

SAFETY DATA SHEET

1 Product & Company Identification

Product Identification

Chinese Name	锂离子电池
English Name	Lithium Ion Battery
Proper Shipping Name	Lithium Ion Battery
Product Description	Rechargeable lithium ion battery
Model Name	1) ARK 2.5H-A1, 2) ARK 5.1H-A1, 3) ARK 7.6H-A1, 4) ARK 10.2H-A1, 5) ARK 12.8H -A1, 6) ARK 15.3H-A1, 7) ARK 17.9H-A1, 8) ARK 20.4H-A1,9) ARK 23.0H-A1, 10) ARK 25.6H-A1
UN No.	UN3480/3481
UN38.3 Report No.	01052000007070-1 (E)
Capacity	1) 50Ah, 2) 100Ah, 3) 150Ah, 4) 200Ah, 5) 250Ah, 6) 300Ah, 7) 350Ah, 8) 400Ah, 9) 450Ah, 10) 500Ah
Nominal voltage	1) 51.2 V, 2) 102.4V, 3) 153.6V, 4) 204.8V, 5) 256V, 6) 307.2V, 7) 358.4V, 8) 409.6V, 9) 460.8V, 10) 512V
Watt-hour	1) 2400 Wh, 2) 4800 Wh, 3) 7200 Wh, 4) 9600 Wh, 5) 12000 Wh, 6) 14400 Wh, 7) 16800 Wh, 8) 19200 Wh, 9) 21600 Wh, 10) 24000 Wh
Equivalent lithium content	/
Approximate Weight	1) 28kg, 2) 56kg, 3) 84kg, 4) 112kg, 5) 140kg, 6) 168kg, 7) 196kg, 8) 224kg, 9) 252kg, 10) 280kg

Safety Data Sheet Provider Information


Importer	Growatt New Energy Australia Pty Ltd
Address	C1, 27-29 Fariola Street, Silverwater, NSW 2128;
Importer Telephone	0434380656 Emergency call: 1800 476928
Importer Contact	REX Wang E-Mail: rex.wang@growatt.com
Manufacturer	Shenzhen Growatt New Energy Co., Ltd.
Address	4-13/F, Building A, Sino-German(Europe) Industrial Park, Hangcheng Ave, Bao'an District, Shenzhen, Guangdong, P.R. China
Factory	Huizhou Desay Battery Co., Ltd

Address	Building C, Yalun Company, Jinda Road, Huinan High-tech Industrial, Park, Huiao Avenue, Huizhou, Guangdong, P.R. China
Postcodes	518100
Telephone	+86 176 2037 6956
E-mail Address	dong.tao@growatt.com

| Emergency call

Emergency call	1800 476928
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2 Hazardous Identification

As a whole, the battery is not dangerous in the correct use.	
Hazaed label	 <p>Class 9-lithium batteries</p>
Explosive risk	This article does not belong to the explosion dangerous goods
Flammable risk	This article does not belong to the flammable material
Oxidation risk	This article does not belong to the oxidation of dangerous goods
Toxic risk	This article does not belong to the toxic dangerous goods
Radioactive risk	This article does not belong to the radiation of dangerous goods
Mordant risk	This article does not belong to the corrosion of dangerous goods
other risk	This article is Lithium-polymer battery, Watt hour rate2400 Wh, which belong to the miscellaneous dangerous goods, as is described in IMDG CODE and IATA DGR.

3 Composition /Information on Ingredients

Important note: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

| PACK Composition

MATERIAL OR INGREDIENT
Container, Steel Support and Control System (Note: Non-dangerous chemical)
Batteries (The composition of the battery reference to the following table)

Composition of battery (Note: The percent in following table is only for the weight of battery)

Component	Content/%	CAS No.	Remark
Polypropylene	1.55	9003-07-0	(C ₃ H ₆) _n
Glass Fiber	0.62	65997-17-3	--
Compatibilizer	0.12	NA	--
Flame Retardants	0.74	NA	--
Zinc	0.01	7440-66-6	Zn
Iron	0.05	7439-89-6	Fe
Aluminum	11.86	7429-90-5	Al
Copper	16.58	7440-50-8	Cu
Lithium Iron Phosphate	27.71	15365-14-7	LiFePO ₄
Carbon (proprietary)	12.92	7782-42-5	C
Separator (proprietary)	3.73	9003-07-0	(C ₃ H ₆) _n
Electrolyte (proprietary)	23.06	NA	LiPF ₆
Polyvinyl Chloride	0.2	9002-86-2	(C ₂ H ₃ Cl) _n
Polyphenylene Ether	0.25	24938-59-9	--
Polyester Fber	0.6	25038-59-9	--
Plumbum	Not Detected	7439-92-1	Pb
Cadmium	Not Detected	7440-43-9	Cd
Mercury	Not Detected	7439-97-6	Hg

4 First Aid Measures

First Aid Measures

Under normal conditions of use, the battery is hermetically sealed.

Eye Contact	The ingredients in the battery can cause severe allergies and chemical burns. Open the upper and lower eyelids immediately and rinse the eyes with water for more than 15 minutes until no chemical remains. Then seek medical attention immediately.
Skin Contact	The ingredients in the battery may cause skin irritation or chemical burns. Remove contaminated clothing and wash skin with soap and water. Seek medical attention if chemical burns or irritation persists.
Ingestion	Ingesting the battery is harmful. The composition of the battery can cause severe chemical burns in the mouth, esophagus, and gastrointestinal tract. Do not induce vomiting or food or drink if you ingest the battery or disassemble the battery. Seek medical attention immediately.

Inhalation	Ingredients in the battery may cause respiratory allergies, and inhalation of vapor may cause upper respiratory tract and lung allergies. Breathe fresh air and seek medical attention immediately.
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5 Fire Fighting Measures

Extinguishing media

Suitable fire extinguishing medium	Water or water mist, sand, fire blanket, dry powder or carbon dioxide fire extinguisher
Inappropriate extinguishing medium	None

Special hazards arising from this substance or mixture

1	In transportation and test engineering, risk factors such as electric box drop, extrusion, puncture, metal short circuit, liquid immersion may occur, and electric shock and fire risk may occur;
2	If in a confined space, there may be a risk of gas explosion.
3	Liquids leaking from accidents, including improper handling of fire water, pose a risk of environmental pollution.

Material prepare & training

Material prepare	
1	Water mist fire extinguisher: use 1 9-liter water mist fire extinguisher or 2 6-liter water mist fire extinguishers per 500KWH, which can extinguish ABCE fire (solid, non-flammable liquid, gas, electrical fire under 36KV). Or carry electric or manual sprayers as water mist extinguishers. Suspension type water - based fire extinguisher can be hung above the two cargoes.
2	Waterproof supplies: raincoat, rain boots, rubber gloves; Plastic wrap. Rags.
3	PPE: mask, high temperature gloves, safety glasses, half mask.
4	Smoke exhaust tools: every 20 meters 1 wall smoke exhaust fan, or mobile smoke exhaust fan. The vehicle has ventilation holes.
5	Explosion-proof tools: keep open, such as open environment, vehicles/equipment not airtight. The test must be closed equipment, such as high temperature furnace, high and low temperature impact test instrument. Copper foil with a diameter of 200mm and a thickness of 8 microns shall be placed on the equipment as pressure relief film. Room wall every 20 meters to have a fan, fan displacement at least 5,000 cubic meters per hour.

6	Neutralizing materials: prepare 10 kg of lime powder every 500KWH to neutralize the outflow electrolyte. The electrolyte will form HF at 8% of the weight when encountering water. Neutralize with alkaline materials.
7	Voltage measurement: multi-meter. Physically seal the current protection to avoid explosion of instrument by mistake.

Training skills

1	Turn on or move fan to exhaust smoke
2	Put out the fire with water mist extinguisher after wearing waterproof appliance. Measure the voltage with multi-meter after the battery is dried. After the test voltage is normal, wrap the insulation with plastic wrap, and then transport it.
3	The leaked electrolyte is neutralized with lime or NaOH powder at a ratio of 8% by weight
4	Use multi-meter to test voltage, pay special attention not to use the wrong gear (to physically close the current block), to prevent instrument explosion

| Fire extinguishing precautions and protective measures

1	Alarm immediately when battery smoke or combustion is detected
2	Wear protective equipment, including respirators and masks. If water is used, PPE should include raincoats, rain boots, insulated gloves, etc.
2	Cut off the power supply
3	Using solid fire extinguishers, it is recommended to use fire extinguishers in the following order: water or mist, sand, fire blanket, dry powder, carbon dioxide fire extinguishers;
4	Exhaust smoke through fans or air circulation.
5	Drying, neutralizing. Dry by fan, if water is used, neutralize with calcium hydroxide.

6 Accidental Release Measures

On-site : Place the material a suitable container and alert the local police.

In water: When the battery pack is in water, there is a risk of slight electric shock; when electrolyzing water, hydrogen will be generated. Ventilation must be maintained to prevent hydrogen accumulation and explosion in closed space. If possible, remove the batteries or modules from the water and alert the local police.

7 Handling & Storage

One of the most important risks in the transportation of batteries and battery power equipment is the short circuit of batteries caused by contact between the two poles of batteries with other batteries, metal objects or other conductors. Therefore, packaged batteries and battery cells must be separated in an appropriate way to prevent short circuit and electrode damage. In addition, batteries and battery cells must be packaged in strong external packaging or installed in equipment.

| Handling

1	Do not make excessive physical impact or vibration on batteries.
2	Short circuit should be avoided, although a few seconds of short circuit will not have a serious impact on the battery. A long short circuit can cause the battery to lose energy quickly and generate enough heat to burn the shell.
3	The sources of short circuit include the random placement of batteries in bulk containers or various metal objects used in battery assembly on equipment. In order to minimize the risk of short circuit of batteries, the protection measures of batteries should be provided when the batteries are transported and stored.
4	Batteries cannot be disassembled or deformed.
5	Do not expose the battery to water when it breaks. Operators need insulation protection when handling battery packs that exceed 50V.

| Storage

1	When lithium-ion batteries are stored for a long time, their charging capacity should be between 25% and 75%.
2	Store in a cool, dry and well ventilated area.
3	Excessive temperature can lead to a series of battery problems, such as leakage or rust.
4	Do not put batteries in open fire.

8 Exposure Control/Personal Protection

Important note : The lithium battery is normally sealed and the powder has no fluidity and will not pose a danger to the contact person. It is strictly forbidden for non-professionals to dismantle batteries or cores without permission.

| Engineering Control

Keep away from heat sources and fires and store in dry and cool areas.

9 Physical/Chemical Properties

Physical/Chemical Properties

Physical state	Solid
Color	Not Applicable
Odor	No Odor
Flash point	Not Applicable
Solubility in ethanol soluble	Not Applicable
Boiling Point	Not Applicable
Solubility in water:	Not Applicable
Vapor pressure	Not Applicable
Explosion limit	Not Applicable
Auto flammability	Not Applicable
Melting Point	Not Applicable
Freezing Point	Not Applicable

10 Stability & Reactivity

Stability & Reactivity

Stability	Good stability at standard temperature.
Reactivity	None
Notice	Do not touch water or acidic substances.
	Products after decomposition: If the aluminum foil packaging of the battery is damaged, then do not contact strong oxidants, acidic substances and high temperature environment, and the electrolyte may volatilize to form hydrogen fluoride.

11 Toxicological information

No toxic substances will be produced during routine operation and use.

12 Ecological information

If batteries are to be scrapped, they should be selected and disposed of by professional companies.




13 Disposal considerations




Batteries cannot be discarded directly into sewers or directly discharged into the environment. They should be recycled and treated in accordance with local laws and regulations.

14 Transport Information

| Air transportation

The lithium battery should accord with the International Air Transport Association (IATA DGR 62nd Edition) requirements for transportation. The battery or cell should be packed and signed as following table. (If the cell's power less than 20Wh or battery's power less than 100Wh and the package according with PI-965 Section II, it is not classified as dangerous cargo)

UN NO.	Proper Shipping Name	Power	Package requirements	Label which need to paste
UN3480	lithium ion batteries	Cells > 20Wh Batteries > 100Wh	PI965 Section IA Limit per package: Pax A/C=Forbidden CAO ≤35 kg	Class9 lithium battery hazard label Cargo Aircraft Only label
		Cells ≤20Wh Batteries ≤100Wh	PI965 Section IB NOTE: Use "IB" if package exceeds Section II Limits Limit per package:	Class9 lithium battery hazard label lithium battery mark Cargo Aircraft Only label
			Pax A/C=Forbidden CAO ≤10 kg	
		Cells ≤20Wh Batteries ≤100Wh	PI965 Section II Limit per package: ≤2.7 Wh = 2.5kg; or cells > 2.7 Wh ≤ 20 Wh = 8 cells; or batteries > 2.7Wh ≤100 Wh = 2 batteries; Pax A/C=Forbidden	lithium battery mark Cargo Aircraft Only label 
UN3481	Lithium ion batteries contained in equipment	Cells > 20Wh Batteries > 100Wh	PI967 Section I Limit per package: Pax A/C ≤5 kg CAO ≤35 kg	Class9 lithium battery hazard label 

		Cells ≤ 20Wh Batteries ≤ 100Wh	PI967 Section II Limit per package: Pax A/C ≤ 5 kg CAO ≤ 5 kg	lithium battery mark 
UN3481	lithiumion batteries packed with equipment	Cells > 20Wh Batteries > 100Wh	PI966 Section I Limit per package: Pax A/C ≤ 5 kg CAO ≤ 35 kg	Class9 lithium battery hazard label 
		Cells ≤ 20Wh Batteries ≤ 100Wh	PI966 Section II Limit per package: Pax A/C ≤ 5 kg CAO ≤ 5 kg	lithium battery mark 

Notes

1	Cells and/or batteries at a SOC of greater than 30% of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.
2	Packages prepared according to Section II of PI965 must be offered to the operator separately from other cargo and must not be loaded into a unit load device before being offered to the operator.
3	The lithium core and battery goods required by the packaging specification PI965 and PI968 II shall not be packed in the same outer package as other dangerous goods.
4	Ban lithium ion battery (UN 3480, PI965 Section IA or IB) and lithium batteries (3090, UN PI968 Section IA or IB) with category 1 explosive material (except ammunition) 1.4, 2.1 flammable gas, flammable liquid, 4.1 3 flammable solid, 5.1 class antioxidant and other dangerous goods packaging in the same package.
5	Ensure that the equipment cannot be moved in the oter packing; If there are more than one piece of equipment in the package, it must be packed tightly together to prevent damage caused by contact with other equipment in the package.
6	Do not damage or mishandle this package. If package is damaged, batteries must be quarantined, inspected, and repacked.
7	Cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport.

8	Waste lithium batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator.
9	The lithium battery should pass the UN38.3 test, if the battery cannot pass the testing, it cannot transport, should redesign.
10	The new lithium battery operating mark allows to be 100mm x 100mm square, the minimum mark size is 100mm x70mm.

| Ocean shipping

- Transportation refers to the IMDG CODE 39-18 Edition, which are managed according to UN NO 3480/3481 and packaged in the second category. Firm installation, isolation from each other, short circuit prevention, packages with more than 24 lithium cells or 12 lithium batteries: special procedures to be followed when damaged must be marked; special procedures document to be followed when damaged is available on board.
 - The clause 188 of IMDG CODE 39-18 Edition required:
 - (1) The watt-hour rating of lithium ion cell is less than 20 Wh and the watt-hour rating of lithium-ion battery is less than 100 Wh is not classified as dangerous cargo, but each package shall be marked with below lithium battery mark.
 - (2) Must be packed in inner packagings that completely enclose the cell and battery (not applicable when contained in equipment), inner packagings shall be packed in strong outer packagings that in accordance with < Model Regulation > 4.1.1.1、 4.1.1.2、 4.1.1.5.
 - (3) Must be protected so as to prevent short circuits, including preventing short circuits caused by contact with conductive materials in the same container.
 - The clause 230 of IMDG CODE 39-18 Edition required:
 - (1) The model of each lithium ion cell and battery should meet all testing requirements under Part III, subsection 38.3 of <UN Manual of Tests and Criteria>.
 - (2) Shall be equipped with safe exhaust equipment, prevent violent rupture under normal transportation conditions.
 - (3) Shall be equipped with effective devices to prevent external short circuit.
- For more information, Call: +86-769-88989338.

15 Regulatory Information

Regulatory Information	See ACGIH exposure limits information as noted in Section3
US	This SDS meets/exceeds OSHA requirements.
International	This SDS conforms to European Union (UN), the International Standards Organization (ISO) and the International Labor Organization (ILO) and as documental in ANSI (American National Standards Institute) Standard Z400.1-2010.
Air transportation	According to Civil aviation industry standard MH/T1020-2018 Lithium Battery Air Transport Standard and IATA DGR and ICAO. The international transport and commodity inspection is used this standard at the moment (IMDG CODE),
Ocean shipping	According to International Maritime Dangerous Goods Code to transport and According to the requirements of UN NO 3480/3481 to management the goods.
Land transportation	According to List of Dangerous Goods (GB12268).
Avoid electrical shock	According to Standard for Electrical Safety in the Workplace, NFPA-70E.

16 Other Information

Charging and labeling

Charging	The battery can be recharged repeatedly. Please use the original battery charger. Do not use modified or damaged battery chargers. When the charge exceeds the prescribed charging time, the charge can be stopped to prevent the battery from overcharging. Charging temperature should be between 0 and 45 (32°F and 113° F).There is normal heating phenomenon in the process of battery charging.
Charging Voltages and Currents	When the voltage exceeds the specified value, it is limited by the internal protection circuit of the battery. If the protective circuit is damaged, please stop using it. Please charge and discharge under specified voltage and current. If the battery voltage drops below the specified minimum voltage, please stop using it.
Warning	Chargers provided by the equipment manufacturer shall be used and used in accordance with the operating guidelines. It is forbidden to open the battery, close to the source of fire, and short circuit, which may cause fire, explosion, leakage and personal injury.

Disposal	Disposal shall be carried out in accordance with the relevant regulations of the United Nations, the state and the local authorities.
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| Declaration

The information contained here is completed without any authorization. This information is only a reference. Users should customize an independent system based on the complete and reliable information they actually collect, so as to ensure the proper use and handling of the safety and health of employees and customers.