

**MATERIAL SAFETY DATA SHEET****1. Identification of the product and supplier**

Identification of the product: Lithium Metal  
Thionyl Chloride (Li-SOCl<sub>2</sub>)  
non-rechargeable batteries

Manufacturer: GMB Co., Ltd  
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**2. Composition and information about the ingredients**

## Active materials

	Appr . Percent of Total Weight (%)
Lithium (Li)	4.72 (2.37g)
Carbon black (C)	4.05
Thionyl chloride (SOCl <sub>2</sub> )	37.87
Lithium aluminum tetrachloride (LiAlCl <sub>4</sub> )	5.9

## Passive materials

		Appr . Percent of Total Weight (%)
Base Metal	Steel	44.73
Others	Plastic	2.27
	Glass fiber	0.46

**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 at 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 don't happen

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

If the battery lose 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 sensitisation 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: breath 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: DO NOT USE WATER in case of battery leakage

Special hazards: irritating vapour

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 ( $\text{Na}_2\text{CO}_3$ ) or dry sand, place them in approved container and dispose in accordance with local regulation.

For the eventual handling use gloves in Viton®.

## 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 to work over wet surface
  - Use plastic calibre 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  $+30^\circ\text{C}$
  - 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  $100^\circ\text{C}$ , 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  $> 50,000 \text{ Ah}$ , 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

Appearance: The batteries are metal cylinders with different diameters and height, fitted with an external plastic sleeve.

## 10. Stability and reactivity

### 10.1 Conditions to avoid:

Do not expose at temperature higher than 100°C.  
Avoid short circuit, crush, 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 a lithium-thionyl chloride batteries can developed 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 organisation.



#### 14. Transport information

Restriction for the transport: class 9 in accordance to the United Nation regulation.

##### International convention

Road transport: not hazardous in accordance to ADR

Rail transport: not hazardous in accordance to RID

Sea transport: not hazardous in accordance to IMDG

Air transport: not hazardous in accordance to ICAO

Note: the batteries which contain few than 0,5g of metal lithium are not restricted for transport.

#### 15. Regulation information

Lithium batteries are regulated during shipment by the Dept.of Transportation (USDOT)and United Nation,(International)requirements. Batteries tested and found in compliance with UN Chapter 38.3 requirements can be shipped without designation as "Class9" hazardous materia if all other marking,labeling,packing,and unit volumes are met. The battery complies with Part 1 of PI965 accordingly.

#### 16. Other information

The Lithium batteries or battery packs must be handle by specialize people

They must be kept out of reach from children.

Handle with care. Flammability hazard exists if the package is damaged .

Allow inspection and repacking if necessary.

They must be used following the Technical Specifications, without exceed the values defined. Does not contain any recalled and /or defective batteries.

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 are 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.

NOTICE: The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Guangzhou Markyn Battery Co.,Ltd makes no warranty expressed or implied.

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