



EUROPEAN ASSESSMENT DOCUMENT

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FIBRE REINFORCED SILICA AEROGEL THERMAL INSULATION

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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 products Fibre reinforced Silica Aerogel Thermal Insulations consist of a uniformly distributed blend of polyester (0 – 75% by weight of the product) and textile grade glass fibre (0 – 75% by weight of the product) reinforcement with embedded silica Aerogel. Products are delivered as specified in the ETA.

The EAD covers Fibre reinforced silica Aerogel thermal insulation products with variable percentage of each type of fibres (polyester and/or textile grade glass fibres). The fibres must always be present. This EAD covers variety of products with different percentages of each type of fibres.

The product comprises no coating. It is produced from newly formed fibres, only (i.e. no recycled fibres are used). The product is opaque (it is neither translucent nor transparent). The fibres are isotropic oriented, i.e. the directions of the fibres are uniform and randomly distributed.

The construction product is hereinafter referred to as thermal insulation product.

The ETA will be issued for the product on the basis of agreed data/information, deposited with the Technical Assessment Body.

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 construction product is intended to be used in walls, floors and ceilings as thermal insulation.

The assessment of the insulation product only applies if the product is not exposed to wetting, weathering, heavy moisture transport, condensation or wind.

The product is or is not exposed to compression loads.

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 Fibre reinforced Silica Aerogel Thermal Insulations for the intended use of 50 years when installed in the works (provided that the Fibre reinforced Silica Aerogel Thermal Insulations 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.

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 referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of the thermal insulation product 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	Short term water absorption by partial immersion	See clause 2.2.2	Level
3	Water vapour permeability	See clause 2.2.3	Level (μ)
Basic Works Requirement 6: Energy economy and heat retention			
4	Thermal resistance and thermal conductivity	See clause 2.2.4	Level
5	Geometry of the blankets	See clause 2.2.5	Level, tolerances
6	Dimensional stability	See clause 2.2.6	Level
7	Density	See clause 2.2.7	Level

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

For each value for a characteristic stated in the ETA the density and thickness ranges (or values) shall be stated for which the stated value of the characteristic is valid. When possible the test specimens shall be chosen accordingly (number of test specimens, thickness and density of test specimens).

2.2.1 Reaction to fire

The thermal insulation product shall be tested, using the test method(s) relevant for reaction to fire class A1, A2, B, C, D and E, in order to be classified according to EN 13501-1.

For reaction to fire testing the instructions for mounting and fixing according to EN 15715 using the product specific details for mineral wool (MW) products (Tables A.1 and A.2) shall be used. In deviation from the standard EN 15715, Table A.1, minimum and maximum thickness of the insulation product shall be tested.

In accordance with Regulation 2016/364/EU the product shall be classified according to EN 13501-1. *"The determined class is given in the ETA."*

2.2.2 Water absorption

The determination of short term water absorption by partial immersion shall be carried out according to EN 1609, method A.

The short term water absorption by partial immersion in kg/m² shall be stated in the ETA.

2.2.3 Water vapour diffusion resistance

The determination of the water vapour transmission shall be carried out according to EN 12086. The climate condition according to EN 12086 (A or C), used for testing, shall be given in the ETA.

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

2.2.4 Thermal conductivity and thermal resistance

Thermal conductivity is tested according to EN 12667 or EN 12939 for thick products. The measurements shall be made at a mean temperature of 10°C and in dry conditions. The dryness is achieved with storage of the specimens for at least 72 hours at (65 ± 2) °C in an oven ventilated with air taken at (23 ± 2)°C and (50 ± 5)% relative humidity. Following EN 12667 in order to ensure full surface contact (due to curvature and surface roughness), thermal conductivity could be measured at enhanced pressure load. The possibly needed conversion with regard to moisture content shall be carried out according to EN ISO 10456.

A minimum of 4 measurements shall be carried out/performed.

Thermal conductivity and thermal resistance for given thickness shall be stated in the ETA.

If needed, the declared thermal conductivity $\lambda_{D(23,50)}$ defined in EN ISO 10456 is calculated according to EN ISO 10456 for a moisture content of the insulation product of 23 °C and 50 % relative humidity as 90/90 value, representing at least 90 % of the production with a confidence level of 90 %, rounded upwards to the nearest 0,001 W/(mK) and stated in the ETA. In the case when declared thermal conductivity is stated in the ETA, at least 10 thermal conductivity measurements results are needed for calculation. If conversion of the thermal conductivity due to moisture is necessary, the moisture conversion factor f_u and the moisture content u at 23°C/50% and 23°C/80% shall be stated in the ETA.

2.2.5 Geometry

The determination of length and width shall be carried out according to EN 822.

The determination of thickness shall be carried out following EN 823, whereas due to the curvature of the product, the pressure load, at which measurements are conducted, can be higher than defined in EN 823 (up to 1500 Pa).

The length and the width shall be given in the ETA including tolerances following 4.2.2. of EN 13162 as possible.

The thickness shall be given in the ETA including tolerances following Table 1 of EN 13162 as possible. The pressure at which measurements of thickness were conducted shall be given in the ETA.

2.2.6 Dimensional stability under specified temperature and humidity

The determination of the dimensional stability under specified temperature and humidity conditions shall be carried out on the basis of EN 1604. The test shall be carried out after storage of 48 h at $(70 \pm 2)^\circ\text{C}$ and/or at $(70 \pm 2)^\circ\text{C} / (90 \pm 5)\%$ relative humidity according to EN 13162:2012, Table 2.

The relative change of dimensions in length, $\Delta\varepsilon_l$, width, $\Delta\varepsilon_b$, and thickness, $\Delta\varepsilon_d$, and the levels shall be stated in in the ETA in accordance with EN 13162:2012, Table 2.

2.2.7 Density

The determination of apparent density shall be carried out according to EN 1602, whereas the measurement of thickness is taken from 2.2.5.

The apparent density shall be stated in the ETA. The pressure, at which measurements of thickness were measured according to 2.2.5 and used for the calculation of the apparent density, shall be stated 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 legal act is: Decision 1999/91/EC(EU)

The system is: 3.

In addition, with regard to reaction to fire the applicable European legal act is: Decision 2001/596/EC(EU)

The systems are: 1, 3 or 4.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 2.

Table 2 is an example only; the control plan depends on the individual manufacturing process and has to be established between notified body and manufacturer. In case of discontinuous production these minimum frequencies should be adapted to an equivalent frequency.

Table 2 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	EN ISO 11925-2 (class B, C, D and E)	shall be stated in the Control plan*		Every 3 rd batch or once a week
		EN 13823 (class A2, B, C and D)			1 per 2 years and indirect testing (loss on ignition once per 8 hours + apparent density once per 2 hours)
		EN ISO 1716 (class A1 and A2)			
		EN ISO 1182 (class A1)			
2	Short term water absorption by partial immersion	See clause 2.2.2	shall be stated in the Control plan		Twice a year
3	Water vapour permeability	See clause 2.2.3	shall be stated in the Control plan		Twice a year
4	Thermal conductivity and thermal resistance	See clause 2.2.4	shall be stated in the Control plan		Every batch or once per 24 hours
5	Geometry of the blankets	See clause 2.2.5	shall be stated in the Control plan		Every batch or once per 8 hours
6	Dimensional stability	See clause 2.2.6	shall be stated in the Control plan		Once a year
7	Density	See clause 2.2.7	shall be stated in the Control plan		Every batch or once per 24 hours

* in case of reaction to fire class A1, A2, B, C of the product for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification the involvement of the notified body is required. This is to be stated in the Control Plan.

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 Thermal insulation for buildings made of Fibre reinforced Silica Aerogel Thermal Insulations are laid down in Table 3.

The involvement of the notified body is required only under the conditions defined in 1999/91/EC amended by 2001/596/EC – in case of reaction to fire class A1, A2, B, C of the product for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an additional of fire retardants or a limiting of organic material)

Table 3 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 – only for reaction to fire**)</i>					
1	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.	As defined in clause 2.2.1 of the EAD	shall be stated in the Control plan		When starting the production
Continuous surveillance, assessment and evaluation of factory production control <i>(for system 1 only – only for reaction to fire**)</i>					
2	Continuous surveillance, assessment and evaluation of the 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.	As defined in clause 2.2.1 of the EAD	shall be stated in the Control plan		Annually

** Only relevant for products of class C and higher.

For the products falling under systems 3 or 4 (see clause 3.1), there is no involvement of a notified body after the ETA has been issued.

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, unless a dated reference is given in clause 2.2 or Annex A of this EAD.

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 1604	Thermal insulating products for building applications - Determination of dimensional stability under specified temperature and humidity conditions
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 ISO 11925-2	Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test
EN 12086	Thermal insulating products for building applications - Determination of water vapour transmission properties
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 13162	Thermal insulation products for buildings - Factory made mineral wool (MW) products – Specification
EN 13171	Thermal insulation products for buildings - Factory made wood fibre (WF) products - Specification
EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using test 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