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PRODUCT SAFETY DATA SHEET

The batteries are exempt articles and are not subject to the OSHA Hazard Communication Standard Requirement. This sheet is provided as technical information only. The information and recommendations set forth are made in good faith and are believed to be accurate as of the date of preparation. However, **Maxell makes no warranty expressed or implied.**

Section 1 - Product and Company Identification

Product Name	Sizes:	Date of preparation:
Lithium Thionyl Chloride Battery (ER)	All	Jan. 1, 2016
Company:		Telephone Numbers:
Hitachi Maxell, Ltd., Energy Division		81-(0)794-63-8054
Address (Number, Street, City, State, and ZIP Code):		Fax Numbers:
5, Takumidai, Ono-shi, Hyogo 675-1322, Japan		81-(0)794-63-8445

Section 2 - Hazards Identification

This is a high energy density sealed battery containing dangerous (Lithium) and deleterious (Thionyl Chloride) materials. For this reason, improper handling of the battery could lead to distortion, leakage*, overheating, explosion, fire, or generation of irritating/corrosive gases and cause human injury or equipment trouble. Please strictly observe safety instructions.

(* Leakage is defined as an unintended escape of liquid from a battery.)

Section 3 - Composition/Information on Ingredients

Ingredient	CAS#	Content (wt %)
Thionyl Chloride ($SOCl_2$)	7719-09-7	20 to 45
Aluminum Chloride ($AlCl_3$)	7446-70-0	2 to 6
Lithium Chloride (LiCl)	7447-41-8	0.1 to 2
Lithium (Li)	7439-93-2	2 to 6
Carbon (C)	1333-86-4	2 to 8

Lithium content for each cell

Model	Li content (g)	Model	Li content (g)
ER3S	0.25	ER6	0.6
ER3	0.31	ER17/50	0.8
ER17/33	0.5	ER18/50	0.99
ER6C	0.6		

Section 4 - First Aid Measures

None unless internal materials exposure. If contents are leaked out, observe following instructions.

Inhalation	Fumes can cause nausea or difficulty in breathing. Remove to fresh air and consult a physician.
Skin	Immediately flush skin with plenty of water. If itch or irritation by chemical burn persists, consult a physician.
Eyes	Immediately flush eye with plenty of water for at least 15 minutes. Consult a physician immediately.
Ingestion	If swallowing a battery, consult a physician immediately. If contents come into mouth, immediately rinse by plenty of water and consult a physician.

Section 5 - Fire Fighting Measures

Extinguishing Media	Extinguisher of alkaline metal fire is effective. Plenty of cold water is also effective to cool the surrounding area and control the spread fire. But hydrogen gas may be evolved by the reaction of water and lithium and it can form an explosive mixture. Therefore in the case that lots of lithium batteries are burning in a confined space, use a smothering agent (e.g. carbon dioxide or dry sand).
Fire fighting procedure	Use self-contained breathing apparatus and full protective gear not to inhale harmful gas.

Section 6 - Accidental Release Measures

None under normal use conditions. If contents are leaked out, observe following instructions.

Protection for person	Use full protective equipment not to breathe vapors or touch liquid.
Removing procedure	Put the leaked battery into large container filled with water. Rinse the leaked liquid with water.
Area	Evacuate area except operators. After above procedure, ventilate the contaminated area.

Section 7 - Handling and Storage

1) Handling

● **Never swallow.**

If a battery is accidentally swallowed, see Section 4 - First Aid Measures**.**

● **Never apply excessive force to the positive terminal.**

Because the positive terminal is sealed in glass, subjecting this area to sudden jolts and excessive force (over 19.6 N) can break the glass seal. This can cause leakage and generation of irritating/corrosive gases.

● **Never drop.**

Dropping the battery can cause the glass seal to break leading to leakage and generation of irritating/corrosive gases.

● **Never weld the terminals or weld wire to the body of the battery.**

The heat of welding or soldering can cause the lithium to melt or cause damage to the insulating material in the battery. This can cause distortion, leakage, overheating, explosion, fire or generation of irritating/corrosive gases.

● **Never short-circuit the battery.**

Do not allow the positive and negative terminals to short-circuit. Never carry or store the battery with metal objects such as necklaces or hairpins. Do not take multiple batteries out of the package and stack or mix them when storing. Otherwise, this can lead to distortion, leakage, overheating, explosion, fire or generation of irritating/corrosive gases.

● **Never charge.**

The battery is not designed to be charged by any electrical source. Charging can generate gas and internal short-circuiting, leading to distortion, leakage, overheating, explosion, fire or generation of irritating/corrosive gases.

● **Never forcibly discharge.**

Forcibly discharging using an external power source or other batteries can cause the voltage to fall below 0V (reversing the poles), generating gas inside the battery and leading to distortion, leakage, overheating, explosion, fire or generation of irritating/corrosive gases.

● **Never heat.**

Heating the battery to more than 100 deg. C can increase the internal pressure, causing distortion, leakage, overheating, explosion, fire or generation of irritating/corrosive gases.

● **Never expose to naked flames.**

Exposing to naked flames can cause the lithium metal to melt, causing the battery to catch fire and explode.

● **Never disassemble the battery.**

Disassembly can generate irritating/corrosive gases. In addition, the lithium metal inside the battery can overheat and cause fire.

● **Never deform.**

Deforming the battery can cause leakage, overheating, explosion, fire or generation of irritating/corrosive gases.

● **Never reverse the positive and negative terminals when inserting in electrical equipment.**

Inserting the battery incorrectly can lead to short-circuiting, charging or forced-discharging. This can cause distortion, leakage, overheating, explosion, fire or generation of irritating/corrosive gases.

● **Never use different batteries together.**

Using different batteries together, i.e. different types or old/used and new or those of different manufacturers, can cause distortion, leakage, overheating, explosion, fire or generation of irritating/corrosive gases because of the differences in battery properties. Please consult Maxell before designing devices that use two or more batteries connected in a series or parallel, even with the same battery type.

● **Never touch liquid leaking from a battery.**

If the liquid enters the eyes or mouth, see Section 4 - First Aid Measures.

● **Never attach a battery to the skin.**

Attaching a battery to the skin using tape, etc. should be avoided. Moisture from the skin can cause battery discharge, which can produce certain chemical substances that burn the skin.

● **Never leave damaged battery in electrical equipment.**

Damaged batteries can generate irritating/corrosive gasses and can damage electrical equipment and systems.

2) Storage

Never let the battery contact with water. Never store the battery in hot and high humid place.

Section 8 - Exposure Controls, Personal Protection

Respiratory Protection		NA
Ventilation	Local Exhaust	NA
	Mechanical	NA
	Special	NA
	Other	NA
Eye Protection		NA
Protective Gloves		NA
Other protective clothing		NA

Section 9 - Physical/Chemical Characteristics

Cylindrical shape with primary cell of 3.6V nominal voltage

Section 10 - Stability and Reactivity

Stability: Stable (Performance deterioration depends on circumstance.)

Incompatibility: Water

Hazardous polymerization: Will not occur.

Condition to avoid: See section 7.

Hazardous Decomposition or Byproducts: Sulfur Dioxide, Hydrogen Chloride, Hydrogen

Section 11 - Toxicological Information

As the contents are sealed in the battery case, there is no toxicity.

Section 12 - Ecological Information

If the battery is disposed of on land or in water, the battery case may corrode and liquid leak from the battery. Ecological information has not been reported.

Section 13 - Disposal condition

The battery may be regulated by national or local regulation. Please follow the instructions of proper regulation. As electric capacity is left in a discarded battery and it comes into contact with other metals, it could lead to distortion, leakage, overheating, or explosion, so make sure to cover the (+) and (-) terminals with friction tape or some other insulator before disposal.

Section 14 - Transportation Information

1) Shipping Name (UN Number): Lithium metal batteries (UN3090)
   Lithium metal batteries packed with equipment (UN3091)
   Lithium metal batteries contained in equipment (UN3091)
2) Hazard Classification: Class 9 (Miscellaneous)
3) Method of transportation: As the cells are manufactured under a quality management program in an ISO9001 certified factory and the cells meet all the requirements of a UN manual of tests and criteria, Part III, sub-section 38.3, the applicable packing instructions (PI) or special provisions (SP) are as per the following table.
   The cells or batteries classified in Section II of any Packing Instruction or SP 188 may be exempted from Class 9 Dangerous Goods if complying with all requirements of applicable Section II or SP 188. But lithium metal cells and batteries transported as cargo are restricted to Cargo Aircraft Only.

Note. This does not apply to lithium metal batteries packed with equipment (PI 969) or contained in equipment (PI 970).

Li content per cell	Product name	Air *See Section 15 4)			Sea *See Section 15 5)
		Cell only	Cell packed with equipment	Cell contained in equipment	
not more than 0.3 g	ER3S	PI968 Section II	PI969 Section II	PI970 Section II	SP188
more than 0.3 g but not more than 1 g	ER18/50, ER17/50, ER6, ER6C, ER17/33, ER3	PI968 Section IB (8 or less cells: Section II)	PI969 Section II	PI970 Section II	SP188
more than 1 g	(No)	PI968 Section IA	PI969 Section I	PI970 Section I	SP230

As specific districts, countries and airlines may establish their own special requirements, the shipper must confirm requirements with the forwarder in advance.

Please confirm the aggregate lithium content when transport the battery.

Section 15 - Regulatory Information

Major applicable regulations for the transportation of lithium metal cells and batteries are as follows:

1) UN(United Nations) Recommendations on the Transport of Dangerous Goods: Model Regulations 18th revised edition
2) UN(United Nations) Recommendations on the Transport of Dangerous Goods: Manual of Test and Criteria 5th revised edition, Amendment 2
3) International Civil Aviation Organization (ICAO): Technical Instructions for Safety Transport of Dangerous Goods by Air, 2015-2016 Edition
4) International Air Transport Association (IATA): Dangerous Goods Regulations, 57th Edition
5) International Maritime Organization (IMO): International Maritime Dangerous Goods (IMDG) Code, 2014 Edition

Section 16 - Other Information

Major environmental regulation is as follows:

EU Battery Directive 2006/66/EC

If you want further information, please contact Maxell sales representative.