



Life HEROTile Project

www.lifeherotile.eu

Experimentation on new ventilating tiles to reduce summer air-conditioning costs

PROJECT INTRODUCTION

The most recent international environmental policies highlighted the need of energy demand reduction for summer air-conditioning in Mediterranean areas, because of its environmental and financial costs.

Life HEROTILE is an European project, part of EU LIFE Program (LIFE14CCA/IT/000939), which obtained a financial support of 1,5 Million Euros. The project, started the 1st of August 2015, will last 3 years.

In Mediterranean area summer radiation could drive to the overheating of buildings coverings (roofs and walls). Thus, the air-conditioning would become more and more essential.

A ventilated roof could be a great solution to reduce solar infiltration through the tiles, because of moved air, which reduces part of heating due to solar radiation. This effect could be enhanced by increasing the permeability of air through tiles. It modifies the mould of tiles, without invalidating the original appearance.

This is the aim of Life HEROTILE Project. The research means to enhance the Energy habit of buildings, through the development of two new brick tiles, able to increase ventilation.

Even if public awareness knows the great potential of ventilated walls and roofs (summer Energy savings and comfort), the related legislature does not yet exist. In Mediterranean areas, it is unbelievable, considering climate conditions.

Countries involved in the project are Italy, France, Spain, Israel and Germany, not by chance.

130 Million of inhabitants in South Europe correspond to almost 5,2 Billion of squared meters of floor, and more than 1 Billion of squared meters of roof (total amount of one / two floors buildings, garrets, etc.). Roofs are disseminated both in Mediterranean areas (such as Italy, Spain, Greece) and others (such as France, Portugal). Even if the need of cooling is related to the age and maintenance of buildings, several analysis shown as the actual Energy need for air-conditioning is 60 kWh/m². Therefore, the energy request for under tile goes from 30,000 to 70,000 GWht – equal to 10,000-25,000 GWhe, considering a coefficient of performance equal to 3 (COP), chiller operating.

A tridimensional model CFD has been improved to develop best types of tiles. This prototype has been tested by the CTM of Heusenstamm (Germany). The software used to prototype is COMSOL Multiphysics V5.2, adding program CFD to solve fluid dynamics 3D problem.

The numeric model has been thus tested in several conditions (wind intensity and speed). The results have been collected in conditions that simulated different directions and intensity levels of wind. They provided essential data useful to conceive a new type of tiles, able to increase the



quantity of circulating air under tile, without discourage the sealing of water. The research supposes to evaluate the consequences of air penetration in a ventilated roof, compared to a non-ventilated one. Among all project aims, there's the realization of four mock-ups – already tested in Yerucham(ISRAEL) and Ferrara(ITALY) – to collect data concerning actual habits of the new product. In a few months, two other prototypes will be tested in Cadelbosco(Italy) and Zaragoza(SPAIN), in two buildings addressed to social housing.

Finally, based on experimental data collected, a software will be realized (*SENSAPIRO – Software Energy Savings Pitched ROofs*). It will be able to foresee the effect of roof structure with the new tiles.