

## MATERIAL SAFETY DATA SHEET(MSDS)

### 1. Chemical product and company Identification

Applicant : SHENZHEN M&LAK INDUSTRY CO., LTD.

Address : 5/F., Jinshan Ind. park, Guangshen Road, No.375, Xixiang,  
Baoan district, Shenzhen, China.

Sample name : 3.0V Lithium Metal Battery

Model : CR632、CR927、CR1025、CR1130、CR1212、CR1216、CR1220、CR1225、  
CR1612、CR1616、CR1620、CR1625、CR1632、CR1654、CR2016、  
CR2020、CR2025、CR2032、CR2050、CR2320、CR2325、CR2330、  
CR2335、CR2354、CR2412、CR2430、CR2450、CR2477、CR2477T、  
CR3032

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### 2. Hazards Identification

GHS Classification : Not applicable

Toxicity : Vapor generated from burning batteries, may irritate eyes, skin and throat .

Hazard : Electrolyte and lithium metal are inflammable.

Risk of explosion by fire if batteries are disposed in fire or heated above 100 degrees C.

Stacking or jumbling batteries may cause external short circuits, heat generation, fire or explosion.

### 3. Composition/Information of Ingredients

Component	Material	CAS No.	EC No.	Content (%)
Positive electrode	Manganese dioxide	1313-13-9	215-202-6	12~50
Negative electrode	Lithium metal	7439-93-2	231-102-5	0.5~6
Electrolyte	1,2-dimethoxyethane	110-71-4	203-794-9	1.5~3.5
	Lithium Perchlorate	7791-03-9	232-237-2	0.2~0.7
	Propylene Carbonate	108-32-7	203-572-1	2.5~7
Others (Steel or Plastic parts)	Stainless Steel	12597-68-1		30~85
	Polypropylene	9003-07-0		0.5~10

Lithium content per cell

Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)
CR632	0.008	CR1612	0.01	CR2025	0.05	CR2412	0.03
CR927	0.009	CR1616	0.015	CR2032	0.062	CR2430	0.09
CR1025	0.009	CR1620	0.02	CR2050	0.11	CR2450	0.18
CR1130	0.009	CR1625	0.023	CR2320	0.05	CR2477	0.29
CR1212	0.009	CR1632	0.036	CR2325	0.06	CR2477T	0.29
CR1216	0.008	CR1654	0.06	CR2330	0.08	CR3032	0.17
CR1220	0.01	CR2016	0.02	CR2335	0.09		
CR1225	0.015	CR2020	0.035	CR2354	0.17		

**4. First Aid Measures** (in case of electrolyte leakage from the battery)

- Eye contact : Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Get immediate medical treatment. If appropriate procedures are not taken, this may cause eye injury.
- Skin contact : Wash the contact areas off immediately with plenty of water and soap. If appropriate procedures are not taken, this may cause sores on the skin.
- Inhalation : Remove to fresh air immediately. Get medical treatment immediately.

**5. Fire Fighting Measures**

- Fire extinguishing agent : Alcohol-resistant foam and dry sand are effective.
- Extinguishing method : Be sure on the windward to extinguish the fire, since vapor may make eyes, nose and throat irritate, Wear the respiratory protection equipment in some cases.

**6. Accidental Release Measures** (in case of electrolyte leakage from the battery)

- Take up with absorbent cloth, treat cloth as inflammable.
- Move the battery away from the fire.

**7. Handling and Storage**

Handling:

- When packing the batteries, do not allow battery terminals to contact each other, or contact with other metals. Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together.
- Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation.
- Do not short-circuit, recharge, deform, throw into fire or disassemble.

- Do not mix different type of batteries.
- Do not solder directly onto batteries.
- Insert the battery correctly in electrical equipment.

**Storage:**

- Do not let water penetrate into packaging boxes during their storage and transportation.
- Do not store the battery in places of the high temperature or under direct sunlight
- Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, rain or frozen condition.

**8. Exposure Controls and Personal Protection**

Acceptable concentration : Not specified about Lithium Battery.

Facilities : Nothing in particular.

Protective Equipment (in case of electrolyte leakage from the battery)

Respiratory Protection : Self-Contained Breathing Apparatus for organic gases.

Hand Protection : Safety glove.

Respiratory Protection : Safety goggle.

**9. Physical and Chemical Properties**

Appearance : Coin shape

Voltage : 3 V

**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. Toxicological Information (in case of electrolyte leakage from the battery)**

Acute toxicity : Oral (rat) LD50 > 2,000mg/kg (estimated)

Irritation : Irritating to eye and skin.

Mutagenicity : Not specified.

Chronic toxicity : Not specified.

## 12. Ecological Information

In case of the worn-out battery was disposed in land, the battery case may be corroded, and leak electrolyte.

However, there is no environmental impact information.

Mercury (Hg), Cadmium (Cd) and Lead (Pb) are not used in cell.

## 13. Disposal Considerations

When the battery is worn out, dispose of it under the ordinance of each local government.

## 14. Transport Information

During the transportation of a large amount of batteries by ship, trailer or railway, do not leave them in the places of high temperatures and do not allow them to be exposed to condensation.

During the transportation do not allow packages to be fallen down or damaged.

Proper shipping Name : Lithium metal batteries.

UN Number, UN Class : UN3090, Class9 (for the Air transport by PI968 Section IA or IB)

: Exemption (for the Marine transport SP188 and the Air transport by Section II of PI968, 969 or 970).

Even though the cells are classified as lithium metal batteries (UN3090 or UN3091), they are not subject to some requirements of Dangerous Goods Regulations because they meet the following:

1. For cells, the lithium content is not more than 1g;
2. Each cell is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3.
3. Each cell is manufactured in ISO9001 certified factory.

Please refer to the following reference information about concrete ways of transportation. Actual content of packaging label and shipping documents varies by shipping companies. Make sure to confirm in advance with your shipping company.

#### Information of reference

	Reference	Packing Instruction (PI) Special provision	Note
Air transport	IATA DGR	PI 968 Section I A	Cells, Cargo Aircraft only; Net quantity per package Max. 35kg
		PI 968 Section I B	Cells, Cargo Aircraft only; Net quantity per package Max. 2.5kg
		PI 969 Section II	Cells packed with equipment
		PI 970 Section II	Cells contained in equipment
Marine transport	IMDG Code	SP188	

Note. This does not apply to lithium metal batteries packed with equipment (PI969) or contained in equipment (PI 970)

Lithium Content Per Cell	Product Name	Air *See Section 15			Marine *See Section 15
		Cell only	Cell packed with equipment	Cell contained in equipment	
Not more than 0.3 g	All Lithium Metal Button Cell	PI968 Section IB	PI969 Section II	PI970 Section II	SP188
More than 0.3 g but not more than 1 g	(No)		PI969 Section II	PI970 Section II	SP188
More than 1 g	(No)	PI968 Section IA	PI969 Section I	PI970 Section I	SP230

#### 15. Regulatory Information

- IATA Dangerous Goods Regulations 64<sup>th</sup> Edition (IATA DGR)
- IMO International Maritime Dangerous Goods Code 2020 and 2022 Edition (IMDG Code)
- UN Recommendations on Transportation of Dangerous Goods, Model Regulations
- UN Recommendations on Transportation of Dangerous Goods, Manual of Tests and Criteria
- EU Battery Directive (2006/66/EC, 2013/56/EU)
- Regulation (EC) No. 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- Act on Preventing Environmental Pollution of Mercury (China)

#### 16. Other Information

This MSDS is provided to customers as reference information in order to handle batteries safely.

It is necessary for the customer to take appropriate measures depending on the actual situation such as the individual handling, based on this information.

Prepared by : Engineering Department  
Shenzhen M&LAK Industry Co., Ltd.



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