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## USING OF CARBOXYMETHYLCELLULOSE (CMC) IN MANUFACTURE OF DRY BUILDING MIXES

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**Аннотация-**Технология использования карбоксиметилцеллюлозы (КМЦ) в сухих строительных смесях состоит в том, что на основании местного сырья с технологическими показателями и химическими реагентами позволило создать новую целлюлозу с степенью полимеризации и степенью замещения. Показателями качества, на основании созданной целлюлозы было получено КМЦ различных марок для производства сухих строительных смесей.

**Annotation** - Technology of using carboxymethylcellulose (CMC) in dry construction mixtures is that based on local raw materials with technological parameters and chemical agents has created a new pulp with a degree of polymerisation and the degree of substitution. Quality indicators based on cellulose CMC was obtained by various brands for manufacture of dry building mixes.

**Ключевые слова** – карбоксиметилцеллюлоза, целлюлоза, сухие строительные смеси, эфиры целлюлозы, степень полимеризации, степень замещения, зольность, температура, влажность, мерсеризация

**Key glory** - carboxymethyl cellulose, cellulose, dry building mixtures, cellulose ethers, degree of polymerization, degree of substitution, ash content, temperature, humidity, mercerization

Now the list of dry building mixes in our market is great. Materials for the device of floors, waterproofing and repair structures, glues for a ceramic tile and a natural stone, flatworks for seams (straightening), plaster mixes most of different function - here it is far not the full list of the products delivered in the form of dry mixes. To understand this variety and to choose a product of the necessary quality very difficult. The price, in this case, about what does not speak.

Modern dry mixes it is not simple cement with sand, and a product of the high technologies which application allows not only to increase considerably labour productivity, but also to receive absolutely other qualitative results unattainable in case of use of traditional cement-sandy mixes.

As a part of the modified dry mixes it is possible to allocate four basic groups of components: mineral knitting and additives for reception of special properties, including water-retaining and also polymeric binding which work in the same direction, as mineral, but have absolutely other mechanism of action. As manufacturer of carboxymethyl cellulose (CMC) as the modifying additives influencing properties of dry building mixes first of all interest [1].

Now sharply there is a question of use of water-soluble polymers for building mixes for the purpose of improvement of quality of materials on their basis.

Application of special additives (modifiers) at creation of compounding of the modified dry mixes is caused by necessity of reception certain technical and technical

characteristics on these materials and, first of all, - requirement of deduction of water for the shut solution after its drawing. Water is absorbed in the basis and evaporates from a solution surface that leads to reduction of time of stay of cement in a gel phase, to reduction of degree of hydration and, as consequence, to durability decrease. The less thickness of a layer of a solution, the specified lacks more affect quality of a formed cement stone [2].

In the beginning of the last century in Germany the way of reception of water-soluble ethers of cellulose has been developed. Researches have shown that owing to weak intermolecular interaction with water molecules these polymers possess magnificent water-retaining ability. Each molecule of polymer can keep to 20 thousand molecules of water.

Energy of this interaction is comparable to energy of evaporation and capillary diffusion in a basis that is an obstacle for water leaving. In turn, this energy is a little bit less, than energy of diffusion of water at cement hydration that allows it to select this water.

Actually water in a solution is replaced with a homogeneous jellylike solution of methylcellulose in which cement and filler parts are weighed. High water-retaining ability of such system promotes full hydration of cement and allows a solution to type necessary durability even at thin layer drawing. After leaving of water polymer in the form of the most thin film remains on surfaces between a cement stone and filler, not influencing in any way on mechanical characteristics of the hardened solution. Thus, addition of insignificant quantity (0,02-7 %) water-soluble ethers of cellulose to cement-sandy mixes leads to essential increase in open time and gives the chance to hydrate a solution in regular intervals on all

volume, and also provides essential increase of adhesion to the basis and improvement of quality of a surface.

The more the thickness of a layer of a cement mortal, the less methylcellulose is required for maintenance of necessary degree of initial hydration, therefore on a label of a dry mix is minimum admissible thickness of drawing of structure should be accurately specified. In turn, it is inadmissible and thick (10 mm and more) application of a solution with the high maintenance of an ether of the cellulose intended for thin layer technologies. In this case the "effect caramel" can be shown when a surface cure is normal and not hardened cement mortal inside remains. For this reason for preparation of the rough bases (with differences more 10-15mm) application of system of the materials consisting of a dry mix for rough alignment and thin layer of the leveling weight, providing reception of a smooth finishing layer on which surface the floor covering keeps within is recommended [3].

If methylcellulose possesses good water-retaining characteristics sodium carboxymethyl cellulose (NaCMC) considerably raises прочностные characteristics of dry building mixes. Carboxymethyl cellulose (CMC) it is actively used for manufacture dextrin. For creation dextrin manufacturers use mark CMC 75/400. For dextrin concentration of the basic gluing substance has great value. For easy wall-paper normal it is considered parity CMC to water as 5 % a solution. For heavier wall-paper, accordingly, this parity grows. Dextrin on base carboxymethyl cellulose is much cheaper some glue on a base methylcellulose, thus slightly conceding to it in characteristics.

From secondary raw materials of wood of a poplar we receive cellulose which is chemically processed on NaCMC. We

know that in Namangan chemical enterprise for manufacture CMC some kinds of equipments are used. Therefore the floor space and power consumption, equipment is considered very big, and it leads to increase in the cost price of production, and also received from it NaCMC does not meet the requirements, shown on it. Taking the aforesaid in attention, us was concentration of the non-standard equipment is developed, giving the chance to spend the basic technological processes in technology reception NaCMC in one device and to master its technology [4].

NaCMC widely apply basically as the stabilizer in drilling of oil wells, in furnish of spinning threads in the textile industry, in improvement of quality of paper production, in branch paint – warmish and building materials, pharmaceuticals, in production of food and perfumery branch.

The innovation of the resulted technology that in it on basis raw materials that keep cellulose is possible will receive cellulose, with various quality indicators regulating parameters of process and the expense of chemical reagents.

The "Mono device" method is a universal method, giving the chance to reception some marks of NaCMC from local raw materials, i.e. from cellulose of various plants and a fibrous waste that keep cellulose of the textile enterprises.

At present to "Mono device" methods the small enterprise (OOO "AQUA CELL PRODUKT") with capacity of manufacture NaCMC 1200 t in a year works. For today we make 18 kinds (75/300, 75/400, 85/500, 85/600, 85/700, 85/1100 ...) NaCMC with various marks.

Now in our Republic at the various industrial enterprises it is spent works on replacement existing technologies on the new. The industry concerns them on

manufacture of cellulose and products of its chemical processing.

Especially NaCMC received from cellulose having in structure various inhibitors thermo destruction, as the heat-resistant additive in chisel solutions at an oil recovery and gas.

It is known, that polymers, in particular NaCMC at thermal destruction form radicals, i.e. process proceeds on the radical mechanism. As a part of various inhibitors, in solution NaCMC, there are such substances as phenol, benzene, hydroxyl and carboxyl groups NaCMC, attaching in themselves forming radicals, slow down process destruction a chisel solution. Besides molecules NaCMC surround having molecules lignin which lead to reduction of its contact to air oxygen. It in turn gives the chance to decrease in the expense of chisel reagents.

The given degrees of stability to thermal destruction samples NaCMC with inhibitors and without inhibitors are lower cited (table).

**Table**  
**Comparison of degree of stability to thermal destruction NaCMC on a basis inhibitor to samples with various NaCMC.**

Indicators		NaCMC "KARBONAM"		NaCMC "BARAKA -AAN"		NaCMC on a base inhibitor	
Time of destruct ion, min	Tempera ture of destructi on, °C	Water efficiency of a clay solution, cm <sup>3</sup> /30 min	DP*	Water efficiency of a clay solution, cm <sup>3</sup> /30 min	DP*	Water efficiency of a clay solution, cm <sup>3</sup> /30 min	DP*
120	100	4.8	750	4.2	800	3.2	800
120	120	5.4	720	4.8	780	3.8	790
120	140	6.2	630	5.4	710	4.2	750
120	160	9.8	500	7.4	620	7.8	690
120	180	14	390	12	480	10.4	620
120	200	16	210	15.4	310	14.2	530
120	220	23	190	21	230	16	480

\* DP\* - degree of polymerisation.

There are the various methods of manufacture NaCMC based on scientific researches directed on reception of a product with high quality indicators. It is known, that at autoclaving of natural lignin in the alkaline environment, they get active functional groups which inhibits formation of radicals and become soluble in water in the alkaline environment. Therefore by manufacture modified heat-resistant NaCMC has been used lignin. To usually boring solutions inhibitors add before the beginning drilling of chinks. It leads to inconveniences. I.e. inhibitors in clay mixes extend not in regular intervals, their basic part remains not in a mix, and in an external phase, it is more excellent than new technology that various inhibitors at reception NaCMC are modified.

As, 2011 has been declared by Dear president of republic Uzbekistan year of a small-scale business and development business, gives to us young scientists and businessmen the big force in mastering of new tops such chemical to branch, as expansion of manufacture of cellulose and its ethers, maintenance of commercial operation some marks NaCMC subject to export.

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