

Material Safety Data Sheet

一次性锂金属电池

Lithium Battery

制定: 2023年12月18日
Date: 18th Dec.2023

1. 产品及生产商 Product & Manufacturer

(1) 产品分类 一次性锂金属电池
Product Classification Lithium Battery

(2) 电池标称电压及合计锂含量 Battery Nominal Voltage & Aggregate Lithium Content

品名 Battery Model	标称电压[V] Nominal Voltage	合计锂含量 Aggregate Lithium Content	
CR17450	3	0.84g	3.94%
CR17335	3	0.56g	3.50%
CR17450G	3	0.79g	3.70%
CR17335G	3	0.54g	3.38%
CR14250	3	0.27g	2.69%
CR2/3A	3	0.56g	3.39%
CR123A	3	0.56g	3.39%
CR123A	3	0.49g	2.96%
CR2	3	0.27g	2.69%
CR-P2	6	1.12g	3.02%
2CR5	6	1.12g	2.87%
CR-V9	9	0.81g	2.40%
CR2/3A-B	3	0.56g	3.20%
CR123A-I	3	0.56g	3.20%
CR123A-T47	3	0.56g	3.29%
2CR123A-Q	3	1.12g	3.02%
2CR123A-C	6	1.12g	3.02%
2CR123A-S	6	1.12g	3.22%
2CR17450-A	6	1.68g	3.69%
2CR17450-B	6	1.68g	3.57%

(3) 生产商 Manufacturer

宁波超霸能源有限公司

地址: 中国宁波鄞州区五乡镇中车路58号 邮编: 315040

紧急联系电话

紧急联系人:王春勇 (国贸部) 紧急联系电话 +0086-574-8773-6335

NINGBO GP ENERGY CO., LTD

Address: No.58 Zhongche Road,Yinzhou District, Ningbo, China Postcode: 315040

Emergency Telephone Number

Wang Chunyong TEL +0086-574-8773-6335

【注意】 [Remark]

电池非化学物质，非混合物，而是产品。

Batteries are neither chemical substance nor mixture, but products.

电池的化学物质被密封在具有耐久性的金属钢壳中、不会流向外部。

The chemicals are sealed in outercan to prevent from outflux in the metal steel case for durability.

正常的搬用及使用，不会伤害人体的健康。

No harm to health under normal usage and adequate transportation method.

本资料阐述了异常使用时的潜在危险，主要目的是为了让让大家了解电池中所含有的化学物质，保管时的注意，以及电池运输法规相关的情报。

This instruction states the potential danger generating from non-intended use, for the explanations of chemicals in the batteries, cautions for storage and regulations for transportation.

2. 电池的组成及成分 Components of the Battery

成分 Component	CAS No.	組成 Content
二氧化锰 Manganese-Dioxide	1313-13-9	30 ~ 40 wt%
锂金属 Lithium Metal	7439-93-2	2 ~ 4 wt%
电解液[乙二醇二甲醚] Electrolyte [1,2-Dimethoxyethane(EGDME)]	110-71-4	6.5 ~ 9.5wt%
电解液[有机电解液混合物] Electrolyte [Organic Electrolyte Mixture]	-	3.5 ~ 4.5 wt%
铁 Iron	7439-89-6	32 ~ 38 wt%
碳 Carbon	7440-44-0	3 ~ 5 wt%
聚丙烯 Polypropylene	9003-07-0	2 ~ 4 wt%
聚乙烯 Polyethylene	9002-88-4	1 ~ 2 wt%
其他 Others	-	3 ~ 4 wt%

3. 危险性 Risk

①重要的危险性 无相关情报

Significant Risk No reference

②特有的危险性 无相关情报

Peculiar Risk No reference

③可预想的非常情况概要

General avoidable issues:

- 化学成分都密封在钢壳中，如果电池的保管方式等不正常的话，是有可能泄露出来的。
- Chemicals in the steel can may leak without proper storage.
- 电池投入火中或者放在100℃以上的环境中可能会导致破裂、发火。
- Rupture or fire may happen to battery if disposed in fire or placed over 100°C.
- 电池堆放、混放等导致短路时、电池可能会发热并破裂、着火。
- Heat, rupture and fire may happen to battery if short-circuit caused by stack or mixture.

※我司电池不属于GHS 分类区分。

※GHS classifications do not apply to our batteries.

4. 应急措施 **First Aid Measures**

情况 Case	应急措施 First Aid Measures
吸入时 Inhalation	电池内的成分泄露，吸入体内时，应转移到空气新鲜的场所，并马上就医。 Seek fresh air and immediately get medical attention after inhaling leaking component.
粘到皮肤时 Skin Contact	电池成分泄露粘到皮肤时，肥皂擦洗后，用大量的清水冲洗。长时间搁置会导致皮肤炎症等，应马上就医。 Wash affected area with plenty of soap and water. If irritation develops, get medical attention.
不慎入眼时 Eye Contact	电池内成分泄露进入眼睛时、应立即用清水冲洗15分钟以上后，马上去医院就诊。长时间搁置会导致眼镜障碍。 Flush with water for at least 15 minutes. If irritation develops, get medical attention.
饮入时 Ingestion	不慎饮入电池时、需立刻就医。 Get medical attention immediately if ingestion.

5. 火灾时的措施 **Fire Exinction Measures**

灭火器：粉末灭火剂、水溶性液体泡消类药剂、粉末灭火药剂、水喷雾、二氧化碳、干沙等。
Fire extinguisher: Carbon dioxide; fire foam; dry sand; water spray and powder etc.

灭火方法：为防止火种蔓延、将电池移至安全场所。如果电池的包装材料是纸质的话、一般用水、二氧化碳、粉末消火剂灭火。燃烧时的蒸汽会刺激到眼睛、鼻子、嗓子等、灭火应该在上风口进行，根据情况需要佩戴口罩。

Means of extinction: Remove batteries to safe place to avoid fire spread. Use water, carbon dioxide, powder if the materials for packing is paper. Burning vapour may cause irritation to eyes, nose and throat. Hence, it is suggested put out the fire in the draught. Use mask when necessary.

6. 泄漏时的措施 **Measures for Leakage**

化学成分虽然被密封在钢壳之中、但是电池被使用于设备时误操作的话，会导致成分泄露。此时应采取以下措施：

If misuse the battery at application, the chemicals in steel can may vent. In such case, take measures below:

对于人体的注意事项：电解液短时间被人吸入、或粘到皮肤，不会对人体健康造成大的危险，但是一定要呼吸新鲜的空气，并将电解液洗干净。

Health Cautions: The electrolyte may not cause great damage to health as soon as inhalation or contact to skin, but it should be cleaned immediately, and fresh air would help.

对于环境的注意事项：需进行彻底清洁，对于环境没有特别注意事项。

Environmental Cautions: Clean thoroughly, no significant damage to environment.

回收、中和、封口的方法·

器具：将漏出物集中到一起放入空容器中、根据规定做废弃处理。

Measures/container for collection, neutralization and crimping:

Collect in an empty container and dispose according to regulations.

7. 保管注意 **Storage**

注意 **Caution:**

- (1) 电池充电、短路、分解、变形、过热时不要投入火中。
(1) Do not dispose batteries to fire in case of charge, short-circuit, disassembling, disformation
- (2) 不要重叠，混放电池。
(2) Do not stack or mix batteries.
- (3) 不要将电池放在金属容器、金属板、静电防止材上。
(3) Do not place batteries in metal container, metal sheet or antistatic materials.
- (4) 使用多个电池的器械，更换电池时、要一次性将电池全部换掉。
(4) Batteries should be changed at the same time when used in a multiple-cell applied device.
- (5) 保存在通风、干燥阴凉的地方。
(5) Stored in a dry and cool place with good ventilation.
- (6) 捆包要注意雨水、雪、霜、结露。
(6) Avoid water, snow, frost or condensation of moisture when packing.
- (7) 不要保存在热源热风吹出口的附近。
(7) Do not place batteries near heat or hot air outlet.
- (8) 不要保存在阳光直射的场所。
(8) Do not expose batteries to sun directly.
- (9) 从寒冷的地方转移到高温的地方时，要注意结露。
(9) Avoid condensation of moisture when transferring batteries from cold to hot place.
- (10) 在仓库内设置多个灭火器。
(10) Provide several fire extinguishers in the warehouse.

8. 防止暴露及保护措施 **Exposure Control and Protective Measures**

正常的保存不需要特别的保护用具。但是异常使用于器械或电器时，可能会有大量的电解液漏出，需要使用以下的防护用具：

No special protection tools needed for normal usage. In case of abnormal use in devices or appliances, electrolyte may leak and certain protection tools should be used as below:

呼吸保护用具：面罩（附带呼吸器）

Respiratory protective equipment: Respirators (with apparatus respiratorius)

护手用具：合成橡胶手套

Hand protective equipment: Synthetic rubber gloves

眼睛保护用具：防护眼镜

Eye protective equipment: Protective spectacles

9. 物理或化学性质 **Physical/Chemical Property**

状态：固体 States: Solid 闪点：无 Flash point:NO

形状：角形 Form: Dihedral 沸点：无 Boiling point:NO

熔点：无 Melting point:NO

10. 安定性及反应性 **Stability and Reactivity**

稳定性：正常使用时是稳定的

Stability: It is extremely stable for normal use.

应避免的条件：电池外部短絡、受压变形、100℃以上的高温（可能会引起发热、发火）、直射日光、高湿度

Avoid Condition: External short-circuit, deformation by press, excessive temperature (above 100°C, which may cause heat or fire), expose to sun directly or high humidity.

应避免的物体：引起短路的物体

Avoid Substance: Substance may cause short-circuit.

1.1. 毒性信息 Toxicological Information

化学成分被密封在电池钢壳之中，不具危害性。

Chemicals are sealed in the steel can without danger.

以下是電池主要部材的毒性信息，作为参考用途。

The followings are toxicological information for materials of batteries for reference.

部材 Component	毒性的种类 Classification	毒性 / 症状 Symptom
二氧化锰 Manganese Dioxide	急性毒性 Acute Toxicity	兔子Rabbit LD _{L0} (静脈vein)=45mg/kg 老鼠Mouse LD ₅₀ (皮下subcutaneous)=422mg/kg
	局部效果 Partially Affected	刺激眼、鼻、嗓子、皮肤 Irritation to eyes, nose, throat and skin.
	慢性或長期毒性 Chronic Toxicity or Long-Term Toxicity	长期（最低3个月）的灰尘或气体吸入 有可能会引起类似帕金森的中枢神经症候群 Parkinson's central nervous syndrome may caused by long-term (at least 3 months) inhalation of dirt or gas.
锂金属 Lithium Metal	急性毒性 Acute Toxicity	没有金属状态的情报 No reference
	局部效果 Partially Affected	接触皮肤或眼睛，会引起化学烧伤或碱性化学烧伤 Chemical burning may occur in case of contact to skin or eyes.
電解液 Electrolyte	急性毒性 Acute Toxicity	目前没有情报 No reference
	局部效果 Partially Affected	对眼睛有少量刺激 A little irritation to eyes.

1.2. 环境影响 Environment Effects

残留性·分解性

Residual property/Resolvability

无参考信息

No reference

对土壤的污染

Soil Pollution

无参考信息

No reference

1.3. 废弃时的注意 Disposal Considerations

用完的电池根据规定进行废弃。

Dispose of in a consistent manner according to the regulations.

作为安全措施，为防止短路造成的发热·破裂，用胶带贴电池两个端子、用绝缘袋捆包，或用原来的包装袋捆包、电池做恰当的绝缘处理。

For safety purpose, insulation measures are needed to avoid heat or rupture caused by short-circuit. Such as film on terminals, insulation bag or original package for packing .

1.4. 运输注意 **Transportation Information**

*注意, 请以最新版的相关法规要求为准, 具体可否进行运输及其差异化条件需与具体的承运方进行确认。

*Attention, the latest regulation shall prevail, and the specifications of transportation and its difference shall be confirmed with the carrier.

锂金属单体电池及组装电池、归属于国际class9 分类中、并编有下列国际编号。

运输锂金属单体电池或组装电池时、必须满足国际运输法规的要求。

我司的电池 (第1 章中表述) 以及出货包装都满足UN Manual of Test and Criteria, Part III, subsection 38.3的要求事项、并且满足以下的要求事项, 才得以被允许运输的。

All single lithium-metal cells or battery packs are considered as Class 9 according to international standards as shown below. The transport of lithium-metal cells or battery packs should meet requirements defined in International Transport Regulations. All of our products (defined in chapter 1) and its packing forms meet the requirements of UN Manual of Test and Criteria, Part III, subsection 38.3. Besides, the following transportation requirements shall be met when delivery.

< 空运 **Air Transport** >

我司的电池, 符合《通用要求》和《包装说明968》第IB节的要求, 按照包装说明968第IB节进行包装, 仅限于货机运输。我司的电池, 单体电池合计锂含量在1g 以下的、或者组装电池的合计锂含量在2g 以下的其中一项、符合IATA 危险物规则 (IATA-DGR) 的包装规格

(Packing Instruction) 968 Section IB。电池及出货捆包、全部满足Section IB 运输条件, 因此虽然是class 9 危险物、但是即便不用包装等级II的容器也可以运输。

Lithium metal battery. The goods meet the requirements in General Requirements and section IB of Packaging Instruction 968. The goods are packaged according to the Packaging Instruction 968 section IB. Cargo Aircraft Only. All batteries produced by our company, including single cells with aggregate lithium content less than 1g or battery pack models with aggregate lithium content less than 2g, conform to 968 Section IB defined in Packing Instruction of IATA-DGR. All of our products and its packing forms meet the requirements of Section IB, though the battery itself is considered as dangerous goods, it can be transported without applying containers defined as Class II.

< 海运 **Sea Transport** >

我司的电池属于合计锂含量1g 以下的单体電池、或2g 以下的组装电池、满足国际海运危险品法规 (IMDG Code) 188、及运输条件, 作为危险品以外的物质可以运输。

All batteries produced by our company, including single cells with aggregate lithium content less than 1g or battery pack models with aggregate lithium content less than 2g, conform to special regulation 188 and transport condition defined in IMDG-Code. It can be transported as non-dangerous goods.

UN No. (国联编号)	Proper Shipping Name/Description (运输品类/描述)
UN 3090	Lithium Metal Batteries (锂金属电池)
UN 3091	Lithium Metal Batteries Contained in Equipment (安装于设备内的锂金属电池)
UN 3091	Lithium Metal Batteries Packed with Equipment (与装置一同包装的锂金属电池)

相关法规: [Related Regulation:](#)

运输手段Transport form	相关机构 / 相关法规 Relevant agencies/Issued documents
空运 (航空运输) Air transport	ICAO (国际民用航空组织) / TI (技术指南) IATA (国际航空运输协会) / DGR (危险品法规)
海运 (船舶运输) Sea transport	IMO (国际海事组织) / IMDG Code (国际海运危险品法规)
公路运输 (欧州境内) Land transport (within Europe)	RID (铁路运输法规) , ADR (公路运输法规)
美国 / 国际 US/International	USDOT (美国运输部) / DOT 49 CFR (美国特定法规)
	UN: Recommendations on the transport of dangerous goods: Manual of Tests and Criteria :PartIII, Subsection 38.3

*1 [Dangerous Goods Regulations – 65th Edition Effective 1 January 2024: International Air Transport Association \(IATA\)/Packaging Instructions 968-970](#)

*2 [IMDG Code 41-22](#)

*3 [RID - COTIF 1999/Appendix C-RID/Article 5](#)

1 5 . 法规信息 Regulatory information

电池环境相关法: EU 诸国根据电池指令2006/66/EC相关法规、以及其他国家如中国、韩国、巴西等国, 及北美加拿大都是相类似的法规。

[Related environment regulations for batteries: EU countries according to the Battery Directive 2006/66/EC, and other countries like China, Korea, brazil, North America or Canada have similar regulations.](#)

1 6 . 其他 Others

引用文献 [Reference](#)

(1) 国际航空运输协会 危险品规则 (最新版)

(1) [IATA DGR\(Dangerous Goods Regulations\), latest edition](#)

(2) 文本中定义为危险物品的, 在航空运输过程中可能会引起爆炸。

(2) [Notice defined in air transport regulations for dangerous goods may cause explosion.](#)

本资料是以电池在正常条件下使用为前提编制的引导性文件, 不具备任何保障。

[This instruction established based on the normal use of the battery, without any ensurance.](#)



Hong Kong Batteries Manufactory Limited

MATERIAL SAFETY DATA SHEET
(MSDS Certificate for 2024)

Hkbil Testing Center Issue date: Jan 1, 2024 Document: HK-MSDS-2024-01

1 - IDENTIFICATION

1.1 Product : Rechargeable Lithium-Polymer battery Cell

Trade name and model : Li-Polymer (LiCoO₂)

Customer Name : Computime Limited

Trade Model :-

Model No.	Description	Quantity (PCS)
HK-LP335075	Li-Polymer battery 3.7V 1500mAh, 5.55Wh	Undefined

Electrochemical system :

Electrodes	Negative electrode Carbon	Positive electrode Lithium cobaltite (LiCoO ₂)
Electrolyte	Solution of lithium hexafluorophosphate (LiPF ₆) in a mixture of organic solvents	
Nominal voltage	3.7 Volts	

Equivalent name : lithiated cobalt oxide.

Ethylene Carbonate (EC) + DiMethyl Carbonate (DMC) + DiEthyl Carbonate (DEC).

1.2 Supplier :

Name : HONG KONG BATTERIES MANUFACTORY LIMITED

Address : 7 Flat, 10/F, Kam Hon Ind Bldg, 8 Wang Kwun Road,
KowloonBay, Kowloon, Hong Kong

Phone : +852-2798 8548 (10 Lines)

Fax: + 852-2798 0321

Web Site : www.hk-batteries.com

Revision : 2024-01

Tel: (852) 27988068-10 lines Fax: (852) 27980321 Email: sales@hk-batteries.com

2 - COMPOSITION (typical weight percentages of basic material)

Metals	%	Others	%
-Steel,	2~4.9	- Lithium cobaltite	23~33
- Copper,	6~9	- Carbon	12~17
-Aluminum	14~33	-Organic solvents	12~15
- Lithium metal	0	- Salts	8~12
-Nickle	0~2	-Polypropylene polyethylene	0~2
		-Polyvinylidene fluoride(PVDF)	1~4

- **Lithium Content : Small than 0.35g per cells**
- **UN Number : 3481**

3 - HAZARDS IDENTIFICATION

3.1 Physical :

The Lithium-Ion rechargeable 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 solid 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 the safety valve and/or the rupture of the battery container. Electrolyte leakage, electrode materials reaction with moisture/water or battery vent/explosion/fire may follow, depending upon the circumstances. The batteries are fitted with a safety vent for protection in case of excessive internal pressure and/or temperature.

3.2 Chemical :

Classification of dangerous substances contained into the product as per directive 67/548/EEC

Substance		Melting point	Boiling point	Classification			
CAS N°	Chemical symbol			Exposure limit	Indication of danger	Special risk (1)	Safety advices (2)
12190-79-3	LiCoO ₂	> 1000°C	N/A	0.1 mg/m ³ OSHA		R22 R43	S2 S22 S24 S26 S36 S37 S43

							S45
EC : 96-49-1 DMC : 616-38-6 DEC : 105-58-8	Organic solvents (DC-DMC DEC)	EC : 38°C DMC : 4°C DEC : -43°C	EC : 243°C DMC : 90°C DEC : 127°C	None established OSHA	Flammable	R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45
21324-40-3	LiPF6	N/A (decomposes at 160°C)	N/A	None established OSHA	Irritant Corrosive	R14 R21 R22 R41 R43	S2 S8 S22 S24 S26 S36 S37 S45

1 – Nature of special risks :

R 14 Reacts with water.

R 21 Harmful in contact with skin.

R 22 Harmful if swallowed.

R 41 Risk of serious damage to the eye.

R 42/43 May cause sensitization by inhalation and skin contact.

R 43 May cause sensitization by skin contact.

2 – Safety advices :

S 2 Keep out of reach from children.

S 8 Keep away from moisture.

S 22 Do not breathe dust.

S 24 Avoid contact with skin.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical attention.

S 36 Wear suitable protective clothing.

S 37 Wear suitable gloves.

S 45 In case of incident, seek medical attention.

4 - FIRST AID MEASURES

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

In all case, seek medical attention.

Eye contact : Flush with plenty of water (eyelids held open) for at least 15minutes.

Skin contact : Remove all contaminated clothing and flush affected areas

with plenty of water and soap for at least 15 minutes.

Do not apply greases or ointments.

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 batteries can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 90°C resulting from inappropriate use or from the environment. Possible formation of hydrogen fluoride (HF) and phosphorous oxides during fire. LiPF₆ salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.

Extinguishing media : *Suitable :* CO₂,
Dry chemical or Foam extinguishers
Not to be used : Type D extinguishers

Special exposure hazards : Following cell overheating due to external source or due to improper 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 irritant to ocular tissues.

Skin contact : The electrolyte solution contained in the battery causes skin irritation.

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 vermiculite, 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 incinerate 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 a 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 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.

Other : Follow manufacturer 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.

Hand protection : *Not necessary under normal use.* Use 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 : (Physical shape and color as supplied) Metal squares, hermetically sealed and fitted with an external plastic box.

9.2 Temperature range :

	Continuous	Occasional
in storage	+ 30°C max	- 20/+ 60°C
during discharge	-20/+ 60°C	- 20/+ 60°C
during charge	0/+ 50°C	0/+ 50°C

9.3 Specific energy : Not more than 20 Watt-hours for cell & Not more than 100 Watt-hours per battery.

9.4 Specific pulse power : As defined in relevant IEC standard

10 - STABILITY AND REACTIVITY

Conditions to avoid : Heat above 90°C or incinerate.
Deform, mutilate, crush, pierce, disassemble.
Short circuit.
Prolonged exposure to humid conditions.

Materials to avoid : N/A.

Hazardous decomposition products : Corrosive/Irritant Hydrogen fluoride (HF) is produced in case of reaction of *lithium hexafluorophosphate (LiPF₆)* with water.

Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire.

11 - TOXOLOGICAL INFORMATION

The Lithium-Ion rechargeable batteries cell do not contain toxic materials.

12 - ECOLOGICAL INFORMATION

When properly used or disposed, the Lithium-Ion rechargeable batteries cell do not present environmental hazard.



13 - DISPOSAL CONSIDERATIONS

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

Lithium-Ion batteries should have their terminals insulated and be preferably wrapped in plastic bags 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 : Leachability regulations (mg/l)

Component	Leachability	EC limit	EPA	Other*
Iron	100			5
Nickel	500	2		0.5

13.3 Recycling : Send to authorized recycling facilities, eventually through licensed waste carrier.

14 - TRANSPORT INFORMATION

14.1 UN Number : UN3481

14.2 International conventions :

Air	IATA	Yes
Sea	IMDG	Yes
Land	ADR (road)	Yes
	RID (rail)	Yes

14.3 Identification Criteria : *Carriage of goods complies with the requirements of packing Inductions 903 and Special provision 188 of IMDG CODE(Amdt 40-20).*

15 - REGULATION INFORMATION

The transport of rechargeable lithium-ion batteries is regulated by various bodies (IATA, IMO, ADR, US-DOT) that follow the United Nations -"Recommendations on transport of Dangerous Goods, model regulations, compliance to IMDG code pursuant to Special provision 965(PI965), new special provided that packaging is strong and prevent the products from short-circuit.

-The Li-ion battery are complied with Section II of PI965 to PI967 - (IATA-DGR 65th -2024 Edition of transportation).

-The consignment can be shipped as "Not Restricted" in accordance with the current edition- 65th of IATA-DRG - 2024"

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 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.

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.

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Sign: Chengli Wang

Material Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product Name: Manganese Dioxide Primary Lithium Battery

Nominal Voltage: See below table

Battery Type:

Type	Lithium(gr.)	Nominal Voltage
CR123A	0.47	3V

Remark:

The approximate weight of lithium metal in the table above is about 2.0%~3.0% of the actual battery weight.

Manufacturer: EVE Energy Co., Ltd

Address: EVE Industrial Park, N0.38, Huifeng 7th Road, Zhongkai High-tech Zone, Huizhou, Guangdong, China

Post Code: 516006

Emergency Telephone: 0752-2606966

Fax: 0752-2606033

E-mail: quality@evebattery.com

Note: the battery is neither substance nor mixture but product and having no risk to life and the health under normal use or transportation because ingredients of battery is not leaked out by virtue of hermetical sealing with metal case.

This sheet notifies possible risk of our battery under abnormal use but mainly aim to provide information about ingredients, notification of handing and transportation regulations as a useful reference.

Section 2 – Composition/Information on Ingredient

Ingredient	CAS No.	Contents	Weight
Manganese Dioxide	1313-13-9	39.72%	6.7530g
Lithium Sheet	7439-93-2	2.77%	0.4702g
Graphite	7782-42-5	2.11%	0.3593g
Lithium Compound	—	1.01%	0.1725g
Carbon Steel	363179-62-8	27.17%	4.6190g
Stainless Steel	7439-80-6	16.60%	2.8212g
Polypropylene	9003-07-0	1.83%	0.3104g
Propylene Carbonate	108-32-7	4.79%	0.8144g
Polyethylene	9002-88-4	1.67%	0.2838g
Ethylene Carbonate	96-49-1	2.33%	0.3964g

Section 3 - Hazards Identification

The important hazards and adverse effects of the chemical product	No information available
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Chemical product - specific hazards	No information available
Outline of an anticipated emergency	Chemical contents are sealed in metal can. Therefore, risk of exposure never occurs unless battery is mechanically or electrically abuse. Risk of explosion by fire is anticipated if batteries are disposed of in fire of heated above 100 degree Celsius. Stacking or jumbling of batteries may cause external short circuits, heat generation, in some case, allowing fire or explosion.

Note: Our battery is not classified in accordance with the GHS classification.

Section 4 - First Aid Measures

Eye	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Inhalation	Remove from exposure and move to fresh air immediately. Use oxygen if available.
Skin	Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.
Ingestion	Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Call a physician.

Section 5 - Fire extinguishing agent

Fire extinguishing agent:

Dry chemical, alcohol resistant foam, powder, atomized water, carbon dioxide dry sand are effective.

Extinguisher method:

Escape batteries to safe place prevent from ignition by spreading fire.

Because packaging material of battery is paper, use water extinguisher, CO2 extinguisher or powder extinguisher as normal extinguisher.

Since vapor, generated from burning batteries may take eyes, nose and throat irritate, be Sure to extinguish the fire on the windward side. Wear the respiratory protection

equipment in some cases.

Section 6 - Accidental Release Measures

- **Steps to be Taken in case Material is Released or Spilled**

If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapors to dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid

with absorbent and incinerate.

- **Waste Disposal Method**

It is recommended to discharge the battery to the end, handing in the abandoned batteries to related department unified, dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental protection agency and/or federal EPA.

Section 7 - Handling and Storage

The battery should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container. Do not short circuit terminals, or over charge the battery, forced over-discharge, throw to fire. Do not crush or puncture the battery, or immerse in liquids.

- **Precautions to be taken in Handling and Storing**

Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided.

Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

- **Other Precautions**

The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures.

Do not short or install with incorrect polarity.

Section 8 - Exposure Controls, Personal Protection

- **Respiratory Protection**

In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores. Respiratory Protection is not necessary under conditions of normal use.

- **Ventilation**

Not necessary under conditions of normal use.

- **Protective Gloves**

Not necessary under conditions of normal use.

- **Other Protective Clothing or Equipment**

Not necessary under conditions of normal use.

Personal Protection is recommended for venting battery: Respiratory protection, Protective gloves, protective clothing and safety glass with side shields.

Section 9 - Physical and Chemical Properties

State : Solid

Shape: cylindrical

Section 10 - Stability and Reactivity

- **Stability**

Stable

- **Conditions to Avoid**

Heating, mechanical abuse and electrical abuse.

- **Hazardous Decomposition Products**

N/A.

- **Hazardous Polymerization**

N/A.

If leaked, forbidden to contact with strong oxidizers, mineral acids, strong alkalies, halogenated hydrocarbons.

Section 11 - Toxicological Information

Inhalation, skin contact and eye contact are possible when the battery is opened. Exposure to internal contents, the corrosive fumes will be very irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

Section 12 - Ecological Information

When promptly used or disposed the battery does not present environmental hazard. When disposed, keep away from water, rain and snow.

Section 13 - Disposal Considerations

- **APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION**

If batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amount of not reaction or unconsumed lithium remaining in the spent battery. The battery must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste. Recycling of battery can be done in authorized facility, through licensed waste carrier.

Section 14 - Transport Information

For the international transport of lithium batteries, they must comply with these

regulations: the International Maritime Dangerous Goods (IMDG) Code by International Maritime Organization (IMO), Dangerous Goods Regulations (DGR) by International Air Transport Association (IATA) and Technical Instructions for the Safe Transport of Dangerous Goods by Air (TI) by International Civil Aviation Organization (ICAO). These regulations are based on the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria.

Lithium batteries which meet the requirements of UN38.3 (UN Manual of Tests and Criteria, Part III, subsection 38.3) could be transported by air and by sea as ordinary goods, otherwise should be transported according to Class 9, Packing Group II hazardous goods.

As the published of the UN Recommendations on the Transport of Dangerous Goods, all these regulations have added some new contents to regulate the transport of lithium metal batteries. And they should be complied since 1 January 2009. Following the latest changes on Lithium Cells / Batteries shipment as per the 65th edition of IATA Dangerous Goods Regulations, the Lithium Battery Best Practice 024 will replace Best Practice 023 and with effect from 1st January 2024.

1. For lithium metal batteries, UN ID number is 3090. For lithium metal batteries contained in equipment or lithium metal batteries packed with equipment, UN ID number is 3091.
2. The consignment should be fully described by proper shipping name and packed, marked and in proper condition for carriage by air. The consignment is not classified as dangerous under the current edition of the IATA 65th Effective, Dangerous goods regulation and all applicable carrier and government regulations.
3. For transported air, Lithium-metal Cells/Batteries shipped as "Not Restricted" Cargo: Must comply with Section II of PI968-P1970 accordingly; For cells, the lithium content should not be more than 1g; for batteries, the lithium content should not be more than 2g. Lithium content must be marked on the outside of the battery case (marked by manufacturer).
4. Each consignment must be accompanied with a document such as an air waybill with an indication. For those Lithium metal cells/batteries contained in equipment, the equipment must be equipped with an effective means of preventing accidental activation.
5. For transported air, Lithium-metal Cells/Batteries must comply with Section IA or Section IB of PI968 accordingly.
6. Each package must be capable of withstanding a 1.2m drop test in orientation without damage of cells or batteries contained therein.
7. Lithium batteries which meet the requirements of which could be transported by air, and the batteries manufactured by EVE Energy Co., Ltd meet these requirements. (Lithium batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden transport.)
8. Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packing that

could lead to short circuit.

- Lithium –metal battery is applicable to the International Maritime Dangerous Goods Code (IMDG-Code) Special provision 188 because it corresponds to either case that the cell – lithium content is less than 1g or the battery – lithium content is less than 2g, so it is permitted to transport as Exempted Dangerous Goods when it complies with all requirements of the transport conditions.

Transport Fashion: By air, by sea.

Packaging Information: Packaging paper+ Plastic tray.

Section 15 - Regulatory Information

● Law Information

- 《Dangerous Goods Regulation》
 - 《Recommendations on the Transport of Dangerous Goods Model Regulations》
 - 《International Maritime Dangerous Goods》
 - 《Technical Instructions for the Safe Transport of Dangerous Goods》
 - 《Classification and code of dangerous goods》
 - 《Occupational Safety and Health Act》 (OSHA)
 - 《Toxic Substances Control Act》 (TSCA)
 - 《Consumer Product Safety Act》 (CPSA)
 - 《Federal Environmental Pollution Control Act》 (FEPCA)
 - 《The Oil Pollution Act》 (OPA)
 - 《Superfund Amendments and Reauthorization Act Title III (302/311/312/313)》 (SARA)
 - 《Resource Conservation and Recovery Act》 (RCRA)
 - 《Safety Drinking Water Act》 (CWA)
 - 《California Proposition 65》
 - 《Code of Federal Regulations》 (CFR)
 - 《Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries》
- In accordance with all Federal, State and Local laws.

Section 16 - Additional Information

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.