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### Primary zinc/silver oxide button cell, mercury free (series V... MF)

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## 1. Identification of the product and of the company undertaking

### Product details

Trade name:	Primary silver oxide battery: button cell
Product types:	V 301 MF, V 303 MF, V 309 MF, V 315 MF, V 317 MF, V 319 MF, V 321 MF, V 329 MF, V 335 MF, V 337 MF, V 339 MF, V 341 MF, V 344 MF, V 346 MF, V 350 MF, V 357 MF, V 361 MF, V 362 HC MF, V 362 MF, V 364 HC MF, V 364 MF, V 370 MF, V 371 HC MF, V 371 MF, V 373 MF, V 377 MF, V 379 HC MF, V 379 MF, V 381 MF, V 384 MF, V 386 MF, V 389 MF, V 390 MF, V 391 MF, V 392 MF, V 393 MF, V 394 MF, V 395 HC MF, V395 MF, V 396 MF, V 397 MF, V 399 MF V 76 PX MF, V 28 PX MF
Voltage:	1,55 V (or multiples of this in case of multi-cell configurations)
Electrochemical system:	Zinc   NaOH/KOH electrolyte   silver oxide, manganese dioxide
Anode (negative electrode):	Zinc
Cathode (positive electrode):	Silver oxide, manganese dioxide

### Supplier details

Address:	VARTA Microbattery GmbH Daimlerstr. 1 D-73479 Ellwangen/Jagst Germany
Emergency telephone number:	+49 7961 921 110 (VAC)

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

Safety Data Sheets 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". According to OSHA, Article means 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 (as determined under paragraph (d) of this section), 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 "mixtures" 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 "safety data sheet according to Regulation (EC) 1907/2006, Article 31".

### General remark

This Safety Data Sheet 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.

## 2. Hazards identification

A sealed zinc/silver oxide 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. In these cases refer to the risk of potassium hydroxide solution or sodium 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 Categories	Hazard Statements	Material
10 - 19 %	7440-66-6	Aquatic Chronic 1	H410	Zinc
5 - 35 %	20667-12-3	Ox. Sol. 1 Eye Dam. 1 Aquatic Acute 1 Aquatic Chronic 1	H271 H318 H400 H410	Silver oxide
24 - 40 %	1313-13-9	Acute Tox. 4	H302 H332	Manganese dioxide
4 - 7 %	1310-58-3	Acute Tox. 4 Skin Corr. 1A	H302 H314	Potassium hydroxide
0 - 0,4 %	1310-73-2	Acute Tox. 4 Skin Corr. 1A	H302 H314	Sodium hydroxide

Full text of Hazard statements: see section 16.

### Heavy Metals

Contents	CAS No.	Material
< 5 mg/kg	7440-43-9	Cadmium
< 40 mg/kg	7439-92-1	Lead
< 1 mg/kg	7439-97-6	Mercury (none intentionally introduced, see Chapter 12)
< 5 mg/kg		Hexavalent Chromium (Cr <sup>6+</sup> )

### 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. Further advice for the medical sector: <a href="http://buttonbatterysafety.com/">http://buttonbatterysafety.com/</a> See also Chapter 7.

### 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 of 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. Further advice for parents: <a href="http://buttonbatterysafety.com/">http://buttonbatterysafety.com/</a>
Supply to private end users:	In case the products are supplied to private end users packed with equipment or contained in equipment it is strongly recommended to follow UL product and instruction manual requirements: The product is required to be marked with a graphical symbol that alerts the user to refer to the instruction manual. The instruction manual itself is required to contain - a warning marking with text to alert the user of the potential chemical burn hazard associated with coin/button battery ingestion, - an instruction as to the presence of a coin/button cell battery, - possible effects of battery ingestion, - an instruction to keep batteries away from children, - an advice to seek immediate medical attention if it suspected that batteries have either been swallowed or placed inside any part of the body.
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 large amounts:	Storage of unpacked batteries can cause short circuit and heat generation. 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".

Storage category according to TRGS 510:

It is recommended to consider the "Technical Rule for Hazardous Substances TRGS 510 - Storage of hazardous substances in nonstationary containers" and to handle primary zinc/ silver oxide button cells according to storage category 11 ("combustible solids").

### 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 70°C the risk of rupture occurs.

### 11. Toxicological information

Under normal conditions (during 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

VARTA primary zinc/silver oxide button cells do not contain heavy metals as defined by the European directives 2006/66/EC Article 21; they comply with the chemical composition requirements of this Directive.

Mercury has not been "intentionally introduced (as distinguished from mercury that may be incidentally present in other materials)" in the sense of the U.S.A. "Mercury-Containing and Rechargeable Battery Management Act" (May 13 1996).

The Regulation on Mercury Content Limitation for Batteries promulgated on 1997-12-31 by the China authorities including the State Administration of Light Industry and the State Environmental Protection Administration defines 'low mercury' as 'mercury content by weight in battery as less than 0.025%', and 'mercury free' as 'mercury content by weight in battery as less than 0.0001%'. And therefore: VARTA primary zinc/silver oxide button cells belong to the category of mercury-free battery (mercury content lower than 0.0001%).

### 13. Disposal considerations

USA: Primary zinc/silver oxide 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/silver oxide 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

### 14. Transport information

#### General considerations

VARTA primary zinc/silver oxide 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 and nickel-cadmium batteries. Any electrical battery [...] having the potential of a dangerous evolution of heat must be prepared for transport so as to prevent: (a) a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; [...]); 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/silver oxide 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 packaging [...]; 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.*

### 15. Regulatory information

<b>Marking consideration:</b>	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" the batteries have to be marked with the crossed bin. Due to the size of the products the battery need not be marked but a symbol measuring at least 1 x 1 cm shall be printed on the packaging..
<b>International safety standards:</b>	IEC 60086-5: "... system S button cells or batteries under 250 mAh capacity ... are exempt from any testing".
<b>Water hazard class:</b>	The regulations of the German Federal Water Management Act (WHG) are not applicable as primary zinc/silver oxide button cells are articles and not substances, thus there is no risk of water pollution, except the batteries are violated or dismantled.

### 16. Other information

#### Full text of Hazard Statements referred to under section 3

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H271	May cause fire or explosion; strong oxidiser.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

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**Note:** Date of issue of the transport regulations: ADR 2015, RID 2015, IATA 2016 (57th edition), IMDG 2014, DOT / 49 CFR 2016.  
Latest covered modification of the European Battery Directive 2006/66/EC: Directive 2013/56/EU.

**RoHS:** See special [Declaration](#)

**REACH:** See special [Declaration](#)

**Issued by:** VARTA Microbattery GmbH  
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**Updates:** Current SDS can be downloaded from VARTA's web page following the link:  
<http://www.varta-microbattery.com/en/news-downloads/downloads.html>