BS 5131 : Section 4.6 : February 1975

[Rib shear]

UDC 685.31 : 620.1 : 685.312.124 : 676.017.42 : 539.415

British Standard Methods of test for

Footwear and footwear materials

Part 4. Other components

Section 4.6 Shear strength of ribs stuck to insoles

NOTE. It is recommended that this Section should be read in conjunction with the information in the General introduction to BS 5131, published separately.

1. Scope

This Section describes a method having as its main purpose the determination of whether a rib attachment is strong enough for welt sewing (an operation which applies similar forces to those in the test). The test is applicable to all types of ribbed insole, or to strips of insole material with ribs affixed along the edges.

NOTE. Section 4.6 is based on SATRA* Method AM 5.

2. Principle

A force is applied to the lip of an attached insole rib, parallel to the insole surface and in the outward direction. The force is increased until failure occurs.

3. Supplementary information

In the case of strips of insole material, the procedure described in this Section requires to be completed by information on the means of attaching the ribs to the insole material. This information shall be derived from the British Standard, or other specification, for the material under test or shall be the subject of agreement between parties interested in the results of the test.

4. Test pieces

NOTE. Shear tests are usually combined with peel tests on the rib. Figures 4.6/1 and 4.6/2 show convenient combined layouts of test pieces for both tests. Section 4.7 of BS 5131 describes a procedure for the determination of resistance to peeling.

4.1 Ribbed insoles. On each of two insoles, mark out two test pieces, each 25 mm wide, across the insole rib (see figure 4.6/1).

4.2 Insole material. (See also the note to **7.2.**) Cut strips of material approximately 75 mm wide and 350 mm long. If the insole material has a direction marked for cutting out, cut one strip with its length in this direction. Otherwise, cut one strip in the machine direction and one strip in the cross direction. Attach ribs to the longer edges of the strips, using the agreed method (see clause **3**). Mark out four test pieces, 25 mm wide, two on each longer edge as shown in figure 4.6/2.

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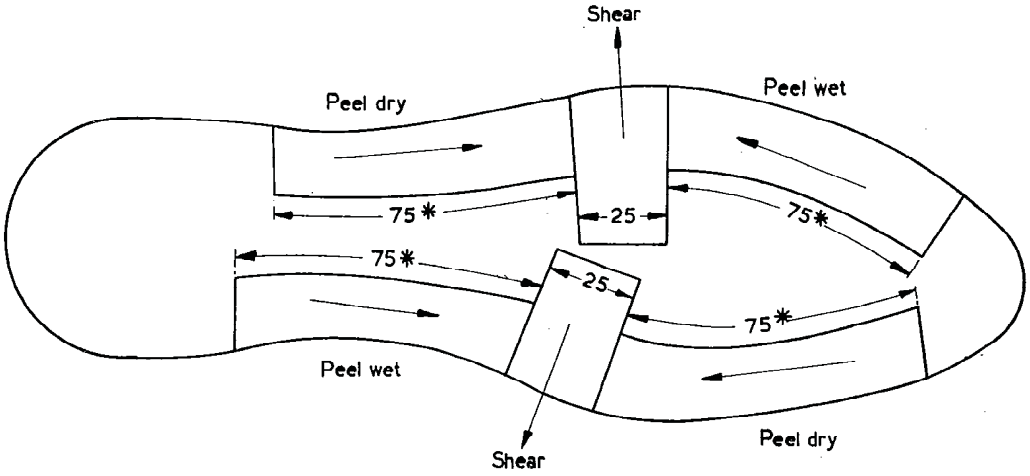
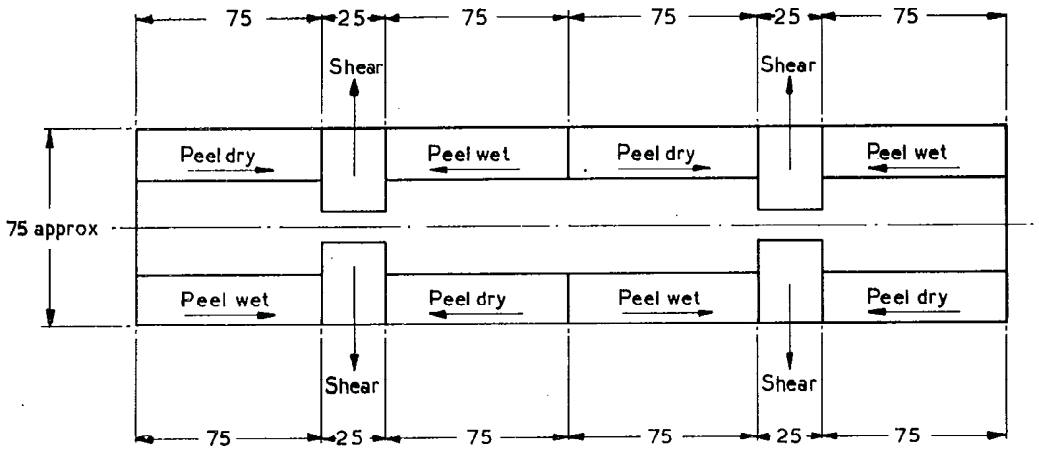


Dimensions marked thus * are approximate
All dimensions are in millimetres

Figure 4.6/1. Test piece layout for the determination both of the shear strength and the resistance to peeling of an attached rib insole



All dimensions are in millimetres

Figure 4.6/2. Test piece layout for the determination both of the shear strength and the resistance to peeling of ribs stuck to insole material

7502–1.5k–B

4.3 Cutting. Prepare each test piece by cutting along the parallel lines 25 mm apart, ensuring that each cut penetrates right through the rib and its stuck-down flanges into the insole. (It is unnecessary to detach the test pieces completely from the remainder of the ribbed insole or insole material.)

5. Apparatus

Use an apparatus, similar to that shown diagrammatically in figure 4.6/3, embodying the following essential features (letters shown in brackets refer to the corresponding lettered parts of figure 4.6/3).

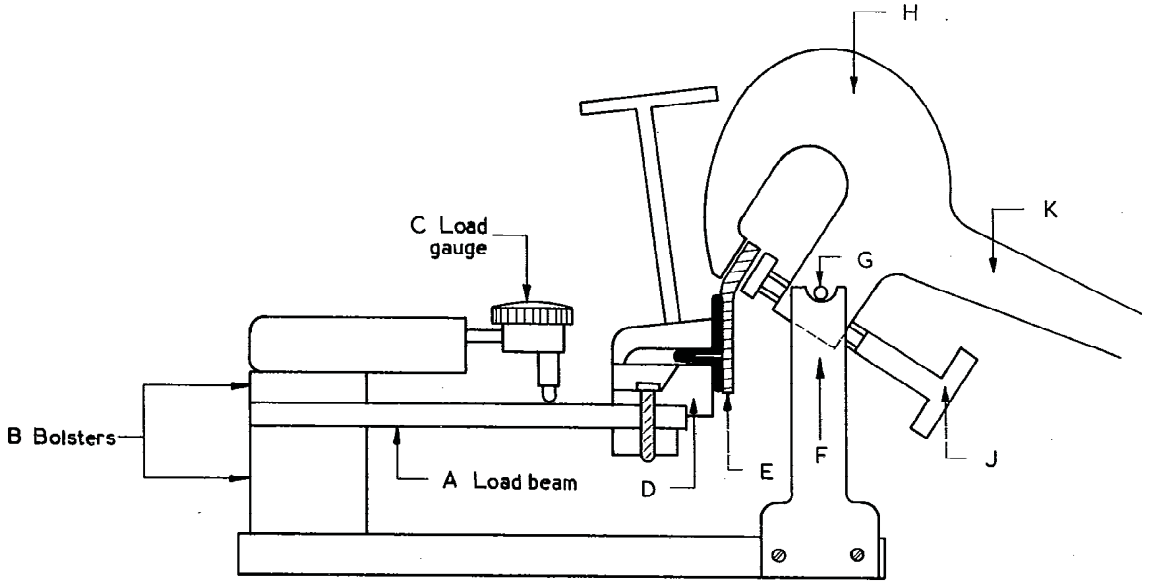


Figure 4.6/3. Diagram of a suitable apparatus with test piece (E) in position (see clause 5 for key to lettering)

(a) *Force-measuring device*, in which the deflection of a high-tensile steel load beam (A) clamped rigidly at one end between cast iron bolsters (B), is measured by a gauge (C), calibrated to give a direct reading, in newtons, of the deflecting force applied at the free end of the beam. The device should show a full scale deflection of the load gauge for a shearing force of 900 N (90 kgf).

(b) *Rib clamp* (D), attached to the end of the load beam, with jaws 19 ± 1 mm wide.

(c) *Pair of supports* (F), fixed to the base of the device and providing a fulcrum for the insole clamp pivots (G).

(d) *Insole clamp* (H), fitted with clamping screw (J), pivots (G) and a lever handle (K) for application, by hand, of the shearing force. The width of the clamp jaws shall be 19 ± 1 mm. Clamp (H) shall be so positioned relative to clamp (D) that the force it exerts on test piece (E) is in the plane of the bond between the rib and insole material.

NOTE. One suitable apparatus is the SATRA sole adhesion tester (STD 185) fitted with attachments (STD 185/R) for shear strength testing.

6. Procedure

Test each test piece by the following procedure.

6.1 Insert the rib of the prepared test piece fully into the rib clamp, positioning the section of rib symmetrically in the clamp, and tighten the clamp whilst ensuring that the insole section of the test piece is vertical. Rotate the gauge dial to bring the pointer to 'zero'. Slide the insole clamp into position along the insole until the clamp pivot rests on its support and the jaws are about 2 cm above the rib of the test piece. Tighten the insole clamp firmly, making certain that the edge of the rib flange is not gripped.

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6.2 Press down on the handle of the insole clamp so as to apply an increasing shearing force on the rib assembly, and to cause failure of the test piece in 3 s to 4 s. Record the force at failure and describe the type of failure occurring.

NOTE. For a stuck-on rib of conventional design the most common types of failure can be described as follows:
(a) shear failure within the insole material;
(b) failure of adhesion to the insole;
(c) non-coalescence in the adhesive;
(d) failure of adhesion to the rib fabric;
(e) tearing of the rib fabric (usually on the inside of the rib).

7. Expression of results

7.1 **Ribbed insoles.** Calculate the mean of the four results, i.e. the two results from each of the two sampled insoles. Express this mean, in newtons, as the shear strength.

7.2 **Insole material.** Calculate the mean of the four results for each direction of cutting of sample strips (see 4.2). Express this mean, in newtons, as the shear strength for this direction.

NOTE. With some cellulose boards, there may be a difference in results corresponding to the two directions along the length of the roll (i.e. usually at right angles to the heel-toe direction of cut insoles). If this effect is apparent (either from the test results or the type of failure) then results for each of these two directions should be obtained and reported separately.

8. Test report

Include the following items in the test report:

(a) the result expressed in accordance with 7.1 or 7.2 as appropriate (the equivalent values in kgf may be added in brackets);

(b) the type(s) of failure occurring;

(c) nature and full identification of the sample(s);

(d) in cases where, for the purpose of the test, ribs were affixed to insole material strips, details of the method of attachment;

(e) reference to the method of test (i.e. Section 4.6 of BS 5131);

(f) date of testing.

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