Li-ion battery

Material Safety Data Sheet.

1. Chemical product and manufacturer identification

Product	Lithium-ion (Li-ion) battery	Transmitter with integrated Lithium-ion (Li-ion) battery
Models	BA301___ BA401___ BA405___ BA406___ BP401___	micron M
Manufacturer	HBC-radiomatic GmbH Haller Strasse 45 – 53 74564 Crailsheim Germany Phone: +49 7951 393-0 Fax: +49 7951 393-50 Email: info@radiomatic.com	
Emergency phone (24-hour-number)	GBK / Infotrac ID 109311 USA domestic: +1 800 535 5053 International: +1 352 323 3500	
Date issued	2018-05-03	
Last date revised	2025-03-01	

2. Composition and 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 oxidate ($Li[M]_m[O]_n$ *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 mean the number of atoms.

3. 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 call 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 hazards 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 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.

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 corresponds 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.
Environmental precautions	Do not throw out into the environment.
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 does not end within specified time.

Storage

- Do not store the battery with metalware, water, seawater, strong acid or strong oxidizer.
- Make the charge amount 30 – 50% then store at room temperature or less (-20 – 35 °C) in a dry (humidity: max. 80%) 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 and 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	Prismatic.
Color	Black / red / orange / blue / yellow housing.
Odor	No odor.

10. Stability and reactivity

Stability: Stable under normal use.

Hazardous reactions occurring under specific conditions

Conditions to avoid	When a battery cell is exposed to an external short circuit, crushes, deformation, high temperature above 80 °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	LD_{50}, oral – Rat: 2,000 mg / kg or more.
Irritating nature	Irritative 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 also refer to Section 7 – “Handling and storage”.

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 *
- Packing group:

* *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

- Dangerous Goods Regulations - 67th Edition Effective 1 Jauary 2026: International Air Transport Association (IATA)
- IMDG Code - 2025 Edition: International Maritime Organization (IMO)
- The European Agreement concerning the International Carriage of Dangerous Goods by Road
- The United Nations Economic Commission for Europe (UNECE)

Disclaimer

The information provided in this material safety data sheet represents our current state of knowledge and has been obtained from sources considered reliable by HBC-radiomatic.
The information is given to the best of our knowledge, but no liability is assumed and we do not guarantee completeness or correctness.
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It is the user's responsibility to make sure the provided information corresponds to the intended purpose of the products.
It is the product user's responsibility to assess use conditions and to provide adequate safety mechanisms.
This material safety data sheet must only be used for the aforementioned product. If the product is used as a component of other products, the information contained in this material safety data sheet may not be applicable.

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