



COVER CONTINUED... SYNTHETIC TURF NORMS & STANDARDS

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Certain aspects of these projects, such as drainage and base construction, are directly related to civil engineering. Because of this, design emphasis is often focused on these components as they are similar to those that can be found in other technical projects such as roads, and are treated as such in the design process and the resulting construction documents. The standards and testing protocols that are applied are the same and they can produce good results if the performance specifications are formulated appropriately.

But, when it comes time to address the synthetic surface itself, there are few similar products or technologies to be found in civil engineering projects. This technology is quite unique and there are too few such projects for engineering schools to dispense training on the subject. This is why certain designers turn to the manufacturers and installers of these products to help them formulate their specs. And,

during the actual construction stage, the supplier is sometimes left to himself and little or no quality control is applied.

In such a product-oriented approach, we often see specs that focus on individual properties and characteristics of the products themselves setting the standards. The bid documents present extensive lists of characteristics such as pile weight and height, tufts per unit area, GMax or DTex ratings, tuft withdrawal force or any number of other related or unrelated parameters. Then, target values are set for each which are used to evaluate the products and systems that will be submitted by the suppliers during the bidding process. Elaborate evaluation tables are invented with the highest score going to the product that has assembled the greatest number of high scoring components. And of course, in our competitive bidding systems, this system must also be the cheapest.

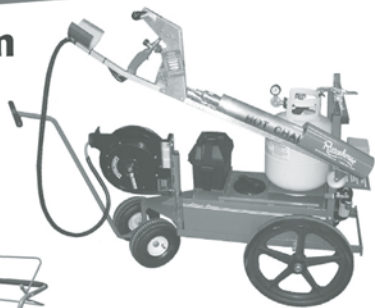
The Systems Approach In Synthetic Turf Projects

Another approach to setting the parameters for synthetic turf projects is to turn to norms and standards that address the project as an integrated system. While the drainage and base aspects are still treated separately as far as materials and design are concerned, they are integrated with the synthetic surface into an overall system that must meet specific performance and quality criteria. Although the different design parameters mentioned above are still considered, it is the resulting performance of the system that is the ultimate goal of the process.

There are a few such established and widely recognized standards. One of these is called the *FIFA Quality Concept*. Under pressure from users clamoring for solutions to the many problems plaguing natural surfaces, and in partnership with other organizations, FIFA (Federation of

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Installation errors can be quite unsightly.

FIFA is a forerunner in the field of synthetic sports turf quality control. At first, its system was designed for the sole purpose of certifying fields that were to be used in its officially sanctioned events. Eventually FIFA adapted it so it could be applied to all types of synthetic sports field projects.

International Football Association), international soccer's governing body, conceived this set of standards and testing procedures to ensure a certain uniformity of synthetic playing surfaces. This system evolved in sophistication over the years and is gaining in popularity.

Other organizations have also established quality and design guidelines. Some of these are related to specific sports, such as IRB, the International Rugby Board, or FIH, the international field hockey federation. These sports related organizations establish norms and standards aimed at obtaining playing surfaces compatible with their specific needs.

One organization that has gone to great lengths to upgrade quality in the industry is the STC (Synthetic Turf Council), an American industry related association that has formulated an extensive set of norms and standards that can be referred to when designing and specifying synthetic projects. This association of synthetic turf suppliers, installers and designers formulated product specs and installation guidelines to help elevate the industry's overall quality standards.

The guidelines published by these associations refer to synthetic sports surfaces as integrated systems and expressly address all parts of the overall construction. They

set minimal values for properties of the different system components, but leave manufacturers with the latitude to set their own specs beyond these minimal thresholds.

The principle behind such an approach is that no individual component or characteristic will elevate a particular system above the rest. It is the combination of all the different properties and components that provides the performance characteristics that are sought after and that distinguish one system from another.

Using Synthetic Turf Quality Control Standards In 3 Easy Steps

Faced by the growing demand for synthetic playing pitches and the lack of a more accessible quality control system, we see an increasing number of designers applying the *FIFA Quality Concept* to their projects. Many think that simply referring to FIFA 1 or 2 STAR requirements will ensure their clients that they will get the highest quality and best performance for their money.

But the standards are only a tool that can be used to help in attaining this goal. It cannot replace judicious design and tight controls that must be applied throughout all phases of the entire project.

FIFA is a forerunner in the field of synthetic sports turf quality control because very early on it had to respond to an overwhelming demand for such surfaces from its membership. At first, its system was designed for the sole purpose of certifying sports fields that were to be used in its officially sanctioned events. Eventually, it adapted it so that it could be applied to all types of synthetic sports field projects, with or without certification.

FIFA does not certify products, thus you cannot purchase a FIFA certified product. There are FIFA accredited manufacturers who can have products registered with the association. FIFA certifies individual playing surfaces that meet its performance standards and that were built with products having gone through the FIFA identification process.

The *FIFA Quality Concept* is devised around the notion that synthetic turf surfaces are not just constituted of a certain product (for lack of a better term, let's call it a carpet). Surfaces are the product of the



Defective products do slip by the manufacturer's quality control processes. It remains up to the owner to make sure he or she is not being sold a lemon – no one wants the costs of maintaining a defective system.

combination of different components that are precisely assembled into a system.

Step 1: System Identification

The carpet is one part of the system, but the carpet itself is an assembly of different components such as the actual synthetic “grass” fibers, the primary backing that consists of a specific combination of different geofabrics and the secondary backing which binds the fibers to the primary backing and gives the carpet some of its force. The carpet has its own specific characteristics, such as fiber type, height, weight and density, overall mass, and so on. All these characteristics are carefully monitored and recorded.

The system also includes the infill, which is constituted of specific materials, each having their own specific characteristics. Sand, rubber and/or other components are tested for granularity and their

relative proportions, the infill depth is measured, etc.

All these parameters are carefully measured and recorded. This data is compiled in an identification data sheet that corresponds to a manufacturer's specific system.

Later, when a synthetic sports field project is initiated, all these identification tests will be replicated on samples taken from the actual product that was delivered on site so that it can be positively identified as being identical to the product that was tested initially by FIFA. If the product fails to meet this initial identification stage, the sports field will fail its certification. Also, all its complementary components must also correspond exactly to those initially identified and compiled in the FIFA identification data sheet corresponding to the system ordered.

This initial step ensures the client that the system components delivered on site are really the ones that were purchased and not cheap generic copies. Less expensive “counterfeit” copies can look and feel almost identical to the original but the quality and long term performance characteristics can be extremely low. And when the cheap components of a counterfeit product start breaking down over a 7,000 square metre plus surface, it is too late to start checking or to invoke an eight year warranty that, sometimes, is not worth the paper it is printed on. This is why this initial validation stage is so critical.

Step 2: System Quality Control

After the system components are identified and analyzed by FIFA certified labs, a series of tests are conducted to see if they meet certain quality and performance criteria. FIFA sets performance criteria that systems must meet in order to be recognized. For instance, the carpet is tested for resistance to wear and tear, the fiber is tested for its resistance to traction, turf bind, etc. A whole series of these tests is done on the different components and assemblies. This ensures that the system and its components meet established quality and performance standards and that the sports field will hold up to its intended use and usage.

When a sports field is tested for certification, the supplier provides samples on which the tests are replicated. If the field is not meant to be FIFA certified, the system quality control data provided by the manufacturer and backed by the FIFA tests ensures that, if the installation work is properly done, the finished system should meet expected quality standards.

During the construction process, the technician tests other components. The base is tested for permeability and the grade is tested for the slightest dips or bumps. This is especially important because the slightest depression on the base will be magnified when the synthetic surface is in place. FIFA specs call for an acceptable error margin of 10 mm. Some designers apply even stricter requirements and only trained technicians can detect such minor deflections on the base.

It is important to note that defective products do slip by the manufacturer's quality control processes. It remains up to the owner to make sure he or she is not being sold a lemon. Even if the more serious manufacturers offer and apply warranties that cover their products and installations, maintaining a defective system can prove to be a painful and long lasting process.

Step 3: System Performance Assurance

The system is then subjected to a series of tests that examine two very different aspects: player/surface interaction and ball/surface interaction. Player/surface interaction addresses how the surface reacts to player movements. There are tests that measure shock absorption, vertical deformation, rotational resistance and the surface's abrasiveness. There are precise values for each of these parameters that the systems must replicate in order to be acceptable. These parameters directly affect the safety of the player. A FIFA certified surface would have to meet all these parameters in order to qualify, and all public synthetic sports surfaces should meet minimal safety related performance requirements whether they are FIFA certified or not.

Ball/surface interaction determines how a soccer ball will react on the surface: how far it will roll, how high it will bounce, etc. In the *FIFA Quality Concept*, this aspect of the test is specific to soccer. Other associations provide variants specific to other sports.

If all the proper procedures are respected throughout the testing process and the playing surface passes all the tests through all three steps, the playing sur-

face can receive a genuine FIFA 1 or 2 STAR accreditation, provided the testing was conducted by a FIFA accredited testing lab.

Is FIFA the Only Alternative to No Controls at All?

The beauty of the FIFA system is that it is simple and easy to apply. The downside is that it refers to European norms and tests. The units and procedures can be awkward to use and apply in a North American context. As an example, here we refer to Gmax as the unit to quantify a surface's hardness, while in Europe they refer to % of surface deformation to describe how resilient it is. These are two opposite approaches to the same phenomenon.

As synthetic sports surfaces gain in number, the testing industry adapts. ASTM has just published a revised version of its F1551 standard entitled "Standard test methods for comprehensive characterization of synthetic turf playing surfaces and materials." This covers a wide variety of tests for most synthetic turf related issues. It remains to be seen if the performance specifications are compatible with all testing methods.

The STC (Synthetic Turf Council) has formulated an elaborate set of standards and norms that is adapted specifically to the American context, using ASTM testing procedures. This may be an alternative to FIFA. Other associations have also published such standards that may act as alternatives to the *FIFA Quality Concept*.

The catch phrase here is certainly not "FIFA, or nothing," but "Quality, or nothing."

Do You Need FIFA Certification?

For years, there was no talk of FIFA tests and standards, or of any other testing systems for that matter. Many projects were built using only the specs provided by manufacturers or builders. Million-dollar projects were left in the hands of the contractor with the client having no way of evaluating the quality and performance of the end product. Of course, many such projects failed to meet expectations and many clients were left high and dry.

With the proliferation of synthetic turf projects, design professionals must scramble to develop specific expertise to meet the demand. They gravitate towards standards to help them develop their specs and to monitor construction. FIFA and other organizations have invested a great amount of resources to develop quality and performance testing programs. Specific testing protocols have been developed and the overall process is quite straight forward and simple to implement.

But many doubt that municipal or school projects warrant going to such extremes for what may seem as a lower grade project. This is why it is useful to examine the applications of this and other similar quality control programs.

Unless a municipality, academic institution or sports club plans on hosting FIFA sanctioned events, the actual certification is not really that useful. The certificate only attests to the fact that the surface has successfully gone through the whole certification process, that the tests were conducted by a FIFA certified testing lab, and that the proper licensing fees have been paid to FIFA. The first two conditions are totally independent of the third. If the process's objective is to ensure the play-



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ing surface's quality and optimal performance, unfortunately the third condition contributes nothing.

Going through the *FIFA Quality Concept* established procedures, or those set by other governing bodies, is an invaluable tool that will ensure that the initial installation is done properly and meets expectations. For a small fraction of a project's overall cost, such an assurance is priceless – especially considering the extended life spans these surfaces are expected to have.

The "Day 1 Snapshot"

Typically, manufacturers and installers offer an eight year warranty. This warranty should cover the different components of the system (the carpet and the infill) as well as the installation, including assembly (sewn or glued), and the different markings. If the playing surface is maintained properly, it should remain trouble free throughout the warranty period and beyond.

The battery of tests conducted on the system's different components and its installation ensure that there are no discernible deficiencies at the time the surface is put in place. These tests are done by true specialists who have the expertise and experience to do this, and not by well-intentioned amateurs reading from a guidebook.

The identification tests provide assurance that the carpet is really the one that was contracted. The tests ensure that the different components that go into the production of these products are the ones that were initially planned, attaining the level of quality that the client expects of the system that was purchased. There are many different manufacturers of the various components, and quality can vary greatly from one product to another. Lower quality materials will inevitably produce lower quality playing surfaces, which inevitably translate into a shorter life span. Considering the price of these installations, this is definitely not an option.

The *Day 1 Snapshot* the testing report constitutes is a reference point in later years as the system ages and in the situation that the warranty needs to be invoked.



Editor's Note: References for Further Follow-up

Founded in 2003, the **Synthetic Turf Council** is a non-profit association dedicated to serving as a resource for information about synthetic turf. Its objective is to encourage, promote and facilitate better understanding among all parties involved in the manufacture, selection, delivery and use of today's synthetic turf systems.

"Suggested Guidelines for the Essential Elements of Synthetic Turf Systems" and "Suggested Guidelines for the Maintenance of Infilled Synthetic Turf Surfaces" are available for download at www.syntheticurfCouncil.org. Click on Selecting Turf/Guidelines.

ASTM International is one of the largest voluntary standards development organizations in the world – a source for technical standards for materials, products, systems and services. Known for their high technical quality and market relevancy, ASTM International standards have an important role in the information infrastructure that guides design, manufacturing and trade in the global economy.

"Standard Test Methods for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials," ASTM F1551 – 09, is available for purchase at <http://www.astm.org/Standards/F1551.htm>.

It can also be used as a monitoring tool after seasonal maintenance operations to ascertain that the surface has been returned to, or acceptably close to, its original condition.

Quality Assurance

While installing drainage and constructing stone bases constitute relatively common civil engineering work and the quality control measures for such work are easy to implement to deliver a perfect playing surface, synthetic turf systems as a whole are another thing altogether. Quality control systems such as FIFA's or those of other such organizations are the only ones that

can be applied to the playing surface itself. The standards that these organizations have set are designed specifically for this type of surface and their careful implementation ensures that the intended results and quality levels are attained.

By making final payment conditional on the delivered components and finished playing surface meeting all the requirements of these standards, the onus is on the supplier to provide the required product and on the installer to apply himself to deliver a perfect assembly. It is imperative that the job be done right from the very start or else it can easily turn into an expensive nightmare. ♦



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