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European technical approval

ETA-05/0186

(English translation, the original version is in German language)

Handelsbezeichnung

Trade name

THERMOFLOC

Zulassungsinhaber

Holder of approval

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Zulassungsgegenstand
und Verwendungszweck

Dämmstoff aus losen, ungebundenen Zellulosefasern

*Generic type and use
of construction product*

Insulation material made of loose, free cellulose fibres

Geltungsdauer vom
Validity from
bis
to

14.05.2012

14.11.2015

Herstellwerk
Manufacturing plant

Werk 1

Diese Europäische
technische Zulassung umfaßt
*This European technical approval
contains*

11 Seiten inklusive 0 Anhänge
11 pages including 0 Annexes

Diese Europäische
technische Zulassung ersetzt
*This European technical
approval replaces*

**ETA-05/0186 mit Geltungsdauer von 15.11.2010 bis
14.11.2015**
ETA-05/0186 with validity from 15.11.2010 to 14.11.2015



European Organisation for Technical Approvals
Europäische Organisation für Technische Zulassungen
Organisation Européenne pour l'Agrément Technique

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Österreichisches Institut für Bautechnik 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/EEC of 22 July 1993²;
 - Kärntner Akkreditierungs- und Baustoffzulassungsgesetz vom 16. Dezember 1993. LGBl. K Nr. 24/1994 idF. LGBl. K Nr. 78/1998 und idF. K Nr. 31/2001;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex of Commission Decision 94/23/EC³.
- 2 The Österreichisches Institut für Bautechnik is authorized 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.
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- 6 The European technical approval is issued by the approval body in its official language. This version corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities N° L 40, 11.02.1989, p. 12

² Official Journal of the European Communities N° L 220, 30.08.1993, p. 1

³ Official Journal of the European Communities N° L 17, 20.01.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of products and intended use

1.1 Definition of products

This European technical approval applies to the following insulation product made of loose, free cellulose fibres:

THERMOFLOC

This product consists of cellulose fibres made from waste paper by mechanical crushing. During this manufacturing process the fibres are provided with a fire protection equipment (borate free or borate reduced) and serves for the production of insulation layers by means of machine processing. The machine processing is carried out in dry conditions or under the addition of water. The insulation product is depending on the area of application and processing produced with different densities (density range **30 - 60 kg/m³**)

The waste paper used in the manufacturing process has to fulfil the following quality criteria

glazed paper content	0 %
humidity	≤ 12 %

1.2 Intended use

The insulation product made of cellulose fibres is used as non loadable insulating material mainly for intended uses where vertical or horizontal cavities are completely filled or horizontal, arched or moderately pitched ($\leq 10^\circ$) exposed areas are covered.

Area of application for walls

- Machine processed cavity insulation material for exterior walls of timber frame constructions
- Machine processed cavity insulation material for interior walls of timber frame constructions.

Area of application for roofs

- Machine processed cavity insulation material for pitched roofs without ventilation (full rafter insulation)
- Machine processed cavity insulation material for flat roofs with upper covering and non ventilated cavity under the waterproofing

Area of application for ceilings / floors

- Machine processed exposed insulation material not subject to foot traffic for ceilings under non habitable attics (thermal insulation layer between or above the load-bearing structure)
- Machine processed cavity insulation material between floor-joists under floor constructions for insulation or cavity damping

The insulation product made of cellulose fibres shall not be used in structures where it will be exposed to wetting or weathering and in such with a border to earth.

The provisions made in this ETA are based on an assumed intended working life of the insulation product of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.

2 Characteristics of products and methods of verification

2.1 Composition and manufacturing process

The insulation product shall as far as its composition and manufacturing process is concerned correspond to the product subject to the approval tests. Details of composition and manufacturing process are deposited at the Österreichischen Institut für Bautechnik.

2.2 Density

The density of the insulating materials is determined according to standard ISO/CD 18393⁴. Depending on the area of application the density ranges stated in Table 1 are to be observed and controlled by the installer.

Table 1: density range depending on the area of application

area of application	density range kg/m ³
<u>Vertical</u> : machine processed cavity insulation in exterior-, interior walls,	42-60
<u>Pitched</u> : machine processed cavity insulation in roofs (pitch >10°)	42-60
<u>Horizontal</u> : machine processed cavity insulation in flat roofs and floor constructions	42-60
<u>Horizontal</u> : machine processed exposed insulation not subject to foot traffic on ceiling constructions (pitch ≤ 10°)	30-44

In case of machine processing under the addition of water the density shall be at least 45 kg/m³. Independent of the area of application the density shall not exceed the value of 55 kg/m³.

2.3 Settlement

The settlement is determined according to ISO/CD 18393 following the test methods stated in Table 2. The maximum values of settlement stated in Table 2 are not exceeded for the given minimum density.

Table 2: Settlement depending on the test method

Test method according to ISO/CD 18393	settlement %	density kg/m ³	settled density kg/m ³
Method A – Settling by impact excitation	4,4	30,1	32,9
Method C – Settling of wall cavity insulation by vibration	0	42,2	42,2
Method D – Settling by specified climatization	7,0	32,3	35,3

2.4 Water absorption

The water absorption of the products is determined according to European standard EN 1609, method A⁵. The mean water absorption at a density of 30/60 kg/m³ and a sample thickness of 100 mm did not exceed **14,5/44,0 kg/m²**.

⁴ ISO/CD 18393:2002-08

Thermal insulation – Accelerated ageing of thermal insulation materials – Assessment of settling of loose-fill thermal insulation used in attic and closed cavity applications

⁵ EN 1609: 1996-11

Thermal insulation products for building applications - Determination of short-term water absorption by partial immersion

2.5 Water vapour diffusion resistance factor

The water vapour permeability of the product is determined in accordance with EN 12086⁶ climatic condition A. The water vapour permeability does not exceed $\mu = 2,0$.

2.6 Airflow resistance

The airflow resistance of the products is determined according to European standard EN 29 053, method A⁷. The mean longitudinal airflow resistance at a density of 30 kg/m³ is at least **6,1 kPa s/m²**.

2.7 Thermal conductivity

a) machine processed in dry conditions

The thermal conductivity of the products is determined according to EN 12667⁸. The declared value of thermal conductivity is determined according to EN 10 456⁹.

The fractile value of thermal conductivity for the density range of 30 kg/m³ - 60 kg/m³ is $\lambda_{(10,dry,90/90)} = 0,0376 \text{ W/(m}\cdot\text{K)}$ representing at least 90 % of the production with a confidence limit of 90%

The limit value of thermal conductivity for the density range of 30 kg/m³ - 60 kg/m³ is $\lambda_{(10,dry,limit)} = 0,0380 \text{ W/(m}\cdot\text{K)}$ representing the total production. The manufacturer is responsible for keeping the limit during production.

The declared value of thermal conductivity for the density range of 30 kg/m³ - 60 kg/m³ is $\lambda_{D(23,50)} = 0,039 \text{ W/(m}\cdot\text{K)}$ – **category 1** determined by conversion of the $\lambda_{(10,dry,90/90)}$ value.

The declared value of thermal conductivity for the density range of 30 kg/m³ - 60 kg/m³ is $\lambda_{D(23,50)} = 0,039 \text{ W/(m}\cdot\text{K)}$ – **category 2** determined by conversion of the $\lambda_{(10,dry,limit)}$ value.

For conversion of humidity the following applies:

- the moisture content mass by mass at 23 °C/50 % relative humidity: $u_{23,50} = 0,071 \text{ kg/kg}$
- the moisture content mass by mass at 23 °C/80 % relative humidity: $u_{23,80} = 0,13 \text{ kg/kg}$
- the moisture content conversion coefficient mass by mass: $f_{u1 (dry - 23/50)} = 0,34 \text{ kg/kg}$
 $f_{u2 (23/50 - 23/80)} = 0,45 \text{ kg/kg}$

b) machine processed in wet conditions

The thermal conductivity of the products is determined according to EN 12667¹⁰. The declared value of thermal conductivity is determined according to EN 10 456¹¹.

6	EN 12086:1997	Thermal insulating products for building applications - Determination of water vapour transmission properties
7	EN 29 053: 1993-03	Acoustics - Materials for acoustical applications - Determination of airflow resistance
8	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
9	EN ISO 10 456: 2000	Thermal insulation - Building materials and products - Determination of declared and design values
10	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
11	EN ISO 10 456: 2000	Thermal insulation - Building materials and products - Determination of declared and design values

The fractile value of thermal conductivity for the density range of 45 kg/m³ - 55 kg/m³ is $\lambda_{10,dry,90/90} = 0,0405 \text{ W/(m}\cdot\text{K)}$ representing at least 90 % of the production with a confidence limit of 9 %.

The limit value of thermal conductivity for the density range of 45 kg/m³ - 55 kg/m³ is $\lambda_{10,dry,limit} = 0,0403 \text{ W/(m}\cdot\text{K)}$ representing the total production. The manufacturer is responsible for keeping the limit during production.

The declared value of thermal conductivity for the density range of 45 kg/m³ - 55 kg/m³ is $\lambda_{D(23,50)} = 0,042 \text{ W/(m}\cdot\text{K)}$ – **category 1** determined by conversion of the $\lambda_{(10,dry,90/90)}$ value.

The declared value of thermal conductivity for the density range of 45 kg/m³ - 55 kg/m³ is $\lambda_{D(23,50)} = 0,042 \text{ W/(m}\cdot\text{K)}$ – **category 2** determined by conversion of the $\lambda_{(10,dry,limit)}$ value

For conversion of humidity the following applies:

- the moisture content mass by mass at 23 °C/50 % relative humidity: $u_{23,50} = 0,066 \text{ kg/kg}$
- the moisture content mass by mass at 23 °C/80 % relative humidity: $u_{23,80} = 0,126 \text{ kg/kg}$
- the moisture content conversion coefficient mass by mass: $f_{u1 (dry - 23/50)} = 0,38 \text{ kg/kg}$
- $f_{u2 (23/50 - 23/80)} = 0,40 \text{ kg/kg}$

2.8 Reaction to fire

The reaction to fire of the insulation products is tested by using the test methods relevant for the corresponding reaction to fire class and is classified according to EN 13 501-1¹². Table 3 shows the reaction to fire classes which apply to the insulation products as a function of their end use application.

Table 3: Reaction to fire classes as a function of the end use application

End use application	Reaction to fire: Class
<ul style="list-style-type: none"> - installation density of the insulating material 30 kg/m³ to 60 kg/m³, - insulation layer thickness $\geq 100 \text{ mm}$, - end use application without air gap - end use application substrates defined in EN13238¹³ for the following standard substrate: "wood based panel": density of the board $\geq 680 \pm 50 \text{ kg/m}^3$, board thickness $\geq 12 \pm 2 \text{ mm}$, reaction to fire of the board: class D, "calcium silicate board": density of the board $870 \pm 50 \text{ kg/m}^3$, board thickness $\geq 11 \pm 2 \text{ mm}$, reaction to fire of the board: class A2 	B-s2,d0
<ul style="list-style-type: none"> - installation density of the insulating material 30 kg/m³ to 60 kg/m³, - insulation layer thickness $\geq 40 \text{ mm}$ 	E

2.9 Resistance to biological actions

The test and the assessment of the resistance to growth of mould fungus has been verified according to the EOTA testing procedure (Annex C of CUAP „In-situ formed loose filled thermal insulation material and/or acoustic insulation material made of vegetable or animal fibres; edition July 2009.“). The reached **class** of the product is **0**.

¹² EN 13 501-1:2002-06

Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests

¹³ EN 13238:2001

Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates

2.10 Corrosion developing capacity on metal construction products

The test and the assessment of the corrosion developing capacity on metal has been verified according to the EOTA testing procedure (Annex E of CUAP „In-situ formed loose filled thermal insulation material and/or acoustic insulation material made of vegetable or animal fibres; edition July 2009.“). No corrosion developing potential of the insulation material was determined.

2.11 Retention of additives

The test and the assessment of the retention of additives has been verified according to the EOTA testing procedure (Annex F of CUAP „In-situ formed loose filled thermal insulation material and/or acoustic insulation material made of vegetable or animal fibres; edition July 2009“). No decrease in the reaction to fire behavior nor resistance to mould growth was determined.

2.12 Dangerous substances

The product consists of cellulose fibres made from waste paper by mechanical crushing under addition of flame retardants (borate free and borate reduced) and complies with the provisions of guidance paper H¹⁴. It does not contain substances which have to be classified as dangerous according to Directive 67/548/EEC and/or listed in the "Indicative list on dangerous substances" of the EGDS and can be classified as product **type 2 (borate reduced) and type 3 (borate free)** according the EOTA testing procedure (clause 4.3.2 of CUAP „Factory-made thermal insulation material made of vegetable or animal fibres; edition October 2009.“).

A declaration of conformity in this respect was made by the manufacturer.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.13 Critical moisture content

No performance determined

3 Evaluation of conformity and CE marking

3.1 Attestation of conformity system

System 3 for **THERMOFLOC** for which the following is valid:

- intended use "any"
- reaction to fire classes E

The system is described in Council Directive (89/106/EEC) Annex III, 2 (ii), Second possibility and is detailed as follows:

- a) Tasks of the manufacturer
 - factory production control.
- b) Tasks of the approved body
 - initial type-testing of the product

3.1.1 Considering the Euroclass B for the reaction to fire and that a clearly stage in the production process has been identified which results in an improvement of the reaction to fire classification (addition of fire retardant), the system of attestation of conformity specified by the Euro-

¹⁴ Guidance paper H: A harmonised approach relating to Dangerous substances under the construction products directive, 18 February 2000

pean commission is system 1 described in the Council Directive 89/106/EEC Annex III, 2 (i), First possibility and described as follows:

Certification of the conformity of the product by a notified certification body on the basis of:

a) Tasks of the manufacturers:

- factory production control
- further testing of samples taken at the factory by the manufacturer in accordance with a control plan

b) Tasks of the Notified Body:

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks for the manufacturer; factory production control

The manufacturer has a factory production control system in his plant and exercises permanent internal control of production.

All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. The factory production control system ensured that the products are always in conformity with the European technical approval.

In the framework of factory production control the manufacturer shall carry out tests and controls in accordance with the control plan¹⁵ which is fixed with this European technical approval.

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to this control plan which is part of the technical documentation of this European technical approval.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- designation of the products and of the basic materials
- type of control or testing
- date of manufacture of the products and date of testing of the products or basic materials or components
- result of control and testing and, if appropriate, comparison with requirements
- signature of person responsible for factory production control

On request the records shall be presented to the Österreichisches Institut für Bautechnik.

3.2.2 Tasks for approved bodies

3.2.2.1 Initial type-testing of the products

For initial type-testing the results of the tests performed as part of the assessment for the European technical approval shall 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 the Österreichisches Institut für Bautechnik and the approved bodies involved.

3.2.2.2 Initial inspection of factory and of factory production control

The approved body shall ascertain that in accordance with the control plan the precautions in the factory, in particular the staff and equipment concerning, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the insulation products with the specifications mentioned in section 2.

¹⁵ The control plan has been deposited at the Österreichisches Institut für Bautechnik and is handed over only to the approved bodies involved in the attestation of conformity procedure

3.2.2.3 Continuous surveillance

The approved body shall visit the factory at least twice a year for surveillance. It has to be verified that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan ¹⁴⁾.

Continuous surveillance and assessment of factory production control have to be performed according to the control plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body or inspection body, respectively, to the Österreichisches Institut für Bautechnik. In cases where the provisions of the European technical approval and the control plan are no longer fulfilled the certificate of conformity shall be withdrawn and the Österreichische Institut für Bautechnik informed immediately.

3.3 CE marking

The CE marking shall be affixed on the products, the packaging or the attached label.

The symbol "CE" shall be accompanied by the following information:

- name or identifying mark of producer and manufacturing plant,
- the last two digits of the year in which the CE marking was affixed,
- number of the European technical approval,
- identification of products (commercial name),
- density range depending on the area of application
- settlement
- water absorption
- water vapour diffusion resistance
- airflow resistance
- declared value of thermal conductivity
- class of reaction to fire ¹⁶⁾

¹⁶⁾ European classification of reaction to fire of building materials according to the Commission Decision 2000/147/EG of 8 February 2000 implementing Article 20 of Directive 89/106/EEC on construction products.

4 Assumptions under which the fitness of the products for the intended use was favourably assessed

4.1 Manufacturing

The thermal insulation products shall correspond as far as their composition and manufacturing process is concerned to the products subject to the approval tests. Composition and manufacturing process are deposited at the Österreichischen Institut für Bautechnik.

4.2 Installation

4.2.1 Parameters for the design of construction works or parts of construction works

4.2.1.1 Design value of thermal conductivity

The design value of thermal conductivity shall be defined in accordance with the relevant national provisions.

4.2.1.2 Nominal thickness for the thermal resistance calculation

When calculating the thermal resistance, the nominal thickness of the insulation layer according to Table 4 shall be applied.

Table 4: Nominal thickness depending on the area of application

area of application	nominal thickness
<u>Vertical</u> : machine processed cavity insulation in exterior-, interior walls,	clear span of the filled cavity
<u>Pitched</u> : machine processed cavity insulation in roofs (pitch >10°)	clear span of the filled cavity
<u>Horizontal</u> : machine processed cavity insulation in flat roofs and floor constructions	clear span of the filled cavity
<u>Horizontal</u> : machine processed exposed insulation not subject to foot traffic on ceiling constructions (pitch ≤ 10°)	up to 33 cm 10 % and over 33 cm installation thickness 15% insulation thickness shall be added to the nominal thickness

For horizontal machine processed installation of exposed insulation not subject to foot traffic the insulation layer shall have a constant installation thickness taking into account the nominal thickness. For that purpose suitable height marks shall be arranged in sufficient distances before the processing. When blowing into closed cavities it shall be made sure by appropriate measures (e. g. control drillings) that the cavity is completely filled with the insulating material.

4.2.1.3 Value of water vapour diffusion resistance

The construction shall be designed and installed in such a way that no harmful condensation occurs within the works

4.2.2 Parameters for the installation in the construction works or parts of construction works

The fitness of the cellulose fibres for the intended use is given under the following condition:

- Installation carried out by appropriate personnel which have adequate experience in installing the material under the supervision of the person responsible for technical matters on site.
- Installation in accordance with the manufacturer's specifications. Concerning this matter the manufacturer has to train the installers. In case of processing under addition of water it shall be ensured that the main share of water is evaporated before closing the cavity.

The time period necessary for this depends on the climatic conditions of the surroundings.
Only building materials allowing an evaporation of moisture may be used as facings.

- Precise compression of the cellulose fibres
- Installation of constructive measurements to avoid settlement by large cavity thickness

4.2.3 Use of the insulation products as airborne sound insulation

In case of use of the products as airborne sound insulation it is necessary to determine the airborne sound insulation for the specific construction work in question in accordance with the relevant technical rules in force.

5 Recommendations for the manufacturer

5.1 Recommendations on packaging, transport and storage

Packaging of the products has to be such that they are protected against moisture during transport and storage unless other measures are foreseen by the manufacturer for this purpose.

5.2 Recommendations on installation

The product has to be protected against moisture during installation.

The processing guidelines of the manufacturer have to be followed.

5.3 Accompanying information

In the information accompanying CE marking the manufacturer shall indicate that the products shall be protected against humidity during transport, storage and installation.

Furthermore it is the responsibility of the manufacturer to ensure that the information on the installation procedure is shown clearly on the package and/or on an enclosed instruction sheet.

On behalf of Österreichisches Institut für Bautechnik



Rainer Mikulits
Managing Director