

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

Product Name: JIOS AeroVa[®] Fire Resistant Coating

Synonyms: Silica aerogel material

Use of the Substance/Preparation: High performance fire resistant material

Manufacturer: JIOS Aerogel Corporation
Address: 531-14 Gajang-ro, Osan-si, Gyeonggi-do, Korea 447-210

Telephone: +82 31 379-8700
Fax: +82 31 379-8788, 8799

2. HAZARDS IDENTIFICATION

Indication of Hazards to Humans and the Environment:
Not hazardous according to the Globally Harmonized System (GHS)

Emergency Overview

Caution:
May cause skin and respiratory tract irritation. Ingestion may cause gastric disturbances.

Appearance: Turbid Liquid
Odor: Faint Odor

Primary Routes of Exposure:
Primary routes of exposure for liquids include skin and eye contact, inhalation, and ingestion.

Potential Health Effects

Skin contact:
May cause skin irritation. May be harmful if absorbed through the skin.

Eye contact:
May cause eye irritation.

Inhalation:
Material may be irritating to upper respiratory tract and mucous membranes.

Ingestion:
May be harmful if swallowed.

Chronic Effects of Exposure:
None known for product

Carcinogenicity:
No data available.

Target Organ Effects:

Skin, Lungs

Medical Condition Aggravated By Exposure:

Excessive exposure and inhalation may aggravate pre-existing skin disorders and chronic respiratory disorders including, but not limited to, bronchitis, emphysema, and asthma.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	Percent	EINECS Number
Trimethylsilylated Silica (amorphous silica)	7631-86-9	1~15	262-373-8
Sodium Silicate	1344-09-8	30~40	215-687-4
Water	7732-18-5	55	231-791-2
Proprietary Additive	NA	<=10	Not assigned

4. FIRST AID MEASURES

Eye Contact:

Immediately wash with large amounts of water for several minutes, occasionally lifting lids. Remove contact lenses if worn and continue to wash with water. If irritation occurs and persists, get medical treatment.

Skin Contact:

Remove contaminated clothing and footwear. Immediately wash with large amounts of water for at least 20 minutes. If irritation occurs and persists, get medical treatment.

Ingestion:

Seek immediate medical attention. Do not induce vomiting.

Inhalation:

Remove to fresh air. If irritation occurs and persists, get medical treatment.

5. FIRE-FIGHTING MEASURES

Flash Point:

Not applicable

Autoignition Temperature:

Not applicable

Hazardous combustion products:

Flammable hydrogen gas may be produced on prolonged contact with metals such as aluminum, tin, lead, and zinc.

Extinguishing Media:

Use media suitable for surrounding fire and that are appropriate to the surrounding environment; Water & foam, water mist, carbon dioxide, and dry chemical fire extinguishers are all suitable.

Note that water & foam and water mist fire extinguishers are primarily for Class A fires.

Protective Equipment for Fire-fighting:

Firefighters should be equipped with self-contained breathing apparatus and turnout gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Wear personal protective equipment during cleanup and provide adequate ventilation.

Environmental Precautions:

Local authorities should be advised if significant spillages cannot be contained.

Methods and Materials for Containment and Cleaning Up:

Contain spills using inert absorbent material such as sand, earth, and saw dust. Use rags to clean up spilled material. Dispose in suitable waste containers in accordance with local, state, and federal regulations.

Deactivating Materials:

Residue can be neutralized with a dilute solution of acetic acid.

7. HANDLING AND STORAGE

Precautions for Safe Handling:

Wear personal protective gear (rubber gloves, protection uniform, activated carbon mask, etc.) and avoid direct skin contact. Provide adequate ventilation and avoid inhalation of vapor or mist. Practice good industrial hygiene and safety guidelines.

Conditions for Safe Storage:

Keep in cool and well-ventilated area and protect from freezing. Store in clean steel or plastic containers. Separate from acids, reactive metals, and ammonium salts. Do not store in aluminum, fiberglass, copper, brass, zinc, or galvanized containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

None applicable

Engineering Controls

Ensure adequate ventilation. Keep containers closed.

Personal Protective Equipment

Respiratory Protection:

Wear properly fitted NIOSH/MSHA approved respirator whenever workplace conditions warrant use of a respirator. Wear respiratory protection if ventilation is inadequate.

Hand Protection:

Nitrile, latex or other impermeable protective gloves to prevent dermal exposure

Eye Protection:

Safety goggles (Chemical goggles). Wear face shields if splashing hazard exists.

Hygiene Measures:

Wash hands and/or face thoroughly between breaks and at the end of the working period.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Turbid Liquid
Odor:	Faint odor
pH:	11.0 ~ 13.0 (25 °C)
Freezing/Melting Point:	Not Determined
Boiling Point:	100 ~ 110 °C
Flashing Point:	Not applicable
Evaporation Rate:	Not Determined
Flammability:	Not a flammable liquid according to GHS
Vapor Pressure:	18 mmHg (20 °C)
Solubility in Water:	Partly Soluble
Autoignition Temperature:	Not applicable
Viscosity:	500 ~ 2000 mPa·s

10. STABILITY AND REACTIVITY

Chemical Stability:

Chemically stable under normal handling conditions

Hazardous Reactions:

Gels and generates heat when mixed with acid. May react with ammonium salts resulting in evolution of ammonia gas. Flammable hydrogen gas may be produced on contact with aluminum, tin, lead, and zinc.

Conditions To Avoid:

None

Substances to Avoid:

Highly reactive with acids. Reactive with oxidizing agents.

Hazardous Decomposition Products:

Hydrogen gas

11. TOXICOLOGICAL INFORMATION

Principal Routes of Exposure**Ingestion:**

May cause irritation to mouth, esophagus and stomach. Causes digestive tract irritation.

Skin Contact:

Causes moderate skin irritation.

Inhalation:

May cause irritation of upper respiratory tract.

Eye Contact:

Causes eye irritation.

Acute Toxicity of Product

Acute Oral

Type of value: LD50

Value: Not available

Acute Dermal

Type of value: LD50

Value: Not available

Acute Inhalation

Type of value: LC50

Value: Not available

Additional Information:

When tested for primary skin irritation potential, this material produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when this material gets on clothes at the collar, cuffs or other areas where abrasion may occur. The acute oral toxicity of this product has not been tested. When sodium silicates were tested on a 100% solids basis, their single dose acute oral LD50 in rats ranged from 1500 mg/kg to 3200 mg/kg. The acute oral lethality resulted from nonspecific causes. This product contains approximately 37.5% sodium silicate.

Subchronic Data: In a study of rats fed sodium silicate in drinking water for three months, at 200, 600 and 1800 ppm, changes were reported in the blood chemistry of some animals, but no specific changes to the organs of the animals due to sodium silicate administration were observed in any of the dosage groups. Another study reported adverse effects to the kidneys of dogs fed sodium silicate in their diet at 2.4g/kg/day for 4 weeks, whereas rats fed the same dosage did not develop any treatment-related effects. Decreased numbers of births and survival to weaning was reported for rats fed sodium silicate in their drinking water at 600 and 1200 ppm.

Carcinogenicity:

Sodium silicate is not listed in IARC nor ACGIH as a carcinogen.

Other information:

The information was derived from products of similar composition.

12. ECOLOGICAL INFORMATION

Environmental Effects:

High pH of this material is harmful to aquatic life.

Other Information:

The following data is reported for sodium silicates on a 100% solids basis: A 96 hour median tolerance for fish (*Gambusia affinis*) of 2320 ppm; a 96 hour median tolerance for water fleas (*Daphnia magna*) of 247 ppm; a 96 hour median tolerance for snail eggs (*Lymnea*) of 632 ppm; and a 96 hour median tolerance for Amphipoda of 160 ppm. This material is not persistent in aquatic systems, but its

high pH when undiluted or unneutralized is acutely harmful to aquatic life. Diluted material rapidly depolymerizes to yield dissolved silica in a form that is indistinguishable from natural dissolved silica. It does not contribute to BOD. This material does not bioaccumulate except in species that use silica as a structural material such as diatoms and siliceous sponges. Where abnormally low natural silica concentrations exist (less than 0.1 ppm), dissolved silica may be a limiting nutrient for diatoms and a few other aquatic algal species. However, the addition of excess dissolved silica over the limiting concentration will not stimulate the growth of diatom populations; their growth rate is independent of silica concentration once the limiting concentration is exceeded. Neither silica nor sodium will appreciably bioconcentrate up the food chain. Sinks and dissolves in water. Only water will evaporate from this material.

13. DISPOSAL CONSIDERATIONS

Waste Disposal:

Dispose in an approved facility or through a licensed waste disposal contractor. Disposal of this product, solutions, and any byproducts should at all times comply with the requirements of environmental protection and waste disposal legislation. Do not discharge into waterways, drains, and sewers.

Container Disposal:

Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Follow Waste Disposal guidelines.

14. TRANSPORT INFORMATION

UN Number:

Not classified as a dangerous good under transport regulations.

UN Proper Shipping Name:

Not classified as a dangerous good under transport regulations.

Transport Hazard Class:

Not classified as a dangerous good under transport regulations.

Packaging Group:

Not classified as a dangerous good under transport regulations.

Land Transport:

USDOT Not classified as a dangerous good under transport regulations.

Sea Transport:

IMDG Not classified as a dangerous good under transport regulations.

Air Transport:

IATA/ICAO Not classified as a dangerous good under transport regulations.

Rail Transport:

RID Not classified as a dangerous good under transport regulations.

15. REGULATORY INFORMATION

Federal and State Regulations:	TSCA 8(b) inventory
OSHA Hazard Category	Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)
CERCLA/SARA:	Not Listed
MA, NJ, PA Right-to-Know List:	Not Listed
California Proposition 65:	Not Listed
WHMIS (Canada):	CLASS D-2B: Material causing other toxic effects (TOXIC).
DSCL (EEC):	R35- Causes severe burns.

16. OTHER INFORMATION

HMIS Rating

Health: 3 Flammability: 0 Physical Hazard: 0

DISCLAIMER

The Data set forth in these sheets are based on the information provided by the suppliers of the raw materials and chemicals used in the manufacturing of the aforementioned product. JIOS AEROGEL LIMITED makes no warranty with respect to the accuracy of the information provided by their suppliers, and disclaims all liability of reliance thereon.

® and 'TM' indicate trademarks of JIOS AEROGEL Limited.