

SAFETY DATA SHEET

Classified in accordance with 29 CFR 1910.1200

1. Identification

Product identifier: Polymer Grade Propylene**Other means of identification****Common name(s), synonym(s):** Propylene, propene, 1-propene**SDS number:** NOVA-0150**Recommended use and restriction on use****Recommended use:** Raw material for chemicals and polymers, fuel gas products.**Restrictions on use:** All uses other than the identified.**Manufacturer/Importer/Supplier/Distributor Information****Manufacturer**

Company Name: NOVA Chemicals Olefins LLC
Address: P.O. Box 470
Geismar, Louisiana, USA 70734
Telephone: Product Information: 1-412-490-4063
SDS Information Email: msdsemail@novachem.com

Emergency telephone number:

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

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

2. Hazard(s) identification

Hazard Classification**Physical Hazards**

Flammable gas	Category 1
Gases under pressure	Liquefied gas

OSHA hazard(s)

Simple asphyxiant

Label Elements**Hazard Symbol:****Signal Word:** Danger**Hazard Statement:** Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.**Precautionary Statements:**

Prevention:	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Use only outdoors or in a well-ventilated area.
Response:	Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources.
Storage:	Store in a well-ventilated place. Protect from sunlight.
Disposal:	Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: Contact with liquefied gas may cause irritation and/or frostbite.

3. Composition/information on ingredients

Mixtures

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
1-Propene	Propylene	115-07-1	>99.5%
Propane	Dimethylmethane	74-98-6	<0.4%

* All concentrations are percent by weight.

Additional Information: This product may contain very low levels of Naturally Occurring Radioactive Materials (NORM), which have been identified as Radon 222 (CAS No. 14859-67-7) and its main radioactive decay products, Lead 210 (CAS No. 14255-04-0) and Polonium 210 (CAS No. 13981-52-7). See Section 16 - Further information. This product is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

4. First-aid measures

Inhalation:	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Seek medical attention.
Ingestion:	Ingestion of this product is not a likely route of exposure. Do NOT induce vomiting. Seek medical attention.
Skin Contact:	Contact with liquefied gas may cause irritation and/or frostbite. Seek medical attention immediately in the event of frostbite. IF ON SKIN: Wash with plenty of soap and water. Thaw frosted parts with lukewarm water. Do not rub affected area. Remove non-adhering contaminated clothing. Do not remove adherent material or clothing. Seek medical attention.
Eye contact:	Contact with liquefied gas may cause irritation and/or frostbite. Seek medical attention immediately in the event of frostbite. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention.

Most important symptoms/effects, acute and delayed

Symptoms: Frostbite, headache, dizziness, nausea, heartbeat irregularities.

Indication of immediate medical attention and special treatment needed

Treatment: 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, frostbite, 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.

5. Fire-fighting measures

General Fire Hazards: Extremely flammable liquefied gas. Vapors may travel considerable distance to a 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 reignition. Vapors may form explosive mixture with air. Consider need for immediate emergency isolation and evacuation. If a pipeline or a storage vessel is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions. Keep containers away from source of heat or fire. Contains gas under pressure; may explode if heated.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use dry chemical, foam, carbon dioxide (CO₂), water spray or fog to extinguish. Use water to cool fire-exposed containers and to protect personnel.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical: Upon combustion, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Keep upwind. Keep unauthorized 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. Avoid inhaling any smoke and combustion materials. Remove and isolate contaminated clothing and shoes. Cool containers with flooding quantities of water until well after the fire is out. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Reference Emergency Response Guidebook No. 115 for additional details and instructions.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unauthorized personnel away. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air.

Methods and material for containment and cleaning up: Wear appropriate personal protective equipment. Do not touch or walk through spilled material. Eliminate all ignition sources if safe to do so. Keep upwind. Keep out of low areas. Stop leak if safe to do so. All equipment used when handling the product must be grounded. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Keep area isolated until any detectable flammable gas has been fully dispersed.

Small Spills: Isolate spill or leak area for 50 to 100 meters (164 to 330 feet).

Large Spills: Consider initial downwind evacuation for at least 800 meters (1/2 mile). Evacuate personnel to upwind of the spill area, and position at a safe distance. Use water spray to reduce gas or divert gas cloud drift.

7. Handling and storage

Precautions for safe handling: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. 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". Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Radioactive decay products may accumulate over time in scale or deposits in processing equipment (e.g. pumps, filters, piping, etc.). Equipment and piping should be checked for possible treatment (decontamination) prior to maintenance or disposal/salvage. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Conditions for safe storage, including any incompatibilities: Protect from sunlight. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Only allow access to authorized persons. Store and handle in properly designed pressure vessels and equipment. Store and use away from heat, sparks, open flame, or any other ignition source. 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. Store away from incompatible materials. Store according to applicable regulations and standards for flammable materials.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

In the ACGIH TLVs® and BEIs® book, propane (CAS# 74-98-6) has been identified as being an "Explosion hazard" and "Simple asphyxiant". Please refer to the ACGIH TLVs® and BEIs® book, latest edition, for additional information.

Chemical Identity	Type	Exposure Limit Values	Source
1-Propene	TWA	500 ppm	US. ACGIH Threshold Limit Values, as amended
Propane	PEL	1,000 ppm 1,800 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended
	TWA	1,000 ppm 1,800 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
	REL	1,000 ppm 1,800 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
	IDLH	2,100 ppm	US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended

Appropriate 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.

Individual protection measures, such as personal protective equipment

General information:	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.
Eye/face protection:	Safety glasses. Chemical goggles under a full-face shield or respirator are recommended if contact with liquefied gas is possible.
Skin Protection	
Hand Protection:	Wear protective gloves. Wear cold insulating gloves.
Skin and Body Protection:	Wear appropriate clothing to prevent any possibility of skin contact. Wear work clothes with long sleeves and pants. Fire resistant (i.e., Nomex) or natural fiber clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where a flammable vapor release may occur. Wear chemical-resistant safety footwear with good traction to prevent slipping. Static Dissipative (SD) rated footwear is also recommended.
Respiratory Protection:	Air supplied breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed OEL.
Hygiene measures:	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.

9. Physical and chemical properties

Appearance

Physical state:	Gas
Form:	Liquefied gas
Color:	Clear and colorless
Odor:	no distinct odor
Odor Threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	No data available.
Initial boiling point and boiling range:	-48 °C (-54 °F)
Flash Point:	-108 °C (-162 °F)
Evaporation rate:	> 1
Flammability (solid, gas):	Extremely flammable.
Upper/lower limit on flammability or explosive limits	
Flammability Limit - Upper (%):	11.1 %(V)
Flammability Limit - Lower (%):	2 %(V)
Vapor pressure:	8,690 mm HG (25 °C (77 °F))
Vapor density:	1.48 (Air=1)
Density:	No data available.
Relative density:	0.508 - 0.52 (15.6 °C (60.1 °F))
Solubility(ies)	
Solubility in water:	No data available.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	1.77

Auto-ignition temperature:	> 400 °C (> 752 °F)
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	Contact with incompatible materials. Sources of ignition. Exposure to heat.
Chemical Stability:	Stable under normal conditions.
Possibility of hazardous reactions:	Under specific conditions, such as high temperature and pressure, and when product is in liquid state, product may polymerize with metal coordination complexes or mixtures of lithium nitrate and sulfur dioxide. May react vigorously with oxidizing agents. Liquefied gas may explode on contact with hot water (45 °C to 75 °C) (113 °F to 167 °F).
Conditions to avoid:	Keep away from heat, sparks and open flame.
Incompatible Materials:	Strong oxidizing agents. Nitrogen oxides. Nitrates. Perchlorates. Many materials become brittle after contact with liquefied gases and may fail without warning. Carefully select and test equipment, gaskets and hoses periodically to ensure integrity and compatibility.
Hazardous Decomposition Products:	Upon decomposition, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Inhalation:	Product is not acutely toxic.
Ingestion:	Ingestion of this product is not a likely route of exposure.
Skin Contact:	The liquefied form will cause freezing burns (frostbite).
Eye contact:	The liquefied form will cause freezing burns (frostbite).

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation:	Headache, dizziness, nausea, heartbeat irregularities.
Ingestion:	No adverse effects due to ingestion are expected.
Skin Contact:	Frostbite.
Eye contact:	Frostbite.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product:	Not classified for acute toxicity based on available data.
Dermal Product:	Not classified for acute toxicity based on available data.
Inhalation Product:	Not classified for acute toxicity based on available data.

Repeated dose toxicity

Product: (Rat, Inhalation - gas, 2 yr): > 4985 ppm (Target Organ(s): nasal cavity) (LOAEL)

Skin Corrosion/Irritation

Product: No data available.

Components:

Propane Contact with liquid form may cause frostbite.

Serious Eye Damage/Eye Irritation

Product: No data available.

Components:

Propane Contact with liquefied gas might cause frostbites, in some cases with tissue damage.

Respiratory or Skin Sensitization

Product: No data available.

Carcinogenicity

Product: Not classified

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:

No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050), as amended:

No carcinogenic components identified

Germ Cell Mutagenicity**In vitro**

Product: No data available.

Components:

1-Propene A weak mutagenic response was observed with *Salmonella typhimurium* strains TA1535 exposed to propylene in the presence of S9 mix but not in the absence of S9.

In vivo

Product: No data available.

Reproductive toxicity

Product: No data available.

Specific Target Organ Toxicity - Single Exposure

Product: Not classified

Specific Target Organ Toxicity - Repeated Exposure

Product: Not classified. In the nasal cavity, propylene induced nasal lesions of relatively mild nature and relatively few animals were affected.

Aspiration Hazard

Product: not applicable

Other effects:

Propylene that is inhaled is largely exhaled unchanged. A small fraction may be metabolized and transported in blood as propylene oxide. There is no known health effect found to be associated with this metabolism in 2-year cancer studies or in studies of potential adverse genetic effects.

12. Ecological information**Ecotoxicity:****Acute hazards to the aquatic environment:**

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability**Biodegradation**

Product: Results of distribution modeling show that chemical constituents of streams in the Propylene Streams Category will partition primarily to the air compartment, with a negligible amount partitioning to water. In the air, these constituents have the potential to rapidly degrade through indirect photolytic processes mediated primarily by hydroxyl radicals. This is expected to be the dominant route of loss and degradation process for constituents of these streams. Aqueous photolysis and hydrolysis will not contribute to the transformation of category constituents in aquatic environments because they are either poorly or not susceptible to these reactions.

Although the biodegradability of streams in this category has not been evaluated with standard testing procedures because of their high volatility, studies have demonstrated that the predominant category constituents can be degraded by bacteria isolated from soil and surface water samples.

Biodegradation is unlikely to contribute to the overall degradation of constituents from these streams because they tend to partition to the air compartment. Propylene will degrade rapidly in air; with a calculated atmospheric half-life range of 4.9 to 101.2 hours.

BOD/COD Ratio

Product: No data available.

Bioaccumulative potential**Bioconcentration Factor (BCF)**

Product: Not expected to bioaccumulate.

Partition Coefficient n-octanol / water (log Kow)

Product: 1.77

Mobility in soil: Low potential. Subject to microbial degradation.

Other adverse effects: No data available.

13. Disposal considerations

Disposal instructions: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste.

Contaminated Packaging: Check local, federal and state environmental regulations prior to disposal.

14. Transport information**DOT**

UN Number:	UN 1077
UN Proper Shipping Name:	Propylene
Shipping Name Continued:	Not Odorized
Transport Hazard Class(es)	
Class:	2.1
Label(s):	2.1
Packing Group:	–
Marine Pollutant:	No
Special precautions for user:	Reference Emergency Response Guidebook No. 115, latest revision.

15. Regulatory information**US Federal Regulations****TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050), as amended

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

None present or none present in regulated quantities.

Superfund Amendments and Reauthorization Act of 1986 (SARA)**Hazard categories**

Flammable (gases, aerosols, liquids, or solids), Gas under pressure, Simple asphyxiant

US. EPCRA (SARA Title III) Section 304 Extremely Hazardous Substances Reporting Quantities and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Hazardous Substances

None present or none present in regulated quantities.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

<u>Chemical Identity</u>	<u>Reporting threshold for other users</u>	<u>Reporting threshold for manufacturing and processing</u>
1-Propene	10000 lbs	25000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

<u>Chemical Identity</u>	<u>Reportable quantity</u>
1-Propene	10000 lbs
Propane	10000 lbs

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

None present or none present in regulated quantities.

US State Regulations**US. California Proposition 65**

No ingredient requiring a warning under CA Prop 65.

US. New Jersey Worker and Community Right-to-Know Act**Chemical Identity**

1-Propene

US. Pennsylvania RTK - Hazardous Substances**Chemical Identity**

1-Propene

Inventory Status

Canada DSL Inventory List: On or in compliance with the inventory

US TSCA Inventory: On or in compliance with the inventory

16. Other information, including date of preparation or last revision**Issue Date:** 03/13/2020**Revision Information:** 03/13/2020: SDS Update – phrase edits
01/02/2020: SDS Update**Version #:** 2.1**Abbreviations and acronyms:** ACC = American Chemistry Council; ACGIH = American Conference of Governmental Industrial Hygienists; BOD = Biochemical Oxygen Demand; C = Ceiling; CAS = Chemical Abstracts Service; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; COD = Chemical Oxygen Demand; DOT = Department of Transportation; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EPA = Environmental Protection Agency; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; HPV = High Production Volume; IARC = International Agency for Research on Cancer; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PMCC = Pensky-Martens Closed Cup; PPE = Personal Protective Equipment; RCRA = Resource Conservation and Recovery Act; REL = Recommended Exposure Limit; SARA = Superfund Amendments and Reauthorization Act; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; STEL = Short Term Exposure Limit; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average**Further Information:** 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".**Naturally Occurring Radioactive Material (NORM):** This information is given to call attention to the issue of Naturally Occurring Radioactive Material (NORM) contamination. Industry experience has shown that this product may contain small amounts of Radon-222 (Rn-222) and its radioactive decay products.

Radon-222 is a naturally occurring radioactive gas that has been found to be a contaminant in natural gas. During processing, Rn-222 tends to be concentrated in the liquefied petroleum gas stream and in product streams having a similar boiling point range. Although Rn-222 levels in this product do not present any direct radon exposure, customers should be aware of the

potential for buildup of Rn-222 decay products within their processing streams. The concentration of Rn-222 decay products in processing equipment (e.g. pumps, filters, piping, etc.) may accumulate to a point where gamma radiation is detected outside of this equipment during normal operations.

Field studies quoted in the literature, and those conducted by company personnel, have not shown any conditions, which subject workers to cumulative exposures that may exceed regulated limits. Equipment emitting gamma radiation should be presumed to be internally contaminated with alpha-emitting decay products (i.e. Lead-210, Polonium-210). These decay products may be a health hazard if inhaled or ingested. Equipment and piping should be checked for possible treatment (decontamination) prior to maintenance or disposal/salvage.

Protective equipment (e.g. coveralls, gloves, and a respirator with HEPA filters, or supplied air) should be worn by personnel entering a vessel or working on contaminated process equipment to prevent skin contamination, ingestion, or inhalation of any NORM contaminated residue. Airborne contamination may be minimized by handling contaminated materials in a wet state.

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