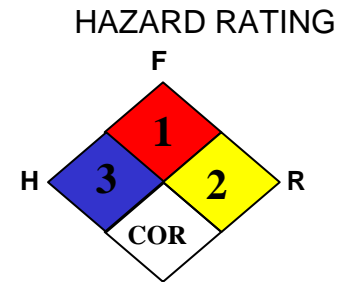




TROJAN BATTERY COMPANY
LEAD / ACID BATTERY



MATERIAL SAFETY DATA SHEET

SECTION 1-- CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER'S NAME: TROJAN BATTERY COMPANY	EMERGENCY TELEPHONE NO.: CHEMTREC (800) 424-9300 International (703) 527-3887
ADDRESS: 12380 CLARK ST., SANTA FE SPRINGS, CA 90670	OTHER INFORMATION CALLS: 562-236-3000 800-423-6569
PERSON RESPONSIBLE FOR PREPARATION: Ismael Pedroza, Jr. – Director of EH&S	Revision Date: May 13, 2010

SECTION 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

C.A.S.	PRINCIPAL HAZARDOUS COMPONENT(S) (chemical & common name(s))	Hazard Category	%	ACGIH TLV	OSHA PEL-TWA
7439-92-1	Lead/Lead Oxide/Lead Sulfate	Acute-Chronic	60 - 97%	0.05 mg/m ³	0.05 mg/m ³
7440-36-0	Antimony	Chronic	1.5 - 4%	0.5 mg/m ³	0.5 mg/m ³
7440-38-2	Arsenic	Acute-Chronic	< 1%	0.01 mg/m ³	0.01mg/m ³
7664-93-9	Sulfuric Acid (Battery Electrolyte)	Reactive-Oxidizer Acute-Chronic	10 - 38%	1.0 mg/m ³	1.0 mg/m ³
7440-70-2	Calcium	Reactive	< 0.15%	Not established	Not established
7440-31-5	Tin	Chronic	< 0.3%	2.0 mg/m ³	Not established

NOTE: PEL's for individual states may differ from OSHA PEL's. Check with local authorities for the applicable state PEL's.
 OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health.

COMMON NAME: (Used on label)
 (Trade Name & Synonyms) Lead/Acid Storage Battery Chemical Family: Toxic and Corrosive Material Mixture
 Chemical Name: Lead/Acid Storage Battery Formula: Lead and Acid (electrolyte)

SECTION 3 -- HAZARD IDENTIFICATION

Signs and Symptoms of Exposure	1. Acute Hazards	Do not open battery. Avoid contact with internal components. Internal components include lead and liquid electrolyte. Electrolyte - Electrolyte is corrosive and contact may cause skin irritation and chemical burns. Electrolyte causes severe irritation and burns of eyes, nose and throat. Ingestion can cause severe burns and vomiting. Lead -Direct skin or eye contact may cause local irritation. Inhalation or ingestion of lead dust or fumes may result in headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia and leg, arm and joint pain.				
2. Subchronic and Chronic Health Effects	Electrolyte - Repeated contact with sulfuric acid battery electrolyte fluid may cause drying of the skin which may result in irritation, dermatitis, and skin burns. Repeated exposure to sulfuric acid mist may cause erosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat and lungs. Lead - Prolonged exposure may cause central nervous system damage, gastrointestinal disturbances, anemia, wrist-drop and kidney dysfunction. Pregnant women should be protected from excessive exposure to prevent lead from crossing the placental barrier and causing infant neurological disorders. California 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, and during charging, strong inorganic acid mists containing sulfuric acid are evolved, a chemical Known to the State of California to cause cancer. Wash hands after handling.					
Medical Conditions Generally Aggravated by Exposure	If battery is broken or material is spilled, then persons with the following medical conditions must take precautions: pulmonary edema, bronchitis, emphysema, dental erosion and tracheobronchitis.					
Routes of Entry	Inhalation - YES Ingestion - YES	Eye Contact - YES Skin Contact - YES				
Chemical(s) Listed as Carcinogen or potential Carcinogen	Proposition 65 - YES	National Toxicology Program - YES	I.A.R.C. Monographs - YES	OSHA - NO	EPA CAG - YES	NIOSH - YES

SECTION 4 -- FIRST AID MEASURES

Emergency and First Aid Procedures	Contact with internal components if battery is opened, broken or spilled.
1. Inhalation	Remove to fresh air and provide medical oxygen/CPR if needed. Obtain medical attention.
2. Eyes	Immediately flush with water for at least 15 minutes, hold eyelids open. Obtain medical attention.
3. Skin	Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention if necessary.
4. Ingestion	Do not induce vomiting. If conscious drink large amounts of water/milk. Obtain medical attention. Never give anything by mouth to an unconscious person.

SECTION 5 - FIREFIGHTING MEASURES

Flash Point	Not Applicable	Flammable Limits in Air % by Volume (When charging)	Hydrogen (H ₂)	Lower 4.1%	Upper 74.2%	Extinguisher Media	Class ABC, CO ₂ , Halon	Auto-Ignition Temperature	Polypropylene 675° F
Special Fire Fighting Procedures	Lead-acid batteries do not burn or burn with difficulty. Do not use water on fires where molten metal is present. Extinguish fire with agent suitable for surrounding combustible materials. Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapors generated by heat or fire are corrosive. Use NIOSH approved self-contained breathing apparatus (SCBA) and full protective equipment operated in positive-pressure mode.								
Unusual Fire and Explosion Hazards	Hydrogen gas and sulfuric acid vapors are generated upon overcharge and polypropylene case failure. Ventilate charging areas as per ACGIH <u>Industrial Ventilation : A Manual of Recommended Practice</u> and <u>National Fire Code</u> , 1980 Vol. 1, P. 12, B-9, 10. Hydrogen gas may be flammable or explosive when mixed with air, oxygen, chlorine. Avoid open flames/sparks/other sources of ignition near battery. To avoid risk of fire or explosion, keep sparks or other sources of ignition away from batteries and do not allow metallic materials to simultaneously contact negative and positive terminals of cells and batteries. SULFURIC ACID REACTS VIOLENTLY WITH WATER/ORGANICS.								

SECTION 6 -- ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Stop release, if possible. Avoid contact with any spilled material. Contain spill, isolate hazard area, and deny entry. Limit site access to emergency responders. Neutralize with sodium bicarbonate, soda ash, lime or other neutralizing agent. Place battery in suitable container for disposal. Dispose of contaminated material in accordance with applicable local, state and federal regulations. Sodium bicarbonate, soda ash, sand, lime or other neutralizing agent should be kept on-site for spill remediation.

Personal Precautions: Acid resistant aprons, boots and protective clothing. ANSI approved safety glasses with side shields/face shield recommended. Ventilate enclosed areas.

Environmental Precautions: Lead and its compounds and sulfuric acid can pose a severe threat to the environment. Contamination of water, soil, and air should be prevented.

SECTION 7 -- HANDLING AND STORAGE

Precautions to be Taken in Handling and Storage	Keep away from flames during and immediately after charging. Combustion or overcharging may create or liberate toxic and hazardous gases and liquids including hydrogen, sulfuric acid mist, sulfur dioxide, sulfur trioxide, stibine, arsine and sulfuric acid. Store batteries in cool, dry, well ventilated area. Do not short circuit battery terminals, or remove vent caps during storage or recharging. Protect battery from physical damage.
Other Precautions	GOOD PERSONAL HYGIENE AND WORK PRACTICES ARE MANDATORY. Refrain from eating, drinking or smoking in work areas. Thoroughly wash hands, face, neck, and arms before eating, drinking or smoking. Launder soiled clothing before reuse. Emptied batteries contain hazardous sulfuric acid residue.

SECTION 8 -- EXPOSURE CONTROLS AND PERSONAL PROTECTION

Respiratory Protection (Specify Type)	Acid/gas NIOSH approved respirator is required when the PEL is exceeded or employee experiences respiratory irritation. When exposure levels are unknown or when firefighting, wear a self-contained breathing apparatus with a full facepiece operated in a positive pressure mode.				
Ventilation	Must be provided when charging in an enclosed area. Change air every 15 min.	Local Exhaust	When PEL is exceeded.	Mechanical (General)	Normal mechanical ventilation recommended for stationary applications.
Protective Gloves	Wear rubber or plastic acid resistant gloves with elbow length gauntlet when filling batteries.	Eye Protection	ANSI approved safety glasses with side shields/face shield recommended. Safety goggles.		
Other Protective Clothing or Equipment	Ventilation as described in the <u>Industrial Ventilation Manual</u> produced by the American Conference of Governmental Industrial Hygienists, shall be provided in areas where exposures are above the PEL or TLV specified by OSHA or other local, state and federal regulations. Acid-resistant rubber or plastic apron, boots and protective clothing. Safety shower and eyewash.				

SECTION 9 -- PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point	Electrolyte Approx. 235° F	Vapor Pressure	Electrolyte 1 mm Hg @ 145.8° F	Specific Gravity	Electrolyte (H ₂ O = 1) 1.250 - 1.320 pH < 2	Melting Point	Polypropylene < 320° F
Percent Volatile by Volume (%)	Not Applicable	Vapor Density	Hydrogen (Air = 1) : 0.069 Electrolyte (Air = 1) : 3.4	At STP	Evaporation Rate	Not Applicable	
Solubility in Water	Electrolyte: 100% Soluble			Reactivity in Water	Electrolyte - water reactive (1)		
Appearance and Odor	Battery: Polypropylene or hard rubber case, solid. Lead: Gray, metallic, solid Electrolyte: Liquid, colorless, oily fluid; nuisance odor when hot or charging battery.						

SECTION 10 -- STABILITY AND REACTIVITY

Stability	Unstable <input type="checkbox"/> Stable <input checked="" type="checkbox"/>	Conditions to Avoid	High temperatures - cases decompose at <320°F. Avoid overcharging and smoking, or sparks near battery surface and rapid overcharge.
Incompatibility (Materials to Avoid)	Sparks, Open flames, Keep battery case away from strong oxidizers.		
Hazardous Decomposition Products	An explosive hydrogen/oxygen mixture within the battery may occur during charging. Combustion can produce carbon dioxide (CO ₂) and carbon monoxide (CO). Molten metals produce fumes and/or vapor that may be toxic or respiratory irritants.		
Hazardous Polymerization	May Occur <input type="checkbox"/> Will Not Occur <input checked="" type="checkbox"/>	Do not overcharge.	

SECTION 11 -- TOXICOLOGICAL INFORMATION

GENERAL: The primary routes of exposure to lead are ingestion or inhalation of dust and fumes.

ACUTE:

INGESTION/INHALATION: Exposure to lead and its compounds may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in the legs, arms and joints. Kidney damage, as well as anemia, can occur from acute exposure.

CHRONIC:

INHALATION/INGESTION: Prolonged exposure to lead and its compounds may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and wrist drop. Symptoms of central nervous system damage include fatigue, headaches, tremors, hypertension, hallucinations, convulsions and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity, but there is, at present, no substantiation of the implication. Pregnant women should be protected from excessive exposure. Lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure in pregnant women.

SECTION 12 -- ECOLOGICAL INFORMATION

In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates and precipitates out of the water column. Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil. Lead (when in the dissolved phase) is bio-accumulated by plants and animals, both aquatic and terrestrial.

SECTION 13 -- DISPOSAL CONSIDERATIONS

Waste Disposal Methods	Lead-acid batteries are completely recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For information on returning batteries to Trojan Battery Company for recycling call 800-423-6569. For neutralized spills, place residue in acid-resistant containers with sorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.
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SECTION 14 -- TRANSPORT INFORMATION

U.S. DOT PROPER SHIPPING NAME: Batteries, wet, filled with acid
U.S. DOT HAZARD CLASS: 8
U.S. DOT ID NUMBER: UN 2794
U.S. DOT PACKING GROUP: III
U.S. DOT LABEL: Corrosive

IMO PROPER SHIPPING NAME: Batteries, wet, filled with acid
IMO REGULATION PAGE NUMBER: 8120
IMO U.N. CLASS: 8
IMO U.N. NUMBER: UN 2794
IMO PACKING GROUP: III
IMO LABEL: Corrosive
IMO VESSEL STOWAGE: A

IATA PROPER SHIPPING NAME: Batteries, wet, filled with acid
IATA U.N. CLASS: 8
IATA U.N. NUMBER: UN 2794
IATA PACKING GROUP: III
IATA LABEL: Corrosive

SECTION 15 -- REGULATORY INFORMATION

U.S. Hazardous Under Hazard Communication Standard:

Lead - YES
Sulfuric Acid - YES
Antimony - YES
Arsenic - YES

Ingredients Listed on TSCA Inventory:

YES

CERCLA Section 304 Hazardous Substances:

Lead – YES	RQ: NA*
Sulfuric Acid – YES	RQ: 1000 pounds
Antimony - YES	RQ: 5000 pounds
Arsenic – YES	RQ: 1 pound

*Reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers.

EPCRA Section 302 Extremely Hazardous Substance:

Sulfuric acid - YES

EPCRA Section 313 Toxic Release Inventory:

Lead - CAS NO: 7439-92-1
Sulfuric Acid - CAS NO: 7664-93-9
Antimony - CAS NO: 7440-36-0
Arsenic - CAS NO: 7440-38-2

SECTION 16 -- OTHER INFORMATION

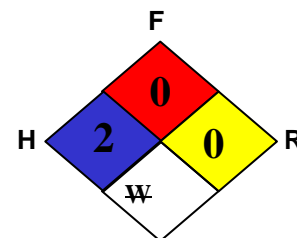
THE INFORMATION ABOVE IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, TROJAN BATTERY COMPANY MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES. ALTHOUGH REASONABLE PRECAUTIONS HAVE BEEN TAKEN IN THE PREPARATION OF THE DATA CONTAINED HEREIN, IT IS OFFERED SOLELY FOR YOUR INFORMATION, CONSIDERATION AND INVESTIGATION. THIS MATERIAL SAFETY DATA SHEET PROVIDES GUIDELINES FOR THE SAFE HANDLING AND USE OF THIS PRODUCT; IT DOES NOT AND CANNOT ADVISE ON ALL POSSIBLE SITUATIONS, THEREFORE, YOUR SPECIFIC USE OF THIS PRODUCT SHOULD BE EVALUATED TO DETERMINE IF ADDITIONAL PRECAUTIONS ARE REQUIRED.

Form MSDS Rev. May 13, 2010



TROJAN BATTERY COMPANY
LEAD PASTED PLATES
MATERIAL SAFETY DATA SHEET

Hazard Rating



SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER'S NAME: TROJAN BATTERY COMPANY	EMERGENCY TELEPHONE NO.: CHEMTREC (800) 424-9300 International (703) 527-3887
ADDRESS: 12380 CLARK ST., SANTA FE SPRINGS, CA 90670	OTHER INFORMATION CALLS: 562-236-3000 800-423-6569
PERSON RESPONSIBLE FOR PREPARATION: Ismael Pedroza, Jr. – Director of EH&S	Revised Date: May 13, 2010

SECTION 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

C.A.S.	PRINCIPAL HAZARDOUS COMPONENT(S) (chemical & common name(s))	Hazard Category	% Weight	ACGIH TLV - mg/m ³	OSHA PEL/TWA - mg/m ³
7439-92-1	Grid Containing Lead	Acute-Chronic	40-50	0.05 mg/m ³	0.05 mg/m ³
7440-36-0	Antimony	Chronic	0-7.0	0.5	0.5
7440-31-5	Tin	Chronic	0-3.0	2	2
7440-70-2	Calcium (lead calcium alloy)	Reactive	0-0.5	Not Established	Not Established
7440-38-2	Arsenic (inorganic)	Acute-Chronic	0-0.2	0.01	0.05
None assigned	Paste Containing Lead Oxide (Litharge)	Acute-Chronic	50-60	0.05 (lead)	0.05 (lead)
7446-14-2	Lead Sulfate	Acute-Chronic	5-20	Not Established	0.05 mg/m ³ (as lead)
1333-86-4	Carbon Black	Chronic	<0.2	3.5	3.5

Note: PEL's for individual states may differ from OSHA's PEL's. Check with local authorities for the applicable state PEL's

COMMON NAME: (Used on label) (Trade Name & Synonyms) Pasted Plates	Chemical Family: Toxic Mixture
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Chemical Name: Lead, Pasted Plates	Formula: Mixture
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SECTION 3 – HAZARD IDENTIFICATION

Signs and Symptoms of Exposure	1. Acute Hazards	Direct skin or eye contact may cause local irritation. Inhalation or ingestion of lead dust or fumes may result in headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia and leg, arm and joint pain.				
	2. Sub-Chronic and Chronic Health Effects	Prolonged exposure may cause central nervous system damage, gastrointestinal disturbances, anemia, wrist-drop and kidney dysfunction. Pregnant women should be protected from excessive exposure to prevent lead from crossing the placental barrier and causing infant neurological disorders. California Proposition 65 Warning: This product contains lead and lead compounds, which are chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.				
Medical Conditions Generally Aggravated by Exposure	Pulmonary edema, bronchitis, emphysema, dental erosion and tracheobronchitis.					
Routes of Entry	Inhalation- YES Ingestion – YES	Eye Contact- YES		Skin Absorption- NO		
Chemical(s) Listed as Carcinogen or potential Carcinogen	Proposition 65 - YES	National Toxicology Program - YES	I.A.R.C. Monographs - YES	O.S.H.A. - NO	EPA CAG - YES	N.I.O.S.H. - YES

SECTION 4 - FIRST AID MEASURES

Emergency and First Aid Procedures	Contact with Lead/Pasted Plates
1. Inhalation	Move to ventilated area. Obtain medical attention if experiencing effects of overexposure.
2. Eyes	Flush the eyes with copious quantities of cool running water for 15 minutes. Obtain immediate medical attention.
3. Skin	Wash area thoroughly with soap and water.
4. Ingestion	Do not induce vomiting. If conscious drink large amounts of water/milk. Obtain medical attention. Never give anything by mouth to an unconscious person.
5. Lead Exposure	May cause lassitude, constipation, anemia, nausea, vomiting, paralysis, and central nervous system depression. Greatest exposure comes from dust in the air and on hands when packing/unpacking, and during lead acid battery manufacturing.

SECTION 5 – FIRE-FIGHTING MEASURES

Flash Point – Not Applicable	Flammable Limits in Air % by Volume	Lower N/A	Upper N/A	Extinguishing Media – Dry Chemical or CO ₂	Auto-Ignition - Not Applicable Temperature
Special Fire Fighting Procedures	Do not use water on fires where molten metal is present. Use NIOSH/MSHA approved SCBA and full body protective equipment operated in positive pressure mode.				
Unusual Fire and Explosion Hazards	Molten metals produce fumes and/or vapor that may be toxic or respiratory irritants. Product can react vigorously with strong oxidizing agents.				

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Avoid contact with any spilled material. Contain spill, isolate hazard area, and deny entry. Limit site access to emergency responders. Material should be vacuumed with HEPA filter or wet swept and stored in dry containers for later disposal. Do not use compressed air or dry sweeping as a means of cleaning.

Personal Precautions: Wear protective clothing and appropriate NIOSH/MSHA approved respirator. ANSI approved safety glasses with side shields recommended.

Environmental Precautions: Lead and its compounds are a severe threat to the environment. Contamination of water, soil and air should be prevented.

SECTION 7 – HANDLING AND STORAGE

Precautions to be Taken in Handling and Storage	Store away from reactive materials, open flames and sources of ignition as defined in Section 10 – Stability and Reactivity.
Other Precautions	GOOD PERSONAL HYGIENE AND WORK PRACTICES ARE MANDATORY. Refrain from eating, drinking or smoking in work areas. Thoroughly wash hands, face, neck and arms before eating, drinking and smoking. Work clothes and equipment should remain in designated lead contaminated areas, and never taken home or laundered with personal clothing. Wash soiled clothing, work clothes, and equipment before reuse.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Respiratory Protection	NIOSH approved respirator is required when the PEL is exceeded or employee experiences respiratory irritation. When exposure levels are unknown or when fire-fighting, wear a self-contained breathing apparatus with a full face-piece operated in positive pressure mode.		
Ventilation	Use adequate general or local exhaust ventilation to keep airborne concentration below the PEL.		
Protective Gloves	Rubber Gloves	Eye Protection	ANSI approved safety glasses with side shields recommended.
Other Protective Clothing or Equipment	Aprons, boots and protective clothing appropriate for an industrial environment. Ventilation, as described in the <u>Industrial Ventilation Manual</u> produced by the American Conference of Governmental Industrial Hygienists, shall be provided in areas where exposures are above the PEL or TLV specified by OSHA or other local, state and federal regulations. Safety shower and eyewash.		

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: Not Applicable	Vapor Pressure	Not Applicable	Specific Gravity	7.4 g/ml	Melting Point: 550°F	
Percent Volatile By Volume	Not Applicable	Vapor Density	Not Applicable		Evaporation Rate	Not applicable
Solubility In water	33 mg/l	Reactivity in Water		None		
Appearance and Odor:	Lead: Gray metallic, solid Lead Oxide: Orange or gray paste No apparent odor		Product manufactured by pasting lead oxide over lead frame (grid).			

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable	Conditions to Avoid: Intense Heat; avoid high concentrations of corrosives/acids.
Incompatibility (Materials to Avoid)	Strong oxidizers and this product may liberate hydrogen gas.
Hazardous Decomposition Products	Molten metals produce fumes and/or vapors that may be toxic or respiratory irritants.
Hazardous Polymerization	Hazardous Polymerization has not been reported.

SECTION 11 - TOXICOLOGICAL INFORMATION

GENERAL: The primary routes of exposure are ingestion or inhalation of dust.

ACUTE:

INHALATION/INGESTION: Exposure to lead and its compounds may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in the legs, arms and joints. Kidney damage, as well as anemia, can occur from acute exposure.

CHRONIC:

INHALATION/INGESTION: Prolonged exposure to lead and its compounds may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and wrist drop. Symptoms of central nervous system damage include fatigue, headaches, tremors, hypertension, hallucination, convulsions and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic overexposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity, but there is at present, no substantiation of the implication. Pregnant women should be protected from excessive exposure. Lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure in pregnant women.

SECTION 12 - ECOLOGICAL INFORMATION

In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates, and precipitates out of the water column. Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil. Lead (dissolved phase) is bioaccumulated by plants and animals, both aquatic and terrestrial.

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS FOR LEAD AND LEAD COMPOUNDS.

SECTION 14 - TRANSPORT INFORMATION

U.S. DOT PROPER SHIPPING NAME: RQ, Environmentally Hazardous Substances, solid, n.o.s.
U.S. DOT HAZARD CLASS: 9
U.S. DOT ID NUMBER: UN3077
U.S. DOT PACKING GROUP: III
U.S. DOT LABEL: Class 9

SECTION 15 - REGULATORY INFORMATION

U.S. HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD:

LEAD – YES
ANTIMONY – YES
ARSENIC – YES
LEAD SULFATE - YES

INGREDIENTS LISTED ON TSCA INVENTORY: YES
CERCLA SECTION 304 HAZARDOUS SUBSTANCES:

LEAD – YES

RQ: REPORTING NOT REQUIRED WHEN DIAMETER OF THE PIECES OF SOLID METAL RELEASED IS EQUAL TO OR EXCEEDS 100 µm (micrometer).

ANTIMONY – YES
ARSENIC – YES
LEAD SULFATE –YES

RQ: 5000 POUNDS
RQ: 1 POUND
RQ: 10 POUNDS

EPCRA SECTION 313 TOXIC RELEASE INVENTORY:

LEAD – CAS NO: 7439-92-1
ANTIMONY – CAS NO: 7440-36-0
ARSENIC – CAS NO: 7440-38-2
LEAD SULFATE – CAS NO: 7446-14-2

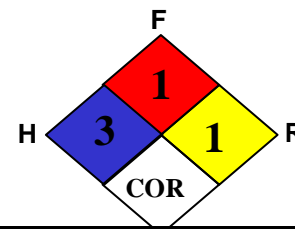
SECTION 16 - OTHER INFORMATION

THE INFORMATION ABOVE IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, TROJAN BATTERY COMPANY MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES. ALTHOUGH REASONABLE PRECAUTIONS HAVE BEEN TAKEN IN THE PREPARATION OF THE DATA CONTAINED HEREIN, IT IS OFFERED SOLELY FOR YOUR INFORMATION, CONSIDERATION AND INVESTIGATION. THIS MATERIAL SAFETY DATA SHEET PROVIDES GUIDELINES FOR THE SAFE HANDLING AND USE OF THIS PRODUCT; IT DOES NOT AND CANNOT ADVISE ON ALL POSSIBLE SITUATIONS, THEREFORE, YOUR SPECIFIC USE OF THIS PRODUCT SHOULD BE EVALUATED TO DETERMINE IF ADDITIONAL PRECAUTIONS ARE REQUIRED.

Form MSDS Rev. May 13, 2010



TROJAN BATTERY COMPANY
MOIST DRY BATTERY



MATERIAL SAFETY DATA SHEET

SECTION 1 -- CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER'S NAME: TROJAN BATTERY COMPANY	EMERGENCY TELEPHONE NO.: CHEMTREC 800/424-9300 International (703) 527-3887
ADDRESS: 12380 Clark St. Santa Fe Springs, CA 90631	OTHER INFORMATION CALLS: 562-236-3000 800-246-2550
PERSON RESPONSIBLE FOR PREPARATION: Ismael Pedroza, Jr. – Director of EH&S	Revised Date: February 15, 2010

SECTION 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

C.A.S.	PRINCIPAL HAZARDOUS COMPONENT(S) (chemical & common name(s))	Hazard Category	% Weight	ACGIH TLV - mg/m ³	OSHA PEL/TWA - mg/m ³
7439-92-1	Lead/Lead Oxide/Lead Sulfate	Acute-Chronic	60-97%	0.05	0.05
7664-93-9	Sulfuric Acid (Battery Electrolyte)	Reactive-Oxidizer Acute-Chronic	<5%	1	1
7440-38-2	Arsenic (inorganic)	Acute-Chronic	< 0.3%	0.01	0.05
7440-70-2	Calcium	Reactive	<0.15%	Not Established	Not Established
7440-36-0	Antimony	Chronic	<0.15%	0.5	0.5
7440-31-5	Tin	Chronic	< 0.03%	2	Not Established

Note: PEL's for Individual states may differ from OSHA's PEL's. Check with local authorities for the applicable state PEL's.

OSHA – Occupational Safety and Health Administration; ACGIH – American Conference of Governmental Industrial Hygienists; NIOSH – National Institute for Occupational Safety and Health.

COMMON NAME: (Used on label)

(Trade Name & Synonyms) Moist Dry Battery Chemical Family: Toxic and Corrosive Material Mixture

Chemical

Name: Lead/Acid Storage Battery Formula: Lead and Acid (electrolyte)

SECTION 3 -- HAZARD IDENTIFICATION

Signs and Symptoms of Exposure	1. Acute Hazards	Do not open battery. Avoid contact with internal components. Internal components include lead and liquid electrolyte. Electrolyte: Electrolyte is corrosive and contact may cause skin irritation and chemical burns. Electrolyte causes severe irritation and burns of eyes, nose and throat. Ingestion can cause severe burns and vomiting. Lead: Direct skin or eye contact may cause local irritation. Inhalation or ingestion of lead dust or fumes may result in headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia and leg, arm and joint pain.				
	2. Sub-Chronic and Chronic Health Effects	Electrolyte - Repeated contact with electrolyte causes irritation and skin burns. Repeated exposure to mist may cause erosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat and lungs. Prolonged inhalation of a mist of sulfuric acid can cause inflammation of the upper respiratory tract leading to chronic bronchitis. Lead - Prolonged exposure may cause central nervous system damage, gastrointestinal disturbances, anemia, wrist drop and kidney dysfunction. Pregnant women should be protected from excessive exposure to prevent lead from crossing the placental barrier and causing infant neurological disorders. California 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, and during charging, strong inorganic acid mists containing sulfuric acid are evolved, a chemical known to the State of California to cause cancer. Wash hands after handling.				
Medical Conditions Generally Aggravated by Exposure	If battery is broken or material is spilled, then persons with the following medical conditions must take precautions: pulmonary edema, bronchitis, emphysema, dental erosion and tracheobronchitis.					
Routes of Entry	Inhalation: Yes Ingestion: Yes	Eye Contact: Yes Skin Contact: Yes				
Chemical(s) Listed as Carcinogen or potential Carcinogen	Proposition 65 - YES	National Toxicology Program - YES	I.A.R.C. Monographs - YES	O.S.H.A. - NO	EPA CAG - YES	N.I.O.S.H. - YES

SECTION 4 -- FIRST AID MEASURES

Emergency and First Aid Procedures	Contact with internal components if battery is opened, broken or spilled.
1. Inhalation	Remove to fresh air and provide medical oxygen/CPR if needed. Obtain medical attention.
2. Eyes	Immediately flush with water for at least 15 minutes, hold eyelids open. Obtain medical attention.
3. Skin	Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention if necessary.
4. Ingestion	Do not induce vomiting. If conscious drink large amounts of water/milk. Obtain medical attention. Never give anything by mouth to an unconscious person.

SECTION 5 -- FIREFIGHTING MEASURES

Flash Point – Not Applicable	Flammable Limits in Air % by Volume: (when charging)	Hydrogen (H ₂) 4.1%	Lower 4.1%	Upper 74.2%	Extinguishing Media – Class ABC, CO ₂ , HALON.	Auto-Ignition Temperature 675°F (polypropylene)
Special Fire Fighting Procedures	Lead/acid batteries do not burn, or burn with difficulty. Do not use water on fires where molten metal is present. Extinguish fire with agent suitable for surrounding combustible materials. Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapors generated by heat or fire are corrosive. Use NIOSH approved self-contained breathing apparatus (SCBA) and full protective equipment operated in positive-pressure mode.					
Unusual Fire and Explosion Hazards	Hydrogen gas and sulfuric acid vapors are generated upon overcharge (when filled with electrolyte) and polypropylene case failure. Ventilate charging areas as per ACGIH <u>Industrial Ventilation A Manual of Recommended Practice</u> and <u>National Fire Code</u> , 1980 Vol. 1, P. 12, B-9, 10. Hydrogen gas may be flammable or explosive when mixed with air, oxygen, chlorine. To avoid risk of fire or explosion, keep sparks or other sources of ignition away from batteries and do not allow metallic materials to simultaneously contact negative and positive terminals of cells and batteries. SULFURIC ACID REACTS VIOLENTLY WITH WATER/ORGANICS.					

SECTION 6 -- ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Stop release, if possible. Avoid contact with any spilled material. Contain spill, isolate hazard area, and deny entry. Limit site access to emergency responders. Neutralize with sodium bicarbonate, soda ash, lime or other neutralizing agent. Place battery in suitable container for disposal. Dispose of contaminated material in accordance with applicable local, state and federal regulations. Sodium bicarbonate, soda ash, sand, lime or other neutralizing agent should be kept on-site for spill remediation.

Personal Precautions: Acid resistant aprons, boots and protective clothing. ANSI approved safety glasses with side shields/face shield recommended. Ventilate enclosed areas.

Environmental Precautions: Lead and its compounds and sulfuric acid are a severe threat to the environment. Contamination of water, soil and air should be prevented.

SECTION 7 -- HANDLING AND STORAGE

Precautions to be Taken in Handling and Storage	Keep away from flames during and immediately after charging. Combustion or overcharging may create or liberate toxic and hazardous gases and liquids including hydrogen, sulfuric acid mist, sulfur dioxide, sulfur trioxide, stibine, arsine and sulfuric acid. Store batteries in cool, dry, well-ventilated areas. Do not short circuit battery terminals, or remove vent caps during storage or recharging. Protect battery from physical damage.
Other Precautions	GOOD PERSONAL HYGIENE AND WORK PRACTICES ARE MANDATORY. Refrain from eating, drinking or smoking in work areas. Thoroughly wash hands, face, neck, and arms before eating, drinking or smoking. Work clothes and equipment should remain in designated lead contaminated areas, and never taken home or laundered with personal clothing. Wash soiled clothing, work clothes and equipment before reuse. Emptied batteries contain hazardous sulfuric acid residue.

SECTION 8 -- EXPOSURE CONTROLS AND PERSONAL PROTECTION

Respiratory Protection (Specify Type)	Acid/gas NIOSH approved respirator is required when the PEL is exceeded or employee experiences respiratory irritation. When exposure levels are unknown or when firefighting, wear a self-contained breathing apparatus with a full facepiece operated in a positive pressure mode.				
Ventilation	Must be provided when charging in an enclosed area. Change air every 15 minutes.	Local Exhaust	When PEL is exceeded.	Mechanical (General)	Normal mechanical ventilation recommended for stationary applications.
Protective Gloves	Wear rubber or plastic acid resistant gloves with elbow length gauntlet when filling batteries.	Eye Protection	ANSI approved safety glasses with side shields/face shield recommended.		
Other Protective Clothing or Equipment	Ventilation, as described in the <u>Industrial Ventilation Manual</u> produced by the American Conference of Governmental Industrial Hygienists, shall be provided in areas where exposures are above the PEL or TLV specified by OSHA or other local, state and federal regulations. Acid-resistant rubber or plastic apron, boots and protective clothing. Safety shower and eyewash.				

SECTION 9 -- PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: Electrolyte Approx: 235 °F	Vapor Pressure Electrolyte 1 mm HG @ 145.8°F	Specific Gravity Electrolyte (H ₂ O = 1) 1.250-1.320 pH < 2	Melting Point: <320°F (polypropylene)	
Percent Volatile By Volume Not Applicable	Vapor Density Hydrogen (Air = 1) : 0.069 Electrolyte (Air =1) : 3.4 @ STP	Evaporation Rate Not applicable		
Solubility In water Electrolyte: 100% soluble	Reactivity in Water Electrolyte – water reactive (1)			
Appearance and Odor:	Battery: Polypropylene or hard rubber case, solid. Lead: Gray, metallic, solid. Electrolyte: Liquid, colorless, oily fluid; nuisance odor when hot or charging battery.			

SECTION 10 -- STABILITY AND REACTIVITY

Stability: Stable	Conditions to Avoid: High temperatures – cases decompose at <320°F Avoid overcharging and smoking, or sparks near battery surface and rapid overcharge.
Incompatibility (Materials to Avoid)	Sparks, open flames, keep battery away from strong oxidizers.
Hazardous Decomposition Products	An explosive hydrogen/oxygen mixture within the battery may occur during charging. Combustion can produce carbon dioxide (CO ₂) and carbon monoxide (CO). Molten metals produce fumes and/or vapor that may be toxic or respiratory irritants.
Hazardous Polymerization	Hazardous Polymerization has not been reported. Do not overcharge.

SECTION 11 -- TOXICOLOGICAL INFORMATION

GENERAL: The primary routes of exposure to lead are ingestion or inhalation of dust and fumes.

ACUTE:

INHALATION/INGESTION: Exposure to lead and its compounds may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in the legs, arms and joints. Kidney damage, as well as anemia, can occur from acute exposure.

CHRONIC:

INHALATION/INGESTION: Prolonged exposure to lead and its compounds may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and wrist drop. Symptoms of central nervous system damage include fatigue, headaches, tremors, hypertension, hallucination, convulsions and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity, but there is at present, no substantiation of the implication. Pregnant women should be protected from excessive exposure. Lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure in pregnant women.

SECTION 12 -- ECOLOGICAL INFORMATION

In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates, and precipitates out of the water column. Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil. Lead (dissolved phase) is bio-accumulated by plants and animals, both aquatic and terrestrial.

SECTION 13 -- DISPOSAL CONSIDERATIONS

Lead-acid batteries are completely recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For information on returning batteries to Trojan Battery Company for recycling call 800-423-6569. For neutralized spills, place residue in acid resistant containers with sorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

SECTION 14 -- TRANSPORT INFORMATION

U.S. DOT PROPER SHIPPING NAME: Batteries, wet, filled with acid
U.S. DOT HAZARD CLASS: 8
U.S. DOT ID NUMBER: UN 2794
U.S. DOT PACKING GROUP: III
U.S. DOT LABEL: Corrosive

IMO PROPER SHIPPING NAME: Batteries, wet, filled with acid
IMO REGULATION PAGE NUMBER: 8120
IMO U.N. CLASS: 8
IMO U.N. NUMBER: UN 2794
IMO PACKING GROUP: III
IMO LABEL: Corrosive
IMO VESSEL STOWAGE: A

IATA PROPER SHIPPING NAME: Batteries, wet filled with acid
IATA U.N. CLASS: 8
IATA U.N. NUMBER: UN 2794
IATA PACKING GROUP: III
IATA LABEL: Corrosive

SECTION 15 -- REGULATORY INFORMATION

U.S. HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD: LEAD – YES
ANTIMONY – YES
ARSENIC – YES
SULFURIC ACID - YES

INGREDIENTS LISTED ON TSCA INVENTORY: YES

CERCLA SECTION 304 HAZARDOUS SUBSTANCES: LEAD – YES RQ: N/A*
ANTIMONY – YES RQ: 5000 POUNDS
ARSENIC – YES RQ: 1 POUND
SULFURIC ACID – YES RQ: 1000 POUNDS

*RQ: REPORTING NOT REQUIRED WHEN DIAMETER OF THE PIECES OF SOLID METAL RELEASED IS EQUAL TO OR EXCEEDS 100 µm (micro-meters).

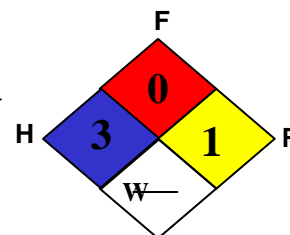
EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE: SULFURIC ACID – YES

EPCRA SECTION 313 TOXIC RELEASE INVENTORY: LEAD – CAS NO: 7439-92-1
ANTIMONY – CAS NO: 7440-36-0
ARSENIC – CAS NO: 7440-38-2
SULFURIC ACID – CAS NO: 7664-93-9

SECTION 16 -- OTHER INFORMATION

THE INFORMATION ABOVE IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, TROJAN BATTERY COMPANY MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES. ALTHOUGH REASONABLE PRECAUTIONS HAVE BEEN TAKEN IN THE PREPARATION OF THE DATA CONTAINED HEREIN, IT IS OFFERED SOLELY FOR YOUR INFORMATION, CONSIDERATION AND INVESTIGATION. THIS MATERIAL SAFETY DATA SHEET PROVIDES GUIDELINES FOR THE SAFE HANDLING AND USE OF THIS PRODUCT; IT DOES NOT AND CANNOT ADVISE ON ALL POSSIBLE SITUATIONS, THEREFORE, YOUR SPECIFIC USE OF THIS PRODUCT SHOULD BE EVALUATED TO DETERMINE IF ADDITIONAL PRECAUTIONS ARE REQUIRED.

TROJAN BATTERY COMPANY
VALVE REGULATED LEAD ACID BATTERY



MATERIAL SAFETY DATA SHEET

SECTION 1 -- GENERAL INFORMATION

MANUFACTURER'S NAME: TROJAN BATTERY COMPANY	EMERGENCY TELEPHONE NO.: CHEMTREC (800) 424-9300 International (703) 527-3887
ADDRESS: 12380 CLARK ST., SANTA FE SPRINGS, CA 90670	OTHER INFORMATION CALLS: 562-236-3000 800-423-6569
PERSON RESPONSIBLE FOR PREPARATION: Ismael Pedroza, Jr. - Director of EH&S	Revised Date: May 13, 2010

SECTION 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

C.A.S.	PRINCIPAL HAZARDOUS COMPONENT(S) (chemical & common name(s))	Hazard Category	% Weight	ACGIH TLV - mg/m ³	OSHA PEL/TWA - mg/m ³
7439-92-1	Lead/Lead Oxide (Litharge)/Lead Sulfate	Acute-Chronic	60-90	0.05 mg/m ³	0.05 mg/m ³
7440-70-2	Calcium (lead calcium alloy)	Reactive	<0.1	Not Established	Not Established
7440-31-5	Tin	Chronic	<0.5	2	Not Established
7440-38-2	Arsenic (inorganic)	Acute-Chronic	<0.1	0.01	0.01
7664-93-9	Sulfuric Acid (Battery Electrolyte)	Reactive-Oxidizer Acute -Chronic	10-30	1.0	1.0
Not applicable	Inert Ingredients	Not applicable	<6	Not Applicable	Not Applicable

Note: PEL's for Individual states may differ from OSHA's PEL's. Check with local authorities for the applicable state PEL's.
OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health.

COMMON NAME: (Used on label)
(Trade Name & Synonyms) Battery, Valve Regulated Non-Spillable (VRLA) Chemical Family: Toxic and Corrosive Material Mixture
Chemical Formula: Lead/Acid
Name: Battery, Storage, Lead Acid, Valve Regulated

SECTION 3 -- HAZARD IDENTIFICATION

Signs and Symptoms of Exposure	1. Acute Hazards	Do not open battery. Avoid contact with internal components. Internal components include lead and gelatinous electrolyte. Electrolyte - Electrolyte is corrosive and contact may cause skin irritation and chemical burns. Electrolyte causes severe irritation and burns of eyes, nose and throat. Ingestion can cause severe burns and vomiting. Lead - Direct skin or eye contact may cause local irritation. Inhalation or ingestion of lead dust or fumes may result in headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia and leg, arm and joint pain.				
	2. Subchronic and Chronic Health Effects	Electrolyte - Repeated contact with electrolyte causes irritation and skin burns. Repeated exposure to mist may cause erosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat and lungs. Lead - Prolonged exposure may cause central nervous system damage, gastrointestinal disturbances, anemia, wrist-drop and kidney dysfunction. Pregnant women should be protected from excessive exposure to prevent lead from crossing the placental barrier and causing infant neurological disorders. California 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, and during charging, strong inorganic acid mists containing sulfuric acid are evolved, a chemical known to the State of California to cause cancer. Wash hands after handling.				
Medical Conditions Generally Aggravated by Exposure	Contact with internal components if battery is broken or opened, then persons with the following medical conditions must take precautions: pulmonary edema, bronchitis, emphysema, dental erosion and tracheobronchitis.					
Routes of Entry	Inhalation - YES Ingestion - YES	Eye Contact- YES				
Chemical(s) Listed as Carcinogen or potential Carcinogen	Proposition 65 - YES	National Toxicology Program - YES	I.A.R.C. Monographs - YES	O.S.H.A. - NO	E.P.A. CAG - YES	N.I.O.S.H. - YES

SECTION 4 -- FIRST AID MEASURES

Emergency and First Aid Procedures	Contact with internal components if battery is opened/broken.
1. Inhalation	Remove to fresh air and provide medical oxygen/CPR if needed. Obtain medical attention.
2. Eyes	Immediately flush with water for at least 15 minutes, hold eyelids open. Obtain medical attention.
3. Skin	Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention if necessary.
4. Ingestion	Do not induce vomiting. If conscious drink large amounts of water/milk. Obtain medical attention. Never give anything by mouth to an unconscious person.

SECTION 5 -- FIREFIGHTING MEASURES

Flash Point – Not Applicable	Flammable Limits in Air % by Volume: Not Applicable	Extinguishing Media – Class ABC, CO ₂ , Halon	Auto-Ignition 675°F (polypropylene) Temperature
Special Fire Fighting Procedures	Lead/acid batteries do not burn, or burn with difficulty. Do not use water on fires where molten metal is present. Extinguish fire with agent suitable for surrounding combustible materials. Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapors generated by heat or fire are corrosive. Use NIOSH approved self-contained breathing apparatus (SCBA) and full protective equipment operated in positive-pressure mode.		
Unusual Fire and Explosion Hazards	Sulfuric acid vapors are generated upon overcharge and polypropylene case failure. Use adequate ventilation. Avoid open flames/sparks/other sources of ignition near battery.		

SECTION 6 -- ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup. Avoid contact with any spilled material. Contain spill, isolate hazard area, and deny entry. Limit site access to emergency responders. Neutralize with sodium bicarbonate, soda ash, lime or other neutralizing agent. Place battery in suitable container for disposal. Dispose of contaminated material in accordance with applicable local, state and federal regulations. Sodium bicarbonate, soda ash, sand, lime or other neutralizing agent should be kept on-site for spill remediation.

Personal Precautions: Acid resistant aprons, boots and protective clothing. ANSI approved safety glasses with side shields/face shield recommended.

Environmental Precautions: Lead and its compounds and sulfuric acid can pose a severe threat to the environment. Contamination of water, soil and air should be prevented.

SECTION 7 -- HANDLING AND STORAGE

Precautions to be Taken in Handling and Storage	Store away from reactive materials, open flames and sources of ignition as defined in Section 10 – Stability and Reactivity Data. Store batteries in cool, dry, well-ventilated areas. Batteries should be stored under roof for protection against adverse weather conditions. Avoid damage to containers.
Other Precautions	GOOD PERSONAL HYGIENE AND WORK PRACTICES ARE MANDATORY. Refrain from eating, drinking or smoking in work areas. Thoroughly wash hands, face, neck and arms, before eating, drinking and smoking. Work clothes and equipment should remain in designated lead contaminated areas, and never taken home or laundered with personal clothing. Wash soiled clothing, work clothes and equipment before reuse.

SECTION 8 -- EXPOSURE CONTROLS AND PERSONAL PROTECTION

Respiratory Protection (Specify Type)	None required under normal conditions. Acid/gas NIOSH approved respirator is required when the PEL is exceeded or employee experiences respiratory irritation.				
Ventilation	Store and handle in dry ventilated area.	Local Exhaust	When PEL is exceeded.	Mechanical (General)	Not Applicable
Protective Gloves	Wear rubber or plastic acid resistant gloves.		Eye Protection	ANSI approved safety glasses with side shields/face shield recommended	
Other Protective Clothing or Equipment	Safety shower and eyewash.				

SECTION 9 -- PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: Not Applicable	Vapor Pressure	Not Applicable	Specific Gravity	1.250-1.320 pH <2	Melting Point: <320°F (polypropylene)
Percent Volatile By Volume	Not Applicable	Vapor Density	Hydrogen: 0.069 (Air =1) Electrolyte: 3.4 @ STP (Air = 1)	Evaporation Rate	Not applicable
Solubility In water	100% soluble (electrolyte)		Reactivity in Water	Electrolyte – Water Reactive (1)	
Appearance and Odor:	Battery: Polypropylene or hard rubber case, solid. Lead: Gray, metallic, solid. Electrolyte: Odorless, white gelatinous semi-solid (absorbed). No apparent odor.				

SECTION 10 -- STABILITY AND REACTIVITY

Stability:	Stable	Conditions to Avoid:	Avoid overcharging and smoking, or sparks near battery surface. High temperatures-cases decompose at <320°F.
Incompatibility (Materials to Avoid)	Sparks, open flames, keep battery away from strong oxidizers.		
Hazardous Decomposition Products	Combustion can produce carbon dioxide and carbon monoxide.		
Hazardous Polymerization	Hazardous Polymerization has not been reported.		

SECTION 11 -- TOXICOLOGICAL INFORMATION

GENERAL: The primary routes of exposure to lead are ingestion or inhalation of dust and fumes.

ACUTE:

INHALATION/INGESTION: Exposure to lead and its compounds may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in the legs, arms and joints. Kidney damage, as well as anemia, can occur from acute exposure.

CHRONIC:

INHALATION/INGESTION: Prolonged exposure to lead and its compounds may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and wrist drop. Symptoms of central nervous system damage include fatigue, headaches, tremors, hypertension, hallucination, convulsions and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been

implicated as a causative agent for the impairment of male and female reproductive capacity, but there is at present, no substantiation of the implication. Pregnant women should be protected from excessive exposure. Lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure in pregnant women.

SECTION 12 -- ECOLOGICAL INFORMATION

In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates, and precipitates out of the water column. Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil. Lead (dissolved phase) is bioaccumulated by plants and animals, both aquatic and terrestrial.

SECTION 13 -- DISPOSAL CONSIDERATIONS

Lead-acid batteries are completely recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For information on returning batteries to Trojan battery Company for recycling call 800-423-6569. For neutralized spills, place residue in acid-resistant containers with sorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

SECTION 14 -- TRANSPORT INFORMATION

U.S. DOT PROPER SHIPPING NAME: Batteries, wet, non-spillable
U.S. DOT HAZARD CLASS: 8
U.S. DOT ID NUMBER: UN2800
U.S. DOT PACKING GROUP: III
U.S. DOT LABEL: CORROSIVE

OR

Excepted from the requirements because batteries have passed the Vibration, Pressure Differential and Crack Performance tests for "Non-spillable" designation.

IMO PROPER SHIPPING NAME: Batteries, wet, non-spillable
IMO REGULATION PAGE NUMBER: 8120
IMO U.N. CLASS: 8
IMO U.N. NUMBER: UN 2800
IMO PACKING GROUP: III
IMO LABEL: None required
IMO VESSEL STOWAGE: A

IATA PROPER SHIPPING NAME: Batteries, wet, non-spillable
IATA U.N. CLASS: 8
IATA U.N. NUMBER: UN 2800
IATA PACKING GROUP: III
IATA LABEL: CORROSIVE

SECTION 15 -- REGULATORY INFORMATION

U.S. HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD:

LEAD – YES
ANTIMONY – YES
ARSENIC – YES
SULFURIC ACID – YES

INGREDIENTS LISTED ON TSCA INVENTORY:

YES

CERCLA SECTION 304 HAZARDOUS SUBSTANCES:

LEAD – YES	RQ: N/A*
ANTIMONY – YES	RQ: 5000 POUNDS
ARSENIC – YES	RQ: 1 POUND
SULFURIC ACID – YES	RQ: 1000 POUNDS

* RQ: REPORTING NOT REQUIRED WHEN DIAMETER OF THE PIECES OF SOLID METAL RELEASED IS EQUAL TO OR EXCEEDS 100 µm (micrometers).

EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE:

SULFURIC ACID – YES

EPCRA SECTION 313 TOXIC RELEASE INVENTORY:

LEAD – CAS NO: 7439-92-1
ANTIMONY – CAS NO: 7440-36-0
ARSENIC – CAS NO: 7440-38-2
SULFURIC ACID – CAS NO: 7664-93-9

SECTION 16 -- OTHER INFORMATION

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