

# SYNTHETIC TURF COUNCIL

## Glossary of Terms for Synthetic Turf

Term	Context	Definition
<b>Adhesive</b>	ADHESIVE	Industrial adhesives, products not found in home supply stores, are used to bond synthetic turf seams and inserts, and, in some applications, a total glue down of the synthetic turf to the base. Synthetic turf adhesives should be applied by experienced, professional installers. The adhesives should provide a strong, hazard-free, and durable bond between adjacent turf panels or sections and to be usable for installation under variable weather conditions. The adhesive should also be resistant to water, fungus, and mildew. Synthetic turf adhesives include: one-part adhesives (urethane), two-part (epoxy or urethane), hot melt, and water-based (latex).
<b>Base Materials (or Aggregate Base)</b>	CONSTRUCTION & INSTALLATION	The aggregate base on which the synthetic turf is installed provides a structurally sound foundation for field construction, and a media for drainage of the field. The base is designed to ensure that once the field is in place, it never moves. A good geotechnical report will provide essential information for a firm and stable base for the synthetic turf.
<b>Antimicrobial</b>	ADDITIVE	An agent that kills microbes. Can be effective on bacteria and/or fungi. Can be applied topically or embedded in fiber or infill.
<b>Antistatic properties</b>	TURF	Resisting the tendency to produce annoying static electric shocks in situations where friction of the foot tread builds up static in low-humidity conditions.
<b>ASTM</b>	STANDARDS ORGANIZATION	The American Society for Testing and Materials. An international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.
<b>Backing</b>	BACKING	Materials comprising the back of the turf, as opposed to the turf or face. The adhesive backing refers to the urethane or latex coating. Turf backing refers to the stabilizing fabrics that are used to secure the fiber tufts.
<b>Ball-Surface Interaction</b>	PERFORMANCE	Ball-surface interaction describes the performance characteristics of the field that relate to the ways in which the ball reacts to the surface. It is important that the ball perform as close as possible to the optimal performance characteristics for the sport or sports being played on the field. Therefore, measurements of vertical ball rebound, angled ball rebound, and ball roll, are taken to compare against the published standards of the regulatory organization(s) applicable to each sport.
<b>Brushing (or Grooming)</b>	MAINTENANCE	Periodic brushing or grooming of the synthetic turf surface by a static (non-rotary) double brush is important to redistribute the infill evenly throughout the field, ensure that the exposed part of the fiber is uniform in its direction and is vertical, and helps remove litter, leaves, etc. The brushing activities should conform to the written maintenance guidelines provided by the installation company.
<b>Cleaning</b>	MAINTENANCE	The periodic use of a vacuum, sweeper or blower should be applied to keep the synthetic surface clean. This equipment should be compatible with synthetic turf fields. This typically means wider tires and softer nylon type brushes. The cleaning activities should conform to the written maintenance suggested guidelines provided by the synthetic installation builder.
<b>Compaction</b>	CONSTRUCTION & INSTALLATION	The field base materials should be thoroughly compacted to prevent any significant differential settlement across the area of synthetic turf surfacing. The appropriate moisture content must be maintained in the base materials to allow for optimal levels of compaction. Compaction can also mean an unwanted condition of the infill. De-compacting the infill using special maintenance equipment will improve drainage, <i>g-max</i> , safety, and playability.
<b>Crumb Rubber and Coated Rubber Infill</b>	INFILL	Crumb Rubber is derived from scrap car and truck tires that are ground up and recycled. Two types of crumb rubber infill exist: Ambient and Cryogenic. Together these make up the most widely used infill in the synthetic sports field and landscape market. Crumb rubber infill is substantially metal free, and, according to the <i>STC Guidelines for Crumb Rubber Infill</i> , should not contain liberated fiber in an amount that exceeds .01% of the total weight of crumb rubber, or .6 lbs. per ton.  Coated Rubber: Both ambient and cryogenic rubber can be coated with colorants, sealers, or anti-microbial substances if desired. Coated rubber provides additional aesthetic appeal, reduction of dust by products during the manufacturing process and complete encapsulation of the rubber particle.
<b>Density</b>	TURF	The amount of pile fiber in the turf and the closeness of the tufts.
<b>Drainage System</b>	CONSTRUCTION & INSTALLATION	An efficient and effective underground drainage system is an integral component of a synthetic turf system, and is designed to carry away the water that percolates through the turf. The system chosen will depend on the use of the field, climate, amount of rainfall and other factors.
<b>Durability</b>	PERFORMANCE	Durability describes the performance characteristic of the field that relates to the resistance of the synthetic turf system to wear and tear, and the environment. This characteristic is established by testing for such things as abrasion resistance, joint strength, tuft bind, and climatic resistance to uv, water, and heat.
<b>Edge Anchoring</b>	CONSTRUCTION & INSTALLATION	Edge anchoring is the system that is designed to be installed at the perimeter of the field to attach to the synthetic turf, anchor it, and transition to whatever abuts the field, such as a running track. The anchor may consist of a concrete curb, a treated wood nailer, a composite material or a trench drain. These may vary by design and region, but should always provide a secure anchor.
<b>Elastic Layer Pad (E-Layer)</b>	CONSTRUCTION & INSTALLATION	Elastic layers (E-layers) are poured in-place (in-situ) pads and must be installed by specialty contractors. They are completely permeable and are typically comprised of rubber granulate and polyurethane binder. E-layers can vary in thickness (typically 19, 25 or 35mm) and do not have seams typical of other resilient underlayments. These pads are more expensive than rubber, foam or panel shock attenuation systems however, budget allowing, They offer the most consistent surface planarity as well as the most permanent base available for safe g-max levels over the lifecycle of multiple surfaces.
<b>EPDM Infill</b>	INFILL	EPDM (Ethylene Propylene Diene Monomer) is a polymer elastomer with high resistance to abrasion and wear and will not change its solid form under high temperatures. Typical EPDM colors are green and tan. EPDM has proven its durability as an infill product in all types of climates. Its excellent elasticity properties and resistance to atmospheric and chemical agents provide a stable, high performance infill product.
<b>Face Weight</b>	TURF	The total weight of the face (above the backing) fiber in the turf.
<b>Fiber</b>	FIBER	Typically, the fiber used in synthetic turf is textured and/or non-textured polypropylene, polyethylene, nylon, or other suitable performing hybrid or copolymer in tape form or monofilament. Minimum fiber sizes are 50 microns for polypropylene or polyester, 100 microns for tape form (slit film) polyethylene, 140-300 form monofilament polyethylene (shape dependent), and 500 denier for nylon. Fibers should be compliant with ASTM guideline for total lead content.
<b>Fiber size</b>	FIBER	Refers to the denier per filament (dpf) or thickness of a filament. Fiber size impacts resilience, performance and wear.
<b>FIFA</b>	SPORT GOVERNING BODY	The Fédération Internationale de Football Association (International Federation of Association Football) is the international governing body of association football (soccer). FIFA dictates design and performance characteristics required for FIFA approved soccer fields.

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<b><i>g-max</i></b>	TESTING	A field's level of shock absorbency is tested by using a unit of measurement called the <i>g-max</i> , where one "g" represents a single unit of gravity. The peak acceleration reached upon impact of two objects, such a football player and the synthetic turf surface, is the maximum number of g's a field is able to absorb. A field with a higher <i>g-max</i> level loses its ability to absorb the force -- and places more impact on the athlete during a collision, while a surface with a lower <i>g-max</i> absorbs more force, lessening the impact to the athlete. Using ASTM F1936 test method, <i>g-max</i> readings shall not exceed 200 at each test point. With proper maintenance, a synthetic turf field should have a <i>g-max</i> of well below 200.
<b>Irrigation</b>	CONSTRUCTION & INSTALLATION	Sprinklers and irrigation systems are used for cooling and control of static electricity and dust in synthetic turf systems.
<b>Lines and Markings</b>	CONSTRUCTION & INSTALLATION	Lines and markings, such as sport specific game lines, logos, and numbers, should be applied to the synthetic turf surface in one of three methods: with colored fiber that is either tufted or knitted into the synthetic turf panels during the manufacturing process, installed as inlays, or with temporary or permanent paint that is approved for use on synthetic turf surfaces. Tufted-in or inlaid lines and markings are a permanent part of the surface. Painted lines and markings installed with either permanent or temporary paint require maintenance. Even permanently painted lines require additional paint on a periodic basis.
<b>Maintenance</b>	MAINTENANCE	Maintaining a synthetic turf field is essential for optimum appearance, safety, playing performance, and field longevity. A regular schedule of maintenance should include surface cleaning, debris removal, grooming, and infill redistribution and de-compaction. The maintenance procedures and equipment, as specified by the synthetic turf systems builder and required for the system, should be evaluated during the selection process so that the appropriate budget resources for manpower and equipment may be allocated. Note: Refer to the Synthetic Turf Council's Suggested Guidelines for the Maintenance of Infilled Synthetic Turf Surfaces, April 2007, for additional information.
<b>Maintenance Log</b>	MAINTENANCE	A maintenance log should be kept to record the maintenance performed on the field as recommended by the field builder.
<b>Nylon</b>	FIBER	A petrochemical-based fiber invented in 1938. There are two basic types of nylon: Type 6,6 nylon and Type 6 nylon. Nylon is the dominant fiber choice for commercial carpet use due to its wear characteristics.
<b>Organic Infill</b>	INFILL	There are several organic infills available in the North American market, all utilizing different organic components, such as natural cork and/or ground fibers from the outside shell of the coconut. These products can be utilized in professional sports applications as well as for landscaping. At the end of its life cycle it can be recycled directly into the environment.
<b>Pad (also known as Shock Pad)</b>	CONSTRUCTION & INSTALLATION	Shock attenuation pads offer an added level of protection and consistent playability to the playing surface and are designed to contribute to a safe <i>g-max</i> level throughout a synthetic turf field's life. Roll out or panel systems are relatively economical and offer ease of installation. Pads can be permeable or impermeable. Some can replace all or portions of the stone base and provide both shock attenuation and drainage, while others are used in combination with a traditional stone and drainage base. Pads can be placed directly over asphalt or cement stabilized surfaces. Provided care is taken in the turf install/removal process, some last more than one turf lifecycle. Some pads are made from recycled materials, while others are made from virgin materials and may be recyclable.
<b>Perforations</b>	TURF	For synthetic turf systems designed to be permeable to water, a system with a fully coated secondary backing will typically have holes punched into the backing at regular intervals to provide adequate vertical drainage throughout the system.
<b>Performance Evaluation of Synthetic Turf</b>	TESTING	There are three basic categories that define the overall performance of a synthetic turf sports field: ball/surface interaction, player/surface interaction, and durability. Refer to the specific category for its definition.
<b>Permeability</b>	CONSTRUCTION & INSTALLATION	Synthetic turf and the base on which it is installed is usually designed to allow for water to percolate through it so that there is no standing water on the surface. Water permeability rates for both the field's surfacing and the field base materials should be designed to accommodate the local weather and rainfall patterns.
<b>Pigment</b>	FIBER	Highly colored and insoluble, colored pigments are added to polymer to create colored fiber.
<b>Pile</b>	TURF	The visible surface of turf, consisting of yarn tufts. Sometimes called the face or nap.
<b>Pile height</b>	TURF	The length of the tufts measured from the primary backing top surface to their tips. Pile tufts should be gently extended but not stretched during accurate measurement. This specification is expressed in fractions of an inch or decimal fractions of an inch in the U.S.
<b>Pile weight</b>	TURF	The weight in ounces of the fiber in a square yard of turf.
<b>Player-Surface Interaction</b>	PERFORMANCE	Player-surface interaction describes the performance characteristics of the field that relate to footing, shock absorbency, surface abrasion, and surface stability, for example. These characteristics are determined through testing for vertical deformation, force reduction, traction, slip resistance, energy restitution, abrasiveness, among others. Proper shoe selection is a critical component to the way a player interacts with the playing surface.
<b>Polyethylene</b>	FIBER	A polymer of ethylene, the same material that is used in plastic bags.
<b>Polymer</b>	FIBER	Polymers are large chemical molecules from which synthetic fibers, synthetic infill and backing systems are made. Polymers are complex, chain-like macromolecules which are made by uniting simpler molecules called monomers. Synthetic polymers used for synthetic turf fiber include Type 6 nylon (polyamides), polyethylene and polypropylene.
<b>Polypropylene</b>	FIBER, BACKING	A polymer of propylene, the same material that is frequently used in packaging.
<b>Polyurethane</b>	BACKING	A polymer of a diisocyanate and usually a polyol. When reacted these materials form a urethane.
<b>Post Installation Testing</b>	TESTING	After installation, a field should be tested periodically to record its <i>g-max</i> , and other safety and performance values, to determine if and what remedial maintenance is required. A schedule for on-going testing should be included and understood by the parties. Seams and inlays should be regularly inspected and repaired, as needed.
<b>Primary backing</b>	BACKING	The primary backing materials are of a woven or non-woven fabric in one or more layers which are utilized in the tufting process, or of high strength polyester multi-filament fiber utilized in the knitting process. This backing material provides the initial dimensional stability for the system.

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<b>Sand (Silica) and Coated Silica Sand Infill</b>	INFILL	<p>Pure silica sand is one of the original infilling materials utilized in synthetic turf. This product is a natural infill that is non-toxic, chemically stable and fracture resistant. Silica sand infills are typically tan, off-tan or white in color and - depending upon plant location – may be round or sub-round in particle shape. As a natural product there is no possibility of heavy metals, and the dust/turbidity rating is less than 100. It can be used in conjunction with many other infills on the market to provide a safe and more realistic playing surface. The round shape plays an integral part in the synthetic turf system. It is important that silica sand have a high purity (greater than 90%) to resist crushing and absorption of bacteria and other field contaminants. Silica sand can either be coated with different materials as a standalone product or can be used to firm up in combination with traditional crumb rubber infill systems.</p> <p>Coated Silica Sand. This class of infill consists of coated, high-purity silica sand with either a soft or rigid coating specifically engineered for synthetic turf. These coatings are either elastomeric or acrylic in nature (non-toxic) and form a bond with the sand grain sealing it from bacteria to provide superior performance and durability over the life of a field. Coated sand is available in various sizes to meet the application’s needs.</p> <p>Depending on the amount and type of infill, coated sands can either be used with or without a pad and are available in various colors. All of the coatings are non-toxic and are bonded to the quartz grain for superior performance and durability over the life of your field. These materials are typically used as a homogenous infill which provides both ballast and shock absorbing qualities to a synthetic turf application.</p>
<b>Seam</b>	CONSTRUCTION & INSTALLATION	Synthetic turf materials are manufactured in panels or rolls that are usually 15 feet wide. Each panel or roll should be attached to the next with a seam to form the fabric of the field. Seams should be glued with a supplemental backing material or sewn with high strength sewing thread. The bonding or fastening of all system material components should provide a permanent, tight, secure, and hazard-free athletic playing surface. Seam gaps should be uniform. For tufted infill systems the gap between the fibers should not exceed the gauge of the tufting.
<b>Seaming Tape</b>	CONSTRUCTION & INSTALLATION	Seaming tape is commonly used for seams and/or inlaid lines and markings. The tape is comprised of a fabric that should be installed below the backing material on both sides of a seam or inlay. The fabric used for seaming tape should provide dimensional strength and enough surface texture to bond well with the adhesive.
<b>Seam Repair</b>	MAINTENANCE	Seams that open or become loose may require some immediate and temporary gluing until they can be inspected and corrected by the installation builder. The gluing should conform to the written maintenance suggested guidelines provided by the synthetic turf vendor.
<b>Secondary Backing</b>	BACKING	The secondary backing materials are applied through a coating process with a single or multiple applications of one or various materials. A tufted fabric typically receives a suitable coating of polyurethane, latex, hot melt, or other coatings or fabrics in various weight and thickness configurations, depending on individual system design. The secondary backing provides an additional level of tuft bind and structural integrity to the synthetic turf.
<b>Shock Pad</b>	CONSTRUCTION & INSTALLATION	See Pad
<b>Synthetic Fiber</b>	FIBER	Produced by man-made means, not available in nature in the same form.
<b>TPE Infill</b>	INFILL	Thermo plastic elastomer (TPE) infill is non-toxic, heavy metal free, available in a variety of colors that resist fading, very long lasting, and 100% recyclable and reusable as infill when the field is replaced. TPE infill, when utilizing virgin-based resins, will offer consistent performance and excellent g-max over a wide temperature range.
<b>Tuft</b>	TURF	A cluster of yarns drawn through a fabric and projecting from the surface in the form of cut yarns.
<b>Tuft Bind</b>	TESTING	The force (usually measured in pounds) required to pull a tuft from the turf backing. Also known as tuft lock.
<b>Urethane</b>	BACKING	Polyurethane. A polymeric resin applied as an adhesive backing. This backing encapsulates the yarn for extra tuft bind.
<b>Warranty</b>	WARRANTY	<p>Warranties for the synthetic turf field systems should be clearly understood and may include the following:</p> <ul style="list-style-type: none"> <li>· Acceptable uses for the field</li> <li>· Expected number of yearly hours of use of the field</li> <li>· Type of shoes used</li> <li>· Fading</li> <li>· Color match within specifications</li> <li>· Excessive fiber wear</li> <li>· Acceptable loss of pile height over time</li> <li>· Wrinkling and panel movement</li> <li>· Shock absorbency (<i>g-max</i>)</li> <li>· Seam integrity</li> <li>· Drainage</li> <li>· Response time for required repairs or replacement</li> <li>· Other items deemed relevant</li> </ul>
<b>Yarn</b>	FIBER	A continuous strand of fibers used in tufting, weaving and bonding to form turf and other fabrics.