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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

European Technical Assessment ETA-23/0813 of 2026/04/10

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:	ROTHO BLAAS WHT Hold Downs
Product family to which the above construction product belongs:	Three-dimensional nailing plate (Hold Down for timber-to-timber or timber-to-concrete or steel connections)
Manufacturer:	ROTHO BLAAS SRL Via dell'Adige 2/1 IT-39040 Cortaccia (BZ) Tel. + 39 0471 818400 Fax + 39 0471 818484 Internet www.rothoblaas.com
Manufacturing plant:	Rotho Blaas s.r.l Held on file by ETA-Danmark A/S
This European Technical Assessment contains:	15 pages including 2 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Article 95(4) of Regulation (EU) 2024/3110, on the basis of:	EAD 130186-00-0603 for Three-dimensional nailing plates
This version replaces:	The ETA with the same number issued on 2023-12-28

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

Rotho Blaas WHT hold downs are one-piece welded, face-fixed angle brackets to be used in timber to timber or in timber to concrete or timber to steel connections. They are connected to construction members made of timber or wood-based products with threaded (ringed shank) type LBA nails according to ETA-22/0002 or ringed shank nails according to EN 14592 or screws type LBS or LBSH according to ETA-11/0030 and to concrete or steel members with bolts or metal anchors.

The hold downs with a steel plate thickness of 2,5 mm up to 5,0 mm are made from the following material:

- steel S355 / Z 275 or FeZn12c according to EN 10025:2005 or equivalent or better carbon steel with $R_e \geq 355$ N/mm², $R_m \leq 490$ N/mm² and $A_{80} \geq 22\%$

The washers with a steel plate thickness of 6,0 mm up to 12,0 mm are made from the following material:

- steel S275 according to EN 10025:2005 or equivalent or better carbon steel with $R_e \geq 275$ N/mm², $R_m \leq 470$ N/mm² and $A_{80} \geq 23\%$

Dimensions, hole positions and typical installations are shown in Annex B. Rotho Blaas srl. hold downs are made from steel with tolerances according to EN 10143.

2 Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

The hold downs are intended for use in making connections in load bearing timber structures, as a connection between wall and floor elements or as wall-to-wall connection and on concrete/steel elements, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 of Regulation (EU) 305/2011 shall be fulfilled.

The connection may be with a single hold down or with a hold down on each side of the fastened timber member (see Annex B).

The static and kinematic behaviour of the timber members or the supports shall be as described in Annex A and B.

The wood members may be of solid timber, glued laminated timber and similar glued members, or wood-based structural members with a characteristic density from 290 kg/m^3 to 460 kg/m^3. The wood members may be of Laminated Veneer Lumber (LVL) with a characteristic density up to 500 kg/m^3 with nails/screws in the wide face of the LVL component. This requirement to the material of the wood members can be fulfilled by using the following materials:

- Structural solid timber according to EN 14081,
- Glulam according to EN 14080 or ETA,
- Glued solid timber according to EN14080,
- LVL according to EN 14374 or ETA,
- Parallam PSL,
- Intrallam LSL,
- Cross laminated timber according to ETA,
- Plywood according to EN 636 or ETA,
- Engineered wood products with certified mechanical resistances for connections with dowel-type fasteners.

If a wood-based panel or a soundproofing interlayer with a thickness of not more than 26 mm is placed between the connector plate and the timber member, the lateral load-carrying capacity of the nail or screw, respectively, has to take into account the effect of the interlayer.

The design of the connections shall be in accordance with Eurocode 5 or a similar national Timber Code. The wood members shall have a thickness which is larger than the penetration depth of the nails into the members.

The hold downs are primarily for use in timber structures subject to the dry, internal conditions defined by service classes 1 and 2 of Eurocode 5 and for connections subject to static or quasi-static loading. This includes seismic actions.

The hold downs may also be used for connections between a timber member and a member of concrete or steel.

The scope of the hold downs regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions and in conjunction with the admissible service conditions according to EN 1995-1-1 and the admissible corrosivity category as described and defined in EN ISO 12944-2.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the hold downs 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

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability*) (BWR1)	
Joint Strength - Characteristic load-carrying capacity	See Annex B
Joint Stiffness	See Annex B
Joint ductility	No performance assessed
Resistance to seismic actions	No performance assessed
Resistance to corrosion and deterioration	See section 3.6
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The hold downs are made from steel classified as Euroclass A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364
Resistance to fire	No performance assessed
3.3 General aspects related to the performance of the product	The hold downs have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1 and 2
Identification	See Annex A

*) See additional information in section 3.4 – 3.7.

3.4 Methods of verification

Safety principles and partial factors

The characteristic load-carrying capacities are based on the characteristic values of the nail or screw connections and the steel plates. To obtain design values the capacities must be divided by different partial factors for the material properties, in case of failure of connections between the hold down to a timber member in addition multiplied with the coefficient k_{mod}.

According to EN 1990 (Eurocode – Basis of design) paragraph 6.3.5 the design value of load-carrying capacity may be determined by reducing the characteristic values of the load-carrying capacity with different partial factors.

Thus, the characteristic values of the load–carrying capacity are determined also for timber failure $F_{Rk,T}$ (obtaining the embedment strength of fasteners subjected to shear or the withdrawal capacity of the most loaded fastener, respectively) as well as for concrete or steel plate failure $F_{Rk,C/S}$. The design value of the load–carrying capacity is the smaller value of both load–carrying capacities.

$$F_{Rd} = \min\left\{\frac{k_{mod} \cdot F_{Rk,T}}{\gamma_{M,T}}; \frac{F_{Rk,S}}{\gamma_{M,S}}; \frac{F_{Rk,C}}{\gamma_{M,C}}\right\}$$

Therefore, for timber failure the load duration class and the service class are included. The different partial factors γ_M for concrete, steel or timber, respectively, are also correctly taken into account.

3.5 Mechanical resistance and stability

See annex B for the characteristic load-carrying capacity in load direction F_1.

The characteristic capacities of the hold downs are determined by calculation assisted by testing and testing as described in the EAD 130186-00-0603. They should be used for designs in accordance with Eurocode 5 or a similar national Timber Code.

No performance has been determined in relation to ductility of a joint under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed.

Other connector nails or screws according to EN 14592 or ETA with the same or better performance than the fasteners given in table A.3 may be used.

3.6 Aspects related to the performance of the product

3.6.1 Corrosion protection in service class 1 and 2.

In accordance with EAD 130186-00-0603 the hold downs or washers are produced from:

- Hold-downs: steel S355 / Z 275 or FeZn12c according to EN 10025:2005 with $R_e \geq 355$ N/mm², $R_m \leq 630$ N/mm² and $A_{80} \geq 22\%$
- Washers: steel S275 according to EN 10025:2005 with $R_e \geq 275$ N/mm², $R_m \leq 560$ N/mm² and $A_{80} \geq 23\%$

3.7 General aspects related to the use of the product

The hold downs 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.

The nailing pattern used shall be as defined in Annex A.

The following provisions apply:

- The structural members to which the brackets are fixed shall be:
  - Restrained against rotation.
  - Strength class C14 or better, see section II.2 of this ETA
  - Free from wane under the bracket.
- The actual end bearing capacity of the timber member to be used in conjunction with the bracket is checked by the designer of the structure to ensure it is not less than the bracket capacity and, if necessary, the bracket capacity reduced accordingly.
- The minimum nail's or screw's end and edge distances according to EN 1995-1-1:2010 or ETA have to be provided for.
- For CLT, minimum nail's end and edge distances are:
  $a_{3,t} = (7 + 3 \cos \alpha)\ d$
  $a_{3,c} = 6\ d$
  $a_{4,t} = (3 + 4 \cos \alpha)\ d$
  $a_{4,c} = 3\ d$
  α is the angle between load and grain direction of the outer layers.
- For CLT, minimum screw's end and edge distances are:
  $a_{3,t} = 6\ d$
  $a_{3,c} = 6\ d$
  $a_{4,t} = 6\ d$
  $a_{4,c} = 2{,}5\ d$
  α is the angle between load and grain direction of the outer layers.
- There are no specific requirements relating to preparation of the timber members.

The execution of the connection shall be in accordance with the assessment holder's technical literature.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 AVCP system

According to the decision 97/638/EC of the European Commission1, as amended, 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 provided for 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 2026-04-10 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex A
Product details definitions

Table A.1 Materials specification

Hold down type	Thickness (mm)	Steel specification	Coating specification
WHT15	2,5	S355 or equivalent	FeZn12c / Z 275
WHT20	3,0	S355 or equivalent	FeZn12c / Z 275
WHT30	3,0	S355 or equivalent	FeZn12c / Z 275
WHT40	4,0	S355 or equivalent	FeZn12c / Z 275
WHT55	5,0	S355 or equivalent	FeZn12c / Z 275
Washer WHTW6016	6,0	S275 or equivalent	-
Washer WHTW6020	6,0	S275 or equivalent	-
Washer WHTW8016	10,0	S275 or equivalent	-
Washer WHTW8020	10,0	S275 or equivalent	-
Washer WHTW8024	10,0	S275 or equivalent	-
Washer WHTW8024L	12,0	S275 or equivalent	-

Table A.2 Range of sizes

Hold down type	Height (mm) vertical		Height (mm) horizontal		Width (mm)	
WHT15	248	252	61,5	63,5	59	61
WHT20	288	292	62	64	59	61
WHT30	398	402	72	74	79	81
WHT40	478	482	73	75	79	81
WHT55	598	602	74	76	79	81
Washer WHTW6016	-	-	55	57	49	51
Washer WHTW6020	-	-	55	57	49	51
Washer WHTW8016	-	-	65	67	69	71
Washer WHTW8020	-	-	65	67	69	71
Washer WHTW8024	-	-	65	67	69	71
Washer WHTW8024L	-	-	65	67	69	71

Table A.3 Fastener specification

Fastener	Minimum Length	Minimum Threaded Length	Fastener type
Rotho Blaas nail 4.0 mm, type LBA	40 mm	30 mm	Ringed shank nails according to ETA-22/0002
Ringed shank nail 4.0 mm	40 mm	30 mm	Ringed shank nails according to EN 14592
Rotho Blaas screw 5.0 mm, type LBS or LBSH	40 mm	35 mm	Self-tapping screws according to ETA-11/0030
In the load-carrying-capacities of the nailed or screwed connection in Annex B the capacities calculated from the formulas of Eurocode 5 are used assuming a thick steel plate when calculating the lateral fastener load-carrying-capacity. The characteristic withdrawal capacity of the nails or screws is determined by calculation in accordance with EN 1995-1-1:2010 ETA-22/0002 or ETA-11/0030. The shape of the LBA nail or LBS or LBSH screw directly under the head shall be in the form of a truncated cone with a diameter under the head which fits the hole diameter. Head pull-through is not relevant.			

Bolts diameter	Correspondent hole diameter in the washer	Bolts type
16.0 mm	Max. 2 mm larger than the bolt diameter	See specification of the manufacturer
20.0 mm	Max. 2 mm larger than the bolt diameter	See specification of the manufacturer
24.0 mm	Max. 2 mm larger than the bolt diameter	See specification of the manufacturer

Metal Anchors diameter	Correspondent Hole diameter in the washer	Anchors type
16.0 mm	Max. 2 mm larger than the anchor diameter	See specification of the manufacturer
20.0 mm	Max. 2 mm larger than the anchor diameter	See specification of the manufacturer
24.0 mm	Max. 2 mm larger than the anchor diameter	See specification of the manufacturer

Table A.4 Installation options

Washer type	WHT15	WHT20	WHT30	WHT40	WHT55
WHTW6016	●	●	-	-	-
WHTW6020	●	●	-	-	-
WHTW8020	-	-	●	●	-
WHTW8024	-	-	●	●	-
WHTW8024L	-	-	-	-	●

Annex B
Characteristic load-carrying capacities and slip moduli

The upward directed forces are assumed to act in the middle of the hold down.

There are two different types of fastener patterns:

- wide fastener pattern, in which all vertical rows of holes are used (see Figure B.8)
- narrow fastener pattern, in which only the 2nd, 3rd and 4th vertical row of holes are used (see Figure B.8).

Both, wide and narrow fastener patterns may be used with full or partial nailing pattern; there must always be nails or screws in the n_{ax} (see Table B.1) lowermost holes of the specific fastener pattern.

B.1 WHT hold downs fastened with nails or screws and bolts or metal anchors

Loading up:

$$F_{l,Rk} = \min\left\{ n_{eq} \cdot k_{nef} \cdot k_{a4} \cdot F_{v,Rk};\ F_{l,steel,Rk};\ \frac{F_{ax,Rk}}{k_t} \right\} \qquad \text{(B.1)}$$

n_{eq} equivalent number of nails or screws transferring shear force in the vertical flange, see Table B.1

k_{nef} Factor considering effective number of nails or screws
$k_{nef} = 1{,}0$ for $a_{4,c} \geq 5d$ or for $n \leq 9$ and 12,5 mm $\leq a_{4,c} < 5d$
$k_{nef} = n_{\parallel}^{-0,15}$ for $n > 9$ and 12,5 mm $\leq a_{4,c} < 5d$ according to EN 1995-1-1 Equation (8.17)

$n_{\parallel}$ Number of nails or screws in load direction parallel to grain

k_{a4} Factor considering influence of edge distance and load eccentricity for groups of up to 18 nails
$k_{a4} = 0{,}8 \cdot \sqrt{350/\rho_k}$ for up to $n = 18$ nails in LVL and 12,5 mm $\leq a_{4,c} < 5d$ for narrow fastener pattern
$k_{a4} = 1{,}0$ in all other cases ($a_{4,c}$ must be at least 5 d for $n > 18$ nails or screws)

$F_{v,Rk}$ Characteristic lateral load-carrying capacity of a nail or screw in single shear in the vertical flange according to EN 1995-1-1 and ETA-11/0030 or ETA-22/0002 assuming a thick plate, $F_{v,Rd} = k_{mod} \cdot F_{v,Rk} / \gamma_M$

$F_{1,steel,Rk}$ Characteristic load-carrying capacity of the hold-down, see Table B.1, $F_{1,steel,Rd} = F_{1,steel,Rk}/\gamma_{M0}$

$F_{ax,Rk}$ Characteristic axial load-carrying capacity of the bolt or metal anchor in the horizontal flange

k_t Coefficient, $k_t = 1{,}0$ for hold-downs with gap, $k_t = 1{,}09$ for hold-downs without gap

Note: The gap size does not influence the characteristic load-carrying capacity

$$K_{l,ser} = \min\left\{ n_{eq} \cdot F_{v,Rk};\ F_{l,steel,Rk} \right\} / 6 \qquad \text{(B.2)}$$

Table B.1: Force F_1, 1 hold-down / connection timber to timber or timber to rigid support

Hold-down	$F_{1,steel,Rk}$ [kN]	Wide fastener pattern			Narrow fastener pattern		
		LBA nails: n_{eq} [a]	LBS or LBSH screws: n_{eq} [a]	n_{ax}	LBA nails: n_{eq} [a]	LBS or LBSH screws: n_{eq} [a]	n_{ax}
WHT15 with 6 mm washer	40	n - 2	n - 1	10	n - 1	n - 1	6
WHT15 without washer	30	n - 2	n - 1	10	n - 1	n - 1	6
WHT20 with 6 mm washer	50	n - 3	n - 1	15	n - 2	n - 1	9
WHT20 without washer	40	n - 3	n - 1	15	n - 2	n - 1	9
WHT30 with 10 mm washer	70	n - 3	n - 1	20	n - 2	n - 1	12
WHT40 with 10 mm washer	90	n - 4	n - 2	25	n - 3	n - 2	15
WHT55 with 12 mm washer	120	n - 5	n - 3	30	n - 3	n - 2	18

Double hold downs per connection
The hold downs must be placed at each side opposite to each other, symmetrically to the component axis.

Single hold down per connection
The vertical member shall be prevented from rotation.

Wane
Wane is not allowed; the timber has to be sharp-edged in the area of the hold downs

Timber splitting or block shear failure
For the lifting force F_1 it must be checked in accordance with Eurocode 5 or a similar national Timber Code that splitting or block shear failure will not occur.

Rotho Blaas Hold-downs

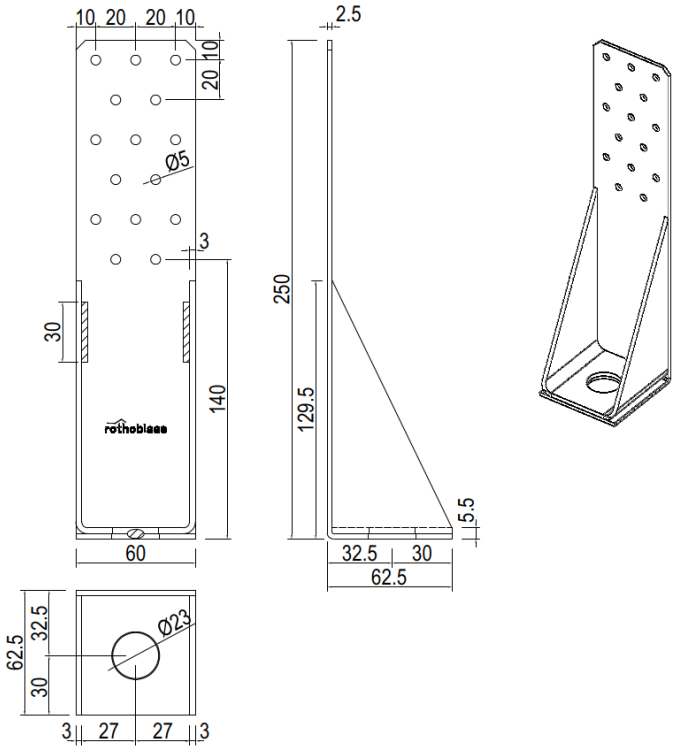

Figure B.1 Dimensions of Rotho Blaas WHT15 hold down.

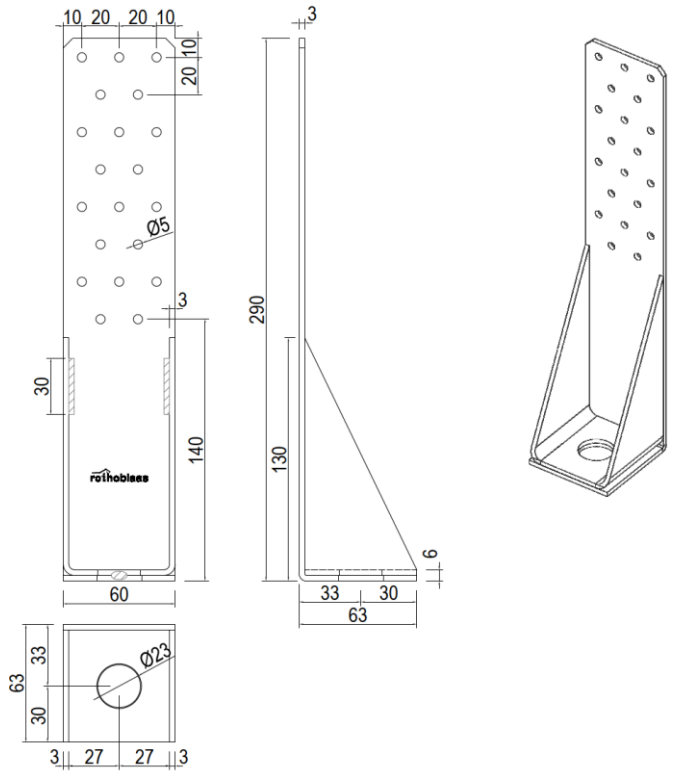

Figure B.2 Dimensions of Rotho Blaas WHT20 hold down.

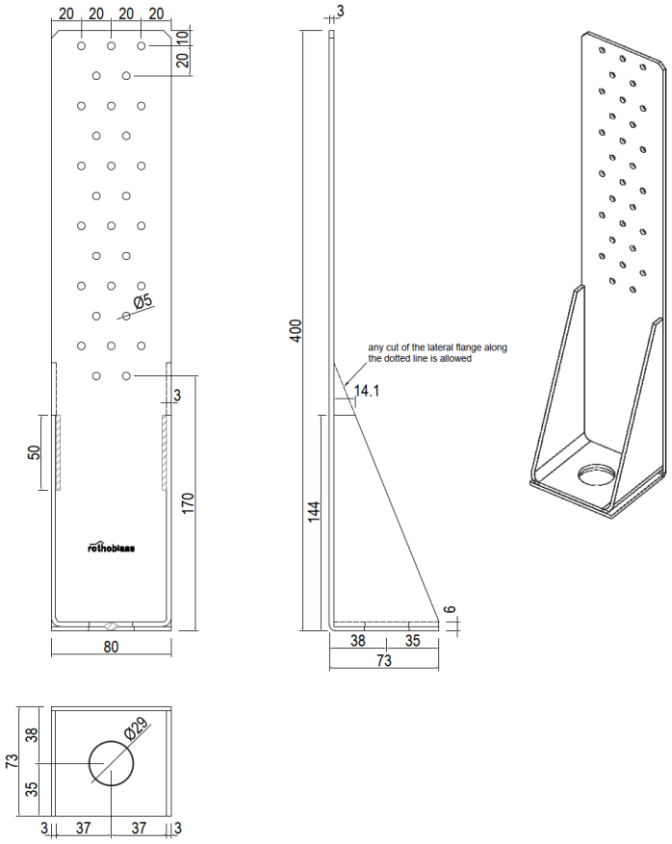

Figure B.3 Dimensions of Rotho Blaas WHT30 hold down.

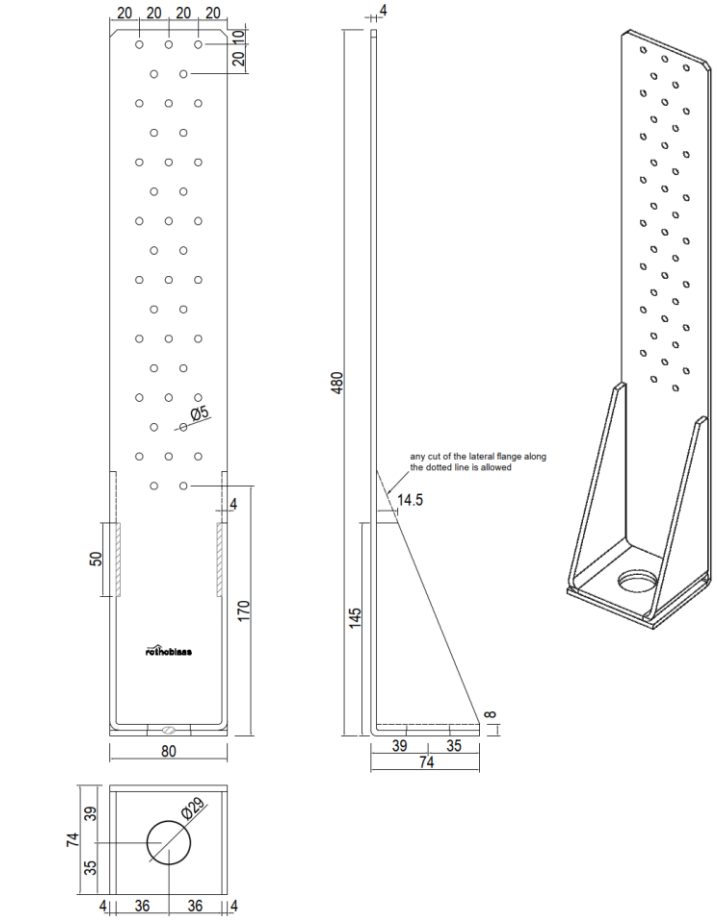

Figure B.4 Dimensions of Rotho Blaas WHT40 hold downs.

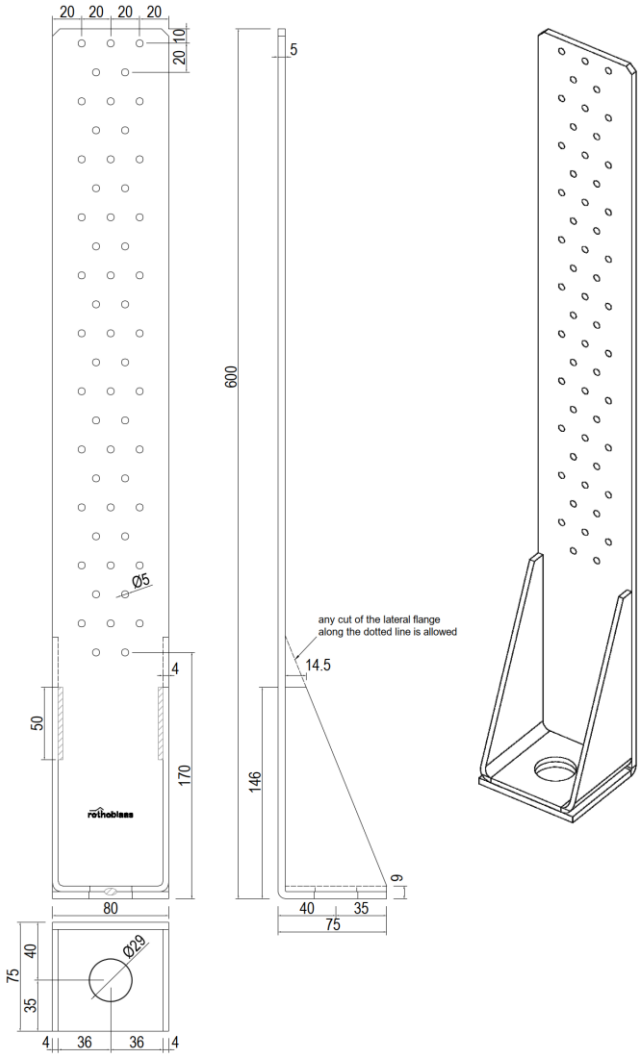

Figure B.5 Dimensions of Rotho Blaas WHT55 hold down.

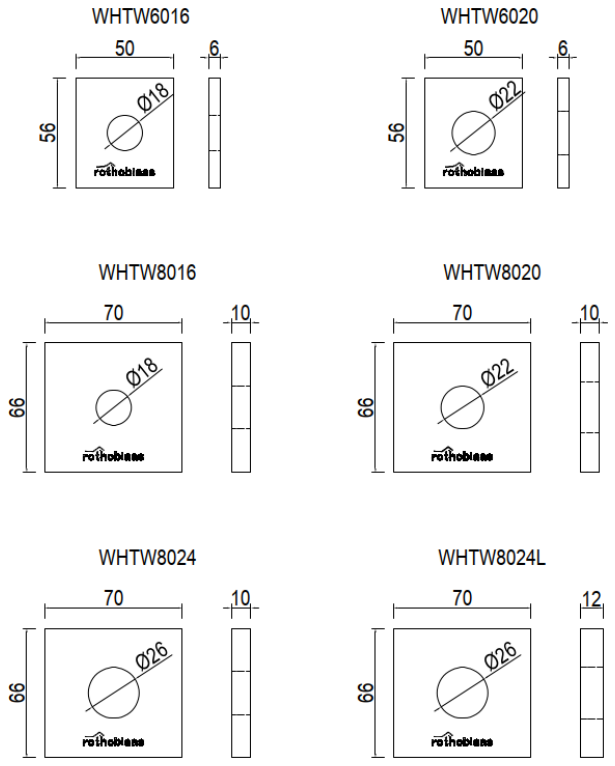

Figure B.6 Dimensions of Rotho Blaas WHT washers.

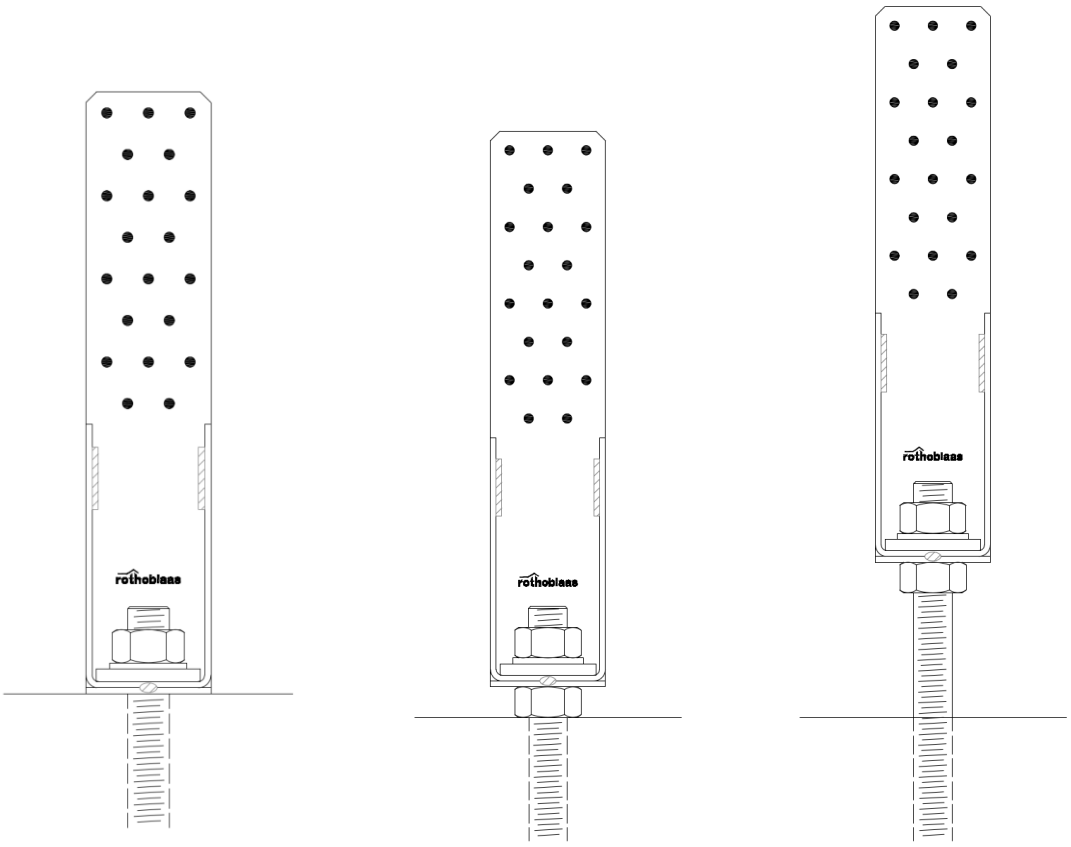

Figure B.7 Installation without and with gap.

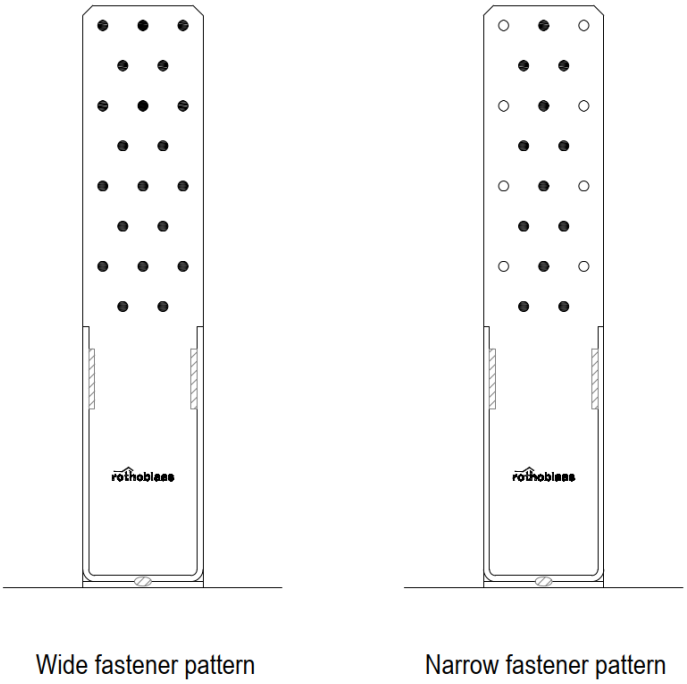

Figure B.8 Wide and narrow fastener pattern.

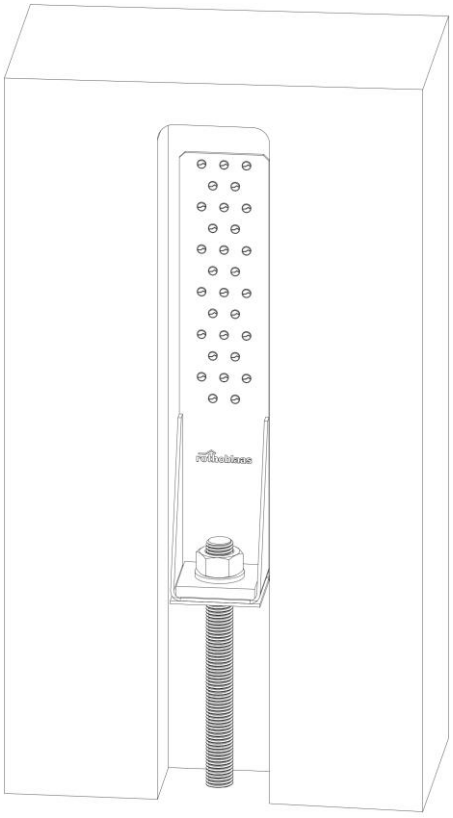

Figure B.9 WHT possible installation with gap.