

English Version

Surfaces for sport areas - Determination of thickness of  
unbound mineral surfaces for outdoor sports areas

Sols sportifs - Détermination de l'épaisseur des sols  
minéraux non liés pour les terrains de sport de plein air

Sportböden - Bestimmung der Dicke von ungebundenen  
mineralischen Belägen für Sportböden für den  
Außenbereich

This European Standard was approved by CEN on 12 September 2005.

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## Foreword

This European Standard (EN 14953:2005) has been prepared by Technical Committee CEN/TC 217 "Surfaces for sport 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of an identical text or by endorsement, at the latest by May 2006, and conflicting national standards shall be withdrawn at the latest by May 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## **1 Scope**

This European Standard describes two methods for determining the thickness of granular materials within a structure.

The two methods can be used to provide an indication of the thickness of surfacing material, one using a steel tape, the other using a floating disc and a steel tape. Method 1 is applicable to layers within a profile. Method 2 measures the thickness of a material at the surface.

## **2 Method 1 – Profile and divider method**

### **2.1 Application**

This method is suitable for determining the thickness of granular materials on-site or in the laboratory, provided that a profile can be removed without destroying the structure.

### **2.2 Principle**

A hole is excavated within the structure to reveal a cross-sectional profile of the layers. This enables the thickness of each layer of material to be measured.

### **2.3 Apparatus**

**2.3.1 Spade**, which cuts cleanly.

**2.3.2 Trowel**.

**2.3.3 Two-in flexible divider**.

**2.3.4 Steel tape**, graduated in millimetres.

**2.3.5 1 m straight edge**.

**2.3.6 Corer**, for laboratory analysis.

### **2.4 Test area**

Ensure that the test area is sufficiently moist to enable a clean cut to be made into the structure.

If the thickness of a surface material is to be measured, the surface smoothness, i.e. evenness, shall be within the limits of 2 mm under a 1 m straight edge. If surface evenness is not within these limits, the surface shall be tamped and levelled by luting within a tolerance of 2 mm under a 1 m straight edge.

### **2.5 Procedure**

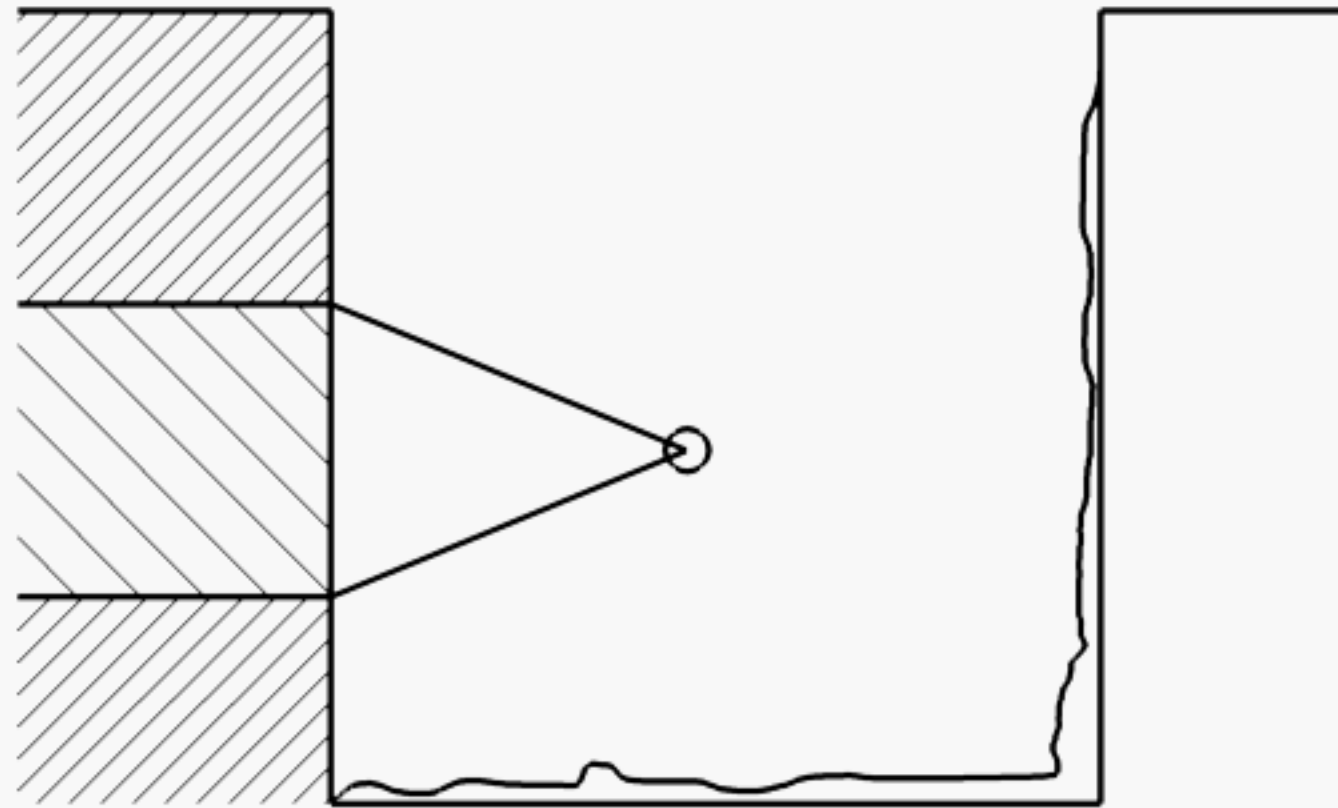
Create on-site a vertical profile by digging a hole, no less than 300 mm x 300 mm square, to the depth required to reveal the layer or layers to be measured.

For laboratory analysis remove a core no less than 150 mm in diameter with a corer.

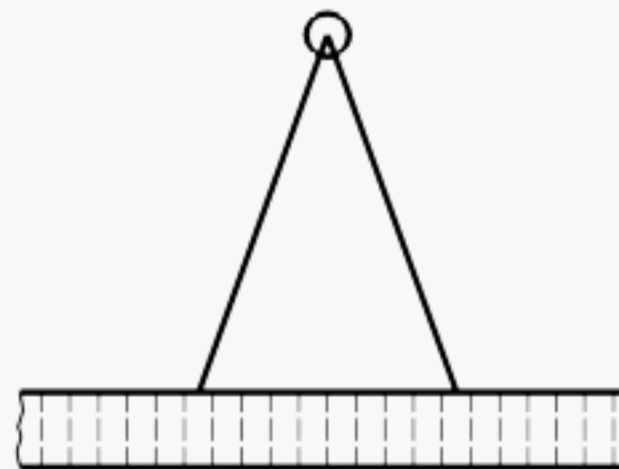
From the profile to be measured remove all loose surplus materials to give a smooth even face to the profile.

Insert the flexible divider above and below the layer in the profile of material to be measured (Figure 1).

Remove the divider, measure and record the distance between its two points in millimetres (Figure 2).



**Figure 1 — Divider adjustment in profile**



**Figure 2 — Measuring the distance between the points of the divider**

## **2.6 Calculation and expression of results**

Express the results in millimetres. If a profile has strata of varying thickness, measure the profile in three locations across its face, one on each side and one in the centre, and calculate the mean value.

## **2.7 Test report**

The test report shall include the following particulars:

- a) reference to this European standard, i.e. EN 14953:2005, Method 1;
- b) type of material under test;
- c) depth of profile excavated;
- d) average thickness of layer;
- e) condition of the ground at the time of the test;
- f) for surfacing materials, smoothness of the material, i.e. its evenness under a 1,0 m straight edge, prior to and after luting and tamping, as appropriate.

### **3 Method 2 – Floating disc method**

#### **3.1 Application**

This method is suitable for the rapid testing of a number of areas for thickness of surfacing materials, where loose particulates are used. For very accurate measurement, i.e. within  $\pm 2$  mm, method 1 should be used.

#### **3.2 Principle**

A smooth straight edge is laid over an excavated hole which is to the depth of the measurable layer. A floating disc is placed in the hole, lowered onto the top of the straight and locked onto the probe. The floating disc is removed and the distance between the bottom of the probe and the underside of the disc is measured and recorded. The thickness of the straight edge is measured and subtracted from the recorded figure.

#### **3.3 Apparatus**

**3.3.1 1 m straight edge.**

**3.3.2 Steel tape**, graduated in millimetres.

**3.3.3 Trowel or spade.**

**3.3.4 Floating disc** (see Figure 3).

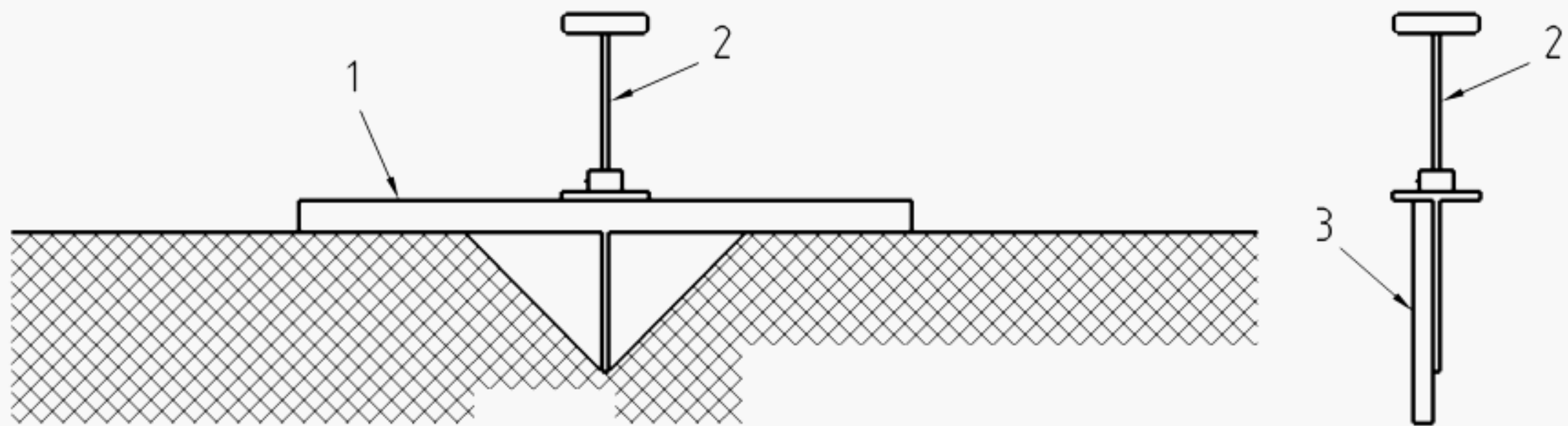
#### **3.4 Test area**

Ensure that the test area is sufficiently moist, to enable the materials to be moved without breaking during the excavation. If the surface is undulated, ensure that the area is levelled (by luting) and tamped to within a limit of 2 mm under a 1 m straight edge.

#### **3.5 Procedure**

Remove the surface material down to the top of the next layer of material. Ensure that the excavation is sloping on two sides. Leave the other two sides free of excavated material for the positioning of the straight edge.

Lay the straight edge over the hole. Hold the probe of the floating disc vertically down the side of the straight edge with the tip resting at the bottom of the excavated hole. Lower the floating disc on top of the straight edge and lock it in position. Remove the probe from the hole. Measure the thickness of the straight edge and subtract this from the depths recorded with the floating disc. Record the result in millimetres.



### Key

- 1 Straight edge
- 2 Floating disc
- 3 Metal tape

Figure 3 — Floating disc

### 3.6 Calculation and expression of result

Express the results in millimetres. Take three measurements over an area of 1,0 m x 1,0 m and calculate the mean value.

### 3.7 Test report

The test report shall include the following:

- a) reference to this European Standard, i.e. EN 14953:2005, Method 2;
- b) type of material under test;
- c) size of the hole expressed in millimetres;
- d) condition of the test area, i.e. moist, saturated, etc.;
- e) method of recording the depth with a metal tape or a floating disc and metal tape;
- f) smoothness of the surfaces at the time of the test, i.e. its evenness under a 1 m straight edge, prior to and after luting and tamping, as appropriate;
- g) all measurements taken in each location and the mean result of each location.