

The logo consists of the letters 'FLH' in a bold, sans-serif font. The 'F' is red, the 'L' is white with a blue outline, and the 'H' is blue.

HOCKEY TURF & FIELD STANDARDS

Engineered
for Hockey



Part 3. Requirements for Hockey Fields

2017 Edition

FIH Hockey Turf and Field Standards

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Contents

Foreword	3
1 Introduction.....	4
1.1 Scope	4
1.2 Principal changes from previous edition.....	4
1.3 Implementation	4
2 Definitions.....	4
3 Test Institutes	5
4 Requirements	5
4.1 Field base & drainage systems.....	5
4.2 Playing Surface	6
4.2.1 New Fields.....	6
4.2.2 Existing Fields	6
4.2.3 Use of Existing Shockpads / Elastic Layers	7
4.3 General Field Design Requirements	8
4.3.1 Dimensions.....	8
4.3.2 FOP Colours.....	8
4.3.3 Run-off Colours	8
4.3.4 Field Markings	9
4.3.5 Profile and Gradients.....	9
4.4 Field Tests.....	11
4.4.1 Test Conditions.....	11
4.4.2 Test Positions	11
4.5 Test Methods.....	13
4.6 Installation Quality Requirements	14
4.6.1 Shockpad Installation.....	14
4.6.2 Carpet Installation.....	14
4.6.3 Carpet Repairs	15
4.7 Product Identification	15
4.8 Field Test Requirements.....	17
4.9 Assessment of Field Irrigation Systems	17
4.10 Water Permeability	19
5 Reporting.....	19
6 Period of Field Certification.....	19
Annex A - Field Test Requirements	21

Foreword

A new hockey field is a major investment therefore it is important that it meets the expectations of hockey players, associations and clubs. To help ensure good quality fields are built for all levels of play, from elite level competition to community development, the FIH has developed its internationally recognised quality-assurance programme - the FIH Quality Programme for Hockey Turf. The programme was launched as part of an initiative of the Hockey Revolution - FIH's ten-year strategy for hockey aimed at making hockey a global game that inspires the next generation.

The programme provides consistent and dependable industry standards and ensures the appropriate quality of performance for the intended level of play - whether it is community development, international competition, or anything in between. It is based on the principles of quality assurance. Only companies that meet the demanding standards of the FIH are able to join. The Hockey Turf products they produce are independently tested by internationally recognised test institutes accredited by the FIH. Once installed hockey facilities are also independently tested to verify the construction and performance is as required for the games of hockey and Hockey 5s.

The technical requirements of the programme are detailed in the FIH Hockey Turf and Field Standards, which are published in four parts:

Part 1 – Introduction & General Guidance

Part 2 – Requirements for Hockey Turf Products

Part 3 – Requirements for Hockey Fields

Part 4 - Requirements for Hockey 5s Courts

This document is Part 3 of the *FIH Hockey Turf and Field Standards*. It specifies the performance and construction standards for hockey fields.

Full details of the FIH Quality Programme for Hockey Turf, including a list of the companies who are part of it, their approved products and the hockey fields and Hockey 5s courts that are currently certified can be found at www.fih.ch/hockeyturf.

1 Introduction

1.1 Scope

This document is Part 3 of the *FIH Hockey Turf and Field Standards*. It specifies the performance and construction standards for hockey fields. It supersedes the 2014 edition.

The requirements have been established after consultation with players, members of the FIH Quality Programme for Hockey Turf and FIH accredited test institutes. They describe the properties a hockey field requires to enable hockey to be played to the required standard, whilst helping to ensure player welfare.

Field certification is required for FIH, Continental Federation and national competitions, depending on the specific rules of the competition. It is also often required as a condition of public funding for new fields.

As field certification also helps field owners demonstrate they are providing facilities that are fit for purpose and therefore meeting their legal obligations the FIH recommends all new fields be certified, irrespective of any competition requirements.

For a hockey field to be certified by the FIH it must meet the requirements of this Standard.

1.2 Principal changes from previous edition

The principal changes from the 2014 Standard are:

- A new category of field certification, Global Elite.
- An expansion of the Multi-Sport category to encourage the development of fields that allow hockey and other sports such as tennis to share facilities.
- Revised criteria for field gradients.

1.3 Implementation

The Standard becomes effective from 1 July 2017 and all fields requiring certification from this date shall be tested in accordance with this Standard. Fields previously certified shall continue to be tested in accordance with the edition of the FIH standard applicable when the field was first tested.

2 Definitions

Approved Product - a Hockey Turf surface that has been tested and certified in accordance with Part 2 of the FIH Hockey and Field Standards.

EN - standard published by the European Standards Committee (CEN).

FIFA TM - test method specified by FIFA in their Handbook of Test Methods for Football Turf.

Field of Play (FOP) - the playing area as defined in the Rules of Hockey.

Filled synthetic turf or textile surface - synthetic turf or textile surface whose pile is either totally filled or partly filled with an unbound particulate material, typically sand.



Hockey Field - a sports field as defined in the *Rules of Hockey*.

Hockey Turf - a synthetic turf or textile surface designed to have the quality and performance characteristics required to allow the game of hockey to be played.

ISO - standard published by the International Standards Organisation.

Long pile synthetic turf surface - synthetic turf surface whose pile length is equal to or greater than 30mm when tested in accordance with ISO 2549.

Non-filled synthetic turf - synthetic turf surface that does not contain any form of unbound particulate fill within the pile of the carpet.

One Turf Concept - a joint initiative between FIFA, World Rugby and FIH setting performance requirements for long pile synthetic turf surfaces that can be used by all three sports.

Operational Margin - a paved area around the perimeter of the field, outside the run-offs, that provides space for media and event personnel.

Rules of Hockey - Rules of Hockey as published by the FIH and available at www.fih.ch/inside-fih/our-official-documents. Unless specified to the contrary, the edition of the Rules applicable at the time a field was built shall apply through the life of the field.

Run-offs - a perimeter margin outside the FOP that provides an area for players to run onto without the risk of colliding with any permanent or temporary structures.

Shockpad and elastic layer - prefabricated foam or elastomeric sheets or tiles or insitu laid elastomeric granulate and binder mixes, laid beneath the synthetic turf or textile surface and designed to aid the provision of the required sport's performance.

Short pile synthetic turf - synthetic turf surface whose pile length is less than 30mm when tested in accordance with ISO 2549.

Synthetic turf surface – a carpet designed for sports use, having a tufted, knitted or woven construction.

Textile surface – a carpet designed for sports use, having a needle-punched or fibre bonded sports surface.

3 Test Institutes

Field tests shall only be undertaken by FIH Accredited Tests Institutes, details of which can be found at www.fih.ch/hockeyturf. A number of the Accredited Test Institutes have regionally based engineers to allow the competitively priced testing of fields globally.

4 Requirements

For a field to be certified it shall fully comply with the following requirements:

4.1 Field base & drainage systems

The base on which a Hockey Turf surface is laid shall be designed and constructed to:

- provide adequate stability so that the playing surface does not move outside the requirements for surface regularity over a period of at least 10 years;
- resist the effects of frost or drought that may be expected to occur in a return cycle of once every 30 years;

The field's drainage system (vertical or lateral) shall be designed and installed to:

- ensure that all surface water is removed from the Hockey Turf at a rate that ensures that no surface flooding will occur during heavy storms, or use of the facility will not be lost either through rain at the highest intensity which may be expected to occur once every five years.
- protect the installation from the effects of ground or surface water from the areas surrounding the field.
- ensure no water remains present in the base construction that may result in a reduction of the load bearing capacity of the formation or damage to the construction from the actions of frost.

When applying for a field to be certified under the FIH Quality Programme the applicant is deemed to be confirming that these requirements have been satisfied, unless written confirmation from the field owner is supplied acknowledging, for whatever reason, that non-compliance with this requirement was accepted at the design/contract stage of the field's construction.

This requirement does not automatically apply to existing fields that are being resurfaced or upgraded, unless it is included in a contract specification.

Notes:

- 1 To ensure these requirements are satisfied the field should be designed and constructed by specialist companies with a proven ability to construct hockey fields. The FIH recommends the use of FIH Preferred Suppliers or FIH Certified Field Builders.
- 2 The FIH recommends inspections be made at key stages through construction of the base and drainage system to verify the installation is proceeding to the agreed design and specification.

4.2 Playing Surface

4.2.1 New Fields

The field (FOP and run-offs) shall be surfaced with an FIH Approved Hockey Turf Product. A list of which can be found at www.fih.ch/hockeyturf.

During 2017, new hockey fields may be surfaced with Approved Products that are listed on the FIH website (www.fih.ch/hockeyturf) and have been tested to the 2017 or earlier editions of the FIH Standards. From 31 January 2018, new fields must be surfaced with a Hockey Turf that has been tested and approved in accordance with Part 2 of the *FIH Hockey Turf and Field Standards - 2017 edition*.

4.2.2 Existing fields

Existing fields requiring certification for the first time or fields requiring re-certification shall be surfaced with a Hockey Turf that was approved at the time the field was built.

4.2.3 Use of existing shockpads / elastic layers

Whenever an existing field is being resurfaced, the existing shockpad or elastic layer should ideally be reused, providing it is in a suitable condition for a further 8-10 years' use.

FIH Approved Hockey Turf Products are a sports surface system that comprises a synthetic turf or textile carpet and a shockpad or elastic layer. When only the synthetic turf or textile carpet is being replaced the FIH consider it acceptable to incorporate an existing shockpad or elastic layer into the Approved Hockey Turf Product providing:

- the generic type (not brand) of shockpad is like that used in the Hockey Turf system that will be laid;
- shock absorption of the existing shockpad or elastic layer is within $\pm 5\%$ of the value declared by the manufacturer for the Hockey Turf system that will be laid;
- the vertical deformation of the shockpad or elastic layer is within $\pm 3\text{mm}$ of the value declared by the manufacturer for the Hockey Turf system that will be laid;
- the water permeability of the shockpad or elastic layer is greater than 150mm/h when tested in accordance with EN 12616;
- the surface regularity of the shockpad or elastic layer complies with the requirements of this Standard

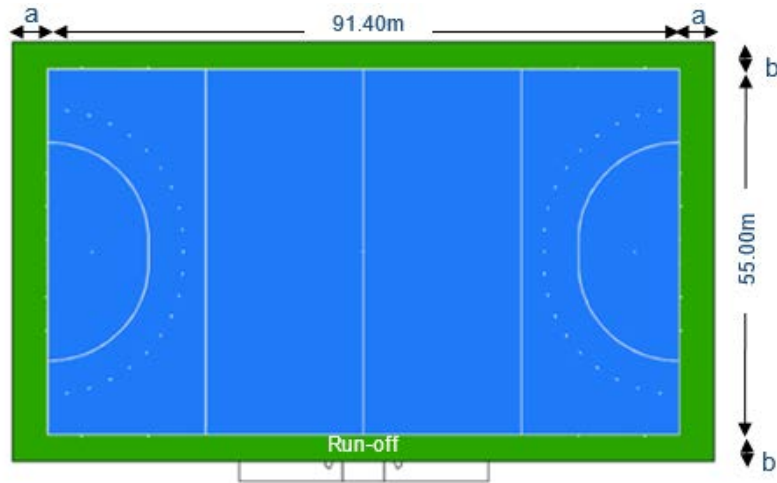
Compliance with the above requirements does not override the need for the resurfaced field to fully satisfy the requirements of this Standard.

Notes:

- 1 It is recommended that sample of the existing shockpad are tested to ensure the tensile strength is in accordance with the requirements of clause 8.17 of Part 2 of this Standard.
- 2 The condition and performance of an existing shockpad or elastic layer should be assessed in advance of any tender or bidding process to allow Preferred Suppliers, Certified Field Builders and Certified Manufacturers to determine if the existing shockpad is similar to one used in one of their Approved Hockey Turf Products. Such assessments may be undertaken by FIH Accredited Test Institutes or specialist consultants.

4.3 General field design requirements

4.3.1 Dimensions



4.3.1.1 FOP

The FOP shall measure 91.40m by 55.00m.

4.3.1.2 Run-offs

The width of the run-offs should be as detailed below. The inner portion of the run-off shall be surfaced with the same specification of Hockey Turf as the FOP. The outer part may be surfaced with Hockey Turf or a different material (e.g. asphalt paving) providing it is laid flush (on the same plane) to the inner run-off.

End run-offs (a)	Recommended	Minimum
Total (inner and outer portions)	$\geq 5.0\text{m}$	$\geq 3.0\text{m}$
Inner portion surfaced with Hockey Turf	$\geq 3.0\text{m}$	$\geq 2.0\text{m}$
Side run-off (b)		
Total (inner and outer portions)	$\geq 3.0\text{m}$	$\geq 2.0\text{m}$
Inner portion surfaced with Hockey Turf	$\geq 2.0\text{m}$	$\geq 1.0\text{m}$

Note: For some FIH Tier 1 events, an operational margin outside the run-offs, but within the fenced area, is also required. This should be at least 1.0m wide and surfaced with Hockey Turf or hard paving.

For Global Elite category fields the full run-off should be surfaced with Hockey Turf.

4.3.2 FOP colours

The colour of the FOP shall be a single uniform green, single uniform blue (either RAL 5002 or RAL 5005) or any other FIH approved colour. FIH Global category Hockey Turfs (surfaces that require irrigation) shall be manufactured from low gloss or matt yarns.

4.3.3 Run-off colours

The colour of synthetic turf or textile carpet used to surface the run-offs may be any colour, providing the yarn or fibre meets the specified criteria for Resistance to Artificial Weathering defined in Part 2 of this Standard and it satisfies the requirements of any specific competition rules.

4.3.4 Field markings

Field markings shall conform to the latest edition of the Rules of Hockey and shall not depart from the specified dimensions by more than the following tolerances.

All lines shall be 75mm wide.

Length of straight lines	$\pm 50\text{mm}$
Width of lines	$\pm 10\text{mm}$
Radius of circle arcs	$\pm 30\text{mm}$
Position of penalty spots	$\pm 30\text{mm}$
300mm external field markings	$\pm 30\text{mm}$
Difference between field diagonals	$< 300\text{mm}$

Lines intended to be straight must show no sudden deviation or irregularity greater than 10mm from a string line pulled over a distance of 30m.

Notes:

- 1 Where field markings have been tufted into a field and a change to the Rules of Hockey makes the markings redundant, the redundant markings may be painted out and any new markings painted on or inserted into the carpet.
- 2 Guidance on whether other markings are permitted on a field is given in the individual field category requirements in Annex A.

Inlaid or tufted line markings and logos shall be manufactured from the same specification of Hockey Turf as the main field and or outer run-offs, as appropriate. Each colour of synthetic turf or textile carpet used to form lines or logos shall meet the specified criteria for Resistance to Artificial Weathering defined in Part 2 of this Standard.

4.3.5 Profile and Gradients

The profile of a field influences important sports characteristics. Hockey desires a field to have unbiased performance and therefore consistency requirements are included for certain properties. One of these is ball roll, which relates to the speed of the surface. A field with a pronounced slope will give different ball roll results depending on whether the ball is rolling up or down the slope. Therefore, keeping the field as flat as possible will help ensure unbiased ball roll. Fields need, however, to be built in regions of the world that are subjected to intense rainfall and often have to be constructed from materials that have very low water infiltration rates. In these cases, hockey fields need to rely on horizontal drainage to allow water to discharge from the playing surface, and to achieve this, an adequate slope is required.

To address these two conflicting requirements the FIH has established preferred and maximum slope requirements. In all cases compliance with the slope requirements do not take precedence over the ball roll consistency criteria and it is the field designer's responsibility, in conjunction with the Hockey Turf manufacturer, to determine the acceptable balance between the two parameters.

4.3.5.1 FIH Preferred Gradients

Longitudinal gradients along the length of the field	$\leq 0.2\%$
Lateral gradients across the width of the field	$\leq 0.4\%$

4.3.5.2 FIH Maximum Gradient

The maximum gradient in any direction (including diagonal and combined gradients, etc.) shall not exceed 1.0%.

Notes:

- 1 Experience is showing that the latest types of Global category Hockey Turfs based on texturised-monofilament pile yarns are particularly sensitive to gradients over 0.6% and the advice of the Hockey Turf manufacturer should always be sought before designing Global Elite or Global category fields that do not use the FIH Preferred Gradients.
- 2 The FIH do not wish to deter those wishing to lay non-filled (wet) Hockey Turfs onto existing fields. See Appendix A – Global Field Certification for details.
- 3 The FIH will consider granting dispensation to existing fields that have slopes that exceed the Maximum Gradient criteria on a case-by-case basis.
- 4 When refurbishing an existing Global, National or Multi-Sport category field the gradient requirements of this Standard need not apply outside the inner portion of the run-offs, to allow a smooth tapered transition from a new construction to existing field edgings, etc.

4.3.5.3 Field Profile

A number of different field profiles are used including single planes (end-to-end, side-to-side and diagonal falls), envelope and ridge profile.

Global Elite and Global category fields shall have profiles that do not cause the surface to dry inconsistently across the field.

For Global Elite fields the profile should be symmetrical around the central axis of the field.

When envelope or ridge profiles are used, the change in grade shall not adversely affect the consistency of the ball roll or exceed the requirements for surface regularity.

Historically in some countries, fields have been built with a ridge profile. If the ridge is pronounced it can result in a field not satisfying the surface regularity requirements of this standard. As the FIH has no desire to prevent existing fields from continuing to be used, such fields can be certified providing the ridge does not cause ball travelling at speed to lift from the Hockey Turf. This should be assessed by the Test Institute witnessing balls being hit at high speed in varying directions across the ridge and reporting their observations.

4.4 Field Tests

4.4.1 Test conditions

A field shall be tested under the condition(s) for which it was designed to be used, as specified below.

Hockey Field Test Conditions			
	Irrigated	Dry	Wet / Damp
Global Elite	✓		When field is wet due to rain or dew
Global	✓		
National	✓ (optional)	✓	
Multi-Sports		✓	

Hockey Turf products that are required to be irrigated prior to play shall be watered using the procedures specified for match play. This shall evenly apply a volume of water that is equal to or greater than that used to irrigate the product when it was tested for approval (and as specified in the Product Approval test report). Following irrigation, the field shall be left for 15 ±1 minutes before the tests commence. Tests shall then be undertaken in the following order:

- Ball rebound. Tests shall be completed in all five positions within 30 minutes of the tests commencing.
- Shoe – Surface friction

A further application of water shall then be applied if the surface is becoming dry. If required, this shall be determined by re-measuring the ball rebound in the first test position. If the value differs by more than ± 15% of initial value, the surface shall have another half cycle of irrigation applied, before the following tests are undertaken:

- Ball Roll & Ball Roll Deviation
- Shock Absorption and Vertical Deformation

If required by the field owner, fields having National Class 1 Approved Hockey Turfs and an irrigation system, may also be tested after irrigation.

Tests should be conducted during a period of commonly prevailing climatic conditions. Wherever possible, tests should be made when wind speeds are less than 5m/s.

Note: A drying field or strong winds cannot be used to justify acceptance of a non-complying field.

4.4.2 Test positions

Tests shall be undertaken in a minimum of five locations, as specified below. However, the Test Institute is responsible for adequately assessing the field’s condition; therefore, the testing personnel may increase the number of test location spot tests at their discretion and they may select other locations if they consider this will present a more complete picture of the field’s condition. The location of the tests shall be identified in the test report.

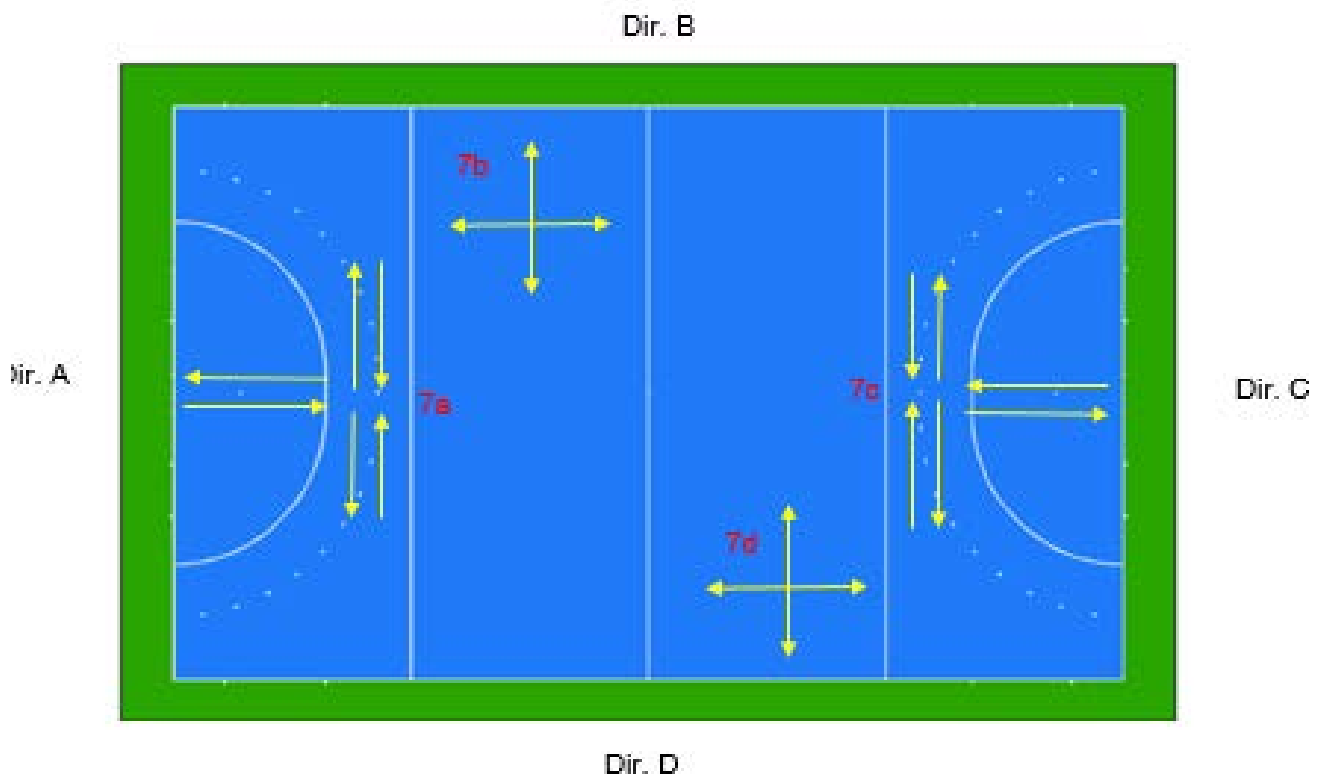
If the client commissioning the tests is concerned about the performance of particular areas of the field, they may ask the test institute to conduct additional tests in those areas.

The diagram below illustrates the possible positions for the spot tests.



Test Position 1	This position is within the field of play and not more than 3 metres from the corner flag. Any one of the four marked positions may be chosen.
Test Position 2	This position is midway between the penalty stroke mark and the centre of the goal. Either of the two marked positions may be chosen.
Test Position 3	This position is a maximum of 1 metre inside the circle on the extended line from the centre of the goal-line through the penalty stroke mark. Test positions 2 and 3 must not be in the same circle.
Test Position 4	This position is within the field of play not more than 6 metres nor less than 4 metres from the side-line and on the 23 metre lines. Any one of the four marked positions may be chosen.
Test Position 5	This position is within 3 metres of the centre of the centre-line. Either of the two positions may be chosen.
Test Position 6	At least one test position should be chosen in the field run-off areas. Ball rebound is not required in this position.

Ball roll tests shall be undertaken in the positions and directions shown below. Each position shall be selected to ensure the ball comes to a complete rest within the field of play.



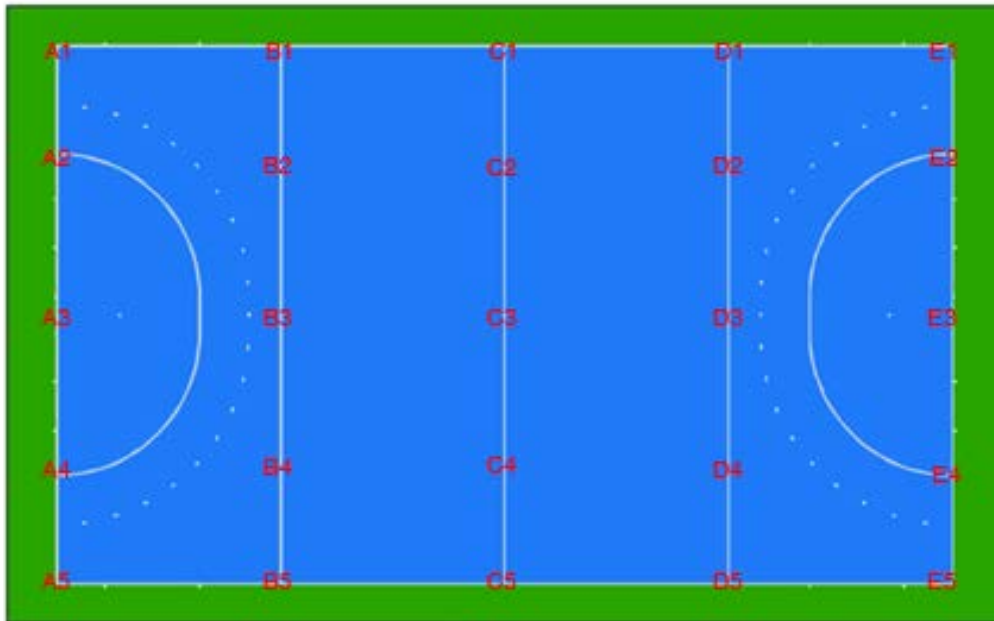
4.5 Test Methods

The following test methods shall be used:

Ball Rebound	EN 12235 using an acoustic timer and an FIH Approved Hockey Ball. When tested on concrete the ball shall have a rebound of 700 ± 50 mm.
Ball Roll	EN 12234 using an FIH Approved Hockey Ball. Three tests shall be made in each direction/position of test
Ball Roll Deviation	FIH Hockey Turf and Field Standards Part 2 – clause 7.3
Shock Absorption	CEN TS 16717
Vertical Deformation	CEN TS 16717
Energy Restitution*	EN TS 16717 - only required for fields located in the Netherlands, where a range of 30% - 55% applies.
Shoe – Surface Friction	EN 15301-1 using the dimpled test sole
Surface Regularity	FIFA TM 12 Any localised ridges or hollows identified during the 3m straightedge survey of the field should also be checked using a 300mm straightedge.

Profile and Gradients

The gradients and profile of the field shall be determined in the positions specified in the positions shown in the figure below. Measurements shall be made using a surveyor's level and staff, or equivalent technique. When lines are bonded into place the measurements shall be offset by the width of the jointing tape if this noticeable.



4.6 Installation Quality Requirements

4.6.1 Shockpad installation

The shockpad or elastic layer shall be installed to provide a uniform and consistent under-layer on which the Hockey Turf is laid. There shall be no variations in quality or installation that adversely affect the performance of the hockey field so it falls outside the relevant requirements of this Standard.

In situ elastic layers shall be formed from materials and be laid in accordance with the Hockey Turf manufacturer's instructions and specifications.

Prefabricated shockpads shall be laid in accordance with the manufacturer's instructions; including the taping of all head and side joints as required.

4.6.2 Carpet installation

The installed synthetic turf or textile surfacing shall be free of manufacturing and visual defects.

Global and National Class 1 surfaces shall be laid in full width rolls running across the FOP (side line to side line) without head seams. Head seams in the perimeter run-offs shall be kept to a minimum.

Global category surfaces shall either be loose laid, tensioned and clamped along their side boundaries, or be bonded to the underlying shockpad to minimise the risk of dimensional movement. The adhesive used to bond the surface shall be in as specified by the Hockey Turf manufacturer and it shall be applied in accordance with their instructions.

Note: The FIH also recommends the tensioning and clamping or bonding of sand dressed synthetic turf carpets.

There shall be no carpet rucks, wrinkles or any other form of installation defect within the FOP or run-offs.

All carpet joints shall be fully bonded/stitched with no joint failures.

The maximum gap at the top of the carpet pile on any carpet joint or any in-laid line markings, shall be equal to or less than the carpet's stitch gauge plus 2mm.

Bonded carpet joints shall not have any adhesive beads within the pile of the carpet that may cause a ball to lift or deviate as it passes over the joint. Stitched joints shall not cause a ball to lift or deviate as it passes over the joint.

The pile of the synthetic turf or textile carpet immediately either side of a joint shall be consistent with the remainder of the field. The carpet pile should not be trapped within the joint nor should adhesive layers and backing films beneath the carpet cause ridges outside the tolerances stated for surface regularity.

4.6.3 Carpet repairs

Repairs to the playing surface shall only be permitted if:

- They have no adverse effect on the performance or consistency of the field. The Test Institute shall undertake all necessary tests to verify this and report accordingly;
- On new fields, the field owner is willing to accept such repairs and confirms this (in writing) to the Test Institute;
- On new fields, the specification and colour of any patch matches the surrounding area.

4.7 **Product Identification**

To verify that the Hockey Turf supplied to a field is the same as the Approved Product, representative samples of the installed hockey synthetic turf or textile surface, shockpad and any infill materials shall be characterised by the Test Institute using the test methods detailed below. The following samples shall be tested:

- Sample representative of the FoP
- Sample representative of the run-offs if different to the FoP
- Sample representative of each colour of in-laid or tufted line marking

By including the results of the product identification tests in the Field Test Report the Test Institute is deemed to be confirming the samples tested are representative of the materials installed on the field. They shall take all necessary steps to ensure this is correct.

The results obtained shall comply with the manufacturer's product declaration, as detailed in the product approval test report, subject to the tolerances specified below.

Component / property	Characteristic	Requirement
Carpet type	Synthetic turf or textile surface	-
Method of carpet manufacture	Tufted, Woven, Knitted or Needle-punch	-
Carpet pile colour – FOP, Run-offs and line markings	RAL Classic number	Same RAL number(s) as Approved Product
Carpet pile type	Straight, curled, monofilament, split film	Same as Approved Product
Shockpad	Type of construction	Same as Approved Product
Infill	Type / composition	Same as Approved Product

Component	Characteristic	Test Method	Tolerance
Properties of synthetic turf carpet	Pile height above backing	ISO 2549	$\pm 10\%$
	Tufts per unit area	ISO 1763	$\pm 10\%$
	Filaments/m ²	See note 1	$\pm 10\%$
	Pile weight	ISO 8543 – see note 2	$\pm 10\%$
	Pile dtex	FIFA TM 23	$\pm 10\%$
	Pile Thickness	FIFA TM 25	$\geq 90\%$
	Pile Profile	FIFA TM 25	Same profile
	Pile polymer characterisation	ISO 11357-3 / FIFA TM 22	Same number of peaks, same profile $\pm 3\text{ }^{\circ}\text{C}$ (peak)
	Carpet mass per unit area	ISO 8543	$\pm 10\%$
	Water permeability of carpet	FIFA TM 24	$\geq 90\%$

Properties of inlaid / tufted line markings	Colour	RAL Classic	Same as approved product
	Polymer characterization	FIFA TM 22	Same number of peaks, same profile $\pm 3\text{ }^{\circ}\text{C}$ (peak)

Properties of shockpads and elastic layers	Thickness	EN 1969	90% - 130%
	Mass per unit area	ISO 8543	± 10%
	Shock Absorption	EN TS 16717	± 5% SA
	Water permeability	FIFA TM 244	≥ 90%

Properties of infills	Particle Grading	FIFA TM 20	60% between d and D
	Particle Shape	EN 14955	Similar shape
	Bulk density	EN 1097-3	± 15%
	Polymer composition (polymeric infills only)	FIFA TM 11	± 15%

Properties of textile carpets	Thickness of pile above the substrate	ISO 1766	≤ 10 %
	Fibre polymer characterization	ISO 11357-3 / FIFA TM 22	Same number of peaks, same profile ± 3 °C (peak)
	Carpet mass per unit area	ISO 8543	≤ 10 %
	Water permeability	FIFA TM 244	≥ 90%

Notes

- 1 The number of filaments per square metre shall be calculated by multiplying the number of tufts per square metre by the number of filaments per tuft; this figure being the mean value of 20 tufts extracted at random from a 200mm x 200mm sample
- 2 If it is not possible to extract tufts from the carpet backing (e.g. when there is an integral shockpad or the carpet is of a knitted construction, etc.) the pile weight per unit area above the substrate shall be determined in accordance with ISO 8543. This shall be noted in the test report

4.8 Field Test Requirements

A field shall fully comply with the requirements detailed in Annex A, as appropriate for the category of field certification being sought.

4.9 Assessment of Field Irrigation Systems

In order to verify fields surfaced with Hockey Turfs that are designed to be used wet can be adequately irrigated, the performance of the irrigation system shall be tested as part of a field test.

Traditionally, field irrigation has been provided using rain-guns or pop-up sprinklers. More recently, companies are starting to innovate and develop sub-field irrigation systems that are designed to reduce the amount of water required to keep a field in its optimum playing condition. The FIH supports such innovations.

4.9.1 Assessment of above ground irrigation

An above ground irrigation system shall be designed to apply the quantity of water required for the specific approved Hockey Turf being installed and as detailed in the product approval report.

In climates where the average ambient daytime temperature during the hockey season is not expected to exceed 32°C the irrigation system shall be able to:

- Apply a full application of water across the field prior to a game in a period of 10 minutes or less;
- Apply up to a 50% application of water across the field in a period of 10 minutes or less during the half time break.

In climates where the average ambient daytime temperature during the hockey season may be expected to exceed 32°C the irrigation system shall be able to:

- Apply a full application of water across the field prior to a game in a period of 10 minutes or less;
- Apply a further full application of water across the field in a period of 10 minutes or less during the half time break. If required, the fixed irrigation system may be augmented with flexible or movable sprinklers/hoses that allow partial or reduced watering to ensure a previously wetted field is returned to the optimum playing conditions.

The performance of an above ground irrigation system shall be tested by laying out a nominal 10m x 10m grid. The outer boundaries of the grid shall be 2m beyond each end line and 1m beyond each side line (giving boundary dimensions of 95.4m x 57.0m). A full watering cycle shall be conducted. This shall be completed in no more than 10 minutes. The depth or volume of water collected in each collector dish shall be determined and the uniformity of distribution across the field calculated.

The mean volume or depth of water for the whole test grid shall be equal to or greater than watering requirements of the installed Hockey Turf, as detailed in the product approval report. In addition, the water depth at any test spot shall not be more than twice the depth (+100%) or less than half the depth (-50%) of an adjacent measuring point.

Tests shall not be undertaken if winds are causing the water spray:

- to drift significantly off the field
- to over or under water certain areas of the field

Tests should not be undertaken if it is raining.

4.9.2 Assessment of sub-field irrigation

For fields having sub-field irrigation that require certification, the method of verifying adequate and consistent wetting shall be agreed by the FIH Preferred Supplier/Certified Manufacturer/Certified Field Builder, the Accredited Test Institute and the FIH prior to the field test.

4.10 Water permeability

Fields shall have a water permeability rate of 150mm/h or greater. When required (in cases of concern, etc.) this shall be measured in accordance with EN 12616 to verify compliance.

Whenever a Global Elite or Global field is tested the ability of the surface to drain freely shall be assessed during the testing of the irrigation system. If National and Multi-Sport category fields are tested in the rain the ability of the surface to also drain freely shall be assessed.

If water is found to be ponding on the playing surface 5 minutes after the irrigation or rainfall ceases this should be reported.

5 Reporting

The results of a field test shall be reported on an official FIH Test Report prepared by an FIH Accredited Test Institute.

The completed test report shall be sent to the FIH (facilities@fih.ch) for review. If the review concludes the field meets the requirements of this Standard, the FIH will issue a Certificate of Field Certification and a copy of the test report to the following:

- Field owner
- FIH Preferred Supplier or FIH Certified Manufacturer.
- FIH Preferred Supplier or FIH Certified Field Builder
- National Hockey Association
- Continental Federation

The FIH will also place the field on the list of Certified Fields on the FIH Website (www.fih.ch/hockeyturf).

Field test reports shall be submitted to the FIH by the FIH Accredited Test Institute within two months of the date of the field test.

6 Period of Field Certification

6.1 Global Elite fields

Global Elite fields shall be certified for a period of two years. If fields that are less than 12 months old at the date of the first field test are not re-tested after two years, the venue owner may apply (to the FIH) for the certification to be downgraded to the Global category for a further one year.

6.2 Global, National and Multi-sport category fields

Fields that are less than 12 months old when tested will be certified for a period of three years from the date of the field test.

Fields that are more than 12 months old when tested will be certified for a period of two years from the date of the field test.

6.3 Termination or loss of field certification

If the synthetic turf or textile surface is replaced the field automatically loses its certification, unless a new field test is undertaken.

If the FIH becomes aware of defects that mean the field no longer fully complies with the requirements of this Standard they reserve the right to suspend the field certification until the defect is rectified.

In applying for a field to be certified, the field owner is deemed to be granting the FIH the right to commission a spot test (at the FIH's expense) at any time (subject to scheduling), to verify compliant performance is being maintained. If a field is found to no longer comply with this Standard following a spot test the FIH reserves the right to suspend or terminate the certification until the performance defect is rectified.

If the manufacturer of the installed Hockey Turf ceases to be a member of the FIH Quality Programme for Hockey Turf for any reason, this will not prevent field owners from applying to have a field recertified when a current certificate expires.

Annex A - Field Test Requirements

FIH Field Category		Global Elite	
Construction & Field Layout Requirements			
FOP size		91.40m x 55.00m	
Minimum run-off sizes	Ends of field	FIH Recommended – see clause 4.3.1.2	
	Sides of field	Hockey Turf shall be used for the full width of the run-off.	
Operational zone	Ends of field	Minimum 1m wide	
	Sides of field		
Space for the technical delegate's table		Required - see note 1	
Team benches		Required - see note 2	
Field orientation		North / South, with a maximum deviation from north of no more than $\pm 15^{\circ}$	
Category of Approved Product		Global	
Type of pile yarn		Crimped monofilament – see note 3	
Colour of FOP		See clause 4.3.2	
Colour of run-offs		See clause 4.3.3 and note 4	
Colour & type of line marking		White – tufted / inlaid Hockey Turf	
5m broken lines outside shooting circles		Required	
Accuracy of line markings		Required - see clause 4.3.4	
Other line markings within the FOP		None	
FIH Quality Programme logo within run-off		Required	
Logos within the FOP		None – see note 6	
Surface regularity	Maximum undulation	3m straightedge	0.3m straightedge
		$\leq 6\text{mm}$	$\leq 2\text{mm}$
Gradients		See clause 4.3.5. The profile should be symmetrical around the central axis of the field.	
Assessment of irrigation system's performance as part of field assessment		Required	
FOP Performance Requirements			
Ball Rebound		100mm - 400mm	
Ball Rebound consistency between test positions		$\leq 10\%$ of overall mean	
Ball Roll		$\geq 10.0\text{m}$	
Ball Roll consistency between test positions		$\leq \pm 10\%$ of overall mean	
Ball Roll Deviation		$\leq 0.50\text{m}$ @ 9.5m	

Shock Absorption	45% - 60%	
Shock Absorption consistency	$\leq \pm 5\%$ SA (absolute) from overall mean	
Vertical Deformation	4mm – 9mm	
Shoe – Surface Friction	25Nm – 45Nm	
Shoe – Surface Friction consistency	$\leq \pm 5$ Nm from overall mean	
Sports Equipment		
Hockey goals, complete with nets, side and backboards	Required – see note 7	
Corner flags	Required – see note 8	
Perimeter fencing		
Height of fencing along ends of the field see note 6	Mesh fencing	>3.0m
	Mesh or provision for suspended netting	7.0m total
Side fencing	Minimum 1.0m high	
Emergency vehicle access to field	Required	
Maintenance and Operational Equipment		
Flexible or movable sprinklers/hoses	Required – see note 9	
Maintenance equipment	Required – see note 10	
Maintenance log	Required – see note 11	

Notes:

- 1 Adequate space (minimum 6m wide by 3m deep centred on the halfway line) shall be allowed outside the operational zone on one side of the field for the technical officials' table.

The table does not need to be installed at the time a field is tested to allow FIH field certification but the FIH Accredited Test Institute does need to confirm that space has been allowed.

- 2 Two team benches shall be installed. Each shall provide seating for 11 people. Each bench shall be installed on the same side and be within 7.5m of the technical table. They shall be outside of the run-offs.

The team benches shall be covered to provide overhead protection from the weather and balls leaving the FOP.

Note: Retractable front screens to provide protection during watering of the field are also recommended.

Each bench shall have an electrical outlet and water supply.

Alongside each bench, space for a stick storage box and a 3m² table shall be provided.

- 3 A crimped monofilament pile yarn may be produced by a texturising or a knit-de-knit manufacturing process.
- 4 The Hockey Turf on the run-offs shall be a colour that provides good contrast with a hockey ball.
- 5 Unless required by FIH commercial agreements.
- 6 The field shall be fully fenced. The fencing mesh shall not allow hockey balls to pass through it, but it shall allow spectator visibility. Behind the goals the fencing shall be at least 7m high and it shall run for the full width of the field. On the side-boundaries the fencing shall be a minimum of 1.0m high.

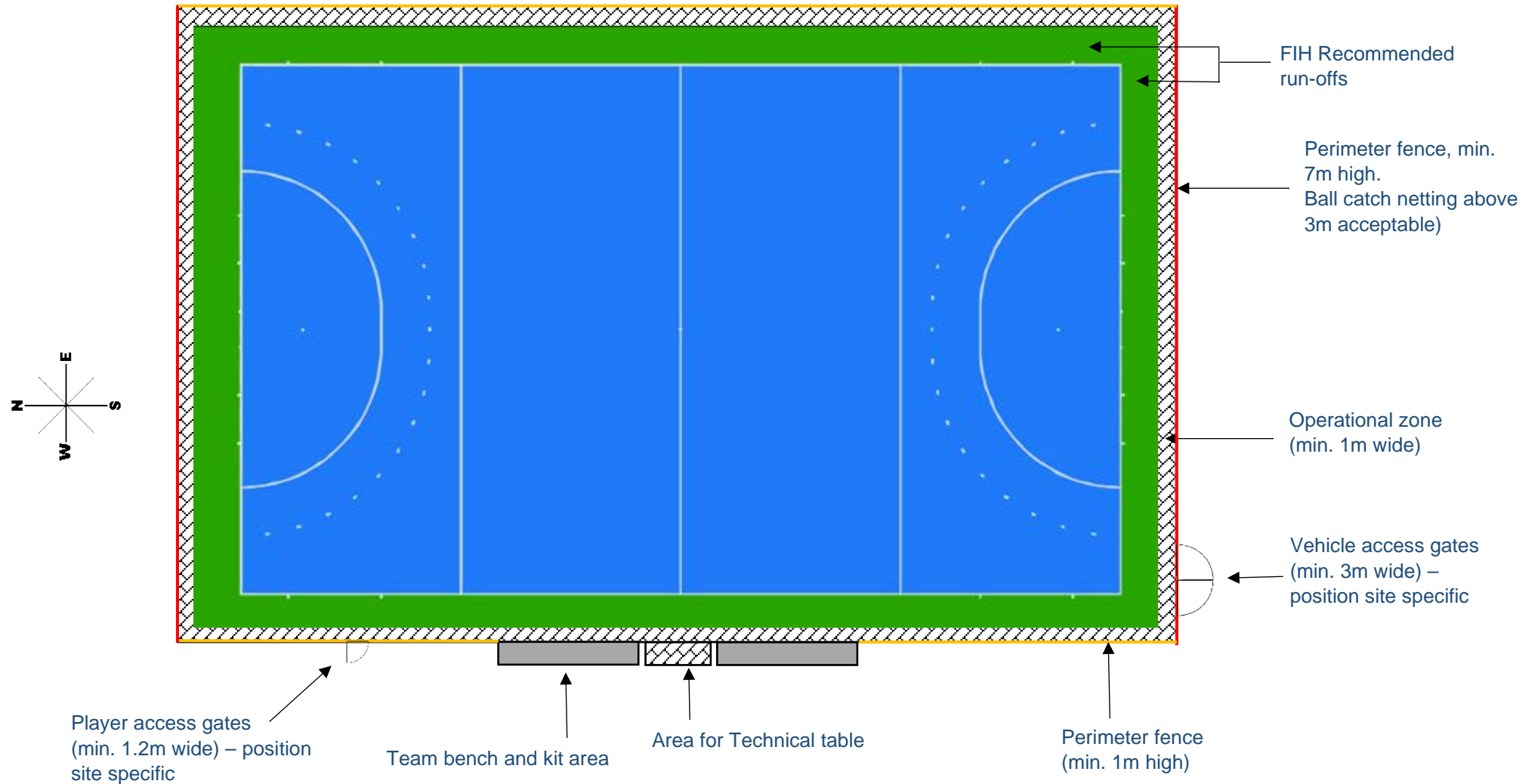
Fencing above 3m in height may comprise ball catch netting suspended from tensioned cables that keep the netting taut to prevent it billowing in the wind. The netting does not need to be installed at the time a field is tested for FIH certification but the Test Institute does need to confirm that the fencing design allows the ball catch netting to be erected when required.

If low level fencing is installed on side boundaries it shall incorporate an upper hand rail.

Player and match officials' access gates to the field shall be at least 1.2m wide.

At least one set of double gates shall be provided to allow maintenance and emergency vehicle access to the field.

- 7 Goals shall be manufactured by an FIH Quality Programme Certified Manufacturer.
- 8 Corner flags and posts shall be installed on each corner. They shall comply with the Rules of Hockey and be mounted on flexible posts that are free standing or fitted into ground sockets.
- 9 In addition to the permanent irrigation system the field shall have large bore hoses or portable sprinklers to allow manual localised watering as required.
- 10 The field shall be equipped with the maintenance equipment recommended by the Hockey Turf Manufacturer.
- 11 The field operator shall complete the Hockey Turf Manufacturer's Maintenance Log each time maintenance is undertaken on the field. The log shall be available for inspection by the FIH Accredited Test Institute at the time the field is tested for FIH field certification.



Global Elite Hockey Field – Conceptual Layout

FIH Field Category		Global	
Construction & Field Layout Requirements			
FOP Size		91.40m x 55.00m	
Minimum Run-Off sizes	Ends of field	FIH Minimum see clause 4.3.1.2	
	Sides of field		
Operational zone		Not required	
Category of Approved Product		Global	
Type of Pile Yarn		No restrictions	
Colour of FOP		See clause 4.3.2	
Colour of Run-Offs		See clause 4.3.3	
Colour of Line Marking		White	
5m broken lines outside shooting circles		Optional – see note 1	
Accuracy of Line Markings		Required - see clause 4.3.4	
Other line marking within the FOP		Permitted - see note 2 and clause 4.3.4	
FIH Quality Programme logo within run-off		Optional	
Logos within the FOP		Permitted - see note 3	
Surface Regularity	Maximum Undulation	3m straightedge	0.3m straightedge
		≤ 6mm	≤ 2mm
Gradients		See clause 4.3.5 and Note 4	
Assessment of irrigation system's performance as part of field assessment		Required	
Performance Requirements			
Ball Rebound		100mm - 400mm	
Ball Rebound consistency between test positions		≤ 10% of overall mean	
Ball Roll		≥ 10.0m	
Ball Roll consistency between test positions		≤ ± 10% of overall mean – see note 4	
Ball Roll Deviation		≤ 0.50m @ 9.5m	
Shock Absorption		45% - 60%	
Shock Absorption consistency		≤ ± 5% SA (absolute) from overall mean	
Vertical Deformation		4mm – 9mm	
Shoe – surface friction		25Nm – 45Nm	
Shoe – surface friction consistency		≤ ± 5Nm from overall mean	

Notes:

1. Although the 5m broken lines are not required to enable a field to be FIH Certified in this category, the broken lines are mandatory for Senior International Matches. Their adoption for other matches is at the discretion of National Associations. The advice of the national hockey association should always be sought when deciding whether to have these markings or not.
2. The presence of cross pitch marking for hockey training and markings for Hockey 5s on a field in this category will not prevent it being FIH Certified but they may exclude the field from being used for certain categories of competition. The advice of the national hockey association should always be sought before deciding to put additional markings on a field.
3. The presence of logos on a field in this category will not prevent it being FIH Certified but they may exclude the field from being used for certain categories of competition. The advice of the national hockey association should always be sought before deciding to put a logo on the FOP.
4. When an existing field that has gradients greater than 0.2% longitudinally and 0.4% laterally is being resurfaced, the ball roll consistency requirement for Global Field Certification will be relaxed to $\leq \pm 15\%$ of the overall mean.

This dispensation does not apply when the base of a field is being reconstructed.

FIH Field Category		National	
Construction & Field Layout Requirements			
FOP size		91.40m x 55.00m	
Minimum run-off sizes	Ends of field	FIH Minimum – see clause 4.3.1.2	
	Sides of field		
Operational Zone		Not required	
Category of Approved Product		National, Class 1 or Class 2	
Type of pile yarn		No restrictions	
Colour of FOP		See clause 4.3.2	
Colour of run-offs		See clause 4.3.3	
Colour of line marking		White or yellow – see clause 4.3.4	
5m broken lines outside shooting circles		Optional	
Accuracy of line markings		Required - see clause 4.3.4	
Other line marking within the FOP		Permitted - see note 2	
FIH Quality Programme logo within run-off		Optional	
Logos within the FOP		Permitted - see note 3	
Surface regularity	Maximum undulation	3m straightedge	0.3m straightedge
		≤ 6mm	≤ 3mm
Gradients		See clause 4.3.5	
Assessment of irrigation system's performance as part of field assessment		Optional – see note 4	
Performance Requirements			
Ball Rebound		100mm - 425mm	
Ball Rebound consistency between test positions		≤ 20% of overall mean	
Ball Roll		≥ 9.0m	
Ball Roll consistency between test positions		≤ ± 20% of overall mean	
Ball Roll Deviation		≤ 0.45m @ 8.5m	
Shock Absorption		40% - 65%	
Shock Absorption consistency		≤ ± 5% SA (absolute) from overall mean	
Vertical Deformation		4mm – 9mm	
Shoe – surface friction		25Nm – 45Nm	
Shoe – surface friction consistency		≤ ± 5Nm from overall mean	

Notes:

1. The presence of cross pitch marking for hockey training and markings for Hockey 5s on a field in this category will not prevent it being FIH Certified but they may exclude the field from being used for certain categories of competition. The advice of the national hockey association should always be sought before deciding to put additional markings on a field.
2. The presence of logos on a field in this category will not prevent it being FIH Certified but they may exclude the field from being used for certain categories of competition. The advice of the national hockey association should always be sought before deciding to put a logo on the FOP.
3. Some National Category fields have irrigation systems. Assessing the performance of the irrigation system is not mandatory, but it is recommended whenever a field is being tested.

FIH Field Category		Multi-Sport – Category 1	
Typical sports uses		Hockey, small sided football, lacrosse, general physical education	
Construction & field layout requirements			
FOP size		91.40m x 55.00m	
Minimum run-off sizes	Ends of field	FIH Minimum – see clause 4.3.1.2	
	Sides of field		
Operational Zone		Not required	
Category of Approved Product		Multi-Sport Class 1	
Type of pile yarn		No restrictions	
Colour of FOP		See clause 4.3.2	
Colour of run-offs		See clause 4.3.3	
Colour of hockey line marking		White or yellow recommended	
5m broken lines outside shooting circles		Not required	
Accuracy of line markings		Assessment not required - see note 1	
Other markings allowed within the FOP		Yes	
FIH Quality Programme logo within run-off		Optional	
Logos within the FOP		Permitted - see note 2	
Surface regularity	Maximum undulation	3m straightedge	0.3m straightedge
		≤ 6mm	≤ 3mm
Gradients		See clause 4.3.5	
Performance Requirements			
Ball Rebound		100mm - 450mm	
Ball Rebound consistency between test positions		≤ 20% of overall mean	
Ball Roll		≥ 8.0m	
Ball Roll consistency between test positions		≤ ± 20% of overall mean	
Ball Roll Deviation		≤ 0.40m @ 7.5m	
Shock Absorption		40% - 70%	
Shock Absorption consistency		≤ ± 5% SA (absolute) from overall mean	
Vertical Deformation		4mm - 10mm	
Shoe – surface friction		25Nm – 45Nm	
Shoe – surface friction consistency		≤ ± 5Nm from overall mean	

Notes:

1. Multi-Sport fields have a number of sports markings and it is recognised that if there are too many it can be confusing to players and match officials and compromise the integrity of the playing surface (if they are cut-in). To minimise these problems common line markings are often used and occasionally these may not fully comply with the *Rules of Hockey*. Nevertheless, the FIH will certify such fields providing they have the necessary markings to allow Hockey to be played.
2. The presence of logos on a field in this category will not prevent it being FIH Certified but they may exclude the field from being used for certain categories of competition. The advice of the national hockey association should be sought before deciding to put a logo on the FOP.

FIH Field Category		Multi-Sport – Category 2	
Typical sports uses		Hockey and tennis	
Construction & Field Layout Requirements			
FOP size		91.40m x 55.00m	
Minimum run-off sizes	Ends of field	FIH Minimum – see clause 4.3.1.2	
	Sides of field		
Operational zone		Not required	
Category of Approved Product		Multi-Sport Class 2	
Type of pile yarn		No restrictions	
Colour of FOP		See clause 4.3.2	
Colour of run-offs		See clause 4.3.3	
Colour of hockey line marking		White or yellow recommended – see clause 4.3.4	
5m broken lines outside shooting circles		Not required	
Accuracy of line markings		Assessment not required - see note 1	
Other markings allowed within the FOP		Yes	
FIH Quality Programme logo within run-off		Optional	
Logos within the FOP		Permitted - see note 2	
Surface regularity	Maximum undulation	3m straightedge	0.3m straightedge
		≤ 6mm	≤ 3mm
Gradients		See clause 4.3.5	
Performance Requirements			
Ball Rebound		≤ 500mm	
Ball Rebound consistency between test positions		≤ 20% of overall mean	
Ball Roll		≥ 8.0m	
Ball Roll consistency between test positions		≤ ± 20% of overall mean	
Ball Roll Deviation		≤ 0.40m @ 7.5m	
Shock Absorption		≥ 30%	
Shock Absorption consistency		≤ ± 5% SA (absolute) from overall mean	
Vertical Deformation		2mm - 9mm	
Shoe – surface friction		25Nm – 45Nm	
Shoe – surface friction consistency		≤ ± 5Nm from overall mean	

Notes:

1. Multi-Sport fields by definition have a number of sports markings and it is recognised that if there are too many it can be confusing to players and match officials and compromise the integrity of the playing surface (if they are cut-in). To minimise these problems common line markings are often used and occasionally these may not fully comply with the *Rules of Hockey*. Nevertheless, the FIH will certify such fields providing they have the necessary markings to allow Hockey to be played.
2. The presence of logos on a field in this category will not prevent it being FIH Certified but they may exclude the field from being used for certain categories of competition. The advice of the national hockey association should be sought before deciding to put a logo on the FOP.
3. Based on the requirements of EN 15330, Multi-Sport MS2 category field should have a tennis ball rebound under dry and wet conditions of $\geq 1.12\text{m}$, when tested in accordance with EN 12235. Compliance with this requirement does not form part of the FIH Field Certification requirements.

FIH Field Category		Multi-Sport – Category 3	
Typical sports uses		Football & development level hockey	
Construction & Field Layout Requirements			
FOP size		91.40m x 55.00m	
Minimum run-off sizes	Ends of field	FIH Minimum – see clause 4.3.1.2	
	Sides of field		
Operational zone		Not required	
Category of Approved Product		Multi-Sport Class 3	
Type of pile yarn		No restrictions	
Colour of FOP		See clause 4.3.2	
Colour of run-offs		See clause 4.3.3	
Colour of hockey line marking		White or yellow recommended – see clause 4.3.4	
5m broken lines outside shooting circles		Not required	
Accuracy of line markings		See note 1	
Other markings allowed within the FOP		Yes	
FIH Quality Programme logo within run-off		Optional	
Logos within the FOP		Permitted - see note 2	
Surface regularity	Maximum undulation	3m straightedge	0.3m straightedge
		≤ 6mm	≤ 3mm
Gradients		See clause 4.3.5	
Performance Requirements			
Ball Rebound		≥ 75mm	
Ball Rebound consistency between test positions		≤ 20% of overall mean	
Ball Roll		≥ 5.0m	
Ball Roll consistency between test positions		≤ ± 20% of overall mean	
Ball Roll Deviation		Not applicable	
Shock Absorption		55% - 70%	
Shock Absorption consistency		≤ ± 5% SA (absolute) from overall mean	
Vertical Deformation		4mm - 12mm	
Shoe – surface friction		25Nm – 50Nm	
Shoe – surface friction consistency		≤ ± 5Nm from overall mean	

Notes:

1. Multi-Sport fields have a number of sports markings and it is recognised that if there are too many it can be confusing to players and match officials and compromise the integrity of the playing surface (if they are cut-in). To minimise these problems common line markings are often used and occasionally these may not fully comply with the *Rules of Hockey*. Nevertheless, the FIH will certify such fields providing they have the necessary markings to allow Hockey to be played.
2. The presence of logos on a field in this category will not prevent it being FIH Certified but they may exclude the field from being used for certain categories of competition. The advice of the national hockey association should be sought before deciding to put a logo on the FOP.
3. Based on the requirements of the One Turf Concept, Multi-Sport MS3 category surfaces should have a football rebound under dry and wet conditions of $\leq 1.00\text{m}$, when tested in accordance with EN 12235. Compliance with this requirement does not form part of the FIH Field Certification requirements.
4. Based on the requirements of the One Turf Concept Multi-Sport MS3 category surfaces should have a football roll under dry and wet conditions of $\leq 12.00\text{m}$, when tested in accordance with EN 12234. Compliance with this requirement does not form part of the FIH Field Certification requirements.
5. If the field is in the USA or Canada and it is also used for American Football, it should also be tested for Gmax in accordance with ASTM F1936-10 (2015): *Standard Specification for Impact Attenuation of Turf Playing Systems as Measured in the Field and the Gmax* should be no greater than 200g. Compliance with this requirement does not form part of the FIH Field Certification requirements.

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