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Research Article

REQUIREMENTS FOR HEAT-RETAINING COATINGS IN OUR COUNTRY

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Tojiboyev Boburjon Tolibjonovich
Senior Lecture At Ferghana Polytechnic Institute, Ferghana, Uzbekistan

ABSTRACT

The article discusses the outcomes of experimental research on the evaluation and advancement of current techniques for calculating the thermal conductivity of liquid composite heat-insulating coatings.

KEYWORDS

Thermocouple sensors, thermal conductivity, microspheres, thermal insulation paint, energy efficiency, thermal insulation material, and stationary versus non-stationary methods.

INTRODUCTION

Energy conservation via lowering building energy consumption is one of the most crucial and urgent problems in the current construction sector. One of the priority is, in particular, the effective use of thermal energy in structures, heat pipelines, energy networks, and other sectors. This is because there aren't enough energy supplies available, it's expensive, and producing it has a bad effect on the environment.

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The Fergana Polytechnic Institute's Youth Center for Innovative Technologies is conducting research to enhance the procedure for calculating the thermal conductivity of heat-insulating coatings.

This paint is used for internal heat retention and protection, heating and engineering networks, process pipes, thermal energy and capacity equipment, waterproofing, corrosion protection, and construction of facades of residential and commercial structures. made with building in mind.

Acrylic binders, hollow microspheres in the form of entire fillers, and other materials are used to create the paint.

Thermal insulators that contain hollow microspheres as part of their composition operate very differently from "classic" heaters in terms of how they work. The material has a considerable energy-saving effect even at a thickness of 1 mm because of its special qualities.

Waterproofing also contains anti-corrosion features in addition to its heat-insulating qualities, which include compounds that are water-resistant (impermeable). The coating is made waterproof, flexible, and resistant to UV rays, temperature changes, moisture, and environmental conditions thanks to the components.

As soon as the coating is applied, air reacts with it to create a long-lasting polymer covering that has great thermal insulation qualities that lessen heat loss. One coating's drying layer creates a film with a thickness of 0.1 to 0.5 mm.

At both low and high temperatures, our paint has a high viscosity and is flexible. Throughout its lengthy service life (up to 15 years), the paint does not split or undergo chemical changes, nor does it contain any base material remnants.

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Picture 1. Results from the experiment

The paint has excellent adhesion (glass adheres to concrete, brick, cement-sand plaster, metal, plastic, wood, and other materials), inhibits corrosion and condensation on chilly surfaces, and is mechanically and atmospherically impact resistant without the need for extra protection. Ceramic or silicone balls are vacuumed inside. They are inorganic pigments, acrylic polymers, and suspended components in liquid synthetic rubber. After drying, it takes on the appearance of a light gray suspension and creates an elastic, thin coating. A special material with flexibility, lightness, elasticity, and the capacity to properly attach to surfaces of any shape and practically any chemical composition has been made possible by the combination of such components.

The paint has the following advantages:

→ Easy to apply (can be done by spraying with a brush, roller and compressor);

→ Small size, compactness;

→ Environmentally friendly;

→ Does not contain harmful substances;

→ Good resistance to both alkalis and acids;

→ Fire resistant;

Areas of application

→ Residential and industrial buildings (external and internal insulation);

→ Easy-to-install structures;

→ Metal structures (garages, containers,);

→ Heating mains, pipes, ventilation ducts;

→ Shut-off valves (valves and valves);

→ Industrial containers;

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→ Car showrooms;

Fireproof substance that cannot burn. Temperature and humidity resistance as well as resistance to UV radiation are two additional types of resistance to liquid insulation. Liquid thermal insulation can be utilized both indoors and outdoors, in childcare facilities, public dining establishments, etc., with no functional limitations due to the composition's usage of solely ecologically benign components.

Even in challenging situations, simple to apply. You can apply liquid thermal insulation in a number of methods to the surface of your choice. Simply select the option that best matches your needs. There are many tools you can use, including brushes and rollers.

Concrete surfaces should have dust, mold, and oil removed using a brush; metal surfaces should also be cleaned and degreased. It is advised to use a phosphating agent to cure any rust stains on the metal. The wood needs to be primed with primer and biocides before the insulation is applied.

→ If you are reworking a brick surface, you must first prime it and then plaster it.

Metal, concrete, brick, wood, plastic, and many other surfaces are coated with thermal insulation. Pre-cleaning, priming, diluting with water of the same composition (not more than 5%), or using the surface as a primer can be utilized for any acrylic paint or liquid glass mixture.

Pushing the mixture on a wet, icy surface is not advised. There are multiple layers of mixture set down. Depending on the objectives, the tasks will define how many layers are needed. With drying breaks, the layers can be applied more than once. Depending on the heat carrier temperature and the desired surface temperature, the final coating thickness is chosen.

Any geometric shape's surface can simply have the coating applied to it using a brush, spatula, roller, or sprayer. No hazardous substances are released into the atmosphere by the coating. When working indoors, it is advised to use a standard respirator; however, when working outside or in a ventilated space, no respirator is necessary. 750–1000 g/m2 is the typical consumption for producing a dry coating layer with a thickness of 1 mm.

The inspection took place outside. Three layers make up the coating. 3 mm was the final thickness. The total amount of coating used was 0.9 liters.

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