

Material Safety Data Sheet

Material Name: **Ethylene Gas, Dilute**

MSDS ID: NOVA-0017A

Section 1 - Product and Company Identification

Synonyms: Mixed ethylene/ethane feed**Chemical Name:** Hydrocarbon gas**Chemical Family:** Petrochemical**Material Use:** Feedstock for chemical and polymer synthesis**Chemical Formula:** Mixture of C₂H₄ (ethylene) and C₂H₆ (ethane)**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**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)

Section 2 - Hazards Identification

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

DANGER! EXTREMELY FLAMMABLE GAS. This product is a colourless gas with a sweet hydrocarbon odour. Ethylene is highly volatile, when released it will disperse as a highly flammable vapour cloud. Consider need for immediate emergency isolation and evacuation. Vapours may travel to some distant ignition source and flash back. DO NOT ATTEMPT TO EXTINGUISH A GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF. Excessive inhalation of this product causes headache, dizziness, nausea and loss of coordination and in extreme conditions coma and possibly death.

Potential Health Effects: Eye

Contact with the gas is not irritating.

Potential Health Effects: Skin

Contact with the gas is not irritating. Product does not penetrate through the skin.

Potential Health Effects: Ingestion

Ingestion of this product is extremely unlikely.

Potential Health Effects: Inhalation

This product is a mildly narcotic asphyxiant gas that can cause unconsciousness / death if OXYGEN levels are sufficiently reduced. Excessive inhalation causes headache, dizziness, nausea, loss of coordination, and in extreme conditions coma and possibly death. High concentrations may trigger heartbeat irregularities and possible cardiac sensitization.

Section 3 - Composition/Information on Ingredients

CAS #	Component	Percent by Wt.
74-85-1	Ethylene	75-99
74-84-0	Ethane	1-5
74-84-0	Ethane	5-10
74-84-0	Ethane	10-25

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.

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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.

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

DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention. 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 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

Pipeline and container explosion hazards are extremely high when this product is exposed to heat or flame. May BLEVE explosively when heated or involved in a fire. Use massive quantities of water to cool fire-exposed pipelines or containers. Immediately withdraw in case of fire and container venting or heat discoloration of a container. Vapours 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.** Be aware of possibility of re-ignition. When pressure in a container needs to be controlled consider setting up emergency flaring. Consider need for immediate emergency isolation and evacuation for at least 800 metres. If a pipeline or a storage vessel is involved in a fire, **ISOLATE** for 1600 metres in all directions.

Explosion Hazards

Vapours 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. Containers may explode when heated and rocket away.

Hazardous Combustion Products

Upon combustion, this product emits carbon monoxide, carbon dioxide, and/or low molecular weight hydrocarbons.

Extinguishing Media

Dry chemical, foam, carbon dioxide, and water fog. Do not use water jets. Adding water directly to pooled liquid will heat liquid and increase evolution of highly flammable gas. Foam cover may help suppress evolution of flammable gas. 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.** Let uncontrolled fires burn off. Monitor water run-off for flammability, and prevent from entering sewers, drains, ditches or other confined or underground spaces.

Fire Fighting Equipment/Instructions

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. Let uncontrolled fires burn off. Fire fighters should wear full-face, self-contained breathing apparatus and thermal protective clothing. Avoid inhaling any smoke and

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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. Ground all approved equipment used in area. Keep area isolated until any detectable flammable gas has been dispersed.

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. 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 vapours or divert vapour cloud drift. High expansion foam cover may help suppress evolution of flammable gas. Prevent flammable vapours or liquids from entering sewers, drains, ditches 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.

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. This product can be stored as a flammable gas or liquid depending on the temperature and pressure. Handle in fully enclosed, grounded, properly designed and approved transfer and storage 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. Wear suitable protective equipment including thermally protective gloves. No smoking or open flames permitted in storage, use or 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 in close proximity to work locations.

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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 authorities.

Ethylene (74-85-1)

ACGIH: 200 ppm TWA; 230 mg/m³ TWA

Alberta: 200 ppm TWA; 229 mg/m³ TWA

Ontario: 200 ppm TWA; 230 mg/m³ TWA

Ethane (74-84-0)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases Alkane C1-C4)

Alberta: 1000 ppm TWA

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

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 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. If skin contact is possible, wear coveralls 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 vapour 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 vapours 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

Physical State and Appearance:	Gas at ambient temperature	Colour:	Colourless
Odour:	Sweet hydrocarbon, faint	Odour Threshold:	270 to 600 ppm (ethylene)
pH:	Not applicable	Vapour Pressure:	750 psia at 10°C (ethylene); 938 psia at 21°C (ethylene)
Vapour Specific Gravity @ 0°C and 14 psia (Air=1):	0.974 (ethylene)	Boiling Point:	-103.8°C (ethylene)
Freezing Point:	-169°C (ethylene)	Solubility (H2O):	Negligible (131 mg/l at 20°C) (ethylene)
Heat of Vapourization at Critical Temperature:	3.07 BTU/lb at 9.2°C (ethylene)	Critical Pressure:	731 psia (ethylene)
Evaporation Rate (n-Butyl Acetate=1):	Immediate at 20°C	Percent Volatile:	100%
Critical Compressibility Factor:	0.281 (ethylene)	Specific Gravity (Water=1):	0.568 at its boiling point (ethylene)
Octanol/H2O Coeff.:	log Kow = 1.13 (ethylene)	Auto Ignition:	Range: 425°C to 542°C (ethylene) 490°C to 515°C (ethane)
Flash Point:	-136°C (ethylene)	Flash Point Method:	Not available
Upper Flammable Limit (UFL):	Range: 28.6% to 36% (ethylene); 12% (ethane)	Lower Flammable Limit (LFL):	Range: 2.3% to 3.02% (ethylene); 3% (ethane)
Flammability Classification:	Extremely Flammable		

Section 10 - Stability & Reactivity Information

Chemical Stability

This product is moderately reactive and may polymerize, decompose or become self-reactive under certain conditions of high temperatures, high pressures or contamination. Rapid pressurization can lead to exothermic decomposition of the product; pressure shocks should be avoided.

Chemical Stability: Conditions to Avoid

Keep away from heat, sparks or open flame.

Incompatibility

Product can react with water to form hydrates. Avoid strong acids, strong oxidizing agents, chlorine, halogens, organic peroxides, ozone and nitrogen dioxide. **Caution:** Evaluate the compatibility of the molecular sieve with the vendor if it is to be in ethylene service. There is a risk of runaway polymerization under certain conditions. Carefully select and test equipment, gaskets and hoses periodically to ensure integrity and compatibility.

Possibility of Hazardous Reactions or Hazardous Polymerization

Hazardous polymerization can occur at elevated temperature and pressure in the presence of a catalyst.

Corrosivity

Not corrosive to the common metals such as cast iron, steel, stainless steel and aluminum.

Hazardous Decomposition

Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

Special Remarks

Vapours may form an explosive mixture with air. May polymerize explosively when heated or involved in a fire. May react vigorously with incompatible materials.

Section 11 - Toxicological Information

A: Acute Toxicity - General Product Information

This product is not considered acutely toxic. Ethylene gas is not irritating to the skin and eyes. At very high exposures, ethylene gas produces an anaesthetic effect. Excessive exposures may cause headache, muscular weakness, 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 asphyxiation. Inhalation of ethane by Guinea pigs, in

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concentrations may trigger heartbeat irregularities. Excessive amounts in the air in an enclosed space will decrease the amount of oxygen and may cause asphyxiation. Inhalation of ethane by Guinea pigs, in concentrations of 2.2 to 5% in air, for 2 hours has shown slight drowsiness and irregular breathing, but no other toxic effects. At 15 to 19%, ethane mixed in oxygen has been shown to be a weak cardiac sensitizer.

B: Acute Toxicity - LD50/LC50

Ethylene (74-85-1)

Inhalation LC50 Rat: >57,000 ppm/4H

Ethane (74-84-0)

Inhalation LC50 Rat: 658 mg/L/4H

C: Chronic Toxicity - General Product Information

Inhalation of ethylene by Sprague Dawley rats, in concentrations of 0, 300, 1000, 3000, or 10,000 ppm, 6 hours/day, 5 days/week for 14 weeks did not cause any toxic effects. Female F344 rats were exposed to 0, 10, 50,300 or 10,000 ppm ethylene six hours/day, five days/week for four weeks (20 days of exposure). In this study, ethylene produced a minimal to mild rhinitis. There is no determination as to whether a significant risk of injury to health occurs with this preliminary finding. The study did not show any evidence of irritation effects associated with ethylene.

D: Chronic Toxicity - Carcinogenic Effects

ACGIH, EPA, IARC, OSHA, and NTP carcinogen lists have been checked for selected similar materials or those components with CAS registry numbers.

Ethylene (74-85-1)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 60 [1994], Supplement 7 [1987] (Group 3 (not classifiable))

Section 12 - Ecological Information

Ecotoxicity

A: General Product Information

This product is not considered harmful to aquatic life and has limited absorption into soil and sediment. Ethylene is a natural plant hormone produced by plants at all stages of growth in varying amounts. Terrestrial plants such as fruit, flowers and nursery stock show diverse effects from ethylene exposure. For example, grasses and grassy vegetables such as lettuce are resistant to ethylene. However, several species of flowers (orchids, carnations, etc.), and vegetables such as tomatoes, potatoes, peppers, beans and peas are sensitive to ethylene exposure. Under certain conditions, emissions may contribute to photochemical formation of ground level ozone and possible smog formation.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Ethylene (74-85-1)

120 Hr EC50 Daphnia magna 53.402 mg/L

Environmental Fate/Mobility

Product is highly volatile and will partition rapidly to air on release to land or water. Product is largely insoluble in water, and evaporates rapidly from surface soils and water. Potential for mobility in soil is considered to be low.

Persistence/Degradability

The lifetime of ethylene in the atmosphere ranges from 0.4 to 4 days, with an average of 1.5 days, and is strongly dependent on the amount of sunlight. Biodegradation will occur in soils by microorganisms.

Bioaccumulation/Accumulation

Bioconcentration potential is low. Log Kow are 1.13 (ethylene) and 1.81 (ethane).

Section 13 - Disposal Considerations

Canadian Waste Information

This product is known to be 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.**

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: Compressed gas, flammable, n.o.s. (Ethylene, Ethane)

UN/NA #: UN1954 **Hazard Class:** 2.1

Required Label(s): FLAMMABLE GAS

Additional Info.: 2008 Emergency Response Guidebook, Guide # 115.

Canadian TDG Information

Shipping Name: COMPRESSED GAS, FLAMMABLE, N.O.S (ethylene, ethane)

UN #: UN1954 **Hazard Class:** 2.1 **Required Label(s):** FLAMMABLE GAS

Additional Info.: 2008 Emergency Response Guidebook, Guide # 115.

International Air Transport Association (IATA) and International Civil Aviation Organization (ICAO) Information

Shipping Name: Compressed gas, flammable, n.o.s. (Ethylene, Ethane)

UN #: UN1954 **Hazard Class:** 2.1

Required Label(s): FLAMMABLE GAS

International Maritime Dangerous Goods (IMDG) Code

Shipping Name: Compressed gas, flammable, n.o.s. (Ethylene, Ethane)

UN #: UN1954 **Hazard Class:** 2.1

Required Label(s): FLAMMABLE GAS

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)

No components are identified under the Canadian Hazardous Products Act - 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, 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 GAS. This product is a colourless gas with a sweet hydrocarbon odour. Ethylene is highly volatile, when released it will disperse as a highly flammable vapour cloud. Consider need for immediate emergency isolation and evacuation. Vapours may travel to some distant ignition source and flash back. **DO NOT ATTEMPT TO EXTINGUISH A GAS FIRE UNLESS LEAK SOURCE CAN BE ISOLATED AND SHUT OFF.** Excessive inhalation of this product causes headache, dizziness, nausea and loss of coordination and in extreme conditions coma and possibly death.

FIRST AID:

SKIN: Wash immediately with soap and water. Seek medical attention if symptoms develop or persist.

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.

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INGESTION: DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention. 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. Eliminate all potential ignition sources. Stop leak remotely or when safe to do so. 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 vapours or divert vapour cloud drift. High expansion foam cover may help suppress evolution of flammable gas. Prevent flammable vapours or liquids from entering sewers, drains, ditches 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.

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; ADR = Transport of Dangerous Goods by Road; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; BLEVE = Boiling Liquid Expanding Vapour Explosion; BOD = Biochemical Oxygen Demand; CAS = Chemical Abstracts Service; CEPA = Canadian Environmental Protection Act; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; CPR = Controlled Products Regulations; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EPA = Environmental Protection Agency; EU = European Union; FDA = Food and Drug Administration; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; HCS = Hazard Communication Standard; HMIS = Hazardous Materials Identification System; 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 or Health; IMDG = International Maritime Dangerous Goods; IMO = International Maritime Organization; ISHL = Industrial Safety and Health Law; Kow = Octanol/water partition coefficient; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; LEL = Lower Explosive Limit; LFL = Lower Flammable Limit; LLV = Level Limit Ceiling Limit (Sweden dust); MAK = Maximum Concentration Value in the Workplace; MITI = Ministry of International Trade and Industry; MSDS = Material Safety Data Sheet; NAB = Threshold Values (Indonesia); NCEC = National Chemical Emergency Centre; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NJTSR = New Jersey Trade Secret Registry; NTP = National Toxicology Program; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PNOC = Particulates Not Otherwise Classified; PPE = Personal Protective Equipment; PRTR = Designated Chemical Substance Law (Japan); PSD = Short Term Exposure Limit (Indonesia); RCRA = Resource Conservation and Recovery Act; REACH = Registration, Evaluation, Authorisation and Restriction of Chemical Substances; REL = Recommended Exposure Limit; RID = Transport of Dangerous Goods by Rail; SARA = Superfund Amendments and Reauthorization Act; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; SEPA = State Environmental Protection Administration; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average; UEL = Upper Explosive Limit; UFL = Upper Flammable Limit; VLA-ED = Valor límite Ambiental de Exposición Diaria (Environmental Exposure Daily Limit Value); VME = valeur limite d'exposition (Occupational Exposure Limits); WHMIS = Workplace Hazardous Materials Information Systems

MSDS Prepared by: NOVA Chemicals

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

Other Information

Notice to Reader:

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