MATERIAL SAFETY DATA SHEET

SECTION 1--- PRODUCT AND MANUFACTURER

Product Name: Nonspillable Lead-Acid Battery

Battery type: Valve Regulation Lead Acid(VRLA) Battery

Manufacturer's name/address: ZHEJIANG NARADA POWER SOURCE CO.,LTD

Address: 72 /Jingguan Road, Qingshan Town, Lin'an Economic Development Zone.

Zhejiang, China.

Post Code: 311305

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Email: INTL@NARADA.BIZ

Website: http://www.naradabattery.com

SECTION 2--- HAZARDOUS COMPONENTS

MATERIAL:	**% by Wt.**	**CAS Number**	**OSHA PEL**	**ACGIH TLV**	**Other NIOSH REL**
Lead Compound Lead	**50**	**7439-92-1**	**50 μg/m³**	**150 μg/m³**	**100 μg/m³**
Lead Dioxide	**18**	**1309-60-0**	**50 μg/m³**	**150 μg/m³**	**100 μg/m³**
LEAD SULFATE	**<1**	**7446-14-2**	**50 μg/m³**	**150 μg/m3**	**100 μg/m³**
Electrolyte(Sulfuric acid)	**21**	**7664-93-9**	**1000μg/m3**	**1000μg/m3**	**1000μg/m3**
Case material: ABS	**8**	**9003-56-9**	**N/A**	**N/A**	**N/A**

SECTION 3--- PHYSICAL DATA

Components	Density	Melting Point	Solubility (in H2O)	Odor	Appearance
Lead	11.34	327.4ºC	None	None	Silver-Gray Metal
Lead Sulfate	6.2	1170ºC	40 mg/l (15ºC)	None	White Powder

Lead Dioxide	9.4	290ºC	None	None	Brown Powder
Fiberglass Separator	N/A	N/A	Slight	Toxic	White Fibrous Glass Membrane
Container (ABS or PP)	N/A	N/A	NONE	No Odor	Solid Plastics

SECTION 4---PROTECTION

Exposure	Protection	Comments
Skin	Rubber gloves, Apron, Safety shoes	Protective equipment must be worn if battery is cracked or otherwise damaged.
Respiratory	Respirator (for lead)	A respirator should be worn during reclaim operations if the TLV exceeded.
Eyes	Safety goggles, Face Shield	In the UK use of this material must be assessed under the COSHH regulations.

SECTION 5--- FIRST AID MEASURES

Emergency and First Aid Procedures	Contact with internal components if battery is opened/broken.
1. Inhalation	Remove to fresh air and provide medical oxygen/CPR if needed. Obtain medical attention.
2. Eyes	Immediately flush with water for at least 15 minutes, hold eyelids open. Obtain medical attention.
3. Skin	Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention if necessary.
4. Ingestion	Do not induce vomiting. If conscious drink large amounts of water/milk. Obtain medical attention. Never give anything by mouth to an unconscious person.

SECTION 6--- FLAMMABILITY DATA

Components	Flash Point	Explosive Limits	Comments
Lead	None	None	
Sulfuric Acid	None	None	
Hydrogen	259 ºC	4%-74.2%	Emit hydrogen only if over charged (Voltage>2.4 VPC). To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery. Extinguishing Media: Dry chemical, Foam, CO2
Fiberglass Separator	N/A	N/A	Toxic vapors may be released. In case of fire: wear self-contained breathing apparatus.
ABS	None	N/A	Danger: Vapors may cause Flash Fire. Harmful or Fatal if Swallowed. Vapor Harmful.
PP	None	N/A	Temperatures over 300 ºC (572ºF) may release combustible gases. In case of fire: wear positive pressure self-contained breathing apparatus.

SECTION 7--- REACTIVITY DATA

Components	Lead/lead compounds
Stability	Stable
Incompatibility	Potassium, carbides, sulfides, peroxides, phosphorus, sulfurs.
Decomposition Products	Oxides of lead and sulfur.
Condition To Avoid	High temperature, Sparks and other sources of ignition.

Stability	Stable at all temperatures
Polymerization	Will not polymerize
Incompatibility	Reactive metals, strong bases, most organic compounds
Decomposition Products	Sulfuric dioxide, trioxide, hydrogen sulfide, hydrogen
CONDITIONS TO AVOID	Prohibit smoking, sparks, etc. from battery charging area.

SECTION 8---CONTROL MEASURES

1. Store sealed batteries with adequate ventilation. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.
2. Do not remove vent caps. Follow shipping and handling instructions that are applicable to the battery type. To avoid damage to terminals and seals, do not double-stack industrial batteries.

STEPS TO TAKE IN CASE OF LEAKS OR SPILLS

Flush the area with water discard to the sewage systems. Do not allow unneutralized water into the sewage system.

WASTE DISPOSAL METHOD:

Spent batteries must be treated as hazardous waste and disposed of according to local state, and federal regulations. A copy of this material safety data must be supplied to any scrap dealer or secondary smelter with battery.

ELECTRICAL SAFETY

Due to the battery's low internal resistance and high power density. High levels of short circuit can be developed across the battery terminals. Do not rest tools or cables on the battery. Use insulated tools only.

Follow all installation instruction and diagrams when installing or maintaining battery systems.

SECTION 9---HEALTH HAZARD DATA

LEAD: The toxic effects of lead are accumulative and slow to appear. It affects the kidneys, reproductive, and central nervous system.

The symptoms of lead overexposure are anemia, vomiting, headache, stomach pain (lead colic), dizziness, loss of appetite, and muscle and joint pain. Exposure to lead from a battery most often occurs during lead reclaim operations through the breathing or ingestion of lead

dusts and fumes.

THIS DATA MUST BE PASSED TO ANY SCRAP OR SMELTER WHEN A BATTERY IS RESOLD.

FIBERGLASS SEPARATOR: Fibrous glass is an irritant of the upper respiratory tract, skin and eyes. For exposure up to 10F/CC use MSA Comfort with type H filter. Above 10F/CC up to 50F/CC use Ultra-Twin with type H filter. NTP or OSHA does not consider this product carcinogenic.

SECTION 10--- LEAD POWDER PRECAUTIONS

Stability: Stable Substances to be avoided include water, most common metals, organic materials, strong reducing agents, combustible materials, and bases, oxidizing agents. Reacts violently with water .Reaction with many metals is rapid or violent, and generates hydrogen (flammable, explosion hazard).

INHALATION: Lead powder mist form formation process may cause respiratory irritation, remove from exposure and apply oxygen if breathing is difficult.

SKIN CONTACT: Lead powder may cause irritation or sensitive. Flush with plenty of soap and water, remove contaminated clothing.

EYE CONTACT: Lead powder may cause irritation or sensitive. Call physician immediately and flush with water until physician arrives.

INGESTION: Lead Powder may cause irritation of mouth, throat, esophagus and stomach. Call physician. If patient is conscious, flush mouth with water, have the patient drink milk or sodium bicarbonate solution.

DO NOT GIVE ANYTHING TO AN UNCONSCIOUS PERSON.

SECTION 11—SAFE HANDLING PRECAUTIONS

Hygiene Practices

Following contact with internal battery components, wash hands thoroughly before eating, drinking, or smoking.

Projective Measures to be Taken During Non-Routine Tasks, Including Equipment Maintenance

Wear recommended eye protection. If clothing becomes saturated with lead powder remove and wash affected area with water for 15 minutes. Discard saturated clothing. Do not permit flames or sparks in the vicinity of battery(s).

SPILL OR LEAK PROCEDURES

Protective Measures to be Taken if Material is Released or Spilled

Remove combustible materials and all sources of ignition. Contain spill with soda ash (sodium carbonate) or quicklime (calcium oxide). Mix well. Make certain mixture is neutral, then collect residue and place in a drum or other suitable container. Dispose of

as a hazardous waste.

DO NOT RELEASE UNNEUTRALIZED WATER!

Waste Disposal Method

Sealed battery**: Neutralize as above for a spill, collect residue, and place in a drum or suitable container. Dispose of as a hazardous waste.**

DO NO FLUSH LEAD-CONTAMINATED WATER INTO SEWER.

Batteries: Send to lead smelter for reclamation following applicable Federal, state, and local regulations.

Product can be recycled along with automotive (SLI) sealed batteries.

OTHER HANDLING AND STORAGE PRECAUTIONS.

None Required.

SECTION 12---FIRE AND EXPLOSION DATA

Flash Point (test method)	Auto Ignition Temperature	Flammable Limits in Air, % by 3/4 Vol. (Hydrogen)	
Hydrogen - 259℃	**Hydrogen 580℃**	**Lower - 4.1**	**Upper - 74.2**

Extinguishing Media

Dry chemical, foam, or CO_2

Special Fire Fighting Procedures

Use positive pressure, self-contained breathing apparatus.

Unusual Fire and Explosion Hazard

Hydrogen and oxygen gases are produced in the cells during normal battery operation (hydrogen is flammable and oxygen supports combustion). These gases enter the air through the vent caps. To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery.

SECTION 13---TRANSPORTATION REGULATIONS

U.S. DOT Excepted from the hazardous materials regulations (HMR) because the batteries meet the requirements of 49 CFR 173.159(f) and 49 CFR 173.159a of the U.S. Department of Transportation/s HMR. Battery and outer package must be marked “NONSPILLABLE" or "NONSPILLABLE BATTERY”. Battery terminals must be protected against short circuits.

IATA Excepted from the dangerous goods regulations because the batteries meet the requirements of Packing Instruction 872 and Special Provisions A67 of the International Air Transportation Association (IATA) Dangerous goods Regulations and International Civil Aviation Organization (ICAO) Technical Instructions. Battery Terminals must be protected against short circuits.

IMDG Excepted from the dangerous goods regulations for transport by sea because the batteries meet the requirements of Special Provision 238 of the International Maritime Dangerous Goods (IMDG CODE). Battery terminals must be

protected against short circuits.

Narada VRLA(Non-spillable) Batteries can be considered as non-spillable provided that they are capable of withstanding the vibration and pressure differential tests. Without leakage of battery fluid.

SECTION 14---TOXICOLOGICAL INFORMATION

GENERAL: The primary routes of exposure to lead are ingestion of dust and fumes

ACUTE:

INHALATION/INGESTION: Exposure to lead and its compounds may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in the legs, arms and joints. Kidney damage, as well as anemia, can occur from acute exposure.

CHRONIC

INHALATION/INGESTION: Prolonged exposure to lead and its compounds may produce many of the symptoms of short-term exposure and may also cause central nervous hallucination, convulsions and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity, but there is at present, no substantiation of the implication. Pregnant women should be protected from excessive exposure. Lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure in pregnant women.

SECTION 15---ECOLOGICAL INFORMATION

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 coating 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 with hydrous oxides or clays or by chelation with humic in the soil. Lead (dissolved phase) is bioaccumulated by plants and animals, both aquatic and terrestrial.

SECTION 16---DISPOSAL INFORMATION

Sealed 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 accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

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