

Lithium primary cylindrical cell (coiled)

1. Identification of the product and of the company undertaking

Product details

Trade name:	Lithium primary cylindrical cell (coiled)
Voltage:	3.0 V (or multiples of this in case of multi-cell configurations)
Electrochemical system:	Lithium metal organic electrolyte manganese dioxide
Anode (negative):	Lithium metal
Cathode (positive):	Manganese dioxide

Type:	Lithium content per cell:
CR 123 A	0.5049 g
CR 2	0.2948 g

Supplier details

Address:	VARTA Microbattery GmbH Daimlerstr. 1 D-73479 Ellwangen/Jagst Germany
Emergency telephone number:	+49 7961 921 110 (VAC)

Legal Remark (U.S.A.)

Safety Data Sheets 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". According to OSHA, Article means 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 (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

Because all of our batteries are defined as "articles", they are exempted from the requirements of the Hazard Communication Standard.

Legal remark (EU)

These batteries are no "substances" or "mixtures" according to Regulation (EC) No 1907/2006 EC. Instead they have to be regarded as "articles", no substances are intended to be released during handling. Therefore there is no obligation to supply a "safety data sheet according to Regulation (EC) 1907/2006, Article 31".

General remark

This Safety Data Sheet is provided as a service to our customers. The details presented are in accordance with our present knowledge and experiences. They are no contractual assurances of product attributes

2. Hazards identification

The battery is sealed hermetically. Thus, the ingredients have no hazard potential, except the battery is violated or dismantled.

If in case of mistreatment the ingredients are released, a spontaneously flammable gas mixture may be released under certain circumstances (measures according to chapter 4 to 6).

Attention: If batteries are treated wrong the danger of burns or bursts occurs. Batteries must not be heated above 100°C or incinerated. The battery contents must not get in contact with water. If the negative electrode gets in contact with water or humidity hydrogen gas is formed, which may inflame spontaneously.

3. Composition/information on ingredients

Ingredients

Contents	CAS No.	Hazard Categories	Hazard Statements	Material
2 -5 %	7439-93-2	Water-react. 1 Skin Corr. 1B	H260 H314	Lithium
13 - 45 %	1313-13-9	Acute Tox. 4	H302 H332	Manganese dioxide
< 10 %	108-32-7			Propylene carbonate
< 10 %	110-71-4			1,2-Dimethoxy ethane
< 5 %	646-6-0			1,3-Dioxolane
< 5 %	7791-03-9			Lithium perchlorate

Heavy Metals

Contents	CAS No.	Material
< 1 mg/kg	7440-43-9	Cadmium
< 10 mg/kg	7439-92-1	Lead
< 0,1 mg/kg	7439-97-6	Mercury (none intentionally introduced, see Chapter 12)

Other Ingredients

Contents	CAS No.	Material
33 – 74 %		Metals
3 – 10 %		Plastic

SVHC substances according to REACH (Article 33)

Contents	EC No.	CAS No.	Material
> 0.1 %	203-794-9	110-71-4	1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)

For information to allow safe use: see section 7.

4. First-aid measures

Measures at accidental release

After inhalation:	Fresh air. Seek for medical assistance.
After skin contact:	Remove solid particles immediately. Flush affected areas with plenty of water (at least 15 min.). Remove contaminated cloth immediately. Seek for medical assistance.
After eye contact:	Flush the eye gently with plenty of water (at least 15 min.). Seek for medical assistance.
After ingestion:	Drink plenty of water. Avoid vomiting. Seek for medical assistance. No trials for neutralization.

5. Fire-fighting measures

Suitable extinguishing media:	Metal fire extinction powder, rock salt or dry sand shall be used. In case only water is available, it can be used in large amounts.
Extinguishing media with limited suitability:	Carbon dioxide (CO ₂) is not suitable. Water in small quantities may have adverse effects.
Special protection equipment during fire-fighting:	Protective clothing including breathing apparatus.
Special hazard:	Cells may explode and release metal parts. At contact of anode material with water extremely flammable hydrogen gas and caustic liquid are released.
Attention:	Do not let used extinguishing media penetrate into surface water or ground water. Dispose off properly.

6. Accidental release measures

Person related measures:	Wear personal protective equipment adapted to the situation (protection gloves, cloth, face protection, breathing protection).
Environment protection measures:	Bind released ingredients with powder (rock salt, sand). Dispose off according to the local law and rules. Avoid leached substances to penetrate into the earth, canalization or water.
Treatment for cleaning:	If battery casing is dismantled, small amounts of electrolyte may leak. Package the battery tightly including ingredients together with lime, sand or rock salt. Then clean with water.

7. Handling and storage

Guideline for safe handling:

Always follow the warning information on the batteries and in the manuals of devices. Only use the recommended battery types.

Keep batteries away from children.

For devices to be used by children, the battery casing should be protected against unauthorized access.

Unpacked batteries shall not lie about in bulk.

In case of battery change always replace all batteries by new ones of identical type and brand.

Do not swallow batteries.

Do not throw batteries into water.

Do not throw batteries into fire.

Do not short-circuit batteries.

Do not recharge primary batteries.

Do not open or disassemble batteries.

Storage:

Storage preferably at room temperature (approx. 20°C). Avoid large temperature changes. Avoid direct sunlight. At higher temperature the electrical performance may be reduced.

Storage of unpacked batteries can cause short circuit and heat generation.

Storage category

according to TRGS 510:

It is recommended to consider the "Technical Rule for Hazardous Substances TRGS 510 - Storage of hazardous substances in nonstationary containers" and to handle lithium primary cylindrical cells according to storage category 11 ("combustible solids").

Storage of large amounts:

Follow the recommendations of the German Insurance Association (GDV - "Gesamtverband der Deutschen Versicherungswirtschaft e.V.") concerning lithium batteries:

http://vds.de/fileadmin/vds_publicationen/vds_3103_web.pdf

In case of storage of large amounts (used storage volume > 7 m³ and/or more than 6 pallets) batteries shall be stored in fire-resistant or separated rooms or areas (e.g. warehouse or container for hazardous materials). Mixed storage with other products is not allowed. The storage area shall be monitored by an automatic fire detection system, connected to a permanently manned place. A fire-extinguishing system shall reflect the extinguishing agents mentioned in chapter 5.

8. Exposure controls/personal protection

Under normal conditions (during discharge) release of ingredients does not occur.

9. Physical and chemical properties

Not applicable if closed.

10. Stability and reactivity

Dangerous reactions:

When heated above 100°C the risk of rupture occurs.

11. Toxicological information

Under normal conditions (during charge and discharge) release of ingredients does not occur. In case of accidental release see information in chapter 2.

Swallowing of a battery can be harmful. Call the local Poison Control Centre for advice and follow-up.

12. Ecological information

Lithium primary cylindrical cells do not contain heavy metals as defined by the European directives 2006/66/EC Article 21.

For the state of California these batteries are considered as "free of perchlorate".

Mercury has not been "intentionally introduced (as distinguished from mercury that may be incidentally present in other materials)" in the sense of the U.S.A. "Mercury-Containing and Rechargeable Battery Management Act" (May 13 1996).

The Regulation on Mercury Content Limitation for Batteries promulgated on 1997-12-31 by the China authorities including the State Administration of Light Industry and the State Environmental Protection Administration defines 'low mercury' as 'mercury content by weight in battery as less than 0.025%', and 'mercury free' as 'mercury content by weight in battery as less than 0.0001%'. And therefore: Varta lithium primary button cells/batteries belong to the category of mercury-free battery (mercury content lower than 0.0001%).

13. Disposal considerations

USA: Lithium primary cylindrical cells are classified by the federal government as non-hazardous waste and are safe for disposal in the normal municipal waste stream.

In the European Union, manufacturing, handling and disposal of batteries is regulated on the basis of the DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC. Customers find detailed information on disposal in their specific countries using the web site of the European Portable Batteries Association (http://www.epbaeurope.net/legislation_national.html).

Importers and users outside EU should consider the local law and rules.

In order to avoid short circuit and heating, used lithium primary cylindrical cells should never be stored or transported in bulk. Proper measures against short circuit are:

- Storage of batteries in original packaging
- Coverage of the terminals
- Embedding in dry sand

14. Transport information

General considerations

Lithium primary cylindrical cells manufactured by VARTA Microbattery are considered to be UN3090 Lithium Metal Batteries and are tested according to 38.3 of the "UN Manual of Tests and Criteria" for compliance with the requirements of special provisions ADR 188, IMDG 188, DOT / 49 CFR § 172.102, and the General Requirements of IATA DGR packing instruction 968. Positive test results as well as other relevant information required for transportation are stated in dedicated "Declarations of Conformity".

Transportations of cells or batteries packed with equipment or contained in equipment have to follow the appropriate regulations for UN3091.

A compilation of transport requirements for Lithium batteries can be found in:

<http://www.hyperedizioni.com/news/the-lithium-batteries/3139/The-lithium-batteries.html>

During the transportation of large amounts of batteries by ship, trailer or railway, do not store them in places of high temperature and do not allow them to be exposed to condensation. During the transportation do not allow the packaging to be damaged, as a damage of the packaging may cause fire. In the event packaging is damaged, special procedures must be used including inspection and repackaging if necessary and handle with care.

USA

Primary (non-rechargeable) lithium batteries and cells are forbidden for transport aboard passenger carrying aircraft. The outside of each package that contains primary (non-rechargeable) lithium batteries or cells must be marked "PRIMARY LITHIUM BATTERIES-FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT" on a background of contrasting color.

IEC 60086-1

Code of practice for packaging and shipment of primary batteries given in IEC 60086-1:

The packaging shall be adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design shall be chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of moisture.

Shock and vibration shall be kept to a minimum. For instance, boxes should not be thrown off trucks, slammed into position or piled so high as to overload battery containers below. Protection from inclement weather should be provided.

15. Regulatory information

Marking consideration:

According to "DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC" the batteries have to be marked with the crossed bin.

For the state of California the battery types CR 123 A -R and CR 2 -R have to be marked as "containing perchlorate".

International safety standards:

The basis cells are recognized components according to UL 1642.

Water hazard class:

The regulations of the German Federal Water Management Act (WHG) are not applicable as Lithium primary batteries are articles and not substances, thus there is no risk of water pollution, except the batteries are violated or dismantled..

16. Other information

Full text of Hazard Statements referred to under section 3

H225	Highly flammable liquid and vapour.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H360FD	May damage fertility. May damage the unborn child.

Note:

Date of issue of the transport regulations: ADR 2015, RID 2015, IATA 2015 (55th edition), IMDG 2014, DOT / 49 CFR 2014.
Latest covered modification of the European Battery Directive 2006/66/EC: Directive 2013/56/EU.

Issued by:

VARTA Microbattery GmbH
Quality / Environmental Management

Contact:

<http://contact.varta-microbattery.com>

Updates:

Current SDS can be downloaded from VARTA's web page following the link:
<http://www.varta-microbattery.com/en/news-downloads/downloads.html>

PRODUCT SAFETY DATASHEET

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Lithium Iron Disulfide Batteries
January 2017

PRODUCT SAFETY DATA SHEET**PRODUCT NAME:** Energizer Battery**Type No.:** L91 (AA), L92 (AAA)**Volts:** 1.5**TRADE NAMES:** ULTIMATE**Approximate Weight:** 7.6 g. (L92) – 15 g. (L91)**CHEMICAL SYSTEM:** Lithium Iron Disulfide**Designed for Recharge:** No **Document Number:** 12003-A

Energizer has prepared copyrighted Product Safety Datasheets to provide information on the different Eveready/Energizer battery systems. Batteries are articles as defined under the GHS and exempt from GHS classification criteria (Section 1.3.2.1.1 of the GHS). The information and recommendations set forth herein are made in good faith, for information only, and are believed to be accurate as of the date of preparation. However, ENERGIZER BATTERY MANUFACTURING, INC. MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM REFERENCE ON IT.

SECTION 1- MANUFACTURER INFORMATION

Energizer Battery Manufacturing, Inc.
25225 Detroit Rd.
Westlake, OH 44145

Telephone Number for Information:
800-383-7323 (USA / CANADA)

Date Prepared: January 2017

SECTION 2 – HAZARDS IDENTIFICATION**GHS classification:** N/A**Signal Word:** N/A**Hazard Classification:** N/A

Under normal conditions of use, the battery is hermetically sealed.

Ingestion: Swallowing a battery can be harmful.

Inhalation: Contents of an open battery can cause respiratory irritation.

Skin Contact: Contents of an open battery can cause skin irritation.

Eye Contact: Contents of an open battery can cause severe irritation.

SECTION 3 - INGREDIENTS

IMPORTANT NOTE: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Carbon Black (CAS# 1333-86-4)	3.5 mg/m ³ TWA	3.5 mg/m ³ TWA	0-4
1,2 Dimethoxymethane (CAS# 110-71-4)	None established	None established	2-4
1,3 Dioxolane (CAS# 646-06-0)	None established	20 ppm TWA	5-9
Graphite (CAS# 7782-42-5)	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirable fraction)	2 mg/m ³ TWA (respirable fraction)	0-4
Iron Disulfide (CAS# 1309-36-0)	None established	None established	28-38
Lithium or Lithium Alloy	None established	None established	6.3-6.6 / AA 5.4-5.5 / AAA
Lithium Iodide	None established	None established	0.3-3

PRODUCT SAFETY DATASHEET

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Non-Hazardous Components			
Steel (Iron CAS# 65997-19-5)	None established	None established	18-22
Plastic and Other	None established	None established	Balance

SECTION 4 – FIRST AID MEASURES

Ingestion: Do not induce vomiting or give food or drink. Seek medical attention immediately. CALL NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up (202-625-3333) collect day or night.

Inhalation: Provide fresh air and seek medical attention.

Skin Contact: Remove contaminated clothing and wash skin with soap and water.

Eye Contact: Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

Note: Carbon black is listed as a possible carcinogen by International Agency for Research on Cancer (IARC).

SECTION 5- FIRE FIGHTING MEASURES

In case of fire where lithium batteries are present, flood area with water or smother with a Class D fire extinguishant appropriate for lithium metal, such as Lith-X. Water may not extinguish burning batteries but will cool the adjacent batteries and control the spread of fire. Burning batteries will burn themselves out. Virtually all fires involving lithium batteries can be controlled by flooding with water. However, the contents of the battery will react with water and form hydrogen gas. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended. A smothering agent will extinguish burning lithium batteries.

Emergency Responders should wear self-contained breathing apparatus. Burning lithium-iron disulfide batteries produce toxic and corrosive lithium hydroxide fumes and sulfur dioxide gas.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

To cleanup leaking batteries:

Ventilation Requirements: Room ventilation may be required in areas where there are open or leaking batteries.

Respiratory Protection: Avoid exposure to electrolyte fumes from open or leaking batteries.

Eye Protection: Wear safety glasses with side shields if handling an open or leaking battery.

Gloves: Use neoprene or natural rubber gloves if handling an open or leaking battery.

Battery materials should be disposed of in a leak-proof container.

SECTION 7 - HANDLING AND STORAGE

Storage: Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life. In locations that handle large quantities of lithium batteries, such as warehouses, lithium batteries should be isolated from unnecessary combustibles.

Mechanical Containment: If potting or sealing the battery in an airtight or watertight container is required, consult your Energizer Battery Manufacturing, Inc. representative for precautionary suggestions. Do not obstruct safety release vents on batteries. Encapsulation of batteries will not allow cell venting and can cause high pressure rupture.

Handling: Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, generate significant heat and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, metal covered tables or metal belts used for assembly of batteries into devices. Damaging a lithium battery may result in an internal short circuit.

The contents of an open battery, including a vented battery, when exposed to water, may result in a fire and/or explosion.

Crushed or damaged batteries may result in a fire.

If soldering or welding to the battery is required, consult your Energizer representative for proper precautions to prevent seal damage or short circuit.

Charging: This battery is manufactured in a charged state. It is not designed for recharging. Recharging can cause battery leakage or, in some cases, high pressure rupture. Inadvertent charging can occur if a battery is installed backwards.

PRODUCT SAFETY DATASHEET

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Labeling: If the Energizer label or package warnings are not visible, it is important to provide a package and/or device label stating:

WARNING: Battery can explode or leak and cause burns if installed backwards, disassembled, charged, or exposed to water, fire or high temperature.

Where accidental ingestion of small batteries is possible, the label should include:

WARNING: (1) Keep away from small children. If swallowed, promptly see doctor; have doctor phone (202) 625-3333 collect.
(2) Battery can explode or leak and cause burns if installed backwards, disassembled, charged, or exposed to water, fire or high temperature.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation Requirements: Not necessary under normal conditions. / **Respiratory Protection:** Not necessary under normal conditions.

Eye Protection: Not necessary under normal conditions. / **Gloves:** Not necessary under normal conditions.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color, etc.):	Solid object
Upper Explosive Limits:	Not applicable for an Article
Lower Explosive Limits	Not applicable for an Article
Odor	No odor
Vapor Pressure (mm Hg @ 25°C)	Not applicable for an Article
Odor Threshold	No odor
Vapor Density (Air = 1)	Not applicable for an Article
pH	Not applicable for an Article
Density (g/cm ³)	1.7 -2.0
Melting point/Freezing Point	Not applicable for an Article
Solubility in Water (% by weight)	Not applicable for an Article
Boiling Point @ 760 mm Hg (°C)	Not applicable for an Article
Flash Point	Not applicable for an Article
Evaporation Rate (Butyl Acetate = 1)	Not applicable for an Article
Flammability	Not applicable for an Article
Partition Coefficient	Not applicable for an Article
Auto-ignition Temperature	Not applicable for an Article
Decomposition Temperature	Not applicable for an Article
Viscosity	Not applicable for an Article

SECTION 10 – STABILITY AND REACTIVITY

Lithium iron disulfide batteries contain no sulfides or cyanides and they do not meet any other reactivity criteria including “reacts violently with water” and therefore do not meet any of the criteria established in 40 CFR 261.2 for reactivity.

SECTION 11 – TOXICOLOGICAL INFORMATION

Under normal conditions of use, lithium iron disulfide batteries are non-toxic.

SECTION 12 – ECOLOGICAL INFORMATION

Issues such as ecotoxicity, persistence and bioaccumulation are not applicable for articles.

SECTION 13 – DISPOSAL CONSIDERATIONS

Lithium iron disulfide batteries are not hazardous waste per the United States Resource Conservation and Recovery Act (RCRA) - 40 CFR Part 261 Subpart C. Dispose of in accordance with all applicable federal, state and local regulations.

SECTION 14 – TRANSPORT INFORMATION

In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in “strong outer packaging” that prevents spillage of contents. All original packaging for Energizer lithium batteries are compliant with these regulatory concerns.




Energizer lithium-iron disulfide batteries are exempt from the classification as dangerous goods as they meet the requirements of the special provisions listed below. (Essentially, they are properly packaged and labeled, contain less than 1 gram of lithium and pass the tests defined in UN model regulation section 38.3).

Regulatory Body	Special Provisions
ADR	188, 230, 310, 636, 656
IMDG	188, 230, 310, 957
UN	UN 3090, UN 3091
US DOT	29, A54, A100, A101
IATA 58 th Edition, ICAO	Packaging Instructions 968 – 970

Energizer is registered with CHEMTREC. In the event of an incident during transport call 1-800-424-9300 (North America) or 1-703-527-3887 (International).

A global lithium label chart is provided below to summarize the current global labeling requirements.

Label Summary Chart

Shipping Mode	Li content	Net quantity wt. of batteries per package	Battery Type			
AIR	0.3g to ≤1g/cell 0.3g to ≤2g/battery	≤2.5 kg	L91, L92, L522	YES	YES	YES
	≤0.3g/cell	≤2.5kg	All Li Coin and 2L76	NO	YES	YES
	≤0.3g/cell	>2.5kg	All Li Coin and 2L76	YES	YES	YES
Land/Sea only	All	All	All	NO	YES	YES

SECTION 15 - REGULATORY INFORMATION

Outside of the transportation requirements noted in Section 14, lithium iron disulfide batteries marketed by Energizer Battery Manufacturing, Inc. are not regulated.

SARA/TITLE III - As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.

SECTION 16 - OTHER INFORMATION

None.



Product Safety Data Sheet (PSDS)

The battery products referenced in this PSDS document are consumer products. Batteries are considered "articles" under the Global Harmonized System and are exempted from the GHS labeling and SDS classification criteria. This PSDS document is provided as service in response to requests for information on battery use, safety and regulatory compliance.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: DURACELL LITHIUM MANGANESE DIOXIDE COIN CELLS

Product Identification: Lithium Manganese Dioxide Coin Cells – (lithium metal battery)

Duracell Designations: DL1216; DL1616; DL1620; DL1632; DL2016; DL2025; DL2032; DL2430; DL2450

Product Use: Energy Source

PSDS Date of Preparation: April 24, 2009 **Reaffirmed:** 4/08/2011; **Updated:** January 21, 2015

Document ID: Lithium Coin-NA

Company Identification

US Office

Duracell, a P&G business
Berkshire Corporate Park
14 Research Drive
Bethel, CT USA 06401
(203) 796-4000

Canadian Office

Duracell, a P&G business
4711 Yonge Street
Toronto, Ontario
Canada M2N 6K8
(416) 730-4711

SECTION 2: HAZARDS IDENTIFICATION

Physical Appearance: Coin cells.

EMERGENCY OVERVIEW

CAUTION: For information on treatment, call the NATIONAL BUTTON BATTERY INGESTION HOTLINE collect, day or night, at (202) 625-3333. Ingestion may lead to serious injury or death. Battery can explode or leak if heated, disassembled, shorted, recharged, exposed to fire or high temperature or inserted incorrectly. Keep in original package until ready to use. Do not carry batteries loose in your pocket or purse. Keep batteries away from children. If swallowed, consult a physician at once. Under certain misuse conditions and by abusively opening the battery, exposed lithium can react with water or moisture in the air causing potential thermal burns or fire.

Potential Health Effects:

The chemicals and metals in this product are contained in a sealed can. Exposure to the contents will not occur unless the battery leaks, is exposed to high temperatures or is mechanically, physically, or electrically abused.

Eye Contact: Contact with battery contents may cause irritation.

Skin Contact: Contact with battery contents may cause irritation.

Inhalation: Inhalation of vapors or fumes released due to heat or a large number of leaking batteries may cause respiratory and eye irritation.

Ingestion: Seek immediate medical advice. Batteries lodged in the esophagus should be removed immediately since leakage, caustic burns and perforation can occur as soon as two hours after ingestion. Irritation to the internal/external mouth areas, may occur following exposure to a leaking battery.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Amount
Manganese Dioxide	1313-13-9	65-75%
Propylene Carbonate	108-32-7	10-15%
Lithium	7439-93-2	5-10%
Graphite, synthetic	7440-44-0	5-10%
1,2-Dimethoxyethane	110-71-4	1-10%
Lithium Perchlorate	7791-03-9	<1.5%

SECTION 4: FIRST AID MEASURES

Eye Contact: If battery is leaking and material contacts the eye, flush thoroughly with copious amounts of running water for 30 minutes. Seek immediate medical attention.

Skin Contact: If battery is leaking and material contacts the skin, remove any contaminated clothing and flush exposed skin with copious amounts of running water for at least 15 minutes. If irritation, injury or pain persists, seek medical attention.

Inhaled: If battery is leaking, contents may be irritating to respiratory passages. Move to fresh air. If irritation persists, seek medical attention.

Swallowed: If battery is swallowed seek immediate medical advice. Batteries lodged in the esophagus should be removed immediately since leakage, caustic burns and perforation can occur as soon as two hours after ingestion. If mouth area irritation or burning has occurred, rinse the mouth and surrounding area with tepid water for at least 15 minutes. Do not give ipecac.

Note to Physician: Published reports recommend removal from the esophagus be done endoscopically (under direct visualization). Batteries beyond the esophagus need not be retrieved unless there are signs of injury to the GI tract or a large diameter battery fails to pass the pylorus. If asymptomatic, follow-up x-rays are necessary only to confirm the passage of larger batteries. Confirmation by stool inspection is preferable under most circumstances. For information on treatment, telephone (202) 625-3333, collect day or night. Potential leakage of less than 50 milligrams of dimethoxyethane and propylene carbonate. Dimethoxyethane rapidly evaporates. Do not give ipecac.

SECTION 5: FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Batteries may burst and release hazardous decomposition products when exposed to a fire situation.

Extinguishing Media: Use dry chemical, alcohol foam, water or carbon dioxide as appropriate for the surrounding fire. For incipient fires, carbon dioxide extinguishers are more effective than water.

Special Fire Fighting Procedures: Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing. Fight fire from a distance or protected area. Cool fire exposed batteries to prevent rupture. Use caution when handling fire-exposed containers (batteries may explode in heat of fire).

Hazardous Combustion Products: Thermal degradation may produce hazardous fumes of lithium and manganese; oxides of carbon and other toxic by-products.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Notify safety personnel of large spills. Irritating vapors and flammable vapors may be released from leaking or ruptured batteries. Eliminate all ignition sources. Evacuate the area and allow the vapors to dissipate. Clean-up personnel should wear appropriate protective clothing to avoid eye and skin contact and inhalation of vapors or fumes. Increase

ventilation. Carefully collect batteries and place in an appropriate container for disposal. Remove spilled liquid with absorbent and contain for disposal.

SECTION 7: HANDLING AND STORAGE

Avoid mechanical or electrical abuse. DO NOT short circuit or install incorrectly. Batteries may explode, pyrolyze or vent if disassembled, crushed, recharged or exposed to high temperatures. Install batteries in accordance with equipment instructions. Replace all batteries in equipment at the same time. Do not carry batteries loose in a pocket or bag.

Storage: Store batteries in a dry place at normal room temperature.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

The following occupational exposure limits are provided for informational purposes. No exposure to the battery components should occur during normal consumer use.

Chemical Name	Exposure Limits
Manganese Dioxide	5 mg/m ³ Ceiling OSHA PEL 0.2 mg/m ³ TWA ACGIH TLV
Propylene Carbonate	2 mg/m ³ Ceiling ACGIH TLV
Lithium	None established
Graphite (synthetic non-fibrous))	5 mg/m ³ TWA (respirable dust), 15 mg/m ³ TWA (total dust) OSHA PEL 2 mg/m ³ TWA (respirable dust) ACGIH TLV
1,2-Dimethoxyethane	None established.
Lithium Perchlorate	None established

Ventilation: No special ventilation is needed for normal use.

Respiratory Protection: None required for normal use.

Skin Protection: None required for normal use. Use butyl rubber gloves when handling leaking batteries.

Eye Protection: None required for normal use. Wear safety goggles when handling leaking batteries.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Coin cells.

Specific Gravity: Not applicable

Water Solubility: Insoluble

Vapor Pressure: Not applicable

Vapor Density: Not applicable

Boiling Point: Not applicable

Melting Point: Not applicable

Flash Point: 29°F (-2°C) (1,2-Dimethoxyethane)

Autoignition Point: Not applicable

SECTION 10: STABILITY AND REACTIVITY

Stability: This product is stable.

Incompatibility/Conditions to Avoid: Contents are incompatible with strong oxidizing agents. Do not heat, crush, disassemble, short circuit or recharge.

Hazardous Decomposition Products: Thermal decomposition may produce hazardous fumes of lithium and manganese; oxides of carbon and other toxic by-products.

Hazardous Polymerization: Will not occur

SECTION 11: TOXICOLOGICAL INFORMATION

Acute Toxicity Data:

Manganese Dioxide: LD50 oral rat >3478 mg/kg

Propylene Carbonate: LD50 oral rat 29100 uL/kg; LD50 dermal rabbit >20 mL/kg; LC50 inhalation rat >5 g/m³

1,2-Dimethoxyethane: LDLo oral rat 1000 mg/kg, LCLo inhalation rat 63 g/m³/6 hr

Chronic Effects: The chemicals in this product are contained in a sealed can and exposure does not occur during normal handling and use. No chronic effects would be expected from handling a leaking battery.

Target Organs: Skin, eyes and respiratory system.

Carcinogenicity: None of the components of this product are listed as carcinogens by ACGIH, IARC, NTP or OSHA

SECTION 12: ECOLOGICAL INFORMATION

No ecotoxicity data is available. This product is not expected to present an environmental hazard.

SECTION 13: DISPOSAL INFORMATION

Disposal should be in accordance with Federal, state/provincial and local regulations. Large quantities of open batteries should be treated as hazardous waste. Do not incinerate except for disposal in a controlled environment.

Some communities offer recycling or collection of batteries – contact your local government for disposal practices in your area

In California, packages that contain lithium manganese dioxide coin cells and the owner/operating instructions of products that contain lithium manganese dioxide coin cells must include the following statement: **“Perchlorate Material – Special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate.”**

SECTION 14: TRANSPORT INFORMATION

Emergency Phone Number:

**CHEMTREC 24-Hour Emergency Response Hotline
+703-527-3887 (United States of America)**

The information in this section is provided for informational purposes only.

DURACELL lithium metal batteries are produced and delivered in accordance with IATA 56th ICAO, IMO and US DOT Regulations. DURACELL lithium metal cells and batteries are not subject to the other provisions of the Dangerous Goods regulations as long as they are packaged and marked in accordance with the appropriate regulations.

All persons who prepare or offer lithium batteries for transport are required by regulation to be sufficiently trained and aware of all applicable regulations. Regulatory guidance for safe packaging requires that batteries be packaged in a manner that prevents short circuits, prevent battery movement within the package and that prevents spillage of contents.

DURACELL Primary Lithium Metal Batteries
UN3090 Primary lithium metal batteries UN3091 Primary lithium metal batteries packed with or contained in equipment
UN 38.3 Transportation Tests : DURACELL certifies that all of its lithium batteries meet the requirements of the UN Manual of Tests and Criteria, Part III subsection 38.3 and the batteries were
US DOT: Special Provision 49CFR-173.185,
Air Transport IATA/ICAO: Special Provisions A88, A99, A154, A164, A183, A201 PI 968 – Lithium metal batteries only PI 969 – Lithium metal batteries packed with equipment PI 970 – Lithium metal batteries contained in equipment
Marine/Water Transport (IMDG): Special Provision 188, 230, 310, 957
ADR: Special Provisions: 188, 230, 310, 957
Air travelers should consult the US Department of Transportation (DOT) Safety Travel web site at http://safetravel.dot.gov for guidance regarding carry on of lithium batteries.

The gram weight of lithium metal in Duracell lithium metal cells & batteries is:

Catalog Number	Lithium Content grams	Total cell weight
DL 1616	.02 g	1.2g
DL 1620	.02 g	1.4g
DL 2016	.02 g	1.8g
DL 2032	.07 g	3.1g
DL 2430	.07 g	4.6g
DL 2450	.15 g	6.6g

SECTION 15: REGULATORY INFORMATION

United States

OSHA Status: While the finished product(s) is considered an article and not covered by the OSHA Hazard Communication Standard, 29 CFR 1910.1200, this PSDS contains valuable information critical to the safe handling and proper use of the product".

EPA TSCA Status: All intentionally-added components of this product are listed on the US TSCA Inventory.

SARA 313/302/304/311/312 chemicals: Manganese compounds 65-75%

California: This product has been evaluated and certain products require a warning labeling for perchlorate under California Proposition 65.

State Right-to-Know and CERCLA:

The following ingredients present in the finished product are listed on state right-to-know lists or state worker exposure lists

Ingredient	CAS #	Level	CERCLA RQ	State				
				IL	MA	NJ	PA	RI
Manganese Dioxide	1313-13-9	65-75%	None	Y	Y	N	Y	Y
Propylene Carbonate	108-32-7	10-15%	None	Y	Y	Y	Y	Y
Lithium	7439-93-2	5-10%	None	Y	Y	Y	Y	Y
Graphite	7782-42-5 7440-44-0	5-10%	None	Y	Y	N	Y	Y
1,2-Dimethoxyethane	110-71-4	1-10%	None	Y	Y	Y	Y	N
Lithium Perchlorate	7791-03-9	<1.5%	None	N	N	N	N	N

Canada All intentionally-added components of this product are listed on the Canadian DSL. This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and this PSDS contains all information required by the Controlled Products Regulations.

SECTION 16: OTHER INFORMATION

P&G Hazard Rating: Health: 0 Fire: 0 Reactivity: 0

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Data supplied is for use only in connection with occupational safety and health.

DISCLAIMER: This PSDS is intended to provide a brief summary of our knowledge and guidance regarding the use of this material. The information contained here has been compiled from sources considered by P&G to be dependable and is accurate to the best of the Company's knowledge. It is not meant to be an all-inclusive document on worldwide hazard communication regulations.

This information is offered in good faith. Each user of this material needs to evaluate the conditions of use and design the appropriate protective mechanisms to prevent employee exposures, property damage or release to the environment. P&G assumed no responsibility for injury to the recipient or third persons, or for any damage to any property resulting from misuse of the product.

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
e-mail: oembatteries@panasonic.com

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

Revision: January 1, 2018

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.

SDS

Safety Data Sheets (SDS) 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 SDS 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 ₂	1313-13-9
Negative Electrode	Lithium	Li	7439-93-2
Electrolyte	Propylene Carbonate-Solvent	C ₄ H ₆ O ₃	108-32-7
	1,2 Dimethoxyethane-Solvent	C ₄ H ₁₀ O ₂	110-71-4
	Lithium Triflate-Salt	CF ₃ SO ₃ Li	33454-82-9
Coin Cell Components	Material	Formula	
Positive Electrode	Manganese Dioxide	MnO ₂	1313-13-9
Negative Electrode	Lithium	Li	7439-93-2
Electrolyte	Propylene Carbonate-Solvent	C ₄ H ₆ O ₃	108-32-7
	1,2 Dimethoxyethane-Solvent	C ₄ H ₁₀ O ₂	110-71-4
	Lithium Perchlorate-Salt	LiClO ₄	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

Notice: The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation.
Panasonic Industrial Company makes no warranty expressed or implied.

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".

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.

Effective January 1, 2018 all Panasonic lithium batteries can be shipped by air in accordance with International Civil Aviation Organization (ICAO), 2017-2018 edition, Section II or Section 1B or International Air Transport Association (IATA) 59th 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), 2016, 38th 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, 6th revised edition.

If you plan on transporting any untested prototype battery packs contact your Panasonic Sales Representative for regulatory information. Check with your air carrier before shipping. Many air carriers have additional requirements.

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°F (100°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. Cooling the exterior of the batteries will help prevent rupturing. 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.