

Explanatory sheet about safety of products

1. Basic item

Product name	Li-ion Battery Pack
Product code (Model No.)	Refer to Table 1. and 2
Manufacture	Panasonic Corporation
Address	1668, fujikata, Tsu, Mie, 514-8555, Japan
Phone number :	+81-59-228-1141
E-mail	pt-tr-001@ml.jp.panasonic.com

2. Product information

Basic composition of the product

This product is a battery which consists of such main component as core battery pack assembled with some Lithium ion cells. And it consists of any combination of plastic casing, tube casing, protection circuit boards, safety devices and interface terminals.

Table 1

No.	Product code (Model No.)	Product number	Cell Number	Wh Rating
1	EY9L10 / EZ9L10	UR18650W2	1	6 Wh
2	EY9L21 / EZ9L21	UR18650W2	2	11 Wh
3	EY9L30 / EZ9L30	CGR26650A	3	27 Wh
4	EY9L31 / EZ9L31	CGR26650B	3	34 Wh
5	EY9L32 / EZ9L32	UR18650W2	3	17 Wh
6	EY9L40 / EZ9L40	CGR26650A	4	44 Wh
7	EY9L41 / EZ9L41	CGR26650B	4	45 Wh
8	EY9L42 / EZ9L42	CGR18650K	4	22 Wh
9	EY9L44 / EZ9L44	CGR18650KA	8	48 Wh
10	EY9L45 / EZ9L45	NCR18650E	8	61 Wh
11	EY9L46 / EZ9L46	UR18650W2	8	44 Wh
12	EY9L47 / EZ9L47	UR18650RX	4	29 Wh
13	EY9L48 / EZ9L48	UR18650NSX	8	72 Wh
14	EY9L50 / EZ9L50	CGR18650KA	10	60 Wh
15	EY9L51 / EZ9L51	NCR18650E	10	76 Wh
16	EY9L52 / EZ9L52	UR18650RX	5	36 Wh
17	EY9L53 / EZ9L53	NCR20650A	5	54 Wh
18	EY9L54 / EZ9L54	UR18650NSX	10	90 Wh
19	EY9L61 / EZ9L61	CGR26650B	6	67Wh
20	EY9L62 / EZ9L62	NCR18650E	12	91 Wh
21	EY9L82 / EZ9L82	UR18650W2	16	87 Wh
22	EY9L84 / EZ9L84	NCR2070C	8	98 Wh
23	EY9L64 / EZ9L64	UR18650RX	12	86Wh

Table 2

No.	Product code (Model No.)	Product number	Cell Number	Wh Rating
F1	EYFB30 / EZFB30	UR18650W2	6	33 Wh
F2	EYFB31 / EZFB31	CGR18650K	3	17 Wh
F3	EYFB32 / EZFB32	UR18650RX	6	22 Wh
F4	EYFB40	CGR18650KA	8	48 Wh
F5	EYFB41	UR18650RX	4	29 Wh
F6	EYFB42	NCR18650E	8	61 Wh
F7	EYFB50	UR18650NSX	10	90 Wh
F8	EYFB51	NCR20650A	5	54 Wh
F9	EYFB60	NCR18650E	12	91 Wh
F10	EY9L20 / EZ9L20	UR18650W2	2	11 Wh
F11	EYFB43	UR18650RX	8	58Wh
F12	EYFB43 for Korea	UR18650RX	8	57Wh
F13	EYFB61	UR18650RX	12	86Wh
F14	EYFB61 for Korea for India	UR18650RX	12	85Wh

3. TRANSPORT INFORMATION

Regarding cautions under transportation, it is according to the related clause in the annexed or attached 'Safety data sheet for product of Lithium ion rechargeable battery cell'.

*Note : Check the latest version of transportation regulation because it is frequently revised.

Kazufumi Iji

Kazufumi Iji
Manager
Quality Assurance Section
Power Tools Strategic Business Unit
Energy Systems Business Division
Panasonic Corporation

Explanatory sheet about safety of product for transportation (Safety Data Sheet for transportation)

1. Basic item

Product name: Lithium ion rechargeable battery (including lithium polymer battery)
Product identification: Refer to Table 1.
Manufacturer: SANYO Electric Co., Ltd., Panasonic group
Address: 222-1, Kaminaizen, Sumoto, Hyogo, Japan
Phone number: +81-799-23-3931
E-mail: prb-bp-ta@ml.jp.panasonic.com

2. Product information

- The UN number of this product is 3480.
- This product is "cell" may be accompanied by outer case or tube covering, protective device, input / output terminal, and the like.
- The watt-hour rating of this product does not exceed 20 Wh.
- SANYO guarantee that this product has passed the test of the UN Manual of Tests and Criteria Part III, sub-section 38.3.
- SANYO manufacture this product under the quality management program required by UN Model Regulations 2.9.4 (e).
- At the time of shipment from SANYO, the package of this product satisfies the following conditions.
 - Passed the 1.2 m drop test.
 - The net quantity of one package does not exceed 10 kg.
 - Marked and labeled according to requirement of the Packing Instruction 965 Section IB stated in ICAO's and IATA's dangerous goods regulations.
 - Products identified as damaged or defective for safety reasons are not included. Also, products recovered for disposal or recycling are not included.

3. Transportation guidelines

- Guidelines for using packages shipped from SANYO are as follows.
 - In air transportation, it is necessary to ship by cargo aircraft at a state of charge not exceeding 30% of their rated design capacity with Class 9 Dangerous Goods Label according to requirement of the Packing Instruction 965 Section IB (or more stringent Packing Instruction) stated in ICAO's and IATA's dangerous goods regulations.
 - In ocean and ground transportation, it is necessary to ship according to UN Model Regulations. But the package is not subject to the fully regulated requirements for Dangerous Goods.

4. Appendix

Cell's safety data sheet for product



H. Kuroda Senior Manager
Product Development Promotion Department
Energy Solutions Business Division
SANYO Electric Co., Ltd.
Panasonic Group

Safety data sheet for product

- This product is an "article" used with the contents sealed. Therefore, issuing and providing SDS is not required by the GHS or any law based on GHS.
- This document has been prepared not to satisfy requirements such as GHS, but for the purpose of providing safety information to customers.
- Refer the other document issued by the shipper, when you want to know whether your current packaging and content comply with transport regulations.

1. PRODUCT AND COMPANY IDENTIFICATION

- Product name: Lithium ion rechargeable battery cell
- Product code: None
(All models Sanyo manufactured and whose capacity is less than or equal to 5.4Ah, including the cell branded as Panasonic, excluding the cell whose shape is prismatic and two or more short / middle / long side excess 12mm/85mm/110mm.)
- Company name: Sanyo Electric Co., Ltd., Panasonic group
- Address: 222-1, Kaminaizen, Sumoto City, Hyogo, Japan
- Telephone number: +81-799-24-4111
- Fax number: +81-799-23-2879
- Emergency telephone number: [Daytime of business day] +81-799-23-3931
[Night and holiday] +81-799-24-4131

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 are no physical hazards such as ignition, explosion and chemical hazards due to leakage of battery contents.

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.

Also, if it is heated strongly by surrounding fires or the like, there is a possibility that irritating or harmful gas may be generated.

- 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 oxidate ($\text{Li}[\text{M}]_m[\text{O}]_n$ *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:
Wash out mouth thoroughly. Do not make the victim vomit, unless instructed by medical personnel. Seek medical attention immediately.

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: Refer to Section 8-EXPOSURE CONTROLS / PERSONAL PROTECTION (WHEN THE ELECTROLYTE LEAKS)

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 (refer to Section 8-EXPOSURE CONTROLS / PERSONAL PROTECTION (WHEN THE ELECTROLYTE LEAKS)). 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 doesn't end within specified time.
- Storage
 - Do not store the battery with metalware, water, seawater, strong acid or strong oxidizer.
 - Make the charge amount less than or equal to 50% then store at -20~40 degree C in a dry (humidity: 45~85%) place.
Since deterioration will be faster in the high temperature range than in the low temperature range, so do not keep it in the high temperature range beyond the period that is specified by the seller or owner.
 - Use insulative 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: Normally stable unless a strong shock is applied or heated strongly
- Possibility of hazardous reactions: Damage to the container may cause leakage of contents. Contents may leak or ignite due to temperature rise.
- Conditions to avoid: Crushing or deformation, use and storage at 80 degree C or higher or at high humidity. Usage at a voltage or a current outside the rating and external short circuit.
- Incompatible materials: Conductive material such as water or metal pieces. Oxidizing agent such as bleach.
- Hazardous decomposition products: Irritating or harmful gases are released if a leakage or fire occurs.

11. TOXICOLOGICAL INFORMATION

Organic Electrolyte

- Acute toxicity:
 - LD₅₀, oral - Rat 2,000mg/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 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, 3171 when the battery is contained in vehicle and that is only powered by the battery)
- Proper shipping name:
Lithium ion batteries ("lithium ion batteries contained in equipment" or "lithium ion batteries packed with equipment" for 3481, "Battery-powered vehicle" for 3171)
- 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 TI/IATA-DGR
- Worldwide - Ocean transportation:
IMO-IMDG Code
- Europe - Ground transportation:
ADR

15. REGULATORY INFORMATION

- Regulations specifically applicable to the product:

Wastes Disposal and Public Cleansing 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 – 62nd Edition Effective 1 January 2021: International Air Transport Association (IATA)
IMDG Code – 2018 Edition: International Maritime Organization (IMO)
The European Agreement concerning the International Carriage of Dangerous Goods by Road – 2019:
The United Nations Economic Commission for Europe (UNECE)

First edition: Apr. 28, 2010
Prepared and approved by: Product Development Promotion Department
Energy Solutions Business Division
Sanyo Electric Co., Ltd.
Panasonic group