STATUS OF VENTILATIVE COOLING IN DK

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VELUX

Status of ventilative cooling in DK

- Ventilative cooling is possible to include in the Building energy performance in DK, also for natural ventilation – if you are very clever
- Ventilative cooling only used to small extend by building designers. It is considered difficult to evaluate
- Improvements are planned and some can be expected soon

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PRESENT STATUS #1:

- DK Building Regulation allows in general terms to take into account the effect of ventilative cooling – but does not tell how.

- DK compliance tool *be10* is a simplified monthly-mean calculation tool. Must be used to document compliance with DK BR

- *be10* allows you to input a ventilation rate value for ventilative cooling but does not assist you in determining the value. Simple for mechanical systems, difficult for natural ventilation. *be10* does not take into account effects of elevated air velocity

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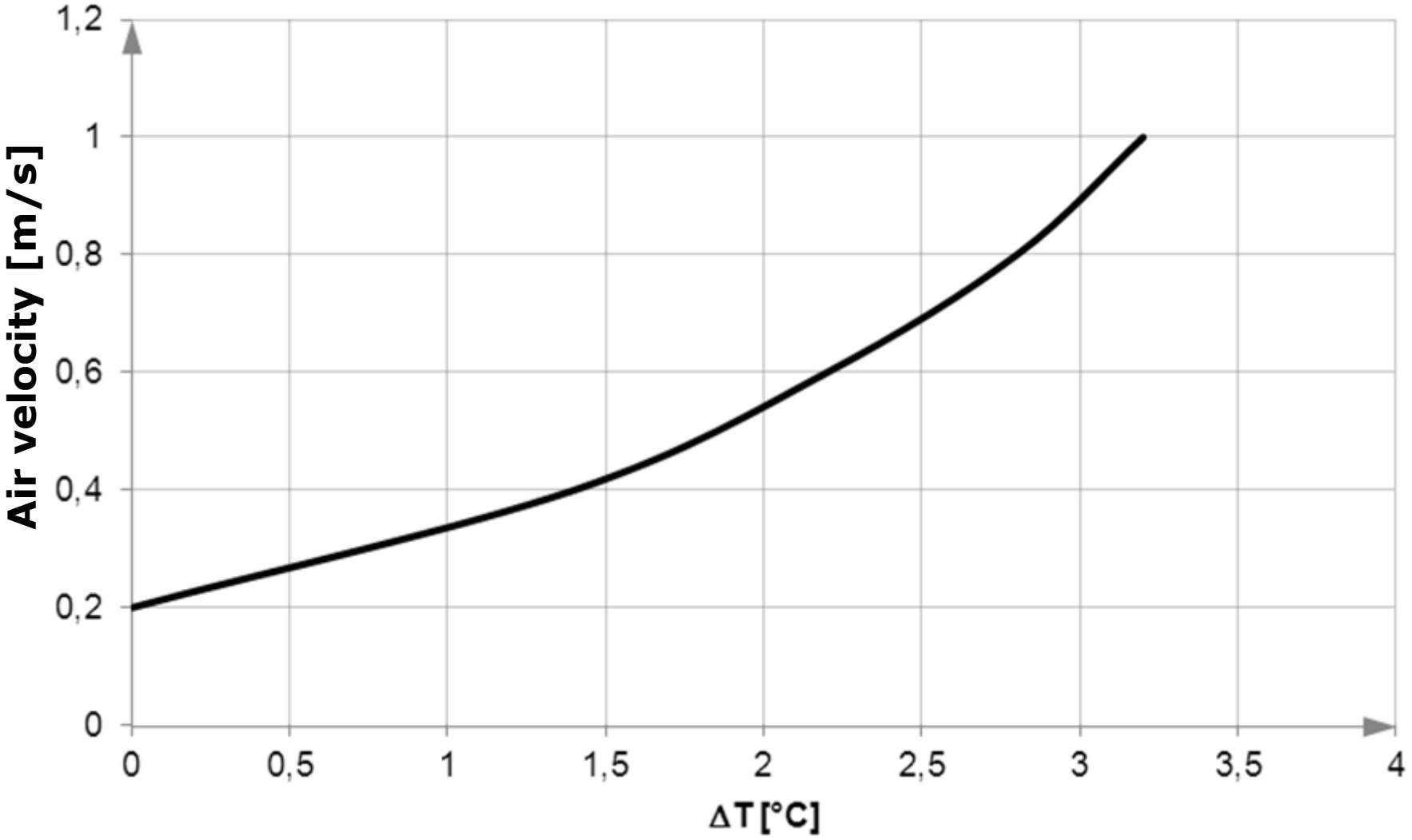
PRESENT STATUS #2:

- Danish Standard DS 447 specifies requirements for mechanical, natural and hybrid ventilation systems – and also includes ventilative cooling expressed as
  - Free cooling,
  - Night cooling,
  - Passive cooling,
  - Cooling by means of natural ventilation.
  - Effects of elevated air velocities (informative annex)

Air velocity vs reduction in temperature sensation, ΔT. ISO 7730 and EN 15251. From annex in DS 447



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PRESENT STATUS #3:

- (Too) many full scale (unintended) experiments show: Lots of over-heating in low-energy buildings have been reported
- Design without the use of simple control means such as solar shading and ventilative cooling – WHY?
  - Focus on heating energy consumption
  - Difficult to evaluate the VC performance. Lack of know-how, simple tools with realistic results
  - Compliance tool focus on energy, cannot evaluate summer comfort and VC
  - VC evaluation needs use of separate tools – happens sometimes in non-residential buildings, rarely in residential buildings.

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PRESENT STATUS #4:

- Product Solutions:
  - Mechanical systems – yes but normally dimensioned for IAQ
  - Manual windows – yes
  - Electrical windows – yes, some
  - Control systems
    - Yes for non-residential buildings
    - No for residential buildings

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FUTURE DEVELOPMENT

- Near future (few months):
- A new module for *be10* will be launched to allow a very simple evaluation of natural ventilative cooling on the building energy performance. Will give similar results for single side, cross and stack ventilation and not very suited for design of buildings

- Future (several years?)
- Increased legislative focus on summer comfort
- More detailed evaluation tool of (natural) ventilative cooling is under discussion. Shall be useful also for design of buildings – destiny unknown so far.
- Products?

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CONCLUSION:

- **Status**
- Rather unclear: Ventilative cooling not well supported by building regulation or compliance tool
- New Danish standard helps but it's not enough
- (Natural) Ventilative cooling is considered somewhat difficult to work with as an engineer, too little guidance and too large responsibility
- Therefore (natural) ventilative cooling is not widely included by building designers.

- **Future**
- Looks reasonably good for ventilative cooling in DK, simplified inclusion of natural ventilative cooling in compliance tool *be10* is on its way
- Further improvements are under discussion
- Products hopefully will follow in parallel