SECTION 1: CHEMICAL PRODUCT AND COMPANY INFORMATION

MANUFACTURER'S NAME: Delphi Product & Service Solutions
ADDRESS: Division of Delphi Corporation
1441 West Long Lake Road
Troy, MI 48098
INFORMATION: 248.267.8780; Hours. 8 AM – 4 PM Monday - Friday
EMERGENCIES - INFOTRAC: 1-800-535-5053

PREPARED BY: Delphi Corporation
CREATION DATE: January 1, 1985
REVISED DATE: January 6, 2003

TRADE NAME: Storage Battery, Wet
SYNONYMS: Lead/Acid Battery
CHEMICAL FAMILY: Liquid content - sulfuric acid
VOL/WGT: Varies with model

GM REFERENCE: FID: 121229

PRODUCT DESCRIPTION/USE: Electric Storage Battery

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

CAS NUMBER	COMMON NAME	WT%	ACGIH TLV-TWA (mg/m^3)	OSHA PEL-TWA (mg/m^3)	OTHER (mg/m^3)
7439-92-1	Lead	50	0.05 *	0.05	MSHA - 0.15 TWA
7664-93-9	Sulfuric acid	15	1	1	MSHA - 1 TWA ACGIH - 3 STEL **
7732-18-5	Water	25	--	--	--
--	Polypropylene/polyethylene	Balance	--	--	--

* **A3 category for carcinogenicity, Confirmed Animal Carcinogen with Unknown relevance to Humans.**
** **STEL, short-term exposure limit of 3 mg/m^3. A 15-minute exposure TWA that should not be exceeded during the workday even if the 8-hour TWA is within the TLV-TWA.**

SECTION 3: HAZARDS IDENTIFICATION

Emergency Overview: Danger! Explosive gases. Poison. Causes severe burns.
Wet Storage Battery is a manufactured article composed of lead and acid encased in polypropylene/ polyethylene plastic, sealed and vented with a flame arrestor to reduce flashback potential. The case color varies. These batteries contain dilute sulfuric acid, a corrosive substance, and may expel explosive gases. Short-circuiting of battery terminals can cause sparks and fire.

Routes of Entry: Skin: Yes Eye: Yes Inhalation: Yes Ingestion: Yes

Acute Health Effects:

Skin: Sulfuric acid may cause severe chemical burns. Severity depends on acid concentration and duration of contact.

Eyes: Sulfuric acid may cause chemical burns. Severity depends on acid concentration and duration of contact. Scarring of the cornea is possible.

Inhalation: Sulfuric acid mists or vapors may cause severe respiratory difficulty.

Ingestion: Sulfuric acid is corrosive and may cause severe chemical burns. See first aid measures below.

Chronic Health Effects:

Inhalation: Sulfuric acid mists or vapors may affect the lung by repeated and/or prolonged exposure.

Oral Contact: sulfuric acid mists or vapors may produce tooth erosion upon repeated and/or long-term exposure.

Medical Conditions Aggravated by Exposure to Sulfuric Acid:

Pulmonary edema, bronchitis, emphysema, eczema, contact dermatitis, dental erosion and tracheobronchitis.

SECTION 4: FIRST AID MEASURES

Skin: If skin comes in contact with sulfuric acid flush the exposed skin with large amounts of water for 15 minutes. Remove contaminated clothing. Seek medical attention.

Eyes: If eyes come in contact with sulfuric acid force eyes open and rinse with clean, cool, running water for 15 minutes. Do not use eye drops or other medication unless advised to do so by a doctor. Seek medical attention immediately after rinsing.

Inhalation: If sulfuric acid mist or vapors are inhaled immediately remove from exposure. Seek medical attention.

Ingestion: Do not induce vomiting. If conscious, drink large quantities of milk or water. Follow with milk of magnesia, beaten egg, egg whites or vegetable oil. Seek medical attention immediately.

SECTION 5: FIRE FIGHTING MEASURES

Flash Point:	Not applicable	Flammable Limits: (Hydrogen Gas) 4.1% LEL, 74.2% UEL
Autoignition Temperature: Not applicable		Fire Point: Not applicable

Extinguishing Media: Class ABC extinguisher, carbon dioxide, foam, halon, water spray.

Special Fire Fighting Procedures: Cool exterior of battery if exposed to fire to prevent rupture. Acid mists and vapors in a fire are corrosive. Wear protective clothing and use self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards:

- Hydrogen and oxygen gases are produced during normal battery operation and charging. These gases escape through the battery vents and may form an explosive atmosphere around the battery if ventilation is poor. Avoid open flame, sparks and other ignition sources in areas where batteries are used or stored.
- Sulfuric acid is an oxidizer and can ignite combustibles upon contact.

Hazardous Combustion Products: Acid mists and vapors, toxic fumes from burning plastic.

HMIS Codes: Not determined

NFPA Codes: H = 3 F = 0 R = 2 (Sulfuric acid component only)

SECTION 6: ACCIDENTAL RELEASE MEASURES

Spill and Leak Procedures:
Small spill: Neutralize the spill with baking soda, household ammonia and/or water. Rinse clean.

Large spill: Remove combustible materials and all sources of ignition. Contain spill by diking with soda ash (sodium carbonate) or quicklime (calcium oxide). Cover spill with neutralizing agent such as soda ash or quicklime. Mix well. When mixture is neutral collect the residue in a suitable container and dispose of per local, state and federal waste regulations. Wear acid resistant boots, face shield, chemical splash goggles, and acid resistant gloves. Do not release unneutralized acid.

SECTION 7: HANDLING AND STORAGE

Storage Temperature:
Min: -20°F (-28°C) for fully charged batteries. 20°F (-6°C) for completely discharged batteries.
Max: 80°F (26°C) for low shelf discharge but up to 100°F (38°C) is acceptable.

Shelf Life: Not determined.

Special Sensitivity: Avoid direct conductive connection across positive and negative terminals to prevent short circuit.

Storage Precautions: Batteries must be kept in an upright position away from ignition sources. Stack batteries so as to prevent accidental contact between terminal and/or other damage to terminals or containers. Whenever feasible, store on shipping pallet or rack. Do not stack loaded pallets or racks on top of other batteries. Store batteries in cool, well-ventilated location. Keep a supply of neutralizing agent in or near the storage area for emergency use. Avoid storage in areas exposed to heat or solar buildup. When batteries are completely discharged, the electrolyte will freeze when stored below 20°F. Fully charged batteries may be stored at temperatures as low as -20°F.

Handling Precautions: 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 batteries. Do not tilt batteries to an angle greater than 45 degrees. Do not smoke when working near a battery.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection: Chemical splash goggles or a full-face shield with safety glasses.

Skin Protection: Acid resistant clothing with rubber/neoprene boots for major spill clean up.

Respiratory Protection: Use NIOSH approved respiratory protection when concentrations exceed exposure guidelines.

Ventilation: Must be provided when charging in an enclosed area [29 CFR 1910.178(g) and .305(j)(7)].

Personal Protective Equipment: Lab apron, acid resistant steel-toed boots and protective clothing.

Engineering Controls: Local/building/fire codes may require explosion proof fans and equipment. Mechanical ventilation may be required to reduce airborne concentrations of sulfuric acid mist and/or hydrogen gas to acceptable levels.

Workplace/Hygienic Practices: Follow good personal hygiene practices. Keep work area clean.

Protective Gloves: Acid resistant gloves such as rubber, neoprene, vinyl coated, PVC.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: Not applicable	**Melting Point:** >300°F/149°C for case
Vapor Pressure: Not applicable	**Specific Gravity**: 1.280 at 77°F/25°C (electrolyte)
Solubility in Water: miscible (sulfuric acid)	**pH:** < 1.0 (dilute sulfuric acid)
Appearance: A manufactured article cased in plastic with a sealed case, terminals and flame arrestor vent caps. Case color varies. Product is essentially odorless.	

SECTION 10: STABILITY AND REACTIVITY

Stable: Yes

Stability - Conditions to Avoid: Use only approved charging methods. Avoid overcharging. Prevent short-circuiting. Avoid heat and sparks and other ignition sources. Keep away from oxidizing and reducing materials. Do not open, break or melt the casing.

Incompatible Materials: Strong oxidizing or reducing agents.

Hazardous Decomposition Products: Can emit highly toxic fumes when heated. Combustion can produce carbon dioxide and carbon monoxide. Will release an explosive hydrogen/oxygen gas mixture. Oxides of lead, lead and/or lead compounds may be released. Sulfuric acid may release sulfur dioxide and/or sulfur trioxide.

Hazardous Polymerization: Will not occur

Hazardous Polymerization - Conditions to Avoid: Not applicable

SECTION 11 TOXICOLOGICAL INFORMATION

Toxicology Data: Wet storage batteries are sealed articles. Exposure to lead, acid and lead contaminated acid is not anticipated during normal storage, handling and intended use or maintenance of the battery. Battery recycling personnel should carefully follow established employer protocols when processing batteries and battery components.

Eye Effects:
Sulfuric Acid - Severe eye irritant

Skin Effects:
Sulfuric Acid - Extremely irritating, corrosive, and toxic to tissue, resulting in rapid destruction of tissue, causing severe burns. If much skin is involved, exposure is accompanied by shock, collapse and symptoms similar to those seen in severe burns. Repeated contact with dilute solutions can cause dermatitis.

Ingestion Effects:
- Lead - Poison by ingestion in large dosages and with prolonged exposure leading to the same effects as seen in exposure by inhalation. Adults absorb 5-15% of ingested lead and retain less than 5%. Children absorb about 50% and retain about 30%.
- Sulfuric Acid - Moderately toxic by ingestion.

Inhalation Effects:
- Lead - For industry, inhalation is much more important than is ingestion. Systemic effects include loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis and liver changes. Major organ systems affected are the nervous system, blood system and kidneys. Experimental evidence suggests that blood levels of lead below 10 μg/dL can lower the IQ scores of children. Low levels of lead impair neurotransmission and immune system function and may increase systolic blood pressure. Reversible kidney damage can occur from acute exposure. Chronic exposure can lead to irreversible vascular sclerosis, tubular cell atrophy, interstitial fibrosis, and glomerular sclerosis. Very heavy intoxication can sometimes be detected by formation of a dark line on the gum margins.
- Sulfuric Acid - Experimental poison by inhalation. Repeated or prolonged inhalation of sulfuric acid mist can cause inflammation of the upper respiratory tract, leading to chronic bronchitis. Severe exposure may cause chemical pneumonitis. Erosion of tooth enamel due to strong acid fume exposure has been observed in industry. Workers exposed to low concentrations of the vapors gradually lose their sensitivity to its irritating action.

Carcinogenicity:

CAS #	Name	OSHA Listed	NTP Listed	IARC
7439-92-1	Lead	Yes	No	2B, Human Limited Evidence
7664-93-9	Sulfuric acid*	Yes	Yes	1, Human Sufficient Evidence

* Occupational exposures to strong-acid mists containing sulfuric acid have been associated with several respiratory tract cancers. Sulfuric acid has been found to be non-mutagenic, and in two studies of workers employed in lead acid battery manufacture, no association between sulfuric acid mist exposure and respiratory tract cancers was observed.

Mutagenicity:

Lead - Human mutation data reported.

Reproductive Effects:

- Lead - Severe toxicity can cause sterility, abortion, and neonatal mortality and morbidity. Experimental teratogen. Experimental reproductive effects. Pathological lesions have been found on male gonads.
- Sulfuric Acid - Experimental teratogen.

SECTION 12: ECOLOGICAL INFORMATION

There are no data available on the battery itself. Due caution should be exercised to prevent release of the electrolyte material to the aquatic or terrestrial environment. Runoff from fire control may cause a pollution hazard.

Environmental Fate:

Lead is a naturally occurring element that does not break down readily in soil or water but its compounds are changed by air, water, and sunlight. Lead is strongly adsorbed onto soil particles and sediment, resulting in little mobility with a residence time of many years. The tendency of inorganic lead to be tightly bound to soil results in little availability to terrestrial plants, to which adverse effects are normally only observed at very high concentrations. Lead is ubiquitous in most surface and ground water systems, and tends to form highly insoluble salts, and complexes with various anions, which precipitate out of the water column. Bioavailability of lead is lowered by ion exchange with hydrous oxides, clays, or by chelation with humic or fulvic acids, and in general when organic material, sediment, and small clay particles are present. In the dissolved phase, lead is bioaccumulated by plants and animals, in both aquatic and terrestrial environments.

Sulfuric acid in the air will react with other chemicals present (e.g., ammonia, magnesium, calcium) to form salts that neutralize the acid. The acid particles or droplets dissolve in the atmosphere and may result in dilute acid solutions. In the aquatic environment, the availability and toxicity of sulfuric acid is dependent on the buffering capacity and resulting pH of the water.

Environmental Toxicity:

In aquatic systems with low buffering capacity, lead is particularly detrimental to plants, birds, and aquatic organisms. Lead may inhibit nitrification and denitrification in activated sludge.

Small quantities of sulfuric acid will be neutralized by the natural alkalinity in aquatic systems. Larger quantities may lower the pH for extended periods of time, and the resulting increased acidity (e.g., pH 5 or below) may adversely affect invertebrate and fish populations. Sulfuric acid had moderate acute toxicity on

aquatic life (LC50s for invertebrates and fish from 10 to 300 mg/L). It is corrosive to plants, birds, or animals exposed. It has moderate chronic toxicity to aquatic life.

SECTION 13: DISPOSAL CONSIDERATIONS

RCRA Hazard Waste Number: D002, D008

Waste Disposal Method: Wet storage batteries are recyclable and should be turned over to a licensed battery recycler. Do not incinerate.
Sulfuric acid: Neutralize as for a spill; collect residue and dispose of as a hazardous waste in accordance with local, state and federal regulations. Do not flush lead contaminated acid into the sewer.

SECTION 14: TRANSPORT INFORMATION

Canadian TDG Information
TDG Shipping Name: Batteries, Wet Filled with Acid
Hazard Class: 8
ID Number: UN 2794
Packing Group: III
Special Label or Marking Requirements: Corrosive

U.S. DOT Information
Proper Shipping Name: Batteries, Wet Filled with Acid
Hazard Class: 8
ID Number: UN 2794
Packing Group: III
RQ: N.A.
Special Label or Marking Requirements: Corrosive

International Air Transportation Association (IATA Classification)
Proper Shipping Name: Batteries, Wet Filled with Acid
Hazard Class: 8
ID Number: UN 2794
Packing Group: III
Special Label or Marking Requirements: Corrosive

International Maritime Information (IMO Classification)
Proper Shipping Name: Batteries, Wet Filled with Acid
Hazard Class: 8
ID Number: UN 2794
Packing Group: III
Marine Pollutant: No
Special Label or Marking Requirements: Corrosive

SECTION 15: REGULATORY INFORMATION

TSCA Inventory Status: All ingredients are listed on the U.S. TSCA Inventory

EPA Hazard Categories:

Immediate (acute) health hazard: Yes
Delayed (chronic) health hazard: Yes
Fire hazard: No
Sudden release of pressure hazard: No
Reactive hazard: No

SARA 311/312: Extremely Hazardous Substances

CAS #	Name	RQ	TPQ
7664-93-9	Sulfuric acid	1000 lbs	1000 lbs

SARA 313: Specific Toxic Chemical Listings

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

CERCLA Section 103: Hazardous Substances List

CAS #	Name	Percent	RQ
7439-92-1	Lead	50%	10 lbs
7664-93-9	Sulfuric acid	15%	1000 lbs

Great Lakes Persistent Toxics - Metals:

CAS #	Name	Percent
7439-92-1	Lead	50%

Volatile Organic Compound (VOC): Not applicable

WHMIS: Controlled as a manufactured article.

Canadian Environmental Protection Act (CEPA):

CAS #	Name	Schedule
7439-92-1	Lead	I and III part II

California Proposition 65 - Reproductive Toxicants

CAS #	Name	Percent
7439-92-1	Lead and lead compounds	50%

California Proposition 65 – Developmental, Female, Male; Cancer

CAS #	Name	Percent
7439-92-1	Lead and lead compounds	50%

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. Wash hands after handling.

Connecticut Hazardous Material Survey

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

Illinois Chemical Safety Act / Right-to-Know

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

Louisiana Right-to-Know

CAS #	Name	Percent
7664-93-9	Sulfuric acid	15%

New Jersey Right-to-Know Hazardous Substances

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

Massachusetts Substance List

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

Minnesota Right-to-Know Hazardous Substance List

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

Pennsylvania Hazardous Substances

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

Ontario Designated Substance

CAS #	Name	Percent
7439-92-1	Lead	50%

Rhode Island Right-to-Know Hazardous Substances

CAS #	Name	Percent
7439-92-1	Lead	50%
7664-93-9	Sulfuric acid	15%

Tennessee Hazardous Right-to-Know

CAS #	Name	Percent
7664-93-9	Sulfuric acid	15%

EINECS: Lead (CAS# 7439-92-1) Listed
Sulfuric Acid (CAS# 7439-92-1) Listed

SECTION 16: OTHER INFORMATION

Label Information:

DANGER! Explosive Gases: Always shield eyes and face from battery. Cigarettes, flames, sparks could cause battery to explode. Do not charge or use booster cables or adjust post connections without proper instruction and training.

POISON! Causes severe burns: Contains sulfuric acid. Avoid contact with skin, eyes or clothing. In event of accident flush with water and call a physician immediately. Keep out of reach of children.

The information and recommendations set forth herein are taken from sources believed to be accurate as of the date of preparation; however, Delphi Corporation makes no warranty with respect to the accuracy or suitability of the recommendations, and assumes no liability for any use thereof.

End of MSDS