

U.S. SILICA COMPANY

Safety Data Sheet European Union

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Product Name: Silica Sand and Ground Silica

Product Description: Crystalline Silica

1. Identification of the substance/preparation and of the company/undertaking

1.1. Identification of the substance or preparation

Product Name/Trade Names:

Sand and Ground Silica Sand (flour) sold under various names: ASTM TESTING SANDS • GLASS SAND • FLINT SILICA • DM-SERIES • F-SERIES • FOUNDRY SANDS • FJ-SERIES • H-SERIES • L-SERIES • N-SERIES • NJ SERIES • OK-SERIES • P-SERIES • T-SERIES • HYDRAULIC FRACING SANDS • MIN-U-SIL® Fine Ground Silica • MYSTIC WHITE® • #1 DRY • #1 SPECIAL • PENN SAND® • Q-ROK® • SIL-CO-SIL® Ground Silica • MICROSIL® • Supersil® • MASON SAND • GS SERIES • PER-SPEC

Chemical Name or Synonym:

Silicon Dioxide (SiO₂). Sand, Silica Sand, Quartz, Crystalline Silica, Flint, Ground Silica (flour).

White or tan sand or ground silica with no odor.

1.2. Use of the substance/preparation

Main Applications (non-exhaustive list): abrasives, brick, ceramics, foundry castings, glass, grout, hydraulic frac (proppant) sand, mortar, paint and coatings, silicate chemistry, silicone rubber, thermoset plastics.

1.3. Company / Producer

U.S. Silica Company
8490 Progress Drive, Suite 300
Frederick, MD 21701
U.S.A.
301-682-0600

For all sand & ground silica products:

Active Minerals International, LLC
6 North Park Drive – Suite 105
Hunt Valley, MD 21030
U.S.A.

Contact: Terri Kansler
Telephone: 410-825-2920
T.Kansler@activeminerals.com

1.4. Emergency telephone

(office hours only)

Contact: Terri Kansler
Telephone: 410-825-2920

2. Hazards Identification

Silica sand is not per se hazardous. However, any particles at sizes below 10 micron are respirable and may penetrate the lungs. As the products identified in this safety data sheet may contain more than 10% of particles below 10 micron, the preparation is classified as "harmful" Xn R48/20 according to Directives 67/548/EEC and 1999/45/EC. The mixture is classified as STOT RE 1/ H372/ P260, P285, P501 according to the CLP (Hazard Class/Hazard Statement/Precaution Statements):

Prolonged inhalation of **excessive levels** of respirable crystalline silica dust may cause silicosis, a lung fibrosis. Individuals with silicosis are reported to have an increased risk of lung cancer. Principal symptoms of silicosis are cough and breathlessness. Exposure to dust should be monitored and managed.

Hazardous Decomposition or Byproducts: Silica will dissolve in hydrofluoric acid and produce a corrosive gas – silicon tetrafluoride.

3. Composition / Information on Ingredients

Component / CAS #	Symbol	Risk Phrases	EC #	%
Crystalline Silica (quartz) 14808-60-7			238-878-4	98.7 - 99.9
Per EU 67/548/EEC (DSD),	XN	R48/20		
Per EN 1272/2008 (CLP) Hazard Class / Hazard Statement/ Precaution Statements	STOT RE1	H372 / P260, P285, P501		
Aluminum Oxide 1344-28-1	None	None	215-691-6	<1.1
Iron Oxide 1309-37-1	None	None	215-168-2	<0.1
Titanium Oxide 13463-67-7	None	None	236-675-5	<0.1

4. First Aid Measures

- 4.1. Eye Exposure:**
Wash immediately with plenty of water. If irritation persists, seek medical attention.
- 4.2. Skin Exposure:**
Not applicable
- 4.3. 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.
- 4.4. Ingestion:**
Not applicable

5. Fire Fighting Measures

5.1. Fire Hazard Data:

Autoignition: Not Applicable

Flash Point: Not Applicable

Flammability Limits (vol / vol%):	Lower:	Upper:
	Not Applicable	Not Applicable

Extinguishing Media:

Product is not flammable, combustible or explosive. Use extinguishing media appropriate for surrounding fire.

Special Fire Fighting Procedures:

Use self contained breathing apparatus with full face mask.

Unusual Fire and Explosion Hazards:

None

6. Accidental Release Measures

6.1. Personal precautions:

Avoid dust formation. In case of dust exposure, wear protective equipment specified in Section 8 of this Safety Data Sheet.

Environmental precautions: No specific precautions. Discard any product, residue, disposable container or liner in compliance with regulatory requirements.

Methods for cleaning up: Avoid dry sweeping. Use water spraying / flushing or ventilated vacuum cleaning system. Use closed containers.

7. Handling and Storage

7.1. Handling

Avoid dust formation. Do not breathe dust. Use adequate exhaust ventilation and dust collection. Keep airborne dust concentrations below permissible national exposure limits. Do not rely on your sight to determine if dust is in the air. Respirable crystalline silica dust may be in the air without a visible dust cloud. In case of insufficient ventilation, wear a respirator approved for silica dust when using, handling, storing or disposing of this product or bag. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with EN standards. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing that has become dusty.

DO NOT USE U.S. SILICA COMPANY MATERIALS FOR SAND BLASTING.

7.2. Storage

Ensure trapping of dust produced during loading and unloading. Keep containers closed and store bags as to avoid accidental bursting.

7.3. Specific uses

Apply safe handling recommendations in Section 7.1.

8. Exposure Controls / Personal Protection

8.1. Exposure limit values

Crystalline Silica	Occupational Exposure Limit
Austria	Maximale Arbeitsplatzkonzentration 0.15/mg/m ³
Belgium	0.1 mg/m ³ VLE (respirable dust)
Bulgaria	0.07 mg/m ³ (OEL (8 h) respirable fraction)
Cyprus	10% of respirable crystalline silica in air sample
Czech Republic	0.1 mg/m ³
Denmark	0.1 mg/m ³ TWA (total); 0.1 mg/m ³ TWA (respirable)
Estonia	0.1 mg/m ³ TWA (respirable dust)
Finland	0.2 mg/m ³ TWA (respirable); 0.2 mg/m ³ TWA (blasting and quarrying, respirable)
France	0.1 mg/m ³ VME (inhalable fraction, listed under silica crystallines). In addition, separate reference value for dust (5 or 25k/Q)
Germany	Previously maximale Arbeitsplatzkonzentration 0.15mg/m ³ . Since 2005 workers health protection system ("Schutzstufenkonzept")
Greece	0.1 mg/m ³
Hungary	0.15 mg/m ³ TWA (respirable)
Ireland	0.05mg/m ³ 2002 Code of practice for Safety Health & Welfare at Work
Italy	0.05 mg/m ³ Associazione Italiana Degli Igienisti Industriali
Latvia	1 mg/m ³ (if silicon dioxide is more than 70%) 2 mg/m ³ (if silicon dioxide is 10 - 70%) 4 mg/m ³ (if silicon dioxide is 2 - 10%)
Lithuania	0.1 mg/m ³ IPRV (respirable fraction), general dust respirable fraction 10 mg/m ³ and alveolar fraction 5 mg/m ³
Luxembourg	0.15 mg/m ³
Malta	None for respirable crystalline silica. In specific situations, Maltese authorities are in practice applying UK reference values.
Netherlands	0.075 mg/m ³ MAC (respirable dust)

Poland	2 mg/m ³ NDS (total inhalable dust, containing >50% free crystalline silica); 0.3 mg/m ³ NDS (respirable dust, containing >50% free crystalline silica); 4.0 mg/m ³ NDS (total inhalable dust, containing 2% to 50% free crystalline silica); 1.0 mg/m ³ NDS (respirable dust, containing 2% to 50% free crystalline silica)
Portugal	0.05 mg/m ³ TWA (respirable fraction)
Romania	0.1 fiber/cm ³ (Quartz - OEL (8 h) respirable rate)
Slovak Republic	10 mg/m ³ TWA (total aerosol) 0.5 mg/m ³ STEL 0.1 mg/m ³ TWA
Slovenia	0.15 mg/m ³ TWA (respirable fraction)
Spain	0.1 mg/m ³ VLA-ED (respirable fraction) 5 or 25 k/Q
Sweden	0.1 mg/m ³ LLV (respirable dust)
United Kingdom	0.1mg/m ³
Turkey	If amount of crystalline silica in respirable dust is less than 5%, then the occupational exposure limit will be accepted as 5 mg/m ³ . If the amount of the crystalline silica in the respirable dust is more than 5% in a workplace, then it is prohibited for such workplace to employ employees for the production.

8.2. Exposure controls

8.2.1. Occupational exposure controls

Engineering Controls:

Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in Section 8.1 of this Safety Data Sheet.

Respiratory Protection

In case of exposure to dust, and in any case if such exposure is above regulatory limits (see above), wear a personal respirator in compliance with national law and European Standard EN 149.

Eye / Face Protection:

If eye contact while using product may be anticipated, wear appropriate safety glasses with side shields or chemical goggles as described by European Standard EN 166.

Skin Protection

Wear chemical resistant gloves (such as latex or neoprene) and protective clothing to minimize skin contact. Substance may have drying effect on skin. Maintain good industrial hygiene. Protection recommended for workers suffering from dermatitis or sensitive skin.

8.2.2. Environmental Exposure Controls

No special requirements. There is no reported ecotoxicity for silica, a naturally occurring substance abundantly present in nature.

9. Physical and Chemical Properties

9.1. General Information

Physical State: White or tan sand: granular, crushed or ground to a powder.
Odor: None

9.2. Important Health, Safety and Environmental Information

pH: 6 - 8
Specific Gravity: 2.65 g/cc
Melting Point: 3110°F/1710°C
Freezing Point: Not Applicable
Boiling Point: 4046°F/2230°C
Flashpoint: Not Applicable
Flammability: Not Applicable
Explosive properties: Not Applicable
Oxidizing properties: contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires.
Vapor Pressure: None
Relative Density: Not Applicable
Solubility: Silica will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride
Water Solubility: Insoluble
Percent Volatiles by Volume: Not Applicable
Viscosity: Not Applicable
Vapor density: Not Applicable
Molecular Weight: 60.08
Evaporation rate: Not Applicable

10. Stability and Reactivity

10.1. Chemical Stability:

Stable

10.2. Conditions to Avoid:

Contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires

10.3. Materials / Chemicals to Be Avoided:

Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.

10.4. Hazardous Decomposition Products:

Silica will dissolve in hydrofluoric acid and produce the corrosive gas silicon tetrafluoride (SiF₄).

10.5. Hazardous Polymerization:

Will not occur.

11. Toxicological Information

The method of exposure to crystalline silica that can lead to the adverse health effects described below is inhalation.

A. 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 (often referred to as Simple 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 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 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 initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and 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 "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 68, "Silica, Some Silicates..." (1997).

The EU Scientific Committee for Occupational Exposure Limits (SCOEL) concluded in June 2002 (SCOEL Sum Doc. 94-final): "The main effect in humans of inhalation of respirable silica dust is silicosis. There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore preventing the onset of silicosis will also reduce the cancer risk."

C. AUTOIMMUNE DISEASES

Several studies have reported excess cases of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers. 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).

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).

E. KIDNEY DISEASE

Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85, pp. 14-19 (2000).

F. 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).

Sources of information:

The ***NIOSH Hazard Review - Occupational Effects of 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* should be consulted for additional information, and citations to published studies on health risks and diseases associated with occupational exposure to respirable crystalline silica. The *NIOSH Hazard Review* is available from NIOSH - Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226, or through the NIOSH web site, www.cdc.gov/niosh/topics/silica, then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica".

12. Ecological Information

12.1. Ecotoxicological Information:

Crystalline silica (quartz) is not known to be ecotoxic; i.e., there are no data that suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms or plants.

13. Disposal Considerations

13.1. Waste Disposal Method:

Discard any product, residue, disposable container or liner in full compliance with national regulations.

13.2. Container Handling and Disposal:

Dispose of container and unused contents in accordance with national regulations.

14. Transportation Information

Shipping Name:

ADR/RID/IMO/ICAO /US DOT	Proper Shipping Name	Not Regulated
	Hazard Class	Not Regulated
	ID Number	Not Regulated
	Packaging Group	Not Regulated

15. Regulatory Information

Silica sand has no harmonized classification & labeling under Directives 67/548/EEC and 1999/45/EC. Because the respirable fraction is high (10% and more) in ground silica (flour), the preparation is self-classified as Xn (harmful). In such case, the following risk and safety phrases are applicable.

Risk Phrases:

R 48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases:

S 22: Do not breathe dust

S 38: In case of insufficient ventilation, wear suitable respiratory equipment.

Under EC Number 1272/2008 (CLP) regulations, mixtures containing more than 10% crystalline silica, which potentially includes all of the grades listed in the MSDS, there are hazard class, hazard statements and precaution statements:

Hazard Class:

STOT RE1: Specific Target Organ Toxicant, DANGER

Hazard Statement:

H372: Causes damage to lungs through prolonged or repeated exposure via inhalation

Precaution Statements:

P260: Do not breathe dust.

P285: In case of inadequate ventilation wear respiratory protection.

P501: Dispose of contents / containers in accordance with local regulation.

16. Other Information

* For further information on health effects, see Sections 2 and 11 of this Safety Data Sheet.

13 European industry associations and two employee associations concluded on April 25, 2006 an autonomous European Social Dialogue Agreement on "Workers Health Protection through the Good Handling and Use of Crystalline Silica and Products Containing it" which is applicable since October 25, 2006. This Agreement and its annexes provide technical guidance and good handling recommendations for dust prevention. The Agreement and its annexes are available at <http://www.nepsi.eu/>

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