GROUP	D
EXHIBIT	
23	

Agency / Organization

Lyondellbasell

Title

Isobutylene Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Trade name	:	ISOBUTYLENE
CAS Number:	:	115-11-7
Chemical characterization	:	Alkenes
Chemical name	:	Isobutylene
Synonyms	:	Isobutene, Unsaturated Butene, 2-Methylpropene
Identified uses	:	Monomer; Intermediate

Company Address
Lyondell Chemical Company
LyondellBasell Tower, Suite 300
1221 McKinney St.
P.O. Box 2583
Houston Texas 77252-2583

Company Telephone
Customer Service 888 777-0232
product.safety@lyb.com

Emergency telephone number
CHEMTREC USA 800-424-9300
LYONDELL 800-245-4532

E-mail address : product.safety@lyb.com
Responsible/issuing person

2. HAZARDS IDENTIFICATION

GHS Classification

Flammable gases	Category 1
Gases under pressure	Liquefied gas
Short-term (acute) aquatic hazard	Category 3
Simple Asphyxiant	

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.

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

Hazards Not Otherwise Classified (HNOC)
May cause frostbite.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Components

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

Key:
(A) Substance

4. FIRST AID MEASURES

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.

5. FIRE-FIGHTING MEASURES

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.
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.

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.

7. Handling and storage

Precautions for safe 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.
Fire-fighting class	:	Extremely flammable gas.

Conditions for safe storage, including any incompatibilities

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.

Specific end use(s)

: See Section 1.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Ingredients with workplace control parameters

Occupational Exposure Limits

Components	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 : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
Potential asphyxiation hazard.
Avoid entering any oxygen-poor area, even with respirator.
Explosion/asphyxiation risk may exist. Enter only with U.S. National Institute for Occupational Safety and Health (NIOSH) supplied air device.

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 liquefied 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquified gas. gaseous at 20 °C (1,013 hPa)
Color	:	Clear, colorless.
Odor	:	Slight sweet odor.
Odor Threshold	:	no data available
Flash point	:	-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	:	465 °C
Molecular weight	:	56.11 g/mol
Decomposition temperature	:	not determined
Melting point/range	:	-140.7 °C
Boiling point/boiling range	:	-6.9 °C at 1,013 hPa
Vapor pressure	:	2,560 - 2,580 hPa at 20 °C
Density	:	0.59 g/cm3 at 20 °C

(Air = 1.0)

Water solubility	:	263 mg/l 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
Other Information	:	No additional information available.

10. STABILITY AND REACTIVITY

Reactivity	:	Stable under recommended storage conditions.
Chemical stability	:	Stable
Hazardous reactions	:	Not expected to occur. 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.

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 irritation : Not classified

: 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

Short-term (acute) aquatic hazard : Classified, Harmful to aquatic life.

Long-term (chronic) aquatic hazard : 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 : Low chronic toxicity to aquatic invertebrates.

(Chronic toxicity)

(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.

Stability in soil
2-methylpropene : Expected to have high mobility in soils.
Volatilization from moist soil surfaces is expected.

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 : Type: Stability in soil
Low potential for soil adsorption expected

: Type: Stability in water
Not expected to hydrolyze readily.

Other adverse effects

Environmental fate and pathways : No additional information available.

Other information

Additional ecological information : No additional information available.

13. Disposal considerations

Waste treatment methods

Product : 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.

14. TRANSPORT INFORMATION

CFR_ROAD

UN number	:	1055
Description of the goods	:	ISOBUTYLENE
Class	:	2.1
Labels	:	2.1
Marine pollutant	:	no

CFR_RAIL

UN number	:	1055
Description of the goods	:	ISOBUTYLENE
Class	:	2.1
Labels	:	2.1
Marine pollutant	:	no

IMDG

UN number	:	1055
Description of the goods	:	ISOBUTYLENE
Class	:	2.1
Labels	:	2.1
EmS Number 1	:	F-D
EmS Number 2	:	S-U
Marine pollutant	:	no

BLG (MARPOL Annex II)

Description of the goods	:	NOT APPLICABLE
Pollution category	:	NONE
Ship type	:	NONE

15. REGULATORY INFORMATION

TSCA 12b

No substances are subject to TSCA 12(b) export notification requirements.

Significant New Use Rules (SNUR)

No substances are subject to a Significant New Use Rule.

SARA 302/304

This product contains no known chemicals regulated under SARA 302/304.

SARA 311/312

Based upon available information, this material is classified as the following health and/or physical hazards according to Section 311 & 312:

Flammable (gases, aerosols, liquids, or solids)
Gases under pressure
Simple Asphyxiant
Hazard not otherwise classified (health hazards)

SARA 313

This product contains no known chemicals regulated under SARA 313.

State Reporting

This material contains the following chemical substance at very low levels which is regulated under California Proposition 65. However, it is the responsibility of the California business owner to develop his or her own regulatory compliance plan. Contact Product Safety for further information at product.safety@lyb.com.

Substance	CASRN	Type of Toxicity			
		Carcinogen	Developmental	Repro-Male	Repro-Female
Acetaldehyde	75-07-0	X			

This product contains the following chemicals regulated by New Jersey's Worker and Community Right to Know Act:

115-11-7 Isobutylene

This product contains the following chemicals regulated by Massachusetts' Right to Know Law:

115-11-7 Isobutylene
75-07-0 Acetaldehyde

This product contains the following chemicals regulated by Pennsylvania's Right to Know Act:

115-11-7 Isobutylene

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 registered under REACh, in accordance with the deadlines set forth in REACh. (Regulation (EU) No. 1907/2006)

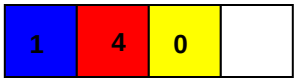
Contact product.safety@lyb.com for additional global inventory information.

16. OTHER INFORMATION

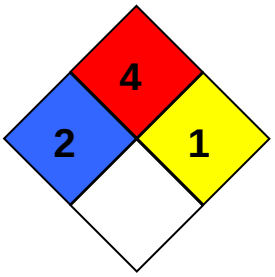
Material safety datasheet sections which have been updated:

Revised Section(s): 15 16

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



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



Further information

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

Disclaimer

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The Trade Name referenced in section 1 is a trademark owned or used by the LyondellBasell family of companies.

Numerical Data Presentation
The presentation of numerical data, such as that used for physical and chemical properties and toxicological values, is expressed using a comma (,) to separate digits into groups of three and a period (.) as the decimal marker. For example, 1,234.56 mg/kg = 1 234,56 mg/kg.

Language Translations
The information presented in this document has been translated from English by a vendor LyondellBasell believes to be reliable. LyondellBasell and its vendor have made a good-faith effort to verify the accuracy of the translation, but assume no liability or other responsibility for any errors that may have occurred. Please refer to our web site (www.lyondellbasell.com) for the original document written in English.

End of Material Safety Data Sheet