

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 Product and Company Identification

Name of Product : Manganese lithium rechargeable battery (ML Series)  
Name of Company : Panasonic Corporation, Automotive & Industrial Systems Company  
Address : 1-1 Matsushita-cho, Moriguchi City, Osaka, 570-8511, Japan  
Division : Energy Device Business Division  
Department : Engineering Department  
Telephone number : +81-6-6994-4537

### 2 Hazards Identification

GHS Classification : Not applicable

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.

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

### 3 Composition/Information of Ingredients

| Component                          | Material                | CAS No.              | Content    |
|------------------------------------|-------------------------|----------------------|------------|
| Positive electrode                 | Lithium manganese oxide | 12057-17-9           | 9 ~ 28wt%  |
| Negative electrode                 | Lithium                 | 7439-93-2            | 0.4 ~ 3wt% |
|                                    | Aluminum                | 7440-32-6            | 2 ~ 11wt%  |
| Electrolyte                        | 1,2-dimethoxyethane     | 110-71-4             | 1 ~ 4wt%   |
|                                    | Organic electrolyte     | -                    | 3 ~ 11wt%  |
| Others<br>(Steel or Plastic parts) | Steel                   | 7439-89-6, 7440-47-3 | 60 ~ 85wt% |
|                                    | Polypropylene           | 9003-07-0            | 1 ~ 15wt%  |

#### Lithium content per cell

| Model Number | Lithium content(g) | Model Number | Lithium content(g) | Model Number | Lithium content(g) | Model Number | Lithium content(g) |
|--------------|--------------------|--------------|--------------------|--------------|--------------------|--------------|--------------------|
| ML414        | 0.0004             | ML614        | 0.001              | ML920        | 0.004              | ML2020       | 0.02               |
| ML421        | 0.0008             | ML621        | 0.002              | ML1220       | 0.006              |              |                    |
|              |                    |              |                    |              |                    |              |                    |

## 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. 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 Fire Fighting Measures

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

## 6 Accidental Release Measures (in case of electrolyte leakage from the battery)

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

## 7 Handling and Storage

- I 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.
- I Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation.
- I Do not mix different type of batteries.
- I Do not solder directly onto batteries.
- I Do not let water penetrate into packaging boxes during their storage and transportation.
- I Do not store the battery in places of the high temperature or under direct sunlight.
- I 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 (in case of electrolyte leakage from the battery)

- Acceptable concentration : Not specified in ACGIH.  
Facilities : Provide appropriate ventilation system such as local ventilator in the storage place.  
Protective clothing : Self-Contained Breathing Apparatus for organic gases, safety goggle, and safety glove.

## 9 Physical and Chemical Properties

- Appearance : Coin shape  
Voltage : 3 volts

## 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 = 200 ~ 2,000mg/kg (estimated)  
Irritation : Irritating to eye and skin.  
Mutagenicity : Not specified.  
Chronic toxicity : Not specified.

## 12 Ecological Information

In case the worn-out battery is disposed of on land, the battery case may corrode and leak electrolyte.

## 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.

UN Number : Even though the cells are classified as lithium metal batteries (UN3090 or 3091), they are exempted from Dangerous Goods 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.

Proper shipping Name : Lithium metal batteries

UN Class : Not Applicable

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<br>(Reference number) | Special provision               | Note                          |
|------------------|---------------------------------|---------------------------------|-------------------------------|
| Air transport    | IATA (2)                        | Packing Instruction 968 Section | Cells, on Cargo Aircraft Only |
|                  |                                 | Packing Instruction 969 Section | Cells packed with equipment   |
|                  |                                 | Packing Instruction 970 Section | Cells contained in equipment  |
| Marine transport | IMDG (3)                        | Special provision 188           |                               |

**15 Regulatory Information**

IATA Dangerous Goods Regulations

ICAO Technical Instructions for the safe transport of dangerous goods by air

**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.

References

- (1) UN Recommendations on the Transportation of Dangerous Goods, Model Regulations
- (2) IATA Dangerous Goods Regulations 57th Edition ( 2016 )
- (3) IMO International Maritime Dangerous Goods Code 2014 Edition
- (4) UN Recommendations on the Transportation of Dangerous Goods, Manual of Tests and Criteria

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