Instructions for the safe handling of lead-acid accumulators (Lead-acid batteries)

1. Identification of product and company

Product: Lead-acid battery filled with dilute sulphuric acid

Manufacturer:

Johnson Controls Autobatterie GmbH & Co. KGaA
Am Leineufer 51
D-30419 Hanover

Contact: Dr. Axel Lesch, Director, Environment & Facility Management

Telephone: ++ 49 / 511/975-2690
Fax: ++ 49 / 511/975-2696
Emergency: ++ 49 / 511/975-2680

Email: Axel.Lesch@jci.com

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

2. As a result of the harm to the unborn children 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. 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 (e.g. lead acetate). The hardly soluble lead compounds such as battery lead oxide were not tested at that time. Tests on battery lead oxide were carried out in 2001, 2005 and 2006. 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/R53) does not apply to battery lead oxide. As the 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 and active mass (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 two significant characteristics:

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

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

The hazard symbols have these meanings:

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.

Additional: 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 ingredients occurred.

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

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, CO_2 or dry powder fire extinguishing agents
- Special protective equipment:	Protective goggles, respiratory protective equipment, acid proof clothing

6. Measures to be taken in case of accidental release

Cleaning / take-up procedures

Use a bonding agent, such as sand, to absorb spilt acid; use lime / sodium carbonate for neutralization; dispose of with due regard to the official local regulations; do not permit penetration into the sewage system, the soil or bodies of water.

7. Handling and storage

Store under roof in cool ambiance. 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 during normal condition of use.

8.2 Possible exposure caused by sulphuric acid and acid mist during filling and charging.

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

Eye protection: Safety goggles are necessary during reloading or recharging

Skin protection recommendation: Gloves, Type of material: nitril rubber.
Thickness of material: 0,11 mm
Break through time of material: > 480 minutes

8.3 In case of broken battery and with direct contact with its compounds the following exposure control and personal protection will become evident:

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

Personal protective equipment

Eye protection: Safety goggles are necessary

Skin protection recommendation:

Type of material: nitrile rubber
Thickness of material: 0,11 mm
Breakthrough time of material: > 480 minutes

9. Physical and chemical properties

Lead		***Sulphuric acid (30 to 38.5 %)***	
Appearance		**Appearance**	
form:	solid	form:	liquid
colour:	grey	colour:	colourless
odour:	odourless	odour:	odourless
Safety-related data		**Safety-related data**	
pH-value(25 °C):	7 – 8 (100 mg/l water)	*pH-value(25 °C):*	0,3 (49 mg/l water)
solidification point:	327 °C	*solidification point:*	-35 to -60 °C
boiling point:	1'740 °C	*boiling point:*	approx. 108 to 144 °C
solubility in water: (25 °C)	low (0.15 mg/l)	*solubility in water: (25 °C):*	complete
density (20 °C):	11.35 g/cm³	*density (20 °C):*	(1.2 to 1.3) g/cm³
vapour pressure (20 °C)	-	*vapour pressure (20 °C)*	14.6 mbar
Lead and lead-containing battery paste is poorly soluble in water.			

10. Stability and reactivity of sulphuric acid (30 to 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 with 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.

- **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: LD50 (oral, rat) = 2140 mg/kg, LC50 (inhalation, rat) = 510 mg/mc/2h.

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

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 it's 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).

13. Disposal considerations

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

Johnson Controls has established an own collection called ecosteps. More information are 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.

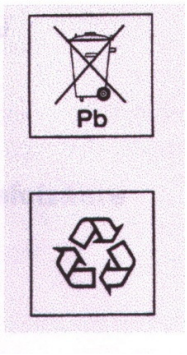
By no means may the electrolyte, the diluted sulphuric acid, be emptied in an inexpert manner. This process is to be carried out by the processing companies.

14. Transport information

Land Transport	Land Transport (ADR/RID)	
	UN N°:	UN2794
	Classification ADR/RID:	Class 8
	Proper Shipping Name:	BATTERIES,WET,FILLED WITH ACID electric storage
	Packing Group ADR:	not assigned
	Label required:	Corrosive
	ADR/RID:	Batteries are exempted from all ADR/RID regulations, if requirements of special provision 598 are met (a) New storage batteries when - they are secured in such a way that they cannot slip, fall or be damaged - they are provided with carrying devices, unless they are suitably stacked, e.g. on pallets - there are dangerous traces or acids on the outside - they are protected against short circuits
Sea Transport	Sea Transport (IMDG Code)	
	UN N°:	UN 2794
	Classification:	Class 8
	Proper Shipping Name:	BATTERIES,WET,FILLED WITH ACID electric storage
	Packing Group:	not assigned
	EmS:	F-A, S-B
	Label required:	Corrosive
Air Transport	Air Transport (IATA-DGR)	
	UN N°:	UN 2794
	Classification:	Class 8
	Proper Shipping Name	BATTERIES,WET,FILLED WITH ACID electric storage
	Packing Group:	not assigned
	Label required:	Corrosive

15. Regulatory information

In accordance with the EU Battery Directive 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 manufacture, 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

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/