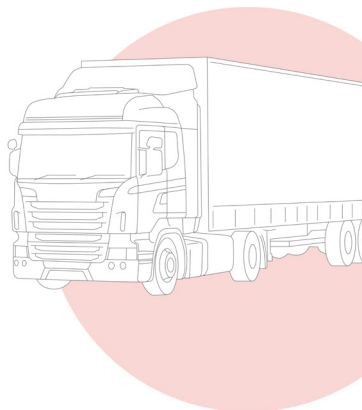
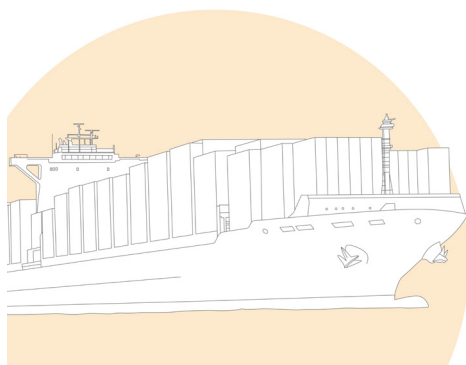
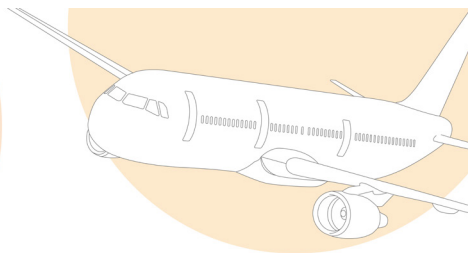
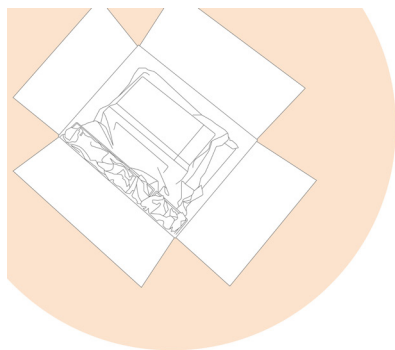




medinCNO medinCNOmini medin-NC3 Spare part batteries

Transportation and packing instructions

Attention:

The medinCNO/medinCNOmini/medin-NC3 includes a lithium ion battery and a lithium metal cell and therefore the rules for transportation of hazardous goods must be followed. During any transport of medinCNO/medinCNOmini/medin-NC3 or its internal batteries, the requirements of your transportation company for the transport of lithium batteries must be met. For detailed information, contact your transportation company. medin recommends transporting medinCNO/medinCNOmini medin-NC3 only in the original packaging. For this reason, at least one original package should be kept.

Please note:

The transport and packing instructions are not part of the user manual.

The instructions must be followed for each air transport of medinCNO/ medinCNOmini/ medin-NC3 between medin and distributor/customer. For other ways of transport and transport within your country, please observe country specific and transport type specific regulations.



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Rev11

Transport and packing instructions

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1. Internal batteries - reason for special packing requirements

medinCNO/medinCNomini/medin-NC3 contains two internal batteries:

1x Lithium ion battery (rechargeable internal battery REF 39-101 or rechargeable exchange battery NC3 REF 30-150), which is tested according to subsection 38.3 of the "UN Manual of Tests and Criteria" part III. It is protected against damage by the case of the device. See data sheet included in chapter 6.1.

Watt-hour rating	92.16 Wh (marked on the outside of the device)
Lithium content	7.68g
Net weight of battery	415 g

1x Lithium metal cell (designated "small 3 V battery REF 39-102"), which is tested according to subsection 38.3 of the "UN Manual of Tests and Criteria" part III. It is protected by the case of the device. See data sheet included in chapter 6.2.

Lithium content	0.58 g
Net weight of battery	17 g

Both batteries are mounted inside the device, which is classified as "contained in equipment" for transportation. The assembly protects the batteries against damage and also ensures that the two batteries are prevented from short circuits.

Attention: One medinCNO/medinCNomini/medin-NC3 unit does not have more than 4 cells and not more than 2 batteries inside. Because of this, labelling of the package according to the IATA packing instruction 965, IATA packing instruction 970 and ADR Special Provision 188 is not necessary, but some transportation companies may request labelling. Correct documentation in the way bill is always necessary.

2. Transport and packing of a complete medinCNO/ medinCNOmini/ medin-NC3 unit

2.1 Relevant IATA packing instructions

For the transport of a complete medinCNO/medinCNOmini/medin-NC3 unit by air, the IATA Packing Instruction 967 (UN3481) and IATA packing Instruction 970 (UN3091) are valid. The detailed information which is necessary to define the mode of transportation of the medinCNO/ medinCNOmini/medin-NC3 is described in chapter 1; this information can be provided to your transportation company if necessary.

2.2 Packing

Attention: For the transport of a medinCNO/medinCNOmini/medin-NC3 it is recommended to use the original packaging.

For each package which contains a medinCNO/medinCNOmini/medin-NC3 unit, it should be ensured that:

1. the package is strong enough to prevent the device from damage due to being dropped
2. the medinCNO/medinCNOmini/medin-NC3 can't move inside its package and the package cannot move inside the outer packaging
3. the medinCNO/medinCNOmini/medin-NC3 cannot be switched on inside the package
4. the medinCNO/medinCNOmini/medin-NC3 is packaged in a waterproof fashion
5. not more than 11 medinCNO/ medinCNOmini are shipped together; not more than 6 medin-NC3 with exchange battery (REF 30-150) or 11 medin-NC3 without exchange battery are shipped together (maximum allowed net weight 5 kg – one medinCNO/ medinCNOmini@/medin-NC3 without exchange battery: 0.42kg; one medin-NC3 with exchange battery: 0.82kg)

To ensure the above, the medinCNO/medinCNOmini/medin-NC3 unit must be packed according to the checklist in chapter 2.6.

2.3 Labelling

Normally no special lithium battery labels are needed on the outside of the medinCNO/ medinCNOmini/medin-NC3 package, because one unit medinCNO/medinCNOmini/

medin-NC3 without exchange battery contains only one lithium ion battery and only one lithium metal cell and one unit medin-NC3 with exchange battery contains only two lithium ion batteries and only one lithium metal cell. The special labels are necessary if more than 2 lithium ion batteries or more than 4 lithium metal cells are inside one individual package.

However, some airlines may ask for the lithium ion/lithium metal label. In this case, the labels from chapter 5 must be applied and the necessary text (see chapter 5) must be written on the documents which accompany the medinCNO/medinCNOmini/medin-NC3. The sites where the labels are to be applied are also described in chapter 5.

2.4 Delivery documentation

If a lithium ion battery label or a lithium metal label is used, the information described in chapter 5.1 and 5.2 (text required for delivery documents) has to be printed onto the delivery documentation.

2.5 Waybill

Attention: You are responsible for ensuring that the transport company receives all necessary information. Every time a medinCNO/medinCNOmini/medin-NC3 unit is transported, the fact that it includes lithium batteries has to be indicated on the waybill – regardless of whether the lithium metal battery label, the lithium ion battery label or no label at all is used.

Ask your transport company about which forms must be filled out and which information is needed.

Transport via air:

To transport a medinCNO/medinCNOmini/medin-NC3 by air, the following information must be indicated on the air waybill inside the box entitled *Nature and Quantity of goods*:

1. Lithium ion batteries in compliance with Section II of PI 967
2. Lithium metal batteries in compliance with Section II of PI 970

Ground Transport (via road, rail and inland waterways):

In this case all of the information requested by your transport company must be added to the waybill. For detailed and local information, ask your transport company.

At a minimum, the following information or the information for transport via air should be added:

1. Excepted lithium batteries as per Special Provision 188

2.6 Checklist

The packaging and documents of your medinCNO/medinCNOmini/medin-NC3 unit have to fulfil all of the points in the following checklist. It is recommended that original packaging always be used:

Requirements:		
Does your medinCNO/medinCNOmini/medin-NC3 include only good batteries and no defective or damaged batteries? If your medinCNO/medinCNOmini/medin-NC3 has defective or damaged batteries inside, these batteries are to be removed before transport and disposed of according to your local regulations. Afterwards the medinCNO/medinCNOmini/medin-NC3 can be transported. Attention: Transportation of defective batteries is NOT ALLOWED!	☐	ok
	☐	not ok
Is the quality of the cardboard box which you want to use high enough – the cardboard box should be made of double-faced corrugated board with a minimum quality of 3.2 A drop of 1.2 meters should not damage the two internal batteries!	☐	ok
	☐	not ok
Is the medinCNO/medinCNOmini/medin-NC3 packed in a waterproof fashion – e.g. the medinCNO/medinCNOmini/medin-NC3 is wrapped inside a plastic bag.	☐	ok
	☐	not ok
Is every medinCNO/medinCNOmini/medin-NC3 packed inside its own cardboard box? If sending more than one medinCNO/medinCNOmini/medin-NC3: Each medinCNO/medinCNOmini/medin-NC3 must be packed into a separate cardboard box. Afterwards, the individual boxes can be packaged together in one large cardboard box, but only maximum of 11 medinCNO/medinCNOmini/medin-NC3 without exchange battery or maximum of 6 medin-NC3 with exchange battery (REF 30-150).	☐	ok
	☐	not ok

Is the medinCNO/medinCNOmini/medin-NC3 packed such in a way that nothing can activate the on/off button?	☐	ok
Make sure that all accessories are secured and packed in such a way that they cannot come into contact with the medinCNO/medinCNOmini/medin-NC3.	☐	not ok
Make sure that the packing material is not able to come into contact with the on/off button.	☐	not ok
Is the medinCNO/medinCNOmini/medin-NC3 packed in such a way that it cannot move inside its package?	☐	ok
Is the box containing the medinCNO/medinCNOmini/medin-NC3 secured inside the outer box such that it cannot move?	☐	not ok
If you use one or both of the lithium battery labels:		
1. Did you put one label on each cardboard box which contains a medinCNO/medinCNOmini/medin-NC3?	☐	ok
2. Did you write the telephone number on each label?		
3. If you are using a large cardboard box containing several cardboard boxes inside – did you also put the label on the outer cardboard box? Did you write "OUTER PACKAGING" on the outer cardboard box?	☐	not ok
4. Did you write the necessary information on the accompanying documents (chapter 2.4)?		
Did you inform your transportation company about the lithium batteries inside your delivery?	☐	ok
Did you clarify if your transportation company has special requirements?		
Did you fill in all the necessary fields on your waybill (see chapter 2.5)?	☐	not ok
If necessary, did you fill in the special form for lithium batteries required by your transportation company?	☐	not ok

Attention: If any point is answered with not ok, the packaging must be corrected, otherwise the medinCNO/medinCNOmini/medin-NC3 cannot be transported.

3. Transport of the internal rechargeable battery REF 39-101 by itself or the rechargeable exchange battery REF 30-150 by itself – Lithium-Ion

3.1 Relevant IATA packing instructions

For air transport of a rechargeable battery which is not mounted inside a medinCNO/ medinCNOmini/medin-NC3, the IATA Packing Instruction 965 (UN3480) should be observed. The detailed information which is necessary to define the mode of transportation of the batteries REF 39-101 is described in chapter 1; this information may have to be provided to your transportation company.

3.2 Packing

Attention: To transport the rechargeable internal battery, it is recommended to use the original packaging from medin.

The package and its outer box must ensure that:

1. The package is strong enough to prevent the batteries from damage due to being dropped
2. The batteries cannot move inside the package and the package cannot move inside the outer package.
3. The battery is protected so as to prevent short circuits, including protection against contact with conductive materials within the same package.
4. The battery is protected against shifting which could cause battery-to-battery contact
5. The battery is packed in a waterproof fashion
6. The maximum net weight of batteries per package is not over 2.5 kg
7. Maximum of 2 batteries, but each battery has to be packed in a separate box inside on bigger box.
8. State of charge of not more than 30% for airway.

To ensure the above, the packing of the rechargeable battery has to fulfil the points in the checklist in chapter 3.6.

3.3 Labelling

Each package containing a rechargeable battery by itself has to be labelled with the lithium

ion battery handling label (chapter 5.1), even if there is only one battery inside. For airway also the label for cargo aircraft (see chapter 5.2). The sites where the labels are to be applied are described in chapter 5.

3.4 Delivery documentation

The information in chapter 5.1 – “Necessary text for the delivery documents” must be written onto documents, which accompany the delivery every time a rechargeable battery REF 39-101 or rechargeable exchange battery REF 30-150 is transported.

3.5 Waybill

Attention: You are responsible for ensuring that the transport company receives all necessary information. Every time a rechargeable battery (REF 39-101) for medinCNO/ medinCNOmini/ medin-NC3 or a rechargeable exchange battery for medin-NC3 (REF 30-150) is transported, information that this delivery includes lithium ion batteries has to be indicated on the waybill. Ask your transport company about which forms must be filled out and which information is needed.

Transport via air:

To transport rechargeable batteries REF 39-101 for medinCNO/medinCNOmini/ medin-NC3 or the rechargeable exchange battery for medin-NC3 REF 30-150 via air, the following information has to be written on the air waybill inside the box entitled *Nature and Quantity of goods*:

- Lithium ion batteries in compliance with Section II of PI 965

Ground Transport (via road, rail and inland waterways):

In this case all the information required by your transport company must be entered on the waybill. For detailed and local information, ask your transport company.

At a minimum, the following information or the information for transport via air is to be added:

- Excepted lithium batteries as per special provision 188 (energy of the lithium ion batteries up to 100 Wh)

3.6 Checklist

The packing and documents for the rechargeable batteries REF 39-101 have to fulfil all of

the points in the following checklist. It is recommended that batteries always be sent in the original packaging delivered by medin:

Requirements:		
Is it only 1 battery in one box? Maximum 2 batteries in one shipment?	☐	ok
	☐	not ok
Is the state of charge of the battery not more than 30% for airway?	☐	ok
	☐	not ok
Does your delivery include only good batteries and no defective or damaged batteries? Defective or damaged batteries cannot be transported; instead they must be disposed of according to your local regulations. Attention: Transportation of defective batteries is NOT ALLOWED!	☐	ok
	☐	not ok
Is the quality of the cardboard box which you want to use high enough – the cardboard box should be made of double-faced corrugated board with a minimum quality of 3.2. A drop of 1.2 meters in any direction should not damage the batteries inside!	☐	ok
	☐	not ok
Are the batteries packed in a waterproof fashion – e.g. are they wrapped inside a plastic bag?	☐	ok
	☐	not ok
Are the batteries packed in a way that it is impossible for them to touch conductive materials or each other (even after being dropped and got a shock during transport)?	☐	ok
	☐	not ok
Is the net weight of the batteries in the package ≤ 2.5 kg?	☐	ok
	☐	not ok

Are the batteries packed in such a way that they cannot move inside the package?	☐	ok
Is the box containing the batteries secured inside the box used as outer packaging so that it cannot move?	☐	not ok
Labels:		
1. Did you put one label (chapter 5.1) on each cardboard box, which contains a rechargeable battery REF 39-101?	☐	ok
2. Did you write the telephone number on each label?		
3. If you are using a large cardboard box, which contains several cardboard boxes – did you also put the label on the outer cardboard box? And did you write "OUTER PACKAGING" on the outer cardboard box?	☐	not ok
Delivery slip:	☐	ok
• Did you write the necessary information on the accompanying documents (chapter 3.4)?	☐	not ok
Did you inform your transportation company about the lithium ion batteries inside your delivery?	☐	ok
Did you clarify if your transportation company asks for special requirements?		
Did you fill in all the necessary fields on your waybill (see chapter 3.5)?	☐	not ok
If necessary, did you fill in the special form for lithium batteries required by your transportation company?		

Attention: If any point is answered with not ok, the packaging must be corrected; otherwise, the batteries cannot be transported.

4. Transport of the small 3 V (Lithium-metal) battery REF 39-102 by itself

4.1 Relevant IATA packing instructions

For transport by air of the 3V battery REF 39-102 which is not mounted inside a medinCNO/medinCNOmini/medin-NC3, the IATA Packing Instruction 968 (UN3090) is relevant. The detailed information which is necessary to define the mode of transportation of batteries REF 39-102 is described in chapter 1; this information may need to be given to your transportation company.

4.2 Packing

Attention: For the transport of the battery REF 39-102, it is recommended to use the original packaging from medin.

The package and its outer box have to ensure that:

1. The package is strong enough to prevent the batteries from damage by being dropped.
2. The batteries cannot move inside the package and the package cannot move inside the outer package.
3. The battery is protected so as to prevent short circuits, including protection against contact with conductive materials within the same package.
4. The battery is protected against shifting which could cause battery-to-battery contact.
5. The battery is packed in a waterproof fashion.
6. The maximum net weight of batteries per package is 2.5 kg.
7. maximum of 8 batteries, but each battery has to be packed in a separate box inside on bigger box.

To ensure the above, the packing of the battery REF 39-102 has to fulfil the points in the checklist in chapter 3.6.

4.3 Labelling

Each package containing a battery by itself has to be labelled with the lithium metal battery handling label (chapter 5.1), even if there is only one battery inside.

For airway also the label for cargo aircraft (see chapter 5.3).

The sites where the labels are to be applied are described in chapter 5.

4.4 Delivery documentation

The information in chapter 5.2 – “Necessary text for the delivery documents” must be written onto documents which accompany the delivery every time a battery REF 39-102 is transported.

4.5 Waybill

Attention: You are responsible for ensuring that the transport company receives all necessary information. Every time a battery (REF 39-102) for medinCNO/ medinCNOmini/ medin-NC3 is transported, information that this delivery includes lithium metal batteries has to be indicated on the waybill.

Ask your transport company about which forms must be filled out and which information is needed.

Transport via air:

To transport batteries REF 39-102 for the medinCNO/medinCNOmini/medin-NC3 via air, the following information is to be entered on the air waybill inside the box entitled *Nature and Quantity of goods*:

- Lithium metal batteries in compliance with Section II of PI 968

Transport via road:

If your package is only transported via road, all of the information required by your transport company must be entered on the waybill. For detailed and local information, ask your transport company.

At a minimum, the following information or the information for transport via air is to be added:

- Excepted lithium batteries as per special provision 188

4.6 Checklist

The packing and documents for the rechargeable batteries REF 39-102 have to fulfil all of the points in the following checklist. It is recommended that batteries always be sent in the original packaging delivered by medin:

Requirements:		
Is it only 1 battery? Maximum 8 batteries in one shipment?	☐	ok
	☐	not ok
Does your delivery include only good batteries and no defective or damaged batteries? Defective or damaged batteries cannot be transported; instead they must be disposed of according to your local regulations Transportation of defective batteries is NOT ALLOWED!	☐	ok
	☐	not ok
Is the quality of the cardboard box which you want to use high enough – the cardboard box should be made of double-faced corrugated board with a minimum quality of 3.2 A drop of 1, 0.02 metres in any direction should not damage the batteries inside!	☐	ok
	☐	not ok
Are the batteries packed in a waterproof fashion – e.g. are they wrapped inside a plastic bag?	☐	ok
	☐	not ok
Are the batteries packed in a way that it is impossible for them to touch conductive materials or each other (even after being dropped and got a shock during transport)?	☐	ok
	☐	not ok
Is the weight of the batteries in the package ≤ 2.5 kg?	☐	ok
	☐	not ok
Are the batteries packed in such a way that they cannot move inside the package? Is the box containing the batteries secured inside the box used as outer packaging so that it cannot move?	☐	ok
	☐	not ok

Labels: • Did you put one label (chapter 5.2) on each cardboard box which contains a rechargeable battery REF 39-101? • Did you write the telephone number on each label? • If you are using a large cardboard box which contains several cardboard boxes – did you also put the label on the outer cardboard box? And did you write "OUTER PACKAGING" on the outer cardboard box?	☐	ok
	☐	not ok
Delivery slip:	☐	ok
Did you write the necessary information on the accompanying documents (chapter 4.4)?	☐	not ok
Did you inform your transportation company about the lithium metal batteries inside your delivery? Did you clarify if your transportation company asks for special requirements?	☐	ok
Did you fill in all the necessary fields on your waybill (see chapter 4.5)? If necessary, did you fill in the special form for lithium batteries required by your transportation company?	☐	not ok

Attention: If any point is answered with not ok, the packaging must be corrected, otherwise the batteries cannot be transported.

5. Signs/Label for the package

5.1 Lithium ion/metal battery sign

Sign/Label:

If necessary, the following sign is to be used and affixed in a waterproof fashion to the site described below. The minimum size of the label is 100 mm x 100 mm:

For the label the applicable UN number/numbers (* - see Table 1 – multiple numbers possible) must be added. The numbers should be at least 12 mm high.

Attention: Whenever this label is used, the documents accompanying the delivery have to include the text described below.



Table 1 - UN Numbers - use for * - multiple/combination of numbers possible

UN Number	Description	Use for
UN 3480	Lithium Ion Batteries	Only spare part internal battery REF 39-101 or only external battery REF 30-150
UN 3481	Lithium Ion Batteries packed with/within Equipment	medinCNO/medinCNOmini/medin-NC3 (including REF 39-101 battery)
UN 3090	Lithium Metal Batteries	Only spare part 3V battery REF 39-102
UN 3091	Lithium Metal Batteries packed with/within equipment	medinCNO/medinCNOmini/medin-NC3 (including REF 39-102 battery)

Package marking:

The delivery consists of only one package (carton) and does not contain any other marked packages! The following markings are to be applied to shipping packages:

- Shipper, Consignee, net (kg), gross (kg), delivery bill
- Battery marking with UN#

Marking of overpackaging:

If several ready marked packages are packed together in one outer package for shipping optimization, the following markings shall be applied:

- Shipper, Consignee, Net (kg), Gross (kg), Delivery bill
- battery mark with UN#
- UMVERPACKUNG / OVERPACK

On an UMVERPACKUNG/OVERPACK all markings of the contained packages must be reproduced.

Required text for the delivery documents:

The following information must be printed onto the documents accompanying the delivery. Copy all of the following texts onto your accompanying documents:

1. The package contains lithium ion batteries or/and lithium metal batteries (whichever included in package)
2. The package must be handled with care. If the package is damaged, a flammability hazard exists.
3. If the package is damaged, special procedures must be followed including inspection and repacking if necessary.
4. For more information call (add the telephone which is also written on the labels)

5.2 Cargo Aircraft sign/label

Sign/Label:

If necessary, the following sign is to be used and affixed in a waterproof fashion to the site described below. The minimum size of the label is 75 mm x 75 mm:

Attention: Whenever this label is used, the documents accompanying the delivery have to include the text described below.



Package marking:

The delivery consists of only one package (carton) and does not contain any other marked packages! The following markings are to be applied to shipping packages:

- Shipper, Consignee, net (kg), gross (kg), delivery bill
- Battery marking with UN#

Marking of overpackaging:

If several ready marked packages are packed together in one outer package for shipping optimization, the following markings shall be applied:

- Shipper, Consignee, Net (kg), Gross (kg), Delivery bill
- battery mark with UN#
- UMVERPACKUNG / OVERPACK

On an UMVERPACKUNG/OVERPACK all markings of the contained packages must be reproduced.

Required text for the delivery documents:

The following information must be printed onto the documents accompanying the delivery. Copy all of the following texts onto your accompanying documents:

1. The package contains lithium metal cells.
2. The package must be handled with care. If the package is damaged, a flammability hazard exists.
3. If the package is damaged, special procedures must be followed including inspection and repacking if necessary.

5.3 Requirements for the contact telephone number

Both lithium battery warning labels include a telephone number to contact if more information is needed, e.g. if the package is damaged. This telephone number has to meet these requirements:

1. It reaches a person with knowledge about the shipment who could provide product specific information about the shipment.
2. It is reachable during business hours.
3. It reaches a person with knowledge about the points printed inside this document (especially chapter 6).

6. Material Safety data sheets

6.1 Rechargeable battery REF 39-101 (MSDS published by HY-LINE)



SAFETY DATA SHEET FOR PRODUCT

1. PRODUCT INFORMATION

Product Name: Rechargeable Lithium Ion Battery Pack

IATA Battery type code:

UN 3480 – Lithium Ion Batteries

UN 3481 – Lithium Ion Batteries and Lithium Ion batteries contained in equipment or packed with equipment

Product	CE	configuration	energy	celltype	Cell manufacturer
H2B665	Yes	4S2P	92Wh	NCR18650BF	Panasonic

Product and company identification

Product name: Lithium ion rechargeable battery cell

Product code: None

Company name: HY-LINE AG

Address: Hochstrasse. 355, 8200 Schaffhausen, Switzerland

Telephone number: +41 52 647 42 00

Fax number: +41 52 647 42 01

Emergency telephone number: [Weekday] +41 52 647 42 00

2. Hazards identification

For the battery cell, chemical materials are stored in a hermetically sealed metal or metal laminated plastic case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage.

However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released.

Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

GHS classification: Not available (This product is outside the scope of GHS system since it's considered as an "article".)

Most important hazard and effects

Human health effects:

Inhalation:

The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.

Skin contact:

The steam of the electrolyte stimulates a skin. The electrolyte skin contact causes a sore and stimulation on the skin.

Eye contact:

The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and stimulation on the eye. Especially, substance that causes a strong inflammation of the eyes is contained.

Environmental effects:

Since a battery cell remains in the environment, do not throw out it into the environment.

Specific hazards:

If the electrolyte contacts with water, it will generate detrimental hydrogen fluoride. Since the leaked electrolyte is inflammable liquid, do not bring close to fire.



3. Composition / information on ingredients

Substance or preparation: Preparation

Information about the chemical nature of product: *1

Portion	Material name	Concentration range (wt %)
Positive electrode	Lithium transition metal oxide (Li[M]m(O)n *2)	20~60
Positive electrode's base	Aluminum	1~10
Negative electrode	Carbon	10~30
Negative electrode's base	Copper	1~15
Electrolyte	Organic electrolyte principally involves ester carbonate	5~25
Outer case	Aluminum, iron, aluminum laminated plastic	1~30

*1 Not every product includes all of these materials.

*2 The letter M means transition metal and candidates of M are Co, Mn, Ni and Al. One compound

Includes one or more of these metals and one product includes one or more of the compounds. The letter m and n means the number of atoms.

4. First-aid measures

Spilled internal cell materials:

Inhalation: Make the victim blow his/her nose, gargle. Seek medical attention if necessary.

Skin contact: Remove contaminated clothes and shoes immediately. Wash extraneous matter or contact region with soap and plenty of water immediately.

Eye contact: Do not rub one's eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

A battery cell and spilled internal cell materials:

Ingestion: Make the victim vomit. When it is impossible or the feeling is not well after vomiting, seek medical attention.

5. Fire-fighting measures

Suitable extinguishing media: Plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.

Specific hazards: Corrosive gas may be emitted during fire.

Specific methods of fire-fighting: When the battery burns with other combustibles simultaneously, take fire extinguishing method which correspond to the combustibles. Extinguish a fire from the windward as much as possible.

Special protective equipment for firefighters:

Respiratory protection: Respiratory equipment of a gas cylinder style or protection against dust mask

Hand protection: Protective gloves

Eye protection: Goggle or protective glasses designed to protect against liquid splashes

Skin and body protection: Protective cloth



6. Accidental release measures

Spilled internal cell materials, such as electrolyte leaked from a battery cell, are carefully dealt with according to the followings.

Precautions for human body:

Remove spilled materials with protective equipment. (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible. Do not throw out into the environment.

Environmental precautions:

Method of cleaning up:

The spilled solids are put into a container. The leaked place is wiped off with dry cloth.

Prevention of secondary hazards:

Avoid re-scattering. Do not bring the collected materials close to fire.

7. Handling and storage

Handling suggestions:

- Do not connect the positive terminal to the negative terminal with electrical wire or chain.
- Avoid polarity reverse connection when installing the battery to an instrument.
- Do not wet the battery with water, seawater, drink or acid; or expose to strong oxidizer.
- Do not damage or remove the external tube.
- Keep the battery away from heat and fire.
- Do not disassemble or reconstruct the battery; or solder the battery directly.
- Do not give a mechanical shock or deform.
- Do not use unauthorized charger or other charging method. Terminate charging when the charging process doesn't end within specified time.

Storage:

- Do not store the battery with metal ware, water, seawater, strong acid or strong oxidizer.
- Make the charge amount 30~50% then store at room temperature or less (temperature= -20~35 degree C) in a dry (humidity: 45~85%) place. Avoid direct sunlight, high temperature, and high humidity.
- Use insulating and adequately strong packaging material to prevent short circuit between positive and negative terminal when the packaging breaks during normal handling. Do not use conductive or easy to break packaging material.

8. Exposure controls / personal protection (when the electrolyte leaks)

Control parameters

ACGIH has not been mentioned control parameter of electrolyte.

Personal protective equipment

Respiratory protection: Respirator with air cylinder, dust mask

Hand protection: Protective gloves

Eye protection: Goggles or protective glasses designed to protect against liquid splashes.

Skin and body protection: Working clothes with long sleeve and long trousers.

9. Physical and chemical properties

Appearance

Physical state: Solid

Form: Cylindrical or Prismatic or Pouch (laminated)

Color: Metallic color or black (without tube if it has tube)

Odor: No odor



10. Stability and reactivity

Stability:

Stable under normal use

Conditions to avoid:

Hazardous reactions occurring under specific conditions.
When a battery cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.

Materials to avoid:

Conductive materials, water, seawater, strong oxidizers and strong acids.

Hazardous decomposition products: Acrid or harmful gas is emitted during fire.

11. TOXICOLOGICAL INFORMATION

Organic Electrolyte

Acute toxicity:

LD50, oral - Rat 2,000mg/kg or more

Irritating nature:

Irritation to skin and eye

12. Ecological information

Persistence/degradability:

Since a battery cell and the internal materials remain in the environment, do not bury or throw out into the environment.

13. Disposal considerations

Recommended methods for safe and environmentally preferred disposal:

Product (waste from residues)

Specified collection or disposal of lithium-ion battery is required by the law like as "battery control law" in several nations. Collection or recycle of the battery is mainly imposed on battery's manufacturer or importer in the nations recycle is required.

Contaminated packaging

Neither a container nor packing is contaminated during normal use. When internal materials leaked from a battery cell contaminates, dispose as industrial wastes subject to special control.

14. Transport information

In the case of transportation, avoid exposure to high temperature and prevent the formation of any condensation. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet by rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a cell. Please refer to Section 7-HANDLING AND STORAGE also.

UN regulation

UN number:

3480 (3481 when the battery is contained in equipment or packed with equipment)

Proper shipping name:

Lithium ion batteries ("lithium ion batteries contained in equipment" or "lithium ion batteries packed with equipment")

Class:

9 *

** Although this product meets the criteria of "dangerous goods" and are classified as "lithium ion batteries", depending on the battery's total capacity in the packaging, etc., they may not be subject to the fully regulated provisions.*

Regulation depends on region and transportation mode

Worldwide - Air transportation:

ICAO/IATA-DGR [packing instruction 965 section IB or II] (When shipping batteries "packed with" or "contained in" equipment, use packing instruction 966 or 967 as appropriate.)

Worldwide - Ocean transportation:

IMO-IMDG Code [special provision 188]

Europe - Ground transportation:

ADR [special provision 188]

** Instructions or provisions in the box brackets are conditions to make the battery cell exempted from full regulation.*



15. Regulatory information

Regulations specifically applicable to the product:

Wastes Disposal and Public Cleaning Law [Japan]

Law for Promotion of Effective Utilization of resources [Japan]

US Department of Transportation 49 Code of Federal Regulations [USA]

** About overlapping regulations, please refer to Section 14-TRANSPORT INFORMATION*

16. Other information

This safety data sheet is offered an agency who handles this product to handle it safely.

The agency should utilize this safety data sheet effectively (put it up, educate person in charge) and take proper measures.

The information contained in this Safety data sheet is based on the present state of knowledge and current legislation.

This safety data sheet provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.

Reference

Latest Dangerous Goods Regulations by International Air Transport Association (IATA)

IMDG Code – latest Edition: International Maritime Organization (IMO)

Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)–
latest version: The United Nations Economic Commission for Europe (UNECE)

6.2 3 V battery REF 39-102 (MSDS published by Varta)



Safety Data Sheet MSDS 2.001.007
Primary Lithium Cylindrical Cell (coiled)

1 Identification of the product and of the company undertaking

Product details

Trade name	Lithium primary cylindrical cell (coiled)
Electrochemical system:	Lithium metal organic electrolyte manganese dioxide
Anode (negative):	Lithium metal
Cathode (positive):	Manganese dioxide

This MSDS applies to the following cell and battery types and batteries assembled from these types.

Type	Lithium content	Nominal voltage
CR 1/2 AA H-R	0.3 g	3.0 V
CR 123 A	0.58 g	3.0 V
CR 123 A-R	0.5 g	3.0 V
CR 2	0.26 g	3.0 V
CR 2-R	0.29 g	3.0 V
CR 2/3 AH	0.58 g	3.0 V
CR 2/3 AH-R	0.51 g	3.0 V
CR AH-R	0.74 g	3.0 V
CR P2	1.16 g	6.0 V
CR block*	1.41 g	9.0 V

* This battery is assembled from Lithium primary pouch cells.

Supplier details

Address:	VARTA Microbattery GmbH VARTA-Platz 1 73479 Ellwangen Germany
Emergency Phone Number:	+49 7961 921 110 (VAC)

General remark

This 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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Germany



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.

Legal remark (USA)

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.

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 sections 4 to 6).

Attention: If batteries are treated wrong the danger of burns or bursts occurs. Batteries must not be heated above 85 °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

Content	CAS no.	EC no.	Material	Hazard Categories	Hazard Statements
33 – 74 %	confidential	confidential	Steel and nickel		
13 – 45 %	1313-13-9	215-202-6	Manganese dioxide	Acute Tox. 4	H302, H332
3 – 10 %	confidential	confidential	Polymers		
< 10 %	108-32-7	203-572-1	Propylene carbonate	Eye Irrit. 2	H319
< 10 %	110-71-4	203-794-9	1,2-Dimethoxy ethane	Flam. Liq. 2, Repr. 1B, Acute Tox. 4	H225, H332, H360-FD
2 – 5 %	7439-93-2	231-102-5	Lithium	Water-react. 1, Skin Corr. 1B	H260, H314
< 5 %	646-06-0	211-463-5	1,3-Dioxolane	Flam. Liq. 2	H225
< 5 %	7791-03-9	232-237-2	Lithium perchlorate (-R types only)	Ox. Sol. 2, Skin Irrit. 2, Eye Irrit. 2, STOT SE 3	H272, H315, H319, H335

For full text of hazard statements see section 16.

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Substances relevant for Battery Directive 2006/66/EC

Content	CAS no.	EC no.	Material
< 0.0040 %	7439-92-1	231-100-4	Lead
< 0.0020 %	7440-43-9	231-152-8	Cadmium
< 0.0001 %	7439-97-6	231-106-7	Mercury (none intentionally introduced, see section 12)

SVHC substances according to REACH (Article 33)

Content	CAS no.	EC no.	Material
> 0.1 %	110-71-4	203-794-9	1,2-Dimethoxy ethane

For information to allow safe use: see section 7.

4 First-aid measures

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 the person who ingested the battery 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 physician identify the battery type and chemistry. Warning: Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion. In case of ingestion of a cell or battery, seek medical assistance promptly. See also section 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:	Firefighting clothing and self-contained breathing apparatus.
Special hazard:	Cells may explode and release metal parts. At contact of electrolyte with water traces of hydrofluoric acid may be formed. In this case avoid contact and take care for good ventilation. At contact of charged anode material with water extremely flammable hydrogen gas is generated.
Attention:	Do not let used extinguishing media penetrate into surface water or ground water. If necessary, thicken water or foam with suitable solids. Dispose of property.

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6 Accidental release measures

Person related measures:	Wear personal protective equipment adapted to the situation (protection gloves, face protection, breathing protection).
Environment protection measures:	In the event of battery rupture, prevent skin contact and collect all released material in a plastic lined container. Bind released ingredients with powder (rock salt, sand). Dispose of 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. Keep small cells and batteries which are considered swallowable out of the reach of 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. Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion. In case of ingestion of a cell or battery, seek medical assistance promptly. Do not throw batteries into water. Do not throw batteries into fire. Avoid deep discharge. 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. Do not store close to heating devices. Avoid direct sunlight. At higher temperature the electrical performance may be reduced.
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 cells and batteries 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: VdS 3103. 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 section 5.

8 Exposure controls/personal protection

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

9 Physical and chemical properties

Not applicable if closed.

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10 Stability and reactivity

Dangerous reactions:

When heated above 100 °C the risk of rupture occurs.

11 Toxicological information

Under normal conditions (during discharge) release of ingredients does not occur. In case of accidental release see information in sections 2 to 4 and 6.

Swallowing of a battery can be harmful. Call the local Poison Control Centre for advice and follow-up. See section 4.

12 Ecological information

VARTA primary lithium cylindrical coiled 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 lithium cylindrical coiled cells belong to the category of mercury-free battery (mercury content lower than 0.0001 %).

For the state of California the batteries CR 2/3 AH, CR 123 A, CR 2 and CR P2 are considered as "free of perchlorate".

13 Disposal considerations

In order to avoid short circuit and heating, used VARTA primary lithium cylindrical coiled 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

European Union

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 (www.epb.europa.net/legislation_national.html).

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

USA

VARTA primary lithium cylindrical coiled cells are classified by the federal government as non-hazardous waste and are safe for disposal in the normal municipal waste stream. These batteries, however, do contain recyclable materials and are accepted for recycling by Cal2Recycle, Inc. Please go to their website at www.cal2recycle.org for additional information.

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14 Transport information

General considerations

VARTA primary lithium cylindrical coiled cells are considered to be UN 3090 Lithium Metal Batteries and are tested according to subsection 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 requirements of IATA DGR packing instruction 968. Test results as well as other relevant information required for transportation are given in dedicated "Supplier's Test Summaries".

Transportations of cells or batteries packed with equipment or contained in equipment have to follow the appropriate regulations for UN 3091.

During the transportation of large amounts of batteries by ship, trailer or railway, do not store them in places of high temperature and do not allow them to be exposed to condensation. During the transportation do not allow the packaging to be damaged, as a damage of the packaging may cause fire. In the event packaging is damaged, special procedures must be used including inspection and repackaging if necessary and handle with care.

Compilations of transport requirements for Lithium batteries can be found in:

<https://www.lithium-batterie-service.de/en/>

<https://www.iata.org/whatwedo/cargo/dgr/Documents/lithium-battery-shipping-guidelines.pdf>

Each cell or battery is manufactured under a quality management program according to 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

European Union: 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.

Marking consideration (USA)

The casing of VARTA primary lithium cylindrical coiled cells is made out of Nickel plated steel. For the exposition to Nickel no safe-harbour level is given in California Proposition 65, officially known as the Safe Drinking Water and Toxic Enforcement Act of 1986. Therefore the following warning must be given to customers in the State of California: "WARNING: This product can expose you to chemicals including nickel, which is known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov." The warning must be given together with a triangular yellow warning symbol.

For the state of California the -R battery types have to be marked as "containing perchlorate".

International safety standards

For UL recognition of the basis cells according to UL 1642 see: [BBCV2.MH13654](#)

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Water hazard class

The regulations of the German Federal Water Management Act (WHG) are not applicable as VARTA primary lithium cylindrical coiled 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	
H225	Highly flammable liquid and vapour.
H228	Flammable solid.
H250	Catches fire spontaneously if exposed to air.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H271	May cause fire or explosion; strong oxidiser.
H272	May intensify fire; oxidiser.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer
H350i	May cause cancer by inhalation.
H351	Suspected of causing cancer.
H360D	May damage the unborn child.
H360FD	May damage fertility. May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

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Note: Latest covered modifications of transport regulations: ADR 2021, RID 2021, IATA DGR 2022 (63rd edition), IMDG Code 2020 (inc. Amdt. 40-20).
Latest covered modification of the European Battery Directive 2006/66/EC: Directive (EU) 2018/849.

RoHS: See special [Declaration](#)

REACH: See special [Declaration](#)

Issued by: VARTA Microbattery GmbH
Product Compliance

Contact: <https://www.varta-ag.com/en/about-varta/contact>

Updates: Current SDS can be downloaded from VARTA's web page
<https://www.varta-ag.com/en/industry/product-solutions>

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Notes



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