



Synthetic TurfSM
COUNCIL

Guidelines for Minimizing the Risk of Heat-Related Illness





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C O U N C I L

Guidelines for Minimizing the Risk of Heat-Related Illness

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Introduction

Synthetic turf is growing in popularity as a sports field, landscape, and recreation alternative to natural grass because it:

- Allows for virtually unlimited hours of safe practice and play time
- Remains resilient, well-draining, and grass-like even in adverse climactic conditions
- Significantly reduces cost of regular maintenance
- Eliminates need for pesticides and fertilizers

However, in direct sunlight during the hottest part of the day in the summer months, the upper layer of the synthetic turf that is exposed to the sun's rays will get significantly hotter than grass. So on a hot, sunny day, in addition to taking proper precautions to minimize their risk of heat exhaustion, heat stroke or other heat-related health complications regardless of the playing surface, those who play on synthetic turf should consider the practical risk avoidance strategies recommended in this STC guidance document.

The Risks of Playing in the Heat – It’s Not Just About Synthetic Turf

Studies have shown that heat stroke and other heat-related illnesses from athletic exertion on all playing surfaces are most often suffered by overweight or poorly conditioned athletes, and those who have not been properly acclimatized to playing in the heat. Nevertheless, it is critically important for all those who play or exercise outside during the hot summer months to take some basic precautions to minimize the risk of exertional heat illness. For essential information and guidance on minimizing heat-related illnesses, the STC recommends the following:

- The National Athletic Trainers’ Association (NATA) issued [“Preseason Heat-Acclimatization Guidelines for Secondary School Athletics”](#) (2009), and [Tips for Exercising Safely in the Heat](#) (2008);
- The National Collegiate Athletic Association (NCAA) in 2003 published [“Heat Illness” guidelines](#).

There are two indexes that are used to indicate whether practice conditions are safe:

- The most widely used is the [Wet Bulb Globe Temperature](#) (WBGT) index, which was developed by the U.S. Marines and estimates heat stress on players in direct sunlight by taking into account actual temperature, humidity, wind speed, sun angle, and cloud cover (solar radiation);
- The [Heat Index](#) which is calculated for shady areas using actual air temperature and relative humidity. Since synthetic turf gets hot in direct sunlight, the Heat Index is not appropriate.

Conditions that Cause Synthetic Turf to Get Hot

Synthetic turf (aka synthetic grass and artificial grass/turf) becomes hot when it is exposed to direct sunlight. A study published in *The Journal of Turfgrass and Sports Surface Science* Vol. 83 (2007) explains that “the intensity of solar radiation striking the artificial turfgrass and the solar zenith angle were primarily responsible for elevating the artificial turfgrass temperature.” Therefore, synthetic turf does not get hot on hazy or overcast days. Even on a sunny day, during the early morning and evening when the sun’s rays are not overhead, the synthetic turf will feel cool to the touch. Also, the fibers and infill that are below the surface of the synthetic turf system are much cooler than those on the surface, which is why playing on synthetic turf that registers 170° at the surface with proper footwear is tolerable, and won’t burn the hand of a football lineman in his stance. The air temperature above the hot synthetic turf will dissipate quickly, and will approximate the ambient air temperature at 2’ feet above the surface.

The Journal pointed out another important characteristic of synthetic turf – “because of a low apparent specific heat, the artificial turfgrass demonstrated a rapid rise and fall in temperature based on time of day and cloud cover.” As an example, when a cloud passes overhead, the surface temperature of the synthetic turf will plummet quickly.

Recommended Strategies for Playing on Synthetic Turf and Other Playing Surfaces during the Hot Summer Months

To reduce the risk of heat stroke, heat exhaustion, and other heat-related illnesses during the summer, the Synthetic Turf Council recommends the following:

- Regardless of the playing surface, but particularly on synthetic turf on a hot, sunny day, be aware of and follow the NCAA and NATA guidelines (links to these guidelines are included above),
 - ⇒ Schedule activity during the cooler parts of the day (early morning or evening),
 - ⇒ limit the duration and intensity of activity early in the season and in hot weather,
 - ⇒ keep athletes well-hydrated and periodically rested to avoid becoming overheated;
- Evaluate the risks of athletic exercise by using the [Wet Bulb Globe Temperature](#) index, and be familiar with the NOAA's information on heat-related illness symptoms and first aid (see Appendix B);
- If possible, have the athletes who are not on the field stand in the shade;
- If there is no shade, cover synthetic turf sideline areas where athletes stand with a cover recommended for that purpose (see the STC Buyer's Guide and Member Directory at www.syntheticurfCouncil.org for a list of companies who specialize in synthetic turf field covers), or a tent or canopy;
- Install on demand misting stations near the sidelines to allow for players to cool themselves. Large, portable misting fans may also be used to cool the players on the bench, but they are hard to control.

Innovations to Address Heat in Synthetic Turf Systems

Synthetic turf materials and systems are being introduced that absorb less and reflect more of the sun's infrared energy, without compromising the important qualities of resilience, softness, and durability. For example, new reflective yarns and light colored alternative infills are in use. However, in its January 2012 study, "Synthetic Turf Heat Evaluation," Penn State's Center for Sports Surface Research reported that, of all the synthetic turf systems it tested, none "substantially reduced surface temperature compared to the traditional system of green fibers filled with black rubber in both the indoor and outdoor test." However, significantly cooler surface temperatures are being reported by manufacturers of organic infill, and light-colored coated and uncoated silica sand.

Irrigating a synthetic turf sports field is viewed by its proponents as the best strategy to significantly reduce the surface temperature for unavoidable play during the hottest times of the day. (Note: According to some synthetic turf sports field owners and sports turf managers, irrigation will also clean the surface, settle the infill after grooming, and enhance field performance.) Because the surface temperature will usually rebound within an hour after irrigation, sports field managers and coaches will often irrigate the field just prior to a game and again at halftime. When ambient temperatures are high, irrigating a field will raise the humidity above the field as it cools. After irrigation the temperature will slowly rise as humidity drops. In addition to temperature, radiant heat, and wind speed, humidity is a contributor to heat stress.

Industry scientists are working hard to develop new technologies to effectively address this issue.

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Disclaimer

The STC's *Guidelines for Minimizing the Risk of Heat-Related Illness When Playing on Hot Synthetic Turf Sports Fields* ("Heat Guidelines") includes practical and recommended risk avoidance strategies for those who play or exercise in the high heat of the summer, particularly on synthetic turf playfields. However, these are not exhaustive and there may be other important strategies that should be considered. This document does not imply, suggest, or in any way guarantee that players exercising in the heat on a synthetic turf or other sports surface could not sustain a heat-related illness. These suggested Heat Guidelines are not intended to be, are not, and are not to be considered as safety standards.

About the Synthetic Turf Council

Based in Atlanta, the Synthetic Turf Council was founded in 2003 to promote the industry and to assist buyers and end users with the selection, use and maintenance of synthetic turf systems in sports field, golf, municipal parks, airports, landscape and residential applications. The organization is also a resource for current, credible, and independent research on the safety and environmental impact of synthetic turf. Membership includes builders, landscape architects, testing labs, maintenance providers, manufacturers, suppliers, installation contractors, infill material suppliers and other specialty service companies. For more information, visit the STC's Online Buyers' Guide and Member Directory at www.syntheticurfCouncil.org.



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