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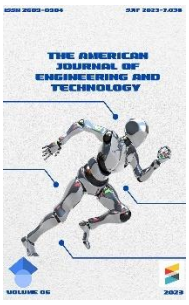

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Research Article

STUDY OF WATER INFLUENCE ON WATERPROOFING MATERIAL "POLYISOL-M"

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ABSTRACT

The paper presents the results of experiments to study the properties of water absorption and water resistance of the waterproofing material "Polyisol-M". As a result of experimental analysis the water absorption capacity of the waterproofing material "Polyisol-M" with thickness of 5 mm was 0,59 %, and the value of mass loss was 2,42 %, therefore it was recommended to use it in production.

KEYWORDS

Component, mixture, oil sludge, gossypol resin, technical sulfur, lime temperature, bituminous composition, formulation, waterproofing, coating.

INTRODUCTION

Domestic and foreign scientists Amir Modarres, Morteza Rahmanzadeh, A.B. Kolbanovskaya, I.M. Rudenskaya, V.V. Mikhailov, M.I. Kuchma, I. Pfeiffer, L. Corbett, J. Oliensis, H. Charo, K.A. Vorobyev, V.M. Kapustin, M.G. Rudin, S.G. Kukes, S.S. Negmatov, A.S. Ibadullaev, B.N. Khamidov, E.U. Teshabayeva, Sh.M. Saidakhmedov, G.R. Narmetova and others.

On the basis of the analysis of existing works it should be noted the study of components in the processes of oil and gas processing, chemical, oil and gas industry, obtaining composite materials based on new types of bitumen of different composition, modifiers to increase elasticity. The issues of frost and heat resistance properties of bitumen, such as creation, introduction of ingredients of polymer-bitumen compositions and technologies of their extraction are not covered in detail.

Materials and methods

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In this connection new compositions of waterproofing materials, construction bitumen compositions are created and their physical and chemical properties are studied, bitumen modification technologies are developed, physical and chemical, technological, physical and mechanical and operational properties of construction bitumen compositions are determined, construction bitumen compositions are developed. Issues related to the solution of such problems as the application of the material "Polyisol" in industrial structures and buildings, obtained by the author of this work, are widely covered [1].

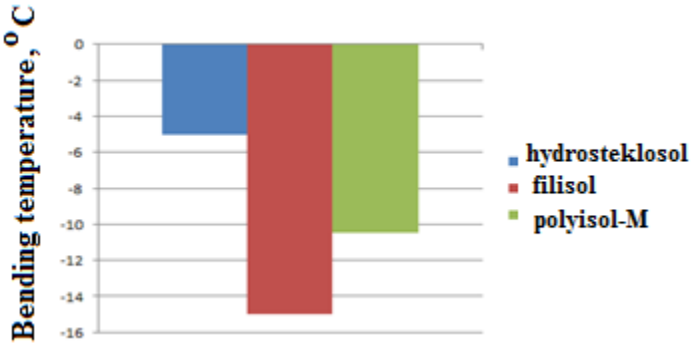

Figure 1. Bending temperature relative to regulatory requirements of a 5 mm thick specimen

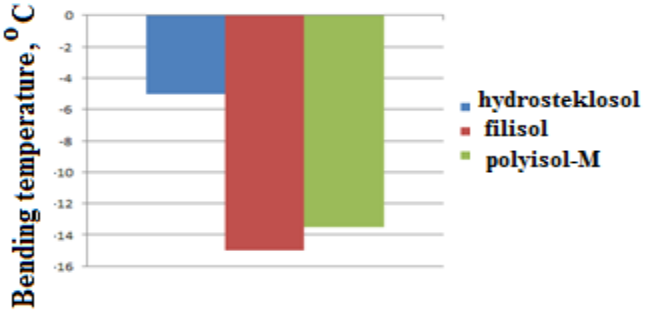

Figure 2. Bending temperature relative to the normative requirements of a 10 mm thick specimen

As shown in Figure 2, at the thickness of our sample "Polyisol-M" 5 mm, its bending temperature is -13.5 °C, which is -8.5 °C difference from the hydrostekloizol, which meets the requirements of the standard, but from the waterproofing material "Filizol" showed a negative indicator [2].

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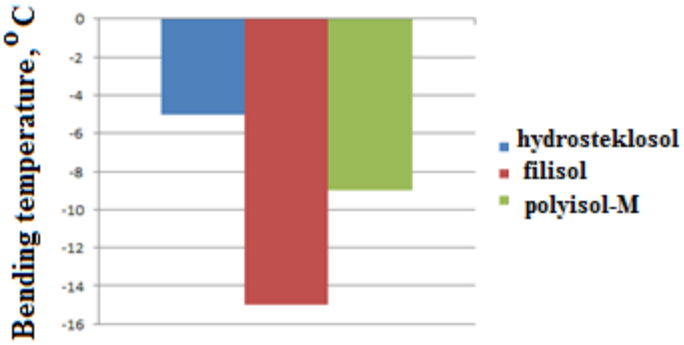

Figure 3: Bending temperature relative to the standard requirements of the sample thickness of 10 mm.

As shown in Figure 3, when the thickness of the sample we obtained "Polyisol-M" 10 mm, its bending temperature is -9°C, which is -4°C difference from hydrostekloizol, which meets the requirements of the standard, and - Negative indicator 6°C from the waterproofing material "Filizol".

From Figures 1-3 we can conclude that the thicker the sample "Polyisol-M", the better its flexibility temperature. But as the thickness of the sample "Polyisol-M" increases, its consumption is proportional to this. Since at the thickness of 1 roll of sample "Polyisol-M" 3 mm the consumption of bituminous composition of the new content is 18-20 kg, with the increase in the thickness of the sample the consumption of the developed bituminous composition increases proportionally.

This work provides the study of water absorption capacity of waterproofing material "Polyisol-M" and the study of water resistance of the material.

The study of the effect of water on the waterproofing material "Polyisol-M" is carried out as follows:

The water absorption capacity of the waterproofing material is studied [3], the water absorption (w) of the waterproofing material "Polyisol - M" is calculated to the nearest 0.1 percent using the following formula:

w=(m_3-m_2)/m_1 ·100% (1);

here m_3 - mass of the sample after testing in water for 120 min, g;

m_2- mass of the sample after the test in water after one minute, g;

m_1- mass of dry sample, g.

The parameters of the samples were obtained in the laboratory, and let's calculate the water absorption of 3 mm, 5 mm and 10 mm thick samples by substituting them:

1. When the sample thickness is 3 mm:

$$w = \frac{m_3 - m_2}{m_1} \cdot 100\% = \frac{313{,}26 - 311{,}12}{310{,}09} \cdot 100 = 0{,}69\%$$

2. When the thickness of the specimen is 5 mm:

$$w = \frac{m_3 - m_2}{m_1} \cdot 100\% = \frac{414{,}79 - 412{,}39}{410{,}08} \cdot 100 = 0{,}59\%$$

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3. When the thickness of the specimen is 10 mm:

$$w = \frac{m_3 - m_2}{m_1} \cdot 100\% = \frac{818{,}21 - 812{,}84}{810{,}11} \cdot 100 = 0{,}66\%$$

From the results presented in Figure 3, the following conclusion can be made: 3 samples obtained in the laboratory "Chemistry of oil" of the Institute of General and Inorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan were taken in the appropriate experimental facilities. When calculating the water absorption capacity of the sample "Polyisol - M" with a thickness of 3 mm [4].

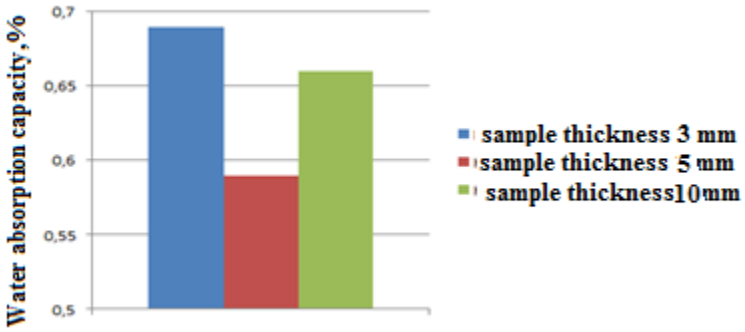

Figure 4: Water absorption capacity of "Polyisol - M" depending on the thickness of the sample

When calculating the water absorption capacity of the sample "Polyisol - M" thickness of 10 mm, it was found that it has a good indicator compared to the regulatory requirements for waterproofing material, that is, water absorption was 0.66%.

When analyzing the water absorption capacity of 3 samples of waterproofing material "Polyisol - M" second sample, ie at a thickness of 5 mm, water absorption capacity gave a much better indicator than the first and third samples. Because the water absorption capacity of the second sample with a thickness of 5 mm is 0.10% less than the first sample with a thickness of 3 mm, and the water absorption capacity of the third sample with a thickness of 10 mm is 0.07% more than the first sample. second sample with a thickness of 5 mm, as shown in Figure 4.

Based on the above analysis, we can draw the following conclusion, one of the main requirements for waterproofing material is water absorption capacity, and experimental analysis obtained in our laboratory showed that the water absorption capacity of waterproofing "Polyisol-M" material thickness of 5 mm is 0.59%.It is recognized necessary to give a recommendation for production [4].

Results and discussion. If within a certain time and at a given pressure on the surface of the material there is no change, ie, if the surface of the sample does not appear water, the material is considered to have passed the test.

Based on the above results and analysis, it can be concluded that all three specimens showed good water resistance and will allow future use as building foundations.

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Heat resistance and mass loss when heating waterproofing material "Polyisol - M" was determined as follows:

The method presented in [4] should be used to determine the heat resistance of the waterproofing material "Polyisol-M", used as a cushion of the foundations of buildings and structures under construction, and mass loss when heating the waterproofing material.

1-The increase in the length of the material when heating the waterproofing material "Polyisol-M":

If no changes occur on the surface of the material within a certain period of time, i.e. no swelling on the surface of the specimen, displacement of the wrapping layer and elongation in excess, the material is considered to pass the test.

The length increase (ΔL) is calculated as a percentage to the nearest 0.1% using the following formula [5]:

$$\Delta L = \frac{L_1 - L_3}{L_3} \cdot 100\%, (2);$$

where L_1 – is the length of the specimen after the test, mm;
L_3- length of the specimen before the test, mm.

1. When the thickness of the sample of waterproofing material "Polyisol - M" 3 mm:

$$\Delta L = \frac{L_1 - L_3}{L_3} \cdot 100\% = \frac{121{,}5 - 100}{100} \cdot 100 = 21{,}5\%$$

2. When the thickness of the sample of waterproofing material "Polyisol - M" 5 mm:

$$\Delta L = \frac{L_1 - L_3}{L_3} \cdot 100\% = \frac{119{,}4 - 100}{100} \cdot 100 = 19{,}4\%$$

3. When the thickness of the sample of waterproofing material "Polyisol - M" 10 mm:

$$\Delta L = \frac{L_1 - L_3}{L_3} \cdot 100\% = \frac{132{,}2 - 100}{100} \cdot 100 = 32{,}2\%$$

When the material is heated, its length increases. The results presented in Figure 5 can be analyzed as follows: 3 samples taken in the laboratory "Chemistry of oil" of the Institute of General and Inorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan were conducted in the appropriate experimental facilities and compared with Hydrostekloizol and "Filizol" that meet the requirements of the standard [6]. When calculating the length increase of "Polyisol-M" sample with thickness of 3 mm during heating, it was found that it has a good index in comparison with the material "Hydrostekloizol", that is, the value of length increase of the material sample increased in 21.5 % during heating.

Similarly, when calculating the value of length increase of 5 mm thick "Polyisol-M" sample during heating, it has a good index in comparison with the materials "Hydrostekloizol" and "Filizol", that is, the value of length increase of the material sample increased by 19.4% during the heating process.

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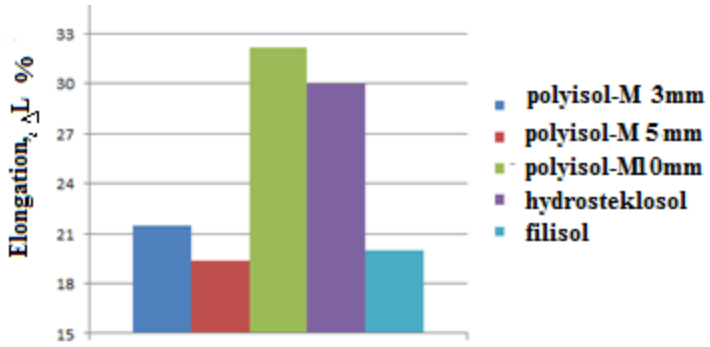

Figure 5: Hydrostekloizol, Filizol and Polyisol - samples of waterproofing material M (ΔL) with thickness of 3mm, 5mm, 10mm.

The length increase of 10mm thick Polyisol-M sample when heated is calculated. The results obtained in this case have a poor index in comparison with the materials Gidrostekloizol and Filizol, that is, the value of increase in the length of the sample of the material during heating increased by 32.2%.

Conclusions.When analyzing the value of length increase compared to the samples of Hydrostekloizol, Filizol and 3 waterproofing materials "Polyisol - M" the second sample, i.e. "Polyisol - M", with a material thickness of 5 mm, the value of length increase gave a much better value than the samples with thicknesses of 3 mm and 10 mm, and Hydrostekloizol and Filizol gave a good value of the standard requirements. Because the elongation value of 5 mm thick Polyisol-M sample is 2.1% less than that of 3 mm thick Polyisol-M sample, and the elongation value of 10 mm thick Polyisol-M sample is 5 mm.

One of the main requirements for the waterproofing material "Polyisol-M" is water absorption capacity, and the obtained experimental analyses showed that the water absorption capacity of the waterproofing material "Polyisol-M" with thickness of 5 mm was 0.59%, and the value of mass loss was 2. Since it amounted to 42%, it was considered necessary to recommend its production.

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