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**1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY**

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**Product Name:** Pyrogel® 3350, 6350, 10350

**Synonyms:** Silica gel, trimethylsilylated; silica aerogel materials

**Use of the Substance/Preparation:** High performance insulation material

**Manufacturer:** Aspen Aerogels, Inc.

**Address:** 30 Forbes Road  
Northborough, MA 01532

**Telephone:** (508) 691-1111

**Emergency Telephone Number:** 800-535-5053 US (INFOTRAC)  
352-323-3500 INTERNATIONAL

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**2. HAZARDS IDENTIFICATION**

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**Appearance and Odor:** Dark grey fabric material with no characteristic odor. Under certain conditions, product may have faint ammonia-like odor.

**Emergency Overview:** Inhalation of excessive amounts of dust from the product may cause mechanical irritation to the respiratory tract. Dermal contact may cause mechanical irritation.

**POTENTIAL HEALTH EFFECTS**

**Inhalation:** Inhalation of airborne dusts may cause mechanical irritation of the upper respiratory tract.

**Eye Contact:** Exposure to dust from this product can produce a drying sensation and mechanical irritation of the eyes.

**Skin Contact:** Skin contact with dust from this product can produce a drying sensation and mechanical irritation of the skin and mucous membranes.

**Ingestion:** This material is not intended to be ingested (eaten). If ingested in large quantity, the material may produce mechanical irritation and blockage.

**Acute Health Hazards:** Dust from this product is a physical irritant, and may cause temporary irritation or scratchiness of the throat and / or itching and redness of the eyes and skin.

**Chronic Health Hazards:** Some studies of long term amorphous silica dust exposures indicate a potential for decreased lung function. In surveyed studies, this effect is characterized as compounded by smoking. Additionally, surveyed studies characterize the decreased lung function effect as reversible on discontinuation of exposure.

Per the fiberglass manufacturer, the fiberglass is considered textile grade and is not classified as a human carcinogenic by IARC (Group 3), ACGIH (Group A4), NTP, or OSHA.

This product contains a proprietary opacifier whose elemental components include copper and manganese. Because of the structure of the copper and manganese and the respective weight percentage in this proprietary component, exposure to these elements is expected to be below levels which would cause chronic health effects. The final product contains less than 1% of each of these elements. Chronic overexposure to manganese and its compounds may have effects on the lungs and central nervous system.

**Medical Conditions Aggravated by Exposure:** Excessive inhalation of dust may aggravate pre-existing chronic lung conditions including, but not limited to, bronchitis, emphysema, and asthma. Dermal contact may aggravate existing dermatitis.

**CARCINOGENICITY**

| Component                        | ACGIH | NTP        | IARC |
|----------------------------------|-------|------------|------|
| Continuous Filament Glass Fibers | A4    | Not Listed | 3    |
| Amorphous Silica                 | NA    | Not Listed | None |
| Proprietary opacifier            | A4    | Not Listed | None |

**SECTION 2 NOTES:** This product is composed of synthetic amorphous silica dioxide, often referred to as silica gel or amorphous precipitated silica. Amorphous silica should not to be confused with crystalline silica. Epidemiological studies indicate low potential for adverse health effects from exposure to amorphous silica. The ACGIH A4 designation is based on the base ingredients in the proprietary opacifier.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

| Ingredient                         | CAS Number  | Percent | EINECS Number | EU Classification |
|------------------------------------|-------------|---------|---------------|-------------------|
| Silica gel, trimethylsilylated     | 126877-03-0 | 50-70   | Not Assigned  | None              |
| Oxidized polyacrylonitrile fiber   | NA          | 15-35   | Not Assigned  | None              |
| Fibrous glass (textile grade)      | NA          | 15-35   | Not Assigned  | None              |
| Proprietary Opacifier <sup>a</sup> | NA          | 0-2     | NA            | None              |

<sup>a</sup> Product contains a proprietary opacifier whose elemental components include copper and manganese. The final product contains less than 1% of each of these elements.

**4. FIRST AID MEASURES**

**Eye Contact:** Immediately wash with large amounts of water for at least 15 minutes, occasionally lifting lids. If irritation occurs and persists, get medical treatment.

**Skin Contact:** Wash skin thoroughly with soap and plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Obtain medical attention if symptoms occur.

**Ingestion:** Material will pass through the body normally.

**Inhalation:** Remove to fresh air. Drink water to clear throat and blow nose to remove dust. Obtain medical attention if ill effects persist.

**5. FIRE-FIGHTING MEASURES**
**5.1 FLAMMABILITY PROPERTIES**

|  |                |
|--|----------------|
| Auto ignition Temperature                    | Not Applicable |
| Flash Point                                  | Not Applicable |
| Flammability Limits: (Lower Explosive Limit) | Not Applicable |
| Flammability Limits: (Upper Explosive Limit) | Not Applicable |

**5.2 EXTINGUISHING MEDIA:**

Use media suitable for surrounding fire and that are appropriate to the surrounding environment; normal fog nozzle water application and/or exclusion of air is typically suitable for extinguishing this product in blanket form.

### 5.3 PROTECTION FOR FIRE FIGHTERS

|  |   |
|--|---|
| <b>Special Fire Fighting Procedures:</b>   | Normal fire fighting procedures should be followed to avoid inhalation of smoke and gases produced by a fire.   |
| <b>Unusual Fire and Explosion Hazards:</b> | Product is a super-insulation material. Rolls of material can retain heat within internal layers causing re-ignition in the presence of oxygen if heat is not removed.  |
| <b>Hazardous Decomposition Products:</b>   | Primary combustion products are carbon monoxide and carbon dioxide. The product contains polyacrylonitrile. If involved in combustion events, product can evolve trace amounts of; NH <sub>3</sub> (ammonia), HCN (hydrogen cyanide), and monomeric acrylonitrile.<br><br>This material was tested for toxic combustion gases using the widely accepted Boeing Specification Standard BSS 7239, Gas Analysis and Smoke Density and Toxicity Test for aircraft. All concentrations of toxic gases measured were less than 10% of the exposure limits specified in this standard. |

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## 6. ACCIDENTAL RELEASE MEASURES

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|-----------------------------------|---|
| <b>Personal Precautions:</b>      | Minimize dust generation. Ensure adequate ventilation. Use personal protective equipment as necessary.                |
| <b>Environmental Precautions:</b> | Material is not soluble. Do not flush into surface water or sanitary sewer system.                                    |
| <b>Methods for Cleaning Up:</b>   | Contain and collect released material for proper disposal. Dry vacuuming is the preferred method of cleaning up dust. |

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## 7. HANDLING AND STORAGE

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|-----------------|---|
| <b>Handling</b> | Aerogel blankets will generate dust when handled. Workplace exposure to all dusts should be controlled with standard industrial hygiene practices. Local exhaust ventilation should be the primary dust control method. Dust released during the handling of aerogel blankets should be cleaned up promptly. Dry vacuuming is the preferred method for cleaning up dust. Sweeping is not an effective method of picking up aerogel dust. Because aerogel dust is hydrophobic, water is not effective as a dust control agent. |
| <b>Storage</b>  | Aerogel blankets should be kept in their packaging until they are ready to be used. Unpack the material in the work area. This will help to minimize the area where dust exposure may occur. Trimmed material and scrap should be promptly packed in disposal bags.   |

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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### 8.1 Exposure Limit Values

There are no exposure limits identified for the main product component, classified as synthetic amorphous silica. Exposure limits for synthetic amorphous silica are based on silica (CAS No. 7631-86-9).

| CAS Number | Component Name                     | Exposure Limits                  |
|------------|------------------------------------|----------------------------------|
| 7631-86-9  | Silica, Amorphous                  | Germany TRGS 900                 |
|            |                                    | UK WEL                           |
|            |                                    | US OSHA PEL (TWA) <sup>a</sup> : |
|            |                                    | US ACGIH <sup>b</sup>            |
| NA         | Continuous filament glass fibers   | US ACGIH                         |
|            |                                    | US OSHA                          |
| NA         | Proprietary opacifier <sup>d</sup> | NA                               |

<sup>a</sup> The US OSHA standard for amorphous silica is: (80 mg/m<sup>3</sup>)/(%SiO<sub>2</sub>). The NIOSH Sampling Method 7501 for Amorphous Silica calculates the %SiO<sub>2</sub> based on the percentage of crystalline silica in the sample. Because the percentage of crystalline silica in aerogel is 0%, the particulate limit applies.

<sup>b</sup> US ACGIH based on Particles Not Otherwise Specified (PNOS)

<sup>c</sup> Respirable fibers: length >5 μm; aspect ratio ≥3:1, as determined by the membrane filter method at 400–450X magnification (4-mm objective), using phase-contrast illumination. US NIOSH length μm, width <3 μm diameter and length:width ratios ≥3.

<sup>d</sup> Product contains a proprietary opacifier whose elemental components include copper and manganese. The final product contains less than 1% of each of these elements. According to the manufacturer of the opacifier, there is no specific exposure limit for this material. Based on the percentage of these elements in the final product, the applicable amorphous silica exposure limit would be exceeded before the copper compounds and manganese compounds exposure limits would be exceeded.

## 8.2 Exposure Control

**Ventilation:** Local exhaust in accordance with general industrial hygiene practices is recommended to control dust.

**Respiratory Protection:** A properly fitted, NIOSH or CE approved respirator should be worn when ventilation is unavailable or inadequate to maintain airborne concentrations below applicable occupational exposure limits. A respiratory protection program that meets applicable local regulations should be implemented whenever workplace conditions warrant use of a respirator.

**Hand Protection** Silica aerogels are hydrophobic (repel water) and may cause drying and irritation of the skin, eyes, and mucous membranes. For this reason, nitrile, latex, or other impermeable gloves should be worn when handling aerogel blankets.

**Eye Protection:** Safety glasses, or chemical goggles as needed to provide greater protection from dust.

**Skin Protection:** Long-sleeved, long-legged work clothes are also advised. Disposable coveralls should be considered to minimize skin exposure and track out of aerogel dusts into adjacent areas.

**Work Hygienic Practices** Keep materials packaged until just prior to use. Die cut in preference to rotary or other cutting methods. Dry vacuum with proper filtration preferred to sweeping. Wash thoroughly after using the product. Wash clothing if dusty conditions present. Wash hands before eating or drinking.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                                   |   |
|-----------------------------------|---|
| <b>Appearance:</b>                | Dark grey fabric blanket  |
| <b>Odor:</b>                      | No characteristic odor. Under certain conditions, product may have faint ammonia-like odor. |
| <b>pH:</b>                        | Not applicable.   |
| <b>Boiling Point/Range:</b>       | Not applicable.   |
| <b>Flash Point:</b>               | Not applicable.   |
| <b>Flammability (solid, gas):</b> | Not applicable.   |
| <b>Explosive Properties:</b>      | Not applicable.   |
| <b>Oxidizing Properties:</b>      | Not applicable.   |
| <b>Vapor Pressure:</b>            | Not applicable.   |
| <b>Solubility:</b>                | Insoluble.  |
| <b>Viscosity:</b>                 | Not applicable.   |
| <b>Evaporation Rate:</b>          | Not applicable  |

## 10. STABILITY AND REACTIVITY

|   |  |
|---|--|
| <b>Chemical Stability:</b>              | Stable   |
| <b>Conditions to Avoid:</b>             | Prolonged exposure to temperatures above the recommended use temperature.  |
| <b>Materials to Avoid:</b>              | None Known.  |
| <b>Hazardous Decomposition Products</b> | Please refer to Section 5.3 for products of combustion. Under recommended usage conditions, hazardous decomposition products are not expected. |

## 11. TOXICOLOGICAL INFORMATION

### ACUTE TOXICITY

Dust may cause mechanical irritation and dryness to eyes and skin.

#### Synthetic Amorphous Silica

|                         |   |
|-------------------------|---|
| <b>Oral LD50:</b>       | >5,000 mg/kg  |
| <b>Inhalation LC50:</b> | >2,000 mg/m <sup>3</sup>  |
| <b>Dermal LD50:</b>     | >3,000 mg/kg  |
| <b>Eye Irritation:</b>  | Synthetic amorphous silica and silicates are not irritating to skin and eyes under experimental conditions, but may produce dryness following prolonged and repeated exposure.  |
| <b>Skin Irritation:</b> | Synthetic amorphous silica and silicates are not irritating to skin and eyes under experimental conditions, but may produce dryness following prolonged and repeated exposure. This material was determined to be non-irritating by the MatTek Epiderm MTT Viability Assay. |

### CHRONIC TOXICITY

Some studies of long term amorphous silica dust exposures indicate a potential for decreased lung function. In surveyed studies, this effect is characterized as compounded by smoking. Additionally, surveyed studies characterize the decreased lung function effect as reversible on discontinuation of exposure.

**CARCINOGENICITY**

The International Agency for Research on Cancer (IARC) considers synthetic amorphous silica to be not classifiable as to its carcinogenicity to humans (Group 3). According to the manufacturer, the fiberglass in this product is considered textile grade fibrous glass and it is not classified as a carcinogen by ACGIH, IARC, NTP or OSHA. The elements in the proprietary opacifier are considered A4 (Not Classifiable as a Human Carcinogen) by ACGIH.

**NOTE TO SECTION 11:** Toxicological information is based on literature review for synthetic amorphous silica (CAS No. 7631-86-9)

**12. ECOLOGICAL INFORMATION**

**Aquatic Toxicity**

|                                   |   |
|-----------------------------------|---|
| <b>Synthetic Amorphous Silica</b> | Fish: LC50 > 10,000 mg/L (Brachydanio rerio: 96 hour), Method OECD 203<br>Daphnia magna: EC50 > 10,000 mg/l (24 hours), Method OECD 202 |
|-----------------------------------|---|

|                 |   |
|-----------------|---|
| <b>Mobility</b> | None expected due to insoluble nature of product. |
|-----------------|---|

|   |  |
|---|--|
| <b>Persistence and Biodegradability</b> | Not applicable for inorganic material. |
|---|--|

|                                  |   |
|----------------------------------|---|
| <b>Bioaccumulative Potential</b> | None expected due to insoluble nature of product. |
|----------------------------------|---|

|                              |                |
|------------------------------|----------------|
| <b>Other Adverse Effects</b> | None expected. |
|------------------------------|----------------|

**NOTE TO SECTION 12:** Ecological information is based on literature review for synthetic amorphous silica (CAS No. 7631-86-9)

**13. DISPOSAL CONSIDERATIONS**

Dispose in an approved landfill in accordance with federal, state / provincial, and local regulation. Cover promptly to avoid dust generation. This product is not regulated as a hazardous waste under US RCRA regulations.

**14. TRANSPORT INFORMATION**

|                       |                             |
|-----------------------|-----------------------------|
| <b>Shipping Name:</b> | Not regulated for transport |
|-----------------------|-----------------------------|

|                     |      |
|---------------------|------|
| <b>Hazard Class</b> | None |
|---------------------|------|

|                  |      |
|------------------|------|
| <b>UN Number</b> | None |
|------------------|------|

|                      |      |
|----------------------|------|
| <b>Packing Group</b> | None |
|----------------------|------|

|                          |      |
|--------------------------|------|
| <b>Required Label(s)</b> | None |
|--------------------------|------|

|                         |    |
|-------------------------|----|
| <b>Marine Pollutant</b> | No |
|-------------------------|----|

|                               |      |
|-------------------------------|------|
| <b>Additional Information</b> | None |
|-------------------------------|------|

**15. REGULATORY INFORMATION**

**EC REGULATORY INFORMATION**

Product is not classified as a dangerous material or preparation as defined in EC Directives 67/548/EEC or 1999/45/EC.

**U.S. FEDERAL REGULATIONS**

**CERCLA (Comprehensive Response Compensation and Liability Act):** Product is not classified as hazardous or reportable under this requirement.

**SARA TITLE III (Superfund Amendments and Reauthorization Act):** Product is not classified as hazardous or reportable under this requirement.

**311/312 HAZARD CATEGORIES:** Materials in this product are classified as hazardous or reportable under this requirement.

**313 REPORTABLE INGREDIENTS:** Materials in this product are classified as hazardous or reportable under this requirement.

**STATE REGULATIONS:** Materials in this product appear on the following state hazardous substance lists : CA, IN, KY, MA, MN, NC, NJ, OR, PA. Check individual state requirements

**INTERNATIONAL REGULATIONS** Amorphous silica (CAS No. 7631-86-9), are listed on the WHMIS Ingredient Disclosure List at a concentration threshold of 1 %.

**TSCA:** All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.”

**16. OTHER INFORMATION**

**NFPA HAZARD CLASSIFICATION**

**Health** 1  
**Flammability** 1  
**Reactivity** 0  
**Other** N/A

**HMIS HAZARD CLASSIFICATION**

**Health** 1  
**Flammability** 1  
**Reactivity** 0  
**Protection** Please refer to Section 8.

**ABBREVIATIONS:**

|                      |   |
|----------------------|---|
| <b>NA</b>            | Denotes no applicable information found or available.       |
| <b>CAS Number</b>    | Chemical Abstract Service Number                            |
| <b>EINECS Number</b> | European INventory of Existing Chemical Substances          |
| <b>ACGIH</b>         | American Conference of Governmental Industrial Hygienists   |
| <b>US OSHA</b>       | United States Occupational Safety and Health Administration |
| <b>TLV</b>           | Threshold Limit Value                                       |
| <b>PEL</b>           | Permissible Exposure Limit                                  |
| <b>TWA</b>           | Time-weighted average                                       |
| <b>IARC</b>          | International Agency for Research on Cancer                 |
| <b>EC</b>            | European Commission   |
| <b>NTP</b>           | National Toxicology Program                                 |
| <b>R</b>             | Risk  |
| <b>S</b>             | Safety  |
| <b>LC50</b>          | Lethal Concentration 50%                                    |
| <b>LD50</b>          | Lethal Dose 50%   |
| <b>NFPA</b>          | National Fire Protection Association                        |
| <b>HMIS</b>          | Hazardous Materials Identification System                   |
| <b>US DOT</b>        | United States Department of Transportation                  |
| <b>TDG</b>           | Transportation of Dangerous Goods Regulation                |

Section 11 Synthetic Amorphous Silica Toxicity Information Reference: United Nations Environmental Programme (UNEP), Organization for Economic Co-operation and Development (OECD) Screening Information Data Set (SIDS) Initial Assessment Report, Synthetic Amorphous Silica, July 23, 2004. Information on proprietary additive was provided by manufacturer.

**Revision Summary:** This revised safety data sheet replaces all previous versions. The safety data sheet was modified to update format and clarify content.

**DISCLAIMER:** The information herein is presented in good faith and believed to be accurate as the effective data given. However, no warranty, expressed or implied, is given. It is the user’s responsibility to ensure that its activities comply with Federal, State or Provincial, and local laws.