Material Safety Data Sheet

Material Name: Kyanite

* * * Section 1 - Chemical Product and Company Identification * * *

Chemical Name: Mixture - Primarily aluminum silicates

Manufacturer Information

Kyanite Mining Corporation
30 Willis Mountain Plant Lane
Dilwyn, VA 23936

Phone: 434-983-4322

* * * Section 2 - Hazards Identification * * *

Emergency Overview

Chronic (long-term) health hazard. This product contains crystalline silica. Repeated inhalation of dusts containing crystalline silica over time can cause lung disease and cancer. Avoid dust creation. Do not inhale dusts from this product. Use a vacuum or wet clean-up methods to remove dusts.

Potential Health Effects: Eyes

Chemical irritation is not expected. Dusts and particles may scratch the eyes.

Potential Health Effects: Skin

Irritation is not expected.

Potential Health Effects: Ingestion

Not considered a likely route of exposure under normal product use conditions. May cause gastrointestinal irritation if swallowed. Product is relatively non-toxic.

Potential Health Effects: Inhalation

Inhalation of high dust concentrations may cause coughing and mild irritation. Repeated inhalation of dusts containing crystalline silica over time can cause progressive fibrotic lung disease (silicosis) and increase the risks of developing respiratory cancer. Lung damage may progress even if the worker is removed from exposure. Silicosis can result in death from cardiac failure or the destruction of lung tissue. The extent and severity of lung damage depends on a variety of factors including particle size, percentage of silica, natural resistance, dust concentration, and length of exposure. Aluminum silicates may also cause milder lung effects.

Medical Conditions Aggravated by Exposure

Inhalation of dusts may aggravate pre-existing respiratory conditions. People that develop silicosis are more likely to develop tuberculosis. Smoking and exposure to crystalline silica increases the risks of lung damage. Chronic obstructive pulmonary disease and autoimmune related diseases have been linked to crystalline silica exposure.

HMIS Ratings: Health: 0 **Fire:** 0 **HMIS Reactivity** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
1302-76-7	Kyanite	85-95
14808-60-7	Quartz	5-10
13463-67-7	Titanium dioxide	1-5
14464-46-1	Silica, cristobalite	<0.1

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

Dusts and particles may case physical abrasion. Do not rub eyes. Rinse eyes with lukewarm water for at least 15 minutes. Open and close the eyelids during rinsing to remove all dusts and particles. If irritation persists, seek medical attention.

First Aid: Skin

None required.

First Aid: Ingestion

None required for small amounts. If substantial quantities are ingested, give 4-8 ounces of water or milk to dilute and seek medical advice.

First Aid: Inhalation

Immediate effects are not expected. If high concentrations of dust are inhaled, remove to fresh air. If breathing problems occur, a certified professional should administer oxygen or artificial respiration as indicated and obtain immediate medical attention.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Product is not flammable or combustible. It will not burn readily.

Hazardous Combustion Products

None

Extinguishing Media

Any. Use media appropriate for surrounding fire.

Fire Fighting Equipment/Instructions

Firefighters should wear a NIOSH approved full-facepiece self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout or bunker gear.

NFPA Ratings: Health: 0 **Fire:** 0 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

* * * Section 6 - Accidental Release Measures * * *

Personal Precautions

Do not walk through or scatter spilled material.

Containment Procedures

Avoid dust generation.

Clean-Up Procedures

Use wet clean-up methods (wiping, mopping, etc.) or a vacuum to remove small amounts. The vacuum must be equipped with a filtration system sufficient to remove and prevent the recirculation of crystalline silica (a vacuum equipped with a high-efficiency particulate air filter (HEPA) filter is recommended). For large spills, use a fine water spray or mist to control dust creation and carefully scoop or shovel into a clean, dry container for later reuse or disposal. Completely remove all dusts to prevent recirculation of crystalline silica into the workplace. DO NOT USE DRY SWEEPING OR COMPRESSED AIR TO CLEAN SPILLS. Clean-up personnel must wear appropriate protective equipment including respiratory protection (See Section 8).

Evacuation Procedures

Isolate area of spill and deny entry to unauthorized and/or unprotected personnel.

Special Procedures

Avoid inhalation of dust from the spilled material.

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Plant processes should be designed to control airborne dusts at or below acceptable exposure guidelines. DO NOT use compressed air or dry sweeping to remove dust from work area. Dusts should be removed using vacuum or wet clean-up methods (wet towels, use of mists, etc.).

Under dusty conditions, employees should wear coveralls or other suitable work clothing. Contaminated clothing must be vacuumed before removal and respiratory protection should be the last article of clothing removed. DO NOT REMOVE dusts from clothing by blowing or shaking. Practice good housekeeping. Wash thoroughly after handling. Launder contaminated clothing before re-wearing. Do not take contaminated clothing home.

Storage Procedures

Store in a dry area in closed containers. Storage and work areas should be periodically cleaned to minimize dust accumulation. Comply with OSHA Hazard Communication Rule 29 CFR 1910.1200, and applicable federal, country, state, provincial, or local laws and regulations during storage, use, and disposal of this product. For further information, consult the current American Society for Testing and Materials (ASTM) standard practice, "Standard Practice for Health Requirements Relating to Occupational Exposure to Crystalline Silica".

* * * Section 8 - Exposure Controls / Personal Protection * * *

A: Component Exposure Limits

Quartz (14808-60-7)

ACGIH: 0.025 mg/m3 TWA (respirable fraction)
OSHA: 0.1 mg/m3 TWA (respirable dust)
NIOSH: 0.05 mg/m3 TWA (respirable dust)

Titanium dioxide (13463-67-7)

ACGIH: 10 mg/m3 TWA
OSHA: 10 mg/m3 TWA (total dust)

Silica, cristobalite (14464-46-1)

ACGIH: 0.025 mg/m3 TWA (respirable fraction)
OSHA: 0.05 mg/m3 TWA (respirable dust)
NIOSH: 0.05 mg/m3 TWA (respirable dust)

Engineering Controls

Use local exhaust and general ventilation as necessary to control air contaminants at or below acceptable exposure guidelines. Collection systems must be designed and maintained to prevent the accumulation and recirculation of respirable silica into the workplace. Additional controls to limit exposure to crystalline silica may include but are not limited to: wet processes, installation of dust collection systems, dust control additives, enclosed work processes, and automated processes.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Safety glasses with side shields or goggles to prevent dust and particles from entering the eyes.

Personal Protective Equipment: Skin

Protective gloves are recommended.

Personal Protective Equipment: Respiratory

Under normal working conditions, at or below acceptable exposure guidelines, none is required. Appropriate respirator selection is dependent upon the magnitude of exposure. Wear NIOSH approved respiratory protection in accordance with 29 CFR Part 134. A medical surveillance program should be implemented in accordance with NIOSH recommendations and other applicable federal, state, local or provincial requirements.

Personal Protective Equipment: General

Where there is a potential exposure to crystalline silica, the following warnings should be readily visible and posted near entrances and accessways to work areas: WARNING! FREE SILICA WORK AREA. Unauthorized persons keep out. The following warning should be posed within the work area where potential exposure may occur: WARNING! FREE SILICA WORK AREA. Avoid breathing dust. May cause delayed lung injury (silicosis). (NIOSH Criteria Document, Occupational Exposure to Crystalline silica, pg. 5, 1974)

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Vitreous to pearly - gray in color	**Odor:**	Odorless
Physical State:	Solid mineral	**pH:**	NA
Vapor Pressure:	NA	**Vapor Density:**	NA
Boiling Point:	NA	**Melting Point:**	P.C.E. 36-37
Solubility (H2O):	Insoluble	**Specific Gravity:**	3.2-3.7
Evaporation Rate:	NA	**VOC:**	NA
Octanol/H2O Coeff.:	ND	**Flash Point:**	NA
Flash Point Method:	NA	**Upper Flammability Limit (UFL):**	NA
Lower Flammability Limit (LFL):	NA	**Burning Rate:**	NA
Auto Ignition:	NA		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

Stable

Chemical Stability: Conditions to Avoid

None

Incompatibility

Silica is incompatible with strong oxidizers.

Hazardous Decomposition

Quartz may convert to cristobalite at high temperature (> 1470 ºC). Kyanite will decompose to form mullite and cristobalite at high temperatures (~ 1450 ºC). This conversion is associated with a large irreversible volume change.

Possibility of Hazardous Reactions

Will not occur.

* * * Section 11 - Toxicological Information * * *

Acute Dose Effects

A: General Product Information

The short-term or immediate effects of dust inhalation are expected to be coughing and mild respiratory irritation. Scratching or physical damage to the eyes can cause irritation, pain, redness, tears, blurred vision, and light sensitivity. There may be no symptoms during the early stages of chronic silicosis. As the disease progresses, the symptoms include tiredness, shortness of breath, severe cough, and characteristic x-rays. Shortness of breath upon exertion is one of the most common symptoms and limited chest expansion is the most common physical sign.

B: Component Analysis - LD50/LC50

Quartz (14808-60-7)

Oral LD50 Rat: 500 mg/kg

Titanium dioxide (13463-67-7)

Oral LD50 Rat: >10000 mg/kg

Repeated Dose Effects

Silicosis is a progressive fibrotic pneumoconiosis that greatly decreases the ability of the lungs to provide oxygen (decreased pulmonary capacity). Three types of silicosis have been identified. Acute silicosis can occur several weeks or months following exposure to very high levels of crystalline silica and can result in death in months or within several years. Accelerated silicosis can occur 5-10 years after exposure to higher levels of crystalline silica. Chronic silicosis is the most common type and usually occurs after 10 or more years of exposure to low levels of crystalline silica.

Similar aluminum silicate minerals such as kaolin have been found to cause lung fibrosis in the absence of crystalline silica. The disease is not as severe as silicosis but can cause respiratory symptoms and changes. Crystalline silica exposure appears to enhance the severity of the disease.

Animal studies indicate that cristobalite has a greater potential to produce fibrosis than quartz. Cristobalite produces a more severe response than quartz and fibrosis elicited is diffuse rather than nodular.

Other: Silica particles less than 10 µm are considered respirable; however, particles retained in the lungs are generally much smaller. A median diameter of particles retained in the lungs has been cited as 0.5-0.7 µm.

Carcinogenicity

A: General Product Information

No carcinogenicity data available for this product.

B: Component Carcinogenicity

Quartz (14808-60-7)

ACGIH: A2 - Suspected Human Carcinogen
NIOSH: potential occupational carcinogen
NTP: Known Human Carcinogen (Select Carcinogen)
IARC: Monograph 68 [1997] (listed under Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources) (Group 1 (carcinogenic to humans))

Titanium dioxide (13463-67-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NIOSH: potential occupational carcinogen
IARC: Monograph 93 posted, Monograph 47 [1989] (Group 2B (possibly carcinogenic to humans))

Silica, cristobalite (14464-46-1)

ACGIH: A2 - Suspected Human Carcinogen
NIOSH: potential occupational carcinogen
IARC: Monograph 68 [1997] (listed under Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources) (Group 1 (carcinogenic to humans))

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

This product is an ecologically inert material. It does not contain ozone depleting substances and is not expected to exert an ecotoxic effect or bioconcentrate in the food chain.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

No ecotoxicity data are available for this product's components.

* * * Section 13 - Disposal Considerations * * *

US EPA Waste Number & Descriptions

Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions

Dispose of according to applicable federal, state, provincial, and local regulations.
See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

* * * Section 14 - Transportation Information * * *

International Transportation Regulations

Not Regulated

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

SARA Hazard Category: This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and by definition meets the requirements of the following category: Chronic Health Hazard

Component Analysis

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

State Regulations

None

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Quartz	14808-60-7	No	Yes	Yes	Yes	Yes	Yes

Titanium dioxide	13463-67-7	No	Yes	Yes	Yes	Yes	Yes
Silica, cristobalite	14464-46-1	No	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Canadian WHMIS Information

A: General Product Information

WHMIS Classification: D2A

B: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Quartz	14808-60-7	1 %

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Kyanite	1302-76-7	No	DSL	EINECS
Quartz	14808-60-7	Yes	DSL	EINECS
Titanium dioxide	13463-67-7	Yes	DSL	EINECS
Silica, cristobalite	14464-46-1	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

Other Information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied is made with respect to the information contained herein. This information is solely for your consideration and interpretation.

Key/Legend

ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service
(C): Ceiling Limit
DOT: Department of Transportation
IARC: International Agency for Research on Cancer
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
SARA: Superfund Amendment and Reauthorization Act
TLV: Threshold Limit Value