



## GUANGZHOU FULLRIVER INDUSTRY CO., LTD

### MATERIAL SAFETY DATA SHEET

#### **Instructions for the handing of Fullriver AGM batteries (Absorbed Glass Mat lead acid batteries) Valve Regulated (VRLA) Batteries**

#### **SECTION 1: PRODUCT IDENTIFICATION AND COMPANY IDENTIFICATION**

<b><u>Chemical/trade Name(as used on label):</u></b>	<b><u>Chemical Family/Classification</u></b>
Absorbed Glass Mat Lead Acid Battery Sealed Valve Regulated Lead-Acid Battery	Electric Storage Battery
<b><u>Manufacturer's Name:</u></b>	<b><u>Date revised:</u></b> Sep. 12, 2015
GUANGZHOU FULLRIVER INDUSTRY CO., LTD	
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#### **SECTION 2: HAZARDOUS INGREDIENTS/IDENTIFY INFORMATION**

<u>CAS#</u>	<u>COMPONENTS</u>	<u>Hazard category</u>	<u>Approximate % BY WEIGHT</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>
7439-92-1	Inorganic Lead/Lead Compounds	Acute-Chronic	65%~75%	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>
7440-31-5	Tin	Chronic	<0.5%	2000µg/m <sup>3</sup>	2000 µg/m <sup>3</sup>
7440-70-2	Calcium	Reactive	<0.2%	N/A	N/A
7664-93-9	Sulfuric Acid absorbed in glass fiber material	Reactive-Oxidizer  Acute -Chronic	16%~21%	1mg/m <sup>3</sup>	1mg/m <sup>3</sup>
-	Fiberglass Separator	Not applicable	5%	N/A	N/A
9003-56-9	Case Material: Acrylonitrile Butadiene Styrene(ABS)	Not applicable	5%-10%	N/A	N/A

**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.

**SECTION 3: HAZARDS IDENTIFICATION**

No hazards in case of an intact battery and observation of the instructions for use.

Lead-acid batteries have the following significant characteristics:

- They contain diluted sulphuric acid, which is absorbed in glass fiber material. Skin contact with glass fiber material may cause severe acid burns.
- During the charging process they develop hydrogen gas and oxygen gas, which under certain circumstances may turn into an explosive mixture.

**For this reason, the batteries have been marked with the following hazard symbols:**

The significance of the hazard symbols is:

1. No smoking, no open flames, no sparks.
2. Wear safety goggles.
3. Keep away from children.
4. Sulphuric acid.
5. Observe operating instructions.
6. Explosive gas mixture.



Additionally: Do not clean batteries with dry washers, use only wet washers.

**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: FIRE AND EXPLOSION HAZARD DATA**

<b>FIRE AND EXPLOSIVE PROPERTIES:</b>	
<b>Hydrogen Flash point:</b> N/A	<b>Hydrogen Auto ignition point:</b> 580°C
<b>Hydrogen Flammable Limits in Air</b> (% by Volume): LEL: 4.1 UEL: 74.2	
Lower Explosion Limit (LEL), Upper Explosion Limit (UEL)	
<b>Extinguishing Media:</b> Dry chemical, foam, CO <sub>2</sub>	

**Special Fire Fighting Procedures:**

Use Positive

Pressure, self-contained breathing apparatus.

**Unusual Fire and Explosion Hazards:**

In operation,

batteries generate 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 instructions 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..

**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: PRECAUTIONS FOR SAFE HANDING 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. Batteries being charged will generate 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 bicarbonate, 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.

**SECTION 8: 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 than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

<b>Electrolyte:</b>			
<b>Boiling Point:</b>	203-240°F	<b>Specific Gravity(H<sub>2</sub>O=1):</b>	1.300-1.330
<b>Melting Point:</b>	N/A	<b>Vapor Pressure(mm Hg):</b>	10
<b>Solubility in Water:</b>	100%	<b>Vapor Density (AIR = 1):</b>	3.4
<b>Evaporation Rate: (Butyl Acetate = 1)</b>	Less than 1	<b>% Volatile by Weight:</b>	N/A
<b>Appearance and Odor:</b>	Manufactured article; no apparent odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.		

**SECTION 10: REACTIVITY DATA**

<b>Stability:</b> Stable
<b>CONDITIONS TO AVOID:</b> High temperature, Sparks and other sources of ignition.
<p><b>Incompatibility (materials to avoid):</b></p> <p><b>Electrolyte</b> (Water and Sulfuric Acid Solution): Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.</p> <p><b>Lead compounds:</b> Avoid contact with strong acids, bases, halides, halogenated, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents.</p>
<p><b>Hazardous Byproducts:</b></p> <p><b>Sulfuric Acid:</b> Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, and hydrogen.</p> <p><b>Lead Compounds:</b> 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.</p>

**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 sorbet 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 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

Land Transport	Land Transport (ADR/RID)	
	UN N°:	UN2800
	Classification ADR/RID:	Class 8
	Proper Shipping Name:	BATTERIES, (ACCUMULATORS), WET, NON-SPILLABLE, electric storage
	Packing Group ADR:	not assigned
	Label required:	not assigned
	ADR/RID:	

	AGM batteries are non-spillable batteries (special provision 238) and are exempt from all ADR/RID provisions, if they are protected from short circuit.
Sea Transport	<p>Sea Transport (IMDG Code)</p> <p>UN N°: UN2800</p> <p>Classification: Class 8</p> <p>Proper Shipping Name: BATTERIES, (ACCUMULATORS), WET, NON SPILLABLE, electric storage</p> <p>Packing Group: not assigned</p> <p>EmS: not assigned</p> <p>Label required: not assigned</p> <p>AGM batteries are non-spillable batteries (special provision 238) and are exempt from all IMDG codes, if they are protected from short circuit.</p>
Air Transport	<p>Air Transport (IATA-DGR)</p> <p>UN N°: UN2800</p> <p>Classification: Class 8</p> <p>Proper Shipping Name: BATTERIES, (ACCUMULATORS), WET, NON SPILLABLE, electric storage</p> <p>Group: not assigned</p> <p>Label required: not assigned</p> <p>AGM batteries are non-spillable batteries (special provision A67) and are exempt from all IATA DGR codes, if they are protected from short circuit.</p>

## Notice

### Special provision 238 ADR/RID/IMDG Code:

**a.) Batteries can be considered as non-spillable provided that they are capable of withstanding the vibration and pressure differential test given below, without leakage of battery fluid**

#### Vibration test:

The battery is rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) is applied. The frequency is varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies and return is traversed in 95 ± 5 minutes for each mounting position (direction of vibration) of the battery. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for equal time periods.

#### Pressure differential test:

Following the vibrations test, the battery is stored for six hours at 24 °C ± 4°C while subjected to a pressure differential of at least 88 kPa. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and

vents, if any, in an inverted position) for at least six hours in each position.

b.)

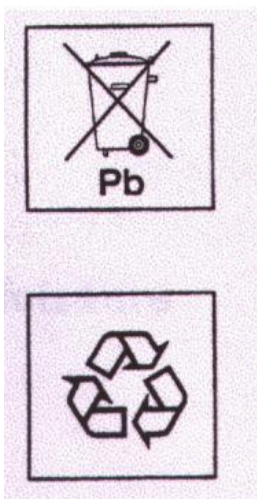
Non-spillable batteries are not subject to the requirements of ADR if, at a temperature of 55°C, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, as packaged for carriage, the terminals are protected from short circuit.

#### **A67 IATA DGR:**

Non-spillable batteries are considered to be non-dangerous if, at a temperature of 55 °C, the electrolyte will not flow out of a ruptured or cracked case and there is no free liquid to flow. When packaged for transport, the terminals must have protection against short circuits.

### **SECTION 15 -- Marketing**

In accordance with EC and national laws lead-acid batteries have to be marked by a crossed out refuse bin with the chemical symbol for lead Pb shown below, together with the ISO return/ recycling symbol.



In addition, the ISO-return / recycling symbol is rendered.

The manufacturer, respectively the importer of the batteries shall be responsible for the attachment of the symbols. In addition, a consumer / user information on the significance of the symbols has to be attached, which is required by the EC Directives quoted above.

The manufacturers and sellers of the batteries subject to identification requirements (packaging, technical instructions, leaflets) shall be responsible for this information.

### **SECTION 16 -- OTHER INFORMATION**

THE INFORMATION ABOVE IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, FULLRIVER 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.