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SAFETY DATA SHEET

SPODUMENE CONCENTRATE SUBSTITUTE

300-GHS

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SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUBSTANCE: SPODUMENE CONCENTRATE SUBSTITUTE
TRADE NAMES/SYNONYMS: None.
CHEMICAL FAMILY: Mixture of naturally occurring silicates and quartz.
PRODUCT USE: Used for a variety of industrial and research applications.
FORMULA: LiAl(Si₂O₆)/SiO₂

**FOR EMERGENCY
 TRANSPORTATION
 INFORMATION,
 CALL CHEMTREC
 1-800-424-9300**

SECTION 2 HAZARDS IDENTIFICATION

GHS Classification:

Health	Environmental	Physical
Carcinogen Category 1A Specific Target Organ Toxicity -Repeated Exposure Category 1	None	None

GHS Label



Contains Quartz

DANGER!

H350 May cause cancer by inhalation.
 H372 Causes damage to organs through prolonged or repeated exposure.

Prevention:

P201 Obtain special instructions before use.
 P202 Do not handle until all safety precautions have been read and understood.
 P260 Do not breathe dust.
 P264 Wash thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
 P280 Wear protective gloves, protective clothing and eye protection.

Response:

P308+P313 If exposed or concerned: Get medical attention.

Storage

P405 Store locked up.

Disposal:

P501 Dispose of contents and containers in accordance with local, regional and national regulations.

Warning: This product contains a chemical known to the State of California to cause cancer.

SECTION 3 COMPOSITION, INFORMATION ON INGREDIENTS

Component	CAS #	% w/w
Spodumene	66057-55-4	60-95
Quartz	14808-60-7	5-40

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-2004 format.

SECTION 4 FIRST-AID MEASURES

Victims of chemical exposure must be taken for medical attention if any adverse effect occurs. Take copy of label and MSDS to physician or health professional with victim.

SKIN EXPOSURE: Remove exposed or contaminated clothing, taking care not to contaminate eyes. Wash with soap and water. Seek medical attention irritation develops.

EYE EXPOSURE: Immediately flush victim's eyes with gently running water, holding open eyelids. Have victim "roll" eyes. Seek medical attention if irritation persists.

INHALATION: If this product is inhaled, remove victim to fresh air. Obtain medical attention if

SECTION 4 FIRST-AID MEASURES

adverse effect occurs.

INGESTION: If swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. Do not induce vomiting unless directed by medical personnel. If conscious, have victim rinse mouth with water.

MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND DELAYED: Inhalation of dust may cause respiratory irritation. Eye contact may cause mechanical, abrasive injury. There may be no immediate signs or symptoms of exposure to hazardous concentrations of respirable crystalline silica (quartz). However, prolonged overexposure to respirable crystalline silica may cause lung disease (silicosis) and increase the risk of lung cancer. Risk of cancer depends on duration and level of exposure.

INDICATION OF IMMEDIATE MEDICAL TREATMENT AND SPECIAL TREATMENT: Immediate medical attention is not required unless eye injury from particles occurs.

SECTION 5 FIRE-FIGHTING MEASURES

FIRE EXTINGUISHING MEDIA: This product is not flammable. Use fire extinguishing material appropriate for surrounding fire.

SPECIFIC FIRE AND EXPLOSION HAZARDS: None known.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING EQUIPMENT AND PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

SECTION 6 ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used (See Section 8). In case of a spill, clear the affected area and protect people. Self-Contained Breathing Apparatus would be worn in situations where the oxygen level is below 19.5 % or is unknown.

METHODS AND MATERIALS FOR CONTAINMENT/CLEANUP: Sweep up or vacuum spilled material carefully, avoiding the generation of dusts. Place all spill residue in a suitable container. Dispose of in accordance with U.S. Federal, State, and local or Canadian solid waste disposal regulations (see Section 13, Disposal Considerations).

SECTION 7 HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: Avoid generating and breathing dust. Avoid eye contact. Remove contaminated clothing. Use ventilation and other engineering controls to minimize potential exposure to this product. All employees who handle Spodumene should be trained to handle it safely. Ensure containers are properly labeled. Empty containers may contain residual material; therefore, empty containers must be handled with care. Silica dust may be in the air without a visible dust cloud. Practice good housekeeping to prevent accumulation of dust in work areas.

STORAGE: Store containers in a dry location. Store away from incompatible materials (see Section 10, Stability and Reactivity). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Empty containers may contain residual material; therefore, empty containers must be handled with care.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

Component	Exposure Limits in Air				
	ACGIH-TLVs		OSHA-PELs		OTHER
	TWA mg/m ³	STEL mg/m ³	TWA mg/m ³	STEL mg/m ³	
Spodumene (as PNOC)	NE	NE	5 (Respirable fraction) 15 (Total dust)	NE	NE
Quartz	0.025 (Respirable)	NE	10 mg/m ³ % SiO ₂ + 2 (Respirable fraction) 30 mg/m ³ % SiO ₂ + 2 (Total dust)	NE	0.05 TWA (Respirable dust) NIOSH REL

NE = Not Established See Section 16 for Definition of other terms and acronyms used.

The information presented is based only on this product. The Exposure Controls and Personal Protection required will be dependent on the conditions present in the workplace, including the presence of other chemicals. PPE should be based on a Hazard Assessment as required in 29CFR1910.132.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation, to ensure exposures are below the occupational exposure limits provided above. Mechanical exhaust may be needed.

RESPIRATORY PROTECTION: If ventilation is inadequate, an approved dust/mist respirator may be required. For higher exposures or in potentially oxygen deficient atmospheres, a supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2, CSA Standard Z94.4-02 and good Industrial Hygiene practice.

EYE PROTECTION: Safety glasses with side shields or goggles. If necessary, refer to U.S. OSHA 29 CFR 1910.133, and appropriate Canadian Standards.

HAND PROTECTION: None normally required.

BODY PROTECTION: Use body protection appropriate for task. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, wear foot protection, as described in U.S. OSHA 29 CFR 1910.136.

NOTE: Additional protection may be required for specific work situations in which this product is used. The potential exposure hazards for each work situation must be evaluated, per 29 CFR 1910.132 (Federal OSHA Personal Protective Equipment Standard/General requirements), to determine the appropriate personal protective equipment for the operation.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: White to beige dry, fine sand

ODOR: Very faint fatty odour

ODOR THRESHOLD: Not applicable.

pH: Not applicable

MELTING/FREEZING POINT: 1375°C (2507°F)

BOILING POINT: Not applicable

FLASH POINT: Not applicable

EVAPORATION RATE: Not applicable

FLAMMABILITY: Not flammable or combustible

FLAMMABLE LIMITS (in air by volume): Not applicable

VAPOR PRESSURE: Not applicable

VAPOR DENSITY (air = 1): Not applicable

SPECIFIC GRAVITY (water = 1): 3.1

SOLUBILITY IN WATER @ 20°C: Insoluble in water and common dilute acids.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not applicable

AUTOIGNITION TEMPERATURE: Not applicable.

DECOMPOSITION TEMPERATURE: Not applicable

VISCOSITY: Not applicable

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Not reactive under normal conditions.

STABILITY: Stable.

POSSIBILITY OF HAZARDOUS REACTIONS: None known.

CONDITIONS TO AVOID: Contact with water or high humidity.

INCOMPATIBLE MATERIALS: Acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Quartz will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride.

SECTION 11 TOXICOLOGICAL INFORMATION

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: In terms of anticipated occupational overexposure situations for employees, the main health effect from overexposure would be inhalation of respirable dust.

INHALATION: Inhalation of dust may irritate the tissues of the eyes, nose, and respiratory system. Symptoms of such overexposure can include coughing, sneezing, and a sore throat. Breathing respirable silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may have serious chronic health effects.

CONTACT WITH SKIN or EYES: Eye contact may cause abrasive, mechanical irritation and injury. No adverse effects are expected from skin exposure.

SKIN ABSORPTION: Skin absorption is not a route of exposure for this any component of this product.

INGESTION: Ingestion is not anticipated to be a significant route of occupational exposure. If this material is swallowed, it can irritate, throat, and other tissues of the digestive system.

CHRONIC: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling and sometimes fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop mycobacterial infections (tuberculous and non-tuberculous) and fungal infections. Inhalation

of air with a very high concentration of respirable silica dust can cause the most serious forms of silicosis in a matter of months or a few years. Some epidemiologic studies have concluded that there is significant risk of developing silicosis even at airborne exposure levels that are equal to the recommended NIOSH REL, and ACGIH TLV.

TARGET ORGANS: ACUTE: Eyes. CHRONIC: Respiratory system and lungs.

TOXICITY DATA: The following toxicology data are currently available for the components of this product.

QUARTZ:

LD₅₀ (Oral-Rat) >22, 500 mg/kg

CARCINOGENICITY STATUS: Quartz is listed as the following: ACGIH TLV-A2 (Suspected Human Carcinogen); IARC-1 (Carcinogenic to Humans-sufficient evidence of carcinogenicity); MAK-1 (Substances that Cause Cancer in Man- which can be assumed to make a significant contribution to cancer risk); NIOSH-Ca (Potential Occupational Carcinogen Defined with no Further Categorization); NTP-K (Known to be a Human Carcinogen-sufficient evidence of carcinogenicity from studies in humans which indicates a causal relationship between the agent and human cancer).

IRRITANCY OF PRODUCT: This product is not a chemical irritant.

SENSITIZATION TO THE PRODUCT: This product is not expected to cause sensitization.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: The components of this product are not reported to produce mutagenic effects in humans.

Embryotoxicity: The components of this product are not reported to produce embryotoxic effects in humans.

Teratogenicity: The components of this product are not reported to produce birth defects effects in humans.

Reproductive Toxicity: The components of this product are not reported to cause reproductive effects in humans.

ACGIH BIOLOGICAL EXPOSURE INDICES (BEIs): Currently there are no ACGIH Biological Exposure Indices (BEIs) determined for the components of this product.

SECTION 12 ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: No data available.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product is an inert material. No adverse effects are expected.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product is an inert material. No adverse effects are expected.

ACUTE AQUATIC TOXICITY:

QUARTZ:

LC50 Carp >10,000 mg/L/72 hr

PERSISTENCE AND DEGRADABILITY: The methods for determining biodegradability are not applicable to inorganic substances.

BIOACCUMULATIVE POTENTIAL: No data available.

OTHER ADVERSE EFFECTS: No data available.

SECTION 13 DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations or with regulations of Canada and its Provinces. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local solid waste regulatory authority.

U.S. EPA WASTE NUMBER: None

SECTION 14 TRANSPORT INFORMATION

THIS PRODUCT IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Not Regulated

HAZARD CLASS NUMBER and DESCRIPTION: None

UN IDENTIFICATION NUMBER: None

PACKING GROUP: None

DOT LABEL(S) REQUIRED: None

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2012): None

MARINE POLLUTANT: The components of this product are not designated as a DOT Marine Pollutants (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This material is considered as Dangerous Goods, per regulations of Transport Canada. The use of the above U.S. DOT information from the U.S. 49 CFR regulations is allowed for shipments that originate in the U.S. For shipments via ground vehicle or rail that originate in Canada, the following information is applicable.

PROPER SHIPPING NAME: None Regulated

SECTION 14 TRANSPORT INFORMATION	
<u>HAZARD CLASS NUMBER and DESCRIPTION:</u>	None
<u>UN IDENTIFICATION NUMBER:</u>	None
<u>HAZARD LABEL(S) REQUIRED:</u>	None
<u>PACKING GROUP:</u>	None
<u>SPECIAL PROVISIONS:</u>	None
<u>EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX:</u>	None
<u>ERAP INDEX:</u>	None
<u>PASSENGER CARRYING SHIP INDEX:</u>	None
<u>PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX:</u>	None
<u>MARINE POLLUTANT:</u> No component of this product is listed as a marine pollutant under TC regulations.	
<u>EMERGENCY RESPONSE CONTACT FOR AN INCIDENT DURING TRANSPORTATION:</u> CHEMTREC 1-800-424-9300 or 1-703-527-3887	

SECTION 15 REGULATORY INFORMATION	
ADDITIONAL U.S. REGULATIONS:	
<u>U.S. SARA REPORTING REQUIREMENTS:</u> The components of this product are not subject to the reporting requirements of the Comprehensive Environmental Response, Compensation, and Liability Act and Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.	
CERCLA SECTION 103 (40 CFR 302.4) Listed CERCLA HAZARDOUS SUBSTANCE: No	
SARA SECTION 302 (40 CFR 355.30) EXTREMELY HAZARDOUS SUBSTANCE: No	
SARA SECTION 304 (40 CFR 355.40) RQ – CERCLA OR SARA 302: No	
SARA SECTION 313 (40 CFR 372.65) Toxic Chemical Release Inventory (TRI Form R): No	
SARA SECTION 311/312 HAZARD CATEGORIES: Chronic Health	
<u>U.S. SARA THRESHOLD PLANNING QUANTITY:</u> There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.	
<u>U.S. CERCLA REPORTABLE QUANTITY (RQ):</u> Not applicable.	
<u>U.S. TSCA INVENTORY STATUS:</u> The components of this product are listed on the TSCA Inventory.	
<u>U.S. TSCA 12(b) EXPORT NOTIFICATION:</u> TSCA 12(b) Notification is not required, per 40 CFR 707, for the components of this product.	
<u>OTHER U.S. FEDERAL REGULATIONS:</u> Not applicable	
<u>U.S. STATE REGULATORY INFORMATION:</u> The components of this product are covered under specific State regulations, as denoted below:	
Massachusetts - Substance List: Quartz.	New Jersey - Right to Know Hazardous Substance List: Quartz.
Michigan - Critical Materials Register: Lithium Compounds.	Pennsylvania - Hazardous Substance List: Quartz.
<u>CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):</u> The Quartz component of this product is on the California Proposition 65 list as Silica, crystalline (airborne particles of respirable size). WARNING! This product contains a chemical known to the State of California to cause cancer.	
CANADIAN REGULATIONS:	
<u>CANADIAN DSL/NDL INVENTORY STATUS:</u> Spodumene is not on the DSL/NDL. Quartz is on the DSL.	
<u>CANADIAN WHMIS CLASSIFICATION AND SYMBOLS:</u> Class D2A Carcinogen	

SECTION 16 OTHER INFORMATION	
<u>HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATING:</u> Health Hazard = 0*; Fire Hazard = 0; Physical Hazard = 0	
<u>NFPA 704 RATING:</u> Health Hazard = 0; Fire Hazard = 0; Instability Hazard = 0 4 = Severe Hazard 3 = Serious Hazard 2 = Moderate Hazard 1 = Slight Hazard 0 = Minimal Hazard	
CREATION DATE: 5/25/14	REVISION DATE: None

DEFINITIONS OF EXPOSURE LIMIT TERMS AND ABBREVIATIONS
ACGIH - American Conference of Governmental Industrial Hygienists, a professional association that establishes exposure limits. TLV - Threshold Limit Value - an airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (TWA), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (C). Skin absorption effects must also be considered.
OSHA - U.S. Occupational Safety and Health Administration. PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based on the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase,

SECTION 16**OTHER INFORMATION**

“Vacated 1989 PEL,” is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG MAK** is the Republic of Germany’s Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

DNEL(Derived No-Effect Level): A DNEL is the level of exposure to the substance below which no adverse effects are expected to occur. It is therefore the level of exposure to the substance above which humans should not be exposed. DNEL is a derived level of exposure because it is normally calculated on the basis of available dose descriptors from animal studies such as No Observed Adverse Effect Levels (NOAELs) or benchmark doses (BMDs). This value is derived under EU REACH when a chemical safety assessment is performed as part of registration.

PNEC (Predicted No-Effect Concentration): Concentration of the substance below which adverse effects in the environmental sphere of concern are not expected to occur. This value is derived under EU REACH when a chemical safety assessment is performed as part of registration.

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