RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

Cerema
CLIMAT & TERRITOIRES DE DEMAIN

INSPECTION OF VENTILATION SYSTEMS IN THE NEW EPBD AND IN EXISTING EU STANDARDS

Valérie Leprince

AIVC Webinar – June 5th 2025

What is it about?

- New requirements on inspection in the EPBD
- Existing and up-coming EU standards
- Needs for future standards

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

1. This Directive promotes the improvement of the energy performance of buildings and the reduction of greenhouse gas emissions from buildings within the Union, with a view to achieving a zero-emission building stock by 2050, taking into account the outdoor climatic conditions, the local conditions, the requirements for indoor environmental quality, and cost-effectiveness.

2024: New EPBD requirements

Commissioning and Monitoring of ventilation systems are no longer an option!

General Context (EPBD 2024)

- **Objective of the Directive:** Improve the energy performance of buildings while ensuring adequate indoor environmental quality (IEQ).
  - Introduction of continuous monitoring of IEQ
  - Strengthened inspection of HVAC systems (Heating, Ventilation, Air Conditioning)

2. This Directive lays down requirements as regards:

(l) regular inspection of heating systems, ventilation systems and air-conditioning systems in buildings;

(m) independent control systems for energy performance certificates, renovation passports, smart readiness indicators and inspection reports;

(n) the indoor environmental quality performance of buildings.

Legal reference: Directive (EU) 2024/1275 – OJ L 127, 8.5.2024, Article 1

IEQ Monitoring Requirements

- 📅 Effective from 29 May 2026
  - **Mandatory continuous monitoring of IEQ in automation systems for non-residential buildings**
  - Required functionalities in new or renovated residential buildings (where technically and economically feasible):
    - Electronic monitoring of system efficiency
    - Alerts in case of performance drift or maintenance needs
    - Optimization of energy distribution and storage

4. Member States shall set requirements for the implementation of adequate indoor environmental quality standards in buildings in order to maintain a healthy indoor climate.

5. Member States shall require non-residential zero-emission buildings to be equipped with measuring and control devices for the monitoring and regulation of indoor air quality. In existing non-residential buildings, the installation of such devices shall be required, where technically and economically feasible, when a building undergoes a major renovation. Member States may require the installation of such devices in residential buildings.

Reference: Article 13, page 30-31

Ventilation System Inspection

- Regular inspections required for HVAC systems with effective rated output > 70 kW
  - ⏱️ Frequency:
    - ≥ 290 kW → **every 3 years**
    - 70–290 kW → **every 5 years**
  - Scope of inspection includes:
    - Heating/cooling generators
    - Pumps and distribution networks
    - Hydraulic balancing and control systems
    - Ventilation system sizing and performance under typical use

Where a ventilation system is installed, its sizing and its capabilities to optimise its performance under typical or average operating conditions relevant for the specific and current use of the building shall also be assessed.

Reference: Article 23, pages 42–43

Reporting and Data Logging

- **After each inspection:**
  - A report must be produced including results, recommendations, and any safety issues
  - It must be uploaded to the national database
  - Provided to the building owner and/or occupant
- Purpose: Ensure traceability, continuous improvement, and integration into national renovation strategies.

Article 24

Reports on the inspection of heating systems, ventilation systems and air-conditioning systems

1. An inspection report shall be issued after each inspection of a heating system, ventilation system or air-conditioning system. The inspection report shall contain the result of the inspection performed in accordance with Article 23 and include recommendations for the cost-effective improvement of the energy performance of the inspected system.

3. The inspection report shall be uploaded into the national database for the energy performance of buildings pursuant to Article 22.

Reference: Article 24, page 43

EPBD Key message

(71) Regular maintenance and inspection of heating systems, ventilation systems and air-conditioning systems by qualified personnel contributes to maintaining their correct adjustment in accordance with the product specification and in that way ensures optimal performance from an environmental, safety and energy point of view. An independent assessment of the entire heating system, ventilation system and air-conditioning system should occur at regular intervals during its lifecycle in particular before its replacement or upgrading. Inspections should address the parts of the systems that are accessible either directly or indirectly through available non-destructive methods. In order to minimise the administrative burden on building owners and tenants, Member States should endeavour to combine inspections and certifications as far as possible. Where a ventilation system is installed, its sizing and its capabilities to optimise its performance under typical or average operating conditions relevant for the specific and current use of the building should also be assessed.

Existing and up-coming EPBD standards

- EN 16211: measuring flowrate
- EN 12599: Inspection in non-residential buildings
- EN 14134: Inspection in residential buildings
- EN 16798-17: Inspection in the EPBD context

Overview of Ventilation Inspection Standards

- Purpose: Ensure performance of ventilation systems through harmonized European standards.

Standard	Stage	Focus	Applies to
EN 16798-17	Any inspection	Energy use, general approach	Ventilation & AC
EN 16211	Any inspection	Measuring flowrate	All ventilation systems
EN 12599	Handover / Commissioning	Performance testing, measurements	All non-residential ventilation systems
EN 14134	Any inspection (mostly focusing on commissioning)	Full commissioning, measurement	All residential ventilation systems

EN 16798-17:2017

- Title: Energy performance of buildings. Ventilation for buildings - Guidelines for inspection of ventilation and air conditioning systems
- Scope:
  - General guidance for periodic inspection of systems
  - Complements EPBD requirements

  ⇒Provides common methodology and the requirements for inspection of air conditioning systems in buildings for space cooling and/or heating and/or ventilation systems from an energy use standpoint.
- Covers:
  - Pre- inspection: system documentation and operation
  - On-site general methodology
  - Inspection report
- Use case: National inspection schemes under EPBD compliance

EN 16211: 2024

- Title: Ventilation for buildings. Measurement of air flow rates on site. Methods
- Scope:
  - Applies to any kind buildings
  - Intended for use during commissioning and inspections
- Covers:
  - Air flowrate measurement,
    - Most methods presented only apply to constant flowrate
- Use case: functional check of ventilation systems

EN 16211-2024 List of methods presented

- 8 differents methods compatible with various kind of measurements
  - 4 in ducts through multi-points measurements (2 methods) or through fixed devices (1) or through tracer gaz (1)
  - 3 for supply ATD with flow hood, tight bags or fixed devices
  - 3 for extract ATD
  - 1 for exhaust vent (informative)
  - 2 for intake vent (informative)

Table 3 — Summary of the methods described in this document

Measurement method	Measurement location designation						Clause(s)/ subclause(s) of this document
	In duct	At supply	At extract	At fan	At exhaust vent	At intake vent	
Multi-point measurement in the duct cross-section – with measurement plane criteria	ID1XX						7.2
Multipoint measurement in the duct cross-section – without measurement plane criteria	ID2XX						7.3
Fixed devices for air flow rate measurement	ID3X	ST1X	ET1X	ID31			7.4
Measurement with tight bag		ST2					7.5
Measurement with flow hood		ST3X	ET2X				7.6
Measurement with tracer gas	ID4						Annex A (informative)
Measurement at intake vents or exhaust vents					EX1	IN1	Annex A (informative)
Point measurements using hot wire anemometer at rectangular grilles			ET3			IN2	Annex A (informative)

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

EN 12599:2012 – Under revision (foreseen 2025)

- Title: Ventilation for buildings. Test procedures and measurement methods to hand over air conditioning and ventilation systems
- Scope:
  - Applies to non-residential systems during handover/commissioning
  - Defines methods to measure and verify the installed system's performance (all but air flow rate)
- Covers:
  - Measurement of fan power, ductwork leakage, sound pressure levels, air velocity, pressure losses
  - Test reports
- Use case: Functional verification before acceptance of installation

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

EN 14134:2019

- Title: Ventilation for buildings. Performance measurement and checks for residential ventilation systems

Scope:

  - Inspection of ventilation systems in residential buildings

- Covers:
  - Application of EN 16798-17 to residential buildings (inc. sampling rules)
    - List of document for pre-check
    - Functional check: check list
    - Functional measurement: air flow rate, static pressure
    - Special measurement: duct leakage (ref. to product standards), sound pressure level, electric power
- Use case: Commissioning in residential buildings

What do we need?

All those standards do not cover …

- Natural/Hybrid ventilation
  - No commissioning process for natural ventilation: only pre-inspection apply
- Demand control ventilation
  - No detailed protocol for the verification of DCV (sensor, actuator, etc.)
- Inspection of IEQ
  - Performance based regulation are under development
    - Development of DCV
  - Need for specific protocol (inc. measuring of IEQ protocol)
- Monitoring of IEQ
  - What is to be measured, how, which indicators, how to define thresholds?

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

INDICATORS FOR DESIGN VS FOR MONITORING

Needs for design indicators:

- Agreement on emission scenario for the parameter
- Knowledge on the behavior of the parameter
- Agreement on threshold values

⇒ **Revision of EN 16798-1**

Needs for monitoring/commissioning

- Measurable!

⇒ **Need for new standard to define indicators and protocol**

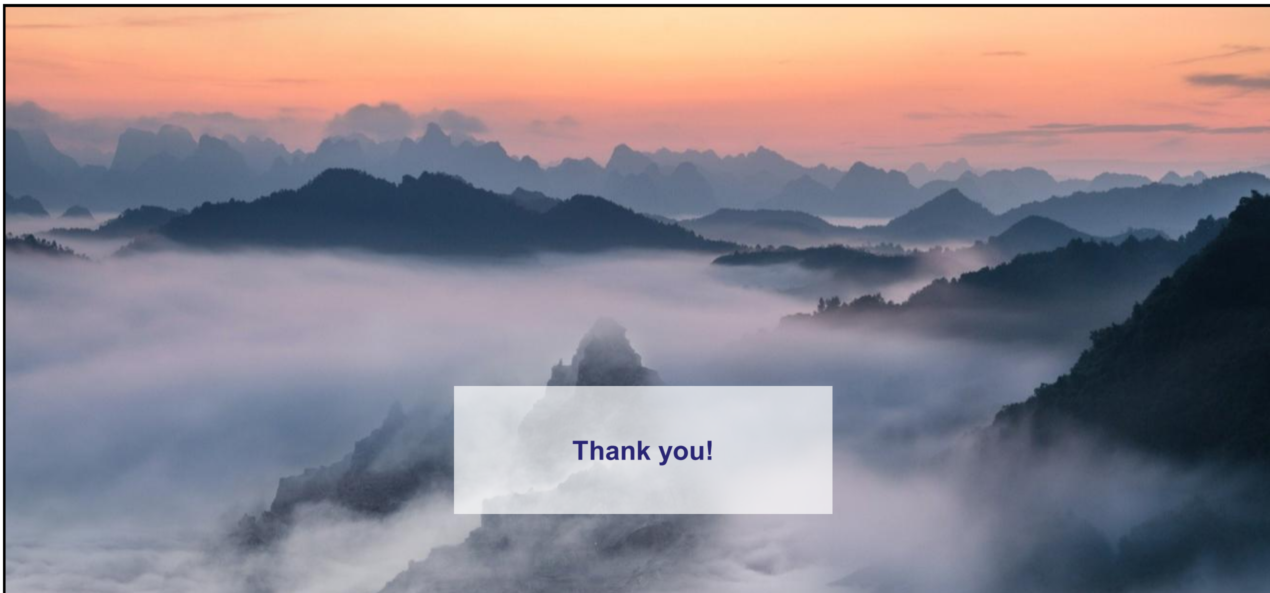
⇒ As for energy IAQ design indicators are not directly verifiable on site!!

⇒ Impossible to reproduce exactly emission scenario, meteo, etc. on site

⇒ IAQ design indicators aim at evaluating the performance of the full system but not at predicting precisely IAQ once the building is in operation

Design indicators
≠
Monitoring indicators
≠
Inspection indicators

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN



Other EPBD requirements

Article 5

Setting of minimum energy performance requirements

1. Member States shall take the necessary measures to ensure that minimum energy performance requirements for buildings or building units are set with a view to at least achieving cost-optimal levels and, where relevant, more stringent reference values such as nearly zero-energy building requirements and zero-emission buildings requirements. The energy performance shall be calculated in accordance with the methodology referred to in Article 4. Cost-optimal levels shall be calculated in accordance with the comparative methodology framework referred to in Article 6.

Member States shall take the necessary measures to ensure that minimum energy performance requirements are set for building elements that form part of the building envelope and that have a significant impact on the energy performance of the building envelope when they are replaced or retrofitted, with a view to achieving at least cost-optimal levels. Member States may set the requirements for building elements at a level that would facilitate the effective installation of low temperature heating systems in renovated buildings.

When setting requirements, Member States may differentiate between new and existing buildings and between different categories of building.

Those requirements shall take account of optimal indoor environmental quality, in order to avoid possible negative effects such as inadequate ventilation, as well as local conditions and the designated function and the age of the building.

Obligatory Ventilation Control in Sweden (abbreviated OVK)

FUNKIS
Funktionskontrollanterna i Sverige

Dennis Andersson, secretary Funkis

1

Ventilation inspectors

OVK in **Sweden** since 1991, has about 1861 OVK inspectors.

Åland has OVK since 2018, has 10 OVK inspectors.

2

Background to OVK

OVK started **1991** because problems appeared in people in the form of **allergies** and other **hypersensitivity** symptoms. Sick building syndrome.

Among the factors that were assumed to contribute to ill health in the users were **three** factors in focus: the building's **ventilation system**, the **buildingmaterial** and **moisture** in the building.

The role of the regulation is to **control the ventilation** in buildings.

The control is done **before** the ventilation system is taken in operation and after that on **regular intervals** (except for single and two-family houses).

The purpose of the OVK is to **secure that the indoor climate** is good and that the **ventilation system** is functioning.

3

Which buildings and ventilation systems are subject to OVK requirements?

The starting point is that **most buildings must be inspected**. For one- and two-family buildings, a recurring inspection is not required, but only an initial inspection.

Some buildings and ventilation systems are completely exempt from the requirement for OVK:

One- and two-family buildings with **natural or fan controlled** exhaust ventilation

Farm buildings

Industrial buildings

Military buildings that are of a secret nature.

4

OVK Interval

1. Function of the building.
2. Type of ventilation-system.

Buildings and type of ventilation system	**Interval**
Preschools, schools, care facilities and other similar buildings. Regardless of the type of ventilation system.	3 years
Apartment buildings, office buildings and staff rooms and offices in industrial buildings and the like. FT, FTX ventilation	3 years
Apartment buildings, office buildings and staff rooms and offices in industrial buildings and the like. S, F, FX ventilation	6 years
One- and two-dwelling buildings with FX, FT, FTX ventilation.	Only an initial installation inspection before the system is put into use. No recurring inspection.

S-ventilation = natural ventilation.
F-ventilation = fan ventilation where the exhaust air flows are fan controlled.
FT ventilation = fan ventilation where both the exhaust and supply air flows are fan controlled.
FX ventilation = F-ventilation with heat recovery.
FTX ventilation = FT ventilation with heat recovery.

How should the function check be done?

- At each OVK, it must be checked that:
- 1. the ventilation system does not contain **contaminants** that can spread throughout the building
- 2. **Instructions** and care instructions are readily available
- 3. The ventilation system otherwise **works as intended**.

In addition, the first inspection must check that:

- 1. The function and characteristics of the ventilation system comply with **current regulations**.

7

In the case of periodic inspections, the functional inspector shall:

- 1. check that the function and characteristics of the ventilation system are **essentially in accordance** with the **regulations** in force when the system was put into use
- 2. investigate what measures can be taken to improve **energy conservation** in the ventilation system and that do not result in a deteriorating indoor climate.
- It is the **owner of the building** who then decides whether the proposals for energy efficiency measures should be implemented

8

Fix errors and shortcomings as soon as possible

- The owner of the building must ensure that errors and deficiencies discovered at OVK are rectified **as soon as possible**.
- The **owner is responsible**, even between inspections, for taking the necessary measures to ensure that the requirements for the ventilation system are met and for them to be maintained so that their essential technical characteristics are preserved.

The municipality is responsible for control and supervision

It is the **municipality's building committee** that will monitor that the building's owner takes care of their obligations to OVK.

If **the owner of the building** does not carry out the OVK, the building committee can order the owner to carry it out.

If it appears from a protocol that the requirements for functional inspection are not met, the building committee can order the owner to **investigate and rectify** the deficiencies. The order may be combined with a fine.

Exemption for inspection intervals

If there are **valid reasons** why the inspection cannot be carried out within the interval or that it does not provide any intended protective function, you can **apply for an exemption** from the regular inspection interval.

For example, it may be that **the building is not in use** or that there is a **major change** in direct connection with the regular intervals and that it is therefore **better to wait** for a new first inspection.

It may also be because **it is not possible to gain access** for inspection for reasons that the property owner cannot influence. For example, as it was in housing during the **COVID pandemic**.

It is **the building committee** that assesses the possibility of exemption in the individual case.

Certified ventilation inspectors

The inspection must be carried out by a **certified inspector**.

It is an expert functional inspector, who is certified by an accredited certification body, who will carry out the inspection.

An OVK protocol must be submitted by the inspector to the **building´s owner** and to the municipality's **building committee**. A certificate must also be posted in a clearly visible place in the building.

FUNKIS
Funktionskontrollanterna i Sverige

Most OVK inspectors are members of Funkis.

The Functional Controllers in Sweden were formed in June 1993.

The membership is personal and can be acquired by anyone who has the authority to **perform OVK** or is a **municipal administrator** of OVK as well as **Certified ventilation adjusters**.

FunkiS is a non-profit association.

The activities are financed through members' fees and symposium fees.

The work is focused on interpreting the OVK-regulations and informing the members about administrative, technical, ethical and legal aspects, as well as giving the concrete instructions that the interpretation entails.

13

Experiences from OVK in Sweden, ”Modernized OVK 2017” review

This report presents results on how the OVK works, both in theory and in practice and identified suggestions for development of the OVK.

To get a broad picture of how the OVK works, interviews were carried out with persons related to the OVK;
building owners,
OVK controllers,
administrators at the municipality,
legislators,
organizations etc.
Based on this, suggestions were made for how the OVK could develop to better suit its purpose.

14

Experiences from OVK in Sweden, ”Modernized OVK 2017” review

The interviews show several results. First, an approved OVK is not a guarantee that the indoor environment is satisfactory since the current use of the premises isn't always taken into account.

The study also shows that the follow up of the OVK from the municipality often are inadequate. Moreover, energy-saving measures that should be included in the OVK are handled very differently and the level varies considerably.

Possible improvements of OVK-regulations from “Modernized OVK 2017” review:

DEVELOPMENT PROPOSALS

Top priority

- Include the indoor environment and the use of the premises in the OVK in a better way.

Intermediate priority

- Fee for processing OVK cases.
- Uniform, preferably electronic protocol.
- Training and skills enhancement for OVK inspectors and OVK administrators.
- Requirement that the same/e OVK inspector performs both OVK inspection and post-inspection.

Lowest priority

- Minimum requirements for energy saving measures.

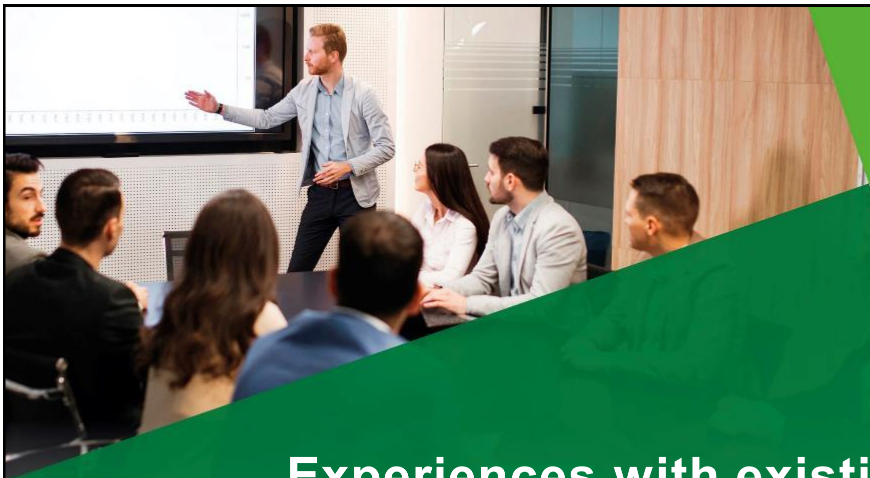
Swedish ventilation organisation review 2024:

The most common **remarks** that appear at OVK in **schools:**

1. Flow-affecting dirt in ductwork
2. Too low air flows in relation to the activity for which the ventilation is adapted
3. Lack of service and maintenance
4. A larger number of pupils or children than the premises are intended for
5. New changed operations, i.e. the ventilation is no longer adapted to the activities in each room
6. Demand-controlled ventilation that does not work as intended

Improvements suggested by Swedish ventilation 2024

1. OVK should take greater account of the operation by, for example, including the number of people.
2. Introduce uniform digital OVK protocols and a national register.
3. Enable municipalities to charge a fee for the supervision of OVK.



Experiences with existing inspection schemes in Belgium

Maarten De Strycker, Arnold Janssens, Peter Wouters

AIVC Webinar | 5 June 2025

BCCA

1

INSPECTION SCHEMES

BCCA

2

NECESSITY OF ON-SITE INSPECTION SCHEMES

- Essential elements in building – but result not visible for builder and difficult to verify afterwards
  - Post-insulation of cavity walls
  - Airtightness test
  - Ventilation system
  - Sewery renovation
  - …
- On-site inspection
- During or directly after works/measurement/reporting

BCCA

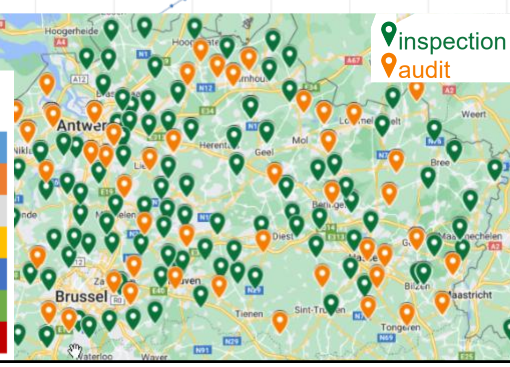
PROCESS AIR TIGHTNESS AND VENTILATION

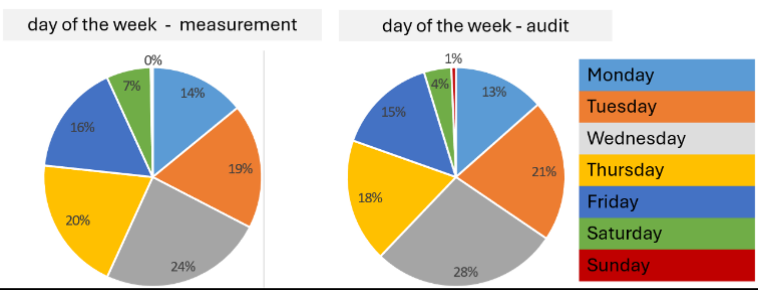
- Voluntary training: 1 day
- Theoretical examination
  - AT: 50 questions; V: 10-50 questions depending on aspect
- Practical examination
  - AT: test on real building; V: 10 air flow measurements
  - Check measurement devices
- Agreement with certification body, check other requirements:
  - AT: insurance, minimal experience
- Announce every measurement in database: planning and sms
- Unannounced audits: during/just after measurement
- Test results in database
- Declaration of conformity / ventilation report by tester
- If issues with the test and reporting: sanctions

BCCA

RESULTS AIR TIGHTNESS AND VENTILATION

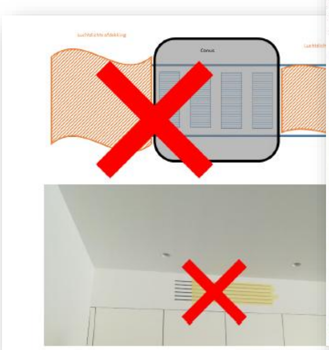
- New profession: ventilation inspector
- Evolution in measurement devices
- Possible to implement and to achieve effective auditing system
  - Distribution over all inspectors
  - Distribution over types of buildings
  - Distribution over region
  - Distribution in time





RESULTS VENTILATION

- Residential systems mostly measured with flow hood device
- Attention for technical challenges
  - Guidance
- Broad communication
  - Involve all parties

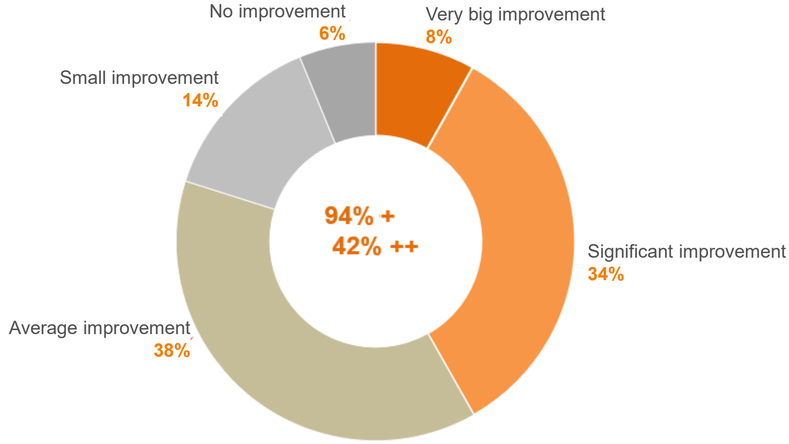


Aandacht voor ventilatie in keukens bij residentiële nieuwbouw of ingrijpende energetische renovatie

Binnenluchtkwaliteit wint de laatste jaren sterk aan aandacht bij bewoners en overheden. Hoe beter we onze woningen isoleren, hoe belangrijker een doordacht ventilatiesysteem wordt. Het hoeft dan ook niet te verbazen dat ventilatie een belangrijk onderdeel vormt van de EPB-regelgeving.

RESULTS VENTILATION

To what extend did the quality framework improve the installed ventilation systems in the last 3 years? (in Flanders, survey end 2019)



BCCA

ELEMENTS IN AN INSPECTION SCHEME

- Create **management framework**: dedicated team, clear rules
- **Consultation**: working groups, advisory boards, commission for recognition, feedback to authorities
- **Communication**: website, newsletters, information sessions, who is certified?
- Provide **documentation**
- Follow standardisation, international networking
- Create **compelling** boundary conditions
- **Training**
- **Qualify** persons: (online) examination, practical examination
- **IT-development**: web application, database, access to documents
- **Surveillance** of the reporting: on site and desktop inspections
- **Level-playing field** on every level

BCCA

VENTILATION IN NON-RESIDENTIAL BUILDINGS

BCCA

9

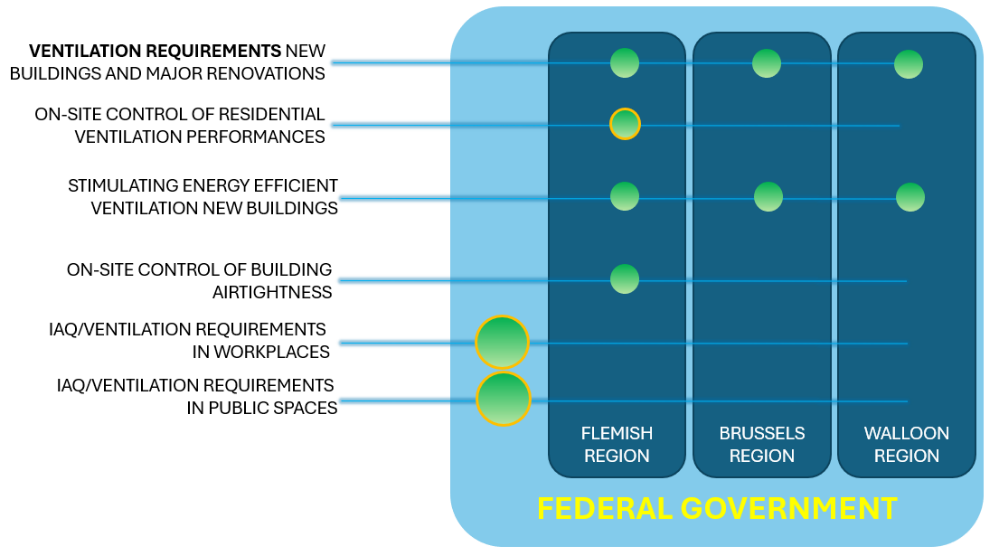
DIFFERENT (SETS OF) REQUIREMENTS

- EPB non residential
  - New buildings
  - Only design values, no mandatory check on-site
- EPC non residential
  - Existing buildings, since 1/1/2024
  - Simple (visual) check if ventilation is available in building, no evaluation of effectiveness or measurement of flow
- Federal regulation on well being in workplaces
  - Workplaces
  - Requirement in terms of minimal air flow rate or maximum increase in CO_2 concentration
    - If in line with low-polluting building: 25 m³/h.person **OR** maximum increase of 800 ppm
    - In other cases: 40 m³/h.person **OR** maximum increase of 500 ppm
- Federal law on IAQ in public spaces
  - Public spaces
  - Informative reference levels of CO_2 and ventilation rates
  - Communication on IAQ, based on CO_2 **or** on ventilation rates
  - Voluntary labelling of spaces, possible inventarisation of ventilation facilities

BCCA

10

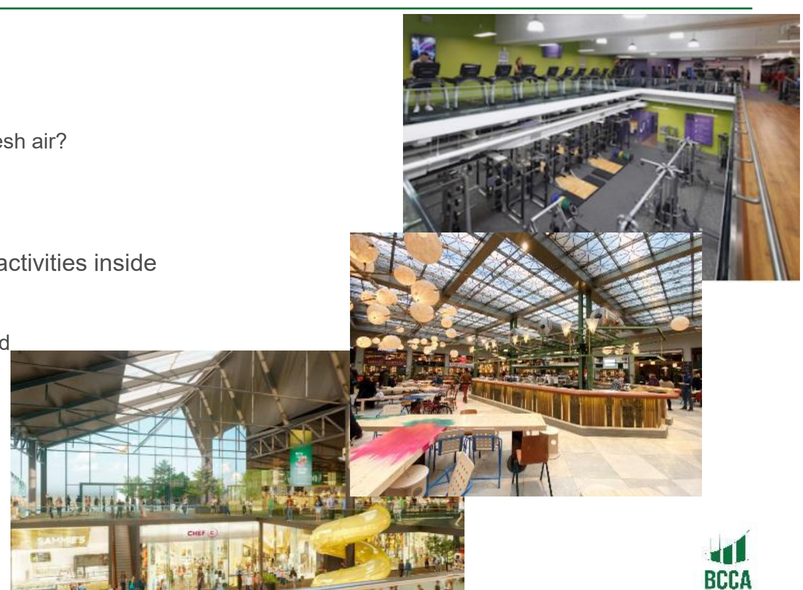
DIFFERENT (SETS OF) REQUIREMENTS



BCCA

CHALLENGES FOR INSPECTIONS IN NON-RESIDENTIAL VENTILATION SYSTEMS

- Type of ventilation systems
  - Hybrid, complex, non-defined
  - Interaction with HVAC, share of fresh air?
  - Complex control systems
- Existing and new buildings
- Number and type of spaces and activities inside
- Required number of inspectors
  - Define level of competence needed



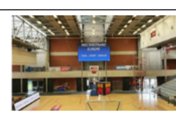
BCCA

OVERVIEW TEST EVENTS IN SPORTS INFRASTRUCTURE

Type of facility	Activity	Number of participants	Length of activity
Fitness centre (FC1)	Individual fitness	50	1.5h
Fitness centre (FC2)	Group classes in 4 rooms	20+16+28+16	4x1h
Indoor climbing hall (CH)	Rope climbing and bouldering	40+40	4x2h
Sports hall (SH)	Basketball match with audience	550	3h

PREPARATION

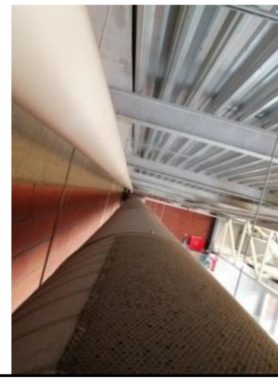
- Pre-provided information: type of ventilation system, plans, maintenance certificate, operating description, general HVAC product information, expected flow rate from BMS
- Who explained how installation works and provided preliminary information?

contactgegevens zaalverantwoordelijke (GSM, e-mail)	
Naam lokaal	
beeld	
vloeroppervlakte (m^2)	
gemiddelde hoogte (m)	
luchtvolume (m^3)	
aantal opengaande ramen in gevel	
aantal opengaande ramen in dak	
aantal buitendeuren	
totaal opengaand raam- en deuroppervlak gevels	
totaal oppervlak opengaande dakramen	
mechanische ventilatie in lokaal?	ja
beschrijving installatie	3 luchtgroepen luchtverwarming + ventilatie; regelklep recirculatie;
toevoerdebiet verse lucht gekend?	nee
geraamd verse luchtdebiet (m^3/h)	30000

GHENT UNIVERSITY

OVERALL RESULTS INSPECTION

- Not all sports facilities had dedicated ventilation systems
- None of the installations work as expected by the operator
- In 2 facilities, the fresh air flow rates estimated by the manager corresponded with inspection measurements.
- Generally no balance between supply and discharge
- In 2 other facilities inspection revealed problems with installation, maintenance or operation:
  - Closed outdoor air dampers
  - Clogged extraction grids
  - Faulty settings or indications BEMS
- Remedial measures were taken to maximize fresh air flow rates.



GHENT UNIVERSITY

15

VENTILATION EFFECTIVENESS

Foto in verlaagd plafond

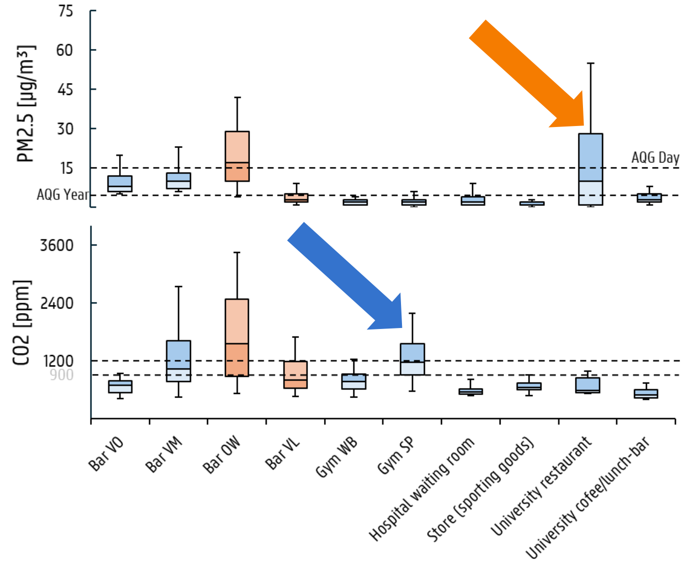
- Not always possible to measure flow rates
  - Swirl diffusers?
  - What about duct measurements?
    - Not always possible correctly
    - As close to the space as possible
    - What about air tightness of ducts?
- Measurement uncertainty?
  - Reported between 4% and 11% based on variation measured air velocities in measurement reports (pitot tube and vane probe)
- Distinction fresh air/mixed air (recirculation)?
  - Inside the unit, dilution outdoors?
- Short circuiting supply/extract
- Control of the system: clock vs CO_2

GHENT UNIVERSITY

16

MONITORING IAQ

- PM10 results similar to PM2.5
- Trends in PM2.5 and CO_2-level similar
- NOT for gym:
  high CO_2, acceptable PM2.5
- NOT for restaurant
  acceptable CO_2, high PM2.5
- IAQ label based on CO_2-level can underestimate the impact of PM
- Range of priority polluants should be considered as alternative
- Technical information about HVAC often missing



GHENT UNIVERSITY

CONCLUSION

- Residential applications
  - Ventilation inspection scheme operational in Flanders for almost 10 years
  - Possible to set up an inspection scheme
  - Some prerequisites
  - Keep the pressure on correct reporting
- Non-residential
  - IAQ not always bad
  - Ventilation system often present
  - But challenges when IAQ or effect of ventilation on results should be certified

BCCA

REFERENCES

- Wet van 6 november 2022 betreffende de verbetering van de binnenluchtkwaliteit in gesloten plaatsen die publiek toegankelijk zijn, 2022034199, Federale Overheidsdienst Volksgezondheid, Veiligheid en Veiligheid van de Voedselketen, Belgisch Staatsblad—Moniteur Belgique 88761 (2022). https://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=nl&la=N&cn=2022110604&table_name=wet
- De Jonge, K. & Janssens, A. (2024). IAQ-label for Belgian public spaces: monitoring in 11 public spaces. 44th AIVC Conference "Retrofitting the Building Stock: Challenges and Opportunities for Indoor Evironmental Quality", (p. 373). Croke Park, Dublin, Ireland, 9-10 October 2024.
- De Strycker, M., Van Gelder, L.& Leprince, V. (2018). Quality framework for airtightness testing in the Flemish Region of Belgium – feedback after three years of experience. 39th AIVC Conference "Smart Ventilation for buildings", (p. 24). Antibes Juan-Les-Pins Conference Centre, France, 18-19 September 2018.
- De Strycker, M., Van Gelder, L., Andrzejewicz, M. & Leprince, V. (2019). Quality framework for residential ventilation systems in Flemish Region in Belgium – feedback after three years' experience. 40th AIVC Conference "From energy crisis to sustainable indoor climate – 40 years of AIVC", (p. 832). Het Pand, Ghent, Belgium, 15-16 October 2019.

BCCA

Thank you for your attention

Questions?

Maarten De Strycker

mds@bcca.be – ventilatie@bcca.be

ASBL BELGIAN CONSTRUCTION CERTIFICATION ASSOCIATION VZW

www.bcca.be • mail@bcca.be

Hermeslaan, 9 - 1831 Diegem

T +32 (0)2 238 24 11

BCCA

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

Cerema
CLIMAT & TERRITOIRES DE DEMAIN

PromevenTertiaire:

the new French protocol for the inspection of ventilation systems in non-residential buildings

AIVC & TightVent Webinar
June 5th 2025

Ariane Lesage | Cerema

PromevenTertiaire

1

INTRODUCTION

Context in France:

To date, **no regulation requiring ventilation systems to be inspected** in non-residential buildings

Yet feedbacks highlight recurring malfunctions impacting energy consumption, indoor air quality…

RÉPUBLIQUE FRANÇAISE

Cerema
CLIMAT & TERRITOIRES DE DEMAIN

2

PROMEVENTERTIAIRE PROJECT: 2018 - 2022

- **9 French partners:**

Lead

- **Funding received by:**

PROMEVENTERTIAIRE PROJECT: 2018 - 2022

Main objectives:

- Improve reliability and quality of mechanical ventilation systems controls (by harmonizing checking and measurement methods)
- Provide practical tools and guidelines for professionals

Scope:

- Both new and existing non-residential buildings (offices, schools…)
- Most common mechanical ventilation systems:
  - Extract (or supply) mechanical ventilation
  - Balanced mechanical ventilation
  - Mechanical ventilation systems with air treatment

PROMEVENTERTIAIRE PROJECT: 2018 - 2022

Key tasks:

- On-site measurement campaigns
  - 3 buildings (schools, office) to test protocol application robustness
  - Different measuring teams with various measuring instruments
- Laboratory tests:
  - Calibration and uncertainties evaluation
- Impact of observed dysfunctions

Final result:

- Protocol + technical appendices + reports + guides on common fa and their impacts

PROMEVENTERTIAIRE PROTOCOL

Methodology overview

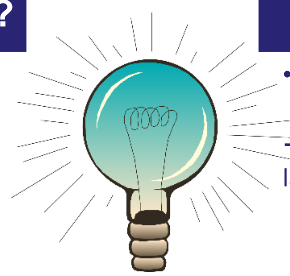
- Define checks and measurements to perform
- Pre-check (document analysis)
- Output data from pre-check
- On-site checks and measurements
  - Functional checks (visual checks)
  - Functional measurements
    - at ventilation air handling units
    - at air terminal devices or in terminal ducts
  - Special measurements
    - ductwork airtightness
    - fan speed rotation
- Report drawing up

PROMEVENTERTIAIRE PROTOCOL

An answer to these questions about measurements:

Which parameter?

- Airflow rate
- Pressure
- Air velocity
- Power …



Which instrument?

- Appropriate measuring instrument (flowmeter, anemometer…)

→ Recommandations from on-site and laboratory campaigns

Where?

- At the terminal device
- In the duct upstream of the terminal device

How?

- Operating conditions of the installation
- Methods (standards…)

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

APPLICATIONS OF THE PROTOCOL

Some examples of the current applications of PromevenTertiaire:

- Certification programs or labels such as Effinergie labels

RE2020 effinergie Bâtiment à énergie positive

- Legal expertise
- Voluntary initiative from project owners and managers
- Self-checking for installers in replacement of previous checking procedures

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

COMPLEMENTARY PROJECTS

To go further in reliability of methods:

A study on the measurement method described in EN 16211 standard at air intake or air exhaust grille using anemometer

(PromevenTertiaire team, 2023-2024)

An updated guide to air flow measu

(Cetiat, 2023)

Available here

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

PROSPECTS

Further steps needed before consideration in future French regulations

Define **how to analyze results of an inspection** with respect to the requirements set

- Functional Checks:
  - Regulatory enforcement verification point
  - Check point for the application of good practices
  - Acceptable tolerance
- Functional measurements:
  - Reference values
  - Acceptable tolerance, uncertainty for airflow

Demand **qualification/skills of operators**

Work in progress

RÉPUBLIQUE FRANÇAISE Cerema CLIMAT & TERRITOIRES DE DEMAIN

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

Cerema
CLIMAT & TERRITOIRES DE DEMAIN

Thank you for your attention

Any questions?

AIVC & TightVent Webinar
June 5th 2025

ariane.lesage@cerema.fr

PromevenTertiaire