# European Technical Assessment ETA-19/0498 of 2019/11/07

## I General Part

<table>
<thead>
<tr>
<th>Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade name of the construction product:</td>
</tr>
<tr>
<td>Product family to which the above construction product belongs:</td>
</tr>
</tbody>
</table>
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Sudenburger Wuhne 60  
D-39116 Magdeburg  
Tel +49 391 7352 60  
Fax +49 391 7352 52  
Internet [www.bt-innovation.de](http://www.bt-innovation.de) |
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Production Plant 5 |

This European Technical Assessment contains: 12 pages including 3 annexes which form an integral part of the document

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of: EAD 330387-00-0601– Glass fibre reinforced plastics (GFRP) connectors for use in sandwich and element walls made of concrete, dated 2018-12-22

This version replaces: -
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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product
The ThermoPin® tie anchor type H with nominal diameter 7.5 mm is an anchor made of a glass fibre reinforced plastic bar. Both ends of the anchor tapered. For material and dimensions of the tie anchor, see Annex 1.

The anchor is made with a straight plastic sleeve (type H). The operating principle of the anchor is based on utilising the form fit between the conical end of the plastic bar and the concrete.

Installation of the anchor is shown in Annex 2.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Taper length</td>
<td>60 - 120 mm</td>
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<tr>
<td>Thickness of the facing shell</td>
<td>50 - 120 mm</td>
</tr>
<tr>
<td>Minimum thickness of bearing layer</td>
<td>40 (in-situ concrete + FT)</td>
</tr>
<tr>
<td>Minimum gap between ThermoPin® tie anchors</td>
<td>210 mm</td>
</tr>
<tr>
<td>Minimum edge distance</td>
<td>100 mm</td>
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</tbody>
</table>

Table 1, assembly parameters for ThermoPin® tie anchor and thicknesses of the shell

1) In accordance with Annex 3.1 (Type H)

2 Specification of the intended use in accordance with the applicable EAD

The anchor is used when manufacturing core insulated reinforced concrete wall panels.

The layers consist of a facing shell and load-bearing layer made of standard concrete, and one or more layers of insulation panels. The load-bearing layer consists of a pre-cast part or a precast part and a layer of concrete mixed in-situ.

The anchors are used to connect the facing shell with the load-bearing layer.

The type H anchor may also be used to retain facing shells which are floor-mounted. The type H anchor must be fitted horizontally. It may only be used to transfer temporary centric tension and pressure loads.

Anchorage is in normal weight concrete of strength classes in the range of C20/25 to C50/60 in accordance with EN 206 “Concrete – Specification, performance, production and conformity”.

The facing shell may also impress temporary forced deformations parallel to the wall into anchors type H. Reinforced concrete wall panels up to size 12 x 6 m can be manufactured with the anchors. The direction of installation of the finished-part walls with freely suspended facing shells must be clearly indicated, for instance by using transport anchors. The anchor can be used for internal and external walls. The temperature on the surface of the concrete cover layer may between +65 °C and -20 °C (max. short term temperature). The maximum long-term temperature is 40 °C.

On the inside of the load-bearing layer, the temperature may not permanently exceed 40 °C. The anchor permanently used for exposure classes XC, XD and XS under EN 1992-1-1 with DIN EN 1992-1-1/NA:2011-01, section 4.2

The provisions for the anchor must correspond to the details given in the Annexes in its dimensions and material characteristics.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the ThermoPin® tie anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment
### Essential characteristic

<table>
<thead>
<tr>
<th>Assessment method</th>
<th>Assessment of characteristic</th>
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#### 3.1 Mechanical resistance and stability (BWR1)

In the below characteristics the value $h_{\text{nom,min}}$ corresponds to the value $h_{\text{nom}} = 40$ mm

- **Resistance to GFRP failure under compression load**, $N_{\text{BL, GFRP,D}}$ [kN]
  - Assessment: 2.2.1
  - Assessment of characteristic: 4.7 kN

- **Resistance to concrete failure under compression load**, $N_{\text{Rk,c,D}}$ [kN]
  - Assessment: 2.2.2
  - Assessment of characteristic: 2.5 kN

- **Resistance to GFRP failure under tension load**, $N_{\text{RL, GFRP}}$ [kN]
  - Assessment: 2.2.3
  - Assessment of characteristic: 6.2 kN

- **Resistance to concrete failure (cracked and uncracked concrete) under tension load**, $N_{\text{Rk,c,cr}}$ [kN] $N_{\text{Rk,c,ucr}}$ [kN]
  - Assessment: 2.2.4
  - Assessment of characteristic: $N_{\text{Rk,c,cr}}$ (C20/25): 4.7 kN $N_{\text{Rk,c,ucr}}$ (C50/60): 5.9 kN

- **Resistance to GFRP failure under shear load**, $V_{\text{RL, GFRP}}$ [kN]
  - Assessment: 2.2.5
  - Assessment of characteristic: 0.4 kN

- **Resistance to concrete failure under shear load**, $V_{\text{Rk,c}}$ [kN]
  - Assessment: 2.2.6
  - Assessment of characteristic: 0.6 kN

- **Maximum acceptable shear deformation $\omega_{\text{max}}$ [mm]**
  - Assessment: 2.2.7
  - Assessment of characteristic: 3.7 mm

- **Minimum edge distances and spacing**
  - Assessment: 2.2.8
  - Assessment of characteristic: $c_{\text{min}}$: 105 mm $s_{\text{min}}$: 210 mm

- **Durability**
  - Assessment: 2.2.9
  - Assessment of characteristic: 50 years

- **Modulus of Elasticity**
  - Assessment: 2.2.10
  - Assessment of characteristic: $E_N$: 60,000 N/mm² $E_M$: 30,000-60,000 N/mm²

- **Geometric parameters**
  - Assessment: 2.2.11
  - Assessment of characteristic: $A_{\text{pin}}$: 41.9 mm², $I_y$: 139.4 mm⁴, $I_z$: 139.4 mm⁴

*) See additional information in section 3.2-3.3
3.2 Methods of verification
The characteristic values of the anchors are based on the EAD 330387-00-0601, dated 2018-12-22

3.3 General aspects related to the fitness for use of the product

The European Technical Assessment is issued for the product based on agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide if such changes affect the ETA and consequently the validity of the CE marking based on the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

ThermoPin® tie anchor type H are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.
4 Attestation and verification of constancy of performance (AVCP)

4.1 AVCP system
According to the decision 97/463/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2019-11-07 by

Thomas Bruun
Managing Director, ETA-Danmark
ThermoPin®
Material & Dimensions

Annex 1.1
**ThermoPin® tie anchor Type H**: GFK anchor with straight plastic sleeve. Dimensions in [mm].

**ThermoPin® tie anchor Type H_M**: GFK anchor with modified straight plastic sleeve. Dimensions in [mm].

\[
\begin{align*}
\text{Material} & : & \text{Glass-fibre reinforced plastic} \\
\text{Pin (1)} & : & \text{Plastic} \\
\text{Sleeve (2)} & : & \text{Plastic} \\
\text{Caps (3)} & : & \text{Plastic} \\
\end{align*}
\]

**Dimensions**
- **Length L1**: Total length freely selectable as a function of application.
- **Sleeve**: Position of sleeve dependent on respective application.
- **L3**: 10 mm or 20 mm

**Labelling**
- Works identification: B.T. innovation
- Anchor: ThermoPin®

\[
\begin{align*}
\text{d}_1 & : 7,5 \pm 0,3 \text{ mm} \\
\text{d}_2 & : 10,5 \pm 0,4 \text{ mm} \\
\text{L}_2 & : 21,8 \pm 0,3 \text{ mm} \\
\text{L}_3 & : 10 \text{ or } 20 \text{ mm} \pm 0,3 \text{ mm}
\end{align*}
\]
**Sandwich wall**

1. Fill in and compact the concrete of the first shell. Apply the insulation as tightly as possible to the fresh concrete of the first shell. Insert ThermoPins through the insulation layer into the fresh concrete of the facing layer.

2. Compact the concrete of the facing layer. Secure the insulation against lateral displacement if possible.

3. Apply the concrete of the second shell.

4. Compact the concrete of the second shell. Observe curing times.

5. Transport the sandwich wall to the construction site.
Element wall

1. Fill in and compact the concrete of the first shell. Apply the insulation as tightly as possible to the fresh concrete of the first shell. Insert ThermoPins through the insulation into the fresh concrete of the facing layer.

2. Compact the concrete of the facing layer. Secure the insulation against lateral displacement if possible. Observe curing times.

3. Fill in the concrete of the second shell.

4. Turn the first shell with the ThermoPins into the fresh concrete of the second shell.

5. Compact the fresh concrete of the second shell. Observe curing times.
Transport the element wall to the construction site.

Concreting on site, taking into account the concreting speed according to the static calculations.
Example of view of a precast element (element wall or sandwich wall) with vertical facing shell with ThermoPin® tie anchors Type H.

Arrangement of ThermoPin® tie anchors in accordance with static calculation.

Minimum axis gap between two ThermoPin® Type H: \( \delta_{HH} = 210 \text{ mm} \)

Minimum edge distance of ThermoPin® Type H: \( C_H = 105 \text{ mm} \)

ThermoPin®

Anchorage length of ThermoPin® tie anchor Type H in concrete

Annex 3.1