

Assessment of Airtightness Through a Standardized Procedure in a Nearly-Zero Energy Demand House

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Abstract : The lack of insulation, along with the existence of air leakages, constitute a meaningful impact on the energy performance of buildings. Both of them lead to increases in the energy demand through additional heating and/or cooling loads. Additionally, they cause thermal discomfort. In order to quantify these uncontrolled air currents, pressurization and depressurization tests can be performed. Among them, the Blower Door test is a standardized procedure to determine the airtightness of a space which characterizes the rate of air leakages through the envelope surface, calculating to this purpose an air flow rate indicator. In this sense, the low-energy buildings complying with the Passive House design criteria are required to achieve high levels of airtightness. Due to the invisible nature of air leakages, additional tools are often considered to identify where the infiltrations take place. Among them, the infrared thermography entails a valuable technique to this purpose since it enables their detection. The aim of this study is to assess the airtightness of a typical Mediterranean dwelling house located in the Valencian orchard (Spain) restored under the Passive House standard using to this purpose the blower-door test. Moreover, the building energy performance modelling tools TRNSYS (TRaNsient System Simulation program) and TRNFlow (TRaNsient Flow) have been used to determine its energy performance, and the infiltrations' identification was carried out by means of infrared thermography. The low levels of infiltrations obtained suggest that this house may comply with the Passive House standard.

Keywords : airtightness, blower door, trnflow, infrared thermography

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