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

Trade name	:	ETHYLENE OXIDE
CAS Number:	:	75-21-8
Chemical characterization	:	Ethylene Oxide
Chemical name	:	Ethylene Oxide
Synonyms	:	1,2-Epoxyethane, Oxirane, EO
Identified uses	:	Monomer; Intermediate
Prohibited uses	:	Fumigants; Sterilants; Pesticides; Munitions

Company Address
Equistar Chemicals, LP
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
EQUISTAR 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
Acute toxicity; Oral	Category 3
Acute toxicity; Inhalation	Category 2
Skin irritation	Category 2
Eye irritation	Category 2A
Respiratory sensitization	Category 1B
Skin sensitization	Category 1B
Carcinogenicity	Category 1B
Germ cell mutagenicity	Category 1B
Reproductive toxicity	Category 1B
Specific target organ toxicity - single exposure	Category 3
Specific target organ toxicity - repeated exposure Eyes, Respiratory Tract, Nervous system, Testes	Category 2
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.
H301 Toxic if swallowed.
H330 Fatal if inhaled.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H317 May cause an allergic skin reaction.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H340 May cause genetic defects.
H350 May cause cancer.
H360F May damage fertility.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.
H373 May cause damage to organs (Blood, Respiratory Tract, Testes) through prolonged or repeated exposure.
H402 Harmful to aquatic life.

Precautionary Statements :

Prevention

P201 + P202 Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P284 Wear respiratory protection.

Response

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.
P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312 IF ON SKIN: Wash with plenty of water. Call a POISON CENTER/doctor if you feel unwell.

P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P304 + P340 + P310 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Storage
P410 + P403 Protect from sunlight. Store in a well-ventilated place.
P233 Keep container tightly closed.
P405 Store locked up.

Disposal
P501 Dispose of contents/ container to an approved waste disposal plant.

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
Ethylene Oxide	75-21-8	>= 99.9 %	A

Key:
(A) Substance

4. FIRST AID MEASURES

General advice : Take proper precautions to ensure your own health and safety

before attempting rescue and providing first aid.
Immediately remove all contaminated clothing.
If unconscious place in recovery position.
Give oxygen or artificial respiration if needed.

If inhaled : Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. When breathing is difficult, properly trained personnel may assist the affected person by administering oxygen. Keep the affected person warm and at rest. Get medical attention immediately.

In case of skin contact : Wash off immediately with soap and plenty of water.
Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
Thaw frosted parts with lukewarm water. Do not rub affected area.
Call a physician.

In case of eye contact : If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.
Direct contact with liquified gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

If swallowed : Ingestion unlikely.
However, if ingested, obtain emergency medical attention.

Notes to physician

Symptoms : High concentrations can displace oxygen and cause drowsiness, dizziness, unconsciousness and/or suffocation by asphyxiation.
irritant effects
sensitizing effects
Respiratory irritation
central nervous system effects
Contact with rapidly evaporating liquid may cause frostbite, with redness, skin color change to gray or white, and blistering.

Hazards : Toxic if swallowed.
Fatal if inhaled.
Causes skin irritation.
Causes serious eye irritation.
May cause an allergic skin reaction.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.

May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May cause damage to organs through prolonged or repeated exposure.
Simple Asphyxiant.
Rapid release of compressed gas may cause frostbite.

Treatment : Treat symptomatically.
There is no specific antidote.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : SMALL FIRE: Use dry chemicals, CO_2, water spray or alcohol-resistant foam
LARGE FIRE: Use water spray, water fog or alcohol-resistant foam

Specific hazards during fire fighting : Vapors may travel long distances along the ground before reaching a source of ignition and flashing back.
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
Cool containers with flooding quantities of water until well after fire is out.
Move containers from fire area if it can be done without risk.
Damaged cylinders should be handled only by specialists.
Do not direct water at source of leak or safety devices; icing may occur.
Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
Always stay away from tanks engulfed in fire.

Special protective equipment for fire-fighters : Wear positive pressure self-contained breathing apparatus (SCBA).
Structural firefighter's protective clothing will only provide limited protection.

6. ACCIDENTAL RELEASE MEASURES

Methods for containment / Methods for cleaning up : Extremely flammable gas.
Eliminate all sources of ignition. Let evaporate. If possible, turn leaking container so that gas escapes rather than liquid.

Do not direct water at spill or source. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas.
Isolate area until gas has dispersed.

Additional advice : See Section 15: Regulatory Information.

7. Handling and storage

Precautions for safe handling

Advice on safe handling : Do not handle near heat, sparks, or flame. Avoid contact with incompatible agents. Use only with adequate ventilation/personal protection. Avoid contact with eyes, skin and clothing. Do not enter storage area unless adequately ventilated. Metal containers involved in the transfer of this material should be grounded and bonded.

Fire-fighting class : Flammable Gas

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store containers in a cool, dry, ventilated, fire resistant area away from sources of ignition and incompatible materials.

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
Ethylene Oxide	75-21-8	TWA	1 ppm	US (ACGIH) 2012	

Ethylene Oxide	75-21-8	IDLH	800 ppm	NIOSH September 2007	
Ethylene Oxide	75-21-8	STEL	5 ppm	US (OSHA) June 23, 2006	
	Remarks: See 29 CFR 1910.1047				
Ethylene Oxide	75-21-8	TWA	1 ppm	US (OSHA) June 23, 2006	

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.

Personal protective equipment

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Hand protection : Wear chemical resistant gloves such as:
Butyl rubber.

Eye and face protection : Eye protection, including both chemical splash goggles and face shield, must be worn when possibility exists for eye contact due to splashing/spraying liquid, airborne particles, or vapor.

Skin and body protection : Use PPE that is chemical resistant to the product and prevents skin contact.

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.
Wash clothing frequently.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	gaseous
Color	:	Colorless.
Odor	:	Sweet. Ether-like odor.
Odor Threshold	:	260 ppm Odor is not an adequate warning of potentially hazardous ambient air concentrations.
Flash point	:	<= -18 °C
Lower explosion limit	:	2.6 vol%
Upper explosion limit	:	99.99 vol%
Flammability (solid, gas)	:	Extremely flammable gas.
Oxidizing properties	:	Not considered an oxidizing agent.
Autoignition temperature	:	429 °C
Decomposition temperature	:	not determined
Melting point/freezing point	:	-112.5 °C
Initial boiling point and boiling range	:	11 °C
Vapor pressure	:	1,436 - 1,733 hPa at 20 °C
Density	:	0.89 g/cm3 (Water = 1)
Water solubility	:	completely soluble
Partition coefficient: n-octanol/water	:	log Pow: -0.3
Viscosity, dynamic	:	Not applicable.
Viscosity, kinematic	:	0.27 mm2/s at 10 °C
Relative vapor density	:	1.5 (Air = 1.0)
Explosive properties	:	Contains gas under pressure; may explode if heated.
Other Information	:	No additional information available.

10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under recommended storage conditions.
Hazardous reactions	:	Polymerizes violently in presence of traces of metals or acids. May polymerize in the presence of acids or bases. This material is stable when properly handled and stored.
Conditions to avoid	:	High temperature and pressure.
Materials to avoid	:	Metal oxides, metal powders, and oxidants. Acids Bases.
Hazardous decomposition products	:	Carbon Monoxide and Carbon dioxide. Toxic vapors are generated when heated.
Thermal decomposition	:	Gives off irritating and/or toxic gases in a fire.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Acute oral toxicity	:	Classified Toxic if swallowed.
	:	270 mg/kg Species: Guinea pig Ingestion is not an expected route of exposure. Accidental ingestion may cause severe discomfort and pronounced irritation of the gastrointestinal tract as well as CNS depression (drowsiness, loss of consciousness and possibly death).
Acute inhalation toxicity	:	Classified Fatal if inhaled.
	:	LC50 (vapor): 1.2 mg/l 660 ppm Exposure time: 4 HOURS Species: Mouse Exposure to vapor or aerosol will result in irritation of the eyes and respiratory tract as well as gastrointestinal disturbances, headache, and CNS depression (including intoxication, drowsiness, convulsions, loss of consciousness and possible

death).

Acute dermal toxicity : Not classified
No study available.

Skin corrosion/irritation : Classified
Causes skin irritation.

: Skin contact with liquid ethylene oxide may result in frostbite due to rapid evaporative cooling. Neat liquid may cause chemical burns (especially if contact is prolonged), while dilute solutions have been reported to cause irritation and dermatitis.

Serious eye damage/eye irritation : Classified
Causes serious eye irritation.

Respiratory or skin sensitization : Respiratory sensitization
Classified
May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Chronic toxicity

Component Name	NTP	IARC	OSHA
Ethylene Oxide	known as a human carcinogen	1	Present

Carcinogenicity : Classified
May cause cancer.
Ethylene oxide is a multi-site animal carcinogen, producing tumors active in a range of tissues (primarily the hematopoietic system, lung, peritoneal cavity and brain) after chronic inhalation exposure. Epidemiology studies indicate it is a human carcinogen, causing primarily lymphatic and hematopoeitic cancer. An association between ethylene oxide exposure and other human cancers has been suggested but any causal link remains tentative.

Germ cell mutagenicity : Classified
May cause genetic defects.

Reproductive toxicity

Effects on fertility / Effects on or via lactation : Classified
May damage fertility.

Effects on Development	:	Not classified No adverse effect observed.
Target Organ Systemic Toxicant - Single exposure	:	Classified, May cause respiratory irritation., May cause drowsiness or dizziness.
	:	Exposure routes: Inhalation Target Organs: Respiratory system, Nervous system
Target Organ Systemic Toxicant - Repeated exposure	:	Classified, May cause damage to organs through prolonged or repeated exposure.
	:	Exposure routes: Inhalation Target Organs: Eyes, Respiratory system, Nervous system, Testes
	:	Inflammation of the respiratory tract, mineralization (opacity) of the eye as well as behavioral and degenerative changes affecting the nervous system have been observed in laboratory animals following long term repeated exposure. Similar changes may also occur in the human nervous system, especially in over-exposure situations.
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, based on readily biodegradability and low acute toxicity.
Toxicity to fish	:	Harmful to fish.
	:	LC50: 57 mg/l Exposure time: 96 HOURS Species: Pimephales promelas
Toxicity to daphnia and other aquatic invertebrates	:	Low acute toxicity to aquatic invertebrates.
Toxicity to algae	:	Low toxicity to algae.
Toxicity to bacteria	:	Moderately toxic to sewage treatment plant microbes

: EC50: 10 - 100 mg/l
Exposure time: 3 HOURS
Species: Activated sludge

Toxicity to fish (Chronic toxicity) : No study available.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : No study available.

Persistence and degradability

Biodegradability : Rapidly degradable.

: Biodegradation: 93 - 100 %
(After 28 days in a ready biodegradability test)

Bioaccumulative potential

Bioaccumulation : This material is not expected to bioaccumulate.

: Bioconcentration factor (BCF): 3.16
Method: (QSAR calculated value)

Mobility in soil

Distribution among environmental compartments : Type: Stability in soil
Koc: 3.2 - 4.7
Low absorption to soil particulates predicted
(QSAR calculated value)

: Type: Stability in water
Expected to hydrolyse under environmental conditions
Half-life in river or salt water 9-14.2 days at pH 7-7.4 and 25C

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 : Disposal should be conducted through a facility equipped with and operating an air emission control device in accordance with requirements of applicable Clean Air Act regulations.
Air emission control devices include but are not limited to vent scrubbers, on-line analyzers, and flare systems.
Assure emissions comply with applicable regulations.

14. TRANSPORT INFORMATION

CFR_RAIL

UN number : 1040
Description of the goods : Ethylene oxide with nitrogen
Class : 2.3
Subsidiary hazard class : 2.1
Labels : 2.3 (2.1)

Marine pollutant : no

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

The following substance(s) is/are regulated under SARA 302/304:

Component	CASRN	TPQ	RQ
Ethylene Oxide	75-21-8	1000lbs	10 lbs

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
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Carcinogenicity
Germ cell mutagenicity
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)
Simple Asphyxiant
Hazard not otherwise classified (health hazards)

SARA 313

This product contains the following chemicals subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR 372:

Component	CASRN	Reporting Threshold
Ethylene Oxide	75-21-8	0.1%

State Reporting

This material contains the following chemical substance 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
Ethylene Oxide	75-21-8	X	X	X	X

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

75-21-8 Ethylene Oxide

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

75-21-8 Ethylene Oxide

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

75-21-8 Ethylene Oxide

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)

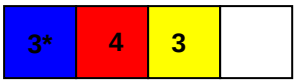
Contact product.safety@lyb.com for additional global inventory information.

16. OTHER INFORMATION

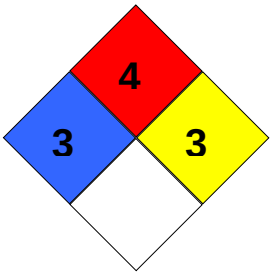
Material safety datasheet sections which have been updated:

Revised Section(s): 15 16

HMIS Classification : Health Hazard: 3
Chronic Health Hazard: *
Flammability: 4
Physical hazards: 3



NFPA Classification : Health Hazard: 3
Fire Hazard: 4
Instability: 3



Further information

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

Disclaimer

Information in this document is accurate to the best of our knowledge at the date of publication. The document is designed to provide users general information for safe handling, use, processing, storage, transportation, disposal and release and does not constitute any warranty or quality specification, either express or implied, including any warranty of merchantability or fitness for any particular purpose. Users shall determine whether the product is suitable for their use and can be used safely and legally.

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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

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

Trade name	:	Glycol Ether DPM
CAS Number:	:	34590-94-8
Chemical characterization	:	Propylene Glycol Ethers
Chemical name	:	Dipropylene Glycol Monomethyl Ether
Synonyms	:	DPM, Dipropylene Glycol Methyl Ether, DPGME
Identified uses	:	Solvent

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 liquids	Category 4
Specific target organ toxicity - single exposure	Category 3

Label elements

Hazard symbols :

Signal word : Warning

Hazard Statements : H227 Combustible liquid.
H335 May cause respiratory irritation.

Precautionary Statements : **Prevention**
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTER/ doctor if you feel unwell.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P235 Keep cool.
P405 Store locked up.

Disposal
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

No additional information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Components

Chemical name	CAS-No. EC-No.	Weight %	Component Type
Dipropylene Glycol Monomethyl Ether	34590-94-8	> 99.0 %	A

Key:
(A) Substance

4. FIRST AID MEASURES

General advice : Consult a physician/doctor if necessary.
Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.
Show this material safety data sheet to the doctor in attendance.

If inhaled	:	Remove to fresh air. Keep patient warm and at rest. Give oxygen or artificial respiration as needed. Obtain emergency medical attention. Prompt action is essential.
In case of skin contact	:	Remove contaminated clothing as needed. Wash skin thoroughly with mild soap and water. Flush with lukewarm water for 15 minutes. If sticky, use waterless cleaner first. Seek medical attention if discomfort persists.
In case of eye contact	:	Flush with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If eye irritation persists, consult a specialist.
If swallowed	:	This material may be a slight health hazard if ingested in large quantities. If large quantity swallowed, give lukewarm water (pint/ 1/2 liter) if victim completely conscious/alert. Do not induce vomiting. Risk of damage to lungs exceeds poisoning risk. Obtain emergency medical attention.

Notes to physician

Symptoms	:	Nasal irritation Respiratory irritation
Hazards	:	May cause respiratory irritation. May be harmful if swallowed and enters airways.
Treatment	:	Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	SMALL FIRE: Use dry chemical, CO2, water spray or regular foam. LARGE FIRE: Use water spray, water fog or regular foam. Do not use straight streams.

Unsuitable extinguishing media	:	Do not use solid water stream.
Specific hazards during fire fighting	:	Heat from fire can generate flammable vapor. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined. Flammable vapors may be heavier than air and travel long distances along the ground before igniting and flashing back to vapor source. Fine sprays/mists may be combustible at temperatures below normal flash point. Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of burns/injuries. Cool containers with flooding quantities of water until well after fire is out. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Move containers from fire area if it can be done without risk. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	:	Wear an approved positive pressure self-contained breathing apparatus and firefighter turnout gear. Structural firefighter's protective clothing will only provide limited protection.
Further information	:	Cool containers with flooding quantities of water until well after fire is out.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Use personal protective equipment. Eliminate all sources of ignition. Clean-up to be performed only by trained and properly equipped personnel.
Methods for containment / Methods for cleaning up	:	Eliminate all sources of ignition. 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. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible

material and transfer to containers.
Use clean non-sparking tools to collect absorbed material.

Additional advice : Keep non-involved personnel away from the area of spillage.
See section 8 for additional PPE information.
See section 13 for disposal information.

7. Handling and storage

Precautions for safe handling

Advice on safe handling : Keep container tightly closed when not in use.
The potential for peroxide formation is enhanced when this solvent is used in processes such as distillation.
Use only non-sparking tools.
Properly ground containers before beginning transfer.
When transferring propylene glycol ethers with flash points at or below 60 ºC (140 ºF) into fixed site vessels, the vessel should be purged and inerted prior to transfer.
Propylene glycol ethers may be transferred into air atmospheres if the temperature of the product and the ambient temperature within the shipping container are both at least 16.7 ºC (30 ºF) less than the product's flash point. After loading, nitrogen blanketing is required if the contents of the transportation container could exceed a temperature of 16.7 ºC (30 ºF) less than the product flash point during any subsequent transportation activities.
If the product flash point is less than 16.7 ºC (30 ºF) above either the ambient temperature of the transportation container or the storage temperature of the product, the container should be purged and inerted with nitrogen prior to loading and nitrogen blanketed after loading.
Handle empty containers with care.
Flammable/combustible residue remains after emptying.
The purging of all empty shipping containers, regardless of the flashpoint, is recommended when received with air atmospheres.
Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair.
Use adequate personal protective equipment.
Observe precautions pertaining to confined space entry.

Fire-fighting class : OSHA/NFPA Class IIIA Combustible Liquid.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents.
Storage under nitrogen atmosphere is recommended to

minimize potential for moisture condensation in the vapor space, and the formation of peroxides.
Store in properly lined steel/stainless steel to avoid slight discoloration from mild steel/copper.
Aluminum (5000 series alloys - U.S. Aluminum Association Standard) showed no corrosion after 30 days contact with PM Acetate, DPM, TPM, PTB, or PM at 71°C (160°F).
Some plastics/rubbers are attacked by Glycol Ethers/Ether Esters.
This product will absorb water if exposed to air.

Advice on common storage : Carbon steel
Store in properly lined steel/stainless steel to avoid slight discoloration from mild steel/copper.
Some plastics/rubbers are attacked by Glycol Ethers/Ether Esters.

Other data : Stable under recommended storage conditions.

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
Dipropylene Glycol Monomethyl Ether	34590-94-8	STEL	150 ppm	US (ACGIH) 2012	
Dipropylene Glycol Monomethyl Ether	34590-94-8	TWA	100 ppm	US (ACGIH) 2012	
Dipropylene Glycol Monomethyl Ether	34590-94-8	IDLH	600 ppm	NIOSH September 2007	
Dipropylene Glycol Monomethyl Ether	34590-94-8	TWA	100 ppm 600 mg/m3	US (OSHA) June 23, 2006	

Consult local authorities for acceptable exposure limits.

Exposure controls

Engineering measures

Local exhaust in addition to general room ventilation may be required to meet exposure limit(s).

Personal protective equipment

Respiratory protection	:	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. If exposure can exceed the occupational exposure limit(s), use approved respiratory protection equipment.
Hand protection	:	Wear chemical resistant gloves such as: Neoprene.
Eye and face protection	:	Use splash goggles when eye contact due to splashing or spraying liquid is possible.
Skin and body protection	:	Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn. Use PPE that is chemical resistant to the product and prevents skin contact.
Hygiene measures	:	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. Take off contaminated clothing and wash before reuse. Use care in walking on spilled material.
Protective measures	:	Wear suitable protective equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	Clear, colorless.
Odor	:	Ether-like odor.
Odor Threshold	:	No Data Available.
Flash point	:	75 °C at 1,013 hPa (760 mm Hg)
Lower explosion limit	:	1.1 vol%
Upper explosion limit	:	14 vol%
Flammability (solid, gas)	:	Not applicable

Oxidizing properties	:	Not considered an oxidizing agent.
Autoignition temperature	:	206.5 °C at 1,013 hPa
Molecular weight	:	148.2 g/mol
Decomposition temperature	:	not determined
Melting point/freezing point	:	-83 °C at 1,013 hPa
Boiling point/boiling range	:	189.6 °C at 1,013 hPa
Vapor pressure	:	~ 0.37 hPa at 20 °C
Density	:	0.95 g/cm3 at 20 °C
Water solubility	:	25 °C completely miscible
Partition coefficient: n-octanol/water	:	log Pow: 0.004 at 25 °C
Viscosity, dynamic	:	4.000 mPa.s at 25 °C (Brookfield).
Viscosity, kinematic	:	4.55 mm2/s at 20 °C (static)
Relative vapor density	:	~ 5.1 at 16 - 32 °C (Air = 1.0)
Evaporation rate	:	0.02 (butyl acetate = 1)
Explosive properties	:	Not explosive
Other Information	:	Hygroscopic.

10. STABILITY AND REACTIVITY

Reactivity : Will not occur.

Chemical stability	:	Stable under recommended storage conditions.
Hazardous reactions	:	Will not occur.
Conditions to avoid	:	Extended contact with air or oxygen. The potential for peroxide formation is enhanced when this solvent is used in processes such as distillation. Heat, sparks, open flame, other ignition sources, and oxidizing conditions. Ignition may occur at temperatures below those published in the literature as autoignition or ignition temperatures.
Materials to avoid	:	Air or oxygen. Moisture and humidity. Strong oxidizing agents. May react with oxygen to form peroxides.
Hazardous decomposition products	:	Not expected to decompose under normal conditions.
Thermal decomposition	:	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	:	Based on acute toxicity values, not classified.
	:	LD50: > 5,000 mg/kg Species: Rat
Acute inhalation toxicity	:	Based on acute toxicity values, not classified.
	:	LC0: > 275 ppm Exposure time: 7 HOURS Species: Rat
Acute dermal toxicity	:	Based on acute toxicity values, not classified.
	:	LD50: > 9,500 mg/kg Species: Rabbit
Skin corrosion/irritation	:	Based on skin irritation values, not classified.

Serious eye damage/eye irritation : Based on eye irritation values, not classified.

Respiratory or skin sensitization : Respiratory sensitization
no data available

: Skin sensitization
Based on skin sensitization values, not classified.

Chronic toxicity

Carcinogenicity : Not classified

Germ cell mutagenicity : Not classified

Reproductive toxicity

Effects on fertility / Effects on or via lactation : Not classified

Effects on Development : Not classified

Target Organ Systemic Toxicant - Single exposure : Classified

: May cause respiratory irritation.

: Exposure routes: Inhalation
Target Organs: Respiratory Tract

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

Aspiration hazard : Not classified
May be harmful if swallowed and enters airways.

12. Ecological information

Ecotoxicology Assessment

Short-term (acute) aquatic hazard : Based on acute aquatic toxicity values, not classified.

Long-term (chronic) aquatic hazard : Not classified, based on readily biodegradability and low acute toxicity.

Toxicity to fish	:	Low acute toxicity to fish
Toxicity to daphnia and other aquatic invertebrates	:	Low acute toxicity to aquatic invertebrates.
Toxicity to algae	:	Low toxicity to algae.
Toxicity to bacteria	:	Low toxicity to sewage microbes.
Toxicity to fish (Chronic toxicity)	:	no data available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	Low chronic toxicity to aquatic invertebrates.

Persistence and degradability

Biodegradability	:	Biodegradation: 76 - 92 % Rapidly degradable. (After 28 days in a ready biodegradability test)
Stability in soil Dipropylene Glycol Monomethyl Ether	:	Low absorption to soil particulates predicted

Bioaccumulative potential

Bioaccumulation	:	This material is not expected to bioaccumulate.

Mobility in soil

Distribution among environmental compartments	:	Type: Stability in water no data available
	:	Type: Stability in soil no data available Low absorption to soil particulates predicted

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	:	Contaminated product, soil, or water may be hazardous waste. Dispose of contents/ container to an approved landfill. Use registered transporters. Burn concentrated liquids. Assure emissions comply with applicable regulations. Dilute aqueous waste may biodegrade. Avoid overloading/poisoning plant biomass. Assure effluent complies with applicable regulations.
Contaminated packaging	:	Do not burn, or use a cutting torch on, the empty drum. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION

Not regulated for transport

CFR_ROAD

UN number	:	NA1993
Description of the goods	:	COMBUSTIBLE LIQUID, N.O.S.
	:	(DIPROPYLENE GLYCOL METHYL ETHER)
Class	:	CL
Packing group	:	III
Labels	:	3
Marine pollutant	:	no

CFR_RAIL

UN number	:	NA1993
Description of the goods	:	COMBUSTIBLE LIQUID, N.O.S.
	:	(DIPROPYLENE GLYCOL METHYL ETHER)
Class	:	CL
Packing group	:	III
Labels	:	3
Marine pollutant	:	no

BLG (MARPOL Annex II)

Description of the goods	:	POLY(2-8)ALKYLENE GLYCOL MONOALKYL(C1-C6)ETHER (CONTAINS DIPROPYLENE GLYCOL METHYL ETHER)
Pollution category	:	Z

Ship type : 3

Other information : Not regulated for IMDG or IATA

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) Specific target organ toxicity (single or repeated exposure)

SARA 313

This product contains no known chemicals regulated under SARA 313.

State Reporting

This material does not contain listed substance(s) known to the State of California to cause cancer, birth defects, or other reproductive harm that would require warning under the California Proposition 65 State Drinking Water and Toxic Enforcement Act.
However, LyondellBasell has not tested for the presence of listed chemical substances.

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

34590-94-8 Dipropylene Glycol Monomethyl Ether

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

34590-94-8 Dipropylene Glycol Monomethyl Ether

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

34590-94-8 Dipropylene Glycol Monomethyl Ether

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)

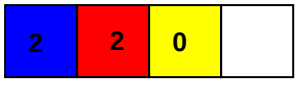
Contact product.safety@lyb.com for additional global inventory information.

16. OTHER INFORMATION

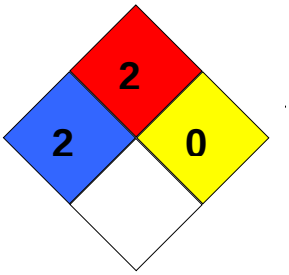
Material safety datasheet sections which have been updated:

14

HMIS Classification : Health Hazard: 2
Flammability: 2
Physical hazards: 0



NFPA Classification : Health Hazard: 2
Fire Hazard: 2
Instability: 0



Further information

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

Disclaimer

Information in this document is accurate to the best of our knowledge at the date of publication. The document is designed to provide users general information for safe handling, use, processing, storage, transportation, disposal and release and does not constitute any warranty or quality specification, either express or implied, including any warranty of merchantability or fitness for any particular purpose. Users shall determine whether the product is suitable for their use and can be used safely and legally.

In addition to any prohibitions of use specifically noted in this document, LyondellBasell may further prohibit or restrict the sale of its products into certain applications. For further information, please contact a LyondellBasell representative or visit the LyondellBasell website at: https://www.lyondellbasell.com/en/products-technology/product-safety-stewardship/
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

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

Trade name	:	ALLYL ALCOHOL
CAS Number:	:	107-18-6
Chemical characterization	:	Aliphatic alcohols
Chemical name	:	Allyl Alcohol
Synonyms	:	Vinyl Carbinol, 1-Propen-3-ol, 2-Propen-1-ol, Propenyl Alcohol
Identified uses	:	Manufacture of substances; Use in polymer production

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 liquids	Category 2
Acute toxicity; Oral	Category 3
Acute toxicity; Dermal	Category 2
Acute toxicity; Inhalation	Category 2
Serious eye damage/eye irritation	Category 2A
Reproductive toxicity	Category 2
Specific target organ toxicity - single exposure; Oral Gastrointestinal tract, Kidney, Liver, Lungs	Category 1
Specific target organ toxicity - single exposure	Category 3
Specific target organ toxicity - repeated exposure; Oral Gastrointestinal tract, Kidney, Liver, Lungs, Nose, Throat	Category 1
Short-term (acute) aquatic hazard	Category 1
Long-term (chronic) aquatic hazard	Category 3

Label elements

Hazard symbols :

Signal word : Danger

Hazard Statements :

H225 Highly flammable liquid and vapour.
H301 Toxic if swallowed.
H310 Fatal in contact with skin.
H330 Fatal if inhaled.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.
H361 Suspected of damaging fertility or the unborn child.
H370 Causes damage to organs (Gastrointestinal tract, Kidney, Liver, Lungs).
H372 Causes damage to organs (Gastrointestinal tract, Kidney, Liver, Lungs, Nose, Throat) through prolonged or repeated exposure.
H400 Very toxic to aquatic life.
H412 Harmful to aquatic life with long lasting effects.

Precautionary Statements :

Prevention

P201 + P202 Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P262 Do not get in eyes, on skin, or on clothing.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284 Wear respiratory protection.

Response

P370 + P378 In case of fire: Use dry chemical, carbon dioxide, water spray, or alcohol-resistant foam.
P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P303 + P361 + P353 + P310 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER/doctor.

P363 Wash contaminated clothing before reuse.
P304 + P340 + P310 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P308 + P311 IF exposed or concerned: Call a POISON CENTER/doctor.
P314 Get medical advice/ attention if you feel unwell.
P391 Collect spillage.

Storage
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

No additional information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Chemical nature : Substance

Components

Chemical name	CAS-No. EC-No.	Weight %	Component Type
Allyl Alcohol	107-18-6	>= 99.0 %	A

Key:
(A) Substance

4. FIRST AID MEASURES

General advice : Assess rapidly and aggressively.
Prompt action is essential.
Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Move out of dangerous area.
Consult a physician/doctor if necessary.
Show this material safety data sheet to the doctor in attendance.

If inhaled : If overcome by exposure, remove victim to fresh air immediately.
Give oxygen or artificial respiration as needed.
Obtain emergency medical attention.

In case of skin contact : Immediately remove contaminated clothing.
Wash skin thoroughly with mild soap and water.
Flush with lukewarm water for 15 minutes.
Obtain emergency medical attention.

In case of eye contact : Prompt action is essential.
Immediately flush eyes thoroughly with plenty of water and continue flushing for at least 15 minutes.
Direct contact may result in corneal injury.
Obtain emergency medical attention.

If swallowed : If even minor quantity swallowed, give lukewarm water (pint/ 1/2 liter) and induce vomiting if victim completely conscious/alert.
Obtain emergency medical attention.

Notes to physician

Symptoms : Ingestion of high doses may cause discomfort and irritation of the gastrointestinal tract and CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).
May be absorbed through the skin and produce toxic effects such as CNS depression.
Vapors may cause irritation of the eyes, nose and throat as well as CNS depression (fatigue, dizziness, loss of concentration, with collapse, coma and death possible in cases of severe overexposure). High vapor concentrations may be irritating to the upper respiratory tract.

Hazards : Toxic if swallowed.
May be harmful if swallowed and enters airways.
Fatal in contact with skin.
Fatal if inhaled.
Causes serious eye irritation.
May cause respiratory irritation.

Causes damage to organs.

Treatment	:	Treat symptomatically. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient. If patient is comatose, post ictal, has a decreased level of consciousness, or depressed/absent gag reflex, perform gastric lavage. Treat burns or allergic reactions conventionally after decontamination.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam. LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.
Unsuitable extinguishing media	:	Do not use solid water stream.
Specific hazards during fire fighting	:	On exposure to high temperature, may decompose, releasing toxic/flammable vapors. Fine sprays/mists may be combustible at temperatures below normal flash point. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined. Vapors may be heavier than air. May travel long distances along the ground before igniting and flashing back to vapor source. Poisonous gas(es) may be generated without warning on release from confinement/high temperature decomposition or rupture of closed containers/water contact, all of which will greatly increase hazards of firefighting. Move containers from fire area if it can be done without risk. Dike fire control water for later disposal; do not scatter material. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. 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). Wear chemical protective clothing that is specifically

recommended by the manufacturer. It may provide little or no thermal protection.
Structural firefighter's protective clothing will only provide limited protection.

Further information : Use water spray to cool unopened containers.
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Use personal protective equipment.
Ensure adequate ventilation.

Environmental precautions : Should not be released into the environment.

Methods for containment / Methods for cleaning up : Flammable liquid.
Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
Eliminate all sources of ignition.
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.
Prevent entry into waterways, sewers, basements or confined areas.
A vapor suppressing foam may be used to reduce vapors.
Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
Use clean non-sparking tools to collect absorbed material.
Dike large spills and place materials in salvage containers.
Water spray may reduce vapor; but may not prevent ignition in closed spaces.

7. Handling and storage

Precautions for safe handling

Advice on safe handling : For industrial use only.
Use only non-sparking tools.
Extinguish all ignition sources.
Carefully vent any internal pressure before removing closure.

Containers must be properly grounded before beginning transfer.
Handle empty containers with care; vapor/residue may be flammable.
If any residual product may be present, total encapsulating impervious protective suits, gloves, and boots should be worn.

Fire-fighting class : OSHA/NFPA Class IB Flammable Liquid.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents.
Vapor space above stored liquid may be flammable/explosive unless blanketed with inert gas.
Storage and handling in stainless steel is preferred.
Outside storage tanks should be diked to contain potential spills.

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
Allyl Alcohol	107-18-6	TWA	0.5 ppm	US (ACGIH) 2012	
Allyl Alcohol	107-18-6	IDLH	20 ppm	NIOSH September 2007	
Allyl Alcohol	107-18-6	TWA	2 ppm 5 mg/m3	US (OSHA) June 23, 2006	

Consult local authorities for acceptable exposure limits.

Exposure controls

Engineering measures

Both local exhaust and general room ventilation are usually required.
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.
Hand protection	:	Wear chemical resistant gloves such as: Butyl rubber. or Teflon.
Eye and face protection	:	Eye protection, including both chemical splash goggles and face shield, must be worn when possibility exists for eye contact due to splashing/spraying liquid, airborne particles, or vapor.
Skin and body protection	:	Complete suit protecting against chemicals The equipment must be cleaned thoroughly after each use.
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. Take off contaminated clothing and wash before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	clear colorless
Odor	:	Sharp, mustard odor.
Odor Threshold	:	< 0.8 ppm Odor is not an adequate warning of potentially hazardous ambient air concentrations.
Flash point	:	~ 21 °C at 1,013 hPa (760 mm Hg) Method: (Closed Cup)

Lower explosion limit	:	~ 2.5 vol%
Upper explosion limit	:	~ 18 vol%
Flammability (solid, gas)	:	Not applicable
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Autoignition temperature	:	~ 375 °C at 1,013 hPa
Molecular weight	:	58.08 g/mol
Decomposition temperature	:	not determined
Melting point/range	:	~ -129 °C at 1,013 hPa
Boiling point/boiling range	:	~ 97.4 °C at 1,013 hPa
Vapor pressure	:	100 hPa at 44.5 °C
Density	:	0.854 g/cm3 at 20 °C
Water solubility	:	Miscible
Partition coefficient: n-octanol/water	:	log Pow: 0.17 at 25 °C
Viscosity, kinematic	:	< 11.7 mm2/s at 20 °C
Relative vapor density	:	~ 2 at 15.5 - 32.2 °C
Surface tension	:	73.1 mN/m at 20 °C
Explosive properties	:	No Data Available.
Other Information	:	No additional information available.

10. STABILITY AND REACTIVITY

Reactivity	:	Will not occur.
Chemical stability	:	Stable under recommended storage conditions.

Hazardous reactions	:	Vapors may form explosive mixture with air.
Conditions to avoid	:	Heat, sparks, open flame, other ignition sources, and oxidizing conditions.
Materials to avoid	:	Strong acids. Strong oxidizing agents. Reacts violently with oxidizing substances. Bases Carbon tetrachloride. Oleum. Diallyl phosphate Potassium chloride Tribromolemine Metal alkyl
Thermal decomposition	:	Thermal decomposition may produce oxides of carbon and other toxic gases and liberate heat and pressure.

11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Acute oral toxicity : Classified
Toxic if swallowed.
Ingestion of high doses may cause discomfort and irritation of the gastrointestinal tract and CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).
May damage lungs, liver, and kidneys.

: LD50 (Oral): 99 mg/kg
Species: Rat

Acute inhalation toxicity : Classified
Fatal if inhaled.
Vapors may cause irritation of the eyes, nose and throat as well as CNS depression (fatigue, dizziness, loss of concentration, with collapse, coma and death possible in cases of severe overexposure). High vapor concentrations may be irritating to the upper respiratory tract.
May damage lungs, liver, and kidneys.

: LC50 (vapor): > 100 ppm
Exposure time: 4 HOURS
Species: Rat

Acute dermal toxicity : Classified
Fatal in contact with skin.
May be absorbed through the skin and produce toxic effects such as CNS depression.
May damage lungs, liver, and kidneys.

: LD50 (Skin): 89 mg/kg
Species: Rabbit

Skin corrosion/irritation : Based on skin irritation values, not classified.

Serious eye damage/eye irritation : Classified
Causes serious eye irritation.

Respiratory or skin sensitization : Respiratory sensitization
Not classified
No study available.

: Skin sensitization
Based on skin sensitization values, not classified.

Chronic toxicity

Carcinogenicity : Not classified
No adverse effect observed.

Germ cell mutagenicity : Not classified
No adverse effect observed.

Reproductive toxicity

Effects on fertility / Effects on or via lactation : Classified
Suspected of damaging fertility.

Effects on Development : Not classified
No adverse effect observed.

Target Organ Systemic Toxicant - Single exposure : Classified, Causes damage to organs.

: Exposure routes: Oral, Dermal
Target Organs: Gastrointestinal tract, Kidney, Liver, Lungs

: May cause respiratory irritation.

: May cause drowsiness or dizziness.

Target Organ Systemic Toxicant - Repeated exposure

: Classified, Causes damage to organs through prolonged or repeated exposure.

: Exposure routes: Oral, Inhalation
Target Organs: Gastrointestinal tract, Kidney, Liver, Lungs, Nose, Throat

: Repeated or prolonged exposure may cause severe irritation of the nose, throat and lungs, as well as liver, kidney, and gastrointestinal damage.

Aspiration hazard

: Not classified
May be harmful if swallowed and enters airways.

12. Ecological information

Ecotoxicology Assessment

Short-term (acute) aquatic hazard

: Classified, Very toxic to aquatic life.

Long-term (chronic) aquatic hazard

: Classified, Harmful to aquatic life with long lasting effects.

Toxicity to fish

: Very toxic to fish.

: LC50: 0.32 mg/l
Exposure time: 96 HOURS
Species: Pimephales promelas (fathead minnow)

Toxicity to daphnia and other aquatic invertebrates

: Toxic to aquatic invertebrates.

: EC50: 1.65 mg/l
Exposure time: 48 HOURS
Species: Daphnia magna (Water flea)
(immobilization)

Toxicity to algae

: Toxic to algae.

: EC50: 5.38 mg/l
Exposure time: 72 HOURS
Species: Pseudokirchneriella subcapitata (green algae)
(growth rate)

: NOEC: 0.93 mg/l
Exposure time: 72 HOURS
Species: Pseudokirchneriella subcapitata (green algae)
(growth rate)

Toxicity to bacteria : Low toxicity to sewage microbes.

Toxicity to fish (Chronic toxicity) : No study available.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Harmful to aquatic invertebrates with long lasting effects.

NOEC: 0.919 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
(reproduction)

Persistence and degradability

Biodegradability : Rapidly degradable.

: Biodegradation: 86 %
(After 14 days in a ready biodegradability test)

Stability in water : Volatilization from water or soil surfaces is expected to be limited, with allyl alcohol partitioning mainly to water and showing high mobility in soil.

Bioaccumulative potential

Bioaccumulation : This material is not expected to bioaccumulate.

: Bioconcentration factor (BCF): 3.16
Method: Predicted Bioconcentration Factor.

Mobility in soil

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

: Type: Stability in water
no data available

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 : Contaminated product, soil, water, container residues and spill cleanup materials containing allyl alcohol are hazardous wastes.
Containers or inner liners removed from a container holding this product are also considered hazardous wastes.
In addition to its acute toxicity, allyl alcohol is also an extremely flammable material.
Proper grounding procedures to avoid static electricity should be followed.
Comply with applicable federal, state, and local regulations.

14. TRANSPORT INFORMATION

CFR_ROAD

UN number : 1098
Description of the goods : Allyl alcohol
Class : 6.1
Subsidiary hazard class : 3
Packing group : I
Labels : 6.1 (3)

Marine pollutant : yes

CFR_RAIL

UN number : 1098
Description of the goods : Allyl alcohol
Class : 6.1
Subsidiary hazard class : 3
Packing group : I
Labels : 6.1 (3)

Marine pollutant : yes

IMDG

UN number : 1098

Description of the goods	:	ALLYL ALCOHOL
Class	:	6.1
Subsidiary hazard class	:	3
Packing group	:	I
Labels	:	6.1 (3)
EmS Number 1	:	F-E
EmS Number 2	:	S-D
Marine pollutant	:	yes ALLYL ALCOHOL

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

The following substance(s) is/are regulated under SARA 302/304:

Component	CASRN	TPQ	RQ
Allyl Alcohol	107-18-6	1000lbs	100 lbs

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)
Acute toxicity (any route of exposure)
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)
Reproductive toxicity

SARA 313

This product contains the following chemicals subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR 372:

Component	CASRN	Reporting Threshold

Allyl Alcohol	107-18-6	1.0%

State Reporting

This material does not contain listed substance(s) known to the State of California to cause cancer, birth defects, or other reproductive harm that would require warning under the California Proposition 65 State Drinking Water and Toxic Enforcement Act.
However, LyondellBasell has not tested for the presence of listed chemical substances.

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

107-18-6	Allyl Alcohol
71-23-8	n-Propyl Alcohol

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

107-18-6	Allyl Alcohol

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

107-18-6	Allyl Alcohol

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)

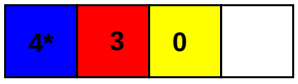
Contact product.safety@lyb.com for additional global inventory information.

16. OTHER INFORMATION

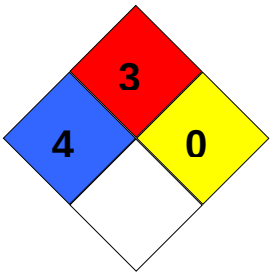
Material safety datasheet sections which have been updated:

Revised Section(s): 15 16

HMIS Classification : Health Hazard: 4
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0



NFPA Classification : Health Hazard: 4
Fire Hazard: 3
Instability: 0



Further information

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

Disclaimer

Information in this document is accurate to the best of our knowledge at the date of publication. The document is designed to provide users general information for safe handling, use, processing, storage, transportation, disposal and release and does not constitute any warranty or quality specification, either express or implied, including any warranty of merchantability or fitness for any particular purpose. Users shall determine whether the product is suitable for their use and can be used safely and legally.

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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

SAFETY DATA SHEET

METHANOL

Version	Revision Date:	SDS Number:	Date of last issue: -
1.0	04/26/2023	BE124	Date of first issue: 04/26/2023

SECTION 1. IDENTIFICATION

Trade name	:	METHANOL
CAS Number:	:	67-56-1
Chemical characterization	:	Aliphatic alcohols
Chemical name	:	Methyl alcohol
Synonyms	:	Wood Alcohol
Identified uses	:	Solvent; Intermediate
Prohibited uses	:	Formulation of hand sanitizers

Company Address
Equistar Chemicals, LP
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
EQUISTAR 800-245-4532

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

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	:	Category 2
Acute toxicity (Oral)	:	Category 3
Acute toxicity (Inhalation)	:	Category 3
Acute toxicity (Dermal)	:	Category 3
Eye irritation	:	Category 2B
Specific target organ toxicity - single exposure	:	Category 1 (Nervous system, Blood, Eyes)

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard Statements :
H225 Highly flammable liquid and vapour.
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled.
H320 Causes eye irritation.
H370 Causes damage to organs (Nervous system, Blood, Eyes).

Precautionary Statements :

Prevention:

P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe mist or vapours.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ eye protection/ face protection.

Response:

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P307 + P311 IF exposed: Call a POISON CENTER or doctor/ physician.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container

tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Substance name : Methyl alcohol

CAS-No. : 200-659-6 (EINECS)

Components

Chemical name	CAS-No.	Concentration (% w/w)
Methanol	67-56-1	> 99

SECTION 4. FIRST AID MEASURES

General advice : Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.
Consult a physician/doctor if necessary.
Show this material safety data sheet to the doctor in attendance.
Side effect onset may be delayed.
Prolonged observation may be indicated.

If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Do not leave the victim unattended.
Immediately seek medical attention.
Keep patient warm and at rest.
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 : Take off contaminated clothing and shoes immediately.
Clothing that has become saturated with the product must be removed immediately because the product is absorbed through the skin.
Flush with lukewarm water for 15 minutes.
Seek medical attention if ill effect or irritation develops.

Wash contaminated clothing before reuse.

In case of eye contact	:	In case of eye contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain emergency medical attention. Do not use eye ointment unless directed to by a physician.
If swallowed	:	DO NOT induce vomiting. If vomiting does occur, have victim lean forward to reduce risk of aspiration. Get medical attention immediately. Rinse mouth with water. If victim is drowsy or unconscious, place on the left side with head down. Never give anything by mouth to an unconscious person. Prompt action is essential.
Most important symptoms and effects, both acute and delayed	:	Methanol is a human poison. It can produce severe metabolic acidosis, blindness and death. The onset of symptoms may be delayed for 18 to 24 hours after ingestion. Toxicity is related to the degree of acidosis produced. Headache Dizziness Respiratory disorders Nausea Coma Blindness Methanol itself is relatively non-toxic; however, it is metabolized to the highly toxic compounds formaldehyde and formic acid that are responsible for the acidosis and blindness characteristic of methanol poisoning. Risk of respiratory disorders Risk of blindness
Notes to physician	:	Methanol is rapidly absorbed and emesis should be initiated early to be effective. Gastric lavage is indicated in those patients who require decontamination. Be sure that an endotracheal tube is in place prior to lavage; use cuffed tubes in patients over 7 years of age. Administration of an aqueous slurry of activated charcoal with magnesium citrate or sorbitol as a cathartic has been reported helpful Treatment of metabolic acidosis, administration of ethanol, and hemodialysis may be indicated. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	SMALL FIRE: Use dry chemicals, CO2, water spray or alco-

hol-resistant foam. LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.

Unsuitable extinguishing media	:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards during fire fighting	:	Extremely flammable well below ambient temperatures. Vapor forms explosive mixture with air and may cause a flash fire. Eliminate all sources of ignition. Prevent entry into waterways, sewers, basements or confined areas. Flammable vapors may be heavier than air and travel long distances along the ground before igniting and flashing back to vapor source. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined. Diluting with water may not suffice to raise flash point above ambient temperatures. A methanol fire may not be visible to the naked eye. Extreme caution must be exercised in fighting alcohol fires. Under some circumstances, may corrode certain metals, including aluminum and zinc, and generate hydrogen gas. 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. Dike fire control water for later disposal; do not scatter material. Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of burns/injuries. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. Sustained fire attack on vessels may result in a Boiling Liquid Expanding Vapour Explosion (BLEVE). For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	:	Wear positive pressure self-contained breathing apparatus (SCBA). Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Structural firefighter's protective clothing will only provide limited protection.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Clean-up to be performed only by trained and properly equipped personnel. Wear recommended personal protective equipment. Eliminate all sources of ignition. Ensure adequate ventilation. Evacuate personnel to safe areas.
Environmental precautions	:	Prevent entry into waterways, sewers, basements or confined areas. 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 and materials for containment and cleaning up	:	Highly flammable liquid and vapour. Eliminate all sources of ignition. 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. Prevent entry into waterways, sewers, basements or confined areas. Water spray may reduce vapor; but may not prevent ignition in closed spaces. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. For large spills: Contain spill with dike to prevent entry into sewers or waterways.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	Wear recommended personal protective equipment. Eliminate all sources of ignition. Do not handle near heat, sparks, or open flame. Use only in area provided with appropriate exhaust ventilation. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only non-sparking tools. Avoid contact with incompatible agents. Open and handle container with care. Keep in properly labeled containers. Avoid contact with eyes, skin, and clothing. Do not enter storage areas unless adequately ventilated. Metal containers involved in the transfer of this material should be grounded and bonded. Ensure all equipment is electrically grounded before beginning transfer operations.

Handle empty containers with care; vapor/residue may be extremely flammable.
Do not pressurize or expose empty containers to open flame, sparks, or heat.
Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair.
Observe precautions pertaining to confined space entry.

Conditions for safe storage : Do not store in aluminum, zinc (galvanized) or other corrodible containers.
Carbon steel is satisfactory material of construction.
Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents.
Store closed drums with bung in up position.
Blanket storage with dry inert gas.
Will absorb atmospheric moisture.
Metal containers used to store this material should be grounded.
Metal containers involved in the transfer of this material should be grounded and bonded. Keep containers tightly closed and in a well-ventilated place. Store away from oxidizers and other combustible material by a distance of at least 20 feet. Metal containers used to store this material should be grounded.
Ensure that all relevant regulations regarding explosive atmosphere, and handling and storage facilities of flammable products are followed.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Methanol	67-56-1	STEL	250 ppm	US (ACGIH)
		TWA	200 ppm	US (ACGIH)
		IDLH	6,000 ppm	NIOSH
		TWA	200 ppm 260 mg/m3	98/24/EC

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Methanol	67-56-1	methanol	urine	end of shift	15 mg/l	

Engineering measures : General room or local exhaust ventilation is usually required to meet exposure limit(s).

Personal protective equipment

Respiratory protection	:	Do not use air-purifying respirators. If exposure can exceed the exposure limit(s), use only approved self-contained or supplied air respirator operated in a positive pressure mode.
Eye protection	:	Eye protection such as chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapor. Chemical splash goggles and/or face shield should be worn.
Skin and body protection	:	When skin contact is possible, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. The equipment must be cleaned thoroughly after each use.
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. Clothing that has become saturated with the product must be removed immediately because the product is absorbed through the skin. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Take off contaminated clothing and wash before reuse.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	clear
Odor	:	Characteristic, pungent odor
Odor Threshold	:	100 ppm Odor is not an adequate warning of potentially hazardous ambient air concentrations.
pH	:	no data available

Melting point/freezing point	:	~ -144 °F / -98 °C (1013.0 hPa)
Boiling point/boiling range	:	~ 149 °F / 65 °C (1013.0 hPa)
Flash point	:	49.5 °F / 9.7 °C (1013.0 hPa) Method: (Closed Cup)
Evaporation rate	:	2.1 (butyl acetate = 1)
Flammability (solid, gas)	:	Not applicable
Self-ignition	:	~ 851 °F / 455 °C 101.3 kPa
Upper explosion limit / Upper flammability limit	:	36 vol%
Lower explosion limit / Lower flammability limit	:	6 vol%
Vapor pressure	:	169.27 hPa (77 °F / 25 °C)
Relative vapor density	:	1.1 (Air = 1.0)
Density	:	~ 0.8 g/cm3 (68 °F / 20 °C)
Bulk density	:	No Data Available.
Solubility(ies)		
Water solubility	:	> 1,000 g/l Complete (In All Proportions). (68 °F / 20 °C)
Partition coefficient: n-octanol/water	:	log Pow: -0.77 (68 °F / 20 °C)
Decomposition temperature	:	Incomplete combustion may produce carbon monoxide, formaldehydes, and other toxic gases.
Viscosity		
Viscosity, kinematic	:	0.68 - 0.74 mm2/s (77 °F / 25 °C)
Explosive properties	:	Not explosive
Oxidizing properties	:	Not considered an oxidizing agent.
Molecular weight	:	32.04 g/mol

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Will not occur.
Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Will not occur. Stable.
Conditions to avoid	:	Heat, sparks, open flame, other ignition sources, and oxidizing conditions.
Incompatible materials	:	Strong oxidizing agents. Coatings. Rubber. Certain forms of plastics. Aluminum metals. Zinc. Any reactive metal which will displace hydrogen.
Hazardous decomposition products	:	Partial oxidation of methanol can lead to the formation of formaldehyde carbon monoxide, and formic acid.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Components:

Methanol:

Acute oral toxicity	:	(Humans): 300 - 1,000 mg/kg LD50 (Rat): 1,187 mg/kg Assessment: The component/mixture is toxic after single ingestion.
Acute inhalation toxicity	:	(Humans): 4.2 mg/l Exposure time: 4 HOURS LC50 (Rat): 128.2 mg/l Exposure time: 4 HOURS Test atmosphere: vapour Assessment: The component/mixture is toxic after short term inhalation.
Acute dermal toxicity	:	(Humans): 300 - 1,000 mg/kg LD50 (Rabbit): 17,100 mg/kg Assessment: The component/mixture is toxic after single con-

tact with skin.

Skin corrosion/irritation

Components:

Methanol:

Assessment : No skin irritation

Serious eye damage/eye irritation

Components:

Methanol:

Result : Mild eye irritation

Respiratory or skin sensitization

Components:

Methanol:

Assessment : Did not cause sensitization on laboratory animals.

Germ cell mutagenicity

Components:

Methanol:

Germ cell mutagenicity - Assessment : Did not show mutagenic effects in animal experiments.

Carcinogenicity

Components:

Methanol:

Carcinogenicity - Assessment : Not classifiable as a human carcinogen.

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Components:

Methanol:

Reproductive toxicity - Assessment : Based on available data, the classification criteria are not met.

STOT - single exposure

Components:

Methanol:

Target Organs : Nervous system, Blood, Eyes
Assessment : The substance or mixture is classified as specific target organ toxicant, single exposure, category 1.

STOT - repeated exposure

Components:

Methanol:

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration toxicity

Components:

Methanol:

The substance or mixture causes concern owing to the assumption that it causes a human aspiration toxicity hazard.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Methanol:

Toxicity to fish : Remarks: Low acute toxicity to fish

LC50 (Lepomis macrochirus): 15,400 mg/l
Exposure time: 96 HOURS

Toxicity to daphnia and other aquatic invertebrates : Remarks: Low acute toxicity to aquatic invertebrates.

EC50 (Daphnia magna.): > 10,000 mg/l
Exposure time: 48 HOURS

Toxicity to algae/aquatic plants	:	Remarks: Low toxicity to algae. ErC50 (Selenastrum capricornutum (green algae)): 22,000 mg/l Exposure time: 96 HOURS
Toxicity to fish (Chronic toxicity)	:	Remarks: Low chronic toxicity to fish. NOEC (Oryzias latipes): 7,900 mg/l Exposure time: 200 HOUR
Toxicity to microorganisms	:	Remarks: Low toxicity to sewage treatment plant microbes expected. IC50 (Activated sludge): > 1,000 mg/l Exposure time: 3 HOURS

Persistence and degradability

Product:

Biodegradability	:	Biodegradation: 76 % Exposure time: 5 d Remarks: Rapidly degradable. Biotic Degradability: BOD 76% (5 day). There is evidence that it is degraded under anaerobic conditions.
Stability in water	:	Remarks: No hydrolysis is expected.

Components:

Methanol:

Biodegradability	:	Result: Biodegradable Biodegradation: 76 % Exposure time: 5 d

Bioaccumulative potential

Product:

Bioaccumulation	:	Bioconcentration factor (BCF): 1 - 4.5 Remarks: This material is not expected to bioaccumulate.

Components:

Methanol:

Bioaccumulation	:	Bioconcentration factor (BCF): 1 - 4.5 Remarks: This material is not expected to bioaccumulate.

Partition coefficient: n-octanol/water	:	log Pow: -0.77 (68 °F / 20 °C)

Mobility in soil

Product:

Distribution among environmental compartments	:	Remarks: no data available
Stability in soil	:	Remarks: Low absorption to soil particulates predicted

Components:

Methanol:

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

Other adverse effects

Product:

Environmental fate and pathways	:	Remarks: This material is volatile and water soluble. : This material is likely to evaporate from soil and water.
Results of PBT and vPvB assessment	:	Not applicable.

Components:

Methanol:

Results of PBT and vPvB assessment	:	Not applicable.
Additional ecological information	:	No additional information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Proper grounding procedures to avoid static electricity should be followed. Can be incinerated, when in compliance with local regulations. Contaminated product, soil or water should be considered dangerous due to potential evolution of flammable vapor. Contaminated product, soil or water may be hazardous waste due to potentially low flash point. Comply with applicable local, state or international regulations

concerning solid or hazardous waste disposal and/or container disposal.

SECTION 14. TRANSPORT INFORMATION

CFR_ROAD

UN number	:	1230
Description of the goods	:	METHANOL
Class	:	3
Packing group	:	II
Labels	:	3 (6.1)
Marine pollutant	:	no

CFR_RAIL

UN number	:	1230
Description of the goods	:	METHANOL
Class	:	3
Packing group	:	II
Labels	:	3 (6.1)
Marine pollutant	:	no

IMDG

UN number	:	1230
Description of the goods	:	METHANOL
Class	:	3
Subsidiary hazard class	:	6.1
Packing group	:	II
Labels	:	3 (6.1)
EmS Number 1	:	F-E
EmS Number 2	:	S-D
Marine pollutant	:	no

SECTION 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

The following substance(s) is/are regulated under SARA 302/304:

Component	CASRN	TPQ	RQ
Methanol	67-56-1		5000 lbs

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)
Acute toxicity (any route of exposure)
Specific target organ toxicity (single or repeated exposure)
Serious eye damage or eye irritation

SARA 313

This product contains the following chemicals subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR 372:

Component	CASRN	Reporting Threshold
Methanol	67-56-1	1.0%

State Reporting

This material contains the following chemical substance 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
Methanol	67-56-1		X		

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

67-56-1 Methanol

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

67-56-1 Methanol

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

67-56-1 Methanol

Other international regulations

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

Country/Region	Inventory	Status Description
Australia	AICS	Listed
Canada	DSL	Listed
China	IECSC	Listed
Europe	REACH	See Compliance Statement*
Japan	ENCS	Listed
Korea	K REACH	Pre-registration period *
New Zealand	NZIoC	Listed
Philippines	PICCS	Listed
United Kingdom	UK REACH	See Compliance Statement*
United States of America	TSCA	Listed
Taiwan	TCSCA	Listed
Turkey	KKDIK	Pre-registration period *

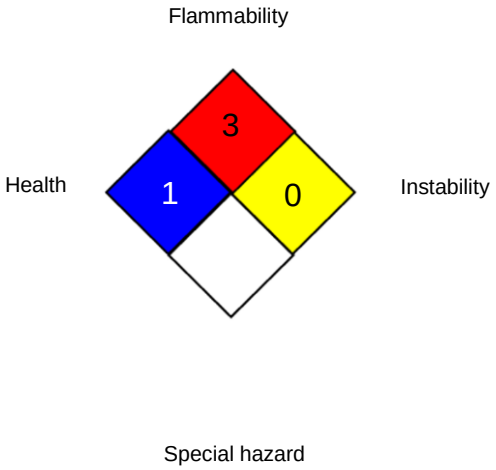
* If the product has been purchased domestically from the notifying/registering legal entity of the LyondellBasell group of companies. We confirm that all substances (in this preparation) have been registered in accordance with the deadlines set forth in the applicable regulation. During the “Pre-registration period”, we confirm that all substances in this preparation have been pre-registered or, where required under the regulation, registered, and that we have the intention to proceed with their registration in accordance with the deadlines set forth in the regulation. For more information, please contact reach@lyondellbasell.com.

† For more information on the status of this material, please contact chemical control at global.chemical.control@lyondellbasell.com.

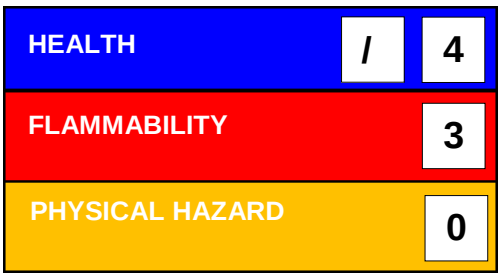
SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:



HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

98/24/EC	:	98/24/EC
NIOSH	:	NIOSH (US)
US (ACGIH)	:	US (ACGIH)
98/24/EC / TWA	:	TWA
NIOSH / IDLH	:	IDLH
US (ACGIH) / TWA	:	TWA
US (ACGIH) / STEL	:	STEL

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Develop-

ment; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Revision Date : 04/26/2023

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

US / EN