

SAFETY DATA SHEET

Classified in accordance with Health Canada Hazardous Products Regulations (SOR/2015-17)

1. Identification

Product identifier: Crude Butadiene (Stabilized)**Other means of identification****Common name(s),
synonym(s):** C4 Co-product; C4 Intermediate Hydrocarbon Stream; C4, ethylene-manuf.-by-product; Joffre C4's, Crude Butadiene
SDS number: NOVA-0012**Recommended use and restriction on use****Recommended use:** Raw material used in industrial applications for chemical and elastomers manufacturing.**Restrictions on use:** All uses other than the identified.**Manufacturer/Importer/Supplier/Distributor Information****Manufacturer****Company Name:** NOVA Chemicals
Address: P.O. Box 2518, Station M
Calgary, Alberta, Canada T2P 5C6
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)

Canada: 1-800-579-7421 (NCEC) (24 hours)

2. Hazard(s) identification

Hazard Classification According to Hazardous Products Regulations**Physical Hazards**

Flammable gas	Category 1
Gases under pressure	Liquefied gas
Simple asphyxiant	Category 1

Health Hazards

Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A

Environmental Hazards

Acute hazards to the aquatic environment	Category 3
Chronic hazards to the aquatic environment	Category 3

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. May cause genetic defects. May cause cancer. Harmful to aquatic life with long lasting effects.
Precautionary Statements:	
Prevention:	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. 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. Wear protective gloves/ protective clothing/ eye protection/ face protection. Avoid release to the environment.
Response:	IF exposed or concerned: Get medical advice/attention. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources.
Storage:	Store locked up. Protect from sunlight. Store in a well-ventilated place.
Disposal:	Dispose of contents/ container to an approved facility in accordance with local, regional, national and international regulations.
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 (%)*
1,3-Butadiene	Vinylethylene	106-99-0	63 - 80%
n-Butane	Butane	106-97-8	10.51 - 14.29%
1-Butene	Butene-1	106-98-9	7.29 - 8.60%
2-Butene	Butylene	107-01-7	2 - 7%
1-Buten-3-yne	Butenyne, vinyl acetylene	689-97-4	1.00 - 1.30%
1-Propene	Propylene	115-07-1	0.01 - 1.00%
1-Propene, 2-methyl-	Iso-butene, Isobutylene	115-11-7	0.35 - 0.50%
1,2-Butadiene	Buta-1,2-diene	590-19-2	0.01 - 0.45%
1-Propyne	Methyl acetylene	74-99-7	0.05 - 0.45%
1-Butyne	Ethylacetylene	107-00-6	0.11 - 0.20%
1,2-Propadiene	Propadiene	463-49-0	0.01 - 0.10%
Propane	Dimethylmethane	74-98-6	0.01 - 0.04%
1,2-Benzenediol, 4-(1,1-dimethylethyl)-	4-tert-butylcatechol, TBC	98-29-3	0.0001 - 0.02%

* All concentrations are percent by weight.

Additional Information: This product has been assigned a CAS # of 68476-52-8 - Hydrocarbons, C4, ethylene-manuf.-by-product. It is comprised of the above listed components. Other components are below required disclosure limits. This product is considered hazardous by the Hazardous Products Regulations, 2015.

4. First-aid measures

Inhalation:	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical attention immediately.
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: Gently 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 can occur with exposure to liquefied gases. High concentrations reduce available oxygen levels and may cause headache, dizziness, nausea, loss of coordination, difficulty breathing, suffocation, or cardiac rhythm disturbance.
------------------	---

Indication of immediate medical attention and special treatment needed

Treatment:	Administer oxygen by mask if there is respiratory distress, any change in level of consciousness, or cardiac rhythm disturbance. Treat unconsciousness, frostbite, nausea, hypotension, seizures and cardiac dysrhythmias in the conventional manner. Adrenergic (epinephrine, norepinephrine) and dopaminergic agonists should be avoided during treatment or used with caution (lowest effective dose) because of possible cardiac sensitization by this product mixture.
-------------------	---

5. Fire-fighting measures

General Fire Hazards:	Extremely flammable liquefied gas. Vapours 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. Vapours 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 metres (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 (CO ₂), 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 fire-fighters**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. Do not direct water at source of leak or safety devices as icing may occur. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Reference Emergency Response Guidebook No. 116P for additional details and instructions.

Special protective equipment for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA).

6. Accidental release measures**Personal precautions, protective equipment and emergency procedures:**

Wear appropriate personal protective equipment. 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:

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 run-off 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 at least 100 metres (330 feet) in all directions.

Large Spills: Consider initial downwind evacuation for at least 800 metres (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. Soil remediation may be required.

7. Handling and storage**Precautions for safe handling:**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. 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". Procedures and design should exclude oxygen from the handling and processing systems. Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Equipment and piping should be checked for possible treatment (decontamination) prior to maintenance or disposal/salvage. Equipment preparation may include nitrogen purge, acid wash (to remove iron oxides), sodium nitrate pacification, and final oxygen removal using diethylhydroxylamine (DEHA) or other suitable materials. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. Avoid release to the environment.

Conditions for safe storage,
SDS_CA

Protect from sunlight. Store in a well-ventilated place. Keep container tightly

including any incompatibilities:

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.

For road, rail and marine shipments, ensure product is transported with the addition of a suitable inhibitor / stabilizer, such as t-butyl catechol (TBC) or equivalent. Consider addition of TBC or equivalent to storage system if it cannot be maintained entirely free of oxygen.

8. Exposure controls/personal protection**Control Parameters****Occupational Exposure Limits**

In the ACGIH TLVs® and BEIs® book, n-butane (CAS# 106-97-8) (as Butane, isomers), 1-Propyne (methylacetylene) (CAS# 74-99-7) and propane (CAS# 74-98-6) have been identified as being an "Explosion hazard". Propane (CAS# 74-98-6) has also been identified as a "Simple asphyxiant". Please refer to the ACGIH TLVs® and BEIs® book, latest edition, for additional information.

Chemical Identity	type	Exposure Limit Values		Source
1,3-Butadiene	TWA	2 ppm	4.4 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
1,3-Butadiene	TWA	2 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
1,3-Butadiene	TWA	2 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
1,3-Butadiene	TWA	2 ppm	4.4 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
1,3-Butadiene	TWA	2 ppm		US. ACGIH Threshold Limit Values, as amended
1,3-Butadiene	IDLH	2,000 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
n-Butane	TWA	1,000 ppm		Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
n-Butane	STEL	1,000 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
n-Butane	TWA	800 ppm	1,900 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
n-Butane	STEL	1,000 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
n-Butane	STEL	1,000 ppm		US. ACGIH Threshold Limit Values, as amended
n-Butane	REL	800 ppm	1,900 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
n-Butane	IDLH	1,600 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
1-Butene	TWA	250 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
1-Butene	TWA	250 ppm		US. ACGIH Threshold Limit Values, as amended
2-Butene	TWA	250 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended

2-Butene	TWA	250 ppm		US. ACGIH Threshold Limit Values, as amended
1-Propene	TWA	500 ppm	860 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
1-Propene	TWA	500 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
1-Propene	TWA	500 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
1-Propene	TWA	500 ppm		Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
1-Propene	TWA	500 ppm		US. ACGIH Threshold Limit Values, as amended
1-Propene, 2-methyl-	TWA	250 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
1-Propene, 2-methyl-	TWA	250 ppm		US. ACGIH Threshold Limit Values, as amended
1-Propyne	TWA	1,000 ppm	1,640 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
1-Propyne	TWA	1,000 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
1-Propyne	TWA	1,000 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
1-Propyne	TWA	1,000 ppm	1,640 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
1-Propyne	TWA	1,000 ppm		US. ACGIH Threshold Limit Values, as amended
1-Propyne	REL	1,000 ppm	1,650 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
1-Propyne	IDLH	1,700 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
Propane	TWA	1,000 ppm		Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
Propane	TWA	1,000 ppm	1,800 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
Propane	REL	1,000 ppm	1,800 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Propane	IDLH	2,100 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended

Biological Limit Values

Chemical Identity	Exposure Limit Values	Source
1,3-Butadiene (1,2-Dihydroxy-4-(N-acetylcysteinyl)-butane: Sampling time: End of shift.)	2.5 mg/l (Urine)	ACGIH BEI
1,3-Butadiene (Mixture of N-1- and N-2-(hydroxybutenyl)valine hemoglobin (Hb) adducts: Sampling time: Not critical.)	2.5 pmol/g (Blood)	ACGIH BEI

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 are recommended if contact with liquefied gas is possible.
Skin Protection	
Hand Protection:	Wear protective gloves. Wear cold insulating gloves. Use impervious gloves when handling material.
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 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. Wear chemical-resistant safety footwear with good traction to prevent slipping. Static Dissipative (SD) rated footwear is also recommended.
Respiratory Protection:	Appropriate NIOSH approved air-purifying respirator that meets the requirements of CSA Standard CAN/CSA-Z94.4, or self-contained breathing apparatus should be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators or IDLH levels.
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:	Stabilized. Liquefied gas
Colour:	Colourless
Odour:	Faint aromatic odour
Odour Threshold:	0.45 ppm (detectable), (1,3-butadiene)
pH:	not applicable
Melting point/freezing point:	-108.9 °C (-164.0 °F) (1,3-butadiene)
Initial boiling point and boiling range:	-12 - 4 °C (10 - 39 °F)
Flash Point:	-76 °C (-105 °F) (Closed cup) (1,3-butadiene)
Evaporation rate:	not applicable
Flammability (solid, gas):	Extremely flammable.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	11.5 %(V) (1,3-butadiene)
Flammability limit - lower(%):	2 %(V) (1,3-butadiene)
Vapour pressure:	2 atm (15.3 °C (59.5 °F)) (1,3-butadiene)
Vapour density:	1.9 (1,3-butadiene)
Density:	580 - 630 kg/m ³
Relative density:	0.58 - 0.63 (Water=1)
Solubility(ies)	

Solubility in water:	735 mg/l (1,3-butadiene)
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	1.99 (1,3-butadiene)
Auto-ignition temperature:	414 °C (777 °F) (1,3-butadiene)
Decomposition temperature:	No data available.
Viscosity:	not applicable

10. Stability and reactivity

Reactivity:	Product may become self-reactive under conditions of shock or increased temperature or pressure. In the presence of air, explosive peroxides and/or pyrophoric polymers may be produced. Procedures and design should exclude oxygen from the handling and processing systems, including removing oxygen before introducing the product. May form acetylides with copper, silver, mercury or alloys that are explosive and very hazardous when dry. Contact with incompatible materials. Sources of ignition. Exposure to heat.
Chemical Stability:	This product is unstable . Product may undergo vigorous polymerization in contact with air.
Possibility of Hazardous Reactions:	This product may undergo dangerous decomposition, condensation or polymerization. It may become self-reactive under conditions of shock or increased temperature or pressure. In the presence of air, explosive peroxides and/or pyrophoric polymers may be produced. May form acetylides with copper, silver, mercury or alloys that are explosive and very hazardous when dry. Hazardous polymerization can occur. Storage and processing requires review of risks and use of suitable inhibitors such as tert-butyl catechol (TBC) or equivalent. 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. Contact with incompatible materials.
Incompatible Materials:	Oxidizing agents. Organic compounds. Acids. Copper-containing alloys. Certain plastics and rubbers. 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:	May displace oxygen and cause rapid suffocation.
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:	High concentrations reduce available oxygen levels and may cause headache, dizziness, nausea, loss of coordination, difficulty breathing, suffocation, or cardiac rhythm disturbance.
--------------------	---

Ingestion:	No adverse effects due to ingestion are expected.
Skin Contact:	Frostbite or burns.
Eye contact:	Frostbite or burns.

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: Mild toxic effect.

Skin Corrosion/Irritation

Product: No data available.

Components:

1,3-Butadiene	Not likely, due to the form of the product. Frostbite hazard - rapidly expanding gas or liquid may cause frostbite.
n-Butane	Gas may be mildly irritating. Contact with the liquefied or pressurized gas may cause frostbite.
1-Butene	Gas may be mildly irritating. Contact with liquid form may cause frostbite.
1-Propyne	Contact with the liquefied or pressurized gas may cause frostbite.
1-Butyne	May cause frostbite or freezing of skin.
1,2-Propadiene	Contact with liquid form may cause frostbite.
Propane	Contact with liquid form may cause frostbite.
1,2-Benzenediol, 4-(1,1-dimethylethyl)-	Severely Irritating

Serious Eye Damage/Eye Irritation

Product: No data available.

Components:

1,3-Butadiene	Irritant of eyes and mucous membranes. Frostbite hazard - rapidly expanding gas or liquid may cause frostbite.
n-Butane	Gas may be mildly irritating. Contact with the liquefied or pressurized gas may cause momentary freezing followed by swelling and eye damage.
1-Butene	Gas may be mildly irritating. Contact with liquefied gas might cause frostbites, in some cases with tissue damage.
1-Propyne	Contact with the liquefied or pressurized gas may cause momentary freezing followed by swelling and eye damage.
1-Butyne	May cause frostbite or freezing of skin.

1,2-Propadiene	Contact with liquefied gas might cause frostbites, in some cases with tissue damage.
Propane	Contact with liquefied gas might cause frostbites, in some cases with tissue damage.
1,2-Benzenediol, 4-(1,1-dimethylethyl)-	Severely Irritating

Respiratory or Skin Sensitization

Product: No data available.

Carcinogenicity

Product: May cause cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

1,3-Butadiene Overall evaluation: 1. Carcinogenic to humans.

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

1,3-Butadiene Known To Be Human Carcinogen.

ACGIH Carcinogen List:

1,3-Butadiene Group A2: Suspected human carcinogen.

Germ Cell Mutagenicity**In vitro**

Product: May cause genetic defects.

In vivo

Product: May cause genetic defects.

Reproductive toxicity

Product: Not classified.

Specific Target Organ Toxicity - Single Exposure

Product: Not classified

Specific Target Organ Toxicity - Repeated Exposure

Product: No data available.

Aspiration Hazard

Product: not applicable

Other effects: No data available.

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

Product: Harmful to aquatic life.

Aquatic Invertebrates

Product: Harmful to aquatic life.

Toxicity to aquatic plants

Product: Harmful to aquatic life.

Chronic hazards to the aquatic environment:**Fish****Product:** Harmful to aquatic life with long lasting effects.**Aquatic Invertebrates****Product:** Harmful to aquatic life with long lasting effects.**Toxicity to aquatic plants****Product:** Harmful to aquatic life with long lasting effects.**Persistence and Degradability****Biodegradation****Product:** Product is likely to biodegrade.**BOD/COD Ratio****Product:** No data available.**Bioaccumulative Potential****Bioconcentration Factor (BCF)****Product:** Bioconcentration Factor (BCF): 10 (estimated) (1,3-butadiene)**Partition Coefficient n-octanol / water (log Kow)****Product:** 1.99 (1,3-butadiene)**Mobility in Soil:**

Not likely to adsorb to soil, hence considered moderately mobile; however, unlikely to leach into groundwater due to rapid volatilization and 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 provincial environmental regulations prior to disposal.

14. Transport information**TDG**

UN number or ID number:	UN 1010
UN Proper Shipping Name:	BUTADIENES, STABILIZED
Class	2.1
Packing Group	–
Label(s)	2.1
Subsidiary risk label	–
Special precautions for user:	Emergency Response Guidebook No. 116P, latest revision.

15. Regulatory information**Canada Federal Regulations****List of Toxic Substances (CEPA, Schedule 1)****Chemical Identity**1,3-Butadiene
Benzene

1,3-Butadiene, 2-methyl-

Export Control List (CEPA 1999, Schedule 3)

Not regulated

National Pollutant Release Inventory (NPRI)**Canada. Canadian Environmental Protection Act (CEPA). National Pollutant Release Inventory (NPRI) (Parts 1-4)**

NPRI	1,3-Butadiene
	n-Butane
	1-Butene
	1-Propene
	Propane

Canada. National Pollutant Release Inventory (NPRI) Substances, Part 5, VOCs with Additional Reporting Requirements

NPRI PT5	1,3-Butadiene
	n-Butane
	1-Butene
	2-Butene
	1-Propene

Greenhouse Gases

Not regulated

Precursor Control Regulations

Not regulated

Canada. Substances Subject to Significant New Activity (SNAC) Reporting Requirements

Not regulated

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:** 11/10/2023**Revision Information:** 10/11/2023: SDS Update – Emergency response telephone number updated, composition edits, OEL updates, section 15 updates, phrase edits
01/21/2020: SDS Update**Version #:** 7.1**Abbreviations and acronyms:** ACGIH = American Conference of Governmental Industrial Hygienists; BOD = Biochemical Oxygen Demand; CAS = Chemical Abstracts Service; CEPA = Canadian Environmental Protection Act; COD = Chemical Oxygen Demand; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EPA = Environmental Protection Agency; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; IARC = International Agency for Research on Cancer; IDLH = Immediately Dangerous to Life or Health; Kow = Octanol/water partition coefficient; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; LEL = Lower Explosive Limit; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PNOC = Particulates Not Otherwise Classified; PPE = Personal Protective Equipment; REL = Recommended Exposure Limit; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; 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".

For additional information on properties, health and environmental hazard information, regulatory overview, handling, transport and storage, fire safety and emergency response, please refer to the, "Butadiene Product Stewardship Guidance Manual", updated November 27, 2019, by the American Chemistry Council (www.americanchemistry.com)

For additional information on the safe handling of butadiene, please refer to the "Butadiene Popcorn Polymer Resource Book" (in CD format), published by the International Institute of Synthetic Rubber Producers, Inc. (IISRP) (www.iisrp.com)

Disclaimer:

ALTHOUGH THE INFORMATION CONTAINED IN THIS DOCUMENT IS PRESENTED IN GOOD FAITH, BASED ON AVAILABLE INFORMATION BELIEVED TO BE RELIABLE AT THE TIME OF PREPARATION OF THIS DOCUMENT, **NOVA CHEMICALS MAKES NO WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION OR THE PRODUCT/MATERIALS DESCRIBED HEREIN, AND EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES AND CONDITIONS (INCLUDING ALL WARRANTIES AND CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE). NO FREEDOM FROM INFRINGEMENT OF ANY PATENT OWNED BY NOVA CHEMICALS OR OTHERS IS TO BE INFERRED. THIS INFORMATION IS SUBJECT TO CHANGE WITHOUT NOTICE. PLEASE CONTACT NOVA CHEMICALS FOR THE MOST CURRENT VERSION OF THIS SDS. NOVA CHEMICALS DOES NOT ASSUME RESPONSIBILITY FOR SDS OBTAINED FROM THIRD PARTY SOURCES.**

UNLESS SPECIFICALLY AGREED OTHERWISE, NOVA CHEMICALS DOES NOT TAKE RESPONSIBILITY FOR USE, TRANSPORTATION, STORAGE, HANDLING OR DISPOSAL OF THE PRODUCT/MATERIALS DESCRIBED HEREIN.