

1. Purpose of the battery

1.1 Lead-acid starter battery with a nominal voltage of 12 V (hereinafter referred to as the battery) is manufactured in accordance with the requirements of DSTU IES 60095-1, EN 50342-1, technical conditions for a specific type of battery and is intended for starting engines and powering the electrical equipment of auto-tractor machinery.

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 25C, and the electrolyte in a fully charged battery should be $1.28 \pm 0.01 \text{ g/cm}^3$.

2. Safety measures

2.1. **WARNING!** A mixture of hydrogen and air is explosive.

IT IS STRICTLY PROHIBITED do not smoke near the battery, use an open flame, allow spark formation, including by closing the battery terminals. Many years of experience with batteries in all countries have led to another recommendation: in dry weather, you should not approach the battery for at least one hour after a long journey or when charging with a charger while wearing clothing containing wool or synthetic fibers, as this may cause 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 (clothes), as well as from the battery case, briefly covering it with a damp cloth.

WARNING! The cloth should not touch the battery terminals.

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

2.3 Connecting and disconnecting the battery must be done with the engine not working and the current consumers turned off (charger turned off). At the same time, the positive pole is connected first, and then the negative. Disconnecting the battery is carried out in the reverse order.

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.

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

2.5. In order to prevent the possibility of injury when working with the battery or near the battery, the cover of the monoblock is marked with safety signs prohibiting and warning..

3. Preparing the battery for use

3.1 Before installing a flooded battery on a vehicle or for storage, the density of the electrolyte in the battery should be checked. If the density of the electrolyte is lower than the values specified in point 1.2 by 0.03 g/cm^3 or more or the density values in the battery cells differ by more than 0.01 g/cm^3 , the battery should be charged according to points 3.2-3.4.

WARNING! Flame extinguishers and ventilation devices built into plugs can be used in batteries of this design. These plugs are installed in medium (No. 3, No. 4) accumulators (cells) at the manufacturing company. They differ from the rest of the corks in the presence of a gas outlet hole in the center of the cork.

Before starting operation, check the presence of these plugs, the absence of contamination in the area of the gas outlet holes.

NOTE: When operating a new battery, it is RECOMMENDED to perform the first check of the level and density of the electrolyte after 100 km of mileage since the start of operation, since it is possible that gas bubbles remained in the pocket separators after the battery was charged at the factory. Under the influence of vibration, while the vehicle is moving, the gas escapes from the pocket separators through the battery vents into the atmosphere. As a result, the electrolyte level in the battery can drop significantly.

If during control with a glass tube it turns out that in one of the batteries (one of the cells), or in all of them, the electrolyte level is below the norm, and the density of the electrolyte corresponds to the norm, then it is necessary to top up the electrolyte to the normal level specified in 4.6, while the density of the electrolyte should be equal to the operational, i.e. measured.

3.2. The battery should be charged in a well-ventilated room with a current in amperes numerically equal to 10% of the nominal capacity (for example: 6.0 A with a nominal battery capacity of 60 A hours).

WARNING! Having reached a voltage of 14.4 V at the terminals of the battery, the charging current must be reduced by two times and the charge should be carried out until the constant voltage and density of the electrolyte (taking into account the temperature) is reached within 10 hours, that is, until full charge.

In general, the charging time depends on the degree of battery discharge.

3.3. When charging **DO NOT OVERHEAT THE ELECTROLYTE** above 45°C. Otherwise, interrupt the charge until the temperature of the electrolyte drops to 35°C.

3.4. After reaching full charge, the level and density of the electrolyte should be checked. If necessary, adjust the density of the electrolyte according to the values given in point 1.2. At the same time, the density values in the battery accumulators should differ by no more than 0.01 g/cm³. Increased density is corrected by adding distilled water. In the process of adjusting the density and level of the electrolyte, the battery should be charged each time for 40 minutes at a voltage of 15-16 V in order to intensively move the electrolyte. The electrolyte level should be adjusted taking into account what is stated in clause 4.6.

4. Use and maintenance of the battery

4.1. The battery must be assembled and fixed on the vehicle according to its operating instructions. Unreliable fastening of the battery leads to its mechanical damage, premature destruction of the electrodes and short circuits.

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

4.3. The terminals of the current-carrying wires should be cleaned and lubricated with a thin layer of technical petroleum jelly.

4.4. The engine is started when the transmission is disengaged or when the clutch is pressed duration of no more than 10-15 seconds with intervals of at least one minute between starts. If the engine does not start after five attempts, the battery should be charged, the engine start system should be checked. Repeated, long attempts to start the engine lead to an unacceptably deep discharge of the battery.

4.5. **DO NOT UNDER-CHARGE OR OVER-CHARGE THE BATTERY.** The charging voltage from the generator must comply with the instructions for the vehicle (14.2+ - 0.3) V.

4.6. **WARNING!** When operating the battery, the electrolyte level must be in the range between the minimum and maximum levels. The minimum (depending on the design of the battery) electrolyte level is considered to be at least 15 mm above the upper edge of the separator or at least 5 mm from the pole bridge (if the bridge is located directly under the filler neck). The maximum electrolyte level is determined by the design of the battery and is indicated by the corresponding mark on the side surface. If there is no marking of the electrolyte level, the maximum level should be considered the electrolyte level 10 mm higher than the minimum, that is, 25 mm or 15 mm, respectively.

If the electrolyte level drops below the minimum level (15 mm from the edge of the separator or 5 mm from the bridge), it is necessary to add distilled water. Topping up electrolyte is not allowed, except for the cases described in 3.1. The operation of topping up distilled water should be carried out after the battery is fully charged according to the following scheme: - unscrew the plugs; - measure the electrolyte level (for example, with a glass tube under its own weight). It depends on the performance of the battery to take either the edges of the separator or the bridge of the half-block of electrodes as a base; - add distilled water to the maximum level (see 4.6); - twist the cork; - charge the battery in order to mix the electrolyte (see 3.2).

Exceeding the upper permissible limit of the electrolyte level is also unacceptable, as this can lead to splashing of the electrolyte through the gas discharge channels to the outside of the battery. In the cold season, distilled water should be added in a heated room with a subsequent charge.

4.7. The battery should be kept charged. Check the density of the electrolyte at least once every six months. When the density decreases by 0.03/cm³ or more, the battery should be charged according to 3.2 - 3.4. A decrease in the density of the electrolyte below 1.25 g/cm³ leads to irreversible sulfation and battery failure, and at negative temperatures - to freezing of the electrolyte and destruction of the battery.

4.8. Users of cars with a mechanical voltage regulator relay are recommended to check the voltage of the on-board network regularly (at least once every 3 months).

WE GET YOUR ATTENTION, that at a voltage higher than 14.5 V and a high temperature of the underhood space of the car, the battery is overcharged and water consumption is increased; with a voltage below 13.9 V, frequent engine starts and short runs (especially in winter), a systematic undercharging of the battery is possible.

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 according to paragraph 3.2-3.4. The electrolyte level should be adjusted with distilled water. Topping up electrolyte is not allowed.

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

Battery storage is recommended in cool rooms, away from heating devices.

6. Manufacturer's guarantees

6.1 The manufacturer guarantees the conformity of 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 24 months, if the warranty period of the vehicle is no more than 75,000 km of mileage or the production resource within this period is no more than 2,500 engine hours, and is calculated from the date of battery manufacture. For batteries of individual designs, provided that the vehicle has a warranty period of no more than 75,000 km and timely service of the battery at a regional center or at an official dealer, a warranty period of 36 months is provided, which is indicated on the label of the specific battery. The warranty period of operation of batteries installed on "taxi (route taxi)" cars is 12 months.

WARNING! It is strongly recommended that the battery be serviced at a regional center or at an official dealer (seller) every 6 months of battery operation, with the date of service noted on the warranty card.

6.2 During the warranty period, service is provided, which includes: consultation on battery operation and charging, battery condition control, electrolyte level correction, and battery charge voltage control on the car

7. The procedure for presenting complaints

7.1. In case of detection of a battery malfunction, it is necessary to provide the official dealer (seller) with the battery, warranty card and the car on which the battery was used, or send a complaint to the address of the company - the manufacturer with the addition of the warranty card and a written statement containing the essence of the claim.

7.2. Claims are not satisfied in the following cases:

7.2.1. The documents necessary 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, was opened or was 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 the electrolyte level is below normal.

7.2.6 The density of the electrolyte in a charged battery is higher than 1.31 g/cm³.

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

7.2.8. There is a dark brown coating on the vent holes of the plugs, and the presence of a dark brown sediment in the electrolyte, which indicates a systematic overcharging of the battery.

7.2.9. The presence in the electrolyte of chemical substances not foreseen by the battery manufacturer, including various additives.

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

7.2.11. The ventilation holes of the plugs are clogged.

7.2.12. There is a fault with the car charger.

7.2.13. Incorrectly selected starter battery for this type of vehicle.

7.2.14. The use of non-standard consumers of electrical energy, which causes constant discharge of the battery and, as a result, premature wear.

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

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

8. Disposal

8.1 A battery that 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.