

# Influence of the Type of Ash in the Insulating Capacity of Fly Ash Mortars Used for Passive Protection against Fire

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**KEYWORDS:** Coal fly ash, co-combustion ash, biomass, fireproof products, Passive protection against fire, Insulating mortar

## ABSTRACT

In this work, the possibility of using different types of fly ash as a major component of mortars used for the manufacture of thermal insulating elements has been studied. Fly ashes coming from the combustion of different pulverized coals, the co-combustion of coal and biomass and also from the combustion of biomass alone (rice husk and olive oil pomace) were tested. Thermal and mechanical properties of the products obtained after blending the ashes with Portland cement and other ingredients have been measured, with the aim of developing potential applications for them as compartmentalization components used for passive protection against fire.

In order to optimize the insulating properties of the final products and analyze the contribution of different components, density, heat capacity, thermal conductivity and compressive strength of the pastes have been measured until temperature of 240°C. Besides the influence of the type of ash in the mortar, the effect of some binders and additives have also been studied using different thermal analysis techniques (differential scanning calorimetry, differential thermal analysis and thermogravimetry). Results show that properties are remarkably dependent on composition.

Cylindrical test probes fabricated from the pastes showing the best thermal and mechanical properties were placed in an oven and were subjected to a heating program that provides the standard fire resistance curve (temperature versus time) and allows the measurement of the temperature in different points of the test probe. Results show that the ashes studied have different insulating behaviors and that some of the products prepared in this work, containing a high proportion of ash, have promising thermal and mechanical properties.