UDC 536.24

EXPERIMENTAL STUDY OF EFFICIENCY OF NEW CONSTRUCTION THE HEAT ACCUMULATOR OF PHASE TRANSFORMATIONS OF ACCUMULATING MATERIAL

E. Antypov, graduate student*

Carried out experimental study of the efficacy of the developed design the heat accumulator of phase transformations of accumulating material. Confirmed effectiveness of the new construction such accumulator. The optimal distance placing the heat exchange surface in the body heat storage is defined.

Keywords: heat accumulator, accumulating material, phase transformations, heat exchange surface.

The effective use of thermal energy in the operation of heating systems is impossible without solving the problem of accumulation of heat. The most promising is the use of phase change heat accumulators (PCHA) as provided by the high density of stored energy, small changes in temperature and stable temperature at the outlet of the heat accumulator.

As heat accumulating material (HAM) for PCHA can be used: crystalline (mainly Glauber's salt), natural waxes, paraffins, hydrocarbons row saturated fat organic acids [3]. Heat accumulating materials based on solid paraffin, ceresin are inert and can withstand a large number of cycles of melting-crystallization without changing thermal properties.

However paraffins, as in many organic HAM is one drawback - low thermal conductivity [2], which leads to complications construction as is necessary to take measures or means to improve heat transfer between HAM and coolant.

The purpose of research - the experimental confirmation of the effectiveness

---

* *Scientific director – Doctor of technical science V.G. Gorobets*

© Є.О. Антипов, 2015

developed a new battery design phase heat transfer while maintaining the dynamics of the charge-discharge characteristics of heat-known construction such accumulator [3] while increasing operational reliability of the battery.

Materials and methods of research. It is known that convective heat flows upward [1], due to varying density liquid (near the walls of the heating tubes) and cold there. Therefore, to reduce the volume not heat accumulating material to a minimum and increase the battery capacity of heat accumulation of the phase transition of the new design, the bottom of its hull perform an undulating shape.

Results. Using a heat transfer surface beam diameter metal pipe ½ inch and placing them in uniform staggered along and near the bottom and walls of the battery case.

For 8 hours heat battery based paraffin (period of electricity at the lowest cost energy band calculation) in the central area of the battery heat accumulating material is heated evenly.

Implementation undulating forms the bottom of the hull reduces the volume accumulator hot heat accumulating material to a minimum, which increases the ability of your battery heat accumulative phase transition.

References

1. Beckman G. Thermal energy storage. G. Beckman, P. Gilly. - M .: Mir, 1987. - 468 p.

2. Gorobets V. Computer simulation of heat and mass transfer in the seasonal heat accumulator. / V. Gorobets, I. Antypov // Herald VIESH. - 2014. - №1 (14). - P. 15 - 19.

3. Towards the creation of micro-encapsulated heat storage phase change materials. / Y. Albinskaya, S. Usachev, F. Ressner, O. Rudakov // Scientific Herald VGASU. - 2013 - Vol. №2 (7). - 185.