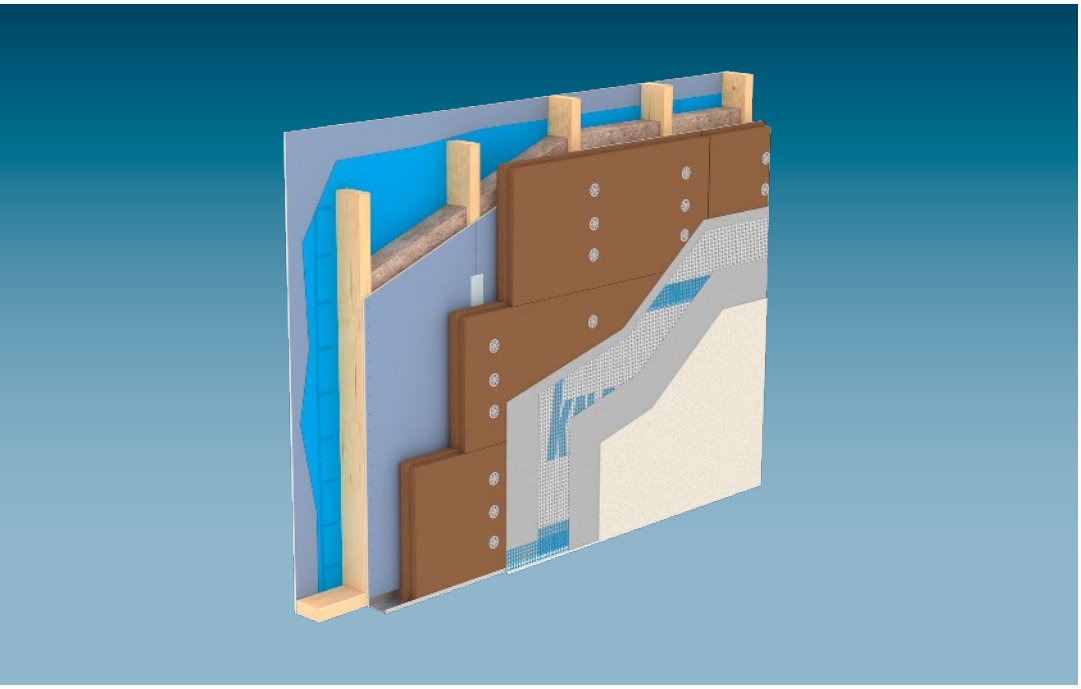

Plaster & Façade Systems

# WE203S.de

System Data Sheet 2023-02

# **Knauf WARM WALL Natur S** in Timber Construction

## ETICS systems with wood fibre insulation panels

WE203Sa.de – With mineral-based render system

WE203Sc.de – With mineral-based / organic-based render system

## Note on English translation / Hinweise zur englischen Fassung

This is a translation of the system data sheet valid in Germany.
All stated details and properties are in compliance with the regulations of the German standards and building regulations. They are only applicable for the specified products, system components, application rules, and construction details in connection with the specifications of the respective certificates and approvals.
Knauf Gips KG denies any liability for applications outside of Germany as this requires changes acc. to the respective national standards and building regulations.

Dies ist eine Übersetzung des in Deutschland gültigen Detailblattes. Alle angegebenen Werte und Eigenschaften entsprechen den in Deutschland gültigen Normen und bauaufsichtlichen Regelungen. Sie gelten nur bei Verwendung der angegebenen Produkte, Systemkomponenten, Anwendungsregeln und Konstruktionsdetails in Verbindung mit den Vorgaben der bauaufsichtlichen Nachweise.
Die Knauf Gips KG lehnt jegliche Haftung für Einsatz und Anwendung außerhalb Deutschlands ab, da in diesem Fall eine Anpassung an nationale Normen und bauaufsichtliche Regelungen notwendig ist.

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## Notes on the document

Knauf system data sheets are the basis for planning and application for planners and professional installers when applying Knauf systems. The contained information and specifications, constructions, details and stated products are based, unless otherwise stated, on the Certificates of Usability (e.g. general national technical approvals abZ and general type approvals aBG) valid at the date they are published as well as on the applicable standards. In addition, design and structural requirements and those regarding building physics (fire protection and sound insulation) are considered.

The details shown are solution suggestions intended for general orientation in the subject matter and must be adapted accordingly to suit the constructional features on site. Ancillary trades are only represented schematically.

## References to other documents

**System data sheets**

- ETICS systems with wood fibre insulation panels ISOLAIR and PAVAWALL Knauf WARM WALL Natur D in Timber Construction WE203D.de
- ETICS systems with wood fibre insulation panels AGEPAN® THD Putz 050 Knauf WARM WALL Natur T in Timber Construction P335.de
- Knauf Structural Wood Frame Panels W55.de

**Product data sheets**

- Observe the product data sheets of the Knauf system components

## Intended use of Knauf Systems

Please observe the following:

| | |
|---|---|
| **Caution** | Knauf systems may only be used for the application cases specified in the Knauf documentation. In case third-party products or components are used, they must be recommended or approved by Knauf. Flawless application of products / systems assumes proper transport, storage, assembly, installation and maintenance. |

## General notes on Knauf systems

Building physics requirements must be examined and tested in detail.

For design of timber structures see EN 1995-1-1 in conjunction with EN 1995-1-1/NA.

To avoid thermal bridges, see DIN 4108 amendment 2.

Freedom from condensation: The assessment of the freedom from condensation (hygrothermal performance) shall be performed in accordance with DIN 4108-3 or DIN EN 15026. A vapour retarder is required on the interior in accordance with the building physics ratings.

The assessment of the thermal insulation shall be performed in accordance with DIN 4108-2 and if required GEG (German energy saving ordinance).

The structural stability of the existing wall must be assured before installation of ETICS. The proof must include all load-bearing and associated elements.

It is essential to ensure that the construction is airtight. Refer to DIN 4108-7 as well as the guideline “Ausführung luftdichter Konstruktionen und Anschlüsse - *Implementing airtight constructions and connections* (German only)” issued by the Fachverband der Stuckateure für Ausbau und Fassade Baden-Württemberg, Germany.

Connections must be carefully planned and must be made driving-rain proof.

Before the application of a plastering system we recommend use of a handover certificate for the transfer of the site to another trade.

The insulation panels set out in this document are STEICO protect H, STEICO protect M, STEICO protect H dry, STEICO protect L dry, STEICO protect M dry and STEICO duo dry.

### Term definitions

**Splash water zone**

The splash water zone starts with the edge of the ground line or top edge of the covering and has a height of at least 300 mm. The use of moisture resistant insulation panels is recommended in this area. Water from precipitation must be diverted away from the façade by constructional measures (gravel bed or layer that interrupts capillary action). Paving stone or paving must be installed sloping away from the building and be constructionally separated from the building. Observe the DIN 18533 as well as the DIN 68800-2.

### Explanation of terms

In this system data sheet, the following general type approval / terms that diverge from the system are used:

- Finish coat with paint coat instead of a final coating
- WF protect instead of STEICO protect, WF duo instead of STEICO duo

### Abbreviations used in the document:

- DIBt: Deutsches Institut für Bautechnik - German Institute for Civil Engineering
- EPS: Expanded polystyrene
- GEG: German energy saving ordinance
- VDPM: Verband für Dämmsysteme, Putz und Mörtel e. V. - Federation for Insulation Systems, Plaster and Mortar
- ETICS: External Thermal Insulation Composite System

## Notes on fire resistance

In this system data sheet, unless explicitly stated, fire protection concerns are not taken into account in the detailed features shown.

## Certificate of Usability

| Knauf system | Proof |
|---|---|
| Knauf WARM WALL Natur S in Timber Construction | Z-33.47-1258 |

The stated constructional and structural properties, and characteristic building physics of Knauf systems can solely be ensured with the exclusive use of Knauf system components, or other products explicitly recommended by Knauf. The validity and up-to-datedness of the stated proofs have to be considered.

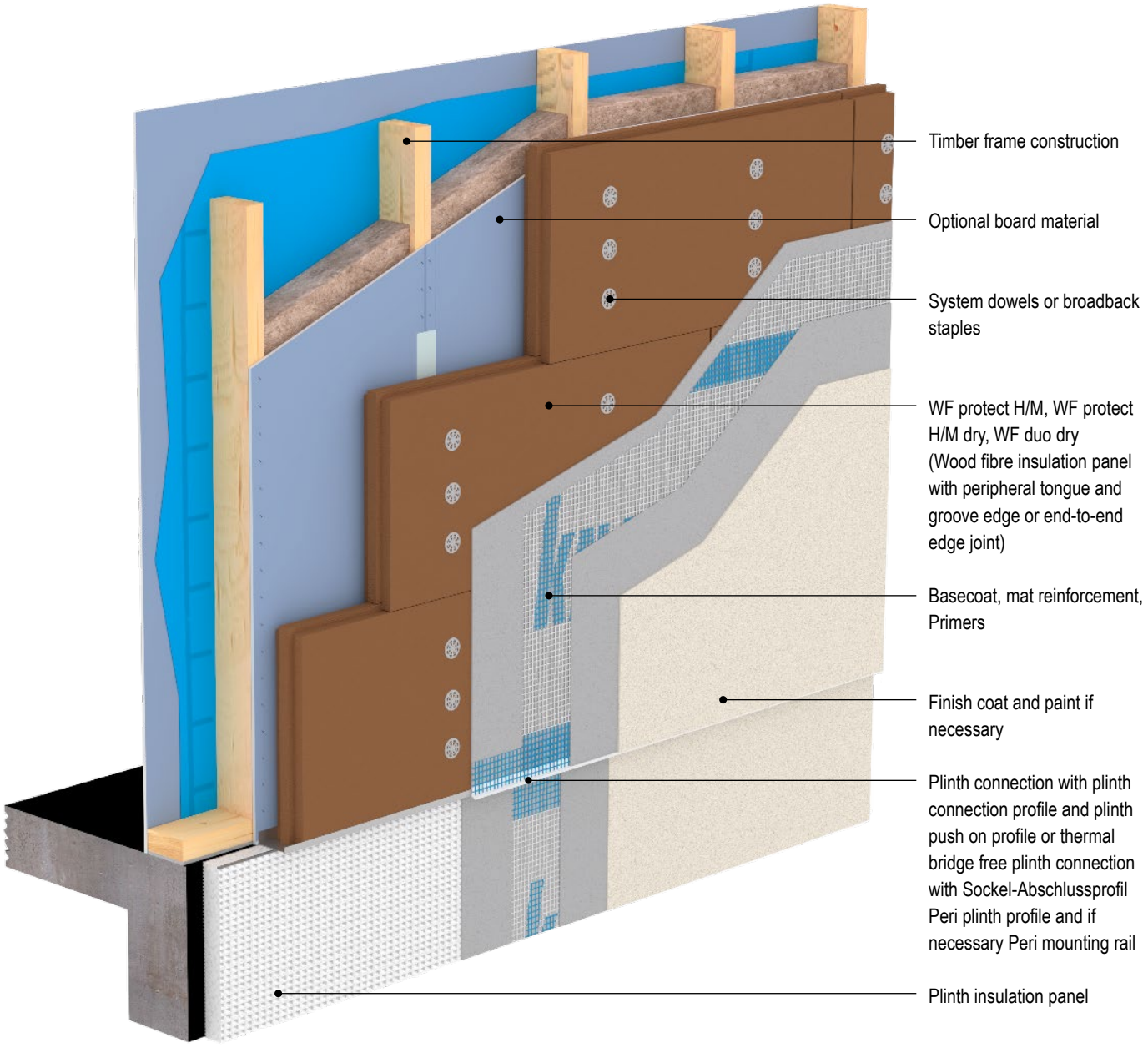
## Knauf WARM WALL Natur S – The naturally insulated façade in timber construction

Knauf WARM WALL Natur S – The Natural Insulation Façade in Timber Construction – is a building authority approved external thermal insulation composite system (ETICS) in timber construction made of ecological wood fibre façade boards (directly clad or on board material), manufactured according to EN 13171. The boards have end-to-end edge joints or a tongue and groove edge type. The peripheral tongue and groove edge type of the WF protect H, WF protect H dry, WF protect M, WF protect M dry and WF duo dry boards prevent heat losses in the joint area and guarantee a safe and fast insulation panel bond with a flat surface. WARM WALL Natur S can be utilized up to building class 3 without any special measures. The system can also be applied for other building classes when fire protection concepts are taken into consideration.

### Properties

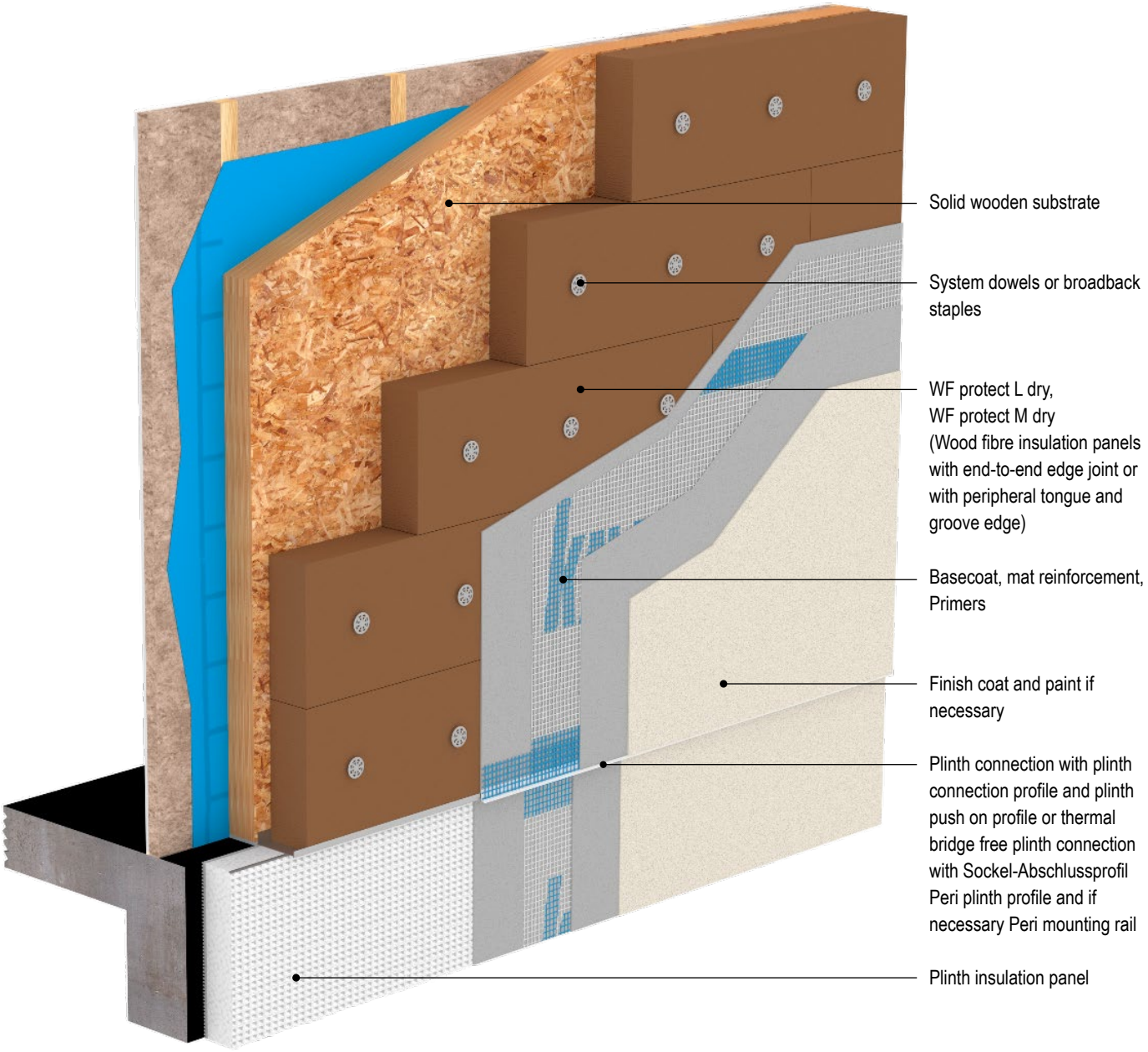
- ETICS reaction to fire: flammable (building material class B2), see table Page 13
- Highly permeable as well as good regulation of moisture
- High heat storage capacity for protection against summer heat
- Very good sound insulation characteristics
- Insulation material thickness: certified up to maximum 160 mm

### Timber frame construction



## Knauf WARM WALL Natur S – The naturally insulated façade in timber construction (continuation)

**Solid wooden substrate**



## System overview

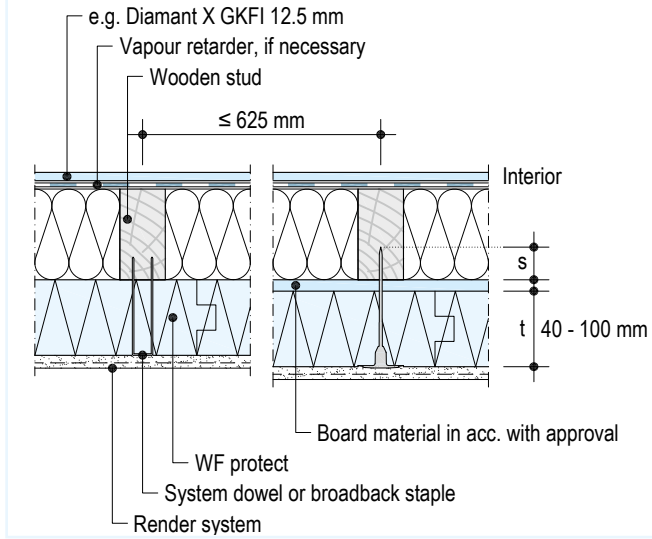
| Knauf System | WE203Sa.de<br>WARM WALL Natur S<br>Mineral based | WE203Sc.de<br>WARM WALL Natur S<br>Mineral based/organic |
|---|---|---|
| Description | Natural rendering mortar made of high-quality mineral-based raw materials optionally available with marble grains. Robust, durable, open to diffusion with variable render surface. Combined with a mineral reinforcement (basecoat) layer. | Organically bonded finishing plaster for a more intensive range of colour shades. Combined with a mineral reinforcement (basecoat) layer. |
| Reaction to fire/building material class ETICS | Flammable B2 (see Page 13) | |
| Maximum insulation material thickness t | 160 mm | |
| Plaster system layer thickness (reinforcement layer and finish coat) | 8.5 – 15 mm | 8.5 – 13 mm |
| **Façade** | | |
| Insulation materials WF | WF protect H, WF protect H dry, WF protect M, WF protect M dry, WF protect L dry, WF duo dry | |
| Fasteners | Schraubdübel STR H dowels, Schraubdübel 6H dowels, broadback staples (steel staples $b_r \geq 27$ mm wide, $t_n \geq 2.0$ mm, $l_n \geq 75$ mm, anchoring deph at least 30 mm, made of stainless steel acc. to DIN EN 14592) | |
| Basecoat | SM700 Pro, SM300[1)], Luis | |
| Reinforcement mesh | 4x4 mm, 5x5 mm | |
| Primers | Isogrund (recommended) | Quarzgrund pro |
| Finish coat | SM700 Pro<br>SP 260 Pro, RP 240<br>Noblo, Noblo Filz<br>MineralAktiv Scheibenputz floated render[1)]<br>MineralAktiv Scheibenputz Dry floated render[1)] | Conni S<br>Addi S |
| Paint coats | Siliconharz-EG-Farbe paint<br>Autol, Autol TSR<br>Minerol<br>MineralAktiv Fassadenfarbe paint[2)] | Siliconharz-EG-Farbe paint<br>Autol, Autol TSR<br>MineralAktiv Fassadenfarbe paint |
| **Plinth/splash water area** | | |
| Adhesive | Sockel-SM Pro or Sockel-SM, SM700 Pro, SM300, Luis | |
| Insulation material | Sockeldämmplatte 032, Sockeldämmplatte 035 | |
| Plinth connection (with recessed plinth) | Sockel-Abschlussprofil Peri plinth profile (free of thermal bridges) and if necessary Peri installation rail, plinth profile and push on plinth profile | |
| Basecoat | Sockel-SM Pro or Sockel-SM, SM700 Pro, SM300, Luis | |
| Mesh reinforcement, primer, finish coat and decorative coat | As with façade, Butz, Sockel-SM Pro, Sockel-SM | |
| Plaster seal / moisture protection | Sockel-Dicht (with Sockel-SM Pro as a basecoat and render finish with a total ≥ 7 mm not required) | |

*1) Only permissible on WF protect H dry, WF protect M dry, WF protect L dry and WF duo dry.*

*2) Required on MineralAktiv Scheibenputz Dry floated render.*

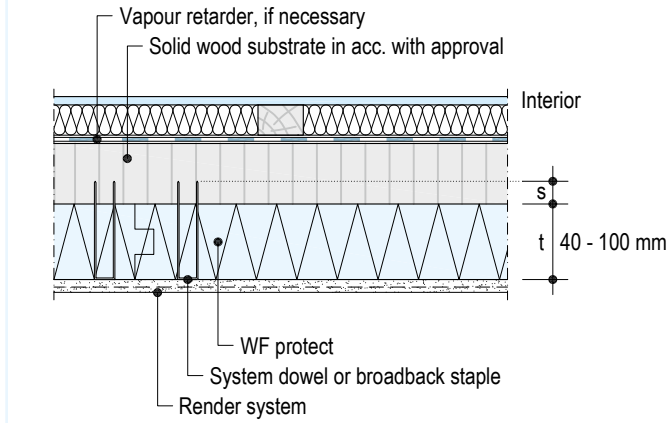
## System variants

### New constructions – Wooden frame constructions

| Scheme drawing | Approved substrate |
|---|---|
|  | **Permissible board materials, t = 12 – 22 mm:**<br>■ Particle boards acc. to EN 312, type P5 or P7<br>■ Plywood panels acc. to EN 636, type EN 636-2 or EN 636-3<br>■ OSB boards acc. to EN 300, type OSB/3 or OSB/4<br>■ Gypsum-fibre boards acc. to EN 15283-2 or European Technical Assessment<br>■ Gypsum boards acc. to EN 520 with the properties EH2 or FH2 and additionally with the properties acc. to designation GKBI or GKFI acc. to DIN 18180<br>■ Cementitious particle boards acc. to EN 13986 (EN 634-2)<br>■ Wood fibre insulation panels acc. to EN 13171 with a short term water absorption of WS ≤ 1.0, t ≤ 28 mm<br>■ Laminated veneer lumber STEICO LVL X acc. to aBG Z-9.1-842, t ≤ 30 mm |

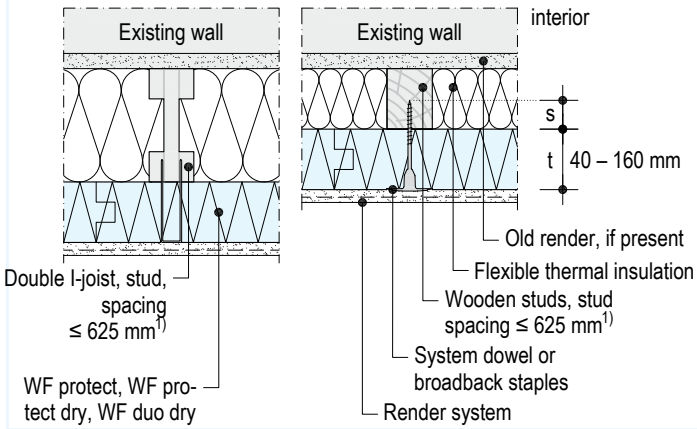


### New construction – solid wooden substrate

| Scheme drawing | Approved substrate |
|---|---|
|  | ■ Solid wood exterior wall components made of Lignotrend elements acc. to abZ/aBG Z-9.1-555<br>■ Wood material exterior wall components made of SWISS KRONO MAGNUMBOARD® OSB elements acc. to ETA13/0784<br>■ Solid timber panels (three- and five-layer boards made of softwood) acc. to EN 13986, type SWP/2 or SWP/3<br>■ Stacked timber elements acc. to National Technical Approval or European Technical Assessment<br>■ Cross-laminated timber acc. to National Technical Approval or European Technical Assessment<br>■ Glulam and stacked wood laminate elements acc. to EN 14080<br>■ Laminated veneer lumber STEICO LVL X acc. to aBG Z-9.1-842, t > 30 mm |



### Old construction – special applications following Z-33.47-1258

| Scheme drawing | Approved substrate |
|---|---|
| Coordination with the planning office is generally necessary.<br>  | Existing walls can be thermally retrofitted with a façade as a wood frame construction with WARM WALL Natur S, e.g.<br>■ Masonry<br>■ Timber framing |

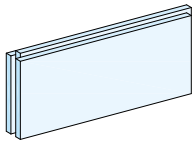
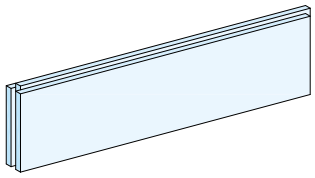
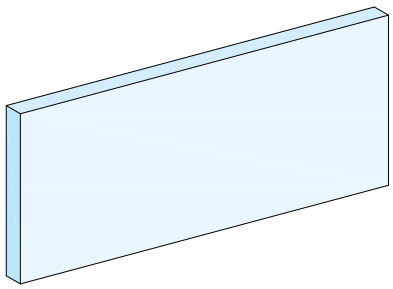
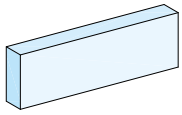
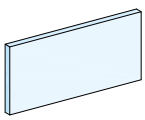
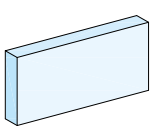


*1) Cross-section of wooden studs as well as fixing with building authority approved frame dowels or connectors according to the structural certificate.*

*t = insulation material thickness*

*s = anchoring depth*

## Insulation material

| Insulation material | Description | Rated thermal conductivity $\lambda_B$ W/(m·K) | Board format (cover size) w x l mm | Application type | Insulation thickness mm |
|---|---|---|---|---|---|
| **Façade** | | | | | |
|  | **WF protect H** *Wood fibre façade board with tongue and groove edge on all sides, density approx. 265 kg/m³* | 0.050 | **600 x 1325** (575 x 1300) | Acc. to aBG | 40 – 60 |
| | **WF protect M** *Wood fibre façade board with tongue and groove edge on all sides, density approx. 230 kg/m³* | 0.048 | **600 x 1325** (575 x 1300) | Acc. to aBG | 80 – 100 |
| | **WF protect H dry** *Wood fibre façade board with tongue and groove edge on all sides, density approx. 180 kg/m³* | 0.045 | **600 x 1325** (575 x 1300) | Acc. to aBG | 60 |
| | **WF protect M dry** *Wood fibre façade board with tongue and groove edge on all sides, density approx. 140 kg/m³* | 0.042 | **600 x 1325** (575 x 1300) | Acc. to aBG | 60 – 160 |
|  | **WF duo dry** *Wood fibre façade board with tongue and groove edge on all sides, density approx. 180 kg/m³* | 0.045 | **600 x 2230** (575 x 2205) | Acc. to aBG | 60 |
|  | **WF protect H dry** *Large format wood fibre façade board with end to end edge, density approx. 180 kg/m³* | 0.045 | **1250 x 2800** | Acc. to aBG | 60 |
| | **WF protect M dry** *Large format wood fibre façade board with end to end edge, density approx. 140 kg/m³* | 0.042 | **1250 x 2800** | Acc. to aBG | 60 – 160 |
|  | **WF protect L dry** *Wood fibre façade board with end to end edge, density approx. 110 kg/m³* | 0.039 | **400 x 1200** | Acc. to aBG | 100 – 160 |
| **Reveal** | | | | | |
|  | **EPS Standard 035 white** | 0.035 | **500 x 1000** | WAP / acc. to aBG | 20 – 50 |
| | **EPS Standard 032** | 0.032 | **500 x 1000** | WAP / acc. to aBG | 20 – 50 |
| **Plinth** | | | | | |
|  | **Sockeldämmplatte 035 plinth insulation panel** *EPS, white* | 0.035 | **500 x 1000** | PW | 30 – 160 |
| | **Sockeldämmplatte 032 plinth insulation panel** *EPS, grey* | 0.032 | **500 x 1000** | PW | 40 – 160 |

## Insulation material (continued)

**Thermal resistance**

Examples

| Insulation material | Rated design value of the thermal resistance **R** in $(m^2 \cdot K)/W$<br>Insulation thickness **t** in mm | | | | | | |
|---|---|---|---|---|---|---|---|
| | **40** | **60** | **80** | **100** | **120** | **140** | **160** |
| WF protect H | 0.80 | 1.20 | – | – | – | – | – |
| WF protect M | – | – | 1.67 | 2.08 | – | – | – |
| WF protect H dry / WF duo dry | – | 1.33 | – | – | – | – | – |
| WF protect M dry | – | 1.43 | 1.90 | 2.38 | 2.86 | 3.33 | 3.81 |
| WF protect L dry | – | – | – | 2.56 | 3.08 | 3.59 | 4.10 |

In the table, using the rated thermal resistance as well as the total thickness of the insulation material you can read off the rated value of the thermal resistance R. The sum of all thermal resistances (plaster, timber construction, insulation materials, etc.) is added to the sum of the 0.17 $(m^2 \cdot K)/W$ of both thermal transfer resistances for interior and exterior and delivers the thermal resistance. The inverse value of the thermal transmission resistance is the U value.

## Dowels

**Schraubdübel STR H dowel, Schraubdübel 6H dowel**

Quick fasteners for surface flush installation of wood fibre insulation panels on wooden substrates.

## Basecoat

The reinforcement mortar is referred to as basecoat in the approvals and in ETICS is a component of the rendering/plastering system. Its purpose is to protect the ETICS permanently from the effects of weather, to securely incorporate the reinforcement mesh and to form the basis for the subsequent final coating.

## Reinforcement mesh

The reinforcement mesh 4x4 mm and 5x5 mm are high strength, permanent, alkaline resistant reinforcement mesh made of glass fibres with a mesh spacing of 4x4 mm or 5 x 5 mm. The mesh is resistant to sliding and includes blue markings for mesh overlap indication. In addition to the mesh spacings, both meshes differ in terms of their tensile strengths, the weight per unit area and rigidity. They have the function of a reinforcement to avoid the formation of cracks and prevent the ingress of moisture into the system. The mesh is embedded into the fresh basecoat. The position of the basecoat depends on its thickness.

## Finish coat

**Noblo Filz**

Mineral-based, fine grain finishing plaster with 1.0 or 1.5 mm marble grains for fine sponged surface finishes or as a floated render (1.0 mm).

**Noblo, SP 260 Pro, RP 240**

Mineral finishing renders as a floated render texture (Noblo and SP 260 Pro) and/or groove render texture (RP 240).

**SM700 Pro**

The mineral based, universal all rounder for façades and plinths. Can be a sponged or freely textured render in natural white or pigmented finish.

**MineralAktiv Scheibenputz floated render, MineralAktiv Scheibenputz Dry floated render**

In a system together with MineralAktiv Fassadenfarbe paint, the mineral floated render offers the highest level of protection against the growth of algae and fungi and caters for the perfect appearance of façades. MineralAktiv Scheibenputz floated render also impresses with its elegant texture.

**Conni S**

Ready-to-use, paste-like, soiling-resistant silicone resin floated render, highly water-repellent and highly water permeable.

**Addi S**

Ready-to-use, paste-like, organically bonded and silicone resin reinforced floated render for intensive colour shades. Very extra-hard wearing, water-repellent and water-vapour-permeable.

**Sockel-SM Pro, Sockel-SM**

System approved and mineral based universal all rounder on a cementitious basis for the plinth area. Use as an adhesive and reinforcing mortar as well as a sponged final coat. When using Sockel-SM Pro as a basecoat and render finish with a total render thickness ≥ 7 mm, no additional protection for the render against ground moisture (moisture protection) is necessary.

**Butz**

Can only be used in the plinth zone. Coloured stone render with washed plaster effect for surface design in areas subject to wear and tear, e.g. plinth surfaces in the splash water zone.

## Finish coat (continued)

### Characteristics of finish coats for plinths / splash water zone and façade

| Characteristics | Mineral-based finishing plasters | | | | | Organic finishing plasters | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Silicon resin renders | | Resin plasters |
| | Noblo Filz, Noblo, SP 260 Pro, RP 240 | SM700 Pro | MineralAktiv Scheibenputz floated render, MineralAktiv Scheibenputz Dry floated render | Sockel-SM Pro | Sockel-SM | Conni S | Butz | Addi S |
| Binder | Lime cement | Lime cement | Hybrid binder | Cement | Cement | Silicone resin emulsion, dispersion | Silicone resin emulsion, dispersion | Polymer dispersion, silicone resin |
| Hydrophobic (water-repellent) | ●● | ●● | ●● | ●●●● | ●●● | ●●●● | ●●●● | ●●● |
| Diffusion properties | ●●●● | ●●●● | ●●●● | ●● | ●● | ●●● | ●● | ● |
| Colour shade range | ●● | ●● | ●● | ● | ● | ●●● | ●● | ●●●● |
| Resistance to soiling | ●●●● | ●●●● | ●●●● | ●●●● | ●●●● | ●●●● | ●●●● | ●●● |
| Plinth/splash water area | ●● | ●●●● | ●● | ●●●● | ●●●● | ●●● | ●●●● | ●● |

●●●● *Ideal*
●●● *Ideal to very well suited*
●● *Very suitable*
● *Suitable*

### Application of finish coats for plinths / splash water zone and façade

| Criteria | Mineral-based finishing plasters | | | | | | | Organic finishing plasters | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Silicon resin renders | | Resin plasters |
| | Noblo Filz | Noblo, SP 260 Pro | RP 240 | SM700 Pro | MineralAktiv Scheiben-putz floated render | MineralAktiv Scheiben-putz Dry floated render | Sockel-SM Pro, Sockel-SM | Conni S | Butz | Addi S |
| **Surfaces** | | | | | | | | | | |
| Sponged texture | ● | | | ● | | | ● | | | |
| Freely styled texture | ● | | | ● | | | | | ● | |
| Textured floated render | ● | ● | | | ● | ● | | ● | | ● |
| Textured groove render | | | ● | | | | | | | |
| **Application** | | | | | | | | | | |
| By machine | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| By hand | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| **Order information** | | | | | | | | | | |
| Bucket (paste-like) | | | | | ● | | | ● | ● | ● |
| Bagged material | ● | ● | ● | ● | | ● | ● | | | |

## Paint coats

**Siliconharz-EG-Farbe paint**
Siliconharz-EG-Farbe paint is especially suitable for equalisation (single coat) of mineral finishing coats with the same colour shade as the render and the paint. Suitable for equalisation of drying-related, weather-related or application-related differences in the colour shade on the finishing coat.

**Autol**
Autol is a highly permeable, matt, premium silicon resin self-cleaning effect façade paint. It is ideally suited as two paint coats on mineral and organically bound renders, as well as a top coat in case of different shades of finishing coat and paint. A strong reduction in the adhesion of dirt particles facilitates wash-off of dirt and soiling by the action of precipitation.

**Autol TSR**
Autol TSR is a highly permeable, matt, silicon resin self-cleaning effect façade paint. Reflection-optimised, resulting in reduced heat-up due to solar radiation and increased resistance to cracking on the substrate. It is used on new, pure white rendering/plastering systems when the colour shade of the final coat has a luminosity of < 20.

**Minerol**
Minerol is a highly permeable, matt, premium silicate façade paint with organic stabilisers. It is ideally suited as a texture-retaining two coat paint on mineral substrates. Minerol bonds by silification with the substrate and is an ideal coating on mineral renders in case of different shades of finishing coat and paint.

**MineralAktiv Fassadenfarbe paint**
MineralAktiv Fassadenfarbe paint is a texture preserving, mineral façade paint on a hybrid binder basis without addition of film preservation. The optimised moisture management ensures that MineralAktiv Fassadenfarbe façade paint in a system with MineralAktiv finish coats is ideal in preventing growth of algae and mould. It has a high yield and an elegant mineral appearance.

### Comparison of Knauf façade paints

| Criteria | Mineral based<br>Silicate based dispersion<br>**Minerol** | Hybrid façade paint<br>**MineralAktiv Fassadenfarbe paint** | Organic<br>Silicone resin paints<br>**Autol, Autol TSR** | **Siliconharz-EG-Farbe paint** |
|---|---|---|---|---|
| Binder | Potassium silicate, dispersion | Hybrid binder | Silicone resin emulsion, dispersion | Silicone resin emulsion, dispersion |
| Hydrophobic (water-repellent) | ●●● | ●●● | ●●●● | ●●●● |
| Diffusion properties | ●●●● | ●●●● | ●●●● | ●●● |
| Colour shade range | ●● | ●● | ●●● | ●● |
| Resistance to ageing | ●●●● | ●●●● | ●●●● | ●●●● |
| Hiding power | ●●● | ●●●● | ●●●● | ●●● |

●●●● *Ideal*
●●● *Ideal to very well suited*
●● *Very suitable*

### Knauf Farbcenter (colour center)
The Knauf Farbcenter provides information on the feasibility and luminosity of colour shades for Knauf paints and plasters: knauf.de/farbcenter.

**Explanation of colour code**

**B P 2 5 7**
- 7 – Luminosity range (here: 70 to 79)
- 5 – Brightening
- 2 – Greying
- P – Colour shade with English designation abbreviations (in this case: Blue Purplish)
- B

## U values and parameters for the protection against summer heat with WARM WALL Natur S

Examples

| Studs | Infill insulation | With WARM WALL Natur S exterior insulation Insulation material thickness t | | | | | | | | Calculation without correction for fasteners | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **60 mm** (WF protect H dry) | | | | **80 mm** (WF protect M dry) | | | | **100 mm** (WF protect M dry) | | | |
| **w x h** | $\lambda_B$ | **U value total** | $\varphi^{1)}$ | TAR[2)] | TAD[3)] | **U value total** | $\varphi^{1)}$ | TAR[2)] | TAD[3)] | **U value total** | $\varphi^{1)}$ | TAR[2)] | TAD[3)] |
| mm | W/(m·K) | W/(m²·K) | h | | | W/(m²·K) | h | | | W/(m²·K) | h | | |
| | 0.040 | 0.268 | 8.2 | 0.220 | 5 | 0.232 | 9.2 | 0.168 | 6 | 0.209 | 10.0 | 0.120 | 8 |
| 60 x 100 | 0.035 | 0.251 | 8.3 | 0.203 | 5 | 0.219 | 9.3 | 0.156 | 6 | 0.198 | 11.0 | 0.113 | 9 |
| | 0.032 | 0.240 | 8.5 | 0.191 | 5 | 0.211 | 9.5 | 0.148 | 7 | 0.191 | 11.0 | 0.107 | 9 |
| | 0.040 | 0.241 | 8.5 | 0.194 | 5 | 0.212 | 9.5 | 0.149 | 7 | 0.192 | 11.0 | 0.108 | 9 |
| 60 x 120 | 0.035 | 0.225 | 8.7 | 0.177 | 6 | 0.199 | 9.7 | 0.137 | 7 | 0.182 | 11.0 | 0.099 | 10 |
| | 0.032 | 0.215 | 8.8 | 0.167 | 6 | 0.191 | 9.8 | 0.129 | 8 | 0.175 | 11.0 | 0.094 | 11 |
| | 0.040 | 0.219 | 8.8 | 0.172 | 6 | 0.195 | 9.7 | 0.133 | 8 | 0.178 | 11.0 | 0.097 | 10 |
| 60 x 140 | 0.035 | 0.204 | 9.0 | 0.157 | 6 | 0.182 | 10.0 | 0.122 | 8 | 0.168 | 11.0 | 0.088 | 11 |
| | 0.032 | 0.194 | 9.2 | 0.147 | 7 | 0.175 | 10.0 | 0.114 | 9 | 0.161 | 11.0 | 0.083 | 12 |
| | 0.040 | 0.201 | 9.0 | 0.154 | 7 | 0.180 | 10.0 | 0.120 | 8 | 0.166 | 11.0 | 0.087 | 12 |
| 60 x 160 | 0.035 | 0.187 | 9.1 | 0.140 | 7 | 0.168 | 10.0 | 0.109 | 9 | 0.156 | 12.0 | 0.079 | 13 |
| | 0.032 | 0.178 | 9.3 | 0.131 | 8 | 0.161 | 10.0 | 0.102 | 10 | 0.149 | 12.0 | 0.074 | 14 |
| | 0.040 | 0.186 | 8.9 | 0.140 | 7 | 0.168 | 10.0 | 0.109 | 9 | 0.155 | 12.0 | 0.079 | 13 |
| 60 x 180 | 0.035 | 0.172 | 9.2 | 0.126 | 8 | 0.156 | 10.0 | 0.098 | 10 | 0.145 | 12.0 | 0.071 | 14 |
| | 0.032 | 0.163 | 9.7 | 0.117 | 9 | 0.149 | 11.0 | 0.092 | 11 | 0.139 | 12.0 | 0.066 | 15 |
| | 0.040 | 0.172 | 9.7 | 0.127 | 8 | 0.157 | 10.0 | 0.099 | 10 | 0.146 | 12.0 | 0.071 | 14 |
| 60 x 200 | 0.035 | 0.160 | 9.8 | 0.114 | 9 | 0.146 | 11.0 | 0.089 | 11 | 0.136 | 12.0 | 0.064 | 16 |
| | 0.032 | 0.151 | 10.0 | 0.106 | 10 | 0.139 | 11.0 | 0.083 | 12 | 0.130 | 12.0 | 0.060 | 17 |

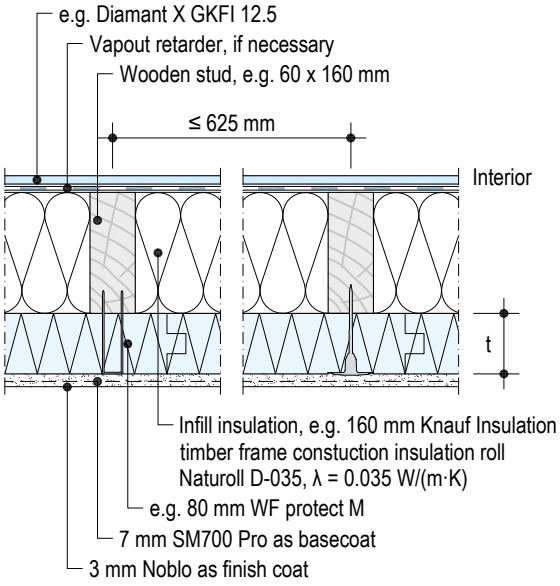
*1) Phase lag*

*2) Temperature amplitude ratio*

*3) Temperature amplitude damping*

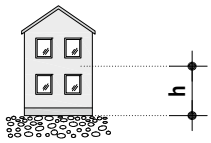
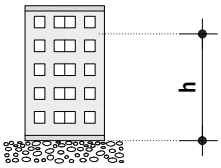
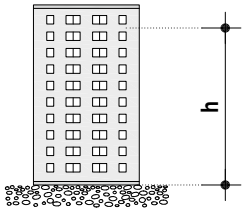
The temperature amplitude ratio (TAR) describes the maximum temperature fluctuation (amplitude) on the interior room-side construction component surface to the maximum temperature fluctuation on the exterior construction component surface. The lower the TAR value, the higher the attenuation. The inverse value is called the temperature amplitude damping (TAD). The phase lag is the period between the occurrence of the highest temperature on the exterior outer surface of a building component until the highest temperature is achieved on the interior, and depends on the heat retention capacity of the building component layers. A phase lag of more than 10 hours should be pursued.

### Design example



## Fire resistance requirements acc. to building regulation bye-laws

The demands on the reaction to fire of the façade lining are defined in the state building codes (LBO) and the corresponding fire prevention regulations of the German states. They are differentiated in dependence on the building height and/or building classes.
Additional special guidelines or regulations must be observed for special constructions and buildings such as hospitals, meeting halls, residential care homes, schools, shopping centres, etc. ETICS in scenarios such as firewalls building party walls, access galleries, escape routes, fire service passage routes, etc. must be designed as non-combustible according to the state building codes (building material class A according to DIN 4102-1).

| Height range | | Upper edge of the floor[1)] | Required fire behaviour of ETICS | Building material class of ETICS<br>Acc. to DIN 4102-1 |
|---|---|---|---|---|
|  | Building class 1 – 3<br>(Low height buildings) | **h = 0 – 7 m** | Flammable | **B2** |
|  | Building class 4 – 5<br>(Medium height buildings) | **h > 7 – 22 m** | Not easily flammable | **B1** |
|  | High-rise buildings | **h > 22 m** | Non-combustible | **A** |

*1) The specified heights are defined differently in the individual German states. They can be found in the respective state building codes. The height specifications refer to the dimension of the upper edge of the highest floor on which common rooms can be built, measured from the average terrain height (clause 2, paragraph 3 of the Musterbauordnung [German model building code] as well as the respective state building code).*

## Reaction to fire of WARM WALL Natur S in Timber Construction

| Insulation material thickness t | System | Reaction to fire/building material class ETICS |
|---|---|---|
| Up to 160 mm | Mineral<br>Mineral / organic | Flammable<br>**B2** (acc. to DIN 4102-1) |

## Method for determination of wind loads

| For use with | Practice-based method<br>Acc. to the recommendations of the VDPM[1] and the DIBt[2] (Germany) | Simplified method<br>acc. to EN 1991-1-4 and EN 1991-1-4/NA | Standard method<br>acc. to EN 1991-1-4 and EN 1991-1-4/NA |
|---|---|---|---|
| Building height | ≤ 25 m | ≤ 25 m | Not specified |
| Wind zone | 1 to 3 | 1 to 4 | 1 to 4 |
| Building layout | Rectangular | Rectangular | Any |
| Height / width ratio | ≤ 2 | ≤ 2 | Any |
| Elevation of site | ≤ 800 m above sea level, flat terrain | ≤ 800 m above sea level, flat terrain | Any |

*1) Verband für Dämmsysteme, Putz und Mörtel e. V. - Federation for Insulation Systems, Plaster and Mortar*

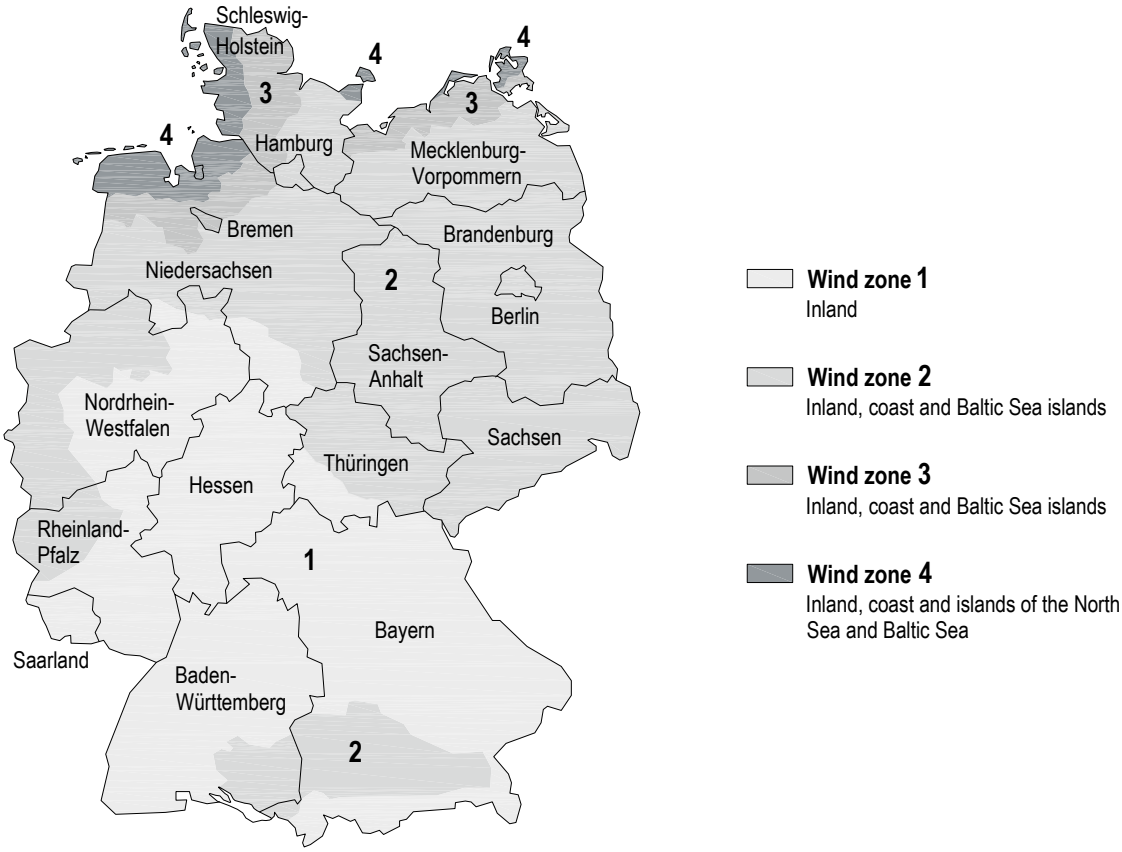
*2) Deutsches Institut für Bautechnik - German Institute for Civil Engineering*

**Procedure for determining the quantity and length of fasteners**

Selection of the wind zone (Germany)
refer to the map below
→ Determination of the width of fringe A
see Page 15
→ Selection of the fasteners
→ Read off the number of fasteners required in the table
refer to Pages 15 to 17
→ Selection of the fastener length in dependence on the insulation material thickness see Page 18

## Determination of wind loads

**Wind zones acc. to EN 1991-1-4/NA**



## Determination of wind loads (continuation)

**Wind suction forces $w_{ek}$ in kN/m² acc. to EN 1991-1-4 and EN 1991-1-4/NA acc. to the simplified method**

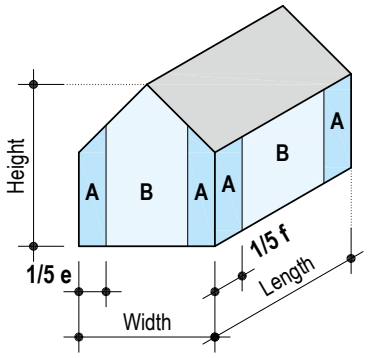
| Wind zone | Region | Wind suction forces $w_{ek}$ in kN/m² | | | | | |
|---|---|---|---|---|---|---|---|
| | | Building height | | | | | |
| | | **0 to 10 m** | | **0 to 18 m** | | **0 to 25 m** | |
| | | Fringe A | Zone B | Fringe A | Zone B | Fringe A | Zone B |
| **1a** | Inland | 0.738 | 0.550 | 0.959 | 0.715 | 1.106 | 0.825 |
| **2a** | Inland | 0.959 | 0.715 | 1.180 | 0.880 | 1.328 | 0.990 |
| **2b** | Coast and Baltic sea islands | 1.245 | 0.935 | 1.475 | 1.100 | 1.623 | 1.210 |
| **3a** | Inland | 1.180 | 0.880 | 1.401 | 1.045 | 1.623 | 1.210 |
| **3b** | Coast and Baltic sea islands | 1.549 | 1.155 | 1.770 | 1.320 | 1.918 | 1.430 |
| **4a** | Inland | 1.401 | 1.045 | 1.696 | 1.265 | 1.918 | 1.430 |
| **4b** | North and Baltic sea coasts and Baltic sea islands | 1.844 | 1.375 | 2.065 | 1.540 | 2.286 | 1.705 |
| **4c** | North sea islands | 2.065 | 1.540 | – | – | – | – |

### Determination of the width of fringe A

**Width of fringe A:**
**1/5 e or 1/5 f**

**e = 2 x height** *or* **e = length**
**f = 2 x height** *or* **f = width**

The smallest corresponding value is decisive.




## Dimensioning of the fasteners and spacings

Table 1: **WF protect H/M, WF protect H/M/L dry, WF duo dry**
**(**Minimum number of Schraubdübel STR H dowels and Schraubdübel 6H dowels acc. to approval) Insulation material thickness 40 – 160 mm

| Wind zone | Region | **Minimum number of Schraubdübel dowels per m²**<br>Maximum ETICS wind load: 1.60 kN/m²<br>Wind loads: acc. to simplified method | |
|---|---|---|---|
| | | Building height **0 to 10 m**<br>Timber frame construction, solid wooden substrate | |
| | | Fringe A | Zone B |
| **1** | Inland | 4 (6) | 4 (5) |
| **2** | Inland | 4 (6) | 4 (6) |
| | Coast and Baltic Sea islands | 6 (8) | 4 (6) |
| **3** | Inland | 6 (8) | 4 (6) |
| | Coast and Baltic Sea islands | 6 (8) | 6 (8) |
| **4** | Inland | 6 (8) | 6 (8) |
| | North and Baltic sea coasts and Baltic sea islands | – | – |
| | North sea islands | – | – |

*Values in brackets apply for WF protect L dry. This insulation material may only be used on board material or solid wooden substrates.*

## Dimensioning of the anchors and spacings (continued)

Table 2: **WF protect H** (minimum number of broadback staples acc. to approval) Insulation material thickness 40 – 60 mm

| Wind zone | Region | **Minimum number of broadback staples per m²**<br>Maximum ETICS wind load: 1.60 kN/m²<br>Wind loads: acc. to simplified method | |
|---|---|---|---|
| | | Building height **0 to 10 m**<br>Timber frame construction, solid wooden substrate<br>Fringe A | Zone B |
| **1** | Inland | 12 | 12 |
| **2** | Inland | 12 | 12 |
| | Coast and Baltic sea islands | 16 | 12 |
| **3** | Inland | 16 | 12 |
| | Coast and Baltic sea islands | 16 | 16 |
| **4** | Inland | 16 | 16 |
| | North and Baltic sea coasts and Baltic sea islands | – | – |
| | North sea islands | – | – |

Table 3: **WF protect M** (minimum number of broadback staples acc. to approval) Insulation material thickness 80 – 100 mm

| Wind zone | Region | **Minimum number of broadback staples per m²**<br>Maximum ETICS wind load: 1.60 kN/m²<br>Wind loads: acc. to simplified method | |
|---|---|---|---|
| | | Building height **0 to 10 m**<br>Timber frame construction, solid wooden substrate<br>Fringe A | Zone B |
| **1** | Inland | 17 | 17 |
| **2** | Inland | 17 | 17 |
| | Coast and Baltic sea islands | 25 | 17 |
| **3** | Inland | 25 | 17 |
| | Coast and Baltic sea islands | 25 | 25 |
| **4** | Inland | 25 | 25 |
| | North and Baltic sea coasts and Baltic sea islands | – | – |
| | North sea islands | – | – |

Table 4: **WF protect H dry and WF duo dry** (minimum number of broadback staples acc. to approval) Insulating material thickness 60 mm

| Wind zone | Region | **Minimum number of broadback staples per m²**<br>Maximum ETICS wind load: 1.60 kN/m²<br>Wind loads: acc. to simplified method | | | |
|---|---|---|---|---|---|
| | | Building height **0 to 10 m**<br>Timber frame construction, solid wooden substrate<br>**With tongue and groove on all sides (WF protect H dry and WF duo dry)**<br>Fringe A | Zone B | **With end to end edge (WF protect H dry)**<br>Fringe A | Zone B |
| **1** | Inland | 8 | 6 | 10 | 7 |
| **2** | Inland | 8 | 8 | 10 | 10 |
| | Coast and Baltic sea islands | 10 | 8 | 14 | 10 |
| **3** | Inland | 10 | 8 | 14 | 10 |
| | Coast and Baltic sea islands | 10 | 10 | 14 | 14 |
| **4** | Inland | 10 | 10 | 14 | 14 |
| | North and Baltic sea coasts and Baltic sea islands | – | – | – | – |
| | North sea islands | – | – | – | – |

## Dimensioning of the anchors and spacings (continued)

Table 5: **WF protect L dry** (minimum number of broadback staples acc. to approval) Insulation material thickness 100 – 160 mm

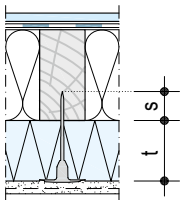
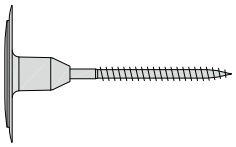
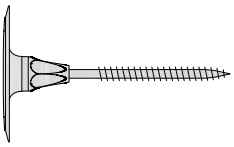
| Wind zone | Region | Minimum number of broadback staples per $m^2$<br>Maximum ETICS wind load: 1.60 $kN/m^2$<br>Wind loads: acc. to simplified method | |
|---|---|---|---|
| | | Building height **0 to 10 m**<br>Timber frame construction, solid wooden substrate | |
| | | Fringe A | Zone B |
| **1** | Inland | 38 | 25 |
| **2** | Inland | 38 | 38 |
| | Coast and Baltic sea islands | 55 | 38 |
| **3** | Inland | 55 | 38 |
| | Coast and Baltic sea islands | 55 | 55 |
| **4** | Inland | 55 | 55 |
| | North and Baltic sea coasts and Baltic sea islands | – | – |
| | North sea islands | – | – |

Table 6: **WF protect M dry** (minimum number of broadback staples acc. to approval) Insulation material thickness 60 – 160 mm

| Wind zone | Region | Minimum number of broadback staples per $m^2$<br>Maximum ETICS wind load: 1.60 $kN/m^2$<br>Wind loads: acc. to simplified method | | | |
|---|---|---|---|---|---|
| | | Building height **0 to 10 m**<br>Timber frame construction, solid wooden substrate | | | |
| | | **With tongue and groove on all sides** | | **With end to end edge** | |
| | | Fringe A | Zone B | Fringe A | Zone B |
| **1** | Inland | 15 | 10 | 22 | 15 |
| **2** | Inland | 15 | 15 | 22 | 22 |
| | Coast and Baltic sea islands | 20 | 15 | 33 | 22 |
| **3** | Inland | 20 | 15 | 33 | 22 |
| | Coast and Baltic sea islands | 20 | 20 | 33 | 33 |
| **4** | Inland | 20 | 20 | 33 | 33 |
| | North and Baltic sea coasts and Baltic sea islands | – | – | – | – |
| | North sea islands | – | – | – | – |

## Selection of the fasteners

**Length of the fasteners in dependence on the insulation material thickness**

| **Insulation material thickness** | **Length of the fastener** (without board material) | | |
|---|---|---|---|
| | **Schraubdübel STR H** dowel (acc. to abZ) | **Schraubdübel 6H dowel** | **Broadback staple** (acc. to EN 14592) |
|  |  |  |  |
| **t**<br>mm | **s** ≥ 25 mm<br>mm | **s** ≥ 25 mm<br>mm | **s** ≥ 30 mm<br>mm |
| 40 | 80 | 70 | 75 |
| 60 | 100 | 90 | 100 |
| 80 | 120 | 110 | 110 |
| 100 | 140 | 130 | 130 |
| 120 | 160 | 150 | 150 |
| 140 | 180 | 170 | – |
| 160 | 200 | 190 | – |

*t = insulation material thickness*

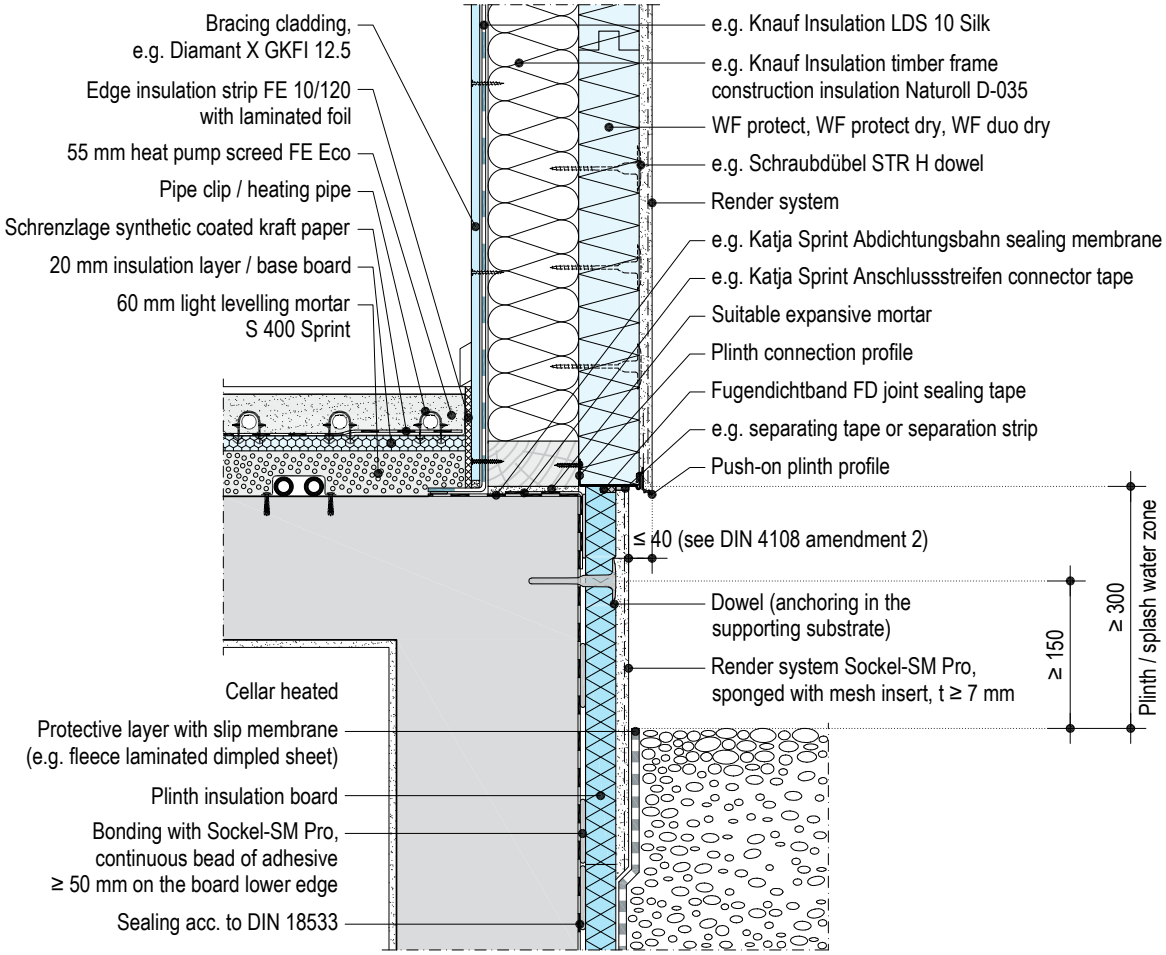
*s = anchoring depth*

Calculation of the length:
Anchoring depth **s** + (possible board material thickness) + insulation material thickness **t**

## Implemented with perimeter insulation

### WE203S.de-SO-V5 Recessed plinth application

Scale 1:10 I Dimensions in mm

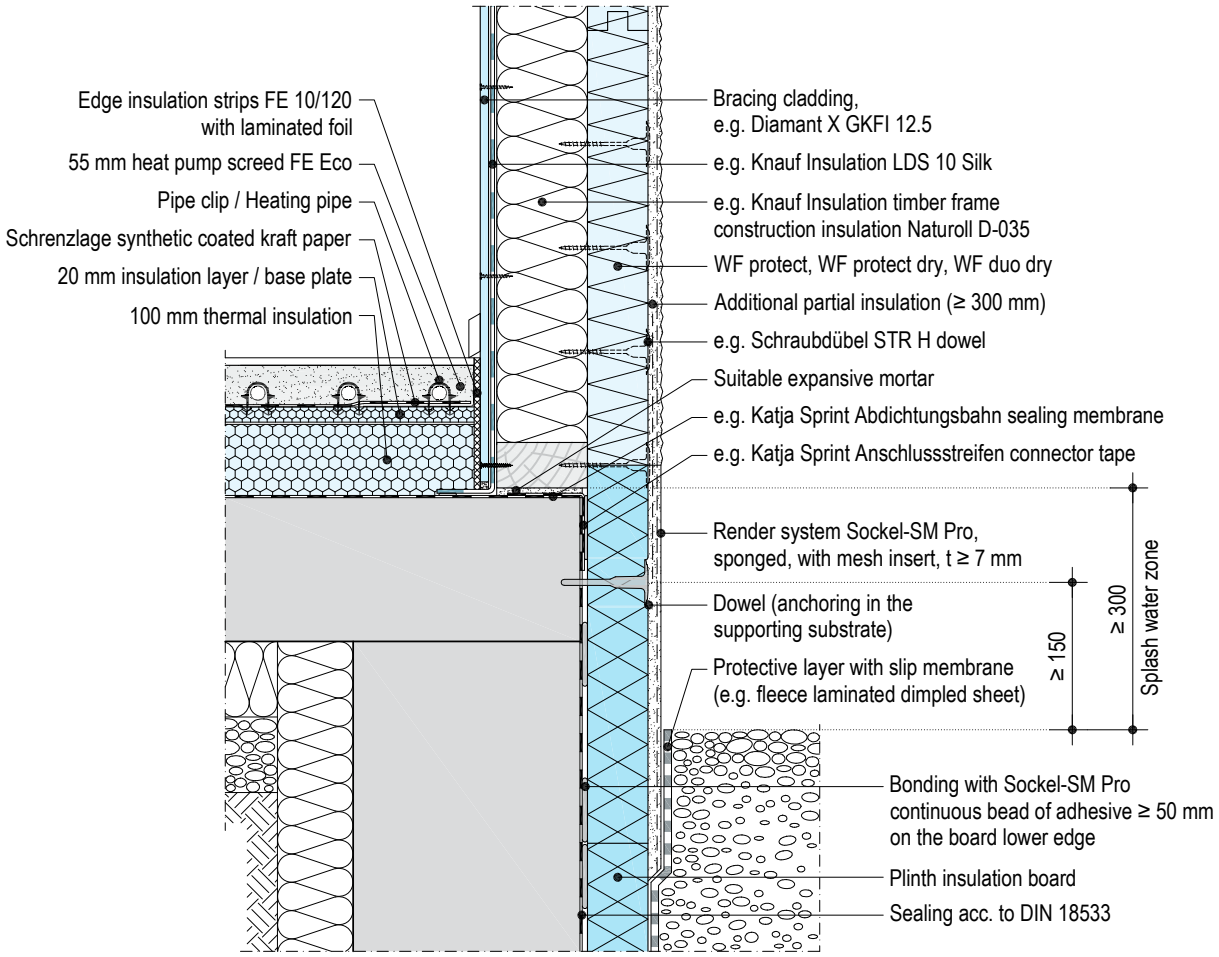


## Implemented with perimeter insulation (continued)

Scale 1:10 I Dimensions in mm

### WE203S.de-SO-V6 Flush plinth application

Application with floor slab

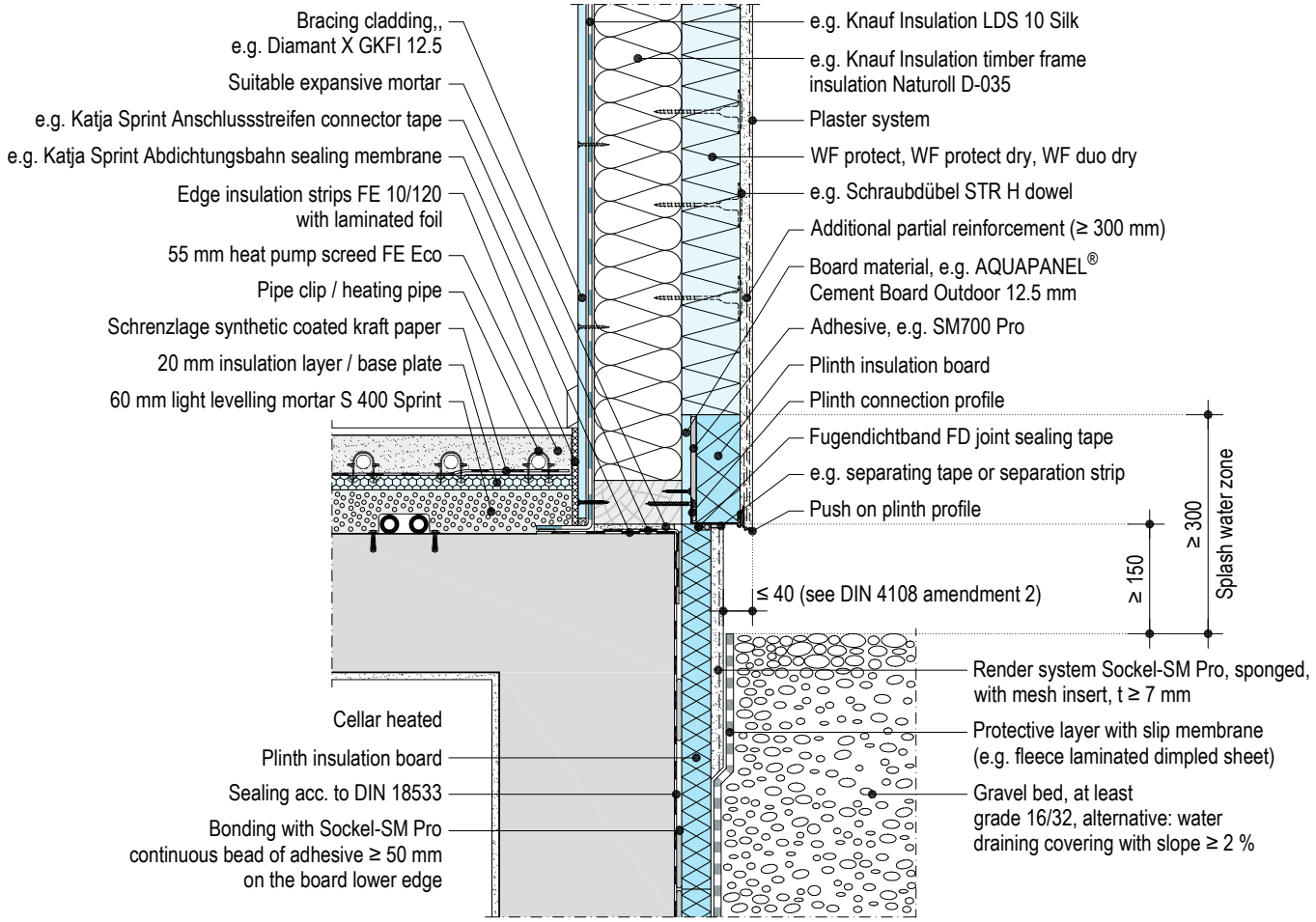


## Implemented with perimeter insulation (continued)

Scale 1:10 I Dimensions in mm

### WE203S.de-SO-V7 Recessed plinth application

Taking consideration of special measures acc. to DIN 68800-2

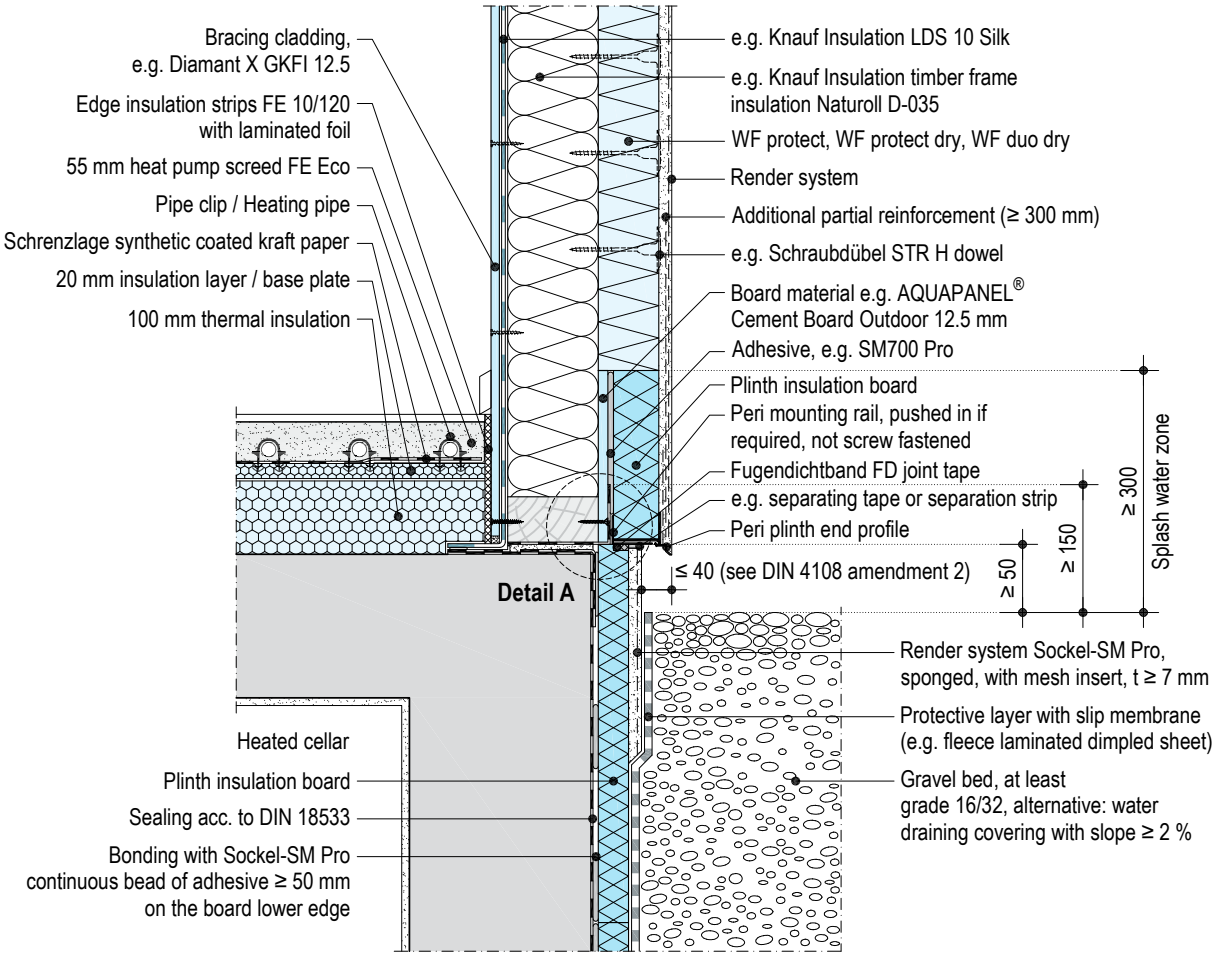


## Implemented with perimeter insulation (continued)

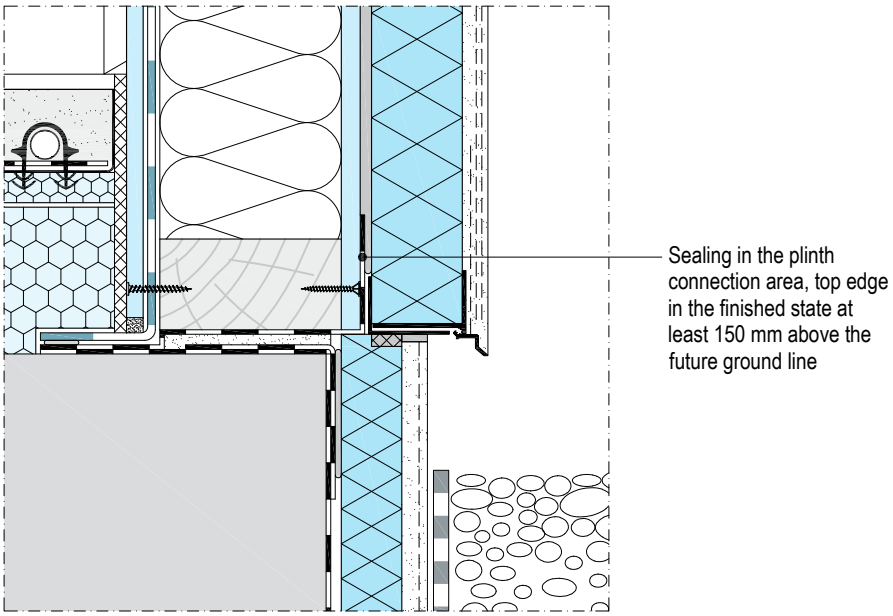
Scale 1:10 I Dimensions in mm

### WE203S.de-SO-V15 Recessed plinth application

Taking consideration of special measures acc. to DIN 68800-2




**Detail A** Scale 1:5



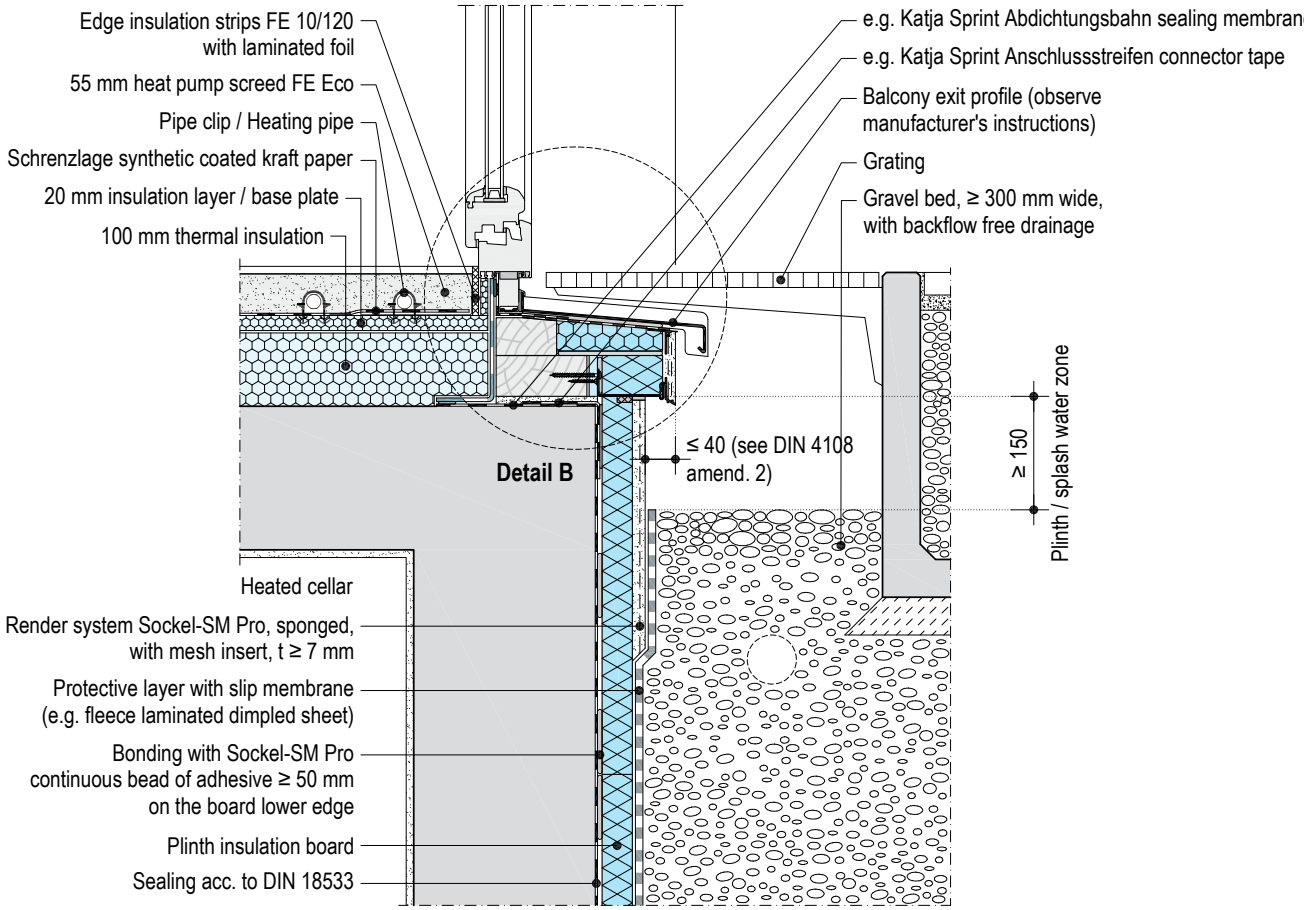

| Note | Penetration of the building waterproofing should be avoided. |
|---|---|

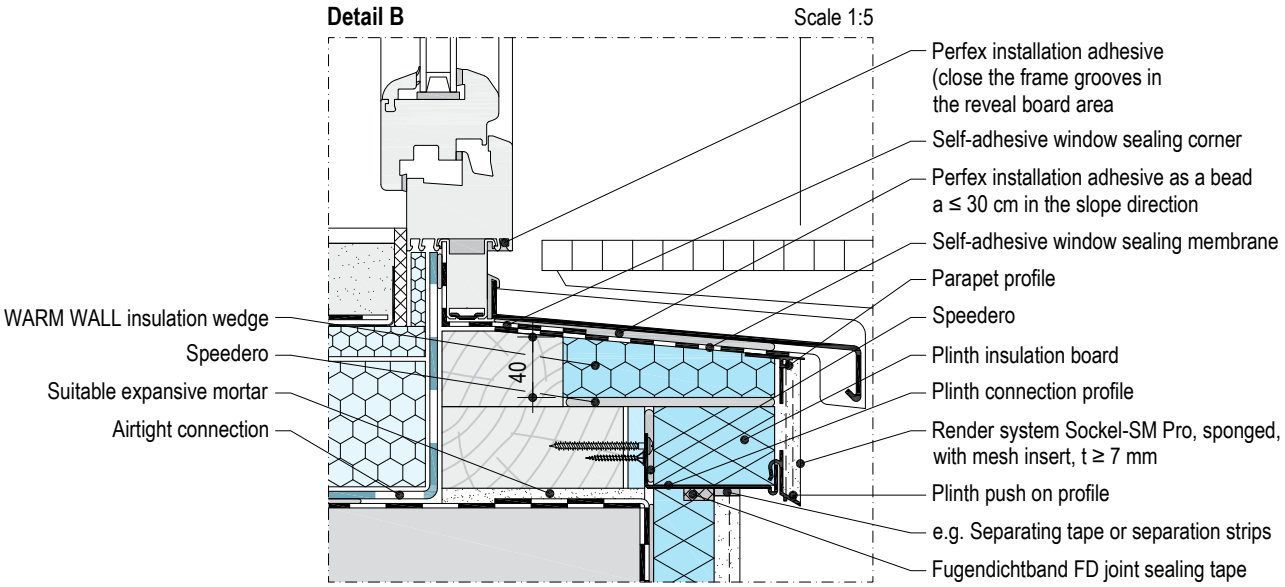
## French door connections

Scale 1:10 I Dimensions in mm

### WE203S.de-SO-V9 Recessed plinth application

French door exterior flush with wooden studs, not barrier free




**Notes**

Take care to ensure fully sealed openings (interface gaps) and ensure that filling is applied under window frames.

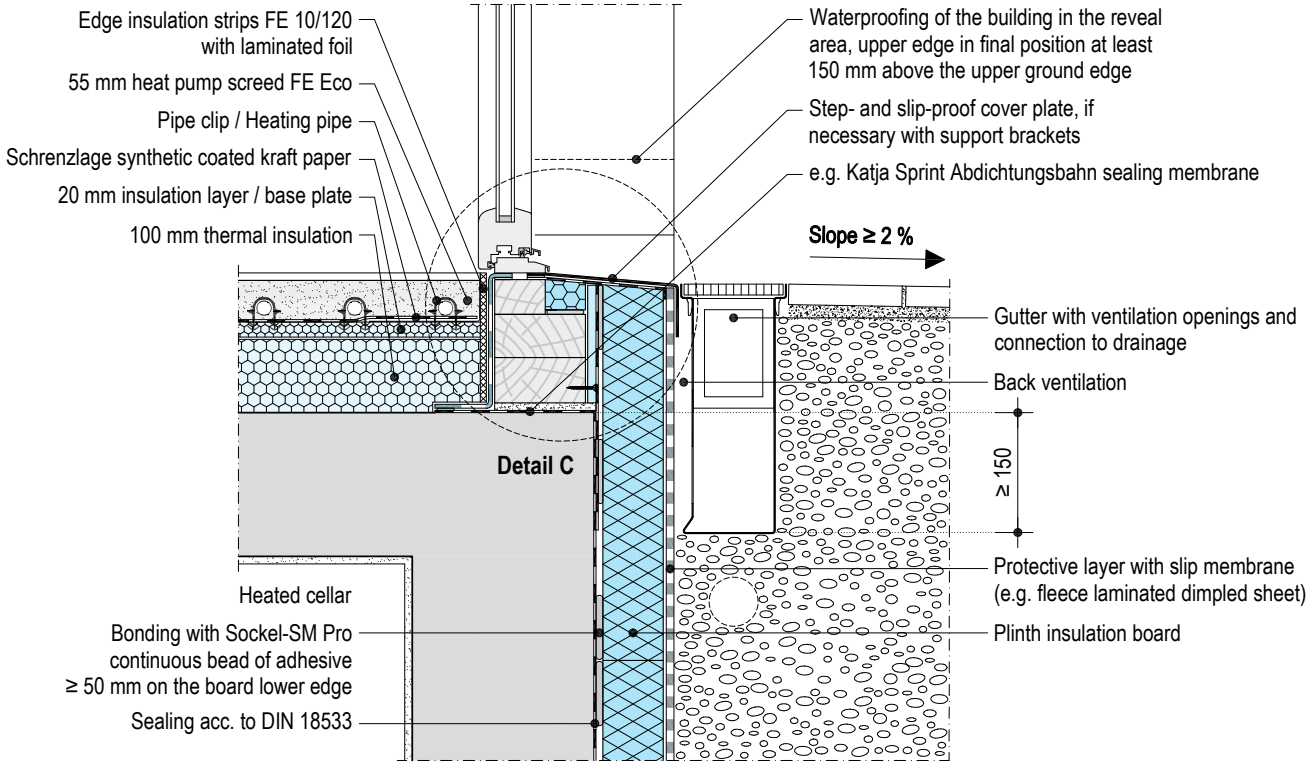
The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with plaster, drywall and external thermal insulation composite systems” (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany. The construction details shown only apply for the implementation of a second water channelling level, e.g. with Knauf WARM WALL window sealing system, see Installation Instructions P651-A01.de.

## French door connections (continued)

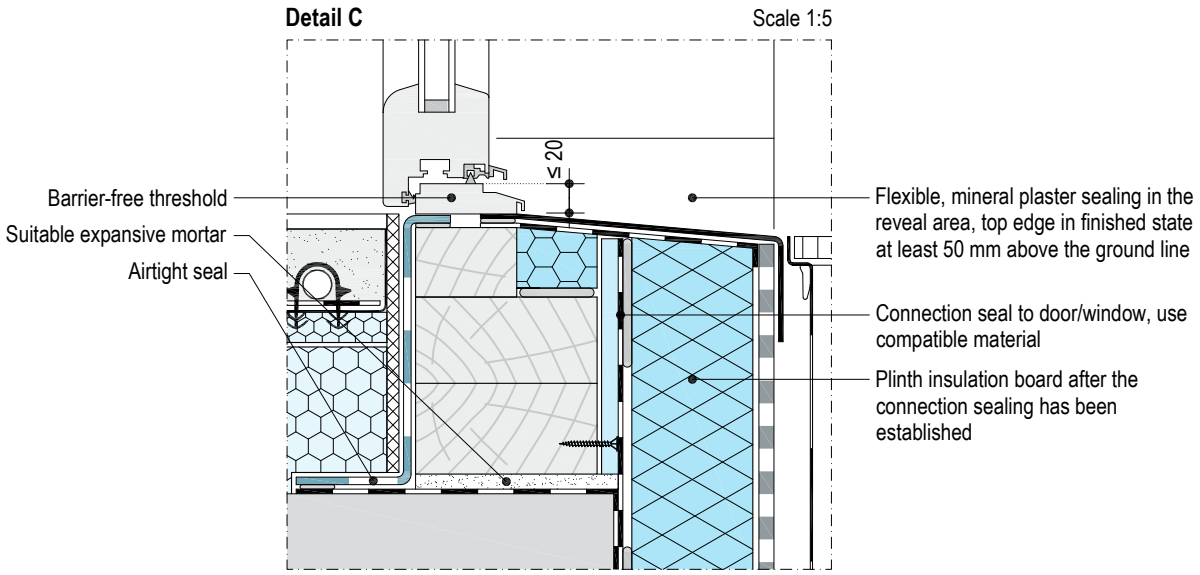
Scale 1:10 I Dimensions in mm

### WE203S.de-SO-V10 Flush plinth application

French door interior flush with wooden studs, barrier free




**Detail C** Scale 1:5




**Notes**

Ground level or barrier free entrance from the terrace should be agreed with the contractors. With the regulations governing barrier-free access, the threshold heights and non-slip surfaces, etc. must be observed. Furthermore, the investor must be informed about non-compliance to the regulations as set down in the DIN 18533 in the area of the cross-over between buildings (height at house door or French door maximum 20 mm). Also refer to the BDF leaflet 03-04 “Plinth constructions acc. to DIN 68800-2, classification in usage class GK 0”. Refer to the guideline “Façade plinth render/External components” (German only), issued by Fachverband der Stuckateure für Ausbau und Fassade Baden-Württemberg, flat roof guideline of the German roofers association or in individual cases the green roof guideline of the respective associations.

Take care to ensure fully sealed openings (interface gaps) and ensure that filling is applied under window frames.

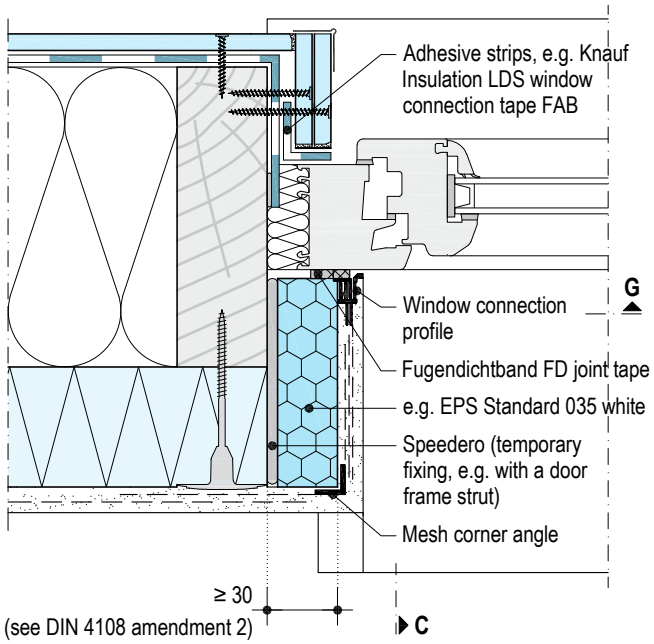
The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with plaster, drywall and external thermal insulation composite systems” (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany. The construction details shown only apply for the implementation of a second water channelling level, e.g. with Knauf WARM WALL window sealing system, see Installation Instructions P651-A01.de.

## Window centred with wooden studs

Scale 1:5 I Dimensions in mm

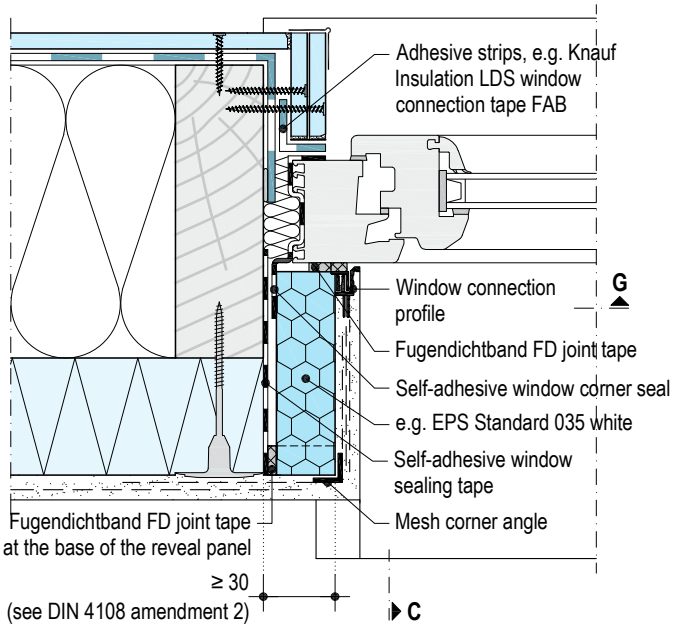
### WE203S.de-FE-H1 Horizontal section

Section A



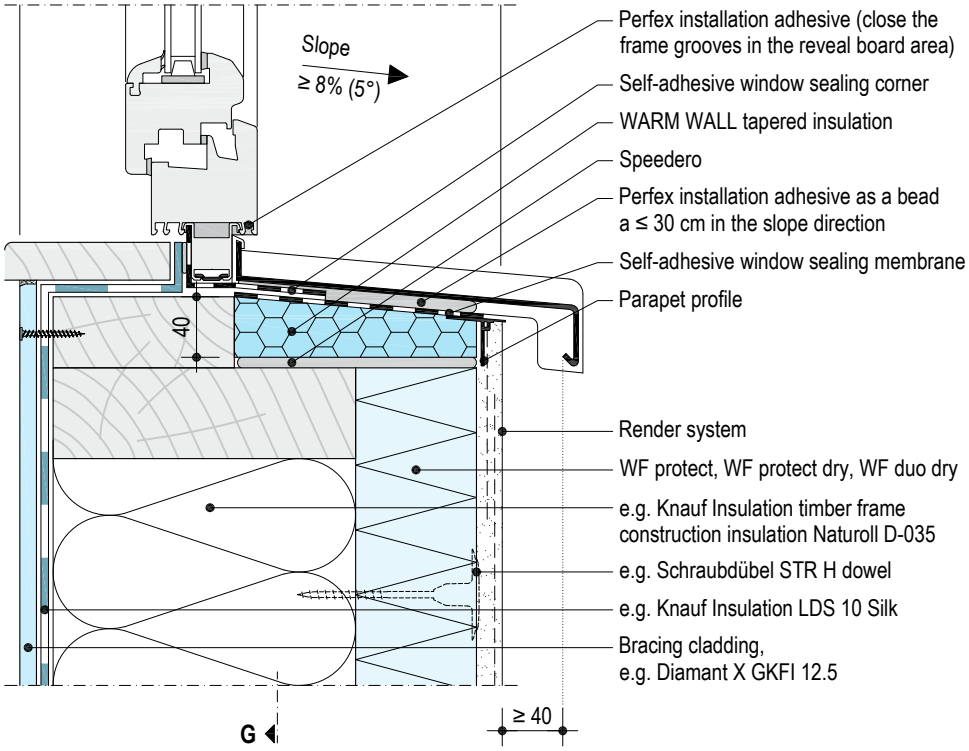

### WE203S.de-FE-H4 Horizontal section

Section B (base)




### WE203S.de-FE-V1 Vertical section

Section C




To facilitate drainage of any water present, a second water channeling level between the front edge of the façade insulation and the lower side of the window sill may not have any Fugendichtband FD joint sealing tape installed.

**Notes**

Take care to ensure fully sealed openings (interface gaps) and ensure that filling is applied under window frames.

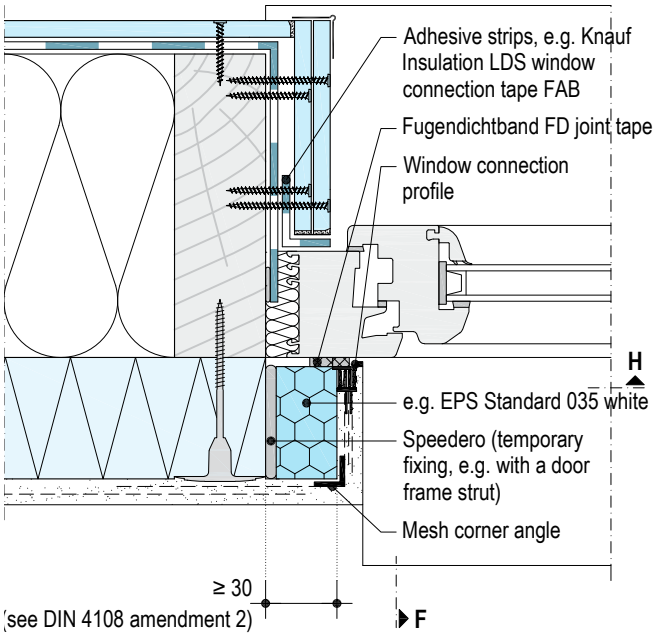
The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with plaster, drywall and external thermal insulation composite systems” (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany. The construction details shown only apply for the implementation of a second water channelling level, e.g. with Knauf WARM WALL window sealing system, see Installation Instructions P651-A01.de.

## Window exterior flush with wooden studs

Scale 1:5 I Dimensions in mm

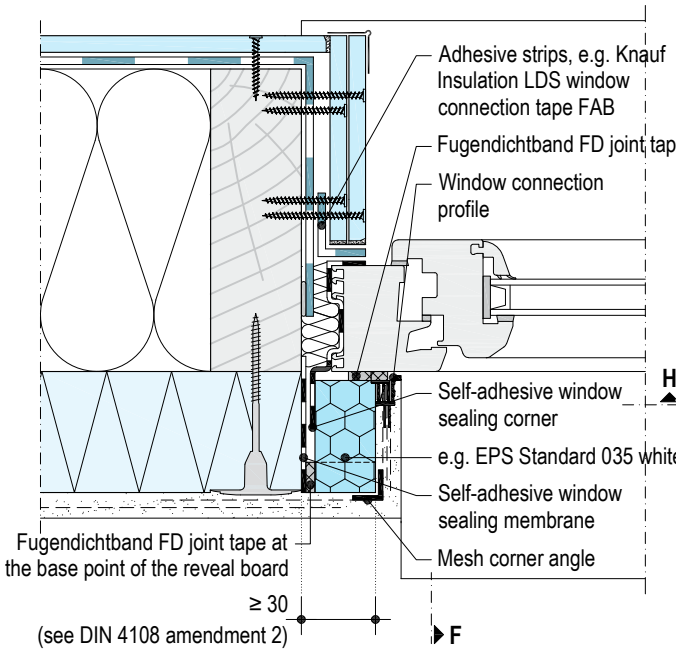
### WE203S.de-FE-H2 Horizontal section

Section D



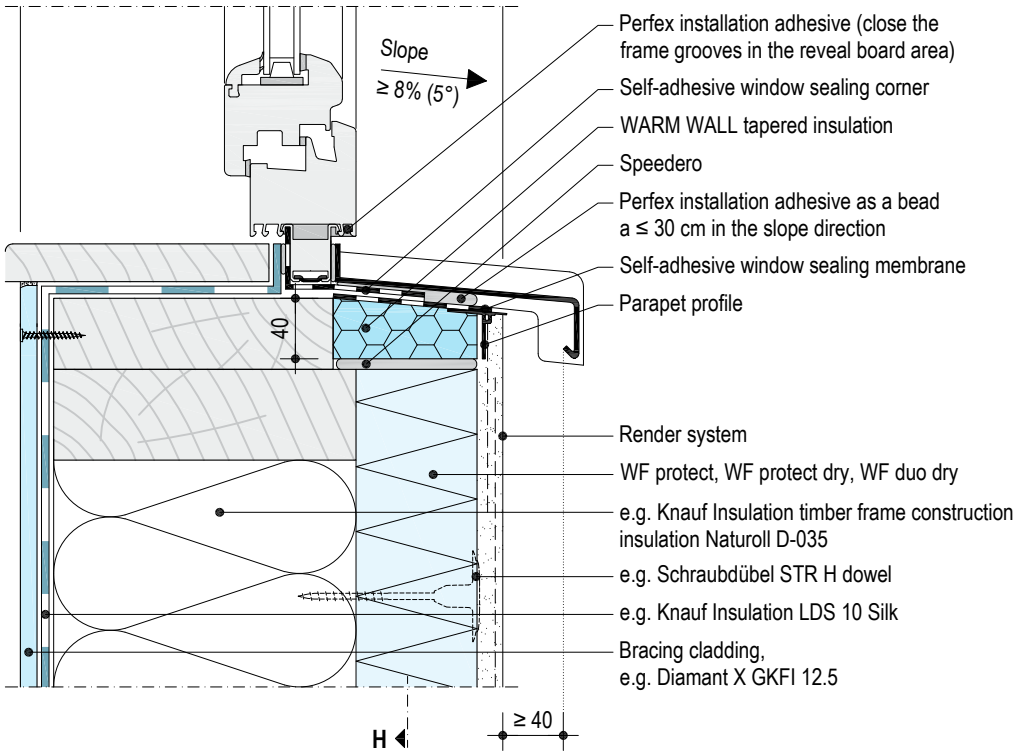

### WE203S.de-FE-H5 Horizontal section

Section E (base)




### WE203S.de-FE-V2 Vertical section

Section F




To facilitate drainage of any water present, a second water channeling level between the front edge of the façade insulation and the lower side of the window sill may not have any Fugendichtband FD joint sealing tape installed.

**Notes**

Take care to ensure fully sealed openings (interface gaps) and ensure that filling is applied under window frames.

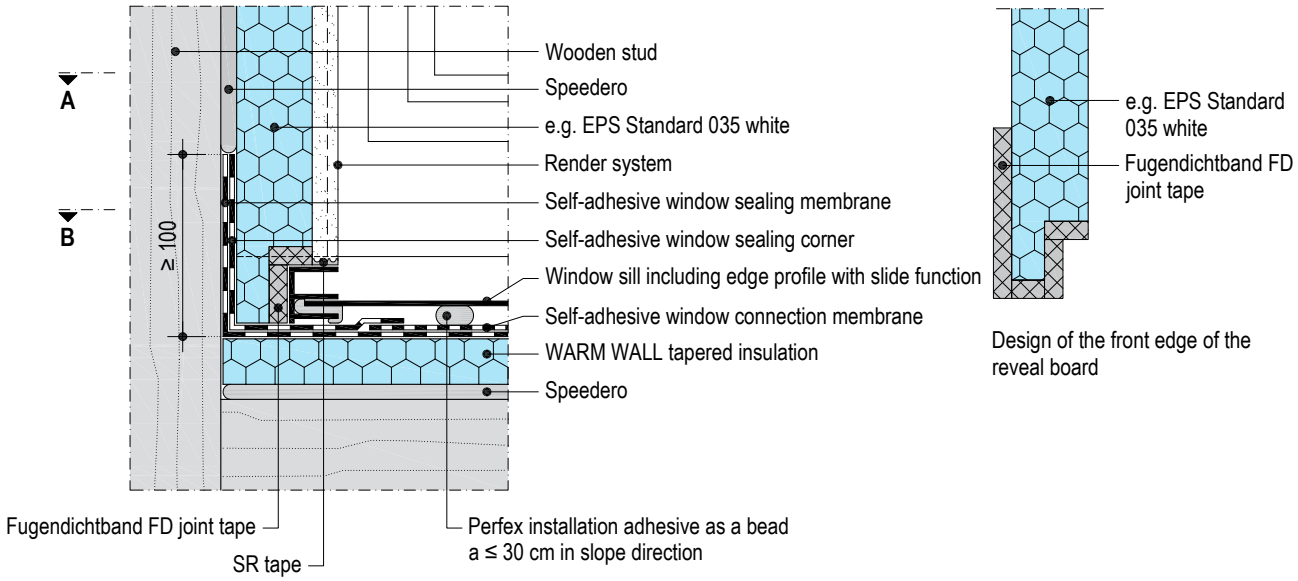
The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with plaster, drywall and external thermal insulation composite systems” (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany. The construction details shown only apply for the implementation of a second water channelling level, e.g. with Knauf WARM WALL window sealing system, see Installation Instructions P651-A01.de.

## Connection to window sill side section

Scheme drawings I Dimensions in mm

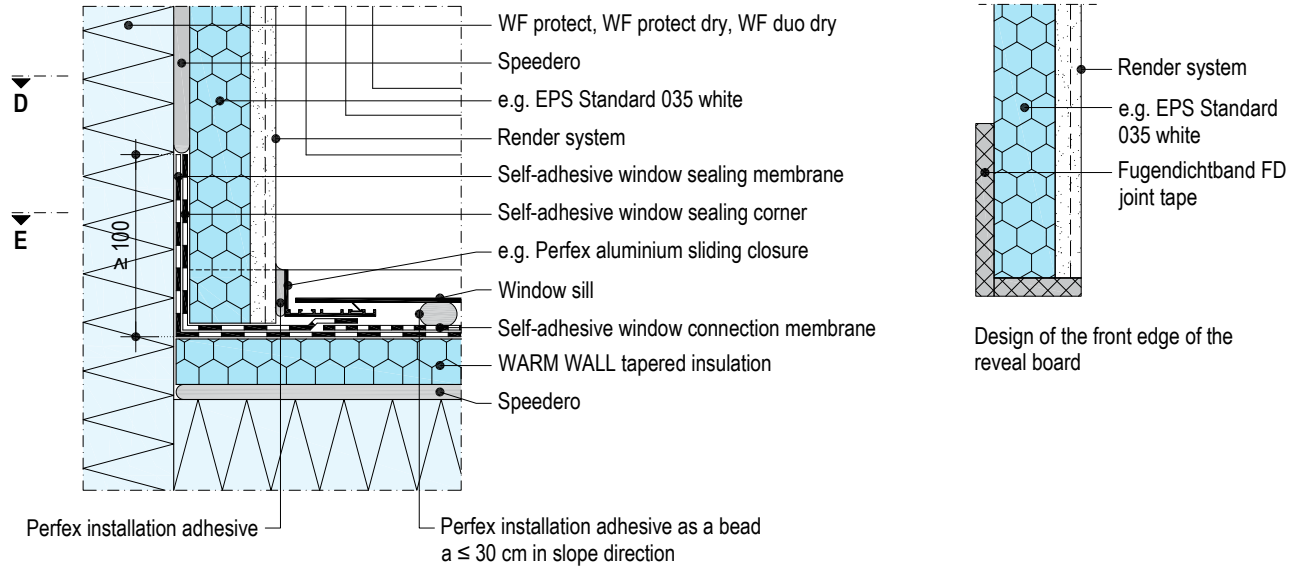
### WE203S.de-FE-V4 Connection to window sill including edge profile with slide function

Section G




### WE203S.de-FE-V5 Connection to window sill – subsequent window sill installation

Section H




| Notes | |
|---|---|
| | The construction details shown only apply for the implementation of a second water channelling level, e.g. with Knauf WARM WALL window sealing system, see Installation Instructions P651-A01.de. |
| | At the foot of the reveal insulation panel as well as the render system, a joint is mandatory in the connection area to the window sealing corner/window sealing membrane, to prevent waterlogging underneath the reveal board. This is achieved by attachment of the joint sealing tape FD to the base of the reveal board. |
| | When retrofitting the window sill, do not apply full surface adhesive to the sliding closure to guarantee the water flow direction of the window sill front edge. |
| | See also the video “Knauf – Abdichtung für Fenster bei WDVS” (German) (Sealing for windows with ETICS) at youtube.com/knauf |

## Connection to window sill side section (continued)

**Recommendation for the lateral render spacing for window sills with edge profile**

| Window sill colour | Window sill length | Expected movement | Lateral plaster spacing | |
|---|---|---|---|---|
| | | | Edge profile without slide function | Edge profile with slide function[1)] |
| | m | mm | mm | mm |
| Natural, white | 1 | ± 0.5 | ≥ 1 | ≥ 1 |
| | 3 | ± 1.5 | ≥ 2 | ≥ 1 |
| Dark | 1 | ± 1.0 | ≥ 2 | ≥ 1 |
| | 3 | ± 2.5 | ≥ 3 | ≥ 1 |

Not recommended

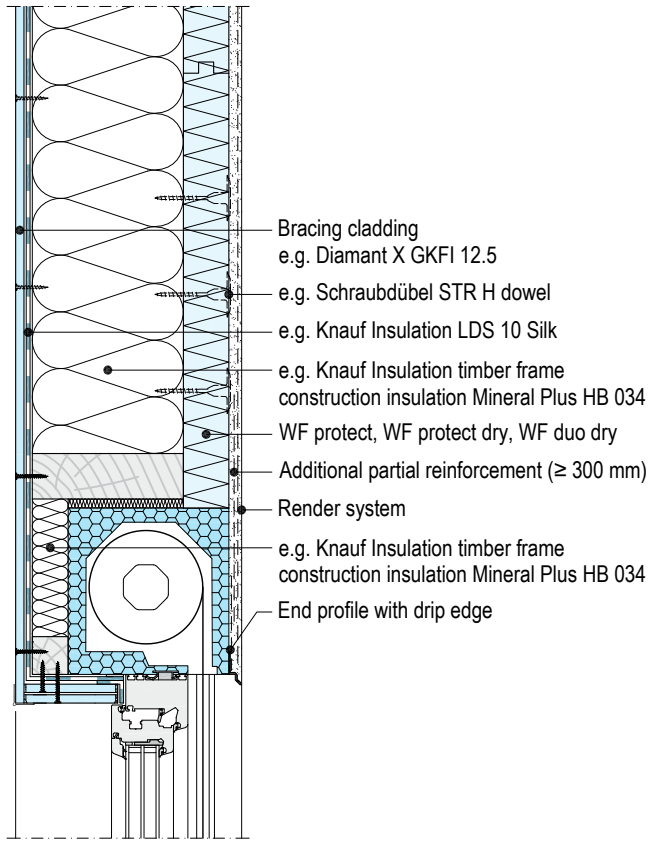
*1) The constraint-free movement absorption between the edge profile and window sill must provide at least the expected range of motion.*

The installation of window sills with edge profile featuring a slide function; recommended when retrofitting window sills with sliding closures.

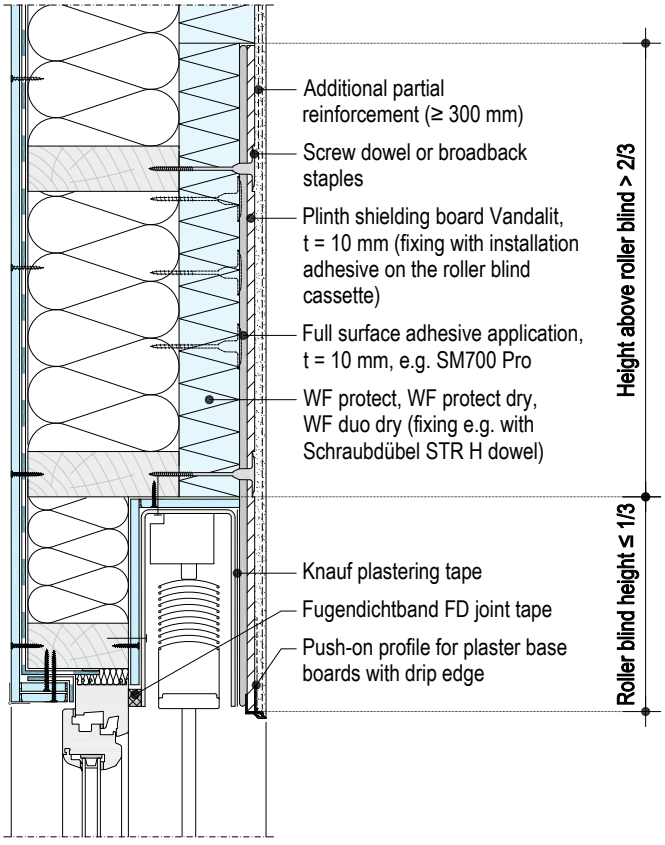
## Connection to sun screening

Scale 1:10 I Dimensions in mm

### WE203S.de-FE-V6 Integrated roller blind unit




### WE203S.de-FE-V7 Roller blind

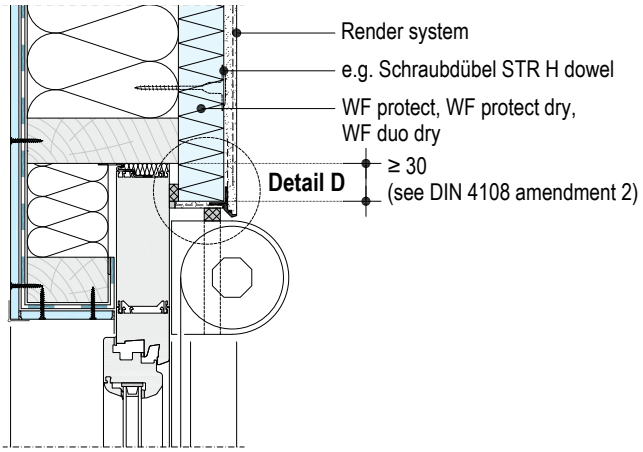


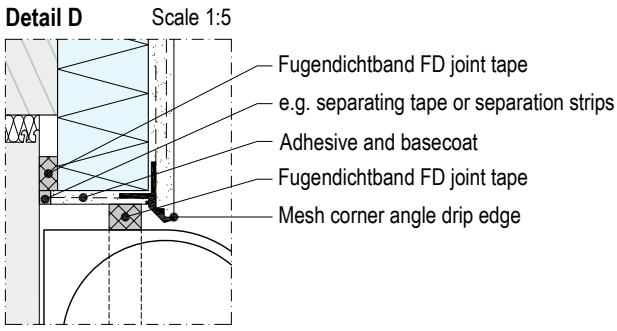

| Notes | |
|---|---|
| | Ensure that all openings (interface gaps) are sealed.<br>The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with plaster, drywall and external thermal insulation composite systems” (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany. |

## Connection to sun screening (continued)

Scale 1:10 I Dimensions in mm

### WE203S.de-FE-V3 Projection roller blind unit

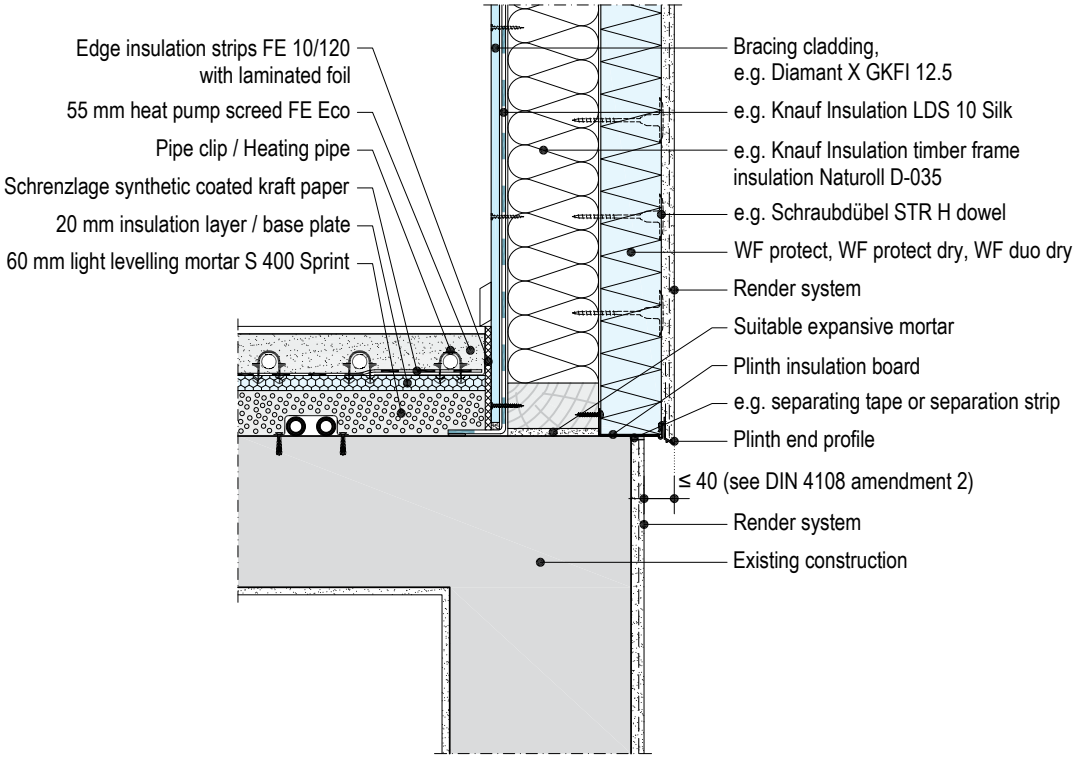



## Vertical extension

### WE203S.de-EX-V2 Vertical extension on existing storey

Existing building not remodelled

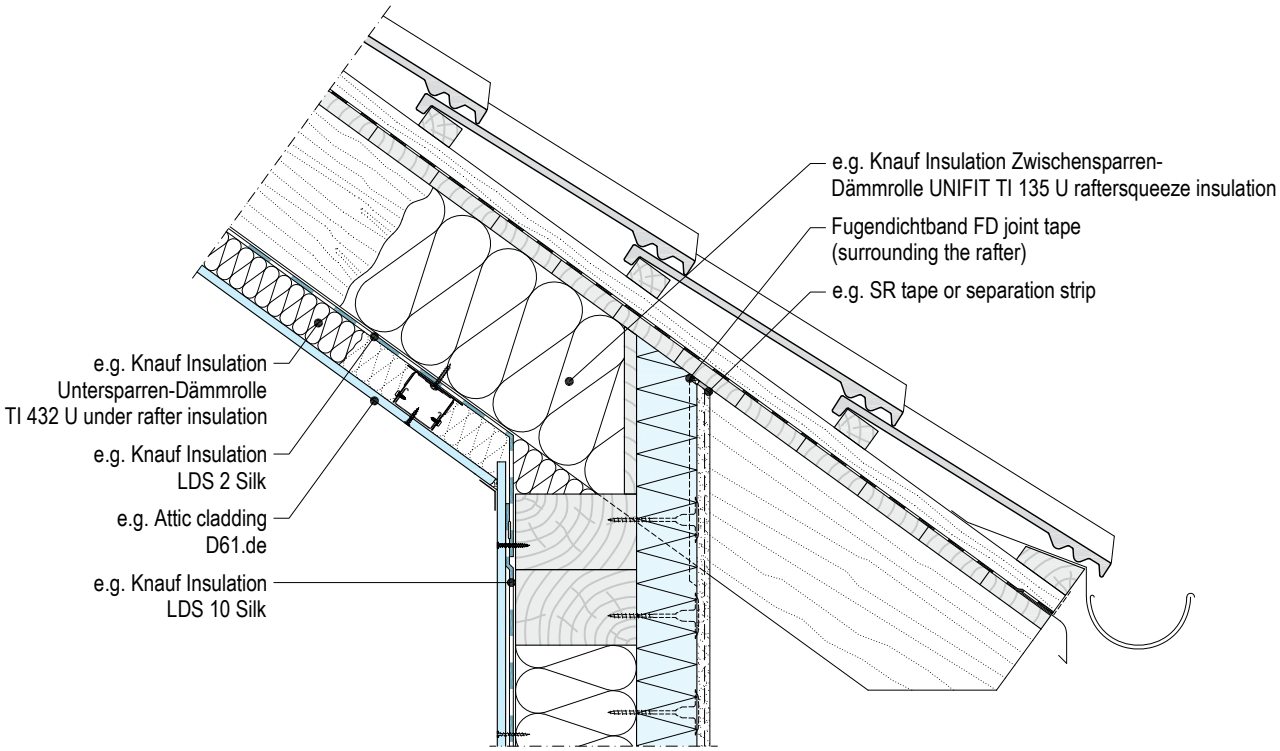



| | |
|---|---|
| **Notes** | When installing the projection roller blind unit a driving-rain proof application should be observed (connection of the plaster façade with Fugendichtband FD joint sealing tape).<br>Ensure that all openings (interface gaps) are sealed.<br>The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with plaster, drywall and external thermal insulation composite systems” (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany. |

## Connections to roof

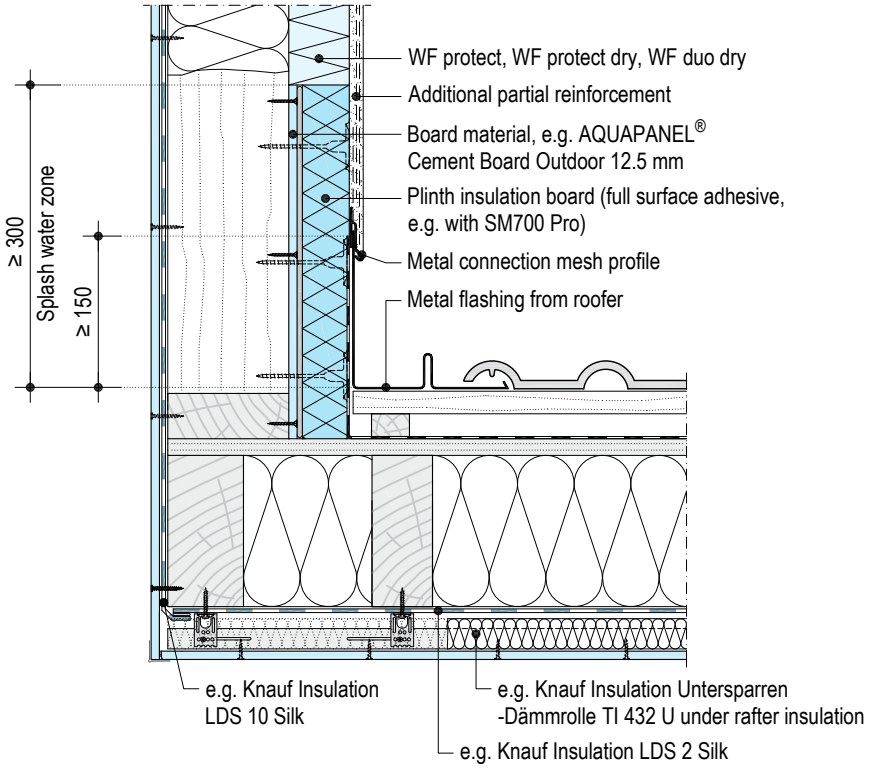
Scale 1:10 I Dimensions in mm

### WE203S.de-DA-V1 Eaves connection to roof weatherboarding




### WE203S.de-DA-V3 Connection to rising wall - dormer wing

With metal connection mesh profile



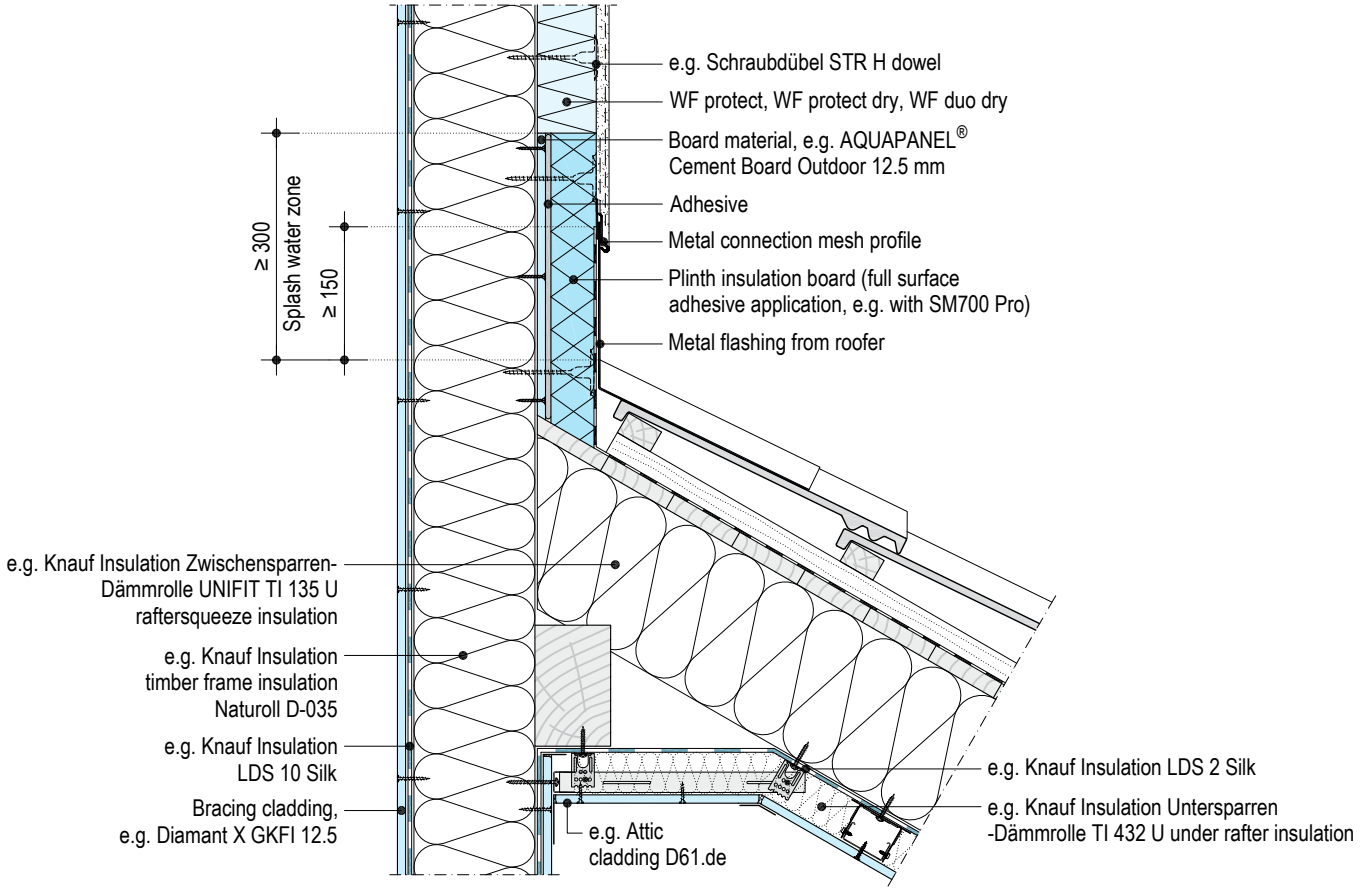

| Note | Oberve guideline “Metallanschlüsse an Putz und Wärmedämm-Verbundsysteme - *Metal connections to render and external thermal insulation composite systems*”, (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany as well as the DIN 18531. |
|---|---|

## Connections to roof (continued)

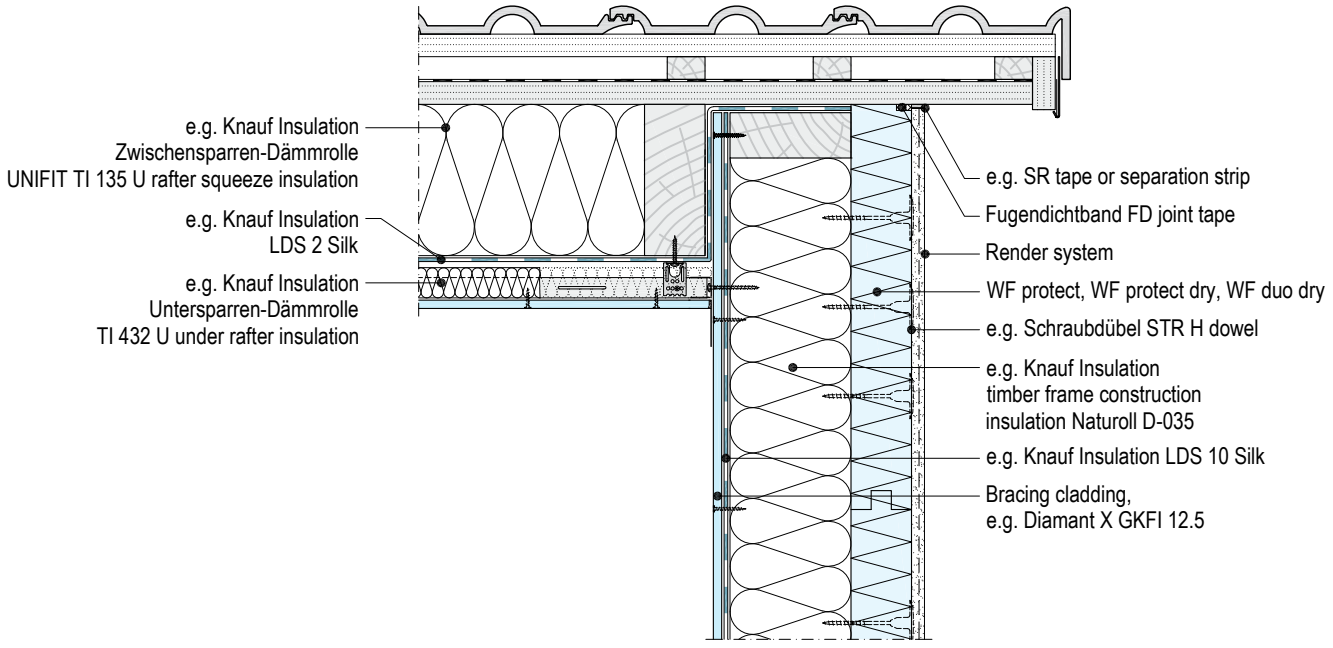
Scale 1:10 I Dimensions in mm

### WE203S.de-DA-V6 Pitched roof connection to rising wall

With metal connection mesh profile




### WE203S.de-DA-V5 Bargeboard connection



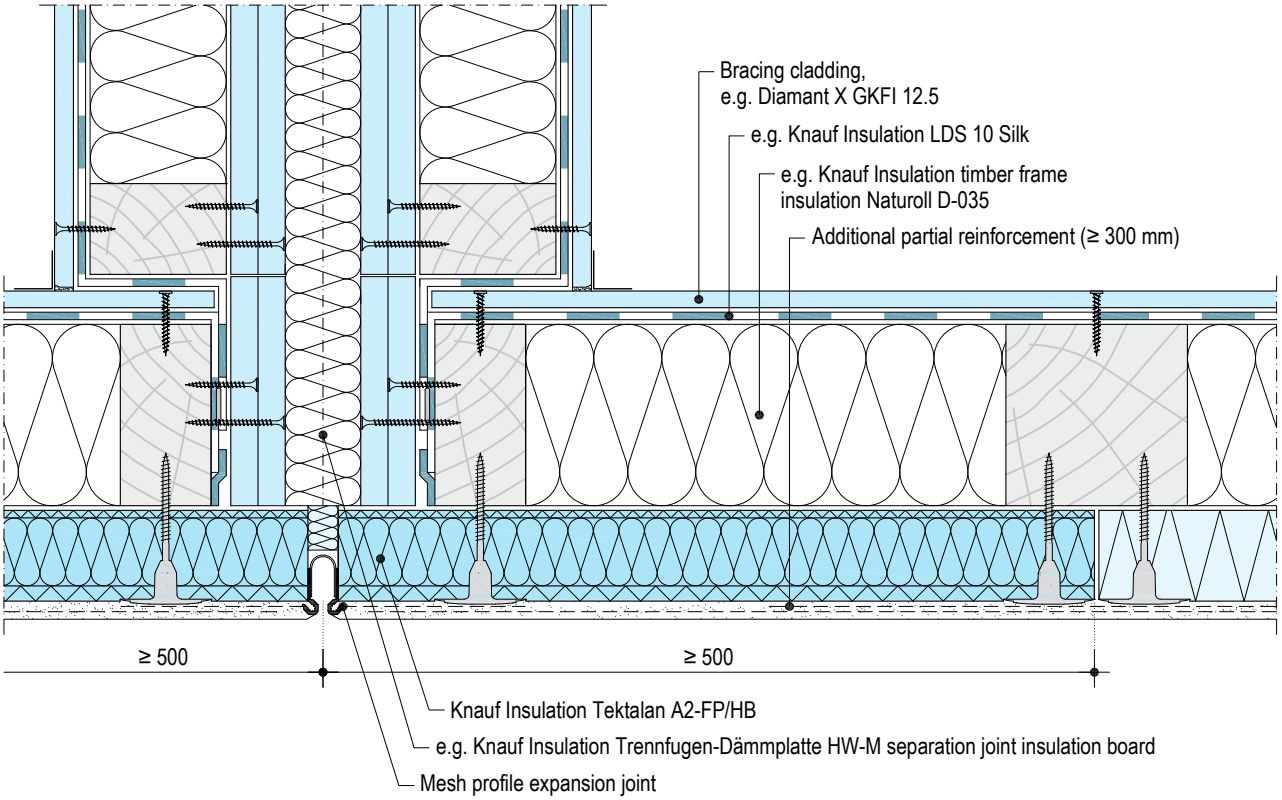

| Note | Oberve guideline “Metallanschlüsse an Putz und Wärmedämm-Verbundsysteme - *Metal connections to render and external thermal insulation composite systems*”, (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany as well as the DIN 18531. |
|---|---|

## Expansion and connection joints

Scale 1:5 I Dimensions in mm

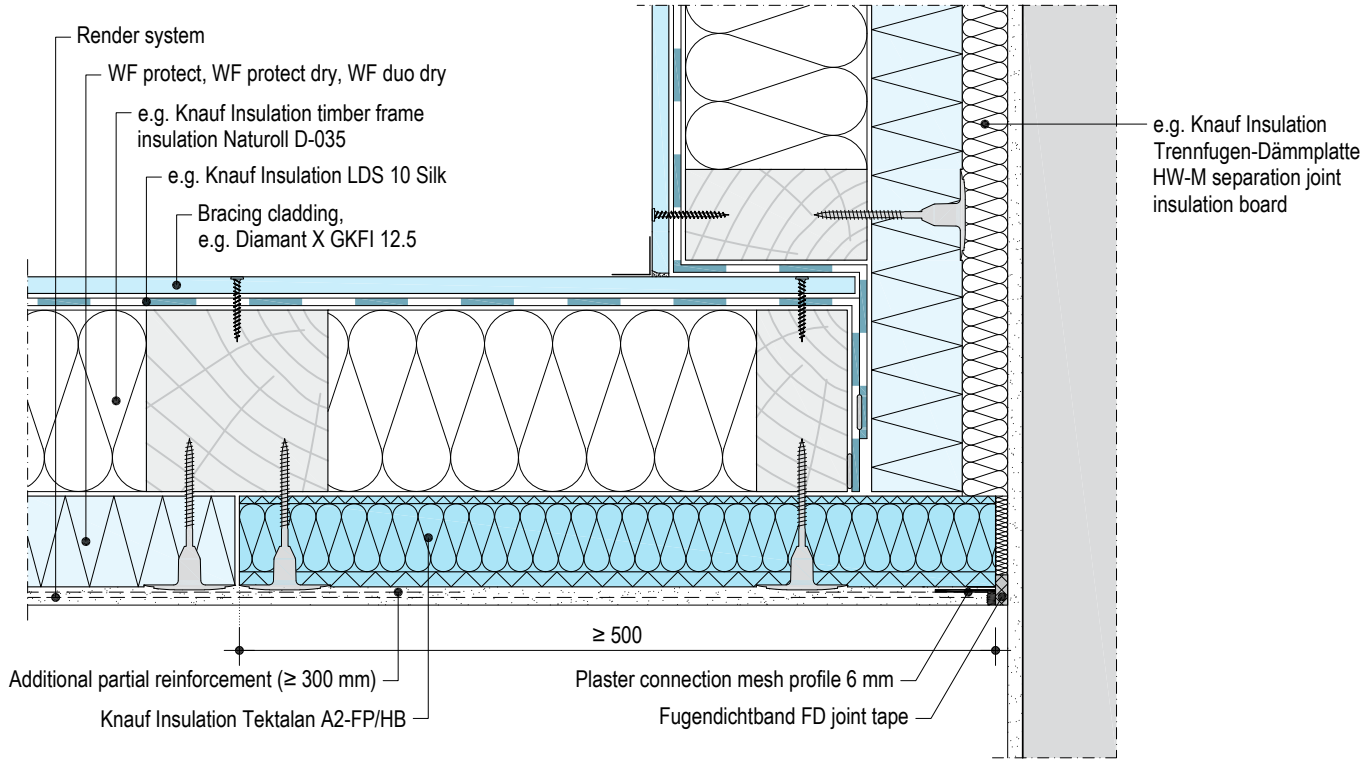
### WE203S.de-FU-H1 Building Party Wall – Semidetached house

Fire flashover area with Knauf Insulation Tektalan A2-FP/HB




### WE203S.de-FU-H2 Connection to existing constructional component

Fire flashover area with Knauf Insulation Tektalan A2-FP/HB

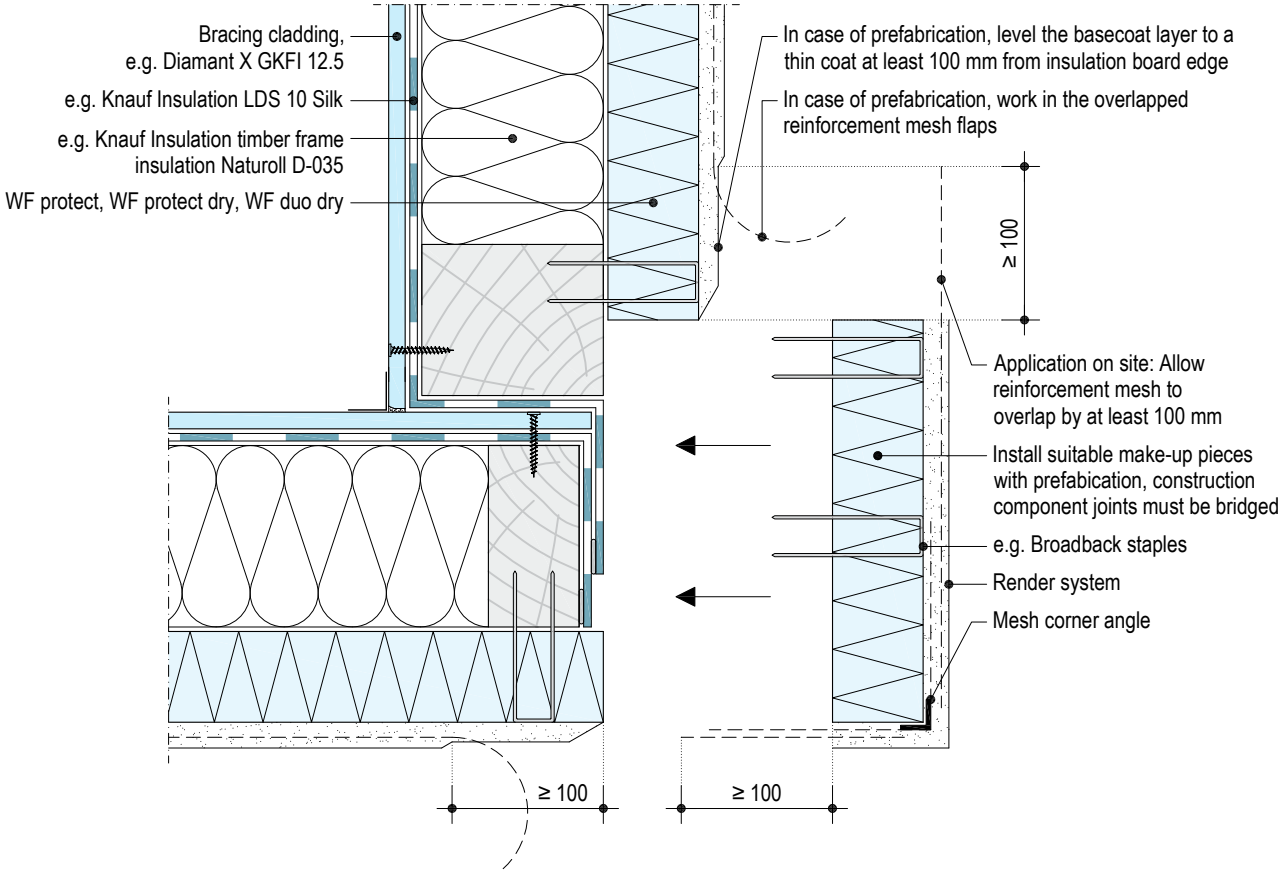



| Note | The application in terms of materials and dimensions is based on the guidelines of the applicable state building code. An existing fire protection concept must be observed. |
|---|---|

## Connection to building corner

Scale 1:5 I Dimensions in mm

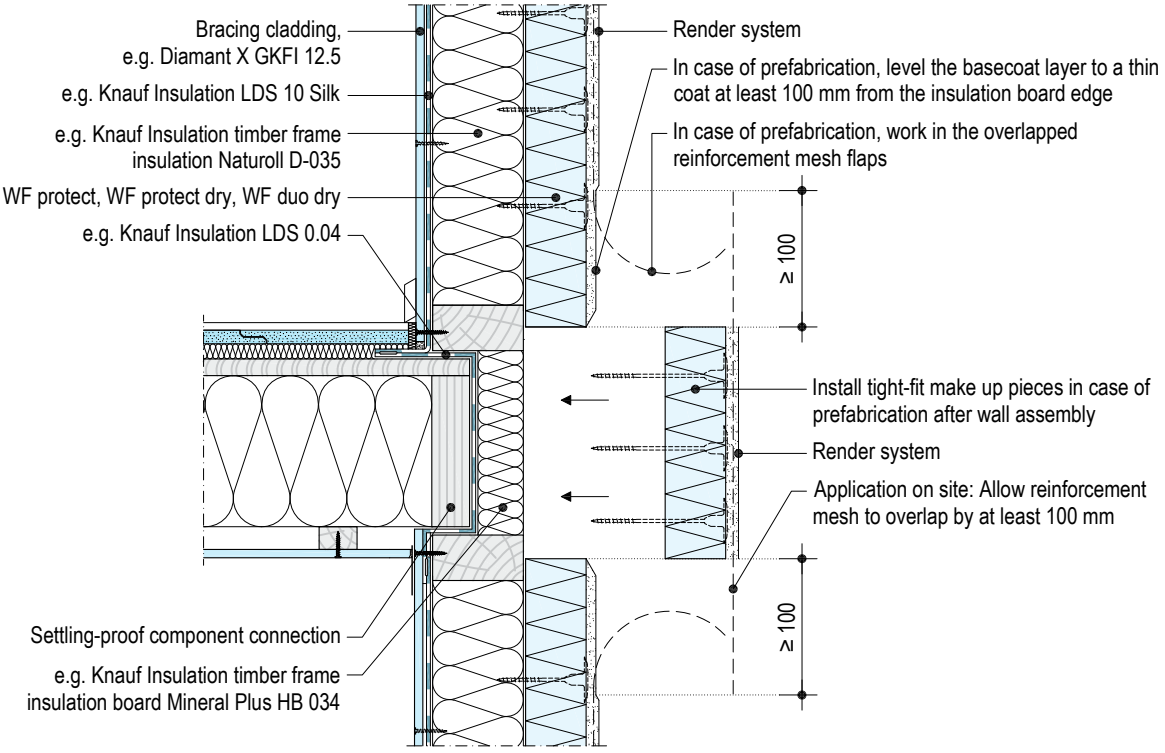
### WE203S.de-EX-H1 Connection to building corner




## Junction between stories

Scale 1:10 I Dimensions in mm

### WE203S.de-EX-V1 Connection to junction between stories



## Preconditions

Protect the insulation panels against moisture.

All connections and detail features must be clarified before application.

All substrates must be stable, dry and even. The construction timbers or exterior wall components must have a moisture level in the wood of ≤ 20 %. The substrate must be protected against detrimental moisturization before the application of ETICS.

Butt joints of the board substrate must be sealed acc. to manufacturers specifications, for example, using joint tape and jointing compound before ETICS are applied.

Rising damp may not be present. Plan all applied connections as driving-rain proof with Fugendichtband FD joint sealing tape. When using driving-rain proof window connection profiles, back with additional FD joint sealing tape. Ensure that all openings (interface gaps) are sealed.

The internal plastering and screed works as well as the introduction of loose infill insulation should be completed and the components should be dry enough so that an excessive accumulation of moisture is avoided.

The contractor is solely responsible for inspecting the condition of the substrate and the on-site conditions. The ambient temperature, substrate and material temperature must be at least +5 °C and may not exceed +30 °C during the entire application, drying and setting phase.

Stored insulation materials on building sites must be protected against moisture and direct sunlight. When glueing and applying plaster, suitable protection measures against precipitation and UV-radiation on the façade must be provided.

Only cold, clean water (drinking water quality) may be used as mixing water. Water up to a temperature of +30 °C may be used on building sites in spring and autumn.

Cover or apply a watertight covering to easily-soiled building components (e.g. window sills) prior to application. Observe the Code of Practice "Abklebe- und Abdeckarbeiten für Maler- und Stuckateurarbeiten - *Masking and covering for painting and stucco work*" issued by the German Bundesverband Ausbau und Fassade. Protect surfaces from precipitation and direct sunlight.

Please note that with the existing construction type, movements may occur due to

- drying out of materials applied when damp,
- thermal and moisture deviations within the building materials and the corresponding shrinkage and expansion behaviour,
- dynamic deformation from horizontal loads (wind load),

as well as swelling of the wood fibre insulation panels due to extremely high levels of diffusion. These influences may cause stresses in the rendering that may lead to hairline cracks in individual cases.

Building expansion joints must be implemented in ETICS including the cladding and designed accordingly so that the same movement is possible at the same location without any hinderance. The joints must be sealed to be driving-rain proof. The ETICS is unsuitable for exposure to compressive loads due to deformation in the substructure. As long as this cannot be excluded with certainty, suitable measures (e.g. expansion joints) must ensure that they can be accepted.

## Machine technology from Knauf PFT for the application of ETICS

| Product | Mixing pump/ feed pump | Stator/ rotor | Mortar hoses | Wet mortar pumping distance |
|---|---|---|---|---|
| **Bonding and reinforcement mortar** | | | | |
| SM700 Pro | G 4 | D4-3 with Rotoquirl | Ø 25 mm | Up to 30 m |
| | RITMO L plus | B4-2L with Rotomix | Ø 25 mm | Up to 20 m |
| SM300 | G 4 | D4-3 | Ø 25 mm | Up to 30 m |
| | RITMO L plus | B4-2L | Ø 25 mm | Up to 20 m |
| | PuMax | ex-works | Ø 35 + 25 mm | Up to 65 m |
| Sockel-SM Pro, Sockel-SM | G 4 | D4-3 with Rotoquirl | Ø 25 mm | Up to 30 m |
| | RITMO L plus | B4-2L with Rotomix | Ø 25 mm | Up to 15 m |
| Luis | G 4 | D4-3 1/2 capacity | Ø 25 mm | Up to 40 m |
| **Finishing plasters** | | | | |
| Mineral, thin-layer finishing coats (e.g. SP 260 Pro, RP 240 , MineralAktiv Scheibenputz Dry floated render etc.) | G 4 | D4-3 | Ø 25 mm | Up to 30 m |
| | RITMO L plus | B4-2L | Ø 25 mm | Up to 20 m |
| Paste-like finishing plasters (e.g.Addi S, Conni S, MineralAktiv Scheibenputz floated render) | SWING | C4-2 | Ø 25 mm | Up to 20 m |
| | RITMO L plus | B4-2L | Ø 25 mm | Up to 20 m |

For further information on machine engineering see pft.de

## Insulation material – Bonding

### Plinth and splash water zone

Inspect / supplement the building waterproof sealing before insulation work. The application of ETICS in the splash water zone is only permissible, if it can be assured that the thermal insulation material is not exposed to moisture. Otherwise the thermal insulation material in this zone must be replaced by a suitable material (e.g. Knauf plinth insulation panel or EPS insulating material). A plinth insulation panel must be used in the plinth or splash water zone.

Adhesively bond plinth insulation panels using adhesive mortar on mineral or bituminous waterproofing of buildings. The adhesive application is across the entire surface or using an edge ribbon and dab bonding method with an adhesive surface of at least 40 %. The lower edge of the plinth insulation panel must have a continuous strip applied at least 50 mm wide. The lower edge of the plinth insulation panel can be taper cut with a minimal integration depth in the soil (up to 500 mm under the ground level), according to guideline “Facade plinth render/External components” (German only), issued by Fachverband der Stuckateure für Ausbau und Fassade Baden-Württemberg.

Allow a setting time of at least 48 hours before continuing work.

**Adhesive bonding on bituminous substrates**

In case of mineral adhesives (not necessary with Sockel-SM Pro), apply Sockel-Dicht on two component, bituminous substrates as a bonding layer and roughen the surface with a broom. Allow to dry and set fully before continuing.

Insulation material from 150 mm above the edge of the ground line requires additional dowels.

**Further information**

For further information on the installation and application of insulation panels and plaster system in the plinth area see Pages 36 to 51.

Observe the following guidelines:

- Guideline “Façade plinth render/External components” (German only), issued by Fachverband der Stuckateure für Ausbau und Fassade Baden-Württemberg
- DIN 18533
- DIN 68800-2
- BDF leaflet 03-04 “Plinth constructions acc. to DIN 68800-2” of the German Bundesverband Deutscher Fertigbau e. V.
- DHV leaflet “Praxisgerechte Sockelausbildung - practical plinth design ” of the German association Deutschen Holzfertigbau-Verbandes e. V.
- “Informationsdienst Holz – Holzrahmenbau - *information service on wood and wood frame construction*” from the German Informationsvereins Holz e. V.

## Insulation material – application

The substrate must be stable, dry, even and sufficiently wide enough for attachment. The construction timbers or exterior wall components must have a moisture level in the wood of ≤ 20 %.

Apply the insulation panels when dry (board moisture < 13 % by mass), dust free according to manufacturers guidelines. Observe the notes on exposure to outdoor weather (see Page 45). Dry cleaning of soiled surfaces only. The boards must be worked in the dry state. Should there be slight damage on the board ends, the loose fibre materials must be removed before joining the boards to ensure tight joints.

The substrate temperature must be ≥ 0 °C when placing a dowel.
Back-ventilation of the system level should be avoided both with the installation on a wooden frame as well as on surface substrates, so that the boards do not warp and curl due to different levels of moisture on both surfaces. This can lead to problems associated with deformation and imperfections and can impair the airtightness of the ETICS reducing the effectiveness of the insulation.

Install the plinth connection end profile horizontally and fix using suitable fasteners at spacings of approx. 300 mm. Connect the joints and the plinth connection end profiles with H connectors. Provide the outside corners with the appropriate mitring. Push on plinth profile made of plastic with drip edge and integrated reinforcement mesh strips on the plinth connection end profile ensuring joint offsetting to the insulation panel and plinth connection end profile.

When connecting perimeter/plinth insulation panels with recessed plinth to existing ETICS or when using a plinth connection end profile, a joint sealing tape FD is inserted between the perimeter/plinth insulation panel and plinth connection end profile. If the ETICS are applied on existing perimeter / plinth insulation panels, use of a Sockel-Abschlussprofil Peri plinth connection profile is recommended. Application of a joint sealing tape is unnecessary. As an alternative for a thermal-bridge free plinth connection apply the Peri mounting rail with a suitable fastener (see Page 50). Peri plinth connection profile is inserted between the perimeter insulation and the façade insulation panel.

Apply the insulation panels directly to the wooden construction or onto the cladding. Bed the boards aligned with the tongue pointing upwards and joints staggered by ≥ 250 mm on the plinth connection end profile or on the Peri mounting rail (cut off the groove of the first insulation panel row or fill with insulation material strips). The board side with the stamp is the exterior side to be plastered. Avoid cross joints, e.g. on opening corners. At corners of openings (windows, doors), the insulation panels are to be laid in such a way that the butt joints are preferably not present in the immediate corner.

There may be no offsets, open butt joints, cross joints and bed joints, flaws or unevenness present that exceed the specifications of the DIN 18202 “Tolerances in building construction”. Furthermore, there may be no unsupported joints with end to end edges in the surface and the substrate may not deform when the boards are pressed on.

Minimum quantity and arrangement of the fasteners acc. to the German National Technical Approvas / type approval Z-33.47-1258 (see Pages 38 to 45). The wind loads result in acc. with EN 1991-1-4 and EN 1991-1-4/NA. The simplified method in acc. with Pages 14 to 18 can be applied with the corresponding conditions.

Every insulation panel must be fixed to at least two wooden studs (spacing of studs ≤ 625 mm) using at least 5 broadback staples per stud at vertical spacings ≤ 150 mm (with WF protect H, WF protect H dry and WF duo dry) or ≤ 90 mm (with WF protect M and WF protect M dry) or ≤ 70 mm (with WF protect L dry) and with a staple angle of 30 to 60° or using at least 3 dowels per stud. Apply staples and dowels so that they are flush with the surface and consider the required perimeter spacings in accordance with EN 1995-1-1 with EN 1995-1-1/NA. Placement of the fastener on the board joint is not permissible. The anchoring depth is at least 25 mm with dowels and 30 mm with broadback staples. Other fasteners not specified in the National Technical Approval / type approval Z-33.47-1258 are not permissible.

The insulation panel WF protect L dry may only be used on cladding or cladding made of board materials or on solid wood substrates and must always be fixed to the spars or studs, i.e. the anchoring must be placed through the cladding.

Storey height insulation panels may be installed vertically.

## Insulation material – application (continued)

If a board joint is required on the wooden studs, insulation panels should create a butt joint with tongue and groove and the staples should be applied directly on the wooden stud on the left and right beside the board joint arranged with a minimum spacing to the middle of the staple of 20 mm (stud width minimum 80 mm with inclined staple arrangement, see scheme drawing on Pages 38 to 41).

Any joints that may occur up to a maximum width of 5 mm can be sealed with STEICO multi fill. In case of joints exceeding 5 mm width, use make-up pieces made of equivalent insulation material and glue them with a frictional bond using STEICO multi fill. Grind any board joint surface unevenness smooth after application. Completely remove any grinding remnants (dust-free).

Corner grooving is unnecessary. Create a butt joint on front ends (cut back the tongues or grooves).

The wood fibre insulation panels may be applied up to 300 mm above the ground line. The DIN 68800-2 must be observed if the spacing to the ground line is reduced, see details on Pages 21 to 24.

Connections to adjacent constructional components should be made driving-rain proof with joint sealing tape FD. Connections, e.g. to window sills, should generally be carried out so that a second water draining or sealing level is provided (see installation instructions P651-A01.de). In order to allow any resulting water to drain to the exterior, no joint sealing tape FD may be used between the front edge of the façade insulation and the window sill with the second water channelling level. Furthermore, window sills must be rain-proof, e.g. with the aid of plastered in edge profiles featuring a sliding function.

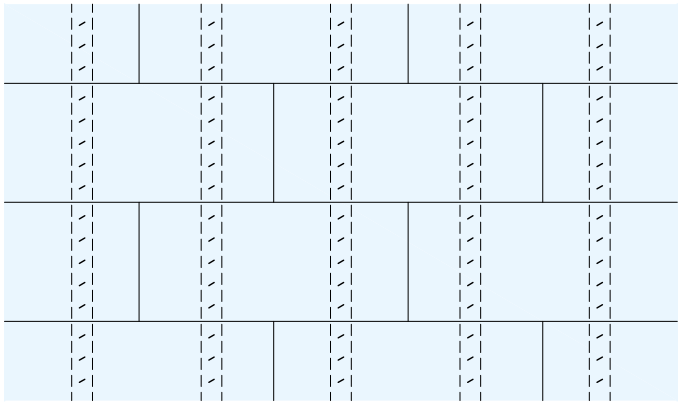
### Plinth and splash water zone

Apply additional constructional, mechanical fixing of the plinth insulation panels from a height of 150 mm measured above the edge of the ground line, e.g. for bituminous or painted substrates with general building authority approved dowels (2 dowels per board).

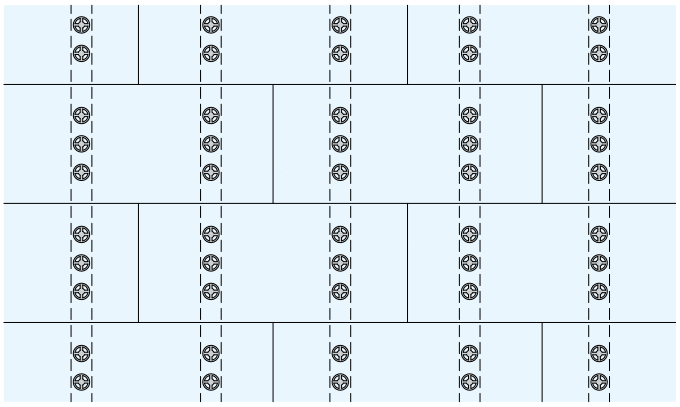
| | |
|---|---|
| **Notes** | Wet, soiled or damaged insulation panels may not be installed.<br>For rating and selection of the fasteners, see Pages 14 to 18.<br>Furthermore, the specifications on material and application of the insulation panels must be observed: steico.com |

### Non-supported joints with tongue and groove

**Staples**

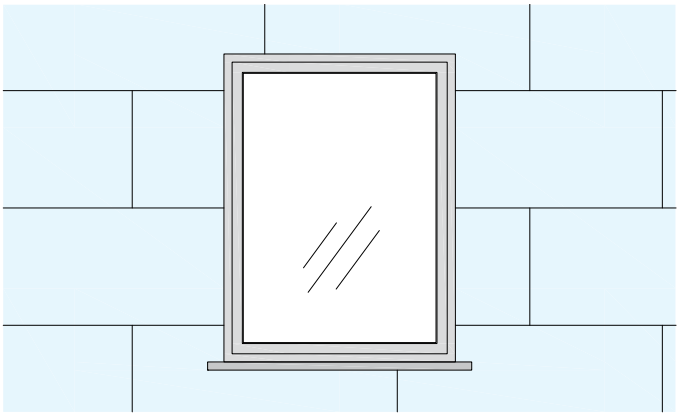


**Dowels**



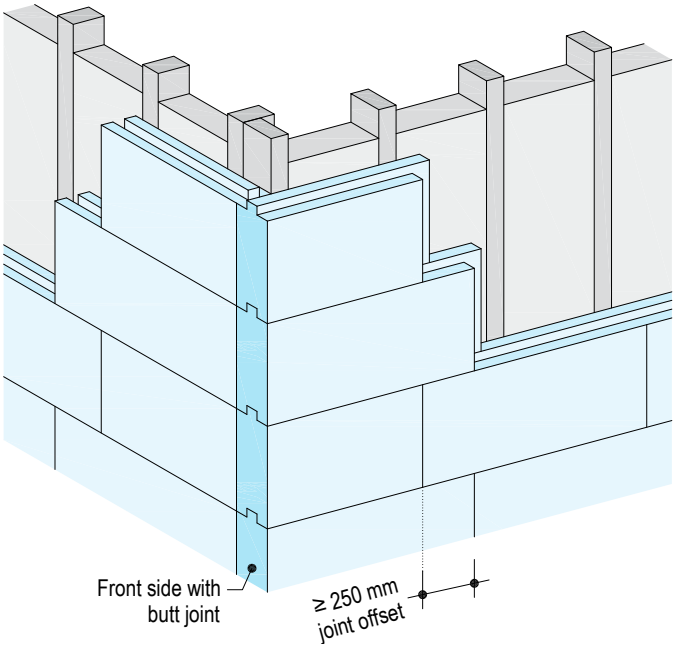
Fix the insulation panels to at least two wooden studs, refer to tables Pages 15 to 17.

**Window and door openings**



Avoid cross joints

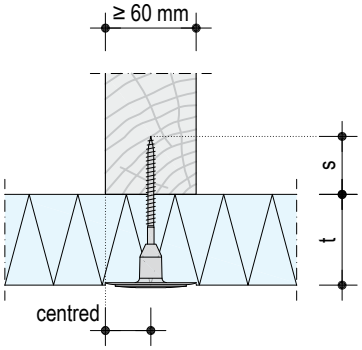
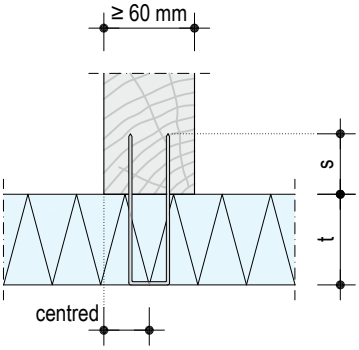
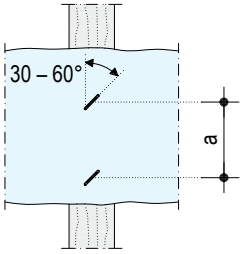
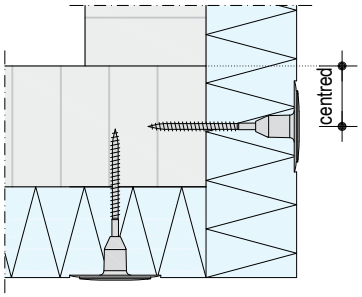
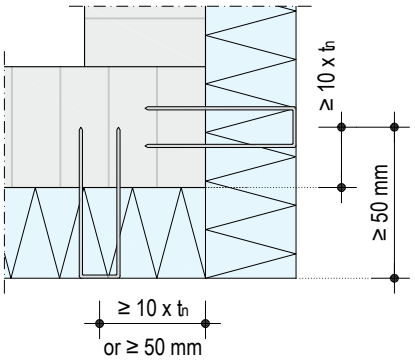
**Corner configuration**



## Insulation material – application (continued)

**Fasteners**

Scheme drawings

| **Dowels Schraubdübel STR H** (acc. to abZ)**, Schraubdübel 6H** | **Broadback staples** (acc. to EN 14592) |
|---|---|
| **Timber frame construction** | **Timber frame construction** |
|  |  |
| |  |
| | **Highest permissible vertical spacing**:<br>WF protect L dry: **a** ≤ 70 mm<br>WF protect M / dry: **a** ≤ 90 mm<br>WF protect H / dry: **a** ≤ 150 mm<br>WF duo dry: **a** ≤ 150 mm |
| **Solid wooden substrate** | **Solid wooden substrate** |
|  |  |
| | Apply staples flush with board |
| ■ Always apply dowels to the board surface<br>■ Permissible spacing of the dowel shaft to the panel edge: ≥ 150 mm | ■ Always apply staples to the board surface<br>■ Apply staples flush to the boards |

*t = insulation material thickness*

*$t_n$ = rated diameter of a staple arm ≥ 2.0 mm*

*s = anchoring depth ≥ 25 mm with dowels and ≥ 30 mm with broadback staples*

The EN 1995-1-1 and EN 1995-1-1/NA apply for the required perimeter spacings.

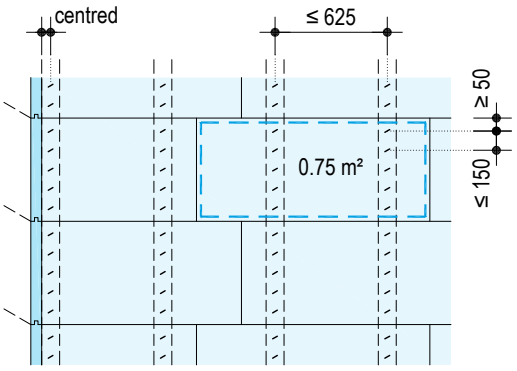
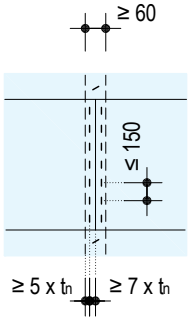
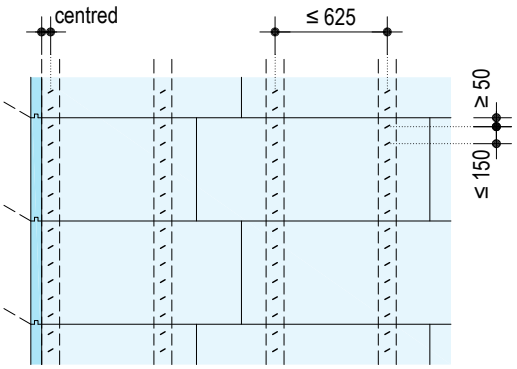
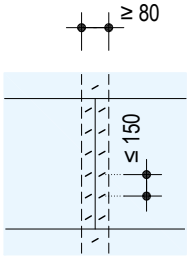
## Insulation material – application (continued)

### Dowels

Determination of the wind load, the number of dowels and dowel arrangement schemes at: knauf.de/duebelrechner

### Timber frame construction (with/without board material) – Broadback staples

Scheme drawings I Dimensions in mm

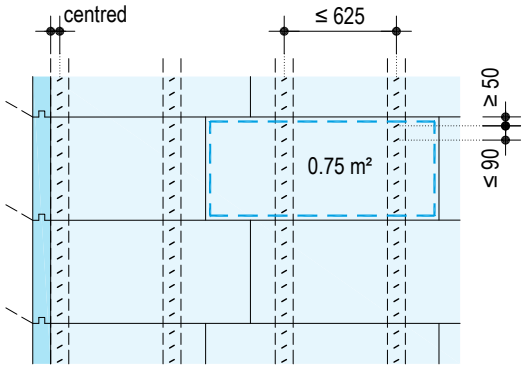
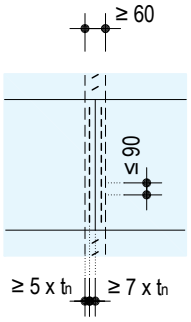
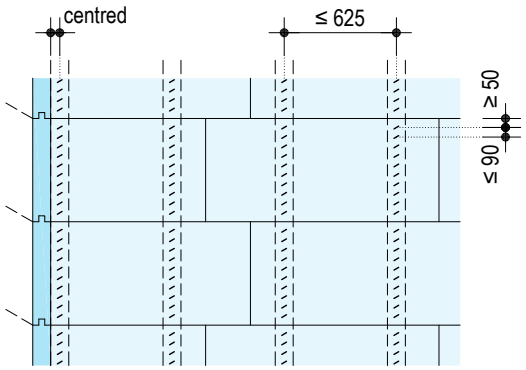
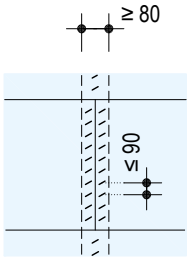
| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 575 mm x 1300 mm | Remark |
|---|---|---|
| **WF protect H** | | |
| **12** clamps/m² |  Board butt joint on studs– Alternative 1  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 5 staples per stud (10 staples/board with a board size of 0.75 m²) |
| **16** clamps/m² |  Board butt joint on studs– Alternative 2  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 6 staples per stud (12 staples/board with a board size of 0.75 m²) |

| Notes | |
|---|---|
| | The specified dimensions are based on the insulation panel edge/distance between centres of the staples.<br>Placement of the fastener on the board joint is not permissible.<br>Board joints on the wooden studs must be applied as butt joints.<br>If the staples are not arranges at an angle of 30° – 60° to the wooden studs with a butt joint, the number of staples increases by 30 %.<br>Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA.<br>For rating and selection of the fasteners, see Pages 14 to 18. |

## Insulation material – application (continued)

**Timber frame construction (with/without board material) – Broadback staples**

Scheme drawings I Dimensions in mm

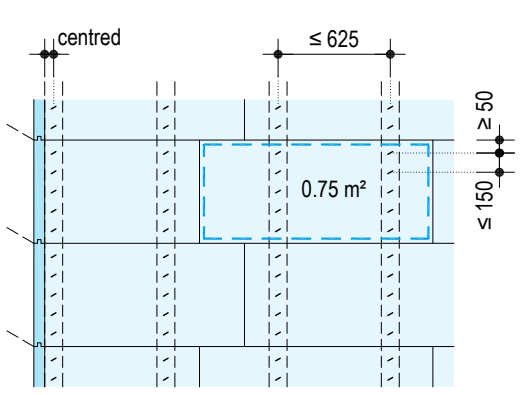
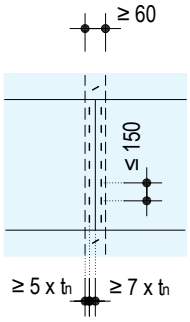
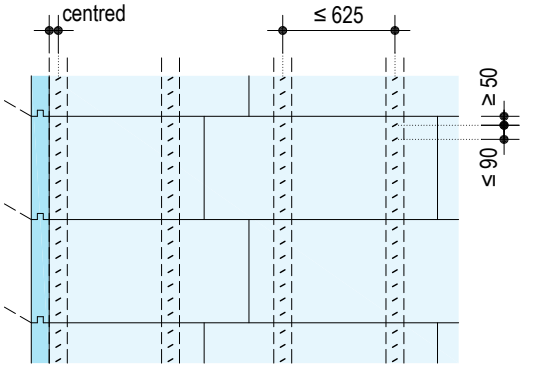
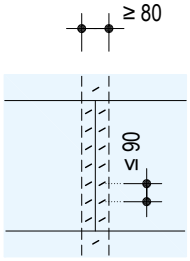
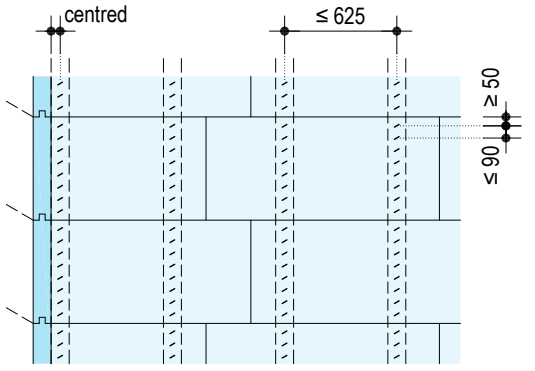
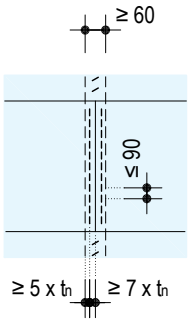
| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 575 mm x 1300 mm | Remark |
|---|---|---|
| **WF protect M** | | |
| **17** clamps/m² |  Board butt joint on studs– Alternative 1  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 7 staples per stud (14 staples/board with a board size of 0.75 m²) |
| **25** clamps/m² |  Board butt joint on studs– Alternative 2  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 10 staples per stud (20 staples/ board with a board size of 0.75 m²) |

| Notes | |
|---|---|
| | The specified dimensions are based on the insulation panel edge/distance between centres of the staples.<br>Placement of staples at the panel joint is not permissible. |
| | Board joints on the wooden studs must be applied as butt joints.<br>If the staples are not arranges at an angle of 30° – 60° to the wooden studs with a butt joint, the number of staples increases by 30 %. |
| | Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA. |
| | For rating and selection of the fasteners, see Pages 14 to 18. |

## Insulation material – application (continued)

**Timber frame construction (with/without board material) – Broadback staples**

Scheme drawings I Dimensions in mm

| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 575 mm x 1300 mm | Remark |
|---|---|---|
| **WF protect H dry** | | |
| **6 – 10** staples/m² |  Board butt joint on studs– Alternative 1  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 5 staples per stud (10 staples/board with a board size of 0.75 m²) |
| **WF protect M dry** | | |
| **10 – 15** staples/m² |  Board butt joint on studs– Alternative 2  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 7 staples per stud (14 staples/board with a board size of 0.75 m²) |
| **20** staples/m² |  Board butt joint on studs– Alternative 1  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 8 staples per stud (16 staples/board with a board size of 0.75 m²) |

**Notes**

The specified dimensions are based on the insulation panel edge/distance between centres of the staples.
Placement of staples at the panel joint is not permissible.

Board joints on the wooden studs must be applied as butt joints.
If the staples are not arranges at an angle of 30° – 60° to the wooden studs with a butt joint, the number of staples increases by 30 %.

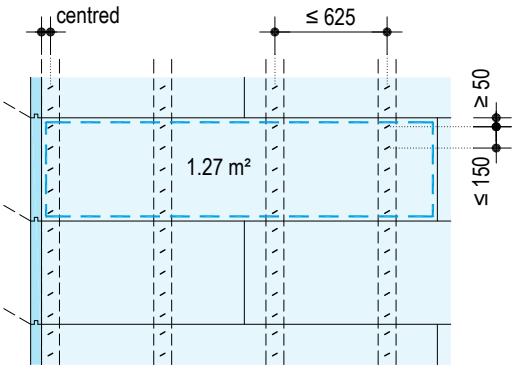
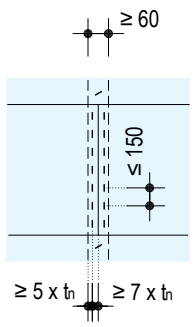
Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA.

For rating and selection of the fasteners, see Pages 14 to 18.

## Insulation material – application (continued)

**Timber frame construction (with/without board material) – Broadback staples**

Scheme drawings I Dimensions in mm

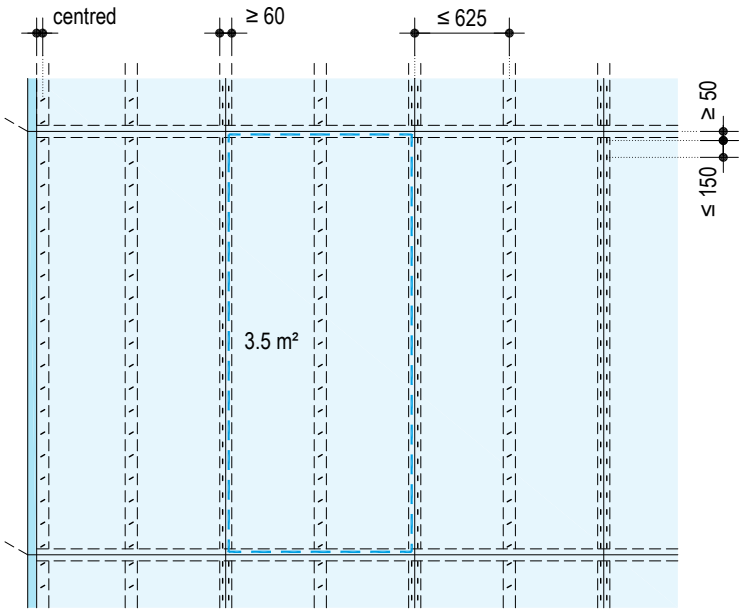
| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 575 mm x 2205 mm | Remark |
|---|---|---|
| **WF duo dry** | | |
| **6 – 10** staples/m² |   | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 5 staples per stud (20 staples/board with a board size of 1.27 m²) |

| | |
|---|---|
| **Notes** | The specified dimensions are based on the insulation panel edge/distance between centres of the staples.<br>Placement of the fastener on the board joint is not permissible.<br>Board joints on the wooden studs must be applied as butt joints.<br>If the staples are not arranges at an angle of 30° – 60° to the wooden studs with a butt joint, the number of staples increases by 30 %.<br>Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA.<br>For rating and selection of the fasteners, see Pages 14 to 18. |

## Insulation material – application (continued)

**Timber frame construction (with/without board material) – Broadback staples**

Scheme drawings I Dimensions in mm

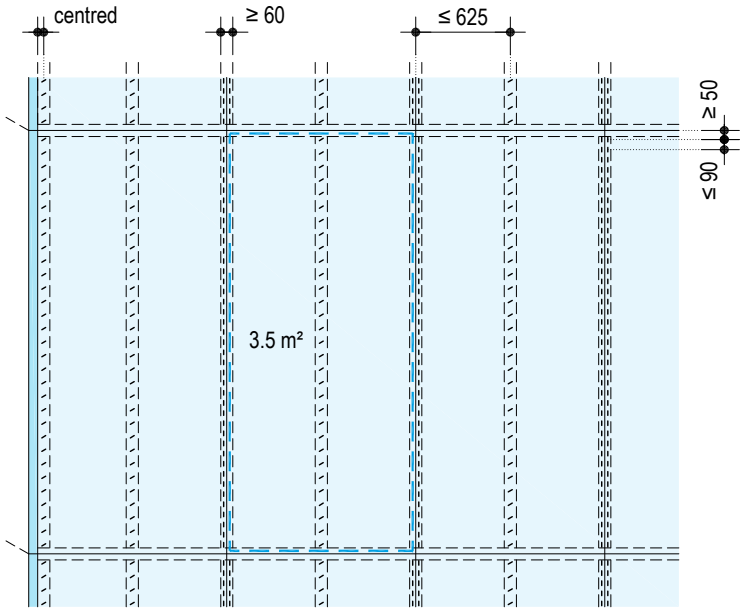
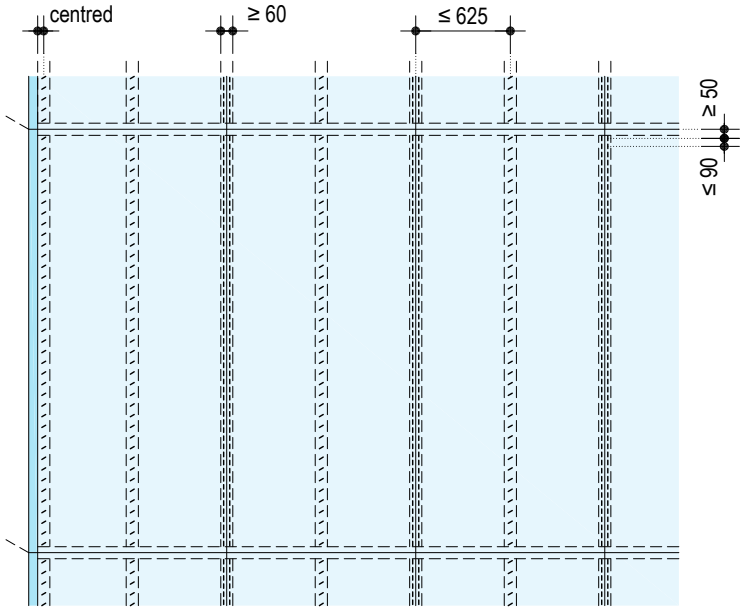
| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 1250 mm x 2800 mm | Remark |
|---|---|---|
| **WF protect H dry** | | |
| **7 – 14** staples/m² |  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 19 or 25 staples per stud (69 staples/board with a board size of 3.5 m²) |

| Notes | |
|---|---|
| | The specified dimensions are based on the insulation panel edge/distance between centres of the staples.<br>Placement of staples at the panel joint is not permissible. |
| | Board joints on the wooden studs must be applied as butt joints.<br>If the staples are not arranged at an angle of 30° – 60° to the wooden studs with a butt joint, the number of staples increases by 30 %. |
| | Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA. |
| | For rating and selection of the fasteners, see Pages 14 to 18. |

## Insulation material – application (continued)

**Timber frame construction (with/without board material) – Broadback staples**

Scheme drawings I Dimensions in mm

| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 1250 mm x 2800 mm | Remark |
|---|---|---|
| **WF protect M dry** | | |
| **15 – 22** staples/m² |  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 31 or 41 staples per stud (113 staples/board with a board size of 3.5 m²) |
| **33** staples/m² |  | The vertical permissible stud spacings in accordance with the approval must be observed. Each insulation panel has to be attached to at least two wooden studs with 39 or 51 staples per stud (141 staples/board with a board size of 3.5 m²) |

**Notes**

The specified dimensions are based on the insulation panel edge/distance between centres of the staples.
Placement of staples at the panel joint is not permissible.

Board joints on the wooden studs must be applied as butt joints.
If the staples are not arranged at an angle of 30° – 60° to the wooden studs with a butt joint, the number of staples increases by 30 %.

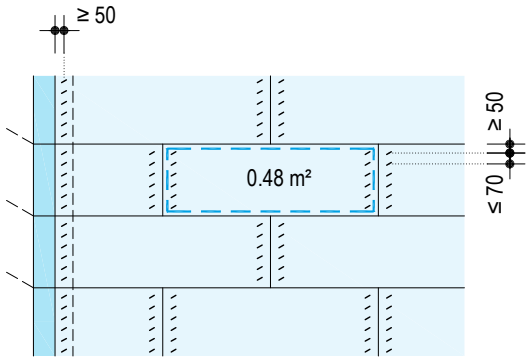
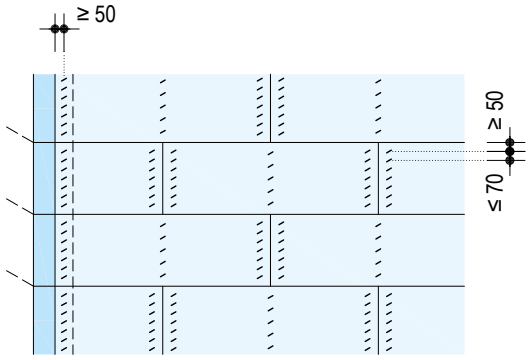
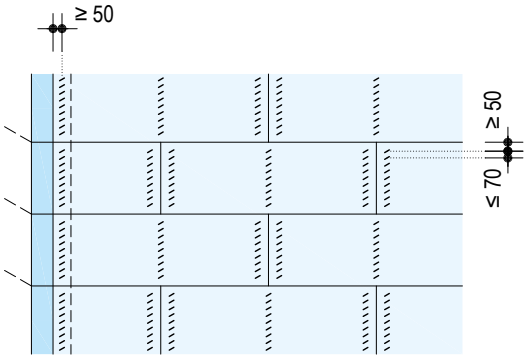
Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA.

For rating and selection of the fasteners, see Pages 14 to 18.

## Insulation material – application (continued)

**Solid wooden substrate – broadback staples**

Scheme drawings I Dimensions in mm

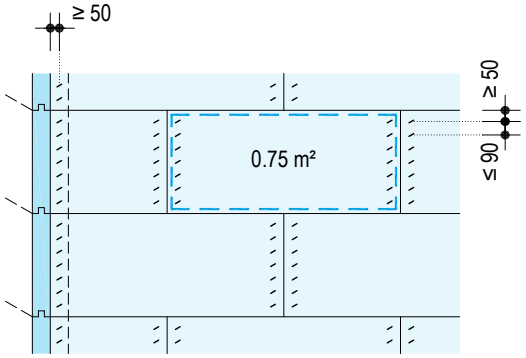
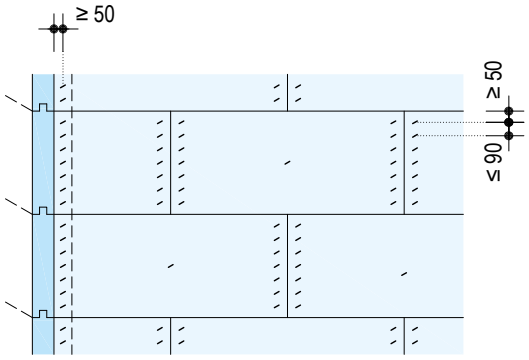
| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 400 mm x 1200 mm | Remark |
|---|---|---|
| **WF protect L dry** | | |
| **25** staples/m² |  | The vertical permissible stud spacings in accordance with the approval and sufficient fastening of at least the vertical panel edges must be observed. 12 staples/ panel are required with a board size of 0.48 m². |
| **38** staples/m² |  | The vertical permissible stud spacings in accordance with the approval and sufficient fastening of at least the vertical panel edges must be observed. 19 staples/ panel are required with a board size of 0.48 m². |
| **55** staples/m² |  | The vertical permissible stud spacings in accordance with the approval and sufficient fastening of at least the vertical panel edges must be observed. 27 staples/ panel are required with a board size of 0.48 m². |

| Notes | |
|---|---|
| | The specified dimensions are based on the insulation panel edge/distance between centres of the staples.<br>Placement of staples at the panel joint is not permissible.<br>Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA.<br>For rating and selection of the fasteners, see Pages 14 to 18. |

## Insulation material – application (continued)

**Solid wooden substrate – broadback staples**

Scheme drawings I Dimensions in mm

| Minimum required quantity according to the rating of the fasteners Pages 14 to 18 | Cover dimension 575 mm x 1300 mm | Remark |
|---|---|---|
| **WF protect M dry** | | |
| **10 – 15** staples/m² |  | The vertical permissible stud spacings in accordance with the approval and sufficient fastening of at least the vertical panel edges must be observed. 14 staples/ panel are required with a board size of 0.75 m². |
| **20** staples/m² |  | The vertical permissible stud spacings in accordance with the approval and sufficient fastening of at least the vertical panel edges must be observed. 15 staples/ panel are required with a board size of 0.75 m². |

| Notes | |
|---|---|
| | The specified dimensions are based on the insulation panel edge/distance between centres of the staples. Placement of staples at the panel joint is not permissible. |
| | Required perimeter spacings acc. to EN 1995-1-1 and EN 1995-1-1/NA. |
| | For rating and selection of the fasteners, see Pages 14 to 18. |

## Insulation material – Exposure to outdoor weather

Boards may be exposed to outdoor weather for a maximum of 30 days. A prerequisite is the professionally applied sealing of the joints and connections to avoid damage to the overall construction. Furthermore, the board moisture directly before application of the render must be < 13 % by mass, measured e.g. with measurement device Gann Hydromette BL H 41. The properties of the boards change with a high level of material moisture. During unfavourable weather conditions with poor evaporation performance, the exposure to outdoor weather is limited to 14 days.

By a surface-pressed application and the application of the entire reinforcement layer render thickness of at least 7 mm with mesh reinforcement, a maximum exposure to outdoor weather of 6 months is possible.

Before application of the top coat the substrate properties must be tested (suction properties, level of soiling). A suitable primer is necessary if required.

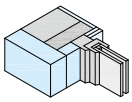
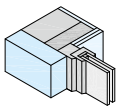
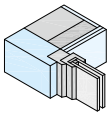
Alternatively, a sheet which is open to diffusion can be used as a temporary weather protection foil. Formation of condensation must be avoided. Open areas must be protected against permanent exposure to weather during installation (e.g. window reveals / parapets)

## Driving-rain proof window connection profile

### Selection criteria

| Window connection profiles | Features | Total plaster thickness |
|---|---|---|
| Duo G10 | With shadow gap, two-part profile | 6 – 15 mm |
| Duo G6 | With shadow gap, two-part profile | 6 – 12 mm |
| Milano | With protective lip, two-part profile | 6 – 10 mm |
| Universal Pro | With shadow gap and integrated PUR sealing tape | 6 – 12 mm |
| Front mounted roller shutters | With shadow gap and membrane for roller blind guide rails | 6 – 10 mm |

### Application

| Window connection profiles | Movement absorption capacity | Window position in wooden stud | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Centred | | | Flush | | | Projected (plasterable reveal necessary) | | |
| | |  | | |  | | |  | | |
| | | Maximum insulation material thickness in mm with window size | | | | | | | | |
| | | ≤ 6 m² | ≤ 10 m² | ≤ 15 m² | ≤ 6 m² | ≤ 10 m² | ≤ 15 m² | ≤ 6 m² | ≤ 10 m² | ≤ 15 m² |
| Duo G10 | A | 160 | 160 | – | 160 | 160 | – | 160 | 160 | – |
| Duo G6 | B | 160 | 160 | – | 160 | 160 | – | 160 | 160 | – |
| Milano | A | 160 | 160 | – | 160 | 160 | – | 160 | 160 | – |
| Universal Pro | A | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| Front mounted roller shutters | A | 160 | 160 | – | 160 | 160 | – | 160 | 160 | – |

**Notes**

Always apply window connection profiles in timber construction with additional joint sealing tape FD.

When using window connection profiles, the VDPM leaflet "Formation of details with profiles and joint sealing tapes in external rendering and ETICS" (German only) and the current window guideline of the Fachverband der Stuckateure "Connections windows and roller shutters in rendering, external thermal insulation composite system and drywalling" (German only) must be observed.

For coloured metal and plastic windows, the use of profiles with high shear resistance (higher movement class, e.g. instead of class B → class A) is recommended.

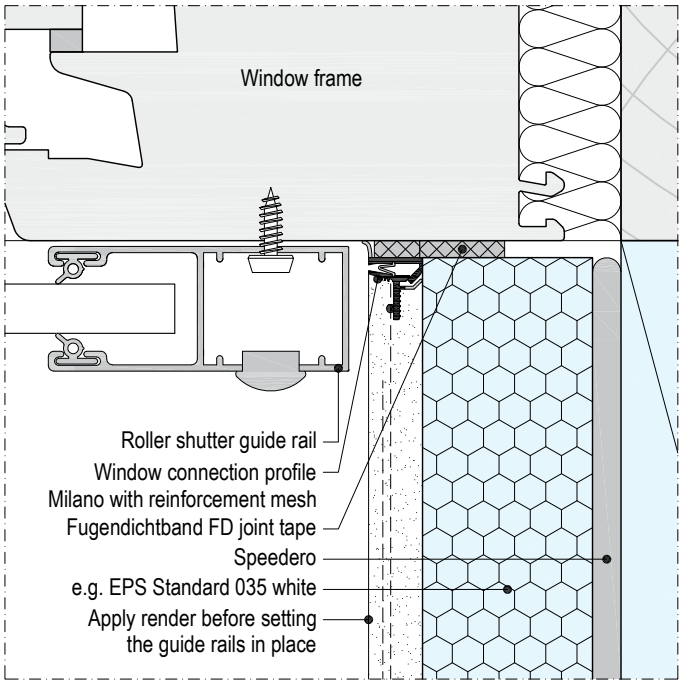
### Use of adhesively bonded window connection profiles

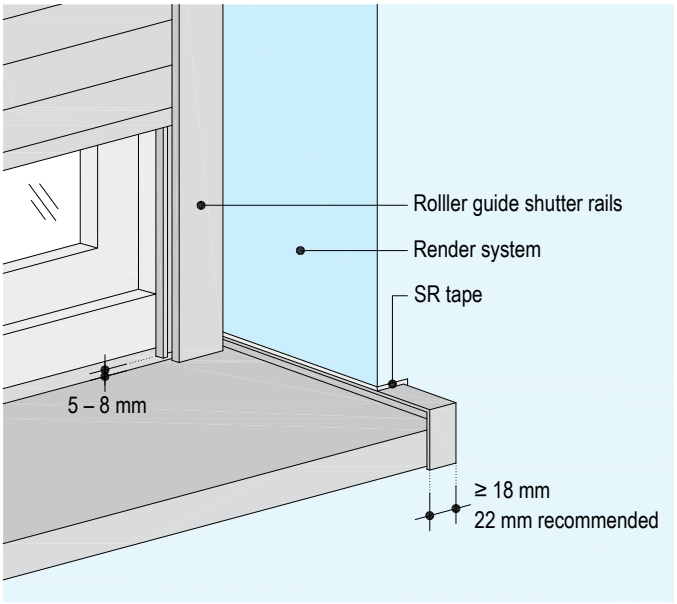
An adhesive bonding test must be performed before the use of adhesively bonded window connection profiles. For this purpose, clean a concealed location with a clean and dry cloth (without cleaning agent). The substrate should be level, dry and dust free. Residues that can affect bonding must be removed. The temperature must be between +5 °C and +40 °C. Cut off a short section of the profile (approx. 100 mm), peel off the protective paper of the PE-Dichtband sealing tape and push the profile section firmly on. Wait 10 minutes and then tear the profile with force away from the substrate. The self-adhesive PE-Dichtband sealing tape must on the one hand remain completely attached to the profile and on the other hand completely to the substrate (continuous foam rupture). Thus the substrate is suitable for adhesive bonding. Should this not be the case, the window connection profile Universal Pro with PUR sealing tape must be used.

## Driving-rain proof window connection profiles (continued)

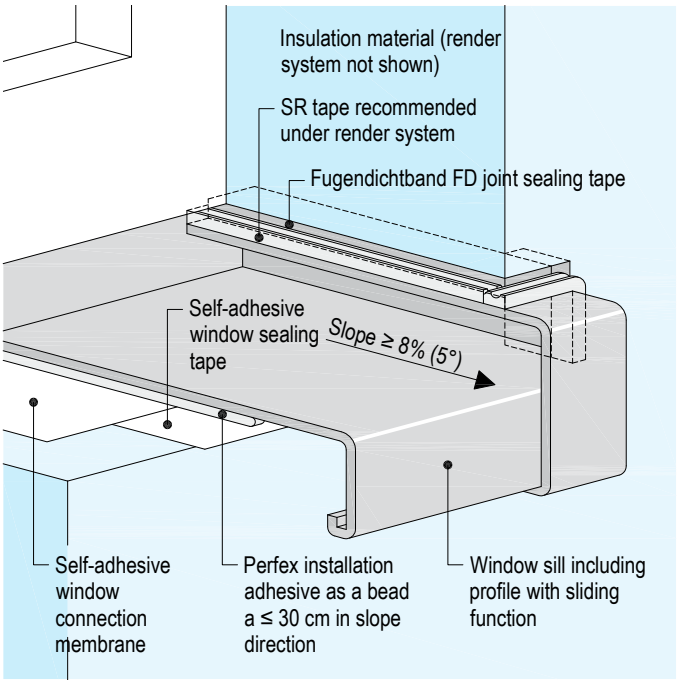
Scheme drawings

### Window connection with roller blind guide rails




### Connection to window sill side section

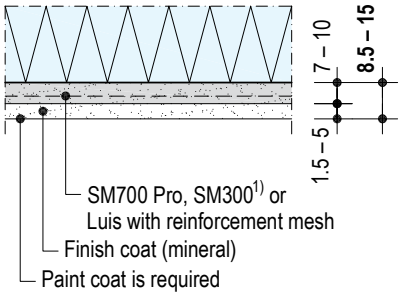



Example: Application in conjunction with a second water channelling level

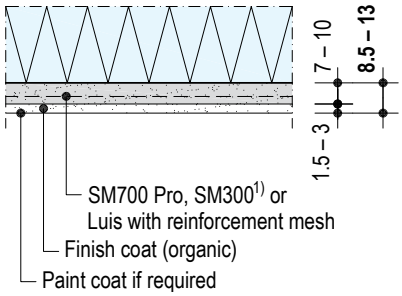
## Applied render system

Dimensions in mm

**Mineral based**




**Mineral / organic**




*1) Only permissible on WF protect H dry, WF protect L dry, WF protect M dry and WF duo dry.*

## Reinforcement (basecoat) layer

### Façade reinforcement

| System | Basecoat[2] | Layer thickness | Reinforcement mesh | Mesh arrangement in the reinforcement layer | Mesh reinforcement joint overlap |
|---|---|---|---|---|---|
| Mineral based<br>Mineral / organic | SM300[3], Luis | 7 mm | See following table[4] | In the upper third | ≥ 100 mm |
| | SM700 Pro | 7 – 10 mm | | | |

*2) The reinforcement thickness is specified in the approval with 5 mm. We always recommend a reinforcement thickness of 7 mm on wood fibre insulation panels.*

*3) Only permissible on WF protect H dry, WF protect L dry, WF protect M dry and WF duo dry.*

*4) With Noblo 1.5 mm an additional mesh layer is recommended.*

### Reinforcement in dependence on the finishing plaster and luminosity of the final coating

| Finish coat | Graining | Luminosity of the finish coating<br>Siliconharz-EG-Farbe, Autol, Minerol, MineralAktiv Fassadenfarbe paint | | | Autol TSR[5] |
|---|---|---|---|---|---|
| | mm | **100** to **30** | **29** to **25** | **24** to **20** | **< 20** |
| Noblo Filz, SM700 Pro | 1.0 | ● | ● | ● | ● |
| Noblo Filz | 1.5 | ● | ● | ● | ● |
| Noblo | 1.5 | ●● | ●● | ●● | ●● |
| | 2.0 – 3.0 | ● | ● | ● | ● |
| RP 240, SP 260 Pro | 2.0 – 5.0 | ● | ● | ● | ● |
| MineralAktiv Scheibenputz floated render | 1.5 – 3.0 | ● | ● | ● | – |
| MineralAktiv Scheibenputz Dry floated render | 2.0 – 3.0 | ● | ● | ● | – |
| Conni S, Addi S | 1.5 – 3.0 | ● | ● | ● | ● |

*5) Functionality only on white, newly created final coats is guaranteed in combination with an at least 5 mm thick, mineral reinforcement layer.*

● *Single-layer mesh reinforcement*

●● *Double-layer mesh reinforcement*

## Reinforcement layer (continued)

The insulation panels must have a moisture level of < 13 % by mass when the render is applied. Consider changes in material moisture due to air humidity.

Initially apply basecoat as a surface-pressed layer on the board surface. Then the basecoat layer is subsequently built up as wet plaster on wet plaster. At the inside corners of openings (e.g. window reveal - lintel), embed reinforcement mesh strips or mesh corner angle reinforcement fully into the basecoat. Subsequently apply Gewebeeckwinkel mesh corner angles perpendicular and flush. Apply the reinforcement layer and level it. Except when using Gewebeeckwinkel Sturzecke mesh corner angle for lintel corner, extending diagonally from all opening corners embed Gewebeeckpfeile mesh corner arrows or approx. 300 x 500 mm strips of reinforcement mesh in the fresh mortar. Subsequently embed Armiergewebe reinforcement mesh on the entire surface with at least a joint overlap of 100 mm fresh-in-fresh in the upper third of the basecoat layer. Apply a full covering of basecoat to the mesh.

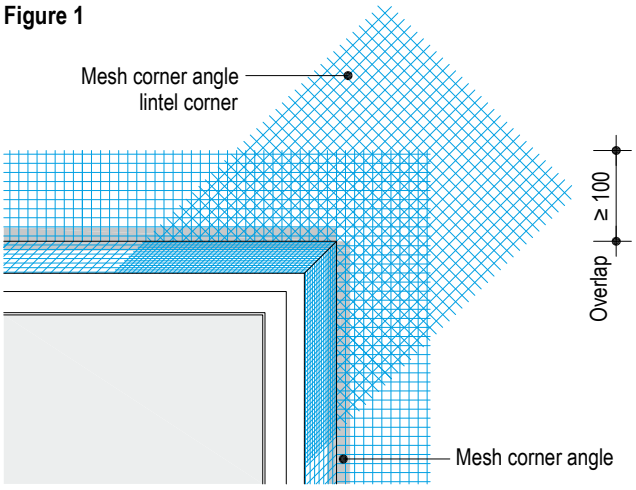
If a double layer of reinforcement is required (see Page 48), an approx. 4 mm thick basecoat layer is applied to the existing surface-pressed layer in which the reinforcement mesh is applied crease-free and with a joint overlap of approx. 100 mm in the upper third. After the basecoat layer has hardened, the second basecoat mesh is embedded with a joint overlap of ≥ 100 mm to the first mesh and a joint overlap to one another of ≥ 100 mm in the second layer of the basecoat. The position of the second mesh corresponds to the position of a simple reinforcement with a mesh. Alternatively, the second reinforcement layer can also be applied onto the fresh first reinforcement layer. For this purpose, apply minimum 3 mm of basecoat as wet plaster on wet plaster onto the first basecoat layer and apply reinforcement mesh with staggered joints. The diagonal reinforcements are embedded before the second mesh layer.

Avoid excessive smoothing of the reinforcement layer to prevent a concentration of fine particles or formation of a sinter layer on the surface. Rub off any burrs that have formed when drying. Should natural discolourations occur on the reinforcement (basecoat) layer, apply Aton Sperrgrund barrier coating as a plaster primer when dry. Plaster connections should be separated from the constructional components with a separating strip (e.g. SR band), separation cut, profiles or similar.

### Reinforcement of window lintel/ reveal

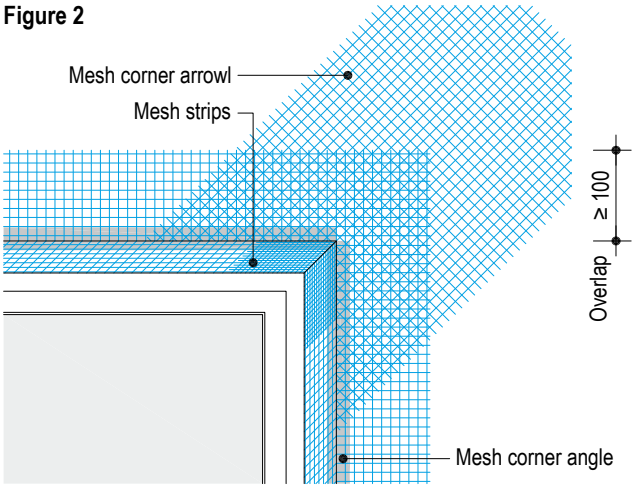
Dimensions in mm

**Figure 1**




*The lintel/reveal corner areas require additional Gewebeeckwinkel Sturzecke mesh corner angle reinforcement.*

**Figure 2**




*Alternatively, the lintel/reveal corner areas can be reinforced with Gewebeeckpfeile mesh corner arrow or reinforcement mesh strips.*

### Basecoat drying time

Before application of a further coating (primer/basecoat) it is important to ensure that the basecoat is fully dry. The minimum drying time is generally approx. 1 day/mm layer thickness. With unfavourable weather conditions (e.g. high levels of air humidity or low temperatures) the drying time is extended, e.g. the drying time at +5 °C is around double so long. For further information please refer to the product data sheets of the subsequent coatings.

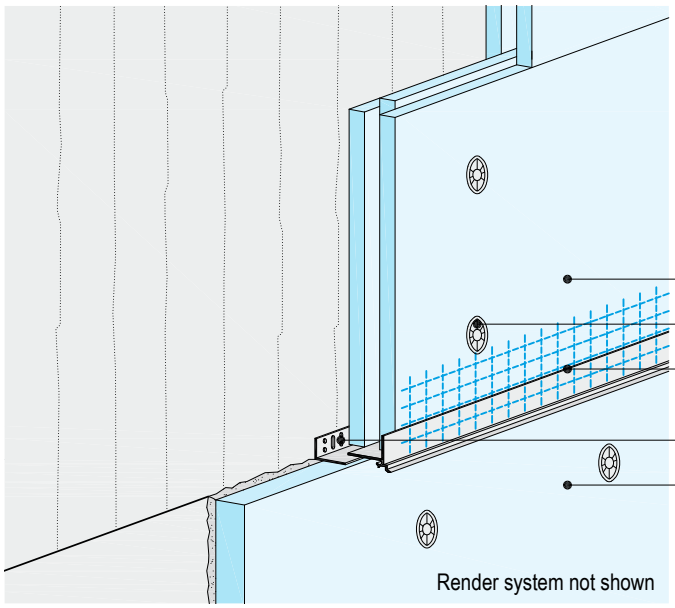
### Plinth and splash water zone

Apply at preferably least 5 mm basecoat covering the full surface and embed reinforcement mesh 4x4 mm or 5x5 mm to the entire surface in the upper third of the basecoat. Stagger the joints by at least 100 mm.

When insulation is applied in areas contacting the soil, the reinforcement layer ends underneath the edge of the future ground line.

## Reinforcement layer (continued)

### Thermal bridge free Peri plinth end profile




Apply the basecoat on the insulation material. Push in the Peri plinth connection profile between the perimeter / plinth insulation and façade insulation or Peri mounting rail and façade insulation, push into the basecoat, align flush and embed the reinforcement mesh.
Connect the profiles with the supplied connectors. Provide the outside corners with the appropriate mitring or suitable corner elements. Constructional separation of the plinth plaster, e.g. by using a separating strip (SR Band), separation cut, profile or similar. When implementing the transition between the façade insulation and the plinth insulation, driving-rain proofing must be observed. If necessary apply a Fugendichtband FD joint sealing tape.

## Finish coat

### Primers

Stir the contents of the container thoroughly and repeat occasionally.
With thin-layer mineral-based finishing coats when required undiluted Quartzgrund Pro, or undiluted Isogrund, diluted 1:1 with clean water and apply uniformly with a roller to the entire surface or apply using a suitable spray device. With Conni and Addi, apply undiluted Quarzgrund Pro uniformly using a roller or brush and spread crosswise. Avoid streaking. When applying pigmented Conni and Addi, Quarzgrund Pro pigmented in the same or similar colour shade is recommended.

Allow a drying time of at least 2 hours before applying the finishing coat with Quarzgrund Pro and at least 12 hours for Isogrund.

### Plaster application

| Finish coat | Layer thickness in mm |
|---|---|
| **Façade** | |
| Noblo Filz (freely styled texture) | 3 – 5 |
| Noblo Filz | 2 – 3 |
| Noblo, SP 260 Pro, RP 240 | Grain size |
| SM700 Pro (sponged / freely styled texture) | 3 |
| Conni S, Addi S | Grain size |
| MineralAktiv Scheibenputz floated render, MineralAktiv Scheibenputz Dry floated render | Grain size |
| **Plinth area** | |
| Sockel-SM Pro (sponged)[1)]<br>Sockel-SM (sponged)[2)] | 2 |
| Butz | 2 |

1) *Only in conjunction with Sockel-SM Pro as a basecoat. Sockel-Dicht is unnecessary in case Sockel-SM Pro is used as a render system (basecoat and finish coat) in a total thickness ≥ 7 mm.*
2) *Only in conjunction with Sockel-SM as a basecoat.*

Required water quantity and mixing of the mortar in acc. with the current product data sheet.

Check the containers before use to ensure that the colour shades are correct. When applying a shaded finish coat, ensure that the batch numbers are the same or only mix sufficient render required to finish a full rendered surface. Slight differences in colour hues can occur due to the use of natural aggregates. When reordering, always state the consignment number of the previous delivery.

## Finish coat (continued)

Ensure uniform grain distribution.

The type of tool used influences the surface roughness and it is therefore essential to use the same tool for a consistent finish. Ensure that there are sufficient workers available on every scaffolding level to avoid bothersome structural effects. Work quickly fresh in fresh and do not rework hardened surfaces. Avoid interruptions when working on continuous surfaces and always complete the work on self-contained surfaces.

Observe Code of Practice no. 26 “Farbveränderungen von Beschichtungen im Außenbereich - *Colour changes in exterior coatings*” of the Bundesausschuss Farbe und Sachwertschutz (Federal Paint and Property Protection Committee). Plaster connections should be separated from the constructional components with a separating strip (e.g. SR band), separation cut, profiles or similar.

**Noblo Filz**

Apply a fully covering coat of Noblo Filz in grain thickness, allow to stiffen and then apply a second coat in grain thickness, and immediately sponge / felt, without using water. Apply approx. 3 to 5 mm for free textures, spread flush and texture immediately with the required tool.

**Noblo, SP 260 Pro, RP 240**

Apply the render with a stainless steel finishing trowel or trowel, spread flush in grain size and structure immediately as required using a suitable tool.

**SM700 Pro**

For sponged surfaces SM700 Pro is applied in a layer thickness of approx. 3 mm on the basecoat and sponged after initial setting or freely textured.

**MineralAktiv Scheibenputz floated render, MineralAktiv Scheibenputz Dry floated render**

Knauf MineralAktiv Scheibenputz floated render is applied over the entire surface in grain thickness with a stainless steel trowel, and directly after application it is worked uniformly and without interruption to the desired texture using a hard plastic trowel. A sponge rubber float produces a coarser more rustic texture finish.

**Conni S, Addi S**

Ready-to-use, paste-like finish coat must be mixed thoroughly. When necessary, a small quantity of water may be added to set the application consistency. Apply Conni S or Addi S (floated render texture) with a stainless steel trowel in grain size to the entire surface and trowel smooth with circular movements without interruption using a hard plastic trowel.

### Plinth and splash water zone

Apply a primer to suit the selected top coat, observe the required drying times. Apply plinth renders, e.g. Sockel-SM Pro or Sockel-SM on the following day on the system-compatible reinforcement layer and sponge.

**Sockel-SM**

The layer thickness as a basecoat should be at least 5 to 7 mm. Apply Sockel-SM for sponged surfaces (layer thickness 1 to 2 mm) one day later at the earliest to the basecoat layer already applied with Sockel-SM. Sponge Sockel-SM as the mortar dries.

**Sockel-SM Pro**

When applying with Sockel-SM Pro render system in a total layer thickness (basecoat and finish coat) of at least 7 mm, additional moisture protection with Sockel-Dicht is unnecessary.

**Butz**

Allow a drying time of at least 2 hours before applying Butz on Quarzgrund Pro. Mix the contents of the container well, apply using a stainless steel trowel slightly thicker than the grain size and level in one direction.

## Plaster seal / moisture protection

A plaster system (with exception of: Sockel-SM Pro) must be protected against the ingress of moisture in damp and water hazard areas. This also applies for balconies, loggias, flat roofs and terraces.

The required plaster sealing or the necessary moisture protection must be applied up to at least 50 mm above the edge of the ground line or top edge of the covering. In case of stairs, the plaster sealing should be applied at least 80 mm above the step, as it is necessary to assume an increased exposure to moisture here. In our case this must be applied up to the existing building sealing.

In case of plastered insulation panels that are connected to the existing on-site perimeter insulation, it is necessary to ensure that the lower plaster edge is protected against the ingress of moisture by the plaster seal / moisture protection.

As plaster seal / moisture protection, Sockel-Dicht must be applied in a dry layer thickness of at least 1 mm (wet layer thickness at least 1.2 mm) in two work steps, e.g. with a trowel or wide (water) brush. In case of a paintable consistence, Sockel-Dicht is applied with a prime brush, in case of a plasterable consistence it is applied with a spatula, finishing trowel or trowel. The application is performed in two stages.

## Mechanical protection in the plinth area

As protection for the plinth in the area contacting the soil against mechanical influences of the soil or gravel bed, use of on-site protective layer with slip membrane (e.g. fleece laminated dimpled sheet) up to the edge of the ground line is recommended.

## Paint coats

### Primers

A suitable primer for a façade paint can be found in the product data sheets for the façade paints.

Casiol Grund is a ready-to-use, white pigmented, highly permeable, mineral calcium silicate primer for reducing the risk of lime efflorescence, as well as for equalising the suction properties on alkaline finishing renders before applying paint coats (medium to intensive colour shades).

### Façade paint

In case of top coat MineralAktiv Scheibenputz Dry floated render a coat of MineralAktiv Fassadenfarbe paint is required.

Use a trial coat to ensure the colour shade is correct. Never apply the content from different buckets together on a common wall. Mix the contents together in a clean bucket beforehand. Stir the contents of the bucket thoroughly. The application consistence can be modified in acc. with the product data sheet. Apply a thin and even paint coat crosswise without joints on the fully hardened and dried finish coat. Always complete surfaces that can be viewed together on the same day.

| | |
|---|---|
| **Notes** | All the products listed here are formulated, so that a preventative and retarding action against soiling is in effect. Permanent protection against soiling caused by microorganisms such as algae and fungus cannot be guaranteed. The susceptibility depends on the local and environmental conditions. Loss of the technical function of the finish coat and/or the paint coat due to fouling of the surface with mould and mildew is practically excluded.<br>Refer to “Guideline on inspection obligations upon delivery of ceramic / pottery goods within the scope of the duty to inspect and give notice of defects (§ 377 HGB)” (German only), also refer to vdpm.info/services/downloads.<br>Observe the Code of Practice "Egalisationsanstriche auf Edelputzen – Farbtonegalisierende Beschichtung - Equalization coats on finishing plasters”, see also vdpm.info/services/downloads. |

## Maintenance

Maintenance of the façade surface should be performed at regular intervals taking the size, architecture and location into consideration.
Maintenance is understood to mean cleaning, painting or, if required, renewing of connections (maintenance joints) on the intact External Thermal Insulation Composite Systems (ETICS). It is necessary to undertake corrective measures as quickly as possible if a maintenance issue is identified in order to assure the ETICS service life and protect the visual appearance. We generally recommend consulting experienced and qualified specialist companies if a maintenance issue is identified.

### Plaster surfaces

Perform an inspection of the plaster surfaces on the basis of the standard DIN 18550-1.
In every case, the driving-rain proof protection of the exterior wall and the permanent weather resistance of the overall system must be assured.

| Inspect for | Technical instructions and measures |
|---|---|
| Soiling | Clean using a high-pressure water jet (water temperature below +60 °C, observe the regional wastewater discharge regulations) and if required, apply a new coat of paint to the façade with a system-conform paint once sufficiently dry. |
| Microbiological growth (e.g. algae, mould) | Clean using a high-pressure water jet (water temperature below +60 °C, observe the regional wastewater discharge regulations), apply Algizid (ready-to-use remediation solution) and if required, apply a new coat of paint to the façade with a system-conform paint once sufficiently dry. |
| Sealing of elastic connections<br>(windows, doors, expansion joints, façade penetrations) | Joints applied with permanently-elastic materials are maintenance joints and should be inspected and replaced at regular intervals, if required, or sealed to repel moisture. |
| Mechanical damage | Fill with equivalent insulation materials, reapply the render including the reinforcement mesh, and if necessary, apply a new coat of paint with a system-conform paint. Repairs to small areas and spots may stand out visually from the rest of the surface. Differences in texture and colour of the finishing coat may be visible. |

## Material requirement without allowance for loss and waste

| Plinth | Façade | System components | Remark | Unit | Quantity as average value WE203Sa.de Mineral based | WE203Sc.de Mineral / organic |
|---|---|---|---|---|---|---|
| **Bonding layer** per m² plinth, e.g. on bituminous waterproof sealing | | | | | | |
| ●[1] | | Sockel-Dicht | Layer thickness 2 mm | kg | 3.8 | |
| **Adhesive** per m² plinth insulation | | | | | | 40 %–100 % adhesive area ratio) |
| ● | | SM700 Pro | Max. layer thickness 5 mm | kg | 2.9 – 7.1 | |
| ● | | SM700 | | kg | 2.8 – 6.9 | |
| ● | | Sockel-SM | | kg | 4.0 – 8.0 | |
| ●[2] | | Sockel-SM Pro | | kg | 4.0 – 8.0 | |
| **Insulation material** per m² | | | | | | |
| ● | | Plinth insulation panel | Insulation material thickness: Up to 160 mm → Integration into the soil: Up to 3 m | m² | 1 | |
| | ● | WF protect H | Thickness 40 – 60 mm | m² | 1 | |
| | ● | WF protect M | Thickness 80 – 100 mm | m² | 1 | |
| | ● | WF protect H dry | Thickness 60 mm | m² | 1 | |
| | ● | WF protect L dry | Thickness 100 – 160 mm | m² | 1 | |
| | ● | WF protect M dry | Thickness 60 – 160 mm | m² | 1 | |
| | ● | WF duo dry | Thickness 60 mm | m² | 1 | |
| **Plinth connection** per m | | | | | | Only with recessed plinth |
| | ● | Plinth connection profile | Projection of 30 to 160 mm | m/m | 1 | |
| | ● | Plinth profile | Plinth profile with drip edge and reinforcement mesh for layer thickness 10 mm or 14 mm | m/m | 1 | |
| | ● | Assembly kit plinth end profiles | Fasteners | Set/m | 0.04 | |
| | ● | Peri plinth end profile | For layer thickness 7 mm | m/m | 1 | |
| | ● | Peri installation rail | Plastic profile for supporting Peri plinth connection profile, projection of 50 to 160 mm | m/m | 1 | |
| **Fasteners** per m² façade insulation material[3] | | | | | | |
| ● | | Schlagdübel CNplus 8 insulation anchor nail | Anchoring depth s ≥ 35 mm, ≥ 55 mm for use category D and E | pcs. | 2 dowels per plinth insulation panel from a height of 150 mm above the edge of the ground line on solid substrates | |
| ● | | Schraubdübel STR U 2G dowel | Anchoring depth s ≥ 25 mm, ≥ 65 mm for category E | | | |
| ●[4] | ● | Schraubdübel STR H dowel | Anchoring depth s ≥ 25 mm | | Number of fasteners dependent on the wind load, see tables on Pages 15 to 17 | |
| ●[4] | ● | Schraubdübel 6H dowel | Anchoring depth s ≥ 25 mm | | | |
| ●[4] | ● | Broadback staples[5] | Anchoring depth s ≥ 30 mm | | | |

*1) When bonding on bituminous waterproofing apply Sockel-Dicht as a bonding layer, in case Sockel-SM Pro is not used.*

*2) Sockel-Dicht as a bonding layer is not required when using Sockel-SM Pro as an adhesive on bituminous sealants.*

*3) Plinth insulation panels that are adhesively bonded to the building waterproofing must be anchored with 2 dowels/panel from a height of 150 mm above the top edge of the ground line.*

*4) For the plinth area with wooden substructure and plinth insulation panel.*

*5) Steel staples acc. to EN 14592, $b_r$ ≥ 27 mm, $t_n$ ≥ 2.0mm, $l_n$ ≥ 75 mm, anchoring depth at least 30 mm, made of stainless steel.*

## Material requirement without allowance for loss and waste (continuation)

| Plinth | Façade | System components | | Remark | Unit | Quantity as average value WE203Sa.de Mineral based | WE203Sc.de Mineral / organic |
|---|---|---|---|---|---|---|---|
| **Basecoat** per m² | | | | | | | |
| ● | ● | SM700 Pro | | Layer thickness 7 – 10 mm | kg | 10.0 – 13.0 | 10.0 – 13.0 |
| ● | ● | SM300 [1] | | Layer thickness 7 mm | kg | 10.5 | 10.5 |
| ● | ● | Luis | | Layer thickness 7 mm | kg | 10.0 | 10.0 |
| ● | | Sockel-SM | | Layer thickness 5 – 7 mm | kg | 7.0 – 10.0 | 7.0 – 10.0 |
| ●[2] | | Sockel-SM Pro | | Layer thickness 5 mm | kg | 8.0 | 8.0 |
| **Reinforcement mesh** per m² | | | | | | | |
| ● | ● | Reinforcing mesh 4x4 mm | | 100 mm joint overlap | m² | 1.1 | 1.1 |
| ● | ● | Reinforcing mesh 5x5 mm | | 100 mm joint overlap | m² | 1.1 | 1.1 |
| **Primer** per m² | | | | | | | |
| ● | ● | Isogrund (recommended) | | Diluted: 1:1 with water | kg | (0.1) | – |
| ● | ● | Quarzgrund Pro[3] | | Undiluted | kg | 0.17 | 0.17 |
| **Finish coat** per m² | | | | | | | |
| ● | ● | SM700 Pro sponged / freely styled texture | **Grain size** 1.0 mm | Layer thickness 3 mm | kg | 4.2 | – |
| ● | ● | SM 260 Pro | 2.0 mm | Layer thickness 2 mm | kg | 3.2 | – |
| | | | 3.0 mm | Layer thickness 3 mm | kg | 3.4 | – |
| | | | 5.0 mm | Layer thickness 5 mm | kg | 5.0 | – |
| ● | ● | RP 240 | 2.0 mm | Layer thickness 2 mm | kg | 3.1 | – |
| | | | 3.0 mm | Layer thickness 3 mm | kg | 3.8 | – |
| | | | 5.0 mm | Layer thickness 5 mm | kg | 5.0 | – |
| ● | ● | Noblo | 1.5 mm[4] | Layer thickness 1.5 mm | kg | 2.3 | – |
| | | | 2.0 mm | Layer thickness 2 mm | kg | 2.8 | – |
| | | | 3.0 mm | Layer thickness 3 mm | kg | 3.4 | – |
| ● | ● | Noblo Filz | 1.0 mm | Layer thickness 2 mm | kg | 3.2 | – |
| | | | 1.5 mm | Layer thickness 3 mm | kg | 4.6 | – |
| ● | ● | MineralAktiv Scheibenputz floated render[1] | 1.5 mm | Layer thickness 1.5 mm | kg | 2.4 | – |
| | | | 2.0 mm | Layer thickness 2 mm | kg | 3.2 | – |
| | | | 3.0 mm | Layer thickness 3 mm | kg | 4.2 | – |
| ● | ● | MineralAktiv Scheibenputz Dry floated render[1] | 2.0 mm | Layer thickness 2 mm | kg | 2.4 | – |
| | | | 3.0 mm | Layer thickness 3 mm | kg | 3.4 | – |
| ● | ● | Conni S | 1.5 mm | Layer thickness 1.5 mm | kg | – | 2.2 |
| | | | 2.0 mm | Layer thickness 2 mm | kg | – | 2.8 |
| | | | 3.0 mm | Layer thickness 3 mm | kg | – | 3.7 |
| ● | ● | Addi S | 1.5 mm | Layer thickness 1.5 mm | kg | – | 2.2 |
| | | | 2.0 mm | Layer thickness 2 mm | kg | – | 2.8 |
| | | | 3.0 mm | Layer thickness 3 mm | kg | – | 3.7 |

*1) Only permissible on WF protect H dry, WF protect L dry, WF protect M dry and WF duo dry.*

*2) In conjunction with Sockel-SM Pro as a finish coat. With total layer thickness ≥ 7 mm moisture protection with Sockel-Dicht is unnecessary.*

*3) With a coloured finishing top coat Quarzgrund Pro in the same colour shade is recommended.*

*4) Additional mesh layer in basecoat is recommended.*

## Material requirement without allowance for loss and waste (continuation)

| Plinth | Façade | System components | Grain size | Remark | Unit | Quantity as average value WE203Sa.de Mineral based | WE203Sc.de Mineral / organic |
|---|---|---|---|---|---|---|---|
| **Finish coat** per m² | | | | | | | |
| ●[1] | | Sockel SM Pro (sponged) | 1,0 mm | Layer thickness 2 mm | kg | 3.0 | – |
| ●[2] | | Sockel SM (sponged) | 1.0 mm | Layer thickness 2 mm | kg | 3.0 | – |
| ● | | Butz | 2.0 mm | Layer thickness 2 mm | kg | – | 4.5 |
| **Plaster seal / moisture protection** per m² | | | | | | | |
| ● | | Sockel-Dicht | | Layer thickness min. 1 mm (two coats) | kg | 1.8 | 1.8 |
| **Primer** per m² | | | | | | | |
| ● | ● | Casiol Grund | | Undiluted | l | 0.17 | – |
| **Coat** per m² | | | | | | | |
| ● | ● | Siliconharz-EG-Farbe paint | | Single coat[3] | l | 0.17 – 0.22 | 0.17 – 0.22 |
| ● | ● | Autol | | Double coat | l | 0.25 – 0.40 | 0.25 – 0.40 |
| ● | ● | Autol TSR[4] | | Double coat | l | 0.25 – 0.40 | 0.25 – 0.40 |
| ● | ● | Minerol | | Double coat | l | 0.25 – 0.40 | – |
| ● | ● | MineralAktiv Fassadenfarbe paint | | Double coat | l | 0.28 – 0.40[5] | 0.28 – 0.40 |

1) *Only in conjunction with Sockel-SM Pro as a basecoat.*
2) *Only in conjunction with Sockel-SM as a basecoat.*
3) *Recommendation: Double coat for enhanced weather-proofing (see "Code of Practice No. 9 - Coatings on mineral renders" from the German Bundesausschuss Farbe und Sachwertschutz).*
4) *Functionality only on at least 5 mm thick mineral reinforcement layer and only possible on white, newly created final coats.*
5) *Required on MineralAktiv Scheibenputz Dry floated render.*

# Information on sustainability

## Knauf WARM WALL Natur S

### Information on the sustainability of Knauf WARM WALL Natur S in timber construction

Building assessment systems ensure the sustainable quality of buildings and constructional structures by a detailed assessment of ecological, economic, social, functional and technical aspects.

In Germany, the following certification systems are of particular relevance

- DGNB system
  Deutsches Gütesiegel Nachhaltiges Bauen der DGNB (German association for environmentally sustainable building)
- BNB
  (Bewertungssystem Nachhaltiges Bauen - Quality rating system for environmentally sustainable building)
- LEED
  (Leadership in Energy and Environmental Design).

Knauf WARM WALL systems can positively influence many of these criteria.

#### DGNB/BNB

*Ecological quality*

- Criterion: Total primary energy requirement
  Reduction of the building energy requirement over the entire lifecycle due to efficient WARM WALL systems
- Criterion: Use of sustainable resources / wood
  The wood of the wood fibre façade boards originates from sustainable forestry that is FSC certified and PEFC certified

*Economic quality*

- Criterion: Building related life-cycle costs
  Reduction of the operating costs due to cost-effective WARM WALL systems

*Sociocultural and functional quality*

- Criterion: Thermal comfort in summer or winter
  Cozy room climate with WARM WALL systems

*Technical quality*

- Criterion: Premium quality thermal and moisture protection for the building shell
  With WARM WALL systems significantly exceeding the GEG requirements

#### LEED

*Materials and Resources*

- Credit: Regional materials
  Availability depending on location of building. Information on request
- Credit: Certified Wood
  The wood of the wood fibre façade boards originate from sustainable forestry, FSC certified and PEFC certified

Videos for Knauf systems and products can be found under the following link:
**youtube.com/knauf**

Find the right system for your requirements!
**knauf.de/systemfinder**

The Knauf Infothek App now provides all the current information and documents from Knauf Gips KG at any time and in every location in a clear and comfortable way.
**knauf.de/infothek**

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WE203S.de/eng/02.23/0/Dbl

**The stated constructional and structural design specifications and characteristics of building physics of Knauf systems can only be ensured with the exclusive use of Knauf system components, or other products expressly recommended by Knauf.**