



FIFA Natural-Pitch Rating System

Natural Playing Surfaces Quality Programme

May 2022, version 1.0



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1. Introduction

The purpose of the following document is to improve the overall quality of natural playing surfaces by implementing a rating system that allows the quality of the surfaces to be objectively assessed. This document only discusses the generic testing protocols, test positions and the rating system. All the detailed test methods can be found in the Natural Playing Surfaces Test Manual.

(<https://www.fifa.com/technical/football-technology/standards/natural-playing-surfaces>)

For tournament organisers, the rating system has been developed to help them identify where resources are most needed and to assess the potential risks relating to the playing surface quality before the tournament.

The rating system is intended to be an efficient tool for ground staff in their day-to-day work and to help them keep a record of the surface quality.

2. Test methods and field test positions

For the Natural Playing Surfaces Quality Programme, the different systems are categorised as follows:

Natural playing surfaces			
Fully natural	Natural reinforced root zone	Natural in-situ stitched fibres	Natural synthetic carpet based
Traditional construction for natural turf using only natural materials, including sand.	Synthetic elements added to the root-zone profile of the natural turf to provide reinforcement.	Synthetic fibres stitched into the natural surface with natural turf growing within the fibres.	Synthetic carpet laid in the surface with natural turf growing within the carpet.

Two types of on-site assessment have been developed: the full and the reduced assessment.

The full assessment is designed to be performed by a FIFA-accredited test institute to assess the performance of a new or existing pitch, or the performance of a surface prior to a tournament.

The **reduced assessment** is designed to be regularly performed by the ground staff in charge of monitoring the preparation of a pitch for a tournament or as part of a regular quality control process.

Characteristic	Test method	Test apparatus	Full assessment – test positions	Reduced assessment – test positions
Performance	Vertical ball rebound	Vertical ball rebound	A, L, K, J, Q, H	<i>optional testing</i>
	Ball roll	Ball roll ramp	A, L, K, J, Q, H	<i>optional testing</i>
	Shock absorption	Advanced Artificial Athlete	All test locations (A to S)	<i>optional testing</i>
	Vertical deformation	Advanced Artificial Athlete	All test locations (A to S)	<i>optional testing</i>
	Rotational resistance	Lightweight rotational resistance apparatus	A, L, K, J, Q, H	<i>optional testing</i>
	Evenness	three-metre straightedge	All playing surfaces	All playing surfaces
Agronomy	Surface hardness	Impact tester	All test locations (A to S)	A, L, K, J, Q, H
	Compaction severity	Penetrometer	A, L, K, J, Q, H	<i>optional testing</i>
	Infiltration rate	Two concentric cylinders	A, L, K, J, Q, H	<i>optional testing</i>
	Normalised difference vegetation index (NDVI)	NDVI handheld device	All test locations (A to S)	<i>optional testing</i>
	Sward height	Prism	A, L, K, J, Q, H	A, L, K, J, Q, H
	Root depth	Steel ruler	A, L, K, J, Q, H	A, L, K, J, Q, H
	Thatch depth	Steel ruler	A, L, K, J, Q, H	A, L, K, J, Q, H
	Sward colour	Visual assessment	A, L, K, J, Q, H	A, L, K, J, Q, H
	Ground coverage %	Square frame	A, L, K, J, Q, H	A, L, K, J, Q, H
	Weed content %	Square frame	A, L, K, J, Q, H	A, L, K, J, Q, H
	Insect pests	Square frame	A, L, K, J, Q, H	A, L, K, J, Q, H
	Diseases	Square frame	A, L, K, J, Q, H	A, L, K, J, Q, H
	Volumetric soil moisture content	Moisture probe	A, L, K, J, Q, H	A, L, K, J, Q, H

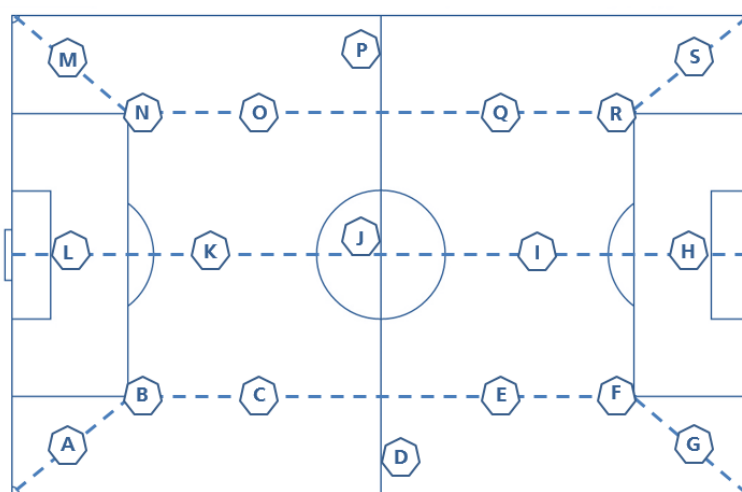


Figure 1: Field test positions

3. Official FIFA reports

Official FIFA reports can only be generated using the test results uploaded to the FIFA quality programme database by FIFA-accredited test institutes. FIFA accredits specialised test institutes for each of its quality programmes by carrying out comprehensive quality control and inter-laboratory testing every year. Only accredited test institutes can perform official FIFA testing and request an official FIFA report.

4. Rating system for pitches mainly intended for professional football

4.1 Rating system

For each quantifiable characteristic, rating goes from “unacceptable” to “excellent”. The lowest rating (unacceptable quality) is awarded 1 point and the highest is awarded 10 points. Ratings can be specifically designed for warm or cool season grass (all/warm/cool).

The rating system uses the following point system:

Unacceptable quality	Poor quality	Satisfactory quality	Good quality	Excellent quality
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- Unacceptable quality – 1 point
- Poor quality – 3 points
- Satisfactory quality – 5 points
- Good quality – 7 points
- Excellent quality – 10 points

When the characteristics can be evaluated for consistency, the following is used:

Highly variable	Variable	Normal variability	Consistent	Very consistent
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- Highly variable – 1 point
- Variable – 3 points
- Normal variability – 5 points
- Consistent – 7 points
- Very consistent – 10 points

Consistency will not be considered for the pitch rating score if the characteristic is rated as “unacceptable quality” or “poor quality”.

There are only three categories in the subjective assessment:

Major concerns with the pitch under consideration	Minor concerns with the pitch under consideration	No concerns with the pitch under consideration
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- Major concerns with the pitch under consideration – 1 point
- Minor concerns with the pitch under consideration – 5 points
- No concerns with the pitch under consideration – 10 points

4.2 Weighting and pitch rating score

Each parameter (characteristic, consistency, and subjective assessment) is weighted based on its overall importance to the performance of the pitch.

The pitch rating score is expressed as a percentage (%) representing the sum of each characteristic score multiplied by its characteristic weighting divided by the maximum score possible.

The calculation of the overall score is:

$$\text{Overall score (\%)} = \frac{\sum \text{characteristic score (1 to 10)} \times \text{characteristic weighting}}{\sum \text{characteristic maximum score (10)} \times \text{characteristic weighting}}$$

Characteristic	All/warm/ cool season grass	Unacceptable quality (1 point)	Poor quality (3 points)	Satisfactory quality (5 points)	Good quality (7 points)	Excellent quality (10 points)	WEIGHTING
Vertical ball rebound	All	<0.45m or >1.15m	0.45-0.49m or 1.11-1.15m	0.50-0.59m or 1.01-1.10m		0.60-1.00m	4
Vertical ball rebound – consistency	All	>±25%	±25%	±20%	±15%	±10%	0.5
Ball roll	All	<3.0m or >15.0m	3.0-3.9m or 12.1- 15.0m	10.1-12.0m		4.0-10.0m	4
Ball roll – consistency	All	>±25%	±25%	±20%	±15%	±10%	0.5
Shock absorption	All	<40.00%FR or >80.0%FR	40.0-44.9%FR or 75.1-80.0%FR	45.0-49.9%FR or 70.1-75.0%FR	50.0-54.9%FR	55.0-70.0%FR	9
Shock absorption – consistency	All	>±25%	±25%	±20%	±15%	±10%	0.5
Vertical deformation	All	<3.0mm or >14.0mm	12.1-14.0mm	3.0-4.0mm or 11.1-12.0mm		4.0-11.0mm	4
Vertical deformation – consistency	All	>±25%	±25%	±20%	±15%	±10%	0.5
Rotational resistance	All	<15.0Nm or >60.0Nm	15.0-19.9Nm or 55.1-60.0Nm	20.0-24.9Nm or 49.9-55.0Nm		25.0-50.0Nm	6
Rotational resistance – consistency	All	>±25%	±25%	±20%	±15%	±10%	0.5

Characteristic	All/warm/ cool season grass	Major concerns with the pitch under consideration (1 point)	Minor concerns with the pitch under consideration (5 points)	No concerns with the pitch under consideration (10 points)	WEIGHTING
Evenness (10mm)	All	No deformation >30mm	No deformation >20mm	No deformation >10mm	5

Characteristic	All/warm/ cool season grass	Unacceptable quality (1 point)	Poor quality (3 points)	Satisfactory quality (5 points)	Good quality (7 points)	Excellent quality (10 points)	WEIGHTING
Surface hardness	All	<40.0CIV or >100.0CIV	40.0-49.9CIV or 95.1-100.0CIV	50.0-59.9CIV or 90.1-95.0CIV	60.0-69.9CIV or 85.1-90.0CIV	70.0-85.0CIV	10
Surface hardness – consistency	All	>±30%	±30%	±20%	±15%	±10%	10
Compaction severity	Cool	<1.50MPa or >7.00MPa	6.01-7.00MPa	4.01-6.00 MPa	2.51-4.00MPa	1.50-2.50MPa	3
	Warm	<1.50MPa or >7.00MPa	6.01-7.00MPa	4.01-6.00 MPa	3.01-4.00MPa	1.50-3.00MPa	3
Compaction severity – consistency	All	>±50%	±50%	±40%	±20%	±15%	0.5
Infiltration rate	Cool	<40mm/h	40-50mm/h	51-100mm/h	101-150mm/h	>150mm/h	8
	Warm	<40mm/h	40-50mm/h	51-100mm/h	101-150mm/h	>150mm/h	8
Infiltration rate – consistency	All	>±50%	±50%	±40%	±20%	±15% (or ≥200mm/h)	0.5
Normalised difference vegetation index (NDVI)	Cool	<0.60NDVI	0.60-0.69 NDVI	0.70-0.74NDVI	0.75-0.79NDVI	≥ 0.80NDVI	6
	Warm	<0.30NDVI	0.30-0.59 NDVI	0.60-0.64NDVI	0.65-0.69NDVI	≥ 0.70NDVI	6
Normalised difference vegetation index (NDVI) – consistency	All	>±25%	±25%	±20%	±15%	±10%	0.5
Visual inspection (divots, footmarks, etc.)	All	Extensive	Widespread	Localised	Occasional	Very occasional	3
Visual inspection (divots, footmarks, etc.) – size	All	Very large	Large	Medium	Small	Very small	3

Characteristic	All/warm/ cool season grass	Unacceptable quality (1 point)	Poor quality (3 points)	Satisfactory quality (5 points)	Good quality (7 points)	Excellent quality (10 points)	WEIGHTING
Sward height	Cool	<15.0mm or >55.0mm	15.0-17.9mm or 45.1-55.0mm	18.0-19.9mm or 35.1-45.0mm	20.0-21.9mm or 28.1-35.0mm	22.0-28.0mm	5
	Warm	<15.0mm or >45.0mm	15.0-17.9mm or 35.1-45.0mm	28.1-35.0mm	18.0-19.9mm or 25.1-28.0mm	20.0-25.0mm	5
Sward height – consistency	All	>±30%	±30%	±20%	±15%	±10%	0.5
Root depth	Cool	<50.0mm	50.0-69.9mm	70.0-84.9mm	85.0-99.9mm	≥100.0mm	5
	Warm	<50.0mm	50.0-69.9mm	70.0-84.9mm	85.0-99.9mm	≥100.0mm	5
	Hybrid carpet- based or stitched	<30.0mm	30.0-39.9mm	40.0-44.9mm	45.0-49.9mm	>50.0mm	5
Thatch depth (or mat)	Cool	>7.0mm	7.0-5.1mm	5.0-3.1mm	3.0-1.1mm	≤1.0mm	5
	Warm	>25.0mm	25.00-15.1mm	15.0-10.1mm	10.0-6.1mm	≤6mm	5
Uniformity of sward – colour	All	Highly variable	Variable	Normal variability	Consistent	Very consistent	5
Ground coverage	Cool	<75.0%	75.0-84.9%	85.0-89.9%	90.0-94.9%	95.0-100.0%	8
	Warm	<75.0%	75.0-84.9%	85.0-89.9%	90.0-94.9%	95.0-100.0%	8
Ground coverage – consistency	All	>±50%	±50%	±40%	±20%	±15%	0.5
Weed content	All	>2.5%	2.50-1.01%	1.00-0.51%	0.50-0.11%	0.10-0.00%	5
Insect pests	All	>10.00%	10.00-1.01%	1.00-0.51%	0.50-0.11%	0.10-0.00%	5
Diseases	All	>10.00%	10.00-1.01%	1.00-0.51%	0.50-0.11%	0.10-0.00%	5
Volumetric soil moisture content	Cool	<10.0%	10.0-14.9%	15.0-19.9%	20.0-24.9%	25.0-30.0%	For information
	Warm	<5.0% or >35.0%	5.0-9.9% or 30.1- 35.0%	10.0-11.9% or 25.1-30.0%	12.0-14.9% or 20.1-25.0%	15.0-20.0%	For information
Volumetric soil moisture content – consistency	All	>±40%	±40%	±30%	±20%	±15%	3
pH (site testing)	All	<4.5 or >8.5	4.5-4.9 or 8.1-8.5	5.0-5.9 or 7.6-8.0	6.0-6.4 or 7.1-7.5	6.5-7.0	For information
pH (lab testing)	All	<4.5 or >8.5	4.5-4.9 or 8.1-8.5	5.0-5.9 or 7.6-8.0	6.0-6.4 or 7.1-7.5	6.5-7.0	For information
Soil health analysis	All	Unacceptable quality	Poor quality	Satisfactory quality	Good quality	Excellent quality	For information