NATURAL TURF ALLIANCE

# Health Risks of PFAS in Synthetic Turf – July 2024

## Urgent Concern: Synthetic Turf Contains Harmful PFAS

**1. Testing for PFAS**

Testing for Total Organofluorines (TOF) has recently generated substantial interest as a simple way to account for the total mass of Per- and Polyfluoroalkyl Substances (PFAS) in environmental or commercial product samples.

PFAS represents a group of thousands of man-made organofluorine compounds (e.g. PFOS & PFOA) which have been shown to be globally distributed, environmentally persistent, and bio accumulative.

Due to their unique water and oil resistant properties and thermal stability, PFAS have been used in a wide range of commercial applications including food packaging, cleaners, floor polishes, photographic film, cosmetics, insecticides, Teflon® production, and in surface treatments of paper, clothing, carpets, artificial turf and other products.

Ref: https://www.alsglobal.com/-/media/ALSGlobal/News/News-Articles/Enviromail-Canada/PDFs/EnviroMail_27_Total-Organofluorine-Assay-for-Estimates-of-Total-PFAS

**2. Test results – Synthetic Field in Northern Sydney**

The National Measurements Institute of the Department of Industry, Science, and Resources recently completed testing on samples of artificial turf plastic fibre obtained from a synthetic field in Northern Sydney.

The test reported 15 mg F/kg of organofluorine, a concentration within the range observed in other international studies.

Ref: https://pubs.acs.org/doi/10.1021/acs.estlett.2c00260
https://dep.nj.gov/wp-content/uploads/dsr/pfas-artificial-turf-memo-2023.pdf

Based on this result, a calculation was performed looking at the likely levels of extractable levels of organofluorine in a standard FIFA soccer field containing 14,638 kg of plastic grass.

This calculation identified 219,583 milligrams of extractable organofluorine. If dissolved in a standard Olympic-sized swimming pool containing 1 million litres of water, the concentration would be 219 micrograms per litre or ppb of extractable organofluorine.
Ref: Internal calculations, available on request

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**Health issues associated with PFAS and synthetic turf**

PFAS chemicals, including those detected in synthetic turf, have been linked to severe health issues. These chemicals accumulate in the body and have been associated with lower childhood immunity, endocrine disruption, and various cancers.

PEER (Public Employees for Environmental Responsibility) have conducted extensive research on the impact of artificial turf on public health. PEER has identified the significant health risks associated with tyre crumb in artificial fields and children's playgrounds. These surfaces have been found to contain dangerously high levels of lead, arsenic, cadmium, chromium, mercury and a number of dangerous hydrocarbons, with potential toxicity to children and athletes.
Ref: https://peer.org/areas-of-work/public-health/artificial-turf/

The U.S. Environmental Protection Agency (EPA) warns that PFAS can cause cancer over long-term exposure and asserts that there is no safe level of exposure.
Ref: https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas

**PFAS Dermal Exposure**

There's increasing evidence of dermal exposure to PFAS through cosmetics, dust, clothing and other sources. These studies highlight the need for further consideration of this pathway in PFAS risk assessment studies.

Mesfin Tefera et al. (2022) found that for firefighters, incidental ingestion and dermal absorption accounted for 15% (typical) and 34% (worst case) exposure potential, with dietary exposures comprising the largest fraction of exposure potential.
Ref: https://europepmc.org/article/MED/35964536

A recent preliminary US study looked at levels on the skin of six-year-old soccer players and their coach. Three players and one coach used GhostWipes® to wipe their hands prior to and after soccer games on artificial turf and on natural grass fields in California in the summer of 2023. Results suggest an increase in PFOS levels from playing on artificial turf with a mean increase of PFOS (mean=0.6125 ng/wipe, $p<0.08$).
Ref: https://peer.org/wp-content/uploads/2024/03/3_6_2024-Dermal-absorption-PFAS-AT.pdf

**Global Context and Actions**

In Europe, the EU has proposed banning around 10,000 PFAS-containing products due to their environmental and health risks. A Swedish study found significant fluorine levels in the backing, filling, and blades of artificial turf, contributing to environmental microplastic contamination.
Ref: https://echa.europa.eu/hot-topics/perfluoroalkyl-chemicals-pfas

In the U.S., President Biden and the EPA have implemented the first national drinking water standards for PFAS, setting specific limits for various PFAS compounds to protect up to 100 million people from exposure. The administration has also secured $9 billion through the Bipartisan Infrastructure Law for PFAS mitigation, reflecting a strong commitment to public health and environmental protection.
Ref: https://www.fda.gov/food/environmental-contaminants-food/and-polyfluoroalkyl-substances-pfas

**Australian Context**

PFOA is permitted in Australia's tap water at 140 times the maximum level the US will allow and has been found in the drinking water of up to 1.8 million Australians since 2010.
Ref: https://www.healthed.com.au/clinical_articles/there-are-forever-chemicals-in-our-drinking-water-should-standards-change-to-protect-our-health

Australia's Chief Health Officer, Dr. Kerry Chant, confirmed in June 2024 that PFOA, a type of PFAS, is carcinogenic. This comes after investigations revealed PFAS contamination in drinking water across several Sydney suburbs and other regions, with concentrations far exceeding U.S. standards. The National Health and Medical Research Council is reviewing its guidelines for PFAS in drinking water in light of these findings.
Ref: https://www.smh.com.au/national/nsw/only-one-sydney-site-monitored-for-cancer-causing-chemicals-in-drinking-water-20240611-p5jky9.html

The NSW Chief Scientist recently published a report "Independent review into the design, use and impacts of synthetic turf in public open spaces" which reported that "*The presence of per- and poly-fluoroalkyl substances (PFAS) was raised with the Review by local community members. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) compounds have been found in low concentrations in synthetic turf in some preliminary testing studies, most likely through production of pile blades and the carpet. Studies identify a link between PFAS exposure and several health effects*."
Ref: https://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0004/542263/CSE-Synthetic-Turf-Review-Final-Report.pdf

**Industry Responsibility**

Despite these known risks, the synthetic turf industry continues to promote their products as eco-friendly and safe. Local councils and sports clubs, supported by state government grants and the synthetic turf industry, are installing synthetic fields throughout Australia. This contradicts international and national reports and studies

highlighting the presence of PFAS in synthetic turf and its associated health risks.

**Call to Action**

The synthetic turf industry must urgently address the issue of PFAS contamination in their products. It is imperative that they take responsibility for the potential health hazards and work towards safer alternatives. Health authorities and the public deserve transparency and action to prevent further exposure to these harmful chemicals.

**Natural Turf Alliance**

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