

Instructions for the Safe Handling of Lead-Acid Batteries



This document was prepared in co-operation with the Committee of Environmental Affairs of EUROBAT (May 2003), reviewed by EUROBAT TC members (September 2003) and CEM (October – November 2003). Revised June 2013.

Batteries are considered as articles under REACH regulation 1907/2006/EC and, as such, do not require the publication of a safety data sheet. However, there is a requirement to provide safety information on products. This document, which fulfils this requirement, is commonly called an MSDS, but, in Europe, is more correctly referred to as 'Instructions for the Safe Handling of Lead-Acid Batteries'.

ENERSYS CUSTOMER CARE PROGRAM

1. Identification of Product and Company

Product: Motive Power Lead acid battery

Brand names: EnerSys, Hawker, Fiamm Motive Power, Energia, Oerlikon, Oldham, General Battery.

Manufacturer: EH Europe GmbH

Address: Löwenstrasse 32, CH-8001 Zürich, Switzerland

Phone: Emergency tel. no. +1 703 527 3887

2. Composition and Information on the Main Ingredients ³⁾

CAS no.	Description	Content ¹⁾ [% of weight]	Hazard symbol
7439-92-1	Lead Grid (metallic lead, lead alloys with possible traces of additives)	~ 32	T ²⁾
7439-92-1	Active Mass (battery oxide, inorganic lead compounds)	~ 32	T ²⁾
7664-93-9	Electrolyte ⁴⁾ (diluted sulphuric acid with additives)	~ 29	C
	Plastic Container / Plastic Parts ⁵⁾	~ 7	

¹⁾ Contents may vary due to the design of the battery

²⁾ As result of the harm to the unborn child, lead compounds are classified as toxic for reproduction, Category 1. As this category is not described with a specific hazard symbol, lead compounds have to be labelled with the "skull" symbol. Lead compounds are not classified "toxic".

³⁾ See chapter 12 – Ecological Information

⁴⁾ Density of the electrolyte varies in accordance to the state of charge

⁵⁾ Composition of the plastic may vary due to different customer requirements

3. Hazards Identification

No hazards occur during the normal operation of a lead acid battery as it is described in the instructions for use that are provided with the battery. Lead-acid batteries have three significant characteristics:

- They contain an electrolyte which contains dilute sulphuric acid. Sulphuric acid may cause severe chemical burns.
- During the charging process or during operation they might develop hydrogen gas and oxygen, which under certain circumstances may result in an explosive mixture.
- They can contain a considerable amount of energy, which may be a source of high electrical current and a severe electrical shock in the event of a short circuit.

Paragraph 15 of the document provides information on the symbols that are displayed on the batteries.

4. First Aid Measures

This information is of relevance only if the battery is broken and this results in direct contact with the battery's contents.

4.1 General

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

4.2 Electrolyte (sulphuric acid)

After skin contact:	rinse with water, remove and wash wetted clothing
After inhalation of acid mist:	inhale fresh air, seek advice of a medical doctor
After contact with the eyes:	rinse under running water for several minutes, seek advice of a medical doctor
After swallowing:	drink a lot of water immediately, swallow activated carbon, do not induce vomiting, seek advice of a medical doctor

4.3 Lead compounds

After skin contact:	clean with water and soap
After inhalation:	inhale fresh air, seek advice of a medical doctor
After contact with the eyes:	rinse under running water for several minutes, seek advice of a medical doctor
After swallowing:	wash mouth with water, seek advice of a medical doctor

5. Fire Fighting Measures

Suitable fire extinguishing agents:	CO ₂ or dry powder extinguishing agents
Unsuitable fire extinguishing agents:	Water, if the battery voltage is above 120 V
Special protective equipment:	Protective goggles, respiratory protective equipment, acid protective equipment, acid-proof clothing in case of larger stationary battery plants or where larger quantities are stored.

6. Measures to be Taken in Case of Accidental Release

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

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

7. Handling and Storage

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

8. Exposure Limits and Personal Protective Equipment

8.1 Lead and lead compounds

No exposure to lead and lead compounds during normal conditions of use.

8.2 Electrolyte (sulphuric acid)

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

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

Hazard symbol: C, corrosive

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

CAS-No: 7664-93-9

R-phrases: R-35 Causes severe chemical burns

S-phrases: S-2 Keep out of reach of children

S-16 Keep away from sparks or naked flame, no smoking

S-26 In case of contact with eyes rinse immediately with plenty of water and seek medical advice

S-45 In case of accident or if you feel unwell seek medical advice immediately.

9. Physical and Chemical Properties

	Lead and lead compounds	Electrolyte (dilute sulphuric acid, 30 to 38.5%)
Appearance <i>form:</i> <i>colour:</i> <i>odour:</i>	solid grey odourless	liquid colourless odourless
Safety-related data <i>solidification point:</i> <i>boiling point:</i> <i>solubility in water:</i> <i>density (20°C):</i> <i>vapour pressure (20°C):</i>	327 °C 1740 °C very low (0.15 mg/l) 11.35 g/cm ³ N.A.	-35 to -60 °C approx. 108 to 114 °C complete 1.2 to 1.3 g/cm ³ N.A.

Lead and lead compounds used in lead-acid batteries are poorly soluble in water; lead can be dissolved in an acidic or alkaline environment only.

10. Stability and Reactivity (sulphuric acid, 30 – 38.5 %)

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

11. Toxicological Information

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

11.1 Electrolyte (dilute sulphuric acid)

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

Acute toxicity data:

- LD₅₀ (oral, rat) = 2140 mg/kg
- LC₅₀ (inhalation, rat) = 510 mg/m³/2h

11.2 Lead and lead compounds

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

12. Ecological Information

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

12.1 Electrolyte (dilute sulphuric acid)

In order to avoid damage to the sewage or drainage system, the acid has to be neutralised by means of lime or sodium carbonate before disposal. Ecological damage is possible by change of pH. The electrolyte solution reacts with water and organic substances, causing damage to flora and fauna. The electrolyte may also contain soluble components of lead that can be toxic to aquatic environments.

12.2 Lead and lead compounds

Chemical and physical treatment is required for the elimination from water. Waste water containing lead must not be disposed of in an untreated condition.

The former classification of lead compounds as toxic for the aquatic environment R50/53 had been triggered from test results generated in the 1980's for soluble lead compounds (lead acetate). The hardly soluble lead compounds such as battery lead oxide were not tested at this time. Tests on battery lead oxide were carried out in 2001 and 2005. The respective test results concluded that battery lead oxide is not toxic for the environment, neither R50 nor R50/53 nor R51/53. From this it follows that the general classification for lead compounds (R50/53) does not apply to battery lead oxide. As a result of this, the risk phrase R52/53 (harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment) applies to battery lead oxide.

Effects of battery lead oxide in the aquatic environment:

- Toxicity for fish: 96 h LC 50 > 100 mg/l
- Toxicity for daphnia: 48 h EC 50 > 100 mg/l
- Toxicity for alga: 72 h IC 50 > 10 mg/l

The results demonstrate that the battery lead oxide compounds in a concentration of 100 mg/l have no adverse effect on fish and daphnia. A concentration of the battery lead oxide of 10 mg/l has no adverse effect on the rate of growth and the biomass. For the classification according to Directive 67/548/EEC the most sensitive adverse effect has to be considered. As a result of the toxicity for alga at > 10 mg/l battery lead oxide has to be classified according to the R-Phrases 52/53 (Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

13. Disposal Considerations

Spent lead-acid batteries (EWC 16 06 01) are subject to regulation of the EU Battery Directive (2006/66/EC) and its adoption into national legislation on the composition and end-of-life management of batteries.

Spent lead-acid batteries are recycled in lead refineries (secondary lead smelters). The components of a spent lead-acid battery are recycled or re-processed.

At the points of sale, the manufacturers and importers of batteries, respectively the metal dealers take back spent batteries, and render them to the secondary lead smelters for processing.

To simplify the collection and recycling or re-processing process, spent lead-acid batteries must not be mixed with other batteries.

By no means may the electrolyte (dilute sulphuric acid) be emptied in an inexpert manner. This process is to be carried out by the processing companies only.

14. Transport Regulation

14.1 Flooded lead-acid batteries:

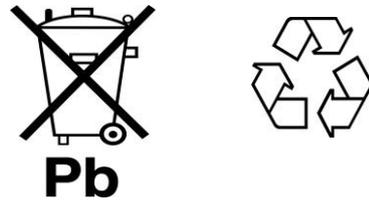
Land Transport	Land Transport (ADR/RID) <ul style="list-style-type: none">- UN No. UN2794- Classification ADR/RID: Class 8- Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID- Packing Group ADR: not assigned- Label required: Corrosive- ADR/RID: New and spent batteries are excepted from all ADR/RID if they meet the requirements of Special Provision 598.
Sea Transport (On account of the differences between products supplied by various manufacturers, the supplier should be consulted.)	Sea Transport (IMDG Code) <ul style="list-style-type: none">- Classification: Class 8- UN No. UN2794- Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID- Packing Group: not assigned- EmS: F-A, S-B- Label required: Corrosive
Air Transport	Air Transport (IATA-DGR) <ul style="list-style-type: none">- Classification: Class 8- UN No. UN2794- Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID- Packing Group: II- Label required: Corrosive

14.2 VRLA batteries only:

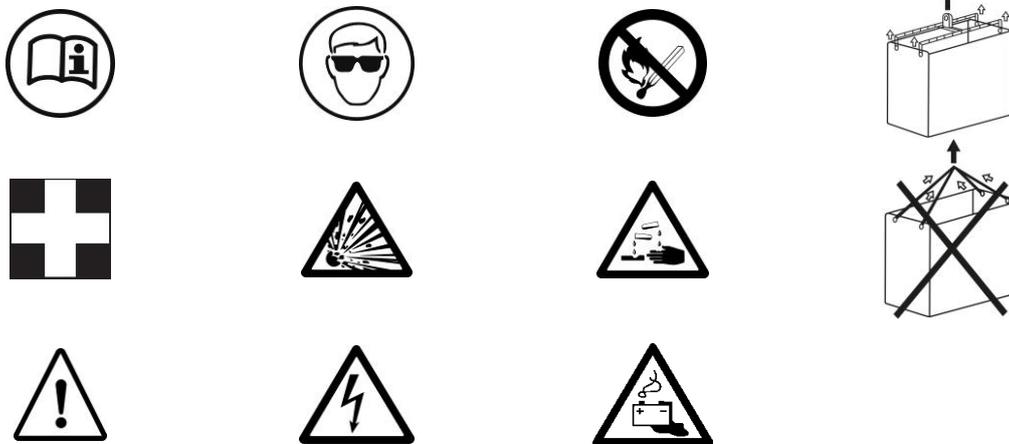
Land Transport	Land Transport (ADR/RID, U.S. DOT) <ul style="list-style-type: none">- UN No. UN2800- Classification ADR/RID: Class 8- Proper Shipping Name: BATTERIES, WET, NON SPILLABLE- Packing Group ADR: not assigned- Label required: Corrosive- ADR/RID: New and spent batteries are excepted from all ADR/RID requirements provided the requirements of Special Provision 598 are met.
Sea Transport	Sea Transport (IMDG Code) <ul style="list-style-type: none">- UN No. UN2800- Classification: Class 8- Proper Shipping Name: BATTERIES, WET, NON SPILLABLE- Packing Group: not assigned- EmS: F-A, S-B- Label required: Corrosive- If non-spillable batteries meet the requirements of Special Provision 238, they are excepted from the IMDG codes provided that the batteries' terminals are protected against short circuits.
Air Transport	Air Transport (IATA-DGR) <ul style="list-style-type: none">- UN No. UN2800- Classification: Class 8- Proper Shipping Name: BATTERIES, WET, NON SPILLABLE- Packing Group: not assigned- Label required: Corrosive- If non-spillable batteries meet the testing requirements in Packing Instruction 872 and Special Provision A67, they are excepted from all the IATA DGR codes provided that the batteries' terminals are protected against short circuits.

15. Regulatory Information

In accordance with the EU Battery Directive and the respective national legislation, lead-acid batteries have to be marked by a crossed out dust bin with the chemical symbol for lead shown below, together with the ISO return/recycling symbol.



In addition, the batteries have to be labelled with some or all of the following hazard symbols:



Labelling might vary due to the application, design, dimension and country of sale of the batteries. The manufacturer, respectively the importer of the batteries shall be responsible for placing the symbols (a minimum size is specified).

16. Other Information

The information given above is provided in good faith based on existing knowledge and does not constitute an assurance of safety under all conditions. It is the user's responsibility to observe all laws and regulations applicable for storage, use, maintenance or disposal of the product. If there are any queries, the supplier should be consulted.

However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.