Shearing forces

Calculation values/minimum dimensions for auxiliary beam/main beam transverse force connection
1 screw pair per connection, utility class 1 – 2, load-duration class = medium[1)]

Diameter [mm]	Total length [mm]	Thread length, top [mm]	Thread length, bottom [mm]	V_{rd} in soft wood >=C24 _k=350 kg/m_ [kN]	V_{rd} in glulam >=GL24h _k=380 kg/m_ [kN]	Min. wood cross section Main beam W/H [mm/mm]	Min. wood cross section Auxiliary beam W/H [mm/mm]
6,5	100	45	45	2,2	2,5	80/80	80/80
6,5	150	70	70	3,3	3,9	80/120	80/120
6,5	190	90	90	4,2	5,0	80/150	80/150
6,5	215	100	100	4,8	5,6	90/170	80/170
8,5	100	45	45	2,8	3,3	100/100	100/100
8,5	150	70	70	4,3	5,1	100/120	100/120
8,5	190	90	90	5,6	6,6	100/150	100/150
8,5	215	100	100	6,2	7,3	100/170	100/170
8,5	270	122	122	7,5	8,9	110/210	100/210
8,5	300	138	138	8,5	10,1	120/230	100/230
8,5	350	158	158	9,8	11,6	140/260	100/260

Calculation values/minimum dimensions for auxiliary beam/main beam transverse force connection
2 screw pairs per connection[3)], utility class 1 – 2, load-duration class = medium[1)]

Diameter [mm]	Total length [mm]	Thread length, top [mm]	Thread length, bottom [mm]	V_{rd} in soft wood >=C24 _k=350 kg/m_ [kN]	V_{rd} in glulam >=GL24h _k=380 kg/m_ [kN]	Min. wood cross section Main beam W/H [mm/mm]	Min. wood cross section Auxiliary beam W/H [mm/mm]
6,5	100	45	45	4,3	5,1	80/80	120/80
6,5	150	70	70	6,6	7,8	80/120	120/120
6,5	190	90	90	8,5	10,0	80/150	120/150
6,5	215	100	100	9,5	11,2	90/170	120/170
8,5	100	45	45	5,5	6,5	100/100	140/100
8,5	150	70	70	8,6	10,2	100/120	140/120
8,5	190	90	90	11,2	13,2	100/150	140/150
8,5	215	100	100	12,5	14,7	100/170	140/170
8,5	270	122	122	15,1	17,8	110/210	140/210
8,5	300	138	138	17,1	20,1	120/230	140/230
8,5	350	158	158	19,7	23,2	140/260	140/260

1).. Correction factors for load-duration class: Constant: 0.75, long: 0.88, medium: 1.0, short: 1.13, very short: 1.38

2).. Screws arranged one above the other (transverse direction of beam)

3).. Recommended forces (not defined by approval), the connection should not be fully loaded due to the group effect of 2 screw pairs.

Important information:

The tables apply to solid soft wood min. C24 (spruce, pine, fir) or glulam min. GL24h. The screw fitting's centre of gravity is always in the connection joint, at the mid point of the cross sectional height of the auxiliary beam. Acceptance of the offset moment $V^*b_{HT}/2$ is to be verified separately for one-sided connection or for two-sided connection with different loads.

Delivery range HECO-TOPIX®-CC / HECO-TOPIX®-T

HECO-TOPIX®-CC

Article	ø x length	Drive	Qty per box
42954	6,5 x 100	T30	100
42955	6,5 x 150	T30	100
42956	6,5 x 190	T30	100
42957	6,5 x 215	T30	100
42946	8,5 x 100	T40	100
42947	8,5 x 150	T40	100
42948	8,5 x 190	T40	100
42949	8,5 x 215	T40	100
42950	8,5 x 270	T40	100
42951	8,5 x 300	T40	100
42952	8,5 x 350	T40	50
42953	8,5 x 400	T40	50

HECO-TOPIX®-T

Article	ø x length	Drive	Qty per box
42186	8 x 200	T40	100
42188	8 x 240	T40	100
42190	8 x 280	T40	100
42192	8 x 300	T40	100
42194	8 x 330	T40	50
42196	8 x 360	T40	50
42198	8 x 400	T40	50
42200	8 x 450	T40	50

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Your specialist dealer:

43108-06/2007

HECO-TOPIX®-CombiConnect

HECO-TOPIX®-Therm

HCS-Calculation Software

THE WOOD SCREWS FOR PROFESSIONALS

HECO® SCHRAUBEN

Safe and secure

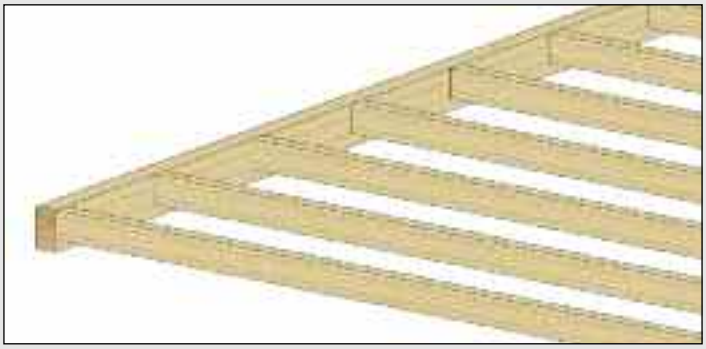
HECO-TOPIX®-CC –
for load acceptance at the highest level!

With the HECO-TOPIX®-CombiConnect you have available a power screw for the most varied range of applications:

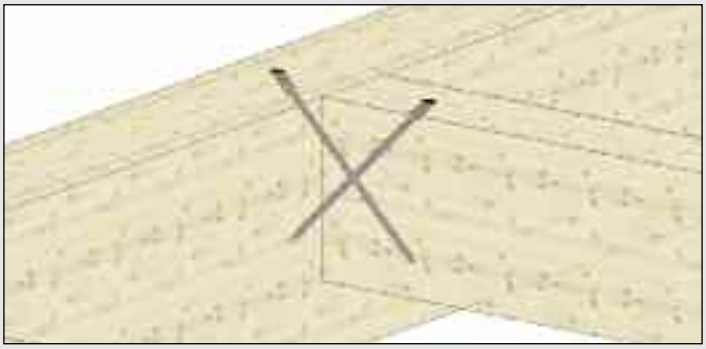
- Transverse butt joints
- Doubling up of weak wooden beams
- Reinforcement of weak points in the cross section of classic timber joints
- Rafter-purlin joints
- Transmission of considerable compressive forces
- Clamping effect, the structure is pulled together by up to 5 mm

1. Transverse butt joints

Rational working procedures – industrial production – modern timber construction!
In recent years, many advances have been made in connection with the simple butt joint in combination with steel components. Whether dowel joints or the classic joist hanger – although they are appropriate construction elements, they are unfortunately very time-consuming in their execution. With the HECO-TOPIX®-CC screw transverse butt joints couldn't be easier and faster. Added to this, the screws not only take up the shearing force of the beam structure but they also bear the transverse pull of the structure.



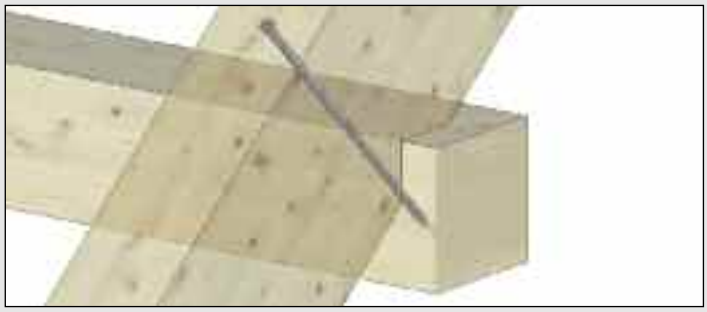
Transverse butt joints



Advantages

- Higher degree of load transmission
- Bearing of transverse pull
- Fasteners not visible
- Fast, cost-saving working procedures
- Easy to disassemble
- Simplest execution of purlin butt joints
- High fire resistance
- Approved and certified product (Z.9.1-665)
- Simple dimensioning with HCS (HECO-Calculation-Software)
- **Please refer to back of brochure for load tables**

Rafter-purlin joints

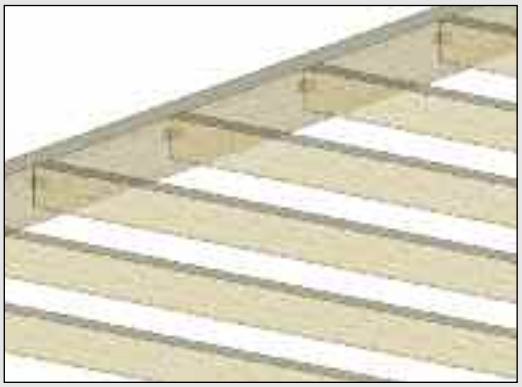


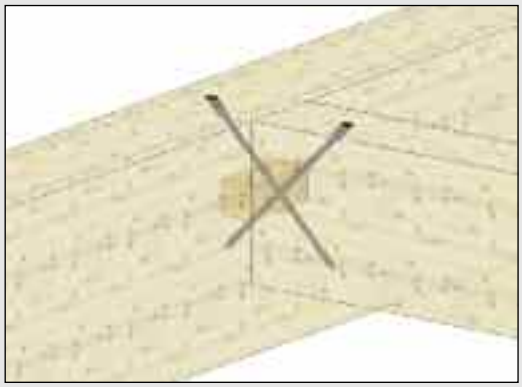
2. Rafter-purlin joints

In addition to the previous HECO-TOPIX® range, a large proportion of the rafter-purlin joints in areas of increased loads can be made with the HECO-TOPIX®-CC, thus rendering additional steel components or corresponding design solutions unnecessary. These joints are particularly suitable for preventing pullout (lifting loads) in the load ranges between 5 kN and 7.8 kN.

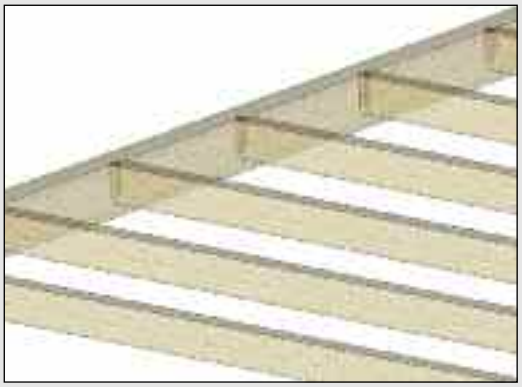
Advantages

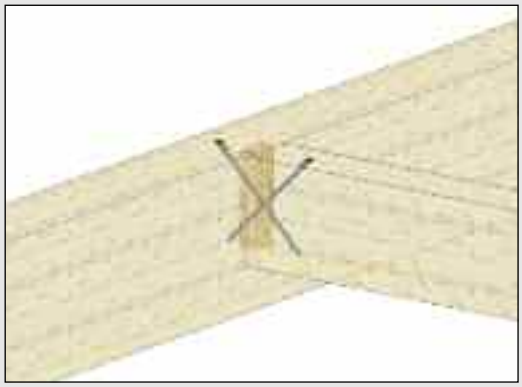
- Higher degree of load transmission
- No protrusion of plate heads or rosettes on the framework level of the rafter surface
- Fast, cost-saving working procedures
- Easy to disassemble at any time
- Fasteners not visible
- High fire resistance
- Approved and certified product (Z.9.1-665)
- Simple dimensioning with HCS (HECO-Calculation-Software)



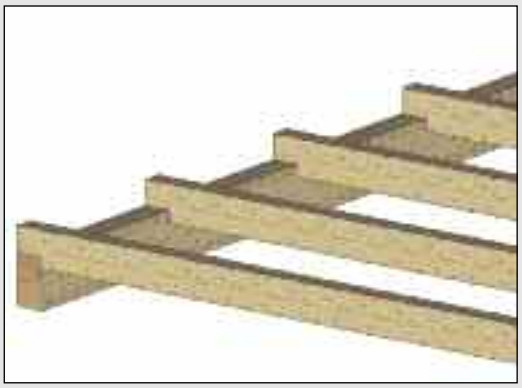


Tenon





Dovetail



Common halving

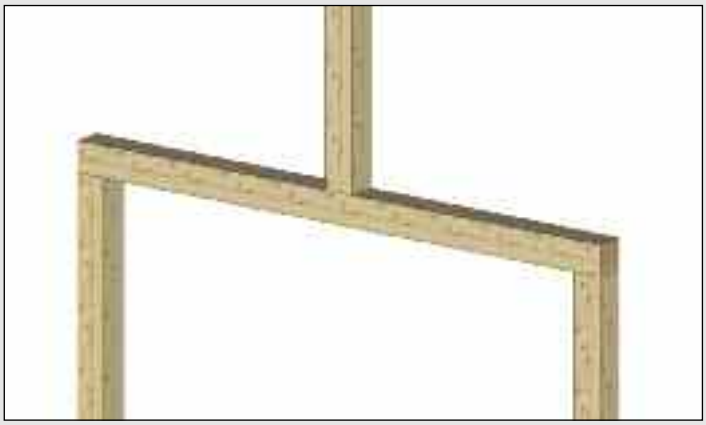
Double offset

3. Reinforcement of weak points in the cross section of classic timber joints

Traditional carpenter's joints are susceptible to considerable cross sectional weaknesses. Whether tenon joints, dovetail joints or common halvings – the cross section of these joints can be reduced without decreasing the load bearing capacity (see transverse butt joints). Nevertheless, if a traditional joint is still required, you have the option of using simple tenon joints to accept the transverse pull!

Advantages

- Higher degree of load transmission
- Acceptance of transverse pull
- Fasteners not visible
- Fast, cost-saving working procedures
- Easy to disassemble at any time
- Easy to use, with simplest execution
- High fire resistance
- Approved and certified product (Z.9.1-665)
- Simple dimensioning with HCS (HECO-Calculation-Software)



Doubling up

4. Doubling up of weak wooden beams

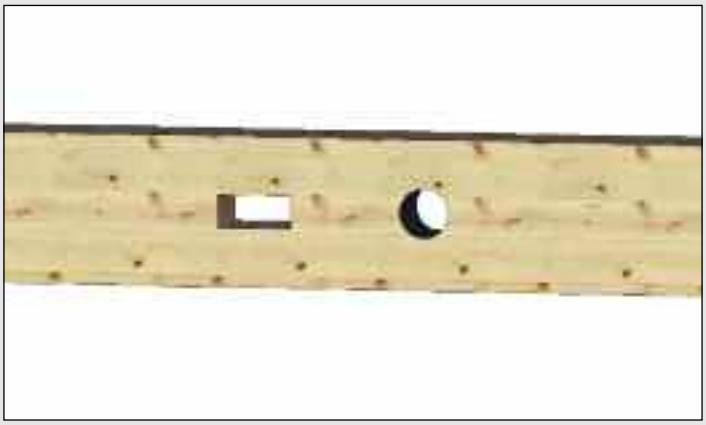
The entire construction sector is attaching more and more importance to building in existing stock. Nevertheless, reducing costs is still of the utmost priority. Existing timber-work is often well preserved in the building structures but not adequately dimensioned for focused load application of the new structure. Previously, the only option in such cases was the removal of the weak timber beam.
The new HECO-TOPIX®-CC provides a much simpler solution: Simply double up your supporting beam to the required cross section. The HECO-TOPIX®-CC provides the necessary reinforcement of the new cross section.

Advantages

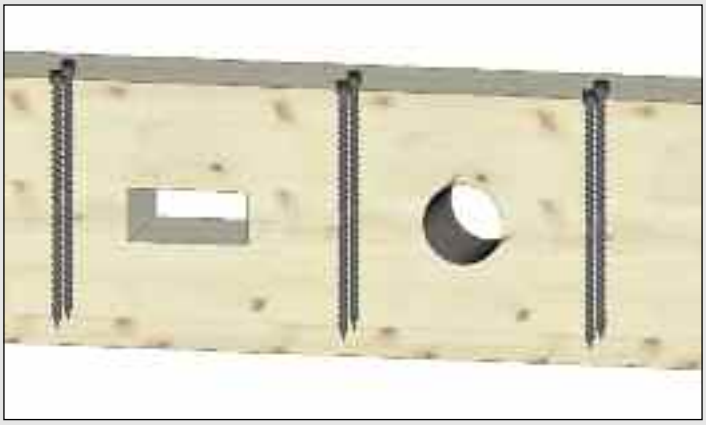
- Higher load acceptance from the supporting structure
- Fast, cost-saving working procedures
- No removal of existing building stock
- Fasteners not visible
- High fire resistance
- Approved and certified product (Z.9.1-665)
- Simple dimensioning with HCS (HECO-Calculation-Software)

5. Reinforcement of cross sectional weak points in openings

Whether new building or renovation project – time and again installation work and the necessary openings in load-bearing components pose considerable problems in terms of the load-bearing capacity of the structure. It is often necessary to raise the floor structure or suspend ceilings in order to compensate for excessively large cross sections of the timber beams. With HECO-TOPIX®-CC you can avoid wood grain splitting. HECO-TOPIX®-CC screws are screwed in to the right and left of the potential breakage points of the component openings so as to provide the necessary reinforcement of the supporting beam with weakened cross section.



Openings



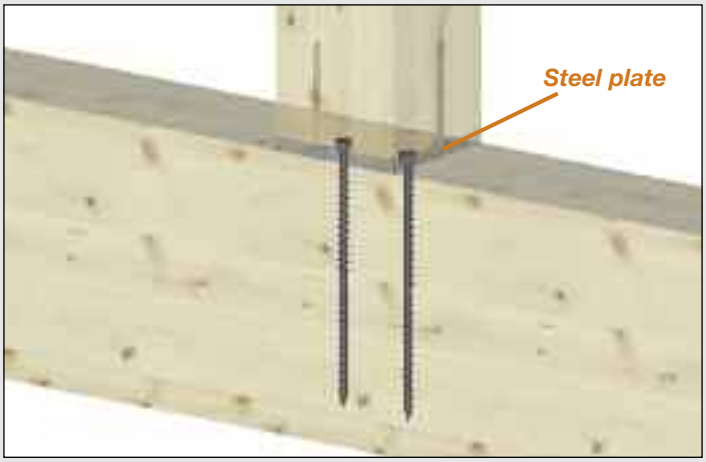
Advantages

- Higher load acceptance from the supporting structure
- Fast, cost-saving working procedures
- Flexible installation options
- Fasteners not visible
- High fire resistance
- Approved and certified product (Z.9.1-665)
- Simple dimensioning with HCS (HECO-Calculation-Software)

6. Transmission of considerable compressive forces

Slender cross sections and high loads – time and time again, this arrangement poses problems in timber construction applications. Although the slender, visually appealing component can take up the necessary compressive forces, it would press too much into the supporting beam.
This results in an increase in the cross section or the need for a steel component with large-area load transmission. The HECO-TOPIX®-CC screw renders bulky, oversized cross sections or steel components unnecessary. When screwed in, the screw can be subjected to compressive load and transmits the applied loads over the entire length of the thread into the load component. The steel plate practically matching the size of the cross section can thus be placed directly onto the flat surface of the all-thread screws.

Compressive forces



Advantages

- Higher degree of load transmission
- Fasteners not visible
- Fast, cost-saving working procedures
- Easy to disassemble at any time
- Easy to use with blunt-end supports
- High fire resistance
- Approved and certified product (Z.9.1-665)
- Simple dimensioning with HCS (HECO-Calculation-Software)

Calculated values for bearer/sole plate connection, load-duration class = medium[1)]
Compressive force – bearer 100/100

Diameter/ total length [mm]	Thread length at top/ thread length at bottom [mm]	Min. screw spacing [mm]	Number of screws	N_{rd} in soft wood >=C24 _k=350 kg/m_ [kN]	N_{rd} in glulam >=GL24h _k=380 kg/m_ [kN]	Min dimensions of sole plate W/H [mm]
6,5 x 100	45/45	35	4	33,1	35,7	100/110
6,5 x 150	70/70	35	4	43,1	49,5	100/160
6,5 x 190	90/90	35	4	43,1	49,5	100/200
6,5 x 215	100/100	35	4	43,1	49,5	100/230
8,5 x 100	45/45	45	2	32,3	37,4	100/110
8,5 x 150	70/70	45	2	37,5	46	100/160
8,5 x 190	90/90	45	2	41,6	48,7	100/200
8,5 x 215	100/100	45	2	42,3	48,7	100/230
8,5 x 270	122/122	45	2	42,3	48,7	100/280
8,5 x 300	138/138	45	2	42,3	48,7	100/310
8,5 x 350	158/158	45	2	42,3	48,7	100/360

Calculated values for bearer/sole plate connection, load-duration class = medium[1)]
Compressive force – bearer 200/200

Diameter/ total length [mm]	Thread length at top/ thread length at bottom [mm]	Min. screw spacing [mm]	Number of screws	N_{rd} in soft wood >=C24 _k=350 kg/m_ [kN]	N_{rd} in glulam >=GL24h _k=380 kg/m_ [kN]	Min dimensions of sole plate W/H [mm]
6,5 x 100	45/45	35	25	98,6	106,2	200/110
6,5 x 150	70/70	35	25	129,4	139,4	200/160
6,5 x 190	90/90	35	25	154	166	200/200
6,5 x 215	100/100	35	25	166,3	179,3	200/230
8,5 x 100	45/45	45	12	97	104,6	200/110
8,5 x 150	70/70	45	12	127,8	137,8	200/160
8,5 x 190	90/90	45	12	152,5	164,3	200/200
8,5 x 215	100/100	45	12	164,8	177,6	200/230
8,5 x 270	122/122	45	12	191,9	206,8	200/280
8,5 x 300	138/138	45	12	207,6	228,1	200/310
8,5 x 350	158/158	45	12	207,6	233,8	200/360

Important information:

The values are reference values and include γ_F=1.3 and k_{mod}=0.8 (load-duration class = medium). See below for load-duration class correction factors! Intermediate plates t = 10 mm are required for accepting the compressive force at the screw head.
The values refer to an intermediate support with an overall support spacing >=2*$h_{sole\ plate}$ in accordance with DIN 1052.10.2.4. Specific verification is required for other general conditions.
A minimum screw spacing parallel and vertical with respect to the grain of min. 35 mm (6.5 diameter) and 45 mm (8.5 diameter) respectively was taken into account.
There are no higher permissible loads for longer screws in the grey-shaded fields.

1).. Correction factors for load-duration class:
Constant: 0.75, long: 0.88, medium: 1.0, short: 1.13, very short: 1.38. Important! The load bearing capacity of the screw may be decisive for screw length > = 190 mm. The conversion with load-duration class factors is therefore not permitted for such screws!

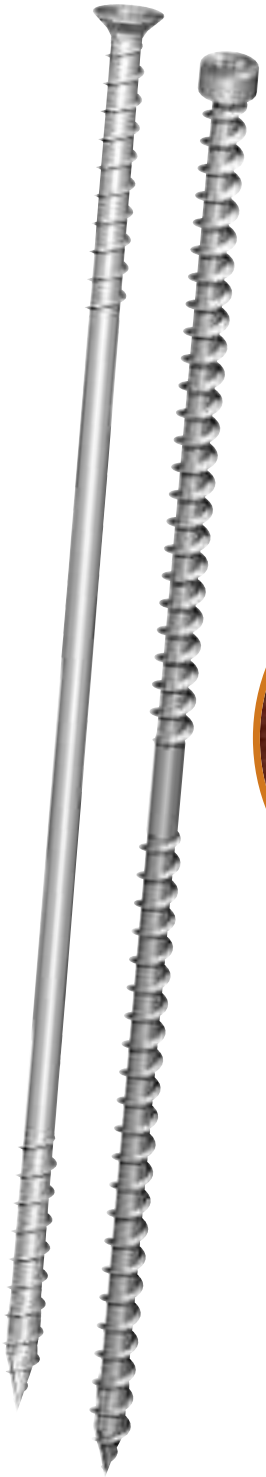
Advantages

- Suitable for any type of insulating material
- Insulation thicknesses up to 300 mm for roof insulation and thermal insulation composite systems
- Calculation software for determining screw spacing
- Easy to use – avoids mistakes
- Execution also possible without roof overhang

The HECO-TOPIX® fastening system for building insulation. Facade or roof insulation with perfect energy efficiency!

The method of fastening soft insulating materials for facade and roof insulation poses a specific problem: how are the applied compressive and shear loads transmitted and how is the material secured reliably but with the least possible effort? HECO® solves these problems professionally, efficiently and fast.

Low-strength insulating materials cannot transmit compressive loads such as the weight of the roof covering or snow loads. For this reason, HECO® has developed the new HECO-TOPIX®-Therm.



With its underhead thread, the counter-batten is fastened by means of screws secured at defined intervals. All compressive loads which were previously transmitted by the pressure-proof insulating material pressing against the counter-batten are now accepted by the fastening element with the thread in the counter-batten. This arrangement also ensures a flat roof surface, as the counter-batten does not penetrate into the soft insulating material.

The shearing forces that occur can be intercepted by means of a shear block. Use HECO-TOPIX®-CombiConnect to construct the eaves detail and all the shearing forces of the roof area will be distributed through the eaves into the shear blocks.

Advantages:
You need only one screw length in the insulated roof area, which is always perpendicular to the inclination of the roof. You no longer need screw templates, screws of different lengths and different screw angles! On the whole, screw requirements and thus working times are reduced. This saves you both time and money!

The innovative HECO® roof insulation system can also be used effectively on buildings without a roof overhang.

For this purpose, the eaves laths are simply displaced into the roof area and can therefore be ideally insulated in the resulting fields under the shear boards. This option provides a considerable advantage particularly for building passive houses or

highly insulated buildings in general. The screw intervals in the roof area as well as the screw lengths and the eaves detail are calculated with the easy-to-use HECO-Software HCS.

This software is available on the internet at www.heco-schrauben.de in the form of a download program or it can be sent to you on a CD ROM.
Our application engineering specialists would even be pleased to perform these calculations for you.
Follow the practical and simple path together with HECO®!

User-friendly and practical!

The new HECO® fastening system is suitable for facade and roof insulation applications.

HECO SCHRAUBEN

HECO®-HCS

Bemessungssoftware

Calculation software

Anybody can easily and effectively realise facade* or roof insulation with the HCS calculation software from HECO®. It provides all necessary items, screw spacings and processing details.
www.heco-schrauben.de

**** Facade tool currently being perfected***