

Laboratory Report AS-0303/2

STF Sandwich Track

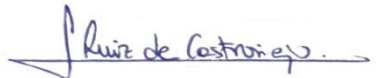
Athletics track surfacing

Summary:

A programme of testing has been carried out on STF Sandwich Track, a synthetic athletics track surfacing from STF International Construction Engineering Limited. The product was tested to the requirements of *BS EN 14877: 2013 - "Synthetic surfaces for outdoor sports areas - Specification"*.

This report describes the method of test employed and details the results obtained.

Reported by:



Susana Ruiz de Castroviejo
Operations Manager

Date of this report:

1st December 2022

*Tests marked * are outside the scope of our accreditation under UKAS*

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1 INTRODUCTION

Instructions were received from Jason Zhang of STF International Construction Engineering Limited to carry out a programme of testing on their sports surfacing *STF Sandwich Track*. The product was tested to the requirements of *BS EN 14877: 2013- "Synthetic surfaces for outdoor sports areas – Specification"*.

This standard lays down different requirements for surfaces intended for Athletics, Multi sports and Tennis and the performance of the product was compared with the requirements for athletics use.

Samples were received from:

STF International Construction Engineering Limited
Room 2103
Tung Chiu Commercial Centre 193
Lockhard Road, Wan Chai
Hong Kong
CHINA

Samples were tested at Centre for Sports Technology facility:

CST
Unit C
Circle Line House
8 East Road
CM20 2BJ
UK

The results obtained relate only to sample provided for test.

Sample was tested in the "as received" condition unless otherwise stated.

2 SAMPLE DETAILS

4 No. identical samples of STF Sandwich Track, measuring 500 x 500mm, were supplied for test. The samples were received on 6th July 2022.

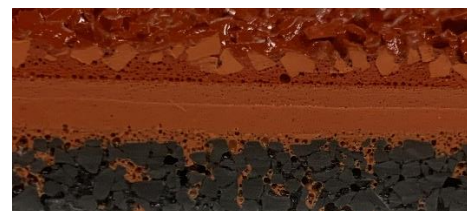
STF Sandwich Track is a sandwich system, non-permeable sports surfacing constructed in three layers with an overall thickness of 15.6mm. After abrasion of 50% of the texture depth, the absolute thickness was 13.9mm.

Construction of each layer was as follows (information supplied by client):

Uppermost layer (3rd) -	Coloured PU material coating with Colored EPDM granule broadcast by manual or spraying by sprayer machine. Additional PU protect layer is optional	3.1mm
Middle layer (2nd) -	Coloured PU material mixed with EPDM powder for sealer coating on rubber layer followed by additional coating with colored PU material with squeegee for level well	1.8mm
Lowest layer (1st) -	Rubber granule bound with PU binder applied in situ by pavement machine	10.7mm



Top surface



Cross-section

Samples were tested at 23°C and 42% RH.

Samples were assembled on a rigid concrete substrate for testing.

3 TEST PROCEDURES

The following tests methods were carried out:

- 3.1 Shock Absorption** is determined using the method described in EN 14808:2005. This test measures the degree by which the surface reduces the impact force which occurs when an athlete lands on it. The test was devised to simulate the forces observed when a runner's heel strikes the ground. The apparatus consists of a 20kg mass, which is allowed to fall onto a stiff spring resting on the floor. The force which results from the impact depends on the relative stiffness of the floor to that of the spring. The test is carried out on a concrete floor as well as on the floor under test and the result quoted is the amount by which the force measured on the test floor is lower than the force measured on concrete.
- 3.2 Vertical Deformation** is determined using the method described in EN 14809:2005. In this test, the amount by which the floor deflects under impact load is measured directly. The test is similar in principle to the shock absorption test. However, a softer spring is used and the drop height is adjusted so that the peak force produced falls within a certain range.
- 3.3 Resistance to Wear*** was performed in accordance with EN ISO 5470-1:1999 and utilises the Taber Abraser apparatus fitted with Type H18 wheels, each operating under a 1kg load. The mass loss between 500 and 1500 cycles shall be less than 4g. A value outside this range implies that the material could change its behaviour significantly once the surface coating had abraded away. To assess the environmental resistance of the product the same test, carried out on a specimen in the as-received condition, is repeated after artificial weathering in accordance with EN 14836:2005.
- 3.4 Tensile Properties*:** The Tensile Strength and Elongation at Break were determined according to the method described in EN 12230:2003 and shall be not less than 0.4MPa and 40% respectively. To assess the environmental resistance of the product under test, the same test carried out on a specimen in the as-received condition is repeated after artificial weathering in accordance with EN 14836:2005.
- 3.5 Absolute Thickness** was determined as described in EN 1969:2000, Method A (destructive test method) where a core of the sample was taken and its thickness measured with a dial gauge before and after abrading the top layer with a grade 60 abrasive paper.
- 3.6 Colour*** is assessed following method described in EN ISO 20105-A02.

3.7 Friction* is determined using the method described in EN 13036-4:2011, using the CEN rubber and in both dry and wet conditions. This test uses a pendulum carrying at its end a spring-loaded slider, which makes contact with the surface over a set distance. The angle through which the pendulum swings after it has made contact with the surface to test depends on the friction between the slider and the floor. The standard specifies that a value between 55 and 110 units should be obtained under either wet or dry conditions and no individual test result shall differ from the mean by more than four units.

3.8 Spike Resistance* was determined following the method described in EN 14810:2006.

3.9 Effects of Ageing*

After exposing the surface to artificial weathering in accordance with EN 14836:2005, any effects on the surface are assessed by re-measuring shock absorption, tensile strength, resistance to wear and spikes and colour to determine the degree of change. The sample is subjected to an exposure of 4896 ± 125 kJ (takes 3000h with cycling to complete).

4 RESULTS

4.1 GENERALLY

BS EN 14877: 2013 sets out different performance requirements for outdoor sports facilities intended for three different applications: Athletics, Tennis and Multi-sports. The product was assessed against the requirements for Athletics applications.

4.2 Shock Absorption

The requirements for shock absorption depend on the application and the results obtained place the product in one or other Type for each application, thus:

Athletics	
SA25 - SA34	SA35 -SA50
25-34	35-50

Results:

Tested:	Unit	Accuracy ¹	Result
@ 10°C	%	± 1	39
@ 23°C			39
@ 40°C			40
After artificial ageing	%	± 1	40

¹ Accuracy refers to the precision of the test.

4.3 Vertical Deformation

	Unit	Accuracy ¹	Result	Requirements Athletics
@ 10°C	mm	± 0.1	1.9	≤ 3
@ 23°C			2.0	
@ 40°C			2.1	

¹ Accuracy refers to the precision of the test.

4.4 Resistance to Abrasive Wear*

	Units	Accuracy ¹ (±)	As received	After artificial weathering	Requirement Athletics
Wear Index	g	0.02g/1000 revs	0.72	0.70	≤ 4.0

¹ Accuracy refers to the precision of the test.

4.5 Tensile Properties*:

	Tensile strength (MPa ± 0.02)	Elongation @ break (% ± 5)
As received	0.97	189
After artificial weathering	0.89	167
Requirement – Athletics	≥ 0.40	≥ 40

4.6 Thickness:

	Units	Accuracy ¹	Result	Requirement Athletics
Overall	mm	± 0.01	15.6	-
Absolute			13.9	≥ 10

¹ Accuracy refers to the precision of the test.

4.7 Colour*

	Units	Accuracy ¹	Result	Requirement – Athletics
As received	Methuen	± 1	9D8 Reddish Brown	For identification only
Colour change after ageing	Grey Scale	± 1	No change	No less than 3

¹ Accuracy refers to the precision of the test.

4.8 Friction*

	Units	Accuracy ¹ (±)	Result	Requirement – Athletics
Dry	μ	3	98	80-110
Wet	μ	3	78	55-110

¹ Accuracy refers to the precision of the test.

4.9 Spike Resistance*

	Tensile strength (MPa ± 0.02)	Elongation @ break (% ± 5)
As received	0.77	84
After artificial weathering	0.66	81
Requirement – Athletics	≥ 0.40	≥ 40
Difference before/after weathering (%)	14	4
Requirement- Athletics (%)	≤ 20	≤ 20

5 CONCLUSIONS

5.1 When tested according to *BS EN 14877: 2013 - "Synthetic surfaces for outdoor sports areas - Specification"* the sample of **STF Sandwich Track** tested conformed to the requirements for Athletics use with regards to its:

- Friction* (wet and dry)
- Shock Absorption (Type SA35–SA50)
- Vertical Deformation
- Absolute Thickness
- Resistance to Wear*
- Tensile Properties *
- Spike Resistance*
- Colour*
- Effects of Ageing*

5.2 Results relate only to the sample provided for test.

END OF TEXT

Appendix 1 - Test Certificate

TEST CERTIFICATE

THIS IS TO CERTIFY THAT THE SAMPLE OF

STF Sandwich Track

Supplied for test by:

STF International Construction Engineering Limited

has been tested in accordance with BS EN 14877: 2013- "Synthetics surfaces for outdoor sports areas – Specification" and met the following requirements relative to a surface for:

"Athletics use"

Friction* (wet and dry)
Shock Absorption (Type SA35–SA50)
Vertical Deformation
Absolute Thickness
Resistance to Wear*
Tensile Properties *
Spike Resistance*
Colour*
Effects of Ageing*



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Susana Ruiz de Castroviejo
Operations Manager



Date: 1st December 2022

IMPORTANT: The performance of many sports and recreation surfacing products can be influenced by changes to their thickness, density and other properties and by the manner in which they are installed. The sample was tested in the "as received" condition unless otherwise stated. Reference should always be made to the Laboratory Report relating to this Certificate, to ensure relevance to the intended situation. The Laboratory Report to which this Certificate relates is numbered:

AS-0303/2 dated 1st December 2022

CST is a member of the International Association for Sports Surface Sciences (ISSS) and formally accredited by the World Athletics (WA), the International Tennis Federation (ITF), World Squash Federation (WSF), World Bowls (WB), International Basketball Federation (FIBA) and the Union des associations européennes de football (UEFA) for the testing of products to their specification.