Material Safety Data Sheet

EnergyCell GH Batteries

Section 1: Chemical Product and Company Identification	
Product Name:	EnergyCell GH
Trade Name	Electrical Storage Valve Regulated Lead-Acid (VRLA) Battery – Absorbed Glass Mat (AGM)
Manufacturer's Name:	EnerSys
Address:	P.O. Box 14145 2366 Bernville Rd Reading, PA 19612-4145
Telephone: **North America 24-Hour Emergency (CHEMTREC):** **International 24-Hour Emergency (CHEMTREC):**	610-208-1996 800-424-9300 703-527-3877
Website:	www.enersys.com

Section II: Hazardous Ingredients					
			Air Exposure Limits (µg/m³)		
Material	**Approx. % By Weight or Volume**	**CAS Number**	**OSHA**	**ACGIH**	**NIOSH**
Inorganic Lead Compound					
Lead	45 to 60	7439-92-1	50	150	100
Lead Dioxide	15 to 25	1309-60-0	50	150	100
Antimony	2	7440-36-0	500	500	N/A
Arsenic	0.2	7440-38-2	10	200	N/A
Calcium	0.2	7440-70-2	N/A	N/A	N/A
Tin	0.2	7440-31-5	2000	2000	N/A
Electrolyte (Sulfuric Acid)	10 to 30	7664-93-9	1000	1000	1000
Case Material	5 to 10		N/A	N/A	N/A
Polypropylene		9003-01-0			
Polystyrene		9003-53-6			
Styrene Acrylonitrile		9003-54-7			
Acrylonitrile Butadiene Styrene		9003-56-9			
Styrene Butadiene		9003-55-8			
Polyvinylchloride		9002-86-2			
Polycarbonate, Hard Rubber, Polyethylene		N/A			
Other					
Sheet Molding Compound (Glass Reinforced Polyester)	20 to 40	7631-86-9	N/A	N/A	N/A
Inorganic lead and electrolyte (sulfuric acid) are the primary components of every EnergyCell GH.					

Section III: Physical Data			
Electrolyte			
Boiling Point	203 to 240°C	Specific Gravity (H_2O = 1)	1.125 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
Appearance and Odor:	Manufactured article: no apparent odor. Acid is a clear to cloudy liquid with a sharp, penetratic, pungent odor.		

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Section IV: Fire and Explosion Hazard Data

Flash Point: N/A	**Flammable Limits:** LEL = 4.1% (Hydrogen Gas)	UEL = 74.2%

Extinguishing Media: CO_2; foam; dry chemical

Special Firefighting Procedures:

If batteries are on charge, shut off power. Use positive pressure, self-contained breathing apparatus. Water applied to electrolyte generates heat and causes it to spatter. Wear acid-resistant clothing.

Unusual Fire and Explosion Hazards:

Highly flammable hydrogen gas is generated during charging and operation of batteries. 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 V: Reactivity Data

Stability	Stable.
Conditions to avoid	Overheating, prolonged overcharging, overcharging which results in acid mist/hydrogen generation.
Incompatibility (materials to avoid)	
Sulfuric Acid	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.
Hazardous Byproducts	
Sulfuric Acid	Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, and hydrogen.
Lead Compounds	High temperatures likely to produce toxic metal fumes, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

Section VI: Health Hazard Data

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 fumes.
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.
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	Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in 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 Category I 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 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.
Arsenic	Listed by National Toxicology Program (NTP), International Agency for Research on Cancer (IARC), OSHA and NIOSH as a carcinogen only after prolonged exposure at high levels.
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.

Emergency and First Aid Procedures

Inhalation

Sulfuric Acid	Remove to fresh air immediately. If breathing is difficult, give oxygen.
Lead	Remove from exposure, gargle, wash nose and lips; consult physician.

Ingestion

Sulfuric Acid	Give large quantities of water; do not induce vomiting; consult physician.
Lead	Consult physician immediately.

Skin

Sulfuric Acid	Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes.
Lead	Wash immediately with soap and water.

Eyes

Sulfuric Acid or Lead	Flush immediately with large amounts of water for at least 15 minutes; consult physician.

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.

Section VII: Handling and Use

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 unneutralized acid to sewer.

Waste Disposal Methods

Send spent batteries to secondary lead smelter for recycling.

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 environmentalagency and/or federal EPA.

Handling and Storage

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. Store and handle only in areas with adequate water supply and spill control. Avoid damage to containers. Keep away from fire, sparks and heat.

Precautionary Labeling

POISON – CAUSES SEVERE BURNS

DANGER – CONTAINS SULFURIC ACID

Section VIII: Control Measures

Engineering Controls

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant.

Work Practices

Handle batteries cautiously to avoid spills. Make certain vent caps are on securely. Avoid contact with internal components. Wear protective clothing when filling or handling batteries.

Respiratory Protection

None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed the PEL, use NIOSH or MSHA-approved respiratory protection.

Protective Gloves

Chemical goggles or face shield.

Eye Protection

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant.

Other Protection

Acid-resistant apron. Under severe exposure emergency conditions, wear acid-resistant clothing and boots.

Emergency Flushing

In areas where sulfuric acid is handled in concentrations greater then 1%, emergency eyewash stations and showers should be provided, with unlimited water supply.

Section IX: Other Regulatory Information

NFPA Hazard Rating for Sulfuric Acid

Flammability (Red) = 0	Health (Blue) = 3
Reactivity (Yellow) = 2	Sulfuric acid is water-reactive if concentrated.

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Section IX: Other Regulatory Information (continued)

U.S. DOT

EnergyCell GH batteries that are classified as Nonspillable have been tested and meet the nonspillable criteria listed in CFR 49, 173.159 (f) and 173.159a (d) (1). Nonspillable batteries are excepted from CFR 49, Subchapter C requirements, provided that the following criteria are met:

1. The batteries must be securely packed in strong outer packagings and meet the requirements of CFR 49 173.159a.

2 The batteries' terminals must be protected against short circuit.

3. Each battery and its outer packaging must be plainly and durably marked "NONSPILLABLE" or "NONSPILLABLE BATTERY".

The exception from CFR 49, Subchapter C means shipping papers need not show proper shipping name, hazard class, UN number, packing group, or hazard labels when transporting a nonspillable battery.

Contact your OutBack Power representative for additional information regarding the classification of batteries.

IATA

EnergyCell GH GH batteries that are classified as Nonspillable have been tested and meet the nonspillable criteria listed in IATA Packing Instruction 872 and Special Provision A67. Nonspillable batteries must be packed according to IATA Packing Instruction 872. This means shipping papers need not show proper shipping name, hazard class, UN number, packing group, or hazard labels are not required when transporting a nonspillable battery.

These batteries are excepted from all IATA regulations provided that the batteries' terminals are protected against short circuits.

Contact your OutBack Power representative for additional information regarding the classification of batteries.

IMDG

EnergyCell GH batteries that are classified as Nonspillable have been tested and meet the nonspillable criteria listed in Special Provision 238. Non-spillable batteries must be packed according to IMDG Packing Instruction P003. This means shipping papers need not show proper shipping name, hazard class, UN number, packing group, or hazard labels when transporting a nonspillable battery.

These batteries are excepted from all IMDG codes provided that the batteries' terminals are protected against short circuits per PP16.

Contact your OutBack Power representative for additional information regarding the classification of batteries.

RCRA

Spent lead-acid batteries are not regulated as hazardous waste by the EPA when recycled. However, state and international regulations may vary.

CERCLA (Superfund) and EPCRA

(a) Reportable Quantity (RQ) for spilled 100% sulfuric acid under CERCLA (Superfund) and EPCRA (Emergency Planning Community Right to Know Act) is 1,000 lbs. State and local reportable quantities for spilled sulfuric acid may vary.

(b) Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA, with a Threshold Planning Quantity (TPQ) of 1,000 lbs.

(c) EPCRA Section 302 notification is required if 1,000 lbs. or more of sulfuric acid is present at one site. The quantity of sulfuric acid will vary by battery type. Contact your OutBack Power representative for additional information.

(d) EPCRA Section 312 Tier 2 reporting is required for batteries if sulfuric acid is present in quantities of 500 lbs. or more and/or if lead is present in quantities of 10,000 lbs. or more.

(e) Supplier Notification: This product contains toxic chemicals, which may be reportable under EPCRA Section 313 Toxic Chemical Release Inventory (Form R) requirements. If you are a manufacturing facility under SIC codes 20 through 39, the following information is provided to enable you to complete the required reports:

Toxic Chemical	Lead	Sulfuric Acid	* Antimony	* Arsenic
CAS Number	7439-92-1	7664-93-9	7440-36-0	7440-38-2
Approximate % by Weight	60	10 to 30	2	0.2

If you distribute this product to other manufacturers in SIC Codes 20 through 39, this information must be provided with the first shipment of each calendar year. The Section 313 supplier notification requirement does not apply to batteries which are "consumer products".

* Not present in all battery types. Contact your OutBack Power representative for additional information

TSCA

Ingredients in EnerSys' batteries are listed in the TSCA Registry as follows.

	Electrolyte	**Inorganic Lead Compounds**						
Component	Sulfuric Acid	Lead	Lead Oxide	Lead Sulfate	Antimony	Arsenic	Calcium	Tin
Chemical	H_2SO_4	PB	PbO	$PbSO_4$	Sb	As	Ca	Sn
CAS Number	7664-93-9	7439-92-1	1317-36-8	7446-14-2	7440-36-0	7440-38-2	7440-70-2	7440-31-5
TSCA Status	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed

CAA

EnerSys supports preventative actions concerning ozone depletion in the atmosphere due to emissions of CFCs and other ozone-depleting chemicals (ODC's), defined by the USEPA as Class I substances. Pursuant to Section 611of the Clean Air Act Amendments (CAAA) of 1990, finalized on January 19, 1993, EnerSys established a policy to eliminate the use of Class I ODCs prior to the May 15, 1993 deadline.

OutBack Power Technologies

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