

BE EN 15306:2014



BSI Standards Publication

# Surfaces for outdoor sports areas — Exposure of synthetic turf to simulated wear

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**National foreword**

This British Standard is the UK implementation of EN 15306:2014. It supersedes BS EN 15306:2007 which is withdrawn.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.

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English Version

## Surfaces for outdoor sports areas - Exposure of synthetic turf to simulated wear

Sols sportifs d'extérieur - Exposition du gazon synthétique à l'usure simulée

Sportböden für den Außenbereich - Simulierter Verschleiß von Kunststoffrasenflächen

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## Foreword

This document (EN 15306:2014) 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of an identical text or by endorsement, at the latest by July 2014, and conflicting national standards shall be withdrawn at the latest by July 2014.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 15306:2007.

In comparison with the previous edition, the test method has been revised to more precisely define the design of the studded roller used within the test equipment. In particular, the positioning of the studs on the conditioning roller is now precisely specified.

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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.

## 1 Scope

This European Standard specifies a method for conditioning synthetic turf and needle-punch surfaces by simulating interaction between a sports shoe and sports surface, to allow changes in appearance and to allow sports functional characteristics to be measured.

NOTE The method specified is commonly known as the Lisport method.

## 2 Principle

A test piece is laid on a metal support.

Two cylinders equipped with studs move linearly along the surface of the test piece. The two cylinders roll on the surface and a mechanical system between the cylinders causes a sliding movement of one of the cylinders. Depending on the configuration of the machine, the support might have a movement transverse to the linear movement of the cylinders.

## 3 Apparatus

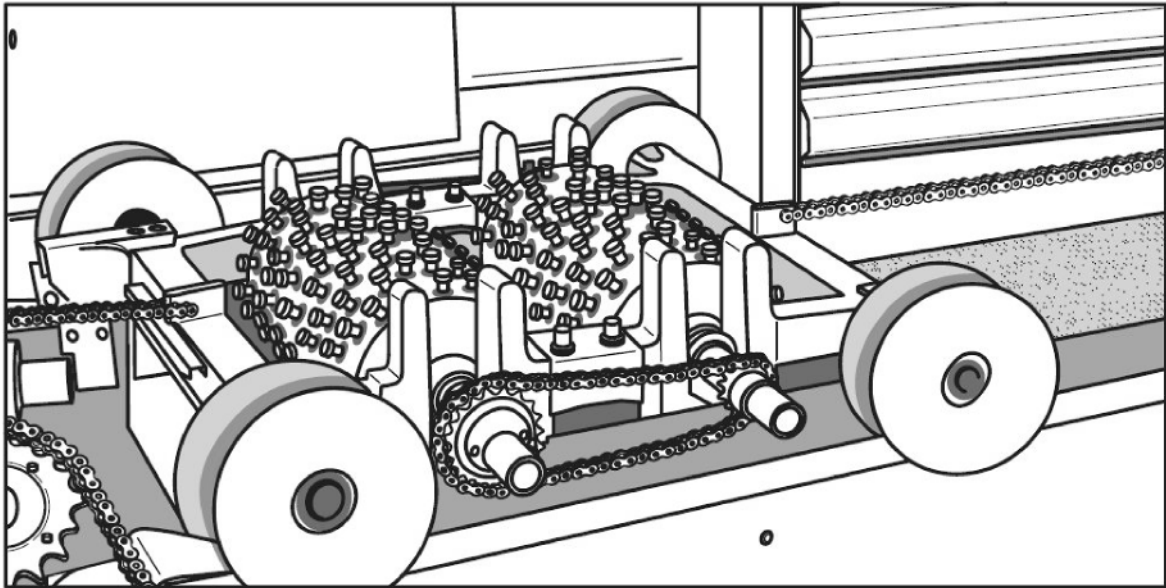
### 3.1 Wear simulator

Comprised of two cylinders, each having a length of at least 300 mm and a diameter without any test profile of  $(118 \pm 5)$  mm (see Figure 1).

One roller shall rotate at a circumferential speed as close as possible to the speed of the carriage (allowing for frictional losses). The second roller shall rotate  $40 \pm 3$  % slower than the first. The rollers shall be mounted so the roller rotating more slowly is the leading roller (the first to contact the sample).

NOTE 1 The ratio of rollers speeds can be obtained using gear ratios of 1:1.75.

The linear speed for each cycle of movement, to and fro, shall be  $(0,25 \pm 0,05)$  m/s. A mechanical system to count the number of cycles shall be provided. The wear simulator shall be arranged so that interrupted movement, i.e. the cylinders stop rotating, slip and then start rotating again (slip stick), is avoided. To avoid studs continually impacting the same spots, free movement of the cylinders shall occur at the end of a cycle, or the slip shall change from time to time within the tolerances of the ratio of rotation and/or transverse movement of the sample tray shall occur. When transverse movement occurs the distance travelled during each cycle of transverse movement shall be  $(20 \pm 1)$  mm at a speed of  $(0,015 \pm 0,005)$  m/s.



**Figure 1 — Wear simulator**

Mounted to the rollers shall be a test sole as specified in the product specification.

The standard studded test sole shall be comprised of  $(145 \pm 5)$  studs<sup>1)</sup>. The studs shall be as shown in Figure 3, be manufactured from plastic and have a Shore A hardness of  $(96 \pm 2)$ . The mass of the roller all the gears and chains that contribute to the load on the sample  $(28\,500 \pm 500)$  g for a 300 mm wide roller. If wider rollers are used the mass shall be increased proportionally.

The studs shall not be mounted linearly on the cylinders but shall be mounted so that the studs and their movement form a low frequency sine wave, to ensure that the wear area of the sample is uniform. Their pattern of the studs shall be as shown in Figure 2. The location of the mounting positions of each stud shall be as detailed in Table 1.

NOTE 2 A manufacturing tolerance of  $\pm 1$  mm for the stud positions has been found satisfactory.

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1) 13 mm nylon studs supplied by Decathlon Group are an example of suitable products available commercially. This information is given for the convenience of users of this European Standard and does not constitute an endorsement by CEN of this product.

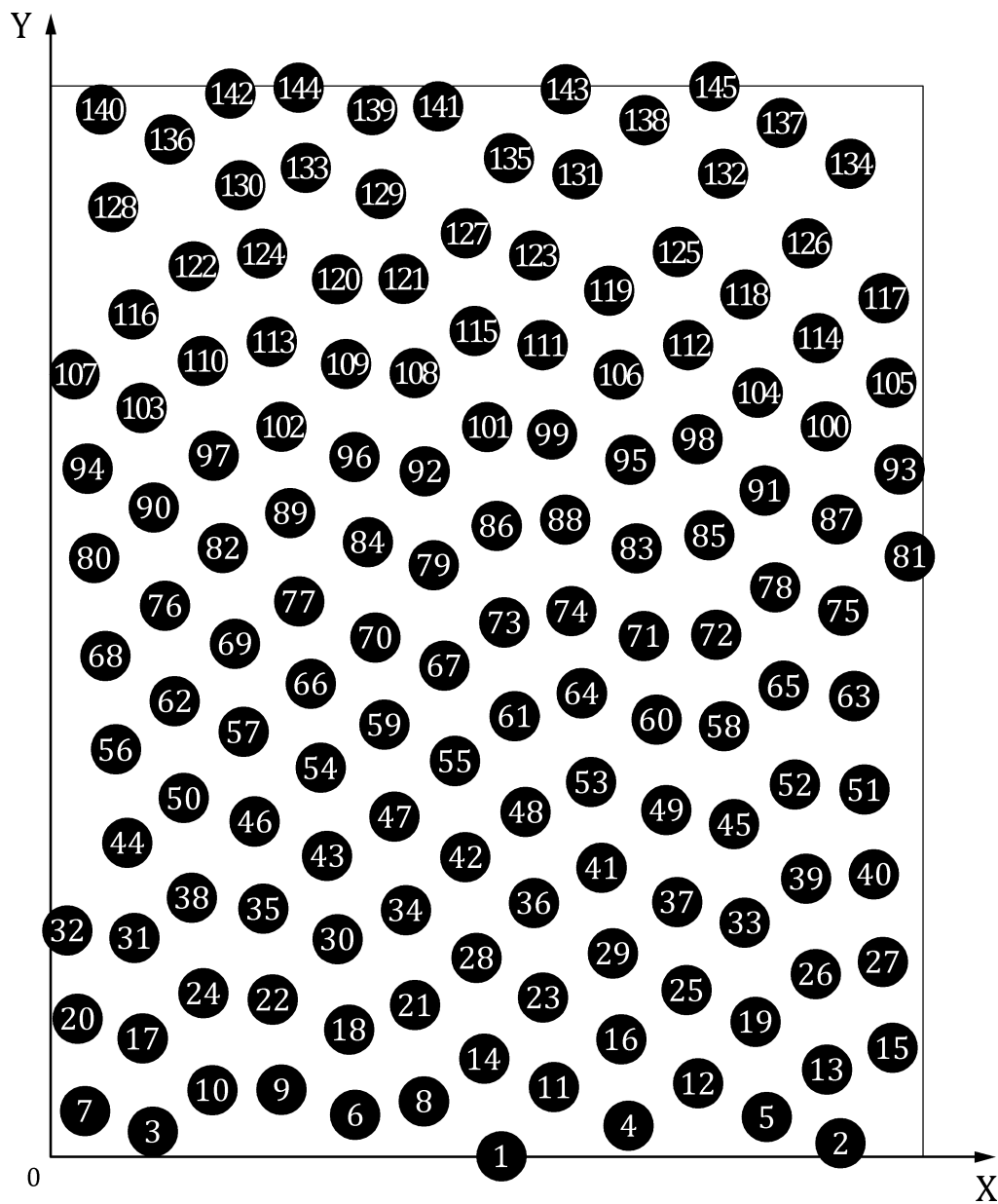


Figure 2 — Pattern of studs



**Table 1 — Coordinates of stud positions (centre of stud)**

STUD - X AXIS - Y AXIS			STUD - X AXIS - Y AXIS			STUD - X AXIS - Y AXIS		
	mm	mm		mm	mm		mm	mm
1	154,5	0,0	51	279,5	127,5	101	150,0	252,5
2	271,5	4,5	52	255,5	128,5	102	78,5	252,5
3	35,0	8,5	53	185,5	129,5	103	31,0	259,0
4	198,5	10,5	54	92,5	134,5	104	242,5	264,5
5	246,0	13,5	55	139,0	136,5	105	289,0	268,0
6	105,0	14,0	56	22,0	141,0	106	195,0	270,5
7	11,5	16,0	57	65,5	146,5	107	7,5	271,0
8	128,5	19,0	58	231,5	149,0	108	125,0	271,0
9	79,0	23,0	59	114,5	149,5	109	101,0	274,5
10	55,0	23,0	60	208,0	151,0	110	51,5	275,5
11	173,0	24,0	61	159,5	152,5	111	169,5	280,5
12	222,0	25,0	62	42,0	157,5	112	219,0	280,5
13	267,0	30,0	63	276,0	158,5	113	76,0	282,0
14	149,0	33,5	64	182,5	160,0	114	263,5	284,0
15	289,5	37,0	65	252,5	162,5	115	145,5	285,0
16	196,0	40,0	66	89,0	164,0	116	28,0	291,5
17	31,0	41,0	67	135,0	170,0	117	286,0	297,0
18	102,0	43,5	68	18,5	173,0	118	239,0	298,5
19	242,0	46,0	69	63,0	177,5	119	192,0	300,0
20	8,5	47,0	70	111,0	179,5	120	98,0	304,0
21	125,0	52,5	71	204,5	180,0	121	121,0	304,0
22	76,0	54,0	72	229,0	180,5	122	48,5	308,0
23	169,0	55,0	73	155,5	184,5	123	166,0	312,0
24	52,0	56,0	74	178,5	188,5	124	72,0	312,5
25	218,5	57,5	75	272,5	189,0	125	215,0	313,5
26	263,0	63,0	76	38,5	190,5	126	260,0	316,0
27	286,0	67,0	77	85,0	192,5	127	142,0	319,5
28	146,0	68,5	78	249,0	196,5	128	21,0	329,0
29	193,0	70,5	79	131,5	204,5	129	113,0	333,0
30	98,5	75,0	80	14,5	207,0	130	64,5	336,0
31	28,0	75,5	81	294,5	208,0	131	180,0	340,0
32	5,5	78,0	82	58,5	210,5	132	231,0	340,0
33	239,0	81,0	83	201,0	210,5	133	87,0	342,5
34	122,0	85,0	84	108,5	212,5	134	275,0	343,5
35	73,0	85,5	85	226,0	215,0	135	157,5	345,5
36	166,0	88,0	86	153,0	218,0	136	40,0	352,0
37	215,0	88,0	87	270,0	220,0	137	251,0	357,5
38	48,5	89,5	88	176,5	220,5	138	204,0	358,5
39	259,5	96,0	89	82,0	222,5	139	110,0	362,5
40	283,0	97,5	90	34,5	224,5	140	16,5	362,5
41	189,0	100,0	91	246,0	231,0	141	133,0	363,5
42	142,0	103,0	92	128,5	237,5	142	61,0	368,0
43	94,5	104,0	93	292,0	237,5	143	177,5	369,0
44	25,5	109,0	94	12,0	238,5	144	84,5	370,0
45	235,0	114,5	95	199,0	241,0	145	228,0	370,0
46	69,5	116,0	96	104,0	242,0			
47	118,5	117,5	97	55,0	243,0			
48	162,5	119,5	98	222,0	248,0			
49	211,5	119,5	99	172,5	250,0			
50	46,0	123,5	100	266,5	252,5			

The studs shall be as shown in Figure 3. They shall be manufactured from plastics and have a Shore A hardness of  $(96 \pm 2)$ .

Dimensions in millimetres

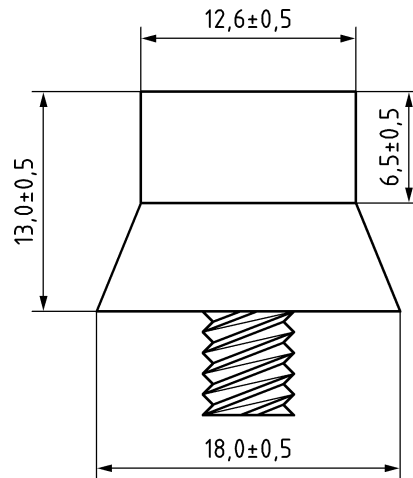


Figure 3 — Stud profile

### 3.2 Stud inspection and replacement

After every 20 tests, the length of the 15 studs removed at random from the rollers shall be determined. The mean length and the standard deviation of the 15 studs shall be calculated, and if the mean length is less than 11,0 mm, the standard deviation is more than 0,5 or any one stud has a length of less than 10 mm, all of the studs on both rollers shall be replaced.

## 4 Test pieces

The dimension of the test piece shall be a minimum of 800 mm × 400 mm. The uniform abraded surface shall be at least 500 mm × 300 mm.

## 5 Procedure

### 5.1 Conditioning

Condition the test piece for 24 h at a temperature of  $(23 \pm 2)$  °C.

### 5.2 Test

Mount the test piece into the sample tray and fill it (if applicable) in accordance with the manufacturer's instructions.

Place the prepared test piece in the wear simulator (3.1) and adjust the height of the rollers to ensure full stud contact with the infill layer or carpet pile. The height of the rollers shall ensure the rollers remain fully in contact with the infill layer throughout the test.

On vertically free moving rollers a clearance gap of approximately 2 mm from the base of the roller carriage slot should be used.

Undertake the number of cycles given in the relevant specification.

After every 2 500 cycles (one cycle is comprised of one complete to and fro movement), stop the machine and replace any fill material that has either been dislodged from the test piece and is lying in the sample tray or has collected along the edges of the test piece, evenly distributing it over the test piece; do not add new material to the test piece. Lightly brush the pile to lift.

Repeat in increments of 2 500 cycles until the number of cycles completed is 200 less than the number specified in the product specification. Carry out a further 200 cycles but do not re-apply any fill material that has been dislodged. Remove the sample tray containing the test piece from the wear simulator.

Carefully remove the test piece from the sample tray ensuring that the test piece and fill are not disturbed. Do not brush or lift the pile of the carpet.

## **6 Evaluation and expression of results**

### **6.1 Change of appearance**

Photograph the test piece to show the general effects of the simulated wear.

Report the change in fibrillation, flattening, breaking of fibres, abrasion, etc., using photographs.

### **6.2 Test of sports functional characteristics**

Measure the sports performance and material properties as specified in the relevant product specification and record any changes following exposure to wear.

## **7 Test report**

The test report shall include the following information:

- a) reference to this European Standard, i.e. EN 15306:2014;
- b) description and the identification of synthetic turf, shock absorption pad and sand;
- c) method used for additional tests on sports functional characteristics (6.2), if appropriate;
- d) observations made on the surface aspects (e.g. fibrillation, breaks, abrasion);
- e) change in sports performance and material properties (e.g. shock absorption, deformation, friction, ball re-bounce);
- f) date of the test report.

## Bibliography

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



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