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1 **Mechanical and thermo-physical behaviour of concretes and mortars**  
 2 **containing Phase Change Material**

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8 **Abstract**

9 This study deals with the inclusion of micro encapsulated Phase Change Materials (PCM), up  
 10 to 29% in volume, in concretes and mortars. Thermal and mechanical characteristics of  
 11 hardened mixes are measured and compared with classical civil engineering models. PCM  
 12 microcapsules behave as voids on a mechanical point of view, and as properly dispersed  
 13 spheres on a thermal point of view. It is shown that PCM included in a mineral matrix to  
 14 make building blocks could have a beneficial effect on walls thermal behaviour, keeping a  
 15 consistent mechanical strength.

16 **Keywords**

17 Phase Change Material (PCM); Concrete; Mortar; Mechanical properties; Thermal analysis.

18 **Nomenclature**

$C$	Mass of cement per cubic meter of mixture [kg]
$L_f$	Latent heat of melting of the PCM
$L_m$	Latent heat of freezing of the PCM
$T_{hot}$	Temperature of the hot plate during the guarded hot plate test [°C]
$T_{cold}$	Temperature of the cold plate during the guarded hot plate test [°C]
$T_{middle}$	Temperature in the middle of the sample during the guarded hot plate test [°C]
$W$	Mass of water per cubic meter of mixture [kg]
$W_{PCM}$	Mass of water equivalent to the volume of PCM nodules per cubic meter of mixture [kg]

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