

MATERIAL SAFETY DATA SHEET

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1. PRODUCT IDENTIFICATION

Product: LI-ION RECHARGEABLE BATTERY
 Trade name: LI-ION (LiCoO₂)
 Model: 063450AR
 Electrochemical system:
 Electrodes:
 Negative Electrode: C
 Positive Electrode: LiCoO₂
 Electrolyte: LiPF₆
 Nominal Voltage: 3.7 Volt

2. COMPOSITION.

No More Than Lithium Is Contained

3. HAZARD DATA

3.1 Physical:

The Li-ion batteries described in this Material Safety Data Sheet are sealed, which are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain intact, Risk of exposure only in case of abuse, e.g. mechanical, thermal, electrical, which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage, electrode materials reaction with moisture/water of battery vent/explosion/fire may follow depending upon circumstances.

3.2 Chemical:

Classification of dangerous Substances Contained into the Product as per Directive

Substance	Chemical Symbol	Content (%)	Melting Point °C	Indication of Danger	Special Risk	Safety Advice
Lithium cobaltite	LiCoO ₂	23~33	> 1000		R22 R43	S2 S22 S24 S26 S36 S37 S45
Carbon	C	12~17	> 1000			
Organic solvents	EC DMC DEC	3	EC : 38°C DMC : 4°C DEC : -43°C	Flammable	R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45
	LiPF ₆		N/A	Irritant Corrosive	R14	S2 S8 S22 S24 S26 S36

slight variations depending from all type

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1) Name of Special Risks:

- R14/15 Reacts with water and yields flammable gases
- R21 Harmful in contact with skin
- R22 Harmful us swallowed
- R35 Causes severe burns
- R41 Risk of serious damage to the eye
- R42/43 May cause sensitization by inhalation and skin contact
- R43 May cause sensitization by skin contact

2) 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
- S45 In case of incident, seek medical attention

4. First Aid Measures

In case of battery rupture or explosion, evacuate personnel from contaminated area and provide maximum ventilation to clear out corrosive fumes/gases and pungent odors.

In all case, seek immediate medical attention,

Eye contact: Flush with plenty of water (eyelids-held open) for at least 15 minutes

Skin contact: Remove all contaminated clothing and flush affected areas with plenty of water and sop for at least 15minutes.

Ingestion: Dilute by giving plenty of water and get immediate medical attention.
Assure that the victim does not aspirate vomited material by use of positional drainage.

Assure that mucus does not obstruct the airway.

Do not give anything by mouth to an unconscious person

Inhalation: Remove to fresh air and ventilate the contaminated area.

Give oxygen or artificial respiration if needed.

5. Fire-Fighting Measures

Fire and explosion hazard:	The batteries can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 90°C resulting from inappropriate use or from the environment. Possible formation of hydrogen fluoride (HF) and phosphorous oxides during fire.LiPF6 salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.
Extinguishing media:	Suitable : CO2, Dry chemical or Foam extinguishers

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	Not to be used : Type D extinguishers
Special exposure hazards:	<p>Following cell overheating due to external source or due to improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment.</p> <p>Eye contact: The electrolyte solution contained in the battery is irritant to ocular tissues.</p> <p>Skin contact: The electrolyte solution contained in the battery causes skin irritation.</p> <p>Ingestion: The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract.</p> <p>Inhalation: Contents of a leaking or ruptured battery can cause respiratory tract, mucus, membrane irritation and edema.</p>
Special protective equipment:	<p>Use self-contained breathing apparatus to avoid breathing irritant fumes.</p> <p>Wear protective clothing and equipment to prevent body contact with electrolyte solution.</p>

6. Accidental Release Measures

The material contained within the batteries would only be expelled under abusive conditions. Using shovel or broom, cover battery or spilled substances with dry sand or vermiculite, place in approved container (after cooling if necessary) and dispose in accordance with local regulations.

7. Handling and Storage

The batteries should not be opened destroyed nor incinerated since they may leak or rupture and release in the environment the ingredients they contain.

Handling	Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non-conductive (i.e. plastic) trays.
Storage	Store in a cool (preferably below 30°C) and ventilated area away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 90°C may result in battery leakage and rupture. Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.
Other	<p>Manufacturer recommendations regarding maximum recommended currents and operating temperature range.</p> <p>Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation.</p>

8. Exposure Controls/personal Protection

Respiratory protection:	<p>Not necessary under normal use.</p> <p>In case of battery rupture, use self-contained full-face respiratory equipment. Equipment with type ABEK filter.</p>
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Hand protection:	Not necessary under normal use. Use rubber gloves if handling a leaking or ruptured battery.
Eye protection:	Not necessary under normal use. Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.
Skin protection:	Not necessary under normal use. Use rubber apron and protective working in case of handling of a ruptured battery.

9. Physical and Chemical Properties

9.1 Appearance (Physical shape and color as supplied :)

Metal squares, hermetically sealed and fitted with an external plastic box.

9.2 Temperature range

	Temperature range
In storage	+30°C max
During discharge	-25~+80°C

9.3 Specific energy: 135Wh/Kg

9.4 Specific pulse power : ≈ 300 Wh/kg

9.5 Mechanical resistance : As defined in relevant IEC standard

10. Stability and Reactivity

Conditions to avoid	Heat above 90°C or incinerate. Deform, mutilate, crush, pierce, and disassemble. Short circuit. Prolonged exposure to humid conditions.
Materials to avoid	N/A
Hazardous decomposition products	Corrosive/Irritant Hydrogen fluoride (HF) is produced in case of reaction of lithium (LiPF ₆) with water. Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire.

11. Toxicological Information

The Li-ion batteries do not contain toxic materials

12. Ecological Information

When properly used or disposed, the Li-ion batteries do not present environmental hazard

13. Disposal Considerations

Dispose in accordance with applicable regulations, which vary from country to country. (In more countries, the thrashing of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through not-for-profit organizations, mandated by local governments or organized on a voluntary basis by professionals).

Lithium-Ion batteries should have their terminals insulated and be preferably wrapped in plastic bags prior to disposal.

13.1 Incineration:

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Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.

13.2 Land filling:

Leach ability regulations (mg/l)

Component	Leach ability	EC limit	EPA	Other*
Iron	100			5
Nickel	500	2		0.5

13.3 Recycling:

Send to authorized recycling facilities, eventually through licensed waste carrier.

14. TRANSPORT INFORMATION

The battery models listed have aggregate equivalent lithium content below the 8g. And shipment contains no item listed under IATA DGR Special Provision A154, and meets all requirements under UN Manual of Tests and Criteria Part III, subsection 38.3.

No	ITEMS	RESULT	REMARKS
1	Altitude simulation	Pass	Test 1 to 5 must be conducted in sequence on the same cell or battery
2	Thermal test	Pass	
3	Vibration	Pass	
4	Shock	Pass	
5	External short circuit	Pass	
6	Impact	Pass	
7	Overcharge	Pass	Only battery do need this test item
8	Forced Discharge	Pass	

The product is not classified as dangerous under the current edition of the ICAO & IATA dangerous goods regulations and according A45 all applicable Carriers. The product is safe for air transportation and not regulated by ICAO & IATA DGR.

15. REGULATORY INFORMATION

The transport of rechargeable lithium-ion batteries is regulated by various bodies (IATA, IMO, ADR, US-DOT) that follow the United Nations "Recommendations on the Transport of Dangerous Goods, Model Regulations, 15th Revised edition - Ref.ST/SG/AC.10/1 Rev. 15". Depending on their lithium metal equivalent weight content, design, and ability to pass safety tests defined by the UN in the "Recommendations on the Transport of Dangerous Good - Manual of Tests and Criteria – 4th Revised edition - Ref. ST/SG/AC.10/11 Rev.4 Amendment 1 «Lithium Batteries»", the lithium-ion cells and the battery packs are not be assigned to the UN N° 3090 Class-9, that is restricted for transport.

Individual lithium-ion cells and battery packs with respectively less than 1.5 and 8 grams of equivalent lithium metal content that pass the UN-defined safety tests, are not restricted for transport (1.0 Ah of declared nominal capacity = 0.3 gram of Li equivalent weight content).

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16. Other Information/Disclaimer

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