

## SAFETY DATA SHEET (SDS)

### 1. Product and Company identification

Product Category : Alkaline Manganese Battery  
 Product name : LR20, LR14, LR6, LR03, LR1, 6LR61(6LF22)  
 Nominal Voltage : 1.5 V (exception for 6LR61: 9V)  
 Supplier's Name : FDK CORPORATION  
 Supplier's Address : 1-6-41 Konan, Minato-ku, Tokyo 108-8212, Japan  
 Telephone +81-3-5715-7400  
 Emergency Contact : Same as above

**Note:** SDS is not applicable to the product hermetically sealed as dry battery. The battery has no risk to life and health under normal use or transportation because ingredients of battery are not leaked out by virtue of hermetical sealing with metal case.

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

### 2. Hazards identification

The important hazards and adverse effects of the chemical product	No information available
Chemical product - specific hazards	No information available
Outline of an anticipated emergency	Chemical contents are sealed in metal can. But if battery is mechanically or electrically abused or placed on high temperature condition, risk of leakage, heat generation or in extreme case explosion may be anticipated. Most likely risk is attaching of released caustic alkali (KOH) to skin and eye. Anticipated volume of leakage is 2 to 20 ml, depending on battery size. For consumer use, warning to abuse is indicated on package or on the battery.

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

### 3. Composition/ information on Ingredients

Material	CAS No.	Contents
Manganese dioxide [MnO <sub>2</sub> ]	1313-13-9	20 ~ 30 wt%
Graphite [C]	7782-42-5	2 ~ 3 wt%
Zinc [Zn]	7440-66-6	15 ~ 18 wt%
Electrolyte [KOH solution]	1310-58-3	5 ~ 8 wt%

#### 4. First-aid measures

Chemical contents are sealed in metal can. Therefore, risk of exposure never occurs unless battery is mechanically or electrically abused. First aid shown below may need in such abnormal case only.

Inhalation :	Inhalation of fume of released electrolyte may stimulate respiratory organ. Provide fresh air. Refer for medical attention.
Skin contact :	Released contents from battery may cause skin irritation and/or chemical burns. Remove contaminated clothes and rinse skin with plenty of water. If chemical burn occurs or if irritation persists, get medical assistance.
Eyes contact :	If released content from battery is attached on eyes, severe irritation and chemical burns occur. Immediately rinse with plenty of water for several minutes (remove contact lenses if possible), get medical assistance.
Swallowing :	In case of swallowed battery, immediately refer for medical attention.

#### 5. Fire-fighting measures

Fire extinguishing agent: Water and all kind of extinguishers are available.

Extinguishing method: Because packaging material of battery is paper, use water extinguisher, CO<sub>2</sub> extinguisher or powder extinguisher as normal extinguisher.  
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.

Special equipment for the protection of firefighters

Hand protection: A pair of flame-proof groves

Eye protection: Face mask

Protective wear of skin and/or body: Protective closing

#### 6. Accidental release measures

Chemical contents are sealed in metal can. But if the battery is mechanically or electrically abused, contents may leak out. In such case, take action as showing below.

Personal precautions : Temporary inhalation of fume or attaching of electrolyte to skin does not cause serious health hazard. Be sure the ventilation and washing out of electrolyte quickly.

Environmental precautions : Clean up it quickly. Specific environmental precaution is not necessary.

Method and materials for containment and methods and materials for cleaning up:

Not applicable. Clean up and dispose of it according to section 13

Prevention of secondary hazards : No need.

## 7. Handling and storing

Transportation and freight handling:	<ol style="list-style-type: none"> <li>(1) Prevent wetting of packing by rain or dew condensation.</li> <li>(2) Do not place packing near source of heat.</li> <li>(3) Do not drop packing from more than 1m height and do not press packing allowing deform it.</li> </ol>
Handling :	<ol style="list-style-type: none"> <li>(1) Do not charge, short-circuit, disassemble, deform or disposed of in fire.</li> <li>(2) Do not pile up or mingle batteries with each other.</li> <li>(3) Do not place battery on metal case, metal plate or antistatic material.</li> <li>(4) In case of multi cell application, replace all battery to new at once when replacement of used batteries.</li> </ol>
Storage :	<ol style="list-style-type: none"> <li>(1) Be sure to store batteries in well-ventilated, dry and cool conditions.</li> <li>(2) Prevent wetting of packing by rain, snow, frost or dew condensation.</li> <li>(3) Do not store batteries near source of heat or nozzle of hot air.</li> <li>(4) Do not store batteries in direct sunshine.</li> <li>(5) Take care of wetting of packing caused by dew condensation when packing is removed from cold to warm and humid condition.</li> </ol>

## 8. Exposure controls and personal protection

There is no need of personal protective equipment on regular handling and storage, but lot of electrolyte is released by mechanical or electrical abuse, use the protections as shown below.

Respiratory protection: Mask (with a filter preferably)

Hand protection: Synthetic rubber gloves

Eye protection: Goggles or glasses

## 9. Physical and chemical properties

State: Solid

Shape: Cylindrical (Exception for 6LR61: Prismatic)

Since battery is not chemical product other than above information is not applicable.

## 10. Stability and reactivity

Stability: Stable on regular handling

Conditions to avoid: External short circuit of battery, deformation by crush, exposure at high temperature of more than 85 degree C (may cause leakage and rupture), direct sunlight, high humidity

Materials to avoid: Water, a chain, and a piece of metal that causes short circuit.

Hazardous decomposition product: Emitted acrid or poisonous gases in fire.

## 11. Toxicological information

Since chemicals are contained in a sealed can, there are no hazards.

Toxicological information of main components of battery is shown below as reference.

Material	Type	Toxicity / symptom
Manganese dioxide [MnO <sub>2</sub> ]	Acute toxicity	Rabbit : LD <sub>0</sub> (blue pipe)=45mg/kg Mouse: LD <sub>50</sub> (subcutaneous)=422mg/kg
	Local effect	May cause irritation of eyes, throat or skin
	Chronic toxicity	Inhalation of powder dust or fume for a long time (at least 3 months) may cause specific central nerve symptom like Parkinson's disease.
	Reproduction toxicity	Mouse inhalation TCL <sub>0</sub> =49mg/m <sup>3</sup>
Electrolyte [KOH solution]	Acute toxicity	Oral LD <sub>50</sub> =284mg/kg
	Skin corrosive	In case of contact with skin and eyes, acute burn and irritation may cause.
	Chronic toxicity	Chronic contact with dilute solutions of potassium hydroxide can cause dermatitis. Inhalation can produce chronic productive cough, and shortness of breath.

## 12. Ecological information

Anticipated behavior of chemical product in environment/possible environmental impact/ecotoxicity	No information available
Persistence and degradability	No information available
Bioaccumulative potential	No information available
Mobility in soil	No information available

Exposure of internal content of battery may occur by corrosion of metal case of battery after batteries are disposed of in ground and kept for long time. But no available information about environmental hazard is reported after evaluation of long term landfill experiment.

Our battery does not involve more than limited contents of hazardous materials prohibited in EU Battery Directive (2006/66/EC).

## 13. Disposal considerations

Dispose of batteries in accordance with applicable federal, state and local regulations.

For safety precaution, battery should insulate in proper manner; covering both terminals by tape, wrapping of battery in insulative bag or packing battery in original package is recommended for prevent from leakage and rupture due to short-circuit.

## 14. Transport Information

## Caution for handling

Avoid rough handling of battery cartons. Batteries shall be kept in dry and cool conditions. Do not place batteries in a place exposed to direct sunshine for a long time or splashed by rain water. Do not mix unpacked batteries so as to avoid mechanical damage and/or short-circuit among each other.

## Compliance with special Provision of transportation

Because our battery is compliance with US DOT special provision 130 and IATA SP A123 as followings, any transportation is available.

Alkaline Manganese Batteries are considered to be "dry cell" batteries and are unregulated for purposes of transportation by the U.S. Department of Transportation (DOT), International Civil Aviation Administration (ICAO), International Air Transport Association (IATA) and the International Maritime Organization (IMO). The only requirement for shipping these batteries by DOT 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 requirements for shipping of these batteries by ICAO and IATA is Special Provision A123 which states: "A 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, by disconnection of the battery and protection of exposed terminals) is forbidden from transportation. In addition, in the case of air transportation of batteries which is conformed to this requirement, the information "Not restricted, as per Special Provision A123" shall be noted in certain column of "Substances" of air waybill."

Our battery complies above requirements because of implementation of applicable packaging preventing outer short-circuit by applying effective packing and obeying of waybill notation requirement.

	Necessary information in waybill for each transportation
Air transport	"Not restricted, as per Special Provision A123"
Marine/Water Transport	None
Ground Transport	None

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#### 15. Regulatory information

Environment-related law of batteries; EU nations have applicable law in accordance with Directive 2006/66/EC and other some countries, China, Korea, Brazil, some provinces of USA and Canada or so have similar law.

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#### 16. Other information

Reference; IEC 60086-1(2015), 60086-2 (2015), 60086-5 (2011)  
 JIS C 8500(2013), JIS C 8515(2013), JIS C 8514(2014)  
 Database on TSCA Inventory(EPA) , Ministry of the Environment Japan.  
 Dangerous Goods Regulations – 57<sup>th</sup> Edition, effective 1 January 2016: International Air Transport Association (IATA)

The information and the recommendations set forth are made in good faith and believed to be accurate until validated date shown below.

The present file refers to normal use of the product in question. FDK Corp. makes no warranty expressed or implied.

Validated date: December 31, 2016