

## **Research solar linear heat receiver with a pulsing movement of the heat-carrier.**

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Researching the solar liquid piston water pump we discovered, that the efficiency of flat solar collectors with pulsing moving of the heat-carrier grows on the average by 9 % in comparison with a mode of continuous moving [1].

In this work we carried out experimental researches of processes of a heat transfer with an oscillatory movement of the heat-carrier and at its pulsing moving on the model imitating the linear solar heat receiver. The model of linear solar heat receiver is a pipe of 6 m length with an internal diameter of 35 mm and 3,5 mm thickness of a wall . One end of the pipe is connected to membrane pulsar, and the other – to pneumatic liquid accumulator. With the help of these devices the excitation and maintenance of an oscillatory movement of the heat-carrier are provided. Pulsing pumping of the heat-carrier is carried out by the volumetric circulating pump. The possibility of continuous pumping of the heat-carrier by the centrifugal pump is also provided . Heat transfer to the linear heat receiver is carried out in its central part by an electrical heater. The removal of heat is being done in two water shirts - calorimeters, located symmetric on distance of one meter from a heater. Temperature of the heat-carrier and wall of the pipe is measured by thermocouples put inside of the pipe and in its walls.

The researches of a temperature field, heat exchange and heat transfer of the linear heat receiver in the following working modes are carried out:

- The stationary mode (heat exchange is initiated by heat conductivity and natural convection);
- Mode of continuous heat-carrier pumping;
- Mode of oscillatory movement of the heat-carrier;
- Mode of oscillatory movement with pulsing pumping of the heat-carrier.

The analysis of the executed researches allows to make the following conclusions.

In conditions of an oscillatory movement and pulsing pumping of the heat-carrier the heat exchange efficiency grows essentially. So in conditions of an oscillatory movement of the heat-carrier on the average on length of a linear contour the four-multiple reduction of a difference of temperatures between the heat-carrier and wall of the pipe was observed in comparison with a stationary mode. Thus in the investigated modes the increase of a flow of heat in calorimeters on 15-20% was observed. In a mode of an oscillatory movement with pulsing pumping of the heat-carrier the additional increase of a flow of heat and double decrease of a difference of temperatures of the heat-carrier and wall of a pipe were observed.

#### Reference

1. E.Orda, V.Trukhov, I.Tursunbaev Test liquid piston water pump with flat solar collectors, *Geliotekhnika*, 1995, \_ 4, \_ .41-45.