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(54) **THE METHOD OF MANUFACTURING BUILDING BRICK**

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(57) **ABSTRACT**

Dry compound from clay, quartz sand, starch as binding addition agent is prepared, 20% of water solution of sodium hydroxide is added to it, the obtained mixture is formed and exposed to bake for 1.5 hour under 960-1050 deg. C., at that, the ratio of quartz sand and clay is 2.33:1, and the ratio of dry compound and solution of sodium hydroxide is 6.25:1. Thus, the method is simplified, the obtained bricks have low heat transfer and low gravity, but are solid, cold, heat and chemical-resistant.

THE METHOD OF MANUFACTURING BUILDING BRICK

TECHNICAL FIELD

[0001] The present invention relates to field of building material, in particular to the manufacturing light, stable and hollow man-made bricks and stone, which is provided for brickwork.

BACKGROUND ART

[0002] There are method of manufacturing building brick and stone [1], according to which the compound of carbonated loam (85-90%) and micro-silica (10-15 wt %) is prepared and exposed to granulation in the presence of water solution of sulphate soap. Obtained granulated compound is molded, dried and burnt under 950 deg. C.

[0003] There are method of manufacturing facing bricks tiles [2], which includes humid breakage of waste products (10-15 wt % of junk and 10-15 wt % of thermophosphate slag), its blending with 32.5 wt % of high-quality and 32.5 wt % of low-grade (sand-mixed) clay and additional granulation and drying of this compound. It is obtained 4-8 wt % humidity containing granulated molding compound, which is exposed to half-dry molding and burn.

[0004] There are method of manufacturing ceramic bricks for wall incrustation [3], according to which the mixture of the following comprise (wt %) clay slate 60-80, pearlite or obsidian 15-20 or junk 5-10, quicklime 5-10 and solution of sodium hydroxide as much is prepared beforehand. The forming of compound is realized by half-dry method, applying MPa pressure. The obtained bricks are dried up to 1% remanent humidity and burnt, the heating speed is 200-300 deg. C. an hour, under 750-800 deg. C. carrying out for 1-3 hours.

[0005] The obtained specification figures are: water-absorbent 2-10%, cold-resistance 25-30 cycle, strength of pressure 22-45 MPa.

[0006] This method has series of lacks. The obtained bricks have not big solidity, which doesn't allow to use it in main wall brickwork. A lot of used clay and because of its capacity for shrinkage, cause to the necessity of prior slowly dry of bricks in order to refrain from cracks during burn. The use of quicklime complicates the manufacturing method and requires big expenditures of energy bound with limestone burn and its crushing.

DISCLOSURE OF THE INVENTION

[0007] The technical problem of the invention is to get building small-graned bricks with low heat transfer and low gravity, but solid, cold, heat, chemical and biologically-resistant for brickwork, providing simple and economical technology.

[0008] The main point of invention is that for manufacturing building hollow bricks and stone the compound of raw materials quartz sand and fustible clay is used with 2,33:1 (wt %) ratio, to which 0.8-1 wt % starch is also added. The liquid component (6.25:1 wt % ratio), which is sea-water and caustic soda (ρ=1.4 g/cm^3) is added to the obtained dry compound. The ready humid and friable mass is exposed half-dry molding. The obtained raw bricks are baked for 1.5 hour under 960-1050 deg. C.

[0009] The process of the manufacturing of building bricks includes several steps:

[0010] 1. The prior preparation of the source of raw materials.

[0011] The natural shallowness of the pure sand of deserted barhan and its humidity meet the requirements, so it is screened only by the sieve, which has holes of 0.7-0.8 mm size.

[0012] The clay is exposed to bum (up to 6-8% of the remanent humidity), after which it is reduced to fragments by hammer crusher, than it is screened by vibrating screen (the holes' size is 0.7mm).

[0013] 2. The preparation of mixture.

[0014] The sand and the clay with ratio of 2.33:1 (wt %), as well as ~1 wt % of starch are mixed in twin-shaft agitator. Adding some NaOH and water to the obtained dry compound the humid and friable moulding blend is prepared.

[0015] 3. Forming.

[0016] The moulding blend with 10-11% of humidity is exposed to half-dry forming at hydraulic press under 35-50 kg/cm^3 two-sided pressure.

[0017] 4. The raw bricks' baking.

[0018] The baking is realized in tunnel kiln, which has 48 m size, in which 3 zones are conditionally marked out. In heating zone the brick remains for 3.5 hour, in baking zone, where the temperature reaches up to 960-1050 deg. C. it remains for 1.5 hour and in cooling zone it remains for 7 hours.

EXAMPLE

[0019] 100 g of shallowness sand of desert's barhan and clay compound is took at 2.33:1 ratio (wt %) and 1 g of starch, 6.67 ml of caustic soda (ρ=1.4 g/cm^3) and 6.67 ml of sea-water compound (with 33 g/l content of salt) is added to it. The obtained half-dry compound is pressed under 35-50 kg/cm^3 pressure and baked for 1.5 hour under 960-1050 deg. C. The same example is recurred, using the quartz sand and technical water.

[0020] The present method has alternative big advantages for those countries in particular, where there are problem with building materials and water, but which have inexhaustible and not of great value raw materials: desert sand and sea-water.

[0021] In the result of thorough and experimental research the following axes were chosen: the content of raw materials and grading, water-holding capacity, technology conditions, which guarantee economy and simple method of producing, as well as meeting the requirements of physic mechanical figures of ready products.

Below there are (in table 1) comparative technical characteristics of obtained ("SICLAY" trade-name) and another building materials, having the same purpose.

TABLE 1

N	Indexes	SICLAY	Ceramic brick GOST 530-80	Silica brick GOST 379-95	Concrete GOST 6133-59	Armenian tuff
1	Water-absorbence %	11-12	16-25	18-22	6-8	11-19
2	Heat conductivity λ = Vt/m ° C.	0.58-0.65	0.33-0.22	0.81-0.87	0.89-1.0	0.45-0.55
3	Thermal resistance (20 cm) R = m^2 x° C./Vt	0.35-0.31	0.23-0.20	0.33-0.22	0.25-0.23	0.44-0.36
4	Breaking point kg/m^2	80-120	35-100	75-150	25-35	60-100
5	Density kg/m^3	1100-1300	1600-1800	1600-1800	1800-2000	1500-1800

[0022] Ceramic brick and stones may be used for outdoor and indoor brickwork, for manufacturing another elements of buildings and constructions, as well as for wall panel and blocks.

[0023] SICLAY's rectangular block's standard size is 40×20×20 cm^3. The block has 3 cylinder holes, the emptiness is 38-40%, but by customer order it can be formed any way, following GOST 530-80 requirements.

[0024] The present hollow stone, which has heat engineering characteristics and density, described in table 1, is considered to be effective, as it gives opportunity to seize the wall thickness up to 40 cm, satisfying double-row brickwork.

REFERENCES

[0025] 1. RU Patent N 2233815 (2002)

[0026] 2. RU Application N 93016771 (1993)

[0027] 3. RU Patent N 2036880, Int. Cl. C04B 33/00,1995.

1. The method of manufacturing building brick, according to which the dry compound of clay and silica raw and binding addition agent is prepared, the solution of sodium hydroxide is added to it, the obtained mixture is molded and exposed to burn, wherein the clay is used as clay raw, the quartz sand is used as silica raw, 0.8-1% of starch is used as binding addition agent, 20% of water solution of NaOH is used as solution of sodium hydroxide, where the ratio of quartz sand and clay is 2.33:1, and the ratio of dry compound and solution of sodium hydroxide is 6.25:1, the bake is realized under 960-1050 deg. C. for 1.5 hour.

2. The method of claim **1**, wherein the clay of Lanjazat deposit, which has the following content (wt %) SiO_2 -46.5; Al_2O_3-11.9; K_2O-2.3; CaO+MgO-11.1; Fe_2O_3-6.3; P_2O_3-6.5 is used.

3. The method of claim **1**, wherein the shallowness sand of desert's barhan with 92% of quartz is used as quarts sand.

4. The method of claim **1**, wherein the technical or sea-water is used for preparation of 20% water solution of sodium hydroxide.

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