SLOVENSKI STANDARD

SIST EN 436:1999

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Netekstilne talne obloge - Ugotavljanje gostote

Resilient floor coverings - Determination of density

Elastische Bodenbeläge - Bestimmung der Dichte

Revetements de sol résilients - Détermination des masses volumiques

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Resilient floor coverings - Determination of density

Revêtements de sol résilients - Détermination des masses volumiques

Elastische Bodenbeläge - Bestimmung der Dichte

This European Standard was approved by CEN on 1994-08-22. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard was prepared by Technical Committee CEN/TC134 'Resilient and textile floor coverings', the Secretariat of which is held by BSI.

Both of the methods are based on ISO 1183. Attention is also drawn to prEN 672 which specifies a method for determining the density for cork floor coverings.

This document was submitted to the formal vote and approved.

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of an identical text or by endorsement, at the latest by November 1994, and conflicting national standards shall be withdrawn at the latest by November 1994.

In accordance with the CEN/CENELEC Internal Regulations, following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard specifies two methods for determining the density of homogeneous resilient floor coverings and solid layers of other resilient floor coverings.

2 Definitions

For the purposes of this standard the following definition applies.

density: The quotient of mass and volume.

3 Sampling

Take a representative sample from the available material.

4 Conditioning

Condition the test pieces at a temperature of (23 ± 2) °C and relative humidity of (50 ± 5) % for a minimum of 24 h.

Maintain these conditions when carrying out the test.

5 Method A

5.1 Principle

A test piece of known mass is immersed in a liquid and reweighed and its density is calculated.

5.2 Apparatus

5.2.1 A balance with a sensitivity of 1 mg.

5.2.2 A pan straddle or other stationary support.

5.2.3 A beaker of 200 ml capacity.

5.2.4 Thin wire of maximum diameter 0,125 mm.

5.2.5 Freshly distilled water containing not more than 0,1 % of wetting agent (to help in removing air bubbles) at a temperature of (23 ± 2) °C.

5.3 Preparation of test pieces

Take three test pieces at equal distances from the sample, the distance between the outer edge of the sample and the nearest edge of the test piece being at least 100 mm, each of minimum dimensions (30 x 30) mm or diameter 36 mm, or from individual tiles.

5.4 Procedure

Weigh the test piece with the thin wire suspended around it. Record the mass, m_1.

Immerse the test pieces, still suspended by the wire, in the distilled water contained in the beaker on the pan straddle or other stationary support.

Remove adhering air bubbles with a fine wire. Mark the level of immersion and the record the mass of the immersed test piece, m_2.

Immerse the remaining test pieces at the same level.

5.5 Calculation and expression of results

Calculate the density, ρ, in kilograms per cubic metre, of the test piece from the following equation:

$$\rho = \frac{m_1 \ \rho H_2O}{(m_1 - m_2)}$$

where:

m_1	is the initial mass of the test piece, in kilograms;
m_2	is the mass of the immersed test piece, in kilograms;
ρH_2O	is the density of water, at that temperature.

Calculate the mean result of the three test pieces and express this to the nearest 1 kg/m^3.

5.6 Repeatability and reproducibility

5.6.1 Repeatability, r

The difference between two individual test results obtained with the same method on identical test material, under the same conditions (same operator, same apparatus, same laboratory) should not exceed 2 kg/m^3, at a confidence level of 95 %.

5.6.2 Reproducibility, R

The difference between two individual and independent test results, obtained with the same method on identical test material but under different conditions (different operators, different apparatus, different laboratories) should not exceed 4 kg/m^3, at a confidence level of 95 %.

6 Method B

6.1 Principle

The density of a test piece is determined graphically using a density gradient column.

6.2 Apparatus

6.2.1 A density gradient column consisting of a suitable cylinder, not less than 40 mm in diameter and approximate length of 1 m, which shall be graduated.

6.2.2 A thermostatically controlled water bath, capable of being maintained at (23 ± 0,1) °C.

6.2.3 A number of calibrated glass floats covering the density range to be studied and an accuracy of 0,1 kg/m^3 and approximately evenly distributed.

6.2.4 A set of suitable hydrometers covering the range of densities to be studied and having density graduations of
1 kg/m^3.

6.2.5 Apparatus for gradient column preparation (see figure 1), e.g. siphon or pipette assembly for filling.

6.2.6 A mixture of two liquids, e.g. water/calcium nitrate (density range 1000 kg/m^3 to 1600 kg/m^3), water/potassium carbonate (density range 1000 kg/m^3 to 1530 kg/m^3).

6.2.7 Cathetometer (optional)

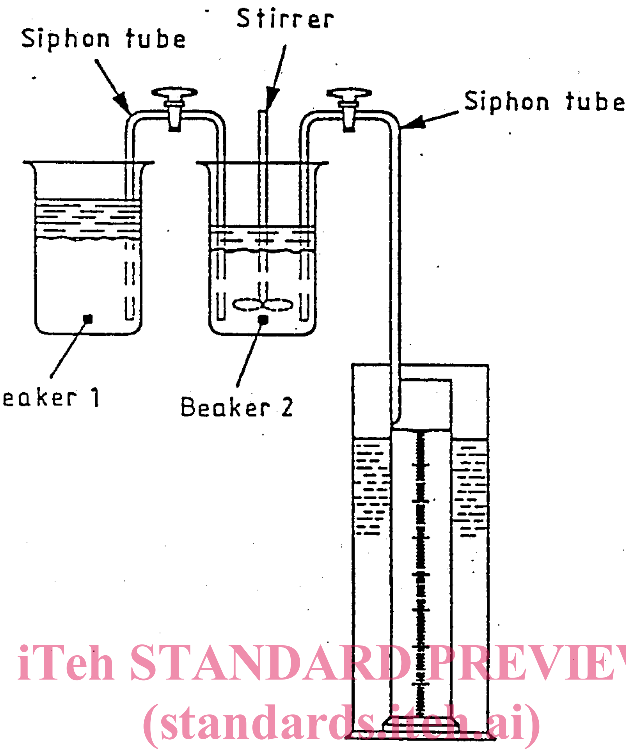

Figure 1: Apparatus for gradient column preparation

6.3 Preparation of test pieces

Take three test pieces of approximate area (2 to 5) mm^2 cut from the wear layer of a sample.

6.4 Procedure

To prepare the density column, place the graduated glass cylinder in the thermostatically controlled bath. Select a suitable combination of liquids such that the resulting sensitivity of the column shall be no poorer than 3 kg/m^3 per 10 mm of cylinder length.

The extreme upper and lower portions of the cylinder shall not be used, and readings outside the calibrated part shall not be taken.

Any of several methods of preparing the gradient may be used, of which one is as follows:

Assemble the apparatus as shown in figure 1, using beakers of equal diameter. Select an appropriate amount of two suitable liquids, which previously have been deaerated.

The volume of liquid used in the mixer (beaker 2 in the figure) shall be equal to at least one half of the total volume of the gradient cylinder.

Place an appropriate mass of denser liquid into beaker 2, and begin to stir using a high speed propeller-type stirrer. Adjust the speed of stirring such that the surface of the liquid does not fluctuate greatly.

Place an equal mass of the less dense liquid into beaker 1.

After priming the siphon, which shall be equipped with a capillary tip at the delivery end for flow control with liquid 1, start the delivery of the liquid to the gradient cylinder. Fill the cylinder carefully over a time of 1 h to 1½ h. Cap the column.

NOTE 1: The apparatus for gradient column filling may be bought from suitable suppliers. Another of the methods is shown in figure 2. Herein the flasks are connected at the bases and the less dense liquid is placed in flask 2. The end of the capillary filling tube goes to the bottom of the cylinder.

Allow the prepared density gradient column to rest for at least 24 h. For every 200 mm of cylinder length, dip a clean, calibrated float spanning the effective range into the less dense liquid and add them in the cylinder. If the floats do not spread out evenly in the cylinder, discard the solution and repeat the preparation.

Cap the cylinder and retain it in the constant temperature bath for 24 h to 48 h. After this time, measure the heights of the floats to the nearest millimetre and plot a curve of the density of the floats as a function of their heights. If the curve is not quasi-linear, discard the solution and repeat the procedure.

NOTE 2: Density column gradients normally remain stable for several months. A daily check of the original calibration will reveal when instability has been reached.

Wet three test pieces with the less dense of the two liquids, and place them in the cylinder. Allow the cylinder and test pieces to reach equilibrium, which may require some time. Determine the densities of the test pieces graphically to the nearest 1 kg/m^3.

6.5 Calculation and expression of results

Calculate the mean result of the three test pieces and express this to the nearest 1 kg/m^3.

6.6 Repeatability and reproducibility

6.6.1 Repeatability, r

The difference between two individual test results, obtained with the same method on identical test material, under the same conditions (same operator, same apparatus, same laboratory) should not exceed 1 kg/m^3, at a confidence level of 95 %.

6.6.2 Reproducibility, R

The difference between two individual and independent test results, obtained with the