

## EUROPEAN ASSESSMENT DOCUMENT

EAD 060012-00-0802

October 2018

**KIT CONSISTING OF CHIMNEY  
FLUE LINER, MADE OF GLASS  
FIBRES, MINERAL AND ORGANIC  
SUBSTANCES, AND ANCILLARIES**

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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. 1 SCOPE OF THE EAD

### 1.1 Description of the construction product

The kit according to this EAD is consisting of the hardened chimney flue liner, made of glass fibres, mineral and organic substances (basic composite), and ancillaries. Hardening process of the flexible flue liner is taking place on site.

This EAD is applicable to a kit which is, depending on design situation, consisting of the following components:

- flue liner (consisting of outer textile and basic composite)
- metallic fittings
- cleaning and inspection doors
- condensate collector (optional)
- spacers (optional) made of stainless steel

Whereas:

Fittings used for products according to this EAD are made of metal and including elastomeric seals according to EN 1856-1 and EN 1856-2 respectively, whereas relevant designation for the kit according to Table 1 of this EAD applies.

Cleaning and inspection doors used for flue liner according to this EAD are made of metal and including elastomeric seals according to EN 1856-1 and EN 1856-2 respectively, whereas relevant designation for the kit according to Table 1 of this EAD applies.

Spacers according to this EAD are made of stainless steel ring springs, whereas the mechanical properties of the element are defined by its free length, the diameter of the wires and of the spring and the tensile force of the required shape.

Condensate collector used for products according to this EAD are made according to EN 1856-1 and EN 1856-2 as the metallic fittings.

Note: In the ETA it shall be stated that the use of siphon is not subject of the assessment according to the ETA.

The product is not covered by a harmonised European standard (hEN). This kind of product is not covered by EN 14471 due to consisting of composite materials, including mineral and organic substances and glass fibres, not dealt with in EN 14471.

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. This includes instruction on hardening of the product.

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)

Renovation or adaptation of existing chimneys for corrosion resistance classes 1 and 2 and maximum temperature class T200 according to EN 1443, whereas for corrosion resistance class 2 natural wood is excluded. Products according to this EAD shall not be used in chimneys with sootfire resistance class "G".

The product can also be used for non-vertical installation, whereas the maximum possible inclination is 45° and depending on the relevant design situation detailed in Clause 2.2.1.9. In case of inclined installation the bending of the inner diameter of the flue liner is related to not more than 10 % of the nominal diameter in order to minimize the influence of the flow resistance and ensure proper cleanability of the flue liner.

### 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 chimney flue liner, made of glass fibres, mineral and organic substances, and ancillaries for the intended use of 10 years when installed in the works (provided that the chimney flue liner, made of glass fibres, mineral and organic substances, and ancillaries is subject to appropriate installation (see 1.1)) These provisions are based upon the current state of the art and the available knowledge and experience and the assessment of the durability of the flue liner according to this EAD.

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

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 (if necessary in addition to the definitions in CPR, Art 2)

For the purposes of this EAD, the specific terms and definitions given in EN 1443, EN 1856-1 and -2, EN 13063-3, EN 14471 and EN 15287-1 and -2 apply.

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<sup>1</sup> 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. 2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

### 2.1 Essential characteristics of the product

#### 2.1.1 Essential characteristics of the chimney flue liner, made of glass fibres, mineral and organic substances, and ancillaries to be used in an assembled system

Table 1 shows how the performance of the chimney flue liner, made of glass fibres, mineral and organic substances, and ancillaries is assessed in relation to the essential characteristics.

The essential characteristics of the chimney flue liner, made of glass fibres, mineral and organic substances, and ancillaries relevant for the intended use of the product as foreseen by the manufacturer(s) and as referred to in Clause 1.2 of this EAD are indicated in Table 1.

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

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire (of the components)	2.2.1.1	Class
Basic Works Requirement 3: Hygiene, health and the environment			
2	Thermal performance	2.2.1.2	Level, Class
3	Gas tightness/leakage	2.2.1.3	Class
4	Flow resistance	2.2.1.4	Level
5	Thermal resistance	2.2.1.5	Level
6	Durability/Condensate resistance	2.2.1.6	Class
7	Durability against chemicals and corrosion	2.2.1.7	Class

No	Essential characteristic	Assessment method	Type of expression of product performance
<b>Basic Works Requirement 4: Safety and accessibility in use</b>			
8	Maximum height (including non-vertical installation)	2.2.1.8	Level
9	Durability of the flue liner		
9.1	Long-term resistance to thermal load	2.2.1.9.1	Description
9.2	Resistance to wet/dry cycling	2.2.1.9.2	Description
9.3	Long-term compatibility with ancillaries	2.2.1.9.3	Description
9.4	Compound of the layer	2.2.1.9.4	Description
9.5	Durability against Freeze-thaw	2.2.1.9.5	Description
9.6	Durability against UV radiation <sup>1</sup> <sup>1</sup> Relevant in case of flue liner is not covered against UV radiation	2.2.1.9.6	Description

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

The performance of any kit component which is obtained from a component manufacturer and is CE marked on the basis of a hEN or an EAD, will be considered to be the performance declared by the component manufacturer in his DoP. The component does not need to be re-assessed regarding this performance aspect.

### **2.2.1 Essential characteristic of the assembled chimney kit to be used in an assembled system**

#### **2.2.1.1 Reaction to fire**

For the flue liner for reaction to fire the assessment shall be done in equivalence to EN 14471, Clause 7.7.8. The product shall be classified according to Commission Delegated Regulation (EU) No 2016/364.

#### **2.2.1.2 Thermal performance**

For assessment of thermal performance EN 13216-1 applies, whereas the non-vertical installation shall be taken into account and the criteria according to EN 14471, Clause 6.6.1.3, apply.

In case of assessment of the thermal performance without expression of distance to combustible materials EN 1856-2 may be used, whereas relevant information shall be stated in the ETA.

#### **2.2.1.3 Gas tightness/leakage of the assembled kit**

Assessment shall be done according to EN 13216-1 applies. For the classification EN 1443 applies.

#### **2.2.1.4 Flow resistance of the assembled kit**

Assessment of the flue liner and the fittings shall be done either according to EN 13216-1, or using appropriate data according to EN 13384-1, depending on the inner surface and design situation.

In case of use of pressure-equalising opening EN 13063-3 applies in analogy.

#### **2.2.1.5 Thermal resistance**

Assessment of the thermal resistance of the kit shall be done depending on the design situation either according to EN 13216-1 or by calculation according to EN 13384-1 taking into account, where relevant, EN 15287-1.

#### **2.2.1.6 Durability/Condensate resistance of the assembled kit**

Assessment of condensate resistance of the kit shall be done depending on design situation to be expressed in the ETA according to EN 14471.

In addition, the durability of the flue liner dealt with in Clauses 2.2.1.9.1 to 2.2.1.9.3 is of relevance.

#### **2.2.1.7 Durability against chemicals and corrosion**

Durability against chemicals and corrosion is assessed by means of the assessment of the long term resistance to condensate exposure and resistance to wet/dry cycling as stated below:

Long term resistance to condensate exposure: For class 1 and class 2 assessment of durability against corrosion shall be done according to EN 14471. Assessment is to be done for the flue liner, whereas the classification according to Table 1 in this EAD is based on Tables 11 and 12 in EN 14471.



Due to the products covered by this EAD (layered structure of the product) it is possible to protect the cutting of the test specimen.

Resistance to wet/dry cycling: According to Clause 2.2.1.9.2 in this EAD, relevant for classification “W”.

#### 2.2.1.8 Maximum height of the assembled kit (including non-vertical installation)

The maximum height of the flue liner considered by maximum load by opening sections shall be assessed in equivalence to EN 1856-2, taking into account boundary conditions given in its Clause 6.1, taking into account the most onerous design situation. Most onerous situation means when installed as self-supporting structure.

The maximum height is stated referring to the minimum value resulting from the assessment.

Assessment of possible angle of non-vertical installation and related allowable length above and of the inclined section is done in equivalence to the assessment according to EN 1856-1 with the following conditions:

- configuration of the test specimen is taking into account the maximum inclined installation situation for the concerned product and referring to the minimum diameter, including the possible change of diameter according to Clause 1.2 in this EAD;
- the minimum distance of the inclined section shall include at least 3 spacers, whereas the positioning of the spacers shall take into account the most onerous situation within the inclined section;
- the vertical load is to be applied centrally on the top of the vertical section above;
- the possible movement of the vertical section due to the load is to be measured with a tolerance as given in EN 1859, Clause 4.1.2.2;
- the allowable movement is to be evaluated in the assessment procedure (recommended value is 5 mm – as is also given e.g. in EN 1856-1, Clause 6.2.1.2);
- factor of 3 applies;
- the maximum inclination and related maximum height of the assembled kit are to be stated in the ETA, including description of the design situation.

#### 2.2.1.9 Durability of the flue liner

##### 2.2.1.9.1 Long-term resistance to thermal load

For the long-term resistance to thermal load the properties stated below and their change after exposure to thermal load is assessed.

- Tensile strength at break of the flue liner (alternatively tensile modulus)
- Ring stiffness of the flue liner
- Density of the flue liner
- Geometrical stability of the flue liner
- Tightness of the flue liner with a connected fitting

The assessment method is given in Annex A. The assessment method given in Annex A is related to simulating the specific situation of reaction of flue gas to the material of the flue liner.

The change in the properties shall not affect the durability of the flue liner. This can be evaluated in comparison with indicated change in properties given in EN 14471, taking into account the composition of the flue liner.

For the assessment of the tightness of the flue liner with a connected fitting it is to be evaluated that the envisaged pressure class is maintained before and after exposure.

##### 2.2.1.9.2 Resistance to wet/dry cycling

For all design situations with classification “W” the assessment of resistance to wet/dry cycling shall be done according to EN 14471 for the properties of the flue liner stated below.

- Tensile strength at break of the flue liner (alternatively tensile modulus)

- Ring stiffness of the flue liner
- Density of the flue liner

The assessment of tensile strength at break (alternatively tensile modulus) shall be done according to EN 1393, method A.

The assessment of ring stiffness shall be done according to EN 1228, Method A.

The assessment of the density shall be done according to EN ISO 1183-1, whereas samples dried at a temperature of 160° C for 24 hours (for eliminating process water etc.) are used.

The change in the properties (in comparison to the virgin material) shall not affect the durability of the flue liner. This can be evaluated in comparison with indicated change in properties given in EN 14471, taking into account the composition of the flue liner.

#### 2.2.1.9.3 Long-term compatibility with ancillaries

The interaction of the metal parts with the flue liner under certain conditions (hot temperature) is considered as essential in respect to consequences of oxidation which may occur in the contact area. It shall be assessed by means of the change of the density and the tightness of the flue liner with a connecting fitting.

The assessment is given in Annex A of this EAD.

The change in the density of the flue liner in the area of the metallic fitting (in comparison to virgin material) shall be equivalent to the change of the density as defined in Clause 2.2.1.9.1 in this EAD. The tightness of the flue liner shall be maintained as indicated in Clause 2.2.1.9.1 in this EAD.

#### 2.2.1.9.4 Compound of the layer

The compound of the layer is defined by its resistance against delamination.

Assessment is based on the tensile strength of the compound according to EN 2243-4.

The composition of the layer is defined by means of the raw materials, deposited with the technical documentation of the manufacturer.

#### 2.2.1.9.5 Durability against Freeze-thaw

Freeze thaw resistance of the flue liner shall be assessed according to EN 14297, whereas Table 1 of EN 14297 applies. The assessment of damages, if any, shall be done in equivalence to EN 1457-1,-2 for ceramic flue liners.

Note: In equivalence means that the method referred to is addressed for other kind of products (ceramic flue liners) but shall be used for this product as well.

#### 2.2.1.9.6 Durability against UV radiation

UV radiation resistance shall be assessed in equivalence to EN 14471.

Note: In equivalence means that the method referred to is addressed for other kind of products (plastic chimneys) but shall be used for this product as well.

### **3. 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 95/467/EC<sup>2</sup> of the European Commission, amended by the Commission Decision 2001/596/EC<sup>3</sup> and 2002/592/EC<sup>4</sup> and 2010/679/EC<sup>5</sup>

The system(s) is (are): 2+

In addition, with regard to reaction to fire for products covered by this EAD the applicable European legal act is: Decision 2001/596/EC (EU)

The system(s) is (are): 1-3-4 depending on the conditions defined in the said Decision. The intervention of a Notified Body under system 1 is only necessary for class (A1, A2, B, C) if a limitation of organic substance or the addition of fire-retardant takes place in the production process.

The performance of any kit component which is obtained from a component manufacturer and is CE marked on the basis of a hEN or an EAD will, (for the purposes of verification of constancy of performance) be considered to be the performance declared by the component manufacturer in his DoP. The component does not need to be re-assessed regarding this performance aspect.

#### **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 2 to Table 2e.

In case of components manufactured by separate manufacturers, the FPC as indicated in the tables below is related to the manufacturer of the chimney kit.

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<sup>2</sup> Official Journal of the European Communities L 268/29 of 10.11.1995

<sup>3</sup> Official Journal of the European Communities L 209/33 of 2.08.2001

<sup>4</sup> Official Journal of the European Communities L 192/57 of 20.07.2002

<sup>5</sup> Official Journal of the European Communities L 292/55 of 08.11.2010

**Table 2 Control plan for the chimney kit; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	General	Definition of the responsibilities Handling of non-conformities			Continuously
2	Incoming materials	Documentation of incoming materials  For individual components Tables 2a till 2g of this EAD apply.			Each delivery
3	Production	Description of the production, including calibration of production means. Assembling			Continuously
4	Documentation of FPC	Documentation (description, working/testing instructions) Documentation of fulfilment of Tables 2a till 2g of this EAD Calibration of measuring instruments			Continuously
5	Finished products	Documentation for correct assembling of the kit for delivery			Each kit

**Table 2a Control plan of the flue liner; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
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.		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	
3	Production of basic composite for the flue 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	
5	Manufacturing of the flue liner: Geometry	According to working instruction	Length and diameter	Each produced flue liner	
	Visual check	Details are laid down in control plan	Evenness and homogeneity of the sheets of the flue liner		
	Check of compound	EN 2243-4	Minimum tensile strength laid down in control plan	1 sample per flue liner produced from one batch of based resin	Minimum one per delivery of base resin and/or one per week

**Table 2b Control plan of the metallic fittings (optional); cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	Parameters according to EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2
In case of supply of the components to the kit manufacturer: Relevant DoP and EC certificate					

**Table 2c Control plan of the cleaning and inspection doors for flue liner (optional); cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	Parameters according to EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2
In case of supply of the components to the kit manufacturer: Relevant DoP and EC certificate					

**Table 2d Control plan of the spacers (optional); cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	Material quality  Dimensions	Material quality: Each delivery  Dimensions: Type and frequency laid down in control plan			

**Table 2e Control plan of the condensate collector (optional); cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Factory production control (FPC)</b>					
1	Parameters according to EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2	EN 1856-1 EN 1856-2
In case of supply of the components to the kit manufacturer: Relevant DoP and EC certificate					

### 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 product are laid down in Table 3 to Table 3e. The role of the notified product certification body is limited only for reaction to fire and this only if a limitation of organic substances takes place or if a fire retardant is added in the production phase. The tasks of the notified bodies cannot be extended beyond the manufacturer of the kit.

**Table 3 Control plan of the chimney kit; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	Table 2 of this EAD	Control of devices and equipment and documentation of FPC for the kit			1
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
2	Table 2 of this EAD	Control of documentation of FPC for the kit			Once a year

**Table 3a Control plan for the flue liner; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	Parameters according to Table 2a of this EAD except reaction to fire	Control of devices and equipment and documentation of FPC for the kit		1	
2	Reaction to fire	In equivalence to EN 14471			
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
3	Parameters according to Table 2a of this EAD except reaction to fire	Control of documentation of FPC for the kit		Once a year	
4	Reaction to fire	In equivalence to EN 14471			

**Table 3b Control plan for the notified body for the metallic fittings (optional); cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2		1	
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
2	EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2		Once a year	



**Table 3c Control plan for the cleaning and inspection doors for flue liner; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2			1
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
4	EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2			Once a year

**Table 3d Control plan for the spacers (optional); cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	Dimension	Control of documentation			1
2	Material quality				
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
3	Dimension	Control of documentation			Once a year
4	Material quality				

**Table 3e Control plan for the condensate collector (optional); cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2			1
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
2	EN 1856-1 and EN 1856-2	EN 1856-1 EN 1856-2			Once a year

#### 4. REFERENCE DOCUMENTS

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

CPR “Construction Products Regulation (EU) No 305/2011”

EN 1228 “Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of initial specific ring stiffness”

EN 1393 “Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes; Determination of initial longitudinal tensile properties”

EN 1443 “Chimneys - General requirements”

EN 1457-1 “Chimney – Clay/ceramic flue liners – Part 1: Flue liners operating under dry conditions – Requirements and test methods”

EN1457-2 “Chimney – Clay/ceramic flue liners – Part 2: Flue liners operating under wet conditions – Requirements and test methods”

EN 1856-1 “Chimneys - Requirements for metal chimneys - Part 1: System chimney products”

EN 1856-2 “Chimneys - Requirements for metal chimneys - Part 2: Metal flue liners and connecting flue pipes”

EN 1859 “Chimneys - Metal chimneys - Test methods”

EN 2243-4 “Aerospace series - Non-metallic materials - Structural adhesives - Test method - Part 4: Metal-honeycomb core flatwise tensile test”

EN 13063-3 “Chimneys - System chimneys with clay/ceramic flue liners - Part 3: Requirements and test methods for air flue system chimneys”

EN 13216-1 “Chimneys - Test methods for system chimneys - Part 1: General test methods”

EN 13384-1 “Chimneys - Thermal and fluid dynamic calculation methods - Part 1: Chimneys serving one appliance”

EN 13501-1 “Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests”

EN 14241-1 “Chimneys - Elastomeric seals and elastomeric sealants – Material requirements and test methods - Part 1: Seals in flue liners”

EN 14297 “Chimneys - Freeze-thaw resistance test method for chimney products”

EN 14471 “Chimneys - System chimneys with plastic flue liners - Requirements and test methods”

EN 15287-1 “Chimneys - Design, installation and commissioning of chimneys - Part 1: Chimneys for non-roomsealed heating appliances”

EN 15287-2 “Chimneys - Design, installation and commissioning of chimneys - Part 2: Chimneys for roomsealed appliances”

EN ISO 1183-1 “Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method”

## **ANNEX A – ASSESSMENT OF THE LONG-TERM RESISTANCE TO THERMAL LOAD OF THE FLUE LINER WITH CONNECTED FITTINGS**

### **1. Scope**

This Annex describes the method of assessment of long-term resistance to thermal load by testing of properties of the flue liner with connected fittings and their change after exposure to thermal load. The test execution is related to the specific composition of the flue liner covered by this EAD.

### **2. Principles**

The principle of this test procedure is to assess the tensile strength at break, ring stiffness, density, geometrical stability, tightness of the flue liner with a connected fitting and reaction of metal parts when coming in contact with the flue liner according to the assessment method stated below before and after exposure of the hardened flue liner to thermal load as defined in Clause 6 in this Annex.

### **3. Samples and preparation of test specimens**

The test sample for assessment of the properties as defined in Clause 4 of the flue liner before exposure to thermal load shall correspond to the test pieces as defined in the test method for the individual property as defined in Clause 4.

Equivalent test sample from the same production shall be prepared in order to assess the properties after exposure.

As an alternative, single test pieces can be taken from different productions and shall be separated for the tests of the properties before and after exposure.

The test pieces shall be arranged in a way to ensure that all of them are subjected to the testing atmosphere.

In order to assess the compatibility with metallic parts the arrangement should include such elements in a proper way.

### **4. Testing execution for assessment of the properties before exposure to thermal load**

Assessment of tensile strength at break (alternatively tensile modulus) shall be done according to EN 1393, Method A.

Assessment of ring stiffness shall be done according to EN 1228, method A, with condition A, whereas the diameter of the tube shall be at least 150 mm.

Assessment of density shall be done according to EN ISO 1183-1. The density shall be checked on samples dried at a temperature of 160° C for 24 hours (for eliminating process water etc.)

Assessment of geometrical stability shall be done by measurement of change of internal diameter and length of the flue liner.

Assessment of tightness of a test sample with a connected fitting (without sealant) with the following conditions:

- testing pressure is depending on the envisaged pressure class;
- the length of the flue liner section is exceeding the dimension of the fitting on both sides between 50 mm to 150 mm;
- the opening of the fitting is connected to the pressure equipment.

Assessment of the reaction of metal parts when coming in contact with the flue liner: Measurement of change of density.

## 5. Test equipment for exposure to thermal load

The test equipment shall simulate the assessed maximum temperature class T200 situation for connections of flue pipes and fittings. It consists of an oven chamber with ventilation and control device for keeping constant the temperature of the surrounding air in the chamber and the testgas in the flue liner. Example is given in Figure 1.

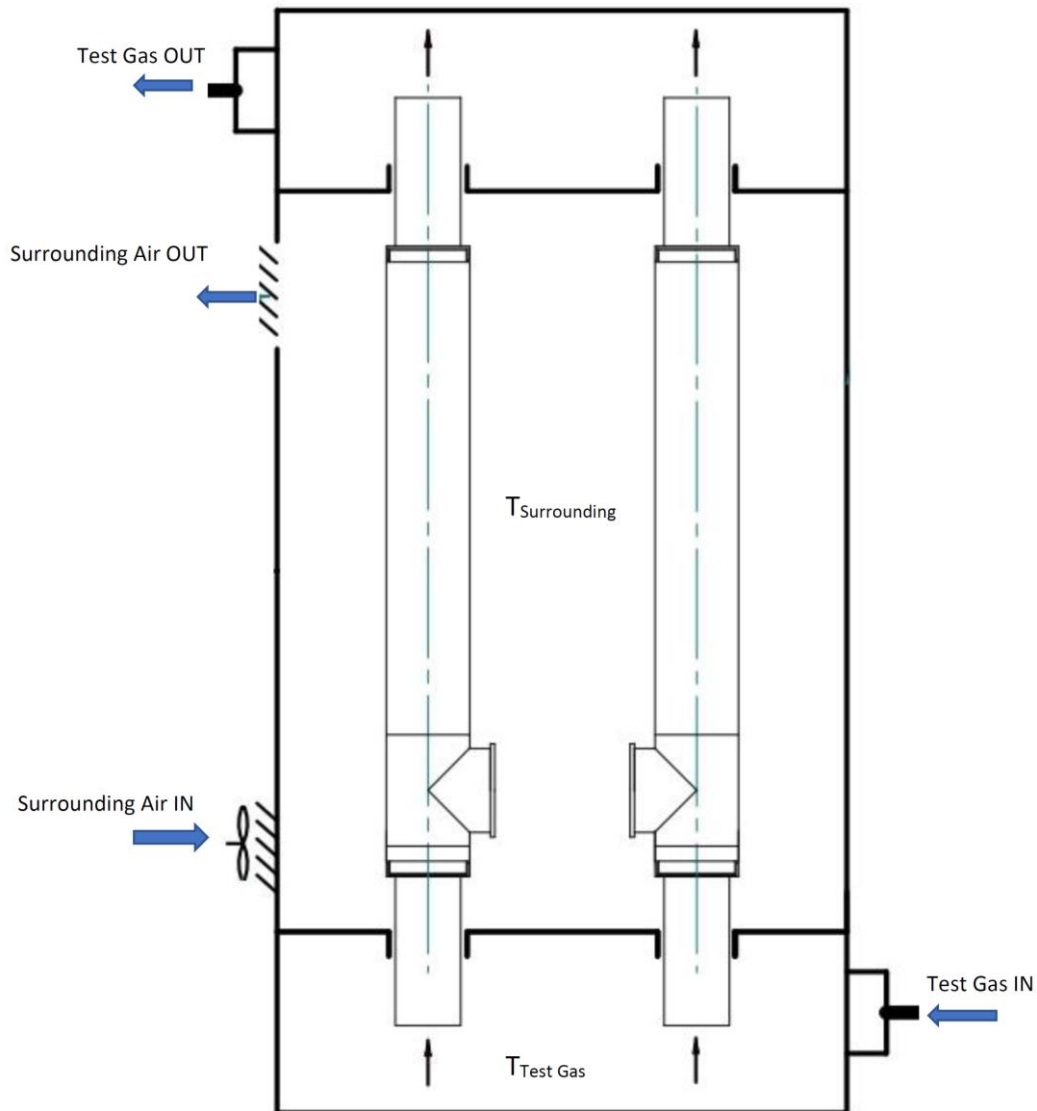


Figure 1 Testing arrangement

The test gas consists of nitrogen, CO<sub>2</sub> and oxygen, whereas an oxygen content of 13% is to be achieved.

The requested temperature for the test gas and surrounding air are ensured by electrical equipment.

The temperature of the surrounding air and the test gas is kept constant with a tolerance of  $\pm 2^\circ\text{C}$ .

The exchange rate in order to ensure constant condition of the surrounding air in the test chamber.

## 6. Execution of exposure to thermal load

The test specimen shall be exposed continuously for 70 days to 140°C surrounding air temperature and 200°C test gas temperature.

Note: Specific exposure conditions (differences in temperature, use of flue gas) are related to the composition of the product to be tested.

## **7. Testing execution for assessment of the properties after exposure to thermal load**

Assessment of tensile strength (alternatively tensile modulus) at break shall be done according to EN 1393, Method A.

Assessment of ring stiffness shall be done according to EN 1228, Method A, with condition A, whereas the diameter of the tube shall be at least 150 mm.

Assessment of density shall be done according to EN ISO 1183-1.

Assessment of geometrical stability shall be done by measurement of change of internal diameter and length of the flue liner, change in dimensions of openings in case of fittings (one or more).

Assessment of the tightness of a test sample with a connected fitting (testing conditions see clause 4 in this annex).

Assessment of the reaction of metal parts when coming in contact with the flue liner.

## **8. Expression of the results**

For all parameters given in Clause 2.2.1.9.1 in the EAD the values shall be stated and extraordinary occurrences (damages, debonding, etc.) shall be recorded.

## **9. Test report**

The test report shall refer to this Annex and shall include the following:

- Name of the manufacturer and production centre,
- Name and signature of testing body,
- Reference to this Annex and any deviation from it,
- Description of the test equipment,
- Date of the preparation of specimens, the date of test,
- Expression of the test results.