



HOCKEY TURF & FIELD STANDARDS

**Engineered
for Hockey**



Part 1. Introduction & General Guidance
2017 Edition

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1 Introduction

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**

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.

This document, Part 1, is intended as a general introduction. It describes the various types of Hockey Turf surfaces covered by the Standard and different types of product, field and Hockey 5s court certification.

2 Definitions & Terminology

Base

Typically, a layer or layers of aggregate that are laid above the prepared sub-soil to provide structural strength and load bearing capacity to the sports facility. May include an upper layer or layers of asphalt.

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.

Hockey 5s Court

The area on which Hockey 5s is played and as defined in the Rules of Hockey 5s.

Hockey Field

The area on which 11 a-side field hockey is played and as defined in the Rules of Hockey.

Hockey Turf

A sports surface designed to have the quality and performance characteristics required to allow the game of hockey to be played. It comprises the synthetic turf or textile surface, shockpad or elastic layer and any supporting layers that influence the sports performance or biomechanical properties of the playing surface.

Infill

Granulated materials (normally sand, or rubber and sand mixes in Multi-Sport Class 3 surfaces) used to infill and support the pile of the synthetic turf or textile surface.

Long pile synthetic turf surface

Synthetic turf surface whose pile length is greater than 30 mm.

Non-filled synthetic turf

Synthetic turf surface that does not contain any form of unbound particulate fill within the pile of the carpet.

Pile

The yarns or fibres used to form the upper part of the synthetic turf or textile surface that is visible when laid.

Shockpad & elastic layer

Prefabricated foam or elastomeric sheets or tiles or insitu laid elastomeric granulate and binder (normally polyurethane) 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 30mm or less.

Synthetic turf surface

Sports surface comprised of a carpet of tufted, knitted or woven construction.

Textile Surface

Fibre bonded sports surface of needle-punched construction, whose pile forms a fleece like structure that is infilled with sand.

3 Types of Hockey Turf

Choosing the right Hockey Turf surface can be difficult. The surface needs to provide the performance required by the players, offer adequate protection to minimise the risk of injury and withstand the damaging effects of use and the climate so it lasts a realistic period of time.

To assist in the selection of the right products, the FIH Quality Programme for Hockey Turf endorses quality-approved products manufactured by FIH Preferred Suppliers and FIH Certified Manufacturers. Tested for over twenty different properties, only those products that fully satisfy the requirements of the programme are awarded the prestigious FIH Approved Product designation. The criteria for FIH Product Approval is given in Part 2 of the FIH Hockey Turf and Field Standards.

When determining which form of Hockey Turf is most appropriate for a specific facility it is very important that the requirements of the various competitions that will be held on the facility are considered, as well as the policies and recommendations of the national hockey association. If in doubt, you should always consult the national hockey association for guidance.

The principal types of surfaces used for hockey and Hockey 5s are:

1 Non-filled 'wet' Hockey Turf



Carpet type	Synthetic Turf
Pile height*	10mm - 18mm
Infill	Non-filled
Irrigation	Required
Shockpad	Required



**this is the height of the carpet pile, which will be less than the length of a texturised or curled pile yarn when it is stretched straight.*

This type of synthetic turf is designed specifically for hockey and has become the surface of choice for top-level competitions. The surfaces have short, dense, piles that are non-filled. The surface is normally manufactured from monofilament yarns that are texturised to increase the density of the playing surface. To provide the fast, predictable, non-abrasive playing surface players' desire, the surface is watered prior to play.

This class of hockey turf provides the best playing qualities and are laid on Global Elite and Global category fields, used for top-level international and national competitions. The turfs may also be laid on National or Multi-Sport category fields if they are also shown to have compliant performance under dry conditions.

2 Sand Dressed Hockey Turf



Carpet type	Synthetic Turf
Pile height*	13mm - 20mm
Infill	Normally sand
Free pile above infill	> 25%
Irrigation	Optional
Shockpad	Required



*This is the height of the carpet pile, which may be less than the length of a texturised or curled pile yarn when it is stretched straight.

This type of synthetic turf is also designed specifically for hockey and is quite similar in concept to non-filled turfs. The pile is, however, slightly longer and more open, which allows it to be partly dressed with a sand ballast. This ballast helps allow the surface to be used when dry or wet.

When wet, most players will find the playing characteristics similar to those of wet non-filled surfaces. When dry, the surfaces are a little slower and a hockey ball may bobble a little more as it rolls across the surface.

Sand dressed Hockey Turfs are suitable for lower level international, national, club and community hockey. They may also be used within Multi-Sport Approved Products.

3 Sand Filled Hockey Turf



Carpet type	Synthetic Turf
Pile height*	18mm - 30mm
Infill	Typically sand
Free pile above infill	Typically < 15%
Irrigation	Not required
Shockpad	Required



*further information on FIH Multi-Sport surfaces is given in section 4

This type of synthetic turf was originally developed in the 1980s as a lower cost alternative to non-filled surfaces. The surfaces normally have straight pile yarns that are longer and less densely spaced than those of non-filled or sand dressed surfaces. The surface is almost totally filled with sand to keep the pile standing upright. This provides a durable surface that can sustain high levels of use, making it particularly suitable as a multi-sport surface.

Better skilled players tend to now prefer the greater consistency and comfort sand dressed or non-filled surfaces provide.

4 Textile Surface



Carpet type	Textile Surface
Pile height	12mm – 20mm
Infill	Sand
Irrigation	Not required
Shockpad	Required



Manufactured using a needle-punch technique that produces a thick fleece-like surface, that is normally filled with sand. The surface provides a durable, relatively fast and consistent playing surface that is used for community and development hockey and Hockey 5s courts.

5 Long Pile (3G) Synthetic Turf Surfaces



Carpet type	Synthetic Turf
Pile height	>30mm
Infill	Normally rubber granules & sand
Irrigation	Not required
Shockpad	Optional, depending on infill type and depth



Known as long pile or 3G synthetic turf surfaces, these types of surface are designed to replicate the playing qualities of natural grass and are primarily used for football and rugby. Some multi-sport forms have been developed to allow football and hockey to be played on the same field. These typically have a curly pile of at least 30mm in height that is partly filled with a mix of sand and rubber granules.

Certain forms of these surfaces can also meet the guidelines given in the One Turf Concept, which is a joint initiative by FIH, FIFA and World Rugby to allow long pile synthetic turf fields to be used for development level community football, rugby and hockey.

Experience is showing that in countries where hockey is predominately now played on Hockey Turf these forms of synthetic turf surfaces are considered slow and somewhat inconsistent. However, in countries where grass or mineral surfaces are still used for hockey, long pile synthetic turf surfaces can provide an acceptable playing surface for community and development level hockey.

4 Construction of Hockey Fields & Hockey 5s Courts

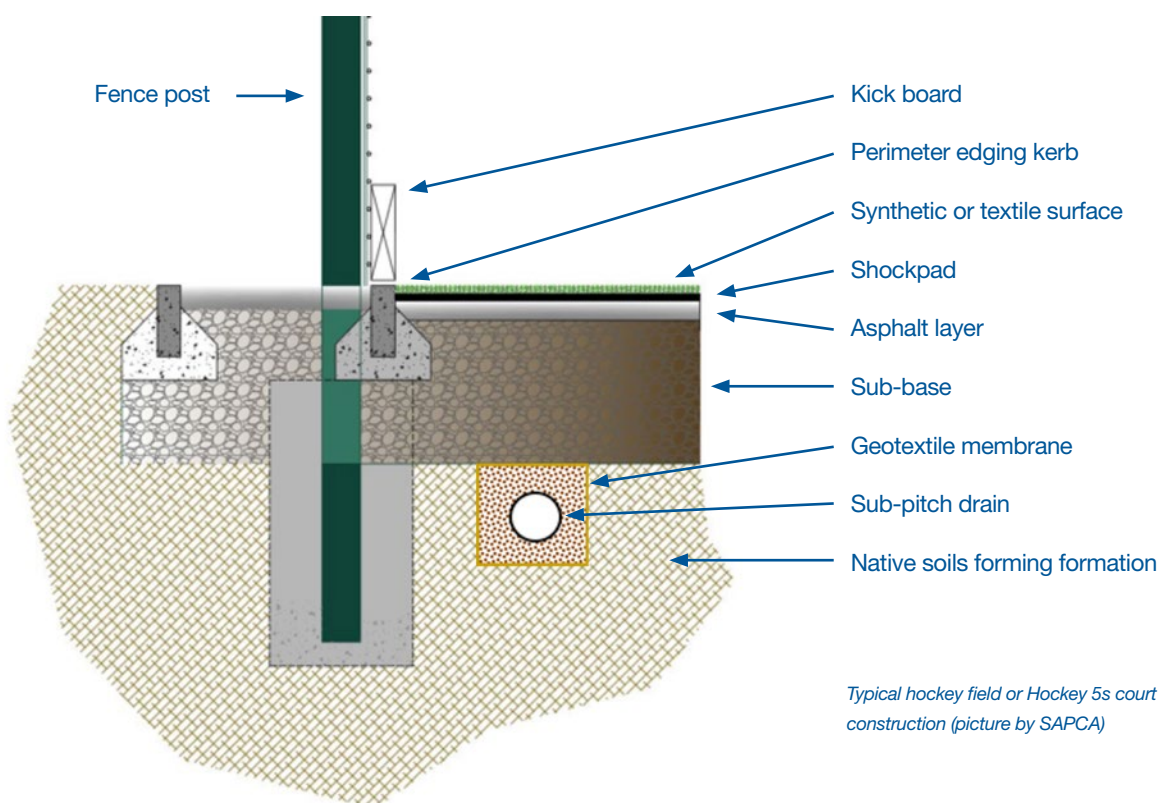
The combination of the Hockey Turf and base on which it is laid is a complex piece of engineering that is required to have the playing characteristics hockey requires, whilst ensuring player comfort, and at the same time being able to withstand the effects of use and the weather.

There are many ways of producing Hockey Turfs and constructing hockey fields and Hockey 5s courts. The FIH does not wish to stifle innovation or local good practice and any method of construction that is proven to satisfy the requirements of the FIH Hockey Turf and Field Standards is considered acceptable.



4.1 Field Foundations

In many parts of the world the construction of a hockey field or Hockey 5s court typically comprises:



The primary functions of a field's foundation are to provide a stable platform on which the Hockey Turf playing surface can be laid and to protect the underlying ground from any excessive loads that may lead to its deformation and instability. The foundation may also be used to aid drainage from the surface (providing it is permeable). Due to the many localised considerations that will have a significant bearing on the design and construction of the foundation it is not possible for the FIH to set global standards for them.

Experience has shown the greatest risk of unforeseen problems during construction and longer-term field stability usually result from inadequate provision for the local site or climatic conditions. To minimise the risk of such failures occurring, a comprehensive geotechnical investigation should be undertaken out at an early stage of a project to enable a suitable design to be developed.

The field or court should incorporate a drainage system that is designed to remove rainfall from the playing surface at a sufficient rate to ensure that excess water does not accumulate on the playing surface and prevent play, or within the foundation and adversely affect the stability of the field.

In many parts of the world, the foundation is topped with an asphalt layer. This is designed to provide a smooth load-bearing platform on which the Hockey Turf and shockpad is laid. The asphalt layer may be permeable or impermeable depending on the type of drainage being used. As fields with impermeable asphalt layers need more pronounced slopes to aid the lateral flow of water, the use of a permeable asphalt, that allows a flatter and more consistent playing surface, is considered preferable.

In some countries, national guidance and standards are available for the design and construction of field foundations and drainage systems; these should be followed whenever possible. Where no such guidance is available, it is essential a specialist design team and construction company be appointed to undertake the works. Identifying such companies can be difficult, which is why the FIH has introduced the certification of FIH Preferred Suppliers and Certified Field Builders. These are companies with a proven ability to design and construct hockey facilities. See section 6 of this document for more details.



4.2 Shockpads (or Elastic Layers)

Shockpads are laid beneath the synthetic turf playing surface to provide the comfort and impact attenuation players require. Shockpads are normally produced from flexible foams that are laid as rolls or tiles or from elastic layers made from rubber granules and polyurethane binders (that are mixed on site and laid with a small paving machine). Both forms, providing they meet the relevant requirements of the FIH Standards, are considered acceptable.

4.3 Carpet Installation

If not adequately anchored, non-filled and sand dressed synthetic turf carpets can move during use, resulting in carpet wrinkles and line markings not being straight. To prevent this occurring such surfaces should either be tensioned and clamped along the field boundaries, or be bonded to the underlying shockpad.

Bonding a carpet to the shockpad ensures that problems with lines moving and carpets lifting in periods of intense rainfall do not occur; it also helps minimise the stresses placed on the carpet joints. Bonding can, however result in the shockpad being damaged when the carpet is removed, possibly meaning that the shockpad must be replaced prematurely.

4.4 Field gradient

To ensure true and predictable performance the FIH Standards detail recommended maximum field gradients. If a field has gradients that exceed these, there is a possibility that it will not satisfy the consistency requirements for ball roll and ball roll deviation; unacceptable variations in surface wetness may also occur. This is particularly the case with global category fields having the latest forms of texturised mono-filament Hockey Turfs.

When designing a new global category field with slopes that exceed the FIH preferred gradients or planning to resurface or convert an existing field that does not comply with the preferred gradients, guidance should be sought from the Certified Field Builder appointed to build the field and the Hockey Turf manufacturer about the ability of the field to achieve the level of performance and certification required.

4.5 Quality Monitoring During Construction

Failure to construct a hockey facility correctly can seriously compromise its long-term performance and suitability and it is important that proper quality assurance procedures are applied throughout the construction process. Site inspections and materials sampling should be undertaken throughout construction, with attention being paid to the completion of each key stage. Checks are normally made either by independent engineers or by the installation contractor operating a suitable quality management system.

5 Field Irrigation

Global Elite and Global category fields require watering to establish the optimum playing conditions between the Hockey Turf and the stick, ball, footwear and players' bodies.

Most Global Elite and Global fields are watered using automated irrigation systems based on rain-guns or pop-up sprinklers that are located around the perimeter of the field and throw water onto the FOP. Responding to the FIH's desire to reduce water consumption, irrigation systems based on sub-field watering are also being introduced to the market. Whichever system of irrigation is selected it should be designed to provide an even wetting of the Hockey Turf surface.

The volume of water required to wet the field will depend on the specific Hockey Turf product installed on the field. Traditionally a volume of 3 l/m² has been used but companies are now developing Hockey Turf surfaces that require less water.

Water quality

Water used to irrigate fields should be of potable quality. If the incoming water supply is likely to be from a non-potable source it should be treated by dosing with a residual disinfectant or be disinfected using UV treatment etc.

If the water used to irrigate a field has a very high mineral or salt content it can result in discolouration of the Hockey Turf as the minerals build-up on the playing surface. This is most likely to occur when untreated ground water from a bore hole is used to irrigate a field. To reduce the risk of this occurring, it is recommended that the water is suitably filtered before being applied.

In locations where any of the conditions listed below could occur, the irrigation system should be designed to ensure the risk of water borne bacterial infection of players or spectators from diseases such as Legionnaires Disease is eliminated:

- The water temperature in all or some parts of the system is between 20 °C and 45 °C
- Water is stored in an open loop system
- Water is re-circulated
- There are sources of nutrients such as rust, sludge, scale, organic matter or biofilms within the irrigation or storage system
- Local climatic conditions are likely to encourage bacteria to multiply

Water harvesting

Wherever possible, consideration should be given to minimising water consumption by utilising water harvesting systems to recycle rainfall and the reuse of water applied to a field.

Cold climate protection

In cold climates, all irrigation pipework, etc. should be suitably lagged to prevent freezing.

5.1 Above-Ground Irrigation Systems

If above-ground irrigation is selected, there should be no sprinklers located within the field of play or within 2m of a goal or side-line. Any sprinklers or irrigation infra-structure located within the run-offs must not protrude above ground when not in use.

The design of the irrigation system shall take into account the prevailing wind directions and minimise water spray drift onto spectators.

The sprinklers or rain guns should be capable of sectoring to 90° or 180° and the discharge rate should be such that an irrigation cycle of all emitters (operating in matched arc pairs) should achieve an even wetting over the FOP.

The control system should allow varying cycles and individual programs to ensure the entire playing area and surrounds can be watered. The following cycles are typically used:

- 10 - 15 minutes
- 5 - 8 minutes
- 3 - 4 minutes
- Single station activation

Adequate water storage should be provided to ensure the field can be fully watered as required for the schedules of play throughout a day. This should include watering during half time and, in hotter climates, the ability to also water during the quarter game breaks.

5.2 Sub-Field Irrigation

If a sub-field irrigation system is to be used it should ensure water levels are uniformly maintained at the required level throughout a game and have the ability to top-up during breaks in play as required. The control mechanism should ensure that optimum playing conditions are retained at all times, and that ponding of water within the Hockey Turf surface does not occur. The system should be sufficiently responsive so that it can self-adjust to any rain occurring during a game, so there is no adverse effect on play.

5.3 Ancillary Watering


Back-up large bore hoses with a suitable supply should normally be provided for additional manual watering of a field as necessary. These should be stored close to the field, but not on the run-offs to enable rapid deployment, and should be stored safely to avoid tripping hazards.

6 FIH Multi-Sport Approved Products

Recognising that facilities on which hockey is played also often have to be used by other sports, the FIH Quality Programme for Hockey Turf includes three categories of Multi-Sport Surface. Multi-Sport 1 and Multi-Sport 2 Approved Products are based on sand dressed or sand filled synthetic turf surfaces or textile surfaces, that are laid on shockpads that provide slightly wider ranges of performance than those used specifically for hockey.

When considering installing an FIH Multi-Sport surface, it's suitability for other sports should be verified by reference to the appropriate specifications of the relevant sports federations. FIH certification only assesses the suitability of the surface for hockey.

The three categories of Multi-Sport surface are:

	<p>This category is designed to accommodate surfaces that are suitable for a number of sports including recreational & small sided football, tag rugby, lacrosse and general physical education. They still allow a level of hockey that is considered quite acceptable for community fields, multi-sport clubs and educational facilities.</p>
	<p>This category allows surfaces to be stiffer and more resilient, meaning sports that need a ball to bounce, such as tennis, can also be played.</p> <p>Multi-Sport Category 2 surfaces based on sand dressed or Textile Surfaces have also been found to be suitable for recreational netball.</p> <p>The surfaces allow a level of hockey that is considered quite acceptable for community fields, multi-sport clubs and educational facilities.</p>
	<p>This category of hockey turf comprises long pile (3G) synthetic turf surfaces that are designed to replicate the playing qualities of natural grass.</p> <p>These types of surface are favoured by sports such as football and rugby but can also be used for starter or development level hockey, subject to approval by the national hockey association.</p>

7 Field & Court Certification




It does not matter how good the quality of the Hockey Turf is if it is laid badly or placed on a poorly constructed base. To ensure a field or court is constructed correctly and has the right sports and player welfare characteristics it should be tested upon completion. The FIH has established a comprehensive series of checks that are undertaken by independent Accredited Test Institutes and these should be undertaken on all new hockey facilities.

As the performance of a field or court will change with time, it is also recommended that facilities be periodically retested to allow an owner to be confident their facility is still fit for purpose and providing an acceptable playing environment. Retesting also allows changes in conditions to be monitored so realistic predictions of when a facility will need to be resurfaced can be made. The criteria for FIH Field Certification is given in Part 3 of the FIH Hockey Turf and Field Standards.



7.1 Full Size Hockey Fields

The FIH Quality Programme for Hockey Turf has a number of categories of certification for hockey fields as follows.

	<p>Fields designed to satisfy the competition requirements of FIH Tier One hockey events. These fields are surfaced with Global Approved Products and require watering prior to play.</p>
	<p>Fields designed for international and top-level national competitions, they also are surfaced with Global Approved Products and require watering prior to play.</p>
	<p>This category of field may be used for competitive play when dry or wet. Normally surfaced with a National Approved Product (Class 1 or 2) the fields are used for lower level national, regional and club play.</p>

The Multi-Sport category of field is designed to be used by a number of sports including hockey. These fields are normally surfaced with Multi-Sport Approved Products (Class 1, 2 or 3), but may be surfaced with any suitable FIH Approved Product.

	<p>Multi-Sport Category 1 fields are intended for hockey and a number of sports such as small sided football, lacrosse and general physical education.</p>
	<p>Multi-Sport Category 2 fields are firmer than other categories of hockey field allowing them to also be used by sports such as recreational tennis.</p>
	<p>Multi-Sport Category 3 fields are intended for recreational football and development level hockey</p>

A list of the currently certified fields can be found at www.fih.ch/hockeyturf



7.2 Typical use of the different categories of Hockey Field

The following table summarises the types of Hockey Turf typically used for the different levels of hockey played around the world. Some competition rules and regulations specify the category of field and/or type of hockey turf to be used, therefore when designing a new hockey facility, guidance should always be sought from your national and continental (when appropriate) hockey associations. For their contact details please visit www.fih.ch/inside-fih/our-members/

Class of Hockey Turf							
	Global	Global	National Class 1	National Class 2	Multi-Sport Class 1	Multi-Sport Class 2	Multi-Sport Class 3
- FIH Tier 1 International Competitions	✓						
- Other International Competitions - Top level Continental Competitions - Top level National Club Competitions - Top level University & College Competitions	✓	✓					
- International Development Competitions - Continental Competitions - National Club Competitions - Regional Club Competitions - University & College Competitions - Community Club Competitions - Schools Competitions			✓	✓			
- Community & School Hockey Field also used for sports such as small sided football, futsal etc.				✓	✓		
- Community & School Hockey Field also used for sports such as tennis						✓	
- Community & Basic Development Hockey Field designed for football with hockey as a secondary sport							✓

7.3 Hockey 5s Courts

The FIH Quality Programme for Hockey Turf also has a number of categories of certification for Hockey 5s courts as follows:

	<p>Full sized Hockey 5s courts with rebound boards and run-offs, designed to satisfy the competition requirements of FIH Tier One Hockey 5s events. These fields are surfaced with Global Approved Products and require watering prior to play.</p>
	<p>Full sized Hockey 5s courts with rebound boards and run-offs. Surfaced with a Global or National Class 1 Approved Products and having a suitable means of watering the surface prior to play.</p>
	<p>Full sized Hockey 5s courts with rebound boards and run-offs. Surfaced with a National Class 1 or 2 Approved Product, that do not require watering prior to play.</p>
	<p>Hockey 5s courts that either are surfaced with an FIH Multi-Sport Class 1, 2 or 3 Approved Product or courts that are over or under sized.</p>

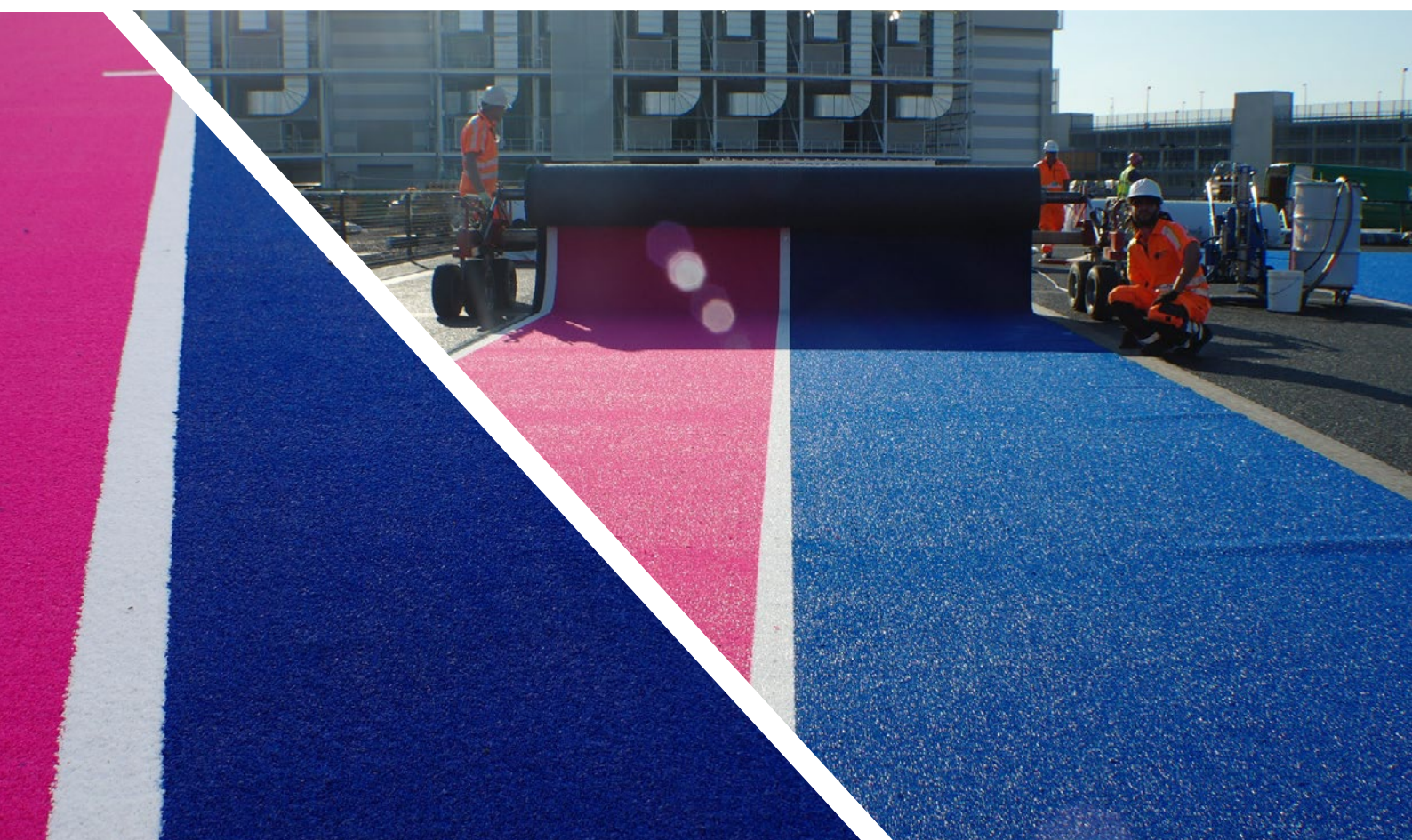
A list of the currently certified Hockey 5s Courts can be found at www.fih.ch/hockeyturf

7.4 Line Markings

There is often a desire to put additional markings or logos onto a hockey field or Hockey 5s court to allow other activities to take place. The ability to do this will often depend on the competition rules for the games that will be held on the field or court and the advice of the national hockey association should always be sought before deciding to place additional markings on a facility.

With regard to FIH Field Certification the following conditions apply:

Global Elite	No other markings allowed, unless they are specifically being applied for an FIH event in accordance with FIH competition or commercial regulations
Global	Cross pitch marking for hockey training and markings for Hockey 5s allowed
National	Cross pitch marking for hockey training and markings for Hockey 5s allowed
Multi-Sport Class 1, 2 3	Markings for sports other than hockey training and Hockey 5s allowed



8 FIH Certified Companies

Because of the growth in the market for sports facilities, there has also been an increase in the number of companies offering products and services. This includes companies of a wide range of sizes, structures and abilities, many of which have limited knowledge or understanding of what hockey requires. To help ensure only companies of proven competence are considered for the construction of hockey facilities the FIH Quality Programme has four categories of certified company.

	<p>FIH Preferred Suppliers are companies that meet all the requirements of certified manufacturers and certified field builders, allowing customers to benefit from a one-stop approach to the construction of their new hockey field. In addition, Preferred Suppliers have a global commitment to working with the FIH to provide high quality hockey fields suitable for international, national, club and development hockey.</p> <p>A list of Preferred Suppliers can be found at www.fih.ch/hockeyturf</p>
	<p>FIH Certified Manufacturers are companies that specialise in the manufacturing of Hockey Turf. These companies have a proven ability to manufacture Hockey Turf to the standards the game requires, operate quality management systems to ensure consistency in their products and provide comprehensive maintenance advice to customers purchasing their products.</p> <p>A list of FIH Certified Manufacturers can be found at www.fih.ch/hockeyturf</p>
	<p>FIH Certified Field Builders are companies that specialise in building hockey fields. The companies have a proven ability to construct fields to the standards required for hockey, have appropriate in-house civil engineering expertise for the design and construction of hockey fields, operate quality management systems to ensure consistency in their work and provide comprehensive maintenance advice to their customers.</p> <p>A list of FIH Certified Field Builders can be found at www.fih.ch/hockeyturf</p>
	<p>FIH Accredited Test Institutes are internationally recognised independent laboratories that specialise in testing sports surfaces and equipment. Working to the highest standards the institutes are subjected to annual audits by the FIH and independent third party auditors. Only FIH Accredited Test Institutes are authorised to undertake the testing of Hockey Turf products, hockey fields and Hockey 5s courts.</p> <p>A list of FIH accredited test Institutes and the procedure for accreditation can be found at www.fih.ch/hockeyturf</p>

9 Performance & Field Testing Terminology

Ball Rebound

The height to which a ball bounces is an important consideration for players. Generally, players prefer surfaces that have a low bounce and are able to minimise any bobbling of the ball as it rolls across the field.

Ball Roll

The distance a ball rolls across a surface is an indication of its speed. Surfaces with low roll distances will generally be considered slow, whilst surfaces with long ball rolls are fast.

Ball Roll Deviation

It is important that the Hockey Turf or field's profile does not cause a ball to deviate from a straight line when rolling across the surface. Therefore, the pile of the Hockey Turf surface should be non-directional and the field built with gradients that are not too steep.

Ball Roll Deviation

It is very important that the dynamic properties of the Hockey Turf provide adequate comfort and protection to players as they run and fall on the surface, whilst at the same time providing a stable and non-tiring playing surface. These properties are known as Shock Absorption and Vertical Deformation.

Shock Absorption & Vertical Deformation

Shock Absorption is measured using an Advanced Artificial Athlete test rig. This is designed to simulate the impact forces placed on the surface when a player runs on it. It measures the peak impact value and compares this to the value measured on concrete. The result of the test is expressed as a percentage reduction (in force) compared to concrete. The larger the number reported the greater the level of shock absorption being provided.

Vertical Deformation is also measured using the Advanced Artificial Athlete, the degree to which it causes the playing surface to compress when dynamically loaded being measured. Hockey Turf surfaces should allow some vertical deformation to ensure injuries such as sprains to the ligaments around the big toe joint do not occur through the jarring of a player's foot when it strikes the surface. However, if the vertical deformation is too high, players will find the surface unstable and tiring so a maximum deformation is also specified.

Shoe – Surface Friction

The ability of the Hockey Turf to provide acceptable levels of foot grip is important if players are to run, turn and stop with confidence. It is important that the level of grip is not too high, causing injuries through foot lock and not too low meaning players slip.

Water Permeability

To ensure water can drain through the playing surface into the sub-field drainage system the Hockey Turf needs to have adequate vertical water permeability.

Surface Regularity

To reduce the risk of a ball bobbling or rising unintentionally from the playing surface a hockey field must be built without undulations or high spots. Surface Regularity measures the smoothness or evenness of the playing field

Toxicology & Environmental Properties

Hockey Turf surfaces must not have an adverse effect on the health of players or the environment in which they are laid. Increasingly national regulations and legislation are being introduced that address these aspects and any manufacturer of Hockey Turf needs to ensure they fully comply with all applicable regulations and legislation in the markets in which they operate.

The FIH wishes to ensure that all Hockey Turfs they approve are compatible with human activity and the environment even in markets where there are no national regulations so have incorporated current best practice into its standards to provide confidence to consumers of its approved hockey turf products.

Product Identification

To ensure the materials used in an approved hockey turf product do not change for whatever reason a comprehensive series of characterisation tests are undertaken on all the individual components when a Hockey Turf is initially tested in the laboratory to enable the FIH to approve it. These tests 'identify or finger print the product' and allow similar checks to be made when a new playing surface is laid on a field, ensuring it is the approved product that has been supplied and installed.



10 Normative References

The FIH Hockey Turf and Field Standards incorporate by dated or undated reference, provisions from other publications. For dated references, subsequent amendments to or revisions of any of these publications will apply to the FIH Standards only when incorporated into it by amendment or revision. For undated references, the latest edition of the publication referred to applies.



HOCKEY IS...

FAN-CENTRIC

211million+



watched 2016 Champions Trophy

3,750 hours broadcast
Rights sold to 130+ countries

Ranked **4th** highest Olympic sport across social media

79k Twitter followers

95k Instagram followers

45million+ minutes watched on YouTube

The national sport of **INDIA**
5th of the world's population

SOCIAL

@fih_hockey

fihockey

fihockey

@fihockey

INCLUSIVE

50/50
male / female sport

Strong continental representation

132 National Associations Target of **152** by 2024



OLYMPIC

First played in **London** in **1908**



Excellent **anti-doping** record

Rio 2016 women's final
watched live by

16million

viewers in Great Britain & The Netherlands

Voted by **best moment** of the Olympics
BBC viewers

