

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

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Laender Governments



European Technical Assessment

ETA-16/0092
of 27 September 2021

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

"Bien-Zenker"
"Living-Haus"

Product family
to which the construction product belongs

Timber building kits

Manufacturer

Bien-Zenker GmbH
Am Distelrasen 2
36381 Schlüchtern
DEUTSCHLAND

Manufacturing plant

Bien-Zenker Plant 1

This European Technical Assessment
contains

75 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

EAD 340308-00-0203

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Specific part

1 Technical description of the kit

The company Bien-Zenker GmbH manufactures timber building kits with the trade name "Bien-Zenker" and "Living-Haus".

A building kit consists of predesigned 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. Windows and exterior doors are not part of the kit.

The main load-bearing structures are timber frames with planking.

The prefabricated building components and the related components are shown in Annex A. Essential construction details are described in Annex B.

The building components are prefabricated and are delivered to the building site as complete elements. Some layers of the kit, like the gypsum board of wall and roof elements can be mounted on site. The parts of the kit are mounted to each other and to the substructure. The substructure of the building is not part of this European technical assessment (in the following called ETA).

The load bearing connections between the building elements in factory production as well as at the assembling on building site are used with structural designed fasteners which are part of the kit. Examples of connections between particular building components among each other are shown in Annex B. The necessary characteristics for structural design are mentioned in Annex A, standards referred to, or in ETAs, etc.

The anchorage of the external wall building components to the substructure (basement or foundation slab made of concrete) is performed with structural designed fasteners but it is not part of the kit.

The exterior wall cladding (slate, straps, clinker, etc.), the internal linings (e.g.: tiles, murals, plaster, seals) of internal building components, roofing materials, floor linings, stairs, service installations and other building components which are needed for a complete building are not part of this ETA. Some 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 different construction works will usually be built-in building components.

No recycled wood is used for this kit.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The timber building kit is intended to be used for the following types of buildings:

- residential buildings (single-, multistory, terraced houses, semi and multi-family houses)
- commercial buildings (hotel complexes, office buildings, industrial buildings)
- extensions and heightening of buildings
- public buildings (e.g. kindergartens, schools)

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

The provisions made in this ETA are based on an assumed working life of "Bien-Zenker" and "Living-Haus" of at least 50 years and of at least 25 years for the exterior wall cladding, provided that the conditions to utilization, care and maintenance laid down in Section 3.1 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.

The performances given in Section 3 are only valid if timber building kits are used in compliance with the specifications and conditions given in Annex A and B.

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
Resistance, stiffness and stability of wall, floor and roof elements and their connections against vertical and horizontal loads	See Annex A All building components are described with regard to their components and their structure

By means of this description of the load-bearing building components both mechanical resistance and stability for each load-bearing building component and their connections between the components are determined.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire of materials and components	The classification for reaction to fire of the components is given in Annex A
Resistance to fire	The classification for resistance to fire of some building components is given in Annex A

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Water vapour resistance	The works shall be designed such that the building envelope with regards to interstitial and surface condensation meets the general requirements. The assessment of relevant building parts, including wet room envelopes, shall be calculated according to EN ISO 13788 ¹ considering relevant design climatic conditions. Particular building elements were calculated according to EN 15026 ² .

¹ EN ISO 13788:2013 Hygrothermal performance of building components and building elements - Internal surface temperature to avoid critical surface humidity and interstitial condensation - Calculation methods

² EN 15026:2007 Hygrothermal performance of building elements - assessment of moisture transfer by numerical simulation

Essential characteristic	Performance
Watertightness	Provided the kit is properly manufactured and assembled the building envelope is resistant to penetrating water (also driving rain-resistant) and snow. In case of ranges of application with extreme conditions of driving rain and snow the intended use shall be assessed in every individual case.
Durability class/ use class	Durability class/ use class see Annex A.

3.4 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Impact resistance	Due to technical experience the impact resistance is sufficient. The complete wall construction with a thickness of at least 18 mm; 2x12,5 mm gypsum board or 12 mm wood-based panel with 12,5 mm gypsum board is sufficiently shock-proof.

3.5 Protection against noise (BWR 5)

Essential characteristic	Performance
Airborne sound insulation of walls, floors and roof structures	Weighted sound reduction index R_w of some walls see Annex A.
Impact sound insulation of floors	Weighted normalized impact sound pressure level $L_{n,w}$ of some floors see Annex A.

3.6 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal resistance	Thermal transmittance coefficients according to EN ISO 6946 of exterior walls and roofs are given in Annex A.
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 ³ or EN 13829 ⁴ if necessary.

³ EN ISO 9972:2013 Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method

⁴ EN 13829:2000 Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method (ISO 9972:1996 modified)

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 Commission⁵, the system to be applied is 1.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Dokument

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 27 September 2021 by Deutsches Institut für Bautechnik

Anja Dewitt
Head of Section

beglaubigt:
Vössing

⁵ Official Journal of the European Communities L 178/56-57 of 14.07.1999

Annex A Description of the building components

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A) Specification of the technical description

Substructure

The kit can be used for separate building works or be placed as an addition of another storey on an existing building. The tolerances of the surface of the substructure normally amount to ± 30 mm but may amount up to ± 60 mm for heightening.

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 applicable building regulations.

Execution of construction works

The manufacturer provides an assembly schedule containing the following aspects:

- construction techniques and necessary equipment
- temporary bracing and weather protection
- completion of joints between components of the kit (fixing, sealing against climatic influences, etc.)
- fixing of wind anchorage to the substructure and between building parts
- additional building materials and building components applied on site and which are a precondition for the fitness of use of the kit
- special boundary conditions (e.g. special crane requirements, hoisting strap positions, etc.)

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

The provisions for health protection and occupational safety shall be observed. The building components of the kit are compiled at the manufacturing plant in accordance with this ETA. The ETA is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik.

Manufacture, 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 applicable building regulations (regulations concerning construction works).

The factory production of the building components normally takes place in dry and heated sites and the temporary storage of the components is usually below roofs.

The dimensioning of building elements and the selection of materials for wall-, floor- and roof- elements shall be carried out in accordance with the requirements of structural and building physics calculations. Non-load-bearing internal walls might be arranged in any way inside the building. Exterior walls can get external insulation systems according to European technical assessments which are than part of the kit. The evidence against lift of, of the wall building components with the substructure shall be provided.

Packaging, transport and storage

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

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 ETA as well as the specific installation instructions.

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 assessment of this requirement is part of the calculation of mechanical resistance and structural stability.

Durability class/ use class

Softwood that fulfils the needs of natural durability of solid wood according to EN 350¹ respective Table 1 is used as construction wood.

Table 1: Classes of natural durability against destructive fungi

Wood Types	Classes of natural durability
Spruce and fir	4
Pine and larch	3-4

Only technically dried timber with a moisture content up to 20 % is used.

The building components are not treated with chemical wood preservatives.

Table 2: Classification of building components according to EN 335²

Type of building component	Use class
Load-bearing structures wall, ceiling, roof	1
Internal linings (non-loadbearing) and internal planking (load-bearing) of walls and ceilings	1
Thresholds (solid timber) of internal and external walls of the ground floor	2
Internal linings (non-loadbearing) and internal planking (load-bearing) of walls and ceilings, behind ventilation or for covering insulation	2
Weather exposed exterior walls including exterior wall cladding	3

Termites are only found in certain limited areas in Europe. The assessment of durability in this ETA contains no information about resistance to termites. Use in areas where termites occur is not recommended without appropriate chemical wood protection.

In order to reach the intended working life of the kit, the user has to care and maintain it according to the service manual of the manufacturer. This service manual is part of the kit.

The durability against corrosion of metallic fasteners, used for these kits, fulfils the requirements of DIN EN 1995-1-1³ under consideration of the corrosivity category according to EN ISO 12944-2⁴.

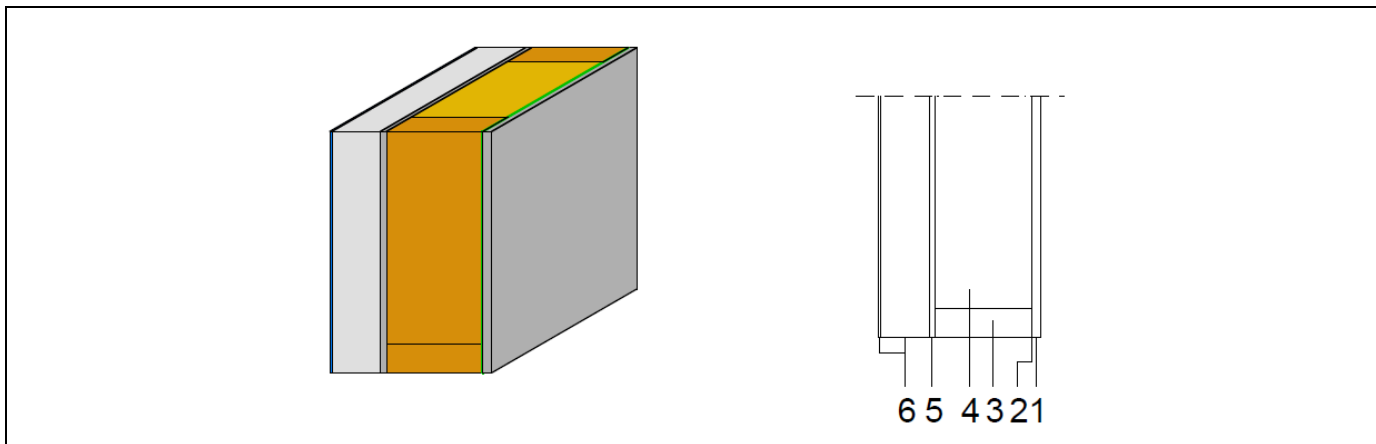
1 EN 350:2016 Durability of wood and wood-based products - Natural durability of solid wood- Part 2: Guide to the natural durability and treatability of selected wood species of importance in Europe

2 EN 335:2013 Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products

3 EN 1995-1-1:2004 + AC:2006 + A1:2008 + A2:2014 Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings

4 EN ISO 12944-2:2017 Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments

B) AW_01 Standard external wall



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	18	A2-s1, d0 ⁵ (2006/673/EC)
W	2	Vapour retarder layer	EN 13984 PE	0,2	E
W	3	Timber structure - Stud (spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	200/60	D-s2, d0 (2003/593/EC)
W		Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		200/60	
W		Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		200/60	
W	4	Mineral wool Flow resistance $\geq 8 \text{ kPa} \cdot \text{s/m}^2$	EN 13162	200	A1
W	5	Gypsum fibre board Density $\geq 1050 \text{ kg/m}^3$	EN 15283-2 GF	12,5	A2-s1, d0
W	6	Façade system ETICS	The whole system ETA 11/0505 ⁶		The whole system: E ⁷
W	6.1	Adhesive film façade system		Full-surface application	
W	6.2	Polystyrene EPS Dynamic stiffness $\leq 50 \text{ MN/m}^3$ Density $\geq 13 \text{ kg/m}^3$		$60 \leq d \leq 100$	
W	6.3	Undercoat plaster		3	
B	6.4	External plaster		2,5	

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W	5	Gypsum fibre board	Staple	EN 14592	1,55 / 50	50	75
W	6.2	EPS Façade insulation board	Staple	EN 14592	2 / 105	105	250

W: factory
B: construction side

⁵ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.
⁶ Other ETIC-Systems with ETA in accordance with EAD 040089-00-0404, which are intended for use of timber frame buildings' walls, may as well be used. These ETIC-Systems shall be suitable for the present building kit.
⁷ Proof through ETA.

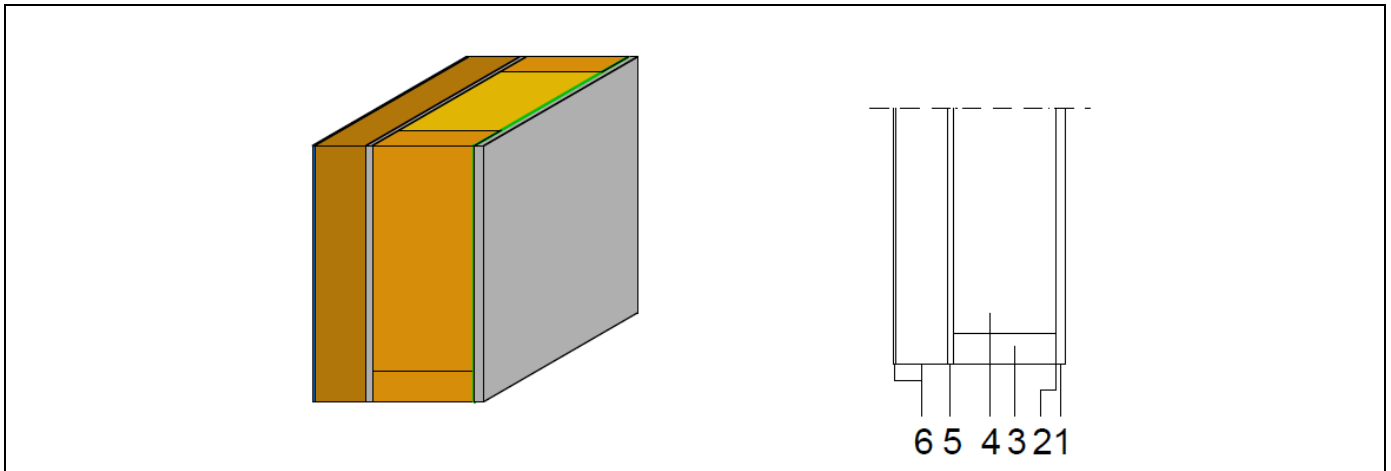
English translation prepared by DIBt

Building physics characteristics*								
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]						U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,04	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	5	6		
AW_01_BZ_035	18 0,21	0,2 -	200 0,13	200 0,035	12,5 0,36	100 0,04	0,133	
AW_01_BZ_040	18 0,21	0,2 -	200 0,13	200 0,040	12,5 0,36	100 0,04	0,142	42
AW_01_LH_035	18 0,21	0,2 -	200 0,13	200 0,035	12,5 0,36	60 0,04	0,154	
AW_01_LH_040	18 0,21	0,2 -	200 0,13	200 0,04	12,5 0,36	60 0,04	0,166	

Fire protection classification/ boundary conditions				
Build-up	REI	Dimensions h x w [m ²]	Max. load	Fire exposure
AW_01_BZ_040	60	≤ 3,00 x ≥ 2,98	51 kN/m	Lopsided from outwards
AW_01_BZ_040	60	≤ 3,00 x ≥ 2,98	51 kN/m	Lopsided from inside

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

C) AW_02 External wall with wood fibre-ETICS



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ⁸ (2006/673/EC)
W	2	Vapour retarder layer	EN 13984 PE	0,2	E
W	3	Timber structure – Stud (Spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	200/60	D-s2, d0 (2003/593/EC)
W		Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		200/60	
W		Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		200/60	
W	4	Mineral wool	EN 13162	200	A1
W	5	Gypsum fibre board Density $\geq 1050 \text{ kg/m}^3$	EN 15283-2 GF	12,5	A2-s1, d0
W	6	Façade System ETICS	The whole system ETA-08/0303 ⁹		The whole system: E ¹⁰
W	6.1	Adhesive film Façade System			
W	6.2	Wood fibre- Façade insulation board		60≤d≤100	
W	6.3	Undercoat plaster		5	
B	6.4	External plaster		2,5	

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W	5	Gypsum fibre board	Staple	EN 14592	1,55 / 50	50	75
W	6.2	Wood fibre- Façade insulation board (mount with stud)	Staple	EN 14592	2 / 150	150	150

W: Factory

B: Construction Side

⁸ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

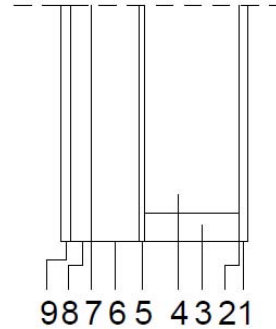
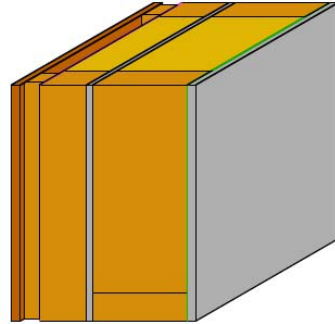
⁹ Other ETIC-Systems according to EAD 040089-00-0404, which are intended for use of timber frame buildings' walls, may as well be used. These ETIC-Systems shall be suitable for the present building kit.

¹⁰ Proof through ETA.

Building physics characteristics*								
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]						U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,04	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	5	6		
AW_02_035	18 0,21	0,2 -	200 0,13	200 0,035	12,5 0,36	100 0,042	0,135	
AW_02_040	18 0,21	0,2 -	200 0,13	200 0,040	12,5 0,36	100 0,042	0,144	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

D) AW_03 External wall timber façade



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹¹ (2006/673/EC)
W	2	Vapour retarder layer	EN 13984 PE	0,2	E
W	3	Timber structure – Stud (Spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	200/60	D-s2, d0 (2003/593/EC)
W		Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		200/60	
W		Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		200/60	
W	4	Mineral wool	EN 13162	200	A1
W	5	Gypsum fibre board Density $\geq 1050 \text{ kg/m}^3$	EN 15283-2 GF	12,5	A2-s1, d0
W	6.1	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100/60	D-s2, d0 (2003/593/EC)
W	6.2	Mineral wool	EN 13162	100	A1
W	7	Underlay	EN 13859	1	E
W	8	Timber structure	EN 14081 C 24	40/40	D-s2, d0 (2003/593/EC)
W	8.1	Air layer, ventilated		40	-
B	9	Wooden façade	EN 14081-1 C 24	19	D-s2, d0 (2003/593/EC)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W	5	Gypsum fibre board	Staple	EN 14592	1,55 / 50	50	75
W	6.1	Timber structure	Screw	EN 14592	6 / 160	160	
W	8	Timber structure	Nail	EN 14592	6,3 / 90	90	300
B	9	Wooden façade	Screw	EN 14592	4,5 / 60	60	625

W: Factory

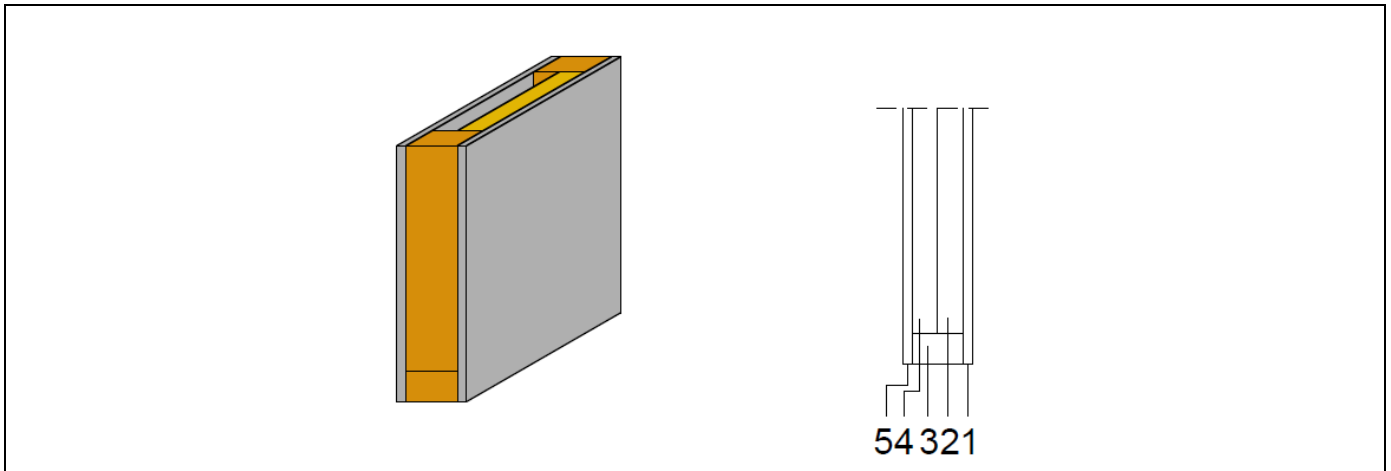
B: Construction Side

¹¹ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

Building physics characteristics*									
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]							U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	5	6.1	6.2		
AW_03_035	18 0,21	0,2 -	200 0,13	200 0,035	12,5 0,36	100 0,13	100 0,040	0,143	
AW_03_040	18 0,21	0,2 -	200 0,13	200 0,040	12,5 0,36	100 0,13	100 0,040	0,153	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

E) IW_01 Standard internal wall



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	18	A2-s1, d0 ¹² (2006/673/EC)
W	2	Mineral wool Flow resistance $\geq 9 \text{ kPa}\cdot\text{s/m}^2$	EN 13162	50	A1
W	3	Timber structure – Stud (Spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100 \leq d \leq 200/60	D-s2, d0 (2003/593/EC)
W		Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100 \leq d \leq 200/60	
W		Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100 \leq d \leq 200/60	
W	4	Air layer		50 \leq d \leq 150	-
W	5	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	18	A2-s1, d0 ¹² (2006/673/EC)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W	5	Gypsum board	Staple	EN 14592	1,55 / 50	50	75

W: Factory
B: Construction Side

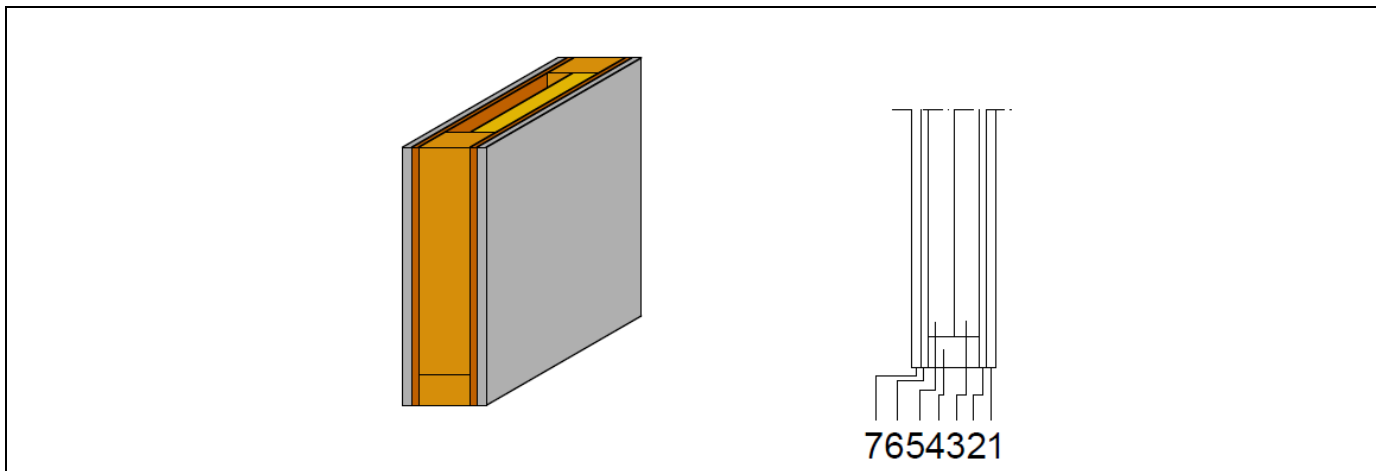
¹² The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

Building physics characteristics*						
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]				U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	5	
IW_01_100	18 0,21	50 0,04	100 0,13	50 0,278	18 0,21	36
IW_01_200	18 0,21	50 0,04	200 0,13	150 0,278	18 0,21	

Fire protection classification/ boundary conditions				
Build-up	REI	Dimensions h x w [m ²]	Max. load	Fire exposure
IW_01_100	45	≤ 3,00 x ≥ 2,98	25,5 kN/m	Lopsided from the inside

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

F) IW_02 both-sided gypsum board and wood-based panel



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹³ (2006/673/EC)
W	2	Particle board Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	12≤d≤13	D-s2, d0 (2007/348/EC)
W	3	Mineral wool Flow resistance $\geq 9 \text{ kPa}\cdot\text{s/m}^2$	EN 13162	50	A1
W	4	Timber structure – Stud (Spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100≤d≤200/60	D-s2, d0 (2003/593/EC)
W		Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100≤d≤200/60	
W		Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100≤d≤200/60	
W	5	Air layer		50≤d≤150	-
W	6	Particle board Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	12≤d≤13	D-s2, d0 (2007/348/EC)
W	7	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹³ (2006/673/EC)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W	2	Particle board	Staple	EN 14592	1,55 / 50	50	75
W	6	Particle board	Staple	EN 14592	1,55 / 50	50	75
W	7	Gypsum board	Staple	EN 14592	1,55 / 50	50	75

W: Factory

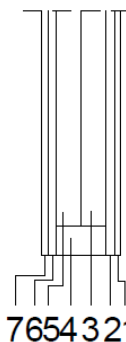
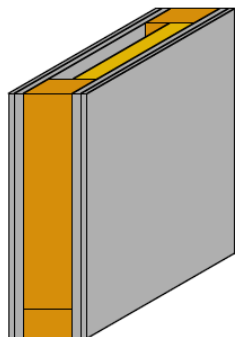
B: Construction Side

¹³ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

Building physics characteristics*									
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]							U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	5	6	7		
IW_02_100	18 0,21	12 0,13	50 0,04	100 0,13	50 0,278	12 0,13	18 0,21	0,529	42
IW_02_200	18 0,21	12 0,13	50 0,04	200 0,13	150 0,278	12 0,13	18 0,21	0,436	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

G) IW_03 both-sided double gypsum board



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ¹⁴ (2006/673/EC)
W	2	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹⁴ (2006/673/EC)
W	3	Mineral wool Flow resistance $\geq 9 \text{ kPa}\cdot\text{s/m}^2$	EN 13162	50	A1
W	4	Timber structure – Stud (Spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100≤d≤200/60	D-s2, d0 (2003/593/EC)
W		Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100≤d≤200/60	
W		Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100≤d≤200/60	
W	5	Air layer		50≤d≤150	-
W	6	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹⁴ (2006/673/EC)
W	7	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ¹⁴ (2006/673/EC)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W	2	Particle board	Staple	EN 14592	1,55 / 50	50	75
W	6	Particle board	Staple	EN 14592	1,55 / 50	50	75
W	7	Gypsum board	Staple	EN 14592	1,55 / 50	50	75

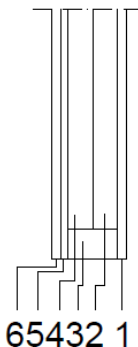
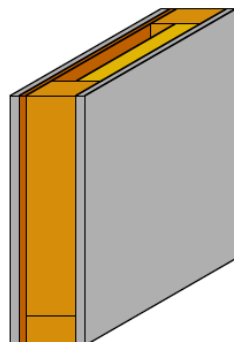
W: Factory

B: Construction Side

Building physics characteristics*									
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]							U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	5	6	7		
IW_03_100	12,5 0,21	18 0,21	50 0,04	100 0,13	50 0,278	18 0,21	12,5 0,21	0,548	45
IW_03_200	12,5 0,21	18 0,21	50 0,04	100 0,13	150 0,278	18 0,21	12,5 0,21	0,449	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

H) IW_04 both-sided gypsum board, one-sided wood-based panel



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹⁵ (2006/673/EC)
W	2	Mineral wool	EN 13162	50	A1
W	3	Timber structure – Stud (Spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100≤d≤200/60	D-s2, d0 (2003/593/EC)
W		Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100≤d≤200/60	
W		Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100≤d≤200/60	
W	4	Air layer		50≤d≤150	-
W	5	Particle board Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	12≤d≤13	D-s2, d0 (2007/348/EC)
W	6	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹⁵ (2006/673/EC)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W	5	Particle board	Staple	EN 14592	1,55 / 50	50	75
W	6	Gypsum board	Staple	EN 14592	1,55 / 50	50	75

W: Factory

B: Construction Side

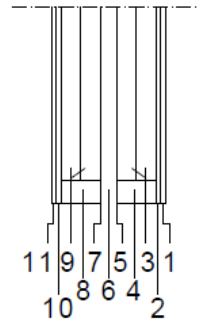
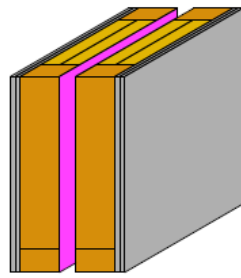
¹⁵ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

Building physics characteristics*								
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]						U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	5	6		
IW_04_100	18 0,21	50 0,04	100 0,13	50 0,278	12 0,13	18 0,21	0,557	
IW_04_200	18 0,21	50 0,04	200 0,13	150 0,278	12 0,13	18 0,21	0,455	

* The calculation has been done under the following conditions:

- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
- Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
- Possible shadowing has not been taken into account

I) IW_05 Party wall, both-sided double gypsum board



Construction build-up:
(from the inside outwards)

No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W 1	Gypsum board, Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ¹⁶ (2006/673/EC)
W 2	Gypsum board, Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ¹⁶ (2006/673/EC)
W 3	Mineral wool Flow resistance $\geq 12 \text{ kPa} \cdot \text{s/m}^2$	EN 13162	100	A1
W 4	Timber structure – Stud (Spacing: 625 mm), Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100/60	D-s2, d0 (2003/593/EC)
W	Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W	Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W 5	Vapour retarder layer	EN 13984 PE	0,1	E
B 6	Air layer		42	-
W 7	Vapour retarder layer	EN 13984 PE	0,1	E
W 8	Timber structure – Stud (Spacing: 625 mm), Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100/60	D-s2, d0 (2003/593/EC)
W	Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W	Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W 9	Mineral wool Flow resistance $\geq 12 \text{ kPa} \cdot \text{s/m}^2$	EN 13162	100	A1
W 10	Gypsum board, Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ¹⁶ (2006/673/EC)
W 11	Gypsum board, Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ¹⁶ (2006/673/EC)

Fixing devices
(from the inside outwards)

To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W 1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 2	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 10	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 11	Gypsum board	Staple	EN 14592	1,55 / 50	50	75

W: Factory

B: Construction Side

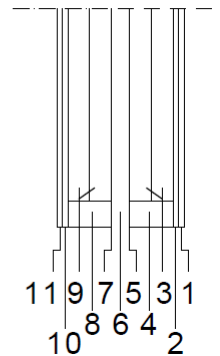
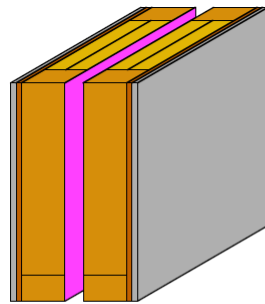
Building physics characteristics*												
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]										U-Value EN ISO 6946 [W/m²K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717- 1 R _w [dB]
	1	2	3	4	6	8	9	10	11			
IW_05	12,5 0,21	12,5 0,21	100 0,04	100 0,13	42 0,28	100 0,13	100 0,04	12,5 0,21	12,5 0,21		0,208	68

Fire protection classification/ boundary conditions				
Build-up	REI	Dimensions h x w [m²]	Max. load	Fire exposure
IW_05	60	≤ 3,00 x ≥ 2,98	25,5 kN/m	Lopsided from the inside

* The calculation has been done under the following conditions:

- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
- Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
- Possible shadowing has not been taken into account

J) IW_06 Party wall, both-sided gypsum board and wood-based panel



Construction build-up:
(from the inside outwards)

No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W 1	Gypsum board, Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ¹⁷ (2006/673/EC)
W 2	Particle board, Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	$12 \leq d \leq 13$	D-s2, d0 (2007/348/EC)
W 3	Mineral wool Flow resistance $\geq 12 \text{ kPa}\cdot\text{s/m}^2$	EN 13162	100	A1
W 4	Timber structure – Stud (Spacing: 625 mm), Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100/60	D-s2, d0 (2003/593/EC)
W	Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W	Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W 5	Vapour retarder layer	EN 13984 PE	0,1	E
B 6	Air layer		42	-
W 7	Vapour retarder layer	EN 13984 PE	0,1	E
W 8	Timber structure – Stud (Spacing: 625 mm), Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100/60	D-s2, d0 (2003/593/EC)
W	Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W	Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W 9	Mineral wool Flow resistance $\geq 12 \text{ kPa}\cdot\text{s/m}^2$	EN 13162	100	A1
W 10	Particle board, Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	$12 \leq d \leq 13$	D-s2, d0 (2007/348/EC)
W 11	Gypsum board, Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ¹⁷ (2006/673/EC)

Fixing devices
(from the inside outwards)

To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W 1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 2	Particle board	Staple	EN 14592	1,55 / 50	50	75
W 10	Particle board	Staple	EN 14592	1,55 / 50	50	75
W 11	Gypsum board	Staple	EN 14592	1,55 / 50	50	75

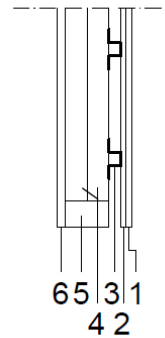
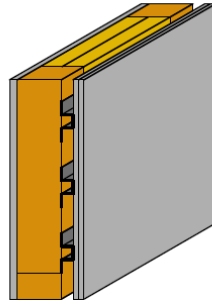
W: Factory

B: Construction Side

Building physics characteristics*											
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]									U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	3	4	6	8	9	10	11		
IW_06	12,5 0,21	13 0,13	100 0,04	100 0,13	42 0,28	100 0,13	100 0,04	13 0,13	12,5 0,21	0,205	68

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

K) IW_07 Internal wall sound insulation wall stair wall



Construction build-up:
(from the inside outwards)

No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B 1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ¹⁸ (2006/673/EC)
B 2	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ¹⁸ (2006/673/EC)
B 3	Spring rods	14195 Knauf	27	A1 (96/603/EC)
W 4	Mineral wool Flow resistance $\geq 12 \text{ kPa} \cdot \text{s/m}^2$	EN 13162	100	A1
W 5	Timber structure – Stud (Spacing: 625 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100/60	D-s2, d0 (2003/593/EC)
W	Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W	Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W 6	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	18	A2-s1, d0 ¹⁸ (2006/673/EC)

Fixing devices
(from the inside outwards)

To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B 1	Gypsum board	Drywall screw	EN 14566/A1	4,0 / 35	30	170
B 2	Gypsum board	Drywall screw	EN 14566/A1	4,0 / 35	30	170
B 3	Spring rods	Drywall screw	EN 14566/A1	4,0 / 35	30	170
W 6	Gypsum board	Staple	EN 14592	1,55 / 50	50	75

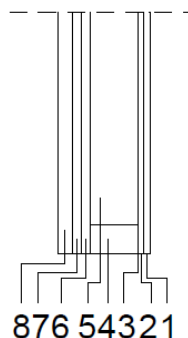
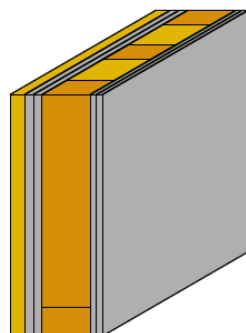
W: Factory
B: Construction Side

¹⁸ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

Building physics characteristics*							
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]					U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	4	5	6		
IW_07	12,5 0,21	12,5 0,21	100 0,04	100 0,13	18 0,21	0,362	55

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

L) GTW_01 apartment party wall without EVICS FW 100 mm



Construction build-up:
(from the inside outwards)

No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
W 1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ¹⁹ (2006/673/EC)
W 2	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ¹⁹ (2006/673/EC)
W 3	Vapour retarder layer	EN 13984 PE	0,2	E
W 4	Timber structure – Stud (Spacing: 312,5 mm) Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100/60	D-s2, d0 (2003/593/EC)
W	Timber structure – Sole plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W	Timber structure – Head plate Density at 12 % MC $\geq 350 \text{ kg/m}^3$		100/60	
W 5	Mineral wool Flow resistance $\geq 14 \text{ kPa}\cdot\text{s/m}^2$	EN 13162	100	A1
W 6	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	18	A2-s1, d0 ¹⁹ (2006/673/EC)
W 7	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	18	A2-s1, d0 ¹⁹ (2006/673/EC)
W 8	Mineral wool Flow resistance $\geq 37 \text{ kPa}\cdot\text{s/m}^2$	EN 13162 Rock wool	30	A1

Fixing devices
(from the inside outwards)

To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W 1	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 2	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 6	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 7	Gypsum board	Staple	EN 14592	1,55 / 50	50	75
W 8	Mineral wool	Staple	EN 14592	1,55 / 50	50	250

W: Factory

B: Construction Side

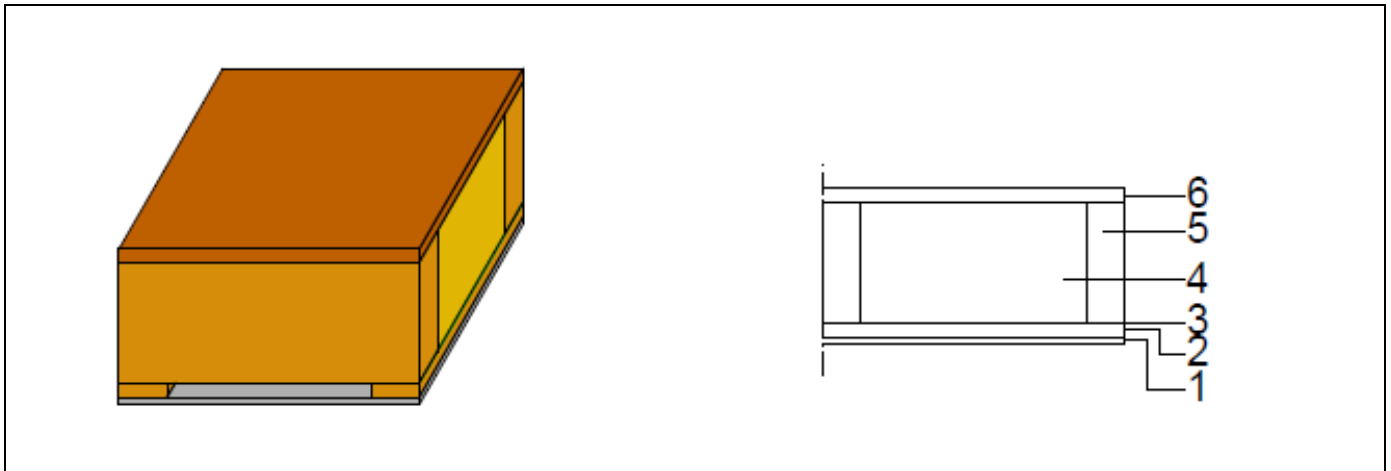
¹⁹ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

Building physics characteristics*									
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]							U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,13 R _{se} = 0,13	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	4	5	6	7	8		
GTW_01	12,5 0,21	12,5 0,21	100 0,13	100 0,040	18 0,21	18 0,21	30 0,040	0,318	70 (for the double wall)

Fire protection classification/ boundary conditions				
Build-up	REI	Dimensions h x w [m ²]	Max. load	Fire exposure
GTW_01	120	≤ 3,00 x ≥ 2,98	25,5 kN/m	Lopsided from outwards
GTW_01	60	≤ 3,00 x ≥ 2,98	25,5 kN/m	Lopsided from inside

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

M) DE_01 Standard collar beam ceiling



Construction build-up:
(from the inside outwards)

No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B 1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ²⁰ (2006/673/EC)
W 2	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	24/80	D-s2, d0 (2003/593/EC)
W 2.1	Air layer		24	
W 3	Vapour retarder layer	EN 13984 PE	0,2	E
W 4	Mineral wool	EN 13162	240	A1
W 5	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	240/ ≥ 60	D-s2, d0 (2003/593/EC)
W 6	Wood-based panel Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	22	D-s2, d0 (2007/348/EC)

Fixing devices
(from the inside outwards)

To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B 1	Gypsum board	Drywall screw	EN 14566/A1	3,9 / 35	35	220
W 2	Timber structure	Staple	EN 14592	1,8 / 65	65	2x pro 400
W 5	Timber structure	Screw	EN 14592	12 / 340	340	1250
W 6	Wood-based panel	Staple	EN 14592	1,8 / 65	65	≤ 120

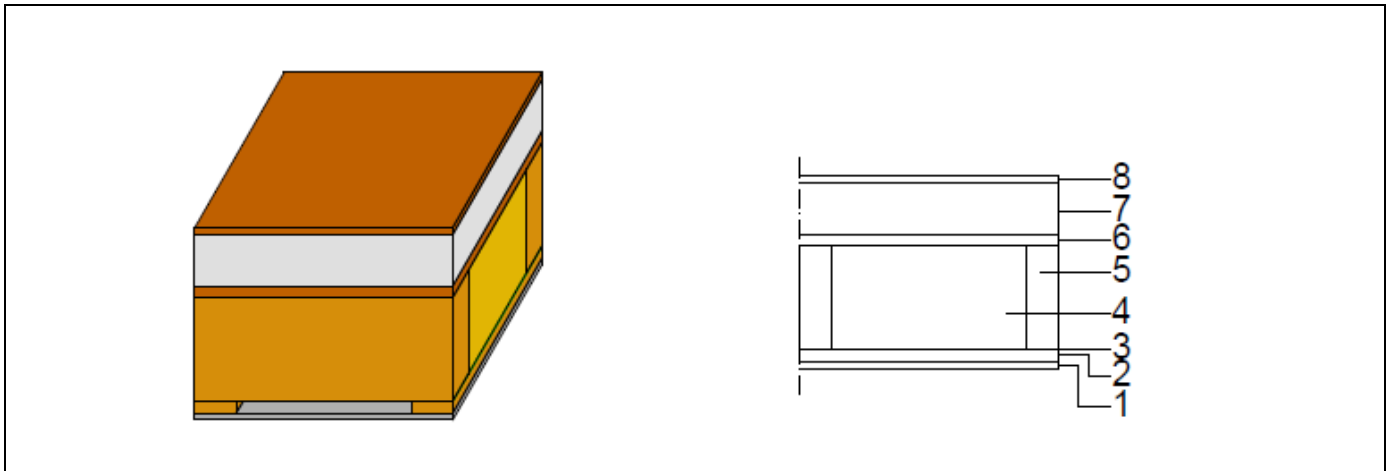
W: Factory

B: Construction Side

Building physics characteristics*								
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]						U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,04	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	2.1	4	5	6		
DE_01_040	12,5 0,21	24 0,13	24 0,139	240 0,040	240 0,13	22 0,13	0,181	
DE_01_035	12,5 0,21	24 0,13	24 0,139	240 0,035	240 0,13	22 0,13	0,166	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

N) DE_02 Collar beam ceiling above developed attic



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ²¹ (2006/673/EC)
W	2	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	24 / 80	D-s2, d0 (2003/593/EC)
W	2.1	Air layer		24	-
W	3	Vapour retarder layer	EN 13984 PE	0,2	E
W	4	Mineral wool	EN 13162	240	A1
W	5	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	240/ ≥ 60	D-s2, d0 (2003/593/EC)
W	6	Wood-based panel Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	22	D-s2, d0 (2007/348/EC)
B	7	EPS Insulation board	EN 13163 EPS	100	E
B	8	Wood-based panel Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	$12 \leq d \leq 13$	D-s2, d0 (2007/348/EC)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B	1	Gypsum board	Drywall screw	EN 14566/A1	3,9 / 35	35	220
W	2	Timber structure	Staple	EN 14592	1,8 / 65	65	2x pro 400
W	5	Timber structure	Screw	EN 14592	12 / 340	340	1250
W	6	Wood-based panel	Staple	EN 14592	1,8 / 65	65	≤ 120
W	8	Wood-based panel	Screw	EN 14566/A1	6 / 180	180	1250

W: Factory

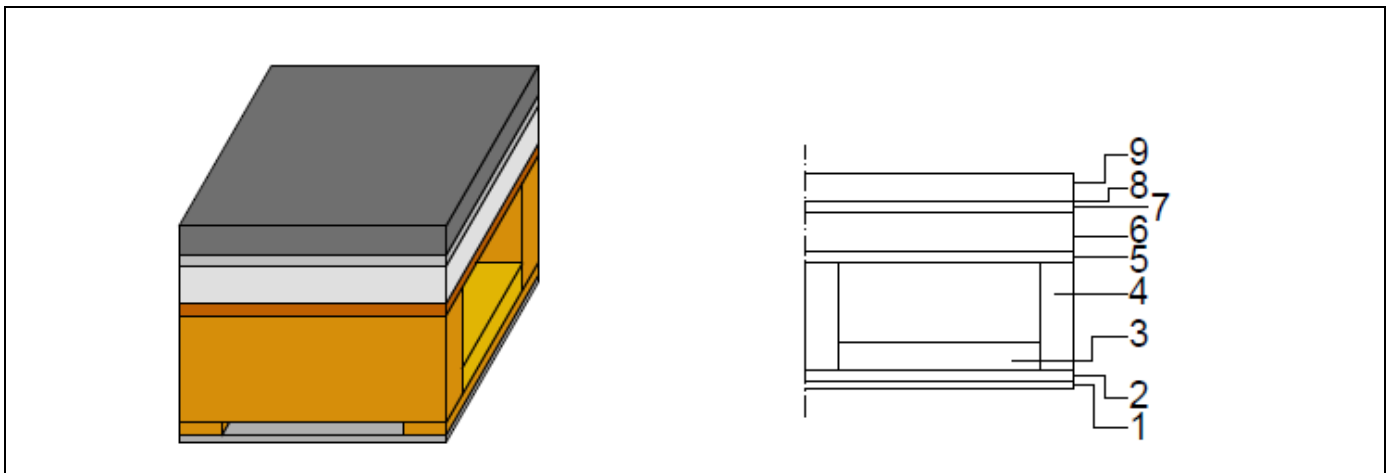
B: Construction Side

²¹ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

Building physics characteristics*										
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]								U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,04	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	2.1	4	5	6	7	8		
DE_02_040	12,5 0,21	24 0,13	24 0,139	240 0,040	240 0,13	22 0,13	100 0,040	12 0,13	0,121	
DE_02_035	12,5 0,21	24 0,13	24 0,139	240 0,035	240 0,13	22 0,13	100 0,040	12 0,13	0,114	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

O) DE_03 Apartment ceiling detached house



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ²² (2006/673/EC)
W	2	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	24 / 80	D-s2, d0 (2003/593/EC)
W	2.1	Air layer		24	-
W	3	Mineral wool Flow resistance $\geq 8 \text{ kPa} \cdot \text{s/m}^2$	EN 13162	≥ 50	A1
W	3.1	Air layer		≤ 190	
W	4	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	240 / ≥ 60	D-s2, d0 (2003/593/EC)
W	5	Wood-based panel Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	22	D-s2, d0 (2007/348/EC)
B	6	EPS Insulation board	EN 13163 EPS DEO, dm	70	F
B	7	Impact sound insulation boards Dynamic stiffness $\leq 33 \text{ MN/m}^3$	EN 13163 EPS DES, sm	20	E
B	8	Screed-Separating layer	EN 13984 PE	0,2	-
B	9	Cementitious screed Grammage $\geq 120 \text{ kg/m}^2$	EN 13319 CT-F5	55	A1

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B	1	Gypsum board	Drywall screw	EN 14566/A1	4 / 35	35	220
W	2	Timber structure	Staple	EN 14592	1,8 / 65	65	2x pro 400
W	4	Timber structure	Screw	EN 14592	12 / 340	340	1250
W	5	Wood-based panel	Staple	EN 14592	1,8 / 65	65	≤ 120

W: Factory

B: Construction Side

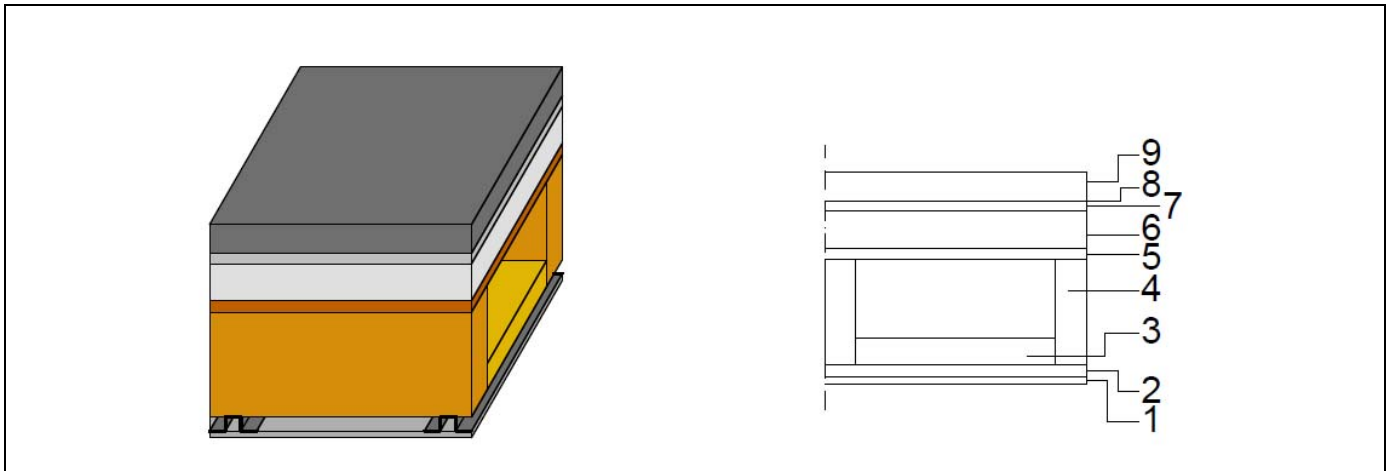
Building physics characteristics*												
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]										U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,10	Weighted sound reduction index R _w [dB] / Weighted normalized impact sound pressure level L _{n,w} [dB]
	1	2	2.1	3	3.1	4	5	6	7	9		
DE_03_040	12,5 0,21	24 0,13	24 0,139	50 0,040	190 1,278	240 0,13	22 0,13	70 0,04	20 0,04	55 1,4	0,212	61 / 60
DE_03_035	12,5 0,21	24 0,13	24 0,139	50 0,035	190 1,278	240 0,13	22 0,13	70 0,04	20 0,04	55 1,4	0,206	

Fire protection classification/ boundary conditions				
Build-up	REI	Dimensions h x w [m ²]	Max. load	Fire exposure
DE_03_040	30	≤ 4,90 x ≥ 4,92	2,8 kN/m ²	Lopsided from the inside

* The calculation has been done under the following conditions:

- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
- Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
- Possible shadowing has not been taken into account

P) DE_04 Apartment ceiling duplex house



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type DF	12,5	A2-s1, d0 ²³ (2006/673/EC)
W	2	Spring rods	EN 14195 Knauf	27 / 70	A1
W	2.1	Air layer		27	-
W	3	Mineral wool Flow resistance $\geq 8 \text{ kPa} \cdot \text{s/m}^2$	EN 13162	≥ 100	A1
W	3.1	Air layer		≤ 140	
W	4	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	240 / ≥ 60	D-s2, d0 (2003/593/EC)
W	5	Wood-based panel Density at 12 % MC $\geq 600 \text{ kg/m}^3$	EN 520 Type F	22	D-s2, d0 (2007/348/EC)
B	6	EPS Insulation board	EN 13163 EPS DEO, dm	70	F
B	7	Mineral wool impact sound insulation boards Dynamic stiffness $\leq 12 \text{ MN/m}^3$	EN 13162 Mifa DES, sm	20	A1
B	8	Screed-Separating layer	EN 13984 PE	0,2	-
B	9	Cementitious screed Grammage $\geq 120 \text{ kg/m}^2$	EN 13319 CT-F5	55	A1 (96/603/EG)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B	1	Gypsum board	Drywall screw	EN 14566/A1	4,0 / 30	35	220
W	2	Spring rods	Drywall screw	EN 14566/A1	4,0 / 30	35	2x pro 400
W	4	Timber structure	Screw	EN 14592	12 / 340	340	1250
W	5	Wood-based panel	Staple	EN 14592	1,8 / 65	65	≤ 120

W: Factory

B: Construction Side

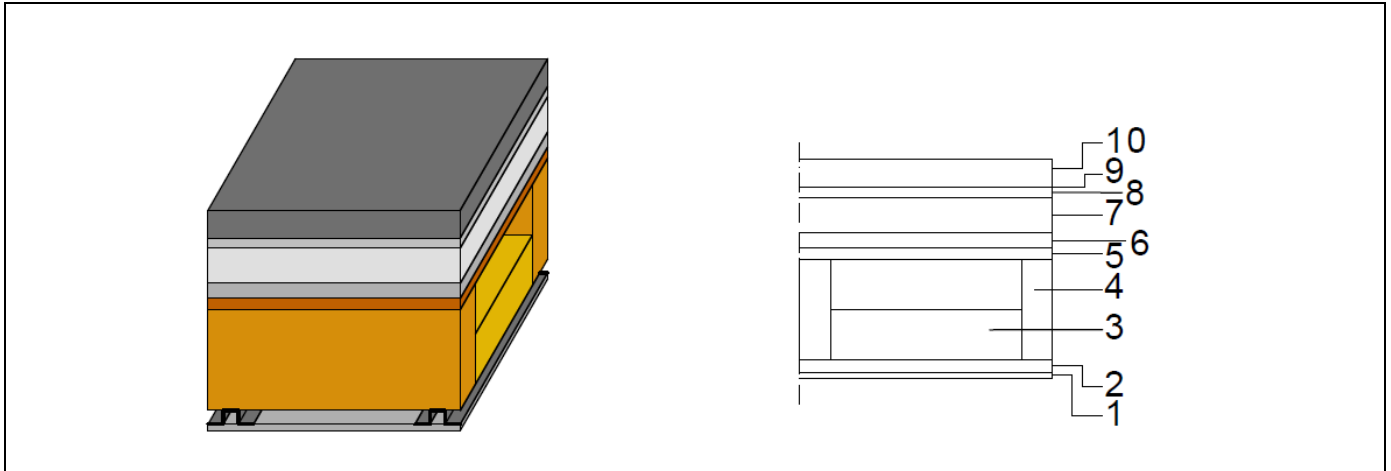
Building physics characteristics*												
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]										U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,10	Weighted sound reduction index R _w [dB] / Weighted normalized impact sound pressure level L _{n,w} [dB]
	1	2.1	3	3.1	4	5	6	7	9			
DE_04_0 40	12,5 0,21	27 0,139	100 0,040	140 0,278	240 0,13	22 0,13	70 0,04	20 0,035	55 1,4	0,175	76/ 48	
DE_04_0 35	12,5 0,21	27 0,139	100 0,035	140 0,278	240 0,13	22 0,13	70 0,04	20 0,035	55 1,4	0,168		

Fire protection classification/ boundary conditions				
Build-up	REI	Dimensions h x w [m ²]	Max. load	Fire exposure
DE_03_040	30	≤ 4,90 x ≥ 4,92	2,8 kN/m ²	Lopsided from the inside

* The calculation has been done under the following conditions:

- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
- Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
- Possible shadowing has not been taken into account

Q) DE_05 Apartment ceiling duplex house with lime chippings fill



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ²⁴ (2006/673/EC)
W	2	Spring rods	EN 14195 Knauf	27 / 70	A1
W	2.1	Air layer		27	-
W	3	Mineral wool Flow resistance $\geq 8 \text{ kPa} \cdot \text{s/m}^2$	EN 13162	≥ 100	A1
W	3.1	Air layer		≤ 140	-
W	4	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	240 / ≥ 60	D-s2, d0 (2003/593/EC)
W	5	Wood-based panel Density $\geq 600 \text{ kg/m}^3$	EN 520 Type F	22	D-s2, d0 (2007/348/EC)
B	6	Lime chippings fill Grammage $\geq 48 \text{ kg/m}^2$		30	A1 (96/603/EG)
B	7	Polystyrene rigid foam board	EN 13163 EPS DEO, dm	40	F
B	8	Mineral wool impact sound insulation boards; Dynamic stiffness $\leq 12 \text{ MN/m}^3$	EN 13162 Mifa DES, sm	20	A1
B	9	Screed-Separating layer	EN 13984 PE	0,2	-
B	10	Cementitious screed Grammage $\geq 120 \text{ kg/m}^2$	EN 13319 CT-F5	55	A1 (96/603/EG)

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B	1	Gypsum board	Drywall screw	EN 14566/A1	4,0 / 30	35	220
W	2	Spring rods	Drywall screw	EN 14566/A1	4,0 / 30	35	2x pro 400
W	4	Timber structure	Screw	EN 14592	12 / 340	340	1250
W	5	Wood-based panel	Staple	EN 14592	1,8 / 65	65	≤ 120

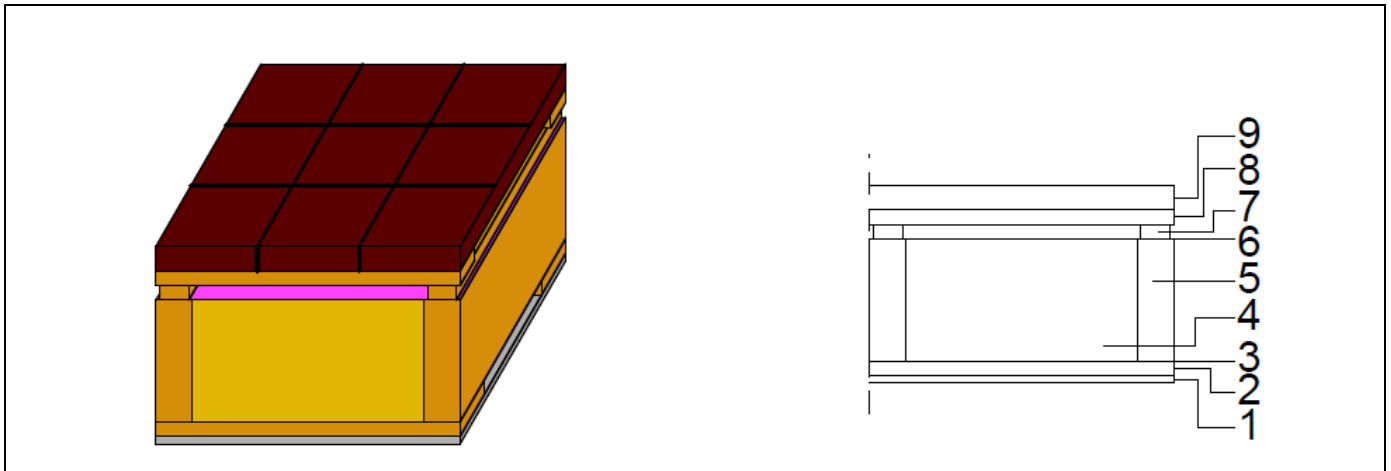
W: Factory

B: Construction Side

Building physics characteristics*													
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]											U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,10	Weighted sound reduction index R _w [dB] / Weighted normalized impact sound pressure level L _{n,w} [dB]
	1	2	2.1	3	3.1	4	5	6	7	9	10		
DE_05_0 40	12,5 0,21	24 0,12	24 0,139	100 0,04	140 0,278	240 0,13	22 0,13	30 0,7	40 0,04	20 0,04	55 1,4	0,200	81/ 34

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

R) DA_01 pitched roof



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board Density $\geq 680 \text{ kg/m}^3$	EN 520 Type A	12,5	A2-s1, d0 ²⁵ (2006/673/EC)
W	2	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	24 / 80	D-s2, d0 (2003/593/EC)
W	2.1	Air layer	-	24	-
W	3	Vapour retarder layer	EN 13984 PE	0,2	E
W	4	Mineral wool	EN 13162	$200 \leq d \leq 240$	A1
W	5	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	$200 \leq d \leq 240 / 70$	D-s2, d0 (2003/593/EC)
W	6	Underlay	EN 13859	0,2	E
W	7	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	$\geq 24 / \geq 48$	D-s2, d0 (2003/593/EC)
W	7.1	Air layer, ventilated		≥ 30	-
W	8	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	$\geq 40 / \geq 60$	D-s2, d0 (2003/593/EC)
W	8.1	Air layer		≥ 40	-
B	9	Roofing ²⁶			-

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B	1	Gypsum board	Gypsum board-Screw	EN 14566/A1	4,0 / 30	35	220
W	2	Timber structure	Staple	EN 14592	1,8 / 63	63	200
W	5	Timber structure	Screw	EN 14592	8 / 340	340	
W	7	Timber structure	Staple	EN 14592	1,8 / 63	63	300
W	10	Timber structure	Staple	EN 14592	1,8 / 72	72	2 pieces all 350

W: Factory

B: Construction Side

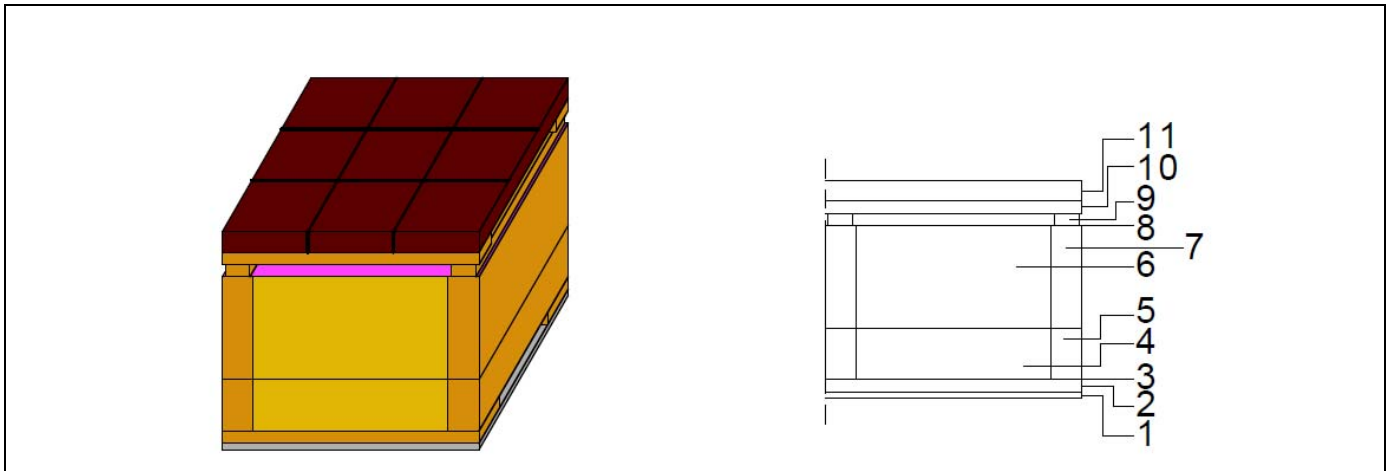
²⁵ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

²⁶ The roofing components are not part of the kit.

Building physics characteristics*							
Build-up	Layer No.					U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,04	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	Thickness [mm] / Lambda [W / m K]						
	1	2	2.1	4	5		
DA_01_200_040	12,5 0,21	24 0,13	24 0,139	200 0,040	200 0,13	0,218	
DA_01_240_040	12,5 0,21	24 0,13	24 0,139	240 0,040	240 0,13	0,185	
DA_01_200_035	12,5 0,21	24 0,13	24 0,139	200 0,035	200 0,13	0,199	
DA_01_240_035	12,5 0,21	24 0,13	24 0,139	240 0,035	240 0,13	0,168	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

S) DA_02 Pitched roof_KfW_40



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board, Density $\geq 680 \text{ kg/m}^3$	EN 520 Type A	12,5	A2-s1, d0 ²⁷ (2006/673/EC)
W	2	Timber structure, Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	24 / 80	D-s2, d0 (2003/593/EC)
W	2.1	Air layer	-	24	-
W	3	Vapour retarder layer	EN 13984 PE	0,2	E
W	4	Mineral wool	EN 13162	240	A1
W	5	Timber structure – Rafter duplication Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	240 / 70	D-s2, d0 (2003/593/EC)
W	6	Mineral wool	EN 13162	100	A1
W	7	Timber structure – Rafter Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	100 / 60	D-s2, d0
W	8	Underlay	EN 13859	0,2	E
W	9	Timber structure, Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	$\geq 24 / \geq 48$	D-s2, d0 (2003/593/EC)
W	9.1	Air layer, ventilated		30	-
W	10	Timber structure, Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	$\geq 40 / \geq 60$	D-s2, d0 (2003/593/EC)
W	10.1	Air layer		≥ 40	-
B	11	Roofing ²⁸			-

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
B	1	Gypsum board	Gypsum board-Screw	EN 14566/A1	4,0 / 35	35	220
W	2	Timber structure	Staple	EN 14592	1,8 / 63	63	200
W	5	Timber structure – Rafter duplication	Screw	EN 14592	8 / 160	160	
W	7	Timber structure – Rafter	Screw	EN 14592	10 / 340	340	
W	9	Timber structure	Staple	EN 14592	1,8 / 63	63	300
W	10	Timber structure	Staple	EN 14592	1,8 / 72	72	2 pieces all 350

W: Factory

²⁷ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.

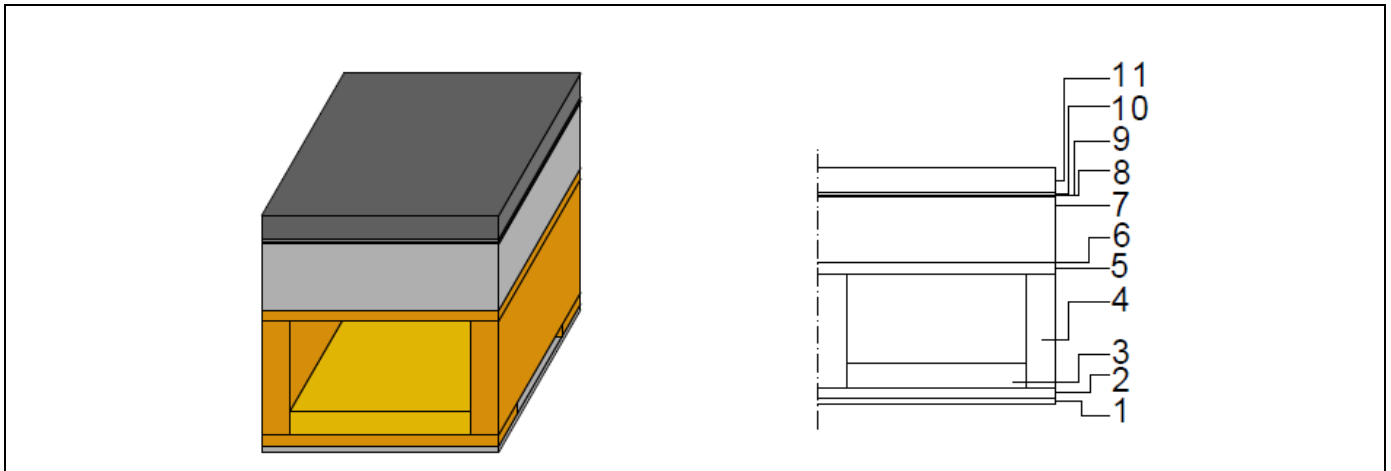
²⁸ The roofing components are not part of the kit.

B: Construction Side

Building physics characteristics*							
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]					U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,04	Weighted sound reduction index EN ISO 717- 1 R _w [dB]
	1	2	2.1	4 + 6	5 + 7		
DA_02_040	12,5 0,21	24 0,13	24 0,139	240 + 100 0,040	240 + 100 0,13	0,133	
DA_02_035	12,5 0,21	24 0,13	24 0,139	240 + 100 0,035	240 + 100 0,13	0,121	

- * The calculation has been done under the following conditions:
- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
 - Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
 - Possible shadowing has not been taken into account

T) DA_03 Flat roof



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ²⁹ (2006/673/EC)
W	2	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	24	D-s2, d0 (2003/593/EC)
W	2.1	Air layer	-	24	-
W	3	Mineral wool	EN 13162	50	A1
W	3.1	Air layer	-	190	-
W	4	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	240 / 70	D-s2, d0 (2003/593/EC)
W	5	Particle board Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	22	D-s2, d0 (2007/348/EC)
B	6	Vapour retarder layer	EN 13984 PE	0,2	E
B	7	Polystyrol foam	EN 13163 EPS DEO,dm	140	F
B	8	Protective fleece ³⁰		4	-
B	9	Plastic-Sheet ³⁰	-	1,5	-
B	10	Protective fleece ³⁰		6	-
B	11	Gravel ³⁰		50	-

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	2	Timber structure	Staple	EN 14592	1,8 / 63	63	300
W	3	Timber structure	Staple	EN 14592	1,8 / 63	63	300
W	8	Timber structure	Staple	EN 14592	1,8 / 63	63	200
B	9	Gypsum board	Drywall screw	EN 14566/A1	3,9 / 35	35	220

W: Factory

B: Construction Side

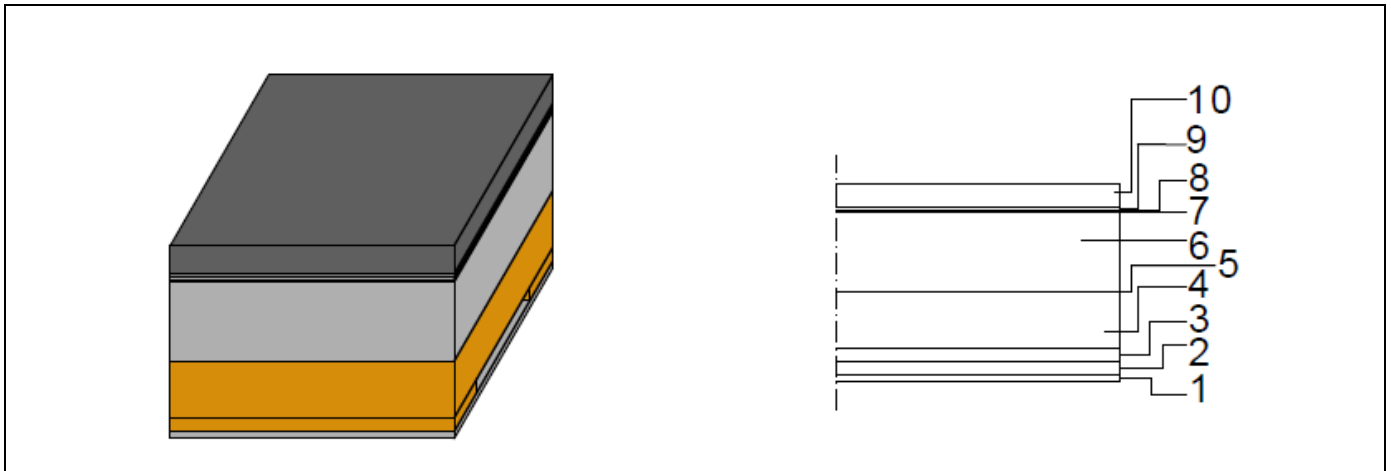
²⁹ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.
³⁰ The roofing components are not part of the kit.

Building physics characteristics*										
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]								U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,04	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	2.1	3	3.1	4	5	7		
DA_03_040	12,5 0,21	24 0,13	24 0,139	50 0,040	190 1,33	240 0,13	22 0,13	140 0,040	0,187	
DA_03_035	12,5 0,21	24 0,13	24 0,139	50 0,035	190 1,33	240 0,13	22 0,13	140 0,040	0,182	

* The calculation has been done under the following conditions:

- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
- Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
- Possible shadowing has not been taken into account

U) DA_04 Ceiling under balcony



Construction build-up:
(from the inside outwards)

	No.	Construction product	EN-Standard	Dimension [mm]	Reaction to fire
B	1	Gypsum board Density $\geq 800 \text{ kg/m}^3$	EN 520 Type F	12,5	A2-s1, d0 ³¹ (2006/673/EC)
W	2	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	24 / 80	D-s2, d0 (2003/593/EC)
W	2.1	Air layer		24	-
W	3	Particle board Density $\geq 600 \text{ kg/m}^3$	EN 13986 P5	24	D-s2, d0 (2007/348/EC)
W	4	Timber structure Density at 12 % MC $\geq 350 \text{ kg/m}^3$	EN 14081 C 24	$\geq 100 / 360$	D-s2, d0 (2003/593/EC)
W	5	Vapour retarder layer	EN 13984 PE	0,2	E
W	6	Polystyrol foam	EN 13163 EPS DEO,dm	140	F
W	7	Protective fleece 300 g ³²		4	-
B	8	Plastic-Sheet ³²	-	1,5	-
B	9	Protective fleece for construction ³²		6	-
B	10	Concrete block on stilts bearing ³² Grammage $\geq 85 \text{ kg/m}^2$		40	-

Fixing devices
(from the inside outwards)

	To No	Construction product	Type	EN-Standard	Dimension [mm]	Length [mm]	Spacing [mm]
W	1	Gypsum board	Staple	EN 14592	1,8 / 63	63	120
W	2	Timber structure	Staple	EN 14592	1,8 / 63	63	2x pro 400
W	3	Particle board	Staple	EN 14592	1,8 / 63	63	120

W: Factory

B: Construction Side

³¹ The reaction to fire of the gypsum board depends on the paper weight. The reaction to fire of the gypsum core is Euro class A1.
³² The roofing components are not part of the kit.

Building physics characteristics*								
Build-up	Layer No. Thickness [mm] / Lambda [W / m K]						U-Value EN ISO 6946 [W/m ² K] R _{si} = 0,10 R _{se} = 0,04	Weighted sound reduction index EN ISO 717-1 R _w [dB]
	1	2	2.1	3	4	6		
DA_04	12,5 0,21	24 0,12	24 0,139	22 0,13	100 0,13	140 0,040	0,208	42

* The calculation has been done under the following conditions:

- Outside climate: hourly climate data of the hygrothermal reference year for Holzkirchen
- Inside climate: derivation of the outside climate according to EN 15026 for the living room with ordinary allocation
- Possible shadowing has not been taken into account

Annex B Construction details

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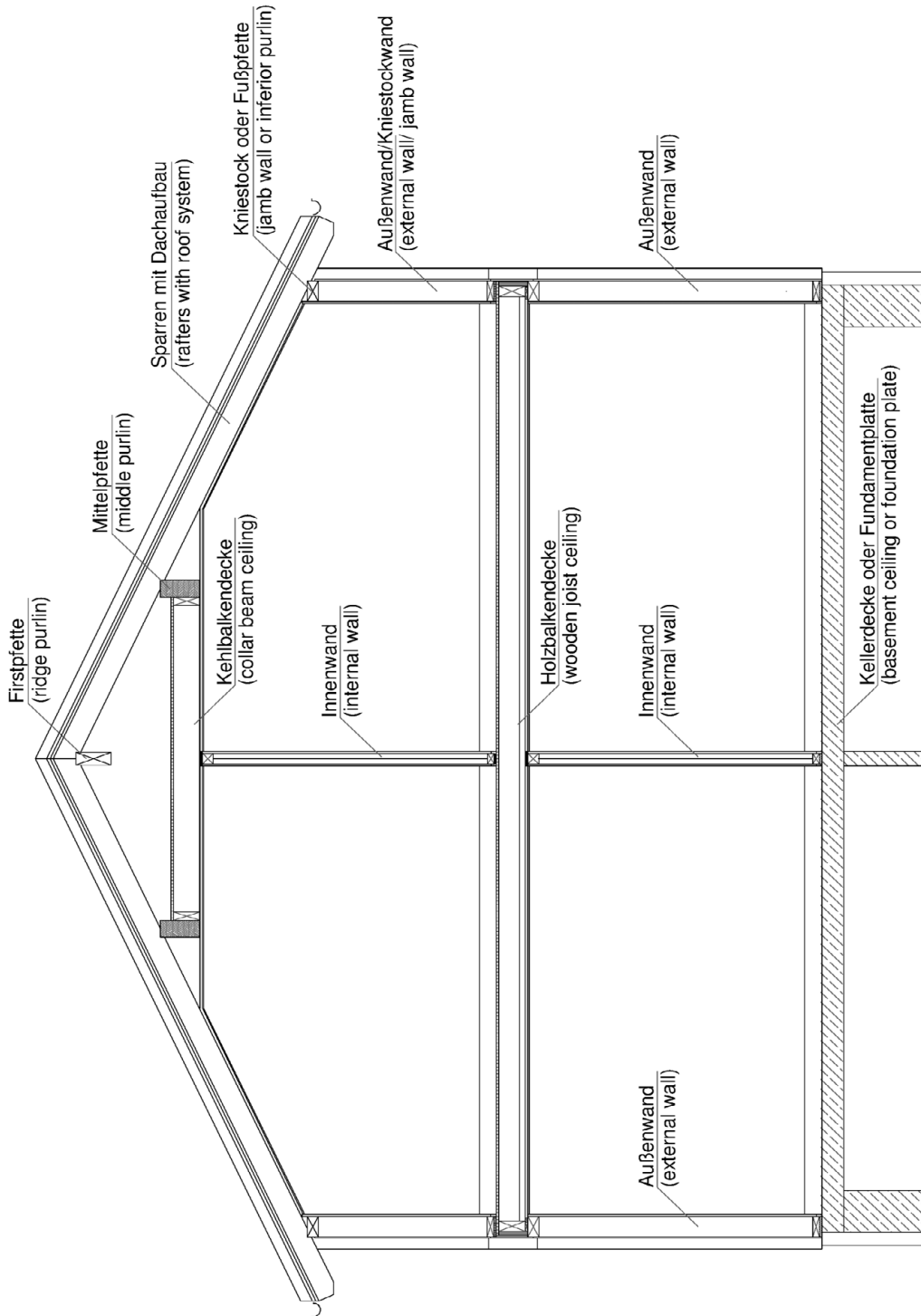
"Bien-Zenker"
"Living-Haus"

table of content

Annex B

English translation prepared by DIBt

**Gebäudequerschnitt - Prinzip-Skizze
 (building cross-section - principle sketch)**

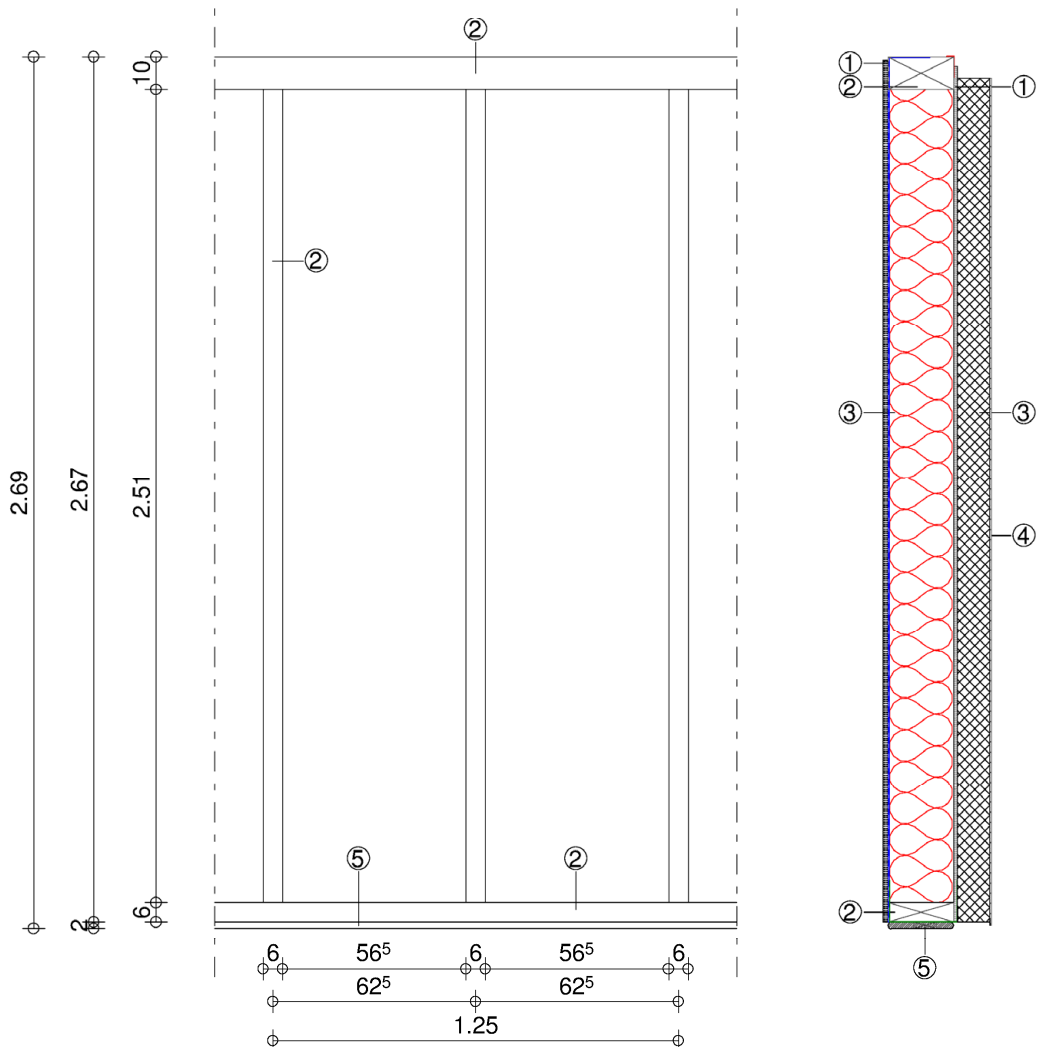


"Bien-Zenker"
 "Living-Haus"

building cross-section - principle sketch

Annex B.1

Standard Außenwandelement (standard external wall element)



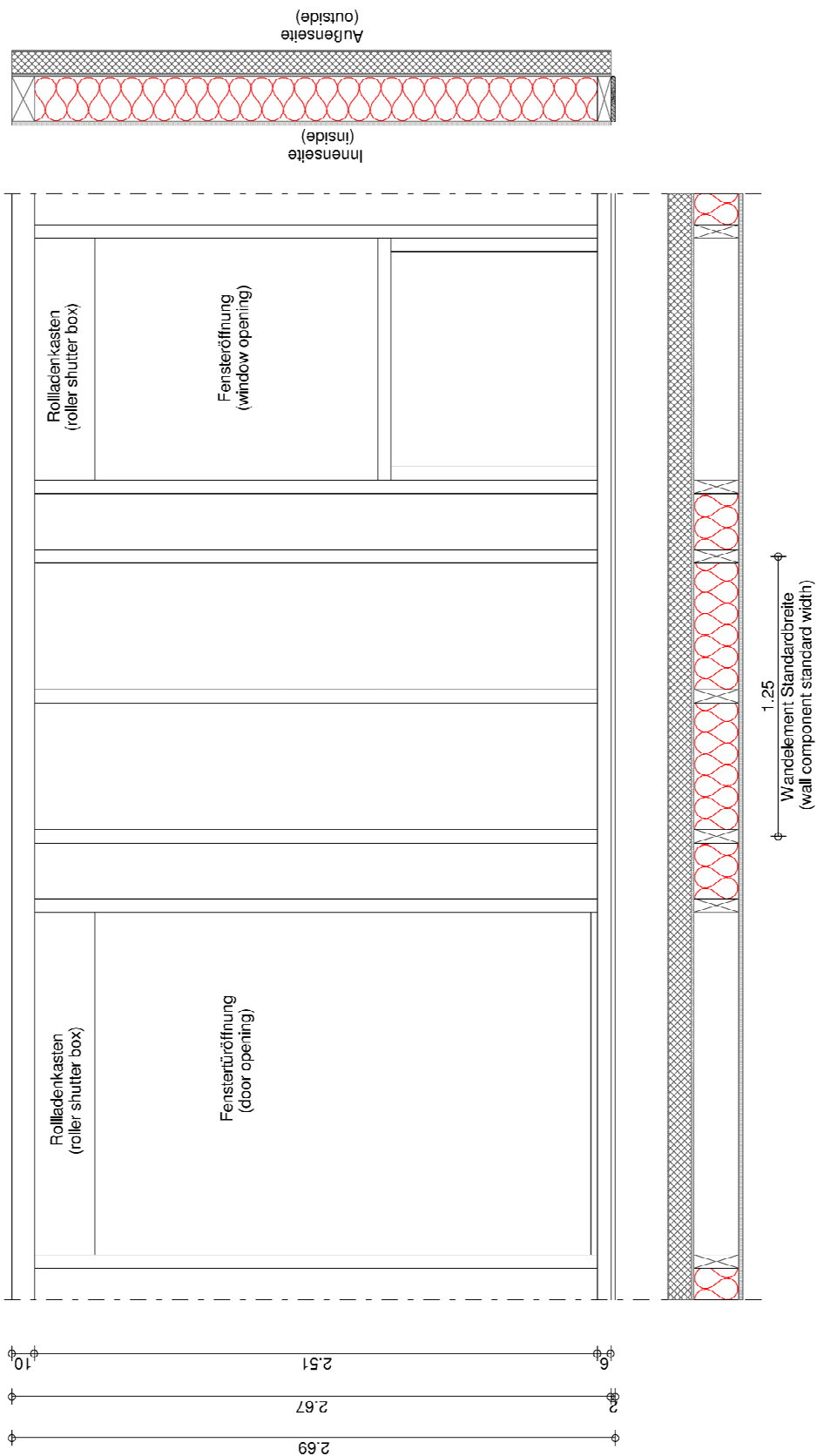
- | | |
|------------------------------------|---|
| 1 = Wandbeplankung
(wall panel) | 4 = Putz
(plaster) |
| 2 = Rahmenhölzer
(timber studs) | 5 = Quellmörtel und Distanz-Platten
(expanding mortar and spacer plates) |
| 3 = Dämmung
(insulation) | |

"Bien-Zenker"
"Living-Haus"

standard external wall element

Annex B.2

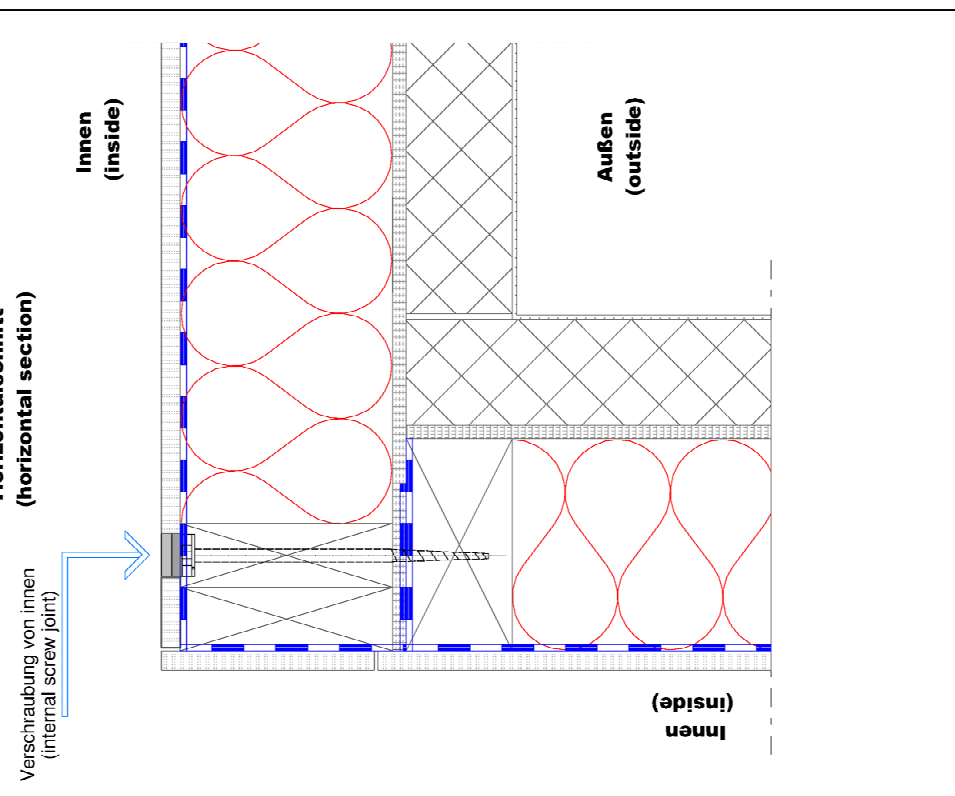
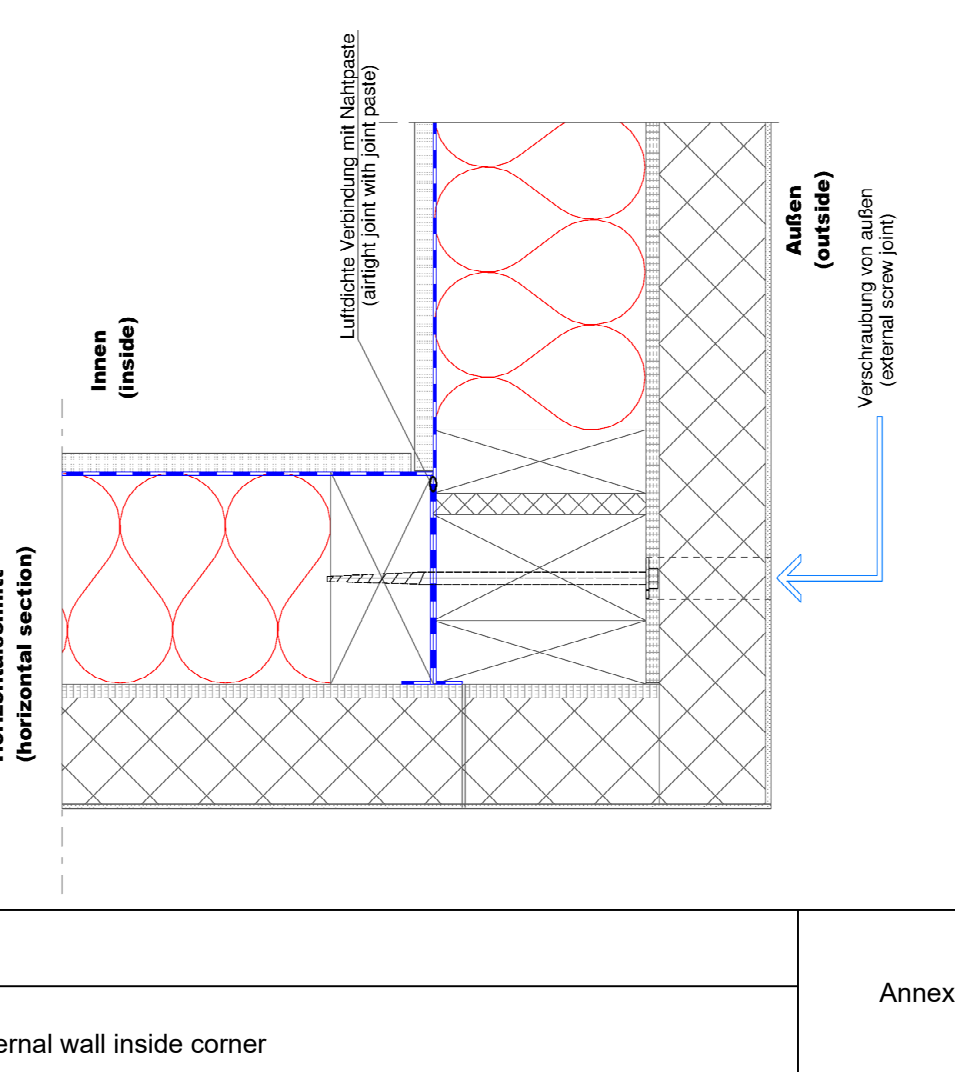
Ansicht Außenwandelement (Beispiel)
(view of external wall element (example))



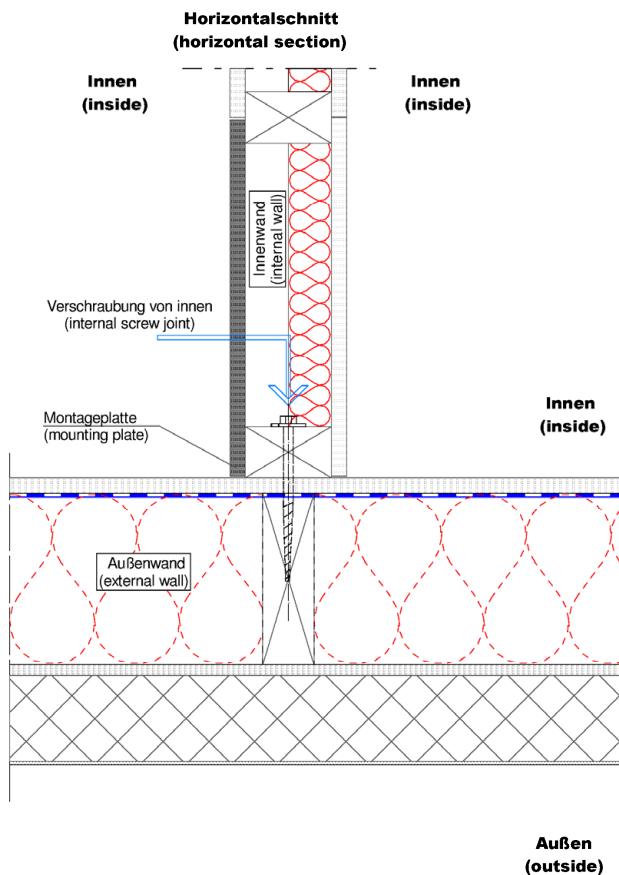
"Bien-Zenker"
"Living-Haus"

view of external wall element (example)

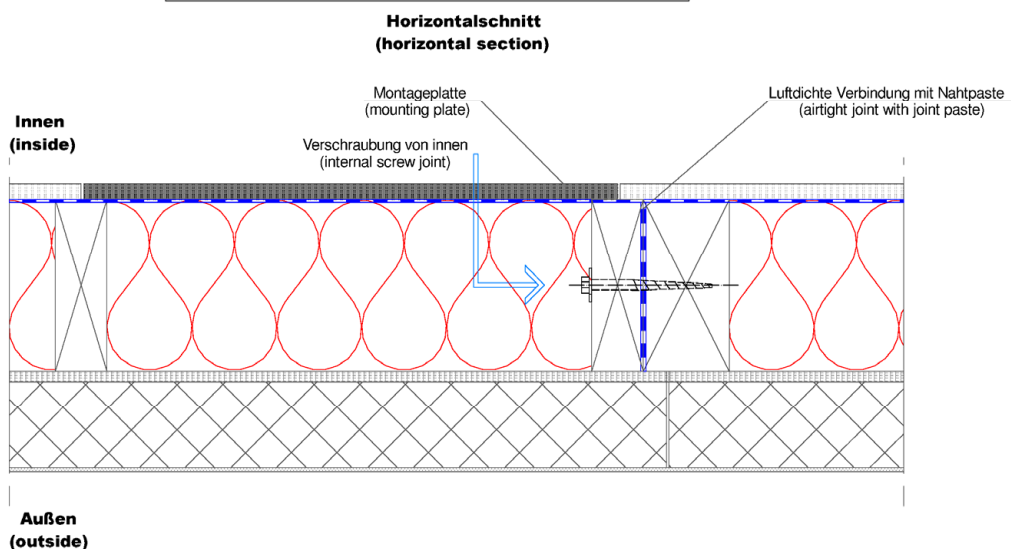
Anhang B.3

<p>Außenwanddecke (external wall corner)</p> <p>Horizontalschnitt (horizontal section)</p> <p>Innen (inside)</p> <p>Außen (outside)</p> <p>Verschraubung von außen (external screw joint)</p> 	<p>Außenwand Innenecke (external wall inside corner)</p> <p>Horizontalschnitt (horizontal section)</p> <p>Innen (inside)</p> <p>Außen (outside)</p> <p>Verschraubung von innen (internal screw joint)</p>  <p>Luftdichte Verbindung mit Nahtpaste (airtight joint with joint paste)</p> <p>Verschraubung von außen (external screw joint)</p>
<p>"Bien-Zenker" "Living-Haus"</p> <p>external wall corner / external wall inside corner</p>	<p>Annex B.4</p>

**Außenwand-Innenwandanschluss
(internal wall connection with external wall)**



**Längsstoß, Außenwand
(external wall joint with external wall)**



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"Bien-Zenker"
"Living-Haus"

internal wall connection with external wall / external wall joint with external wall

Annex B.5

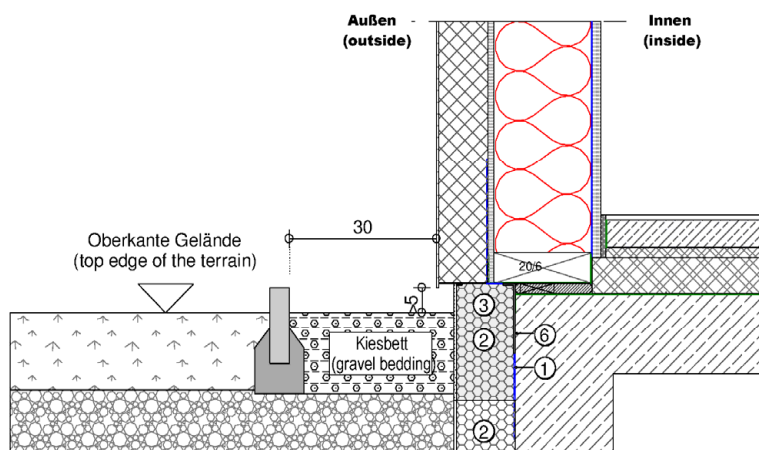
Anschluss Außenwand an Gelände (external wall joint with terrain)

mit Dichtungsbahn
(with sealing sheet)

Vertikalschnitt
(vertical section)

In Bereichen mit Dichtungsbahn darf der Außenbelag bis max. 5 cm unter Unterkante der Fassade geführt werden.

(In areas with sealing sheet, the external covering may be laid up to a maximum of 5 cm below the lower edge of the facade.)



Schnitt Wand (sectional drawing of the wall)

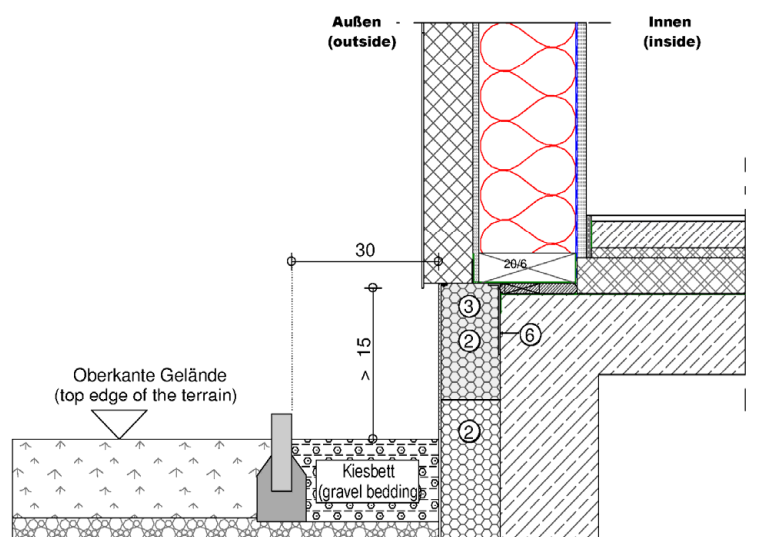
- ① Abdichtungsbahn nach EN 13969
(hinter Perimeterdämmung an Beton kleben)
(sealing sheet according to EN 13969)
(bond to concrete behind perimeter insulation)
- ② Perimeterdämmung
(perimeter insulation)
- ③ Fugendichtband
(joint tape)
- ⑥ Luftdichtband, 15 cm umlaufend
(air-proofing strip, 15 cm circumferential)

ohne Dichtungsbahn
(without sealing sheet)

Vertikalschnitt
(vertical section)

In Bereichen ohne Dichtungsbahn ist zwingend eine Sockelhöhe von 30 cm/bzw. 15 cm mit Kiesbett einzuhalten.

(In areas without sealing sheet, the height of the base must be 30 cm/ or 15 cm with the gravel bedding)



Schnitt Wand (sectional drawing of the wall)

- ⑥ Luftdichtband, 15 cm umlaufend
(air-proofing strip, 15 cm circumferential)
- ② Perimeterdämmung
(perimeter insulation)
- ③ Fugendichtband
(joint tape)

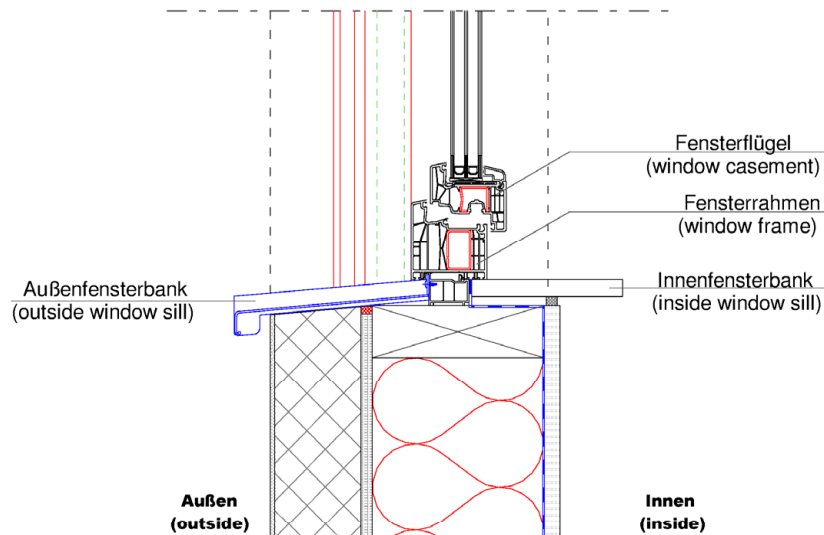
"Bien-Zenker"
"Living-Haus"

external wall joint with terrain

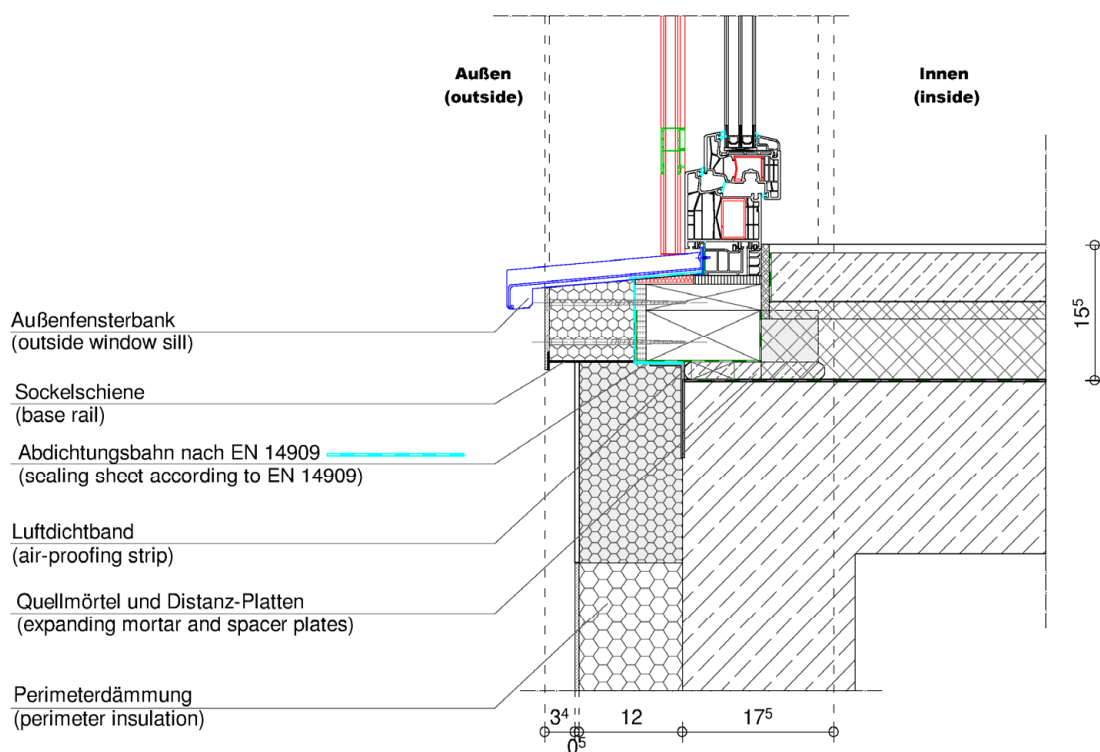
Annex B.6

**Anschluss Fensterbank
(window sill connection)**

Vertikalschnitt
(vertical section)



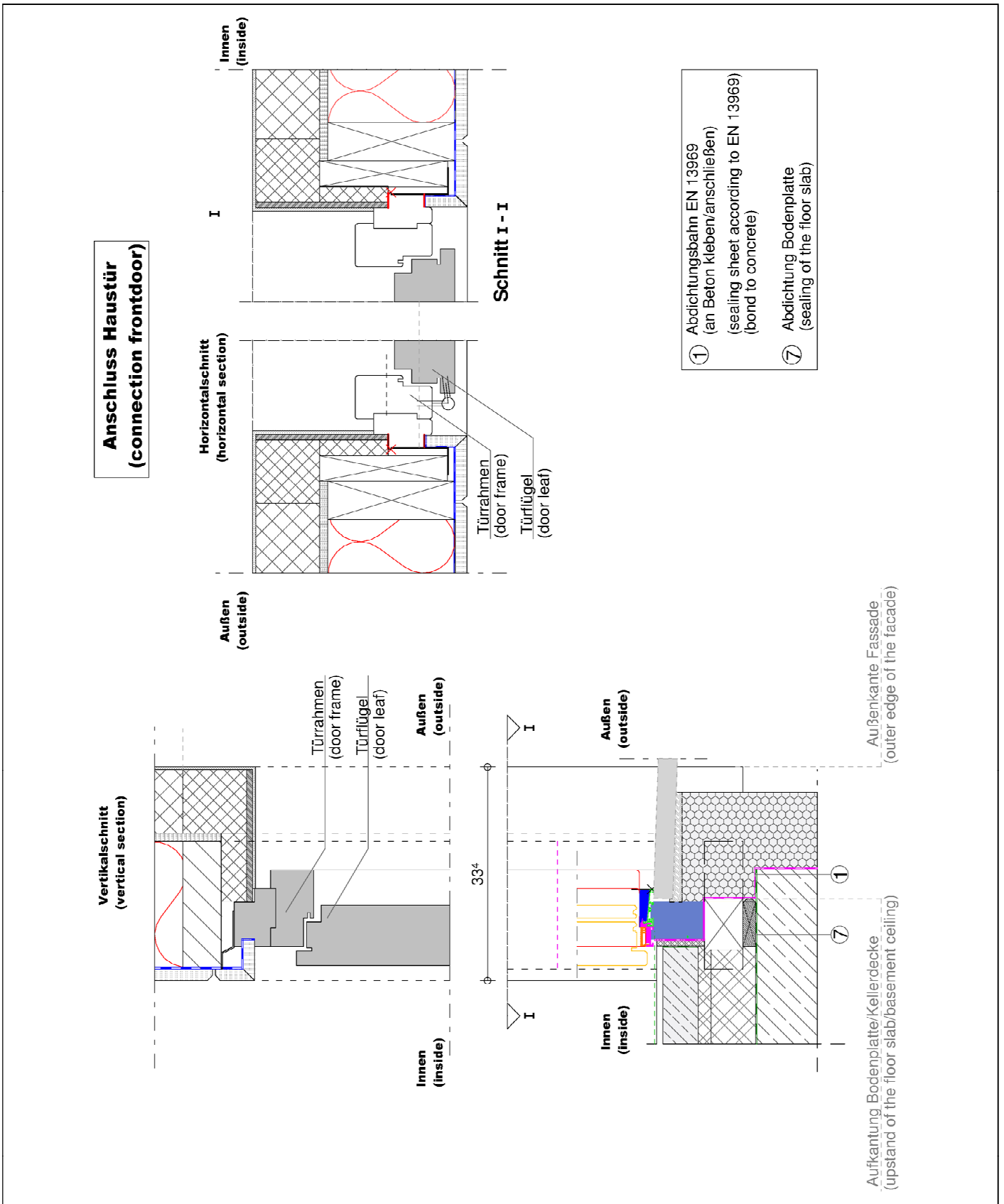
**Terrassentür Austritt
(patio door step)**



"Bien-Zenker"
"Living-Haus"

window sill connection / patio door step

Annex B.7

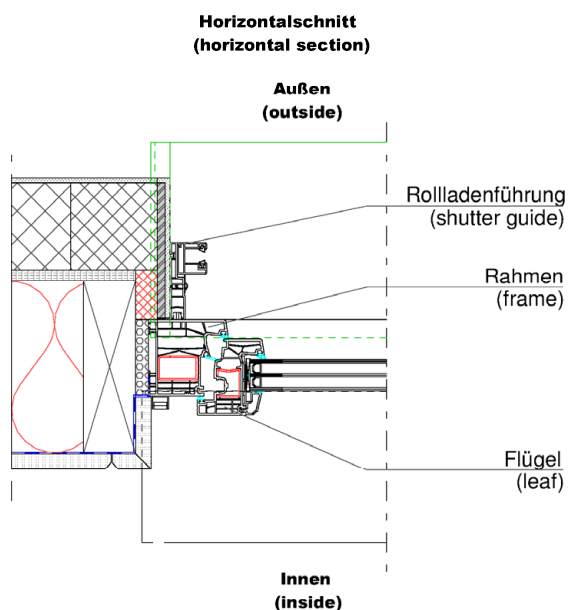


"Bien-Zenker"
"Living-Haus"

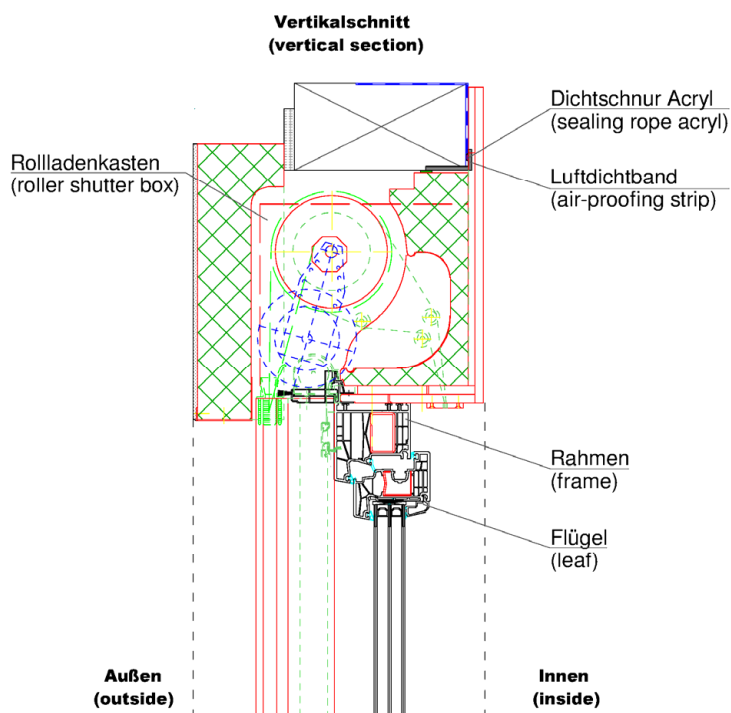
connection frontdoor

Annex B.8

**Seitlicher Anschluss Fenster und Terrassentür mit Rollläden
(side connection, window and patio door with roller shutters)**



**Oberer Anschluss Fenster und Terrassentür mit Rollläden
(upper connection, window and patio door with roller shutters)**



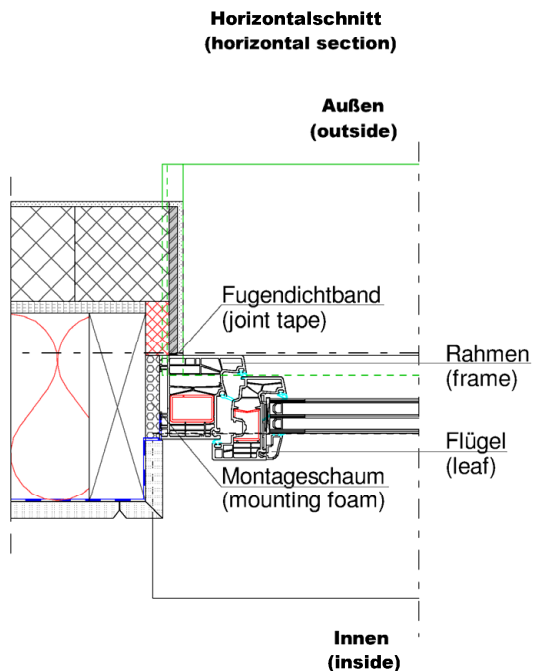
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"Bien-Zenker"
"Living-Haus"

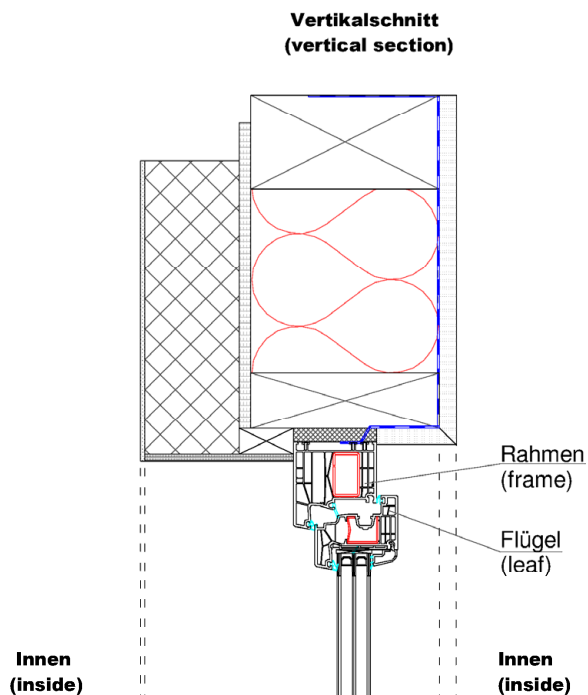
side connection, window and patio door with roller shutters / upper connection

Annex B.9

**Seitlicher Anschluss Fenster und Terrassentür ohne Rollläden
(side connection, window and patio door without roller shutters)**



**Oberer Anschluss Fenster und Terrassentür ohne Rollläden
(upper connection, window and patio door without roller shutters)**



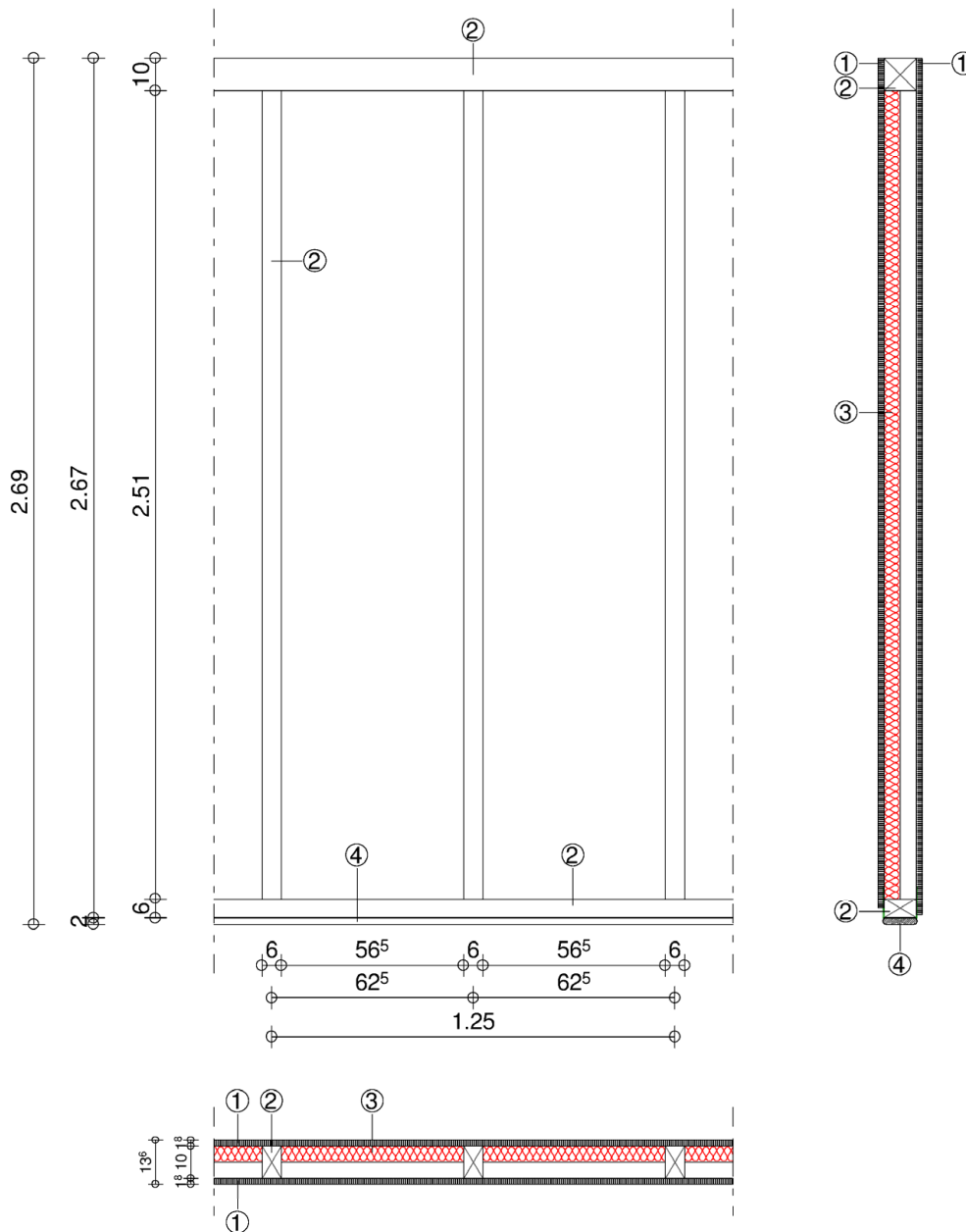
Electronic copy of the ETA by DIBt: ETA-16/0092

"Bien-Zenker"
"Living-Haus"

side connection, window and patio door without roller shutters / upper connection

Annex B.10

Standard Innenwandelement (standard internal wall element)



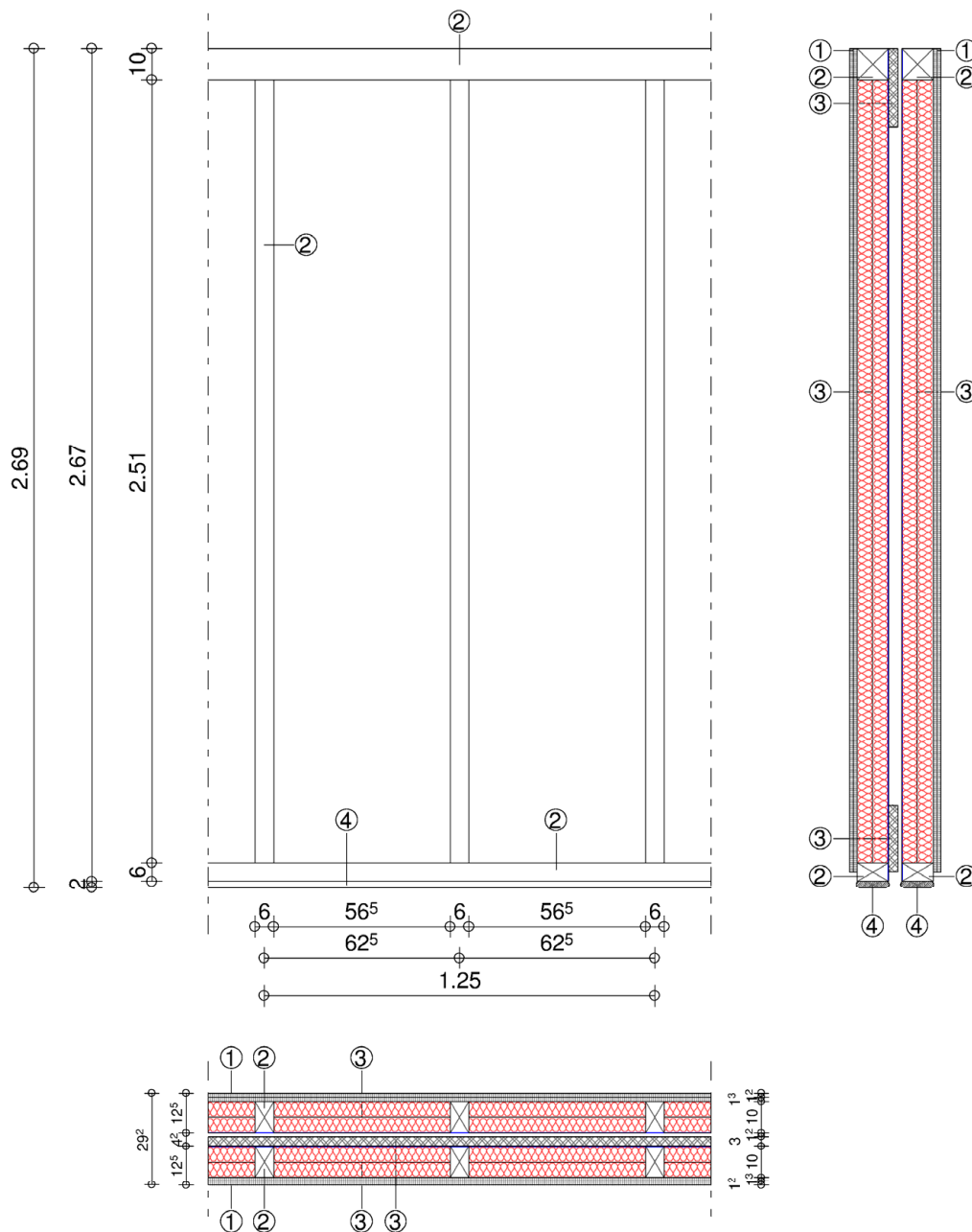
- | | |
|------------------------------------|---|
| 1 = Wandbeplankung
(wall panel) | 3 = Dämmung
(insulation) |
| 2 = Rahmenhölzer
(timber studs) | 4 = Quellmörtel und Distanz-Platten
(expanding mortar and spacer plates) |

"Bien-Zenker"
"Living-Haus"

standard internal wall element

Annex B.11

Standard Wohnungstrennwandelement (standard apartment partition wall element)



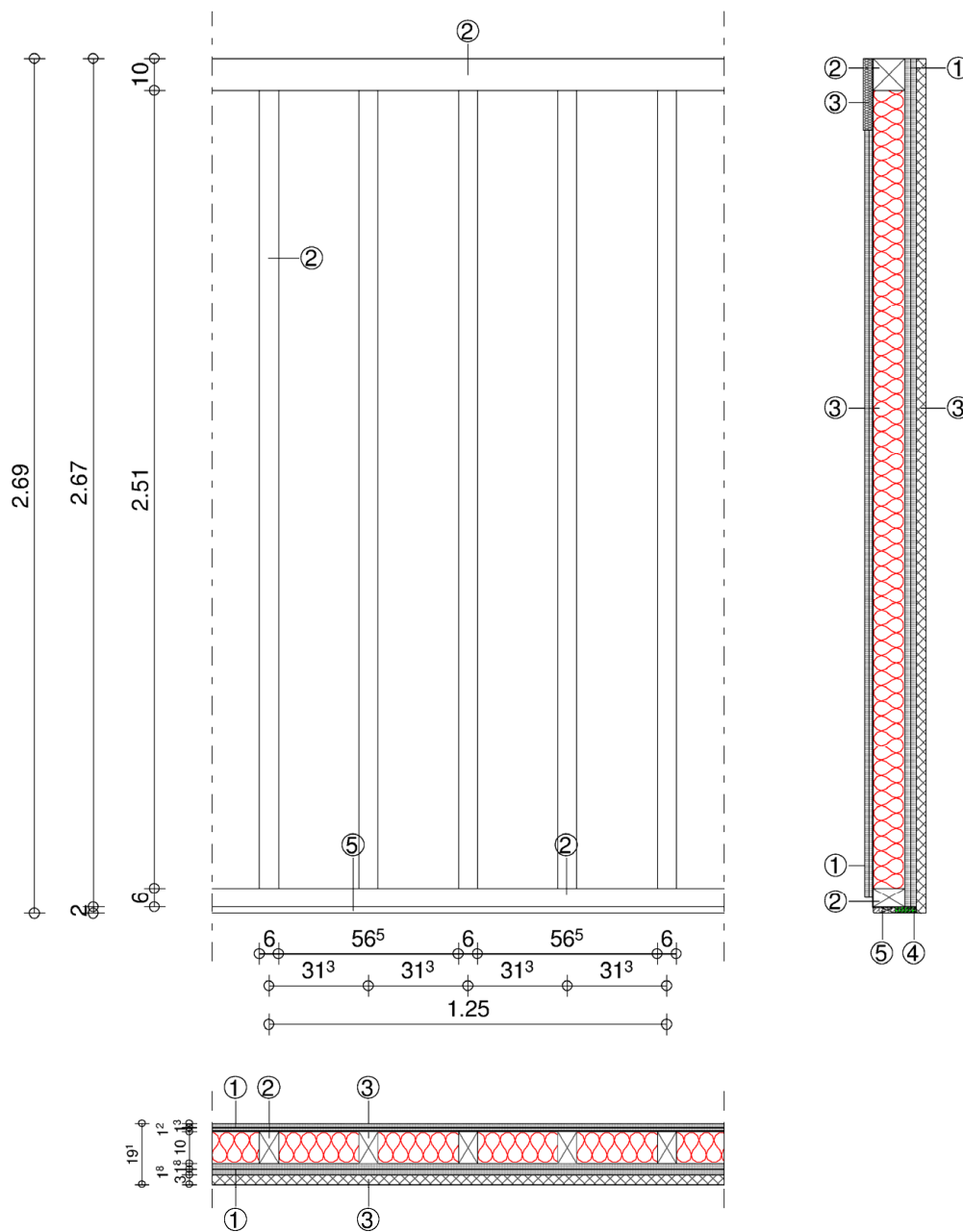
- | | |
|------------------------------------|---|
| 1 = Wandbeplankung
(wall panel) | 3 = Dämmung
(insulation) |
| 2 = Rahmenhölzer
(timber studs) | 4 = Quellmörtel und Distanz-Platten
(expanding mortar and spacer plates) |

"Bien-Zenker"
"Living-Haus"

standard apartment partition wall element

Annex B.12

Standard Gebäudetrennwandelement (standard party wall element)



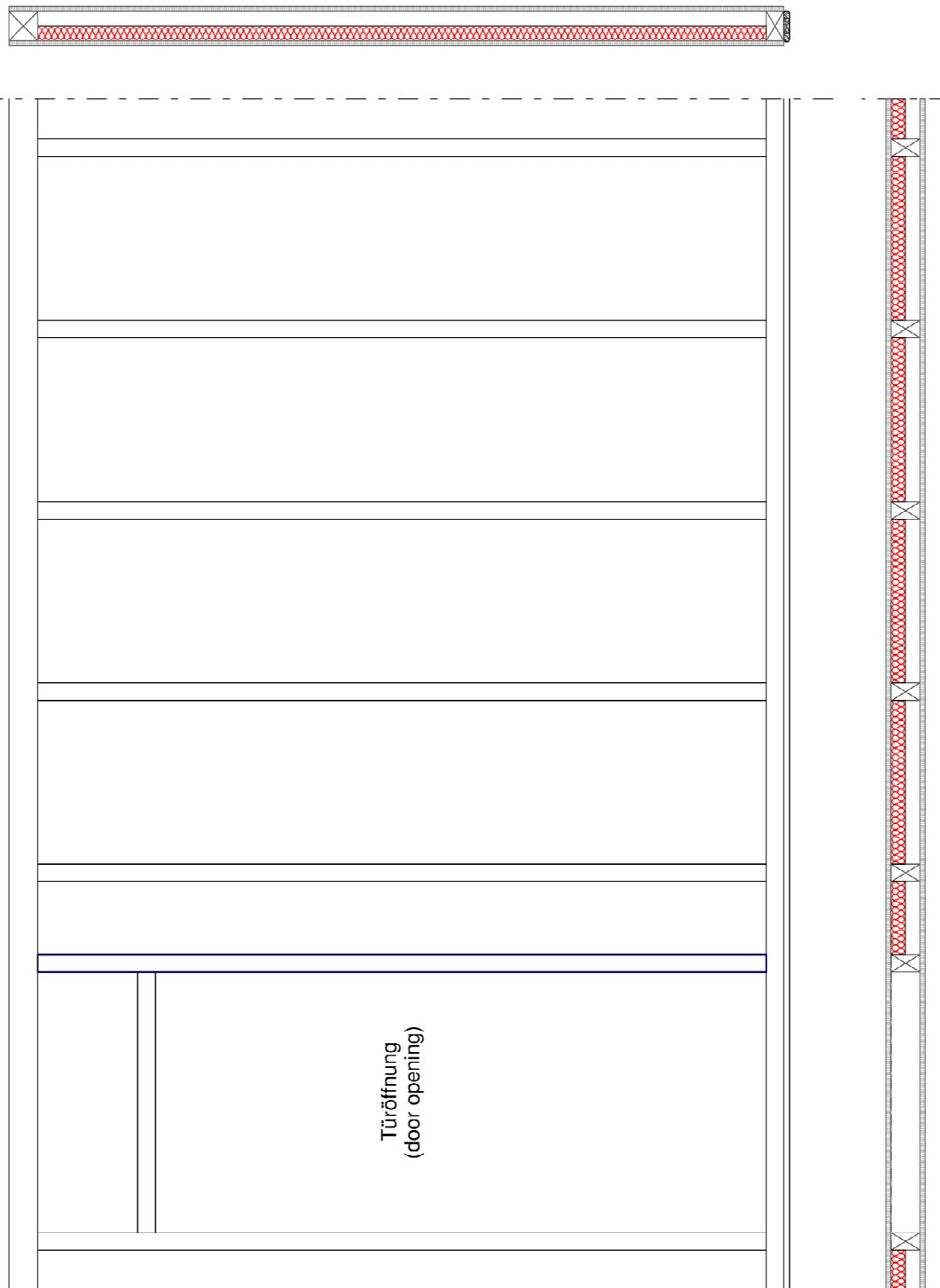
- | | |
|------------------------------------|---|
| 1 = Wandbeplankung
(wall panel) | 4 = Brandschutzplatte
(fire protection board) |
| 2 = Rahmenhölzer
(timber studs) | 5 = Quellmörtel und Distanz-Platten
(expanding mortar and spacer plates) |
| 3 = Dämmung
(insulation) | |

"Bien-Zenker"
"Living-Haus"

standard party wall element

Annex B.13

Ansicht Innenwandelement (Beispiel)
(view of internal wall element (example))



ϕ	2.51	ϕ
ϕ	2.67	ϕ
ϕ	2.69	ϕ

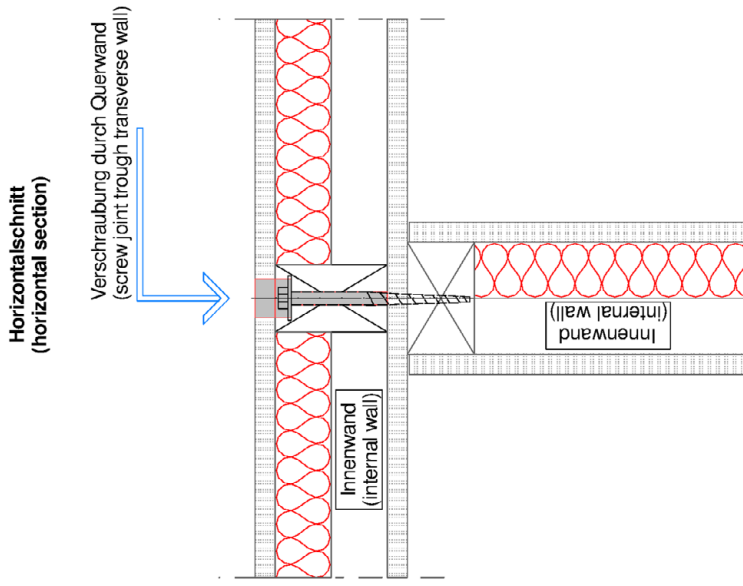
"Bien-Zenker"
 "Living-Haus"

Annex B.14

view of internal wall element (example)

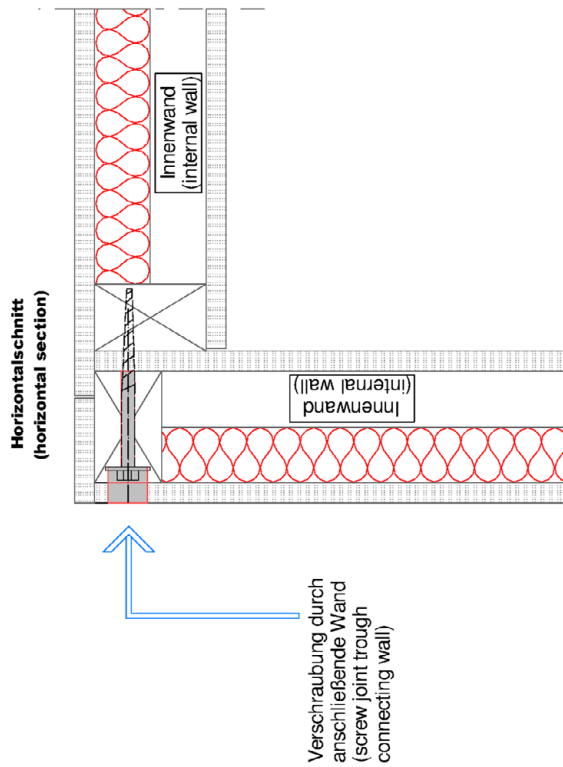
**T-Anschluss, Innenwand
(internal wall connection in T-form)**

Verschraubung durch anschließende Wand
(screw joint through connecting wall)

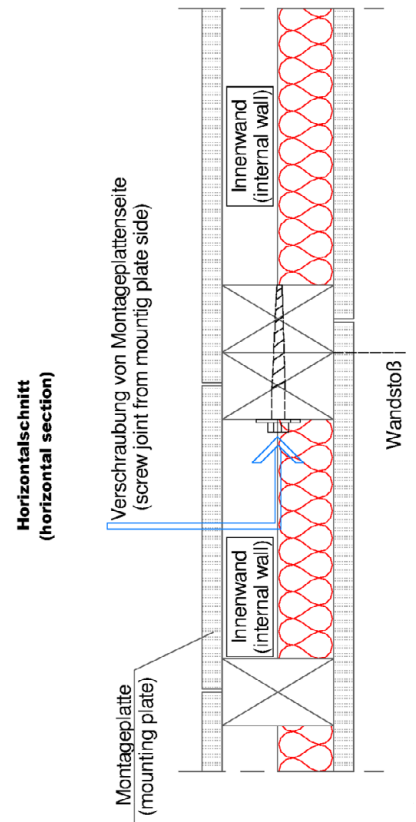


**Eck-Anschluss, Innenwand
(internal wall connection corner)**

Verschraubung durch anschließende Wand
(screw joint through connecting wall)



**Längsstoß, Innenwand
(internal wall joint with internal wall)**

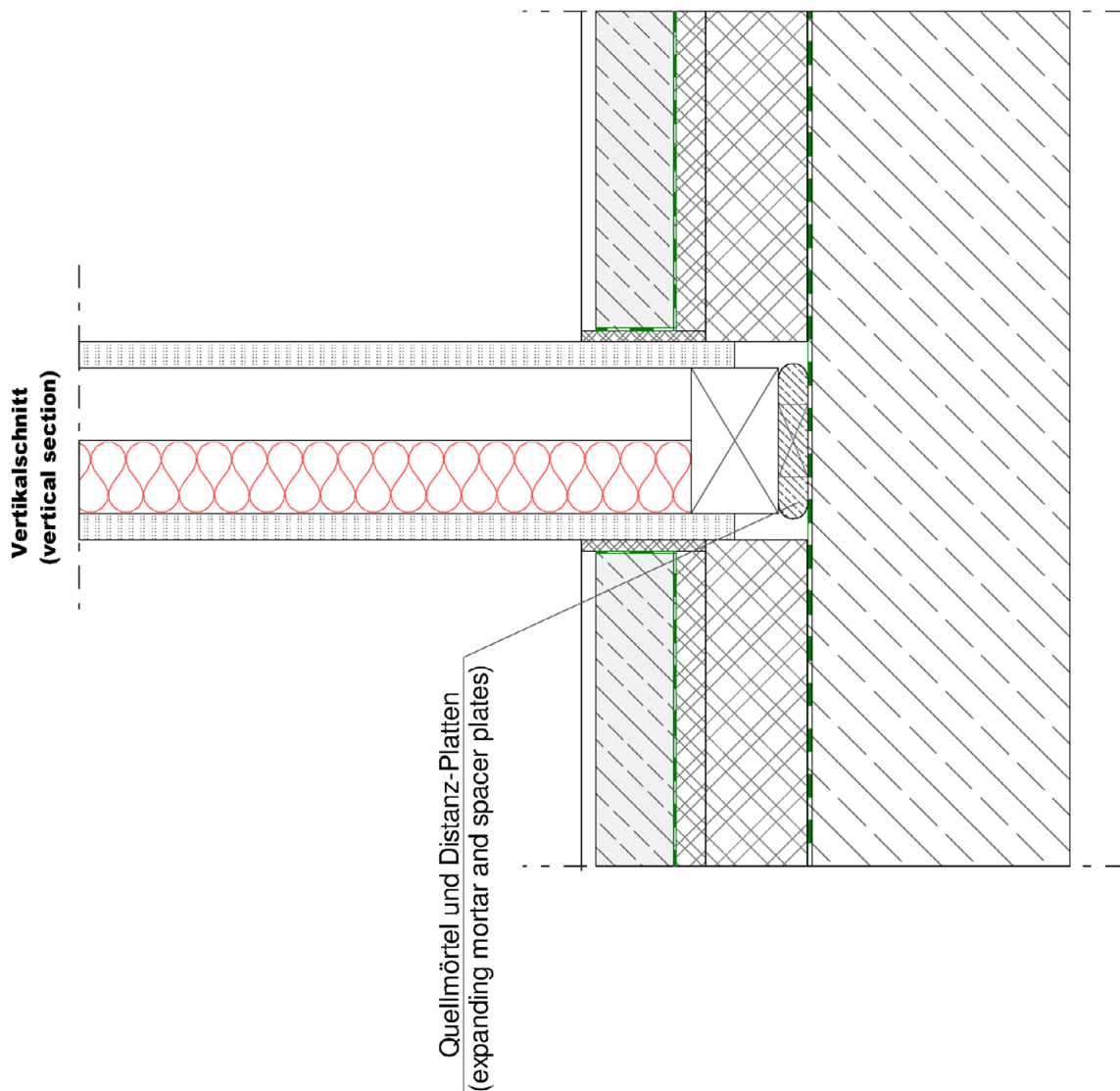


"Bien-Zenker"
"Living-Haus"

Annex B.15

internal wall connection corner / connection in T-form / joint with internal wall

**Anschluss Innenwand an Fundamentplatte/Kellerdecke
(connection between internal wall and foundation plate/ basement ceiling)**



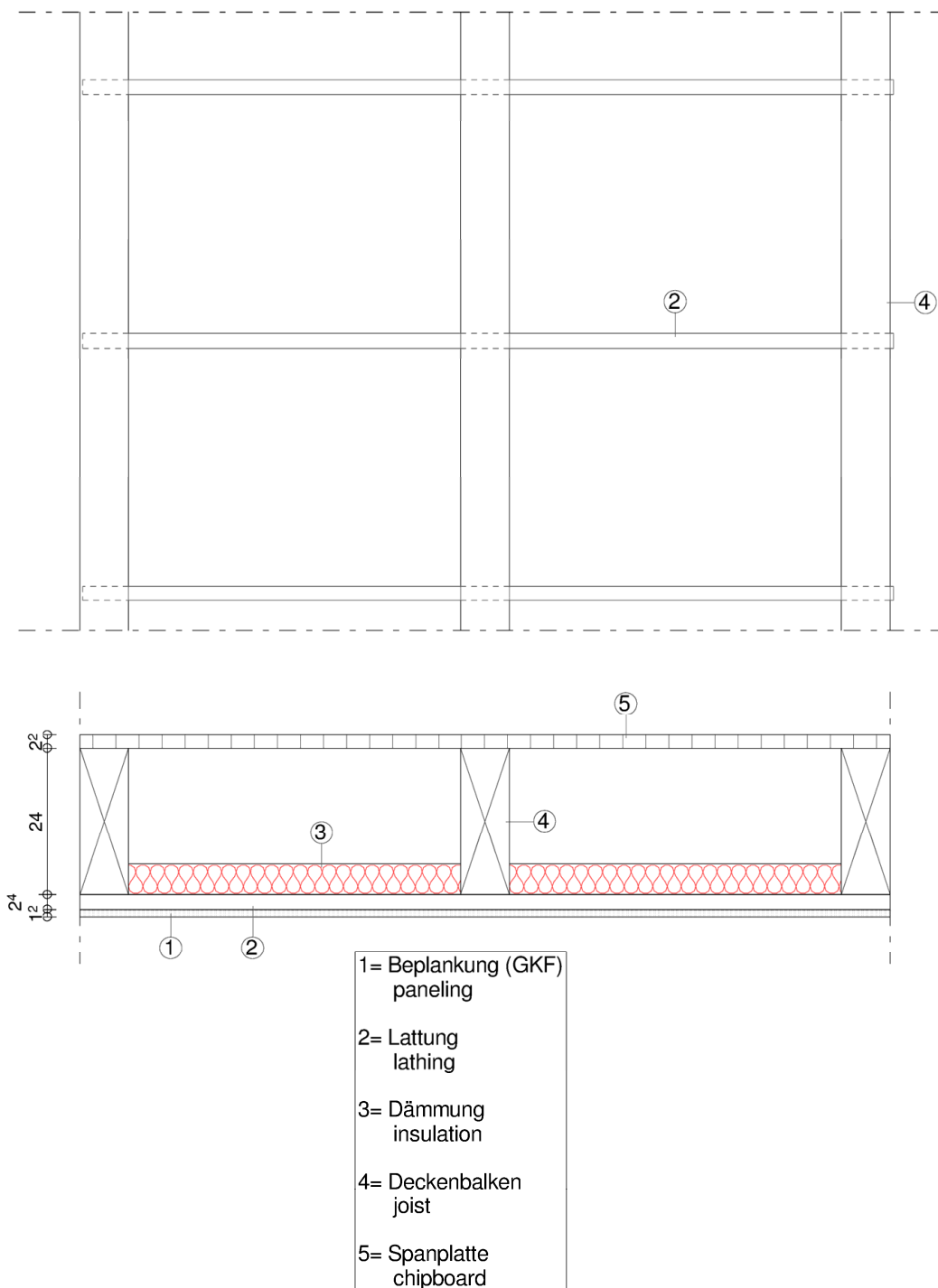
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"Bien-Zenker"
"Living-Haus"

connection between internal wall and foundation plate/ basement ceiling

Annex B.16

**Schnitt durch Decke
 (sectional drawing of the ceiling)**



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"Bien-Zenker"
 "Living-Haus"

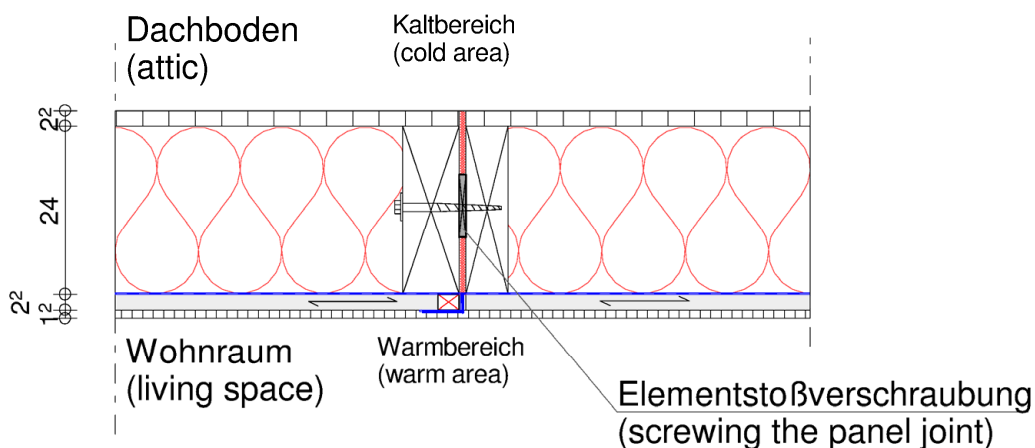
sectional drawing of the ceiling

Annex B.17

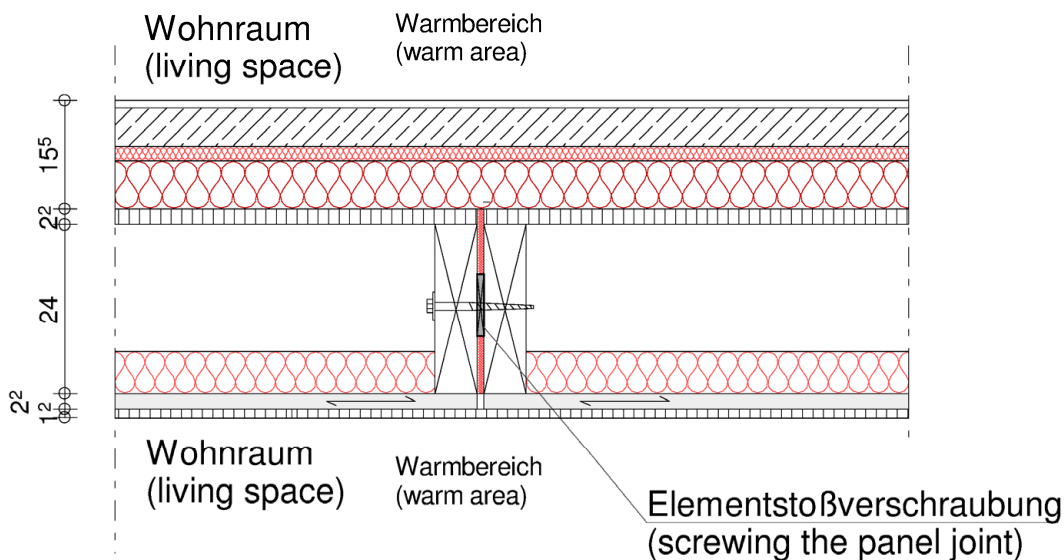
Elementstoß, Decke/Kehlbalkendecke (ceiling element joint)

**Vertikalschnitt
(vertical section)**

**Kehlbalkendecke
(collar beam ceiling)**



**Geschossdecke
(storey ceiling)**



"Bien-Zenker"
"Living-Haus"

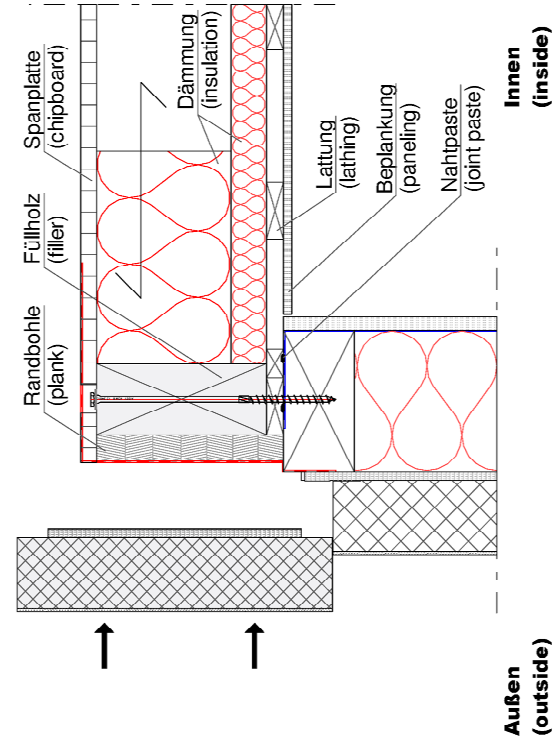
ceiling element joint

Annex B.18

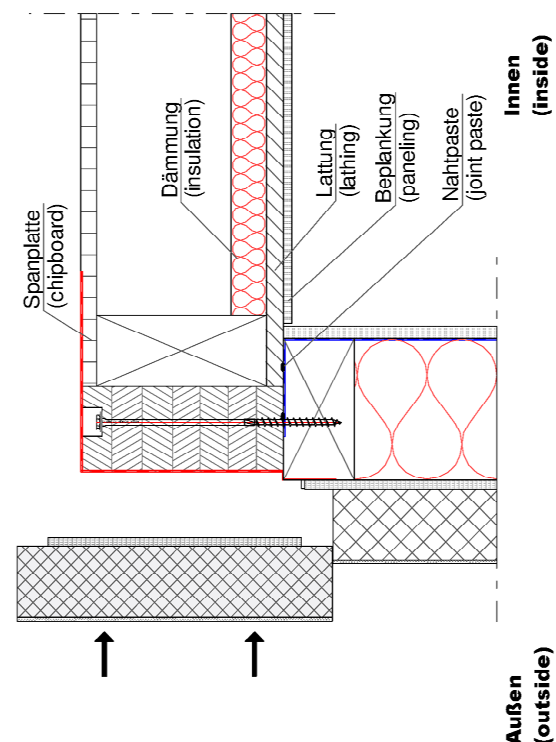
**Detail Randbalken EG/OG
(detailed drawing of the edge beam to ground floor/top floor)**

Vertikalschnitt
(vertical section)

Deckenspannrichtung senkrecht zur Außenwand
(joists spans vertical external wall)



Deckenspannrichtung parallel zur Außenwand
(joists spans parallel external wall)

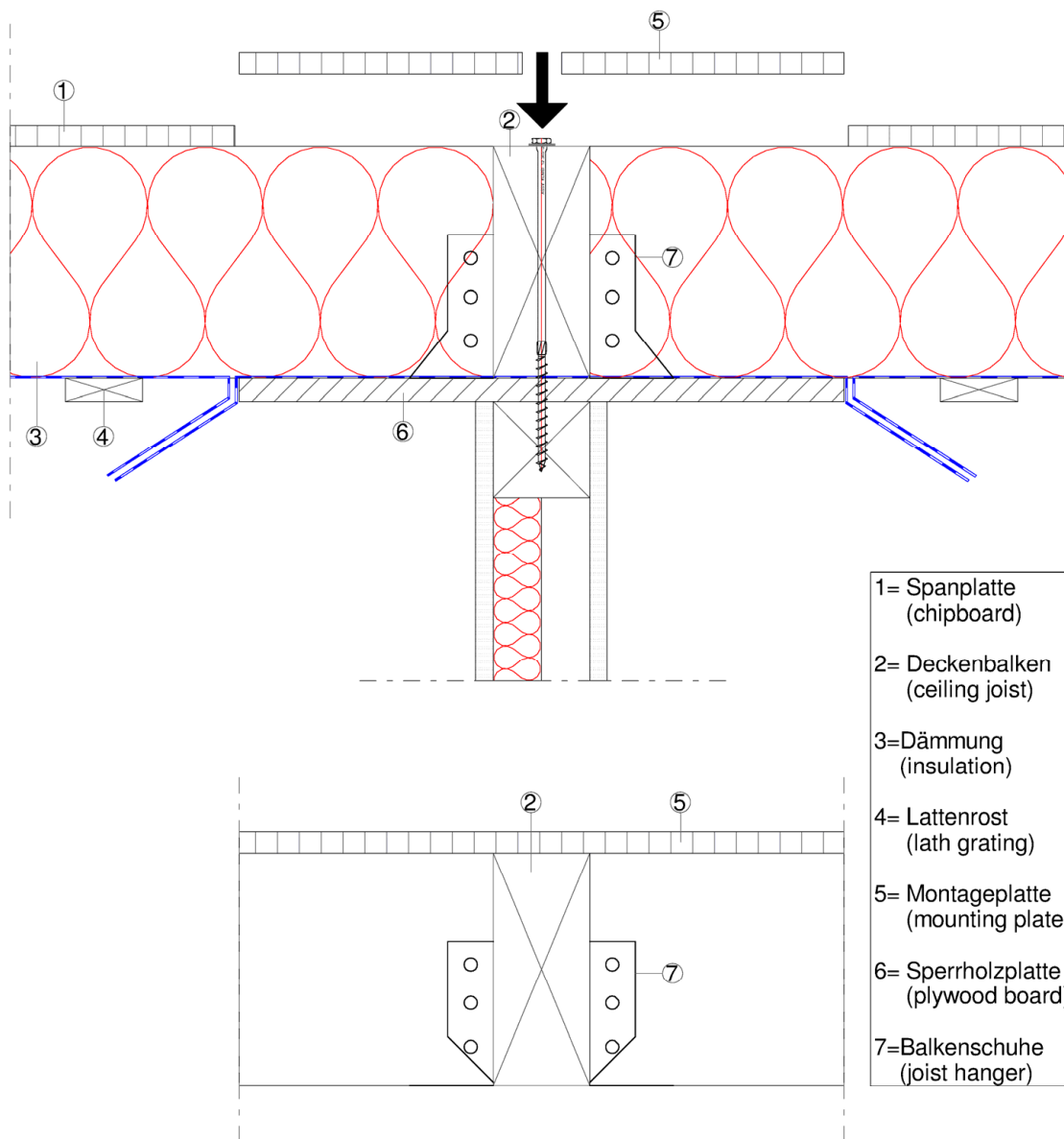


"Bien-Zenker"
"Living-Haus"

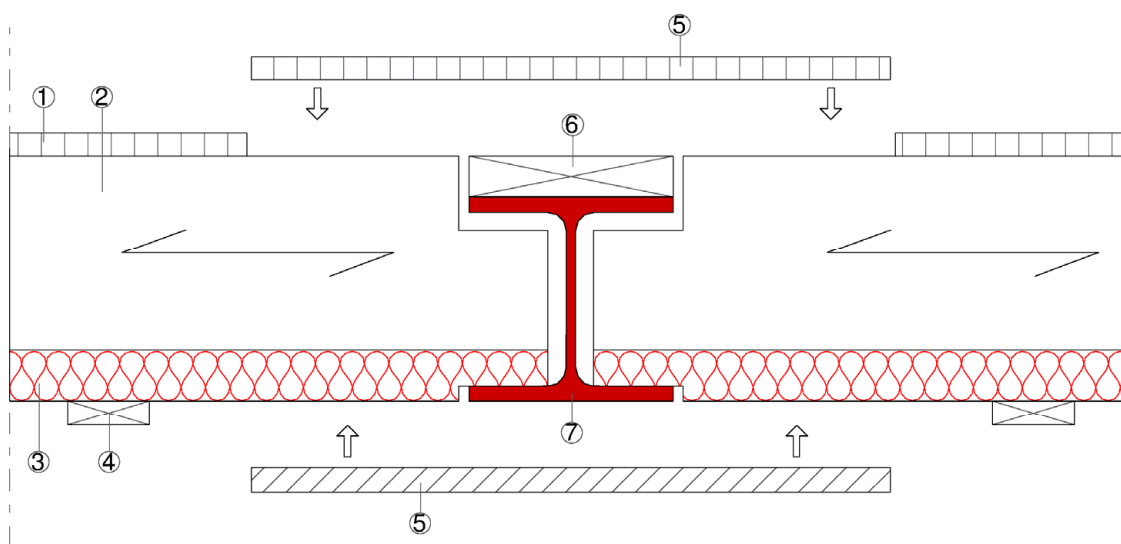
detailed drawing of the edge beam to ground floor/top floor

Annex B.19

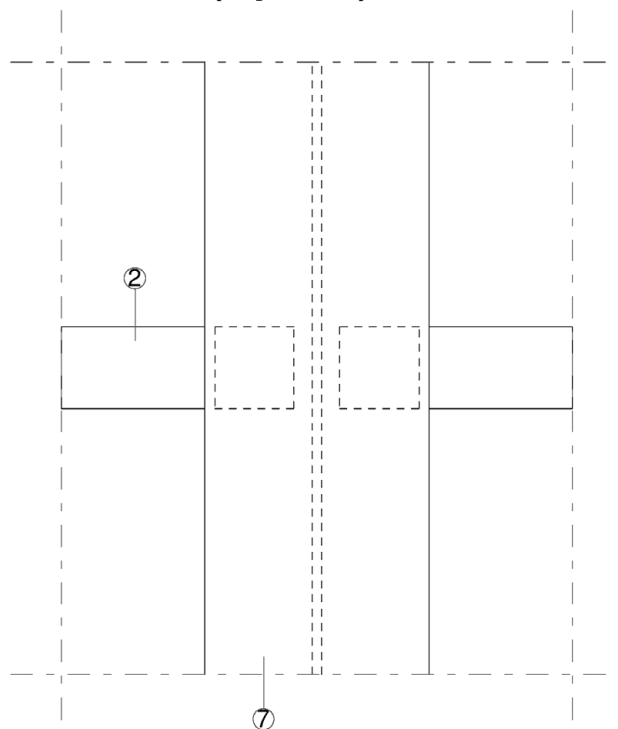
Kehlbalkenstoß (collar beam joint)



Deckenbalken - Auflager auf Stahlträger (ceiling joist - beam in the steel girder)



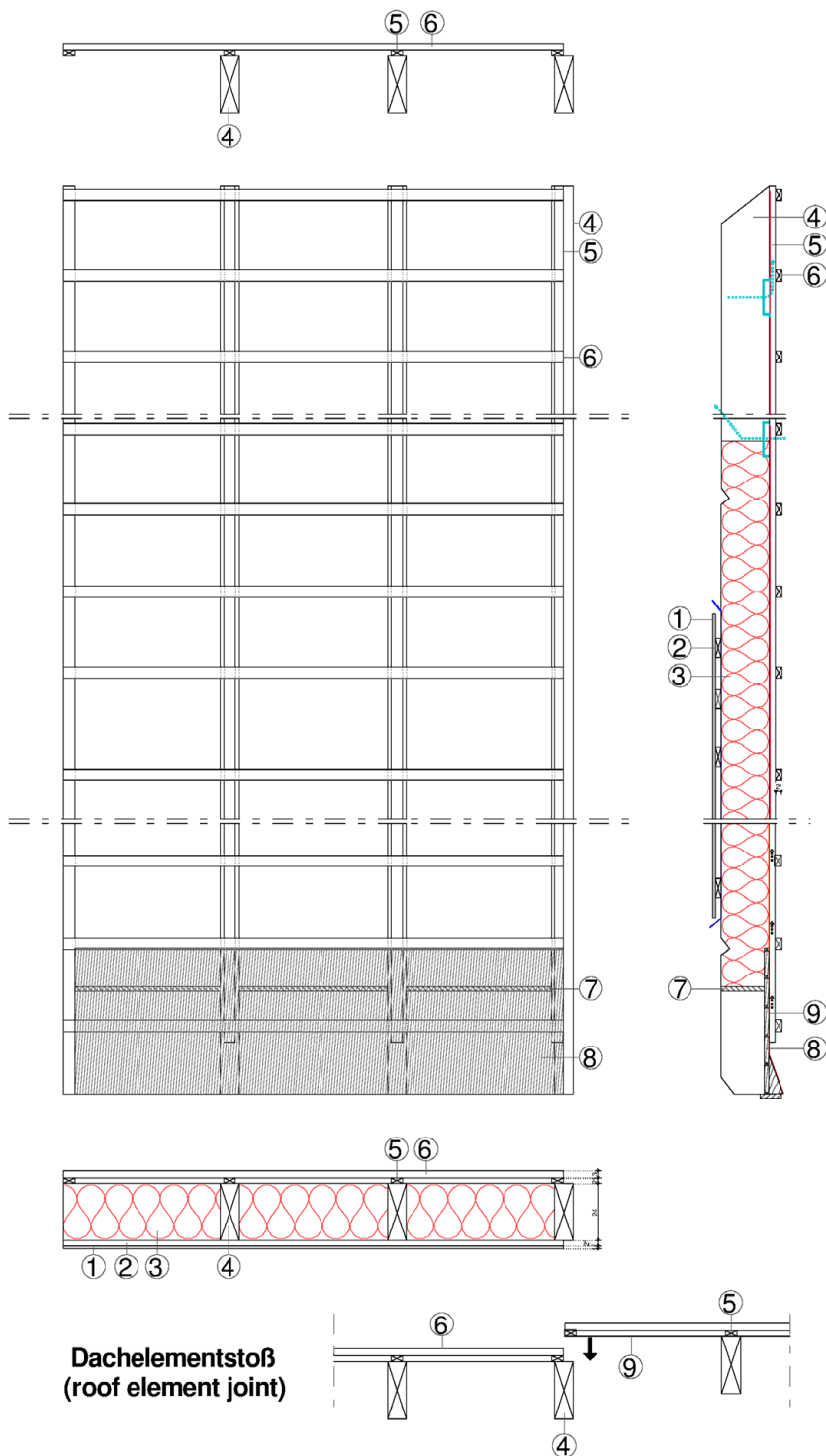
**Draufsicht
(top view)**



- 1= Spanplatte
(chipboard)
- 2= Deckenbalken
(ceiling joist)
- 3=Dämmung
(insulation)
- 4= Lattenrost
(lath grating)
- 5= Montageplatte
(mounting plate)
- 6= Füllholz
(filler)
- 7= Stahlträger
(steel girder)

**Dachelement
(roof element)**

- 1= Beplankung
(paneling)
- 2= Lattung
(lathing)
- 3= Dämmung
(insulation)
- 4= Sparren
(rafter)
- 5= Konterlattung
(counterlathing)
- 6= Dachlattung
(roof lathing)
- 7= Stellbrett
(plank)
- 8= Profilschalung
(cladding boards)
- 9= diffusionsoffene Unterspannbahn
(permeable sarking sheet)



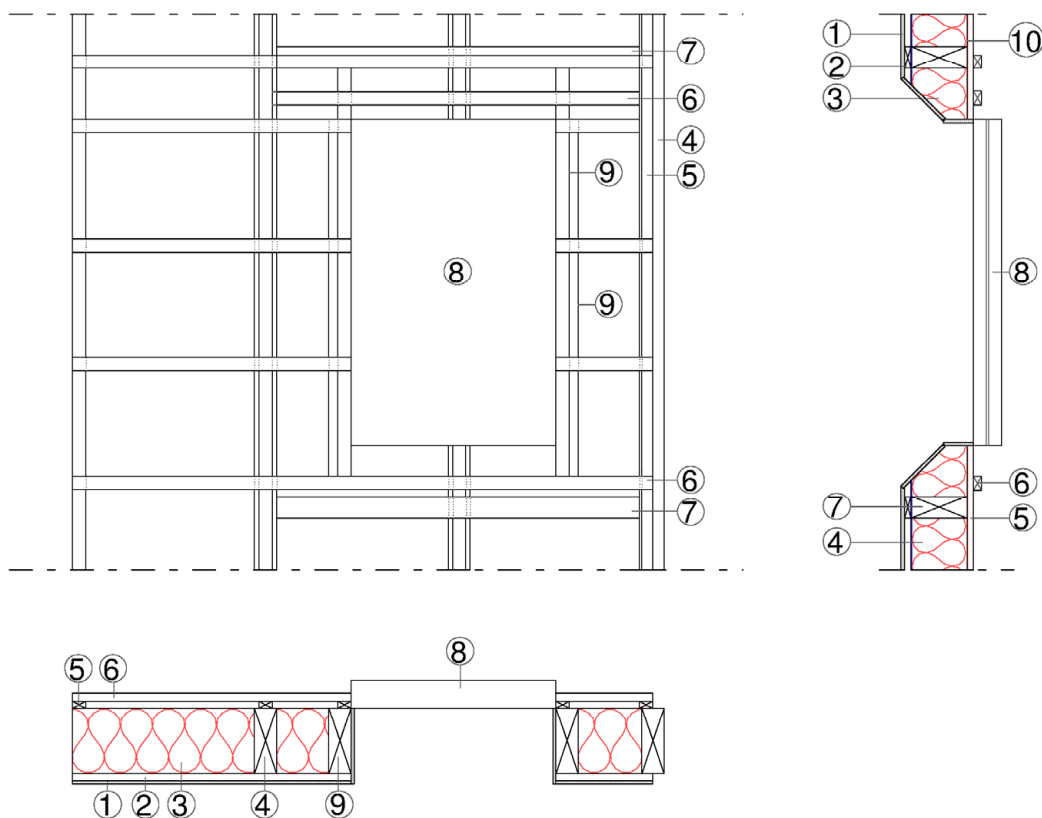
**Dachelementstoß
(roof element joint)**

"Bien-Zenker"
"Living-Haus"

roof element

Annex B.22

Dachelement mit Dachflächenfenster (Beispiel)
(roof element with roof-light (example))



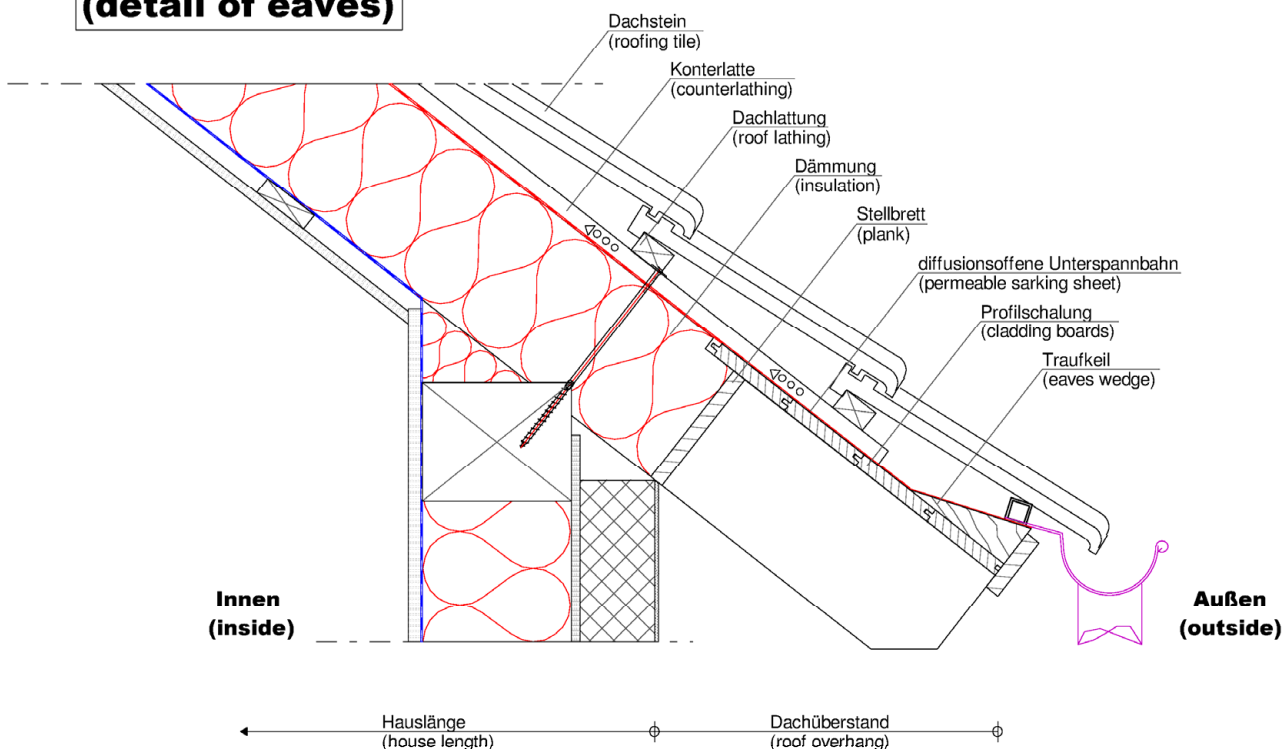
1= Beplankung (paneling)	6= Dachlattung (roof lathing)
2= Lattung (lathing)	7= Riegel (rail)
3= Dämmung (insulation)	8= Dachflächenfenster (roof-light)
4= Sparren (rafter)	9=Füllholz (filler)
5= Konterlattung (counterlathing)	10= diffusionsoffene Unterspannbahn (permeable sarking sheet)

"Bien-Zenker"
"Living-Haus"

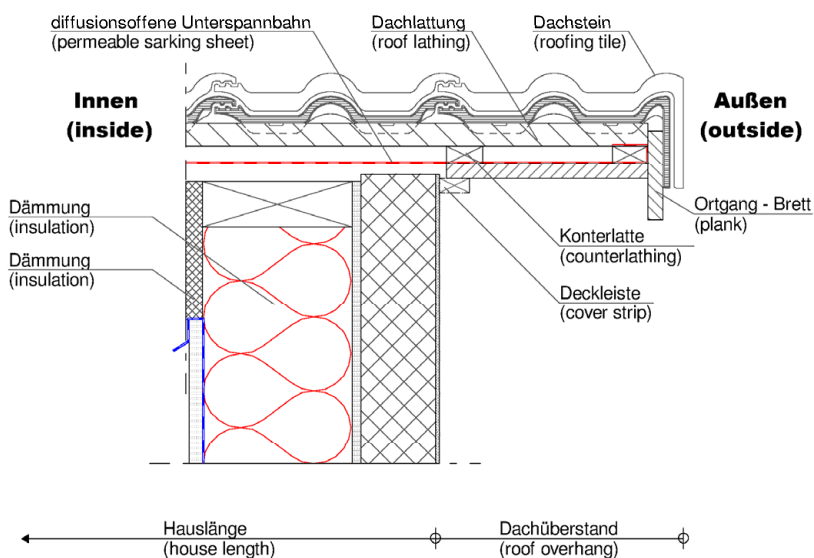
roof element with roof-light (example)

Annex B.23

**Detail Traufe
(detail of eaves)**



**Dachüberstand an Ortgang
(roof overhang to the verge)**



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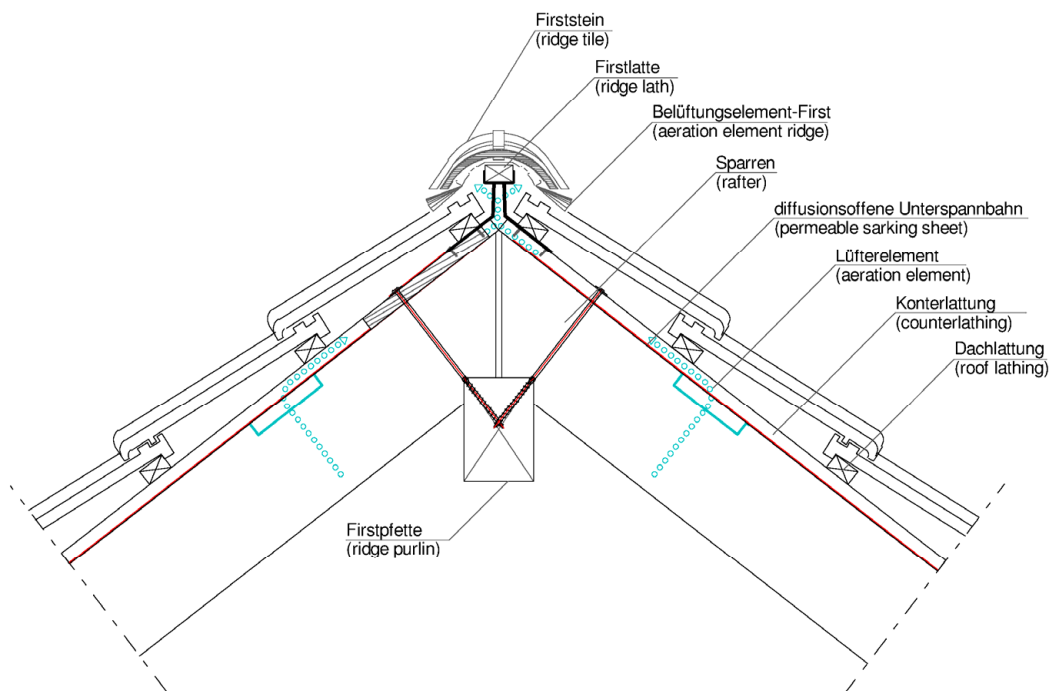
"Bien-Zenker"
"Living-Haus"

detail of eaves / roof overhang to the verge

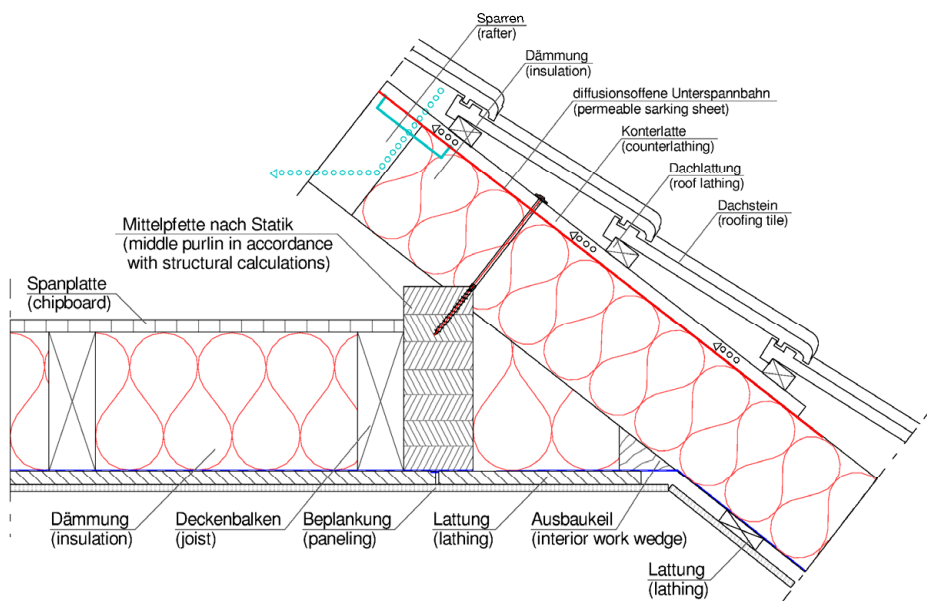
Annex B.24

Detail Firstausführung (detail of the ridge-construction)

Firstausbildung mit Hinterlüftung
(ridge with ventilation)



Standard-Dachschnitt (sectional drawing of the roof)



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"Bien-Zenker"
"Living-Haus"

detail of the ridge-construction / sectional drawing of the roof

Annex B.25