

# Material Safety Data Sheet(MSDS)

**Rechargeable Li-Ion Battery** 

Model/type reference: V4

Typical Capacity...... 3.65V 6040mAh 22.046Wh

Weight..... 120±5g

Shape and Physical Dimension (mm): length70\* width44.5\* thick21.5

## Other means of identification

Synonyms: none

## Preparation Date..... Jan 8, 2018

## 1. Recommended use of the chemical and restrictions on use

Recommended Use:Used in portable electronic equipments; Uses adviced against:

a) Do not dismantle, open or shred secondary cells or batteries.

- b) Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.
- c) Do not short-circuit a cell or a battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.
- d) Do not remove a cell or battery from its original packaging until required for use.
- e) Do not subject cells or batteries to mechanical shock.
- f) In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- g) Do not use any charger other than that specifically provided for use with the equipment.
- h) Observe the plus (+) and minus (-) marks on the cell, battery and equipment and ensure correct u
- i) Do not use any cell or battery which is not designed for use with the equipment.
- j) Do not mix cells of different manufacture, capacity, size or type within a device.
- k) Battery usage by children should be supervised. l) Seek medical advice immediately if a cell or a battery has been swallowed.

m) Always purchase the battery recommended by the device manufacturer for the equipment. n) Keep cells and batteries clean and dry.

- o) Wipe the cell or battery terminals with a clean dry cloth if they become dirty.
- p) Secondary cells and batteries need to be charged before use. Always use the correct charger and refer to the manufacturer's instructions or equipment manual for proper charging instructions.
- q) Do not leave a battery on prolonged charge when not in use.

r) After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.

s) Retain the original product literature for future reference.



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- t) Use only the cell or battery in the application for which it was intended.
- u) When possible, remove the battery from the equipment when not in use.
- v) Dispose of properly. Details of the supplier of the safety data sheet:

## Details of the supplier of the safety data sheet:

Supplier Name: Fuji Electronics(Shenzhen) Co.,Ltd.

Address: Bld.10.2rd Industrial Park Tangxiayong.Songgang.Baoan,Shenzhen City, China

Telephone number of the supplier: 0086-0755-33893788

Fax: 0086-0769-0755-33895166 Postcode:518105

E-mail address: kelly@ fujielectronics.com.cn

## 2. HAZARDS IDENTIFICATION

Classification

No harm at the normal use. If contact the ink in the HIGHLIGHTER/PEN COMBO 3PK, reference as follows:

## Classification of the substance or mixture

Classification according to GHS Acute Toxicity, Oral(Hazard category 4) Acute Toxicity, Dermal(Hazard category 3) Skin, irritate(Cagegory 1B) Eye Irritate (Hazard category 1)

#### **GHS Label elements, including precautionary statements:**



## Signal word: Warning

Hazard statement(s):

H242:Heating may cause a fire;

H311: Toxic in contact with skin;

H314:Causes severe skin burns and eye damage;

H302:Harmful if swallowed;

#### precautionary statements:

## **Prevention:**

P264 Wash thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

#### **Response:**

P312:Call a Poison center or doctor/physician if you feel unwell.

P302+P350-IF ON SKIN: Gently wash with plenty of soap and water

P301+P330+P331-IF SWALLOWED: rise mouth. Do NOT induce vomiting

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.



#### Storage:

None

Disposal P501: Dispose of contents/container in accordance with local/national regulations Hazards not otherwise classified (HNOC) Not Applicable **Other information** 

No information available.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### **Chemical characterization: Mixtures**

#### **Description:**

Product: Consisting of the following components.

Common Chemical Name	Concentration	CAS	EC No.
	(%)	Number	
Lithium Cobalt Oxide (LiCoO2)	35	12190-79-3	235-362-0
Aluminum Foil (Al)	20	7429-90-5	231-072-3
Graphite (C)	15	7782-42-5	231-955-3
Copper Foil (Cu)	15	7440-50-8	231-159-6
Phosphate(1-), hexafluoro-, lithium	10	21324-40-3	244-334-7
Polypropylene	1	9003-07-0	

Note: CAS number is Chemical Abstract Service Registry Number.

N/A=Not apply.

## 4. FIRST-AID MEASURES

#### **First aid measures**

Eye Contact Rinse thoroughly with plenty of water, also under the eyelids. If symptoms persist, call a physician.

Skin Contact Remove contaminated clothing and shoes. Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation Move to fresh air. If symptoms persist, call a physician.

Ingestion Do NOT induce vomiting. Drink plenty of water. If symptoms persist, call a physician.

Most important symptoms and effects, both acute and delayed

Swallowing Do not induce vomiting. Get medical attention.

Most Important Symptoms/Effects No information available.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

## 5. FIRE-FIGHTING MEASURES

#### **Suitable Extinguishing Media**

CO2, dry chemical powder, water spray.

Unsuitable Extinguishing Media:No information available.

#### Specific Hazards Arising from the Chemical

Formation of toxic gases is possible during heating or in case of fire.

In case of fire, the following can be released:



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Carbon monoxide(CO) Carbon dioxide Other irritating and toxic gases. **Hazardous Combustion Products** 

Carbon oxides. **Explosion Data** Sensitivity to Mechanical Impact No Sensitivity to Static Discharge No **Protective Equipment and Precautions for Firefighters** 

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. For example: Wear self-contained respiratory protective device. Wear suitable protective clothing and eye/face protection.

## Special hazards arising from the substance or mixture:

Battery may burst and release hazardus decomposition products when exposed to a fire situation. Lithium ion batteries contain flammable electrolyte that may vent, ignite and produce sparks when subjected to high temperature(>150°C), When damaged or abused(e.g. mechanical damage or electrical overcharging); may burn rapidly with flare-burning effect; may ignite other batteries in clothes proximity.

## 6. ACCIDENTAL RELEASE MEASURES

## Personal precautions, protective equipment and emergency procedures

Personal Precautions Avoid contact with eyes.

Refer to section 8 for personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition.

Evacuate personnel to safe areas.

## **Environmental precautions**

Environmental Precautions Refer to protective measures listed in Sections 7 and 8.

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to item 13.

## Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning up Use personal protective equipment. Dam up. Cover liquid spill with sand, earth or other Non combustible absorbent material. Pick up and transfer to properly labeled containers. Clean contaminated surface thoroughly.

## 7. HANDLING AND STORAGE

## **Precautions for safe handling**

Handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Wear personal protective equipment.

Wash thoroughly after handling. Use this material with adequate ventilation.

The product is not explosive.

## Conditions for safe storage, including any incompatibilities

If the Lithium-ion Battery is subject to storage for such a long term as more than 3 months, it is recommended

to recharge the Lithium-ion Polymer Battery periodically.

3 months:  $-10 \sim +40^{\circ}$ C, 45 to 85% RHAnd recommended at  $0 \sim +35^{\circ}$ C for long period storage.

The capacity recovery rate in the delivery state (50% capacity of fully charged) after storage is assumed to be



#### 80% or more.

The voltage for a long time storage shall be 3.6V~3.9V range.

Do not storage Lithium-ion Battery haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.

Keep out of reach of children.

Do not expose Lithium-ion Polymer Battery to heat or fire. Avoid storage in direct sunlight.

Do not store together with oxidizing and acidic materials.

Keep ignition sources away- Do not smoke.

Store in cool, dry and well-ventilated place.

Incompatible Products: None known.

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

#### **Control parameters**

Ingredients with limit values that require monitoring at the workplace:		
12190-79-3 Lithium Cobalt Oxide		
TLV (USA)	0.02mg/m <sup>3</sup>	
MAK (Germany)	0.1mg/ m <sup>3</sup>	

**Other Exposure Guidelines** Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962(11th Cir., 1992).

#### **Appropriate engineering controls**

Engineering Measures Showers

Eyewash stations

Ventilation systems

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Ensure adequate ventilation.

#### Individual protection measures, such as personal protective equipment

**Eye/Face Protection:** 



Tightly sealed goggles

**Body protection:** 

Protective work clothing.

**Skin protection:** 



#### **Protective gloves**

#### Material of gloves:

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

#### **Penetration time of glove material:**

The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.

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**Respiratory Protection** No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

## 9. PHYSICAL AND CHEMICAL PROPERTIE

	Form: prismatic		
Physical	Color: Black		
State	Odour: Odourless		
	OdorThreshold:No information available	lable	
Change in condition:			
pH,withindid	cationoftheconcentration	Not determined.	
Melting poir	nt/freezing point	Not determined.	
Initial boilin	g point and Boiling range:	Not determined.	
Flash Point		Not determined.	
Evaporation	rate	Not determined.	
Flammabilit	y (solid, gas)	Not determined.	
Upper/lower	flammability or explosive limits	Not determined.	
Vapor Pressure:		Not determined.	
Vapor Density:		Not determined.	
relative density:		Not determined.	
Solubility in Water:		Not determined.	
Solubility in	other solvents	Not determined.	
n-octanol/wa	ater partition coefficient	Not determined.	
Auto-ignition temperature		Product is not self-igniting.	
Decompositi	ion temperature	Not determined.	
Odout threshold		Not determined.	
Evaporation	rate	Not determined.	
Viscosity		Not determined.	
Other Information		No further relevant information available.	

## **10. STABILITY AND REACTIVITY**

**<u>Reactivity</u>**: Stable under recommended storage and handling conditions (see section 7, Handling and storage).

<u>Chemical stability:</u> Stable under normal conditions of use, storage and transport.

**Thermal decomposition/conditions to be avoided:** No decomposition if used according to specifications. **Possibility of Hazardous Reactions:**None under normal processing.

Hazardous Polymerization: Hazardous polymerization does not occur.

Conditions to avoid: Strong heating, fire, Incompatible materials.

**Incompatible materials:** Strong oxidizing agents. Strong acids.Base metals.

Hazardous Decomposition Products: Carbon oxides, Other irritating and toxic gases.

## **11. TOXICOLOGICAL INFORMATION**

Acute toxiciy: No data available.

LD/LC50 values relevant for classification:

Not available.



Skin corrosion/irritation: No irritant effect.

Serious eye damage/irritation: Cause serious eye irritation.

Respiratory or skin sensitization: No sensitizing effects known.

Specific target organ system toxicity: No information available.

CMR effects(carcinogenity, mutagenicity and toxicity for reproduction): No information available.

## **12. Ecological Information**

## Toxicity:

Acquatic toxicity:	
No further relevant information available.	

Persistence and degradability: No further relevant information available.

Bioaccumulative potential: No further relevant information available.

Mobility in soil: No further relevant information available.

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Other adverse effects: No information available.

## **13. DISPOSAL CONSIDERATIONS**

## Waste treatment methods

Recommendation: Must not be disposed together with household garbage.

Do not allow product to reach sewage system

## **Uncleaned packaging:**

Recommendation: Disposal must be made according to official regulations.

## **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(IA TA )and Technical Instructions for the Safe Transport of Dangerous Goods by Air (T1) 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 UN 38.3(UN Manual of Tests and Criteria, Part III, subsection 38.3) could be transported by air and by sea. If the package meets the packing instruction of IATA-DGR, could be transported as ordinary goods, otherwise should be transported according to Class 9, Packing Group I hazardous goods.

According to UN classification: However this product's shipping name is "lithium ion batteries "(or "Lithium ion Batteries packed with equipment" or " Lithium ion Batteries contained in equipment"), it is not recognized as "DANGEROUS GOODS" when its transport condition accords with "packing instruction 965 section II or section IB of IATA-DGR"(or "packing instruction 966 section II" or "packing instruction 967 section II") or "special provision 188 of IMO-IMDG Code", it could be transported as ordinary goods. It is recognized as "DANGEROUS GOODS" when its transport condition accords with "packing instruction 965 Section IB of IATA-DGR".

1. For lithium ion batteries, UN ID number is 3480, for lithium ion batteries contained in equipment or lithium ion batteries packed with equipment, UN ID number is 3481.



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- The consignment should be fully described by proper shipping name and packed, marked and in proper 2. condition for carriage by air. The consignment is not classified as dangerous under the current edition of the IATA 59th Effective, Dangerous goods regulation and all applicable carrier and government regulations. It is recognized as "DANGEROUS GOODS" when its transport condition accords with "packing instruction 965 Section IB of IATA-DGR" and the transport of lithium ion batteries must be at no more than 30% state of charge (SOC).
- 3. For transported by air, lithium-ion Cells/Batteries shipped as "Not Restricted "Cargo: Must comply with Part II of PI965-PI967 accordingly; for cells, the watt-hour rating should not be more than 20wh; For batteries. The watt-hour rating should not be more than 100Wh. watt-hour rating must be marked on the outside of the battery case (marked by manufacturer).

When its transport condition accords with "packing instruction 965 Section IB of IATA-DGR", the weight of each package should not be more than 10 KG and each package must be labeled with three labels (Li-ion batteries label have two specifications: Normal size min 120mm width\*min 110mm height, When the package size is too small to base on the normal size label to post, then can use the 105mm width\*74mm height specifications of the label ). The design specifications are the same as below figures .



1. Li-ion battery label size:120\*110mm





3 Cargo label size:120\*110mm

4. Each consignment must be accompanied with a document with an indication that: The Package contains lithium ion cells or batteries; the package must be handled with care and that a flammability hazard exists if the package is damaged; Special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary;

The telephone number for additional information for FUJI cells/batteries is 86-755-33893788.

- 5. Each package must be capable of withstanding a 1. 2m drop test in any orientation without damage of cells or batteries contained therein.
- 6. Lithium batteries which meet the requirements of A 154 could be transported by air, and the batteries manufactured by FUJI meet these requirements. (A154 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 for transport).
- 7. Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to short circuit.
- 8. Transport condition should accord with "special provision 188 of IMO-IADG Code".

## **15. REGULATORY INFORMATION**

## Safety, health and environmental regulations/legislation specific for the substance or mixture EU Regulation:

Authorisations: No information available.



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**Restrictions on use:** No information available.

CAS No.	EU	US	Japan	Canada	Austrlia	Korea	China
	(EINECS)	(TSCA)	(ENCS)	(DSLNDS	(AICS)	(ECL)	IECSC)
				L)			
12190-79-3	Listed	Not listed	Not listed	NDSL	Not listed	Not listed	Not listed
7429-90-5	Listed	Listed	Listed	DSL	Listed	Listed	Listed
24937-79-9	Listed	Listed	Listed	DSL	Listed	Listed	Listed
7782-42-5	Not listed	Listed	Not listed	DSL	Listed	Listed	Listed
7440-50-8	Not listed	Listed	Not listed	DSL	Listed	Listed	Listed
9003-55-8	Listed	Listed	Listed	DSL	Listed	Listed	Listed
9002-88-4	Listed	Not listed	Not listed	Not listed	Not listed	Not listed	Listed
9003-07-0	Listed	Listed	Not listed	NDSL	Not listed	Not listed	Not listed
21324-40-3	Listed	Listed	Listed	DSL	Listed	Listed	Listed
96-49-1	Listed	Listed	Listed	DSL	Listed	Listed	Listed

Chemical safety assessment A Chemical Safety Assessment has not been carried out.

## **16. OTHER INFORMATION**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

## **Relevant phrases:**

R20/22: Harmful by inhalation and if swallowed.

R36: Irritating to eyes.

H302: Harmful if swallowed.

H332: Harmful if inhaled.



Issue Date: 2018-1-8



# **MATERIAL SAFETY DATA SHEET**

## **Lithium-ion Polymer Battery**

# Model: 603450-1100mAh

Prepared by	Approved by		
Lingling Chen	Fenzhi Shi		
Date: Dec. 19, 2016	Date: Dec. 19, 2016		

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# **Material Safety Data Sheet**

## **Section 1-Chemical Product and Company Identification**

## **Product Identification**

SP Lithium-Ion Polymer ba	tte	ry			
Norminal Voltage	:	3.7 V			
Equivalent Lithium content	:	<mark>≤20 Wh</mark>			
Testing Period	:	Sep .2, 2017	То	Sep.5,	2017

## Manufacturer

SPRINGPOWER TECHOLOGY SHENZHEN CO.,LTD Chaoshun Industrial Zone, Renmin Road, Fumin, Guanlan, Baoan, Shenzhen, Guangdong, China

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-mail	: llchen@highpowertech.com
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Section 2-Composition/information on ingredients						
Chemical Composition	Molecular Formula	Weight%	CAS No	OSHA(PEL)	ACGIH(TLV)	
Lithium Cobalt Oxide	LiCoO2	35~38%	12190-79-3	N/A	N/A	
Graphite powder	С	23~25%	7782-42-5	N/A	N/A	
Electrolete	LiPF6 C3H4O3 C4H6O3	12 - 150/	21224 40 2			
Electrolyte	C3H10O3	12/~15%	21324-40-3	IN/A	N/A	
Polyethylene	(C <sub>2</sub> H <sub>4</sub> ) n	0.5~1%	9002-88-4	N/A	N/A	
Cu	Cu	5~10%	7440-50-8	N/A	N/A	
Nickel	Nickel	2~3%	7440-02-0	N/A	N/A	
Polyvinylidene fluoride	(CH <sub>2</sub> CF <sub>2</sub> ) n	0.5~2%	24937-79-9	N/A	N/A	
Polypropylene	(C3H6) n	2~5%	9003-07-0	N/A	N/A	
Aluminum foil	Al	7~10%	7429-90-5	N/A	N/A	
Silicon	Si	1~2%	7440-21-3	N/A	N/A	
Epoxy Resin	EP	1.5~2%	38891-59-7	N/A	N/A	
PVC	(C <sub>2</sub> H <sub>3</sub> Cl)x	0.2~0.5%	9002-86-2	N/A	N/A	
Gold	Au	0.2~0.5%	7440-57-5	N/A	N/A	
Sn	Sn	$0.05 \sim 0.1\%$	7440-31-5	N/A	N/A	

## **Section 3-Hazards Identification**

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## **Section 3-Hazards Identification**

Preparation	Not dangerous with normal use. Do not dismantle, open or shred Li-ion Battery.
hazards and	Exposure to the ingredients contained within or their ingredients products could be harmful.
classification	
Appearance,	Solid object with no odor, no color.
Color, and	
Odor	
Primary	These chemicals are contained in a sealed stainless steel enclosure. Risk of exposure occurs
Route(s) of	only if the cell is mechanically, thermally or electrically abused to the point of
Exposure	compromising the enclosure. If this occurs, exposure to the electrolyte solution contained
	within can occur by Inhalation, Ingestion, Eye contact and Skin contact.
Potential	ACUTE (short term): see Section 8 for exposure controls In the event that this battery has
Health	been ruptured, the electrolyte solution contained within the battery would be corrosive and
Effects:	can cause burns.
	Inhalation: Inhalation of materials from a sealed battery is not an expected route of
	exposure. Vapors or mists from a ruptured battery may cause respiratory irritation.
	Ingestion: Swallowing of materials from a sealed battery is not an expected route of
	exposure. Swallowing the contents of an open battery can cause serious chemical burns of
	mouth, esophagus, and gastrointestinal tract.
	Skin: Contact between the battery and skin will not cause any harm. Skin contact with
	contents of an open battery can cause severe irritation or burns to the skin.
	Eye: Contact between the battery and the eye will not cause any harm. Eye contact with
	contents of an open battery can cause severe irritation or burns to the eye.
	CHRONIC (long term): see Section 11 for additional toxicological data
Medical	Not applicable
Conditions	
Aggravated	
by	
Exposure	
Reported as	Not applicable
carcinogen	

## **Section 4-First-aid Measures**

Inhalation	If contents of an opened battery are inhaled, remove source of contamination or move victim to fresh air. Obtain medical advice.
Skin contact	If skin contact with contents of an open battery occurs, as quickly as possible remove contaminated clothing, shoes and leather goods. Immediately flush with lukewarm, gently flowing water for at least 30 minutes. If irritation or pain persists, seek medical attention. Completely decontaminate clothing, shoes and leather goods before reuse or discard.

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Eye contact	If eye contact with contents of an open battery occurs, immediately flush the contaminated			
	eye(s) with lukewarm, gently flowing water for at least 30 minutes while holding the eyelide			
	open. Neutral saline solution may be used as soon as it is available. If necessary, continu			
	flushing during transport to emergency care facility. Take care not to rinse contaminate			
	water into the unaffected eye or onto face. Quickly transport victim to an emergency car			
	facility.			
Ingestion	If ingestion of contents of an open battery occurs, never give anything by mouth if victim is			
	rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth			
	thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 60 to 240 mL			
	(2-8 oz.) of water. If vomiting occurs naturally, have victim lean forward to reduce risk of			
	aspiration. Have victim rinse mouth with water again. Quickly transport victim to an			
	emergency care facility.			

Section 5-Fire Fighting Measures		
Flammable	In the event that this battery has been ruptured, the electrolyte solution contain within the	
Properties	battery would be flammable. Like any sealed container, battery cells may rupture when	
	exposed to excessive heat; this could result in the release of flammable or corrosive	
	materials.	
Suitable	Use extinguishing media suitable for the materials that are burning.	
extinguishing		
Media		
Unsuitable	Not available	
extinguishing		
Media		
Explosion	Sensitivity to Mechanical Impact: This may result in rupture in extreme cases	
Data	Sensitivity to Static Discharge: Not Applicable	
Specific	Fires involving Li-ion Battery can be controlled with water. When water is used, however,	
Hazards	hydrogen gas may evolve. In a confined space, hydrogen gas can form an explosive mixture.	
arising from	In this situation, smothering agents are recommended to extinguish the fire	
the chemical		
Protective	As for any fire, evacuate the area and fight the fire from a safe distance. Wear a	
Equipment	pressure-demand, self-contained breathing apparatus and full protective gear.	
and	Fight fire from a protected location or a safe distance. Use NIOSH/MSHA approved	
precautions	full-face self-contained breathing apparatus(SCBA) with full protective gear.	
for firefighters		
NFPA	Health: 0 Flammability: 0 Instability: 0	

## Section 6-Accidental Release Measures

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Personal Precautions, protective equipment, and	Restrict access to area until completion of
emergency procedures	clean-up. Do not touch t
	he spilled material. Wear
	adequate personal protective equipment as
	indicated in Section 8.
Environmental Precautions	Prevent material from contaminating soil and
	from entering sewers or waterways.
Methods and materials for Containment	Stop the leak if safe to do so. Contain the spilled
	liquid with dry sand or earth. Clean up spills
	immediately.
Methods and materials for cleaning up	Absorb spilled material with an inert absorbent (dry
	sand or earth). Scoop contaminated absorbent into an
	acceptable waste container.
	Collect all contaminated absorbent and dispose of
	according to directions in Section 13. Scrub the area
	with detergent and water; collect all contaminated
	wash water for proper disposal.

## Section 7-Handling and Storage

	T
Handling	Don't handling Li-ion Battery with metalwork. Do not
	open, dissemble, crush or burn battery.
	Ensure good ventilation/ exhaustion at the workplace.
	Prevent formation of dust. Information about
	protection against explosions and fires: Keep ignition
	sources away- Do not smoke.
Storage	If the Li-ion Battery are subject to storage for such a
	long term as more than 3 months, it is recommended
	to recharge the Li-ion Battery periodically.
	3 months: -10 $^\circ\!\mathrm{C}$ ~+40 $^\circ\!\mathrm{C}$ , 45 to 85%RH And
	recommended at $0^{\circ}C \sim +35^{\circ}C$ for long period storage.
	The capacity recovery rate in the delivery state (50%
	capacity of fully charged) after storage is assumed to
	be 80% or more. The voltage for a long time storage
	shall be 3.7V~4.2V range.
	Do not storage Li-ion Battery haphazardly in a box or
	drawer where they may short-circuit each other or be
	short-circuited by other metal objects.
	Keep out of reach of children.

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Do not expose Li-ion Battery to heat or fire. Avoid storage in direct sunlight. Do not store together with oxidizing and acidic materials.

## Section 8-Exposure Controls/Personal Protection

Engineering Controls	Use local exhaust ventilation or other engineering	
	controls to control sources of dust, mist, fumes and	
	vapor. Keep away from heat and open flame. Store in	
	a cool, dry place.	
Personal Protective Equipment	Respiratory Protection: Not necessary under	
	normal conditions.	
	Skin and body Protection: Not necessary under	
	normal conditions, Wear neoprene or nitrile rubber	
	gloves if handling an open or leaking battery.	
	Hand protection: Wear neoprene or natural rubber	
	material gloves if handling an open or leaking	
	battery.	
	Eye Protection: Not necessary under normal	
	conditions, Wear safety glasses if handling an open or	
	leaking battery.	
Other Protective Equipment	Have a safety shower and eye wash fountain readily	
	available in the immediate work area.	
Hygiene Measures	Do not eat, drink, or smoke in work area.	
	Maintain good housekeeping.	

## **Section 9-Physical and Chemical Properties**

Physical	Form: Solid	
State	Color: White	
	Odour: Monotony	
Change in condition:		
pH, with indication of the concentration		Not applicable
Melting point/fre	ezing point	Not available.

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Boiling Point, initial boiling point and Boiling	Not available.
range:	
Flash Point	Not available.
Upper/lower flammability or explosive limits	Not available.
Vapor Pressure:	Not applicable
Vapor Density: (Air = 1)	Not applicable
Density/relative desity	Not available.
Solubility in Water:	Insoluble
n-octanol/water partition coefficient	Not available.
Auto-ignition temperature	130°C
Decomposition temperature	Not available.
Odout threshold	Not available.
Evaporation rate	Not available.
Flammability (soil, gas)	Not available.
Viscosity	Not applicable

## Section 10- Stability and Reactivity

Stability	The product is stable under normal conditions.
Conditions to Avoid (e.g. static discharge, shockor	Do not subject Li-ion Batteryto mechanical shock.
vibration)	Vibration encoutered during transportation does not
	cause leakage, fire or explosion.
	Do not disassemble, crush, short or install with
	incorrect polarity. Avoid mechanical or electrical
	abuse.
Incompatible Materials	Not Available
Hazardous Decomposition Products	This material may release toxic fumes if burned
	or exposed to fire
Possibility of Hazardous Reaction	Not Available

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#### **Section 11-Toxicological Information**

Irritation	Risk of irritation occurs only if the cell is mechanically, thermally or electrically abused to the
	point of compromising the enclosure. If this occurs,
	irritation to the skin, eyes and respiratory tract may
	occur.
Sensitization	Not Available
Neurological Effects	Not Available
Teratoaenicitv	Not Available
Reproductive Toxicity	Not Available
Mutagenicity (Genetic Effects)	Not Available
Toxicologically Synergistic Materials	Not Available

## **Section 12-Ecological Information**

General note:	Water hazard class 1(Self-assessment): slightly
	hazardous for water.
	Do not allow undiluted product or large quantities
	of it to reach ground water, water course or
	sewage system.
Anticipated behavior of a chemical product in	Not Available
environment/possible environmental	
impace/ecotoxicity	
Mobility in soil	Not Available
Persistence and Degradability	Not Available
Bioaccumulation potential	Not Available
Other Adverse Effects	Not Available

## **Section 13-Disposal Considerations**

Product disposal recommendation: Observe local, state and federal laws and regulations. Packaging disposal recommendation: Be aware discarded batteries may cause fire, tape the battery terminals to insulate them. Don't disassembly the battery. Completely discharge containers (no tear drops, no powder rest, scraped carefully). Containers may be recycled or re-used. Observe local, state and federal laws and regulations.

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The potential effects on the environment and human health of the substances used in batteries and accumulations; the desirability of not disposing of waste batteries and accumulators as unsorted municipal waste and of participating in their separate collection so as to facilitate treatment and recycling.

## **Section 14-Transport Information**

This report applies to by sea, by air and by land;

The Li-ion Battery tested according to the requirements of the 5th revised edition of the UN manual of tests and Criteria, Part III, subsection 38.3;

Lithium ion battery was protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to short circuit;

The LITHIUM ION BATTERY(603450-1100mAh) according to Section II/IA/IB of PACKING INSTRUCTION 965/ 966 /967 of the 2017 IATA Dangerous Goods regulations 58th Edition may be transported and applicable U.S.DOT regulations for the safe transport of Li-ion Battery.

More information concerning shipping, testing, marking and packaging can be obtained from label master at http://www.labelmaster.com/.

The packaging shall be adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design shall be chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of moisture.

The package must be handled with care and that a flammability hazard exists if the package is damaged; Each package must be labeled with a Li-ion Battery handling label or in addition to the Class 9 hazard label. With regard to transport, the following regulations are cited and considered:

- The International Civil Aviation Organization (ICAO) Technical Instructions.
- The International Air transport Association (IATA) Dangerous Goods Regulations. UN number of lithium battery: UN3480 or UN3481;

UN Proper shipping name/Description (technical name): Lithium ion batteries or Lithium ion batteries contained in equipment or Lithium ion batteries packed with equipment;

UN Classification (Transport hazard class): Non dangerous;

Marine pollutant (Y/N): N;

- The International Maritime Dangerous Goods (IMDG) Code.

For lithium-ion batteries by sea, provided that packaging is strong and prevent the products from short-circuit. UN number of lithium battery: UN3480 or UN3481;

UN Proper shipping name/Description (technical name): Lithium ion batteries or Lithium ion batteries contained in equipment or Lithium ion batteries packed with equipment;

UN Classification (Transport hazard class): Non dangerous; Marine pollutant (Y/N): N;

Special Provision: International maritime dangerous goods code (IMDG) 188, 230, 310, 348, 957;

- The US Hazardous Materials Regulation (HMR) pursuant to a final rule issued by RSPA

- The Office of Hazardous Materials Safety within the US Department of Transportations' (DOT) Research and Special Programs Administration (RSPA)

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## Section 16-Other Information

The information above is believed to be accurate and represents the best information currently available to us. However, concord makes no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration of investigation. This material safety data sheet provides guidelines for the safe handling and use of this product; it does not and cannot advise on all possible situations, therefore, your specific use of this product should be evaluated to determine if additional precautions are required.

The data/information contained herein has been reviewed and approved for general release on the basis that this document contains no export controlled information.

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# **Material Safety Data Sheet**

# 化学品安全技术说明书

#### Section 1 - Chemical Product and Company Identification 第一部分 化学品及企业标识

Product Name: Rechargeable Li-ion Battery 产品名称:可充锂离子电池

Type/Model: GSP454487 2200mAh 3.7V 8.14Wh

型号: GSP454487 2200mAh 3.7V 8.14Wh

Manufacturer: ZHUHAI GREAT POWER ENERGY CO., LTD. 生产企业名称: 珠海鹏辉能源有限公司

Address:XINQING TECHNOLOGY PARK, ZHUFENG AVENUE, JING AN TOWN, DOUMEN DISTRICT, ZHUHAI CITY, GUANGDONG PROVINCE 地址: 广东省珠海市斗门区井岸镇珠峰大道新青科技园

Post Code: 519100 邮编: 519100

Tel: 0756-3922111 电话: 0756-3922111

Emergency Telephone: 0756-3922111 应急电话: 0756-3922111

Fax: 0756-3922218 传真: 0756-3922218

E-mail: renzheng@great power.net 邮箱: renzheng@great power.net



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			1	
Chemical Composition		Chemical	CAS No:	Weight(%)
化学名称		Formula	CAS 号:	百分含量(%)
		分子式		
Lithium	Cobalt Oxide	LiCoO <sub>2</sub>	12190-79-3	48
	钴酸锂			
(	Graphite	0	7782-42-5	21.2
石墨		C		
Organic Electrolyte 有机电解液	碳酸乙烯酯(EC)	C3H4O3	96-49-1	4.71
	碳酸甲乙酯(EMC)	C4H8O3	623-53-0	0. 785
	碳酸二乙酯 (DEC)	C5H10O3	105-58-8	6.28
	碳酸丙烯酯 (PC)	C4H6O3	108-32-7	1.9625
	六氟磷酸锂(LiPF6)	F6LiP	21324-40-3	1.57
Polypropylene 聚丙烯		C <sub>3</sub> H <sub>6</sub>	9003-07-0	0.8
Copper		Cu	7440-50-8	8.7
铜				
Aluminum		AI	7429-90-5	5.6
铝				

## Section 2 -Composition/Information on Ingredient 第二部分 成分/组成信息

Section 3 -Hazards Identification 第三部分 危险性概述

Health Hazards (Acute and Chronic) 健康危害

These chemicals are contained in a sealed can .Risk of exposure occurs only if the cell is mechanically or electrically abused.Contact of electrolyte and extruded lithium with skin and eyes should avoided.

化学物质泄漏会产生危害。电芯 机械性或电力性破损会产生接触性伤害。避免皮肤和眼睛接触电解液。

Sign/symptoms of Exposure 暴露症状 A shorted lithium cell can cause thermal

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and chemical burns upon contact with the skin. 短路的锂电芯接触皮肤会产生电热性损伤。

## Section 4-first Aid Measures 第四部分 急救措施

Eye: Flush eyes with plenty of water for at least 15 minutes ,occasionally lifting the upper and lower eyelids.Get medical aid.

眼睛接触:迅速用大量水冲洗 15 分钟以上,期间提起上下眼睑。速就医。

Skin: Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes .Get medical aid.

皮肤接触:除去附着衣物,用大量水冲洗15分钟。速就医。

Inhalation: Remove from exposure and move to fresh air immediately.Use oxygen if available.

吸入:移到通风片。如需要给予输氧。

Ingestion: give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious.call a physician.

食入:口服2杯牛奶或水。人员无意识下禁止催吐。速就医。

## Section 5 -Fire Fighting Measures 第五部分 消防措施

Flash point : N/A 闪点:不涉及

Auto-Ignition Temperature: N/A 燃点: 无资料

Extinguishing Media : Dry chemical,CO<sub>2</sub>. 灭火剂 : 干粉, CO<sub>2</sub>.

Special Fire-Fighting Procedures 灭火过程方法 Self-contained breathing apparatus. 配戴自主呼吸器 Unusual Fire and Explosion Hazards 燃爆危害



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Cell my vent when subjected excessive heat-exposing cell contents.

过度加热会导致内含物溢出

Hazardous Combustion Products

燃烧产物

Carbon monoxide, carbon dioxide, lithium oxide fumes. 二氧化碳,一氧化碳、锂的金属氧化物,其他刺激性和毒性气体

## Section 6-Accidental Release Measures 第六部分 泄漏应急处理

Steps to be Taken in case Material is Released or Spilled 泄漏处理

If the cell material is released, remove personnel from area until fumes dissipate.

Provide maximum ventilation to clear out hazardous gases.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 cell 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.

如电芯发生破损并且电解液泄漏,疏散人员直到烟雾散尽。用布擦净,并装入袋子放入钢桶内。

如电芯灼热,先远离现场,冷却电芯,使蒸汽消散。充分通风。避免工眼睛接触蒸汽。

#### Waste Disposal Method

废弃物处理法

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

电芯应放电完全,将废弃的电芯统一上交于相关部门,所有废弃物必须参照联合国,国家,地方性法规进行处置。参照国家环保局或联邦 EPA。

Section 7 - Handling and Storage 第七部分 操作处置与存储

The cell should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients they contain in the hermetically sealed container.

Do not short circuit terminals,or over charge the cell,forced over-discharge,throw to fire.

Do not crush or puncture the cell,or immerse in liquids.

电芯禁止拆开,损毁或焚烧,严禁破损流出电解液。需在密封容器内储存。 禁止短路,过充电、强制放电 或投入火中。

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禁止挤压或刺穿电芯。 禁止将电芯放入液体中。

Precautions to be taken in handling and storing 操作和储存

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 cell near heating equipment,nor expose to direct sunlight for long periods.

禁止机械或电力损伤电芯。储存在干燥、凉爽、通风的环境中,避免温度化或高温。远 离热源,避免长时间阳光照射。电芯在拆开、挤压、遇火或高温情况下,会引起起火或 爆炸,严禁短路或非正确操作。

#### Other precautions

cells 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 第八部分 接触控制/个体防护

## Respiratory Protection

呼吸系统防护

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

如电芯泄漏, 需充分通风。 Ventilation 手防护 Not necessary under conditions of normal use. 正常使用下, 不需要 Protective Gloves 个人防护 Not necessary under conditions of normal use. 正常使用下, 不需要 Other protective clothing or Equipment 其他防护 Not necessary under conditions of normal use.



正常使用下,不需要

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MSDS-58th File No: GP170816-1 2017-08-16 Personal protection is recommended for venting cell: Respiratory Protection Protective Gloves,Protective Clothing and safety glass with side shields. 如电芯发生泄漏, 需佩戴呼吸器, 防护手套, 作业工作服, 化学防护镜。

> Section 9 Physical and Chemical Properties 第九部分 理化特性

Nominal Voltage : 3.7V 标称电压: 3.7V Rated Capacity: 2200mAh

额定电容量: 2200mAh

Appearance Characters: Silver Solid batteries for the Pouch tasteless 外观与性状:银色袋状无味的固体电池。

#### Section 10 -Stability and Reactivity 第十部分 稳定性和反应活性

Stability: Under normal use, good stability
稳定性:正常使用下,稳定性良好
Conditions to Avoid: Heating ,mechanical ,abuse and electrical abuse.
禁忌物:高温、高热、机械或电力损伤
Hazardous Decomposition Products: N/A
热分解产物: N/A
Hazardous Polymerization: N/A
聚合产物: N/A
If leaked ,forbidden to contact with strong oxidizers,mineral acids,strong alkalis,halogenated hydrocarbons.
如果泄漏,避免接触强氧化剂,避免接触酸、碱、卤素。

Section 11- Toxicological information 第十一部分 毒理学资料

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

当电芯破损时,吸入,皮肤接触或眼睛接触可能产生刺激作用。刺激性蒸汽会损伤皮肤,眼睛和呼吸粘膜。

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## Section 12 -Ecological information 第十二部分 生态学资料

When promptly used or disposed the cell odes not present environmental hazard. When disposed,keep away from water,rain and snow. 环境影响:正确使用和处置电芯不会对环境产生危害。 处置废弃时,远离水源,雨水和雪水。

## Section 13 -Disposal Considerations

第十三部分 废弃处置

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION If cell are still fully charged or only partially discharged ,they can be considered a reactive hazardous waste because of significant amount of uncreated or unconsumed lithium remaining in the spent cell.The cell must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste .Recycling of cell can be done in authorized facility ,through licensed waste carrier.

如果锂电芯未完全放电 或只部分放电 的情况 下,由于 部分未耗尽的锂存在于电芯中,此 电芯视为具有一定危害的危险废弃物。必须通过经认可的其进行处理方可废弃。在相关法律 法规下,电芯可循环再利用。

## Sections 14 -Transport information 第十四部分 运输信息

The Li-ion batteries has passed the test UN38.3 该锂离子电池已通过 UN38.3 测试。

According to packing instruction PI967 section II of IATA DGR 58<sup>th</sup> Edition for transportation or the special provision 188 of IMDG.

运输过程中请根据 IATA DGR 规则第 58 版包装规定 PI967 第 II 部分,海运危险品规则 IMDG 特殊规定 188 执行。

The products are not subject to dangerous goods. 该产品不属于危险品



More information concerning shipping .testing,marking and packaging can be obtained from Label master at <u>http://www.labelmaster.com.</u> 更多关于锂离子电芯运输、测试、 包装等相关规定

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MSDS-58th File No: GP170816-1 2017-08-16 请参见网址: <u>http://www.labelmaster.com.</u>

Separate Lithium -ion cell when shipping to prevent short -circuiting.They should be Packed in strong packaging for support during transport .Take in a cargo of them without Falling,dropping,and breakage.Prevent collapse of cargo piles and wet by rain. 电芯相互隔开并防止短路、泄漏,并装放在结实的容器内运输。

注: 该电芯应在半荷电状态(20-50%充电状态)下包装成臬进行运输,在运输过程中应防止剧烈振动、冲击或挤压,防止日晒雨淋。具体细节请对照本文第七部分操作处置与储存。 Transport Fashion: By air ,by sea. 运输方式: 空运,海运。

## Section 15 - Regulatory Information 第十五部分 法规信息

Law Information 法规信息 «Dangerous Goods Regulation» 《危险品规则》 «Recommendations on the Transport of Dangerous Goods Model Regulations» 《危险品货物运输规章范本》 «International Maritime Dangerous Goods» 《国际海上危险货物运输规则》 «Technical Instructions for the Safe Transport of Dangerous Goods» 《危险物品航空安全运送技术指南》 «Classification and code of dangerous goods» 《危险货物分类和品名编号》 «Occupational Safety and Health Act» (OSHA) 《职业安全与卫生条例的危害》 《Toxic Substances Control Act 》(TSCA) 《毒性物质控制法》 《Consumer Product Safety Act 》(CPSA) 《消费品安全法》 《Federal Environmental Pollution Control Act 》 (FEPCA) 《联邦环境污染控制法》 «The Oil Pollution Act » (OPA) 《石油污染法》 «Superfund Amendments and Reauthorization Act Title III(302/311/312/313) » (SARA) 《附加基金修正复审法 III(302/311/312/313)》 《Resource Conservation and Recovery Act 》 (RCRA) 《资源保护和回收法》

珠海鹏辉能源有限公司 MSDS-58th File No: GP170816-1 2017-08-16 《Safety Drinking Water Act 》(CWA) 《安全饮水法》 《California Proposition 65》 《加州提案 65》 《Code of Federal Regulations 》(CFR) 《美国联邦法规》 In accordance with all Federal,State and Local laws. 可参照联合国、国家、地方性法规。

## Section 16-Additional Information 第十六部分 其他信息

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 bot assume any responsibility for the results of its use.This information is furnished upon condition that person receiving it shall made his own determination of the suitability of the material for his particular purpose.

上述信息是基于现有的数据信息,在实际应用过程中可能出现其他未预料的情况,其相应信息可能需要修改,我方不承担引项责任。在操作中请根据实际情况做出相应的正确的处置。

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This product is a consumer product which is used in a hermetically sealed state. So, it is not an object of the SDS system. This document is provided to customers as reference information for the safe handling of the product. The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Panasonic Corporation makes no warranty expressed or implied.

## **PRODUCT SAFETY DATA SHEET**

#### 1 Chemical product and company identification

Name of Product	:	Manganese dioxide lithium battery		
Name of Company	:	Panasonic Corporation Automotive & Industrial Systems Company		
Address	:	1-1 Matsushita-cho, Moriguchi-city, Osaka, 570-8511, Japan		
		Telephone +81-6-6994-4560		
Division		Energy Device Business Division		
Department		Engineering Department		
Emergency Contact	:	Outside the United States +1-703-527-3887		
(call CHMTREC)		in the United States 1-800-424-9300		

#### 2 Hazards identification

:	Not applicable			
:	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.	Content (%)
Positive electrode	Manganese dioxide	1313-13-9	25 - 47
Negative electrode	Lithium metal	7439-93-2	2 - 5
Electrolyte	1,2-dimethoxyethane	110-71-4	3 - 7
Electrolyte	Organic electrolyte	-	5 - 17
Others	Steel	7439-89-6, 7440-47-3	25 - 50
(Steel or Plastic parts) Polypropylene		9003-07-0	3 - 15

Lithium content per cell

Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)
CR2	0.33	CR123A	0.6	CR-2/3AZ	0.6	CR-AG	0.8



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4	<b>First aid measures</b> (in cas Eye contact	<ul> <li>e of electrolyte leakage from the battery)</li> <li>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 eve injury.</li> </ul>
	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	<b>Firefighting measures</b> Fire extinguishing agent Extinguishing method	<ul> <li>Alcohol-resistant foam and dry sand are effective.</li> <li>Since vapor, generated from burning batteries may make eyes, nose and throat irritates, be sure to extinguish the fire on the windward side. Wear the respiratory protection equipment in some cases.</li> </ul>

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	: Ž 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.
		ž Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation.
		ž Do not short-circuit, recharge, deform, throw into fire or disassemble.
		ž Do not mix different type of batteries.
		ž Do not solder directly onto batteries.
		ž Insert the battery correctly in electrical equipment.
	Storage	• Do not let water penetrate into packaging boxes during their storage and transportation.
		<ul> <li>Do not store the battery in places of the high temperature or under direct sunlight.</li> </ul>
		<ul><li>Ž Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, rain or frozen condition</li></ul>



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#### 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)

<b>Respiratory Protection</b>	:	Self-Contained Breathing Apparatus for organic gases
Hand Protection	:	Safety gloves.
Eye Protection	:	Safety goggle

#### 9. Physical and chemical properties

Appearance	:	Cylindrical shape
Nominal 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 > 2000mg/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 dropped or damaged.



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Proper shipping name	:	Lithium metal batteries
UN Number, UN Class	:	<ul> <li>UN3090, Class9 (for the Air transport by PI968 Section IA or IB)</li> <li>Exemption (for the Marine transport and the Air transport by Section II of PI 968, 969 or 970)</li> <li>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:</li> <li>1. for cells, the lithium content is not more than 1g;</li> <li>2. each cell is of the type proven to meet the requirements of each test in the LIN Manual of Tests and Criteria Part sub-section 38.3</li> </ul>
		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(SP)	Note
Air transport	IATA DGR	PI 968 Section A	Cells, Cargo Aircraft only; Net quantity per package Max. 35kg
		PI 968 Section B	Cells, Cargo Aircraft only; net quantity per package Max. 2.5kg
		PI 968 Section	Cells, on Cargo Aircraft only, not more than one package in any single consignment. Maximum number of cells per package; 8 cells
		PI 969 Section	Cells packed with equipment
		PI 970 Section	Cells contained in equipment
Marine transport	IMDG Code	SP 188	

#### 15. Regulatory information

- IATA Dangerous Goods Regulations 59th Edition (IATA DGR)
- IMO International Maritime Dangerous Goods Code 2016 Edition (IMDG Code)
- UN Recommendations on the Transportation of Dangerous Goods, Model Regulations
- UN Recommendations on the 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)
- $\boldsymbol{\cdot}$  State of California Regulations Best management practices for Perchlorate Materials

#### 16. Other information

This PSDS 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.