

<b>Process / Document Owner:</b>		Xantrex LLC	
<b>Document Revision:</b>	Rev B	<b>Date:</b>	April 2022
<b>970-0112-01-01 Xantrex Battery SDS</b>			

# SAFETY DATA SHEET

## 1.0 Chemical Product and Company Identification

### 1.1 Product identifiers

<b>Product brand name and number</b>	Xantrex 310Ah 12V Battery (PN: 884-0310-12), Xantrex 410Ah 12V Battery (PN: 884-0410-12), Xantrex 205Ah 24V Battery (PN: 884-0205-24), Xantrex 100Ah 51V Battery (PN: 884-0100-51).
<b>Product type</b>	Rechargeable lithium-ion battery pack, LiFePO <sub>4</sub> (LFP)
<b>Also known as</b>	Xantrex Battery, Xantrex Li-ion battery, e-GEN battery.

### 1.2 Relevant identified uses

<b>Recommended applications</b>	Auxiliary energy storage for recreational vehicles
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### 1.3 Supplier Details

<b>Manufacturer</b>	<b>Xantrex LLC</b>
<b>Address</b>	541 Roske Drive, Suite A, Elkhart, Indiana, 46516 USA
<b>Contact Information</b>	Toll Free: 1-800-670-0707 Fax: 574-975-2720 Website: <a href="http://www.xantrex.com/contacts/">http://www.xantrex.com/contacts/</a>
<b>Emergency Contact</b>	PERS Emergency Response Service CALL: 1-800-633-8253 (USA/Canada), 1-801-629-0667 (International) Reference Account Number: <b>12202</b>

## 2.0 Hazards Identification

The product should not present a health hazard when used under reasonable conditions and in accordance with manufacturer's instructions with adherence to local rules and regulations. The lithium-ion battery is designed with one of the safest available current lithium-ion technologies – Lithium Iron Phosphate (LiFePO<sub>4</sub>) [aka LFP]. That said: Lithium-ion batteries contain:

- Battery electrolyte and may become flammable, can vent, ignite, and produce sparks when subjected to: a) High temperature (>150°C/302°F), b) Damage or abuse (e.g., mechanical damage or electrical overcharging); and may burn rapidly with a flare- burning effect. Burning batteries can ignite other batteries in close proximity. Fire will produce irritating, corrosive, and/or toxic gases. Burning batteries may produce toxic hydrogen fluoride gas. Fumes may cause dizziness or suffocation. Vacate the area if this occurs and seek medical attention.
- Battery electrolyte if contacted, may be irritating to skin, eyes, and mucous membranes. Follow the recommendations in Section 4 below.

Do not dismantle, open, or shred battery cells. Exposure to the ingredients contained within could be harmful. If the battery is discarded into the environment, the harmful contents may be dangerous. Dispose according to local recycling rules and regulations for lithium-ion batteries.

For shipping purposes, these Lithium-ion batteries are considered Dangerous Goods and classified Class 9, so when shipped shall be marked (refer to Transport section below) and follow all applicable regulatory requirements accordingly.

## 2.1 Primary routes of exposure

These chemicals are contained in sealed battery cells, inside a sealed container (battery case). Risk of exposure can occur if the battery is mechanically, thermally and/or electrically abused. If this occurs, exposure to the electrolyte solution contained within the battery case can occur by inhalation, ingestion, skin, and eye contact. The battery includes a safety valve which may vent small amounts of toxic vapors when the battery internal pressure is too high, e.g., as a result of overcharging or high temperature.

## 2.2 Potential Health Effects

<b>Eye</b>	Contact between the battery and the eye is not an expected route of exposure. Eye contact with contents of an open battery can cause severe irritation or burns to the eye.
<b>Skin</b>	Contact between the battery and skin is not an expected route of exposure. Skin contact with contents of an open battery can cause severe irritation or burns to the skin.
<b>Inhalation</b>	Inhalation of materials from a sealed battery is not an expected route of exposure. Vapors or mists from a ruptured or venting battery may cause respiratory irritation.
<b>Ingestion</b>	Swallowing of materials from a sealed battery is not an expected route of exposure. Swallowing the contents of an open battery case can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.
<b>Other hazards</b>	No information available

## 3.0 Composition/Information on Ingredients

The rechargeable lithium-ion battery is a mixture of the following ingredients:

<b>Chemical Name</b>	<b>Composition (in % by weight)</b>	<b>CAS Number</b>
Lithium Iron Phosphate (LiFePO <sub>4</sub> )	38.1	15365-14-7
Lithium hexafluorophosphate (LiPF <sub>6</sub> )	20.3	21324-40-3
Graphite(C)	18.1	7782-42-5
Copper (Cu)	11.4	7440-50-8
Aluminum (Al)	7.6	7429-90-5
Polypropylene (C <sub>3</sub> H <sub>6</sub> ) <sub>n</sub> (plastic)	4.5	9002-88-4

## 4.0 First Aid Measures

### 4.1 Description of first aid measures

<b>Eye</b>	<ul style="list-style-type: none"> <li>- Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Do not rub eyes with hand. Check for and remove any contact lenses if possible.</li> <li>- Get medical aid immediately.</li> </ul>
<b>Skin</b>	<ul style="list-style-type: none"> <li>- If skin irritation occurs, remove contaminated clothing and shoes and flush skin with plenty of water and soap or shower for 15 minutes.</li> <li>- Get medical aid immediately, if symptoms persist.</li> </ul>
<b>Inhalation</b>	<ul style="list-style-type: none"> <li>- Remove from exposure and move to fresh air immediately.</li> <li>- If breathing is difficult, give oxygen. If not breathing, give artificial respiration.</li> <li>- Get medical aid immediately if symptoms persist.</li> </ul>
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>- If the victim is conscious, do not induce vomiting, wash mouth out with water, then give 2 – 4 glasses of milk or water. Never give anything by mouth to an unconscious person.</li> <li>- Call the Poison Control Center at 1-800-222-1222 (or your local poison control center) for further instructions. Induce vomiting only when instructed to do so.</li> <li>- Get medical aid immediately.</li> </ul>

## 5.0 Fire Fighting Measures

<b>Flash Point</b>	N/A
<b>Suitable extinguishing agents</b>	Use extinguishing agent suitable for local conditions and the surrounding environment. Suitable extinguishing media include dry chemical (Class ABC Type) and CO <sub>2</sub> . Water is not recommended (after installation) as electricity is involved and would present a shock hazard.
<b>Special hazards arising from the substance or mixture</b>	Battery can be overheated by an external source or by internal shorting and develop metal hydroxide mist. In fire situations, fumes containing lithium, aluminum, and fluoride gas may evolve. Toxic vapor may release in case of fire. Thermal shock may cause the battery case to crack open. Battery containers may explode when heated. Firefighting water runoff and dilution water may be toxic and corrosive and may cause adverse environmental impacts. In some bad usage conditions (e.g., high overcharge, reverse polarity charge, external short circuit) and in cases of internal control failures, some electrolyte vapor can be vented from the battery via the safety valve. Exposure to the ingredients contained within the battery pack could be harmful under some circumstances.
<b>Advice for firefighters Protective equipment</b>	Wear self-contained breathing apparatus. Use proper personal protective equipment as indicated in Section 8. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. If rail car is involved in a fire, isolate for 500 meters in all directions. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Move containers from fire area if this can be done without risk. Prevent runoff from fire control dilution from entering streams or drinking water supply.

## 6.0 Accidental Release Measures

### 6.1 Steps to be taken in case material is released or spilled

- Use proper personnel protection equipment (PPE) as indicated in Section 8.
- In case of leakage, evacuate personnel from area immediately. Do not pass through the spilled area.
- Safely remove all sources of ignition or heat. Prevent unnecessary or unprotected personnel from entering the area.
- Avoid skin and eye contact and breathing vapors, mist, or gas. Ensure adequate ventilation to remove hazardous gases.
- Prevent spilled material and runoff from contact with soil, waterways, drains, and non-chemical sewers.
- Stop leak if safe to do so. Move containers from spill area.
- Leaking batteries and contaminated absorbent material should be placed in metal containers.
- Contaminated floor may be flushed with water into chemical sewer.

## 7.0 Handling and Storage

- The batteries should not be opened, destroyed or incinerated, since they may leak or rupture and release the ingredients to the environment.
- Do not short circuit terminals, or over charge the battery, forced over-discharge, or place the battery in a fire.
- Do not crush or puncture the battery, or immerse in liquids.
- Always handle the battery in an upright orientation and it is preferred that it be stored in this orientation as well. The battery may however, be stored in any orientation except with the battery connectors facing down.
- If transporting, ensure that the State-of-Charge (SoC) is less than the maximum of 30% SoC (specifically required for air transport) and comply with all Class 9 dangerous goods transport requirements for lithium-ion batteries. Refer to section 14 for more information.

### 7.1 Precautions to be taken in handling and storing

- Ensure good local exhaust ventilation.
- Keep container away from any sources of ignition or heat (e.g., open flames, hot surfaces).
- Eating, drinking, and smoking should be prohibited in areas where batteries are handled, stored, and processed.
- Avoid mechanical or electrical abuse.
- Storage area should be equipped with appropriate type and quantity of fire equipment and leakage emergency equipment.
- Store preferably in cool, dry and ventilated area, which is subject to little temperature change.
- Storage at high temperatures or below freezing should be avoided. Follow recommendations in the battery manual.
- Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.
- The battery is heavy. Always use proper lifting techniques (for example, a two-man lift) when handling the battery.

### 7.2 Other Precautions

- Batteries may explode or cause burns, if disassembled, crushed, or exposed to fire or high temperatures.
- Do not short battery terminals or install with incorrect polarity. Electrically insulate battery terminals to mitigate short circuits.

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# 8.0 Exposure Controls and Personal Protection

## 8.1 Exposure Limits

Chemical Name	CAS Number	ACGIH	NIOSH	OSHA
Aluminum (Al)	7429-90-5	TLV-TWA: 10 mg/m <sup>3</sup> (dust) TLV-TWA: 5 mg/m <sup>3</sup> (pyrotechnic powders)	REL-TWA: 10 mg/m <sup>3</sup> (total) REL-TWA: 5 mg/m <sup>3</sup> (respirable)	PEL-TWA: 15 mg/m <sup>3</sup> (total) REL-TWA: 5 mg/m <sup>3</sup> (respirable)
Copper (Cu)	7440-50-8	TLV-TWA: 0.2 mg (Cu) /m <sup>3</sup> (fume) TLV-TWA: 1 mg/m <sup>3</sup> (dust and mist)	REL-TWA: 1 mg/m <sup>3</sup> (as Cu, except Copper fume) IDLH: 100 mg/m <sup>3</sup> (as Cu)	PEL-TWA: 1 mg/m <sup>3</sup> (as Cu, except Copper fume)
Graphite(C)	7782-42-5	TLV-TWA: 2 mg/m <sup>3</sup> (respirable)	REL-TWA: 2.5 mg/m <sup>3</sup> (respirable) IDLH: 1250 mg/m <sup>3</sup>	PEL-TWA: 15 ppm cf (respirable)
Lithium hexafluorophosphate (LiPF <sub>6</sub> )	21324-40-3	N/A	N/A	N/A
Lithium Iron Phosphate (LiFePO <sub>4</sub> )	15365-14-7	N/A	N/A	N/A
Polypropylene (C <sub>3</sub> H <sub>6</sub> ) <sub>n</sub> (plastic)	9002-88-4	N/A	N/A	N/A

## 8.2 Engineering Controls

- Use local exhaust ventilation or other engineering controls to control sources of dust, mist, fumes and vapor.
- General room ventilation is sufficient during normal use and handling.
- Do not install these batteries in sealed, unventilated areas.
- Keep away from heat and open flame.
- Store in a cool, dry place following battery manual instructions.
- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

## 8.3 Personal Protective Equipment (PPE)

<b>Eye and Face Protection</b>	Not necessary under normal conditions. Wear safety glasses if handling an open or leaking battery.
<b>Skin and body Protection</b>	Not necessary under normal conditions. For general safety, <ul style="list-style-type: none"> <li>- Wear nitrile rubber gloves if handling an open or leaking battery.</li> <li>- Do not wear metallic items such as watches or bracelets when working on the battery.</li> <li>- Use insulated tools to prevent accidental short circuit.</li> </ul>
<b>Hand protection</b>	Wear nitrile rubber material gloves if handling an open or leaking battery.
<b>Respiratory Protection</b>	Not necessary under normal conditions. In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting batteries. A full-face positive pressure supplied-air respirator or a self-contained breathing apparatus should be used in case of fire.
<b>Other Protective Equipment</b>	Have a safety shower and eye wash fountain readily available in the immediate work area. If lifting, wear steel-toed work boots.
<b>Hygiene Measures</b>	Do not eat, drink, or smoke in work area. Maintain good housekeeping.

## 9.0 Physical and Chemical Properties

<b>Nominal Voltages</b>	12V (rated 12.8Vdc) (Xantrex PN: 884-0310-12   PN: 884-0410-12), 24V (rated 25.6Vdc) (Xantrex PN: 884-0205-24), 48V (rated 51.2Vdc) (Xantrex PN: 884-0100-51).
<b>Rated Capacity</b>	310Ah (884-0310-12)   410Ah (884-0410-12), 205Ah (884-0205-24), 100Ah (884-0100-51).
<b>Rated Energy</b>	3.968kWh (884-0310-12)   5.248kWh (884-0410-12), 5.248kWh (884-0205-24), 5.120kWh (884-0100-51)
<b>Chemical Uses</b>	Electrochemical power source
<b>Appearance Characteristics</b>	Blue-White, sealed, solid battery inside metal enclosure
<b>Upper/lower flammability or explosive limit</b>	Not available
<b>Odor</b>	Odorless. If leaking, smells like medical ether.
<b>Odor threshold</b>	Not applicable
<b>Vapor pressure</b>	Not applicable
<b>Vapor density</b>	Not applicable
<b>Relative density</b>	Not applicable
<b>Density</b>	Not applicable
<b>pH</b>	Not applicable
<b>Solubility(ies) in water</b>	Not soluble in water
<b>Melting point/freezing point</b>	Not applicable
<b>Initial boiling point and boiling range</b>	Not applicable
<b>Evaporation rate</b>	Not applicable
<b>Partition coefficient: n-octanol / water</b>	Not applicable
<b>Flash point</b>	Not applicable
<b>Flammability (solid, gas)</b>	Not applicable
<b>Auto-ignition temperature</b>	Not applicable
<b>Decomposition temperature</b>	Not applicable
<b>Viscosity</b>	Not applicable
<b>Explosive properties</b>	Not applicable
<b>Oxidizing properties</b>	Not applicable

## 10.0 Stability and Reactivity

This section describes the reactivity hazards of the chemical and the chemical stability information.

<b>Reactivity</b>	The product is stable under normal conditions. If battery leakage occurs, the internal materials may react with strong oxidizers, strong acids, strong bases, etc.
<b>Chemical stability</b>	The product is stable under normal conditions.
<b>Conditions to Avoid</b>	Incompatible materials, any sources of ignition or heat (e.g., open flames, smoking, hot surfaces, excess heat), freezing conditions, mechanical damage, or electrical overcharge or overdischarge.
<b>Incompatibilities</b>	Conductive materials, water, seawater, oxidizing agents, strong acids, strong bases.
<b>Hazardous Decomposition Products</b>	In case of fire or high temperature, metal oxides and irritating/harmful fumes/smoke may be generated.

## 11.0 Toxicological Information

No health effects are expected under normal use. 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.
- Long-term exposure to internal contents can cause lung damage (pulmonary fibrosis).
- Prolonged or repeated exposure to internal contents may cause damage to organs (liver).
- If battery electrolyte is swallowed, it may cause severe chemical burns to mouth, esophagus, and gastrointestinal system.
- If battery is broken, inhalation of fumes/dust may cause respiratory irritation, cough, shortness of breath, or chemical burns.

## 12.0 Ecological Information

No ecological effects are expected under normal use. Do not allow product to be released to the environment without proper treatment. Internal contents of battery may cause long lasting harmful effects to aquatic life. At the end of useful life, observe all Lithium-Ion battery disposal regulations (See section 13).

## 13.0 Disposal Considerations

- Do not discard with general waste.
- Keep away from sunlight, water, rain, and snow.
- Batteries should be fully discharged prior to disposal.
- Batteries should be considered hazardous waste.
- Dispose of the batteries in accordance with approved local, state, and federal requirements.
- The batteries must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste. Recycling of battery can be done in an authorized facility, through a licensed waste carrier.

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# 14.0 Transport Information

The LITHIUM IRON PHOSPHATE BATTERY (LiFePO<sub>4</sub>) [LFP] complies with UN/DOT 38.3 tests, according to PACKING INSTRUCTION 965 of IATA DGR 63rd Edition (2022) for transportation.

<b>Cargo Aircraft weight limit: ≤ 35kg</b>	Xantrex 310Ah 12V Battery (PN: 884-0310-12) = exceeds weight limit, Xantrex 410Ah 12V Battery (PN: 884-0410-12) = exceeds weight limit, Xantrex 205Ah 24V Battery (PN: 884-0205-24) = exceeds weight limit, Xantrex 100Ah 51V Battery (PN: 884-0100-51) = exceeds weight limit.
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## 14.1 Transport Methods

Electric energy is greater than 100Wh and greater than 35 kg which exceeds the standard to be considered Dangerous Goods Cargo only.

- By air is **FORBIDDEN** (batteries exceed ≤ 35kg max. limit). See below (IATA DGR).
- By sea is PERMITTED. See below (Maritime).
- By railway is PERMITTED
- By road is PERMITTED

<b>IATA Proper Shipping Name</b>	Lithium-ion batteries (Including lithium polymer batteries)	<b>Maritime IMDG / Roadway Transport</b>	Lithium-ion batteries (Including lithium polymer batteries)
<b>Hazard Class</b>	9	<b>IMDG/DOT Class</b>	9
<b>Identification Number</b>	UN3480	<b>UN Number</b>	UN3480
<b>Packaging group</b>	PI 965	<b>Packaging group</b>	PI 965
<b>Other hazards</b>	- Pax A/C* = <b>FORBIDDEN</b> - CAO* = <b>FORBIDDEN</b> (does not comply with ≤ 35kg max. limit) - Not to be packaged with Class 1 articles or substances - SoC ≤ 30	<b>Other hazards</b>	- SoC ≤ 30%

\*Note 1: PAX A/C = passenger aircraft; and  
COA = cargo only aircraft.



More information concerning shipping, testing, marking, and packaging can be obtained from Labelmaster at:  
<http://www.labelmaster.com>.

- Separate Li-ion batteries when shipping to prevent short-circuiting.
- They should be packed in strong packaging for support during transport.
- In the case of transportation, confirm no leakage and no overspill from a container. Transport cargo without falling, dropping and breakage.
- Prevent collapse of cargo piles and exposure to rain. The container must be handled carefully.
- Do not give shocks that result in a mark or damage to batteries. Please refer to "Handling and Storage" on page 4.

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Labeling requirements for packaging are provided below.

<p>The following placard must be placed visibly in proportion to crate size but must be no less than 120mm x 110mm.</p>	
<p>When a battery is shipped individually, the package box must be applied with the following information.</p> <p>a. "Lithium-ion batteries: UN 3480"</p> <p>b. United Nations Packaging Symbol: “  ”</p> <p>c. "The UN code adjacent UN mark: "4G/Y35/S/xx/US/yyyyy" (or equiv. where "xx" = 2-digit year of mfg; "y..." = Mfg certifying pkg)</p> <p>d. "For PERS Emergency Response Service: Call 1-800- 633-8253 (USA/Canada), 1-801-629-0667 (International) – Reference Account Number: 12202"</p>	

Note 2: The SDS is not a shipping document. The information provided is only for reference purposes. The federal and international transportation codes and regulation requirements take precedence.

## 15.0 Regulatory Information

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

Composition	CAS#	IECSC	DSL	TSCA	EC#	EINECS
Aluminum (Al)	7429-90-5	Listed	Listed	Listed	231-072-3	Listed
Copper (Cu)	7440-50-8	Listed	Listed	Listed	231-159-6	Listed
Graphite(C)	7782-42-5	Listed	Listed	Listed	231-955-3	Listed
Lithium hexafluorophosphate (LiPF <sub>6</sub> )	21324-40-3	Listed	Listed	Listed	244-334-7	Listed
Lithium Iron Phosphate (LiFePO <sub>4</sub> )	15365-14-7	Unlisted	Listed	Listed	476-700-9	Listed
Polypropylene (C <sub>3</sub> H <sub>6</sub> ) <sub>n</sub>	9002-88-4	Listed	Listed	Listed	None	Unlisted

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## 16.0 Additional Information

This Safety Data Sheet (SDS) complies with the requirements of the USA Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)) and European Union (EU) Regulation (EC) No. 1907/2006 (REACH).

### 16.1 Terms and definitions

Term or Abbreviation or Acronym	Definition
ACGIH	American Conference of Governmental Industrial Hygienists
EC / EU	European Commission / European Union as it relates to EC/EU - safety data sheet which is the central instrument for communicating safety-related information for substances and mixtures in the supply chain.
Calif. Prop. 65	California Proposition 65 Harmful Substances
CAS	Chemical Abstracts Service, as in CAS Registry Number or CAS Number
CO <sub>2</sub>	Carbon Dioxide
DSL	Domestic Substance List
EINECS	European Inventory of Existing Commercial Chemical Substances
EPA	Environmental Protection Agency, a United States Federal Agency
IATA DGR	International Air Transport Association Dangerous Goods Regulation
IECSC	Inventory of Existing Chemical Substances Produced or Imported in China
IMDG	International Maritime Dangerous Goods
LiPF <sub>6</sub>	Lithium Hexafluorophosphate
LiFePO <sub>4</sub> / LFP	Lithium Iron Phosphate
NIOSH	US National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Level
REL	Recommended Exposure Limit
SDS	Safety Data Sheet (formerly Material Safety Data Sheet [MSDS])
TLV	Threshold Limit Value
TSCA	The Substances Control Act of 1976 authorizes the EPA to track the 75,000 industrial chemicals currently produced or imported into the U.S.
TWA	Time Weighted Average (over an 8-hour period)

### 17.0 Revision summary

Revision	Date of Revision	Description
Draft	29-Apr-2021	Draft of document.
A	14-June-2021	Final draft document (approved internally)
B	30-Mar-2022	Revised to remove Xantrex 205Ah, 51Vdc Battery (PN: 844-0205-51) and Update transport information.

### 18.0 Disclaimer

The above information is based on the data of which we are aware and is believed to be correct as of the date 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 date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make their own determination of the suitability of the material for their particular purpose.

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