

Instructions for the safe handling of AGM Lead-Acid Batteries (Adsorptive Glassfibre Material)

1. Identification/ preparation of the substance and identification/
undertaking of the company

Data on the product:
trade name

AGM battery with adsorbed sulphuric acid

Data on the manufacturer:

Johnson Controls Autobatterie GmbH & Co. KGaA
Am Leineufer 51
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2. Composition / information on ingredients

| EINECS-No. | CAS-No. | Description | Content [% of weight] ¹ | Classification |
|------------|-----------|---|------------------------------------|--|
| 231-100-4 | 7439-92-1 | Lead alloys | ~ 32 | - - |
| 231-100-4 | 7439-92-1 | Active mass (preparation content Battery lead oxide) | ~ 32 | T ² - Teratogenic R61-20/22-33-62- 52/53 ³ |
| 231-639-5 | 7664-93-9 | Diluted sulphuric acid ⁴ | ~ 29 | C-Corrosive R 35 |
| - | - | Plastic container ⁵ | ~ 7 | - |

*Content may vary

3. Hazards identification

No hazards in case of an intact battery and observation of the instructions for use.

AGM batteries have two significant characteristics:

- They contain fixed diluted sulphuric acid, which may cause severe acid burns, when the material is touched.
- During the charging process they develop hydrogen gas and oxygen, which under certain circumstances may turn into an explosive mixture.

For this reason, the batteries have been marked with the following hazard symbols:



The significance of the hazard symbols*) is:
 *) IEC and EN standard in preparation

1. No smoking, no open flames, no sparks.
2. Wear safety goggles.
3. Keep away from children.
4. Sulphuric acid.
5. Observe operating instructions.
6. Explosive gas mixture.

Additionally: Do not clean batteries with dry wishers, use only wet wishers.

4. First-aid measures

This information is of relevance only, if the battery is broken and direct contact to the compounds occurred.

Glassfibre material with adsorbed sulphuric acid:

after contact to skin

rinse with water; remove and wash wetted clothing

after inhalation of acid mist)*

inhale fresh air

after contact with the eyes)*

rinse under running water for several minutes

after swallowing)*

drink a lot of water immediately, and swallow activated carbon, do not induce vomiting.
 Seek to advice a doctor.

Lead compounds

- after skin contact:

clean with water and soap

- after inhalation of lead compounds:

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 extinguishing agents:

Water, CO₂ or dry powder fire extinguishing agents

- Special protective equipment:

Protective goggles, respiratory protective equipment, acid proof clothing

6. Accidental release measures

Cleaning / take-up procedures

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 permit penetration into the sewage system, the 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. If batteries have to be stored in storage rooms, it is imperative that the instructions for use are observed.

Additional Information about the storage of lead-acid batteries is available by Johnson Controls Autobatterie GmbH Co. KGaA.

8. Exposure controls / personal protection

8.1 No exposure caused by lead and lead containing battery paste when handling properly.

8.2 In case of a broken battery and with direct contact with compounds

| | | |
|------------------------------|------|--|
| Threshold value on workplace | | Occupational exposure to sulphuric acid mist is regulated on a national basis |
| Hazard symbol | | C, corrosive |
| R-phrases | R-35 | Causes severe 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 (show the label where possible). |

Personal protective equipment

In case of broken battery and with direct contact with its compounds:

Eye protection: Safety goggles are necessary during reloading or recharging

Recommend safety gloves for contact with compounds:

Type of material: nitrile rubber

Thickness of material: 0,11 mm

Breakthrough time of material: > 480 minutes

8.3 In case of broken battery and with direct contact with its compounds:

| | | |
|---------------|---------|--|
| Hazard symbol | | T, teratogenic |
| R-phrases | R-61 | May cause harm to the unborn child |
| | R-20/22 | Harmful by inhalation and if swallowed |
| | R-33 | Danger of cumulative effects |
| | R-62 | Possible risk of impaired fertility |
| | R-52/53 | Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment |
| S-phrases | S-52 | Not recommended for interior use on large surface areas. |
| | S-45 | In case of accident or if you feel unwell, seek medical advice immediately |
| | S-60 | Refer to manufacturer/supplier for information on recovery/recycling |
| | S-61 | Avoid release to the environment. Refer to special instructions / Safety data sheets |

9. Physical and chemical properties

Lead

| | |
|--|---------------------------|
| Appearance | |
| form: | solid |
| colour: | grey |
| odour: | odourless |
| Safety-related data | |
| <i>pH-value(25 °C):</i> | 7 – 8 (100 mg/l water) |
| <i>solidification point:</i> | 327 °C |
| <i>boiling point:</i> | 1'740 °C |
| <i>solubility in water: (25 °C)</i> | low (0.15 mg/l) |
| <i>density (20 °C):</i> | 11.35 g/cm ³ |
| <i>vapour pressure (20 °C)</i> | - |
| Lead and lead-containing battery paste is poorly soluble in water. | |

10. Stability and reactivity of glassfibre material containing

- Thermal decomposition at 338 °C
- Destroys organic materials, such as cardboard, wood, textiles.
- Reacts with metals producing hydrogen.
- Vigorous reactions with alkalis.

11. Toxicological information

- **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/mc/2h.

- **Lead and lead-containing battery paste:**

may cause damage to the blood, nerves, and kidneys when ingested. Lead containing battery paste is classified as toxic for reproduction.

Note: Not applicable to the finished product, only applicable to its compounds in case of broken battery.

12. Ecological information

- **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 batteries also contain soluble components of lead that can be toxic to aquatic environments.

Water-polluting material within the meaning of the German Water-Resources Act (WHG) Water pollution class 1

- **Lead and its inorganic compounds**

Chemical and physical treatment is required for the elimination from water.

Waste water containing lead must not be disposed of in untreated condition.

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 Battery Lead Oxide in a concentration of 100 mg/l has no adverse effect on fish and daphnia. A concentration of 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-Phrase 52/53 (Harmful to aquatic organism, may cause long-term adverse effects in the aquatic environment).

- Glassfibre material contains adsorbed acid. Don't dispose the material to the sewer system

13. Disposal considerations

The point of sale, the manufacturers and importers of batteries take back dead batteries, and render them to the secondary lead smelters for processing.

Johnson Controls has established a collection system called ecosteps. More information is available on:

http://www.johnsoncontrols.com/content/us/en/products/power_solutions/Battery_Technology_Centers/global_battery_recycling.html

Spent lead-acid batteries (EWC 160601*) are subject to the regulation of EU (Battery Directive) and its adoptions into national legislation on the composition and end-of-life management of batteries.

They are marked with the recycling / return symbol and with a crossed-out roller container. Spent lead-acid batteries should not be mixed with other batteries in order not to complicate the processing.

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

14. Transport information

| | |
|----------------|--|
| Land Transport | <p>UN N°: UN2800 Classification ADR/RID: Class 8 Proper Shipping Name: Packing Group ADR: not assigned Label required: not assigned ADR/RID: AGM batteries are non-spillable batteries (special provision 238) and are exempted from all ADR/RID provisions if they are protected from short circuit</p> |
| Sea Transport | <p>Sea Transport (IMDG Code)</p> <p>UN N°: UN 2800 Classification: Class 8 Proper Shipping Name: BATTERIES (ACCUMULATORS), WET, NON-SPILLABLE, ELECTRIC STORAGE Packing Group: not assigned EmS: not assigned Label required: not assigned AGM batteries are non-spillable batteries (special provision 238) and are exempted from all IMDG codes if they are protected from short circuit</p> |
| Air Transport | <p>Air Transport (IATA-DGR)</p> <p>UN N°: UN 2800 Classification: Class 8 Proper Shipping Name: BATTERIES WET, NON-SPILLABLE, ELECTRIC STORAGE Packing Group: not assigned Label required: not assigned AGM batteries are non-spillable batteries (special provision A 67) and are exempted from all IATA DGR codes if they are protected from short circuit</p> |

Notice:

Special provision 238 ADR/RID/IMDG Code:

a.) Batteries can be considered as non-spillable provided that they are capable of withstanding the vibration and pressure differential test given below, without leakage of battery fluid

Vibration test:

The battery is rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) is applied. The frequency is varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies and return is traversed in 95 ± 5 minutes for each mounting position (direction of vibration) of the battery. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for equal time periods.

Pressure differential test:

Following the vibrations test, the battery is stored for six hours at 24 °C ± 4°C while subjected to a pressure differential of at least 88 kPa. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for at least six hours in each position.

b.)

Non-spillable batteries are not subject to the requirements of ADR if, at a temperature of 55°C, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, as packaged for carriage, the terminals are protected from short circuit.

A67 IATA DGR:

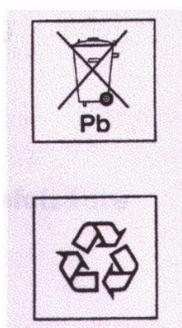
A67 Non-spillable batteries meeting the requirements of Packing instruction 872 are not subject to these Regulations if, at a temperature of 55°C (131°F), the electrolyte will not flow from a ruptured or cracked case. The battery must not contain any free or unabsorbed liquid. Any electrical battery or battery powered device, equipment or vehicle having the potential of dangerous evolution of heat must be prepared for transport so as to prevent:

- a) A short circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or in the case of equipment, by disconnection of the battery and protection of exposed terminals); and
- b) Unintentional activation

The words "Not Restricted" and the Special Provision number must be included in the description of the substance on the Air Waybill as required by 8.2.6. when an Air Waybill is issued.

15. Regulatory information

In accordance with EC and national laws lead-acid batteries have to be marked by a crossed out refuse bin with the chemical symbol for lead Pb shown below, together with the ISO return/ recycling symbol.



The manufacturer, respectively the importer of the batteries shall be responsible for the attachment of the symbols. In addition, a consumer / user information on the significance of the symbols has to be attached.

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.

Products such as batteries are not in the scope of any regulation which requires the publication of a Material Safety Data Sheets according EU Regulation No 1907/2006 in connection with EU Regulation No 453/2010.

More information you will find:

<http://www.johnsoncontrols.com/>