

PROCEDURE FOR USING BASALT FIBERS IN UZBEKISTAN

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***Annotation:** In this article, the history of the origin of basalt fibers, which are widely used in construction in the conditions of Uzbekistan today, their place and advantages in production, is explained in detail with the help of giving detailed examples.*

***Keywords:** basalt fiber, production, carbon fiber and glass fiber, concrete, reinforcement.*

First of all, what is basalt itself? Its features, procedure and where can we use it? it would be appropriate to answer such questions.

Basalt is an igneous volcanic rock from the basalt family with a basic composition of the normal alkalinity series. The name probably comes from another Greek language. Betakos - "basic" or, according to another version, Ethiopian basalt (bselt, bsalt) - "boil", "stone containing iron", because the manuscripts of Pliny the Elder say that the first basalts came from Ethiopia. The plutonic analogue of basalts is gabbro, and the hypabyssal analogue is dolerite. Traps are a type of basalt. They predominate among other cainotype (weakly altered) volcanic rocks.

In seismology, "basaltic" refers to the lower layer of the earth's crust, characterized by an increase in the speed of longitudinal seismic waves ($v_P = 6.5-7.2$ km / s), characteristic of basalts. The thickness of the basalt layer on the continents reaches 20-35 km, in the oceans it does not exceed 5-6 km. To determine the nature of the "basalt" layer, the Kola ultra-deep well was drilled.

Due to its low weight, resistance to the negative effects of acids, salt solutions and alkalis, basalt fiber becomes a more convenient material for use in various fields of production. Unlike expensive carbon and less strong fiberglass, the basalt counterpart is highly resistant to abrasion, structural mechanical stress, high temperature and ultraviolet radiation, excellent strength and electromagnetic inertness.

The appearance of basalt fiber is as follows, that is, basalt is a solidified volcanic magma by nature, its properties have changed due to the influence of the atmosphere. This petrified breed became the basis for many tools of ancient man. (Fig. 1)



Rice. 1. Appearance of basalt fiber.

The production of small amounts of fiber from it started only in the 20s of the 20th century. But during the height of the Cold War between the USSR and the USA, scientists actively developed the material, carefully studying its useful properties and the possibilities of its use for militaristic purposes. The industrial method of producing fiber from basalt was used in the early 80s. The center of its development was located in Kiev.

Over time, it was abandoned in favor of more expensive carbon fiber and fiberglass. The reason for this was the imperfection of basalt processing technologies. Today, technology has developed and the situation has changed radically.

The main stages of production of basalt fiber are as follows:

- Fine fibers are obtained by melting fine basalt at an extremely high temperature of +1500 degrees Celsius and passing the resulting mass through spinners - funnel-shaped small holes.

- Raw materials are blown with compressed air or sprayed using centrifugal devices.

- Melt filaments are drawn and wound into spools. No chemical additives are used in the process.

Fiberglass is also produced in this way, but it contains several components at the same time.

The use of basalt fiber in composite materials is carried out in the following order, that is, the composite consists of a binding material (matrix) and a filler. The latter can be in the form of rovings, cords and continuous fiber fabrics. By properly combining these materials, you can get completely different products with unique properties and characteristics. Basalt thermoplastic composites are highly crack resistant and can be easily processed at high temperatures. In heat-resistant basalt composites used in the rocket industry, metal and ceramics are used for the binder.

Construction is one of the main industries where basalt products are widespread. Here, many structures are based on unusually strong concrete, reinforced with special basalt fiber, which tolerates any temperature and high humidity. Reinforcement from the same fiber makes the construction object strong.

With the help of basalt wool, you can increase the sound and heat insulation of the room. The goal of the work of many scientists is to create ideal containers for storing various chemicals. They are expected to be cylinders made of basalt fiber.

The main task is the protection of nature and the environment, which will require the following:

- Basalt composites are easily recycled for later return to production.
- Waste from their production is used to create a large amount of useful products. Processing does not require large financial costs.

Due to its low weight, non-flammability and corrosion resistance, composites are actively used in shipbuilding, in the production of eco-yachts and boats. The automotive industry is no exception. He is interested in extending the life of cars and reducing fuel consumption by reducing the weight of cars. For this, new materials are being developed for modern electric cars that increase the range and do not emit harmful emissions into the atmosphere. Heat insulation for exhaust pipes is made of basalt fiber. In addition, well-known global car manufacturers such as Tesla and Infiniti use composites to create innovative tuning kits for prestigious and expensive cars.

Basalt raw materials are widely used in industries where it is necessary to start a recycling process with the reuse of waste during the production process.

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