



### Features & Benefits

- Superior long term reliability
- High current pulse discharge capability
- Wide operating temperature (-40°C to 70°C)
- High safety and energy density

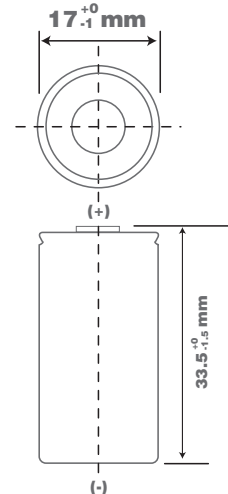
### Specifications

**Capacity:** 1600 mAh Typical

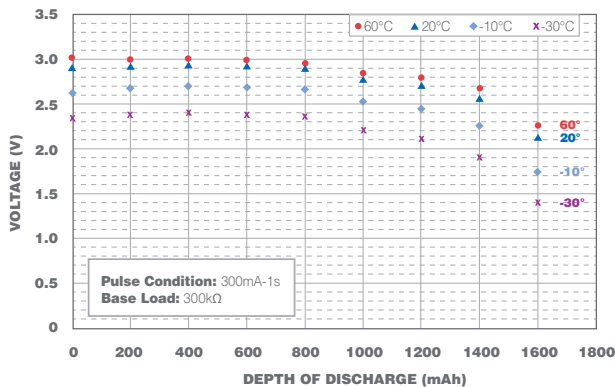
**Nominal Voltage:** 3V

**Weight:** Approximately 17g

### Dimensions

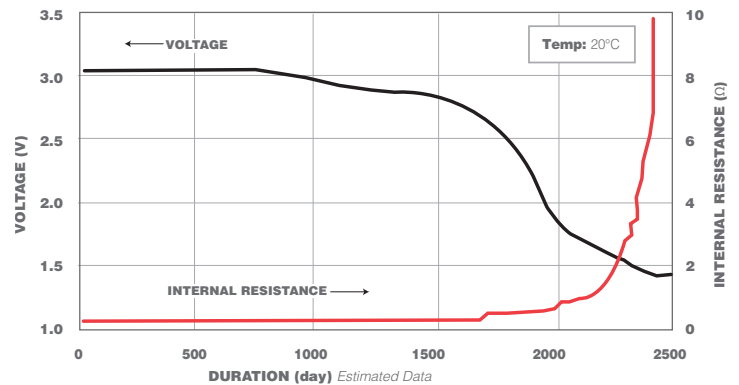


### Pulse Discharge Characteristics

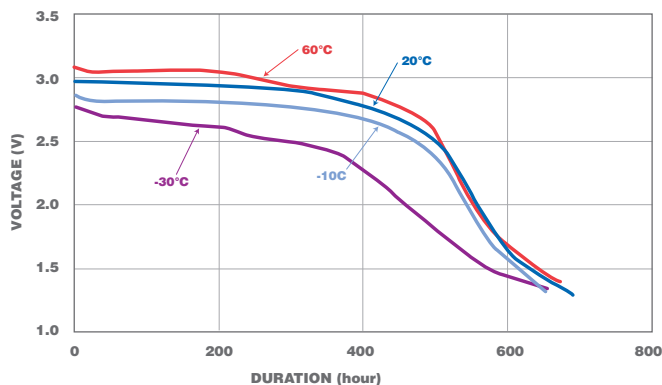


DISCHARGE CURVES (1kohm)

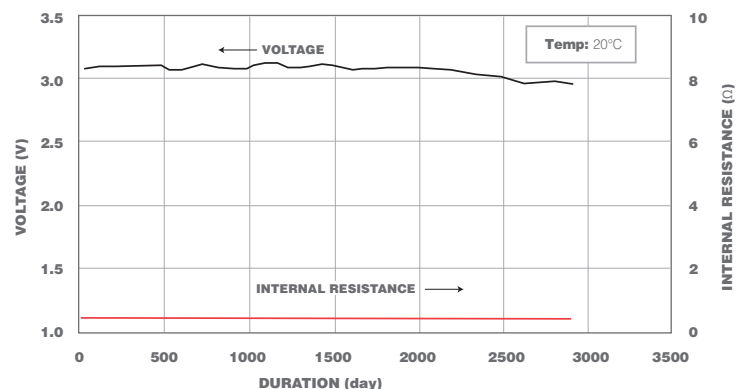
### Long Term Discharge 100kΩ (without wake-up pulse)



### Discharge Curves (1kohm)



### Long Term Discharge 300kΩ (without wake-up pulse)



The data in this document is for descriptive purposes only and is not intended to make or imply any guarantee or warranty.



## Features & Benefits

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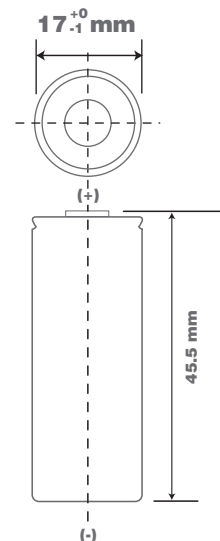
## Specifications

**Capacity:** 2400 mAh Typical

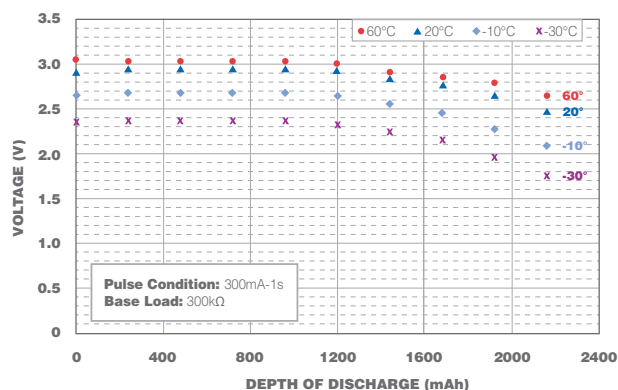
**Nominal Voltage:** 3V

**Weight:** Approximately 22g

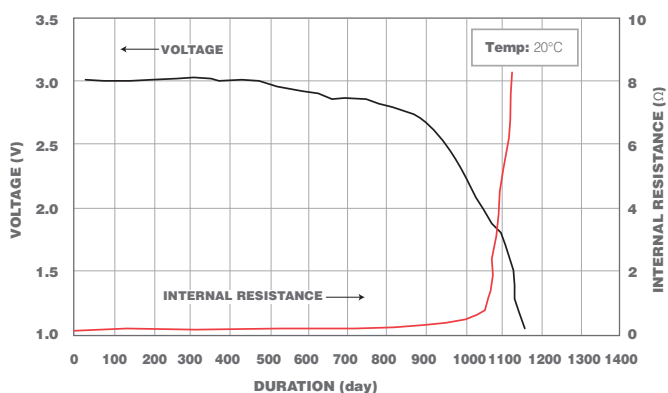
## Dimensions



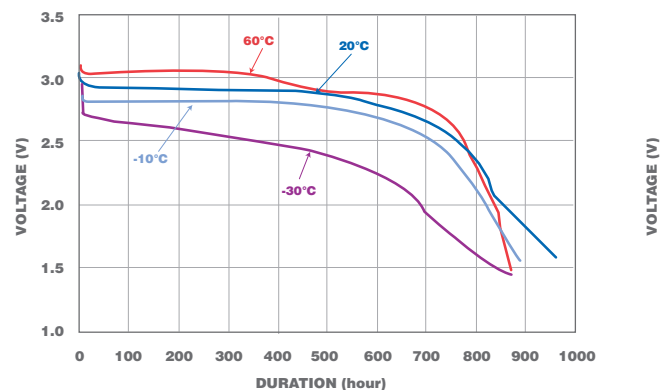
## Pulse Discharge Characteristics



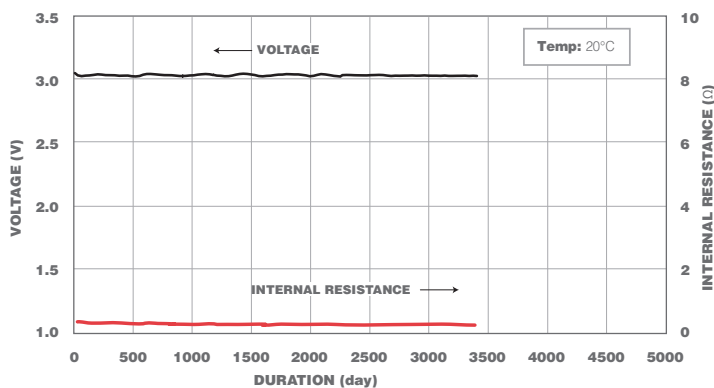
## Long Term Discharge 30kΩ (without wake-up pulse)



## Discharge Curves (1kohm)



## Long Term Discharge 300kΩ (without wake-up pulse)

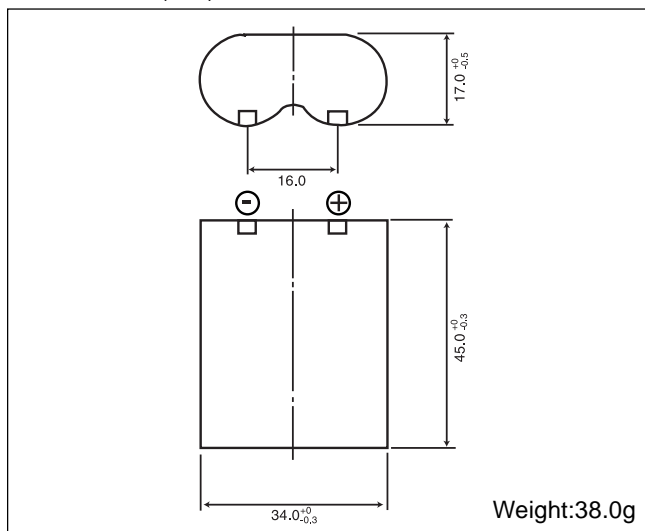


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# Manganese Dioxide Lithium Cylindrical Batteries: Individual Specifications

## 2CR5

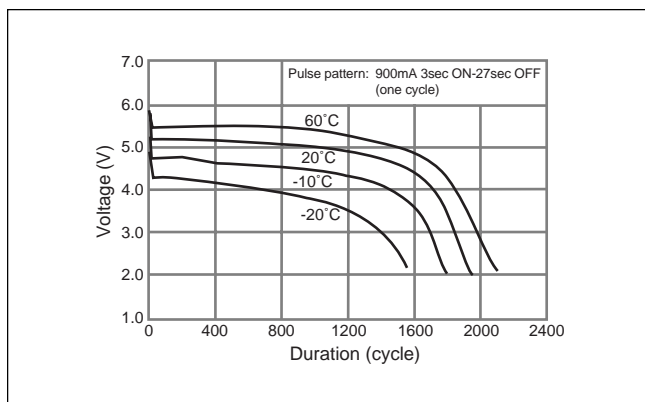
### ■ Dimensions(mm)



### ■ Specification

Nominal voltage (V)	6
Nominal capacity (mAh)	1,400
Continuous standard load (mA)	20
Operating temperature (C)	-40 ~ +70*

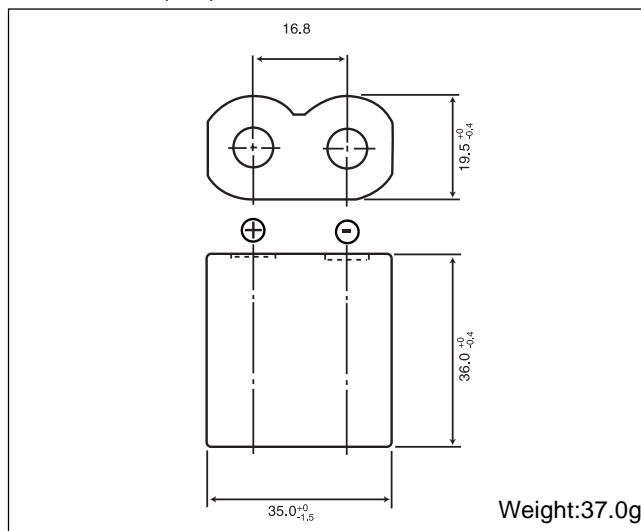
### ■ Temperature Characteristics



\* Please consult Panasonic for use below and above -20°C to +60°C

## CR-P2

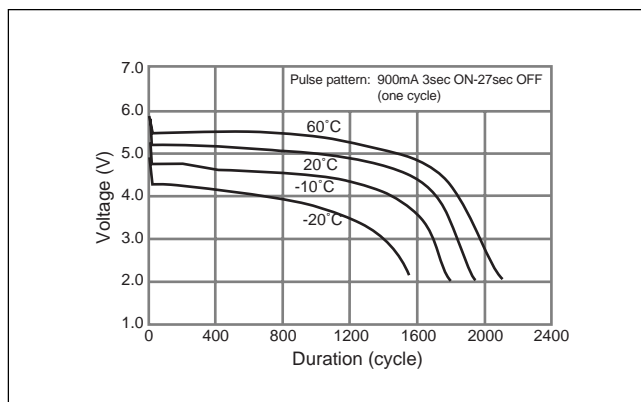
### ■ Dimensions(mm)



### ■ Specification

Nominal voltage (V)	6
Nominal capacity (mAh)	1,400
Continuous standard load (mA)	20
Operating temperature (C)	-40 ~ +70*

### ■ Temperature Characteristics

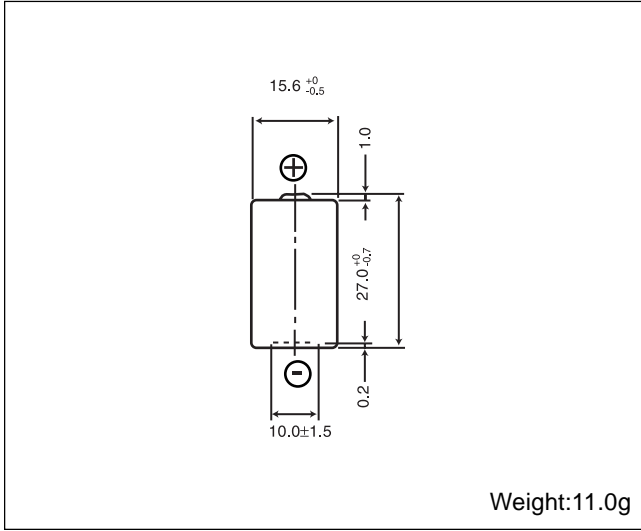


\* Please consult Panasonic for use below and above -20°C to +60°C

# Manganese Dioxide Lithium Cylindrical Batteries: Individual Specifications

## CR2

### ■ Dimensions(mm)

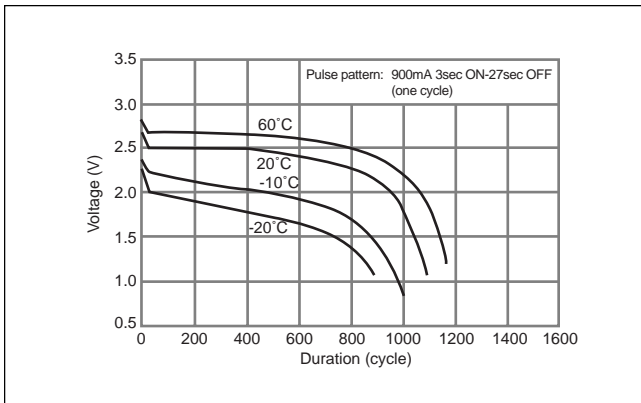


### ■ Specification

Nominal voltage (V)	3
Nominal capacity (mAh)	850
Continuous standard load (mA)	20
Operating temperature (C)	-40 ~ +70*

\* Please consult Panasonic for use below and above -20°C to +60°C

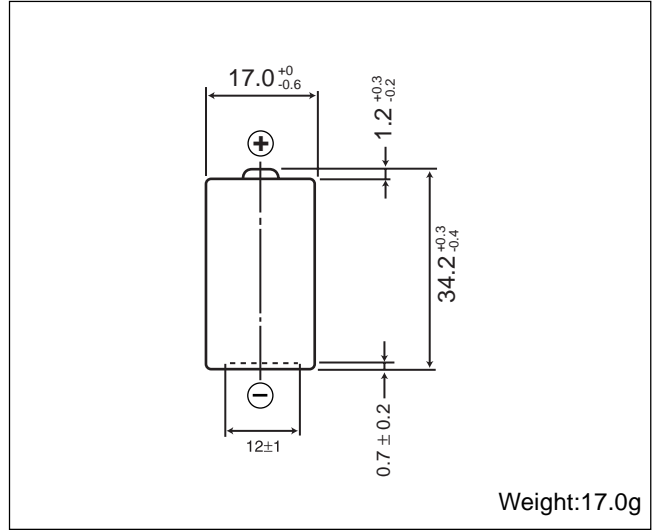
### ■ Temperature Characteristics



\* Please consult Panasonic for use below and above -20°C to +60°C

## CR123A

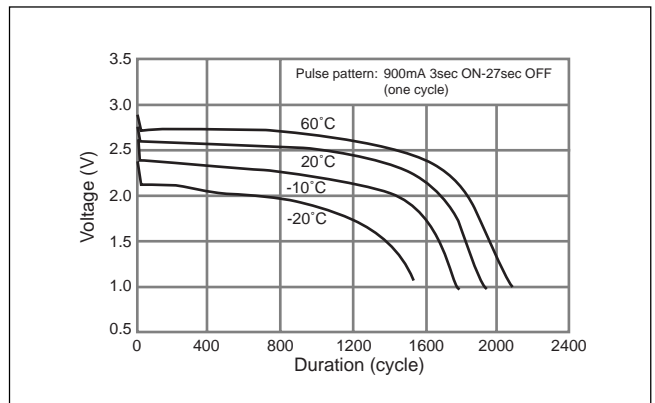
### ■ Dimensions(mm)



### ■ Specification

Nominal voltage (V)	3
Nominal capacity (mAh)	1,550
Continuous standard load (mA)	20
Operating temperature (C)	-40 ~ +70*

### ■ Temperature Characteristics

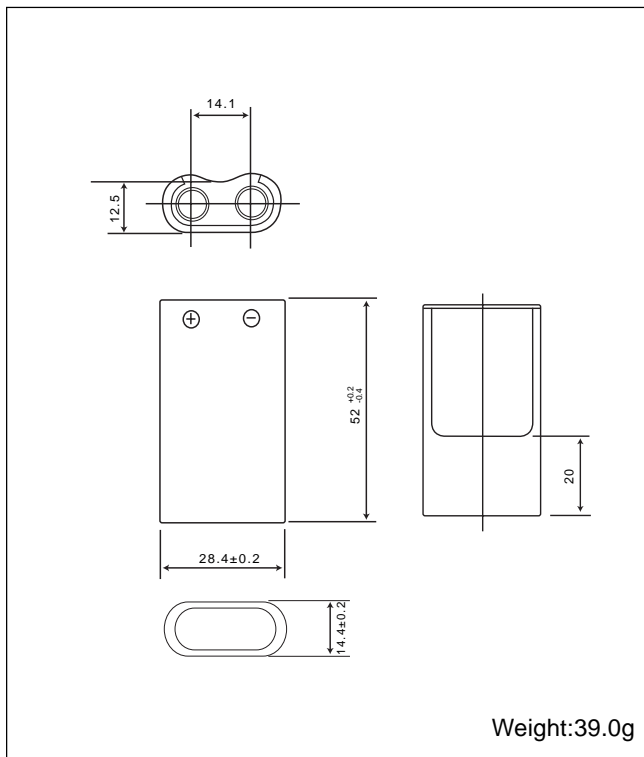


\* Please consult Panasonic for use below and above -20°C to +60°C

# Manganese Dioxide Lithium Cylindrical Batteries: Individual Specifications

## CR-V3p

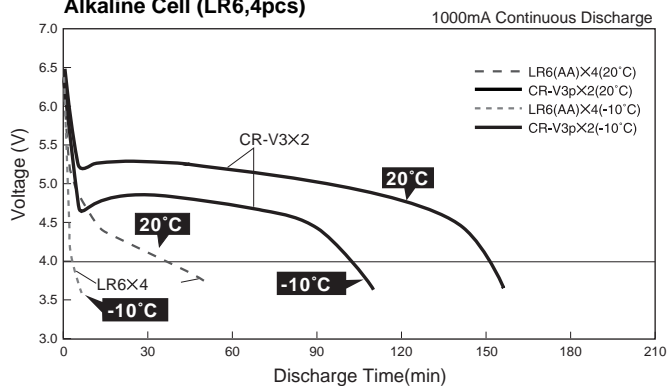
### ■ Dimensions(mm)



### ■ Specification

Nominal voltage (V)	3
Nominal capacity (mAh)	3,000
Continuous standard load (mA)	200
Operating temperature (C)	-40 ~ +70°

### Discharge Characteristics of CR-V3p(2pc)and"AA" Alkaline Cell (LR6,4pcs)



\* Please consult Panasonic for use below and above -20°C to +60°C

# Product Information Sheet

## Panasonic Batteries

Panasonic Industrial Company  
A Division Panasonic Corporation of North America  
5201 Tollview Drive, 1F-3  
Rolling Meadows, IL 60008  
Toll Free: 877-726-2228  
Fax: 847-637-4660  
Internet: [www.panasonic.com/industrial/batteries-oem](http://www.panasonic.com/industrial/batteries-oem)  
e-mail: [oembatteries@panasonic.com](mailto:oembatteries@panasonic.com)

**Product:** Manganese Dioxide (CR Type) Lithium Batteries  
**Applicable models/sizes:** All CR type cylindrical and coin batteries

**Revision:** January 1, 2014

**The batteries referenced herein are exempt articles and are not subject to the OSHA Hazard Communication Standard requirement. This sheet is provided as a service to our customers.**

## MSDS

Material Safety Data Sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article". OSHA has defined "article" as a manufactured item other than a fluid or particle; (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

*Because all of our batteries are defined as "articles", they are exempt from the requirements of the Hazard Communication Standard; hence a MSDS is not required.*

**The following components are found in a Panasonic Manganese Dioxide (CR) Lithium battery:**

Cylindrical Cell Components	Material	Formula	CAS #
Positive Electrode	Manganese Dioxide	MnO <sub>2</sub>	1313-13-9
Negative Electrode	Lithium	Li	7439-93-2
Electrolyte	Propylene Carbonate-Solvent	C <sub>4</sub> H <sub>6</sub> O <sub>3</sub>	108-32-7
	1,2 Dimethoxyethane-Solvent	C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>	110-71-4
	Lithium Triflate-Salt	CF <sub>3</sub> SO <sub>3</sub> Li	33454-82-9
Coin Cell Components	Material	Formula	CAS #
Positive Electrode	Manganese Dioxide	MnO <sub>2</sub>	1313-13-9
Negative Electrode	Lithium	Li	7439-93-2
Electrolyte	Propylene Carbonate-Solvent	C <sub>4</sub> H <sub>6</sub> O <sub>3</sub>	108-32-7
	1,2 Dimethoxyethane-Solvent	C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>	110-71-4
	Lithium Perchlorate-Salt	LiClO <sub>4</sub>	7791-03-9

Lithium Triflate is Lithium Trifluoromethanesulfonate.

## DISPOSAL

Lithium batteries are neither specifically listed nor exempted from the Federal Environmental Protection Agency (EPA) hazardous waste regulations as promulgated by the Resource Conservation and Recovery Act (RCRA). The only metal of possible concern in a lithium battery is lithium that is not a listed or characteristic toxic hazardous waste. Waste lithium batteries can be considered a reactive hazardous waste if there is a significant amount of unreacted, or unconsumed lithium remaining in the spent battery. The key to disposing of a lithium battery as a non-hazardous waste is to guarantee that it is fully or mostly discharged. Once it is discharged it can be disposed of as non-hazardous waste. You can dispose of a fully charged or partially discharged lithium battery as a hazardous waste after they are first neutralized through an approved secondary treatment. The need for a secondary treatment prior to disposal is a requirement of the U.S. Land Ban Restrictions of the Hazardous and Solid Waste Amendments of 1984. A secondary treatment center can only receive these batteries as manifested hazardous waste. The waste code for charged lithium

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batteries is D003, reactive. **In either case, button cell batteries contain so little lithium that they never qualify as a reactive hazardous waste. These batteries are safe for disposal in the normal municipal waste stream.**

Disposal of large quantities of undischarged lithium batteries should be performed by permitted, professional disposal firms knowledgeable in Federal, State and local hazardous materials and hazardous waste transportation and disposal requirements. As always, households are exempt from the RCRA hazardous waste guidelines.

In California, 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 [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)". The effective date for this Perchlorate label was July 1, 2006 for non-consumer products and January 1, 2007 for consumer products.

## **TRANSPORTATION**

All Panasonic lithium batteries are not subject to the requirements of the Department of Transportation (DOT) Subchapter C, Hazardous Materials Regulations if shipped in compliance with 49 CFR 173.185 and Special Provision 188.

Effective January 1, 2014 all Panasonic lithium batteries can be shipped by air in accordance with International Civil Aviation Organization (ICAO), 2013-2014 edition, Section II or Section 1B or International Air Transport Association (IATA) 55th edition, Section II or Section 1B Packing Instructions (PI) 968 (Batteries), PI 969 (Batteries, packed with equipment) and PI 970 (Batteries, contained in equipment) as appropriate

All Panasonic lithium batteries are regulated by the International Maritime Organization (IMO), 2012, 36<sup>th</sup> amendment, under Special Provisions 188 and 230.

All Panasonic lithium cells are tested and comply with the UN Model Regulations, Manual of Test and Criteria, Part III, subsection 38.3..

If you build any of our lithium cells into a battery pack, you must also assure that they are tested in accordance with the UN Model Regulations, Manual of Test and Criteria. Part III, subsection 38.3, 5<sup>th</sup> revised edition, Amendment 1.

The DOT requires that the outside of each package that contains lithium metal batteries, regardless of size or number of batteries, be labeled with the following statement: "**LITHIUM METAL BATTERIES- FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT**". The labeling requirement covers shipments via highway, rail, vessel or cargo-only aircraft and covers all shipments inside, into or out of the US. The label must be in contrasting color and the letters must be 12 mm (0.5 in) in height for packages weighing more than 30 Kg and 6 mm (0.25 in) in height for packages weighting less than 30 Kg.

If you plan on transporting any untested prototype battery packs contact your Panasonic Sales Representative for regulatory information.

## **First Aid**

If you get electrolyte in your eyes, flush with water for 15 minutes without rubbing and immediately contact a physician. If you get electrolyte on your skin wash the area immediately with soap and water. If irritation continues, contact a physician. If a battery is ingested, call the National Capital Poison Center (NCPC) at 202-625-3333 (Collect) or your local poison center immediately. Lithium coin batteries lodged in the esophagus should be removed immediately. Leakage, chemical burns and perforation can occur within hours of ingestion.

## **General Recommendations**

CAUTION: Risk of fire, explosion and burns. Do not recharge, crush, heat above 212<sup>o</sup>F (100<sup>o</sup>C) or incinerate.

## **Fire Safety**

In case of fire, you can use a Class "D" fire extinguisher or other smothering agent such as Lith-X, copper powder or dry sand. If you use water, use enough to smother the fire. Using an insufficient amount of water will only make the fire worse. Cooling the exterior of the batteries will help prevent rupturing. Burning of these batteries will generate toxic and corrosive lithium hydroxide fumes. Fire fighters should use self-contained breathing apparatus. Detailed information on fighting a lithium metal battery fire can be found in Guide 138 (Substances – Water – Reactive) of the US DOT Emergency Response Guide.

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