SLOVENSKI STANDARD

SIST EN 12616:2023

01-maj-2023

Nadomešča:

SIST EN 12616:2013

Podloge za športne dejavnosti - Preskusne metode za ugotavljanje stopnje prepojitve z vodo in vodoravnega pretoka vode

Surfaces for sports areas - Test methods for the determination of vertical water infiltration and horizontal water flow rates

Sportböden - Prüfverfahren zur Bestimmung der vertikalen Wasserinfiltrationsrate und der horizontalen Wasserdurchflussrate

Sols sportifs - Méthodes d'essai pour la détermination de la vitesse d'infiltration verticale de l'eau et du débit d'eau horizontal

Ta slovenski standard je istoveten z: **EN 12616:2023**

ICS:

97.220.10 Športni objekti Sports facilities

SIST EN 12616:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12616

January 2023

ICS 97.220.10

Supersedes EN 12616:2013

English Version

Surfaces for sports areas - Test methods for the determination of vertical water infiltration and horizontal water flow rates

Sols sportifs - Méthodes d'essai pour la détermination de la vitesse d'infiltration verticale de l'eau et du débit d'eau horizontal

Sportböden - Prüfverfahren zur Bestimmung der vertikalen Wasserinfiltrationsrate und der horizontalen Wasserdurchflussrate

This European Standard was approved by CEN on 16 October 2022.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 12616:2023 E

Contents

Page

European foreword

This document (EN 12616:2023) 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 July 2023, and conflicting national standards shall be withdrawn at the latest by July 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12616:2013.

In comparison with the previous edition, the following technical modifications have been made: a temperature correction factor has been reinstated (from the 2003 edition) and a laboratory test method for measuring the horizontal water flow rate has been added.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

1 Scope

This document has two parts.

Part 1 specifies four methods for the determination of the vertical water infiltration rate of different types of sports surfacing.

Method A is suitable for measuring the vertical water infiltration rate of synthetic, textile and synthetic turf sports surfaces in the laboratory.

Method B is suitable for on-site measurements of the Vertical Water Infiltration Rate of synthetic, textile, synthetic turf and bound mineral sports surfaces.

Method C is suitable for on-site measurements of the vertical water infiltration rate of natural turf sports surfaces.

Method D is suitable for measuring the for on-site measurements of the vertical water infiltration rate of unbound mineral sports surfaces.

NOTE For filled synthetic turf and unbound mineral surfaces, laboratory tests are considered to give a more precise indication of how a surface will perform.

Part 2 specifies a method for determining the horizontal water flow rate of synthetic, textile and synthetic turf surfaces in the laboratory.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 12958-1:2020, *Geotextiles and geotextile-related products - Determination of water flow capacity in their plane - Part 1: Index test (ISO 12958-1:2020)*

3 Terms and definitions

No terms and definitions are listed in this document.

4 Part 1 – Determination of vertical water infiltration rate

4.1 Method A – laboratory determination of synthetic turf, textile and synthetic sports surfaces

4.1.1 Principle

Water is ponded in a cylinder into which a test specimen has been sealed. The rate of flow through the sports surface is measured.

NOTE The test can be performed on a component of a sports surfacing system, e.g. on a shockpad or synthetic turf carpet, or on a total system.

4.1.2 Apparatus

4.1.2.1 Single ring infiltrometer, of metallic or plastic material with an internal diameter of 300 mm ± 2 mm and a method of sealing the ring to the product to be tested (either mechanically with a clamp or by use of a sealant) (see Figure 1).

4.1.2.2 **Support grid**, for underpinning the product to prevent it distorting when water is poured into the apparatus (see Figure 1). The maximum deformation of the product shall be 5 mm from the outside of the ring to the centre once water has been added to the ring. Within the ring there shall be three parallel horizontal wires or bars and a central bar perpendicular to the other three. These shall be 2,5 mm ± 0,5 mm in width to prevent obstruction of any drainage holes in the sports surface.

Figure 1 — Single ring infiltrometer with supporting grid

4.1.2.3 **Stopwatch**, resolution to 0,1 s.

4.1.2.4 **Round disc**, with an internal diameter of 295 mm ± 2 mm and a mass of 5 kg ± 0,25 kg.

4.1.2.5 **Spirit level.**

4.1.2.6 **Graduated scale or other apparatus**, enabling the depth of water to be measured to an accuracy of 1 mm.

4.1.2.7 **Temperature measuring apparatus**, capable of measuring the temperature of the water to an accuracy of 1 °C.

4.1.2.8 **Geotextile or mesh grid**, with a mesh size no greater than 300 µm.

4.1.3 Test specimen

4.1.3.1 Select and prepare a test specimen of the sports surface ensuring that the minimum number of any drainage holes are visible within the 300 mm ring area. Measure the diameter and location of the holes within the test piece and record and/or photograph the evidence, which may be included in the report.

4.1.3.2 Seal or clamp the test specimen into the infiltration ring.

4.1.3.3 If required, fill the synthetic turf carpet in accordance with the manufacturer's instructions. Ensure that any pile fibres are visible and that there are no trapped fibres beneath the infill. Compress each infill layer using the round disc that should be rotated and contra-rotated on the test specimen for a minimum of five full rotations to ensure compaction and levelling of any the infill. Ensure no additional pressure is applied to the disc.

4.1.3.4 Wet the test specimen by applying a minimum of 5 l of water through the geotextile or mesh disc. Ensure there is no leaking of water laterally out of the ring joints; if there is, reseal the test specimen.

4.1.4 Conditioning

Condition the test samples and any relevant infill in the laboratory at a temperature of 23 °C ± 2 °C for a minimum period of 4 h.

4.1.5 Procedure

Ensure that the test ring is level prior to the start of the test.

Measure the temperature of the water.

Apply water evenly to the test specimen through the mesh grid or geotextile so that the head of water applied is between 70 mm and 90 mm above the top of the test specimen. For semi-filled synthetic turf surfaces, the top is specified as the top of the infill layer(s).

Mark the ring at 10 mm ± 1 mm and 30 mm ± 1 mm above the top of the test specimen.

Measure the time taken for the head of water to fall between the 30 mm and 10 mm markers to the nearest 0,1 s, ensuring that any geotextile or mesh disc is removed prior to the start of the timer. If the infiltration rate is slow, stop the test at 30 min.

Repeat the test a further two times.

4.1.6 Calculation and expression of results

Calculate the water infiltration rate I_A, expressed in millimetres per hour (mm/h), from the following formula:

$$I_A = (F_{WA} C) / t_A$$

where

F_{WA} is the fall of water level (mm);

t_A is the time taken for the water level to fall (h).

Calculate the mean value of the second and third tests.

4.1.7 Test report

The test report shall include the following information:

a) the sample;

b) reference to this document, EN 12616:2023, and Part and method used, e.g. Part 1, Method A;

c) complete identification and photograph(s) of the sports surface tested;

d) water temperature;

e) any deviations from the procedure;

f) any unusual features observed;

g) the mean average of the test results;

h) the individual test result(s), including a reference to the clause which explains how the results were calculated;

i) the date of the test.

4.2 Method B – on-site determination on synthetic textile, synthetic turf, and bound mineral sports surfaces

4.2.1 Principle

Water is ponded within two concentric cylinders that have been sealed onto, or hammered into, the sports surface. The outer cylinder is used as a buffer area to prevent the lateral flow of water from the inner cylinder.

NOTE A single cylinder can be used if the test piece is fully sealed to prevent lateral flow of water.

The rate of entry into the sports surface from the inner cylinder is measured (see 4.2.6).

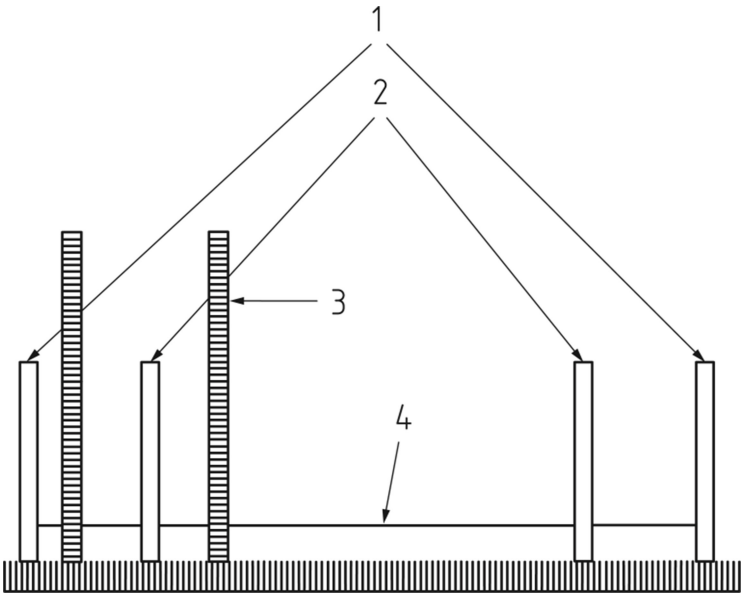
4.2.2 Apparatus

4.2.2.1 Infiltrometer, with dimensions specified in 4.2.2.2 and 4.2.2.3, consisting of one or two metal cylinders (see Figure 2) capable of being sealed onto, or hammered perpendicularly into, the sports surface, as appropriate to minimize lateral leakage.

4.2.2.2 Large cylinder, double-ring infiltrometer, for tests on synthetic, synthetic turf, textile and bound material surfaces with a rate of water infiltration less than 500 mm/h, consisting of an inner cylinder of inner diameter (300 ± 5) mm forming the measurement area and an outer cylinder of inner diameter (500 ± 25) mm forming the buffer area to prevent the lateral flow of water from the inner cylinder.

NOTE A wide tolerance on the cylinder diameter is permitted to allow the cylinders to be stacked for ease of transport.

4.2.2.3 Small cylinder, double-ring infiltrometer, for tests on mineral surfaces consisting of an inner cylinder of inner diameter (150 ± 5) mm and an outer cylinder of inner diameter (300 ± 25) mm.



Key

1 outer cylinder
2 inner cylinder
3 scale
4 water level

Figure 2 — Double-ring infiltrometer

4.2.2.4 Graduated scale or other apparatus, enabling the depth of water to be measured to an accuracy of 1 mm.

4.2.2.5 Clock, accurate to 1 s.

4.2.2.6 Temperature measuring apparatus, capable of measuring the temperature of the water to an accuracy of 1 °C.

4.2.2.7 Sealing material, capable of sealing the infiltrometer to the surface such as low-modulus elastomeric compounds (e.g. silicone rubber or a strip of closed-cell, compressible foam).

NOTE On synthetic sports surfaces, self-adhesive, closed-cell foam strips such as those commonly used as draught excluders have been found to be suitable. A low-modulus, elastomeric tubing, such as silicone, can also create an effective seal on some surfaces.

The sealant shall be chosen to leave no residue on the test surface.

4.2.2.8 Water supply, shall be adequate for the test.

4.2.2.9 Heavy weights, to apply to the top of the apparatus to improve the seal, particularly where the test surface is heavily textured.

4.2.3 Test conditions

Tests shall be carried out at the prevailing site conditions.

4.2.4 Number and distribution of test locations on site

Unless specified in the product standard, test locations on site shall be selected be as follows. On sports surfaces of less than 3 000 m^2 in area, at least one test reading shall be performed per 500 m^2. On sports surfaces larger than 3 000 m^2, at least one test reading shall be performed per 1 000 m^2. All test locations shall be selected at random.

4.2.5 Procedure

4.2.5.1 If sealing of synthetic turf is required, remove any particulate fill by vacuum to allow the rings to seal onto the primary backing of synthetic turf carpets and assist the prevention of lateral seepage of water. Do not disturb the particulate fill in the measurement area.

4.2.5.2 Seal the cylinders onto the sports surface with sealing material taking care to ensure that the sealing material does not restrict water infiltration from any of the area enclosed by the inner cylinder. Apply the weights if necessary.

4.2.5.3 Pond water in both cylinders until the flow of water into the inner cylinder is constant and the water level approaches a steady-state value. Ensure that the water level in the outer cylinder is within ± 2 mm of the level in the inner cylinder.

4.2.5.4 Measure the time taken (t_B) for the water to fall by 20 mm from an initial ponding depth of (30 ± 1) mm to a final ponding depth of (10 ± 1) mm, or the fall in the water level (F_{WB}) after a minimum of 30 min, whichever is quicker.

The water levels between the cylinders can be maintained by the use of a siphon. Where a siphon has been employed, it should be removed it before any measurements are made.

4.2.5.5 If the test piece is laid on a slope, measure the depth of water at the location in each ring with the greatest depth of water.

4.2.5.6 Repeat the test a further two times.

4.2.6 Calculation and expression of results

Calculate the water infiltration rate, I_B, expressed in millimetres per hour (mm/h), from the following formula:

$$I_B = \left(F_{WB} C\right) / t_B$$

where

F_{WB} is the fall of water level (mm);

t_B is the time taken for the water level to fall (h); and

C is the appropriate temperature correction factor, to correct the infiltration rate to a standard temperature of 10 °C.

Calculate the mean value of the second and third tests.