SAFETY DATA SHEET LITHIUM HYPOCHLORITE

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

1.1 **Product Identifier:** Lithium Hypochlorite
1.1.1 **Substances** Not applicable
Alternate names and trade name Formula 2®
1.1.2 **Mixture name:** Lithium Hypochlorite
1.2 **Relevant Identified Uses of the Substance or Mixture and Uses Advised Against:**
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 Lithium
Seven LakePointe Plaza
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Charlotte, NC 28208
Phone: +1.704.868.5300
Fax: +1.704.868.5370
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Bromborough, Merseyside
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Asia Pacific
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No 3 Building No. 4560
Jinke Road
Shanghai, China 201203
T: +86.21.2067.5888

1.4 **Emergency Telephone Number:**

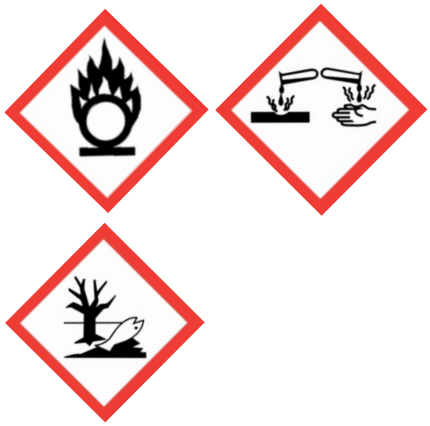
North America
CHEMTREC: +1.800.424.9300
+1.703.527.3887
Plant: +1.704.629.5361
Medical: +1.303.595.9048

Europe
24 hr Specialist advice number:
CHEMTREC: +1.703.527.3887
Office (0900-1700)**:** +44.151.334.8085

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
Oxidizer, Solid Category 3
Skin Corrosion Category 1B
Eye damage; Category 1
Acute Aquatic, Category 1
2.2.2 EC: Classification according to 67/548/EEC or 1999/45/EC [DSD/DPD]
O, R9; C, R34; N, R50
2.2 **Label Elements:**
2.2.3 Hazard Pictograms(s):



2.2.4 Signal Word: Danger
Hazard Statement(s): May intensify fire; oxidizer H272

Causes severe skin burns and eye damage.	H314
Very toxic to aquatic life	H400

Precautionary Statement(s):

Keep away from heat.	P210
Take any precaution to avoid mixing with combustibles (wood, paper, oil etc.)	P221
In case of fire: Use water only for extinction. Do not use dry chemical, CO_2 or Halon.	P370 + P378
Wear protective gloves/protective clothing/eye protection/face protection.	P280
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	P305 + P351 + P338
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.	P303 + P361 + P353
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.	P301 + P330 + P331
Immediately call a POISON CENTER or doctor/physician.	P310

Additional Precautionary Statements(s):

Do not breathe dust/fume/gas/mist/vapours/spray.	P260
Keep/Store away from clothing/…/ combustible materials.	P220
Wash hands thoroughly after handling.	P264
If INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.	P304 + P340
Wash contaminated clothing before reuse.	P363
Store locked up.	P405
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

3.2.1 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 hypochlorite	13840-33-0	237-558-1	None	Not available	28 – 35	Ox. Sol. 3 Skin Corr. 1B Acute Aquatic, 1	H272 H314 H400
Sodium chloride	7647-14-5	231-598-3	None	Not available	29 – 36	None	
Sodium sulfate	7757-82-6	231-820-9	None	Not available	10.9 – 20.7	None	
Lithium chloride	7447-41-8	231-212-3	None	Not available	2 – 4	Acute Tox. 4 Eye Irrit. 2 Skin Irrit. 2	H302 H319 H315
Lithium carbonate	554-13-2	209-062-5	None	Not available	1.3 – 3.7	Acute Tox. 4 Eye Irrit. 2	H302 H315
Lithium chlorate	36355-96-1	None	None	Not available	2.6 – 4.4	Skin Irrit. 2 Acute Tox. 4	H316 H302
Lithium hydroxide	1310-66-3	215-183-4	None	Not available	1.2 – 2.1	Skin Corr. 1B Acute Tox. 4	H314 H302
Water	7732-18-5	None	None	None	2-7	None	

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

Chemical Name	CAS #	EC No	Wt.%	Symbols	R-phrases
Lithium hypochlorite	13840-33-0	237-558-1	28 – 35	O C N	R9 R34 R50
Sodium chloride	7647-14-5	231-598-3	29 – 36	None	
Sodium sulfate	7757-82-6	231-820-9	10.9 – 20.7	None	
Lithium chloride	7447-41-8	231-212-3	2 – 4	Xn Xi	R22 R36, 38
Lithium carbonate	554-13-2	209-062-5	1.3 – 3.7	Xn Xi	R22 R36
Lithium chlorate	36355-96-1	None	2.6 – 4.4	Xi	R38

				Xn	R22
Lithium hydroxide	1310-66-3	215-183-4	1.2 – 2.1	C Xn	R34 R22
Water	7732-18-5	None	2-7	None	

(see Section 16 for R-phrase text)

4. First Aid Measures

4.1 Description of First Aid Measures

EYES: Hold eyelids open and rinse slowly and gently with a stream of water for 15 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue to rinse the eye. **Call a Physician or Poison Control Center for treatment advice.**

SKIN: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Wash with plenty of soap and water. **Call a Physician or Poison Control Center for treatment advice.**

INGESTION: **Immediately call a Physician or Poison Control Center for treatment advice.** Do not induce vomiting unless instructed by Physician or Poison Control Center. Promptly drink large quantities of water if able to swallow. Do not give anything by mouth to an unconscious person. Avoid Alcohol.

INHALATION: Remove person to fresh air. If not breathing, call 911 or ambulance and then give artificial respiration, preferably mouth-to-mouth, if possible. **Call a Physician or Poison Control Center for treatment advice.**

Have the product container or label with you when calling the poison control center or doctor, or going for treatment.

4.2 Most Important Symptoms and effects, both acute and delayed

This product is corrosive.

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

Notes to medical doctor:

Lithium hypochlorite is corrosive to eyes, skin and mucous membranes with chemical burns (caustic). Treatment is dilution/flushing of site with copious amounts of water with controlled removal of exposure followed by symptomatic and supportive care to maintain life functions. Consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Probable mucosal damage may contraindicate the use of gastric lavage. Careful gastric lavage with an endotracheal tube in place should be considered. Observation may be warranted. Medical advice – 303 595 9048 (collect)

5. Fire-Fighting Measures

5.1 Extinguishing media Use water only. Do not use dry chemical, CO_2 or Halon.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products Oxygen and toxic chlorine vapors. Corrosive lithium hydroxide dust.

General Hazard Oxidizer. Contact with easily oxidizable or combustible materials can cause fire or explosion upon ignition from any source.

Properties contributing to Flammability Strong oxidizer. Contact with combustible material may cause fire.

Flashpoint Not applicable

Flammable limits in air Not applicable

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

Do not wash into drains. Dispose of at qualified waste disposal facility.

6.3 Methods and material for containment and cleaning up

Keep combustibles (wood, paper, oil etc.) away from spilled material. With clean shovel, place into clean dry container, and cover loosely.

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

Do not get in eyes, on skin or clothing. Avoid breathing dust. Wash thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Store away from readily oxidizable materials, strong acids and flammable materials. Protect from moisture. Keep container closed.

7.3 Specific end use(s)

Not available. Industrial and professional use only

8. Exposure Controls / Personal Protection

8.1 Control parameters

DNEL

Long-term exposure, systemic, inhalation	Not available
Long-term exposure, systemic, dermal	Not available

PNEC

PNEC aqua (freshwater)	Not available
PNEC STP	Not available

EXPOSURE LIMITS

Chemical Name	EU		EH40 (UK WEL)		USA (ACGIH)		USA (OSHA)	
	TWA	STEL	TWA	STEL	TWA	STEL/Ceiling	PEL	STEL/Ceiling
Lithium hypochlorite	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 inorganic dusts. See Exposure Scenario for more details.
US: NIOSH or MSHA approved
Europe: CEN Class P type

Protective Clothing: **Gloves:** Nitrile (Typical permeation breakthrough time >480 minutes)
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:	White granular solid
Odor:	Burning, chlorine-like odor
Odor threshold:	Not available
pH:	(1% solution) @ 25ºC: 11
Melting point:	Decomposes @ 135ºC (275ºF)
Boiling point:	Not applicable
Flash point:	Not applicable
Evaporation rate(butyl acetate = 1):	Not applicable
Flammability:	Oxidizer. Promotes combustion. Contact with combustible materials may cause fire.
Flammable limits:	Not applicable
Vapor pressure:	Not applicable
Vapor density (air = 1):	Not applicable
Specific gravity:	0.9 to 1.0 g/cc
Solubility in water:	43 % by wt. @ 25ºC (77ºF)
Partition coefficient n-octanol/ water:	Not applicable
Autoignition temperature:	Not applicable
Decomposition temperature:	Decomposes @ 135ºC (275ºF)
Viscosity:	Not applicable
Explosive properties:	Not explosive
Oxidizing properties:	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:	58.39

10. Stability and Reactivity

10.1	**Reactivity**	Oxidizer. Keep from combustible materials, acids and oxidizable materials.
10.2	**Chemical stability**	Stable at room temperature.
10.3	**Possibility of hazardous reaction**	Hazardous polymerization will not occur
10.4	**Conditions to avoid**	Contact with combustible materials (wood, paper, oil). Contamination with moisture.
10.5	**Incompatible materials**	Acids, oxidizable materials, combustible materials.
10.6	**Hazardous decomposition products**	Oxygen, lithium hydroxide, lithium chlorates.

11. Toxicological Information

11.1 Information on toxicological effects

(a) acute toxicity	Classified as not acutely toxic based on lithium hypochlorite.
(b) skin corrosion/irritation	Classified as corrosive, category 1B on the basis of data for the formulation.
(c) serious eye damage/irritation	Classified as corrosive to eyes on the basis of data for the formulation.
(d) respiratory/skin sensitisation	Classed as not sensitizing to skin on the basis of data for the formulation.
(e) germ cell mutagenicity	Classified as not mutagenic based on data for the formulation.
(f) carcinogenicity	Classified as not carcinogenic basis of data for the formulation.
(g) reproductive toxicity	Classified as not a reproductive toxin based on lithium hypochlorite
(h) STOT-single exposure	Classified as not causing organ damage based on lithium hypochlorite.
(i) STOT-repeated exposure	Classified as not causing organ damage on repeat exposure based on lithium hypochlorite.
(j) aspiration hazard	Lithium hypochlorite, a solid, does not present an aspiration hazard.

Acute Effects From Overexposure:
This product is severely irritating/corrosive to the eyes (may cause blindness), skin, respiratory tract, and mucous membranes

Chronic Effects From Overexposure:
Continuous inhalation exposure may cause lung damage.

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: Acute Aquatic; Category 1

Lithium Hypochlorite formulation:
Mallard duck: Acute Oral LD_{50} = 1,960 mg/kg; 5 Day Dietary LC_{50}>17,240 ppm (no deaths at maximum dose)
Bobwhite quail: 5 Day Dietary LC_{50} >17,240 ppm
Rainbow trout: 96 hour LC_{50} 0.69 mg/L
Bluegill: 96 hour LC_{50} = 0.97 mg/L
Daphnia: 48 hour LC_{50} = 0.37 µg/L

12.2 Persistence and degradability
No applicable for metal salts.

12.3 Bioaccumulative potential
No applicable for metal salts.

12.4 Mobility in soil
No data available for the product.

12.5 Results of PBT and vPvB assessment
No applicable for metal salts.

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**	UN1479
14.2	**UN proper shipping name (IMDG, ICAO, ADR, DOT)**	Oxidizing solid, N. O. S. (lithium hypochlorite, mixture)
14.3	**Transport hazard class(es) (IMDG, ICAO, ADR, DOT)**	5.1, Oxidizer
14.4	**Packing group (IMDG, ICAO, ADR, DOT)**	III
14.5	**Environmental hazards**	Marine pollutant
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 hypochlorite	not listed.
sodium chloride	1
sodium sulfate	1
lithium chloride	1
lithium carbonate	1
lithium hydroxide	2

UNITED STATES:

Section 311 Hazard Category (40 CFR 370): Immediate (acute) health hazard, reactive.

Section 313 Reportable Ingredients (40 CFR 372): This product contains lithium carbonate which is subject to the reporting requirements of Section 313 of the Emergency Planning and Right-To-Know Act of 1986.
This information must be included in all MSDS's that are copied and distributed for this material.

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:** 3 **Flammability:** 0 **Reactivity:** 1 **Special:** OXY

INTERNATIONAL INVENTORY STATUS:

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

15.2 Chemical Safety Assessment

The Chemical Safety Assessment has been completed for lithium hydroxide anhydrous.

16. Other Information

European Union:

R Phrases:

R9	Explosive when mixed with combustible material
R22	Harmful if swallowed
R34	Causes burns
R36	Irritating to eyes
R38	Irritating to skin
R50	Very toxic to aquatic organisms

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

Not available

REVISION SUMMARY: Revision # 0. New SDS.

This SDS has been prepared to meet U. S. OSHA Hazard Communication Standard requirements.
type 6a
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