SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	ISOBUTYLENE
CAS Number:		115-11-7
Chemical characterization	:	Alkenes
Chemical Name	:	Isobutene
Synonyms	:	Isobutene, Unsaturated Butene, 2-Methylpropene
Identified uses	:	Monomer; Intermediate
Company	:	Lyondell Chemical Company LyondellBasell Tower, Suite 300 1221 McKinney St. P.O. Box 2583 Houston Texas 77252-2583
Telephone	:	Customer Service 800 321-7000 Product Safety 800 700-0946
Emergency telephone	:	CANUTEC 613 996-6666 CHEMTREC USA 800-424-9300 LYONDELL 800-245-4532
E-mail address		product.safety@lyb.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable gases	Category 1
Gases under pressure	Liquefied gas
Acute aquatic toxicity	Category 3
Simple Asphyxiant	Category 1
Health hazards not otherwise classified	Category 1

GHS Classification Scale (1= severe hazard; 4= slight hazard)

Label elements

Hazard symbols :

Signal Word : Danger

Hazard Statements : H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H402 Harmful to aquatic life.
May displace oxygen and cause rapid suffocation.
May cause frostbite.

Precautionary Statements : **Prevention**

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273 Avoid release to the environment.

Response

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.

Storage

P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Other hazards

No additional information available.

3. Composition/information on ingredients

Substances

Ingredients

Chemical Name	CAS-No. EC-No.	Weight %	Component Type
Isobutylene	115-11-7	>= 99.0 %	A

Key:
(A) Substance

SECTION 4. FIRST AID MEASURES

First aid procedures

General advice : This product is of low acute toxicity.
Simple asphyxiant, high concentrations can displace oxygen and cause drowsiness and dizziness.
Sudden release of this material from pressurized vessels may result in cryogenic burns (frostbite).
Remove contaminated clothes except in the case of frostbite.
Always observe self-protection methods
Move out of dangerous area.
Get medical attention immediately.
Show this material safety data sheet to the doctor in attendance.

If inhaled : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

Do not leave the victim unattended.
Keep patient warm and at rest.
Immediately seek medical attention.
If breathing is difficult, give oxygen.
If unconscious place in recovery position and seek medical advice.
In the event of unconsciousness, apnea or cardiac arrest (no pulse), apply cardiopulmonary resuscitation.

In case of skin contact : Non-irritating to the skin.
Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
If frostbite has occurred, seek medical attention immediately; do not rub the affected area or flush with water. To prevent further damage, do not attempt to remove frozen clothing from affected area. If frostbite has not occurred, immediately and thoroughly wash contaminated skin with soap and water.

In case of eye contact : This gas is non-irritating; but direct contact with liquified/pressurized gas or frost particles may produce severe and possibly permanent eye damage from freeze burns.
If eye tissue is frozen, seek medical attention immediately. If tissue is not frozen, thoroughly flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation persists seek medical attention.

If swallowed : This substance is a gas with a low boiling point; hence, oral exposure and resulting acute toxicity are unlikely.

Notes to physician

Symptoms : High vapor concentrations may cause central nervous system (CNS) depression with symptoms such as nausea, dizziness, weakness, headache, loss of coordination, loss of consciousness, coma and death.

Hazards : Simple Asphyxiant.
Skin or eye contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Treatment : Treat symptomatically.
Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.
Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias (irregular beating) in persons exposed to this material.
Treat frost-bitten areas as needed.

SECTION 5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	:	-105 °F (-76 °C)
Autoignition temperature	:	869 °F (465 °C)
Lower explosion limit	:	1.8 vol%
Upper explosion limit	:	9.6 vol%

Fire fighting

Suitable extinguishing media	:	SMALL FIRE: Use dry chemicals, CO2 LARGE FIRES: Use water spray or fog
Unsuitable extinguishing media	:	Do not use solid water stream - may spread fire.

Protective equipment and precautions for firefighters

Specific hazards during fire fighting	:	Eliminate all sources of ignition. Releases extremely flammable vapors well below ambient temperatures. When exposed to ignition source in air, vapors can burn in open or explode if confined. Potential explosion hazard from reignition, if fire is put out without shutting off source. May travel long distances along the ground before igniting and flashing back to vapor source. Heat/contamination can release extremely flammable isobutylene gas. Metal corrosion may generate flammable hydrogen gas. DO NOT extinguish a leaking gas fire unless leak can be stopped. Explosive atmosphere could form. Evacuate area and fight fire from a maximum distance or use unmanned hose holders or monitor nozzles. Containers can build up pressure if exposure to heat; cool with flooding quantities of water until well after the fire is out. DO NOT direct water at source of leak or pressure relief devices, icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of vessel. Always stay away from the ends of "bullet" tanks. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if it can be done without risk. Cool containers with flooding quantities of water until well after fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Special protective equipment for fire-fighters	:	Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighter’s protective clothing will only provide limited protection. Always wear thermal protective clothing when handling

refrigerated/cryogenic liquids.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Use personal protective equipment. Ensure adequate ventilation. Eliminate all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Enter area only if strictly necessary. A combustible gas detector can be used to check for flammable gas or vapors.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities. An authoritative evaluation of environmental exposure and risk indicates that no special risk management practices are needed to control environmental release.
Methods for containment / Methods for cleaning up	:	Eliminate all sources of ignition. Let evaporate. All equipment used when handling this product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. If possible, turn leaking container so that gas escapes rather than liquid. Suppress (knock down) gases/vapors/mists with a water spray jet. Water spray may reduce vapor; but may not prevent ignition in closed spaces. Prevent entry into waterways, sewers, basements or confined areas. Spillages of liquid product in the water will likely result in a quick and complete vaporization of the product. Isolate the area and prevent fire/explosion hazard for ships and other structures, taking into account wind direction and speed, until the product is completely dispersed. Note: recommended measures are based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary. Local regulations may also prescribe or limit actions to be taken. In those cases when the presence of dangerous amounts of H2S in the leaked/spilled product is suspected or proved, additional or special actions may be warranted, including access restrictions, use of special protection equipment, procedures and personnel training.

SECTION 7. HANDLING AND STORAGE

Handling

Advice on safe handling : Sudden release of this material from pressurized vessels may result in cryogenic burns (frostbite).
If inspection shows cylinders in poor condition, immediately contact supplier.
Keep away from all sources of ignition.
Keep container tightly closed when not in use.
While moving cylinder, always keep in place removable valve cover.
Securely chain cylinders when in use and protect against physical damage.
Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors).
Use only non-sparking tools.
Bond and ground all equipment before transferring this material from one container to another.
The vapor is heavier than air. Beware of accumulation in pits and confined spaces.
Use only in well ventilated areas.
Wear recommended personal protective equipment.
Contact with liquid and with containers and delivery lines from which LPG has just been drawn, should be avoided to prevent cold burns.

Advice on protection against fire and explosion : Take precautionary measures against static discharge.

Storage

Requirements for storage areas and containers : Compressed gases should be stored in a separate safety storage cabinet or room.
Keep away from direct sunlight.
Empty containers may contain flammable product residues.
Do not weld, solder, drill, cut or perform similar operations on or near containers.
Ensure that all relevant regulations regarding explosive atmosphere, and handling and storage facilities of flammable products are followed.

8. Exposure controls/personal protection

Control parameters

Ingredients with workplace control parameters

Occupational Exposure Limits

Ingredients	CAS-No.	Type	Limit Value	Basis Revision Date	Additional Information

Isobutylene	115-11-7	TWA	250 ppm	US (ACGIH) 2012	

Consult local authorities for acceptable exposure limits.

Exposure controls

Engineering measures

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.
Use explosion-proof ventilation equipment.
Electrical equipment should be grounded and conform to applicable electrical code.

Personal protective equipment

Respiratory protection	:	Potential asphyxiation hazard. Avoid entering oxygen deficient areas even with respiratory protection/potential explosion hazard. When absolutely necessary, enter only with approved supplied air respirator, recommended or approved by appropriate local, state or international agency.
Hand protection	:	Wear insulated gloves if contact with liquid is possible.
Eye and face protection	:	Safety glasses and face shield are recommended when handling compressed gas. Use chemical type goggles and face shield when handling liquified gases.
Skin and body protection	:	Clothing such as insulated impervious gloves to protect against exposure to cold liquid or gas should be worn.
Hygiene measures	:	Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	:	Liquified gas. gaseous at 68 °F (20 °C) (1,013 hPa (760 mm Hg))

Color	:	Clear, colorless.
Odor	:	Slight sweet odor.

Safety data

Flash point	:	-105 °F (-76 °C)
Lower explosion limit	:	1.8 vol%
Upper explosion limit	:	9.6 vol%
Flammability (solid, gas)	:	Extremely flammable gas.
Oxidizing properties	:	Not considered an oxidizing agent.
Autoignition temperature	:	869 °F (465 °C)
Molecular weight	:	56.11 g/mol
Decomposition temperature	:	not determined
pH	:	Not applicable.
Melting point/range	:	-221.3 °F (-140.7 °C)
Boiling point/boiling range	:	19.6 °F (-6.9 °C) at 1,013 hPa (760 mm Hg)
Vapor pressure	:	2,560 - 2,580 hPa (1,920 - 1,935 mm Hg) at 68 °F (20 °C)
Density	:	0.59 g/cm3 at 68 °F (20 °C) (Air = 1.0)
Water solubility	:	263 mg/l at 77 °F (25 °C)
Partition coefficient: n-octanol/water	:	log Pow: 2.34
Viscosity, kinematic	:	Not applicable
Relative vapor density	:	1.94 (Air = 1.0)
Explosive properties	:	Not considered explosive

Remarks - Other information : No additional information available.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Stable under recommended storage conditions.

Chemical stability : Stable

Conditions to avoid : Heat, sparks, open flame, other ignition sources, and oxidizing conditions.

Materials to avoid : Halides.
Hydrogen.
Halogens (bromine, chlorine, fluorine).
Strong oxidizing agents.
Aluminum chloride.

Hazardous decomposition products : Carbon Monoxide and Carbon dioxide.

Thermal decomposition : Thermal decomposition may produce carbon monoxide and other toxic vapors.

Hazardous reactions : Not expected to occur.
Stable.

SECTION 11. TOXICOLOGICAL INFORMATION

Product Summary : The below given information is based on the assessment of the product including impurities.

Acute toxicity

Acute oral toxicity : Not applicable

Acute inhalation toxicity : Based on acute toxicity values, not classified.

: LC50: > 10000 ppm
Species: Rat

Acute dermal toxicity : Not applicable

Skin corrosion/irritation : Not classified

: Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Serious eye damage/eye : Not classified

irritation

: Contact with liquid may cause frostbite.

Respiratory or skin sensitization

: Respiratory sensitization
Not applicable

: Skin sensitization
Not applicable

Chronic toxicity

Carcinogenicity : Not classified
Contains a substance that has a positive carcinogenicity study.
The weight of evidence for the carcinogenicity of this substance does not meet the criteria for classification.

Germ cell mutagenicity : Not classified
No adverse effect observed.

Reproductive toxicity

Effects on fertility / Effects on or via lactation : Not classified
No adverse effect observed.

Effects on Development : Not classified
No adverse effect observed.

Target Organ Systemic Toxicant - Single exposure : Based on single exposure toxicity values, not classified.

: High concentrations may cause central nervous system depression.

Target Organ Systemic Toxicant - Repeated exposure : Based on repeated exposure toxicity values, not classified.

Aspiration hazard : Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicology Assessment

Acute aquatic toxicity : Classified
Harmful to aquatic life.

Chronic aquatic toxicity	:	Not classified QSAR (Quantitative structure-activity relationship) based calculation predicts low chronic toxicity.
Toxicity to fish	:	Harmful to fish.
	:	LC50: 28.9 mg/l Exposure time: 96 HOURS Species: Fish (QSAR calculated value)
Toxicity to daphnia and other aquatic invertebrates	:	Harmful to aquatic invertebrates
	:	LC50: 16.8 mg/l Exposure time: 48 HOURS Species: daphnids. (QSAR calculated value)
Toxicity to algae	:	Harmful to algae.
	:	EC50: 13.6 mg/l Exposure time: 96 HOURS Species: green algae. (QSAR calculated value)
Toxicity to bacteria	:	no data available
Toxicity to fish (Chronic toxicity)	:	Low chronic toxicity to fish. (QSAR calculated value)
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	Low chronic toxicity to aquatic invertebrates. (QSAR calculated value)

Persistence and degradability

Biodegradability	:	Inherently biodegradable. Photodegradation following atmospheric release is expected to be the most significant route of degradation in the environment.

Bioaccumulative potential

Bioaccumulation : This material is not expected to bioaccumulate.

: Bioconcentration factor (BCF): 16.25
Method: (QSAR calculated value)

Mobility in soil

Distribution among environmental compartments : Stability in soil
Low potential for soil adsorption expected

: Stability in water
Not expected to hydrolyze readily.

Additional advice Environmental fate and pathways : No additional information available.

Results of PBT and vPvB assessment

Not applicable.

Other adverse effects

Additional ecological information : No additional information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Further information : Assure emissions comply with applicable regulations.
Contaminated product, soil, water, container residues and spill cleanup materials may be hazardous wastes.
Contaminated product, soil or water should be considered dangerous due to potential evolution of flammable vapor.
Proper grounding procedures to avoid static electricity should be followed.
The product should not be allowed to enter drains, water courses or the soil.

SECTION 14. TRANSPORT INFORMATION

TDG_ROAD

UN number : 1055
Description of the goods : ISOBUTYLENE
Class : 2.1
Packing group : NUL
Labels : 2.1

SECTION 15. REGULATORY INFORMATION

All components of this product appear on the Domestic Substances List of the Canadian Environmental Protection Act (CEPA).

Other international regulations

Global Inventory Status

The ingredients of this product are compliant with the following chemical inventory requirements or exemptions.

*Additional Explanatory Status Statements follow the table, as necessary.

Country/Region	Inventory	Status Description
Australia	AICS	Compliant
Canada	DSL	Compliant
China	IECSC	Compliant
Europe	REACH	See REACH Compliance Statement
Japan	ENCS	Compliant
Korea	KECI	Compliant
New Zealand	NZIoC	Compliant
Philippines	PICCS	Compliant
United States of America	TSCA	Compliant
Taiwan	TCSCA	Compliant

REACh status

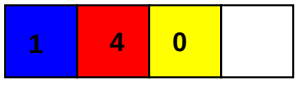
If the product has been purchased from any company of the LyondellBasell group of companies registered in the European Union, we confirm that the chemical substance in this product has been pre-registered or, where required under REACh, registered, and that we have the intention to proceed with any required registration in accordance with the deadlines set forth in REACh. (Regulation (EU) No. 1907/2006)

Contact product.safety@lyb.com for additional global inventory information.

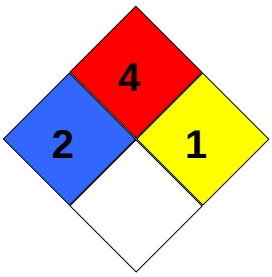
SECTION 16. OTHER INFORMATION

Further information

HMIS Classification : Health Hazard: 1
Flammability: 4
Physical hazards: 0



NFPA Classification : Health Hazard: 2
Fire Hazard: 4
Instability: 1



Other Information
HMIS rating scale (0 = minimal hazard; 4 = severe hazard)
NFPA rating scale (0 = minimal hazard; 4 = severe hazard)

Material safety datasheet sections which have been updated:
Updated format ; Revised Section(s): 1 - 16 November 5 2014

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(ii) applications involving permanent implantation into the body;
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