

EUROPEAN ASSESSMENT DOCUMENT

EAD 360032-00-0803

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**LINER, MADE OF GLASS FIBRES,
MINERAL AND ORGANIC
SUBSTANCES, USED FOR
RELINING OF DUCTS FOR
VENTILATION PURPOSES**

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1 SCOPE OF THE EAD

1.1 Description of the construction product

The product according to this EAD consists of a hardened liner, made of glass fibres, mineral and organic substances (basic composite), named “liner” in this EAD, to be used as circular or rectangular air pipe inside a building. The liner is produced by layers which form the final compound, whereas the final compound is resulting in a homogeneous structure. The composition of the layered hardened liner is defined by means of the raw materials. The liner is either taking the form of the duct to be renovated without gluing to the duct or the liner is self-supporting. In this case fixation elements are not part of this EAD.

Hardening process of the flexible liner is taking place on site.

The product can also be applied for non-vertical installation, whereas the maximum possible inclination to be applied on site is 45°. In case of inclined installation, the reduction of the inner diameter of the liner is related to not more than 15% of its nominal diameter; in order to minimize the influence of the flow resistance and ensure proper cleanability of the liner. For inclination from 45° to 90° the liner includes prefabricated units.

Ancillaries (e.g., metallic parts like fixation elements) are not part of this EAD.

The product is not covered by a harmonised European standard (hEN). Furthermore, the product is not covered by EAD 360001-00-0803¹ as the EAD 360001-00-0803 is dealing with ventilation systems made of mineral wool covered with treated aluminium film.

Concerning product packaging, transport, storage, maintenance, installation, 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)

Relining of material-independent ducts with circular or rectangular cross sections for ventilation purposes to be used inside buildings. Whereas, the liner is used from end-to-end air transportation.

This EAD does not address the use of the product in specific atmospheres that may affect the durability of the product due to chemical reaction and/or changes of physical properties.

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 liner, for the intended use of 10 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 EADs in this chapter are to be understood as references to the dated versions listed in chapter 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.

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 liner 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
Basic Works Requirement 3: Hygiene, health and the environment			
2	Tightness	2.2.2	Level
3	Flow resistance	2.2.3	Level
4	Microbiological growth	2.2.4	Description
Basic Works Requirement 4: Safety and accessibility in use			
5	Ring stiffness	2.2.5	Level
6	Compound of the layered hardened liner	2.2.6	Level
7	Maximum height (including non-vertical installation)	2.2.7	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

Purpose of the assessment

This clause is referring to the assessment and classification of reaction to fire of the liner.

Note: Reaction to fire is related to the performance of the material as such. End-use conditions for the ventilation system, including the ventilation duct to be relined, are not subject of this EAD.

Assessment method

The liner shall be tested according to the method(s) referred to in EN 13501-1 and relevant for the corresponding reaction to fire class. The product shall be classified according to the Commission Delegated Regulation (EU) No 2016/364. For mounting and fixing conditions EN 14471, Clause 7.7.8, applies accordingly.

Expression of results

The performance of the liner shall be classified in the ETA.

2.2.2 Tightness

Purpose of the assessment

The tightness of the liner shall be assessed, depending on cross-section, in order to specify the liner in terms of its tightness for its intended use.

Assessment method

For the circular cross-section of air pipes, the assessment of the tightness shall be done on one representative unit according to EN 12237, Clause 7. Whereas, the test pressure (positive/negative) shall be selected according to Table 2 of EN 12237. For the calculation of the surface area of the duct EN 14239 applies.

For the rectangular cross-section of air pipes, the test specimen unit shall represent the rectangular cross section. The assessment of the tightness shall be done on one representative unit according to EN 1507, Clause 5. Whereas, the test pressure (positive/negative) shall be selected according to Table 1 of EN 1507. For the calculation of the surface area of the duct EN 14239 applies.

Expression of results

The assessed leakage factor [$\text{m}^3 \times \text{s}^{-1} \text{m}^{-2}$] shall be stated in the ETA.

2.2.3 Flow resistance

Purpose of the assessment

The flow resistance of the liner shall be assessed in order to specify the performance of the liner for the use in a ventilation system.

Assessment method

Assessment of the inner surface of the liner shall be done according to EN 13216-1 (Clause 5.11).

Note: The test procedure according to EN 13216-1 for the liner is introduced as the conditions given in it do apply independent from the intended use of the liner.

Expression of results

The mean roughness “r” shall be stated in the ETA.

2.2.4 Microbiological growth

Purpose of the assessment

The microbiological growth of the liner shall be assessed for its intended use.

Assessment method

Assessment shall be done according to EAD 360001-00-0803, Clause 2.2.3.

Expression of results

The outcome of the assessment shall be stated in the ETA by means of description for the assessment criteria indicated.

2.2.5 Ring stiffness

Purpose of the assessment

The ring stiffness of the liner shall be assessed in order to assess the performance of the liner in terms of the use in ducts, in particular in case of inclined ducts.

Assessment method

In the case of circular cross-section, the assessment of ring stiffness shall be done according to EN 1228, Method A.

Expression of results

The resulting ring stiffness shall be stated in ETA.

2.2.6 Compound of the layered hardened liner

Purpose of the assessment

The compound of the layered hardened liner is assessed in order to define its resistance against delamination.

Assessment method

The assessment is done by means of carrying out the tensile strength test on five specimens of the compound according to EN 2243-4. The test specimens are defined in Clause 7 in EN 2243-4, whereas the test temperature up to 150°C as defined in Clause 7.1.1 in EN 2243-4 applies and the test specimen is prepared without foil. The procedure follows EN 2243-4 for Type A test specimen but instead of honeycomb, a layered hardened liner specimen is used. The resulting tensile strength [MPa] is defined as the maximum measured stress in the delamination test, when specimen separate between the sheet layers and not along the adhesive surface.

Expression of results

The average resulting tensile strength [MPa] shall be stated in the ETA.

2.2.7 Maximum height (including non-vertical installation)

Purpose of the assessment

The maximum height of the liner shall be assessed for the vertical installation of the liner and in case of non-vertical installation of the liner, above the inclined part.

Assessment method

For vertical installation the maximum height of the liner is assessed for the self-supporting liner without opening sections and shall be assessed according to EN 1856-2, Clause 6.1.1, whereas for the preparation of the test specimen as defined in EN 1859, Figure 1 (a), is taking into account the specific situation of the manufacturing process of the liner. As Clause 6.1.1 in EN 1856-2 is referring to 6.2.1 of EN 1856-1, the reference is related to single wall sections. Clauses 6.2.1.1, third paragraph, 6.2.1.2, 6.2.2 and 6.2.3 of EN 1856-1 do not apply.

For the range of products to be covered by testing, Annex B.2 in EN 1856-1 applies, whereas for the concerned type(s) one specimen is used. The test specimen shall have a length of 3 times of the outer diameter (circular air pipe and rectangular air pipe), whereas a maximum length of 1 m applies. The test

specimens shall be a straight liner and a liner with up to 90° inclination, if part of the product. For test specimen with 90° elbow the length shall be 500 mm vertical above the elbow. Even in this case the test specimen shall have a length of 3 times of the outer diameter (circular air pipe and rectangular air pipe), whereas a maximum length of 1 m applies.

The assessment of the non-vertical installation is related to an angle of 45° of the inclined part and length above the inclined section. It is carried out as stated in EN 1856-1 with the following precisions:

- configuration of the test specimen is taking into account the maximum inclined installation situation for the concerned product according to Clause 1.1 in this EAD;
- the vertical load is to be applied centrally on the top of the vertical section above;
- the maximum deformation (15%, according to Clause 1.1 in this EAD) in the inclined section of the liner is defined according to Figure 2.2.1 and measured by means of gauge;

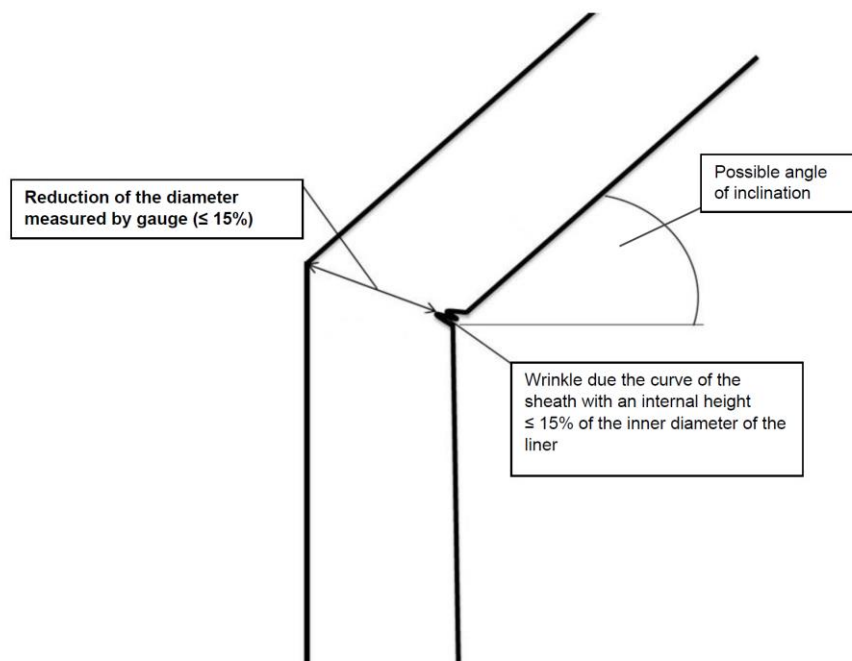


Figure 2.2.1: Reduction of the inner diameter of the liner

Expression of results

The maximum height is defined and stated in the ETA as:

- total height of liner [m] in case of straight installation and
- height [m] above the inclined section in case of including non-vertical installation.

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 (EU) of the European Commission.

The system is: 3

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

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 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	Incoming materials: Depending on the type (resin, additives, outer textile), internal records and/or tests	Documentation, internal tests, visual checks; depending on the type of the material Details laid down in the control plan.	Documentation, internal tests, visual checks; depending on the type of the material Details laid down in the control plan.	Each order, each product, each batch; depending on the type of material	Each order, each product, each batch; depending on the type of material
2	Composition of resin: internal records and/or tests	Composition and mixture according to working instruction	Reaction ability according to working instruction	One test per batch	One test per batch
3	Production of basic composite for the liner	According to working instruction	Content of components	Each unit	At least one test per batch
4	Processing	Degree of polymerisation according to working instruction	Details are laid down in control plan	1 test per unit and production day	1 test per unit and production day
5	Manufacturing of the liner: Geometry	According to working instruction	Length and diameter	Each produced liner	Each produced liner
	Visual check	Details are laid down in control plan	Evenness and homogeneity of the sheets of the liner	Each produced liner	Each produced liner
	Check of compound of the layered hardened liner	Clause 2.2.6 in this EAD	Minimum tensile strength laid down in control plan	1 sample per liner produced from one batch of based resin	Minimum one per delivery of base resin and/or one per week

3.3 Tasks of the notified body

The intervention of the notified body under AVCP system 1 is only necessary for reaction to fire for 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).

In this case the cornerstones of the tasks to be undertaken by the notified body under AVCP system 1 are laid down in Table 3.3.1.

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 <i>(for system 1 only)</i>					
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 (e.g., an addition of fire retardants or a limiting of organic material).	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 <i>(for system 1 only)</i>					
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 (e.g., an addition of fire retardants or a limiting of organic material)	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in Table 3.2.1	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

4 REFERENCE DOCUMENTS

EAD 360001-00-0803:10-2016	Ventilation system made of mineral wool covered with film on outside and inside
EN 1228:1996	“Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of initial specific ring stiffness“
EN 1507:2006	“Ventilation for buildings – Sheet metal air ducts with rectangular section – Requirements for strength and leakage“
EN 1856-1:2009	“Chimneys - Requirements for metal chimneys - Part 1: System chimney products“
EN 1856-2:2009	“Chimneys - Requirements for metal chimneys - Part 2: Metal flue liners and connecting flue pipes“
EN 2243-4:2005	“Aerospace series - Non-metallic materials - Structural adhesives - Test method - Part 4: Metal-honeycomb core flatwise tensile test“
EN 12237:2003	“Ventilation for buildings – Ductwork – Strength and leakage of circular sheet metal ducts“
EN 13216-1:2019	“Chimneys - Test methods for system chimneys - Part 1: General test methods“
EN 13501-1:2018	“Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests“
EN 14239:2004	“Ventilation for buildings – Ductwork – Measurement of ductwork surface area“
EN 14471: 2013+A1:2015	“System Chimneys with plastic liners – Requirements and test methods“