

Accepted Manuscript

Title: Balance point temperature for heating as a function of glazing orientation and room time constant

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PII: S0378-7788(16)31552-3

DOI: <http://dx.doi.org/doi:10.1016/j.enbuild.2016.11.024>

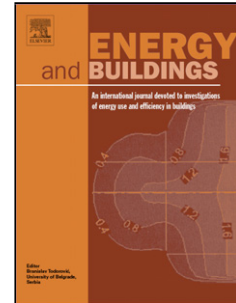
Reference: ENB 7139

To appear in: *ENB*

Received date: 14-7-2016

Revised date: 30-9-2016

Accepted date: 14-11-2016



Please cite this article as: Zoltán Verbai, Imre Csáky, Ferenc Kalmár, Balance point temperature for heating as a function of glazing orientation and room time constant, Energy and Buildings <http://dx.doi.org/10.1016/j.enbuild.2016.11.024>

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Balance point temperature for heating as a function of glazing orientation and room time constant

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HIGHLIGHTS

- validation of EN ISO 13790 calculation methodology by measurements in the PASSOL laboratory
- investigation of the operative temperature variation in March and April months in the test room
- analysis of the effects of the glazed area, thermal mass and orientation on the operative temperature
- investigation of the utilization factor and balance point temperature for heating

Abstract

In continental climates heating accounts for a significant part of the total energy consumption of a residential building with average thermal characteristics of the envelope. Solar heat gains have to be used wisely in order to reduce the energy need for heating. Glazed ratio of the facades, orientation of the transparent area and thermal mass has to be properly chosen in order to obtain the desired utilization factor. In this paper the effects of window size, thermal mass and window orientation on the balance point temperature are analysed in case of a reference room. The calculation methodology given by EN ISO 13790 standard was used. Measurements were done in order to validate the model. Performing the calculus on 48 different cases it was shown, that differences of even 11% can appear between the energy demands for heating (for similar overall heat transfer coefficients of the external building elements).

Keywords: balance point temperature, energy saving, heating season, solar gains, thermal mass, utilization factor

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