Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name
Silane 1.5-15%/Nitrogen (Balance) Gas Mixture

Chemical Family
silicon hydrides mixture

Product Use
semiconductor processing.

Restrictions on Use
None known.

Details of the supplier of the safety data sheet
MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920
General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

Flammable Gases - Category 1
Gases Under Pressure - Compressed gas
Acute Toxicity - Inhalation - Gas - Category 4
Skin Corrosion/Irritation - Category 2
Serious Eye Damage/Eye Irritation - Category 2A
Specific target organ toxicity - Repeated exposure - Category 2

GHS Label Elements
Symbol(s)

Signal Word
Danger

Hazard Statement(s)
Extremely flammable gas.
Contains gas under pressure; may explode if heated.
Harmful if inhaled.
Causes skin irritation.
Causes serious eye irritation.
May cause damage to organs through prolonged or repeated exposure. (lungs)
May displace oxygen and cause rapid suffocation.

Precautionary Statement(s)
Prevention
Keep away from heat, sparks, open flame, and hot surfaces - No smoking.
Do not breathe gas.
Use only outdoors or in a well-ventilated area.
Wear protective gloves and eye/face protection.
Wash thoroughly after handling.

Response
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.
Get medical advice/attention if you feel unwell.

IF INHALED:
Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
If skin irritation occurs, get medical advice/attention.
Take off contaminated clothing and wash before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
If eye irritation persists: Get medical advice/attention.

Storage
Store in a well-ventilated place.
Protect from sunlight.

Disposal
Dispose in accordance with all applicable regulations.

Other Hazards
Rapid release of compressed gas may cause frostbite. May ignite spontaneously on exposure to air.

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### Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS</th>
<th>Component Name</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>7727-37-9</td>
<td>Nitrogen</td>
<td>85-98.5</td>
</tr>
<tr>
<td>7803-62-5</td>
<td>Silane</td>
<td>1.5-15</td>
</tr>
</tbody>
</table>

### Section 4 - FIRST AID MEASURES

**Inhalation**
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

**Skin**
Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation occurs, get medical advice/attention. Thoroughly clean and dry contaminated clothing and shoes before reuse. If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115°F; 41-46°C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

**Eyes**
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

**Ingestion**
If swallowed, get medical attention.

**Most Important Symptoms/Effects**

**Acute**
frostbite, suffocation, skin irritation, eye irritation
Safety Data Sheet

Material Name: Silane 1.5-15%/Nitrogen (Balance) Gas Mixture  
SDS ID: 00244539

Delayed lung damage

Note to Physicians
For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media
regular dry chemical, carbon dioxide. Large fires: water spray or fog

Unsuitable Extinguishing Media
Do not direct water at source of leak or safety devices; icing may occur. Do not use halogenated extinguishing agents.

Special Hazards Arising from the Chemical
Severe fire hazard. May ignite on exposure to air. Containers may rupture or explode if exposed to heat.

Hazardous Combustion Products
oxides of nitrogen, Hydrogen, oxides of silicon, silicon

Fire Fighting Measures
Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Move container from fire area if it can be done without risk. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. For smaller tanks or cylinders, extinguish and isolate from other flammables. Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 800 meters (1/2 mile). Consider downwind evacuation if material is leaking.

Special Protective Equipment and Precautions for Firefighters
Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Do not touch or walk through spilled material. Eliminate all sources of ignition. Reduce vapors with water spray. Ventilate closed spaces before entering. All equipment used when handling the product must be grounded. If possible, turn leaking containers so that gas escapes rather than liquid. Do not direct water at spill or source of leak. Keep unnecessary people away, isolate hazard area and deny entry.

Environmental Precautions
Avoid release to the environment.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling
Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Do not breathe gas. Use only outdoors or in a well-ventilated area. Wear protective gloves/eye protection/face protection. Wash hands thoroughly after handling. Ground/bond container and receiving equipment. Do not eat, drink, or smoke when using this product.
Conditions for Safe Storage, Including any Incompatibilities
Store in a well-ventilated place.
Protect from sunlight.

Incompatible Materials
bases, halogens, metal salts, oxidizing materials, metals

### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### Component Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>Exposure Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>7727-37-9</td>
</tr>
</tbody>
</table>

ACGIH: (See Appendix F: Minimal Oxygen Content)

<table>
<thead>
<tr>
<th>Silane</th>
<th>7803-62-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH:</td>
<td>5 ppm TWA</td>
</tr>
<tr>
<td>NIOSH:</td>
<td>5 ppm TWA ; 7 mg/m3 TWA</td>
</tr>
<tr>
<td>Mexico:</td>
<td>5 ppm TWA VLE-PPT ; 7 mg/m3 TWA VLE-PPT</td>
</tr>
</tbody>
</table>

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)
There are no biological limit values for any of this product's components.

#### Engineering Controls
Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

#### Individual Protection Measures, such as Personal Protective Equipment

##### Eye/face protection
Wear splash resistant safety goggles with a faceshield. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

##### Skin Protection
For the gas: Wear appropriate chemical resistant clothing. For the liquid: Wear appropriate protective, cold insulating clothing.

##### Respiratory Protection
Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

##### Glove Recommendations
For the gas: Wear appropriate chemical resistant gloves. For the liquid: Wear insulated gloves.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>colorless gas</td>
</tr>
<tr>
<td>Physical State</td>
<td>gas</td>
</tr>
</tbody>
</table>
### Odor
- disagreeable

### Odor Threshold
- Not available

### Melting Point
- -210 °C (-346 °F Nitrogen )

### Boiling Point
- -196 °C (-321 °F Nitrogen )

### Boiling Point Range
- Not available

### Evaporation Rate
- Not available

### Autoignition Temperature
- Not available

### Lower Explosive Limit
- 1 % (Silane )

### Upper Explosive Limit
- 100 % (Silane )

### Vapor Density (air=1)
- Not available

### Water Solubility
- 1.6 % (@ 20 °C Nitrogen )

### Viscosity
- 0.01787 cp (Nitrogen )

### Solubility (Other)
- Not available

### Physical Form
- gas

### Chemical Stability
- May ignite on exposure to air.

### Possibility of Hazardous Reactions
- Will not polymerize.

### Conditions to Avoid
- Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

### Incompatible Materials
- bases, halogens, metal salts, oxidizing materials, metals

### Hazardous decomposition products
- oxides of nitrogen, Hydrogen, oxides of silicon, silicon

### Water or Moisture
- silicic acid, silica

### Section 10 - STABILITY AND REACTIVITY

### Section 11 - TOXICOLOGICAL INFORMATION

### Information on Likely Routes of Exposure

#### Inhalation
- nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma, irritation, cough, sore throat, fatigue, Unconsciousness, lung damage
Safety Data Sheet

Material Name: Silane 1.5-15%/Nitrogen (Balance) Gas Mixture  
SDS ID: 00244539

Skin Contact
frostbite, irritation, thermal burns

Eye Contact
frostbite, irritation

Ingestion
ingestion of a gas is unlikely

Acute and Chronic Toxicity

Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and the following selected endpoints are published:

Silane (7803-62-5)
Inhalation LC50 Rat 9600 ppm 4 h

Product Toxicity Data

Acute Toxicity Estimate
No data available.

Immediate Effects
frostbite, suffocation, skin irritation, eye irritation

Delayed Effects
lung damage

Irritation/Corrosivity Data
skin irritation, eye irritation

Respiratory Sensitization
No data available.

Dermal Sensitization
No data available.

Component Carcinogenicity
None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA.

Germ Cell Mutagenicity
No data available.

Tumorigenic Data
No data available

Reproductive Toxicity
No data available for the mixture.

Specific Target Organ Toxicity - Single Exposure
No target organs identified.

Specific Target Organ Toxicity - Repeated Exposure
lungs

Aspiration hazard
Not applicable.

Medical Conditions Aggravated by Exposure
respiratory disorders

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity
No LOILI ecotoxicity data are available for this product's components.

Persistence and Degradability
No data available for the mixture.

Bioaccumulative Potential
No data available for the mixture.
Safety Data Sheet

Material Name: Silane 1.5-15%/Nitrogen (Balance) Gas Mixture

Mobility
No data available for the mixture.

Other Toxicity
Not considered to be harmful to aquatic life. This gas will be dissipated rapidly in well ventilated areas.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.
Hazardous Waste Number(s): D001. D003.

Component Waste Numbers
The U.S. EPA has not published waste numbers for this product’s components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:
Shipping Name: COMPRESSED GAS, FLAMMABLE, N.O.S., (Contains: Silane, Nitrogen)
Hazard Class: 2.1
UN/NA #: UN1954
Required Label(s): 2.1

IMDG Information:
Shipping Name: COMPRESSED GAS, FLAMMABLE, N.O.S., (Contains: Silane, Nitrogen)
Hazard Class: 2.1
UN#: UN1954
Required Label(s): 2.1

International Bulk Chemical Code
This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations
None of this product’s components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories
Flammable; Gas Under Pressure; Acute toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity

U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>7727-37-9</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Silane</td>
<td>7803-62-5</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Not listed under California Proposition 65

Canada Regulations

Canadian WHMIS Ingredient Disclosure List (IDL)
Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL.
### Safety Data Sheet

**Material Name:** Silane 1.5-15%/Nitrogen (Balance) Gas Mixture  
**SDS ID:** 00244539

<table>
<thead>
<tr>
<th>Silane</th>
<th>7803-62-5</th>
<th>1 %</th>
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</table>

#### WHMIS Classification

AB

#### Component Analysis - Inventory

**Nitrogen (7727-37-9)**

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<tbody>
<tr>
<td>Yes</td>
<td>DSL</td>
<td>EIN</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<td>Yes</td>
<td>Yes</td>
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**Silane (7803-62-5)**

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<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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</tbody>
</table>

### Section 16 - OTHER INFORMATION

**NFPA Ratings**

Health: 3  
Fire: 4  
Reactivity: 2  

**Hazard Scale:** 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

**Summary of Changes**

Updated: 05/01/2015

**Key / Legend**

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL), KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower
Safety Data Sheet

Material Name: Silane 1.5-15%/Nitrogen (Balance) Gas Mixture

Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR’s Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; Ne - Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

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