

4 April 2024

Subject: Safety Data Sheets (SDS) for Lithium Metal Batteries installed in Dukane Seacom DK290-[]

To Whom It May Concern:

Dukane Seacom currently uses lithium metal batteries for the DK290-[]. All batteries have passed testing required by UN38.3 standards. The DK290-[] contains two separate battery packs with each battery pack containing 2 cells.

When transporting the beacons, they should be packaged and shipped in accordance with local regulatory requirements or current IATA regulations if shipping by air. Air Carriers may impose restrictions beyond the IATA requirements. Check with your Air Carrier for any additional requirements.

<b>Dukane Seacom Beacon Part Number:</b>	DK290-[]
<b>Beacon Battery Part Number:</b>	3-115-0503
<b>Number of Cells per Battery:</b>	2
<b>Number of Batteries per Beacon:</b>	2
<b>Total Li Metal Content per Beacon:</b>	1.16 g
<b>Total Battery Weight:</b>	60 g
<b>UN Shipping Information when shipping a DK290-[] unit:</b>	UN3091 PI 970 Section II
<b>UN 38.3 Testing Results:</b>	PASSED

Please refer to additional pages of this document for supplementary safety data sheet specifications and UN38.3 information.

Should you require any additional information, please do not hesitate to contact me at [stancey@rpcaero.com](mailto:stancey@rpcaero.com) or the telephone number listed above.

Sincerely,

*Sean Tancey*

Sean Tancey

Director of Quality

## SECTION 1: IDENTIFICATION

### 1.1. Product Identifier

**Product Form:** Mixture

**Product Name:** 3-115-0503

**Synonyms:** DK290 Battery

**Additional Information:** This pack contains a sealed battery. The battery contains hazardous substances, which under normal conditions of use are not in contact with the user unless the battery is altered or there is a spill, leak, or other emergency. This Safety Data Sheet applies to the hazards of the internal contents of the battery, specifically the hazardous substances encased within it.

### 1.2. Intended Use of the Product

Use for DK290 battery only. For professional use only.

### 1.3. Name, Address, and Telephone of the Responsible Party

#### Company

Dukane Seacom Inc

7135 16th Street East, Suite 101

Sarasota, FL 34243

941-739-3200

[www.dukaneseacom.com](http://www.dukaneseacom.com)

### 1.4. Emergency Telephone Number

**Emergency Number** : 1-800-255-3924 or 1-813-248-0585 (International) (Chemtel)

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the Substance or Mixture

#### GHS-US/CA Classification

PHNOC 1

Water-react. 1 H260

Acute Tox. 4 (Oral) H302

Acute Tox. 4 (Inhalation:dust,mist) H332

Skin Corr. 1B H314

Eye Dam. 1 H318

Repr. 1 H360

STOT RE 1 H372

Full text of hazard classes and H-statements : see section 16

### 2.2. Label Elements

#### GHS-US/CA Labeling

#### Hazard Pictograms (GHS-US/CA)



#### Signal Word (GHS-US/CA)

: Danger

#### Hazard Statements (GHS-US/CA)

: H260 - In contact with water releases flammable gases which may ignite spontaneously.  
H302+H332 - Harmful if swallowed or if inhaled.  
H314 - Causes severe skin burns and eye damage.  
H318 - Causes serious eye damage.  
H360 - May damage fertility or the unborn child.  
H372 - Causes damage to organs (brain, central nervous system) through prolonged or repeated exposure.  
Reacts violently with water.

#### Precautionary Statements (GHS-US/CA)

: P201 - Obtain special instructions before use.  
P202 - Do not handle until all safety precautions have been read and understood.  
P223 - Do not allow contact with water.

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P231+P232 - Handle under inert gas. Protect from moisture.  
P260 - Do not breathe mist, spray, vapors, fume.  
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.  
P270 - Do not eat, drink or smoke when using this product.  
P271 - Use only outdoors or in a well-ventilated area.  
P280 - Wear protective gloves, protective clothing, and eye protection.  
P301+P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.  
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  
P302+P335+P334 - IF ON SKIN: Brush off loose particles from skin. Immerse in cool water or wrap in wet bandages.  
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.  
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P308+P313 - If exposed or concerned: Get medical advice/attention.  
P310 - Immediately call a POISON CENTER or doctor.  
P314 - Get medical advice/attention if you feel unwell.  
P321 - Specific treatment (see section 4 on this SDS).  
P330 - Rinse mouth.  
P363 - Wash contaminated clothing before reuse.  
P370+P378 - In case of fire: Use appropriate media (see section 5) to extinguish.  
P402+P404 - Store in a dry place. Store in a closed container.  
P405 - Store locked up.  
P501 - Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

### 2.3. Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions.

### 2.4. Unknown Acute Toxicity (GHS-US/CA)

No data available

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substance

Not applicable

### 3.2. Mixture

Name	Synonyms	Product Identifier	% *	GHS Ingredient Classification
Iron	Iron, elemental / Direct reduced Iron / Iron, reduced / Elemental iron / IRON POWDER	(CAS-No.) 7439-89-6	< 85	Comb. Dust
Chromium	Chromium metal / Chromium, elemental / Chromium, metal / Chromium, metallic / Chrome, metal / Chrome	(CAS-No.) 7440-47-3	< 85	Comb. Dust
Manganese oxide (MnO <sub>2</sub> )	Manganese dioxide / Black manganese oxide / C.I. Pigment Black 14 / C.I. Pigment Brown 8 / Manganese Black / Manganese(IV) oxide / Pyrolusite Brown / MANGANESE DIOXIDE / Manganese peroxide / C.I. 77728	(CAS-No.) 1313-13-9	12 - 50	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation:dust,mist), H332 STOT RE 1, H372
Polypropylene	1-Propene, homopolymer / Polypropylene wax / POLYPROPYLENE / Polypropyl-1-ene / Polypropylene	(CAS-No.) 9003-07-0	0.5 - 10	Comb. Dust

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	homopolymer / Polypropylene and polypropylene wax			
Propylene carbonate	Carbonic acid cyclic methylethylene ester / Carbonic acid, cyclic propylene ester / Carbonic acid, propylene ester / Cyclic 1,2-propylene carbonate / Cyclic methylethylene carbonate / Cyclic propylene carbonate / 1,3-Dioxolan-2-one, 4-methyl- / 4-Methyl-1,3-dioxolan-2-one / 4-Methyl-1,3-dioxolane-2-one / 4-Methyl-2-oxo-1,3-dioxolane / 1,2-Propanediol carbonate / 1,2-Propanediol cyclic carbonate / 1,2-Propanediyl carbonate / 1,2-Propylene carbonate / Propylene glycol cyclic carbonate / 1,2-Propanediolcyclic carbonate / PROPYLENE CARBONATE / Propylene glycol carbonate	(CAS-No.) 108-32-7	2.5 - 7	Eye Irrit. 2A, H319
Lithium	Metallic lithium / Lithium metal / Lithium, metal	(CAS-No.) 7439-93-2	0.5 - 6	PHNOC 1 Water-react. 1, H260 Skin Corr. 1B, H314 Eye Dam. 1, H318 Comb. Dust
Ethylene glycol dimethyl ether	1,2-Dimethoxyethane / 2,5-Dioxahexane / Ethane, 1,2-dimethoxy- / Glycol dimethyl ether / Glyme / Monoethylene glycol dimethyl ether / Monoglyme / Dimethoxyethane, 1,2- / EGDME / Dimethoxy(1,2-jethane	(CAS-No.) 110-71-4	1.5 - 3.5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 1B, H360
Perchloric acid, lithium salt	Lithium perchlorate / Perchloric acid, lithium salt (1:1)	(CAS-No.) 7791-03-9	0.2 - 0.7	Ox. Sol. 2, H272 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335

Full text of H-phrases: see section 16

\*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of First-aid Measures

**General:** Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

**Inhalation:** For exposure to battery contents: Remove to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician. Get medical advice/attention.

**Skin Contact:** For exposure to battery contents: Immediately remove contaminated clothing. Quickly remove/wipe away as much electrolyte/lithium metal as possible. Rinse cautiously with water for at least 30 minutes. Get immediate medical advice/attention.

**Eye Contact:** For exposure to battery contents: Immediately rinse with water for at least 30 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

**Ingestion:** Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

#### 4.2. Most Important Symptoms and Effects Both Acute and Delayed

**General:** Not expected to present a significant hazard under anticipated conditions of normal use. Exposure to battery contents may result in the following: Causes severe skin burns and eye damage. Harmful if inhaled. Harmful if swallowed. May damage fertility. May damage the unborn child. Causes damage to organs (brain, central nervous system, kidneys) through prolonged or repeated exposure.

**Inhalation:** Exposure to materials housed in battery: May be corrosive to the respiratory tract. Inhalation is likely to cause adverse health effects including but not limited to: irritation, difficulty breathing, and unconsciousness.

**Skin Contact:** Exposure to materials housed in battery: Causes severe irritation which will progress to chemical burns.

**Eye Contact:** Exposure to materials housed in battery: Causes permanent damage to the cornea, iris, or conjunctiva.

**Ingestion:** Exposure to materials housed in battery: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. This material is harmful orally and can cause adverse health effects or death in significant amounts.

**Chronic Symptoms:** Exposure to materials housed in battery: May damage fertility or the unborn child. Causes damage to organs (brain, central nervous system) through prolonged or repeated exposure.

#### 4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand. In case of skin contact, wearing rubber gloves rub 2.5% calcium gluconate gel continuously into the affected area for 1.5 hours or until further medical care is available.

### SECTION 5: FIRE-FIGHTING MEASURES

#### 5.1. Extinguishing Media

**Suitable Extinguishing Media:** Only Class D fire extinguishers should be used on lithium metal battery fires.

**Unsuitable Extinguishing Media:** Lithium metal battery fires will react with all other extinguishing agents other than a Class D extinguisher. Do not use, water spray, fog, carbon dioxide, halogenated, dry chemical, or foam extinguishing agents.

#### 5.2. Special Hazards Arising From the Substance or Mixture

**Fire Hazard:** For exposure to the internal contents of a lithium metal battery: Vigorously reacts with water to produce flammable gases which may ignite spontaneously and cause a fire or explosion. Vapors from a damaged battery may be flammable.

**Explosion Hazard:** Battery may rupture/explode when exposed to excessive heat or fire, if overcharged, short circuited, punctured, or crushed. Reacts vigorously with water to emit flammable gases at a high rate of evolution, which could ignite spontaneously and cause an explosion.

**Reactivity:** Batteries are non-reactive under normal conditions of storage and use. If the internal contents are exposed, lithium metal batteries may react with incompatible materials such as water, acids, bases, oxidizers, and reducing agents and form corrosive, irritating, and harmful fumes and by-products. Lithium metal is highly reactive with water and moisture releasing heat and flammable hydrogen gas.

#### 5.3. Advice for Firefighters

**Precautionary Measures Fire:** Exercise caution when fighting any chemical fire.

**Firefighting Instructions:** Remove containers from fire area if this can be done without risk. In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

**Protection During Firefighting:** Do not enter fire area without proper protective equipment, including respiratory protection.

**Hazardous Combustion Products:** Lithium oxides. Hydrogen Fluoride (HF). Carbon oxides (CO, CO<sub>2</sub>). Chlorates. Hydrogen chloride. Manganese oxides. Nitrogen oxides. Chromium oxides. Metal oxides. Corrosive vapors.

**Other Information:** Batteries may explode in fire. Damaged batteries can result in rapid heating and the release of flammable vapors. This product contains lithium metal batteries. The internal contents of lithium metal batteries are water reactive, use appropriate fire extinguishing agents.

#### 5.4. Reference to Other Sections

Refer to Section 9 for flammability properties.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

#### 6.1. Personal Precautions, Protective Equipment and Emergency Procedures

**General Measures:** Product itself under normal conditions of use is not considered hazardous, for materials housed within product: Do not breathe fume, vapor, gas. Do not get in eyes, on skin, or on clothing. Use only non-sparking tools. Keep away from heat, sparks, open flames, hot surfaces. – No smoking.

##### 6.1.1. For Non-Emergency Personnel

**Protective Equipment:** Use appropriate personal protective equipment (PPE).

**Emergency Procedures:** Evacuate unnecessary personnel.

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### 6.1.2. For Emergency Personnel

**Protective Equipment:** Equip cleanup crew with proper protection.

**Emergency Procedures:** Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area.

### 6.2. Environmental Precautions

Prevent entry to sewers and public waters.

### 6.3. Methods and Materials for Containment and Cleaning Up

**For Containment:** As an immediate precautionary measure, isolate spill or leak area in all directions. Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. Use only non-sparking tools. Ventilate area.

**Methods for Cleaning Up:** If battery is not damaged cleanup spills mechanically, and put into approved container for disposal. If battery is damaged and/or leaking: Clean up spills immediately and dispose of waste safely. Cautiously neutralize spilled liquid. Absorb and/or contain spill with inert material. Recover the product by vacuuming, shoveling or sweeping. Transfer spilled material to a suitable container for disposal. Use only non-sparking tools. Contact competent authorities after a spill.

### 6.4. Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for Safe Handling

**Additional Hazards When Processed:** This product contains primary batteries designed for single use, do not attempt to recharge. Never disassemble a battery pack or bypass any safety device. Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. The acts mentioned here may result in a rupture of the battery and exposure to the internal hazardous contents.

**Precautions for Safe Handling:** Since this product is a sealed battery, normal handling hazards are minimal unless the battery is damaged or the internal contents are exposed. If the battery is damaged: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not breathe vapors, fume, gas. Do not get in eyes, on skin, or on clothing. Keep away from heat, sparks, open flames, hot surfaces. – No smoking. Handle empty containers with care because they may still present a hazard. Use only outdoors or in a well-ventilated area. Protect from moisture. Use appropriate personal protective equipment (PPE).

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety procedures. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

### 7.2. Conditions for Safe Storage, Including Any Incompatibilities

**Technical Measures:** Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.

**Storage Conditions:** Store in a cool, dry place. Keep away from moisture, extremely high or low temperatures, ignition sources, and incompatible materials. Keep container tightly closed. Store locked up/in a secure area. Store in original container or corrosive resistant and/or lined container.

**Incompatible Materials:** Strong acids, strong bases, strong oxidizers. Avoid contact of internal battery components with acids, aldehydes, and carbamate compounds. Water. Nitrates. Powdered metals. Organic compounds.

### 7.3. Specific End Use(s)

Use for DK290 battery only. For professional use only.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), or Canadian provincial governments.

Ethylene glycol dimethyl ether (110-71-4)		
Ontario	OEL TWA (mg/m <sup>3</sup> )	18 mg/m <sup>3</sup>
Ontario	OEL TWA (ppm)	5 ppm
Chromium (7440-47-3)		
USA ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (inhalable particulate matter)
USA OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>

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USA IDLH	US IDLH (mg/m <sup>3</sup> )	250 mg/m <sup>3</sup>
Alberta	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
British Columbia	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (total)
Manitoba	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (inhalable particulate matter)
New Brunswick	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Newfoundland & Labrador	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (inhalable particulate matter)
Nova Scotia	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (inhalable particulate matter)
Nunavut	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (metal)
Nunavut	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (metal)
Northwest Territories	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup> (metal)
Northwest Territories	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (metal)
Ontario	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Prince Edward Island	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup> (inhalable particulate matter)
Québec	VEMP (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Saskatchewan	OEL STEL (mg/m <sup>3</sup> )	1.5 mg/m <sup>3</sup>
Saskatchewan	OEL TWA (mg/m <sup>3</sup> )	0.5 mg/m <sup>3</sup>
Yukon	OEL STEL (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Yukon	OEL TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup>

### 8.2. Exposure Controls

**Appropriate Engineering Controls:** Ensure adequate ventilation, especially in confined areas. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Gas detectors should be used when toxic gases may be released. Proper grounding procedures to avoid static electricity should be followed. Ensure all national/local regulations are observed.

**Personal Protective Equipment:** Not required under normal conditions of use, when handling damaged batteries: Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection. Face shield.



**Materials for Protective Clothing:** Chemically resistant materials and fabrics. Wear fire/flammable resistant/retardant clothing. Corrosion-proof clothing.

**Hand Protection:** Wear protective gloves.

**Eye and Face Protection:** Chemical safety goggles and face shield.

**Skin and Body Protection:** Wear suitable protective clothing.

**Respiratory Protection:** If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

**Environmental Exposure Controls:** Avoid release to the environment.

**Other Information:** When using, do not eat, drink or smoke.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Not available
Odor	: Not available
Odor Threshold	: Not available
pH	: Not available
Evaporation Rate	: Not available
Melting Point	: Not available
Freezing Point	: Not available
Boiling Point	: Not available
Flash Point	: Not available

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Auto-ignition Temperature	: Not available
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not available
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: Not available
Relative Vapor Density at 20°C	: Not available
Relative Density	: Not available
Specific Gravity	: Not available
Solubility	: Not available
Partition Coefficient: N-Octanol/Water	: Not available
Viscosity	: Not available
Lithium Content	: 0.29g
Nominal Voltage	: 3.0V
Nominal Capacity	: 1000 mAh

### SECTION 10: STABILITY AND REACTIVITY

- 10.1. Reactivity:** Batteries are non-reactive under normal conditions of storage and use. If the internal contents are exposed, lithium metal batteries may react with incompatible materials such as water, acids, bases, oxidizers, and reducing agents and form corrosive, irritating, and harmful fumes and by-products. Lithium metal is highly reactive with water and moisture releasing heat and flammable hydrogen gas.
- 10.2. Chemical Stability:** Stable under recommended handling and storage conditions (see section 7).
- 10.3. Possibility of Hazardous Reactions:** Hazardous polymerization will not occur. In contact with water releases flammable gases which may ignite spontaneously.
- 10.4. Conditions to Avoid:** Direct sunlight, extremely high or low temperatures, incompatible materials. Do not heat, expose to fire, disassemble, short circuit, immerse in water, or abuse batteries.
- 10.5. Incompatible Materials:** Strong acids, strong bases, strong oxidizers. Avoid contact of internal battery components with acids, aldehydes, and carbamate compounds. Water. Nitrates. Powdered metals. Organic compounds.
- 10.6. Hazardous Decomposition Products:** Under normal conditions of storage and use, hazardous decomposition products should not be produced.

### SECTION 11: TOXICOLOGICAL INFORMATION

#### 11.1. Information on Toxicological Effects - Product

**Acute Toxicity (Oral):** Harmful if swallowed.

**Acute Toxicity (Dermal):** Not classified

**Acute Toxicity (Inhalation):** Harmful if inhaled.

**LD50 and LC50 Data:**

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<b>ATE US/CA (oral)</b>	1,000.00 mg/kg body weight
<b>ATE US/CA (dust, mist)</b>	3.00 mg/l/4h

**Skin Corrosion/Irritation:** Causes severe skin burns and eye damage.

**Eye Damage/Irritation:** Causes serious eye damage.

**Respiratory or Skin Sensitization:** Not classified

**Germ Cell Mutagenicity:** Not classified

**Carcinogenicity:** Not classified

**Specific Target Organ Toxicity (Repeated Exposure):** Causes damage to organs through prolonged or repeated exposure.

**Reproductive Toxicity:** May damage fertility or the unborn child.

**Specific Target Organ Toxicity (Single Exposure):** Not classified

**Aspiration Hazard:** Not classified

**Symptoms/Injuries After Inhalation:** Exposure to materials housed in battery: May be corrosive to the respiratory tract. Inhalation is likely to cause adverse health effects including but not limited to: irritation, difficulty breathing, and unconsciousness.

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**Symptoms/Injuries After Skin Contact:** Exposure to materials housed in battery: Causes severe irritation which will progress to chemical burns.

**Symptoms/Injuries After Eye Contact:** Exposure to materials housed in battery: Causes permanent damage to the cornea, iris, or conjunctiva.

**Symptoms/Injuries After Ingestion:** Exposure to materials housed in battery: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. This material is harmful orally and can cause adverse health effects or death in significant amounts.

**Chronic Symptoms:** Exposure to materials housed in battery: May damage fertility or the unborn child. Causes damage to organs (brain, central nervous system) through prolonged or repeated exposure.

### 11.2. Information on Toxicological Effects - Ingredient(s)

#### LD50 and LC50 Data:

<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>	
LC50 Inhalation Rat	> 1500 mg/m <sup>3</sup> (Exposure time: 4 h)
ATE US/CA (oral)	500.00 mg/kg body weight
ATE US/CA (dust, mist)	1.50 mg/l/4h
<b>Iron (7439-89-6)</b>	
LD50 Oral Rat	98.6 g/kg
<b>Propylene carbonate (108-32-7)</b>	
LD50 Oral Rat	29000 mg/kg
LD50 Dermal Rabbit	> 3000 mg/kg
<b>Ethylene glycol dimethyl ether (110-71-4)</b>	
LD50 Oral Rat	> 4000 mg/kg
LC50 Inhalation Rat	20 - 63 mg/l (Exposure time: 6 h)
<b>Chromium (7440-47-3)</b>	
LD50 Oral Rat	> 5000 mg/kg
LC50 Inhalation Rat	> 5.41 mg/l/4h
<b>Polypropylene (9003-07-0)</b>	
IARC Group	3
<b>Chromium (7440-47-3)</b>	
IARC Group	3

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. Toxicity

Ecology - General: Not classified.

<b>Propylene carbonate (108-32-7)</b>	
LC50 Fish 1	> 1000 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
EC50 Daphnia 1	> 500 mg/l (Exposure time: 48 h - Species: Daphnia magna)
ErC50 (algae)	> 929 mg/l (Exposure time: 96 h - Species: Selenastrum capricornutum [static])

### 12.2. Persistence and Degradability

<b>3-115-0503</b>	
Persistence and Degradability	Not established.

### 12.3. Bioaccumulative Potential

<b>3-115-0503</b>	
Bioaccumulative Potential	Not established.
<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>	
BCF Fish 1	(no bioaccumulation expected)
Log Pow	< 0 (at 20 °C)
<b>Propylene carbonate (108-32-7)</b>	
Log Pow	0.48 (at 25 °C)

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## 12.4. Mobility in Soil

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Ecology - Soil	Not established.
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## 12.5. Other Adverse Effects

Other Information: Avoid release to the environment.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

**Waste Disposal Recommendations:** Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

**Additional Information:** Container may remain hazardous when empty. Continue to observe all precautions. Batteries should be completely discharged prior to disposal and/or the terminals taped or capped to prevent short circuit.

**Ecology - Waste Materials:** Avoid release to the environment.

## SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

### 14.1. In Accordance with DOT

Proper Shipping Name : LITHIUM METAL BATTERIES  
Hazard Class : 9  
Identification Number : UN3090  
Label Codes : 9  
ERG Number : 138



#### 14.1.1 In Accordance with DOT (Shipping DK290-[ ])

Proper Shipping Name : Lithium Metal Batteries Contained in Equipment  
Hazard Class : 9  
Identification Number : UN3091

### 14.2. In Accordance with IMDG

Proper Shipping Name : LITHIUM METAL BATTERIES  
Hazard Class : 9A  
Identification Number : UN3090  
Label Codes : 9A  
EmS-No. (Fire) : F-A  
EmS-No. (Spillage) : S-I



### 14.3. In Accordance with IATA

Proper Shipping Name : LITHIUM METAL BATTERIES  
Hazard Class : 9A  
Identification Number : UN3090  
Label Codes : 12FZ

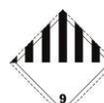


#### 14.3.1 In Accordance with IATA (Shipping DK290- [ ])

Proper Shipping Name : Lithium Metal Batteries Contained in Equipment  
Hazard Class : 9  
Identification Number : UN3091

### 14.4. In Accordance with TDG

Proper Shipping Name : LITHIUM METAL BATTERIES  
Hazard Class : 9  
Identification Number : UN3090  
Label Codes : 9



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## SECTION 15: REGULATORY INFORMATION

### 15.1. US Federal Regulations

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<b>SARA Section 311/312 Hazard Classes</b>	Physical hazard - In contact with water emits flammable gas Health hazard - Specific target organ toxicity (single or repeated exposure) Health hazard - Reproductive toxicity Health hazard - Acute toxicity (any route of exposure) Health hazard - Serious eye damage or eye irritation Health hazard - Skin corrosion or Irritation
<b>Manganese oxide (MnO<sub>2</sub>) (1313-13-9)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

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<b>Lithium (7439-93-2)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Polypropylene (9003-07-0)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>EPA TSCA Regulatory Flag</b>	XU - XU - indicates a substance exempt from reporting under the Chemical Data Reporting Rule, (40 CFR 711).
<b>Iron (7439-89-6)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Propylene carbonate (108-32-7)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Ethylene glycol dimethyl ether (110-71-4)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>EPA TSCA Regulatory Flag</b>	S - S - indicates a substance that is identified in a final Significant New Use Rule.
<b>Chromium (7440-47-3)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
<b>CERCLA RQ</b>	5000 lb no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm
<b>SARA Section 313 - Emission Reporting</b>	1 %
<b>Perchloric acid, lithium salt (7791-03-9)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

### 15.2. US State Regulations

<b>Manganese oxide (MnO2) (1313-13-9)</b>
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual U.S. - Texas - Effects Screening Levels - Long Term U.S. - Texas - Effects Screening Levels - Short Term
<b>Lithium (7439-93-2)</b>
U.S. - Florida - Essential Chemicals List U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2 U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2 RTK - U.S. - Massachusetts - Right To Know List U.S. - Michigan - Polluting Materials List RTK - U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - New Jersey - Special Health Hazards Substances List U.S. - Oregon - Precursor Chemicals RTK - U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Texas - Effects Screening Levels - Long Term U.S. - Texas - Effects Screening Levels - Short Term
<b>Polypropylene (9003-07-0)</b>
U.S. - Texas - Effects Screening Levels - Long Term U.S. - Texas - Effects Screening Levels - Short Term
<b>Iron (7439-89-6)</b>
U.S. - Colorado - Primary Drinking Water Regulations - Secondary Maximum Contaminant Levels (SMCLs) U.S. - Florida - Drinking Water Standards - Secondary Maximum Contaminant Levels (SMCLs) U.S. - Massachusetts - Drinking Water - Secondary Maximum Contaminant Levels (SMCLs)

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U.S. - Missouri - Drinking Water - Secondary Maximum Contaminant Levels (SMCLs)  
U.S. - Nevada - Drinking Water - Secondary Maximum Contaminant Levels (SMCLs)  
U.S. - New Hampshire - Drinking Water - Secondary Maximum Contaminant Levels (SMCLs)  
U.S. - New Jersey - Secondary Drinking Water Standards - Recommended Upper Limits (RULs)  
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria  
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)  
U.S. - New Mexico - Water Quality - Standards for Ground Water of 10,000 mg/L TDS Concentration or Less  
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups  
U.S. - Pennsylvania - Drinking Water - Secondary Maximum Contaminant Levels (SMCLs)  
All concentrations are expressed as percentages by weight unless the ingredient is a gas.  
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Water and Aquatic Organisms  
U.S. - South Carolina - Secondary Maximum Contaminant Levels (SMCLs)  
U.S. - Texas - Drinking Water Standards - Secondary Constituent Levels (SCLs)  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Utah - Drinking Water - Secondary Maximum Contaminant Levels (SMCLs)  
U.S. - Virginia - Water Quality Standards - Public Water Supply Effluent Limits  
U.S. - Alaska - Water Quality Standards - Chronic Aquatic Life Criteria for Fresh Water

### **Propylene carbonate (108-32-7)**

U.S. - Delaware - Volatile Organic Compounds Exempt from Requirements  
U.S. - Massachusetts - Volatile Organic Compounds Exempt From Requirements  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term

### **Ethylene glycol dimethyl ether (110-71-4)**

U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
RTK - U.S. - Massachusetts - Right To Know List  
U.S. - Minnesota - Chemicals of High Concern  
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups  
RTK - U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term

### **Chromium (7440-47-3)**

U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)  
U.S. - Colorado - Hazardous Wastes - Maximum Concentration for the Toxicity Characteristics  
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)  
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)  
U.S. - Connecticut - Drinking Water Quality Standards - Groundwater Sources  
U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)  
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)  
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities  
U.S. - Florida - Drinking Water Standards - Inorganic Contaminants - Maximum Contaminant Levels (MCLs)  
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations  
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)  
U.S. - Idaho - Occupational Exposure Limits - TWAs  
U.S. - Illinois - Toxic Air Contaminants  
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants

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U.S. - Maryland - Surface Water Quality Standards - Consumption of Water and Organisms  
U.S. - Massachusetts - Allowable Ambient Limits (AALs)  
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)  
U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2  
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1  
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2  
RTK - U.S. - Massachusetts - Right To Know List  
U.S. - Massachusetts - Threshold Effects Exposure Limits (TEELs)  
U.S. - Massachusetts - Toxics Use Reduction Act  
U.S. - Michigan - Occupational Exposure Limits - TWAs  
U.S. - Michigan - Polluting Materials List  
U.S. - Minnesota - Hazardous Substance List  
U.S. - Minnesota - Permissible Exposure Limits - TWAs  
U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)  
U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)  
U.S. - Nebraska - Maximum Concentration of Contaminants for the Toxicity Characteristic  
U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)  
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour  
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual  
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances  
U.S. - New Jersey - Environmental Hazardous Substances List  
U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs  
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - New Jersey - Special Health Hazards Substances List  
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria  
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)  
U.S. - New Mexico - Water Quality - Standards for Ground Water of 10,000 mg/L TDS Concentration or Less  
U.S. - New York - Occupational Exposure Limits - TWAs  
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances  
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour  
U.S. - North Dakota - Hazardous Wastes - Maximum Concentration for the Toxicity Characteristic  
U.S. - Oregon - Permissible Exposure Limits - TWAs  
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups  
U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)  
RTK - U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List  
RTK - U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances  
RTK - U.S. - Pennsylvania - RTK (Right to Know) List  
U.S. - South Carolina - Maximum Contaminant Levels (MCLs)  
U.S. - Tennessee - Occupational Exposure Limits - TWAs  
U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)  
U.S. - Texas - Effects Screening Levels - Long Term  
U.S. - Texas - Effects Screening Levels - Short Term  
U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)  
U.S. - Vermont - Hazardous Waste - Hazardous Constituents  
U.S. - Vermont - Hazardous Waste - Maximum Contaminant Concentration for Toxicity  
U.S. - Vermont - Permissible Exposure Limits - TWAs  
U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List  
U.S. - Washington - Permissible Exposure Limits - TWAs  
U.S. - West Virginia - Water Quality - Groundwater Standards - Ceiling Concentrations  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet  
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet

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U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater

U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

### Perchloric acid, lithium salt (7791-03-9)

U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances

## 15.3. Canadian Regulations

### Manganese oxide (MnO<sub>2</sub>) (1313-13-9)

Listed on the Canadian DSL (Domestic Substances List)

### Lithium (7439-93-2)

Listed on the Canadian DSL (Domestic Substances List)

### Polypropylene (9003-07-0)

Listed on the Canadian DSL (Domestic Substances List)

### Iron (7439-89-6)

Listed on the Canadian DSL (Domestic Substances List)

### Propylene carbonate (108-32-7)

Listed on the Canadian DSL (Domestic Substances List)

### Ethylene glycol dimethyl ether (110-71-4)

Listed on the Canadian DSL (Domestic Substances List)

### Chromium (7440-47-3)

Listed on the Canadian DSL (Domestic Substances List)

### Perchloric acid, lithium salt (7791-03-9)

Listed on the Canadian DSL (Domestic Substances List)

## SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

**Date of Preparation or Latest Revision** : 04/04/2024

### Revision

**Other Information** : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR) SOR/2022-272.

### GHS Full Text Phrases:

Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Comb. Dust	Combustible Dust
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Flam. Liq. 2	Flammable liquids Category 2
Ox. Sol. 2	Oxidizing solids Category 2
PHNOC 1	Physical hazard not otherwise classified, category 1
Repr. 1	Reproductive toxicity, Category 1
Repr. 1B	Reproductive toxicity Category 1B
Skin Corr. 1B	Skin corrosion/irritation Category 1B
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
Water-react. 1	Substances and mixtures which in contact with water emit flammable gases Category 1
H225	Highly flammable liquid and vapor
H260	In contact with water releases flammable gases which may ignite spontaneously
H272	May intensify fire; oxidizer
H302	Harmful if swallowed

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H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H318	Causes serious eye damage
H319	Causes serious eye irritation
H332	Harmful if inhaled
H335	May cause respiratory irritation
H360	May damage fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*

## Lithium Battery Test Summary / UN38.3 試験結果要約

<b>Product manufacturer</b>	Panasonic Energy Co., Ltd. (Changed from Panasonic Corporation.)
Address/住所	1-1 Matsushita-cho, Moriguchi City, Osaka 570-8511, Japan
Telephone/電話番号	+81-80-9932-3190 (JST Working hours)
e-mail	un38.3_microbattery@ml.jp.panasonic.com
URL	<a href="https://www.panasonic.com/global/energy.html">https://www.panasonic.com/global/energy.html</a>
<b>Test laboratory</b>	Panasonic Energy Co., Ltd. (Changed from Panasonic Corporation.)
Address/住所	1-1 Matsushita-cho, Moriguchi City, Osaka 570-8511, Japan
Telephone/電話番号	+81-80-9932-3190 (JST Working hours)
e-mail	un38.3_microbattery@ml.jp.panasonic.com
URL	<a href="https://www.panasonic.com/global/energy.html">https://www.panasonic.com/global/energy.html</a>

### Description of Product / 製品情報

Model Number/品番	CR2477
Type/タイプ	Lithium metal cell
Physical description/物理特性	Non-rechargeable, Coin
Mass/質量	10.5 g
Lithium content/リチウム含有量	0.29 g
Watt-hour rating/ワット時定格値	Not applicable
Nominal Voltage/公称電圧	3.0 V
Nominal Capacity/公称容量	1000 mAh

### Test Results / 結果

Identification number/番号	CP0020-8
Date of test report/レポート発行日	2021/09/07
Reference edition/参照	UN Manual of Tests and Criteria, Revision 7

UN Manual of Tests and Criteria 国連勧告テスト判定基準	Results 結果	Remarks 備考
T1 : Altitude simulation / 高度シミュレーション	Pass / 合格	
T2 : Thermal Test / 温度試験	Pass / 合格	
T3 : Vibration / 振動	Pass / 合格	
T4 : Shock / 衝撃	Pass / 合格	
T5 : External short circuit / 外部短絡	Pass / 合格	
T6 : Impact / 衝突, Crush / 圧壊	Pass / 合格	Crush / 圧壊
T7 : Overcharge / 過充電	-	for rechargeable batteries only / 充電式電池のみ
T8 : Forced discharge / 強制放電	Pass / 合格	

Hereby we certify that this model of Lithium battery meets the requirements of each test in the UN Manual of Tests and Criteria Part III, sub-section 38.3.

上記テストは国連勧告テスト(Manual of Tests and Criteria, Part III, sub-section 38.3.)に従い確認された結果であることを証明致します。

Signature: *J. Okamoto*

Name and Title: Jiro Okamoto / Manager  
Energy Device Business Division