

This product is a consumer product which 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 Corporation Automotive & Industrial Systems Company
 Address : 1-1 Matsushita-cho, Moriguchi-city, Osaka, 570-8511, Japan
 Telephone +81-6-6994-4560
 Division : Energy Device Business Division
 Department : Engineering Department
 Emergency Contact : Outside the United States +1-703-527-3887
 (call CHMTREC) in the United States 1-800-424-9300

2 Hazards identification

GHS Classification : Not 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 No.	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
	Organic electrolyte	-	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	CR1612	0.01	CR2012	0.02	CR2412	0.03
		CR1616	0.02	CR2016	0.03	CR2450	0.18
CR1216	0.008	CR1620	0.02	CR2025	0.05	CR2477	0.29
CR1220	0.01	CR1632	0.04	CR2032	0.07		
						CR3032	0.15
				CR2330	0.08		
				CR2354	0.17		

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 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. Get medical treatment immediately.

5 Firefighting measures

- Fire extinguishing agent : Alcohol-resistant foam and dry sand are effective.
- Extinguishing method : Since vapor, generated from burning batteries may make eyes, nose and throat irritates, be sure to extinguish the fire on the windward side. 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 : Self-Contained Breathing Apparatus for organic gases
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 (in case of electrolyte leakage from the battery)

Acute toxicity	:	Oral(rat) LD50 > 2000mg/kg (estimated)
Irritation	:	Irritating to eye 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. 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

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.

Proper shipping name : Lithium metal batteries

UN Number, UN Class : UN3090, Class9 (for the Air transport by PI968 Section IA or IB)
: Exemption (for the Marine transport and the Air transport by Section II of PI 968, 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 0.3g ;
2. each cell is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part , sub-section 38.3.
3. each cell is manufactured in ISO9001 certified factory.

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 A	Cells, Cargo Aircraft only; Net quantity per package Max. 35kg
		PI 968 Section B	Cells, Cargo Aircraft only; net quantity per package Max. 2.5kg
		PI 968 Section	Cells, Cargo Aircraft only, not more than one package in any single consignment; net quantity per package Max. 2.5kg
		PI 969 Section	Cells packed with equipment
		PI 970 Section	Cells contained in equipment, button cell batteries
Marine transport	IMDG Code	SP 188	

15. Regulatory information

- IATA Dangerous Goods Regulations 59th Edition (IATA DGR)
- IMO International Maritime Dangerous Goods Code 2016 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)
- Regulation (EC) No. 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- State of California Regulations - Best management practices for Perchlorate Materials

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.

Document No. SDS-CR-001-E

Safety Data Sheet

Note : SDS is not applicable to the products hermetically sealed. Under normal conditions of use, the battery is contained in a hermetically-sealed case, therefore the information herein contained is provided for your information only.

The information and recommendations set forth herein are made in good faith and are believed to be accurate as of the date of preparation. However, Tohoku Murata Manufacturing Co., Ltd. MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM RELIANCE ON.

1. Product and company Identification

Product Name	Coin manganese dioxide lithium batteries
Model Name	CR1216%, CR1220%, CR1616%, CR1620%, CR1632%, CR2016%, CR2025%, CR2032%, CR2430%, CR2450%, CR2477% CR2032W%, CR2050S%, CR2050W%, CR2450S%, CR2450W%, CR2477W% CR2032X%, CR2450X%, CR2477X%, CR3677X% CR2032R%, CR2450R%
Brand	muRata
Company Name	Tohoku Murata Manufacturing Co., Ltd.
Company Address	1-1 Shimosugishita, Takakura, Hiwada-machi, Koriyama-shi, Fukushima 963-0531 JAPAN
Information Telephone	Japan +81 24 955 7834 FAX +81 24 958 5827
Emergency Telephone	Japan +81 24 958 3811 Tohoku Murata Manufacturing Co., Ltd.
Effective Date	January 1, 2019
Issued Department	Product Department 4 , Energy Device Division , Module Business Unit Tohoku Murata Manufacturing Co., Ltd.

The model name attached % means that valid for all models which the singular/plural digits of alphanumeric or marks (including a space) attached after the model name.

2. Hazard identification

The important hazards and adverse effects of the chemical product	No information available	
Chemical product- specific hazards	No information available	
Outline of an anticipated emergency	Hazard	Coin manganese dioxide lithium batteries contain flammable materials such as organic solvent and metallic lithium. If battery was disposed in fire, or battery temperature exceeded 100°C, explosion or ignition of the battery may be caused. When short-circuit is caused by jumbling the batteries, explosion or ignition may be caused due to heat generation.
	Toxicity	When battery is burned, generated vapor may cause eyes, skin and respiratory irritation.

3. Composition/information on ingredients

Portion	Ingredient	CAS No.	Content ratio wt%
Cathode	Manganese Dioxide	1313-13-9	20~40 wt%
Anode	Metallic Lithium	7439-93-2	1~3 wt% (Li < 0.3g *)
Electrolyte	Dimethoxyethane	110-71-4	1~6 wt%
	Propylene Carbonate	108-32-7	2~9wt%
	Lithium Perchlorate	7791-03-9	0.3~0.9wt%
	Acid Phthalic Anhydride	85-44-9	0~0.1wt%
Others	Heavy metal such as Mercury, Cadmium and Lead are not added in the battery.		

* CR3677X%: Metallic Lithium weight exceeds 0.3g to 1g or less.

4. First aid measures

Swallowing	Ingestion of a battery can be harmful. Contents of an opened battery can cause serious chemical burns of mouth, esophagus and gastrointestinal tract. In either case, do not induce vomiting nor give food or drink. Seek medical attention immediately.
Skin Contact	Contents of an opened battery can cause skin irritation. Wash skin with soap and water. If inflammation was caused on the skin, seek the medical attention.
Eye Contact	Contents of an opened battery can cause eye irritation. Immediately flush eyes thoroughly with water for several minutes. Seek medical attention.
Inhalation	Contents of an opened battery can cause respiratory irritation. Provide fresh air and call a doctor.

5. Fire fighting measures

Extinguishing Media	Powder, Carbon dioxide and Dry sand. Metallic Lithium contained in a battery reacts with water strongly, as a result, generates hydrogen gas. Extinguishing by water may cause explosion.
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6. Accidental release measures (In the case that electrolyte is leaked from battery.)

Personal precautions	Temporary inhalation of odor and attaching of electrolyte to skin does not cause serious health hazard. Be sure the ventilation and washing out of electrolyte quickly.
Environmental precautions	Wipe off with dry cloth and keep away from fire.

7. Precautions for safe handling and use

Handling	<p>Since improper battery handling may cause leakage, overheating or explosion of the battery, the following precautions shall be observed.</p> <p>(1) Keep batteries away from children. Swallowing a battery can cause chemical burn or penetration of the mucous membrane tissue, in the worst case, may result in death. If infant happens to swallow a battery, seek medical attention immediately to take it out.</p> <p>(2) Do not short.</p> <p>(3) Insert batteries with positive (+) and negative (-) terminals correctly oriented.</p> <p>(4) Do not mix different type batteries or mix new and old ones together.</p> <p>(5) Do not directly heat, solder or throw into fire.</p> <p>(6) Do not modify, deform or disassemble the battery.</p> <p>(7) Do not have children replace batteries unsupervised by adults.</p> <p>(8) In case of swallowed battery, seek medical attention immediately.</p> <p>(9) This battery is not designed for recharging. To do so can cause leakage or explosion.</p>
Storage	<p>Store in a cool, well-ventilated area. Do not store batteries at high-temperatures or high-humidity. Proper storage temperature is +10°C~+25°C. It is preferable not to exceed +30°C. Avoid extremely higher or lower humidity (95% or more, 40% or less). Elevated temperature can result in shortened battery life. Avoid exposure to sunlight to prevent performance deterioration, swelling or leakage. Since short circuit can cause burn hazard and leak or explode hazard, do not batteries jumbled in bulk containers. Avoid to contact water, metallic chain or metallic chip which may result in short-circuit.</p>

8. Exposure controls/personal protection

N/A

9. Physical and chemical properties

Condition	Solid
Appearance	Coin Shape
Nominal voltage	3 V

10. Stability and reactivity

Stability : Stable under normal conditions of use.
 Condition to avoid : See Section 7.

11. Toxicological information

Under normal conditions of use, there is no risk to life and health, because ingredients of battery is hermetical sealed with metal case.

12. Ecological information

When exhausted battery is buried in the ground, it is confirmed that outflow of metal contained in the battery has been seldom found. But we have no ecological information.

13. Disposal considerations

When battery is disposed, isolate positive (+) and negative (-) terminals of the battery to avoid those terminals touch each other.
 Batteries may be short-circuited when piled up or mixed the batteries in disorder.
 Dispose in accordance with applicable federal, state and local regulations

14. Transport information

UN Dangerous Goods List

UN No.	Name and Description	Class or division	Special provision	Packing instruction
3090	LITHIUM METAL BATTERIES	9	188 230 310 376 377 384	P903 P908 P909 P910

【Sea transportation】

All lithium metal cells shipping from Tohoku Murata Manufacturing Co., Ltd. and their packing condition conform to the following regulations and meet the requirements, therefore they can be shipped as exemption from Class 9 Dangerous goods.

Outline of IMO-IMDG Code 2018SP188

- For a lithium metal cell, the lithium content is not more than 1g.
- Each cell is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria 6th revised edition, Part III, subsection 38.3.
- Cells shall be packed in inner packagings that completely enclose the cell.
- Each package shall be capable of withstanding a 1.2m drop test in any orientation without damage to cells contained therein, without shifting of the contents so as to allow battery to battery contact and without release of contents.
- Package shall not exceed 30kg gross mass.
- The specified information shall be indicated on each package.
- Each cell shall be manufactured under quality program specified by the United Nations.

【Air transportation】

For air transportation, it is necessary to comply with IATA DGR 60th Edition (Dangerous Goods Regulations, 60th Edition)

Dangerous Goods List on IATA DGR

UN No.	Proper Shipping Name/Description	Class or division	Packing Instruction	Passenger Aircraft	Cargo Aircraft	S.P.
3090	LITHIUM METAL BATTERIES	9	PI968 (Section IA)	Forbidden	Max Net Qty /Package 35kg	A88 A99 A154 A164 A183 A201 A206
			PI968 (Section IB)	Forbidden	Max Net Qty /Package 2.5 kg	
			PI968 (Section II)	Forbidden	Max Net Qty /Package 2.5 kg & Single package for single consignment	

※As all of MuRata Coin manganese dioxide lithium batteries contain lithium metals less than 1.0g, Packing Instruction 969/970 can be applicable to the products that muRata Coin manganese dioxide lithium batteries are assembled into. The equipment is excluded from dangerous goods regulation.

When our cell or battery is contained in equipment or packed with equipment, it is classified into UN3091.

※For the details of indication on package and document required for transportation, please refer to IATA DGR 60th Edition (Dangerous Goods Regulations, 60th Edition).

*Related regulation, Issued documents

- International Air Transport Association (IATA): Dangerous Goods Regulations, 60th Edition
- International Civil Aviation Organization (ICAO): Technical Instructions for the Safe Transport of Dangerous Goods by Air, 2019-2020 Edition
- International Maritime Organization (IMO): International Maritime Dangerous Goods (IMDG) Code, 2018 Edition
- U.S. Department of Transportation (DOT) 49 CFR
- UN(SP188) : UN(United Nations): Recommendations on the Transport of Dangerous Goods: Model Regulations 19th revised edition

15. Regulatory information

- EU Directive 2006/66/EC and 2013/56/EU
- CA Lithium Perchlorate Regulation

16. Other information

If you need further information, please contact your local sales representative.