MATERIAL SAFETY DATA SHEETS

BATTERY

Material Safety Data Sheet

1.Product identification:

Chemical name: battery

Chemical system: Zn /MnO2 / KOH

Applicable sizes:
LR6-AA-ALKALINE
LR03-AAA-ALKALINE
LR14-C-ALKALINE
LR20-D-ALKALINE
LR22-9V-ALKALINE

2.Manufacturer:

3.Hazardous ingredients/Identity information

Chemical identity	Approximate value (%Wt)	**OSHA PEL**	**ACGIH TLV**	Appearance
Zinc (Zn)	/	NA	NA	Silvery solid
Manganese Dioxide (MnO_2)	/	Note 2	Note 2	Black-brown powder
Potassium Hydroxide (KOH)	/	NA	NA	White solid
Carbon black	/	Note 3	Note 3	Black granule
Ion water	/	NA	NA	Liquid
Steel	/	NA	NA	Metal solid
Mercury	≤1ppm (note 1)	NA	NA	Atom state
Cadmium	≤250ppm (note 1)	NA	NA	Atom state
Lead	≤4000ppm (note 1)	NA	NA	Atom state

Note 1: the contents of heavy metal (mercury, cadmium and lead) confirms to the requirements of 98/101/EC.

Note 2: Manganese Dioxide (as Mn)---5mg/m^3 (ceiling) (OSHA); 0.2mg/m^3 (as Mn/ ACGIH)

Note 3: Carbon black---15mg/m^3 (total dust, OSHA); 7.5mg/m^3 (respirable fraction, OSHA); 2.0mg/m^3 (ACGIH)

***These levels are not anticipated under normal consumer use conditions.

***ACGIH: American Council of Governmental Industrial Hygienists

***OSHA: Occupational Safety and Health Administration (U.S)

***PEL: Permissible Exposure Limit

***TLV: Threshold Limit Value

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4.Physical Chemical Characteristics:

Chemical identity	Specific gravity	Boiling point	Melting point	Odor	Corrosion	Toxicity	Flammability
Zinc (Zn)	7.09g/cm^3	907℃	419℃	None	None	None	None
Manganese Dioxide (MnO_2)	5.026g/cm^3	535℃	390℃	None	None	None	None
Potassium Hydroxide (KOH)	2.04g/cm^3	1320℃	360.44℃	None	Slight corrosion	None	None
Carbon black	/	/	/	None	None	None	None
Ion water	1.0 g/cm^3	100℃	/	None	None	None	None
Steel	7.8 g/cm^3	2750℃	1535℃	None	None	None	None
Mercury	13.6g/cm^3	357℃	-39.3℃	None	None	Note 4	None
Cadmium	8.64g/cm^3	765℃	321.1℃	None	None	Note 4	None
Lead	11.34g/cm^3	1740℃	327.5℃	None	None	Note 4	None

Note 4: the contents of heavy metal (mercury, cadmium and lead) confirms to the requirements of 98/101/EC.

The following components are found in a battery with metal jacket.

Component	**Material**	**Formula**	**CAS#**
Positive electrode	Manganese dioxide	MnO_2	1313-13-9
	Black carbon	C	7782-42-5
Negative electrode	Zinc	Zn	7440-66-6
Electrolyte	Potassium Hydroxide	KOH	1310-58-3
Metal-Jacket	Steel	Fe	7439-89-6

5.Reactivity:

Stability	■stable	□unstable	Polymerization	□may occur	■will not occur
Conditions to avoid Do not heat, crush, and disassemble, short circuit or recharge.			**Conditions to avoid** Not applicable		
Incompatible materials Not applicable.			**Hazardous decomposition products** Thermal degradation may produce hazardous fumes of zinc and manganese; such as hydrogen gas.		
Warning signals: not applicable.					

6.Physical data (for the battery)

Boiling point: **NA** ℉; **NA** ℃	Melting point: **NA** ℉; **NA** ℃	Freezing point: **NA** ℉; **NA** ℃
Specific gravity (H_2O=1): **NA**	Vapor density (air=1): **NA**	Vapor pressure: **NA mm Hg**
Evaporation: **NA**	Saturation in air: **NA**	Autoignition temperature: **NA**
% Volatiles: **NA**	Solubility in water: **NA**	PH: **NA**

Appearance/Color: Cylindrical batteries. Contents dark in color.

Flash point and test methods: NA

Flammable limits in air (% by volume): lower NA %; upper NA %

7.Routes/Effects of Exposure:

These chemicals and metals are contained in a sealed can. For consumer use, adequate hazard warnings are included on both the package and on the battery. Potential for exposure should not exist unless the battery leaks, is exposed to high temperature or is mechanically, physically, or electrically abused.

1.Inhalation: Respiratory (and eye) irritation may occur if fumes are released due to heat or an abundance of leaking batteries.

2.Ingestion: Not anticipated due to size of batteries; choking may occur may with the small AAA battery. Irritation, including caustic burns/injury, may occur following exposure to a leaking battery.

3.Skin: a. Contact: Irritation, including caustic burns/injury, may occur following exposure to a leaking battery.

b. Absorption: Not applicable.

4.Eye contact: Irritation, including caustic burns/injury, may occur following exposure to a leaking battery.

5.Other: Not applicable.

8.Environmental impact

1.Dot hazard class: Not applicable.

2.Environmental effects: All “” carbon zinc batteries are manufactured with “no mercury added”. These batteries are classified by the federal government as a non-hazardous waste and are safe for disposal in the normal municipal waste stream.

9.Exposure control methods:

1.Engineering controls: General ventilation under normal use conditions.

2.Eye protection: None under normal use conditions. Wear safety glasses when handling leaking batteries.

3.Skin protection: None under normal use conditions. Use neoprene, rubber or latex-nitrile gloves when handling leaking batteries.

4.Respiratory protection: None under normal use conditions.

5.Other: Keep batteries away from small children.

10.Work practices:

1.Handling and storage:

Store at room temperature. Avoid mechanical or electrical abuse. Do not short or install incorrectly. Batteries may explode or vent if disassembled, crushed. Recharged or exposed to high temperatures. Install batteries in accordance with equipment instructions. Do not mix battery systems, such alkaline and zinc carbon, in the same equipment. Replace all batteries equipment at the same time. Do not carry batteries loose in pocket or bag.

2.Normal clean up:

Not applicable.

3.Waste disposal methods:

Individual consumers may dispose of spent (used) batteries with household trash. Do not incinerate, since batteries may explode at excessive temperatures.

11.Emergency procedures:

1.Steps to be taken if materials is released to the environment or spilled in the work area:

Notify safety personnel of large spills. Slight caustic zinc chloride and Ammonium chloride may be released from leaking or ruptured batteries. Avoid eye or skin contact and inhalation of vapors. Increase ventilation. Clean-up personnel should wear appropriate protective gear.

2.Fire and explosion hazard:

In case of fire, carbon dioxide, carbon monoxide and other toxic organic substances will be generated. Do not inhale fumes and smoke.

3.Extinguishing media:

Carbon dioxide, foam, dry chemical power.

4.Extinguishing media not to be used:

Never use a direct water jet.

5.Firefighting Procedures:

Use self-contained breathing apparatus and full protective gear.

12.First aid and medical emergency procedures

1.Eyes:

Not anticipated. If battery is leaking and material contacts eyes,

First :flush eyes thoroughly with tepid water for 15 minutes.

Second: flush eyes with 3% H_3BO_3 (Boracic Acid)

Third: Contact physician at once.

2.Skin:

Not anticipated. If battery is leaking and material contacts eyes, flush with copious amounts of clear, tepid water for 15 minutes. If irritation, injury or pain persists, consult a physician.

3.Inhalation:

Not anticipated. Rinse the mouth and surrounding area with clear, tepid water for at least 15 minutes. Consult a physician immediately for treatment and to rule out involvement of the esophagus and other tissues.

13.Toxicological information:

The product is multi component mixture for which no toxicological date exists.

14.Ecological information:

iata: not restricted to iata dgr according to special provision a123

imo: not restricted to imdg code according to special provision 304

The product is general industrial chemical, is non-inflammable, non-explosive, non- corrosive, non-virulent and non-harmful substance.

Hazards identification : none

Suggestion according to IMO IMDG Code: The substance is not subject to IMO IMDG Code.

Packaging requirements : The goods are packaged according to the packaging requirement of ordinary goods.

15.Disposable considerations:

Do not dispose of into environment or into sewerage. If recycling is not possible, the product and its container have to be disposed of in accordance with your local legislation and regulations.

16.Transport information:

Road: not regulated

Air: not regulated

Sea: not regulated.

Remark: Batteries must be protected from short circuit and protected from movement that could lead to short circuit.

17. Regulatory information:

Symbol: NA

Contains: Expiration date is on the card.

18.Other information:

MSDS:

Material safety data sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including defined by OSHA as an “article”. OSHA has defined “article” as a manufactured item other than a fluid or particle; (i) Which is formed to a specific shape or design during manufacture; (ii) Which has end use function dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use of does not release more than very small quantities, e.g. minute or trance amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

“Because all of our batteries are defined as “article”, they are exempt from the requirements of the hazard communication standard; hence a MSDS is not required.

Note:

Since the materials in this battery are sealed in the can, the potential for exposure to the components of battery is negligible, when the battery is used as directed however, technical or electrical abuse of the battery may result in the release of battery contents.

19. Storage and stock rotation:

⑴For normal storage, the temperature should be between +10℃ and +25℃ and never exceed +30℃. Extremes of humidity (over 95% and below 40% relative humidity) for sustained periods should be avoided since they are detrimental to both batteries and packing. Therefore, batteries should not be stored next to radiators or boilers, in boxcars or direct sunlight, or next to other sources of heat.

⑵Although the storage life of batteries at room temperature is good, storage is improved at lower temperature provided that special precautions are taken. The batteries should be enclosed in special protective packing (such as sealed plastic bags or variants), which should be retained to protect them from condensation during the time they are warming to ambient temperature. Accelerated warming is harmful.

⑶The height to which batteries may be stacked is clearly dependent on the strength of the pack. As a general guide, this height should not exceed 1.5m for cardboard packs or 3.0m for wooden cases.

⑷The above recommendations are equally valid for storage conditions during prolonged transit. Thus, batteries should be stored away from ship engines and not left for long periods in unventilated metal box cars (containers) during summer.

⑸Batteries should be dispatched promptly after manufacture and in rotation to distribution centers and on to the user. In order to stock rotation (first-in, first-out) can be practiced, storage areas and displays should be properly and packs should be adequately marked.