MSDS (Material safety Data Sheet) **Updated: 2012/10/26**

SECTION 1: Chemical Product and Company Identification

Chemical/Trade Name (as used on label)	**Chemical Family/Classification**
Sealed Lead Acid Battery	Electric Storage Battery
Manufacturer's Name	**Address**
CSB Battery Co., Ltd.	11F, No. 150, Sec. 4, Chengde Rd., Shilin Dist., Taipei City 11167, Taiwan
Contact number	**Website**
Taiwan : +886 2 2880 5600 United States : +1 817 244 7777 Netherlands : +31 0 180 418 140 China : +86 755 8831 6488	WWW.CSB-BATTERY.COM

SECTION 2: Composition, information or Ingredients [3)]

CAS no.	**Description**	**Content[1)] [% of weight]**	**Hazard symbol**
7439-92-1	Lead Grid (metallic lead, lead alloys with possible traces of additives)	~57	T[2)]
1309-60-0	Active Mass (Battery Oxide, inorganic lead compounds)	~ 22	T[2)]
7664-93-9	Electrolyte [4)] (Dilute sulphuric acid with additives)	~14	C
	Plastic Container / Plastic Parts [5)]	~ 7	

1) Contents may vary due to performance data of the Battery

2) As result of the harm to unborn children Lead and Lead compounds are classified as toxic, Category 1. As this category is not described with a specific hazard symbol, Lead compounds have to be labeled with the "skull & crossbones" symbol. Lead and Lead compounds are not classified "toxic".

3) See section 12 – Ecological Information

4) Density of the electrolyte varies in accordance to the state of charge

5) Composition of the plastic may vary due to different customer requirements

SECTION 3: Hazard Identification

APPEARANCE AND ODOR: Colorless, Oily Fluid, Vapors are Colorless; Acrid odor when hot or charging				
RATING CODES: **0**=Insignificant **1**=Slight **2**=Moderate **3**=High **4**=Extreme				
HMIS RATING:	Health: **3**	Flammability: **0**	Reactivity: **2**	Other: **0**
NFPA RATING:	Health: **3**	Flammability: **0**	Reactivity: **2**	Other: **0**
Sulfuric acid is water-reactive if concentrated				

No hazards occur during the normal operation of a Lead Acid Battery as it is described in the instructions for use that are provided with the Battery. Lead acid Batteries have three significant characteristics:

- They contain an electrolyte which contains diluted sulphuric acid. Sulphuric acid may cause severe chemical burns.
- During the charging process or during operation they might develop hydrogen gas and oxygen, which under certain circumstances may result in an explosive mixture.
- They can contain a considerable amount of energy, which may be a source of high electrical current and a severe electrical shock in the event of a short circuit.

The Batteries have to be marked with the symbols listed under section15.

California proposition 65 warning: Battery posts, terminals and related accessories contain lead and lead compounds chemical know to the state of California to cause cancer and reproductive harm. Battery also contain other chemical know to the state California to cause cancer. Wash hands after handling.

SECTION 4: First Aid Measures

General:
1. Electrolyte (diluted sulphuric acid): sulphuric acid acts corrosively and damages skin

Skin/Eyes	Ingestion/Inhalation
- Rinse the affected area under running water for 15 minutes - Remove contaminated clothing - If irritation occurs , seek medical attention	- Do not induce vomiting - Drink 8 oz. of water or milk - If difficulty in breathing occurs, try moving under fresh air and have CPR when necessary - Seek medical attention immediately

2. Lead compounds: lead compounds are classified as toxic for reproduction (if swallowed)

SECTION 5: FireFighting Measures

Hydrogen Flash point: -259°C Hydrogen Autoignition point: 580°C

Hydrogen Flammable Limits in Air (% by Volume):
Lower Explosion Limit (LEL) : 4.1 ; Upper Explosion Limit (UEL) : 74.2

Unusual Fire and Explosion Hazards: Hydrogen and Oxygen gases are produced in cells during normal battery operation and expel into air through vent caps.

Extinguishing Media: Foam, CO2 or dry powder extinguishing agents

Special Firefighter Procedures: Use Positive Pressure, self-contained breathing apparatus.

SECTION 6: Accidental Release Measures

The information is of relevance only if the battery is broken and the ingredients are released. In the case of spillage, try neutralizing exposed battery parts with soda ash or sodium bicarbonate until fizzing stops; and using sand or bonding agent to absorb split acid. Provide adequate ventilation because heat, carbon dioxide and hydrogen gas may be given off during neutralization. Collect residue in a suitable container and place the broken battery in a heavy-duty plastic bag or other non-metallic container. Properly recycle all battery residue and parts based on official local regulations.

SECTION 7: Handling and Storage

Store batteries in a cool, dry area. Store batteries in a covered area that protects against adverse weather conditions. Protect batteries from coming into contact with conductive materials to prevent fire or battery failures. Don't store or charge batteries in temperatures under -4o F (-20o C). Keep away from fire, sparks and heat sources. Protect from damage to prevent possible leaks or spills. It is imperative that these instructions be followed if the batteries are being stored.

SECTION 8: Exposure Controls and Personal Protection

Engineering Controls
Store batteries with adequate ventilation. Room ventilation is also required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.

Personal Protective Equipments
During installation under normal conditions there is no exposure to lead or sulpuric acid. In the event of battery breakage, exposure to sulphuric acid and lead may occur. During high rate charges or overcharging acid mist may occur.

Eye Protection = Chemical goggles, safety glasses with side shields and or a full-face shield.
Protective gloves = Rubber, PVC or neoprene
Respiratory Protection = NIOSH approved acid mist/organic vapor respirator, if OSHA PEL is exceeded.
Other Protective Equipment = Acid resistant apron or clothes.

Work Practices:
Use standard lead-acid battery practices. Do not wear metallic jewelry when working with batteries. Use non-conductive tools only. Discharge static electricity prior to working on a battery. Maintain eyewash, fire extinguisher and emergency communication device in the work area.

SECTION 9: Physical and Chemical Properties

		Lead and lead compounds	Electrolyte
Appearance	Form:	Solid	Liquid
	Color:	Grey	Colorless
	Odor:	Odorless	
Safety related data			
Solidification point:		327℃ [melting point]	-35 ~ -60℃
Boiling point:		1740℃	Approx. 108~114℃
Solubility in water:		Very low (0.15mg/l)	Fully soluble
Density (20℃):		11.35 g/cm3	1.2~1.3 g/ cm3
Vapor pressure (20℃):		N.A.	

Lead and Lead compounds used in Lead Acid batteries are poorly soluble in water; Lead can be dissolved in an acidic or alkaline environment only.

SECTION 10: Stability and Reactivity

Stability: The battery and contents are stable under normal conditions.

Conditions to avoid: Overheating or overcharging the battery may results in acid mist and hydrogen generation.

Incompatibility (materials to avoid): Strong alkaline materials, conductive metals, organic solvents, spark or open flame.

Hazardous byproducts: Hydrogen gas may be generated in an overcharged condition, in fire or at very high temperatures. In fire, may emit CO, CO2 and Sulfur Oxides.

Hazardous polymerization will not occur

Reactivity: Broken batteries may result in small amounts of spilled electrolyte. Electrolyte is a corrosive, nonflammable liquid. Electrolyte can destroy organic materials such as cardboard, wood, textiles. Electrolyte may produce hydrogen as a reaction with some metals.

SECTION 11: Toxicological Information

CSB VRLA batteries are sealed, recombinant design that require no water replacement throughout their service life, thus no contact is made with the battery's internal components or chemical hazards. Under normal use and handling, these batteries do not emit regulated or hazardous substances.

	Administration Route	Dose	Test Animal
LD50	Oral	2140 mg/kg	Rat
LC50	Inhalation	510 mg/m^3	Rat

Carcinogenicity: The International Agency on Cancer (IARCC) has classified "strong inorganic acid mists containing sulfuric acid" as a category 1 carcinogen (inhalation), a substance that is carcinogenic to humans. This classification does not apply to the liquid forms of sulfuric acid contained within the battery. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist at high levels.

SECTION 12: Ecological Information

This information is of relevance if the battery is broken and the ingredients are released to environment.

12.1 Electrolyte (diluted sulphuric acid)
In order to avoid damage to the sewage system, the acid has to be neutralized by means of time or sodium carbonate before disposal. Ecological damage is possible by change of pH. The electrolyte solution reacts with water and organic substances, causing damage to flora and fauna. The electrolyte may also contain soluble components of lead that can be toxic to aquatic environments.

12.2 Lead and Lead compounds
Chemical and physical treatment is required for the elimination from water. Waste water containing lead must not be disposed of in an untreated condition. The former classification of Lead compounds as toxic for the aquatic environment R50/53 had been triggered from test results generated in the 80's for soluble Lead compounds (Lead Acetate). The hardly soluble Lead compounds such as Battery Lead Oxide were not tested at this time. Tests on Battery Lead Oxide were carried out in 2001 and 2005. The respective test results conclude that Battery Lead Oxide is not toxic for the environment, neither R50 nor R50/53 nor R51/53. From this it follows that the general classification for Lead compounds (R50/53) does not apply to Battery Lead Oxide. As the result of this the Risk Phrase R52/53 (Harmful to aquatic organisms, may cause longterm adverse effects in the aquatic environment) applies to Battery Lead Oxide.

Effects of Battery Lead Oxide in the aquatic environment:
Toxicity for fish: 96 h LC 50 > 100 mg/l
Toxicity for daphnia: 48 h EC 50 > 100 mg/l
Toxicity for alga: 72 h IC 50 > 10 mg/l

The results demonstrate these Battery Lead Oxide compounds in a concentration of 100 mg/l have no adverse effect on fish and daphnia. A concentration of these Battery Lead Oxide of 10 mg/l has no adverse effect on the rate of growth and the biomass. For the classification according to Directive 67/548/EEC the most sensitive adverse effect has to be considered. As a result of the toxicity for alga at > 10 mg/l Battery Lead Oxide has to be classified according to the R-Phrases 52/53 (Harmful to aquatic organisms, may cause long term adverse effects in the aquatic environment).

SECTION 13: Disposal Considerations

Spent lead acid batteries (EWC 160601) are subject to regulation of the EU Battery Directive and its adoptions into national legislation on the composition and end of life management of batteries.

Spent Lead Acid batteries are recycled in lead refineries (secondary lead smelters). The components of a spent Lead Acid battery are recycled or reprocessed.

At the points of sale, the manufacturers and importers of batteries, respectively the metal dealers take back spent batteries, and render them to the secondary lead smelters for processing.

To simplify the collection and recycling or reprocessing process, spent Lead Acid batteries must not be mixed with other batteries. By no means may the electrolyte (diluted sulphuric acid) be emptied in an inexpert manner. This process is to be carried out by the processing companies only.

SECTION 14: Transport Information

All CSB batteries are identified as “Battery, Electric Storage, Wet, Nonspillable” when transported by air, sea or by land transportation. 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**. CSB battery(s) warning label identifies each battery as **NONSPILLABLE**.

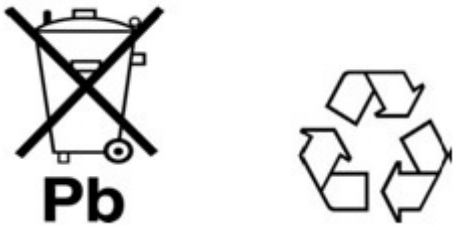
CSB seal lead-acid batteries are classified as “Nonspillable” for the purpose of transportation by DOT, and IATA/ICAO as result of passing the Vibration and Pressure Differential Test described in **DOT [49 CFR 173.159(f)] and IATA/ICAO [Special Provision A67]**. CSB seal lead-acid batteries can be safely transported on deck, or under deck stored on either a passenger or cargo vessel as result of passing the Vibration and Pressure Differential Tests as described in the IMDG regulations (Special Article 238).

To transport these batteries as “Nonspillable” they must be shipped in a condition that would protect them from short-circuits and be securely packaged so as to withstand conditions normal to transportation by a consumer, in or out of a device, they are unregulated thus requiring no additional special handling or packaging.

For all modes of transportation, each battery and outer package is labeled “NON-SPILLABLE” per 49 CFR 173.159(f). If you repackage our batteries either as batteries or as a component of another product you must label the outer package “NON-SPILLABLE” per 49 CFR 173.159(f).

SECTION 15: Regulatory Information

In accordance with EU Battery Directive and the respective national legislation, Lead Acid batteries have to be marked by a crossed out dust bin with the chemical symbol for lead shown below, together with the ISO return/recycling symbol. If other countries or the region have time in addition the stipulation must observe



SECTION 16: Other Information

Products such as Batteries are not in the scope of regulation which requires the publication of an EU Safety Data Sheet (91/155/EEC).

The information given above is provided in good faith based on existing knowledge and does

not constitute an assurance of safety under all conditions. It is the user's responsibility to observe all laws and regulations applicable for storage, use, maintenance or disposal of the product. If there are any queries, the supplier should be consulted.

However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.