EAD **040057-01-1201**

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European Assessment Document for

Thermal insulation boards made of microporous silica

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) 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

Contents

1 SCOPE OF THE EAD

1.1 Description of the construction product

The EAD covers thermal insulation boards made of microporous silica (in the following referred to as “thermal insulation boards”). The thermal insulation boards consist of a rigid monolithic core made of fumed silica, with optionally added binding fibres, additives and opacifier which can be fitted with additional facings (see figure 1.1.1). The core is mechanically compressed and can have a water-repellent treatment. Additional facings are either:

- mechanically fixed on both sides of the core surface (by stitching with a thread (e.g., HDPE - High-Density Polyethylene) and fixing the thread with an adhesive tape to the surface of the facing) or
- fully encasing the core with a surrounding cloth where the joints of the cloth are closed by welding or a thread (e.g., HDPE - High-Density Polyethylene).

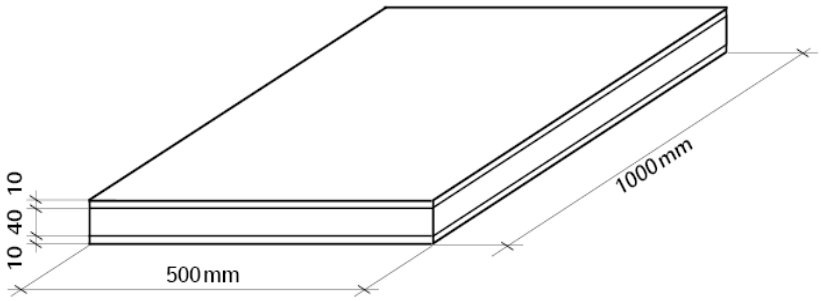

Figure 1.1.1: Example of the thermal insulation board with (optional) additional facings (e.g., 10 mm mineral wool)

The product is neither covered by a harmonised European standard (hEN) nor by EAD 040685-00-1201. The products covered by EAD 040685-00-1201 comprise no facing. Due to the differences in material and the additional facings, the assessment methods in this EAD are different in comparison to the assessment methods in EAD 040685-00-1201:

- The test provisions concerning reaction to fire and propensity to undergo continuous smouldering differ.
- The long-term water absorption by partial immersion is missing in EAD 040685-00-1201.
- Method A of EN ISO 29767 shall be used in EAD 040685-00-1201 concerning the short-term water absorption by partial immersion (method B in this EAD 040057-01-1201).
- Climatic condition B of EN 12086 shall be used in EAD 040685-00-1201 concerning the water vapour transmission (climatic condition A in this EAD 040057-01-1201).
- The conditions during the storage of the test specimens before testing the thermal conductivity are different in EAD 040685-00-1201 and EAD 040057-01-1201.
- No specified temperature is given in EAD 040685-00-1201 regarding the dimensional stability under specified temperature.

The product is also not fully covered by EAD 040057-00-1201. Compared to the previous version of the EAD, the following changes have been introduced:

- possible additional facings of the thermal insulation boards (see above),
- the essential characteristic "Propensity to undergo continuous smouldering" has been added (see clause 2.2.2).

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

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

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

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

1.2.1 Intended use(s)

The thermal insulation board made of microporous silica is intended to be used for the thermal insulation of walls, roofs and ceilings/floors.

The thermal insulation board made of microporous silica can be glued to the substructure with suitable glue. Fixing with suitable anchors is possible.

The EAD provides for assessment methods and criteria for the thermal insulation boards only; glue or anchors (the way of fixing to the substrate) are not covered by this EAD.

The product is intended to be used protected from precipitation, wetting or weathering in built-in state. The product is not intended to be used for construction elements with contact to water and soil.

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 thermal insulation board made of microporous silica for the intended use of 50 years when installed in the works (provided that the thermal insulation board made of microporous silica 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.

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[1].

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 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 the working life referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

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

2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of thermal insulation board made of microporous silica is assessed in relation to the essential characteristics.

Table 2.1.1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class
2	Propensity to undergo continuous smouldering	2.2.2	Description
Basic Works Requirement 3: Hygiene, health and the environment			
3	Content emission and/or release of dangerous substances	2.2.3	Description/Level
Basic Works Requirement 4: Safety and accessibility in use			
4	Bending strength	2.2. 4	Level
5	Compressive stress at 10% strain or compressive strength	2.2. 5	Level
6	Deformation under specified compressive load and temperature conditions	2.2. 6	Level
7	Tensile strength perpendicular to faces	2.2. 7	Level
8	Tensile strength parallel to faces	2.2.15	Level
9	Behaviour under point load	2.2. 8	Level
Basic Works Requirement 5: Protection against noise			
10	Sound absorption	2.2.16	Level
Basic Works Requirement 6: Energy economy and heat retention			
11	Thermal conductivity	2.2. 9	Level
12	Deviations from length, width, thickness, squareness and flatness	2.2. 10	Level
13	Short-term water absorption by partial immersion	2.2.11	Level
14	Long-term water absorption by partial immersion	2.2.12	Level
15	Water vapour transmission	2.2.13	Level
16	Dimensional stability	2.2.14	Level

2.2 Assessment methods and criteria for 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.

The test specimens shall be chosen in such a way that the range of density(*) and thicknesses of the product is covered. If necessary, test specimens with at least

- the minimum and maximum density (independent of the thickness) and
- the minimum and maximum thickness (independent of the density)

shall be used.

The tests and assessments shall be performed on the core of the thermal insulation board (without additional facings) unless otherwise stated in the following. The used test conditions (with or without additional facings) shall be given in the ETA.

The optional facings (mineral wool, glass fleece or glass cloth) shall be described in the European Technical Assessment (ETA) concerning material type, density/mass per unit area and geometry/thickness, based, if possible, on the relevant specification (e.g., EN standard).

** Note: The density of the rigid core of the thermal insulation board shall be determined according to EN ISO 29470 at (23 ± 2) °C and (50 ± 5) % relative humidity with at least 5 test specimens of at least 100 mm x 100 mm. Before testing all test specimens shall be dried at (23 ± 2) °C and (50 ± 5) % relative humidity to constant mass.*

The range of the density (minimum and maximum) of the rigid core of the thermal insulation board shall be given in the ETA (in kg/m^3).

2.2.1 Reaction to fire

2.2.1.1 Thermal insulation board without additional facings

2.2.1.1.1 Class A1 product – without testing (only for products with an organic content ≤ 1,0 %)

If the organic content of the product is ≤ 1,0 % then it is considered to satisfy the requirements of class A1 of the reaction-to-fire performance in accordance with the Commission Decision 96/603/EC, as amended by Commission Decisions 2000/605/EC and 2003/424/EC, without the need for testing on the basis of it fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

Therefore, when the conditions referred to above are fulfilled, the performance of the product is class A1.

Class of reaction to fire A1 shall be given in the ETA.

2.2.1.1.2 Other classes – with testing (for products with an organic content > 1,0 %)

If the organic content of the product is > 1,0 % the thermal insulation board made of microporous silica shall be tested, using the test method(s) relevant for the corresponding reaction to fire class according to EN 13501-1. The thermal insulation board made of microporous silica shall be classified according to Commission Delegated Regulation (EU) 2016/364) in connection with EN 13501-1.

The instructions for mounting and fixing according to EN 15715 using the product specific details for calcium silicate (Tables A.48 and A.49) shall be used for reaction to fire testing.

Class of reaction to fire shall be given in the ETA.

2.2.1.2 Thermal insulation board with additional facings

If the thermal insulation board (including its additional facings) exclusively consists of materials with less than 1 % homogenously distributed organic content as listed in Commission Decision 96/603/EC, as amended by Commission Decisions 2000/605/EC and 2003/424/EC, the product is considered to satisfy the requirements of class A1 of the reaction-to-fire performance in accordance with the Commission Decision 96/603/EC, without the need for testing on the basis of it fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

Therefore, when the conditions referred to above are fulfilled, the performance of the product is class A1.Class of reaction to fire A1 shall be given in the ETA.

Otherwise, the thermal insulation board made of microporous silica with additional facings shall be tested, using the test method(s) relevant for the corresponding reaction to fire class according to EN 13501-1. The product shall be classified according to Commission Delegated Regulation (EU) No 2016/364 in connection with EN 13501-1.

The instructions for mounting and fixing according to EN 15715 using the product specific details for calcium silicate (Tables A.48 and A.49) together with the following instructions shall be used for reaction to fire testing. Different types of facings shall be taken into account and separate tests of the core boards together with the facings shall be conducted.

In addition to the provisions given in table A 48 of EN 15715, for facings made of mineral wool the mineral wool with the highest organic content shall be used for testing, as well as the highest thickness and the highest raw density of the mineral wool facing (analogously to the details given for mineral wool in EN 15715, Table A.1).

Discrete or linear components of the insulation board, like adhesive tape, threads and so on (c.f. clause 1.1) have to be taken into account adequately. Depending on the test method, it may be considered by the same proportion of the component in specimens as in the final product or by execution of prescribed joints of the specimens with these components. Decision on that shall be taken case by case in the assessment procedure with regard to the assembly of the concerned product.

For thermal insulation boards with facings where tests according to EN ISO 11925-2 are required (reaction to fire classes B, C, D and E), the thermal insulation boards shall be tested according to EN ISO 11925-2 with surface exposure and edge exposure according to clauses 7.3.3.1 and 7.3.3.2 on the frontside as well as with edge exposure according to clause 7.3.3.2.3 on each layer of specimens turned 90 degrees on their vertical axis. Where the thermal insulation board is encased in a facing (mineral wool, glass fleece or glass cloth), the place where the enclosing is jointed (e.g., by stitching or welding) shall be impinged to flaming as well.

Class of reaction to fire shall be given in the ETA.

2.2.2 Propensity to undergo continuous smouldering

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

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

2.2.2.1 Sample taking

In addition to EN 16733, the following conditions and parameters shall be considered when performing sampling and preparing test samples:

a) Homogenous products / non-homogenous products with non-substantial external facings (thickness < 1 mm and mass per unit area < 1,0 kg/m²):

- the product variations of a product family (as defined by a certain combination of raw materials and other additives and produced in a certain production process)[2],
- the product or product variant with the highest organic content (in percentage per mass) determined according to EN 13820,
- the product or product variant with the highest as well as the lowest density of the thermal insulation board determined by tests according to EN ISO 29470, conditioned at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) %,
- the product or product variant with the highest thickness of the thermal insulation board determined by tests according to clause 2.2.5,
- without non-substantial facings – existing full-surface external non-substantial facings shall be removed when preparing the test specimens.

b) Non-homogenous products with substantial external facings made of mineral wool insulation (thickness ≥ 1 mm or weight ≥ 1 kg/m²):
   - the product variations of a product family (as defined by a certain combination of raw materials and other additives and produced in a certain production process),
   - the product or product variant with the highest as well as lowest density of the microporous silica insulation determined by tests according to EN ISO 29470, conditioned at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) %,
   - the product or product variant with the highest thickness of each layer of the thermal insulation board made of microporous silica and the mineral wool layer determined by tests according to clause 2.2.5,
   - each different produced orientation of the thermal insulation board,
   - the product or product variant with the highest organic content (in percentage per mass) determined according to EN 13820,
   - the product or product variant with the highest density as well as a density of about 100 kg/m³ (± 15 %) of the second layer made of mineral wool; if the highest density of the range is equal or lower than 115 kg/m³, then only the product or product variant with the highest density. The density shall be determined in accordance with EN ISO 29470, conditioned at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) %,
   - without non-substantial facings – existing full-surface external non-substantial facings shall be removed when preparing the test specimens.

2.2.2.2 Preparation of test specimens

The test of homogenous / non-homogenous products with non-substantial facings (above case "a)") shall be done on specimens where existing facings have been removed before testing.

The tests of non-homogenous products with substantial facings made of mineral wool (thickness ≥ 1 mm or weight ≥ 1 kg/m²; above case "b)") shall be done on specimens with a 2-layer assembly (consisting of the microporous silica core and with one external mineral wool layer) which also cover 3-layer boards (with two external mineral wool layers) or one external mineral wool layer and one external layer made of another material – see clause 1.1). The other external layer on the rear (either made of mineral wool, glass fleece or glass cloth) shall be removed before testing.

Both layers of the specimens of a non-homogenous product with substantial facing (see case "b)" above) shall be exposed to the ignition source.

The tests shall be done without consideration of the intended end-use conditions, because propensity to undergo continuous smouldering is hardly affected by end-use conditions. If clause 6.2.5 of EN 16733 applies, a permanent contact between the pieces shall be assured.

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

2.2.2.3 Extended application of test results

The determined performance of the tested product shall be expressed in accordance with clause 11 of EN 16733. The results of tests considering the aforementioned parameters completely are also valid for products:

- of the same material,
- with all densities of the rigid microporous silica core of the thermal insulation boards between those evaluated,
- with densities of the mineral wool layer lower than those evaluated,
- with lower thickness of the thermal insulation boards and also with higher thickness if 100 mm thick specimens have been tested,
- with lower thickness of substantial external facings (thickness ≥ 1 mm or weight ≥ 1 kg/m²) made of mineral wool than that tested,
- with any external non-substantial (thickness < 1 mm and mass per unit area < 1.0 kg/m²) facings,
- for any end-use conditions.

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

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

2.2.3 Content, emission and/or release of dangerous substances

The performance of the thermal insulation boards related to the emissions and/or release and, where appropriate, the content of dangerous substances shall be assessed on the basis of the information provided by the manufacturer[3] after identifying the release scenarios taking into account the intended use of the product and the Member States where the manufacturer intends his product to be made available on the market.

The identified intended release scenarios for this product and intended uses with respect to dangerous substances are:

IA2: Product with indirect contact to indoor air (covered products) but possible impact on indoor air.

IA3: Product with no contact to indoor air (e.g., thermal insulation boards intended to be used for external insulation).

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3 The manufacturer may be asked to provide to the TAB the REACH related information which shall accompany the DoP with (cf. Article 6(5) of Regulation (EU) No 305/2011).

The manufacturer is **not** obliged:
- to provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or
- to provide a written declaration to the TAB stating whether the product (or constituents of the product) contain(s) substances which are classified as dangerous in accordance with Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS, taking into account the installation conditions of the construction product and the release scenarios resulting from there.

Any information provided by the manufacturer regarding the chemical composition of the products may not be distributed to EOTA or to TABs.

2.2.3.1 SVOC and VOC

For the intended use covered by the release scenario IA2, semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516. The respective loading factor [m^2/m^3] used for emission testing shall be taken from the following table:

Table 2.2.3.1.1: Loading factor, depending on the intended use (in accordance with EN 16516)

Intended use	Loading factor [m^2/m^3]
Walls	1,0
Floor, ceiling	0,4

Sampling, transport and storage of the specimen proceeds essentially as described in EN ISO 16000-11. Specimens shall be taken as close as possible to the time of production.

The following product parameters shall be taken into account when testing the thermal insulation boards:

- Each thermal insulation board with a different composition and facing shall be tested separately.
- The product with the highest thickness shall be considered.
- In case of doubt, tests shall be performed separately on specimens with different specifications for each characteristic.
- The test specimen shall be prepared by covering the edges and the back of the board.

Once the test specimen has been produced, it shall immediately be placed in the emission test chamber. This time is considered the starting time of the emission test.

The test results shall be reported for the relevant parameters (e.g., chamber size, temperature and relative humidity, air exchange rate, loading factor, size of test specimen, conditioning, production date, arrival date, test period, specimen preparation procedure, test result) after 3 and/or 28 days testing.

The product performance shall be expressed in [µg/m^3 or mg/m^3] and given in the ETA.

2.2.4 Bending strength

Bending strength shall be determined according to EN 12089, test method B.

The bending strength σ_b in kPa shall be given in the ETA.

2.2.5 Compressive stress at 10 % strain or compressive strength

Compressive stress at 10 % strain or compressive strength shall be determined according to EN 826 with at least 5 test specimens (100 mm x 100 mm).

The compressive stress at 10 % strain σ_{10} or compressive strength σ_m in kPa shall be given in the ETA.

2.2.6 Deformation under specified compressive load and temperature conditions

The determination of the deformation under specified compressive load and temperature conditions shall be carried out according to EN 1605 with at least 3 test specimens of at least 200 mm x 200 mm for test condition 1 according to Table 1, clause 7 of EN 1605.

The relative change in thickness $\Delta\varepsilon d$ in % shall be given in the ETA.

2.2.7 Tensile strength perpendicular to faces

The determination of the tensile strength perpendicular to faces, σ_{mt}, shall be carried out according to EN 1607 with at least 5 test specimens (200 mm x 200 mm).

The tensile strength perpendicular to faces σ_{mt} in kPa shall be given in the ETA.

2.2.8 Behaviour under point load

The determination of the deformation under a point load of 500 N shall be carried out according to EN 12430.

The deformation under a point load of 500 N in mm shall be given in the ETA.

2.2.9 Thermal conductivity

The thermal conductivity at a temperature of 10 °C under dry conditions shall be determined in accordance with EN 12667 or, for thick products, EN 12939. At least 4 measurements shall be performed under dry conditions. The specimens shall be dried at a temperature of (70 ± 2) °C to constant mass.

The influence of humidity on the thermal conductivity is determined by storing the specimen in a climate of (23 ± 2) °C and (50 ± 5) % relative humidity and (23 ± 2) °C and (80 ± 5) % relative humidity followed by measurements with at least 3 specimens for each climate-condition in accordance with EN 12667 or, for thick products, EN 12939.

For each climate the thermal conductivity ($\lambda_{10,\,(23,50)}$ / $\lambda_{10,\,(23,80)}$) and the moisture content mass by mass ($u_{23,50}$ / $u_{23,80}$) shall be determined.

The preparation of the specimens shall be in accordance with EN 13167, Annex E.

The thermal conductivity shall be measured at specimens covering the entire range of density. In case the thermal conductivity is expected to be influenced by the density, test specimens at least with the minimum density and the maximum density shall be used (for instance if different results are to be expected concerning the thermal conductivity). During the measurement, precaution shall be taken to avoid moisture absorption by the specimens.

The mass-related moisture conversion coefficient $f_{u,1}$ shall be calculated by the following formula (derived from EN ISO 10456, formula 4) by using the average values for λ and u:

$$f_{u,1} = \frac{\ln \dfrac{\lambda_{10,(23,50)}}{\lambda_{10,dry}}}{u_{23,50} - u_{dry}}$$

u_{dry} is defined to be 0.

The mass-related moisture conversion coefficient $f_{u,2}$ shall be calculated by the following formula (derived from EN ISO 10456, formula 4) by using the average values for λ and u:

$$f_{u,2} = \frac{\ln \dfrac{\lambda_{10,(23,80)}}{\lambda_{10,(23,50)}}}{u_{23,80} - u_{23,50}}$$

Note: For the determination of the mass-related moisture conversion coefficient $f_{u,1}$ and $f_{u,2}$, the test specimens shall be taken from the same production run.

The moisture conversion factors F_{m1} and F_{m2} shall be calculated according to EN ISO 10456, formula 4.

The determination of the thermal conductivity to be given in the ETA shall be performed as follows (based on $\lambda_{90/90}$).

The thermal conductivity at 23 °C and 50 % relative humidity $\lambda_{D(23,50)}$, representing at least 90 % of the production with a confidence level of 90 %, shall be determined on the basis of the measuring results in accordance with EN ISO 10456, clauses 5 and 7.3, and shall be given in the ETA.

The mass-related moisture conversion coefficients $f_{u,1}$ for the conversion of $\lambda_{10,\,dry}$ to $\lambda_{23,50}$ and $f_{u,2}$ for the conversion of $\lambda_{23,50}$ to $\lambda_{23,80}$ as well as the moisture content mass by mass (m/m) at 23 °C and 50 % relative humidity and 23 °C and 80 % relative humidity shall be given in the ETA.

The moisture conversion factors F_{m1} for the conversion of $\lambda_{10,\,dry}$ to $\lambda_{23,50}$ and F_{m2} for the conversion of $\lambda_{23,50}$ to $\lambda_{23,80}$ shall be given in the ETA.

If the additional facings consist of thermal insulation material according to a harmonised European Standard (e.g., mineral wool according to EN 13162) the thermal conductivity of these layers can be given additionally in the ETA in accordance with the provisions laid down in the relevant standard. It shall be taken from the DoP (Declaration of Performance) for the thermal insulation material, if indicated therein..

2.2.10 Deviations from length, width, thickness, squareness and flatness

The length and width of the thermal insulation board shall be determined in accordance with EN ISO 29465, with at least 3 test specimens.

The thickness d shall be determined according to EN 823 with at least 3 test specimens, using a load equal to (50 ± 1,5) Pa.

The squareness shall be determined according to EN 824, the flatness according to EN ISO 29468, both with at least 3 test specimens.

The maximum deviations from nominal length and nominal width shall be given in the ETA in accordance with EN 13168, clause 4.2.2, Table 1.

The maximum deviations from nominal thickness shall be given in the ETA in accordance with EN 13168, clause 4.2.3, Table 2.

The maximum deviation from squareness (in direction of length, width and thickness) and the maximum deviation from flatness shall be given in the ETA in accordance with EN 13168, clauses 4.2.4 and 4.2.5.

2.2.11 Short-term water absorption by partial immersion

Short-term water absorption by partial immersion shall be determined according to EN ISO 29767, method B.

Before testing the test specimens shall be stored for at least 6 hours at (23 ± 5) °C. The test shall be carried out at (23 ± 5) °C using water with a temperature of (23 ± 5) °C.

The water absorption W_p in kg/m^2 shall be given in the ETA.

2.2.12 Long-term water absorption by partial immersion

The water absorption by long-term partial immersion shall be determined according to EN ISO 16535, method 1A.

Before testing the test specimens shall be stored for at least 6 hours at (23 ± 5) °C. The test shall be carried out at (23 ± 5) °C using water with a temperature of (23 ± 5) °C.

The water absorption W_{lp} in kg/m^2 shall be given in the ETA.

2.2.13 Water vapour transmission

The water vapour permeability (water vapour diffusion resistance factor) shall be determined according to EN 12086, climatic condition A. The specimens shall be stored in accordance with EN 12086 at (23 ± 2°C)/ (50 ± 5 %) relative humidity until mass is constant.

The water vapour diffusion resistance factor μ shall be given in the ETA.

2.2.14 Dimensional stability

2.2.14.1 Dimensional stability under specified temperature

The determination of the dimensional stability under specified temperature shall be carried out according to EN 1604. Testing shall be performed after 48 h storage at (70 ± 2) °C in accordance with EN 13168, clause 4.3.2.1.

The relative change in length $\Delta\varepsilon_l$ and in width $\Delta\varepsilon_b$ shall be given in % in the ETA considering the maximum level (0,5 %) according to EN 13168, clause 4.3.2.1.

The relative change in thickness $\Delta\varepsilon_d$ shall be given in % in the ETA considering the maximum level (3 %) according to EN 13168, clause 4.3.2.1.

2.2.14.2 Dimensional stability under specified temperature and humidity conditions

The determination of the dimensional stability under specified temperature and humidity conditions is carried out according to EN 1604. Testing shall be performed after a 48 h storage at (70 ± 2) °C and (90 ± 5) % relative humidity in accordance with EN 13168, clause 4.3.2.1.

The relative change in length $\Delta\varepsilon_l$ and in width $\Delta\varepsilon_b$ shall be given in % in the ETA considering the maximum level (0,5 %) according to EN 13168, clause 4.3.2.1.

The relative change in thickness $\Delta\varepsilon_d$ shall be given in % in the ETA considering the maximum level (3 %) according to EN 13168, clause 4.3.2.1.

2.2.15 Tensile strength parallel to faces

The determination of the tensile strength parallel to faces, σ_t, shall be carried out according to EN ISO 29766 at (23 ± 5) °C with at least 3 test specimens. Before testing all test specimens shall be dried at (23 ± 5) °C for at least six hours.

The tensile strength parallel to faces σ_t in kPa shall be given in the ETA.

2.2.16 Sound absorption

The sound absorption coefficient shall be determined in accordance with EN ISO 354. The sound absorption characteristics shall be calculated in accordance with EN ISO 11654 using the values for the practical sound absorption coefficient, α_p, at the frequencies 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz and the single number value for the weighted sound absorption coefficient α_w. The single number value for the weighted sound absorption coefficients α_p and α_w shall be rounded to the nearest 0,05 (α_p larger than 1 shall be expressed as $\alpha_p = 1$) and given in levels with steps of 0,05 in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance

For the products covered by this EAD the applicable European legal act is Commission Decision 1999/91/EC, as amended by Commission Decision 2001/596/EC.

The system is 3 for any use except for uses subject to regulations on reaction to fire.

In addition, with regard to reaction to fire (including continuous smouldering) the applicable AVCP systems regarding reaction to fire are 1, 3 or 4 depending on the conditions defined in the said Decision.

3.2 Tasks of the manufacturer

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

Table 3.2.1 Control plan for the manufacturer; cornerstones

No	Subject/type of control		Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control*
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]						
1	Reaction to fire	Direct testing	2.2.1	Control plan	1	1 per 2 years
		Indirect testing (substantial components - thickness ≥ 1 mm or mass per unit area ≥ 1.0 kg/m²)	Loss on ignition**			Weekly
			Apparent density			Daily
		Indirect testing (non-substantial components - thickness < 1 mm and mass per unit area < 1.0 kg/m²)	Loss on ignition**			Weekly
			Weight per unit area			Daily
2	Propensity to undergo continuous smouldering	Direct testing	2.2.2	Control Plan	1	1 per 2 years
		Indirect testing	Loss on ignition**			Weekly
			Apparent density			Daily
3	SVOC and VOC		2.2.3	Control plan	1	With production start and every year
4	Thermal conductivity		2.2.9	Control plan	1	Once a month
5	Dimensions/Geometry		2.2.10	Control plan	2.2.10	Daily
6	Water absorption		2.2.11, 2.2.12	Control plan	2.2.11, 2.2.12	Annually
7	Density***		~~3.4~~ 2.2	Control plan	~~3.4~~ 2.2	Daily
8	Bending strength		2.2.4	Control plan	2.2.4	Annually
9	Compressive stress/strength		2.2.5	Control plan	2.2.5	Daily
10	Dimensional stability		2.2.14	Control plan	2.2.14	Twice a year
11	Deformation under specified compressive load and temperature conditions		2.2.6	Control plan	2.2.6	Twice a year
12	Behaviour under point load		2.2.8	Control plan	2.2.8	Annually

* In case of discontinuous production these minimum frequencies should be adapted to an equivalent frequency.
** Determination of loss on ignition according to EN 13820
***The density of the rigid core of the thermal insulation board shall be determined according to EN ISO 29470 at (23 ± 2) °C and (50 ± 5) % relative humidity with at least 5 test specimens of at least 100 mm x 100 mm. Before testing all test specimens shall be dried at (23 ± 2) °C and (50 ± 5) % relative humidity to constant mass.

3.3 Tasks of the notified body

The intervention of the notified body under AVCP system 1 is only necessary for reaction to fire for products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material).

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

Table 3.3.1 Control plan for the notified body; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control					
1	Reaction to fire (including continuous smouldering) The notified body shall verify the ability of the manufacturer for manufacturing the product in accordance with the control plan. In particular the following items shall be appropriately considered: - Presence of suitable test equipment - Presence of trained personnel - Presence of an appropriate quality assurance system and necessary stipulations taking especially in account an addition of fire retardants or a limiting of organic materials as essential parameter which influences reaction to fire (including continuous smouldering)	Verification of the complete FPC, to be implemented by the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	- As defined in the control plan agreed between the TAB and the manufacturer	When starting the production process, after its modification and when starting a new production line
Continuous surveillance, assessment and evaluation of factory production control *(for system 1 only)*					
2	Reaction to fire (including continuous smouldering) It shall be verified that the system of factory production control and the specified manufacturing process are maintained in accordance with the control plan. In particular the following should be dealt with: - Inspection of factory, of the production of the product and of the facilities for factory production control - Evaluation of the documents concerning the factory production control - Issuing a surveillance report taking especially into account an addition of fire retardants or a limiting of organic material as essential parameter which influences reaction to fire (including continuous smouldering)	Verification of the controls carried out by the manufacturer on the raw materials, on the process and on the product as indicated in Table 3.2.1	As defined in the control plan agreed between the TAB and the manufacturer	- As defined in the control plan agreed between the TAB and the manufacturer	Annually

4 REFERENCE DOCUMENTS

EAD 040057-00-1201	Thermal insulation board made of microporous silica
EN 823:2013	Thermal insulating products for building applications - Determination of thickness
EN 824:2013	Thermal insulating products for building applications - Determination of squareness
EN 826:2013	Thermal insulating products for building applications - Determination of compression behaviour
EN 1604:2013	Thermal insulating products for building applications - Determination of dimensional stability under specified temperature and humidity conditions
EN 1605:2013	Thermal insulating products for building applications - Determination of deformation under specified compressive load and temperature conditions
EN 1607:2013	Thermal insulating products for building applications - Determination of tensile strength perpendicular to faces
EN 12086:2013	Thermal insulating products for building applications - Determination of water vapour transmission properties
EN 12089:2013	Thermal insulating products for building applications - Determination of bending behaviour
EN 12430:2013	Thermal insulating products for building applications - Determination of behaviour under point load
EN 12667:2001	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance
EN 12939:2000	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Thick products of high and medium thermal resistance
EN 13162:2012+A1:2015	Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification
EN 13167:2012+A1:2015	Thermal insulation products for buildings - Factory made cellular glass (CG) products – Specification
EN 13168:2012+A1:2015	Thermal insulation products for buildings - Factory made wood wool (WW) products - Specification
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN 13820:2003	Thermal insulating materials for building applications - Determination of organic content
EN 15715:2009	Thermal insulation products – Instructions for mounting and fixing for reaction to fire testing – Factory made products
EN 16516:2017+A1:2020	Construction products - Assessment of release of dangerous substances - Determination of emissions into indoor air

EN 16733:2016	Reaction to fire tests for building products – Determination of a building product's propensity to undergo continuous smouldering
EN ISO 354:2003	Acoustics – Measurement of sound absorption in a reverberation room (ISO 354:2003)
EN ISO 10456:2007+AC:2009	Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values (ISO 10456:2007+Cor1:2009)
EN ISO 11654:1997	Acoustics – Sound absorbers for use in buildings – Rating of sound absorption (ISO 11654:1997)
EN ISO 11925-2:2020	Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2:2020)
EN ISO 16000-11:2024	Indoor air - Part 11: Determination of the emission of volatile organic compounds from samples of building products and furnishing - Sampling, storage of samples and preparation of test specimens (ISO 16000-11:2024)
EN ISO 16535:2019	Thermal insulating products for building applications – Determination of long-term water absorption by immersion (ISO 16535:2019)
EN ISO 29465:2022	Thermal insulating products for building applications - Determination of length and width (ISO 29465:2022)
EN ISO 29468:2022	Thermal insulating products for building applications - Determination of flatness (ISO 29468:2022)
EN ISO 29470:2020	Thermal insulating products for building applications - Determination of apparent density (ISO 29470:2020)
EN ISO 29766:2022	Thermal insulating products for building applications - Determination of tensile strength parallel to faces (ISO 29766:2022)
EN ISO 29767:2019	Thermal insulating products for building applications – Determination of short-term water absorption by partial immersion (ISO 29767:2019)