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European Assessment Document for

Kit for system stove-chimney
consisting of chimney kit with
clay/ceramic flue liner and
integrated stove unit



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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

The “Kit for system stove-chimney consisting of chimney kit with clay/ceramic flue liner and integrated stove unit” according to the title of this EAD, further referred to as “Kit for system stove – chimney” in the body text of the EAD, consists of a chimney kit with clay/ceramic flue liner, operating under negative pressure N1, and an integrated stove unit, as defined in Clause 1.3 in this EAD, with outer wall elements or a unit made of reinforced concrete, whereas the stove unit acts as roomsealed heating appliance. The roomsealed heating appliance according to this EAD is defined by its tightness according to Clause 2.2.10 in this EAD. The chimney element according to this EAD may be manufactured optionally as storey height unit or as monolithic storey height units, whereas, in case of storey height unit its maximum length is stated in the ETA. For the chimney kit according to this EAD the following designations apply: W3Gxx and D3Gxx respectively. In case of conveyance of the products of combustion to the outside atmosphere under wet conditions, the condensate lead is done outside of the stove element to prohibit condensation inside the stove element and shall be detailed in the ETA, if part of the product subject of assessment.

It is a kit for vertical launching of product for combustion in the chimney element of the product (Figure 1.1.1).

1.1.1 Chimney element

The chimney element acts as air flue system (concentric or side by side). For the chimney element of the kit for system stove – chimney the following components (in case of classification D3Gxx defined in EN 13063-1¹ and EN 13063-2, in case of classification W3Gxx defined in EN 1457-2) apply, taking into account that the chimney element itself does not contain an inspection door:

- clay/ceramic flue liner
- mortar for jointing flue liner
- outer wall made of concrete
- mortar for jointing outer wall
- covering made of metal or concrete, in order to prohibit wetness of the chimney element

Optional components of the chimney element include:

- upper cleaning and inspection door made of metal and clay/ceramic
- chimney fittings
- thermal insulation made of:
 - o mineral wool (see Figure 1.1.4)
 - o surface treatment of the concrete outer wall, made of foamed concrete (see Figure 1.1.4)
- reinforcement and related ancillaries, consisting of metallic elements
- grout for outer walls with defined degree of shrinkage and expansion
- thermal separating element in the chimney element (see Clause 1.3.8 and Figures 1.1.1 – 1.1.3)
- increased thermal insulation made of mineral wool, applied between the outer wall(s) of the chimney element and floor/roof/walls (see additional testing arrangement in Clause 2.2.2)
- elements for roof and ceiling penetration (depending on the intended use), according to Figures 1.1.2 and 1.1.3

Clay/ceramic flue liner and chimney fittings for products according to this EAD in case of the designation W3Gxx of the chimney element in case of outer wall including surface treatment made of foamed concrete correspond to the type A3N1 or type B3N1, as defined in the Table 1 in EN 1457-2.

In case of designation D3Gxx the EAD covers clay/ceramic flue liner and chimney fittings for the chimney element type A1N1 and type B1N1 as defined in EN 1457-1 respectively.

In case of designation W3Gxx of the chimney element and outer wall including surface treatment made of foamed concrete, a flue liner with water vapour diffusion class WA as defined in EN 1457-2 is used.

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

In case of outer wall made of concrete without surface treatment flue liner with water vapour diffusion classes WA/WB/WC as defined in EN 1457-2 is used.

Inspection of the chimney element and of the connecting elements is provided by appropriate measures (e.g., inspection openings in the connection elements). Appropriate collection of combustion products (e.g.; soot) to prevent possible overflow of sootfire in the stove element has to be ensured.

1.1.2 Stove unit

For the stove unit of the kit for system stove – chimney the following components apply:

- outer wall of the stove unit consisting of wall elements, made of steel fibre reinforced concrete with a bulk density in the range 800 kg/m³ to 2000 kg/m³, and openings, or, alternatively manufactured as monolithic unit made of steel fibre reinforced concrete with a bulk density in the range 800 kg/m³ to 2000 kg/m³
- covering plate made of concrete
- stove element integrated in the stove unit (see Clause 1.3.3 and Figure 1.1.1)
- door for opening of the stove unit, taking over the function of the inspection door by means of equivalent performance to the performance of an inspection door, depending on the performance of the stove element.
- connecting elements, connecting the stove element with the chimney element, consisting of metal or clay/ceramic (e.g.; adapter, connecting flue pipe and stove air supply duct; see also Clause 1.3.4).
- condensate lead element (in case of operating under wet conditions)
- sealants (for connecting elements) and seals (for the stove unit door)

Optional components of the stove unit, depending on the composition of the product to be covered by the ETA, include:

- Socket made of concrete
- Water run components
- Additional heating appliance for solid fuel (as insert for the combustion chamber of the stove element)
- Thermal separating element in the stove unit, made of metal (See Clause 1.3.9 and Figure 1.1.1)
- Thermal insulation made of mineral wool, applied between outer walls and the stove unit or within the stove unit
- Grout and mortar for connection of covering plate to outer wall of stove unit, as used for the chimney element
- Reinforcement and related ancillaries, as used for the chimney element
- Pellets storage box

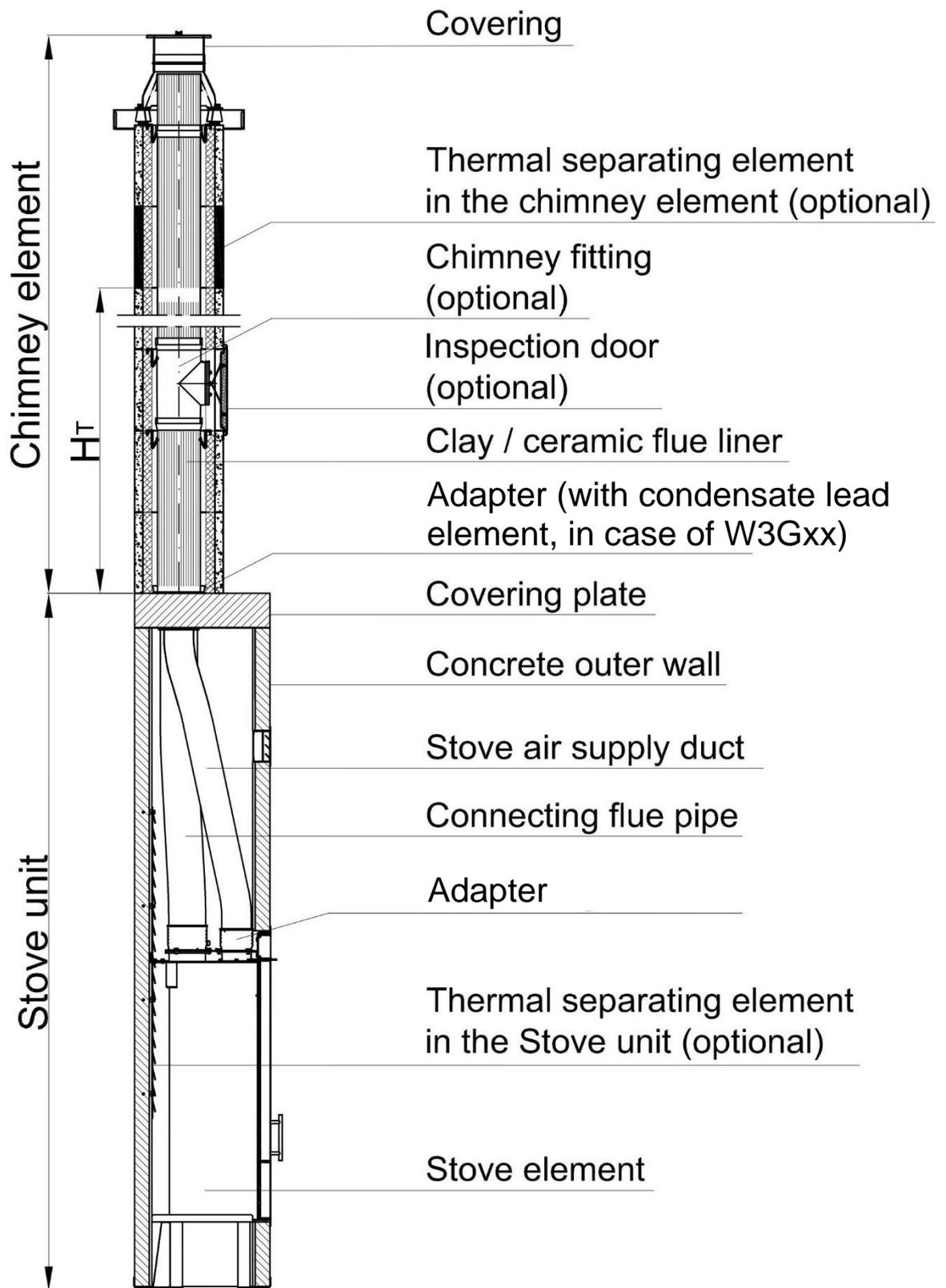


Figure 1.1.1: Assembled kit for system stove-chimney (Example, with concentric air flue chimney)

The product is not covered by harmonised European standards (hEN) EN 13063-1: 2007, EN 13063-2: 2007 and EN 13063-3: 2007 due to:

- combination of chimney element and stove unit;
- vertical conveyance of the products of combustion from the appliances to the outside atmosphere;
- roomsealed heating appliances acting as bearing component;
- the (optional) essential characteristics relevant for the use of the product in buildings with specific requirements regarding air tightness and minimum outer surface temperature;
- (optional) classification W3Gxx;
- testing arrangement according to EN 13216-1, referring to the chimney element, does not refer to the situation of increased thickness of the thermal insulation of the assembled chimney element as indicated optionally in Clause 2.2.2 in this EAD.

Justification for use of EN 13216-1:2004: Assessment methods given EN 13216-1:2004 are used throughout in this EAD in order to comply with related assessment methods in hENs, referred to in this EAD, and related classes indicated in EN 1443:2003 and implemented in the concerned hENs cited in the OJEU.

The optional application of the components for the use of the kit in buildings with specific requirements regarding tightness of the building and air exchange rate is illustrated in Figures 1.1.2 and 1.1.3 as examples. Elements for ceiling penetration are to be delivered with the kit for the concerned specific intended use but are not part of the chimney element as such. They are used together with the chimney element in case the chimney element should be used as suitable component in buildings with specific requirements regarding tightness of the building and air exchange rate (e.g., passive house).

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

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

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

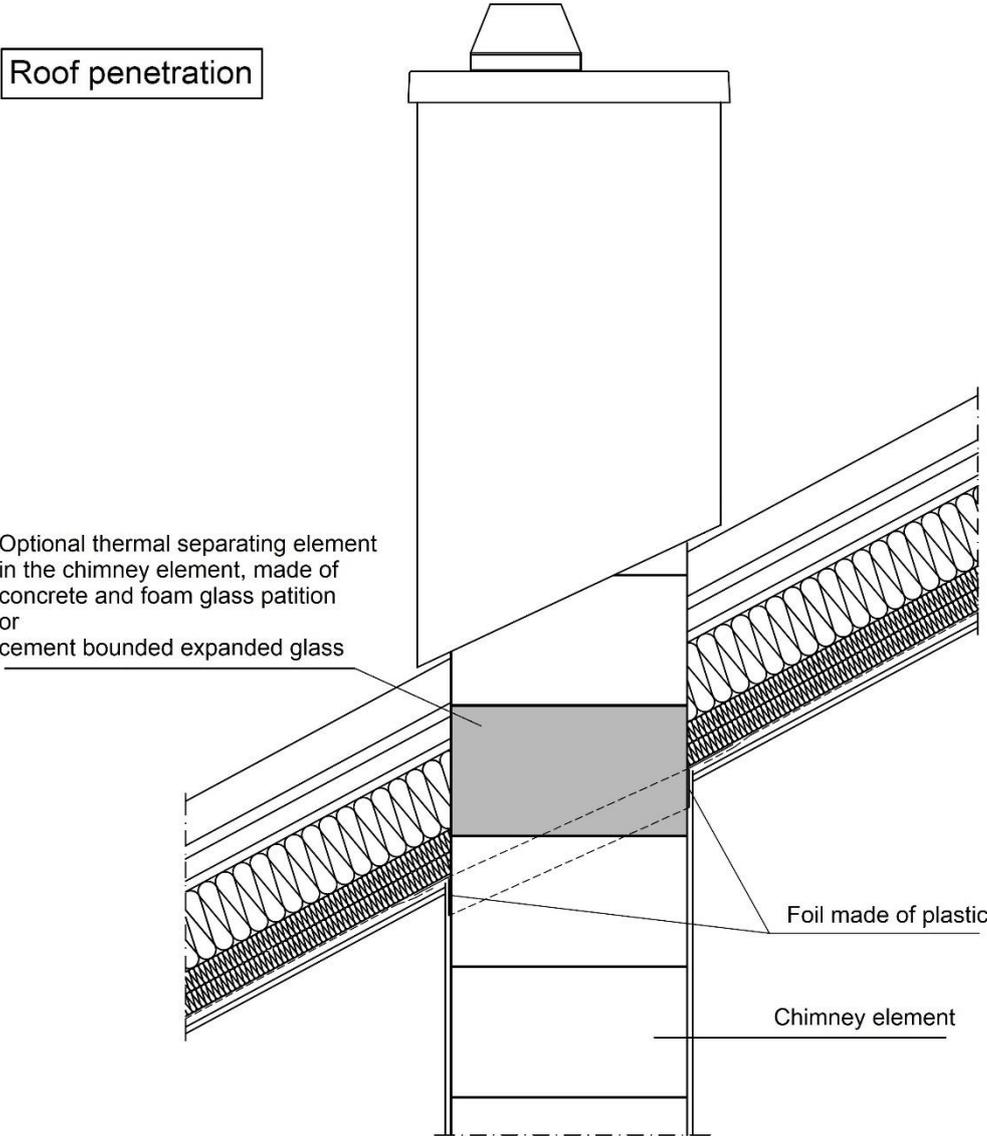


Figure 1.1.2: General drawing for the use of specific components for roof penetration

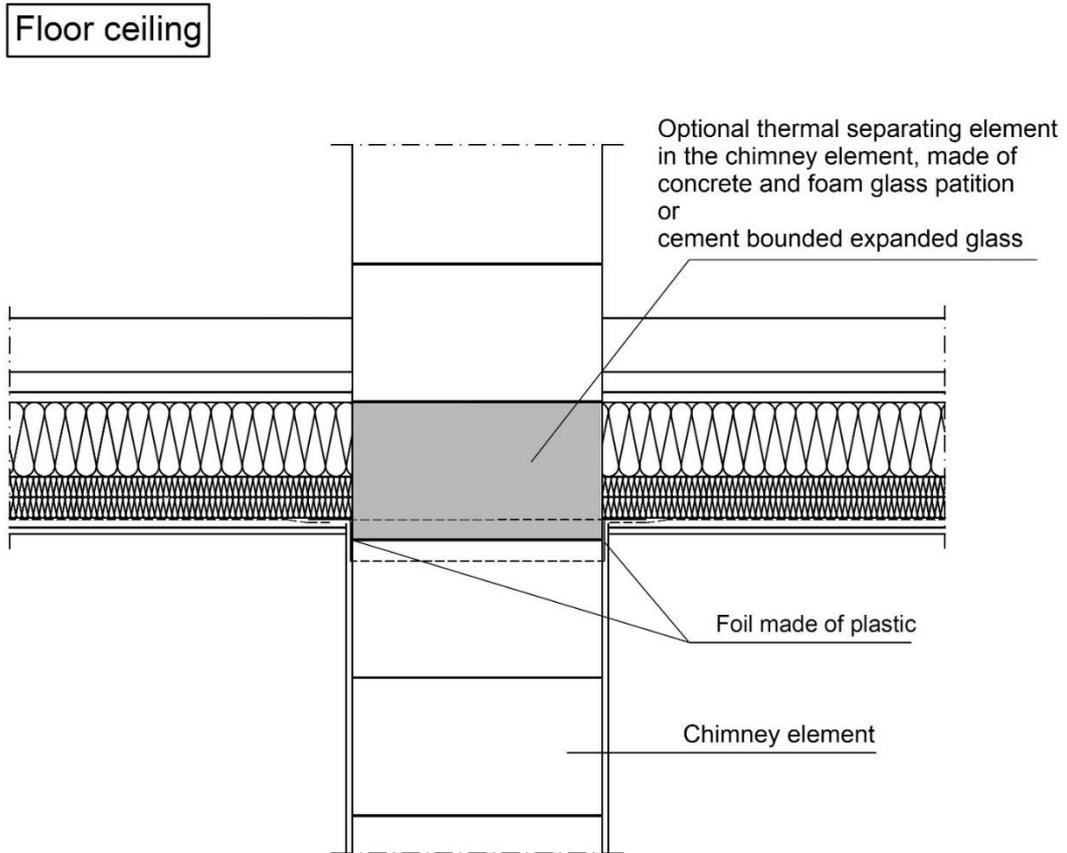


Figure 1.1.3: General drawing for the use of specific components for ceiling penetration

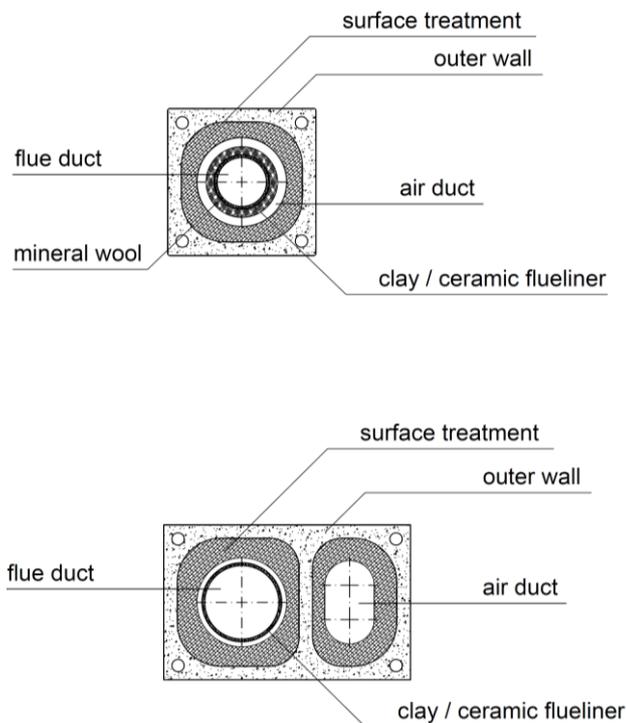


Figure 1.1.4: Example of cross sections of concentric air flue chimney and side-by-side air flue chimney

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

1.2.1 Intended use(s)

This EAD covers the following intended uses:

- heating rooms and buildings respectively, for fuel types split log/pellets apply.
- conveyance of the products of combustion from appliances to the outside atmosphere;
- Optional: System chimneys in case of chimneys for roomsealed appliances for N1 to be used as suitable component in buildings with specific requirements regarding tightness of the building and air exchange rate (e.g., passive house).

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 system stove-chimney for the intended use of 30 years when installed in the works (provided that the kit for system stove-chimney 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. Appropriate evaluation is carried out by means of the assessment of the resistance to abrasion of the flue liner in relation to the working life.

The elements within the stove unit, in particular those subject to wear, are to be expected for a shorter intended working life. In particular, this is referred to the elements within the stove unit, which are considered as exchangeable. This shall be addressed in the ETA.

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 (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 1457-1, EN 1457-2, EN 1856-1, EN 1856-2, EN 12446, EN 13063-1, EN 13063-2, EN 13063-3, EN 13240, EN 14785, FprEN 16510-1 and Commission Delegated Regulation (EU) 2015/1185 and 2015/1186 apply.

1.3.1 Kit for System stove-chimney

Unit consisting of chimney element and integrated stove unit, including ancillaries.

1.3.2 Stove unit

Unit acting as roomsealed heating appliance, consisting of an integrated stove element, its outer wall/plates etc., providing related mechanical resistance for the kit for system stove-chimney, and including ancillaries (e.g., connecting elements between stove element and chimney element etc.).

Note: Connecting flue pipes according to EN 1856-1 or EN 1856-2 are not concerned in this EAD due to the fact, that in opposite to them, the connecting elements are situated within the stove unit.

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.

1.3.3 Stove element

Element within the stove unit and consisting of components (e.g., opening doors, combustion chamber, ash box, etc.) as defined according to EN 13240 and EN 14785 respectively, whereas those essential characteristics, given in EN 13240 and EN 14785 respectively and relevant for intended use of the products for this EAD, are treated together with the assessment of the essential characteristics of the stove unit.

1.3.4 Condensate lead element

Element to prohibit condensation in the stove element, in case of classification W3Gxx. Example location given in Figure 1.1.1.

1.3.5 Connecting elements

Elements within the stove unit for the connection of the stove element with the chimney element (e.g., "Adapter", "Connecting flue pipe" and "Stove air supply duct" in Figure 1.1.1), consisting of metal or clay/ceramic (Type A1N1 and B1N1 according to EN 1457-1 and EN 1457-2 respectively).

1.3.6 Chimney fitting

The term chimney fitting corresponds to similar terms (chimney junctions (EN 1457-1 and EN 1457-2), opening sections (EN 13063-1)).

1.3.7 Grout

Grout: Cement-bonded mortar.

1.3.8 Thermal separating element in the chimney element

Separate outer wall element in order to minimize the thermal conductance of the outer wall in vertical direction (Figures 1.1.2 and 1.1.3), made of concrete and foam glass partition or cement bounded expanded glass.

1.3.9 Thermal separating element in the stove unit

Separate element in combination with the outer wall in order to reduce the heat transfer between the outer wall and adjacent burnable materials (see Figure 1.1.1). Made of metal, applied on inside surface of the back wall of the stove unit. Optionally, applied together with thermal insulation made of mineral wool externally to the outer wall.

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 kit for system stove - chimney consisting of chimney kit with clay/ceramic flue liner and integrated stove unit 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 kit for system stove-chimney 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	Resistance to fire from external to external	2.2.2	Level
3	Resistance to fire from internal to external (sootfire resistance and thermal shock resistance)	2.2.3	Class
4	Minimum distances to combustible materials in all directions	2.2.4	Level
Basic Works Requirement 3: Hygiene, health and the environment			
5	Energy Efficiency	2.2.5	Level & Class
6	Air tightness of the outer wall*	2.2.6	Level
7	Minimum outer surface temperature at defined ambient temperature*	2.2.7	Level
8	Gas tightness/leakage	EN 13063-1, Clause 5.3.1, EN 13063-2, Clause 5.3.1	Class
9	Flow resistance	2.2.8	Level
10	Thermal resistance	2.2.9	Level
11	Electrical safety	EN 13240, Clause 5.8 (fuel type split log) EN 14785 Clause 5.9 (fuel type pellets)	Description

No	Essential characteristic	Assessment method	Type of expression of product performance
12	Emissions of combustion products	2.2.10	Level
13	Maximum operating pressure in case of water run components	EN 13240, Clause A.4.9.4 (fuel type split log) EN 14785 Clause A.4.9.2 (fuel type pellets)	Level
14	Heating performance / Efficiency of heating appliance	2.2.11	Level
15	Tightness of the stove unit	2.2.12	Level
16	Cleanability (in case of use of pellets)	EN 14785 Clauses 4.5, 4.6 & 4.14	Description
17	Durability/Condensate resistance	2.2.13	Class
18	Durability of gas tightness/ leakage against chemicals/ corrosion Durability of compressive strength against chemicals	2.2.14	Class
Basic Works Requirement 4: Safety and accessibility in use			
19	Maximum height of the system stove chimney - Maximum height of the inner liner - Compressive strength of the jointing material - Maximum height of the outer wall	2.2.15	Level Level Level Level
20	Freeze/thaw resistance	2.2.16	Description
Aspects of durability			
21	Durability (in case of use of pellets)	EN 14785, Clause 4.2	Description
*For specific intended use in buildings with specific requirements regarding tightness of the building and air exchange rate.			

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.

Testing will be limited only to the essential characteristics which the manufacturer intends to declare. If for any components covered by harmonised standards or European Technical Assessments the manufacturer of the component has included the performance regarding the relevant characteristic in the Declaration of Performance, retesting of that component for issuing the ETA under the current EAD is not required.

The testing of the product in case of classification W3Gxx shall be carried out according to the test sequence stated in Annex A.

2.2.1 Reaction to fire

Purpose of the assessment

This clause is referring to the assessment of reaction to fire relevant for elements for ceiling penetration, if part of the product to be assessed and sealants and seals, as far as relevant for the stove unit.

Assessment method

Elements for ceiling penetration:

For reaction to fire, the component shall be assessed according to EN 13501-1. The products shall be classified according to Commission Delegated Regulation (EU) No 2016/364.

The following conditions apply:

The following product and end-use application parameters have to be considered: thickness, density, composition of product, substrate and method of fixing.

The substrates shall be selected in accordance with EN 13238. Where non-standard substrates are used, the test result is limited to that same substrate in its end use application.

The specimen has to be tested with surface and edge exposure according to EN ISO 11925-2, clauses 7.3.3.1 and 7.3.3.2.

The plastic material has to be applied without joints on both wings of test device according to EN 13823, clause 5.2.

Sealants and seals:

The sealants and seals used in the stove unit shall be tested according to the test method(s) referred to in EN 13501-1 and relevant for the corresponding reaction to fire class. The products shall be classified according to Commission Delegated Regulation (EU) No 2016/364.

Expression of results

Classes shall be stated in the ETA.

2.2.2 Reaction to fire from external to external

Purpose of the assessment

Assessment shall be done in order to express the performance of outer wall of chimney element.

Assessment method

The resistance to fire from external to external of the chimney element shall be assessed according EN 1366-13.

Expression of results

The assessed resistance to fire from external to external of the chimney element shall be stated in the ETA in terms of minutes.

2.2.3 Resistance to fire from internal to external (sootfire resistance and thermal shock resistance)

Purpose of the assessment

For the envisaged classification (D3G/W3G) of the chimney element the concerned class and related minimum distance to combustible materials shall be assessed.

Assessment method

For classifications D3Gxx/W3Gxx and including the covering made of concrete, if any, the following applies: EN 13063-1, Clauses 5.2.1.2 and 5.2.1.3, EN 13063-2, Clause 5.2.2.2.

For classifications D3Gxx/W3Gxx the following applies: The sootfire resistance and the distance between the outer surface of the chimney and the adjacent combustible material shall be assessed as G (xx), where G is the sootfire resistance class for chimneys with sootfire resistance and xx is the minimum distance in mm. For the minimum distance, the maximum value resulting of the assessment given in EN 13063-1, Clause 5.2.1 and taking into account the conditions stated above, is relevant.

In addition and optional, the following testing arrangements with respect to increased thermal insulation, deviating from EN 13216-1, are of relevance: on the test rig, as defined in 13216-1, figure 1, increased thermal insulation is applied to the walls and also under or above the floor between zone A-B and/or B-C (including definition of minimum distances to combustible materials, depending on the classification of the chimney element envisaged). In case of applying hot gas velocity according to EN 1859 instead of EN 13216-1, this shall be stated in the ETA. For this EAD this is exclusively related to the assessment of minimum distance to combustible materials in case of increased thermal insulation.

In addition, for classification W3Gxx of the chimney element, the leakage of cleaning and inspection doors, if part of the product composition, shall be assessed according to EN 13063-1, clause 5.3.1, and shall not lead to a leakage rate of the kit greater than given in Table 2 in EN 13063-1 for the concerned pressure class. The surface temperature shall be assessed according to EN 13063-1, Clause 5.4. This applies with the exception of cleaning and inspection doors which already have been subject of an assessment of a system chimney with classification W3Gxx.

In case of the classification D3Gxx of the chimney element for the connecting elements made of metal the resistance to fire and thermal performance at normal operating conditions shall be assessed according to EN 1856-2, Cl. 6.2 and Cl. 6.4.1. In case of the classification D3Gxx of the chimney element for the connecting elements made of ceramic either their classification A1N1, B1N1 is given or they have to be assessed equivalent to this classification according to EN 1457-1.

Expression of results

The relevant class, including the distance to combustible materials [mm] and including assessed increased thermal insulation [mm] of concerned wall/floor, where relevant, shall be stated in the ETA.

2.2.4 Minimum distances to combustible materials in all directions

Purpose of the assessment

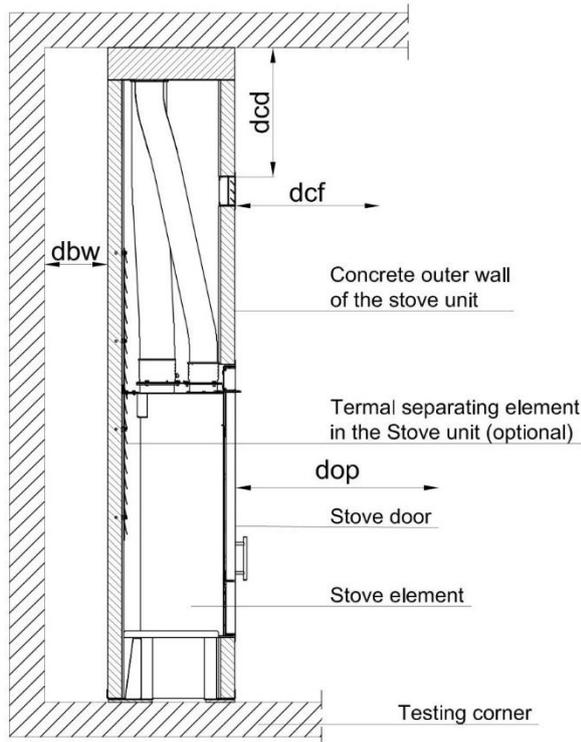
The assessment of the minimum distance to combustible materials in the directions defined in fig. 2.2.4.1 for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this essential characteristic for the stove unit, as the performance of the product is expressed by means of the performance of the stove unit.

Assessment method

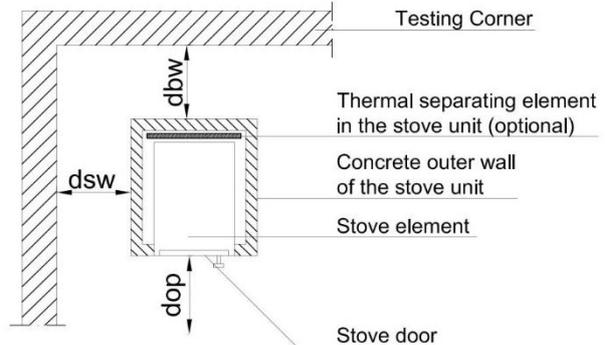
The related minimum distances of the stove unit to combustible materials, as defined in figure 2.2.4.1, shall be assessed.

Note: For products according to this EAD the distance between the stove unit and the floor is 0.

Sectional View - Side



Sectional View - Top



d_{bw}	Distance to back wall
d_{sw}	Distance to side wall
d_{op}	Distance to opening of the stove door
d_{cd}	Distance to convection opening, vertical
d_{cf}	Distance to convection opening, horizontal

Figure 2.2.4.1, stove unit - distances to combustible material

The minimum distances to combustible materials in the directions defined in figure 2.2.4.1 shall be assessed according to EN 13240, clause 5.6 in case of use of fuel type solid fuel and EN 14785, clause 5.1 in case of use of fuel type pellets, respectively.

The testing corner is defined in 13240, clause A.2.2. If increased thermal insulation is applied on the test walls and/or between the test walls and the stove unit, the type, position, density [kg/m^3] and thermal conductivity [W/mK] of the used insulation material shall be stated in the ETA.

The distances to be assessed shall be increased until the measured temperatures meet the requirements given in EN 13240, clause 5.6 and EN 14685, clause 5.1 respectively.

Expression of results

The minimum distance [mm] to combustible materials in the directions defined in figure 2.2.4.1 and the type, position, density [kg/m^3] and thermal conductivity [W/mK] of increased thermal insulation material, if used, shall be stated in the ETA.

2.2.5 Energy efficiency

The assessment of the energy efficiency for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this essential characteristic for the stove unit as the performance of the kit is expressed by means of the performance of the stove unit.

Purpose of the assessment

The energy efficiency of the stove unit shall be assessed by means of calculation and be stated as Energy-Efficiency-Index (EEI) and the corresponding Energy efficiency class. In addition, the seasonal space heating energy efficiency shall be determined.

Assessment method

The Energy-Efficiency-Index (EEI) shall be calculated on basis of the values from Table 2.1.1, No. 14 of this EAD and in accordance to ANNEX VIII of Commission Delegated Regulation (EU) 2015/1186, with the following formula:

$$EEI = (\eta \times BLF) - 10\% + F(2) + F(3) - F(4) - F(5)$$

where

η Efficiency of heating appliance at nominal heat output, derived from Table 2.1.1, No. 14 of this EAD

BLF Biomass label factor (1,45 for biomass local space heaters and 1 for fossil fuel local space heaters)

F (n) Correction factor, as defined in ANNEX VIII of Commission Delegated Regulation (EU) 2015/1186

The energy efficiency class shall be determined by Table 1 in ANNEX II of Commission Delegated Regulation (EU) 2015/1186.

The seasonal space heating energy efficiency (η_s) shall be calculated on basis of the values from Table 2.1.1, No. 14 of this EAD and according to ANNEX III, clause 5, of Commission Delegated Regulation (EU) 2015/1185, with the following formula:

$$\eta_s = \eta - 10\% + F(2) + F(3) - F(4) - F(5)$$

where

η Efficiency of heating appliance at nominal heat output, derived from Table 2.1.1, No. 14 of this EAD

F (n) Correction factor, as defined in ANNEX III of Commission Delegated Regulation (EU) 2015/1185

For the seasonal space heating energy efficiency (η_s), the following thresholds, given in table 2.2.5.1 of this EAD and in accordance with ANNEX II, clause 1, of Commission Delegated Regulation (EU) 2015/1185, apply:

Table 2.2.5.1 Threshold values for seasonal space heating energy efficiency (η_s)

Fueltype	η_s
Solid fuel other than compressed wood in the form of pellets	$\geq 65\%$
Compressed wood in the form of pellets	$\geq 79\%$

Expression of results

In the ETA the energy efficiency of the product shall be expressed by the Energy-Efficiency-Index (EEI) and the corresponding energy efficiency class as well as by the seasonal space heating energy efficiency (η_s).

2.2.6 Air tightness of the outer wall

Purpose of the assessment

Assessment is done for the use within buildings where specific requirements for the building and its elements regarding air tightness apply.

The assessment of the air tightness of the outer wall for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this essential characteristic for the chimney element, including all relevant components (e.g., mortar for jointing outer wall, inspection openings, ceiling penetration elements etc.), as the performance of the product is expressed by means of the performance of the chimney element.

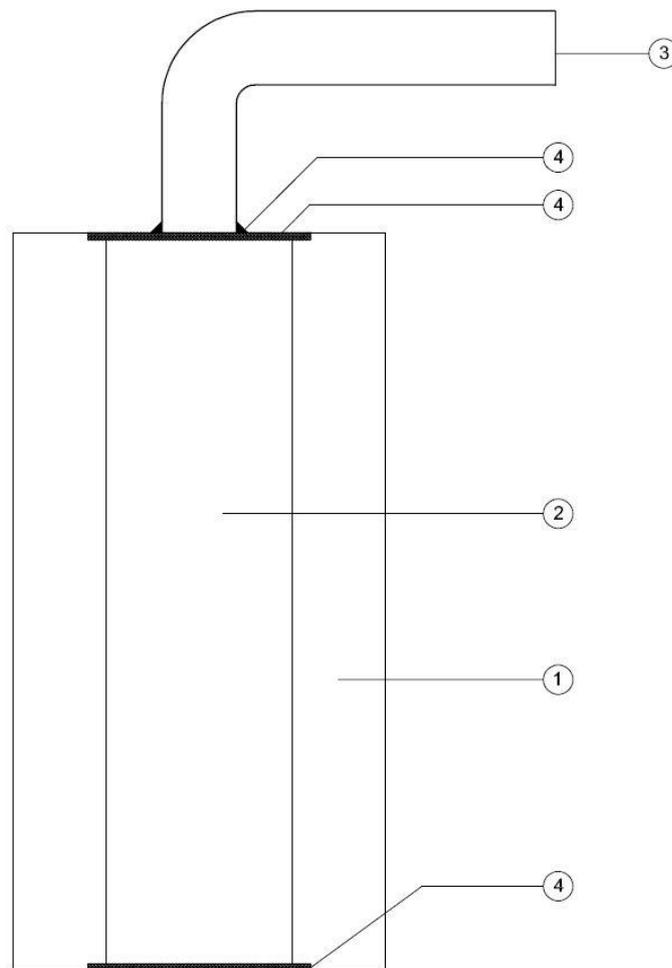
Assessment method

Assessment of the tightness shall be carried out before and after thermal load as defined in Clause 2.2.2 in this EAD, whereas the assessment is done on separate specimen. For each of the tests one specimen shall be tested. As test specimen a chimney unit, including all parts of the product composition (e.g., cleaning and inspection doors), shall be used.

Testing equipment

The testing equipment shall be such that the installed test specimen can be assessed applying positive and negative pressure of 50 Pa. For accuracies Clause 4.2 in EN ISO 9972 apply.

The test assembly, as defined in Figure 2.2.6.1, consists of a chamber with a sealable opening on one side, enclosing the test specimen.



Legend:

- 1 pressure chamber
- 2 test specimen
- 3 connection to ambient pressure
- 4 sealing

Figure 2.2.6.1

Preparation of test specimen

The test specimen shall be sealed on both ends. In addition, a tight connection between the inner surface of the outer wall and the ambient atmosphere is established.

Test execution:

Testing shall be done by applying the fan pressurised method (see also EN ISO 9972) on the outer and inner surface of the outer wall of the test specimen.

During testing the testing pressure of +/- 50 Pa applied to the outer surface shall be maintained constant. The duration of the application of pressure for both levels (positive and negative) shall be sufficient to allow the test pressure to stabilise before the air volume flow is measured. The related air volume flow in order to establish constant pressure shall be measured and recorded.

The measurement shall be done at ambient temperature (10 °C - 30 °C).

Test report

The test report should include:

- A detailed product description and information on treatment of the outer surface, if any
- Measured air volume flow [m^3/h] for both negative and positive pressure
- Observations of unusual occurrences, if any.

Expression of results

In the ETA the air tightness shall be expressed as average leakage rate [m^3/hm]. The average leaking rate before and after thermal load shall be expressed separately.

2.2.7 Minimum outer surface temperature at defined ambient temperature

Purpose of the assessment

The assessment of Minimum outer surface temperature at defined ambient temperature for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this essential characteristic for the chimney element, as the performance of the product is expressed by means of the performance of the chimney element.

Assessment of the minimum outer surface temperature of the unit inside heated buildings at defined ambient temperature (e.g., 20° C) is done, where specific requirements for the building and its elements regarding air exchange apply.

Assessment method

Assessment shall be done by means of calculation in order to evaluate the resulting temperature of the outer surface of the outer wall, taking into account the composition of the product to be covered in the ETA. For this as input value in the calculation the temperature inside of the regarded unit shall be taken into account on basis of an assumed outdoor ambient air temperature inside the unit, taking into account the climatic conditions of the geographic region where the product is intended to be placed on the market (e.g., 5°C). The concerned temperatures (indoor, outdoor) shall be stated in the ETA.

The calculation of thermal flow simulation shall be done on basis of 2D and 3D calculations with suitable software, certified by related technical specifications (e.g., EN ISO 10211 and EN ISO 10077-2). The determination of the thermal resistance "Rs" in [$\text{m}^2\text{K}/\text{W}$] shall be based on EN ISO 6946, ANNEX C.

Expression of results

The resulting minimum outer surface temperature of the outer wall shall be given in the ETA.

The program used for calculation shall be addressed in the ETA.

2.2.8 Flow resistance

The assessment of flow resistance for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this essential characteristic for the chimney element, as the performance of the product is expressed by means of the performance of the chimney element.

Purpose of the assessment

The flow resistance to be assessed for the chimney element is dealt with by means of the flow resistance of the relevant components to be addressed in the ETA for the individual product.

Assessment method

The flow resistance shall be assessed according to EN 13063-1, Clause 5.3.3 (related to flue liner and chimney fittings) and, in addition, EN 13063-3, Clause 5.7.1 (related to air flue system and pressure equalizing opening, if part of the product composition). The assessment of the relevant components (flue liner, concrete parts in case of air flue system, chimney fittings) shall be done either according to EN 13216-1, Clause 5.11, or using appropriate data according to EN 13384-1, Tables B.4 and B.8.

Expression of results

The flow resistance of the relevant parts shall be stated in the ETA by means of mean roughness or ζ -values.

2.2.9 Thermal resistance

The assessment of thermal resistance for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this essential characteristic for the chimney element, as the performance of the product is expressed by means of the performance of the chimney element.

Purpose of the assessment

The thermal resistance of the chimney element shall be assessed in relation to the inner diameter of the flue liner, taking into account the composition of the product (e.g., with/without thermal insulation, outer wall with/without surface treatment) to be covered in the ETA.

Assessment method

The thermal resistance of the assembled system shall be assessed according to EN 13063-1, Clause 5.2.3. In case of outer wall including surface treatment made of foamed concrete (see Fig. 1.1.4) this shall be included in the assessment stated above. The temperature measurement points, as defined in figure 15 of EN 13216-1, are to be applied adequately.

In addition for the foamed concrete, durability against heating, thermal conductivity (in case of calculation of the thermal resistance according to 13063-1, clause 5.2.3) and bulk density shall be assessed. Test specimen shall be prepared of hardened foamed concrete according to the relevant thickness of the foamed concrete as used and the conditions for specimen according to the standards below.

The assessment of durability against heating shall be carried out as stated in EN 13063-2, Clause 5.1.4.2, whereas those given in Clause 5.1.4.1 of EN 13063-2 do not apply. For durability against heating the allowable increase of temperature on the outer surface shall be within 10 %, as stated in EN 13063-1, Cl. 5.1.5.3. For thermal conductivity, to be assessed in respect to the concerned operating temperature of the chimney, EN 12667 applies, for bulk density EN 772-13 applies.

Note: Bulk density is assessed for factory production control purposes.

Expression of results

The thermal resistance shall be stated in the ETA, taking into account the composition of the product (e.g., with/without thermal insulation, outer wall with/without surface treatment), in the following way: R_{yy} (in relation to the inner diameter of the flue liner), where yy is the value in square meters Kelvin per Watt multiplied by 100, rounded to the nearest integer. For foamed concrete, bulk density can be given as supporting information.

2.2.10 Emissions of combustion products

Purpose of the assessment

For the stove unit, depending on the type of fuel (split logs, pellets), the emission of combustion products, defined by the amount of carbon monoxide emission (CO), amount of organic gaseous compounds (OGC), amount of nitrogen oxides (NO_x) and the amount of particulate matter emissions as defined thereafter shall be assessed.

Assessment method

For the assessment, clause 6.3.1 in FprEN 16510-1 applies. In addition, the following applies:

- For carbon monoxide emission (CO), FprEN 16510-1, clause 6.3.2 applies.
- For nitrogen oxides (NO_x) emissions, FprEN 16510-1, clause 6.3.3 applies, with the deviation for measurement methods ANNEX D.2.3 and D.2.4 do not apply.
- For the emission of organic gaseous compounds (OGC), FprEN 16510-1, clause 6.3.4 applies.
- For particulate matter (PM) emissions, FprEN 16510-1, clause 6.3.5 applies.

For products covered by this EAD, the threshold values at nominal heat output according to Commission Delegated Regulation (EU) 2015/1185, ANNEX II, clause 2, and given in Table 2.2.10.1 in this EAD, apply.

Table 2.2.10.1 Threshold values for emissions at nominal heat output of closed fronted solid fuel local space heaters

Emission type	Fuel type	Threshold at 13 % O ₂
Organic gaseous compounds (OGC)	Solid fuel other than compressed wood in the form of pellets	≤ 120 mg C/m ³
	compressed wood in form of pellets	≤ 60 mg C/m ³
Carbon monoxide (CO)	Solid fuel other than compressed wood in the form of pellets	≤ 1500 mg/m ³
	compressed wood in form of pellets	≤ 300 mg/m ³
Nitrogen oxides (NO _x) expressed as NO ₂	biomass	≤ 200 mg/m ³
Particulate matter (PM)	Solid fuel other than compressed wood in the form of pellets	≤ 40 mg/m ³
	compressed wood in form of pellets	≤ 20 mg/m ³

Expression of results

The results, in relation to the nominal heat output and the part load heat output (if part load is specified), shall be stated in the ETA in [mg/m³].

2.2.11 Heating performance / efficiency of heating appliance

The assessment of the heating performance / efficiency of heating appliance for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this essential characteristic for the stove unit (as defined in Clause 1.3.2 of this EAD), as the performance of the product is expressed by means of the performance of the stove unit.

Assessment method

For fuel type split log, Clause 6.3 - 6.8 and Annex A of EN 13240 apply.
For fuel type pellets, Clauses 6.1, 6.4 - 6.10 and Annex A of EN 14785 apply.

Expression of results

The heating performance of the stove unit (as defined in Clause 1.3.2 of this EAD) shall be expressed in the ETA as nominal heat output in [kW] and part load heat output in [kW] (if part load is specified). The efficiency “ η ” at nominal heat output shall be expressed in percent [%] as the ratio of the nominal heat output and the net caloric value of the used fuel in the test procedure.

2.2.12 Tightness of stove unit

Purpose of the assessment

The tightness of the stove unit shall be assessed in relation to a defined number of opening and closing cycles.

Assessment method

The tightness of the stove unit, including all elements (e.g., connecting elements defined in clause 1.3.5), shall be assessed as leakage rate [m³/h] before and after thermal and mechanical load.

For thermal load, the assessments in EN 13240, A.4.7 and A.4.9 apply. The testing pressure is defined as a positive pressure of 10 Pa.

For the mechanical load for fuel type split log, a defined number of 6000 opening and closing cycles for the opening door of the stove unit applies. If a separate ashpit door is part of the product, in addition, a defined number of 1000 opening and closing cycles for the ashpit door applies.

For the mechanical load for fuel type pellets, a defined number of 500 opening and closing cycles for the opening door of the stove unit and 1000 opening and closing cycles for the fuel hopper lid apply.

In addition, for the opening of the stove unit acting as lower inspection door of the chimney element in relation to tightness N1 as defined in EN 1443, table 5, and due to absence of a lower inspection door in the chimney element, the tightness is assessed with an increased positive pressure of 40 Pa.

Expression of results

The tightness after thermal and mechanical load, expressed as leakage rate in [m³/h] for each testing pressure shall be stated in the ETA.

Note: The tightness before thermal and mechanical load is used for factory production control purposes according Table 3.2.2 of this EAD.

2.2.13 Durability/Condensate resistance

Purpose of the assessment

For the envisaged classification W3G of the chimney element the condensate resistance, dealt with in harmonised standards as durability aspect, shall be assessed.

Note 1: For classification D3Gxx of the chimney element separate assessment of this essential characteristic for the chimney element is not relevant.

Note 2: Elastomeric sealings are not part of the kit W3Gxx.

Assessment method

The condensate resistance of the assembled system shall be assessed according to EN 13216-1, Clause 5.5, except assessment of changing in weight of test sample or components according to Clauses 5.5.3 and 5.5.5.

The vapour saturation resistance (condensate resistance in the meaning of EN 13063-2) of the assembled system shall be assessed according to EN 13216-1, Clause 5.6, as stated in EN 13063-2, Clause 5.3.2.1.

Description that no vapour saturation in any part of the kit and no appearance of water on the outside of the test sample of fittings or chimney sections occur. If met, the condensate resistance of the chimney element shall be assessed as condensate resistance class "W".

In addition, in case of classification W3Gxx for the chimney element, for the connecting elements made of metal in the stove unit the water vapour resistance and the condensate resistance shall be assessed according to EN 1856-2, Cl. 6.4.4 and Cl. 6.4.5. In case of classification W3Gxx of the chimney element for the connecting elements made of ceramic either their classification A3N1, B3N1, according to Table 1 in EN 1457-2, is given or they have to be assessed equivalent to this classification according to EN 1457-2.

Expression of results

The relevant class shall be stated in the ETA. In case of classification W3G of the chimney element, in addition it shall be stated for the connecting element of the stove unit and the stove element: water/vapour not occurring/occurring.

2.2.14 Durability of gas tightness/leakage against chemicals/corrosion, durability of compressive strength against chemicals

The assessment of this essential characteristic for the kit for system stove-chimney consisting of chimney element with clay/ceramic flue liner and integrated stove unit is carried out by means of assessment of this

essential characteristic for the chimney element, as the performance of the product is expressed by means of the performance of the chimney element.

Purpose of the assessment

The assessment shall be done for the envisaged classification D3Gxx/W3Gxx of the chimney element. In case of W3Gxx it is composed of the following: Assessment of sootfire resistance, assessment of condensate resistance and assessment of the jointing material of the flue liner.

2.2.14.1 W3Gxx classification

Assessment method

For classification W3Gxx the following applies:

Assessment of sootfire resistance: Clause 2.2.3 in this EAD applies.

Assessment of condensate resistance: Clause 2.2.7 in this EAD applies.

- For the assessment of jointing material made of mortar for the flue liner the following applies: Compressive strength according to EN 13063-2, Clause 5.1.3.1.2,
- Water resistance according to EN 13063-2, Clause 5.1.3.1.3
- Acid resistance according to EN 13063-2, Clause 5.1.3.1.4.

Expression of results

If the requirements stated above are fulfilled, the chimney shall be classified as corrosion resistant class "3", otherwise the product falls beyond the scope of this EAD.

2.2.14.2 D3Gxx classification

Assessment method

For classification D3Gxx, the assessment according to EN 13063-1, Clause 5.3.2 applies.

Expression of results

If the requirements stated above are fulfilled, the chimney shall be classified as corrosion resistant class "3", otherwise the product falls beyond the scope of this EAD.

2.2.15 Maximum height

Purpose of the assessment

The maximum height of the system stove-chimney shall be assessed by means of the assessment of its components outer walls (chimney element and stove unit outer wall elements), types of flue liners and their jointing materials. This is in order to assess the minimum resulting maximum height on basis of the individual assessments.

Assessment method

For the chimney element:

For assessment of the maximum height of the inner liner (by means of maximum load for opening sections) EN 13063-2, Clause 5.1.2 (applicable for classification W3G and D3G) applies. Deviating to ANNEX A.2.3.3 of EN 13063-2, the applied load shall be increased until failure and the maximum load "F_{OP}" in [kN] shall be recorded. The maximum height "H_{IL}" in [m] of the inner liner shall be calculated as follows:

$$H_{IL} = (100 * F_{OP}) / (\chi * G_c)$$

where

F_{OP} Maximum load of the opening section in [kN]

χ Safety factor = 5

G_I	Weight per meter [kg/m] of the inner liner
H_{IL}	Maximum height of the inner liner [m]

For mortar jointing for flue liner EN 13063-2, Clause 5.1.3.1.2 (designation W3G of the chimney element) and EN 13063-1, Clause 5.1.4.2 (designation D3G of the chimney element) apply.

For assessment of the maximum height of the outer wall of the chimney element EN 12446, Clause 8.4 applies. For the test load ANNEX A.11 of EN 1857 applies. The compressive strength " σ " in [N/mm²] shall be measured before and after thermal load. The test specimen shall be taken from the corner situated on the flue-duct-side of the outer wall element (see figure 2.2.15.1), if a side-by-side air flue chimney is part of the kit. Whereas, surface treatment, if part of the product composition (as, for example, shown in figure 2.2.15.1), is not be considered.

The maximum possible height " H_{OW} ", in [m], of the outer wall element is calculated as follows:

$$H_{OW} = \text{MIN} \{ H_{OWb.th}; H_{OWa.th} \}$$

where

$$H_{OWb.th} = (\sigma_{b.th} * A) / (10 * \chi_{b.th} * G_{OW}) = \text{Maximum possible height before (b.th) thermal load in [m]}$$

$$H_{OWa.th} = (\sigma_{a.th} * A) / (10 * \chi_{a.th} * G_{OW}) = \text{Maximum possible height after (a.th) thermal load in [m]}$$

$\sigma_{b.th/a.th}$ compressive strength before (b.th) and after (a.th) thermal load in [N/mm²]

A Cross sectional area of outer wall element in [mm²]

$\chi_{b.th/a.th}$ Safety factor = 4 before (b.th) and = 3 after (a.th) thermal load

G_{OW} Weight per meter [kg/m] of the outer wall of the chimney element.

For jointing material for outer wall EN 13063-1, Clause 5.1.7 applies.

For the maximum possible height above of the thermal separating elements in the chimney element, defined as " H_{TSE} " in [m], if part of the kit (e.g., concrete part + foam glass partition / cement bounded expanded glass, see Figures 1.1.2 and 1.1.3), the assessment defined above (for maximum height of the outer wall of the chimney element) applies with the following addition:

The maximum height " $H_{C.TSE}$ " in [m] of the outer wall of the chimney element, including thermal separating elements, is calculated as follows:

$$H_{C.TSE} = H_{TSE} + H_T$$

where

H_{TSE} Assessed equivalent to H_{OW}

H_T Distance between lowest part of the chimney element and lowest thermal separating element in the chimney element, in [m](see Figure 1.1.1)

For the stove unit:

The compressive strength of the outer wall of the stove unit shall be assessed according to EN 12446, Clause 8.4. For the test load ANNEX A.11 of EN 1857 applies. The compressive strength " σ " in [N/mm²] shall be measured before and after thermal load. The test specimen shall be taken from the centre of a side wall on the left or right side of the outer wall of the stove unit, in the area of the combustion chamber, where the highest temperatures are expected to occur. Deviating from EN 12446, the dimension "a" of the test specimen is defined by the thickness of the side wall of the stove unit.

The maximum possible load of the stove unit " M_{SU} " in [kg] shall be calculated as follows:

$$M_{SU} = \text{MIN} \{ M_{Sub.th}; M_{SUa.th} \}$$

where

$$M_{Sub.th} = (\sigma_{b.th} * A) / (\chi_{b.th} * g)$$

$$M_{SUa.th} = (\sigma_{a.th} * A) / (\chi_{a.th} * g)$$

$\sigma_{b.th/a.th}$ compressive strength before (b.th) and after (a.th) thermal load in [N/mm²]

A Cross sectional area of load-bearing concrete mantel of the stove unit in [mm²]

$\chi_{b.th/a.th}$ Safety factor = 4 before (b.th) and = 3 after (a.th) thermal load

g 10 m/s²

Note: The weight of the stove unit is neglected in the calculation.

The maximum height "H_{c.su}" in [m] of the chimney element which can be carried by the stove unit is defined as:

$$H_{c.su} = M_{SU} / G_c$$

where

G_c Weight of the chimney element in [kg/m] (G_{IL} + G_{OW})

For the system stove-chimney (whole kit):

The maximum height "H" in [m] of the kit system stove-chimney is the outcome of the individual assessments of maximum heights and defined as:

$$H = H_{SU} + H_c$$

where

H_c = MIN { H_{IL}; H_{OW}; H_{c.su}; H_{c.TSE} } = Maximum height of the chimney element

H_{SU} Height of the stove unit in [m]

Expression of results

The maximum height "H" of the system stove-chimney shall be expressed in the ETA by [m]. As far as compressive strength is outcome of the assessment according to the relevant standard, mentioned above, it shall be stated in the ETA as well. In case of including a thermal separating element in the chimney element this shall be taken into account in the expression of results. In addition, the maximum height of the inner liner, the compressive strength of the jointing materials and the maximum height of the outer wall of the chimney element shall be given in the ETA in [m]

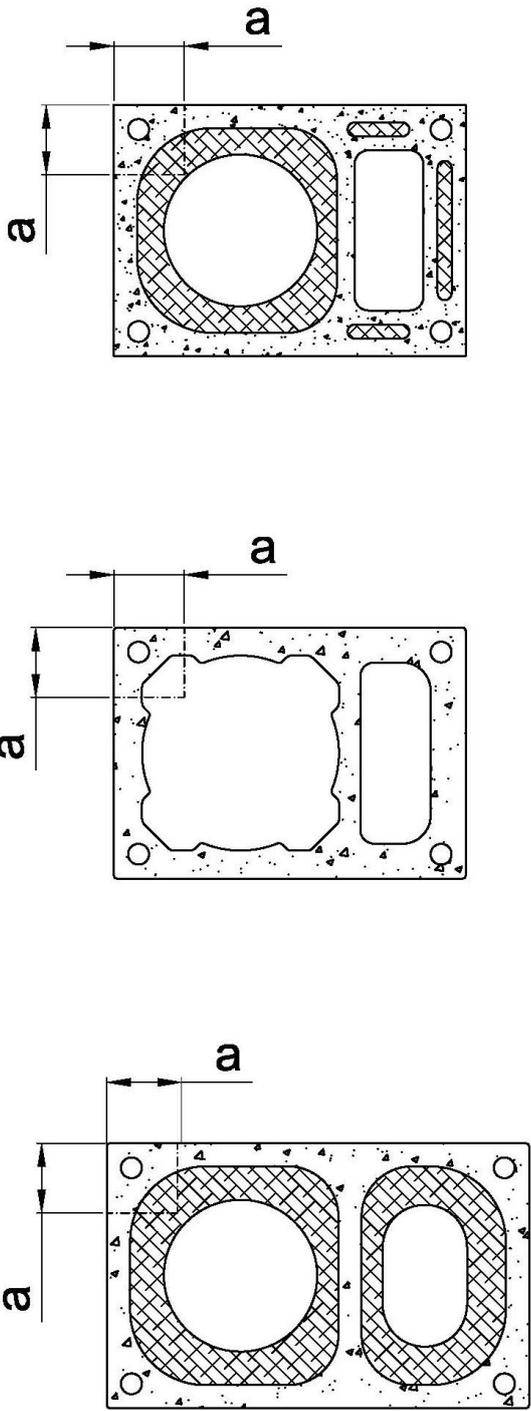


Figure 2.2.15.1: Example of test specimen location of side-by-side air flue chimneys

2.2.16 Freeze thaw resistance

Purpose of the assessment

Freeze-thaw resistance of the system stove-chimney is related to the assessment of the flue liner of the chimney element and of the covering of the flue liner, made of concrete, if part of the kit.

Assessment method

Freeze thaw resistance, including the covering made of concrete, if any, shall be assessed according to the assessment given in EN 13063-1, Clause 5.5.

Expression of results

In the ETA the following shall be stated: Criteria met/ Criteria not met.

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: 95/467/EC (EU), amended by 2001/596/EC (EU) and 2002/592/EC (EU) and 2010/679/EC (EU).

The system is: 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 systems are: 1-3-4 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 to Table 3.2.4.

„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 if the levels of characteristics of components are in compliance with the requirements defined in the kits manufacturer’s control plan“

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	Components produced by the manufacturer himself:	See Table 3.2.2	See Table 3.2.2	See Table 3.2.2	See Table 3.2.2
2	Components not produced by the manufacturer himself (*)	See Table 3.2.3	See Table 3.2.3	See Table 3.2.3	See Table 3.2.3
3	Kit	See Table 3.2.4	See Table 3.2.4	See Table 3.2.4	See Table 3.2.4
(*) Components produced by the supplier under the specifications of the manufacturer.					

Table 3.2.2 Control plan when the components are produced by the manufacturer himself; 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]					
1	Components covered by relevant harmonized standard				
1.1	Essential characteristics according to relevant harmonized standard	According to relevant harmonized standard	According to relevant harmonized standard	According to relevant harmonized standard	According to relevant harmonized standard
2	Outer wall made of concrete of the chimney element				
2.1	Compressive strength in case of storey height units	EN 1857	Value laid down in control plan	EN 12446	EN 12446
2.2	Covering of bars for monolithic storey height units	See row No9.3	See row No9.3	See row No9.3	See row No9.3
2.3	Surface treatment (foamed concrete):				
2.3.1	Bulk density	EN 772-13	Value (Tolerances: $\pm 50 \text{ kg/m}^3$)	3	1 per month
2.3.2	Dimensions	EN 12446	Value (Tolerances according to EN 12446)	EN 12446	EN 12446
2.3.3	Composition	Declaration	-	-	Each production unit
3	Thermal separating element made in the chimney element, made of foam glass partition				
3.1	Bulk density	EN 1602	Value (Tolerances: $\pm 10 \%$)	at least 3 samples each charge	2 tests per year Alternative: To be laid down in control plan
3.2	Compressive strength	EN 826 Annex A	Value	at least 3 samples each charge	2 tests per year Alternative: To be laid down in control plan
3.3	Dimensions	Measurement	In conjunction with checks for the concrete elements in equivalence to EN 12446	EN 12446	EN 12446
4	Thermal separating element in the chimney element, made of cement bounded expanded glass				
4.1	Bulk density	EN 12446	Value (Tolerances: $\pm 10 \%$)	On at least 3 samples	Each charge 2 tests per year Alternative: To be laid down in control plan
4.2	Compressive strength	EN 12446	Value	On at least 3 samples	Each charge 2 tests per year

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
4.3	Dimensions	Measurement	EN 12446	EN 12446	EN 12446
5	Grout				
5.1	Spread value of grout	EN 13395-2 or EN 1015-3 (respectively)	Spread value declared with related tolerances	3	Once a week
Note: Information is to be provided about use of material with decrease of spread value of max. 100mm in 30 minutes after manufacturing, and degree of shrinkage assessed according to EN 12617-4 and expansion assessed according to EN 12617-4 or EN 445 respectively.					
6	Reinforcement and related ancillaries				
6.1	Tensile	EN ISO 15630-1 in conjunction with EN ISO 6892-1	Laid down in the control plan	Laid down in the control plan	Each delivery:
6.2	Yield strength	EN ISO 15630-1 in conjunction with EN ISO 6892-1	Laid down in the control plan	Laid down in the control plan	Each delivery:
6.3	Ancillaries (connections), consisting of metallic parts	Laid down in the control plan	Laid down in the control plan	Laid down in the control plan	Each delivery:
7	Upper cleaning and inspection door of the flue liner in case of W3Gxx				
7.1	Leakage	EN 13063-1, Clause 10.5, first paragraph, whereas details are Laid down in control plan	Laid down in control plan	3	Once a year
7.2	Condensate resistance	EN 13063-1, Clause 10.5, first paragraph, whereas details are Laid down in control plan	Laid down in control plan	3	Once a year
8	Covering				
8.1	Covering made of stainless steel:				
8.1.1	Dimensions	Measurement by means of tape	Laid down in control plan	1	Each charge
8.1.2	Material quality	Laid down in control plan	Laid down in control plan	-	Each delivery
8.2	Covering made concrete				
8.2.1	Condition	Visual control	Absence of cracks	Each piece	Each piece
8.2.2	Bending tension strength	Laid down in control plan	Laid down in control plan	8 pieces of 1 specimen	Once a month
8.2.3	Spread value of concrete	EN 1015-3	Value, tolerances laid down in control plan	3	Once a week

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
9	Outer wall made of concrete of the stove unit				
9.1	Concrete				
9.1.1	Bulk density	EN 206	800kg/m ³ - 2000kg/m ³ ± 10%	3	per production unit
9.1.2	Spread value	EN 206	EN 206	EN 206	EN 206
9.1.3	Cube compressive strength	EN 206	15 N/mm ² including tolerances as given in EN 12446	3	per production unit
9.2	Steel fibres				
9.2.1	Content of steel fibres	Measurement by means of weighing	1,5 M%-2,5 M%	1	per preparation unit of concrete
9.2.2	Steel fibres according to EN 14889-1	EN 14889-1 (AVCP system:1,3)	EN 14889-1 (AVCP system:1,3)	EN 14889-1 (AVCP system:1,3)	EN 14889-1 (AVCP system:1,3)
9.3	Covering of bars	EN 12446, Clause 5 lit. b)	Complete covering assessed by means of visual check	100%	100%
10	Covering plate and socket of the stove unit				
10.1	Covering plate/socket				
10.1.1	Density	EN 206	EN 206	3	Each production unit
10.1.2	Compressive strength	EN 206	EN 206	3	Each production unit
10.2	Covering plate				
10.2.1	Dimensions, including positioning of reinforcement, if any	Measurement by means of tape	Laid down in control plan	Each product	Each product
10.3	Socket (alternatively to (1))				
10.3.1	Parameters according to row No2	See row No2	See row No2	See row No2	See row No2
11	Stove element (for solid fuel) integrated in the stove unit, including water run components of the stove unit				
11.1	Dimensions and compatibility with stove unit	Measurement	Dimensions according to technical drawing in the control plan; compatibility with outer wall of the stove unit	Each element	Each element

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
11.2	Tightness when installed in the stove unit	Assessment of complete assembled unit; including water run components, if Testing pressure: Laid down in the control plan	Acceptable leakage rate: Laid down in the control plan	Each element	Each element
11.3	Material quality and manufacturer	EN 13240 (fuel type split log) and EN 14785 (fuel type pellets)	EN 13240 (fuel type split log) and EN 14785 (fuel type pellets)	Each element	Each delivery
11.4	Check of completeness	Laid down in the control plan	Laid down in the control plan	Each element	Each element
12	External heating appliance (for solid fuel) of the stove unit				
12.1	Dimensions and compatibility with stove unit	Measurement	Dimensions according to technical drawing in the control plan; compatibility with integrated stove element	Each element	Each element
12.2	Tightness of the element	Assessment of complete assembled unit; Testing pressure: Laid down in the control plan	Acceptable leakage rate: Laid down in the control plan	Each element	Each delivery
12.3	Material quality and manufacturer	Laid down in control plan	Laid down in control plan	Each element	Each delivery:-
12.4	Check of completeness	According to checklist as element of the control plan	Completion of all relevant components	Each element	Each element
13	Thermal protection shield in conjunction with thermal insulation of the stove unit				
13.1	Dimensions (including thermal insulation) + Fitting accuracy	Measurement by means of tape	Laid down in the control plan.	Each element	Each element
13.2	Material quality (thermal protection shield only)	EN 10130 and EN 10131 respectively	EN 10130 and EN 10131 respectively	Each element	Each delivery
13.3	Thermal insulation material (Documentation according to EN 14303 or thermal insulation material according to EN 13063-1 equivalent to those according to EN 14303)				
13.3.1	Thermal conductivity	EN 14303 and EN 13063-1 respectively	EN 14303 and EN 13063-1 respectively	Each delivery	Each delivery

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
13.3.2	Allowable application temperature	EN 14303 and EN 13063-1 respectively	EN 14303 and EN 13063-1 respectively	Each delivery	Each delivery
13.3.3	Bulk density	EN 14303 and EN 13063-1 respectively	EN 14303 and EN 13063-1 respectively	Each delivery	Each delivery
14	Thermal insulation of the stove unit				
14.1	Thermal insulation between outer wall and stove unit				
14.1.1	Parameter according to row No13.3	See row No13.3	See row No13.3	See row No13.3	See row No13.3
14.2	Thermal insulation within the stove unit				
14.2	Parameter according to EN 13063-1	According to EN 13063-1	According to EN 13063-1	Each delivery	Each delivery
15	Heat exchanger of the stove unit				
15.1	Dimensions	Measurement	According to technical drawings with tolerances according to EN 1856-2	Each piece	Each piece
15.2	Material properties	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2
15.3	Functioning ability - Tightness when installed in the stove unit as stated in row No11	See row No11	See row No11	See row No11	See row No11
16	Opening of the stove unit				
16.1	Dimensions	Measurement	Fitting accuracy	Each piece	Each piece
16.2	Tightness with increased testing pressure according to Clause 2.2.10 in this EAD	Assessment of complete assembled unit; Increased testing pressure in order to cover tightness N1 in analogy to EN 1443 as inspection door; Details laid down in control-plan.	Acceptable leakage rate: to be laid down in control plan	Each delivery	Each delivery
17	Connecting elements of the stove unit				
17.1	Dimensions	Measurement	According to technical drawings with tolerances according to EN 1856-2	Each element	Each element
17.2	Material properties	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2

No	Subject/type of control		Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
17.3	Functioning ability - Tightness when installed in the stove unit as stated in row No11		See row No11	See row No11	See row No11	See row No11
18	Inspection door (or equivalent cleaning opening in the connecting element) of the stove unit					
18.1	Dimensions		Measurement	According to technical drawings, tolerances according to EN 1856-1-2/EN 1457-1,-2	Each element	Each element
18.2	Material properties		EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2	EN 1856-1,-2; EN 1457-1,-2
18.3	Functioning ability	Fitting accuracy	Laid down in control plan	Laid down in control plan	Each element	Each element
		Tightness when installed in the stove unit as stated in row No16.2	See row No16.2	See row No16.2	See row No16.2	See row No16.2

Table 3.2.3 Control plan when the components are not produced by 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	Components belonging to Case 1 (*)	(1)	Conformity with the order	Testing is not required	Each delivery
		(2)	Acc. to Control Plan	Testing is not required	Each delivery
2	Components belonging to Case 2 (**):	(1)	Conformity with the order	Testing is not required	Each delivery
	▪ Characteristics declared in DoP for the specific use within the kit.	(2)	Acc. to Control Plan	Testing is not required	Each delivery
	▪ Characteristics not declared in DoP for the specific use within the kit.	(3)	Acc. to Control Plan	Acc. to Control Plan	Acc. to Control Plan
3	Components belonging to Case 3 (***):	(1)	Conformity with the order	Testing is not required	Each delivery
		(3)	Acc. to Control Plan	Acc. to Control Plan	Acc. 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 acc. to Table 3.2.2 above. (3) Checking of supplier documents and/or supplier tests and/or test or control acc. to Table 3.2.2 above. (*) Case 1: Component covered by a hEN or its own ETA for all characteristics needed for the specific use within the kit. (**) Case 2: If the component is a product covered by a hEN or its own ETA 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 a product not (yet) covered by a hEN or its own ETA (in case of inspection document according to EN 10204, Type 3.1 applies for parameters given in No6.1, No6.2, No6.3 and 8.1.2 of Table 3.2.2; Type 2.2 applies for parameters given in No11.3, No12.3, No13.2, No13.3.1, No13.3.2 and No13.3.3 of Table 3.2.2).</p>					

Table 3.2.4 Control plan of the complete kit; 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	Conformity to the specification drawings e.g., correct elements, dimensions, pre assembly.	Laid down in the control plan	Laid down in the control plan	Laid down in the control plan	Each delivery
2	General aspects EN 13063-1, Clause 10.5, EN 13063-2, Clause 10.5	EN 13063-1, EN 13063-2 Details laid down in control plan	EN 13063-1, EN 13063-2 Details laid down in control plan	Each kit	Each kit

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 3.3.1.

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 <i>(for systems 1+, 1 and 2+ only, not related to reaction to fire)</i>					
1	Notified Body will ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing of the " kit for system stove-chimney ".	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	According to Control plan	According to Control plan	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control <i>(for systems 1+, 1 and 2+ only, not related to reaction to fire)</i>					
2	The Notified Body will ascertain that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan.	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 to Table 3.2.3	According to Control plan	According to Control plan	1/year

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 3.3.2.

Table 3.3.2 Control plan for the notified; 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 and taking into account a limiting of organic material and/or the addition of fire retardants. <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	As defined in the control plan	When starting the production
Continuous surveillance, assessment and evaluation of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire and taking into account a limiting of organic material and/or the addition of fire retardants. <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 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 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 Tables 3.2.1 to 3.2.3	As defined in the control plan	As defined in the control plan	2 times per year

4. REFERENCE DOCUMENTS

EN 206:2013+A1:2016+A2:2021 “Concrete - Specification, performance, production and conformity”

EN 445:2007 “Grout for prestressing tendons — Test methods”

EN 772-13:2000 “Methods of test for masonry units — Part 13: Determination of net and gross dry density of masonry units (except for natural stone)”

EN 826:2013 “Thermal insulating products for building applications — Determination of compression behaviour”

EN 998-2:2016 “Specification for mortar for masonry — Part 2: Masonry mortar”

EN 1015-3:1999+A1:2004+A2:2006 “Methods of test for mortar for masonry — Part 3: Determination of consistence of fresh mortar (by flow table)”

EN 1366-13:2019 “Fire resistance tests for service installations — Part 13: Chimneys”

EN 1443:2003 “Chimneys — General requirements”

EN 1457-1:2012 “Chimneys - Clay/ceramic flue liners — Part 1: Flue liners operating under dry conditions - Requirements and test methods”

EN 1457-2:2012 “Chimneys - Clay/ceramic flue liners — Part 2: Flue liners operating under wet conditions - Requirements and test methods”

EN 1602:2013 “Thermal insulation products for building applications — Determination of the apparent density”

EN 1856-1:2009 “Chimneys. Requirements for metal chimneys. System chimney products”

EN 1856-2:2009 “Chimneys. Requirements for metal chimneys. Metal flue liners and connecting flue pipes”

EN 1857:2010 “Chimneys. Components. Concrete flue liners”

EN 1859:2009+A1:2013 “Chimneys. Metal chimneys. Test methods”

EN 10130:2006 “Cold rolled low carbon steel flat products for cold forming. Technical delivery conditions”

EN 10131:2006 “Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming. Tolerances on dimensions and shape”

EN 10204:2004 “Metallic products — Types of inspection documents”

EN 12446:2011 “Chimneys - Components — Concrete outer wall elements”

EN 12617-4:2002 “Products and systems for the protection and repair of concrete structures — Test methods — Part 4: Determination of shrinkage and expansion”

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 13063-1:2005+A1:2007 “Chimneys — System chimneys with clay/ceramic flue liners — Part 1: Requirements and test methods for sootfire resistance”

EN 13063-2:2005+A1:2007 “Chimneys — System chimneys with clay/ceramic flue liners — Part 2: Requirements and test methods under wet conditions”

EN 13063-3:2007 “Chimneys — System chimneys with clay/ceramic flue liners — Part 3: Requirements and test methods for air flue system chimneys”

EN 13216-1:2004 “Chimneys — Test methods for system chimneys — Part 1: General test methods”

EN 13238:2010 “Reaction to fire tests for building products — Conditioning procedures and general rules for selection of substrates”

EN 13240:2001+A2:2004+AC:2007 “Roomheaters fired by solid fuel — Requirements and test methods”

EN 13384-1:2019 “Chimneys — Thermal and fluid dynamic calculation methods — Part 1: Chimneys serving one appliance”

EN 13395-2:2002 “Products and systems for the protection and repair of concrete structures — Test methods — Determination of workability — Part 2: Test for flow of grout or mortar”

EN 13501-1:2018 “Fire classification of construction products and building elements — Part 1: Classification using data from fire resistance tests”

EN 13823:2020 “Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by single burning item”

EN 14303:2015 “Thermal insulation products for building equipment and industrial installations. Factory made mineral wool (MW) products. Specification”

EN 14785:2006 “Residential space heating appliances fired by wood pellets. Requirements and test methods”

EN 14889-1:2006 “Fibres for concrete. Steel fibres. Definitions, specifications and conformity”

FprEN 16510-1:2022 “Residential solid fuel burning appliances — Part 1: General requirements and test methods”

EN ISO 6892-1:2016 “Metallic materials — Tensile testing — Part 1: Method of test at room temperature”

EN ISO 6946:2018 “Building components and building elements – Thermal resistance and thermal transmittance-Calculation methods (ISO 6946:2017)

EN ISO 9972:2015 “Thermal performance of buildings – Determination of air permeability of buildings – Fan pressurization method”

EN ISO 10211:2017 “Thermal bridges in building construction — Heat flows and surface temperatures — Detailed calculations”

EN ISO 10077-2:2017 “Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Part 2: Numerical method for frames”

EN ISO 11925-2:2020 “Reaction to fire tests — Ignitability of products subjected to direct impingement of flame — Part 2: Single-flame source test”

EN ISO 15630-1:2010 “Steel for the reinforcement and prestressing of concrete — Test methods — Part 1: Reinforcing bars, wire rod and wire”

ANNEX A TEST SEQUENCE FOR THE CHIMNEY KIT WITH W3 G

The testing of the chimney kit W3 G shall be carried out with the following test sequence:

- a) Gas tightness according to EN 13063-1, EN 13063-2
- b) Thermal test on operating conditions according to Cl. 2.2.3
- c) Gas tightness according to EN 13063-1, EN 13063-2
- d) Relative movement according to EN 13063-1, Cl. 5.2.2³
- e) Thermal test under soot fire conditions according to Cl. 2.2.3
- f) Gas tightness according to EN 13063-1, EN 13063-2
- g) Relative movement according to EN 13063-1, Cl. 5.2.2³ and abrasion resistance of the clay/ceramic flue liner according to EN 1457-2, Cl. 16.12
- h) Condensate resistance and water resistance according to Cl. 2.2.12
- i) Flow resistance according to Cl. 2.2.8
- j) Thermal resistance according to Cl. 2.2.9

³ Noted in the test sequence for the chimney kit with clay/ceramic flue liner equal to the test sequences given in EN 13063-1 and -2, Annex A.1.