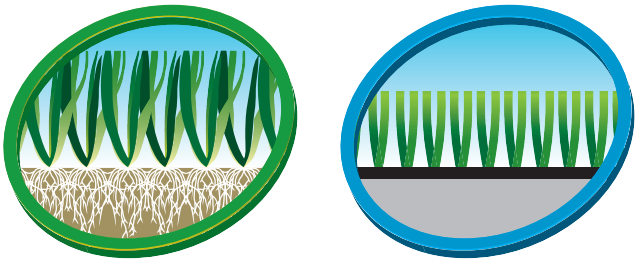
A Guide to Synthetic and Natural Turfgrass for Sports Fields

Selection, Construction and Maintenance Considerations



SportsTurf MANAGERS ASSOCIATION

Experts on the Field, Partners in the Game.

There were many in the industry who provided information for the Guide. Special recognition goes to the STMA Synthetic / Natural Turfgrass Task Force for their dedication to this 10-month project and for their collaborative work on this Guide.

Task Force members include:

Chair Abby McNeal, CSFM
The Chicago Fire

Mike Boekholder
The Phillies – Citizens Bank Park

Darby McCamy
Evergreen Synthetic Turf LLC

Mike McGraw
Surface Solutions North America

Andrew McNitt, Ph.D.
Penn State University

James Newberry
Graff's Turf Farms

A.J. Powell, Jr., Ph.D.
University of Kentucky

Tony Strickland, CSFM
Athletic Construction, Inc.

David Wallace
Tee & Green Sod

SportsTurf
MANAGERS ASSOCIATION
Experts on the Field, Partners in the Game.

A Guide to Synthetic and Natural Turfgrass for Sports Fields

Selection, Construction and Maintenance Considerations

Introduction

The Sports Turf Managers Association (STMA), the authority on sports field management issues, has prepared this Guide to provide basic information about the selection and maintenance of synthetic turf and natural turfgrass fields. This guide is directed to:

- Athletic directors
- School boards
- Community sports organizations
- Coaches
- Parents
- Athletes
- General public

Because each field is different, this Guide offers general information with additional sources to access for your specific situation.

The Guide is divided into topics that are important for you to consider for the safety of the players and the long-term viability of a newly constructed or renovated field. This information is not relevant to indoor facilities or to baseball/softball fields. All references to synthetic turf are to the newer rubber infill technology, which has had more widespread use since 1997. All references to natural turfgrass are for native soil fields, unless otherwise specified. This Guide also includes a glossary of terms.

Table of Contents

Constructing the Field

The most commonly asked question about sports fields relates to the cost to construct them.

So, what are the average construction costs for synthetic turf and natural turfgrass fields?

Just as many factors affect the maintenance of fields, so does the cost to construct them. The cost to construct either field type will vary dramatically depending upon its:

- Field size
- Geographic location
- Labor costs
- Amount of site work required
- Irrigation system (needed for each field type)
- Number of estimated games or activities

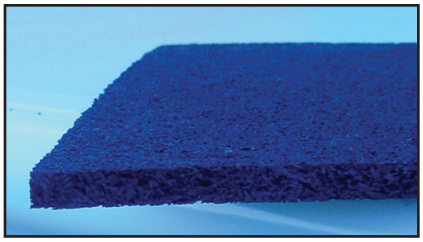
There also may be state and local regulations governing construction, such as requiring an environmental impact study prior to construction.

Items that are Typical to any Athletic Field Construction

Following is a list of items that should be considered when developing a scope of work for athletic field construction.

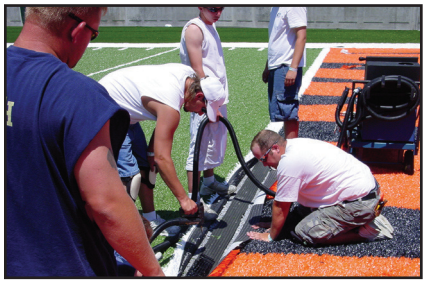
- Architectural & Engineering
- Light Towers
- Environmental Impact
- Consulting
- Excavations/Site Prep
- Permits
- Bonds and Insurance
- Engineering & As-builts
- Surveys
- Earthwork/ Grading
- Erosion & Sediment Control
  - (a) Silt Fence
  - (b) Inlet Sediment Trap
  - (c) Construction Entrance
  - (d) Permanent Grassing
  - (e) Monitoring
- Storm Drainage System
  - (a) Perimeter Drain
  - (b) Tie into Catch Basin
  - (c) Outfall installations
  - (d) Base Trench Drain
- Bleachers
- Sidewalks
- Fencing

To help you calculate average construction costs for synthetic and natural turfgrass fields, the actual playing surface of U.S. football fields are typically 360' x 160' or 57,600 sq. ft. Normally, a field will extend at least another 15' around the playing field boundary.



Example of a synthetic field pad showing its thickness. Photo: Darian Daily

Construction profile for a synthetic field. Photo: Darian Daily



Seam construction on a synthetic field. Photo: Darian Daily

Installation of a special logo on a synthetic field. Photo: Darian Daily

* Cost range provided by Tony L. Strickland, CSFM, President, Athletic Construction, Inc. Oakwood, GA

Synthetic turf

Additional factors may affect the cost of constructing a synthetic turf field. These include:

- Accessibility for heavy equipment
- Type of underground drainage system
- Drainage profile
- Design and engineering
- Edge material
- Type of attachment along edges
- Turf density or denier as they vary from product to product
- Type of backing
- Sewed or glued lines
- Type of pad and its thickness
- Rubber and/or sand infill
- Intricacy of logos and end-zone lettering

Following is a typical cost range and what is included in that range to build a synthetic field in the Southeast with the excavated subgrade already provided.

Synthetic Infill- $7.80-$10.75 per sq. ft.*

Includes:

- Rough Grades
- Curbing and Tack Strip
- Carpet & Rubber Fill
- Lines and Logos
- Geo Textile
- Labor
- Base design and Installation
- Stone & Freight for base
- Drain Collector
- Lateral Drains
- Padding
- Sod & Topsoil Backfill of Curb
- Laser Grading & Compaction
- Equipment & Trenching

- Material Distribution Labor
- Meters
- Backflows
- Irrigation System
- Cleanup and Goal posts

Natural turfgrass

In addition to the factors that are relevant to the construction of all field types, there are some specific items that may affect the cost of native soil fields. These include:

- Drainage modifications
- Top soil costs
- Type of cultivar, propagation and its accessibility
- Thickness and mixture
- Accessibility for heavy equipment
- Design and engineering
- Soil interface issues, if sodding a field

Following is a typical cost range and what is included in that range to build a natural grass field constructed of native soil(s) in the Southeast with the subgrade already provided.

Natural with Native Soils - $2.50-$5.25 per sq. ft.*

Includes:

- Rough Grades
- Tilling/Fertilization/Lime
- 2-4" Topsoil
- Sod & Installation
- Field Lay-out & Stripping
- Topdressing
- Laser Grading & Compaction
- Equipment & Trenching
- Material Distribution Labor
- Meters
- Backflows

Example of bad conduit installation along edge of a natural turfgrass field and reconstruction to fix it. Photo: Tony L. Strickland, CSFM

Poor field drainage on a soccer field improperly constructed. Photo: Tony L. Strickland, CSFM

Example of laying sod on a football field. Photo: Ross Kurcab, CSFM

* Cost range provided by Tony L. Strickland, CSFM, President, Athletic Construction, Inc. Oakwood, GA

- Irrigation System
- Cleanup and Goal posts
- Grow-in Maintenance

Natural with On-site Native Soil - <$1 per sq. ft.*
(no added top soil or sod)

Includes:
- Rough Grades
- Laser Grading
- Seed or Sprigging
- Minimal Irrigation System
- Clean Up
- Final Tillage, Fertilization, Lime Addition
- Grow-in Maintenance

Although this guide specifically focuses on native soil fields, it may be helpful for comparison purposes to have cost ranges for constructing two types of sand-modified fields. These ranges also assume that the excavated subgrade is already provided and are for fields constructed in the Southeast.

Natural with Sand and Drainage - $6.50–$7.95 per sq. ft.*
This includes everything noted in constructing a natural with native soils field, excluding the topsoil; with the addition of a 2" choker layer, 6" sand peat layer, geo-textile and geo-textile install, 4" and 6" perforated piping, and a gravel layer. These fields are typically built for colleges or professional sports where play must occur during almost any weather condition.

Natural with Sand Cap - $3.50 - $5.25 per sq. ft. *
This includes everything noted in constructing a natural with native soils field, but replaces the topsoil with a 2"-4" sand layer.

*Cost ranges and scope of work provided by Tony L. Strickland, CSFM, President, Athletic Construction, Inc., Oakwood, GA

Because many factors can contribute to the field's construction cost, it is recommended that your sports turf manager researches recent field construction that has like characteristics and a similar environment. For further information, contact the STMA at ph. 800-323-3875 for referral to relevant local and regional resources. Additional information may be obtained by contacting the ASTM, www.ASTM.org, which has released a standard on sand-based field construction (F2396-04); the Synthetic Turf Council, www.syntheticturfcouncil.org/, the American Sports Builders Association, www.sportsbuilders.org and the Turfgrass Producers International (TPI) at www.turfgrasssod.org/.

Protecting the Asset: Your Field

What are the typical maintenance activities for proper management of synthetic and natural turfgrass fields?

As with any major asset, synthetic and natural turfgrass sports fields need well-planned and funded management programs to protect the owner's investment. This includes hiring a dedicated and knowledgeable sports turf manager to develop and implement the program. Management of both surfaces also requires a budget that reflects the amount of activities that may be on the fields. The budget must have the flexibility to expand as the demand for field time increases.

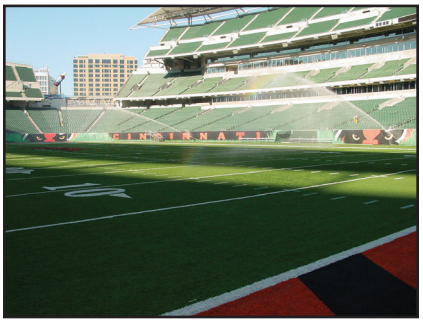
Maintenance and cultural practices will vary based upon these factors:

- amount of use and level of play
- multi-sport use
- weather and climate
- soil and terrain
- water availability and irrigation system
- budget including personnel availability
- owner's goals
- type and quality of field construction
- field security (protection against vandalism, non-regulated play, etc.)

A sports turf manager can develop a cost effective program specific to each field's requirements. For further field management information, contact the STMA at ph. 800-323-3875, for referral to relevant local and regional resources.

Synthetic turf

All synthetic turf manufacturers have recommended grooming practices. Generally, these include sweeping, dragging, and watering for a clean, uniform appearance. Depending upon use and weather conditions, a sand-rubber mix may need to be added annually to help restore the field's resiliency. The sports turf manager will also need special knowledge in troubleshooting and minor repairs, such as seam repair and snow removal. The installer can provide this information per the manufacturer's guidelines.



Irrigating synthetic turf. Photo: Darian Daily

Special solvents and cleansers are used to remove tough debris. Proper testing and a good design will usually mean that drainage is not a problem, if the field is constructed correctly. If the field is used for more than one sport, a plan will need to be developed that follows the manufacturer's recommendations for changing markings. Options may include using different paint colors for different sports; painting over existing lines with green paint; or actually removing the lines and repainting.

Rubber mix used for resiliency on synthetic fields. Photo: Darian Daily

Typical Maintenance Costs

The typical cost range to maintain a synthetic field will vary and can range from $5,000 to $25,000 per year*, including labor, minimal equipment depreciation and water. It is much more expensive to maintain synthetic fields that are highly visible, frequently televised, or when used for multiple sports. The cost can even be higher if field markings must be painted and cleaned often, or if frequent repairs are necessary.

Dragging the field to prepare for game day. Photo: Darian Daily

*Cost range provided by Dr. A.J. Powell, Jr., University of Kentucky, Lexington, KY

Natural turfgrass

The most commonly constructed fields for schools and recreational use are native soil fields. These fields usually drain more slowly than synthetic turf and sand-modified fields, and a 1.5% crown is suggested for most fields.

Just as sand-modified fields are more costly than native soil fields to construct, they are also more expensive to maintain. Although sand-modified fields are playable during heavy rainfall, they do not generally wear better than natural soil fields and intensive maintenance is necessary.

All natural turfgrass fields are living, breathing organisms that require mowing, watering, fertilizing, time off from play, and depending upon disease and pests, the application of plant protectants. To help ease compaction from heavy play, fields may be aerified once or twice a year. Debris is usually removed by mowing, and flushing

Example of a sports field being aerified. Photo: Ross Kurcab, CSFM

Example of topdressing a football field. Photo: Ross Kurcab, CSFM

the field with water removes most other foreign materials. Painting these fields is fairly simple and involves mowing out or washing out existing lines and painting new ones.

Typical Maintenance Costs

Many factors affect maintenance costs. Following are some specific examples to help you plan. However, for relevant costs in your area, contact the STMA at ph. 800-323-3875.

EXAMPLE: A Denver-area native soil field, with Kentucky bluegrass and perennial ryegrass that hosts approximately 110 soccer events annually will spend between $5,500 and $8,000 per year to maintain that field (not including equipment and labor).*

EXAMPLE: In New York state, a high school native soil field with perennial ryegrass and Kentucky bluegrass that hosts approximately 15 fall football games and 30 LaCrosse games in the spring will spend approximately $4,000 annually (not including equipment and labor). **

Although this guide primarily focuses on native soil fields, for comparison, the cost range to maintain a sand-modified field is included.

EXAMPLE: A Denver-area sand-modified field constructed of 90% sand and 10% peat, with four varieties of Kentucky bluegrass that hosts 35 football games and 10 other events, is between $9,000-$11,000 annually (not including equipment and labor).*

* Dave Rulli, Manager of Stadium Operations, Jeffco Stadium, Lakewood, Colo.

** John Gaffney, Central/Henrietta Central Schools, Henrietta, New York

Managing Special Events

Is there anything special required to host non-sports events for synthetic turf and natural turfgrass, and how will the special event affect the warranty?

These events could include:

- concerts
- graduations
- dirt shows
- fireworks
- overflow parking

Set up for a concert showing field protective coverings. Photo: Ross Kurcab, CSFM

Care must be taken to protect each type of field surface. Typically, a sports turf manager will place a protective covering over the turf and will develop a plan to safeguard the turf during the event. Types of materials that should be considered to protect the field surfaces for staging and roadways are:

- ¾ inch plywood (may require two layers)
- Pre-manufactured road mat; and
- Geo-textile blanket.

Other materials are available for flooring protection under the staging and for the seating areas. These products should be investigated to find the one that best suits the event situation. The use of these additional materials to host such events should be taken into consideration and incorporated into the overall cost to produce the event.

Synthetic turf

Concerns from these events are:

- burns from fireworks, cigars and cigarettes
- surface contamination (debris)
- security
- weight of materials (staging) resulting in major damage to the grade, which can be expensive to repair.

Flooring that is more specialized for seating may be necessary for certain events (graduation and concerts). Warranties should be reviewed before holding events to prevent voiding them.

Natural turfgrass

Preventive fungicide applications may be necessary based on the climate conditions and the duration of the event. Surface contamination (debris), weight of materials (staging) are concerns that should be addressed during planning. Sod and grade may be affected by the weight, length, and type of event, which could result in repairing the grade or replacing the sod. When planning for the event, the field's normal schedule must be able to accommodate the additional time necessary following the event to repair the turf. If the length of the event has caused irreparable damage to the turfgrass, time and resources must be allocated to replace it.

Developing an Equipment List

Your sports turf manager will develop a capital budget and replacement schedule, and a utilization schedule to optimize the use of all equipment and accessories. School districts and parks districts often share equipment among different departments. Care should be taken to utilize all equipment per the manufacturer's instructions.

What is a typical equipment list for each type of turf?

Synthetic turf

- Grooming equipment: typically some type of broom, brush or tine that is dragged over the field to stand the synthetic fibers up and to distribute the crumb rubber.
- Utility cart for grooming/cleaning equipment, pushing snow or operating sprayer.
- Spraying equipment: to stop weeds from growing through the synthetic surface, to lessen the static charge from the crumb rubber, and to apply wetting agents.
- Sweepers: to remove trash and other materials from the playing surface.
- Blowers (back pack and 3 pt. hitch): to blow clean the turf of trash.
- Vacuum: to remove small items, such as sunflower shells and peanut shells.
- Top dressing equipment: to periodically re-dress areas that have lost crumb rubber.
- Sanitation equipment and sprays for the spot removal of bacterial growth from bodily fluids

Optional:

- Pressure washers or other flushing equipment: to remove unwanted fluids or contaminants.
- Spiking equipment: for de-compaction and/or to help with redistribution of crumb rubber.
- Irrigation system (some manufacturers require irrigation to maintain warranty.)
- Painters for adding additional lines and mechanical scrubbers for cleaning painted lines on the synthetic turf.
- Special rubber blade snow plow

Natural turfgrass

- Mower: rotary or reel depending on species, quality requirements, etc.
- Irrigation system
- Aerator: core or plug type, typically pulled behind a tractor or utility vehicle.
- Fertilizer spreader / weed and pest control sprayer: typically pulled by a tractor or a utility vehicle.
- Line Painter: available in walk-behind or riding configurations

Optional:

- Blower and / or sweeper: for debris / litter management
- Deep tine aerator
- De-thatching equipment: typically pulled behind a tractor
- Seeder: typically pulled behind a tractor
- Top Dresser: utility vehicle mounted or pulled behind a tractor

Addressing Heat on Fields

What are the temperature differences between synthetic turf and natural turfgrass fields?

Synthetic turf

High field temperatures may be experienced by athletes using synthetic fields on sunny days. One study published in the Journal of Health, Physical Education, and Recreation,* has shown surface temperatures as much as 95 to 140 degrees Fahrenheit higher on synthetic turf than natural turfgrass when exposed to sunlight.

High humidity can also cause a high heat index, which can cause fields to have high surface temperatures. Higher temperatures transfer heat from the surface to the sole of an athlete's foot, which can contribute to serious heat-related health problems. Watering the field prior to a game on a sunny day may lower the surface temperature. However, more research is needed to determine the effectiveness of pre-game watering. If the majority of your games are played in the daytime in a hot, humid, or sunny climate, you may need to alter your game schedule and work with your sports turf manager to implement specific techniques to reduce the field's surface temperature. In these situations, it is strongly suggested that you purchase an infrared thermometer so that the surface temperatures can be monitored continuously and activity delayed if the temperature rises above a set level. Some have set this temperature at 125 degrees. For more information, go to http://cropsoil.psu.edu/mcnitt/Infill7.html and http://cropsoil.psu.edu/mcnitt/infill7a.cfm.

Photo: Ross Kurcab, CSFM

Natural turfgrass

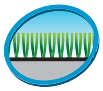
Natural grass has been shown to be a temperature reducer. According to a United States Golf Association study, natural grass keeps areas cooler on a hot day. The temperature of natural grass rarely rises above 85 degrees Fahrenheit, regardless of air temperature.

* Buskirk, E.R., E.R. McLaughlin and J.L. Loomis. 1971. Microclimate over artificial turf. J. Health, Phys. Ed., Rec. 42(9):29-30.

Protecting the Health and Safety of Athletes

The most important element of a sports turf manager's job is to provide the safest fields for athletes, regardless of the level of play.

Are there environmental and health concerns for play on synthetic turf and natural grass?



Synthetic turf

In addition to heat, which was addressed earlier in this Guide, limited research has been conducted on the safety and playability of these surfaces. These surfaces continue to evolve, so long-term data is not available. The United States National Collegiate Athletic Association (NCAA) is collecting injury data from numerous men's and woman's sporting events across the United States, but presently does not have sufficient data. Research studies are being conducted on field hardness and epidemiological issues.

Because these are new surfaces, environmental issues such as disposal of these materials, which contains metals, and their ability to be recycled has not yet been addressed by the EPA.

It is important to budget for the future disposal of a synthetic field. A typical cost range follows:

- Tear-out and Disposal - $1.75 to $2.25 per sq. ft.*
  (does not include transportation costs or additional landfill surcharges for environmentally controlled products.)

* Cost range provided by Tony L. Strickland, CSFM, President, Athletic Construction, Inc. Oakwood, GA

Natural turfgrass

Properly maintained natural turfgrass provides a less abrasive surface for play than a synthetic surface. Studies by the USGA have shown turfgrass to be a natural filter of environmental pollutants. There are no disposal issues with natural turfgrass field material.

Assessing Warranties

What is the purpose of a warranty?

Warranties provide the sports turf manager with assurances from the provider that the product is what was specified in the contract and that it will perform as expected. A warranty should not be confused with the expectation for the life of the product.

What are some key points of the warranty?

Synthetic turf

- Measurable benchmarks (Clegg impact testing, GMAX)
- Pile fiber loss
- Shock-absorbency
- Drainage
- Seam and inlay integrity
- Events that would void warranty

Some Synthetic Turf installers will have a separate warranty for the adhesive that was used during installation. This information should be provided by the adhesive manufacturer.

Warranties may have exclusions. Examples may include:

- Use of improper cleaning methods
- Acts of God and other conditions beyond reasonable control
- Normal wear
- Failure to properly maintain, protect, or repair
- Burns, cuts, accidents
- Failure of subbase
- Use of incorrect grade of infill
- Failure to maintain infill at correct level
- Use of improper footwear or equipment

Currently, the Synthetic Turf Council is working to develop a wear warranty that will help ease fears and give "realistic expectations" of the life of a field. For more information regarding this topic go to www.syntheticturfcouncil.org/.

Natural turfgrass

Natural grass usually has limited warranty coverage for newly constructed and renovated fields only, typically from grow-in until the start of play. Drainage and irrigation are usually covered for the first 12 months. The following may be defined in the warranty:

- Installation Benchmarks (survey/ grading marks)
- Soil testing (particle testing-sand specific)
- Seed/sod testing (verify product) and certified as weed free
- Events that would void warranty
- A recommended maintenance schedule

How should warranties be compared?

A warranty is a promise to perform from the contractor. It is best to investigate the financial strength of the product manufacturer and check existing customer references to determine how different companies honor warranty obligations. Failure to follow prescribed maintenance practices can void a warranty.

Insured warranties help ease fears that the warranty is protected in case a company goes out of business. Most bonds will protect the field in case of bankruptcy by the contractor. Insured warranties are not all the same. Make sure that you read the warranty, ask questions about the warranty and get answers in writing, and consult with a non-biased party to determine if they are worth the extra monies that they cost.

Other Considerations

As you evaluate your specific needs for a new sports field, you may want to consider the following:

- Hiring an independent consultant to represent your facilities' interest. Only select qualified consultants. You may want to seek a certified sports field manager, a sports turf manager, or an agronomist who has prior experience with the construction of natural and synthetic sports fields.
- The qualifications of the contracting firm, and in particular the experience of the project manager assigned to your project. The number of fields the project manager has installed is particularly important. Other information to obtain could include the company's project references, length in business, insurance coverage, litigation history, warranty, coverage, etc.

As you move through the qualification process, you may want to ask these questions of a contractor:

- Explain the most common things that can go wrong with a project and how you fix those things?
- How can we save money on the construction of this field?
- How do you see the field performing in light of the usage we have described?

.

Glossary

aerified – the mechanical process of re-introducing air and pore spaces on a natural grass field to relieve compaction and allow quicker movement of water, nutrients and gases through the root-zone for better root development. A turf surface is considered aerified when a mechanical aerifier is used to make holes a few inches deep and on two-to-six inch centers.

choker layer – a layer of coarse sand or fine gravel that separates the finer textured surface rooting media from the coarse drainage gravel when using the sand construction method.

Clegg Impact testing*- a device used for measuring field hardness, based on a reaction to the impact of a missile dropped through a guide tube; also know as the Clegg Hammer or CIT.

compaction – the reduction of air space between the soil/root-zone particles of a natural grass field, or of the in-fill material of a synthetic field. A turf surface is considered compacted when heavy vehicular or foot traffic compresses the top two or three inches of soil on a grass field and reduces the movement of the in-fill material on synthetic fields. Compaction makes fields very firm.

crown – the highest elevation of an athletic field used to facilitate excess water run-off. Native soil fields are commonly constructed with a center elevation (crown) up to 18" inches higher than the sidelines. Sand-based and synthetic fields utilize a very minimal crown and sometimes are completely flat.

crumb rubber – coarse sand-sized to small gravel-sized rubber pellets used as an infill material in an artificial turf or topdressed on a natural grass playing field.

Cultivar – a variety or subdivision of a plant species that, because of similar morphology and performance characteristics, can be distinguished from other plants within the species.

cultural practices – mowing, fertilizing, irrigating, aerification and preventive pest control practices used to produce a quality natural turfgrass surface.

density – the number of tillers, leaves or fibers in a unit area. A dense turf is usually very resilient.

denier – a unit of weight that expresses the density of a synthetic fiber. The lower the denier, the finer the fiber.

drainage modification – the utilization of coarse sand, gravel and/or perforated piping used to speed the removal of gravitational water after it permeates through the sports turf surface.

drainage profile – a vertical section of the root-zone sub-surface soil and any drainage enhancements, such as coarse sand, gravel and drainage pipe systems that will allow mapping and facilitating the downward movement of water into, through, and out of the soil.

dragging – pulling or pushing a mat or tine rake over a surface to smooth out undulations, re-incorporate finer particles, or stand-up turf fibers or tillers.

epidemiological issues – health issues that can affect many individuals, i.e. heat exhaustion, or the presence of heavy metals, carcinogens, and infectious fungi.

face weight – the unit of measure to determine the amount of yarn per square yard.

field hardness – the ability of a surface to absorb energy. Shock absorbing properties are measured in Gmax.

field markings – indications/markings on a field, such as inbound lines, numbers, and goal areas that are regulated by the governing bodies for the particular level of play and sport.

Geo-textile – manufactured fiber materials made into a variety of fabric constructions and used in civil engineering and construction applications

* hardness testing by these processes are relative to helmeted sports only and not to any non-helmeted/padded sports, such as soccer or intramural sports such as flag football.

Gmax* – maximum deceleration measurement of the hammer, using the Clegg impact tester.

Grade – the desired slope or elevations of an athletic field achieved by using earthmoving equipment. A proper grade will remove excess water.

Grooming – the dragging of a mat, broom, turf comb or spring-toothed rake on the surface to stand up the turfgrass, synthetic fibers or infield material after traffic has occurred.

Heat Index (HI) – the temperature the body feels when heat and humidity are combined. Exposure to direct sunlight can increase the HI by up to 15°F.

monofilament – yarn fiber made in one single strand. Yarn is extruded out of a shower head-type extruder versus a film tape for slit-film yarn fibers.

native soil – unamended soil that is commonly found in a specified area.

pad – layer installed, similar to a carpet pad, for field cushion, before the synthetic surface is installed.

pile fiber loss – the reduction of the diameter, denier, total fiber and/or density of the carpet fibers due to abrasive actions, such as field traffic, grooming or other action that may affect the fibers over a period of time.

plant protectant – an application of a pesticide before the outbreak of disease or infestation, usually on grass that has a history of such outbreaks or infestations.

resiliency – the ability of a surface to recover from, or adjust easily to, change from objects that strike the surface.

road mat – a protective cover used to prevent turf damage in high traffic areas, such as Enkamat® and Bravomat.

root-zone – layer of soil in which the roots of the grass plants are found. Also a growing medium.

rubber infill – granulated car tires or sneakers used as an infill material on synthetic surfaces.

sand-based fields – a field that has a rootzone/ growing medium that consists of sand as the primary growth material.

sand-modified fields – a native soil field that is modified with sand. This is intended to improve the rootzone, which increases the water and nutrient retention and increases field stability.

sand/rubber mix – a percentage of sand and rubber particles that are combined to create an "infill material," which is used on the new generation of synthetic surfaces. This mix fills in the areas between the fibers to provide structural support of the fibers, padding for the players, and ballast to weigh it down.

seam/inlay integrity – the strength, trueness and durability of the area between two edges of synthetic material, which can be hand-sewn or adhered with adhesives. Numbers, logos, and line markings are typically done this way. This is a critical area that needs to be addressed during construction

shock-absorbency – the ability of an object to reduce or dissipate energy from the sudden impact of another object.

site work – earthwork that is necessary before field construction can take place, i.e. the removal of buildings, trees, rocks, soil; installing utilities, improving or installing drainage.

soil profile – a vertical section of soil showing natural or incorporated layers of different colors, textures or materials.

spiking – vertically puncturing the soil to promote turf density and lightly aerify the thatch layer on natural grass, or loosening the crumb rubber on synthetic surfaces.

static charge: producing stationary charges of electricity.

subgrade – the soil base upon which a field is constructed and into which drainage lines are added.

* hardness testing by these processes are relative to helmeted sports only and not to any non-helmeted/padded sports, such as soccer or intramural sports such as flag football.

sun exposure – the amount of Ultra Violet exposure that materials will undergo based on the amount of sun exposure. The most particular concern is the loss of useful tensile properties in products made from polypropylene materials.

synthetic fibers – manufactured fibers resulting from chemical synthesis.

synthetic turf – textile product designed to simulate the appearance and playability of natural grass utilizing a synthetic fiber grass blade constructed into fabric form.

synthetic turf backing – intermediate material used in the manufacturing process of a synthetic turf system to provide a stable medium to insert the synthetic fiber grass blades. The backing also provides dimensional stability for the synthetic turf system.

sweeping – maintenance process used on synthetic turf systems to remove loose debris from the surface and groom the synthetic fiber grass blades.

thatch – an intermingled layer of living and dead grass stems, roots, and other organic matter found between the soil surface and the grass blades.

topdress – process utilized on synthetic and natural turf systems in which a material, such as sand or granulate rubber, is applied mechanically to the turf to create a consistent, level playing surface.

underground drainage – system installed beneath a natural or synthetic turf system to permit the uniform and speedy exit of moisture from the playing surface. It may consist of natural materials, (sand/soil), and/or engineered products (pipes, drainage mats or synthetic stone substitutes).

wetting agent – a chemical additive that improves the spreading, dispersing and/or wetting properties of water.

Sources:

Sports Fields: A Manual for Design, Construction and Maintenance; Puhalla, Krans, Goatley.

Internet sites:

http://www.dezignare.com/newsletter/glossary.html

http://www.gcrio.org/UNEP1998/UNEP98p62.html

http://www.encyclopedia.com

National Weather Service
http://www.nws.noaa.gov/

SportsTurf
MANAGERS ASSOCIATION

Experts on the Field, Partners in the Game.

805 New Hampshire, Ste. E • Lawrence, KS 66044
Ph. 800-323-3875, Fax 800-366-0391
email: STMAinfo@sportsturfmanager.org
www.sportsturfmanager.org