

Material Safety DataSheet (MSDS) – Renobat Ecoenergy

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: LiFePO₄ (Lithium Iron Phosphate) Battery

Manufacturer / Assembler: Renobat Ecoenergia, SL

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SECTION 2: PRODUCT INFORMATION AND COMPOSITION

Chemical name Formula CAS No.% by weight

Lithium Iron Phosphate LiFePO₄ - 38.1

Graphite C 7782-42-5 18.1

Aluminum Al 7429-90-5 7.6

Copper Cu 7440-50-8 11.4

Diaphragm paper (C₃H₆) n 9003-07-0 4.5

Electrolyte (Lithium Hexafluorophosphate) LiPF₆ 21324-40-3 20.3

SECTION 3: HAZARDS IDENTIFICATION

The chemical components of the battery are enclosed in the container so as not to have danger as a battery. The battery is a lithium ion battery and improper use may cause deformation, leakage of electrolytes (liquid in the battery), overheating, explosion, fire or generation of corrosive gas / stimulus. A short-circuited Lithium battery can cause thermal and chemical burns on contact with the skin. Be sure to observe the warning and instructions as these events lead to injury and equipment failure.



SECTION 4: FIRST AID MEASURES

In the event of a battery rupture or explosion, evacuate employees from the contaminated area and ensure maximum ventilation to break up corrosive gas, smoke, and unpleasant odors.

If it happens, by accident, the following measures should be taken:

Inhalation: Remove from exposure, rest, and keep warm. Immediately move to fresh outside air and use oxygen if available. In severe cases get medical attention.

Skin contact: Rinse skin thoroughly with plenty of water or shower for 15 minutes. Take off contaminated clothing and wash before reuse. In severe cases get medical attention.

Eye Contact: Flush thoroughly with water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.

Ingestion: Rinse mouth well with water and drink plenty of water or milk. If the patient is not unconscious, induce vomiting. Get medical attention.

Additional treatment: All cases of ocular contamination, persistent skin irritation and victims who have ingested this substance or have been affected by breathing its vapors should be seen by a doctor.

SECTION 5: FIRE FIGHTING MEASURES.

Suitable Extinguishing Media: Dry chemical powder is applicable for burning lithium ion batteries. Metal fire extinguishing powder, rock salt, or dry sand are suitable if only a few batteries are involved.

Extinguishing media with limited suitability: Carbon dioxide (CO₂) is only applicable for incipient fires. Do not use water.

Special protective equipment during fire fighting: contamination cloth including self-contained breathing apparatus.

Special Hazard: Cells can explode and release metal parts.

- When the electrolyte comes into contact with water, traces of hydrofluoric acid may form. In this case, avoid contact and take care of good ventilation.
- Hazardous combustion products: Carbon monoxide and dioxide, lithium oxide.
- Contact of the exchanged anode material with water generates extremely flammable hydrogen gas.
- Caution: do not allow used extinguishing media to enter surface or ground water.
- If necessary, thicken the water or foam with suitable solids. Dispose of properly.



SECTION 6: ACCIDENTAL RELEASE MEASURES

Take the following actions when materials from the battery's internal cell, such as electrolyte, are leaking.

- Remove personnel from the area until the fumes have disappeared and prohibit entry to the peripheral area by persons other than related personnel, take the measures mentioned above and ventilate the area sufficiently to eliminate the dangerous gases.
- Human Body Precautions: Wear protective equipment to avoid exposure and avoid inhalation of vapor and electrolyte fixation to skin.
- Clean it with a cloth, dispose of it in a plastic bag and place it in a steel box. Later incinerate.
- The ideal response is to leave the area and allow the batteries to cool and the vapors to dissipate.
- Provide maximum ventilation.
- It is recommended to discharge the battery to the end and remove it according to the requirements of each State.

SECTION 7: HANDLING AND STORAGE

Batteries must not be opened, destroyed or incinerated as they can leak or break and release the ingredients contained in the hermetically sealed container into the environment. Do not short-circuit the terminals, or overcharge the battery, overcharge, throw into the fire. Do not crush or puncture the battery or immerse it in liquids.

1. Handling precautions. DO NOT do the following:

- Apply excessive force to the battery terminals.
- Drop the battery
- Solder the main part of the battery
- Cause the battery to short circuit
- Discharge the battery by force
- Heat the battery
- Throw the battery into the fire
- Remove the battery
- Deform the battery by pressing
- Insert the battery in the reverse direction
- Use batteries for different specifications from those recommended.
- Touch the filtered electrolyte of the battery.

2. Storage precautions



- Be sure to store the battery in the place where it cannot be exposed to raindrops, etc., avoiding direct sunlight, high temperature, high humidity, and the place where fire is used.

3. Others:

- applying pressure to the deformation of the battery may cause disassembly followed by irritation of the eyes, skin and throat.
- Lithium ion cells and batteries are not designed to be recharged from external power sources outside of specific renobat approved lithium ion charger models. Connection to unsuitable power sources can cause fire or explosion.
- Batteries can explode or cause burns if disassembled, crushed, or exposed to fire or high temperatures. Do not short circuit or install with wrong polarity.

4. Disposal - Dispose of in accordance with all applicable state and local regulations.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection Not required in normal operating condition. In case of battery ventilation, provide as much ventilation as possible. Avoid confined areas with battery vents.

Ventilation Not required in normal operating condition

Protective gloves Not required in normal operating condition

Eye protection Not required in normal operating condition

Other protective clothing and facilities Not required in normal operating condition

For the ventilation of the batteries, personal protection is necessary and it is recommended:

- Respiratory protection,
- Protection gloves,
- Protective clothing and
- safety glass with side shields

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Note: The following points are not applicable unless there is leakage or damage to batteries with exposure

REN-LIT-7.1	
Nominal voltage [V]	48



Nominal Capacity [Ah]	40
Energy [Wh]	1920
Measures [mm]	375 x 258 x 198
Weight [Kg]	24.2

REN-LIT-7.2	
Nominal voltage [V]	25.6
Nominal Capacity [Ah]	40
Energy [Wh]	1024
Measures [mm]	240 x 258 x 196.5
Weight [Kg]	13

REN-LIT-7.4	
Nominal voltage [V]	48
Nominal Capacity [Ah]	40
Energy [Wh]	1920
Measures [mm]	375 x 258 x 198
Weight [Kg]	24.2

REN-LIT-7.5	
Nominal voltage [V]	25.6
Nominal Capacity [Ah]	80
Energy [Wh]	2048
Measures [mm]	375 x 290 x 255
Weight [Kg]	22.5

REN-LIT-7.7 – REN-LIT-7.8	
Nominal voltage [V]	48
Nominal Capacity [Ah]	40
Energy [Wh]	1920
Measures [mm]	203 x 198 x 260 200 x 198 x 260
Weight [Kg]	22.5

REN-LIT-7.16	
Nominal voltage [V]	51.2
Nominal Capacity [Ah]	200
Energy [Wh]	10240
Measures [mm]	660 x 260 x 680
Weight [Kg]	135

REN-LIT-7.17	
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Nominal voltage [V]	25.6
Nominal Capacity [Ah]	100
Energy [Wh]	2560
Measures [mm]	290 x 258 x 250
Weight [Kg]	45

REN-LIT-7.24	
Nominal voltage [V]	51.2
Nominal Capacity [Ah]	300
Energy [Wh]	15360
Measures [mm]	835 x 526 x 784
Weight [Kg]	920

REN-LIT-7.27	
Nominal voltage [V]	51.2
Nominal Capacity [Ah]	100
Energy [Wh]	5120
Measures [mm]	200 x 620 x 260
Weight [Kg]	50

REN-LIT-7.29	
Nominal voltage [V]	48
Nominal Capacity [Ah]	100
Energy [Wh]	4800
Measures [mm]	200 x 620 x 260
Weight [Kg]	50

Nominal voltage: 24.48V

- Nominal capacity: 40,80,100,120,240,300,400,500,600Ah
- External appearance: solid black square
- Chemical use: Vehicles and electrical appliances
- Odor: Odorless (unless it is a damaged product with electrolyte leakage)
- Flash point: not applicable
- Flammability: not applicable
- Relative density: > 2 g / cm³
- Solubility (water): Not applicable unless individual components are exposed
- Solubility (other): not applicable

SECTION 10: STABILITY AND REACTIVITY

- Stability: stable



- Conditions to avoid:
 - o Heating,or mechanical abuse and
or electrical abuse.
- When using or storing two or more batteries without insulating terminals, the batteries may overheat, explode, or trip due to a short circuit. If they are overcharged, heated, or thrown into a fire, a rapid explosion of electrolytes occurs.
- When batteries are disassembled, it may cause heating and ignition due to a short circuit.
- Hazardous decomposition products: N / A
- Hazardous polymerization: N / A
- If filtered, contact with strong oxidants, mineral acids, strong alkalis and halogenated hydrocarbons is prohibited.

SECTION 11: TOXICOLOGICAL INFORMATION

Signs and Symptoms: None, unless the battery breaks. In case of exposure to internal contents, the corrosive fumes will be very irritating to the skin, eyes and mucous membranes.

Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

- Inhalation: lung irritant
- Skin contact: skin irritant
- Eye contact: irritating to the eyes
- Ingestion: tissue damage to the throat and gastrointestinal tract if ingested

General Medical Conditions Aggravated by Exposure: In case of exposure to internal contents, eczema, skin allergies, lung lesions, asthma and other respiratory disorders can occur.

SECTION 12: ECOLOGICAL INFORMATION

Environmental effect

When used or disposed of immediately, the battery does not present a hazard to the environment. When disposed of, keep away from water, rain and snow.

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal of lithium ion batteries will be carried out in accordance with the relevant laws and regulations of the country where the batteries are disposed of.



United States: Lithium-ion batteries are classified by the federal government as non-hazardous waste and are safe for disposal in the normal municipal waste stream. However, these batteries contain recyclable materials and are accepted for recycling by the Rechargeable Battery Recycling Corporation (RPBC).

Recycling program. Visit the RPBC website at www.rbrc.org (www.call2recycle.org) for additional information.

In the European Union, the manufacture, handling and disposal of batteries is regulated based on DIRECTIVE 2006/66 / CE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and by the Directive 91/157 / EEC is repealed.

Customers find detailed information on disposal in their specific countries using the European Portable Battery Association website (http://www.epbaeurope.net/legislation_national.html)

Importers and users outside the EU should be aware of local laws and regulations.

To avoid short circuits and heating, used lithium ion batteries should never be stored or transported in bulk.

Appropriate measures against short circuits are:

- Storage of batteries in their original packaging.
- Coverage of the terminals.
- Embedding in dry sand

When a lithium-ion battery ends its life cycle within Spain, renobat Ecoenergia, SL has signed a contract with the SCRAP (Extended Collective System of Responsibility of the Producer of waste batteries, accumulators and batteries) called UNIBAT (Union of Industrias de la Bateria, SL) on the collection and recycling of Lithium batteries. All companies that have lithium ion batteries of the renobat® brand can contact UNIBAT so that they can be removed at no cost. Used batteries should be disposed of after taking steps to prevent external short circuits, such as insulating the two terminals by applying insulating tape, as there may be a case where some electrical power is still left in the used batteries.

SECTION 14: TRANSPORTATION INFORMATION

Note: This information is based on the United Nations (UN) Recommendations. However, some regulations vary depending on the mode of shipping and the country / area. Please check with the carrier or airline / shipping company prior to shipping this battery.

The lithium ion battery is classified as dangerous goods and is governed by the UN Recommendations on the Transport of Dangerous Goods, Model Regulations.

LiFePO₄ batteries have passed UN38.3 tests, according to report ID: W03313025221D and W03313025221D-1

Separate lithium ion batteries during shipment to avoid short circuits. They should be packed in strong packaging for support during transportation. Prevent them from moving or falling during transport and avoid getting wet from rain.



Nomenclature and regulations:

ADR Shipping Name: Lithium Ion Batteries

Danger Class: 9

UN No.: UN3480: Lithium ion batteries

UN #: UN3481: Lithium Ion Batteries Contained in Equipment / Packed with Equipment

Packing group:

- II, P903
- special provision: 188; 230; 310; 348; 376; 377; 636
- tunnel code prohibited: E

IATA Shipping Name: Lithium Ion Batteries

Danger Class: 9

UN No.: UN3480: Lithium ion batteries

Packing group:

- 965
- section: II, IB, IA
- special provision: A88; A99; A154; A164; A183

UN #: UN3481: Lithium Ion Batteries Contained in Equipment

Packing group:

- 967
- section: II, I
- special provision: A48; A99; A154; A164; A181; A185

UN #: UN3481: Lithium ion batteries packed with equipment

Packing group:

- 966
- section: II, I
- special provision: A88; A99; A154; A164; A181; A185

Total Watt-hours exceeds the standard, so it belongs to dangerous goods. Only on cargo planes. Products are packed in accordance with packing instruction 965 section I of DGR (air)

IMDG Shipping Name: Lithium Ion Batteries

Danger Class: 9

UN No.: UN3480: Lithium ion batteries



Packing group:

- P903
- special provision: 188; 230; 310; 348; 376; 377

UN #: UN3481: Lithium Ion Batteries Contained in Equipment / Packed with Equipment

Packing group:

- P903
- special provision: 188; 230; 348; 360; 376; 377

Total Watt-hours exceeds the standard, so it belongs to dangerous goods. The products are packed in accordance with IMDG special instruction 188.

Since January 1, 2013 it is necessary to produce both lithium cells and lithium batteries under an existing quality assurance program.

The quality assurance program is detailed in the following parts of the international dangerous goods laws:

- ADR (2015): 2.2.9.1.7 (e)
- IATA (56th edition): 3.9.2.6 (e)
- IMDG code (amendment 37-14): 2.9.4 (5.)

Renobat® declares that all lithium cells and batteries in the renobat® product range are produced in accordance with the quality assurance program mentioned above.

SECTION 15: REGULATORY INFORMATION

Regulations specifically applicable to the product:

- ACGIH and OSHA: See Battery Internal Ingredient Exposure Limits in Section 3.
- Toxic Substances Control Act (TSCA)
- Consumer Product Safety Act (CPSA)
- Federal Law on Environmental Pollution Control (FEPCA)
- The Oil Pollution Act (OPA)
- Superfund Amendments and Reauthorization Act (302/311/312/313) (SARA)
- Resource Conservation and Recovery Act (RCRA)
- Safe Drinking Water Act (CWA)
- IATA / ICAO (air transport): UN 3480 or UN 3481
- US-DOT Transportation, 49 Code of Federal Regulations (special provision 188)
- IMDG (maritime transport): UN 3480 or UN 3481 (special provision 188, 230)



SECTION 16: OTHER INFORMATION

The content of this Product Safety Data Sheet prepared by renobat Ecoenergia, SL is based on materials and information of which we are aware and are believed to be correct. The content could be modified with new information without prior notice. Renobat Ecoenergia, SL is not responsible for problems or defects outside of the specified use. Since this information may be applied in conditions beyond our control and with which you may not be familiar and since the data that we may later have available may suggest changes to the information, we do not assume any responsibility for the results of its use. This information is provided on the condition that the person receiving it makes his or her own determination as to the suitability of the material for its particular purpose.

