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Safety Data Sheet

Revision date: May 16, 2018 Rev. 3.1

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Covered Products: Harmonite-40, Harmonite-70, Harmonite-100, Harmonite C
Synonyms: RAS / Asphalt fiberglass shingle powder
Chemical family: Not Applicable
Formula: Composite (Mixture)

Producer: Recycled Shingle Solutions (RSS, LLC)
6075A Lees Mills Road
Forest Park, GA 30297

Robert Horton	937-510-5870	Available 24 hours
Keith Little	937-479-2796	Information only - Available 24 hours

Section 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Harmonite powders are composed of recycled asphalt and fiberglass-based roofing material manufactured in a high temperature thermal/mechanical process. If Harmonite powder becomes airborne, it may contain oxidized asphalt, limestone, glass fiber-containing dust and/or crystalline silica which can be hazardous if inhaled.
Harmonite powder is a class St-1 combustible dust. Material handling, storage, and housekeeping operations should be consistent with effective controls to minimize the hazard of a combustible dust fire or explosion.

OSHA-GHS Hazard Classification and Hazard Statements (Warning Label):
DANGER — H 350 May cause cancer *(category1)*
WARNING — H 320 Causes eye irritation *(category2B)*

Precautionary Statements and Symptoms
P 201 Obtain specific instructions before use.
P 202 Do not handle until all safety precautions have been read and understood.
P264 Wash hands thoroughly after handling.
P308 + P313 If exposed or concerned, get medical advice.
P305 + P351 + 338 If in eyes, remove contact lenses if present and easy to do so, rinse cautiously with water for several minutes.
P337 + P338 +313: If eye irritation persists. Continue rinsing. Get medical attention
P405 Store locked up.
P 280 Wear eye protection.
HNOC (Hazards Not Otherwise Classified): Combustible dust.

Inhalation: (Acute): Exposure to dust and asphalt fume is irritating to the nose, throat, and respiratory system. Asphalt fume may also cause eye irritation.
In high concentrations in excess of applicable exposure limits, dust may be narcotic and may cause headache, fatigue, dizziness, nausea, breathing disorders and lung damage. Exposure to asphalt fumes may result in irritation.

Inhaled limestone dust and fiberglass particles may cause mechanical irritation of the nose, throat, and respiratory tract.

(Chronic): Restrictive and/or obstructive lung function changes may result from chronic exposure to crystalline silica (quartz). Repeated exposure in excess of exposure limits my cause silicosis, a progressive lung disease resulting in fibrosis (scarring) of the lungs. Silicosis is a serious and irreversible disease; it may be progressive even after exposure has ceased, and can lead do disability and death. Chronic tobacco smoking may further increase the risk of developing chronic lung problems. Respirable crystalline silica (quartz) is a known human carcinogen based on sufficient evidence of carcinogenicity from studies in humans, indicating a causal relationship between exposure to respirable crystalline silica and increased lung cancer rates in workers exposed to crystalline silica dust.

Ingestion: Small amounts (a tablespoonful) swallowed during normal handling are not likely to cause injury. Ingestion of large amounts may cause irritation of the mouth, throat, and stomach.

Skin contact: Dust from this product may cause irritation by mechanical abrasion.

Eye contact: Direct contact with dust may cause irritation by mechanical abrasion. Conjunctivitis may occur.

Section 3. MATERIAL COMPOSITION / INFORMATION ON INGREDIENTS

Name	CAS No.	Weight %
Limestone	1317-65-3	25% - 45%
Oxidized Asphalt	64742-93-4	10% - 36%
Quartz (total)	14808-60-7	< 10%
Aluminum Oxide	1344-28-1	< 7%
Glass Fiber – Wool (Fiberglass)	65997-17-3	1% - 3%
Titanium Dioxide	13463-67-7	< 4%
Kaolin Clay	1332-58-7	< 2%
Water	7732-18-5	< 1%
Non-Hazardous Ingredients	NA	Balance

NOTE: *The above are represented in ranges as estimates. Due to different sources of raw materials, components of Harmonite vary. Asphalt content determined by an independent lab using ASTM D6307.*

Section 4. FIRST AID MEASURES

Inhalation: Move affected person(s) to fresh air. If not breathing, breathing is difficult, or if no heartbeat, give artificial respiration and cardiopulmonary resuscitation (CPR) and/or administer oxygen as needed by trained personnel. Immediately call a physician.

Skin contact: Wash with soap and large amounts of tepid water (not to exceed 90°F). Remove and isolate contaminated shoes and clothing. Wash clothing and clean shoes thoroughly before reuse. If symptoms or irritation occur, call a physician.

Ingestion: If swallowed, do not induce vomiting and do not give liquids. Rinse mouth with water to remove material from the throat. If vomiting occurs

spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Immediately call a physician.

Eye contact: Check for and remove any contact lenses. Flush eyes with large amounts of tepid water for at least 15 minutes. Do not rub or scratch eyes. If symptoms or irritation occur, call a physician.

Notes to Physician: This material, if aspirated into the lungs, may cause chemical pneumonitis. Treat the affected person appropriately.

Section 5. FIREFIGHTING MEASURES

Flammability classification	Combustible dust.
Suitable extinguishing media:	Class B fire-extinguishing media such as carbon dioxide, dry chemical, or foam.
Hazardous combustion products:	Carbon dioxide and carbon monoxide.
Recommended firefighting procedures:	Firefighting may result in potential exposure to high heat, smoke or toxic byproducts of combustion. A self-contained breathing apparatus (SCBA) with full-face piece and full protective firefighting clothing should be worn.

NFPA rating:
Health: 2*; Flammability: 1; Instability/Reactivity: 0 *chronic health effects

Section 6. ACCIDENTAL RELEASE MEASURES

Small Spills Pick up large pieces. Avoid contact with skin and eyes. If using dry clean-up procedures, avoid creating dusts during clean up. Wear protective clothing, gloves, safety glasses and a dust respirator.

Large Spills Follow applicable OSHA regulations (29 CFR 1910.120). Clear the area of personnel and move upwind. Control personal exposure by using protective equipment and a dust respirator. Pick up large pieces and recover the product whenever possible. Avoid generating dust and wet with water to prevent dusting. Put residues in labeled plastic bags or other containers for re-use or disposal. After product recovery, wash down the spill area with water and prevent runoff into drains.

Section 7. HANDLING AND STORAGE

Handle and store as a class St-1 combustible dust (covered or containerized, in protected area away from any ignition sources). See Section 9.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits:

Name	CAS No.	OSHA – PEL (mg/m^3)	ACGIH® TLV® (mg/m^3)	NIOSH REL (mg/m^3)
Limestone	1317-65-3	5 respirable; 15 total	3 respirable; 10 total	NE
Oxidized Asphalt	64742-93-4	NE	0.5 (inhalable fraction, as benzene-soluble aerosol	5 Ceiling (15 minutes as fume)
Crystalline Silica	14808-60-7	$\frac{10\ mg/m^3}{\%\ SiO_2 + 2}$ respirable	0.025 respirable	0.05 respirable
Aluminum Oxide	1344-28-1	5 respirable; 15 total	NE	NE
Name	**CAS No.**	**OSHA – PEL (mg/m^3)**	**ACGIH® TLV® (mg/m^3)**	**NIOSH REL (mg/m^3)**
Titanium Dioxide	13463-67-7	15 total	10 total	NE
Glass Fiber – Wool (fiberglass)	65997-17-3	1 fiber/ cubic centimeter; respirable	1 fiber/ cubic centimeter; respirable	5 total fibers
Kaolin Clay	1332-58-7	5 respirable; 15 total	3 respirable; 10 total	NE

All exposure limits listed are 8-hour time weighted average (TWA) — except where noted otherwise.

Please see Section 16 for additional information on PEL & TLV

Engineering measures:	Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is intrinsically safe or explosion-proof for combustible dust.

PERSONAL PROTECTIVE EQUIPMENT:

Respiratory protection: Use NIOSH-approved respirators as specified by an Industrial Hygienist or Safety Professional. Respirators should be used if operating conditions create airborne concentrations that exceed exposure limits for any individual components. Observe respirator protection factor criteria cited in OSHA.

Skin and body protection: Use canvas or leather gloves when handling. Wear dust-impervious coveralls if airborne dust concentrations exceed limits cited in this section.

Eye protection: Wear safety glasses with side shields.

Hygiene measures: Wash hands before eating, drinking, or smoking. Promptly remove contaminated clothing and launder before reuse.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Finely divided powder
Physical state (solid/liquid/gas):	Solid
Substance type (pure/mixture):	Mixture
Color:	Grey to Black
Odor:	None
Molecular weight:	Not determined
pH:	Not Applicable
Specific gravity:	1.8 - 2.4 (H_2O = 1)
Bulk Density (average):	42 - 48 lbs/ft3

Softening Point (composite powder):	220 - 240°C
Softening Point (extracted asphalt):	126 - 146°C
Solubility:	Partially Soluble in petroleum solvents & aromatic hydrocarbons. Insoluble in water & alcohols.
Quartz (total):	< 10%
Silica (respirable):	0.03 – 0.15 wt% typical[4]
Deflagration Index, (K_{st}) [1,2]:	101 bar•meter/second
Hazard Class of Dust Deflagration [1,2]:	St-1
Maximum Pressure Output, (P_{max}) [1,2]:	100 psig (6.9 bar)
Maximum Pressure Rise Rate, dP/dt:	5,365 psi/second (370 bar/second)
Minimum Ignition Energy of a Dust Cloud in Air[1]:	42-45milli-Joules
Hot-Surface Ignition Temperature of Dust Layers [1]:	No ignition was observed up to the set temperature of 450° C
Minimum Auto-ignition Temperature of Dust Cloud (MAIT) [1]:	440° C
Minimum Explosible Concentration (MEC) [1,3]:	90 g/m^3 (Igniter Energy 5,000J); 185 g/ m^3 (Igniter Energy 2,500J)

[1] Refer to: National Fire Protection Association (NFPA) 654: "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids".
[2] Refer to: American Society for Testing and Materials (ASTM) E1226 "Test Method for Pressure and Rate of Pressure Rise for Combustible Dusts"
[3] Refer to: ASTM E 1515 "Standard Test Method for Minimum Explosible Concentration [MEC] of Combustible Dusts"
[4] Harmonite-100 not tested; results expected to be in a similar range but could be slightly higher or lower.

Section 10. STABILITY AND REACTIVITY

Stability:	Airborne dust may ignite or explode, see Section 9.
Polymerization:	Will not occur.
Hazardous decomposition products:	Combustion produces carbon monoxide, carbon dioxide, hydrogen sulfide, ozone and other compounds
Materials to avoid:	Strong oxidizing agents
Conditions to avoid:	Sources of heat or ignition if airborne dust is created.

Section 11. TOXICOLOGICAL INFORMATION

Acute toxicity:
Product information-Component analysis (toxicological data does not exist for this mixture): Overexposure to limestone (calcium carbonate) may result in irritation to eyes, skin, and respiratory system. Acute ingestion may result in mild gastrointestinal distress while chronic exposure may result in hypercalcemia, alkalosis and renal impairment. Approximately 70-80% of inhaled limestone dust was retained in the lungs. Animal studies suggest that inhalation of limestone dusts may enhance susceptibility to respiratory infection.

Chronic toxicity:
The NTP has classified respirable crystalline silica as a known human carcinogen (Group 1) based on sufficient evidence of carcinogenicity from studies in humans, indicating a causal relationship between exposure to respirable crystalline silica and increased lung cancer rates in workers exposed to crystalline silica dust.

Carcinogenicity:

The International Agency for Research on Cancer (IARC) has identified inhaled crystalline silica in the form of quartz or cristobalite as a known human carcinogen. The IARC has determined that occupational exposure to oxidized asphalt and its emissions are probably carcinogenic to humans. The National Toxicology Program (NTP) has identified crystalline silica as a known human carcinogen. The American Conference of Governmental Industrial Hygienists (ACGIH) has identified crystalline silica as a suspected human carcinogen. The ACGIH has identified oxidized asphalt and titanium dioxide as a cause for concern that they could be carcinogenic for humans, but which cannot be assessed conclusively because of a lack of data. The National Institute for Occupational Safety and Health (NIOSH) has collected sufficient evidence to identify crystalline silica in the form of quartz or cristobalite, and roofing asphalt fumes as a potential occupational carcinogens.

Name	IARC:	NTP:	ACGIH — carcinogens:	NIOSH — carcinogens:
Crystalline Silica (quartz and cristobalite) 14808-60-7 &14464-46-1	Group 1 – Carcinogenic to Humans	Group K – Known Human Carcinogen	A2 – Suspected Human Carcinogen	Potential occupational carcinogen
Oxidized Asphalt 64742-93-4	Group 3 – Not Classifiable as a Human Carcinogen		A4 – Not Classifiable as a Human Carcinogen	Potential occupational carcinogen
Titanium Dioxide 13463-67-7	Group 2B – Possibly Carcinogenic to Humans		A4 – Not Classifiable as a Human Carcinogen	Potential occupational carcinogen

Name	CAS No.	Inhalation:	Dermal:	Oral:
Quartz	14808-60-7	LC_{Lo} 0.3 mg/m^3 /10 hrs (human)	N/A	LD_{50} 500 mg/kg

Summary of health effect information on the product: ***refer to Hazard Section 2***

Section 12. ECOLOGICAL INFORMATION

Ecotoxicity effects: No information is available.

Section 13. DISPOSAL CONSIDERATIONS

Cleanup considerations: This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261).

Section 14. TRANSPORT INFORMATION

Transport information: This product is not regulated by the U.S. Department of Transportation (DOT) and the International Air Transport Association (IATA) as a hazardous material.

Proper shipping name: NA

UN/Identification no.: NA

Hazard class: NA

Packing group: NA

DOT reportable quantity (lbs): N/A

Section 15. REGULATORY INFORMATION

U.S. federal regulatory information:

OSHA Hazard Communication Standard:	This product has been evaluated and determined to be hazardous as defined in the OSHA Hazard Communication Standard.
US TSCA Chemical Inventory Section 8(b):	This product and/or its components are listed on the TSCA Chemical Inventory.
CERCLA/SARA 302	None
CERCLA/SARA 304	None
CERCLA/SARA 313	Aluminum oxide

SARA 311/312 Hazard Categories	ACUTE:	HEALTH HAZARD
	CHRONIC:	HEALTH HAZARD
	FIRE:	No
	REACTIVE:	No
	SUDDEN RELEASE:	No

California Proposition 65	This product contains a chemical known to the state of California to cause cancer, birth defects, or other reproductive harm. Cancer: crystalline silica and titanium dioxide.

NOTE: *User must consult with applicable state and local agencies for special specifics, determinations or compliance obligations regarding this product.*

Section 16. OTHER INFORMATION

Rev. 3 replaced Rev. 2 dated 8/28/2017. Changes to current revision:

- 'Silica' replaced by 'quartz' except where specifically referred to as 'crystalline silica', throughout document.
- OSHA HazCom 2012 classifications added, Sec. 2.
- Footnote 4 added, Sec. 9.
- IH monitoring test results discussion added, Sec. 16.
- Disclaimer modified, Sec. 16.

NOTICE to READER

OSHA-PEL & ACGIH TLV results during normal operations:

The personal exposure risk during normal plant operating conditions is deemed to be very low. Industrial hygiene air monitoring tests were conducted by an independent 3rd party during the manufacture and packaging of Harmonite-40. Results for Occupational Exposure Limit (OEL) air monitoring tests for fibers, total particulate, respirable dust containing silica, and respirable silica indicated all four were significantly below OSHA PEL's and ACGIH TLV's. Voluntary use of disposable dust masks is applicable at the levels observed during the tests.

While the information provided in this safety data sheet is believed to provide a useful summary of the hazards of Harmonite as it is commonly used, the sheet cannot anticipate

and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product. In particular, this information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief accurate and reliable as of the date compiled. However, no representation, warranty or guarantee, expressed or implied, is made as to its accuracy, reliability, or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his particular use. We do not accept liability for any loss or damage that may occur from the use of this information. Nothing herein shall be construed as a recommendation for uses which infringe valid patents or as extending a license of valid patents.