

THE TECHNOLOGICAL PROCESS OF MANUFACTURING SPECIAL POTTERY PLASTER

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Abstract: The main building materials manufactured by S.C. “Congips” S.A. Oradea are the alpha modeling plaster and the expanded polystyrene, obtained through discontinuous manufacturing processes. Researches are conducted in order to obtain a new composition based on alpha modeling plaster with superior sound absorbing and thermal insulating properties. These insulations are made by means of ceilings, plates or coffered ceilings made of materials based on air-binding matters with different admixtures. Beside the sound absorbing and thermal insulation, they also have a functional, ornamental and a hygienic and sanitary role.

Keywords: sound absorbing panels, technological process, gypsum

1. INTRODUCTION

The special modeling plaster (α – semi-hydrate) is obtained by dehydrating, in the presence of the water steam under pressure, of the gypsum rock, this being followed by the drying processes, crushing and calcinations.

The raw material used is the gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), together with its assortments: gypsum G90 or G94 according to STAS 123/78. The granulation of the gypsum takes place between 50-150mm.

The technological process of manufacturing the modeling plaster has more phases, starting with gypsum extraction and ending with the fine grinding and sacking. The detailed chart of the technological flux of obtaining the special modeling plaster at S.C. “Congips” S.A. Oradea is shown at figure 1.

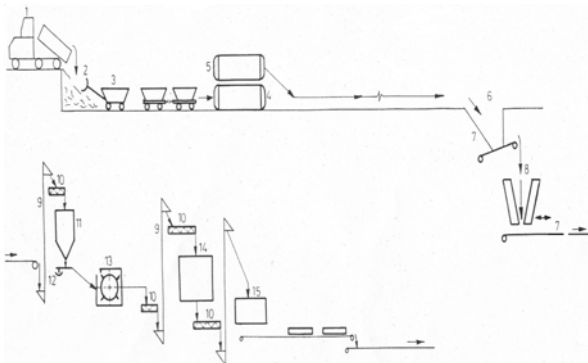


Fig.1. The chart of the technological flux of the alpha modeling plaster [2].

where: 1 – Dump truck, 2 - Tilting charging bucket, 3 – Wagons, 4 – Autoclave (autoclaving), 5 – Autoclave (drying), 6 – Crusher feed bin, 7 – Band conveyer, 8 – Jaw

crusher, 9 – Bucket-type elevator, 10 – Screw conveyor, 11 – Mill feed silo, 12 – Plate-like feeder, 13 – Shredder, 14 – Sack packer feed bin, 15 – Sack packer.

The gypsum stone in the container is washed under an abundant jet of water until the washing water is clear, that is, the impurities from the clay and the dust on rock's surface are gone. The sterile stones identified on the surface of the containers are left out.

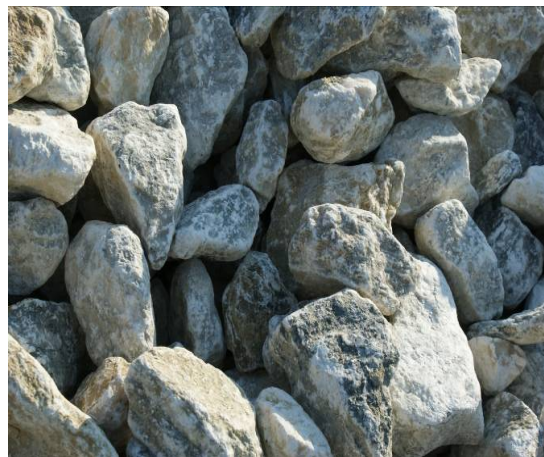


Fig.2. Sorted gypsum rock; 50 x 50 mm size [2].

The floors with the washed stone containers are transported with the fork lift from the stillpot inside de manufacturing hall, on the platform near the autoclave.

The containers filled with washed gypsum stone are transported by means of a bridge crane from the wooden floors into the metal wagons aligned by the narrow railway. Two containers are placed on every wagon.



Fig.3. Gypsum rock deposit and tiltable bottom containers. [2]

The wagons, loaded by means of traverser, are successively introduced inside the autoclave (figure 4).



Fig.4. Autoclave [2].

After loading the autoclave the lids are closed, the security system is checked and the autoclaving process starts. The autoclaving phase lasts approximately 6 hours. The diagram of the thermal treatment is shown at figure 5.

The wagons containing gypsum lumps are introduced inside the drying tunnel that is heated up to 100°-110° C.

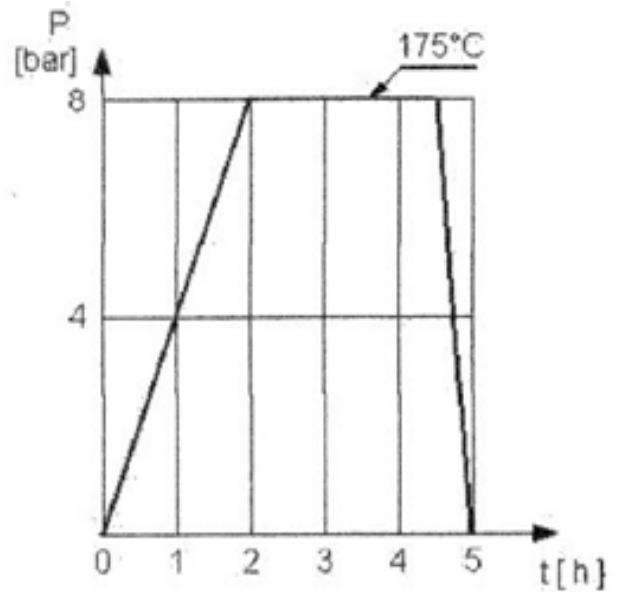


Fig. 5. The diagram of the thermal treatment of autoclaving [2]



Fig.6. Drying tunnel [2]

During the drying period, the temperature inside the drying tunnel must be maintained within the following limits:

- 160-170°C at the hot end
- 145-155°C at end of the outlet – wet air

After 8 hours of drying, the blasting air fan is turned off, as the drying cycle has ended. The diagram of drying the autoclaved gypsum is shown at figure 7.

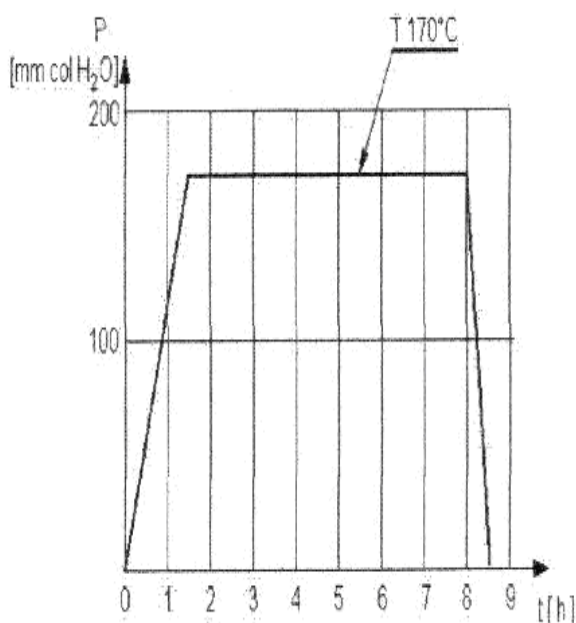


Fig.7. Diagram of drying the autoclaved gypsum [2].

The grinding of the gypsum rubble is done inside the medium-hard materials grinding mill that has a 5tone/hour capacity.

Researches are conducted at SC “Congips” factory, in collaboration with the University of Cluj, in order to obtain a new composition based on alpha modeling plaster with superior sound absorbing and thermal insulating properties.

In what concerns the civil and industrial buildings, a great attention is given to the interior ambiance. In that purpose compositions based on modeling plaster are used.

The used building materials satisfy certain performance requirements:

- Bending strength / Flexural strength
- Compression strength
- Very good thermal insulation

To obtain building material based on phonoabsorbant modeling plaster research has been done in order to find a particle formed complementary material that had the least density and an increased degree of porosity. The role of the modeling plaster based materials obtained in the building field is to create panels, platforms, phonoabsorbant ceilings segmented in panels for ambient interiors. The works where these specific products are needed are the thermal and phonic insulations. The role of the thermal insulations is to increase the thermal comfort necessary to the proper

development of man’s physiological life and to allow various devices and appliances to run normally. These concern walls, floors, ceilings. These insulations are made by means of ceilings, plates or coffered ceilings made of materials based on air-binding matters with different admixtures.



Fig.8 Interior simulation – sound absorbing panels [2].

By coating the sound absorbing panels with a thin layer of dye that helps increase the humidity endurance, these panels have good proprieties for the outdoor environment use.

In the execution of the internal and external phonoabsorbant panels we have used various decorative motifs, the most successful ones being those decorated with geometrical figures (like in figure 9).

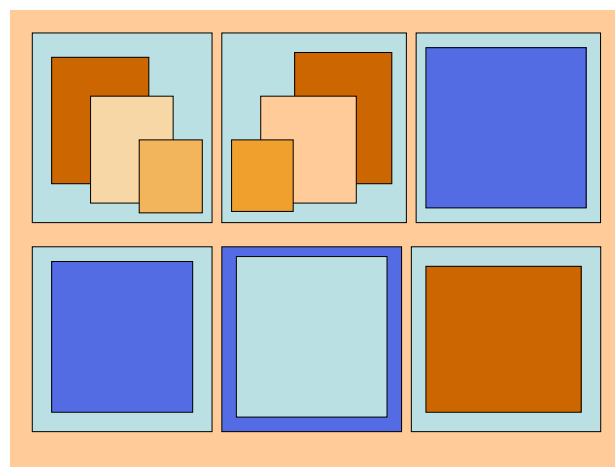


Fig. 9 Abstract composition [2]

Studying and using the esthetics and the painting techniques of the phonoabsorbant panels, that are the subject of this paper, trace their beginnings in the various types and influences existing in the abstract art.

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