

**GHS
SAFETY DATA SHEET**

I. PRODUCT IDENTIFICATION		
MANUFACTURER/SUPPLIER Battery Systems 12322 Monarch St Garden Grove, CA 92841	CHEMICAL/TRADE NAME (as used on label)	Lead-Acid Battery
	PRODUCT ID	UN2794
FOR FURTHER INFORMATION Primary Contact: Bill McAlexander (310) 667-9320 ext 14108 Revised: January 1, 2018	CHEMICAL FAMILY/ CLASSIFICATION	Electric Storage Battery
	FOR EMERGENCY CHEMTREC (800) 424-9300 (703) 527-3887 – Collect 24-hour Emergency Response Contact Ask for Environmental Coordinator	

II. HAZARD IDENTIFICATION
Signal Word: Danger

Category:	GHS Codes	Description
Health: STOT RE 2 Acute Tox. 4 Repr. 1A Skin Corr. 1A Flam. Gas 1 Carc. 1A (arsenic) Aquatic Chronic 1 Aquatic Acute 1	H302 H314 H332 H350 H360 H373 H220 H410 P260 P308+313 P301/330/331 P303/361/353 P304/340 P305/351/338 P310	Harmful if swallowed. Causes severe skin burns and eye damage. Harmful if inhaled. May cause cancer by ingestion May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure. Extremely flammable gas (hydrogen) Very toxic to aquatic life with long lasting effects. Do not breathe dust/fume/gas/mist/vapors/spray. If exposed/concerned, seek medical attention/advice. IF SWALLOWED: rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Handling:	P210 P260 P264 P280 P403 P405 P391 P273 P501	Keep away from heat/sparks/open flames/hot surfaces. No smoking Do not breathe dust/fume/gas/mist/vapors/spray Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Store in well-ventilated area Store locked up. Collect spillage Avoid release to the environment Dispose of contents/container in accordance with local/regional/national/international regulation.

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.

Reactivity: Highly reactive with water and alkalis

III. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS Number	% by Wt.
Inorganic compounds of:		
Lead	7439-92-1	54-62
Antimony	7440-36-0	0.4
Tin	7440-31-5	0.16
Calcium	7440-70-2	0.02
Arsenic	7440-38-2	0.01
Electrolyte (sulfuric acid/water/solution)	7664-93-9	26-40
Case Material: Polypropylene	9003-07-0	5-12
Plate Separator Material: Polyethylene	9002-88-4	1-2

Note:

Inorganic lead and electrolyte (water and sulfuric acid solution) are the primary components of every battery supplied by Battery Systems 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: Electrolyte: Remove to fresh air immediately. If breathing is difficult, give oxygen.
Lead/arsenic compounds: Remove from exposure, gargle, wash nose and lips; consult physician.

Skin Contact: Electrolyte: 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: CO₂; 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)

<i>Ingredient</i>	US OSHA	US ACGIH	US NIOSH	Quebec PEV	Ontario OEL	EU OEL
Inorganic compounds of:						
Lead	0.05	0.05	0.05	0.05	0.05	0.15(a)
Antimony	0.5	0.5	0.5	0.5	0.5	0.5(a,d)
Tin	2	2	2	2	2	2(e)
Arsenic	0.01	0.01	0.002(c)	0.002	0.01	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	pH	Less than 1
Evaporation Rate (Butyl acetate=1)	Less Than 1	Vapor Density (AIR=1)	Greater than 1
Appearance and Odor Threshold	Electrolyte is a clear liquid with a sharp, penetrating, pungent odor. A battery is a manufactured article; no apparent odor.	Viscosity	Not applicable
Octanol Water Partition Coefficient (K _{ow})	Not Applicable	% Volatiles by Volume @70°F	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)

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. No further concern for mechanical impact.

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 the highly toxic gas - arsine

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

XI. TOXICOLOGICAL DATA**Routes of Entry:**

Electrolyte: Harmful by all routes of entry.

Lead/arsenic compounds: 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:

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

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

Elemental arsenic: No data

Oral LD₅₀: 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:

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

Lead compounds: 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.

Lead/arsenic compounds: 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:

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

Lead compounds: 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

Lead compounds: 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 LC₅₀ (modeled for aquatic invertebrates): <1 mg/L, based on lead bullion
Arsenic: 24 hr LC₅₀, freshwater fish (*Carrassius 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 D002 (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, PG III
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 Battery Systems 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	54-62
Sulfuric Acid/Water Solution	7664-93-9	26-40
Antimony	7440-36-0	0.4
Arsenic	7440-38-2	0.01
Tin	7440-31-5	0.16

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 D002 (corrosivity) and D008 (lead).

CAA: Battery Systems 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, Battery Systems 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; <0.1% wt Strong inorganic acid mists including sulfuric acid; CAS #: NA; 26-40% wt Lead – CAS No. 7439-92-1; 54-62% wt. Arsenic – CAS No. 7440-38-2 – 0.1%										
	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	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:										
		<table border="1"> <thead> <tr> <th>Chemical</th> <th>CAS #</th> <th>%wt</th> </tr> </thead> <tbody> <tr> <td>Lead</td> <td>7439-92-1</td> <td>54-62</td> </tr> <tr> <td>Arsenic</td> <td>7440-38-2</td> <td>0.1</td> </tr> <tr> <td>Sulfuric acid</td> <td>7664-93-9</td> <td>26-40%</td> </tr> </tbody> </table>	Chemical	CAS #	%wt	Lead	7439-92-1	54-62	Arsenic	7440-38-2	0.1	Sulfuric acid
Chemical	CAS #	%wt										
Lead	7439-92-1	54-62										
Arsenic	7440-38-2	0.1										
Sulfuric acid	7664-93-9	26-40%										

XVI. OTHER INFORMATION

DATE ISSUED: August 18, 2015

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.

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WHILE THE INFORMATION ACCUMULATED AND SET FORTH HEREIN IS BELIEVED TO BE ACCURATE AS OF THE DATE HEREOF, BATTERY SYSTEMS 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