

Eco-fired clay bricks made by adding spent coffee grounds: a sustainable way to improve buildings insulation

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This paper shows a research for lightweight bricks development, by improving thermal properties, which has been carried out in partnership with a brick factory. The aim is to describe the thermal behavior of fired clay bricks made by spent coffee grounds in order to obtain better enclosure insulation. Organic substances combust within the matrix, during the firing process and an increased porosity is obtained. Therefore brick thermal conductivity is reduced. However, this porosity influences other parameters that determine the usability of the bricks, such as the percentage of water absorption and compressive strength, mainly. Several tests have been conducted for different percentages of waste in order to obtain bricks that meet with the regulatory requirements, settled by standards but with the minimum thermal conductivity. The results have been analyzed and related to previous researches concluding that is possible to add 17 % of waste while bricks compressive strength is above 10 N/mm² which means they can be used for structural purposes. However bricks made by adding 17 % must be coated, therefore must not be used for facing bricks. In this case thermal conductivity is reduced up to 50 %. © 2015, RILEM.

Compressive strength

Eco-bricks

Lightweight clay

Spent coffee grounds

Thermal conductivity

Water absorption

Compressive strength

Porosity

Thermal conductivity

Thermal insulation

Water absorption

Fired clay bricks

Firing process

Lightweight brick

Organic substances

Percentage of water absorptions

Regulatory requirements

Spent coffee grounds

Thermal behaviors

Brick