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European Assessment Document for

Ventilation system
made of mineral wool
with facings on outside and inside



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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).

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1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD covers ventilation systems made of mineral wool with facings on outside and inside, hereinafter referred to as “ductworks”.

The ductworks can be provided to the market as an individual product or as a kit.

When the ductwork is a kit, it is formed on site and composed of:

- mineral wool boards with facings in accordance with EN 14303¹, hereinafter referred to as ductboards,
- and aluminium adhesive tape for the sealings.

Ductworks and ductboards have facings on outside, which works as water vapour barrier (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).

When the ductwork is an individual product, it may have also been formed from ductboards sealed with an aluminium adhesive tape.

Ductwork cross-sections can be rectangular or circular.

The product is not covered by a harmonised European standard (hEN). Non-metallic ventilation ducts are covered by EN 13403, 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 air tightness, bulging or caving or both 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 360001-01-0803. Compared to the previous version of the EAD, the following changes are introduced:

- external uses are included and
- assessment of essential characteristics water tightness, ductboard stiffness, static load resistance, hail resistance and durability under heat-cold and freeze-thaw cycles are included.

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, e.g., with regard to the intended end use conditions, 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 as long as the details of the assessment methods as laid down in this EAD are respected.

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

1.2.1 Intended use(s)

The ductwork is intended to be used in ventilation systems for ventilation and air conditioning systems of buildings subject to human occupancy for internal or external uses.

Ventilation systems for which ductworks covered by this EAD are used shall be made of:

¹ All undated references to standards in this EAD are to be understood as references to the dated versions listed in clause 4.

- Ductworks joined by sealing (e.g., with the same aluminium adhesive tape used for the longitudinal joint of ductboards forming the ductworks) or fittings.
- Supports and hangers or both for fixing the ductworks to the building. As an example, products covered by EAD 280016-00-0602 can be used.

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.

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 apply.

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	2.2.1	Class
2	Propensity to undergo continuous smouldering	2.2.2	Description
Basic Works Requirement 3: Hygiene, health and the environment			
3	Erosion	2.2.3	Description
4	Emission	2.2.4	Level
5	Microbiological growth	2.2.5	Description
6	Air tightness	2.2.6	Level
7	Bulging or caving or both	2.2.7	Level
8	Resistance against pressure	2.2.8	Description
9	Water vapour resistance	2.2.9	Level
10	Water tightness	2.2.10	Description
Basic Works Requirement 4: Safety and accessibility in use			
11	Ductboard stiffness	2.2.11	Level
12	Static load resistance	2.2.12	Level
13	Hail resistance	2.2.13	Level
14	Durability under heat-cold cycles	2.2.14	Description
15	Durability under freeze-thaw cycles	2.2.15	Description
Basic Works Requirement 5: Protection against noise			
16	Acoustical absorption (insertion loss)	2.2.16	Level
17	Acoustical absorption (absorption coefficient)	2.2.17	Level
Basic Works Requirement 6: Energy economy and heat retention			
18	Thermal conductivity	2.2.18	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 ductwork shall be tested, using the test method(s) relevant for the corresponding reaction to fire class according to EN 13501-1. The ductwork shall be classified according to the Commission Delegated Regulation (EU) No 2016/364 in connection with EN 13501-1. The reaction to fire class shall be stated in the ETA.

When the ductwork is a kit, reaction to fire shall be assessed by testing the ductboards and using the tape in the joints of the specimens as specified below and taking into account the manufacturer's product installation instructions (MPII).

When the ductwork is an individual product, reaction to fire shall be assessed by testing ductboards cut from the ductwork. Unless cutting is not needed, i.e., circular ductwork with diameter lower than 300 mm.

The procedures for mounting and fixing the ductboards for the specific test methods shall be in accordance with EN 15715, clause 5 and the specific clauses below:

- a. Ductboards to be used as rectangular ducts (any sizes) or ducts with a circular cross-section with an outer diameter equal to or greater than 300 mm shall be considered as flat products when using EN 15715.

Particularly for flat products, EN 15715, clause 5.3.2.7 and tables A.1 and A.2 apply, but without any substrate and an air gap as defined in EN 15715, clause 6.3.2.4.

- b. Ductboards to be used as ducts with a circular cross-section and an outer diameter lower than 300 mm shall be considered as pipe insulation products when using EN 15715.

Particularly for pipe insulation products, EN 15715, clause 5.3.2.8 and tables A.3 and A.4 apply, 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 aluminium adhesive tape).

When the inner facings of the ductboards 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

When the ductwork is a kit, propensity to undergo continuous smouldering shall be assessed by testing the ductboards and using the tape in the joints of the specimens as specified in the test standard EN 16733 and taking into account the manufacturer's product installation instructions (MPII).

When the ductwork is an individual product, propensity to undergo continuous smouldering shall be assessed by testing ductboards cut from the ductwork.

Ductboards' propensity to undergo continuous smouldering shall be tested 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

Erosion of the ductwork shall be assessed by testing 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

Emission of the ductwork shall be assessed by testing 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 $0,5 \mu\text{m}$ and bigger than $5,0 \mu\text{m}$ 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

When the ductwork is a kit, microbiological growth shall be assessed by testing the ductboards.

When the ductwork is an individual product, microbiological growth shall be assessed by testing ductboards cut from the ductwork. Ductboards cut from circular ductboards shall be flattened before testing, alternatively, when ductboards do not maintain a flat shape, they shall be kept flat during the test (e.g., using platens or clamps) without interfering with the test procedure.

Ductboards shall be tested in accordance with EN 13403, clause 7.4.

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

Before the test, the ductboards 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 beyond the inoculated area (visual inspection).
- Indication of deterioration in wall structure (visual inspection) (e.g., colour change, degradation of any layer or unstuck of layers).
- 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 Air tightness

Air tightness of ductwork shall be assessed by testing in accordance with EN 1507 (rectangular ducts) or EN 12237 (circular ducts).

Ductworks and its joints shall be mounted according to the test standards and taking into account the manufacturer's product installation instructions (MPII).

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 air tightness shall be presented in a diagram or a table with the leakage factors $f [l/(s \cdot m^2)]$ as a function of the tested pressures (in Pa). Reference to the used test standard shall be stated in the ETA.

Test results are also valid for ductworks with the following variations:

- Ductboards with higher flexural rigidity tested in accordance with clause 2.2.11.

2.2.7 Bulging or caving or both

Bulging or caving or both of the ductwork shall be assessed by testing (same tests required for the air tightness assessment (see clause 2.2.6)).

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.

Maximum positive pressure tested shall be stated in the ETA in Pa.

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

2.2.8 Resistance against pressure

Resistance against pressure shall be assessed by testing in accordance with EN 13403 clause 7.3. For circular ducts equivalent interior sections to 300 mm x 300 mm shall be used.

Ductworks and its joints shall be mounted according to the test standard EN 13403, clause 7.3 and taking into account the manufacturer's product installation instructions (MPII).

Specimens shall be exposed to an internal air pressure of 2,5 times the maximum positive tested in the air tightness assessment (clause 2.2.6), but not less than 200 Pa.

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 with a vernier calliper 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 specimen to become unusable, shall also be described in the ETA.

Test results are also valid for ductworks with the following variations:

- Ductboards with higher flexural rigidity tested in accordance with clause 2.2.11.

Internal air pressure during the test shall be stated in the ETA in Pa.

2.2.9 Water vapour resistance

When the ductwork is a kit, water vapour resistance shall be assessed by testing the ductboards.

When the ductwork is an individual product, water vapour resistance shall be assessed by testing ductboards cut from the ductwork. Ductboards cut from circular ductboards shall be flattened before testing, alternatively, when ductboards do not maintain a flat shape, they shall be kept flat during the test (e.g., using platens or clamps) without interfering with the test procedure.

Ductboards 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 Z [$\text{m}^2 \cdot \text{h} \cdot \text{Pa} / \text{mg}$] shall be expressed in the ETA in accordance with EN 12086, clause 8.4.

2.2.10 Water tightness

The assessment of water tightness is mainly intended for external applications.

Ductworks and its joints shall be mounted according to the test standard EN 13403, clause 7.3 and taking into account the manufacturer's product installation instructions (MPII).

Same test as for resistance against pressure (clause 2.2.8) is required, except for the following changes:

- during testing the external surfaces of the duct shall be sprinkled with water.
- internal air pressure shall be the maximum positive tested in the air tightness assessment (clause 2.2.8).
- after the application of internal air pressure, the external surfaces shall be sprinkled with water for 15 minutes more.
- Specimen shall be tested in horizontal position.

Water shall be sprinkled downwards perpendicular to the top surface with a mean flow of $1,5 \text{ l}/(\text{m}^2 \cdot \text{min})$; a maximum temporal deviation of the flow of $0,5 \text{ l}/(\text{m}^2 \cdot \text{min})$ is permitted. In case of circular ducts, water shall be sprinkled downwards against the top half surface of the ducts³.

After testing the external surface shall be checked according to resistance against pressure test results (clause 2.2.8):

- Ruptures: rupture is evidenced by breaks, tears, rips or other openings. Plastic deformation is not considered to be a rupture. Ruptures shall be measured with a vernier calliper in millimetres and given in the ETA. In case of no ruptures, "no ruptures" shall be stated in the ETA.
- Joints: 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 specimen to become unusable, shall also be described in the ETA.

After that, the duct shall be dismantled and a relevant transversal cross-section of the ductwork cut. A visual check shall be done; if it observed water in the mineral wool layer, it shall be noted and stated in the ETA. Otherwise, the sentence „water has not reach the mineral layer“ shall be stated in the ETA.

Test results are also valid for ductworks with the following variations:

- Ductboards with higher flexural rigidity tested in accordance with clause 2.2.11.

³ Flow is defined as water volume per minute divided by the horizontal projection of the duct cross-section.

Internal air pressure during the test shall be stated in the ETA in Pa.

2.2.11 Ductboard stiffness

When the ductwork is a kit, ductboard stiffness shall be assessed by testing the ductboards.

When the ductwork is an individual product, ductboard stiffness shall be assessed by testing ductboards cut from the ductwork. Ductboards cut from circular ductboards shall be flattened before testing, alternatively, when ductboards do not maintain a flat shape, they shall be kept flat during the test (e.g., using platens or clamps) without interfering with the test procedure.

Ductboards shall be tested in accordance with EN 13403, clauses 7.1.1 and 7.1.2.

Three specimens shall be tested in right side up position (with the external face down) and three additional specimens turned upside down.

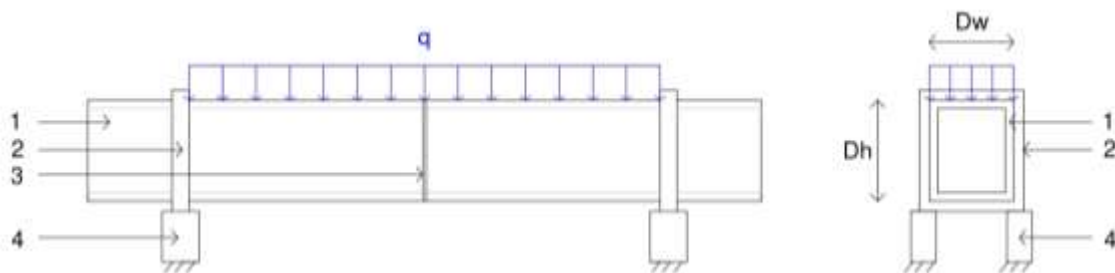
Flexural rigidity referred to 1 mm width EI_u [N/mm²] shall be calculated as the mean value of the six specimens and stated in the ETA.

2.2.12 Static load resistance

The assessment of static load resistance is mainly intended for external applications. Static load resistance is a reference of the product capacity to resist snow loads.

Test a ductwork with the least mechanical resistance combination of internal and external facings.

Ductworks and its joints shall be mounted according to the next figure and taking into account the manufacturer's product installation instructions (MPII).



- 1 - Ductwork
- 2 - Example of reinforcement steel profile
- 3 - Example of joint
- 4 - Example of support
- q - Uniformly distributed load
- Dh - Ductwork's height
- Dw - Ductwork's width

Figure 2.2.12.1: Static load resistance test setup.

Test shall be performed applying a uniformly distributed load (q) on the top surface of the ductwork.

Ductwork's cross-section shall be the least resistant variant of the system, i.e., maximum width and height or maximum diameter. Duct length shall be representative of the use conditions on site, but not less than $(1,0 \pm 0,1)$ m. The ductwork shall be assembled in accordance with the MPII including, when relevant, all the accessories used on site such as profiles, fixings or hangers. The ductwork shall be mounted supported according to the use conditions on site.

Before loading, measure the deflection at zero load in the inside of the duct in the middle of the top surface. Load shall be uniformly applied on the whole top surface tested (top half surface in case of circular ducts). Load shall be applied with dead load or with a press. Load shall be increased by steps of 20 kg and maintaining the load 15 min for each step.

During loading the deflection of top surface shall be continuously measured from inside the duct in the middle of the top surface.

Load shall be increased until the maximum deflection measured is width/10 (or diameter/10 in circular ducts) or the ductwork collapses.

The results of the test are the loads exposed on the product and the maximum deflection measured for each load, until deflection reaches width/10 (or diameter/10 in circular ducts) or any breaks, tears, rips or other openings are visible (e.g., with a videocamera).

Test results are also valid for ductworks with the following variations:

- Ductboards with higher flexural rigidity tested in accordance with clause 2.2.11.
- Ductworks with shorter distances between supports.

The static load resistance shall be presented in a diagram or table with the deflection [mm] as a function of the applied load [kN/m²].

A complete description of the specimen (cross-section, reinforcement steel profiles, supports, fixings, etc.) shall be stated in the ETA.

2.2.13 Hail resistance

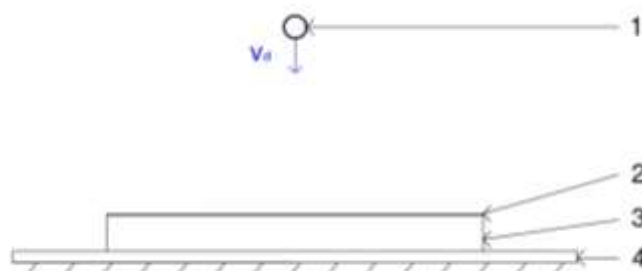
The assessment of hail resistance is mainly intended for external applications.

When the ductwork is a kit, hail resistance shall be assessed by testing the ductboards.

When the ductwork is an individual product, hail resistance shall be assessed by testing ductboards cut from the ductwork. Ductboards cut from circular ductboards shall be flattened before testing, alternatively, when ductboards do not maintain a flat shape, they shall be kept flat during the test (e.g., using platens or clamps) without interfering with the test procedure.

Ductboards shall be tested according to EN 13583. All external facings shall be tested.

Specimens shall be cut from boards, with a surface of 200 mm x 200 mm. A flat rigid surface (e.g., a steel plate) is used as test support instead of soft and hard supports defined in EN 13583. The test specimen shall be placed on the support with the outside surface up. Impacts shall be perpendicular to the tested surface (outside surface).



- 1 - Ball
- 2 – Outside facing of the ductboard
- 3 - Ductboard
- 4 – Flat rigid surface
- v_d - Ball speed

Figure 2.2.13.1: Hail resistance test setup.

The surface of the product is exposed to impacts by balls of gradually increasing energy (ball speed) until at least one perforation of the outside facing out of five shots of the same energy (= one test sequence) is observed. After each sequence, a visual inspection of the tested area is done to check if perforations have appeared.

The result of the test is the highest ball speed tested for which no perforations in the outside facing are observed.

The hail resistance shall be expressed in the ETA in accordance with EN 13583 (ball speed v_d [m/s]).

2.2.14 Durability under heat-cold cycles

The assessment of durability under heat-cold cycles is mainly intended for external applications.

Ductworks and its joints shall be mounted according to the test standard EN 13403, clause 7.3 and taking into account the manufacturer's product installation instructions (MPII).

Same test as for resistance against pressure (clause 2.2.8) is required, except for the following changes:

- Before testing the specimen shall be exposed to 10 heat-cold cycles of 24 hours comprising the following phases:
 1. exposure to (50 ± 5) °C (rise for 1 hour) and maximum 30 % RH for 7 hours (total of 8 hours).
 2. exposure to (-20 ± 5) °C (fall for 2 hours) and maximum 60 % RH for 14 hours (total of 16 hours).

Same expression of results in the ETA as resistance against pressure (clause 2.2.8) apply.

Test results are also valid for ductworks with the following variations:

- Ductboards with higher flexural rigidity tested in accordance with clause 2.2.11.

2.2.15 Durability under freeze-thaw cycles

The assessment of durability under freeze-thaw cycles is mainly intended for external applications.

Ductworks and its joints shall be mounted according to the test standard EN 13403, clause 7.3 and taking into account the manufacturer's product installation instructions (MPII).

Same test as for resistance against pressure (clause 2.2.8) is required, except for the following changes:

- Before testing the specimen shall be immersed in water at (23 ± 5) °C for 48 hours.
- After that, the specimen shall be exposed to 50 freeze-thaw cycles comprising the following phases:
 1. cool (freeze) which shall reach a temperature of (-20 ± 4) °C within 1 hour to 2 hours and hold at this temperature for a further 1 hour.
 2. heat (thaw) which shall reach a temperature of (20 ± 4) °C within 1 hour to 2 hours and hold at this temperature for a further 1 hour. During this phase water shall be sprinkled on the specimen as specified below.

Water shall be sprinkled downwards perpendicular to the top surface with a mean flow of 1,5 l/(m²·min); a maximum temporal deviation of the flow of 0,5 l/(m²·min) is permitted. In case of circular ducts, water shall be sprinkled downwards against the top half surface of the ducts.

Same expression of results in the ETA as resistance against pressure (clause 2.2.8) apply.

Test results are also valid for ductworks with the following variations:

- Ductboards with higher flexural rigidity tested in accordance with clause 2.2.11.

2.2.16 Acoustical absorption (insertion loss)

Acoustical absorption (insertion loss) of the ductwork shall be assessed by testing in accordance with EN ISO 7235 or EN ISO 11691 (when the design air flow velocity does not exceed 15 m/s).

All internal facings shall be tested.

The insertion loss performance shall be given in the ETA including the test standard used.

2.2.17 Acoustical absorption (absorption coefficient)

When the ductwork is a kit, acoustical absorption (absorption coefficient) shall be assessed by testing the ductboards.

When the ductwork is an individual product, acoustical absorption (absorption coefficient) shall be assessed by testing ductboards cut from the ductwork. Ductboards cut from circular ductboards shall be flattened before testing, alternatively, when ductboards do not maintain a flat shape, they shall be kept flat during the test (e.g., using platens or clamps) without interfering with the test procedure.

Ductboards shall be tested in accordance with EN ISO 354. Installation method A of EN ISO 354, annex B applies.

All internal facings shall be tested.

The measured acoustic absorption coefficient shall be expressed as the weighted sound absorption coefficient (α_w) in accordance with EN ISO 11654.

2.2.18 Thermal conductivity

When the ductwork is a kit, thermal conductivity shall be assessed by testing the ductboards.

When the ductwork is an individual product, thermal conductivity shall be assessed by testing ductboards cut from the ductwork. Ductboards cut from circular ductboards shall be flattened before testing, alternatively, when ductboards do not maintain a flat shape, they shall be kept flat during the test (e.g., using platens or clamps) without interfering with the test procedure.

Ductboards shall be tested in accordance with EN 12667 or EN 12939 (guarded hot plate method is recommended). Test specifications given in EN 14303, clauses 5.1 (sampling), 5.2 (conditioning) and 5.3.1 and 5.3.2 (testing) apply.

The thermal conductivity shall be given in the ETA including the test standard used.

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 Commission 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 Commission Decision 2015/1936/EC.

The systems are: 1, 3 or 4.

⁴ And propensity to undergo continuous smouldering, when relevant.

3.2 Tasks of the manufacturer

When the ductwork is an individual product, 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.

When the ductwork is a kit, the cornerstones of the actions to be undertaken by the manufacturer of the kit in the procedure of assessment and verification of constancy of performance are laid down in Tables 3.2.2. to 3.2.5.

For kits: The manufacturer (regarding the components he buys from the market with DoP) shall take into account the Declaration of Performance issued by the manufacturer of that component. No retesting is necessary.

Table 3.2.1 Control plan of the individual product 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)					
Incoming materials					
1	Receipt materials	Delivery ticket or label on the package	Conformity with the order	---	Each delivery
		Checking of supplier certificates or supplier tests	Conformity with the order	---	Each delivery
Finished product					
2	Reaction to fire and propensity to undergo continuous smouldering	Check grammage of facings	Compliance with Control Plan	1	Each delivery
3	Air tightness	2.2.6	Compliance with Control Plan	1	Once per 2 years
4	Resistance against pressure	2.2.8	Compliance with Control Plan	1	Once per 2 years
5	Water vapour permeability	2.2.9	Compliance with Control Plan	1	Once per 2 years
6	Water tightness	2.2.10	Compliance with Control Plan	1	Once per 2 years
7	Ductboard stiffness	2.2.11	Compliance with Control Plan	See note 1	Each batch
8	Hail resistance	2.2.13	Compliance with Control Plan	1	Once per 2 years
9	Acoustic absorption (insertion loss)	2.2.16	Compliance with Control Plan	1	Once per 5 years
10	Thermal conductivity	2.2.17	Compliance with Control Plan	1	Once per 2 years
Note 1: One specimen tested right side up position (with the external face down) and one specimen tested turned upside down.					

In addition, regarding the ductboards from which the ductwork is made of, the control plan for the manufacturer shall be based, in relation to the reaction to fire assessed in the ETA, on the requirements, methods and frequencies given in EN 14303, table A.2. 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.

Table 3.2.2 Control plan of kits 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) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
Components produced by the manufacturer himself:					
1	Ductboards	See table 3.2.3	See table 3.2.3	See table 3.2.3	See table 3.2.3
2	Sealants	See table 3.2.4	See table 3.2.4	See table 3.2.4	See table 3.2.4
Components not produced by the manufacturer himself:					
3	Ductboards	See table 3.2.5	See table 3.2.5	See table 3.2.5	See table 3.2.5
4	Sealants	See table 3.2.5	See table 3.2.5	See table 3.2.5	See table 3.2.5
Kits:					
5	Reaction to fire and propensity to undergo continuous smouldering	Check grammage of facings	Compliance with Control Plan	1	Each delivery
6	Air tightness	2.2.6	Compliance with Control Plan	1	Once per 2 years
7	Resistance against pressure	2.2.8	Compliance with Control Plan	1	Once per 2 years
8	Water tightness	2.2.10	Compliance with Control Plan	1	Once per 2 years
9	Ductboard stiffness	2.2.11	Compliance with Control Plan	See note 1	Each batch
10	Hail resistance	2.2.13	Compliance with Control Plan	1	Once per 2 years
Note 1: One specimen tested right side up position (with the external face down) and one specimen tested turned upside down.					

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.

Table 3.2.3: Control plan when the ductboards are produced by the manufacturer himself; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of specimens	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
Incoming materials					
1	Receipt materials	Delivery ticket or label on the package	Conformity with the order	---	Each delivery
		Checking of supplier certificates or supplier tests	Conformity with the order	---	Each delivery
Finished component					
2	According to the relevant clause of EN 14303	According to the relevant clause of of EN 14303	As defined in the Control Plan	According to the relevant clause of EN 14303	According to the relevant clause of EN 14303

Table 3.2.4: Control plan when the sealants are produced by the manufacturer himself; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of specimens	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
Incoming materials					
1	Receipt materials	Delivery ticket or label on the package	Conformity with the order	---	Each delivery
		Checking of supplier certificates or supplier tests	Conformity with the order	---	Each delivery
Finished component (aluminium adhesive tape)					
2	Thickness	As defined in the Control Plan	As defined in the Control Plan	As defined in the Control Plan	Every batch
3	Tensile strength	As defined in the Control Plan	As defined in the Control Plan	As defined in the Control Plan	Every batch
4	Adherence	As defined in the Control Plan	As defined in the Control Plan	As defined in the Control Plan	Every batch

Table 3.2.5: Control plan when the components are not produced by the manufacturer; cornerstones

No	Subject/type of control (ii)	Test or control method	Criteria, if any	Minimum number of specimens	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Components belonging to <u>Case 1</u> (i)	(1)	Conformity with the order	Testing is not required	Each delivery
		(2)	According to Control Plan	Testing is not required	Each delivery
2	Components belonging to <u>Case 2</u> (i):	(1)	Conformity with the order	Testing is not required	Each delivery
	▪ Characteristics declared in the Declaration of Performance (DoP) for the specific use within the kit.	(2)	According to Control Plan	Testing is not required	Each delivery
	▪ Characteristics not declared in DoP for the specific use within the kit.	(3)	According to Control Plan	According to Control Plan	According to Control Plan
3	Components belonging to <u>Case 3</u> (i):	(1)	Conformity with the order	Testing is not required	Each delivery
		(3)	According to Control Plan	According to Control Plan	According to Control Plan
<p>(1) Checking of delivery ticket and/or label on the package. (2) Checking of technical data sheet and DoP or, when relevant: checking of supplier certificates or supplier tests or test or control according to Tables 3.2.3 or 3.2.4 above. (3) Checking of supplier certificates or supplier tests or test or control according to Tables 3.2.3 or 3.2.4 above.</p>					
<p>(i) Case 1: Component covered by a DoP for all characteristics needed for the specific use within the kit. Case 2: If the component is a product covered by a DoP which, however, does not include all characteristics needed for the specific use within the kit or the characteristic is presented as NPD option for the component manufacturer. Case 3: The component is not covered by a DoP. (ii) Component characteristics are those defined in Tables 3.2.3 or 3.2.4 above.</p>					

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 fire⁵ and only under the conditions foreseen in the Commission Decision 2015/1936/EC.

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 carried out by the manufacturer regarding the constancy of performance related to reaction to fire					
1	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 are fulfilled for reaction to fire, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification or propensity to undergo continuous smouldering or both (e.g., an addition of fire retardants, ratio between fibres and binder of the mineral wool or organic content and grammage of facings).	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer.	As defined in the control plan agreed between the TAB and the manufacturer.	As defined in the control plan agreed between the TAB and the manufacturer.	When starting the production or a new line.
Continuous surveillance, assessment and evaluation of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire*					
2	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 in the Decisions regarding reaction to fire are fulfilled, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification or propensity to undergo continuous smouldering or both (e.g., an addition of fire retardants, ratio between fibres and binder of the mineral wool or organic content and grammage of facings).	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer.	As defined in the control plan agreed between the TAB and the manufacturer.	As defined in the control plan agreed between the TAB and the manufacturer.	1/year.

⁵ And propensity to undergo continuous smouldering, when relevant.

4 REFERENCE DOCUMENTS

EAD 36000-01-0803	Ventilation system made of mineral wool with facings on outside and inside.
EAD 280016-00-0602	Products for installation systems for supporting technical building equipment.
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 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 13583:2012	Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of hail resistance.
EN 13820:2003	Thermal insulating materials for building applications. Determination of organic content.
EN 13823:2020+A1:2022	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 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 11691:2020	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 Sample taking

The following conditions and parameters shall be considered for the product sampling:

- 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/m³)⁶;
- the product or product variant with the highest density as well as a density of about 100 kg/m³ (± 15%); if this range is lower than 115 kg/m³, 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 clause 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.

A.2 Preparation of test specimen

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 clause 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.

⁶ In order to permit the TAB to apply rules for the extended application of test results within the assessment, it is recommended that the manufacturer should provide (but he is not obliged to do so) sufficient information (e.g., on the basis of the composition of the products in question), allowing the TAB to determine which products or product variants should be submitted to testing and so to reduce the number of tests required.