Edition: June 2013

INFORMATION FOR THE SAFE HANDLING OF LEAD-ACID BATTERIES

1. Identification of Product and Company

Product: Lead-Acid battery (see 14.1)

Category: Battery, wet, non-spillable[1]

Trade Name: Lead-Acid batteries

Manufacturer

Company: EXIDE Technologies

Address: 5 Allée des Pierres Mayettes, 92636 Gennevilliers, FRANCE

Phone: +33.1.41.21.23.00

2. Hazards Identification

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

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

The Batteries have to be marked with the symbols listed under item 15.

3. Composition and Information on the main Ingredients[2)]

CAS no.	Description	Content [% of weight]	Hazard Information
7439-92-1	Lead Grid (metallic lead, lead alloys with possible traces of additives)	~ 32	
7439-92-1	Active Mass [3] (Battery Oxide, inorganic lead compounds)	~ 32	H412 (R52/53) H360D / H360f[4]
7664-93-9	Electrolyte [5] (diluted sulphuric acid with additives)	~ 29	H 314
	Plastic Container / Plastic Parts [6]	~ 7	

1 See item 14 – Transport Regulation
2 contents may vary due to performance data of the Battery
3 see chapter 12 – Ecological Information
4 As result of the harm to the unborn children Lead compounds are classified as toxic for reproduction
5 Density of the electrolyte varies in accordance to the state of charge
6 Composition of the plastic may vary due to different customer requirements

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4. First Aid measures

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

4.1 General

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

4.2 Electrolyte (Sulphuric acid)

after skin contact:	rinse with water, remove and wash wetted clothing
after inhalation of acid mist:	inhale fresh air, seek advice of a medical doctor
after contact with the eyes:	rinse under running water for minimum 15 minutes, seek advice of a medical doctor
after swallowing:	drink lot of water immediately, swallow activated carbon, do not induce vomiting, seek advice of a medical doctor

4.3 Lead compounds

after skin contact:	clean with water and soap
after contact with the eyes:	rinse under running water for minimum 15 minutes, 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 ingredients 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 a roof in cool ambient temperature range, for fully charged lead-acid batteries the range is from -40 up to +60ºC. If batteries have the possibility to remain discharged in cold conditions, a correction to the lower temperature limit is recommended to prevent freezing:

- -30ºC at 75% state of charge,
- -20ºC at 50% state of charge,
- and -10ºC at 25% state of charge;

this will help prevent short circuits and damage to the batteries.

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8. Exposure limits and personal protective equipment

8.1 Lead and Lead compounds

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

8.2 Electrolyte (Sulphuric Acid)

Exposure to sulphuric acid and acid mist might occur during filling and charging. Occupational exposure limits for sulphuric acid mist are regulated national basis.

Hazard Class:	Skin corrosive 1A	
Protective equipment:	P280 Wear protective gloves/protective clothing and eye/face protection.	
CAS-No:	7664-93-9	
Hazard Statement:	H314	Cause severe skin burns and eye damage
Precautionary Statements:	P102	Store away and keep out of reach of children
	P210	Keep away from heat/sparks/open flames. – No smoking
	P303+P361+P353	If on Skin or Clothing, remove immediately all clothing, rinse skin with water, take a shower and seek medical advice
	P305+P351+P338	If in contact with eyes rinse immediately with plenty of water, remove contact lenses and seek medical advice
	P309	If exposed or if you feel unwell seek medical advice immediately (show the label where possible).

9. Physical and Chemical properties

	Lead and Lead compounds	**Electrolyte (diluted sulphuric acid, 30 to 38.5%)**
Appearance		
form :	solid	liquid
colour :	grey	colourless
odour :	odourless	odourless
Safety-related data		
solidification point :	327 °C	-35 to -60 °C
boiling point :	1740 °C	approx. 108 to 114 °C
solubility in water :	very low (0.15 mg/l)	complete
density (20°C) :	11.35 g/cm³	1.2 to 1.3 g/cm³
vapour pressure (20°C) :	N.A.	14,6 mbar

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.

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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 (diluted sulphuric acid):

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

Acute toxicity data:

- $LD_{50\ (oral,\ rat)}$ = 2.140 mg/kg
- $LC_{50\ (inhalation,\ rat)}$ = 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 (diluted sulphuric acid)

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

12.2 Lead and Lead compounds

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

The former classification of Lead compounds as toxic for the aquatic environment R50/53 had been triggered from test results generated in the 80’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 conclude 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 the result of this the Risk Phrase R52/53 (GHS:H412; Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment) applies to Battery Lead Oxide.

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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 these Battery Lead Oxide compounds in a concentration of 100 mg/l have no adverse effect on fish and daphnia. A concentration of these 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 (GHS H412; Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

13. Recycling Information

Spent lead-acid batteries are subject to regulation of the EU Battery Directive (2006/66/EU) and its adoptions into national legislation.

Spent Lead-Acid batteries (EWC 160601) 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 (diluted 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 Rules applying to “Batteries, wet, non-spillable”

14.1.1 Land transport according to ADR / RID

- Hazard class: 8
- UN-No.: 2800
- Proper shipping Name: BATTERIES, WET, NON-SPILLABLE
- Packaging group: none
- Packaging instruction: P 003
- Hazard label: 8

Special Provision 238 a)+b): no transport as dangerous goods (non-spillable batteries are not subject to other requirements of ADR/RID if they meet the requirements according to special provision 238. **An appropriate manufactures declaration is necessary**. Batteries which do not meet requirements according to Special Provision 238 have to be packed and carried as described under 14.1.1 Land transport - Special Provision 598.

14.1.2 Sea transport according to IMDG Code

- Hazard class: 8
- UN-No.: 2800
- Proper shipping Name: BATTERIES, WET, NON-SPILLABLE
- Packaging group: none
- Packaging instruction: P 003 and PP 11
- Hazard label: 8
- EmS: F-A, S-B

Special Provision 238 1 + 2: no transport as dangerous goods (non-spillable batteries are not subject to other requirements of IMDG Code if they meet the requirements according to special provision 238. **An appropriate manufactures declaration is necessary**. Batteries which do not meet requirements according to Special Provision 238 have to be packed as described under 14.1.2 Sea transportation IMDG Code according to packaging instruction P901 and carried as dangerous goods according to UN 2794.).

14.1.3 Air transport according to IATA-DGR

- Hazard class: 8
- UN-No.: 2800
- Proper shipping Name: BATTERIES, WET, NON-SPILLABLE
- Packaging group: none
- Packaging instruction: 872
- Hazard label: 8

Special Provision A67: no transport as dangerous goods (non-spillable batteries are not subject to other requirements of IATA-DGR if they meet the requirements according to special provision A67. Provided that battery terminals are protected against short-circuit. **An appropriate manufactures declaration is necessary**. Batteries which do not meet requirements according to Special Provision A67 have to be packed as described under 14.1.1 Air transport IATA-DGR according to packaging instruction 870 and carried as dangerous goods according to UN 2794.).

14.2 Rules applying to “Batteries, damaged”

- Hazard class: 8
- UN-No.: 2794
- Proper shipping Name: BATTERIES, WET, FILLED WITH ACID
- Packaging group: none
- Packaging instruction: P 801a
    - Transport as dangerous goods (packing in “battery boxes”) or,
    - Special Provision VV14 (Transport as dangerous good in bulk)
- Hazard label: 8
- ADR Tunnel restriction code: E
- Note: applies to the transport of Lead Acid batteries under UN-No.: 2800 as well.

14.3 Battery, dry

Batteries delivered without electrolyte “dry batteries or cells” are not in the scope of dangerous goods transport regulation.

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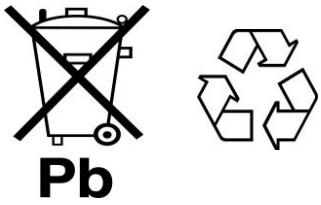
15. Regulatory Information

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



In addition Lead-Acid batteries have to be labelled with the hazard symbols described below:


No smoking, no open flames, no sparks


Wear Safety googles


Keep away from children


Corrosive


Observe operating instructions


Explosive gas mixture

Labelling might vary due to application and dimension of the Battery. The manufacturer, respectively the importer of the batteries shall be responsible for placing the symbols (a minimum size is specified). In addition, consumer/user information on the significance of the symbols may be attached.

16. Other Information

16.1 Material Safety Data Sheet

The European Directive 91/155/EEC which described the requirements for Material Safety Data Sheets had been repealed by the Regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals on June 1st, 2007 (REACH-Regulation 1907/2006/EC). **The requirement to publish a Material Safety Data Sheet applies to all suppliers of substances and preparations.**

As already defined under the former Directive there is no requirement to develop and maintain a Material Safety Data Sheet for products such as Batteries.

16.2 Substances of Very High Concern (SVHC)

The publications of the European Chemicals Agency on **s**ubstances of **v**ery **h**igh **c**oncern are monitored by EXIDE. As defined by REACH, customers will receive the required information if an updated publication may add a substance relevant for our products to the list of SVHC's. On 19 December 2012, four Lead compounds used in the process of battery manufacturing – **Lead Monoxide**, Lead Tetroxide, Tetralead Trioxide Sulphate and Pentalead Tetraoxide Sulphate – were placed on the Candidate List of Substances of Very High Concern under Annex XIV of the REACH.

Batteries ready for use do not contain any substance of very high concern. Irrespective of the Battery design, this applies to all batteries containing electrolyte (flooded, MHF, Gel, AGM).

Dry Batteries / dry cells (dry charged plates, delivered without electrolyte) **contain more than 0,1 % of Lead Monoxide**. Lead Monoxide (CAS Nr.: 1317-36-8) is listed as a substance of very high concern, hence customers of dry batteries receive the required information on Lead monoxide along with the product. Once the batteries / cells are filled with electrolyte all Lead Monoxide is transformed and the presence of any SVHC has ended.

16.3 GHS labels

Among others the European GHS regulation describes classification and labelling of chemicals and preparations. Doing so, the GHS regulation is step by step repealing the current classification and labelling requirements defined in the Chemical Agents Directive (67/548/EC). GHS is not a regulation that describes labelling requirements for products such as Lead Acid Batteries.

The six pictograms on batteries target to provide safety information and are based on an international standard (EN 50342). For the time being these labels remain unaffected.

16.4 General

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.

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