Zinc-Air Battery MSDS

These products are hermetically sealed in a vessel, and are exempted form of the Material Data Sheet Regulations. However, this manual provides you with referential information for safe use of the products.

Section 1 – Products and Company Identification

Products Name: Zinc-Air Batteries (PR)
Products Sizes: PR44, PR41, PR48, PR536
Company: Electrochem Automation (Shanghai) Co., Ltd.
Address: No. 5788 Huaxia (W) Rd., Pudong district, Shanghai, China 201204

Section 2 – Composition/ Information on Ingredients

Ingredients	CAS#	PRTR	Weight/ Content
Manganese dioxide (MnO2)	1313-13-9	1-311	1.2 ~ 1.6 wt%
Carbon (C)	7782-42-5	Not regulated	1.6 ~ 2.6 wt%
Potassium hydroxide (KOH)	1310-58-3	Not regulated	3.6 ~ 4.1 wt%
Zinc (Zn)	7440-66-6	Not regulated	35.8 ~ 48.7 wt%

Section 3 – Summary of Danger and Toxicity

Fatal danger and toxicity: No information available

Danger to environment: Chemical ingredient is hermetically sealed in a vessel, so the product is neither dangerous nor toxic as a cell.
Potassium hydroxide which is the contents of cell is an acute toxic substance and corrosive. If adhering to skin, it ulcerates skin. If getting into eyes, cornea and conjunctiva are acutely attacked, causing poor eyesight and blindness. If inhaled, bronchi, lung and throat are attacked, resulting possibility in pulmonary edema.

Effect to environment: Although no information is available as a cell.
Potassium hydroxide is reported as LC50 (24 hours): 80mg/L in mosquito fish as a result of a fish toxicity survey. Mercury is reported as LC50 (48 hours): 0.66mg/L (in state of mercury chloride)
Lead is reported as TDL0 450mg/kg/6 year for human (female)

Overview of prospective emergency: A cell may break or be shorted by an external mechanical or electrical stress:

Section 4 – First Aid Measures

There is no problem in the normal state. But take the following measures when the contents have begun to leak by the destruction of the battery.

Inhalation:	If person inhaled steam, move him/her to the place where air is fresh immediately. If he/she feels ill, immediately call a doctor for therapy and treatment.
Skin:	If the content adheres to skin, immediately wash it out with a large amount of clean water and soap promptly. If irritating, consult a doctor.
Eyes:	If the content enters eyes, rinse eyes with a large amount of clean water for more than 15 minutes, and consult a doctor.
Ingestion:	If a cell is swallowed, immediately call a doctor for therapy and treatment.

Section 5 – Fire Fighting Measures

Fire extinguishers:	Powder extinguisher, foam extinguisher, carbon dioxide gas extinguisher or large amount of dry sand.
Specific fire fighting method:	In the initial state of a fire, move cells/batteries from near the fire source to a safe location, as far as possible, and be sure to put on a protective breathing mask.
Protection of fire fighting personnel :	Wear protective breathing masks, gloves, glasses and helmet for the keeping safe. (Preferably, use a self-feeding type mask)

Section 6 – Action upon Leakage and Removing Method

A cell hermetically contains constituents in a vessel, so contents normally may not leak out. However, if the contents leaks because of a mechanical or electrical stress, wipe with liquid-boric to absorb it, and collect in a vessel. After that, flush the site with a large amount of water. At that time, be sure to put protective-gloves, glasses and mask. (Preferably, use a self-feeding type mask)

Section 7 – Handling and Storage

Handling:	Never solder a cell body. Do not contact cell terminals between each other, or with another conductor. Neither throws into fire, decompose, heat, dent, deform, charge nor drop a battery. Do not dip a cell in water or seawater.
Storage:	Store cells without direct sunlight, high temperature, high humidity, rain, dew, etc., and select a storage location with a temperature as low as possible (preferable temperature 20 +/-15℃ and relative humidity 70% or less). In addition, keep cells away from dangerous matter such as combustible or ignitable materials. Absolutely never place a cell in contact with a combustible or conductive substance. Prepare appropriate firefighting equipment.
Note:	See handling and storing precautions described in the product catalog, specification, etc.

Section 8 – Special Protection Information

Ventilation requirement:	Not necessary under normal conditions.
Respiratory protection:	Not necessary under normal conditions.
Eye protection:	Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.
Glove:	Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery.
Other protective tools etc.:	Not necessary under normal conditions.

Section 9 – Physical and Chemical Properties

Shape:	Button shape. Contents are sealed in a stiff metal vessel.
PH:	Not applicable because a cell is not soluble with water.
Boiling point/ boiling range:	No information
Melting point:	No information
Decomposition temperature:	No information
Flash point:	No information

Section 10 – Stability and Reactivity

Conditions to be avoided:	If a number of cells are mixed up without insulating terminals, they may short and possibly heat, break and ignite. When a cell is charged, it possibly burst the electrolyte etc. Or, it may possibly burst or fire. If the cell is heated or thrown into fire, it may explode or fire with the electrolyte etc. bursting from inside of the cell. If decomposed, there is a possibility of overheating or fire due to short circuit, and ignition of some material around etc.

Section 11 – Information on Toxicity

There is no toxicity because chemical substances are hermetically sealed in a metal vessel. As reference, chemical substances composing a cell are described below.

Manganese dioxide

Acute toxicity:	LDLO: 45mg/kg (Intravenous injection, rabbit) LDLO: 422mg/kg (Hypodermic injection, mouse)
Irritation:	Irritating eyes, nose, throat and skin.
Chronic toxicity:	If a person is exposed to powder for a long time or repeatedly, the lung and the nervous system may be affected, possibly causing bronchitis pneumonia, nervous disease or mental disease.
Procreation toxicity:	TCLO: 49mg/m3 (mouse, inhalation)

Graphite

Chronic toxicity:	If inhaled for a long time without protective tools, local ventilation, etc., graphite lung may result.
Breathing toxicity:	If inhaled for a long time without protective tools, local ventilation, etc., graphite lung may result.

Potassium hydroxide	
Acute toxicity:	LD50: 273mg/kg (rat, oral)
Acute and chronic toxicity:	If skin repeatedly contacts a dilute solution, various tissues on the skin surface are attacked, causing dermatitis due to direct irritation or chronic eczema.
Mutagenesis:	Hamster, ovary, positive
Zinc powder	
Acute toxicity:	LC50: 2500mg/m3 (rat, inhalation) TCLO: 124mg/m3/50min (human, via respiratory tract)
Mercury	
Acute toxicity:	LD50: 1mg/kg (rat, oral)
Lead	
Acute toxicity:	LC50 10000ppm/7hours (rat, inhalation)

Section 12 – Ecological Information

No information as batteries.

Section 13 – Disposal Precautions

Disposal of the substance should be done according to the laws and regulations. Although used cells can be discarded basically as “nonflammable refuse”, some local governments sort and collect them at their own discretion. Therefore, observe instructions of the government you belong to, to dispose of the substance.

Keep the following discarding precautions?
- Even a used cell sometimes stores electric energy. Therefore, to prevent the battery from short-circuit, isolate cells from each other by a method such as taping +, - terminals of cells, or using the individual housing case of a cell, used when you bought the battery, and orderly encasing batteries in a box, then submit an application of disposal to the local government of your residence, using the designated form.
- Packing cells so that they are not shorted, and prevent the package from being wetted.
- If cells must be discarded in a country other than Japan, observe the instructions of the country and local government.

Section 14 – Transportation

NEXcell sealed zinc-air batteries are not submitted to any specific transportation regulation. However, the battery contains corrosive electrolyte, do not inflict mechanical stress on the battery during transportation to prevent leaking the electrolyte out caused by the destruction of the battery.

Section 15 – Applicable Laws and Regulations

The laws and ordinances the battery obey laws and ordinance set in each country.

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