

USING THE EXERGOECONOMIC METHOD IN DESIGN OF HEAT PUMP SYSTEMS FOR HEATING AND COOLING OF HOUSING AND COMMUNAL FACILITIES

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Abstract

Analysis of existing challenges in the heating facilities in Ukraine and achievements of the modern global heat pump engineering suggest the expediency of implementation of heat pump installations at the Ukrainian housing and communal facilities to solve the pressing energetic, economic, environmental and social issues. Since Ukraine has no own production of heat pumps meeting modern performance, reliability and design requirements, the problem of rational choice of equipment, circuit design and calculation of optimal operation modes of heat pump installations emerges in order to adjust their performance to the specific climatic conditions and requirements of domestic consumers, as well as improving the competitiveness as compared to traditional heat generators. This problem can be solved using exergoeconomic (thermoeconomic) method which is based on exergy analysis and naturally combines both thermodynamic and economic performance. The technique and software was developed to calculate the extreme values of the optimized variables and to implement rational choice of the installed heating capacity of the heat pump installation which is part of a bivalent heating circuit while providing the highest possible values of the thermodynamic perfection degree of the installation and the minimum level of reduced costs.