



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

Document:	SDS 01
Issue No:	16
Issue Date:	11/03/2019
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SECTION 1: IDENTIFICATION OF THE PRODUCT AND OF THE MANUFACTURER/SUPPLIER

1.1	Product Identifier:	Valve Regulated Lead-Acid (VRLA) Industrial Battery
	Classification:	Battery, wet, non-spillable, electric storage (Mixture) Substance classification: UN 2800
	Product Codes:	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	Relevant Identified Uses Of The Product And Uses Advised Against	<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 <u>Uses advised against:</u> Automotive, commercial, and agricultural SLI applications <u>Reason why uses advised against:</u> High starting and ignition current demands beyond the design of internal and external current carrying components
1.3	Details Of The Supplier Of The Safety Data Sheet	Supplier: GS Yuasa Battery Europe Ltd, Address: Unit 22, Rassau Industrial Estate, Ebbw Vale, NP23 5SD United Kingdom Contact: Mike TAYLOR (Product Manager) Tel: (+44) 07733 302 242 e-mail: mike.taylor@yuasaeurope.com Language: English language only Available: Office hours only: 8am to 4:30pm (08:00 to 16:30)
	National Contacts:	<u>France:</u> GS Yuasa Battery France S.A. Contact: Christian RAYNAUD (Technical Manager) Tel: (+33) 0474-95-90-95 e-mail: christian.raynaud@gs-yuasa.fr Language: French & English <u>Germany:</u> GS Yuasa Battery Germany GmbH Contact: Joachim HEER (UPS / Project Manager) Tel: (+49) 0211-41790-15 e-mail: Joachim.Heer@gs-yuasa.de Language: German & English <u>Iberia:</u> GS Yuasa Battery Iberia S.A. Contact: Antonio PULIDO MARTINEZ (Director Commercial Industrial) Tel: (+34) 091-748-89-19 e-mail: antonio.pulido@gs-yuasa.es Language: Spanish & English <u>Italy:</u> GS Yuasa Battery Italy Srl. Contact: Marco FILIPPI (Technical Manager) Tel: (+39) 02-3800-91-08 e-mail: marco.filippi@gs-yuasa.it Language: Italian & English <u>UK:</u> GS Yuasa Battery Sales UK Ltd. Contact: Matt JORDAN (General Manager) Tel: (+44) 01793-833-562 e-mail: Matt.Jordan@gs-yuasa.uk Language: English language only
1.4	Emergency telephone number:	GS Yuasa Battery Manufacturing UK Ltd. Contact: Mike TAYLOR (Product Manager) Tel: (+44) 07733 302 242 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) Full text of H phrases – see section 16	H314	Skin Corr.1A
	H360Fd	Repr.1A
	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)	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)	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	Mechanical	VRLA Batteries can be heavy. Correct manual handling techniques and/or mechanical lifting aides (e.g. Fork Lift Truck) must be used.
		Electrical	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.
		Chemical	- The VRLA Battery presents no chemical hazards during the normal operation provided the recommendations for handling, storage, transport and usage are observed. - 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. - If the battery is broken and the internal components exposed, hazards may exist which require careful attention.



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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) ¹	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 ₂	1309-60-0
			Barium compound	< 1.5	Ba	7440-39-3
	Battery Electrolyte	H314	Dilute Sulphuric Acid	10 to 20	H ₂ SO ₄	7664-93-9
	Case Material		Standard Grade, UL94:HB • ABS (Acrylonitrile-Butadiene-Styrene Copolymer)	5 to 10		9003-56-9
			Flame Retardant (FR) Grade, UL94:V0 • ABS (Acrylonitrile-Butadiene-Styrene Copolymer) • Tetrabromobisphenol-A • Antimony trioxide	5 to 10 < 0.1 < 0.01		9003-56-9 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:	Immediately 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.
Battery Electrolyte		<u>SPEED IS ESSENTIAL - OBTAIN IMMEDIATE MEDICAL ATTENTION.</u>
	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:	<u>SPEED IS ESSENTIAL - OBTAIN IMMEDIATE MEDICAL ATTENTION</u> Immediately 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
Case Material	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.
	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. Note to physician: 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. Immediately 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.
	Separator Material	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. Immediately 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 	- 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. - 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 OFF before disconnecting the batteries from the power source. - 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.
5.1		Suitable Extinguisher types:	CO ₂ ; 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	Components		
	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
	Plate Grids and Active Materials	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.
	Battery Electrolyte:	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.
	Case Material:	Clean-up Methods:	Assume battery case material is contaminated and proceed as for Plate Grids and Active Materials above.
	Separator Material:	Clean-up Methods:	Assume battery case material is contaminated and proceed as for Plate Grids and Active Materials above.

Note: If appropriate refer to 8 and 13

SECTION 7: HANDLING AND STORAGE

7.1	Component:	Precautions For Safe Handling:	
	VRLA Battery		Only trained operators should be allowed to handle VRLA batteries. <u>PPE:</u> No specialist protective clothing or equipment is required, except that for handling heavy weights. <u>Hygiene:</u> There are no specialist requirements beyond good, standard workplace practices. <u>Mechanical lifting aides:</u> (e.g. FLT and pallet trucks) will be required to move pallets of batteries. Weight approximately 1 tonne <u>Mechanical handling aides:</u> (e.g. trucks and lifters) will be required to handle individual batteries over 25 kg in weight. <u>General Safety Considerations:</u> 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.
7.2		Conditions For Safe Storage, Including Any Incompatibilities:	Store VRLA Batteries in a cool, well-ventilated area with a solid, impervious surface, and adequate containment in the event of accidental acid spillage. Store under a roof and protect against direct sunlight and adverse weather conditions including rain, snow and other sources of water. Storage of large quantities of VRLA batteries may require approval from local environmental protection agency and/or local water authorities. Pallets of VRLA Batteries are heavy. Store at ground level or in lower levels of storage systems (e.g. racking). Take special care in dry conditions to avoid the risk of electrostatic discharges. Protect against physical damage and exposure to organic solvents and other incompatible materials. Do not store VRLA batteries close to sources of heat, naked flames and sparks. 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.
		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.
7.3		Specific End Uses: Installation:	- Refer to EN 50272-1:2010, Safety requirements for secondary batteries and battery installations – Part 1 General safety information. - Refer to EN 50272-2:2001, Safety requirements for secondary batteries and battery installations – Part 2 Stationary batteries.



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SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION

Components		
8.1	VRLA Battery	Control Parameters:
8.2		Exposure Control:
8.3		Personal Protection:
		UL CAUTIONARY STATEMENT:

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.

There are no special exposure controls for the handling, storage, installation or use of VRLA Batteries.

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.

"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	- The main components are listed in SECTION 2 above. - 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
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.		
Plate Grids and Active materials:	Appearance	Safety-related data
	Form	Solid
	Colour	Grey or brown
	Odour	Odourless
		Solidification point
		327 °C
		Boiling point
		1740 °C
		Solubility in water
		Very low (0.15mg/l)
		Solubility in acid or alkaline solutions
		Yes, dependant on the strength of solution.
		Density (at 20°C)
		11.35 g/cm ³
		Vapour pressure (at 20°C)
		*Undetectable
	Battery Electrolyte:	
	Form	Liquid
	Colour	Colourless
	Odour	Odourless
		Solidification point
		-35 to -60 °C
		Boiling point
		Approx. 108 to 114 °C
		Solubility in water
		Complete
		Density (at 20°C)
		Variable up to 1.350 g/cm ³
		Vapour pressure (at 20°C)
		*10-20 mmHg
Case Material:	Appearance	Safety-related data
	Form	Solid
	Colour	Grey or black
	Odour	Slight Odour
		Softening point
		> 100 °C (DIN 53460)
		Flash Point
		>330 °C
		Solubility in water
		Insoluble
Separator Material:		Solubility in other solvents
		Soluble in polar solvents, aromatic solvents, chlorinated hydrocarbons.
		Density (at 20°C)
		1.07-1.4 g/cm ³ (DIN 53479)
		Vapour pressure (at *20°C)
		*Undetectable
	Form	Fibrous material
	Colour	White
	Odour	Odourless
		Solidification point
		*820°C
		Boiling point
		*>2500°C
		Solubility in water
		Insoluble
		Density (at 20°C)
		*2.23g/cm ³
		Vapour pressure (at 20°C)
		*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 acetylide. Reacts violently when in contact with chlorine trifluoride.
10.3	Battery Electrolyte:	Possibility of Hazardous Reactions	- Dilution of the higher concentrated grades with water may liberate excessive heat. - Highly reactive with metals and organic materials. - On contact with metals, may generate hydrogen which forms explosive mixtures with air. - Destroys organic materials such as cardboard, wood, textiles, etc. - Vigorous reaction with sodium hydroxide and alkalis.
10.6		Hazardous Decomposition Product(s):	Sulphur oxides
10.1	Case Material:	Materials & Conditions to Avoid:	- To avoid thermal decomposition, do not overheat. - Starts to decompose at temperatures >275°C. - Powerful oxidising agents.
10.6		Hazardous decomposition products:	Monomers, other degradation products, traces of hydrogen cyanide.
10.1	Separator Material:	Stability:	Stable material.
10.4		Materials & Conditions to Avoid:	Incompatible with Hydrofluoric acid and concentrated Sodium Hydroxide.
10.6		Hazardous decomposition products:	No hazardous polymerisation expected.

SECTION 11: TOXICOLOGICAL INFORMATION

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

	Components		
11	VRLA Battery		- 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. - Exposure limits may vary according to national law and regulations.
11.1	Plate Grids: Metallic Lead, Lead alloys.	Acute Toxicity 	- Toxic by ingestion or inhalation - Chronic poison - Lead is a poison that affects virtually every system in the body - Symptoms include fatigue, headaches, constipation, aching bones and muscles, gastrointestinal tract disturbances and reduced appetite - Blood Lead levels of 80 µg/dl and above have been associated with both acute and chronic effects of Lead poisoning
	Active materials: Lead dioxide.	Acute Toxicity 	- Toxic by ingestion or inhalation - Chronic poison - 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 CNS² damage
	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

² CNS = Central Nervous System



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11.1	Battery Electrolyte:	Skin Contact: 	Causes severe chemical burns
		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
	Case Material:		According to information available the product is not harmful to health provided it is correctly handled and processed according to the given recommendations.
	Separator Material:		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.

	Components		
12.1	VRLA Battery		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	Plate Grids and Active materials:	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: 	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.
		H Phrase H400 &410 Effect 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
12.3	Battery Electrolyte:	Ecotoxicity: 	- 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. - 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 components of Lead that can be toxic to aquatic environments.
		Persistence and Degradation:	Remains indefinitely in the environment as sulphate.
12.4	Case Material:	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	Separator Material:		No data available: insoluble in water Not thought to pose any risk to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

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	Components		
13.1	VRLA Battery	Europe:	- 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. - 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.
		Worldwide:	- VRLA batteries contain inorganic Lead compounds and Sulphuric Acid which are damaging to the environment. - Spent (used) batteries must be disposed of in an environmentally friendly manner in accordance with local national laws and regulations.
			- VRLA batteries must not be dismantled, burnt or incinerated as a means of disposal. - 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.
13.2	Plate Grids and Active materials:	Europe Worldwide	- Metallic Lead and active materials (Lead Oxides) must be recycled. - Disposal must be carried out in accordance with the European Hazardous Waste Directive 2008/98/EC
13.3	Battery Electrolyte:	Europe	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
		Worldwide	Disposal should be in accordance with local, state or national legislation.
		General	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.
13.3	Case Material:		- Do not dispose of this product into sewers, any ocean or water course in order to prevent marine animals and birds from ingesting. - Recycling is encouraged. - Disposal by controlled incineration or source landfill in accordance with local national laws and regulations may be acceptable.
13.4	Separator Material:		- Constitutes a special waste by virtue of hazardous substance content. - Dispose of via approved landfill site. Disposal by controlled source landfill in accordance with local national laws and regulations may be acceptable.

SECTION 14: TRANSPORT INFORMATION

	Components		
14.1	VRLA Battery	Land Transport	<u>Land Transport (ADR / RID)</u> - UN N°: UN2800 - Classification ADR / RID: Class 8 - Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage - Packing Group ADR: not assigned - Tunnel code: E - ADR / RID: New and spent (used) batteries are exempt from all ADR / RID (special provision 598)
		Sea Transport	<u>Sea transport (IMDG Code)</u> - UN N°: UN2800 - Classification: Class 8 - Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage - EmS: F-A, S-B 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> - UN N°: 2800 - Classification: Class 8 - Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage - Special Provision A48: Packaging test are not considered necessary - Special Provision A67: Yuasa's VRLA batteries meet the requirements of Packing Instruction 872. The battery has been prepared for transport so as to prevent:

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			a) A short-circuit of the battery's terminals by packaging in a strong and sturdy carton box; AND/OR b) The battery has been fitted with an insulating cover (made from ABS) which prevents contact with the terminals. c) Unintentional activation is thus prevented The words "NOT RESTRICTED" and the Special Provision (SP) number must be indicated on all shipping documents • <u>Special Provision</u>: A164: The battery has been prepared for transport so as to prevent: a) Short-circuit of the battery's terminals by packaging in a strong and sturdy carton box; AND/OR b) The battery has been fitted with a cover (made from ABS) which prevents contact with the terminals c) Unintentional activation is thus prevented
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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
		Pb	The Pb 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

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	Pb – the chemical symbol for Lead Ba – the chemical symbol for Barium Ca – the chemical symbol for Calcium Sn – the chemical symbol for Tin PbO₂ – the chemical formulae for Lead Dioxide H₂SO₄ – the chemical formulae for Sulphuric Acid VRLA – 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
16 (e)	Training Advice	- Only trained, competent personnel, who have received special instructions for the hazards and risks, should be allowed to handle VRLA Batteries. - See Section 7.1 for general advice	
16 (f)	Further Information	To ensure the safe use of VRLA Industrial Batteries supplied by YUASA, the following precautions must be observed: - Warning: Risk of fire, explosion, or burns. Do not disassemble, heat above 50°C, or incinerate. - Never short-circuit battery terminals, since sparks and arcs produced can injure personnel and are a fire and explosion hazard. - 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. - Do not charge VRLA Batteries above + 50 °C, discharge or store above + 60 °C. - 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 (H₂S) 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 NEVER PLACE VRLA BATTERIES INSIDE SEALED OR GAS-TIGHT ENCLOSURES DURING OPERATION, TRANSPORT AND STORAGE 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	

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

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 ³	50 µg/m ³	45-55%	231-100-4	50%
Sulfuric Acid	7664-93-9	100 µg/m ³	1.00 mg/m ³	19-25%	231-639-5	22%
Lead Oxide	1309-60-0	50 µg/m ³	500 µg/m ³	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/m³
Lead Dioxide OES / LTEL - ppm 0.15 mg/m³

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/cm³. (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.