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Investigation on moisture and indoor environment in eight different Danish houses

For many years focus has been on reducing the energy need for heating in buildings. In existing dwellings this is often done by changing the windows and tightening the building. In new buildings air tightness are required leaving the mean part of the ventilation of the building in the hands of the occupants either by natural or mechanical ventilation. The increased focus on energy reduction is putting pressure on the requirements for fresh air. Together with the increased demands for comfort where draft from (natural)ventilation is unacceptable to most people there is an increased risk of lowering the indoor air quality and increasing the relative humidity that might leads to mould problems.

This paper describes an investigation of the indoor air quality, relative humidity and air change rate in eight different Danish dwellings all having problems with condensation on the windows. The dwellings where erected between 1930 and 2007. Some where only slightly renovated and others where completely renovated. Most where naturally ventilated.

In each house temperature, relative humidity and CO_2 where measured in all primary rooms a long with the outdoor conditions. The total air change rate of the house where measured by passive tracer gas technique over a period of one to two weeks.

Based on the measurements the ventilation of the buildings was compared to the build regulation (air change rate), indoor air quality (CO_2 level) and the use of the building (level of relative humidity). The results showed large variations between the eight houses but also between the three different measurements and thereby showing that the requirements in the Danish building regulations on fresh air as a function of the number of square metre can lead to both poor indoor air quality and high level of relative humidity but also to unnecessary energy use in the case where a large house are occupied by few people. An estimate on the moister production in the houses where made and compared to the values given in the literature. The moisture production in most houses where significantly higher than the values given in the literature.

Keywords: moisture production, passive tracer gas technique, air change rate, condensation on windows

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