

MATERIAL SAFETY DATA SHEET

Date: 1 /2/2022
File No.: HR-M5-8860



1. Identification of the substance/preparation and of the company/undertaking

Identification of the product

Product name: Zinc-Manganese Battery/Dry Battery
Chemical System: Zinc-Manganese Battery
Model: R03,R20,R6,R14,3R12
Designated for RECHARGE? No

Manufacturer/supplier identification

Company: Zhejiang HuaRong Battery Co., LTD
Contact for information: 517 dongda Road, JIAXING,ZHEJIANG, PRC
Emergency telephone No.: 86-573-83593608

2. Composition/information on ingredients

Ingredient	Percent	CAS Index No./EC No.	Molar mass	Molecular formula	Symbol
Zinc	25.8%	7440-66-6		Zn	
Manganese(EMD)	48%	7439-96-5		MNO2	
Acetylene	3.8%	74-86-2			
Electrolyte	0.3%	7727-43-7			
Kryptol	0.54%	7440-44-0			
Others	21.56%	7440-50-8			
		7440-50-8			

3. Hazards identification

Health Hazards (Acute and Chronic):

For the battery cell, chemical materials are stored in a hermetically sealed can, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials leakage.

However, if exposed to a fire, added mechanical shocks, decomposed, or added electric stress by misuse the cell case will be breached and hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

Carcinogenicity:

NTP: None IARC Monograph: None OSHA Regulated: None

Medical Conditions Generally Aggravated by Exposure:

An acute exposure will not generally aggravate any medical condition.

Human health effects:

Inhalation: The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.

Skin contact: The steam of the electrolyte stimulates a skin. The electrolyte skin contact causes a sore and the stimulation on the skin.

Eye contact: The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and the stimulation on the eye. Inflammation of the eyes may occur.

Environmental effects:


Since a battery cell remains in the environment, do not throw out it into the environment.

Specific hazards:

If the electrolyte contacts with water, it may generate detrimental hydrogen fluoride.

Since the leaked electrolyte is inflammable liquid, do not bring close to fire.

4. First aid measures



After inhalation contact:	Make the victim blow his/her nose, gargle. Seek medical attention if necessary.
After skin contact:	Remove contaminated clothes and shoes immediately. Immediately wash extraneous matter or contact region with soap and plenty of water.
After eye contact:	Do not rub eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.
After ingestion contact:	Make the victim vomit. Immediately seek medical attention.

5. Fire-fighting measures

Extinguishing Media:	Plenty of water, CO ₂ gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.
Specific methods of fire-fighting:	When the battery burns with other combustibles simultaneously, take fire extinguishing method which corresponds to the combustibles. Extinguish a fire from the windward as much as possible.
Flammable Limits:	Not available

6. Accidental release measures

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

7. Handling and storage

Avoid mechanical or electrical abuse. Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

8. Exposure controls/personal protection

Specific control parameter:

Personal protective equipment :

Respiratory protection (Specify Type):	Not necessary under conditions of normal use.
Ventilation:	Not necessary under conditions of normal use.
Protective Gloves:	Not necessary under conditions of normal use.
Eye protection:	Not necessary under conditions of normal use.
Other Protective (Clothing or Equipment):	Not necessary under conditions of normal use.



9. Physical and chemical properties

Appearance

Physical state:	Solid
Form:	Cylindrical/Square
Color:	Metallic color
Odor:	No odor
PH	N/A
Specific temperatures	Temperature ranges changes in physical state occur.
Flash point	N/A
Explosion properties	N/A
Density	N/A
Solubility	with indication of the solvent(s): Insoluble in water

10. Stability and reactivity

Stability:	Stable
Conditions to Avoid:	When cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will cause heat generation and ignition. Avoid direct sunlight and high humidity.
Hazardous Decomposition or By-products:	Acrid or harmful gas is emitted during fire.
Materials to avoid:	Conductive materials, water, seawater, strong oxidizers and strong acids.

Hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity:

Copper	60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation. TDLo, hypodermic - Rabbit 375mg/kg
Organic electrolyte	LD50, oral - Rat 2,000mg/kg or more

Further toxicological information:

Aluminum	By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).
Lithium Cobaltate	By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.
Graphite	Long-term inhalation of high levels of graphite coarse particulate may cause lung disease or a tracheal disease.

12. Ecological information

Ecotoxic effects: N/A

Further ecological data: N/A

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



13. Disposal considerations

Appropriate method of disposal of substance or preparation

Dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental agency.

14. Transport information

This substance is not subject to IMO IMGG Code.

This substance is not subject to IATA DGR.

This goods can be packaged according to the packaging requirement of ordinary goods

Large batteries are considered to be "Dry cell" batteries and are unregulated for purpose of transportation by the U.S. DOT, ICAO, IATA and IMDG. The only DOT requirement for shipping these batteries is special provision 130 which states: "Batteries, dry are not subject to the requirements of this subchapter only when they are offered for transportation in a manner that prevents the dangerous evolution of heat (For example, by the effective insulation of exposed terminals). The only requirement for shipping these batteries by ICAO and IATA is special provision A123 which states: "An electrical battery or battery powered device having the potential of dangerous evolutions of heat that is not prepared so as to prevent a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or in the case of equipment.

Transport fashion: By air, by sea, by railway, by highway.

15. Regulatory information

N/A

16. Other information

Make people:

Professional post: R&D Engineer

Name(signature): JUMEIFAN

Make unit:

Name: R&D Department

Phone: 0086-577-83593608

Address: R&D Dept., JIAXING Plant.,

Date of issue: 2022/1/2



DISCLAIMER:

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. Hua Rong Battery Co. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

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Report No.: MPIJQ48L987567U3

MSDS Report

Sample Name
& Model

Li-ion Rechargeable Cell ICR18650B

Applicant

SHENZHEN BOFUNENG BATTERY CO.,LTD

Address

A Building Chunyang Industrial park, Zhugushi Road Wulian
community Long Cheng Street, Longgang district, Shenzhen China



No.: MPIJQ48L987567U3

Code: viv104



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Material Safety Data Sheet

Reference to ST/SG/AC.10/30/Rev.9 (GHS)

Section 1 - Chemical Product and Company Identification

Chemical Product Identification

Sample Name: Li-ion Rechargeable Cell**Sample Model:** ICR18650B**Recommended Uses:** N/A**Restrictions on Use:** N/A**Supplier Name:** SHENZHEN BOFUNG BATTERY CO.,LTD**Address:** A Building Chunyang Industrial park, Zhugushi Road Wulian community Long Cheng Street, Longgang district, Shenzhen China**Phone Number:** 0755-84642975**FAX:** 0755-84642732**E-mail:** aijuan_1425@126.com**Emergency Phone Number:** 0755-84642975

Section 2 - Hazards Identification

Emergency overview: This product is a battery. Intended use of the product should not result in exposure to the chemical substance. In case of rupture the below hazards exist.

Classification according to GHS

Acute toxicity, oral (4)

Skin corrosion/irritation (2)

Serious eye damage/eye irritation (2A)

Specific target organ toxicity, single exposure; Respiratory tract irritation (3)

Label elements

Hazard pictogram(s):**Signal word:**

Warning

Hazard statement(s):

H302 Harmful if swallowed

H315 Causes skin irritation

H319 Causes serious eye irritation



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H335 May cause respiratory irritation

Precautionary statement(s):**Prevention:**

P264 Wash skin and clothing thoroughly after handling.

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

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

P261 Avoid breathing dust, fume, gas, mist, vapours, spray.

P271 Use only outdoors or in a well-ventilated area.

Response:

P301 + P312 IF SWALLOWED: Call a POISON CENTER if you feel unwell.

P330 Rinse mouth.

P302 + P352 IF ON SKIN: Wash with plenty water.

P321 Specific treatment (See additional emergency instructions).

P333 + P313 If skin irritation or rash occurs: Get medical advice.

P362 + P364 Take off contaminated clothing and wash it before reuse.

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

P337 + P313 If eye irritation persists: Get medical advice.

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312 Call a POISON CENTER, if you feel unwell.

Storage

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

Disposal:

P501 Send contents to approved waste treatment plants.

Other hazards**Physical and chemical hazards:** See Section 10**Human health hazards:** See Section 11**Environmental hazards:** See Section 12

Section 3 – Composition/Information on Ingredients

Chemical characterization: Mixture

Chemical Composition	CAS No.	EC#	Weight (%)
Cobaltate, lithium	12190-79-3	235-362-0	39.60



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Aluminium	7429-90-5	231-072-3	5.56
Polyvinylidene fluoride resin	24937-79-9	607-458-6	1.15
Graphite	7782-42-5	231-955-3	23.2
Copper	7440-50-8	231-159-6	9.8
Rubber, styrene-butadiene, fume	61789-96-6	612-382-1	1.78
Polyethylene	9002-88-4	618-339-3	0.06
Polypropylene	9003-07-0	618-352-4	0.78
Phosphate(1-), hexafluoro-, lithium	21324-40-3	244-334-7	15.35
1,3-Dioxolan-2-one	96-49-1	202-510-0	2.72

Section 4 - First Aid Measures

Description of first aid measures

General information No special measures required.

After eye contact

Flush eyes with plenty of water for several minutes while holding eyelids open. Get medical attention if irritation persists.

After skin contact

Remove contaminated clothing and shoes. Immediately wash with water and soap and rinse thoroughly. Wash clothing and shoes before reuse. If irritation occurs, get medical attention.

After inhalation

Remove victim to fresh area. Administer artificial respiration if breathing is difficult. Seek medical attention.

After swallowing

Do not induce vomiting. Get medical attention.

Personal protective equipment for first-aid responders: No data available.

Most important symptoms/effects, acute and delayed: No data available.

Indication of immediate medical attention and special treatment needed: Treat symptomatically.

Section 5 - Fire Fighting Measures

Suitable extinguishing media:

Small Fire: Dry chemical, CO₂, water spray or regular foam. Large Fire: Water spray, fog or regular foam. Move containers from fire area if you can do it without risk.



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Unsuitable extinguishing media:

No data available.

Specific Hazards arising from the chemical:

Special hazards arising from the substance or mixture

Battery may burst and release hazardous 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 ($>150^{\circ}\text{C}$ (302°F)), when damaged or abused (e.g. mechanical damage or electrical overcharging); may burn rapidly with flare-burning effect; may ignite other batteries in close proximity.

Specific protective actions for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6 - Accidental Release Measures

Personal precautions:

As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away. Stay upwind, uphill and/or upstream. Ventilate closed spaces before entering. Large Spill: Consider initial downwind evacuation for at least 100 meters (330 feet).

Protective equipment:

No data available.

Emergency procedures:

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Do not touch or walk through spilled material. Absorb with earth, sand or other non-combustible material. Leaking batteries and contaminated absorbent material should be placed in metal containers.

Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.

Methods and materials for containment and cleaning up:

For all waste handling must refer to United Nations, National and Local Regulations for disposal.

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

Section 7 - Handling and Storage

Precautions for safe handling:

Avoid short circuiting the battery. Avoid mechanical damage of the battery. Do not open or



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disassemble. Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity. Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps.

Conditions for safe storage, including any incompatibilities:

Store in a cool, dry, well-ventilated place. Keep away from heat, avoiding the long time of sunlight.

Section 8 - Exposure Controls/Personal Protection

Control parameters

CAS No.	ACGIH	NIOSH	OSHA
12190-79-3	N/A	N/A	N/A
7429-90-5	TLV-TWA 1mg/m ³	REL-TWA 2mg/m ³ REL-TWA 5mg/m ³ REL-TWA 10mg/m ³	PEL-TWA 5mg/m ³ PEL-TWA 15mg/m ³
24937-79-9	N/A	N/A	N/A
7782-42-5	TLV-TWA 2mg/m ³	REL-TWA 2.5mg/m ³	PEL-TWA 15mppcf PEL-TWA 20mppcf
7440-50-8	TLV-TWA 0.2mg/m ³ TLV-TWA 1mg/m ³	REL-TWA 1mg/m ³ REL-TWA 0.1mg/m ³	PEL-TWA 0.1mg/m ³ PEL-TWA 1mg/m ³
61789-96-6	N/A	N/A	N/A
9002-88-4	N/A	N/A	N/A
9003-07-0	N/A	N/A	N/A
21324-40-3	N/A	N/A	N/A
96-49-1	N/A	N/A	N/A

Appropriate engineering controls:

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Personal Protective Equipment:

Respiratory protection: Wear suitable protective mask. For a large large number of battery leakages, wear chemical protective clothing, including self-contained breathing apparatus.

Hand Protection: Wear appropriate protective gloves to reduce skin contact.



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Eye Protection: Wear safety goggles or eye protection combined with respiratory protection.**Skin and Body Protection:** Working environment required, wear suitable protective clothing to minimize contact with skin. The type of protective equipment must be according to the concentration and the content of certain hazardous substances in the workplace.

Section 9 - Physical and Chemical Properties

Information on basic physical and chemical properties

Colour:	Blue.
Physical State:	Cylindrical.
Odour:	Not available.
pH:	Not available.
Melting point/freezing point:	Not available.
Boiling point or initial boiling point and boiling range:	Not available.
Flash Point:	Not available.
Flammability:	Not available.
Solubility:	Not available.
Lower and upper explosion limit/flammability limit:	Not available.
Auto-ignition temperature:	Not available.
Decomposition temperature:	Not available.
Kinematic viscosity:	Not available.
Partition coefficient: n-octanol/water (log value):	Not available.
Vapour pressure:	Not available.
Density and/or relative density:	Not available.
Relative vapour density:	Not available.
Particle characteristics:	Not available.
Other information:	
Voltage	3.7V
Electric capacity	1500mAh
Electric Energy	5.55Wh

Section 10 - Stability and Reactivity

Reactivity: No data available.**Chemical stability:** Stable.



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Possibility of hazardous reactions: No data available.**Conditions to Avoid:** Flames, sparks, and other sources of ignition, incompatible materials.**Incompatible materials:** Oxidizing agents, acid base.**Hazardous decomposition products:** Carbon monoxide, carbon dioxide, lithium oxide fumes.

Section 11 - Toxicological Information

Acute Toxicity:

CAS No.	LC50/LD50
12190-79-3	No data available.
7429-90-5	No data available.
24937-79-9	No data available.
7782-42-5	No data available.
7440-50-8	No data available.
61789-96-6	No data available.
9002-88-4	No data available.
9003-07-0	No data available.
21324-40-3	No data available.
96-49-1	LD50 Rat (oral): 10g/kg

Skin corrosion/irritation: No data available.**Serious eye damage/irritation:** No data available.**Respiratory or Skin sensitization:** No data available.**Germ Cell mutagenicity:** No data available.**Carcinogenicity:** No data available.**Reproductive toxicity:** No data available.**Specific target organ toxicity-Single exposure:** No data available.**Specific target organ toxicity-Repeated exposure:** No data available.**Aspiration hazard:** No data available.**Information on the likely routes of exposure:** No data available.**Eye:** No data available.**Skin:** No data available.**Ingestion:** No data available.**Inhalation:** No data available.



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Section 12 - Ecological Information

Ecological Toxicity: No data available.**Persistence and degradability:** No data available.**Bioaccumulative Potential:** No data available.**Mobility in Soil:** No data available.**Other adverse effects:** No data available.

Section 13 - Disposal Considerations

Disposal methods:**Recommendation:**

Consult state, local or national regulations to ensure proper disposal.

Uncleaned packaging**Recommendation:** Disposal must be made according to official regulations.

Section 14 - Transport Information

UN or ID Number	
IATA	UN3480
IMDG	UN3480
Proper Shipping Name/Description	
IATA	Lithium ion batteries
IMDG	LITHIUM ION BATTERIES
Class or Div. (Sub Hazard)	
IATA	9
Packing Group	
IATA	N/A
IMDG	N/A
Hazard Label	
IATA	
IMDG	N/A
Environmental hazards	
Marine pollutant:	No
IMDG EmS:	F-A, S-I



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Special precautions for user

No information available.

Transport information: The Li-ion Rechargeable Cell ICR18650B has passed the test UN38.3, according to the report ID: MOIKUQEJ49771721.

According to the Packing Instruction 965 section IB of IATA DGR 63rd Edition for transportation, Cargo aircraft only.

According to the special provision 188 of IMDG (40-20), the goods are not subject to other provision of this code.

Separate batteries to prevent short-circuiting. and they should be packed in strong package during transport. Lithium cell or battery should incorporate a safety venting device or be designed to prevent a violent rupture under normal transport conditions. Keep away from high temperature and open flames.

Note: State of Charge (SoC) not exceeding 30% of their rated capacity. (By air, Lithium ion batteries)

Transport Fashion: By air, by sea.

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

CAS No.	TSCA	IECSC	DSL/NDL	EINECS/ ELINCS/ NLP
12190-79-3	Listed	Listed	Listed DSL	Listed
7429-90-5	Listed	Listed	Listed DSL	Listed
24937-79-9	Listed	Listed	Listed DSL	Listed
7782-42-5	Listed	Listed	Listed DSL	Listed
7440-50-8	Listed	Listed	Listed DSL	Listed
61789-96-6	Listed	Listed	Listed DSL	Listed
9002-88-4	Listed	Listed	Listed DSL	Listed
9003-07-0	Listed	Listed	Listed DSL	Listed



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21324-40-3	Listed	Listed	Listed DSL	Listed
96-49-1	Listed	Listed	Listed DSL	Listed

Section 16 - Other Information

Issue Date: 2022-01-04

Issue Department: Technical department

Modification record:

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Other Information:

CAS: (Chemical Abstracts Service);

EC: (European Commission);

ACGIH: (American Conference of Governmental Industrial Hygienists);

NIOSH: (US National Institute for Occupational Safety and Health);

OSHA: (US Occupational Safety and Health);

TLV: (Threshold Limit Value)

TWA: (Time Weighted Average);

STEL: (Short Term Exposure Limit);

PEL: (Permissible Exposure Level);

REL: (Recommended Exposure Limit);

PC-STEL: (Permissible concentration-short time exposure limit);

PC-TWA: (Permissible concentration-time weighted average);

IARC: (International Agency for Research on Cancer);

LC50: (Lethal concentration, 50 percent kill);

LD50: (Lethal dose, 50 percent kill);

EC50: (Median effective concentration);

BCF: (Bioconcentration Factor);

BOD: (Biochemical oxygen demand);

IECSC: (Inventory of Existing Chemical Substances in China);

NOEC: (No observed effect concentration);

NTP: (US National Toxicology Program);



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RTECS: (Registry of Toxic Effects of Chemical Substances);

TOC: (Total Organic Carbon);

TSCA: (Toxic Substances Control Act of USA);

DSL: (the Domestic Substances List of Canada);

NDSL: (the Non-domestic Substances List of Canada)

IATA: (International Air Transport Association);

IMDG: (International Maritime Dangerous Goods);

TDG: (Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations);

End of report

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