

The effect of a rotary heat exchanger in room-based ventilation on indoor humidity in existing apartments in temperate climates - DTU Orbit (08/11/2017)

The effect of a rotary heat exchanger in room-based ventilation on indoor humidity in existing apartments in temperate climates

The investigation constructed and simulated moisture balance equations for single-room ventilation with a non-hygroscopic rotary heat exchanger. Based on literature, the study assumed that all condensed moisture in the exhaust subsequently evaporated into the supply. Simulations evaluated the potential for moisture issues and compared results with recuperative heat recovery and whole-dwelling ventilation systems. To assess the sensitivity of results, the simulations used three moisture production schedules to represent possible conditions based on literature. The study also analyzed the sensitivity to influential parameters, such as infiltration rate, heat recovery, and indoor temperature. With a typical moisture production schedule, the rotary heat exchanger recovered excessive moisture from kitchens and bathrooms, which provided a mold risk. The rotary heat exchanger was only suitable for single-room ventilation of dry rooms, such as living rooms and bedrooms. The sensitivity analysis concluded that varying heat recovery or indoor temperature could limit indoor relative humidity in dry rooms when a moderate risk was present. The rotary heat exchanger also elevated the minimum relative humidity in each room, which could help to avoid negative health impacts. A discussion emphasized the potential benefits of selecting heat recovery to match the individual needs of each room.

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