

# 12 Things You Should Know About Synthetic Turf

**1. Toxic tire scraps don't belong on playing fields.** Most synthetic turf fields use shredded or "crumb" rubber from recycled tires as an infill or cushioning material. Up to 40,000 used tires can be utilized for a single field. The crumb rubber contains a myriad of toxic, restricted use chemicals, including heavy metals, benzene, carbon black and volatile organic compounds (VOCs). Many of the chemicals are known carcinogens, neurotoxins and endocrine disruptors. Student athletes can be exposed to these highly toxic substances through inhalation, skin absorption and accidental ingestion, all of which can easily occur during normal sports activities.

**2. Temperatures on synthetic turf fields can rise to unsafe levels.** The surface temperature of synthetic turf fields on hot, sunny days can reach 180F or higher. High-powered water cannons can be used to cool down unsafe surface temperatures, but this is only temporary, as it takes only about 20 minutes for the temperature to rebound to the unsafe level. On hot, sunny days, water cannons must be used repeatedly to keep field surface temperatures down and reduce the risk of serious heat related illnesses as well as burns to the soles of the feet of the athletes. The leaching of volatile and semi-volatile chemicals coming from the plastic surface and the crumb rubber infill is also exacerbated by high temperatures.

**3. Synthetic turf requires the use of disinfecting chemicals (pesticides).** A synthetic turf field must be disinfected regularly to remove disease-causing pathogens from body fluid spills such as blood, vomit, sweat and saliva. The use of these chemical pesticides can present their own health risks, whereas natural grass fields have the advantage of soil microbial activity, which helps to break down contaminants through natural processes. Additionally, skin abrasions (turf burns) are more common on synthetic turf fields and are typically larger in size, providing more opportunity for antibiotic resistant infections, including MRSA. Medical experts have found that staphylococci and other bacteria can survive for more than 3 months on polyethylene plastic, the material used in the manufacture of synthetic turf carpets and grass blades.

**4. Synthetic turf fields produce unusual and more severe injuries.** Although there is not enough research yet comparing injuries incurred on synthetic turf with those occurring on natural grass fields, there is compelling data indicating that joint injuries (especially ankles and knees) are more common and more severe among athletes playing on synthetic turf. A painful and debilitating condition called "turf toe" is unique to athletes playing on synthetic turf surfaces, and many professional athletes report increased fatigue and greater muscle soreness when playing on these surfaces.



**5. Initial cost, maintenance and replacement costs are higher for synthetic turf fields.** The cost of a synthetic turf field can range from \$750,000 to well over one million dollars, depending on size and multiple factors involving base construction and choice of materials. Maintenance of a synthetic turf field includes cleaning and disinfecting, anti-static and flame retardant chemical applications, painting, brushing, replacement of crumb rubber infill, seam repair, water cooling and weeding. Conservative estimates for proper maintenance are around \$100,000 annually. This cost is more than three times the cost of proper maintenance of natural grass fields. Synthetic turf fields have a set life of 8 to 12 years (sometimes less, depending on usage) and must be replaced due to compaction and worn fibers. Assuming the base is still good, the cost to remove and dispose of the old field and replace the carpet and infill is approximately \$500,000.

**6. Synthetic turf is not a solution for the problem of chemical pesticides.** The often-used argument that synthetic turf decreases the use of chemical pesticides

wrongly assumes that these chemicals are required for natural grass. They are not. In fact, organically maintained natural grass uses no chemical pesticides, and new technologies and equipment make maintaining natural grass playing surfaces easier than ever before. These fields can stand up to heavy use and are completely safe for users, from young soccer players to high school football teams.

**7. Synthetic turf fields have been found to contain lead.** The green pigment used in the synthetic “grass” carpets and blades can contain lead. As the fields age and the elements fade and break down the plastic, it begins to powder, making the lead more accessible. The crumb rubber may also contain lead from tire balancing weights and lead paint residue picked up from road surfaces. Lead is a potent neurotoxin and even tiny amounts can affect the brain, especially in young children. There is no safe lead exposure level for children.

**8. Federal agencies have withdrawn their assurances of safety for synthetic turf fields.** Both the Consumer Product Safety Commission and the United States Environmental Protection Agency have withdrawn safety assurances for recycled rubber tire products, including synthetic turf. The EPA has posted new cautions concerning unexplored chemical exposure to more than 30 compounds found in synthetic shredded tire turf and encouraged future studies to enable more comprehensive conclusions.

**9. Synthetic turf fields contribute to a warming planet.** Synthetic turf fields appear dark when photographed from the air because of the black crumb rubber infill, and like tar roofs, contribute to a “heat island” effect. In addition, these fields, made from petroleum, are unable to convert carbon dioxide into oxygen and store carbon in their biomass as grass fields do.

**10. Emerging health impacts of synthetic turf are causing concern among parents, coaches and school administrators.** There are confirmed reports of a growing incidence of lymphoma and leukemia diagnoses among athletes using synthetic turf fields filled with crumb rubber, particularly among soccer goalies. While no peer-reviewed studies have been conducted to confirm a link, there is a call for independent, scientific research and the establishment of a health agency registry to track athletes who’ve been diagnosed.

**11. Toxic PFAS chemicals used to facilitate the manufacture of plastic grass blades raise new concerns about synthetic turf’s safety.** A recent discovery that the plastic grass blades on turf fields contain PFAS (per- and polyfluoroalkyl substances) chemicals is yet another issue to be addressed when considering replacing natural grass with synthetic turf. Dr. Linda Birnbaum, former Director of the National Institute of Environmental Health Sciences concluded that a “safe” level of PFOA (the chemical found in the plastic blades) would need to be lowered to 0.1 parts per trillion, 700 times lower than the current EPA standard. PFAS exposure has been linked to cancer, liver damage, decreased fertility, asthma and thyroid disease. PFAS chemicals are also known as “forever” chemicals, meaning they take a very long time to degrade, accumulating in the environment and living organisms and threatening water sources if they are not properly treated as hazardous waste. PFAS chemicals can also volatilize, especially on hot, sunny days, and the amount of PFAS that young athletes inhale has yet to be quantified. PFAS chemicals in synthetic turf will add to the cost, both in terms of human health and the bottom line for schools and municipalities.

**12. Few toxicological and risk assessment studies exist for alternative infill materials.** The health concerns of recycled tire crumb rubber infill have forced many schools and municipalities to look at alternative materials for cushioning synthetic turf fields, but more research needs to be done. Plastic coatings on crumb rubber as well as other plastic infill alternatives (EPDM, TPE) often contain flame retardant chemicals and are composed of chemicals like styrene and butadiene, which are classified by the World Health Organization (WHO) as carcinogens. The human health impacts from exposure to these plastic substances in synthetic turf infill materials is not yet known, but the extreme heat effects and contact injuries are similar to crumb rubber infill. While infill from natural cork or coconut hulls may possibly reduce heat exposure, there is insufficient data concerning potential chemical exposures, leaching and offgassing.



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