



SAFETY DATA SHEET

Section 1 – Identification

MSDS Name: Lithium Ion battery cell Gx Battery Pack
Identification: Sanyo Electric Co. Ltd

Synonyms: None **Company**
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Section 2 – Hazard(s) Identification

For the battery cell, Chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous material leakage.

However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress of miss-us, the gas release vent will be operated, The battery cell case will be breached at the extreme, hazardous material may be released.

Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

- Most important hazard and effects

Human health effects:

Inhalation: The steam of the electrolyte has an anesthesia and stimulates a respiratory tract.

Skin contact: The steam of the electrolyte stimulates the skin. The electrolyte skin contact causes a sore and stimulation on the skin.

Eye contact: The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and stimulation on the eye. Especially, substance that causes a strong inflammation of the eye is contained.

Environmental effects: Since a battery cell remains in the environment, do not throw it out in the environment.

- Special hazards:

If the electrolyte contacts with water, it will generate detrimental hydrogen fluoride.

Since the leaked electrolyte is inflammable liquid, do not bring close to fire

Section 3 – Composition, Information on Ingredients

CAS#	Chemical Name	%	EINECS#
12190-79-3	Lithium Cobaltate(LiCO ₂)	25 - 40	235-362-0
7439-89-6	Iron	15 - 25	231-096-4
7429-90-5	Aluminum	2 - 6	231-072-3
7782-42-5 7740-44-0	Graphite Natural Graphite Artificial	10 - 20	231-955-3 101357-30-5
7440-50-8	Copper	5 - 15	231-159-6
----	Organic Electrolyte	10 - 20	--n/a--

According to OSHA, this product should not be considered a hazardous material.
OSHA PEL/ACGIH TLV: NA

Section 4 – First Aid Measures

Spilled internal cell materials

- Inhalation:
Make the victim blow his or her nose, gargle. Seek medical attention if necessary.
- Skin Contact:
Remove contaminated clothes and shoes immediately. Wash extraneously matter or contact region with soap and plenty of water immediately.
- Eye Contact:
Do not rub one's eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

A battery cell and spilled internal cell materials

- Ingestion:
Make the victim vomit. When it is impossible or the feeling is not well after vomiting, seek medical attention.

Section 5 – Fire Fighting Measure

- Suitable extinguishing media:
Plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.
- Specific hazards:
Corrosive gas may be emitted during fire.
- Specific methods of fire fighting:
When the battery burns with other combustibles simultaneously, take fire-extinguishing method that correspond to the combustibles. Extinguish a fire from the windward as much as possible.
- Special protective equipment for firefighters:
 - Respiratory protection:
Respiratory equipment of a gas cylinder style or protection-against-dust mast
 - Hand protection:
Protective gloves
 - Eye protection:
Goggle or protective glasses designed to protect against liquid splashes.
 - Skin and body protection:
Protective clothes

Section 6 – Accidental Release Measures

Spilled internal cell materials, such as electrolyte leaked from a battery cell, are carefully dealt with according to the followings.

- Precautions for human body:
Remove spilled materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.
- Environmental precautions:
Do not throw out into the environment.
- Method of cleaning up:
The spilled solids are put into a container. The leaked place is wiped of with dry cloth.
- Prevention of secondary hazards:
Avoid re-scattering. Do not bring the collected materials close to fire.

Section 7 - Handling and Storage

Handling technical measures:

- Prevention of user exposure:
Not necessary under normal use.
- Prevention of fire and explosion:
Not necessary under normal use.
- Precaution for safe handling :
Do not damage or remove the external tube.
- Specific safe handling advice:
Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water or sea water. Do not expose to strong oxidizers. Do not give a strong mechanical shock or fling. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. In case of charging, use only dedicated charger or charge according to the conditions specified by Sanyo.

Storage:

- Storage conditions (suitable, to be avoided):
Avoid direct sunlight, high temperatures, and high humidity.
- Store in cool place (temperature: -20 ~35degree C, humidity: 45 ~85%).
- Incompatible products: Conductive materials, water, seawater, strong oxidizers, and strong acids.
- Packing material (recommended not suitable): Isolative and tear proof materials are recommended.

Section 8 – Exposure Controls/Personal Protection

- Engineering Measures:
No engineering measure is necessary during normal use. In case of internal cell materials leakage, operate the local exhaust to improve ventilation.
- Control parameters

Common Chemical Name General name	TLV - TWA	BEI
Lithium Cobaltate (LiCoO ₂)	0.02mg/m ³ (as cobalt)	----
Aluminum	10mg/m ³ (metal coarse particulate) 5mg/m ³ (Inflammable powder) 5mg/m ³ (weld fume)	----
Carbon Graphite Natural Graphite Artificial	2mg/m ³ (inhalation coarse particulate)	----
Copper	0.2mg/m ³ (fume) 1.0mg/m ³ (a coarse particulate, Mist)	----
Organic Electrolyte	----	----

ACGIH: American Conference of Industrial Hygienist, Inc.

TLV-TWA: Threshold Limit Value-Time Weighted Average concentration

BEI: Biological Exposure Indices

- Personal protective equipment
Respiratory protection: Respiration with air cylinder
Hand protection: Protective gloves
Eye protection: Goggle or protective glasses designed to protect against liquid splashes.
Skin and body protection: Working clothes with long sleeve and long trousers.

Section 9 – Physical Chemical Properties

- Appearance
 - Physical state: Solid
 - Form: Cylindrical
 - Color: Metallic color (without tube)
 - Oder: No oder
- pH: NA
- Specific temperatures/temperature ranges at which changes at physical state occur:
 - There is no usefull information for the product as a mixture.
- Flash point: NA
- Explosion properties: NA
- Density: NA
- Solubility, with indication of the solvent(s): Insoluble in water.

Section 10 – Stability and Reactivity

- Stability: Stable under normal use
- Hazardous reactions occurring under specific conditions
- Conditions to avoid:
 - When a battery is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.
- Materials to avoid:
 - Conductive materials, water, seawater, strong oxidizers and strong acids.
- Hazardous decomposition products:
 - Arcid or harmful gas is emitted during fire.

Section 11 – Toxicological Information

There is no available data on the product itself. The information of the internal cell material is as follows.

- **Lithium cobaltate – LiCoO₂**
 - Acute toxicity: No application data.
 - Reference cobalt: LDLo, oral – Guinea pig 20mg/kg
 - Local effects: Unknown
 - Sensitization: The nervous system of respiratory organs may be stimulated sensitively.
 - Chronic toxicity/long term toxicity:
 - By the long term inhalation particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.
 - Skin causticity: although it is very rare, the rash of the skin and allergic erythema may result.
- **Aluminum**
 - Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.
 - Chronic toxicity/long term toxicity: By the long term inhalation of coarse particulate or fume, it is possible to cause a lung damage (aluminum lungs).
- **Graphite**
 - Acute toxicity: Unknown
 - Local effects: When it goes into one's eyes, it stimulates one's eyes; conjunctivitis, thickening of corneal epithelium or edematous inflammation palpebra may be caused.
 - Chronic toxicity/long term toxicity:
 - Since the long term inhalation of high levels graphite coarse particular may become a cause of a lung disease or tracheal disease.
 - Carcinogenicity:
 - Graphite is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.

- **Copper**
 - Acute toxicity: 60 - 100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.
 - TDLo, hypodermic – Rabbit 375mg/kg
 - Local effects:
 - Coarse particulate stimulates a nose and a tracheal. When it goes into one's eyes the symptom of the reddening and the pain is caused.
 - Sensitization: Sensitization of the skin may be caused by long term or repetitive contact.
 - Reproductive effects: TDLo, oral – Rat 152mg/kg
- **Organic electrolyte**
 - Acute toxicity: LD₅₀ oral – Rat 2000mg/kg or more
 - Local effects: Unknown
 - Skin irritation study: Rabbit – Mild
 - Eye irritation study: Rabbit – severe

Section 12 – Ecological information

- Persistence / degradability:
 - Since a battery cell and the internal materials remain in the environment, do not bury or throw out into the environment.

Section 13 – Disposal Considerations

- Recommended methods for safe and environmentally preferred disposal:
 - Product (waste from residues)**
 - Do not throw out used battery cell. Recycle it through the recycling company.
 - Contaminates packaging**
 - Neither a container nor packing is contaminated during normal use. When internal material leaked from a battery cell contaminates, dispose as industrial waste subject to special control

Section 14 – Transport Information

In the case of transportation, avoid exposure to high temperature and prevent the formation of any condensation. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a cell. Please refer to Section 7 – HANDLING AND STORAGE.

- UN classification:
 - However this product shipping name is "Lithium Batteries" (or "Lithium Batteries packed with equipment" or "Lithium Batteries contained in equipment"), it is not recognized as "DANGEROUS GOODS" when its transport condition accords with "special provision A45 of IATA – DGR" or Special provision 188 of IMO – IMDG Code".

Section 15 – Regulatory Information

- Regulations specifically applicable to the product:
 - IATA – DGR (air transportation)
 - IMO – IMDG Code (sea transportation)
 - US Department of Transportation 49 Code of Federal Regulations [USA]
 - Waste Disposal and Public Cleaning Law [Japan]
 - Law of Promotion of Effective Utilization of resources [Japan]

Section 16 – Other Information

The information contained within this document is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, expressed or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if M.C. Miller Co. Inc. has been advised of the possibility of such damages