


**HAWKER
POWERSOURCE**
MATERIAL SAFETY DATA SHEET
MSDS - 05
 Rev 5
 06/01/00
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Trade Name : INDUSTRIAL LEAD ACID BATTERIES
1 Chemical Product and Company Identification
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Telephone : (423) 238 - 5700; Emergency : (423) 413-5447; Fax: (423) 238 - 6060
Product Synonyms : Batteries, wet, filled with acid, electric storage
Person Responsible for Preparation : Sam Bennikuty, CHMM, ASP
Chemical Emergency Telephone Number: 1- 800-424-9300 (CHEMTREC)
Product Uses : Article, Lead Acid Battery
Date Prepared : June 2000; Revision 5
2 Composition / Information on Ingredients

Ingredient Name	CAS #	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent w/w
Sulfuric Acid (as H ₂ SO ₄ in Battery Electrolyte)	7664-93-9	1 mg/m ³	1 mg/m ³	N/A	7 - 10
Lead (for battery plates)	7439-92-1	0.05 mg/m ³	0.05 mg/m ³	N/A	60 - 65
Lead dioxide (included with lead)	1308-60-0				
Lead sulfate (included with lead)	7446-14-2				
Antimony (for battery grids)	7440-38-0	0.5 mg/m ³	0.5 mg/m ³	N/A	0 - 5
Arsenic (for battery grids)	7440-38-2	0.01 mg/m ³	0.01 mg/m ³	Arsenic is classified as a carcinogen by OSHA 29 CFR 1910.1018	0 - 0.20
Tin (for battery grids)	7440-31-5	2 mg/m ³	2 mg/m ³	N/A	0 - 0.25
Other non-hazardous components (eg: Tray 10%; water in electrolyte 12 - 13 % etc.)	N/A	N/A	N/A	N/A	22 - 25

Comments:
(1) Battery Electrolyte:

 Battery fluid is a highly corrosive mixture of 25% to 40% sulfuric acid (H₂SO₄) and 75% to 60% water (H₂O).

Specific gravity ranges from 1.150 ± 0.005 to 1.330 ± 0.005 at 77°F (25 °C)

(2) Sulfuric Acid:

Boiling Point : 203°F / 333°C Vapor Pressure : 10 @ 18°F Vapor Density: >1

Specific Gravity: 1.15 - 1.33 Solubility in water : 100% Appearance : Clear liquid, sharp, pungent odor

(3) Battery Separators:

Battery separators contain the following non - hazardous ingredients.

Carboxylated Styrene Butadiene : NO CAS#, No TLV

Diatomaceous Silica : No CAS#, No TLV

(4) Cell Jar:

Plastic jars are non-hazardous polypropylene, styrene acrole-nitrile and acrylonitrile butadiene styrene : No CAS #, No TLV

3 Hazards Identification

SULFURIC ACID

INHALATION:

Breathing vapors or mist may cause respiratory irritation, cough, increased respiratory rate and impairment of ventilatory capacity at levels of 5 mg/m³. Inflammation of bronchial membrane may occur at 12 - 35 mg/m³.

Spillage of acid from batteries in confined areas may lead to over exposure from Inhalation of sulfuric acid mist.

INGESTION:

Swallowing sulfuric acid of any concentration cause burns of mouth, throat, and intestinal track.

SKIN:

Severe irritation, burning ulceration. Sulfuric acid may cause irritative contact dermatitis. It may aggravate skin diseases such as eczema and contact dermatitis.

EYES:

Eye irritation frequently occurs at concentrations of 1.1 to 2.4 mg/m³.

Higher concentration may cause severe burns, cornea damage and blindness, since contact with sulfuric acid results in rapid body tissue destruction.

General Effect of Exposure

Exposure and/or contact with sulfuric 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.

Chronic Exposure:

Chronic exposures are known to cause erosion of the teeth, inflammation of the nose, throat and bronchial tubes.

LEAD

In routine use, no possibility of over exposure to lead, unless battery is broken, destroyed or burnt in fire.

Burning the battery can also create fumes from burning jar, which may be toxic.

ACUTE:

Acute effects of overexposure to lead are gastrointestinal upset which may be loss of appetite, diarrhea and/or constipation with cramping, difficulty in sleeping, and fatigue.

CHRONIC:

Lead and its compounds may cause chronic anemia, damage to the kidneys and nervous system. Lead may also cause reproductive system damage and can affect developing fetuses in pregnant women.

California Proposition 65 Warning: Battery posts, terminals and intercell connectors contain lead and compounds of lead, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

Routes of Entry:

For Sulfuric Acid : Inhalation, ingestion, skin and eyes

For Lead and compounds : Inhalation, ingestion, eye and skin contact ; Skin Absorption : NO

CANCER RISK – Chemical(s) listed as Carcinogen or potential Carcinogen.

Prop 65 – YES;

National Toxicology Program – YES;

I.A.R.C. Monographs – YES;

OSHA – YES;

EPA CAG – YES;

Known Hazards under OSHA Hazard Communication Standard 29 CFR 1910.1200

Skin and eye hazard, toxic agent, Lung and Kidney toxin, Corrosive material and Irritant.

4 First Aid Measures

General:

With injury, first aid must be started immediately, since delay may result in serious injury.

Call a physician as soon as possible. All victims of sulfuric acid exposures should be examined by a physician.

For eyes and skin exposure, move patient to emergency wash shower or eye wash station.

Severe Burns & Shock:

In case of severe burns, shock symptoms (rapid pulse, sweating, collapse) might appear at any time. When they do, place the patient on his back and keep him warm until a physician arrives. Do not give anything by mouth to an unconscious patient.

CONTACT WITH SULFURIC ACID

EYES:

Wash the eyes with copious amount of running water for 15 minutes. Hold the eye lids apart to make sure the water washes all tissues of the surface of eyes and eye lids. Do not use hot water. A physician, preferably an eye specialist, should be called immediately. If one does not arrive within 15 minutes, eye irrigation should be resumed for a second 15 minute period. After the second irrigation, two or three drop of 0.5% pontocaine solution or equally effective aqueous topical anesthetic may be placed in the eyes by a qualified first aid man. Do not use any other solution or ointment. Move the patient to a hospital.

Note: Contact lenses should not be worn when working with any corrosive material. If you suspect the victim is wearing contact lens, either have the victim remove them or get professional assistance, and then flush.**SKIN:**

Flush affected areas of the body with large quantities of water until all traces of sulfuric acid are removed. When the affected areas have been washed thoroughly, neutralize the affected surface of skin with a mild alkaline solution (eg baking soda). Remove all contaminated clothing.

SULFURIC ACID & LEAD/LEAD COMPOUNDS

Inhalation:

Remove to fresh air immediately. If breathing has stopped, begin artificial respiration. Call physician. Keep victim warm and at rest.

Ingestion:

Call a physician immediately. If the patient has ingested sulfuric acid and is conscious, have him wash out his mouth with plenty of water. Do not try to get the victim to vomit. Gargle to wash throat. Then have him drink milk mixed with egg whites. If milk and/or egg whites are not available, have the victim drink as much water as possible.

For ingestion of lead/lead compounds, consult a physician.

5 Fire Fighting Measures

Flash Point : Not applicable, not combustible

If flame is applied, battery jar may melt down.

Auto Ignition : Not applicable

Flammable Limits :

LEL: Not applicable

UEL: Not applicable

Extinguishing Media : Halon, Dry Chemical, Foam or CO₂.

FIRE FIGHTING PROCEDURE: Use positive pressure, self-contained breathing apparatus (SCBA) if batteries are involved in fire.

FIRE AND EXPLOSION HAZARDS:

The normal operation of a battery (Charging) can produce explosive hydrogen gas. Hydrogen and oxygen gases are produced in the cells. Hydrogen is flammable and oxygen supports combustion. These gases enter the air through the vent caps. An ignition source like an electrical spark or lighted cigarettes may ignite/explode the hydrogen gas.

To avoid the chances of a fire or explosion, keep open flames, sparks and other sources of ignition away from the battery while charging.

Always follow manufacturer's instructions.

Do not charge at a higher current or for longer time than is recommended.

Check for proper electrolyte level before charging. Charging area should be adequately ventilated.

NOTE: For hydrogen gas, LEL = 4.0 % and UEL = 74.2 %

6 Accidental Release Measures

Procedure for Spill/Leak:

If possible stop flow of acid. Remove combustible materials and all sources of ignition. Contain and neutralize spill by diluting with soda ash (Sodium Carbonate), baking soda (Sodium bicarbonate), or quicklime (Calcium Oxide). Cover the spill with any of these chemicals and mix well. Make sure the mixture is neutral, collect it in a drum or suitable container. Do not release acid.

On the other hand, one can use vermiculite, dry sand, soil or similar material to contain spill.

Never use rags, saw dust or other combustible materials. Do not permit excess to run into sewer system. Unless spill area is well ventilated, do not permit anyone in the area without proper respiratory protection. For large spill wear acid resistant clothing and personal protective equipments such as boots, full face shield, chemical splash goggles, rubber apron, and gloves.

7 Handling and Storage

Keep away from fire, sparks, and heat and at safe distance from incompatible materials.

Do not store for more than 24 hours at temperature below 10°F (if the battery is not fully charged), or above 140°F.

Freezing of electrolyte can crack the jar and give rise to subsequent acid leak.

Avoid contact with internal components of the battery.

Use a battery carrier to lift battery.

Take care not to short intentionally or accidentally the terminals; this may result in explosion.

Emergency shower and eye wash station should be available near battery handling and charging areas.

In case you handle sulfuric acid electrolyte, always remember to pour acid slowly and carefully into water (for diluting higher specific gravity acid).

8 Exposure Controls / Personal Protection

General :

No possible overexposure to lead unless battery is destroyed.

Personal Protective Equipments (PPE):

Eye Protection : Face Shield, Chemical splash goggles

Hand Protection : Acid resistant rubber gloves

Other Protection : Acid resistant clothing and Safety Shoes, Rubber Apron

Additionally, in Emergency Response during a fire, spill, leak (in which batteries are also included), use Self Contained Breathing Apparatus (SCBA).

9 Physical and Chemical Properties

Product Uses: Article, Lead/Acid Battery.

Keeping in line with the battery industry position, HAWKER POWERSOURCE consider batteries as "Articles" as defined by the OSHA

Hazard Communication Standard, 29 CFR 1910.1200; may, therefore be considered exempt from the provisions of the standard.

Boiling Point : Not applicable

Specific Gravity : Not applicable

Vapor Pressure : Not applicable

Melting Point : Not applicable

Vapor Density : Not applicable

Evaporation Rate: Not applicable

Water Solubility : Not applicable

Percent volatile : Not applicable

Remark:

See comments on SECTION 2, for Sulfuric Acid as Battery Electrolyte.

10 Stability and Reactivity

Stability : Material is 100% stable.

Hazardous Polymerization : Hazardous Polymerization will not occur.

Conditions to Avoid :

- (1) Avoid combustible and strong reducing agents. Reacts with strong reducing agents, sulfur trioxide gas, and most metals to yield explosive/flammable hydrogen gas with toxic sulfur dioxide fumes. This reaction is intensified when the acid is diluted as in electrolyte.
- (2) Avoid overcharging batteries. Overcharging results in production abundant nascent (freshly formed) hydrogen.
Nascent hydrogen can react with traces of inorganic arsenic to generate arsine gas (Arsenic Hydride AsH_3).
In a similar reaction with antimony it can form Stibine gas (SbH_3). Both these gases are toxic.
(Reference: NIOSH CURRENT INTELLIGENCE BULLETIN #32, August 3, 1979).

- (3) Sulfuric Acid will attack some forms of plastic, rubber and coatings which are not acid resistant.

Chemical Incompatibilities:

- (1) Lead/ Lead compounds are incompatible with potassium, carbides, sulfides, peroxides, phosphorus and sulfur.
- (2) Sulfuric acid is an electrolyte, a powerful oxidizer, and it reacts violently with peroxides, cyanides, nitrates, chlorates, carbides, fulminates, picrates,
and other organic materials.

Hazardous Decomposition Products:

When heated or burned in fire can emit highly toxic fumes. Use self contained breathing apparatus (SCBA) in such circumstances.

11 Disposal Considerations

Sulfuric Acid:

Any sulfuric acid waste/spill should be neutralized with lime, soda ash, sodium bicarbonate or sodium carbonate. Strong bases like aqua ammonia will be difficult to manage and will pose problems. Test samples to verify complete neutralization. Collect residue in a drum or suitable container. Dispose off as hazardous waste in accordance with Federal, state and local regulations. Do not flush lead contaminated acid to sewer. Battery storage areas should be so designed to capture any spill of acid.

Spent Batteries:

It is strongly recommended to sent spent batteries for recycling to a lead smelter.

Each and every component of the battery is recyclable.

Ask your dealer or contact our Customer Service Department to know more about our

ENVIROLINK[®] recycling program.

12 Transportation Information

Department of Transportation (DOT) Description (49 CFR 172.101) :

Hazardous Material Description and proper shipping name : Batteries, wet, filled with acid, *electric storage*.

Hazard Class or Division : 8

Identification Number : UN2794

Packing group : III

Label required : CORROSIVE

13 NFPA Hazard Codes

HEALTH: 3

FIRE : 0

REACTIVITY : 2

SPECIFIC HAZARDS : COR

Key For NFPA Codes:

HEALTH HAZARD	FIRE HAZARD	REACTIVITY	SPECIFIC HAZARD
0 Normal Material	0 - Will not burn	0 - Stable	ox - Oxidizer
1 Slightly Hazardous	1 - Flash Point above 200 °F	1 - Unstable if heated	ACID - Acid
2 Hazardous	2 - Flash Point above 100 °F, not exceeding 200 °F	2 - Violent Chemical Change	ALK - Alkali
3 Extreme Danger	3 - Flash Point below 100 °F	3. Shock and heat may detonate	COR - Corrosive
4 Deadly	4 - Flash Point below 73 °F	4 - May detonate	W - Use NO WATER

Other Information

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