
British Standard Methods of test for

Footwear and footwear materials

Part 5. Testing of complete footwear

Section 5.5 Resistance of finished footwear to water penetration (trough test)

Méthodes d'essai des chaussures et des matériaux entrant dans leur confection

Partie 5. Essai de la chaussure complète

Section 5.5 Résistance des articles chaussants parachevés à la pénétration de l'eau

Prüfverfahren für Fussbekleidung und Fussbekleidungswerkstoffe

Teil 5. Prüfen der fertigen Fussbekleidung

Abschnitt 5.5 Wasserdurchdringungswiderstand von Fertigschuhzeug

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 for determining the resistance of complete footwear to the entry of water during wear, using test conditions similar to those that may occur during wear.

2. Principle

A pair of sampled footwear is worn whilst a measured number of paces is walked over a surface flooded with water to a measured depth. The extent of water entry is determined by inspection.

3. Definition

For the purposes of this Section of BS 5131 the following definition applies.

feather line. The line of a shoe where the upper meets the bottom, the part of the bottom involved being the welt, rand, or sole, depending on the method of shoe construction.

4. Supplementary information

The procedure described in this Section requires to be completed by information on the depth(s) of water in

which the footwear is to be tested. This information shall be derived from the specification for the footwear under test or shall be the subject of agreement between parties interested in the results of the test.

NOTE. For most footwear constructions using impermeable soles, a water level 5 mm above the feather line is normally suitable.

5. Trough

A horizontal watertight trough is required, having the following essential features (see also figure 5.5/1):

- (a) a movable platform near each end, high enough to enable the tester to step up and turn around above the water level;
- (b) sufficient length to allow the tester to take 10 normal paces in the water between the platforms;
- (c) width of at least 0.6 m;
- (d) a plug to enable the water to be drained away.

NOTE. It is obviously desirable for the trough to have a piped water supply so that it may readily be filled to the appropriate depth.

6. Tester

Choose the tester, or the size of the sample footwear, so that the footwear fits the tester reasonably comfortably.

7. Procedure

7.1 With the trough empty of water, position the turning platforms so that the tester takes 11 paces walking from one to the other with a normal length of stride (i.e. so that each foot is placed on the floor of the trough five times). Fill the trough to the agreed depth (see clause 4).

NOTE. For certain constructions there are several different ways the water may penetrate and in order to identify these it may be necessary to test different shoes of the same style at several different water levels. For example, for welted constructions suitable levels might be:

- (a) just wetting the sole (for leather and any other non-water-proof soling materials);
- (b) up to the welt;
- (c) over the welt up to the feather line (i.e. just reaching the upper).

7.2 Ensure that the sample footwear is thoroughly dry. Put on the dry footwear over normal hose and stand on one of the platforms. A legging or guard may be used to cover the topline, if desired. Walk 100 paces in the water using the platforms when turning. Take great care to make sure that no water is splashed over the topline of the footwear. To avoid this splashing, walk at a slower pace than normal, if necessary, but preferably not slower than one pace per second.

7.3 After 100 paces step out of the trough, remove the footwear carefully, and examine the inside visually and by touch for signs of water penetration. If any penetration has occurred, record its position and extent on diagrams (figure 5.5/2 shows a suitable form of diagram). If the area of penetration is small (less than 3 cm²), or if only one of the sample pair has leaked, continue the test. Make similar examinations at 200 paces, 400 paces, 800 paces,

1600 paces, 3200 paces, and 6400 paces, or more frequently if appropriate.

NOTE. By recording at least two stages of penetration in different colours on the diagram, the rate of entry of water after initial penetration can be shown.

8. Expression of result

For each depth of water in which the footwear has been tested, and for each boot or shoe, express the result by describing diagrammatically (see figure 5.5/2) the extent of water penetration corresponding to each number of paces at which examination was carried out. If no penetration occurred, state the number of paces at which the procedure was stopped.

9. Test report

Include the following items in the test report:

- (a) the result for each boot or shoe, expressed in accordance with clause 8;
- (b) details of any special measures taken to guard against entry of water;
- (c) depth(s) of water, expressed both in absolute terms and in comparison with the footwear construction (e.g. '5 mm above the feather line');
- (d) full description of the footwear, including relevant constructional details (e.g. sole thickness) and amount of wear;
- (e) full identification of the sample;
- (f) reference to the method of test (i.e. BS 5131: Section 5.5);
- (g) the date of testing.

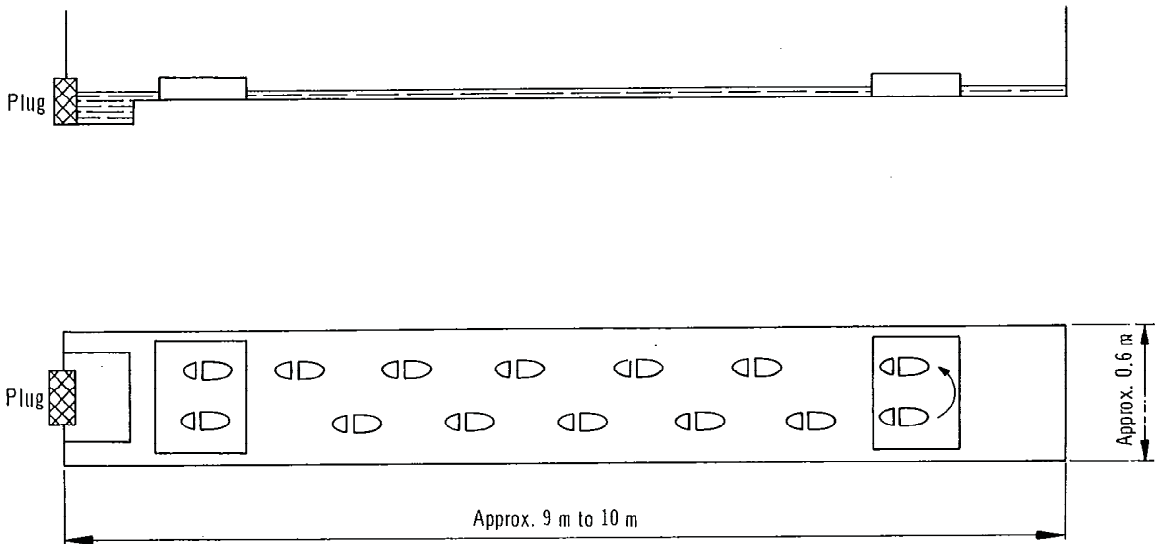


Figure 5.5/1. Trough