

Artificial Turf Fields

Artificial turf fields (ATF) are popular alternatives to natural grass fields. While most commonly used outdoors, ATF have also been installed indoors. In recent years, health concerns have been raised about the safety of ATF, especially regarding potential exposure to chemicals found in the components. This fact sheet provides information about what ATF are made of and ways to use them more safely.

WHAT ARE ATF MADE OF?

ATF are typically composed of three layers – padding and backing material at the bottom, infill in the center, and artificial grass blades on top. The grass blades are made of plastic. The infill layer typically contains crumb rubber made from recycled car and truck tires. Infill is often composed of crumb rubber exclusively or a mixture of crumb rubber and sand. Less frequently, infill materials can be entirely plant-based. The sand helps to stabilize the field, while the crumb rubber cushions the surface and keeps grass blades upright.

WHAT CHEMICALS ARE IN ATF?

Many natural and man-made substances are used during tire manufacturing and some of these chemicals have been found in crumb rubber infill. These include volatile organic compounds (VOCs), semi-VOCs (SVOCs) such as polycyclic aromatic hydrocarbons (PAHs), and metals such as lead.

CAN I BE EXPOSED TO CHEMICALS WHILE USING ATF?

There are several possible ways to be exposed to the chemicals found in the crumb rubber:

- Breathing in volatile chemicals or dust particles generated from the crumb rubber.
- Swallowing small amounts of crumb rubber either while playing on the fields or afterward, if hands are not washed.
- Skin contact with crumb rubber.

To minimize potential exposure to chemicals that may be present in ATF, everyone should follow the tips for safer use of ATF provided in this factsheet.

CAN EXPOSURE TO CHEMICALS IN ATF AFFECT MY HEALTH?

To date, scientific research mostly concludes that adverse health effects from using ATF are unlikely. It is important to note that no studies have specifically evaluated whether there is a relationship between disease outcomes and exposure to crumb rubber in ATF.

A 2019 federal study between the U.S. Environmental Protection Agency, Centers for Disease Control and Prevention, and Consumer Product Safety Commission estimates that exposure to chemicals in crumb rubber is expected to be low. For metals like lead, the study found only a very small fraction of the metals found in crumb rubber would be absorbed if accidentally swallowed. Exposure to VOCs and SVOCs is also limited because low amounts of them are released into the air where field users can potentially breathe them in.

At sufficiently high exposures, such as in manufacturing settings, the chemicals found in crumb rubber can cause irritation of the eyes, nose, throat, and skin, as well as headaches, nausea, and even organ damage. Some PAHs may also increase the risk of developing cancer if individuals are exposed to very high concentrations over long periods of time.

Many factors determine whether exposure to chemicals through ATF usage can affect health. These include the amount, frequency, and duration of exposure; the amount of chemical absorbed into the body; and the sensitivity of an individual e.g., children are generally more sensitive than adults.

CAN I BE EXPOSED TO LEAD WHEN PLAYING ON ATF?

Lead has been detected in the crumb rubber of some ATF. In the 2019 federal study, researchers tested crumb rubber from nine tire recycling facilities and 40 ATF across the country. While lead was consistently detected, the researchers determined if crumb rubber was accidentally swallowed, only a small amount of lead would be available in the swallowed material for the body to absorb.

Because the study only evaluated tire crumb rubber, it is possible that lead is present in and released from other components (e.g., grass blades) of ATF. Some ATF are constructed with components that are certified as having low or no lead content. Using ATF with this certification can help minimize exposure to lead.

While everyone is exposed to small amounts of lead in their daily life, young children, infants, and pregnant women are most vulnerable to the effects of lead exposure. To minimize potential exposure to lead that may be present in ATF, everyone should follow the tips for safer use of ATF provided in this factsheet.

IS FURTHER RESEARCH BEING CONDUCTED ON ATF AND HEALTH?

Yes. In the next phase of the federal study, researchers will collect data on how people come in contact with the tire crumb rubber, how often, and for how long. A biomonitoring study, which will measure levels of chemicals in specimens of blood and urine, will also be included.

To learn more about the federal study, visit: <https://www.epa.gov/chemical-research/federal-research-recycled-tire-crumb-used-playing-fields>

CAN USING ATF INCREASE MY RISK FOR BACTERIAL INFECTIONS?

Some studies have measured the levels of bacteria on surfaces of different types of athletic fields. Very limited research has found fewer bacteria in ATF than soil and the federal study reported indoor ATF having fewer bacteria than outdoor ATF. However, many factors (e.g., presence of bacteria, moisture, and temperature) influence the risk of bacterial infections following the use of any athletic surface. The frequency and severity of skin abrasions can also influence the risk of infection. California's Environmental Protection Agency reported that athletes experience more frequent turf burns (i.e., skin abrasions) on ATF relative to natural fields. Overall, practicing good hygiene is the best way to prevent getting and spreading infections. Washing skin

abrasions with soap and water can decrease the risk of bacterial infections.

DOES DPH SUPPORT THE USE OF ATF?

DPH does not endorse any consumer product, including ATF. The purpose of this fact sheet is to summarize currently available information and offer suggestions for ways to minimize possible exposure to potentially harmful chemicals during use of ATF.

ARE THERE TIPS FOR SAFER USE OF ATF?

Here are some steps to minimize potential exposure to potentially harmful chemicals in ATF:

While playing on ATF:

- Always wear shoes.
- Do not swallow any crumb rubber that accidentally enters the mouth. Monitor young children to prevent swallowing.
- If playing indoors, take steps to increase ventilation if possible (e.g., open windows/doors, turn on fans).
- Be aware that crumb rubber absorbs heat which can increase the surface temperature of ATF and lead to heat-related illness.
- Minimize passive recreation (e.g. laying, sitting)

After playing on ATF:

- Wash hands after use and before eating (especially young children).
- Clean all clothing and equipment used on ATF.
- Take off shoes before entering the house to prevent tracking in any crumb rubber.
- Clean all turf burns with soap and water.

WHO CAN I CONTACT TO LEARN MORE?

Specialists at the Massachusetts Department of Public Health, Bureau of Environmental Health, are available to answer your questions. Contact us at 617-624-5757 (TTY: 617-624-5286) or visit us at www.mass.gov/dph/environmental_health.

