Member Association Handbook

FIFA Quality Programme for Football Turf

June 2021

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Contents

Executive summary

This document provides a framework for member associations, confederations, communities and clubs for the installation and use of high-quality artificial turf playing surfaces for their football competitions and training sites. The framework is based on the FIFA Testing Manual for Football Turf, research conducted by universities and test institutes, and the experience gained during the years since the implementation of the FIFA Quality Programme for Football Turf in 2001.

The structure of the document follows the necessary steps that should be respected to achieve certification for a new artificial turf installation. A successful high-quality installation starts with a tender and ends with the correct maintenance of the pitch.

The first four chapters focus on general information about the FIFA Quality Programme for Football Turf, such as the differences between a range of artificial turf surfaces or the programme for FIFA-licensed turf manufacturers.

The following chapter then looks at how to prepare a tender and which costs to consider for a pitch installation. Finally, the importance of maintenance is highlighted in the last chapter, as only well-maintained artificial turf pitches can sustain the desired performance characteristics and obtain FIFA-certified status for a longer period and thus create revenue for the club, community or association.

The final chapter presents a summary of the main results of the environmental impact study that FIFA commissioned and published in 2017. The chapter focuses on the main factors that influence the environmental impacts of producing, removing and disposing of artificial turf as well as on best-practice recommendations to mitigate environmental impacts.

1. Football turf versus artificial turf

Due to the great potential of artificial turf for the development of football and other sports, synthetic surfaces are used in many areas of the world. Its resistance to weather and ability to sustain more intensive use make it **the best alternative to natural grass**. However, the product range of artificial turf shows significant quality differences between the various systems available.

As a consequence, FIFA developed a testing scheme for artificial surfaces that specifically focuses on the needs of football players. Only artificial turf playing surfaces that have been tested in accordance with the FIFA Quality Programme test criteria in the laboratory and on the pitch can be called **football turf**. This name means that those systems are specifically designed to meet the requirements necessary for football in terms of playing performance, safety, durability and quality assurance.

The latest technology, referred to as **third generation (3G)**, consists of artificial turf with synthetic blades into which layers of specially selected sand and performance infills (elastomeric or organic) are incorporated. Some systems also utilise a shock-absorbing layer underneath the turf.

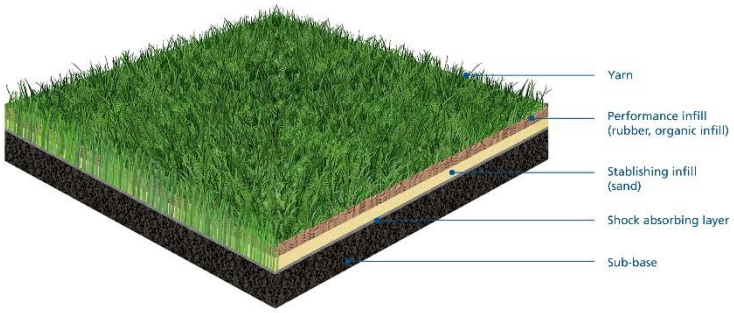


Figure 1: composition of a third-generation football turf system ©FIFA

Figure 2: 3G football turf was used at the FIFA Women's World Cup Canada 2015™ © Getty Images

Football turf pitches that meet the FIFA Quality Programme requirements are awarded either the FIFA QUALITY or the FIFA QUALITY PRO mark:

FIFA QUALITY

Combining a stringent regime of durability, resistance, safety and performance tests, pitches that are awarded the **FIFA QUALITY** mark fulfil the specific requirements for recreational, community and municipal football, with typically **40-60 playing hours per week**.

FIFA QUALITY PRO

Pitches with the **FIFA QUALITY PRO** mark are specifically tested to mimic the high performance and safety requirements for professional football for a typical usage of up to **20 playing hours per week**. There are stricter requirements for international match pitches (e.g. the size of the pitch, no logos).

2. Implementation in the Laws of the Game

The International Football Association Board (IFAB) decided at its Annual General Meeting in February 2004 to approve artificial turf surfaces for international competition matches provided they fulfil the requirements of the FIFA Quality Concept for Football Turf[1].

Law 1 – The Field of Play

Field surface

The field of play must be a wholly natural or, if competition rules permit, a wholly artificial playing surface except where competition rules permit an integrated combination of artificial and natural materials (hybrid system). (…)

Where artificial surfaces are used in either competition matches between representative teams of member associations affiliated to FIFA or international club competition matches, the surface must meet the requirements of the FIFA Quality Programme for Football Turf or the International Match Standard, unless special dispensation is given by The IFAB.

[1] Later changed to the FIFA Quality Programme for Football Turf

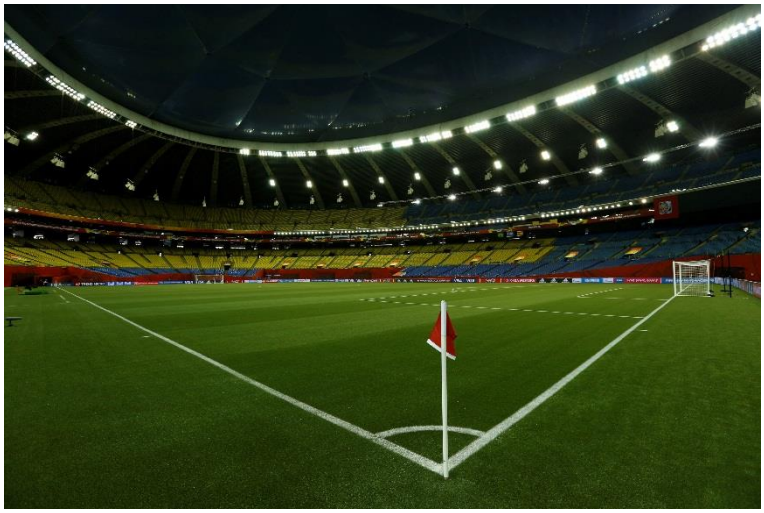


Figure 3: artificial turf at the Olympic Stadium in Montreal during the FIFA Women's World Cup Canada 2015™ © Getty Images

3. FIFA-licensed manufacturers

With the introduction of the FIFA Quality Programme in 2001, FIFA gave manufacturers of artificial turf the opportunity to certify their installations provided they met the criteria specified in the FIFA Quality Programme. Since then, the number of companies supporting the FIFA Quality Programme has increased, so that around 25 companies[2] worldwide are FIFA licensees and as such are helping to improve the quality of artificial turf surfaces for football.

In 2009, the **FIFA Preferred Provider** initiative was introduced in response to the demand for higher quality, not only in the products but in the installation process of football turf as well. The overall objective is to protect the interests of consumers when they are purchasing pitches and to ensure that football turf pitches meet the highest requirements with regard to quality, performance and safety. FIFA Preferred Providers are companies with at least two years of experience with the FIFA Quality Programme and that extend their services further than the traditional supplier/installer relationship. Through their active role in the development of the FIFA Quality Programme standards, regular reporting to FIFA and more demanding requirements, Preferred Providers prove to FIFA that they are committed to quality.

There are currently seven companies registered as FIFA Preferred Providers[3]:

- FIFA Preferred Providers have in-house capacities for civil engineering and maintenance.
- For all football pitches installed by FIFA Preferred Providers, full information for the end user and regular reporting to FIFA are required.

[2] An up-to-date list of all licensed companies is available at https://football-technology.fifa.com/
[3] February 2019

This translates into benefits for the end user, who only has to deal with one party during the entire installation and can rest assured that the FIFA Preferred Provider has a proven track record in installing pitches of high quality.

> HIGHLIGHT: Only if a FIFA Preferred Provider is the main contractor of a project can the company take full responsibility for it.

In addition to FIFA licensees and FIFA Preferred Providers, all turf manufacturers who are not FIFA licensees can test their artificial turf installations in accordance with the **FIFA Basic Standard**, which replicates the same quality criteria as the FIFA Quality standard.

4. FIFA-accredited test institutes

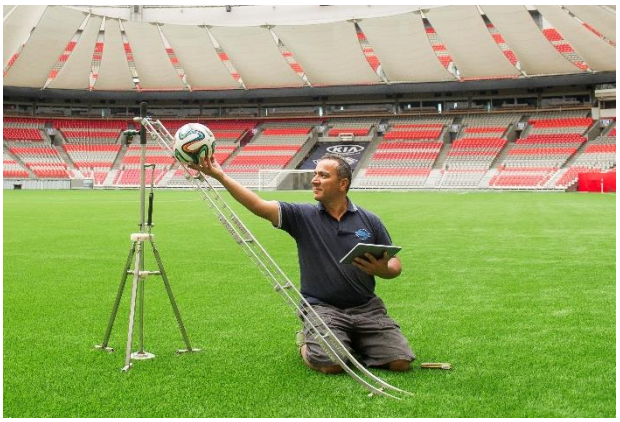
To ensure consistency in the testing of football turf, laboratory and field tests[4] can only be conducted by FIFA-accredited test institutes. These independent test institutes specialise in testing artificial turf surfaces in accordance with the FIFA Testing Manual[5], which is updated on a regular basis. The test institutes prove on an annual basis that their technicians and testing devices meet FIFA's high standards, and the results of the tests remain consistent across the different laboratories.

In the certification process of a football turf pitch, the FIFA-accredited test institutes are involved in the laboratory testing of the football turf system and the on-site testing of the final installation. Besides the performance test of the pitch, the test institutes also ensure that the end user receives maintenance training and full documentation from the FIFA licensee.

[4] Refer also to 5.3
[5] The FIFA Testing Manual was updated in October 2015 and is available for download on ***https://football-technology.fifa.com/***

With their experience in artificial turf, test institutes are also highly involved in the continuing development of artificial turf and the FIFA Quality testing programme.

An overview of the current accredited laboratory and field test institutes is available on https://football-technology.fifa.com/.



Figures 4 & 5: ball roll and straight edge test by a FIFA-accredited test institute prior to the FIFA Women's World Cup Canada 2015™ ©Getty Images

5. Installation of football turf

The installation of a football turf pitch is a significant investment for any club, community or association. With the investment comes the expectation of obtaining a high-quality artificial turf pitch for up to eight years, as well as the potential to generate revenue by using the facility more intensively than a natural grass pitch or as a multi-purpose facility, such as by sharing it with other club teams and communities or by organising concerts. To ensure maximum return on this investment, it is recommended that maintenance needs are not neglected when considering the installation of a football turf pitch.

The following sections can be used as a guideline for all of the steps, from the tender process for a pitch to the correct use and maintenance.

5.1. Tender

The tender process is essential to select the right product for the intended use. However, several other requirements also need to be considered to ensure that the end product – the final installation – meets the requirements for the projected lifetime of the pitch and that the installation represents good value for money. Nevertheless, this can only be achieved if additional considerations are included:

Stage one – facility planning

At the outset of an artificial turf project, a facility planning exercise must be undertaken. A facility plan should identify clear project goals, establish the level of demand, and include detailed financial and operational planning.

A facility plan should cover the following areas:

- The vision: what is the purpose of the facility?
- The need: what is the demand for the facility? Who will use it? How often? What for?
- The money: what are the running costs? How much revenue will it potentially generate? How will the facility be funded?
- The delivery: who will operate the facility and how? What are the key roles and responsibilities?

Independent specialist advice should be sought in the early planning stages of the project. This will provide:

- Input into the facility plan
- Evaluation of turf specification at the pre-contract phase, plus knowledge of soil type and climate
- Expertise in the selection of the contractor
- Quality control of materials and workmanship
- Thorough checks at each stage of construction
- Advice on maintenance of the playing surface

An independent project consultant should have experience with similar projects and, where applicable, be bound by the regulations of the FIFA Quality Programme. Upon request, FIFA will provide a list of suitably qualified experts.

Independent expert advice can equate to between 5% and 10% of the total project budget.

Stage two – budgeting for the playing surface development

Before undertaking the contractor selection process, it is crucial to have a target budget for the project delivery.

Projects can vary in cost significantly, depending on a number of factors. These include:

- Location: availability of materials, distance to transport materials and equipment, taxation, import issues
- Scale: number/area of playing surface(s)
- Site constraints: accessibility
- Site work: the extent of earthwork and drainage requirements, as well as any undersoil heating, drainage and irrigation requirements

- Ground conditions: rock and soil composition
- Surface type and quality: FIFA QUALITY or FIFA QUALITY PRO (see chapter 1.1)

Sufficient budget should be allocated in all projects for the following:

- Maintenance equipment: tractor, brush, ball ramp, herbicide, half-yearly or annual professional maintenance, etc.
- Football equipment: goal posts, corner flags, nets, etc.
- Independent expert advice

When budgeting, it is important to consider not only the initial capital cost of the project but also ongoing running costs. The playing surface should generate sufficient revenue to cover its operating expenditure including maintenance, staff, utilities and supplies, depreciation and planned replacement or renovation.

Budget allowances for more intensive, periodic maintenance or full-surface rejuvenation must be included. It is advisable to begin a sinking fund to replace the turf element as soon as is practicable to offset the need for a single significant payment when the time comes to replace the pitch.

Understanding football equipment requirements

Prospective contractors should also include football equipment, where required for the facility, in their proposals.

Full-size football turf pitches require:

- Goals: posts, crossbars, frames, nets (white) and net posts (two) behind the goals, sockets
- Corners: posts, flags and sockets
- Covered seating for substitutes (up to six players)

> The football equipment supplied must comply with the applicable safety regulations **of that specific country** and adhere to the Laws of the Game and the FIFA Handbook of Requirements for football turf surfaces.

The cost of football equipment can equate to around 1% of the total project cost.

Stage three – selecting a contractor

The project contractor should be able to clearly demonstrate an ability to carry out the work required. In choosing the contractor, it is important to establish:

- The identity of the company and its ownership
- The background of the company and the areas of business they are engaged in
- Their expertise and experience, specifically in relation to the required project (local experience)

- If they are financially secure with appropriate insurance and have sufficient resources to fulfil the project requirements
- If they are a FIFA Preferred Provider

By selecting a FIFA-licensed company, the above points will have already been checked by the FIFA Quality Programme for Football Turf.

A contractor should not be considered if it:

- Is bankrupt/insolvent, or has had related proceedings started against it
- Has a conflict of interest, such as an association with a stakeholder in the development project
- Misrepresents itself in any way

Some of this information can be gathered before the start of the formal selection process through research, site visits and references, and prospective contractors may be excluded from the process as a result.

The selection process

Before beginning the selection process, the facility planning exercise should have been undertaken and the project scope clearly determined. Funding should be in place to achieve the goals set.

The contractor is selected through an "**invitation to tender**". The tender process invites companies to bid competitively to provide the services required based on the same criteria and time frame.

The invitation to tender should:

- Provide clear and complete instructions to the bidding companies about the project and the tender process
- Include standard-format documents for completion by the bidding companies to ensure direct comparison of proposals based on key criteria identified
- Define the expected performance of the pitch (FIFA QUALITY, FIFA QUALITY PRO, BASIC, any other measure of quality) and how this has to be confirmed (e.g. field tests in accordance with the FIFA Quality Programme)
- Determine whether the bidding company has the financial, technical and professional criteria to deliver the contract/work required
- Ensure competition for the provision of the services required
- Be transparent and open and comply with the relevant law/regulations of the country
- Include a requirement for a site inspection of the facility by a technical specialist

The tender project documentation should include the following elements:

- An introductory letter containing the objectives, a list of documents to be submitted, details of timelines and contacts
- The main invitation to tender document, detailing the tender procedure, explaining the proposal assessment process, clearly defining the project scope, and containing a list of the terms and conditions (warranty)
- Technical specifications covering all areas of the project (sub-base construction, product, installation)

- Bidding company information forms to gather information on the bidding company's identity and ownership, establish its expertise/experience, its financial status and details of its project plan
- The pricing schedule, detailing the project cost, along with a breakdown of the proposed payment schedule
- Annexes, which may include project blueprints/drawings/designs, a bill of quantities, conditions of contract and meanings/definitions
- An official FIFA laboratory test report for the product when a FIFA QUALITY or a FIFA QUALITY PRO pitch is requested

> When running a tender for a football turf installation, the design requirements can be simplified by requesting either a FIFA QUALITY or a FIFA QUALITY PRO installation.
> This relates to the performance of the final installation and eliminates unnecessarily complex specifications.

The independent project consultant will advise on the tender process and provide input into the preparation of the project documentation.

Assessing proposals

Proposals from bidding companies should be received by a specific date in a standard format that makes comparison and assessment straightforward.

Proposals that meet the required standards should be assessed according to the same criteria and by using a scoring system. Both the criteria and the assessment method should be made clear to the bidding companies.

The key criteria for assessment include:

- Technical specification: covering all areas of construction, such as the surface and sub-base
- Financial: pricing of the proposal
- Experience: for example, the number of FIFA RECOMMENDED surfaces installed
- Timeline guarantees: assurances that the project will be delivered on time

Criteria should be weighted depending on their importance to the project. Particular attention should be paid to the method of comparing specifications in projects. **Do not only look at the final quotation price**.

Significant differences in pricing can mean major differences in the quality of the solution offered or a misunderstanding of requirements by the bidding company.

The assessment of the proposals should draw on the advice of the independent project consultant.

Following the assessment process, a shortlist of bidding companies can be drawn up and the companies invited for an interview. The contractor will then be chosen.

Warranties and protection

Along with general construction undertakings relating to the quality of work and materials, playing surface construction contracts should include clear provisions relating to warranties.

For football turf projects, the selection of a FIFA Preferred Producer as the main contractor will guarantee the quality of the product, installation and maintenance guidance.

The contractor must meet the requirements of the FIFA Quality Programme for Football Turf and it will be responsible for obtaining a test certificate within three months of completion of the contract unless climatic conditions prevent the pitch from being tested.

> Warranties will be linked to the project specifications for all playing surface construction projects. As such, the role of the independent project consultant is important. Specialist legal advice should also be sought at the contract stage.

Football turf procurement checklist

Task	
Appoint an independent project consultant	✓
Draw up a project budget	✓
Know the maintenance equipment requirements	✓
Know the football equipment requirements	✓
Identify what the contractor has to do	✓
Undertake the tender process	✓
Assess the proposals and select the contractor	✓
Ensure the contract provides adequate protection	✓

5.2. Installation

The installation phase of an artificial turf system is an important step in terms of meeting the quality criteria of the FIFA Quality Programme. Even the best product cannot perform if the installation work is of poor quality.

Generally, the installation can roughly be divided into the following five areas:

- Basework/earthwork
- Drainage

- Sub-base (supporting layers, asphalt, underground heating, surface irrigation)
- Synthetic surfacing
- Installation of sports equipment (goals, bench)

A quality basework, including the drainage and sub-base work, is necessary for the longevity of a turf installation. A solid basework guarantees that the sub-base does not become uneven after a short time, which consequently also affects the playing performance, particularly the ball roll of the final football turf installation. It is therefore recommended that the base level is checked prior to the next installation phase.

For FIFA RECOMMENDED football turf pitches, a sub-base check became mandatory with the introduction of the 2015 Testing Manual.

Figure 6: sub-base preparation for a FIFA Goal project in Greenland ©Greenfields

Figure 7: installation of an e-layer ©Greenfields

When laying the synthetic grass, the installer should make sure that the edges of the carpet are straight and the seams are glued properly. Should a defect be spotted after a certain period of use, the installer should

be contacted directly and requested to return to the site to undertake the necessary repair work. This should be clearly defined in the warranty.

For the installation process, a period of dry weather should be selected as it is not possible to glue the seams or fill in the infill in wet conditions.

Figure 8: preparation of the seam tape ©Limonta

Figure 9: installation of the infill material ©Limonta

5.3. Certification

In order to obtain FIFA certification for the installed artificial surface, a **two-phase testing scheme** has to be passed in the laboratory and on site.

Laboratory test of the football turf system

Prior to installation, the product has to be tested in the laboratory by a FIFA-accredited test institute. In this test, the components of the product are identified and performance criteria checked.

The requirements for the certification of the football turf installation should be mentioned in the tender document and agreed with the contractor in the contract. This ensures that the contractor is aware of the quality criteria needed for this project and can offer a product with a valid FIFA laboratory test report.

Field test by an independent FIFA-accredited test institute

After the pitch installation, a field test on the final pitch must be passed. The certificate provided by FIFA serves as proof that your surface fulfils the highest requirements for artificial football surfaces and should therefore be linked to your warranty (e.g. FIFA QUALITY PRO re-tested and re-certified for five consecutive years).

All tests must be conducted by one of the FIFA-accredited test institutes in accordance with the current FIFA Handbook of Requirements. The pitch is granted either FIFA QUALITY or FIFA QUALITY PRO status and appears in the FIFA pitch database only if the final installation passes the field test.

For international matches between teams of two confederations or for international club competitions, certification is mandatory.

If certification of the pitch is already a requirement in the tender, the FIFA licensee is responsible for arranging the field test with FIFA and a field test institute. Additionally, it can be a requirement in the contract that the licensee has to provide a valid field certificate for the installation.


FIFA QUALITY

FIELD CERTIFICATE

STADIUM NAME

FIFA is pleased to confirm that
PRODUCT NAME
by
LICENSEENAME
has been installed at
CLUB NAME– CITY, COUNTRY

From **01.01.2015** to **31.12.2018** this installation has been certified according to the **"FIFA QUALITY PROGRAMME FOR FOOTBALL TURF – 1 STAR".**

Field No. **XX1234.1**
Zurich, 01.01.2015

Figure 10: FIFA field certificate for a successfully tested football turf installation ©FIFA

5.4. Maintenance

Good maintenance is fundamental

It has long been claimed that artificial surfaces are maintenance-free. This is not only a myth, but a dangerous concept to embrace. The need to maintain a football turf pitch is fundamental for reasons of:

AESTHETICS

A good pitch is attractive to play any sport on and encourages participants to use it in the right way. A scruffy pitch is not attractive to play on, will deter participants from using the facility in the long term and may attract vandalism.

SAFETY

A neglected pitch can also be a dangerous one that presents a number of hazards to players. This in turn can lead to injuries and further detract from the attraction of the facility.

PLAYING PERFORMANCE

A lack of maintenance will lead to discomfort and frustration for players because of:

- Faster movement of the ball
- Uneven roll of the ball
- Variable bounce of the ball
- Having to run on a hard surface
- Poor grip of the surface

LONGEVITY

Finally, the lifetime of the football turf pitch will be significantly reduced by a lack of maintenance, undermining the investment in it.

***HIGHLIGHT*: Correct maintenance will significantly influence the return on investment from your pitch.**

When installing a FIFA-certified pitch, the FIFA Preferred Provider or FIFA licensee should also deliver basic maintenance equipment such as a triangle brush, tractor unit, drag mat and ball roll ramp, as this is a requirement to certify the pitch. Ensure that this is also included in your contract with the turf supplier.

Maintenance equipment

A variety of brush types exist on the market with different degrees of effectiveness. The most commonly used ones are drag brushes, which are normally attached to the rear of tractor units, either hydraulically or as a simple attachment. They are particularly effective at levelling the infill (where present) in the surface. Rotary brushes are also used and are typically attached to the front of the tractor unit. They can rotate forward or in reverse. Rotating forward is particularly effective at removing material from the surface, and either mode of rotation is good for raising the pile of the carpet. The tractor speed should not exceed five kilometres per hour and sharp turns must be avoided. Alternative actions like oscillating brushes are particularly effective in raising the fibres and thus controlling ball roll and allowing studs to penetrate into the infill, thus optimising grip.

Figure 11: triangle brush attached to a tractor for basic brush action ©FIFA

Figure 12: oscillating brush to bring the fibres upright ©Sisis

Check the following before brushing:

- The brush has contact with the surface and applies sufficient pressure
- The bristles are free and not clogged up with infill
- Do not exceed a speed of 5km/h


© FIFA


© Sports Labs

Playing equipment

Portable goals are often used, and can be moved around the pitch to achieve a more even wear. Portable goals should have wheels and not be dragged around on the pitch, as this can easily damage the football turf. When using portable goals, it is also important that they are either anchored into the surface or are weighted to prevent them from toppling over and potentially injuring players.

Signs should be put up with information and rules for use of the pitch. The rules should, among other things, provide information about opening hours for non-organised use, prohibition of smoking, ice cream and chewing gum, and information on where rubbish can be discarded.

General maintenance principles

Do not undertake any action that has not previously been authorised by the installation company. Warranties are normally linked to the maintenance of the surface and a lack of maintenance, or incorrect maintenance, will invalidate the warranty.

Do not apply any chemicals to the surface without consulting the supplier. Many chemical substances can act to the detriment of the surface, particularly petroleum-based products. Care must be taken to avoid all petroleum-based spillages, including fuel for tractor units. Always refuel the maintenance equipment away from the playing surface.

Those chemicals that can be used on synthetic surfaces, after authorisation, include algaecides, mossicides, weedkillers and de-icers.

If you have not received maintenance guidelines from the company that installed your pitch, please make sure you receive this important document before using the pitch.

Regular maintenance

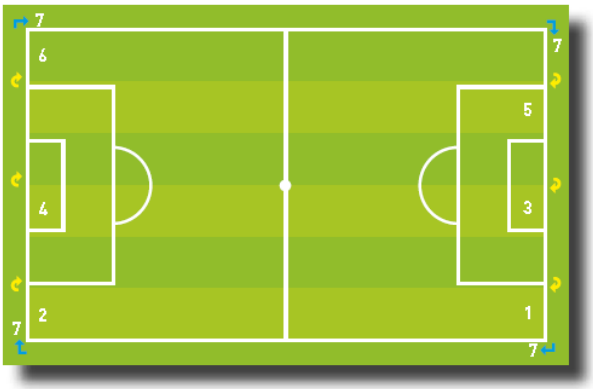
1 **BRUSHING THE SURFACE**

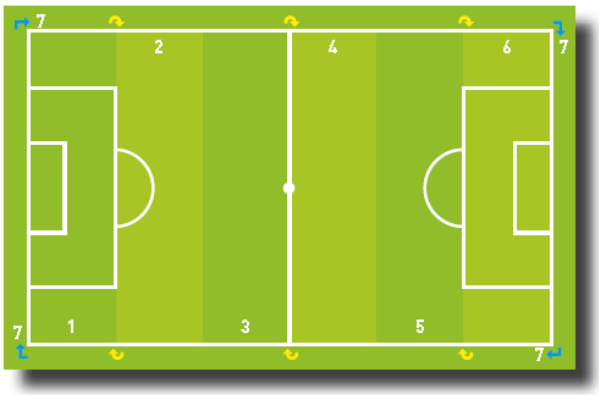
The surface should be brushed regularly and in accordance with the recommendations of the turf manufacturer. The brushing frequency will be related to the intensity of use – the more often it is used, the more often you must brush it.

> Generally, it is recommended to brush the surface every 40 playing hours, bearing in mind that 22 players are on the pitch. If more players are on the pitch, you have to multiply the playing hours accordingly.

The main effect of brushing is to level the infill to ensure the uniformity of the surface. A second important reason for brushing a synthetic pitch is to prevent pile lean and pile flattening. Many synthetic fibres have a tendency to lean in a particular direction or flatten with use. To overcome this, regular brushing in all directions will help to keep the fibres upright and non-directional.

Always brush in different directions, as brushing in one direction will tend to cause the fibres to lean in that direction. This will result in different ball roll characteristics in different directions. The high-wear areas will require additional attention as these zones will obviously have the most disrupted infill and pile flattening due to the intensity of play. It is most effective to brush the surface when it is dry and during the cooler part of the day, usually in the morning.





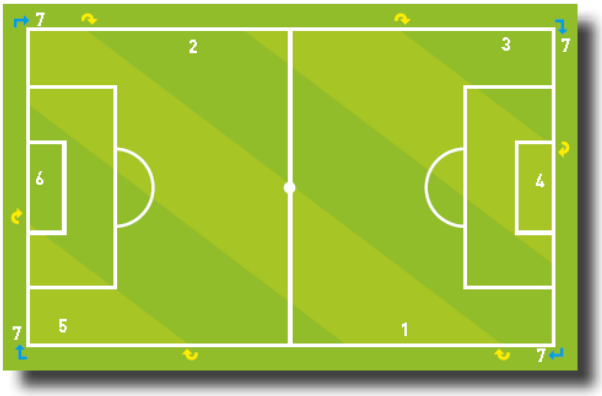


Figure 13: always brush the field in different directions and avoid sharp turns

Only use brushes that are recommended by the turf manufacturer.

2 **KEEP THE INFILL LEVEL**

The penalty spots and corners are prone to disruption of the infill. Ground staff should be aware of this and be prepared to top up on a more regular basis than is necessary for routine brushing. It may be necessary to top up these areas every day during intense use. When material begins to accumulate at the edges of the pitch, debris should be removed from it and the accumulated material cleaned and brushed back into the main pitch.

Systems that utilise infill materials may require a period of settling in. This will necessitate a regime of regular brushing on a more frequent basis than is normally required. The installation company will give advice as to the necessity and added frequency of this extra brushing.

Figure 14: accumulated infill material in the corner area

Replenishment of infill should be made with light equipment or by hand, whichever is most appropriate. Infill is regularly required to top up around the penalty spot, which is regularly disturbed by players practising penalty kicks. With the delivery of the pitch, the owner should buy additional infill material so that it is always available. Installations should have weekly checks of fill levels on the pitch. In addition to the weekly check, there should be an annual inspection of the whole pitch to ensure that the fill height is kept at an appropriate level in accordance with the supplier's specifications. The type of granules for replenishment must be determined in consultation with the turf manufacturer.

3 **KEEP THE SURFACE CLEAN**

Wherever and whenever contaminants are present, remove them as soon as possible. No food or beverages should be allowed on the field. Equally problematic is chewing gum, although this can be simply remedied by freezing the offending gum, which can then be broken out of the pitch when it has become solid. Smoking is strictly forbidden.

Organic material, such as leaves, pine needles and grass on the pitch can interact detrimentally with the granulate if not removed. The possible result of this mixture is that the pitch becomes harder, there will be poorer drainage and all of this will result in algal, moss or weed growth. The problem with organic material can occur throughout the year. In the most vulnerable periods, the pitch should be cleaned daily.

If the infill shows signs of agglomerating, break up the lumps into their individual components.

It is advisable to avoid locating the pitch close to leafy trees, where practicable.

Figure 14: rotating brush to remove debris from the surface ©Sisis

Less frequent maintenance

1 **DECOMPACTION**

Check for compaction of the infill, particularly in the high-use areas. Contact the installation company if you observe this and they will advise accordingly. Some installation companies supply equipment for overcoming this problem; others will undertake the work themselves under a maintenance contract. The maintenance manager can easily check for compaction by bouncing a ball on the surface. A surface with uneven compaction will show variable ball bounce, and a high ball bounce will often indicate loss of or compacted infill.

2 **CHECK SEAMS**

If the seams have failed in any place, contact the installation company as soon as possible and insist on an immediate repair under the terms of the warranty. Do not attempt to undertake the repairs yourself.

3 **IRRIGATION AND WATERFALL**

Football turf pitches will heat up during periods of warm weather. The surfaces can become so warm as to be noticeable to the players. Furthermore, a heated surface can contribute to a friction burn due to the fact that a skin temperature of approximately 60°C will potentially produce a skin burn.

Water has several effects: it will lubricate and cool the surface, stabilise the infill and consequently reduce loss of infill. After heavy rainfall, it is advisable to check the infill levels as they may have become disrupted. This can be particularly significant if the pitch has a slope and the infill has migrated with the slope.

> **HIGHLIGHT:** When installing a football turf pitch in a region with a dry, hot climate, check the heat development of the selected surface. Each product with a FIFA laboratory test has to undergo a heat test and will be categorised.

4 **PITCH CLEANING**

When a pitch begins to show signs of significant compaction and accumulation of detritus, or when permeability problems occur, use specialist machines that are capable of removing a proportion of the infill materials, cleaning them and reintroducing them back into the surface. These procedures are normally undertaken by specialised maintenance companies or the installation company.

5 **WINTER MAINTENANCE**

Pitches with undersoil heating offer players comfort in the winter as, in most cases, they will deliver almost the same quality of playing surface as in the summer. However, undersoil heating can be expensive to install and operate, and mechanical removal of snow is usually still required.

Mechanical removal of snow from the pitch should only be done by trained personnel using specially designed equipment, approved by the manufacturer. Incorrect equipment and/or careless use may cause severe and costly damage.

De-icing chemicals must be used with caution as they might affect the environment, the players' shoes and clothes, and even dressing room floors. The manufacturer must always be consulted before using any kind of chemicals.

6 **MOSS, ALGAE, WEEDS**

Weeds are easily removed by hand if the infestation has not become too excessive. Moss and algae require specialist treatment, normally using specific chemicals and techniques to remove residues. The advice of the installation company should be sought at an early stage if the problem occurs. The longer you leave an infestation in general, the bigger the problem will become.

7 **PITCH SURROUNDS**

The most important design feature is to avoid contamination, which can come in several forms: player-borne contamination, surrounding vegetation, wind-borne contamination and animal-borne contamination.

Players will often take the shortest path between the changing facilities and the pitch. If that pathway is dirty, they will carry that dirt on their boots onto the field. To avoid this, ensure that the pathway is clean (or e.g. that a rubber mat is laid out) and install a brush mat at the entrance to the pitch. In addition, there should be a clean pathway for the maintenance machinery to drive onto the pitch.

Another good solution is to lay asphalt or concrete slabs around the pitch. This will prevent spectators from dragging soil and dirt onto the pitch and provide maintenance vehicles with a clean and stable area around the pitch.

If other vegetation surrounds the pitch, this will inevitably be deposited on the surface, for example grass areas around the pitch will, when cut, deposit cuttings on the pitch. Try to leave a barrier between the natural area and the artificial pitch. This can be a physical barrier or a zone that is vegetation-free.

Contamination, particularly pollution and seeds, will be blown onto the pitch by the wind. Take this into consideration when deciding on the location of the pitch.

Animals, particularly birds, will leave deposits on the pitch. Clean these deposits off as soon as possible as they will become a nutrient for moss, algae and weed growth. Some areas of the world are prone to wind-borne sand, and this will require specialist equipment to remove it as it will have a detrimental effect on the performance of the pitch and its longevity.

Figure 15: bird deposits on a pitch ©FIFA

6. Environmental protection

Producing, removing and disposing of artificial turf will inevitably have an impact on the environment (see the different phases in the life of a turf in Figure 167 below). In order to better understand those impacts, raise awareness and address the issue, FIFA published an environmental study[6] in 2017 that takes a close look at the environmental impacts of producing, removing and disposing of different types of artificial turf and also includes a section on best practice recommendations for member associations so when they reach their end-of-life, today's pitches are not causing more environmental issues.

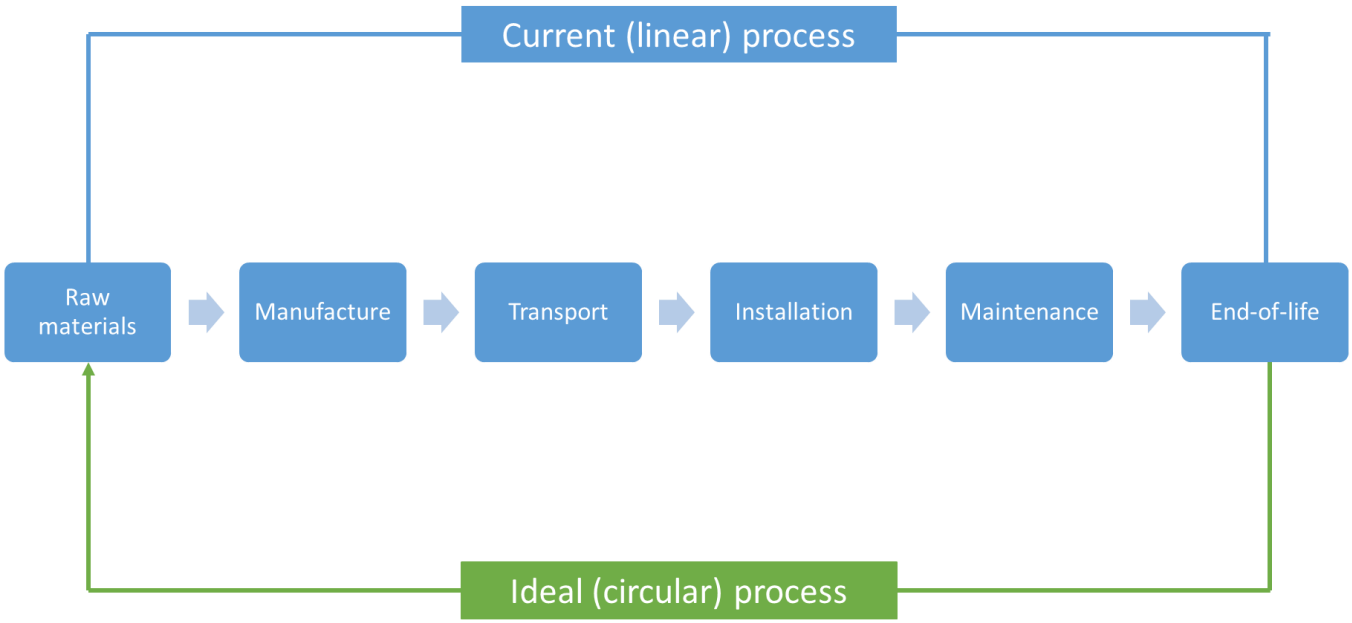


Figure 167: the different phases in the life of a turf

6.1. Environmental impacts of FIFA-certified football turf

There are three main factors that influence the overall environmental impacts of artificial turf:

1. **Choice of the performance infill material:** The performance infill provides the characteristics offering a similar feeling to natural grass and can be produced by synthetic rubber, recycled tyres (SBR) or organic material. The environmental assessment has shown that organic infills have a smaller environmental impact than polymer infills (virgin and SBR) in terms of CO_2e, while virgin polymer infills have a larger environmental impact than (already recycled) SBR. The overall environmental impact also depends on the end-of-life pathway chosen (see Figure 17 for incineration, landfill and recycling pathways).

[6] Environmental Impact Study on Artificial Football Turf: https://football-technology.fifa.com/en/media-tiles/environmental-impact-study-on-artificial-football-turf/

Figure 17: overview of level of environmental impact of different infill material and end-of-life pathway

2. **The decision to use or not to use a shock-pad:** The shock-pad component can absorb the impacts during play. In regard to environmental impacts, installing a shock-pad as part of the turf system reduces the system's overall environmental impact due to a reduction in the amount of performance infill by 50-60%, while the field retains the same performance characteristics. In addition, shock-pads can be left in place for reuse when a new turf is installed, reducing the volume of performance infill needed.

> Please be aware that the re-installed (re-used) shock-pad shall be tested for each property detailed above in the positions detailed in the FIFA Handbook of Test Methods for Football Turf (section 4) by a FIFA field test institute.

3. **End-of-life treatment:** Recycling, incineration and landfill are the three pathways for the end-of-life of artificial turf. Recycling is the preferred solution with the lowest overall environmental impact. Incineration and landfill cause higher environmental impacts compared to recycling. The better choice between incineration or landfill depends on: (a) the type of performance infill material that was used (Figure 17) and (b) the regional waste infrastructure where the turf is installed (Figure 189 and Figure). It is important to note that depending on the performance infill material used, incineration can be environmentally less impactful than landfill, and vice versa.

> Member associations, confederations, communities and clubs must note that, since the fate of the turf can make a significant difference when it comes to environmental impact, it is important to take control of where the turf ends up by investigating viable and environmental friendly options with a primary focus on recycling.

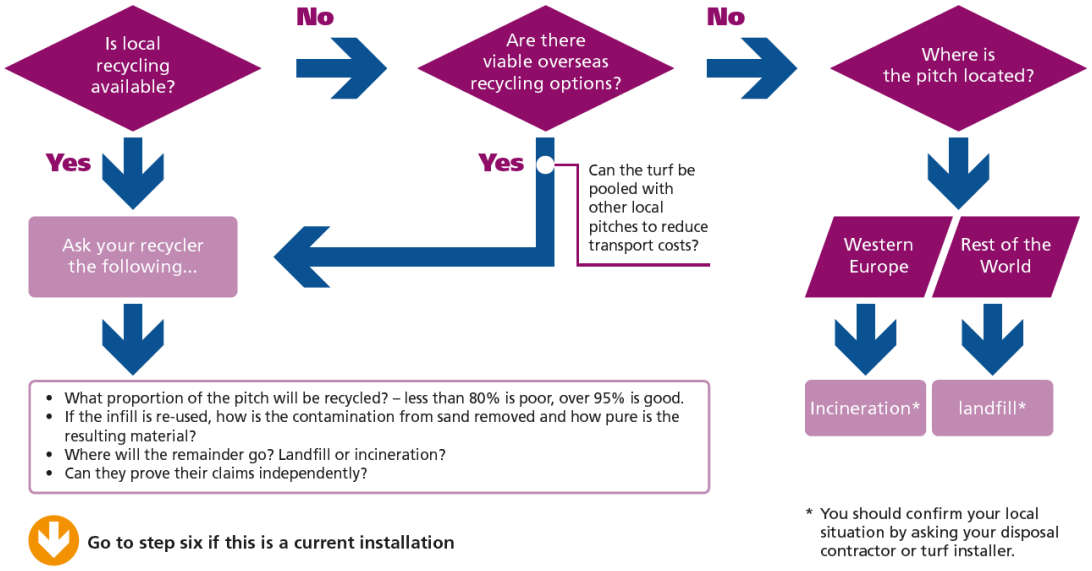


Figure 18: decision diagram to determine which end-of-life pathway option will be environmentally most beneficial

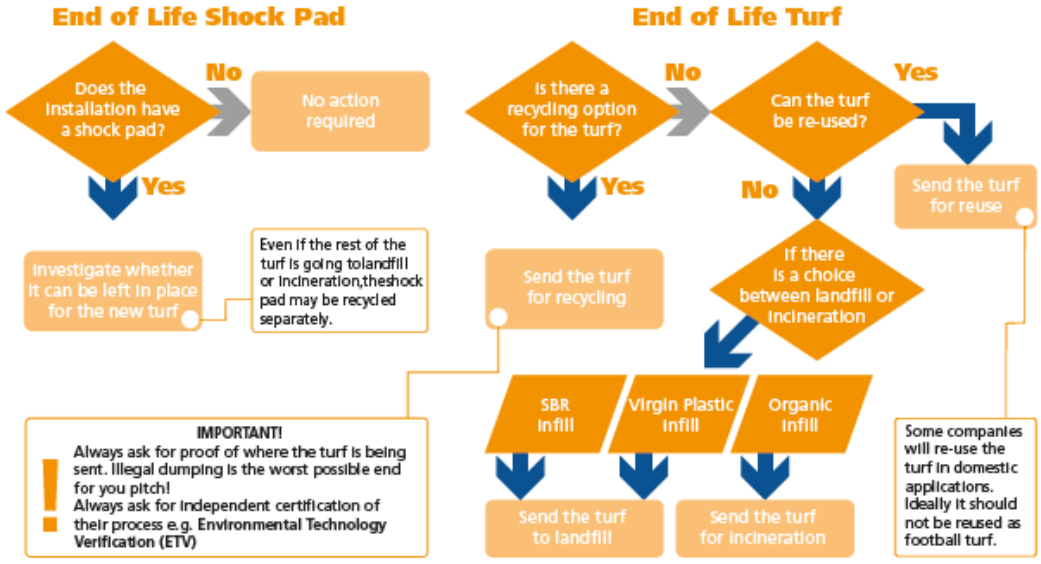


Figure 20: decision diagram to determine which end-of-life pathway is environmentally most beneficial for existing artificial turf

6.2. Environmental standards

Material quality and environmental control and protection are of the utmost importance. One way of checking that the turf supplier fulfils the highest environmental standards in terms of material quality, environmental control and protection is to understand if the provider is certified agains one or more international or national environmental standards. Below a list of three widely used environmental standards:

- ISO 9001, Quality Management System
- ISO 14001, Environmental Management System
- ISO 45001, Occupational Health and Safety Management System

7. Index

Artificial turf: any synthetic surface on which football is played but that was not successfully tested in accordance with the requirements of the FIFA Quality Programme for Football Turf.

Field test: the test of an artificial surface by a FIFA-accredited test institute in accordance with the FIFA Testing Manual after the final installation. A laboratory test (report) of the product is a prerequisite for a successful field test. A successfully tested surface is consequently registered as a FIFA-certified football turf pitch on FIFA.com/football-technology.

FIFA Testing Manual: the document describing the procedure of the laboratory and field tests, which is updated on a regular basis based on the latest research results by FIFA, test institutes and universities.

Football turf: artificial surface that has successfully passed both test phases and fulfils the requirements of the FIFA Quality Programme for Football Turf.

Laboratory test: a test of an artificial turf product in the laboratory in accordance with the FIFA Testing Manual with the aim of identifying the components of the product and checking whether the product generally meets FIFA's stringent requirements. The results are summarised in a FIFA laboratory test report, which is not an indication of FIFA certification.

Method statement: a document describing in detail aspects such as the method of marking out the location of the pitch, the sub-base construction, the levelling of the sub-base, the turf installation and the weather conditions for each work step.

Product declaration: a specification containing all of the details of the proposed or installed product, e.g. yarn, infill, shock pad, jointing method, etc.

Disclaimer

The information in this handbook should be supplemented with advice on local procedures and regulations.