



**B.B. BATTERY CO., LTD.**

## MATERIAL SAFETY DATA SHEET

Valve Regulated Lead-Acid Rechargeable battery

Date: Jan. 1, 2014

### SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

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

**Company:** B.B. BATTERY CO., LTD.

**Address:** Chengdong Trial Area, Huanggang Town, Raoping County, Guangdong Province, 515700, P.R.China

**E-mail:** [Factory@bb-battery.com](mailto:Factory@bb-battery.com)

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**US Office:** B&B Battery USA, Inc.

**Address:** 6415 Randolph Street, Commerce, CA 90040

**Tel:** 323-278-1900

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### 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)		/

### 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 (15<sup>th</sup>) SPECIAL PROVISION 238. It is not restricted to IATA DGR 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.

## SECTION 5: FIRE FIGHTING MEASURES

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

**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.

## 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 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. Materials to Avoid: Strong oxidant, Combustible materials and Corrosives.

## SECTION 8: EXPOSURE CONTROL/PPE

**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:** Chemical safety glasses.

**Clothing:** Wear appropriate protective clothing.

**Hand:** Wear acids resistant gloves.

**Other Protect:** No smoking, drinking and eating at working site. Wash thoroughly after handling.

## SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Black or gray plastics cement case (containing dielectric)
Odor:	Odorless
MP/MP Range:	>300°C
pH Value:	1~2
Solubility:	Partial soluble in water

## SECTION 10: STABILITY AND REACTIVITY

**Stability:** Stable under normal temperatures and pressures.

**Materials to Avoid:** Strong oxidant, Corrosives.

**Conditions to Avoid:** 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.

**Hazardous Polymerization:** Will not occur.

**Hazardous Decomposition Products:** Sulfur oxides, Sulfuric acid mist, Metal oxides.

## SECTION 11: TOXICOLOGICAL INFORMATION

**Toxicity Data:** Not available.

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

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

## SECTION 12: ECOLOGICAL INFORMATION

Lead and its compounds can result in a threat if released into the environment.

In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates, and precipitates out of the water column. Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or by chelation with humic or fulvic acids in the soil. Leak (dissolved phase) is bioaccumulated by plants and animals, both aquatic and terrestrial.

## 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. 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).



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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 Substance classification: UN 2800
	<b>Product Codes:</b>	EN & ENL, NP, NPC, NPH, NPL, NPW, RE, REC, REW, 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 Date Sheet</b>	<p><b>Supplier:</b> Yuasa Battery Europe Ltd, <b>Address:</b> Unit 22, Rassau Industrial Estate, Ebbw Vale, NP23 5SD United Kingdom</p> <p><b>Contact:</b> Peter HOLLINGWORTH (Technical Support Manager) Tel: (+44) 01495 354 062 e-mail: <a href="mailto:peter.hollingworth@yuasaeurope.com">peter.hollingworth@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> Contact: Christian RAYNAUD (Technical Manager) Tel: (+33) 0474-95-90-95 e-mail: <a href="mailto:christian.raynaud@yuasa.fr">christian.raynaud@yuasa.fr</a> Language: French &amp; English</p> <p><u>Germany:</u> Contact: Joachim HEER (UPS / Project Manager) Tel: (+49) 0211-41790-15 e-mail: <a href="mailto:joachim.heer@yuasa-battery.de">joachim.heer@yuasa-battery.de</a> Language: German &amp; English</p> <p><u>Iberia:</u> Contact: Antonio PULIDO MARTINEZ (Director Commercial Industrial) Tel: (+34) 091-748-89-19 e-mail: <a href="mailto:antonio@yuasaiberia.com">antonio@yuasaiberia.com</a> Language: Spanish &amp; English</p> <p><u>Italy:</u> Contact: Marco FILIPPI (Technical Manager) Tel: (+39) 02-3800-91-08 e-mail: <a href="mailto:marco.filippi@yuasa.it">marco.filippi@yuasa.it</a> Language: Italian &amp; English</p> <p><u>UK:</u> Contact: Matt JORDAN (Technical Services Manager) Tel: (+44) 01793-833-562 e-mail: <a href="mailto:matt.jordan@yuasaeurope.com">matt.jordan@yuasaeurope.com</a> Language: English language only</p>
1.4	<b>Emergency telephone number:</b>	<p>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)</p>



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### SECTION 2: HAZARDS IDENTIFICATION

VRLA Battery	<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>
<b>Plate Grids and Active materials</b>		<ul style="list-style-type: none"> <li><b>Metallic Lead, Lead alloys and Lead inorganic compounds:</b></li> <li>Lead poisoning is usually caused by inhalation of minute particles of Lead fume and dust, which are absorbed by the blood stream from the lungs and deposited in the bone marrow.</li> <li>Lead is only slowly released from the bones and thus has an accumulative effect causing chronic poisoning.</li> <li>TOXIC by ingestion or inhalation of dust, vapour or fume</li> <li>May cause harm to the unborn child</li> <li>Harmful by inhalation and if swallowed</li> <li>Danger of cumulative effects</li> </ul>
<b>Battery Electrolyte</b>		Severe IRRITATION and DAMAGE to internal tissues if swallowed, IRRITATION of eyes and skin and may cause BURNS and DERMATITIS.
<b>Case Material</b>		Standard Grade, UL94:HB & Flame Retardant (FR) Grade, UL94:V0. No hazard in normal use. Material can burn in a fire with toxic smoke and decomposition products.
<b>Separator Material</b>		The fibres may cause IRRITATION to skin or eyes upon exposure, and to internal tissues if inhaled or swallowed

### SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances present in the product							
Components	Risk Phrases <sup>1</sup>	Substances	Approximate % (w/w)	Chemical Symbol	CAS No.		
Plate Grid	R23 R25	Metallic Lead	30 to 40	Pb	7439-92-1		
		Calcium	< 0.1	Ca	7440-70-2		
		Tin	< 2	Sn	7440-31-5		
Active Materials	R23 R24 R25	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	R21 R22 R35 R36 R37 R38 R49	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>	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-diglycylether, with tribromophenol	< 0.1		40039-98-8	
Separator Material		Absorbent Glass Matt (AGM) Separator (100% Borosilicate Glass Microfibre)	2 to 5		1309-64-4 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 Yuasa Battery UK Ltd for further information.

<sup>1</sup> For full text of R-phrases see SECTION 16



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### 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	
	<b>Plate Grids and Active materials</b>	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.
	<b>Battery Electrolyte</b>	<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.
	<b>Case Material</b>	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.
		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.





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

5	VRLA Battery	General Information	<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.
		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

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### SECTION 7: HANDLING AND STORAGE

7.1	Component:	Precautions For Safe Handling:	<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>	
	VRLA Battery			
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.
8.2		Exposure Control:	There are no special exposure controls for the handling, storage, installation or use of VRLA Batteries.
8.3		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) <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
<b>Battery Electrolyte:</b>	<i>Form</i>	Liquid
	<i>Colour</i>	Colourless
	<i>Odour</i>	Odourless
		<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
<b>Case Material:</b>	<i>Form</i>	Solid
	<i>Colour</i>	Grey or black
	<i>Odour</i>	Slight Odour
		<i>Safety-related data</i> <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
<b>Separator Material:</b>	<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 acetylide. 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.	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.	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:	Dilute Sulphuric Acid  	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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11.1	<b>Battery Electrolyte:</b>	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
	<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.

	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	<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>The general classification for Lead compounds, R50/53 does not apply to Battery Lead Oxide</li> <li>Tests in 2001 and 2005 have concluded that Battery Lead Oxide is NOT toxic for the environment; neither R50 nor R50/53 nor R51/53.</li> <li>Risk Phrase R52/53 (Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment) applies to Battery Lead Oxide.</li> </ul>
		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

	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>



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		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	<b>Plate Grids and Active materials:</b>	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	<b>Battery Electrolyte:</b>	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	<b>Case Material:</b>		<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	<b>Separator Material:</b>		<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	<b>VRLA Battery</b>	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; 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><u>Special Provision A48</u>: Packaging test are not considered necessary</li> <li><u>Special Provision A67</u>: Yuasa's VRLA batteries meet the requirements of Packing Instruction 872.</li> </ul> The battery has been prepared for transport so as to prevent: <ol 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>The battery has been fitted with an insulating cover (made from ABS) which prevents contact with the terminals.</li> <li>Unintentional activation is thus prevented</li> </ol> The words "NOT RESTRICTED" and the Special Provision (SP) number must be indicated on all shipping documents <ul style="list-style-type: none"> <li><u>Special Provision</u>: A164: The battery has been prepared for transport so as to prevent:</li> </ul>

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			<p>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 a cover (made from ABS) which prevents contact with the terminals</p> <p>c) Unintentional activation is thus prevented</p>
		All methods of transport	<p><b>DO NOT PLACE VRLA BATTERIES INSIDE SEALED OR GAS-TIGHT ENCLOSURES.</b></p> <p>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.</p>

### 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	<p><b>Directive 2006/66/EC</b>, on batteries and accumulators and waste batteries and accumulators</p> <p>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."</p>

### SECTION 16: OTHER INFORMATION

Components			
16 (a)	Revision Information	<p>Version 7: 02.02.2015</p> <ul style="list-style-type: none"> <li>• <b>Plate Grids and Active materials:</b> Vapour pressure(at 20°C) *Undetectable</li> <li>• <b>Battery Electrolyte:</b> Vapour pressure(at 20°C) *10-20 mmHg</li> <li>• <b>Case Material:</b> Vapour pressure (at *20°C) *Undetectable</li> <li>• <b>Separator Material:</b> Solidification point *820°C, Boiling point *&gt;2500°C, Density (at 20°C) *2.23g/cm<sup>3</sup>, Vapour pressure (at 20°C) *Undetectable</li> </ul>	
16 (b)	Abbreviations	<p><b>Pb</b> – the chemical symbol for Lead</p> <p><b>Ba</b> – the chemical symbol for Barium</p> <p><b>Ca</b> – the chemical symbol for Calcium</p> <p><b>Sn</b> – the chemical symbol for Tin</p> <p><b>PbO<sub>2</sub></b> – the chemical formulae for Lead Dioxide</p> <p><b>H<sub>2</sub>SO<sub>4</sub></b> – the chemical formulae for Sulphuric Acid</p> <p><b>VRLA</b> – Valve Regulated Lead-Acid battery</p>	
16 (c)	Key literature references and sources of data	SDS documents from suppliers for components and raw materials	
16 (d)	CLP Regulations	Not Applicable	
16 (e)	Risk Phrases	R21	Harmful in contact with skin
		R22	Harmful if swallowed
		R23	Toxic by inhalation
		R24	Toxic in contact with skin
		R25	Toxic if swallowed

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		R35	Causes severe burns
		R36	Irritating to eyes
		R37	Irritating to respiratory system
		R38	Irritating to skin
		R49	May cause cancer by inhalation
		R52	Harmful to aquatic organisms
		R53	May cause long-term adverse effects in the aquatic environment
16 (f)	Training Advice	<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>	
16 (g)	Further Information	<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>• 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 VLRA 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></ul>	