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ENERGY EFFICIENCY IMPROVEMENT OF RESIDENTIAL AND PUBLIC BUILDINGS

Wall insulation is one of the most effective ways to reduce heat loss. But even there are reasons that can significantly reduce the effectiveness of using this technology. Modern insulating facade surfaces usually consist of polystyrene foam or mineral wool. Both the first and the second material have individual features that affect the scope of their application [1, 2].

Mineral wool, used to insulate enclosing structures, is a material with increased resistance to high temperatures, with excellent sound insulation properties, and good vapor permeability. It should be taken into account that the fire resistance of different grades of mineral wool is different. The use of combustible polymeric materials as binders in some of them, which support the burning process, defines their flammability groups as G1 and G2 - low and moderate. The obvious disadvantages of mineral wool are its hygroscopicity (moisture accumulates in it later) and significant weight compared to polystyrene foam. In addition, insulation of the external walls of the building with mineral wool requires special qualifications from employees, and accordingly, is time-consuming [2].

Styrofoam plates look more preferable compared to mineral wool. They are light, waterproof and have good thermal insulation performance. In addition, it is very simple and easy to work with them, which positively affects the quality and time of work. But the disadvantages of foam plastic are significant. The first is its flammability. In this regard, insulation of the facades of multi-story buildings with foam plates is allowed only up to the 9th floor. In accordance with the technological requirements, the installation of such plates requires additional processing of window and door openings, as well as the device of safety belts made of non-combustible heat-insulating materials every three floors. The material for thermal insulation of facades should also be chosen very carefully, because instead of the necessary material with flammability group G1 and G2 with moderate or high density, packaging foam can be used, which is less dense and has flammability G3 or G4 - medium or high [2].

To preserve heat-insulating properties in any insulation, certain requirements [3] should be met, where the value of the minimum permissible value of heat transfer resistance for the outer walls of the II temperature zone of the building area is defined as 4,0 m^2 ·K/W. In other words, if there are brick walls in the room and their thickness is about 52 cm, then the insulation layer - foam or mineral wool - should be at least 16 cm. For panel walls with a thickness of 30 cm, the insulation layer is chosen at least 18 cm.

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