

Elaboration and characterization of composite materials for structures with high thermal holding

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In case of fire in works of engineering, the new regulations impose to realize a passive fire protection, for their superstructures. Indeed these do not always answer the requirements imposed by circulars and thus present a danger or a risk for the users and emergency personnel. These new regulations take into account in their calculations, exposure to higher and higher temperatures with shorter times of temperature increase, and therefore more violent thermal shocks. This is the case with the curves called ISO 834 (heating of the material from room temperature to 1200 ° C at a very fast rate of temperature increase: 500 ° C in 4 minutes).

New materials based on calcium sulfate hemihydrates and charges have been developed in the form of plates and screened to meet these requirements. The study by calorimetry of hydration of hydraulic binders (calcium sulfate hemihydrates, for example) and additives is made in a first time to control the drying time and the rate of porosity of the material and in a secondly to understand the mechanisms involved. The realization of refractory compositions for transferring molecular was performed.

Conductivity, diffusivity and specific heat of the materials were determined. These results were used to model the mechanical and thermal behavior of these materials deployable depending on the nature of loads and their proportions.