FIFA Quality Programme for Futsal Surfaces

Handbook of Test Methods and Requirements

July 2019 Edition

FIFA

For the Game. For the World.

Contents

1. Introduction 4

2. Normative references 4

3. Surface Certification.. 5

3.1. Step 1: Laboratory test of Futsal surfaces 6
3.2. Step 2: Installation of Futsal surfaces 6
3.3. Step 3: Initial Futsal surface Test.. 6
3.4. Step 4: Futsal surface certification 6
3.5. Period of Futsal surfaces certification 6
3.6. Futsal surface Re-Test 6
3.7. Period of Futsal surfaces certification following re-tests.. 7
3.8. Eligibility 7

4. Terms and definitions 7

5. Laboratory testing 8

5.1. Test specimens 8
5.2. Determination of Shock Absorption (FIFA Test Method Futsal01) 8
5.3. Determination of Vertical Deformation (FIFA Test Method Futsal02) 13
5.4. Slip Resistance.. 15
5.5. Resistance to rolling load 15
5.6. Resistance to wear 15
5.7. Resistance to indentation.. 16
5.8. Reaction to fire.. 16
5.9. Formaldehyde Emissions 16
5.10. Pentachlorophenol (PCP) content.. 17
5.11. Table of laboratory requirements 17

6. Field testing 19

6.1. Shock Absorption (FIFA Test Method Futsal01).. 19
6.2. Vertical Deformation (FIFA Test Method Futsal02) 19
6.3. Slip Resistance.. 20
Test according to EN 16837:2018 Surfaces for sports areas. Determination of linear shoe/surface friction.. 20
6.4. Evenness 20
6.5. Table of field testing requirements.. 21

7. Field Dimensions and Line Markings 21

8. Further research and development 22

9. List of International and European Standard test methods adopted by FIFA 23

Surfaces for sports areas. Determination of linear shoe/surface friction 23

Whilst every effort has been made to ensure the accuracy of the information contained in this Handbook any party who makes use of any part of this Handbook in the development of a futsal field (a "User") does so at its own risk and shall indemnify FIFA their officers, directors, servants, consultants and agents against all claims, proceedings, actions, damages, costs, expenses and any other liabilities for loss or damage to any property, or injury or death to any person that may be made against or incurred by FIFA arising out of or in connection with such User's use of this Handbook.

Compliance with the requirements detailed in this Handbook by a User does not of itself confer on that User immunity from legal obligations.

Compliance with the requirements detailed in this Handbook by a User constitutes acceptance of the terms of this disclaimer by that User.

FIFA reserve the right to amend, update or delete sections of this manual at any time as they deem necessary.

1. Introduction

Besides 11-a-side football, FIFA is also the governing body for various other formats of the game including Futsal. As part of a strategy to develop the game and provide guidelines for Member Associations, the FIFA Quality Programme has put in place a testing protocol for Futsal surfaces. As with the other Quality Programmes, the aim is neither to promote specific products nor to interfere in the market and block innovation, but to describe surfaces in a technical way that are best suited for use in Futsal.

At this stage of the development, FIFA is very aware of the multi-purpose use of indoor halls that Futsal is played in alongside other sports such as Volleyball or Basketball. The standard "FIFA Quality" level reflects this by having tolerances that other sports are able to meet while at the same time narrowing the requirements of the EN14904 standard to better suit the game of Futsal, including some refined methods and methods used in the testing of Football Turf.

A "FIFA Quality Pro" level will be developed over the next years by gaining further player insights and through more research.

2. Normative references

This Handbook incorporates by dated or undated reference provisions from other publications. For dated references, subsequent amendments to or revisions of any of these publications will apply to this Handbook only when incorporated into it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

3. Surface Certification

The FIFA Quality Programme is the certification of a particular field that has been found to fully meet the requirements of the Quality Programme. It is not the approval of Futsal surfaces. In order to be certified, Futsal Surfaces must reach the performance and quality criteria established to provide the best possible playing conditions. To this end, each field must undergo four steps as outlined below:

3.1. Step 1: Laboratory test of Futsal surfaces

A thorough test of the Futsal surface is required.
The manufacturer (as existing or potential licensee) submits the appropriate test specimens to a FIFA accredited laboratory test institute. A list of accredited test institutes is available on https://football-technology.fifa.com/
The FIFA accredited laboratory will undertake all the statutory tests laid out in this document. If the test specimen submitted has fulfilled all the requirements a Test Report is submitted to FIFA confirming that the manufacturer's Futsal surface has met the requirements of the FQP Laboratory Test Procedure. Note: this document is not a Futsal surface certificate.
The licensee will be informed that the Futsal surface is available for installation and eligible for the next steps of testing (subject to completion of the license contract between FIFA and the manufacturer).

3.2. Step 2: Installation of Futsal surfaces

The installation of the Futsal surface as declared, applying the outlined procedures.
The Futsal surface must be installed with similar composition of materials within the required tolerances as was tested in the laboratory in the previous step.
Further documentation (method statement and Futsal surface declaration) shall be filled out by the licensee to document the installation procedure.

3.3. Step 3: Initial Futsal surface Test

Test procedure and technical assessment of the playing surface.
Following the installation of the field, the Licensee must request the field test by means of the FIFA online database (access is granted to each licensee upon signature of the agreement).
The licensee shall appoint one of the FIFA accredited field test institutes (list available on https://football-technology.fifa.com/).
The test request must contain the details of the Futsal surface as well as the method statement and Futsal surface declaration. In addition the licensee shall indicate which FIFA accredited test institute it has appointed for the test of the field.
FIFA approves the complete request and allocates a test number to the surface.
The surface shall be fully tested in accordance with the test procedures specified in this document.

The results of the field and quality control tests will be entered onto a FIFA Field Test Report by the Test Laboratory which shall be sent to FIFA (via the online database) for review.

Note – if the field fails the initial field test the test institute is still required to prepare and submit a FIFA Field Test Report informing FIFA of the failure. If a second initial test is required a new Field Test Report Number should be requested from FIFA.

3.4. Step 4: Futsal surface certification

If the field satisfies all the aspects of the above steps within the FIFA Quality programme, FIFA will grant the appropriate certification to the field.

3.5. Period of Futsal surfaces certification

FIFA QUALITY certification is valid for three years unless the field is subsequently found to no longer satisfy all the aspects of the FIFA Quality Programme following a scheduled or random spot check field test or the Football Turf is removed or replaced.

3.6. Futsal surface Re-Test

A retest can be requested on any field that has previously been tested and not been modified. Where

a field has been resurfaced, an initial test shall be performed.
A field shall be re-tested according to the standard that is was first tested to but can, on request, be tested to the newest standard.
Retesting of a field may be requested by the licensee or the field owner/operator or a FIFA accredited test institute that was contacted by a field's stakeholder or a national association/confederation or FIFA. The licensee shall request the field test through the online database. All other requestors shall do so by email to the FIFA Quality Programme (quality@fifa.org).
Testing shall be undertaken by a FIFA accredited Field Test Institute in accordance with the above-noted procedure.
Retesting may be undertaken up to three months in advance of a field's renewal date without the subsequent renewal date changing. Fields may only be tested more than three months before the expiration of the certification in exceptional cases such as requirements by national competition rules to test at more frequent intervals.

3.7. Period of Futsal surfaces certification following re-tests

If a Futsal surface is found to fully comply with the re-test requirements, then it is recertified for a further 3 years.
If a Futsal surface fails to satisfy the FIFA Quality category, it loses its FIFA certification.
There is no limit to the number of re-tests on any given Futsal surface provided it continues to meet the re-test requirements.

3.8. Eligibility

FIFA QUALITY surfaces are designed to meet the criteria for international competitions they may have varying dimensions or markings. In order for competitive matches to be carried out, the compliance with the Laws of the Game as well as national or local regulations must be ensured. While the FIFA Quality Programme certificate is essential to this eligibility, the compatibility of field markings and dimensions need to be verified.

4. Terms and definitions

Area-elastic sports floor
Sports floor, to which the application of a point force causes deflection over a relatively large area around the point of application of the force.

Point-elastic sports floor
Sports floor, to which the application of a point force causes deflection only at or close to the point of application of the force.

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

5. Laboratory testing

5.1. Test specimens

For area-elastic and combined-elastic sports surfaces, the test specimen shall be a complete surfacing system measuring 3,5 m by 3,5 m, assembled and installed in accordance with the manufacturer's stated method, on a substrate complying with the manufacturer's requirements.
For point-elastic sports surfaces, the test specimen shall be a complete surfacing system of minimum size 1,0 m by 1,0 m, using the recommended method of installation in accordance with the manufacturer's instructions.
Laboratory tests shall be made at an ambient laboratory temperature of 23 ± 2º C.
Test specimens shall be conditioned for a minimum of 3 hours at the laboratory temperature prior to test.

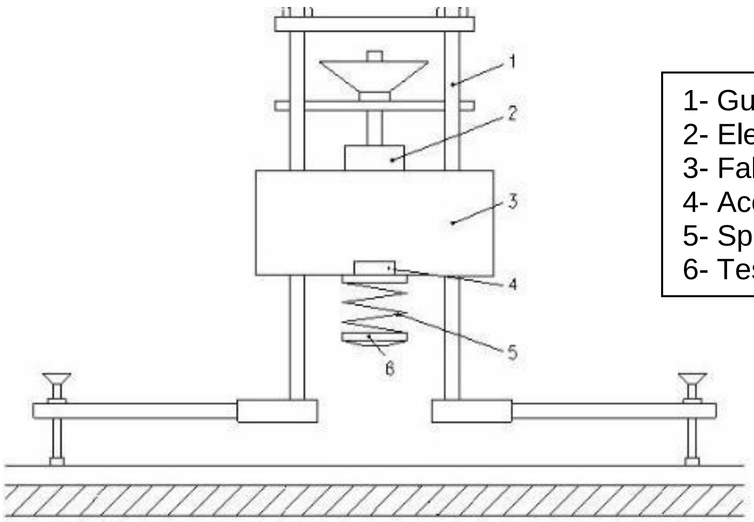
5.2. Determination of Shock Absorption (FIFA Test Method Futsal01)

5.2.1. Principle

A mass with a spring attached to it is allowed to fall onto the test specimen.
The acceleration of the mass is recorded, from the moment of its release until after its impact on the test specimen. The Shock Absorption is calculated by comparing the maximum force on the test specimen with the reference force of impact on concrete. The Shock Absorption is calculated as a reduction of the impact force on the test specimen compared to the impact force on concrete and as such is referred to as Force Reduction.

5.2.2. Test Apparatus

The apparatus used to measure the Shock Absorption is called the **A**dvanced **A**rtificial **A**thlete, AAA. The schematic design of the AAA apparatus is depicted in the Figure 1 below, together with a list of its main components. These essential components are then further specified below.



1- Guide for the falling mass
2- Electromagnet
3- Falling mass
4- Accelerometer
5- Spring
6- Test foot

Figure 1: AAA test apparatus

5.2.3. Electromagnet (2)

The Electromagnet holds the mass (3) at the specified height which can be set to an accuracy of ± 0.25 mm.

5.2.4. Falling mass (3)

The falling mass incorporates an accelerometer, a spiral metal spring (5) and a steel test foot (6). The total mass of (3) + (4) + (5) + (6) shall be 20,000 g ± 100 g.

5.2.5. Piezo-resistive accelerometer (4)

The accelerometer has a 50g full scale capacity (= 50 x 9.80665 $m.s^{-2}$), with the following characteristics:
Minimum cut-off frequency of 1000Hz (attenuation of -3db)
Linearity: 2% over the operating range.
The g-sensor should be positioned on the vertical line of gravity of the falling mass over the spiral steel spring. The g-sensor should be firmly attached to the mass to avoid natural filtering or extraneous vibrations of the accelerometer.

5.2.6. Spiral steel spring (5),

The spring rate is 2000 ± 100 N/mm and is linear over the range 0.1 to 7.5 kN.
The linear characteristic of the spring is controlled with maximum increment of 1000 N.
The spring shall be positioned centrally below the point of gravity of the falling mass.
The spring shall have three coaxial coils rigidly fixed together at their ends.
The mass of the spring shall be 800 g ± 50 g.

5.2.7. Test foot (6)

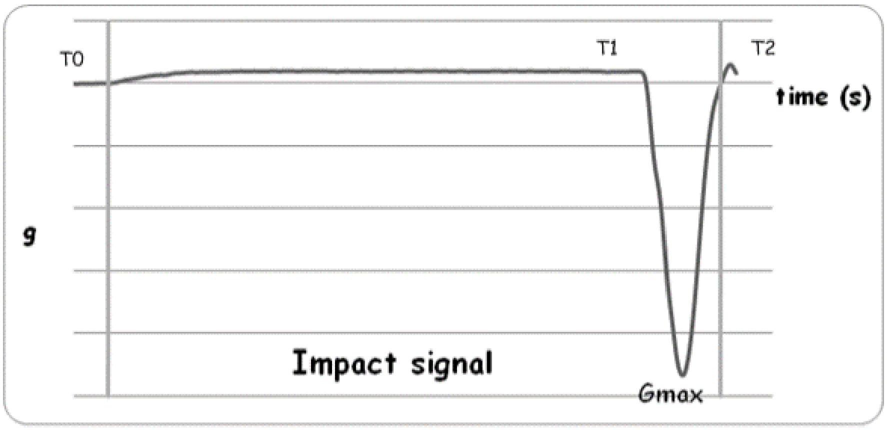
The test foot has a diameter 70 ± 1 mm and a minimum thickness of 10 mm.
The lower side part of the test foot is rounded with a radius of 500 mm ±50 mm and has an edge radius of 1 mm.
The mass of the test foot shall be 400g ± 50g.

5.2.8. Test apparatus frame

The frame consists of three adjustable supporting feet.
The feet are at a distance of not less than 250 mm from the point of impact of the falling mass on the test specimen. The frame is designed to ensure that the mass of the apparatus is equally distributed on its three feet. For the apparatus with the mass, the pressure resulting on each foot must be less than 0.020 N/mm^2. For the apparatus without the mass, the pressure resulting on each foot must be more than 0.003 N/mm^2.

5.2.9. Signal recording

A means of filtering and recording the signal from the accelerometer and a means of displaying the recorded signal (see the figure 6).
Sampling rate: minimum 9600 Hz
Electronic A/D converter with a minimum resolution of 16 bits
Signal filtration with a 2nd order low-pass, Butterworth filter with a cut-off frequency of 600 Hz.



Signal of the sensor

Figure 2: Example of curve representing falling mass acceleration versus

Where:
T0: time when the mass starts to fall
T1: time when the test foot makes the initial contact with the surface (it corresponds with the maximum absolute velocity of the falling mass Vmax*, see figure 3)
T2: time at the maximum absolute velocity of the mass after it rebounds from the impact on the test specimen (determined by Vmin*, see figure 3)

* Vmax and Vmin could be positive or negative values, depending on the accelerometer set-up.

A means of calculating the velocity and the displacement of the falling mass during its travel by integration and double integration of the accelerometer signal (see figure 2).

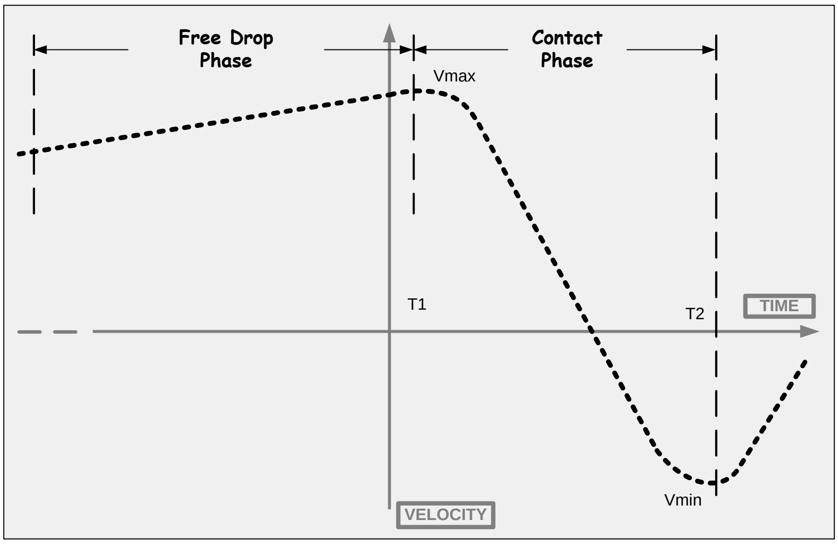


Figure 3: Example of curve representing velocity of the falling mass versus time

5.2.10. <u>Verification of the apparatus: falling mass impact velocity and lift height</u>

This verification is essential to ensure the correct functioning of the apparatus and is compulsory:
For lab tests: at regular intervals, in accordance with the intensity of usage of the apparatus. The recommendation is one verification for every day of testing.
For field tests: before any on-site field testing.
The verification procedure consists of four steps and must be carried out on a stable and rigid floor (this is defined as a floor with no significant deflection under a pressure of 5 kg/cm²).

<u>Step 1</u>
Set up the apparatus for a vertical free drop. Verticality tolerance: maximum 1°

Set the height of the lower face of the test foot at 55.00 ± 0.25 mm above the rigid floor.
Drop the mass on the concrete floor and record the acceleration of the falling mass

Step 2
Repeat Step 1 two more times, creating a total of three impacts.

Step 3
For each impact, integrate the acceleration signal from T0 to T1 and calculate the initial impact velocity. Calculate the mean impact velocity of the 3 impacts.
The mean impact velocity shall be in the range of 1.02 m/s to 1.04 m/s.

Step 4
After verification of the impact velocity, place the falling mass on the rigid floor.
Measure the height between a static reference point on the apparatus (for example the underside of the magnet) and the top of the falling mass.
This height will be a reference and shall be used for all subsequent measurements; it is designated as the "**lift height**".

5.2.11. Test procedure

Set up the apparatus vertically (90° ± 1 degree) on the test specimen.
Lower the test foot smoothly onto the surface of the test specimen.
Within 10 seconds, set the reference "lift height" described in Step 4 of the verification of the apparatus above and attach the falling mass to the electromagnet.

First impact:
After 60 (± 5) seconds (to allow the test specimen to relax after removal of the test mass) release the mass and record the acceleration signal.
Within 10 seconds after the impact, check the lift height and re-attach the mass to the electromagnet.

Second impact:
After 60 (± 5) seconds, release the mass and record the acceleration signal.
Within 10 seconds after the impact, check the lift height and re-attach the mass to the electromagnet.

Third impact:
After 60 (± 5) seconds, drop the mass and record the acceleration signal.

5.2.12. Shock absorption calculation

Calculate the peak force (F_{max}) at the impact with the following formula,

$$\mathrm{F_{max}} = \mathrm{m\ x\ g\ x\ G_{max}} + \mathrm{m\ xg}$$

Where
$\mathrm{F_{max}}$, is the peak force, expressed in Newton (N)
$\mathrm{G_{max}}$, is the peak acceleration during the impact, expressed in g (1 g = 9.81 m/s²)
m, is the falling mass including spring, test foot and accelerometer, expressed in kg
g, is the acceleration by gravity (9.81 m/s²)

Calculate the Shock absorption, SA, using the following formula:

$$SA = \left[1 - \frac{F_{max}}{F_{ref}}\right] \times 100$$

Where:
SA, is the Shock Absorption in %
$\mathrm{F_{max}}$, is the Force max measured on the sport surface, in N

F_{ref}, is the reference force fixed to 6760 N (theoretical value calculated for a concrete floor)

5.2.13. Expression of the results:

Report the Shock Absorption value to the nearest 0.1%.

5.2.14. Concrete floor specifications

The laboratory test floor must be a concrete floor with the following requirements:
A minimum thickness of 100mm
Concrete hardness of minimum 40 MPa, verified according to EN 12504-2 "Testing concrete in structures – Part 2: Non-destructive testing – Determination of rebound number".

5.2.15. Laboratory tests

Make three impacts on the same spot of the test specimen according to Test Procedure 5.2.11
Repeat the procedure in three positions.
Calculate the mean value of Shock Absorption of the second and third impacts for each test position.
Calculate the mean value of the second and third impacts of Shock Absorption of the three test positions.
Undertake tests under dry conditions.

The number of measurements and the test locations for this testing depends on the type of construction of the surface. The testing must cover all constructive elements and both a technical construction drawing of the surface outlying the test locations and a written description of these locations must be included in the test report. The following elements must be included for each type of surface:

Area-elastic sports floor
- Joints in the load distribution plate
- Between sleepers
- On sleepers
- Between pads
- On pads
- Any other constructive elements that influence the sports performance or biomechanical response of the surface.

Point-elastic sports floor
- The joint free positions
- On the length of joints
- On the T-joints
- Any other constructive elements that influence the sports performance or biomechanical response of the surface.

Combined-elastic sports floor
- Joints in the load distribution plate
- Between sleepers
- On sleepers
- Between pads
- On pads
- The joint free positions
- On the length of joints
- On the T-joints
- Any other constructive elements that influence the sports performance or biomechanical response of the surface.

5.2.16. Requirements

Each test location must meet the requirements.

Surface Construction Type	Requirements
Point Elastic	≥ 18.0 % ≤ 75.0 %
Area Elastic	≥ 40.0 % ≤ 75.0 %
Combined Elastic	≥ 40.0 % ≤ 75.0 %

5.3. Determination of Vertical Deformation (FIFA Test Method Futsal02)

5.3.1. Principle

A mass with a spring attached to it is allowed to fall onto the test specimen.
The acceleration of the mass is recorded, from the moment of its release until after its impact on the test specimen. The vertical deformation of the test specimen is calculated by the displacement of the falling mass into the test specimen after its impact on it.

5.3.2. Test Apparatus

See description in 5.2.2

5.3.3. Verification of the apparatus

See description in 5.2.10

5.3.4. Test procedure

See description in 5.2.11

5.3.5. Calculation and expression of Vertical Deformation

The displacement of the falling mass D_{mass} (t) is calculated by integration of $V_{(t)}$ on the interval [T_1, T_2]). Integration starts at (T_1), the moment when the mass has reached its highest velocity.

On the time interval [T_1 - T_2], the vertical deformation (VD) of the test specimen is defined as:

$$\mathbf{VD = D_{mass} - D_{spring}}$$

Where:

$$\mathrm{D_{mass} = \iint_{T1}^{T2} g\, G\, dt, \text{ with } D_{mass} = 0 \text{ mm at } T1}$$

$$\mathrm{D_{spring}} = \frac{(\mathrm{m} \times \mathrm{g} \times \mathrm{G_{max}})}{\mathrm{C_{spring}}}$$

F_{max} is the peak force, expressed in Newton, N
G_{max} is the peak acceleration during the impact, expressed in g (1 g = 9.81 m/s²)
m is the falling mass, including spring, base plate and accelerometer expressed in kg
g is the acceleration by gravity (9.81 m/s²)
C_{spring} is the spring constant (given by the certificate of calibration)

5.3.6. Expression of the results:

Vertical Deformation is reported to the nearest 0.1mm

5.3.7. Concrete floor specifications

The laboratory test floor must be a concrete floor with the following requirements:
A minimum thickness of 100mm
Concrete hardness of minimum 40 MPa, verified according to EN 12504-2 “Testing concrete in structures – Part 2: Non-destructive testing – Determination of rebound number”.

5.3.8. Laboratory tests

The Vertical Deformation is calculated for the three positions tested for the Shock Absorption (see 5.2).
Calculate the mean value of Vertical Deformation of the second and third impacts for each test position.
Calculate the mean value of the second and third impacts of Vertical Deformation of the three test positions.

The number of measurements and the test locations for this testing depends on the type of construction of the surface. The testing must cover all constructive elements and both a technical construction drawing of the surface outlying the test locations and a written description of these locations must be included in the test report. The following elements must be included for each type of surface:

Area-elastic sports floor
- Joints in the load distribution plate
- Between sleepers
- On sleepers
- Between pads
- On pads
- Any other constructive elements that influence the sports performance or biomechanical response of the surface.

Point-elastic sports floor
- The joint free positions
- On the length of joints
- On the T-joints
- Any other constructive elements that influence the sports performance or biomechanical response of the surface.

Combined-elastic sports floor
- Joints in the load distribution plate
- Between sleepers
- On sleepers
- Between pads
- On pads
- The joint free positions
- On the length of joints
- On the T-joints
- Any other constructive elements that influence the sports performance or biomechanical response of the surface.

5.3.9. Requirements

Each test location must meet the requirements.

Surface Construction Type	Requirements

Point Elastic	≤ 6.0 mm
Area Elastic	≥ 3.0 mm ≤ 10.0 mm
Combined Elastic	≥ 3.0 mm ≤ 10.0 mm

5.4. Slip Resistance

Test according to EN16837:2018 Surfaces for sports areas. Determination of linear shoe/surface friction with the following additional requirements:

- Test Equipment and slider preparation (2mm) in accordance with EN 16837
- Test using the full-size plate below the skid tester
- Clean the test surface with cross 10 wipes using a micro-fibre cloth
- Leave 30 seconds between each pendulum swing to allow slider and test surface to return to starting temperature
- Where possible release lever with one hand and catch pendulum with the other hand. When pressing release button do not remove hand until swing has completed
- Report the Pendulum Test Value to the nearest 1 unit
- Rubber slider should be replaced on an annual basis
- 2 locations should be tested on the test specimen

5.4.1. Expression of the results:

Report the Slip Resistance value to the nearest unit.

5.4.2. Requirements:

Each test location must meet the requirements.

Surface Construction Type	Requirements
Point Elastic	80 -115
Area Elastic	
Combined Elastic	

5.5. Resistance to rolling load

Test according to EN 1569:1999 Surfaces for sports areas. Determination of the behavior under a rolling load.

5.5.1. Requirements:

Surface Construction Type	Requirements
Point Elastic	No damage found post-test greater than 0.5mm under 300mm straightedge
Area Elastic	
Combined Elastic	

5.6. Resistance to wear

Test according to ISO 5470-1:2016 Rubber- or plastics-coated fabrics - Determination of abrasion resistance - Part 1: Taber abrader

5.6.1. Requirements:

Top Surface Type	Requirements
Wood	80mg weight loss per 1000 cycles (CS10 wheel with a mass of 500 g)
Synthetic	1000mg weight loss per 1000 cycles (H18 wheel with a mass of 1000g)

5.7. Resistance to indentation

Test according to EN1516: 1999 Surfaces for sports areas. Determination of resistance to indentation.
For the area-elastic sport floor system only its covering, supported on a rigid structure, shall be tested.
For the combined elastic sport floor system only its point elastic component, supported on a rigid structure, shall be tested.

5.7.1. Requirements:

Surface Construction Type	Requirements
Point Elastic	The mean residual indentation of the sport floor system, measured 5 min after removal of the load, shall be reported and the mean residual indentation measured 24 h after removal of the load shall be ≤ 0,5 mm.
Area Elastic	
Combined Elastic	

5.8. Reaction to fire

Test according to EN 14904:2006 – part 5.4 Reaction to fire.

5.8.1. Requirements:

Surface Construction Type	Requirements
Point Elastic	EN 14904:2006 – part 5.4 Reaction to fire.
Area Elastic	
Combined Elastic	

5.9. Formaldehyde Emissions

Test according to EN 14904:2006 – part 5.5 Formaldehyde emissions.

5.9.1. Requirements:

Surface Construction Type	Requirements
Point Elastic	EN 14904:2006 – part 5.5 Formaldehyde emissions.
Area Elastic	
Combined Elastic	

5.10. Pentachlorophenol (PCP) content

Test according to EN 14904:2006 – Annex C - Pentachlorophenol (PCP) content analysis in sport floor surfaces.

5.10.1. .Requirements:

Surface Construction Type	Requirements
Point Elastic	No Pentachlorophenol or derivative in the production process of the system or in the raw materials of the system. The result of the analysis should be below 0.1% of Pentachlorophenol or (derivative) content.
Area Elastic	
Combined Elastic	

5.11. Table of laboratory requirements

5.11.1. Point Elastic products

Property	Test Method	Requirements FIFA QUALITY
Shock Absorption	FIFA Test Method Futsal01	≥ 18.0 % ≤ 75.0 %
Vertical Deformation	FIFA Test Method Futsal02	≤ 6.0 mm
Slip resistance	EN 16837:2018	80 -115
Resistance to rolling load	EN 1569:1999	No damage found post-test greater than 0.5mm under 300mm straightedge
Resistance to wear	ISO 5470-1:2016	1000mg weight loss per 1000 cycles (H18 wheel with a mass of 1000g)
Resistance to indentation	EN1516: 1999	The mean residual indentation of the sport floor system, measured 5 min after removal of the load, shall be reported and the mean residual indentation measured 24 h after removal of the load shall be ≤ 0,5 mm.
Reaction to fire	EN 14904:2006 – part 5.4	EN 14904:2006 – part 5.4 Reaction to fire.
Formaldehyde emissions	EN 14904:2006 – part 5.5	EN 14904:2006 – part 5.5 Formaldehyde emissions
Pentachlorophenol (PCP) content	EN 14904:2006 – Annex C	No Pentachlorophenol or derivative in the production process of the system or in the raw materials of the system. The result of the analysis should be below 0.1% of Pentachlorophenol or (derivative) content.

5.11.2. Area Elastic products

Property	Test Method	Requirements FIFA QUALITY
Shock Absorption	FIFA Test Method Futsal01	≥ 40.0 % ≤ 75.0 %
Vertical Deformation	FIFA Test Method Futsal02	≥ 3.0 mm ≤ 10.0 mm
Slip resistance	EN 16837:2018	80 -115
Resistance to rolling load	EN 1569:1999	No damage found post-test greater than 0.5mm under 300mm straightedge

Resistance to wear	ISO 5470-1:2016	Wood: 80mg weight loss per 1000 cycles (CS10 wheel with a mass of 500 g) Synthetic: 1000mg weight loss per 1000 cycles (H18 wheel with a mass of 1000g)
Resistance to indentation	EN1516: 1999	The mean residual indentation of the sport floor system, measured 5 min after removal of the load, shall be reported and the mean residual indentation measured 24 h after removal of the load shall be ≤ 0,5 mm.
Reaction to fire	EN 14904:2006 – part 5.4	EN 14904:2006 – part 5.4 Reaction to fire.
Formaldehyde emissions	EN 14904:2006 – part 5.5	EN 14904:2006 – part 5.5 Formaldehyde emissions
Pentachlorophenol (PCP) content	EN 14904:2006 – Annex C	No Pentachlorophenol or derivative in the production process of the system or in the raw materials of the system. The result of the analysis should be below 0.1% of Pentachlorophenol or (derivative) content.

5.11.3. Combined Elastic products

Property	Test Method	Requirements FIFA QUALITY
Shock Absorption	FIFA Test Method Futsal01	≥ 40.0 % ≤ 75.0 %
Vertical Deformation	FIFA Test Method Futsal02	≥ 3.0 mm ≤ 10.0 mm
Slip resistance	EN 16837:2018	80 -115
Resistance to rolling load	EN 1569:1999	No damage found post-test greater than 0.5mm under 300mm straightedge
Resistance to wear	ISO 5470-1:2016	Wood: 80mg weight loss per 1000 cycles (CS10 wheel with a mass of 500 g) Synthetic: 1000mg weight loss per 1000 cycles (H18 wheel with a mass of 1000g)
Resistance to indentation	EN1516: 1999	The mean residual indentation of the sport floor system, measured 5 min after removal of the load, shall be reported and the mean residual indentation measured 24 h after removal of the load shall be ≤ 0,5 mm.
Reaction to fire	EN 14904:2006 – part 5.4	EN 14904:2006 – part 5.4 Reaction to fire.
Formaldehyde emissions	EN 14904:2006 – part 5.5	EN 14904:2006 – part 5.5 Formaldehyde emissions
Pentachlorophenol (PCP) content	EN 14904:2006 – Annex C	No Pentachlorophenol or derivative in the production process of the system or in the raw materials of the system. The result of the analysis should be below 0.1% of Pentachlorophenol or (derivative) content.

6. Field testing

All field tests, when not otherwise specified, shall be undertaken in positions 1 – 4 (+2 additional positions on the safety areas outside the court lines).The orientation of test positions shall be determined by the test institute.

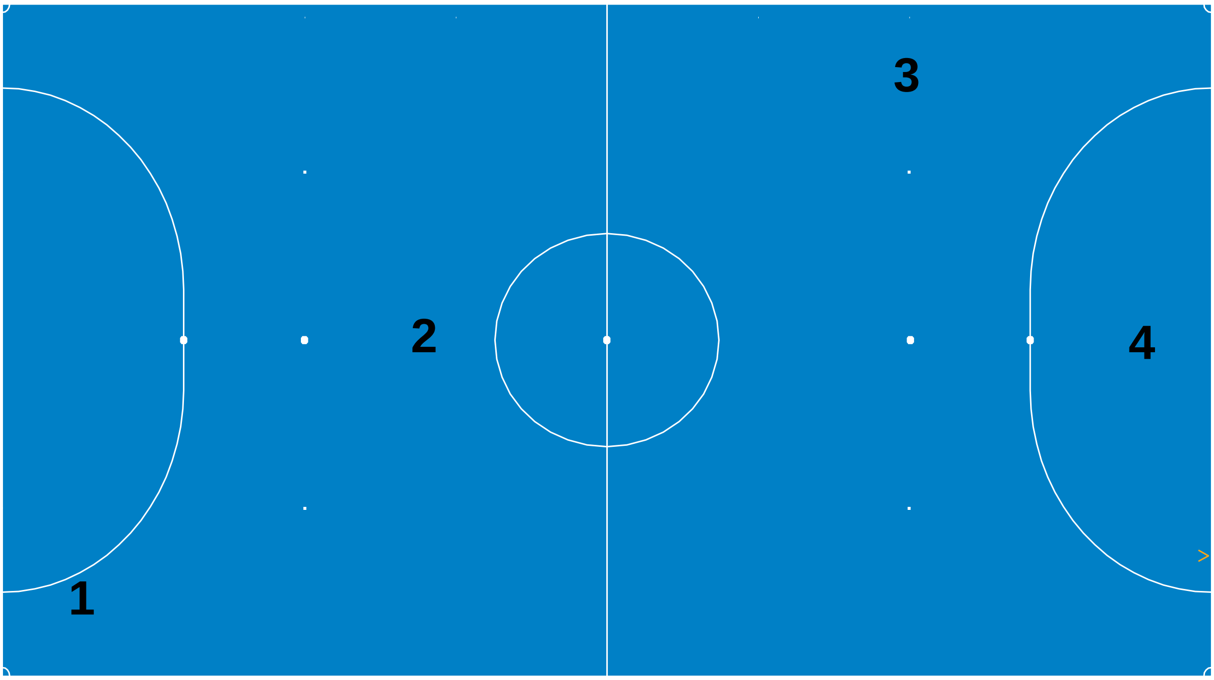


Figure 4: Field test locations (field of play)

6.1. Shock Absorption (FIFA Test Method Futsal01)

6.1.1. Procedure

See description in 5.2.11.

6.1.2. Calculation of results

Calculate the mean values (second and third impacts) of Shock Absorption for each test location.

6.1.3. Requirements

Each test location must meet the requirements.

Surface Construction Type	Requirements
Point Elastic	≥ 18.0 % ≤ 75.0 %
Area Elastic	≥ 40.0 % ≤ 75.0 %
Combined Elastic	≥ 40.0 % ≤ 75.0 %

6.2. Vertical Deformation (FIFA Test Method Futsal02)

6.2.1. Procedure

The Vertical Deformation is calculated for the position tested for the Shock Absorption (see 6.1.2).

6.2.2. Calculation of results

Calculate the mean values (second and third impacts) of Vertical Deformation for each test location.

6.2.3. Requirements

Each test location must meet the requirements.

Surface Construction Type	Requirements
Point Elastic	≤ 6.0 mm
Area Elastic	≥ 3.0 mm ≤ 10.0 mm
Combined Elastic	≥ 3.0 mm ≤ 10.0 mm

6.3. Slip Resistance

6.3.1. Procedure

Test according to EN 16837:2018 Surfaces for sports areas. Determination of linear shoe/surface friction. With the following additional requirements:

- Test Equipment and slider preparation (2mm) in accordance with EN 13036-4:2011
- Test using the full-size plate below the skid tester
- Clean the test surface with cross 10 wipes using a micro-fibre cloth
- Micro-fibre cloth should be replaced regularly when dirty
- Leave 30 seconds between each pendulumswing
- Where possible release lever with one hand and catch pendulum with other hand. When pressing release button do not remove hand until swing has completed
- Report the Pendulum Test Value to the nearest 1 unit
- Rubber slider should be replaced on an annual basis
- In addition to the outlined test locations, 1 additional tests per line colour must be conducted.

6.3.2. Requirements

Each test location must meet the requirements.

System Type	Requirements
Point Elastic	80 - 115
Area Elastic	
Combined Elastic	

6.4. Evenness

6.4.1. Procedure

Test according to EN13036-7:2003 Road and airfield surface characteristics. Test methods. Irregularity measurement of pavement courses. The straightedge test.

6.4.2. Requirements

System Type	Requirements
Point Elastic	Deformations ≤6mm under 3m straightedge

Area Elastic	Deformations ≤2mm under 300mm on joints In addition to this, report any safety issues found on site in the test report
Combined Elastic	

6.5. Table of field testing requirements

6.5.1. Point Elastic products

Property	Test Method	Requirements FIFA QUALITY
Shock Absorption	FIFA Test Method Futsal01	≥ 18.0 % ≤ 75.0 %
Vertical Deformation	FIFA Test Method Futsal02	≤ 6.0 mm
Slip resistance	EN 16837:2018	80 -115
Evenness	EN13036-7:2003	Deformations ≤6mm under 3m straightedge Deformations ≤2mm under 300mm on joints In addition to this, report any safety issues found on site in the test report

6.5.2. Area Elastic products

Property	Test Method	Requirements FIFA QUALITY
Shock Absorption	FIFA Test Method Futsal01	≥ 40.0 % ≤ 75.0 %
Vertical Deformation	FIFA Test Method Futsal02	≥ 3.0 mm ≤ 10.0 mm
Slip resistance	EN 16837:2018	80 -115
Evenness	EN13036-7:2003	Deformations ≤6mm under 3m straightedge Deformations ≤2mm under 300mm on joints In addition to this, report any safety issues found on site in the test report

6.5.3. Combined Elastic products

Property	Test Method	Requirements FIFA QUALITY
Shock Absorption	FIFA Test Method Futsal01	≥ 40.0 % ≤ 75.0 %
Vertical Deformation	FIFA Test Method Futsal02	≥ 3.0 mm ≤ 10.0 mm
Slip resistance	EN 16837:2018	80 -115
Evenness	EN13036-7:2003	Deformations ≤6mm under 3m straightedge Deformations ≤2mm under 300mm on joints In addition to this, report any safety issues found on site in the test report

7. Field Dimensions and Line Markings

The length of the touch line must be greater than the length of the goal line.

For non-international matches, the dimensions are as follows:

	Minimum	Maximum
Length (touch line):	25.00 m	42.00 m
Width (goal line):	16.00 m	25.00 m

For international matches, the dimensions are as follows:

	Minimum	Maximum
Length (touch line):	38.00 m	42.00 m
Width (goal line):	20.00 m	25.00 m

8. Further research and development

A FIFA QUALITY PRO standard is to be developed, which better reflects the needs of the players at the highest level and allows tournament organizers to better specify the surface they would like to play on.

9. List of International and European Standard test methods adopted by FIFA

Shock Absorption	FIFA Test Method Futsal01	Determination of Shock Absorption
Vertical Deformation	FIFA Test Method Futsal02	Determination of Vertical Deformation
Slip resistance	EN 16837:2018	Surfaces for sports areas. Determination of linear shoe/surface friction
Resistance to rolling load	EN 1569:1999	Surfaces for sports areas. Determination of the behavior under a rolling load
Resistance to wear	ISO 5470-1:2016	Rubber- or plastics-coated fabrics - Determination of abrasion resistance - Part 1: Taber abrader
Resistance to indentation	EN1516: 1999	Surfaces for sports areas. Determination of resistance to indentation.
Reaction to fire	EN 14904:2006 – part 5.4	Reaction to fire
Formaldehyde emissions	EN 14904:2006 – part 5.5	Formaldehyde emissions
Pentachlorophenol (PCP) content	EN 14904:2006 – Annex C	Pentachlorophenol (PCP) content analysis in sport floor surfaces.
Evenness	EN13036-7:2003	Road and airfield surface characteristics. Test methods. Irregularity measurement of pavement courses. The straightedge test.