MITSUBISHI ELECTRIC
MITSUBISHI ELECTRIC HOME APPLIANCE

Head Office: 1728-1 OMAEDA FUKAYA-SHI,
SAITAMA-KEN. 369-1295 JAPAN
Battery Dept.: 3-12 SHIOHAMA ICHIKAWA-SHI,
CHIBA-KEN. 272-0127 JAPAN

Reference No. MHK 200112H

SAFETY DATA SHEET

Section 1 - Product and Company Identification

Product Name: Alkaline Manganese Battery	Model: LR20, LR14, LR6, LR03 LR1, 6LF22
Company: Mitsubishi Electric Home Appliance Co., Ltd.	Effective Date From: January 1, 2020
Address (Number, Street, City, State, and ZIP Code): 3-12 SHIOHAMA, ICHIKAWA-SHI, CHIBA-KEN. 272-0127 JAPAN	Telephone: 81-(0)47-712-7500
	Fax: 81-(0)47-307-6010

Note : The battery is neither substance nor mixture but product and having no risk to life and health under normal use or transportation because ingredients of battery is not leaked out by virtue of hermetical sealing with metal case.
This MSDS notify possible risk of our battery under abnormal use but mainly aim to provide information about ingrediens, notification of handling and transportation regulations as a useful reference.

Section 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.

Section 3 - Composition/ information on Ingredients

Material	CAS No.	Contents
Manganese dioxide [MnO_2]	1313-13-9	20 ～ 45 wt%
Graphite [C]	7782-42-5	2 ～ 6 wt%
Zinc [Zn]	7440-66-6	10 ～ 25 wt%
Electrolyte [KOH solution]	1310-58-3	4 ～ 18 wt%
Lead [Pb]	7439-92-1	Additive-free
Mercury [Hg]	7439-97-6	Additive-free
Cadmium [Cd]	7440-43-9	Additive-free

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Section 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.

Section 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_2 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

Section 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.

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Section 7 - Handling and storing

Transportation and freight handling:	(1) Prevent wetting of packing by rain or dew condensation. (2) Do not place packing near source of heat. (3) Do not drop packing from more than 1m height and do not press packing allowing deform it.
Handling :	(1) Do not charge, short-circuit, disassemble, deform or disposed of in fire. (2) Do not pile up or mingle batteries with each other. (3) Do not place battery on metal case, metal plate or antistatic material. (4) In case of multi cell application, replace all battery to new at once when replacement of used batteries. (5) Do not allow children to replace batteries without adult supervision.
Storage :	(1) Be sure to store batteries in well-ventilated, dry and cool conditions. (2) Prevent wetting of packing by rain, snow, frost or dew condensation. (3) Do not store batteries near source of heat or nozzle of hot air. (4) Do not store batteries in direct sunshine. (5) Take care of wetting of packing caused by dew condensation when packing is removed from cold to warm and humid condition. (6) Keep batteries out reach of children.

Section 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

Section 9 - Physical and chemical properties

State: Solid
Shape: Cylindrical
Since battery is not chemical product other than above information is not applicable.

Section 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.

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Section 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_2]	Acute toxicity	Rabbit : LDL_0(blue pipe)=45mg/kg Mouse: LD_{50}(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_0=49mg/m^3
Electrolyte [KOH solution]	Acute toxicity	Oral LD_{50}=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.

Section 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).

Section 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.

Section 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.

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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 theses 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.

UN CLASS and UN Hazard Class: Not applicable
The International Maritime Dangerous Goods Code (IMDG) regulate them for ocean transportation under Special Provision 304 which says as following,
"Batteries, dry, containing corrosive electrolyte which will not flow out of battery case is cracked are not subject to the provisions this Code provided the batteries are secured and protected their packings against short-circuits including alkaline batteries.

Section 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.

Section 16 - Other information

Reference; IEC 60086-1(2015), 60086-2 (2015), 60086-5 (2016)
JIS C 8500(2017), JIS C 8515(2017), JIS C 8514(2018)
Database on TSCA Inventory(EPA) , Ministry of the Environment Japan.
Dangerous Goods Regulations – 61th Edition, effective 1 January 2019: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. Mitsubishi Electric Home Appliance Co., Ltd. makes no warranty expressed or implied.