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ENERGY-SAVING MATERIALS AND PROSPECTS OF THEIR APPLICATION TO BUILDING CONSTRUCTION

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Abstract
The article describes the results of experimental studies on the analysis and improvement of energy-saving materials and their application to newly constructed modern buildings and structures, as well as the existing methods of determining the thermal conductivity of these heat-insulating coatings.
Keywords: energy efficiency, heat insulating material, thermal conductivity, microsphere, heat insulating paint, thermocouple sensors

Introduction

One of the critical concerns facing the globe today is the sensible use of heat via lowering energy usage. It's crucial to utilise heat energy efficiently in buildings and other structures, heat pipes, energy networks, and other areas. This is because energy supplies are scarce, energy is expensive, and producing it has a bad effect on the environment [1-4].

In the current environment of rising costs and a dearth of conventional energy sources, the utilization of contemporary heat-insulating materials—including liquid energy-storing heat-insulating coatings—is a crucial study. Many people's attention has recently been drawn to heat-insulating paints made from hollow ceramic, glass, and polymer microspheres [5-9].

The main part

Research is being done at the Fergana Polytechnic Institute's "Centre for Innovative Technologies of Youth" to enhance the procedure for calculating the coefficient of thermal conductivity of ultra-thin thermal insulation coatings [10-14].

The coating is appropriate for thermal insulation, waterproofing, corrosion protection of heat and engineering networks, technological pipelines, heat energy, and capacity equipment, as well as thermal insulation and protection of the facades and interior of buildings used for residential and commercial purposes. intended.

The coating's composition is built using an acrylic binder, an entire filler, and additional materials in the form of hollow microspheres.

The operation of "classic" heaters and heat insulators with hollow microspheres in their composition differ substantially in terms of how they work. The material provides a significant

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energy-saving outcome even at a thickness of 1 mm because of its special characteristics [15-18].

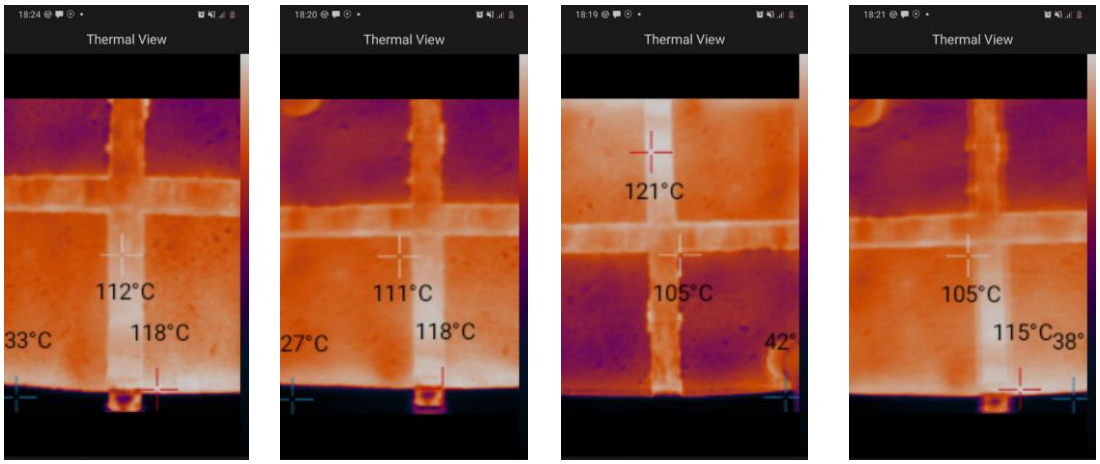
The coating's waterproofing and (corrosion) anti-erosion features go beyond its capabilities as a thermal insulator. It also contains additives that are waterproof and anti-corrosive. The coating is made waterproof, flexible, and resistant to environmental elements like UV rays, temperature changes, and wetness thanks to the contained components.

Application area:

- covering pipes delivering cold water to cooling equipment operating in rooms with poor air quality to avoid condensation and corrosion;
- thermal insulation of external pipes of heating networks, boiler rooms, and other equipment.
- for the thermal insulation and protection of the interior, exterior, and facades of residential and commercial production structures;

Once the liquid content has dried, it becomes a sturdy polymer covering with high thermal insulation qualities that minimize heat loss. A film thickness of 0.1 to 0.5 mm is produced after one coating layer has dried.

At both low and high temperatures, the coating has a high viscosity and is flexible. Throughout its lengthy service life (up to 15 years), the coating does not leave any traces of the base material and does not break.



Picture 1. The results of the experiment

The coating has excellent adherence to a variety of surfaces, including cement-and-sand plaster, concrete, brick, metal, plastic, and wood. It also inhibits corrosion and condensation on cold surfaces and is resistant to mechanical and atmospheric impacts. does not need to be protected. Vacuum-filled balls are made of ceramic or silicone. Inorganic pigments, acrylic polymers, and liquid synthetic rubber all contain them as suspended components. It resembles a light grey suspension that dries to produce an elastic, thin layer. By combining these elements,

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it was possible to produce a special material with great adhesion to surfaces of any shape and nearly any chemical composition, as well as flexibility, lightness, and elasticity [18-20].
Advantages:
Compactness reflects;
It is simple to apply (it can be done by spraying with a brush, roller, and compressor);
No hazardous compounds are present;
not damaging to the environment.
good acid and alkali resistance;
not conducive to combustion;
Fire-resistant materials that are inflammable. Inherent in liquid insulation are two additional types of resistance: UV radiation resistance as well as resistance to temperature and humidity. Liquid thermal insulation can be utilized indoors and outdoors, in childcare facilities, restaurants, and other locations without compromising its functionality because its composition solely contains eco-friendly ingredients.
Even in restricted locations, applying is extremely simple. You can apply liquid thermal insulation to the surface of your choice in a number of ways. Simply select the option that best matches your needs. You can make use of brushes, rollers, and other equipment.
To remove dirt, mold, and oil from concrete surfaces, use a brush;
*It's also necessary to clean and degrease the metal surface. It is advised to use a phosphating agent to cure any rust spots on the metal.
*The wood needs to be primed with primer and biocides before the insulation is applied. If the brick surface needs to be repaired, prime it first, then plaster it.
A heat-insulating coating is used on a variety of surfaces, including metal, concrete, brick, wood, and plastic. The surface is first cleaned, primed if necessary, and then the same mixture is diluted with water (no more than 5%), acrylic paint, or a liquid glass mixture, depending on the application.

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