

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-09/0230**  
**of 28 November 2014**

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

"Krivaja Houses"

Product family  
to which the construction product belongs

Timber building kits for dwelling-houses and similar  
structures

Manufacturer

Krivaja-TMK L.t.d.  
Radnicka 2  
72220 ZAVIDOVICI  
BOSNIEN-HERZEGOWINA

Manufacturing plant

Krivaja-TMK L.t.d.  
Radnicka 2  
72220 ZAVIDOVICI  
BOSNIEN-HERZEGOWINA

This European Technical Assessment  
contains

46 pages including 2 annexes which form an integral part  
of this assessment

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

Guideline for European technical approval of "Timber  
building kits", ETAG 007,  
used as European Assessment Document (EAD)  
according to Article 66 Paragraph 3 of Regulation (EU)  
No 305/2011.

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## Specific part

### 1 Technical description of the product

"Krivaja-Houses" is a timber frame building kit.

The building kit consists of pre designed and prefabricated building components such as walls, roofs and floors in varying numbers according to the scope of application (building project). Depending on the building project the kit is put together at the factory and mounted on site.

The main load-bearing structure is a timber frame.

The prefabricated building components and the relevant components are shown in Annex A. Essential construction details including their joints are described in Annex B.

The internal linings, roofing materials, stairs, service installations and other building components which are needed for a complete building are not part of this European Technical Assessment in the following called ETA. Windows and doors are not part of the kit; however, they are installed at the factory.

This also applies to additional load-bearing components (e.g. joists or steel girders for concentrated loads / point loads) which according to its structural analysis are required for each individual construction works.

The external- and internal wall elements have a width of at most 12.0 m and a height of at most 3.00 m. In case of closed elements the studs are arranged in a grid-pattern of 62.5 cm. The wooden components do have on fitting the wall elements a moisture content of  $\leq 12\%$ .

The external walls are taken to the site as prefabricated elements. The exterior plaster is mounted on the site.

Non-load-bearing internal walls can be arranged in any order.

The internal walls are taken to the site as prefabricated elements.

The ceiling elements (suspended floor) are manufactured according to the structural calculation. The ceiling elements are manufactured with a width of 1.20 up to 2.40 m maximum. The ceiling beams are arranged in a grid pattern of 62.5 cm. On delivery to the plant the wooden components have a moisture content of  $\leq 12\%$ .

The ceiling elements are taken to the site as prefabricated elements. The impact sound insulation, the fibre gypsum board and the gypsum board are part of the kit but are installed on the site. The floor covering is not part of the kit and is installed on site.

The roofing elements are manufactured according to the structural calculation. They are manufactured with a width of 1.20 up to 2.40 m maximum. The rafters are arranged in a grid pattern of max. 0.90 m. On delivery to the plant the wooden components have a moisture content of  $\leq 12\%$ .

In case the production of roof in elements (panels) is not possible, roof parts are delivered and mounted separately. The roof construction consists of either roof trusses or rafters and beams. The distance between rafters is max. 1.25 m.

Exterior wall cladding:

Exterior walls (Type 1 and Type 2) get an external insulation system according to ETA-11/0505 (cladding Type 1) where the insulation boards (EPS according EN 13163) are glued with the adhesive "StoPrefa Coll" over the entire surface (amount of wet application approx. 1.0-1.5 kg/m<sup>2</sup>) onto the fibre gypsum boards of the external walls (see Annex A).

The composition of the adhesive is deposited with DIBt. It is a paste-like synthetic resin dispersion. The insulation boards can additionally be fixed with suitable mechanical fasteners. Insulation boards shall be used with the designation T2-L2-W2-S2-P4-DS(70,-)2-DS(N)2 and a tensile strength according to EN 1607 of at least 100 kPa<sub>0F1</sub>. The surface of the wall shall be flat, dry, free of grease and dust-free and shall have a bond strength of at least 0.08 N/mm<sup>2</sup>.

The insulation boards are coated with the plaster "StoLevel Classic" (amount of wet application approx. 2.5-3.5 kg/m<sup>2</sup> and a thickness from 1.5 to 3.5 mm). The composition of the plaster is deposited with Deutsches Institut für Bautechnik.

Reinforcement "Sto-Glasfasergewebe" is worked into the outer third of the base coat. The reinforcement consists of coated glass fibre mesh, with a mass per unit area of about 155 g/m<sup>2</sup> and a mesh size of 6 mm x 6 mm. Additional information is deposited with Deutsches Institut für Bautechnik.

The external plaster "StoSilco" is used (amount of wet application 3.0 – 4.5 kg/m<sup>2</sup> and a thickness up to approx. 3.0 mm). The composition of the external plaster is deposited with Deutsches Institut für Bautechnik.

The exterior wall Type 1 may as well get an external cladding Type 2, if the construction is in accordance with the structural calculations and if the physics relating to construction fulfil the requirements at the place of use.

No reused wood shall be used for this kit.

For windows normally wooden-windows are used. In Annex A there is a description of a wooden-window given. Other windows are allowed to be used as well if they fulfil the requirements at the place of use.

For roof covering normally concrete tiles according to EN 490<sup>2</sup>/491<sup>3</sup> or clay tiles according to EN 1304<sup>4</sup> are used. Other roofing's which fulfil the requirements at the place of use may also be used.

The connections to each other of the individual building components are shown in Annex B.

The necessary characteristic values for structural design can be gathered from Annex A or the standards referred to there, the ETAs, etc.

The anchorage of the external wall building components to the substructure (basement or foundation slab made of concrete) is performed with steel angles which are connected with screws with the external walls and with steel dowels with the foundation slab. The anchorage of the external wall building components to the substructure is shown in Annex B. The verification of the suction safety of the wall building components with the substructure shall be performed according to the relevant regulations of the Member States.

### Substructure

The substructure of the building is not part of this European technical assessment.

The kit can be used for a separate construction works or be placed as a heightening on an existing construction works. The substructure has to consist of concrete with strength class C20/25 according to EN 206-1 and must have a thickness of at least 10 cm.

The height tolerances of the surface of the substructure amounts to ± 5 mm.

More information as to the dimensions, if necessary and the description of the details (e.g. protective measures against rising moisture) for the manufacture of the substructure will be delivered by the manufacturer of the kit. The substructure shall be designed and built in accordance with the local building regulations.

<sup>1</sup> Each individual value of a test result shall include the value given here.  
<sup>2</sup> EN 490:2011 Concrete roofing tiles and fittings for roof covering and wall cladding – Product specifications  
<sup>3</sup> EN 491:2011 Concrete roofing tiles and fittings for roof covering and wall cladding – Test methods  
<sup>4</sup> EN 1304:2005 Clay roofing tiles and fittings – Product definitions and specifications

#### Execution of construction works

The manufacturer presented specific instructions for the installation of the kit into the works to the assessment body. The specific instruction covers all important aspects related to the work on site.

The completed building (construction works) shall comply with the building regulations (regulations on the works) applicable in the Member States in which the building is to be constructed. The applicable procedures in the Member State for demonstrating compliance with the building regulations shall also be observed by the entity responsible for this act. An ETA for a timber frame building kit does not amend this process in any way.

The building components of the kit are compiled at the manufacturing plant in accordance with this ETA.

The ETA is issued for the kit on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the kit that has been assessed and judged. Changes to the kit (also with regard to the chemical composition, e.g. of the exterior wall cladding) or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

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

The range of application of "Krivaja-Houses" is:

- Residential building (single-storey, multi-storey)
- Commercial buildings (hotel complexes, office buildings, industrial buildings)
- Public buildings (Kindergarten, hospitals)

The intended use shall be evaluated in each individual case depending on the climatic boundary conditions.

The verifications and assessment methods on which this ETB is based lead to the assumption of a working life of "Krivaja-Houses" of at least 50 years and of at least 25 years for the exterior wall cladding, provided that the conditions laid down in this ETA are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are 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**

**3.1 Mechanical resistance and stability (BWR 1)**

Essential characteristic	Performance
Mechanical resistance and stability for each load-bearing building component (walls, floors and roof structures) and their connections	See Annex A All building components are described with regard to their components and their structure
Resistance against seismic actions	No performance determined (NPD)

By means of this exact description of the load-bearing building components both mechanical resistance and stability for each load-bearing building component and their connections between the components shall be determined. When calculating, the valid requirements prevailing in the respective member state shall be taken into account.

**3.2 Safety in case of fire (BWR 2)**

Essential characteristic	Performance
Reaction to fire	The classification for reaction to fire of the components is given in Annex A
Resistance to fire	No performance determined (NPD) Building components have to be verified and dimensioned in order to meet national regulations of standard of the Member State in which the kit will be performed.
External fire performance of roof covering	No performance determined (NPD) The roof covering is not part of the kit; the external fire performance shall be checked on a case-by-case basis, depending on the roof covering.

### 3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Vapour permeability and moisture resistance	The construction works shall be designed in such a way that the general requirements related to interstitial and surface condensation of moisture of the external envelope are met.  The assessment of relevant building parts, including wet room envelopes, shall be calculated according to EN ISO 137885 taking into account relevant design climatic conditions.
Water tightness of the external envelope	Provided the kit is properly manufactured and assembled the building envelope is resistant to penetrating water and snow. In case of ranges of application with extreme conditions of driving rain and snow the intended use shall be assessed in the individual case.
Water tightness of the internal surfaces	No performance determined (NPD)  The surface of internal building components is not part of the kit.
Content and/or release of dangerous substances	The elements of the building kits do not contain dangerous substances according to EOTA TR 034 with the exception of:  - Wood-preservatives: No performance determined (NPD)  - Man made mineral fibres and  - Formaldehyde.

#### Wood-preservatives

Specific stipulations for the components of the kit:

Timber components may be treated with wood preservatives. These wood preservative products have to be marketable according to the Directive 98/8/EC<sup>6</sup> and Regulation (EU) N°528/2012<sup>7</sup> of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocide products.

The carried out wood protection - the treatment with the wood preservative and the wood preservative itself – shall meet the local regulations at the place of use.

The use of wood preservative has to be declared in the declaration of performance. In case of preservative treatment the following information shall be added (see EN15228):

- Treated component,
- Name of the wood preservative,

<sup>5</sup> EN ISO 13788:2001 Hygrothermal performance of building components and building elements - Internal surface temperature to avoid critical surface humidity and interstitial condensation - Calculation methods (

<sup>6</sup> Official Journal of the European Union L 123, 16 February 1989, p. 1

<sup>7</sup> Official Journal of the European Union L 167, July 2012

- Declaration of active substances
- Penetration class,
- Retention value,
- Method of treatment with wood preservative,
- Target biological agents,
- Kind of wood/moisture of the wood in case of treatment.

Fire protection agents

Building components are not treated with fire protection agents. Treatments of the kit and/or components of the kit with fire protection agents after mounting the building are not subject of this European technical assessment.

As far as components of the kit in this European technical assessment are specified via a hEN the requirements stated in the respective hEN shall be met and the supplementary implemented national legal and administrative provisions shall be observed.

Man made mineral fibres

The mineral fibre used for thermal and impact sound insulation are according to the Directive 97/69/EC<sup>8</sup>.

Formaldehyde

The wood based components satisfy class E1 according to EN 13986<sup>9</sup>.and EN 14080<sup>10</sup>.

Note: In addition to the specific clauses relating to dangerous substances contained in this ETB, there may be other requirements applicable to the products falling within its scope (e.g. transposed national laws and administrative provisions). In order to meet the provisions of the Regulation (EU) No 305/2011 of the European Parliament and of the Council, these requirements need also to be complied with, when and where they apply.

**3.4 Safety and accessibility (BWR 4)**

Essential characteristic	Performance
Impact resistance	Due to technical experience the impact resistance is sufficient. The complete wall construction with a gypsum board having a thickness of 12.5 mm is sufficiently shock-proof.
Slipperiness of floor	No performance determined (NPD)

<sup>8</sup> Note: take into account "GefStoffV", Annex IV, N 22 and "ChemVerbotsV section 23, annex to § 1- in Germany  
<sup>9</sup> EN 13986:2004 Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking  
<sup>10</sup> EN 14080:2013 Timber structures – Glued laminated timber and glued solid timber – Requirements



### 3.5 Protection against noise (BWR 5)

Essential characteristic	Performance
	No performance determined (NPD) The building components have to be verified and dimensioned in order to meet the national regulations of standard of the Member State in which the kit will be performed.

### 3.6 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal transmittance coefficient	No performance determined (NPD) The building components have to be verified and dimensioned in order to meet the national regulations of standard of the Member State in which the kit will be performed.
Air permeability	When the kit has been properly manufactured and assembled the building envelope is sufficiently airtight. The measuring shall be performed according to ISO 9972:2013 or EN 13829:2000, if necessary.
Thermal inertia	No performance determined (NPD) The building components have to be verified and dimensioned in order to meet the national regulations of standard of the Member State in which the kit will be performed.

### 3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was investigated for this product.

### 3.8 General aspects

#### Durability

Variant without wood preservative:

Wooden components are untreated. The moisture content of the wooden products of the wall, ceiling and roof elements shall be  $\leq 12\%$  on manufacturing/assembly.

Variant with wood preservative:

Wooden components can be treated with the preservative against biological attack (wood preservative).

The carried out wood preservation – the treatment with the wood preservative and the wood preservative itself – shall meet the local regulations at the place of use.

The durability of the exterior wall cladding Type 1 has been assessed by DIBt in the framework of a national approval for Germany.

- 11 EN ISO 9972:2013 Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method
- 12 EN 13829:2000 Thermal performance of buildings – Determination of air permeability of buildings – Fan pressurization method (ISO 9972:1996 modified)

Protection against moisture as well as wood preservation for the external wall cladding Type 2 have to be verified and dimensioned in order to meet the national regulations of standard of the Member State in which the kit will be performed.

The durability against corrosion of metallic fasteners, used for these kits, has to meet the requirements of DIN EN 1995-1-1<sup>13</sup> under consideration of the corrosivity category according to EN ISO 12944-2<sup>14</sup>. Local provisions of the member state, in which the kit shall be completed, have to be taken into account.

When the kit is properly executed and set up followed by proper maintenance the durability for the intended working life of the kit is guaranteed.

Serviceability

For the serviceability of the kit it shall be ensured that suspended floors have sufficient stiffness to avoid unacceptable vibration through normal use. The verification of this requirement is part of the calculation of mechanical resistance and structural stability.

Local building regulations

As basis for the manufacture and dimensioning of the kit a specification of the relevant requirements for the structural design, reaction to fire and the resistance to fire, protection against noise, the thermal insulation and the heat retention shall be drafted.

The verifications shall correspond to the intended methods and requirements including the verification of the stability of the building prevailing in the Member States where the building is to be erected.

Manufacture and planning and design

The manufacture of a kit shall be conducted on the basis of a specific structural design for the construction works. The structural design shall comply with the building regulations (regulations concerning construction works) applicable in the Member States in which the building is to be constructed.

The factory production of the building components and the temporary storage of the components are done in dry and heated premises.

Packaging, transport and storage

The instructions of the manufacturer related to packaging, transport and storage shall be observed.

During transport and storage the building elements, the components and materials shall be protected from mechanical damage and detrimental moisture, e.g. from precipitations or moisture.

Use, maintenance, repair

It is the manufacturer's responsibility to ensure that exact instructions are enclosed to each delivery regarding the use of the kit which includes both the general conditions of this European technical assessment as well as the specific installation instructions.

Damaged building elements or components of the kit may neither be used nor installed. Damaged building elements or components of the kit shall be exchanged or mended at the building site.

13	EN 1995-1-1:2004 + AC2005 + A1:2008	Eurocode 5: Design of timber structures – Part 1-1: General - Common rules and rules for buildings
14	EN ISO 12944-2:1998	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments

With regard to the assumed working life regular maintenance is necessary. The manufacturer shall add written documents to the kit which contain descriptions about type and frequency of the maintenance.

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

According to Decision 99/455/EC of the Commission of 22 June 1999 (Official Journal L 178 of 14.07.1999, p. 56-57, the system 1 of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use(s)	Level or class	System
Timber frame and log prefabricated building kits	In building works ...	any	1

**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 Deutsches Institut für Bautechnik.

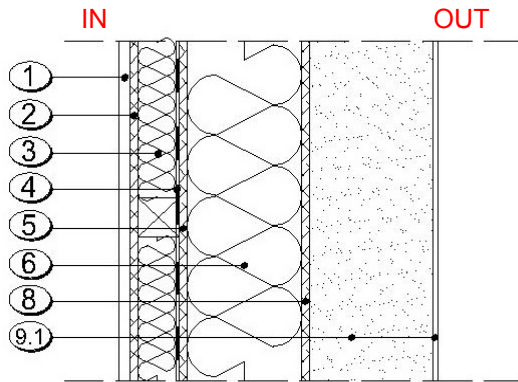
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Uwe Bender  
Head of Department

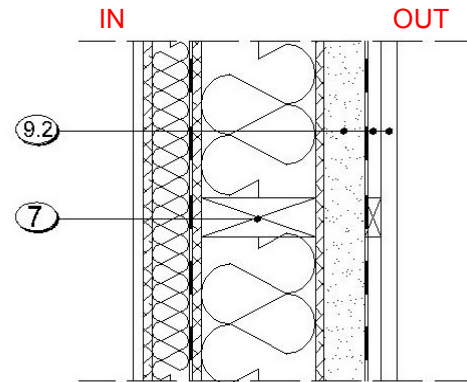
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## ANNEX A – DESCRIPTION OF THE BUILDING COMPONENTS

External wall Type 1  
(Horizontal section)



Wall cladding Type 1



Wall cladding Type 2

### Components

Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
1	Gypsum board** (Paper weight >220g/m <sup>2</sup> ≤320 g/m <sup>2</sup> )*	12.5	EN 520	B-s1, d0 (2006/673/EC)
2.1	OSB/3-board Density ≥ 600 kg/m <sup>3</sup>	10.0 12.0 15.0	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
2.2	Fiber gypsum board	12.5	ETA 03/0050	A2-s1,d0
3a	Mineral wool 040 MW-EN 13162-T3-DS (70,-)-MU1-AFr5 Density ≥ 10kg/m <sup>3</sup>	50	EN 13162	A1
3a1	Wood wool - WF-EN 13171-T2-TR1.0- MU3-AFr5	50	EN 13171	E
3a2	Rock wool MW-EN 13161-T2-WS- WL(P)-MU1	50	EN 13162	A1
3b	Lathing Density ≥ 350 kg/m <sup>3</sup>	45/50	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
4	PE-Foil s <sub>d</sub> > 100m	0.11	EN 13984	E
5.1	OSB/3-board Density ≥600 kg/m <sup>3</sup>	10.0 12.0 15.0	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
5.2	Fiber gypsum board	12.5	ETA 03/0050	A2-s1,d0
6a	Mineral wool 040 MW-EN 13162-T3-DS (70,-)-MU1-AFr5 Density ≥ 10kg/m <sup>3</sup>	100 120 140 160	EN 13162	A1
6b	Wood wool - WF-EN 13171-T2-TR1.0- MU3-AFr5	100 120 140 160	EN 13171	E

Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
6c	Rock wool MW-EN 13161-T2-WS- WL(P)-MU1	100 120 140 160	EN 13162	A1
7	Stud C24 Density $\geq 350 \text{ kg/m}^3$	45/100 45/120 45/140 45/160	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
	Top chord GL24c Density $\geq 350 \text{ kg/m}^3$	90/100 90/120 90/140 90/160	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
	Bottom chord Density $\geq 350 \text{ kg/m}^3$	60/100 60/120 60/140 60/160	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
8.1	OSB/3-Board Density $\geq 600 \text{ kg/m}^3$	10.0 12.0 15.0	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
8.2	Fiber gypsum board	12.5	ETA 03/0050	A2-s1,d0
Exterior wall cladding Type 1				
Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
9.1a	Glue: Sto Prefa Coll	Full-surface application	ETA-11/0505	The whole system C-s2,d0
9.1b	Insulation board: EPS EN 13163-T2-L2- W2-S2-P4-DS(70,-)2- DS(N)2 Additional properties see chapter 1	100 150	ETA-11/0505	
9.1c	Plaster "StoLevel Classic" with reinforcement "Sto- Glasfasergewebe"	1.5.-3.5	ETA-11/0505	
9.1d	External plaster "StoSilco"	$\leq 3.0$	ETA-11/0505	
Exterior wall cladding Type 2				
9.2a	Lathing Density $\geq 350 \text{ kg/m}^3$	45/50	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
9.2b	Insulation board: EPS EN 13163-T2-L2- W2-S2-P4-DS(70,-)2- DS(N)2	50	EN 13163	E
9.2c	PP(steam permeable) foil $s_d \leq 0.3 \text{ m}$	-	EN 13859-1 EN 13859-2	E
9.2d	Lathing Density $\geq 350 \text{ kg/m}^3$	45/20	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
9.2e	Wooden cladding	20	EN 338 EN 14081	D-s2,d0 (2003/593/EC)

\* Joints between gypsum boards: dimension of the gap  $\leq 4 \text{ mm}$

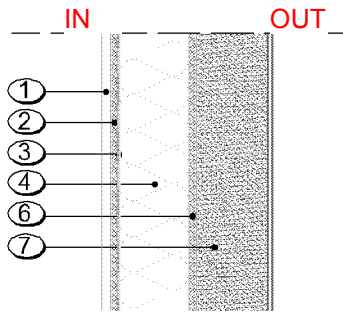
\*\* The gypsum board complies additionally with requirements according to DIN 18180

Fasteners

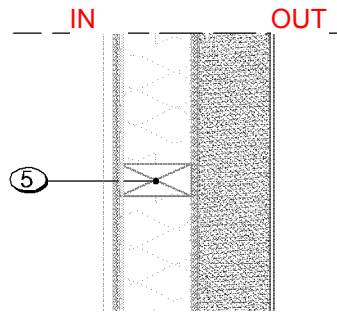
Components	Type	Spacing[mm]		Description
		Edge	Middle	
Gypsum board	Staple Type 1	≤ 100	≤ 200	Last page of Annex A
OSB-board	Staple Type 1	≤ 100	≤ 200	
Fibre gypsum board	Staple Type 1	≤ 100	≤ 200	

Components	Type	Spacing[mm]		Description
		Edge	Middle	
Gypsum board	Nails 2.5x3.5	50-150	150	Last page of Annex A
OSB-board	Nails 2.1x3.5	120	120	
Fibre gypsum board	Nails 2.5x3.5	50-150	150	

External wall Type 2  
(Horizontal section)



Wall cladding Type 1



Wall cladding Type 1

Components

Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
1	Gypsum board** (Paper weight >220g/m <sup>2</sup> ≤320 g/m <sup>2</sup> )*	12.5	EN 520	B-s1,d0 (2006/673/EC)
2.1	OSB/3-board Density ≥ 600 kg/m <sup>3</sup>	10.0 12.0 15.0	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
2.2	Fibre gypsum board	12.5	ETA 03/0050	A2-s1,d0
3	PE-Foil s <sub>d</sub> > 100 m	0.11	EN 13984	E
4a	Mineral wool 040 MW-EN 13162-T3-DS (70,-)-MU1-AFr5 (Density ≥ 10kg/m <sup>3</sup> )	100 120 140 160	EN 13162	A1
4b	Wood wool - WF-EN 13171-T2-TR1.0- MU3-AFr5	100 120 140 160	EN 13171	E
4c	Rock wool MW-EN 13161-T2-WS- WL(P)-MU1	100 120 140 160	EN 13162	A1
5	Stud C24 Density ≥350 kg/m <sup>3</sup>	45/100 45/120 45/140 45/160	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
	Top chord Density ≥350 kg/m <sup>3</sup>	90 (2x45)/100 90 (2x45)/120 90 (2x45)/140 90 (2x45)/160	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
	Bottom chord Density ≥350 kg/m <sup>3</sup>	60 (45)/100 60 (45)/120 60 (45)/140 60 (45)/160	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
6.1	OSB/3-board Density ≥ 600 kg/m <sup>3</sup>	10.0 12.0 15.0	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
6.2	Fibre gypsum board	12.5	ETA 03/0050	A2-s1,d0

Exterior wall cladding Type 1				
7a	Glue: StoPrefa Coll	Full-surface application	ETA-11/0505	The whole system C-s2,d0
7b	Insulation board: EPS EN 13163-T2-L2- W2-S2-P4-DS(70,-)2- DS(N)2 Additional properties see chapter 1	100 150	ETA-11/0505	
7c	Plaster „ StoLevel Classic" with reinforcement "Sto- Glasfasergewebe"	1.5-3.5	ETA-11/0505	
7d	External plaster "StoSilco"	≤3	ETA-11/0505	

\* Joints between gypsum boards: dimension of the gap ≤ 4 mm

\*\* The gypsum board complies additionally with requirements according to DIN 18180

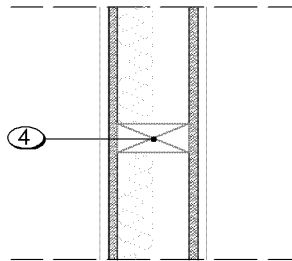
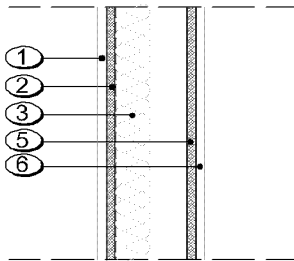
#### Fasteners

Components	Type	Spacing[mm]		Description
		Edge	Middle	
Gypsum board	Staples Type 1	≤ 100	≤ 200	Last page of Annex A
OSB-board	Staples Type 1	≤ 100	≤ 200	
Fibre gypsum board	Staples Type 1	≤ 100	≤ 200	

Components	Type	Spacing[mm]		Description
		Edge	Middle	
Gypsum board	Nails 2.5x3.5	50-150	150	Last page of Annex A
OSB-board	Nails 2.1x3.5	120	120	
Fibre gypsum board	Nails 2.5x3.5	50-150	150	



Internal wall  
(horizontal section)



Components

Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
1	Gypsum board** (Paper weight >220g/m <sup>2</sup> ≤320 g/m <sup>2</sup> )*	12.5	EN 520	B-s1,d0 (2006/673/EC)
2.1	OSB/3-board Density ≥ 600 kg/m <sup>3</sup>	10.0 12.0 15.0	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
2.2	Fibre gypsum board	12.5	ETA 03/0050	A2-s1,d0
3	Mineral wool 040 MW-EN 13162-T3-DS (70,-)-MU1-AFr5 Density ≥ 10kg/m <sup>3</sup>	50 100 120 140	EN 13162	A1
3.1	Wood wool - WF-EN 13171-T2-TR1.0- MU3-AFr5	50 100	EN 13171	E
3.2	Rock wool MW-EN 13161-T2-WS- WL(P)-MU1	50 100	EN 13162	A1
4	Stud C24 Density ≥350 kg/m <sup>3</sup>	45/100 45/120 45/140	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
	Top chord GL24c Density ≥350 kg/m <sup>3</sup>	60/100 60/120 60/140	EN 14081	D-s2,d0 (2003/593/EC)
	Bottom chord Density ≥350 kg/m <sup>3</sup>	60/100 60/120 60/140	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
5.1	OSB/3-board Density ≥ 600 kg/m <sup>3</sup>	10.0 12.0 15.0	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
5.2	Fibre cellulose board	12.5	ETA 03/0050	A2-s1,d0
6	Gypsum board** (Paper weight >220g/m <sup>2</sup> ≤320 g/m <sup>2</sup> )*	12.5	EN 520	B-s1,d0 (2006/673/EC)

\* Joints between gypsum boards: dimension of the gap ≤ 4 mm

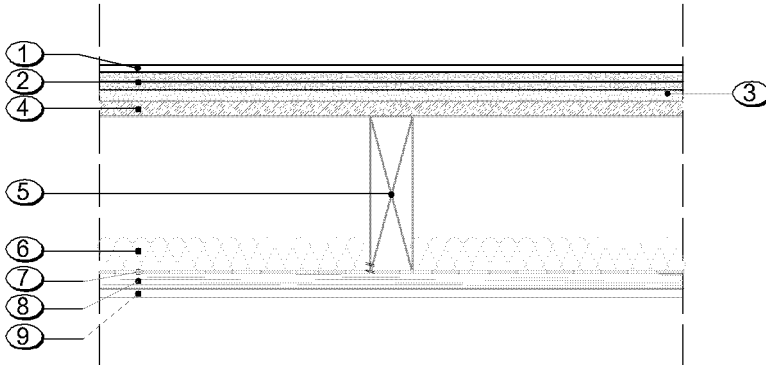
\*\* The gypsum board complies additionally with requirements according to DIN 18180

Fasteners

Components	Type	Spacing [mm]		Description
		Edge	Middle	
Gypsum board	Staples Type 1	≤ 100	≤ 200	Last page of Annex A
OSB-board	Staples Type 1	≤ 100	≤ 200	
Fibre gypsum board	Staples Type 1	≤ 100	≤ 200	

Components	Type	Spacing[mm]		Description
		Edge	Middle	
Gypsum board	Nails 2.5x3.5	50-150	150	Last page of Annex A
OSB-board	Nails 2.1x3.5	120	120	
Fibre gypsum board	Nails 2.5x3.5	50-150	150	

Ceiling  
(Horizontal section)



Components

Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
1	Floor covering	-		
2	Dry screed 2E22	2x12.5	ETA 03/0006	A2-s1,d0
3	Earthwool Acoustic Floor	35 70	EN 13162 EN ISO 50001	A1 EN ISO 13501-1
4	OSB/3-board Density $\geq 600 \text{ kg/m}^3$	22	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
5	Beam C24 Density $\geq 350 \text{ kg/m}^3$	60/220	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
6	Mineral wool 040 MW-EN 13162-T3-DS (70,-)-MU1-AFr5 Density $\geq 10 \text{ kg/m}^3$	50	EN 13162	A1
7	PE-Foil sd > 100 m	0.11	EN 13984	E
8.1	OSB/3-board Density $\geq 600 \text{ kg/m}^3$	22	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
8.2	Lathing Density $\geq 350 \text{ kg/m}^3$	22	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
9	Gypsum board** (Paper weight $> 220 \text{ g/m}^2$ $\leq 320 \text{ g/m}^2$ )*	12.5	EN 520	B-s1,d0 (2006/673/EC)

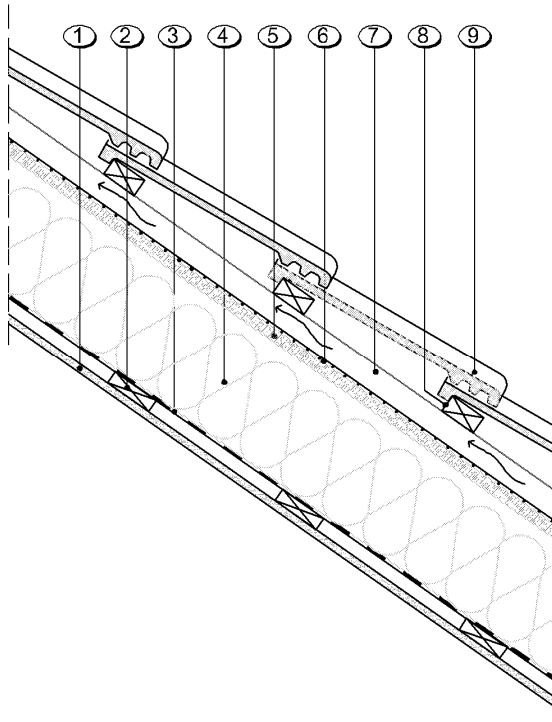
\* Joints between gypsum boards: dimension of the gap  $\leq 4 \text{ mm}$

\*\* The gypsum board complies additionally with requirements according to DIN 18180

Fasteners

Component	Type	Spacing[mm]		Description
		Edge	Middle	
Gypsum board	Screw TN 25	$\leq 170$	$\leq 170$	Last page of Annex A
OSB-board	Screw Zd 4/60	$\leq 200$	$\leq 200$	

Roof  
(Horizontal section)



Components

Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
1	Gypsum board** (Paper weight >220g/m <sup>2</sup> ≤320 g/m <sup>2</sup> )*	12.5	EN 520	B-s1,d0 (2006/673/EC)
2	Lathing (Density ≥350 kg/m <sup>3</sup> )	22	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
3	PE-Foil s <sub>d</sub> > 100 m	0.11	EN 13984	E
4	Rafter C24 (Density ≥350 kg/m <sup>3</sup> )	80/180-80/300	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
4a	Mineral wool 040 MW-EN 13162-T3-DS (70,-)-MU1-AFr5 (Density ≥ 10kg/m <sup>3</sup> )	180 - 300	EN 13162	A1
4a1	Wood wool - WF-EN 13171-T2-TR1.0- MU3-AFr5	180 - 300	EN 13171	E
4a2	Rock wool MW-EN 13161-T2-WS- WL(P)-MU1	180 - 300	EN 13162	A1
5.1	OSB/3-board Density ≥ 600 kg/m <sup>3</sup>	18	EN 300 EN 13986	D-s2,d0 (2007/348/EC)
5.2	Roof deck	22	EN 300 EN 13986	D-s2,d0 (2003/593/EC)
6	Roofing felt, PE foil s <sub>d</sub> ≤ 0.3 m (diffusible)	0.20	EN 13859-1-2	E
7	Counter lathing Density ≥350 kg/m <sup>3</sup>	48/48	EN 338 EN 14081	D-s2,d0 (2003/593/EC)

Nr.	Product	Dimensions [mm]	EN-Standard ETA	Reaction to fire
8	Roof lathing Density $\geq 350 \text{ kg/m}^3$	48/48	EN 338 EN 14081	D-s2,d0 (2003/593/EC)
9	Roof covering	-		

\* Joints between gypsum boards: dimension of the gap  $\leq 4 \text{ mm}$

\*\* The gypsum board complies additionally with requirements according to DIN 18180

#### Fasteners

Components	Type	Spacing [mm]		Description
		Edge	Middle	
Gypsum board	Screws 3.5x25	$\leq 170$	$\leq 170$	Last page of Annex A
OSB-board	Screws 4x60	$\leq 200$	$\leq 200$	
Counter lathing	3.8x100			
Roof lathing	3.8x100			

Example of the windows

Example of the characteristics of wooden window

Permeability according to EN 12207: class B  
Rain resistance according to EN 12208: class B  
Wind resistance according to EN 12210: class B

Thermal transmittance coefficient of the frame according to EN 12412-2:  $U_f = 1.57 \text{ (W/(m}^2\text{K))}$   
Thermal transmittance coefficient of the glass according to EN 673:  $U_g = 1.10 \text{ (W/(m}^2\text{K))}$   
Thermal transmittance coefficient of the window according to EN ISO 10077-1:  $U_w = 1.25 \text{ (W/(m}^2\text{K))}$   
Degree of energy transmittance according to EN 410:  $g = 50 - 63 \%$

## Fasteners

### Staples

For staples the characteristic value of the withdrawal strength related to a staple shank is  $f_{ax,k} = 40 \cdot 10^{-6} \cdot \rho_k^2$  [N/mm<sup>2</sup>] ( $\rho_k$  = characteristic value of raw density in kg/m<sup>3</sup>).

The following staples in accordance with EN 14592 are made of galvanized (zinc coat  $\geq 86$  g/m<sup>2</sup>) round steel wire with tensile strength of  $\geq 1000$  N/mm<sup>2</sup> and have the following dimensions:

Type	Shaft length	Minimum length of resin	Back width	Wire diameter
	$l_n$	$l_H$	$b_R$	$d_n$
	[mm]	[mm]	[mm]	[mm]
Type 1	50	> 28	10.6	1.51

### Screws

Screws are made of phosphate round steel wire (type of thread: double thread) and have the following dimensions:

Diameter  $d_n$  x length  $l_n$

3.5x25mm

4.0x60mm

3.8/100mm

The characteristic value of withdrawal strength is  $f_{ax,k} = 70 \cdot 10^{-6} \cdot \rho_k^2$  [N/mm<sup>2</sup>] ( $\rho_k$  = characteristic value of raw density in kg/m<sup>3</sup>).

### Nails

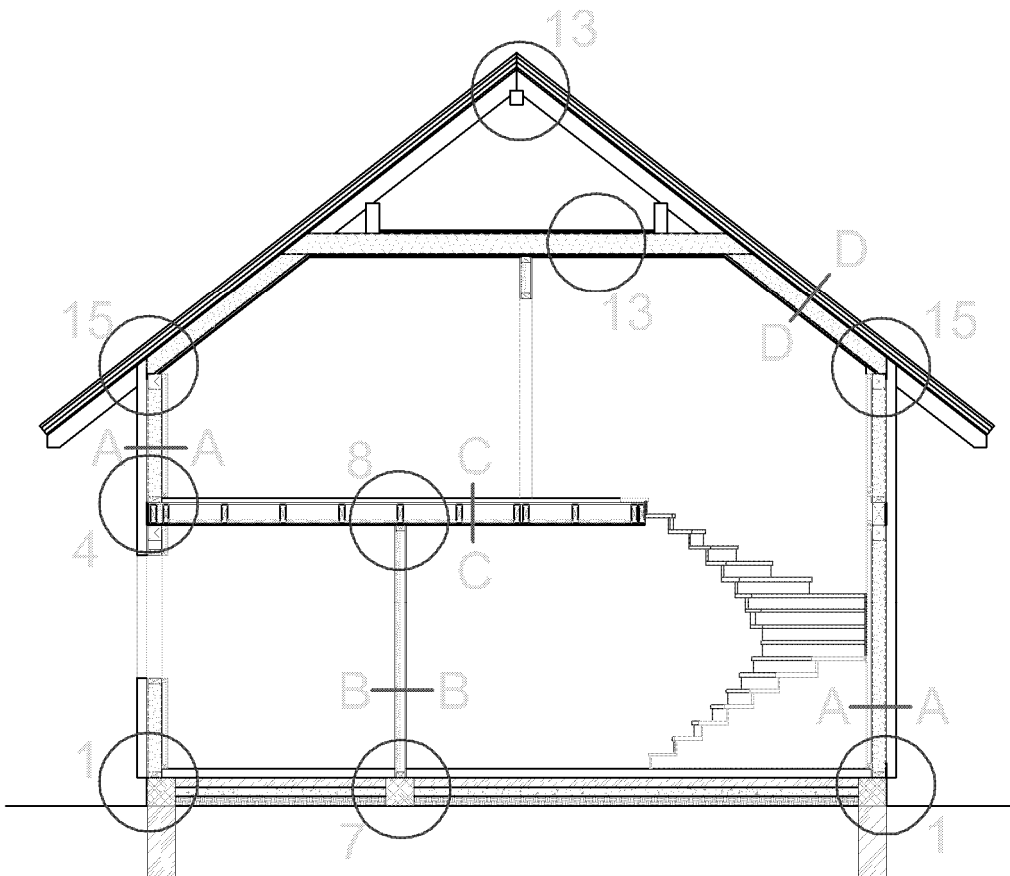
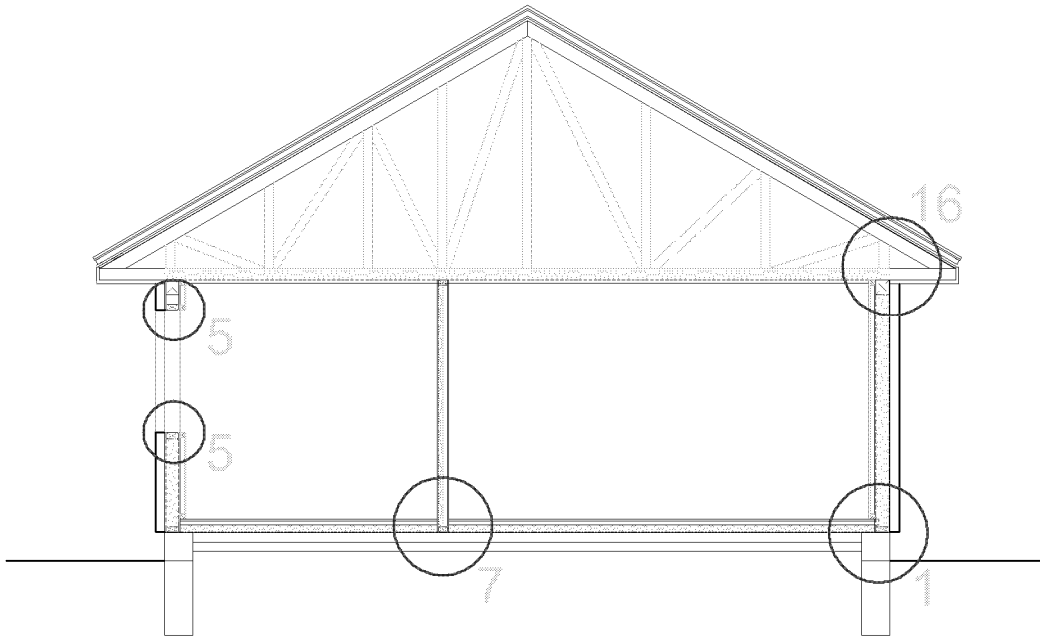
Nails shall be in accordance with EN 14592.

Round cross-sectional threaded shank nails for structural timber products. They are made of non-alloy steel rods according to EN ISO 16120.

Tip	length	diameter	head area $2.5 \cdot d_n^2$
	[mm]	[mm]	[mm <sup>2</sup> ]
2.1x35	35	2.1	11.03
2.5x35	35	2.5	15.63

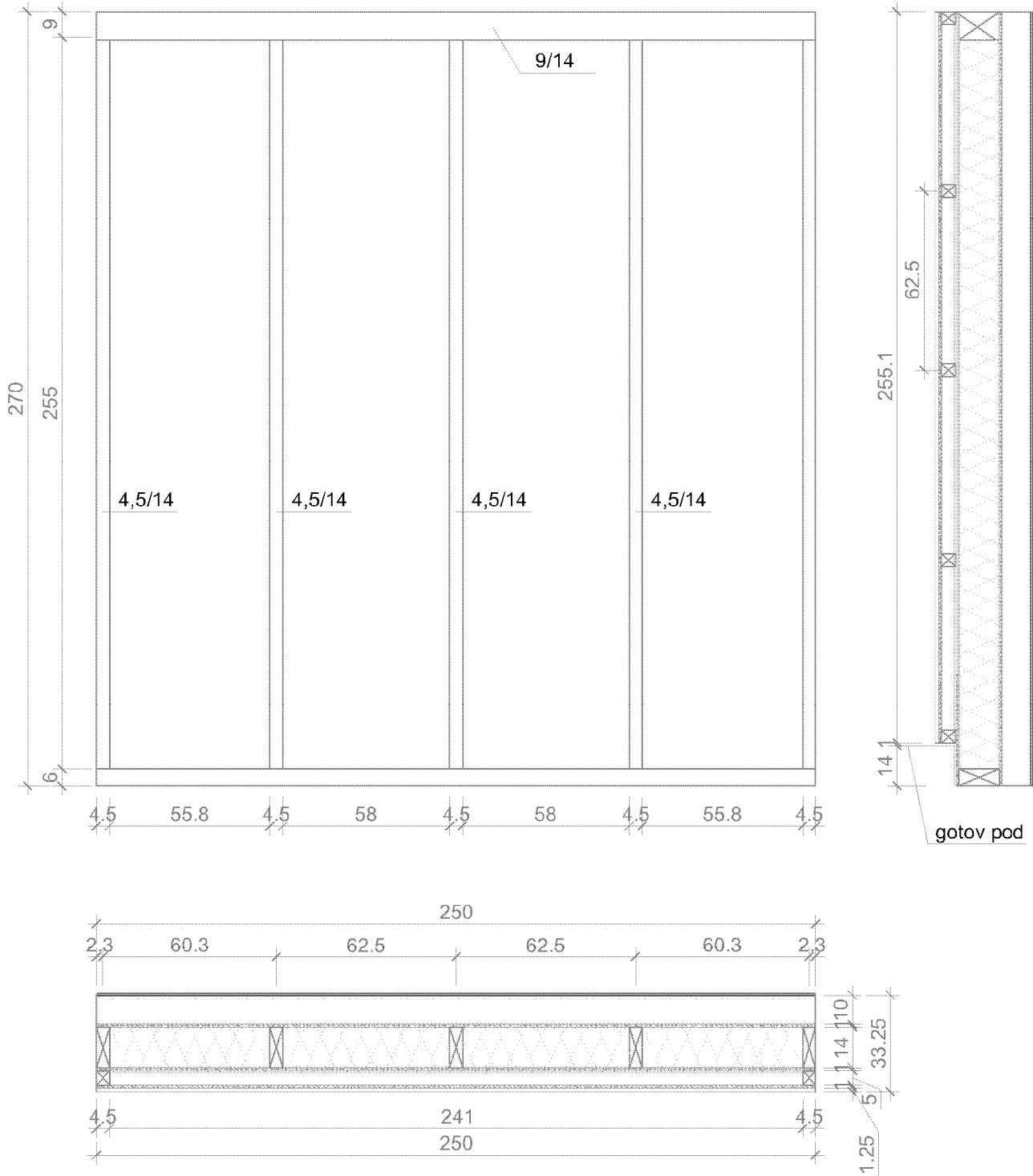
## ANNEX B – CONSTRUCTION DETAILS

Gebäudequerschnitt  
Cross section - building

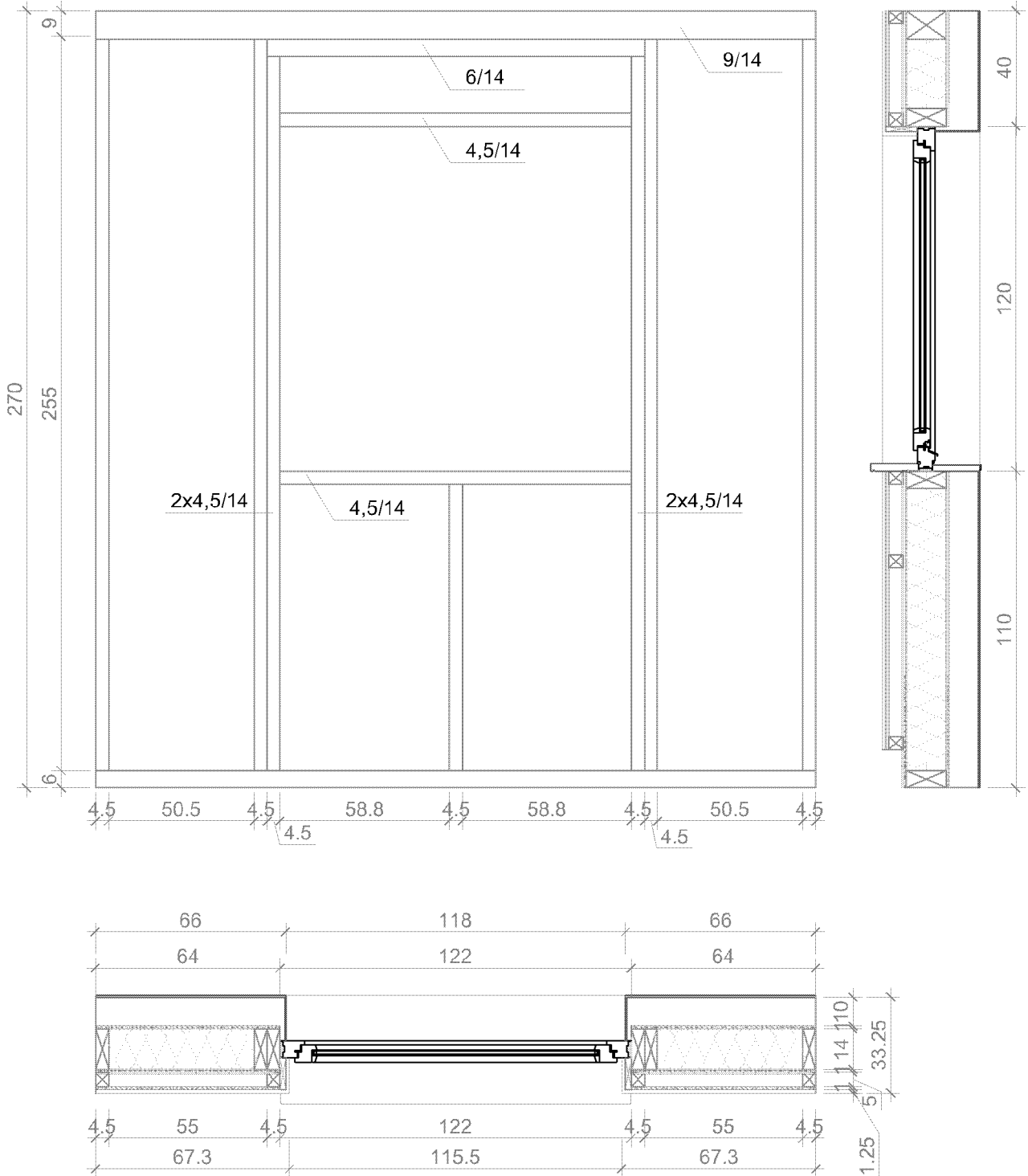




Außenwand-Element (Vertikalschnitt)  
External wall element (vertical section)

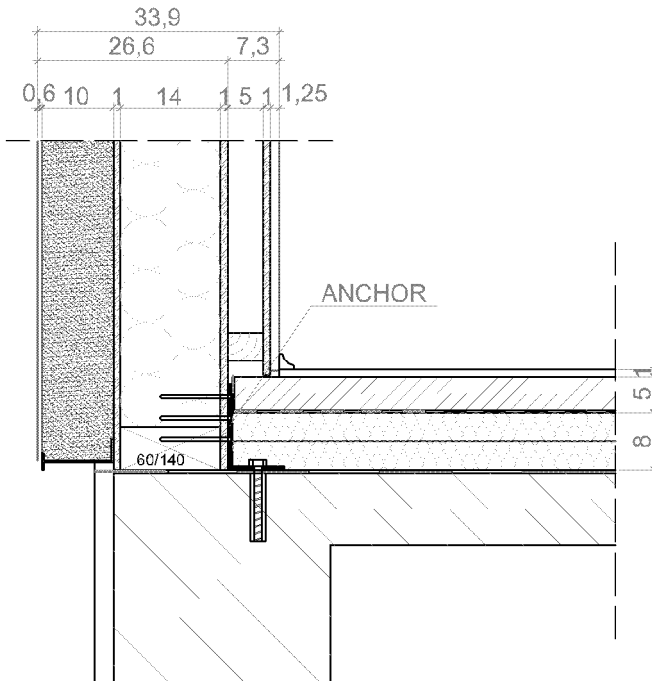


Außenwand-Element – Fenster (Vertikalschnitt)  
 External wall element – window (vertical section)



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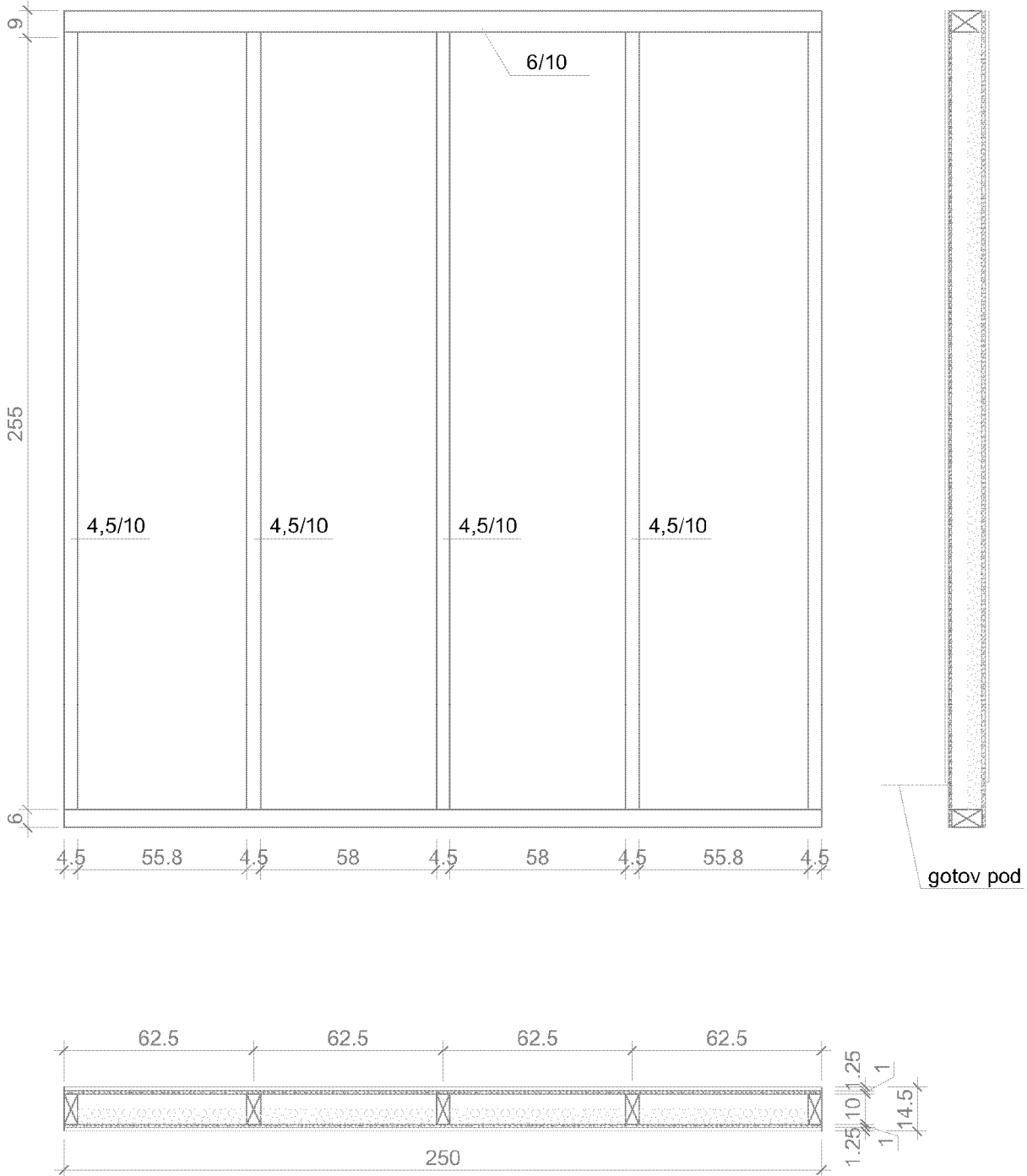
Sockelausbildung - Außenwand mit Wandverankerung  
Pedestal detail - external wall with anchorage of the wall



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

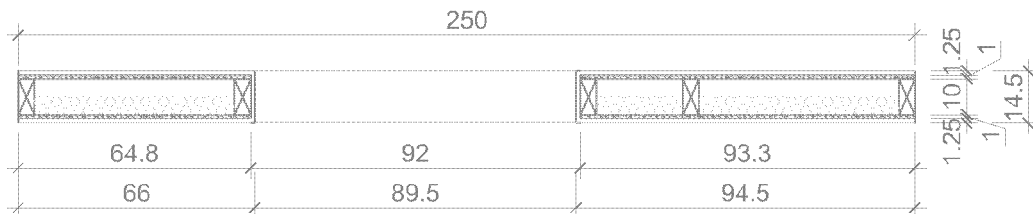
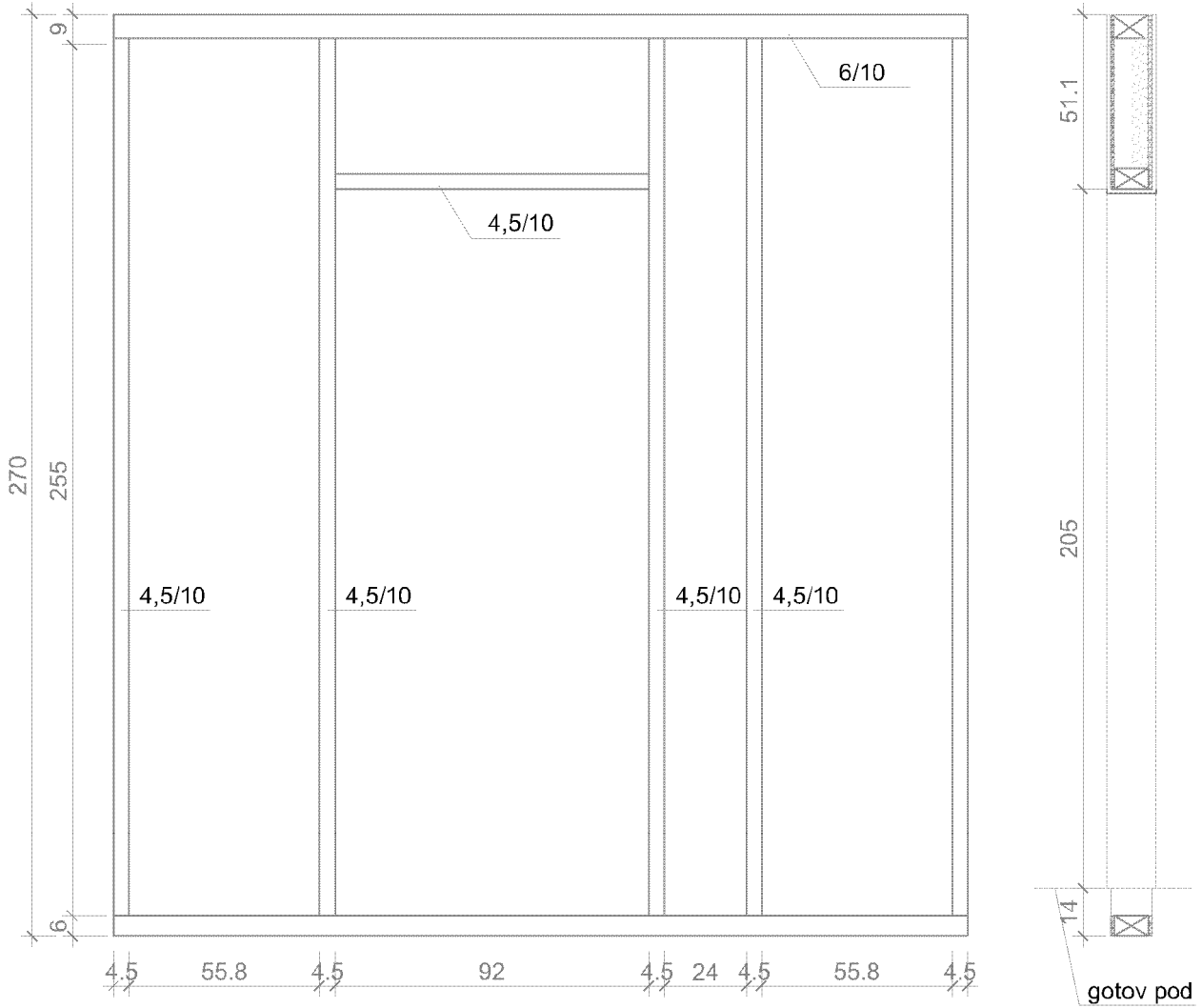
The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

Innenwand-Element (Vertikalschnitt)  
Internal wall element (vertical section)

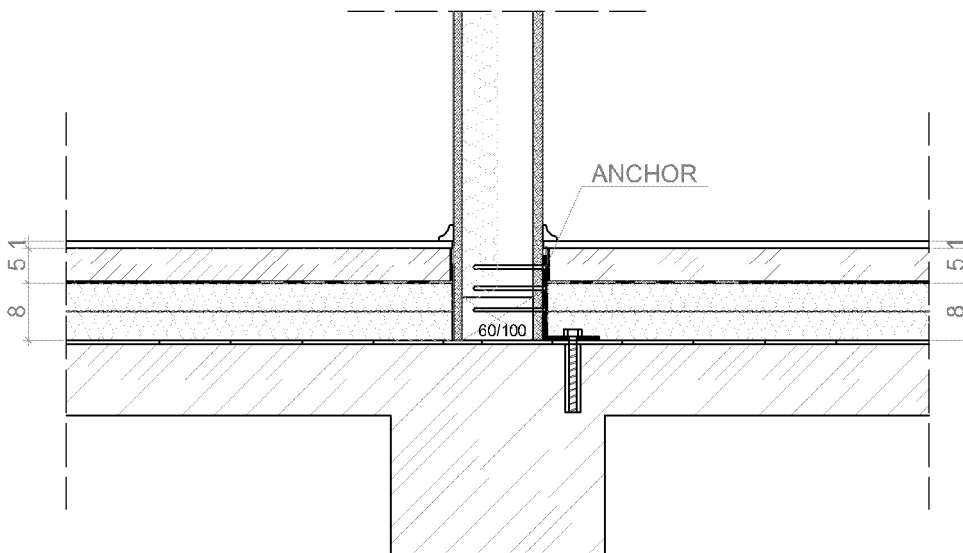
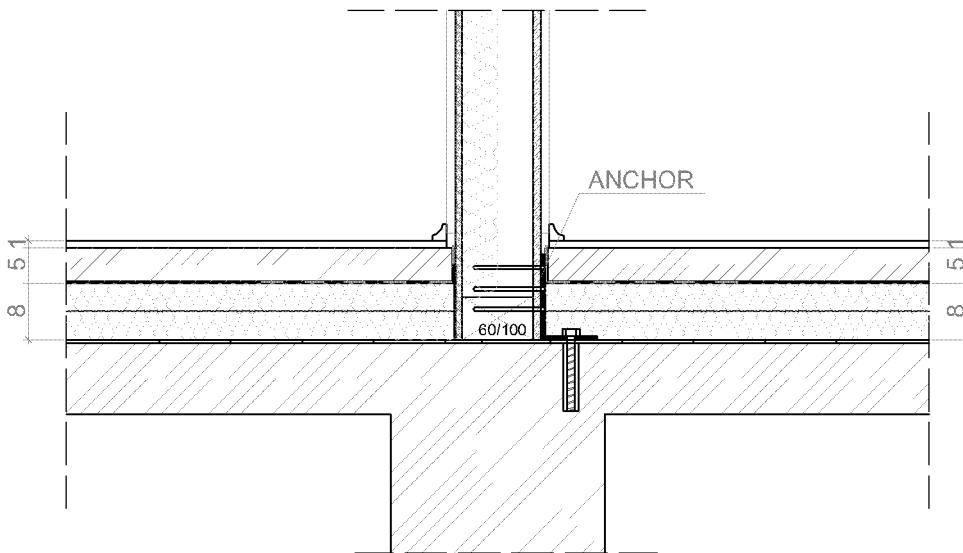


English translation prepared by DIBt

Innenwand-Element – Öffnung (Vertikalschnitt)  
 Internal wall element – opening (vertical section)



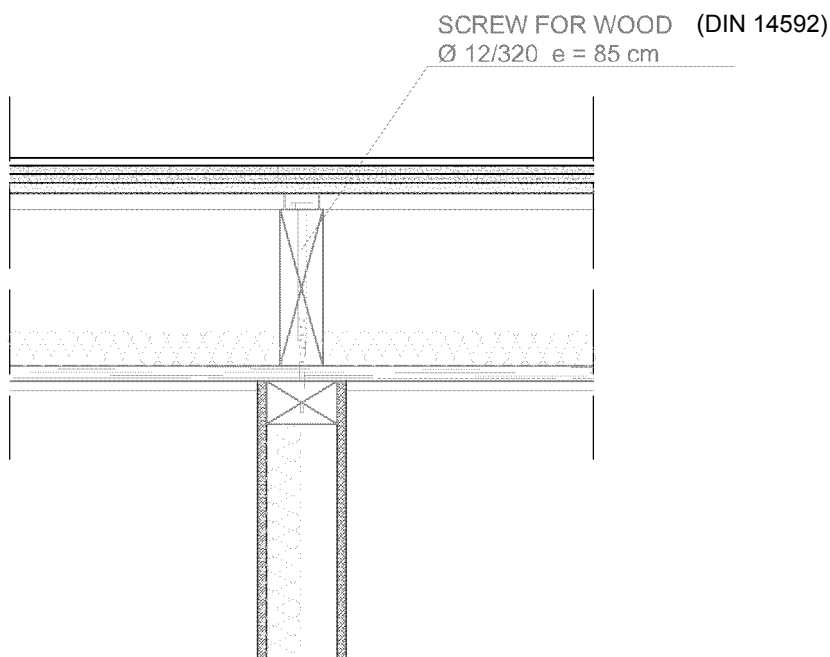
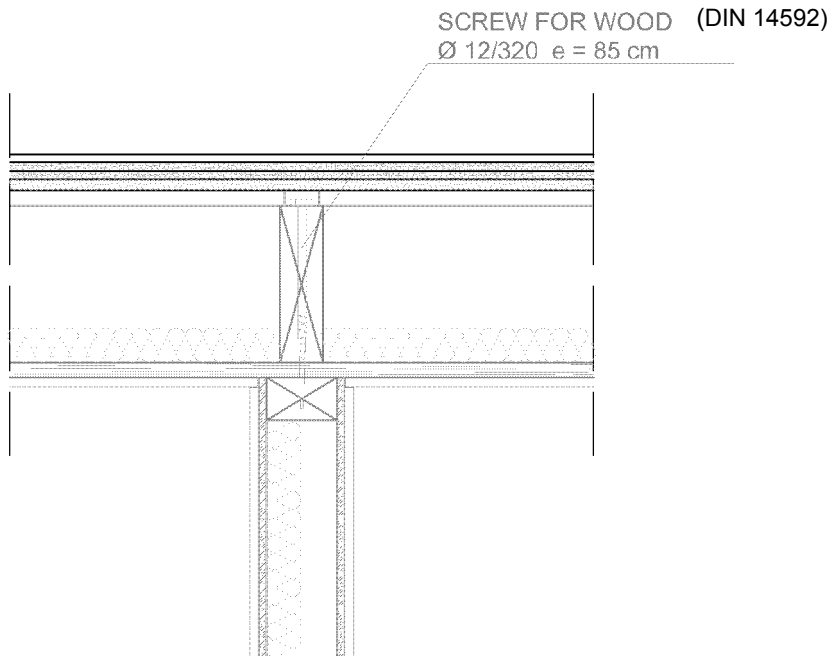
Innenwand mit Verankerung  
Internal wall with anchorage



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

Innenwand – Anschluss Decke  
Internal wall – connection to ceiling



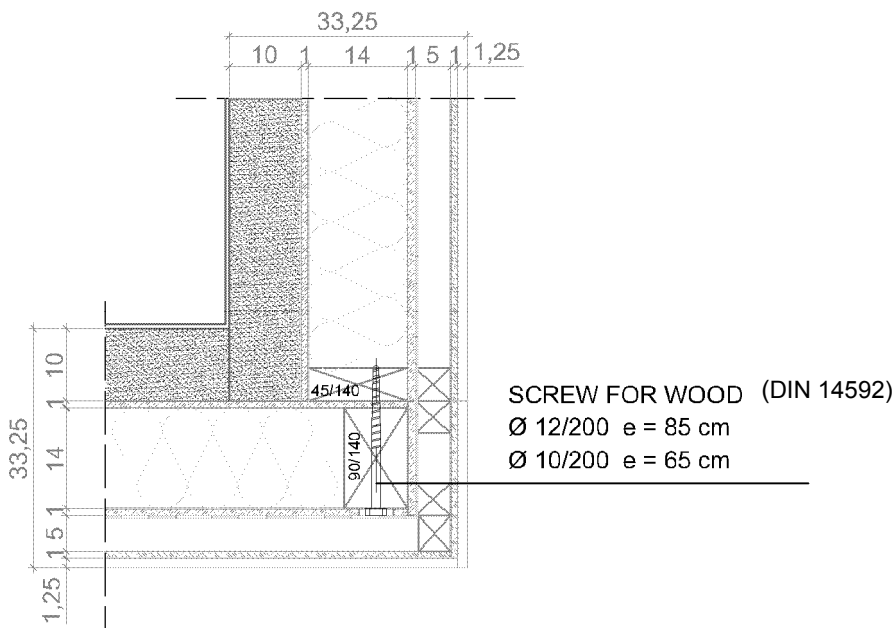
Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

Ecke Außenwand – Außenwand (außen)  
Corner external wall - external wall (external)



Ecke Außenwand – Außenwand (innen) - Horizontalschnitt  
Corner external wall - external wall (internal) – horizontal section

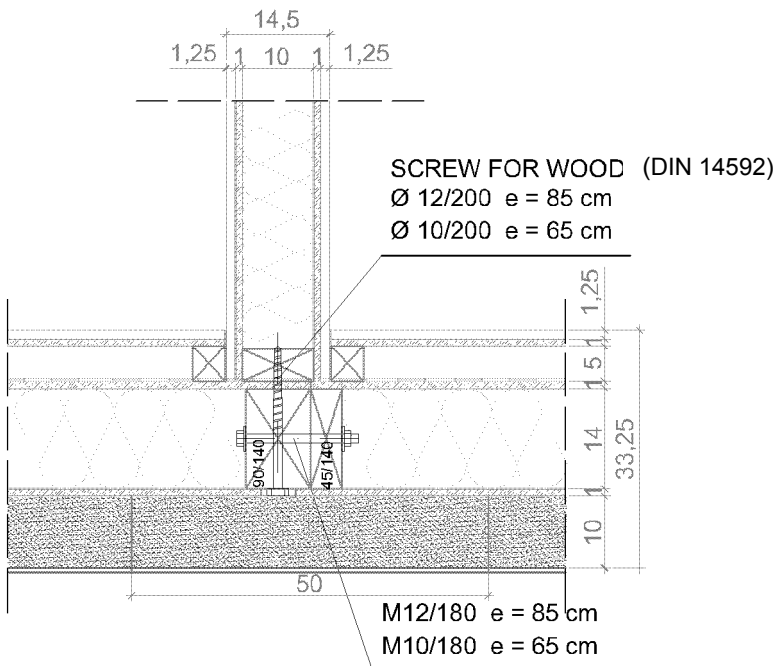
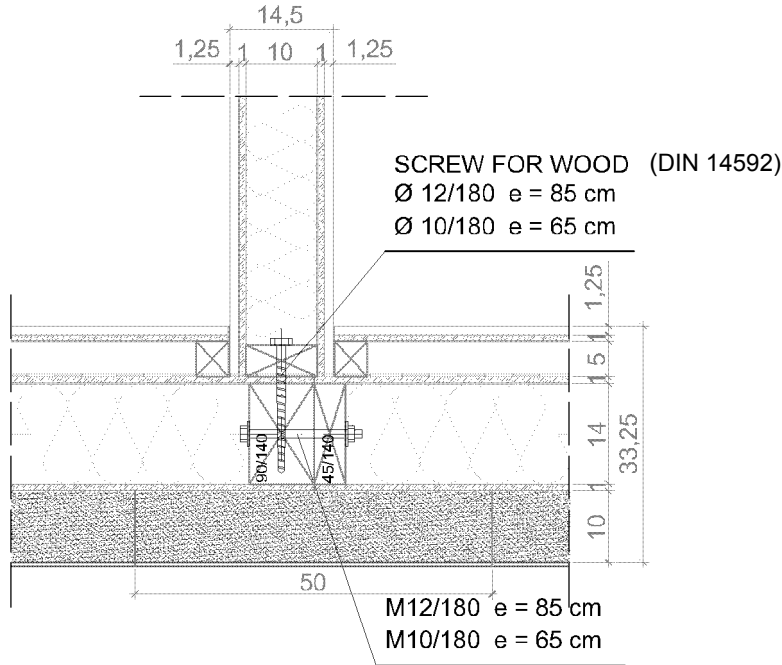


Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.



Anschluss Außenwand – Innenwand (Horizontalschnitt)  
Connection external wall – internal wall (horizontal section)

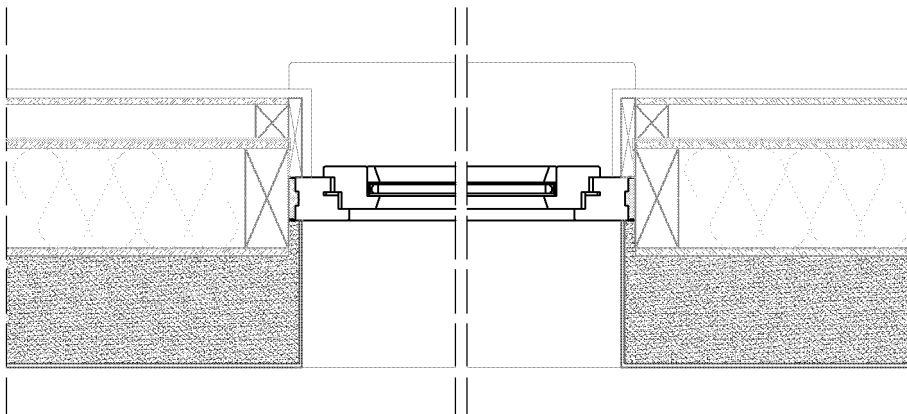
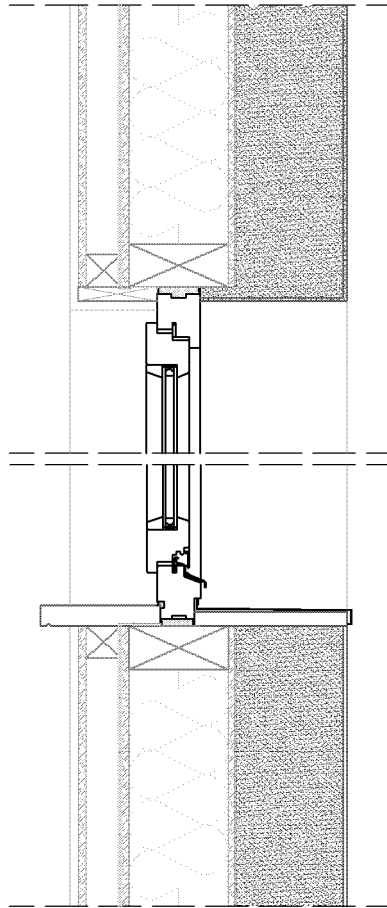


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Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

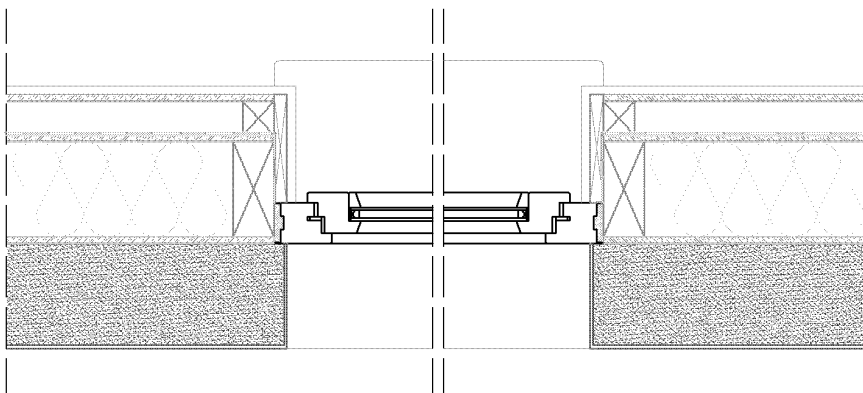
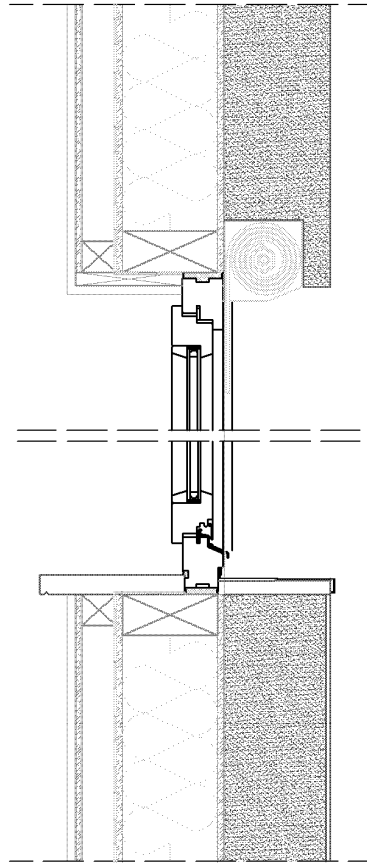
Anschluss Typ 1: Außenwand – Fenster (Vertikal-/Horizontalschnitt)  
Connection type 1: external wall – window (vertical/horizontal section)



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

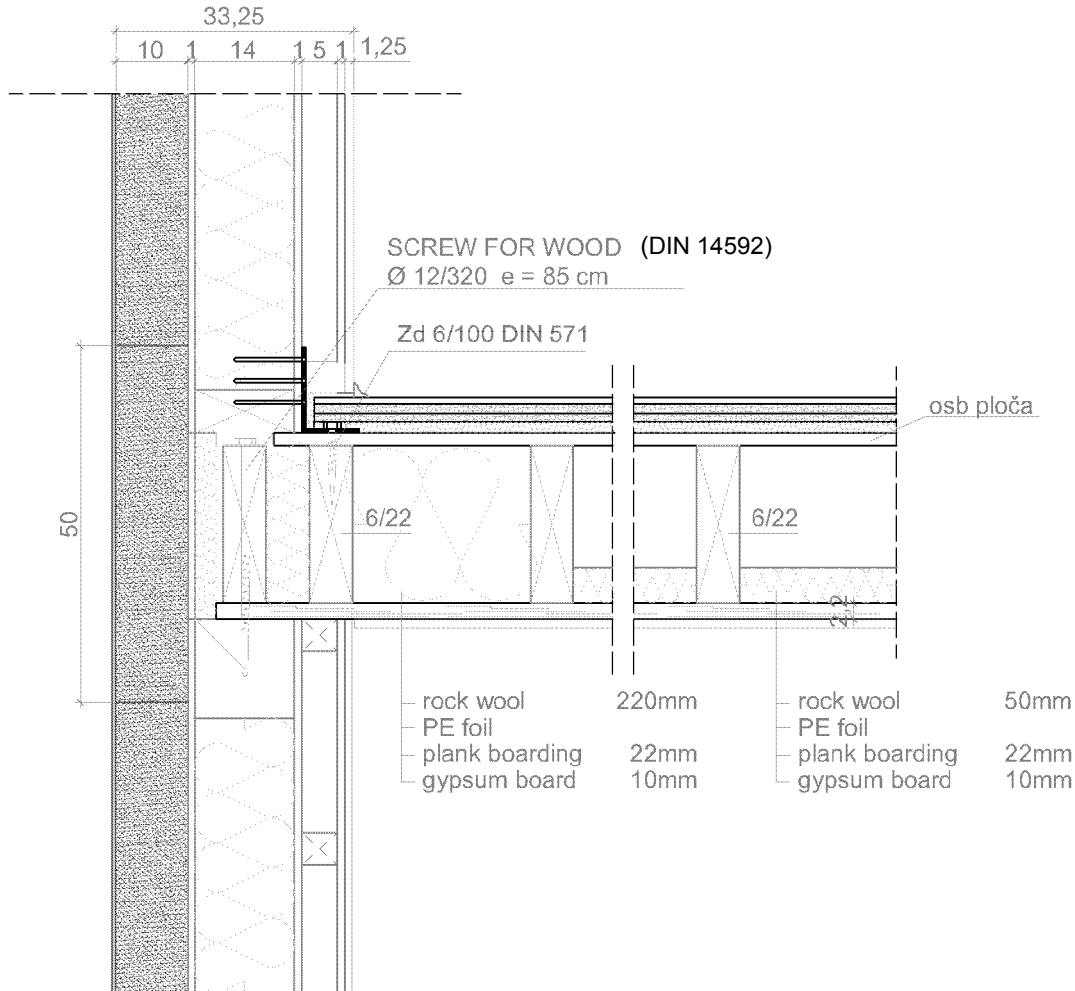
Anschluss Typ 2: Außenwand – Fenster (Vertikal-/Horizontalschnitt)  
Connection type 2: external wall – window (vertical/horizontal section)



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

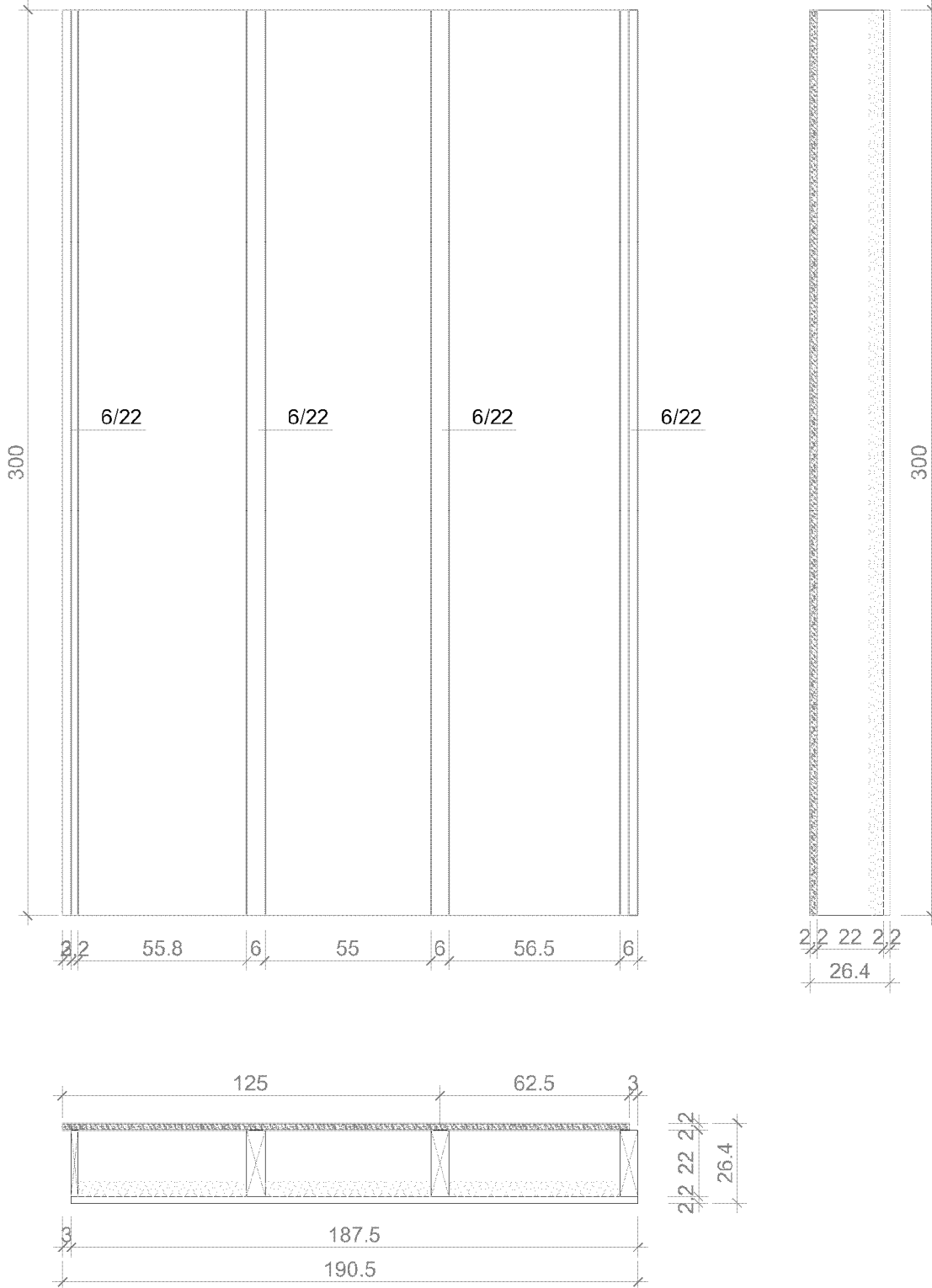
Anschluss Außenwand – Decke  
Connection external wall – ceiling



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

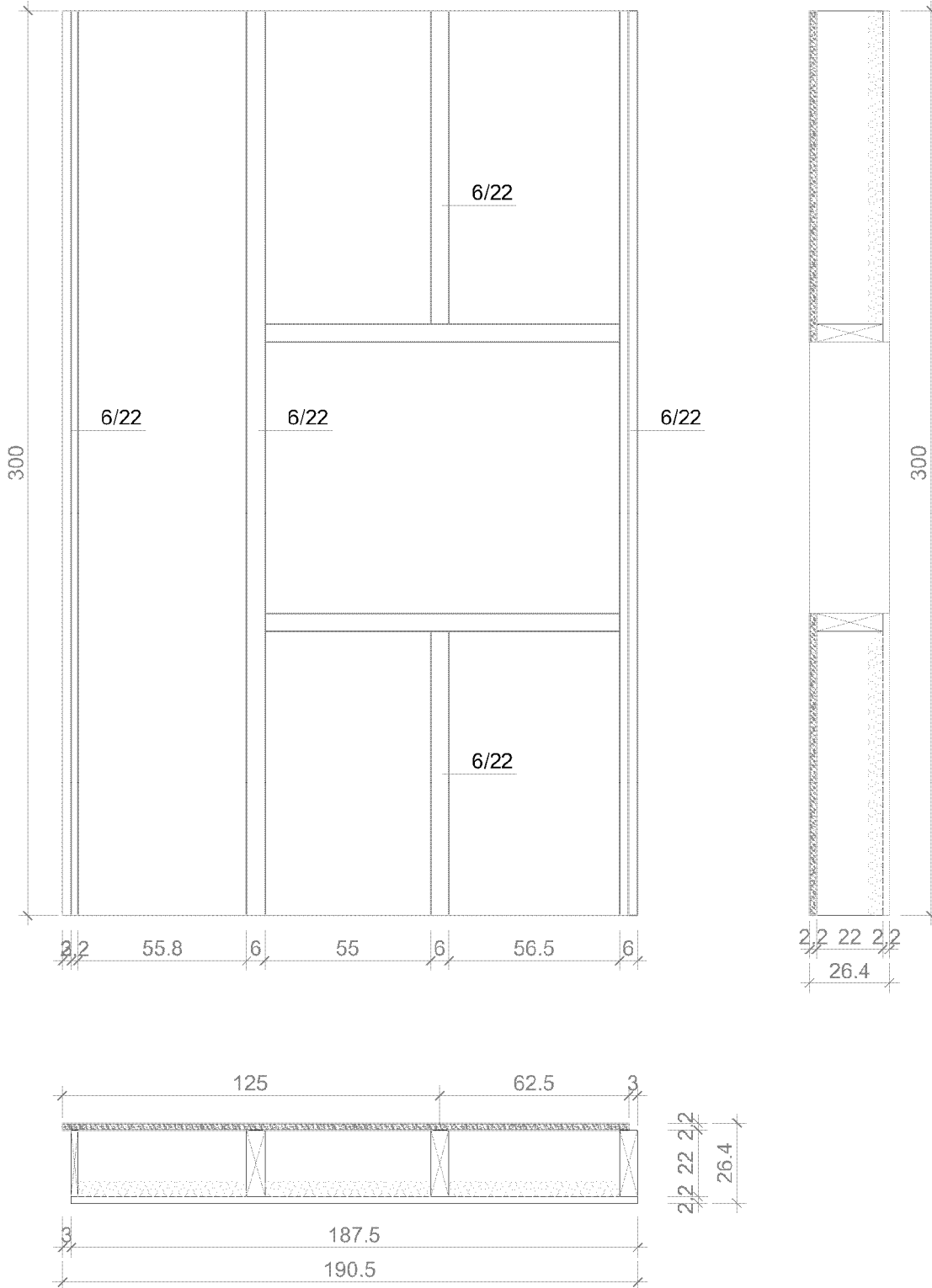
The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

Deckenelement  
Ceiling element



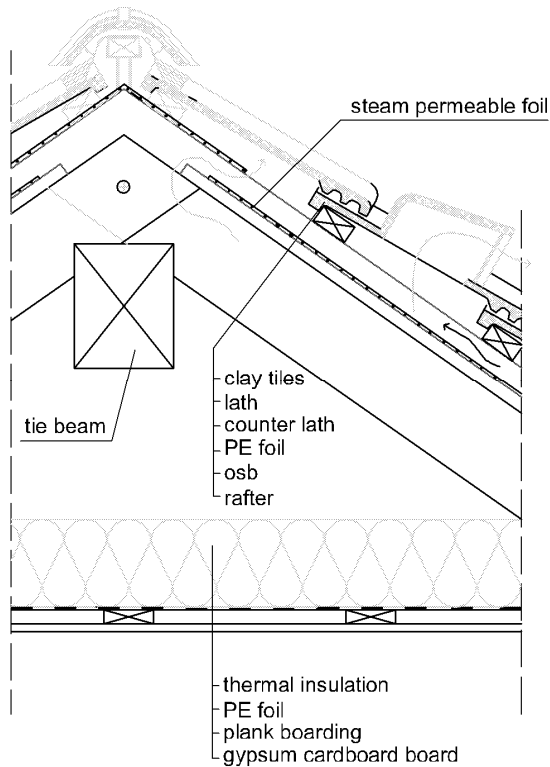
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Deckenelement - Öffnung  
Ceiling element - opening

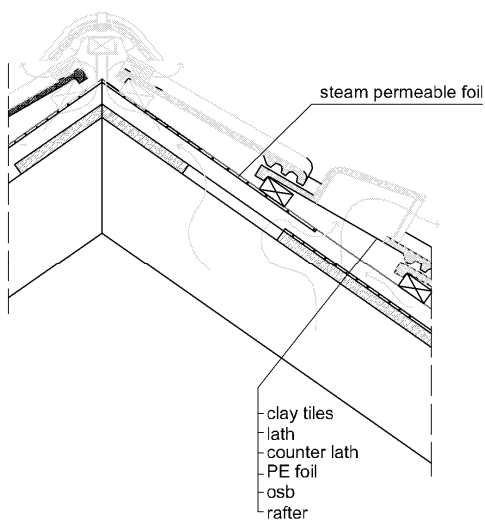


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Dach – Decke  
Roof – ceiling



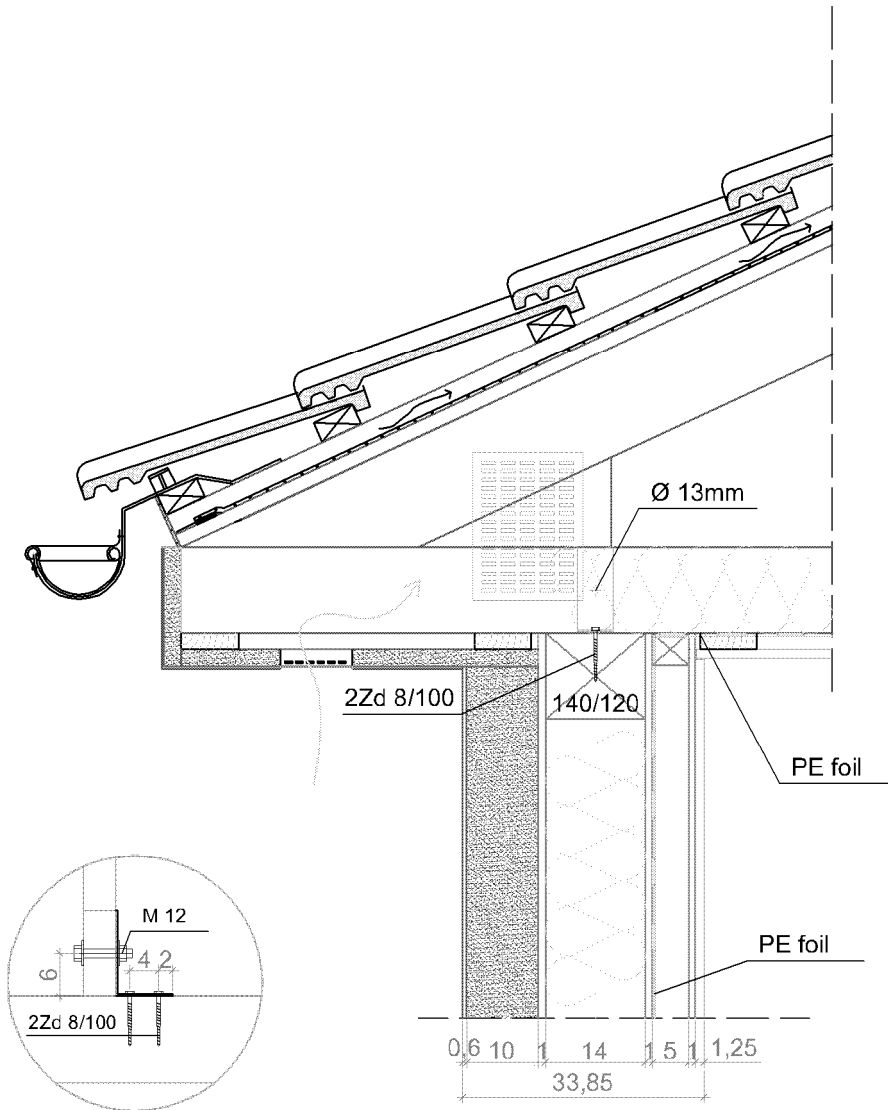
Belüftung bei unbeheiztem Dachboden  
Ventilation of non heated attic



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

Verbindung Außenwand – Dach (flacher Dachüberhang)  
Connection external wall – roof (flat eaves)

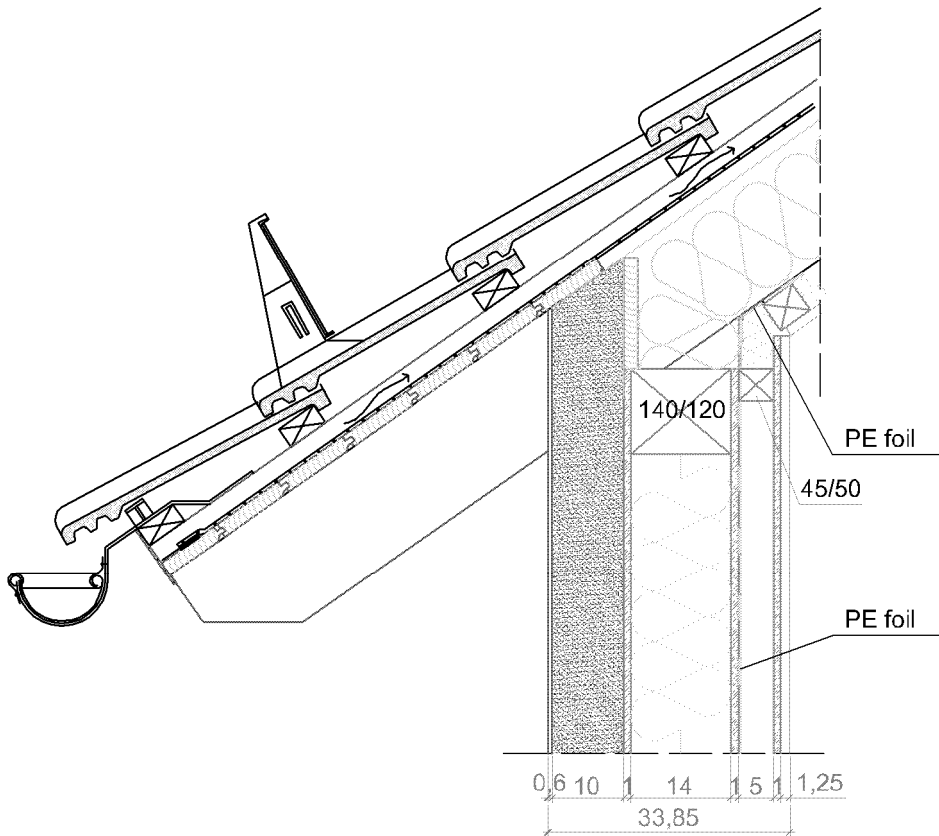


Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.



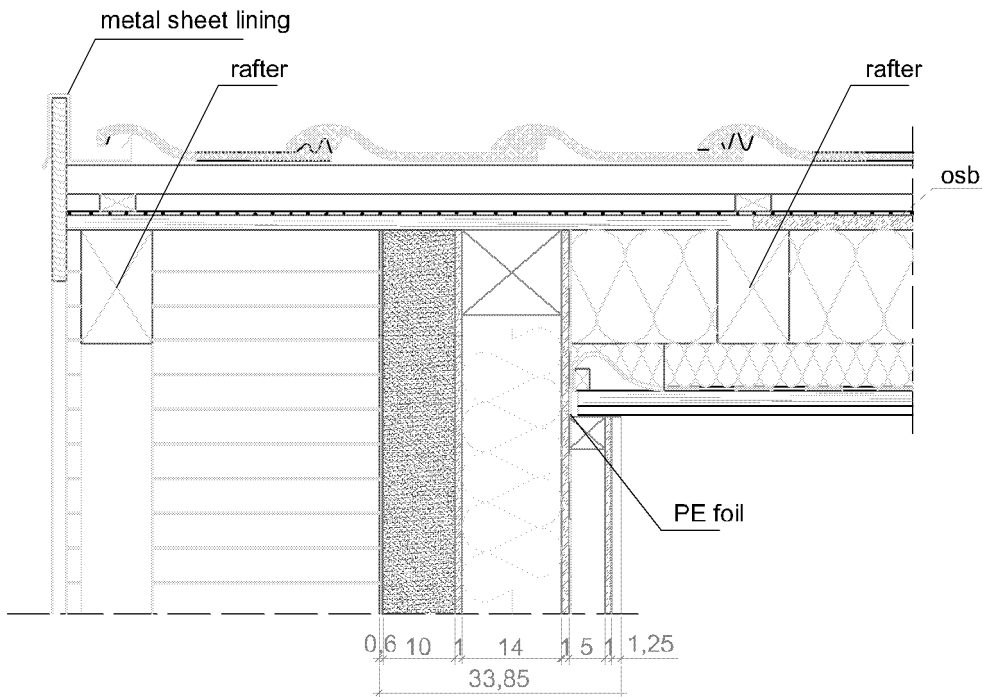
Verbindung Außenwand – Dach (geneigter Dachüberhang)  
Connection external wall – roof (sloped eaves)



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

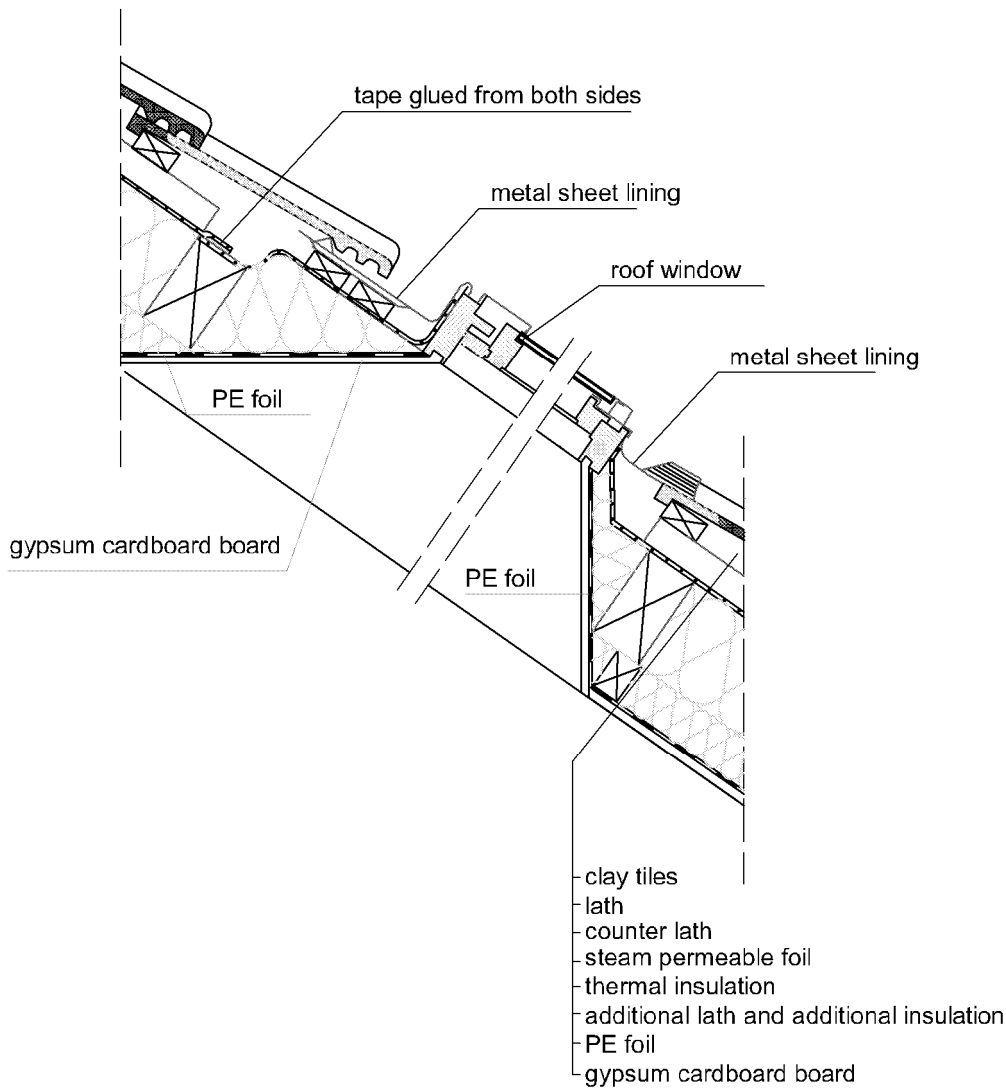
Giebel mit Ortgang - Vertikaler Schnitt  
Gable and verge - vertical section



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

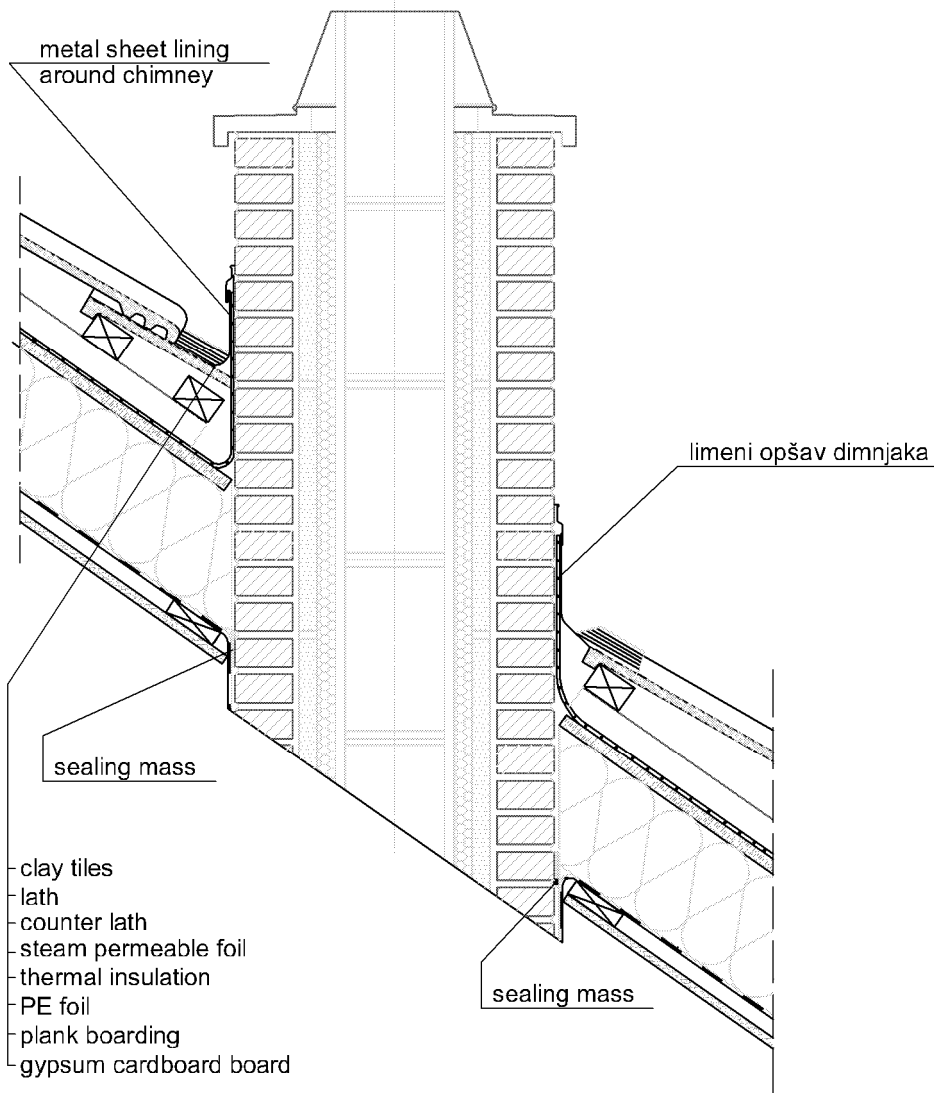
Anschluss Dach – Dachfenster  
Connection roof – roof window



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

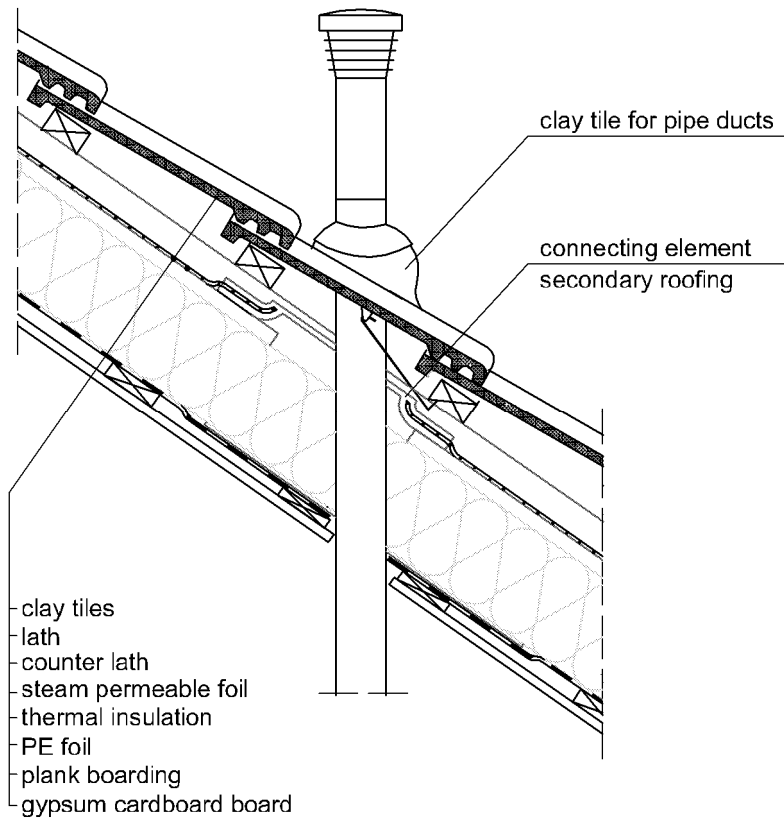
Anschluss Kamin  
Connection chimney



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

Anschluss Kaminrohr  
Connection pipe duct



Die tragenden Anschlüsse sind nur prinzipiell dargestellt. Sie sind gemäß den technischen Regeln zu bemessen und gemäß der statischen Berechnung auszuführen.

The loadbearing connections are only shown generally. They shall be designed according to technical regulations and executed according to structural design.

### Horizontal racking resistance

