Ventilation: Steps towards frameworks for compliant EPC input data and improved quality/compliance

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Ventilation is often of poor quality
Also in Belgium! …since many years!
However a Belgian standard exists since 1991

- **Before 1991**: many problems of dampness
- **1991**: first standards for dwelling ventilation
- **1996**: ventilation is mandatory in Walloon Region
- **2006-2008**: EPBD transposition in the 3 Regions
  → Ventilation is mandatory
- Since 2006: many problems of conformity
  → « FAQ » developed in Flemish Region
- **2015**: New project PREVENT
  → Development of new bases to upgrade ventilation requirements

Ventilation requirements

Ventilation of dwellings

- **Principles**:
  - Flow rate: basis rule of 3.6 m³/h.m²
  - Natural openings: sizing for pressure difference of 2 Pa
  - Supply → transfer → extraction
Ventilation requirements

Ventilation of dwellings

- **4 basic systems**

A

- Extraction (Mechanical)
- Natural

B

- Extraction (Mechanical)

C

- Extraction (Mechanical)

D

- Extraction (Mechanical)

- **Principles:**
  - Basis: EN 13779
  - Flow rate: basis rule of 22 m³/h.pers.
  - Supply in spaces for human occupation

Ventilation requirements

Ventilation of offices and schools
Ventilation in EP calculation

- Ventilation consumes energy!
  - Ventilation heat losses
  - Electrical consumption of fans

- EP calculation in Belgium
  - « as built » approach!
  - Several calculation methods/values (often)
    → from « default » to detailed (e.g. measured data)
  - Input data
    - « Product data »
    - « Installation data »

EP calculation: Principle of equivalence
Largely used in Belgium for Demand Control Ventilation

- Context
  - EP calculation method is simplified
  - Cannot taken into account for “innovative products”

- Objective of the equivalence
  - Evaluate the equivalent energy savings in the EP calculation method for "innovative products"

- Summary of the principles
  - Paid and under the responsibility of the manufacturers
  - Evaluation (calculations, simulations, etc.) by an unique Third Party (Butgb – Ubatc)
« Product data »

- **Examples**
  - Capacity of natural openings
  - Maximum power of fans
  - Heat recovery efficiency

- **Some properties**
  - Often measured on a product (component or system)
  - To be provided by the manufacturer (or supplier)
  - To be checked by the rapporteur (responsibility)

- **Some expectations**
  - Reliability → compliant
  - Availability → easily accessible

« Installation data »

- **Examples**
  - Mechanical ventilation flow rates
  - Electrical power of fans
  - Airtightness of the ductworks

- **Some properties**
  - Measured (or checked) on site on the fully installed ventilation system
  - To be provided by the installer or “measurer”
  - To be checked by the rapporteur (responsibility)

- **Some expectations**
  - Reliability → compliant
Belgian approach for compliant « product data »

General objectives of the databases

- **Compliant** “product data”
- **Easily accessible** “product data”
  
  → [www.epbd.be](http://www.epbd.be)
Key principles

- Compliant data
  - Standardized and clear procedures (test methods)
  - Tests in laboratories
  - Control by a third party (Notified Body)

- Voluntary framework
  - Manufacturers and rapporteurs are NOT forced to use it
  - But high demand from rapporteurs → responsibility

Summary EP databases

- Produced by Manufacturer
- Tested in Labo
- Controlled by Third party
- Published by Authorities
- WWW
- Used by Rapporteurs
- Paid by and under the responsibility of the manufacturer
Many advantages for all the actors

- **For the manufacturers**
  - Higher confidence of the owners
  - Higher visibility
  - Compliant and unquestionably "product data"

- **For the rapporteurs**
  - No risk on the responsibility of "product data"
  - Easier access to "product data"

- **For the authorities**
  - Higher compliance
  - Less controls needed at the moment of EP declarations

Many advantages for all the actors (2)

- **For the designers and installers**
  - Design and preliminary EP calculation:
    - Impact of the products on EP calculation can be estimated
    - Easier comparison and selection of products on the market

- **For the owners**
  - Higher value for money:
    - They can choose which product performance they want to pay for
EP databases in Belgium
A success story since many years

- Trickle ventilators: **26 products**
- Simple fans: **36 products**
- Balanced ventilation units: **160 products**
- DCV systems: under development…
- Other EP products
  - Insulation materials
  - Construction products
  - Sunscreens

[www.epbd.be](http://www.epbd.be)

Ideas for the future

- Development of databases for other EP products
  - Boilers, Heat pumps, PV, …
- **Development of such databases at EU level…**
  - Construction product market is international
  - Test laboratories and Notified Body available in many countries
  - Some of these « product data » are defined in EN standards
- But…
  - Need some convergences
    - Of the EP calculation methods
    - Of national standards
  - Organizational and administrative challenges
New Belgian approach for higher quality of the works and compliant « installation data » for EP

General objectives of the framework

- Reliable **evaluation** and **declaration** of the system **performances** after installation
  - **Transparent quality criteria** (e.g. acoustic, comfort, etc.)
  - **Compliant « installation data »** for EP calculation (e.g. measured flow rates, measured power, etc.)
Key principles

 Declaration of the real performances
  ▪ No minimum quality level required
  ▪ Not a global “conform” or “not conform”
  ▪ But report with detailed results for each criteria

 Certification of the “ventilation tester”, not the installer
  ▪ Applicable whoever has installed
    (e.g. also for DIY)

 Voluntary framework
  ▪ But coupling with (EP) regulation can be easy

Clear criteria and procedures

 Performance based criteria
  ▪ Control at the end, after completion of the works

 Standardized and clear procedure (= “STS”)
  ▪ Defines the performance criteria
  ▪ Describes how to determine (measure) each criteria
  ▪ Coherent with EP regulation and referring to EN standards
Certification of the ventilation testers
To assure the skills of the certified ventilation testers

- Who can become a certified ventilation tester?
  - Installers, designers, rapporteurs, architects, specific experts or testers, etc.
  - Not required to be independent of the project: can be the installer himself!

- Initial evaluation
  - Training + examination

- Continuous evaluation
  - by a Third Party (certification)
  - Random assessment (e.g. 5-10%) of the reports delivered by the ventilation tester
  - Paid by the certified ventilation tester

Reliable measurement methods

- Measurements
  - Flow rates
  - Electrical Power
  - Airtightness of ductworks
  - Noise level
  - ...

- Example of flow rate measurements
  - Not so easy! Many methods give unacceptable errors…
  - See AIVC Workshop 2014
    - “Measurement of airflow rates at air terminal devices: an overview”
Overview of methods at air terminal device

Vane anemometers

Small probe + specific cone
  • Thermal or vane anemometer

Standard hoods

Compensation method

And more...

Many advantages for the final users/actors

• For the building designers and owners
  ▪ Higher value for money:
    ▪ They can choose which performance criteria they want to pay for
  ▪ Design and preliminary EP calculation:
    ▪ Impact of the installation on EP calculation can be estimated
  ▪ Assurance of results and quality

• For the authorities
  ▪ Higher compliance
  ▪ Less controls needed at the moment of EP declarations
Many advantages for professionals

- For the ventilation installers
  - Higher confidence of the owners
  - Value for higher quality
  - Compliant and unquestionably « installation data »

- For the rapporteurs
  - No risk on the responsibility of the « installation data »
  - Easier access to the « installation data »

Summary quality framework

Installed by Installer

Controlled by Ventilation tester

Certified by Third party

Published Performance report

Used by Rapporteurs

WWW
Owners

1. Performance criteria at design/installation

2. Performance report at the end

Summary quality framework

Installed by Installer

Certified by Third party

Controlled by Ventilation tester

Published Performance report

Used by Rapporteurs

www

Performance report at the end

Owners

Performance criteria at design/installation
Overview of the tools/approaches for ventilation

- EP Product Databases
- Ventilation standard + EP Regulation
- Quality framework (STS)
- Code of good practice (TV/NIT)
- Video
- Practical Guide
- Calculation Tool
- Thematic Background