MATERIAL SAFETY DATA SHEET

1. Product & Company Identification

Product Description:	Rechargeable Li-ion Battery System	**Model Name:**	BB-LFP-100Ah-P
Manufacturer:	Contemporary Nebula Technology Energy Co., Ltd.	**Approximate Weight:**	≤47Kg
Capacity	100Ah	**Equivalent lithium content**	--
Nominal voltage	51.2V	**Nominal power**	5120Wh
UN No:	UN3480	**Proper Shipping Name**	Rechargeable Li-ion Battery System
Address:	No. 26-1, Majiang Road, Mawei District, Fuzhou City, Fujian Province		
Telephone:	+86-0591-83970008	**Fax:**	--

Importer Company Name	AMPCONTROL BURN BRITE PTY LTD
Address	21 Old Punt Rd, Tomago NSW 2322
Phone	0412 551 623
E-mail	brad.collins@ampcontrolgroup.com
Emergency contact phone	0412 551 623

2. Hazardous Identification

2.1 CAS-No/EINECS NO.: N/A

INCI CTFA-Description: Lithium ion batteries contained in equipment.

2.2 The product is classified and labeled according to Regulation (EC) No. 1272/2008.

• Hazard pictograms

GHS05 GHS07 GHS08

Signal word: Danger

· Hazard statements

H314 Causes severe skin burns and eye damage.

· Precautionary statements

P101 If medical advice is needed, have product container or label at hand.

P102 Keep out of reach of children.

P103 Read label before use.

P260 Do not breathe dust/fume/gas/mist/vapors/spray.

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310 Immediately call a POISON CENTER/doctor.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards:

Results of PBT and vPvB assessment.

PBT: Not applicable.

vPvB: Not applicable.

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.

3.1 Composition of Rechargeable Li-ion Battery System

MATERIAL OR INGREDIENT	%/wt.
Steel support and control system（Note: Non-dangerous chemical）	37-44
Batteries（The composition of the battery reference to the following table 3.2）	56-63

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

MATERIAL OR INGREDIENT	CAS No. / EC No.	GHS LABELS	%/wt.
Graphite	CAS# 7782-42-5 EC#231-955-3	None established	7-25
Lithium iron Phosphate	CAS# 15365-14-7 EC# 476-700-9	None established	15-40

Hexafluoropropylene-vinylidene fluoride Copolymer	CAS# 9011-17-0 EC# 618-470-6	Hazardous，H411	3-15
Lithium Hexafluorophosphate	CAS# 21324-40-3 EC# 244-334-7	Acute Tox. 3, H311; Skin Corr. 1B, H314; Acute Tox. 4, H302	0-5
Acetylene Black	CAS# 1333-86-4 EC#215-609-9	None established	0-2
Diethyl Carbonate	CAS# 105-58-8 EC#203-311-1	Flam. Liq. 3, H226	0-15
Dimethyl Carbonate	CAS# 616-38-6 EC# 210-478-4	Inflammable，H225	0-15
Ethyl Methyl Carbonate	CAS# 623-53-0 EC# 433-480-9	Inflammable，H225	0-15
Propylene Carbonate	CAS# 108-32-7 EC#203-572-1	Eye Irrit. 2, H319	0-15
Ethylene Carbonate	CAS# 96-49-1 EC#202-510-0	Eye Irrit. 2, H319	0-15

4. First Aid Measures

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

Ingestion: Swallowing a battery can be harmful.

Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract. If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

Inhalation: Contents of an open battery can cause respiratory irritation. Inhalation of vapors may cause irritation of the upper respiratory tract and lungs. Provide fresh air and seek medical attention.

Skin Absorption: Ethylene carbonate, diethyl carbonate and dimethyl carbonate may be absorbed through the skin causing localized inflammation.

Skin Contact: Contents of an open battery can cause skin irritation and/or chemical burns. Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

Eye Contact: Contents of an open battery can cause severe irritation and chemical burns.

Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

5. Fire Fighting Measures

5.1 **Hazard Analysis (electrical shock, fire, explosion, population)**

The voltage of LIB cell is about 3.2V, there is no risk of electric shock. The voltage of the electric box is about 51.2V. The operation shall be strictly in accordance with the product technical specifications to prevent electrical shock accidents.

During the shipment or testing process for ESS, there are danger factors like drop, crush, broken, metal short circuit, liquid immersion, the factors will lead to the hazard like electrical shock, catch fire. If the Container ESS is in well-sealed box, there is gas exploding hazard; if the Container ESS is in open space or space with good ventilation, there is no explode hazard. Liquids leaked from the accident, including improperly treated fire water, are at risk of polluting the environment.

5.2 **Material Prepare & People Training**

1） **Water based sprayer fire extinguish**: 1 set of 9L or 2 sets of 6L water spray fire extinguishers per each 500KWh Container ESS. The water based spray fire extinguisher could be used for fire type ABCE = solid (A), flash point >60℃ liquid (B), gas (C), <36Kv electrical (E) fire.

2） **Water protection sets**: Raincoat, galoshes, and rubber gloves. Plastic rollers. Rags.

3） **PPE**: Breathing mask, safety glass, face mask, gloves for high temperature.

4） **Smoke escape**: Fans in wall one per 20m or portable fans in rooms. Keep gas exchange hole in trucks.

5） **Gases explode tools**: Open condition for devices & rooms. Some devices like high or low temperature ovens must be sealed; there is one copper film with the diameter 200mm & thickness 8um as the safety vent. The wall should have one fan per 20m, ≥5000m^3 per hour for flow rate.

6） **Neutralized material**: For every 500KWH, 10 kg of Ca(OH)2 powder is prepared for neutralizing the effluent electrolyte. The electrolyte will form HF according to 8% by weight when it encounters water. It must be neutralized with alkaline materials.

7） **Voltage measure**: Multimeter. Physically seal the current file to avoid misoperation of the instrument.

8） **People training**: (a) turn on fans or portable fans for smoke escape. (b) Wear the water protection sets → Use water spray fire extinguishers → Dry after fire fighting or dry with gloves → Wrap cling film for insulation. (c) Neutralized by $Ca(OH)_2$ or NaOH for released electrolyte. (d) Use multimeter to measure voltage. Take care of the mistake.

5.3 **Fire Extinguisher Flow Chart**

1） Immediate alarm when the battery is found to be smoking or burning.

2） Wear PPE. (Breath mask, face mask. If using water, PPE should include the raincoat, galoshes, and rubber gloves).

3） Turn off power supply in devices or power supply.

4） Use solid fire extinguishing equipment, it is recommended to use fire extinguishing equipment in the following order: water or water mist fire blanket, dry powder, carbon dioxide fire extinguisher.

5） Exhaust smoke through fans or air circulation.

6） Dry and neutralize. Dry by fans, neutralization by $Ca(OH)_2$ powder if water was used.

Figure 1 water based fire extinguisher
(Could be used for 36KV electrical fire)

Figure 2 water sprayers to fire extinguisher
(Wear PPE to avoid electrical shock)

6. Accidental Release Measures

For guidance on the selection of PPE, see Section 8 of the MSDS. For disposal information, see Section 13. Comply with all applicable local and international regulations.

The following measures apply to the leakage of internal components of the battery:

Personal protective measures, protective equipment, emergency measures: Use personal protective equipment. Avoid direct contact with leaks.

Environmental precautions: Where safety is ensured, measures can be taken to prevent further leakage or spillage. Do not allow product to enter drains.

Disposal materials for containment and removal methods of spilled chemicals: Adsorb spilled electrolyte with an inert material (dry sand, etc.). Sweep and shovel. Put in a suitable closed container for processing. Please refer to Section 13 for disposal.

In the water: When the battery pack is in water, there is a risk of weak electric shock; hydrogen will be generated when electrolyzing water, and ventilation must be maintained to prevent hydrogen accumulation and prevent hydrogen from exploding in confined spaces. If possible, remove the

battery or module from the water and call the local police.

7. Handling & Storage

Handling: Do not expose the battery to excessive physical shock or vibration. Short-circuiting should be avoided; however, accidental short-circuiting for a few seconds will not seriously affect the battery. Prolonged short circuits will cause the battery to rapidly lose energy, could generate enough heat to burn skin. Sources of short circuits include jumbled batteries in bulk containers, coins, metal jewelry, metal covered tables, or metal belts used for assembly of batteries in devices. To minimize Hazard of short-circuiting, the protective case supplied with the battery should be used to cover the terminals when transporting or storing the battery. Do not disassemble or deform the battery. Should an individual cell within a battery become ruptured, do not allow contact with water. When operators handle the battery which voltage more than 50v, they must wear the insulation protection PPE.

Storage: The lithium ion battery should be between 25% and 75% of full charge when stored for a long period of time. Stored in a cool, dry, and well ventilated area. Elevated temperatures can result in loss of battery performance, leakage, or rust. Do not expose the battery to open flames.

8. Exposure Control/Personal Protection

Engineering Control: Keep away from heat and open flame. Stored in a cool, dry area.

Personal Protection:

Respiratory Protection: Not necessary under normal conditions.

Eye/Face Protection: Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.

Hand Protection: Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery.

Foot Protection: Steel toed shoes recommended for large container handling.

9. Physical/Chemical Properties

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

10. Stability & Reactivity

Stability: Product is stable under conditions described in Section 7.

Conditions to Avoid: Heat above 70°C or incinerate, deform, mutilate, crush, disassemble, overcharge, short circuit, expose over a long period to humid conditions.

Materials to Avoid: Oxidant, alkalis, water.

Hazardous Decomposition Products: Toxic fumes, and may form oxides.

Hazardous Polymerization: N/A.

If leaked, forbidden to contact with strong oxidants, mineral acids, strong alkalies, halogenated hydrocarbons.

11. Toxicological information

Signs & Symptoms: None, unless battery ruptures.

In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.

Inhalation: Lung irritant.

Skin Contact: Skin irritant.

Eye Contact: Eye irritant.

Ingestion: Poisoning if swallowed.

Medical conditions generally aggravated by exposure: In the event of exposure to internal contents, moderate to server irritation, burning and dryness of the skin may occur, Target organs nerves, liver and kidneys.

12. Ecological information

Mammalian Effects: None known at present.

Eco-toxicity: None known at present.

Bioaccumulation Potential: Slowly Bio-degradable.

Environmental Fate: None known environmental hazards at present.

13. Disposal considerations

Do not incinerate, or subject cells to temperature in excess of 70°C, such abuse can result in loss of seal leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.

14. Transport Information

According to the International Maritime Dangerous Goods Code (IMDG 39th) for transportation, and according to the requirements of UN NO. 3536 to management the goods. Lithium batteries installed in cargo transport unite must be installed firmly and isolated from each other to prevent short circuits. The outside must be marked with a special procedure to be followed in case of damage; a special procedure instruction document to be followed in case of damage must be provided with the ship.

Article 389 of the International Maritime Dangerous Goods Regulations provides: the lithium batteries shall meet the requirements of 2.9.4 (a) to (g) and contain the necessary systems to prevent overcharge and over discharge between the batteries.

The batteries shall be securely attached to the interior structure of the cargo transport unit (e.g., by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings and vibrations normally incident to transport. Dangerous goods necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), shall be properly secured to or installed in the cargo transport unit and are not otherwise subject to these Regulations. Dangerous goods not necessary for the safe and proper operation of the cargo transport unit shall not be transported within the cargo transport unit.

The batteries inside the cargo transport unit are not subject to marking or labelling requirements. The cargo transport unit shall display the UN number in accordance with 5.3.2.1.2 and be placarded on two opposing sides in accordance with 5.3.1.1.2.

15. Regulatory Information

See ACGIH exposure limits information as noted in Section 3.

US: This MSDS meets/exceeds OSHA requirements.

International: This MSDS 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 Z400.1-1993.

Air transportation: According to civil aviation industry standard MH/T1020-2009 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 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. Charging and Labeling

Charging: This battery is made to be charged many times. Use an energizer approved battery charger. Never use a modified or damaged battery charger. A backup charge termination based on time is recommended to prevent overcharging. The charging temperature should be between 0° C and 45° C (32° F and 113° F). The Container ESS will be normally warm during charging.

Charging Voltages and Currents: Charging voltages are prevented from exceeding the specified limits by an internal battery protection circuit. Never use a battery that shows signs of a damaged protection circuit or broken case. (Such damage to the protection circuit may be indicated by voltages at the battery terminals outside of their specified ranges.) Adhere to all specified charging and discharging voltages and currents. Do not use battery if its voltage drops below the specified minimum voltage.

Labeling: If the CATL label or package warnings are not visible, it is important to provide a package and/or device label stating. If the Container ESS transported by sea the labeling according to IMDG 38th, the requirement as follow,

WARNING: CHARGE ONLY WITH SPECIFIED CHARGERS ACCORDING TO DEVICE MANUFACTURER'S INSTRUCTIONS. DO NOT OPEN BATTERY, DISPOSE OF IN FIRE, OR SHORT CIRCUIT - MAY IGNITE, EXPLODE, LEAK, OR GET HOT CAUSING PERSONAL INJURY.

Disposal: Dispose in accordance with all applicable federal, state and local regulations.

The information contained herein is furnished without warranty of any kind. Users should consider this data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information form all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.