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Requirements and testing procedures for the energetic and acoustic assessment of Passive House ventilation systems for certification as "Passive House suitable component"

Supplementary Sheet Moisture Recovery for ventilation units < 600 m³/h

In order to determine the energy-relevant influence of ventilation units with moisture recovery in Passive Houses, the following additional regulations have been set up on the basis of comprehensive investigations. The general requirements and testing methods for the energetic and acoustic assessment of Passive House ventilation units for certification as "Passive House Suitable Components" are not affected by this supplement. The experimental set-up described in the main document applies for all tests, unless otherwise specified. For devices with a regenerative operation (rotors) the respective supplementary sheet is also to be considered.

In accordance with the general requirements and testing methods for the energetic and acoustic assessment of Passive House ventilation units for certification as "Passive House Suitable Components", the effective dry heat recovery efficiency is calculated when determining the thermodynamic characteristics.

The moisture recovery is determined for the standardised extract air conditions of 21°C/50% rH and for outdoor air conditions of 4°C/80% rH.

$$\eta_x = \frac{x_{AB} - x_{FO}}{x_{AB} - x_{AU}} \qquad [5]$$

For the energy-relevant assessment of moisture recovery with $\eta_x \leq 0{,}6$ the following rule applies:

$$\eta_{WRG,eff} = \eta_{WRG,t,eff} + 0{,}08 \cdot \eta_x \qquad [6]$$

For moisture recovery $\eta_x > 0{,}6$ the bonus is limited to a maximum of 4,8 %.

The heat recovery efficiency including the applicable allowance can be stated on the unit's certificate. The moisture recovery will be listed in the appendix to the certificate.

In order to prevent damage from occasional excessive humidity, units with a moisture recovery of $\eta_x > 0{,}6$ must have a regulated air flow rate, which is controlled by the indoor air humidity. For certification, the method of regulation should be explained.

Furthermore, the increased air change rate required to limit the indoor air humidity must be taken into account in energy balance calculations: Without reliable information, it can be presumed to be

$$\dot{V}_{eff} = \dot{V}_{hyg} \cdot \frac{0{,}4}{1-\eta_x} \qquad [7]$$

for residential use (35 m²/person, moisture generated ca. 2 g/(m²h)).

For devices with a high moisture recovery and special boundary conditions, particularly for adjustable moisture recovery, more favourable values can be calculated with an annual energy balance based on a dynamic hygrothermal building simulation in contrast to the more simplified method according to [6]. The Passive House Institute carries out such assessments on request.

Symbols and abbreviations

η_x	Moisture recovery	[-]
x_{AB}	Absolute humidity extract air	[g/kg]
x_{FO}	Absolute humidity exhaust air	[g/kg]
x_{AU}	Absolute humidity outdoor air	[g/kg]
$\dot{V}_{eff}$	Effective air flow rate	[m³/h]
$\dot{V}_{hyg}$	Air flow rate required for hygienic reasons	[m³/h]
$\eta_{WRG,eff}$	Certifiable effective heat recovery efficiency	[-]
$\eta_{WRG,t,eff}$	Effective dry heat recovery efficiency	[-]