GREEN ENERGY
Power Solution Expert

GREEN ENERGY BATTERY Co.,LTD

MATERIAL SAFETY DATA SHEET

MSDS Reference #GE201301

NAME : *LITHIUM THIONYL CHLORIDE BATTERIES*

1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 Product : LITHIUM THIONYL CHLORIDE BATTERY

Battery Type : ER34615

Electrochemical system :

Electrodes	**Negative electrode** CARBON	**Positive electrode** LITHIUM
Electrolyte	THIONYL CHLORIDE inorganic electrolyte	
Nominal voltage	3.6 Volts	

1.2 Supplier :

Name : GREEN ENERGY BATTERY CO.,LTD

Add : 3/F,Building C,Xintian Innovation Industrial Park,Guanlan Street, Baoan District,Shenzhen,518110, China
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2 – COMPOSITION / Information on Ingredient

Chemical composition	**Molecular formula**	**CAS No.**	**Weight (%)**
Lithium	Li	7439-93-2	4-4.5
Thionyl Chloride	$SOCl_2$	7719-09-7	40-46

Aluminum Chloride	$AlCl_3$	7446-70-0	3-4
Lithium Chloride	LiCl	7447-41-8	1-3
Carbon	C	1333-86-4	3.8

3 - HAZARDS IDENTIFICATION

The Non-rechargeable 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 bt 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 happend.
Do not expose the batteries to temperature 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 sensitation 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

Eyes
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid
Skin
Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid

Inhalation
Remove from exposure and move to fresh air immediately. Use oxygen if available.
Ingestion
Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious.
Call a physician.

5 – FIRE FIGHTING MEASURES

Flash Point: N/A
Auto-Ignition Temperature: N/A
Extinguishing media:
Dry chemical , CO_2
Special Fire-Fighting Procedures
Self-contained breathing apparatus
Unusual Fire and Explosion Hazards
Cell may vent when subjected to excessive heat-exposing battery contents
Hazardous Combustion Prodcuts
Carbon monoxide, carbon dioxide, lithium oxide fumes

6 - ACCIDENTAL RELEASE MEASURES

Steps to be Taken in case Material is Released or Spilled
If the battery material is released , remove personnel from area until fumes dissipate.
Provide maximum ventilation to clear out hazardous gases.
The preferred response is to leave the area and allow the batteries to cool and vapors to dissipate.
Avoid skin and eye contact or inhalation of vapors.
Broken batteries or battery packs must be covered with sodium carbonate (Na_2CO_3) or dry sand, place them in approved container and dispose in accordance with local regulation.

Waste Disposal Method
It is recommended to discharge the battery to the end, handing in the abandoned batteries to related department unified, dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental protection agency and /or federal EPA.

7 - HANDLING AND STORAGE

7.1 Handling:
Do not recharge
Do not forced over-discharge
Do not use different types and brands of batteries
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 +25°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

Respiratory Protection
In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting batteries. Respiratory Protection is not necessary under conditions of normal use.

Ventilation
Not necessary under conditions of normal use.
Protective Gloves
Not necessary under conditions of normal use.

Other Protective Clothing or Equipment
Not necessary under condtions of normal use.
Personal Protection is recommeded for venting batteries: Respiratory Protection, Protective Gloves, Protective Clothing and safety glass with side shields.

9 - PHYSICAL AND CHEMICAL PROPERTIES

Nominal Voltage: 3.6V
Rated Capacity: 19000mAh
Lithium Content: 4.79g

Appearance Characters: cylindrical , odorless, solid battery

10 - STABILITY AND REACTIVITY

Stability
Stable

Conditions to Avoid
Heating, short circuti, mechanical abuse and electical abouse

Hazardous Decomposition Prodcuts
N/A

Hazardous Polymerization
N/A

If leaked, forbidden to contact with strong oxidizers, mineral acids, strong alkalis, halogenated hydrocarbons. Also, to avoid Water

11 - TOXOLOGICAL INFORMATION

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

- Huydrogen (H_2), lithium Oxide (Li_2O) and lithium Hydroxide (LiOH) in case of reaction of lithium metal with water
- Chlorine (Cl_2), sulfur dioxide (SO_2) and disulfur dichloride (S_2Cl_2) if the thyonil cloride go above 140.5°C
- Hydrochloric acid (HCl) and sulfur dioxide (SO_2) in case of reaction of thionyl chloride with water
- Hydrochloric acid (HCl), lithium oxide (Li_2O), lithium hydroxide (LiOH) and aluminium hydroxide ($Al(OH)_3$) in case of reaction of lithium thetrachloroaluminate with water..

Inhalation, skin contact and eye contact are possible when the battery is opened. Exposure to internal contents, the corrosive fumes will be very irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibroid lung injury and membrane irritation.

12 - ECOLOGICAL INFORMATION

When promptly used or disposed the battery does not present environmental hazard.
When disposed, keep away from water, rain and snow.

13 - DISPOSAL CONSIDERATIONS

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
If batteries are still fully or only partially discharged, they can be considered a reactive hazardous waste because of significant amount of not creation, or unconsumed lithium remaining in the spent battery.
The batteries must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste. Recycling of battery can be done in authorized facility, through licensed waste carrier.

14 - TRANSPORT INFORMATION

The Lithium Thionyl Chloride battery (D ER34615) has passed the test UN38.3, according the report ID:H03133038821D~1

IATA Proper Shipping Name: Lithium Metal Batteries
Hazard Class: 9
UN No.: UN3090
Packaging group: II
Lithium content exceeds the standard, so it belongs to dangerous goods. Be shipped by passenger and cargo

aircraft. The goods are packaged according to the packaging instruction 968 Section I A of DGR.

IMDG Proper Shipping Name: Lithium Metal Batteries
Hazard Class: 9
UN No.: 3090
Packaging group: II
Lithium content excessds the standard, so it belongs to dangerous goods.

Land Proper Shipping Name: Lithium Metal Batteries
Hazard Class: 9
UN No.: 3090
Lithium content excessds the standard, so it belongs to dangerous goods.

Separate Lithium Metal batteries when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport. Take in a cargo of them without falling., dropping and breakage. Prevent collapse of cargo piles and wet by rain.

Transport Fashion: By air, by sea , by railway, by road

15 - REGULATORY INFORMATION

Law Information
<<Dangerous Goods Regulation>>
<<Recommendations on the Transport of Dangerous Goods Model Regulations>>
<<International Maritime Dangerous Goods>>
<<Technical Instrucations for the Safe Transport of Dangerours Goods>>
<<Classification and code of dangerous goods>>
<<Occupational Safety and Health Act>> (OSHA)
<<Toxic Substances Control Act>> (TSCA)
<<Consumer Product Safety Act>> (CPSA)
<<Federal Environmental Pollution Control Act>> (FEPCA)
<<The Oil Pollution Act>> (OPA)
<<Resource Conservation and Recovery Act>> (RCRA)
<<Safety Drinking Water Act>> (CWA)
<<California Proposition 65>>
<<Code of Federal Regulations>> (CFR)
In accordance with all Federal, State and Local laws.

16 - ADDITIONAL INFORMATION

The 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 above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be

unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsiblitly for the results of its use. This information is furnished upon condition that the person receiving it shall make his own detemination of the suitablility of th ematerial for his particular purpose..

Approval Date: January 08, 2013