

COMPANY DETAILS

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AUTOMOTIVE

1. Product Identification

Trade name: **Lead Acid Battery (Automotive)**

Chemical family: Electric Storage Battery

2. Composition :

Inorganic compounds of the negative grid:	Chemical	Trade Name	Hazardous	CAS no.	% wt	Air exp. limits mg/ m3		
						OSHA	ACGIH	NIOSH
	Pb	Lead	Yes	7439-92-1	99.6 %	0.05	0.15	0.1
	Ca	Calcium	No	7440-70-2	0.1%	None established		
	Al	Aluminum	Yes	7429-90-5	0.01%	15	10	10
Inorganic compounds of the positive grid:								
	Pb	Lead	Yes	7439-92-1	98 %	0.05	0.15	0.1
	Sb	Antimony	Yes	7440-36-0	1.8 %	0.5	0.5	-
	As	Arsenic	Yes	7440-38-2	0.14 %	0.01	0.2	-
	Cu	Copper	Yes	7440-50-8	0.04%	1.0	1.0	-
	Sn	Tin	Yes	7440-31-5	0.22 %	2.0	2.0	-
	Se	Selenium	Yes	7782-49-2	0.03 %	0.2	0.2	0.2
Electrolyte:	H ₂ SO ₄	Sulphuric acid	Yes	7664-93-9	* 38.5 %	1	1	1
	* % of acid in electrolyte							
Case Material:	Polypropylene	PP	No	9003-07-0	100%	None listed		

3. Hazards Identification :

Main hazard: Explosion / Corrosion

Explosion Hazards: Hydrogen gas is liberated during the operation of batteries. Keep other sources of ignition away from batteries.
Do not allow metallic contact between terminals of opposite polarity.
Follow manufacturer's instructions on installation and service.

Routes of entry: Sulphuric acid: Harmful by all routes of entry.

Lead compounds: Hazardous exposure can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapour or fume.

Eye effects - eyes: Sulphuric Acid: Severe irritation, burns, cornea damage, and blindness.

Lead compounds: May cause eye irritation.

Health effects - skin: Sulphuric Acid: Severe irritation, burns and ulceration.

Lead Compounds: Not absorbed through the skin.

Health effects - ingestion: Sulphuric Acid: May cause severe irritation of mouth, throat, esophagus and stomach.
Lead Compounds: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead rapidly to systemic toxicity and must be treated by a physician.

Health effects - inhalation: Sulphuric Acid: Breathing of Sulphuric acid vapours or mists may cause severe respiratory irritation.
Lead Compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

Carcinogenicity: Sulphuric Acid: the International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing Sulphuric acid" as a Category 1 carcinogen, a substance that is carcinogenic to humans.
This classification does not apply to liquid forms of Sulphuric acid or Sulphuric acid solutions contained within a battery.
Inorganic acid mist (Sulphuric acid mist) is not generated under normal use of this product.
Misuse of the product, such as overcharging, may result in the generation of Sulphuric acid mist.
Lead Compounds: Lead is listed as a 2B carcinogen, likely in animals at extreme doses.
Proof of carcinogenicity in humans is lacking at present.
Arsenic: Listed by national Toxicology Program (NTP), International Agency for Research on Cancer (IARC), OSHA and NIOSH as a carcinogen only after prolonged exposure at high levels.

Effects of Overexposure - Acute

Sulphuric Acid: Severe skin irritation, damage to cornea, upper respiratory irritation.
Lead Compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.

Effects of Overexposure - Chronic

Sulphuric Acid: Possible erosion of tooth enamel, inflammation of nose, throat and bronchial tubes.
Lead Compounds: anaemia, neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in males and females.

Medical Conditions Generally Aggravated by Exposure:

Overexposure to Sulphuric acid mist may cause lung damage and aggravate pulmonary conditions.
Contact of Sulphuric acid with skin may aggravate skin diseases such as eczema and contact dermatitis.
Lead and its compounds can aggravate some forms of kidney, liver and neurological diseases.

4. First Aid Measures :

Product in eye: Sulphuric acid and lead: Flush immediately with large amounts of water for at least 15 minutes; consult physician.

Product on skin: Sulphuric acid: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing including shoes
Lead: Wash immediately with soap and water.

Product ingested: Sulphuric acid: Give large quantities of water; do not induce vomiting; consult physician.
Lead: Consult physician immediately.

Product inhaled: Sulphuric acid: Remove to fresh air immediately. If breathing is difficult, give oxygen.
Lead: Remove from exposure, gargle, wash nose and lips ; consult physician.

5. Fire Fighting Measures :

Extinguishing media: CO₂, foam, dry chemical. Flammable Limits: - LEL + 4.1% (hydrogen gas) UEL = 74.2%.

Special hazards: **If batteries are on charge, shut off power. Use positive pressure, self -contained breathing apparatus. Water applied to electrolyte generates heat and causes it to splatter. Very small quantities of highly flammable hydrogen gas may be generated during charging and operation of batteries. To avoid risk of fire or explosion, keep sparks or other sources of ignition away from batteries. Do not allow metallic materials to simultaneously contact negative and positive terminals of cells and batteries. Follow manufacturer's instructions for installation and service.**

Protective clothing:	<u>Apparatus</u> Self –contained breathing apparatus.	<u>Extinguishing Media</u> CO ₂ foam, dry chemical	<u>Action</u> Check if batteries are on charge.
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Acid resistant clothing

**Avoid water – water added
To acid, liberates heat &
will cause violent reaction.**

**Switch off power (in
case batteries are on
charge.**

6. Accidental Release Measures:

- Personal precautions: Wear acid resistant clothing, boots, gloves and face shield. Do not allow discharge of unneutralised acid to sewer.
- Environmental precautions: Spent batteries: Sent to supplier (or secondary lead smelter) for recycling. Place neutralized slurry into sealed containers and handle as applicable with your country's regulations. Large water-diluted spills, after neutralisation and testing, should be managed in accordance with approved local requirements.
- Large and Small spills: Stop flow of material, contain/absorb small spills with dry sand, earth and vermiculite. Do not use combustible materials. If possible, carefully neutralise spilled electrolyte with soda ash, sodium bicarbonate, lime, etc.

7. Handling and Storage:

- Handling/storage precautions: Store batteries in cool, well ventilated areas with impervious surfaces and adequate containment in the event of spills. Batteries should also be stored under roof for protection against adverse weather conditions. Separate from incompatible materials. Store and handle only in areas with adequate water supply and spill control. Avoid damage to containers. Keep away from fire, sparks and heat.

8. Exposure Controls/Personal Protection

- Engineering control measures: Store and handle in well ventilated area. If mechanical ventilation is used, components must be acid-resistant.
- Personal protection – respiratory: None required under normal conditions. When concentrations of Sulphuric acid mist is known to exceed PEL, use NIOSH or MSHA-approved respiratory protection.
- Personal protection – hand: Rubber or plastic acid-resistant gloves with elbow-length gauntlet.
- Personal protection – eye: Chemical goggles or face shield.
- Personal protection – skin: Acid-resistant apron. Under severe exposure or emergency conditions, wear acid-resistant clothing and boots.
- Other protections : In areas where Sulphuric acid is handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply. Handle batteries cautiously to avoid spills. Make certain vent caps are on securely. Avoid contact with internal components. Wear protective clothing when filling or handling batteries.

9. Physical and Chemical Properties

Component	BP	Solubility in H ₂ O	Appearance & Odour	SG	Vapour Pressure mmHg	Flammable Limits
H ₂	-253°C		None			LEL = 4.1 % UEL = 76%
Sulphuric Acid	95-96°C	100%	Clear liquid with sharp pungent odour.	1.280-1.300	10	

Reactivity:

Product: Stable

Storage: Cool, dry place (Temp approx. 20°C)

Testing: Do not exceed charge temperature of 45°C in service. Normal operational temperature range for Pb-acid batteries is 10 – 30°C.

10. Stability and Reactivity:

Conditions to avoid: Prolonged overcharge, source of ignition.
 Incompatible materials: Sulphuric acid: Contact with combustion and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulphur trioxide gas, strong oxidisers and water. Contact with metals may produce toxic sulphur dioxide fumes and may release flammable hydrogen gas.
 Lead compounds: Avoid contact with strong acid bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen and reducing agents.
 Hazardous decomposition products: Sulphuric acid: Sulphur trioxide, carbon monoxide, Sulphuric acid mist, sulphur dioxide, and hydrogen.
 Lead: High temperatures likely to produce toxic metal fume, vapour or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

<u>Chemical</u>	<u>Chemical Decomposition</u>	<u>Hazardous</u>	<u>Biological</u>
		<u>Chemical</u>	
H ₂ SO ₄ (Sulphuric Acid)	Sulphur trioxide) SO ₂ (sulphur dioxide)) Hydrogen (H ₂) Sulphur mist	Combustible toxic fumes Flammable Flammable	Toxic Toxic Toxic

Stibine (SbH₃) Toxic odourless gas which might contain **Arsine (AsH₃)** Arsine is highly toxic and also odourless. Both gases are not easily detected.

Hydrogen Highly flammable gas. Fire/explosion hazard.

Sulphur Mist Biologically highly toxic gas.

Metal and vapour dust / fumes May produce other chemical side reactions. Toxic

Sulphur dioxide Combustible toxic fumes - biological hazard.

11. Toxicological Information :

Acute toxicity: Acute effects of overexposure to lead compounds are GI (gastrointestinal) upset, loss of appetite, diarrhoea, constipation with cramping, difficulty in sleeping and fatigue. Exposure an/or contact with battery electrolyte (acid) may lead to acute irritation of the skin, corneal damage of the eyes and irritation of the mucous membranes of the eyes and upper respiratory system, including lungs.

Skin and Eye contact: Battery electrolyte (acid) may cause irritative contact dermatitis. Battery electrolyte (acid) will irritate the eyes upon contact.

Chronic toxicity: Lead and its compounds may cause chronic anaemia, damage to the kidneys and nervous system. Lead may also cause reproductive system damage and can affect developing fetuses in pregnant woman. Battery electrolyte (acid) may lead to scarring of the cornea, chronic bronchitis, as well as erosion of tooth enamel in mouth breathers in repeated exposures.

Carcinogenicity: The International Agency for Research on Cancer (IARC) has classified 'strong inorganic mist containing Sulphuric acid' as a Category 1 carcinogen, a substance that is carcinogenic to humans. The ACGIH has classified "strong inorganic acid mist containing Sulphuric acid" as an A2 carcinogen (suspected human carcinogen). These classifications do not apply to liquid forms of Sulphuric acid or Sulphuric acid solutions contained within a battery. Inorganic acid mist (Sulphuric acid mist) is not generated under normal use of this product. Misuses of the product, such as overcharging, may however result in the generation of Sulphuric acid mist.
 The IARC study classified lead as an A3 carcinogen (animal carcinogen). While the agent is carcinogenic in experimental animals at relatively high doses, the agent is unlikely to cause cancer in humans except under common high levels of exposure. For further information, see the ACGIH's pamphlet, 1996 Threshold Limit Values and Biological Exposure Indices.

Mutagenicity: Not known.

Reproductive hazards: Not known.

12. Ecological Information

Sulphuric Acid: Toxic to fish and algae.
Concentrations of 100% Sulphuric acid greater than 1.2 mg/L may be lethal to fish. Lower pH below about 4 would induce fatalities in aquatic life.

Lead Compounds: No specific data.

13. Disposal Information

Undamaged & damaged batteries: Store in impervious inert container and return to supplier for recycling.

14. Transport Information

NFPA Hazard Rating for Sulphuric Acid:

Flammability (red) = 0
Health (blue) = 3
Reactivity (yellow) = 2
Sulphuric acid is water-reactive if concentrated.

U.S. DOT

The transportation of wet and moist charged (moist active) batteries within the continental United States are regulated by the U.S. DOT through the code of Federal Regulations, Title 49 (CFR 49). These regulations classify these types of batteries as hazardous material. Refer to CFR 49, 173.159 for more details pertaining to the transportation of wet and moist batteries. The shipping information is as follows:

Proper Shipping Name: Batteries wet, filled with acid.
Hazardous Class: 8
UN Identification: UN 2794
Packing Group: III
Label / Placard required: Corrosive

IMDG

The international transportation of wet and moist charged (moist active) batteries are regulated by the International Maritime Dangerous Goods code (IMDG). These regulations also classify these types of batteries as a hazardous material. The batteries must be packed according to IATA Packing Instruction 800. The shipping information is as follows:

Proper Shipping Name: Batteries wet, filled with acid.
Hazardous Class: 8
UN Identification: UN 2794
Packing Group: III
Label / Placard required: Corrosive

Contact your FNB representative for additional information regarding the classification of batteries.
Spend lead-acid batteries are not as regulated as hazardous waste by the EPA when recycled; however, state and international regulations may vary.

15. Regulatory Information

EEC hazard classification:
Risk phases
Safety phases
National legislation

16. Other Information

LABEL FIRST AID :

In all cases call a physician immediately.
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash clothes before re-use.
Excess acid on skin can be neutralised with a 2% bicarbonate of soda solution.
If swallowed **DO NOT INDUCE VOMITING.**
Give large quantities of water.
Never give anything by mouth to an unconscious person. If inhaled remove to fresh air.
If not breathing give artificial respiration.
If breathing is difficult – give oxygen.



**MATERIAL SAFETY DATA SHEET –
MSDS 06 AUTOMOTIVE**

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First National Battery provides the information in this MSDS in good faith. However, First National Battery makes no representations as to its comprehensiveness or accuracy. This MSDS is intended, as a guide, for the appropriate precautionary handling of the material by a properly trained person using it.

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