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Laboratory modeling of the heat pump and the determination of its effectiveness

Experience of laboratory modeling process works geothermal heat pump is shown in the article.

Laboratory base rate discipline "Fundamentals of saving energy and resources" is created in the energy department of the Ukrainian Engineering and Pedagogical Academy. This work is performed within the state budget research. This allows for no less than 15 specialized laboratory works in this direction.

The features of this laboratory are an integrated approach to the consideration of the processes in the power equipment and accessibility for understanding the wide range of students, not only energy but also related specialties. The effectiveness of the system of energy saving is achieved by a complex of events that affect both the thermal and electrical subsystems, so the laboratory of "Fundamentals of energy and resources" created interdisciplinary.

A distinctive feature of this lab is to create a laboratory stands are not based on the use of real industrial designs energy-saving equipment, and laboratory simulation of processes in it. This is because the creation of the laboratory based on real industrial designs energy-saving equipment is not possible for the following reasons:

- high cost of industrial equipment;
- large dimensions and volumes of production and consumption of energy, making it impossible to use them in terms of training facilities;
- the impossibility of modeling atypical modes of equipment and obtaining experimental data, etc.

On this basis it is a question of a laboratory simulation of the systems of energy and resources, in which one could demonstrate the effectiveness of such systems and to obtain experimental data in the normal and degraded modes.

The objectives of the laboratory simulation of the technological system of the heat pump are:

- the formation of practical skills with a heat pump;

- learning to evaluate the energy cost efficiency of the heat pump of the heat pump;

- consolidation of knowledge in the field of thermal equipment, which is based on the change in the aggregate state of the coolant.

The basic theoretical principles of thermal energy transfer from the environment in the district heating system of industrial or residential building are presented. The methodology of the lab to determine the economic efficiency of the heat pump is designed.