Safety Data Sheet
MSDS 2.001.005

Lithium primary button cell

1. Identification of the product and of the company undertaking

Product details

Trade name:	Lithium primary button cell
Voltage:	3.0 V (or multiples of this in case of multi-cell configurations)
Electrochemical system:	Lithium metal | organic electrolyte | manganese dioxide
Anode (negative):	Lithium metal
Cathode (positive):	Manganese dioxide

Type:	**Lithium content per cell:**
CR 1025	0,009 g
CR 1216	0,008 g
CR 1220	0,01 g
CR 1225	0,015 g
CR 1616	0,02 g
CR 1620	0,02 g
CR 1632	0,04 g
CR 2016	0,03 g
CR 2016-P	0,03 g
CR 2025	0,05 g
CR 2025-P	0,05 g
CR 2032	0,07 g
CR 2032-P	0,07 g
CR 2320	0,043 g
CR 2430	0,09 g
CR 2430-P	0,09 g
CR 2450	0,17 g
CR 2450-P	0,17 g
CR 1/3 N	0,06 g
p 28 pxl	0,05 g

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

The battery is sealed hermetically. Thus, the ingredients have no hazard potential, except the battery is violated or dismantled.

If in case of mistreatment the ingredients are released, a spontaneously flammable gas mixture may be released under certain circumstances (measures according to chapter 4 to 6).

Attention: If batteries are treated wrong the danger of burns or bursts occurs. Batteries must not be heated above 100°C or incinerated. The battery contents must not get in contact with water. If the negative electrode gets in contact with water or humidity hydrogen gas is formed, which may inflame spontaneously.

3. Composition/information on ingredients

Ingredients

Contents	CAS No.	Hazard Categories	Hazard Statements	Material
1 - 3 %	7439-93-2	Water-react. 1 Skin Corr. 1B	H260 H314	Lithium
13 - 40 %	1313-13-9	Acute Tox. 4	H302 H332	Manganese dioxide
< 10 %	108-32-7	Eye Irrit. 2	H319	Propylene carbonate
< 10 %	110-71-4	Flam. Liq. 2 Repr. 1B Acute Tox. 4	H225 H360-FD H332	1,2-Dimethoxy ethane
< 5 %	646-06-0	Flam. Liq. 2	H225	1,3-Dioxolane
< 5 %	7791-03-9	Ox. Sol. 2 Skin Irrit. 2 Eye Irrit. 2 STOT SE 3	H272 H315 H319 H335	Lithium perchlorate

Full text of Hazard statements: see section 16.

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
Germany

Heavy Metals and RoHS Relevant Substances

Contents	CAS No.	Material
< 1 mg/kg	7440-43-9	Cadmium
< 10 mg/kg	7439-92-1	Lead
< 0,1 mg/kg	7439-97-6	Mercury (none intentionally introduced, see Chapter 12)
< 5 mg/kg		Hexavalent Chromium (Cr^{6+})
< 5 mg/kg		PBB
< 5 mg/kg		PBDE

Other Ingredients

Contents	CAS No.	Material
33 - 74 %		Steel and nickel
3 - 10 %		Plastic

SVHC substances according to REACH (Article 33)

Contents	EC No.	CAS No.	Material
> 0.1 %	203-794-9	110-71-4	1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)

For information to allow safe use: see section 7.

4. First-aid measures

Measures at accidental release

After inhalation:	Fresh air. Seek for medical assistance.
After skin contact:	Remove solid particles immediately. Flush affected areas with plenty of water (at least 15 min.). Remove contaminated cloth immediately. Seek for medical assistance.
After eye contact:	Flush the eye gently with plenty of water (at least 15 min.). Seek for medical assistance.
After ingestion of battery components:	Drink plenty of water. Avoid vomiting. Seek for medical assistance. No trials for neutralization.

After ingestion of battery:

In the event of battery ingestion, seek immediate medical attention at a hospital emergency room.

Do not let your child eat or drink until an X-ray can determine if a battery is present.

If you still have the battery packaging or the device containing the battery take this with you to help the doctor identify the battery type and chemistry.

Further advice for the medical sector: http://buttonbatterysafety.com/

See also Chapter 7.

5. Fire-fighting measures

Suitable extinguishing media:	Metal fire extinction powder, rock salt or dry sand shall be used. In case only water is available, it can be used in large amounts.
Extinguishing media with limited suitability:	Carbon dioxide (CO_2) is not suitable. Water in small quantities may have adverse effects.
Special protection equipment during fire-fighting:	Protective clothing including breathing apparatus.
Special hazard:	Cells may explode and release metal parts. At contact of anode material with water extremely flammable hydrogen gas and caustic liquid are released.
Attention:	Do not let used extinguishing media penetrate into surface water or ground water. Dispose off properly.

6. Accidental release measures

Person related measures:	Wear personal protective equipment adapted to the situation (protection gloves, cloth, face protection, breathing protection).
Environment protection measures:	Bind released ingredients with powder (rock salt, sand). Dispose off according to the local law and rules. Avoid leached substances to penetrate into the earth, canalization or water.
Treatment for cleaning:	If battery casing is dismantled, small amounts of electrolyte may leak. Package the battery tightly including ingredients together with lime, sand or rock salt. Then clean with water.

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: http://buttonbatterysafety.com/ http://www.productsafety.gov.au/content/index.phtml/itemId/993224
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 unpacked batteries can cause short circuit and heat generation.
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 lithium primary button cells according to storage category 11 (“combustible solids“).
Storage of large amounts:	Follow the recommendations of the German Insurance Association (GDV - “Gesamtverband der Deutschen Versicherungswirtschaft e.V.”) concerning lithium batteries: http://vds.de/fileadmin/vds_publikationen/vds_3103_web.pdf In case of storage of large amounts (used storage volume > 7 m^3 and/or more than 6 pallets) batteries shall be stored in fire-resistant or separated rooms or areas (e.g. warehouse or container for hazardous materials). Mixed storage with other products is not allowed. The storage area shall be monitored by an automatic fire detection system, connected to a permanently manned place. A fire-extinguishing system shall reflect the extinguishing agents mentioned in chapter 5.

8. Exposure controls/personal protection

Under normal conditions (during 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 100°C the risk of rupture occurs.

11. Toxicological information

Under normal conditions (during charge and discharge) release of ingredients does not occur. In case of accidental release see information in chapter 2.

Swallowing of a battery can be harmful. Call the local Poison Control Centre for advice and follow-up.

12. Ecological information

Lithium primary button cells manufactured by VARTA Microbattery 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 lithium primary button cells/batteries belong to the category of mercury-free battery (mercury content lower than 0.0001%).

13. Disposal considerations

USA: Lithium primary 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).

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

In order to avoid short circuit and heating, used lithium primary 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
- Embedding in dry sand

14. Transport information

General considerations

Lithium primary button cells manufactured by VARTA Microbattery are considered to be UN3090 Lithium Metal Batteries and are tested according to 38.3 of the “UN Manual of Tests and Criteria” for compliance with the requirements of special provisions ADR 188, IMDG 188, as well as the requirements of DOT / 49 CFR § 173.185 , and the General Requirements of IATA DGR packing instruction 968. Positive test results as well as other relevant information required for transportation are stated in dedicated “Declarations of Conformity”.

Transportations of cells or batteries packed with equipment or contained in equipment have to follow the appropriate regulations for UN3091.

Compilations of transport requirements for Lithium batteries can be found in:
https://www.lithium-batterie-service.de/en/
http://www.iata.org/whatwedo/cargo/dgr/Documents/lithium-battery-guidance-document-2017-en.pdf

Each cell/battery is manufactured under the quality management program described in IATA DGR clause 3.9.2.6, ADR clause 2.2.9.1.7 e), and IMDG code clause 2.9.4.5.

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

Marking consideration:	For the state of California these batteries have to be marked as “containing perchlorate”. 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 × 1 cm shall be printed on the packaging.
International safety standards:	The basis cells are recognized components according to UL 1642.
Water hazard class:	The regulations of the German Federal Water Management Act (WHG) are not applicable as Lithium primary batteries are articles and not substances, thus there is no risk of water pollution, except the batteries are violated or dismantled.

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
Germany

16. Other information

Full text of Hazard Statements referred to under section 3

H225	Highly flammable liquid and vapour.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H272	May intensify fire; oxidizer.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H360FD	May damage fertility. May damage the unborn child.

Note:	Date of issue of the transport regulations: ADR 2017, RID 2017, IATA 2018 (59th edition), IMDG 2016, DOT / 49 CFR 2018. Latest covered modification of the European Battery Directive 2006/66/EC: Directive 2013/56/EU.
Issued by:	VARTA Microbattery GmbH Quality/Environmental Management
RoHS:	See special Declaration
REACH:	See special Declaration
Issued by:	VARTA Microbattery GmbH Quality / Environmental Management
Contact:	https://www.varta-microbattery.com/contact/?lang=en
Updates:	Current SDS can be downloaded from VARTA's web page.

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
Germany

Supplier's Test Summary

in accordance with UN Manual of Tests and Criteria
Part III, subsection 38.3

Information about the manufacturer

Name	VARTA Microbattery GmbH
Address	Daimlerstrasse 1 73479 Ellwangen Germany
Phone	+49 7961 921-0
E-mail	info@varta-microbattery.com
Website	www.varta-microbattery.com

Description of the product

Type	Lithium metal cell
Physical description	Primary lithium metal button cell

Product test information

Each object of this declaration has been tested and was found to be compliant with the UN Manual of Test and Criteria, Part III, subsection 38.3. This includes all single cells and battery assemblies containing not more than one cell of those given in the following list.

Model	Mass	Lithium content	Edition of the manual of test and criteria ST/SG/AC.10/11	Test report number	Test report date
CR2032	3 g	0.07 g	Rev. 4 (2003)	LB160059	2006-08-23
CR2032-P	3 g	0.07 g	Rev. 5 / Amend. 1 (2011)	1113110028	2013-12-09
CR2032-N	3.2 g	0.064 g	Rev. 6 (2015)	LJKJ20180112U01	2018-02-02

List of tests conducted and results

Test Item	Test Result	Test Item	Test Result
T1. Altitude simulation	pass	T5. External short circuit	pass
T2. Thermal test	pass	T6. Impact/Crush	pass
T3. Vibration	pass	T7. Overcharge	N/A
T4. Shock	pass	T8. Forced Discharge	pass

Test laboratories

The tests were performed by one of the following test laboratories.

Name	Shanghai Research Institute of Chemical Industry Testing Centre (SRICI)	Name	Guangzhou MCM Certification and Testing Co., Ltd
Address	No. 345 Yunling East Road, Pudong Shanghai 200062 China	Address	1 F No. 13, Zhong San Section, Shi Guang Road, Panyu District, Guanzhou Citiy Guangdong Province, China
Phone	+86 21 52569800	Phone	+86 20 34777662
E-mail	msds123@gmail.com	E-mail	markmiao@mcmtek.com
Website	www.ghs.cn	Website	www.mcmtek.com

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Supplier's Test Summary

in accordance with UN Manual of Tests and Criteria
Part III, subsection 38.3

Additional information

In original VARTA packaging the products comply with the following special provisions of international transport regulations:

- IATA DGR: Packing Instruction 968 Section IB
  (Transportations of cells or batteries packed with equipment or contained in equipment have to follow Packing Instructions 969 or 970 Section II.)
- ADR/RID/ADN/IMDG Code: Special Provision 188
- DOT / 49 CFR: §173.185 (c)

The products have been manufactured under a quality management program according to IATA DGR clause 3.9.2.6.1 (e), ADR clause 2.2.9.1.7 e), and IMDG code clause 2.9.4.5.

Ellwangen, 2019-07-30

Place and date of issue

VARTA Microbattery GmbH
Daimlerstrasse 1
D-73479 Ellwangen
Germany
VARTA

Company stamp

i. A.

Dr. Sebastian Röhler
Manager Product Compliance

Signature

VARTA Microbattery GmbH
Daimlerstraße 1
73479 Ellwangen
Germany