

**MATERIAL DATA SAFETY SHEET – Lead-acid Battery (U.S.)**  
For cars, truck, boats, etc.

MSDS No. <b>L 8</b>
Date Issued <b>Nov. 15, 1985</b>
Date Revised <b>June 11, 2002</b>

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

**II. Hazardous Ingredients**

Material	% by Wt.	CAS Number	Eight Hour Exposure Limits		
			OSHA PEL	ACGIH TLV	Other
Specific Chemical Identity <b>Lead</b>	34	7439-92-1	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	NIOSH REL
Common Name <b>Grid</b>					100 µg/m <sup>3</sup>
Specific Chemical Identity <b>Lead Dioxide</b>	31	1309-60-0	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	NIOSH REL
Common Name <b>Lead Oxide</b>					100 µg/m <sup>3</sup>
Specific Chemical Identity <b>Lead Sulfate</b>	<1	7446-14-2	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	NIOSH REL
Common Name <b>Anglesite</b>					100 µg/m <sup>3</sup>
Specific Chemical Identity <b>Sulfuric Acid (35%)</b>	34	7664-93-9	1mg/m <sup>3</sup>	1 mg/m <sup>3</sup> STEL 3 mg/m <sup>3</sup> (15 min. max./8 hr. shift)	NIOSH REL
Common Name <b>Battery Electrolyte (Acid)</b>					1 mg/m <sup>3</sup>

**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 <b>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.</b>
Boiling Point (at 760 mm Hg) <b>Lead 1755°C Batt. Electrolyte (Acid) 110-112°C</b>	Melting Point <b>Lead 327.4°C</b>
Specific Gravity (H <sub>2</sub> O =1) <b>Battery Electrolyte (Acid) 1.210 - 1.300</b>	Vapor Pressure <input checked="" type="checkbox"/> (mm Hg at 20°C) <input type="checkbox"/> (PSIG) <b>Battery Electrolyte (Acid) 11.7</b>
Vapor Density (Air =1) <b>Battery Electrolyte (Acid) 3.4</b>	Solubility is H <sub>2</sub> O <b>Lead and Lead Dioxide are not soluble. Battery Electrolyte (acid) is 100% soluble in water.</b>
% Volatile By Weight <b>Not Determined</b>	Evaporation rate (Butyl Acetate = 1) <b>Not Determined</b>

#### 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) may cause irritative contact dermatitis.

###### Skin Absorption

Skin absorption is not a significant route of entry.

###### Eye Contact

Battery electrolyte (acid) will irritate the eyes 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, *1996 Threshold Limit Values and Biological Exposure Indices*.

##### 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 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 neurologic 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) <b>Hydrogen - 259°C</b>	Autoignition Temperature <b>Hydrogen 580°C</b>	Flammable Limits in Air, % by Vol. <b>Hydrogen LEL - 4.1 UEL - 74.2</b>
Extinguishing Media <b>Dry chemical, foam, or CO<sub>2</sub></b>		
Special Fire Fighting Procedures <b>Use positive pressure, self-contained breathing apparatus.</b>		
Unusual Fire and Explosion Hazard <b>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.</b>		

**VI. Reactivity Data**

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

**VII. Control Measures**

Engineering Controls <b>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.</b>	
Work Practices <b>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.</b>	
<b>PERSONAL PROTECTIVE EQUIPMENT</b>	
Respiratory Protection <b>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.</b>	
Eyes and Face <b>Chemical splash goggles are preferred. Also acceptable are "Visor-Gogs" or a chemical face shield worn over safety glasses with solid side shields.</b>	
Hands, Arms, and Body <b>Vinyl-coated, PVC, gauntlet-type gloves with rough finish.</b>	
Other Special Clothing and Equipment <b>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 - Rev. 1972.</b>	

## 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.**