

PRODUCT SAFETY DATA SHEET

1. Product and Company identification

Product Category : Lithium Manganese Battery Coin Type
 Type : CR2016, CR2025, CR2032, CR2430, CR2450, CR2477
 Nominal Voltage : 3.0 V

Supplier's Name : FDK CORPORATION
 Supplier's Address : 5-36-11, Shimbashi, Minato-Ku, Tokyo, 105-8677, Japan
 Telephone +81-3-3434-1279

Manufacturer's Name : FDK ENERGY CO., LTD.
 Manufacturer's Address: 614, Washizu, Kosai-Shi, Shizuoka, 431-0431, Japan
 Telephone +81-53-576-2111

2. Composition and Ingredients information

Material	CAS No.	PRTR	Contents
Manganese dioxide [MnO ₂]	1313-13-9	• • 311	13 • • 50 wt%
Lithium [Li] *1	7439-93-2	-	0.5 • • 4 wt% (0.02 • • 0.3 g)
Electrolyte [Organic EL]	-	-	3 • • 12 wt%
Lithium perchlorate [LiClO ₄]	7791-03-9	-	0.3 • • 1 wt%

Note) Above ingredients are not leaked out without disassembled or broken intentionally because it is protected by sealing with metal case.

3. Summary of hazard

Fatal hazard :	Electrolyte and lithium metal are inflammable. (When lithium metal contacts with water, highly flammable gases are liberated.) Risk of explosion by fire if batteries are disposed in fire or heated above 100 degree Celsius. Stacking or jumbling batteries may cause external short circuits, heat generation, fire or explosion.
Health hazard :	Chemical contents are contained in sealed can. Therefore, risk of exposure occurs if the battery is mechanically or electrically abused. The most likely risk is irritating when a batteries were burnt and generated vapor may attack the eye, skin and throat.
Influence on environment :	No information available.

4. First aid

Inhalation :	Provide fresh air. Refer for medical attention.
Skin contact :	Wash the contact areas off immediately with plenty of water and soap. If appropriate procedure are not taken, this may cause sores on the skin

Eyes contact :	Flush the eyes with plenty of water for at least 15 minutes immediately, without rubbing. Take a medical treatment. If appropriate procedures are not taken, this may cause an eye irritation
Swallowing :	In case of swallowed battery, immediately refer for medical attention.

5. Fire fighting

Extinguishing method : Since vapor, generated from burning batteries may make eyes, nose and throat irritates, be sure to extinguish the fire on the wind word side. Wear the respiratory protection equipment in some cases. The Lithium metal in batteries reacts with water and generates Hydrogen gas. Risk of explosion by fire fighting using water.

Fire extinguishing agent : Dry chemical, alcohol-resistant foam, carbon dioxide and dry sand are effective.

6. Spillage disposal

Chemical contents are contained in sealed can. But if the battery is mechanically or electrically abused, the contents may leak out. In this case, wipe with a dry cloth. Take away from the fire.

7. Precautions for handling and storing

Handling :	<p>When packing the batteries, do not allow battery terminals to contact each other, or contact with other terminals. Be sure to pack batteries by providing partitions in the packing box, or in a separate plastic bag so that the single batteries are not mixed together.</p> <p>(1) Use non-breakable packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation. (2) Do not recharge batteries. Do not deform batteries. (3) Do not mix different type of batteries. (4) Do not solder directly onto batteries.</p>
Storage :	<p>Batteries shall be stored in well-ventilated, dry and cool conditions.</p> <p>(1) Do not let water penetrate into packaging boxes during their storage and transportation. (2) Do not store the batteries in palaces of the high temperature exceeding 35 degree Celsius or under direct sunlight or in front of a stove. Please also avoid the place of high humidity. Be sure not to expose the batteries to condensation, water drop or not to store it under frozen condition. (3) Fire fighting apparatus should be installed.</p>

8. Prevention from exposure

Acceptable concentration : Not specified in ACGIH.
Facilities : Provide appropriate ventilation system such as local ventilator in the storage place.
Protective clothing : Gas mask for organic gases, safety goggle, and safety glove.

9. Physical and chemical characteristics

Shape :	Coin shape
Nominal voltage:	3V
pH :	NA
Boiling point :	NA
Melting point :	180.5• •(Metal Lithium)
Decomposition temperature :	NA
Flash point :	3.5• •(Organic electrolyte) / 179• •(Metal Lithium)
Vapor pressure :	NA
Specific gravity :	NA
Solubility :	NA

10. Stability and reactivity

Since batteries utilize a chemical reaction they are actually considered a chemical product. As such, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, the various usage conditions such as discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage.

11. Toxicity information (in case of electrolyte leakage from the battery)

Acute toxicity : Oral (rat) LD50 > 2,000mg/kg (estimated)
 Acridity : Irritating to eye and skin.
 Mutagenicity : Not specified.
 Chronic toxicity : Liver or Kidney problem may occur in case of prolonged exposure.

12. Ecological information

When the batteries was disposed of and buried under field, the leakage may happen by corrosion as times go. It is not informed, however, that such improper handling caused to affect environment through the long term of underground experiment.

Mercury below 0.5 ppm
 Cadmium below 4 ppm
 Lead below 40 ppm

13. Disposal precautions

Dispose in accordance with applicable federal, state and local regulations.

14. Transportation precautions

- Depend on the UN Recommendations on the Transport of Dangerous Goods (hereinafter referred to as the "UN Recommendations"), Lithium metal battery shall comply with these recommendations. On the other hand, certain regulations of transportation laid down by organization of each transportation and each own country's regulation for transportation are occasionally different from UN Recommendations, however Lithium metal battery shall comply with these regulations too. Furthermore, such batteries as contained in or packed with equipment shall also comply with UN Recommendations and regulations.
- Lithium metal battery is classified in two types; Dangerous goods (Class 9) and No dangerous goods (exemption from regulation) depend on content of Lithium or Lithium alloy, and each treatment is different. Such battery containing Lithium or Lithium alloy is less than 1 g (Battery pack: 2 g) is regarded as No dangerous battery, therefore this battery is classified to **No dangerous goods** and Special provision 188 is applied.

Classification of UN Recommendations

UN ID No.	Proper Shipping Name Description
3090	Lithium metal batteries
3091	Lithium metal batteries contained in equipment
3091	Lithium metal batteries packed with equipment

Other major related regulations

Transportations	Related organization / Issue documents
Air transport (by airplane)	ICAO International Civil Aviation Organization • TI Technical Instruction • IATA International Air Transport Association • DGR Dangerous Goods Regulations •
Maritime transport (by ship)	IMO International Maritime Organization • IMDG Code International Maritime Dangerous Goods Code •
Regulation of USDOT	USDOT US Department of Transportation • DOT49CFR US law •
Land transport (Intra-European)	RID International Carriage of Dangerous Goods by Rail • ADR International Carriage of Dangerous Goods by Road •

15. Applicable regulations

Outline of applicable regulations are as following.

1) Common regulation with both Maritime and Air Transport

With the exception of packages containing four or fewer unit cells or two or fewer assembled batteries built into equipment, marking and documentation are required.

With the exception of batteries built into equipment, 1.2-m drop testing is now required.

Marking and documentation require the indication of an emergency contact, i.e., a "telephone number for additional information."

2) Regulation only with Air Transport

Per-package maximum weight of Passenger aircraft and Cargo aircraft is as following.

Configuration	Passage aircraft	Cargo aircraft
Batteries (transport of batteries only; maximum total weight per package)	2.5kg G Package Max.	Same as Passage aircraft
	Robust packaging as currently practiced	
Batteries packed with equipment (maximum total weight per package of battery excluding equipment)	No weight restrictions; however, the maximum number of batteries in each package must be the minimum number required to power the equipment, plus two spares;	
	Robust packaging as currently practiced	
Batteries contained in equipment (maximum net weight of battery per equipment)	No weight restrictions	

3) Packing instruction

IATA packing instructions are applicable in accordance with each type of packaging.

Lithium metal batteries (only): PI968

Lithium metal batteries in equipment: PI969

Lithium metal batteries packed with equipment: PI970

4) IATA Special provision

With in each case, IATA special provisions; A88, A99, A154, A164 are applicable.

16. Other information

Reference ;

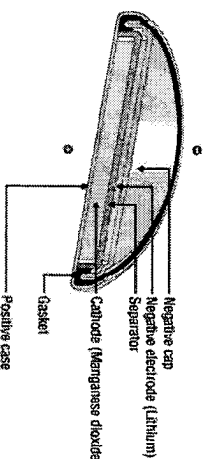
(1) UN Recommendations on the Transportation of Dangerous Goods Model Regulations
(ST/SG/AC.10/1/Rev.12)

(2) Federal Resister / Vol.65, No.174 / Thursday, September 7, 2000 / Notices

(3) IATA Dangerous Goods Regulations, latest edition



Type: CR2450
Total weight: 6.9 g



FDK ENERGY CO., LTD.
Date: March 2, 2009

Material Declaration Sheet

No.	Component Name	Component weight (g)	Material analysis (Element / compound)	CAS Number	Material mass (g)	Material weight % (of total weight)
1	Negative cap	1.65	SUS	-	(component weight)	23.8
			Nickel (plating)	7440-02-0	0.008	0.1
2	Negative electrode (Li)	0.21	Lithium	7439-93-2	(component weight)	3.0
3	Separator	0.02	Paper	Proprietary	(component weight)	0.3
4	Cathode (MnO ₂)	3.11	Manganese Dioxide	1313-13-9	2.49	36.0
			Electrolyte	Proprietary	0.62	9.0
5	Gasket	0.11	PP	9003-07-0	(component weight)	1.7
6	Positive case	1.80	SUS	-	(component weight)	25.9
			Nickel (plating)	7440-02-0	0.11	0.2

Note: Component weight is based on assembly of generic parts.

Conclusion:

The analysis table above shows that this product meets with Directive 2006/66/EC

Maximum allowable limit (ppm)

Mercury	5 ppm
Cadmium	20 ppm
Lead	40 ppm (applied only Labeling requirement)

Caution: Directive 2002/95/EC (RoHS) does not apply to batteries according to introductory clause 29 of Directive 2006/66/EC.