Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name
5% SILANE IN HELIUM, GAS MIX

Product Use
Industrial and Specialty Gas Applications.

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 I
Gases Under Pressure - Compressed gas
Pyrophoric Gas -
Acute Toxicity - Inhalation - Gas - Category 4
Skin Corrosion/Irritation - Category 3
Specific target organ toxicity - Single exposure - Category 3
Specific target organ toxicity - Repeated exposure - Category 2
Simple Asphyxiant -

GHS Label Elements

Symbol(s)

Signal Word
Danger

Hazard Statement(s)
Safety Data Sheet

Material Name: 5% SILANE IN HELIUM, GAS MIX

SDS ID: 00233171

Extremely flammable gas.
May ignite on exposure to air.
Contains gas under pressure; may explode if heated.
Harmful if inhaled.
Causes mild skin irritation.
May cause respiratory irritation.
Causes damage to organs through prolonged or repeated exposure.
May displace oxygen and cause rapid suffocation.
Catches fire spontaneously if exposed to air.

Precautionary Statement(s)

Prevention
Do not breathe gas.
Keep away from heat, sparks, open flame, and hot surfaces - No smoking.
Use only outdoors or in a well-ventilated area.
Do not extinguish, unless leak can be stopped safely.
Keep container tightly closed.

Response
Leaking gas fire.
Eliminate all ignition sources if safe to do so.
IF INHALED.
Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
If skin irritation occurs.
Get medical advice/attention.
Get medical advice/attention if you feel unwell.

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

Disposal
Dispose in accordance with all applicable regulations.

Statement of Unknown Toxicity
100% of the mixture consists of ingredient(s) of unknown acute toxicity.

Other Hazards
The rapid release of compressed gas may cause frostbite.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS</th>
<th>Component Name</th>
<th>Percent</th>
</tr>
</thead>
</table>

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Section 4 - FIRST AID MEASURES

**Inhalation**
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

**Skin**
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**
Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

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

**Most Important Symptoms/Effects**
**Acute**
frostbite, respiratory tract irritation, skin irritation, eye irritation

**Delayed**
lung damage

Section 5 - FIRE FIGHTING MEASURES

**Extinguishing Media**

**Suitable Extinguishing Media**
carbon dioxide, regular dry chemical. Large fires: Use regular foam or flood with fine water spray.

**Unsuitable Extinguishing Media**
Do not use halogenated extinguishing agents.

**Special Hazards Arising from the Chemical**
Severe fire hazard. May ignite on exposure to air. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

**Hazardous Combustion Products**
silicon, Hydrogen

**Fire Fighting Measures**
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: 500 meters (1/3 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.

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**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**
Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Keep unnecessary people away, isolate hazard area and deny entry. Avoid heat, flames, sparks and other sources of ignition. Reduce vapors with water spray. Remove sources of ignition. Ventilate closed spaces before entering. Damaged cylinders should be handled only by specialists.

**Environmental Precautions**
Avoid release to the environment.

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**Section 7 - HANDLING AND STORAGE**

**Precautions for Safe Handling**
Extremely flammable gas. Contains gas under pressure; may explode if heated. Harmful if inhaled. Causes mild skin irritation. May cause respiratory irritation. Causes damage to organs through prolonged or repeated exposure. May displace oxygen and cause rapid suffocation. The rapid release of compressed gas may cause frostbite. May ignite on exposure to air. Wash thoroughly after handling.

**Conditions for Safe Storage, Including any Incompatibilities**
Store in a well-ventilated place.
Store locked up.
Protect from sunlight.

Incompatible Materials
metal salts, bases, halogens, oxidizing materials

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>Exposure Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helium</td>
<td>7440-59-7</td>
</tr>
<tr>
<td>ACGIH:</td>
<td>(See Appendix F: Minimal Oxygen Content)</td>
</tr>
<tr>
<td>Silane</td>
<td>7803-62-5</td>
</tr>
<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 LMPE-PPT; 7 mg/m3 TWA LMPE-PPT</td>
</tr>
</tbody>
</table>

EU - Occupational Exposure (98/24/EC) - Binding Biological Limit Values and Health Surveillance Measures
There are no biological limit values for any of this product's components.

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 ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment
Eye/face protection
Wear helmet with full face shield and fire-proof hood to prevent any possibility of burns if in contact with this substance.

Skin Protection
Wear appropriate chemical resistant 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. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. For Unknown Concentrations or Immediately Dangerous to Life or Health -. 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**
Wear fire-resistant gloves.

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Physical State</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Not available</td>
<td>Physical State</td>
<td>gas</td>
</tr>
<tr>
<td>Odor</td>
<td>unpleasant odor</td>
<td>Color</td>
<td>colorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not available</td>
<td>pH</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not available</td>
<td>Boiling Point</td>
<td>Not available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>Not available</td>
<td>Evaporation Rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Boiling Point Range</td>
<td>Not available</td>
<td>Flammability (solid, gas)</td>
<td>Not available</td>
</tr>
<tr>
<td>Autoignition</td>
<td>Not available</td>
<td>Flash Point</td>
<td>(Flammable gas Silane)</td>
</tr>
<tr>
<td>Lower Explosive Limit</td>
<td>1 % (Silane)</td>
<td>Decomposition</td>
<td>Not available</td>
</tr>
<tr>
<td>Upper Explosive Limit</td>
<td>100 % (Silane)</td>
<td>Vapor Pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor Density (air=1)</td>
<td>Not available</td>
<td>Specific Gravity (water=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Not available</td>
<td>Partition coefficient: n-octanol/water</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
<td>Solubility (Other)</td>
<td>Not available</td>
</tr>
<tr>
<td>Density</td>
<td>Not available</td>
<td>Physical Form</td>
<td>gas</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Not available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Section 10 - STABILITY AND REACTIVITY

**Reactivity**
May ignite on exposure to air.
Safety Data Sheet

Material Name: 5% SILANE IN HELIUM, GAS MIX

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
metal salts, bases, halogens, oxidizing materials

Hazardous decomposition products
silicon, Hydrogen

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation
irritation, nausea, headache, lung damage

Skin Contact
irritation, frostbite

Eye Contact
irritation, frostbite, blurred vision

Ingestion
frostbite

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

Immediate Effects
frostbite, respiratory tract irritation, skin irritation, eye irritation

Delayed Effects
lung damage

Irritation/Corrosivity Data
No animal testing data available for skin or eyes.

Respiratory Sensitization
No data available.
Safety Data Sheet

Material Name: 5% SILANE IN HELIUM, GAS MIX

SDS ID: 00233171

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.

Specific Target Organ Toxicity - Single Exposure
Respiratory system, Skin, Eye

Specific Target Organ Toxicity - Repeated Exposure
lungs

Aspiration hazard
Not applicable.

Medical Conditions Aggravated by Exposure
respiratory disorders

Additional Data
See component data.

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity
No LOLI ecotoxicity data are available for this product’s components

Persistence and Degradability
No data available.

Bioaccumulative Potential
No data available.

Mobility
No data available.

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.
Section 14 - TRANSPORT INFORMATION

US DOT Information:
Shipping Name: Compressed gas, flammable, n.o.s., (Contains: Silane)
Hazard Class: 2.1
UN/NA #: UN1954
Required Label(s): 2.1

IMDG Information:
Shipping Name: Compressed gas, flammable, n.o.s., (Contains: Silane)
Hazard Class: 2.1
UN#: UN1954
Required Label(s): 2.1

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)
Acute Health: Yes Chronic Health: No Fire: Yes Pressure: Yes Reactivity: Yes

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>Helium</td>
<td>7440-59-7</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

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.

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

WHMIS Classification
Section 16 - OTHER INFORMATION

NFPA Ratings
Health: 2 Fire: 4 Reactivity: 3
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; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; 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; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; 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; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower 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; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; 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; STEL - Short-term Exposure Limit; TDG - Transportation of
Safety Data Sheet

Material Name: 5% SILANE IN HELIUM, GAS MIX

SDS ID: 00233171

Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States.

Other Information

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