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NUMERICAL AND EXPERIMENTAL STUDY ON THE THERMO-AERODYNAMIC BEHAVIOR OF A DOUBLE-SKIN GLAZED FAÇADE

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Abstract

This paper presents a study of the thermoaerodynamic spectrum inside an asymmetrically heated vertical channel of a double-skin façade. A double-skin façade is an envelope construction that consists of two transparent surfaces separated by an air channel. The numerical modeling was developed using the Ansys-Fluent simulation software under conditions of forced convection, using a three-dimensional geometry and a "k-ε standard" turbulence model. Then, experimental tests were performed on a full-scale stand in laboratory conditions, the results validating the adopted numerical model. The analysis of results for the temperature and the velocity profiles in some horizontal sections of the channel was performed in order to determine the thermoaerodynamic behavior of the double-skin glazed façades. The temperatures of the experimental measurements are compatible with the numerical results, within the limits of deviations between 0 - 6 °C. Further investigation will focus on a numerical and experimental study of natural convection taking into account the impact of solar radiation on the channel of the double façades.

Key words: double - skin façade, experimental analysis, forced convection, numerical study, thermoaerodynamic behavior, turbulent flow

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