

OPEN DISCUSSION AND PERSPECTIVES

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The slides have been revised after the session to take into account oral and written contributions from participants



4 questions

- Q1: New sensors, new measuring instruments, new measuring techniques?
- Q2: Better knowledge of accuracy/ uncertainty and the way to use them in conformity assessment?
- Q3: New measuring procedures, guidelines, standards, operating manuals ?
- Q4: For large scale implementation: more training and certification? a platform to exchange information?



Possible answers to the 4 questions

- All of the 4 questions could be easily answered by *Yes!*
- But the questions are:
 - *Why* should we improve the situation?
 - And *how* to proceed?



Q1: New sensors, new measuring instruments, new measuring techniques?

- It seems that we have everything!
 - air flow rates, velocities, air change rate, air tightness,...
- But we are still missing quick and simple methods
 - In the laboratory, everything is possible but in the real practice?
- And the use of measuring devices in a wrong way can lead to completely wrong results



Q1: New sensors, new measuring instruments, new measuring techniques?

- Needs?
 - More « robust » measuring devices
 - In large buildings, cheap instruments for use in large numbers, but take care that it is difficult to have cheap sensors that are accurate and easy to use
 - Simple sensors may be expensive to develop: cooperation needed between manufacturers and research institutes
 - More info on how to use measuring devices in the right way
 - Better sensors to quantify IAQ and not only CO₂
 - Standard test protocol to assess the measuring instrument capability in various measuring conditions



Q2: Better knowledge about accuracy, uncertainty and the way to use them

- Measuring device manufacturers do announce accuracies
- Calibration facilities are available
- Methods exist to assess uncertainties
- But not enough attention to accuracy and uncertainty
 - uncertainty is not often estimated
 - we do not know how to use it when comparing a measurement result to a target value



Q2: Better knowledge about accuracy, uncertainty and the way to use them

- Needs?
 - A unified way of announcing accuracy/ uncertainty of measuring devices
 - More systematic /more frequent calibrations
 - Go to a systematic announcement of a measuring result together with its uncertainty
 - Insert equations to assess uncertainty into standards
 - The uncertainty assessment of on site measurements should use a simplified model (this is feasible)
 - Clarify the way to use uncertainty in conformity assessment (for instance in sizing or adjusting systems and/or components)
 - Develop a portable reference to check/adjust on site noise measuring devices



Q3: New measuring procedures, guidelines, standards, operating manuals

- Uncorrect implementation of a measurement can ruin the quality of the result
- Some measuring protocols exist
- But not enough and often not used in the field!



Q3: New measuring procedures, guidelines, standards, operating manuals

- Needs?
 - New measuring protocols, especially for on site measurements, with a compromise between easyness and accuracy
 - A robust protocol makes often an easier measurement and a better accuracy, event if there is no guarantee about this
 - Measuring instruments should make themselves the measurement simpler
 - Measuring procedures should be adapted to different conditions / differents operators
 - Focus on guides for installers and consultants
 - Provide check-lists for on site measurements, insert check-lists into standards
 - Think the measurement at the design stage in order to make it simpler (for example: pre-install air flow measuring devices in ducts)
 - Implement « dynamic » guidelines being enriched by the experience gained



Q4: Large scale implementation: training, certification, information platform

- Measurements have to be operated by trained persons
- Qualification schemes are being implemented



Q4: Large scale implementation: training, certification, information platform

- Needs?
 - Implement new training programs
 - Qualification schemes to be developed and applied
 - Rely on the installer / rely on a tester? Both are needed: the installer for a good quality installation, the tester for checking conformity
 - The installer should feel responsible
 - Use a 2-steps approach: 1) define the competence level needed, 2) develop a framework for a certification guide that can be used in different countries
 - There is a need for an information platform



**THANK YOU FOR YOUR
PARTICIPATION!**

