

British Standard Methods of test for

Footwear and footwear materials

Part 2. Solings

Section 2.7 The preparation of test pieces from soling materials for physical testing

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

Partie 2. Semelles

Section 2.7 Préparation d'échantillons d'essai à partir de matériaux de semelles à des fins d'essai physique

Prüfverfahren für Fußbekleidung und Fußbekleidungswerkstoffe

Teil 2. Sohlen

Abschnitt 2.7 Erstellung von Proben aus Sohlenwerkstoff für physikalische Prüfungen

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

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1. Scope

This Section describes the general procedures for the preparation of the test piece from shoe soles or soling materials, required for the physical tests of solings covered by other Sections of this British Standard and for the tests relevant to solings in BS 903 and BS 2782. It does not describe the preparation of the special test pieces that are required for certain Sections of this British Standard. These are either described in the Sections concerned or, in the case of the preparation of test pieces for adhesion tests, in Part 1.

This Section describes methods for the reduction of moulded soles or soling in sheet form to a uniform sheet of the thickness required for testing, the production of test slabs from injection mouldable or vulcanizable materials, the cutting of test pieces from the sheet or slab, and the time intervals that need to be allowed between sheet preparation and test piece cutting.

2. References

This Section refers to the following standards publications:

BS 903	Methods of testing vulcanized rubber
BS 2782	Methods of testing plastics
BS 5131	Methods of test for footwear and footwear materials
	Section 2.1 Ross flexing method for cut growth resistance of soling materials

3. Principle

Sheets of the required thickness are prepared either by moulding, or from thicker soles or sheet material by splitting or scouring, and are of such a size that the individual test pieces can then be cut from them. The surfaces of the test sheet so prepared shall be as smooth and free from imperfections as possible.

4. Test piece thickness

The thicknesses used for test pieces prepared from solings are preferably:

- (a) solid rubber and plastics, and semi-expanded rubber, for most tests: 2.0 mm or 3.0 mm, tolerance ± 0.2 mm;
- (b) PVC and thermoplastic rubber, flexing (BS 5131 : Section 2.1): 3.0, 5.0, 7.0, 10.0, or 15.0 mm, tolerance ± 0.2 mm;
- (c) cellular rubber and plastics solings: 5.0 ± 0.2 mm;
- (d) leather: tested at the thickness received.

If the soling as received is not thick enough to allow a test sheet of the required standard thickness to be prepared from it, reduce it the minimum amount necessary to produce two smooth and uniform surfaces. Report the non-standard thickness of the test pieces with the test results.

5. Procedure for reduction of the thickness of solings and moulded test slabs

5.1 Sheet soling of solid rubber or plastics. Where one surface of the sheet is smooth, this may be retained as a surface of the test sheet and all the excess thickness removed from the reverse side.

Where there is a pattern on the wearing surface, first remove sufficient from this side to eliminate the pattern completely and obtain a smooth surface, and then remove the remainder from the reverse side.

5.2 Moulded soles and units. Moulded soles and units usually have a pronounced surface pattern on the wearing surface and they may have supporting ribs or similar features on the reverse side. Remove these surface irregularities completely from both sides and then the remainder of the excess thickness from the reverse side. In the case of moulded-on rubber soles it is important not to remove more than the minimum necessary amount from the wearing surface as in some cases there may be a degree of undercure of the sole next to the insole.

5.3 Cellular solings. Remove a layer 0.5 mm thick from the wearing surface. If any of the denser or solid surface skin then remains, remove a little more until it is eliminated. Remove the remainder of the material from the reverse side.

If the soling has a deep pattern or cleats on the wearing surface, remove these completely before removing the 0.5 mm surface layer.

Where the cellular soling, as received, does not have a surface skin and the wearing surface has already been split to produce a uniform cellular structure, it is not necessary to remove the 0.5 mm layer from this surface.

It is desirable to carry out some tests on cellular solings (e.g. polyurethane) with the surface skin still present. In such cases, if the surface is smooth, remove all the material from the reverse side to obtain the specified test thickness.

5.4 Moulded test slabs. Slabs from injection mouldable plastics and thermoplastic rubber shall, wherever possible, be moulded to the test thickness required.

Slabs moulded from vulcanized rubber may, if desired, be moulded to the test thickness required, provided the surfaces of the slab so obtained are smooth and free from imperfections. Alternatively, since there may in some instances be difficulty in moulding to the exact thickness

required, slabs can be moulded a little thicker and then reduced to the required thickness as specified in 5.1.

Moulded cellular polyurethane slabs shall be moulded thicker (10 mm is suggested) and then reduced to the test thickness, as specified in 5.3.

6. Preparation of moulded test slabs

6.1 Moulded-on rubber. Use a mould consisting of a rectangular base with sides for holding the rubber blank during the moulding process and a lid for applying pressure and determining the thickness of the moulded assembly. The area of the rectangle shall be approximately that of a shoe sole: sides 100 mm to 150 mm are suggested. The mould may be made to produce a rubber slab of the required test thickness or, if preferred, a slab that is a little too thick and which is then reduced to the standard thickness by the procedures described in 7.2.1.1. The mould shall fit into a press with heated platens that is able to apply the required pressure.

Use the following moulding conditions, unless the rubber manufacturer's instructions indicate that they are inappropriate for the material being moulded:

Platen temperatures	: 150 ± 5 °C, for both
Pressure over the cavity area	: 4.0 ± 0.5 MPa
Moulding time	: 10 min

Where these conditions are not used, give details of the revised conditions with the test report.

NOTE. This clause relates to the preparation of compression moulded test slabs from rubber compounds which are used for the compression moulding-on of soles in the shoe factory. If test slabs of rubber compounds for injection moulding are required, it is preferable to test such materials in the form of factory prepared injection moulded soles or test slabs.

6.2 Plastics and thermoplastic rubber.

Wherever appropriate, prepare slabs by injection moulding using a commercial production machine rather than by compression moulding. If compression moulding is used, report this fact with the test results, since compression moulded slabs may give different results.

A moulded slab of suitable shape and dimensions which has the injection point at one end is illustrated in figure 2.7/1.

It is recommended that the slab be moulded to the specified thickness of the test pieces that are to be cut from it though, if necessary, part or all of a thicker slab may be reduced to produce thinner test pieces using the procedures described in 7.2.2 and 7.2.3.

6.3 Cellular polyurethane. Although test slabs of cellular polyurethane can be moulded in the laboratory, it cannot be assumed that they will give the same test results as shoe soles prepared commercially from the same compound. Nor is it certain that the same basic technique can be used for all materials. Consequently, it is inappropriate in this standard to include a recommended procedure for their preparation. Where test slabs are produced, they should be about twice the standard test thickness (e.g. 10 mm), and then reduced to this thickness by the procedure described in 7.2.4.

7. Methods for production of test sheets from thicker material

It is not possible to specify one preparation method that is applicable in all cases. Instead a number of techniques are described for removing excess material, followed by notes