

SUNLIGHT

P O W E R I S K N O W L E D G E

BATTERY INFORMATION SHEET

LEAD ACID BATTERY

Contact Us



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1. Identification

1.1 Product identifier **Lead Acid Cell/Battery**

Commercial Product Name: Industrial/Commercial electrical storage batteries
Product Code: NA
Electrochemical System: Lead Acid

1.2 Usage

Forklifts / Cleaning machines / Electric tractors / Lifting platforms / Electric vehicles / Telecom systems / Monitoring and control systems in power plants and energy stations / Signaling systems at railway stations, airports and seaports / Emergency lighting systems / Data processing systems / Uninterruptible power supply systems (UPS) / Renewable energy systems (solar, wind) / Automation systems

1.3 Details of the supplier of the safety data sheet

Name: **Sunlight Group Energy Storage Systems**
Address: 22 Thivaidos Str., Kifissia, 14564 Athens, Attica, Greece
Phone/Fax: +30 210 6245400 / +30 210 6245409
Factory Name: Sunlight Group Manufacturing Plant
Address: 67 200 Neo Olvio Xanthi
Phone/Fax: +30 25410 48100 / +30 25410 95446
Responsible/issuing person: Sunlight Group

1.4 Emergency telephone number

In case of medical emergencies, please contact your local poison control center
Contact telephone number for Sunlight Group: +30 25410 48100
Internet: www.systems-sunlight.com section "contact"

2. Hazards Identification






No hazards occur during the normal operation of a Lead Acid Battery as it is described in the instructions for use that are provided with the Battery. Lead-acid Batteries have three significant characteristics:

- They contain an electrolyte which contains diluted sulphuric acid. Sulphuric acid may cause severe chemical burns.
- During the charging process or during operation they might develop hydrogen gas and oxygen, which under certain circumstances may result in an explosive mixture.
- They can contain a considerable amount of energy, which may be a source of high electrical current and a severe electrical shock in the event of a short circuit.

The Batteries have to be labelled with the symbols listed under item 15.

3. Composition and Information on the main Ingredients ¹

Signs and Symptoms of Exposure

CAS no.	Material Description	Content [% of weight]	Hazards Category and Statement Code, GHS pictograms
7439-92-1	Lead Grid ² (metallic lead, lead alloys with possible traces of additives)	~ 32	 Dgr Repr. 1A - H360Df Lact-H362
n.a.	Active Mass ³ (Battery Oxide, inorganic lead compounds)	~ 32	   Dgs Repr. 1A - H360Df Acute Tox. 4 - H332 Acute Tox. 4 - H302 STOT RE 2 - H373 Aquatic Acute 1 - H400 Aquatic Chronic 1 H410
7664-93-9	Electrolyte ⁴ (diluted sulphuric acid with additives)	~ 29	 Dgs SkinCorr.1A - H 314
n.a.	Plastic Container / Plastic Parts ⁵	~ 7	

4. First Aid Measures

4.1 Description of first aid measures

General advice:

In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). First aider needs to protect himself. Move out of dangerous area. Never give anything by mouth to an unconscious person. Take off contaminated clothing and shoes immediately.

¹ Contents may vary due to performance data of the battery/cell

² Lead metal (CAS 7439-92-1) is classified as a substance of very high concern under REACH

³ Composition of active mass depends on the state of charge

⁴ Density of the electrolyte varies in accordance to the state of charge

⁵ Composition of the plastic container may vary due to different customer requirements

If inhaled:

Sulfuric Acid - Remove to fresh air immediately. If breathing is difficult, give oxygen. Consult physician. Lead Compounds - Remove from exposure, consult physician.

Skin contact:

Sulfuric Acid - Flush with large amounts of water. Immediately remove contaminated clothing. Lead Compounds - are not readily absorbed through the skin. Wash of with plenty of water. Remove contaminated clothing

Eye contact:

Sulfuric Acid – rinse out immediately with plenty of water for at least 15 minutes with the eyelid held wide open, then consult physician. Lead Compounds – rinse out with plenty of water for at least 10 minutes with the eyelid held wide open. Summon eye specialist if necessary.

If Ingested:

Sulfuric Acid – make victim drink large quantities of water; DO NOT induce vomiting (danger of perforation). Immediately call in physician. Do not attempt to neutralize. Lead Compounds – make victim drink plenty of water, induce vomiting. Immediately consult a physician.

If swallowed:

Sulfuric Acid –rinse mouth with water (only if the person is conscious). Do not induce vomiting - give copious water to drink. Consult doctor immediately. Lead Compounds – make victim drink plenty of water, induce vomiting. Immediately consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Irritation and corrosion, Risk of blindness!

4.3 Indication of any immediate medical attention and special treatment needed

No data available.

5. Fire – Fighting Measures

5.1 Extinguishing media

■ **Suitable extinguishing media:** Dry chemical, carbon dioxide foam. Do not use water on live electrical circuits.

■ **Unsuitable extinguishing media:** ---

5.2 Special hazards arising from the mixture

■ **Specific hazards during firefighting** The product is non-combustible. If heated, corrosive vapours may be formed. Thermal decomposition or combustion may liberate carbon oxides and other hazardous gases or fumes.

5.3 Advice for firefighters

- **Special Fire Fighting Procedures & Protective Equipment:** Use appropriate media for surrounding fire. Do not use carbon dioxide directly on cells/containers due to the possibility of thermal shock causing cracking and electrolyte leaking. Avoid breathing vapors. Use full protective equipment (bunker gear) and self-contained breathing apparatus.
- **Further information:** Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Avoid Contact with Skin. Neutralize any spilled electrolyte with neutralizing agents, such as soda ash, sodium bicarbonate, or very dilute sodium hydroxide solutions.

6.2 Environmental precautions:

Prevent spilled material from entering sewers and waterways.

6.3 Methods and material for containment and cleaning up:

Add neutralizer/absorbent to spill area. Sweep or shovel spilled material and absorbent and place in approved container.

Dispose of any non-recyclable materials in accordance with local, state, provincial or federal regulations.

6.4 Reference to other sections

Follow advices and protective measures mentioned in section 7 and 8.

7. Handling and Storage

7.1 Precautions for safe handling

Keep away from flames during and immediately after charging. Combustion or overcharging may create or liberate toxic or hazardous gases and liquids.

Personal Precautions: Acid resistant aprons, boots and protective clothing. Safety glasses with side shields/face shield recommended. Ventilate enclosed areas.

Other Precautions: GOOD PERSONAL HYGIENE AND WORK PRACTICES ARE MANDATORY. Refrain from eating, drinking or smoking in work areas. Thoroughly wash hands, face, neck, and arms before eating, drinking or smoking. Launder soiled clothing before reuse. Emptied batteries contain hazardous sulfuric acid residue.

7.2 Conditions for safe storage, including any incompatibilities

Store batteries in cool, dry, well ventilated area. Do not short circuit battery terminals, or remove vent caps during storage or recharging. Protect battery from physical damage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated. Subchronic and Chronic Health Effects

8. Exposure controls/personal protection

8.1 Control parameters

Engineering Controls: Store and handle in a well ventilated area.

Work Practices: Make certain vent caps are on tightly. Follow all manufacturers’ recommendations when stacking or palletizing. Do not allow metallic materials to simultaneously contact both the positive and negative terminals of the batteries. Do not carry battery by terminals.

Personal Protective Equipment: None required during normal use.

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.



Respiratory protection

If an overcharge or overheating condition exists (or when firefighting) and concentration of sulfuric acid are known or suspected to exceed the exposure limit, wear a self-contained breathing apparatus with a full face piece operated in a positive pressure mode.



Hand protection

Rubber or plastic acid resistant gloves with elbow length gauntlet.



Eye protection

Chemical goggles or safety glasses with side shields and a full face shield.

Other Special Clothing and Equipment: Acid resistant apron. Under severe exposure or emergency conditions, wear acid resistant clothing and boots.

Work Practices: Do not wear metallic jewelry when working with batteries. Use non-conductive tools only. Discharge static electricity prior to working on a battery. Maintain an eyewash, fire extinguisher and emergency communication device in the work area

General safety and hygiene measures: Use only as directed.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Sulfuric Acid (electrolyte)	Form	Liquid	
	Color	Colorless	
	Odor	Odourless	
	pH value	Strongly acid	
	Melting Point	-20 to -68 °C	
	Boiling Point	103 to 119 °C	
	Ignition Temperature	N/A	
	Flash Point	N/A	
	Explosion Limits	Upper Lower	N/A
	Density (20 °C)	1,18 to 1,30 g/cm ³	
Solubility in water (20 °C)	Soluble (CAUTION! DEVELOPMENT OF HEAT)		
Lead/Lead alloys/ Lead compounds	Form	Solid	
	Color	Metallic/brown/grey/white	
	Odor	None	
	Flammability	None	
	Melting Point	320 °C	
	Density (20 °C)	9.6 – 11.3 g/cm ³	
	Reactivity	Lead dioxide/oxidizer	
	Solubility in water (20 °C)	Insoluble	

9.2 Other information

Other physical and chemical data have not been determined.

10. Stability and Reactivity

10.1 Reactivity

Stable under normal temperature conditions.

10.2 Chemical stability

The material is stable under normal conditions of use and storage. Store at room temperature.

10.3 Possibility of hazardous reactions

A risk of explosion and/or of toxic gas formation exists only for electrolyte (Sulfuric Acid) with the following substances:

Water, Alkali metals, alkali compounds, Ammonia, Aldehydes, acetonitrile, Alkaline earth metals, alkalines, Acids, alkaline earth compounds, Metals, metal alloys, Oxides of phosphorus, phosphorus, hydrides, halogen-halogen compounds, oxyhalogenic compounds, permanganates, nitrates, carbides, combustible substances, organic solvent, acetylidene, Nitriles, organic nitro compounds, anilines, Peroxides, picrates, nitrides, lithium silicide, iron(III) compounds, bromates, chlorates, Amines, perchlorates, hydrogen peroxide.

10.4 Conditions to avoid

Sparks and other sources of ignition. Prolonged overcharge and overheating.

10.5 Incompatible materials

Combination of sulfuric acid with combustibles and organic materials may cause fire and explosion. Also avoid strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur trioxide fumes and may release flammable hydrogen gas.

Lead Compound: Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, carbides, sulfides, peroxides, phosphorus, sulfur, nascent hydrogen, and reducing agents.

10.6 Hazardous decomposition products

Sulfuric Acid: Hydrogen, sulfur dioxide, sulfur trioxide, hydrogen sulfide, and sulfuric acid mist.

Lead compounds: Temperatures above the melting point are likely to produce toxic metal fumes, vapor or contact with strong acid or base or the presence of nascent hydrogen may generate highly toxic gas.

11. Toxicological Information

11.1 Information on toxicological effects

Acute toxicity:

Lead: In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates and precipitates out of the water column. Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange

with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil. Lead (when in the dissolved phase) is bioaccumulated by plants and animals, both aquatic and terrestrial.

Further toxicological information:

Lead: Due to the poor absorbability via the gastrointestinal tract, only very high doses lead to acute case of intoxication. After a latency period of several hours, metallic taste, nausea, vomiting and colics occur, in many instances followed by shock. Chronic uptake causes peripheral muscular weakness, anemia, and central-nervous disorders. Women of child-bearing age should not be exposed to the substance over longer periods of time (observe critical threshold).

Sulfuric Acid:

After inhalation of aerosol damage to the affected mucous membranes.

After skin contact severe burns with formation of scabs.

After eye contact burns corneal lesions.

After swallowing severe pain (risk of perforation), nausea, vomiting and diarrhoea.

After a latency period of several weeks possibly pyrolic stenosis

12. Ecological Information

12.1 Toxicity

Lead Compounds:

Quantitative data on the toxicity are not available

Sulfuric Acid:

LC50 (inhalation, rat): 510 mg/me/2h (calculated on the pure substance)

LD50 (oral, rat): 2140 mg/kg (Using 25% solution)

Specific symptoms in animal studies:

Eye irritation test (rabbit):burns

Skin irritation test (rabbit): burns

Toxicological values are not available due to other dangerous properties of the substance.

Sulfuric Acid: Biological Effects: harmful effect on aquatic organisms. Harmful effect due to pH shift. Toxic effect on fish and algae. Caustic even in diluted form. Does not cause biological oxygen deficit. Endangers drinking water supplies if allowed to enter soil and/or waters in large quantities. Neutralization possible in waste water treatment plants..

Subacute to chronic toxicity:

Lead Compounds:

The risk of an embryo toxic effect must be considered probable. Pregnant women should not be exposed to the product.

Sulfuric Acid:

No teratogenic effects in animal experiments

12.2 Persistence and degradability

No data available.

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

No data available.

12.6 Other adverse effects

None known.

Further hazardous properties cannot be excluded

Further ecological information:

The product should not be allowed to enter drains, water courses or the soil. If the product contaminates rivers and lakes or drains inform respective authorities.

13. Disposal considerations

13.1 Waste treatment methods

Lead Acid Battery: Do not dispose as household waste. Follow local and National regulations to dispose. Return for recycling

Sulfuric Acid: Dispose as chemical compound- do not pollute the environment

Lead and lead compounds: Dispose as chemical compounds- do not pollute the environment

Disposal code according to the European Waste Catalogue:

Used product: 16 06 01* lead batteries

14. Transport information

The product is subject to different provisions applicable in the different transport modes of dangerous goods governed by the relevant international regulations (ADR/RID, IMDG, ICAO/IATA).

ADR/RID

UN N°: UN2794

Classification: Class 8

Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID electric storage

Packing Group ADR: not assigned

Label required: Corrosive

New batteries are exempt from all ADR/RID (special provision 598).

IMDG

UN No:	2794
Proper shipping name:	BATTERY, WET, FILLED WITH ACID, electric storage
Class:	8
Packing group:	III
EmS:	F-A, S-B
Marine Pollutant:	No
Label required:	Corrosive

IATA

UN No:	2794
Proper shipping name:	BATTERY, WET, FILLED WITH ACID, electric storage
Class:	8
Packing group:	III
Marine Pollutant:	No
Label required:	Corrosive

Special precautions for user

See sections 6, 7 & 8

15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the mixture

VOC (1999/13/EC): Not applicable

Seveso Directive (96/82/EC): Directive 96/82/EC does not apply.

In accordance with EU Battery Directive and the respective national legislation, Lead-Acid batteries have to be marked by a crossed out dust bin with the chemical symbol for lead shown below, together with the ISO return/recycling symbol.



National legislation

Other regulations: Take note of Dir 94/33/EC on the protection of young people at work.

Further information: Reserved for industrial and professional use. Safety data sheet available for professional user on request.

15.2 Chemical safety assessment

For this mixture a chemical safety assessment has not been carried out.

16. Other information

16.1 Safety Data Sheet

The European Directive 91/155/EEC which described the requirements for Material Safety Data Sheets had been repealed by the Regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals on June 1st, 2007 (REACH-Regulation 1907/2006/EC, Art. 31). The requirement to publish a Safety Data Sheet applies to all suppliers of substances and preparations.

As already defined under the former Directive there is no requirement to develop and maintain a Safety Data Sheet for products such as Batteries.

16.2 Substances of Very High Concern (SVHC)

The publications of the European Chemicals Agency on substances of very high concern are monitored by Sunlight Group. As defined by REACH, customers will receive the required information if an updated publication may add a substance relevant for our products to the list of SVHC's. On 19 December 2012, four Lead compounds used in the process of battery manufacturing – Lead Monoxide, Lead Tetroxide, Tetralead Trioxide Sulphate and Pentalead Tetraoxide Sulphate – were added to the list of Substances of Very High Concern. As of June 27 2018, Lead Metal was added to the SVHC list as well.

Irrespective of the battery design (flooded, MHF, Gel, AGM) all lead based batteries contain Lead Metal (CAS Nr.: 7439-92-1). The content varies but exceeds the notification threshold of 0,1% w/w.

Batteries ready for use do not contain Oxides or Sulphates that are classified SVHC.

Dry Batteries/dry cells (dry charged plates, delivered without electrolyte) contain more than 0,1 % of Lead Monoxide. Lead Monoxide (CAS Nr.: 1317-36-8) is listed as a substance of very high concern. Once the batteries / cells are filled with electrolyte all Lead Monoxide is transformed and the presence of Lead Monoxide has ended.

16.3 GHS labels

Among others the European GHS regulation describes classification and labelling of chemicals and preparations. GHS is not a regulation that describes labelling requirements for products such as Lead Acid Batteries.

The six pictograms on batteries target to provide safety information and are based on an international standard (EN 50342). These labels remain unaffected.

16.4 General

The information given above is provided in good faith based on existing knowledge and does not constitute an assurance of safety under all conditions. It is the user's responsibility to observe all laws and regulations applicable for storage, use, maintenance or disposal of the product. If there are any queries, the supplier should be consulted.

However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship. H314: Causes severe skin burns and eye damage.

All information provided herein is deemed reliable and is intended to ensure optimal protection during transport, handling and storage of our products.

However, the present should not be considered as a warranty or quality specification.

This information relates to the specific materials designated and may not be valid for such material used in combination with other materials or in any process. It is the user's responsibility to satisfy himself as to the suitability and completeness of this information for his particular use.

Sunlight Group does not accept liability for any loss or damage that may occur, whether direct, indirect or consequential, from the use of this information.



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