BRITISH STANDARD

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15301-1:2007

Surfaces for sports areas —

Part 1: Determination of rotational resistance

The European Standard EN 15301-1:2007 has the status of a British Standard

ICS 97.220.10

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National foreword

This British Standard was published by BSI. It is the UK implementation of EN 15301-1:2007. It partially supersedes BS 7044-2.2:1990 Method 1. EN 15301-1:2007 is one of a package of standards being produced by CEN/TC 217. On publication of the entire package, BS 7044 will be withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/57, Surfaces for sports areas.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Surfaces for sports areas - Part 1: Determination of rotational resistance

Sols sportifs - Partie 1 : Détermination de la résistance en rotation

Sportböden - Teil 1: Bestimmung des Drehwiderstandes

This European Standard was approved by CEN on 10 February 2007.

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Foreword

This document (EN 15301-1:2007) has been prepared by Technical Committee CEN/TC 217 “Surfaces for sports areas”, the Secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2007, and conflicting national standards shall be withdrawn at the latest by September 2007.

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1 Scope

This part of EN 15301 specifies methods for determining the rotational resistance of sports surfaces.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12229, *Surfaces for sports areas - Procedure for the preparation of synthetic turf and needle-punch test pieces*

3 Principle

The force required to initiate rotational movement of a test sole in contact with the sports surface being tested is measured.

4 Apparatus

4.1 The apparatus shall consist of the following components (see Figure 1).

— Test foot, comprised of a steel disc (150 ± 2) mm in diameter to which the appropriate test sole is mounted.

— Shaft with attached lifting handles that are centrally attached to the centre of the studded disc.

— Two-handled mechanical torque wrench with a scale marked from 0 Nm to 80 Nm in a maximum of 2 Nm increments, that attaches to the top of the shaft.

— Set of annular weights that rest centrally on the upper surface of the studded disc allowing free movement of the disc beneath the weights. The total mass of the apparatus (test foot, shaft, torque wrench and weights) shall be (46 ± 2) kg.

— Tripod and guide to minimize any lateral movement of the test foot during testing. The tripod shall not restrict the free rotation of the shaft and the guide shall incorporate a means of holding and dropping the weighted test foot onto the test specimen from a height of (60 ± 5) mm.

4.2 The test sole shall be as specified in the product specification. Standard test soles are as follows:

a) Football stud test sole;

Six football studs[1] equally spaced on the bottom surface of the test foot (46 ± 1) mm from the centre of the disc. The studs shall be as shown in Figure 2, be manufactured from plastic and have a Shore A hardness of (96 ± 2).

[1] 13 mm nylon studs supplied by Decathlon Group are an example of suitable products available commercially. This information is given for the convenience of users of this European Standard and does not constitute an endorsement by CEN of this product.

b) Smooth rubber sole;

Smooth rubber disk (150 ± 2) mm in diameter and at least 5 mm thick. The rubber shall be as given in Table 1.

Table 1 — Properties of smooth rubber test sole

Property	Temperature °C				
	0	10	20	30	40
Lübke Resilience (%)	43 to 49	58 to 65	66 to 73	71 to 77	74 to 79
Hardness (IRHD)	53 to 65				
NOTE The rubber composition given in Annex B of EN 13036-4:2003 has been found to be satisfactory.					

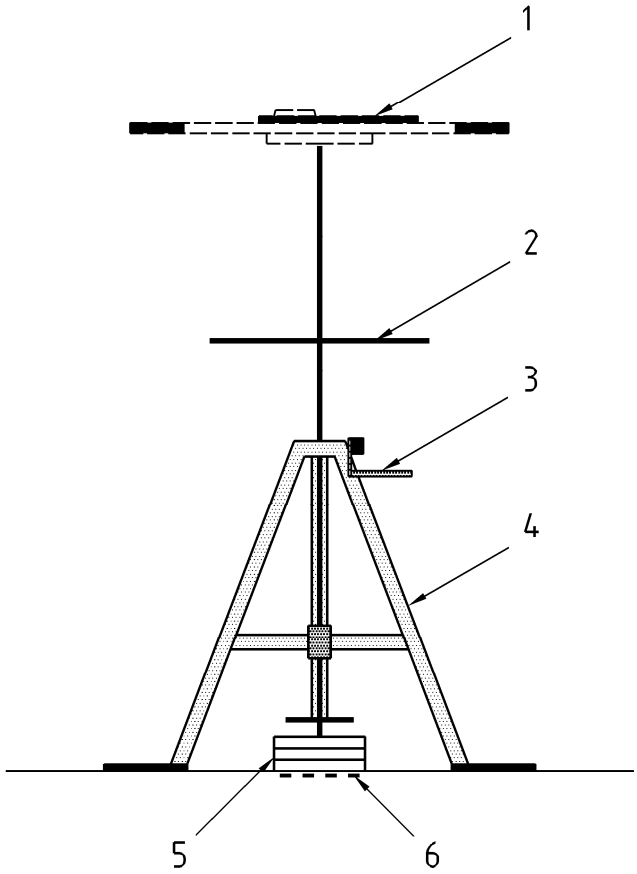
c) Dimpled rubber sole[2)].

Rubber disk (150 ± 2) mm in diameter with a profile comprised of 55 dimples (studs) positioned as shown in Figure 3. Each dimple shall be (6 ± 1) mm in length and (9 ± 1) mm in depth. The rubber used to form the test foot shall be as given in Table 2.

Table 2 — Properties of dimpled rubber test sole

Property	Temperature °C		
	5	23	40
Lübke Resilience (%)	19 to 23	21 to 26	26 to 30
Hardness (IRHD)	94 to 98		

2) The dimpled rubber sole is specifically manufactured for testing sports surfaces by Rapra Technology Ltd, Shawbury, Shropshire SY4 4NR, United Kingdom. This information is given for the convenience of the users of this European Standard and does not constitute an endorsement of this product by CEN.



Key
1 dial indicating torque wrench
2 lifting handles
3 release mechanism
4 tripod
5 weights
6 test foot

Figure 1 — Test apparatus

Dimensions in millimetres

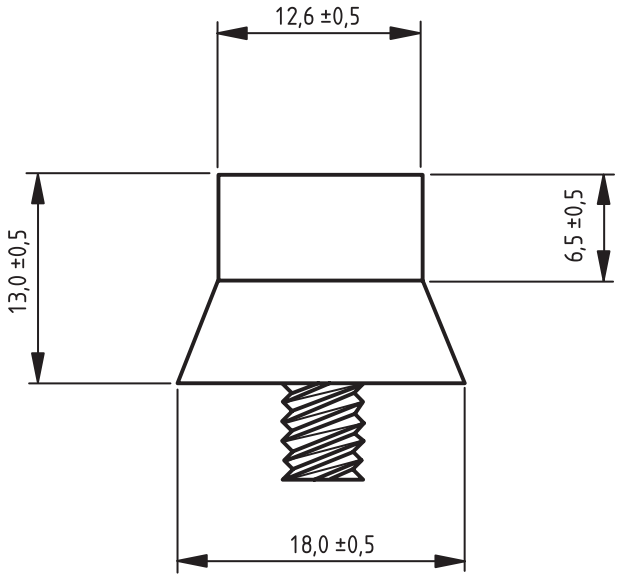


Figure 2 — Profile of football stud

Dimensions in millimetres

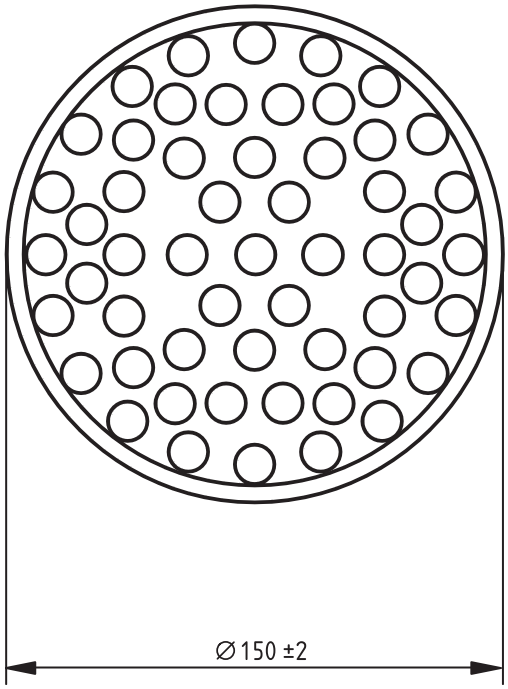


Figure 3 — Dimpled rubber test sole, stud layout

5 Test pieces

Unless otherwise specified, the test piece shall be a piece of the sports surface measuring a minimum of 1 000 mm x 1 000 mm and prepared in accordance with the manufacturer's instructions. Synthetic turf and needle-punch surfaces shall be prepared in accordance with EN 12229 and the manufacturer's instructions.

6 Conditioning

Condition the test pieces for a minimum of 3 h at the test temperature. Unless otherwise specified, the laboratory test temperature shall be (23 ± 2) °C. Site tests shall be made under the prevailing conditions.

7 Procedure

Ensure that the test sole is cleared of any in-fill and detritus. Assemble the apparatus and ensure the free movement of the test foot.

For synthetic turf and needle punch surfaces remove the torque wrench and drop the weighted test foot from a height of (60 ± 5) mm onto the surface. Reattach the torque wrench. For all other forms of surface place the apparatus onto the surface taking care not to damage the surface.

Zero the indicator needle on the torque wrench. Without placing any excessive vertical pressure on the torque wrench and while applying minimum rotational torque to the torque wrench, turn the wrench and test foot smoothly, without snatching, at a nominal speed of rotation of 12 r/min until movement of the test foot occurs and it has rotated through at least 45 °. Record the maximum value displayed on the torque wrench to the nearest Nm. Move the test apparatus and repeat the procedure to obtain five results, unless otherwise specified, ensuring that the test positions are at least 50 mm apart (outside edge of test foot to outside edge of test foot) and at least 50 mm from the sides of the test piece. If a conditioning procedure is used that produces a test piece of less than 1 000 mm x 1 000 mm, make a minimum of three measurements.

8 Calculation and expression of results

Calculate the mean value of rotational resistance.

Report the mean result to the nearest Nm, e.g. 40 Nm.

9 Test report

The test report shall include the following information:

— reference to this European Standard, i.e. EN 15301-1:2007;

— complete identification of the surface tested, including its location, area and previous history;

— test sole used;

— mean value of rotational resistance ;

— individual test results, if required.

Bibliography

[1] EN 13036-4:2003, Road and airfield surface characteristics - Test methods - Part 4: Method for measurement of slip/skid resistance of a surface - The pendulum test

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