The role of measurements in quality and compliance schemes

Peter Wouters

Manager INIVE EEIG

- IEA and ventilation: Overview
- AIVC and measurements
- TightVent and measurements
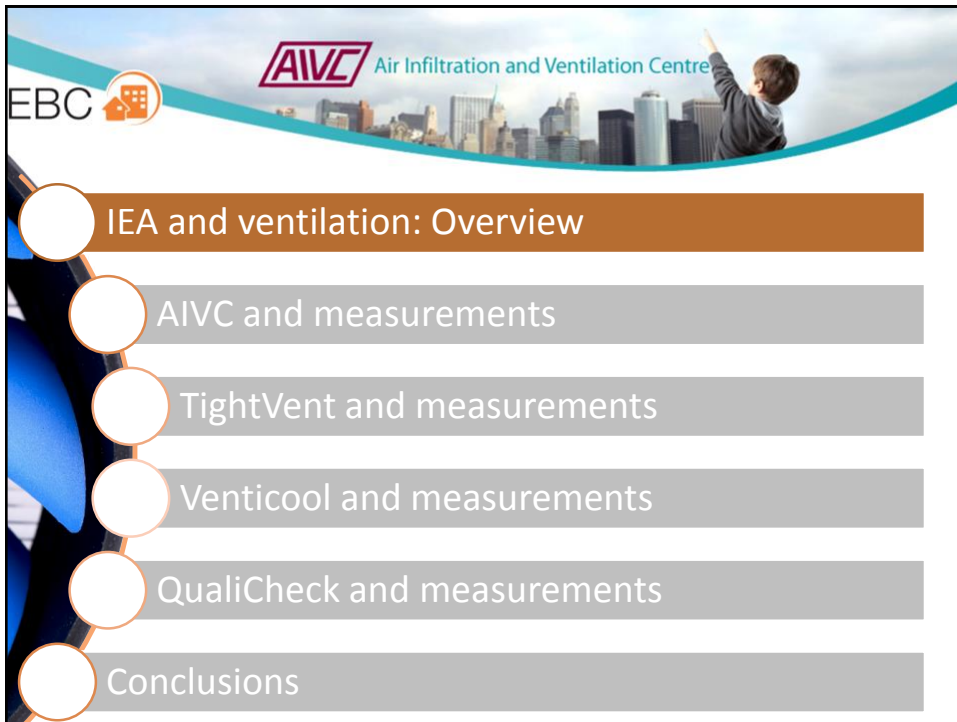- Venticool and measurements
- QualiCheck and measurements
- Conclusions

IEA and ventilation: Overview

AIVC and measurements

TightVent and measurements

Venticool and measurements

QualiCheck and measurements

Conclusions

Quite a lot of ventilation related projects in IEA EBC in which measurements are important…

- Annex 5: Air Infiltration and Ventilation Centre
- Annex 8: Inhabitant behaviour with regard to ventilation
- Annex 9: Minimum ventilation rates
- Annex 18: Demand controlled ventilation systems
- Annex 20: Air flow patterns in buildings
- Annex 23: Multi-zone air flow modelling
- Annex 26: Energy efficient ventilation for large enclosures
- Annex 27: Evaluation & demonstration of domestic ventilation systems
- Annex 35: Control strategies for hybrid ventilation
- Annex 44: Integrating environmentally responsive elements
- Annex 62: Ventilative cooling

DEMAND CONTROLLED VENTILATION (DCV) SYSTEMS : PERFORMANCES OF INFRARED DETECTION

A.M. Bernard [1] (CETIAT) – J.G. Villenave [2] (CSTB)
Marie Claude LEMAIRE [3] (ADEME)
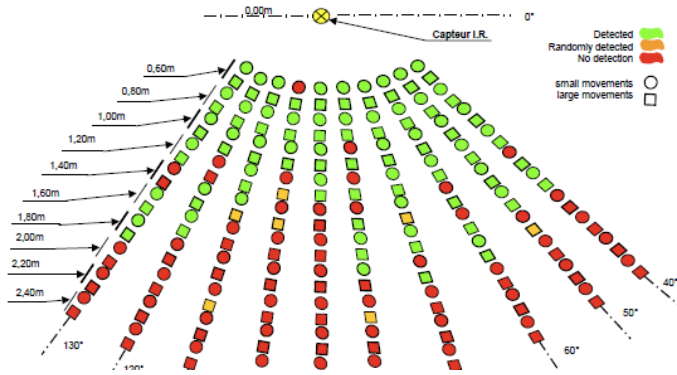
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AIVC projects…

Envelope air leakage databases

Philosophy on airtightness requirements

How tight and insulated ducts should be?

Durability aspects of airtightness

Quality management of airtightness

TAAC (TightVent Airtightness Associations Committee)

Quality of methods for measuring ventilation and infiltration

Ventilative cooling

Ventilation needs and health

Steps to improve the quality of residential ventilation systems

Steps to improve the quality of residential ventilation systems

International workshop
Brussels, 18-19 March, 2013
Securing the quality of ventilation systems in residential buildings

Existing approaches in various countries

35th AIVC Conference

24-25 September 2014
Poznań, Poland

Ventilation and airtightness in transforming the building stock to high performance

4th TightVent Conference
2nd venticool Conference

Receipt of abstracts: April 7 2014
Confirmation of acceptance: 1 May 2014
Submission of papers: 30 June 2014

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BUILDING AND DUCTWORK AIRTIGHTNESS PLATFORM

www.tightvent.eu

Objectives of TightVent

1 • **Awareness raising about the importance**

2 • **Awareness raising about the existing approaches**

3 • **Identifying and supporting a long term action plan**

...accurate and reliable measurements...

TightVent
Europe
BUILDING AND DUCTWORK AIRTIGHTNESS PLATFORM

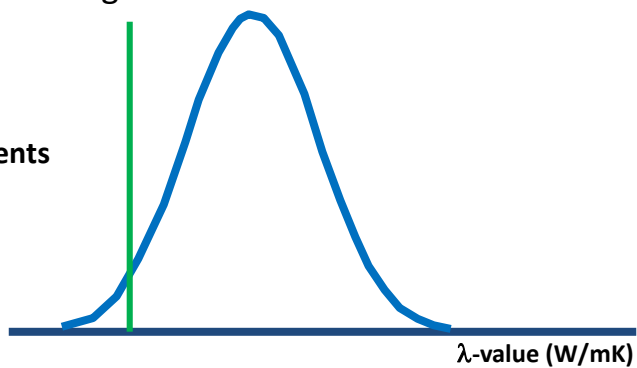## ... airtightness issues in relation to the topic of this workshop?

• What do we know about the accuracy aspects of airtightness measurements? Do we know enough?

• Do we need to take the uncertainties into account when declaring airtightness results?
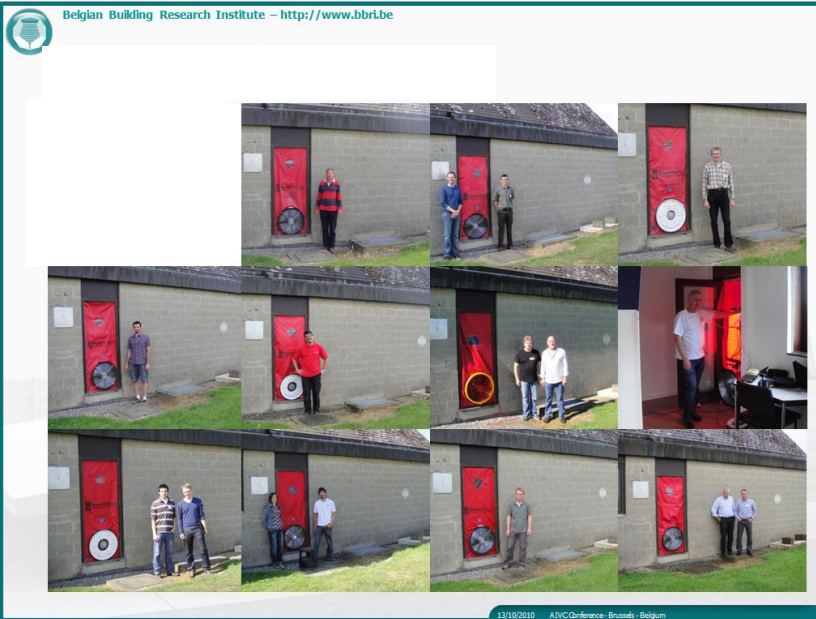
• ...

Compliance checks…

- **Thermal insulation**: $\lambda_{90/90}$
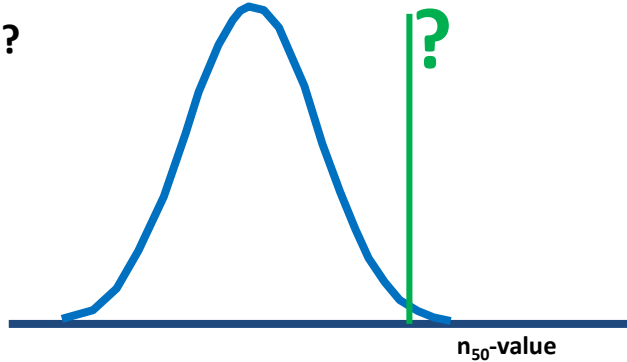 - Probability of 90 % that 90% of the measurements is better than the given value

Reliable measurements are rewarded!

λ-value (W/mK)

Compliance checks…

- **Thermal insulation**: $\lambda_{90/90}$
  - Probability of 90 % that 90% of the measurements is better than the given value
- **Airtightness?**

?

n$_{50}$-value

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…accurate and reliable measurements…

www.venticool.eu

Ventilative cooling issues in relation to this workshop?

- How to have a reliable measurement of **air flow rates** in ventilative cooling conditions? Which accuracy can be expected?
- The same questions for **room temperatures**?
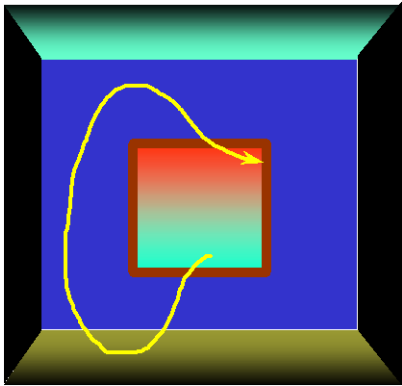 - Air temperatures
  - Surface wall temperatures

Example: single sided ventilation measurements
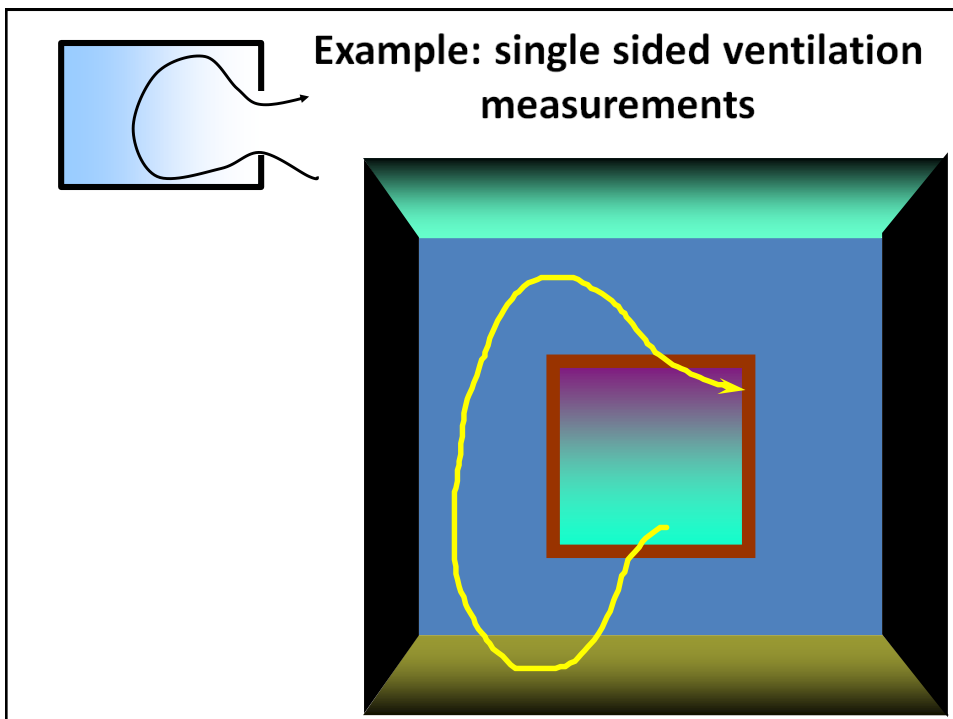
Example: single sided ventilation measurements

How to characterise the room temperatures?
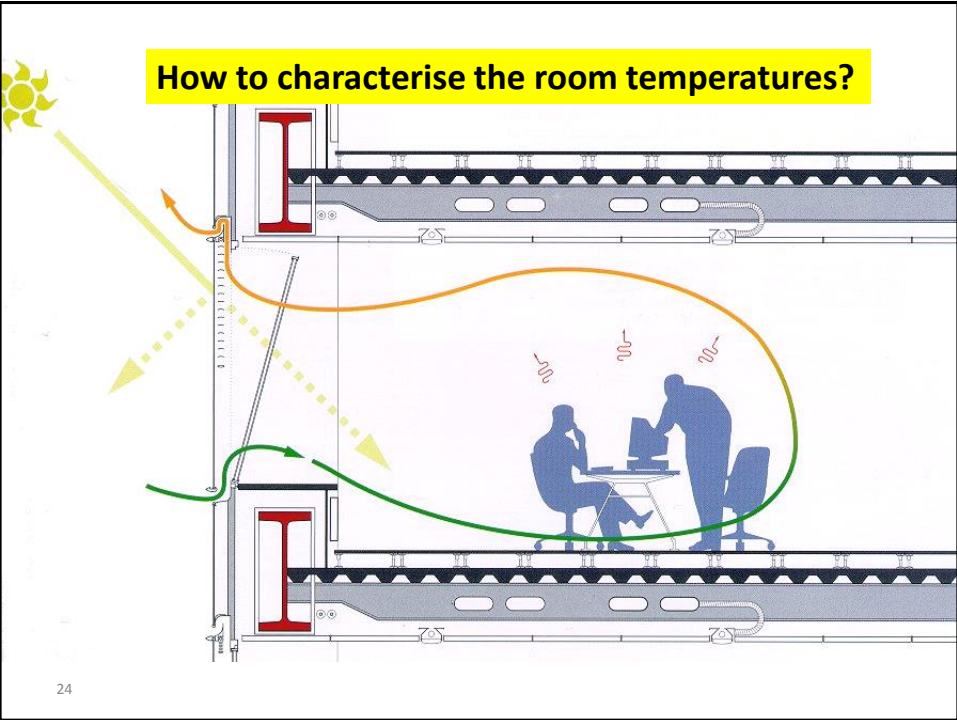
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ENERGY PASSPORT

Important that the market follows the requirements!

Reliable input data

QualiCheck project (2014-2017)

WP – Status of compliance and quality on the ground

WP – Towards easy access of reliable EPC input data

WP – Towards more quality of the works

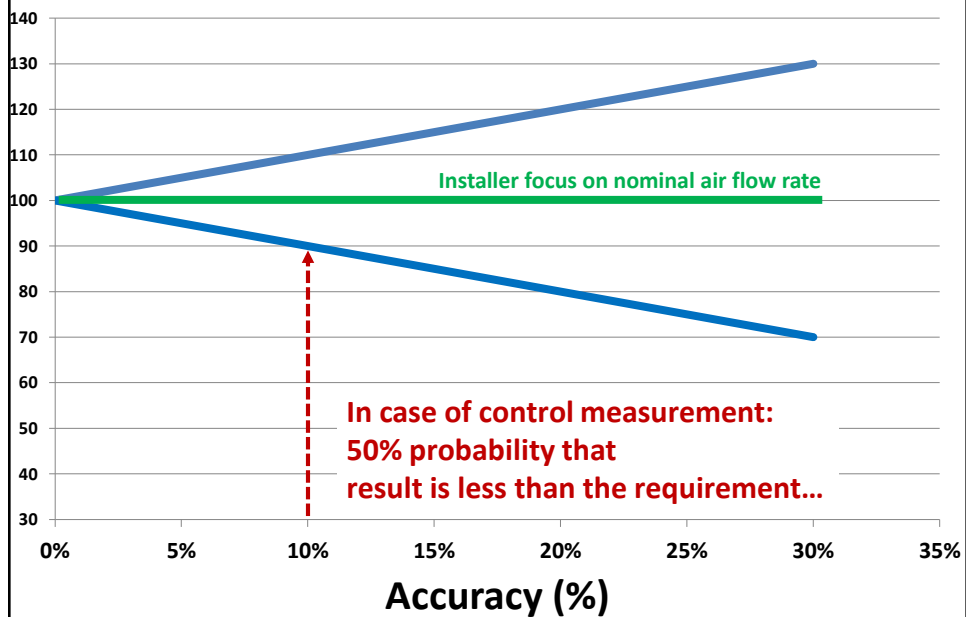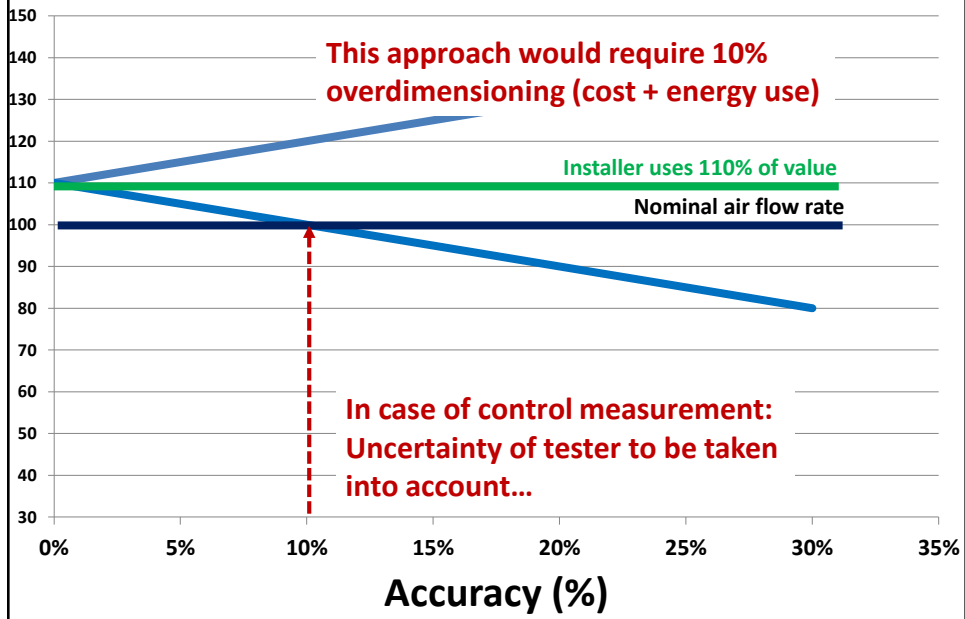**WP – Towards better compliance and effective penalties**

Solutions

Example: air flow rates

Installer focus on nominal air flow rate

In case of control measurement:
50% probability that
result is less than the requirement…

Accuracy (%)

Example: air flow rates

This approach would require 10% overdimensioning (cost + energy use)

Installer uses 110% of value

Nominal air flow rate

In case of control measurement: Uncertainty of tester to be taken into account…
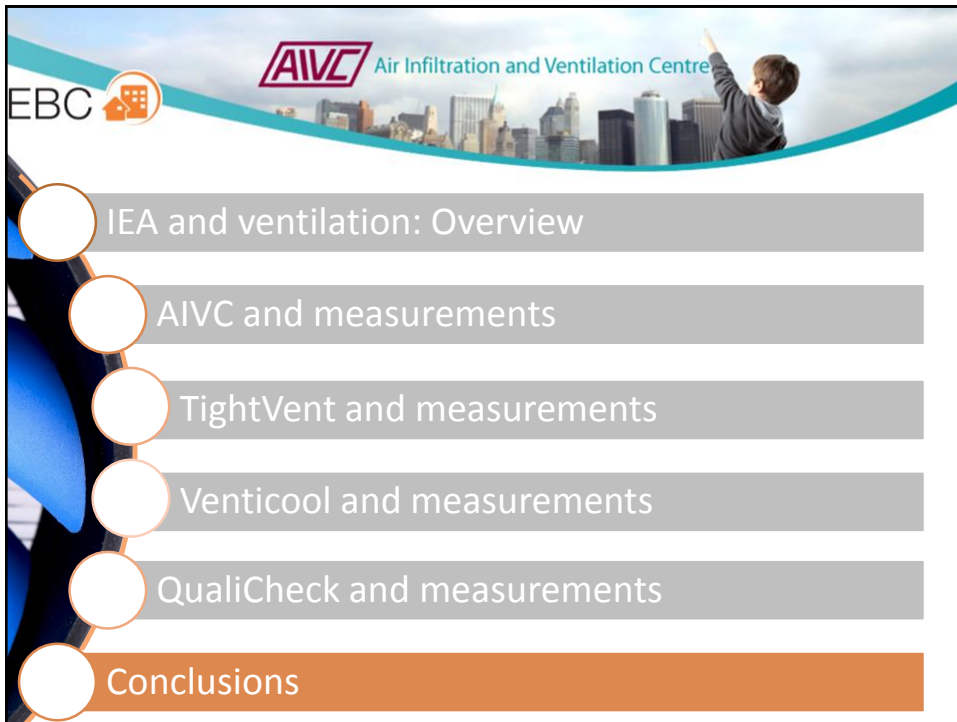
Accuracy (%)

Example: Acoustical measurements

Apparently, it is not so evident to have a simple and rather accurate measurement <u>in practice</u> for checking the requirements in e.g. bedrooms

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Conclusions

- Reliable information on measured results is important
- There are still pending problems/issues
- Due to growing interest in the quality of systems and increased focus on compliance frameworks: importance of reliable measurements is growing

Question 1

- **Do we need new sensors, new measuring instruments, new measuring techniques?**

Question 2

- **Do we need to better know the accuracy of the measuring instruments / the uncertainty of measurement?**

- **Do we need to better use the uncertainty when comparing a measurement result to a required value?**

Question 3

- **Do we need new measuring procedures, guidelines, standards, operating manuals?**

Question 4

- **For a large scale implementation of measurements, do we need more training and certification?**

- **Do we need a platform to exchange information?**