Soluna (Shanghai) Co.,Ltd.

Add.	No. 3492 Jinqian Road, Qingcun Town, Fengxian District, Shanghai, China	P. C	201406
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MATERLAL SAFETY DATA SHEET

Issue date:2019-02-25 Rev: 1.0

MSDS REF. NO.: Soluna 4K PACK

LITHIUM-ION RECHARGEABLE BATTERY

MATERIAL SAFETY DATA SHEET

IDENTITY	Product Category	:	Rechargeable Li-ion Battery Pack
	Model Name	:	SOLUNA 4K pack
	Brand	:	Soluna
	Nominal Capacity	:	75Ah
	Nominal Voltage	:	51.2V
	Watt-hour	:	3840W/hr
	Chemical System	:	Lithium cobaltite / Carbon
	Desigened for Recharge	:	☒ Yes ☐ No

SECTION 1 MANUFACTURER'S INFORMATION

Manufacturer's Name	:	SOLUNA(SHANGHAI)CO.,LTD.
Supplier's Name	:	SOLUNA(SHANGHAI)CO.,LTD.
Supplier's Address	:	No.3492,Jinqian Road, Fengxian District, Shanghai, China
Information Telephone	:	+86-021-57475865
Emergency Telephone	:	+86-021-57475865
Date Prepared	:	2019-2-25

SECTION 2 MATERIAL AND INGREDIENTS INFORMATION

Battery Cell :

Important Note	:	The battery should not be opened or burned since the following ingredients contained within the product that could be barmful under some circumstance if exposed or misuse. The battery contains neither metallic lithium nor lithium alloy.
Cathode	:	C
Anode	:	$LiFePO_4$
Electrolyte	:	$LiPF_6$
Others	:	Heavy metals such as Mercury, Cadmium, Lead, and Chromium are not used in the batteries.

Common chemical name / General name	CAS number	Concentration / Concentration range
Aluminum foil	7429-90-5	2 ~ 6 %
Copper foil	7440-50-8	5 ~ 10 %

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Linear and Cyclic Carbonic Solvents (See other information)	N/APP	5 ~ 15 %
Graphite Powder	7440-44-0	12 ~ 15 %
Lithium cobaltite (LiFePO4)	12190-79-3	25 ~ 30 %
Lithium hexaflurorphosphate(LiPF6)	21324-40-3	1 ~ 5 %
Poly (vinylidene fluoride) (PVDF)	24937-79-9	0.1 ~ 2 %
Steel, nickel and inert polymer	N/APP	5 ~ 15 %
Carbon black and others	N/APP	0 ~ 2 %

Circuit Module :

HAZARDOUS INGREDIENTS	%	CAS number
Lead	<0.1	7439-92-1
Mercury	0	7439-97-6
Chromium	0	7440-47-3
Cadmium	0	7440-43-9

Plastic Parts :

HAZARDOUS INGREDIENTS	%	CAS number
Lead	<0.1	7439-92-1
Nickel	<0.01	7440-02-0
CFCs	0	75-69-4
Polyclorinated Biphenyls	0	1336-36-3

SECTION 3 HAZARDS IDENTIFICATION

PRIMARY ROUTES OF ENTRY
Skin contact, Skin absorption, Eye contact, Inhalation, and Ingestion : NO SYMPTOMS OF EXPOSURE
Skin contact: No effect under routine handling and use.
Skin absorption: No effect under routine handling and use.
Eye contact: No effect under routine handling and use.
Inhalation: No effect under routine handling and use.
REPORTED AS CARCINOGEN : Not applicable

SECTION 4 FIRST-AID MEASURES

Internal cell materials of an opened battery cell

- Inhalation :
  Make the victim blow his/her nose, gargle. Seek medical attention if necessary.
- Skin contact :
  Remove contaminated clothes and shoes immediately. Wash the adhere or contact region with soap and
  plenty of water immediately.
- Eye contact :
  Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

A battery cell and internal cell materials of an opened battery cell

- Ingestion :
  Induce vomiting. When it is impossible or the feeling is not well after vomiting, seek medical attention.

ECTION 5 FIRE-FIGHTING MEASURE

- Suitable extinguishing media : Pouring water, carbon dioxide gas, nitrogen gas, chemical

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powder fire extinguishing medium and fire foam.

- Specific hazards : Corrosive gas may be emitted during fire.
- Specific methods of fire-fighting : When the battery burns with other combustibles simultaneously, take fire extinguishing method which correspond to the combustibles. Extinguish a fire from the windward as much as possible.
- Special protective equipment for firefighters :
  Respiratory protection : Respiratory equipment of a gas cylinder style or protection-against-dust mask
  Hand protection : Protective gloves
  Eye protection : Goggle or protective glasses designed to protect against liquid splashes
  Skin and body protection : Protective cloth

SECTION 6 ACCIDENTAL RELEASE MEASURES

Internal cell materials, such as electrolyte leaked from battery cell, are carefully dealt with according to the
followings.

- Personal precautions :
  Remove leaked materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.
- Environmental precautions : Do not throw out into the environment.
- Method of cleaning up : The leaked solid is moved to a container. The leaked place is wiped off with dry cloth.

Prevention of secondary hazards : Avoid re-scattering. Do not bring the collected materials close to fire.

SECTION 7 PERCAUTIONS FOR SAFE HANDLING AND USE

Storage	:	Store in a cool, well-ventilated area. Do not expose to high temperature（60℃）. Since short circuit can cause burn hazard or safety vent to open, do not store with metal jewelry, metal covered tables, or metal belt.
Handling	:	Do not disassemble, crush or solder. Do not short + and – terminals with a metal. Do not open the battery.
Charging	:	Charge within the limits of 0℃ to 45℃ temperature. Charge with specified charger designed for this battery.
Discharging	:	Discharge within the limits of -20℃ to 60℃ temperature.
Battery Energy Rate	:	The battery capacity at shipment is 65-75 % of the full capacity.
Disposal	:	Dispose in accordance with applicable federal, state and local regulations.
Warning	:	Fire, Explosion, and Severe Burn Hazard. Do not Crush, Disassemble, Heat Above 100℃/212℉, or Incinerate.

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SECTION 8 ECOLOGICAL INFORMATION

- Persistence/degradability :

Since a battery cell and the internal materials remain in the environment, do not bury or throw out into the environment.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

- Appearance
  Physical state : Solid
  Form : Cylindrical
  Color : Metallic color (without tube)
  Odor : No odor
- pH : NA
- Specific temperatures/temperature ranges at which changes in physical state occur.
  There is no useful information for the product as a mixture.
- Flash point : NA
- Explosion properties : NA
- Density : NA
- Solubility ,with indication of the solvent(s) : Insoluble in water

SECTION 10 STABILITY AND REACTIVITY

- Stability : Stable under normal use
- Hazardous reactions occurring under specific conditions
- Conditions to avoid : When a battery cell is exposed to an external short-circuit, crushes, modification, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.
- Materials to avoid : Conductive materials, water, seawater, strong oxidizers and strong acids.
- Hazardous decomposition products : Acrid or harmful gas is emitted during fire.

SECTION 11 TOXICOLOGICAL INFORMATION

This product does not elicit toxicological properties during routine handling and use.

Sensitization: NO	Teratogenicity: NO	Reproductive toxicity: NO	Acute toxicity: NO

This product does not contain any kinds of the following substances and halogen-type flame retardants including Chlorine and Bromide type harmful flame retardants which are listed in Appendix of TCO documents and relevant international ECO requirements:

Polybromated Biphenyls (PBB)
Polybromated Biphenyl Ethers (PBBE)
Polybromated Biphenyl Oxides (PBBO)
Polybromated Diphenylethers (PBDE)
Polychlorinated Biphenyl (PCB)
Polychloronated Diphenylethers (PCDE)
Tetrabromphisphenol A (TBBPA)
Asbestos, Antimonytrioxide, Dioxine

None of the following substances will be exposed, leaked, or emitted during transportation,

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storage or any operation and any temperature condition:
Chlorinated Fluorohydrocarbon (FCKW)
Acrylonitride
Styrol
Phenol
Benzol
Mercury of greater than 0.0001 wt% for alkaline battery
Mercury of greater than 0.0005 wt% for other battery
Cadmium, lead, and other harmful heavy metal
Lithium ion batteries containing no more than 1.2g/cell and 960g/battery pack
Lithium ion cell, a watt-hour rating is not more than 4.8Wh and for lithium ion battery is not more than 3840Wh.

And will comply with the regulation of 51 CFR (DOT regulation), International Air Transport Association (IATA), and Deuche Forschungsgemeinschaft (DFG) regarding concentrations of emitted substances.

If the cells are opened through misuse or damage, discard immediately. Internal components of cell are irritants and sensitizers.

SECTION 12 ECOLOGICAL INFORMATION

Some materials within the cell are bioaccumulative. Under normal conditions, these materials are
contained and pose no risk to persons or the surrounding environment.

SECTION 13 DISPOSAL CONSIDERATIONS

- Recommended methods for safe and environmentally preferred disposal :

Product(waste from residues)

Do not throw out a used battery cell. Recycle it through the recycling company.

Contaminated packaging

Neither a container nor packing is contaminated during normal use. When internal materials leaked from a battery cell contaminates, dispose as industrial wastes subject to special control.

SECTION 14 Transport information

- UN Number : UN 3480
- Proper Shipping Name : LITHIUM ION BATTERY
- Hazard class : 9
- Packing group : II

In the case of transportation, avoid exposure to high temperature and prevent the formation of any condensation. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet by rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a pack. Please refer to Section 7-HANDLING AND STORAGE also.

The Lithium Ion batteries are considered to be "Rechargeable batteries" and meet the requirements of transportation by the U.S. Department of Transportation(DOT), International Civil Aviation Administration(ICAO), International Air Transport Association(IATA) Dangerous Goods Regulations (58th Edition, Special Provision A88, A99, A154 and A164 and Section II of package instruction 965,966 or 967 for lithium ion batteries) and belong to non-dangerous

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goods.

SECTION 15 REGULATORY INFORMATION

Regulations specifically applicable to the product :

- The transport of the lithium batteries is regulated by the United Nations, "Model Regulations on Transport of Dangerous Goods".
- Lithium batteries are subject to shipping requirements exceptions under 49 CFR 173.185(paragraph c).

- Shipping of Lithium batteries in aircrafts are regulated by the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) requirements in Special Provision "A48".
- Shipping of lithium batteries on sea are regulated the International Maritime Dangerous Goods (IMDG) requirements of UN 3480.

The internal component (thionyl chloride) is non-hazardous and under the criteria of the Federal OHSA Hazard Communication Standard 29 CFR 190.1200.

SECTION 16 SPECIAL PROTECTION INFORMATION

Respiratory Protection	:	Not necessary under normal use.
Ventilation	:	Not necessary under normal use.
Eye Protection	:	Not necessary under normal use.
Protective Gloves	:	Not necessary under normal use.