

## Material Safety Data Sheet

Material Name: **Hydrogen Gas - Joffre**

MSDS ID: NOVA-0019

### Section 1 - Product and Company Identification

**Synonyms:** H<sub>2</sub>, Hydrogen Gas**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:** +44 208 762 8322 (NCEC) (24 hours)

### Section 2 - Hazards Identification

**HMIS Ratings: Health: 0 Fire: 4 Physical Hazard: 0 Personal Protection:** chemical goggles, gloves, respirator*Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe \* = Chronic hazard***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 and odourless compressed gas. Consider need for immediate emergency isolation and evacuation. 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 some distant 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. **WARNING:** Hydrogen burns with an invisible to pale blue flame that is often very difficult to see. Excessive amounts of gas 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, disorientation, nausea, vomiting, unconsciousness, convulsions and eventually death.

**Potential Health Effects: Eye**

Contact of the eye with pressurized gas may be drying, mildly irritating and may cause frostbite. At higher pressures, may cause possible mechanical damage to the eye from contact or from flying debris.

**Potential Health Effects: Skin**

Contact of the skin with the pressurized gas may be mildly irritating and may cause frostbite. Product does not penetrate through the skin. Pressurized gases can dislodge debris that can cause injury when striking skin.

**Potential Health Effects: Ears**

Contact of the ear channel with pressurized gas may be damaging to hearing. High noise levels can be associated with its sudden release.

**Potential Health Effects: Ingestion**

Ingestion of this product is extremely unlikely. However, contact of the mouth or throat with the gas may result in possible drying, irritation or frostbite.

**Potential Health Effects: Inhalation**

This product is an asphyxiant gas that can cause unconsciousness and/or death if OXYGEN levels are sufficiently reduced. Excessive amounts in the air of enclosed space will decrease the amount of oxygen and may cause suffocation. Central nervous system effects include changes to respiration and heart rate, fatigue, disorientation, nausea, vomiting, unconsciousness, convulsions and possibly death.

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## Section 3 - Composition/Information on Ingredients

CAS #	Component	Percent by Wt.
1333-74-0	Hydrogen	≥99.99

### Additional Information

This product is considered to be hazardous under 29 CFR 1910.1200 (Hazard Communication).

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

For skin contact, 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.

### First Aid: Ears

Seek medical attention 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 luke warm water, ensuring that the conscious affected individual does not gag or choke. If the individual is not breathing, qualified personnel should perform mouth-to-mouth resuscitation. 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: Notes to Physician

For more detailed medical emergency support information call 1-800-561-6682, 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. Gases may travel to some distant source of ignition and flash back. Consider need for immediate emergency isolation and evacuation. DO NOT ATTEMPT TO EXTINGUISH A GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF. Be aware of possibility of re-ignition.

### 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 (½ mile to one

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mile) distance if during a fire, a rupture of a container, pipeline or major vessel is possible.

## Hazardous Combustion Products

None. Burns clean. May release irritating or toxic gases from combustion of nearby materials.

## Extinguishing Media

Dry chemical, foam, carbon dioxide, and 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 drains and sewers, or other confined or underground spaces.

## Fire Fighting Equipment/Instructions

**WARNING!** Hydrogen burns with an invisible to pale blue flame that is often very difficult to see. Reference 2004 Emergency Response Guidebook, Guide # 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, 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 build-up of flammable air concentrations.

### Small Spills

Isolate spill or leak area for 50-100 metres (164-328 feet). Eliminate all potential ignition sources. Stop leak remotely or when safe to do so. Released gas will rapidly dissipate upwards into the atmosphere, as it is much lighter than air. 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 (1/2 mile). Eliminate all potential ignition sources. Stop leak remotely or when safe to do so. Released gas will rapidly dissipate upwards into the atmosphere, as it is much lighter than air. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for build-up of flammable air concentrations. 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. Prevent flammable gas from entering drains and sewers, or other confined or underground structures. Accumulations of gas may persist in low areas. 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. Evacuate personnel to a distance of one to two kilometres if a rupture of a pipeline or major vessel is possible.

### 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

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 build-up 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. No smoking or open flames permitted in storage, use or

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handling areas. Where possible, collect and flare vents.

## 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 and diked. Keep cylinders secure 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.

## 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.

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

ACGIH: Simple Asphyxiant

Alberta: Simple asphyxiant

Ontario: Simple Asphyxiant

### 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 full-face shield is recommended if exposure to high-pressure gas is possible.

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

Use impervious gloves designed to prevent freezing of body tissues if contact with gas is possible. 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 flammable gas releases may occur.

#### Personal Protective Equipment: Respiratory

If engineering controls and ventilation is not sufficient to prevent buildup of aerosols or 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; gas at ambient conditions	<b>Vapour Density @ 0°C (Air=1):</b>	0.07 at 101.3 kPa and 15 °C (59°F)
<b>Boiling Point:</b>	-252.8°C (-423°F)	<b>Melting Point:</b>	-259.2°C (-434.6°F)
<b>Solubility (H2O):</b>	Slightly soluble (1.9 ml/100ml water at 15.6°C (60.1°F))	<b>Specific Gravity (Water=1):</b>	Not applicable
<b>Dispersion Properties:</b>	Rapid dispersion in air	<b>Evaporation Rate (n-Butyl Acetate=1):</b>	Not applicable; gas at ambient conditions
<b>Critical Temperature:</b>	-240°C (-400°F)	<b>Percent Volatile:</b>	100%
<b>Auto Ignition:</b>	Reported: 400°C, 500°C, 578°C	<b>Flash Point:</b>	Less than -50°C (-58°F)
<b>Flash Point Method:</b>	Not available	<b>Upper Flammable Limit (UFL):</b>	75.0%
<b>Lower Flammable Limit (LFL):</b>	4.0%	<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.

### Hazardous Polymerization

Not likely to occur.

### Corrosivity

Not considered to be corrosive.

### 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 or refrigerated liquefied gas will cause freezing burns (frostbite) to the eyes and skin. At very high exposures, hydrogen has an anesthetic 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.

### B: Acute Toxicity - LD50/LC50

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

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

### C: Chronic Toxicity - General Product Information

This product is not expected to present any chronic health effects including no increased risk of cancer.

### D: Chronic Toxicity - Carcinogenic Effects

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

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## Section 12 - Ecological Information

### Ecotoxicity

No information has been found to indicate there would be a negative 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.

### Environmental Fate/Mobility

Material is highly volatile and will partition rapidly to air on release to land or water. Material is slightly soluble in water, and evaporates rapidly from surface soils and water.

### Persistence/Degradability

No data has been found to indicate there would be any negative impacts.

### Bioaccumulation/Accumulation

No data has been found to indicate there would be any negative impacts.

## Section 13 - Disposal Considerations

### U.S./Canadian Waste Number & Descriptions

#### A: General Product Information

This product may generate a hazardous waste according to US and Canadian regulations. The use, mixing or processing of this material may alter this product. Contact federal, provincial/state 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/material 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.*

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

#### B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

## Section 14 - Transportation Information

### US DOT Information

**Shipping Name:** Hydrogen, compressed  
**UN/NA #:** UN1049 **Hazard Class:** 2.1  
**Required Label(s):** FLAMMABLE GAS  
**Additional Info.:** 2004 Emergency Response Guidebook Guide Item #115.

### Canadian TDG Information

**Shipping Name:** Hydrogen, compressed  
**UN #:** UN1049 **Hazard Class:** 2.1  
**Required Label(s):** FLAMMABLE GAS  
**Additional Info.:** 2004 Emergency Response Guidebook Guide Item #115.

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

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

### International Maritime Dangerous Goods (IMDG) Code

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

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## Section 15 - Regulatory Information

### A: International Regulations

#### Component Analysis - International Inventory Status

Component	CAS #	US - TSCA	CANADA - DSL	EU - EINECS
Hydrogen	1333-74-0	Yes	Yes	Yes

### B: USA Federal & State Regulations

Ongoing occupational hygiene, medical surveillance programs, or site emission or spill reporting may be required by Federal or State regulations. Check for applicable regulations.

#### USA OSHA Hazard Communication Class

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

HCS Classes:

HCS CLASS: Flammable gas.

#### USA Right-to-Know - Federal

None of this product's components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

#### USA Right-to-Know - State

The following components appear on one or more of the following state hazardous substances lists. Some components (including those present only in trace quantities, and therefore not listed in this document) may be included on the Right-To-Know lists of other U.S. states. The reader is therefore cautioned to contact his or her NOVA Chemicals' representative or NOVA Chemicals' Product Integrity group for further U.S. State Right-To-Know information.

Component	CAS	NJ	PA
Hydrogen	1333-74-0	Yes	Yes

### C: Canadian Regulations - Federal and Provincial

#### WHMIS Ingredient Disclosure List (IDL)

No components are listed in the WHMIS Ingredient Disclosure List (IDL).

#### 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

#### Other Regulations

Ongoing occupational hygiene, medical surveillance programs, or site emission or spill reporting may be required by Federal or Provincial regulations. Check for applicable regulations.

## Section 16 - Other Information

### Label Information

**DANGER! EXTREMELY FLAMMABLE COMPRESSED GAS!** This product is a colourless and odourless compressed gas. Consider need for immediate emergency isolation and evacuation. 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 some distant 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. **WARNING:** Hydrogen burns with an invisible to pale blue flame that is often very difficult to see. Excessive amounts of gas 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, disorientation, nausea, vomiting, unconsciousness, convulsions and eventually death.

**FIRST AID:**

**SKIN:** For skin contact, 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.

**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.

**EARS:** Seek medical attention if experiencing difficulty in hearing or if pain or other injury occurs.

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**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 luke warm water, ensuring that the conscious affected individual does not gag or choke. If the individual is not breathing, qualified personnel should perform mouth-to-mouth resuscitation. **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.

**IN CASE OF A LARGE SPILL:** Consider initial downwind evacuation for at least 800 metres (1/2 mile). Eliminate all potential ignition sources. Stop leak remotely or when safe to do so. Released gas will rapidly dissipate upwards into the atmosphere, as it is much lighter than air. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for build-up of flammable air concentrations. 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. Prevent flammable gas from entering drains and sewers, or other confined or underground structures. Accumulations of gas may persist in low areas. 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. Evacuate personnel to a distance of one to two kilometres if a rupture of a pipeline or major vessel is possible.

## 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; BLEVE = Boiling Liquid Expanding Vapour Explosion; BOD = Biochemical Oxygen Demand; 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; IARC = International Agency for Research on Cancer; IDL = Ingredient Disclosure List; Kow = Octanol/water partition coefficient; LEL = Lower Explosive Limit; 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; TDG = Transportation of Dangerous Goods; TSCA = Toxic Substances Control Act.

**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-0019.