

Contract ENER/C3/2018-447/05

Feasibility study EPBD article 19a

2nd stakeholder meeting

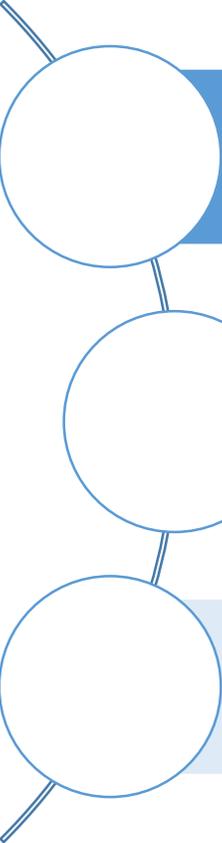
Brussels, 28 November 2019

Relevance, feasibility and possible scope of measures for the inspection of stand-alone ventilation systems

Presentation of policy options

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Contents



How to build an inspection scheme?

What could be other measures than inspection?

Selection of 6 policy options for the impact analysis

Questions to build an inspection scheme

TECHNICAL ASPECTS	
Aim of inspection	Which performance to be inspected?
Targets of inspection	Who should benefit from inspection? What types of buildings should be covered? What types of ventilation systems should be inspected? Which climatic zones should be concerned? Which period of the year should be concerned?
Rules for inspection	What are the aspects covered by inspection (technical procedure)? What are the parts of ventilation system to be inspected? Is there a sampling of ventilation systems to be inspected?
In-situ measurements	What are the measured quantities? What are the measuring instruments? What is the measuring uncertainty? What is the calibration frequency of measuring instruments? What is the calibration procedure?
Reporting about inspection	What is the content of the report? What are the compliance criteria? What is the acceptable deviation for deciding on compliance? Who receives the report? Who keeps the report?

ORGANISATIONAL ASPECTS	
Periodicity of inspection	Does inspection occurs once or is it regular? When does inspection occur?
Inspectors	By who is inspection operated? Is there a need for quality assurance? Is there a need for training of inspectors? Is there a need for the qualification of inspectors? Is there a need for the certification of inspectors? Is there a surveillance of inspectors?
Non-compliance Status	What are the sanctions if inspection is not operated according to the defined rules? Is the inspection voluntary or mandatory?
Conformity to legislation	Is the inspection scheme in conformity with the legislations?
Economy	What is the cost of the inspection? Who is going to pay? What are the benefits?
Stakeholders	Who are the stakeholders involved in the implementation of the inspection scheme? Who are the stakeholders involved in the operation of the scheme? What is the role of public authorities? How is surveillance organised?
Other aspects	Does the inspection scheme create a market differentiation? Will the inspection scheme get societal support? Does the inspection scheme create barriers to innovation? Does the inspection scheme generate any risk?

Answers to each question (= modules)

			TECHNICAL ASPECTS							
AIM	AIM	1-WHICH PERFORMANCE TO BE INSPECTED?	Energy performance	Air flow rates, air change	Indoor air quality	Hygiene of the ventilation system	Noise	Thermal comfort (draughts, temperature gradient)	Overall well-being of occupants	Overall well-being of neighborhood
TARGETS	TAR	1-TARGET POPULATION BENEFITING FROM INSPECTION	Occupants	Owners	Workers	Children	Elderly people	Persons with low revenues		
		2-TYPE OF BUILDING SUBMITTED TO INSPECTION	All residential	Single-family house	Multi-apartment buildings	All non-residential	Offices	Retail buildings	Educational buildings	Health care facilities
		3-TYPE OF VENTILATION SYSTEM SUBMITTED TO INSPECTION	Natural	Hybrid	Mechanical decentralised unidirectional	Mechanical decentralised balanced without heat recovery	Mechanical decentralised balanced with heat recovery	Mechanical centralised unidirectional	Mechanical centralised balanced without heat recovery	Mechanical centralised balanced with heat recovery
		4-CLIMATIC ZONE FOR INSPECTION	All climatic zones	Average	Cold	Warm				
		5-PERIOD OF THE YEAR FOR INSPECTION	All year	Warm season	Cold season	Mid-season				
RULES	RUL	1-ASPECTS COVERED BY INSPECTION	Completeness	Adequacy between design and installation	Cleanliness and hygiene	General state	Good overall operation	Good operation of controls	Occupants satisfaction	Energy consumption (from energy invoices)
		2-PARTS OF VENTILATION SYSTEMS TO BE INSPECTED	Whole system	Ductwork	All system components	Ventilation unit	Air inlets	Air outlets	Air transfers	Controls
		3-SAMPLING RULES FOR INSPECTION	Each system	A sample of the systems	A sample of the buildings					
IN SITU MEASUREMENTS	MEA	1-MEASURED QUANTITIES	Air flow rates at fan level	Air flow rates at room level	Air pressures at fan level	Air pressures at room level	Ductwork airtightness	Electrical consumption	Performance of heat recovery	Indoor air quality parameters
		2-MEASURING INSTRUMENTS	Flow meter	Anemometer	Manometer	Wattmeter	Thermometer	Pollutant concentration analyser	Noise analyser	Hygrometer
		3-MEASURING UNCERTAINTY	No uncertainty	Fixed uncertainty	Uncertainty of the measurement method	Uncertainty of the measuring instrument				

Description of a module (example)



Brick's name	Description	Advantages / Drawbacks of the presence of this brick in the inspection		Comments on the feasibility (if any)
Completeness	<p>This type of inspection consists in checking the completeness of the system, i.e. to verify that all components are present and that their assembly seems correct.</p> <p>Checking completeness relies on visual inspection, and ideally on a comparison between available documents describing the system and the actual installation.</p> <p>Checking completeness also includes a verification of the electrical connections and on the ductwork circuits: this can be checked for example by dismounting air inlets/outlets to check that they have been correctly connected to a duct.</p>	Advantages:	This type of inspection can take place on the system out of operation.	
		Drawbacks:	<p>If this inspection is made on a system out of operation, the correct direction of rotation of the fan and the detection of abnormal noise, vibrations or significant air leakage cannot take place.</p> <p>It can happen that parts of the system are not easily accessible to visual check: in such a case, the inspection report should mention which parts of the system have not been inspected.</p>	

Building an inspection scheme

			TECHNICAL ASPECTS							
AIM	AIM	1-WHICH PERFORMANCE TO BE INSPECTED?	Energy performance	Air flow rates, air change	Indoor air quality	Hygiene of the ventilation system	Noise	Thermal comfort (draughts, temperature gradient)	Overall well-being of occupants	Overall well-being of neighborhood
TARGETS	TAR	1-TARGET POPULATION BENEFITING FROM INSPECTION	Occupants	Owners	Workers	Children	Elderly people	Persons with low revenues		
		2-TYPE OF BUILDING SUBMITTED TO INSPECTION	All residential	Single-family house	Multi-apartment buildings	All non-residential	Offices	Retail buildings	Educational buildings	Health care facilities
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Feasibility Study EPBD19a

Analysis of the relevance, feasibility and possible scope of measures for the inspection of stand-alone ventilation systems

Final report

Reference:
ENER/C3/2018-447/05

Client:
European Commission's
Directorate General for Energy

September 2019

Report available at
www.epbd19a.eu

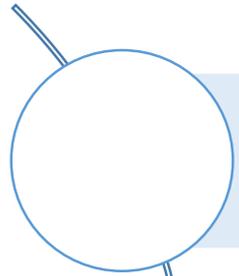
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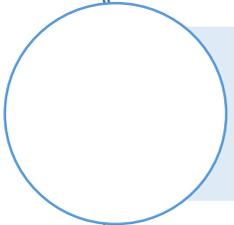
Other measures than inspection

Awareness	Increasing awareness on ventilation among users and owners
	Increasing awareness on ventilation among professionals
	Increasing awareness on ventilation among policy makers
Products	Easier access to ventilation product data
	Certification of ventilation product performances
Education	Education of professionals on ventilation
Training	Training of professionals on ventilation
Quality assurance	Quality assurance scheme for design, installation, commissioning and maintenance of ventilation systems
Qualification	Qualification of professionals concerned by ventilation
Certification	Certification of the competence of professionals about ventilation
Requirements for indoor environment	Regulations with requirements on the indoor environment (IAQ, noise, etc.), including measurements
Smart systems	Stimulating the use of smart ventilation systems

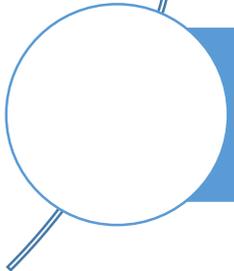
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How to build an inspection scheme?



What could be other measures than inspection?



Selection of 6 policy options for the impact analysis

Selection of policy options for impact analysis

- Option 1: Awareness raising
- Option 2: Training
- Option 3: Visual inspection
- Option 4: Inspection with measurements
- Option 5: Inspection with measurements and the obligation to make the system compliant
- Option 6: Indoor air quality requirements

Selection of policy options for impact analysis

- **Option 1: Awareness raising**

Collection of data on stocks, markets and actual performances of installed systems. Information of stakeholders and consultation on possible actions to improve performance.

- **Option 2: Training**

Mandatory training of installation companies leading to their certification.

- **Option 3: Visual inspection**

Mandatory visual inspection of newly installed residential systems by qualified companies.

Selection of policy options for impact analysis

- **Option 4: Inspection with measurements**

Mandatory inspection of newly installed residential systems by qualified companies, including measurements of air flow rates at room level, air cross-section areas of air transfers and fan(s) electrical power input.

- **Option 5: Inspection with measurements and the obligation to make the system compliant**

Same as option 4 with additional requirement that the ventilation system is made compliant within a certain delay if inspection shows non-compliance. Inspection must be repeated after corrective actions.

- **Option 6: Indoor air quality requirements**

Mandatory requirements about the maximum CO₂ concentration in bedrooms and living rooms in residential buildings with a newly-installed ventilation system.

Selection of policy options for impact analysis

- Option 1: Awareness raising
- Option 2: Training
- Option 3: Visual inspection
- Option 4: Inspection with measurements
- Option 5: Inspection with measurements and the obligation to make the system compliant
- Option 6: Indoor air quality requirements



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