



Technologies Inc.

# SAFETY DATA SHEET

Silicon Carbide (SiC) Whisker/Microfiber By-Product

Revision: 3; Revision Date: March 17, 2017

## SECTION 1: IDENTIFICATION OF THE SUBSTANCE /MIXTURE AND OF THE COMPANY

### 1.1 Product identifiers

Commercial product name(s): Silicon Carbide Whisker By-Product

Generic name: Silicon Carbide Froth

REACH No. A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration, or the registration is envisaged for a later registration deadline.

CAS No. See Section 3

### 1.2 Relevant identified uses of the substance or mixture, and uses advised against

Silicon Carbide Whisker By-Product.

### 1.3 Details of the supplier of the safety data sheet

Company: Haydale Technologies Inc.  
1446 South Buncombe Road  
Greer, SC 29651, USA

Telephone: +1-864-877-0123

Fax: +1-864-879-6615

E-mail address: info@haydale-technologies.com

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1 Classification of the substance or mixture

Combustible Dust

#### **Classification according to Regulation (EC) No 1272/2008 [CLP]**

Specific target organ toxicity - repeated exposure, Inhalation (Category 2)

Flammable liquids, Category 3

#### **Classification according to Directive 67/548/EEC**

Harmful: danger of serious damage to health by prolonged exposure through inhalation.

R10: Flammable; Xn: Harmful.; Xi: Irritant.; N: Dangerous for the environment; R10; R38; R65; R51/53

### 2.2 Label elements

Warning:

H228: Flammable Solid

H373: May cause damage to organs through prolonged or repeated exposure if inhaled

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CLP Hazard Statements:

PHYSICAL HAZARDS:

H226: Flammable liquid and vapor

HEALTH HAZARDS:

H315: Causes skin irritation

H304: May be fatal if swallowed and enters airways

H336: May cause drowsiness or dizziness

ENVIRONMENTAL HAZARDS:

H411: Toxic to aquatic life with long lasting effects

CLP Precautionary statements:

Prevention: P102: Keep out of reach of children.

P210: Keep away from heat/sparks/open flames/hot surfaces - No smoking

P280: Wear protective gloves/protective clothing/eye protection/face protection

Response: P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician

P331: Do NOT induce vomiting

Disposal: P501: Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations

## 2.3 Other hazards

**2.3.1** Silicon carbide (SiC) whiskers/microfibers are a fibrous form of single-crystal silicon carbide having an aspect ratio of 3:1 or greater. SiC whiskers/microfibers are non-toxic by ingestion, have no extractables, and are even approved for food contact in some situations.

Raw, dry SiC whiskers/microfibers may become airborne during handling and become respirable in some conditions. When dispersed in water, solvent, polymer, or other carrier material (when wetted), SiC whiskers/microfibers are non-respirable and non-hazardous. When SiC whiskers/microfibers are incorporated into a matrix material or composite system (for example a polymer coating), they are non-respirable and non-hazardous. Under such conditions, there is no evidence to suggest that SiC whisker or microfiber ever become respirable, even when these matrix material or composite systems are subjected to mechanical wear.

SiC whiskers/microfibers are not a hazardous substance according to Regulation (EC) No. 1272/2008. Most agencies list SiC whiskers/microfibers as non-hazardous even in dry powder form. However, some agencies list SiC whiskers/microfibers as potential carcinogens, based on limited experimental animal data that suggests a carcinogenic effect. Any potential carcinogenicity of SiC whiskers/microfibers is limited to chronic overexposure of dry, respirable dust. No data exists for humans.

Haydale Technologies Inc. recommends handling this substance with appropriate caution according to the recommendations of this safety data sheet to ensure workplace safety.

OSHA: non-hazardous.

ECHA: non-hazardous.

NTP: non-hazardous.

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IARC: class 2B, "possibly carcinogenic to humans" of dry respirable dust, although no data exists for humans. This classification is for the entire family of refractory ceramic fibers, which includes silicon carbide whiskers/microfibers.

ACGIH®: class A2, "suspected human carcinogen" for dry respirable dust, although no data exists for humans. Recommended exposure limits is 0.1 fibers/cc 8-hour time weighted average (TWA) for fibers greater than 5µm in length with an aspect ratio greater than or equal to 3:1 as determined by the membrane filter method at 400 to 450 times magnification (4-mm objective) using phase-contrast illumination.

**2.3.2** Carbon: Hazards not otherwise classified (HNOC) or not covered by GHS - Combustible dust

**2.3.3** Quartz (Silica): Hazards not otherwise classified (HNOC) or not covered by GHS – none

**2.3.4** Kerosene: Hazards not otherwise classified (HNOC) or not covered by GHS – none

### **SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS**

#### **3.1 Substances**

Definition according to EC directive: Silicon Carbide Whiskers (Microfibers) 10-25%

CAS No.: 409-21-2 (silicon carbide)  
EINECS No.: 206-991-8 (silicon carbide)

Carbon 17-25%  
CAS No.: 7440-44-0  
EINECS No.: 231-153-3

Quartz (Silica) 2-4%  
CAS No.: 14808-60-7  
EINECS No.: 238-878-4

Kerosene 1-5%  
CAS No.: 8008-20-6  
EINECS No.: 232-366-4

Water 40-50%  
CAS No.: 7732-18-5  
EINECS No.: 231-791-2

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## **SECTION 4: FIRST AID MEASURES**

### **4.1 Description of first aid measures**

Inhalation:	If dust is inhaled, and if symptoms of pulmonary involvement develop (coughing, wheezing, or shortness of breath), remove immediately from the exposure area to fresh air. If symptoms persist, seek medical attention.
Skin contact:	Not expected to present a significant skin hazard under anticipated conditions of normal use, but, if irritation or rash occurs, seek medical attention for symptomatic treatment. Wash off with soap and water.
Eye contact:	In case of eye irritation due to contact with material, immediately rinse with copious quantities of clean water, occasionally lifting upper and lower eyelids, until no evidence of material remains (approximately 15-20 minutes). If symptoms persist, such as pain, blinking, tears, or redness, seek medical attention.
Ingestion:	Not expected to present a significant ingestion hazard under anticipated conditions of normal use. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

### **4.2 Most important symptoms and effects, both acute and delayed**

The most important known symptoms and effects are described in SECTIONS 2.2-Label Elements/2.3 – Other Hazards and also in SECTION 11 – TOXICOLOGICAL INFORMATION.

### **4.3 Indication of any immediate medical attention and special treatment needed**

No data available.

## **SECTION 5: FIREFIGHTING MEASURES**

### **5.1 Extinguishing media**

Water spray or water fog.

### **5.2 Special hazards arising from the substance or mixture**

None known.

### **5.3 Advice for firefighters**

Wear pressure-demand, self-contained breathing apparatus and full firefighting protective clothing for firefighting if necessary. When mixed with air and exposed to an ignition source, sufficient flammable dust may exist to burn in the open or explode if confined. Use good housekeeping practices to avoid rendering dust airborne. Heat from fire can also ignite product. May not be obvious that product is burning unless material is stirred and sparks are apparent. Do not enter area without proper protection. Fight fire from safe, protected location. Apply extinguishing media carefully to prevent frothing/steam explosion. Use water spray or fog for cooling. Avoid creating dust. Notify authorities if liquid enters sewers or public waters.

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## **SECTION 6: ACCIDENTAL RELEASE MEASURES**

### **6.1 Personal precautions, protective equipment and emergency procedures**

Wear personal protective equipment if warranted, to prevent breathing of respirable dust. It is recommended to work in an engineered closed system where respirable dust may be exhausted. If it is not easy or possible to work in an engineered closed system, a suitable respirator should be worn. Remove all sources of ignition.

For more information, see SECTION 8.2 – Exposure controls.

### **6.2 Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

### **6.3 Methods and material for containment and cleaning up**

Wet down spillage, pick-up mechanically, and dispose of according to national, regional, and local regulations.

### **6.4 Reference to other sections**

For personal protection see SECTION 8. For disposal see SECTION 13.

## **SECTION 7: HANDLING AND STORAGE**

### **7.1 Precautions for safe handling**

Avoid dust formation. Use an engineered closed system if possible during handling, and appropriate respiratory protection. Keep away from sources of ignition - No smoking. Take measures to prevent the build-up of electrostatic charge. Store in a sealed container.

### **7.2 Conditions for safe storage, including any incompatibilities**

Store in tightly sealed containers in a clean, secure area. Identify the contents of all containers. No known incompatibilities.

### **7.3 Specific end use(s)**

Apart from the uses mentioned in SECTION 1.2, no other specific uses are stipulated.

## **SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION**

### **8.1 Control parameters**

Silicon Carbide Whiskers (microfibers)

OSHA: non-hazardous.

ECHA: non-hazardous.

NTP: non-hazardous.

IARC: class 2B, “possibly carcinogenic to humans” of dry respirable dust, although no data exists for humans. This classification is for the entire family of refractory ceramic fibers, which includes silicon carbide whiskers/microfibers.

ACGIH®: class A2, “suspected human carcinogen” for dry respirable dust, although no data exists for humans. Recommended exposure limits is 0.1 fibers/cc 8-hour time weighted average (TWA) for

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fibers greater than 5µm in length with an aspect ratio greater than or equal to 3:1 as determined by the membrane filter method at 400 to 450 times magnification (4-mm objective) using phase-contrast illumination.

Carbon

OSHA PEL: 15mg/m<sup>3</sup> total, 5mg/m<sup>3</sup> respirable

ACGIH®TLV®: 10mg/m<sup>3</sup> total, 3mg/m<sup>3</sup> respirable

Quartz (Silica)

OSHA PEL: 10mg/m<sup>3</sup> ÷ (%SiO<sub>2</sub>+2)

ACGIH®TLV®: 0.1mg/m<sup>3</sup> total, .05mg/m<sup>3</sup> respirable

Kerosene: N/P

Water: N/P

## 8.2 Exposure controls

General protection and hygiene measures:

Observe general industrial hygiene practice.

Respiratory protection:

Use an engineered closed system if possible during handling. If it is not easy or possible to work in an engineered closed system, a suitable respirator should be worn, to prevent breathing of respirable dust. A respirator with category N95 filters should be used.

Hand protection:

Not normally considered a skin hazard. Where use can result in skin contact, practice good personal hygiene, and wash hands and other exposed areas with mild soap and water before eating, drinking, smoking, using toilet facilities, or leaving work.

Eye/face protection:

Use protective goggles to prevent contact with eyes. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Environmental exposure controls:

No data available.

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

(a) Appearance:	Whisker/microfiber/particle/carbon powder. Variable color, typically gray-green/black.
(b) Odor:	Not applicable.
(c) Odor threshold:	Not applicable.
(d) pH:	Not applicable.
(e) Melting point / freezing point:	Decomposes above 2500°C.
(f) Initial boiling point and boiling range:	Not applicable.
(g) Flash point:	>225°F (closed cup).
(h) Evaporation rate:	(Butyl Acetate = 1): Not applicable.
(i) Flammability (solid, gas):	Flammable.
(j) Upper/lower flammability or explosive limits:	Lower (LEL): Not applicable. Upper(UEL): Not applicable.
(k) Vapor pressure:	(mm Hg): Not applicable.
(l) Vapor density:	(Air = 1): Not applicable.
(m) Relative density:	Not applicable.
(n) Water solubility:	Insoluble in water.
(o) Partition coefficient: n-octanol/water:	Insoluble in both water and n-octanol.
(p) Auto-ignition temperature:	Not applicable.
(q) Decomposition temperature:	2500°C.
(r) Viscosity:	No data available.
(s) Explosive properties:	Not applicable.
(t) Oxidizing properties:	Not applicable.

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## **SECTION 10: STABILITY AND REACTIVITY**

### **10.1 Reactivity**

No data available.

### **10.2 Chemical stability**

Stable under normal use conditions. Avoid dust creation and excessive heat. Temperatures greater than 700°C may produce carbon monoxide when silicon carbide whiskers are in contact with oxidizing agents.

### **10.3 Possibility of hazardous reactions**

Not applicable.

### **10.4 Conditions to avoid**

Avoid heat, sparks, open flames and other ignition sources.

### **10.5 Incompatible materials**

Strong oxidizing agents.

### **10.6 Hazardous decomposition products**

Carbon monoxide and carbon dioxide.

## **SECTION 11: TOXICOLOGICAL INFORMATION**

### **11.1 Information on toxicological effects**

- |  |   |
|--|---|
| (a) Acute toxicity                     | LD50 for dry silicon carbide powder is > 2.000 mg/kg  |
| (b) Skin corrosion/irritation:         | No data available.  |
| (c) Serious eye damage/irritation:     | No data available.  |
| (d) Respiratory or skin sensitization: | Excessive exposure to respirable silicon carbide whiskers may cause cough, mucus production, shortness of breath, irritation of the breathing passages, and/or may result in lung damage. |
| (e) Germ cell mutagenicity             | No data available.  |
| (f) Carcinogenicity:                   | See SECTION 2.3 – Other hazards.  |
| (g) Reproductive toxicity:             | No data available.  |
| (h) STOT-single exposure:              | No data available.  |
| (i) STOT-repeated exposure:            | No data available.  |
| (j) Aspiration hazard:                 | No data available.  |
| Further toxicological information:     | Silicon carbide is not bioactive and not known to absorb into living tissues. Silicon carbide is not sensitizing and is non-toxic by oral ingestion.                                      |



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## SECTION 12: ECOLOGICAL INFORMATION

### 12.1 Toxicity

No data available.

### 12.2 Persistence and degradability

No data available.

### 12.3 Bio accumulative potential

No data available.

### 12.4 Mobility in soil

No data available.

### 12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

### 12.6 Other adverse effects

No data available.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Product disposal: Spillage or unused materials should be disposed in accordance with national, regional, and local solid waste regulations.

Contaminated packaging: Containers should be tightly sealed to prevent drying and subsequent airborne emissions during transportation and at the disposal site. It is recommended that containers be externally labeled to indicate that container should remain sealed.

## SECTION 14: TRANSPORT INFORMATION

### 14.1 UN Number

ADR/RID: UN Number: 1223

IMDG: UN Number: 1223

IATA UN Number: 1223

### 14.2 UN proper shipping name

ADR/RID: Kerosene

IMDG: Kerosene

IATA Kerosene

### 14.3 Transport hazard class(es)

3

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**14.4 Packing group**

III

**14.5 Environmental hazards**

Yes. Marine Pollutant.

**14.6 Special precautions for user**

No data available.

**SECTION 15: REGULATORY INFORMATION**

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

No data available.

**15.2 Chemical safety assessment**

For this product a chemical safety assessment was not carried out.

**SECTION 16: OTHER INFORMATION**

This information covers the safety requirements of the product(s) exclusively and is based on current knowledge and experience. This safety information should be used for information purposes only, and does not represent a guarantee for properties of the described product(s) in terms of any legal warranty. Haydale Technologies Inc. shall not be held liable for any damage resulting from handling or from contact with the above product.