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EXPERIMENTAL RESEARCH ON OPTIMAL PLACEMENT OPTIONS OF HEAT EXCHANGE SURFACES IN THE HEAT ACCUMULATOR PARAFFIN-BASED

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At the present stage of development of science and technology there is the possibility of realization of almost any known principle of heat accumulation, which led to their different technical solutions [1, 2]. The feasibility of using each principle is defined by the presence of a positive effect, first and foremost, economic, that might be possible at the lowest cost battery.

The effectiveness of heat accumulators (HA), including the most promising in terms of the density of stored energy - based on the phase transitions of the storage material HA, largely depends on the degree of use of the potential energy savings and efficiency for the full cycle of the corresponding device in the quantities required by the user. This puts the researchers the task of selecting the type and design of the heat exchange surface to ensure the optimal geometric parameters of these devices, which includes the volume, mass and heat-accumulating material, etc., and their performance.

In the experiments, the geometry of the placement of heat exchanging tubes having an outer diameter of 21.3 mm, the inside volume of heat-accumulating material is formed at an axial distance of 40 mm from the sides and bottom of the storage tank casing.

As a result of experimental studies found that the bottom of the working volume located under the heat source, there are "dead zones", the temperature of which is 12% lower than in the intensive melting material. A large amount of heat generated is consumed while overheating of the molten volume in the upper part of the heat accumulator. The duration of this "overheated" is at least 25% of the total time of the heat accumulator in the "charge". Thus, to reduce the amount of "dead zones" and improve the efficiency of heat storage, placement of the first series of heating tubes, from the bottom and sides of the hull, must be performed on the boundary region above which a 20% reduction in the efficiency of use of mass-storage material is 7%.

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