Technical documentation

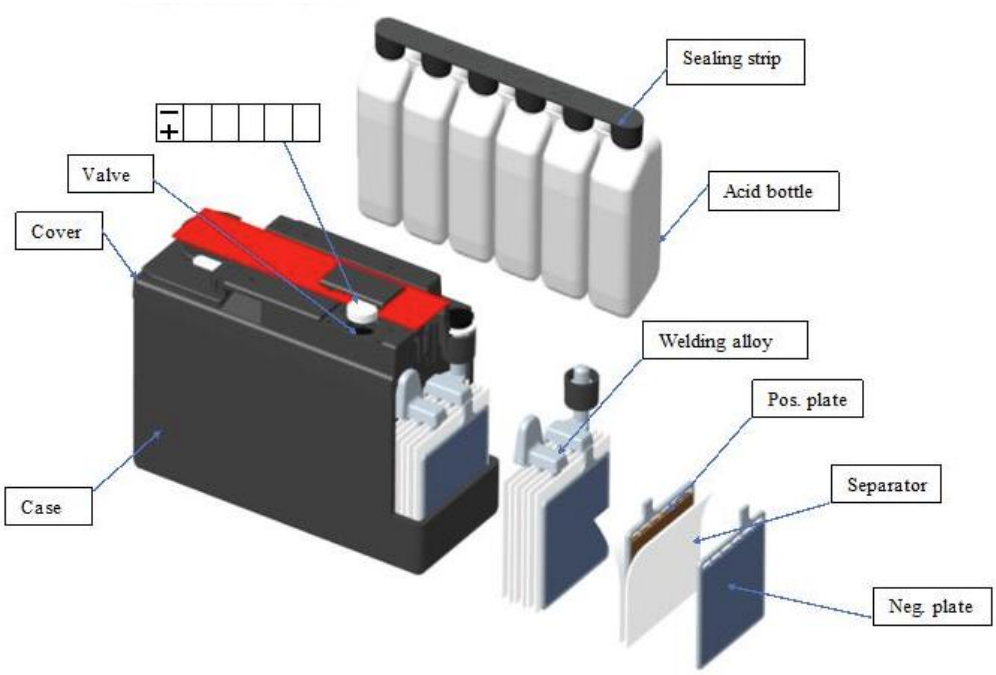
Technical documentation according to Battery Regulation 2023/1542,

Article 17, Annex VIII

1. General description and intended usage

MF (MAINTENANCE FREE) are lead-acid batteries that can output and store electrical energy. It is a battery whose electrodes are mainly made of lead and its oxides, and the electrolyte is sulfuric acid solution. The battery is composed of 6 single cells, each with a nominal voltage of about 2V, which are connected in series to form a 12V lead-acid battery. There is an exhaust hole on the battery cover to discharge the gas generated inside the battery. There are two terminals on the battery, positive and negative, which are the connection joints for charging and discharging with the vehicle.

2. Conceptual design and manufacturing drawings (12V)



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3. Explanations necessary for the understanding of the drawings referred to the point 2

① **Positive plate:** As the positive electrode of the battery, select the appropriate plate size according to the external dimensions of the battery. According to the capacity requirements, design the required amount of active material. According to the CCA requirements, the positive plates are evenly distributed in 6 single cells. Use a lead alloy grid and coat the required amount of active material on the grid to make the required positive plate.

② **Negative plate:** As the negative electrode of the battery, select the appropriate plate size according to the external dimensions of the battery. According to the capacity requirements, design the required amount of active material. According to the CCA requirements, the negative plates are evenly distributed in 6 single cells. Use a lead alloy grid and coat the required amount of active material on the grid to make the required negative plate.

③ **Electrolyte:** It functions as a medium for electrochemical reactions. The ions of the electrolyte participate in the charge and discharge reactions of the battery. The electrolyte is generally prepared from sulfuric acid and distilled water in a certain proportion.

④**Separator:** The function of the separator is to prevent short circuit caused by direct contact between positive and negative plates. Because the separator is required to be porous, acid, and high temperature resistant, no oxidation deformation, and has good insulation.

⑤ **Welding alloy:** After the plates required for each cell of the battery are assembled, the positive plates or negative plates are connected through welding as a path for current conduction.

⑥ **Plastic parts** (including battery case, battery cover, acid bottle, sealing strip, valve): used to hold the plates and electrolyte. Made of polypropylene/rubber etc. materials. The battery tank is an integral structure. The 12V battery is divided into 6 independent cells (batteries). Each cell is covered. Before the acid injection, remove the battery cover. Tear off the upper aluminum foil, then remove the sealing strip on the upper part of the acid bottle, then inject the acid in the acid bottle into

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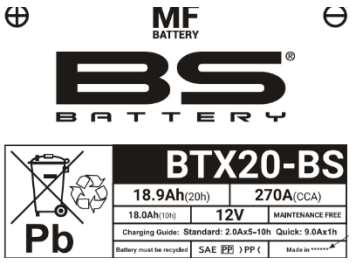
the battery, and then cover the sealing strip. At this time, the battery has a certain discharge function.

⑦ **Flame arrestor:** The battery will produce gas during use. The gas is a mixture of hydrogen and oxygen gas, to prevent external sparks from igniting the hydrogen and oxygen gas inside the battery. Install a flame arrestor at the exhaust hole, which can discharge the battery, and can also prevent external flames from entering the battery.

No further documentation is needed to understand drawings and schemes. For any details concerning operation of the battery refer to safety instructions and user manual.

4. Marking specimen according to Article 13



The marking requirements are derived from:

- Article 4, Article 21 and Annex 2 of the EU Battery Directive 2006/66 and
- Article 6, Article 13 and Annex 6of the EU Battery Regulation 2023/1542

5. List of the harmonized standards

No harmonized standards are available. Article 6 (Restriction on substance) and Article 13(labelling and marking of batteries) compliance requirements don't need specific measurement or calculations.

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6. Description of the solutions adopted to meet the applicable requirements

For the restriction on substances requirement, below comment specifications are applied to this product:

Restriction regulation	Requirement	
Restrictions set out in Annex I to Regulation (EU) 2023/1542	Designation of the substance or group of substances	Conditions of restriction
	1. Mercury CAS No 7439-97-6 EC No 231-106-7 and its compounds	Batteries, whether or not incorporated into appliances, light means of transport or other vehicles, shall not contain more than 0,0005 % of mercury (expressed as mercury metal) by weight.
	2. Cadmium CAS NO 7440-43-9	Portable batteries, whether or not incorporated into appliances, light means of transport or other vehicles, shall not contain more than 0,002 % of cadmium (expressed as cadmium metal) by weight.
	3. Lead CAS No 7439-92-1 EC No 231-100-4 and its compounds	1. From 18 August 2024, portable batteries, whether or not incorporated into appliances, shall not contain more than 0,01 % of lead (expressed as lead metal) by weight. 2. The restriction set out in point 1 shall not apply to portable zinc-air button cells until 18 August 2028

7. Results of design calculations and the examinations carried out

NA

8. Test reports

NA

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