

Material Safety Data Sheet (MSDS)

16. June 2023

SECTION 1: Product and Company Identification

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|--------------------|---|
| Name of Product: | Lithium-Ion battery pack |
| Model: | All models listed in the below table |
| Name of company: | bebob factory GmbH |
| Address: | Höglwörther Str. 350 81379 Munich Germany |
| Telephone number: | +49 (0)89 8563 485-0 |
| Email / Website | info@bebob.de / www.bebob.de |
| Emergency contact: | +49 (0)178 433 74 34 / +49 (0)89 8563 485-0 |

SECTION 2: Hazards identification

The chemical materials are stored in a hermetically sealed metal 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 or chemical danger of hazardous material leakage and the product is safe.

However, mishandling and/or misuse can cause serious damage to the product and there will be the possibility of generation of smoke or rupturing metals, flaming or acid gas emission or electrolyte leakage.

Most important hazards and effects:

Human health effects:

- Inhalation: the vapour of the electrolyte has an anaesthetic effect and stimulates the respiratory tract.
- Skin contact: the vapour of the electrolyte stimulates the skin. An electrolyte/skin contact can cause sores and stimulation of the skin.
- Eye contact: the vapour of the electrolyte irritates eyes. An electrolyte-eye contact can cause sores and irritation of the eye. In particular, substances that cause a strong inflammation of the eyes are contained within.

Environmental effects: A battery pack is to be disposed according to regulation procedures.

Specific hazards:

If the electrolyte comes into contact with water, it can generate detrimental hydrogen fluoride.

Since the leaked electrolyte is an inflammable liquid it should not be brought close to fire.

SECTION 3: Composition/information on ingredients

COMPOSITION / INFORMATION ON INGREDIENTS OG BATTERY CELLS

- Substance or preparation: Preparation
- Information about the chemical nature of the cells: *2

| Cell | Material Name | Concentration Range (in %) | CAS No. |
|---------------------------|---|----------------------------|--|
| Positive electrode | Lithium transition metal oxidate - $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 20-60 | 12190-79-3 12057-17-9 12031-75-3 193214-24-3 346417-97-8 |
| Positive electrode's base | Aluminum | 1-10 | 7429-90-5 |
| Negative electrode | Carbon Graphite | 10-30 | 7440-44-0 7782-42-5 |
| Negative electrode's base | Copper | 1-15 | 7440-50-8 |
| Electrolyte | Organic electrolyte principally involves ester carbonate | 5-25 | - |
| Others | Aluminum, Iron | 1-30 | 7429-90-5 7439-89-6 |

INFORMATION ON BATTERY MODEL

The Equivalent Lithium Content derives as an average of the above concentration:

| Battery Model | Voltage | Capacity | Energy | Chemistry | Equivalent Lithium Content |
|----------------------------------|---------|----------|----------|--|----------------------------|
| A/V 45micro | 14,4V | 3,0Ah | 43,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 3,6g |
| A/V MLmicro | 14,4V | 2,9Ah | 43,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 3,5g |
| A/V 98micro | 14,4V | 6,6Ah | 95,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 7,9g |
| A/V 98 | 14,4V | 6,6Ah | 95,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 7,9g |
| A/V 150micro | 14,4V | 9,9Ah | 143,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 11,9g |
| A/V 150 | 14,4V | 9,9Ah | 143,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 11,9g |
| A/V 200micro | 14,4V | 13,2Ah | 190,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 15,8g |
| A/V 200 | 14,4V | 13,2Ah | 190,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 15,8g |
| A/V 90RMcine | 14,4V | 5,9Ah | 85,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 7,0g |
| B90cineHS | 14,4V | 6,0Ah | 86,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 7,2g |
| A/V 155RMcine | 14,4V | 10,8Ah | 156,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 13,0g |
| B155cine | 14,4V | 10,8Ah | 156,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 13,0g |
| A/V 290RMcine | 14,4V | 19,8Ah | 285,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 23,8g |
| B290cine | 14,4V | 19,8Ah | 285,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 23,8g |
| B480cine | 14,4V | 33,0Ah | 475,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 39,6g |
| Cube 1200 | 14,4V | 79,2Ah | 1140,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 95,0g |
| Hot Swap Adapter (ML-120 Series) | 14,4V | 2,0Ah | 28,0Wh | $\text{Li}[\text{M}]_m[\text{O}]_n^{*1}$ | 2,3g |

*1 The letters M and O mean transition metals. Candidates of M and O 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.

*2 Not every product includes all of these materials.

DISCONTINUED PRODUCTS:

| Battery Model | Voltage | Capacity | Energy | Chemistry | Equivalent Lithium Content |
|---------------|---------|----------|---------|--------------------------|----------------------------|
| A/V 75 (+) | 14,8V | 5,0Ah | 75,0Wh | Li[M]m[O]n ^{*1} | 6,0g |
| A/V 95 | 14,8V | 6,6Ah | 95,0Wh | Li[M]m[O]n ^{*1} | 9,0g |
| A/V 140 | 14,8V | 9,2Ah | 140,0Wh | Li[M]m[O]n ^{*1} | 12,0g |
| A/V 140RL | 14,8V | 9,0Ah | 137,0Wh | Li[M]m[O]n ^{*1} | 12,0g |
| A/V 160 | 14,8V | 11,0Ah | 160,0Wh | Li[M]m[O]n ^{*1} | 15,0g |
| A/V 190 | 14,8V | 13,0Ah | 190,0Wh | Li[M]m[O]n ^{*1} | 18,0g |
| A/V 200RL | 14,4V | 13,5Ah | 200,0Wh | Li[M]m[O]n ^{*1} | 15,1g |
| A/V 140C | 14,4V | 9,6Ah | 140,0Wh | Li[M]m[O]n ^{*1} | 11,5g |
| A/V 90RM | 14,8V | 6,0Ah | 90,0Wh | Li[M]m[O]n ^{*1} | 7,2g |
| A/V 140RM | 14,8V | 9,0Ah | 140,0Wh | Li[M]m[O]n ^{*1} | 10,8g |
| A/V 275RM | 14,4V | 19,0Ah | 275,0Wh | Li[M]m[O]n ^{*1} | 23,0g |

*1 The letters M and O mean transition metals. Candidates of M and O 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.

*2 Not every product includes all of these materials.

SECTION 4: First aid measures

The product contains organic electrolyte. In case of electrolyte leakage from the battery, actions described below are required.

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|---------------|---|
| Eye contact: | Flush the eyes with plenty of clean water, such as tap water, immediately without rubbing. Seek medical treatment. If appropriate procedures are not taken, loss of sight may result. |
| Skin contact: | Wash the contacted areas off immediately with plenty of clean water such as tap water, otherwise irritation of the skin may result. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with water promptly. If irritation persists after washing, seek immediate medical attention. |
| Inhalation: | Move the exposed person to an area with fresh air immediately and seek medical treatment. |
| Ingestion: | Seek medical attention immediately |

SECTION 5: Firefighting measures

Clear fire area of all non-emergency personnel. Clear away any combustible substances from the fire area.

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| Extinguishing method: | Since vapour generated from burning battery packs causes irritation of the eyes, nose and throat, make sure to extinguish any fire noting the direction of the wind. Wear respiratory protection equipment in when the situation demands. |
| Fire extinguishing agent: | Plenty of water, CO ₂ , and alcohol-resistant foam are recommended. |

SECTION 6: Accidental release measures

In case of accidental electrolyte leakage, move the battery packs away from the fire immediately. Avoid contact with spilled or released material. Immediately remove any contaminated clothing.

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| Personal precautions: | Remove any ignition sources nearby. Control any dust generation. You may consider wearing sufficient ventilation/respiratory protection. Prevent any skin and eye contact with the chemical. |
| Environmental precautions: | Do not dispose of in drains, surface and ground water and soil. Alert the neighbourhood if possible. |
| Method for cleaning up: | Use of absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.), reduction of gases/fumes with water dilution. |
| Note: | Refer to heading 8 for exposure control Refer to heading 13 for disposal consideration |

SECTION 7: Handling and storage

Handling:

- When packing the battery packs, do not allow terminals to contact each other, or contact with other metals.
- Avoid improper handling of the packaging box, so as not to drop or damage it.
- Do not disassemble or reconstruct, swallow, incinerate or heat the product.
- Avoid use or leave product in the vicinity of fire, stove or heated place.
- Do not immerse the product in water or seawater.
- Dispose of, or recycle the product according to your local government legislation/regulations.

Storage:

- Do not store the battery packs in places with temperature exceeding 35° or under direct sunlight as this can affect the battery performance.
- Avoid places of high humidity and be sure not to expose the battery pack to condensation or water drops and do not store it in frozen environments.
- When piling the pallets up or placing them in parallel, appropriate space between each pallet should be allocated.
- Be sure to install suitable fire extinguishing equipment, such as automatic fire extinguishers.
- Avoid storing the battery pack in places where it can be exposed to static electricity so as not to damage the protection circuit of the battery pack.

However in the special case of long term storage we recommend the following operation:

Storage Temperature and Humidity (within 2 months):

- Batteries should be stored in a stable environment characterized by low-humidity (less than 70%RH), free of corrosive gasses, and an ambient temperature between -20°C and +40°C.
- To prevent rust, avoid conditions that can create condensation such as rapid fluctuations in the ambient.

Long Term Storage (longer than 2 months):

- For a long duration storage batteries should be stored in a stable environment characterized by low-humidity (less than 70%RH), free of corrosive gasses, and an ambient temperature between -20°C and +20°C.
- To prevent rust, avoid conditions that can create condensation such as rapid fluctuations in the ambient.
- For a long term storage a partial charged battery with a State of Charge (SoC) shall be 30% of its rated capacity (a SoC with a minimum of 10% and a maximum of 60% can be handled practically). The battery should be recharged every 4-8 weeks, to keep the battery in full function and e.g. prevent under voltage.
- After storage some self-discharge will occur. Before re-use it is advisable to recharge the battery fully.

SECTION 8: Exposure controls/personal protection

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

SECTION 9: Physical and chemical properties

Appearance:

- Physical state: Solid
- Form: generally prismatic shape, size may vary
- Colour: generally black, but can vary
- Odour: No odour

SECTION 10: Stability and reactivity

Since batteries function by chemical reaction, they are considered a chemical product.

As such, battery performance will deteriorate over time even if stored for a long period of time without being used.

In addition, the various usage conditions such as charge, discharge, ambient temperature, etc. if not maintained within the specified ranges, may shorten the life expectancy of the battery, or the device in which the battery is used may be damaged by electrolyte leakage.

Stability:

- Stable under normal use.

Hazardous reactions occurring under specific conditions. Conditions to avoid:

- Avoid impact, deconstruction, direct sunlight, high temperature, high humidity, sparks, open flames and other ignition sources

Materials to avoid:

- Conductive materials, water, seawater, strong oxidisers and strong acids.

Hazardous decomposition products:

- Acid or harmful gas is emitted during fire.

SECTION 11: Toxicological information

- Irritation: Irritation to eyes, skin and throat
- Sensitivity: Sensitivity to skin
- Respiratory irritation: Inhalation of vapours may cause irritation to the respiratory system

SECTION 12: Ecological information

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

SECTION 13: Disposal considerations

When the battery is worn out, dispose of it under the ordinance of the local authorities or the law imposed by the relative government.

SECTION 14: Transport information

During the transportation of a large amount of battery packs by sea, air, trailer, or railway, do not leave these in a location of high temperature and do not allow them to be exposed to condensation. Confirm there is no leakage or spillage from the container. Properly store cargo to prevent falling, dropping and breakage. Prevent collapse of cargo piles and exposure to rain. The container must be handled carefully. Do not give shocks that result in dents on the product. Please also refer to Section 7-HANDLING AND STORAGE

UN regulation

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|-----------------------|--|
| UN Classification: | UN3480 (stand alone battery pack) UN3481 (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 – Miscellaneous Dangerous Goods |

Regulation depends on region and transportation mode:

Worldwide, air transportation:

- IATA-DGR: packing instruction 965, when capacity is below 100Wh and other conditions are met.
- IATA-DGR: packing instruction 965 Section IB, when capacity is below 100Wh and other conditions are met.
- IATA-DGR: packing instruction 965 Section IA, when capacity is over 100Wh.
- When batteries are packaged with equipment or contained in equipment, refer to packing instruction 966 or 967 instead of 965.)

Worldwide, sea transportation:

- IMO-IMDG Code [special provision 188]

Europe, road transportation:

- ADR [special provision 188]

SECTION 15: Regulatory information

- UN (United Nations): Recommendations on the Transportation of Dangerous Goods Model Regulations
- ICAO (International Civil Aviation Organisation): Technical Instructions for the safety transport of dangerous goods by air.
- IATA (International Air Transport Organisation): Dangerous Goods Regulations 64th Edition
- IMO (International Maritime Organisation): International Maritime Dangerous Goods (IMDG) Code

SECTION 16: Other information

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.