Material Safety Data Sheet

1. Identification of the substance/preparation and of the company / undertaking

Product name: Alkaline zinc-manganese dioxide batteries
Product designation: LR6
Nominal Voltage: 1.5V
Chemical system: Zinc/ Manganese Dioxide
Designed for recharge: Yes _No√
Company name: Zhongyin (Ningbo) Battery Co., Ltd.
128 Xingguang Road, Hi-Tech Park
Ningbo
China
Tel: +86 574 87491087 / 87493214
Fax: +86 574 87493903

2. Hazards identifications

General advice: The common known rules for handling of chemicals should be obeyed. These chemicals are contained in a sealed steel can. For consumer use, adequate hazard warnings are printed on both the package and the battery. Potential for exposure should not exist unless the battery leaks, is exposed to high temperatures or is mechanically or electrically abused. Concentrated potassium hydroxide contained is caustic. Anticipated potential leakage of potassium hydroxide is 2-20 ml, depending on battery size. Do not eat and drink batteries. Keep batteries away from small children.

Physical-Chemical Hazards: This preparation is not classified as dangerous according to the criteria of directive 99/45/EEC.

Hazards to man: If battery leaking, exposure to caustic ingredients may occur. Therefore, may cause sensitization by skin contract.

Hazards to environment: N.A..

3. Compositions /Information on Ingredients:

Chemical Nature: Alkaline zinc-manganese dioxide batteries

<table>
<thead>
<tr>
<th>MATERIALS</th>
<th>CAS#</th>
<th>APPROXIMATE PERCENT OF TOTAL WEIGHT (~%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese Dioxide (MnO₂)</td>
<td>1313-13-9</td>
<td>42.6</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>7440-66-6</td>
<td>16.1</td>
</tr>
<tr>
<td>Water (H₂O)</td>
<td>7732-18-5</td>
<td>12.2</td>
</tr>
<tr>
<td>Potassium Hydroxide (KOH)</td>
<td>1310-58-3</td>
<td>5.2</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>3.0</td>
</tr>
<tr>
<td>Brass</td>
<td>12597-71-6</td>
<td>2.4</td>
</tr>
<tr>
<td>Steel</td>
<td>7439-89-6</td>
<td>15.7</td>
</tr>
<tr>
<td>Ni-plating</td>
<td>7440-02-0</td>
<td>0.3</td>
</tr>
<tr>
<td>Nylon-66</td>
<td>None</td>
<td>1.6</td>
</tr>
<tr>
<td>Fiber</td>
<td>None</td>
<td>0.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPURITY</th>
<th>CAS#</th>
<th>APPROXIMATE PERCENT OF TOTAL WEIGHT (~%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury (Hg)</td>
<td>7439-97-6</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>7439-92-1</td>
<td>&lt;0.0030</td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>7440-43-9</td>
<td>&lt;0.0003</td>
</tr>
<tr>
<td>Arsenic (As)</td>
<td>7440-38-2</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
4. First-aid measures
Inhalation: In case of excessive inhalation due to leaking batteries remove to fresh air. Obtain medical advice.
Skin Contact: If exposed to a leaking battery, remove contaminated clothing. Wash exposed areas with plenty of water and soap. If irritation occurs, consult a physician.
Eye contact: If a battery is leaking and materials contact eyes, flush immediately with running water for at least 15 minutes. Consult an ophthalmologist at once.
Ingestion: Not anticipated due to size of batteries. Choking may occur with the smaller size batteries. If exposed to a leaking battery, rinse mouth and surrounding areas with running water for at least 15 minutes. Give plenty of water to drink. Do not induce vomiting. Obtain medical advice.

5. Fire-fighting measures
Suitable extinguishing media: Carbon dioxide (CO₂), foam, dry chemical powder.
Extinguishing media not to be used: Never use a direct water jet.
Exposure hazards from combustion products: In case of fire, carbon dioxide, carbon monoxide and other toxic organic substances will be generated. Do not inhale fumes and smoke.
Personal protective equipments: Wear full protective clothing. Use self-contained breathing apparatus.

6. Accidental release measures
Personal precautions: Notify safety personnel of large spills. Caustic potassium hydroxide may be released from leaking or ruptured batteries. Avoid eye or skin contact and inhalation of vapours. Increase the ventilation. Wear protective clothing. Keep unprotected persons away.
Environmental precautions: Avoid discharge and penetration into sewerage systems, waterways, pits, and cellars.
Methods for cleaning up: Collect spilled material with an insert standard absorbent like sand or silica. Care for well-ventilated conditions. Recycle or dispose of the materials in an appropriate way.

7. Handling and storage
General handling: Obey the common known rules and precautions for handling with chemicals. Avoid mechanical and electrical abuse. Do not short battery or install incorrectly. Batteries may explode, pyrolize or vent if disassembled, crushed, recharged or exposed to high temperatures. Install batteries according to equipment instructions. Do not mix battery systems, such as alkaline and zinc-carbon. Replace all batteries in equipment at the same time. Do not carry batteries loose in pocket or bag. Do not remove battery labels.
Storage: Store product in well-filled, appropriate coated and tightly closed containers avoiding influence of oxygen/air, light and humidity. Storage at room temperature.

8. Exposure controls and personal protection
Exposition/Technical measures: Atmospheric vapour concentrations must be minimized by adequate ventilation.
Protection of hands, eyes and skin: None required under normal use conditions. When handling leaking batteries, use neoprene, rubber or nitrile gloves and wear safety glasses to protect hands, eyes and skin.
General safety and hygiene measures: Use only as directed.

9. Physical and chemical properties
Physical state: Stainless steel top battery Colour: Contents dark and gray in colour
Odour: N.A.
Melting point: N.A.
Boiling point: N.A.
Flash point: N.A.
Explosion limit: Not available
Ignition temperature: Not available
Vapour pressure: Not available
Specific gravity: N.A.
Solubility in water: N.A.
Solubility in other solvents: N.A.
PH value: Not available
Partition coefficient: Not available
Viscosity: Not available

10. Stability and Reactivity
Thermal decomposition: Batteries may burst and release hazardous decomposition products when exposed to fire.
Substances to avoid: Strong oxidation agents.
Hazardous reactions: Contents incompatible with strong oxidizing agents.
Hazardous decomposition products: Thermal degradation may produce hazardous fumes of zinc and manganese; hydrogen gas; caustic vapors of potassium hydroxide and other toxic by-products.

11. Toxicological information
Toxicity information is available on the battery ingredients noted in Section 2, but in general, N.A. to intact batteries.
Chronic health effects: N.A.

12. Ecological information
Not available

13. Disposable considerations
Product: Dispose in accordance with appropriate regulations. If in doubt, contact your local government office concerned for information. Do not incinerate, since batteries may explode at excessive temperatures.

14. Transport Information
Road (ADR/RID): Not regulated
Air (ICAO/IATA): IATA DGR(56th): Special Provision A123: “Examples of such batteries are: alkali-manganese, zinc-carbon, nickel-metal hydride and nickel-cadmium batteries. Any electrical battery ... having the potential of a dangerous evolution of heat must be prepared for transport as to prevent (a) a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals...) is forbidden from transport; and (b) accidental activation. The words “Not Restricted” and the Special Provision number must be included in the description of the substance on the Air Waybill as required by 8.2.6, when an Air Waybill is issued.”

Sea (IMDG): IMDG CODE:Special Provision 304 which says: “Batteries, dry, containing corrosive electrolyte which will not flow out of the battery if the battery case is cracked are not subject to the provisions of this Code provided the batteries are securely packed and protected against short-circuits. Examples of such batteries are: alkaline-manganese, zinc-carbon, nickel metal hydride and nickel-cadmium batteries”

These batteries are not regulated by international agencies as hazardous materials or dangerous goods when shipped. A shipping name of “Alkaline Batteries – Non-hazardous” may be used on all domestic and international bills of lading.

15. Regulatory Information
Symbol: N/A
EC labeling: None
Risk phrases: None
Safety phrases: None

Labeling is not required because alkaline batteries are classified as “articles” under the Dangerous Preparations Directive and as such are exempt from the requirements of the Directive.

16. Other information
The information on this Material Safety Date Sheet (MSDS) was obtained form current and reputable sources. However, the data is provided without any warranty; expressed or implied, regarding its correctness or accuracy. It is the user’s responsibility to assume liability on loss, injury, damage, or expense resulting from improper use of this product. Any previous MSDS of this product mentioned above are hereby replaced with this new document. We urge you to make this information available as appropriate in your organization and to any others with whom you arrange to handle this product.
2. HAZARDS IDENTIFICATION

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Oral</td>
<td>Category 4</td>
</tr>
<tr>
<td>Acute toxicity - Inhalation (Gases)</td>
<td>Category 4</td>
</tr>
<tr>
<td>Acute toxicity - Inhalation (Dusts/Mists)</td>
<td>Category 4</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 1, Sub-category A</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

GHS Label elements, including precautionary statements
Emergency Overview

Signal word
Danger

Hazard Statements
Harmful if swallowed
Harmful if inhaled
Causes severe skin burns and eye damage
May cause damage to organs through prolonged or repeated exposure

Appearance Metallic
Physical State Solid
Odor No information available

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response
Immediately call a POISON CENTER or doctor/physician
Specific treatment (see supplemental first aid instructions on this label)

Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician

Skin
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse

Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Immediately call a POISON CENTER or doctor/physician

Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Do NOT induce vomiting

Precautionary Statements - Storage
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Not applicable

**Unknown Toxicity**
4.83% of the mixture consists of ingredient(s) of unknown toxicity

**Other information**

Very toxic to aquatic life with long lasting effects

**Interactions with Other Chemicals**

Use of alcoholic beverages may enhance toxic effects.

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No</th>
<th>Weight-%</th>
<th>Trade Secret</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>10 - 30</td>
<td>*</td>
</tr>
</tbody>
</table>

*The exact percentage (concentration) of composition has been withheld as a trade secret

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### 4. FIRST AID MEASURES

**First aid measures**

**General Advice**

Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

**Eye Contact**

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Seek immediate medical attention/advice. Remove contact lenses, if present and easy to do. Continue rinsing.

**Skin Contact**

Immediate medical attention is required. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

**Inhalation**

Remove to fresh air. If symptoms persist, call a physician. If breathing has stopped, give artificial respiration. Get medical attention immediately. If not breathing, give artificial respiration. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. If breathing is difficult, (trained personnel should) give oxygen. Delayed pulmonary edema may occur. Get medical attention immediately if symptoms occur. Do not breathe dust.

**Ingestion**

Do NOT induce vomiting. Rinse mouth. Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

**Self-protection of the first aider**

Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Use personal protective equipment as required. Wear personal protective clothing (see section 8). Do not breathe dust.

**Most important symptoms and effects, both acute and delayed**
Most Important Symptoms and Effects

Burning sensation. Coughing and/or wheezing. Difficulty in breathing.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

Treat symptomatically. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

CAUTION: Use of water spray when fighting fire may be inefficient.

Specific Hazards Arising from the Chemical

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Uniform Fire Code

Irritant: Solid
Toxic: Solid
Oxidizer: Class 1--Solid

Hazardous Combustion Products

Carbon oxides.

Explosion Data

Sensitivity to Mechanical Impact

No.

Sensitivity to Static Discharge

No.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions

Attention! Corrosive material. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Avoid generation of dust. Do not breathe dust.

Other Information

Refer to protective measures listed in Sections 7 and 8.

Environmental Precautions

Refer to protective measures listed in Sections 7 and 8. Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.

Methods and material for containment and cleaning up

Methods for Containment

Prevent further leakage or spillage if safe to do so.

Methods for cleaning up

Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Use only with adequate ventilation and in closed systems. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Do not breathe dust. Avoid generation of dust.

Conditions for safe storage, including any incompatibilities

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from moisture. Store locked up. Keep out of the reach of children. Store away from other materials.

Incompatible Products


8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc 7440-66-6</td>
<td>STEL: 10 mg/m³ respirable fraction TWA: 2 mg/m³ respirable fraction</td>
<td>TWA: 5 mg/m³ fume TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction</td>
<td>IDLH: 500 mg/m³ Ceiling: 15 mg/m³ dust TWA: 5 mg/m³ dust and fume STEL: 10 mg/m³ fume</td>
</tr>
</tbody>
</table>

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value OSHA PEL: Occupational Safety and Health
Administration - Permissible Exposure Limits NIOSH IDLH Immediately Dangerous to Life or Health

Other Exposure Guidelines
Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992) See section 15 for national exposure control parameters

Appropriate engineering controls

Engineering Measures
Shower
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/Face Protection
Face protection shield.

Skin and Body Protection
Wear protective gloves and protective clothing. Long sleeved clothing. Chemical resistant apron. Impervious gloves.

Respiratory Protection
No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. For environmental protection, remove and wash all contaminated protective equipment before re-use. Do not breathe dust.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical State
Solid

Appearance
Metallic

Color
No information available

Odor
No information available

Odor Threshold
No information available

Property
Values
Remarks
Method

pH
No data available
None known

Melting / freezing point
No data available
None known

Boiling point / boiling range
No data available
None known

Flash Point
No data available
None known

Evaporation Rate
No data available
None known

Flammability (solid, gas)
No data available
None known

Flammability Limit in Air

Upper flammability limit
No data available
None known

Lower flammability limit
No data available
None known

Vapor pressure
No data available
None known

Vapor density
No data available
None known

Specific Gravity
No data available
None known

Water Solubility
Immiscible in water
None known

Solubility in other solvents
No data available
None known

Partition coefficient: n-octanol/water
No data available
None known

Autoignition temperature
No data available
None known

Decomposition temperature
No data available
None known

Kinematic viscosity
No data available
None known

Dynamic viscosity
No data available
None known

Explosive properties
No data available
None known
10. STABILITY AND REACTIVITY

Reactivity

No data available.

Chemical stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous Polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Exposure to air or moisture over prolonged periods. Excessive heat.

Incompatible materials


Hazardous Decomposition Products

Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Product does not present an acute toxicity hazard based on known or supplied information.

Inhalation

Specific test data for the substance or mixture is not available. Corrosive by inhalation. (based on components). Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhaled corrosive substances can lead to a toxic edema of the lungs. Pulmonary edema can be fatal. May cause irritation of respiratory tract. Harmful by inhalation.

Eye Contact

Specific test data for the substance or mixture is not available. Causes burns. (based on components). Corrosive to the eyes and may cause severe damage including blindness. Causes serious eye damage. May cause irreversible damage to eyes.

Skin Contact

Specific test data for the substance or mixture is not available. Corrosive. (based on components). Causes burns.

Ingestion

Specific test data for the substance or mixture is not available. Causes burns. (based on components). Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways. Ingestion may cause irritation to mucous membranes. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. May be harmful if swallowed.
Component Information

Information on toxicological effects

**Symptoms**

Erythema (skin redness). Burning. May cause blindness. Coughing and/or wheezing.

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Sensitization**

May cause sensitization of susceptible persons.

**Mutagenic Effects**

No information available.

**Carcinogenicity**

The table below indicates whether each agency has listed any ingredient as a carcinogen.

**IARC (International Agency for Research on Cancer)**

Group 3 - Not Classifiable as to Carcinogenicity in Humans

**Reproductive Toxicity**

No information available.

**STOT - single exposure**

No information available.

**STOT - repeated exposure**

Causes damage to organs through prolonged or repeated exposure. Based on classification criteria from the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200), this product has been determined to cause systemic target organ toxicity from chronic or repeated exposure. (STOT RE).

**Chronic Toxicity**

No known effect based on information supplied. Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Prolonged exposure may cause chronic effects. May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects. Carcinogenic potential is unknown.

**Target Organ Effects**


**Aspiration Hazard**

No information available.

**Numerical measures of toxicity**

**Product Information**

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)
845.00 mg/kg

ATEmix (inhalation-gas)
10,976.00 ppm (4 hr)

ATEmix (inhalation-dust/mist)
3.70 mg/l

ATEmix (inhalation-vapor)
27.00 ATEmix
12. ECOLOGICAL INFORMATION

This product contains a chemical which is listed as a severe marine pollutant according to DOT

Ecotoxicity
Very toxic to aquatic life with long lasting effects.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Toxicity to Algae</th>
<th>Toxicity to Fish</th>
<th>Toxicity to Microorganisms</th>
<th>Daphnia Magna (Water Flea)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc 7440-66-6</td>
<td>96h EC50: 0.11 - 0.271 mg/L (Pseudokirchneriella subcapitata) 72h EC50: 0.09 - 0.125 mg/L (Pseudokirchneriella subcapitata)</td>
<td>96h LC50: 2.16 - 3.05 mg/L (Pimephales promelas) 96h LC50: 0.211 - 0.269 mg/L (Pimephales promelas) 96h LC50: = 2.66 mg/L (Pimephales promelas) 96h LC50: = 30 mg/L (Cyprinus carpio) 96h LC50: = 0.45 mg/L (Cyprinus carpio) 96h LC50: = 7.8 mg/L (Cyprinus carpio) 96h LC50: = 3.5 mg/L (Lepomis macrochirus) 96h LC50: = 0.24 mg/L (Oncorhynchus mykiss) 96h LC50: = 0.59 mg/L (Oncorhynchus mykiss) 96h LC50: = 0.41 mg/L (Oncorhynchus mykiss)</td>
<td>48h EC50: 0.139 - 0.908 mg/L</td>
<td></td>
</tr>
</tbody>
</table>

Persistence and Degradability
No information available.

Bioaccumulation
No information available

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal methods
This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated Packaging
Dispose of contents/containers in accordance with local regulations.

California Hazardous Waste Codes 181
This product contains one or more substances that are listed with the State of California as a hazardous waste.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>California Hazardous Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc 7440-66-6</td>
<td>Ignitable powder Toxic</td>
</tr>
</tbody>
</table>
14. TRANSPORT INFORMATION

DOT

Proper Shipping Name
NON REGULATED

Hazard Class
N/A

Marine Pollutant
This product contains a chemical which is listed as a severe marine pollutant according to DOT.

TDG

Marine Pollutant
Not regulated
This product contains a chemical which is listed as a severe marine pollutant according to TDG.

MEX

Not regulated

ICAO

Not regulated

IATA

Proper Shipping Name
NON REGULATED

Hazard Class
N/A

IMDG/IMO

Hazard Class
N/A

RID

Not regulated

ADR

Not regulated

ADN

Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA
Complies

DSL
All components are listed either on the DSL or NDSL.

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No</th>
<th>Weight-%</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>10 - 30</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Health Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Sudden release of pressure hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

CWA (Clean Water Act)
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)
### Chemical Name

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
<th>CWA - Hazardous Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7440-66-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

### US State Regulations

#### California Proposition 65

This product contains the following Proposition 65 chemicals.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>California Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose</td>
<td></td>
</tr>
<tr>
<td>9004-34-6</td>
<td>X</td>
</tr>
</tbody>
</table>

### U.S. State Right-to-Know Regulations

#### New Jersey

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese dioxide</td>
<td>X</td>
</tr>
<tr>
<td>1313-13-9</td>
<td></td>
</tr>
</tbody>
</table>

#### Massachusetts

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Massachusetts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium hydroxide</td>
<td>X</td>
</tr>
<tr>
<td>1310-58-3</td>
<td></td>
</tr>
</tbody>
</table>

#### Pennsylvania

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>X</td>
</tr>
<tr>
<td>7440-50-8</td>
<td>X</td>
</tr>
</tbody>
</table>

#### Rhode Island

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>X</td>
</tr>
<tr>
<td>7440-50-8</td>
<td>X</td>
</tr>
</tbody>
</table>

#### Illinois

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Illinois</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>X</td>
</tr>
<tr>
<td>7440-50-8</td>
<td>X</td>
</tr>
</tbody>
</table>

### International Regulations

#### Mexico

National occupational exposure limits

Mexico - Occupational Exposure Limits - Carcinogens

#### Canada

WHMIS Hazard Class

Non-controlled

### 16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>NFPA Health Hazards</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical and Chemical Hazards</th>
<th>Personal Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes 3</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS Health Hazards</th>
<th>Flammability</th>
<th>Physical Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Chronic Hazard Star Legend

* = Chronic Health Hazard

Prepared By

Product Stewardship

23 British American Blvd.

Latham, NY 12110

1-800-572-6501

Revision Date

28-Apr-2014

Revision Note

No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing,
storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet
Section I – Product and Company Identification

Information of Product

Product Identity (used on the label) | Cylindrical Alkaline Battery

Information of Manufacturer

Manufacturer’s Name | Emergency Telephone Number
GPI International Ltd. | Within USA & Canada call: +1-800-424-9300
 | Outside USA and Canada call: +1-703-527-3887

Address (Number, Street, City State, and ZIP Code) | Telephone Number for Information
7/F, Building 16W, 16 Science Park West Avenue | +852-24843333
Hong Kong Science Park, New Territories, Hong Kong

Date of prepared and revised
17 September, 2019

Recommended use of chemicals:
N.A.

Section II – Hazards Identification

Hazards identifications

General advice: The common known rules for handling of chemicals should be obeyed. These chemicals are contained in a sealed steel can. For consumer use, adequate hazard warnings are printed on both the package and the battery. Potential for exposure should not exist unless the battery leaks, is exposed to high temperatures or is mechanically or electrically abused. Concentrated potassium hydroxide contained is caustic. Anticipated potential leakage of potassium hydroxide is 2-20 ml, depending on battery size. Do not eat and drink batteries. Keep batteries away from small children.

Physical-Chemical Hazards: This preparation is not classified as dangerous according to the criteria of directive 99/45/EEC.

Hazards to man: If battery leaking, exposure to caustic ingredients may occur. Therefore, may cause sensitization by skin contract.

Hazards to environment: N.A.

Remark: “N.A.” is indicated if not applicable.

Manufacturer reserves the right to alter or amend the design, model and specification without prior notice.
Section III – Composition/Information on Ingredients

Chemical Nature: Alkaline zinc-manganese dioxide batteries

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS No.</th>
<th>%/wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese Dioxide (MnO2)</td>
<td>1313-13-9</td>
<td>40.6 ~ 42.6</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>7440-66-6</td>
<td>14.8 ~ 17.4</td>
</tr>
<tr>
<td>Water (H2O)</td>
<td>7732-18-5</td>
<td>11.0 ~ 12.2</td>
</tr>
<tr>
<td>Potassium Hydroxide (KOH)</td>
<td>1310-58-3</td>
<td>4.8 ~ 7.0</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>1.7 ~ 3.4</td>
</tr>
<tr>
<td>Brass</td>
<td>12597-71-6</td>
<td>0.8 ~ 3.0</td>
</tr>
<tr>
<td>Steel</td>
<td>12597-69-2</td>
<td>15.7 ~ 20.4</td>
</tr>
<tr>
<td>Ni-plating</td>
<td>7440-02-0</td>
<td>0.2 ~ 0.3</td>
</tr>
<tr>
<td>Nylon-66</td>
<td>32131-17-2</td>
<td>1.4 ~ 1.6</td>
</tr>
<tr>
<td>Polyvinyl Alcohol Fiber (PVA)</td>
<td>9002-89-5</td>
<td>0.6 ~ 0.9</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>7439-97-6</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>7439-92-1</td>
<td>&lt;0.0030</td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>7440-43-9</td>
<td>&lt;0.0003</td>
</tr>
<tr>
<td>Arsenic (As)</td>
<td>7440-38-2</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Section IV – First-aid Measures

**Inhalation:** In case of excessive inhalation due to leaking batteries remove to fresh air. Obtain medical advice.

**Skin Contact:** If exposed to a leaking battery, remove contaminated clothing. Wash exposed areas with plenty of water and soap. If irritation occurs, consult a physician.

**Eye contact:** If a battery is leaking and materials contact eyes, flush immediately with running water for at least 15 minutes. Consult an ophthalmologist at once.

**Ingestion:** Not anticipated due to size of batteries. Choking may occur with the smaller size batteries. If exposed to a

Remark: “N.A.” is indicated if not applicable.
leaking battery, rinse mouth and surrounding areas with running water for at least 15 minutes. Give plenty of water to drink. Do not induce vomiting. Obtain medical advice.

**Section V – Fire-fighting Measures**

- **Suitable extinguishing media:** Carbon dioxide (CO2), foam, dry chemical powder.
- **Extinguishing media not to be used:** Never use a direct water jet.
- **Exposure hazards from combustion products:** In case of fire, carbon dioxide, carbon monoxide and other toxic organic substances will be generated. Do not inhale fumes and smoke.
- **Personal protective equipments:** Wear full protective clothing. Use self-contained breathing apparatus.

**Section VI – Accidental Release Measures**

- **Personal precautions:** Notify safety personnel of large spills. Caustic potassium hydroxide may be released from leaking or ruptured batteries. Avoid eye or skin contact and inhalation of vapours. Increase the ventilation. Wear protective clothing. Keep unprotected persons away.
- **Environmental precautions:** Avoid discharge and penetration into sewerage systems, waterways, pits, and cellars.
- **Methods for cleaning up:** Collect spilled material with an insert standard absorbent like sand or silica. Care for well-ventilated conditions. Recycle or dispose of the materials in an appropriate way.

**Section VII – Handling and Storage**

- **General handling:** Obey the common known rules and precautions for handling with chemicals. Avoid mechanical and electrical abuse. Do not short battery or install incorrectly. Batteries may explode, pyroleze or vent if disassembled, crushed, recharged or exposed to high temperatures. Install batteries according to equipment instructions. Do not mix battery systems, such as alkaline and zinc-carbon. Replace all batteries in equipment at the same time. Do not carry batteries loose in pocket or bag. Do not remove battery labels.

- **Storage:** Store product in well-filled, appropriate coated and tightly closed containers avoiding influence of oxygen/air, light and humidity. Storage at room temperature.

**Section VIII – Exposure Controls/Personal Protection**

- **Exposition/Technical measures:** Atmospheric vapour concentrations must be minimized by adequate ventilation.
- **Protection of hands, eyes and skin:** None required under normal use conditions. When handling leaking batteries, use neoprene, rubber or nitrile gloves and wear safety glasses to protect hands, eyes and skin.
- **General safety and hygiene measures:** Use only as directed.

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*Member Gold Peak Group*

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## Section IX – Physical and Chemical Properties

Physical state: Stainless steel top battery  
Colour: Contents dark and gray in colour  
Odour: N.A.  
Melting point: N.A.  
Boiling point: N.A.  
Flash point: N.A.  
Explosion limit: Not available  
Ignition temperature: Not available  
Vapour pressure: Not available  
Specific gravity: N.A.  
Solubility in water: N.A.  
Solubility in other solvents: N.A.  
PH value: Not available  
Partition coefficient: Not available  
Viscosity: Not available

## Section X – Stability and Reactivity

Thermal decomposition: Batteries may burst and release hazardous decomposition products when exposed to fire.  
Substances to avoid: Strong oxidation agents.  
Hazardous reactions: Contents incompatible with strong oxidizing agents.  
Hazardous decomposition products: Thermal degradation may produce hazardous fumes of zinc and manganese; hydrogen gas; caustic vapors of potassium hydroxide and other toxic by-products.

## Section XI – Toxicological Information

Toxicity information is available on the battery ingredients noted in Section III, but in general, N.A. to intact batteries  
Chronic health effects: N.A.

## Section XII – Ecological Information

Not available.

## Section XIII – Disposal Considerations

**Product:** Dispose in accordance with appropriate regulations. If in doubt, contact your local government office concerned for information. Do not incinerate, since batteries may explode at excessive temperatures.

Remark: “N.A.” is indicated if not applicable.
## Section XIV – Transport Information

**Road (ADR/RID):** Not regulated  
**Air (ICAO/IATA):**

IATA DGR : Special Provision A123: “Examples of such batteries are: alkali-manganese, zinc-carbon, nickel-metal hydride and nickel-cadmium batteries. Any electrical battery ... having the potential of a dangerous evolution of heat must be prepared for transport as to prevent (a) a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals...) is forbidden from transport; and (b) accidental activation. The words “Not Restricted” and the Special Provision number must be included in the description of the substance on the Air Waybill as required by 8.2.6, when an Air Waybill is issued.”

**Sea (IMDG):**

IMDG CODE: Special Provision 304 which says: “Batteries, dry, containing corrosive electrolyte which will not flow out of the battery if the battery case is cracked are not subject to the provisions of this Code provided the batteries are securely packed and protected against short-circuits. Examples of such batteries are: alkaline-manganese, zinc-carbon, nickel metal hydride and nickel-cadmium batteries”

These batteries are not regulated by international agencies as hazardous materials or dangerous goods when shipped. A shipping name of “Alkaline Batteries – Non-hazardous” may be used on all domestic and international bills of lading.  
In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in “strong outer packaging” that prevents spillage of contents. All original packaging for GP alkaline batteries has been designed to be compliant with these regulatory concerns.

## Section XV – Regulatory Information

<table>
<thead>
<tr>
<th>Symbol:</th>
<th>N.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC labeling:</td>
<td>None</td>
</tr>
<tr>
<td>Risk phrases:</td>
<td>None</td>
</tr>
<tr>
<td>Safety phrases:</td>
<td>None</td>
</tr>
</tbody>
</table>

Labeling is not required because cylindrical alkaline batteries are classified as “articles” under the Dangerous Preparations Directive and as such are exempt from the requirements of the Directive.

**Remark:** “N.A.” is indicated if not applicable.

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