

ХИМИЯ, ЭКОЛОГИЯ И ХИМИЧЕСКИЕ ТЕХНОЛОГИИ

УДК: 620.9:504.06

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FOAM CONCRETE RELIABLE ENERGY-SAVING PIPELINE INSULATION ПЕНОБЕТОН – НАДЕЖНЫЙ ЭНЕРГОСБЕРЕГАЮЩИЙ ИЗОЛИРУЮЩИЙ МАТЕРИАЛ

В сообщении рассмотрены свойства и физико-химические характеристики материалов для теплосетей, позволяющих увеличить срок их эксплуатации и значительно снизить потери тепловой энергии через изоляцию трубопроводов.

In Russia, heat networks are badly worn out: about 80 % of thermal networks have exceeded their service life, more than 30 % are in an emergency condition, and heat loss levels according to different data reach 40 % [1]. The problem of poor quality of thermal insulation of pipelines of heating networks makes us pay attention to ourselves.

In Yekaterinburg in the last decade, heat insulation from polyurethane foam has been actively used. According to numerous statements of experts, this material is suitable for use in the construction of heating mains. It has a number of drawbacks, including mandatory protection against humidification with a constant moisture control of the material. It leads to deterioration of thermal insulation properties, destruction of polymers and corrosion of steel pipe ulcers. Insulating materials on a polymer base have a temperature limitation. The practice of heating networks in Yekaterinburg with PPU isolation showed that the insulation quality drops significantly after the coolant supply. This occurs, as a rule, during the first three months after installation of the thermal insulation. This is due to the quality of insulation, as well as to the processes of displacement of condensed moisture. It is worth noting that PPU insulation assumes a non-channel or above-ground laying of heat networks. The use of this material in the

channel gasket leads to a rise in the cost of work, acceleration of corrosion processes. The moisture accumulating in the voids between the shells of the PPU and the conduits leads to accelerated ulcer corrosion processes [1].

In St. Petersburg, foam concrete is used for cheaper insulating materials. The experience of the companies showed that the foam concrete has higher adhesion to the surface, but also relates to materials with properties with respect to steel pipes [2].

Foam concrete is an environmentally friendly material, it is not environmentally harmful. Unlike polymer materials, over time it only grows stronger. Foam concrete has a high heat resistance, water resistance, increased durability, as well as the possibility of using for thermal insulation of pipelines with a coolant temperature or higher. This technique of thermal insulation was not widely used because the production of pre-insulated pipes was possible only at the plant, and transport damages occurred, loading and unloading violations, violations when laying pipes in the trench [3].

In St. Petersburg, to add additional thermal insulation properties to the foam concrete, it is possible to add vermiculite. This material is a simple and effective thermal insulation material. An important advantage of vermiculite is that it has fluidity, which makes it possible to fill irregularly shaped voids. The addition of vermiculite will make it possible to use a foam concrete mix for insulation of heat pipes with a high coolant temperature (steam pipelines) [4].

Successful experience in St. Petersburg has shown that in order to reduce heat losses it is necessary to develop a priority direction in the future use of thermal insulation materials. Strict management is required both in the construction of heat networks and in their condition during operation. It is interesting how the thermal insulation of pipelines of heating networks from foam concrete and vermiculite at the initial stage of the thermal insulation design will meet the requirements in Yekaterinburg.

Bibliography

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