## MATERIAL SAFETY DATA SHEET
OSHA HAZARD COMMUNICATION RULE

**DATE OF LAST REVISION:** 05-2002

### CHEMICAL IDENTITY

<table>
<thead>
<tr>
<th>LABEL IDENTITY</th>
<th>SILICON NITRIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEMICAL NAME/SYNONYMS</td>
<td>TRISILICON TETANITRIDE</td>
</tr>
<tr>
<td>FORMULA</td>
<td>Si3N4 (mixture of alpha and beta forms)</td>
</tr>
<tr>
<td>CHEMICAL FAMILY</td>
<td>METAL NITRIDE</td>
</tr>
<tr>
<td>HAZARDOUS INGREDIENTS</td>
<td>SILICON NITRIDE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>%:</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS:</td>
<td>12033-89-5</td>
</tr>
<tr>
<td>TLV:</td>
<td>10mg/m³</td>
</tr>
<tr>
<td>OSHA/PEL:</td>
<td>10mg/m³ (as Si)</td>
</tr>
<tr>
<td></td>
<td>0.1mg/m³ (as SiO₂)</td>
</tr>
</tbody>
</table>

### PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>COLOR, FORM AND ODOR</th>
<th>Grayish-white amorphous powder. Slight ammonia possible.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOILING POINT</td>
<td>ND</td>
</tr>
<tr>
<td>DENSITY (gm/cc)</td>
<td>3.44</td>
</tr>
<tr>
<td>VAPOR PRESSURE @ 20°</td>
<td>NA</td>
</tr>
<tr>
<td>% VOLATILE BY VOLUME (%)</td>
<td>NA</td>
</tr>
<tr>
<td>REACTION WITH WATER</td>
<td>Exothermic reaction possible</td>
</tr>
<tr>
<td>EVAPORATION RATE (H2O=1)</td>
<td>NA</td>
</tr>
<tr>
<td>SOLUBILITY IN WATER</td>
<td>Insoluble</td>
</tr>
<tr>
<td>MELTING POINT</td>
<td>1900 (pressure) 2173 ° K-sublim</td>
</tr>
</tbody>
</table>

### FIRE AND EXPLOSION HAZARD DATA

| FLASH POINT | NA |
| AUTOIGNITION TEMPERATURE (°C) | NA |
| FLAMMABILITY | Non-flammable |
| EXTINGUISHING MEDIA | Use dry chemical, CO₂. |
| SPECIAL FIRE FIGHTING PROCEDURES | Wear a self-contained breathing apparatus and full protective clothing to prevent contact with skin and eyes. |
| UNUSUAL FIRE & EXPLOSION HAZARDS | Material may emit toxic fumes if involved in a fire or on contact with acid or acidic fumes. NH₃ gas may be evolved on contact with water or moisture. |

### HEALTH HAZARD INFORMATION

<table>
<thead>
<tr>
<th>TOXICITY DATA</th>
<th>ipr-mus LDLO: 40mg/kg</th>
<th>ivn-rat LDLO: 15mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ipr-rat LDLO: 400mg/kg</td>
<td>ivn-rbt LDLO: 35mg/kg</td>
</tr>
<tr>
<td></td>
<td>itr-rat LDLO: 120mg/kg</td>
<td></td>
</tr>
</tbody>
</table>
SILICON NITRIDE
MATERIAL SAFETY DATA SHEET

HMIS RATING:
  HEALTH: 2  FLAMMABILITY: 0  REACTIVITY: 2  PERSONAL PROTECTION: F

ROUTES OF ENTRY
  INHALATION: Yes
  SKIN: Yes
  INGESTION: Yes

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:
  Respiratory Disorders

EFFECTS OF OVEREXPOSURE (acute and chronic):
  INHALATION: A respiratory irritant. Coughing, sneezing, difficulty breathing and pulmonary edema. May cause irritation of the mucous membranes of the nose and throat.
  OTHER: The action of crystalline silica on the lungs results in the production of a diffuse, modular fibrosis in which the parenchyma and the lymphatic system are involved. This fibrosis is, to a certain extent, progressive, and may continue to increase for several years after exposure is terminated. When the pulmonary reserve is sufficiently reduced, the worker complains of shortness of breath or exertion. This is the first and most common symptom in cases of uncomplicated silicosis. If severe, it may incapacitate the worker for heavy, or even light, physical exertion, and in extreme cases there may be shortness of breath even while at rest. The most common physical sign of silicosis is a limitation of expansion of the chest. There may be a dry cough, sometimes very troublesome. The characteristic radiographic appearance is one of diffuse, discrete modulation, scattered throughout both lung fields. Where the disease advances, the shortness of breath becomes worse, and the cough more productive and troublesome. There is no fever or other evidence of systemic reaction. Further progress of the disease results in marked fatigue, extreme dispense and cyanosis, loss of appetite, pleuritic pain and total incapacity to work. IF tuberculosis does not supervene, the condition may eventually cause death either from cardiac failure or from destruction of lung tissue, with resultant anorexia.
  The details of the toxicity of nitrides as a group are unknown. However, many nitrides react with moisture to evolve NH3. This gas is an irritant to mucous membranes.

CARCINOGENICITY: None  NTP: NO  IARC MONOGRAPHS: NO  OSHA REGULATE: NO

EMERGENCY FIRST AID PROCEDURES:
  INGESTION: Administer 1-2 cups of water or milk and induce vomiting, seek medical attention.
  INHALATION: Remove to fresh air, give oxygen if breathing is difficult. Seek medical attention.
  SKIN CONTACT: Wash affected area with soap and water, seek medical attention.
  EYE CONTACT: Flush eyes for at least 15 minutes with lukewarm water, seek medical.
SILICON NITRIDE
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REACTIVITY DATA

STABILITY
Unstable

CONDITIONS CONTRIBUTING TO UNSTABILITY
Air and moisture

INCOMPATIBILITY (MATERIALS TO AVOID)
Strong acids, strong bases and water

HAZARDOUS DECOMPOSITION PRODUCTS
SiO\textsubscript{x}, NH\textsubscript{3}

HAZARDOUS POLYMERIZATION
Will Not Occur

CONDITIONS TO AVOID
Heat, air, water/moisture and incompatible materials.

SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Wear self-contained breathing apparatus and full protective clothing. Isolate the area where the spill occurred and insure proper ventilation is available. Vacuum up the spill using a high efficiency unit and place in a container for proper disposal. Take care not to raise dust.

WASTE DISPOSAL METHOD:
Dispose of in accordance with applicable federal, state and local regulations.

SPECIAL PROTECTIVE INFORMATION

RESPIRATORY PROTECTION
Wear NIOSH-approved dust-mist-fume cartridge respirator.

LOCAL EXHAUST
Maintain exposure below TLV

MECHANICAL (general)
Recommended

SPECIAL
Handle in a dry, inert, controlled atmosphere

OTHER
NA

PROTECTIVE GLOVES
Neoprene

EYE PROTECTION
Safety glasses

OTHER PROTECTIVE EQUIPMENT
Wear protective clothing to prevent contamination of skin and clothes

SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE:
Store in tightly closed container, store away from heat and incompatible materials, wash hands and face thoroughly after handling and before meals.
TRANSPORTATION REQUIREMENTS

DOT CLASS: Not Classified
UN NUMBER: NC
IMCO CLASS: NC
OTHER: SPC, corrosive

PRECAUTIONARY LABELING
NONE

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NA= NOT APPLICABLE
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