OBTAINING BUILDING FRONT TILES BY USING GALVANIC MUD

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This work presents the results of research into building ceramic front tiles using non-conventional raw materials – galvanic mud, a waste from the "Electrodevice" factory (belonging to the joint venture JV Elga-Asia). As the basic local source of raw materials, Angren secondary kaolin, Sergeli KDK waste, and Koytash pegmatite were used.

In order to define the technological parameters of manufacturing front tiles, industrial tests were conducted on the optimum structures of ceramic masses. Experimental-industrial tests were carried out on reception of experimental batches (open Society "Elga Asia") at the Tashkent building materials enterprise.

Eight components of raw mixture were chosen for this purpose: tri-component mass on the basis of Sergeli KDK waste containing galvanic mud in a quantity of 10-20% without pegmatite; the four-component mass containing 15% pegmatite with prevalence waste and maintaining a galvanic mud content of 10%. Thus, it is necessary to note that mixture components of the experimental bodies were prepared in quantity of 4 kg for each body (calculated on a dry basis).

To study the technological and physical mechanical properties of the samples on the basis of the investigated mixture, the accepted technique of ceramic technologies was applied. In this technique, stony materials were previously crushed to no more than 10mm in a diameter, then subjected to wet fine grinding in a spherical mill with uralite balls. The crushed Angren clay and a joint ground clay were then mixed with crushing components during 8-10 hours in wet slip at 48-50% till dispersion, characterizing the residue on a №0063 sieve at no more 2%. The prepared slip was put through a №5 sieve and then left to drain in gypsum form.

After draining to the pressing humidity of 6,5-7%, the mass was sieve through a №2 screen under the standard, and the granulometric components of the press-powders were defined. The plasticity of the masses was determined on a difference between absolute humidity mass deals to the top borders of fluidity and rolling.

Pressing of the ceramic front tiles in the size 200x200x7 mm was carried out on a "Magnum-808" press at a pressing pressure of 230-240 kg/sm^2. Mechanical durability of tiles dried at temperature 100±5ºC was 4,8-5,2 kg/sm^2. The tile was then fired on a "Siti" conveyor line with a general duration of 45 minutes and the maximal temperature 1117-1121ºC. The results of the visual examination of the fired samples indicated, after firing, that all tiles except for mass M-3 had no cracks and deformations.

Also rough ripples didn't appear on the surface of the tiles.

Tests of physical mechanical properties of experimental tiles have shown that, on the bending stability in the fired condition, all components with the exception of mass M-3 surpassed the requirements of SS 6141-91. All components satisfied the requirements of thermostability and Mohs hardness without exception and

bodies M-1, M-3 and M-6 satisfied the water absorption requirement. Thus, it is possible to note that, on a parameter of deflections from the nominal sizes, this was slightly exceeded by the bodies of M-5 and M-6; however, all tri-componential bodies (except for M-6) have considerably exceeded permissible deflections on the length and width (in 1,6-6,3 times), that testifies on inadequate sintering. Here there are strong linear deformations of samples, owing to sharp increase in quantity of a liquid phase formed in the final firing stages. Only four-componential bodies M-7 and M-8, containing 15% Koytash pegmatite, had admissible deflection parameters.

It is necessary to note also, that these compositions are allocated among others with qualitatively excellent low values of general shrinkage, on the average almost by 2 times.

As the whole, it was established, that the general shrinkage of four-componential mass was lower than the general shrinkage of the tri-componential mass.

On the basis of the results obtained in the experimental-industrial test, the composition was determined that contained optimum quantities of waste and pegmatite. Thus the galvanic mud content should not exceed 10%. It was established, that the introduction of 10% fired tile scrap into the composition improved the physical-mechanical and technological properties of the fired tile.

As a result of the conducted researches, the optimum content of the raw components for the manufacture of ceramic facade tiles, based on the results of experimental-industrial test, was defined as follows, expressed in mass%:

- Angren secondary kaolin - 40-45%
- Sergali KDK waste - 20-25%
- Koytash pegmatite - 15%
- Fired tile scrap - 10%
- Galvanic mud from the "Electrodevice" factory - 10%

Thus, the conducted experimental-industrial tests have shown an opportunity for using galvanic mud from the "Electrodevice" factory as a component of the mass for obtaining the face ceramic front tiles that satisfy the standard operating requirements. Usage of galvanic mud from the above-mentioned factory as a tile mass component will allow expenses in the transportation of raw materials to be reduced as they are located in the territory of Tashkent, and also the raw materials base to be expanded, and environment preservation problems to be solved due to the recycling of a technogenic industrial by-product.