MATERIAL SAFETY DATA SHEET ("MSDS")

From: Oleum Industrial, LLC
Prepared: August 1, 2019
Describe Change from Previous Version: Original

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Product Name/Synonyms: Silica Sand; also referred to as: Quartz Sand, Proppant Sand, Resin Coating Base Sand, Industrial Sand, Testing Sand, and Agricultural Sand.

Product Uses: Silica Sand has many industrial uses including well stimulation and hydraulic fracturing; glass manufacturing; animal bedding; and others.

> **WARNING**: This product is not intended to be used for abrasive blasting, grinding, or other aggressive handling or uses that can generate respirable silica dust. This MSDS and the information contained herein were not developed for such uses.

Supplier Name: Oleum Industrial, LLC

Supplier Contact Information: 821 Aubrey Ave., Ste. B1, Ardmore, PA 19003 / 610.664.1219

SECTION 2 – HAZARDS INDENTIFICATION

Silica sand is a light tan to white sand, and has no odor. Respirable silica can be present when there is no visible dust in the air. Accordingly, do not rely on visual observations of dust.

Potential Health Effects

Inhalation (Chronic): Prolong exposure to respirable crystalline silica can cause silicosis. The respirable size, as defined by the occupational hygiene methods described by ACGIH (2004)/ISO (1995), has a 50% cut point at 4μm particle aerodynamic diameter. Silicosis causes fibrosis (scarring) of the lungs and may be progressive leading to disability and/or death. Additional health effects such as lung disease, cancer, susceptibility to tuberculosis, certain autoimmune disease disorders and increased incidence of kidney diseases (nephrotoxicity) can occur with exposure to crystalline silica. There are commonly no noticeable signs or symptoms of chronic exposures to crystalline silica. However, when symptoms of chronic silicosis are present, they could include shortness of breath, wheezing, coughing and sputum production.

Cancer Warning: Prolonged occupational exposure to sufficient concentrations of inhaled respirable crystalline silica is 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 causal relationship between exposure to respirable crystalline silica and increased lung cancer rates in workers exposed to crystalline silica dust. The International Agency for Research on Cancer (IARC) has evaluated crystalline silica and determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1).

Inhalation (Acute): Acute silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short period of time, 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 often fatal.

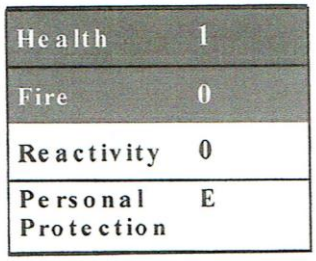
Individuals with lung diseases such as bronchitis, emphysema, chronic obstructive pulmonary disease, etc. may notice that these diseases can be aggravated by exposure to respirable crystalline silica.

Ingestion: There are no known health effects related to ingesting silica sand.

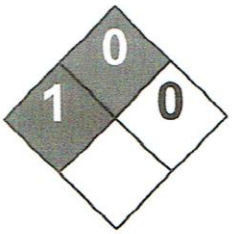
Skin: Silica sand is abrasive and may cause irritation of the skin with repeated contact.

Eyes: With prolonged contact, silica sand may cause irritation of the eye and/or abrasion of the cornea.

Hazardous Materials Information System (HMIS)



National Fire Protection Association (NFPA)



SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients (specific)	%	CAS Number
Crystalline Silica, Quartz (SiO2)	89-99.9	14808-60-7

SECTION 4 – FIRST AID MEASURES

Inhalation: If acute exposure is suspected, remove the individual from the area where the exposure occurred and take him/her to fresh air immediately. If the individual stops breathing, call for emergency assistance and perform artificial respiration until medical services arrive. There are no specific treatments for chronic exposure.

Ingestion: If the quantity ingested is significant, seek medical attention.

Skin: Wash the skin thoroughly and repeatedly as necessary using a soap and water solution. If irritation persists, seek medical attention.

Eyes: Flush the eyes immediately with running water for 10 to 15 minutes or until irritation ceases. Seek medical attention if irritation or discomfort does not subside or abrasion of the cornea is suspected.

SECTION 5 – FIREFIGHTING MEASURES

Silica sand is not flammable, combustible or explosive.

Flash Point: None	**Special Fire Fighting Procedures**: None
UEL/LEL: None	**Hazardous Combustion Products**: None
Auto ignition Temperature: None	
Extinguishing Media: Compatible with all media. Use the extinguishing media necessary to address the fire surrounding the silica sand.	

SECTION 6 – ACCIDENTAL RELEASE MEASURES

If an accidental release occurs, wear the appropriate personal protective equipment (PPE) as described in Section 8 of this MSDS. Clean up the material using methods that minimize the raising of dust. If vacuuming, ensure that the vacuum is equipped with a High-Efficiency Particulate Air (HEPA) filter. When possible, thoroughly wetting the silica sand prior to clean up will minimize dust. Place the silica sand in a covered container appropriate for transport to a reprocessing facility or disposal site. Manage waste silica sand according to federal, state, and local regulations.

SECTION 7 – HANDLING AND STORAGE

Silica sand should be stored in a cool, dry place. Do not cut, grind, weld or drill on or near the container that is being used to store or transport silica sand. Good housekeeping procedures should be used to prevent the accumulation of silica sand and dust in the workplace. Avoid creating respirable dust during handling of silica sand, and use adequate ventilation and/or dust collection equipment. Maintain the dust collection system to ensure that it will adequately reduce airborne dust levels to below appropriate occupational health limits.

Use NIOSH, 42 CFR Part 82, approved respiratory protective equipment during the establishment of engineering controls. Refer to Section 8 – Exposure Controls/Personal Protection for further information about appropriate PPE. Select PPE based on MSHA and/or OSHA guidelines and ANSI standards.

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 will govern the protection of employees who are involved in manufacturing, transportation storage or use of silica sand. Employers are required to familiarize their employees with the information contained on this MSDS. Employers shall notify their employees (and their customers if the silica sand is sold) of the potential health risks associated with the use of silica sand. Employers are required to train their employees in the appropriate use of PPE and engineering controls that will reduce their potential for exposure to respirable crystalline silica dust.

For additional information, see the ASTM International standard practice E 1132-06, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica."

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 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Time Weighted Average (TWA) Exposure Limits for Crystalline Silica Based on the respirable dust fraction (i.e., ≤ 4 μm particle size)

MSHA/OSHA PEL	ACGIH TLV	NIOSH REL
(10mg/m3) / (%SiO2+2)	0.025 mg/m3	0.05 mg/m3

Crystalline silica exists in several forms and the most common form, quartz, is present in the silica sand represented in this MSDS. When crystalline silica is heated to more than 1,595 degrees F, it can change to a form of crystalline silica known as trydimite, and if crystalline silica is heated to more than 2,678 degrees F, 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 permissible exposure limit (PEL) for crystalline silica as trydimite and cristobalite is one-half the PEL for crystalline silica (quartz); the ACGIH TLV for crystalline silica as cristobalite is equal to the TLV for crystalline silica as quartz. In 2005, ACGIH withdrew the TLV for crystalline silica as trydimite.

Ventilation: Use local exhaust systems to maintain exposures below the occupational exposure limits. See the latest edition of the ACGIH Publication: "Industrial Ventilation – Recommended Practice."

Respiratory Protection: Use the OSHA regulations (29 CFR 1910.134 and 1926.103) for minimum program requirements and NIOSH recommendations (42 CFR 84) to determine the appropriate respiratory protection for employees to wear while working with silica sand. Use only NIOSH-approved respiratory protective equipment to avoid breathing respirable crystalline silica that may be present in the air during the use and handling of silica sand. Air monitoring shall be conducted to determine the appropriate level of respiratory protection when the workplace airborne crystalline silica concentration for a given task is unknown. Consult with a certified industrial hygienist, an insurance risk manager, or the OSHA Consultative Services group for sampling information and procedures. To ensure employee exposures to respirable crystalline silica do not exceed the above TWA Exposure limits, employers should require

employees to wear an appropriate respirator and HEPA filtering device while performing respirator-required tasks, which are identified based on air monitoring results. Provisions should be made for a written respiratory protection program including employee training and medical monitoring. Employers may also consult with the latest revision of the ANSI standard Z88.2, "American National Standard for Respiratory Protection."

Skin/Hands: Long sleeved shirt, full length pants, gloves and safety shoes.

Eyes: Safety glasses with side shields are appropriate for most situations. Goggles are recommended when visible dust conditions are observed.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Light tan to white, granular	**Evaporation Rate**: Not applicable
Color: Light tan to white	**Vapor Density**: Not applicable
pH: Not applicable	**Specific Gravity**: 2.65 for Quartz
Melting Point: 3,110 degrees F for Quartz	**Solubility in Water**: Insoluble
Boiling Point: 4,046 degrees F for Quartz	**Odor**: Odorless

SECTION 10 – STABILITY AND REACTIVITY

Chemical Stability: Stable.

Conditions to Avoid: Contact with strong oxidizing agents such as fluorine, chlorine trifluoride, hydrogen fluoride, and oxygen difluoride. Contact with these agents could result in fires.

Hazardous Decomposition: Silica can dissolve in hydrofluoric acid to produce a corrosive gas known as silicon tetrafluoride.

Hazardous Polymerization: Does not occur.

SECTION 11 – TOXICOLOGICAL INFORMATION

Route of Entry: Inhalation.

Toxicity to Animals: LD50: Not available. LC50: not available.

Carcinogenicity of Crystalline Silica: IARC considers crystalline silica (Quartz) a class 1 carcinogen (i.e., proven human carcinogen). ACGIH places crystalline silica (Quartz) in category A2 (i.e., suspected human carcinogen). The NTP, in its Ninth Annual Report on Carcinogens, concluded that respirable crystalline silica is known to be a human carcinogen. OSHA does not regulate crystalline silica as a carcinogen.

Synergistic Effects from Inhalation of Respirable Crystalline Silica Dust: There is a synergistic effect between cigarette smoke and exposure to respirable crystalline silica dust. This means smoking and exposure to respirable crystalline silica dust may increase the risk of developing respiratory disease. Employees should consult with their employer and their doctor if breathing problems develop and/or persist.

Autoimmune Diseases: There is some evidence that suggests breathing respirable crystalline of scleroderma, which is an immune system disorder manifested by fibrosis of the lungs, skin and other internal organs. Additional possible autoimmune disorders include systemic lupus erythematosus and rheumatoid arthritis.

Nephrotoxicity: There is evidence that exposure to respirable crystalline silica in the absence of silicosis, or that the disease silicosis is associated with an increased incidence of kidney diseases, including end stage renal disease.

Tuberculosis: Susceptibility to tuberculosis increases in individuals with silicosis.

Types of Silicosis

Chronic Silicosis: This is the most common form of silicosis and can occur after many years of exposure to respirable crystalline silica at concentrations in the air that exceed the occupational exposure limits for respirable crystalline silica dust.

Simple Silicosis: This type of chronic silicosis may be progressive and may develop into a more complicated form of silicosis known as progressive massive fibrosis (PMF). Simple silicosis is characterized by lung lesions, shown as radiographic opacities, and measuring less than 1 centimeter in diameter. The lesions are noticeable primarily in the upper lung zones. Simple silicosis commonly is not associated with specific symptoms or detectable changes in lung function or disability.

PMF or Complicated Silicosis: The symptoms of PMF or complicated silicosis may or may not manifest themselves consistently in all employees. PMF or complicated silicosis is characterized by lung lesions, shown as radiographic opacities, and measuring greater than 1 centimeter in diameter. In general, the symptoms include: shortness of breath, wheezing, coughing and sputum production. PMF is associated with decreased lung function and may be disabling. Advanced PMF can lead to secondary diseases such as heart disease.

Accelerated and Acute Silicosis: Short-term exposures to very high concentrations of respirable crystalline silica can result in either of these two forms of silicosis. Accelerated silicosis typically manifests itself within 5 years and acute silicosis within a period as short as a few months. Accelerated silicosis can be similar to chronic silicosis, except that lung lesions appear earlier and the progression is more rapid.

SECTION 12 – ECOLOGICAL INFORMATION

Silica sand is prevalent in the natural environment and is not known to be an ecotoxin. In addition, there is not data to suggest that silica sand is toxic to birds, fish, invertebrates, microorganisms or plants.

SECTION 13 – DISPOSAL CONSIDERATIONS

Silica sand is not classified as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) or any of its regulations specific in 40 CFR §261 et seq. Unused or unwanted silica sand may be classified as a solid waste and can be landfilled. This disposal information applies to any silica sand products provided by Oleum Industrial, LLC. Customers/end users who purchase silica sand may have various processes that could contaminate the silica sand during use. It is the responsibility of the customers/end users to assess the hazards associated with any contaminated silica sands and determine the appropriate disposal method for the specific contaminants of concern.

SECTION 14 – TRANSPORT INFORMATION

Silica sand is not a hazardous material for purposes of transportation under the U.S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101. Silica sand should be transported in covered containers to minimize generation of airborne dust during transport.

SECTION 15 – REGULATORY INFORMATION

Based on the requirements of OSHA's Hazardous Communications Standard (29 CFR 1910.1200), silica sand presents possible health hazards. The OSHA Hazardous Communications Standard and state and local worker or community "Right to Know" laws and regulations should be strictly adhered to. Employers shall provide training about the recommended precautions and proper handling of silica sand described in this MSDS. It is the customers'/end users' responsibility to make available the information in this MSDS to their employees and others who may handle or be exposed to respirable crystalline silica dust.

RCRA: Silica sand is not classified as a hazardous waste under RCRA or any of its regulations specified in 40 CFR §261 et seq.

CERCLA: Silica sand is not classified as a hazardous substance under the regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) 40 CFS §302.

EPCRA: Silica sand is not classified as a hazardous substance under Section 302 and is not a toxic chemical subject to Section 313.

Clean Air Act: Silica sand is not processed with or does not contain any Class I or Class II ozone depleting substances. Particulate matter may be regulated under a state or federal operation permit.

Clean Water Act: Silica sand is not listed as a hazardous substance in Section 311.

TSCA: Silica sand is on the EPA TSCA inventory (CAS No. 14808-60-7).

NPRI: CEPA subsection 16(1) – None required.

NTP: Respirable crystalline silica is classified as a known carcinogen.

OSHA: Silica sand is not listed or regulated as a known human carcinogen.

California Proposition 65: Crystalline Silica is classified as a substance known to the State of California to be carcinogenic.

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

Canadian EPA – Domestic Substance Limit (DSL): Silica sand, as a naturally occurring substance, is on the Canadian Environmental Protection Agency's DSL.

WHMIS Classification: Class D, Division 2A.

EINECS No.: 231-545-4.

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

IARC: Silica sand is classified as an IARC Group 1 Carcinogen.

Additional local, county, state/provincial or national emergency planning, right-to-know, or other laws, regulations or ordinances may apply to silica sand.

SECTION 16 – OTHER INFORMATION

All information contained in this MSDS is based on data obtained from recognized technical sources. Although the information is believed to be accurate, Oleum Industrial, LLC makes no commitment or guarantee to its accuracy or sufficiency. The data contained herein are offered solely for customers'/end users' deliberation, investigation, and verification. The uses of the silica sand are beyond the control of Oleum Industrial, LLC. The customers/end users assume all risk and liability of use associated with the silica sand, and the reliance upon whether or not the silica sand is suitable for their intended application. The customers/end users accept all responsibility for training their employees regarding the safe use of silica sand in accordance with applicable regulations and laws pertaining to education, training, exposure, handling, application and disposal of silica sand.

Oleum Industrial, LLC makes no warranties, expressed or implied, concerning silica sand or the merchantability or fitness thereof for a particular purpose with respect to silica sand or information provided herein.

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