EUROPEAN ASSESSMENT DOCUMENT

EAD 220018-00-0401

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DECENTRALIZED ENERGY EFFICIENT LOW-PRESSURE VENTILATION UNIT WITH ALTERNATING FLOW AND HEAT RECOVERY

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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

Contents

1 SCOPE OF THE EAD

1.1 Description of the construction product

The ventilation unit placed in the marked as a separate add-on unit to a roof window.

The ventilation unit consist of the following main elements:

1. Weather covering
2. Insulation
3. Regenerators
4. Ventilator unit
5. Filter holder
6. Control panel

The ventilation unit is installed in combination with a roof window, which in itself is CE marked in accordance with EN 14351-1, and is positioned above the roof window on the external side of the roof, i.e. outside of vapour barrier, insulation and underroof. The ventilation unit in conjunction with the roof window enables decentralized low-pressure mechanical ventilation with heat recovery.

In active mode when indoor temperature is higher than outdoor temperature, a ventilator unit leads warm indoor air through the unit towards the outside. The air passes a regenerator that absorbs heat from the passing indoor air. The flow direction will change automatically and the regenerator will emit the accumulated heat to the passing colder outside air, heating it before it is lead into the room via the roof windows ventilation element.

In active mode when indoor temperature is lower than outdoor temperature, a ventilator unit leads colder indoor air through the unit towards the outside. The air passes a regenerator that is cooled from the passing indoor air. The flow direction will change automatically and the regenerator will cool the passing hotter outside air, before it is lead into the room via the roof windows ventilation element.

The mechanical ventilation with heat recovery is active when the sash of the roof window is closed and the roof windows ventilation element is open. The process stops automatically when the sash of the roof window is opened or when the roof windows ventilation element unit is closed.

The assembly position of the ventilation unit prevents that condensation reaches the window frame. The occurring defrost water is discharged on to the roof covering.

See Annex A for drawings of the unit.

The product is not covered by a harmonised European standard

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document, shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

The ventilation unit is intended to provide decentralized ventilation to any enclosed or partially enclosed building or space.

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the ventilation unit for the intended use of 25 years when installed in the roof (For parts subject to wear: The assumed service life for electrical parts is 10 years, the assumed service life for gaskets is 5 years). These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works[1].

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

1.3 Specific terms used in this EAD

The Decentralized energy efficient low-pressure ventilation unit with alternating flow and heat recovery is called ventilation unit in this EAD

1 The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than the assumed working life.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of the ventilation unit is established in relation to the essential characteristics.

Table 1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No.	Essential characteristic	Assessment method	Type of expression of product performance (level, class, description)
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class
2	External fire performance of roofs	2.2.2	Class
Basic Works Requirement 3: Hygiene, health and the environment			
3	Water tightness	2.2.3	Level
4	Flow rate	2.2.4	Level
Basic Works Requirement 5: Protection against noise			
5	Sound power	2.2.5	Level
6	Airborne sound insulation	2.2.6	Level
Basic Works Requirement 6: Energy economy and heat retention			
7	Condensation	2.2.7	Level
8	Heat recovery efficiency	2.2.8	Level
9	Energy consumption	2.2.9	Level
10	Durability	2.2.10	Level

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

Characterisation of products to be assessed shall be done in accordance with available specifications, notably, material properties, geometry and dimensions.

2.2.1 Reaction to fire

The main elements of the ventilation unit shall be tested, using the test method(s) relevant for the corresponding reaction to fire class, in order to be classified according to EN 13501-1

or

The ventilation unit is considered to satisfy the requirements for performance class A1 of the characteristic reaction to fire, in accordance with the provisions of EC decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

The ventilation unit covered by this EAD shall be classified according to EN 13501-1. Taking into account to EC Decision 96/603/EC, amended by EC Decision 2000/605/EC.

2.2.2 External fire performance

The ventilation unit shall be tested using the test method relevant for the corresponding external fire performance roof class, in order to be classified according to EN 13501-5.

The ventilation unit shall be classified according to EN 13501-5.

2.2.3 Water tightness

The water tightness of the ventilation unit installed together with at roof window shall be determined in accordance with EN 1027.

The performance of the tested sample shall expressed as described in EN 12208 and be stated in the ETA.

2.2.4 Flow rate

The flow rate of the ventilation unit at various pressure differences shall be determined in accordance with clause 5.2.3 of EN 13141-8 (testing in accordance with clause 4 of EN 13141-4).

The performance of the tested sample shall expressed as described in clause 5.2.3 of EN 13141-8 and be stated in the ETA.

2.2.5 Sound power

The sound power of the ventilation unit shall be determined in accordance with clause 9 of EN 13141-8 using either the precision methods described in EN ISO 3741 (reverberation room) or EN ISO 3745 (anechoic or semi-anechoic room) or engineering methods described in EN ISO 3743-1.

The performance of the tested sample shall expressed as described in clause 9 of EN 13141-8 and be stated in the ETA.

Note:
The manufacturer may state a sound pressure value alongside the sound power value if the calculation method or measuring standard used is described or referred to and if parameters relevant for the calculation or measurement are provided together with the sound pressure value

2.2.6 Airborne sound insulation

The airborne sound insulation performance of the ventilation unit installed together with at roof window shall be determined by laboratory tests according to EN ISO 10140-1 and EN ISO 10140-2. The rating of airborne sound insulation shall be undertaken according to EN ISO 717-1.

Indicative field testing of an assembly within a manufacturer's range may be possible, as part of the assessment process. However, National Regulations in some Member States may require field testing of the completed building in each case.

The airborne sound insulation between exterior environment and rooms shall be stated in the ETA, as element normalized level difference $D_{n,e,w}$ acc. EN ISO 10140-2 + EN ISO 717-1.

Other designations mentioned in EN ISO 717-1 may be added in the assessment, to agree with the verification methods according to national building regulations based on such designations.

2.2.7 Condensation

The risk of condensation of the ventilation unit shall be determined in accordance with clause 5.4.5 of EN 13141-8.

The terms for condensation test are given by EN13141-8 cl. 5.4.5, in which table 3 states the boundary conditions. The test is performed with temperature conditions as described for standard test 1, 2 and 3 in table 3 of EN 13141-8.

The performance of the tested sample shall expressed as described in 5.4.5 of EN 13141-8 and be stated in the ETA.

2.2.8 Heat recovery efficiency

The heat recovery efficiency of the ventilation unit shall be determined based on DIN4701-10 with the following parameters:

$HR = HR_{measured} * (1- \eta_{condensation} - \eta_{heat\ loss} - \eta_{tightness})$, or alternatively, if individual correction factors are not considered:

$HR = HR_{measured} * (1- 0{,}91)$

Where its relevant the individual correction factors are determined by:

$\eta_{condensation}$:

Outer temperature	Correction factor
>-6°c	0,06
≤-6°c	0,04
≤-9°c	0,02
≤-12°c	0

$\eta_{heat\ loss}$:

Thermal resistance of casing	Correction factor
R ≥ 1 [m^2K/W]	0
R < 1 [m^2K/W]	0,02

$\eta_{tightness}$:

Tightness	Correction factor
Good tightness	0
Normal tightness	Minimum 0,01

The test rig shall reflect the use situation of the unit, i.e. that part of the unit is facing the exterior.

Additionally, a frost resistance test of the unit is performed by decreasing the temperature from -3 °C to -12 °C and maintaining this condition for 12 hours.

2.2.9 Energy consumption

The energy consumption of the ventilation unit shall be determined in accordance with clause 5.5 of EN 13141-8. The recording of the energy consumption is performed in connection with the test for heat recovery efficiency – see 2.2.9 of this EAD.

The performance of the tested sample shall expressed as described in 5.5 of EN 13141-8 and be stated in the ETA.

2.2.10 Durability

When assessing the durability of materials and components in the ventilation unit it should be born in mind that durability is normally best ensured by good design measures and good site practice.

One aspect related to the durability of the ventilation is the corrosion of metal. Exposure classes are given in EN ISO 12944-5:2007. The corrosion protection of steel component shall be carried out according to EN ISO 12944-7:2000.

The durability of materials and components in the ventilation unit is sufficiently proved if these materials and components comply with the relevant applicable product standards.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is: Decision 98/436/EC as amended by decision 2001/596/EC

The system is: 3 except for uses subject to regulations on reaction to fire.

For uses subject to regulations on reaction to fire the applicable AVCP systems regarding reaction to fire are 1, or 3, or 4 depending on the conditions defined in the said Decision

3.2 Tasks of the manufacturer

The corner stones of the actions to be undertaken by the manufacturer of the ventilation unit in the procedure of assessment and verification of constancy of performance are laid down in Table 2.

Table 2 Control plan for the manufacturer; corner stones

No	Subject/type of control *(product, raw/constituent material, component - indicating characteristic concerned)*	Test or control method *(refer to 2.2 or 3.4)*	Minimum frequency of control
Factory production control (FPC)			
1	Instructions on for example : - type and quality of all materials and components incorporated in the elements - overall dimensions of prefabricated elements - tolerances of geometry - surface treatments when relevant - markings for correct position and installation in the works - packaging and transport protection	As defined in control plan	As defined in control plan
2	Reaction to fire	As defined in control plan	As defined in control plan
3	Design specifications	As defined in control plan	As defined in control plan

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for ventilation unit are laid down in Table 3.

The involvement of the notified body is required only under the conditions defined in Decision 98/436/EC as amended by decision 2001/596/EC – in case of reaction to fire class A1, A2, B, C of the product for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an additional of fire retardants or a limiting of organic material)

Table 3 Control plan for the notified body; cornerstones

Subject/type of control *(product, raw/constituent material, component - indicating characteristic concerned)*	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control				
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire and taking into account a limiting of organic material and/or the addition of fire retardants.	As defined in control plan	As defined in control plan	As defined in control plan	According to the control plan
Continuous surveillance, assessment and evaluation of factory production control				
Continuous surveillance, assessment and evaluation of the factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire and taking into account a limiting of organic material and/or the addition of fire retardants.	As defined in control plan	As defined in control plan	As defined in control plan	According to the control plan

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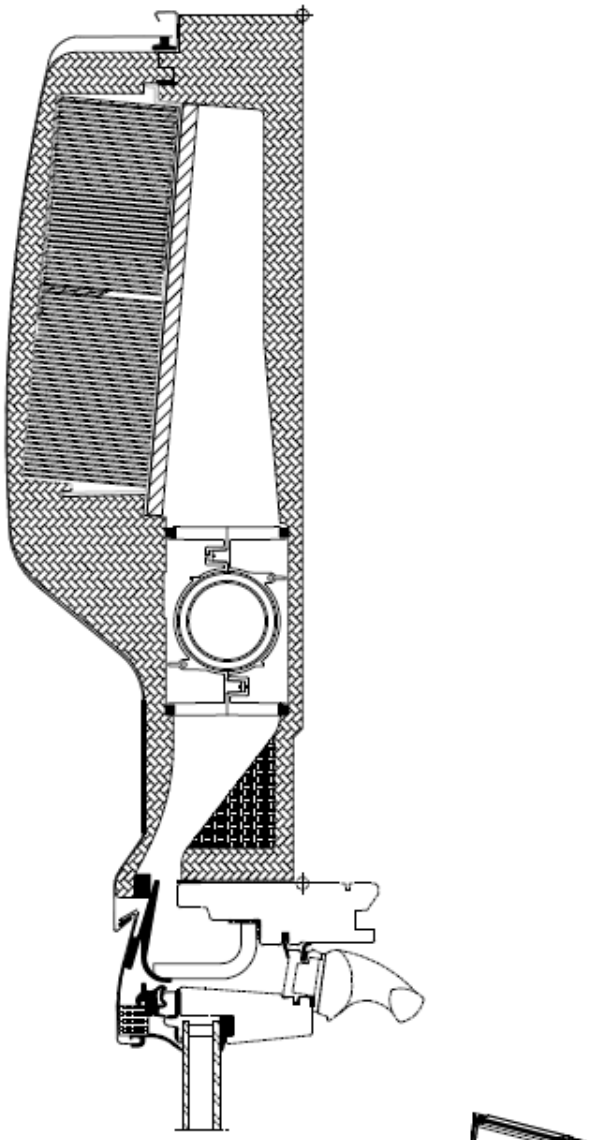
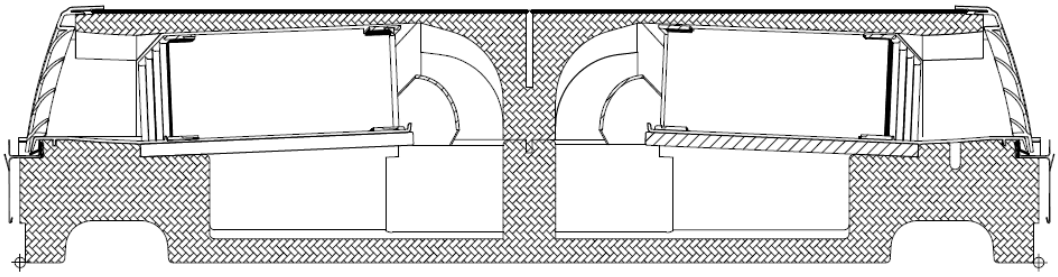
4 REFERENCE DOCUMENTS

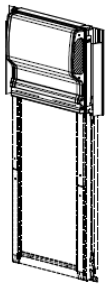
As far as no edition date is given in the list of standards thereafter, the standard in its current version at the time of issuing the European Technical Assessment, is of relevance.

EN 14351:2006 + A1:2010	Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics
EN 13501-1:2007+A1:2009	Fire classification of construction products and building elements - Part 1: Classification using test data from fire reaction to fire tests
EN 13501-5:2007+A1:2009	Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests
EN 1027:1999	Windows and doors - Watertightness - Test method
EN 12208:1999	Windows and doors - Watertightness - Classification
EN 13141-8:2014	Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 8: Performance testing of un-ducted mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for a single room
EN 13141-4:2011	Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 4: Fans used in residential ventilation systems
EN ISO 3741:2010	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for reverberation test rooms
EN ISO 3745:2012	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic rooms and hemi-anechoic rooms
EN ISO 3743-1:2010	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for small movable sources in reverberant fields - Part 1: Comparison method for a hard-walled test room
EN 10140-1:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products
EN ISO 717-1:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation - Amendment 1: Rounding rules related to single number ratings and single number quantities
EN ISO 12944-5:2007	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 5: Protective paint systems
EN ISO 12944-7:2000	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 7: Execution and supervision of paint work
EN ISO 11963	Plastics – Polycarbonate sheets – Types, dimensions and characteristics

ANNEX A DESCRIPTION OF THE CONSTRUCTION PRODUCT







Main elements of ventilator unit, main dimensions (W x H) 780 x 565 [mm] Thickness 190 [mm]	Description / Materials
Weather cover	Painted aluminum Air in/outlet of plastic, POM
Insulation	EPP
Regenerators	Plastic, PE, ABS and PC
Ventilator unit	Plastic, PC and ABS
Filter holder	Plastic, POM
Control panel	Plastic, PC and POM