

## 1. Product and Company Information


<b>Product Series</b>	Fortimix®
<b>Product Use</b>	Additive for use in rubber, plastics, composites, adhesives, coatings, and sealants
<b>Product Type</b>	Ultra-fine-grained ceramic mineral additive
<b>Manufacturer</b>	Spherix   Two Notch Road, Lexington, SC 29073   1-844-774-3749   customersupport@spherixproducts.com

## 2. Hazards Identification

### 2.1 Classification of substance

<b>Health Hazards</b>	Skin irritation, Category 2. Eye irritation, Category 2B. Specific Target Organ Toxicant, Single Exposure, Category 3.
<b>Specific Hazards</b>	Respirable particles may become airborne if agitated. Provide workplace air filtration engineering controls, capable of removing at least 99% of particulates. If action levels of airborne respirable silica may be exceeded over a 30-day period, use facemasks with an assigned protection factor of 50 and equipped with filter P-100 cartridges.
<b>Main Symptoms</b>	Upper respiratory tract irritation   Coughing   Irritation of eyes and mucous membranes   Skin irritation

### 2.2 Label Elements

<b>Signal Word</b>	Warning
<b>Symbol</b>	
<b>Hazard Statements</b>	Dust may cause respiratory irritation. Repeated/prolonged exposure to dust inhalation may cause damage to lungs.

### 2.3 Precautionary Statements

<b>Prevention</b>	For detailed information please refer to SNUR 40 C.F.R. Section 721.11174 - Silane-treated aluminosilicate (generic). Avoid prolonged skin contact   Avoid ingestion   Avoid breathing dust   Use respiratory protection
<b>Response</b>	<b>IF IN EYES:</b> Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. If eye irritation persists, get medical advice/attention. <b>IF INHALED:</b> Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER if you feel unwell. <b>IF SKIN IRRITATION OCCURS:</b> Get medical advice/attention.
<b>Storage</b>	Store bags in dry, well-ventilated place with container tightly closed. Store locked up.
<b>Disposal</b>	NON-HAZARDOUS (EPA). Product does not constitute hazardous waste. Federal Register 21301-21501. April 17, 2015.

### 2.4 Human Health Hazards

<b>Respiratory Complications</b>	Central nervous system effects; internal organ effects; birth defects; reproductive effects; cancer; immune system effects; developmental effects.
<b>Precautionary Statements</b>	Avoid prolonged skin contact   Avoid breathing substance   Avoid ingestion   Use respiratory protection   Wash skin with soapy water.

## 3. Composition Information

Ingredient Name	CAS Number	Wt.%	UN GHS (Rev 4) Classification
Aluminosilicate Solid Ceramic Spheres	68131-74-8	95-99	Single Exposure STOT, Hazard Category 3
Polysiloxane Surface Treatment	Proprietary	1-5	N/A
Silica, Respirable	14808-60-7	0.2-1	Repeated exposure STOT, Hazard Category 2
<b>Components of Solid, Ceramic Spheres</b>			
Amorphous Silicon Dioxide	60676-86-0	40-55	Spheres: Single Exposure STOT Hazard Category 3
Alumina	1344-28-1	25-35	
Iron Oxide	1309-37-1	3-12	
Calcium Oxide	1305-78-8	2-4	
Potassium Oxide	12136-45-7	2-4	
Magnesium Oxide	1309-48-4	1-2	
Titanium Oxide	13463-67-7	0.1-4	
Crystalline Silica	14808-60-7	0.1-2	

## 4. First Aid Measures

<b>Inhalation</b>	Remove person to fresh air. Dust in throat and nasal passage should clear spontaneously. Consult a physician if discomfort or difficulty breathing persists.
<b>Eye Contact</b>	Do not rub. Flush eyes with water for several minutes. Consult a physician if there is persistent irritation.
<b>Skin Contact</b>	No acute hazard is associated with short-term skin contact. Avoid prolonged skin contact. Periodic washing of skin with soap and water is recommended.
<b>Ingestion</b>	Rinse mouth with water; clear nose and throat. No specific first aid measures are required.

<b>Most important health effects, both acute and delayed</b>	Acute: irritated respiratory tract and eyes. Chronic effects: frequent inhalation of dust levels above permissible exposure limits (PEL) over a long period of time increases the risk of developing lung damage, including silicosis.
<b>Indication of any immediate medical attention and special treatment needed</b>	None on short term exposure to dust. Get medical attention if inhalation is severe/prolonged and respiratory symptoms persist after immediate first aid measures are given.

## 5. Fire-Fighting Measures

<b>Suitable Extinguishing Media</b>	Product is noncombustible. Use extinguishing media for surrounding materials.
<b>Extinguishing Media Which Should Not be Used</b>	No restriction
<b>Special Exposure Hazards</b>	No unusual fire or explosion hazards noted. No anticipated thermal decomposition products.
<b>Special Protective Equipment for Fire Fighters</b>	Wear dust mask.

## 6. Accidental Release Measures

<b>Personal Precautions</b>	No action shall be taken involving any personal risk or without suitable training. Don appropriate personal protective equipment. If ventilation is inadequate, utilize appropriate respiratory protection. Avoid airborne dust generation.
<b>Environmental Precautions</b>	Fortimix® does NOT CONSTITUTE HAZARDOUS WASTE. Powder may tend to float on water. Soapy water is required to disperse particulates in water. Air-dried solids will form a wet cake, which can be disposed of in landfills. Prevent further leaking or spillage, if safe to do so. Avoid conditions that result in generating airborne dust.
<b>Methods of Cleaning Up</b>	Do not dry sweep. Do not use compressed air. Water spray or HEPA equipped vacuum is recommended for removing spilled material. Minimize generation of airborne dust during cleanup activities.

## 7. Handling and Safe Storage

<b>Handling</b>	
<b>Advice on Safe Handling</b>	No special precautions, except for controlling dust. In immediate proximity of product: use full-face mask (APF-50). Periodically vacuum (HEPA filter) accumulated dust on walls, floors, sills, ledges, machinery, or equipment. Keep airborne dust concentrations below PEL.
<b>Technical Measures and Storage</b>	Provide appropriate exhaust ventilation of at least 99% of dust where airborne dust occurs. Keep containers closed.
<b>Storage</b>	
<b>Technical Measures and Storage</b>	Containers need to be protected from physical damage that could lead to spillage and airborne dust generation.
<b>Packaging Materials</b>	Use dust collection to trap dust produced during handling of open containers, loading, and unloading. Keep containers closed and store bags to avoid accidental tearing, breaking, or bursting.
<b>Specific Uses Permitted</b>	Fortimix® is to be incorporated into rubber, plastic, composites, adhesives, coatings, and sealants containing one or more polymers using conventional equipment, e.g., mixers, extruders, roll mills, etc.

## 8. Exposure Controls/Personal Protection

Ingredient Name	OSHA PEL	ACGIH TLV	NIOSH REL
Respirable Silica (Quartz)	0.05 mg/m <sup>3</sup> 8-Hr. TWA Action level: 0.025 mg/m <sup>3</sup> 8 Hr. TWA 30 or more days per year.	0.1 mg/m <sup>3</sup> (respirable dust)	0.05 mg/m <sup>3</sup> 10 Hr. TWA (respirable dust)

<b>Special Statement on Crystalline Silica</b>	Nearly all crystalline silica present is encapsulated in the solid ceramic spheres and being that these spherical particles are 10 microns or less in diameter, they are respirable. Scanning Electron Microscopy has been used to evaluate the presence of non-encapsulated crystalline structures, and these may be present at concentrations of up to 1 ppm.
<b>Biological Limit Values</b>	There are no ACGIH Biological Exposure Indices (BEI®) for SPHERIX® solid aluminosilicate spheres.
<b>DNEL/NMEL Values</b>	Not Available
<b>PNEC Values</b>	Not Available
<b>Eye Protection</b>	Full face mask be used.
<b>Skin Protection</b>	Wear gloves and work clothing that minimizes skin contact.
<b>Respiratory Protection</b>	Where the level exposure to dust exceeds the action levels or PEL, NIOSH-certified full facemask with Assigned Protection Factor (APF) of 50 equipped with P-100 cartridges is required.
<b>General Exposure Controls</b>	Indoor workspaces where dust may arise must be equipped with air filtration for removal of at least 99% of airborne particles. Air monitoring of each active workspace is required to determine filtration efficiency and worker exposure, in accordance with established PEL.

<b>Environmental Exposure Controls</b>	Contain spills and prevent wind dispersal. Follow state regulations for disposal, water emissions, and air emissions.
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## 9. Physical and Chemical Properties

<b>Appearance</b>			
<b>Physical State</b>	Solid (powder)		
<b>Color</b>	Beige (dry powder state)		
<b>Odor</b>	Slight alcohol odor		
<b>Properties</b>			
<b>Flash Point</b>	Incombustible	<b>Odor Threshold</b>	N/A
<b>Explosion Limits (Upper)</b>	Not available	<b>Viscosity</b>	N/A
<b>Explosion Limits (Lower)</b>	Not available	<b>Solubility (water)</b>	Insoluble
<b>pH (10% aqueous slurry)</b>	6.5 – 7.5	<b>Partition Coefficient n-octanol/water</b>	Resides in water phase
<b>Melting Point</b>	Greater than 1600°F	<b>Evaporation Rate</b>	Zero
<b>Relative Density</b>	2.3 – 2.4	<b>Vapor Density</b>	N/A – No volatile components
<b>Vapor Pressure</b>	Zero		

## 10. Stability and Reactivity

<b>Conditions to Avoid</b>	Prolonged agitation that generates dust
<b>Materials to Avoid</b>	Strong acids, strong oxidizers
<b>Chemical Stability</b>	Chemically stable in all conditions of normal use
<b>Possible Hazardous Reactions</b>	Material is a stable earthen mineral. Polymerization will not occur
<b>Hazardous Decomposition Products</b>	Not known

## 11. Toxicological Information

<b>General Information</b>	Fortimix® as a mixture has not been evaluated for toxicological information. It is made of amorphous aluminosilicate mixed metal oxide ceramic formed during a high-temperature oxidation process which is then subjected to chemical surface treatment.
<b>Special Statement on Crystalline Silica</b>	Without dust removal equipment, prolonged agitation of dry powder may generate airborne dust over an 8- hour time weighted average at action levels for respirable crystalline silica. Engineering controls and face respirator with APF 50 required.
<b>Skin Contact</b>	Dust may irritate skin on prolonged exposure.
<b>Inhalation</b>	Dust may irritate sinuses, and respiratory system. Chronic exposure above Occupational Exposure Limits increases the risk of developing lung disease.
<b>Eye Contact</b>	Dust may irritate eyes.
<b>Toxicological Information for Components (US NIOSH)</b>	Note: Occupational exposure to silica and metal oxides within the solid ceramic spheres does not occur during normal use of Fortimix®.
<b>CMR Effects (carcinogenicity, mutagenicity, and toxicity for reproduction)</b>	Fortimix® has not been tested for carcinogenicity, mutagenicity, or toxicity for reproduction. Two components of the solid ceramic spheres are on the IARC list: silica dust (crystalline) in the form of quartz or cristobalite (14808-60-7) as Class 1 [carcinogenic to humans (2012)]; and titanium dioxide (13463-67-7) as Class 2B [possibly carcinogenic to humans (2010)]. Although no studies are known about airborne chronic health effects, specifically associated with cancer, mutagenicity or toxicity for reproduction from exposure to solid ceramic spheres, the risks associated with any respirable, poorly soluble solids such as these are assumed to potentially apply.

## 12. Ecological Information

<b>Ecotoxicity</b>	No data at this time
<b>Mobility</b>	No data at this time

## 13. Disposal Considerations

<b>Waste Disposal</b>	Cover material to prevent airborne dust and dispose of in a landfill according to state and local regulations for non-hazardous waste.
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## 14. Transportation

<b>DOT Shipping Name</b>	Not regulated
<b>DOT Hazard Class</b>	Not regulated
<b>DOT Label(s)</b>	Not regulated
<b>UN/NA Number</b>	Not regulated
<b>Placards</b>	Not regulated

<b>IATA</b>	Not regulated
<b>Marine Pollutant</b>	Not listed

## 15. Regulatory Information

US Regulations	
<b>SARA 302 EHS</b>	Neither Fortimix® nor components of the solid ceramic spheres are on the EPCRA Extremely Hazardous Substances list (40 CFR 302).
<b>SARA 311/312 Classification</b>	Chronic
<b>SARA 313 Supplier Notification</b>	None
<b>TSCA</b>	Fortimix® products are registered under a Consent Order, and users are required to conform to air quality and personal protective equipment limit set forth herein.
<b>California Proposition 65</b>	The following substances are known to the State of California to be carcinogens and/or reproductive toxicants: silica, crystalline.

State Right to Know					
Component	CAS	MA <sub>1,2</sub>	NJ <sub>3,4</sub>	PA <sub>5</sub>	RI <sub>6</sub>
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO <sub>2</sub> ), quartz	14808-60-78	Yes	Yes	Yes	No
Sodium Oxide	1313-59-3	No	Yes	No	No

1. Massachusetts Department of Public Health, no date
2. 189th General Court of The Commonwealth of Massachusetts, no date
3. New Jersey Department of Health and Senior Services, 2010a
4. New Jersey Department of Health, 2010b
5. Pennsylvania Code, 1986
6. Rhode Island Department of Labor and Training, no date

International Regulations	
<b>Canada DSL</b>	All components of the solid ceramic spheres are listed on the Domestic Substances List.
<b>EINECS</b>	All components of the solid ceramic spheres are listed on the European Inventory of Existing Commercial Chemical Substances List.
<b>REACH</b>	NOT registered.
<b>ECHA</b>	Substances in Fortimix® are not on the ECHA Candidate List of Substances of Very High Concern.
<b>Ozone-Depleting Substances</b>	Neither Fortimix® nor components of the solid ceramic spheres are on a regulatory list for ozone depleting substances.

## 16. Other Information

<b>Training Instructions</b>	Workers exposed to crystalline are required to obtain training to be in compliance with OSHA Final rules for silica (81 FR 16286-16890) Published March 26, 2016, which are applicable to the safe handling and use of Fortimix® products. Follow company training, housekeeping, air quality engineering controls, and use the proper personal protective equipment described above.
<b>Data Sources</b>	ACGIH® (American Conference of Governmental Industrial Hygienists) New Jersey Right to Know Hazardous Substance Fact Sheets US OSHA, 29 CFR 1910, Tables Z-1, Z-2, Z-3 US Centers for Disease Control and Prevention, NIOSH Pocket Guide
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