

GHS SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

MANUFACTURER/SUPPLIER CHEMICAL/TRADE NAME *Lead-Acid Battery

Stryten Energy, LLC (* as used on label) 3700 Mansell Road, Suite

400 Alpharetta, GA PRODUCT ID UN2794

30022

FOR FURTHER INFORMATION CHEMICAL FAMILY/ Electric Storage Battery

CLASSIFICATION

Primary Contact:

Option 7, Option 1

Stryten SDS Support (678) FOR EMERGENCY

In the U.S. Call CHEMTREC (800) 424-9300 24-hour Emergency Response Contact/

(703) 527-3887 – Collect Ask for Environmental Coordinator

In **Canada** Call **CANUTEC** (888) 226-8832, (613) 996-6666 or *666 on a Mobile Phone

II. HAZARD IDENTIFICATION









Signal Word: Danger

Category:		GHS Codes	Description
		H302/H312/H332	Harmful if swallowed, inhaled, or in contact with skin.
		H314	Acid causes severe skin burns and eye damage.
		H315/H318	Causes skin irritation, serious eye damage.
		H302/H313/H332	Contact with internal components may cause irritation or severe burns.
		H350	May cause cancer if ingested or inhaled.
		H360	May damage fertility or the unborn child if ingested or inhaled.
		H373	Causes damage to central nervous system, blood and kidneys through
Health:	STOT RE 2		prolonged or repeated exposure if ingested or inhaled.
	Acute Tox. 4	H203	Explosive, fire, blast or projection hazard.
	Repr. 1A	H410	Very toxic to aquatic life with long lasting effects.
	Skin Corr. 1A	P314	If exposed/concerned, or if you feel unwell seek medical attention/advice.
	Carc. 1A (arsenic)	P301/330/331	IF SWALLOWED OR CONSUMED: rinse mouth. Do NOT induce
			vomiting. Call a poison center/doctor if you feel unwell.
	Aquatic Chronic 1	P303/361/353	IF ON CLOTHING OR SKIN (or hair): Remove/Take off immediately
	Aquatic Acute 1		all contaminated clothing and wash it before reuse. Rinse skin with
			water/shower.
		P304/340	IF INHALED: Remove person to fresh air and keep comfortable for
			breathing.
		P305/351/338	IF IN EYES: Rinse cautiously with water for several minutes. Remove
			contact lenses, if present and easy to do. Continue rinsing.
		P311	Immediately call a POISON CENTER or doctor/physician.
		H362	May cause harm to breast-fed children.
		P201	Obtain special instructions before use.
		P202	Do not handle until all safety precautions have been read and understood.
		P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
		P263	Avoid contact during pregnancy/while nursing.
		P264	Wash thoroughly after handling.
Handling:		P270	Do not eat drink or smoke when using this product.
Transmig.		P280	Wear protective gloves/protective clothing/eye protection/face protection.
		P403/P405	Store locked up, in a well-ventilated area, in accordance with local and
			national regulation.
		P271	Use only outdoors or in a well-ventilated area.
		P501	Dispose of contents/container in accordance with local & national laws.
		P201	Keep out of reach of children.

WARNING: Batteries subjected to abusive charging at excessively high currents for prolonged periods of time without vent caps in place may create a surrounding atmosphere of the offensive strong inorganic acid mist containing sulfuric acid. Extremely flammable gas (hydrogen). May form explosive air/gas mixture during charging. Do not breathe dust/fume/gas/mist/vapors/spray.

Reactivity: Highly reactive with water and alkalis

III. COMPOSITION/INFORMATION ON INGREDIENTS			
Ingredient	CAS Number	% by Wt.	
Inorganic compounds of:			
Lead	7439-92-1	42-70	
Antimony	7440-36-0	0.3-1.0	
Tin	7440-31-5	0.15-0.4	
Calcium	7440-70-2	0.00-0.03	
Arsenic	7440-38-2	0.01-0.03	
Electrolyte (sulfuric acid/water/solution)	7664-93-9	23-50	
Case Material:			
Polypropylene	9003-07-0	2.5-10.5	
Plate Separator Material:			
Polyethylene	9002-88-4	0.7-1.7	

Note:

Inorganic lead and electrolyte (water and sulfuric acid solution) are the primary components of every battery manufactured by Stryten Energy or its subsidiaries. Other ingredients may be present dependent upon battery type. Polypropylene is the principal case material of automotive and commercial batteries.

IV. FIRST AID MEASURES

Take proper precautions to ensure you own health and safety before attempting to rescue a victim and provide first aid.

Inhalation: <u>Electrolyte</u>: Remove to fresh air immediately. If breathing is difficult, give oxygen.

<u>Lead/arsenic compounds</u>: Remove from exposure, gargle, wash nose and lips; consult physician.

Skin Contact: <u>Electrolyte</u>: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely,

including shoes.

Lead/arsenic compounds: Wash immediately with soap and water.

Eye Contact: Electrolyte and Lead/arsenic compounds: Flush immediately with large amounts of water for at least 15 minutes; consult

physician immediately.

Ingestion: Electrolyte: Give large quantities of water; **do not** induce vomiting; consult physician.

Lead/arsenic compounds: Consult physician immediately.

V. FIRE FIGHTING MEASURES

Flash Point:	Not Applicable
Flammable Limits:	LEL = 4.1% (Hydrogen Gas in air); UEL = 74.2%
Extinguishing media:	CO ₂ ; foam; dry chemical

Fire Fighting 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:

In operation, batteries generate and release flammable hydrogen gas. They must always be assumed to contain this gas which, if ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Carefully follow manufacturer's instructions for installation and service. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery.

VI. ACCIDENTAL RELEASE MEASURES

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 acid to sewer.* Acid must be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.

VII. HANDLING AND STORAGE

Handling:

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. Single batteries pose no risk of electric shock but there may be increasing risk of electric shock from strings of connected batteries exceeding three 12-volt units.

Storage:

Store batteries under roof in cool, dry, well-ventilated areas separated from incompatible materials and from activities that may create flames, spark, or heat. Store on smooth, impervious surfaces provided with measures for liquid containment in the event of electrolyte spills. Keep away from metallic objects that could bridge the terminals on a battery and create a dangerous short-circuit.

Charging:

There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being

charged. Shut-off power to chargers whenever not in use and before detachment of any circuit connections. 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.

VIII. EXPOSURE CONTROLS AND PERSONAL PROTECTION

	Occupational Exposure Limits (mg/m³)						
Ingredient	US OSHA	US ACGIH	US NIOSH	Quebec PEV	Ontario OEL	EU OEL	
Inorganic compounds of: Lead Antimony Tin Arsenic	0.05 0.5 2 0.01	0.05 0.5 2 0.01	0.05 0.5 2 0.002(c)	0.05 0.5 2 0.002	0.05 0.5 2 0.01	0.15(a) 0.5(a,d) 2(e) 0.01(a,f)	
Electrolyte (sulfuric acid/water/solution)	1	0.2	1	1	0.2	0.05(b)	

NOTES:

- a) as inhalable aerosol
- b) thoracic fraction
- c) potential occupational carcinogen
- d) based on OELs of Austria, Belgium, Denmark, France, Netherlands, Switzerland, & UK
- e) based on OEL of Belgium
- f) based on OEL of Belgium & Denmark

Engineering Controls (Ventilation):

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. Handle batteries cautiously, do not tip 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.

Respiratory Protection (NIOSH/MSHA approved):

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

Skin Protection:

Rubber or plastic acid-resistant gloves with elbow-length gauntlet. Acid-resistant apron. Under severe exposure or emergency conditions, wear acid-resistant clothing, gloves, and boots.

Eye Protection:

Chemical goggles or face shield.

Other Protection:

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.

IX. PHYSICAL AND CHEMICAL PROPERTIES- ELECTROLYTE

Boiling Point@760 mm Hg	226 to 237° F	Specific Gravity @ 77°F (H ₂ O=1)	1.2185 to 1.3028
Melting Point	Not Applicable	Vapor Pressure (mm Hg)	13.5 to 17.8
% Solubility in Water	100	рН	Less than 1
Evaporation Rate	Less Than 1	Vapor Density (AIR=1)	Greater than 1
(Butyl acetate=1)		Viscosity	Not applicable
Appearance and Odor Threshold	Electrolyte is a clear liquid with a sharp, penetrating, pungent odor. A battery is a manufactured article; no apparent odor.	% Volatiles by Volume @70°F	Not Applicable
Octanol Water Partition Coefficient (K _{ow})	Not Applicable		

Note: The properties above reflect 30-40% Sulfuric acid

X. STABILITY & REACTIVITY

Stability: Stable X Unstable ___

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

Incompatibilities: (materials to avoid)

<u>Electrolyte</u>: 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. No further concern for mechanical impact.

<u>Lead compounds</u>: 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 the highly toxic gas - arsine

Hazardous Decomposition Products:

Electrolyte: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen sulfide.

<u>Lead compounds</u>: 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

XI. TOXICOLOGICAL DATA

Routes of Entry:

Electrolyte: Harmful by all routes of entry.

<u>Lead/arsenic compounds</u>: Hazardous exposure can occur only when product is heated above the melting point, oxidized or otherwise processed or damaged to create dust, vapor, or fume. The presence of nascent hydrogen may generate highly toxic arsine gas.

Acute Toxicity:

Oral LD₅₀:

Inhalation LD₅₀: Electrolyte: LC₅₀ rat: 375 mg/m³; LC₅₀: guinea pig: 510 mg/m³

<u>Elemental Lead:</u> Acute Toxicity Point Estimate = 4500 ppmV (based on lead bullion)

Elemental arsenic: No data Electrolyte: rat: 2140 mg/kg

Elemental lead: Acute Toxicity Estimate (ATE) = 500 mg/kg body weight (based on lead bullion)

Elemental arsenic: LD₅₀ mouse: 145 mg/kg

Inhalation:

<u>Electrolyte</u>: Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation. May lead to increase of risk of lung cancer.

<u>Lead compounds</u>: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

Ingestion:

Electrolyte: May cause severe irritation of mouth, throat, esophagus, and stomach.

<u>Lead/arsenic compounds</u>: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea, and severe cramping. This may lead rapidly to systemic toxicity. Acute ingestion should be treated by physician.

Skin Contact:

<u>Electrolyte</u>: Severe irritation, burns, and ulceration. Sulfuric acid is not readily absorbed through the skin and is not a dermal sensitizer.

<u>Lead compounds</u>: Not absorbed through the skin and is not a dermal sensitizer.

Arsenic compounds: Contact may cause dermatitis and skin hyperpigmentation. Arsenic pentoxides are dermal sensitizers.

Eye Contact:

Electrolyte: Severe irritation, burns, cornea damage, blindness.

Lead/arsenic compounds: May cause eye irritation.

Synergistic Products:

Electrolyte: No known synergistic products

<u>Lead compounds:</u> Synergistic effects have been noted with heavy metals (arsenic, cadmium, mercury), N-nitroso-N-(hydroxyethyl)ethylamine, N-(4-fluoro-4-biphenyl)acetamide, 2-(nitrosoethylamine)ethanol, and benzo[a]pyrene.

Arsenic compounds: Cigarette smoking has been shown to increase the occurrence of lung cancer in people with high levels of arsenic in the drinking water Co-exposure to ethanol and arsenic may exacerbate the toxic effects of arsenic

Additional Information:

Medical Conditions Generally Aggravated by Exposure:

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of electrolyte (water & sulfuric acid solution) with skin may aggravate skin diseases such as eczema and contact dermatitis. Contact of electrolyte (water & sulfuric acid solution) with eyes may damage cornea and/or cause blindness. Lead and its compounds can aggravate some forms of kidney, liver, and neurologic diseases.

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 ventilation and respiratory protection covered in Section VIII. Follow good personal hygiene to avoid inhalation and ingestion: wash hands, face, neck and arms thoroughly before eating, smoking or leaving the work site. 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 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.

XII. ECOLOGICAL INFORMATION

Environmental Fate: lead is very persistent in soil and sediments. No data on environmental degradation. Mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead.

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 LC_{50} (modeled for aquatic invertebrates): <1 mg/L, based on lead bullion

Arsenic: 24 hr LC₅₀, freshwater fish (*Carrassisus auratus*) >5000 g/L.

XIII. DISPOSAL INFORMATION

US

Spent batteries: Send to secondary lead smelter for recycling. Spent lead-acid batteries are not regulated as hazardous waste

when recycled. Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number <u>D002</u>

(corrosivity) and D008 (lead).

Electrolyte: Place neutralized slurry into sealed acid resistant containers and dispose of as hazardous waste, as applicable.

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.

XIV. TRANSPORT INFORMATION

GROUND - US-DOT/CAN-TDG/EU-ADR/APEC-ADR:

Batteries, Wet, Filled with Acid

UN 2794, 8

Label: "Corrosive"

AIRCRAFT – ICAO-IATA:

Batteries, Wet, Filled with Acid

UN 2794, 8

Label: "Corrosive"

Reference IATA packing instructions 870

VESSEL – IMO-IMDG:

Batteries, Wet, Filled with Acid

UN 2794, 8

Label: "Corrosive"

Reference IMDG packing instructions P801

Additional Information:

- Batteries must be kept upright at all times and packaged as required to prevent short circuits.
- Transport may require packaging and paperwork, including the Nature and Quantity of goods, per applicable origin/destination/customs points as-shipped.

XV. REGULATORY INFORMATION

United States:

EPA SARA Title III

Section 302 EPCRA Extremely Hazardous Substances (EHS):

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

EPCRA Section 302 notification is required if **500 lbs** or more of sulfuric acid is present at one site (40 CFR 370.10). An average automotive/commercial battery contains approximately 5 lbs of sulfuric acid. Contact your Stryten representative for additional information.

Section 304 CERCLA Hazardous Substances:

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

Section 311/312 Hazard Categorization:

EPCRA Section 312 Tier Two reporting is required for non-automotive 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.

Section 313 EPCRA Toxic Substances:

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	Approximate % by Weight
Lead	7439-92-1	42-70
Sulfuric Acid/Water Solution	7664-93-9	23-50
Antimony	7440-36-0	0.3-1.0
Arsenic	7440-38-2	0.01-0.03
Tin	7440-31-5	0.15-0.4

Note: The Section 313 supplier notification requirement does not apply to batteries that are "consumer products".

TSCA: Each ingredient chemical listed in Section III of this SDS is also listed on the TSCA registry.

OSHA: hazardous in accordance with Hazard Communication Act (29CFR1910.1200)

RCRA: Spent lead-acid batteries are not regulated as hazardous waste when recycled. Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number <u>D002</u> (corrosivity) and D008 (lead).

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

NFPA Hazard Rating for sulfuric acid:

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

US State Notifications and Warnings:	Identification	Notifications/Warning				
California	California Proposition 65	"WARNING: This product contains lead and arsenic, chemicals known to the State of California to cause cancer, or birth defects or other reproductive harm." The following chemicals identified to exist in the finished product as distributed into commerce are known to the State of California to cause cancer, birth defects or to cause reproductive harm: Arsenic (as arsenic oxides); CAS# 7440-38-2; <0.01% wt Strong inorganic acid mists including sulfuric acid; CAS #: NA; 23-50% wt Lead – CAS No. 7439-92-1; 42-70% wt. Arsenic – CAS No. 7440-38-2; 0.01-0.03%				
	Consumer Product Volatile Organic Compound Emissions	This product is not regulated as a consumer product for purposes of CARB/OTC VOC Regulations, as sold for the intended purpose and into the industrial/commercial supply chain.				
Country/Organization	Identification	Notifications/Warning				
Canada	All chemical substances in this product are listed on the CEPA DSL/NDSL or are exempt from list requirements.	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations. Refer to the Controlled Products Regulation for product labeling requirements				
	NPRI and Ontario Regulation 127/01	This product contains the following chemicals subject to the reporting requirements of Canada NPRI and/or Ont. Reg. 127/01: Chemical CAS # %wt Lead 7439-92-1 42-70 Arsenic 7440-38-2 0.01-0.03 Sulfuric acid 7664-93-9 23-50%				
	Toxic Substances List	Lead Arsenic				

AVI. OTHER INFORMATION

DATE ISSUED: September 30, 2020

OTHER INFORMATION:

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/Export of the product as-sold.

SOURCES OF INFORMATION:

International Agency for Research on Cancer (1987), IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Overall Evaluations of Carcinogenicity: An updating of IARC Monographs Volumes 1-42, Supplement 7, Lyon, France.
Ontario Ministry of Labor Regulation 654/86. Regulations Respecting Exposure to Chemical or Biological Agents.

PREPARED BY: ENVIRONMENTAL, SAFETY AND HEALTH DEPARTMENT

STRYTEN ENERGY, LLC

3700 MANSELL ROAD, SUITE 400

ALPHARETTA, GA 30022

VENDEE AND THIRD PERSONS ASSUME THE RISK OF INJURY PROXIMATELY CAUSED BY THE MATERIAL IF REASONABLE SAFETY PROCEDURES ARE NOT FOLLOWED AS PROVIDED FOR IN THE DATA SHEET, AND VENDOR SHALL NOT BE LIABLE FOR INJURY TO VENDEE OR THIRD PERSONS PROXIMATELY CAUSED BY ABNORMAL USE OF THE MATERIAL EVEN IF REASONABLE PROCEDURES ARE FOLLOWED.

ALL PERSONS USING THIS PRODUCT, ALL PERSONS WORKING IN AN AREA WHERE THIS PRODUCT IS USED, AND ALL PERSONS HANDLING THIS PRODUCT SHOULD BE FAMILIAR WITH THE CONTENTS OF THIS DATA SHEET. THIS INFORMATION SHOULD BE EFFECTIVELY COMMUNICATED TO EMPLOYEES AND OTHERS WHO MIGHT COME IN CONTACT WITH THE PRODUCT.

WHILE THE INFORMATION ACCUMULATED AND SET FORTH HEREIN IS BELIEVED TO BE ACCURATE AS OF THE DATE HEREOF, STRYTEN ENERGY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE FOR THEIR PARTICULAR CIRCUMSTANCES.

ANY PHOTOCOPY MUST BE OF THIS ENTIRE DOCUMENT