ARCHITECTURE CIVIL ENGINEERING ENVIRONMENT
The Silesian University of Technology No. 2/2019

doi: 10.21307/ACEE-2019-031

ADDITIONAL INSULATION MATERIALS IN A WINDOW FRAME: EXPERIMENTAL AND CFD ANALYSES

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Received: 9.04.2019; Revised: 11.05.2019; Accepted: 11.05.2019

Abstract
During our research, we tested how addition of insulating material inside a PCV window profile affects improvement of its thermal insulation. The tested insulation types were: PIR board, aerogel mat, and 3D printed additional profiles. The analysis of the heat flux passing through the window frame was carried out using the authors' methodics, based on measurements of the temperature distribution in operating conditions and CDF simulations. The heat flux passing through the profile is calculated numerically, and the results of measurements are used to validate the accuracy of these simulations. For all the tested cases, simulations accurately reproduced the results of measurements. The heat flux drop compared to unmodified profile was about 9.8% for aerogel mat, 6.9% for PIR board, and 4.3% for 3D printed elements.

Keywords: **CFD; window profile insulation; Window frame; PCV window.**