

1. Purpose of the battery

1.1 The lead-acid traction battery with a nominal voltage of 6 V and a nominal capacity of 225 A•h (hereinafter referred to as the battery) is manufactured in accordance with the requirements of DSTU EN 60254-1, DSTU EN 60254-2 and the technical conditions of TU U 27.2-38361903-002 :2019. 1.2 The battery is delivered to consumers filled with electrolyte and charged. An electrolyte is used to fill and operate the battery - a solution of sulfuric acid in distilled water. The density of the electrolyte being poured in is reduced to 25 °C, as well as the density of the electrolyte in a fully charged battery should be $1.28 \pm 0.01 \text{ g/cm}^3$.

2. Scope of application

2.1 Batteries are recommended for the following types of vehicles and equipment:

- as a backup power source for household pumps of heating systems, water supply and other uninterrupted power supply systems.
- golf carts (small electric cars designed for the transportation of golf players, usually designed for two passengers, less often - for four);
- washing machines (for cleaning and cleaning carpets, polishing machines, for washing floors);
- lifting platforms (elevating tables and other warehouse equipment);
- floor railless transport (loading and unloading machines, electric trolleys) and other traction machines;
- wheelchairs;
- warehouse equipment (loaders, stackers, conveyors);
- campers (homes on wheels).

3. Safety measures

3.1 **WARNING!** A mixture of hydrogen and air is explosive. **IT IS STRICTLY PROHIBITED** do not smoke near the battery, use an open flame, allow the formation of sparks, including by closing the battery terminals. When servicing batteries to monitor the electrolyte level as a light source **it is not allowed to use open flame sources (matches, lighters, etc.)**. *Many years of experience with batteries in all countries have led to another recommendation: in dry weather, do not approach the battery for at least one hour after a long journey or when charging with the charger while wearing clothing containing wool or synthetic fibers, as this may lead to the discharge of the battery of electrostatic electricity accumulated on the human body. It is necessary to first remove the charge from your body (clothing), as well as from the battery case, briefly covering it with a damp cloth. **WARNING!** The cloth should not touch the battery terminals.*

3.2. **ELECTROLYTE IS AN AGGRESSIVE LIQUID.** If it gets on unprotected parts of the body, immediately wash them thoroughly with water and a 10% solution of baking soda. If necessary, seek medical help.

3.3 Connection and disconnection of the battery must be performed with disconnected current consumers (disabled charger). At the same time, the positive pole (+) is connected first, and then the negative pole (-). Disconnecting the battery is carried out in the reverse order. Care must be taken when working with metal tools when servicing and testing batteries, because accidentally shorting the battery poles with the tool can ignite the gases inside the battery and cause it to explode. **IT IS PROHIBITED** knock on the terminals and cable ends when connecting and disconnecting the battery, as this may break the battery's electrical circuit.

3.4 The terminals of the current-carrying wires must be tightly clamped to the battery terminals, and the wires themselves should be loosened.

3.5 In order to prevent the possibility of injury when working with the battery or near the battery, safety signs are placed on the cover of the monoblock, prohibiting and warning.

4. Use and maintenance of the battery

4.1 The battery must be installed on a flat surface. To be attached to the car body with the help of a metal bar from above through two pins, to be fixed on the vehicle according to its operation manual.

Unreliable fastening of the battery leads to its mechanical damage, premature destruction of the electrodes and short circuits.

4.2 The terminals of the current-carrying wires must be tightly clamped, and the wires themselves should be loosened.

4.3 The battery should be kept clean (wiped with a rag moistened with a weak alkaline (soda) solution).

4.4 Main technical characteristics: - the nominal capacity at a discharge current of 11.25 A to a final voltage of 5.25 V is 225 A•h;

- the nominal capacity at a discharge current of 36 A to a final voltage of 5.1 V is 180 A•h;
 - reserve capacity at a current of 75 A is 115 minutes;
 - reserve capacity at a current of 25 A is 445 minutes;
 - overall dimensions (length x width x height) 262 x 181 x 286 mm.
- 4.4.1 Cyclic durability. The estimated number of cycles to battery failure at depth of discharge (%) is:
- 25% - 700 (voltage at the end of the discharge is not less than 6 V);
 - 50% - 215 (voltage at the end of the discharge is not less than 5.8 V);
 - 75% - 50 (voltage at the end of the discharge is at least 5.45 V).

4.4.2 Battery charge requirements:

- из - battery charge current ($i_{из} = 11.25$ A);
- из - limit charge current when charging with direct current ($i_{из} = 33.75$ A);
- the battery charging voltage should be (7.1 ± 0.3) V. The battery should be charged with the maximum charge current ($i_{zp} = 33.75$ A) up to a voltage of 7.2 V. After that, continue charging the battery with a current ($i_{zp} = 11.25$ A) without a voltage limit. As long as the observed voltage and electrolyte density in all battery cells remain unchanged during the last two hours of charging.

4.5 Adjusting the electrolyte level

4.5.1 Batteries with liquid electrolyte require topping up with water. More importantly, the water must be added at the right time and in the right amount, otherwise it can degrade the performance and service life (longevity) of the battery. Under normal battery operating conditions, there is no need to add battery acid. If the battery was overturned and the electrolyte leaked, which caused the loss of a certain amount of acid, then and only then should the battery be topped up with acid (electrolyte). But these works should only be performed by trained battery service personnel using personal protective equipment. **Tap water and water from open sources (stream, river, well) should not be used to top up the battery due to the high content of iron and other mineral impurities.**

4.5.2 The loss of the electrolyte level is caused by a decrease in the amount of water **during the charging and storage process** battery due to its decomposition into hydrogen and oxygen, as well as evaporation of water due to the heat released during the charging process.

Because the electrolyte in batteries is an aqueous solution of sulfuric acid, but the sulfuric acid does not evaporate from the electrolyte, while the loss of the water part of the electrolyte must be continuously replenished.

4.5.3 It is necessary to monitor the electrolyte level in each accumulator of all the batteries installed on the car every month and make its adjustments. The electrolyte level should never be allowed to fall below the upper edge of the plates - this can cause damage to the part of the plates that will be in contact with air, and also cause the battery to explode. If, before charging, you see that the electrolyte level does not cover the separators before the battery is charged, you must add enough water so that the electrolyte covers the upper edges of the separators. After the charge is finished, it is necessary to adjust the electrolyte level by adding water to the level specified by the battery manufacturer (usually 20-25 mm above the upper edge of the separator).

When adjusting the electrolyte level, do not overfill the battery. The problem is that when the battery is overfilled, the electrolyte will leak from the battery both during the charging process and during its operation. If the electrolyte leaks, the capacity that the battery can give during discharge will decrease, and the metal parts of the battery, connecting jumpers, and the container to which the batteries are installed will corrode.

4.5.4 When to add water. It is recommended that water be added to the batteries before they run out of charge or after they are removed from the facility or vehicle for charging. Make sure that the plugs in the battery are securely screwed after adding water, otherwise the electrolyte may splash out during battery operation. In general, water should be added to the batteries every 30 days. Such periodicity is due to intensive operation of the battery, frequent charges and evaporation of water due to the heat released during the charging process.

It is recommended to unscrew the ventilation plugs once a week to control the electrolyte level and determine the need to add water to the battery.

5. Transportation and storage

5.1 Batteries are transported in covered vehicles that protect them from mechanical damage and contamination from precipitation and direct sunlight.

Batteries are transported and stored in a vertical position, with the terminals facing up.

5.2 Batteries should be stored fully charged. The density and level of the electrolyte should be checked at least once a month. If the density decreases by 0.03 g/cm³ or more, charge the batteries. The electrolyte level should be adjusted with distilled water. Topping up electrolyte is prohibited.

IT IS NOT ALLOWED TO STORAGE A BATTERY WITH A LOWER THAN THE NORMAL LEVEL OF ELECTROLYTE. STORAGE OF DISCHARGED BATTERY IS NOT ALLOWED.

It is recommended to store batteries in cool rooms, away from heating devices.

6. Manufacturer's guarantees

6.1 The manufacturer guarantees compliance with the quality of the battery in compliance with the conditions of its operation, transportation, storage and serviceability of the electrical equipment of the vehicle.

The warranty period of battery operation is 12 months and is calculated from the date of manufacture of the battery under the conditions of meeting the requirements of clause 4.4.1.

7. The procedure for presenting complaints

7.1 If a battery malfunction is detected, the battery and warranty card must be provided to the official dealer (seller)..

7.2 Claims are not satisfied in the following cases:

7.2.1 Documents required for filing a claim are missing.

7.2.2 The marking on the battery does not correspond to the information specified in the warranty card.

7.2.3 The battery is mechanically damaged, has been opened or is being repaired.

7.2.4 The battery was operated unsecured on the vehicle or poorly secured, which led to excessive vibration of the battery and, as a result, to the destruction of the plates or violation of the tightness of the battery case

7.2.5 The battery is presented with drained electrolyte or electrolyte level below normal.

7.2.6 The density of the electrolyte in a charged battery (in two or more batteries) is higher than 1.31 g/cm³.

7.2.7 The battery is discharged, that is, the density of the electrolyte is below 1.20g/cm³ at a temperature from 15C to 20C.

7.2.8 The presence of chemicals in the electrolyte not foreseen by the battery manufacturer, including various additives.

7.2.9 Adding undistilled or dirty water, which leads to accelerated self-discharge of the battery.

7.2.10 Clogged ventilation holes of plugs.

7.2.11 There is a malfunction of the charger.

7.2.12 Incorrectly selected battery for this type of vehicle.

7.2.13 Use of non-standard (additional) consumers of electrical energy, which causes constant discharge of the battery and, as a result, premature wear.

7.2.14 The presence of traces of melting of the pole terminals and the monoblock of the battery, which indicates poor-quality contact of the terminals with the pole terminals of the battery or a short circuit.

7.2.15 Battery explosion in the absence of a break in the electrical circuit.

8. Disposal

8.1 The battery, which has served the set terms, taking into account its actual condition, is subject to disposal at a specialized enterprise, as evidenced by the corresponding marking on the label.