

Technical Notice

Safety data sheet lithium batteries

1. Identification

- 1.1 Product Name:** Tadiran High Energy Lithium Battery, or
Sonnenschein Lithium Inorganic Lithium Battery
- Voltage:** 3.6 Volts
- Chemistry System:** Lithium thionyl chloride
- Anode:** Lithium metal
- Cathode:** Liquid, thionyl chloride
- 1.2 Company:** Tadiran Batteries GmbH
Industriestr. 22
D-63654 Büdingen
- 1.3 Emergency Telephone Number:** +49(0)6042/954-599

Note: This safety data sheets refers to cells and batteries assembled from them

2. Composition/Information on Ingredients

Substance	CAS No.	Approximate percent of total weight	Hazard symbol	R-phrases
Lithium Metal	7439-93-2	2 - 6	F, C	14/15-34
Thionyl Chloride	7719-09-7	18 - 47	C	14-34-37
Aluminium Chloride	7446-70-0	2 - 5		
Lithium Chloride	7447-41-8	1 - 2		
Carbon	7440-44-0	2 - 5		
Steel, Nickel plated	----	35 - 73		
Glass	----	0 - 2		
PVC	9002-86-2	0 - 1		
PMMA	9011-14-7	0 - 1		
PTFE	9002-84-0	0 - 1		

Hazard Symbols: C Corrosive
F Highly flammable

R-Phrases: R 14 Reacts violently with water
R 14/15 Reacts violently with water liberating extremely flammable gases
R 34 Causes burns
R 37 Irritating to respiratory system

Important Note: The material in this section may only represent a hazard if the integrity of the battery is compromised, or if the battery is physically or electrically abused.

Revised 2009-01-23

3. Hazards Identification

Warning: Fire, explosion, and severe, burn hazard. Do not recharge, disassemble, heat above 100 °C (series SL-500: 150 °C), incinerate, or expose contents to water.

Protection from charging:

Whenever lithium batteries are not the single power source in a circuit the following measures recommended by Underwriters Laboratories are relevant. The cells should not be connected in series with an electrical power source that would increase the forward current through the cells.

The circuit for these cells shall include one of the following:

- A. Two suitable diodes or the equivalent in series with the cells to prevent any reverse (charging) current. The second diode is used to provide protection in the event that one should fail. Quality control, or equivalent procedures, shall be established by the device manufacturer to ensure the diode polarity is correct for each unit,
- or*
- B. A blocking diode or the equivalent to prevent any reverse (charging) current and a resistor to limit current in case of a diode failure. The resistor should be sized to limit the reverse (charging) current to the maximums given in the data sheets.

4. First Aid Measures

A. Electrolyte Contact

- Skin: Immediately flush with plenty of water for at least 15 minutes. If symptoms are present after flushing, get medical attention.
- Eyes: Immediately flush with plenty of water for at least 15 minutes and get medical attention.
- Respiratory system: With large quantities and irritation of the respiratory tract medical surveillance for 48 hours.
Immediately inhale Cortisone Spray, e.g. Pulmicort.

B. Lithium Metal Contact

- Skin: Remove particles of lithium from skin as rapidly as possible. Immediately flush with plenty of water for at least 15 minutes and get medical attention.
 - Eyes: Immediately flush with plenty of water for at least 15 minutes and get immediate medical attention.
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Revised 2009-01-23

5. **Fire - fighting measures**

A. **Extinguishing Media**

- During a fire with lithium batteries, copious amounts of cold water is an effective medium to prevent expansion of the fire. Do not use warm water or hot water.
- Lith-X (Class D extinguishing media) is effective on fires involving only a few lithium batteries.
- Do not use CO₂ or Halon type extinguishers.
- Dry chemical type extinguishers have limited extinguishing potential

B. **Fire Fighting Procedures**

- Use a positive pressure self-contained breathing apparatus if batteries are involved in a fire.
- Full protective clothing is necessary.
- During water application caution is advised as burning pieces of lithium may be ejected from the fire.
- Where the cells or batteries are not at the centre of the fire copious amounts of water may be supplied to the cells using a diffuser type nozzle so that the cells remain cool during the containment and extinguishing of the fire. A sprinkler system should be sufficient for this purpose the critical factor being that the lithium cells do not experience temperatures above the melting point of lithium.
- Small amounts of water should never be used such as the volumes contained within portable fire extinguishers. Standard dry powder extinguishers are ineffective. Halon extinguishers must not be used when fighting lithium fires as toxic gases may be generated during fire fighting. It should be noted that a hazard of hydrogen formation exists whenever hot lithium metal comes into contact with water.

6. **Accidental release measures**

When the battery housing is damaged, small amounts of electrolyte may leak. Seal battery air tight in a plastic bag, adding some chalk (CaCO₃) or lime (CaO) powder or Vermiculite. Electrolyte traces may be wiped off dryly using household paper. Rinse with water afterwards.

7. **Handling and Storage**

- Do not allow terminals to short-circuit.
- Storage preferably in a cool (below 21 °C), dry area that is subject to little temperature change.
- Do not place near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in reduced battery service life.

8. **Exposure controls / personal protection**

Not applicable

Revised 2009-01-23

9. Physical and chemical properties

Not applicable

10. Stability and reactivity

May rupture violently when heated above 150 °C or when charged.

11. Toxicological information

Not applicable

Refer to information under item 2.

12. Ecological information

The batteries do not contain mercury, cadmium or other heavy metals.

13. Disposal Considerations

- Dispose by incineration or burial at permitted waste treatment and/or disposal sites unless suitable recycling possibilities exist.
- Batteries do not contain hazardous materials according to EC directives 91/157/EEC and 93/86/EEC.
- EC battery directive 2006/66/EC is currently being implemented by EC member states.
- A disposal service is offered upon request by Tadiran Batteries.

14. Transport information

Class 9

UN 3090: LITHIUM METAL BATTERIES

UN 3091: LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT, or
LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT

Packing group: II

Special provisions and packing instructions:

ADR, RID: 188, 230, 310, 636, P903, P903a, P903b

IATA: A88, A99, A154, A164, P968, P969, P970

IMDG-Code: 188, 230, 310, P903

EmS: F-A, S-I

Storage and segregation: Category A

For more information see www.tadiranbatteries.de > products > Transport Regulations

15. Regulatory information

Not applicable

Revised 2009-01-23

16. Other information

- Tadiran Lithium Batteries are registered by Underwriters Laboratories, Northbrook, U.S.A. under file MH 12827.
- Further information is given in
 - Tadiran Lithium Battery Product Data Catalogue
 - Tadiran Lithium Battery Technical Brochure.
- For lithium batteries in general, Safety standard IEC 60086-4 applies. It contains detailed recommendations for manufacturers of equipment and users.
- Visit our web site under www.tadiranbatteries.de.
- Battery packs

The design and assembly of battery packs require special skills, expertise and experience. Therefore it is not recommended that the end user attempt to self-assemble battery packs. It is preferable that any battery using lithium cells be fabricated by TADIRAN to ensure proper battery design and construction. A full battery assembly service is available from TADIRAN who can be contacted for further information. If for any reason, this is not possible, TADIRAN can review the pack design in confidence to ensure that the design is safe (in assembly and use) and capable of meeting stated performance requirements.

The information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.