AMERICAN JOURNALS
Open Access, Peer Reviewed Journals

American Journal of Technology and Applied Sciences
ISSN (E): 2832-1766| Volume 13, | June, 2023

ELECTRIC BOILER HEATING SYSTEM

Бадалов А.А.,
Тухтамишев Ш.К.
Турғунов Ф.И.,
Бадалова Д.А.

ABSTRACT

The possibilities of using the heating system with an electric boiler are considered. The types of electric boilers and their operation are described. The advantages and disadvantages of electric heating are given.

KEYWORDS

electric boiler, heating, electric heating.

Introduction

The heating system based on an electric boiler is the safest and most reliable. But in order for it to be also effective, you need to correctly calculate the power of the equipment. Everything is taken into account: the area of heated rooms, the characteristics of the walls, floor and ceiling, climatic conditions, the required temperature regime.

The work of an electric boiler is to heat the coolant with the help of electricity, this happens at the time of the passage of the same coolant through the electric boiler.

Electric boilers designed to work in heating systems have a number of advantages. And so, in the presence of an electric boiler, you do not need to equip a separate room for a boiler room, and spend money on the installation of chimneys (subject to the installation of an electric boiler in a private house, cottage, cottage). In addition, electric boilers have established themselves in the market of heating devices as relatively inexpensive. But here, it is important to note about the operating costs, along with other fuels, the use of electricity as a heater is still more expensive. But, as you know, you have to pay for reliability and quality. Electric heaters are very effective in heating apartments and small rooms, which means that in high-rise buildings and residential complexes, the most optimal solution is to install an electric boiler.

In total, there are 3 varieties of such boilers:

Boilers with heating elements;

Electrode;

Each of these types has a certain specificity of water heating. And more about them will be discussed below. But the heating system of a country house will remain the same. Its essence is that the coolant is heated in the boiler and is launched through pipes and radiators, warming up the room. Sometimes, a plumbing system is also run through an electric boiler to produce hot water. There are two fundamentally different approaches to the use of such a heating system.

By design, electric boilers are of two types: classic and ionic. In the first case, heat is produced by the TENaim, that is, a spiral with high resistance, enclosed in a tube or flask, which, when current flows, heats up and gives heat to water. There can be several heating elements, and they are switched on in parallel. At the same time, the power of the boiler is the total capacity of heating elements. Heating elements are installed in a special tank called a heat exchanger. An adjustable control unit is also attached to the electric boiler. In the second case, the principle of operation of the boiler is based on the fact that water is a conductor, there are two contacts in it, between which current flows, heating the water. This type of electric boiler is more compact, but they need good quality water. Boilers using heating elements are much less demanding on water quality, but also much larger in size. Note that an electric boiler, like a wall-mounted gas boiler, is a full-fledged mini-boiler room, most models have a built-in expansion tank and a circulation pump.

Installation of electric boilers is carried out on the wall, they work almost silently, compact in shape, easy to install and unpretentious in operation. Electric boilers do not have such stringent requirements as most other boilers, do not require special boiler equipment and chimney installation.

Electric boilers with a capacity of 4 to 15 kW are produced with the possibility of two-stage power adjustment, from 16 kW and above - in a three-stage version. The use of two- or three-stage adjustment allows for more efficient use of electricity and not to turn on the boiler at full capacity during transition periods - in spring and autumn.

As already mentioned, due to the high cost of electricity, it is better to purchase such boilers for installation in a small, such as a country house, or as a backup power source. Costs can be reduced, and significantly, sometimes twice, by installing a multi-tariff electricity meter and a battery that stores energy at night, when reduced tariffs are in effect, and then gives it to the heating circuit during the daytime. Also, significant energy savings can be achieved with the additional installation of programmers in the system, which automatically maintain the temperature in the room according to a predetermined schedule. In addition to saving, such devices improve the comfort of the heating system as a whole.

And finally, when installing an electric boiler, it is necessary to have safety circuit breakers and, most likely, the laying of a separate power line.

In the innovative heating system, water underfloor heating, along with gas and solid fuel boilers, electric boilers are also used.

Electric heating of a private house has the following advantages:

Simple and easy to install. For self-installation, you do not need expensive tools and special knowledge. All equipment has small dimensions, is installed quickly and at minimal cost.

All devices are easily transported and transferred to different rooms. A separate boiler room and chimney are also not required.

Security. Electrical systems do not form carbon monoxide, combustion products are completely absent. Harmful emissions are not emitted even if the system breaks down or is disassembled.

Low initial costs. There is no need to prepare project documentation with the invitation of special services. No permits are needed.

Reliability and quietness. Electric heating does not need regular maintenance with the involvement of specialists. All installations operate absolutely silently, since there is no fan and circulation pump in the system.

Ease of operation. There are no elements in the system that could quickly fail. There is no need to constantly monitor the sensors and fuel level.

High level of efficiency. Allows you to quickly heat a private house even in the most severe frosts. Electric heating is always equipped with a special system that makes it possible to regulate the temperature in each individual room, which can significantly save financial costs during the heating season.

Cons of work.

The main disadvantage of electric heating is considered to be a large consumption of electricity. In some areas, the price of energy is quite high, so this method may simply be unprofitable.

The second disadvantage is energy dependence. If the electricity is turned off for any reason, heating the room will become impossible.

The third disadvantage can be considered an unstable voltage in the power grid, especially in rural areas. Purchasing your own generator removes this problem, but significantly increases financial costs. When designing, it is necessary to take into account the condition and power of the electrical wiring.

Conclusion

Almost all popular methods of heating a country house with electricity were considered. There are many advantages of each method - this is the absence of the need for a fuel reserve, environmental friendliness, safety, noiselessness and ease of operation. But given that electricity is not cheap at the moment, there is no need to wait for a special economic effect. Therefore, special attention should be paid to the insulation of a private house in order to reduce heat loss to a minimum.

Literature

1. Electricity, heating and water supply to your home. Family Leisure Club, 2010 Read more: https://www.labirint.ru/books/243695/
2. V. I. Nazarova "Modern heating systems" RIPOL classic, 2011, 320 pages, (22.0 mb pdf)
3. Svistunov V., Pushnyakov K. "Heating, ventilation and air conditioning of objects of the agro-industrial complex and housing and communal services" Polytechnic, 2007, 423 pages, ill., (14.6 mb. djvu).