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Authorised and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA



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

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

ThermoPin®

Product family to which the above construction product belongs:

Glass fibre reinforced plastics connectors

Manufacturer:

B.T. innovation GmbH
Sudenburger Wuhne 60
D-39116 Magdeburg
Tel +49 391 7352 60
Fax +49 391 7352 52
Internet www.bt-innovation.de

Manufacturing plant:

B.T. innovation GmbH
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.

Anchorage length of ThermoPin tie anchor Type H in concrete ¹⁾	h_{nom}	[mm]	40 - 120 or 60 - 155
Thickness of the facing shell	h_f	[mm]	50 - 120
Thickness of the insulation	h_i	[mm]	50 - 200
Minimum thickness of bearing layer	Element wall	$h_{T,min}$	60 (FT)
	Sandwich wall		140 (in-situ concrete + FT) 100
Minimum gap between ThermoPin tie anchors Type H	S_{min} C_{min}	[mm]	210
Minimum axis gap between two anchors Type H			
Minimum edge distance			105
Minimum gap between ThermoPin tie anchors			
Mindestrandabstand	C_{min}		105

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”. Only the temporary or permanent forces from the facing shells working vertically or parallel to the wall in the direction of their own weight may be transferred into the anchor.

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	Assessment method	Assessment of characteristic
3.1 Mechanical resistance and stability (BWR1)		
In the below characteristics the value $h_{nom,min}$ corresponds to the value $h_{nom} = 40$ mm		
Resistance to GFRP failure under compression load, $N_{Rk,GFRP,D}$ [kN]	2.2.1	4,7 kN
Resistance to concrete failure under compression load, $N_{Rk,c,D}$ [kN]	2.2.2	2,5 kN
Resistance to GFRP failure under tension load, $N_{Rk,GFRP}$ [kN]	2.2.3	6,2 kN
Resistance to concrete failure (cracked and uncracked concrete) under tension load, $N_{Rk,c,cr}$ [kN] $N_{Rk,c,ucr}$ [kN]	2.2.4	$N_{Rk,c,cr}$ (C20/25): 4,7 kN $N_{Rk,c,ucr}$ (C50/60): 5,9 kN
Resistance to GFRP failure under shear load $V_{Rk,GFRP}$ [kN]	2.2.5	0,4 kN
Resistance to concrete failure under shear load $V_{Rk,c}$ [kN]	2.2.6	0,6 kN
Maximum acceptable shear deformation w_{max} [mm]	2.2.7	3,7 mm
Minimum edge distances and spacing c_{min} [mm] s_{min} [mm]	2.2.8	c_{min} : 105 mm s_{min} : 210 mm
Durability	2.2.9	50 years
Modulus of Elasticity E_N, E_M [N/mm ²]	2.2.10	E_N : 60.000 N/mm ² E_M : 30.000- 60.000 N/mm ²
Geometric parameters A [mm ²], I_y, I_z [mm ⁴]	2.2.11	A_{pin} : 41,9 mm ² , I_y : 139,4 mm ⁴ , I_z : 139,4 mm ⁴

*) 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+.

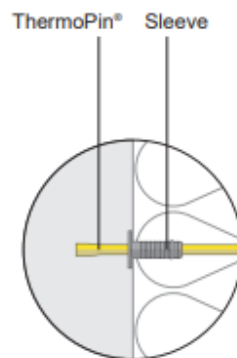
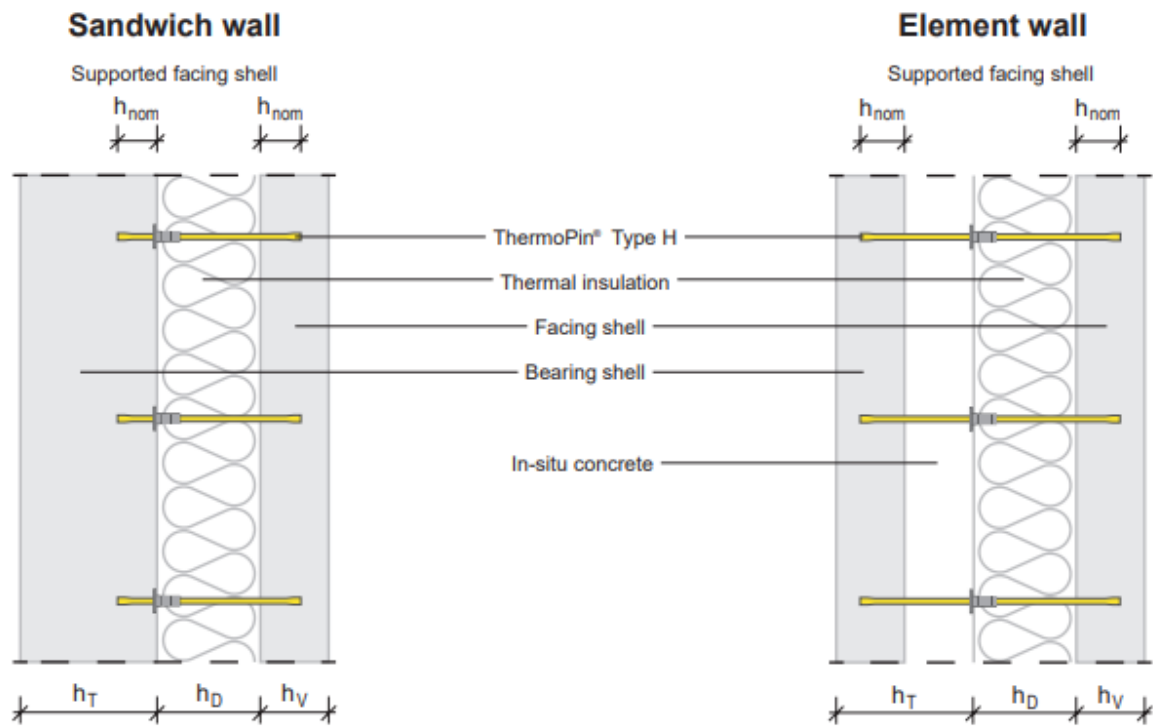
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

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



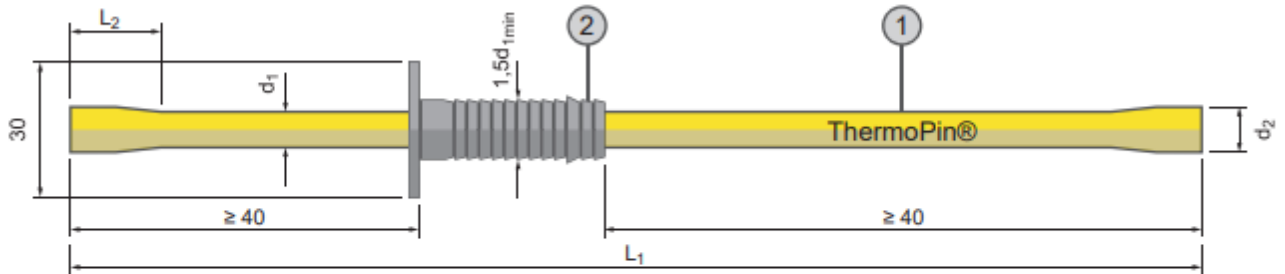
Thomas Bruun
Managing Director, ETA-Danmark



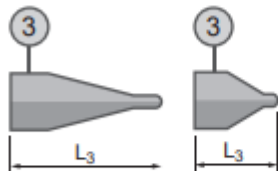
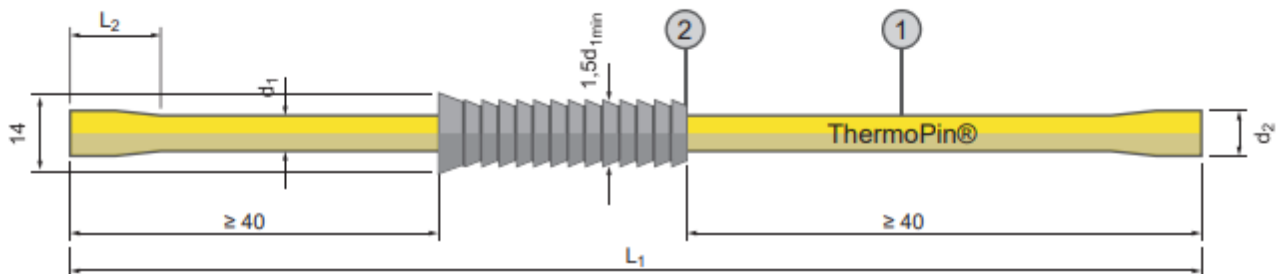
h_D corresponds to the thickness of the insulation h_T corresponds to the thickness of the bearing shell
 h_V corresponds to the thickness of the facing layer h_{nom} corresponds to the connection depth of the ThermoPin[®] tie anchors

ThermoPin[®]	Annex 1.1
Material & Dimensions	

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].



$d_1: 7,5 \pm 0,3 \text{ mm}; d_2: 10,5 \pm 0,4 \text{ mm}$
 $L_2: 21,8 \pm 0,3 \text{ mm}; L_3: 10 \text{ or } 20 \text{ mm} \pm 0,3 \text{ mm}$

Labelling

Worksite identification: B.T. innovation
 Anchor: ThermoPin®

Material

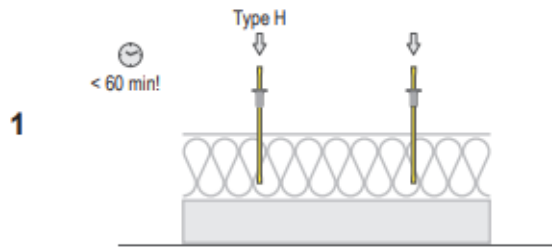
Pin (1): Glass-fibre reinforced plastic
 Sleeve (2): Plastic
 Caps (3): Plastic

Dimensions

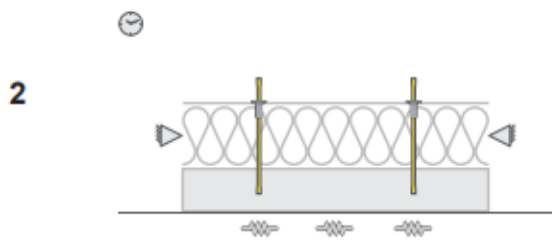
Length L1: Total length freely selectable as a function of application.
 Sleeve: Position of sleeve dependent on respective application.
 L3: 10 mm or 20 mm

ThermoPin®	Annex 1.2
Material & Dimensions	

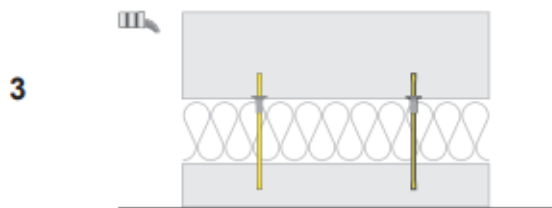
Sandwich wall



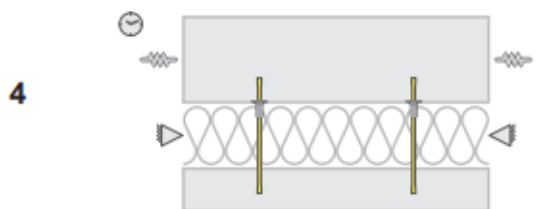
Fill in and compact the concrete of the first shell. Apply the insulation as tightly as possible to the fresh concrete of the first shell. Insert ThermoPins through the insulation layer into the fresh concrete of the facing layer.



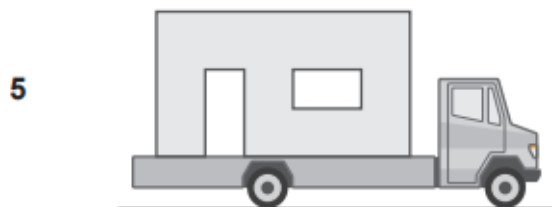
Compact the concrete of the facing layer. Secure the insulation against lateral displacement if possible.



Apply the concrete of the second shell.

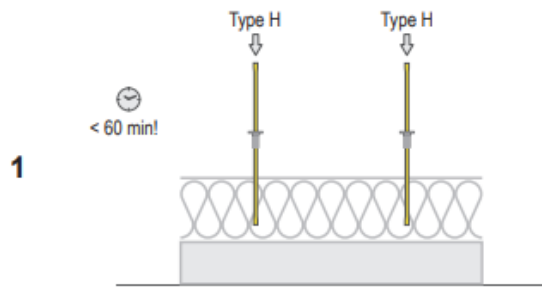


Compact the concrete of the second shell. Observe curing times.

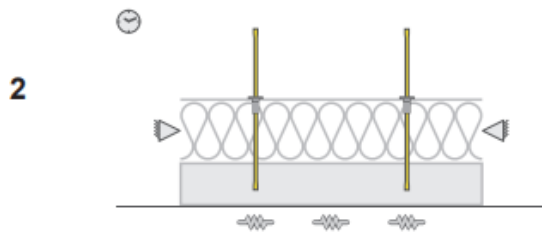


Transport the sandwich wall to the construction site.

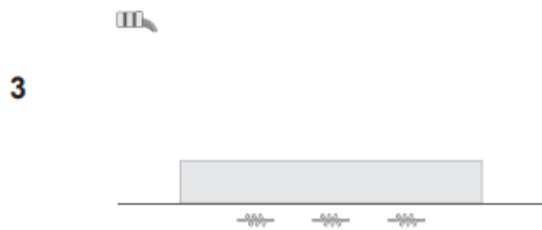
Element wall



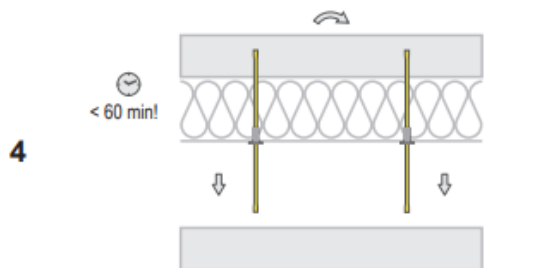
Fill in and compact the concrete of the first shell. Apply the insulation as tightly as possible to the fresh concrete of the first shell. Insert ThermoPins through the insulation into the fresh concrete of the facing layer.



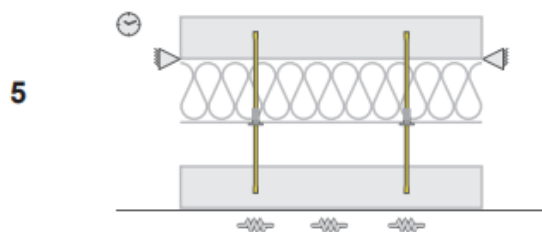
Compact the concrete of the facing layer. Secure the insulation against lateral displacement if possible. Observe curing times.



Fill in the concrete of the second shell.

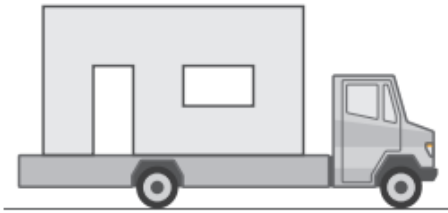


Turn the first shell with the ThermoPins into the fresh concrete of the second shell.



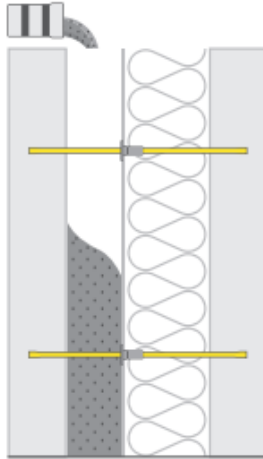
Compact the fresh concrete of the second shell. Observe curing times.

6



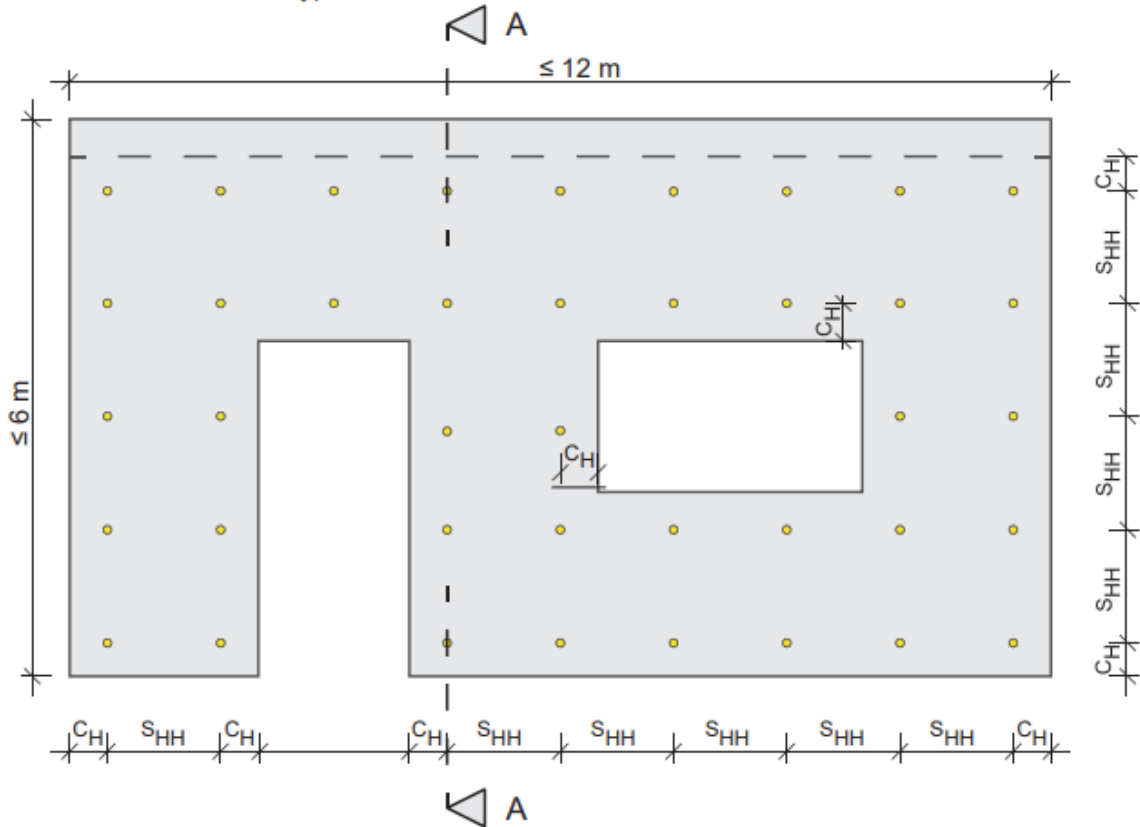
Transport the element wall to the construction site.

7



Concreting on site, taking into account the concreting speed according to the static calculations.

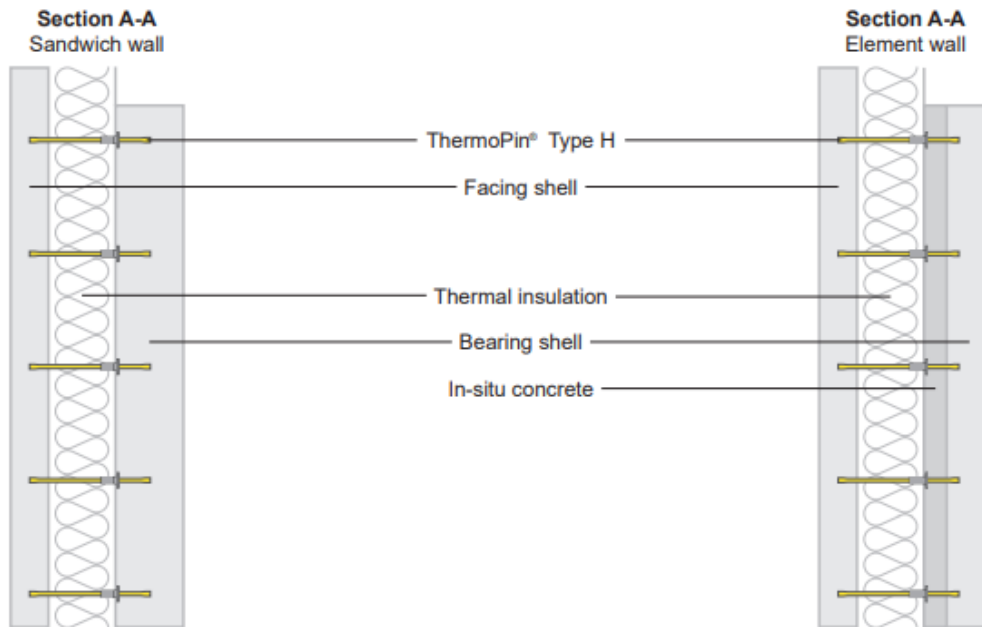
Example of view of a precast element (element wall or sandwich wall) with vertical facing shell with ThermoPin® tie anchors Type H.



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

Minimum axis gap between two ThermoPin® Type H: $S_{HH} = 210 \text{ mm}$

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



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

<p>ThermoPin®</p>	
<p>Anchorage length of ThermoPin® tie anchor Type H in concrete</p>	<p>Annex 3.1</p>