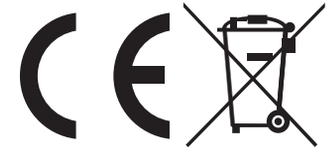
Safety information on batteries for products containing coin-type lithium manganese dioxide batteries.



1. information identifying the manufacturer in accordance with Article 38(7);
   Maxell, Ltd. (https://www2.maxell.co.jp)
   1-1 Matsushita^cho, Moriguchi-city, Osaka, 570-8511, Japan
2. the battery category and information identifying the battery in accordance with Article 38(6);
   Portable Battery CR2016
3. the place of manufacture (geographical location of a battery manufacturing plant);
   Jl. Teuku Umar Km. 44, Cikarang Barat, Bekasi 17530, Jawa Barat, Indonesia
4. the date of manufacture (month and year); Printed on the surface of the battery.
5. the weight; 1.6 g
6. the capacity; 90mAh
7. the chemistry; MnO2 , Li
8. the hazardous substances present in the battery, other than mercury, cadmium or lead; non-inclusion
9. usable extinguishing agent;
   Extinguisher of alkaline metal fire is effective.
   Plenty of cold water is also effective to cool the surrounding area and control the spread fire.
   But hydrogen gas may be evolved by the reaction of water and lithium and it can form an explosive mixture.
   Therefore in the case that lots of lithium metal batteries are burning in a confined space, use a smothering agent (e.g. carbon dioxide or dry sand).
   Use self-contained breathing apparatus and full protective gear not to inhale harmful gas.
10. Critical raw materials present in the battery in a concentration of more than 0,1 % weight by weight. : Manganese Dioxide(MnO2)

D.o.C. for coin-type lithium manganese dioxide batteries.

This product is used in a hermetically sealed state. So, it is not an object of the SDS system. This document is provided to customers as reference information for the safe handling of the product. The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Panasonic Corporation makes no warranty expressed or implied.

PRODUCT SAFETY DATA SHEET

1 Chemical product and company identification

Name of Product : Manganese dioxide lithium battery
Name of Company : Panasonic Energy Co., Ltd.
Address : 1-1 Matsushita-cho, Moriguchi-city, Osaka, 570-8511, Japan
Emergency Contact : +81-80-9932-3190 (JST Working hours)
+81-6-6991-1141 (Holiday)

2 Hazards identification

GHS Classification : No applicable
Toxicity : Vapor generated from burning batteries, may irritate eyes, skin and throat.
Hazard : Electrolyte and lithium metal are inflammable.
Risk of explosion by fire if batteries are disposed in fire or heated above 100 degrees C.
Stacking or jumbling batteries may cause external short circuits, heat generation, fire or explosion.

3 Composition/information of ingredients

Component	Material	CAS RN	Content (%)
Positive electrode	Manganese dioxide	1313-13-9	12 - 50
Negative electrode	Lithium metal	7439-93-2	0.5 - 6
Electrolyte	1,2-dimethoxyethane	110-71-4	1.5 - 3.5
	Lithium Perchlorate	7791-03-9	0.2 - 0.7
	Propylene Carbonate	108-32-7	2.5 - 7
Others (Steel or Plastic parts)	Steel	7439-89-6, 7440-47-3	30 - 85
	Polypropylene	9003-07-0	0.5 - 10

Lithium content per cell

Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)
CR1025	0.008	CR2012	0.02	CR2330	0.08	CR2412	0.03
CR1216	0.008	CR2016	0.03	CR2354	0.17	CR2430	0.09
CR1220	0.01	CR2025	0.05			CR2450	0.18
CR1612	0.01	CR2032	0.07			CR2477	0.29
CR1616	0.02						
CR1620	0.02					CR3032	0.15
CR1632	0.04						

4 First aid measures (in case of electrolyte leakage from the battery)

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

Skin contact : Wash the affected area under tepid running water using a mild soap. If appropriates procedures are not taken, this may cause sores on the skin. Get medical attention if irritation develops or persists.

Inhalation : Remove to fresh air immediately. Get medical treatment immediately.

5 Firefighting measures

Fire extinguishing agent : Alcohol-resistant foam and dry sand are effective.

Extinguishing method : Be sure on the windward to extinguish the fire, since vapor may make eyes, nose and throat irritate, Wear the respiratory protection equipment in some cases.

6 Accidental release measures (in case of electrolyte leakage from the battery)

Take up with absorbent cloth, treat cloth as inflammable.
Move the battery away from the fire.

7 Handling and storage

Handling :

- 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.
- Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation.
- Do not short-circuit, recharge, deform, throw into fire or disassemble.
- Do not mix different type of batteries.
- Do not solder directly onto batteries.
- Insert the battery correctly in electrical equipment.

Storage :

- Do not let water penetrate into packaging boxes during their storage and transportation.
- Do not store the battery in places of the high temperature or under direct sunlight.
- Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, rain or frozen condition

8. Exposure controls and personal protection

Acceptable concentration : Not specified about Lithium Battery.
Facilities : Nothing in particular.

Protective Equipment (in case of electrolyte leakage from the battery)
Respiratory Protection : For most condition no respiratory protection.
Hand Protection : Safety gloves.
Eye Protection : Safety goggle

9. Physical and chemical properties

Appearance : Coin shape
Nominal Voltage : 3 V

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 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. Toxicological information

Swallowing can lead to chemical bums, perforation of soft tissue, and death. Severe bums can occur within 2 hours of ingestion. Seek medical attention immediately.

12. Ecological information

In case of the worn out battery was disposed in land, the battery case may be corroded, and leak electrolyte. However, there is no environmental impact information.
Mercury (Hg), Cadmium (Cd) and Lead (Pb) are not used in cell.

13. Disposal considerations

When the battery is worn out, dispose of it under the ordinance of each local government.

14. Transport information

Handling

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 dropped or damaged.

UN Number, UN Class : UN3090, Class9 (for the Air transport by PI968 Section IA or IB)

: Exemption (for the Marine transport SP188 and the Air transport by Section II of PI 969 or 970)
Even though the cells are classified as lithium metal batteries (UN3090 or UN3091), they are not subject to some requirements of Dangerous Goods Regulations because they meet the following:

1. for cells, the lithium content is not more than 1 g ;
2. each cell is of the type proven to meet the requirements of each test

in the UN Manual of Tests and Criteria, PartⅢ, sub-section 38.3 ;
3. each cell is manufactured in ISO9001 certified factory ;
4. the test summary is available from ;
https://energy.panasonic.com/global/business/e/na/downloads/test-summary

Please refer to the following reference information about concrete ways of transportation. Actual content of packaging label and shipping documents varies by shipping companies. Make sure to confirm in advance with your shipping company.

Information of reference

	Reference	Packing Instruction(PI)/ Special provision(SP)	Note
Air transport	IATA DGR	PI 968 Section Ⅰ A	Cells, Cargo Aircraft only; Net quantity per package Max. 35kg
		PI 968 Section Ⅰ B	Cells, Cargo Aircraft only; net quantity per package Max. 2.5kg
		PI 969 SectionⅡ	Cells packed with equipment
		PI 970 SectionⅡ	Cells contained in equipment, button cell batteries
Marine transport	IMDG Code	SP 188	

15. Regulatory information

- IATA Dangerous Goods Regulations Edition 66 (IATA DGR)
- IMO International Maritime Dangerous Goods Code 2022 and 2024 Edition (IMDG Code)
- UN Recommendations on the Transportation of Dangerous Goods, Model Regulations
- UN Recommendations on the Transportation of Dangerous Goods, Manual of Tests and Criteria
- EU Battery Directive (2006/66/EC, 2013/56/EU)
- EU Battery Regulation (Regulation (EU) 2023/1542 of the European Parliament and of the Council)
- EU REACH Regulation (Regulation (EC) No. 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals)
- State of California Regulations - Best management practices for Perchlorate Materials
- Act on Preventing Environmental Pollution of Mercury (Japan)

16. Other information

This PSDS is provided to customers as reference information in order to handle batteries safely.
It is necessary for the customer to take appropriate measures depending on the actual situation such as the individual handling, based on this information.

In California only, packages that contain CR lithium coin cells and the Owners/Operating Instructions of products that contain CR lithium coin cells must include the following statement: "Perchlorate Material - special handling may apply,
See http://www.dtsc.ca.gov/hazardouswaste/perchlorate".
The effective date for this Perchlorate label is July 1, 2006 for non-consumer products and January 1, 2007 for consumer products.

Prepared by : Engineering Department
Energy Device Business Division
Panasonic Energy Co., Ltd.

Control number	02015-5E-006

PUI TECHNOLOGY LIMITED

SPECIFICATION	
Manganese dioxide Lithium Battery	
Ordering Code :	CR-2016/BE
Model Code :	CR2016

Approved by
Division/Department
Name
Title
Signature/date

ISSUED
May,14,2015
PT. Panasonic Gobel Energy Indonesia

Date of Issued : May,14,2015

PT. Panasonic Gobel Energy Indonesia

Approved	Checked	Drafted
K. Amano		Dadang K

Revision history		
No.	Date	Revision
1	May,14,2015	Issued
2		
3		
4		
5		
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1. Applicable range

This specification applies to manganese dioxide lithium batteries which are delivered to from PT. Panasonic Gobel Energy Indonesia

2. Nominal specification

2.1. Model number (bare cell) CR2016
2.2. Nominal voltage 3V
2.3. Nominal capacity 90 mAh
2.4. Operation temperature From -30 to 60 °C
(Please consult Panasonic in case continuous high-temperature usage conditions)
2.5. Recommendable storage condition Temperature : 5°C to 35°C Humidity : 45～85%RH
2.6. Mass Refer to drawing 1
2.7. Dimension Refer to drawing 1
2.8. Battery composition Lithium primary battery composed of cathode from manganese dioxide anode from lithium and electrolyte from organic solvent and lithium salt.

3. Battery characteristics

Table 1. CR2016 characteristics

	Items	Test method	Temperature		initial	After 1 year in room temperature
1	Open circuit voltage	Voltage between terminals (Min)	20 +/- 2°C		3.1V	3.1V
2	Internal resistance	1kHz sine wave method (Max.)	20 +/- 2°C		30Ω	-
3	Discharge duration	Continuous discharge (Std.)	20 +/- 2°C	Load : 15kΩ	473h	463h
		Continuous discharge (Min.)		cut offV : 2.0V	425h	416h

4. Indication

4.1.Below items are indicated on battery or its package
Model code CR2016
Nominal voltage 3V
Plus polarity ＋
Manufacturer or its brand : Panasonic
Production country Made in Indonesia
(Design of indication can be changed without notice)

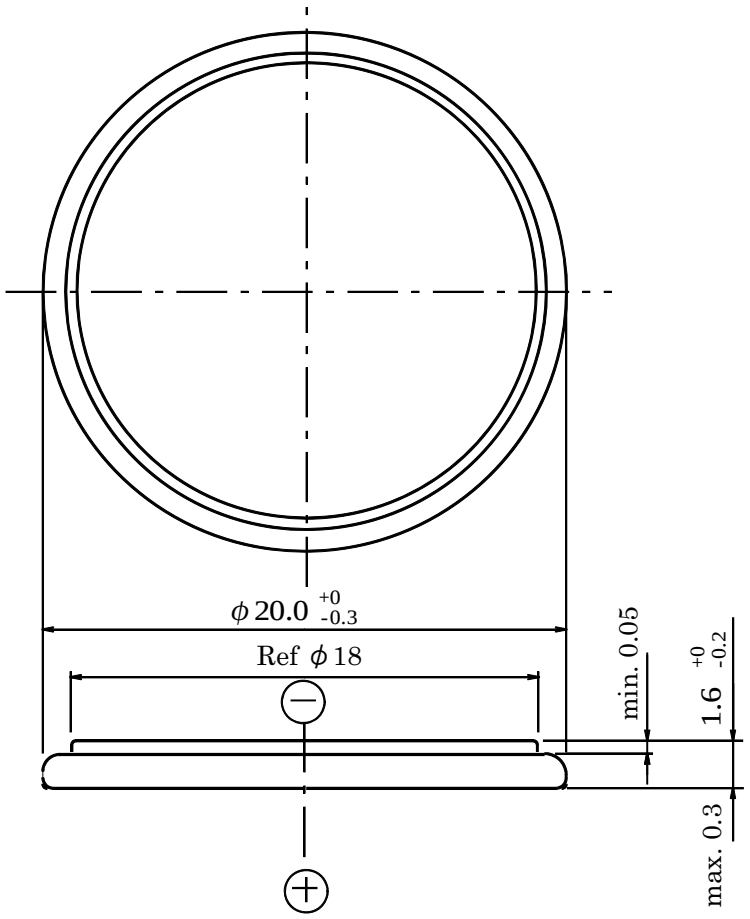
4.2. Production date
Stated on minus side of battery
First digit: End digit of dominical year; Second digit; Month (October=O, November=Y, December=Z)
Example : 7Z(December/2007)

4.3. UL
This battery is certificate by UL and listed on file number MH12210

4.4 Production Site
PT. Panasonic Gobel Energy Indonesia, Jl.Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat Indonesia

Drawing 1. Dimensions

Ordering code : CR2016



Terminal : Plus terminal material : Nickel plated stainless steel
Minus terminal material : Nickel plated stainless steel

Mass : Approx. 1.7 g

5. Test condition and performance

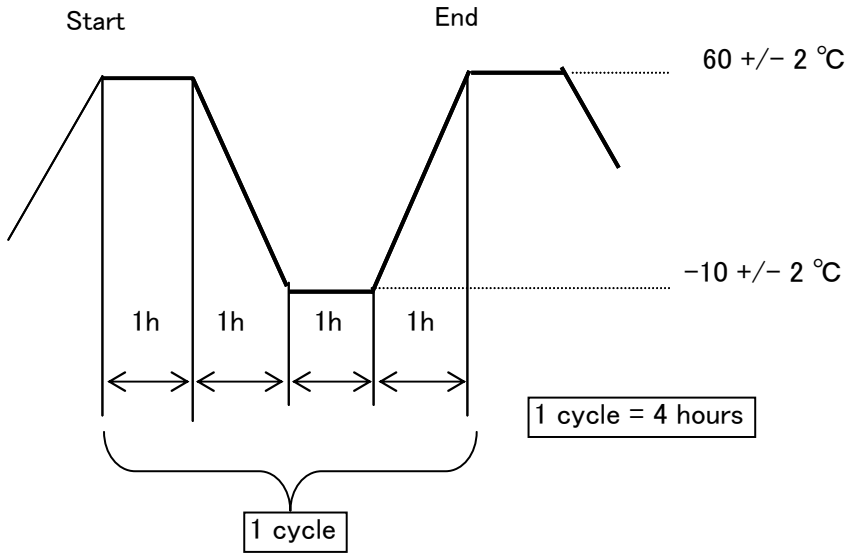
5.1. External dimensions — Measure the battery dimensions with caliper described in item 6.3.(1) herein without making short-circuit.
Dimensions shall be confirmed with drawing 1 herein.

5.2. Open circuit voltage — Measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein after keeping the battery for 2 hours at least in measuerement environment. Open circuit voltage shall conform to table 1 herein.

5.3 Internal resistance — Measure the interenal resistance with the resistance meter described in item 6.3.(3) herein after keeping the battery for 2 hours at least in measuerement environment. Internal resistance shall conform to table 1 herein.

5.4. Discharge duration — Discharge the battery with the load resistance specified in table 1 herein after keeping the battery in measurement environment for 8 hours at least. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein.
Discharge duration shall conform to table 1 herein.

5.5. Anti-leakage — Appearance check after 42 cycles of thermal cycle by the condition showing below. Battery shall not have deformation or leakage.
* This test shall be started from high temperature (60℃) position.
* No humidifying to ambient temperature and humidity.



5.6. Storage characteristics

(1) Open circuit voltage — After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein.
Open circuit voltage shall conform to table 1 herein.

(2) Internal resistance — After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the internal resistance with the resistance meter described in item 6.3.(3) herein. Internal resistance shall conform to table 1

(3) Discharge duration — After storage term described on table 1 herein, keep the battery for 8 hours at least in measurement environment, then discharge the battery with the load resistance specified in table 1 herein. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein.
Discharge duration shall conform to values described in table 1 herein.

5.7. Appearance — No deformation, bruise and stain which cause practical interference.

6. Test conditions

6.1. Initial test — Initial test must be started within 2 months from delivery.

6.2. Temperature and humidity — Unless otherwise specified, test should be carried out in room temperature (20 +/− 15 ℃) and room humidity (65 +/− 20%RH).

6.3. Measuring equipment's

(1) Dimension

Micrometer defined by JIS B7502 or equivalent or more accurate one must be used for dimension measurement.

For one digit decimals tolerance, caliper with 0.05mm accuracy which is defined JIS B7507 or higher accuracy equipment must be used.

(2) Voltage

Voltage meter defined by JIS C1102 class 0.2 or higher, and more than 10Mohm impedance must be used.

(3) Internal resistance

It should be measured by sinusoidal current method (1kHz). Measurement should be finished within 5 seconds.

(As a general rule, Agilent Technologies LCRmeter 4263B or equivalent should be used.)

(4) Load resistance includes all resistance of discharge circuit, and its tolerance shall be less than 0.5%.

(5) Appearance check is observed by visual evaluation.

7. Revision and modification of this specification

Revision and modification must be carried out after the prior mutual agreement.

All accidents or issues caused by any events that are neither defined nor described in this specification, mutual discussion shall take place for the resolution.

8. Important Notes (Warranty)

1) The batteries are warranted to conform to the description contained in this specifications for a period of twelve【12】months from the ex-factory date and any claim by customer (apparatus manufacturer or distributor) must be made within such period. During that warranty period, if the batteries are proved to become defective, non-defective and conforming batteries will be supplied in due course at sole expense of PECGI upon PECGI's own determination that this is apparently caused by negligence of PECGI.

2) Confirm and assure the matching and reliability of batteries on actual set or unit application with customer's responsibility.

3) PECGI shall not warrant or be responsible in any case where customer fails to carry out proper handling, operating, installation, testing, service and checkout of the batteries and/or to follow the instruction, cautions, warnings, notes provided in this specifications, or other PECGI's reasonable instructions or advise.

4) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.

9. Precautions for use

9.1 Cautions for storage

- Store the battery at a constant temperature of 35 degree C or less in order to prevent deteriorations from heat.
- Keep the battery away from high humidity such as 85% RH or higher in order to prevent dew condensations on the battery that may cause to electrical leakage,
- Keep the battery away from heat sources i.e., boiler, radiator and etc., and from direct sunlight.

9.2 Warning for safety

Following cautions should be taken into consideration in order to use this battery in safe, since the battery contains combustible materials such as Lithium metal and organic electrolyte.

- Do not use except in applicable model or equipment.
- Do not mix fresh and used batteries.
- Do not mix different types (chemistries) of batteries.
- Do not short circuit.
- Do not charge.
- If multiple batteries are kept in contact with each other. The (+) and (-) terminals may short-circuit, and/or the charging possibly happen by other adjacent batteries, which may cause of shorten service life, significant damages and catching fire.
- Do not dispose into fire.
- Do not heat up higher than 100°C.
- Do not solder direct to battery.
- Do not disassemble.
- Do not soak in water.
- Do not deform.
- Do not apply inadequacy modifications or remodeling on the batteries.
- Insert the batteries in the correct polarity position.

Warning for prevention of ingestion accident

- Small-sized batteries can easily be swallowed. They must be kept out of the reach of small children.
- Also, in the design of equipment using batteries, the care should be taken to ensure that batteries are NOT easy removable for children.

9.3 Caution for better usage

- Use gold-plated or nickel-plated steel or stainless steel strips for terminals in order to keep good conductivity with the battery surface. Terminals made of gold-plated phosphor bronze will ensure stable conductivity.
- Apply and keep the contact pressure more than 2N for stable conductivity.
- Before inserting batteries, check the terminal contact surfaces on both the equipment and the batteries are clean, and also check that they are not deformed. If the contact surfaces are dirty, clean up and dry them thoroughly before inserting batteries.
- Even if batteries of the same size or same shape, they may differ in type or grade. When replacing batteries, confirm that they are correct type by checking the identification symbol (designated by I.E.C. standards) which is marked on the battery and its packages.
- Lithium primary batteries continuously indicate high voltage even toward the end of their service life. As such, they may be mistakenly judged as yet being strong. In case of multiple batteries are used in an application or equipment, all batteries should be replaced at the same time when the one of those batteries shows it has totally consumed even other batteries seems still operating, since the remaining capacity in other batteries must be also quite little at the time.
- When multiple batteries are used in series in applications or equipments, it may occur that the one battery has a polarity inversion at the end of operation life. That behavior happen when the battery had consumed its capacity earlier than other batteries. Therefore, that is not failure of battery.
- When the Lithium battery has short-circuit, even slightly. A certain amount of time is required for recovering its voltage completely. If the electrical characteristics of the battery are

measured at a time before a sufficient time has passed, it may indicate unstable values due to the battery was in recovering mode.

- If the battery touch with any antistatic conductive materials include packing bags, trays, mats, sheets, films and resin cases, sheets, for example, have a resistance of 10^3 to 10^6 Ω, it may cause of short-circuit since both the positive and the negative terminal of the battery may contact with those materials. In order to prevent short circuit, special attention may apply when handle batteries or battery attached PCB in close to those materials.

Notice for equipment design

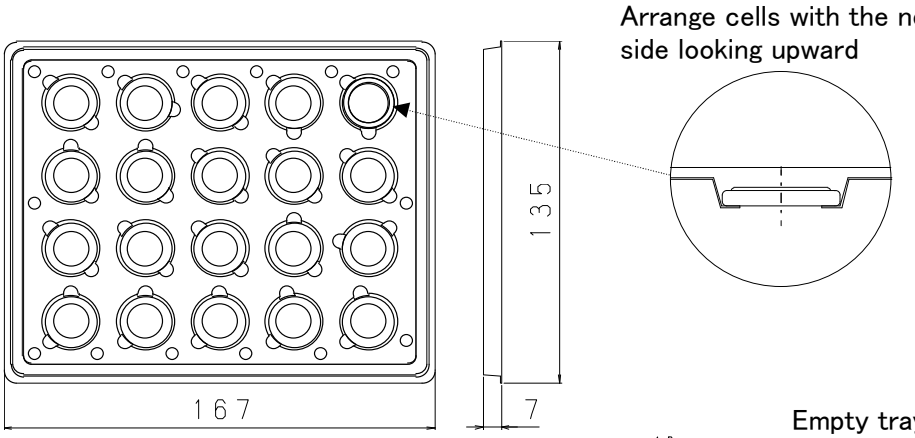
- Keep batteries away from heat source or flame, and water.
- Please contact us in case of using multiple batteries.

Product No. : CR-2016/BN	Classification No.	C16-1 R1 ※
Product name : Lithium battery	Constitution	2009.2.3
SPEC : 20pcs.tray × 200pcs.middle × 800pcs.corrugated board case	Execution	2009.2

1. Product

Refer to the product drawing

2. 20pcs. —tray [φ20-type/PS・t=0.3mm]

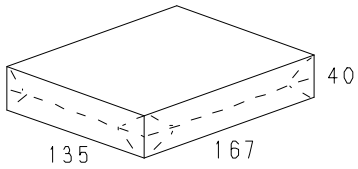


×10

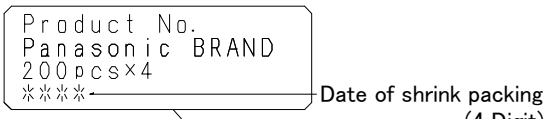
Empty tray as lid (φ20-type)1pc.

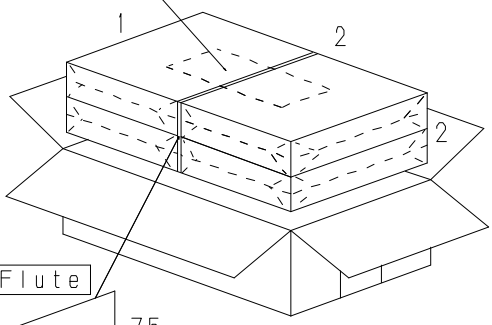
10-stack piling

3. 200pcs. -middle(Shrink Packing) (Polypropylen/15±2μm)

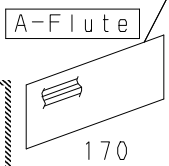


Arrangement

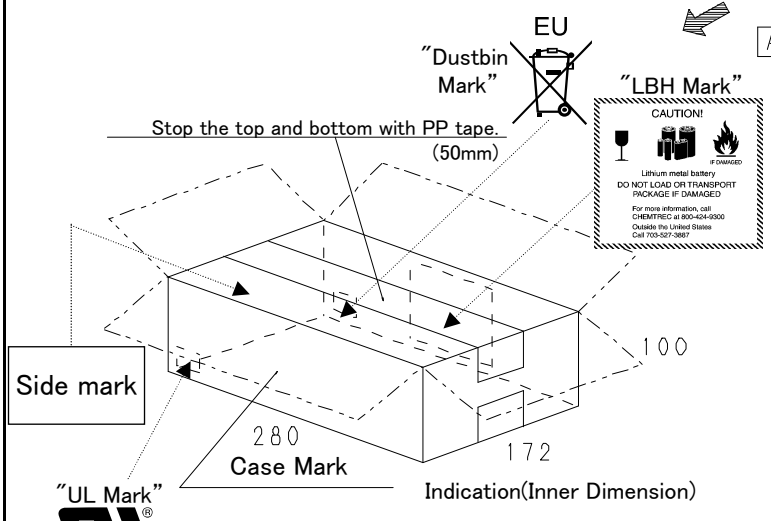




4. 800pcs. -corrugated board case(No.C16) [A type AB flute make] (K180:S:K180)



Fill the space with a buffer material.



Packing List

External dimensions : 188 × 296 × 132mm
Volume : 0.0074m³
Net : 1.36kg 1.70g/pc.
Gross : 1.86kg

unit:mm

SPECIFICATION

. Precautions for Use .

Please pay attention to the following points in order to maintain satisfactory operating conditions.

* Use nickel plated(steel or stainless steel) for power terminal contacts.
* To ensure stable contact, the contact pressure for power terminals must be at least 50 grams.
* When measuring battery voltage, use a meter with an internal resistance of 1 MΩ or greater. Correct voltage measurements cannot be obtained otherwise.
* Batteries are extremely sensitive to the adverse effects of humidity. Be sure to store them in a place which is dry and subject to little temperature change.
* Do not place near the boiler or radiator, nor expose to the direct sunlight.
* If button-type batteries are kept in contact with each other, the (+) and (-) terminals may short-circuit, greatly shortening their serviceable life.
* Button-type batteries may expand slightly during use. Therefore , sufficient space must be provided for this expansion when designing equipment.
* Befor inserting batteries, check to confirm that the terminal contact surfaces on both the equipment and the batteries are clean and that they are not deformed. If the contact surfaces are dirty, clean and dry them thoroughly before inserting batteries.
* Batteries of the same size and shape may differ in type and grade. When exchanging batteries, confirm that they are the correct type by checking the identification symbol (designated by I.E.C. standards) provided on the battery.
* Alkaline primary batteries continue to register high voltage even toward the end of their serviceable life. As such, they may be mistakenly judged as yet being strong. If one of several batteries being used in a set is found to be exhausted, it can be assumed that there is very little life remaining in the others even though they may continue to register high voltage. It is therefore advisable to exchange all of the batteries at the same time.
* The direction of polarity in a battery may reverse as it nears the end of its serviceable life. This occurs when it is the first among several batteries being used in a set to be exhausted. It is not due to an abnormality in the battery itself.
* When a lithium battery is short-circuited, even slightly, a certain amount of time is required for its voltage output to recover completely. If the electrical characteristics of the battery are measured before a sufficient amount of time has passed, the battery may appear to be malfunctioning when actually it is merely in a state of recovery.

The batteries should be used correctly, otherwise the set may be damaged due to leakage trouble. Therefore, keep the following precautions in mind.

* Do not charge, short-circuit, disassemble, heat or dispose the batteries in fire.
* Insert the batteries in correct polarity position.
* Do not directly solder to batteries.
* Do not use spent batteries with new ones.

Small-sized batteries can easily be swallowed.
They must be kept out of the reachof small children.
Also, in the design of battery powered equipment, Care should be taken to ensure that batteries cannot be easily removed by children.

Sym.	Date of Revision	Remarks
3		
2		
1		

Date of stipulation	Stipulated			Described
May . 4. 1984				H. Hattori

Panasonic

Battery Safety Practices
Avoid danger when handling batteries

Lithium batteries contain volatile materials such as lithium, organic solvents and other chemical ingredients. Incorrect handling of lithium batteries may result in heat generation, fire or explosion, with the risk of personal injury or damage. To prevent accidents when handling batteries, be sure to observe the following precautions.

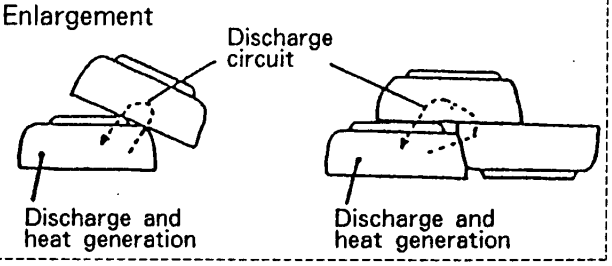
1. Do not stack or jumble batteries

Avoid contact between positive (+) and negative (−) battery poles, and contact with other metal surfaces, as this can cause short circuits with intense current flows and heat.
Stacking or jumbling batteries, as shown at right, may cause short circuits, heat generation, fire or explosion.

Example of stacked and jumbled batteries

* Contact between battery poles may form a discharge circuit and lead to heat generation, fire or explosion.

Enlargement



2. Do not dispose of batteries in fire

Disposal of batteries in fire is extremely dangerous with a risk of explosion and violent flaring.

3. Do not heat batteries

When lithium batteries are heated above 100℃ (212° F), the resin used in seals, separators and other parts may be damaged, causing electrolyte leaks and internal short circuits which may lead to fire or explosion.

4. Do not Solder directly onto batteries

Heat from soldering may damage seals, separators and other parts, causing electrolyte leaks and internal short circuits which may lead to fire or explosion.

5. Do not recharge batteries

Attempting to recharge batteries may result in internal generation of gases, which may lead to swelling, fire or explosion.

6. Do not dissemble batteries

Do not disassemble lithium batteries as this can generate a gas that may irritate the throat. Lithium may also react with moisture to generate heat and fire.

7. Do not deform batteries

When extreme pressure is applied to batteries, seals may be deformed or damaged, causing electrolyte leaks or internal short circuits. This may lead to the risk of heat generation, fire or explosion.

8. Do not mix different types of batteries

For some applications, mixing different types of batteries, or new and old batteries, can cause over discharge due to differences in voltage and electrical capacities. This may lead to the risk of swelling or explosion.

9. Insert batteries correctly

Depending on the application device, incorrect insertion of batteries, with positive (+) and negative (−) poles reversed, may result in short circuits and the risk of heat generation, fire or explosion.

Please ensure the above precautions are strictly observed by related divisions including production departments, sales departments and external subcontractors. For additional details and information, please contact our sales representatives.

Panasonic

Beware of Antistatic Conductive Materials

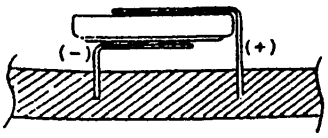
Whenever terminal-mounted backup batteries or coin-type lithium batteries contact conductive materials, they discharge. Measures to protect semiconductor parts from static damage have been implemented in plants that use such ICs and LSIs. A number of protective materials are presently being used, and all contain blends of carbon, aluminum and other metals that make them conduct.

Antistatic conductive materials include packing bags, trays, mats, sheets, film and resin cases. Sheets, for example, have a resistance of 10^3 to 10^6 Ω, which means that when they contact the positive and negative terminals of a battery, they will discharge the battery.

In a lithium battery, a current flow of several μA to several mA reduces its voltage and electrical capacity. We recommend constant attention when using batteries around protective materials.

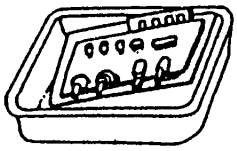
Examples

A terminal-mounted battery with its terminals inserted into a conductive mat is completely discharged after several days.



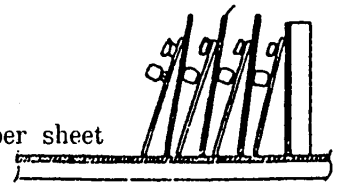
Conductive mat

A PCB-mounted battery is completely discharged by contact with the conductive resin case.

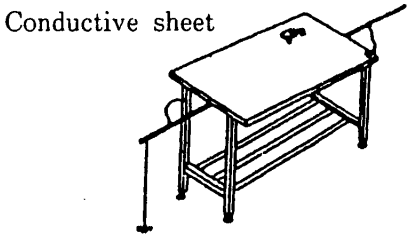


Conductive resin case

PCB-mounted batteries are discharged by contact with spacers and conductive rubber sheets.



Batteries left on a work bench with positive and negative terminals in direct contact with the grounded rubber sheet cover are completely discharged.



For more information, please make contact with your local dealer.

Panasonic

Maintaining Better Battery Contact

Preventing Accidental Memory Erasure

Coin-type Lithium batteries are widely used for memory backup purposes. However, there have been an increasing number of cases of accidental memory erasure due to inadequate battery contact.
To prevent unexpected memory erasure, consider the following tips for proper use.

＜Long-term Continuous Battery Use＞

- Use a battery with solderable tab terminals, so that the battery can be permanently soldered to terminal pads on the circuit board (Fig. 1).
- If the battery requires periodic replacement, use a battery holder (Fig. 2) or a battery with in-line lead connectors (Fig. 3).
  The battery holder can be adjusted to suit any Panasonic lithium battery (Fig. 2).

＜Batteries Requiring Short-Term Periodic Replacement --- Using batteries without solderable tab terminals or lead connectors＞

- Use gold- or nickel-plated steel or stainless-steel strips for battery terminal contacts. Terminals made of gold-plated phosphor bronze will ensure contact with long-term stability.
- Y-shaped terminals (double contacts) for both the anode and cathode offer very stable contact (Fig. 4).
  Each contact on the Y-shaped terminals requires a minimum contact pressure of 2-10N {approximately 200～1000gf} (Fig. 5).
- To guard against momentary contact failures of a few milliseconds in duration, use the tantalum capacitor-diode-resistor circuit shown in Fig. 6.

* Do not touch the contact surfaces of the battery with bare hands. as this will increase the contact resistance and impair proper contact.

Figures 1 through 6 show examples of how to ensure proper battery contact.

Fig-1 (Soldered)

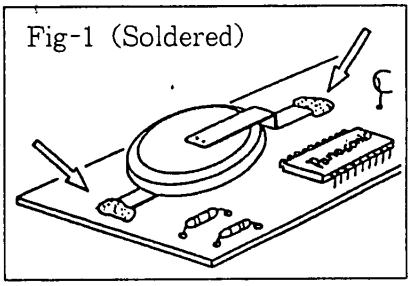


Fig-2

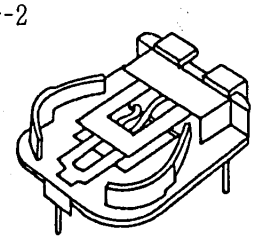


Fig-3

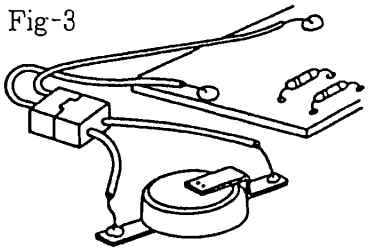


Fig-4

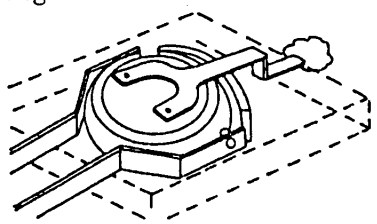


Fig-5 (Contact pressure)

2～10N

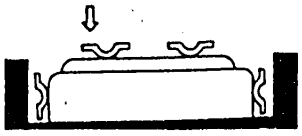
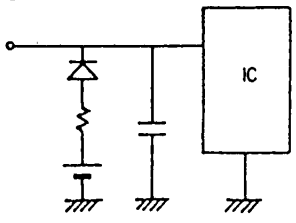


Fig-6



For more information, please make contact with your local dealer.

UN38.3 试验概要
UN38.3 Test Summary

812200500567080

单位信息 Company information	
委托单位 Consignor	松下新能源株式会社 Panasonic Energy Co., Ltd. 日本大阪府守口市松下町 1 番 1 号 1-1 Matsushita-cho, Moriguchi-shi, Osaka, Japan 021-3855-2331 zhuwenjun@cn.panasonic.com /
生产单位 Manufacturer	Panasonic Gobel Energy Indonesia PT. Panasonic Gobel Energy Indonesia PT. JI. Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat - Indonesia JI. Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat - Indonesia 021-38552000 sunyongze@cn.panasonic.com /
测试单位 Test lab	松下新能源株式会社 Panasonic Energy Co., Ltd. 日本大阪府守口市松下町 1 番 1 号 1-1 Matsushita-cho, Moriguchi-shi, Osaka, Japan 021-3855-2331 zhuwenjun@cn.panasonic.com /

电池信息 Battery information			
名称 Name	锂电池	品牌 Brand	/
型号 Type	CR2016	原始测试型号 Original tested type	/
标称电压(V) Nominal voltage	3	容量/能量 Capacity/energy	90mAh
描述 Description	不可充电锂金属电池芯 Primary Li-metal cell	锂含量(g) Li content	0.03
质量(kg) Mass	0.00162	外观 Appearance	银色钮扣状金属外壳 Silvery button metal shell

测试信息 Test information			
原报告编号 Original test report No.	CP0001-7	测试报告日期 Date of test report	2020-10-09
测试标准 Test standard	联合国《关于危险货物运输的建议书试验和标准手册》第 38.3 章 UNITEDNATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria 38.3		ST/SG/AC.10/11/Rev.6/Amend.1
T.1 高度模拟 Altitude simulation	合格 Passed	T.2 温度测试 Thermal test	合格 Passed
T.3 振动测试 Vibration	合格 Passed	T.4 冲击测试 Shock	合格 Passed
T.5 外部短路 External short circuit	合格 Passed	T.6 挤压 Crush	合格 Passed
T.7 过度充电 Overcharge	/	T.8 强制放电 Forced discharge	合格 Passed
38.3.3 (f)	/	38.3.3 (g)	/

UN38.3 试验概要
UN38.3 Test Summary

812200500567080

样品图片 Sample Picture


结论 Conclusion	测试样品符合联合国《关于危险货物运输的建议书试验和标准手册》ST/SG/AC.10/11/Rev.6/Amend.1 38.3 标准要求。The tested samples meet the requirements of test items of the UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11/Rev.6/Amend.1 38.3		
备注 Remark	/		
签名 Signature 职务 Title	王寅 副总工程师 Vice chief engineer	签发日期 Issued date	2022-11-24

-验证码:466042-

报告结束

REGULATION (EU) 2023/1542
Article 6 : Restrictions on substances
Conformity Assessment Report

1. Product Information

Name of product	Manganese Dioxide Primary Lithium Coin Batteries
Category of battery	☐ Starting, lighting and ignition battery (SLI) ☐ Electric vehicle battery (EV) ☐ Light means of transport battery (LMT) ☑ Industrial battery ☑ Portable battery
Model number	CR1025, CR1216, CR1220, CR1616, CR1620 CR1632, CR2012, CR2016, CR2025, CR2032 CR2330, CR2354, CR2412, CR2430, CR2450 CR2477, CR3032

2. Subjected regulation and directive

The following regulations and directives are subject to Article 6: Substance Restrictions of REGULATION (EU) 2023/1542.

- Annex XVII to Regulation (EC) No 1907/2006
- Article 4(2), point (a), of Directive 2000/53/EC
- Annex I to REGULATION (EU) 2023/1542

3. Compatibility confirmation method

Since harmonized standards are specified in neither Article 6 nor Annex 1 of REGULATION (EU) 2023/1542, we use EN IEC 63000:2018 as a reference standard.

Confirmed by any of the following three methods.

- Supplier declarations: Non-use Warranty Certificates.
- Material declarations by supplier: List of specific substance content and identifying any exemptions.
- Analytical test results: Test data obtained by high-precision analysis (quantitative analysis) of product parts. Test data related to Hg, Cd, Pb, and Cr(VI) are applicable.

4. Conformity Assessment Result

We have confirmed that all parts of these battery products do not contain restricted substances by the applicable regulations.

Target regulation	Restricted substances	Target category	Threshold	Result
Annex XVII to Regulation (EC) No 1907/2006	Annex XVII Restricted substances	All batteries	Restriction conditions are set for each entry number.	☑ Pass ☐ Fail
Article 4(2), point (a), of Directive 2000/53/EC	Hg	Batteries subject to ELV Directive	0.1% per homogeneous material	☐ Pass ☐ Fail ☑ Not applicable
	Cd		0.01% per homogeneous material	☐ Pass ☐ Fail ☑ Not applicable
	Pb		0.1% per homogeneous material	☐ Pass ☐ Fail ☑ Not applicable
	Cr (VI)		0.1% per homogeneous material	☐ Pass ☐ Fail ☑ Not applicable
Annex I to REGULATION (EU) 2023/1542	Hg	All batteries	0.0005% per battery weight	☑ Pass ☐ Fail
	Cd	Portable Battery	0.002% per battery weight	☑ Pass ☐ Fail ☐ Not applicable
	Pb ※1	Portable Battery	0.01% per battery weight	☑ Pass ☐ Fail ☐ Not applicable

※1 : Regulations for zinc-air button batteries will start from August 2028.

Note : This document provides the conformity assessment results of restrictions on substances. It does not indicate that the covered product is suitable for use in the battery category of the regulation.

Date: March 7, 2024

Signature: Approved and Signed by Manabu Nara

Printed Name / Title Manabu Nara / General Manager
Quality Administration Department
Energy Device Business Division
Panasonic Energy Co., Ltd.