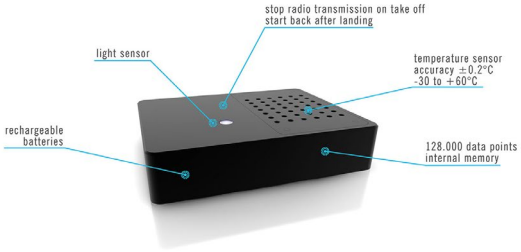
North American Headquarters: Lives International Corp.
1 Chestnut Street Nashua, NH 03063
Ph: + 1 603 821 1898

European Headquarters: Lives International
3, rue Jules Guesde F – 92300 Levallois Perret, France
Ph: + 33 142 708 589

Application Note – XperTrack
Safety and Transportation Regulation



XperTrack System

Overview – XperTrack

XperTrack is a tracking device that allows users to real time determine the position and temperature values of the environment the equipment is placed in.

XperTrack stops data transmission on planes take off and restarts automatically on landing. A sensor light alarm detects any intrusion or temper with the container where the device is placed in Temperature operating range of the device: -30 to 60 ºC.

Temperature measuring range of the deported RTD sensor connected to the device: -200 to 200 ºC. The device is powered by 2 rechargeable batteries supplied by Panasonic – model NCR18650B.

Standards – Safety and Transportation

General safety recommendations for lithium batteries have been published in the standards UL1642 and IEC 60086-4.

According to Panasonic PSDS (Product Safety Data Sheet) document reference LIP-PSDS-2011-211 issued on 29 July 2011 with regards to Lithium-Ion batteries, the batteries used in XperTrack device are handled as Non-Dangerous Goods by meeting the UN Recommendation on the Transportation of Dangerous Goods Model Regulations Special Provision SP188.

The Appendix attached describes and list all the references compatible with the UN Recommendation on the Transportation of Dangerous Goods Model Regulations Special Provision SP188.

Lives International QA
Andreea Ciorogariu

Date: 27 March 2020

North American Headquarters: Lives International Corp.
1 Chestnut Street Nashua, NH 03063
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European Headquarters: Lives International
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APPENDIX A

PSDS Panasonic LIP-PSDS-2011-211

Issued date : July 29, 2011

PRODUCT SAFETY DATA SHEET

1. Product and Company Identification

Name of Product　Lithium-Ion battery　(or, Lithium-Ion secondary battery)

Model name　Please refer to the attached sheet (Applied Model Name)

Name of Company　: Panasonic Corporation
Address　: 1-1,Matsushita-cho,Moriguchi,Osaka 570-8511 Japan
Department　: Energy Company Lithium-Ion Battery Business Unit
Representative　: Iichiro Mori
Telephone number　: +81-6-6991-1141
Facsimile number　: +81-6-6994-4623
For emergency　: +81-6-6991-1141

Document number: LIP-PSDS-2011-211

2. Composition / Information on Ingredients

Substance　: Lithium-Ion battery
CAS number　: Not specified
UN Class　: Even classified as lithium ion batteries UN3480 or UN3481(Contained in Equipment or Packed with Equipment) the product is handled as Non-Dangerous Goods by meeting the UN Recommendations on the Transportation of Dangerous Goods Model Regulations Special Provision SP188 and IATA Dangerous Goods Regulations Packing Instruction 965-967 General Requirement and Section Ⅱ (Excepted) is applied for air transportation, IMDG Code SP188 is applied for marine transportation.　(1)(2)(3)

Composition　: Positive electrode;

Cell Type A; Lithium cobalt oxide	20－35wt%
Cell Type B; Lithium nickel manganese cobalt oxide	20－35wt%
Cell Type C; Lithium nickel oxide	20－35wt%
Negative electrode; Carbon	10－20wt%
Electrolyte; Organic electrolyte (mainly composed of alkyl carbonate)	10－20wt%
Enclosure; Plastic	

3. Summary of Hazard

Class name　: Not applicable for regulated class
Hazard　: It may cause heat generation or electrolyte leakage if battery terminals contact with other metals. Electrolyte is flammable. In case of electrolyte leakage, move the battery from fire immediately.

Toxicity : Vapor generated from burning batteries, may make eyes, skin and throat irritate.

4. First Aid Measures

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

Eye contact : Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Take a medical treatment. If appropriate procedures are not taken, this may cause an eye irritation.

Skin contact : Wash the contact areas off immediately with plenty of water and soap. If appropriate procedures are not taken, this may cause sores on the skin.

Inhalation : Remove to fresh air immediately. Take a medical treatment.

5. Fire Fighting Measures

Extinguishing method : Since vapor, generated from burning batteries may make eyes, nose and throat irritate, be sure to extinguish the fire on the windward side. Wear the respiratory protection equipment in some cases.

Fire extinguishing agent : Plenty of water and alcohol-resistant foam are effective.

6. Measures for Electrolyte Leakage from the Battery

- Take up with absorbent cloth.
- Move the battery away from the fire.

7. Precaution for Handling and Storage

- When packing the batteries, do not allow battery terminals to contact each other, or contact with other metals. Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together. (1)(2)(3)
- Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation. (1)(2)(3)
- Do not let water penetrate into packaging boxes during their storage and transportation.
- The batteries will be stored at room temperature, charged to about 30－50% of capacity.
- Do not store the battery in places of the high temperature exceeding 35 deg. C or under direct sunlight or in front of a stove. Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, water drop or not to store it under frozen condition.
- Batteries are sure to be packed in such a way as to prevent short circuits under conditions normally encountered in transport. (1)(2)(3)
- Please avoid storing the battery in the places where it is exposed to the static electricity so that no damage will not be caused to the protection circuit of the battery pack.

8. Exposure Controls / Personal Protection (in case of electrolyte leakage from the battery)

Acceptable concentration : Not specified in ACGIH. (4)

Facilities : Provide appropriate ventilation system such as local ventilator in the storage place.
Protective clothing : Gas mask for organic gases, safety goggle, safety glove.

9. Physical and Chemical Properties of Single Cell

Appearance : Single cell: Cylindrical or Prismatic cell
Nominal voltage : Single cell: Please refer to the attached sheet (Applied Model Name)

10. Stability and Reactivity

Since batteries utilize a chemical reaction they are actually 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. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage.

11. Toxicology Information (in case of electrolyte leakage from the battery)

Acute toxicity : Oral (rat) LD50 >2g/kg (estimated)
Irritation : Irritating to eyes and skin.
Mutagenicity : Not specified.
Chronic toxicity : Not specified.

12. Ecological Information

- In case of the worn-out battery was disposed in land, the battery case may be corroded, and leak electrolyte. But, we have no ecological information.

Heavy metal in battery : Mercury(Hg) and Cadmium(Cd) are neither contained nor used in battery.

13. Disposal Conditions (Precautions for recycling)

- When the battery is worn out, dispose of it under the ordinance of each local government or the low issued by relating government.
- Disposal of the worn-out battery may be subjected to Collection and Recycling Regulation.

14. Transportation Information

- Even classified as lithium ion batteries UN3480 or UN3481(Contained in Equipment or Packed with Equipment), the product is handled as Non-Dangerous Goods by meeting the UN Recommendations on the Transportation of Dangerous Goods Model Regulations Special Provision SP188. (1)

(a) For a lithium-ion cell, the Watt-hour rating is not more than 20 Wh;
(b) For a lithium-ion battery, the Watt-hour rating is not more than100 Wh.
Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case, except those manufactured before 1 January 2009 ;
(c) Each cell or battery is of the type proved to meet the requirements of each test in the UN Manual of Tests

and Criteria, PartⅢ, sub-section 38.3 ;

(d) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings ;

(e) Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;

(f) Except for packages containing button cell batteries installed in equipment (including circuit boards), or no more than four cells installed in equipment or no more than two batteries installed in equipment, each package shall be marked with the following:

(i) an indication that the package contains " lithium ion" cells or batteries, as appropriate;

(ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;

(iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and

(iv) a telephone number for additional information;

(g) Each consignment of one or more packages marked in accordance with paragraph (f) shall be accompanied with a document including the following:

(i) an indication that the package contains " lithium ion" cells or batteries, as appropriate;

(ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;

(iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and

(iv) a telephone number for additional information;

(h) Except when batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents: and

(i) Except when batteries are contained in or packed with equipment, packages shall not exceed 30 kg gross mass for marine transportation. (not exceed10kg for air transportation)

- For marine transportation the product is handled as Non-Dangerous Goods by meeting the IMO International Maritime Dangerous Goods (IMDG Code) 2010 Edition (Amendment 35-10) SP188 (Same as UN Special Provision SP188 above).(3)

- For air transportation the product is handled as Non-Dangerous Goods by meeting the IATA Dangerous Goods Regulations 52nd Edition Effective 1 January 2011 Packing Instruction 965-967 General Requirement and SectionⅡ(Excepted) and UN Special Provision SP188 above.(2)

(j) Lithium ion batteries identified by manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

(k) Each package contains more than four cells or more than two batteries must be labeled with a lithium battery handling label.

* The width 120mm X length 110mm sized lithium battery handling label must be labeled onto the side of a package without bending it.

* The width 74mm X length 105mm sized lithium battery handling label may use for smaller packages.

(l) The words “Lithium ion batteries”, “not restricted” and “PI number” must be included in the Additional

Handling Information on the air waybill, when an air waybill is used.
(PI number Cell and Battery : PI965, Packed with Equipment : PI966, Contained in Equipment : PI967)

(m) Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

(n) Except when batteries are installed in or packed with equipment, packages shall not exceed10kg gross mass.

- The Lithium-Ion cells or batteries as stated in Appendix are made in compliance to the requirements stated in the latest edition of the IATA Dangerous Goods Regulations Packing Instruction 965 General requirements and SectionⅡ, such that they can be transported as a NOT RESTRICTED (non-hazardous/non-dangerous) goods. However, if those lithium-ion cells or batteries are pack 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 General requirements and SectionⅡ Packing Instruction 966 or 967 in order for that consignment to be declared as NOT RESTRICTED (non-hazardous/non-Dangerous).

- During the transportation of a large amount of batteries by ship, trailer or railway, do not leave them in the places of high temperatures and do not allow them to be exposed to condensation.

- During the transportation do not allow packages to be fallen down or damaged.

15. Regulatory Information

- UN (United Nations): Recommendations on the Transportation of Dangerous Goods Model Regulations Sixteenth revised edition
- ICAO (International Civil Aviation Organization) : Technical Instructions for the safety transport of dangerous goods by air 2011-2012 Edition
- IATA (International Air Transport Organization) : Dangerous Goods Regulations 52nd Edition Effective 1 January 2011
- IMO (International Maritime Organization) : International Maritime Dangerous Goods (IMDG) Code 2010 Edition (Amendment 35-10)

16. Other Information

References

(1) UN (United Nations) : Recommendations on the Transportation of Dangerous Goods Model Regulations Sixteenth revised edition
(2) IATA (International Air Transport Organization) : Dangerous Goods Regulations 52nd Edition, Effective 1 January 2011
(3) IMO (International Maritime Organization) : International Maritime Dangerous Goods (IMDG) Code 2010 Edition (Amendment 35-10)
(4) TLVs and BEIs 1999 ACGIH

Safety data sheet for product

1. PRODUCT AND COMPANY IDENTIFICATION

- Product name: Lithium ion battery cell
- Product code: None (All models Sanyo manufactured and whose capacity is less than or equal to 4.95Ah)
- Company name: Sanyo Electric Co., Ltd. Energy Devises Company
- Address: 222-1 , Kaminaizen, Sumoto City, Hyogo, Japan
- Telephone number: +81-799-24-4111
- Fax number: +81-799-23-2879
- Emergency telephone number: [Weekday] +81-799-23-3931
  [Night and holiday] +81-799-24-4131

2. COMPOSITION / INFORMATION ON INGREDIENTS

- Substance or preparation: Preparation
- Information about the chemical nature of product: *1

Common chemical name / General name	CAS number	Classification and hazard labeling
Lithium transition metal oxidate ($Li[M]_m[O]_n$ *2)	12190-79-3 12057-17-9 182442-95-1	
Iron	7439-89-6	
Aluminum	7429-90-5	
Graphite (Natural graphite) (Artificial graphite)	 7782-42-5 7440-44-0	
Copper	7440-50-8	
Organic electrolyte	-	Inflammable liquid

**1 Not every product includes all of these materials.*

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

3. HAZARDS IDENTIFICATION

For the battery cell, 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 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.

- 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.

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.

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5. FIRE-FIGHTING MEASURE

- 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

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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.

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7. HANDLING AND STORAGE

- Handling
  Technical measures:
  Prevention of user exposure: Not necessary under normal use.
  Prevention of fire and explosion: Not necessary under normal use.
  Precaution for safe handling: Do not damage or remove the external tube.
  Specific safe handling advice: Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water or seawater. Do not expose to strong oxdizers. Do not give a strong mechanical shock or fling. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. Do not use in the place temperature can be high. In the case of charging, use only dedicated charger or charge according to the conditions specified by Sanyo.
- Storage
  Technical measures:
  Storage conditions (suitable, to be avoided): Avoid direct sunlight, high temperature, high humidity. Store in cool place (temperature: -20 ~ 35 degree C, humidity: 45 ~ 85%).
  Incompatible products: Conductive materials, water, seawater, strong oxidizers and strong acids
  Packing material (recommended, not suitable): Insulative and tear proof materials are recommended.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

・Engineering measures:

No engineering measure is necessary during normal use. In case of internal cell materials' leakage, operate the local exhaust or improve ventilation.

・Control parameters

Common chemical name / General name	ACGIH (2009)	
	TLV-TWA	BEI
Lithium transition metal oxidate	0.02mg/m^3 (as cobalt) * 0.2mg/m^3 (as manganese) * 0.2 mg/m^3 (as nickel) *	-
Aluminum	10mg/m^3 (metal coarse particulate) 5mg/m^3 (inflammable powder) 5mg/m^3 (weld fume)	-
Carbon (Natural graphite) (Artificial graphite)	2mg/m^3 (inhalant coarse particulate)	-
Copper	0.2mg/m^3 (fume) 1.0mg/m^3 (a coarse particulate, Mist)	-
Organic electrolyte	-	-

ACGIH: American Conference of Governmental Industrial Hygienists, Inc.
TLV-TWA: Threshold Limit Value-Time Weighted Average concentration
BEI: Biological Exposure Indices

* *Not every product includes all of these metals.*

・Personal protective equipment

Respiratory protection: Respirator with air cylinder, dust mask
Hand protection: Protective gloves
Eye protection: Goggle or protective glasses designed to protect against liquid splashes
Skin and body protection: Working clothes with long sleeve and long trousers

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9. PHYSICAL AND CHEMICAL PROPERTIES

・Appearance

Physical state: Solid
Form: Cylindrical or Prismatic or Prismatic (laminated)
Color: Metallic color or black(without tube if it has tube)
Odor: No odor

・pH: NA

・Specific temperatures/temperature ranges at which changes in physical state occur:

There is no useful information for the product as a mixture.

・Flash point: NA

・Explosion properties: NA

・Density: NA

・Solubility ,with indication of the solvent(s): Insoluble in water

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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 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.

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11. TOXICOLOGICAL INFORMATION

There is no available data on the product itself. The information of the internal cell materials is as follows.

Lithium transition metal oxidate - $Li[M]_m[O]_n$

- Acute toxicity: No applicable data.
  Reference cobalt: LDLo, oral - Guinea pig 20mg/kg
  manganese: LD50, oral - Guinea pig 9000mg/kg
  nickel: LDLo, oral - Guinea pig 5mg/kg
- Local effects: Unknown.
- Sensitization:
  The nervous system of respiratory organs may be stimulated sensitively.
- Chronic toxicity/Long term toxicity:
  By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.
  Cobalt compounds belong to the 2B group of the carcinogen in the IARC category (substance which is suspected to have carcinogenic to man).
  By the long-term or repetitive inhalation of coarse particulate of Manganese Oxide (MnO_2), lungs and nervous system may be affected; bronchitis, pneumonia, nerve disease or nerve mental disorder (manganese poisoning) may be caused.
  Nickel Compounds belong to the 1st group of the carcinogen in the IARC category (substance which has carcinogenic to man).
- Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.
  ** Not every product includes all of these metals.*

Aluminum

- Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.
- Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).

Graphite

- Acute toxicity: Unknown.
- Local effects: When it goes into one's eyes, it stimulates one's eyes; conjunctivitis, thickening of corneal epithelium or edematous inflammation palpebra may be caused.
- Chronic toxicity/Long term toxicity:
  Since the long-term inhalation of high levels of graphite coarse particulate may become a cause of a lung disease or a tracheal disease.
- Carcinogenicity:
  Graphite is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.

Copper

- Acute toxicity:
  60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.
  TDLo, hypodermic - Rabbit 375mg/kg
- Local effects:
  Coarse particulate stimulates a nose and a tracheal.
  When it goes into one's eyes, the symptom of the reddening and the pain is caused.
- Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.

Organic Electrolyte

- Acute toxicity:
  LD_{50}, oral - Rat 2,000mg/kg or more
- Local effects: Unknown.
- Skin irritation study: Rabbit - Mild
- eye irritation study: Rabbit - Very severe

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.

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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.

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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

・ID number: 3480
・Proper shipping name:
Lithium ion batteries
・Class: 9 *
・Packing group: II *

** However this product is defined as above, it is **not** recognized as "DANGEROUS GOODS" when its transport condition accords with instructions or provisions depend on region and transportation mode. About the instructions or provisions, please see descriptions in box brackets of following regulations.*

Regulation depends on region and transportation mode

・Worldwide, air transportation:
IATA-DGR ["packing instruction 965 section II")
・Worldwide, sea transportation:
IMO-IMDG Code [special provision 188]
・Europe, road transportation:
ADR [special provision 188]

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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 INFOMATION.*

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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

Chemical substances information: Japan Advanced Information center of Safety and Health
International Chemical Safety Cards (ICSCs): International Occupational Safety and Health Information Centre (CIS)
Dangerous Goods Regulations – 52nd Edition Effective 1 January 2011: International Air Transport Association (IATA)
IMDG Code - 2010 Edition: International Maritime Organization (IMO)
The European Agreement concerning the International Carriage of Dangerous Goods by Road – 2011: The United Nations Economic Commission for Europe (UNECE)
RTECS (CD-ROM)
MSDS of raw materials prepared by the manufactures

First edition: Apr. 28, 2010
Prepared and approved by
Sanyo Electric Co., Ltd.
Energy Devices Company
Lithium-Ion Battery Division
Battery System Development Management Department

Applied Model Name

Model Information				Cell			Battery Pack				Refer SDS
Panasonic Toughbook Model Name	Battery Pack Model Name	Manufacture	Manufacturer Model Name	Cell Name	Type	Nominal Voltage (V)	Rating Voltage (V)	Rating Capacity Typ.(Ah)	Rating Capacity Min.(Ah)	Watt-hour Rating	
CF-07	CF-VZSU21 CF-VZSU21JS CF-VZSU21W	Sanyo	2UF103450P-MDS-07	UF103450P	-	3.7	7.4	1.7	1.7	13	SDS-IBT-00026
CF-08	CF-VZSU44 CF-VZSU44U	Sanyo	2UR18650F-2-MDS-08	UR18650F	-	3.7	7.4	5.2	5	37	SDS-IBT-00026
CF-18	CF-VZSU36	Panasonic	CGR-B/6B4B	CGR18650CA	A	3.7	7.4	6.6	6.12	46	LIP-PSDS-2011-211
CF-18	CF-VZSU30 CF-VZSU30U	Panasonic	CGR-B/682A	CGR18650CA	A	3.7	7.4	6.6	6.12	46	LIP-PSDS-2011-211
CF-18	CF-VZSU30A CF-VZSU30AU	Panasonic	CGR-B/6C2A	CGR18650D	A	3.7	7.4	7.05	6.66	50	LIP-PSDS-2011-211
CF-18	CF-VZSU30B CF-VZSU30BU	Panasonic	CGR-B/6D8H CGR-B/6D8M	CGR18650E	A	3.7	7.4	7.65	7.26	54	LIP-PSDS-2011-211
CF-18	CF-VZSU30BR	Panasonic	CGR-B/6D8J CGR-B/6D8L CGR-B/6D8N CGR-B/6D8R	CGR18650E	A	3.7	7.4	7.65	7.26	54	LIP-PSDS-2011-211
CF-18	CF-VZSU30BR2	Panasonic	CGR-B/6D8K CGR-B/6D8P	CGR18650E	A	3.7	7.4	7.65	7.26	54	LIP-PSDS-2011-211
CF-19	CF-VZSU48 CF-VZSU48U	Panasonic	NCR-B/603E	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-19	CF-VZSU48R	Panasonic	NCR-B/603F	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-19	CF-VZSU48R2	Panasonic	NCR-B/603G	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-19	CF-VZSU48K	Panasonic	NCR-B/603H	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-19	CF-VZSU50 CF-VZSU50W	Panasonic	NCR-B/607C	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-19	CF-VZSU58U	Sanyo	3UR18650ZT-2-MDS19	UR18650ZT	-	3.7	11.1	5.6	5.3	59	SDS-IBT-00026
CF-28/48/50	CF-VZSU18B CF-VZSU18BU	Sanyo	3UR18650F-3-MDS-50	UR18650F	-	3.7	11.1	6.6	6.3	70	SDS-IBT-00026
CF-28/48/50	CF-VZSU18 CF-VZSU18U	Sanyo	3UR18650P-3-MDS-48	UR18650P	-	3.7	11.1	5.4	5.1	57	SDS-IBT-00026
CF-29	CF-VZSU29A CF-VZSU29AU	Panasonic	CGR-B/982D	CGR18650E	A	3.7	11.1	7.65	7.26	81	LIP-PSDS-2011-211
CF-29	CF-VZSU29AR	Panasonic	CGR-B/982E	CGR18650E	A	3.7	11.1	7.65	7.26	81	LIP-PSDS-2011-211
CF-29/51/52	CF-VZSU29AS CF-VZSU29ASU	Sanyo	3UR18650F-3-MDS-52	UR18650F	-	3.7	11.1	7.8	7.5	84	SDS-IBT-00026
CF-29/51/52	CF-VZSU29ASR	Sanyo	3UR18650F-3-MDS52C	UR18650F	-	3.7	11.1	7.8	7.5	84	SDS-IBT-00026
CF-30	CF-VZSU46 CF-VZSU46U	Panasonic	NCR-B/901D	NCR18650	C	3.55	10.65	8.55	8.1	87	LIP-PSDS-2011-211
CF-30	CF-VZSU46R	Panasonic	NCR-B/901E NCR-B/922BE	NCR18650	C	3.55	10.65	8.55	8.1	87	LIP-PSDS-2011-211
CF-30	CF-VZSU46T	Panasonic	NCR-B/901F	NCR18650	C	3.55	10.65	8.55	8.1	87	LIP-PSDS-2011-211
CF-31	CF-VZSU46AU	Panasonic	NCR-B/916A NCR-B/916BE NCR-B/922BE	NCR18650	C	3.55	10.65	8.55	8.1	87	LIP-PSDS-2011-211
CF-31/52	CF-VZSU65AU	Sanyo	3UR18650F-2-MDS31V	UR18650F	-	3.7	11.1	5.2	5	56	SDS-IBT-00026
CF-52	CF-VZSU65U	Sanyo	3UR18650F-2-MDS52V	UR18650F	-	3.7	11.1	5.2	5	56	SDS-IBT-00026
CF-53	CF-VZSU71U	Panasonic	CGR-B/9A7AE	CGR18650CG	B	3.6	10.8	6.75	6.3	69	LIP-PSDS-2011-211
CF-53	CF-VZSU72U	Panasonic	CGR-B/6T5AE	CGR18650CG	B	3.6	10.8	4.5	4.2	46	LIP-PSDS-2011-211
CF-73	CF-VZSU26 CF-VZSU26U	Sanyo	3UF103450P-2-MDS73	UF103450P	-	3.7	11.1	3.8	3.6	40	SDS-IBT-00026
CF-74	CF-VZSU43A CF-VZSU43AU	Sanyo	3UR18650F-3-MDS74A	UR18650F	-	3.7	11.1	7.8	7.5	84	SDS-IBT-00026
CF-A2/A3	CF-VZSU20 CF-VZSU20J CF-VZSU20JS	Panasonic	CGR-B/653C	CGR18650A	A	3.7	11.1	4	3.8	43	LIP-PSDS-2011-211
CF-B10	CF-VZSU69JS	Sanyo	3UR18650A-2-MDS	UR18650A	-	3.6	10.8	4.5	4.2	46	SDS-IBT-00026
CF-B10	CF-VZSU70JS	Sanyo	3UR18650A-MDS-2	UR18650A	-	3.6	10.8	2.25	2.1	23	SDS-IBT-00026
CF-B10	CF-VZSU77JS	Sanyo	3UR18650ZTA-2-MDS2	UR18650ZTA	-	3.7	11.1	7	5.7	64	SDS-IBT-00026
CF-C1	CF-VZSU66U	Sanyo	2UR18650ZT-2-MDSC1	UR18650ZTA	-	3.7	7.4	6	5.7	43	SDS-IBT-00026
CF-D1	CF-VZSU73U	Panasonic	NCR-B/693AE	NCR18650A	C	3.6	10.8	6.2	5.8	63	LIP-PSDS-2011-211
CF-F8	CF-VZSU56U	Panasonic	NCR-B/617A	NCR18650	C	3.6	10.8	5.8	5.4	59	LIP-PSDS-2011-211
CF-F9(JP)	CF-VZSU56AJS	Panasonic	NCR-B/666A	NCR18650A	C	3.6	10.8	6.2	5.8	63	LIP-PSDS-2011-211
CF-J9/J10	CF-VZSU67JS	Panasonic	NCR-B/429A	NCR18650A	C	3.6	7.2	6.2	5.8	42	LIP-PSDS-2011-211
CF-J9/J10	CF-VZSU68JS	Panasonic	NCR-B/673A	NCR18650A	C	3.6	7.2	9.3	8.7	63	LIP-PSDS-2011-211
CF-L2	CF-VZSU19 CF-VZSU19JS	Sanyo	3UF103450P-2-MDSL2	UF103450P	-	3.7	11.1	3.6	3.4	38	SDS-IBT-00026
CF-M34	CF-VZSU15A CF-VZSU15AJS	Panasonic	CGR-B/664F	CGR18650A	A	3.7	11.1	4	3.8	43	LIP-PSDS-2011-211
CF-M34	CF-VZSU15A CF-VZSU15AW	Panasonic	CGR-B/664G	CGR18650A	A	3.7	11.1	4	3.8	43	LIP-PSDS-2011-211
CF-P1	CF-VZSU22 CF-VZSU22JS CF-VZSU22W	Sanyo	2UR18650-MDS-6	UR18650P	-	3.7	7.4	1.7	1.7	13	SDS-IBT-00026
CF-P1	CF-VZSU28 CF-VZSU28JS	Sanyo	2UR18650F-MSD-P1R1	UR18650F	-	3.7	7.4	2.1	2.1	16	SDS-IBT-00026
CF-P1	CF-VZSU28 CF-VZSU28W	Sanyo	2UR18650F-MSD-P1R2	UR18650F	-	3.7	7.4	2.1	2.1	16	SDS-IBT-00026
CF-P2	CF-VZSU33	Panasonic	CGA-E/109BA	CGA103450A	A	3.6	3.6	1.95	1.85	6.7	LIP-PSDS-2011-211
CF-R1/T1/R2/T2	CF-VZSU24A CF-VZSU24AU	Sanyo	2UR18650F-2-MDS-T2	UR18650F	-	3.7	7.4	4.4	4.2	32	SDS-IBT-00026
CF-R1/T1/R2/T2	CF-VZSU24AR	Sanyo	2UR18650F-2-MDST2C	UR18650F	-	3.7	7.4	4.4	4.2	32	SDS-IBT-00026
CF-R1/T1/R2/T2	CF-VZSU24B CF-VZSU24BU	Sanyo	2UR18650F-2-MDST2R	UR18650F	-	3.7	7.4	4.8	4.6	35	SDS-IBT-00026
CF-R3	CF-VZSU32 CF-VZSU32U	Sanyo	2UR18650F-3-MDS-R3	UR18650F	-	3.7	7.4	7.2	6.9	52	SDS-IBT-00026
CF-R3	CF-VZSU32R	Sanyo	2UR18650F-3-MDSR3C	UR18650F	-	3.7	7.4	7.2	6.9	52	SDS-IBT-00026
CF-R4	CF-VZSU42 CF-VZSU42U	Sanyo	2UR18650F-3-MDS-R4	UR18650F	-	3.7	7.4	7.8	7.5	56	SDS-IBT-00026

CF-R4	CF-VZSU42R	Sanyo	2UR18650F-3-MDSR4C	UR18650F	–	3.7	7.4	7.8	7.5	56	SDS-IBT-00026
CF-R6/R7/R8	CF-VZSU49 CF-VZSU49U	Panasonic	NCR-B/402B	NCR18650	C	3.6	7.2	5.8	5.4	39	LIP-PSDS-2011-211
CF-R6/R7/R8	CF-VZSU54U	Panasonic	NCR-B/404B	NCR18650	C	3.6	7.2	5.8	5.4	39	LIP-PSDS-2011-211
CF-R9	CF-VZSU49AJS	Panasonic	NCR-B/426A	NCR18650A	C	3.6	7.2	6.2	5.8	42	LIP-PSDS-2011-211
CF-R9	CF-VZSU54AJS	Panasonic	NCR-B/427A	NCR18650A	C	3.6	7.2	6.2	5.8	42	LIP-PSDS-2011-211
CF-S8/N8/S9/N9	CF-VZSU59U	Panasonic	NCR-B/807A	NCR18650A	C	3.6	7.2	12.4	11.6	84	LIP-PSDS-2011-211
CF-S8/N8/S9/N9	CF-VZSU60U	Panasonic	NCR-B/806A	NCR18650A	C	3.6	7.2	12.4	11.6	84	LIP-PSDS-2011-211
CF-S8/N8/S9/N9	CF-VZSU61U	Panasonic	NCR-B/805A	NCR18650A	C	3.6	7.2	12.4	11.6	84	LIP-PSDS-2011-211
CF-S8/N8/S9/N9	CF-VZSU62U	Panasonic	NCR-B/420A	NCR18650A	C	3.6	7.2	6.2	5.8	42	LIP-PSDS-2011-211
CF-S8/N8/S9/N9	CF-VZSU64U	Panasonic	NCR-B/418A	NCR18650A	C	3.6	7.2	6.2	5.8	42	LIP-PSDS-2011-211
CF-S10/N10(JP)	CF-VZSU60AJS	Panasonic	NCR-B/821A	NCR18650B	C	3.6	7.2	13.6	12.8	93	LIP-PSDS-2011-211
CF-S10/N10(JP)	CF-VZSU61AJS	Panasonic	NCR-B/820A	NCR18650B	C	3.6	7.2	13.6	12.8	93	LIP-PSDS-2011-211
CF-S10/N10(JP)	CF-VZSU62AJS	Panasonic	NCR-B/434A	NCR18650B	C	3.6	7.2	6.8	6.4	47	LIP-PSDS-2011-211
CF-T4/T5	CF-VZSU39 CF-VZSU39U	Panasonic	CGR-B/437C	CGR18650E	A	3.7	7.4	5.1	4.84	36	LIP-PSDS-2011-211
CF-T4/T5	CF-VZSU37 CF-VZSU37U	Panasonic	CGR-B/979C	CGR18650E	A	3.7	11.1	7.65	7.26	81	LIP-PSDS-2011-211
CF-T7/T8/W7/W8/T9/W9	CF-VZSU52AJS	Panasonic	NCR-B/304G	NCR18650	C	3.6	10.8	2.9	2.7	30	LIP-PSDS-2011-211
CF-T7/T8/W7/W8/T9/W9	CF-VZSU52W	Panasonic	NCR-B/304H	NCR18650	C	3.6	10.8	2.9	2.7	30	LIP-PSDS-2011-211
CF-T7/T8/W7/W8/T9/W9	CF-VZSU51JS	Panasonic	NCR-B/609C	NCR18650	C	3.6	10.8	5.8	5.4	59	LIP-PSDS-2011-211
CF-T7/T8/W7/W8/T9/W9	CF-VZSU51AJS	Panasonic	NCR-B/609H	NCR18650	C	3.6	10.8	5.8	5.4	59	LIP-PSDS-2011-211
CF-T7/T8/W7/W8/T9/W9	CF-VZSU51W	Panasonic	NCR-B/609J	NCR18650	C	3.6	10.8	5.8	5.4	59	LIP-PSDS-2011-211
CF-T7/T8/W7/W8/T9/W9	CF-VZSU51R	Panasonic	NCR-B/609K	NCR18650	C	3.6	10.8	5.8	5.4	59	LIP-PSDS-2011-211
CF-T7/T8/W7/W8/T9/W9	CF-VZSU57JS	Panasonic	NCR-B/616B	NCR18650	C	3.6	10.8	5.8	5.4	59	LIP-PSDS-2011-211
CF-U1/H1	CF-VZSU53W	Panasonic	NCR-B/202A NCR-B/202B	NCR18650	C	3.6	7.2	2.9	2.75	20	LIP-PSDS-2011-211
CF-U1/H1	CF-VZSU53JS	Panasonic	NCR-B/202C	NCR18650	C	3.6	7.2	2.9	2.7	20	LIP-PSDS-2011-211
CF-U1/H1	CF-VZSU53R	Panasonic	NCR-B/202D	NCR18650	C	3.6	7.2	2.9	2.7	20	LIP-PSDS-2011-211
CF-U1/H1	CF-VZSU53Q	Panasonic	NCR-B/202F	NCR18650	C	3.6	7.2	2.9	2.7	20	LIP-PSDS-2011-211
CF-H2	CF-VZSU53AW	Panasonic	NCR-B/206A	NCR18650B	C	3.6	7.2	3.4	3.2	23	LIP-PSDS-2011-211
CF-H2	CF-VZSU53AJS	Panasonic	NCR-B/206B	NCR18650B	C	3.6	7.2	3.4	3.2	23	LIP-PSDS-2011-211
CF-VZSU1428W/JS CF-VZSU1473U	CF-VZSU14B	Panasonic	CGA-E/608D	CGA103450A	A	3.7	11.1	3.6	3.4	38	LIP-PSDS-2011-211
CF-VZSU1430U	CF-VZSU14C	Panasonic	CGA-E/621C	CGA103450A	A	3.7	11.1	3.9	3.7	42	LIP-PSDS-2011-211
CF-VZSU1431U	CF-VZSU14D	Panasonic	CGA-E/621D	CGA103450A	A	3.7	11.1	3.9	3.7	42	LIP-PSDS-2011-211
CF-W2/Y2	CF-VZSU27A CF-VZSU27AU	Panasonic	CGR-B/6A6EA	CGR18650D	A	3.7	7.4	7.05	6.66	50	LIP-PSDS-2011-211
CF-W4	CF-VZSU40A CF-VZSU40AU	Sanyo	2UR18650F-3-MDS-W4	UR18650F	–	3.7	7.4	7.8	7.5	56	SDS-IBT-00026
CF-W4	CF-VZSU40AR	Sanyo	2UR18650F-3-MDSW4C	UR18650F	–	3.7	7.4	7.8	7.5	56	SDS-IBT-00026
CF-W5	CF-VZSU47 CF-VZSU47AU	Panasonic	NCR-B/602D	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-W5	CF-VZSU47R	Panasonic	NCR-B/602E	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-Y4	CF-VZSU41 CF-VZSU41U	Panasonic	CGR-B/6D2E	CGR18650E	A	3.7	7.4	7.65	7.26	54	LIP-PSDS-2011-211
CF-Y5/Y7/Y8/Y9	CF-VZSU45 CF-VZSU45U	Panasonic	NCR-B/601D	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211
CF-Y5/Y7/Y8/Y9	CF-VZSU45R	Panasonic	NCR-B/601E	NCR18650	C	3.55	10.65	5.7	5.4	58	LIP-PSDS-2011-211

Last 2 digits XX in model number "CF-VZSUxxxXX " means the destination, where
"R ": Taiwan, China
"R2": HongKong, China
"Q": Taiwan
"K": Korea
"J ", "JS": Japan
"W ": Universal except Japan or China
"U ", or " ": Universal except China