

A Mineral Visions, Inc. White Paper

A Safe Alternative to Crumb Rubber Infill Within Synthetic Turf Fields

Mineral Visions Inc.
a Fairmount Minerals Subsidiary
11830 Revena Road
Chardon, OH 44024
Phone: 800.255.7263

www.flexsand.com

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Synthetic Turf Introduction

The growing need for durable, low maintenance, multi-purpose athletic fields has fueled significant growth in the use of synthetic turf throughout the world. While the traditional application is athletic fields, synthetic turf is now being used in everything from lawns, to golf greens, to pet runs. These days, synthetic turf seems to be everywhere.

According to Applied Market Information Ltd. (AMI), an independent industry consultant, the synthetic field market has grown by almost 20% per annum from 2001 to 2006. AMI projects similar growth numbers through 2009. The growth is driven by several factors, but primarily because the turf itself has been significantly improved since its introduction in the early 1960s in the Houston Astrodome.

Crumb Rubber in Synthetic Turf

One of the primary materials often used in the installation of synthetic turf is crumb rubber. This granular material typically comes from scrap tires or other used industrial rubber. It is brushed into the synthetic grass and acts as a shock absorption material. Its role is to reduce injury and improve field performance. It has been in use since the 1990s and is often combined with raw sand, which provides ballast to hold the synthetic grass blades up.¹

Within the last year or so, a debate over the use of crumb rubber has grown. Recently, several non-governmental organizations and action groups are waging war on crumb rubber. They're concerned about what they refer to as the "toxic" constituents of the material and what they perceive as a lack of sound technical data to allay their fears.

¹ US Patent 5,958, 527, "Process of laying synthetic grass" Assignee Fieldturf Holdings, September 28, 1999.

Voices of Concern

The public concern about crumb rubber is growing. Take for example recent, preliminary tests at the state-run Connecticut Agricultural Experiment Station. Tests show volatile organic compounds are being released into the air and water table from rubber pellets used with artificial turf fields.

“Why not err on the side of safety and heed the recommendation of an independent environmental group that has suggested a delay for towns and schools planning on installing artificial turf made from (installed with) chopped up tires.”²

“The Connecticut Agricultural Experiment Station study conclusively demonstrates that the tire crumbs and tire mulch release chemical compounds into the air and ground water. Thus, tire crumbs constitute a chemical exposure for humans and the environment.”³

These concerns have prompted much debate. Several groups have called for a moratorium on the use of crumb rubber until more is known.

The synthetic turf industry in North America has information to the contrary. They have referenced several outside experts and studies that show crumb rubber to be a safe material. For more information: www.syntheticurfCouncil.org.

Unfortunately, there doesn't seem to be an end in sight for the crumb rubber debate. It will likely be quite some time before the facts are separated from fiction.

So the logical question exists: *Is there a good alternative?*

A Safe Alternative to Crumb Rubber

To find an alternative to crumb rubber, a strong engineering collaboration was required. Three leading companies partnered to engineer a new,

safe infill material. They took a 360 degree development approach, and focused their energies on performance safety, environmental responsibility in use, and recyclability.

They teamed up and developed a product to address the concerns voiced about crumb rubber. When properly applied in an engineered synthetic turf system, this new material provides a safe solution.

The FlexSand™ Action Alternative

For synthetic turf to replace natural grass, the entire system must be comprised of materials that are both safe and environmentally responsible. Since doubts remain about crumb rubber, a team of engineers set out to develop a new infill material. They looked for an alternative product that had the ballast benefits of raw sand and shock absorption performance of crumb rubber without the perceived environmental issues.

The product they developed combines engineered elastomers and high purity quartz sand. The elastomers are bonded to the quartz grain surface to provide superior application performance. Patents exist in Europe and applications have been filed in North America which cover this unique product.

The product, FlexSand™ Action, is comprised of polyolefin “plastomers.” These engineered materials bridge the gap between engineered plastics and rubber. These materials are not by-products, but have been chosen based on their rheological and elastomeric performance. They are safe and shock absorbent.

² “Study Finds Volatile Organics in Turf Fields”. *The Day – New London*. Judy Benson. August 18, 2007.

³ Brown, David R. *Artificial Turf Exposures to Ground-up Rubber Tires*. Environment and Human Health, Inc. Published in 2007.

Fire Safety

Because of the formulation, FlexSand™ Action has excellent thermal stability and UV resistance. It is also considered “non-flammable,” having attained a Type 1 fire rating.⁴ For this reason, one of its base elastomers is widely used in many electrical applications including wire and cable sheathing. FlexSand™ Action has also been approved for indoor use in specific constructions by such organizations as UEFA.⁵

Leaching Resistance

FlexSand™ Action is a product that has been engineered not to leach. The elastomers used in FlexSand™ Action do not contain any heavy metals and their formulations are chemically cross linked to assure stability. As a result, FlexSand™ Action has performed well in leaching tests, including stringent European leach examinations.⁶

Tested for Extractables

In addition to a battery of leach tests, the formulated elastomers are tested, in advance, for extractables. These tests are often more aggressive than leach tests, because the material is put under duress to see if anything can be physically or chemically extracted. This elastomer formulation holds up under these aggressive test conditions.

FDA Compliance

Whether it is neighborhood children or a favorite professional athlete playing on FlexSand™ Action, personal safety is of paramount importance. It is for this reason that the team of engineers chose to include an FDA compliant elastomer in FlexSand™ Action.⁷ This material is approved for use for, among other things, fresh cut produce, meats,

and cheeses.

A Recyclable Material

At the end of its useful life, the elastomers in FlexSand™ Action can be recycled. The materials can be reprocessed and used in other compatible applications.⁸

Summary

While the crumb rubber debate rages on, a safe, environmentally responsible, engineered replacement has been developed. This replacement has the application performance characteristics required, and in addition, addresses the concerns of the public at large.

For more information on this product, please contact:

Mineral Visions, Inc.
11833 Ravenna Road
Chardon, Ohio 44024
800-255-7263
www.flexsand.com

⁴ ASTM E648 Standard test method for critical radiant flux of floor covering systems.

⁵ Football Turf in UEFA Competitions, Certificate U-101-06/PV-04

⁶ Leach Test DIN 18035-7

⁷ Complies to FDA FCN 449

⁸ Designated as Recyclable Material 04