



MATERIAL SAFETY DATA SHEET

SECTION 1 – PRODUCT IDENTIFICATION AND COMPANY IDENTIFICATION

Trade Name: Trademarks and product names include Red Flint Sand and Gravel,
Common Name: Silica, Flint, Sand, Silica Sand, Industrial Sand, and Quartz
This product is not to be used for abrasive blasting. This material safety data sheet and the information contained herein were not developed for abrasive blasting.

Manufacturer's Name: Red Flint Sand and Gravel
Manufacturer's Address: 717 Short Street
P.O. Box 688
Eau Claire, WI 54702-0688

Manufacturer's Number: (800) 238-9139 (8:00 am-5:00 pm Central Time Monday-Friday)
Manufacturer's Fax: (715) 835-0662
Emergency Contact: Industrial Sales or Safety Department
(800) 238-9139 (8:00 am-5:00 pm Central Time Monday-Friday)

SECTION 2 – COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredient

Name: Silica Quartz, SiO₂
Case Number: 14808-60-7
Concentration (%): > 89%

Exposure Limits (respirable fraction) in Air:

OSHA & MSHA – PEL	<u>10mg/m³</u> % SiO ₂ + 2	(8-Hour TWA)
ACGIH – TLV	0.05 mg/cubic meter	(8-Hour TWA)
NIOSH	0.05mg/cubic meter	(10-Hour TWA, 40-hour work week)

Exposure Limits refer to the respirable fraction.

PEL means OSHA Permissible Exposure Limit.

TLV means American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value.

MSHA means Mine Safety and Health Administration Exposure Limit.

TWA means 8 hour Time Weighted Average.

CAUTION:

Silica is classified as hazardous under Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910.1200). The Permissible Exposure Limits (PEL) reported above are the pre-1989 limits that were reinstated by OSHA June 30, 1993 following a decision by the 11th Circuit Court of Appeals. There PELs are now being enforced by the Federal OSHA. Be aware that more restrictive exposure limits may be enforced by some states, agencies, or other authorities. Crystalline silica exists in several forms, the most common of which is quartz. If crystalline silica (quartz) is heated to more than 870° C it can change to a form of crystalline silica known as trydimite, and if crystalline silica (quartz) is heated to more than 1470° C, it can change to a form of crystalline silica known as cristobalite. Crystalline silica as trydimite and cristobalite are more fibrogenic than crystalline silica as quartz. The OSHA PEL for crystalline silica as trydimite and cristobalite is one-half the PEL for crystalline silica (quartz); the ACGIH TLV for crystalline silica as trydimite and cristobalite is one-half the TLV for crystalline silica as quartz.

SECTION 3 – HAZARDS IDENTIFICATION

Emergency Overview

Red Flint Sand and Gravel silica sand is a light buff, tan, and gravel-multicolored with no odor. It is not flammable, combustible, or explosive. It can cause irritation to the eyes. A single exposure will not result in serious adverse health effects. Crystalline silica is not known to be an environmental hazard.

Potential Health Effects

Inhalation:

- a. *Silicosis:* Respirable crystalline silica (quartz) can cause chronic silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death. Acute Silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very 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 is fatal.
- b. *Cancer:* Crystalline silica (quartz) inhaled from occupational sources in sufficient concentrations is classified as carcinogenic to humans. In its Ninth Annual Report on Carcinogens, the National Toxicology Program (NTP) listed crystalline silica as a known human carcinogen, based on sufficient evidence of carcinogenicity from studies in humans indicating a casual relationship between exposure to respirable crystalline silica and increased lung cancer rates in workers exposed to crystalline silica and determined that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)."
- c. *Autoimmune Diseases:* There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis may be associated with the increased incidence of several autoimmune disorders, -- scleroderma, systematic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys.
- d. *Tuberculosis:* Silicosis increases the risk of tuberculosis.
- e. *Nephrotoxicity:* 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.

Eye Contact: Crystalline silica (quartz) may cause abrasion of the cornea.

Skin Contact: May cause abrasion to skin.

Ingestion: No known health effect.

Acute Effects: One form of silicosis, Acute Silicosis, can occur with exposures to very high concentrations of respirable crystalline silica over a very 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 is fatal.

Chronic Effects: The adverse health effects -- lung disease, silicosis, cancer, autoimmune disease, tuberculosis, and nephrotoxicity -- are chronic effects.

Signs and Symptoms of Exposure: There are generally no signs or symptoms of exposure to crystalline silica (quartz). Often, chronic silicosis has no symptoms. The symptoms of chronic silicosis, if present, are shortness of breath, wheezing, cough and sputum production. The symptoms of acute silicosis are the same as those associated with chronic silicosis; additionally, weight loss and fever may also occur. The symptoms of scleroderma include thickening and stiffness of the skin, particularly in the fingers, shortness of breath, difficulty swallowing and joint problems.

Medical Conditions Generally Aggravated by Exposure: The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

See Section 11, Toxicological Information, for additional detail on potential adverse health effects.

SECTION 4 – FIRST AID PROCEDURES

Symptoms of Overexposure:

Inhaled – Shortness of breath, coughing, reduced pulmonary function. Prolonged inhalation of respirable silica may result in permanent lung damage, silicosis. No specific first aid is necessary since the adverse health effects associated with exposure to crystalline silica (quartz) result from chronic exposures. If there is a gross inhalation of crystalline silica (quartz), remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

Swallowed – May cause gastrointestinal discomfort. Give one or two glasses of water. If discomfort persists, see a physician.

First Aid – Emergency procedures.

Eye Contact – Wash with water for at least fifteen (15) minutes. If irritation or redness persists see a physician.

Skin Contact – Wash with soap and water. If irritation persists see a physician.

Ingestion – Not applicable.

Suspected Cancer Agent: Yes **Federal OSHA:** No **NTP:** Yes **IARC:** Yes

NTP: Respirable crystalline silica has been listed in the Sixth Annual Report on Carcinogens.

IARC: Monographs on the Evaluation of the Carcinogenic Risk of Chemical to Humans (vol. 68, 1997) concludes that there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the forms of quartz and cristobalite (Group 1) in certain industrial circumstances, but that carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs.

SECTION 5 – FIRE FIGHTING MEASURES

Flashpoint:	None
Upper/Lower Explosive Limit:	Not Combustible
Autoignition Temperature:	None
Unusual Fire and Explosion Habits:	None
Extinguishing Media:	Compatible with all media; use the medium appropriate to the surrounding fire.
Special Fire Fighting Procedures:	None with respect to this product. Fire fighters should always wear self-contained breathing apparatus for fires indoors or in confined areas.
Hazardous Combustion Products:	None

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Wear appropriate personal protective equipment as described in Section 8 of this document. If uncontaminated, collect the material using a method which does not produce dust [High-Efficiency Particulate Air (HEPA) vacuum or thoroughly wetting down the silica]. Place the silica in a covered container appropriate for disposal. If contaminated: a) use appropriate method for the nature of the contamination, b) consider possible toxic or fire hazards associated with the contaminating substances. Dispose of the silica according to federal, state, and local regulations.

SECTION 7 – HANDLING AND STORAGE

This product is **not** to be used for abrasive blasting. Do not breathe dust which may be created during the handling of this product. Do not rely on vision to determine whether respirable silica is present in the air, as it may be present without a visible cloud. Use good housekeeping procedures to prevent the accumulation of silica dust in the workplace. Avoid the creation of respirable dust.

Use adequate ventilation and dust collection equipment. Ensure that the dust collection system is adequate to reduce dust levels to below the appropriate occupational health limit. Maintain and use proper, clean respiratory equipment (see Section 8). Launder clothing that has become dusty. Empty containers (bags, bulk containers, storage tanks, etc.) retain silica residue and must be handled in accordance with the provisions of this Material Safety Data Sheet.

In accordance with the U.S. Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard (29 CFR 1910.1200, 1915.99, 1917.28, 1918.90, 1926.59, 1928.21), state, and/or local right-to-know laws and regulations, familiarize your employees with this MSDS and the information contained herein. Warn your employees (and your customers in case of resale) of the potential health risks associated with the use of this product and train them in the appropriate use of personal protective equipment and engineering controls which will reduce their risks of exposure.

See also American Society for Testing and Materials (ASTM) standard practice E 1132-99a, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica."

*****Warn your employees (and your customers - users in case of resale) by posting and other means of the hazards and OSHA precautions to be used. Provide training for your employees about OSHA precautions.**

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation: Use sufficient local exhaust to reduce the level of respirable crystalline silica to below the PEL. See ACGIH "Industrial Ventilation, A Manual of Recommended Practice" (latest edition).

Gloves: Recommended in situations where abrasion from sand may occur.

Eye: Use safety glasses and protection as appropriate for the task at hand.

Other: Use protective clothing as appropriate for the work environment. Dusty clothing should be laundered before reuse. Make sure to always wash hands after handling the material.

Respiratory Protection: This product is **not** to be used for abrasive blasting. Consult with OSHA regulations and NIOSH recommendations to determine the appropriate respiratory protection during use of this product. Use only NIOSH-approved or MSHA-approved respiratory protection equipment. Avoid breathing dust produced during the use and handling of this product. If the workplace airborne crystalline silica concentration is unknown for a given task, conduct air monitoring to determine the appropriate level of respiratory protection. Consult with a certified industrial hygienist, your insurance risk manager, or the OSHA Consultative Services group for detailed information. Ensure appropriate respirators are worn during and following the task, including clean-up or whenever airborne dust is present, to insure ambient dust levels are below occupational health limits. Provisions should be made for a respiratory protection training program (see 29 CFR 1910.134 – Respiratory Protection for minimum program requirements).

See also ANSI standard Z88.2 (latest revision) "American National Standard for Respiratory Protection," 29 CFR 1910.134 and 1926.103, and 42 CFR 84. Positive pressure supplied air-type respiratory protection recommended.

The following chart specifies the types of respirators, which may provide respiratory protection for crystalline silica.

PARTICULATE CONCENTRATION	MINIMUM RESPIRATORY PROTECTION*
10 X PEL or Less	Any particular respirator, except single-use or quarter-mask respirator. Any fume respirator or high efficiency particulate filter respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
50 x PEL or Less	A high efficiency particulate filter respirator with a full-face piece. Any supplied-air respirator with a full-face piece, helmet, or hood. Any self-contained breathing apparatus with a full-face piece.
500 x PEL or Less	A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
Greater than 500 x PEL or Entry and Escape from Unknown Concentrations	Self-contained breathing apparatus with a full-face piece operated in pressure-demand mode. A combination respirator which includes a Type C supplied-air respirator with a full-face piece operated in pressure-demand or other positive pressure continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

Component	CAS No.	Percentage (by wt.)	OSHA (TWA)	OSHA (STEL)	ACGIH (TWA)	ACGIH (STEL)	NIOSH (TWA)	NIOSH (STEL)	Unit
Crystalline Silica (Quartz)	14808-60-7	87.0-99.9%	10 % SiO ₂ +2	None	.05	None	.05	None	mg/m ³

Crystalline silica is listed by the Governor of the State of California, under Proposition 65, as requiring the following warning: "Detectable amounts of chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in this product."

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Light buff, tan, gravel-multicolored
Odor:	None
Physical State:	Granular Solid
pH:	Not Applicable
Vapor Pressure:	Not Applicable
Vapor Density:	10mm @ 3146°F
Boiling Point or Range, °F:	4046°F (Quartz)
Melting Point or Range, °F:	3110°F (Quartz)
Solubility In Water:	Insoluble
Specific Gravity:	2.65 (Quartz)
Evaporation Rate:	None

SECTION 10 – STABILITY AND REACTIVITY

Stability:	Stable.
Materials to Avoid:	Strong Oxidizing Agents, such as fluorine, chlorine trifluoride, hydrogen fluoride, and oxygen trifluoride.
Hazardous Decomposition Products:	Silica will dissolve in hydrofluoric acid and produce a corrosive gas – silicon tetrafluoride.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	None.

SECTION 11 – TOXICOLOGICAL INFORMATION

A. SILICOSIS

The major concern is silicosis (lung disease), 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 is the most common form of silicosis, and can occur after many years of exposure to levels above the occupational exposure limits for airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis.

Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, 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 (cor pulmonale) secondary to the lung disease. Accelerated Silicosis can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of the initial exposure. The progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that the lung lesions appear earlier and the progression is more rapid. Acute Silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very 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 is fatal.

B. 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 occupational sources", and that 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 that not all industrial circumstances studied showed evidence of carcinogenicity. The monograph also stated that "[C]arcinogenicity 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 68, "Silica, Some Silicates..." (1997).

SECTION 11 – TOXICOLOGICAL INFORMATION Continued...

NTP - The National Toxicology Program, in its Ninth Annual Report on Carcinogens, concluded that respirable crystalline silica is known to be a 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.

There have been many articles published on the carcinogenicity of crystalline silica, which the reader should consult for additional information; the following are examples of recently published articles: (1) "Lung cancer among industrial sand workers exposed to crystalline silica", *Am J Epidemiol*, Volume 153, pp. 695-703 (2001); (2) "Crystalline Silica and the risk of lung cancer in the potteries", *Occup. Environ. Med.*, Volume 55, pp. 779-785 (1998); (3) "Is Silicosis Required for Silica-Associated Lung Cancer," *American Journal of Industrial Medicine*, Volume 37, pp. 252- 259 (2000); (4) " Silica, Silicosis, and Lung Cancer: A Risk Assessment", *American Journal of Industrial Medicine*, Volume 38, pp. 8-18 (2000); (5) "Silica, Silicosis, and Lung Cancer: A Response to a Recent Working Group Report", *Journal of Occupational and Environmental Medicine*, Volume 42, pp. 704-720 (2000).

C. AUTOIMMUNE DISEASES

There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis may be associated with the increased incidence of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys. For a review of the subject, the following may be consulted: "Occupational Exposure to Crystalline Silica and Autoimmune Disease", *Environmental Health Perspectives*, Volume 107, Supplement 5, pp. 793-802 (1999); "Occupational Scleroderma", *Current Opinion in Rheumatology*, Volume 11, pp. 490-494 (1999); "Connective tissue disease and silicosis", *Am J Ind Med*, Volume 35, pp. 375-381 (1999).

D. TUBERCULOSIS

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: *Occupational Lung Disorders*, Third Edition, Chapter 12, entitled "Silicosis and Related Diseases", Parkes, W. Raymond (1994); "Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners," *Occup Environ Med.*, Volume 55, pp.496- 502 (1998); "Occupational risk factors for developing tuberculosis", *Am J Ind Med*, Volume 30, pp. 148-154 (1996).

E. 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 on the subject, the following may be consulted: "Kidney Disease and Silicosis", *Nephron*, Volume 85, pp. 14-19 (2000); "End stage renal disease among ceramic workers exposed to silica", *Occup Environ Med*, Volume 56, pp. 559-561 (1999); "Kidney disease and arthritis in a cohort study of workers exposed to silica", *Epidemiology*, Volume 12, pp. 405-412 (2001).

SECTION 12 – ECOLOGICAL INFORMATION

Crystalline silica (quartz) is not known to be ecotoxic; i.e., there is no data that suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms, or plants. For additional information on crystalline silica (quartz), see Section 9 (physical and chemical properties) and Section 10 (stability and reactivity) of this MSDS.

SECTION 13 – DISPOSAL CONSIDERATIONS

- General:** Crystalline silica may be landfilled. Material should be placed in covered containers to minimize generation of airborne dust.
- RCRA:** Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

The above information applies to Red Flint Sand and Gravel silica sand only as sold. The product may be contaminated during use, and it is the responsibility of the user to assess the appropriate disposal method in this situation.

SECTION 14 – TRANSPORT INFORMATION

Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the U. S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

SECTION 15 – REGULATORY INFORMATION

UNITED STATES (FEDERAL AND STATE)

TSCA No.: Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7.

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

SARA 311/312: Hazard categories for SARA Section 311/312 Reporting: Chronic Health

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.

Emergency Planning and Community Right to Know Act: Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: Crystalline silica (quartz) mined and processed by Red Flint Sand and Gravel was not processed with or does not contain any Class I or Class II ozone depleting substances.

FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b) (3) (xxvi).

NTP: Respirable crystalline silica (quartz) is classified as a known human carcinogen.

OSHA Carcinogen: Crystalline silica (quartz) is not listed.

California Proposition 65: Crystalline silica (quartz) is classified as a substance known to the state of California to be a carcinogen.

CANADA

Domestic Substances List: Red Flint Sand and Gravel products, as naturally occurring substances, are on the Canadian DSL.

WHMIS Classification: D-2A

OTHER

EINECS No.: 231-545-4

EEC Label (Risk/Safety Phrases): R 48/20, R 40/20, S22, S38

IARC: Crystalline silica (quartz) is classified in IARC Group 1. National, state, provincial or local emergency planning, community right to know or other laws, regulations or ordinances may be applicable—consult applicable national, state, provincial or local laws.

Japan MITI: All of the components of this product are existing chemical substances as defined in the Chemical Substance Control Law.

SECTION 16 – OTHER INFORMATION

More information on the effects of crystalline silica exposure may be obtained from the Occupational Safety and Health Administration (OSHA) (phone number: 1-800-321-OSHA; website: <http://www.osha.gov>) or from the National Institute for Occupational Safety and Health (NIOSH) (phone number: 1-800-35-NIOSH; website: <http://www.cdc.gov/niosh>).

The data in this Material Safety Data Sheet (MSDS) relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. The information set forth herein is based on technical data the Red Flint Sand and Gravel believes reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside the control of Red Flint Sand and Gravel, no warranties, expressed or implied, are made and no liability is assumed in connection with any use of this information. Any use of these data and information must be determined by the user to be in accordance with federal, state, and local laws and regulations.