ANALYSIS OF THE EFFICIENCY OF THE APPLICATION OF HEAT INSULATING CASES FOR PLATE HEAT EXCHANGERS

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Abstract: *in the article deals with the problem of heat losses of heat exchange equipment into the environment. A plate heat exchanger for heating needs was chosen as the object under study. The work evaluates the economic and technical efficiency of using a heat-insulating casing to reduce heat losses to the environment. The results are presented for a heat exchanger with a capacity of 1.6 Gcal / h. In conclusion, the positive and negative consequences of the use of heat-insulating casings are described.*
Keywords: *heat point, heat supply, heating system, plate heat exchanger, heat insulating casings, energy saving, energy efficiency, thermal protection.*

АНАЛИЗ ЭФФЕКТИВНОСТИ ПРИМЕНЕНИЯ ТЕПЛОИЗОЛЯЦИОННЫХ КОЖУХОВ ДЛЯ ПЛАСТИНЧАТЫХ ТЕПЛООБМЕННИКОВ

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Аннотация: *в статье рассматривается проблема тепловых потерь теплообменного оборудования в окружающую среду. В качестве исследуемого объекта выбран пластинчатый теплообменный аппарат для нужд отопления. В работе проведена оценка экономической и технической эффективности применения теплоизоляционного кожуха для снижения тепловых потерь в окружающую среду. Результаты*

представлены для теплообменного аппарата мощностью 1,6 Гкал/ч. В заключении описаны положительные и негативные последствия применения теплоизоляционных кожухов.
Ключевые слова: *тепловой пункт, теплоснабжение, система отопления, пластинчатый теплообменный аппарат, теплоизоляционные кожухи, энергосбережение, энергоэффективность, тепловая защита.*

Heat supply to consumers in Russia is mainly carried out through a centralized system from heat points. Heat exchangers are used to supply heat energy for technological needs, heating and hot water supply.

Heat exchangers perform one of the main works to provide consumers with heat energy. One of the factors of the efficiency and reliability of the heat supply system is the quality of the heat exchanger. Undersupply of heat, excessive consumption of fuel and energy to replenish heat losses and the reasons for the increase in the temperature head of the coolant are the main problems of heat exchangers [1].

In heat exchangers, heat is transferred from one medium to another. The process is associated with heat loss. In most cases, heat exchangers are not insulated. Heated to a temperature of 95-105 ° C, they increase the temperature in the room, which exceeds the temperature values in accordance with sanitary and temperature standards. Insulating casings can be used to protect maintenance personnel and to keep the surrounding equipment from overheating.

Insulating casings are made of mineral wool or foamed rubber, sheathed on all sides with a moisture-proof lining material or installed in an aluminum casing, with fasteners [2]. The covers are designed for reusable use and can be easily removed and reinstalled in case of need for maintenance and disassembly of the apparatus (fig. 1).

Fig. 1. Insulating casing design

To study the efficiency of using a heat-insulating casing, a plate heat exchanger was selected to provide heating. The system parameters are presented in Table 1.

Table 1. System parameters

Hot heat transfer fluid		**Cold coolant**	
Type	water	Type	water
Inlet temperature, ºC	130	Inlet temperature, ºC	65
Output temperature, ºC	70	Output temperature, ºC	95
Pressure, bar	3,2	Pressure, bar	2,7

The main characteristics of the heat exchanger are shown in table 2.

Table 2. Characteristics of the heat exchanger

Indicator name	**Value**
Dimensions (length x width x thickness), mm	1375x600x1
Heat exchange surface, m^2	0,6
Number of plates, pcs	280
Heat exchanger capacity, Gcal/h	1,6

The calculated thermal conductivity coefficient of the casing mineral wool was 0.11 W / (m * K). The heat transfer coefficient of the casing, according to the calculation, is 3.577 W / (m^2 * K). Heat losses to the environment when

using a heat-insulating casing relative to the state without use amounted to 1.833 * 10^{-4} Gcal / h. The annual difference is 0.445 Gcal. At a rate of 1,668 RUB / Gcal, the annual savings are 742 RUB. With the cost of the insulating casing equal to 26 950 RUB, the payback period is 36 years.

Thus, the installation of insulating casings is impractical. But in addition to increasing the energy efficiency of the system, one can also note the creation of safe conditions for the operation of the rest of the equipment of the substation and comfortable working conditions for the service personnel in the room.

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