



EUROPEAN ASSESSMENT DOCUMENT

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VENTILATION SYSTEM MADE OF MINERAL WOOL WITH FACINGS ON OUTSIDE AND INSIDE

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1 SCOPE OF THE EAD

1.1 Description of the construction product

Ventilation system made of mineral wool products with facings on outside („e.g.,” kraft paper and glass mesh reinforced aluminium foil, glass mesh reinforced aluminium foil, or fibreglass fabric) and inside („e.g.,” reinforced glass fabric, glass mesh reinforced aluminium foil, or kraft paper reinforced aluminium foil), referred to as “ventilation system” hereinafter. The system consists of the duct sections made from the mineral wool boards as described, which can also be formed on site, and fittings such as glue, aluminium adhesive tape, reinforcement steel profiles or mechanical fixings for the installation of the system. Final duct cross-sections can be rectangular or circular. No steel duct is present.

The product is not covered by a harmonised European standard (hEN). Non-metallic ventilation ducts are covered by EN 13403¹, which is not a harmonised Technical Specification. On the other hand, definition of test specimens’ preparation, test conditions or test installation methods is missing or insufficient in EN 13403 for some characteristics (such as tightness, bulging and/or caving or water vapour resistance). Finally, some essential characteristics addressed in this EAD are not considered in EN 13403 such as propensity to undergo continuous smouldering or acoustical absorption (insertion loss).

The product is not fully covered by EAD 360001-00-0803. Compared to the previous version of the EAD, the following changes are introduced:

- other type of facings and rectangular cross-section of the ventilation ducts are permitted,
- assessment of essential characteristics propensity to undergo continuous smouldering, acoustical absorption (absorption coefficient) and thermal conductivity are included and
- essential characteristics stiffness, dimensional stability and tolerances have been removed because they do not define the performance of the system.

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 system is intended to be used inside buildings for ventilation and air conditioning systems of buildings subject to human occupancy.

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 system for the intended use of 25 years when installed in the works. These provisions are based upon the current state of the art and the available knowledge and experience.

¹ All undated references to standards or to EAD’s in this document are to be understood as references to dated versions listed in clause 4.

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 works².

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

For the purpose of this EAD, the terms and definitions given in clause 3 of EN 13403 applies.

² 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 referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of the ventilation system is assessed in relation to the essential characteristics.

Table 2.1.1 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
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	Clause 2.2.1	Class
2	Propensity to undergo continuous smouldering	Clause 2.2.2	Description
Basic Works Requirement 3: Hygiene, health and the environment			
3	Erosion	Clause 2.2.3	Description
4	Emission	Clause 2.2.4	Level
5	Microbiological growth	Clause 2.2.5	Description
6	Bulging and/or caving	Clause 2.2.6	Level
7	Resistance against pressure	Clause 2.2.7	Description
8	Tightness	Clause 2.2.8	Level
9	Water vapour resistance	Clause 2.2.9	Level
Basic Works Requirement 5: Protection against noise			
10	Acoustical absorption (insertion loss)	Clause 2.2.10	Level
11	Acoustical absorption (absorption coefficient)	Clause 2.2.11	Level
Basic Works Requirement 6: Energy economy and heat retention			
12	Thermal conductivity	Clause 2.2.12	Level

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

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

2.2.1 Reaction to fire

The components of the ventilation system shall be tested, using the test method(s) relevant for the corresponding reaction to fire class, in order to be classified in accordance with EN 13501-1 and Commission Delegated Regulation (EU) No 2016/364.

Commission Decision 96/603/EC, as amended by 2000/605/EC and 2003/424/EC, may be considered for the components of the ventilation system which, under the specified conditions, are deemed to be class A1 without testing.

The procedures for mounting and fixing the mineral wool products for the specific test methods shall be in accordance with EN 15715, clause 5 and:

- a. tables A.1 and A.2 for mineral wool boards to be used as rectangular ducts (any sizes) or ducts with a circular cross-section with an outer diameter greater than 300 mm, but without any substrate (see specification on the air gap below), or
- b. tables A.3 and A.4 for mineral wool products to be used as ducts with a circular cross-section and an outer diameter equal to or lower than 300 mm, provided that a product variant with an outer diameter lower than 200 mm (maximum dimension testable to EN 13823) is available, but considering for the mounting and fixing that no steel pipe is to be included in the test (ventilation system without steel duct in end use conditions).

Note: Test results obtained according to tables A.3 and A.4 for products with an outer diameter lower than 200 mm are valid for diameters between 200 mm and 300 mm. In the case that the product is not available with an outer diameter lower than 200 mm, the product will only be tested as a flat product.

Tests according to EN 13823 shall be representative of the system end-use conditions, considering the fittings (such as the glue or adhesive aluminium tape) and an air gap behind the mineral wool products.

When the inner facings of the mineral wool products have combustible components, which could contribute to the fire growth, it is necessary to consider lowest and highest thickness as well as lowest and highest density of the mineral wool.

2.2.2 Propensity to undergo continuous smouldering

The performance of the mineral wool boards' propensity to undergo continuous smouldering shall be tested and assessed in accordance with EN 16733.

The conditions and parameters which shall be taken into account within the test as well as the rules for the application of the test results are specified in Annex A.

In accordance with EN 16733, clause 11, the ETA shall specify the following information, depending on the outcome of the assessment:

- “The product does not show propensity to undergo continuous smouldering”;
- “The product shows propensity to undergo continuous smouldering” or
- “Assessment of the propensity to undergo continuous smouldering is not possible”.

2.2.3 Erosion

The performance of the ventilation system shall be tested in accordance with EN 13403, clause 7.2, mounted following manufacturer's specifications.

All relevant internal facings shall be tested.

After the test, the ductwork shall be inspected for damages („i.e.,” if material flakes off, breaks away or shows evidence of delamination or erosion). Information about size of damaged area shall be reported in the ETA.

The threshold values given in clause 7.2 of EN 13403 are not applicable.

2.2.4 Emission

The performance of the ventilation system shall be tested in accordance with EN 13403, clause 7.2, mounted following manufacturer's specifications.

All relevant internal facings shall be tested.

The concentration ($\mu\text{g}/\text{m}^3$) of particles bigger than 0,5 μm and bigger than 5,0 μm shall be given in the ETA.

The threshold values given in clause 7.2 of EN 13403 are not applicable.

2.2.5 Microbiological growth

The performance of the ventilation system is assessed by testing the mineral wool boards and their connections in accordance with EN 13403, clause 7.4.

Boards with internal facings with the highest amount of organic content and lowest specific mass shall be tested.

Before the test, the boards shall be cleaned. The number of cleaning cycles shall be calculated according to expected number of cleanings per year and the assumed working life (if one cleaning per year, 25 cleaning cycles).

The following test results shall be given in the ETA:

- Extent of mould growth (visual inspection).
- Indication of deterioration in wall structure (visual inspection).
- If the mould has spread beyond the inoculated area.
- If significant growth of mould has been observed.
- The number of cleaning cycles applied before the test.

The threshold values given in clause 7.4 of EN 13403 are not applicable.

2.2.6 Bulging and/or caving

The performance of the ventilation system shall be tested³ in accordance with EN 13403, clause 4.4, mounted following manufacturer's specifications. For rectangular and circular ducts use provisions stated in EN 1507 and EN 12237 respectively.

The following test results shall be given in the ETA:

- Bulging/caving during test calculated in percentage of the width.
- Bulging/caving during test measured in mm.
- Bulging/caving after load relieving calculated in percentage of the width.
- Bulging/caving after load relieving, measured in mm.

The threshold values given in clause 4.4 of EN 13403 and in clause 5.2 of EN 12237 are not applicable.

2.2.7 Resistance against pressure

The performance of the ventilation system shall be tested in accordance with EN 13403 clause 7.3. For circular ducts equivalent interior sections to 300 mm x 300 mm shall be used.

Test ducts with worst combination of internal and external facings regarding tensile strength of facings.

Air ducts and connector sections with joints, assembled in accordance with the manufacturer's instructions, shall be exposed to an internal air pressure of 2,5 times the manufacturer's rated positive pressure, but not less than 200 Pa.

³ Same tests required for ducts' tightness assessment (clause 2.2.9).

The resistance against pressure shall be assessed by measurement of ruptures. For this test, rupture is evidenced by breaks, tears, rips or other openings. Plastic deformation is not considered to be a rupture. Ruptures shall be measured in millimetres and given in the ETA. In case of no ruptures, “no ruptures” shall be stated in the ETA.

If any joining material does not remain intact, materials such as tapes may become displaced. These displacements shall be measured in millimetres and given in the ETA. In case of no displacements, “no displacements” shall be stated in the ETA.

Other evidence of damage, which would cause the sample to become unusable, shall also be described in the ETA.

2.2.8 Tightness

The performance of the ventilation system shall be tested in accordance with EN 1507 (rectangular ducts), EN 12237 (circular ducts) or EN 15727 (technical components, such as sound attenuators or filter boxes).

Test ducts with worst combination of internal and external facings regarding tensile strength of facings.

The leakage test with negative pressure shall be done with at least one of the following pressures: 200 Pa, 500 Pa or 750 Pa. The leakage test with positive pressure shall be done with at least one of the following pressures: 400 Pa, 1000 Pa or 2000 Pa.

The assessment of the tightness shall be presented in a diagram or a table with the leakage factors as a function of the tested pressures.

2.2.9 Water vapour resistance

The performance of the mineral wool boards shall be tested in accordance with EN 12086 with test conditions A of table 1.

All relevant facings shall be tested.

The water vapour resistance shall be expressed in the ETA in accordance with EN 12086, clause 8.4.

2.2.10 Acoustical absorption (insertion loss)

The performance of the ventilation system shall be tested in accordance with EN ISO 7235 or EN ISO 11691 (when the design air flow velocity does not exceed 15 m/s).

All relevant internal facings shall be tested.

The insertion loss performance shall be given in the ETA in accordance with the relevant test standard.

2.2.11 Acoustical absorption (absorption coefficient)

The performance of the mineral wool boards shall be tested in accordance with EN ISO 354. Installation method A of EN ISO 354 applies.

All relevant internal facings shall be tested.

The measured acoustic absorption coefficient shall be expressed as a single number rating α_w in accordance with EN ISO 11654.

2.2.12 Thermal conductivity

The performance of the mineral wool boards shall be tested in accordance with EN 12667 or EN 12939.

All relevant facings shall be tested.

The thermal conductivity shall be given in the ETA.

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 2015/1936/EC.

The system is: 3.

In addition, with regard to reaction to fire⁴ for products covered by this EAD the applicable European legal act is: Decision 2015/1936/EC.

The systems are: 1, 3 or 4.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.2.1.

Table 3.2.1 Control plan for the manufacturer; cornerstones.

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC)					
1	Check of incoming material	Declaration of conformity	Manufacturer's specification	-	Every delivery
2	Resistance against pressure	2.2.8	Compliance with DoP	1	Once per 2 years
3	Tightness	2.2.9	Compliance with DoP	1	Once per 2 years

In addition, regarding the mineral wool boards from which the ventilation system is made of, the control plan for the manufacturer shall be based, in relation to the essential characteristics assessed in the ETA, on the requirements, methods and frequencies given in EN 14303 or EN 13162.

Regarding the characteristic propensity to undergo continuous smouldering, when relevant, the density and mass loss shall be determined (1 per 4 h) as indirect tests, and direct tests shall be performed once per 2 years.

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 the ventilation system are laid down in Table 3.3.1.

The intervention of the notified body under AVCP system 1 is only necessary regarding reaction to fire⁴ and only under the conditions foreseen in the Decision 2015/1936/EC (see Note under table 3.3.1).

⁴ And propensity to undergo continuous smouldering, when relevant.

Table 3.3.1 Control plan for the notified body; cornerstones.

No	Subject/type of control	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 <i>(for system 1 only)</i>					
1	<p>Reaction to fire*, and propensity to undergo continuous smouldering.</p> <p>The notified body shall verify the ability for manufacturing the system in accordance with the control plan, in particular to the addition of flame retardants and/or the limitation of organic content. The following items shall be appropriately considered:</p> <ul style="list-style-type: none"> - personnel and equipment - the suitability of the factory production control established by the manufacturer - full implementation of the prescribed test plan 	As defined in the control plan	As defined in the control plan	As defined in the control plan	When starting the production process or after its modification
Continuous surveillance, assessment and evaluation of factory production control <i>(for system 1 only)</i>					
2	<p>Reaction to fire*, and propensity to undergo continuous smouldering.</p> <p>It shall be verified that the system of factory production control and the specified manufacturing process are maintained in accordance with the control plan, in particular to the addition of flame retardants and/or the limitation of organic content. The following should be dealt with:</p> <ul style="list-style-type: none"> - inspection of factory, of the production of the system and of the facilities for factory production control - evaluation of the documents concerning factory production control - issuing a report of surveillance 	As defined in the control plan	As defined in the control plan	As defined in the control plan	Once per year

* Only relevant for classes A1, A2, B or C and products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification („e.g.,” an addition of fire retardants or a limiting of organic material).

4 REFERENCE DOCUMENTS

EN 12086:2013	Thermal insulating products for building applications. Determination of water vapour transmission properties.
EN 12237:2003	Ventilation for buildings. Ductwork. Strength and leakage of circular sheet metal ducts.
EN 12667:2001	Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance.
EN 12939:2000	Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Thick products of high and medium thermal resistance.
EN 13162:2012 +A1:2015	Thermal insulation products for buildings. Factory made mineral wool (MW) products. Specification.
EN 13403:2003	Ventilation for buildings. Non-metallic ducts. Ductwork made from insulation duct boards.
EN 13501-1:2018	Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests.
EN 13820:2003	Thermal insulating materials for building applications. Determination of organic content.
EN 13823:2021	Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item.
EN 14303:2015	Thermal insulation products for building equipment and industrial installations. Factory made mineral wool (MW) products. Specification.
EN 1507:2006	Ventilation for buildings. Sheet metal air ducts with rectangular section. Requirements for strength and leakage.
EN 15715:2009	Thermal insulation products. Instructions for mounting and fixing for reaction to fire testing. Factory made products.
EN 15727:2010	Ventilation for buildings. Ducts and ductwork components, leakage classification and testing.
EN 1602:2013	Thermal insulating products for building applications. Determination of the apparent density.
EN 16733:2016	Reaction to fire tests for building products. Determination of a building product's propensity to undergo continuous smouldering.
EN 823:2013	Thermal insulating products for building applications. Determination of thickness.
EN ISO 11654:1997	Acoustics. Sound absorbers for use in buildings. Rating of sound absorption.
EN ISO 11691:2009	Acoustics. Measurement of insertion loss of ducted silencers without flow. Laboratory survey method.
EN ISO 354:2003	Acoustics. Measurement of sound absorption in a reverberation room.
EN ISO 7235:2009	Acoustics. Laboratory measurement procedures for ducted silencers and air-terminal units. Insertion loss, flow noise and total pressure loss.

ANNEX A – CONDITIONS AND PARAMETERS FOR THE DETERMINATION OF THE PROPENSITY TO UNDERGO CONTINUOUS SMOULDERING

A.1 Sampling and preparation of test specimens

The following conditions and parameters shall be considered for the product sampling and the test specimens' preparation:

- the product-type;
- the product or product variant with the highest organic content (in percentage per mass), determined according to EN 13820; also, the product with the highest absolute organic content (kg/m^3);
- the product or product variant with the highest density as well as a density of about 100 kg/m^3 ($\pm 15\%$); if this range is lower than 115 kg/m^3 , then only the product or product variant with the highest density. The density shall be determined in accordance with EN 1602;
- the product or product variant with the highest thickness. If the highest thickness is greater than 100 mm, the test specimen thickness shall be reduced from the reverse side (side not exposed to the flame) to the maximum testable thickness of 100 mm (see paragraph 6.2.3 of EN 16733). The thickness shall be determined in accordance with EN 823 on at least three specimens;
- each different produced fibre orientation, „i.e.,” lengthwise and crosswise to the length direction of the test specimen, as well as perpendicular to the surface of the specimen front side;
- without any facing, coating (or similar). Existing facings or coatings shall be removed when preparing the test specimens.

The tests shall be done on free-hanging specimens without consideration of the intended end-use conditions, because propensity to undergo continuous smouldering is hardly affected by end-use conditions. No joints will be included in the test specimen, except if paragraph 6.2.5 of EN 16733 applies (dimensions of the product smaller than the required dimensions of the test specimen).

If the product is only available in a length lower than 800 mm, the test specimens shall be prepared by using two (or more) smaller pieces of the mineral wool, which shall be put together with a butt joint. This joint shall be positioned in the highest possible distance to the bottom edge of the test specimens. Connection of the pieces of the test specimens shall be carried out in such a manner that a permanent and close contact is ensured between both pieces at the joint for the entire testing and monitoring time.

A.2 Field of application of test results

The test results, considering the above-mentioned conditions and parameters, are also valid for products:

- of the same product-type,
- with a lower organic content,
- with a lower density,
- with a lower thickness, and also with higher thickness when 100 mm thick specimens are tested,
- with any fibre orientation,
- with any facing or coating,
- for any end-use conditions.