

VABO NV

**LITHIUM THIONYL CHLORIDE
BATTERIES**

Material Safety Data Sheet

Version 2016.07

Product Name: VABO LITHIUM-THIONYL

Chemical Systems: THIONYL CHLORIDE

Type: Art. 10759, 10760, 10969, 11126, 11597, 11999 – ER14250

Art. 10762, 10763, 10337 – ER14505

Art. 10764, 10765 – ER26500

Art. 10766, 10767, 11660 – ER34615

Designed for Rechargeable: No

1 MANUFACTURER INFORMATION

Distributed by:

VABO NV

Boterbosstraat 20

3550 HEUSDEN-ZOLDER

BELGIUM

Tel.: (0032) 13 350550

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2 COMPOSITION & INFORMATION ON INGREDIENTS

Ingredient	Content
Lithium (Li)	TLV/PEL N/A
Thionyl chloride (SOCl ₂)	OSHA: 1,0ppm (5,0mg/m ³) ceiling ACGIH: 1,0ppm (5,0mg/m ³) ceiling
Carbon	ACGIH: 3,5 mg/m ³ TLV/TWA

3 HAZARDS IDENTIFICATION

The lithium thionyl chloride batteries described in this MSDS are hermetically sealed units, which are not hazardous when used according to the recommendations of the manufacturer.

Under normal condition of use of the batteries, the electrode materials and the liquid electrolyte they contained are non-reactive provided the battery integrity is maintained. Risk of exposure exists only in case of mechanical, electrical or thermal abuse. Do not short circuit, recharge, puncture, incinerate, crush, immerse in water, force discharge or expose to temperatures above the temperature range of the cell or battery. In these cases there is risk of fire or explosion.

4 FIRST AID MEASURES

In case of battery rupture, explosion or major leakage, evacuate personnel from contaminated area and provide good ventilation to clear out corrosive fumes, gases or the pungent odor, seek immediate medical attention.

Eyes:

First rinse with plenty of water for 15 minutes (remove contact lenses if possible), and then seek medical attention.

Skin:

Remove contaminated clothes and rinse skin with plenty of water or shower for 15min. Refer to medical attention.

Inhalation:

Remove to fresh air, rest in half-upright position, use artificial respiration if needed and refer to medical attention.

Ingestion:

Rinse mouth, DO NOT induce vomiting, give plenty of water to drink and refer to medical attention

5 FIRE FIGHTING MEASURES

Flash Point: N/A **Auto-Ignition Temp:** N/A **Flammable Limits:** N/A

Extinguisher Media: Copious amounts of water. Lith-X powder, Class D fire extinguisher, Dry Lithium Chloride, Graphite Powder, Pyrene G-1 may not be effective on resulting secondary fires.

Special Fire Fighting Procedures: Cover with Lith-X powder, Class D fire extinguisher, dry lithium chloride, or graphite powder. DO NOT USE CO₂, Class ABC or soda ash extinguisher. Wear protective breathing apparatus; a positive pressure Self Contained Breathing Apparatus (SCBA), or Air Purifying Respirator (APR). Be aware of secondary fires.

Unusual Fire and explosion Hazards: Do not short circuit, recharge, over discharge (discharge below 0,0V), puncture, crush or expose to temperatures above the maximum rated temperature as specified by the manufacturer. Cell may leak, vent or explode. If a bright white flame is present, lithium content is exposed and on fire.

6 ACCIDENTAL RELEASE MEASURES

Accidental Releases: Do not breathe vapors or touch liquid with bare hands (see section 4),

Waste Disposal Methods: Evacuate area. If possible, a trained person should attempt to stop or contain the leak by neutralizing spill with soda lime or baking soda. A NIOSH approved acid gas filter mask or Self-contained Breathing Apparatus should be worn. Seal leaking battery and soda lime or baking soda in a plastic bag and dispose of as hazardous waste.

Other: Follow North American Emergency Response Guide (NAERG) #138 for cells involved in an accident, cells that have vented, or have exploded.

7 HANDLING AND STORAGE

Storage: Cells should be stored at room temperature, approx 21°C. Do not store batteries in high humidity environments for long periods. High Temperature storage will degrade performance.

Precautions: Do not short circuit or expose to temperatures above the maximum rated temperature as specified by the manufacturer. Do not recharge, overdischarge, puncture or crush.

Other conditions: Do not store cells in close proximity of other combustible / flammable materials.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection:

NIOSH Approved Acid Gas Filter Mask, or Self-Contained Breathing Apparatus.

Protective Gloves:

Nitrile or PVC, Gloves should be 15ml, or thicker

Eye protection:

Chemical Worker Safety Glasses or face shield

Other:

Negative pressure chemical fume hood.

Other Protective Clothing and Equipment:

Chemical Laboratory Safety Glasses, Protective, Apron, Acid Resistant Protective Clothing, and face shield,

Hygienic Work Practices:

Use good chemical hygiene practice. Do not eat or drink when handling contents. Avoid unnecessary contact.

9 PHYSICAL AND CHEMICAL CHARACTERISTICS

Ingredient	Content	Weight Percentage
Lithium (Li)	2.2g	4%
Thionyl chloride (SOCl ₂)	21g	39%
Lithium aluminum tetrachloride (LiAlCl ₄)	3g	5.5%
Acetylene Black (Carbon C)	2.4g	4.5%
Steel Case	18.5g	35%
Battery Cap	6.3g	12%

10 STABILITY & REACTIVITY

Stability: Stable

Incompatibility: N/A

Hazardous Polymerization: Will not occur

Conditions to avoid: Temperatures above the maximum rated temperature as specified by the manufacturer due to leak hazard. High humidity for extended periods.

Hazardous Decomposition Products: Sulfur Dioxide_(g), Hydrogen Chloride_(g), Hydrogen_(g)

11 TOXICOLOGICAL INFORMATION

Acute Toxicity (as applicable):

Thionyl Chloride

LC₅₀ (inhalation): 500 ppm (rat 1-hr)

LD₅₀: N/A

Eye Effects: Corrosive

Skin Effects: Corrosive

Sulfuryl Chloride

LC₅₀ (inhalation): 130-250 ppm (rat 1-hr)

LD₅₀: N/A

Eye Effects: Corrosive

Skin Effects: Corrosive

12 ECOLOGICAL INFORMATION

Aquatic Toxicity: Do not let internal components enter marine environments. Avoid releases into waterways, wastewater or groundwater.

13 DISPOSAL CONSIDERATIONS

Proper Shipping Name: Waste Lithium Batteries

UN Number: 3090

Hazard Classification: Class 9 (Misc.)

Packing Group: II

Labels Required: Miscellaneous, hazardous waste

Waste Disposal Code: D003

Other: All lithium thionyl chloride batteries should be disposed of by a certified hazardous waste disposal facility.

14 TRANSPORT INFORMATION

US DOT (per 49 CFR 172.101) and IATA/ICAO

Proper Shipping Name: Lithium Metal Batteries

UN Number: UN 3090 (UN 3091 for Lithium Metal Batteries Contained in Equipment or Lithium Metal Batteries Packed With Equipment)

Hazard Classification: Class 9 (Misc.)

Packing Group: II

Labels Required: Miscellaneous hazard class 9, lithium battery label (IATA 7.4.8)

Other: CARGO AIRCRAFT ONLY (Forbidden as cargo aboard passenger aircraft)

Shipping Requirements:

DOT: Lithium batteries are subject to shipping requirements exceptions under 49 CFR 173.185

IATA: Shipping of lithium batteries in aircrafts are regulated by the International Civil Aviation Organization (ICAO) and the international Air Transport Association (IATA) requirements in Special Provisions A48, A88, A99, A154 and A164 and Packing instruction 968, 969 or 970.

15 REGULATORY INFORMATION

OSHA status: This product is considered an "Article" and the internal component (thionyl chloride / sulfuryl chloride) is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1920.1200.

16 OTHER INFORMATION

Lithium Battery Safety

With proper use and handling, lithium batteries have demonstrated an excellent safety record. The success and wide use of lithium batteries is partially due to the fact that they contain more energy per unit weight than conventional batteries. However, the same properties that result in a high energy density also contribute to potential hazards if the energy is released at a fast uncontrolled rate. In recognition of the high-energy content of lithium systems, safety has been incorporated into the design and manufacture of all Electrochem batteries. However, abuse or mishandling of lithium batteries can still result in hazardous conditions. The information provided here is intended to give users some guidelines to safe handling and use of the VABO lithium batteries.

Cell abuse

In general, the conditions that cause damage to cells and jeopardize safety are summarized on the label of each cell. These conditions include:

- Short Circuit
- Charging

- Forced Over discharge
- Excessive heating or incineration
- Crush, puncture or disassembly
- Very rough handling or high shock and vibration could also result in cell damage.

Cell Handling and Inspection Guidelines

The most frequent forms of cell abuse can easily be identified and controlled in the workplace. It is our experience that inadvertent short circuits are the largest single cause of field failures.

Problems associated with shorting as well as other hazardous conditions can be greatly reduced by observing the following guidelines:

- Cover all metal work surfaces with an insulating material.
- The work area should be clean and free of sharp objects that could puncture the insulating sleeve on each cell.
- Never remove the shrink-wrap from a cell or battery pack.
- All persons handling cells should remove jewelry items such as rings, wristwatches, pendants, etc., that could come in contact with the battery terminals.
- If cells are removed from their original packages for inspection, they should be neatly arranged to preclude shorting.
- Cells should be transported in plastic trays set on pushcarts. This will reduce the chances of cells being dropped on the floor, causing physical damage.
- All inspection tools (calipers, rulers, etc.) should be made from non-conductive materials or covered with a non-conductive tape.
- Cells should be inspected for physical damage. Cells with dented cases or terminal caps should be inspected for electrolyte leakage. If any is noted, the cell should be disposed of in the proper manner.

Cell storage

Cells should be stored in their original containers. Store cells in a well ventilated, cool, dry area. Store cells in a well ventialed, cool, dry area. Store cells in an isolated area, away from combustible materials. Never stack heavy objects on top of boxes containing lithium batteries to preclude crushing or puncturing the cell case.

Handling during product assembly

All personnel handling batteries should wear appropriate protective equipment such as safety glasses.

- Do not solder wires or tabs directly to the battery. Only solder to the leads welded to the cell by the manufacturer.
- Never touch a cell case directly with a hot soldering iron. Heat sinks should be used when soldering to the tabs and contact with the solder tabs should be limited to a few seconds.
- Cells should not be forced into (or out of) battery holders or housings. This could deform the cell causing an internal short circuit, or fracturing the glass to metal hermetic seal.
- All ovens or environmental chambers used for testing cells or batteries should be equipped with an over-temperature controller to protect against excessive heat.
- Only precision convection ovens should be used for cell testing. Lesser ovens may exhibit uneven heating and hot spots that can exceed the rated temperature of the battery.
- Do not connect cells or batteries of different chemistries together.
- Do not connect cells or batteries of different sizes together.
- Do not connect old and new batteries together.
- Consult Electrochem before encapsulating batteries during discharge. Cells may exceed their maximum rated temperature if insulated.
- Although we have provided a general overview of lithium battery safety and handling, we urge you to call us with any questions. Our VABO technical services staff will be pleased to assist you with you questions.