










EPSILOR
ELECTRONIC INDUSTRIES LTD

Material Safety Data Sheet (MSDS)

| 1. Identification of the Substance or Preparation and Company | | | | | |
|---|---------|-----------|---|---|---|
| Product: | | | | | |
| LITHIUM-MANGANESE DIOXIDE BATTERIES | | | | | |
| Trade name and model: | | | LITHIUM-MANGANESE DIOXIDE BATTERIES | | |
| Model: | | | BT-6434 | | |
| Cells model: | | | DL-2/3A | | |
| Supplier: | | | | | |
| EPSILOR ELECTRONIC INDUSTRIES LTD Temed Science Park M.P. Arava 86800, ISRAEL Phone: +972-8-6556280 Fax: +972-8-6555960 | | | | | |
| 2. Composition & Information on Ingredients | | | | | |
| Each cell consists of a hermetically sealed metallic container containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release. | | | | | |
| Ingredient | Content | CAS No. | CHIP Classification | | |
| Lithium (Li) | 3.0% | 7439-93-2 |  |  | F;R14/15 C;R34 R14/15, R34, S(1/2), S8, S43, S45 |
| Manganese dioxide (MnO ₂) | 35-40% | 1313-13-9 |  | | R20, R22 |
| Lithium perchlorate (LiClO ₄) | 1.8% | 7791-03-9 |  |  | R8, R36/37/38 |
| Tetrahydrofuran (C ₄ H ₈ O) With minor contribution from PC and DME | 15-18% | 109-99-9 |  |  | F; R11, R19 Xi; R36/37 |



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3. Hazards Identification

Do not short circuit, recharge, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion. The Lithium-Manganese dioxide batteries described in this Product 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 electrolyte they contain are not exposed to the outside, provided the battery integrity is maintained and seals remain intact. Risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage or battery vent/explosion/fire may follow, depending upon the circumstances.

4. First Aid Measures

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| Inhalation | Remove from exposure, rest and keep warm. In severe cases obtain medical attention. |
| Skin Contact | Wash off skin thoroughly with water. Remove contaminated clothing and wash before reuse. In severe cases obtain medical attention. |
| Eye Contact | Irrigate thoroughly with water for at least 15 minutes. Obtain medical attention. |
| Ingestion | Wash out mouth thoroughly with water and give plenty of water to drink. Obtain medical attention. |
| Further Treatment | All cases of eye contamination, persistent skin irritation and casualties who have swallowed this substance or been affected by breathing its vapors should be seen by a doctor. |

5. Fire Fighting Measures

CO₂ extinguishers or copious quantities of water or water-based foam can be used to cool down burning Li-MnO₂ cells and batteries, as long as the extent of the fire has not progressed to the point that the lithium metal they contain is exposed.

Do not use for this purpose sand, dry powder or soda ash, graphite powder or fire blankets.

Use only metal (Class D) extinguishers on raw lithium.

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| Extinguishing Media | Use water or CO ₂ on burning Li-MnO ₂ cells or batteries and class D fire extinguishing agent only on raw lithium |
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6. Accidental Release Measures

Remove personnel from area until fumes dissipate. Do not breathe vapors or touch liquid with bare hands.



If the skin has come into contact with the electrolyte it should be washed thoroughly with water.

Sand or earth should be used to absorb any exuded material, seal leaking battery and contaminated absorbent material in plastic bag and dispose of as Special Waste in accordance with local regulations.

7. Handling and Storage



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| Handling | <p>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.</p> <p>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.</p> |
| Storage | <p>Store in a cool (preferably below 30°C) and ventilated area, away from moisture, sources of heat, open flames, food and drink. Temperature above 90°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.</p> |
| Other | <p>Lithium-Manganese dioxide batteries are not rechargeable and should not be tentatively charged.</p> <p>Follow Manufacturer's recommendations regarding maximum recommended currents and operating temperature range.</p> <p>Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation.</p> |

8. Exposure Controls & Personal Protection

| Occupational exposure standard | Compound | 8hr TWA | 15min TWA | SK |
|---|-------------------------------|---|-----------|----|
| | Tetrahydrofuran | 50 ppm | 100 ppm | ** |
| | 1,2 Dimethoxymethane | 5 ppm | - | ** |
|  | Respiratory protection | In all fire situations, use self-contained breathing apparatus. | | |
|  | Hand protection | In the event of leakage wear gloves. | | |



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|  | Eye protection | Safety glasses are recommended during handling. |
|  | Other | In the event of leakage wear chemical apron. |
| ** Can be absorbed through broken skin | | |
| 9. Physical and Chemical Properties | | |
| Appearance | Cylindrical shape | |
| Odor | If leaking, smells of medical ether | |
| pH | Not applicable | |
| Flash Point | Not applicable unless individual components exposed | |
| Flammability | Not applicable unless individual components exposed | |
| Relative Density | Not applicable unless individual components exposed | |
| Solubility (water) | Not applicable unless individual components exposed | |
| Solubility (other) | Not applicable unless individual components exposed | |
| 10. Stability and Reactivity | | |
| Product is stable under conditions described in Section 7. | | |
| Conditions to avoid | Heat above 70°C or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble. Recharge. Short circuit. Expose over a long period to humid conditions. | |
| Materials to avoid | Oxidizing agents, alkalis, water. | |
| Hazardous decomposition products | Lithium metal reacts with water to produce highly flammable gasses. Toxic fumes and may form peroxides | |
| 11. Toxicological Information | | |
| Signs & symptoms | None, unless battery ruptures. In the event of exposure to internal contents, vapor fumes may be very irritating to the eyes and skin. | |
| Inhalation | Lung irritant. | |
| Skin contact | Skin irritant | |
| Eye contact | Eye irritant. | |
| Ingestion | Poisoning if swallowed | |



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| Medical conditions generally aggravated by exposure | In the event of exposure to internal contents, moderate to severe irritation, burning and dryness of the skin may occur. Target organs nerves, liver and kidneys. |
| 12. Ecological Information | |
| Mammalian effects | None known at present |
| Eco-toxicity | None known at present |
| Bioaccumulation potential | Slowly Bio-degradable |
| Environmental fate | None known environmental hazards at present. |
| The batteries do not contain mercury, cadmium or other heavy metals | |
| 13. Disposal Considerations | |
| Do not incinerate, or subject cells to temperatures in excess of 70°C. Such abuse can result in loss of seal, leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations. | |
| 14. Transport Information | |
| Label for conveyance | Class 9 label |
| UN Number | UN3090 |
| Shipping Name | Lithium Metal Batteries |
| Hazard Classification | Class 9 |
| Packing Instruction | Group II |
| Battery Testing | Battery passed UN testing requirements (ST/SG/AC.10/11) |
| Documentation | Each consignment must be accompanied with DGD document. |
| 15. Regulatory Information | |
| Not Applicable | |
| 16. Other Information | |
| <p>This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.</p> <p>This information relates to the specific materials designated and may not be valid for such material used in combination with any other materials or in any process. It is the user's responsibility to satisfy himself as to the suitability and completeness of this information for his particular use.</p> <p>Epsilor does not accept liability for any loss damage that may occur, whether direct, indirect, incidental or consequential, from the use of this information. Epsilor does not offer warranty against patent infringement. Additional information is available by calling the telephone number above.</p> | |