

MATERIAL SAFETY DATA SHEET

Lithium-Ion HE Batteries

MSDS CREATION DATE: 06 March 2017

MSDS REV DATE: 10 October 2017

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Lithium HE battery 24V/100Ah
Lithium HE battery 24V/200Ah

PRODUCT CODES: BAT524110300, BAT524120300

COMPANY NAME: Victron Energy

ADDRESS: De Paal 35
1351 JG Almere

CONTACT: Reinout Vader

PHONE: +31 (0)36 535 9700

CHEMICAL NAME: Lithium Nickel Manganese Cobalt Oxide (NMC)

CHEMICAL FAMILY: Lithium Ion

CHEMICAL FORMULA: LiNiMnCoO₂

PRODUCT USE: Electrical

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Component	Chemical name	CAS No.
Cathode	nickel-manganese-cobalt	207803-51-8
Anode	Graphite	7782-42-5
Electrolyte	Ethyl acetate	141-78-6
	Ethylene carbonate	96-49-1
	Dimethyl carbonate	616-36-6
	Lithium hexafluorophosphate	21324-40-3
Binder	Polyvinylidene difluoride	24937-79-9

SECTION 3: HAZARDS IDENTIFICATION**HEALTH HAZARD (ACUTE AND CHRONIC)**

The chemicals are contained in a sealed can. Risk of exposure only occurs if battery is mechanically, thermally or electrically abused. Contact of electrolyte and extruded lithium with skin and eyes should be avoided.

SIGNS/SYMPTOMS OF EXPOSURE

A shorted lithium battery can cause thermal and chemical burns upon contact with the skin.

SECTION 4: FIRST AID MEASURES

EYES:

Flush affected eye with lukewarm water for at least 30 minutes. Seek medical attention.

SKIN:

Flush affected area with lukewarm water at least 30 minutes. If irritation or pain persists, seek medical attention.

INGESTION:

Move victim to fresh air and remove source of contamination from area. Seek medical attention.

INHALATION:

Move victim to fresh air and remove source of contamination from area. Seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Water, dry chemical powder, carbon dioxide (CO₂) and foam are most effective to extinguish a battery fire.

FIRE-FIGHTING PROCEDURES: Wear full protective gear, including self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Battery may vent when subjected to excessive heat-exposing, fire or over voltage condition.

HAZARDOUS COMBUSTION PRODUCTS: Carbon monoxide, carbon dioxide, lithium oxide fumes.

SECTION 6: ACCIDENTIAL RELEASE MEASURES

The material contained within the batteries is only expelled under abusive conditions. Use a shovel and cover battery with sand or vermiculite, place in an approved container and dispose in accordance with section 13.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

If the battery material is released, remove personnel from the area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Leave the area and allow the batteries to cool and vapors to dissipate. Avoid skin and eye contact or inhalation of vapors.

SECTION 7: HANDLING AND STORAGE

HANDLING: Do not expose battery or cell to extreme temperatures or fire. Do not disassemble, crush or puncture battery.

STORAGE: Insulate positive and negative terminals to avoid short circuit. Avoid mechanical or electrical abuse. Store preferably in a cool, dry and ventilated area, which is subjected to little temperature changes. Storage at high temperatures should be avoided. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATION PROTECTION: Not necessary under conditions of normal use. In case of battery venting or rupture, use a self-contained full face respiratory mask.

EYE PROTECTION: Not necessary under conditions of normal use. In case of battery rupture or leakage, use safety goggles.

SKIN/HAND PROTECTION: Not necessary under conditions of normal use. In case of battery rupture or leakage, wear rubber apron and Viton rubber gloves.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid	Odor Type:	Odorless
Appearance:	Battery	Odor Threshold:	Not Applicable
pH:	Not Applicable	Evaporative Rate: (n-Butyl Acetate = 1)	Not Applicable
Relative Density:	Not Applicable	Auto Ignition Temperature (°C):	Not Applicable
Boiling Point:	Not Applicable	Flammability Limits (%):	Not Applicable
Melting Point:	Not Applicable	Vapor Pressure: (mm Hg @ 20 °C)	Not Applicable
Viscosity:	Not Applicable	Vapor Density: (Air = 1)	Not Applicable
Oxidizing Properties:	Not Applicable	Solubility in Water:	Insoluble
Flash Point and Method (°C)	Not Applicable	Water/ Oil distribution coefficient:	Not Applicable

Other information:

Voltage: 25,2 V
Electric capacity: 100 Ah, 200Ah
Electric energy: 2500 Wh, 5000 Wh

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: Heating, mechanical and electrical abuse.

HAZARDOUS DECOMPOSITION PRODUCTS: N/A

HAZARDOUS POLYMERIZATION: N/A

INCOMPATIBILITY (MATERIALS TO AVOID): If leaked, forbidden to contact with strong oxidizers, mineral acids, strong alkalis, halogenated hydrocarbons.

SECTION 11: 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-fibroid lung injury and membrane irritation.

SECTION 12: ECOLOGICAL INFORMATION

When properly used or disposed, the batteries do not present environmental hazard.

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Recycling is encouraged. Dispose of in accordance with local, state and federal laws and regulations.

USA: Dispose of in accordance with local, state and federal laws and regulations.

Canada: Dispose of in accordance with local, state and federal laws and regulations.

EC: Dispose of in accordance with relevant EC Directives.

SECTION 14: TRANSPORT INFORMATION

The used battery cells have passed the test UN38.3.

SHIPPING BY AIR:

IATA proper shipping name: Lithium Ion Batteries

Hazard Class: 9

UN Class: UN3480

Packaging group: II

Watt-hour exceeds the standard, so it belongs to dangerous goods. Cargo only. The goods are packaged according to the packing instructions 965 section IA of DGR.

SHIPPING BY SEA:

IMDG proper shipping name: Lithium Ion Batteries

Hazard Class: 9

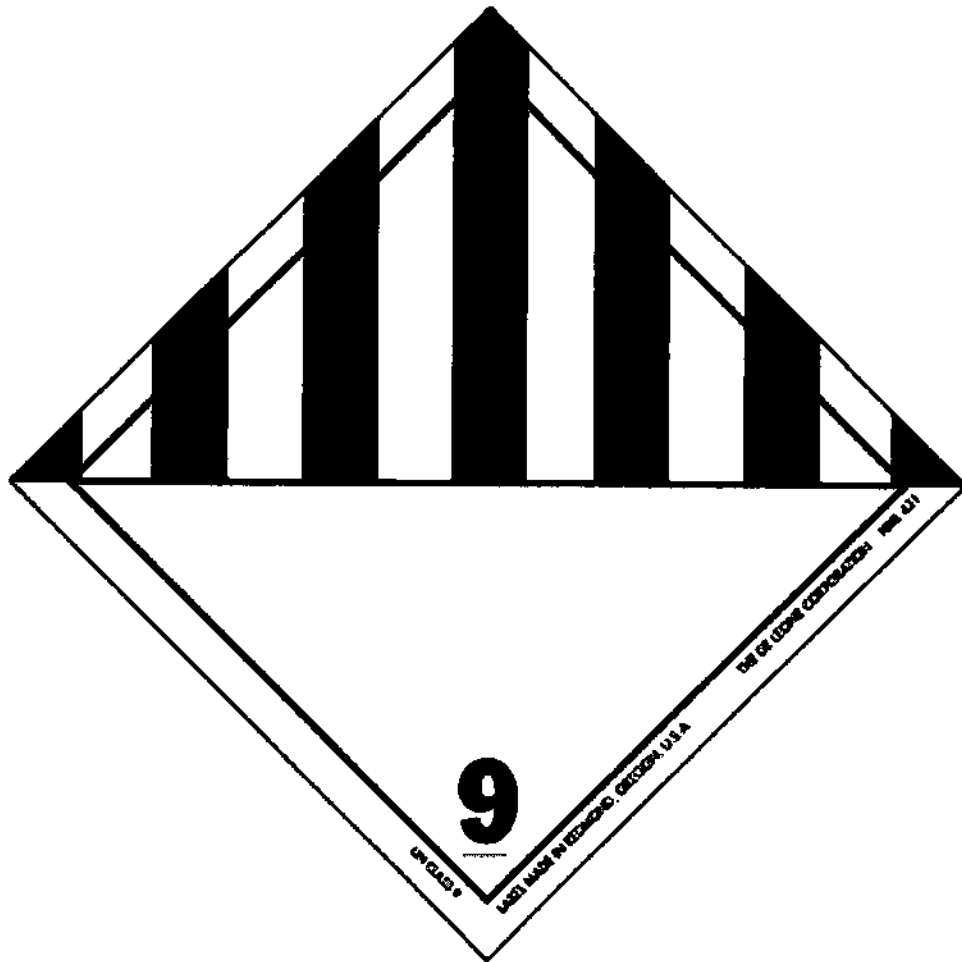
UN Class: UN3480

Packaging group: II

Watt-hour exceeds the standard, so it belongs to dangerous goods.

The goods are packaged according to the special provision 188 of IMDG.

Separate Lithium-ion batteries when shipping to prevent short-circuiting. They should be packed in strong



Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of lithium ion batteries which are assigned Class 9. Refer to relevant transportation documents. Lithium and lithium ion cells and batteries are regulated in the U.S. in accordance with Part 49 of the Code of Federal Regulations, (49 CFR Sections 105-180) of the U.S. Hazardous Materials Regulations.

SECTION 15: REGULATORY INFORMATION

USA

TSCA Status: All ingredients in the product are listed on the TSCA inventory.

SARA Title III:

Sec. 302/304: None

Sec. 311/312: None

Sec. 313: None

CERCLA RQ: None

California Prop 65: This product does not contain chemicals known to the State of California to cause cancer or reproductive toxicity.

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

WHMIS Classification: Not Controlled

New Substance Notification Regulations: All ingredients in the product are listed, as required, on Canada's Domestic Substance List.

NPRI Substances (National Pollutant Release Inventory): This product does not contain any NPRI chemicals.

EC Classification for the Substance/ Preparation:

Symbol: This product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

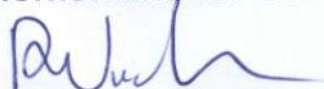
Risk Phrases: None

Safety Phrases: S2: Keep out of the reach of children.

SECTION 16: ADDITIONAL INFORMATION

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VICTRON ENERGY B.V.



Reinout Vader
Managing Director