

## SAFETY DATA SHEET

## LITHIUM METAL

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

- 1.1 **Product Identifier:** Lithium
- 1.1.1 **Substances**
- Alternate names and trade name** Lithium metal, Lectro<sup>®</sup> Max 100 Anode Material, Lectro<sup>®</sup> Max 300 Anode Material, Lectro<sup>®</sup> Max 400 Anode Material
- 1.1.2 **Mixture name:** Not applicable
- 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;  
 Component in lithium batteries.  
 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  
 2801 Yorkmont Rd, Suite 300  
 Charlotte, NC 28208  
 Phone: +1.704.868.5300  
 Fax: +1.704.868.5370  
 1.888.lithium

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

**Europe**

FMC Chemicals  
 Commercial Road  
 Bromborough, Merseyside  
 CH62 3NL, England  
 Phone: +44.151.482.7356  
 Fax: +44.151.482.7361

**Asia Pacific**

FMC Lithium Asia Pacific Office  
 15F Far East International Plaza  
 Shanghai 200051, PRC  
 Phone: +86.21.6235 1919  
 Fax: +86.21.6235 1917

1.4 **Emergency Telephone Number:**

**North America**

CHEMTREC: +1.800.424.9300  
 Plant: +1.704.629.5361  
 Medical: +1.303.595.9048

**Europe**

**24 hr Specialist advice number**  
**(Carechem):** +44.1865.407333  
**Office (0900-1700):** +44.151.334.8085

**Asia Pacific**

Phone: +86.21.6235.1919  
 Fax: +86.21.6235.1917

### 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]**

Water-reactive, Category 1  
 Corrosive to skin, Category 1B

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

F, R14/15; C, R34

2.2 **Label Elements:**

**2.2.3 Hazard Pictograms(s):**



**2.2.4 Signal Word:**

Danger

**Hazard Statement(s):**

In contact with water releases flammable gases which may ignite spontaneously	H260
Causes severe skin burns and eye damage	H314
	EUH014

**Air Treatment Construction Energy Fine Chemicals Glass & Ceramics Greases & Lubricants Polymers Pool Water Treatment**

MARKETS SERVED	NORTH AMERICA AND HEADQUARTERS FMC Lithium	EUROPE FMC Chemicals	JAPAN FMC Lithium	CHINA FMC Lithium	INDIA FMC India Private Limited	TAIWAN FMC Lithium
	2801 Yorkmont Road, Suite 300 Charlotte, NC 28208 P: +1.704.426.5300 F: +1.704.426.5370	Commercial Road Bromborough Merseyside CH62 3NL, England P: +44.151.482.7356 F: +44.151.482.7361	9F, Aoyama Building 1-2-3, Kita-Aoyama Minato-ku, Tokyo 107-0061, Japan T: +81.3.3402.3716 F: +81.3.3402.3700	15F Far East International Plaza No. 317 Xianxia Road Shanghai 200051 P. R. China T: +86.21.6235.1919 F: +86.21.6235.1917	Embassy Star 8, Palace Road High Grounds Bangalore 560052, India T: +91.80.2238.4311 F: +91.80.2238.5255	9F-1, 263 Tun Hwa S. Rd. Sec. 1 Taipei, Taiwan T: +866.2.2705.4400 F: +866.2.2702.7460

**Precautionary Statement(s):**

Keep away from any possible contact with water, because of violent reaction and possible flash fire. P223  
Handle under inert gas. Protect from moisture. P231 + P232  
Wear protective gloves/protective clothing/eye protection/face protection. P280  
In case of fire: Use graphite, copper powder, Lith-X (Ansul) for extinction. P370 + P378  
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. P303 + P361 + P353  
Rinse skin with water/shower. P305 + P351 + P338  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P301 + P330 + P331  
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P310  
Immediately call a POISON CENTER or doctor/physician.

**2.3 Other Hazards**

Reacts violently with water EUH014

**3. Composition / Information on Ingredients**

**3.1 Substances**

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

Chemical Name	CAS #	EC No	EC Index No	REACH Req No	Wt. %	Classification, Hazard Statement Codes	
lithium	7439-93-2	231-102-5	003-001-00-4	not available	99-100	Water-react. 1 Skin Corr. 1B	H260 H314
sodium	7440-23-5	231-132-9	011-001-00-0		0-1	Water-react. 1 Skin Corr. 1B	H260 H314

**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	7439-93-2	231-102-5	99-100	F C	R15 R14 R34
sodium	7440-23-5	231-132-9	0-1	F C	R15 R14 R34

**3.2 Mixtures**

Not applicable.

(see Section 16 for R-phrases text)

**4. First Aid Measures**

**4.1 Description of First Aid Measures**

**EYES:** Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.  
**SKIN:** Quickly wipe off as much as possible, then immediately flush with plenty of water while removing contaminated clothing and/or shoes. Thoroughly wash with soap and water. Obtain immediate medical attention. Contact a medical doctor if necessary.  
**INGESTION:** Quickly wipe material from the mouth and rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.  
**INHALATION:** Remove to fresh air. If breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing has stopped, give artificial respiration and see a medical doctor immediately.

**4.2 Most Important Symptoms and effects, both acute and delayed**

Lithium metal reacts violently with water and is corrosive to the eyes, skin and respiratory tract. Treatment should first remove as much of the material as possible as quickly as possible, then flush with very large quantities of water.

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

**Notes to medical doctor:**

This product is corrosive and reacts violently with water. Treatment should first remove as much of the material as possible as quickly as possible, then flush with very large quantities of water. Ingestion presents a singular problem as emesis may produce esophageal damage and/or aspiration damage; dilution with water or other water-containing materials

may produce a reaction that exacerbates the corrosive activity. Consideration may be given to gastric lavage with a large diameter tube for removal of material and then dilution with large amounts of water. Esophagoscopy may be of assistance in this procedure and to assess extent of damage. Treatment is otherwise symptomatic and supportive.

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## 5. Fire-Fighting Measures

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- 5.1 **Extinguishing media** DO NOT USE WATER, SAND OR CARBON DIOXIDE. Use graphite, copper powder, Lith-X (Ansul). If not available, dry sodium chloride, dry (anhydrous) calcium oxide or dry lithium chloride can be used.
- 5.2 **Special hazards arising from the substance or mixture**  
**Hazardous combustion products** Lithium oxide, lithium hydroxide  
**General Hazard** Flammable solid. Water reactive.  
**Properties contributing to Flammability** Water reactivity of solid and flammable hydrogen gas given off on reaction with moisture.  
**Flashpoint** Not applicable  
**Flammable limits in air** Not applicable  
**Auto ignition temperature** At temperatures above the melting point (180.5°C) lithium metal can catch fire spontaneously on contact with air.  
**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.

Lithium fires can throw off molten lithium metal particles. Burning lithium releases corrosive lithium oxide dust and fumes. Lithium metal can reignite after fire is initially extinguished. Never leave extinguished fire unattended. After all material has apparently burned and cooled, carefully turn over remaining residue and be prepared to reextinguish should reaction occur. Carefully place residue in steel drum, using a long-handled shovel, and cover with extinguishing media.

For additional fire fighting information, see National Fire Protection Assn. Standard NFPA 485.

### COMMENTS:

(See Section 10, Stability and Reactivity)

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## 6. Accidental Release Measures

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- 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 a qualified waste disposal facility.
- 6.3 **Methods and material for containment and cleaning up**  
Remove all sources of ignition. To prevent ignition, cover with mineral oil (or kerosene), soaking thoroughly, and place in oiled steel drums which are approved for transport. Keep water and moisture away from spilled material. 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.

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## 7. Handling and Storage

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- 7.1 **Precautions for safe handling**  
Wear safety glasses or goggles and dry rubber gloves. Where relative humidity is maintained below 50%, or lithium surface is coated with mineral oil, lithium pieces can be handled in open atmosphere at room temperature. To maintain best quality, humidity levels of less than 2% are recommended.
- 7.2 **Conditions for safe storage, including any incompatibilities**

Store in original unopened shipping container. Once opened, store in argon atmosphere or mineral oil.  
 Keep away from water, humid air, acids and oxidizing materials. Keep away from heat, sparks and flame.

**7.3 Specific end use(s)**

Not available. Chemical safety assessment has not been completed for this product.

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## 8. Exposure Controls / Personal Protection

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**8.1 Control parameters**

**EXPOSURE LIMITS**

Chemical Name	EU		EH40 (UK WEL)		USA (ACGIH)		USA (OSHA)	
	TWA	STEL	TWA	STEL	TWA	STEL/Ceiling	PEL	STEL/Ceiling
lithium	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 for general use. Full flame-resistant face shield required if metal is in a molten state.

**Respiratory:**

None

**Protective Clothing:**

**Eyes:** Safety glasses or goggles for general use. Full flame-resistant face shield required if metal is in a molten state.

**Gloves:** Dry rubber gloves for general use. Wear full flame-resistant clothing if the metal is handled or used in a molten state.

**Other:** Quick-drench eyewash and safety shower.

**Work Hygienic Practices:**

Quick-drench eyewash and safety shower.

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## 9. Physical and Chemical Properties

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**9.1 Information on basic physical and chemical properties**

**Appearance:**

Silvery-white soft metal solid

**Odor:**

Odorless

**Odor threshold:**

Not applicable

**pH:**

Reaction with water creates a highly alkaline solution pH>12

**Melting point:**

Li metal: 180.5°C (Li metal with 1% Na has a melting point 2-3 °C lower than pure Li)

**Boiling point:**

1317°C

**Flash point:**

Not applicable

**Evaporation rate(butyl acetate = 1):**

Not applicable

**Flammability:**

Reacts with water to produce hydrogen, a flammable gas.

**Flammable limits:**

Not applicable

**Vapor pressure:**

Not applicable

**Vapor density (air = 1):**

Not applicable

**Specific gravity:**

0.5 g/cc

**Solubility in water:**

Reacts violently with water

**Partition coefficient n-octanol/ water:**

Not applicable

**Autoignition temperature:**

At temperatures above the melting point (180.5°C) lithium metal can catch fire spontaneously on contact with air.

**Decomposition temperature:**

Not available

**Viscosity:**

Not available

**Explosive properties:**

Not explosive

**Oxidizing properties:**

Not an oxidizer

**9.2 Other information**

**Self-reactive properties**

Does not meet classification criteria.

**Pyrophoric properties**

Under normal working conditions, does not meet classification criteria.

**Self-heating properties**

Does not meet classification criteria.

**Water reactive properties**

Water-reactive, Category 1

**Corrosive to metals**

Does not meet classification criteria.

**Molecular weight:**

6.94

## 10. Stability and Reactivity

- 10.1 **Reactivity** Reacts violently with water, producing flammable hydrogen gas.  
 10.2 **Chemical stability** Stable when kept dry and under inert gas.  
 10.3 **Possibility of hazardous reaction** Reacts violently with water, producing flammable hydrogen gas. Hazardous polymerization will not occur.  
 10.4 **Conditions to avoid** Temperatures above the melting point (180.5°C/357°F), and contact with water, moisture or humid air.  
 10.5 **Incompatible materials** Acids, oxidizers, oxygen, nitrogen, or carbon dioxide  
 10.6 **Hazardous decomposition products** Lithium is an element and does not decompose. However, it is highly reactive in contact with many other substances, releasing large quantities of heat and/or hazardous products. It can react violently with water, the humidity in air, and the moisture in other substances, releasing hydrogen gas, which may catch fire explosively. Corrosive fumes of lithium oxide and/or lithium hydroxide are also released.

## 11. Toxicological Information

- 11.1 **Toxicokinetics, metabolism and distribution**  
 Non-human toxicological data Not available  
 Method:  
 Dosis:  
 Routes of administration:  
 Results:  
 Absorption:  
 Distribution:  
 Metabolism:  
 Excretion:

11.2 **Information on toxicological effects**

11.2.1 **Acute Toxicity:** No classification

Substance/mixture	Oral:	Dermal:	Inhalation:
Lithium	Based on the available data, the classification criteria are not met.	Based on the available data, the classification criteria are not met.	Based on the available data, the classification criteria are not met.

11.2.2 **Skin Corrosion/Irritation:** Corrosive to skin, Category 1B

**Substance/mixture** Lithium  
**Data** Estimated to be corrosive to skin.

11.2.3 **Serious Eye Damage/Irritation:** No classification

**Substance/mixture** Lithium  
**Data** Estimated to be corrosive to skin.

11.2.4 **Respiratory or Skin Sensitization:** No classification.

**Substance/mixture** Lithium  
**Data** Based on the available data, the classification criteria are not met.

11.2.5 **Carcinogenicity, Mutagenicity, Reproductive Toxicity:** No classification

Substance/mixture	Germ Cell Mutagenicity	Carcinogenicity	Reproductive Toxicity
Lithium	Based on the available data, the classification criteria are not met.	Based on the available data, the classification criteria are not met.	Based on the available data, the classification criteria are not met.

**Carcinogenicity Listings**

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

11.2.6 **Specific Target Organ Toxicity (STOT) --Single Exposure:** No classification

**Substance/mixture** Lithium  
 Based on the available data, the classification criteria are not met.

**11.2.7 Specific Target Organ Toxicity (STOT) -- Repeated Exposure:** No classification

**Substance/mixture**

Lithium Based on the available data, the classification criteria are not met.

**11.2.8 Aspiration Hazard:** No classification

**Substance/mixture**

Lithium Based on the available data, the classification criteria are not met.

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## 12. Ecological Information

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- 12.1 Toxicity:** No classification.  
Lithium No data available for the product. Based on the available data, the classification criteria are not met.
- 12.2 Persistence and degradability**  
No data available for the product.
- 12.3 Bioaccumulative potential**  
No data available for the product.
- 12.4 Mobility in soil**  
No data available for the product.
- 12.5 Results of PBT and vPvB assessment**  
No data available for the product.
- 12.6 Other adverse effects**  
Lithium metal reacts violently with water. The hydrolysis products consist of hydrogen gas and lithium hydroxide. The hydroxide ion may affect the pH of the water.

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## 13. Disposal Considerations

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- 13.1 Waste treatment methods**  
Waste containing lithium metal is considered a reactive waste. Disposal facilities specializing in the handling of reactive waste are recommended. Dispose of waste according to local and Federal laws and regulations.

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## 14. Transport Information

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- 14.1 UN Number** UN1415
- 14.2 UN proper shipping name (IMDG, ICAO, ADR, DOT)** Lithium
- 14.3 Transport hazard class(es) (IMDG, ICAO, ADR, DOT)** 4.3, Dangerous when wet
- 14.4 Packing group (IMDG, ICAO, ADR, DOT)** I
- 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** Based on available data, the classification criteria are not met.

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## 15. Regulatory Information

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

**EUROPEAN UNION:**

**German Wassergefährdungsklasse (water hazard class)**

lithium	2
sodium	1

**UNITED STATES:**

**Section 311 Hazard Category (40 CFR 370):**  
**Section 313 Reportable Ingredients (40 CFR 372):**

Reactive, fire hazard, immediate (acute) health hazard.  
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.  
Not listed

**Section 302 Extremely Hazardous**

**Substances (40 CFR 355):**  
**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: 3 Reactivity: 2 Special: -W**

**CANADA:**

**WHMIS:**

Product Identification No.: 1415  
Hazard Classification: Class B, Div. 6 (Reactive Flammable Materials)  
Class E (Corrosive)  
Ingredient Disclosure List: Not listed

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

**INTERNATIONAL INVENTORY STATUS:**

<b><u>Inventory/Country</u></b>	<b><u>Product Status</u></b>
EINECS (EU)	Listed
TSCA (US)	Listed
ECL (Korea)	Listed
DSL (Canada)	Listed

**15.2 Chemical Safety Assessment**

The Chemical Safety Assessment has not been completed for this mixture.

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## **16. Other Information**

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**European Union:**

**R Phrases:**

Reacts violently with water, liberating extremely flammable gases R14/15  
Causes burns R34

**REVISION SUMMARY:** Revision # 1.

Section 3 Composition revised to add sodium  
Section 9 Melting point information revised  
Section 15 Sodium added to German Wassergefährdungsklasse

This SDS has been prepared to meet European Regulation (EC) No 1907/2006 [and No 1272/2008], U. S. OSHA Hazard Communication Standard, and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.

type 5a

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