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

Trade name	:	GLACIAL ACETIC ACID, >99%
CAS Number:	:	64-19-7
Chemical characterization	:	Carboxylic Acid
Chemical name	:	Glacial acetic acid
Synonyms	:	Ethanoic acid; Methanecarboxylic acid; Ethylic acid
Identified uses	:	Intermediate; Solvent; Use in laboratories; Agrochemical uses
Prohibited uses	:	Pharmaceutical excipient; Active pharmaceutical ingredient (API); Cosmetics; Toiletries; Personal care products; Applications involving human consumption

Company Address
LyondellBasell Acetyls, LLC
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
CANUTEC 613 996-6666
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 3
Skin corrosion	Category 1A
Serious eye damage	Category 1

Label elements

Hazard symbols :

Signal word : Danger

Hazard Statements : H226 Flammable liquid and vapour.
H314 Causes severe skin burns and eye damage.

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 dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response
P370 + P378 In case of fire: Use alcohol-resistant foam, carbon dioxide or dry sand to extinguish.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
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 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

Storage
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
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
Acetic acid	64-19-7	> 99.9 %	A

Key:
(A) Substance

4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Get medical attention immediately.
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.
Do not leave the victim unattended.

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.
Keep patient warm and at rest.
Do not leave the victim unattended.
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.
GET MEDICAL ATTENTION IMMEDIATELY!

In case of skin contact : Immediately remove excess chemical and contaminated clothing; thoroughly wash contaminated skin with mild soap and water. If irritation persists after washing, seek medical attention.
Thoroughly clean contaminated clothing before reuse; discard contaminated leather goods (gloves, shoes, belts, wallets, etc.).
Flush with lukewarm water for 15 minutes.
Seek medical attention if tissue appears damaged or if pain or irritation persists.
Wash contaminated clothing before reuse.

In case of eye contact : Immediately flush eyes thoroughly with plenty of water and continue flushing for at least 15 minutes.
Remove contact lenses.
GET MEDICAL ATTENTION IMMEDIATELY!

If swallowed : DO NOT induce vomiting.
Never give anything by mouth to an unconscious person.
Rinse mouth with water.
Drink 1 or 2 glasses of water.
Do not attempt to neutralize acid with weak bases or antacids because the chemical reaction may extend the corrosive injury.

GET MEDICAL ATTENTION IMMEDIATELY!

Notes to physician

Symptoms : May cause burns of the mouth, throat, esophagus and stomach. Signs and symptoms may include pain, nausea, vomiting, diarrhea, dizziness, drowsiness, faintness, weakness, collapse and coma.
Damage to skin and eyes.
Broncopneumonia, pulmonary edema, and reactive airway dysfunction syndrome (RADS) may follow acute inhalation overexposure or aspiration.

Hazards : May be harmful if swallowed and enters airways.
May be harmful if swallowed.
May be harmful if inhaled.
Causes severe skin burns and eye damage.

Treatment : For ocular exposures, continuous irrigation with tap water or normal saline should continue until the eye fluid pH is neutral (7).

Following ingestion, neutralization therapy or drinking large volumes of water or milk is not recommended because of concerns related to exothermic neutralization reactions and vomiting with possible aspiration and re-exposure of the esophagus to acid.

There is no specific antidote available.
Assess airway if inhaled and/or ingested.
If ingested, cardiac and respiratory status must be continuously monitored.
Assess extent and severity of tissue injury by appropriate diagnostic studies and procedures.
Vigorous anti-inflammatory/steroid treatment may be required at first evidence of pulmonary/upper airway edema.
Prolonged observation may be indicated.
Treat symptomatically.
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	:	Keep away from heat and sources of ignition. Vapors may travel long distances along the ground before reaching a source of ignition and flashing back. Fire may produce irritating, corrosive and/or toxic gases. Cool containers with flooding quantities of water until well after fire is out. When fighting a fire, notify environmental authorities if liquid enters sewers or public waters. Move containers from fire area if it can be done without risk. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of burns/injuries. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Sustained fire attack on vessels may result in a Boiling Liquid Expanding Vapour Explosion (BLEVE). 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). Structural firefighter's protective clothing will only provide limited protection. Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
Further information	:	Always stay away from tanks engulfed in fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Evacuate personnel to safe areas.
Eliminate all sources of ignition.
Keep people away from and upwind of spill/leak.
Avoid direct contact with released material. Stay upwind.
Do not touch or walk through spilled material.
Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
Wear recommended personal protective equipment.
Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Prevent entry into waterways, sewers, basements or confined areas.
If the product contaminates rivers and lakes or drains inform respective authorities.
If necessary, all contaminated waste water must be treated in a municipal or industrial wastewater treatment plant before release to surface water.

Chemical removal by air and water pollution control devices must meet the minimum efficiency requirements needed to reduce exposures to an acceptable level.
The discharge of treatment plant effluent to rivers and oceans must achieve the dilution ratio needed to reduce exposures to an acceptable level.
The size and capacity of wastewater treatment plants must meet the minimum requirements needed to reduce exposures to an acceptable level.
Waste management practices such as incineration, recycling, reuse must be enforced as needed to reduce exposures to an acceptable level.

External treatment and disposal of waste should comply with applicable local and/or national regulations.
The maximum allowable site tonnage and the days of use should be below the number needed to maintain exposures at an acceptable level.

Methods for containment / Methods for cleaning up : Eliminate all sources of ignition.
Ensure adequate ventilation.
Evacuate/limit access.
Do not touch or walk through spilled material.
Stop leak if you can do it without risk.
All equipment used when handling this product must be grounded.
Contain spill and evacuate all non-essential personnel.
A vapor suppressing foam may be used to reduce vapors.
Use clean non-sparking tools to collect absorbed material.
Water spray may reduce vapor; but may not prevent ignition in

closed spaces.
Collect any excess material with absorbent pads, sand, or other inert non-combustible absorbent materials.
Runoff to sewer may create fire or explosion hazard.
Prevent entry into sewers, basements or confined areas; dike if needed.

Additional advice : Mark the contaminated area with signs and prevent access to unauthorized personnel.
See section 13 for disposal information.

7. Handling and storage

Precautions for safe handling

Advice on safe handling : Avoid contact with eyes, skin, and clothing.
Do not breathe vapors or spray mist.
Do not swallow.
Eliminate every possible source of ignition.
Keep container tightly closed when not in use.
Carefully vent any internal pressure before removing closure.
Wear recommended personal protective equipment.
After handling, always wash hands thoroughly with soap and water.
Avoid contact with incompatible agents.
Use only with adequate ventilation/personal protection.
Do not enter storage areas unless adequately ventilated.
Metal containers involved in the transfer of this material should be grounded and bonded.
Acid or caustic must be transferred only through hose rated and certified for this service.
Inspect frequently to identify bulging or leaking containers.
Handle 'empty' containers with care; residue may be harmful to eyes and skin.
Do not overfill containers which may burst on freezing.
Thaw frozen containers only at room temperature.
Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair.
Check atmosphere for explosiveness and oxygen deficiencies.
Observe precautions pertaining to confined space entry.
Do not pressurize or expose empty containers to open flame, sparks, or heat.

Fire-fighting class : Flammable liquid and vapour.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Flammable materials should be stored in a separate safety storage cabinet or room.

Keep containers tightly closed when not in use and store in a well-ventilated area. Isolate incompatible materials such as oxidizers. Containers should be clearly labeled. Metal containers used to store this material should be grounded. Isolate from oxidizers, caustics and alkalis, chemicals capable of spontaneous heating, ignition sources and explosives. All containers should be labeled to warn against exposure. Metal containers used to store this material should be grounded. All equipment must conform to applicable electrical code. Store closed drums with bung in up position.

Further information on storage conditions : Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Other data : The product is chemically stable.

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
Acetic acid	64-19-7	STEL	15 ppm	US (ACGIH) 2012	
Acetic acid	64-19-7	TWA	10 ppm	US (ACGIH) 2012	

Consult local authorities for acceptable exposure limits.

Exposure controls

Engineering measures

Engineering controls, preferably enclosed systems, should be used whenever feasible to maintain exposures below acceptable criteria. When such controls are not feasible, or sufficient to achieve full conformance, other engineering controls such as local exhaust ventilation should be used.

Personal protective equipment

Respiratory protection	:	If exposure exceeds the exposure limit(s), use respiratory equipment recommended or approved by appropriate local, state or international agency.
Hand protection	:	Use chemical resistant gloves appropriate to conditions of use. Glove material butyl rubber; material thickness .5mm; break through time ≥ 480 min. Gloves must be replaced after 8 hours of wear. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Eye and face protection	:	Safety glasses 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.
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. Take off contaminated clothing and wash before reuse. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Wash clothing frequently.
Protective measures	:	Wear full protective clothing and self-contained breathing apparatus. Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid at 20 °C (1,013 hPa)
Color	:	Clear, colorless.

Odor	:	Pungent.
Odor Threshold	:	0.074 ppm (detectable), Odor is not an adequate warning of potentially hazardous ambient air concentrations.
Flash point	:	39 °C at 1,013 hPa (760 mm Hg) Method: Tag closed cup Method: ASTM D 56
Ignition temperature	:	463 °C at 1,013 hPa
Lower explosion limit	:	4.0 vol%
Upper explosion limit	:	19.9 vol%
Flammability (solid, gas)	:	Not applicable
Oxidizing properties	:	Not considered an oxidizing agent.
Autoignition temperature	:	463 °C at 1,013 hPa
Molecular weight	:	60.05 g/mol
Decomposition temperature	:	not determined
pH	:	< 2
Melting point/freezing point	:	16.5 °C at 1,013 hPa
Boiling point/boiling range	:	118 °C at 1,013 hPa
Vapor pressure	:	20.79 hPa at 25 °C
Density	:	~ 1.05 g/cm3 at 25 °C
Water solubility	:	602.9 g/l 25 °C completely soluble
Partition coefficient: n-octanol/water	:	log Pow: -0.17 at 20 °C

Viscosity, dynamic	:	1.056 mPa.s at 25 °C
Viscosity, kinematic	:	1 mm2/s at 25 °C
Relative vapor density	:	2.1 (Air = 1.0)
Evaporation rate	:	No Data Available.
Explosive properties	:	Not explosive
Other Information	:	Hygroscopic.

10. STABILITY AND REACTIVITY

Reactivity	:	Will not occur.
Chemical stability	:	Stable under recommended storage conditions.
Hazardous reactions	:	Not expected to occur.
Conditions to avoid	:	Heat, sparks, open flame, other ignition sources, and oxidizing conditions.
Materials to avoid	:	Bases Strong oxidizing agents Chromic acid. Nitric acid Sodium peroxide Carbonates. Hydroxides. Phosphates Corrosive to some metals. Potentially violent reaction with acetaldehyde and acetic anhydride. Ignites on contact with potassium-tert-butoxide.
Hazardous decomposition products	:	Excessive heating and/or incomplete combustion may produce carbon monoxide, hydrogen sulfide and other harmful gases or vapors including oxides and/or other compounds of sulfur and sodium.
Thermal decomposition	:	Thermal decomposition may generate carbon monoxide, carbon dioxide, and perhaps 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.
	:	May be harmful if swallowed.
	:	LD50: 3,310 mg/kg Species: Rat
	:	May cause burns of the mouth, throat, esophagus and stomach. Signs and symptoms may include pain, nausea, vomiting, diarrhea, dizziness, drowsiness, faintness, weakness, collapse and coma.
Acute inhalation toxicity	:	Based on acute toxicity values, not classified.
	:	May be harmful if inhaled.
	:	LC50: 40 mg/l Exposure time: 4 HOURS Species: Rat
	:	Exposure to vapor may cause irritation of the eyes, nose, and respiratory tract. Inhalation may cause asthma-like symptoms, including coughing, wheezing, tightness of chest, shortness of breath, and headache.
Acute dermal toxicity	:	Not classified Not applicable study scientifically unjustified
Skin corrosion/irritation	:	Classified Causes severe skin burns.
Serious eye damage/eye irritation	:	Classified Causes serious eye damage.
Respiratory or skin sensitization	:	Respiratory sensitization Not classified Exposure to vapors of this material can lead to cough, dyspnea, and asthma like symptoms.

: Skin sensitization
no data available
study scientifically unjustified

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 : Not classified
No adverse effect observed.

Effects on Development : Not classified
No adverse effect observed.

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

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) : Data waiver
Not expected to exhibit chronic toxicity to fish.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Data waiver
This material is not expected to bioaccumulate.

Persistence and degradability

Biodegradability : Biodegradation: 96 %
Rapidly degradable.
(After 20 days in a ready biodegradability test)

Stability in water : no data available

Stability in soil : Low potential for soil adsorption expected

Bioaccumulative potential

Bioaccumulation : Bioconcentration factor (BCF): 3.16
This material is not expected to bioaccumulate.
(QSAR calculated value)

Mobility in soil

Distribution among environmental compartments : Based on water solubility, partition coefficient and vapor pressure, this substance is expected to have high mobility and be partitioned mainly into the atmospheric and water compartments

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	:	Do not dispose of waste into sewer. Do not contaminate ponds, waterways or ditches with chemical or used container. Contaminated product, soil, water, container residues and spill cleanup materials may be hazardous wastes. Contaminated product, soil or water should be considered dangerous due to potential evolution of flammable vapor. Comply with applicable local, state or international regulations concerning solid or hazardous waste disposal and/or container disposal. Proper grounding procedures to avoid static electricity should be followed. Decontaminate containers thoroughly before reuse/disposal.
Contaminated packaging	:	Dispose of contents/ container to an approved incineration plant.

14. TRANSPORT INFORMATION

TDG_ROAD

UN number	:	2789
Description of the goods	:	ACETIC ACID, GLACIAL
Class	:	8
Subsidiary hazard class	:	3
Packing group	:	II
Labels	:	8 (3)

TDG_RAIL

UN number	:	2789
Description of the goods	:	ACETIC ACID, GLACIAL
Class	:	8
Subsidiary hazard class	:	3
Packing group	:	II
Labels	:	8 (3)

IMDG

UN number	:	2789
Description of the goods	:	ACETIC ACID, GLACIAL
Class	:	8
Subsidiary hazard class	:	3
Packing group	:	II
Labels	:	8 (3)

EmS Number 1 : F-E
EmS Number 2 : S-C

Marine pollutant : no

BLG (MARPOL Annex II)
Description of the goods : ACETIC ACID
Pollution category : Z
Ship type : 3

15. REGULATORY INFORMATION

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

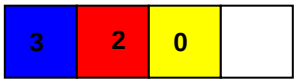
REACh status
If the product has been purchased from any company of the LyondellBasell group of companies registered in the European Union, we confirm that the chemical substance in this product has been registered under REACh, in accordance with the deadlines set forth in REACh. (Regulation (EU) No. 1907/2006)

16. OTHER INFORMATION

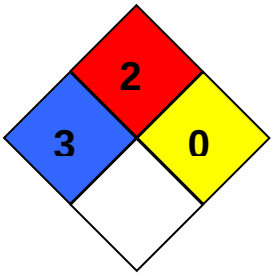
Material safety datasheet sections which have been updated:

Material safety datasheet sections which have been updated:
Revised Section(s): 15 16

HMIS Classification : Health Hazard: 3
Flammability: 2
Physical hazards: 0



NFPA Classification : Health Hazard: 3
Fire Hazard: 2
Instability: 0



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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