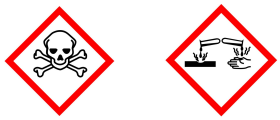
GS BATTERY
Taiwan

Safety Data Sheet

I. Data of Chemicals and Manufacturers

Name of article: Sealed Lead-Acid Batteries、general grade (PE, PX, TEV, LEV, TPH, SPV, GT-B TYPE)
Other name: -
Recommended and restricted use: start the power supply of electrical equipment.
Name, address and telephone number of the manufacturer or supplier: GS Battery Taiwan Co., Ltd., No.999, Chung Cheng N. RD., Yongkang Dist., Tainan City 710, Taiwan (R.O.C.), http://www.gs-battery.com.tw
Emergency Tel./Fax: 886-6-2532191/886-6-2535188

II. Hazard Identification Data

Chemical Hazard Classification:	Lead: Germ Cell Mutagenicity Category 2, Carcinogenicity Category 2, Reproductive Toxicity Category 2, Specific Target Organ Systemic Toxicity-Repeated Exposure Category 1, Hazardous to the Aquatic Environment (Chronic Toxicity) Category 1	Dilute sulphuric acid: Acute Toxicity Category 5 (swallow) Acute Toxicity Category 2 (inhale) Skin Corrosion/Irritation Category 1 Serious Eye Damage/Eye Irritation Category 1 Corrosive to Metals Category 1
Label contents:		
Symbols:	Hazardous to health and environment	Skeleton with two cross bones, corrosion
Warnings:	Danger	Danger
Danger warning message:	May be harmful if swallowed, fatal if inhaled, may corrode metals, cause severe skin burns and eye damage, cause severe eye damage	Suspected to cause genetic defects Suspected to cause cancer May cause damage to fertility or to the fetus Long-term or repeated exposure can cause damage to organs Highly toxic to aquatic organisms and has sustained effects.
Hazard prevention measures:	Place the container in a place with well-ventilated conditions The substance and its container must be disposed of in a safe manner. If an accident occurs or if you feel unwell,	Place the container in a place with well-ventilated conditions If the chemicals are in contact with eyes, wash immediately with plenty of water and seek medical advice.

	seek medical advice immediately Avoid exposure to this substance - use with special instructions	Please do not add water to this product Wear proper protective clothing, gloves and blinder / face masks Others
Other hazards:	—	—

III. Composition/Information on Ingredients

Mixture:

Identification of single- or mixed substance product: Mixed-substance product

(※) PBB spices or PBDE spices is not involved.

Composition	Substance	Content / Weight or Volume (%)	CAS No.
Plate	Lead and lead compounds Barium compound	60-75% 0.3% or below	7439-92-1 (Pb) 7440-39-3 (Ba)
Electrolyte	About 40% dilute sulfuric acid	12-25%	7664-93-9
Container /Cover	ABS resin (synthetic resin)	5-15%	9003-56-9
Separator	Glass Fiber	1-3%	65997-17-3
Other metal parts	Brass Other	1% or below	63338-02-6
Other resin parts	PP (synthetic resin)	1-5%	9003-07-0

IV. First-aid Measures

First aid for different exposure routes:

Inhalation
1. Remove the source of contamination or move the infected person to an area with fresh air.
2. In case of breathing difficulties, ask the well-trained personnel to administer oxygen.
3. Avoid unnecessary movement of the infected person.
4. Seek medical treatment immediately.
5. Symptoms of pulmonary edema may delay for up to 48 hours.

Skin Contact:
1. Wear impervious gloves if necessary to avoid exposure to the chemicals.
2. Gently rinse the contaminated area with warm water for 20-30 minutes.
3. Rinse repeatedly and continuously if the irritation doesn't mitigate.
4. Rinse with plenty of water for at least 15 minutes. Remove contaminated clothing, shoes, or leather accessories when flushing.
5. Seek for medical treatment immediately.
6. Completely decontaminate the contaminated clothing, shoes and leather furnishing before use or discarding.

Eye Contact:
1. Flip over the eyelids and flush immediately and continuously with plenty of water until the patient is sent to the emergency station.
2. Wear impervious gloves if necessary to avoid exposure to the chemicals.
3. Flip over the eyelid immediately and flush the contaminated eye with mild, flowing water for 20 minutes.
4. If possible, rinse with saline water without interruption.
5. Avoid water flowing into unaffected eye.
6. Rinse repeatedly if the irritation doesn't mitigate.

7. Seek medical treatment immediately. Ingestion: 1. If large amount of lead is ingested, use syrupus ipecacuanhae to induce vomiting. 2. If the patient is about to lose consciousness, have lost consciousness or have spasms, do not feed anything by mouth. 3. If the person is conscious, rinse the mouth thoroughly with water. 4. Do not induce vomiting. 5. Ask the patient to drink 240~300 ml of water to dilute the substances in the stomach; if there is milk, let the patient drink it after drinking water. 6. If the patient has spontaneous vomiting, ask him/her to lean forward to reduce the risk of inhalation, gargle and give him/her water repeatedly. 7. Seek for medical treatment immediately.
The most important symptoms and harmful effects: burn, blindness and pulmonary edema caused by corrosion.
Protection for first-aid personnel: perform first aid in a safe area wearing Class C protective equipment.
Prompt to doctors: 1. In case of lead ingestion, the gastric lavage, use of activated carbon and defecation can be taken into account for medical treatment. 2. In case of sulfuric acid inhalation, oxygen administration should be considered and avoid gastric lavage or inducing vomiting

V. Fire Fighting Measures

Applicable fire extinguishing agent: foam, chemical dry powder, carbon dioxide.
Special hazards may occur during firefighting: 1. Lead is not flammable, but lead powder is a kind of combustible dust, which, under some conditions, is likely to cause dust explosion. 2. Sulfuric acid is non-flammable, but concentrated sulfuric acid in contact with flammable materials is likely to cause heat and fire. 3. Reacts with most metals to produce flammable hydrogen, which may explode if ignited.
Special firefighting processes: 1. Do not drain fire effluents into drains or gutters. 2. If not exposed to dangers, try to remove the container from the fire site. 3. Cool down the container with water spray mist till the fire is extinguished. 4. There may be sulfur oxides released in a fire that is extremely irritating and toxic, please avoid inhalation. 5. Put out the fire as far away and windward as possible. 6. If it is safe to do so, remove containers and uncontaminated materials from the fire site. 7. The container may explode when heated. A large amount of water spray can be sprayed to cool the outside of the container. Do not let water come into contact with sulfuric acid, because sulfuric acid will react violently with water and release heat. 8. Personnel without special protective equipment are not allowed to access to the fire site.
Special protective equipment for firefighters: firefighters shall wear air-breathing apparatus, protective gloves and full-body chemical protective clothing.

VI. Leakage Treatment Methods:

Personal precautions:

1. Access control shall be performed till the spillover area is totally cleaned up.
2. Make sure that the cleaning-up is performed by the well-trained personnel.
3. Wear proper personal protective equipment.

Environment precautions:

1. Ventilate the area of spillover and leakage.
2. Remove all sources of ignition.
3. Inform relevant government units of occupational safety, health and environmental protection.

Cleaning-up method:

1. Personnel in charge of cleaning up should be properly protected to avoid inhalation of dust or such substances being in contact with eyes and skin.
2. Avoid the generation of dust by spraying a lot of water.
3. Use vacuum equipment with proper filter and cleaning function to reduce dust dispersion.
4. Shovel the spilled or leaked material into a closed container for treatment or reuse.
5. Do not touch the leakage and avoid draining it into sewers or narrow areas.
6. Try to prevent or reduce spills as far as safety conditions permit.
7. Small leakage should be enclosed with sand, soil or inert absorbent and placed in an appropriately labeled container, and then cleaned with water.
8. Contact fire department, emergency response units and suppliers for assistance in case of large spills.

VII. Handling and Storage

Handling:

1. Handle in a place with well-ventilated conditions.
2. Avoid storing the substances in the lowlands and sumps.
3. Forbid to make the substance contacts with the human body or the food or food utensils expose to it.
4. Avoid contact with incompatible substances.
5. Eating, drinking or smoking is not allowed when operating.
6. The substance is corrosive and the engineering control and protective equipment is required when operating. The working staffs shall be properly trained and informed of the hazard and safe methods to use it.
7. Check whether the container is leaked or spilling over before operation.
8. This material must be handled in a container for the sake of protection.
9. The container shall be labeled and avoid damage.

Storage: Store the substance in the air-tight and sealed container, placing it in the shady and cool, dry and well-ventilated place without direct sunlight. Please keep it far away from incompatible articles, heat and ignition source.

VIII. Exposure Prevention Measures

Engineering control:

1. Apply integral ventilation or local exhaust devices and a closed process.
2. Use anti-corrosion ventilation system and separate it from other exhaust ventilation systems
3. The exhaust outlet is directly open to the outside.
4. Provide sufficient fresh air to supplement the air extracted from the exhaust system.
5. Contaminated waste should be properly decontaminated before it is discharged outdoors.

(Lead) Control Parameters			
PC-TWA	PC-STEL	CEILING	BEIs
0.05 mg/m^3	0.15 mg/m^3	—	30ug/100ml (lead in blood) Note: children born by pregnant women and children with blood lead more than 10ug/dl are at risk of cognitive

(Sulfuric Acid) Control Parameters			
PC-TWA	PC-STEL	CEILING	BEIs
1 mg/m^3	2 mg/m^3	—	—

Personal protective equipment:

Processing station control: stored in a place with well-ventilated conditions, if ventilation equipment is used, the parts should be acid resistant.

Internship working area: the battery should be handled carefully to avoid falling off, keep the passage unobstructed and avoid contact with internal substances. At the time of battery filling and handling, it's required to wear the protective clothing.

Protective mask: generally speaking, it's not required under normal circumstances. A NIOSH or MSHA approved mask is required when the concentration of sulfuric acid mist exceeds PEL.

Protective gloves: elbow-length acid-resistant rubber gloves or plastic gloves.

Goggles: chemical goggles.

Other protective measures: wear a full-body coat when using, wear an acid-proof apron when the battery is filled with electrolyte, and wear acid-proof clothing and riding boots in case of an emergency.

Sanitary measures:

1. Remove contaminated clothes as soon as possible after work. Wash them before wearing or disposing of them. Inform the laundry staff of the danger of contaminants.
2. No smoking or eating in the workplace.
3. Wash hands thoroughly after handling.
4. Keep the work place clean.

IX. Physical and Chemical Properties

Materials (as example)	**Dilute sulfuric acid (for 1.3 of specific gravity)**	**Lead**	**ABS resin**
Outer appearance	Transparent liquid	Silver white solid	Black or Gray Solid
Specific gravity	1.3	11.3	1.20
Boiling point	110℃	1,740℃	—
Melting point	-40℃	327℃	(130℃~150℃) This is no clear melting point. It softens in the large temperature range.
Freezing point	-56.4℃	—	—
Vapor pressure	3.17 kPa (for 30% concentration at 30 ℃)	0.1 kPa (at 25℃)	—

X: Stability and Reactivity

Stability: remain stable under normal conditions.
Possible hazardous reactions under special conditions: Lead: 1. Hydrogen peroxide explodes with trioxane. 2. Sodium azide, lead, acetyl disodium, and oxidants, hydrogen peroxide, chlorine trifluoride, can cause violent reactions.
Conditions to be avoided: dust generation, sparks, ignition sources
Substances to be avoided: 1. Hydrogen peroxide, sodium azide, lead, acetyl disodium and oxidants, hydrogen peroxide, chlorine trifluoride and trioxane. 2. Calcium carbide, chlorate, fulminate, nitrate, perchlorate, manganese acid salt, acetylene picrate, active metal, metal, metal calcium carbide, table of chlorine hydride, aniline, diethylamine, glycol, hydrochloric acid, chlorosulfonic acid, cyclopentene, hydrofluoric acid, nitromethane, 4 - nitrotoluene, phosphorus, potassium, sodium oxide, ethylene glycol, isoprene, styrene, acetaldehyde, allyl chloride, alkaline solution 3. Acetaldehyde, propylene chloride: polymerization occurs in the presence of sulfuric acid.
Hazardous decomposition: -.

XI: Toxicological Information

Exposure routes: skin, inhalation, ingestion, eyes.
Symptoms: abdominal pain, constipation, headache, restlessness, memory problems, infertility, numbness in the hands and feet.
Acute toxicity: Inhalation: 1. Sulfuric acid: Inhalation of sulfuric acid vapors or fumes may cause severe respiratory irritation. 2. Lead and lead compounds: Inhalation of lead dust or gases may cause irritation of the upper respiratory tract and lungs. Skin: 1. Sulfuric acid: Severe irritation, burns and ulcers. 2. Lead and lead compounds: It will not be absorbed through the skin. Eyes: 1. Sulfuric acid: Severe irritation, burns, corneal damage and blindness. 2. Lead and lead compounds: May cause eye allergies. Ingestion: 1. Sulfuric acid: May cause serious irritation of the mouth, throat, esophagus and stomach. 2.Lead and lead compounds: may cause abdominal pain, vomiting, diarrhea, and cramps. This may poison other tissues and must be treated immediately.
Chronic toxicity and long-term toxicity: 1. Chronic inhalation can cause harmful effects on the kidney, heart, blood, neuroreproductive, endocrine and immune systems. 2. The early symptoms of lead poisoning are anorexia, weight loss, constipation, dull expression or irritation, occasional vomiting, fatigue, headache, weakness, metallic taste in the mouth, anemia, gingival lead line in case of poor oral hygiene. 3. Prolonged exposure to low concentrations of lead may result in the accumulation of lead in body tissues with harmful effects on the blood, nervous system, heart, endocrine glands, immune system, kidneys and reproduction. 4. Long term inhalation or ingestion will lead to neurogenic hand and foot pain, joint and abdominal muscle pain, hand and foot paralysis. 5. It will have an impact on the reproduction of both sexes. Special effects: Lead: 1. Administer the mice at an amount of 520mg/Kg (female mice with 7 22 days of pregnancy or 10 days of lactation, ingestion) will cause biochemical and metabolic abnormalities in neonatal mice. 2. The IARC lists it as Group2B: possible carcinogenic to humans. 3. ACGIH lists it as A3: carcinogenic to animals.

XII. Ecological Data:

Ecotoxicity: LC50 (fish): - EC50 (aquatic Invertebrates) : - BCF: -

Durability and degradability:

Lead:

Lead usually exists as dust in the air or it attaches to particles and is dropped by gravity. It may also be converted to oxides or carbides.

Sulfuric acid:

1. When it enters the groundwater, it continues to flow in the direction of the water until it becomes denser than the water.
2. The sulfuric acid in the water will eventually form salts with Ca and Mg.

Bioaccumulates in fatty tissues

Lead:

The bioaccumulates in fatty tissues of lead is not evident in fish but is significant in shellfish, such as oysters.

Sulfuric acid:

Sulfuric acid is not accumulative because it is easily excreted in the body.

Mobility in soil:

Lead:

Lead usually remains 2 to 5 cm above the surface of soil and, although it is known to be absorbed by some plants, the leakage emission is not really worth taking into account, mainly because it forms less soluble sulfides, oxides, or phosphorus salts.

Sulfuric acid:

Because sulfuric acid is dissolved in water, the amount of water in the soil and rain will affect the distribution of sulfuric acid when it spills.

Upon dilution, the viscosity decreases and the flow rate in the soil increases.

Toxic to aquatic organisms.

Half life (air)-

Half life (water surface)-

Half life (groundwater)-

Half life (soil)-

Other adverse effects: -

XIII. Treatment and Disposal of Waste:

Treatment and disposal of waste:

1. According to government regulations.
2. Contact the supplier or manufacturer for detailed recommendations.

XIV: Transportation Materials:

UN No.: UN2800

UN Transport Name: Battery, wet, non-leakage

Classification of Transportation Hazards:

U.S. DOT Category 8 Corrosive Substances.

IATA/ICAO Category 8.

IMDG Category 8.

Package Category: III

Marine Pollutants (Yes/No) : -

Special transportation method and matters needing attention:

1. Domestic transport is carried in accordance with road traffic safety regulations.
2. The International Maritime Dangerous Goods (IMDG) classifies it as Category 8 dangerous goods.

U.S. DOT:

Wet batteries are considered a toxic substance according to U.S. DOT regulations. Further information regarding the shipment of wet batteries is provided in CFR 49,173.159. Shipments are as follows:

Transport Name: battery, wet, non-leakage
Category of Danger: 8
UN No.: UN 2800
Package Category: III
Label Requirements: Corrosive

IATA:

Wet batteries and batteries charged with acid mist are considered to be toxic according to IATA regulations. These batteries must be shipped in accordance with IATA Dangerous Goods Provision A67, Regulations 62D, 2021. The shipment information is as follows:

Transport Name: battery, wet, non-leakage
Category of Danger: 8
UN No.: UN 2800
Package Category: III
Label Requirements: Corrosive

IMDG:

Wet batteries and batteries charged with acid mist are considered to be toxic according to IMDG regulations. These batteries must be shipped in accordance with the Package 238 of Special Provisions of the IMDG 2018 (AMDT 39-18) . The shipment information is as follows:

Transport Name: battery, wet, non-leakage
Category of Danger: 8
UN No.: UN 2800
Package Category: III
Label Requirements: Corrosive

RCRA:

Exhausted lead-acid batteries are not considered hazardous for recycling according to EPA regulations, however the situation may vary according to governmental and international regulations.

CERCLA (Superfund) and EPCRA:

1. According to the quantity bulletin of CERCLA and EPCRA, 100% sulfuric acid is 1,000 lbs. the leakage of sulfuric acid in state and local government bulletin may vary from each other.
2. According to the EPCRA Section 2 Chapter 312, the amount of sulfuric acid in the battery is 500 pounds or more, or 10,000 pounds if the lead is contained.
3. Supplier bulletin: As required by EPCRA Chapter 313 - Toxic Substances Release Catalogue (Type R), this product is

toxicant and manufacturers from SIC Code 20 to Code 39 are required to provide the following reports:

Toxicant	CAS Code	Weight Ratio % (Approx.)
Lead	7439-92-1	60-75
Sulfuric acid	7664-93-9	12-25

TSCA:

The raw materials of GS battery have been registered in TSCA, and the information is as follows:

Components		CAS Number	TSCA status
Electrolyte	Sulfuric Acid (H_2SO_4)	7664-93-9	listed
Inorganic lead compound	lead (Pb)	7439-92-1	listed
	Lead oxide (PbO_2)	1309-60-0	listed
	Lead sulfate ($PbSO_4$)	7446-14-2	listed
	Calcium (Ca)	7440-70-2	listed
	Tin (Sn)	7440-31-5	listed
	Barium (Ba)	7440-39-3	listed
Container & Cover	Antimony trioxide (Sb_2O_3)	1309-64-4	listed

XV. Laws and Regulations:

Applicable laws and rules:
1. Occupational Safety and Health Act.
2. Regulations for the Labeling and Hazard Communication of Hazardous Chemicals
3. Regulations for Prevention of Lead Poisoning.
4. Regulations for Prevention of Lead Poisoning.
5. Road Traffic Safety Regulations.
6. Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste.
7. Enforcement Rules for the Implementation of the Measurement of Labor Working Environment.
8. Regulations on Labor Health Protection.
9. Standards of Hazard Prevention for Specific Chemicals.

XVI. Other Data:

References:	1. RTECS database, Tomes Plus disc, Vol.68,2006. 2. ChemWatch,2006-1. 3. Safety and Health Technology Center, ITRI, Secure Data Sheet 4. OHS MSDS database, 2006. 5. HSDB database. TOMES PLUS disc, Vol.68,2006. 6. http://www.echochemical.com/doc/msds/1310-58-3.pdf. 7. GHS Documents
Tabulator Unit	Name: GS Battery Taiwan Co., Ltd.
	Add. / Tel.: No.999, Chung Cheng N. RD., Yongkang Dist., Tainan City 710, Taiwan (R.O.C.) /06-2423951
Tabulator	Name：Ching Kuei Chen
Tabulation	December 1, 2020

GS BATTERY
Taiwan

Safety Data Sheet

Date	
Note	Symbol - in the above data indicates that no relevant information is available at present, while the symbol ? indicates that this field does not apply to the substance.