Material Safety Data Sheet

Name/ Compound	CAS No.	KE No.	UN No.	EC No.
Acetic Acid Solution 99.85%	64-19-7	KE-00013	2789	200-580-7

1. Chemical Product and Company Information

A. Product name	Acetic Acid Solution 99.85%
B. Recommended use and restrictions on the use	
Recommended use	Industrial use, Food ingredients
Restrictions on the use of this product	Not applicable
C. Manufacturer / Importer / Distribution	
Company name	LOTTE BP Chemicals Co., Ltd
Address	202, Sangnam-ri, Cheongnyang-myeon, Ulju-gun, Ulsan
Emergency contacts	052-279-1190~96

2. Hazard / Risk Identification

A. Hazard and risk classification

Flammable liquid: Category 3
Acute toxicity (Percutaneous): Category 4
Corrosive to metals: Category 1
Skin corrosion / skin irritation: Category 1
Serious eye damage / eye irritation: Category 1
Respiratory sensitization: Category 1
Specific target organ toxicity (single exposure): Category 1

B. Warning signs with precautionary statements

Graphic symbols

Signals: Dangerous

Hazard statements

H226 Flammable liquid or vapor.
H290 May be corrosive to metals.
H312 Harmful if contact with skin.
H314 Cause a severe burn to skin or damage to eyes.
H318 Cause serious damage to eyes.
H334 Suffer from an allergic reaction, or cause asthma or irritate respiratory system if inhaled.
H370 Cause damage to lung or respiratory system.

Prevention precautionary statements

Prevention

P210 Keep away from heat/sparks/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/vapor/spray.
P261 Avoid breathing dust/fume/gas/mist/vapor/spray.
P264 Wash your hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P285 In case of inadequate ventilation wear respiratory protection.

Countermeasures	P301+P330+P331 IF SWALLOWED: rinse mouth with water. Do NOT induce vomiting. P302+P352 IF ON SKIN: Wash with plenty of soap and water. P303+P361+P353 IF ON SKIN(or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P304+P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. 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. P310 Immediately call a POISON CENTER or doctor/physician. P312 Call a POISON CENTER or doctor/physician if you feel unwell. P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. P363 Wash contaminated clothing before reuse. P370+P378 In case of fire: Use water/CO2/dry chemical powder/foam extinguisher for extiction. P390 Absorb spillage to prevent material damage.
Storage	P403+P235 Store in a well-ventilated place. Keep cool. P405 Store locked up. P406 Store in corrosive resistant container.
Disposal	P501 Dispose contents/container (in accordance with the relevant law).

C. Other Hazards and Risks uncovered in the Standards of Hazard and Risk Classification (NFPA)

Health	3
Fire	2
Reactivity	0

3. Composition / Information on Ingredients

Name/ Compound	Synonym	CAS No.	Weight (%)
Acetic Acid	Glacial Acetic Acid	64-19-7	99.85%
Water	Dihydrogen Monoxide	7732-18-5	0.15%

4. First Aid Measures

A. Eye contact	If chemicals are exposed to eyes, flush eyes with plenty of water for at least 15 minutes. If chemicals enter eyes, get immediate medical attention.
B. Skin contact	Remove chemicals by washing with plenty of water and soap for at least 15 minutes. If chemicals are exposed to skin, get medical attention. Remove contaminated clothing and shoes immediately. Wash contaminated clothing and shoes before reuse. Remove contaminated clothing and shoes and dispose them. For burns, cool down the skin in cold water as long as possible, and do not remove clothes adhered to skin.
C. Inhalation	If breathing with difficulty, supply victim with oxygen according to the medical personnel's instructions. If chemicals are ingested, get victim to get immediate medical attention Do not give mouth-to-mouth resuscitation, but use appropriate respiratory equipment.
D. Ingestion	Do not induce vomiting. Give a lot of water to drink. If victim has ingested or drunk chemicals, call a physician immediately.
E. Instructions for medical personnel	Let medical personnel be aware of the applicable material and take protective measures.

5. Explosion/Fire Fighting Measures

A. Appropriate (inappropriate) extinguishing media	Use alcohol foam, CO_2 and water spray if extinguishing a fire in regards to this material. Use dry sand or earth if extinguishing a fire by cutting off the supply of oxygen.
In case of big fire	Use general fire extinguishing agent and fine water spray.
B. Specific hazards from chemicals	Flammable liquid and vapor Vapor may be taken to ignition source and be ignited. While burning, thermal decomposition can lead to release of irritating and toxic gases. May create explosive mixture at the flash point or above. When heating, container may be exploded. High flammability: easily ignited by heat, spark, flame. A fire or explosion may break out by leakage. May be exploded indoor and outdoor and in the sewer. Part may be burned, but not easily ignited. Vapor may create an explosive mixture with air.
C. Personal protection / precautions for fire fighting	Rescuer should wear appropriate protective equipment. Extinguish fire, keeping a safe distance away from the area. Be careful as it is mostly lighter than water. Beware of vapors accumulating to low area or closed space, as most vapors are heavier than air. Contain fire fighting water in a ditch and do not let the material be scattered. In case of a fire on tank: Extinguish the fire at a maximum distance or use an unmanned fire extinguisher. In case of a fire on tank: Cool down container with plenty of water, even after the fire is extinguished. In case of a fire on tank: Immediately step back, if high pitched sound is heard at the pressure relief device or tank discolors. If it may not be dangerous, move container away from fire area. Do not put water into the container. Cool down the container with water spray for a considerable time, even after fire is extinguished. Do not approach ends of tank. Evacuation radius for tank, railroad car or tank truck: 0.8 km (1/2 miles).

6. Accidental Release Measures

A. Personal precautions and protection	Remove all ignition sources like heat, flame, spark, as very fine particles can cause fire or explosion. Wipe out all spillage immediately and follow the precautionary measures in the Clause of Precautions. Isolate the contaminated area. Keep unprotected or unrelated persons away. Ground/bond all equipments while handling this product. Stop leaking if not dangerous. Do not touch leakage or broken container without wearing appropriate protective clothing. May use vapor-resistant foam to decrease occurrence of vapors. Stop spreading leakage by covering with plastic sheet. Do not touch leaked material with hands. Do not put water into the storage or used container.
B. Environment precautions	
Air	Sprinkle with water and decrease vapor generation.
Soil	Consider leaked material as potentially risky waste and dispose accordingly. Move leaked material to isolated place like puddle, sand bag, dike, pit. Neutralize lime, limestone, sodium bicarbonate, soda, ash, etc into alkaline substances. Absorb by using inflammable materials. Build a dike to dispose and manage leaked material. Contain and collect leakage with non-combustible absorbent materials (e.g, dry sand or earth) and place in container for disposal.
Underwater	Neutralize lime, limestone, sodium bicarbonate, soda, ash, etc into alkaline

	substances
C. Cleanup or removal methods	
Small leak	Transfer leaked material to an appropriate container and dispose. Absorb by using inflammable materials
Large leak	Build a dike to dispose and manage leaked material. Give a notice to government departments or local governments if materials are emitted more than standard amount. Isolate the exposed area and restrict it to those persons concerned. Remove all ignition sources like heat, flame and spark. Make a ditch, away from liquid leakage.

7. Handling and Storage

A. Safety handling	Use explosion-proof equipments (electricity, ventilation, lighting etc). Use only tools which do not generate spark. Take measures for the prevention of static elasticity. Avoid inhaling dust, fume, gas, mist, vapor, spray etc. Wash thoroughly after handling. Do not eat, drink or smoke while using this product. Do not give pressure, cut, weld, solder, connect, grind, or disclose to heat, flame, spark, static electricity or other ignition sources. Use only in a well-ventilated area. Follow all MSDS / label precautions, as residuals are still remained even after container is emptied. Use with care for handling and storage. Open the lid carefully. Prevent skin from contacting this product continuously or for a long period of time. Do not enter the storage area, if no appropriate ventilation system exists. Ground/bond all equipments while handling this material. Work by referring to engineering control and personal protective equipments. Beware of heat. Measure oxygen concentration in the air or ventilate during work, as oxygen deficiency is caused while working in a low and closed space.
B. Safe storage	Keep away from heat, spark, flam, high temp. – No smoking Keep container tightly closed. Store or use in accordance with laws or regulations of government departments or local governments. Wear authenticated appropriate, safe and protective equipments. Groundwire to prevent static electricity. Store in a well-ventilated area. Keep away from foods and beverage. Designate the risky area and restrict it to those persons concerned. Maintain the temperature above the freezing point.

8. Exposure Controls and Personal Protection

A. Chemicals exposure standards and biological exposure standards, etc	
Domestic regulation	TWA – 10ppm 25mg/m3 STEL – 15ppm 37mg/m3
ACGIH regulation	TWA 10 ppm STEL 15 ppm
Biological exposure standards	Not available
B. Appropriate engineering controls	Isolate the process or use local ventilation, or conduct another engineering control which enables to control the air level below exposure limits. Ventilate the area which can maintain the air pollution between exposure limit, in case that dust, fume or mist is generated during operation. Install a wash equipment and shower for the facility which stores and uses this material. Verify if the working processes comply with permitted standards and exposure standards of the Ministry of Labor. Install a closed equipment or local ventilation system.
C. Personal protection	

Respiratory	Wear the breathing apparatus (respirator) certified by Korea Occupational Safety and Health Agency/Safety certificate organization of own country.
Eyes	Wear protective glasses and mask to protect eyes and face (front head, forehead, chin, front of the throat, nose and mouse) from harmful liquid and various materials generated while working. Install a wash equipment and shower for the facility which enable workers to easily use.
Hands	Wear chemically-resistant clothing to prevent skin.

9. Physical and Chemical Properties

A. Appearance	
Appearance	Liquid (Clear)
Color	Colourless
B. Odor	Pungent
C. Odor threshold	24.3 ppm (gas in air)
D. pH	2.47 (1.0M solution)
E. Melting/freezing point	17℃
F. Initial boiling point and range of boiling point	118℃
G. Flash point	39℃
H. Evaporation speed	0.97 (Butyl Acetate = 1)
I. Flammability (liquid)	Combustible
J. Upper and lower limits of flammable/explosion	Lower : >5.4% (Volume) Upper: <16.0% (Volume)
K. Vapor pressures	15.7 mmHg (25℃)
L. Solubility	100 g/ 100ml (25℃(water solubility))
M. Vapor density	2.07 (air = 1)
N. Specific gravity	1.0492
O. n-Octanol/water partition coefficient	-0.17
P. Auto-ignition Temp	427 ℃
Q. Decomposition Temp	Not determined
R. Viscosity	1.22 cP (20℃)
S. Molecular weight	60.05 g/mol

10. Stability and Reactivity

A. Chemical stability and adverse reaction	Flammable liquid and vapor. May create explosive mixture at flash point or above. Container may be exploded when heating. Leakage may lead to fire / explosion. Vapor may lead to explosion indoor and outdoor and in the sewer. May be ignited by heat, spark, and flame. Flammable / combustible material Vapor may be moved to ignition source and backfire. May cause serious burns to skin and eyes when contact. Vapor may cause dizziness or suffocation without self-consciousness. In case of fire, it may generate irritating, corrosive and toxic gases. May be toxic when ingesting and inhaling.
B. Conditions to be avoided	Place away from water supply facility and sewer. Avoid heat, flame, spark and other ignition sources. – No smoking Minimize contact with this material.
C. Materials to be avoided	Materials which mixing is not permitted: Flammable materials, amine, oxidizing agent, base, halogen, acid, peroxides, metals, plastic, rubber
D. Harmful materials generated by decomposition	While burning, thermal decomposition or combustion may generate irritating and highly toxic gases.

11. Toxicological Information

A. Exposure routes with high probability	May be exposed to respiratory system, throat, eyes and skin due to negligent handling.
B. Health effects	Acute toxicity
Oral	LD50 3310 mg/kg Rat
Percutaneous	LD50 1060 mg/kg Rabbit

Inhalation	LD50 16000 ppm 4 hr Rat
Skin corrosion or irritation	Show skin necrosis and burn in animal experiments.
Serious eye damage or irritation	Cause serious damage to eyes of rabbits. Permanent corneal damage. Human beings' corneal may be paralyzed or opaque due to accident.
Respiratory hypersensitivity	If inhaled, cause hypersensitivity in respiratory system like bronchial asthma.
Skin hypersensitivity	Skin sensitization to acetic acid is rare, but has occurred.
Carcinogen	
Occupational Safety and Health Act	Materials measured for working environment (1 time / 6 months)
Ministry of Employment and Labor	Not applicable
IARC	No evidence of carcinogenicity
NTP	No evidence of carcinogenicity
OSHA	No evidence of carcinogenicity
ACGH	No evidence of carcinogenicity
EU CLP	No evidence of carcinogenicity
Germ cell mutagenicity	Negative
Reproductive toxicity	Negative
Specific target organ toxicity (single exposure)	Cause intravascular coagulation and severe cythemolysis for human beings. May cause irritate nose, upper airway, lung if inhaled. If vapor is inhaled, may be corrosive to respiratory tract and cause pulmonary edema.
Specific target organ toxicity (repetitive exposure)	Persistent exposure may cause damage to nose, airway and lung.
Inhalation hazard	May be harmful if ingested and flown into the airway

12. Ecological Information

A. Ecotoxicity	
Fishes	LC50 251 mg/ℓ 96 hr
Crustaceans	EC50 47mg/ℓ 24hr
Birds	Not available
B. Persistence / Degradability	
Persistence	Expected that the material is not absorbed into floating matters and deposits.
Degradability	Exists as being separated from the environment.
C. Bioaccumulation	
Accumulation	Not available
Biodegradability	Readily Biogradable
D. Mobility in soil	Be volatilized on the surface of dry soil.
E. Other harmful effects	Not applicable

13. Disposal Considerations

A. Disposal method	Dispose the contents and container according to the regulation if specified in the Wastes Control Act.
B. Disposal considerations	Dispose contents/container according to details specified in the Waste Control Act or relevant regulations.

14. Transportation Information

A. UN Number	2789
B. Proper shipping name	Acetic acid (glacial acetic acid or aqueous solution whose concentration exceeds 80% of its weight) (ACETIC ACID, GLACIAL or ACETICACID, SOLUTION)
C. Hazard class for transportation	3
D. Container class	2
E. Marine pollutants	Liquid hazardous material required for special measures on contamination prevention such as marine emissions or concentration limits, as it causes slight harm to ocean resources or human body, or to comfort or suitable use for ocean, in case of being released to oceans.
F. User's special safety measures needed in regards to Transportation or transport means	
Emergency procedure in case of fire	F-E
Emergency measures for leaks	S-C

15. Regulatory Information

A. Restrictions by Occupational Safety and Health	Materials measured for working environment (measuring cycle: 6 months) Materials under control Materials set for exposure guideline
B. Restrictions by Toxic Chemicals Control Act	Not applicable
C. Restrictions by Safety Control of Dangerous Substance Act	Class 4. Type II oil product (water soluble liquid)
D. Restrictions by Wastes Control Act	Designated waste
E. Restrictions by other domestic and foreign Laws	
Domestic regulations	
Act on Persistent Organic Pollutants	Not applicable
Hazardous and Noxious Substance on Ocean (HNS)	Included in the National Contingency Plan (NCP)
Foreign regulations	
US management information (OSHA Regulation)	Not applicable
US management information (CERCLA Regulation)	2267.995 kg 5000 lb
US management information (EPCRA 302 Regulation)	Not applicable
US management information (EPCRA 304 Regulation)	Not applicable
US management information (EPCRA 313 Regulation)	Not applicable
US management information (materials under Rotterdam Convention)	Not applicable
US management information (materials under Stockholm Convention)	Not applicable
US management information (materials under Montreal Protocol)	Not applicable
EU classification (definitive classification)	R10C; R35
EU Classification (Risk phrases)	R10, R35
EU classification (Safety phrases)	S1/2, S23, S26, 245

16. Other Information

A. Data sources
(1) ICSC (J) (1997)
(2) Merck (13th, 2001)
(3) Howard (1997)
(4) Dictionary of Organic Compounds
(5) Honmel (1991)
(6) PATTY (5th; 2001)
(7) NLM
(8) IUCLID (2004)
(9) ICSC (1997)
(10) IUCLID (2000)
(11) Safety Inspection Date on Existing Chemicals
(12) PHYSPROP Database (2005)
(13) HSDB
(14) KISCHEM (2014)

B. Initial preparation date	Mar. 8, 2010
C. No. of revision and final revision date	
No. of revision	4
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D. Others	

○ This MSDS contained herein is the information edited and revised partly by LOTTE BP Chemical Co., Ltd by referring to MSDS provided by Korea Occupational Safety and Health Agency.