

# ECTIVE LC SERIES

## Material Safety Data Sheet

ECTIVE LC SERIES - LiFePO<sub>4</sub> Lithium Batteries

| Model       | Nominal Voltage | Rated Capacity  | App display | Chargeable at -30°C |
|-------------|-----------------|-----------------|-------------|---------------------|
| LC 12 L     | 12.8V           | 12Ah, 153Wh     | No          | No                  |
| LC 20 L     | 12.8V           | 20Ah, 256Wh     | No          | No                  |
| LC 22 L     | 12.8V           | 22Ah, 281.6Wh   | No          | No                  |
| LC 35 L     | 12.8V           | 35Ah, 448Wh     | No          | No                  |
| LC 50 L     | 12.8V           | 50Ah, 640Wh     | No          | No                  |
| LC 75 L     | 12.8V           | 75Ah, 960Wh     | No          | No                  |
| LC 80 L     | 12.8V           | 80Ah, 1024Wh    | No          | No                  |
| LC 100      | 12.8V           | 100Ah, 1280Wh   | No          | No                  |
| LC 100 L    | 12.8V           | 100Ah, 1280Wh   | No          | No                  |
| LC 150 L    | 12.8V           | 150Ah, 1920Wh   | No          | No                  |
| LC 200 L    | 12.8V           | 200Ah, 2560Wh   | No          | No                  |
| LC 260 L    | 12.8V           | 260Ah, 3328Wh   | No          | No                  |
| LC 300 L    | 12.8V           | 300Ah, 3840Wh   | No          | No                  |
| LC 20L BT   | 12.8V           | 20Ah, 256Wh     | Yes         | No                  |
| LC 50L BT   | 12.8V           | 50Ah, 640Wh     | Yes         | No                  |
| LC 75L BT   | 12.8V           | 75Ah, 960Wh     | Yes         | No                  |
| LC 80 BT    | 12.8V           | 80Ah, 1024Wh    | Yes         | No                  |
| LC 100 BT   | 12.8V           | 100Ah, 1280Wh   | Yes         | No                  |
| LC 100L BT  | 12.8V           | 100Ah, 1280Wh   | Yes         | No                  |
| LC 150L BT  | 12.8V           | 150Ah, 1920Wh   | Yes         | No                  |
| LC 200L BT  | 12.8V           | 200Ah, 2560Wh   | Yes         | No                  |
| LC 250L BT  | 12.8V           | 250Ah, 3200Wh   | Yes         | No                  |
| LC 300L BT  | 12.8V           | 300Ah, 3840Wh   | Yes         | No                  |
| LC 50L BT   | 25.6V           | 50Ah, 1280Wh    | Yes         | No                  |
| LC 100L BT  | 25.6V           | 100Ah, 2560Wh   | Yes         | No                  |
| LC 150L BT  | 25.6V           | 150Ah, 3840Wh   | Yes         | No                  |
| LC 80 LT    | 12.8V           | 80Ah, 1024Wh    | Yes         | Yes                 |
| LC 100 LT   | 12.8V           | 100Ah, 1280Wh   | Yes         | Yes                 |
| LC 100L LT  | 12.8V           | 100Ah, 1280Wh   | Yes         | Yes                 |
| LC 125L LT  | 12.8V           | 125Ah, 1600Wh   | Yes         | Yes                 |
| LC 200L LT  | 12.8V           | 200Ah, 2560Wh   | Yes         | Yes                 |
| LC 300L LT  | 12.8V           | 300Ah, 3840Wh   | Yes         | Yes                 |
| LC 172 L    | 12.8V           | 172Ah, 2201.6Wh | No          | No                  |
| LC 120 L    | 12.8V           | 120Ah, 1536Wh   | No          | No                  |
| LC 120 Slim | 12.8 V          | 120Ah, 1536Wh   | No          | No                  |
| LC 150 Slim | 12.8 V          | 150Ah, 1920Wh   | No          | No                  |
| LC 200 Slim | 12.8 V          | 200Ah, 2560Wh   | No          | No                  |

## 1. Product and Company Identification

**Brand:** ECTIVE  
**Series name:** ECTIVE LC SERIES (Lithium Iron Phosphate Battery)  
**Manufacturer:** batterium GmbH  
 Robert-Bosch-Straße 1, 71691 Freiberg am Neckar, Germany  
 T: +49 7141 - 1410870 | F: +49 7141 / 560 90 49 | info@ective.de  
 ECTIVE.DE



## 2. Composition / Information on Ingredients

Pure chemical       Mixture

### Applicable to BT and LT models of the ECTIVE LC Series:

| Chemical Name       | Percentage of weight | CAS No.    |
|---------------------|----------------------|------------|
| Aluminum (Al)       | 15% - 19%            | 7429-90-5  |
| Copper (Cu)         | 16% - 20%            | 7440-50-8  |
| LiFePO <sub>4</sub> | 28% - 32%            | 15365-14-7 |
| Graphite            | 13% - 17%            | 7782-42-5  |
| Lithium             | 1.6% - 2.0%          | 21324-40-3 |
| Organic solvents    | 15% - 18%            | n/a        |

### Applicable to regular models of the ECTIVE LC Series:

| Chemical Name                                 | Percent of Content | CAS No.    |
|---|--------------------|------------|
| Lithium iron phosphate (LiFePO <sub>4</sub> ) | 25% - 30%          | 12057-17-9 |
| Graphite (C)                                  | 8% - 12%           | 7782-42-5  |
| LiPF <sub>6</sub>                             | 15% - 22%          | 21324-40-3 |
| Aluminum (Al)                                 | 5% - 8%            | 7429-90-5  |
| Copper (Cu)                                   | 10% - 15%          | 7440-50-8  |
| High molecular polymer                        | 3% - 5%            | -          |
| Nickel (Ni)                                   | 0.5% - 1%          | 7440-02-0  |
| Iron (Fe)                                     | 22% - 30%          | 7439-89-6  |

### 3. Hazards Summary

|                                  |  |
|----------------------------------|--|
| <b>Danger Type:</b>              | Not dangerous under normal conditions. Do not dismantle, open or damage the battery. Exposure to the battery's contents may be harmful.  |
| <b>Routes of exposure:</b>       | <ol style="list-style-type: none"> <li>1. Eyes and Skin: In case of leakage, the electrolyte solution contained in the battery may irritate ocular tissues and skin.</li> <li>2. Inhalation: Respiratory irritation may occur if fumes are released due heat or a leakage.</li> <li>3. Ingestion: In case of ingestion, the battery's contents cause serious chemical burns of the mouth, esophagus and gastrointestinal tract.</li> </ol>   |
| <b>Potential health effects:</b> | <p>Exposure the contained electrolyte of a ruptured or leaking battery can cause:</p> <ol style="list-style-type: none"> <li>1. Inhalation: Burns and irritation of the respiratory system, coughing, wheezing, and shortness of breath.</li> <li>2. Eyes: Redness, tearing, burns. The electrolyte is corrosive to all ocular tissues.</li> <li>3. Skin: The electrolyte is corrosive and causes skin irritation and burns.</li> <li>4. Ingestion: The electrolyte solution causes tissue damage to throat and gastrointestinal tract.</li> </ol> |
| <b>Explosion danger:</b>         | The battery may be explosive at high temperature (above 150°C) or when exposed to fire.  |
| <b>Environmental harm:</b>       | Not applicable under normal conditions of use.   |

### 4. First Aid Measures

**Skin contact:**

If the battery is leaking and the contained material contacts the skin, wash the affected area with copious amounts of clear water and soap. Wash clothing and shoes before reuse. In case of continued irritation, consult a physician.

**Eye contact:**

If the battery is leaking and the contained material comes into contact with eyes, flush with copious amounts of clear water for at least 15 minutes. Seek medical attention at once.

**Inhalation:**

Seek fresh air. In case of breathing difficulties, consult a physician.

**Ingestion:**

If the battery is leaking and the contained material is ingested, rinse mouth and surrounding area with clear water at once. Do not induce vomiting. Consult a physician immediately for treatment.

### 5. Fire Fighting Measures

**Unusual Fire and Explosion Hazards:**

The battery may explode or leak potentially hazardous vapors if it is exposed to excessive heat or fire, if it is over-charged or short circuited, punctured or damaged.

**Hazardous Combustion Products:**

Fire, excessive heat or over-voltage conditions may produce hazardous decomposition products. Damaged batteries can result in rapid heating and the release of flammable vapors.

**Suitable extinguishing agents:**

Dry chemical type extinguishers are the most effective means to extinguish a battery fire. A CO<sub>2</sub> extinguisher will also work effectively.

**Fire Fighting Procedures:**

Use a positive pressure self-contained breathing apparatus if batteries are involved in a fire. Full protective clothing is necessary. During the application of water, caution is advised as burning pieces of flammable particles may be emitted from the fire.

## 6. Accidental Release Measures

In the event of a battery rupture or leakage, provide maximum ventilation to dissipate fumes and hazardous gases. Collect all the released materials that are not hot or burning in an appropriate waste disposal container while wearing proper protective clothing. Place in an approved container and dispose in accordance with the local regulations. Avoid contact with skin and eyes as well as the inhalation of vapors.

## 7. Handling and Storage

**Handling:**

1. These batteries are designed to be recharged. However, improper charging may cause a battery to ignite. When charging the battery, use dedicated chargers and follow the specified instructions.
2. Never disassemble or modify a battery.
3. Do not immerse a battery in water.
4. Should a battery unintentionally be damaged, thus releasing its contents, rubber gloves must be used to handle all battery components. Avoid the inhalation of any vapors that may be emitted.
5. Short-circuiting a battery causes heating. In addition, a short circuit reduces the life of the battery and can lead to ignition of surrounding materials. Physical contact with to short-circuited battery can cause skin burns.
6. Avoid reversing the battery polarity. This can damage the battery or cause it to ignite.
7. In the event of skin or eye exposure to the electrolyte, refer to Section 4, "First Aid Measures".

**Storage:**

1. Batteries should be separated from other materials and stored in a noncombustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks. Do not place batteries near heating equipment, nor expose to direct sunlight for long periods.
2. Do not store batteries above 35°C or below -20°C. Store batteries in a cool (about 20°C±5°C), dry and ventilated area that is subject to little temperature change. Elevated temperatures can result in reduced battery cycle life. Battery exposure to temperatures in excess of 60°C will result in the battery venting flammable liquid and gases.
3. Keep batteries in the original packaging until use. Keep them protected from physical damage.

## 8. Exposure Controls/Personal Protection

### Engineering Controls:

Keep away from heat and open fire. Store in a cool, dry place.

### Ventilation:

Ventilation is not necessary under conditions of normal use. In case of a rupture or leakage, ventilate the area to clear gases or fumes.

### Respiratory Protection:

Not necessary under conditions of normal use. If a battery is burning, avoid inhalation of generated gases and fumes. During fire fighting, self-contained breathing, full-face respiratory equipment should be used. Fires must be fought only from safe fire fighting distance. Evacuate all persons from the area of fire immediately.

### Eye Protection:

Not necessary under conditions of normal use. Use safety glasses with side shields if handling a leaking or ruptured battery.

### Body Protection:

Not necessary under conditions of normal use. Use a rubber apron when handling a leaking or ruptured battery.

### Protective Gloves:

Not necessary under conditions of normal use. Use chemical resistant rubber gloves when handling a leaking or ruptured battery.

### Others:

Use good chemical hygiene practice. Wash hands thoroughly after cleaning-up a battery spill caused by leaking battery. Do not eat, drink, or smoke in the battery storage area.

## 9. Physical and Chemical Properties

|                             |           |
|-----------------------------|-----------|
| <b>State:</b>               | Solid     |
| <b>Solubility in water:</b> | Insoluble |

## 10. Stability and Reactivity

|  |   |
|--|---|
| <b>Stability:</b>                        | Stable under normal conditions.   |
| <b>Conditions to avoid:</b>              | Do not heat, throw into fire, disassemble, short circuit, immerse in water or overcharge. Protect from sparks, flames and heat. |
| <b>Incompatibilities:</b>                | Avoid exposure to heat, open flames, corrosives, oxidizing agents.  |
| <b>Hazardous decomposition products:</b> | The battery may release irritative gas upon electrolyte leakage. Carbon monoxide, carbon dioxide, lithium oxide fumes.          |

## 11. Toxicological Information

The battery does not elicit toxicological properties during routine handling and use. If the battery is opened through misuse or damage, discard immediately. The internal components of battery cells cause irritations.

|                               |  |
|-------------------------------|--|
| <b>Irritancy:</b>             | The electrolytes contained in this battery can irritate eyes upon any contact. Prolonged contact with the skin or mucous membranes may cause irritation. |
| <b>Sensitization:</b>         | No information is available.   |
| <b>Teratogenicity:</b>        | No information is available.   |
| <b>Carcinogenicity:</b>       | No information is available.   |
| <b>Mutagenicity:</b>          | No information is available.   |
| <b>Reproductive toxicity:</b> | No information is available.   |

## 12. Ecological Information

1. When properly used and disposed, the battery does not present environmental hazard.
2. The battery does not contain mercury, cadmium, or lead.
3. Do not let internal components enter a marine environment. Avoid releasing to waterways, wastewater or ground water.

## 13. Disposal Considerations

1. Disposal of the battery should be performed by authorized, professional disposal firms knowledgeable in Federal, State or Local requirements of hazardous waste treatment and hazardous waste transportation. The battery does not contain mercury, cadmium, or lead.
2. The battery should be completely discharged prior to disposal and/or the terminals taped or capped to prevent short circuit. When completely discharged, the battery is not considered hazardous.
3. The battery contains recyclable materials. Recycling options available in your local area should be considered when disposing of this product, through licensed waste carrier.

## 14. Transport Information

Batteries containing these cells should be transported as Class 9 hazardous material. UN-Number: 3480. According to the Packing Instruction 965 section IA of IATA DGR 61th Edition for transportation, the Packing Instruction 903 of IMDG CODE (Amdt.38-16) 2016 Edition.

The batteries should be securely packed and protected against short-circuits. Examine whether the package of the containers are integrate and tighten closed before transport. Avoid falling, dropping, and breakage during transport. Prevent collapse of cargo piles. Don't put the batteries together with oxidizers or food chemicals. The transport vehicle and ship should be cleaned and sterilized before transport. During transport, the vehicle should prevent exposure to rain and high temperatures. For stopovers, the vehicle should be away from fire and heat sources. When transported by sea, the batteries should be stored away from bedrooms and the kitchen, and isolated from the engine room, as well as power and fire sources. During road transportation, the driver should drive in accordance with regulated route and not stop over in residential areas or congested areas.

|   |   |
|---|---|
| (a) UN number:  | 3480 & 3481   |
| (b) UN Proper shipping name:  | LITHIUM ION BATTERIES (including lithium ion polymer batteries)<br>or; LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION<br>BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries) |
| (c) Transport hazard class(es):   | 9   |
| (d) Packing Instruction:  | 965 IA, 966 I, 967 I  |
| (e) Marine pollutant (Yes/No):  | No  |
| (f) Transport in bulk (according<br>to Annex II of MARPOL 73/78<br>and the IBC Code): | No information available.   |
| (g) Special precautions:  | No information available.   |

## 15. Regulatory Information

The transport of rechargeable lithium-ion batteries is regulated by the United Nations as detailed in the “model Regulations on the transport of dangerous Goods Ref. ST/SG/AC.10/1 Revision 20 2017”. Defined by UN in the “Recommendations on the transport of Dangerous Goods Chapter 38.3 Manual of Tests and Criteria Ref. ST/SG/AC.10/11 Rev.6/Amend.1 2017”. The Lithium-ion Cells and the battery Packs may or may not be assigned to the UN No. 3480 Class-9 that is restricted for transport.

### Applicable to BT and LT models of the ECTIVE LC Series:

Safety, health and environmental regulations/legislation specific for the substance or mixture

| Composition       | CAS#       | IECSC  | DSL    | TSCA   | EC#       | EINECS |
|-------------------|------------|--------|--------|--------|-----------|--------|
| LiPF <sub>6</sub> | 21324-40-3 | Listed | Listed | Listed | 244-334-7 | Listed |
| Graphite          | 7782-42-5  | Listed | Listed | Listed | 231-955-3 | Listed |
| Aluminum          | 7429-90-5  | Listed | Listed | Listed | 231-072-3 | Listed |
| Copper            | 7440-50-8  | Listed | Listed | Listed | 231-159-6 | Listed |

## 16. Other Information

The information given above is provided in good faith based on present knowledge and does not constitute an assurance of safety under all conditions. It's the users responsibility to observe all laws and regulations applicable. 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 we be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or expemplary damages, howsoever arising, even if we have been advised of the possibilty of such damages. If there are any queries, the supplier should be consulted. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.