FIFA

Quality Concept

for Football Turf

Handbook of Requirements

January 2012 Edition

FIFA

For the Game. For the World.

Contents

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1 Introduction

The development of artificial grass surfaces (designated 'Football Turf' by FIFA) that replicate the playing qualities of good quality natural grass has led to the rapid acceptance of the surfaces by the football world and an ever increasing expansion of the market. Manufacturers are now producing surfaces which have been found to provide an ideal solution to those parts of the world where climate or resources make the provision of good quality natural grass pitches difficult or impossible. Likewise the development of Football Turfs has provided a potential solution to facility operators wishing to maximise the use of their facilities through community use and those struggling with stadium microclimates that make the maintenance and growth of natural grass difficult.

To ensure these new forms of playing surface replicate the playing qualities of good quality natural grass; provide a playing environment that will not increase the risk of injury to players; are of adequate durability (providing they are adequately maintained) FIFA developed its FIFA Quality Concept for Artificial Turf. Launched in 2001 the Quality Concept is a rigorous test programme for Football Turf that assesses the ball surface interaction, player surface interaction and durability of products and allows successful manufacturers to enter into a licensing programme for the use of the prestigious FIFA RECOMMENDED marks.

Following the decision of the International Football Association Board in July 2004 to introduce artificial surfaces into the Laws of The Game the FIFA Quality Concept has been further developed by introducing two categories of performance. FIFA Recommended Two Star is the professional category and has been established to ensure fields meeting it replicate the playing qualities of the best quality natural turf pitches. This category is intended for clubs and national federation teams wishing to play competitive matches subject to the relevant competition rules allowing the use of Football Turf or undertake training on Football Turfs. The FIFA Recommended One Star category has slightly wider bands of acceptability and is primarily aimed at organisations wishing to provide facilities for training and community use, although fields meeting this category of performance may also be used for competitive play (subject to the relevant competition rules).

The laboratory test programme that a Football Turf must satisfy as part of the FIFA Quality Concept includes a programme of simulated use to assess the ability of a surface to perform for a period of time. The degree of simulated use undertaken on FIFA Two Star products is designed to replicate low to moderate levels of use often found on football specific stadium fields; whilst the degree of simulated use undertaken on FIFA One Star products is designed to replicate the higher levels of use found on training and community fields. Potential installers of Football Turf fields should note, however, that experience has shown fields subjected to very high intensity use may not be able to retain the demanding performance criteria of the FIFA Quality Concept for the life of the playing surface. Failure to undertake adequate maintenance will also reduce the period of time a field may satisfy the requirements of the FIFA Quality Concept.

This edition of the manual supersedes previous editions with effect from 31 January 2012. The changes incorporated into this edition of the manual are:

FIFA Two Star Category – Laboratory tests:

- The DSC measurement method has been altered to comply with ISO

- Adaptation of test method for force reduction and deformation (triple A)

FIFA Two Star Category – Field tests

- Specification of lining and use of logos on fields
- Angled ball rebound deleted from field tests
- Stud Slide and Stud Deceleration tests deleted from field tests
- Adaptation of test method for force reduction and deformation (triple A)
- No marking other than permitted lines shall be allowed on the field of play.
- The Method Statement and Product Declaration are to be presented to the Test Institute during the site test.

FIFA One Star Category – Laboratory tests

- The DSC measurement method has been altered to comply with ISO.
- Shock absorption measured on frozen sample (-5°C)
- Adaptation of test method for force reduction and deformation (triple A)

FIFA One Star Category – Field tests

- Adaptation of test method for force reduction and deformation (triple A)
- The Method Statement and Product Declaration are to be presented to the Test Institute during the site test.

2 Field certification

The FIFA Quality Concept is the certification of a particular field that has been found to fully meet the requirements of the Quality Concept. It is not the approval of products. To gain such certification a FIFA licensee needs to undertake two phases of testing and operate a programme of factory quality control (as detailed in Annex G) that shall be open to third party attestation as considered appropriate by FIFA.

The phases of testing are described below.

2.1 Stage 1/3 - laboratory testing

- A potential Licensee (Manufacturer) or existing Licensee will submit the appropriate samples and the Laboratory Test Form to a FIFA accredited laboratory.
- The FIFA accredited laboratory will undertake all the statutory tests laid out in the FIFA Quality Concept – Handbook of requirements. If the sample submitted has fulfilled all the requirements a Test Report will be submitted to FIFA confirming that the potential Licensee's product has met the requirements of the FQC Laboratory Test Procedure.

- On request the (potential) Licensee will be informed by FIFA that the Licensee's Product has met the requirements of the FQC Laboratory Test Procedure and the Licensee can progress with the installation of fields for potential certification (subject to completion of the license the contract between FIFA and the Licensee).

2.2 Stage 2/3 - initial field assessment

- Following construction of a field the Licensee or facility owner will arrange for it to be tested by a FIFA Field Test Institute. The Test Institute appointed to undertake the field test shall not have been involved in the design, specification or procurement of the field. In advance of the field test the Licensee will inform FIFA of the intention to have the field tested, the Test Institute appointed to undertake the field test and the proposed date of test. FIFA will issue a unique Field Test Report Number to the Licensee and Test Institute.

- The field shall be fully tested in accordance with the procedures specified in Table 3.

- Samples of the artificial grass and any infill used to construct the field shall be taken from site by the Test Laboratory and tested using the procedures detailed Table 4 to ensure they are of the same specification as those submitted for the initial laboratory type approval (subject to the tolerances specified in Table 4).

- 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 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.

- The Laws of the Game allow international matches to be played on fields with several sets of lines. The IFAB ruling on Law 1 states: “Where artificial surfaces are used, other lines are permitted provided that they are of a different colour and clearly distinguishable from the lines used for football.”

- The test institute shall take note of any additional markings (logos, writing, adverts) other than those specified in the Laws of the Game. As the professional standard, no FIFA 2 Star installation shall have any additional marking other than those accounted for in the Laws of the Game. FIFA 1 Star installations lose their eligibility to host competitive matches in accordance with the Laws of the Game by the presence of marks (logos etc.) on the field.

- The test institute shall verify that the end user received both the product declaration and method statement in accordance with the FIFA licensee agreement.

2.3 Stage 3 /3 – Field certification

If the field satisfies all aspects of the FIFA Quality Concept FIFA will grant the appropriate FQC star rating to the Licensee with a copy to the field owner/operator.

Only fields surfaced with Football Turfs that have been laboratory tested (Stage 1) in advance of the field test (Stage 2) will be certified.

Eligibility for international competitions: In order for international competitive matches to be carried out on any football field, they must meet the requirements of the respective sections in the Laws of the Game. This implies compatibility with the requirements regarding line marking and the absence of other marks on the field as well as the field dimensions.

2.4 Period of field certification

2.4.1 FIFA Recommended Two Star

FIFA Recommended Two Star certification is valid for twelve months unless:

- the field is subsequently found to no longer satisfy all the aspects of the FIFA Quality Concept Two Star category

or

- the Football Turf is replaced.

2.4.2 FIFA Recommended One Star

FIFA Recommended One Star certification is valid for four years unless:

- the field is subsequently found to no longer satisfy all the aspects of the FIFA Quality Concept One Star category

or

- the Football Turf is replaced.

Note: If national competition rules or other requirements require field re-tests at more frequent intervals this is permitted.

2.5 Field retesting

Retesting of a field may be requested by the licensee or the field owner/operator or a FIFA accredited test institute for Football Turf or a national association/confederation or FIFA.

Testing shall be undertaken by a FIFA accredited Field Test Institute.

Retesting may be undertaken up to three months in advance of a field's renewal date without the subsequent renewal date changing.

In advance of the retest the Licensee, or the field owner/operator will inform FIFA of the intention to have the field retested, the Test Institute appointed to undertake the field test and the proposed date of test. FIFA will issue a unique Field Test Report Number to the Test Institute.

The field shall be fully tested in accordance with the procedures specified in Table 3.

The results of the field retests will be entered onto a Field Retest Report by the Test Laboratory which shall be sent to FIFA. Assuming the field satisfies all aspects of the FIFA Quality Concept FIFA will grant the appropriate FQC star rating to the Licensee.

For a field to be recertified it shall comply with the requirements detailed in this edition of the Handbook of Requirements for Football Turf.

2.5.1 FIFA Recommended Two Star

If a field is found to fully comply with Tables 3 and 5 as well as the Laws of the Game in regard to line marking and marks on the field, as detailed below, it is recertified for a further 12 months.

If a field fails to satisfy the FIFA Recommended Two Star category but is found to satisfy the requirements of the FIFA Recommended One Star category and the Football Turf has been laboratory tested for 20,200 cycles (optional) simulated wear it is re-designated as a FIFA Recommended One Star category for a further three years, after which a further re-test is required.

If a field fails to satisfy the FIFA Recommended Two Star category and the installed Football Turf has only been laboratory tested for 5,200 cycles simulated wear it loses its FIFA Recommended designation.

In cases where a field has been resurfaced it shall be tested as a new installation in accordance with Tables 3 and 4.

2.5.2 FIFA Recommended One Star

If a field is found to fully comply with Tables 3 and 5 it is recertified for a further four years if the installed Football Turf satisfies the laboratory test requirements of the 2011 edition of the FIFA Handbook of Requirements for Football Turf or three years if it satisfies the laboratory test requirements of an earlier edition.

If a field fails to satisfy the FIFA Recommended One Star requirements it loses its FIFA Recommended Designation.

In cases where a field has been resurfaced it shall be tested as a new installation in accordance with Tables 3 and 4.

3 Test methods

The test methods used to assess Football Turfs and installed fields are described in either the FIFA Handbook of Test Methods for Football Turf 2012 edition (identified by the prefix FIFA), International Standards (identified ISO) or European Standards (identified EN). Where a test method is given a dated reference, subsequent amendments to or revisions of the method will apply to this Handbook of Requirements only when incorporated into it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

Note: Fields submitted for initial testing in 2012 may be surfaces with Football Turf that meets either the 2009 or 2012 edition of the FIFA Handbook of Requirements for Football Turf.

4 Laboratory test requirements

4.1 General

When tested in the laboratory for initial type approval the Football Turf shall fully satisfy the requirements of Table 1 using the methods of test specified.

If a Football Turf product is found to fully satisfy the FIFA Two Star laboratory requirements after being subjected to 20,200 cycles simulated wear it may be type approved as meeting both FIFA 2 and FIFA 1 Star laboratory test categories.

The components of the Football Turf shall be identified using the test methods specified in Table 2 and the results compared to the data supplied by the licensees (Section 3 of the FQC Laboratory Report Form). The differences between the product identification tests and licensee's data shall be no greater than the tolerances specified in Table 2.

4.2 Resistance to artificial weathering

If a Football Turf pile is manufactured from a pile yarn that has been previously tested by a FIFA Test Laboratory for Resistance to Artificial Weathering the results may be used for the new Football Turf providing that:

- a pile yarn characterisation (DSC) shows the yarn to be the same as that previously tested;
- the declared pile thickness is the same as the yarn tested previously ($\pm$ 10 % of the declared value);
- the profile of the yarn is the same as the yarn tested previously;
- the colour (RAL CLASSIC number) of the yarn is the same as the yarn tested previously;

4.3 Use of existing shockpads / elastic layers

If an existing artificial turf pitch is to be converted to Football Turf or an existing Football Turf surface is to be replaced, any existing shockpad or elastic layer may be incorporated into the new surfacing system provided:

- the mean shock absorption of the existing shockpad is between 90% and 110% of the shock absorption value declared by the manufacturer when the Football Turf system was initially type approved;
- the mean deformation of the existing shockpad is $\pm$ 2mm of the deformation declared by the manufacturer when the Football Turf system was initially type approved;
- the water permeability of the shockpad is greater than 180mm/h when tested in accordance with EN 12616.

The installed shockpad shall be tested for each property detailed above in the positions detailed in the FIFA Handbook of Tests Methods for Football Turf by a FIFA Field Institute. Tests shall be made no sooner than 12 months before the initial field test after resurfacing. The results of the shockpad tests shall be appended to the FIFA Field Test Report and issued to FIFA following the initial field test.

Compliance with the above requirements does not override the need for the field to fully satisfy the field test requirements of the FIFA Quality Concept.

4.4 Calculation of Variations

Unless explicitly stated, variations are to be calculated as percentage of the declared value and not of the site sample.

4.5 Order of testing

To ensure consistency of test results, all test institutes should carry out the procedures in the same order. The five samples should therefore be used as listed below:

Sample 1a NEW
Size: 1 x 1 m
Preparation of sample
Conditioning
FIFA 01 Ball rebound Dry
Redistribute infill by hand
FIFA 04a Shock absorption - Dry
Redistribute infill by hand
FIFA 05a Vertical deformation - Dry
Redistribute infill by hand
FIFA 06 Rotational resistance - Dry
Maintenance
Wetting
FIFA 01 Ball rebound wet
Redistribute infill by hand
FIFA 04a Shock absorption wet
Redistribute infill by hand
FIFA 05a Vertical deformation wet
Redistribute infill by hand
FIFA 06 Rotational resistance wet
End of tests

Sample 2a LISPORT 5200
Size: 0.8 x 0.4 m
Preparation of sample
Mechanical Abrasion LTM 09
FIFA 01 Ball rebound Dry
Redistribute infill by hand
FIFA 04a Shock absorption - Dry
Redistribute infill by hand
FIFA 05a Vertical deformation - Dry
Redistribute infill by hand
FIFA 06 Rotational resistance - Dry
End of tests

Sample 2b LISPORT 20200
Size: 0.8 x 0.4 m
Preparation of sample
Mechanical Abrasion LTM 09
FIFA 01 Ball rebound Dry
Redistribute infill by hand
FIFA 04a Shock Absorption - Dry
Redistribute infill by hand
FIFA 05a Vertical deformation - Dry
Redistribute infill by hand
FIFA 06 Rotational resistance - Dry
End of tests

Sample 3 LONG
Size: 11 x 1 m
Preparation of sample
Conditioning
FIFA 03 Ball roll dry
Redistribute infill by hand
FIFA 07 Stud Slide & Deceleration - dry
Redistribute infill by hand
FIFA 08 Surface Friction & Abrasion
Redistribute infill by hand
FIFA 02 Angle ball rebound - dry
Redistribute infill by hand
Wetting
FIFA 03 Ball roll wet
Redistribute infill by hand
FIFA 07 Stud Slide & Deceleration Value wet
Redistribute infill by hand
FIFA 02 Angle ball rebound wet
End of tests

Sample 1b NEW
Size: 2x 0.4x0.4 m
FIFA 04a -5°C & +40°C tests
End of tests

Table 1 – Laboratory test requirements

Property	Test Method	Test conditions			Requirements	
		Preparation	Temperature	Condition	FIFA Recommended Two Star	FIFA Recommended One Star
Vertical ball rebound	FIFA 01 & FIFA 09	Pre-conditioning	23ºC	Dry	0.60m - 0.85m	0.60m - 1.0m
				Wet		
		Simulated Wear – 5,200 cycles		Dry	0.60m - 0.85m	N/A
		Simulated Wear – 20,200 cycles		Dry	N/A	0.60m - 1.0m
Angle ball rebound	FIFA 02	Pre-conditioning	23ºC	Dry	45% - 60%	45% -70%
				Wet	45% - 80%	
Ball roll	FIFA 03	Pre-conditioning	23ºC	Dry	4m - 8m	4m - 10m
				Wet		
Shock Absorption	FIFA 04a & FIFA 09	Pre-conditioning	23ºC	Dry	60% - 70%	55% - 70%
				Wet		
		Simulated Wear – 5,200 cycles		Dry	60% - 70%	N/A
		Simulated Wear – 20,200 cycles		Dry	N/A	55% - 70%
		Pre-conditioning	40ºC	Dry	60% - 70%	55% - 70%
	FIFA 04a 1st impact	-	-5ºC	Frozen	60% - 70%	55% - 70%

Property	Test Method	Test conditions			Requirements	
		Preparation	Temperature	Condition	FIFA Recommended Two Star	FIFA Recommended One Star[3]
Vertical Deformation	FIFA 05a & FIFA 09	Pre-conditioning	23ºC	Dry	4mm – 10mm	4mm – 11mm
		Pre-conditioning		Wet		
		Simulated Wear – 5,200 cycles		Dry	4mm – 10mm	N/A
		Simulated Wear – 20,200 cycles		Dry	N/A	4mm – 11mm
Rotational Resistance	FIFA 06 & FIFA 09	Pre-conditioning	23ºC	Dry	30Nm - 45Nm	25Nm - 50Nm
				Wet		
		Simulated Wear – 5,200 cycles		Dry	30Nm - 45Nm	N/A
		Simulated Wear – 20,200 cycles		Dry	N/A	25Nm - 50Nm

Property	Test Method	Test conditions			Requirement	
		Preparation	Temperature	Condition	FIFA Recommended Two Star	FIFA Recommended One Star[3]
Linear Friction - Stud Deceleration Value	FIFA 07	Pre-conditioning	23ºC	Dry	3.0g - 5.5 g	3.0g - 6.0 g
				Wet		
Linear Friction - Stud Slide Value		Pre-conditioning	23ºC	Dry	130 - 210	120 – 220
				Wet		
Skin / surface friction	FIFA 08	Pre-conditioning	23ºC	Dry	0.35 - 0.75	0.35 - 0.75
Skin abrasion	FIFA 08	Pre-conditioning	23ºC	Dry	± 30%	± 30%

Artificial Weathering (FIFA 10)				
Component	**Property & test method**		**Requirement**	
			FIFA Recommended Two Star	**FIFA Recommended One Star**
Artificial turf	Colour change	EN ISO 20105-A02	≥ Grey scale 3	
Pile yarn (s)	Tensile strength	EN 13864	Percentage change from unaged to be no more than 50%	
Polymeric infill	Colour change	EN ISO 20105-A02	≥ Grey scale 3	
Joint strength: stitched seams	Joint strength – unaged	EN 12228 Method 1	1000N/100mm	
	Joint strength - after immersion in hot water	EN 13744 & EN 12228 Method 1		
Joint strength: Bonded seams	Joint strength – unaged	EN 12228 Method 2	25N/100mm	
	Joint strength - after immersion in hot water	EN 13744 & EN 12228 Method 2		

Property	Test Method	Condition	Requirement	
			FIFA Recommended Two Star	FIFA Recommended One Star
Tuft withdrawal	ISO 4919	Unaged	≥30N	≥30N
	EN 13744 & ISO 4919	After immersion in hot water	≥30N	≥30N
Tensile strength of shockpads and e-layers (if supplied as part of system)	EN 12230	Unaged	0.15Mpa	0.15Mpa
Water permeability[1] - using a single ring infiltrometer in which the artificial turf carpet is sealed prior to infilling and testing	EN 12616	Unaged	> 180mm/h[(2)]	> 180mm/h[(2)]

1 Not applicable to surfaces designed specifically for indoor use

2 To ensure adequate drainage of a field all individual elements of the football turf should satisfy this requirement. Any value above 2000mm/h shall be recorded as ">2000mm/h"

Table 2 – Product identification tests

Component	Characteristic	Test method	Permitted variation between laboratory component and manufacture's declaration
Artificial turf	Total mass per unit area	ISO 8543	≤ ± 10%
	Tufts per unit area Knots per unit area (woven carpets)[1]	ISO 1763	≤ ± 10%
	Tuft withdrawal force[2]	ISO 4919	≥ 90% of manufacturer's declaration
	Pile length above backing	ISO 2549	≤ ± 5%
	Total pile weight Pile weight above backing (woven carpets)[3]	ISO 8543	≤ ± 10%
	Water permeability	EN 12616 using a single ring infiltrometer	≥180mm/h[4]
Pile yarn(s)	Pile yarn characterisation	ISO 11357-3	Same polymer
	Pile dtex	See Note 1 below	≤ ± 10%
Performance infill (if supplied as part of system)	Particle size	EN 933 - Part 1	≤ ± 20%
	Particle shape	prEN 14955	Similar shape
	Bulk density	EN 1097-3	≤ ± 15%
	Composition	TGA	≤ ± 15% relative

1 Dtex (g per 10,000m) shall be calculated from the mean weight (measured to 0.01g) and mean length (measured to 1mm) of a minimum of 40 tufts removed from the artificial turf.

[1] A lot of woven carpets are using W bindings. Pay attention to count the complete W as one knot. It can be easier to count the number of knots by splitting warp and weft yarns or shearing off the pile yarns
[2] If all piles are breaking, then the tuft withdrawal force is bigger than this breaking force. Report the mean of the broken results
[3] Try to split warp and weft of the carpet. If the coating that is applied makes this impossible, shear off the piles following the procedure in ISO 8543. This is the pile weight above the backing
[4] Not applicable to surfaces designed specifically for indoor use

Component	Characteristic	Test method	Permitted variation between laboratory component and manufacture's declaration
Stabilising infill (if supplied as part of system)	Particle size	EN 933 - Part 1	≤ ± 20%
	Particle shape	prEN 14955	Similar shape
	Bulk density	EN 1097-3	≤ ± 15%
Shockpads / e-layers (if supplied as part of system)	Shock Absorption	EN 14808	≤ ± 5% Force Reduction
	Thickness	EN 1969	≥ 90% of manufacturer's declaration
Unbound sub-bases (if tested as part of system)	Composition	-	Same composition
	Particle size range (attach particle size grading to test report)	EN 933 - Part 1	≤ ± 20%
	Particle shape	prEN 14955	Similar shape

5 Field Test Requirements

5.1 Field tests procedures

When tested a field (pitch) shall fully satisfy the requirements of Table 3 in any position on the field using the methods of test specified. The field shall be tested in the positions specified in the FIFA Handbook of Test Methods for Football Turf. Field tests should not be made on joints or inlaid lines, other than ball roll that will cross them. Maintenance of the field shall not be undertaken during a field test.

If a field fails to satisfy the requirements of Table 3 the report must be completed and submitted to FIFA indicated what the field failed on. The field may be tested again at a later stage.

Metrological conditions during the field tests shall be as specified in the FIFA Handbook of Test Methods for Football Turf.

5.2 Visual inspection

During the field test programme the Field Test Institute shall make a visual inspection of the field to ensure there are no significant defects they consider to be hazardous to players. In particular there shall be no:

- failed or excessively open joints (greater than 3mm),
- no looped piles
- excessively uneven distribution of infill: difference in infill height should not exceed 10mm.
- exposed irrigation sprinkler heads within the playing area
- exposed goal post sockets

Checks will also be made to ensure line markings are straight (as appropriate).

If unacceptable joints, looped piles, non-straight lines or any other defect considered hazardous to play are found they shall be reported to the Licensee who shall rectify the defects to the satisfaction of the Field Test Institute prior to the Field Test Institute issuing the Field Test Report to FIFA.

Important note: The visual inspection undertaken by the Test Laboratory does not constitute a formal site audit and does not remove the legal responsibility of the installation company and or the facility operator to ensure the field is safe and fit for use. Neither FIFA or its accredited test laboratories accept any liability for any defects or other issues that subsequently result in a injury to a player or other users.

5.3 Material identification – first field test

In order to ensure the components of Football Turf installed on a field are the same as those previously tested in the laboratory the first field test shall include the identification tests detailed in Table 4. The maximum variation between the installed materials and the manufacturer's declaration, as detailed on the FIFA Quality Concept Laboratory Report, shall be as specified in Table 4.

The samples of artificial turf and infill shall be supplied to the laboratory when they undertake the field test. **Where alternative suppliers of infill materials to those detailed in the original laboratory test report are to be used, samples of the infill should also be submitted in advance of construction so that compliance of these materials with**

the requirements of the FIFA Handbook can be determined prior to installation. Samples should be submitted in adequate time so that if it is found they do not comply with the requirements of the FIFA Handbook a new laboratory test using the new materials can be made prior to installation of the Football Turf and subsequent field testing.

5.4 Material identification – field retests

To check that the Football Turf installed on a field has not been materially altered from that tested previously any retest shall include the identification tests detailed in Table 5 and the Football Turf shall comply with the requirements of Table 5.

5.5 Maintenance equipment

For a field to be certified under the FIFA Quality Concept for Football Turf the facility operator shall ensure that all the equipment specified by the surface manufacturer for the installed Football Turf product is available to maintain the field in accordance with the manufacturer's instructions. This may either be achieved by the facility operator purchasing the equipment or entering a service agreement with a specialist maintenance contractor of a combination of both. In the case of maintenance being outsourced, the manufacturer shall present written evidence of such an agreement to maintain the field.

Maintenance equipment on site must at least include a tractor unit, either a drag brush or drag mat, additional infill to top up the field and a ball roll ramp. If this is not the case, the test institute shall note this on the field test report and indicate the field as failed.

The facility operator shall ensure all required maintenance equipment is available for inspection by the test institute during the field test.

5.6 Sprinklers

FIFA do not endorse the use of sprinklers within the playing area of a football field. However, FIFA does acknowledge that occasionally sprinkler systems have to be installed within the playing area because, primarily due to a lack of water pressure available to project water from outside of the play area onto the central portion of the field; such systems have been installed in both natural and artificial turf football fields.

One of the primary aims of the *FIFA Quality Concept for Football Turf* is to take into consideration the comfort and safety of players. Therefore where a sprinkler system has been installed within the playing area there will be an additional test requirement to check that the sprinklers do not present an additional hazard to the players. The Field Test Institute will undertake Shock Absorbency and Vertical Deformation evaluation, in accordance with this manual, on two separate sprinklers (either side of the field). The values obtained must be within the requirements for the particular performance level that the field has been constructed to meet. Neither FIFA nor the field test institute shall be liable for any damage occurring to the sprinklers as a result of these tests. In requesting/allowing a FIFA field test the facility operator is deemed to have accepted this condition of test.

It should be clearly stated by the contractor responsible for installing the Football Turf whether or not additional maintenance work is required, to ensure the consistency of the

infill, after the sprinkler has been elevated and returned to its lowered position. If an additional maintenance procedure is required the Test Institute shall undertake a further test of Shock Absorbency and Vertical Deformation after the maintenance procedure to ensure the area above the sprinkler meets the requirements. Obviously to achieve this, the sprinkler system must be activated and the maintenance procedure carried out before the tests can take place.

5.7 Maintenance during field tests

Maintenance of the field shall not be undertaken during a field test.

Table 3 – Field Test Requirements

Characteristic	Test Method	Requirement			
		FIFA Recommended Two Star		FIFA Recommended One Star	
Vertical ball rebound	FIFA 01	60cm - 85cm		60cm - 100cm	
Ball roll	FIFA 03	Initial assessment	4m - 8m	Initial assessment	4m – 10m
		Re-tests after 12 months play	4m – 10m	Re-tests after 12 months play	4m – 12m
Shock Absorption	FIFA 04a	60% - 70%		55% - 70%	
Vertical Deformation	FIFA 05a	4mm – 10mm		4mm – 11mm	
Rotational Resistance	FIFA 06	30Nm - 45Nm		25Nm – 50Nm	
Surface regularity of playing surface	FIFA 12	<10mm		<10mm	

Table 4 - Material identification and consistency – first site test

Component	Characteristic	Test method	Permitted variation between manufacture's declaration and installed materials
Artificial turf	Mass per unit area	ISO 8543	≤ ± 10%
	Tufts per unit area	ISO 1763	≤ ± 10%
	Tuft withdrawal force	ISO 4919	≥ 90% of manufacturer's declaration
	Pile length above backing	ISO 2549	≤ ± 5%
	Total pile weight	ISO 8543	≤ ± 10%
	Water permeability of carpet (non infill)[5]	EN 12616 using a single ring infiltrometer in which the artificial turf carpet is sealed prior to testing	≥180mm/h and greater than 75% of laboratory result[6]
Pile yarn(s)	Pile yarn characterisation	ISO 11357-3	Same polymer
Performance infill (if supplied as part of system)	Particle size	EN 933 - Part 1	≤ ± 20%
	Particle shape	prEN 14955	Similar shape
	Bulk density	EN 1097-3	≤ ± 15%
	Composition	TGA	≤ ± 15% relative

[5] Outdoor pitches only. Compliance with this requirement may also be wavered by FIFA for fields located indoors or in arid parts of the world. Such wavers will be granted on a case by case basis and permission should be sought from FIFA at the design stage of a field's construction.

[6] If the result exceeds 2000mm/h, denote "> 2000mm/h"

Component	Characteristic	Test method	Permitted variation between manufacture's declaration and installed materials
Stabilising infill (if supplied as part of system)	Particle size	EN 933 - Part 1	≤ ± 20%
	Particle shape	prEN 14955	Similar shape
	Bulk density	EN 1097-3	≤ ± 15%
Shockpads / e-layers[7] (if supplied as part of system)	Shock Absorption	FIFA Test Method 4a	≤ ± 5% Force Reduction
	Thickness	EN 1969	≥ 90% of manufacturer's declaration

Table 5 - Material identification and consistency – site retests

Component	Characteristic	Requirement	Sampling procedure
Artificial grass[8]	Pile height (above primary backing)	≤ ± 5% of the value measured on the site sample tested during the initial site test	Measurements shall be made in four different areas of the field not subjected to high areas of wear or usage. The number of tufts per m^2 shall be calculated by multiplying the number of stitches per 100mm by the stitch gauge.
	Number of stitches per 100mm	The number of tufts per m^2 shall not differ by more than ± 10% of the manufacturer's declaration	
	Stitch spacing (mm)		

[7] When measured in at least four locations
[8] These measurements are made to check the carpet has not been replaced

Performance infill[9]	Particle grading	The largest sieve retaining at least 10% by mass of the infill shall be within the range detailed in the manufacturer's declaration forming Section 4 of the product's FIFA Laboratory Test Report.	A minimum sample of 250g shall be taken from the top portion of the performance infill (20mm) on each of the six tests positions detailed in the FIFA Handbook of Test Methods for Football Turf. The infill shall be graded in accordance with EN 933 Part 1 and the largest sieve retaining at least 10% by mass of the infill determined.

[9] This test is carried out to ensure that coarser infill material has not been installed on the field

6 Field dimensions and markings

6.1 Field dimensions

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

Length: minimum 90.0m, maximum 120.0m

Width: minimum 45.0m, maximum 90.0m

Run-offs shall be in accordance with national and or competition rules. In the absence of any such rules a minimum of 3m per boundary is recommended. Provision of adequate run-offs does not form part of the FIFA Quality Concept.

Note: International Matches must be played on a field with following dimensions

Length:
minimum 100 m (110 yds)
maximum 110 m (120 yds)

Width:
minimum 64 m (70 yds)
maximum 75 m (80 yds)

6.2 Field Markings

The field shall be field marked in accordance with Law 1 - The Field of Play as detailed in the Laws of the Game.

Note: If a FIFA certified field is to be used for competition the respective competition regulations must be met and checked by the responsible local authorities.

In accordance with the decisions of the International Football Association Board:

No kind of commercial advertising, whether real or virtual, shall be permitted on the field of play and field equipment from the time the teams enter the field of play until they have left it at half time and from the time the teams re-enter the field of play until the end of the match. In particular no advertising material of any kind may be displayed on goals nets flag-posts or their flags (Decision 3)

The reproduction of, whether real or virtual of representative logos or emblems of FIFA, confederations, member associations leagues clubs or other bodies is forbidden on the field of play and field equipment (including goal nets and areas they enclose) during playing time, as described in Decision 3 (Decision 5).

7 Maintenance requirements

At the time of submitting a Football Turf for laboratory testing the Licensee shall provide the Accredited Test Laboratory with a fully descriptive list (including photographs) of all equipment required to under routine maintenance of the surface. This list shall form part of the FIFA Laboratory Test Report.

At each Field Test (initial and retests) the Test Institute will compare the Licensee's list of equipment to that present on site with supportive photographic evidence. Where the maintenance equipment is held by a third party it will be necessary for the licensee to supply a copy of the maintenance contract to the Testing Institute.

At handover of the field the Licensee shall provide the owner/operator with a maintenance log with instructions that the owner/operator complete it in accordance with the maintenance instructions.

When requesting a FIFA Field Test Report Number from FIFA in advance of the field retest the Licensee shall provide a copy of the maintenance log (in electronic format i.e. a scanned copy of original) for the preceding 12 months. If required by FIFA the Licensee shall translate the maintenance log into English.

When requesting a FIFA Field Test Report Number from FIFA in advance of an initial test or field retest the Licensee shall also confirm in writing the ground staff responsible for maintaining the field have been trained and are deemed competent; this shall include details of all training (including dates) undertaken.

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ANNEX A

Laboratory test report

ANNEX B

Field test report – FQC Two Star Category

ANNEX C

Field test report - One Star Category

ANNEX D

Field test report – FQC Two Star Category Retest

ANNEX E

Field report – FQC One Star Category Retest

Annex F - General requirements

F1 Gloss

It is not acceptable to incorporate materials or constructions that will cause glare from the reflection of sunlight or artificial lighting to players.

F2 Bearing Capacity

The formation and sub-soil should have sufficient bearing capacity to support the playing surface and any machinery used to maintain the surface. The bearing capacity can be assessed using methods described by EN/TC 250/SC7. No responsibility shall be accepted for any damage caused to the surface by the use of equipment or structures (e.g. collapsible seating) that the surface was not intentionally designed for.

F3 Staining

Every effort should be employed to use non-staining materials where practicable.

F4 Toxicology

The manufacturer should be asked to supply to the purchaser an assurance that the sports surface together with its supporting layers, does not contain in its finished state any substance which is known to be toxic, mutagenic, teratogenic or carcinogenic when in contact with the skin. Furthermore that no such substances will be released as a vapour or dust during normal use.

F5 Environmental Compatibility

The manufacturer and purchaser shall make abide by all local relevant environmental legislation during the construction, material utilisation, operation and disposal of the surface and it's supporting layers.

F6 Climatic Conditions

The manufacturer and purchaser shall take into consideration the prevailing climatic conditions when designing the surface specification.

F7 Resistance to fire

When installing an artificial turf surface the manufacturer / supplier shall ensure the completed installation complies with all relevant building and fire safety regulations.

Annex G - Factory Quality Control Procedures

G.1 Introduction

This specifies a factory production control system for constituent components to ensure that they conform to the relevant requirements of this standard.

The performance of the factory production control system shall be assessed according to the principles used in this document.

Note: The overall quality of the surface remains the responsibility of the licensee.

G.2 Organization

G.2.1 Responsibility and authority

It will be necessary to produce a quality assurance line management diagram outlining the individuals responsible for quality. One individual shall be highlighted as the contact person in cases of quality disputes. These individuals should have the capability to:

- Initiate action to prevent the occurrence of product non-conformity;
- Identify, record and deal with any product quality deviations.

G.2.2 Management representative for factory production control

For every manufacturing plant the licensee must satisfy himself that an appropriately qualified person with appropriate authority will ensure that the requirements given in this document are implemented and maintained.

G.2.3 Management review

The factory production control system adopted to satisfy the requirements of this document shall be audited and reviewed at appropriate intervals to ensure its continuing suitability and effectiveness. Records of such reviews shall be maintained. It is assumed that for most manufacturers this would be covered within an ISO 9000 scheme.

G.3 Control procedures

The licensee shall establish and maintain a factory production control manual setting out the procedures by which the requirements for factory production control are satisfied for those products he directly produces. Furthermore they should establish similar procedures for all suppliers of products that are part of their systems.

G.4 Document and data control

Document and data control shall include those documents and data that are relevant to the requirements of this standard covering purchasing, processing, inspection of materials and the factory production control system documents.

A procedure concerning the management of documents and data shall be documented in the production control manual covering procedures and responsibilities for approval, issue, distribution and administration of internal and external documentation and data; and the preparation, issue and recording of changes to documentation.

G.5 Sub-contract services

If any part of the operation is sub-contracted by the producer a means of control shall be established. The producer shall retain overall responsibility for all components sub-contracted.

G.6 Knowledge of the raw material

There shall be documentation detailing the nature of the constituent parts as specified in the licensees Technical Data Sheets.

It is the licensee's responsibility to ensure that if any dangerous substances are identified their content does not exceed the limits in force.

Note: See EU Council Directive 76/769/EEC.

G.7 Management of production

The factory production control system shall fulfil the following requirements:

- There shall be procedures to identify and control the materials.

Note: these can include procedures for maintaining and adjusting processing equipment, inspection or testing material sampled during processing, etc.

- There shall be procedures to identify and control any hazardous materials identified above to ensure that they do not exceed the limits.
- There shall be procedures to ensure that material is put into stock in a controlled manner and the storage conditions are appropriate for the materials being stored.
- Certain materials are known to deteriorate in storage. There shall be procedures to ensure that material taken from stock has not deteriorated in such a way that its conformity is compromised.
- The product shall be identifiable up to the point of sale as regards source and type.

G.8 Inspection and test

G.8.1 General

The licensee shall ensure that they have all the necessary facilities, equipment and trained personnel to carry out the required inspections and tests.

G.8.2 Equipment

The licensee shall be responsible for the control, calibration and maintenance of inspection, measuring and test equipment

Accuracy and frequency of calibration shall be in accordance with the appropriate standards.

Equipment shall be used in accordance with documented procedures.

Equipment shall be uniquely identified.

Calibration records shall be retained.

G.8.3 Frequency and location of inspection, sampling and tests

The production control document shall describe the frequency and nature of inspections.

G.8.4 Records

The results of factory production control shall be recorded including sampling locations, dates and times and product tested with any other relevant information.

Where the product inspected or tested does not satisfy the requirement laid down in the specification, or if there is an indication that it shall not do so, a note shall be made in the records of the steps taken to deal with the situation (e.g. carrying out of a new test and/or measures to correct the production process).

The records required by all the clauses of this standard shall be included.

The records shall be kept for at least the statutory period.

Note: "Statutory period" is the period of time records are required to be kept in accordance with regulations applying at the place of production.

G.9 Control of non-conforming product

Following an inspection or test that indicates that a product does not conform, the affected material shall be:

- Reprocessed; or
- Diverted to another application for which it is suitable; or
- Rejected and marked as non-conforming.

All cases of non-conformity shall be recorded by the producer, investigated and if necessary corrective action shall be taken.

Note: Corrective actions can include:

- Investigation of the cause of non-conformity including an examination of the testing procedure and making any necessary adjustments;
- Analysis of processes, operations, quality records, service reports and customer complaints to detect and eliminate potential causes of non-conformity;
- Initiating preventive actions to deal with problems to a level corresponding to the risks encountered;
- Applying controls to ensure that effective corrective actions are taken;

- Implementing and recording changes in procedures resulting from corrective action.

G.10 Handling, storage and conditioning in production areas

The manufacturer shall make the necessary arrangements to maintain the quality of the product during handling and storage. This is of particular importance to those materials that may deteriorate in storage.

G.11 Transport and packaging

The producer's factory production control system shall identify the extent of his responsibility in relation to storage and delivery.

Products should be packaged appropriately to prevent any damage of the materials in transit. Any precautions necessary to achieve this during handling and storage of the packaged goods shall be marked on the packaging or accompanying documents.

G.12 Training of personnel

The producer shall establish and maintain procedures for the training of all personnel involved in the factory production system. Appropriate records of training shall be maintained.

G.13 Minimum test frequencies for general properties

The manufacturer shall be asked to give details of the frequency which the products are tested for compliance with the product data sheet. If it is felt that these are inadequate then extra testing maybe requested and/or third party attestation.

G.14 Communication

Before any goods are to leave the factory for site installation the product quality assurance sheets should be signed and dispatched to a third party for attestation. These documents should state unequivocally the testing that has taken place and the frequency of testing.

The minimum testing that is acceptable is full compliance with the technical data sheet for that product. If the data sheet is deemed to be inadequate more testing can be requested to show compliance with the data sheet.

Only upon approval from the third party attestation should the goods be dispatched. This does not however pass the responsibility of quality assurance onto the third party. At all times the quality assurance of the product (including its constituent parts) and the installation is the sole responsibility of the licensee.

Third party attestation would usually be provided by the test laboratory undertaking the field test.

Site samples will be taken by third party's (FIFA accredited test laboratory or FIFA's appointed representatives) in accordance with the requirements of the FIFA Quality Concept for Artificial Turf. The above quality assurance measures are additional to the provisions outlined in the FIFA Quality Concept for Artificial Turf Manual.

G15 **Design and construction verification**

As requested by FIFA the FIFA licensee shall make available all design drawings and bills of quantities for any field submitted for FIFA certification together with details of materials actually used during the constriction. This shall include:

i) Depth of sub-base materials, density of sub-base materials (when compacted), tonnage of material delivered to site (checked against delivery notes)

Ii Length and type of drainage pipes delivered to site (checked against delivery notes)

ii) Quantity and quality of drainage aggregate delivered to site (checked against delivery notes)

iii) Quantity and quality of synthetic grass delivered to site (checked against delivery notes)

iv) Quantity and quality of infill sand delivered to site (checked against delivery notes)

v) Quantity and quality of infill rubber/elastomer delivered to site (checked against delivery notes)

vi) Quantity and quality of adhesive delivered to site (checked against delivery notes)

vii) Quantity and quality of seaming tape delivered to site (checked against delivery notes)

viii) Quantity and quality of sewing thread delivered to site (checked against delivery notes)

ix) Quantity and quality of sports equipment delivered to site (checked against delivery notes)

x) Quantity and quality of maintenance equipment delivered to site (checked against delivery notes)

xi) Quantity and quality of edging kerbs delivered to site (checked against delivery notes)

xii) Quantity and quality of haunching materials delivered to site (checked against delivery notes)

xiii) Quantity and quality of additional contract materials delivered to site for example perimeter paths (checked against delivery notes)

xiv) Quantity and quality of maintenance testing equipment delivered to site (checked against delivery notes)

All information shall be sent to:

FIFA
FIFA Quality Concept for Football Turf
FIFA STRASSE 20
8044 ZURICH
SWITZERLAND