BS EN 15330-1:2013

BSI Standards Publication

Surfaces for sports areas — Synthetic turf and needle-punched surfaces primarily designed for outdoor use

Part 1: Specification for synthetic turf surfaces for football, hockey, rugby union training, tennis and multi-sports use

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National foreword

This British Standard is the UK implementation of EN 15330-1:2013. It supersedes BS EN 15330-1:2007 which is withdrawn.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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Foreword

This document (EN 15330-1:2013) has been prepared by Technical Committee CEN/TC 217 “Surfaces for sports areas”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.

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

This document supersedes EN 15330-1:2007.

Compared with EN 15330-1:2007, the text has been clarified and editorial errors have been corrected.

EN 15330 consists of the following parts, under the general title *Surfaces for sports areas — Synthetic turf and needle-punched surfaces primarily designed for outdoor use*:

— *Part 1: Specification for synthetic turf surfaces for football, hockey, rugby union training, tennis and multi-sports use*;

— *Part 2: Specification for needle-punched surfaces*.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies performance, durability, product identification and facility testing requirements for synthetic turf sports surfaces used primarily outdoors. Five categories of surface are covered, each based on the principal sporting use of the surface, as follows:

— surfaces designed primarily for hockey;

— surfaces designed primarily for association football;

— surfaces designed primarily for rugby union for training purposes;

— surfaces designed primarily for tennis;

— surfaces designed for multi-sports use.

The requirements are intended to apply to surfaces used for community, educational and recreational sport. For professional and elite levels of competition, many sports governing bodies have published their own specifications; the requirements of the sports governing bodies might differ from those detailed in this European Standard and facility developers are advised to ensure that they select surfaces offering the correct level of performance for the level of competition played on the pitch or court.

NOTE Under the Laws of the Game of Rugby Union, surfaces for rugby union matches need to comply with the International Rugby Board's IRB Regulation 22 and associated performance specification for synthetic turf surfaces.

This European Standard has two parts. The first part describes the requirements for product testing of products in the laboratory to ensure they are capable of providing the required levels of sports performance and player/surface interaction required for their intended use and that they are manufactured from materials of acceptable quality. The second section describes the requirements for installed surfaces to ensure that the sports performance and player/surface interaction of a facility is suitable for the intended use.

Some of the surfaces covered by this European Standard are designed to allow users to wear footwear fitted with studs. An example of a typical stud is given in EN 15306. For the purposes of this European Standard, multi-dimpled shoe profiles often found on footwear used on sand-filled or non-filled synthetic turfs are not considered to be studs.

When independent third party testing of synthetic turf sports surfaces is required to assess compliance with this standard, it is recommended the laboratory is certified to EN ISO/IEC 17025 for the relevant test methods specified in this standard.

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 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method*

EN 1097-3, *Tests for mechanical and physical properties of aggregates — Part 3: Determination of loose bulk density and voids*

EN 1177, *Impact attenuating playground surfacing — Determination of critical fall height*

EN 1969, *Surfaces for sports areas — Determination of thickness of synthetic sports surfaces*

EN 12228, *Surfaces for sports areas — Determination of joint strength of synthetic surfaces*

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

EN 12230, *Surfaces for sports areas — Determination of tensile properties of synthetic sports surfaces*

EN 12234, *Surfaces for sports areas — Determination of ball roll behaviour*

EN 12235, *Surfaces for sports areas — Determination of vertical ball behaviour*

EN 12616, *Surfaces for sports areas — Determination of water infiltration rate*

EN 13036-7, *Road and airfield surface characteristics — Test methods — Part 7: Irregularity measurement of pavement courses : the straightedge test*

EN 13672, *Surfaces for sports areas — Determination of resistance to abrasion of non-filled synthetic turf*

EN 13744, *Surfaces for sports areas — Procedure for accelerated ageing by immersion in hot water*

EN 13817, *Surfaces for sports areas — Procedure for accelerated ageing by exposure to hot air*

EN 13864, *Surfaces for sports areas — Determination of tensile strength of synthetic yarns*

EN 13865, *Surfaces for sports areas — Determination of angled ball behaviour — Tennis*

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

EN 14809, *Surfaces for sports areas — Determination of vertical deformation*

EN 14836, *Synthetic surfaces for outdoor sports areas — Exposure to artificial weathering*

EN 14955, *Surfaces for sports areas — Determination of composition and particle shape of unbound mineral surfaces for outdoor sports areas*

EN 15301-1, *Surfaces for sports areas — Part 1: Determination of rotational resistance*

EN 15306, *Surfaces for outdoor sports areas — Exposure of synthetic turf to simulated wear*

EN 20105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour (ISO 105-A02)*

EN ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1)*

ISO 1763, *Carpets — Determination of number of tufts and/or loops per unit length and per unit area*

ISO 2549, *Textile floor coverings — Hand-knotted carpets — Determination of tuft leg length above the woven ground*

ISO 4919, *Carpets — Determination of tuft withdrawal force*

ISO 8543, *Textile floor coverings — Methods for determination of mass*

ISO 11357-3, *Plastics — Differential scanning calorimetry (DSC) — Part 3: Determination of temperature and enthalpy of melting and crystallization*

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3 Terms and definitions

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

3.1
synthetic turf surface
sports surface comprised of a carpet of tufted, knitted or woven construction whose pile is designed to replicate the appearance of natural grass

Note 1 to entry: Not necessarily in colour.

3.2
non-filled synthetic turf
synthetic turf surface that does not contain any form of unbound particulate fill within the pile of the carpet

3.3
filled synthetic turf
synthetic turf surface whose pile is either totally filled or partly filled with an unbound particulate material, typically sand, rubber or sand and rubber mixes

3.4
short pile synthetic turf
synthetic turf surface whose pile length is less than 30 mm when tested in accordance with ISO 2549

3.5
long pile surfaces
synthetic turf surface whose pile length is equal to or greater than 30 mm when tested in accordance with ISO 2549

3.6
surface for multi-sports
synthetic turf surface designed to be used for more than one sport

Note 1 to entry: For further information see Annex A.

3.7
synthetic turf surfacing system
all components of the surface that influence its sports performance or bio-mechanical characteristics including the synthetic turf carpet, infill and shockpad, together with any supporting layers designed to contribute to the performance of the surface

3.8
infill
particulate materials used to infill the synthetic turf pile to provide support and aid the provision of the required performance characteristics

3.9
shockpads
prefabricated or *in situ* laid sheets or tiles laid beneath the synthetic turf carpet and designed to aid the provision of the required performance

4 Laboratory type approval

4.1 General

When tested in the laboratory, the synthetic turf surface shall comply with the following requirements.

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4.2 Material tests

4.2.1 Tensile properties of synthetic turf carpet

When tested in accordance with EN ISO 13934-1, the mean maximum force of synthetic turf carpets designed for football, hockey or tennis shall be greater than 15 N/mm and the difference between the results obtained on samples taken in the direction of manufacturer and across the direction of manufacture shall be no more than 30 % of the higher value.

When tested in accordance with EN ISO 13934-1, the maximum force of synthetic turf carpets designed for rugby shall be greater than 25 N/mm and the difference between the results obtained on samples taken in the direction of manufacturer and across the direction of manufacture shall be no more than 30 % of the higher value.

4.2.2 Tensile strength of synthetic turf pile yarn(s)

When tested in accordance with EN 13864, the minimum tensile strength of the yarn(s) used to form the pile of the synthetic turf carpet shall be greater than 30 N for fibrillated yarns and 8 N for monofilament yarns. Monofilament yarns shall be tested as individual ribbons.

4.2.3 Resistance to artificial weathering of synthetic turf pile yarns

4.2.3.1 Tensile strength

When tested in accordance with EN 13864, following artificial weathering in accordance with EN 14836, the tensile strength of the pile yarn(s) used to form the synthetic turf pile shall be within 50 % of the tensile strength of the unaged pile yarn and no lower than the minimum values detailed in 4.2.2.

4.2.3.2 Colour fastness

When tested in accordance with EN 20105-A02 following artificial weathering in accordance with EN 14836, the colour fastness of the weathered synthetic turf compared with an unaged test specimen of the synthetic turf shall be Grey Scale 3 or greater.

4.2.4 Synthetic turf carpet joint strength

4.2.4.1 Stitched joints

When tested in accordance with Method 1 of EN 12228, the unaged strength of stitched joints shall be equal to or greater than 1 000 N/100 mm.

Following immersion in hot water, in accordance with EN 13744, the aged strength of stitched joints shall be at least 75 % of the unaged value and equal to or greater than 1 000 N/100 mm.

4.2.4.2 Bonded joints

When tested in accordance with Method 2 of EN 12228, the unaged strength of bonded joints shall be equal to or greater than 60 N/100 mm except that, for surfaces intended for rugby, the minimum joint strength shall be 100 N/100 mm.

Following immersion in hot water in accordance with EN 13744, the strength of bonded joints shall be at least 75 % of the unaged value and equal to or greater than the minimum requirements for unaged joints.

4.2.5 Synthetic turf tuft bind

When tested in accordance with ISO 4919, the tuft withdrawal force shall be equal to or greater than 30 N.

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Following immersion in hot water in accordance with EN 13744, the tuft withdrawal force shall be at least 75 % of the tuft withdrawal force of the unaged test specimen and equal to or greater than 30 N.

4.2.6 Water permeability of synthetic turf surfacing system

When tested in accordance with EN 12616, the vertical water infiltration rate of surfaces designed to be permeable shall be equal to or greater than 500 mm/h.

In some countries lateral or horizontal water permeability is also important and national requirements may apply.

4.2.7 Tensile strength of shockpads

When tested in accordance with EN 12230, the maximum tensile strength of shockpad used in the synthetic turf surfacing system shall be greater than 0,15 MPa. If the shockpad is greater than 25mm thick, 50mm wide strips shall be tested; and any failures at the point of clamping shall be disregarded.

Following air ageing in accordance with EN 13817, the maximum tensile strength of any shockpad shall be at least 75 % of the unaged value and equal to or greater than 0,15 MPa.

Some forms of prefabricated shockpad have channels and slots incorporated into their structure to provide drainage or to aid dimensional stability. The design of such shockpads might mean it is not possible to obtain fully homogenous tests specimens. In such cases this should be reported along with the mean value of the maximum Force at Rupture. In such cases the mean value should be within 10 % of the manufacturer’s declared value.

4.2.8 Abrasion resistance of non-filled short pile synthetic turf surfaces

When tested in accordance with EN 13672, the percentage mass loss after 2 000 cycles shall be equal to or less than 2 %.

4.3 Surfaces designed primarily for hockey

4.3.1 General

Synthetic turf surfaces designed primarily for hockey shall conform to the requirements given in 4.2 and those in 4.3.2 to 4.3.6.

Test pieces shall be prepared in accordance with EN 12229 and the manufacturer's instructions prior to testing.

Wet test pieces shall be prepared in accordance with the procedure given in Annex B.

4.3.2 Vertical ball rebound

When tested in accordance with EN 12235 using a hockey ball under both dry and wet conditions, the vertical ball rebound shall be less than 70 % (0,45 m).

4.3.3 Ball roll

When tested in accordance with EN 12234 using a hockey ball under both dry and wet conditions, the ball roll shall be greater than 8,0 m.

4.3.4 Shock absorption

When tested in accordance with EN 14808 under both dry and wet conditions, the shock absorption shall be at least 40 %.

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4.3.5 Vertical deformation

When tested in accordance with EN 14809 under both dry and wet conditions, the vertical deformation shall be between 3 mm and 10 mm.

4.3.6 Rotational resistance

When tested in accordance with EN 15301-1 using the dimpled rubber test sole under both dry and wet conditions, the rotational resistance shall be between 25 Nm and 50 Nm.

4.4 Surfaces designed primarily for football

4.4.1 General

Synthetic turf surfaces designed primarily for football shall conform to the requirements given in 4.2 and those in 4.4.2 to 4.4.7.

Test pieces shall be prepared in accordance with EN 12229 and the manufacturer instructions prior to testing.

Wet test pieces shall be prepared in accordance with the procedure given in Annex B.

4.4.2 Vertical ball rebound

When tested in accordance with EN 12235 using a football under both dry and wet conditions, the vertical ball rebound shall be between 45 % and 75 % (0,60 m and 1,0 m).

4.4.3 Ball roll

When tested in accordance with EN 12234 using a football under both dry and wet conditions, the ball roll shall be between 4,0 m and 10,0 m.

4.4.4 Shock absorption

When tested in accordance with EN 14808 under both dry and wet conditions, the shock absorption shall be between 55 % and 70 %.

4.4.5 Vertical deformation

When tested in accordance with EN 14809 under both dry and wet conditions, the vertical deformation shall be between 4 mm and 9 mm.

4.4.6 Rotational resistance

4.4.6.1 Studded test sole

When tested in accordance with EN 15301-1 using the studded test foot under both dry and wet conditions, the rotational resistance shall be between 25 Nm and 50 Nm.

4.4.6.2 Dimpled test sole

When tested in accordance with EN 15301-1 using the dimpled rubber test foot under both dry and wet conditions, the rotational resistance shall be between 25 Nm and 50 Nm.

4.4.7 Resistance to simulated use

Following simulated use conditioning for 20 200 cycles in accordance with EN 15306 using the studded roller, the dry surface shall conform to the requirements of 4.4.2, 4.4.4, 4.4.5 and 4.4.6.1.

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