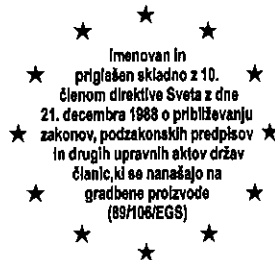


Zavod za gradbeništvo Slovenije
Slovenian National Building and Civil
Engineering Institute

Dimičeva 12,
1000 Ljubljana, Slovenija

Tel.: +386 (0)1-280 42 50
Fax: +386 (0)1-436 74 49
e-mail: info.ta@zag.si
<http://www.zag.si>



ZAG Ljubljana

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Member of EOTA

European Technical Approval ETA-11/0471

[English translation prepared by ZAG Ljubljana – Original version in Slovenian language]

Trade name:
Komerčno ime:

SPACELOFT

Holder of approval:
Imetnik soglasja:

ASPEN AEROGELS INCORPORATED,
Forbes Road bldg 30, Northborough,
MA 01532 USA

Generic type and use of construction product:
Tip gradbenega proizvoda in njegova predvidena uporaba::

Thermal Insulation Product

toplotnoizolacijski proizvod

Validity **from / to:**
Veljavnost od / do:

20. 01. 2012 to 19. 01. 2017

Manufacturing plant:
Proizvodni obrat:

ASPEN AEROGELS INCORPORATED,
East Providence Manufacturing Facility,
3 Dexter Road,
East Providence,
RI 02914 USA

Issue Nr.:
Izdaja št.:

1

This European Technical Approval contains:
To Evropsko tehnično soglasje vsebuje:

8 pages

8 strani



Evropska organizacija za tehnična soglasja
European Organisation for Technical Approvals



I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by the Slovenian National Building and Civil Engineering Institute (ZAG Ljubljana) in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by the Council Directive 93/68/EEC² and Regulation (EC) no. 1882/2003 of the European Parliament and of the Council³,
 - Zakon o gradbenih proizvodih (ZGPro)⁴,
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex of Commission Decision 94/23/EC⁵,
 - CUAP 12-01/36 for European Technical Approval of "Fibre Reinforced Silica Aerogel Thermal Insulation", Edition June 2011.
2. The Slovenian National Building and Civil Engineering Institute (ZAG Ljubljana) is authorised to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.
3. This European Technical Approval is not to be transferred to manufacturers or agents of manufacturer other than those indicated on page 1; or manufacturing plants other than those laid down in the context of this European Technical Approval.
4. This European Technical Approval may be withdrawn by the Slovenian National Building and Civil Engineering Institute (ZAG Ljubljana), in particular pursuant to information by the Commission according to Article 5(1) of the Council Directive 89/106/EEC.
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6. The European Technical Approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities no. L 40, 11.2.1989, p.12

² Official Journal of the European Communities no. L 220, 30.8.1993, p.1

³ Official Journal of the European Union no. L 284, 31.10.2003, p.1

⁴ Official Gazette of the Republic of Slovenia, no. 52/00 and no. 110/02

⁵ Official Journal of the European Communities no. L 17, 20.1.1994, p.34



II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1. Definition of product and intended use

1.1. Definition of the construction product

Fibre reinforced silica Aerogel thermal insulation SPACELOFT is flexible and nanoporous blanket. Aerogel is a solid with low density, acquired from the gel, where the liquid component is exchanged by the gas. The basis of the Aerogel is the silica. Silica Aerogel is embedded into the fibrous reinforcement of 50% polyester and 50 % of the textile grade glass fibres.

The product comprises no coating and is produced from newly formed isotropic oriented fibres.

The product is delivered in rolls of the width of 1470 mm and different lengths from 45 m to 75 m. The thickness of the product is from 5 mm to 10 mm. The product is opaque and grey in colour.

Nominal apparent density of the product is 150 kg/m^3 with the tolerances $\pm 20\%$.

1.2. Intended use of the construction product

The product blankets are intended to be used in walls, floors and ceiling as thermal insulation. The insulation can be used in constructions where it is not exposed to wetting, weathering, heavy moisture transport, condensation or wind and where the product either is or is not exposed to compression loads.

1.3. Assumed working life of the construction product

The provisions made in this European Technical Approval (ETA) are based on an assumed intended working life of the thermal insulation of 50 years, provided that the conditions laid down in sections 4.2, 5.1 and 5.2 for the packaging, transport, storage, installation, use maintenance and repair are met. These provisions are based upon the current state of the art and available knowledge and experience.

Assumed working life means that, when an assessment following the ETA provisions is done, and when working life has elapsed, the real working life may be, in normal use conditions considerably longer without major degradation affecting the Essential Requirements.

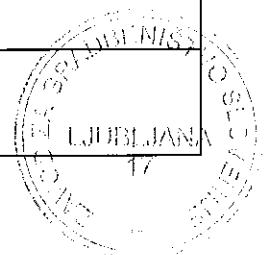
The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or the Approval Body, but should only be regarded as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

2. Characteristics of product and methods of verification

Identification tests and the assessment of the fitness for use of this product according to the Essential Requirements were carried out in compliance with the "CUAP 12.01/36" concerning Fibre Reinforced Silica Aerogel Thermal Insulation – edition June 2011 (called CUAP in this ETA). The methods of verification and characteristics of the insulation evaluated in this ETA are as follows:



CUAP Paragraph	Characteristic	Assessment of the characteristic
ER 1: Mechanical resistance and stability		
2.4.1	Corrosion developing capacity on metal constructions	NPD
ER 2: Safety in case of fire		
2.4.2	Reaction to fire EN 13501-1	C – s1, d0
ER 3: Hygiene, health and environment		
2.4.3	Content and/or release of dangerous substances	Product and the constituents of the product do not contain substances which have to be classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No. 1272/2008 and/or listed in the "Indicative list on dangerous substances" of the EDGS – taking into account the installation conditions. Manufacturer has submitted a written declaration.
2.4.4	Short term water absorption by partial immersion EN 1609	$W_p \leq 0.01 \text{ kg/m}^2$
2.4.5	Water vapour permeability EN 12086	$\mu = 5.0 (23^\circ\text{C}/50\%rH-23^\circ\text{C}/93\%rH)$
2.4.6	Air permeability EN 29053	NPD
2.4.7	Susceptibility to mould growth CUAP 12.01/36 – Annex B	Mould growth is not possible. According to Table 4 of the EN ISO 846 the intensity of mould growth is 0.
ER 4: Safety in use		
Not relevant		
ER 5: Protection against noise		
2.4.8	Dynamic stiffness EN 29052-1 and compressibility EN 12431	nominal thickness 10 mm: $s' \leq 34 \text{ MN/m}^3$, $c \leq 1.2 \text{ mm}$ other thicknesses: NPD
2.4.9	Impact sound reduction EN ISO 140-8, EN ISO 717-2	NPD



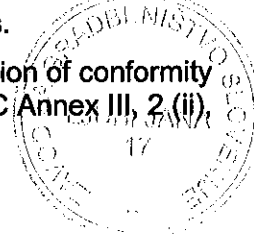
CUAP Paragraph	Characteristic	Assessment of the characteristic
ER 6: Energy economy and heat retention		
2.4.10	Thermal conductivity EN 12667	$\lambda_{D(23,50)} = 0.014$ W/mK $u_{23,50} = 1.9$ %, $u_{23,80} = 4.1$ %, $f_{u,1} = 0.25$, $f_{u,2} = 2.19$ thickness: all thicknesses
2.4.11	Geometry of the blankets EN 822, EN 823	length tolerance: -300 mm / + no limit width tolerance: ± 25 mm thickness tolerance: - 10% or - 0.5 mm/ + 1 mm, whichever gives the greatest tolerance
2.4.12	Dimensional stability EN 1604 (48 h at 70°C)	length: $ \Delta\epsilon_l \leq 1$ % width: $ \Delta\epsilon_b \leq 1$ % thickness: $ \Delta\epsilon_d \leq 1$ %
2.4.13	Tensile strength parallel to faces EN 1608	all thicknesses: $\sigma_T > 200$ kPa in each of 2 perpendicular directions
General aspects relating to fitness for use		
2.4.14	Compressive stress at 10% deformation EN 826	$\sigma_{10} > 80$ kPa
2.4.15	Deformation under specified compressive load and temperature conditions EN 1605	NPD
2.4.16	Tensile strength perpendicular to faces EN 1607	NPD
2.4.17	Compressive creep EN 1606	relative quantities at load 4 kPa after 10 years: creep - $\epsilon_{c10a} \leq 1.5$ %, deformation - $\epsilon_{10a} \leq 10.6$ %
2.4.18	Bending strength EN 12089	NPD
2.4.19	Point load EN 12430	NPD

3. Evaluation and Attestation of Conformity and CE marking

3.1. System of Attestation of conformity

According to the decision 99/91/EC of the European Commission for the product in question, the systems 3 of attestation of conformity applies, since there is no improvement of the reaction to fire classification in the production process.

Considering the Euroclass C for the reaction to fire, the system of attestation of conformity is system 3. This system is described in the Council Directive 89/106/EEC Annex III, 2 (ii).
Second possibility as follows:



Declaration of conformity of the product by the manufacturer on the basis of:

(a) *Tasks for the manufacturer:*

1. Factory Production Control,

(b) *Tasks for the Notified Body:*

2. Initial type testing of the product

3.2. Responsibilities

3.2.1. Tasks of the manufacturer

3.2.1.1. Factory production control

The manufacturer shall have permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the production is in conformity with this European Technical Approval.

The manufacturer may only use components stated in the technical documentation of this European Technical Approval.

The factory production control shall be in accordance with the "Control Plan relating to this European Technical Approval" which is part of the technical documentation of this European Technical Approval. The Control Plan⁶ is laid down in the context of the factory production control system operated by the manufacturer and deposited at ZAG Ljubljana.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan⁷.

3.2.1.2. Other tasks of manufacturer

The manufacturer shall, on the basis of a contract, involve a body (bodies) which is (are) notified for the tasks referred to in section 3.1 in the field of insulating materials in order to undertake the actions laid down in section 3.2.2. For this purpose, the "Control Plan"⁷ referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the Notified Body or Bodies involved.

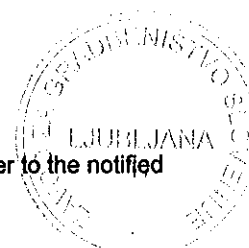
The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European Technical Approval.

3.2.2 Tasks of the Notified Bodies

The Notified Body (Bodies) shall perform the initial type testing of the product in accordance with the provisions laid down in the Control Plan.

For initial type testing, the results of the tests performed as part of the assessment for this European Technical Approval can be used unless there are changes in the production line or plant. In such cases, the necessary initial type testing has to be agreed between ZAG Ljubljana and the Notified Bodies involved.

⁶ The "Control Plan" is a confidential part of the European Technical Approval and only handed over to the notified body or bodies involved in the procedure of attestation of conformity. See section 3.2.2.



The Notified Body (Bodies) shall retain the essential points of its (their) actions referred to above and state the results obtained and conclusions drawn in (a) written report (reports).

3.3 CE marking

The CE marking shall be affixed on the each packaging or on the delivery tickets put into the packages. The letters «CE» shall be accompanied by the following addition information:

- the name of the product: Commercial trade name as indicated in this ETA,
- the name or identifying mark and address of the ETA-holder,
- the last two digits of the year in which the CE marking was affixed,
- the number of the European Technical Approval,
- the declared and most essential properties according to paragraph 2 of this ETA.

4. *Assumptions under which the fitness of the product for the intended use was favourably assessed*

4.1. Manufacturing

Manufacturing of the SPACELOFT is base on the defined production method, use of defined raw materials and tolerances. If changes take place manufacturer is responsible to clarify if the change has influence on the properties of the product tested according to the provisions of the CUAP.

The European Technical Approval is issued for the product on the basis of agreed data/information, deposited with the ZAG Ljubljana, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in the deposited data/information being incorrect should be notified to the ZAG Ljubljana before the changes are introduced. The ZAG Ljubljana will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

4.2. Installation

The insulation is installed on to the building according to the instructions of the manufacturer. The suitability of the insulation to the planned purpose shall be evaluated taking into account what has been said at point 1.3.

5. *Indications to the manufacturers*

5.1. Packaging, transport and storage

The insulation products are transported and stored in sacks.

5.2 Maintenance and repair of the works

The maintenance and repair of the insulation products are not foreseen.



The original version is signed by:

Leading expert:
Friderik Knez, B. Sc.



Head of Service for Technical Approvals:
Franc Capuder, M.Sc.

