



Material Safety Data Sheet

The batteries are exempt articles and are not subject to the OSHA Hazard Communication Standard Requirement. This sheet is only provided as technical information and is referred normal use of the product in question. Pairdeer makes no warranty expressed or implied.

Section 1-Product and Company Identification

● Product Name Lithium Manganese-Dioxide Batteries	Sizes All	Date of preparation Jan.5, 2019
---	--------------	------------------------------------

Section 2-Composition/Information on Ingredients

Component	CAS	No.
Manganese-Dioxide	1313-13-9	30 ~ 40 wt%
Lithium Metal	7439-93-2	2 ~ 4 wt%
Electrolyte [Organic Electrolyte Mixture]	-	10 ~ 14 wt%
Iron	7439-89-6	32 ~ 38 wt%
Carbon	7440-44-0	3 ~ 5 wt%
Polypropylene	9003-07-0	2 ~ 4 wt%
Polyethylene	9002-88-4	1 ~ 24 wt%
Others		3 ~ 4 wt%

*) Lithium content for each cell

Battery Model	Nominal Voltage	Lithium Content	
CR14250	3	0.27g	2.69%
CR2/3A	3	0.56g	3.57%
CR123A	3	0.56g	3.57%
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%

Section 3-Hazards Identification

Significant Risk :No reference

Peculiar Risk: No reference

General avoidable issues:

- Chemicals in the steel can may leak without proper storage.
- Rupture or fire may happen to battery if disposed in fire or placed over 100°C.
- Heat, rupture and fire may happen to battery if short-circuit caused by stack or mixture.

※GHS classifications do not apply to our batteries.

Section 4-First Aid Measures

None unless internal materials exposure. If contents are leaked out, observe following instructions

Inhalation Fumes can cause respiratory irritation. Remove to fresh air and consult a physician.

Skin Immediately flush skin with plenty of water. If itch or irritation by chemical burn persists, consult a physician.

Eyes Immediately flush eye with plenty of water for at least 15 minutes. Consult a physician immediately

Ingestion If swallowing a battery, consult a physician immediately.

If contents come into mouth, immediately rinse by plenty of water and consult a physician.



Section 5–Fire Fighting Measures

Extinguishing Media	Extinguisher of alkaline metal fire is effective. Plenty of cold water is also effective to cool the surrounding area and control the spread fire. But hydrogen gas may be evolved by the reaction of water and lithium and it can form an explosive mixture. Therefore in the case that lots of lithium batteries are burning in a confined space, use a smothering agent.
Fire fighting procedure	Use self-contained breathing apparatus and full protective gear not to inhale harmful gas.

Section 6–Accidental Release Measures

NA

Section 7–Handling and Storage

1) Handling

Never swallow. Never charge. Never hear. Never expose to open flame. Never disassemble. Never reverse the positive and negative terminals when mounting. Never short-circuit the battery. Never weld the terminal or wire to the body of the battery directly. Never use different batteries together. Never touch the liquid leaked out of battery. Never bring fire close to battery liquid. Never keep in touch with battery.

2) Storage

Never let the battery contact with water. Never store the battery in hot and high humid place.

Section 8–Exposure Controls, Personal Protection

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:

Respiratory protective equipment: Respirators (with apparatus respiratorius)

Hand protective equipment: Synthetic rubber gloves

Eye protective equipment: Protective spectacles

Section 9–Physical/Chemical Characteristics

NA



Section 10–Stability and Reactivity

Stability: It is extremely stable for normal use.

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.

Avoid Substance: Substance may cause short–circuit.

Section 11–Toxicological Information

Chemicals are sealed in the steel can without danger.

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

Component	Classification	Symptom
Manganese Dioxide	Acute Toxicity	Rabbit LD ₅₀ (vein)=45mg/kg MouseLD ₅₀ (subcutaneous)=422mg/kg
	Partially Affected	Irritation to eyes, nose, throat and skin
	Chronic Toxicity or Long–Term Toxicity	Parkinson’s central nervous syndrome may caused by longterm (at least 3 months) inhalation of dirt or gas.
Lithium Metal	Acute Toxicity	No reference
	Partially Affected	Chemical burning may occur in case of contact to skin or eyes.
Electrolyte	Acute Toxicity	No reference
	Partially Affected	A little irritation to eyes.

Section 12–Ecological Information

NA

Section 13–Disposal condition

The battery may be regulated by national or local regulation. Please follow the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it could lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+)and (–) terminals with friction tape or some other insulator before disposal.

Section 14–Transportation Information

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

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



MSDS- Lithium Primary Battery

Issue date: 2019.01.05

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.

Besides, the following transporation requirements shall be meet when delivery.

< Air Transport >

All batteries produced by our company, including single cells with lithium content more than 0.3g but less than 1g or battery pack models with lithium content more than 0.3g but less than 2g, conform to 968 Section IB or II defined in Packing Instruction of IATA-DGR. All of our products and its packing forms meet the requirements of Section IB or II, though the battery itself is considered as dangerous goods, it can be transported without applying containers defined as Class II.

< Sea Transport >

All batteries produced by our company, including single cells with lithium content less than 1g or battery pack models with 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.	Proper Shipping Name/Description
UN 3090	Lithium Metal Batteries
UN 3091	Lithium Metal Batteries Contained in Equipment
UN 3091	Lithium Metal Batteries Packed with Equipment

Related Regulation:

Transport form	Relevant agencies/Issued documents
Air transport	ICAO/ TI IATA/DGR
Sea transport	IMO/ IMDG Code
Land transport (within Europe)	RID,ADR
US/Internation	USDOT/ DOT 49 CFR
	UN: Recommendations on the transport of dangerous goods: Manual of Tests and Criteria 5th revised edition Amendment 1 [ST/SG/AC.10/11/Rev.5/Amend.1]:Part III, Subsection 38.3

*1 Dangerous Goods Regulations – 60th Edition Effective 1 January 2019: International Air Transport Association (IATA)/Packaging Instructions 968–970

*2 IMDG Code 38–16

*3 RID – COTIF 1999/Appendix C–RID/Article 5

*4 ADR – ADR/Part 3/CHAPTER 3.3/3.3.1/Clause188、230、238、239、310



Section 15-Regulatory Information

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.

Section 16-Other Information

Reference

(1) IATA DGR (Dangerous Goods Regulations), latest edition

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

This instruction established based on the normal use of the battery, without any insurance.