

MATERIAL SAFETY DATA SHEET
LEAD ACID BATTERY**1. IDENTIFICATION****1.1 Product** Lead Acid Battery

Trade name: Industrial/Commercial electrical storage batteries

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 Supplier**

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1.4 Contact in case of emergency

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Internet: www.sunlight.gr section "contact"**2. Hazards Identification****Lead acid battery****Current and voltage** Battery produces uncontrolled current when the protected terminals are shorted. Current flow can cause sparks, heating and possibly fire.**Explosion Hazard** Flammable/explosive hydrogen gas is liberated during the operation of batteries (explosive mixtures with air 4-74%v/v, lower explosion limit threshold 4%v/v). Keep sparks or other sources of ignition away from batteries. Do not allow metallic contact between terminals of opposite polarity. Follow manufacturer's instructions for installation and service.**Main constituents****Sulfuric acid** Corrosive causes severe burns. May attack many materials and clothing. Attacks many metals with liberation of hydrogen which is flammable and forms**Lead, lead alloys, lead sulfate, lead dioxide** Toxic when ingested.**Secondary constituents****Plastic components, rubber parts** Decomposition in a fire may produce toxic fumes

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3. Composition/Information on Ingredients

MATERIAL	CAS - No	% by Weight	Exposure OSHA	Limits ACGIH
Lead/Lead Dioxide/Lead Sulfate	7439-92-1	60 - 78	0.05 mg/m ³	0.15 mg/m ³
Electrolyte (Sulfuric Acid)	7664-93-9	25 – 40*	1 mg/m ³	1 mg/m ³
Antimony	7440-36-0	1 - 6	0.5 mg/m ³	0.5 mg/m ³
Arsenic	7440-38-2	<1%	0,01 mg/m ³	0,01 mg/m ³

* % of acid in the electrolyte

4. First Aid Measures

Inhalation: **Sulfuric Acid** - Remove to fresh air immediately. If breathing is difficult, give oxygen. Consult physician.

Lead Compounds - Remove from exposure, consult physician.

Skin: **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

Eyes: **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.

Ingestion: **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.

5. Fire – Fighting Measures

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

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.

Unusual Fire and Explosion Hazards: Batteries evolve flammable hydrogen gas during charging and may increase fire risk in poorly ventilated areas near sparks, excessive heat or open flames.

Further information: Firefighting water runoff and dilution water may be toxic and corrosive and may cause adverse environmental impacts.

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6. Accidental Release Measures

Personal precautions:

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

Environmental precautions:

Prevent spilled material from entering sewers and waterways.

Spill containment & cleanup methods/materials:

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.

7. Handling and Storage

Precautions to be taken in handling and storage:

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

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.

Personal

Precautions:

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

8. Exposure controls/personal protection

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.

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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

<ul style="list-style-type: none"> 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	Not Available
	Flash Point	Not Available
	Explosion Limits Upper	Not Available
	Lower	Not Available
Density (20 °C)	1,18 to 1,30 g/cm ³	
Solubility in water (20 °C)	Soluble (CAUTION! DEVELOPMENT OF HEAT)	
<ul style="list-style-type: none"> 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

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Stable

Conditions to avoid:

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

Incompatibility (Materials to Avoid):

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.

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.

Hazardous Polymerization:

Will Not Occur

11. Toxicological Information**Acute 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.

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

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

Further data:

Further hazardous properties cannot be excluded.

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12. Ecological Information

- 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.
- 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.

13. Disposal considerations

- 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

14. Transport information

- UN Number:** UN2794
- Proper Shipping Name:** BATTERY, WET, FILLED WITH ACID, electric storage
- Hazard Classification:** Class 8 (CORROSIVE)
- Packing group:** III
- Label:** Class 8 – CORROSIVE



- EmS No.:** F-A , S-B
- Marine Pollutant:** NO

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- R35 Causes severe burns.
R36 Irritating to eyes.
R38 Irritating to skin.

Safety Phrases: None

- S1/2 Keep locked up and out of the reach of children.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S30 Never add water to this product.
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16. Other information

This information is based on data considered to be accurate, however, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

This information relates to the specific materials designated and may not be valid for such material used in combination with an 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.

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