



## Material Safety Data Sheet

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### 1. Product & Company Identification

<b>Product:</b>	Primary zinc/air button cell (size ZA13/PR48)
<b>Manufacturer:</b>	Conrad Electronic SE
<b>Nominal voltage:</b>	1,4 V
<b>Nominal capacity:</b>	280 mAh
<b>Address:</b>	Klaus-Conrad-Str. 1, D-92240 Hirschau
<b>Telephone:</b>	+49 (0) 9604 / 40 - 8988
<b>Date of issue:</b>	31.03.2014

Electrochemical system: Zinc/mercury | KOH electrolyte | oxygen

Anode (negative electrode): Zinc/mercury

Cathode (positive electrode): MnOx catalyst

#### Legal Remark (U.S.A.)

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 anything 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(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace 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 "articles", they are exempted from the requirements of the Hazard Communication Standard.

#### Legal remark (EU)

These batteries are no "substances" or "preparations" according to Regulation (EC) No 1907/2006 EC. Instead they have to be regarded as "articles", no substances are intended to be released during handling. Therefore there is no obligation to supply a MSDS according to Regulation (EC) 1907/2006, Article 31.

#### General remark

This "Safety Information" is provided as a service to our customers. The details presented are in accordance with our present knowledge and experiences. They are no contractual assurances of product attributes.



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### 2. Hazards Identification

A sealed zinc/air button cell is not hazardous in normal use (as defined in chapter 7).

In case of mistreatment (prolonged deep discharge, charge, reverse charge, external short circuit...) and in case of fault, some electrolyte can leak from the cell through the air holes. In these cases refer to the risk of potassium hydroxide solution (corrosive, pH > 14). Charging may cause rupture. The electrode materials are only hazardous, if the materials are released by mechanical damaging of the cell or if exposed to fire.

### 3. Composition/information on ingredients

#### Ingredients

Contents	CAS No.	Hazard Symbols	R Phrases	Material
0 - 14 %	1313-13-9	Xn	R 20/22	Manganese oxide
18 - 44 %	7440-66-6	N	R 50/53	Zinc
1 - 3 %	1310-58-3	C	R 22-35	Potassium hydroxide
0,4 - 1,0 % < 25 mg/cell	7439-97-6	T+, N	R 61-26-48/23-50/53	Mercury (in zinc alloy)

Full text of Classification and R-phrases: see section 16.

#### Heavy Metals

Contents	CAS No.	Material
0,01 - 0,03 %	7439-92-1	Lead
< 5 mg/kg	7440-43-9	Cadmium

#### Other Ingredients

Contents	CAS No.	Material
27 - 70 %		Nickel plated steel
2 - 5 %		Copper
2 - 7 %		Polymers

### 4. First aid measures

#### Measures at accidental release

**After inhalation:** Fresh air. Seek for medical assistance.

**After skin contact:** Flush affected areas with plenty of water. Remove contaminated cloth immediately. Seek for medical assistance.

**After eye contact:** Flush the eye gently with plenty of water (at least 15 minutes). Seek for medical assistance.

**After ingestion:** Drink plenty of water. Avoid vomiting. Seek for medical assistance. No trials for neutralization.



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### 5. Fire fighting measures

**Suitable extinguishing media:**

Use foam, water, or CO<sub>2</sub>, as appropriate.

**Extinguishing media with limited suitability:**

(none)

**Special protection equipment during fire-fighting:**

Contamination cloth including breathing apparatus.

**Special hazard:**

(none)

### 6. Accidental release measures

**Person related measures:**

Wear personal protective equipment adapted to the situation (protection gloves, cloth).

**Environment protection measures:**

In the event of battery rupture, prevent skin contact and collect all released material in a plastic lined container. Dispose off according to the local law and rules. Avoid leached substances to get into the earth, canalization or waters.

**Treatment for cleaning:**

If battery casing is dismantled, small amounts of electrolyte may leak. Pack the battery including ingredients as described above. Then clean with water (diluted acetic acid may be helpful).

### 7. Handling and storage

**Guideline for safe handling:**

Always follow the warning information on the batteries and in the manuals of devices. Only use the recommended battery types. Keep batteries away from children. For devices to be used by children, the battery casing should be protected against unauthorized access. Unpacked batteries shall not lie about in bulk. In case of battery change always replace all batteries by new ones of identical type and brand. Do not swallow batteries. Do not throw batteries into water. Do not throw batteries into fire. Do not short-circuit batteries. Do not recharge primary batteries. Do not open or disassemble batteries.

**Storage:**

Storage preferably at room temperature (approx. 20°C). Avoid large temperature changes. Avoid direct sunlight. At higher temperature the electrical performance may be reduced. Storage of unpacked batteries can cause short circuit and heat generation.

**Storage of large amounts:**

If possible, store the batteries in original packaging (short circuit protection); A fire alarm is recommended; For automatic fire extinction consider chapter 5 "Fire fighting measures".

**VCI storage category:**

It is recommended to consider the "VCI Guideline for the mixed storage of chemicals" and to handle primary zinc/air button cells according to storage category 11 ("combustible solids").



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### 8. Exposure controls/personal protection

Under normal conditions (discharge, avoid prolonged deep discharge) release of ingredients does not occur.

### 9. Physical and chemical properties

Not applicable if closed.

### 10. Stability and reactivity

#### Dangerous reactions:

When heated above 60°C the risk of rupture occurs.

### 11. Toxicological information

Under normal conditions (during and discharge) release of ingredients does not occur. If accidental release occurs see information in section 2, 3, and 4. Swallowing of a battery can be harmful. Call the local Poison Control Centre for advice and follow-up.

### 12. Ecological information

Our primary zinc/air button cells do contain mercury and lead, and do not contain cadmium as defined by the European directive 2006/66/EC Article 21; they comply with the chemical composition requirements of this Directive. The mercury content is in accordance with the "Mercury-Containing and Rechargeable Battery Management Act" (U.S.A.).

### 13. Disposal considerations

USA: Primary zinc/air button cells are classified by the federal government as non-hazardous waste and are safe for disposal in the normal municipal waste stream.

In the European Union, manufacturing, handling and disposal of batteries is regulated on the basis of the DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC. Customers find detailed information on disposal in their specific countries using the web site of the European Portable Batteries Association ([http://www.epbaeurope.net/legislation\\_national.html](http://www.epbaeurope.net/legislation_national.html)).

Importers and users outside EU should consider the local law and rules.

In order to avoid short circuit and heating, used zinc/air button cells should never be stored or transported in bulk. Proper measures against short circuit are:

- Storage of batteries in original packaging
- Coverage of the terminals



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### 14. Transport information

#### General considerations

Our primary zinc/air button cells 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), the International Maritime Organization (IMO), the "Accord Européen Relatif au Transport International des Marchandises Dangereuses par Route" (ADR) and the "Règlement concernant le transport international ferroviaire de marchandises Dangereuses" (RID).

#### 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."

#### ADR/RID/IMDG Code

As primary zinc/air button cells are not explicitly mentioned in these Dangerous Goods regulations, there are no special Dangerous Goods shipment requirements for these products.

#### USA

49 CFR § 172.102 Special Provision 130: "Dry batteries not specifically covered by another entry in the §172.101 Table are covered by this entry ( i.e., Batteries, dry, sealed, n.o.s.) and are not subject to requirements of this subchapter except for the following: [...] (b) Preparation for transport. Batteries and battery-powered device(s) containing batteries must be prepared and packaged for transport in a manner to prevent: (1) A dangerous evolution of heat; (2) Short circuits, including but not limited to the following methods: [...] (ii) Separating or packaging batteries in a manner to prevent contact with other batteries, devices or conductive materials (e.g., metal) in the packagings [...]; and (3) Damage to terminals. If not impact resistant, the outer packaging should not be used as the sole means of protecting the battery terminals from damage or short circuiting. Batteries must be securely cushioned and packed to prevent shifting which could loosen terminal caps or reorient the terminals to produce short circuits."

#### IEC 60086-1

Code of practice for packaging and shipment of primary batteries given in IEC 60086-1:

The packaging shall be adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design shall be chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of moisture.

Shock and vibration shall be kept to a minimum. For instance, boxes should not be thrown off trucks, slammed into position or piled so high as to overload battery containers below. Protection from inclement weather should be provided.



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### 15. Regulatory information

#### Marking consideration:

According to DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC all batteries have to be marked with the crossed bin; according to Article 21 of this directive primary zinc/air button cells have to be marked with the element symbols "Hg" and "Pb". Due to the size of the battery, this marking has to be placed on the packaging.

#### International safety standards:

IEC 60086-5.

#### Water hazard class:

(according to German Federal Water Management Act) non-water pollution according to VwVwS Appendix 1 (No. 1443 and 766)

### 16. Other information

Full text of Classification and R Phrases referred to under sections 2 and 3

Classification	Xn	Harmful
	T+	Very toxic
	C	Corrosive
	N	Dangerous for the environment
R Phrases	20/22	Harmful by inhalation and if swallowed.
	22	Harmful if swallowed.
	26	Very toxic by inhalation.
	35	Causes severe burns.
	61	May cause harm to the unborn child.
	48/23	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	

#### Note:

Date of issue of the transport regulations: ADR 2013, RID 2013, IATA 2013, IMDG 2010, DOT / 49 CFR 2013.

Latest covered modification of the European Battery Directive 2006/66/EC: Directive 2008/103/EC.