



EUROPEAN ASSESSMENT DOCUMENT

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THERMAL INSULATION BOARD MADE OF MINERAL MATERIAL

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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 construction product is a mineral thermal insulation board made of calcium silicate. The insulation board is manufactured mainly of quartz powder, calcium hydrate and cement if applicable by adding a foaming agent or binding fibers. The insulation board is high-pressure steam cured (autoclaved).

The surface of the thermal insulation board can be provided in the factory with a mineral based priming coat. Boards with a slope up to 10° in direction of length are also covered by this EAD.

The product is not covered by a harmonised European standard (hEN).

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 insulation board is used for the thermal insulation of walls, roofs and ceilings/floors (can also be subjected to compressive load).

The insulation board can be glued to the substructure and can be plastered, coated or painted. Fixing with suitable anchors is possible.

The EAD applies to the board only, not to kits made of this board.

The insulation boards are glued board to board (no glue in the joints), on the good bearing substructure with suitable glue.

The assessment of the insulation product only applies if the product is protected from precipitation, wetting or weathering in built-in state and during transport, storage and installation and if it will not be used for construction elements with contact to water and soil.

The design level of the thermal conductivity shall be laid down according to relevant national provisions.

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 insulation board for the intended use of 50 years when installed in the works (provided that the insulation board 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 works¹.

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.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of the insulation board is assessed in relation to the essential characteristics.

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

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	See clause 2.2.1	Class
Basic Works Requirement 3: Hygiene, health and the environment			
2	Content, emission and/or release of dangerous substances	See clause 2.2.2	Description
3	Water vapour transmission	See clause 2.2.3	Level
Basic Works Requirement 6: Energy economy and heat retention			
4	Thermal conductivity	See clause 2.2.4	Level
5	Dimensions/Geometry	See clause 2.2.5	Level, tolerances
6	Water absorption	See clause 2.2.6	Level
7	Density	See clause 2.2.7	Level, tolerances
8	Bending strength	See clause 2.2.8	Level
9	Compressive stress/strength	See clause 2.2.9	Level
10	Dimensional stability	See clause 2.2.10	Level
11	Tensile strength perpendicular to faces	See clause 2.2.11	Level
12	Behaviour under point load	See clause 2.2.12	Level

Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

No	Essential characteristic	Assessment method	Type of expression of product performance
13	Porosity	See clause 2.2.13	Level

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

For sampling, conditioning and testing (dimensions of the test specimens, minimum number of measurements, specific conditions), EN 13167 shall apply, unless otherwise is specified in the following. The level to be stated for each characteristic has to be representative for the range of density and thicknesses. The test specimens shall be chosen accordingly (number of test specimens, thickness and density of test specimens).

This EAD contains provisions on how to express certain performance characteristics. These provisions only apply if the manufacturer wishes to declare a performance for the relevant product characteristic.

2.2.1 Reaction to fire

The insulation board shall be tested, using the test method(s) relevant for the corresponding reaction to fire class, in order to be classified according to 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.

The TAB shall verify if the product under assessment satisfies the conditions for performance class A1 of the characteristic reaction to fire, in accordance with the provisions of EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that Decision.

The product shall be classified according to EN 13501-1.

2.2.2 Content, emission and/or release of dangerous substances

The performance of the product related to the emissions and/or release and, where appropriate, the content of dangerous substances will be assessed on the basis of the information provided by the manufacturer² after identifying the release scenarios (in accordance with EOTA TR 034) 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 use with respect to dangerous substances are:

IA1: Product with direct contact to indoor air.

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

² The manufacturer may be asked to provide to the TAB the REACH related information which he must 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 according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS.

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

SVOC and VOC

If the intended use is covered by the release scenarios IA1 and/or IA2 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) are to be determined in accordance with EN 16516. The loading factor to be used for emission testing is taken from the following table 2:

Table 2 Loading factor L, depending on the product type (in accordance with EN 16516)

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

The test specimen presents the maximum thickness and is appropriate to the size of the test chamber. Every product variant (e.g. plastered, coated or painted products) is to be tested. The edges of the product should be sealed with self-adhesive, VOC-free aluminum foil or using a suitable frame. It has to be ensured that no emission derives from the back side.

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

The test results have to 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, test result) after 3 and 28 days testing.

The relevant test results shall be expressed in [mg/m³] and stated in the ETA.

2.2.3 Water vapour transmission

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

For largely hygroscopic materials a test according to climatic condition C can in addition be necessary.

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

2.2.4 Thermal conductivity

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

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

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

During the measurement, precaution shall be taken to avoid moisture absorption by the specimen.

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 for λ and u :

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

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 for λ and u :

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

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 calculated result of lambda 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, clause 5 and 7.3 and shall be stated 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.

2.2.5 Dimensions/Geometry

The length and width of the insulation board shall be determined in accordance with EN 822. The nominal length and width shall be given in the ETA. The tolerances in length and width shall be stated using classes according to EN 13163.

The Thickness d shall be determined according to EN 823, using a load equal to 250 ± 5 Pa. The nominal thickness shall be given in the ETA including tolerances following EN 13167.

The squareness shall be determined according to EN 824, the flatness according to EN 825. The squareness and the flatness shall be given in the ETA following EN 13167.

2.2.6 Water absorption

2.2.6.1 Short-term water absorption by partial immersion

Short-term water absorption by partial immersion shall be determined according to EN 1609, method B. The samples shall be dried at a temperature of at least 40 °C to constant mass.

The water absorption in kg/m² shall be given in the ETA as the mean value of the individual values in levels using steps of 1 kg/m².

2.2.6.2 Long-term water absorption by partial immersion

The water absorption by long-term partial immersion shall be determined according to EN 12087, method 1B.

The samples shall be dried at a temperature of at least 40 °C to constant mass.

The test result shall be the mean value of the individual values. The water absorption in kg/m² shall be given in the ETA in levels using steps of 1 kg/m²

2.2.7 Density

The density is to be determined according to EN 1602. The samples shall be dried at a temperature of 105 °C to constant mass.

The density including tolerances of the product shall be given in the ETA.

2.2.8 Bending strength

Bending strength shall be determined according to EN 12089, test method B. The samples shall be dried at a temperature of at least 40 °C to constant mass.

The test result shall be the mean value of the individual values. The bending strength shall be stated in the ETA

2.2.9 Compressive stress or compressive strength

Compressive stress at 10 % deformation or compressive strength shall be determined according to EN 826. The samples shall be dried at a temperature of at least 40 °C to constant mass.

The results are the mean values of the measurements which shall be expressed to three significant figures. The compressive stress shall be given in the ETA

2.2.10 Dimensional stability

2.2.10.1 Dimensional stability under specified temperature

The determination of the dimensional stability under specified temperatures shall be carried out according to EN 1604. Testing shall be performed after 48 h storage at (70 ± 2) °C.

The relative change of dimensions in length $\Delta\varepsilon_l$, in width $\Delta\varepsilon_b$ and in thickness $\Delta\varepsilon_d$ shall be given in % in the ETA following EN 13167.

2.2.10.2 Dimensional stability under specified temperature and humidity conditions

The determination of the dimensional stability under specified temperature and humidity conditions shall be carried out according to EN 1604. Testing shall be performed after a 48h storage at (23 ± 2) °C and (90 ± 5) % or at (70 ± 2) °C and (90 ± 5) % relative humidity.

The relative change of dimensions in length $\Delta\varepsilon_l$, in width $\Delta\varepsilon_b$ and in thickness $\Delta\varepsilon_d$ shall be given in % in the ETA following EN 13167.

2.2.11 Tensile strength perpendicular to faces

The determination of the tensile strength perpendicular to faces, σ_{mt} , shall be carried out according to EN 1607. The samples shall be dried at a temperature of at least 40 °C to constant mass.

The tensile strength perpendicular to faces, σ_{mt} , shall be stated in the ETA in kPa as the mean value off the measured values, to two significant figures.

2.2.12 Behaviour under point load

The determination of the deformation under a point load of 1000 N shall be carried out according to EN 12430. The samples shall be dried at a temperature of at least 40 °C to constant mass.

The deformation under a point load of 1000 N shall be stated in the ETA in levels according to EN 13167, clause 4.3.5.

2.2.13 Porosity

The determination of Porosity shall be carried out according to EN 993-1. The porosity shall be given in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is: Decision 1999/91/EC of the European Commission.

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

For uses subject to regulations on reaction to fire the applicable AVCP systems are 1, or 3, or 4 depending on the conditions defined in the said Decision.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.

Table 3 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	See EN 13167	See clause 2.2.1.2 / EN 13167: 2013-03/ Anhang B	1	See EN 13167: 2013-03/ Anhang B
2	Thermal conductivity	See clause 2.2.4.1	See clause 2.2.4.2	1	Once a month
3	Dimensions/Geometry	See clause 2.2.5.1	See clause 2.2.5.2	See clause 2.2.5.1	Daily
4	Water absorption	See clause 2.2.6	See clause 2.2.6	See clause 2.2.6	Annually
5	Density	See clause 2.2.7	See clause 2.2.7	See clause 2.2.7	Daily
6	Bending strength	See clause 2.2.8	See clause 2.2.8	See clause 2.2.8	Annually
7	Compressive stress/strength	See clause 2.2.9	See clause 2.2.9	See clause 2.2.9	Daily
8	Behaviour under point load	See clause 2.2.12	See clause 2.2.12	See clause 2.2.12	Annually

* In case of discontinuous production these minimum frequencies should be adapted to an equivalent frequency.

3.3 Tasks of the notified body

The intervention of a notified body under AVCP system 1 for this product is only necessary if 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) and the reaction to fire performance class of the product is A1, A2, B or C.

The cornerstones of the actions to be undertaken by the notified body of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 4.

Table 4 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 system 1 only)</i>					
1	Reaction to fire	Presence of suitable test equipment			
		Presence of trained personnel			
		Presence of an appropriate quality assurance system and the necessary stipulations			
Continuous surveillance, assessment and evaluation of factory production control <i>(for system 1 only)</i>					
2	Reaction to fire	Inspection of factory, of the production of the product and of the facilities for factory production control			Annually
		Evaluation of the documents concerning factory production control			Annually
		Issuing a report of surveillance			Annually

4 REFERENCE DOCUMENTS

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

EN 822	Thermal insulating products for building applications - Determination of length and width
EN 823	Thermal insulating products for building applications - Determination of thickness
EN 824	Thermal insulating products for building applications - Determination of squareness
EN 825	Thermal insulating products for building applications - Determination of flatness
EN 826	Thermal insulating products for building applications - Determination of compression behaviour
EN 993-1	Methods of test for dense shaped refractory products – Part 1: Determination of bulk density, apparent porosity and true porosity
EN 1602	Thermal insulating products for building applications - Determination of the apparent density
EN 1604	Thermal insulating products for building applications - Determination of dimensional stability under specified temperature and humidity conditions
EN 1605	Thermal insulating products for building applications - Determination of deformation under specified compressive load and temperature conditions
EN 1607	Thermal insulating products for building applications - Determination of tensile strength perpendicular to faces
EN 1609	Thermal insulating products for building applications – Determination of short term water absorption by partial immersion
EN ISO 10456	Building materials and products – Hygrothermal properties – Tabulated design values and procedures for determining declared and design thermal values
EN 12086	Thermal insulating products for building applications - Determination of water vapour transmission properties
EN 12087	Thermal insulating products for building applications - Determination of long term water absorption by immersion
EN 12089	Thermal insulating products for building applications - Determination of bending behaviour
EN 12430	Thermal insulating products for building applications - Determination of behaviour under point load
EN 12667	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	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 13163	Thermal insulation products for buildings - Factory made expanded polystyrene (EPS) products – Specification
EN 13167	Thermal insulation products for buildings - Factory made cellular glass (CG) products – Specification

- EN 13172 Thermal insulation products - Evaluation of conformity
- EN 13501-1 Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
- EN 13823 Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item
- EN 15715 Thermal insulation products – Instructions for mounting and fixing for reaction to fire testing – Factory made products
- EOTA TR 034 General BWR 3 Checklist for EADs/ETAs – Content and/or release of dangerous substances in construction products
- EN 16516 Construction products – Assessment of release of dangerous substances – Determination of emissions into indoor air