

## Material Safety Data Sheet (MSDS) Lithium Polymer Line Cells and Batteries (LP Series)

### Section I – Manufacturer's Information

Manufacturer: **DYNAMIS Batterien GmbH**  
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Product Name: LITHIUM- POLYMER Battery  
System: Rechargeable Lithium-Ion Battery w/ fixed Polymer Electrolyte

### Section II – Hazard Identification

The components of a Li Polymer battery are only considered potentially dangerous in case of physical damage to a cell, openings, ruptures or punctual damages, exposing to heat, or if dangerous situations are caused by electrical mistreatment.

#### Primary routes of entry

Skin contact	No
Skin absorption	No
Eye contact	No
Inhalation	No
Ingestion	No

#### Symptoms of exposure

Skin contact	No effect under routine handling and use
Skin absorption	No effect under routine handling and use
Eye contact	No effect under routine handling and use
Inhalation	No effect under routine handling and use

Reported as carcinogen Not applicable

### Section III – Product's Component Information

<u>Components</u>	<u>Molecular formula</u>	<u>CAS No.</u>	<u>Content of met. in [%]</u>
Lithium Cobalt Oxide	LiCoO <sub>2</sub>	12190-79-3	30 - 35
Carbon	C	1333-86-4	20 - 25
Electrolyte	LiPF <sub>6</sub>	21324-40-3	1 - 2
PVDF	(CH <sub>2</sub> -CF <sub>2</sub> ) <sub>n</sub>	24937-79-9	1 - 2
Acetylene Black	C	1333-86-4	0.5 – 1
SBR	(C <sub>8</sub> H <sub>8</sub> C <sub>4</sub> H <sub>6</sub> ) <sub>x</sub>	9003-55-8	0.2 – 0.8
EC	C <sub>3</sub> H <sub>3</sub> O <sub>4</sub>	96-49-1	5 - 10
DMC	C <sub>3</sub> H <sub>6</sub> O <sub>3</sub>	616-38-6	5 – 10
Aluminium	Al	7429-90-5	10 - 15
Copper	Cu	7440-50-8	2 - 5
Dissepiment	-	-	2 – 5
Others	-	-	2 – 5

### Section IV - Emergency and First Aid measures

First Aid measures:

#### 1. Eyes:

The eyes shall be rinsed with plenty of water as quickly as possible and for a minimum of 15 minutes, the eye lid shall be lifted occasionally in order to rinse the eye surface below the lid as well.

Call for medical assistance.

#### 2. Skin Contact:

Contaminated clothing shall be removed quickly and the respective skin areas shall be flushed with plenty of water. Continue flushing for at least 15 minutes (if accessible use lab shower / emergency shower), call for medical assistance.

#### 3) Inhalation of Emitted Gas:

Remove the respective person from the endangered area and move to a fresh air zone. If supporting oxygen for emergency breathing is available, use in its proper way. In case of difficulties to breathe, call for medical help immediately.

Flush the endangered area with fresh air.

#### 4) Ingestion:

Call for medical help immediately.

### Section V - Fire and Explosion

Extinguishing Media: Dry Powder, Water

Fire Fighting Method: Self-contained breathing apparatus may be necessary, wear protective clothes.

Unusual Fire- And Explosion Hazards: Toxic gases (HF, PF<sub>6</sub>) may be generated if cells or batteries are exposed to fire. Cells and batteries may burn as well or emit dangerous organic vapors if they are exposed to excessive heat, fire or high voltage. Damaged or opened cells may generate heat by themselves by reaction with air and emit ignitable gases.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide, lithium oxide fumes.

### Section VI - Accidental Release Measures

Personal precaution measures:

Keep away from fire or electronic ignition. Do not smoke.

Place material protective clothing required for handling individual cells.

Environmental protection measures:

If the liquid is leaking an environmental hazard cannot be excluded.

Sweep up or vacuum up spilled material. Put it in suitable container for disposal.

Remove with liquid-binding material (e. g. universal binders) and dispose of it according to local regulations.

In water: If possible, remove from water and call local Fire/Police department

### Section VII – Handling / Use and Storage

- 1) Prevent cells and batteries from short circuits during storage and operation
- 2) Storage preferably in cool, dry and ventilated area. Do not place batteries close to sources of heat and keep away from direct sunlight for longer terms because this may cause high cell temperatures shortening the service life.
- 3) Charging  
Use only suitable chargers and charging methods. Wrong charging methods, over-charge or forced over-discharge, can lead to damages and/or ignition.
- 4) Opening or tear-down of batteries  
Do not open or tear-down a battery. In case a battery is accidentally damaged or cracked in pieces,  
do wear protective gloves for handling the debris and parts. Avoid inhalation of potentially occurring gases.
- 5) Short-circuits  
Avoid any kind of short-circuit. Short-circuits lead to evolution of excessive heat, e.g. at the poles and may propose a source of ignition.  
In any case a short-circuit will shorten the service life of a battery dramatically and may also cause ignition of other materials nearby, inside materials will be damaged substantially as well.  
Physical contact with short-circuited batteries can cause skin burns.  
Do also avoid wrong polarisation assemblies - these may lead to short-circuit situations alike.
- 6) Mixed batteries and types  
Do not connect batteries of different types with each other, as well as the assembly of packs using cells of significant different age. Of course do not mix different chemical system batteries.
- 7) General Handling
  - a) Since the battery is packed in soft package, to ensure its better performance, it's very important to carefully handle the battery;
  - b) The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles.
  - c) Don't strike battery with any sharp edge parts;
  - d) Trim your nails or wear glove before taking battery ;
  - e) Clean worktable to make sure no any sharp particle are on it;
  - f) Don't bend or fold sealing edge.
  - g) Don't open or deform folding edge;
  - h) Don't bend tab
  - i) Don't fall, hit, bend battery body;
  - j) Short terminals of battery is strictly prohibited, it may damage battery.

### Section VIII - Exposure Controls / Personal Protection

Engineering controls      Keep away from heat and open flame. Store in a cool dry place

Personal protection:

Respirator	No required during normal operations. SCBNA required in the event of a fire. In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores.
Eye/face protection	Not required beyond safety practices of employer.
Gloves	Not required for handling of cells.
Foot protection	Steel toed shoes recommended for large container handling.

### Section IX - Physical and Chemical Properties

<u>State</u>	<u>Solid</u>
PH:	N/A
Vapor density	N/A
Solubility in water	N/A
Density	N/A
Odor	N/A
Vapor pressure	N/A
Boiling point	N/A
Specific gravity	N/A

### Section X – Stability and Reactivity

Stability: Product is stable under conditions described in Section 7  
Conditions to avoid: Heat above 70°C or incinerate. Deform, mutilate, crush, disassemble, overcharge, short circuit. Expose over a long period to humid conditions.  
Material to avoid: Oxidising agents, alkalis, water.  
Hazardous Decomposition Products: Toxic Fumes, and may form peroxides  
Hazardous Polymerization: N/A  
If leaked, forbidden to contact with strong oxidizers, minerals acids, strong alkalies, halogenated hydrocarbons.

### Section XI – Toxicological Information

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-fibrotic lung injury and membrane irritation.  
In case of accidental release of content refer to Section II, III and IV.

### Section XII – Ecological Information

Mammalian effects: None known at present  
Eco-toxicity: None known at present  
Bioaccumulation potential: Slowly Bio-degradable

### Section XIII- Disposal

DYNAMIS Lithium Polymer cells and batteries do not contain toxic metals exceeding naturally occurring traces as part of chemical components. To avoid short circuit and heating, the used batteries should be stored or transported in bulk. Please do contact your local authorities according the applicable local laws.

### Section XIV – Transport Information

According PACKING INSTRUCTION 965 ~ 967 of IATA DGR 65th Edition (2024) for transportation, or Special Provision of IMDG.

Furthermore new restrictions apply since April 1, 2016, which forbid transport of Lithium batteries on passenger aircraft at all and strengthen limits even for small numbers and cells on cargo aircraft.

Additional information acc. transport, test, markings and packing methods can be taken from Label master <http://www.labelmaster.com> .

The batteries must be secured against short-circuit for transport using appropriate packages, e.g. with separating functions. These packages must also be protected against outer mechanical damage.

Falling down or other typical incidents must not lead to possible short-circuits. Do avoid many layer packing due to the weight and excessive humidity.

Ways of transport: Air, Land, Sea

Packing information: Resp. Documents

Note: As according to the IATA regulation from 1<sup>st</sup> April, 2016 onwards. The Lithium Ion Polymer cells and batteries are offered for transport at a state of charge (SoC) not exceeding 30% of their rated design capacity.

### Section XV – Regulatory Information

International Civil Aviation Organization (ICAO) – Technical Instructions (2023-2025 Ed.)

International Air Transport Association (IATA) – Dangerous Goods Regulations (65th Ed., 2024)

International Maritime Dangerous Goods (IMDG) AMdt Code 40-20

US Hazardous Materials regulations 49 CFR (Code of Federal Reg.), Sec. 173-185

### Section XVI – Additional Information

The information given above is based on the current knowledge of DYNAMIS. Possible changes to information and recommendations deriving from sources elsewhere may not have been considered in this issue. Current incidents and their consequences to recommendations of which DYNAMIS has not been aware yet do not lead to responsibilities beyond the information given above or for those in contradiction to any part of it.

This information is provided to our customers under the condition, that every customer develops its own view for feasibilities and risks and takes care of the products accordingly.