

SAFETY DATA SHEET
L(+)-Lactic Acid 88%

Jungbunzlauer

Version
1.0
US / EN

Revision Date:
11/29/2021

SDS Number:
100000000514

Date of last issue: -
Date of first issue: 11/29/2021

SECTION 1. IDENTIFICATION

Product name : L(+)-Lactic Acid 88%

Substance name : L(+)-lactic acid aqueous solution 88%

Trade name : L(+)-Lactic Acid 88%

Molecular formula : C3-H6-O3

Chemical identity : S(+)-2-Hydroxypropanoic acid

CAS-No. : 79-33-4

Chemical nature : Liquid

Manufacturer or supplier's details

Details of the supplier of the safety data sheet

Company : Jungbunzlauer Inc.
95 Wells Avenue, Suite 150
Newton, Massachusetts 02459
USA
www.jungbunzlauer.com

Telephone : +1 617 969-0900

Telefax : +1 617 964-2921

E-mail address Responsible/issuing person : msds@jungbunzlauer.com

Emergency telephone number

National Chemical Emergency Centre (NCEC)
+1 202 464 2554

Recommended use of the chemical and restrictions on use

Recommended use : Food additive
Personal care
Cleaning agent
Biocidal product
Industrial use
Pharmaceutical raw material

Restrictions on use : None known.

SECTION 2. HAZARDS IDENTIFICATION

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

Skin corrosion : Category 1

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Serious eye damage : Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H314 Causes severe skin burns and eye damage.

Precautionary statements :

Prevention:

P260 Do not breathe vapours.

P264 Wash skin thoroughly after handling.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

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/ shower.

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

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.

P363 Wash contaminated clothing before reuse.

Storage:

P405 Store locked up.

Disposal:

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

Hazards Not Otherwise Classified

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Chemical nature : Liquid

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)
L(+)-lactic acid	79-33-4	>= 70 - < 90

Non-hazardous ingredients

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Chemical name	CAS-No.	Concentration (% w/w)
H2O	7732-18-5	$\geq 11.5 - < 12.5$

SECTION 4. FIRST AID MEASURES

- General advice : Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.
- If inhaled : If breathed in, move person into fresh air.
No artificial respiration, mouth-to-mouth or mouth to nose. Use suitable instruments/apparatus.
- If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.
- In case of skin contact : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
If on skin, rinse well with water.
If on clothes, remove clothes.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Continue rinsing eyes during transport to hospital.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.
- If swallowed : Clean mouth with water and drink afterwards plenty of water.
Keep respiratory tract clear.
Do NOT induce vomiting.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.
- Most important symptoms and effects, both acute and delayed : Severe eye irritation
Erythema
Skin disorders
Causes serious eye damage.
Causes severe burns.
- Protection of first-aiders : Wear personal protective equipment.
- Notes to physician : Treat symptomatically.

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SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Water mist
Dry powder
Carbon dioxide (CO₂)
Foam
- Unsuitable extinguishing media : High volume water jet
- Specific hazards during fire-fighting : Exposure to decomposition products may be a hazard to health.
- Do not allow run-off from fire fighting to enter drains or water courses.
- Hazardous combustion products : Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).
- Further information : Standard procedure for chemical fires.
Use water spray to cool unopened containers.
In the event of fire and/or explosion do not breathe fumes.
- 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.
- Special protective equipment for firefighters : Use personal protective equipment.
- Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Material can create slippery conditions.
Use personal protective equipment.
- Environmental precautions : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.
- Methods and materials for containment and cleaning up : Clean contaminated surface thoroughly.
- Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

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SECTION 7. HANDLING AND STORAGE

- Technical measures : Avoid temperatures above 200°C.
- Local/Total ventilation : Ensure adequate ventilation, especially in confined areas.
- Advice on protection against fire and explosion : Normal measures for preventive fire protection.
- Advice on safe handling : Do not breathe vapours/dust.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
To avoid spills during handling keep bottle on a metal tray.
Dispose of rinse water in accordance with local and national regulations.
- Conditions for safe storage : Keep in an area equipped with acid resistant flooring.
Store in original container.

Keep container tightly closed in a dry and well-ventilated place.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.
- Further information on storage conditions : Keep away from direct sunlight.
- Materials to avoid : Incompatible with bases.
- Recommended storage temperature : > 41 °F
- Further information on storage stability : No decomposition if stored and applied as directed.
- Packaging material : Suitable material: Plastic container of HDPE, Stainless steel 316L

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures : Ensure adequate ventilation, especially in confined areas.

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally required.

In the case of vapour formation use a respirator with an ap-

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proved filter.
Use NIOSH approved respiratory protection.

Hand protection

Remarks : Wear suitable gloves tested to EN374.
The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Ensure that eyewash stations and safety showers are close to the workstation location.
Safety glasses with side-shields
Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : acid-resistant protective clothing
Long sleeved clothing
Footwear protecting against chemicals
Impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Take off all contaminated clothing immediately.
Wash contaminated clothing before re-use.
When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Aqueous solution, viscous
Colour : colourless, light yellow

Odour : characteristic

Odour Threshold : Not relevant

pH : < 2 (77 °F / 25 °C)

Melting point/freezing point : < -112 °F / < -80 °C
(ca. 1,013.25 hPa)

Boiling point/boiling range : 230 - 266 °F / 110 - 130 °C

Flash point : Not applicable

Evaporation rate : Not applicable

Flammability (solid, gas) : Not applicable

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Flammability (liquids)	: Not applicable
Upper explosion limit / Upper flammability limit	: Not applicable
Lower explosion limit / Lower flammability limit	: Not applicable
Vapour pressure	: ca. 0.038 Pa (68 °F / 20 °C)
Relative vapour density	: No data available
Density	: 1.0 - 1.3 g/cm3
Solubility(ies) Water solubility	: completely miscible
Partition coefficient: n-octanol/water	: log Pow: -0.54 (68 °F / 20 °C)
Auto-ignition temperature	: 752 °F / 400 °C
Decomposition temperature	: No data available
Viscosity Viscosity, dynamic	: 18.4 mPa.s (77 °F / 25 °C)
Viscosity, kinematic	: No data available
Explosive properties	: Not applicable
Oxidizing properties	: Not applicable
Surface tension	: 70.7 mN/m, 1 g/l, 68 °F / 20 °C
Metal corrosion rate	: Not corrosive to metals

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No decomposition if stored and applied as directed.
Chemical stability	: No decomposition if stored and applied as directed.
Possibility of hazardous reactions	: No decomposition if stored and applied as directed.
Conditions to avoid	: Temperature > 200 °C
Incompatible materials	: Bases Oxidizing agents
Hazardous decomposition products	: Build-up of dangerous/toxic fumes possible in cases of fire/high temperature. Carbon dioxide (CO2)

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Carbon monoxide

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Not classified based on available information.

Components:

L(+)-lactic acid:

- Acute oral toxicity : LD50 Oral (Rat, female): 3,543 mg/kg
Test substance: Lactic acid
Assessment: The substance or mixture has no acute oral toxicity
- LD50 Oral (Rat, male): 4,936 mg/kg
Test substance: Lactic acid
Assessment: The substance or mixture has no acute oral toxicity
- Acute inhalation toxicity : LC50 (Rat, male and female): 7.94 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Test substance: Lactic acid
Assessment: The substance or mixture has no acute inhalation toxicity, Corrosive to the respiratory tract.
- Acute dermal toxicity : LD50 Dermal (Rabbit): 2,000 mg/kg
Test substance: Lactic acid
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation

Causes severe burns.

Product:

Remarks : Extremely corrosive and destructive to tissue.

Components:

L(+)-lactic acid:

- Species : Rabbit
Exposure time : 4 h
Assessment : Corrosive after 1 to 4 hours of exposure
Result : Corrosive after 1 to 4 hours of exposure
Test substance : Lactic acid

Serious eye damage/eye irritation

Causes serious eye damage.

Product:

Remarks : May cause irreversible eye damage.

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Components:

L(+)-lactic acid:

Species : chicken
Result : Severe irritation
Test substance : Lactic acid

Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Components:

L(+)-lactic acid:

Species : Guinea pig
Result : Does not cause skin sensitisation.

Germ cell mutagenicity

Not classified based on available information.

Components:

L(+)-lactic acid:

Germ cell mutagenicity - Assessment : In vitro tests did not show mutagenic effects

Carcinogenicity

Not classified based on available information.

Components:

L(+)-lactic acid:

Species : Rat, male and female
Result : Animal testing did not show any carcinogenic effects.
Test substance : Calcium lactate

IARC No component 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 component 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

Not classified based on available information.

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Components:

L(+)-lactic acid:

STOT - single exposure

Not classified based on available information.

Components:

L(+)-lactic acid:

Assessment : No data available

STOT - repeated exposure

Not classified based on available information.

Components:

L(+)-lactic acid:

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

Repeated dose toxicity

Components:

L(+)-lactic acid:

Species : Rat
LOAEL : 886 mg/kg
Application Route : Dermal
Exposure time : 13 wk
Number of exposures : 5 d/wk
Dose : 886 mg/kg bw
Test substance : Lactic acid
Assessment : slight irritation

Species : Rat, female
NOAEL : 50,000 mg/l
Application Route : Oral
Exposure time : 13 wk
Number of exposures : 1/d
Dose : 5%
Test substance : Calcium lactate
Assessment : No adverse effects

Aspiration toxicity

Not classified based on available information.

Components:

L(+)-lactic acid:

No data available

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Experience with human exposure

Product:

Inhalation : Target Organs: Respiratory system
Symptoms: No information available.

Skin contact : Target Organs: Skin
Symptoms: May cause skin irritation in susceptible persons.

Eye contact : Target Organs: Eyes
Symptoms: Redness, Itching

Ingestion : Target Organs: Digestive organs
Symptoms: No information available.

Further information

Product:

Remarks : No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

L(+)-lactic acid:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 130 mg/l
Exposure time: 96 h
Test substance: Lactic acid
Remarks: Not classified

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 130 mg/l
End point: Immobilization
Exposure time: 48 h
Test substance: Lactic acid
Remarks: Not classified due to data which are conclusive although insufficient for classification.

Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (algae)): > 2,800 mg/l
Exposure time: 72 h
Test substance: Lactic acid
Remarks: Not classified due to data which are conclusive although insufficient for classification.

NOEC (Pseudokirchneriella subcapitata (green algae)): 1,900 mg/l
Exposure time: 70 h
Test substance: Lactic acid
Remarks: Not classified due to data which are conclusive although insufficient for classification.

Toxicity to fish (Chronic toxicity) : LOEC (Fish (Oreochromus mossambica)): ca. 2.18 mg/l
Exposure time: 90 d

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Test substance: Lactic acid
Remarks: Environmental exposure assessment for this scenario is not relevant.

Toxicity to microorganisms : EC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: Respiration inhibition
Test substance: Lactic acid
Remarks: Not classified due to data which are conclusive although insufficient for classification.

Toxicity to terrestrial organisms : LC50 (Colinus virginianus (Bobwhite quail)): > 2,250 mg/kg
Exposure time: 14 d
Test substance: Lactic acid

Persistence and degradability

Components:

L(+)-lactic acid:

Biodegradability : Closed Bottle test
Inoculum: activated sludge
Biochemical oxygen demand
Biodegradation: 80 %
Exposure time: 28 d
Method: OECD Test Guideline 301
Test substance: L(+)-Lactic acid
Remarks: Readily biodegradable.

Ready biodegradability
Method: QSAR
Test substance: Lactic acid
Remarks: Readily biodegradable.

Stability in water : Remarks: Not applicable

Bioaccumulative potential

Components:

L(+)-lactic acid:

Bioaccumulation : Remarks: The product is miscible in water and readily biodegradable in both water and soil. Accumulation is not expected.

Partition coefficient: n-octanol/water : log Pow: -0.54 (68 °F / 20 °C)

Mobility in soil

Components:

L(+)-lactic acid:

Mobility : Method: Calculation, Mackay Level III Fugacity Model
Remarks: After release, disperses through ground water.

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Distribution among environmental compartments : Koc: < 20.9, log Koc: < 1.32
Method: OECD Test Guideline 121
Remarks: Lactic acid

Stability in soil : Remarks: Readily biodegradable.

Other adverse effects

Product:

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information : No data available

Components:

L(+)-lactic acid:

Results of PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

Additional ecological information : No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : In accordance with local and national regulations.

Do not dispose of waste into sewer.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Send to a licensed waste management company.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	: UN 3265
Proper shipping name	: Corrosive liquid, acidic, organic, n.o.s. (lactic acid)

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Class : 8
Packing group : III
Labels : Class 8 - Corrosive substances
Packing instruction (cargo aircraft) : 856
Packing instruction (passenger aircraft) : 852

IMDG-Code

UN number : UN 3265
Proper shipping name : CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
(lactic acid)
Class : 8
Packing group : III
Labels : 8
EmS Code : F-A, S-B
Marine pollutant : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations

DOT

UN/ID/NA number : UN 3265
Proper shipping name : Corrosive liquid, acidic, organic, n.o.s.
(lactic acid)
Class : 8
Packing group : III
Labels : CORROSIVE
ERG Code : 153
Marine pollutant : no

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCM I Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know

L(+)-lactic acid
H2O

Not Assigned
Not Assigned

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The components of this product are reported in the following inventories:

TCSI	: On the inventory, or in compliance with the inventory
TSCA	: All substances listed as active on the TSCA inventory
AIIC	: On the inventory, or in compliance with the inventory
DSL	: All components of this product are on the Canadian DSL
ENCS	: On the inventory, or in compliance with the inventory
ISHL	: On the inventory, or in compliance with the inventory
KECI	: On the inventory, or in compliance with the inventory
PICCS	: On the inventory, or in compliance with the inventory
IECSC	: On the inventory, or in compliance with the inventory
NZIoC	: On the inventory, or in compliance with the inventory

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REACH : This substance has been registered according to Regulation (EC) No. 1907/2006 (REACH).

TSCA list

No substances are subject to a Significant New Use Rule.

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

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AIIIC - 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 Development; 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; 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

Items where relevant changes have been made to the previous version are highlighted in the body of this document by two vertical lines, red letters and grey shading.

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Revision Date:
11/29/2021

SDS Number:
100000000514

Date of last issue: -
Date of first issue: 11/29/2021

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