SAFETY DATA SHEET — LITHIUM CHLORIDE SOLUTION

1. Identification of the Substance/Mixture and of the Company/Undertaking:

1.1 Product Identifier: Lithium chloride solution

1.1.1 Substances Not applicable

1.1.2 Mixture name: Lithium chloride solution

Alternate names and trade name ADVAGuard® Inhibited Lithium Chloride Solution, Limit® 201, Limit® 301

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against:

Component in closed systems for air conditioning applications.
Formulation and chemical synthesis in industrial manufacturing operations.
Additive for preparations and articles for industrial and consumer use.
Do not use for private purposes (household).

1.3 Details of the Supplier of the Safety Data Sheet

North America
FMC Corporation
2801 Yorkmont Road, Suite 300
Charlotte, NC 28208
Phone: +1.704.426.5300
Fax: +1.704.426.5370
1.888.lithium

Europe
FMC Chemicals
Commercial Road
Bromborough, Merseyside
CH62 3NL, England
Phone: +44.151. 334.8085
Fax: +44.151.482.7361

Asia Pacific
FMC Asia Innovation Center
No 3 Building No. 4560
Jinke Road
Shanghai, China 201203
T: +86.21.2067.5888

Email: lithium.info@fmc.com
Web: www.fmclithium.com

1.4 Emergency Telephone Number:

North America
CHEMTREC: +1.800.424.9300
+1.703.527.3887
Plant: +1.704.629.5361
Medical: +1.303.595.9048

Europe
24 hr Specialist advice number:
CHEMTREC: +44 870 8200418

Asia Pacific
Phone: +86.21.2067.5888

2. Hazards Identification

2.1 Classification of the Substance or mixture:

2.1.1 GHS Classification [EC Regulation No 1272/2008 and US OSHA regulations]

Acute Toxicity, Category 4
Eye Irritant, Category 2
Skin irritant, Category 2

2.2.2 EC: Classification according to 67/548/EEC or 1999/45/EC [DSD/DPD]

Xn, R22; Xi, R36, R38

2.2 Label Elements:

2.2.3 Hazard Pictograms(s):

2.2.4 Signal Word: Warning

Hazard Statement(s):	Harmful if swallowed	H302
	Causes serious eye irritation	H319
	Causes skin irritation	H315
Precautionary Statement(s):		
	Wear protective gloves/protective clothing/eye protection/face protection.	P280
	IF IN EYES: Rinse cautiously w/ water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	P305 + P351 + P338
	If eye irritation persists: Get medical advice/attention.	P337 + P313
	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.	P301 + P312
	IF ON SKIN: Wash with plenty of soap and water.	P302 + P352
	If skin irritation occurs: Get medical advice/attention.	P332 + P313
Additional Precautionary Statements:		
	Wash hands thoroughly after handling.	P264

Do not eat, drink or smoke when using this product.	P270
Take off contaminated clothing and wash before reuse.	P362
Dispose of contents/ container to an approved waste disposal plant	P501

2.3 Other Hazards

None.

3. Composition / Information on Ingredients

3.1 Substances Not applicable.

3.2 Mixtures

3.1.1 GHS Classification [EC: Regulation No 1272/2008; US: OSHA regulations]

Chemical Name	CAS #	EC No	EC Index No	REACH Reg No	Wt.%	Classification, Hazard Statement Codes	
Lithium chloride	7447-41-8	231-212-3	not avail.	01-2119560574-35-0000	33-42	Acute Tox. 4 Eye Irrit. 2 Skin Irrit. 2	H302 H319 H315
Water	7732-18-5	None	None	None	58-62	None	

3.1.2 EC: Classification according to 67/548/EEC or 1999/45/EC [DSD/DPD]

Chemical Name	CAS #	EC No	Wt.%	Symbols	R-phrases
Lithium chloride	7447-41-8	231-212-3	33-42	Xn Xi	R22 R36, 38
Water	7732-18-5	None	58-62	None	

(see Section 16 for R-phrase text)

4. First Aid Measures

4.1 Description of First Aid Measures

EYES: Flush with water for at least 15 minutes. If irritation occurs and persists, contact a medical doctor.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Drink 1 or 2 glasses of water. Never give anything by mouth to an unconscious person. If any discomfort persists, obtain medical attention.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

4.2 Most Important Symptoms and effects, both acute and delayed

Skin and eye irritation.

4.3 Indication of any immediate medical attention and special treatment needed.

Notes to medical doctor:

This product has low oral, dermal and inhalation toxicity, and is a mild irritant. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. Fire-Fighting Measures

5.1 Extinguishing media Dry chemical, CO_2, water spray or regular foam.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products	None
General Hazard	No known physical hazard, non-combustible.
Properties contributing to Flammability	None
Flashpoint	Not applicable
Flammable limits in air	Upper: Not available Lower: Not available.
Auto ignition temperature	Not applicable
Sensitivity to static discharge	Not applicable
Sensitivity to static impact	Not applicable

5.3 Advice for fire-fighters

Wear full protective clothing and self-contained breathing apparatus (SCBA) approved for fire fighting. This is necessary to protect against the hazards of heat, products of combustion and oxygen

deficiency. Do not breathe smoke, gases or vapors generated.

COMMENTS:
(See Section 10, Stability and Reactivity)

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures
Before cleanup measures begin, review the entire SDS with particular attention to Section 2, Hazards Identification; and Section 8, Exposure Controls/Personal Protection.

6.2 Environmental precautions
Contain spill. Do not wash into drains. Dispose of at qualified waste disposal facility.

6.3 Methods and material for containment and cleaning up
Contain spill with absorbant. Sweep up and place in approved transport container. Dispose of waste according to local and Federal laws and regulations.

6.4 Reference to other sections
Before cleanup measures begin, review the entire SDS with particular attention to Section 2, Hazards Identification; and Section 8, Exposure Controls/Personal Protection.

6.5 Additional information
Not specified.

7. Handling and Storage

7.1 Precautions for safe handling
Avoid contact with eyes, skin or clothing. Use with adequate ventilation. Wear safety glasses or goggles and rubber gloves. Wash thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities
Keep away from strong acids. Keep container closed.

7.3 Specific end use(s)
Defined in Exposure scenarios. Industrial and professional use only

8. Exposure Controls / Personal Protection

8.1 Control parameters

Lithium Chloride

DNEL

Long-term exposure, systemic, inhalation	10 mg/m^3
Long-term exposure, systemic, dermal	73.2 mg/kg/day

PNEC

PNEC aqua (freshwater)	10.4 mg/l
PNEC STP	140 mg/l

EXPOSURE LIMITS

Chemical Name	EU		EH40 (UK WEL)		USA (ACGIH)		USA (OSHA)	
	TWA	STEL	TWA	STEL	TWA	STEL/Ceiling	PEL	STEL/Ceiling
Lithium chloride	none*		none*		none*		none*	

* No occupational exposure limit value

8.2 Exposure controls

Engineering controls:
Use local exhaust ventilation to keep airborne concentrations below exposure limits.

Personal protective equipment

Eyes and Face: Safety glasses or goggles

Respiratory: When engineering controls are not adequate, wear a respirator approved for protection against aqueous sprays.
US: NIOSH or MSHA approved
Europe: CEN Class P type

Protective Clothing: **Gloves:** Nitrile/Neoprene/PVC/Natural Rubber (permeation breakthrough not detected during 6 hr test)
These glove recommendations should not be used as the absolute basis for glove selection. Actual in-use conditions may vary glove performance from the

controlled conditions of laboratory tests. Factors such as concentration and temperature, glove thickness and glove reuse, may affect performance. Other glove requirements, such as length, dexterity, cut, abrasion, puncture and snag resistance, or glove grip need to be considered in making your final selection.
Other: Not specified.

Work Hygienic Practices: Quick-drench eyewash and safety shower.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Water-white liquid
Odor:	Odorless
Odor threshold:	None
pH:	6 to 8
Melting point:	< 0°C Aqueous mixture
Boiling point:	130°C (266°F)
Flash point:	Not applicable
Evaporation rate(butyl acetate = 1):	Not applicable
Flammability:	Not applicable
Flammable limits:	Not applicable
Vapor pressure:	As for water
Vapor density (air = 1):	Not applicable
Specific gravity:	1.2-1.3 g/cc @ 25ºC (77ºF)
Solubility in water:	Miscible in any proportion
Partition coefficient n-octanol/ water:	Not available
Autoignition temperature:	Not applicable
Decomposition temperature:	Not available
Viscosity:	Not applicable
Explosive properties:	Not explosive
Oxidizing properties:	Not an oxidizer

9.2 Other information

Self-reactive properties	Does not meet classification criteria.
Pyrophoric properties	Does not meet classification criteria.
Self-heating properties	Does not meet classification criteria.
Water reactive properties	Does not meet classification criteria.
Corrosive to metals	Does not meet classification criteria.
Molecular weight:	42.4 (LiCl)

10. Stability and Reactivity

10.1	**Reactivity**	Reacts with acids to form hydrogen chloride
10.2	**Chemical stability**	Stable
10.3	**Possibility of hazardous reaction**	Hazardous polymerization will not occur.
10.4	**Conditions to avoid**	Contact with acids
10.5	**Incompatible materials**	Acids
10.6	**Hazardous decomposition products**	None

11. Toxicological Information

11.1 Information on toxicological effects

(a) acute toxicity	Lithium chloride acute oral toxicity > 526 mg/kg (rat) Lithium chloride acute inhalation toxicity LC_{50}: > 5.57 mg/L (male/female) Lithium chloride acute dermal toxicity LD50: >2000 mg/kg (rat),
(b) skin corrosion/irritation	Classified as an irritant to skin on the basis of lithium chloride.
(c) serious eye damage/irritation	Classified as irritant to eyes on the basis of lithium chloride.
(d) respiratory/skin sensitisation	Classed as not sensitizing to skin on the basis of lithium chloride.
(e) germ cell mutagenicity	Classified as not mutagenic based on lithium chloride.

(f) carcinogenicity	Classified as not carcinogenic based on lithium chloride.
(g) reproductive toxicity	Classified as not a reproductive toxin based on lithium chloride.
(h) STOT-single exposure	Classified as not causing organ damage based on lithium chloride.
(i) STOT-repeated exposure	Classified as not causing organ damage on repeat exposure based on lithium chloride.
(j) aspiration hazard	Lithium chloride, a solid, does not present an aspiration hazard.

Lithium chloride has been extensively tested for REACH registration

Acute Effects From Overexposure:
No data available for the formulation.
No envisaged effects other than acute effects from local irritation

Chronic Effects From Overexposure:
No data available for product.

Carcinogenicity Listings

EH40: Not listed.
IARC: Not listed.
NTP: Not listed.
OSHA: Not considered a carcinogen under OSHA.
ACGIH: Not listed.

12. Ecological Information

12.1 Toxicity: No classification
Lithium chloride — Rainbow trout: 96 hr. LC_{50} = 158 mg/L
Daphnia magna: 48 hr. EC_{50} = 249 mg/L
Daphnia reproduction 21 day, NOEC 10.4 mg/l

12.2 Persistence and degradability
Inorganic salt.

12.3 Bioaccumulative potential
Inorganic. Lithium salts are not bioaccumulative

12.4 Mobility in soil
Not expected to be mobile.

12.5 Results of PBT and vPvB assessment
Inorganic

12.6 Other adverse effects
None

13. Disposal Considerations

13.1 Waste treatment methods
Use a qualified industrial waste disposal facility. Dispose of waste according to local and Federal laws and regulations.

14. Transport Information

14.1	**UN Number**	None
14.2	**UN proper shipping name (IMDG, ICAO, ADR, DOT)**	None
14.3	**Transport hazard class(es) (IMDG, ICAO, ADR, DOT)**	Based on available data, the classification criteria are not met.
14.4	**Packing group (IMDG, ICAO, ADR, DOT)**	None
14.5	**Environmental hazards**	Based on available data, the classification criteria are not met.
14.6	**Special precautions for user**	None
14.7	**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	None

15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EUROPEAN UNION:

German Wassergefährdungsklasse (water hazard class)

Lithium chloride	1

UNITED STATES:

Section 311 Hazard Category (40 CFR 370):	Immediate (acute) health hazard,
Section 313 Reportable Ingredients (40 CFR 372):	This product does not contain a toxic chemical subject to the reporting requirements of Section 313 of Emergency Planning and Community Right-To-Know Act of 1986.
Section 302 Extremely Hazardous Substances (40 CFR 355):	Not listed
CERCLA Hazardous Substance (40 CFR 302.4):	Not listed
TSCA Sec 12b Export Notification:	This product is not subject to TSCA 12 (b) Export Notification Requirements.
NFPA Rating:	**Health:** 1 **Flammability:** 0 **Reactivity:** 0 **Special:** None

INTERNATIONAL INVENTORY STATUS:

Inventory/Country	**Product Status**
EINECS (EU)	Listed
TSCA (US)	Listed
ECL (Korea)	Listed
DSL (Canada)	Listed

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been completed for this material

16. Other Information

European Union:

R Phrases:

Harmful if swallowed	R22
Irritating to eyes	R36
Irritating to skin	R38

Harmful if swallowed	H302
Causes serious eye irritation	H319
Causes skin irritation	H315

List of Abbreviations used in this SDS:

PBT	Persistent, Bioaccumulative and Toxic
vPvB	very Persistent, very Bioaccumulative
PEC	Predicted environmental concentration
PNEC	Predicted no effect concentration
DNEL	Derived no effect level

Specific uses identified for Exposure Scenarios

ES1	Industrial, chemical synthesis and processing
ES2	Formulation, industrial
ES3	Industrial, use of products
ES4	Professional, use of products
ES5	Consumer, use of products

REVISION SUMMARY: Revision # 1. Revision of skin irritation classification in Section 11.

This SDS has been prepared to meet U. S. OSHA Hazard Communication Standard requirements.
type 1a