



MATERIAL SAFETY DATA SHEET

MSDS No. L 8
Date Issued Nov. 15, 1985
Date Revised Jan 19, 2005

Chemical/Trade Name (identity used on label) Lead Acid Battery	Chemical Family/Classification Electric Storage Battery	HMIS Rating for Sulfuric Acid 3 0 2 X X= Acid
Synonyms/Common Name SLI Battery	DOT, IATA and IMO Description Battery, Wet, Filled with Acid, UN 2794, Class 8	
Company Name Johnson Controls Battery Group Inc.	Address P.O. Box 591 Milwaukee, WI 53201	
Division or Department Automotive Systems Group		
CONTACT		TELEPHONE NUMBER
Questions Concerning MSDS Industrial Hygiene, Safety & Security - Automotive Systems, Battery	Day: SLI: (800) 333-2222 ext. 3138	
Transportation Emergencies CHEMTREC	24 Hours: (800) 424-9300	

Material	% by Wt.	CAS Number	Eight Hour Exposure Limits		
			OSHA PEL	ACGIH TLV	Other
Specific Chemical Identity Lead	34	7439-92-1	50 µg/m ³	150 µg/m ³	NIOSH REL 100 µg/m ³
Common Name Grid					
Specific Chemical Identity Lead Dioxide	31	1309-60-0	50 µg/m ³	150 µg/m ³	NIOSH REL 100 µg/m ³
Common Name Lead Oxide					
Specific Chemical Identity Lead Sulfate	<1	7446-14-2	50 µg/m ³	150 µg/m ³	NIOSH REL 100 µg/m ³
Common Name Anglesite					
Specific Chemical Identity Sulfuric Acid (35%)	34	7664-93-9	1mg/m ³	1 mg/m ³ STEL	NIOSH REL 1 mg/m ³
Common Name Battery Electrolyte (Acid)				0.2 mg/m ³ (respirable thoracic fraction)	

NOTE: The contents of this product are toxic chemicals that are subject to the reporting requirements of section 302 and 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40CFR 355 and 372).

III. Physical Data	
Material is (at normal temperatures) <input checked="" type="checkbox"/> Solid <input checked="" type="checkbox"/> Liquid	Appearance and Odor Battery Electrolyte (acid) is a clear to cloudy liquid with slight acidic odor. Acid saturated lead oxide is a dark reddish-brown to gray solid with slight acidic odor.
Boiling Point (at 760 mm Hg) Lead 1755°C Batt. Electrolyte (Acid) 110-112°C	Melting Point Lead 327.4°C
Specific Gravity (H ₂ O =1) Battery Electrolyte (Acid) 1.210 - 1.300	Vapor Pressure (mm Hg at 20°C) (PSIG) Battery Electrolyte (Acid) 11.7
Vapor Density (Air =1) Battery Electrolyte (Acid) 3.4	Solubility is H ₂ O Lead and Lead Dioxide are not soluble. Battery Electrolyte (acid) is 100% soluble in water.
% Volatile By Weight Not Determined	Evaporation rate (Butyl Acetate = 1) Not Determined

IV. Health Hazard Information

NOTE: Under normal conditions of battery use, internal components will not present a health hazard. The following information is provided for battery electrolyte (acid) and lead for exposure that may occur during battery production or container breakage or under extreme heat conditions such as fire
ROUTES AND METHODS OF ENTRY
Inhalation Acid mist generated during battery formation may cause respiratory irritation. Spillage of acid from batteries in confined areas may also lead to exposure to sulfuric acid mist.
Skin Contact Battery electrolyte (acid) can cause severe irritation, burns and ulceration.
Skin Absorption Skin absorption is not a significant route of entry.
Eye Contact Battery electrolyte (acid) can cause severe irritation, burns, and cornea damage upon contact.
Ingestion Hands contaminated by contact with internal components of a battery can cause ingestion of lead/lead compounds. Hands should be washed prior to eating, drinking, or smoking.
SIGNS AND SYMPTOMS OF OVEREXPOSURE
Acute Effects Acute effects of overexposure to lead compounds are GI (gastrointestinal) upset, loss of appetite, diarrhea, constipation with cramping, difficulty in sleeping, and fatigue. Exposure and/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.
Chronic Effects 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. 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.
POTENTIAL TO CAUSE CANCER
The National Toxicological Program (NTP) and The International Agency for Research on Cancer (IARC) have classified "strong inorganic acid mist containing sulfuric acid" as a Category 1 carcinogen, a substance that is carcinogenic to humans. The ACGIH has classified "strong inorganic acid mist containing sulfuric acid" as an A2 carcinogen (suspected human carcinogen). These classifications do not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist. The NTP and the IARC have 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 uncommonly high levels of exposure. For further information, see the ACGIH's pamphlet, <i>1996 Threshold Limit Values and Biological Exposure Indices</i> .
EMERGENCY AND FIRST AID PROCEDURES
Inhalation Remove from exposure and consult a physician if any of the acute effects listed above develop.
Skin Wash thoroughly with soap and water. If acid is splashed on clothing, remove and discard. If acid is splashed in shoes, remove them immediately and discard. Acid cannot be removed from leather.
Eyes Immediately rinse with cool running water for at least 15 minutes. Seek medical attention immediately after rinsing.
Ingestion Lead/Lead compounds: Consult a physician. Battery Electrolyte (Acid): Do not induce vomiting. Refer to a physician immediately.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Inorganic lead and its compounds can aggravate chronic forms of kidney, liver, and neurological diseases. Contact of battery electrolyte (acid) with the skin may aggravate skin diseases such as eczema and contact dermatitis.

V. Fire and Explosion Data

Flash Point (test method) Hydrogen - 259°C	Autoignition Temperature Hydrogen 580°C	Flammable Limits in Air, % by Vol. Hydrogen LEL - 4.1 UEL - 74.2
Extinguishing Media Dry chemical, foam, or CO₂		
Special Fire Fighting Procedures Use positive pressure, self-contained breathing apparatus.		
Unusual Fire and Explosion Hazard Hydrogen and oxygen gases are produced in the cells during normal battery operations, hydrogen is flammable and oxygen supports combustion. These gases enter the air through the vent caps. To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery.		

VI. Reactivity Data

Stability <input type="checkbox"/> Unstable <input checked="" type="checkbox"/> Stable	Conditions to Avoid Sparks and other sources of ignition may ignite hydrogen gas.
Incompatibility (materials to avoid) Lead/lead compounds: Potassium, carbides, sulfides, peroxides, phosphorus, sulfur. Battery electrolyte (acid): Combustible materials, strong reducing agents, most metals, carbides, organic materials, chlorates, nitrates, picrates, and fulminates.	
Hazardous Decomposition Products Lead/Lead compounds: Oxides of lead and sulfur Battery electrolyte (acid): Hydrogen, sulfur dioxide, sulfur trioxide	
Hazardous Polymerization <input type="checkbox"/> May Occur <input checked="" type="checkbox"/> Will Not Occur	Conditions to Avoid High temperature. Battery electrolyte (acid) will react with water to produce heat. Can react with oxidizing or reducing agents.

VII. Control Measures

Engineering Controls Store lead acid batteries with adequate ventilation. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.
Work Practices Make certain vent caps are on tightly. Place a minimum of two layers of corrugated cardboard between layers of batteries. When stacking in trailer, stack no more than three layers high. Use a battery carrier to lift a battery or place hands at opposite corners to avoid spilling acid through the vents. Avoid contact with internal components of the batteries.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection None required under normal handling conditions. During battery formation (high-rate charge condition), acid mist can be generated, which may cause respiratory irritation. If irritation occurs, wear a respirator suitable for protection against acid mist.
Eyes and Face Chemical splash goggles are preferred. Also acceptable are "Visor-Gogs" or a chemical face shield worn over safety glasses with solid side shields.
Hands, Arms, and Body Vinyl-coated, PVC, gauntlet-type gloves with rough finish.
Other Special Clothing and Equipment Safety shoes worn with rubber or neoprene boots or steel-toed rubber or neoprene boots worn over socks. Place pants legs over boots to keep acid out of boots. All footwear must meet requirements of ANSI Z41.1-1991.

VIII. Safe Handling Precautions

Hygiene Practices

Wash hands thoroughly before eating, drinking, or smoking after handling batteries.

Protective Measures to be Taken During Non-Routine Tasks, Including Equipment Maintenance

Wear recommended eye protection. If clothing becomes saturated with acid, remove and wash affected area with water for 15 minutes. Discard saturated clothing.

SPILL OR LEAK PROCEDURES

Protective Measures to be Taken if Material is Released or Spilled

Remove combustible materials and all sources of ignition. Contain spill by diking with soda ash (sodium carbonate) or quicklime (calcium oxide). Cover spill with either chemical. Mix well. Make certain the mixture is neutral, then collect residue and place in a drum or other suitable container. Dispose of as a hazardous waste.

Wear acid-resistant boots, chemical face shield, chemical splash goggles, and acid-resistant gloves.

DO NOT RELEASE UNNEUTRALIZED ACID!

Waste Disposal Method

Battery Electrolyte (Acid): Neutralize as above for a spill, collect residue, and place in a drum or suitable container. Dispose of as a hazardous waste.

DO NOT FLUSH LEAD-CONTAMINATED ACID INTO SEWER.

Batteries: Send to lead smelter for reclamation following applicable Federal, state, and local regulations.



OTHER HANDLING AND STORAGE PRECAUTIONS

An eyewash fountain and safety shower should be located in or near the production or storage area(s) for lead/lead acid batteries. Such storage areas should be equipped with a containment facility which captures acid spills so that they may be neutralized, collected, and disposed of properly.

IX. Other Regulatory Information

TSCA Registry: Ingredients listed in the TSCA Registry are lead, lead oxide, lead sulfate and sulfuric acid.

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

Disclaimer: This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either express or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein. This information relates to the specific material designated and may not be valid for such material used in combination with any 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 own particular use. We do not accept liability for any loss or damage that may occur, whether direct, indirect, incidental or consequential, from use of this information.