



Profixings

Eurotec[®]

The specialist for fastening technology

OUR 

VERTILOCK PRO FACADE SYSTEM

**INSTRUCTIONS FOR
INSTALLATION**

**FACADE FASTENING SYSTEM
REGULATIONS**

CALCULATION PRINCIPLES

25
OVER YEARS



DISCOVER OUR NEW VERTILOCK PRO CALCULATION PROGRAM

OPTIMAL PLANNING FOR YOUR CONSTRUCTION PROJECT

- Calculate yourself how many screws are required in your project, taking into account economic design principles according to expert reports.
- Create a preliminary structural design for submission to the engineer.
- Visualise a cross-section of your facade
- Choose between three basic constructions, either timber, concrete or masonry.

Available now!



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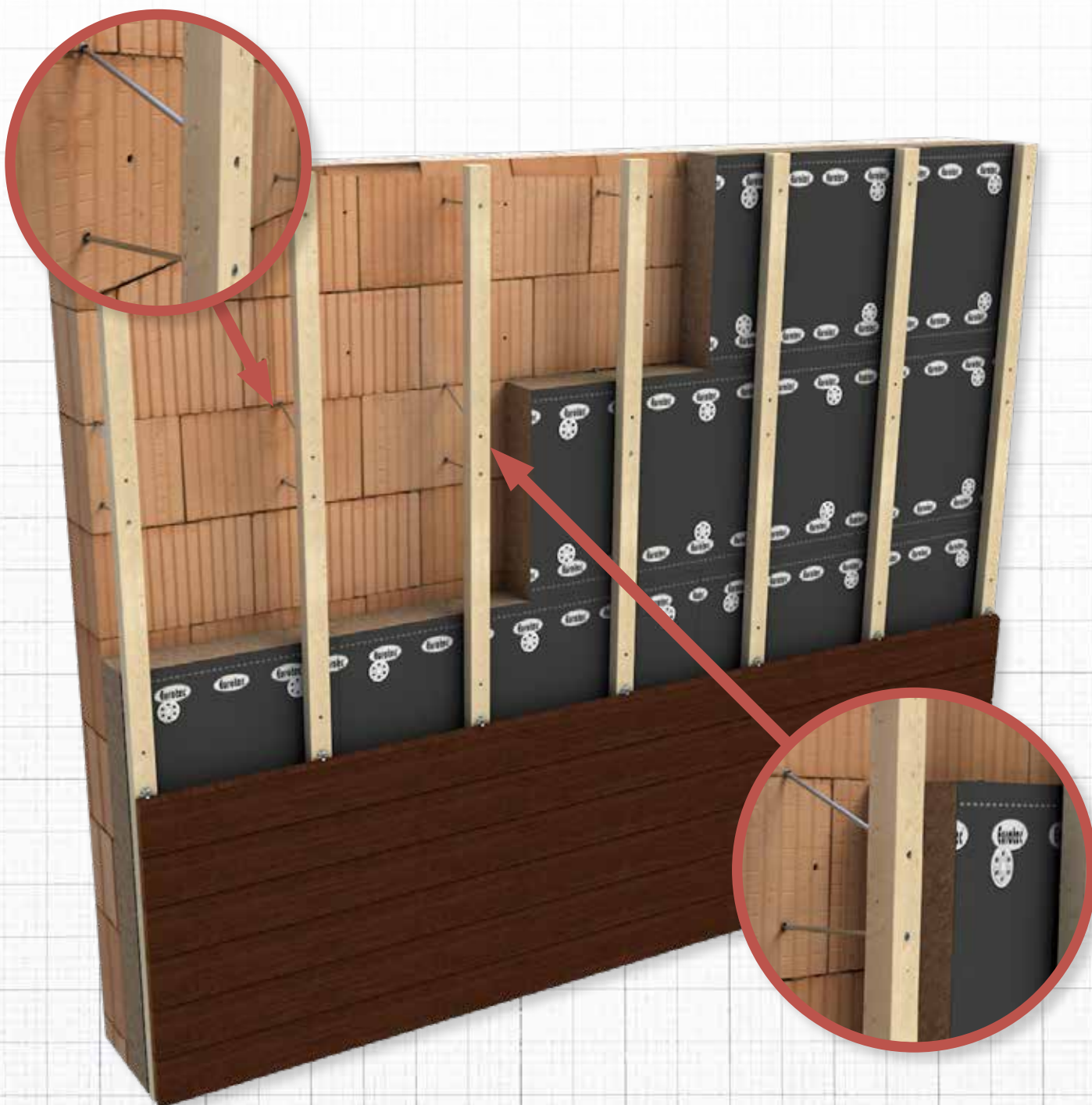
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EFFICIENT FACADE FASTENING SYSTEM: VERTILOCK PRO FOR TIMBER SUBSTRUCTURES

The VertiLock Pro facade fastening system has been specifically designed to install a self-supporting timber framework, which is then used to fix the outer building envelope after the installation of a continuous thermal insulation system. The timber framework is fixed in two stages:

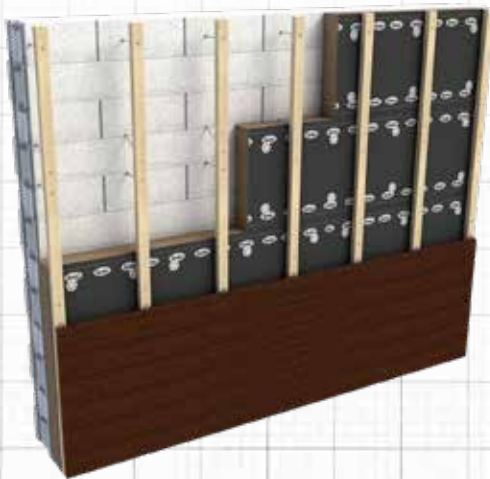
1. Attaching the substructure with single (horizontal) screws so that the facade can be installed and aligned quickly. The timber supporting structure has no contact with the insulation or the substrate and is therefore ideal for ventilating the facade.
2. Install diagonal screws. These screws form a stiff framework that gives the construction its ultimate stability and strength.



APPLICATION EXAMPLES

COMPLETELY RENOVATED: MODERNISATION OF YOUR OLD BUILDING

The supporting structure of the facade siding is anchored into the existing wall using the VertiLock Pro facade screw.



NEW BUILDING

The supporting structure of the facade siding is anchored to the load-bearing wall using the VertiLock Pro facade screw.

TIMBER FRAME CONSTRUCTION

Supporting structure The facade siding is anchored to the supporting structure using the VertiLock Pro facade screw.



INSTRUCTIONS FOR INSTALLATION

For optimum results, only the specified system combinations may be used in accordance with the prescribed installation instructions.

1. DRILLING ADVICE

For drilling in ceramic hollow bricks, porous materials and a diamond-ground masonry drill bit is recommended. This sharpened drill bit has been specially developed for such applications and is used in combination with, for example, a drill or a sufficiently powerful cordless machine without impact mechanism. High-speed drilling is recommended for perfect results.



Stone/universal drill

SDS-type rotary hammers are only suitable for concrete, sand-lime brick and sufficiently hard and solid brickwork. Special drilling regulations apply for use in aerated concrete; failure to observe these regulations will have a negative effect on installation.



Wood drill

2. INSTALLING INSULATION MATERIALS

The insulation boards are fixed without interruption to create a continuous insulation layer. For „masonry“ applications, it is recommended that the internal load-bearing supporting shell of new buildings is first raised to remove mortar residue. In renovation applications, it is suggested that the wall is brushed down before the insulation boards are applied.

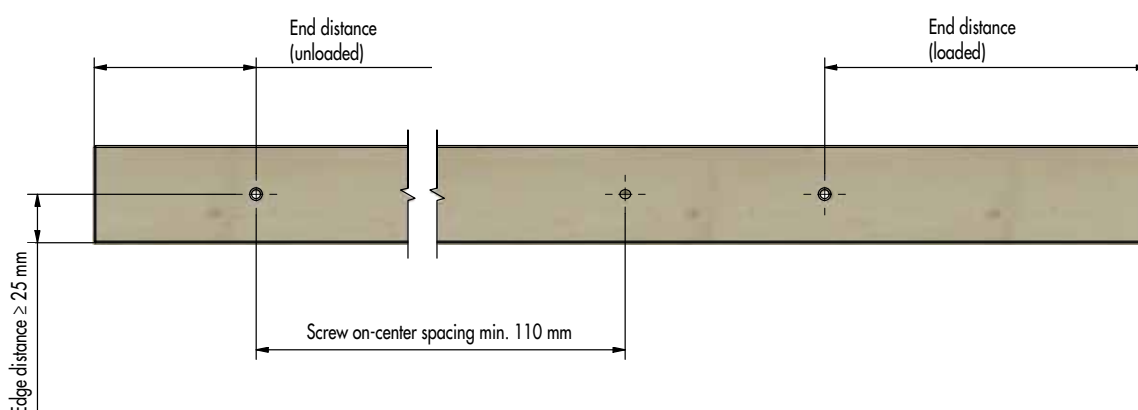
The insulation boards should be fixed to the substrate with a minimum of four insulation plugs per square meter, evenly distributed across the board. It's important to follow the installation instructions provided by the insulation board manufacturer.

Where external wall siding has open joints, an additional higher diffusion underlay is recommended on top of the insulation material. The insulation boards must be fixed in such a way that no additional insulation weight is added to the facade system.



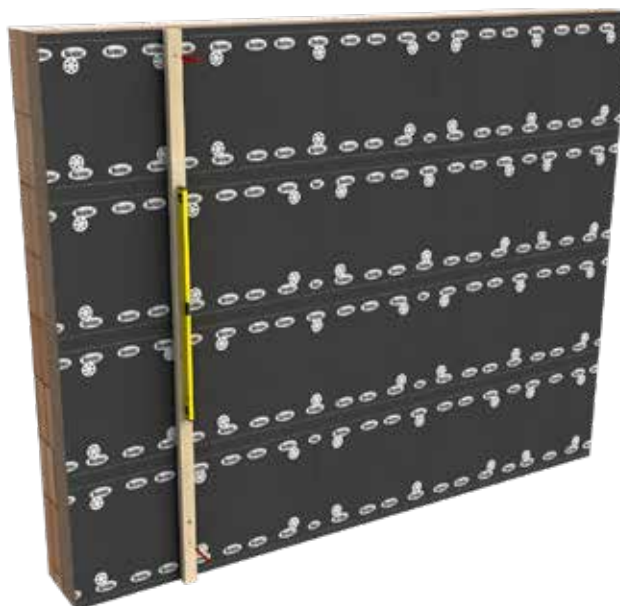
3. PRE-DRILL WOODEN BATTENS

For practical reasons, the holes for the individual fixings (horizontal) are pre-drilled in the battens with a wood drill. With wider support battens, the holes can be arranged alternately on the left and right to achieve greater stability along the longitudinal axis. The edge distance of the facade screws from the support battens must be taken into account. The spacing of the individual screws and the inclined screws depends on the weight of the facade, the wind loads, the substrate and the distance between the support battens and the substrate. The support battens should not be spaced more than 600 mm apart. As a rule, batten spacing is also often limited by the span widths of the facade siding. There should be a minimum end distance of 25 mm and a minimum end distance of 160 mm at the end of the support battens, regardless of it being loaded or unloaded.



4. ZERO REFERENCE - DETERMINE FACADE

Once the insulation has been installed, the maximum deviation from the facade surface can be determined using a construction laser or a guide line. The defined reference point determines the placement of the battens.



5. SETTING VERTICAL SUPPORT BATTENS WITH SINGLE FACADE SCREWS

Hold the support battens vertically in the visible plane from the centre to the centre of the support battens. Observe the manufacturer's instructions for the panelling when spacing the support battens. The support battens must rest on the insulation material. The insulation material must have a minimum compressive strength of 50 kPa.

Larger distances between the support battens and the insulation are not permitted with a purely vertical 0° screw connection.

The support battens should be pre-drilled with a Ø 10 mm wood drill before they are placed on the insulation. Then the insulation and the substrate below should be pilot drilled with a Ø 10 mm wall drill by using the drilling method determined by the brickwork below. Ø



The support battens are placed on the insulation for installation. The masonry / concrete drill bit can be guided through the pre-drilled hole to pre-drill the insulation material and the substrate.

The minimum setting depth and the borehole depths should always be taken into account in accordance with **Table 1: Installation requirements**. The appropriate drilling method must be selected depending on the substrate. The horizontal screws (90-degree) pre-fix the support battens. Unevenness in the substrate can still be levelled out during pre-fixing. After the drilling the plug gets mounted on the first threads of the VertiLock Pro screw. Then the screw and plug are inserted together through the wood and the insulation into the drilling channel and tightened slightly. Leave the lower part of the batten hanging „free“ and align it. Each screw connection point can now be pre-fixed and aligned with horizontal screws. All other horizontal screw connection points can then be perfectly positioned according to the specified reference point.

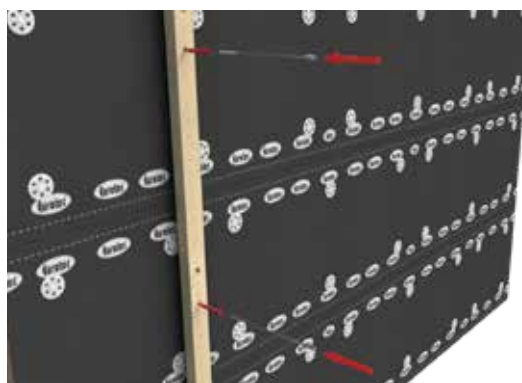


Table 1: Installation requirements*

Base material	Drill diameter in base material [mm]	Min. anchoring depth [mm]	Drilling method ^{a)}	Min. component thickness [mm]	Min. edge distance [mm]	Min. centre distance [mm]
Concrete C20/25	10,0	90	H	100	50	110
Vertically perforated brick ^{b)}	10,0	90	R	115	50	110
Solid clay brick	10,0	90	H	115	50	110
Solid lime-sand brick	10,0	90	H	115	50	110
Aerated concrete	10,0	90	R	115	50	110
Perforated lime-sand brick	10,0	90	R	115	50	110
Wood	c)	90	R	100	25	110

* The pull-out values of the anchoring base must be checked on site

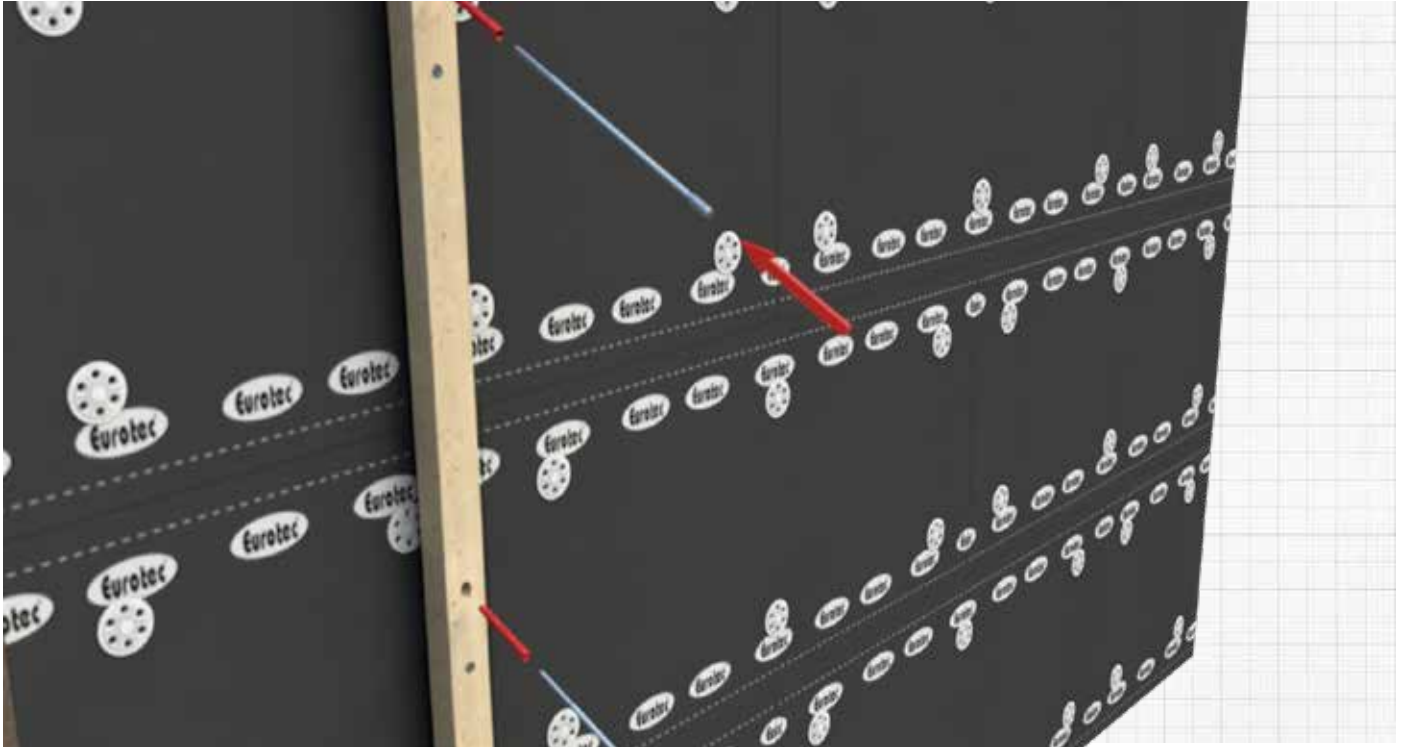
a) H = hammer drilling, R= rotary drilling

b) The plug should be inserted into at least 3 walls of the perforated brick. The drilling process should be carried out carefully so as not to destroy the inner structure of the perforated brick.

c) Timber substructures do not have to be predrilled.

6. SET INCLINED VERTILOCK PRO FACADE SCREWS

After aligning and fixing the support battens with individual facade screws, the entire supporting structure must also be fitted with inclined facade screws, depending on the statics, to ensure the load-bearing capacity.



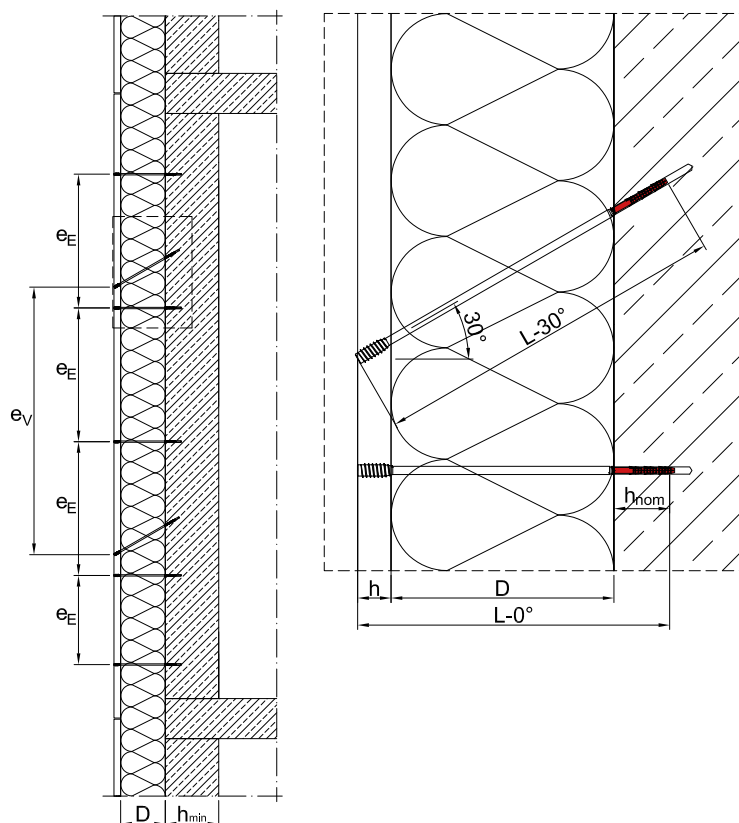
6. RESULT

The timber supporting structure is fully aligned and now has the required stability. The facade siding can now be applied, which must be carried out in accordance with the manufacturer's instructions.



FACADE FASTENING SYSTEM REGULATIONS

1. FACADE SCREWS + PLUGS



VERTILOCK PRO SCREW AND PLUG



VertiLock Pro			
Art. no	Dimensions Ø d x L [mm]	Drive	PU
945882	7,0 x 198	TX30 •	50
945823	7,0 x 218	TX30 •	50
945824	7,0 x 238	TX30 •	50
945825	7,0 x 258	TX30 •	50
945826	7,0 x 278	TX30 •	50
945827	7,0 x 298	TX30 •	50
945828	7,0 x 318	TX30 •	50
945829	7,0 x 338	TX30 •	50
945830	7,0 x 318	TX30 •	50
945830	7,0 x 358	TX30 •	50
945831	7,0 x 378	TX30 •	50
945832	7,0 x 398	TX30 •	50
945833	7,0 x 418	TX30 •	50

VertiLock Pro Plug			
Art. no	Dimensions Ø d x L [mm]	PU	
945835	10,0 x 90	200	

2. LENGTH OF VERTILOCK PRO FACADE SCREW

The screw length is determined by the cantilever and the anchor type depending on the substrate, as shown in **Table 2: Required length of horizontal and inclined screws by using the insulation thickness**. If the facade surface differs significantly, the maximum deviation must also be taken into account when determining the length of the VertiLock Pro facade screw.

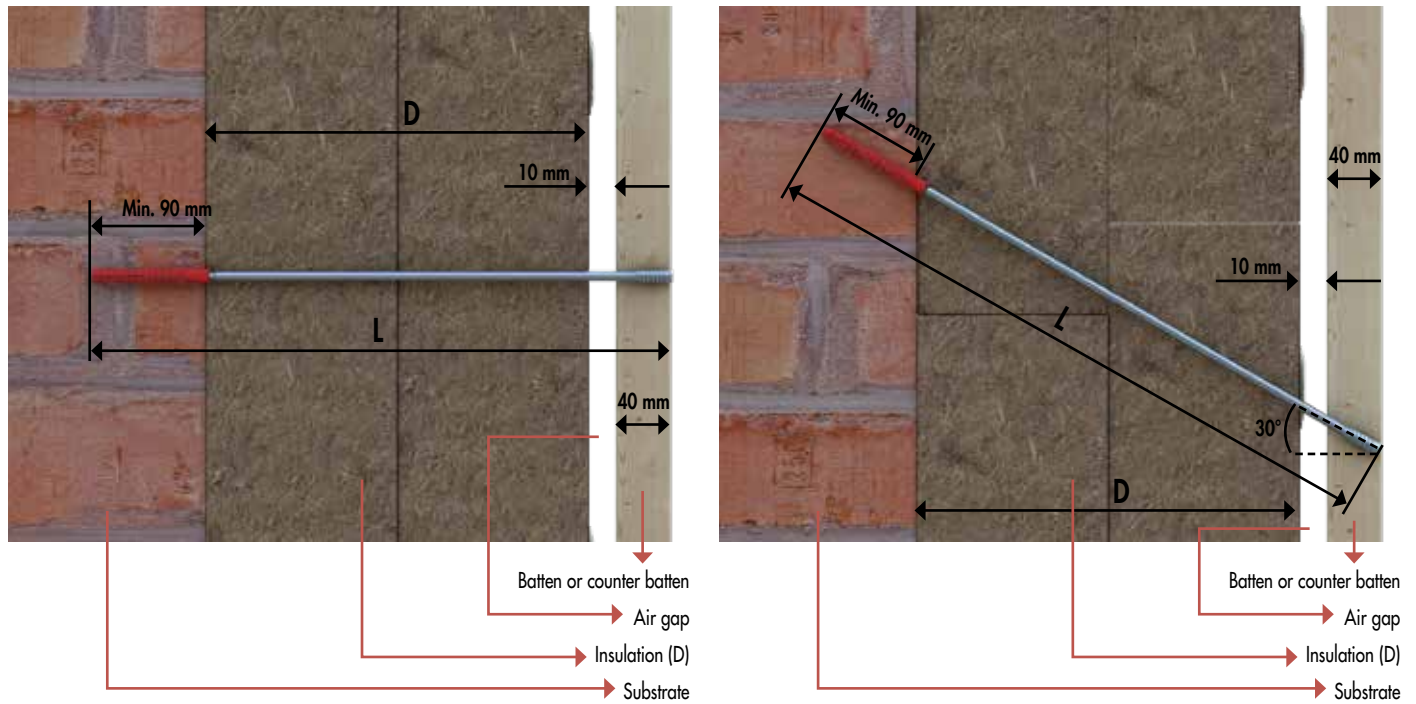


Table 2: Required length of horizontal and inclined screws by using the insulation thickness

Insulation thickness (D) [mm]	Screw length (L) 90-degree screws [mm]	Screw length (L) 30-degree screws [mm]
60	198	238
80	218	258
100	238	278
120	258	298
140	278	318
160	298	338
180	318	358
200	338	378
220	358	398
240	378	418
260	398	–
280	418	–

Batten thickness assumed: 40 mm

Min. penetration depth into substrate: 90 mm

Air gap assumed between insulation and batten: 10 mm

VertiLock Pro plug: 10 x 90 mm

3. INSTALL SUPPORT STRUCTURE + WOOD FOR SUBSTRUCTURE, AIR CAVITY

The screw length is determined by the cantilever and the anchor type depending on the substrate. If the facade surface differs significantly, the maximum deviation must also be taken into account when determining the length of the VertiLock Pro facade screw.

WOOD SECTION VERTICAL BATTENS:



Minimum width battens:	75 mm
Minimum thickness battens:	38 mm
Minimal air cavity:	10 mm

WOOD SECTION HORIZONTAL BATTENS:



Minimum width battens:	89 mm
Minimum thickness battens:	38 mm
Maximum air cavity:	18 mm

Placement of support structure + wood section can change in function of type of siding and must therefore always be done according to the siding manufacturer's instructions, whereby the minimum wood section must always be observed.

The minimum strength class of wooden batten must comply with C18, depending on design of faced with corresponding standards. In addition, the wood shall be protected against deterioration from fungi, etc., according to the applicable standard.

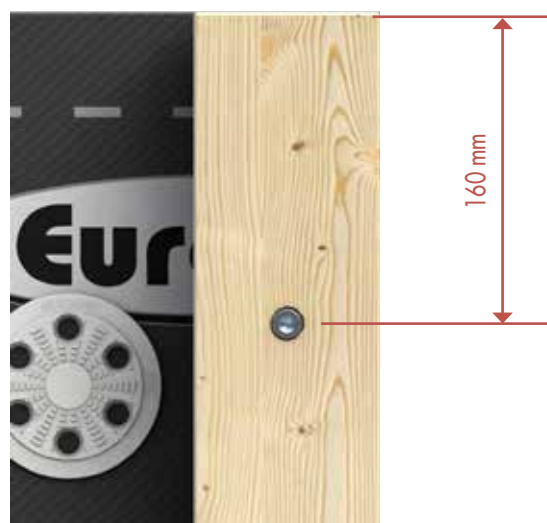
Minimum characteristic bending strength: **18 N/mm²**
Minimum mean modulus of elasticity: **9000 N/mm²**

4. EDGE DISTANCES WHEN INSTALLING FACADE PLUGS IN THE SUBSTRATE.

Minimum edge distance: 80 mm

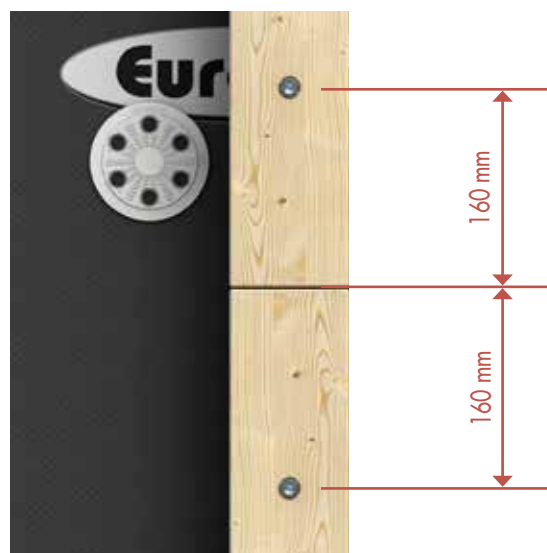
5. END DISTANCES OF THE GABLE SCREWS IN THE BATTENS

For installation of the gable screws in the wooden battens, as seen in the battens, an end distance between a minimum of 160 mm must be maintained.



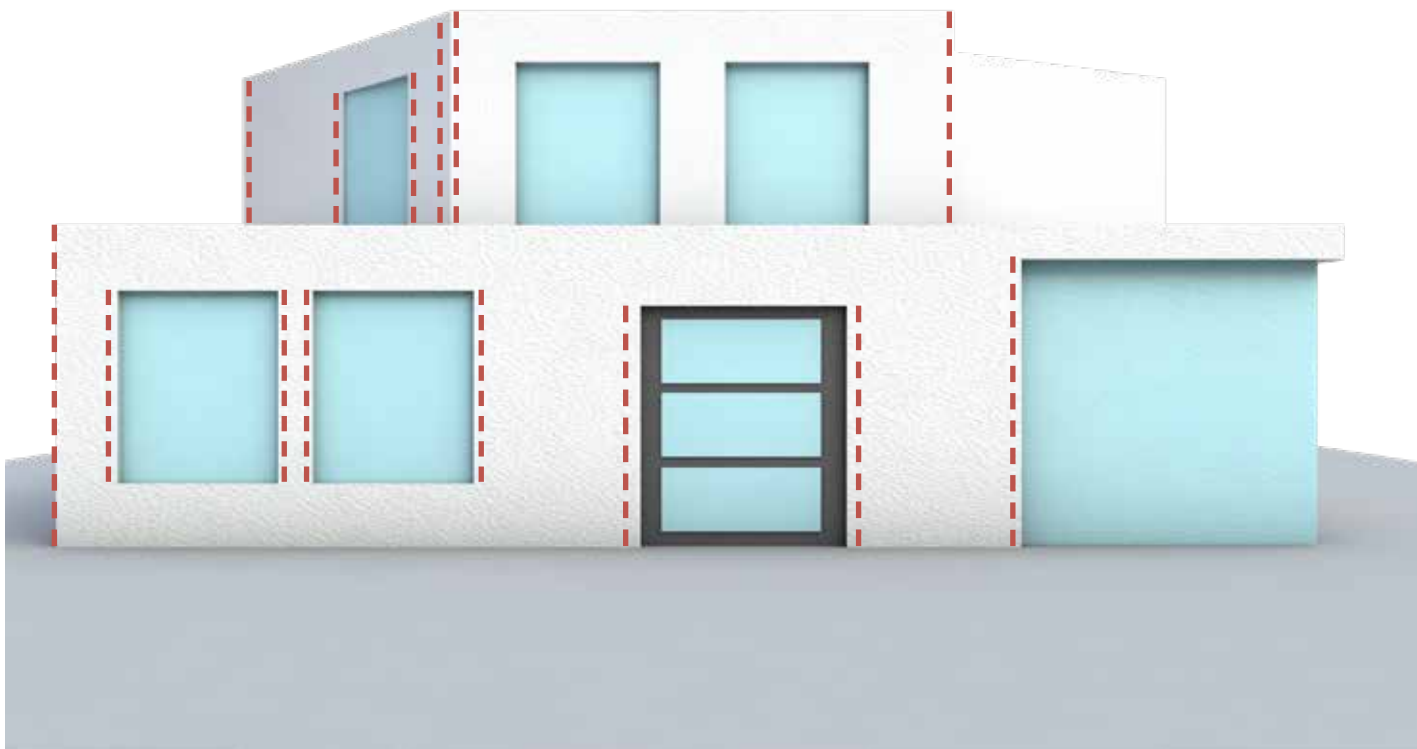
6. FREE ENDS AND COUPLING OF BATTENS

At free ends or if a connection of the battens is required (timber length less than the required facade length), a diagonal facade screw must always be added per end, taking into account an end distance of 160 mm.



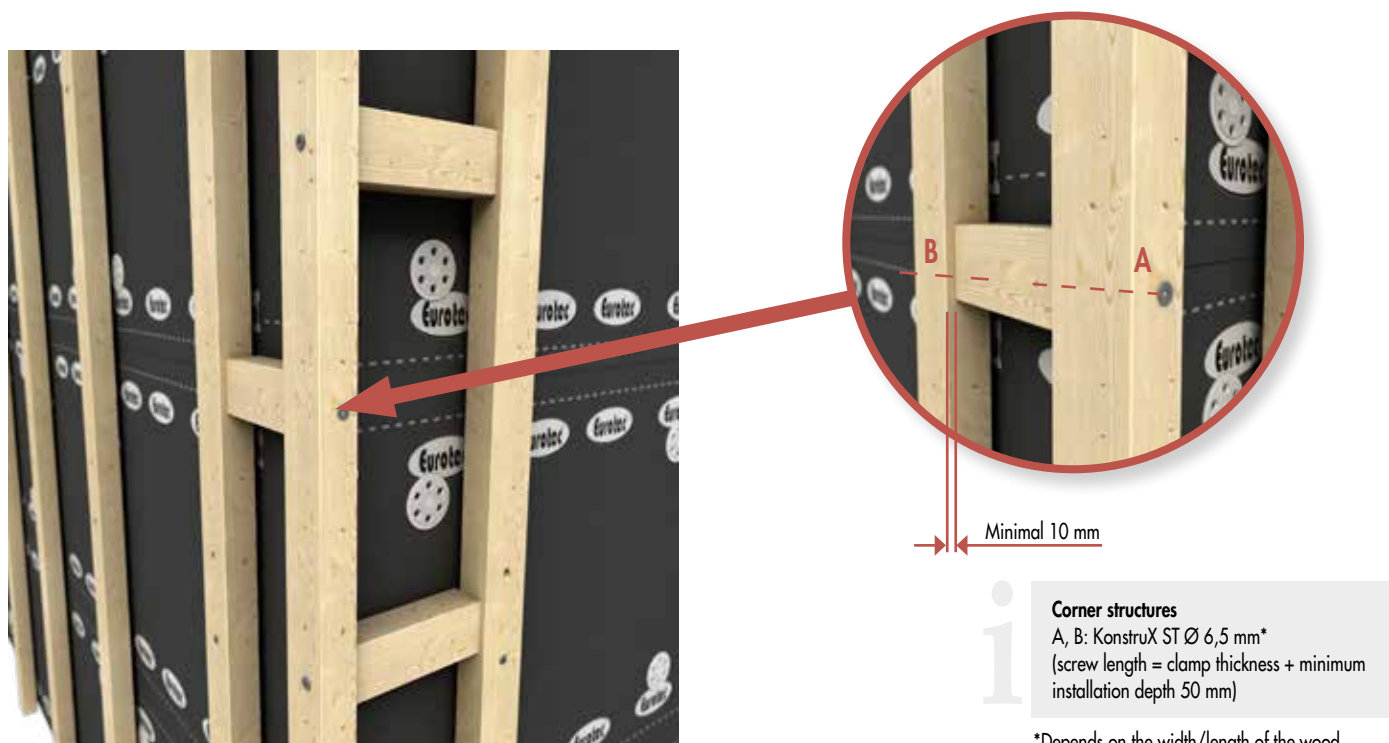
7. TRUSSES ALONG EDGES AND GABLE OPENINGS

Along the boundaries of each gable plane as well as along gable openings, all solitary screws must be screwed in combination with a lattice screw (see dotted lines in the photo).



8. CORNER CONSTRUCTION AND WALL OPENINGS

Such corner joints are always made with screws to ensure sufficient stability. For the optimum ventilation of the facade, the distance between the insulation and the wood must be determined in accordance with the manufacturer's instructions. When making and/or installing a corner joint, the horizontal mullions must not impede good ventilation.



CALCULATION PRINCIPLES

In VertiLock Pro facade systems, the calculation principles for the required number per area and the spacing of horizontal screws, mainly depend on the following factors:

- Facade weight,
- Substrate,
- Batten spacing.

In order to limit deflections and increase capacity against wind suction forces, diagonal screws shall be added. It should be noted that wind force calculations shall be based on related Terrain Category and reference height of the building, according to EN1991-1-1-4. For different scenarios, freely available design software can be used to determine minimum screw spacing and the total number of horizontal and inclined screws.



VERTILOCK PRO CALCULATION PROGRAM

Optimize Your Facade Fixing System with VertiLock Pro Insulated Facade System: Enter load and geometry data to ensure precise and secure installations tailored to your project's specifications.



Please enter load and geometry data

Facade weight [kg/m²]
13,99

Wind load [kN/m²]
0,5

Distance of batten from wall D [mm]
170

Batten width [mm]
60

Batten height [mm]
40

Strength class
C24

Service class according to Eurocode 5
2

Horizontal batten distance [mm]
600

Substructure
Concrete

Facade area [m²]
10

Submit



VertiLock Pro Insulated Facade System

Building materials and geometry

Dimensions of counter battens b/h = 40/60, Strength class C24

Clear distance between counterbattens and wall: D = 120.0 mm

Horizontal distance between counterbattens: e_b = 600.0 mm

Facade area: A = 10.0 m

VertiLock pro 7, 0 mm

Loading

Self weight g_s = 20.0 kg/m²

Wind load q = 0.5 kN/m²

Assume design tensile stress in the critical normal force and is calculated as: $N_d = 1.5 \cdot c_p \cdot q = 1000 = 375.0$ N

Here c_p is taken as 0.5

Design shear force per unit area: $F_d = 1.35 \cdot g_s = 9.81 = 264.87$ N

Design bending moment based on the shear force and the distance of the counter batten to the wall:
 $M_d = F_d \cdot (D + d_b) = 34433.1$ Nmm

Here d_b is assumed to be 10 mm.

Calculation details

Check of the load bearing capacity of the substructure

$N_{Rd} = 800.0$ N (normal load bearing capacity of the screw based on the pull out capacity of the plug.)

Only the screw of the pair of screws arranged in a V-shape that is inserted perpendicular to the wall is taken into account.

$M_{Rd} = 14200$ Nmm (yield moment for one screw)

The number of screws that satisfies the loading is increased until the following check is fulfilled.

$M_{Ed} = n \cdot 14200$ Nmm = 2.5 · 14200 Nmm = 35500.0 Nmm > 34433.1 Nmm

$N_{Rd} = n \cdot 800.0$ N = 2.5 · 800.0 N = 2000.0 N > 375.0 N

$M_{Ed} / (n \cdot 14200$ Nmm) + $N_{Ed} / (n \cdot 800.0$ N) ≤ 0.862 ≤ 1

Screw count details

Required number of horizontal screws: 2.5 per m².

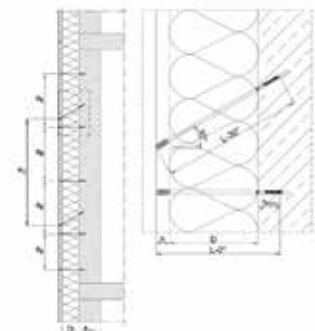
Adding a percentage 12.5% inclined screws for stability.

Total required number of screws (horizontal + inclined): 2.81 per m².

Total number of screws : 29

Vertical distance between horizontal screws e_H: 65 cm.

Vertical distance between inclined screws e_I: 200 cm.



The report generated from the Profixings software for the VertiLock Pro Insulated Facade System provides a thorough analysis of the building materials, geometry, and loading parameters essential for ensuring the stability and safety of facade installations. Additionally, it calculates the required number of screws needed to meet the structural load requirements, ensuring a secure and reliable facade system.

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25
OVER YEARS

E.u.r.o.Tec GmbH

Unter dem Hofe 5 – D-58099 Hagen

Tel. +49 2331 62 45-0

Fax +49 2331 62 45-200

E-Mail info@eurotec.team

www.eurotec.team/en

