

ATLANTIC SILICA INC.

Section 1 MATERIAL IDENTIFICATION AND USE	
Material Name / Identifier: Silica sand or Quartz sand	
Supplier: Atlantic Silica Inc. 4 Osborne Road Poodiac, New Brunswick, E4E 5K5, Canada	Information Telephone #'s (506)-433-5890 or (902)-883-3020
Chemical Name Silicon dioxide	Chemical Family Inorganic oxides
Intended Material Uses Typical uses of this product include but are not limited to sand use for: beach renewal, cement additives, concrete aggregate, construction sands, decorative sands, fertilizer filler, fiberglass, filtration sands e.g. pools, golf course sands, lawn bowling sands, mortar mixes, playground sands, mixing for sheet and container glass, silicon carbide production, top dressing sand, tractions sands, tree nursery grits and white golf bunker sand. Caution for Other Uses Using this product as blasting sands, foundry sands, refractory sands, smelter flux, can/will result in the formation of additional airborne and respirable quartz/silica dust and crystals, which are smaller in size than the original product. Such subsequent uses therefore have the primary potential for harm to workers, as described in this MSDS document, due to the ability of the smaller particles to penetrate further into the lung.	Trade Names & Synonyms #00 Sand, #0 Sand, #1 Sand, #2 Sand
Regulatory Classification WHMIS: Class D2B, Poisonous and Infectious Materials Causing Other Toxic Effects, Chronic Toxic Effects NFPA Ratings: No rating TDG: Not required, not a Transportation Dangerous Good	

Section 2 HAZARDOUS INGREDIENTS				
Hazardous Ingredients	Approx. Conc. % (#00 Sand)	C.A.S. Number	Exposure Limits (ACGIH 2007)	LD50 / LC50 Specify Species and Route
Silica Crystalline Quartz	30-60%	1480-60-7	TLV = 0.025 mg/m ³ as respirable quartz particles median size less than 4 um	Not available
Inhalable particles (PNOS)	20%	Not applicable	TLV = 10 mg/m ³ particles median size less than 100 um	Not available
Non-Silica "Respirable particles"	0.3% (or less)	Not applicable	TLV = 3 mg/m ³ particles median size less than 4 um	Not available.

Section 3 PHYSICAL DATA			
Physical State Solid	Odor and Appearance Odorless fine grained particles white to yellowish white		Odor Threshold (ppm) Odorless
Specific Gravity (H₂O=1) 2.66	Vapor pressure (mm Hg & temp) 0 mm Hg	Vapor Density (Air =1) None	Evaporation Rate None
Boiling Point (°C) 2230	Freezing Point (°C) 1710	pH In water = neutral.	Coef. of Water/Oil Dist. Not applicable
Solubility in Water Insoluble	Solvent Solubility Insoluble in common solvents. Soluble in hydrofluoric acid.		

Section 4 FIRE AND EXPLOSION HAZARDS		
Flammability – If yes, under which conditions: Not flammable		
Means of Extinction – None required, material not flammable. Sand is used as means to extinguish Class A and B fires.		
Flash Point (°C) and Method Not applicable	Upper Explosion Limit Not applicable	Lower Explosion Limit Not applicable
Auto Ignition Temperature (°C) Not applicable	Hazardous Combustion Products Not applicable	Explosion Data / Sensitivity to Mechanical Impact None
Rate of Burning Not applicable	Explosive Power Not applicable	Sensitivity to Static Discharge None

Section 5 REACTIVITY DATA
Chemical Stability – If no, under which conditions? Substance is extremely stable.
Incompatibility with other substances. If so, which ones? Powerful oxidizers: fluorine, boron trifluoride, chlorine trifluoride, manganese trioxide, manganese trifluoride, oxygen difluoride, hydrogen peroxide, etc.
Reactivity and under what conditions? With hydrofluoric acid to produce a corrosive gas silicon tetrafluoride. Crystalline silica degrades when exposed to alkaline aqueous solutions and in the presence of acetylene and ammonia.
Hazardous Decomposition Products: Under mechanical impact (e.g. sand blasting) silica sand physically breaks down into fine dust or respirable silica quartz (particles less than 4 microns median diameter). This finer silica dust can deposit deeper into the user's lungs and thus is more harmful to the user. Use effective respiratory protection in such circumstances (See Section 7 for further information).
Hazardous Polymerization? Will not occur.

Section 6 TOXICOLOGICAL PROPERTIES
Prime Route of Entry Inhalation of airborne respirable particles/silica. Secondary None
Effects of Acute Exposure: Acute hypersensitivity reactions or rapid developing silicosis may occur in a short period of time in heavy unprotected exposure situations, such as sandblasting and foundry use. Particles in levels above the TLV may cause shortness of breath, dryness of mucous membranes, and irritation to eye, nose and throat.
Effects of Chronic Exposure: Prolonged exposure can cause silicosis, pulmonary fibrosis, other obstructive pulmonary conditions and cancer of the lung. Silicosis appears to be associated with a higher incidence of Tuberculosis. In addition, this term "Extra Pulmonary Silicosis" encompasses the spread of lesions to the liver, spleen, kidneys, bone marrow and extra-thoracic lymph nodes. Silicosis of the liver has been especially well documented (reviewed in Siavin et al., 1985). In addition, the following have been suspected and or documented: 1. Quartz is listed by ACGIH as an A2, a suspected human carcinogen. IARC lists crystalline silica as Group 1 or "Carcinogenic to humans". 2. Scleroderma or Progressive Systemic Sclerosis (PSS) an Auto-Immune disease affecting connective tissues and many organ systems of the body. 3. Possible kidney damage (chronic nephropathy) with resulting reduced kidney function. 4. Exacerbates pulmonary pathology from other origins and toxicity from exposure to other acute or chronic pulmonary toxicants (e.g. smoking, respiratory irritants).

LC50 Not available	Irritancy Airborne particles will irritate unprotected eyes and other mucous membranes.	Exposure Limits 0.025 mg/m ³ as respirable silica quartz < (less than) 4 micron median particle size
LD50 Not available	Sensitization None known	Synergistic Materials None known
Toxic Effects: Component, respirable quartz ☒ Carcinogenicity ☐ Mutagenicity ☐ Reproductive Toxicity ☐ Teratogenicity		
General: Silicosis is a form of disabling pulmonary fibrosis which can be progressive, adversely affect lung function and may lead to death. For workers having chronic exposure (frequent, regular, long term) Baseline and ongoing medical monitoring is recommended. OSHA recommends that individuals chronically exposed to silica receive baseline and periodic medical and lung function examinations. Such examinations should be repeated every five years in individuals with less than 20 years exposure and every two years in those with more than 20 years exposure. A chest XRAY is recommended upon termination of employment. As well, where respirable silica levels exceed exposure limits it is prudent to implement a mandatory respiratory protection program.		

Section 7 PREVENTIVE MEASURES

Personal Protective Equipment

Preventing Silica Crystals from entering the lungs is imperative to prevent acute or chronic harm. Develop and enforce a respiratory protection program to minimize harm to workers exposed to respirable silica (e.g. according to CSA Z94.4 Selection, Use and Care of Respirators).

For sand blasting use only NIOSH approved Type CE, Abrasive Blast Supplied-Air Respirators. Depending on measured or known exposure levels use continuous-flow respirator loose fitting hood for non-blasting dust levels up to 25 X the TLV, and continuous flow tight fitting face piece for non-blasting dust levels up to 50 X the TLV, positive-pressure respirator with tight fitting half-mask face piece to 1000 X the TLV. See users note at www.cdc.gov/niosh/abrasi-1.html dated May 23, 1996.

Gloves (Specify)

As necessary for physical protection from blasting or foundry, etc use.

Note: Severe injury can occur when in contact with sand stream under pressure during sand blasting.

Respiratory (Specify)

For non application use adjacent workers should wear NIOSH approved N100, R100, P100 or HEPA half face dust masks up to 10 X the TLV, or as a precaution against accidental exposure. R100 filters should be replaced once 200 mg total dust (not just quartz) is on the dust mask. This use time can be estimated by knowing average dust levels (TWA) in mg/m³ x inhaled air/shift (average = approx. 10 m³ shift).

Eye (Specify)

As necessary for physical protection from exposure/handling. Blasting/foundry requires task specific head/full face protection including eyes (e.g. Type CE helmet).

Footwear (Specify)

As necessary for physical protection from blasting or foundry, or dropping of bagged product, etc use.

Clothing (Specify)

As necessary for physical protection from blasting or foundry, etc use.

Other (Specify)

It is recommended the user have a Respiratory Protection Program in accordance with CSA Z94.4-02 Selection, Use, and Care of Respirators, or ASTM E 1132-86 Standard Practice for Health Requirements Relating to Occupational Exposure to Quartz Dust.

Engineering Controls (Specify)

In confined or enclosed spaces local exhaust with sufficient exhausting of the occupied space sufficient to reduce levels below ½ protective capability of the chosen respirator, or if no respirator specified, below ½ the TLV. ½ TLV is specified due to the generally variable nature of exposure to dusts that could cause excursions over the TLV. See also ACGIH Industrial Ventilation, A Manual of Recommended Practice, latest edition.

Leak and Spill Procedures For unused material collect using methods that do not raise dust levels, such as HEPA vacuum or shovel. <u>Wear minimum N100 respiratory protection if sweeping is necessary.</u> For used material, high levels of respirable silica quartz may be present, if so, do not sweep, wear minimum N100 respirator, use vacuums with HEPA filters or wet down with water before shoveling/sweeping.
Waste Disposal Unused material can be reused or disposed to landfill directly. Used silica quartz sand must be tested for contaminants in accordance with Federal, Provincial/State and Municipal regulations and disposed of in accordance with the authority having jurisdiction. This generally refers to bulk and/or leachate analysis for contaminating toxic metals (such as lead in removed paint).
Handling Procedures and Equipment Avoid creating dust or mechanical abrasion of the material.
Storage Requirements No special requirements, store covered and away from incompatible reactive compounds. Store bagged material in secure manner to prevent falling. Engulfment hazard when stored bulk in silos, bins, trucks or other large storage containers.
Special Shipping Information Material has no TDG labeling or manifesting requirements.

Section 8	FIRST AID MEASURES
Skin	No hazard on skin, unless applied under pressure (e.g. sand blasting); may cause itching.
Abrasions	– Wash abrasion with cool water and pH neutral soap to remove sand and seek medical attention if rash occurs or irritation continues.
Burns	– Treat as for abrasions.
Eye	Irrigate eye with water for at least 15 minutes to remove sand and seek medical attention if irritation continues.
Inhalation	For acute inhalation remove person to fresh air. Seek medical attention if worker experiences difficulty breathing after exposure. Monitor respiratory function for some time after such exposure.
Ingestion	If material ingested and is not used material containing contaminants, make comfortable and provide water, do not induce vomiting. If material is used and may contain contaminants, make person comfortable and provide water, do not induce vomiting and seek medical attention.
General Advice	Smoking and/or exposure to other respiratory irritants or toxins aggravate the effects of exposure. Individuals with lung disease (e.g. bronchitis, emphysema, COPD, pulmonary disease etc.) can be aggravated by exposure.

Section 9	PREPARATION OF M.S.D.S.
Additional Information and Caution	If this product is used for other than intended uses, aggressive respiratory protection measures, as referenced above, are necessary to prevent the harm to exposed workers. See Section 1, "Intended Material Uses" for information on intended uses and cautions related to other uses.
Technical Sources Used	MSDS Atlantic Silica Sand 2007, ACGIH 2010 TLVs and BEIs, NIOSH Pocket Guide to Chemical Hazards Feb 2004, NIOSH respirators user notice Type CE Respirators May 23, 1996, quartz analysis April 2004, chemical and physical analysis data Gallant Aggregates Limited Jan - Mar 2004, physical & size analysis (Maxxam Analytics Inc.) May 2007 #00 Sand.
Toxicology References:	Clinical Environmental Health and Toxic Exposures, 2 nd Ed., J. B. Sullivan and G. R. Krieger, Editors, 2001; and Casarett & Doull's Toxicology, 6 th Ed., C. D. Klassen, 2001; OSHA Final PEL Rule (1989) and NIOSH Hazard Review of Silica (General), 2002; ACGIH Silica, Crystalline-alpha Quartz and Cristobalite-TLV Documentation 2010; IARC Monograph #68, 2004 Silica; US DHHS HSDB Review of Silica.

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Checked by John Cooper, Safety Advisor, Basin Contracting Limited (Affiliated Company of Atlantic Silica Inc.)	
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CAUTION:

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