

### Material Safety Data Sheet

### Lithium Primary Cells/Supercap, Combination Product (LIX-Series)

#### Section I – Information of Manufacturer

Manufacturer's Name: DYNAMIS Batterien GmbH  
Address: Brühlstr. 15 D-78465 Dettingen / Konstanz  
Tel. +49 7533 93669-0  
Date 2017-04-13

#### Section II – Hazardous Information

Hazardous Components:

A. LTC cell	CAS#	wt-%
1. Lithium	7439-93-2	< 5
2. Thionyl Chloride	108-32-7	< 47
3. Carbon	1333-86-4	< 6
4. Aluminum Chloride	7446-70-0	< 5
5. Lithium Chloride	7447-41-8	< 2
6. PVC	9002-86-2	< 1
7. PTFE	9002-84-0	< 1

  

B. Supercap		
8. Graphite Carbon	7782-42-5, 1333-86-4	10-20
9. Ethylene Carbonate	96-49-1	3-12
10. Dimethyl Carbonate	616-38-6	3-12
11. Diethyl Carbonate	105-58-8	3-12
12. Lithium Hexafluorophosphate	21324-40-3	1-2
13. Polyvinylidene fluoride	24937-79-9	< 1
14. Copper	7440-50-8	7-15
15. Aluminium	7429-50-5	5-10
16. Lithium Metal Oxide		
17. Steel, Nickel and other non reactive components		

#### Lithium content per cell

Product	Capacity in [mAh]	content of metal Lithium in [g]
---------	-------------------	---------------------------------

---

< 1g per cell:

LI-110 (ER14250)	1200	0.31
LI-120 (ER14335)	1650	0.43
LI-130 (ER14505)	2600	0.70

> 1g per cell:

LI-150 (ER26500)	8500	2.20
LI-160 (ER34615)	19000	4.92

### Section III – Physical / Chemical Characteristics

Boiling Point: N/A

Vapour Pressure (mm Hg): N/A

Vapour Density (AIR=1): N/A

Solubility in Water: N/A

Appearance and Odour: Cylindrical Shape/Combination, Odourless (in sealed condition)

Specific Gravity (H<sub>2</sub>O=1): N/A

Melting Point: N/A

Evaporation Rate (Butyl Acetate): N/A

Density: > 1.5 g/cm<sup>3</sup>

Use properties: Primary (one-off) power supply, nominal voltage 3.6V

### Section IV – Hazard Classification

Classification: N/A

All chemicals are sealed into the cell can respectively Supercap container. Risk of exposure only possible if the cell can is mechanically or electrically damaged (by abuse). In these cases contact of Lithium or SOCl<sub>2</sub> with skin or eyes shall be avoided.

A ruptured or shorted battery, the product of combination or one of this can cause thermal or chemical burns upon contact with skin or eyes.

This may be a reproductive hazard.

### Section V – Reactivity Data

Stability: Stable Status

Conditions to Avoid: Fire/Heating above specified range, short circuiting solvents, mechanical/electrical abuse.

Incompatibility (Materials to Avoid): Acids, Water, any material causing corrosion to cell.

Hazardous Decomposition of By-products: N/A during specified use

Damage of cell integrity (by fire, e.g.): Products of combustion (CO, Hydrocarbon-Oxidation products, Metal Oxide) among decomposition products (HF e.g.) can occur.

Hazardous Polymerization: N/A

In case of leakages: Thionyl Chloride may react with water/alkaline/acids to form Sulfuric Acid fumes - Lithium metal will react with oxidizing agents, among with Nitrogen.

### Section VI – Health Hazard Data

Routes of Entry

Inhalation: N/A

Skin: N/A

Ingestion: N/A

Health Hazard (Acute and Chronic) / Toxicological information:

In case of leakage, contact with electrolyte can cause severe irritation and chemical burns with skin and eyes.

Inhalation of electrolyte vapours may cause irritation of the upper respiratory tract and lungs.

### Section VII – First Aid Measures

First Aid Procedures (in case of leakages):

Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eye lids.

See to medical aid.

### Skin:

Remove contaminated clothes and rinse skin with plenty of water or shower immediately and continue for 15 minutes. See to medical aid.

### Inhalation:

Remove from exposure and move to fresh air, oxygen if available. Seek medical attention if respiratory irritation develops. Ventilate the contaminated area.

### Ingestion:

Drink immediately at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Immediately call for medical assistance.

### Section VIII – Fire and Explosion Hazard Data

Flash Point (Method Used): N/A

Ignition Temp.: N/A

Flammable Limits: N/A

LEL: N/A

UEL: N/A

Extinguishing Media: Carbon Dioxide, Dry Chemical, dry sand can be useful for a controlled burn-up.

Special Fire Fighting Procedures: Self-contained breathing apparatus required

Unusual Fire and Explosion Hazards: Cell may vent if exposed to excessive heat

Do not dispose of battery in fire – may explode.

Do not short – circuit battery – may cause burns.

Hazardous combustion products: CO, CO<sub>2</sub>, Li Oxide fumes, Sulfuric Oxide/Sulfuric Oxide, Chlorine

### Section IX – Accidental Release or Spillage

Steps to Be Taken in Case Material is Released or Spilled:

If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth and lots of water, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapors to dissipate while maximum ventilation is provided. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

Batteries that are leakage should be handled with rubber gloves.

Avoid direct contact with electrolyte.

Wear protective clothing and a positive pressure self – Contained Breathing Apparatus (SCBA).

Waste Disposal:

It is recommended to discharge the battery to the end, handing in the abandoned batteries to related department unified, dispose of the batteries in accordance with approved local, state, and federal requirements.

### Section X – Handling and Storage

Safe handling and storage advice:

The battery should not be opened, destroyed or incinerated, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container.

Do not short circuit terminals, or over charge the battery, forced over-discharge, throw to fire. Do not crush or puncture the battery, or immerse in liquids.

### I Precautions to be taken in Handling and Storing

Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided.  
Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

### I Other Precautions

The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures.  
Do not short or install with incorrect polarity.

### I Supercap charging

The Supercaps used in the LIX-Products cannot be charged by external power source.  
They are only constructed for the use within the specific LIX-Combination.

### Section XI – Exposure Controls / Person Protection

Respiratory Protection (Specify Type): In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cells. Respiratory protection is not necessary during normal (specified) use.

Ventilation: N/A during specified use

Local Exhausts: N/A during spec. use.

Special: N/A

Mechanical (General): N/A

Special: N/A

Other: N/A

Eye Protection: N/A

Protective Gloves: N/A during specified use

Other Protective Clothing or Equipment: N/A

Work / Hygienic Practices: Do not touch the batteries with wet hands.

### Section XII – Ecological Information

When properly used or disposed of the battery does not present an environmental hazard. When disposed avoid water, rain and snowy conditions for long-term storage.

### Section XIII – Disposal Method

General: Dispose of batteries according to government regulations.

If batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amount of unconsumed Lithium remaining in the spent battery. The battery must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste (or discharged appropriately). Recycling of battery can be done in authorized facility, by a licensed waste carrier.

### Section XIV – Transportation Information

According to PACKING INSTRUCTION 965 ~ 970 of IATA DGR 58<sup>th</sup> (2017) Edition for transportation, or the special provision 188 of IMDG.

More information concerning shipping, testing, marking and packaging can be obtained from Label master at <http://www.labelmaster.com>, further <http://www.iata.org/whatwedo/cargo/dgr/Pages/download.aspx>

Separate battery when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles and wet by rain.

Transport Fashion: By air, by sea, by overland

Packaging Information: According to regulations

### Section XV – Regulatory Information

- 《Dangerous Goods Regulation》 IATA-DGR
- 《Recommendations on the Transport of Dangerous Goods Regulations》 UN38.3
- 《International Maritime Dangerous Goods》
- 《Technical Instructions for the Safe Transport of Dangerous Goods》
- 《Classification and code of dangerous goods》
- 《Occupational Safety and Health Act》 (OSHA)
- 《Toxic Substances Control Act》 (TSCA)
- 《Consumer Product Safety Act》 (CPSA)
- 《Federal Environmental Pollution Control Act》 (FEPCA)
- 《The Oil Pollution Act》 (OPA)
- 《Superfund Amendments and Reauthorization Act Title III (302/311/312/313)》 (SARA)
- 《Resource Conservation and Recovery Act》 (RCRA)
- 《Safety Drinking Water Act》 (CWA)
- 《California Proposition 65》
- 《Code of Federal Regulations》 (CFR)

### Section XVI – Other Information

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, DYNAMIS do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.