



CITY OF WORCESTER, MASSACHUSETTS
Department of Health & Human Services
Division of Public Health

Matilde Castiel, MD
Health & Human Services
Commissioner

Karyn E. Clark
Public Health
Director

March 14, 2017

Daniel J. Morgado, Town Manager
Town of Shrewsbury
100 Maple Avenue
Shrewsbury, MA 01545

Dear Mr. Morgado,

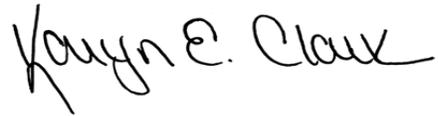
I understand there are residents who have expressed their concern relative to specific materials that will be used in the artificial turf for Shrewsbury Public School's athletic fields. I believe the specific concern is about crumb rubber, of which the Worcester City Council has also inquired. Attached, please find a report that my office prepared for Edward M. Augustus, Jr., Worcester's City Manager regarding that substance. Our research concluded that no studies have found significant health effects from utilizing crumb rubber. I have attached that report here for your information along with an FAQ on the matter from the Massachusetts Department of Public Health.

That being said, I recently had an opportunity to meet with Mr. Patrick Collins, Assistant Superintendent of Finance and Operations for Shrewsbury Public Schools. He reviewed the spec sheets and had an actual sample of an *alternative* in-fill of coated sand called Enviro-fill. This particular material has been used in many athletic fields in Massachusetts and Connecticut. I have contacted a number of these communities to inquire about any health concerns; thus far I have received a response from Dennis Johnson, Director of Public Health for Guilford, CT. Mr. Johnson states that after just one year, the product has lived up to its manufacturer's claims and expectations and that his office has not received one complaint from players or parents about the product nor have there been any complaints at the Board of Education level. I will update this report as I hear back from the other communities I have reached out to.



Based on all the information I have seen and studied, this alternative product (sand) is no more detrimental to the public's health than having a natural grass field that requires water and fertilization. Please let me know if you have any further questions or concerns.

Respectfully,

A handwritten signature in black ink that reads "Karyn E. Clark". The signature is written in a cursive style with a large initial 'K' and a long, sweeping underline.

Karyn E. Clark, Director

Worcester Division of Public Health / Central MA Regional Public Health Alliance

Cc: Board of Health, School Committee, Board of Selectman



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DATE: OCTOBER 25, 2016
TO: EDWARD M. AUGUSTUS JR., CITY MANAGER
FROM: MATILDE "MATTIE" CASTIEL, MD, COMMISSIONER
SUBJECT: ARTIFICIAL TURF FIELDS

I am pleased to provide you with information regarding artificial turf fields. Please share the same with council for their review and information.
Please find attached a brief report on artificial turf fields.

Artificial turf fields (ATFs) are synthetic alternatives to natural grass fields. Components of ATFs include artificial grass fibers (blades), crumb rubber infill, and sand infill overlaid on a carpet-like backing that holds the turf together. The grass fibers are typically made of nylon, polyethylene, or polypropylene, and the crumb rubber infill used to soften the surface is most often made of recycled tires.

ATF components, such as crumb rubber infill, have been found to contain chemicals including semi-volatile organic compounds (including polyaromatic hydrocarbons, or PAHs), volatile organic compounds (VOCs), and metals.

Several studies evaluating potential exposure opportunities to constituents in ATFs have been conducted by state (e.g., California, New York, New Jersey, Connecticut) and federal agencies (e.g., U.S. Environmental Protection Agency), as well as academic researchers (e.g., Rutgers Robert Wood Johnson Medical Center).

The studies that have been conducted measured concentrations of chemicals in the air above ATFs as well as in the components of the ATFs. In addition, some studies have evaluated the potential for these chemicals to actually enter the body and reach a susceptible organ (e.g., bioavailability studies).

Public health agencies evaluate concentrations measured in studies and compare them to well-established, health-based standards or guidelines (developed through



comprehensive research by federal or state governments) or they conduct evaluations using standard risk assessment methods to estimate health risks from environmental exposures.

The term "risk assessment" refers to a process of assessing and evaluating the potential health effects that may result from an environmental exposure. Risk assessments take into consideration information about the toxicity of a contaminant, the estimated amount of contaminant that someone may be exposed to, the sensitivity of an individual to the contaminant (e.g., children are generally more sensitive to environmental contaminants than healthy adults), and other factors.

Exposure assumptions that have been used include assuming someone plays on the field for 3-5 hours a day, 4-5 days a week, 8-12 months a year, and 12 (child) to 30 years (adult). Such assumptions are designed to be conservative and consider worst-case scenarios.

Although exhaustive research has not been completed, the available studies have shown that although ATF components contain chemicals in the material itself, exposure opportunities at levels measured do not suggest that health effects are likely.

Results of samples taken at or above (e.g., air) ATFs and analyzed for VOCs, SVOCs, metals, and particulate matter that can be inhaled into the lungs suggested that adverse health effects were unlikely to occur. These include studies conducted by the Connecticut Health Department, the New York State Health Department, and the California Office of Environmental Health Hazard and Assessment.

The Rutgers study evaluated whether exposures to SVOCs or metals in ATF components might suggest exposures of health concern via ingestion, inhalation, or dermal contact. They concluded that overall the opportunities for exposure to constituents in these fields presented very low risk among all populations that would use ATFs. Authors of a study in the Netherlands reported that results of urine testing indicated that uptake of PAHs among participants, following playing on an ATF with crumb rubber infill, was minimal.

The Rutgers researchers found that lead concentrations in one of seven ATFs tested could potentially result in blood lead levels above the U.S. Centers for Disease Control and Prevention reference value for blood lead in young children (5 ug/dL). It should be noted, however, that the lead concentration in the materials used in this study included a sample of turf fiber with a lead concentration of 4,400 mg/kg, well above the US Consumer Product Safety and Improvement Act limit for lead content in children's products of 100 mg/kg.

Some ATFs are constructed with components that are certified as having no or low lead content. Use of ATF components that meet the Consumer Product Safety and Improvement Act limit of 100 ppm for lead in children's products would minimize exposure opportunities to lead.

The California Office of Environmental Health Hazard and Assessment tested for bacterial contamination at both natural grass fields and ATFs. They found fewer bacteria detected on artificial turf compared to natural turf, and therefore less likely to result in infection risks to athletes using ATFs that may have skin abrasions.

Some recent media reports have raised concerns about the possible association between playing on ATFs and the development of cancers. It is important to note that the types of cancers reported are among those that have been more prevalent in children for many years. To date, no epidemiologic studies have evaluated the occurrence of cancer among athletes or others who play on ATFs.

Although cancer is much less common among children than older adults, unfortunately 1 in 285 children in the U.S. will be diagnosed with cancer before the age of 20. Leukemia is the most common cancer diagnosed in children and teens, accounting for almost 1 out of 3 cancers in this age group. From 1975 to 2010, the overall incidence of pediatric cancer in the U.S. increased slightly, by an average of 0.6 percent per year.

Several studies, including those conducted by officials in New York City, New York State, Connecticut, California, the U.S. Environmental Protection Agency, and Norway, have conducted cancer risk assessments based on opportunities for exposures at ATFs. These evaluations were based on testing results from different kinds of fields under a variety of weather and use conditions. These risk assessment studies all indicate that the use of ATFs is not associated with elevated cancer risk.

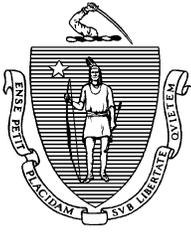
MA Department of Public Health (MDPH) does not endorse any particular consumer product, including ATFs. MDPH routinely evaluates whether exposure opportunities to constituents in consumer products may pose health concerns and provides information to put risk in perspective.

Concerns have been expressed in relation to the increased temperature of fields as outdoor temperatures rise. For these reasons, fields may be frequently watered to cool the surface, and athletes should increase hydration and take frequent breaks to reduce the potential for burns or heat stress.

MDPH recommends common sense steps to minimize potential exposures to chemicals that may be present, such as washing hands after playing on a field and before eating (particularly for younger children with frequent hand-to-mouth activity) and taking off shoes before entering the house to prevent tracking in any crumb rubber particles.

Conclusion

Although exhaustive research has not been completed, the available studies have shown that although ATF components contain chemicals in the material itself, exposure opportunities at levels measured do not suggest that health effects are likely.



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Frequently Asked Questions Artificial Turf Fields

1. What are artificial turf fields (ATFs)?

Artificial turf fields (ATFs) are synthetic alternatives to natural grass fields.

2. What are ATFs composed of?

Components of ATFs include artificial grass fibers (blades), crumb rubber infill, and sand infill overlaid on a carpet-like backing that holds the turf together. The grass fibers are typically made of nylon, polyethylene, or polypropylene, and the crumb rubber infill used to soften the surface is most often made of recycled tires.

3. Are chemicals present in ATF components?

Yes, ATF components, such as crumb rubber infill, have been found to contain chemicals including semi-volatile organic compounds (including polyaromatic hydrocarbons, or PAHs), volatile organic compounds (VOCs), and metals.

4. Have studies been done to determine if ATFs impact health?

Several studies evaluating potential exposure opportunities to constituents in ATFs have been conducted by state (e.g., California, New York, New Jersey, Connecticut) and federal agencies (e.g., U.S. Environmental Protection Agency), as well as academic researchers (e.g., Rutgers Robert Wood Johnson Medical Center).

5. How have these studies evaluated exposure opportunities at ATFs?

The studies that have been conducted measured concentrations of chemicals in the air above ATFs as well as in the components of the ATFs. In addition, some studies have evaluated the potential for these chemicals to actually enter the body and reach a susceptible organ (e.g., bioavailability studies).

6. How do public health agencies evaluate whether exposure can result in health effects?

Public health agencies evaluate concentrations measured in studies and compare them to well-established, health-based standards or guidelines (developed through comprehensive research by federal or state governments) or they conduct evaluations using standard risk assessment methods to estimate health risks from environmental exposures.

7. What is a risk assessment?

The term “risk assessment” refers to a process of assessing and evaluating the potential health effects that may result from an environmental exposure. Risk assessments take into consideration information about the toxicity of a contaminant, the estimated amount of contaminant that someone may be exposed to, the sensitivity of an individual to the contaminant (e.g., children are generally more sensitive to environmental contaminants than healthy adults), and other factors.

8. What assumptions have been used in risk assessments done for ATFs?

Exposure assumptions that have been used include assuming someone plays on the field for 3-5 hours a day, 4-5 days a week, 8-12 months a year, and 12 (child) to 30 years (adult). Such assumptions are designed to be conservative and consider worst-case scenarios.

9. What do the available studies that have been conducted on exposure opportunities to ATFs and health impacts show?

Although exhaustive research has not been completed, the available studies have shown that although ATF components contain chemicals in the material itself, exposure opportunities at levels measured do not suggest that health effects are likely.

10. What are the findings of studies that evaluated exposure opportunities based on measurements of constituents (e.g., in air, dust) at ATFs?

Results of samples taken at or above (e.g., air) ATFs and analyzed for VOCs, SVOCs, metals, and particulate matter that can be inhaled into the lungs suggested that adverse health effects were unlikely to occur. These include studies conducted by the Connecticut Health Department, the New York State Health Department, and the California Office of Environmental Health Hazard and Assessment.

11. What are the findings of studies that have evaluated ingestion or inhalation of, and/or skin contact with constituents in ATFs?

The Rutgers study evaluated whether exposures to SVOCs or metals in ATF components might suggest exposures of health concern via ingestion, inhalation, or

dermal contact. They concluded that overall the opportunities for exposure to constituents in these fields presented very low risk among all populations that would use ATFs. Authors of a study in the Netherlands reported that results of urine testing indicated that uptake of PAHs among participants, following playing on an ATF with crumb rubber infill, was minimal.

12. What were the findings of the Rutgers study with respect to lead?

The Rutgers researchers found that lead concentrations in one of seven ATFs tested could potentially result in blood lead levels above the U.S. Centers for Disease Control and Prevention reference value for blood lead in young children (5 ug/dL). It should be noted, however, that the lead concentration in the materials used in this study included a sample of turf fiber with a lead concentration of 4,400 mg/kg, well above the US Consumer Product Safety and Improvement Act limit for lead content in children's products of 100 mg/kg.

13. Do all ATFs have lead?

No. Some ATFs are constructed with components that are certified as having no or low lead content. Use of ATF components that meet the Consumer Product Safety and Improvement Act limit of 100 ppm for lead in children's products would minimize exposure opportunities to lead.

14. What are the findings of studies that evaluated exposures to bacteria?

The California Office of Environmental Health Hazard and Assessment tested for bacterial contamination at both natural grass fields and ATFs. They found fewer bacteria detected on artificial turf compared to natural turf, and therefore less likely to result in infection risks to athletes using ATFs that may have skin abrasions.

15. Have epidemiological studies been conducted to determine if ATF exposures are associated with the occurrence of cancer in children?

Some recent media reports have raised concerns about the possible association between playing on ATFs and the development of cancers. It is important to note that the types of cancers reported are among those that have been more prevalent in children for many years. To date, no epidemiologic studies have evaluated the occurrence of cancer among athletes or others who play on ATFs.

16. How common is it for children to get cancer?

Although cancer is much less common among children than older adults, unfortunately 1 in 285 children in the U.S. will be diagnosed with cancer before the age of 20. Leukemia is the most common cancer diagnosed in children and teens, accounting for almost 1 out of 3 cancers in this age group. From 1975 to 2010, the overall incidence of pediatric cancer in the U.S. increased slightly, by an average of 0.6 percent per year.

17. Has the potential for the development of cancer been assessed using standard risk assessment methods for exposure opportunities associated with ATFs?

Several studies, including those conducted by officials in New York City, New York State, Connecticut, California, the U.S. Environmental Protection Agency, and Norway, have conducted cancer risk assessments based on opportunities for exposures at ATFs. These evaluations were based on testing results from different kinds of fields under a variety of weather and use conditions. These risk assessment studies all indicate that the use of ATFs is not associated with elevated cancer risk.

18. Does MDPH endorse the use of ATFs?

No, MDPH does not endorse any particular consumer product, including ATFs. MDPH routinely evaluates whether exposure opportunities to constituents in consumer products may pose health concerns and provides information to put risk in perspective.

19. What other exposure concerns have been raised about ATFs?

Concerns have been expressed in relation to the increased temperature of fields as outdoor temperatures rise. For these reasons, fields may be frequently watered to cool the surface, and athletes should increase hydration and take frequent breaks to reduce the potential for burns or heat stress.

20. Are there steps that can be taken to reduce exposure opportunities to ATF components?

Yes. MDPH recommends common sense steps to minimize potential exposures to chemicals that may be present, such as washing hands after playing on a field and before eating (particularly for younger children with frequent hand-to-mouth activity) and taking off shoes before entering the house to prevent tracking in any crumb rubber particles.

21. Who should I contact for more information?

If you have any questions about ATFs and health, you may contact the following:

Environmental Toxicology Program
Bureau of Environmental Health
Massachusetts Department of Public Health
250 Washington Street, 7th Floor
Boston, MA 02108
617-624-5757