Ventilative Cooling in Standards and Regulations Country Report from Austria

Dipl.-Ing. Dr. Peter Holzer
IPJ Ingenieurbüro P. Jung and
Institute of Building Research & Innovation
Vienna

National Code B 8110-3 (2012)
Thermal protection in building construction
Part 3: Prevention of summerly overheating

Background and Area of Application

- Part of the OENORM B 8110 series „Thermal protection in building construction"

- Revised and relaunched in March 2012

- Valid for all types of rooms with constant human occupancy, without technical cooling

Criteria

- Max. 27°C op. Temperature in each room
- Max. 25°C op. Temp. in sleeping rooms at night

General Methodology

Dynamic Heat Balance according to EN ISO 13791

- Climate

- Geometry

- Thermal Properties

- Solar properties, including shading

- Internal load profiles

- Ventilation

General Methodology

Dynamic Heat Balance according to EN ISO 13791

- **Climate**

- Geometry

- Thermal Properties

- Solar properties, including shading

- Internal load profiles

- Ventilation

Site sensitive, hourly climate data, defined as a constantly repeated mid summer design day (obligatory)

To be taken from OENORM B 8110-5 by mean day temp of 15. July plus defined day/night swing $\pm$7K

Further Referring to

- EN 13791 (sky temp.)

- EN ISO 13370 (ground temp)

General Methodology

Dynamic Heat Balance according to EN ISO 13791

- Climate

- **Geometry**

- Thermal Properties

- Solar Properties,
  including Shading

- Internal Load Profiles

- Ventilation

General Methodology

Dynamic Heat Balance according to EN ISO 13791

- Climate

- Geometry

- **Thermal Properties**

- Solar Properties,
  including Shading

- Internal Load Profiles

- Ventilation

Referring to

- EN 13786 (usable thermal mass)

General Methodology

Dynamic Heat Balance according to EN ISO 13791

- Climate

- Geometry

- Thermal Properties

- **Solar Properties, including Shading**

- Internal Load Profiles

- Ventilation

Default values plus referring to

- EN 13363 (shading properties)

- EN 13561 and EN 13659 and EN 13791 (wind resistance)

- EN 13791 (fixed obstacles)

General Methodology

Dynamic Heat Balance according to EN ISO 13791

- Climate

- Geometry

- Thermal Properties

- Solar Properties, including Shading

- **Internal Load Profiles**

- Ventilation

Mandatory lists of

hourly internal load profiles and hygienic ventilation rates

for residential, office, schools and hospitals,

[W/m²], [W/workplace], [m³/h,pers]

General Methodology

Dynamic Heat Balance according to EN ISO 13791

- Climate

- Geometry

- Thermal Properties

- Solar Properties, including Shading

- Internal Load Profiles

- **Ventilation**

- Window ventilation by formula, $V\ [\text{m}^3/\text{h}] = f(A_{window},\ H_{window},\ dT)$

- Mechnical ventilation
  up to 1,5 ach in occupied rooms
  up to 2,5 ach in unoccupied rooms
  including thermal load from vents

Ventilative Cooling by Window Opening
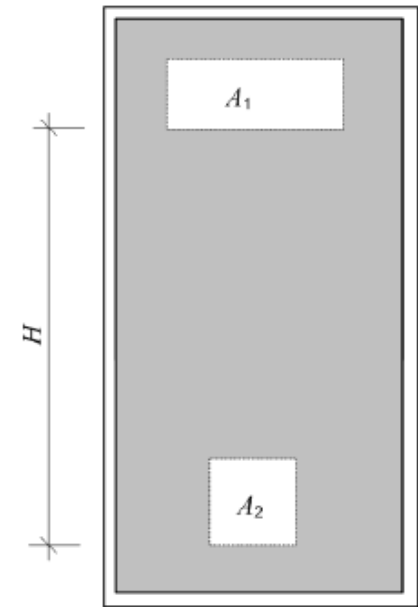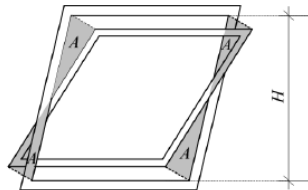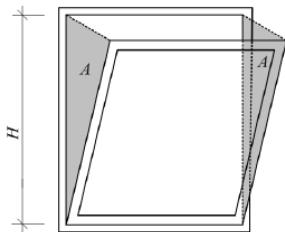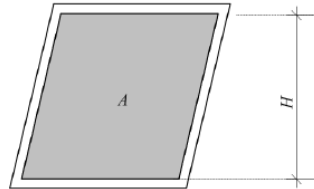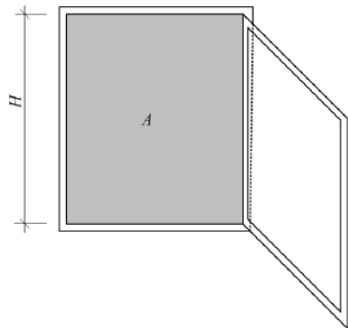
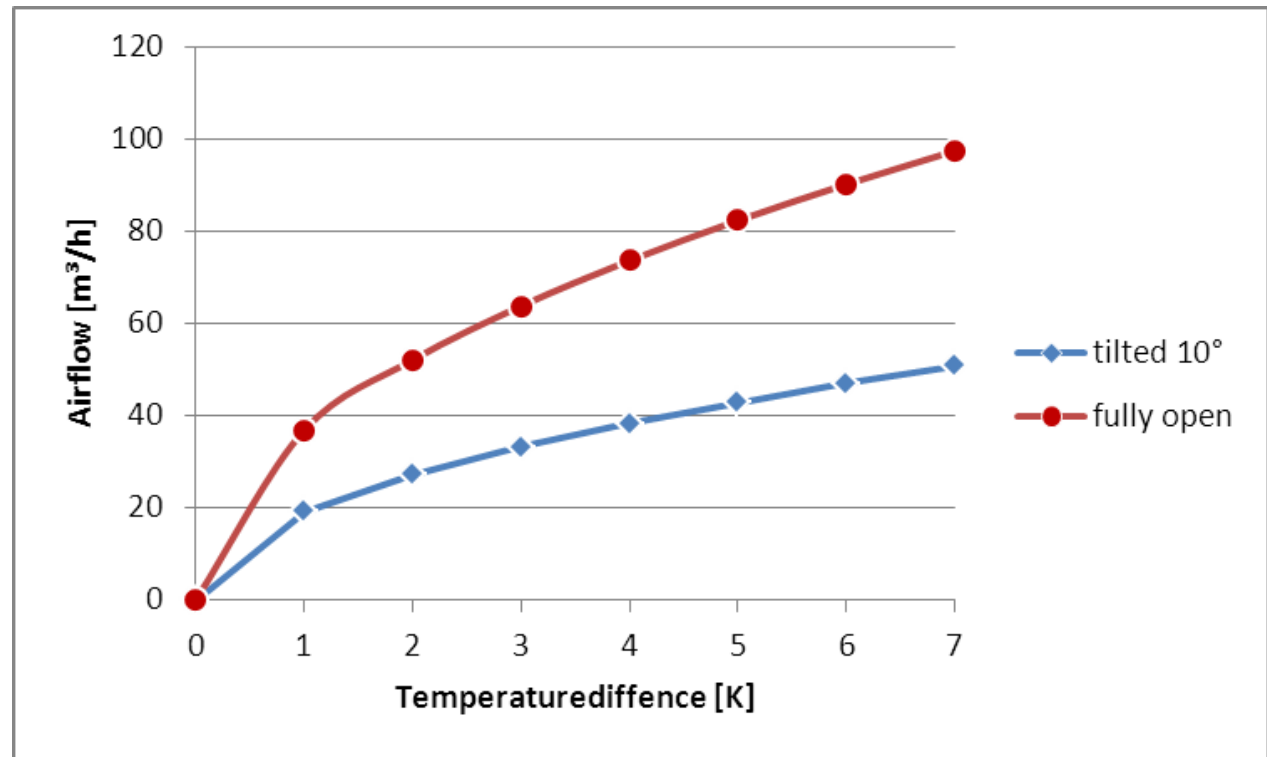$$\dot{V} = 0{,}7 \cdot C_{\text{ref}} \cdot A \cdot \sqrt{H} \cdot \sqrt{\Delta T}$$

Ventilative Cooling by Window Opening

$$\dot{V} = 0{,}7 \cdot C_{\text{ref}} \cdot A \cdot \sqrt{H} \cdot \sqrt{\Delta T}$$

W = 40 cm

H = 120 cm

Learnings

Thank you