

MATERIAL SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET - Complies with ANSI Z400.1 Draft Standard for the Preparation of Material Safety Data Sheets, Copyright 1991, Chemical Manufacturers Association. May be used to comply with U.S. Department of Labor OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standards must be consulted for specific requirements.

Date : 07/02/2001

Oglebay Norton Industrial Sands, Inc. Silica Sand (Not For Sandblasting)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Sand, Silica Sand, Quartz, Crystalline Silica, Flint, Ground Silica, Foundry Sand, Engine Sand, Frac Sand, Filtration Sand, Bunker Sand, Turf Sand, Glass Sand.

CHEMICAL NAME: Silicon Dioxide

CHEMICAL FAMILY: Quartz Sand

COMPANY IDENTIFICATION

EMERGENCY / TECHNICAL NUMBERS

Oglebay Norton Industrial Sands, Inc.
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Phoenix, AZ 85008

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CHEMTREC:
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PRODUCT INFORMATION: MSDS Requests and Product Information: (602) 389-4390

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>COMPONENTS</u>	<u>CAS No.</u>	<u>OSHA Exposure Limits (PEL)</u>	<u>ACGIH Recommended Limits (TLV)</u>	<u>Percent by Weight</u>
Silicon Dioxide (SiO ₂)	14808-60-7	10 mg/m ³ / SiO ₂ + 2	0.1 mg/m ³	90.0-99.9%

COMPOSITION COMMENTS:

OSHA PEL as stated in 29 CFR §1910.1000, Table Z-1-A. Hazardous Ingredient: Crystalline silica (quartz), typically 90.0% to 99.9%. NIOSH recommended standard maximum permissible concentration - 0.05 mg/m³ respirable free silica. 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.

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS

PRIMARY ROUTE OF ENTRY: Nasal

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

SKIN: May cause skin irritation. See Section 7.

INGESTION: Not applicable.

INHALATION: **Silicosis:** Respirable crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs. Silicosis may be progressive; it may lead to disability and death. **Cancer:** Respirable crystalline silica (quartz) inhaled from occupational sources is classified as carcinogenic to humans. **Scleroderma:** There is evidence that exposure to respirable crystalline silica or that the disease silicosis is associated with the increased incidence of scleroderma, an autoimmune disorder manifested by a fibrosis (scarring) of the skin and internal organs. **Tuberculosis:** Silicosis increases the risk of tuberculosis. **Nephrotoxicity:** There are several studies suggesting that exposure to respirable crystalline silica or that the disease silicosis is associated with the increased incidence of kidney disorders. **Arthritis:** There is evidence that exposure to respirable crystalline silica is associated with the increased incidence of crippling arthritis.

CHRONIC EFFECTS: Silicosis, cancer, scleroderma, tuberculosis, nephrotoxicity and arthritis. The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

4. FIRST AID MEASURES

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; additionally, weight loss and fever are associated with acute silicosis. The symptoms of scleroderma include thickening and stiffness of the skin, particularly in the fingers, shortness of breath, difficulty swallowing and joint problems. See also Section 11 for additional detail on potential adverse health effects.

FIRST AID PROCEDURES

EYE: Wash immediately with water. If irritation persists, seek medical attention.

SKIN: Not applicable.

INGESTION: Not applicable.

INHALATION: 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.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: Nonflammable

FLASH POINT / METHOD USED: None

AUTOIGNITION: None

FLAMMABILITY LIMITS (% by volume in air): LEL: N/A UEL: N/A

EXTINGUISHING MEDIA: N/A

NFPA RATINGS: Health 0; Flammability 0; Reactivity 0.

FIRE FIGHTING INSTRUCTIONS: None

UNUSUAL FIRE AND EXPLOSIVE HAZARDS: None

COMBUSTION PRODUCTS: None

6. ACCIDENTAL RELEASE MEASURES

CLEANUP MEASURES: Use dustless methods (vacuum) and place into closable container for disposal, or flush with water. Do not dry sweep. Wear protective equipment specified below. See also Section 13.

7. HANDLING AND STORAGE

WARNING LABEL: DO NOT BREATHE THIS MATERIAL

Never Use This Material Without An Air-Supplied Respirator: Silica (Blasting) sand material contains fine dust. If you breathe this dust you can suffer severe, irreversible lung damage and death. Some medical reports state inhalation of silica dust may cause lung cancer. Medical reports also link breathing silica dust to crippling arthritis and skin and eye irritation.

You must never use this material without having a government-approved respirator. The work area must also be thoroughly ventilated by the use of forced air ventilation during and after use of this material.

Prior to use or handling, you are advised to review and thoroughly understand all health precautions outlined in the Material Safety Data Sheet (MSDS) provided to you by your employer by the supplier of this material.

Respirator Protection: It is a violation of federal safety laws (OSHA) for employers to require workers to use this material without full respiratory protection. The federal laws that apply are: 29 CFR §1910.134; 29 CFR §1910.1000; 29 CFR §1910.94.

It is recommended that users of abrasive blasting media use OSHA approved positive pressure, air fed breathing hood respirators. The positive air pressure will prevent dust from being drawn into the respirator. Continue to wear the respirator until all airborne dust is eliminated from the work area.

Ventilation: Finely divided silica dust is nearly invisible. Work areas must be thoroughly ventilated with forced ventilation fans sufficient to exhaust all dust and provide a complete air exchange every five (5) minutes. Continue ventilation even after abrasive blasting operations have been completed.

Other Protective Equipment: Dust can be harmful to skin and eyes. You need to wear tight goggles, heavy rubber gloves. Clothing should be tight fitting at the cuffs, neck and ankles to prevent dust from contacting your body. Clothing should be regularly washed to prevent dust accumulation.

Warning Symptoms and First Aid: If you experience shortness of breath, coughing, lung and/or throat irritation, these may be early warning signs that silica dust is causing a medical condition such as silicosis. Avoid further contact with the material and see your doctor at once if such symptoms occur. Swelling of joints and joint pain, may signal the start of arthritis, which is also reported to be aggravated by silica exposure. Again if such symptoms occur seek immediate medical attention. If eye contact and irritation take place, flush your eyes continuously with clear cold water for at least 15 minutes and then see your doctor for an examination and possible treatment.

Precautions During Storage: Avoid breakage of bagged material or spills of bulk material. See control measures in Section 8. **Safety Notes:** Federal safety regulations require that employers train workers in the safe use of abrasive blasting materials and equipment and that they hold periodic safety meetings to assure that safety precautions are being maintained. Report any concerns about these issues to OSHA at (202) 999-OSHA. The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.99, 1917.28, 1918.90, 1926.59, and 1928.21, and state and local worker or community "right to know" laws and regulations should be strictly followed. **Warn you employees (and your customers in case of resale) by posting and other means of the hazards and the required OSHA precautions. Provide training for your employees about the OSHA precautions for handling crystalline silica.** See also American Society for Testing and Materials (ASTM) standard practice E 1132-86, "Standard Practice for Health Requirements Relating to Occupational Exposure to Quartz Dust." For additional health and safety information, call OSHA, at (202) 999-OSHA.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: 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).

MINIMUM RESPIRATORY PROTECTION*:

10 × PEL or less:	Any particulate respirator, except single-use or quarter-mask respirator. Any fume respirator or high efficiency particulate respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
50 × PEL or less:	A high efficiency particulate filter respirator with a 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 × PEL or less:	A powered air-purifying respirator with a high efficiency particulate filter. A Type-C, supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
<500 × PEL or entry and escape from unknown concentrations & Abrasive Blasting:	A Type-C, supplied air respirator with a full face piece, hood, or helmet, operated in a positive pressure mode (see 29 CFR 1910.94(a)). Anyone in the vicinity of the blasting site during blasting and during cleanup should wear proper respiratory protection. (See 29 CFR 1910.94 (5) (iii)). Also see 30 CFR Part 11.

*Use only NIOSH-approved or MSHA-approved equipment. See 29 CFR §1910.134 and 42 CFR §84. See also ANSI standard Z88.2 (latest version) "American National Standard for Respiratory Protection."

EYE AND FACE PROTECTION: Use safety glasses with side shields. If there is potential for exposure to particles which could cause mechanical injury to the eye, wear goggles.

SKIN AND HAND PROTECTION: Gloves as desired by user.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: White or tan sand; granular, crushed, or ground.

ODOR: Odorless

VAPOR PRESSURE (mm Hg): N/A

BOILING POINT: 4046°F

MELTING POINT: 3110°F

SPECIFIC GRAVITY (H₂O = 1): 2.65

FLASH POINT: None

VAPOR DENSITY (AIR = 1): N/A

EVAPORATION RATE (BUTYL ACETATE = 1): N/A

SOLUBILITY: Insoluble in H₂O; 0.4-0.6% in acid.

pH: 7.4

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.

CONDITIONS TO AVOID: Contact with powerful oxidizing agents may cause fires.

INCOMPATIBILITY WITH OTHER MATERIALS: Hydrofluoric acid (HF), fluorine (F), chlorine trifluoride (ClF₃) or oxygen difluoride (OF₂).

HAZARDOUS DECOMPOSITION PRODUCTS: Silica dissolves in hydrofluoric acid and produces silicon tetrafluoride, a corrosive gas.

HAZARDOUS POLYMERIZATION: Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

SILICOSIS: The major concern is silicosis, 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 relatively low levels of 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 one (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 one (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 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 period, sometime 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.

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 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 “carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependant 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). (Emphasis added.) **NTP** – The National Toxicology Program, in its Sixth Annual Report on Carcinogens, concluded that “silica, crystalline (respirable)” may reasonable be anticipated to be a carcinogen, based on sufficient evidence in experimental animals and limited evidence in humans. **OSHA** – Crystalline silica (quartz) is not regulated by the U.S. Occupational Safety and Health Administration as a carcinogen. There is substantial literature on the issues of the carcinogenicity of crystalline silica, which the reader should consult for additional information. A summary of the literature is set forth in “Exposure to crystalline silica and risk of lung cancer; the epidemiological evidence,” Thorax, Volume 51, pp. 97-102 (1996). The official statement of the American Thoracic Society on the issue of silica carcinogenicity was published in “Adverse Effects of Crystalline Silica Exposure,” American Journal of Respiratory and Critical Care Medicine, Volume 155, pp 761-765 (1997). The official statement concluded that “The available data support the conclusion that silicosis produces increased risk for bronchogenic carcinoma. The cancer risk may also be increased by smoking and other carcinogens in the workplace. Epidemiologic studies provide convincing evidence for increased cancer risk among tobacco smokers with silicosis. Less information is available for never-smokers and for workers exposed to silica but who do not have silicosis. For workers with silicosis, the risks for lung cancer are relatively high and consistent among various countries and investigators. Silicosis should be considered a condition that predisposes workers to an increased risk of lung cancer.” Id. at 763.

SCLERODERMA: There is evidence that exposure to respirable crystalline silica or that the disease silicosis is associated with the increased incidence of scleroderma, an immune system disorder manifested by a fibrosis (scarring) of the lungs, skin and other internal organs. Recently, the American Thoracic Society noted that “there is persuasive evidence relating scleroderma to occupational silica exposure in settings where there is appreciable silicosis risk.” The following may be consulted for additional information on silica, silicosis and scleroderma (also known as progressive systemic sclerosis): Occupational Lung Disorders, Third Edition, Chapter 12, entitled “Silicosis and Related Diseases,” Parkes, W. Raymond (1994). “Adverse Effects of Crystalline Silica Exposure,” American Journal of Respiratory and Critical Care Medicine, Volume 155, pp. 761-765 (1997).

TUBERCULOSIS: Individuals with silicosis are at increased risk to develop 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). “Adverse Effects of Crystalline Silica Exposure,” American Journal of Respiratory and Critical Care Medicine, Volume 155, pp. 761-765 (1997).

NEPHROTOXICITY: There are several recent studies suggesting that exposure to respirable crystalline silica or that the disease silicosis is associated with the increased incidence of kidney disorders. The following may be consulted for additional information on silica, silicosis and nephrotoxicity: Occupational Lung Disorders, Third Edition, Chapter 12, entitled “Silicosis and Related Diseases,” Parkes, W. Raymond (1994). “Further evidence of human silica nephrotoxicity in occupationally exposed workers,” British Journal of Industrial Medicine, Vol. 50, No. 10, pp. 907-912 (1993). “Adverse Effects of Crystalline Silica Exposure,” American Journal of Respiratory and Critical Care Medicine, Volume 155, pp. 761-765 (1997).

ARTHRITIS: There are recent studies suggesting that exposure to respirable crystalline silica or that the disease silicosis is associated with the increased incidence of arthritis. The following may be consulted for additional information on silica exposure and arthritis: American Journal of Industrial Medicine, Volume 35, pp. 375-381 “Connective Tissue Disease and Silicosis,” Rosenman KD; Moore-Fuller M.; Reilly MJ. (1999). Environmental Health Perspective, Volume 107, pp. 793-802 “Occupational Exposure to Crystalline Silica and Autoimmune Disease,” Parks, CG; Conrad, K; Cooper, GS. (1999).

12. ECOLOGICAL INFORMATION

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

13. DISPOSAL CONSIDERATIONS

GENERAL: The material may be landfilled; however, spent abrasive media may contain materials derived from the prepared surfaces that because of contamination may not be disposed of in landfills. Disposed materials should be covered 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 applies to materials as sold by Oglebay Norton Industrial Sands, Inc. The material may be contaminated during use, and it is the responsibility of the user to assess the appropriate disposal of the used material.

14. TRANSPORTATION 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.

15. REGULATORY INFORMATION

U.S. (FEDERAL AND STATE): 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. **CERCLA:** Crystalline silica (quartz) is not classified as a hazardous waste 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 Oglebay Norton Industrial Sands, Inc. was not processed with or does not contain any Class I or Class II ozone depleting substances. **TSCA No.:** Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7. **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 probable carcinogen. **OSHA Carcinogen:** Respirable crystalline silica (quartz) is not listed. **California Proposition 65:** Respirable crystalline silica (quartz) is classified as a substance known to the state of California to be a carcinogen. **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, city, county 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.

Originally prepared by: Oglebay Norton Industrial Sands, Inc., February 12, 2001.

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. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our silica. Customer-users of silica must comply with all applicable health and safety laws, regulations, and orders, including the OSHA Hazardous Communication Standard.