SAFETY DATA SHEET
according to OSHA Hazard Communication Standard 29CFR
1910.1200 (HCS 2012)

Lithium Chloride Solution abt. 40% in Water,
Molybdate-inhibited

SDS Number: RS_000001114

Version 1.1  Revision Date: 06/28/2019
Date of last issue: 12/21/2018  Date of first issue: 12/21/2018
Print Date: 10/07/2019

SECTION 1. IDENTIFICATION

Product name : Lithium Chloride Solution abt. 40% in Water, Molybdate-inhibited

Manufacturer or supplier's details
Company name of supplier : Albemarle Corporation
Address : 4250 Congress Street, Suite 900
Charlotte , NC 28209
United States of America (USA)
Telephone : 980.299.5700
Telefax : 980.299.5512
Emergency telephone : +32 (0) 70-233-201 (EUROPE)
(+1)225-344-7147 (US and WORLDWIDE)
+65-6733-1661 (ASIA PACIFIC)
+86-532-8388-9090 (CHINA)
+61 2 8014 4558 or 18000 74234 (Australia)

Contact person product safety : DEPARTMENT OF PRODUCT SAFETY
E-mail address : PRODUCTSAFETY@ALBEMARLE.COM

Recommended use of the chemical and restrictions on use
Recommended use : Raw material for chemical industry.
Operating medium for air conditioning.
Restrictions on use : None known.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Acute toxicity (Oral) : Category 4
Skin irritation : Category 2
Eye irritation : Category 2A
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GHS label elements
Hazard pictograms

Signal Word: Warning
Hazard Statements: H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary Statements:
Prevention:
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
The information required is contained in this Material Safety Data Sheet.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture: Mixture
Chemical nature: Aqueous solution of alkali salts.

Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>lithium chloride</td>
<td>7447-41-8</td>
<td>&gt;= 30 - &lt; 50</td>
</tr>
</tbody>
</table>
SECTION 4. FIRST AID MEASURES

General advice

: First Aid responders should pay attention to self-protection and use the recommended protective clothing. Take off contaminated clothing and shoes immediately. Move out of dangerous area. Keep warm and in a quiet place.

If inhaled

: Move to fresh air. If not breathing, give artificial respiration. Keep the victim calm and in a semi-upright position. If symptoms persist, call a physician.

In case of skin contact

: Wash off with soap and water. If symptoms persist, call a physician.

In case of eye contact

: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

If swallowed

: Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Call a physician immediately.

Most important symptoms and effects, both acute and delayed

: eye redness

: Discomfort

Notes to physician

: Treat symptomatically. For specialist advice physicians should contact the Poisons Information Service.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

: Water spray

: Foam

: Carbon dioxide (CO2)

: Dry powder

Unsuitable extinguishing media

: High volume water jet

Specific hazards during fire fighting

: Hazardous decomposition products formed under fire conditions.
Hazardous combustion products: Metal oxides
Chlorine compounds

Further information: 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 fire-fighters: Wear full protective clothing and self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Ensure adequate ventilation.
Wear personal protective equipment.
Avoid contact with skin, eyes and clothing.
Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
Keep people away from and upwind of spill/leak.

Environmental precautions: Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.

Methods and materials for containment and cleaning up: Soak up with inert absorbent material.
Pick up and transfer to properly labeled containers.
Adequate disposal

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion: Normal measures for preventive fire protection.

Advice on safe handling: Provide sufficient air exchange and/or exhaust in work rooms.
Wear personal protective equipment.
Avoid formation of aerosol.
Handle in accordance with good industrial hygiene and safety practice.
In general, emissions are controlled and prevented by implementing an appropriate management system, including regular informing and training workers.

Conditions for safe storage: Keep containers tightly closed in a dry, cool and well-ventilated place.
Store in original container.
Do not store in or use iron or steel containers.
Protect from frost.
Keep away from heat.

Materials to avoid:
- Do not store near acids.
- Keep away from metals.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

Engineering measures: Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment
Respiratory protection: In case of inadequate ventilation wear respiratory protection. Recommended Filter type:
- ABEK-P2-filter

Hand protection:
- Material: Wear suitable gloves.

Remarks: The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. The exact break through time can be obtained from the protective glove producer and this has to be observed. Protective gloves have to be replaced at the first sign of deterioration.

Eye protection: Safety glasses with side-shields

Skin and body protection: Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Protective measures: Handle in accordance with good industrial hygiene and safety practice. Ensure that eye flushing systems and safety showers are located close to the working place.

Hygiene measures: Take off contaminated clothing and shoes immediately. Avoid contact with skin, eyes and clothing. Do not breathe dust/ fume/ gas/ mist/ vapors/ spray. Smoking, eating and drinking should be prohibited in the application area. Keep away from food, drink and animal feedingstuffs. Wash hands before breaks and at the end of workday.
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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid
Color : colorless
Odor : odorless
Odor Threshold : No data available
pH : 7 (68 °F / 20 °C)
    Concentration: 400 g/l
Melting point/freezing point : No data available
Boiling point/bolling range : > 212 °F / > 100 °C
Flash point : No data available
Evaporation rate : No data available
Flammability (solid, gas) : No data available
Self-ignition : No data available
Upper explosion limit / Upper flammability limit : No data available
Lower explosion limit / Lower flammability limit : No data available
Vapor pressure : < 23 hPa (68 °F / 20 °C)
Relative vapor density : No data available
Relative density : No data available
Density : ca. 1.26 g/cm3 (68 °F / 20 °C)
Solubility(ies)
    Water solubility : Not applicable
    Solubility in other solvents : No data available
Partition coefficient: n-octanol/water : log Pow: ca. -1
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Autoignition temperature : No data available
Decomposition temperature: To avoid thermal decomposition, do not overheat.
                          To avoid thermal decomposition, do not overheat.
Viscosity
Viscosity, dynamic : ca. 13 mPa,s (68 °F / 20 °C)
Viscosity, kinematic : No data available
Explosive properties : No data available
Oxidizing properties : No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No hazards to be specially mentioned.
Chemical stability : Stable under normal conditions.
Possibility of hazardous reactions : No dangerous reaction known under conditions of normal use.
Conditions to avoid : Protect from frost, heat and sunlight.
Incompatible materials : Strong acids
                        Metals
Hazardous decomposition products : No decomposition if stored and applied as directed.
                                Decomposes by reaction with strong acids.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Ingredients:

Lithium chloride:
Acute oral toxicity : LD50 (Rat, male): 526 mg/kg
Remarks: Information taken from reference works and the literature.
Acute inhalation toxicity : LC50 (Rat, male and female): > 5.57 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
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Method: OECD Test Guideline 403
GLP: yes

Acute dermal toxicity: LD50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
GLP: yes

Skin corrosion/irritation
Ingredients:
lithium chloride:
Species: Rabbit
Exposure time: 4 h
Method: OECD Test Guideline 404
Result: Skin irritation
GLP: yes

Serious eye damage/eye irritation
Ingredients:
lithium chloride:
Species: Rabbit
Result: Irritation to eyes, reversing after 7 to 21 days.
Method: OECD Test Guideline 405
GLP: yes

Respiratory or skin sensitization
Ingredients:
lithium chloride:
Test Type: Buehler Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Did not cause sensitization on laboratory animals.
GLP: yes

Germ cell mutagenicity
Ingredients:
lithium chloride:
Genotoxicity in vitro: Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes
Test substance: Read-across (Analogy)

Test Type: reverse mutation assay
Test system: Escherichia coli
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes
Test substance: Read-across (Analogy)

Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
GLP: yes
Test substance: Read-across (Analogy)

Test Type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
GLP: yes
Test substance: Read-across (Analogy)

Carcinogenicity

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

Ingredients:

lithium chloride:
Effects on fetal development: Test Type: Two-generation study
Species: Rat, male and female
Strain: wistar
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Application Route: Oral
General Toxicity Maternal: NOAEL: 17 mg/kg bw/day
Developmental Toxicity: NOAEL: 52 mg/kg bw/day
Target Organs: Adrenal gland, Liver, Kidney
Method: OECD Test Guideline 416
GLP: yes
Remarks: Read-across (Analogy)

Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
General Toxicity Maternal: NOAEL: 34 mg/kg bw/day
Embryo-fetal toxicity.: NOAEL: 103 mg/kg body weight
Method: OECD Test Guideline 414
GLP: yes
Remarks: Read-across (Analogy)

Repeated dose toxicity

Ingredients:

Lithium chloride:
NOAEL: extrapolated 7.32 mg/kg
Application Route: Oral
Test substance: Read-across (Analogy)
Remarks: Epidemiological data

NOAEL: extrapolated 73.2 mg/kg
Application Route: Skin contact
Test substance: Read-across (Analogy)
Remarks: Epidemiological data

NOAEC: extrapolated 0.02562 mg/l
Application Route: Inhalation
Test substance: Read-across (Analogy)
Remarks: Epidemiological data

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Lithium chloride:
Toxicity to fish: LC50 (Onchorhynchus mykiss (rainbow trout)): 158 mg/l
End point: mortality
Exposure time: 96 h
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Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 203
GLP: yes

Toxicity to daphnia and other aquatic invertebrates:
EC50 (Daphnia magna (Water flea)): 249 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae:
EC50 (Desmodesmus subspicatus (green algae)): > 400 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

NOEC (Desmodesmus subspicatus (green algae)): 25 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

Toxicity to fish (Chronic toxicity):
NOEC (Onchorhyncus mykiss (rainbow trout)): 18 mg/l
End point: mortality
Exposure time: 34 d
Test Type: semi-static test
Analytical monitoring: yes
Test substance: Read-across (Analogy)
Method: OECD Test Guideline 210
GLP: yes
Remarks: The value is calculated

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC (Daphnia magna (Water flea)): 10.4 mg/l
End point: mortality
Exposure time: 21 d
Test Type: semi-static test
Analytical monitoring: yes
Test substance: Read-across (Analogy)
Method: OECD Test Guideline 211
GLP: yes
Remarks: The value is calculated
Toxicity to microorganisms:
- EC50 (activated sludge): 320.05 mg/l
- End point: Respiration inhibition
- Exposure time: 3 h
- Test Type: static test
- Test substance: Read-across (Analogy)
- Method: OECD Test Guideline 209
- GLP: yes
- Remarks: The value is calculated

Persistence and degradability

Product:
- Biodegradability: Remarks: The methods for determining biodegradability are not applicable to inorganic substances.
- Physico-chemical removability: Remarks: No data available

Ingredients:
- Lithium chloride:
  - Biodegradability: Remarks: The methods for determining biodegradability are not applicable to inorganic substances.

Bioaccumulative potential

Product:
- Bioaccumulation: Remarks: Bioaccumulation is unlikely.

Ingredients:
- Lithium chloride:
  - Bioaccumulation: Remarks: Bioaccumulation is unlikely.

Mobility in soil
No data available

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).
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Additional ecological information: Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: Dispose of in accordance with local regulations.
Contaminated packaging: Refer to manufacturer/supplier for information on recovery/recycling.

SECTION 14. TRANSPORT INFORMATION

UNRTDG
Not regulated as a dangerous good

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation

49 CFR
Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

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: Acute toxicity (any route of exposure) 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.

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 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.

US State Regulations
Massachusetts Right To Know
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know
water 7732-18-5
lithium chloride 7447-41-8

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

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

The ingredients of this product are reported in the following inventories:
EINECS: On the inventory, or in compliance with the inventory
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DSL : All components of this product are on the Canadian DSL

AICS : On the inventory, or in compliance with the inventory

NZIoC : Not in compliance with the inventory

ENCS : On the inventory, or in compliance with the inventory

ISHL : Not 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

TCSI : On the inventory, or in compliance with the inventory

TSCA : On TSCA Inventory

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

Further information

NFPA 704:

HMIS® IV:

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLAMMABILITY</td>
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</tr>
<tr>
<td>PHYSICAL HAZARD</td>
<td>0</td>
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</tbody>
</table>

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

AICS - Australian Inventory of Chemical Substances; 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 - (Quantit
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US / Z8