

SAFETY DATA SHEET

SECTION 1: PRODUCT IDENTIFICATION

Chemical Name or Synonyms: Crystalline Silica (Quartz), Silica Sand

Product Name/Trade Name: Flint Silica, #530 Silica, #505 Silica, #730 Silica, #4751 Silica, GS16 Silica, GS18 Silica, GS20 Silica, GS22 Silica, #612B Silica, #612S Silica, #1240S Silica, #12ST Silica, #420 Silica, #480 Silica, #3070 Silica, #2 Silica, #3 Silica, M13 Silica, #16/35 Silica, #620 Silica, #650 Silica, #12/20 Silica, #20 Silica, #25 Silica, Sil-Co-Sil Flour(s), ¼ x 1/8 Silica Gravel, and all other Silica or Lake Sands as so designated.

Recommended Use: brick, ceramics, foundry castings, sandblasting, mixes, non-slip, glass, grout, hydraulic fracturing sand, filtration, frac sand, proppant, mortar, paint and coatings, silicate chemistry, silicone rubber, thermoset plastics.

Restrictions on Use: It is not intended for nor recommended for Sandblasting.

Supplier Identifier: Bell & Mackenzie Co. Ltd., 500 Sherman Ave., N., P.O. Box 844 LCD #1, Hamilton Ontario L8N 3N9 Telephone #905-527-6000 or 1-888-794-5665

Emergency Telephone Number: See above

SECTION 2: HAZARD(S) IDENTIFICATION

Hazard Overview:

Product is a chemically inert, non-combustible mineral. A single exposure will likely not result in serious adverse effects. Long term exposure can cause silicosis. Silicosis is a respiratory disease, which can result in delayed, disabling and sometimes fatal lung injury. IARC and NTP have determined that respirable crystalline silica inhaled from occupational sources can cause cancer in humans. Risk of injury is dependent on the duration and level of exposure.

GHS Classification:

Physical: Not Classified

Health: Category 1A Carcinogen

Category 1 Specific Target Organ

Systemic Toxicity (Repeated Exposure)



Environmental: Not Classified

Signal Word: Danger

Hazard Statements:

H372: Causes damage to lungs and/or kidneys through prolonged or repeated exposure by inhalation.
H350: May cause lung cancer

Precautionary Statements:

P260: Do not breathe dust.
P314: Get medical advice/attention if you feel unwell.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Concentration	Other Identifiers
Crystalline Silica	14808-60-7	> 90	Alfa Quartz

SECTION 4: FIRST AID MEASURES

Inhalation: First aid is not generally required. The adverse health effects associated with inhalation of respirable crystalline silica result from chronic exposure. If there is a gross inhalation of product, remove the person immediately to fresh air. Get medical attention if person(s) feel unwell.

Skin Contact: Dermal contact with this product should not affect the skin. Wash exposed skin with soap and water.

Eye Contact: Immediately flush eyes thoroughly with plenty of water or an ophthalmic saline solution liftin the lids. Do not rub eyes. If irritation persists, seek medical attention.

Ingestion: Rinse mouth with water. If large amounts of product are swallowed, get immediate medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Particulates may cause abrasive eye injury. Inhalation of dust may cause respiratory tract irritation. Symptoms of exposure may include cough, sore throat, nasal congestion, sneezing, wheezing and shortness of breath. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer.

Immediate Medical Attention and Special Treatment: Not Required

SECTION 5: FIRE FIGHTING MEASURES

Extinguishing Media: Product is not flammable or combustible. It is compatible with all extinguishing media. Use any media that is appropriate for the surrounding fire.

Unsuitable Extinguishing Media: None known.

Special Hazards Arising from the Product: Product is not flammable, combustible or explosive.

Special Protective Equipment and Precautions for Fire-Fighters: None required.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Wear appropriate clothing and respiratory protection (see Section 8). Avoid generating airborne dust during clean-up.

Environmental Precautions: No specific precautions.

Methods for Containment and Cleaning Up: Avoid generating dust. If material is uncontaminated, collect using dustless method (HEPA vacuum) and place in appropriate container for use. Do not use compressed air to clean spilled sand or ground silica. If contaminated use appropriate method for the nature of contamination and consider possible toxic or fire hazards that may be associated with the contaminated substances. Collect material in appropriate containers for recovery and recycling or disposal (see Section 12).

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling: Avoid generating dust. Do not breathe dust. *Use of this product may generate elevated airborne levels of crystalline silica dust not visible to the naked eye.* Use normal precautions to avoid bag breakage or bulk material spills. Use proper work practices and adequate exhaust ventilation and dust collection to maintain levels of crystalline silica to below the OSHA Permissible Exposure Limit (PEL). Maintain and test ventilation and dust collection equipment. Use available work practices to control dust exposures, such as water sprays. If airborne levels of crystalline silica exceed the PEL, wear respiratory protection and protective clothing when handling this product. Do not alter the respirator. Do not wear a tight-fitting respirator with facial hair, such as a beard or mustache that prevents a good seal between the respirator and face. Maintain, clean and fit test respirators in accordance with applicable standards. Refer to Section 8 for additional information on personal protective equipment. Also see American Society for Testing and Materials (ASTM) Standard Practice E1132-99a, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica."

Conditions for Safe Storage: Use dust collection to trap dust produced during loading and unloading. Keep containers closed and store bags to avoid accidental tearing, breaking or bursting.

The OSHA Hazard Communication Standard 29 CFR §1910.1200 and state and local worker or community "Right to Know" laws and regulations should be strictly followed, which includes training employees on the content of this SDS. *Warn your employees (and your customer users in case of resale) by posting and other means of the potential health risks associated with use of this product and train them in the appropriate personal protective equipment, work practices, and engineering controls, which will reduce their risk of exposure.*

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters:

Chemical Name: Crystalline Silica (quartz, cristobalite and tridymite)

OSHA PEL: 0.05 mg/m³ TWA (respirable dust)

ACGIH (TLV): 0.025 mg/m³ TWA (respirable dust)

NIOSH REL: 0.05 mg/m³ TWA (respirable dust)

OSHA Permissible Exposure Limits (PEL) and ACGIH Threshold Limit Values (TLV) are an 8-hour time-weighted average.

(TWA) concentration during a 40-hour work week. NIOSH Recommended Exposure Limited (REL) is a time-weighted concentration for up to a 10-hour work day during a 40-hour work week.

Appropriate Engineering Controls: Use adequate general or local exhaust ventilation to maintain concentrations in the workplace below the applicable exposure limits listed above.

Individual Protection Measures

Eye/Face Protection: Wear appropriate protective safety glasses with side shields or safety goggles.

Skin Protection: Maintain good personal hygiene practices that include washing exposed skin with soap and water and laundering work clothing that becomes dusty. Protection is recommended for those who suffer from dermatitis or sensitive skin.

Respiratory Protection: If it is not possible to control exposures to respirable crystalline silica below the OSHA PEL (or other exposure limit), use the following table to help in selecting respiratory protection. This table is part of NIOSH Respirator Selection Logic (2004). The assigned protection factor (APF) is the minimum expected level of respiratory protection provided by a properly functioning respirator. Respiratory protection for respirable crystalline silica is based on the airborne exposure concentration and duration of exposure for the particular use of the respirator. The protection offered by a given respirator must be in accordance with OSHA Standard 29 CFR §1910.134 and implemented whenever the workplace conditions warrant the use of a respirator. ANSI Standard Z88.2 (recent revision) "American National Standard for Respiratory Protection" should also be considered. All tight fitting respirators must be fit-tested either qualitatively or quantitatively for each respirator user. Use only NIOSH certified respirators.

Assigned Protection Factor	Type of Respirator (NIOSH Certified Respirator)
10	Any air-purifying elastomeric half-mask respirator equipped with appropriate type of particulate filter. ¹ Appropriate filtering facepiece respirator. ^{1,2} Any air-purifying full facepiece respirator equipped with appropriate type of particulate filter. ¹ Any negative pressure (demand) supplied-air respirator equipped with a half-mask.
25	Any powered air-purifying respirator equipped with a hood or helmet and a high efficiency (HEPA) filter. Any continuous flow supplied-air respirator equipped with a hood or helmet.
50	Any air-purifying full facepiece respirator equipped with N-100, R-100 or P-100 filter(s). Any powered air-purifying respirator equipped with a tight-fitting facepiece (half or full facepiece) and a HEPA filter. Any negative pressure (demand) supplied-air respirator equipped with a full face piece. Any continuous flow supplied-air respirator equipped with a tight-fitting facepiece (half or full facepiece). Any negative pressure (demand) self-contained respirator equipped with a full face piece.
1000	Any pressure-demand supplied-air respirator equipped with a full facepiece.
¹ Appropriate means that the filter medium will provide protection against the particulate in question. ² APF of 10 can only be achieved if the respirator is qualitatively or quantitatively fit tested on individual workers.	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White or tan sand; granular, crushed or ground to a powder.

Odor: None

Odor Threshold: Not Determined

pH: 6-8

Melting Point and Freezing: 1610°C / 2930°F

Initial Boiling Point/Range: 2230°C / 4046°F
Flash Point: Not Applicable
Evaporation Rate: None
Flammability (solid, gas): Not Applicable
Upper and Lower Flammability or Explosive Limit: Not Applicable
Specific Gravity (water = 1): 2.65
Solubility in Water: Insoluble
Vapor Density: Not Applicable
Vapor Pressure (air =1): Not Applicable
Partition Coefficient: n-octanol/water: Not Applicable
Auto Ignition Temperature: Will not burn
Decomposition Temperature: Not Determined
Viscosity: Not Applicable

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Not Reactive under normal conditions of use.
Chemical Stability: Stable under normal handling and storage conditions.
Possibility of Hazardous Reactions: Powerful oxidizing agents such as fluorine, chlorine trifluoride and oxygen difluoride may cause fires.
Conditions to Avoid: Avoid generation of dust in handling and use.
Incompatible Materials: Strong oxidizing agents such as fluorine, chlorine trifluoride, oxygen difluoride, and manganese trioxide may cause fire.
Hazardous Decompression Products: Silica will dissolve in hydrofluoric acid producing a corrosive gas, silicon tetrafluoride.

SECTION 11: TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Skin Contact, Eye Contact, Ingestion

Acute Toxicity:

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Crystalline Silica (Quartz)	>10,000 mg/L/72 hr (carp)	,500 mg/kg (rat)	Not available

Notes: Inhalation of respirable silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring.

Skin Corrosion/Irritation: No adverse effects are expected.

Serious Eye Damage/Irritation: Particulates may cause abrasive injury.

STOT (Specific Target Organ Toxicity) Single Exposure: See Below

STOT (Specific Target Organ Toxicity) Repeated Exposure: See Below

Aspiration Hazard: See Below

Respiratory and/or Skin Sensitization:

Inhalation: Inhalation of dust may cause respiratory tract irritation. Symptoms of exposure may include cough, sore throat, nasal congestion, sneezing, wheezing and shortness of breath. However, there may be no immediate signs or symptoms of exposure to hazardous concentrations of respirable crystalline silica (quartz). See "Inhalation" subsection above for symptoms of silicosis. The absence of symptoms is not necessarily indicative of safe conditions.

Ingestion: Ingestion is an unlikely route of exposure. If dust is swallowed, it may irritate the mouth and throat.

Medical Conditions Aggravated by Exposure: Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to respirable silica dust.

Inhalation of respirable silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of silica dust may have the following serious chronic health effects:

Carcinogenicity

Silicosis: The major concern is silicosis which is caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.

Chronic or Ordinary Silicosis (can be referred to as Simple Silicosis) is the most common form of silicosis and can occur after many years of prolonged repeated exposure to relatively low concentrations of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis. Lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter characterize simple silicosis, primarily in the upper lung zones. Often Simple silicosis is not associated with symptoms, detectable changes in lung function or disability. Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pulmonale).

Accelerated Silicosis can occur with prolonged repeated inhalation of high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of the initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except the lung lesions appear earlier and the progression is more rapid.

Acute Silicosis can occur after the repeated inhalation of very high concentrations of respirable crystalline silica over a short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis can be fatal.

Cancer:

IARC: The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupation sources", and there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans (Group 1)*." The IARC evaluation noted "carcinogenicity was not detected in all industrial circumstances studies.

Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs". For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 100C, "A Review of Human Carcinogens: Arsenic, Metals, Fibres and Dusts" (2011).

NTP: The National Toxicology Program (NTP), in its Ninth Annual Report on Carcinogens, classified "silica, crystalline(respirable)" as a known human carcinogen.

OSHA: Crystalline silica (quartz) is not regulated by the Occupational Safety and Health Administration (OSHA) as a human carcinogen.

There have been many articles published on the carcinogenicity of crystalline silica, which the reader should consult for additional information.

Autoimmune Diseases:

There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis is associated with the increased incidence of several autoimmune disorders—scleroderma, systemic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys.

Tuberculosis:

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to tuberculosis bacteria. Individuals with chronic silicosis have a three-fold higher risk of contracting tuberculosis than similar individuals without silicosis.

Kidney Disease:

There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis is associated with the increased incidence of kidney diseases, including end stage renal disease. For additional information of the subject, the following may be consulted: "*Kidney Disease and Silicosis*", *Nephron*, Vol. 85: 14-19 (2000)

Non-Malignant Respiratory Diseases:

The reader is referred to Section 3.5 of the NIOSH Special Hazard Review cited below for information concerning the association between exposure to crystalline silica and chronic bronchitis, emphysema and small airways disease. There are studies that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

Source of Information: The NIOSH *Hazard Review – Occupational Exposure to Respirable Crystalline Silica* published in April 2002 summarizes and discusses the medical and epidemiological literature on the health risks and diseases associated with occupational exposures to respirable crystalline silica. The *NIOSH Hazard Review* is available through the NIOSH website, www.cdc.gov/niosh/topics/silica, then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica."

The Occupational Safety and Health Administration (OSHA) published a summary of respirable crystalline silica health effects in connection with OSHA's Proposed Rule regarding occupational exposure to respirable crystalline silica. The summary was published in the September 12, 2013 Federal Register, which can be found at www.federalregister.gov/articles/2013/10/12/2013-20997/occupational-exposure-to-respirable-crystalline-silica.

Numeric Acute Toxicity Measure – Crystalline Silica:

Oral, rat: LD50 = >22,500 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity: Crystalline silica (quartz) is not known to be ecotoxic.

Persistence and degradability: Silica is not degradable.

Bioaccumulative potential: Silica is not bioaccumulative.

Mobility in soil: Silica is not mobile in soil

This product is not expected to present an environmental hazard.

SECTION 13: DISPOSAL CONSIDERATIONS

If uncontaminated, dispose as an inert, non-metallic mineral. If contaminated, dispose in accordance with all applicable local, provincial/state and federal regulations in light of the contamination present. Local regulations may be more stringent than regional and national requirements. It is the responsibility of the waste generator to determine the toxicity and physical characteristics of the material to determine the proper waste identification and disposal in compliance with applicable regulations

SECTION 14: TRANSPORT INFORMATION

This product is not regulated for transportation under the U.S. DOT, Canadian TDG, IMDG, or IATA Regulations.

SECTION 15: REGULATORY INFORMATION

Canada:

Domestic Substances List (DSL): Crystalline Silica (quartz) is a naturally occurring substance on the DSL.

WHIMS Classification: Crystalline Silica—Class D, Division 2, Subdivision A (Very Toxic Material causing other Toxic Effects).

United States:

TSCA: Crystalline Silica (CAS #14808-60-7) is listed on the EPA Toxic Substance Control Act (TSCA) Section 8 (b) inventory.

RCRA: Crystalline Silica is not classified as hazardous waste under the Resource Conservation and Recovery Act (RCRA), or its regulations, 40 CFR §261 *et seq.*

CERCLA: Crystalline Silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302

SARA 311/312: Hazard Categories for SARA Section 311/312 Reporting: Crystalline Silica (Acute and Chronic Health Hazard)

SARA 313: Product contains no chemical that are subject to Annual Release Reporting Requirements under SARA Section 313 (40 CFR 372)

Clean Air Act: Product was not processed with or does not contain Class I or II ozone depleting substances.

Clean Water Act: Not listed as a hazardous substance in Section 311.

NTP: Crystalline Silica (quartz) is classified as a Known to be a Human Carcinogen.

OSHA: Crystalline Silica (quartz) is listed under 29 CFR 1910.1000 as a toxic and hazardous substance.

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Crystalline Silica (respirable) is classified as a substance known by the State of California to cause cancer.

California Inhalation Reference Exposure Level (REL): California established a chronic non-cancer effect REL of 3 ug/m³ for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no non-cancer health effects are anticipated in individuals indefinitely exposed to the substance at that level.

Massachusetts Toxic Use Reduction Act: Silica, crystalline (respirable size, <10 microns) is "toxic" for purposes of the Massachusetts Toxic Use Reduction Act.

Pennsylvania Worker and Community Right to Know Act: Quartz is a hazardous substance under the Act but it is not a special hazardous substance or an environmental hazardous substance.

Texas Commission of Environmental Quality: The Texas CEQ has established chronic and acute Reference Values and short term and long term Effects Screening Levels for crystalline silica (quartz). The information can be accessed through www.tceq.texas.gov.

Other:

IARC: Crystalline silica (quartz) is classified in IARC Group 1 Carcinogen

European Inventory of Commercial Chemical Substances: Crystalline silica (quartz) is listed on EINECS Inventory; the EINECS number for quartz: 238-878-4

European Community Labeling:

Harmful Xn

Contains crystalline silica, quartz (238-878-4)

R48/20 Harmful: Danger of serious damage to health by prolonged exposure by inhalation

S22 Do not breathe dust

S38 In case of insufficient ventilation, wear suitable respiratory protection

Notes:

Provincial, State, National or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable—consult applicable provincial, state, national or local laws.

SECTION 16: OTHER INFORMATION

Hazardous Material Information System (HMIS):

Health *

Flammability 0

Physical Hazard 0

Person Protection E

* Warning – Chronic health effect possible – inhalation of silica dust may cause lung injury/disease (silicosis). Take appropriate measures to avoid breathing dust. See Section 8

National Fire Protection Association (NFPA):

Health 0

Flammability 0

Reactivity 0

OSHA Website: <https://www.osha.gov/dsg/topics/silicacrystalline/index.html>

NIOSH Website: <http://www.cdc.gov/niosh/topics/silica>

NIOSH Hazard Review – Health Effects of Occupational Exposure to Respirable Crystalline Silica
<http://www.cdc.gov/niosh/docs/2002-129/>

IARC Monograph concerning crystalline silica, Volume 100C:
<http://monographs.iarc.fr/ENG/Monographs/PDFs/index.php>

SDS Prepared By: Richard Bell

Phone No: 1-905-527-6000

Date of Preparation: January 18, 2018

User's Responsibility: The OSHA Hazard Communication Standard 29 CFR 1910.1200 require that this Safety Data Sheet be made available to your employees who handle or may be exposed to this product. Educate and train your employees regarding applicable precautions. Instruct your employees to handle this product properly.

Disclaimer: The information and recommendations contained herein are based upon data believed to be up to date and correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for one's own particular use. Since the actual use of the product described herein is beyond our control, we accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure of the product by others. Appropriate warnings and safe handling procedures should be provided to handlers and users. In particular they are under an obligation to carry out a risk assessment for the particular work places and

take adequate risk management measures in accordance with the national implementation legislation of EU Directives 89/391 and 98/24.