

MATERIAL SAFETY DATA SHEET

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1. Product and Company Identification

Product Identification :

Lithium-Ion Rechargeable Battery pack

Commercial product name

BULI003

Use of the substance/preparation

Lithium-ion batteries

Synonyms

Lithium-ion Cell, Lithium-ion Battery, Li-Ion Cell,

Further Information

Battery-System: Lithium-ion (Li-ion)

Nominal Voltage: 3.6V

Rated Capacity:3.5Ah

Wh rating: 12.6 Wh

Anode (negative electrode): based on intercalation graphite

Cathode (positive electrode): based on lithiated metal oxide (Cobalt, Nickel, Manganese)

Manufacturer :

HQ: APO International Co., Ltd.

Address: 12F, No. 206, Rueiguang Rd., Neihu District, Taipei City 114, Taiwan

For Hazardous Materials [or Dangerous Goods] Incident

Spill, Leak, Fire, Exposure, or Accident

Call CHEMTREC Day or Night

1-800-424-9300 / +1 703-527-3887 CCN827254

2. Hazards Identification

Hazard Summary

Physical hazards: Not classified for physical hazards.

Health hazards: Not classified for health hazards.

Environmental hazards: Not classified for hazards to the environment.

Specific hazards: Exposure to contents of an open or damaged cell or battery: contact with this material will cause burns to the skin, eyes and mucous membranes.

May cause sensitization by skin contact.

Main Symptoms: Symptoms include itching, burning, redness and tearing.

Hazardous Materials Information Label (HMIS)

Health: 0
 Flammability: 1
 Physical Hazard: 0

NFPA Hazard Ratings

Health: 0
 Flammability: 1
 Reactivity: 0
 Unique Hazard:

3. Composition / Identification on Ingredients

Substance : Lithium Ion

Battery CAS number :

Reference 3-3

UN Class : Even classified as lithium batteries, they are exempted from dangerous goods. UN-Recommendations on the Transport of Dangerous Goods Model Regulations.

- * Lithium ion cells and batteries may be offered for transport if they meet the following :
- * For cells, the Watt-hour rating should not be more than 20 Wh;
- * For batteries, the Watt-hour rating should not be more than 100 Wh. The Watt-hour rating must be marked on the outside of the battery case .
- * Each cell or battery of the type proved to meet the requirements of each test in the UN manual of tests and criteria, Part III, subsection 38.3.
- * General requirements and additional requirements, Please see Section II or IB of Packing Instruction 965, 966, 967 accordingly or UN 3480 , UN3481.

Composition :

- 3-1. Cases: Plastic Not dangerous
- 3-2. Printed Circuit Board Assembly Not dangerous
- 3-3. Lithium Ion Cell :

	Chemical Name	CAS No.	*Mass range in cell (g/g %)
Electrolyte	Contains Electrolyte salt and solvents		5-20
Electrolyte salt	Lithium hexafluorophosphate	21324-40-3	0.05-5
Electrolyte solvent	Includes one or more of the following; Ethylene Carbonate Propylene Carbonate Diethyl Carbonate Ethyl propionate	96-49-1 108-32-7 105-58-8 105-37-3	5-20
PVDF	Polyvinylidene fluoride	24937-79-9	<1

Copper	Cu	7440-50-8	3-15
Aluminium	Al	7429-90-5	2-10
Cathode	Lithium cobalt oxide	12190-79-3	20-50
Anode	Graphite	7782-42-5	10-30
Steel, Nickel, and inert components		Various	Balance

4. First Aid Measures

Description of first aid measures

The hazardous components of this cell or battery are contained within a sealed unit. The following measures are only applicable if exposure has occurred to components when a cell or battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged. The hazardous contents are caustic alkaline electrolytes contained in cells with lithium metal oxide cathodes, graphite and carbon anodes and Polyvinylidene fluoride binders.

Ingestion: Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING.

Quickly transport victim to an emergency care facility.

EYE: If eye contact with contents of an open cell occurs, immediately flush the contaminated eye(s) with water. Quickly transport victim to an emergency care facility.

Skin Contact: Immediately flush with water. If irritation or pain persists, seek medical attention.

Inhalation: Remove the patient from exposure into fresh air, seek medical attention.

PROTECTION FOR FIRST

AIDERS: Do not enter corrosive vapor contaminated areas without a respirator or Self Contained Breathing

Apparatus. Wear adequate personal protective equipment as indicated in Section 8.

FIRST AID FACILITIES: Eye wash bottle, fountain, safety showers or at least a source of running water are required in the area where the product is used.

Most important symptoms & effects, acute & delayed, caused by exposure:

ACUTE: The contents of the battery are rated as corrosive. Ingestion of the electrolyte could lead to severe gastrointestinal tract irritation with nausea, vomiting and potentially burns. Inhalation of vapors may lead to severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.

Eye contact may lead to severe eye irritation or in worst case scenario irreversible damage and possible eye burns. Skin contact may lead to irritation and possible skin burns.

CHRONIC: Skin contact may aggravate/exacerbate existing skin conditions, such as dermatitis. chronic inhalation may lead to the same symptoms as listed for acute inhalation above.

Indication of any immediate medical attention and special treatment needed

ADVICE TO DOCTOR: Treat symptomatically if the person comes into contact with the corrosive electrolyte liquid contents of a damaged battery.

5. Fire Fighting Measures

Suitable extinguishing media

Cold water and dry powder in large amount are applicable. Use metal fire extinction powder or dry sand if only few cells are involved.

Special hazards arising from the chemical

May form hydrofluoric acid if electrolyte comes into contact with water. In case of fire, the formation of the following flue gases cannot be excluded: Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide.

Protective equipment and precautions for firefighters

Wear self-contained breathing apparatus and protective suit.

Additional information

If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) can explode/vent. Cell is not flammable but internal organic material will burn if the cell is incinerated.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures:

As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed areas before entering. Wear adequate personal protective equipment as indicated in Section 8.

Environmental precautions

Absorb spilled material with non-reactive absorbent such as vermiculite, clay or earth. Prevent from migration into soil, sewers and natural waterways – inform local authorities if this occurs.

Methods and material for containment and cleaning up

Evacuate spill area immediately and remove sources of ignition. Do NOT touch spilled material. Cleanup personnel must be trained in the safe handling of this product. Spills may be absorbed on non-reactive absorbents such as vermiculite. Place cells or batteries into individual plastic bags and then place into appropriate containers and close tightly for disposal. Ensure that cleanup procedures do not expose spilled material to any moisture. Immediately transport closed containers outside. Lined steel drums are suitable for storage of damaged cells or batteries until proper disposal can be arranged.

7. Handling and Storage

Precaution for Handling

Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition.

Condition for storage

Storage at room temperature (approx. 20°C) at approx. 20~60% of the nominal capacity (OCV approx. 3.6 - 3.9 V/cell). Keep in closed original container.

8. Exposure Controls / Personal Protection

Exposure Control Measures

Exposure Limit Values: Airborne exposures to hazardous substances are not expected when the cells or batteries are used for their intended purposes. Exposure standards are not applicable to the sealed articles.

Biological Monitoring: Not applicable.

Control Banding: Not applicable.

Recommended monitoring procedures: Follow standard monitoring procedures.

Derived no-effect level (DNEL): Not applicable.

Derived minimal effect level (DMEL): Not applicable.

Predicted no-effect concentrations (PNECs): Not applicable.

9. Physical and Chemical Properties

Appearance

physical state,:	Solid
Color:	Various
Odor:	Odorless

Important health, safety and environmental information

Test method

pHValue:	n.a.
Flash point:	n.a.
Lower explosion limits:	n.a.
Vapour pressure:	n.a.
Density:	n.a.
Water solubility:	Insoluble
Ignition temperature:	n.a.

10. Stability and Reactivity

Stability

Stable

Conditions to avoid

Keep away from open flames, hot surfaces and sources of ignition. Do not puncture, crush or incinerate.

Materials to avoid

No materials to be especially mentioned.

Hazardous decomposition products

In case of open cells, there is the possibility of hydrofluoric acid and carbon monoxide release.

Possibility of Hazardous Reactions

Will not occur

Additional information

No decomposition if stored and applied as directed.

11. Toxicological Information

Information on toxicological effects:

The hazardous components of the cell or battery are contained within a sealed unit. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell or battery integrity remains and the seals remain intact. The potential for exposure should not exist unless the battery leaks, is exposed to high temperature or is mechanically, electrically or physically abused/damaged. The following toxicology data is in respect to if a person comes into contact with the electrolyte.

Skin Corrosion/Irritation: The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit Dermal Corrosivity/Irritation.

Serious Eye Damage/Irritation: The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit serious Damage/Corrosivity.

Respiratory or Skin Sensitization: The electrolyte contained within the cell or battery is not expected to be a skin sensitizer according to OECD test 406, based on the available data and the known hazards of the components. The electrolyte contained within the battery is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.

Germ Cell Mutagenicity: The electrolyte contained within the cell or battery is not expected to be mutagenic according to test such as OECD tests 471, 475, 476, 478 and 479, based on the available data and the known hazards of the components.

Carcinogenicity: The electrolyte contained within the cell or battery is not expected to be a carcinogen. The cathode contains Cobalt and Nickel components. These components are classified as IARC 2B – possibly carcinogenic to humans, however they do not pose a threat when contained in the cell or battery sealed unit.

Reproductive Toxicity: The electrolyte contained within the cell or battery is not expected to be a reproductive hazard according to test such as OECD tests 414 and 421, based on the available data and the known hazards of the components.

12. Ecological Information

Further information

Ecological injuries are not known or expected under normal use. Do not flush into surface water or sanitary sewer system.

13. Disposal Consideration

Advice on disposal

For recycling consult manufacturer.

Contaminated packaging

Disposal in accordance with local regulations.

14. Transport Information

With regard to transport, the following regulations are cited and considered:

- UN No. 3480
- UN proper shipping name: Lithium Ion Batteries.
- Transportation hazard class 9
- Air PI 965 Section I B: Dangerous Goods
- Sea, Land, Air PI965 Section II : Non dangerous Goods
- The International Civil Aviation Organization (ICAO) Technical Instructions, Packing Instruction 965, Section I B or II (2017-2018 Edition),
- The International Air Transport Association (IATA) Dangerous Goods Regulations, Packing Instruction 965, Section I B or II (58th Edition, 2017)
- The International Maritime Dangerous Goods (IMDG) Code [Special provision 188, 230, 384] (2016 Edition),
- US Hazardous Materials Regulations 49 CFR(Code of Federal Regulations)

Sections 173.185 Lithium batteries and cells,

- The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria 38.3 Lithium batteries, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type (latest version is Revision 6)

If those lithium-ion batteries are packed with or contained in an equipment, then it is the responsibility of the shipper to ensure that the consignment are packed in compliance to the latest edition of the IATA Dangerous Goods Regulations section II of either Packing Instruction 966 or 967 in order for that consignment to be declared as NOT RESTRICTED (non-hazardous/non-Dangerous). If those lithium-ion batteries are packed with or contained in an equipment, UN No. is UN3481

Our products are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to all the applicable international and national governmental regulations, not limited to the above mentioned. We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations (T1 – T8) on the Transport of Dangerous Goods Model Regulations and the Manual of Testes and Criteria.

Test results of the UN Recommendation on the Transport of Dangerous Goods

No	Item	Result	Remark
1	Altitude simulation	PASS	
2	Thermal test	PASS	
3	Vibration	PASS	
4	Shock	PASS	
5	External short circuit	PASS	
6	Impact/Crush	PASS	
7	Overcharge	PASS	For pack and single cell battery
8	Force discharge	N/A	

15. Regulatory Information

United States Federal and State Regulations:

TSCA Status: All ingredients in these products are listed on the TSCA inventory.
OSHA: These products do not meet criteria as per Part 1910.1200, manufactured article.
SARA EPA Title III: None.
Sec. 302/304: None.
Sec. 311/312: None.
Sec. 313: None.
CERCLA RQ: None.

EC Classification for the Substance/Preparation:

These products are not classified as hazardous according to Regulation (EC) No. 1272/2008.
Keep out of the reach of children.

EU Restrictions on use:

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended: Aluminium (CAS 7429-90-5)

Other EU Regulations

This Safety Data Sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Japanese Regulations

Japanese Industrial Standards (JIS) JIS Z 7253:2012
Waste disposal and public cleaning law
Law for Promotion of Effective Utilization of Resources

Taiwanese Regulations

Regulation of Labelling and Hazard Communication of Dangerous and Harmful Materials: Labeling requirements and other relevant provision of chemicals, this product is not classified as dangerous goods.
Toxic Chemicals Substance Control Law: Not Listed.
CNS 1030016 Safety of primary and secondary lithium cells and batteries during transport.

Chinese Regulations

General Rule for Classification and Hazard Communication of Chemicals (GB 13690-2009): Specifies the classification, labeling and hazard communication of chemicals in compliance with the GHS standard for chemical production sites and labeling of consumer goods.
General Rule for Preparation of Precautionary Labels for Chemicals (GB 15258-2009): Specifies the relevant application methods of precautionary labels for chemicals.
Safety Data Sheet for Chemical Products Content and Order of Sections (GB/T 16483-2008)

16. Other Information

Further Information

Data of sections 4 to 8, as well as 10 to 12, do not necessarily refer to the use and the regular handling of the product (in this sense consult package leaflet and expert information), but to release of major amounts in case of accidents and irregularities. The information describes exclusively the safety requirements for the product (s) and is based on the present level of our knowledge. This data does not constitute a warranty for the characteristics of the product(s) as defined by the legal warranty regulations. "(n.a. = not applicable; n.d. = not determined)"

The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet