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USE OF ALKALINE CEMENT OBTAINED WITHOUT BURNING IN CONSTRUCTION

Annotation: *It is considered that alkaline cements obtained without burning in construction, along with concrete and reinforced concrete for industrial and civil construction, can be used in hydraulic structures, road construction and other places..*

Keywords: *alkali metals, amphoteric oxides, hydroaluminosilicate, slag-alkaline binders*

The history of the development of the science of binders shows that mineral binders are mainly based on calcium, and some binders are based on magnesium. These two chemical elements are located in the second column of the Mendeleev periodic table, the column of alkaline earth metals. The previous column contains alkali metals and the next column contains amphoteric metals. Analysis of the types of binders, composition, production technology, solidification, analysis of new compounds in the formed artificial stone shows that alkali metals have stronger bonding properties than alkaline earth metals. This underscores the genius of the Mendeleev periodic table, as alkaline metals with high binding properties are placed first, then alkaline earth metals with relatively low binding properties, and then metals that form amphoteric oxides.

Oxides and salts of alkali metals were first added to binders due to their high solubility. Alkali metals were then added in small amounts as an activating additive to the calcium binding system. This added alkali accelerated the dissolution of silicon in the calcium binding system, eventually leaving the structure in the form of white salt without participating in the formation of new compounds.

This problem was solved by Professor V.D. Glukhovsky added a third component to the binding system, amphoteric oxide, and formed a new three-component compound with high water resistance to alkali metal, the hydroaluminum silicate of the alkali metal. Thus, in 1957, alkaline earth metals - Sa, Mg, Sr, Ba, alkali metals - Li, Na, K, Rb, Cs were also found to have binding properties. Alkaline alkalis hydraulic binder obtained on the basis of.

A well-studied type of alkaline cement is slag-alkaline binders. Aluminosilicate is used as a smelter of ferrous metals (blast furnace slag) and non-ferrous metallurgy - nickel, copper, lead slag, as well as electrothermophosphorus slag, which is a waste of the chemical industry. The qualitative composition of the oxides in these slags corresponds to the composition of Portland cement and differs in quantity: portland cement contains more CaO than slag, less SiO2, so Portland cement hardens naturally, and slag does not (Table 1).

Table 1

Chemical composition of aluminosilicate components

Naming	Oxides in% by mass					
	SiO_2	Al_2O_3	Fe_2O_3+ FeO	CaO	M_0*	M_a**
Blast furnace slag	35÷39	7÷17	1÷3	35÷49	0,9÷1,13	0,16÷0,48
Non-ferrous metallurgical slag	29÷45	6÷12	18÷34	11÷22	0,3÷0,6	0,13÷0,27
Electrother-phosphorus slag	41÷42	2÷4	to 1 gacha	44÷46	1,05÷1,13	0,07÷0,08
Portland cement clinker	21÷24	4÷8	2÷4	63÷66	~3	0,17÷0,39

M_0 – basic modules ($CaO+MgO/ SiO_2+ Al_2O_3$)

**Ma- activity module (Al_2O_3/ SiO_2).*

Slag-alkaline cements are obtained by mixing fine-grained metallurgical or electrothermophosphorus slags with an aqueous solution of alkali metal compounds (sodium, potassium, lithium) that form an alkaline environment in

water. If the hygroscopicity of the alkaline constituent is low, then these two components appear soft together and the resulting powder is mixed with water. chemical wastes contained in these elements can be used.

Mineral or organic additives may be added to the slag or alkali cement and to the artificial stone to control its properties.

Slag-alkaline cement can be produced in two ways. In the first method, the measured aluminosilicate, alkaline components and additives are dried together in a mill. In the second method, the alkaline component is dissolved in separate water.

When slag-alkaline cement is mixed with water (if the binder is prepared in the first method) or an aqueous solution of the alkaline component (if prepared in the second method), a plastic paste is formed and gradually begins to harden. The mineralogical composition of the artificial rock obtained as a result of solidification consists of low-base hydrosilicates of calcium and hydroalumo- and hydroferrosilicates of alkali metals, in addition to calcite. This mineralogical composition justifies the high physical and mechanical properties of slag-alkaline cement.

The main properties of slag-alkaline cement are:

- average pile density 1000 ÷ 1200 kg / cm3;
- actual density 2.7 ÷ 2.9 g / cm3;
- fineness 270 ÷ 300 m2 / kg; {{1 }}
- water demand 24 ÷ 26%;
- brands 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200 according to the limit of compressive and flexural strength;
- Stamps on cold tolerance 50; 100; 200; 300.

One of the main properties of slag-alkaline cement is high sulfate resistance.

The above basic properties justify the use of slag-alkaline cement. These cements are used in concrete and reinforced concrete for industrial and civil construction, as well as in hydraulic structures, road construction and other places.

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