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Safety Data Sheet

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Section 1: Identification

Chemical trade name (as used on label)	Valve Regulated Lead Acid Battery AlphaCell 100XTV, 150XTV, 195XTV and 240XTV
Chemical Family/Classification	Rechargeable Storage Batteries
Manufacturers Name:	Hitachi Chemical Energy Technology Co., Ltd.
Address	11F, No. 150, Sec. 4, Chengde Rd., Shilin Dist., Taipei City 11167, Taiwan
Website	WWW.CSB-BATTERY.COM

Section 2: Hazard Identification

Classification of the Substance or Mixture

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Material is an article. No health effects are expected during normal use of this product as sold. Hazardous exposure may occur when the product is heated, oxidized or otherwise processed, damaged or subjected to misuse. Follow manufacturer's instructions for installation, service and use.

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 sulfuric acid. Sulfuric 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.

Note: The batteries have to be marked with the symbols listed under Section 15.

Other Hazards

Adverse human health effects and symptoms:

	Acute	Chronic
Inhalation	Under normal conditions of use, no health effects are expected. Contents of an open battery can cause respiratory irritation.	Repeated and prolonged exposure may cause irritation.
Skin	Under normal conditions of use, no health effects are expected.	No data available.
Eye	Under normal conditions of use, no health effects are expected. Exposure to dust may cause irritation.	No data available.
Ingestion	Under normal conditions of use, no health effects are expected. Lead ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping.	No data available.
HMIS Rating for Sulfuric Acid	Health: 3 Flammability: 0 Reactivity: 2 Other: 0	
NFPA Rating for Sulfuric Acid	Health: 3 Flammability: 0 Reactivity: 2 Other: 0	
		Rating Codes 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

Section 3: Composition, Information on Ingredients³

Material	CAS No	EC No	OSHA PEL	ACGIH TLV	¹ By Weight%	Classification according to CLP (1272/2008)
Specific Chemical Identity: LEAD	74939-92-1	231-100-4	50 µg/m ³	150 µg/m ³	~ 57%	² T, R60, R61, S1, S2, S13, S35, S45, S53
Common Name: GRID						
Specific Chemical Identity: Lead Dioxide	1309-60-0	215-174-5	50 µg/m ³	150 µg/m ³	~ 22%	² T, R20/22, R33, R50/53, R61, S53, S45, S60, S61
Common Name: Lead Oxide						
Specific Chemical Identity: Sulfuric Acid	7664-93-90	231-639-5	1 mg/m ³	1 mg/m ³	~ 14%	C; R35; S1/2, S26, S30, S45
Common Name: ⁴ Battery Electrolyte (Acid)						
⁵ Plastic Container / Plastic Parts	—				~ 7%	—

NOTES:

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 4: First Aid Measures

Description of First Aid Measures

Electrolyte (diluted sulfuric acid): sulfuric acid acts corrosively and damages skin.
Lead compounds: lead compounds are classified as toxic for reproduction (if swallowed).

Electrolyte (Sulfuric Acid)

After Skin Contact	Rinse with water, remove and wash wetted clothing.
After Inhalation of Acid Mist	Inhale fresh air, seek advice of a medical doctor.
After Contact with the Eyes	Rinse under running water for several minutes, seek advice of a medical doctor.
After Swallowing	Drink lots of water immediately, swallow activated carbon, do not induce vomiting, seek advice of a medical doctor.

Lead Compounds

After Skin Contact	Clean with water and soap.
After Inhalation of Acid Mist	Inhale fresh air, seek advice of a medical doctor.
After Contact with the Eyes	Rinse under running water for several minutes, seek advice of a medical doctor.
After Swallowing	Wash mouth with water, seek advice of a medical doctor.

Section 5: Fire-fighting Measures

Unusual Fire and Explosion Hazards	Hydrogen and oxygen gases are produced in cells during normal battery operation and expel into air through vent caps.
Suitable Fire Extinguishing Agents	CO ² or dry powder extinguishing agents.
Unsuitable Fire Extinguishing Agents	Water, if the battery voltage is above 120V.
Special Protective Equipment	Protective goggles, respiratory protective equipment, acid protective equipment, acid proof clothing in case of larger stationary battery plants or where larger quantities are stored.
Special Firefighter Procedures	Use positive pressure, self-contained breathing apparatus.

Hydrogen Flash Point: -259°C; Hydrogen Auto-Ignition Point: 580°C;
Hydrogen Flammable Limits in Air (% by Volume): Lower Explosion Limit (LEL): 4.1 / Upper Explosion Limit (UEL): 74.2

Section 6: Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

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.

Note: Personal Protective Equipment advice is contained in Section 8 of the SDS.

Environmental Precautions

Prevent entry into waterways, sewers, basements or confined areas.
Runoff from fire control and dilution water may be toxic and corrosive and may cause adverse environmental impacts.

Methods and Materials for Containment and Cleanup

For Containment	In the event of a battery rupturing; stop the leak if it can be done without risk. Absorb with dirt, sand, or other non-combustible material. Cautiously neutralize spilled liquid.
For Cleanup	Dispose of in accordance with local, state, and national regulations.

Section 7: Handling and Storage

Precautions for Safe Handling

Handling:

- Keep away from heat and sources of ignition.
- Wash hands thoroughly after use.
- Do not use organic solvents; use only manufacturer recommended cleaners on the batteries.
- Avoid sparks.
- Do not remove vent caps.
- Do not stack batteries.
- Always protect terminals when possible and avoid accidental short circuit.

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. Do not store or charge batteries in temperatures under -40°F (-40°C). Keep away from fire, sparks and heat sources. Protect from damage to prevent possible leaks or spills.

Section 8: Exposure Controls/Personal Protection

Appropriate Engineering Controls

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

Substance Name	EC-No.	CAS-No.	Description
Lead	231-100-4	7439-92-1	No exposure to lead and lead-containing battery paste during normal conditions of use.
Sulfuric Acid	231-639-5	7664-93-9	R-phrases R35: Causes severe chemical burns. S-phrases S2: Keep out of reach of children. S16: Keep away from sparks or open flame. Do not smoke when using this product. S26: In case of contact with eyes rinse immediately with plenty of water and seek medical advice. S45: In case of accident or if feeling unwell, seek medical advice immediately (Show the label where possible).

Individual Protection Measures

Personal Protective Equipment:

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

Eye / Face 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. Ensure that there is eyewash, a fire extinguisher and an emergency communication device in the work area.

Section 9: Physical and Chemical Properties

Item		Lead and Lead Compounds	Electrolyte
Appearance	Form	Solid	Liquid
	Color	Grey	Colorless
	Odor	Odorless	
PH		N/A	
Melting Point / Freezing Point		327.4°C (Melting Point)	-35 to -60°C
Initial Boiling Point and Boiling Range		1740°C (lit.)	~ 108 to 114°C
Flash Point		N/A	
Evaporation Rate		N/A	
Vapor Pressure (mm Hg @ 20°C)		N/A	< 0.3mmHg
Vapor Density (Air = 1)		7.1	3.4
Density (20°C)		11.35 g/cm ³	1.2 to 1.3 g/cm ³
Solubility In Water		Very Low (0.15 mg/l)	Fully Soluble
Partition Coefficient: N-Octanol / Water		N/A	
Decomposition Temperature		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

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 and textiles. Electrolyte may produce hydrogen as a reaction with some metals.
Chemical Stability	The battery and contents are stable under normal conditions.
Possibility of Hazardous Reactions	Hazardous polymerization will not occur.
Conditions to Avoid	Overheating or overcharging the battery may result in acid mist and hydrogen generation.
Materials to Avoid	Strong alkaline materials, conductive metals, organic solvents, spark or open flame.
Hazardous By-product	Hydrogen gas may be generated in an overcharge condition, in fire or at very high temperatures. In a fire, it may emit CO, CO ² and Sulfur Oxides.

Section 11: Toxicological Information

Information on Toxicological Effects

AlphaCell XTV 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.

Sulfuric Acid (7664-93-9)

Administration Route	Method	Dose	Test Animal
Acute Oral Toxicity	LD50	2140 mg/kg	Rat
Acute Inhalative Toxicity (Vapor)	LC50	510 mg/m ³	Rat

Route of Exposure

	Acute	Chronic
Inhalation	Under normal conditions of use, no health effects are expected. Contents of an open battery can cause respiratory irritation.	Repeated and prolonged exposure may cause irritation.
Skin	Under normal conditions of use, no health effects are expected.	No data available.
Eye	Under normal conditions of use, no health effects are expected. Exposure to dust may cause irritation.	No data available.
Ingestion	Under normal conditions of use, no health effects are expected. Lead ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping.	No data available.

Carcinogenicity: The International Agency on Cancer (IARC) 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.

Electrolyte (diluted sulfuric acid)

In order to avoid damage to the sewage system, the acid has to be neutralized by means of lime 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.

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 1980s 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 long term 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 algae 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 Consideration

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 sulfuric acid) be emptied in an inexpert manner. This process is to be carried out by the processing companies only.

Section 14: Transport Information

All AlphaCell XTV 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. AlphaCell XTV battery(s) warning label identifies each battery as NONSPILLABLE.

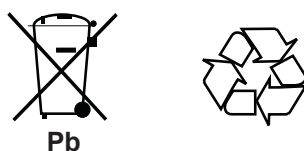
AlphaCell XTV sealed lead-acid batteries are classified as "Nonspillable" for the purpose of transportation by DOT, and IATA/ICAO as result of passing the Vibration and Pressure Differential Test described in DOT [49 CFR 173.159(f)] and IATA/ICAO [Special Provision A67]. AlphaCell XTV sealed lead-acid 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.



In addition, some of the following hazard symbols described below may apply:



Corrosive



Explosive gas mixture



Read instructions



Keep out of reach of children



No smoking, open flames, or sparks



Wear safety goggles

State Regulations (US)

California Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds known to the state of California to cause cancer and reproductive harm. Batteries also contain other chemicals known to the state of California to cause cancer. Wash hands after handling.

International Regulations (Non-US)

National regulations(Canada):

- Canadian Domestic Substance List (DSL):
All ingredients remaining in the finished product as distributed into commerce are included on the Domestic Substances List.
- Canada NDSL:
None of the components on this SDS are listed on the Canadian NDSL

WHMIS Classifications:

Class E: Corrosive materials present at greater than 1%

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Controlled Products Regulations.

About Battery Handling, please see the OSHA 29 CFR 1910.268(b) as below:

910.268(b)(2)(i)

Eye protection devices which provide side as well as frontal eye protection for employees shall be provided when measuring storage battery specific gravity or handling electrolyte and the employer shall ensure that such devices are used by the employees. The employer shall also ensure that acid resistant gloves and aprons shall be worn for protection against splattering. Facilities for quick drenching or flushing of the eyes and body shall be provided unless the storage batteries are of the enclosed type and equipped with explosion proof vents, in which case sealed water rinse or neutralizing packs may be substituted for the quick drenching or flushing facilities. Employees assigned to work with storage batteries shall be instructed in emergency procedures such as dealing with accidental acid spills.

910.268(b)(2)(ii)

Electrolyte (acid or base, and distilled water) for battery cells shall be mixed in a well ventilated room. Acid or base shall be poured gradually, while stirring, into the water. Water shall never be poured into concentrated (greater than 75 percent) acid solutions. Electrolyte shall never be placed in metal containers nor stirred with metal objects.

910.268(b)(2)(iii)

When taking specific gravity readings, the open end of the hydrometer shall be covered with an acid resistant material while moving it from cell to cell to avoid splashing or throwing the electrolyte.

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.

The contents and format of this SDS are in accordance with EEC Commission Directive 1999/45/EC, 67/548/EC, 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex II.