

## Material Safety Data Sheet

Material Name: **Hydrogen Gas - Corunna**

MSDS ID: NOVA-0018

### Section 1 - Product and Company Identification

**Synonyms:** H<sub>2</sub>, Hydrogen Methanated, Hydrogen Non-Methanated**Chemical Name:** Hydrogen**Chemical Family:** Not available**Material Use:** Fuel gas, petrochemical feedstock and purified hydrogen applications**Chemical Formula:** H<sub>2</sub>**NOVA Chemicals**

P.O. Box 2518, Station M

Calgary, Alberta, Canada T2P 5C6

**Product Information:** 1-412-490-4063**MSDS Information Email:**[msdsemail@novachem.com](mailto:msdsemail@novachem.com)**EMERGENCY Telephone Numbers:****North America (Canada and US):**

1-800-561-6682, 1-403-314-8767 (NOVA Chemicals) (24 hours)

1-800-424-9300 (CHEMTREC-USA) (24 hours)

1-613-996-6666 (Canutec-Canada) (24 hours)

**Mexico and South America:** +44 (0) 1235 239 670 (NCEC) (24 hours)**General Comments**

This product has been assigned a CAS # of 1333-74-0.

### Section 2 - Hazards Identification

**NFPA Ratings: Health: 0 Fire: 4 Reactivity: 0***Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe***Emergency Overview**

**DANGER! EXTREMELY FLAMMABLE COMPRESSED GAS!** This product is a colourless, odourless, compressed gas. **WARNING:** Hydrogen burns with an invisible to pale blue flame that is often very difficult to see. Consider need for immediate emergency isolation and evacuation. Gas may travel to source of ignition and flash back. **DO NOT ATTEMPT TO EXTINGUISH A GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF.** Contact with gas may cause frostbite. Excessive amounts of hydrogen in an enclosed space can displace the available oxygen and cause suffocation (asphyxiation). Oxygen deficiency causes central nervous system (CNS) depression with symptoms that include changes to respiration and heart rate, fatigue, dizziness, disorientation, nausea, vomiting, unconsciousness, convulsions and eventually death.

**Potential Health Effects: Eye**

Direct contact with pressurized gas may cause irritation and can cause frostbite.

**Potential Health Effects: Skin**

Direct contact with pressurized gas may cause irritation and can cause frostbite. Product does not penetrate through the skin. Direct ear contact with pressurized gas, as it escapes from a cylinder, may damage hearing.

**Potential Health Effects: Ingestion**

Ingestion of a gas is extremely unlikely. However, contact of the mouth or throat with the gas may cause irritation and can cause frostbite.

**Potential Health Effects: Inhalation**

This product is an asphyxiant gas that can cause unconsciousness and/or death if OXYGEN levels are sufficiently reduced. If excessive amounts are released in an enclosed space, hydrogen will decrease the amount of available oxygen and may cause suffocation. Carbon monoxide impurity may increase or prolong possible toxic central nervous system effects including changes to respiration and heart rate, fatigue, dizziness, disorientation, nausea, vomiting, unconsciousness, convulsions and possibly death.

### Section 3 - Composition/Information on Ingredients

CAS #	Component	Percent by Volume
1333-74-0	Hydrogen	92-98
74-82-8	Methane	2.5-5
74-82-8	Methane	5-8
630-08-0	Carbon monoxide	0.1-1

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## Additional Information

The actual components and weight % concentrations vary based on operating conditions.

This material is a controlled product under Canadian WHMIS regulations.

This material is regulated as a hazardous material / dangerous goods for transportation.

See Section 8 for applicable exposure limits. See Section 11 for applicable toxicity data.

## Section 4 - First Aid Measures

### First Aid: Eyes

Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical attention if symptoms develop or persist.

### First Aid: Skin

Wash immediately with soap and water. Seek medical attention if symptoms develop or persist. Thaw frostbite slowly with lukewarm water. DO NOT RUB affected area. Do not pull off adherent clothing or objects. Seek medical attention at once and if experiencing difficulty in hearing or if pain or other injury occurs.

### First Aid: Inhalation

Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, is unconscious or if any other symptoms persist. WARNING: Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

### First Aid: Ingestion

Ingestion of this product is extremely unlikely. DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention. Examine the lips and mouth to ascertain whether the tissues are damaged. Thaw frostbite in mouth slowly with lukewarm water, ensuring that the conscious affected individual does not gag or choke.

### First Aid: Notes to Physician

For more detailed medical emergency support information call 1-800-561-6682 or 1-403-314-8767 (24 hours, NOVA Chemicals Emergency Response). Treat unconsciousness, nausea, hypotension, seizures and cardiac arrhythmias in the conventional manner. Sympathomimetics or catecholamines should be avoided or used with caution (lowest effective dose) because of possible cardiac sensitization. Administer oxygen by mask if there is respiratory distress.

## Section 5 - Fire Fighting Measures

See Section 9: Physical Properties for flammability limits, flash point and auto-ignition information.

### General Fire Hazards

**WARNING!** Hydrogen gas has an extremely wide flammability range. Hydrogen burns with an invisible to pale blue flame that is often very difficult to see. Fire and container explosion hazards are extremely high when this product is exposed to heat or flame. Use massive quantities of water to cool fire-exposed containers. Immediately withdraw in case of fire and container venting or heat discoloration of a container. Gas may travel to source of ignition and flash back. DO NOT ATTEMPT TO EXTINGUISH A GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF. Consider need for immediate emergency isolation and evacuation. Be aware of possibility of re-ignition. If a pipeline or a storage vessel is involved in a fire, ISOLATE for 1600 metres in all directions.

### Explosion Hazards

Gas may form an explosive mixture with air. Keep containers away from source of heat or fire. Highly explosive in the presence of sparks, fire, heat and oxidizing agents. Evacuate personnel 0.8 to 1.6 kilometres distance if during a fire, a rupture of a container, pipeline or major vessel is possible.

### Hazardous Combustion Products

None.

### Extinguishing Media

Dry chemical, foam, carbon dioxide, water spray or fog. Do not use water jets. Use massive quantities of water to cool fire-exposed containers and to protect personnel. DO NOT ATTEMPT TO EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF. Monitor water run-off for flammability, and prevent from entering sewers, drains, ditches or other confined or underground spaces.

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## Fire Fighting Equipment/Instructions

**WARNING!** Hydrogen burns with an invisible to pale blue flame that is often very difficult to see. Reference 2008 Emergency Response Guidebook, Guide No. 115 for additional details and instructions. Position upwind. Keep unnecessary personnel away. Move containers from fire area if you can do so without risk. Fight fire from maximum distance or use unmanned holders or monitor nozzles. Immediately withdraw in case of fire and container venting or heat discoloration of a container. Fire fighters should wear full-face, self-contained breathing apparatus and thermal protective clothing. Avoid inhaling any smoke and combustion materials. Remove and clean or destroy any contaminated clothing. Cool containers with flooding quantities of water until well after the fire is out. Control runoff waters to prevent entry into sewers, drains, ditches, underground or confined spaces and waterways.

## Section 6 - Accidental Release Measures

### Evacuation Procedures

Isolate area. Keep unnecessary personnel away. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air.

### Small Spills

Isolate spill or leak area for 50 to 100 metres. Eliminate all potential ignition sources. Stop leak remotely or when safe to do so. Released gas will rapidly dissipate upwards into the atmosphere. Ground all approved equipment used in area. Keep area isolated until any detectable flammable gas has been fully dispersed. Check oxygen and flammable gas levels prior to entering confined spaces or buildings. Check for gas pockets under roofs or at high ends of equipment.

### Large Spills

Consider initial downwind evacuation for at least 800 metres. Eliminate all potential ignition sources. Stop leak remotely or when safe to do so. Released gas will rapidly dissipate upwards into the atmosphere. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air. Ground all approved equipment used in area. Evacuate personnel to upwind of the spill area, and position at a safe distance. Consider use of water spray to reduce gases or divert gas cloud drift. Keep area isolated until any detectable flammable gas has been dispersed. Check oxygen and flammable gas levels prior to entering confined spaces or buildings. Check for gas pockets under roofs or at high ends of equipment.

### Special Procedures

Contact local police/emergency services and appropriate emergency telephone numbers provided in Section 1. Ensure that statutory and regulatory reporting requirements in the applicable jurisdiction are met. Wear appropriate protective equipment and clothing during cleanup. Individuals without appropriate protective equipment should be excluded from area of spill until cleanup has been completed.

*See Section 8 for recommended Personal Protective Equipment and see Section 13 for waste disposal considerations.*

## Section 7 - Handling and Storage

### Handling Procedures

Keep locked up or secured. Handle in fully enclosed, grounded, properly designed and approved pressurized hydrogen gas systems. Use with adequate ventilation. Avoid inhalation. Keep away from uncontrolled heat and incompatible materials. Ground all material handling and transfer equipment to dissipate buildup of static electricity. Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Wear suitable protective equipment including thermally protective gloves. No smoking or open flames permitted in storage, use or handling areas.

### Storage Procedures

Storage area should be clearly identified, well illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store in grounded, properly designed and approved pressure containers and away from incompatible materials. Store and use away from heat, sparks, open flame, or any other ignition source. Store according to applicable codes or regulations for pressurized flammable gases as applicable to cylinders, vessels, piping, buildings, rooms, cabinets, allowable quantities and minimum storage distances. Have appropriate extinguishing capability in storage area (e.g. sprinkler system, portable fire extinguishers) and flammable gas detectors. Storage pressure vessels should be above ground. Keep cylinders firmly secured while in storage or in transportation.

*See Section 8: Exposure Controls/Personal Protection for appropriate Personal Protective Equipment. See Section 10 for information on Incompatibilities.*

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## Section 8 - Exposure Controls / Personal Protection

### Exposure Guidelines

#### A: General Product Information

Refer to published exposure limits - use effective control measures and PPE to maintain worker exposure to concentrations that are below these limits. Ensure that eyewash stations and safety showers are within close proximity to work locations.

#### B: Component Exposure Limits

ACGIH, OSHA, NIOSH, EPA, Alberta, and Ontario exposure limit lists have been checked for major components listed with CAS registry numbers. Other exposure limits may apply, check with proper authorities.

\*Note: The Vacated OSHA Permissible Exposure Limits (PELs) are those provided in the 1989 update to OSHA's Air Contaminants Standard 29 CFR 1910.1000. These limits were vacated by the U.S. Court of Appeals, Eleventh Circuit but may be enforceable in some states.

#### Hydrogen (1333-74-0)

ACGIH: Simple Asphyxiant  
Alberta: Simple asphyxiant  
Ontario: Simple Asphyxiant

#### Methane (74-82-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)  
Alberta: Simple asphyxiant  
Ontario: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)

#### Carbon monoxide (630-08-0)

ACGIH: 25 ppm TWA; 29 mg/m<sup>3</sup> TWA; BEI  
OSHA (Vacated)\*: 35 ppm TWA; 40 mg/m<sup>3</sup> TWA; 200 ppm Ceiling; 229 mg/m<sup>3</sup> Ceiling  
OSHA (Final): 50 ppm TWA; 55 mg/m<sup>3</sup> TWA  
NIOSH: 35 ppm TWA; 40 mg/m<sup>3</sup> TWA; 200 ppm Ceiling; 229 mg/m<sup>3</sup> Ceiling  
1200 ppm IDLH  
Alberta: 25 ppm TWA; 29 mg/m<sup>3</sup> TWA  
Ontario: 25 ppm TWA; 100 ppm STEL

### ENGINEERING CONTROLS

Engineering methods to reduce hazardous exposure are preferred controls. Methods include mechanical ventilation (dilution and local exhaust) process or personal enclosure, remote and automated operation, control of process conditions, leak detection and repair systems, and other process modifications. Ensure all exhaust ventilation systems are discharged to outdoors, away from air intakes and ignition sources. Supply sufficient replacement air to make up for air removed by exhaust systems. Administrative (procedure) controls and use of personal protective equipment may also be required.

### PERSONAL PROTECTIVE EQUIPMENT

#### Personal Protective Equipment: Eyes/Face

Wear safety glasses. Use of chemical goggles or a face shield is recommended if exposure to high-pressure gas is possible.

#### Personal Protective Equipment: Skin/Hands/Feet

Use impervious gloves when handling product. Wear chemical-resistant safety footwear with good traction to prevent slipping. Work clothing that sufficiently prevents skin contact should be worn, such as coveralls and/or long sleeves and pants. Fire resistant (i.e., Nomex) or natural fibre clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where a flammable gas release may occur. Static Dissipative (SD) rated footwear is recommended.

#### Personal Protective Equipment: Respiratory

If engineering controls and ventilation are not sufficient to prevent buildup of gases and/or oxygen concentrations are low, appropriate air-supplied breathing apparatus should be used.

#### Personal Protective Equipment: General

Personal protective equipment (PPE) should not be considered a long-term solution to exposure control. Employer programs to properly select, fit, maintain, and train employees to use equipment must accompany PPE. Consult a competent industrial hygiene resource, the PPE manufacturer's recommendation, and/or applicable regulations to determine hazard potential and ensure adequate protection.

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## Section 9 - Physical & Chemical Properties

<b>Physical State and Appearance:</b>	Gas (Compressed)	<b>Colour:</b>	Colourless
<b>Odour:</b>	Odourless	<b>pH:</b>	Not applicable
<b>Vapour Pressure:</b>	Not applicable	<b>Vapour Density at 0°C (Air=1):</b>	0.07 at 101.3 kPa and 15°C
<b>Boiling Point:</b>	-162°C (methane) -192°C (carbon monoxide) -252.8°C (hydrogen)	<b>Melting Point:</b>	-182°C (methane) -205°C (carbon monoxide) Not applicable (hydrogen)
<b>Solubility (H2O):</b>	Slightly soluble (1.9 ml/100ml water at 15.6°C ) (hydrogen)	<b>Specific Gravity (Water=1):</b>	Not applicable
<b>Evaporation Rate (n-Butyl Acetate=1):</b>	Not applicable	<b>Percent Volatile:</b>	100%
<b>Critical Temperature:</b>	-240°C (hydrogen)	<b>Octanol/H2O Coeff.:</b>	Log P(oct) = 0.45 (estimated) (hydrogen)
<b>Auto Ignition:</b>	570°C (hydrogen) 537°C (methane) Varies: 607°C, 652°C, 700°C (carbon monoxide)	<b>Flash Point:</b>	Less than -50°C (hydrogen)
<b>Flash Point Method:</b>	Not available	<b>Upper Flammable Limit (UFL):</b>	15.4% (methane) 74.2% (carbon monoxide) 74.5% (hydrogen)
<b>Lower Flammable Limit (LFL):</b>	12.5% (carbon monoxide) 5.0% (methane) 4.0% (hydrogen)	<b>Flammability Classification:</b>	Extremely Flammable

## Section 10 - Stability & Reactivity Information

### Chemical Stability

This product is stable under normal use conditions for shock, vibration, pressure, or temperature.

### Chemical Stability: Conditions to Avoid

Keep away from static discharge, heat, sparks, or open flame.

### Incompatibility

May react explosively with halogen compounds, finely divided platinum, lithium, chlorine trifluoride, nitrogen trifluoride, oxygen difluoride. Avoid strong oxidizing agents. Carefully select and test equipment, gaskets, and hoses periodically to ensure integrity and compatibility.

### Possibility of Hazardous Reactions or Hazardous Polymerization

Hazardous polymerization not likely to occur.

### Corrosivity

Not corrosive to the common metals.

### Hazardous Decomposition

None.

### Special Remarks

Vapours may form an explosive mixture with air. May react vigorously with oxidizing agents.

## Section 11 - Toxicological Information

### A: Acute Toxicity – General Product Information

Direct contact with compressed gas may cause freezing burns (frostbite) to the eyes and skin. At very high exposures, hydrogen has an anaesthetic effect. Excessive exposures may cause headache, dizziness, nausea, loss of coordination, and in extreme conditions coma and possibly death. High concentrations may trigger heartbeat irregularities. Excessive amounts in the air in an enclosed space will decrease the amount of oxygen and may cause suffocation. The following additional information has been found for its other components:

**Methane** - at high exposures has anaesthetic effects, may cause heartbeat irregularities, CNS depression, and suffocation due to low oxygen.

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**Carbon monoxide** - quickly enters the blood when inhaled into the lungs. Levels normally present in the atmosphere are unlikely to cause ill effects. At low levels it may cause poor concentration, memory and vision problems, and loss of muscle coordination. At higher levels (200 ppm for 2-3 hours), it may cause headaches, fatigue and nausea. At very high levels (400 ppm) the symptoms intensify and will be life-threatening after three hours. Exposure to levels of 1200 ppm or greater are immediately dangerous to life. Carbon monoxide combines with haemoglobin to form carboxyhaemoglobin, reducing the oxygen-carrying ability of the blood. Carbon monoxide is excreted from the body in exhaled air. Elimination is quite rapid during the first few hours after exposure, but complete elimination may take 1-2 days.

## B: Acute Toxicity - LD50/LC50

### Hydrogen (1333-74-0)

Inhalation LC50 Rat: >15,000 ppm/1H

### Methane (74-82-8)

Inhalation LC50 Mouse: 326 g/m<sup>3</sup>/2H

### Carbon monoxide (630-08-0)

Inhalation LC50 Rat: 1807 ppm/4H

## C: Chronic Toxicity - General Product Information

This product is not expected to present any chronic health effects including no increased risk of cancer. The following additional information has been found for its other components:

**Carbon monoxide** - Long-term (chronic) exposure to low levels of carbon monoxide may produce heart disease and damage the nervous system. Exposure of pregnant women to carbon monoxide may cause low birthweight, increased foetal mortality and nervous system damage to the offspring. Carbon monoxide is classified by the National Occupational Health and Safety Commission (NOHSC) as a Category 1 reproductive toxicant (substance known to cause developmental toxicity to humans).

## D: Chronic Toxicity - Carcinogenic Effects

None of this product's components are listed by ACGIH, EPA, IARC, OSHA, or NTP as a carcinogen.

## Section 12 - Ecological Information

### Ecotoxicity

No impact on the environment if released without ignition. Hydrogen is naturally present as a free element in the atmosphere at levels less than 1 ppm. Methane is a greenhouse gas (GHG). Although methane is normally present at very low atmospheric concentrations (< 2 ppm), increases in atmospheric methane concentrations are linked to climate change/global warming. Although carbon monoxide is not considered a greenhouse gas, it is a precursor to greenhouse gases.

### Environmental Fate/Mobility

Product is a gas and will dissipate rapidly on release. Product is slightly soluble in water,

### Persistence/Degradability

No hydrogen data is available. Gas-phase methane is very slowly degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be about 6 yrs, calculated from its rate constant of  $6.9 \times 10^{-15}$  cm<sup>3</sup>/molecule-sec at 25°C. Methane is not expected to undergo hydrolysis in the environment due to the lack of hydrolysable functional groups nor to directly photolyze due to the lack of absorption in the environmental UV spectrum (>290 nm). Carbon monoxide elevates the concentrations of methane and ozone in the atmosphere. It eventually oxidizes into carbon dioxide.

### Bioaccumulation/Accumulation

Product does not bioaccumulate.

## Section 13 - Disposal Considerations

### Canadian Waste Information

This product may generate a hazardous waste according to Canadian regulations. The use, mixing or processing of this product may alter its properties or hazards. Contact federal, provincial and local authorities in order to generate or ship a waste material associated with this product to ensure materials are handled appropriately and meet all criteria for disposal of hazardous waste. **DO NOT ATTEMPT TO DISPOSE OF BY UNCONTROLLED IGNITION.** Since emptied containers retain product residue, follow safe handling/label warnings even after container is emptied.

See Section 7: Handling and Storage and Section 8: Exposure Controls/Personal Protection for additional handling information that may be applicable for safe handling and the protection of employees.

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Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste.

## Section 14 - Transportation Information

### US DOT Information

**Shipping Name:** Hydrogen, compressed, mixture  
**UN/NA #:** UN1049 **Hazard Class:** 2.1  
**Required Label(s):** FLAMMABLE GAS  
**Additional Info.:** 2008 Emergency Response Guidebook Guide No.115.

### Canadian TDG Information

**Shipping Name:** Hydrogen, compressed, mixture  
**UN #:** UN1049 **Hazard Class:** 2.1  
**Required Label(s):** FLAMMABLE GAS  
**Additional Info.:** 2008 Emergency Response Guidebook Guide No. 115.

### International Air Transport Association (IATA) and ICAO Information

**Shipping Name:** Hydrogen, compressed, mixture  
**UN #:** UN1049 **Hazard Class:** 2.1  
**Required Label(s):** FLAMMABLE GAS

### International Maritime Dangerous Goods (IMDG) Code

**Shipping Name:** Hydrogen, compressed, mixture  
**UN #:** UN1049 **Hazard Class:** 2.1  
**Required Label(s):** FLAMMABLE GAS  
**Additional Info.:** EmS No.: F-D, S-U  
**Marine Pollutant:** No

## Section 15 - Regulatory Information

### Canadian Regulations - Federal and Provincial

Canadian Environmental Protection Act (CEPA): All components of this product are on the Domestic Substances List (DSL) or are exempt and are acceptable for use under the provisions of CEPA.

### WHMIS Ingredient Disclosure List (IDL)

The following components are identified under the Canadian Hazardous Products Act - Ingredient Disclosure List (IDL):

Component	CAS #	Minimum Concentration
Carbon monoxide	630-08-0	0.1 %

### WHMIS Classification

Workplace Hazardous Materials Information System (WHMIS): This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and the MSDS contains all the information required by the CPR.

WHMIS CLASS A: Compressed gas

WHMIS CLASS B1: Flammable gas

WHMIS CLASS D1A: Very Toxic (Carbon monoxide)

WHMIS CLASS D2A: Embryotoxin, Teratogen (Carbon monoxide)

### Other Regulations

Ongoing occupational hygiene, medical surveillance programs, site emission or spill reporting may be required by federal or provincial regulations. Check for applicable regulations. For additional regulatory information, please contact your NOVA Chemicals' representative or Product Integrity.

## Section 16 - Other Information

### Label Information

**DANGER! EXTREMELY FLAMMABLE COMPRESSED GAS!** This product is a colourless and odourless compressed gas.  
**WARNING:** Hydrogen burns with an invisible to pale blue flame that is often very difficult to see. Consider need for immediate emergency isolation and evacuation. Gas may travel to source of ignition and flash back. **DO NOT ATTEMPT TO EXTINGUISH A GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF.** Contact with gas may cause frostbite. Excessive amounts of hydrogen in an enclosed space can displace the available oxygen and cause suffocation

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(asphyxiation). Oxygen deficiency causes central nervous system (CNS) depression with symptoms that include changes to respiration and heart rate, fatigue, dizziness, disorientation, nausea, vomiting, unconsciousness, convulsions and eventually death.

#### FIRST AID:

**SKIN:** Wash immediately with soap and water. Seek medical attention if symptoms develop or persist. Thaw frostbite slowly with lukewarm water. DO NOT RUB affected area. Do not pull off adherent clothing or objects. Seek medical attention at once and if experiencing difficulty in hearing or if pain or other injury occurs.

**EYES:** Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical attention if symptoms develop or persist.

**INHALATION:** Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, is unconscious or if any other symptoms persist. **WARNING:** Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

**INGESTION:** Ingestion of this product is extremely unlikely. DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention. Examine the lips and mouth to ascertain whether the tissues are damaged. Thaw frostbite in mouth slowly with lukewarm water, ensuring that the conscious affected individual does not gag or choke.

**IN CASE OF A LARGE SPILL:** Consider initial downwind evacuation for at least 800 metres. Eliminate all potential ignition sources. Stop leak remotely or when safe to do so. Released gas will rapidly dissipate upwards into the atmosphere. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air. Ground all approved equipment used in area. Evacuate personnel to upwind of the spill area, and positioned at a safe distance. Consider use of water spray to reduce gases or divert gas cloud drift. Keep area isolated until any detectable flammable gas has been dispersed. Check oxygen and flammable gas levels prior to entering confined spaces or buildings. Check for gas pockets under roofs or at high ends of equipment.

#### References

Available on request.

#### Special Considerations

For additional information on equipment bonding and grounding, refer to the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity".

#### Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; CAS = Chemical Abstracts Service; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CPR = Controlled Products Regulations; DOT = Department of Transportation; DSL = Domestic Substances List; EINECS = European Inventory of Existing Commercial Substances; EPA = Environmental Protection Agency; EU = European Union; FDA = Food and Drug Administration; HMIS = Hazardous Materials Information System; IARC = International Agency for Research on Cancer; IDL = Ingredient Disclosure List; IDLH = Immediately Dangerous to Life or Health; Kow = Octanol/water partition coefficient; LEL = Lower Explosive Limit; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NJTSR = New Jersey Trade Secret Registry; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; RCRA = Resource Conservation and Recovery Act; SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

**MSDS Prepared by:** NOVA Chemicals

**MSDS Information Phone Number:** 1-412-490-4063

#### Other Information

##### Notice to Reader:

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This is the end of MSDS # NOVA-0018.