




Safety Data Sheet

EnergyCell PLC Batteries

Section I: Chemical Product and Company Identification

Chemical Trade Name (as used on battery)	Maintenance Free Pure Sealed Lead Carbon Batteries	
Manufacturer's Name:	Leoch Battery (Jiangsu) Corp.	
Address and Telephone:	North of Shenhua Blvd. (West of Tongtai Road), Jinhu Industry Zone, Jinhu, Huaian, Jiangsu, China	Telephone: +86.18726896639 Fax: +86.517.86987436
Emergency Telephone:	+86.755.86036060	

Section II: Hazard Identification

HEALTH		ENVIRONMENTAL	PHYSICAL
			
Acute Toxicity (Oral/Dermal/Inhalation)	Category 4	Aquatic Chronic 1 Aquatic Acute 1	Explosive Chemical, Division 1.3
Skin Corrosion/Irritation	Category 1A		
Eye Damage	Category 1		
Reproductive	Category 1A		
Carcinogenicity (lead compounds)	Category 1B		
Carcinogenicity (arsenic)	Category 1A		
Carcinogenicity (acid mist)	Category 1A		
Specific Target Organ Toxicity (repeated exposure)	Category 2		
Hazard Statements DANGER <ul style="list-style-type: none"> Causes severe skin burns and eye damage. Causes serious eye damage. May damage fertility or the unborn child if ingested or inhaled. Causes damage to central nervous system, blood, and kidneys through prolonged or repeated exposure. May cause cancer if ingested or inhaled. May form explosive air/gas mixture during charging. Extremely flammable gas (hydrogen). Explosive, fire, blast, or projection hazard. 		Precautionary Statements <ul style="list-style-type: none"> Wash thoroughly after handling. Do not eat, drink, or smoke when using this product. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing, eye protection/face protection. Irritating to eyes, respiratory system, and skin. Causes skin irritation, serious eye damage. Contact with internal components may cause irritation or severe burns. Avoid contact with internal acid. 	

Section III: Composition / Information on Ingredients

Material	CAS Number	% By Weight
Lead and Lead Compounds (inorganic)	7439-92-1	65 to 75
Tin	7440-31-5	<0.5%
Calcium	7440-70-2	<0.1%
Carbon	7440-44-0	~3%
Dilute Sulfuric Acid	7664-93-9	~17%
Fiberglass Separator	N.A.	~5%
Case Material: Acrylonitrile Butadiene Styrene	9003-56-9	~5%
NOTE: Inorganic lead and electrolyte (sulfuric acid) are the primary components of every lead-acid battery sold by OutBack. Other ingredients may be present dependent upon battery type. Contact your OutBack representative for additional information.		

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Section IV: First Aid Measures

Inhalation	Sulfuric Acid	Remove to fresh air immediately. If breathing is difficult, give oxygen. Consult a physician.
	Lead	Remove from exposure, gargle, wash nose and lips; consult physician.
Ingestion	Sulfuric Acid	Give large quantities of water; do not induce vomiting, or aspiration into the lungs may occur and can cause permanent injury or death; consult physician.
	Lead	Consult physician immediately.
Skin Exposure	Sulfuric Acid	Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before reuse. Discard contaminated shoes.
	Lead	Wash immediately with soap and water.
Eye Exposure	Sulfuric Acid and Lead	Flush immediately with large amounts of water for at least 15 minutes while lifting lids. Seek immediate medical attention if eyes have been exposed directly to acid.

Section V: Firefighting Measures

Hydrogen Flammable Limits (% by Volume):		
Lower Explosion Limit (LEL): 4.1%	Upper Explosion Limit (UEL): 74.2%	Flash Point: N/A
Extinguishing Media		
CO ₂ ; foam; dry chemical, water mist. Do not use carbon dioxide directly on cells. Avoid breathing vapors. Use appropriate media for surrounding fire. Do not use water on electrically active circuits.		
Firefighting Procedures		
Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application and wear acid-resistant clothing, gloves, face and eye protection. If batteries are on charge, shut off power to the charging equipment, but note that strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.		
Hazardous Combustion Products		
Highly flammable hydrogen gas is generated during charging and operation of batteries. If ignited by burning cigarette, naked flame or spark, this may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. To avoid risk of fire or explosion, keep sparks or other sources of ignition away from batteries. Do not allow metallic materials to simultaneously contact negative and positive terminals of cells and batteries. Follow manufacturer's instructions for installation and service.		

Section VI: Accidental Release Measures

Spill or Leak Procedures
Stop flow of material. Contain/absorb small spills with dry sand, earth, and vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Do not allow discharge of non-neutralized acid to sewer. Acid must be managed in accordance with local, state, and federal requirements. Consult state environmental agency and/or federal EPA.

Section VII: Handling and Storage

Handling
<ul style="list-style-type: none"> Always follow warning information and instructions provided with the batteries and any device connected to them. Keep children away from these batteries. Unless involved in recycling operations, do not breach the casing or empty the contents of the battery. Handle carefully and avoid tipping, which may allow electrolyte leakage. There may be increased risk of electric shock from strings of connected batteries. Keep containers tightly closed when not in use. If battery case is broken, avoid contact with internal components. Cover terminals to prevent short circuits. Do not stack batteries. Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers, and water. Use banding or stretch wrap to secure items for shipping.
Storage
<ul style="list-style-type: none"> Store batteries in cool, dry, well-ventilated areas with impervious surfaces and adequate containment in the event of spills. Batteries should also be stored under roof for protection against adverse weather conditions. Separate from incompatible materials. Avoid damage to containers. Store and handle only in areas with adequate water supply and spill control. Keep away from fire, sparks, and heat. Keep away from metallic objects which could bridge the terminals on a battery and create a dangerous short-circuit.
Charging
<ul style="list-style-type: none"> Shut off power to chargers whenever not in use and before detachment of any circuit connections. There is a possible risk of electric shock from charging equipment and from strings of series-connected batteries, whether or not being charged. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

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Section VIII: Exposure Controls / Personal Protection

COMPONENTS	Type	Value		
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)				
Lead	TWA	0.05 mg/m³		
US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)				
Tin	PEL	2 mg/m³		
Sulfuric Acid	PEL	1 mg/m³		
US. ACGIH Threshold Limit Values				
Lead	TWA	0.05 mg/m³		
Tin	TWA	2 mg/m³		
Sulfuric Acid	TWA	0.2 mg/m³ (thoracic fraction)		
US. NIOSH: Pocket Guide to Chemical Hazards				
Lead	TWA	0.05 mg/m³		
Tin	TWA	2 mg/m³		
Sulfuric Acid	TWA	1 mg/m³		
ABBREVIATIONS				
PEL = Permissible Exposure Limit				
TWA = Time Weighted Average				
Biological Limit Values				
ACGIH Biological Exposure Indices				
Components	Value	Determinant	Specimen	Sampling Time
Lead	300 µg/l	Lead	Blood	See source document
Engineering Controls (ventilation)				
<ul style="list-style-type: none">• Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant.• Handle batteries cautiously to avoid spills.• Make certain vent caps are on securely.• If battery case is damaged, avoid bodily contact with internal components.• Wear protective clothing, eye, and face protection when filling, charging, or handling batteries.• Do not allow metallic materials to simultaneously contact both the positive and negative terminals of the batteries.• Charge the batteries in areas with adequate ventilation. General dilution ventilation is acceptable.				
Respiratory Protection (NIOSH/MSHA approved)				
<ul style="list-style-type: none">• None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed the PEL, use NIOSH or MSHA-approved respiratory protection.				
Skin Protection				
<ul style="list-style-type: none">• If battery case is damaged, use rubber or plastic acid-resistant gloves with elbow-length gauntlet, acid-resistant apron, clothing, and boots.				
Eye Protection				
<ul style="list-style-type: none">• If battery case is damaged, use chemical goggles or face shield.				
Other Protection				
<ul style="list-style-type: none">• In areas where water and sulfuric acid solutions are handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply.• Chemically impervious apron and face shield recommended when adding water or electrolyte to batteries. Wash hands after handling.				

Section IX: Physical and Chemical Properties

Properties Listed Below are for Electrolyte:

Boiling Point:	203 to 204 °F	Specific Gravity (H₂O = 1):	1.215 to 1.350
Melting Point:	N/A	Vapor Pressure (mm Hg):	10
Solubility in Water:	100%	Vapor Density (AIR = 1):	Greater than 1
Evaporation Rate: (Butyl Acetate = 1)	Less than 1	% Volatile by Weight:	N/A
pH:	~1 to 2	Flash Point:	Below room temperature (as hydrogen gas)
LEL (Lower Explosive Limit):	4.1% (Hydrogen)	UEL (Upper Explosive Limit):	74.2 (Hydrogen)
Appearance and Odor:	Manufactured article; no apparent odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.		

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Section X: Stability and Reactivity

Stability: Stable X Unstable

This product is stable under normal conditions at ambient temperature.

Conditions To Avoid: Prolonged overcharge at high current; sources of ignition

Incompatibility (Materials to Avoid)	Electrolyte	Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.
	Lead Compounds	Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents.
	Arsenic Compounds	Strong oxidizers; bromine azide. NOTE: Hydrogen gas can react with inorganic arsenic to form highly toxic arsine gas.
Hazardous Decomposition Products	Electrolyte	Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen sulfide.
	Lead Compounds	Temperatures above the melting point are likely to produce toxic metal fume, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.
Hazardous Polymerization: Will not occur.		

Section XI: Toxicological Information

Non-human Toxicological Data: Not available

Routes of Entry	Sulfuric Acid	Harmful by all routes of entry.
	Lead Compounds	Hazardous exposure can occur only when product is heated, oxidized, or otherwise processed or damaged to create dust, vapor, or fume. The presence of nascent hydrogen may generate highly toxic arsine gas.
Inhalation	Sulfuric Acid	Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.
	Lead Compounds	Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.
Ingestion	Sulfuric Acid	May cause severe irritation of mouth, throat, esophagus, and stomach.
	Lead Compounds	Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea, and severe cramping. This may lead rapidly to systemic toxicity and must be treated by a physician.
Skin Contact	Sulfuric Acid	Severe irritation, burns and ulceration.
	Lead Compounds	Not absorbed through the skin.
	Arsenic Compounds	Contact may cause dermatitis and skin hyper pigmentation.
Eye Contact	Sulfuric Acid	Severe irritation, burns, cornea damage, and blindness.
	Lead Compounds	May cause eye irritation.
Effects of Overexposure (Acute)	Sulfuric Acid	Severe skin irritation, damage to cornea, upper respiratory irritation.
	Lead Compounds	Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.
Effects of Overexposure (Chronic)	Sulfuric Acid	Possible erosion of tooth enamel, inflammation of nose, throat and bronchial tubes.
	Lead Compounds	The toxic effects of lead are cumulative and slow to appear. May cause anemia, damage to kidneys and nervous system, and damage to reproductive system in both males and females.
Carcinogenicity	Sulfuric Acid	The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Group 1 carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist.
	Lead Compounds	Lead is listed as a Group 2A carcinogen, likely in animals at extreme doses. Per the guidance found in OSHA 29 CFR 1910.1200 Appendix F, this is approximately equivalent to GHS Category 1B. Proof of carcinogenicity in humans is lacking at present.
	Arsenic	Arsenic is listed by IARC as a Group 1 - carcinogenic to humans. Per the guidance found in OSHA 29 CFR 1910.1200 Appendix F, this is approximately equivalent to GHS Category 1A.

Medical Conditions Generally Aggravated by Exposure:

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of sulfuric acid with skin may aggravate diseases such as eczema and contact dermatitis. Lead and its compounds can aggravate some forms of kidney, liver, and neurologic diseases.

Acute Toxicity	LD50 (Oral, rat)	>2000 mg/kg bw	Germ cell mutagenicity	N/A
	LD50 (Dermal, rat)	>2000 mg/kg bw	Carcinogenicity:	N/A
	LC50 (Inhalation, rat)	>5.05 mg/L 4h	Reproductive toxicity	N/A
	Skin corrosion/irritation	N/A	STOT- single exposure	N/A
	Serious eye damage/irritation	N/A	STOT-repeated exposure	N/A
	Respiratory or skin sensitization	N/A	Aspiration hazard	N/A

Additional Health Data:

All heavy metals, including the hazardous ingredients in this product, are taken into the body primarily by inhalation and ingestion. Most inhalation problems can be avoided by adequate precautions such as the ventilation and respiratory protection covered in Section 8.

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Follow good personal hygiene to avoid inhalation and ingestion: wash hands, face, neck, and arms thoroughly before eating, smoking, or leaving the worksite. Keep contaminated clothing out of non-contaminated areas or wear cover clothing when in such areas. Restrict the use and presence of food, tobacco, and cosmetics to non-contaminated areas. Work clothes and work equipment used in contaminated areas must remain in designated areas and never be taken home or laundered with personal non-contaminated clothing. This product is intended for industrial use only and should be isolated from children and their environment.

The 19th Amendment to EC Directive 67/548/EEC classified lead compounds, but not lead in metal form, as possibly toxic to reproduction.

Risk phrase 61: May cause harm to the unborn child; applies to lead compounds, especially soluble forms.

Section XII: Ecological Information

Environmental Toxicity	Aquatic Toxicity	
	Sulfuric Acid	24 hr LC50, freshwater fish (Brachydanio rerio): 82 mg/L 96 hr LOEC, freshwater fish (Cyprinus carpio): 22 mg/L
	Lead	48 hr LC50 (modeled for aquatic invertebrates): <1 mg/L, based on lead bullion
	Additional information:	<ul style="list-style-type: none"> No known effects on stratospheric ozone depletion Volatile organic compounds: 0% (by Volume) Water Endangering Class (WGK): NA

Section XIII: Disposal Considerations (United States)

Spent batteries	Send to secondary lead smelter for recycling. Spent lead-acid batteries are not regulated as hazardous waste when the requirements of 40 CFR Section 266.80 are met. Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).
Electrolyte	Place neutralized slurry into sealed containers and handle as applicable with state and federal regulations. Large water-diluted spills, after neutralization and testing, should be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.

NOTE: Following local, State/Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end user.

Section XIV: Transport Information

United States

Wet, non-spillable batteries do not need to be shipped and transported as fully-regulated Class 8 Corrosive hazardous materials / dangerous goods when tested, packaged and marked in accordance with the following regulations.

United States

The U.S. Department of Transportation (DOT) hazardous materials regulations (49 CFR) applicable to lead acid batteries are specified in 49 CFR 173.159.

Proper Shipping Name: Batteries, wet, non-spillable

Hazard Class: 8

ID Number: UN2794

Packing Group: N/A

Labels: Corrosive

49 CFR 173.159(e) specifies that when transported by highway or rail, electric storage batteries containing electrolyte or corrosive battery fluid are not subject to any other requirements of this subchapter, if all of the following are met:

- 1) No other hazardous materials may be transported in the same vehicle;
- 2) The batteries must be loaded or braced so as to prevent damage and short circuits in transit;
- 3) Any other material loaded in the same vehicle must be blocked, braced, or otherwise secured to prevent contact with or damage to the batteries; and
- 4) The Transport vehicle may not carry material shipped by any person other than the shipper of the batteries.

If any of the above-referenced requirements are not met, the batteries must be shipped as fully-regulated Class 8 Corrosive hazardous materials.

U.S. Hazardous Materials Regulations	<ul style="list-style-type: none"> The batteries are excepted from regulation if they have been tested in accordance with the vibration and pressure differential tests found in 49 CFR 173.159(f) and "rupture test" found at 49 CFR 173.159a. Battery and outer package must be marked "NONSPILLABLE" or "NONSPILLABLE BATTERY" as required by 49 CFR 173.159a. Battery terminals must be protected against short circuits and securely packaged in accordance with 49 CFR 173.159a.
IATA Dangerous Goods Regulations	<ul style="list-style-type: none"> The batteries are excepted from regulation if they have been tested in accordance with the vibration and pressure differential tests found in Packing Instruction 872 and "rupture test" found in Special Provision A67 of the International Air Transport Association (IATA) Dangerous Goods Regulations. The batteries must be protected against short circuits and securely packaged in accordance with Special Provision A67. The words "NOT RESTRICTED, SPECIAL PROVISION A67" must be provided on an Air Waybill when issued.
IMDG Code	<ul style="list-style-type: none"> The batteries are excepted from regulation if they have been tested in accordance with the vibration and pressure differential tests and "rupture test" found in Special Provision 238.1 and 238.2. The batteries must be protected against short circuits and securely packaged in accordance with Special Provision 238.1 and 238.2.

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Section XV: Regulatory Information

United States EPA SARA Title III	EPCRA Sections 302, 304, 311 & 312	
	Lead-acid batteries do NOT meet the OSHA definition of an "article" (US EPA, OCT. 1998). The lead and acid that compose these batteries must be included when determining the various thresholds for these EPCRA section regulations. The acid in lead-acid batteries is sulfuric acid, which is an Extremely Hazardous Substance (EHS). The following table outlines the applicable EPCRA Sections and their respective thresholds for sulfuric acid:	
	EPCRA Sections — Sulfuric Acid	Thresholds
	302 — Emergency Planning Notification	TPQ ≥ 1,000 lbs.
	304 — Emergency Release Notification	RQ ≥ 1,000 lbs.
	311 — MSDS Reporting	*TPQ ≥ 500 lbs.
	312 - Chemical Inventory Reporting (i.e. Tier II)	*TPQ ≥ 500 lbs.
	The lead used in lead-acid batteries does not qualify for any OSHA or EPCRA exemptions. Lead is NOT an EHS, and the following table outlines the applicable EPCRA Sections and their respective thresholds for lead:	
	EPCRA Sections — Lead	Thresholds
	311 — MSDS Reporting	≥ 10,000 lbs.
	312 - Chemical Inventory Reporting (i.e. Tier II)	≥ 10,000 lbs.
TSCA	EPCRA Section 313	
	The reporting of lead and sulfuric acid (and their releases) in lead-acid batteries used in cars, trucks, most cranes, forklifts, locomotive engines, and aircraft for the purposes of EPCRA Section 313 is not required. Lead-acid batteries used for these purposes are exempt for Section 313 reporting per the "Motor Vehicle Exemption." See page B-22 of the U.S. EPA Guidance Document for <i>Lead and Lead Compound Reporting</i> under EPCRA Section 313 for additional information of this exemption.	
	Supplier Notification:	
	This product contains toxic chemicals that may be reportable under EPCRA Section 313 Toxic Chemical Release Inventory (Form R) requirements. For a manufacturing facility under SIC codes 20 through 39, the following information is provided to enable you to complete the required reports:	
	TOXIC CHEMICAL	CAS NUMBER
	Lead	7439-92-1
	Sulfuric Acid	7664-93-9
	APPROXIMATE % BY WEIGHT	
	65% to 75%	
	~20%	
RCRA	Section 8b Inventory Status	All chemicals comprising this product are either exempt or listed on the TSCA Inventory.
	Section 12b (40 CFR Part 707.60[b])	No notice of export will be required for articles, except PCB articles, unless the Agency so requires in the context of individual section 5, 6, or 7 actions.
	Section 13 (40 CFR Part 707.20)	No import certification required (EPA 305-B-99-001, June 1999, Introduction to the Chemical Import Requirements of the Toxic Substances Control Act, Section IV.A).
Other Federal Regulations	Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List	
	Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)	
	Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number	
	Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))	
	DEA Exempt Chemical Mixtures Code Number	
STATE REGULATIONS (U.S.)	Proposition 65 Warning:	
	Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Batteries also contain other chemicals known to the State of California to cause cancer. Wash hands after handling.	
INTERNATIONAL REGULATIONS	<ul style="list-style-type: none"> Distribution into Quebec to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2). Distribution into the EU to follow applicable Directives to the use, import, and export of the product as sold. 	

*The reporting threshold for sulfuric acid is ≥ the designated TPQ or 500 lbs., whichever is less

Section XVI: Other Information

NFPA Hazard Rating for Sulfuric Acid	Flammability (Red) = 0	Reactivity (Yellow) = 2
	Health (Blue) = 3	X= Acid
	Sulfuric acid is water-reactive if concentrated.	

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