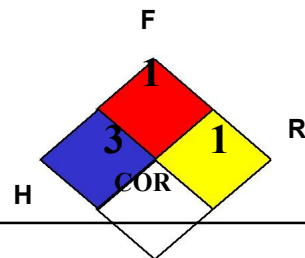


HANGZHOU RUIYUN ELECTRONICS CO.,LTD

LEAD ACID BATTERY



MATERIAL SAFETY DATA SHEET

SECTION 1 -- CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER'S NAME: HANGZHOU RUIYUN ELECTRONICS CO.,LTD	EMERGENCY TELEPHONE NO.: CHEMTREC 0086-0571-89010567
ADDRESS: Olive garden, chongxian street, yuhang district, hangzhou city, zhejiang province, China	OTHER INFORMATION CALLS: 0086-0571-89010567
PERSON RESPONSIBLE FOR PREPARATION: Caixian Shen	Revised Date: November 25th, 2016

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 lead oxide 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)	Lower 4.1%	Upper 74.2%	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.					
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 Industrial Ventilation A Manual of Recommended Practice and National Fire Code, 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

These batteries have been tested and meet the non-spillable criteria listed in CFR49, 173.159.

U.S. DOT PROPER SHIPPING NAME: Batteries, wet, non-spillable
U.S. DOT HAZARD CLASS: 8
U.S. DOT ID NUMBER: UN 2800
U.S. DOT PACKING GROUP: III
U.S. DOT LABEL: Corrosive

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: Corrosive
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 -

INGREDIENTS LISTED ON TSCA INVENTORY:

YES

CERCLA SECTION 304 HAZARDOUS SUBSTANCES:

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

*RQ: REPORTING NOT REQUIRED WHEN DIAMETER OF THE PIECES OF SOLID METAL RELEASED IS EQUAL TO OR EXCEEDS 100 μ m (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, HANGZHOU RUIYUN ELECTRONICS CO., LTD 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

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