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MATERIAL SAFETY DATA SHEET

Reference No.130102

LITHIUM MANGANESE DIOXIDE (LI-MnO_2) NON-RECHARGEABLE BATTERY

1. PRODUCT IDENTIFICATION

Product: Rechargeable? NO

Trade name: LITHIUM MANGANESE DIOXIDE (LI-MnO_2)

Model: CR2032

Electrochemical system:

Electrodes:	Negative Electrode:	Lithium metal (Li)
	Positive Electrode:	Manganese Dioxide (MnO_2)
Electrolyte:	Lithium perchlorate	
Nominal Voltage:	3.0 Volt	

2. COMPOSITION.

No More Than 4% Lithium Is Contained.

3. HAZARD DATA

3.1 Physical:

The Lithium-Manganese Dioxide batteries described in this Material Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, the electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain intact. Risk of exposure only in case of abuse, e.g. mechanical, thermal, electrical, which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage, electrode materials reaction with moisture/water of battery vent/explosion/fire may follow, depending upon circumstances.

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. EEMB CO., LTD. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

Substance	Special Risk	Safety Advice
Lithium	R14/15 R34	S1/S2 S8 S43 S45
Manganese Dioxide	R20/22	S25
Lithium Perchlorate	R8 R36/37/38	S17 S26 S27 S36/37 S38
Tetrahydrofuran	R11 R19 R36/37	S2 S16 S29 S33
Propylene Carbonate	R36	S24/S25
1,2 Dimethoxyethane	R11 R19 R20	S24/S25

1. Name of Special Risks:

R8 Contact with combustible material may cause fire.
R11 Highly Flammable
R14/15 Reacts with water and yields flammable gases
R19 May form explosive peroxides.
R20 Harmful by inhalation
R20/22 Harmful by inhalation and if swallowed.
R34 Causes burns.
R36 Irritating to the eyes.
R36/37 Irritating to eyes and respiratory system.
R36/37/38 Irritating to eyes, respiratory system and skin.

2. Safety Advices:

S1/2 Keep locked up and out of reach of children.
S2 Keep out of the reach of children.
S8 Keep container dry
S16 Keep away from sources of ignition - No Smoking.
S17 Keep away from combustible material.
S24/25 Avoid contact with skin and eyes.
S25 Avoid contact with eyes.

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S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S27	Take off immediately all contaminated clothing.
S29	Do not empty into drains.
S33	Take precautionary measures against static discharges.
S36/37	Wear suitable protective clothing and gloves.
S38	In case of insufficient ventilation, wear suitable respiratory equipment.
S43	In case of fire, use Lith-X (Graphite based) fire extinguisher. Never use water
S45	In case of accident or if you feel unwell, seek medical advice immediately.

4. First Aid Measures

In case of battery rupture or explosion, evacuate personnel from contaminated area and provide maximum ventilation to clear out corrosive fumes/gases and pungent odour.

In all case, seek immediate medical attention.

Eye contact:	Flush with plenty of water (eyelids-held open) for at least 15 minutes.
Skin contact:	Remove all contaminated clothing and flush affected areas with plenty of water and sop for at least 15 minutes.
Ingestion:	Dilute by giving plenty of water and get immediate medical attention. Assure that the victim does not aspirate vomited material by use of positional drainage. Assure that mucus does not obstruct the airway. Do not give anything by mouth to an unconscious person.
Inhalation:	Remove to fresh air and ventilate the contaminated area. Give oxygen or artificial respiration if needed.

5. Fire-Fighting Measures

Fire and explosion hazard:	The battery can spout vaporized or decomposed electrolyte fumes in case of exposure above 100°C resulting from un-appropriate use or the environment. Risk of explosion is increased if the melting point of lithium (180°C) is exceeded. Hydrogen coming from the decomposition of lithium metal with water is flammable.
Extinguishing media:	*Suitable*: Type D extinguishers, Lith-X Water may be used only to keep battery cool. *Not to be used:* Water in case of battery rupture or explosion (detectable by the pungent odour).
Special exposure hazards:	Following cell overheating due to external source or due to un-proper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment. **Eye contact**: The electrolyte solution contained in the battery is corrosive to all ocular tissues. **Skin contact:** The electrolyte solution contained in the battery corrosive and causes skin irritation and burns.

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	Ingestion: The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract. **Inhalation:** Contents of a leaking or ruptured battery can cause respiratory tract, mucus, membrane irritation and edema.
Special protective equipment:	Use self-contained breathing apparatus to avoid breathing irritant fumes. Wear protective clothing and equipment to prevent body contact with electrolyte solution.

6. Accidental Release Measures

The material contained within the batteries would only be expelled under abusive conditions.

Using shovel or broom, cover battery or spilled substances with dry sand or, preferably, sodium carbonate (Na_2CO_3) or 1:1 mixture of soda ash and slaked slime. Keep away from water, rain, snow. Place in approved container (after cooling if necessary) and dispose in accordance with local regulations.

7. Handling and Storage

The batteries should not be opened, destroyed nor incinerated since they may leak or rupture and release in the environment the ingredients they contain.

Handling	Do not crush, pierce, short (+) and (-) battery terminals with conductive i.e. metal, goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non-conductive, i.e. plastic, trays.
Storage	Store in ad cool (preferably below 30°C) and ventilated area away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 100 °C may result in battery leakage and rupture. Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.
Other	**Lithium-Mangabese Dioxide batteries are NOT rechargeable** and should not be tentatively charged.

Follow Manufacturers recommendations regarding maximum recommended currents and operating temperature range. Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

8. Exposure Controls/Personal Protection

Respiratory protection:	Not necessary under normal use. In case of battery rupture, use self contained full-face respiratory equipment with type ABEK filter.

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Hand protection:	Not necessary under normal use. Use Viton rubber gloves if handling a leaking or ruptured battery.
Eye protection:	Not necessary under normal use. Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.
Skin protection:	Not necessary under normal use. Use rubber apron and protective working in case of handling of a ruptured battery.

9. Physical And Chemical Properties

9.1 Appearance(color) and Odor:

Lithium is a soft, silvery metal, MnO2 is a black powder, PC is a colorless, odorless liquid., DME is a colorless liquid with a sweet odor.

9.2 Temperature range:

	Temperature range
In storage	+30°C max
During discharge	-20~+70 °C

10. Stability and Reactivity

Conditions to avoid	Do not heat, crush, disassemble, short circuit or recharge.
Incompatible Materials	Contents incompatible with strong oxidizing agents.
Hazardous reactions	Lithium metal reacts with water to produce highly flammable gasses.
Hazardous decomposition reactions	Toxic Fumes, and may form peroxides.
Hazardous decomposition products:	Thermal degradation may produce hazardous fumes of manganese and lithium; oxides of carbon and other toxic by-products.

11. Toxilogical Information

The Lithium-Manganese Dioxide batteries do not contain toxic materials.

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12. Ecological Information

When properly used or disposed, the Lithium- Manganese Dioxide batteries do not resent environmental hazard.

13. Disposal Considerations.

Dispose in accordance with applicable regulations which vary from country to country.

(In most countries, the thrashing of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through non profit organizations, mandated by local governments or organized on a voluntary basis by professionals).
Lithium batteries should have their terminals insulated prior to disposal.

13.1 Incineration: Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.
13.2 Landfilling: According to the proper laws and regulations in different countries or areas, the battery should be buried deeply in the specified place.
13.3 Recycling: Send to authorized recycling facilities, eventually through licensed waste carrier.

14. Transportation Information

We hereby certify that the captioned lithium manganese dioxide batteries are non-hazardous materials for air/sea transportation in any nature if the consignment is fully described by proper shipping name and packed, marked and in proper condition for carriage by air/sea. We hereby further certify that the consignment is not classified as dangerous under the current edition of the IATA 54th Effective 1 January 2013 Dangerous goods regulations and all applicable carrier and government regulations and the battery can be shipped by air/sea.
We also acknowledge that we may be liable for damage resulting from any blunder or omission and we further agree that any air/sea carrier involved in the carriage of this consignment may rely upon this certification.
1.Cells and batteries are packed in inner packagings that completely enclose the cell or battery (retail type plastic blister packs meet this requirement);
2.cells and batteries are protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit;
3.each package are capable of withstanding a 1.2 m drop test in any orientation without:
-damage to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact; release of contents.
4.Quantity per package shall not exceed 2.5kg (Air) or 30kg (road and sea).
5.each consignment are accompanied with a document such as an air waybill with an indication that:
- the package contains lithium metal cells or batteries;
- the package are handled with care and that a flammability hazard exists if the package is damaged;
- special procedures are followed in the event the package is damaged, to include inspection and repacking if necessary; and a telephone number for additional information.
Recommendations on the transport of dangerous goods-Model Regulations 15th revised edition,IATA Special Provision A154,A164 and IMDG Special Provision 188.

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15. UN Class:

Even classified as Lithium metal batteries (UN3091),2013 IATA Dangerous Goods Regulations 54th edition Packing Instruction 970 Section II is applied. The product is handled as Non-Dangerous Goods by meeting the following requirements.(1)

Lithium metal cells and batteries offered for transport are not subject to other additional requirements of the UN Regulations if they meet the following(1)(3)

1.for cells the mass of lithium is not more than 1.0 gram

2.for batteries, the aggregate mass of lithium is not more than 2.0 grams

3. each cell or battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria Part III subsection 38.3.

Regulatory Information

IATA Dangerous Goods Regulations 54th Edition Effective 1 January 2013.

ICAO Technical Instructions for the safe transport of dangerous goods by air/sea.

16. Other Information / Disclaimer

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable.

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