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MATERIAL SAFETY DATA SHEET

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Section I - Product identification

Product Name:	Lithium Battery	Nominal Voltage: 3.0 V
Model:	Coin Type Cells	
Chemical System:	Manganese Dioxide Lithium Primary	Designated for Recharge:
		.... Yes X No

Section II - Hazardous ingredients

IMPORTANT NOTE: The battery cell should not be opened or exposed to heat because exposure of the following ingredients contained within could be harmful under some circumstances.

Chemical Name	CAS No.
Manganese Dioxide (MnO_2)	1313-13-9
Lithium*	7439-93-2
Propylene Carbonate (PC)	108-32-7
Dimethoxyethane (DME)	110-71-4
Lithium Perchlorate ($LiClO_4$)	7791-03-9

*Weight of lithium per cell or battery: see table page 5

Section III - Physical Data

Boiling point (°C)	PC: 240, DME: 85
Vapor pressure (hPa)	PC: 0.01, DME: 64
Vapor Density (Air=1)	PC: not available, DME: 3.1
Solubility in water (g/l)	PC: 214, DME: complete
Specific Gravity (H_2O=1)	MnO_2: 5.03, DME: 0.87, Li: 0.54, $LiClO_4$: 2.43, PC: 1.21
Melting point (°C)	Li: 179, MnO_2: decomposes at 535, $LiClO_4$: 236

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Appearance and Odor:	Lithium is a soft, silvery metal. MnO_2 is a black powder. PC is a colorless liquid. DME is a colorless liquid with a sweet odor.

Section IV - Fire and Explosion Hazard Data

Flash point (°C)	DME: -6, PC: 135
Extinguishing Media	Water
Flammable Limits	Not available
Special Fire Fighting Procedure:	In case of fire in an adjacent area, use water. CO_2 or dry chemical extinguishers if cells are packed in their original containers since the fuel of the fire is basically paper products. For bulk quantities of unpackaged cells use LITH-X (Graphite Base). In this case, do not use water.

Section V - Reactivity Data

Stability:	Stable
Conditions to avoid:	Do not heat, disassemble or recharge.
Hazardous Decomposition or by products:	N/A

Hazardous polymerization will not occur.

Section VI - Health Hazard Data

Routes of entry:	Inhalation	Yes
	Skin	Yes
	Ingestion	Yes

Health hazards (acute and chronic):

These chemicals are contained in a sealed can. Risk of exposure occurs only if the battery is mechanically or electrically abused. The most likely risk is acute exposure when a cell vents. DME is believed to be slightly to moderately toxic, PC moderately toxic. $LiClO_4$ is irritating to skin, eyes and mucous membrances. Contact of electrolyte and extruded lithium with skin and eyes should be avoided.

Carcinogenicity:

NTP: None IARC Monograph: None OSHA Regulated: None

Signs / Symptoms of exposure:

DME may be a reproductive hazard. Lithium can cause thermal and chemical burns upon contact with the skin.

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Medical conditions generally aggravated by exposure:

An acute exposure will not generally aggravate any medical condition.

Emergency and first aid procedures:

In case of skin contact with contents of battery, flush immediately with water. For eye contact, flush with copious amounts of water for 15 minutes. Do not inhale leaked material. If irritation persists, get medical help.

Section VII - Precautions for safe handling and use

Steps to be taken in case material is released or spilled:

The preferred response is to leave the area and allow the batteries to cool and the vapors to dissipate. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

Waste disposal method:

Dispose in accordance with appropriate regulations. Open cells should be treated as hazardous waste.

Precautions to be taken in handling and storing:

Avoid mechanical or eletrical abuse.

Other precautions:

SAFETY GUIDELINES AND CAUTIONS

Make sure to observe the following warnings. If misused, the batteries may explode or leak, causing injury or damage to the equipment.

1. Keep batteries out of the reach of children, especially those batteries fitting within the limits of the truncated cylinder defines in ISO/DP 8124/2.2 page 17.
   In case of ingestion of a cell or battery, the person involved should seek medical assistance promptly.

2. Equipment intended for use by children should have battery compartments which are tamper-proof.

3. The circuits of equipment designed to use alternative power should be such as to eliminate the possibility of the battery being overcharged (see UL standard for diode use).

4. It is important that batteries are inserted into the equipment correctly with regard to polarity (+ and -).

5. Do not attempt to revive used batteries by heating, charging or other means.

6. Do not dispose of batteries in fire. Do not dismantle batteries.

7. Replace all batteries of a set at the same time. Newly purchased batteries should not be mixed with partially exhausted ones. Batteries of different electrochemical systems, grades or brands should not be mixed. Failure to observe these precautions may result in some batteries in a set being driven beyond their normal exhaustion point and thus increase the possibility of leakage.

8. Do not short-circuit batteries.

9. Avoid direct soldering to batteries.

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10. Do not expose batteries to high temperatures, moisture and direct sunlight.

11. When discarding batteries with solder tags, insulate the tags by wrapping them with tape, foil, etc.

12. Improper welding can damage the internal components of batteries and impair their performance.

13. Do not expose a battery to any conductive surface (anti-static work mat, packaging bag or form trays) as it can cause the battery to short.

Section VIII - Control measure

Respiratory protection (specify type):	Not necessary under conditions of normal use.
Ventilation:	Not necessary under conditions of normal use.
Protective gloves:	Not necessary under conditions of normal use.
Eye protection:	Not necessary under conditions of normal use.
Other protective clothing or equipment:	Not necessary under conditions of normal use.

Section IX - Disposal

Lithium batteries are best disposed of as a non-hazardous waste when fully or mostly discharged. The Federal Environmental Protection Agency (EPA) (governed by the Resource Conservation and Recovery Act (RCRA)) do not list or exempt lithium as a hazardous waste. However, if waste lithium batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amounts of unreacted, or unconsumed lithium remaining in the spent battery. The batteries must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste (as required by the U.S. Land Ban Restrictions for the hazardous and Solid Waste Amendments of 1984.) Secondary treatment centers receive these batteries as manifested hazardous waste under code "D003-reactive". Button cells are exempt because they contain so little lithium and therefore can be disposed of in the normal municipal waste stream. Use a professional disposal firm for disposal of mass quantities of undischarged lithium batteries.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212°F (100°C). Such treatment can cause cell rupture.

Section X - Transportation

RENATA Lithium batteries are exempt from dangerous goods regulations and meet the exception of 49CFR Part 173.185(b). They are considered non-dangerous goods by the Internation Civil Aviation organization (ICAO) and the Internation Air Transport Association (IATA) because they meet all requirements of Special Provision A45.

Separate lithium batteries when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport.

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WEIGHT OF LITHIUM FOR LITHIUM BATTERY

	Model no.	Approx. % of total weight of lithium	Approx. weight of battery (g)/cell
PRIMARY BATTERIES			
Coin-type	CR927	1.9	0.51
	CR1025	1.5	0.58
	CR1216	1.2	0.65
	CR1220	1.5	0.74
	CR1225	1.7	0.9
	CR1616	1.3	1.1
	CR1620	1.7	1.2
	CR1632	2.1	1.8
	CR2016	1.5	1.7
	CR2025	2.0	2.5
	CR2032	2.0	2.7
	CR2320	1.7	2.6
	CR2325	1.7	3.0
	CR2430	2.1	4.0
	CR2450N	2.7	5.8
	CR2477N	3.2	8.3

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