Toxic "Forever Chemicals" Infest Artificial Turf

Processing aids that contaminate synthetic turf with PFAS may be in other plastic goods

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Washington, DC — The toxic chemicals used in fire retardants and non-stick cookware have been found in artificial turf carpet, according to Public Employees for Environmental Responsibility (PEER) and The Ecology Center. This raises new public health and environmental concerns, including the potential of these chemicals to leach from turf fields into nearby waters.

Per-and polyfluoroalkyl substances (PFAS) are called “forever chemicals” because they do not break down in the environment and bio-accumulate in the food chain. Human exposures to PFAS are associated with cancer, birth defects, and other impairments. Massachusetts is poised to implement a ground water and drinking water standard of 20 ppt for six PFAS, individually or combined.

Currently, there are between 12,000 and 13,000 synthetic turf sports fields in the U.S., with more than a thousand new installations each year, producing industry revenue of an estimated $2.5 billion annually. More than a quarter of the nation’s scrap tires (62 million) are used for playgrounds, landscaping, mulch, etc. Each athletic field uses 40,000 shredded tires for infill. For decades, research efforts focused on the toxicity of the infill, but not on the carpet itself.

The Ecology Center found elemental fluorine and specific PFAS chemicals in artificial turf, suggesting that PFAS is an ingredient of the carpet grass fibers or the backing, or a byproduct of the manufacturing process. PEER and The Ecology Center –

- Tested a brand-new piece of turf being laid at Oliver Ames High School in Easton, Massachusetts for PFAS, and the lab found 300 ppt of 6:2-Fluorotelomersulfonic acid (6:2 FTSA), a short-chain Gen X PFAS, in the backing of the turf. Last month, *The Intercept* discovered that 6:2 FTSA killed rats exposed to the chemical and induced chromosomal aberrations in hamster ovary cells;
- Tested the backing from a discarded piece of artificial turf manufactured around 2004 in Franklin, Massachusetts that had 190 ppt of PFOS;
- Tested 8 different synthetic turf fiber samples (including Shaw and Turf Factory Direct brands) and found 100% of grass fiber contained total fluorine levels, suggesting the presence of PFAS (results indicated 44-255 ppm total fluorine), and;
- Found turf patents and industry literature discussing the widespread use of PFAS as a plastic processing aid (PPA) to enhance smoothness and reduce friction. This may mean PFAS are in many other plastic products.

“The shredded tires used as infill on fields are filled with carcinogens and other toxic chemicals, but PFAS in synthetic turf should sound alarm bells for all municipalities with these fields,” stated PEER Science Policy Director Kyla Bennett, a scientist and lawyer formerly with the U.S. Environmental Protection Agency, noting that some of the chemicals found accumulate rapidly in both blood and liver and show toxic effects on cells. “All turf manufacturers should immediately disclose whether they use PFAS in their manufacturing process.”

The PEER and Ecology Center findings may represent only a small part of a larger problem, as there are thousands of PFAS chemicals, but PEER was able to test for only 36. The levels of total fluorine found are also indicative of PFAS. Nonetheless, the PFAS footprint is large and growing, with an estimated 100 million American drinking water contaminated with PFAS.

“The PFAS chemicals we are seeing in artificial turf grass carpet may just be the tip of the iceberg,” Jeff Gearhart of the Ecology Center added, noting that there are more questions than answers about PFAS in plastics. “We are concerned about the environmental fate and public health impacts of these chemicals from their use in both artificial turf and other products, and the life cycle impacts of the production and disposal of PFAS chemicals used in plastics.”

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Look at turf patents referencing PFAS:
Patent for polyethylene composition of artificial turf (https://default.salsalabs.org/T5fb81e6d-80c6-4914-a0e3-dd8092625319/7922b68d-db5a-446a-89ec-6802b0b634b6)
and
Patent for filler for artificial turf systems (https://default.salsalabs.org/Td909e30c-4617-40ae-9b22-3c4085cee43d/7922b68d-db5a-446a-89ec-6802b0b634b6)

Examine health concerns about crumb rubber turf (https://default.salsalabs.org/Tef3144cd-bcb8-411a-9809-03d5b109e335/7922b68d-db5a-446a-89ec-6802b0b634b6)

View spreading PFAS stain in the environment (https://default.salsalabs.org/T0fd5f402-91d6-484a-af91-0fda84743942/7922b68d-db5a-446a-89ec-6802b0b634b6)

[See PEER's complaint on Franklin's alleged wetland violation (https://default.salsalabs.org/T6138e273-fb39-4a72-9514-555e78140ff9/7922b68d-db5a-446a-89ec-6802b0b634b6)]

[See *The Intercept* story here (https://default.salsalabs.org/T8ff5abeb-09b4-4b4c-99a1-33bd8db07bb1/7922b68d-db5a-446a-89ec-6802b0b634b6)]

[See *The Intercept*'s work on 6:2 FTSA (https://default.salsalabs.org/T2b68ec81-d934-4eb5-8a60-1bf298678687/7922b68d-db5a-446a-89ec-6802b0b634b6)]

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> — Jeff Gearhart, Ecology Center

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