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CORRECT CHOICE OF HEATING EQUIPMENT TO BE INSTALLED IN APARTMENTS IN RESIDENTIAL BUILDINGS

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ANNOTATION

There are no central heating boilers in many villages of the city of Karshi, Kashkadarya region of the Republic of Uzbekistan. For this reason, Askarova Ziyoda, a student of the Tashkent State Transport University, gave full information about mini-heating devices and considered their correct choice. The article examines the types of heating devices and the heating devices that can sufficiently heat the apartment. In addition, gas boilers, electric boilers, boilers with solid materials were considered. Boiler selection methods - There are several types of boilers and some of their parameters. For a residential building, it is better to buy a powerful but economical boiler with automation. If it is possible to connect gas, a gas boiler is the right choice from an economical point of view. Heating a house with electricity is very expensive. But if the house is well insulated and its heat loss is small, and it is expensive to connect gas to the house, then an electric boiler is a good solution. [1, 2, 3, 4, 5, 6]

The warranty and service life of the boiler varies from one manufacturer to another: it can be 1 year or 10 years. When the manufacturer is sure of the quality of his boiler, the warranty will be greater. However, with proper maintenance, the service life can significantly exceed the warranty period. [10, 11, 12, 13]

Key words: Boiler, cast iron, steel, boiler room, wood, fuel, gas, gas electric heaters, fire pit.

INTRODUCTION

A boiler room (boiler room) is a structure in which a working fluid (heat carrier) (usually water) is heated for a heating or steam supply system located in one technical room. Boilers are connected to consumers through heating mains and/or steam pipes. The main device of the boiler room is steam, fire tube and/or hot water boilers. Boilers are used for centralized heat and steam supply or local heating of buildings. [14, 15, 16]

A boiler room is a set of devices located in special rooms and serving to convert the chemical energy of fuel into thermal energy steam or hot water. Its main elements are boiler, combustion device (furnace), feed and traction devices. In general, a boiler plant is a combination of boiler (boilers) and equipment, which includes the following

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devices: fuel supply and combustion; water treatment, chemical treatment and deaeration; heat exchangers for various purposes; source (raw) water pumps, network or circulating pumps - for circulating water in the heat supply system, make-up pumps - for covering water consumed by the consumer and leakage in networks, feed pumps for supplying water to steam boilers, circulation (mixing); feed, condensation tanks, hot water storage tanks; ventilators and airway; smoke exhaust devices, gas line and chimney; ventilation devices; systems of automatic regulation and fuel combustion safety; heat shield or control panel. [17, 18, 18]

SETTING AND RESOLUTION OF THE ISSUE

There are no central heating boilers in many villages of the city of Karshi, Kashkadarya region of the Republic of Uzbekistan. It is necessary to ensure that the population lives comfortably. The correct selection of these heating devices increases the worker's productivity and ensures a comfortable rest for the vacationers. [19,20]

1 - picture. Heating device

Therefore, Askarova Ziyoda, a student of the Tashkent State Transport University, introduced many of the mini heating devices. Thus, the methods of choosing them correctly were studied.

The structure of the boiler is a mini-boiler that converts fuel into heat. Boilers differ according to the type of fuel used, but the principle of operation is approximately the same: fuel is fed to the boiler, which is burned in the combustion chamber, and the resulting heat is transferred to the cooling water through a heat exchanger. For example, water is heated and then passes through pipes to heating radiators or hot water taps. [21, 22, 23]

RESULTS AND SAMPLES

Types of boilers - First of all, boilers differ depending on the type of fuel used - the design of the boiler depends on it. Each fuel has its own characteristics. In the article, we analyze the most popular types of boilers.

Gas is the best option for the residents of Uzbekistan. Gas boilers use natural gas as fuel. The cost of gas when converted to heat is lower than other materials. Therefore, economy is the main advantage of gas boilers.

But to use a gas boiler, gas must be connected to the house or can be connected. If gas is already supplied, choosing a gas boiler is a wise decision. If you haven't already, consider connection costs when estimating. For example, in the village, the cost of the project, equipment and work outside the house starts from 45 million. In some cases, it is cheaper to use another boiler.

A gas boiler should be serviced once a year - this is done by gas service specialists. For example, at Monoblokgaz, such a service starts from 65 mln.

Electric boilers are a simpler option: they do not require approval and are easy to install. The boiler does not require annual maintenance, as in the case of a gas unit.

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Cleaning once every few years is enough.

Here, electricity is used for heating - this is the main disadvantage. Despite the fact that the coefficient of efficiency (efficiency) of such a boiler is close to 100%, due to the cost of electricity, heating a house with such a boiler is much more expensive than a gas boiler. [7, 8, 9, 24]

If there is a gas pipeline near the house and it can be connected, an electric boiler is a good temporary solution until the gas is turned on. And when the gas is connected, the electric boiler is considered as a temporary backup when the gas is cut off.

If there is not enough electricity, it will not be possible to connect the electric boiler. For example, only 5 kW is supplied to the house, and 9 kW to the boiler. Therefore, it is necessary to use a boiler with low power in the house.

2 – picture. Installation of gas pipelines in residential buildings

Solid fuel boilers burn wood and coal to produce heat. They are installed in cases where neither gas nor electricity is available. Such boilers have a special loading chamber where fuel is placed for combustion. If you heat with wood, the chamber will be larger, if you use coal, it will be smaller and the walls of the chamber will be thicker, because coal has a higher burning temperature.

To use the boiler, you need to add fuel to it. Depending on the size of the chamber and the type of fuel, one fuel will last from several hours to several days. Some coal boilers operate automatically.

Solid fuel boilers are cheap and easy to use. They are easier to find fuel for and run without electricity. But it is necessary to store the following solid fuel products in front of such boilers: coal and firewood.

Stove boilers are a type of solid fuel boilers. Stove boilers use cylindrical fuel pellets to generate heat.

Liquid fuel boilers use liquid fuel - usually diesel fuel (diesel fuel). Such boilers do not require constant monitoring and maintenance. The disadvantages of such boilers are the high cost of fuel and the need to install them in a warm, dry room.

Combined boilers are boilers that work on several types of fuel. Such boilers allow combining the advantages of different fuel options.

Electric solid fuel heating elements: when wood or coal runs out, the boiler switches to electric mode. Another option: solid and liquid fuel.

Type and principle of fuel burning - Electric and gas boilers are the most convenient, because the fuel for combustion is provided automatically and does not

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require maintenance. It will be very difficult to include furnace boilers in the same group - they can work for several weeks without maintenance. All other boilers - solid fuel, liquid fuel - require manual supply.

Energy dependence - The design of solid fuel boilers is very simple, they do not require electricity. Some gas boilers are also self-powered. Gas and electric boilers do not work without electricity.

Single-circuit boilers heat only the room, and double-circuit boilers heat the room and heat cold water for domestic needs.

There are boiler capacity, availability of regulation, calculation rules. When choosing a boiler, you need to choose the right power: if the power is not enough, it will be cold, and if necessary, you will overpay for the boiler. The following rule is usually used to calculate the power required for heating in the central part of Uzbekistan: 0.1 kW power + 10-20% reserve for 1 m² of the house.

Power for the operation of hot water supply is taken into account separately - about 5 kW for each hot water tap. 20 kW is drawn for 4 taps - this is the maximum power required if all taps are open at the same time.

If you want to equip a 100 m² house with hot water supply in two bathrooms and a kitchen, then the boiler capacity has a reserve for simultaneous use of heating and hot water in all taps:

$$W = 0{,}1\ kVt \times 100 \times 1{,}2 + 5\ kVt \times 3 = 27\ kVt$$

The material of the heat exchanger in the boiler affects the heating of the coolant. Heat exchangers are made of cast iron, steel or copper. Cast irons are heavier and more expensive, but they are not afraid of corrosion. Steel is cheaper, lighter, but afraid of corrosion. Copper heat exchangers are used in compact, small boilers, but are not as durable as cast iron.

Open and closed combustion chamber - characteristics of boilers that require air to burn fuel. If the combustion chamber is open, the combustion air is taken from the room where the boiler is installed. Such rooms require ventilation and removal of combustion products. When using a closed chamber, boilers receive air from the outside, so additional ventilation is not required.

4 – picture. Rural houses in the city of Karshi

Installation method and type of placement - The boiler can be installed on the wall or on the floor. A more compact and convenient option is a wall-mounted

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boiler. It does not require a separate room and can be hung in the bathroom or other convenient room.

Boilers installed on the ground are usually stronger and larger. They are used when a wall-mounted boiler is not enough to heat a large house.

The weight of the boiler depends on the materials from which it is made. Wall-mounted boilers are often made of steel and weigh about 30-50 kg. Floor boilers are stronger, sometimes cast iron is used in their production, so the weight of such boilers can reach hundreds of kilograms.

The warranty and service life of the boiler varies from one manufacturer to another: it can be 1 year or 10 years. When the manufacturer is sure of the quality of his boiler, the warranty will be greater. However, with proper maintenance, the service life can significantly exceed the warranty period.

The price of boilers starts from several million soums. The price depends on the design of the boiler (the type of fuel used) and its power.

In addition to the price of the boiler, it is necessary to take into account the cost of installation. We will provide an estimate for installation in the village. The project estimate does not take into account gas equipment inside the house - for example, a boiler.

Boiler selection methods - There are several types of boilers and some of their parameters. For a residential building, it is better to buy a powerful but economical boiler with automation. If it is possible to connect gas, a gas boiler is the right choice from an economical point of view. Heating a house with electricity is very expensive. But if the house is well insulated and its heat loss is small, and it is expensive to connect gas to the house, then an electric boiler is a good solution.

10 kW of electricity is allocated to the apartment. If we put 11 kettles of 1 kW each to boil water at once, the circuit breaker will go off and the whole house will lose power. Therefore, it is advisable to choose a boiler with a power of 9 kW, and leave 1 kW as a reserve for water pumps, a refrigerator, lighting and the same kettle. Even when the boiler is turned on at full power, the electricity does not go out.

Name of works	Cost, sum
Installation according to the project	5 mln
Get technical specifications	500 a thousand
Home gasification project	200 a thousand
Boiler start-up, inspection and restart	200 a thousand
Maintenance of internal gas equipment	150 a thousand
Additional accessories for the boiler (sensor, board,	100 a thousand

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Name of works	Cost, sum
flexible gas supply)	

A boiler is a large vessel in which water is heated and kept hot for water supply - from which hot water flows. It consists of two schemes: the first is heating, the second is a boiler.

5 – picture. An electric boiler connected to 4 pipes, through which water circulates: two for heating and two for hot water

The main operating mode of the boiler is heating water for the main circuit - heating system. The same water, passing through the indirect heating boiler, gives part of the heat to the water inside the boiler, heating it. The boiler maintains a supply of hot water if too much is needed at once.

There are a few simple settings in the boiler. It is possible to set the water temperature in radiators. In winter, we set it to 55-60 0C, and in spring and autumn to about 15-20 0C. In summer, the house is heated by the sun during the day, and this heat is enough to not turn on the heating at night.

CONCLUSION

Boiler selection methods - There are several types of boilers and some of their parameters. For a residential building, it is better to buy a powerful but economical boiler with automation. If it is possible to connect gas, a gas boiler is the right choice from an economical point of view. Heating a house with electricity is very expensive. But if the house is well insulated and its heat loss is small, and it is expensive to connect gas to the house, then an electric boiler is a good solution.

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