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PREVENT HEAT LOSS FROM FLOORS, WALLS AND WALLS

Annotation: this article is devoted to the issues of improving the energy efficiency of buildings and structures, energy resources, thermal insulation, energy efficiency in the design of buildings, increasing the thermal insulation of wall structures.

Keywords: wall thickness, energy saving, fuel and energy resources

Energy saving is now a pressing issue in all countries. The country is implementing a long-term strategy for the development of the oil and gas, electricity, coal, chemical and construction industries, aimed at ensuring sustainable economic growth and increasing the welfare of the population, continuous satisfaction of demand for fuel and energy resources.

At the same time, the existing capacity of the fuel and energy sector does not fully meet the growing demand for energy resources, and the energy consumption of the economy is much higher than the average of developed countries1.

On August 23, 2019, the Resolution of the President of the Republic of Uzbekistan "On operational measures to increase energy efficiency in the economy and social sphere, the introduction of energy-saving technologies and the development of renewable energy sources" was announced.Revise the norms and rules of urban planning in order to radically increase the requirements for energy efficiency of newly built and reconstructed buildings and structures, as defined in the resolution; Development and approval of normative documents to determine the level of energy efficiency of buildings and structures (A, B, C and other levels), according to the proposal in the application list transparency and objectivity in the assessment of consumption efficiency, reduction of energy consumption of enterprises, as well as reduction of emissions into the atmosphere; achieving energy management efficiency with minimal use of resources, primarily financial resources, increasing the level of capitalization of enterprise assets; tasks such as increasing the competitiveness of products and services.

In the late twentieth and early twenty-first centuries, improving the energy efficiency of buildings and structures has become one of the main directions of scientific and technical policy of the construction industry in many countries around the world. This is due to the fact that 40% of fuel and energy resources are spent on maintaining the normative parameters of the microclimate in different buildings. At the same time, world energy production has increased significantly in recent decades, and the overall trend of energy consumption growth continues. Therefore, increasing energy efficiency and reducing greenhouse gas emissions around the world remain a priority.

Energy saving and environmental protection are the most popular issues in developed countries: in Europe, the United States, Japan and others. In European countries, as early as the seventies of the last century, the regulatory framework was very demanding in the design in order to reduce heat loss through the exterior cladding of the building. In order to address the issues of energy saving and increasing the thermal protection of buildings in the European Union, special Directives have been developed to standardize building standards for increasing the energy efficiency of buildings. In order to implement these pan-European directives, EU countries have had to create their own national laws and standards. It should be noted that these directives have been constantly updated and developed.

The energy efficiency of a building depends mainly on its exterior cladding, i.e., walls, roof, lighting fixtures. Currently, only by increasing the thermal insulation of barrier structures, it is possible to save 50% of energy consumption for heating buildings.

It should be noted that the experience of the Scandinavian countries in improving the energy efficiency of buildings is noteworthy. In Finland, for example, after the energy crisis in 1974, it set high regulatory requirements for thermal protection for all types of buildings. According to Finnish standards, buildings have a thermal resistance of 2.86 (m2 · 0S) / W for external thermal protection structures, 4.35 (m2 0S) / W for roof structures, 2.5 (m2 0S) / W for grounded structures, windows and doors - 0.48 (m2 0S) / W. Since 2006, their minimum allowable value has been set at 5 for walls and 6 (m2 0S) / W for roof structures.

When it comes to minimum energy consumption for heating and hot water, it is necessary to pay attention to energy efficiency in the design of buildings. The very low energy consumption of these buildings is mainly explained by its thermal protection design. In this case, the rational thermal protection design of the floor structure is crucial. If we take the foam concrete material as thermal insulation, it provides a comfortable microclimate in the rooms and significantly reduces energy consumption. New modern building materials such as foam, mineral wool, expanded clay are used in the construction of floor structures. The advantages of such blocks over other building materials are their porous structure, high thermal insulation ability, as well as a high level of strength. In addition, stacking lightly large-sized blocks onto a thin-layer mixture is significantly more efficient.

With the sharp increase in the amount of resistance of external walls to normal heat transfer, the problem of creating an effective thermal insulation material for single-layer walls has become very relevant. Because it takes time to create new materials that meet the requirements of the norm, scientists have once again turned to a well-known material - aerated concrete.

It is known that porous concrete is divided into 2 groups: porous aerated concrete and porous foam concrete. Depending on the function and average density, porous concrete is divided into 3 subgroups:

- thermal insulation - ρ≤ 500 kg / m3;

– construction-thermal insulation - ρ = 500÷900 kg / m3;

– construction - ρ = 900÷1200 kg / m3.

Since the strength of aerated concrete is not high, it is advisable to use them in low-rise buildings, on top of which the heat loss in one- and two-story houses is 4-5 times higher than in multi-storey houses.

For this reason, only 8-10% of the wall materials produced in the CIS countries are wall materials made of aerated concrete.

It should be noted that most products made of aerated concrete have a density of 600-700 kg / m3. According to the new requirements, their effectiveness in single-layer barrier structures will be less compared to that in multi-layer walls. In such cases it is necessary to increase the thickness of the outer walls. To ensure the required thermal protection properties of the walls without increasing the thickness of the walls, it is necessary to reduce the average density to 400-500 kg / m3 while maintaining the strength of porous concrete. Such blocks are also convenient for the construction of self-supporting walls for the construction of the frame, which is now popular.

In most developed foreign countries, the production of autoclaved aerated concrete with an average density of 500 kg / m3 and a strength of 2.5-4 MPa for load-bearing and barrier structures is well established. They achieved this through the use of highly mechanized and automated conveyor lines equipped with quality technological equipment.CIS countries lag far behind foreign countries in terms of modernization of production equipment and quality of products, and therefore many enterprises have adopted the technology of non-autoclaved aerated concrete. This technology is simpler, requires less energy, and therefore provides a more cost-effective product. The average density of structural and heat-insulating aerated concrete obtained by this technology can be up to 400-500 kg / m3, and the strength can be increased to 2.5-3.5 MPa in the design period. In addition, such concretes have the potential to lose capillary porosity, reduce thermal conductivity, avoid heat treatment, apply new methods of shearing.

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