



PERFORMANCE AND CONSTRUCTION STANDARDS

For Synthetic Turf Rugby League Competition
and Training Pitches

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**» 1 /
INTRODUCTION**

» THE DEVELOPMENT OF SYNTHETIC TURF SURFACES THAT REPLICATE THE PLAYING QUALITIES OF NATURAL TURF BUT SUSTAIN MUCH HIGHER LEVELS OF USE HAS LED TO THEIR INCREASING USE FOR THE GAME OF RUGBY LEAGUE.

To ensure these new forms of surface provide a satisfactory playing environment that will not increase the risk of injury to players and are of adequate durability the National Rugby League Limited has commissioned the development of these performance and construction standards for synthetic turf Rugby League pitches. The standards have been prepared by Labosport an independent laboratory specialising in the testing of sports surfaces (www.labosport.co.uk).

The standard is based on European Standard BS EN 15330-1: Surfaces for Sports Arenas: Specification for Synthetic Turf and Needle-punched surface: Part 1 – Specification for synthetic turf surfaces⁽¹⁾, modified for the specific requirements of Rugby League and takes into account the results of a comprehensive study by Labosport into the performance of natural turf pitches during the winter of 2010 and summer of 2011.

As it is likely that many synthetic turf Rugby League pitches will also be used for Football or Rugby Union the Standard has been aligned with the requirements of FIFA⁽²⁾ (as adopted by the FA) and IRB Regulation 22⁽³⁾ wherever possible.

To ensure only synthetic turf pitches that satisfy this Standard are used for Rugby League facilities the NRL has adopted a three-stage process of pitch certification as follows:

Stage 1 – product type approval – the synthetic turf surface is subjected to a comprehensive series of laboratory tests that assess its performance, durability and material qualities. Only synthetic turf surfaces that have been tested and shown to comply with the laboratory requirements of this standard can be considered for possible selection when designing a synthetic turf Rugby League pitch.

Stage 2 – initial facility testing and certification – following construction the pitch is tested to verify the synthetic turf surface has been installed correctly and is providing the anticipated levels of performance. The NRL require all synthetic turf pitches that are to be used for competitive play or training to be tested and the results notified to the NRL within three months of construction.

Stage 3 – pitch recertification – the pitch is re-tested throughout its life to demonstrate it is still providing a satisfactory and safe playing environment. Stadium Category pitches shall be re-tested annually, whilst Community Category pitches shall be tested once every two years. A field may be re-tested up to two months in advance of its re-test date.

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**NRL PERFORMANCE
AND CONSTRUCTION
STANDARDS FOR
SYNTHETIC TURF
PITCHES**





2.1 Introduction

The NRL Performance and Construction Standard for Synthetic Turf Pitches details the requirements for synthetic turf surfaces used for Rugby League (training and competition). The standard comprises two parts and for a pitch to meet the Standard it must comply with both. Part 1 comprises a series of laboratory tests that are designed to assess the ability of a synthetic turf surface to provide the required levels of player/surface and ball/surface interaction, together with tests that assess the durability and quality of materials used to form the surface.

Part 2 of the Standard details the requirements for field tests. These tests are undertaken following construction of a pitch to ensure it has been constructed correctly and is achieving the required levels of performance and then periodically through the life of the pitch to ensure it is retaining acceptable playing characteristics.

This Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications will apply to this Standard only when incorporated into it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

2.2 Test laboratories

Laboratory and pitch tests shall only be undertaken by laboratories operating a quality system accredited to ISO 17025 for the principal sports performance tests. A list of suitable laboratories may be obtained from the NRL. The laboratory appointed to undertake a pitch test shall not have been involved in the design, specification or procurement of the pitch.

2.3 Definitions

A synthetic turf surface comprises the synthetic turf carpet and infill plus shockpad and any supporting layers that are designed to influence the sports performance or biomechanical response of the surface. Tests shall be made on all elements of the construction that influence the sports performance or biomechanical response of the surface.

The designation BS used to reference test procedures in this Standard refers to 'British Standard'. British Standards are published by the British Standards Institution (www.bsigroup.com).

2.4 Laboratory test specimens

Test specimens shall be prepared strictly in accordance with the manufacturer's instructions and BS EN 12229. If required this may include additional consolidation of the infill by means of a conditioning roller or other means (up to a maximum of 250 passes by the roller). The same conditioning procedure shall be used on all test specimens being prepared for player/surface and ball/surfaces tests.

2.5 Laboratory test bases

Unless a synthetic turf surface is laid on a base that is designed to contribute to the dynamic performance of the surface laboratory tests shall be carried out on test specimens laid on a rigid flat floor.

If an synthetic turf surface is laid on a base that is designed to contribute to the dynamic performance of the surface the measurements of shock absorption, vertical deformation, energy restitution, HIC and ball rebound shall be made on a test specimen comprising the synthetic turf surface and the base, laid to the depth specified by the manufacturer or supplier.

2.6 Laboratory test conditions

Laboratory tests shall be made at an ambient laboratory temperature of $23 \pm 2^{\circ}\text{C}$.

Test specimens shall be conditioned for a minimum of 3 hours at the laboratory temperature prior to test.

2.7 Laboratory test specimen conditioning

2.7.1 Wet test specimens

Laboratory tests shall be made on dry and wet test specimens, as specified in the appropriate test procedure.

Wet specimens shall be prepared by evenly applying to the test piece a volume of water that thoroughly soaks the specimen (if in doubt this should be equal to the volume of the test specimen). Care shall be taken when applying the water to ensure it does not disturb the infill within the carpet; the use of a fine hose spray or fine rose on a watering can is recommended. Following wetting the test specimen shall be allowed to drain for 15 minutes and the test carried out immediately thereafter.

2.7.2 Resistance to simulated use

Test specimens shall be conditioned in general accordance with BS EN 15306 with transverse movement of the test specimen. The number of conditioning cycles shall be 20,200 cycles and dispersed infill shall be reapplied to the test specimen every 2,500 cycles.

2.7.3 Water ageing

Test specimens shall be conditioned in accordance with BS EN 13744.

2.7.4 Air ageing

Test specimens shall be conditioned in accordance with BS EN 13817.

2.7.5 Resistance to artificial weathering

Test specimens shall be conditioned in accordance with BS EN 14836.

2.8 H.I.C tests

H.I.C tests shall be made in accordance with BS EN 1177. In order to assess the effects of compaction of any infill materials, surfaces shall be tested as loose particulate materials and three repeat tests be made at each drop height on the same location and the highest H.I.C. value. A minimum of five drop heights shall be used with at least two giving H.I.C. values in excess of 1000.

To assess the performance of test specimens subjected to simulated wear three individual tests shall be made from a fall height of $1.30 \pm 0.01\text{m}$ and the mean HIC value of the three impacts calculated. Each test shall be made in a new test position.

2.9 Ball rebound

To verify surfaces have acceptable ball rebound characteristics ball rebound shall be measured in accordance with BS EN 12335. As the shape of a Rugby League ball prevents reproducible results, tests shall be made with a football as described in BS EN 12335.

2.10 Shock absorption and vertical deformation

Laboratory tests for shock absorption and vertical deformation shall be made using an Advanced Artificial Athlete as described in the IRB Artificial Rugby Turf Performance Specification (3) and the working documents of CEN TC 217 WG11.

Field tests shall also be undertaken using and Advanced Artificial Athlete unless a second sport being played on the pitch requires it to be tested using an Artificial Athlete. In such cases shock absorption shall be measured in accordance with EN 14808 and Vertical Deformation in accordance with EN 14809. When an Artificial Athlete is used the shock absorption values shall be as detailed in this Standard and the Vertical Deformation requirements shall be reduced by 1.5mm.

2.11 Energy Restitution

The measurement of energy restitution using the Advanced Artificial Athlete is a new testing procedure for which expertise is still being gathered. At this stage the values detailed in this Standard are target values. Products and pitches will not be excluded if they fall outside the target range but purchasers should be aware that such products and fields may have different dynamic properties to natural turf fields, particularly in drier conditions.

2.12 Requirements

2.12.1 Categories of performance

Two categories of performance are specified. The category designated *Stadium* is intended to replicate the playing qualities of top level natural turf playing surfaces and is intended for pitches used for professional matches and training. The category designated *Community* has wider ranges of acceptability that are intended to replicate the playing qualities found on good quality community natural turf fields.

2.12.2 Laboratory tests

The synthetic turf system shall satisfy the Laboratory Test Requirements of Table 1.

Copies of test reports showing the results of the laboratory tests shall be sent to:

Martin Meredith
T +61 2 9359 8646
E mmeredith@nrl.com.au

2.12.3 Pitch tests

For a pitch to comply with the NRL's *Performance and Construction Standard for Synthetic Turf Pitches* it shall be surfaces with an synthetic turf that meets the laboratory test requirements of the Standard and meets the Field Test Requirements detailed in Table 2.

Tests on site shall be made in the positions shown of Figure 1.

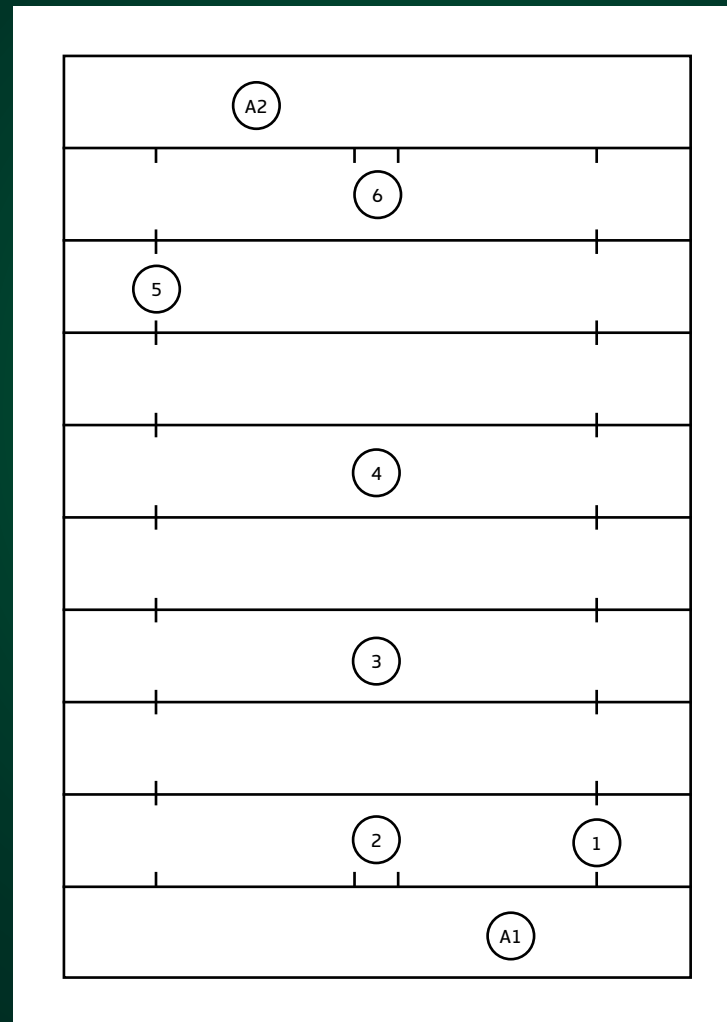
All the performance tests detailed in Table 2 shall be undertaken in positions 1 – 6. Shock Absorption, and HIC shall also be measured in positions A1 and A2. Tests may also be made in additional positions if their performance is of concern.

Infill depths and free pile heights shall be measured on a 10m grid across the pitch and end zones.

All other tests shall be made under the prevailing site conditions.

The surface and ambient temperatures and the ambient relative humidity at the time of test shall be recorded and reported.

Figure 1 – Pitch test positions



The results of all pitch tests shall be detailed on a NRL Synthetic Turf Pitch Test Report (see Appendix A), a copy of which shall be submitted within three weeks of a pitch test to:

Martin Meredith
T +61 2 9359 8646
E mmeredith@nrl.com.au

2.12.4 Product identification

As part of the laboratory test programme, each element forming the synthetic turf surface shall be characterised using the test methods specified in Table 3 and the results of the tests shall be within the tolerances specified in Table 3 when compared to the manufacturer's declared values for each property. The manufacturer's declared values shall be reported in the laboratory test report.

In order to ensure the components of the synthetic turf surface installed on a pitch are the same as those previously tested in the laboratory the initial pitch test shall also include the identification tests detailed in Table 3. The maximum variation between the installed materials and the manufacturer's declared values shall be as specified in Table 3.

2.12.5 Logos

If a pitch is to incorporate permanent logos within the playing area or end zones the logos shall be manufactured from the same quality of synthetic turf and infill and the main playing area and all yarn colours used in the logo shall satisfy the Resistance to Artificial Weathering requirements of this Standard.



Table 1 – Laboratory test requirements

Property	Test Method	Test Condition	Requirement	
			Stadium use surfaces	Community use surfaces
Head Injury Criterion	BS EN 1177	Dry	≥ 1.3m	≥ 1.3m
		Wet		
		After simulated use		HIC ≤ 1000 at drop height of 1.3m
Shock Absorption	AAA	Dry		
		Wet	50% – 65%	50% – 70%
		After simulated use		
		-5°C	≥ 50%	
Vertical Deformation	AAA	40°C	50% – 65%	50% – 70%
		Dry		
		Wet	3.0 – 8.5mm	≤ 11.0mm
Energy Restitution (target range non-mandatory)	AAA	After simulated use		
		Dry	20% – 40%	20% – 50%
		Wet		
Rotational Resistance – studded sole	BS EN 15301-1 Football stud sole	After simulated use		
		Dry	35 – 50Nm	25 – 55 Nm
		Wet		
Rotational Resistance – dimpled rubber sole	BS EN 15301-1 dimpled rubber sole	After simulated use		
		Dry		
		Wet	–	25 – 50 Nm
Skin Friction	NRL 01	After simulated use		≤ 0.75μ
Skin Abrasion	NRL 01	Dry		≤ 30%
Ball Rebound	BS EN 12335	Dry		
		Wet	0.80 – 1.10m	0.60 – 1.10m
		After simulated use		
Water Permeability	BS EN 12228	After simulated use		> 300mm/h

Table 1 – Laboratory test requirements

Property	Test Method	Test Condition	Requirement	
			Stadium use surfaces	Community use surfaces
Joint strength	BS EN 12616 - Method A	Unaged After water ageing		≥ 2500/100mm
	BS EN 12616 - Method B	Unaged After water ageing		50 N/100mm
Resistance to tuft withdrawal	BS ISO 4919	Unaged After water ageing		≥ 40 N
Tensile strength of carpet	BS ISO 13934-1	Unaged After water ageing		Mean: ≥ 25 N. Minimum in any direction: 15 N
Tensile strength of pile yarn	BS EN 13864	Fibrillated yarns	Unaged	≥ 30 N
		Mono-filament yarns	Unaged	≥ 8 N per strand
Tensile strength of shockpads	BS EN 12230	Unaged After air ageing		≥ 0.15 MPa
Shock absorption of shockpad	BS EN 14808	Unaged		Within ± 5% FR of manufacturer's declaration
		After air ageing		± 5% FR of unaged result
Water permeability of shockpad	BS EN 12228	-		> 300mm/h
Infill splash	NRL 02	Unaged - DRY		≤ Category 3
Resistance to artificial weathering				
Pile yarn(s)				
Change in tensile strength	IS EN 13864	After UV exposure	≤ 50%	
Colour change	IS EN ISO 20105-A02	After UV exposure	> Grey scale 3	
Polymeric infills				
Colour change	IS EN ISO 20105-A02	After UV exposure	≥ Grey scale 3	
Composition	Visual assessment	After UV exposure	No change	

Table 2 – Field test requirements

Property	Test Method	Stadium category fields	Community category fields
Head Injury Criterion	BS EN 1177	≥ 1.3m	≥ 1.3m
Shock Absorption	AAA	50% – 65%	50% – 70%
Vertical Deformation	AAA	3.0mm – 8.5mm	≤ 11.0mm
Energy Restitution (target range non-mandatory)	AAA	25% – 40%	20% – 50%
Rotational Resistance – studded sole	BS EN 15301-1 Football stud sole	35 – 50Nm	25 – 55Nm
Rotational Resistance – dimpled rubber sole	BS EN 15301-1 dimpled rubber sole	–	25 – 55Nm
Ball Rebound	BS EN 12335	0.80m – 1.10m	0.60 – 1.10m
Infill Depth	BS EN 1969	Between 90% and 110% of manufacturers declared value	Between 90% and 110% of manufacturers declared value
Vertical free pile height	NRL 003	Within 75% of manufacturers declared value	Within 75% of manufacturers declared value

Note: Skin friction is an important property for players. Pitches shall be maintained in accordance with the surface manufacturer's instructions to ensure satisfactory performance of this property. If concerns or complaints about excessive friction or skin abrasion are received the pitch shall be tested under dry conditions in accordance with the specified test methods and the field shall comply with the requirements detailed in Table 1 for these properties.

Table 3 – Product identification tests

Component	Property	Test Method	Maximum variation Field sample / Laboratory sample / Manufacturer's declaration
Artificial grass	Mass per unit area	IS ISO 8543	≤ 10%
	Tufts per unit area	IS ISO 1763	≤ 10%
	Tufts withdrawal force	IS ISO 4919	≥ 90% of lab sample result
	Pile length	IS ISO 2549	≤ 5%
	Pile weight	IS ISO 8543	≤ 10%
	Gauge	IS ISO 1763	Same gauge
	Pile yarn characterisation	IS ISO 11357-3	Same polymer
Shockpad or e-layer	Force Reduction	IS EN 14808	± 5% (FR) of lab sample
	Thickness	IS EN 1969	≥ 90% of lab sample result
Performance infill	Particle grading	IS EN 933 – Part 1	Similar particle range
	Particle shape	IS EN 14955	Similar shape
	Bulk density	IS ISO 1097-3	≤ 15%
	Thermo-gravimetric analysis	% organic / %	± 5%
Stabilising infill	Particle grading	IS EN 933 – 1	Same particle range (± 10%)
	Particle shape	IS EN 14955	Similar shape
	Bulk density	IS ISO 1097-3	≤ 15%

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PITCH CONSTRUCTION REQUIREMENTS AND TOLERANCES



Pitches should be designed and built to the following requirements.

3.1 Construction standards

Pitches shall be constructed in accordance with the SAPCA Code of Practice for the Construction and Maintenance of Synthetic Turf Pitches.

3.2 Surface regularity

When assessed with a 3m straightedge and graduated wedge in accordance with BS EN 13606-7 the maximum undulation shall be 10mm. Up to 15 deviations (for full size pitches pro-rata for smaller areas) are considered permissible providing no deviation is greater than 15mm and does not form a potential hazard to players or detract from the playing experience. Any undulations greater than 1m in length shall be considered multiple deviations of 1m intervals.

3.3 Gradients

The gradient of a pitch shall be no more than 1.0% in any direction.

References

- BS EN 15330-1: Surfaces for Sports Areas: Specification for Synthetic Turf and Needle-punched surface: Part 1 – Specification for synthetic turf surfaces
- FIFA Quality Concept for Football Turf
- IRB Regulation 22 – Artificial Rugby Turf Performance Specification



» APPENDIX A
NRL SYNTHETIC TURF
PITCH TEST REPORT



NRL Synthetic Turf Pitch Test Report

1 Site details

Type of test	Initial	<input type="radio"/>	Retest	<input type="radio"/>
Category of pitch	Stadium	<input type="radio"/>	Community	<input type="radio"/>
Club (if applicable)				
Pitch location				
Site contact				
Tel				
Email				
Synthetic turf surface name				
Surface manufacturer				
Installation contractor				
Date of pitch construction				

2 Test laboratory

Test laboratory
Laboratory address
Test laboratory project reference
Laboratory email address

3 Test conditions

Date of test		
General surface condition (dry or wet)		
Surface temperature (°C)	Min.	Max.
Humidity (%RH)	Min.	Max.

4 Conclusions

Stadium category pitch			
Pitch passed	<input type="radio"/>	Pitch failed	<input type="radio"/>
Community category pitch			
Pitch passed	<input type="radio"/>	Pitch failed	<input type="radio"/>
Criteria that failed (if any)			
Signed by Laboratory Director			Date

Section 3: Detailed results

Property	Specified Range		Test Postion								Pass / Fail	
	Stadium category	Community category	1	2	3	4	5	6	A1	A2		
Head Injury Criterion	≥ 1.3m	≥ 1.3m										
Shock Absorption	50% - 65%	50% - 70%										
Vertical Deformation	3.0 - 8.5mm	≤ 11.0mm										
Energy Restitution (target range non- mandatory)	20% - 40%	20% - 50%										
Rotational Resistance - studded sole	35-50Nm	25-55Nm										
Rotational Resistance - dimpled rubber sole	Not applicable	25-50Nm										
Ball Rebound	0.70 - 1.10m	0.60 - 1.10m										

Infill Depth (mm)

Position	Manufacturer's declaration												
	End Zone	0	10	20	30	40	50	60	70	80	90	100	End Zone
0m													
Variation													
10m													
Variation													
20m													
Variation													
30m													
Variation													
40m													
Variation													
50m													
Variation													
60m													
Variation													
68m													
Variation													
Field passes							Field fails						

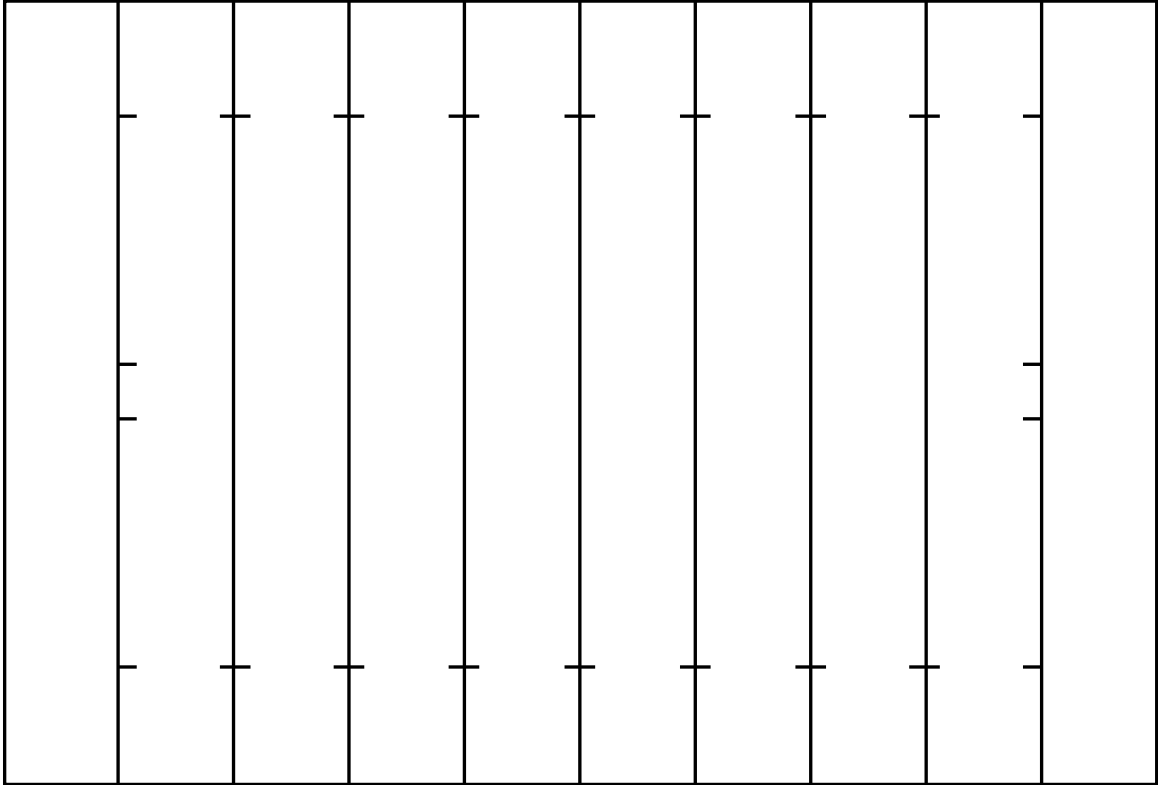
Freepile (mm)

Position	Manufacturer's declaration											
	End Zone	0	10	20	30	40	50	60	70	80	90	100
0m												
Variation												
10m												
Variation												
20m												
Variation												
30m												
Variation												
40m												
Variation												
50m												
Variation												
60m												
Variation												
68m												
Variation												
Field passes							Field fails					

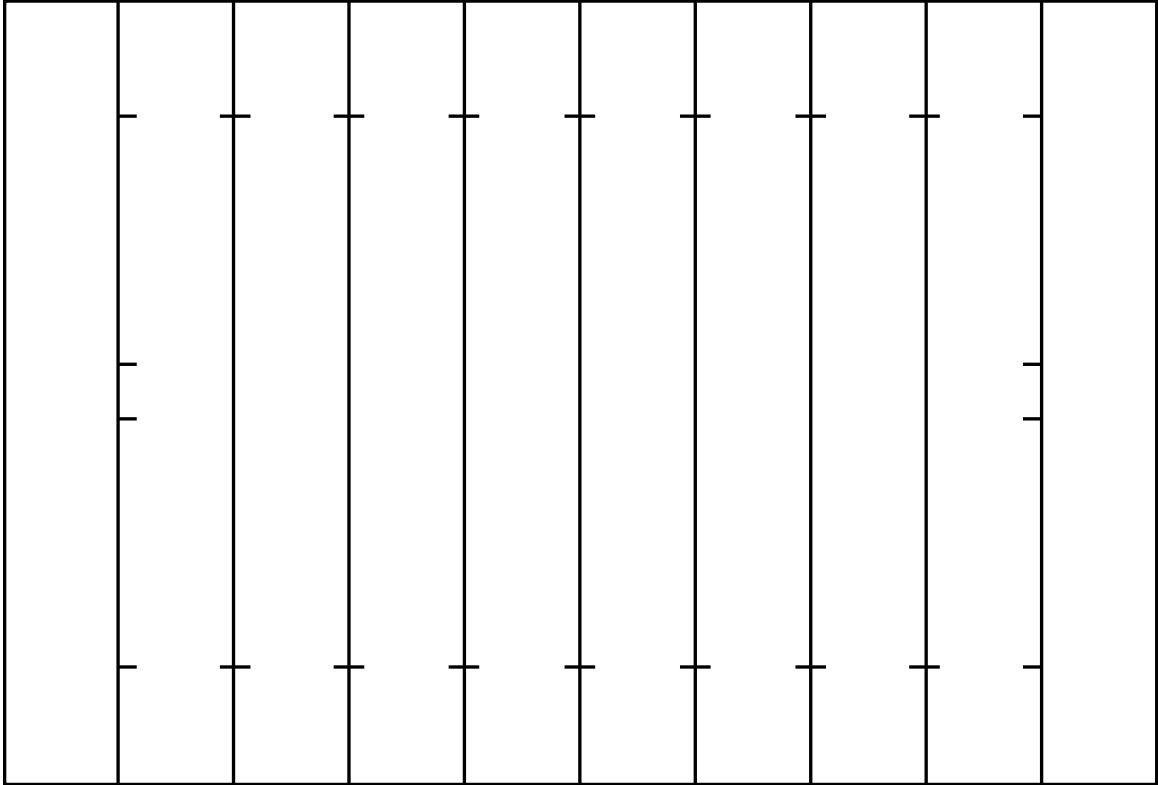
Product identification (initial pitch tests only)

Component	Property	Site sample	Manufacturer's declaration	Variation	Tolerance	Pass/Fail
	Mass per unit area				$\leq \pm 10\%$	
	Tufts per unit area				$\leq \pm 10\%$	
	Tuft withdrawal				$\geq 90\%$ of reference	
Artificial turf	Pile length above backing				$\leq \pm 5\%$	
	Total Pile Weight				$\leq \pm 10\%$	
	Dtex				$\leq \pm 10\%$	
	Yarn Characterisation				Same polymer	
	Particle size				$\leq \pm 20\%$	
Performance infill	Particle shape				Similar shape	
	Bulk Density				$\leq \pm 15\%$	
	Particle size				$\leq \pm 20\%$	
Stabilising infill	Particle shape				Similar shape	
	Bulk Density				$\leq \pm 15\%$	

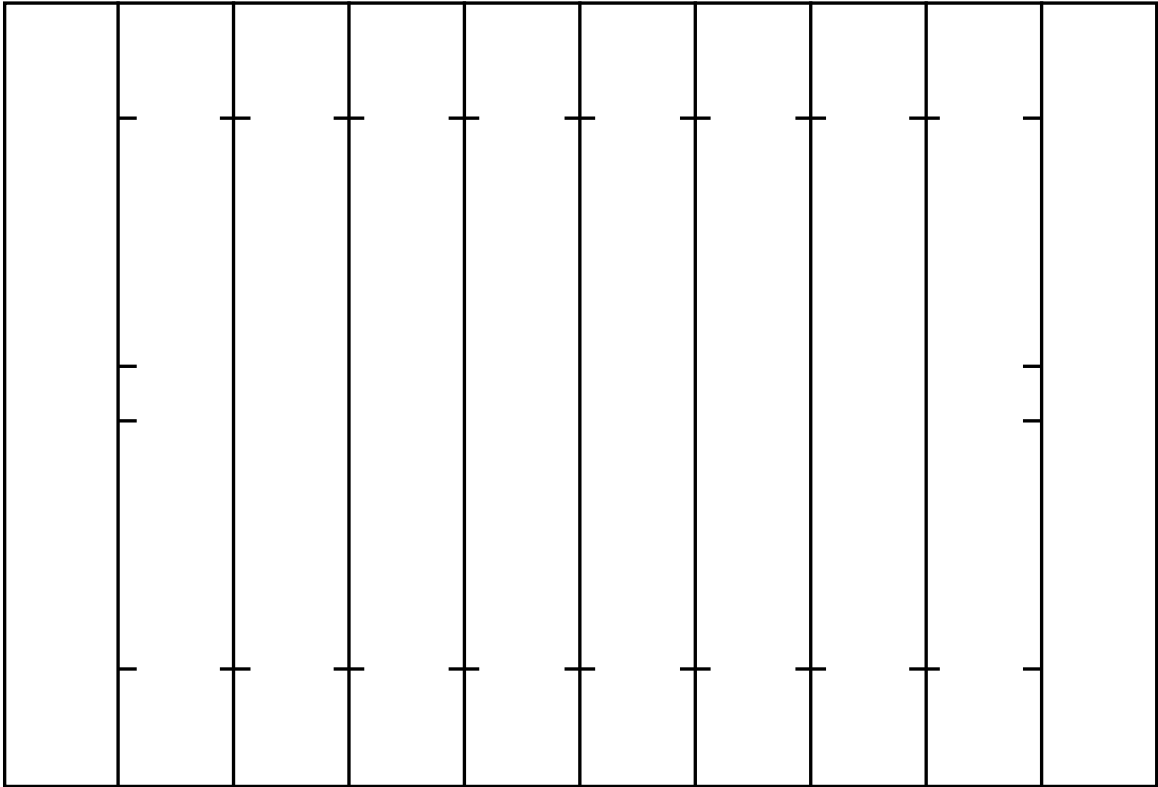
Plan showing surface undulations exceeding 10mm – detail location, size and magnitude



Plan showing principal gradients



Field test position – mark orientation on drawing



» APPENDIX B
NRL TEST METHODS



Test Method NRL 01 – Skin / Surface Friction and Skin Abrasion

Note: This test procedure is similar to that specified by FIFA and the IRB

Determination of Skin Friction & Skin Abrasion

Apparatus

The test apparatus comprises:

- Securisport® Sports Surface Tester by Wassing Messtechnik GmbH
- Silicon Skin L7350 supplied by Maag Technic AG
- Polished steel test plate ($0.2\mu\text{m} < \text{Ra} < 0.4\mu\text{m}$).

Skin preparation

Wash three silicon skin specimens each measuring 15cm by 8cm in water and allow to air dry for 24 hours.

Clean the metal test plate with acetone and allow it to evaporate for at least 5 minutes.

Attach a test skin to the test foot (glossy side exposed) using double sided adhesive tape and the clamping screws. Ensure the smooth surface of the silicon skin is the test face; the grooved side being attached to the test foot.

Attach the draw strings to the mounting screws on the test foot and place the test foot (with silicon skin) onto the test plate and add additional weights to obtain a total mass of $1,700 \pm 50\text{g}$;

Ensuring the test foot remains stable on the test plate, measure the force required to pull the test foot along the metal plate over a distance of 100mm at a speed of $500 \pm 10\text{mm/min}$.

Repeat the force measurement at least ten times and determine the average force over a sliding distance of 40mm and 80mm.

Calculate the average force ($F_{\text{new skin}}$) of the ten measurements.

Repeat on two further samples of silicon skin.

Measurement of skin/surface friction

Fix the test specimen to the laboratory floor to prevent movement during the test.

Attach a calibrated skin to the test foot of the Securisport Sports Surface Tester using double sided adhesive tape and mount onto the apparatus. Adjust the foot so it is positioned just above the test specimen.

Position the Securisport Sports Surface Tester over test specimen and adjust to level. Apply a vertical force to the test foot of $100\text{N} \pm 10\text{N}$ and start the rotation of the test foot. Allow the test foot to make five complete revolutions at a speed of $40 \pm 1\text{ rev/min}$; sampling at a frequency of 40 Hz. Ignoring any peak value occurring as the test foot starts to rotate, recorded the mean coefficient of friction as displayed on the Securisport.

Repeat the test three times, changing the synthetic skin and replacing any infill between tests.

Calculate the mean Coefficient of Friction of the three tests.

Determination of skin abrasion

Carefully remove the test foot from the Securisport without touching the test skin. Remove any detritus from the test skin using compressed air.

Place the test foot (with silicon skin) onto the clean metal plate and add an additional mass to obtain a total mass of $1,700 \pm 50\text{g}$.

Measure the force required to pull the silicon skin along the metal plate over a sliding distance of 100mm at a speed of $500 \pm 10\text{mm/min}$. Repeat the force measurement at least ten times.

Determine the average force over a sliding distance of 40mm and 80mm.

Calculate the skin abrasion using the following formula:

$$\text{Skin abrasion} = 100 \times [F_{\text{new skin}} - A_{\text{abraded skin}}] / F_{\text{new skin}}$$

where:

$F_{\text{(new skin)}}$ = the mean average force of the second to fourth tests prior to the Skin Friction test.

$F_{\text{(abraded skin)}}$ = the mean average force of the second to fourth tests after the Skin Friction test.

Report the result to the nearest 1% e.g. 25%

Repeat the test three times.

Test Method NRL 02 – Infill splash

Test apparatus

The test apparatus comprises:

- A release mechanism that allows the ball to fall vertically from $2.00 \pm 0.01\text{m}$ (measured from the bottom of the ball) without imparting any impulse or spin.
- Vertical scale to allow the drop height of the ball to be established.
- Video or other means of recording the ball's impact with the surface and resulting infill dispersion, that allows frame by frame analysis and a permanent record of the maximum infill dispersion to be recorded.
- Football as described in BS EN 12335.

Test procedure

Validate the vertical rebound of the ball on concrete immediately before testing.



Release the ball from 2.00 ± 0.1 m and photographically record its impact with the surface capturing the degree of infill dispersion that occurs.

Select the image showing the maximum infill dispersion resulting from the ball's impact and assess the degree of dispersion against the scale below.



Report the infill splash category and include the photograph showing the splash in the test report.



Infill Splash grading scale

<p>Category 1</p>	<p>No infill splash</p>		<p>Category 2</p>	<p>Low infill splash</p>	
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Infill Splash grading scale

<p>Category 3</p>	<p>Medium infill splash</p>		<p>Category 4</p>	<p>High infill splash</p>	
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Test Method NRL 03 – Determination of free pile height for synthetic turf

1 Apparatus

Prism Gauge as shown schematically in figure 1 and comprising:

- 1.1.1 A steel and glass prism frame of 2.00 ± 0.1 kg weight; 215 ± 5 mm length; 125 ± 5 mm width; and 70 ± 5 mm height.
- 1.1.2 The frame should contain a transparent prism with a mirrored bottom surface of reflective material which should be angled at 45 ± 0.2 degrees.
- 1.1.3 A scale in 'mm' to a height of 40 ± 1 mm with a measuring resolution of 1 mm.



Figure 1 – Prism gauge

2 Procedure

- 2.1 Place the prism gauge on the synthetic turf surface
 - 2.2 Ensure the prism gauge is flat on the surface by mean of a bubble/spirit level
 - 2.3 Record the length of the 10 highest yarn fibres; repeat this procedure at 90° to the first test A.
 - 2.4 Calculate the median pile height in mm from the 20 highest yarn fibres
- A For measurements on site alternate between longitudinal and cross pitch directions for each test position and calculate the median pile height in mm from the 10 highest yarn fibres at each position.

Report the median free pile height.



Figure 2 – example of Free pile height measurement

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