

INFLUENCE OF COMPOSITIONAL MODIFICATION ON MOISTURE EXPANSION OF CERAMIC WALL TILES

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Ceramic wall tiles are quiteaesthetical products commonly preferred for internal applications, those have high porosity and therefore high water absorption. They are less stable than fully sintered ones and in particular ceramic wall tiles always undergo an expansion process when they are in contact with water molecules. Chemical and phase composition of ceramic wall tiles directly affect the moisture expansion. Ceramic bodies consist of three different phases; amorphous, glassy and crystalline, and each one has many factors which can make the moisture expansion to increase or decrease. Amorphous phases, remaining from clay minerals, generally have high specific surface area and their surface energy is high, which therefore play a significant role in moisture expansion.The effect of crystalline phases on moisture expansion is very low because they have much smaller specific surface area and therefore they show a low moisture expansion. On the other hand, glassy phases contribute to the moisture expansion but less than in the case of amorphous phases.

In this work, the influence of compositional modification of ceramic bodies on the extend of the moisture expansionhave been evaluated.The study of the moisture expansion phenomenon was done by changing alkaline and earth-alkaline oxides in an alumina-silicate system. Alkaline and earth alkaline oxide ratios, alumina and silica content were all adjusted systematically. Moisture expansion of the samples was determined by a dilatometer method.According to the results,by optimum adjustment of the composition it was possible to lower the moisture expansion of ceramic wall tiles significantly.Moisture expansion of bodies decreases as the content of alkaline oxides and amorphous phases decreases and the content of CaOand crystal phases increases.

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