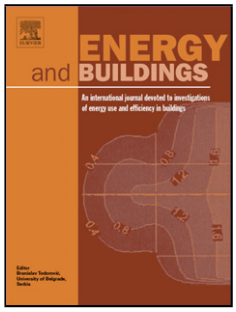

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Solar heat gain coefficient of water flow glazings

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Abstract

Water flow glazings include a water flowing chamber which enhances their thermal behaviour. This work addresses the connection between the optical properties and the energy performance of this type of glazings. The spectral properties of each layer of the glazing determine the fraction of solar radiation absorbed in each layer, which is later transported by the water in a closed circuit. The methodology requires the optical properties retrieved from the spectral problem and the thermal behaviour is predicted following the classical double glass pane analysis detailed in EN 673 (2011) and EN 410 (2011). The g factor and the U value of this new active glazing are obtained by solving analytically this model. Besides, it is shown that a third parameter, which takes into account the temperature of the inlet water, appears to complete the thermal behaviour of the glazing. In particular, three different configurations are examined. A comparison between these configurations is conducted and the active behaviour of the glazings is explained by means of a variable g factor which depends on the flow rate of the water chamber. The discussion includes some examples for the model parameters. The possibility to control dynamically the g factor provides huge energy saving potentials.

Keywords: water flow glazing, g factor, thermal transmittance, active behaviour, energy management, solar heat gain coefficient (SHGC)

Highlights

- A linear thermal multi-layer model is described for water flow glazings
- The solution is connected to typical thermal parameters of classical glazing
- The active behaviour of water flow glazing is shown by a variable g factor

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