MATERIAL SAFETY DATA SHEET

Updated August, 2004

AAAEVGN6A
AAAEVGT6A
AAAEV305AA
AAAEV27AA

Product□Valve regulated lead-acid battery

Description: Batteries, wet, sealed, maintenance-free, non-spill able.

UN No: 2800

Package group:□

Class: 8

Scope: for every model of "**DISCOVER**" batteries

Battery overall reaction: $Pb + PbO_2 + 2H_2SO_4 = 2\ PbSO_4 + 2H_2O$

Hazardous components

Item	%W_t	CSHAPEL (TLV)	LD50 Oral	LD50 Inhalation	LD50 Contact
Lead (Pb,PbO_2,$PbSO_4$)	69.64%	0.050mg/m^3	<500mg/kg	<20mg/m^3	n/a
Sulfuric acid	20%	1mg/m^3	2.135mg/kg	17mg/m^3	130mg/kg
Fiberglass separator	5%	—	—	—	—
ABS	5%	—	—	—	—
Antimony	0.0025%	—	—	—	—
Calcium	0.1%	—	—	—	—
Tin	0.25%	2mg/m^3	—	—	—

Physical Data

Component	Density(g/cm^3) @20□	Melting Points	Solubility in Water	Odor	Appearance
Lead	11.34	327□	None	None	Grey metal
Lead sulfate	6.2	107□	40mg/L(15□)	None	White powder
Lead dioxide	9.4	290□	None	Acidic	Brown powder
Sulfuric acid	1.300	N/A	100%	None	Colorless liquid
Fiberglass Separator	N/A	N/A	Slight	None	White Membrane
ABS	N/A	N/A	None	None	Solid plastics
Antimony	6.684	630□	None	None	Silver lustrous grey metal
Calcium	1.55	839□	None	None	Silver white metal
Tin	7.31	232□	None	None	White metal

Flammability Data

Component	Flashpoint	Explosive limits	Comments
Lead	None	None	
Sulfuric acid	N/A.	None	
Hydrogen		4%	Produced only if the battery be over charged
Fiberglass separator	None	N/A	
ABS		N/A	
Antimony	None	None	
Calcium	None	None	
Tin	None	None	

Corrosive acid

The battery contain dilute sulfuric acid which is a corrosive substance .If the acid get on to your clothing or skin, make sure wash with clean water. Additionally, if the acid gets in your eyes, wash with clean water immediately and see a doctor. Acid can cause a loss of eyesight and a skin burn.

. HEALTH HAZARD INFORMATION

Under normal operating conditions, the internal material will not be hazardous to your health. Only internally exposed material during production or case breakage or extreme heat (fire) may be hazardous to your health.

Routes of Entry:

- Installation: Acid mist from formation process may cause respiratory irritation.
- Skin Contact: Acid may cause irritation, burns and/or ulceration.
- Skin Absorption: Not a significant route of entry.
- Eye Contact: Acid may cause sever irritation, burns, cornea damage and/or blindness.
- Ingestion: Acid may cause irritation of mouth, throat, esophagus and stomach.

Sign and Symptoms of Over Exposures:

Acute Effects:

Over exposure to lead may lead to loss of appetite, constipation, sleeplessness and fatigue. Over exposure to acid may lead to skin irritation, corneal damage of the eyes and upper respiratory system.

Chronic Effects:

Lead and its components may cause damage to kidneys and nervous system. Acid and its components may cause lung damage and pulmonary conditions.

Potential to Cause Cancer:

The International Agency for Research on Cancer has classified "strong inorganic acid mist containing sulfuric acid" as a Category 1 carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist is not generated under normal use of this product. Misuse of the product, such as overcharging, may however result in the generation of sulfuric acid mist.

Emergency and First Aid Procedures:

- Inhalation: Remove from exposure and apply oxygen if breathing is difficult.
- Skin: Wash with plenty of soap and water. Remove any contaminated clothing.
- Eyes: Flush with plenty of water immediately for at least 15 minutes. Consult a physician.

- Ingestion: Consult a physician immediately.

FIRE AND EXPLOSION HAZARD DATA:

Flash Point:

Hydrogen = 259 °C

Auto ignition Temperature:

Hydrogen = 580 °C

Extinguishing Media:

Dry chemical, foam, CO2

Unusual Fire and Explosion Hazards:

Hydrogen and oxygen gases are produced in the cells during normal battery operation (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.

REACTIVITY DATA:

Stability:

Stable

Conditions to Avoid: Sparks and other sources of ignition.

Incompatibility: (materials to avoid)

1. **Lead/lead compounds:**

Potassium, carbides, sulfides, peroxides, phosphorus, sulfurs.

2. **Battery electrolyte (acid):**

Combustible materials, strong reducing agents, most metals, carbides, organic materials, chlorates, nitrates, pirates, and fulminates.

Hazardous Decomposition Products:

1. **Lead/lead compounds:**

Oxides of lead and sulfur.

2. **Battery electrolyte (acid):**

Hydrogen, sulfur dioxide, and sulfur trioxide.

Conditions to Avoid:

High temperature. Battery electrolyte (acid) will react with water to produce heat. Can react with oxidizing or reducing agents.

CONTROL MEASURES:

Engineering Controls:

Store lead/acid batteries with adequate ventilation. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.

Work Practices:

Do not remove vent caps. Follow shipping and handling instructions, which are applicable to the battery type. To avoid damage to terminals and seals, do not double-stack industrial batteries.

PERSONAL PROTECTIVE EQUIPMENT:

Respirator:

Protective equipment must ice won if the battery is cracked or other wise damaged. HEPA respirator exclaims operations. If the OSHAPEL is exceeded.

Eye safety: Goggles, face shield.

Electrical safety: Due to the low internal resistance of power batteries and high power density, high levers of shorn developed across the battery terminals. Do not rest tools or cables on the battery use

insulated tools only follow an diagrams when installing or maintaining battery systems

1. Respiratory Protection:

None required under normal handling conditions. During battery formation (high-rate charge condition), acid mist can be generated which may cause respiratory irritation. Also, if acid spillage occurs in a confined space, exposure may occur. If irritation occurs, wear a respirator suitable for protection against acid mist.

2. Eyes and Face:

Chemical splash goggles are preferred. Also acceptable are "visor-gaga" or a chemical face shield worn over safety glasses.

3. Hands, Arms, Body:

Vinyl coated, VC, gauntest type gloves with rough finish are preferred.

4. Other Special Clothing and Equipment:

Safety shoes are recommended when handling batteries. All footwear must meet requirements of ANSI Z41.1 – Rev. 1972.

5. Electrical safety:

Due to the low internal resistance of power batteries and high power density, high levers of shorn developed across the battery terminals. Do not rest tools or cables on the battery use insulated tools only follow an diagrams when installing or maintaining battery systems

PRECAUTIONS FOR SAFE HANDLING AND USE:

1. Hygiene Practices:

Following contact with internal battery components, wash hand thoroughly before eating, drinking, or smoking.

2. Respiratory Protection:

Wear safety glasses. Do not permit flames or sparks in the vicinity of battery(s). If battery electrolyte (acid) comes in contact with clothing, discard clothing.

3. Protective Measures:

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

b. Wear acid-resistant boots, chemical face shield, chemical splash goggles, and acid-resistant gloves. **Do not release neutralized acid.**

4. Waste Disposal Method:

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

b. **Do not flush lead contaminated acid to sewer.**

c. Batteries: Send to lead smelter for reclamation following applicable Federal, state and local regulations. Product can be recycled along with automotive (SLI) lead acid batteries, or use CSB Recycling Program number (800) 3CSB/USA.

5. Other Handling and Storage Precautions: None Required.

UNIWELL BATTERY CORP.
Suite#880-999 W. Broadway, Vancouver, B.C. Canada V5Z1K5
Tel: (604)7302877 Fax: (604)7302898

AAADC4006

Material Safety Data Sheet

VALVE REGULATED (VRLA) BATTERIES - ABSORBED ELECTROLYTE (AGM)

I. Product Identification and Company Identification

Chemical / Trade Name (Identity used on label) **Absorbed Electrolyte Battery / HGL, DC, HGHL Sealed Valve Regulated Lead-Acid Battery**	Chemical Family / Classification **Electric Storage Battery**
Manufacturer's Name **Fullriver Battery Manufacture Co. Ltd.**	Date Revised **May 27th, 2009**
Address **P.O. Box 511475** **Taishi Industrial Area, Yuwotou Town,** **Panyu Zone, Guangzhou, China**	Telephone **86-20-84916671** Web **http://www.fullriverdcbattery.com**

II. Hazardous Ingredients / Identify Information

NOTE: Inorganic lead and electrolyte (water and sulfuric acid solution) are the primary components of every battery manufactured by Fullriver Technologies or its subsidiaries. Other ingredients may be present dependent upon battery type.

Materials / Components	% by Wt.	CAS Number	Exposure Limits		
			OSHA	ACGIH	NIOSH
Specific Chemical Identity / Common Name **Inorganic Lead / Lead Compounds**	65% - 75%	7439-92-1	50 µg/m³	150 µg/m³	100 µg/m³
Specific Chemical Identity / Common Name **Tin**	<0.5%	7440-31-5	2000 µg/m³	2000 µg/m³	NA
Specific Chemical Identity / Common Name **Calcium**	<0.2%	7440-70-2	NA	NA	NA
Specific Chemical Identity / Common Name **Sulfuric Acid (40%) / Battery Electrolyte (Acid)**	15% - 21%	7664-93-9	1 mg/m³	1 mg/m³	1 mg/m³
Specific Chemical Identity / Common Name **Fiberglass Separator**	5%	-	NA	NA	NA
Specific Chemical Identity / Common Name **Acrylonitrile Butadiene Styrene (ABS)**	5% - 10%	9003-56-9	NA	NA	NA

III. Fire and Explosion Hazard Data

Fire and Explosive Properties	**Hydrogen Flash Point:** N/A **Hydrogen Auto Ignition Point:** 580°C **Hydrogen Flammabl Limits in Air** (% by Volume): LEL: 4.1 UEL: 74.2 Low Explosion Limit (LEL), Upper Explosion Limit (UEL)
Extinguishing Media	**Dry Chemical, Foam, CO_2**
Special Fire Fighting Hazards	**Use Positive Pressure, Self-Contained breathing apparatus.**

Unusual Fire and Explosion Hazards

If AGM batteries are properly charged they will not release any flammable hydrogen gas. If they are excessively overcharged the safety relief valve can open and release flammable hydrogen gas. They must always be assumed to contain this gas which, if ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Carefully follow manufacturer's instruction for installation and service. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery.

IV. Health Hazard Information

Routes of Entry

Sulfuric Acid: Harmful by all routes of entry.
Lead Compounds: Hazardous exposure can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapor or fumes.

Inhalation

Sulfuric Acid: Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.
Lead Compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.
Fiberglass Separator: Fiberglass is an irritant to the upper respiratory tract, skin and eyes. For exposure up to 10F°/use MSA Comfoll with type H filter. Above 10F° use Ultra Twin with type H filter. This product is not considered carcinogenic by NTP or OSHA.

Ingestion

Sulfuric Acid: May cause severe irritation of mouth, throat, esophagus and stomach.
Lead Compounds: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead rapidly to system toxicity and must be treated by a physician.

Skin Contact

Sulfuric Acid: Severe irritation, burns and ulceration.
Lead Compounds: Not absorbed through the skin.

Eye Contact

Sulfuric Acid: Severe irritation, burns, cornea damage, and blindness.
Lead Compounds: May cause eye irritation.

Effects of Overexposure - Acute

Sulfuric Acid: Severe skin irritation, damage to cornea, upper respiratory irritation.
Lead Compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.

Effects of Overexposure - Chronic

Sulfuric Acid: Possible erosion of tooth enamel, inflammation of nose, throat and bronchial tubes.
Lead Compounds: Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in males and females.

Carcinogenicity

Sulfuric Acid: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category 1 carcinogen, a substance that is carcinogenic to humans. This classification does 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.
Lead Compounds: Lead is listed as a 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.

Medical Conditions Generally Aggravated by Exposure

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of sulfuric acid with skin may aggravate diseases such as eczema and contact dermatitis. Lead and its compounds can aggravate some forms of kidney, liver and neurologic diseases.

V. Emergency and First Aid Procedures

Inhalation

Sulfuric Acid: Remove to fresh air immediately. If breathing is difficult, give oxygen.
Lead Compounds: Remove from exposure, gargle, wash nose and lips; consult physician.

Ingestion

Sulfuric Acid: Give large quantities of water; do not include vomiting; consult physician.
Lead Compounds: Consult physician immediately.

Skin

Sulfuric Acid: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes.
Lead Compounds: Wash immediately with soap and water.

Eyes

Sulfuric Acid and Lead: Flush immediately with large amounts of water for a least 15 minutes; consult physician.

VI. Precautions For Safe Handling and Use

Handling and Storage

Store batteries in cool, dry, well-ventilated areas with impervious surfaces and adequate containment in the event of spills. Batteries should also be stored under roof for protection against adverse weather conditions. Separate from incompatible materials. Store and handle only in areas with adequate water supply and spill control. Avoid damage to containers. Keep away from fire, sparks and heat.

Precautionary Labeling

POISON - Causes severe burns DANGER - Contains Sulfuric Acid

Charging

There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being charged. Shut-off power to chargers whenever not in use and before detachment of any circuit connections. If batteries are properly charged they will not release any flammable hydrogen gas. If they are excessively overcharged the safety relief valve can open and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

Spill or Leak Procedures

Stop flow of material; contain/absorb small spills with dry sand, earth and vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bucarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Do not allow discharge of un-neutralized acid to sewer.

Waste Disposal Method

Spent batteries: Send to secondary lead smelter for recycling.

LEAD - RETURN - RECYCLE

VII. Control Measures

Engineering Controls Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant.
Work Practices Handle batteries cautiously to avoid spills. Make certain vent caps are on securely. Avoid contact with internal components. Wear protective clothing when filling or handling batteries.
Respiratory Protection None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed the PEL, use NIOSH or MSHA-approved respiratory protection.
Protective Gloves Rubber or plastic acid-resistant gloves with elbow-length gauntlet.
Eye Protection Chemical goggles or face shield.
Other Protection Acid-resistant apron. Under severe exposure emergency conditions, wear acid-resistant clothing and boots.
Emergency Flushing In areas where sulfuric acid is handled in concentrations greater then 1%, emergency eyewash stations and showers should be provided, with unlimited water supply.

VIII. Physical Data

Electrolyte:			
Boiling Point:	203-240°F	**Specific Gravity (H2O=1):**	1.300-1.330
Melting Point:	N/A	**Vapor Pressure (mm Hg):**	10
Solubility in Water:	100%	**Vapor Density (AIR = 1):**	3.4
Evaporation Rate: (Butyl Acetate = 1)	Less than 1	**% Volatile by Weight:**	N/A
Appearance and Odor:	Manufactured article; no apparent odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.		

IV. Reactivity Data

Stability: Stable
Conditions to Avoid: High temperature, Sparks and other sources of ignition
Incompatibility (Materials to avoid) **Electrolyte (Water and Sulfuric Acid Solution):** Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfuric trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.

Reactivity Data Cont...

IV. Reactivity Data (Continued)

Incompatibility (Materials to avoid) Continued...

Lead Compounds: Avoid contact with strong acids, bases, halides, halogenated, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents.

Hazardous Byproducts

Sulfuric Acid: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, and hydrogen.
Lead Compounds: High temperatures likely to produce toxic metal fume, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

X. Ecological Information

Lead and its compounds can pose a threat if released into the environment.

XI. Transport Information

All **Fullriver** AGM batteries, when transported by air, surface or by vessel are identified as **"Battery, Electric Storage, Wet, Nonspillable, Not Regulated".**
The battery(s) must be identified as above on the Bill of Lading and properly packaged with their terminals protected from short circuit. NA or UN numbers do not apply.
Fullriver AGM battery(s) warning label identifies each battery as NONSPILLABLE.
Fullriver AGM battery(s) preprinted cartons identify each battery as NONSPILLABLE.
Fullriver AGM battery(s) shipped without Fullriver cartons (bulk packed) need to be identified as NONSPILLABLE or NONSPILLABLE BATTERY on the outer packaging.
Air: Fullriver AGM batteries meet the conditions in IATA/ICAO Special Provision A67.
Surface: Fullriver AGM batteries meet the conditions for DOT Haz Mat Regulations CFR-Tittle 49 parts 171-189.
Vessel: Fullriver Batteries meet the conditions of IMDG.

XII. Regulatory Information

See 29 CFR 1910.268(b)(2)

XIII. Other Information

The information herein is given in good faith, but no warranty, expressed or implied, is made.