

## MATERIAL SAFETY DATA SHEET

### Section 1 – Identification

#### Manufacturer

Name of Company	:	Minamoto Battery (HK) Ltd.
Address	:	Flat A-6, 8/F., Mai Hing Ind. Bldg., 16-18 Hing Yip Street, Kwun Tong, Kowloon, Hong Kong
Department	:	Lithium Battery Development & Engineering Dept.
Tel	:	27934790
Fax	:	27934932
Contact Person	:	Iris Chu
Ref. No.	:	UH001264
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Product Name: Lithium Thionyl Chloride Batteries (Lithium metal Batteries)

Model: ER14335-2PT

### 2. Composition and information about the ingredients

#### Active materials

	Appr. Percent of Total Weight (%)
Lithium (Li)	3 to 4
Carbon Black ( C )	3 to 5
Thionyl chloride (SOCl <sub>2</sub> )	25 to 38
Lithium Aluminum Tetrachloride (LiAlCl <sub>4</sub> )	4 to 6

#### Passive materials

		Appr. Percent of Total Weight (%)
Base Metal	Steel	41 to 58
Others	Plastic	2 to 4
	Glass fiber	0 to 2

### 3. Hazards identification

The lithium-thionyl chloride batteries are not hazardous when used according to the recommendations of the manufacturer. But if the design of the circuit doesn't forecast all the necessary cares to prevent the inversion of polarity in the assembly of the battery or the battery packs, there is the risk of dangers due to the explosion of the battery. Define with care the assembling process to assure that accidental short circuit does not happen.

Do not expose the batteries to temperatures above 100°C.

If the battery loses its integrity and sealing, due to break or damages (mechanical, thermal or electrical), leakage, explosion or fire may follow. In this case there is the risk of release of chemical materials as defined in the paragraph 2 (active materials) of this safety sheet. Here below are shown the nature of special risks and the advices of caution.

#### Nature of special risks

- R14/15 (reacts with water and yields flammable gases)
- R21 (harmful in contact with skin)
- R22 (harmful if swallowed)
- R35 (causes severe burns)
- R41 (risk of serious damage to the eye)
- R42/43 (may cause irritations by inhalation and skin contact)

Safety advices

- S2 (keep out of reach from children)
- S8 (keep away from moisture)
- S22 (do not breathe dust)
- S24 (avoid contact with skin)
- S26 (in case of contact with eyes, rinse immediately with plenty of water and seek medical attention)
- S36 (wear suitable protective clothing)
- S37 (wear suitable gloves)
- S43 (in case of fire use extinguisher type D. DO NOT USE WATER)
- S45 (in case of incident or indisposition seek medical attention)

**4. First aid measures**

Only in case of contact with internal components of the battery:

Skin contact: flush with plenty of water

Eye contact: flush with plenty of water (eyelids held open)

Inhalation: breathe fresh air and give oxygen or artificial respiration by specialist people

Ingestion: drink much water and consult a doctor

**5. Fire-fighting measures**

Extinguishing media: extinguishers type D, Lith-X, DO NOT USE WATER in case of battery leakage

Special hazards: Irritating vapor.

Special protective equipment: wear protective clothing, use self-contained breathing apparatus with filtered cartridge type ABEK

**6. Accidental release measures**

In case of break of a battery, all the people must go away from the place where the incident happened and come back only after the dissolution of the irritating gas.

Broken batteries or battery packs must be covered with sodium carbonate (Na<sub>2</sub>CO<sub>3</sub>) or dry sand, place them in approved container and dispose in accordance with local regulation. For the eventual handling use gloves in Viton<sup>®</sup>.

**7. Handling and storage**

7.1 Handling: - Do not recharge

- Do not use different types and brands of batteries or with different state charge
- Avoid short circuit
- Use desk of work electrically insulated
- Avoid working over wet surface
- Use plastic caliber to valuate the dimensions of a Lithium battery or to insulate the metallic surface of the battery
- Do not have rings on the fingers; otherwise wear insulating gloves.
- Do not cut in the same time both the terminals of a battery: it could be a short circuit trough the shears

- Keep the batteries in non-conductive trays (i.e. plastic, wood or carton)
- Do not solder directly on the battery
- Do not disassemble the batteries, do not throw them in the fire, do not hole, do not overheat or plunge into water

7.2 Storage: - Store the Lithium cells in a cool, dry and ventilated area far from fires and heating sources.

- It is recommended the use of a non-combustible structure, keep adequate clearance between walls and batteries.
- The maximum temperature suggested for the storage is +30°C
- Higher temperatures are allow but cause an increase in the self discharge of the battery and speed up the process of passivation
- in any case, never go over 100 °C, as the batteries can break and cause a leakage
- Arrange adequate protections to avoid possible hurts to the batteries
- Keep the batteries in their original packages till when they are used
- Do not expose the batteries directly to the sun light
- Do not put an higher number of cartons one on another (respect what indicated)
- If in the same place are storage batteries with a total capacity > 50,000 Ah, it is suggested to install an alarm for smoke and gas

## 8. Exposure controls/personal protection

If the battery is integral, storage and handle with care, there is any dangers.

It is suggested to handle the batteries in a ventilated place, to don't smoke, eat or drink during the assembling.

## 9. Physical and chemical properties

N/A

## 10. Stability and reactivity

### 10.1 Conditions to avoid:

Do not expose at temperature higher than 100°C.

Avoid short circuit, crush, and exposition to heat sources.

Do not disassemble the batteries or the battery packs, do not throw them in the fire, do not perforate them, do not overheat or wet them.

### 10.2 Material to avoid:

Water, oxidizing agents, alkalis.

## 11. Toxicological information

The rupture of lithium-thionyl chloride batteries can develop the following substances:

- Hydrogen (H<sub>2</sub>), lithium Oxide (Li<sub>2</sub>O) and lithium Hydroxide (LiOH) in case of reaction of lithium metal with water
- Chlorine (Cl<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>) and disulfur dichloride (S<sub>2</sub>Cl<sub>2</sub>) if the thionyl chloride go above 140.5°C
- Hydrochloric acid (HCl) and sulfur dioxide (SO<sub>2</sub>) in case of reaction of thionyl chloride with water.
- Hydrochloric acid (HCl), lithium oxide (Li<sub>2</sub>O), lithium hydroxide (LiOH) and aluminium hydroxide (Al(OH)<sub>3</sub>) in case of reaction of lithium tetrachloroaluminate with water.

## 12. Ecological information

When properly used or disposed, the lithium-thionyl chloride batteries do not present environmental hazard.

## 13. Disposal consideration

For the disposal apply to specialized organization.

## 14. Transport information

Road transport: not restricted for Transport through compliance with ADR

Rail transport: not restricted for Transport through compliance with RID, 2002 requirements in special provisions 188, 230 and 310.

Sea transport: not restricted for Transport through compliance with IMDG: IMDG Code 2010 Edition, special provisions 188, 230 and 310.

Air transport: not restricted for Transport through compliance with ICAO/IATA, 57<sup>th</sup> Edition, Packing Instruction 968 section II.

Note: For a lithium metal cell or battery, the lithium content is not more than 1.0 g per cell, are not restricted for Transport with Packing Instruction 968 section II. If this requirement is satisfied, lithium batteries will not be considered as dangerous goods when transported.

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**\*\* PRODUCTIN OF MSDS/ PSDS/ LAB TEST REPORT / CERTIFICATION FOR SAFE TRANSPORT OF AIR CARGO PROVING UN MANUAL OF TESTS AND CRITERIA, PART III, SUB-SECTION 38.3 IS MET\*\***

**\*\*MAWB AND HAWB NO. (IF ANY) HAVE TO BE INDICATED ON THE DECLARATINO LETTER AND MSDS. AND THE DOCUMENT NUMBER OF MSDS IS REQUIRED TO BE MARKED ON THE LETTER AS WELL FOR CROSS-REFERENCE PURPOSE\*\***

## 15. Regulation information

The transport of lithium batteries is regulated by ONU as described in the "Recommendations of the Transport of Dangerous Goods ref.ST/SG/AC.10/1-Ed.-11-2000".

Depending on their lithium metal content (quantity higher than 1g), the batteries may or may not be assigned to the transport restrictions, following the rules defined in the ONU document "Recommendations of the Transport of Dangerous Goods".

## 16. Other information

The lithium-thionyl chloride batteries or battery packs must be handle by specialize people.

They must be kept out of reach from children.

They must be used following the Technical Specifications, without exceed the values defined.

Do not assemble by one self a serial of batteries, but request the finished battery to the supplier, who will provide for install protection components (diodes, etc.)

The information contained in this sheet is based on the present knowledge and the conditions of use.

For every use not in conformity to the safety sheet or for the use in combination with any other material or in any other process the user is the responsible.