. The axis about which the jaw system rocks is at the line where the extension of the sloping external faces of the jaws would intersect, as shown in figure 4.2/1.

(b) *Weighted clamp,* with a mass of 2.00 ± 0.01 kg, which can be suspended from the lower end of the test specimen. The clamp and mass are constrained to move vertically up and down below the jaws, i.e. prevented from swinging, when the test specimen is flexed.

(c) *Counter,* which indicates the total number of completed flex cycles during a test and which stops automatically on failure of the test specimen.

3.3 *Double rotating blade strip cutter* comprising two rotating circular sharp blades of maximum width not greater than 1.06 mm and equipped with spacers between the blades to provide a distance between the cutting edges of 10 ± 0.1 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

From the conditioned fibreboard cut one set of three rectangles using the rotating blade cutter (**3.3**) so as to produce test specimens of nominal width 10 mm and length approximately 80 mm, with the 80 mm sides parallel to the machine direction of the fibreboard, and a second set of three similar rectangles with the 80 mm sides parallel to the cross direction of the fibreboard.

6 Procedure

6.1 Test the three test specimens from one of the two principal directions of the fibreboard simultaneously by the following procedure.

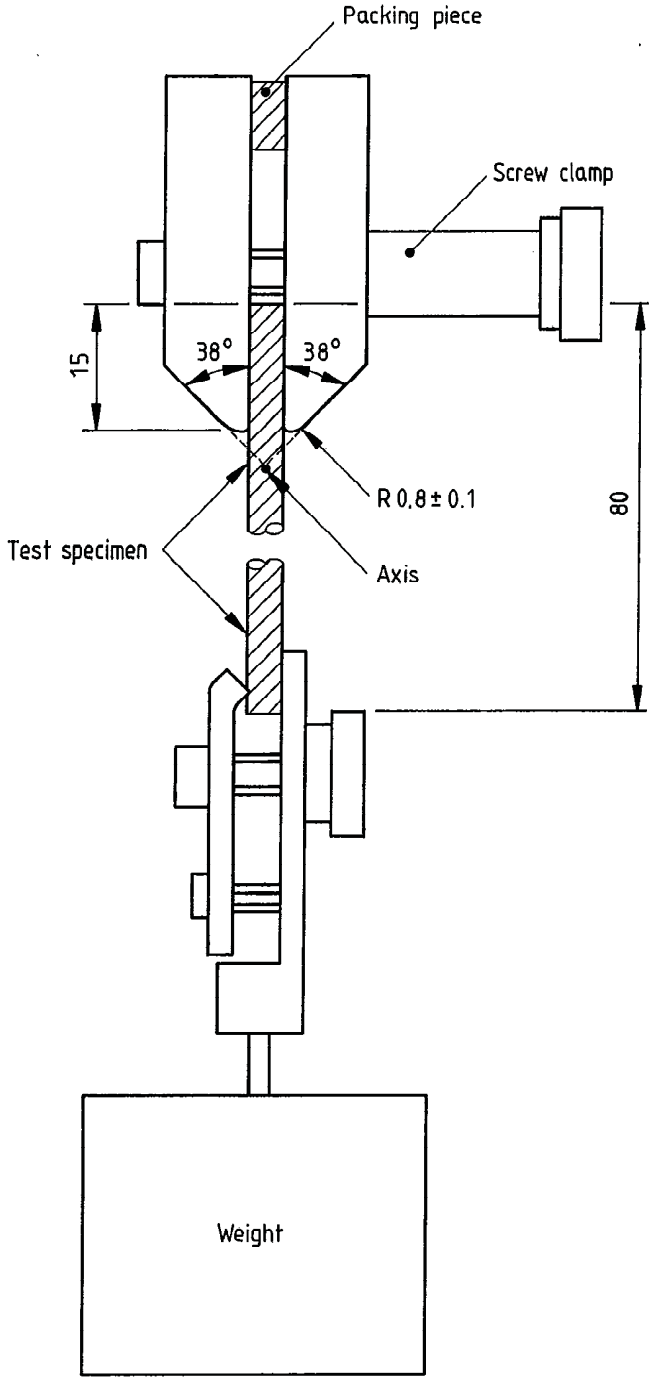
6.2 Align the test specimen in the jaws of the flexing apparatus (**3.2**) so that the 80 mm sides are perpendicular to the horizontal edges of the jaws and approximately 15 mm of the length of the specimen is clamped by the jaws.

Insert small strips of fibreboard between the jaws above the test specimen, if necessary, to ensure that the two clamping faces of the jaws stay parallel.

Clamp the test specimens tightly in position, and attach the weighted clamps to the free ends. Run the flexing apparatus until all three test specimens have broken and record, using the counter, the number of flex cycles to breakage for each test specimen (X).

6.3 Repeat the procedure using the second set of test specimens which were cut in the other principal direction of the fibreboard.

[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. All dimensions are in millimetres.

Figure 4.2/1. Jaw system with test specimen and weighted clamp

7 Expression of results

7.1 Calculate the flexing index for each of the two principal directions of the fibreboard as follows:

$$\text{Flexing index} = \tfrac{1}{3}(\log_{10} X_1 + \log_{10} X_2 + \log_{10} X_3)$$

where X_1, X_2, X_3 are the respective numbers of cycles to cause failure of the three test specimens.

7.2 State the results corrected to one decimal place.

8 Test report

The test report shall include the following items:

(a) results, expressed in accordance with clause **7**;

(b) nature and full identification of the sample;

(c) reference to this method of test, i.e. BS 5131: Section 4.2;

(d) date of testing.

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 1975
Second edition December 1990

The following BSI references relate to the work on this standard:
Committee reference TCM/39
Draft for comment 89/36225 DC

ISBN 0 580 18756 X

Amendments issued since publication

Amd. No.	Date	Text affected

BSI, 2 Park Street, London W1A 2BS BSI, Linford Wood, Milton Keynes MK14 6LE