



## European Technical Approval ETA-11/0328

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung <i>Trade name</i>	INTHERMO für Holzbau
Zulassungsinhaber <i>Holder of approval</i>	INTHERMO GmbH Roßdörfer Straße 50 64372 Ober-Ramstadt DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck <i>Generic type and use of construction product</i>	Außenseitiges Wärmedämm-Verbundsystem mit Putzschicht zur Anwendung auf Außenwänden in Holzbauart <i>ETICS with rendering for the use on timber frame buildings</i>
Geltungsdauer: <i>Validity:</i>	vom <i>from</i> 11 July 2012 bis <i>to</i> 11 July 2017
Herstellwerk <i>Manufacturing plant</i>	INTHERMO GmbH Roßdörfer Straße 50 64372 Ober-Ramstadt DEUTSCHLAND

Diese Zulassung umfasst  
*This Approval contains*

15 Seiten einschließlich 1 Anhang  
*15 pages including 1 annex*

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches 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 products<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998<sup>4</sup>, as amended by law of 31 October 2006<sup>5</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>.
- 2 Deutsches 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.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those laid down in the context of this European technical approval.
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<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12

<sup>2</sup> Official Journal of the European Communities L 220, 30 August 1993, p. 1

<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25

<sup>4</sup> *Bundesgesetzblatt Teil I 1998*, p. 812

<sup>5</sup> *Bundesgesetzblatt Teil I 2006*, p. 2407, 2416

<sup>6</sup> Official Journal of the European Communities L 17, 20 January 1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of product and intended use

The External Thermal Insulation Composite System "INTHERMO", called ETICS in the following text, is designed and installed in accordance with the ETA-holder's design and installation instructions, deposited with the Deutsches Institut für Bautechnik (DIBt). The ETICS comprises the following components, which are factory-produced by the ETA-holder or a supplier. It's made up on site from these. The ETA-holder is ultimately responsible for the ETICS.

#### 1.1 Definition of the construction product

	Components (see clause 2.3 for further description, characteristics and performances)	Coverage [kg/m <sup>2</sup> ]	Thickness [mm]
Insulation material with associated method of fixing	<ul style="list-style-type: none"> <li><b>Insulation product</b> "INTHERMO HFD-Exterior Solid" factory-prefabricated wood fibre (WF) to EN 13171:2009</li> <li><b>Mechanical fixings for insulation product</b> <ul style="list-style-type: none"> <li>- INTHERMO HFD-Thermoschraube Plus (screw)</li> <li>- Breitrückenklammer (clip)</li> </ul> </li> </ul>	–	40 to 200
Base coat	<b>"INTHERMO HFD-Armierungsmasse"</b> Cement based powder with additional redispersible synthetic-resin and aggregates requiring addition of 20 – 25 % of water.	5.5 to 7.0 (powder)	4.0 to 6.0
Glass fibre mesh	<b>Standard mesh:</b> "INTHERMO HFD-Armierungsgewebe" Alkali- and slide-resistant glass fibre mesh with mass per unit area of about 0,160 g/m <sup>2</sup> and mesh size of about 4.0 mm x 4.0 mm.	–	–
Finishing coat	<ul style="list-style-type: none"> <li>Thin layered cement based powder requiring addition of about 28 – 44 % of water: <b>INTHERMO HFD Mineral-Leichtputz</b> (particle size 2.0 to 3.0 mm)</li> <li>Ready to use paste – siloxane resin / acrylate emulsion <b>INTHERMO HFD-Siliconharzputz K*</b> (particle size 1.5 to 3.0 mm)</li> <li><b>INTHERMO HFD-Siliconharzputz R*</b> (particle size 1.5 to 3.0 mm)</li> </ul>	2.1 to 2.6 (powder)  3.4 to 3.8  3.4 to 3.8	2.0 to 3.0  2.0 to 3.0  2.0 to 3.0
Ancillary material	The ETICS include special fittings to connect them to adjacent building structures. The instruction to the installer remains the responsibility of the ETA-holder.		
* K/R indicates different structures of the finishing coat.			

## 1.2 Intended use

This ETICS is intended to be used as external insulation to timber frame building walls. The application of ETICS can be directly on the timber frame or the surface can be a board substrate (wood based panels, solid wood panels, plasterboards, cement bonded boards, etc). The board substrate must be suitable for humid conditions as specified in EN 13986. It shall be designed to give the wall to which it is applied satisfactory thermal insulation.

The ETICS is non load-bearing construction element. It does not contribute directly to the stability of the wall on which it is installed, but it can contribute to durability by providing enhanced protection from the effects of weathering.

The ETICS can be used on new or existing (retrofit) vertical timber frame building walls.

The ETICS is not intended to ensure the air tightness of the building structure.

The choice of the method of fixing depends on the characteristics of the substrate, which could need preparation (see clause 4.2.4 of this ETA) and on the national instructions.

The provisions made in this European technical approval (ETA) based upon the assumed intended working life of the ETICS of at least 25 years, provided that the conditions laid down in clauses 4.2, 5.1 and 5.2 for the packaging, transport, storage, installation as well as appropriate use, maintenance and repair are met. 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 to choosing the appropriate products in relation to the expected, economically reasonable working life of the works.

## 2 Characteristics of products and methods of verification

### 2.1 General

The assessment of the fitness for use of the ETICS for the intended use was carried out.

Characteristics (of the components as well as of the ETICS), not mentioned in this ETA nor in the annexe shall correspond to the respective values laid down in the technical documentation of this ETA.

### 2.2 Characteristics of the ETICS

#### 2.2.1 Reaction to fire

Class according to EN 13501-1:2010: E.

##### Mounting and fixing

(for all end use applications given in clause 1.2 of the ETA)

Following tests were carried out:

The assessment of reaction to fire is based on test according to EN ISO 11925-2:2002 with a insulation layer thickness of 40 mm (testing) and a maximum insulation material (WF) density of 250 kg/m<sup>3</sup> as well as a rendering system with the highest organic content.

Representative for the rendering system with the highest organic content a organic based finishing coat was tested with the highest thickness of 3.0 mm.

For testing according to EN ISO 11925-2:2002 no substrate was used.

The installation of the ETICS was carried out by the approval holder following his design and installation instructions using a single mesh all over the test specimen.

The tests specimens were prefabricated and did not include any joints.

For testing according to EN ISO 11925-2:2002 the edges were not covered with the rendering system (cut edges). The tests were performed with surface flaming of the front side and edge flaming turned by 90°.

Mechanical fixings were not included in the tested ETICS as they have no influence on the test result.

Note:

A European reference fire scenario for facades has not been laid down. In some Member States, the classification of ETICS according to EN 13501-1:2010 might not be sufficient for the use in facades. An additional assessment of ETICS according to national provisions (e.g. on the basis of a large scale test) might be necessary to comply with Member State regulations, until the existing European classification system has been completed.

**2.2.2 Water absorption (capillarity test)**

**Base coat:**

- Water absorption after 1 h: < 1 kg/m<sup>2</sup>
- Water absorption after 24 h: < 0.5 kg/m<sup>2</sup>

Rendering system: Base coat with finishing coat indicated hereafter	Water absorption after 24 h	
	< 0.5 kg/m <sup>2</sup>	≥ 0.5 kg/m <sup>2</sup>
INTHERMO HFD-Mineral-Leichtputz (2 mm)		x
INTHERMO HFD-Siliconharzputz (2 mm)	x	

**2.2.3 Hygrothermal behaviour**

Hygrothermal cycles have been performed on a rig with the base coat "INTHERMO HFD-Armierungsmasse". None of the following defects occur during the testing:

- blistering or peeling of any finishing
- failure or cracking associated with joints between insulation product boards or profiles fitted with the system
- detachment of render
- cracking allowing water penetration to the insulation layer

The ETICS is so assessed resistant to hygrothermal cycles.

**2.2.4 Freeze/thaw behaviour**

The water absorption of the base coat as well as the rendering system with finishing coats "INTHERMO HFD-Siliconharzputz" is less than 0.5 kg/m<sup>2</sup> after 24 hours. The ETICS is so assessed as freeze/thaw resistant.

The ETICS with finishing coat "INTHERMO HFD-Mineral-Leichtputz" has been assessed as freeze/thaw resistant according to the simulated method.

**2.2.5 Moisture content and moisture gradient (Small scale test)**

The small scale test was performed without an external board. Moisture content was always < 20 % by mass; moisture gradient is not determined (npd).

None of the following defects occur during the testing:

- blistering or peeling of any finishing

- failure or cracking associated with joints between insulation product boards or profiles fitted with the system
- detachment of render
- cracking allowing water penetration to the insulation layer

### 2.2.6 Water penetration

Water penetration of the ETICS is not determined (npd).

### 2.2.7 Impact resistance

The verified resistance to hard body impact and to perforation of the ETICS results in the classification into categories listed below. The resistance to perforation has not to be verified, because of a total render thickness of not less than 6 mm.

Rendering system: Base coat with finishing coat indicated hereafter	Single standard mesh "INTHERMO HFD-Armierungsgewebe"
INTHERMO HFD-Armierungsmasse + INTHERMO HFD Mineral-Leichtputz (2,0 mm)	Category II
INTHERMO HFD-Armierungsmasse + INTHERMO HFD Siliconharzputz (2,0 mm)	Category II

### 2.2.8 Water vapour permeability

Rendering system: Base coat with finishing coat indicated hereafter	Equivalent air thickness $s_d$
INTHERMO HFD Mineral-Leichtputz (2,0 mm)	$\leq 1.0$ m (Test result obtained with a layer thickness 2 mm: 0.4 m)
INTHERMO HFD Siliconharzputz (2,0 mm)	$\leq 1.0$ m (Test result obtained with a layer thickness 2 mm: 0.7 m)

### 2.2.9 Emission of dangerous substances or radiation

The ETICS complies with the provisions of Guidance Paper H ("A harmonized approach related to dangerous substances under the construction product directives Revision August 2002").

In addition to the specific clauses relating to dangerous substances contained in this ETA, 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 Construction Products Directive, these requirements need also to be complied with, when and where they apply.

### 2.2.10 Safety in use

#### 2.2.10.1 Bond strength between base coat and insulation product (WF)

Conditioning		
Initial state	After hygrothermal cycles	After freeze/thaw test
< 0.08 MPa but failure in the insulation product	< 0.08 MPa but failure in the insulation product	< 0.08 MPa but failure in the insulation product

2.2.10.2 Fixing strength (displacement test)

Test not required because the ETICS fulfils the following criterion:

$$- E \cdot d < 50\,000 \text{ N/mm}$$

(E: modulus of elasticity of the base coat – d: mean dried thickness of the base coat)

2.2.10.3 Wind load resistance

Safety in use of mechanically fixed ETICS using mechanical fixings

Pull-through test and tensile shear test

The following failure loads only apply to the listed combination (WF panel's characteristics) / (mechanical fixings type) and the characteristics of the insulation product given in clause 2.3.1.

mechanical fixings mounted on the insulation panels surface				
Characteristics of the WF	Thickness		≥ 40 mm	≥ 40 mm
Fixing type			INTHERMO Thermoschraube	Breitückenklammer
Characteristic failure loads [kN]	Fixing not placed at the panel joints (Pull-through test; opening 150 mm, EN 1383)	$R_{\text{panel}}$	0.782	0.640
	Fixing not placed at the panel joints (tensile shear test; EN 1381)	$R_{\text{panel}}$	0.672	0.370

Distance between mechanical fixing and panel border must be minimal 75 mm.

The wind load resistance  $R_d$  of the ETICS is calculated as follows:

$$R_d = \frac{R_{\text{panel}} \cdot n_{\text{panel}}}{\gamma}$$

$n_{\text{panel}}$ : number (per m<sup>2</sup>) of fixings not placed at the panel joints

$\gamma$ : national safety factor

Dynamic wind uplift test with INTHERMO Thermoschraube

Thickness off insulation d 0 40 mm

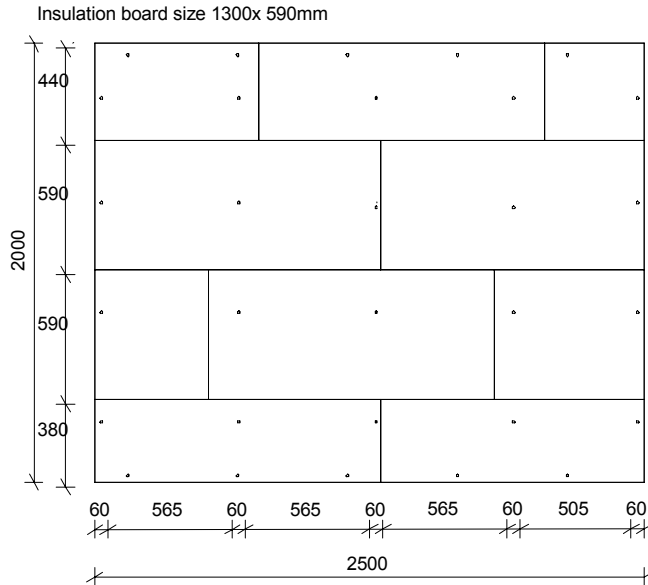
$$R_d = \frac{Q_1 \times C_s \times C_a}{\gamma}$$

$$Q_1 = 2 \text{ kPa}$$

$$C_s = 0.97$$

$$C_a = 1$$

$$R_d = \frac{1.94}{\gamma}$$



2.2.10.4 Resistance to soft body impact for ETICS directly mounted to the timber frame

The impact energy to soft body impact for ETICS directly mounted to timber frame is level B. There is no penetration, nor collapse and no projection. The deflection is not determined (npd).

2.2.11 Thermal resistance

The nominal value of the additional thermal resistance R provided by the ETICS to the substrate wall is calculated in accordance with EN ISO 6946:2007 from the nominal value of the insulation product's thermal resistance  $R_D$  given accompanied to the CE marking and from the thermal resistance of the rendering system  $R_{render}$  which is about  $0.02 (m^2 \cdot K)/W$ .

$$R = R_D + R_{render}$$

The thermal bridges caused by mechanical fixings increase the thermal transmittance U. This influence had to take into account according to EN ISO 6946:2007.

$$U_c = U + \chi_p \cdot n \quad \text{Corrected thermal transmittance}$$

where:  $\chi_p \cdot n$  influence of thermal bridges  
 $n$  number of mechanical fixing per  $m^2$   
 $\chi_p$  local influence of thermal bridge caused by an mechanical fixing. The values listed below are taken into account.

- $\chi_p = 0.004 W/K$  INTHERMO Thermoschraube
- $\chi_p = 0.008 W/K$  Breitrückenkammer (clip)

2.2.12 Aspects of durability and serviceability

Bond strength after ageing:

<b>Rendering system:</b> Base coat with finishing coat indicated hereafter	INTHERMO HFD Mineral-Leichtputz (2.0 mm)	< 0.08 MPa but failure in the insulation product
	INTHERMO HFD Siliconharzputz (2.0 mm)	



### 2.3 Characteristics of the components

Detailed information on the chemical composition and other identifying characteristics of the components has been deposited with the DIBt.

Further information can be observed from the product data sheets, which are part of the technical documentation for this ETA.

#### 2.3.1 Thermal insulation product

Factory-prefabricated, uncoated panels made of wool fibre (WF) to EN 13171:2009 shall be used, having the description and characteristics defined in the Table below.

Description and characteristics	For mechanically fixed ETICS
Reaction to fire; EN 13501-1:2007+A1:2006	Class E
Thermal resistance [(m <sup>2</sup> ·K)/W]	Defined in the CE marking in reference to EN 13171:2009
Thickness [mm]; EN 823:1994	-1 / +3 (class T4)*
Length; EN 822:1994	± 2%
Width [mm]; EN 822:1994	± 1.5%
Squareness [mm/m]; EN 824:1994	± 5
<b>Dimensional stability under</b>	
- laboratory conditions [%]; EN 1603:1996	
Thickness	± 1%
Length	± 0.5 %
Width	± 0.5 %
- specified temperature and humidity conditions [%]; EN 1604:1996+A1:2006	
Thickness	± 1%
Length	± 1%
Width	± 1%
Water absorption (short term partial immersion) [kg/m <sup>2</sup> ]; EN 12087:1997+A1:2006	≤ 1.0 (class W 1.0)
Compressive strength* [kPa]; EN 826:1996	$\sigma_m \geq 100$ (class CS(10/Y)100)
Water vapour diffusion resistance factor; EN 12086:1997	$\mu = 5$
Tensile strength perpendicular to the faces in dry conditions** [kPa]; EN 1607:1996	
- single plate (20 mm)	$\sigma_{mt} \geq 30$
- bonded plates ( $\geq 40$ mm)	$\sigma_{mt} \geq 8$

Description and characteristics	For mechanically fixed ETICS
Tensile strength perpendicular to the faces in wet conditions** [kPa]; EN 1607:1996 - bonded plates ( $\geq 40$ mm)	$\sigma_{mt} \geq 6$
Bending strength** [kPa]; EN 12089:1997	$\sigma_b \geq 700$
Apparent density [kg/m <sup>3</sup> ]; EN 1602:1996	$\rho_a = 250 \pm 20$
Shear strength** [kPa]; EN 12090:1997	$f_{tk} \geq 45$
Testing of characteristics see EN 13171:2009.	
* Minimal numeric value is deciding value ** Minimal value of all single values	

### 2.3.2 Mechanical fixings

The mechanical fixings listed in the Table in clause 1.1. The measurements for "INTHERMO HFD-Thermoschraube Plus" and for "Breitrückenklammer" according to Annex 1.

Screw for insulation products:

Trade name	Plate diameter (mm)	characteristic resistances in the wooden substrate (solid wood)
INTHERMO HFD-Thermoschraube Plus	$\geq 19.6$	3.0 kN

Clips for insulation products:

Trade name	Back (mm)	characteristic resistances in the wooden substrate (solid wood)
Breitrückenklammer	$27 \pm 0.5$	0.734 kN

Note:

On anchorage of the Insulation product in substrate the mechanically fixing shall be done through the board substrate into the wooden frame construction (solid) with a depth of anchoring of at least:

- INTHERMO HFD-Thermoschraube Plus: 50 mm
- Breitrückenklammer: 30 mm

### 2.3.3 Render (base coat)

The average value of crack width of the base coat reinforced with the glass fibre mesh "INTHERMO HFD-Armierungsgewebe" measured at a render strain value of 1 % is about 0.07 mm.

### 2.3.5 Reinforcement (glass fibre mesh)

Characteristics (alkali resistance): Pass

	"INTHERMO HFD-Armierungsgewebe"	
	Warp	Weft
Residual strength after ageing [N/mm]	$\geq 20$	$\geq 20$
Relative residual resistance after ageing in % of the strength in the as-delivered state	$\geq 50$	$\geq 50$

### 3 Evaluation and attestation of conformity and CE-marking

#### 3.1 System of attestation of conformity

Considering Class E for reaction to fire of the ETICS, the system of attestation of conformity is system 2+.

This system of attestation of conformity is defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:

- (1) initial type-testing of the product;
- (2) factory production control;
- (3) testing of samples taken at the factory in accordance with a prescribed test plan.

(b) Tasks for the notified body:

- (4) certification of factory production control on the basis of:
  - 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

###### 3.2.1.1 Factory production control

The manufacturer shall exercise 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 ETICS and the components are in conformity with this ETA.

The manufacturer shall only use raw materials stated in the technical documentation of this ETA. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

The factory production control shall be in accordance with the "Control plan"<sup>7</sup> which is part of the technical documentation of this ETA. The "Control plan"<sup>7</sup> has been agreed between the manufacturer and the DIBt and is laid down in the context of the factory production control system operated by the manufacturer and deposited with the DIBt.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the "Control plan"<sup>7</sup>. The records include at least the following information:

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

The records shall be presented to the notified body involved in continuous surveillance. On request they shall be presented to the DIBt.

<sup>7</sup> The "Control plan" is a confidential part of the European technical approval and only handed over to the notified body involved in the procedure of attestation of conformity. See section 3.2.2.

### 3.2.1.2 Other tasks for the manufacturer

For initial type-testing of the ETICS and the components the results of the tests performed as part of the assessment for the ETA 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 with the DIBt.

The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in clause 3.1 in the field of ETICS in order to undertake the actions laid down in clause 3.2.2. For this purpose, the "Control plan"<sup>7</sup> referred to in clauses 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the notified bodies involved.

The manufacturer shall make a declaration of conformity, stating that the ETICS is in conformity with the provisions of ETA-11/0328 issued on 11 July 2012.

### 3.2.2 Tasks for the notified bodies

The notified body shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the "Control plan"<sup>7</sup>.

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The notified certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the provisions of this ETA.

In cases where the provisions of the ETA and its "Control plan"<sup>7</sup> are no longer fulfilled the notified certification body shall withdraw the certificate of conformity and inform the DIBt without delay.

## 3.3 Marking

### 3.3.1 CE marking

The CE marking shall be affixed on the accompanying commercial document. The letters "CE" shall be followed by the identification number of the notified certification body and be accompanied by the following additional information:

- the name and address of the ETA-holder (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate for the factory production control,
- the number of the ETA,
- the ETICS trade name.

### 3.3.2 Additional marking

The respective trade name of the individual components of the ETICS shall be given on the packaging.

In addition to the trade name the following information shall be given in the accompanying commercial document and/or on the packaging of the thermal insulation product:

- Minimum value of the tensile strength perpendicular to the faces of the insulation product.

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

##### **4.1 Manufacturing**

The composition and manufacturing process used for the components of the ETICS shall comply with those on which the approval tests were based. Composition and manufacturing process are deposited at the DIBt.

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

##### **4.2 Installation, design and execution**

###### **4.2.1 General**

The wall on which the ETICS is applied shall be sufficiently stable and airtight. Its stiffness shall be large enough to ensure that the ETICS is not subjected to deformations, which could lead to damage.

The sound insulation factor of the wall may change after application of an ETICS.

###### **4.2.2 Installation**

The ETICS is installed on site. The approval holder is obliged to instruct all those entrusted with the design and execution of the ETICS about the specific conditions of this ETA and all other details necessary for perfect execution.

Only the components whose trade name is given in clause 1.1 and which have the characteristics according to clause 2.3 may be used for the ETICS.

###### **4.2.3 Design**

###### **4.2.3.1 Requirements for the substrate**

The substrate must have a sufficient resistance for the use of mechanical fixings according to clause 2.3.2.

It should be possible to attach fixtures (down pipes, etc) into the substrate without damaging the integrity of the ETICS to a degree likely to reduce the overall performance.

###### **4.2.3.2 Resistance to wind load**

Judging of sufficient resistance to wind load should be on the basis of the resistance of the fixings according to clause 2.2.8.3 and of the characteristic tension resistance of the used mechanical fixings according to clause 2.3.2. Taking into account the national safety factors the design values of resistance are determined. The smaller one of the design resistances of the ETICS ( $R_d$ ) and of the mechanical fixing ( $N_{Rd}$ ) is decisive.

The determined design wind load suction  $S_d$  (taking into account the national safety factors) is compared with the design resistance.

#### 4.2.4 Execution of the works

The manufacturer's design and installation instructions, which are part of the technical documentation for this ETA, shall be observed with respect to the installation of the ETICS and drying times of rendering products.

The works shall be executed by trained installers.

##### 4.2.4.1 Preparation of the substrate

The substrate has to be strong, dry and free of loose material. It may be necessary to protect the substrate against wetting and weathering before the application of the ETICS.

##### 4.2.4.2 Mechanically fixed ETICS

For mechanically fixed ETICS boards according to EN 312 (particleboards), EN 622-5 (fibreboards MDF) – type MDF.HLS, EN 300 (OSB) – type 2 or 3, EN 636 (plywood) – type 2 or 3, EN 634-2 (cement bonded particleboards), EN 520 (plasterboards type E or H) and applicable timber frame made of solid wood have been accepted as deemed to satisfy the requirements if adequate mechanical fixings are used.

#### 4.2.5 Execution of the system

- Rows of boards are positioned so that vertical joints are staggered.
- Joints between insulation panels shall be tightly butted and must not contain render.
- The installed panel shall provide a flush surface to ensure the application of even thickness of base coat.
- The insulation product shall be protected from the environment before it begins to degrade.
- The thickness of the base coat and the finishing coat must be as specified in the ETA
- The reinforcement shall be fully embedded in the base coat.
- The mechanical fixings are always anchored in timber frame, not in boards; if necessary through boards in timber frame.

### 5 Indications to the manufacturer

#### 5.1 Packaging, transport and storage

Packaging of the components 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.

The components are to be protected against damage.

#### 5.2 Maintenance and repair of the works

The finishing coat shall normally be maintained to fully preserve the ETICS performances.

Maintenance includes:

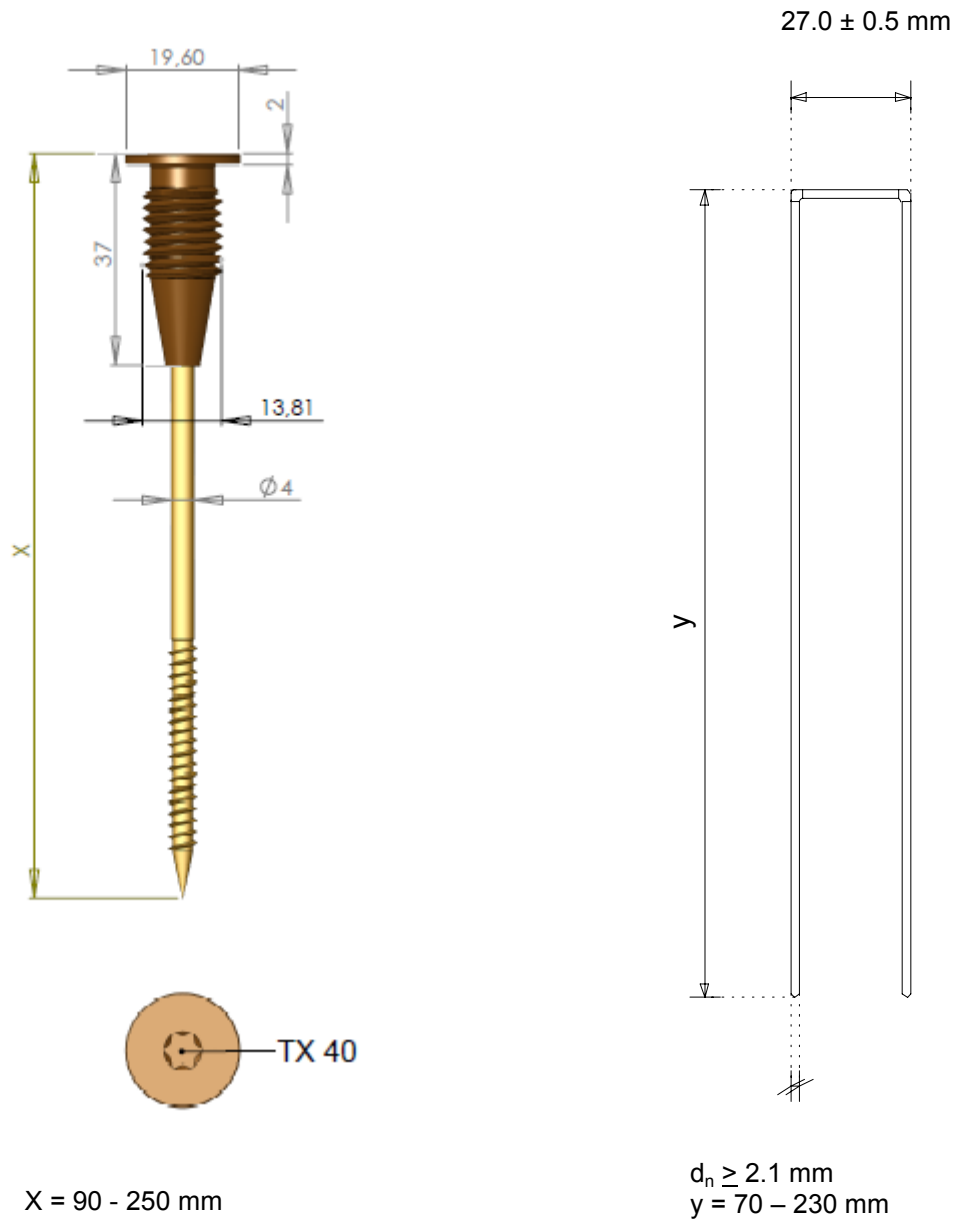
- the repairing of localised damages areas due to accidents,
- the aspect maintenance with products adapted and compatible with the ETICS (possibly after washing or ad hoc preparation).

Necessary repairs should be performed rapidly.

It is important to be able to carry out maintenance as far as possible using readily available products and equipment, without spoiling appearance.

Uwe Bender  
Head of Department

*beglaubigt:*  
Rogsch



INTHERMO für Holzbau

Mechanical fixings

Annex 1