



**SLOVENSKI STANDARD**  
**oSIST prEN 14904-1:2017**  
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**Podloge za športne dejavnosti - Sistemi večnamenskih podlog za notranjo uporabo - 1. del: Bistvene značilnosti**

Surfaces for sports areas - Multi-sports floor systems for indoor use - Part 1: Essential characteristics

Sportböden - Mehrzweck-Sporthallenböden - Teil 1: Wesentliche Merkmale

**iTeh STANDARD PREVIEW**

Sols sportifs - Systèmes de sols multi-sports pour utilisation en intérieur - Partie 1 : Caractéristiques essentielles

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## Surfaces for sports areas - Multi-sports floor systems for indoor use - Part 1: Essential characteristics

Sols sportifs - Systèmes de sols multi-sports pour utilisation en intérieur - Partie 1 : Caractéristiques essentielles  
Surfaces for sports areas

portböden - Mehrzweck-Sporthallenböden - Teil 1: Anforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 217.

If this draft becomes a European Standard, 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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EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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**prEN 14904-1:2017 (E)****European foreword**

This document (prEN 14904-1:2017) has been prepared by Technical Committee CEN/TC 217 “Surfaces for sports areas”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document, together with prEN 14904-2 and prEN 14904-3, will supersede EN 14904:2006.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential characteristics of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

The following significant technical changes have been implemented in this new edition:

- splitting the former document in 3 parts;
- all necessary characteristics for the CPR (New terminology of the CPR);
- changes of the slip resistance (upper limit);
- EoC is changed in Assessment and verification of constancy of performance – AVCP;
- Annex B “Measuring points on sample”.

EN 14904 consists of the following parts, under the general title *Multi-sports floor systems for indoor use*:

- *Part 1: Essential characteristics*
- *Part 2: Specifications*
- *Part 3: In situ testing*

## Introduction

This European Standard is the first revision of EN 14904 which was first published in 2006. This standard provides performance criteria, as mandated by CEN, for the Essential Characteristics which need to be considered for a sports floor system that is to be used for one or more than one sport and appropriate test methods by which these Essential Characteristics should be measured.

When setting the various performance criteria detailed within the standard, the needs of Volleyball, Basketball, Badminton, Small sided Football, Handball and Physical Education were prioritized. Whilst the performance criteria are applicable when one or more sports are played on a sports floor system, it was also felt that if a facility was to be used for just one of the five aforementioned sports then this standard would also be applicable. However, this standard may not be appropriate for single sport centres designed for specialist sports such as Tennis or Cricket as some of the performance criteria (such as shock absorption and angle ball rebound) are not appropriate nor are some of the test methods.

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**prEN 14904-1:2017 (E)****1 Scope**

This European Standard specifies essential characteristics for multi-sports floor systems designed for use in indoor sport halls and gymnasias.

This European Standard also applies to single sport facilities designed for the following sports: volleyball, basketball, badminton, small sided football, and handball.

NOTE 1 Physical education is considered as a multisport use.

NOTE 2 Essential characteristics as defined in regulation EU N° 305/2011”

NOTE 3 Other requirements for multi-sports floor systems designed for use in indoor sport halls and gymnasias are specified in part 2 of this standard.

This European Standard provides for the test methods, Assessment and Verification of Consistency of Performance and marking for multi-sport assessment and verification of consistency of performance of sports floor systems whether prefabricated as a single product or constructed *in situ* as a kit (e.g. a or a combination of the two components or more).

This European Standard does not apply to synthetic turf or textile surfaces used indoors.

**2 Normative references**

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

EN 717-1, *Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method*

[kSIST FprEN 14904-1:2019](https://standards.iteh.ai/catalog/standards/sist/cbd9d614-83e0-44ab-bf73-05c459800733/sist-pr-en-14904-1-2017)

EN 1569, *Surfaces for sports areas - Determination of the behaviour under a rolling load*

EN 12673, *Water quality - Gas chromatographic determination of some selected chlorophenols in water*

EN 13238, *Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

EN 14808, *Surfaces for sports areas - Determination of shock absorption*

CEN/TS 16516, *Construction products - Assessment of release of dangerous substances - Determination of emissions into indoor air*

prEN 16837, *Surfaces for sports areas - Determination of linear shoe/surface friction*

EN ISO 5470-1, *Rubber- or plastics-coated fabrics - Determination of abrasion resistance - Part 1: Taber abrader (ISO 5470-1)*

EN ISO 12460-3, *Wood-based panels - Determination of formaldehyde release - Part 3: Gas analysis method (ISO 12460-3)*

EN ISO 16000-9, *Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method (ISO 16000-9)*



EN ISO 16000-32, *Indoor air - Part 32: Investigation of buildings for the occurrence of pollutants (ISO 16000-32)*

ISO 1957, *Machine-made textile floor coverings — Selection and cutting of specimens for physical tests*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **sports floor system**

finished product which is a combination of the sports floor covering and all components below it that influence the sports performance and dynamic properties of the floor

Note 1 to entry: It is also named as sport floor surface and sport floor

#### 3.2

##### **sports floor covering**

set of components of the floor system which compose the top playing layer

Note 1 to entry: It can be the top layer alone or the top layer and the underneath elastic layer (depending on the structure of the products).

#### 3.3

##### **facilities for multi-sports use**

sports halls and gymnasiums designed for more than one sport (e.g. handball, basketball, volleyball, five-a-side football, which may also be used for physical education and other sporting activities)

#### 3.4

##### **area-elastic sports floor**

sports floor systems to which the application of a point force causes deflection over a relatively large area around the point of application of the force

#### 3.5

##### **point-elastic sports floor**

sports floor systems, to which the application of a point force causes deflection only at or close to the point of application of the force

#### 3.6

##### **combined-elastic sports floor**

area-elastic sports floor systems with a point-elastic top layer, to which the application of a point force causes both localized deflection and deflection over a wider area

#### 3.7

##### **mixed-elastic sports floor**

point-elastic sports floor systems with a synthetic area-stiffening component

## 4 Essential characteristics<sup>1</sup>

### 4.1 Reaction to fire

#### 4.1.1 Classification

If a claim for reaction to fire performance is made, the sports floor system shall be tested and classified according to the requirements of EN 13501-1 and the resulting class and subclass shall be declared.

#### 4.1.2 Specimen preparation and conditioning

Preparation of test specimens shall be as defined in the appropriate fire test standard.

The specimens shall be tested on one of the two standard substrates specified for floorings in EN 13238, according to the intended end use.

The composition of the product, including the presence of any fire retardant additive (if applicable), shall be declared by the manufacturer prior to type testing.

#### 4.1.3 Application rules

Sports floor systems shall be tested on the standard substrates for floorings defined in EN 13238 according to their intended use.

For sports floor systems with thickness below or equal to 55 mm the whole system shall be tested.

EN ISO 9239-1 equipment cannot be modified in order to test floors with a thickness over 55 mm. If the assembly of the sports floor covering, with the load distribution plate and the elastic layer (or a foil or the sleeper layer when applicable) exceeds 55 mm, it is possible to test specimens with a thickness approximately 55 mm. In this case the test specimen shall be reduced by cutting away the unexposed surface. If the specimens are tested on the combustible substrate (not fire retardant treated particleboard) for floorings specified in EN 13238, the test result is also valid on the non-combustible (fibre cement board) specified in EN 13238.

If the test specimens are tested adhered to the standard substrate according EN 13238, the result is only valid for families of adhesives as define in EN 923 (e.g. acrylic, polyurethane, epoxy, chloroprene, polyvinylacetate, ...) in the applied quantity as tested and lower.

NOTE The reason is that the use of a non-combustible substrate will provide an improvement to the fire behaviour of the sport floor.

If the specimens are tested using an adhesive, the test result is valid for the tested sport floor with that adhesive or the generic adhesive type corresponding to this adhesive, in end use conditions.

If the specimens are tested without using an adhesive, the test result is valid for the tested sport floor with and without using adhesives in end use conditions.

#### 4.1.4 Product parameters influencing reaction to fire performance

The product parameters shown in Table 1, *Product parameters influencing reaction to fire performance of indoor sports floor systems* influence the reaction to fire performance of sports floor systems and this table shall be followed if testing a range of products.

<sup>1</sup> The Essential characteristics are those which are mandatory for CE marking of sports floor systems.

**Table 1 — Product parameters influencing reaction to fire performance of indoor sports floor systems**

| Parameters                    | Comments  |
|-------------------------------|---|
| Composition                   | Each sports floor system with different composition, build-up or sports floor covering shall be tested separately.  |
| Thickness                     | If a sports floor system is produced with a range of different nominal thicknesses, this shall be considered when testing. At least the minimum and maximum thickness shall be tested (one individual indicative test each) and for the worst case a complete series of tests shall be carried out. The worst case determines the classification.   |
| Mass per unit area or density | If a sports floor system is produced with a range of different nominal masses per unit area or densities, this shall be considered when testing. At least the minimum and maximum masses per unit area or densities shall be tested (one individual indicative test each) and for the worst case a complete series of tests shall be carried out. The worst case determines the classification. |
| Surface structure             | If a sports floor system is produced with several different surface structures and it is assumed that this will influence the fire performance, this shall be considered when testing. Each surface structure shall be tested (one classification each). The worst case determines the classification.  |
| Colour and design             | Colour and design of a sports floor system have no effect on the reaction to fire behaviour unless different colours and designs change the composition or other parameters as mentioned above.   |

[https://standards.iTech.ai/catalog/standards/sist/cbd9d614-83e0-44ab-bf73-](https://standards.iTech.ai/catalog/standards/sist/cbd9d614-83e0-44ab-bf73-43386073/ksist-pr-en-14904-1-2019)

#### 4.2 Emission of formaldehyde

The release of formaldehyde (HCHO) shall be determined either:

- a) in accordance with EN 717-1; or
- b) in accordance with CEN/TS 16516, EN ISO 16000-9 and EN ISO 16000-32 using DHNP absorbers (or equivalent absorber types).

If the formaldehyde release has been determined in accordance to EN 717-1, the emissions shall be declared as class E1 or E2 depending on the test results. The sports floor system shall satisfy the requirements listed in Table 2, *Classes for formaldehyde emissions (E-classes)*.

If formaldehyde is not used in the manufacturing process of the floor system or any of its raw materials and is not known to occur in any stage of the production process, then the floor system does not need to be tested and may be declared as E1.

Table 2 — Classes for formaldehyde emissions (E-classes)

| Class | Product type determination (EN 717-1)   | Factory production control (EN ISO 12460-3)   |
|-------|---|---|
| E1    | Equilibrium concentration in the air of the test chamber $\leq 0,1 \text{ ml/m}^3$ ( $\leq 0,12 \text{ mg/m}^3$ ) | Equilibrium concentration in the air of the test chamber $\leq 0,1 \text{ ml/m}^3$ ( $\leq 0,12 \text{ mg/m}^3$ ) or release of $\leq 3,5 \text{ mg/m}^2\text{h}$ |
| E2    | Equilibrium concentration in the air of the test chamber $> 0,1 \text{ ml/m}^3$ ( $> 0,12 \text{ mg/m}^3$ )       | Equilibrium concentration in the air of the test chamber $> 0,1 \text{ ml/m}^3$ ( $> 0,12 \text{ mg/m}^3$ ) or release of $> 3,5 \text{ mg/m}^2\text{h}$          |

### 4.3 Content of pentachlorophenol

Sports floor system shall not contain pentachlorophenol or a derivative thereof as a component in the production process of any element/component of the floor system or of its raw materials. In cases where verification is required, if the content is less than 0,1 % by mass by the method described in Annex A, this requirement shall be considered to be met.

The test need to not be undertaken on sport floor system which no pentachlorophenol-containing materials were added during production or post-production processing. These need not be classified, but may, without any testing, be declared as  $\leq 0,1 \%$ .

### 4.4 Release of other dangerous substances

National regulations on other dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through: <http://ec.europa.eu/enterprise/construction/cpd-ds/>

### 4.5 Linear friction

When tested by the method described in prEN 16837 under dry conditions at a temperature of  $(23 \pm 2) \text{ }^\circ\text{C}$ , the sports floor covering shall have a value of linear friction between 80 and 115.

NOTE It is expected that when line-markings are supplied as part of sports floor their linear friction is between 80 and 115

### 4.6 Shock absorption

#### 4.6.1 Positioning of test apparatus on laboratory sample (Preparation of the sample)

The position of the system testing spots (as shown in Annex B) (at least 5) is depending on the appropriate sports floor construction and should cover all constructive elements. The positions fixed should be described by wording and for area elastic and combined elastic sports floor in addition shown in a drawing (scheme of the construction).

#### a) Area elastic sports floor

- all constructive elements (if appropriate) e.g. joints in the load distribution plate, between sleepers, on sleepers, between pads, on pads, etc. shall be considered;

- b) point elastic sports floor
  - in the joint free positions;
  - on the length and T-joints of each layer including the fabric and the top layer (where they exist);
- c) combined elastic sports floor
  - all constructive elements of the area-elastic part (where they exist) as i.e. joints in the load distribution plate, between sleepers, on sleepers, between pads, on pads, etc. shall be considered as well as any specific elements of the point-elastic part where they exist;
- d) mixed elastic sports floor
  - in the joint free positions;
  - on the length and T-joints of each layer including the fabric.

#### 4.6.2 Requirements and test methods

When tested by the method described in EN 14808, a minimum of testing positions as described in 4.6.1 shall be carried out. The mean shock absorption of the sport floor system shall be between 25 % and 75 % and no individual result shall differ from the mean by more than  $\pm 5$  units.

NOTE 1 These values are laboratory values.

#### 4.7 Durability

##### 4.7.1 Resistance to rolling load

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When tested by the method described in EN 1569, sports floor systems shall have a minimum resistance of 1 500 N, the maximum indentation shall be 0,5 mm under a 300 mm straight edge and no perceivable damage shall be observed after the test. In this case “no damage” and indication “ $\leq 0,5$  mm” shall be declared.

NOTE This property is important to ensure that the sports floor system will not be damaged by equipment or seating that might be moved around on it. In addition, over loading of a sports floor by equipment or seating can cause damage to the shock pad component.

##### 4.7.2 Resistance to wear

For synthetic sport floor covering (examples: PVC, acrylic, Polyolefin, linoleum, PU and rubber), when tested by the method described in EN ISO 5470-1, using H18 wheels with a mass of 1 kg, the maximum loss in mass after 1 000 cycles shall be 1 000 mg. In this case indication “mass loss  $\leq 1,0$  g” shall be declared.

For non-synthetic (examples: woods, wood-boards) sports floor coverings where a lacquer or a coating is intended to be applied as part of scheduled maintenance, when tested by the method described in EN ISO 5470-1, using CS10 wheels with a mass of 500 g, the maximum loss in mass after 1 000 cycles shall be 80 mg. In this case indication “mass loss  $\leq 0,08$  g” shall be declared.

NOTE This property is important to ensure a reasonable expected lifetime in use, particularly for high usage areas which are prone to loss of material by abrasion.