



**GS Yuasa Battery Europe Ltd.**  
**SAFETY DATA SHEET**  
In accordance with REACH Regulation EC No. 453/2010

Document:	SDS 01
Issue No:	16
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**SECTION 1: IDENTIFICATION OF THE PRODUCT AND OF THE MANUFACTURER/SUPPLIER**

1.1	<b>Product Identifier:</b>	<b>Valve Regulated Lead-Acid (VRLA) Industrial Battery</b>
	<b>Classification:</b>	Battery, wet, non-spillable, electric storage ( <b>Mixture</b> ) Substance classification: UN 2800
	<b>Product Codes:</b>	EN & ENL, NP, NPC, NPH, NPL, NPW, RE, REC, REW, SW, SWL, TEV, FXH, UXH, UXL, Yucel, YPC and YFT Series of Industrial VRLA Batteries
1.2	<b>Relevant Identified Uses Of The Product And Uses Advised Against</b>	<p><u>Relevant identified uses:</u> Standby: Telecoms; UPS; alarm and security systems; emergency lighting; utility switching Cyclic: Golf Trolleys, portable tools, portable lighting, wheelchairs, remote telemetry Energy storage: Photovoltaic energy systems (PVES); wind turbines</p> <p><u>Uses advised against:</u> Automotive, commercial, and agricultural SLI applications</p> <p><u>Reason why uses advised against:</u> High starting and ignition current demands beyond the design of internal and external current carrying components</p>
1.3	<b>Details Of The Supplier Of The Safety Data Sheet</b>	<p><b>Supplier:</b> <b>GS Yuasa Battery Europe Ltd,</b> <b>Address:</b> Unit 22, Rassau Industrial Estate, Ebbw Vale, NP23 5SD United Kingdom</p> <p><b>Contact:</b> <b>Mike TAYLOR (Product Manager)</b> Tel: (+44) 07733 302 242 e-mail: <a href="mailto:mike.taylor@yuasaeurope.com">mike.taylor@yuasaeurope.com</a> Language: English language only Available: Office hours only: 8am to 4:30pm (08:00 to 16:30)</p>
	<b>National Contacts:</b>	<p><u>France:</u> GS Yuasa Battery France S.A. Contact: Christian RAYNAUD (Technical Manager) Tel: (+33) 0474-95-90-95 e-mail: <a href="mailto:christian.raynaud@gs-yuasa.fr">christian.raynaud@gs-yuasa.fr</a> Language: French &amp; English</p> <p><u>Germany:</u> GS Yuasa Battery Germany GmbH Contact: Joachim HEER (UPS / Project Manager) Tel: (+49) 0211-41790-15 e-mail: <a href="mailto:Joachim.Heer@gs-yuasa.de">Joachim.Heer@gs-yuasa.de</a> Language: German &amp; English</p> <p><u>Iberia:</u> GS Yuasa Battery Iberia S.A. Contact: Antonio PULIDO MARTINEZ (Director Commercial Industrial) Tel: (+34) 091-748-89-19 e-mail: <a href="mailto:antonio.pulido@gs-yuasa.es">antonio.pulido@gs-yuasa.es</a> Language: Spanish &amp; English</p> <p><u>Italy:</u> GS Yuasa Battery Italy Srl. Contact: Marco FILIPPI (Technical Manager) Tel: (+39) 02-3800-91-08 e-mail: <a href="mailto:marco.filippi@gs-yuasa.it">marco.filippi@gs-yuasa.it</a> Language: Italian &amp; English</p> <p><u>UK:</u> GS Yuasa Battery Sales UK Ltd. Contact: Matt JORDAN (General Manager) Tel: (+44) 01793-833-562 e-mail: <a href="mailto:Matt.Jordan@gs-yuasa.uk">Matt.Jordan@gs-yuasa.uk</a> Language: English language only</p>
1.4	<b>Emergency telephone number:</b>	GS Yuasa Battery Manufacturing UK Ltd. Contact: <b>Mike TAYLOR (Product Manager)</b> Tel: <b>(+44) 07733 302 242</b> Opening Hours: Only available during office hours, 8am to 4pm (08:00 to 16:00) Language: English language only Available: Office hours only: 8am to 4:30pm (08:00 to 16:30)



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**SECTION 2: HAZARDS IDENTIFICATION – In the event of the internal battery components being exposed**

2.1	Classification of the substance or mixture	
According to Regulation (EC) No. 1272/2008 (CLP)	H314	Skin Corr.1A
	H360Fd	Repr.1A
Full text of H phrases – see section 16	H372	STOT RE1
	H400	Aquatic Acute 1
	H410	Aquatic Chronic 1

**Adverse physicochemical, human health and environmental effects**

No additional information available

**2.2 Label Elements**

Labelling according to Regulation (EC) No. 1272/2008 (CLP)

Hazard Pictograms (CLP)



GHS05



GHS08



GHS09

Signal Word (CLP) - **DANGER**

Hazard Statements (CLP)	Hazard Statement	Description
	H314	Causes severe skin burns and eye damage
	H360Fd	May damage fertility. Suspected of damaging the unborn child
	H372	Causes damage to organs through prolonged or repeated exposure
	H400	Very toxic to aquatic life
	H410	Very toxic to aquatic life with long lasting effects

Precautionary Statements (CLP)	Precautionary Statement	Description
	P201	Obtain special instructions before use
	P202	Do not handle until all safety precautions have been read and understood
	P260	Do not breathe dust/fume/gas/mists/vapours/spray
	P264	Wash .... Thoroughly after handling
	P270	Do not eat, drink or smoke when using this product
	P273	Avoid release to the environment

**2.3 Other Hazards**

VRLA Battery	Category	Description
	<b>Mechanical</b>	VRLA Batteries can be heavy. Correct manual handling techniques and/or mechanical lifting aides (e.g. Fork Lift Truck) must be used.
	<b>Electrical</b>	VRLA Batteries can contain large amounts of electrical energy which can give very high discharge currents and severe electrical shock if the terminals are short circuited.
	<b>Chemical</b>	<ul style="list-style-type: none"><li>The VRLA Battery presents no chemical hazards during the normal operation provided the recommendations for handling, storage, transport and usage are observed.</li><li>VRLA Batteries emit hydrogen gas which is highly flammable and will form explosive mixtures in air from approx. 4% to 76%. This can be ignited by a spark at any voltage, naked flames or other sources of ignition.</li><li>If the battery is broken and the internal components exposed, hazards may exist which require careful attention.</li></ul>



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**SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS**

3.1	Substances present in the product				
Components	Classification according to Regulation (EC) No. 1272/2008 (ELP) <sup>1</sup>	Substances	Approximate % (w/w)	Chemical Symbol	CAS No.
Plate Grid		Metallic Lead	30 to 40	Pb	7439-92-1
		Calcium	< 0.1	Ca	7440-70-2
		Tin	< 2	Sn	7440-31-5
Active Materials	H360 H372 H400 H410	Lead Monoxide	< 0.1	PbO	1317-36-8
		Lead Dioxide (Lead IV Oxide)	35 to 45	PbO <sub>2</sub>	1309-60-0
		Barium compound	< 1.5	Ba	7440-39-3
Battery Electrolyte	H314	Dilute Sulphuric Acid	10 to 20	H <sub>2</sub> SO <sub>4</sub>	7664-93-9
Case Material		<b>Standard Grade, UL94:HB</b> • ABS (Acrylonitrile-Butadiene-Styrene Copolymer)	5 to 10		9003-56-9
		<b>Flame Retardant (FR) Grade, UL94:V0</b> • ABS (Acrylonitrile-Butadiene-Styrene Copolymer)	5 to 10		9003-56-9
		• Tetrabromobisphenol-A • Antimony trioxide	< 0.1 < 0.01		79-94-7 1309-64-4
Separator Material		Absorbent Glass Matt (AGM) Separator (100% Borosilicate Glass Microfibre)	2 to 5		65997-17-3

Inorganic lead and battery electrolyte (Dilute Sulphuric Acid) are the main components of VRLA batteries. Other substances may be present but in small amounts dependant on battery type. Contact GS Yuasa Battery Manufacturing UK Ltd for further information.

**SECTION 4: FIRST AID MEASURES FOR ACUTE EXPOSURE**

This information is of relevance only if the VRLA Battery has suffered damage, is broken and persons have direct contact with the internal components.

4.1	Description of first aid measures	
Components		Action
Plate Grids and Active materials	Inhalation:	Remove the person from exposure to fresh air. Seek advice from a medical doctor
	Ingestion	Wash out mouth with water and give plenty of water to drink. Do not induce vomiting. Seek advice from a medical doctor
	Skin Contact:	Wash off with plenty of water and soap to prevent accidental ingestion or inhalation. Seek medical advice if pain or rash does not reduce
	Eye Contact:	<b>Immediately</b> irrigate with eyewash solution or clean water for at least 10 minutes, holding the eyelids apart. Then take the person to hospital without further delay
	Self-protection for the first aider	Eye protection (safety glasses or face shield), and <b>heavy-duty gloves</b> are required. In case of inhalation, a face mask or respirator may be required.
Battery Electrolyte		<b><u>SPEED IS ESSENTIAL - OBTAIN IMMEDIATE MEDICAL ATTENTION.</u></b>
	Inhalation:	Remove the person from exposure to fresh air. If the person continues to feel unwell seek advice from a medical doctor.
	Ingestion	Wash out mouth with water and give plenty of water to drink. Do not induce vomiting. If the person continues to feel unwell seek advice from a medical doctor.
	Skin Contact:	Drench with large quantities of water. Remove contaminated clothing and place in water to dilute the acid. Continue to wash the affected area for at least 10 minutes. Seek advice from a medical doctor
	Eye Contact:	<b><u>SPEED IS ESSENTIAL - OBTAIN IMMEDIATE MEDICAL ATTENTION</u></b> <b>Immediately</b> irrigate with eyewash solution or clean water for at least 10 minutes, holding the eyelids apart. Then take the person to hospital without further delay
Self-protection for the first aider	Eye protection (safety glasses or face shield), and heavy-duty gloves are required. In case of inhalation, a face mask or respirator may be required.	
Case Material	Inhalation:	Material can burn in a fire with toxic smoke and decomposition products. Upon inhalation of decomposition products, keep patient calm, remove to fresh air, and seek advice from a medical doctor. If a large quantity is inhaled take the person to hospital. <b>Note to physician:</b> Treat according to symptoms (decontamination, vital functions), no known specific antidote.



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		Ingestion	Wash out mouth with water and give plenty of water to drink. Do not induce vomiting. If the person continues to feel unwell seek advice from a medical doctor.
		Skin Contact:	Areas affected by molten material should be quickly placed under cold running water and a sterile protective dressing applied. Seek advice from a medical doctor.
		Eye Contact:	May cause irritation or injury due to mechanical action and traces of Battery Electrolyte. <b>Immediately</b> irrigate with eyewash solution or clean water for at least 10 minutes, holding the eyelids apart. Then take the person to hospital without further delay
		Self-protection for the first aider	Eye protection (safety glasses or face shield), and disposable gloves are required. In case of inhalation, a face mask or respirator may be required.
	<b>Separator Material</b>	Inhalation:	Remove patient from exposure to fresh air. If irritation persists, seek advice from a medical doctor
		Ingestion	Wash out mouth with water and give plenty of water to drink. Do not induce vomiting. If the person continues to feel unwell seek advice from a medical doctor.
		Skin Contact:	After contact with skin, wash immediately with plenty of soap and water. If irritation persists, seek advice from a medical doctor
		Eye Contact:	May cause irritation or injury due to mechanical action and traces of Battery Electrolyte. <b>Immediately</b> irrigate with eyewash solution or clean water for at least 10 minutes, holding the eyelids apart. Then take the person to hospital without further delay
		Self-protection for the first aider	Eye protection (safety glasses or face shield), and disposable gloves are required. In case of inhalation, a face mask or respirator may be required.

### SECTION 5: FIRE-FIGHTING AND EXPLOSION HAZARD MEASURES

5	VRLA Battery	General Information: Explosion Hazard 	<ul style="list-style-type: none"> <li>VRLA Batteries emit hydrogen gas which is highly flammable and will form explosive mixtures in air from approx. 4% to 76%. This can be ignited by a spark at any voltage, naked flames or other sources of ignition.</li> <li>Batteries in use will be part of an electrical circuit and must be isolated from the power source before attempting to put out a fire. Switch the power <b>OFF</b> before disconnecting the batteries from the power source.</li> <li>Damaged batteries may expose negative plates, grey in colour, which may ignite if allowed to dry out. These plates may be wetted down with water after the battery has been removed from all electrical circuits.</li> </ul>
5.1		Suitable Extinguisher types:	CO <sub>2</sub> ; Foam; Dry Powder.
		Unsuitable Extinguisher types	Water extinguishers must never be used to put out an electrical fire.
5.2		Hazardous combustion & decomposition products:	Carbon monoxide, Sulphur Dioxide, Sulphur Trioxide, Lead fume and vapour, toxic fumes from decomposition of battery case materials.
5.3		Advice for fire-fighters	Full face visor or safety goggles; Respiratory equipment or self-contained breathing apparatus (SCBA); Full acid resistant protective clothing must be worn in fire-fighting conditions.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

This information is of relevance only if the VRLA Battery has suffered damage and is broken.

6	<b>Components</b> VRLA Battery		VRLA batteries are designed to be safe to handle and not to leak battery electrolyte under normal conditions. In case of accidental damage heavy-duty gloves are required to pick-up the battery to protect against unseen electrolyte leakage
	<b>Plate Grids and Active Materials</b>	Personal Precautions:	Eye protection (safety glasses or face shield), and heavy-duty gloves are required. If the material is wet, a face mask or respirator is not required. If the material is dry, a face mask or respirator is required
		Clean-up Methods:	Large, solid pieces may be picked up and bagged for recycling. Never use a brush to sweep up debris; it may create Lead-dust in the air. Wet clean the spill area to remove all traces of debris. Battery debris and cleaning materials must be collected and placed in an inert sealed container (e.g. self-seal plastic bag or bucket) for disposal, see Section 13.
		Environmental Precautions:	Do not allow material to enter a watercourse. Exposed Lead materials must be placed in an inert sealed container (e.g. self-seal plastic bag or bucket) for disposal, see Section 13.
	<b>Battery Electrolyte:</b>	Personal Precautions:	Ensure suitable, acid resistant personal protective clothing (including heavy-duty gloves, safety glasses and respiratory protection) is worn during removal and clean-up of spillages.



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	Clean-up Methods:	
	Small spillages:	Neutralise and absorb the spillage using soda ash, sodium bicarbonate (available from supermarkets), sodium carbonate or calcium carbonate powder. Wet clean the spill area to remove all traces of debris. Battery debris and cleaning materials must be collected and placed in an inert sealed container (e.g. self-seal plastic bag or bucket) for disposal, see Section 13.
	Large spillages:	Large amounts of electrolyte spillage are unlikely with VRLA batteries since the electrolyte is fully absorbed in the active materials and separator. Bund the spillage area using dry sand, earth, sawdust or other inert material.  Neutralise the electrolyte using soda ash, sodium bicarbonate (available from supermarkets), sodium carbonate or calcium carbonate powder. Wet clean the spill area to remove all traces of debris and electrolyte. Cleaning materials must be collected and placed in an inert sealed container (e.g. self-seal plastic bag or bucket) for disposal, see Section 13.
	Environmental Precautions:	Battery electrolyte must not be allowed to enter any drains or sewage system or water course.
<b>Case Material:</b>	Clean-up Methods:	Assume battery case material is contaminated and proceed as for <b>Plate Grids and Active Materials</b> above.
<b>Separator Material:</b>	Clean-up Methods:	Assume battery case material is contaminated and proceed as for <b>Plate Grids and Active Materials</b> above.

Note: If appropriate refer to 8 and 13

**SECTION 7: HANDLING AND STORAGE**

7.1	<b>Component:</b>	Precautions For Safe Handling:	
	VRLA Battery		<p>Only trained operators should be allowed to handle VRLA batteries.</p> <p><b>PPE:</b> No specialist protective clothing or equipment is required, except that for handling heavy weights.</p> <p><b>Hygiene:</b> There are no specialist requirements beyond good, standard workplace practices.</p> <p><b>Mechanical lifting aides:</b> (e.g. FLT and pallet trucks) will be required to move pallets of batteries. Weight approximately 1 tonne</p> <p><b>Mechanical handling aides:</b> (e.g. trucks and lifters) will be required to handle individual batteries over 25 kg in weight.</p> <p><b>General Safety Considerations:</b> Do not drop batteries: dents and deformation of the case may be an indication of internal damage to the battery. Cracks will allow electrolyte to escape. Do not place VRLA Batteries lid-to-lid so that terminals will short-circuit.</p>
7.2		Conditions For Safe Storage, Including Any Incompatibilities:	<p>Store VRLA Batteries in a cool, well-ventilated area with a solid, impervious surface, and adequate containment in the event of accidental acid spillage.</p> <p>Store under a roof and protect against direct sunlight and adverse weather conditions including rain, snow and other sources of water.</p> <p>Storage of large quantities of VRLA batteries may require approval from local environmental protection agency and/or local water authorities.</p> <p>Pallets of VRLA Batteries are heavy. Store at ground level or in lower levels of storage systems (e.g. racking).</p> <p>Take special care in dry conditions to avoid the risk of electrostatic discharges.</p> <p>Protect against physical damage and exposure to organic solvents and other incompatible materials.</p> <p>Do not store VRLA batteries close to sources of heat, naked flames and sparks.</p> <p>Store batteries in their original packaging wherever possible. When batteries are removed from their original packaging (e.g. for transportation of small quantities), ensure new packaging protects the batteries from damage and the risk of short-circuit of the terminals.</p>
		End-of-Life (EC WEEE Regulations)	Ensure batteries are removed from equipment at the end of life and are collected for recycling by an approved contractor.
		Specific End Uses: Installation:	<ol style="list-style-type: none"> <li>Refer to EN 50272-1:2010, Safety requirements for secondary batteries and battery installations – Part 1 General safety information.</li> <li>Refer to EN 50272-2:2001, Safety requirements for secondary batteries and battery installations – Part 2 Stationary batteries.</li> </ol>
7.3			



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**SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION**

Components			
8.1	VRLA Battery	Control Parameters:	There are no special control parameters for the handling, storage, installation of VRLA Batteries.
			VRLA Batteries emit hydrogen gas which is highly flammable and will form explosive mixtures in air from approximately 4% to 76%. Never install VRLA Batteries in a gas-tight enclosure during storage, transport or usage.
		Exposure Control:	There are no special exposure controls for the handling, storage, installation or use of VRLA Batteries.
		Personal Protection:	When there is no evidence of damage or visible traces of liquid (electrolyte) or solid deposits on the batteries they may be handled safely without extra personal protective equipment.  Ensure electrical insulation equipment is used when installing batteries. (e.g. insulated mats and covers; insulated tools)  Remove ALL metallic objects from the person when working with VRLA Batteries: e.g. Jewellery (rings, watches, bracelets, necklaces), pens, torches, etc.  Where there are signs of damage or liquid (electrolyte) or solid deposits, rubber gloves and acid resistant clothing must be worn when handling the batteries and affected packaging to protect against the effects of any electrolyte that may be present. If it is suspected that free electrolyte is present, then safety glasses must be worn, and if large amounts are present, chemical goggles or face shield should be used.
		<b>UL CAUTIONARY STATEMENT:</b>	"Warning: Risk of fire, explosion, or burns. Do not disassemble; heat above 50°C; or incinerate".

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

Components			
9.1	VRLA Battery	<ul style="list-style-type: none"> <li>The main components are listed in <b>SECTION 2</b> above.</li> <li>The undamaged product is a manufactured article in an inert plastic (ABS) case, which will burn if subjected to high temperatures or sources of ignition. Some battery types are made with Flame Retardant ABS cases, see technical specification. These batteries carry the suffix 'FR' after the battery type; e.g. NP24-12IFR</li> </ul>	

The information below refers to the physical and chemical properties of the main VRLA Battery components and substances. This information is published for reference only.

Component	Appearance	Safety-related data	
<b>Plate Grids and Active materials:</b>	<i>Form</i>	Solid	
	<i>Colour</i>	Grey or brown	
	<i>Odour</i>	Odourless	
		<i>Solidification point</i>	327 °C
		<i>Boiling point</i>	1740 °C
		<i>Solubility in water</i>	Very low (0.15mg/l)
<b>Battery Electrolyte:</b>		<i>Solubility in acid or alkaline solutions</i>	Yes, dependant on the strength of solution.
		<i>Density (at 20°C)</i>	11.35 g/cm <sup>3</sup>
		<i>Vapour pressure (at 20°C)</i>	*Undetectable
	<i>Form</i>	Liquid	
	<i>Colour</i>	Colourless	
	<i>Odour</i>	Odourless	
<b>Case Material:</b>		<i>Solidification point</i>	-35 to -60 °C
		<i>Boiling point</i>	Approx. 108 to 114 °C
		<i>Solubility in water</i>	Complete
		<i>Density (at 20°C)</i>	Variable up to 1.350 g/cm <sup>3</sup>
		<i>Vapour pressure (at 20°C)</i>	*10-20 mmHg
		<i>Safety-related data</i>	
<b>Separator Material:</b>	<i>Form</i>	Solid	
	<i>Colour</i>	Grey or black	
	<i>Odour</i>	Slight Odour	
		<i>Softening point</i>	> 100 °C (DIN 53460)
		<i>Flash Point</i>	>330 °C
		<i>Solubility in water</i>	Insoluble
	<i>Solubility in other solvents</i>	Soluble in polar solvents, aromatic solvents, chlorinated hydrocarbons.	
	<i>Density (at 20°C)</i>	1.07-1.4 g/cm <sup>3</sup> (DIN 53479)	
	<i>Vapour pressure (at 20°C)</i>	*Undetectable	
	<i>Form</i>	Fibrous material	
	<i>Colour</i>	White	
	<i>Odour</i>	Odourless	
		<i>Solidification point</i>	*820°C
		<i>Boiling point</i>	*>2500°C
		<i>Solubility in water</i>	Insoluble
	<i>Density (at 20°C)</i>	*2.23g/cm <sup>3</sup>	
	<i>Vapour pressure (at 20°C)</i>	*Undetectable	

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**SECTION 10: STABILITY AND REACTIVITY**

	Components		
10.1	VRLA Battery	Stability:	Within the operational temperature range -20 to +50 °C the undamaged product is stable.
10.4	Plate Grids and Active materials:	Materials & Conditions to Avoid:	Powdered Lead reacts violently with fused ammonium nitrate and sodium acetylde. Reacts violently when in contact with chlorine trifluoride.
10.3	Battery Electrolyte:	Possibility of Hazardous Reactions	<ul style="list-style-type: none"> <li>Dilution of the higher concentrated grades with water may liberate excessive heat.</li> <li>Highly reactive with metals and organic materials.</li> <li>On contact with metals, may generate hydrogen which forms explosive mixtures with air.</li> <li>Destroys organic materials such as cardboard, wood, textiles, etc.</li> <li>Vigorous reaction with sodium hydroxide and alkalis.</li> </ul>
10.6		Hazardous Decomposition Product(s):	<ul style="list-style-type: none"> <li>Sulphur oxides</li> </ul>
10.1	Case Material:	Materials & Conditions to Avoid:	<ul style="list-style-type: none"> <li>To avoid thermal decomposition, do not overheat.</li> <li>Starts to decompose at temperatures &gt;275°C.</li> <li>Powerful oxidising agents.</li> </ul>
10.6		Hazardous decomposition products:	<ul style="list-style-type: none"> <li>Monomers, other degradation products, traces of hydrogen cyanide.</li> </ul>
10.1	Separator Material:	Stability:	<ul style="list-style-type: none"> <li>Stable material.</li> </ul>
10.4		Materials & Conditions to Avoid:	<ul style="list-style-type: none"> <li>Incompatible with Hydrofluoric acid and concentrated Sodium Hydroxide.</li> </ul>
10.6		Hazardous decomposition products:	<ul style="list-style-type: none"> <li>No hazardous polymerisation expected.</li> </ul>

**SECTION 11: TOXICOLOGICAL INFORMATION**

This information is of relevance only if the VRLA Battery has suffered damage and is broken.

	Components		
11	VRLA Battery		<ul style="list-style-type: none"> <li>This information does not apply to the undamaged VRLA Battery. It is of relevance if the battery is broken and the components are released to the environment.</li> <li>Exposure limits may vary according to national law and regulations.</li> </ul>
11.1	Plate Grids: Metallic Lead, Lead alloys.	Acute Toxicity 	<ul style="list-style-type: none"> <li>Toxic by ingestion or inhalation</li> <li>Chronic poison</li> <li>Lead is a poison that affects virtually every system in the body</li> <li>Symptoms include fatigue, headaches, constipation, aching bones and muscles, gastrointestinal tract disturbances and reduced appetite</li> <li>Blood Lead levels of 80 µg/dl and above have been associated with both acute and chronic effects of Lead poisoning</li> </ul>
	Active materials: Lead dioxide.	Acute Toxicity 	<ul style="list-style-type: none"> <li>Toxic by ingestion or inhalation</li> <li>Chronic poison</li> <li>Chronic exposure to Lead compounds may lead to a build-up of Lead in the body, giving rise to a variety of health problems, including anaemia, kidney and liver damage, impaired eyesight, memory loss and CNS<sup>2</sup> damage</li> </ul>
	Battery Electrolyte:	Corrosive 	Corrosive, the more concentrated solutions can cause serious burns to the mouth, eyes and skin Harmful by ingestion and through skin contact
		Inhalation: 	Mist is a severe irritant to the respiratory tract. Fluid build-up on the lung (pulmonary oedema) may occur up to 48 hours after exposure and could prove fatal
		Ingestion:	Will immediately cause severe corrosion of and damage to the gastrointestinal tract

<sup>2</sup> CNS = Central Nervous System



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		Eye Contact:	Risk of serious damage to eyes. Causes severe burns. May cause prolonged or permanent damage or even total loss of sight. Mist will cause irritation
	<b>Case Material:</b>		According to information available the product is not harmful to health provided it is correctly handled and processed according to the given recommendations.
	<b>Separator Material:</b>		Based on animal implantation and epidemiologic studies glass microfibers are thought to have some limited carcinogenic potential and as such are designated as Group 2B materials (IARC, US). The material should be treated as a category 3 carcinogen (Europe). Limited evidence of carcinogenic effect.

**SECTION 12: ECOLOGICAL INFORMATION**

This information is of relevance only if the VRLA Battery has suffered damage and is broken.

	<b>Components</b>		
12.1	<b>VRLA Battery</b>		This information does not apply to the undamaged VRLA Battery. It is of relevance if the battery is broken and the components are released to the environment.
12.2	<b>Plate Grids and Active materials:</b>	Metallic Lead, Lead alloys and Lead dioxide.	Chemical and physical treatment is required for the elimination of Lead from water. Waste water containing Lead must not be disposed of in an untreated condition.
		Ecotoxicity:	<ul style="list-style-type: none"> <li>Lead metal in massive form is not classified as hazardous to the aquatic environment, due to its low solubility and rapid removal from the water column. Inorganic lead compounds are considered to be acutely toxic in the environment and also to present a long-term hazard to aquatic organisms.</li> </ul>
		H Phrase H400 &410 Effect in the aquatic environment:	<ul style="list-style-type: none"> <li>Toxicity for fish: 96 h LC 50 &gt; 100 mg/l</li> <li>Toxicity for daphnia: 48 h EC 50 &gt; 100 mg/l</li> <li>Toxicity for alga: 72 h IC 50 &gt; 10 mg/l</li> </ul>
12.3	<b>Battery Electrolyte:</b>	Ecotoxicity:	<ul style="list-style-type: none"> <li>In order to avoid damage to the sewerage system, the acid has to be neutralised by means of soda ash, sodium bicarbonate or sodium carbonate before disposal.</li> <li>Ecological damage is possible by change of pH. The electrolyte solution reacts with water and organic substances, causing damage to flora and fauna.</li> <li>The electrolyte may also contain components of Lead that can be toxic to aquatic environments.</li> </ul>
		Persistence and Degradation:	Remains indefinitely in the environment as sulphate.
12.4	<b>Case Material:</b>	Elimination information:	No data available: insoluble in water
		Behaviour and environmental fate:	Due to the consistency of the product, and its insolubility in water, it will apparently not be bio-available.
12.5	<b>Separator Material:</b>		No data available: insoluble in water Not thought to pose any risk to the environment.

**SECTION 13: DISPOSAL CONSIDERATIONS**

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**SAFETY DATA SHEET**  
 In accordance with REACH Regulation EC No. 453/2010

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Components			
13.1	VRLA Battery	Europe:	<ul style="list-style-type: none"> <li>Spent (used) VRLA Batteries are subject to the requirements of the Batteries Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators. Spent (used) VRLA Batteries MUST be sent for recycling through an authorised contractor at the end-of-life.</li> <li>The WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment) applies. Spent (used) VRLA Batteries MUST be removed from electrical and electronic equipment at the end-of-life.</li> </ul>
		Worldwide:	<ul style="list-style-type: none"> <li>VRLA batteries contain inorganic Lead compounds and Sulphuric Acid which are damaging to the environment.</li> <li>Spent (used) batteries must be disposed of in an environmentally friendly manner in accordance with local national laws and regulations.</li> </ul>
			<ul style="list-style-type: none"> <li>VRLA batteries must not be dismantled, burnt or incinerated as a means of disposal.</li> <li>At the end of life VRLA batteries may still be electrically 'live' and contain a large amount of electrical energy. The same care and attention to safe handling should be taken as when handling new batteries. Particular care must be taken to avoid short-circuiting the battery terminals.</li> </ul>
13.2	Plate Grids and Active materials:	Europe Worldwide	<ul style="list-style-type: none"> <li>Metallic Lead and active materials (Lead Oxides) must be recycled.</li> <li>Disposal must be carried out in accordance with the European Hazardous Waste Directive 2008/98/EC</li> </ul>
13.3	Battery Electrolyte:	Europe	<ul style="list-style-type: none"> <li>Disposal must be carried out in accordance with the European Hazardous Waste Directive 2008/98/EC on the protection of the environment through criminal law</li> </ul>
		Worldwide	<ul style="list-style-type: none"> <li>Disposal should be in accordance with local, state or national legislation.</li> </ul>
		General	<ul style="list-style-type: none"> <li>Battery electrolyte is dilute Sulphuric Acid, the strength of which depends on the state of charge of the batteries. It must be neutralised before disposal. See SECTION 6 for clean-up and disposal advice.</li> </ul>
13.3	Case Material:		<ul style="list-style-type: none"> <li>Do not dispose of this product into sewers, any ocean or water course in order to prevent marine animals and birds from ingesting.</li> <li>Recycling is encouraged.</li> <li>Disposal by controlled incineration or source landfill in accordance with local national laws and regulations may be acceptable.</li> </ul>
13.4	Separator Material:		<ul style="list-style-type: none"> <li>Constitutes a special waste by virtue of hazardous substance content.</li> <li>Dispose of via approved landfill site. Disposal by controlled source landfill in accordance with local national laws and regulations may be acceptable.</li> </ul>

**SECTION 14: TRANSPORT INFORMATION**

Components			
14.1	VRLA Battery	Land Transport	<u>Land Transport (ADR / RID)</u> <ul style="list-style-type: none"> <li>UN N°: UN2800</li> <li>Classification ADR / RID: Class 8</li> <li>Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage</li> <li>Packing Group ADR: not assigned</li> <li>Tunnel code: E</li> <li>ADR / RID: New and spent (used) batteries are exempt from all ADR / RID (special provision 598)</li> </ul>
		Sea Transport	<u>Sea transport (IMDG Code)</u> <ul style="list-style-type: none"> <li>UN N°: UN2800</li> <li>Classification: Class 8</li> <li>Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage</li> <li>EmS: F-A, S-B</li> </ul> Non-Spillable batteries meet the requirements of Special Provision 238 *parts 1 & 2; they are exempt from all IMDG codes and are not subject to special regulation for sea transport
		Air Transport	<u>Air Transport (IATA-DGR)</u> <ul style="list-style-type: none"> <li>UN N°: 2800</li> <li>Classification: Class 8</li> <li>Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage</li> <li>Special Provision A48: Packaging test are not considered necessary</li> <li>Special Provision A67: Yuasa's VRLA batteries meet the requirements of Packing Instruction 872.</li> </ul> The battery has been prepared for transport so as to prevent:

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		<p>a) A short-circuit of the battery's terminals by packaging in a strong and sturdy carton box; AND/OR</p> <p>b) The battery has been fitted with an insulating cover (made from ABS) which prevents contact with the terminals.</p> <p>c) Unintentional activation is thus prevented</p> <p>The words "NOT RESTRICTED" and the Special Provision (SP) number must be indicated on all shipping documents</p> <ul style="list-style-type: none"> <li>• <b>Special Provision:</b> A164: The battery has been prepared for transport so as to prevent:       <ul style="list-style-type: none"> <li>a) Short-circuit of the battery's terminals by packaging in a strong and sturdy carton box; AND/OR</li> <li>b) The battery has been fitted with a cover (made from ABS) which prevents contact with the terminals</li> <li>c) Unintentional activation is thus prevented</li> </ul> </li> </ul>
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**SECTION 15: REGULATORY INFORMATION**

Components			
15.1	VRLA Battery	Required Markings:	
			Crossed-out wheeled bin indicating "SEPARATE COLLECTION" for all batteries and accumulators. Not to be disposed of with general domestic, commercial or industrial waste. Ref: The Batteries Directive 2006/66/EC
		<b>Pb</b>	The <b>Pb</b> symbol indicates the heavy metal content of the battery and enables the Lead-Acid battery to be sorted for recycling. Ref: The Batteries Directive 2006/66/EC.
			The International Recycling Symbol, required by law in many countries world-wide to facilitate the identification of secondary batteries and accumulators for recycling. Ref: IEC 61429 : 1995, Marking of secondary cells and batteries with the International Recycling Symbol ISO 7000-1135.
		EC Directives	<u>Directive 2006/66/EC</u> , on batteries and accumulators and waste batteries and accumulators Paragraph (Recital) 29 states: "Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment does not apply to batteries and accumulators used in electrical and electronic equipment."

**SECTION 16: OTHER INFORMATION**

Components			
16 (a)	Revision Information	*Issue16 : 11/03/2019  Amended statement in section 14.1 Sea Transport to state "Special Provision 238 *parts 1 & 2"	
16 (b)	Abbreviations	<b>Pb</b> – the chemical symbol for Lead <b>Ba</b> – the chemical symbol for Barium <b>Ca</b> – the chemical symbol for Calcium <b>Sn</b> – the chemical symbol for Tin <b>PbO<sub>2</sub></b> – the chemical formulae for Lead Dioxide <b>H<sub>2</sub>SO<sub>4</sub></b> – the chemical formulae for Sulphuric Acid <b>VRLA</b> – Valve Regulated Lead-Acid battery	
16 (c)	Key literature references and sources of data	SDS documents from suppliers for components and raw materials	
16 (d)	Full text of H phrases:	Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
		Aquatic Chronic 1	Hazardous to the aquatic environment — Chronic Hazard, Category 1
		Repr. 1A	Reproductive toxicity, Category 1A
		Skin Corr. 1A	Skin corrosion/irritation Category 1A
		STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
		H314	Causes severe skin burns and eye damage
		H360	May damage fertility or the unborn child

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		H360Fd	May damage fertility. Suspected of damaging the unborn child
		H372	Causes damage to organs through prolonged or repeated exposure
		H400	Very toxic to aquatic life
		H410	Very toxic to aquatic life with long lasting effects
<b>16 (e)</b>	<b>Training Advice</b>	<ul style="list-style-type: none"><li>• Only trained, competent personnel, who have received special instructions for the hazards and risks, should be allowed to handle VRLA Batteries.</li><li>• See Section 7.1 for general advice</li></ul>	
<b>16 (f)</b>	<b>Further Information</b>	<p>To ensure the safe use of VRLA Industrial Batteries supplied by <b>YUASA</b>, the following precautions must be observed:</p> <ul style="list-style-type: none"><li>• Warning: Risk of fire, explosion, or burns. Do not disassemble, heat above 50°C, or incinerate.</li><li>• Never short-circuit battery terminals, since sparks and arcs produced can injure personnel and are a fire and explosion hazard.</li><li>• Batteries must always be charged on a voltage-regulated charging system with adequate ventilation provided to avoid the build-up of ignitable gases and to promote good heat dissipation.</li><li>• Do not charge VRLA Batteries above + 50 °C, discharge or store above + 60 °C.</li><li>• Under extreme conditions of charging equipment malfunction and/or battery failure, high voltage and high temperature conditions may occur causing the evolution of Hydrogen Sulphide (H<sub>2</sub>S) gas, which is toxic. If detected by its odour of rotten eggs (at extremely low concentrations), switch off the charging equipment, evacuate all personnel from the area and ventilate well. Seek advice before attempting to re-start charging</li><li>• <b>NEVER PLACE VRLA BATTERIES INSIDE SEALED OR GAS-TIGHT ENCLOSURES DURING OPERATION, TRANSPORT AND STORAGE</b> VRLA Batteries emit hydrogen gas which is highly flammable and will form explosive mixtures in air from approximately 4% to 76%. This can be ignited by a spark at any voltage, naked flames or other sources of ignition</li></ul>	

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product*

# SHENZHEN POWER KINGDOM CO., LTD.

## Material Safety Data Sheet

Data Sheet No: VRLA AGM Issue 4

Date Issued: January 2th, 2018

### 1 Identification of the substance

Product name: Sealed Lead Acid Battery

Trade name: Lead acid battery

Manufacturers Name: SHENZHEN POWER KINGDOM CO., LTD.

Manufacturers Address: Building C,Dezhaoji industrial Park,Bogongao industrial Zone, Xikeng New Village, Guanlan Town,Shenzhen,China

E mail: [tech@powerkingdom.com.cn](mailto:tech@powerkingdom.com.cn)

Tel: (86) 0755-22161920

Fax: (86) 0755-22161360

Responsible persons: QA Representative, Managing Director



### 2 Composition / Ingredient Data

Hazardous Components Chemical Identity	CAS Number	OSHA PEL	ACGIH TLV	Percent By Weight	EC Number	Average
Lead	7439-92-1	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	45-55%	231-100-4	50%
Sulfuric Acid	7664-93-9	100 µg/m <sup>3</sup>	1.00 mg/m <sup>3</sup>	19-25%	231-639-5	22%
Lead Oxide	1309-60-0	50 µg/m <sup>3</sup>	500 µg/m <sup>3</sup>	19-23%	215-174-5	21%

	Risk Phrases	Safety Phrases
Sulphuric Acid	R61,62,20/22,33	S1/2,S26,S30,S45
Lead Oxide	R35	None

### 3 Hazards Identification

Odour: Not applicable

Appearance: Article as described above

Weight High Density/ Good lifting technique required

#### **Hazards refer to internal component, i.e. lead and sulphuric acid**

Contact with eyes: Causes irritation

Contact with skin: May cause dermatitis

Inhalation: May cause irritation

Ingestion: Can cause damage to the kidneys

#### 4 First Aid Measures

Contact with skin: Remove contaminated clothing immediately and drench affected skin with plenty of water, then wash with soap and water.

Contact with eyes: If substance has got into eyes, immediately wash out with plenty of water for at least 15 minutes.

#### Seek immediate medical attention.

Ingestion: Do not induce vomiting.

#### Seek immediate medical attention.

Inhalation: Remove patient to fresh air.  
Seek medical attention if irritation persists.

#### 5 Fire-Fighting Measures

Auto-ignition point (Hydrogen) 580° C at 760 mm Hg  
Wear positive-pressure breathing apparatus  
In case of fire use foam, carbon dioxide or dry agent (S43)  
Flash point Hydrogen 259° C  
Flammable Limits in air, Lower 4.1%  
% by 3/4 vol. (Hydrogen)

#### Fire/explosion

Hydrogen and oxygen gases are produced in the cells during normal battery operation (hydrogen is flammable and oxygen supports combustion).

#### 6 Accidental Release Measures

Immediate Actions: Shut off all ignition sources  
Clean Up Actions: Neutralise with soda ash  
Place in appropriate container  
Ventilate area  
Do not empty into drains (S29)

#### 7 Handling and Storage

Under normal conditions of battery use, internal components will not present a health hazard

Handling: Keep away from heat and sources of ignition  
Wash hands thoroughly after use  
Avoid sparks  
Avoid contact with metal jewellery and watches etc.

#### **Do Not Remove Vent Caps**

Do not double stack industrial batteries, it may cause damage.

Storage: Keep in cool and dry & Protect from heat.  
Store lead acid batteries with adequate ventilation.  
Room ventilation is required for batteries utilised for standby power generation.  
**Never re-charge batteries in an unventilated, enclosed space.**

## 8 Exposure Controls / Personal Protection

Personal protection: Wear safety shoes with toe protector.  
Where internal components are liberated use rubber or neoprene boots.  
Wear goggles/safety glasses giving complete eye protection.  
Respiratory protection may be required under exceptional circumstances when excessive air contamination exists.  
Wear PVC mitts, gloves or gauntlets.

Exposure Limits: Lead OES / LTEL - ppm 0.15 mg/m<sup>3</sup>  
Lead Dioxide OES / LTEL - ppm 0.15 mg/m<sup>3</sup>

## 9 Physical and Chemical Properties

Odour: Not applicable.  
Appearance: Sealed Valve Regulated lead Acid Battery  
State under normal temp: Solid  
Flash point (Hydrogen): 259° C



### Internal components

pH - (Sulphuric acid): 1.3 .  
Boiling point: Battery Electrolyte 110° C, Lead 1755° C  
(at 760 mm/Hg)  
Melting point: Lead 327.4° C  
Vapour pressure: 11.7  
Vapour density: Battery Electrolyte 3.4, (air =1)  
Specific gravity: Battery Electrolyte 1.3 g/cm<sup>3</sup>. (water =1)  
Auto-ignition point: 580° deg C at 760 mm/Hg.  
Water solubility: Battery Electrolyte is 100% soluble in water

## 10 Stability and Reactivity

VRLA Batteries are considered stable at normal conditions.  
Keep away from heat and sources of ignition.  
Incompatible with reducing agents. Incompatible with organic agents.  
Decomposition products may include hydrogen.  
Decomposition products may include sulphur oxides.

## 11 Toxicological Information

Danger of cumulative effects. (R33)  
May cause severe irritation.  
May cause gastro-intestinal disturbances.  
Can cause damage to the mucous membranes.

## 12 Ecological Information

Ecotoxicology - no information available

### 13 Disposal Considerations

Classification: This material and/or its container must be disposed of as hazardous waste.  
Disposal considerations: Do not discharge into drains or the environment, dispose to an authorised waste collection point.

### 14 Transport Information

POWER KINGDOM battery is not regulated for transportation because it has been tested and passed the tests specified in 49 CFR 173.159(d), IATA Packing Instruction A67, and IMDG Special Provision 238.

We hereby certify that the SHENZHEN POWER KINGDOM CO., LTD.range of Maintenance Free Rechargeable Sealed Lead Acid batteries conform to the UN2800 classification as " Batteries, Non-Spillable, and electric storage" as a result of passing the Vibration and Pressure Differential Test described in DOT [ 49 CFR 173.159(d) and IATA/ICAO [Special Provision A67 ].

SHENZHEN POWER KINGDOM CO., LTD.having met the related conditions are EXEMPT from hazardous goods regulations for the purpose of transportation by DOT,IMDG and IATA/ICAO, and therefore are unrestricted for transportation by any means.

### 15 Regulatory information

Classification and labeling. Not classified as hazardous for supply

### 16 Other Information

Under normal conditions of battery use, internal components will not present a health hazard. The information contained in this Safety Data Sheet is provided for battery electrolyte (acid) and lead, for exposure that may occur during battery production or container breakage or under extreme heat conditions such as fire.

Tested as per IMDG Amendment. 35-10, special provision 238 "a" and "b", Comply.

This Safety Data Sheet and the information therein does not constitute the user's own assessment of work place risk as required by other Health & Safety legislation.



# PRODUCT INFORMATION SHEET

N° DXK43E02en

*Reserve Power Solutions*

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**Title : VRLA (SLA 800÷2000; SMG) - LEAD ACID STATIONARY BATTERIES**

## GENERAL REMARK

This leaflet was prepared in cooperation with the Committee of Environmental Affairs of EUROBAT (May 2003), reviewed by EUROBAT TC members (September 2003) and CEM (October – November 2003). Last revision: October 2016.

Batteries are "articles" according to Regulation (EC) No 1907/2006 EC, they are not "substances" nor "mixtures", therefore there is no obligation to supply a safety data sheet (SDS) according to Regulation (EC) 1907/2006, and Regulation CLP (EC) 1272/2008.

Information on safe handling is provided as a service to our customers.

This product information sheet contains valuable information critical to the safe handling and proper use of the product. The details presented are in accordance with our present knowledge and experiences, they cannot advise all possible situation.

## 1. PRODUCT AND COMPANY IDENTIFICATION

Product Name & Use: FIAMM Valve Regulated Lead Acid Battery for stationary application

Company Identification FIAMM Energy Technology S.p.A.  
Viale Europa, 75 I - 36075 Montecchio Maggiore (Vicenza)  
Telephone +390444709311; Fax +390444699237

E-mail: [sdp@fiamm.com](mailto:sdp@fiamm.com)

## 2. HAZARDS IDENTIFICATION

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 item 15.

Data Prima Emissione: <i>First Issue Date</i>	<b>01/01/2011</b>	Indice di Revisione: <i>Revision Index</i>	7	Data Ultima Revisione: <i>Last Revision Date</i>	<b>11/08/2017</b>
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Title : **VRLA (SLA 800÷2000; SMG) - LEAD ACID STATIONARY BATTERIES**

**3. COMPOSITION / INFORMATION ON INGREDIENTS**

CAS no.	Index Numbers	Description	Content <sup>1)</sup> [% of weight]	Hazards Category and Statement Code
7439-92-1	082-014-00-7	Lead Grid (massive lead, lead alloys)	~ 32	Repr. 1A - H360FD Lact- H362 STOT RE 1 – H372
7439-92-1	082-001-00-6	Active Mass (Lead dioxide, inorganic lead compounds, with possible traces of additives)	~ 32	Repr. 1A - H360Df Acute Tox. 4 - H332 Acute Tox. 4 - H302 STOT RE 1 - H372 Lact – H362 Carc.2 – H351 Aquatic Acute 1 - H400 Aquatic Chronic 1 H410
7664-93-9	016-020-00- 8	Electrolyte <sup>2)</sup> (diluted sulphuric acid with additives)	~ 29	SkinCorr.1A - H 314
		Plastic Container / Plastic Parts <sup>3)</sup>	~ 7	

<sup>1)</sup> Contents may vary due to performance data and/or application of the Battery  
<sup>2)</sup> Density of the electrolyte varies in accordance to the state of charge  
<sup>3)</sup> Composition of the plastic may vary due to different customer requirements

Note: Batteries do not contain Cadmium (Cd) nor Mercury (Hg)

**4. FIRST AID MEASURES**

This information is of relevance only if the Battery is broken and this results in a direct contact with the ingredients.

4.1 General	Electrolyte (diluted sulphuric acid):	sulphuric acid acts corrosively and damages skin
	Lead compounds:	lead compounds are classified as toxic for reproduction (if swallowed)
4.2 Electrolyte (Sulphuric 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 lot of water immediately, swallow activated carbon, do not induce vomiting, seek advice of a medical doctor
4.3 Lead compounds	after skin contact:	clean with water and soap
	after inhalation:	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

Data Prima Emissione: <b>01/01/2011</b>	Indice di Revisione: 7	Data Ultima Revisione: <b>11/08/2017</b>
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**Title : VRLA (SLA 800÷2000; SMG) - LEAD ACID STATIONARY BATTERIES**

**5. FIRE FIGHTING MEASURES**

**Suitable fire extinguishing agents:**

CO2 or dry powder extinguishing agents

**Unsuitable fire extinguishing agents:**

Water, if the battery voltage is above 120 V

**Special protective equipment:**

Protective goggles, respiratory protective equipment, acid protective equipment, acidproof clothing in case of larger stationary battery plants or where larger quantities are stored.

**6. ACCIDENTAL RELEASE MEASURES**

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

In the case of spillage, use a bonding agent, such as sand, to absorb spilt acid; use lime / sodium bicarbonate for neutralisation; dispose of with due regard to the official local regulations; do not allow penetration into the sewage system, into earth or water bodies.

**7. HANDLING AND STORAGE**

Store under roof in cool ambience charged lead acid batteries do not freeze up to 50°C; prevent short circuits. Seek agreement with local water authorities in case of larger quantities of batteries to be stored. If batteries have to be stored, it is imperative that the instructions for use are observed.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**8.1 Lead and Lead compounds**

No exposure to lead and leadcontaining battery paste during normal conditions of use.

**8.2 Electrolyte (Sulphuric Acid diluted solution)**

Exposure to sulphuric acid and acid mist might occur during filling and charging.

Threshold value in workplace: occupational exposure limits for sulphuric acid mist are regulated on a national basis.

Hazard symbol: corrosive

Personal protective equipment: protective goggles, rubber or PVC gloves, acid resistant clothing, safety boots.

CAS No: 7664-93-9

Hazard statements: H314 Causes severe burns and eye damage.

Precautionary Statements: P102 Keep out of reach of children.

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

P305+P351+315 IF in eyes. Rinse cautiously with water for several minutes. Get immediate medical advice/attention.

P309+315 IF exposed or if you feel unwell. Get immediate medical advice/attention.

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Title : **VRLA (SLA 800÷2000; SMG) - LEAD ACID STATIONARY BATTERIES**

**9. PHYSICAL AND CHEMICAL PROPERTIES**

	Lead and Lead compounds	Electrolyte (diluted sulphuric acid solution)
Appearance		
form :	solid	liquid
colour :	grey	colourless
odour :	odourless	odourless
Safety related data		
solidification point :	327 °C	approx 35 to 60 °C
boiling point :	1740 °C	approx. 108 to 114 °C
solubility in water :	very low (0.15 mg/l)	complete
density (20°C) :	11.35 g/cm <sup>3</sup>	1.2 to 1.35 kg/l
vapour pressure (20°C) :	N.A.	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.

**10. STABILITY AND REACTIVITY** (referred to diluted sulphuric acid, density 1.2 ÷ 1.35 kg/l)

- Corrosive, non flammable liquid
- Thermal decomposition at 338° C.
- Destroys organic materials such as cardboard, wood, textiles.
- Reacts with metals, producing hydrogen
- Vigorous reactions on contact with sodium hydroxide and alkalis.

**11. TOXICOLOGICAL INFORMATION**

This information does not apply to the finished product "lead acid battery". This information only applies to its compounds in case of a broken product. Different exposure limits exist on a national level.

**11.1 Electrolyte (diluted sulphuric acid):**

Sulphuric Acid is intensely corrosive to skin and mucous membranes; the inhalation of mists may cause damage to the respiratory tract.

Acute toxicity data:

- LD<sub>50</sub> (oral, rat) = 2.140 mg/kg
- LC<sub>50</sub> (inhalation, rat) = 510 mg/m<sup>3</sup>/2h

**11.2 Lead and Lead compounds**

Lead and its compounds used in a Lead Acid Battery may cause damage to the blood, nerves and kidneys when ingested. The lead contained in the active material is classified as toxic for reproduction.

Data Prima Emissione: <b>01/01/2011</b>	Indice di Revisione: 7	Data Ultima Revisione: <b>11/08/2017</b>
First Issue Date	Revision Index	Last Revision Date

**Title : VRLA (SLA 800÷2000; SMG) - LEAD ACID STATIONARY BATTERIES****12. ECOLOGICAL INFORMATION**

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

**12.1 Electrolyte (diluted sulphuric acid)**

In order to avoid damage to the sewage system, the acid has to be neutralised 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

**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.

Lead metal grids are not classified as eco-toxic.

**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.

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.

*\*200133 EWC may be used for municipal collected batteries.*

Data Prima Emissione: <b>01/01/2011</b>	Indice di Revisione: 7	Data Ultima Revisione: <b>11/08/2017</b>
<i>First Issue Date</i>	<i>Revision Index</i>	<i>Last Revision Date</i>

**Title : VRLA (SLA 800÷2000; SMG) - LEAD ACID STATIONARY BATTERIES****14. TRANSPORT INFORMATION****Land Transport (ADR/RID, U.S. DOT)**

UN N°: UN2800  
Classification ADR/RID: Class 8  
Proper Shipping Name: BATTERIES, WET, NON SPILLABLE electric storage  
Packing Group ADR: not assigned  
Label required: Corrosive  
ADR/RID: New batteries are excepted from all ADR/RID (special provision 598).

**Sea Transport (IMDG Code)**

UN N°: UN2800  
Classification: Class 8  
Proper Shipping Name: BATTERIES, WET, NON SPILLABLE electric storage  
Packing Group: not assigned  
EmS-FIRE & SPILL: F-A, S-B  
Label required: Corrosive

**Air Transport (IATA-DGR)**

UN N°: UN2800  
Classification: Class 8  
Proper Shipping Name: BATTERIES, WET, NON SPILLABLE electric storage  
Packing Group: not assigned  
Label required: Corrosive

**Note:**

These batteries conform to the following:

International

IMDG Code (International Maritime Dangerous Goods)  
• special provision 238.1

IATA (International Air Transport Association) Dangerous Goods Regulation  
• packing instruction 872

Europe

ADR (Agreement for the transportation of Dangerous Goods by Road)  
• special provision 238 a)

USA

U.S. Department of Transportation (DOT) hazardous materials regulations  
• § 49 CFR 173.159(f)

**15. REGULATORY INFORMATION**

The following legislation do not apply to lead-acid batteries:

- RoHS directive 2002/95/EC, updated by directive 2011/65/UE
- Low Voltage directive 73/23/EEC, updated by directive 2006/95/EC, if the voltage is < 75 V
- ELV directive 2000/53/EC
- EMC directive 89/336/EEC, updated by directive 2004/108/EC

REACH Regulation: No substance currently in the SVHC "candidate list" is contained in Fiamm products

Data Prima Emissione: **01/01/2011**

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**Title : VRLA (SLA 800÷2000; SMG) - LEAD ACID STATIONARY BATTERIES**

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.



Labelling might vary due to application and dimension of the Battery. The manufacturer, respectively the importer of the batteries shall be responsible for placing at least the following symbols in accordance with International standards.



Electrical  
Accumulators



Wear safety  
goggles



Dangerous voltage  
electrical risk



No smoking, no  
open flames



Observe  
operating  
instructions

**16. OTHER INFORMATION**

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.

Data Prima Emissione: **01/01/2011**

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Data Ultima Revisione: **11/08/2017**

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**B.B. TECH(CHANGSHA) CO., LTD.**

## MATERIAL SAFETY DATA SHEET

Valve Regulated Lead-Acid Rechargeable battery

Date:01.Jan.2019

### SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

**Product name:** Valve Regulated Lead-Acid Rechargeable battery  
**Company:** B.B. TECH(CHANGSHA) CO., LTD.  
**Address:** No.57 DongsiRoad, Changsha National Economic & Technical Development Zone, Changsha, Hunan PRC  
**E-mail:** maggy@bb-battery.com  
**Tel:** +86-731-82955888  
**Fax:** +86-731-82955111

**US Office:** B&B Battery USA, Inc.  
**Address:** 6415 Randolph Street, Commerce, CA 90040  
**Tel:** 323-278-1900  
**Fax:** 323-278-1268

### SECTION 2: INFORMATION ON INGREDIENTS

**Product name:** Valve Regulated Lead-Acid Rechargeable battery

Ingredient	CAS No.	Concentration	Hazardous Label
Inorganic Lead/Lead Compounds	7439-92-1	~ 72%	T
Sulfuric Acid	7664-93-9	~ 20%	C
Fiberglass Separator	65997-17-3	~ 2%	/
Container Plastic (ABS or PP)	9003-56-9 (ABS)	~ 5%	/
	9003-07-0 (PP)		/

**Composition comments:** All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

### SECTION 3: HAZARDS IDENTIFICATION

**Hazards Identification:** The battery has passed the vibration test, pressure differential test and leakage test at 55°C according to Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulation 20th SPECIAL PROVISION 238. It is not restricted to IATA Dangerous Goods Regulation (DGR) 60th according to special provision A67 and is not restricted to IMDG CODE according to special provision 238.

**Emergency Overview:** The internal battery materials may cause severe irritation to eyes and skin. Causes burns.

## SECTION 4: FIRST-AID MEASURES

**Skin Exposure:** If the internal battery materials of an opened battery cell come into contact with the skin, immediately flush with plenty of water for at least 15 minutes. Seek immediate medical attention.

**Eye Exposure:** In case of contact the electrolyte contained inside the battery with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Seek immediate medical attention.

**Inhalation Exposure:** If potential for exposure to mist or dusts occurs, remove immediately to fresh air and seek medical attention.

**Oral Exposure:** If swallowed, do not induce vomiting. Seek immediate medical attention.

**Most important symptoms/effects, acute and delayed:** Under normal conditions of processing and use, exposure to the chemical constituents in this product is unlikely. The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

**Indication of immediate medical attention and special treatment needed:** Treat symptomatically.

**General information:** Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## SECTION 5: FIRE FIGHTING MEASURES

**Extinguishing Media:** Suitable: Dry chemical, Sandy soil, Carbon dioxide or appropriate foam.

**Unsuitable extinguishing media:** In the event that a battery is ruptured and the internal components are exposed, DO NOT USE WATER. Do not use carbon dioxide directly on cells.

**Specific hazards arising from the chemical:** Batteries evolve flammable hydrogen gas during charging and may increase fire risk. Containers may explode when heated.

**Firefighting:**

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific hazards: Emit toxic fumes under fire conditions.

**General fire hazards:** Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of corrosive and flammable materials.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

If batteries show signs of leaking, avoid skin or eyes contact with the material leaking from the battery. Use chemical resistant rubber gloves and non-flammable absorbent materials for clean up. Mix with inert material (e.g. dry sand, vermiculite) and transfer to sealed container for disposal.

## SECTION 7: HANDLING AND STORAGE

**Handling:**

Keep away from ignition sources, heat and flame. Such batteries must be packed in inner packages in such a manner as to effectively prevent short circuits and to prevent movement which could lead to short circuits. Avoid mechanical or electrical abuse and overcharge. More than a momentary short circuit will generally reduce the battery service life. Avoid reversing battery polarity within the battery assembly.

In case of a battery unintentionally be crushed, acid resistant gloves must be used to handle all battery components. Avoid contact with eyes, skin. Avoid inhalation. No smoking at working site. Materials to Avoid: Strong oxidant, Combustible materials and Corrosives

**Storage:**

Store in a cool; well-ventilated area. Keep away form ignition sources, heat and flame. Such batteries must be packed in inner packages in such a manner as to effectively prevent short circuits and to prevent movement which could lead to short circuits. Materials to Avoid: Strong oxidant, Combustible materials and Corrosives.

**SECTION 8: EXPOSURE CONTROL/PPE**

**Occupational exposure limits:**

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053).

Components	Type	Value
------------	------	-------

Lead and lead compounds (CAS 7439-92-1)	TWA	0.05 mg/m <sup>3</sup>
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US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
------------	------	-------

Sulphuric acid (CAS 7664-93-9)	PEL	1 mg/m <sup>3</sup>
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US. ACGIH Threshold Limit Values

Components	Type	Value	Form
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Lead and lead compounds (CAS 7439-92-1)	TWA	0.05 mg/m <sup>3</sup>	
--	-----	------------------------	--

Sulphuric acid (CAS7664-93-9)	TWA	0.2 mg/m <sup>3</sup>	Thoracic fraction.
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US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
------------	------	-------

Lead and lead compounds (CAS 7439-92-1)	TWA	0.05 mg/m <sup>3</sup>
--	-----	------------------------

Sulphuric acid (CAS 7664-93-9)	TWA	1 mg/m <sup>3</sup>
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**Biological limit values:** No biological exposure limits noted for the ingredient(s).

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
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Lead and lead compounds (CAS 7439-92-1)	200 µg/l	Lead	Blood	*
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\* - For sampling details, please see the source document.

**Engineering Controls:** Use ventilation equipment if available. Safety shower and eye bath.

**Personal Protective Equipment:**

**Respiratory:** Wear government approved air-purifying respirator if needed.

**Eye:** Wear safety glasses with side shields (or goggles).

**Clothing:** Wear appropriate protective clothing.

**Hand:** Wear chemical resistant gloves

**Thermal hazards:** When material is heated, wear gloves to protect against thermal burns.

**Other Protect:** No smoking, drinking and eating at working site. Wash thoroughly after handling. Wear suitable protective clothing. Use of an impervious apron is recommended.

## SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

<b>Appearance</b>	
Physical state	Solid.
Form	Sulfuric acid, gelatinous. Lead, solid.
Color	Not available.
Odor	Odorless.
Odor threshold	Not available.
pH	< 1
Melting point/freezing point	Not available.
Initial boiling point and boiling range	235 - 240 °F (112.78 - 115.56 °C) (Sulfuric acid)
Flash point	Below room temperature (as hydrogen gas).
Evaporation rate	< 1 (n-BuAc=1)
<b>Flammability (solid, gas):</b>	
Upper/lower flammability or explosive limits	
Flammability limit – lower (%)	4 % (Hydrogen)
Flammability limit - upper (%)	74 % (Hydrogen)
Vapor pressure	10 mm Hg
Vapor density	> 1 ( Air=1)
Relative density	1.27 - 1.33
Solubility(ies)	
Solubility (water)	100 % (Sulfuric acid)
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
<b>Other information:</b>	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing

## SECTION 10: STABILITY AND REACTIVITY

<b>Stability:</b> Stable under normal temperatures and pressures.
<b>Incompatible materials:</b> Strong bases. Combustible organic materials. Reducing agents. Finely divided metals. Strong oxidizers. Water.
<b>Conditions to Avoid:</b> Avoid exposure to heat and open flame, Avoid mechanical or electrical abuse and overcharge. Prevent short circuits. Prevent movement which could lead to short circuits.
<b>Hazardous Polymerization:</b> Will not occur.
<b>Hazardous Decomposition Products:</b> Sulfur dioxide. Sulfur trioxide. Carbon monoxide. Sulfuric acid. Hydrogen

## SECTION 11: Toxicological information

<b>Information on likely routes of exposure:</b>	
Inhalation	Exposure to contents of an open or damaged battery: Harmful if inhaled.
Skin contact	Exposure to contents of an open or damaged battery: Causes severe skin burns.
Eye contact	Exposure to contents of an open or damaged battery: Causes serious eye damage.
Ingestion	Exposure to contents of an open or damaged battery: Harmful if swallowed.

Symptoms Related to the physical, chemical and toxicological characteristics	Exposure to contents of an open or damaged battery: Dust may irritate the eyes and the respiratory system.	
<b>Information on toxicological effects:</b>		
Acute toxicity	Exposure to contents of an open or damaged battery: Harmful if inhaled or swallowed.	
Components	Species	Test Results
Sulphuric acid (CAS 7664-93-9):		
Acute		
Oral		
LD50	Rat	2140 mg/kg
Skin corrosion/irritation	Exposure to contents of an open or damaged battery: Causes severe skin burns	
Serious eye damage/eye irritation	Exposure to contents of an open or damaged battery: Causes serious eye damage.	
Respiratory or skin sensitization:		
Respiratory sensitization	No data available.	
Skin sensitization	No data available.	
Germ cell mutagenicity	No data available.	
Carcinogenicity	The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen, (IARC category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid or sulfuric acid solutions.	
IARC Monographs. Overall Evaluation of Carcinogenicity		
Lead and lead compounds (CAS 7439-92-1)	2B Possibly carcinogenic to humans.	
Sulphuric acid (CAS 7664-93-9)	1 Carcinogenic to humans.	
NTP Report on Carcinogens		
Lead and lead compounds (CAS 7439-92-1)	Reasonably Anticipated to be a Human Carcinogen.	
Sulphuric acid (CAS 7664-93-9)	Known To Be Human Carcinogen.	
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)		
Not regulated.		
Reproductive toxicity:	None under normal conditions. Exposure to contents of an open or damaged battery: May damage fertility or the unborn child.	
Specific target organ toxicity-single exposure:	None under normal conditions. Exposure to contents of toxicity-single an open or damaged battery: Causes damage to organs exposure (respiratory system).	
Specific target organ toxicity – repeated exposure:	None under normal conditions. Exposure to contents of an open or damaged battery: Causes damage to organs through prolonged or repeated exposure: Respiratory system.	
Aspiration hazard	Due to the physical form of the product it is not an aspiration hazard.	
chronic effects:	Exposure to contents of an open or damaged battery: Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues. Chronic inhalation of sulfuric acid mist may increase the risk of lung cancer.	

## SECTION 12: ECOLOGICAL INFORMATION

**Ecotoxicity:** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. Exposure to contents of an open or damaged battery: Very toxic to aquatic life with long lasting effects.

Components	Species	Test Results
------------	---------	--------------

Lead and lead compounds (CAS 7439-92-1) LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)	1.17 mg/l, 96 Hours
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**Persistence and degradability:** The degradation half-life of the product is not known. Lead and its compounds are highly persistent in water.

**Bioaccumulative potential:** Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants, but very little bioaccumulation occurs through the food chain.

**Mobility in soil:** If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.

**Mobility in general:** The product is insoluble in water and will spread on water surfaces

**Other adverse effects:** None known.

## SECTION 13: DISPOSAL CONSIDERATIONS

### Appropriate Method of Disposal of substance:

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

We hereby certify that all B.B. Valve Regulated Lead-acid Rechargeable batteries conform to the UN2800 classification as "Batteries, wet, Non-Spillable, and electric storage" as a result of passing the Vibration and Pressure Differential Test described in D.O.T., 49 CFR 173.159(f), and IMO/IMDG, and ICAO/IATA packing instruction 872 and note A48, A67, A164 and A183. The batteries are not restricted to IMO/IMDG code according to special provision 238.

B.B. Batteries having met the related conditions are EXEMPT from hazardous goods regulations for the purpose of transportation by DOT, and IATA/ICAO, and therefore are unrestricted for transportation by any means, including air transport. For all modes of transportation, each battery outer package is labeled "NON-SPILLABLE". All our Batteries are marked non-spillable.

## SECTION 15: REGULATORY INFORMATION

### EU Regulation:

In accordance with EU2006/66/EC Battery Directive, VRLA batteries should present crossed-out wheeled bin symbol of lead together with the ISO recycling symbol. Does not contain any mercury ( $Hg < 0.0005\%$ ) or cadmium ( $Cd < 0.002\%$ ).



## 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).