



**Synthetic Turf**<sup>SM</sup>  
C O U N C I L

# Guidelines for Crumb Rubber Infill Used in Synthetic Turf Fields





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# Synthetic Turf<sup>SM</sup>

C O U N C I L

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# Introduction

## Purpose

To provide producers, customers and the public with an understanding of what CRI is and how the industry manages its safety, purity and quality.

## Objectives

- Clear standards on origin and composition of CRI
- Clear standards on cleanliness and purity of CRI
- Guidance on testing, sampling and packaging of CRI

## General Characteristics of Crumb Rubber Infill (CRI)

Effective January 1, 2011:

The CRI used in artificial turf fields shall be derived from used whole vulcanized automobile, SUV, and truck tires (DOT tires for over the road). Buffings, bladders and tubes shall not be used as feedstock for CRI.

The CRI shall have a specific gravity range from 1.1 minimum to 1.2 maximum grams per cubic centimeter as determined by ASTM D 297 (including any modifications made by ASTM in the future).

The CRI shall have an ash content of between 5 and 15% as determined by ASTM D 297 (including any modifications made by ASTM in the future).

CRI made after Jan 1, 2011 shall not contain more than .01% liberated fiber (mathematically expressed as 0.0001) (no more than 0.2 lbs. per ton, which is 3.2 ounces of fiber per 2,000 lb. supersack which is approximately 25 lbs. of fiber per average field) tested per ASTM D 5603. The liberated fiber remaining in the CRI shall be free flowing and not agglomerated into clumps of fiber as received at the job site. CRI made before Jan 1, 2011 shall contain no more than 0.05% liberated fiber. All CRI sold after 12/31/11 must meet the 0.01% standard.

The CRI shall be dry and free flowing.

Sieve/gradation specification shall be agreed upon between customer and producer.

## Processing Standards for CRI

- CRI shall be produced cryogenically, ambiently, or a combination.
- Scales used for bagging must be certified per local/state requirements.

## Certification Compliance

Suppliers shall certify that the CRI is derived from only used, whole, vulcanized automobile, SUV, or truck tires and produced in compliance with North American tire manufacturing specifications.

Providers of CRI shall provide in writing that they maintain an ongoing Quality Control program meeting all the standards of the STC Guidelines for CRI Used in Synthetic Turf Fields and capable of meeting all the specifications described herein.

Shipment and/or Order Certification shall include at least the following information:

- Type and origin of raw material (certify that it comes from tires)
- Production facility
- Production method (cryo or ambient)
- Fiber content (%)
- CRI sieve/gradation analysis

## Old Packaging (applicable before 12/31/2010)

Supersacks must meet the following specifications:

- Rated 2,200 (minimum) working load
- Rated 5:1 safety factor
- Minimum loop length of 8"
- UV treated with a 1,200 hour standard
- Minimum fabric weight of 5.5 ounce
- Side seams: at least 50% of the way down the bag
- At point of shipment bag should be clean and free of debris
- The supersack shall be secure and stable on the pallet
- Customers shall be billed for net weight of rubber shipped
- All supersacks must have traceability to date of production
- In the case of used/recycled supersacks:
  - Certified as 1x only prior use and indoor use only
  - Certified as cleaned of prior use materials

## New Packaging (applicable on and after 1/1/2011)

New supersacks must be used and must meet the following specifications. All material (regardless of date of manufacture) must be in new supersacks:

- Rated 2,200 (minimum) working load
- Rated 5:1 safety factor
- Minimum loop length of 8"
- UV treated with a 1,200 hour standard
- Minimum fabric weight of 5.5 ounce
- Side seams: at least 50% of the way down the bag
- At point of shipment bag should be clean and free of debris
- The supersack should be secure and stable on the pallet
- Customers should be billed for net weight of rubber shipped
- All supersacks should have traceability to date of production
- CRI producers may use used supersacks if a customer specifies them.

## Packaging

Pallets will meet the following specifications:

- 2 way or 4 way
- No broken or cracked boards
- No missing boards
- Fasteners all level with surface, none missing
- Construction:
  - ⇒ Top: 1 x 4's (measuring  $\frac{3}{4}$ " thick x 3.5" wide); gaps < 3"
  - ⇒ Structural: 2 x 4's (measuring 1.5" x 3.5"), minimum of 3
  - ⇒ Bottom: 1 x 4's (measuring  $\frac{3}{4}$ " thick x 3.5" wide), minimum of 3

## Field Quality Testing and Sampling

Equipment:

- Sampling stick
- Sample splitter
- Sample tray (width = 12", length = 12", Depth = 3")
- High precision scale (0.01 gram)
- Tweezers

Sampling:

- Randomly select 3 bags (super sacks) per load of infill material.
- Record the bag information such as bag number, lot number, date shipped, bill of lading number, etc.
- Place the sampling stick into the bag vertically 3 times in 3 different locations and collect 3 samples.
- Place the 3 samples into a plastic bag.
- Repeat above steps until at least 3000 grams of crumb rubber are obtained.
- Shake the collected sample well.



## Field Quality Testing and Sampling (*continued*)

### Measurements:

- Use the sample splitter to divide the crumb rubber sample evenly into 2 portions.
- Send 1 portion to the supplier with proper bag, lot, etc. identification as recorded above.
- Spread the second portion evenly on the sample tray and pick up all the free fabric with tweezers and place in the weighing tray of the scale.
- Weigh the collected fabric.
- Divide the weight of the fabric by the total weight of infill material in the tray and multiply the result by 100 to calculate percent fabric contamination.
- Repeat 3 times and average the result.
- Document the result with the proper bag, lot, etc. identification recorded above and report results to the supplier.

## Standard Format MSDS

To create and maintain a uniform understanding of CRI in the marketplace, all CRI suppliers should use an MSDS ([Material Safety Data Sheet](#)) with essentially the same elements and components.

The following format is the recommended MSDS format based on research that suggests more specificity is not required. Any producer who has received other counsel is free to use a more detailed MSDS.

Please note that this recommended format is intended to be fully consistent with OSHA and Canadian requirements and eliminates much of the chemical terminology that has historically been included because initial MSDS were derived from those used in the tire manufacturing industry.

<b>MATERIAL (CAS)</b>	<b>WT%</b>	<b>OSHA PEL</b>	<b>(ACGIHTLV)</b>
Vulcanized Rubber Compound	Approx. 99%	N/A	N/A
Talc (Hydrous Magnesium Silicate)	Less than 4%	2.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>
FLASH POINT: Ignition temperature of dust cloud 320 degrees Centigrade (608 F) approximately		FLAMMABLE LIMITS	N/A

<b>HAZARDOUS INGREDIENTS</b>			
<b>PRODUCT IDENTIFICATION/CHEMICAL &amp; PHYSICAL CHARACTERISTICS</b>			
<b>PRODUCT NAME</b>	Crumb Rubber	<b>SOLUBILITY IN WATER</b>	Insoluble
<b>APPEARANCE</b>	Black granular powder	<b>ODOR</b>	Slight smell of
<b>SPECIFIC GRAVITY</b>	1.1—1.2 g/cm <sup>3</sup>	<b>MELTING POINT</b>	N/A
<b>VAPOR PRESSURE</b>	N/A	<b>VAPOR DENSITY</b>	N/A
<b>EVAPORATION RATE</b>	N/A	<b>BOILING POINT</b>	N/A

## Standard Format MSDS (*continued*)

### FIRE AND EXPLOSION HAZARD DATA

LEL—.025 OZ/CU.FT. \*

UEL: N/A

EXTINGUISHING MEDIA:

Water, foam, dry powder, encapsulating fire suppressant. (DO NOT USE HIGH PRESSURE WATER)

SPECIAL FIRE FIGHTING PROCEDURES:

Noxious gases may be formed under fire conditions. West NIOSH approved self contained apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Dust may be explosive if mixed with air in critical proportions and in the presence of an ignition source. The hazard is similar to that of many organic solids.

\* Estimates based on the NPFA Fire Protection Book

## Standard Format MSDS (*continued*)

<b>HAZARDOUS INGREDIENTS HEALTH HAZARD DATA</b>	
STABLE: Yes	CONDITIONS TO AVOID: Conditions that will cause burning
INCOMPATIBILITY (Materials to avoid)	Avoid strong oxidizing agents
HAZARDOUS DECOMPOSITION OF BYPRODUCTS	Thermal decomposition may produce carbon monoxide, carbon dioxide, zinc oxide fumes/dust, sulfur dioxide, liquid and gaseous hydrocarbons.
HAZARDOUS POLYMERIZATION : Will not occur	CONDITIONS TO AVOID: Do not store hot material in hoppers due to possibility of spontaneous combustion.
ROUTES OF ENTRY	Inhalation
HEALTH HAZARDS (Acute and Chronic)	This product can contain fine fibers that may cause itching. Otherwise, not known. This material is generally thought to be a nuisance dust.
CARCINOGENICITY	Rubber is not listed as a carcinogen.
SIGNS AND SYMPTOMS OF EXPOSURE	Itching of skin, irritation of mucous membranes, sneezing and coughing, irritation of eyes.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE	Not known; however, could potentially aggravate allergies due to dust exposure/inhalation.
EMERGENCY AND FIRST AID PROCEDURES	Normal washing of skin with soap and water. Ordinary means of personal hygiene are adequate.

## Standard Format MSDS (*continued*)

<b>PRECAUTIONS FOR SAFE HANDLING AND USE</b>	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Sweep up or vacuum into disposal containers
WASTE DISPOSAL METHOD	Product not defined as hazardous waste. Dispose of in accordance with federal, state, and local regulation.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	Do not store near flame or ignition source. Do not store hot material in tubs or containers where spontaneous ignition could occur.
OTHER PRECAUTIONS	If material burns, an oily residue will result. This residue must be disposed of in accordance with federal, state and local regulations.
RESPIRATORY PROTECTION (Specify Type)	Use any dust and mist respirator noted for up to 10 mg/m <sup>3</sup> .

<b>CONTROL MEASURES</b>	
VENTILATION: Yes	LOCAL EXHAUST: Yes, if dusty conditions occur.
SPECIAL: None	MECHANICAL (General): Dust collector and
PROTECTIVE GLOVES: Recommended	EYE PROTECTION: Use safety goggles to prevent dust entry.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT	Enough fresh air should flow past the user to prevent exposure to airborne fibers and particles.
WORK/HYGIENE PRACTICES	Good personal hygiene; frequent washing with soap and water of exposed areas; remove and clean solid clothing.

The information contained in this MSDS is consistent with the U.S. Department of Labor OSHA Form OMB 1218-0072. Consult OSHA Hazard Communication Standard 29 CFR 1910.1200 for additional information. To fully understand the use of any material, the user should avail themselves of reference material and expert consultation in the fields of fire prevention, ventilation and toxicology.

## About the Synthetic Turf Council

Based in Atlanta, the Synthetic Turf Council was founded in 2003 to promote the industry and to assist buyers and end users with the selection, use and maintenance of synthetic turf systems in sports field, golf, municipal parks, airports, landscape and residential applications. The organization is also a resource for current, credible, and independent research on the safety and environmental impact of synthetic turf. Membership includes builders, landscape architects, testing labs, maintenance providers, manufacturers, suppliers, installation contractors, infill material suppliers and other specialty service companies. For more information, visit the STC's Online Buyers' Guide and Member Directory at [www.syntheticurfCouncil.org](http://www.syntheticurfCouncil.org).



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