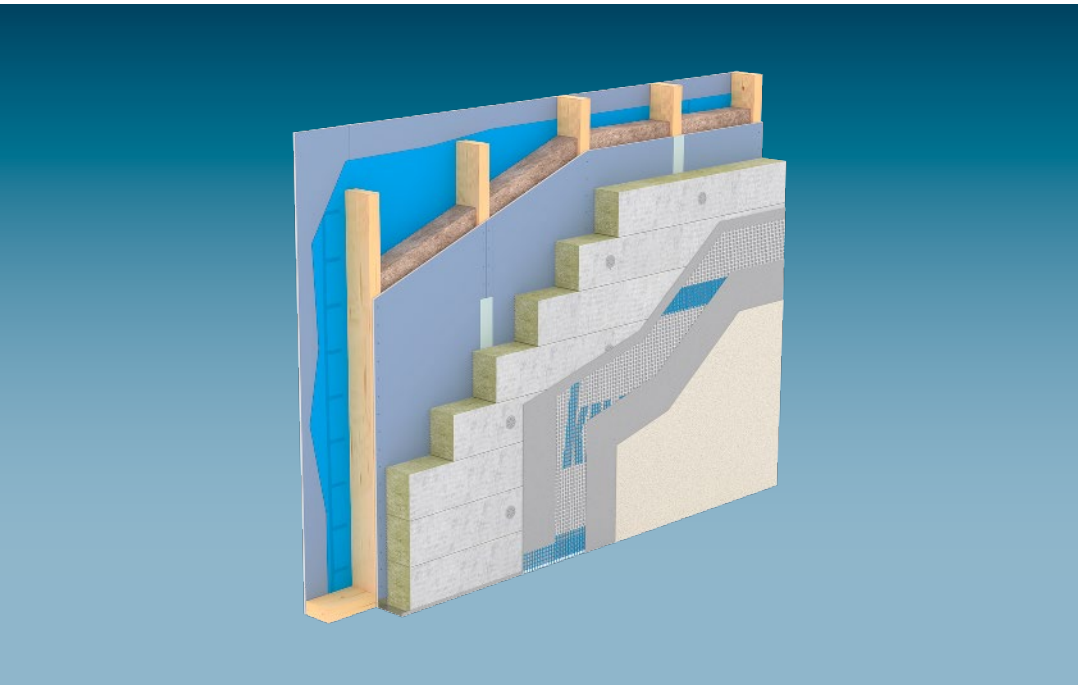


Plaster & Façade Systems

# WE202.de

System Data Sheet 2022-11

# **Knauf WARM WALL Plus MW** in Timber Construction ETICS with Insulation Materials Made of Mineral Wool

WE202a.de – With mineral-based render system

WE202c.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.

# Contents

## 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 with Mineral Wool Insulation Materials Knauf WARM WALL Plus in Solid Construction WE112.de
- ETICS with Insulation Materials made of EPS Knauf WARM WALL Basis EPS in Timber Construction WE201.de
- Knauf Structural Wood Frame Panels W55.de

**Technical brochures**

- Knauf Multi-storey Timber Construction HB02.de

**Product data sheets**

- Observe the product data sheets of the Knauf system components

## Symbols in the system data sheet

The following symbols are used in this document:

**Insulation layers**

S Mineral wool insulation layer acc. to EN 13162
non-combustible
melting point ≥ 1000 °C acc. to DIN 4102-17
(insulating material, e.g. from Knauf Insulation)

## Intended use of Knauf systems

Please observe the following:

| | |
|---|---|
| **Caution** | Knauf systems may only be used for the application cases as stated 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 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 / render system, we recommend use of a handover certificate for the transfer of the site to another trade.

### Term definition

**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

### Abbreviations used in the document:

- DIBt: Deutsches Institut für Bautechnik - German Institute for Civil Engineering
- EPS: Expanded polystyrene
- GEG: German energy saving ordinance
- MW: Mineral wool
- 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.

## Notes on sound insulation

$R_w$ = Weighted sound reduction index in dB without sound transmission via flanking building components

Infill insulation: Mineral wool insulation layer 30 mm, acc. to EN 13162; length-related flow resistance acc. to EN 29053: r ≥ 5 kPa·s/m$^2$; sound insulation values were determined with a fill ratio of 100 %.

With the spectrum adaptation terms C and $C_{tr}$ the sound insulation of different constructions in the range 100 Hz to 3150 Hz, and if required, in case of specific noise types, can be incorporated for special individual cases in the rating of the sound insulation of the constructional components.

## Certificates of Usability

| Knauf System | Proof | Fire protection | Sound insulation<br>Knauf sound insulation proof | Structural Engineering<br>Taking the respective fire protection abP (National Technical Test Certificate) into consideration |
|---|---|---|---|---|
| WARM WALL Plus MW in Timber Construction with adhesively bonded or adhesively bonded and dowelled mineral wool insulation material | Z-33.47-899 | | | |
| Walls with WARM WALL Plus MW with fire protection capability | | AbP P-SAC-02/III-599 | L007-10.07<br>L005-10.07 | Rated acc. to EN 1995-1-1 in conjunction with EN 1995-1-1/NA |

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 expressly recommended by Knauf. The validity and up-to-datedness of the stated proofs have to be considered.

### Fire protection

The specifications marked with plus offer additional application options, which are not directly included in the Certificate of Usability. On the basis of our technical assessments, we assume that these marked design solutions can be assessed as a non-significant divergence. We can make the documentation on which this assessment is based, such as surveyors' reports or technical assessments, available to you together with the Certificate of Usability on request. We recommend that a non-significant divergence be coordinated and authorised in advance in consultation between the persons responsible for fire resistance and/or the relevant authorities.

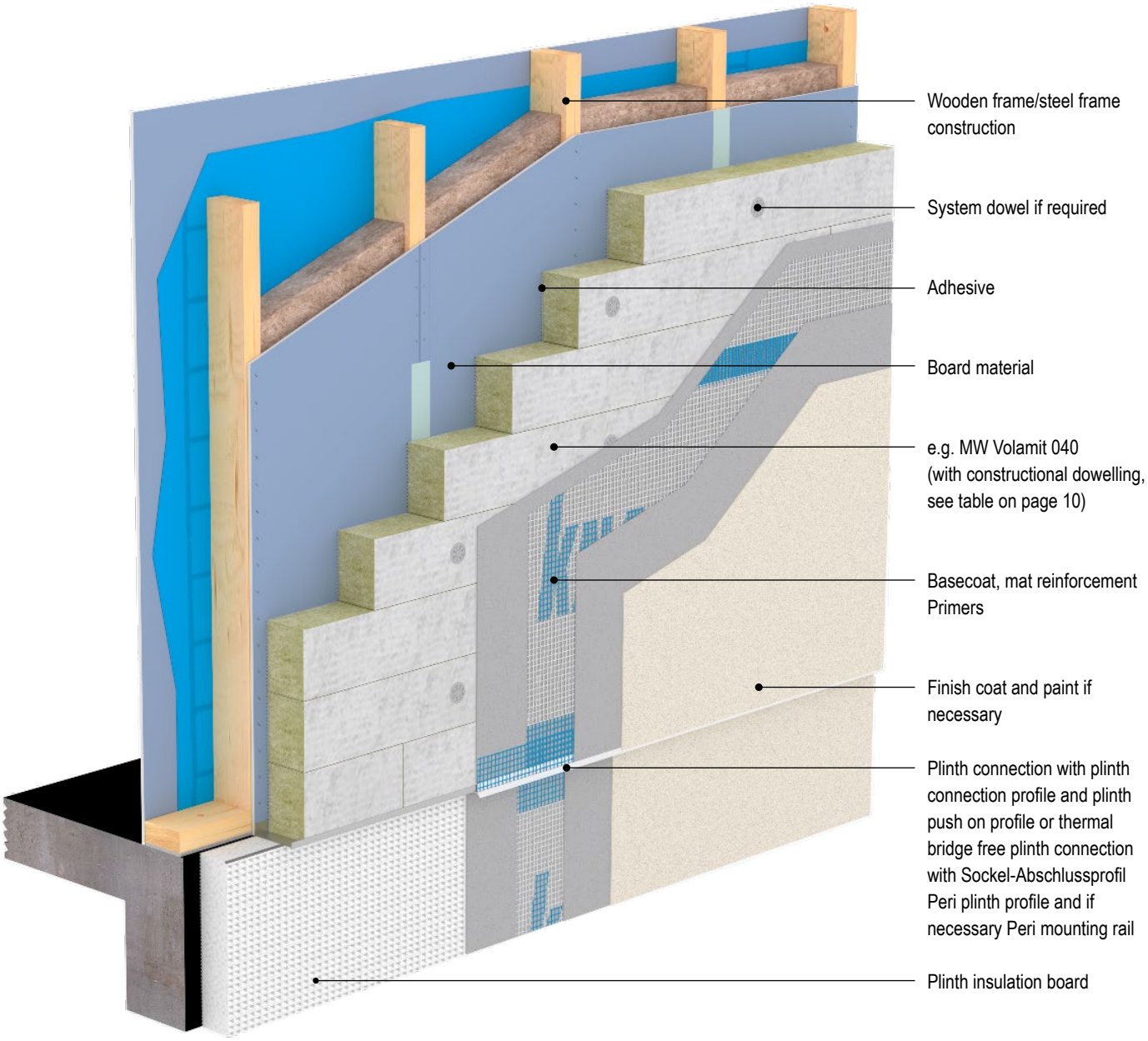
## Knauf WARM WALL Plus MW in Timber Construction

Knauf WARM WALL Plus MW in Timber Construction is a building authority certified external thermal insulation composite system (ETICS) in timber construction with insulation materials made of mineral wool (MW). Alternatively, mineral wool façade board or mineral wool lamella can be used. The mineral wool insulation materials are adhesively bonded, and if necessary, dowelled onto the timber construction or steel frame construction clad with board materials or onto the solid wooden substrate. The system WARM WALL Plus MW in Timber Construction can be employed as a not easily flammable system up to the high-rise building limit. The building height is dependent on the respective applicable state building code.

### Characteristics

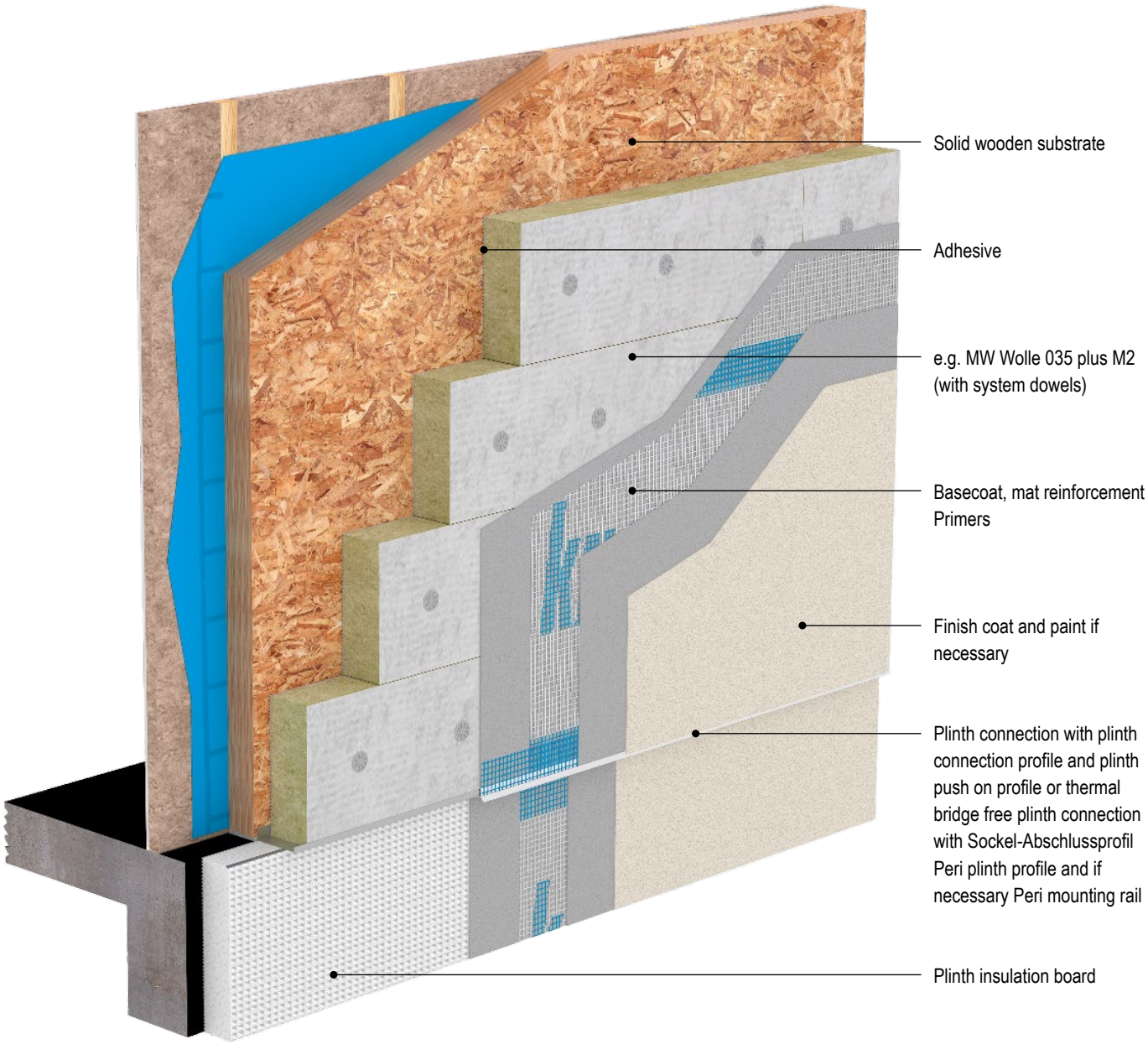
- Reaction to fire of ETICS: depending on the version is not easily flammable (building material class B1) or flammable (building material class B2), refer to table on page 18
- Insulation material thickness: certified up to maximum 240 mm

### Wooden frame/steel frame construction



## Knauf WARM WALL Plus MW in Timber Construction (continuation)

**Solid wooden substrate**



## System overview

| Knauf System | WE202a.de<br>WARM WALL Plus MW<br>Mineral | WE202c.de<br>WARM WALL Plus MW<br>Mineral / 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 [1], not easily flammable B1 (see page 18) | |
| Maximum insulation material thickness t | Up to 240 mm | |
| Plaster system layer thickness (reinforcement layer and finish coat) | 5.5 – 15 mm | 5.5 – 13 mm |
| **Façade** | | |
| Adhesive | SM700 Pro, SM300, Pastol Dry, Luis | |
| Insulation material MW | MW Volamit 040, MW Wolle 035 plus L, MW Wolle 035 plus LX, MW Wolle 035 plus M2 | |
| System dowel (if necessary) | Schraubdübel STR H A2 dowel | |
| Dowel plate (if required) | SBL 140 plus, VT 2G | |
| Basecoat | SM700 Pro, SM300[2], 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 | Conni S<br>Addi S |
| Coats | Siliconharz-EG-Farbe paint (required with Noblo)<br>Autol, Autol TSR<br>Fassadol, Fassadol TSR<br>Minerol<br>MineralAktiv Fassadenfarbe paint | Siliconharz-EG-Farbe paint (required with Conni S)<br>Autol, Autol TSR<br>Fassadol, Fassadol TSR<br>MineralAktiv Fassadenfarbe paint |
| **Plinth / splash water area** | | |
| Adhesive | Sockel-SM Pro or Sockel-SM, SM700 Pro, SM300 | |
| 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 | |
| Mesh reinforcement, primer, finish coat and decorative coat | As with façade, Butz, Sockel-SM Pro, Sockel-SM | |
| Moisture protection | Sockel-Dicht (with Sockel-SM Pro as a basecoat and render finish with a total ≥ 7 mm not required) | |

*1) In case of Pastol Dry basecoat.*

*2) Only in conjunction with finish coats of SP 260 Pro, RP 260, Noblo, MineralAktiv Scheibenputz floating render and Conni S.*

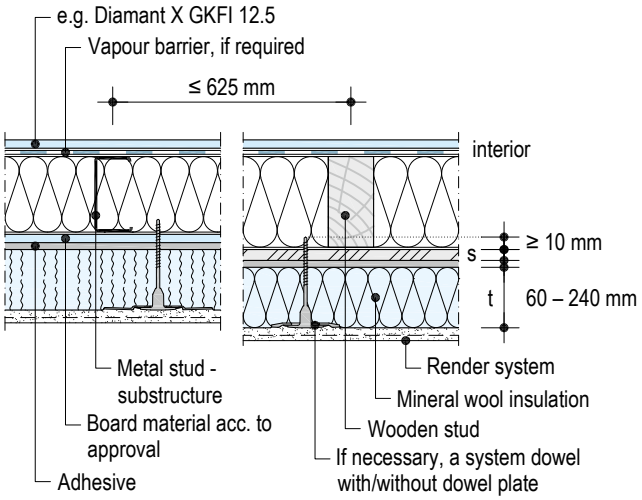
## Plaster weight

| Finish coat | | | Basecoat | | | Plaster weight total |
|---|---|---|---|---|---|---|
| | Layer thickness mm | Weight kg/m² | | Layer thickness mm | Weight kg/m² | kg/m² |
| SM700 Pro | 3 | 4.2 | SM700 Pro | 5 – 10 | 7.0 – 13.0 | 11.2 – 17.2 |
| | | | SM300 | 5 – 7 | 7.6 – 10.5 | 11.8 – 14.7 |
| | | | Luis | 4 – 5 | 7.2 | 11.4 |
| SM 260 Pro | 2 – 5 | 3.2 – 5.0 | SM700 Pro | 5 – 10 | 7.0 – 13.0 | 10.2 – 18.0 |
| | | | SM300 | 5 – 7 | 7.6 – 10.5 | 10.8 – 15.5 |
| | | | Luis | 4 – 5 | 7.2 | 10.4 – 12.2 |
| RP 240 | 2 – 5 | 3.1 – 5.0 | SM700 Pro | 5 – 10 | 7.0 – 13.0 | 10.1 – 18.0 |
| | | | SM300 | 5 – 7 | 7.6 – 10.5 | 10.7 – 15.5 |
| | | | Luis | 4 – 5 | 7.2 | 10.3 – 12.2 |
| Noblo | 1.5 – 3 | 2.3 – 3.7 | SM700 Pro | 5 – 10 | 7.0 – 13.0 | 9.3 – 16.7 |
| | | | SM300 | 5 – 7 | 7.6 – 10.5 | 9.9 – 14.2 |
| | | | Luis | 4 – 5 | 7.2 | 9.5 – 10.9 |
| Noblo Filz | 2 – 3 | 3.2 – 4.6 | SM700 Pro | 5 – 10 | 7.0 – 13.0 | 10.2 – 17.6 |
| | | | SM300 | 5 – 7 | 7.6 – 10.5 | 10.8 – 15.1 |
| | | | Luis | 4 – 5 | 7.2 | 10.4 – 11.8 |
| MineralAktiv Scheibenputz floated render | 1.5 – 3 | 2.4 – 4.2 | SM700 Pro | 5 – 10 | 7.0 – 13.0 | 9.4 – 17.2 |
| | | | SM300 | 5 – 7 | 7.6 – 10.5 | 10.0 – 14.7 |
| | | | Luis | 4 – 5 | 7.2 | 9.6 – 11.4 |
| Conni S, Addi S | 1.5 – 3 | 2.2 – 3.7 | SM700 Pro | 5 – 10 | 7.0 – 13.0 | 9.2 – 16.7 |
| | | | SM300 | 5 – 7 | 7.6 – 10.5 | 9.8 – 14.2 |
| | | | Luis | 4 – 5 | 7.2 | 9.4 – 10.9 |

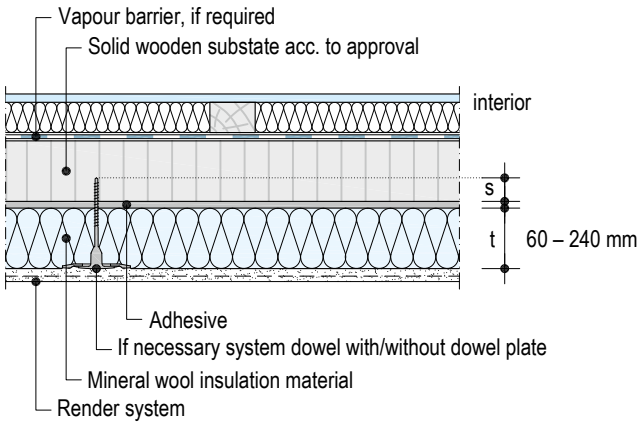
## System variants

**Scheme drawing**

■ **New construction – Wooden frame/steel frame construction**[1)]



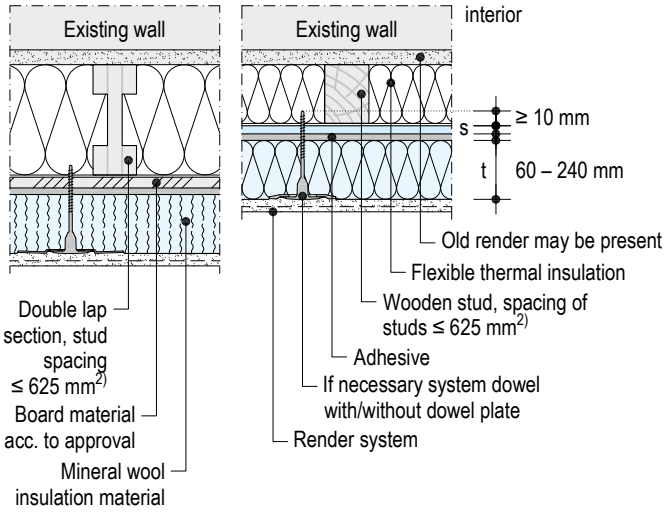

■ **New construction – Solid wooden substrate**




■ **Old construction – Special applications following Z-33.47-899**

Existing walls can be thermally retrofitted with a façade as a wood frame construction with WARM WALL Plus MW, e.g. masonry and the half-timbered structure.

Coordination with the planning office is generally necessary.




*1) Steel frame constructions must feature a minimum stiffness that complies with common wooden frame constructions.*

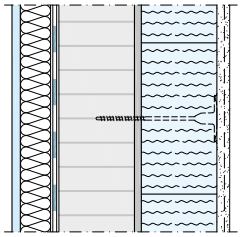
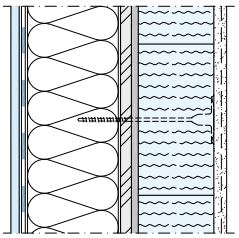
*2) Cross-section of wooden studs as well as fixing with building authority approved frame dowels or connectors according to the structural certificate*

*t = insulation material thickness*

*s = anchoring depth*

## System variants (continued)

**Mineral wool lamella – Attachment to the substrate**

| Scheme drawing | Insulation material | Permissible insulating material thickness in mm | Substrate | Adhesive | Fastening |
|---|---|---|---|---|---|
| **Adhesively bonded to solid wooden substrate[1]** | | | | | Glue only |
|  | MW Volamit 040 | 60 – 200 | ■ 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 ETA-13/0784<br>■ Solid timber elements / 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 | SM700 Pro<br>Pastol Dry<br>Luis | Maximum wind load<br>$w_{ek} \leq 1.59$ kN/m²<br><br>Construction dowelling with 4 dowels/m² recommended |
| **Bonding of the insulation panels[2], t ≥ 12 mm** | | | | | Glue only |
|  | MW Volamit 040 | 60 – 200 | ■ Particle boards[3] acc. to EN 312, type P5 or P7<br>■ Plywood panels[3] acc. to EN 636, type EN 636-2 or EN 636-3<br>■ Cementitious particle boards[3] acc. to EN 13986 (EN 634-2) | SM700 Pro<br>Pastol Dry<br>Luis | Maximum wind load<br>$w_{ek} \leq 1.59$ kN/m²<br><br>Construction dowelling with 4 dowels/m² recommended |
| | | | ■ Gypsum fibre boards<br>■ Cement fibre boards acc. to EN 12467 (non-coated and without impregnation / water-repellents) of category B<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>■ AQUAPANEL® Cement Board Outdoor acc. to ETA-07/0173 | SM700 Pro<br>SM300<br>Pastol Dry<br>Luis | |
| | | | ■ OSB boards[4] acc. to EN 300, type OSB/3 or OSB/4, e.g. AGEPAN® OSB 3 Ecoboard®, AGEPAN® OSB 4 Ecoboard®, EGGER OSB 3 EO, EGGER OSB 4 TOP, SWISS KRONO OSB/3 and SWISS KRONO OSB/F**** | SM700 Pro<br>Pastol Dry<br>Luis | |

*1) Glue application 1 – 3 mm*

*2) The board material must be suitable for use as exterior cladding or lining (without direct exposure to weather).*

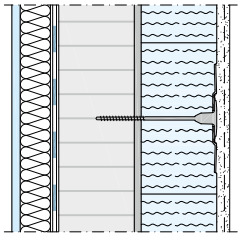
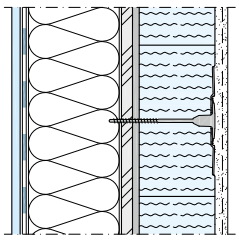
*3) When Luis adhesive is used, only board materials with a homogeneous surface made of fine particles are permissible.*

*4) The surface must be free of loose particles.*

| Note | When complying with the fire resistance class REI 60 and cladding criteria $K_2$60, observe the National Technical Test Certificate P-SAC02/III-599. |
|---|---|

## System variants (continued)

### Mineral wool lamella – Attachment to the substrate (continuation)

| Scheme drawing | Insulation material | Permissible insulating material thickness in mm | Substrate | Adhesive | Fastening |
|---|---|---|---|---|---|
| **Dowel installation in solid wooden substrate**[1] | | | | | Glueing and dowelling |
| **Surface flush under mesh** (or through the mesh)  | MW Volamit 040 | 60 – 200 | ■ Glulam acc. to EN 14080 in conjunction with DIN 20000-3<br>■ Stacked wood laminate acc. to EN 14080 in conjunction with DIN 20000-3 or acc. to the National Technical Approval, made of softwood, minimum stress-grade C 24 acc. to EN 14081-1<br>■ Cross-laminated timber acc. to National Technical Approval or European Technical Assessment, made of softwood, minimum stress-grade C 24 acc. to EN 14081-1, width of the joints in the layers ≤ 3.5 mm | SM700 Pro<br>Pastol Dry<br>Luis | Wind load $w_{ek}$:<br>1.6 kN/m² to 2.2 kN/m²<br>■ Plaster system weight[3] ≤ 10 kg/m²: ≥ 3 dowels/m²<br>■ Plaster system weight[3] ≤ 10 kg/m²: ≥ 5 dowels/m²<br><br>In case of dowel installation under the mesh: Additional rondelle Ø 140 mm |
| **Dowel installation in board material** | | | | | Glueing and dowelling |
| **Surface flush under mesh** (or through the mesh)  | MW Volamit 040 | 60 – 200 | ■ Resin-bonded chipboard[2] acc. to EN 13986 (EN 312) and DIN 20000-1 or acc. to National Technical Approval, density ≥ 650 kg/m³, t ≥ 16 mm | SM700 Pro<br>Pastol Dry<br>Luis | Wind load $w_{ek}$:<br>1.6 kN/m² to 2.2 kN/m²<br>■ Plaster system weight[3] ≤ 10 kg/m²: ≥ 3 dowels/m²<br>■ Plaster system weight[3] > 10 kg/m²: ≥ 5 dowels/m²<br><br>In case of dowel installation under the mesh: Additional rondelle Ø 140 mm |
| | | | ■ Gypsum fibre boards acc. to ETA-03/0050, density ≥ 1150 kg/m³, t ≥ 15 mm | SM700 Pro<br>SM300<br>Pastol Dry<br>Luis | |
| | | | ■ OSB boards acc. to EN 13986 (EN 300) and DIN 20000-1 or acc. to National Technical Approval, type OSB/3 or OSB/4, density ≥ 550 kg/m³, t ≥ 12 mm | Pastol Dry | |
| | | | ■ Cementitious particle boards[2] acc. to EN 13986 (EN 634 634) and DIN 20000-1 or acc. to National Technical Approval, density ≥ 1300 kg/m³, t ≥ 16 mm | SM700 Pro<br>Pastol Dry<br>Luis | Wind load $w_{ek}$:<br>1.6 kN/m² to 2.2 kN/m²<br>■ Plaster system weight[3] ≤ 10 kg/m²: ≥ 3 dowels/m²<br>■ Plaster system weight[3] > 10 kg/m²: ≥ 5 dowels/m²<br><br>In case of dowel installation under the mesh: Additional rondelle Ø 140 mm |

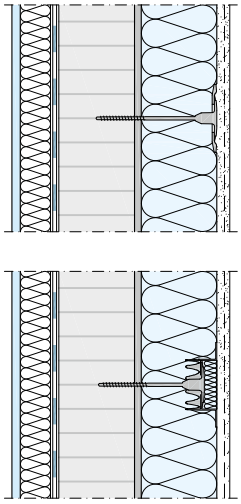
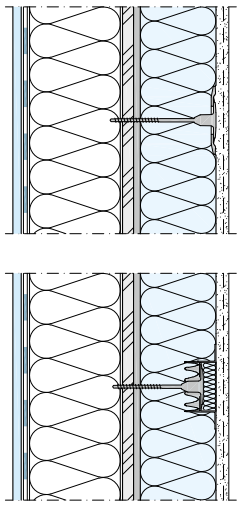
*1) Glue application 1 – 3 mm*

*2) When Luis adhesive is used, only board materials with a homogeneous surface made of fine particles are permissible.*

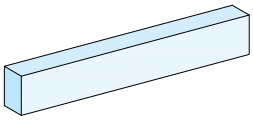
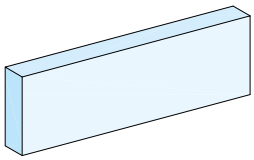
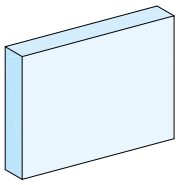
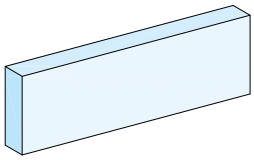
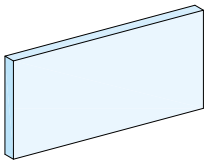
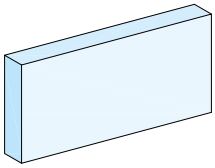
*3) Plaster system weight see table on page 8*

## System variants (continued)

### Mineral wool boards – Attachment to the substrate

| Scheme drawing | Insulation material | Substrate | Adhesive | Fastening |
|---|---|---|---|---|
| **Dowel installation in solid wooden substrate** | | | | Glueing and dowelling |
| **Surface flush under mesh** (or through the mesh)  | ■ MW Wolle 035 plus L (thickness: 60 – 200 mm)<br>■ MW Wolle 035 plus LX (thickness: 80 – 200 mm)<br>■ MW Wolle 035 plus M2 (thickness: 60 – 240 mm) | ■ Solid wood made of soft wood, minimum sorting class S 10 or stress-grade C 24 acc. to EN 14081-1 in conjunction with DIN 20000-5<br>■ Glulam acc. to EN 14080 in conjunction with DIN 20000-3<br>■ Stacked wood laminate acc. to EN 14080 in conjunction with DIN 20000-3 or acc. to the National Technical Approval, made of softwood, minimum stress-grade C 24 acc. to EN 14081-1<br>■ Cross-laminated timber acc. to National Technical Approval or European Technical Assessment, made of softwood, minimum stress-grade C 24 acc. to EN 14081-1, width of the joints in the layers ≤ 3.5 mm | SM700 Pro<br>Pastol Dry<br>Luis | For number of dowels see dowel tables on page 21 – 27<br><br>In case of dowel installation under the mesh: Additional rondelle Ø 90 mm possible<br><br>Surface flush, recessed dowel installation with additional rondelle VT 2G |
| **Dowel installation in board material** | | | | Glueing and dowelling |
| **Surface flush under mesh** (or through the mesh)  | ■ MW Wolle 035 plus L (thickness: 60 – 200 mm)<br>■ MW Wolle 035 plus LX (thickness: 80 – 200 mm)<br>■ MW Wolle 035 plus M2 (thickness: 60 – 240 mm) | ■ Resin-bonded chipboard2) acc. to EN 13986 (EN 312) and DIN 20000-1 or acc. to National Technical Approval, density ≥ 650 kg/m³, t ≥ 16 mm | SM700 Pro<br>Pastol Dry<br>Luis | For number of dowels see dowel tables on page 21 – 27<br><br>In case of dowel installation under the mesh: Additional rondelle Ø 90 mm possible<br><br>Surface flush, recessed dowel installation with additional rondelle VT 2G |
| | | ■ Gypsum fibre boards acc. to ETA-03/0050, density ≥ 1150 kg/m³, t ≥ 15 mm | SM700 Pro<br>SM300<br>Pastol Dry<br>Luis | |
| | | ■ OSB boards acc. to EN 13986 (EN 300) and DIN 20000-1 or acc. to National Technical Approval, type OSB/3 or OSB/4, density ≥ 550 kg/m³, t ≥ 12 mm | Pastol Dry | |
| | | ■ Cementitious particle boards2) acc. to EN 13986 (EN 634 634) and DIN 20000-1 or acc. to National Technical Approval, density ≥ 1300 kg/m³, t ≥ 16 mm | SM700 Pro<br>Pastol Dry<br>Luis | For number of dowels see dowel tables page 21 – 27<br><br>In case of dowel installation under the mesh: Additional rondelle Ø 90 mm possible<br><br>Surface flush, recessed dowel installation with additional rondelle VT 2G |

## Insulation material

| Insulation material | Description | Rated value of thermal conductivity λ W/(m·K) | Dimensions w x l mm | Application type | Insulation material thickness mm |
|---|---|---|---|---|---|
| **Façade** | | | | | |
|  | **MW Volamit 040**[1)]<br>*Mineral wool lamella* | 0.041 | 200 x 1200 | Acc. to aBG | 60 – 200 |
|  | **MW Wolle 035 plus L**[1)]<br>*Mineral wool panel* | 0.035 | 400 x 1200 | Acc. to aBG | 60 – 200 |
|  | **MW Wolle 035 plus LX**[1)]<br>*Mineral wool panel* | 0.035 | 625 x 800 | Acc. to aBG | 80 – 200 |
|  | **MW Wolle 035 plus M2**[1)]<br>*Mineral wool panel* | 0.035 | 400 x 1200 | Acc. to aBG | 60 – 240 |
| **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 board**<br>*EPS, white* | 0.035 | 500 x 1000 | PW | 30 – 240 |
| | **Sockeldämmplatte 032**<br>*EPS, grey* | 0.032 | 500 x 1000 | PW | 40 – 240 |

*1) Coated on both sides*

Reveal design also possible using the Perfex window complete system.

## Insulation material (continued)

**Thermal resistance**

Examples

| Insulation material | Thermal resistance **R** in $(m^2 \cdot K)/W$<br>Insulation thickness **t** in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **60** | **80** | **100** | **120** | **140** | **160** | **180** | **200** | **220** | **240** |
| MW Volamit 040 | 1.46 | 1.95 | 2.44 | 2.93 | 3.41 | 3.90 | 4.39 | 4.88 | – | – |
| MW Wolle 035 plus L | 1.71 | 2.29 | 2.86 | 3.43 | 4.00 | 4.57 | 5.14 | 5.71 | – | – |
| MW Wolle 035 plus LX | – | 2.29 | 2.86 | 3.43 | 4.00 | 4.57 | 5.14 | 5.71 | – | – |
| MW Wolle 035 plus M2 | 1.71 | 2.29 | 2.86 | 3.43 | 4.00 | 4.57 | 5.14 | 5.71 | 6.29 | 6.86 |

In the table, you can read off the thermal conductivity as well as the total thickness of the insulation material of the thermal resistance R using the rated value. 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 results in the thermal resistance. The inverse value of the thermal transmission resistance is the U value.

## Dowels

**Schraubdübel STR H A2 dowel**

Rustproof screw fastener for recessed and flush mounting on wooden substrates Stainless steel screw with hardened cutting point.

## 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 finish coating.

## Reinforcement mesh

The reinforcement mesh 4x4 mm and 5x5 mm are high strength, permanent, alkaline resistant reinforcement meshes made of glass fibres with a mesh spacing of 4x4 mm or 5x5 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.

**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 sponge finished or freely-structured as a natural white or coloured top coat.

**MineralAktiv Scheibenputz 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 finish 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 | 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 zone | ●● | ●●●● | ●● | ●●●● | ●●●● | ●●● | ●●●● | ●● |

●●●● *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 Scheibenputz 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 | ● | ● | ● | ● | | ● | | | |

## 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 finish coat has a luminosity of < 20.

**Fassadol**
Fassadol is a highly permeable, matt and highly colour shade fast silicone-reinforced façade paint. It is ideally suited as two paint coats for intensive colour shades on mineral and organically bound renders, as well as a top coat in case of different shades of finishing coat and paint.

**Fassadol TSR**
Fassadol TSR is a reflection-optimised, diffusion permeable, highly colour shade fast and high coverage siloxane-reinforced façade paint with a satin-matt appearance. It is is suitable for applying two coats on white, mineral and organic bonded plaster systems if the colour shade of the finish coat should have 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 | | Organic | | |
|---|---|---|---|---|---|
| | Silicate based dispersion **Minerol** | Hybrid façade paint **MineralAktiv Fassadenfarbe paint** | Silicone resin paints **Autol, Autol TSR** | **Siliconharz-EG-Farbe paint** | Pure acrylic paint **Fassadol, Fassadol TSR** |
| Binder | Potassium silicate, dispersion | Hybrid binder | Silicone resin emulsion, dispersion | Silicone resin emulsion, dispersion | Pure acrylic |
| Hydrophobic (water-repellent) | ●●● | ●●● | ●●●● | ●●●● | ●●●● |
| Diffusion properties | ●●●● | ●●●● | ●●●● | ●●● | ●● |
| Colour shade range | ●● | ●● | ●●● | ●● | ●●●● |
| Resistance to ageing | ●●●● | ●●●● | ●●●● | ●●●● | ●●●● |
| Hiding power | ●●● | ●●●● | ●●●● | ●●● | ●●●● |

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

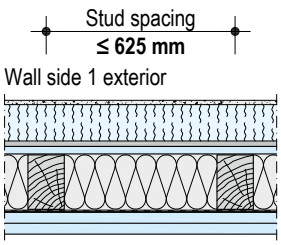
### Knauf Farbcenter (colour center)

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
- B P — Colour shade with English designation abbreviations (in this case: Blue Purplish)

## Exposure to fire from one side from exterior or from interior

| Knauf System | | Cladding Wall side 1 Exterior | | | | Wall side 2 Interior[2] | | Wooden stud | Insulation layer Fire protection permissible between the wooden studs | | Sound insulation Sound reduction index | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Installation level | |
| Scheme drawing | Fire resistance class | WARM WALL Plus MW[1] MW Volamit 040 | Min. thickness mm | Diamant / Diamant X | Min. thickness mm | Diamant X | Min. thickness mm | Min.-cross-section w x h mm | Minimum thickness mm | Min. density kg/m³ | Without dB | Resilient Channels dB |
| **Exterior walls for structural wood frame panels with WARM-WAND Plus MW** | | | | | | | | | | | | Stud spacing ≤ 625 mm |
|  | **REI 60 + $K_260$** | • | **60** | • | **12.5** | • | **2x 18** | 60 x 90 | Mineral wool (S) cavity filling | – | $R_w$ = *48*<br>C = *-1*<br>$C_{tr}$ = *-6* | $R_w$ = *57*<br>C = *-7*<br>$C_{tr}$ = *-14* |

1) *Rendering/plastering system adhesive and basecoat: 3.0 – 4.0 mm adhesive SM700 Pro or Luis; basecoat: 6.0 mm SM700 Pro or 5.0 mm Luis acc. to Z-33.47-899.*

2) *Application with airtight level / vapour retarder, e.g. Knauf Insulation LDS 10 Silk or equivalent. Required $s_d$ value dependent on overall design.*

- The stress $\sigma_D$ in the wood cross-section of the wooden studs of ≤ 2.0 N/mm² in the event of a fire is decisive.
- Back the horizontal joints with timber battens or board strips on the wall exterior.
- Sound insulation specifications in the table apply without weather protection. The application of the ETICS WARM WALL Plus MW does not have a negative influence on the sound insulation.
- Additional insulation materials e.g. for sound insulation: Mineral wool (S) (melting point ≥ 1000 °C) is required within the encapsulation.
- *Sound reduction index values represented in italics* are derived values from measurements on divergent constructions.

**Notes**

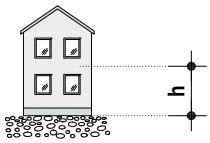
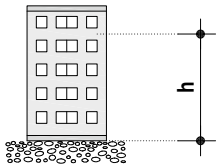
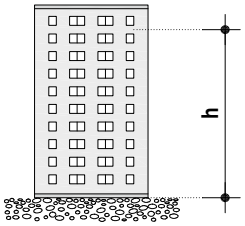
Observe the notes page 3.

For further information see the technical brochure Knauf Multi-Storey Timber Construction HB02.de.

For further wall designs W551.de Structural wood frame panel construction exterior wall with fire resistance class see system data sheet Knauf Structural Wood Frame Walls W55.de.

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

The demands on the fire behaviour 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 Knauf WARM WALL Plus MW in Timber Construction

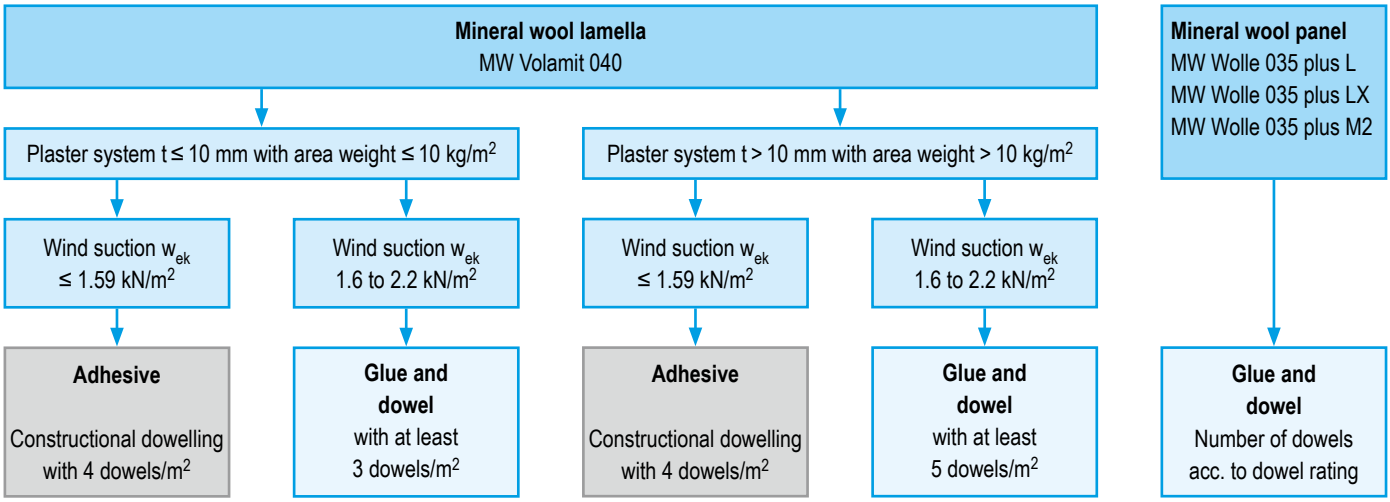
| Insulation material thickness t | System | Reaction to fire/building material class ETICS |
|---|---|---|
| Up to 240 mm | Mineral (without Pastol Dry adhesive)<br>Mineral / organic (without Pastol Dry adhesive) | Not easily flammable<br>**B1** (acc. to DIN 4102-1) |
| | Mineral (with Pastol Dry adhesive)<br>Mineral / organic (with Pastol Dry adhesive) | Flammable<br>**B2** (acc. to DIN 4102-1) |

## Insulation material – Bonding

| Application method | Glued surface | Application on | Mineral wool panels Coated<br>MW Wolle 035 plus L<br>MW Wolle 035 plus LX<br>MW Wolle 035 plus M2 | Mineral wool lamella Coated<br>MW Volamit 040 |
|---|---|---|---|---|
| Manual | Surface press filling [1] | Insulation material | | |
| | Full surface | | • | • |
| By machine | Full surface | Substrate | • | • |

*1) After the surface press filling the adhesive is applied to the full surface as wet plaster on wet plaster on the insulation panels using a notched trowel.*

## Overview – Anchoring for insulation type




| Note | Plaster system weight see table on page 8 |
|---|---|

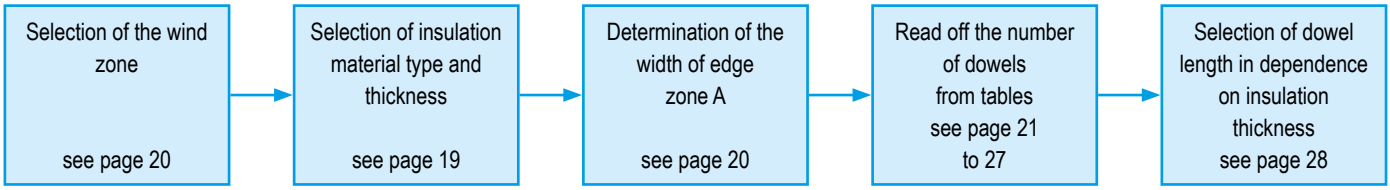
## Method for determination of wind loads

| For use with | Practice-based method<br>Acc. to the recommendations of the VDPM[2] and the DIBt[3] (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 |

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

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

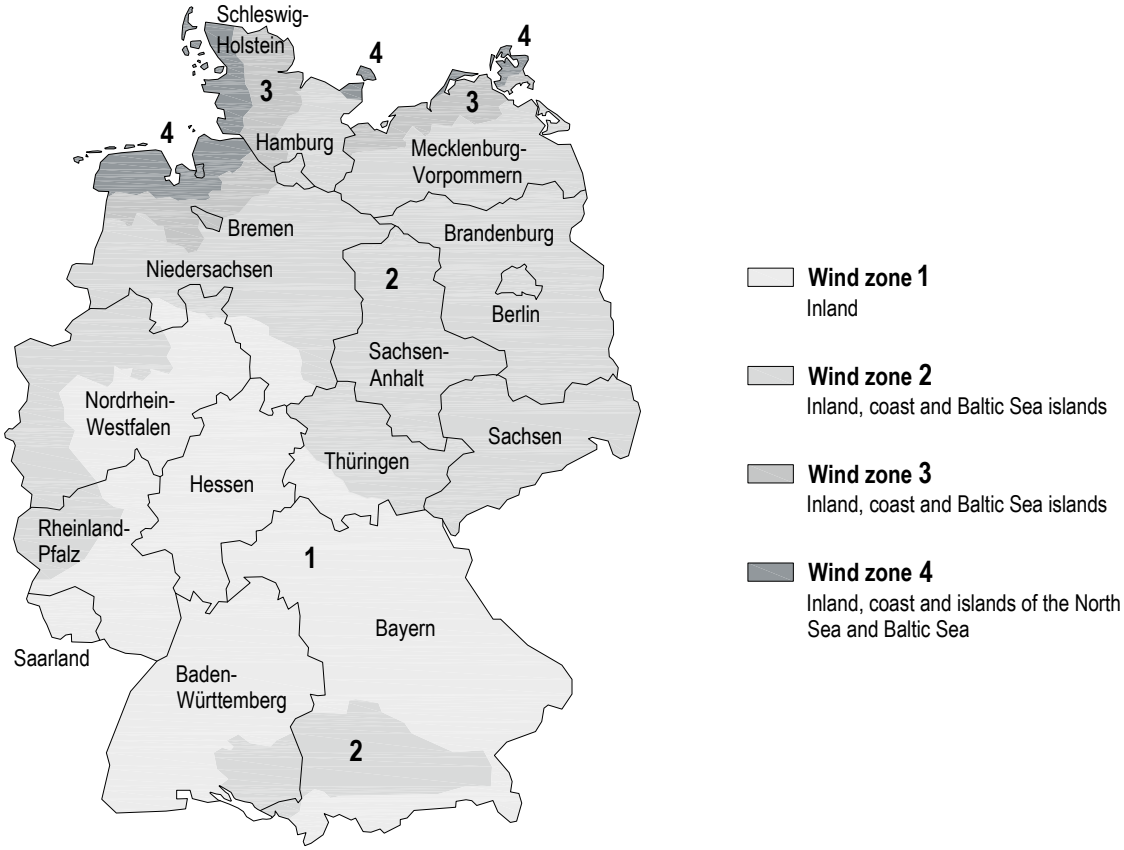
### Process for determination of the dowel quantity and length




Calculation of the number of dowels: refer also to knauf.de/duebelrechner.

## Determination of wind loads

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




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

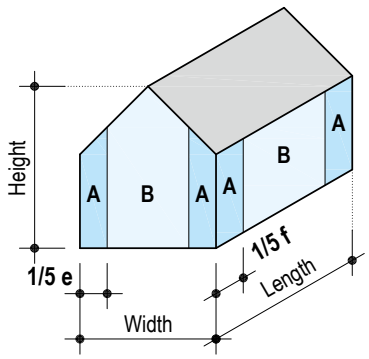
| Wind zone | Region | Wind suction forces $w_{ek}$ in kN/m² | | | | | |
|---|---|---|---|---|---|---|---|
| | | Building height | | | | | |
| | | 0 to 10 m | | 0 to 18 m | | 0 to 25 m | |
| | | Fringe A | Zone B | Fringe A | Zone B | Fringe A | Zone B |
| 1a | Inland | 0.738 | 0.550 | 0.959 | 0.715 | 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.



## Determination of the number of dowels acc. to approval

In order to use the number of dowels as specified in the following tables, the dowels must feature the required tensile capacity (acc. to the dowel approvals). If the tensile capacity of the dowel is insufficient, individual rating on the basis of the EN 1991-1-4 and EN 1991-1-4/NA is required. The basis for determination of the number of dowels is the wind load acc. to the simplified method.

Table 1: **MW Volamit 040** (for wind suction $w_{ek}$: 1.6 to 2.2 kN/m²) Insulation thickness 60 – 200 mm

| Wind zone | Minimum number of dowels per 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 | | |
| | **Installed** | | | | | | | | | | | | | | | | | |
| | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** |
| **1a** | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 |
| **2a** | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 |
| **2b** | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 | 3 | 5 | – | – | – | 4 |
| **3a** | – | – | 4 | – | – | 4 | – | – | 4 | – | – | 4 | 3 | 5 | – | – | – | 4 |
| **3b** | – | – | 4 | – | – | 4 | 3 | 5 | – | – | – | 4 | 3 | 5 | – | – | – | 4 |
| **4a** | – | – | 4 | – | – | 4 | 3 | 5 | – | – | – | 4 | 3 | 5 | – | – | – | 4 |
| **4b** | 3 | 5 | – | – | – | 4 | 3 | 5 | – | – | – | 4 | 3 | 5 | – | 3 | 5 | – |
| **4c** | 3 | 5 | – | – | – | 4 | Not used | | | | | | | | | | | |

**Installation type legend**

| Number | Installed | Dowel placement | Ø dowel plate in m | Plaster system | Requirements |
|---|---|---|---|---|---|
| **1** | Surface flush | Surface + joint | 140 | t ≤ 10 mm, insulation weight ≤ 10 kg/m² | Wind suction $w_{ek}$: 1.6 – 2.2 kN/m² |
| **2** | Surface flush | Surface + joint | 140 | t > 10 mm, insulation weight > 10 kg/m² | Wind suction $w_{ek}$: 1.6 – 2.2 kN/m² |
| **3** | Surface flush | Area | 60 | – | Constructional acc. to Knauf specification |

| | |
|---|---|
| **Notes** | Plaster system weight see table on page 8 |
| | See the table on page 11 for permissible substrates. |
| | Optional dowelling through the mesh: without dowel plates / rondelles. |
| | Constructional dowelling recommended in case of wind suction ≤ 1.59 kN/m². |
| | Observe system approval Z-33.47-899. |

## Determination of the number of dowels acc. to approval (continuation)

Table 2: **MW Wolle 035 plus L** — Insulation thickness 60 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | Installed | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1a | 8 | 8 | 6 | 7 | 6 | 7 | 5 | 6 | 10 | 10 | 8 | 8 | 8 | 8 | 6 | 7 | 11 | 12 | 9 | 10 | 9 | 9 | 7 | 8 |
| 2a | 10 | 10 | 8 | 8 | 8 | 8 | 6 | 7 | 11 | 12 | 9 | 10 | 9 | 9 | 7 | 8 | 13 | 14 | 10 | 11 | 10 | 10 | 8 | 8 |
| 2b | 12 | 13 | 10 | 11 | 10 | 10 | 8 | 8 | 14 | 15 | 11 | 12 | 10 | 11 | 8 | 9 | 16 | 16 | 13 | 13 | 12 | 13 | 10 | 11 |
| 3a | 11 | 12 | 9 | 10 | 9 | 9 | 7 | 8 | 14 | 15 | 11 | 12 | 10 | 11 | 8 | 9 | 16 | 16 | 13 | 13 | 12 | 13 | 10 | 11 |
| 3b | 15 | 16 | 12 | 13 | 11 | 12 | 9 | 10 | – | – | 13 | 14 | 13 | 14 | 10 | 11 | – | – | 15 | 16 | 14 | 15 | 11 | 12 |
| 4a | 14 | 15 | 11 | 12 | 10 | 11 | 8 | 9 | 16 | – | 13 | 13 | 12 | 13 | 10 | 11 | – | – | 15 | 16 | 14 | 15 | 11 | 12 |
| 4b | – | – | 14 | 15 | 13 | 14 | 10 | 11 | – | – | 15 | 16 | 15 | 16 | 12 | 13 | – | – | – | – | 16 | – | 13 | 14 |
| 4c | – | – | 15 | 16 | 15 | 16 | 12 | 13 | Not used | | | | | | | | | | | | | | | |

Table 3: **MW Wolle 035 plus L** — Insulation thickness 80 – 100 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | Installed | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1a | 6 | 7 | 6 | 7 | 5 | 5 | 5 | 6 | 7 | 8 | 8 | 8 | 6 | 7 | 6 | 7 | 9 | 10 | 9 | 10 | 7 | 7 | 7 | 8 |
| 2a | 7 | 8 | 8 | 8 | 6 | 7 | 6 | 7 | 9 | 10 | 9 | 10 | 7 | 7 | 7 | 8 | 10 | 11 | 10 | 11 | 7 | 8 | 8 | 8 |
| 2b | 9 | 10 | 10 | 11 | 7 | 8 | 8 | 8 | 11 | 12 | 11 | 12 | 8 | 9 | 8 | 9 | 12 | – | 13 | 13 | 9 | 10 | 10 | 11 |
| 3a | 9 | 10 | 9 | 10 | 7 | 7 | 7 | 8 | 11 | 12 | 11 | 12 | 8 | 9 | 8 | 9 | 12 | – | 13 | 13 | 9 | 10 | 10 | 11 |
| 3b | 11 | 12 | 12 | 13 | 9 | 10 | 9 | 10 | – | – | 13 | 14 | 10 | 11 | 10 | 11 | – | – | 15 | 16 | 11 | 12 | 11 | 12 |
| 4a | 11 | 12 | 11 | 12 | 8 | 9 | 8 | 9 | 12 | – | 13 | 13 | 9 | 10 | 10 | 11 | – | – | 15 | 16 | 11 | 12 | 11 | 12 |
| 4b | – | – | 14 | 15 | 10 | 11 | 10 | 11 | – | – | 15 | 16 | 11 | 12 | 12 | 13 | – | – | – | – | 12 | – | 13 | 14 |
| 4c | – | – | 15 | 16 | 11 | 12 | 12 | 13 | Not used | | | | | | | | | | | | | | | |

**Installation type legend**

| Number | Installed | Dowel placement | Ø dowel plate in mm |
|---|---|---|---|
| 1 | Surface flush | Area | 60 |
| 2 | Surface flush | Surface + joint | 60 |
| 3 | Surface flush | Area | 90 |
| 4 | Surface flush | Surface + joint | 90 |

| Notes | |
|---|---|
| | See the table on page 12 for permissible substrates. |
| | Optional dowelling through the mesh: without dowel plates / rondelles. |
| | Observe system approval Z-33.47-899. |

## Determination of the number of dowels acc. to approval (continuation)

Table 4: **MW Wolle 035 plus L** Insulation thickness 120 – 200 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | **Installed** | | | | | | | | | | | | | | | | | | | | | | | |
| | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** |
| **1a** | 4 | 6 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 7 | 4 | 5 | 4 | 6 | 4 | 4 | 6 | 8 | 5 | 6 | 5 | 6 | 4 | 5 |
| **2a** | 5 | 7 | 4 | 5 | 4 | 6 | 4 | 4 | 6 | 8 | 5 | 6 | 5 | 6 | 4 | 5 | 7 | 9 | 5 | 7 | 5 | 7 | 4 | 5 |
| **2b** | 7 | 8 | 5 | 6 | 5 | 7 | 4 | 5 | 8 | 10 | 6 | 7 | 6 | 8 | 4 | 5 | 9 | 11 | 7 | 8 | 7 | 8 | 5 | 6 |
| **3a** | 6 | 8 | 5 | 6 | 5 | 6 | 4 | 5 | 8 | 10 | 6 | 7 | 6 | 8 | 4 | 5 | 9 | 11 | 7 | 8 | 7 | 8 | 5 | 6 |
| **3b** | 8 | 10 | 6 | 7 | 6 | 8 | 5 | 6 | 10 | 12 | 7 | 8 | 7 | 9 | 5 | 7 | 12 | 14 | 8 | – | 8 | 10 | 6 | 7 |
| **4a** | 8 | 10 | 6 | 7 | 6 | 8 | 4 | 5 | 9 | 11 | 7 | 8 | 7 | 8 | 5 | 6 | 12 | 14 | 8 | – | 8 | 10 | 6 | 7 |
| **4b** | 11 | 12 | 8 | 8 | 7 | 9 | 5 | 7 | 13 | 16 | 8 | – | 8 | 10 | 6 | 7 | – | – | – | – | 10 | 11 | 7 | 8 |
| **4c** | 13 | 16 | 8 | – | 8 | 10 | 6 | 7 | Not used | | | | | | | | | | | | | | | |

**Installation type legend**

| Number | Installed | Dowel placement | Ø dowel plate in mm |
|---|---|---|---|
| **1** | Surface flush | Area | 60 |
| **2** | Surface flush | Surface + joint | 60 |
| **3** | Surface flush | Area | 90 |
| **4** | Surface flush | Surface + joint | 90 |

| | |
|---|---|
| **Notes** | See the table on page 12 for permissible substrates.<br>Optional dowelling through the mesh: without dowel plates / rondelles.<br>Observe system approval Z-33.47-899. |

## Determination of the number of dowels acc. to approval (continuation)

Table 5: **MW Wolle 035 plus LX** — Insulation thickness 80 – 100 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | Installed | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1a | 5 | 6 | 4 | 5 | 4 | 5 | 4 | 4 | 6 | 7 | 5 | 6 | 5 | 6 | 4 | 5 | 7 | 9 | 5 | 6 | 5 | 7 | 4 | 5 |
| 2a | 6 | 7 | 5 | 6 | 5 | 6 | 4 | 5 | 8 | 9 | 6 | 7 | 6 | 7 | 4 | 5 | 9 | 11 | 6 | 7 | 7 | 8 | 5 | 6 |
| 2b | 8 | 9 | 6 | 7 | 6 | 7 | 5 | 6 | 10 | 11 | 7 | 8 | 7 | 9 | 5 | 6 | 11 | 12 | 8 | 9 | 8 | 9 | 6 | 7 |
| 3a | 8 | 9 | 6 | 7 | 6 | 7 | 4 | 5 | 9 | 11 | 7 | 8 | 7 | 9 | 5 | 6 | 11 | 12 | 8 | 9 | 8 | 9 | 6 | 7 |
| 3b | 10 | 12 | 7 | 9 | 8 | 9 | 6 | 7 | 12 | 13 | 8 | 9 | 9 | 11 | 6 | 7 | 13 | 14 | 9 | 10 | 9 | 11 | 7 | 8 |
| 4a | 9 | 11 | 7 | 8 | 7 | 9 | 5 | 6 | 11 | 12 | 8 | 9 | 8 | 9 | 6 | 7 | 13 | 14 | 9 | 10 | 9 | 11 | 7 | 8 |
| 4b | 12 | 14 | 9 | 10 | 9 | 11 | 7 | 8 | 14 | – | 10 | – | 10 | 12 | 7 | 9 | – | – | – | – | 11 | 13 | 8 | 9 |
| 4c | 14 | – | 10 | – | 10 | 12 | 7 | 9 | Not used | | | | | | | | | | | | | | | |

Table 6: **MW Wolle 035 plus LX** — Insulation thickness 120 – 200 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | Installed | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1a | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 6 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 6 | 4 | 5 | 4 | 5 | 4 | 4 |
| 2a | 5 | 6 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 6 | 4 | 5 | 4 | 5 | 4 | 4 | 6 | 7 | 5 | 6 | 5 | 6 | 4 | 5 |
| 2b | 6 | 7 | 5 | 6 | 5 | 6 | 4 | 5 | 7 | 8 | 5 | 6 | 5 | 6 | 4 | 5 | 8 | 9 | 6 | 7 | 6 | 7 | 5 | 6 |
| 3a | 5 | 6 | 4 | 5 | 4 | 5 | 4 | 4 | 6 | 7 | 5 | 6 | 5 | 6 | 4 | 5 | 8 | 9 | 6 | 7 | 6 | 7 | 5 | 6 |
| 3b | 7 | 8 | 6 | 7 | 5 | 6 | 4 | 5 | 8 | 9 | 6 | 7 | 6 | 7 | 5 | 6 | 9 | 10 | 7 | 8 | 6 | 7 | 5 | 6 |
| 4a | 6 | 7 | 5 | 6 | 5 | 6 | 4 | 5 | 8 | 9 | 6 | 7 | 6 | 7 | 5 | 6 | 9 | 10 | 7 | 8 | 6 | 7 | 5 | 6 |
| 4b | 8 | 9 | 7 | 8 | 6 | 7 | 5 | 6 | 9 | 10 | 7 | 8 | 7 | 8 | 6 | 7 | – | – | – | – | 8 | 9 | 6 | 7 |
| 4c | 9 | 10 | 7 | 8 | 7 | 8 | 6 | 7 | Not used | | | | | | | | | | | | | | | |

**Installation type legend**

| Number | Installed | Dowel placement | Ø dowel plate in mm |
|---|---|---|---|
| 1 | Surface flush | Area | 60 |
| 2 | Surface flush | Surface + joint | 60 |
| 3 | Surface flush | Area | 90 |
| 4 | Surface flush | Surface + joint | 90 |

| Notes | |
|---|---|
| | See the table on page 12 for permissible substrates. |
| | Optional dowelling through the mesh: without dowel plates / rondelles. |
| | Observe system approval Z-33.47-899. |

## Determination of the number of dowels acc. to approval (continuation)

Table 7: **MW Wolle 035 plus M2** Insulation thickness 60 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | Installed | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1a | – | – | 7 | – | – | – | 5 | – | – | – | 8 | – | – | – | 7 | – | – | – | 10 | – | – | – | 8 | – |
| 2a | – | – | 8 | – | – | – | 7 | – | – | – | 10 | – | – | – | 8 | – | – | – | 12 | – | – | – | 8 | – |
| 2b | – | – | 11 | – | – | – | 8 | – | – | – | 12 | – | – | – | 10 | – | – | – | 14 | – | – | – | 11 | – |
| 3a | – | – | 10 | – | – | – | 8 | – | – | – | 12 | – | – | – | 10 | – | – | – | 14 | – | – | – | 11 | – |
| 3b | – | – | 12 | – | – | – | 10 | – | – | – | 16 | – | – | – | 11 | – | – | – | 16 | – | – | – | 12 | – |
| 4a | – | – | 12 | – | – | – | 10 | – | – | – | 14 | – | – | – | 11 | – | – | – | 16 | – | – | – | 12 | – |
| 4b | – | – | 16 | – | – | – | 12 | – | – | – | 16 | – | – | – | 12 | – | – | – | – | – | – | – | 16 | – |
| 4c | – | – | 16 | – | – | – | 12 | – | Not used | | | | | | | | | | | | | | | |

**Installation type legend**

| Number | Installed | Dowel placement | Ø dowel plate in mm |
|---|---|---|---|
| 3 | Surface flush | Area | 90 |

| Notes | |
|---|---|
| | See the table on page 12 for permissible substrates. |
| | Optional dowelling through the mesh: without dowel plates / rondelles. |
| | Observe system approval Z-33.47-899. |

## Determination of the number of dowels acc. to approval (continuation)

Table 8: **MW Wolle 035 plus M2** — Insulation thickness 80 – 100 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | Installed | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1a | 4 | 6 | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 7 | 5 | 6 | 4 | 6 | 4 | 5 | 6 | 8 | 5 | 7 | 5 | 6 | 4 | 6 |
| 2a | 5 | 7 | 5 | 6 | 4 | 6 | 4 | 5 | 6 | 8 | 5 | 7 | 5 | 6 | 4 | 6 | 9 | 9 | 6 | 8 | 5 | 7 | 5 | 6 |
| 2b | 8 | 9 | 6 | 8 | 5 | 7 | 5 | 6 | 10 | 10 | 8 | 9 | 6 | 8 | 5 | 7 | 11 | 11 | 9 | 10 | 8 | 9 | 6 | 8 |
| 3a | 6 | 8 | 5 | 7 | 5 | 6 | 4 | 6 | 10 | 10 | 8 | 9 | 6 | 8 | 5 | 7 | 11 | 11 | 9 | 10 | 8 | 9 | 6 | 8 |
| 3b | 10 | 11 | 8 | 9 | 6 | 8 | 5 | 7 | 12 | 12 | 9 | 10 | 9 | 9 | 6 | 8 | 12 | – | 10 | – | 10 | 10 | 8 | 9 |
| 4a | 10 | 10 | 8 | 9 | 6 | 8 | 5 | 7 | 11 | 11 | 9 | 10 | 8 | 9 | 6 | 8 | 12 | – | 10 | – | 10 | 10 | 8 | 9 |
| 4b | 12 | – | 10 | – | 9 | 10 | 6 | 8 | – | – | – | – | 10 | 11 | 8 | 9 | – | – | – | – | 12 | 12 | 9 | 10 |
| 4c | – | – | – | – | 10 | 11 | 8 | 9 | Not used | | | | | | | | | | | | | | | |

Table 9: **MW Wolle 035 plus M2** — Insulation thickness 120 – 200 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | Installed | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1a | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 6 | 4 | 4 | 4 | 5 | 4 | 4 | 6 | 7 | 4 | 5 | 5 | 6 | 4 | 4 |
| 2a | 5 | 6 | 4 | 4 | 4 | 5 | 4 | 4 | 6 | 7 | 4 | 5 | 5 | 6 | 4 | 4 | 7 | 8 | 5 | 6 | 5 | 6 | 4 | 4 |
| 2b | 7 | 8 | 5 | 5 | 5 | 6 | 4 | 4 | 8 | 9 | 6 | 6 | 6 | 7 | 4 | 5 | 9 | 10 | 6 | 7 | 7 | 8 | 5 | 5 |
| 3a | 6 | 7 | 4 | 5 | 5 | 6 | 4 | 4 | 8 | 9 | 6 | 6 | 6 | 7 | 4 | 5 | 9 | 10 | 6 | 7 | 7 | 8 | 5 | 5 |
| 3b | 8 | 9 | 6 | 6 | 6 | 7 | 4 | 5 | 9 | 10 | 6 | 7 | 7 | 8 | 5 | 6 | 10 | 11 | 7 | 8 | 8 | 9 | 6 | 6 |
| 4a | 8 | 9 | 6 | 6 | 6 | 7 | 4 | 5 | 9 | 10 | 6 | 7 | 7 | 8 | 5 | 5 | 10 | 11 | 7 | 8 | 8 | 9 | 6 | 6 |
| 4b | 10 | 11 | 7 | 8 | 7 | 8 | 5 | 6 | 11 | 12 | 8 | 8 | 8 | 9 | 6 | 6 | – | – | – | – | 9 | 10 | 6 | 7 |
| 4c | 11 | 12 | 8 | 8 | 8 | 9 | 6 | 6 | Not used | | | | | | | | | | | | | | | |

**Installation type legend**

| Number | Installed | Dowel placement | Ø dowel plate in mm |
|---|---|---|---|
| 1 | Surface flush | Area | 60 |
| 2 | Surface flush | Surface + joint | 60 |
| 3 | Surface flush | Area | 90 |
| 4 | Surface flush | Surface + joint | 90 |

| Notes | |
|---|---|
| | See the table on page 12 for permissible substrates. |
| | Optional dowelling through the mesh: without dowel plates / rondelles. |
| | Observe system approval Z-33.47-899. |

## Determination of the number of dowels acc. to approval (continuation)

Table 10: **MW Wolle 035 plus M2** Insulation thickness 220 – 240 mm

| Wind zone | Minimum number of dowels per m² Wind loads acc. to simplified method | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | | | |
| | **Installed** | | | | | | | | | | | | | | | | | | | | | | | |
| | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** |
| **1a** | – | – | 6 | 6 | – | – | 6 | 6 | – | – | 6 | 7 | – | – | 6 | 6 | – | – | 6 | 8 | – | – | 6 | 6 |
| **2a** | – | – | 6 | 7 | – | – | 6 | 6 | – | – | 7 | 8 | – | – | 6 | 6 | – | – | 8 | 9 | – | – | 6 | 7 |
| **2b** | – | – | 7 | 8 | – | – | 6 | 7 | – | – | 8 | 9 | – | – | 6 | 7 | – | – | 9 | 10 | – | – | 7 | 8 |
| **3a** | – | – | 7 | 8 | – | – | 6 | 6 | – | – | 8 | 9 | – | – | 6 | 7 | – | – | 9 | 10 | – | – | 7 | 8 |
| **3b** | – | – | 9 | 10 | – | – | 7 | 8 | – | – | 10 | 11 | – | – | 8 | 9 | – | – | 11 | 12 | – | – | 8 | 9 |
| **4a** | – | – | 8 | 9 | – | – | 6 | 7 | – | – | 9 | 10 | – | – | 7 | 8 | – | – | 11 | 12 | – | – | 8 | 9 |
| **4b** | – | – | 10 | 11 | – | – | 8 | 9 | – | – | 12 | 12 | – | – | 9 | 10 | – | – | – | – | – | – | 10 | 11 |
| **4c** | – | – | 12 | 12 | – | – | 9 | 10 | Not used | | | | | | | | | | | | | | | |

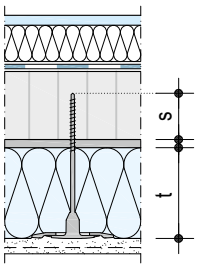
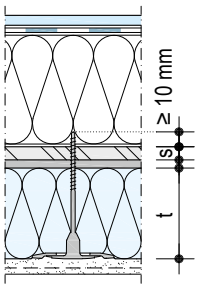
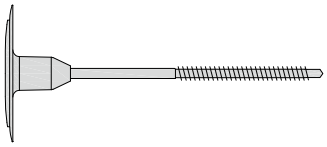
**Installation type legend**

| Number | Installed | Dowel placement | Ø dowel plate in mm |
|---|---|---|---|
| **3** | Surface flush | Area | 90 |
| **4** | Surface flush | Surface + joint | 90 |

| | |
|---|---|
| **Notes** | See the table on page 12 for permissible substrates.<br>Optional dowelling through the mesh: without dowel plates / rondelles.<br>Observe system approva Z-33.47-899 beachten. |

## Dowel selection

**Dowel lengths in dependence on the insulation material thickness** (with an adhesive thickness of max. 5 mm)

| **Insulation material thickness**<br>Anchoring in solid wooden substrate | Anchoring in board material<br>(screwed-through design) | **Dowel length**<br>**Schraubdübel STR H A2 dowel**<br>(acc. to abZ) |
|---|---|---|
|  |  |  |
| **s** ≥ 35 mm<br><br>**t**<br>mm | **s** ≥ board material thickness<br>(+ minimum 10 mm protrusion)<br>**t**<br>mm | <br><br><br>mm |
| 40 | 40 | 80 |
| 60 | 60 | 100 |
| 80 | 80 | 120 |
| 100 | 100 | 140 |
| 120 | 120 | 160 |
| 140 | 140 | 180 |
| 160 | 160 | 200 |
| 180 | 180 | 220 |
| 200 | 200 | 240 |
| 220 | 220 | 260 |
| 240 | 240 | 280 |

*t = insulation material thickness*

*s = anchoring depth*

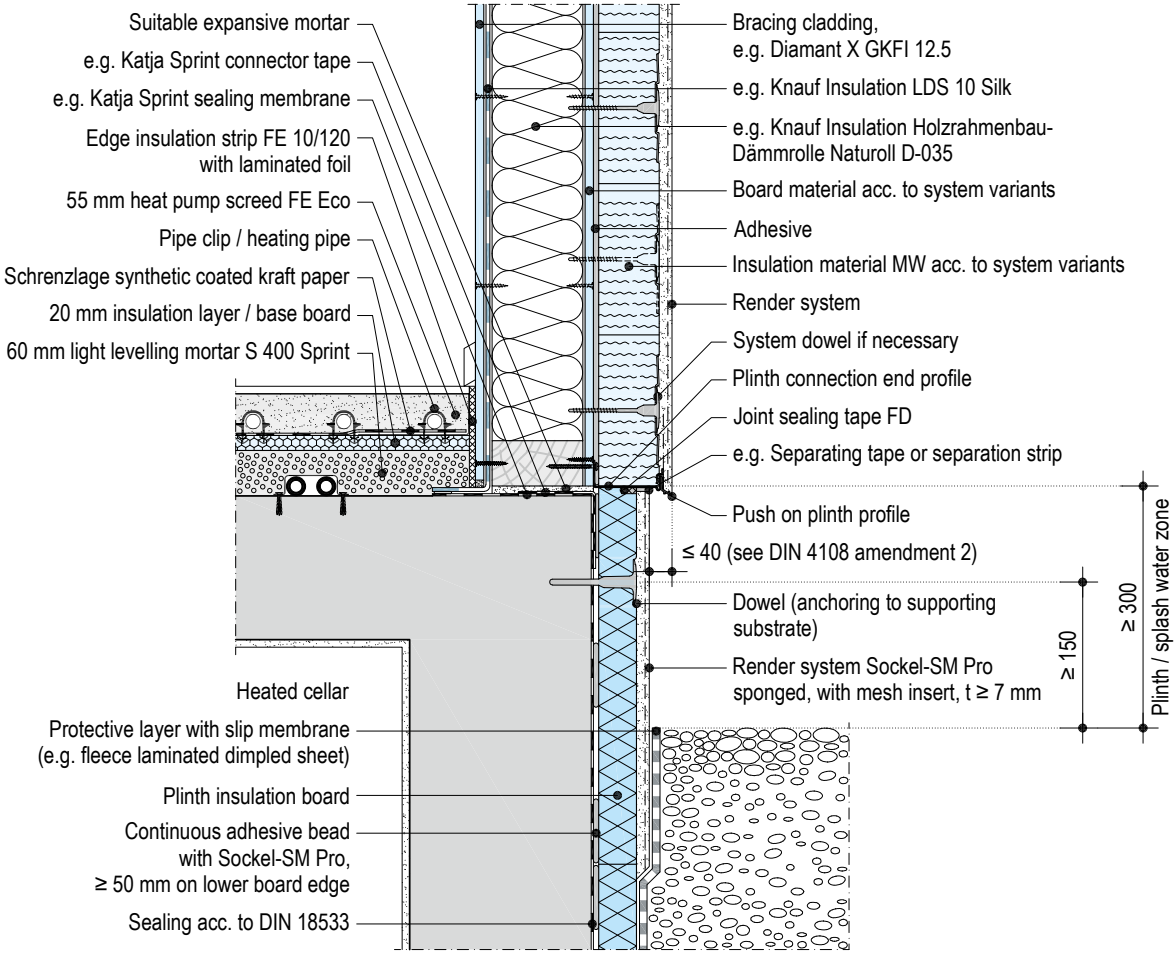
Calculation of the length:

- In case of anchoring in solid wooden substrate:
  Anchoring depth **s** + 5 mm adhesive thickness + insulation material thickness **t**
- In case of anchoring in board material:
  Anchoring depth **s** (board material thickness) + minimum 10 mm protrusion + 5 mm adhesive thickness + insulation material thickness **t**

## Implemented with perimeter insulation

### WE202.de-SO-V1 Recessed plinth application

Scale 1:10 I Dimensions in mm

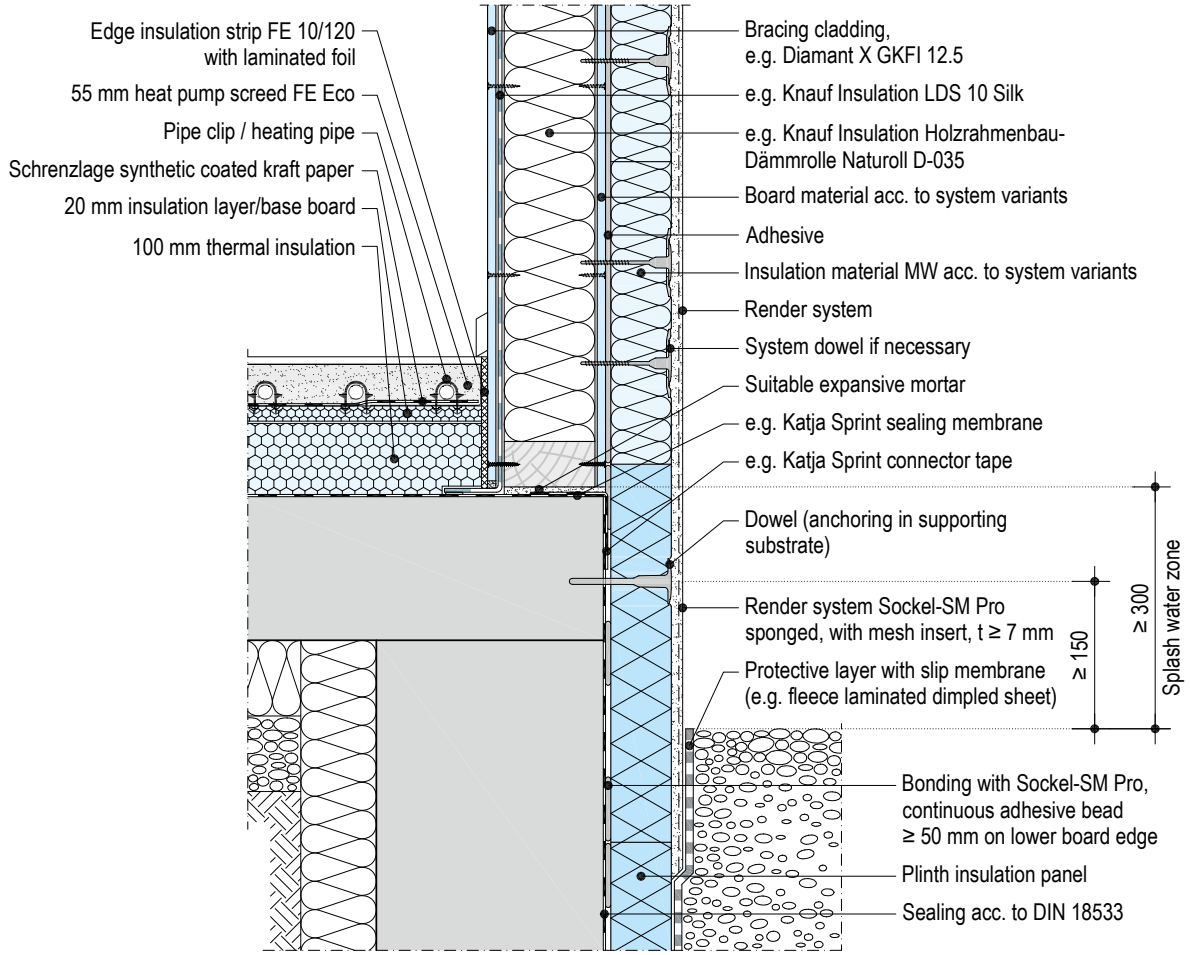


## Implemented with perimeter insulation (continued)

Scale 1:10 I Dimensions in mm

### WE202.de-SO-V2 Flush plinth application

Application with floor slab

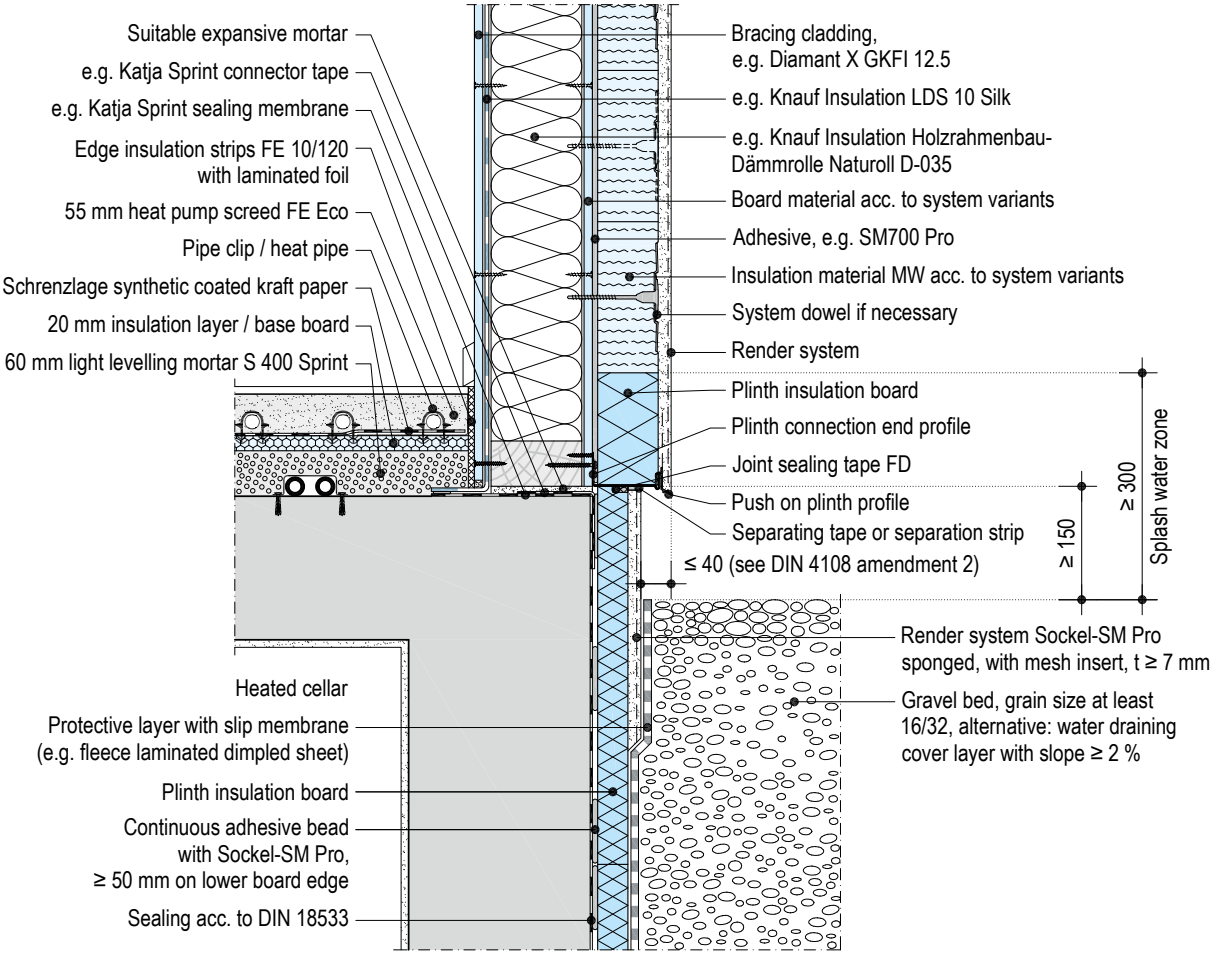


## Implemented with perimeter insulation (continued)

Scale 1:10 I Dimensions in mm

### WE202.de-SO-V3 Recessed plinth application

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

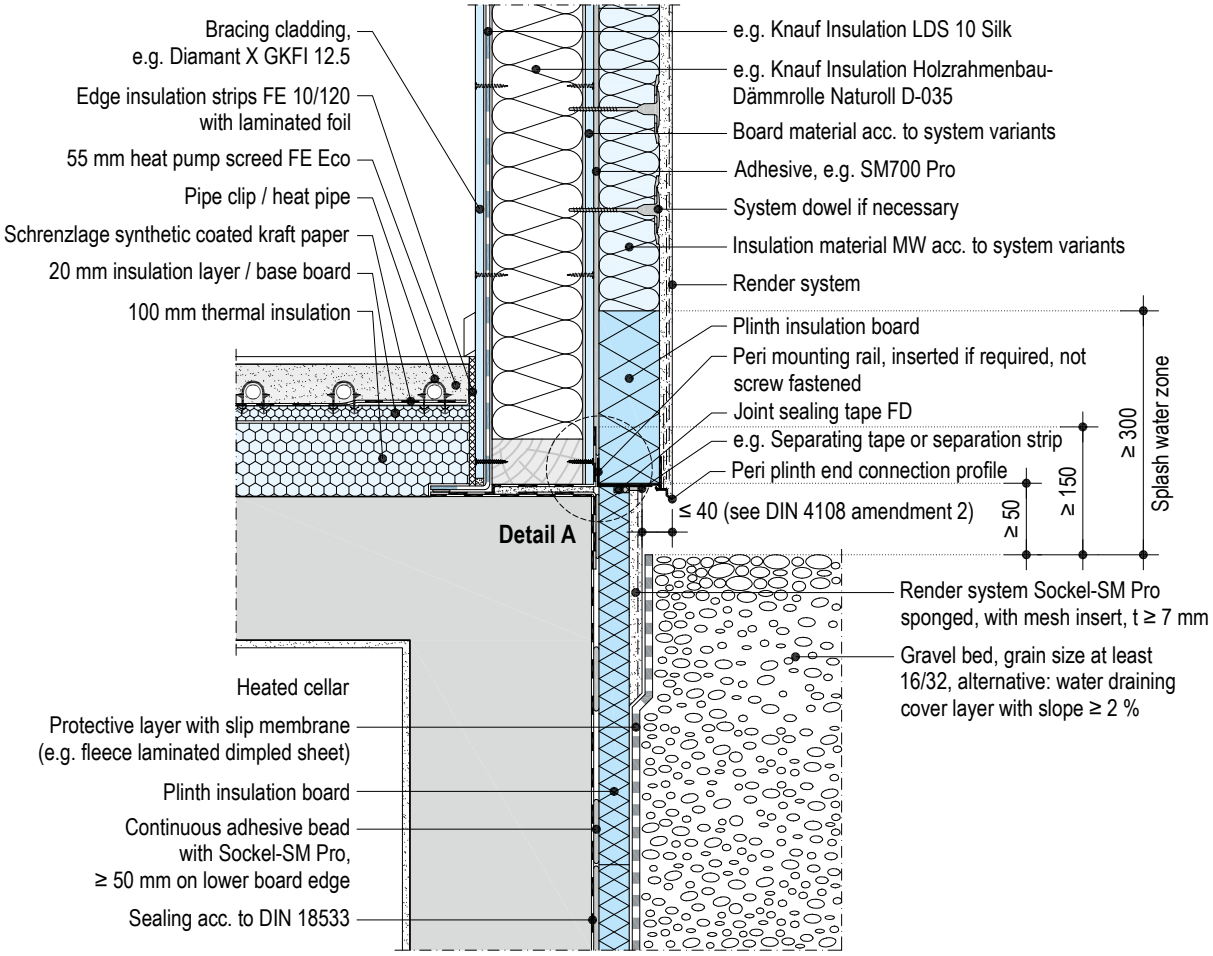


## Implemented with perimeter insulation (continued)

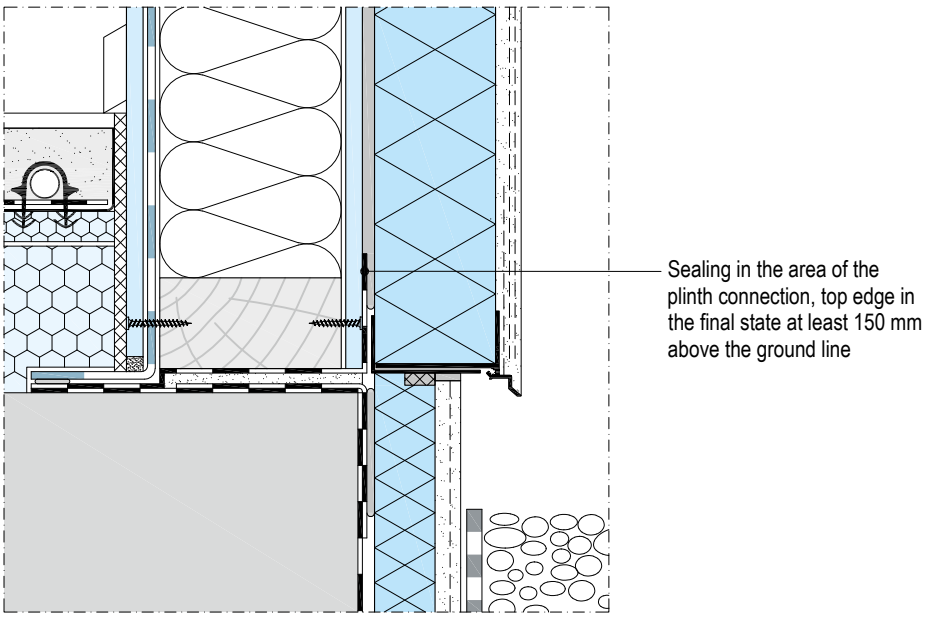
Scale 1:10 I Dimensions in mm

### WE202.de-SO-V4 Recessed plinth application

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




**Detail A** Scale 1:5



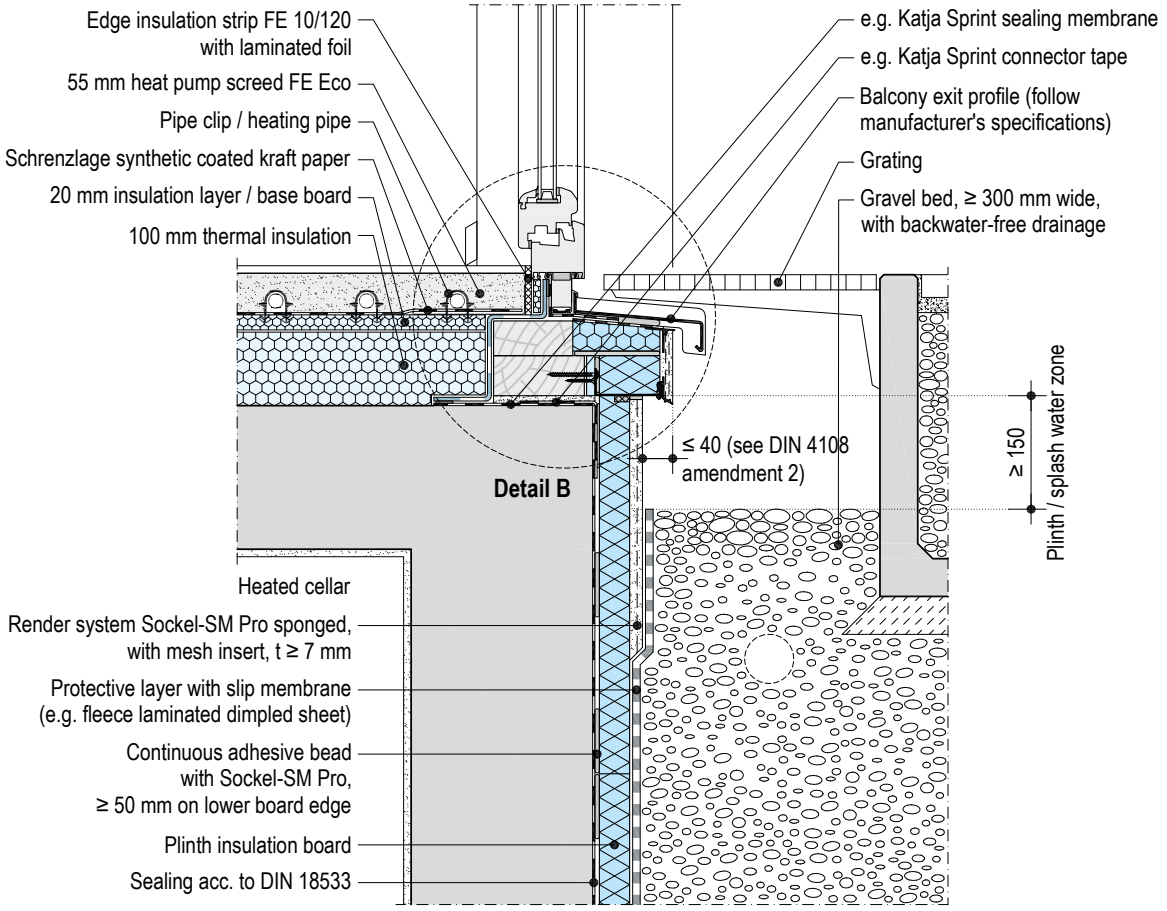

| Note | Penetration of the building waterproofing should be avoided. |
|---|---|

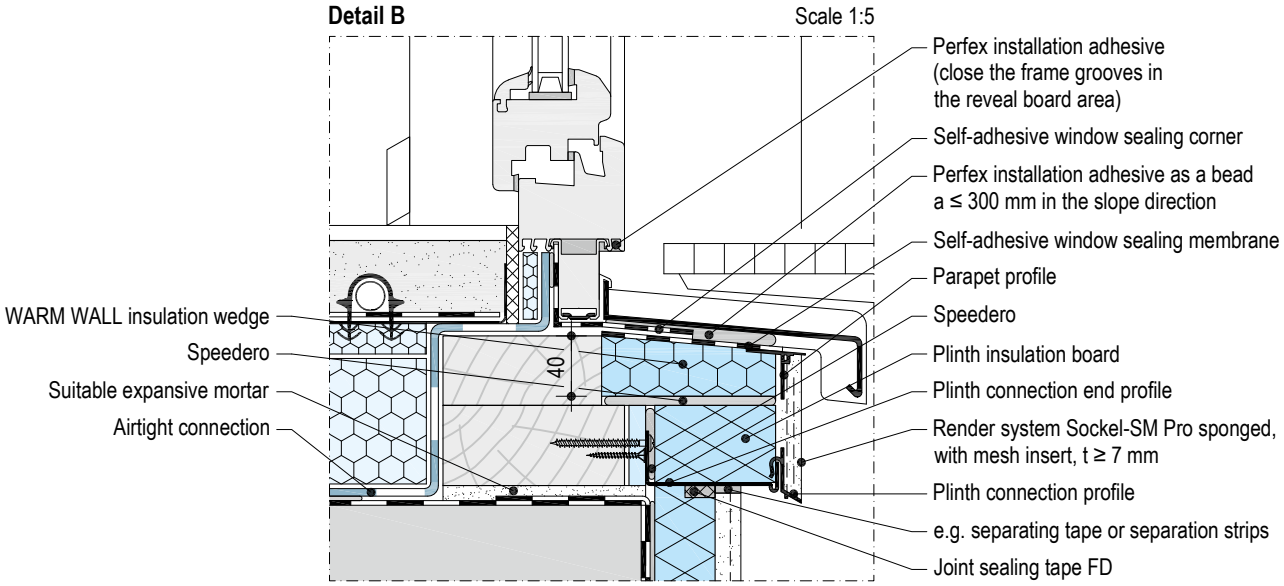
## French door connections

Scale 1:10 I Dimensions in mm

### WE202.de-SO-V5 Recessed plinth application

French door exterior flush with wooden studs, not barrier free



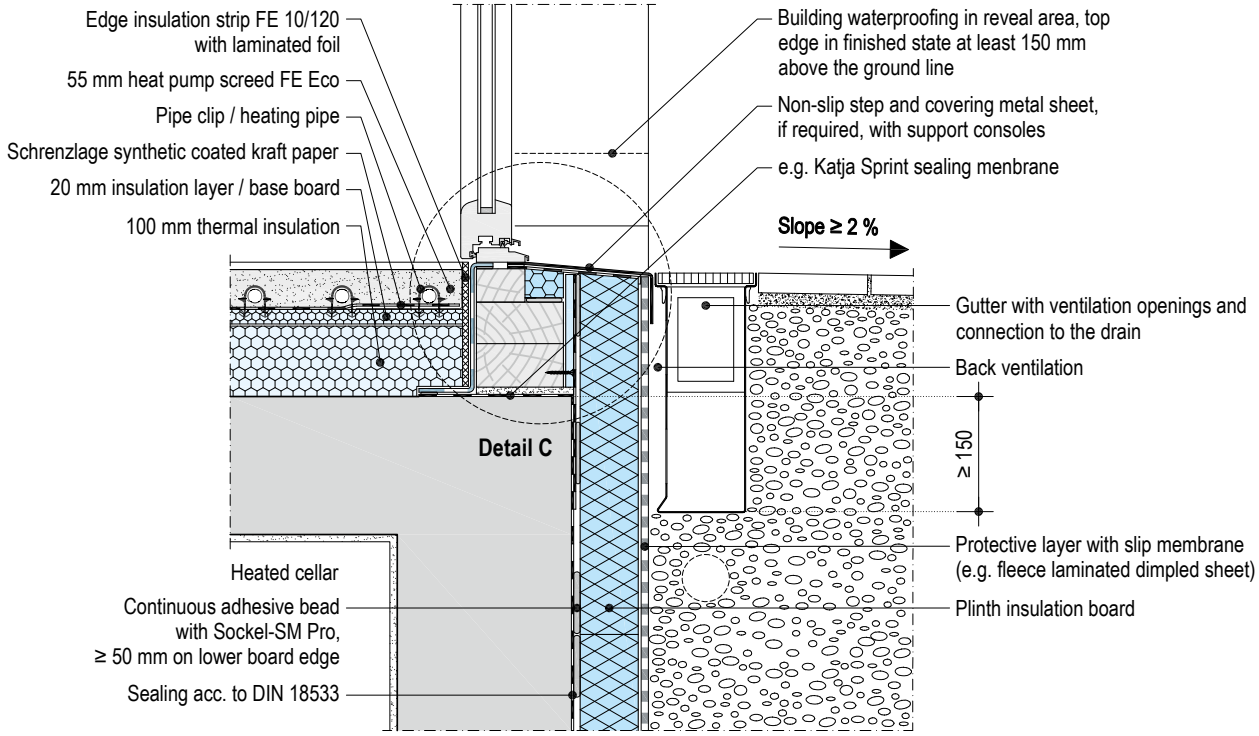

| | |
|---|---|
| **Notes** | Take care to ensure fully sealed openings (interface gaps) and ensure that filling is applied under window frames.<br>The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft 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. 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. |

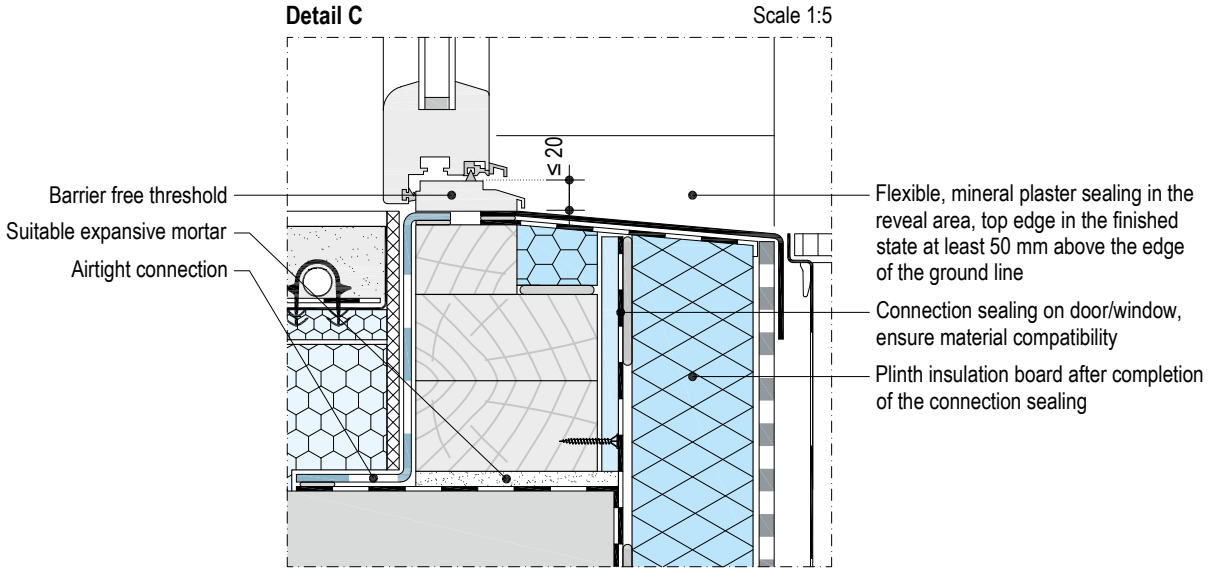
## French door connections (continued)

Scale 1:10 I Dimensions in mm

### WE202.de-SO-V6 Flush plinth application

French door interior flush with wooden studs, barrier free




**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.

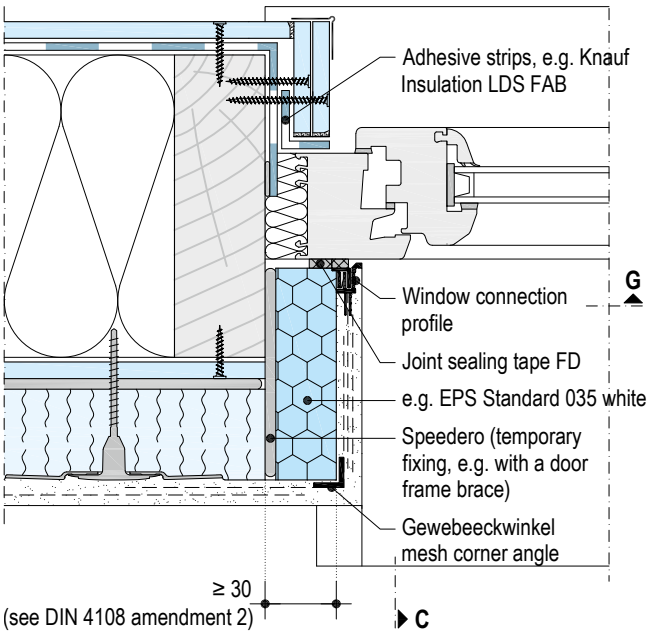
The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with 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

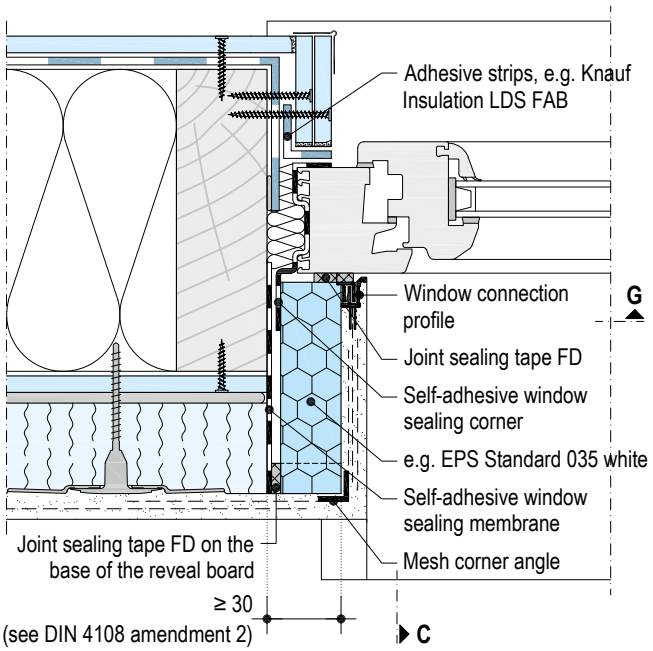
### WE202.de-FE-H1 Horizontal section

Section A



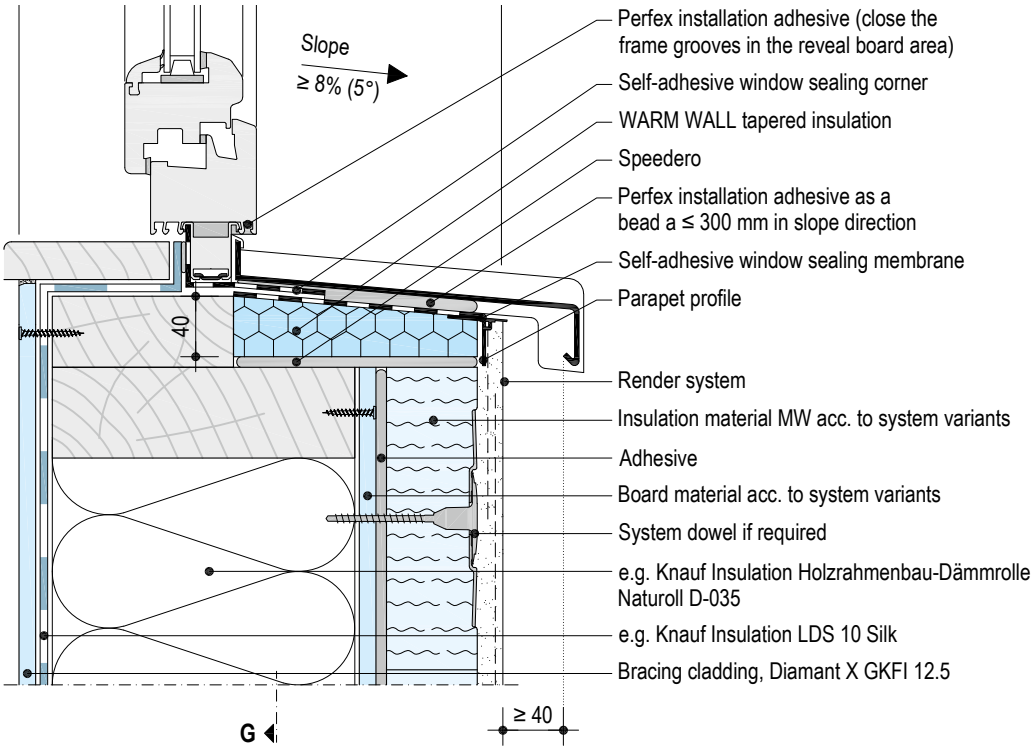

### WE202.de-FE-H2 Horizontal section

Section B (base)




### WE202.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.

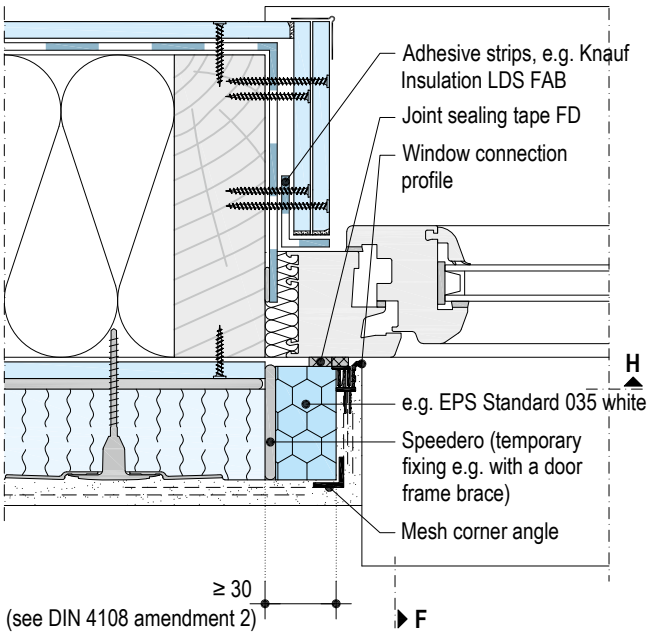
The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with 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

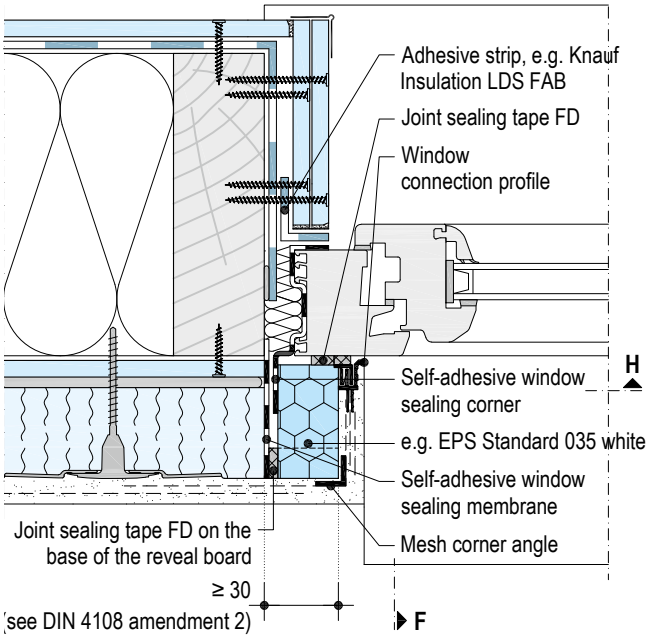
### WE202.de-FE-H3 Horizontal section

Section D



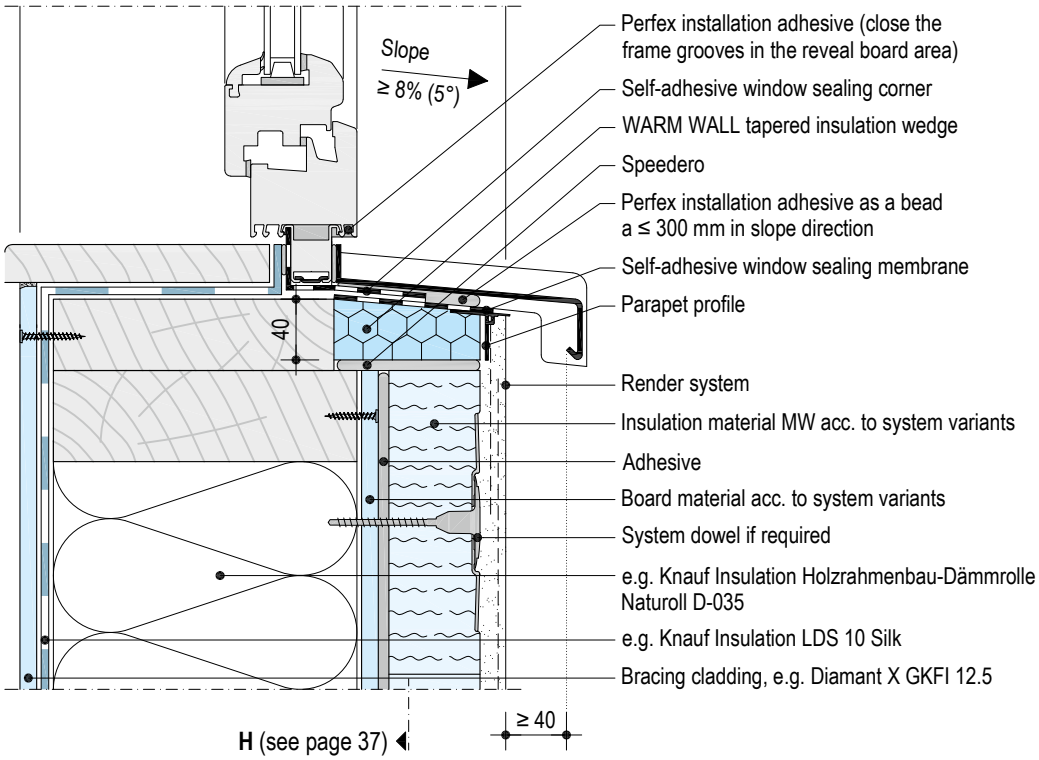

### WE202.de-FE-H4 Horizontal section

Section E (base)




### WE202.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.

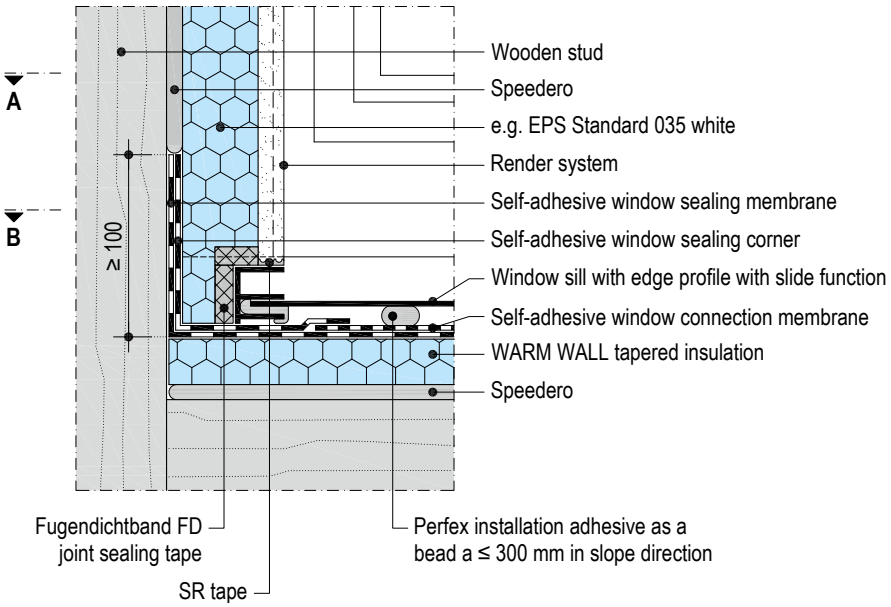
The window installation and seals are represented schematically, refer to “Guideline on the installation of windows and doors” from the RAL-Gütegemeinschaft Fenster und Haustüren e.V. (German Quality Assurance Association Windows and Doors) or the guideline “Connection of windows and roller blinds with 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.

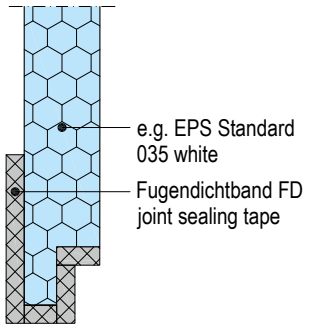
## Connection to window sill side section

Scheme drawings I Dimensions in mm

### WE202.de-FE-V3 Connection to window sill including edge profile with slide function

Section G

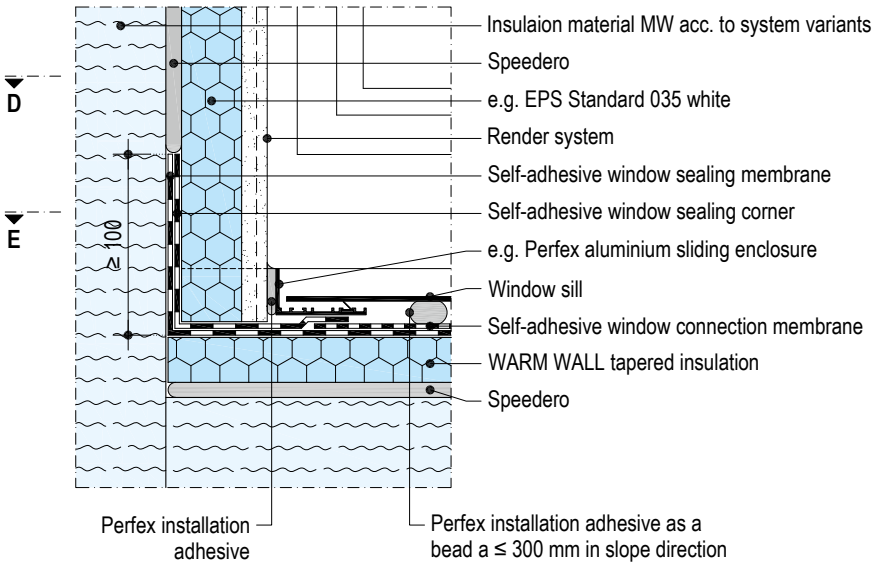


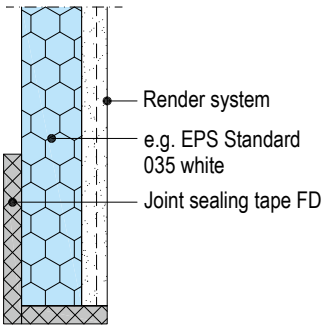




Design of the front edge of the reveal board

### WE202.de-FE-V4 Connection to window sill – subsequent window sill installation

Section H




Design of the front edge of the reveal board

**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

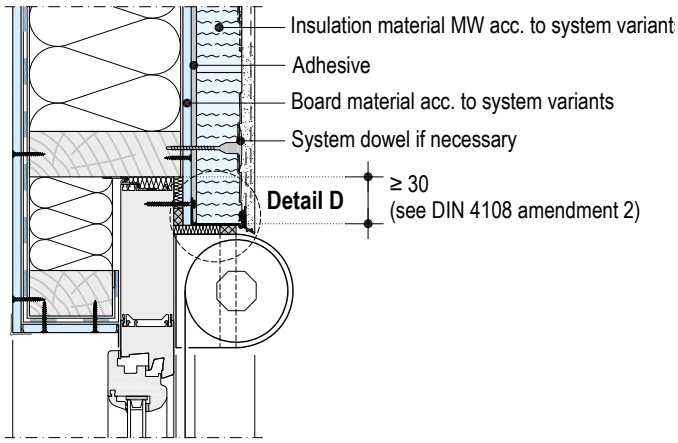
*1) The constraint-free movement absorption between the edge profile and window sill must provide at least the expected range of motion.*

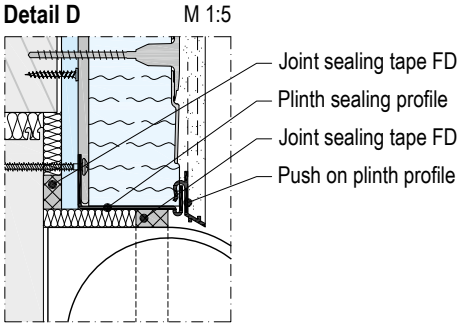
The installation of window sills with edge profile featuring a slide function; recommended when retrofitting window sills with sliding closures.

## Connection to sun screening

Scale 1:10 I Dimensions in mm

### WE202.de-FE-V5 Projection roller blind unit



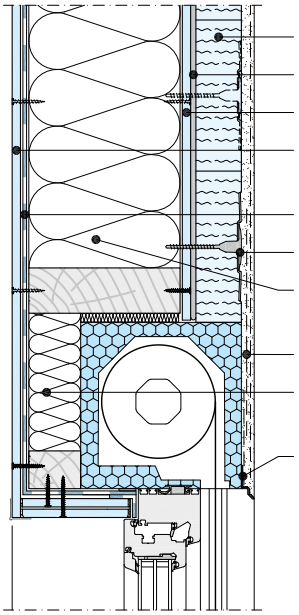




| | |
|---|---|
| **Notes** | When installing the projection roller blind unit a driving-rain proof application should be observed (connection of the plaster façade with Fugendichtband FD joint sealing tape).<br>Ensure that all openings (interface gaps) are sealed.<br>The window installation and seals 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. |

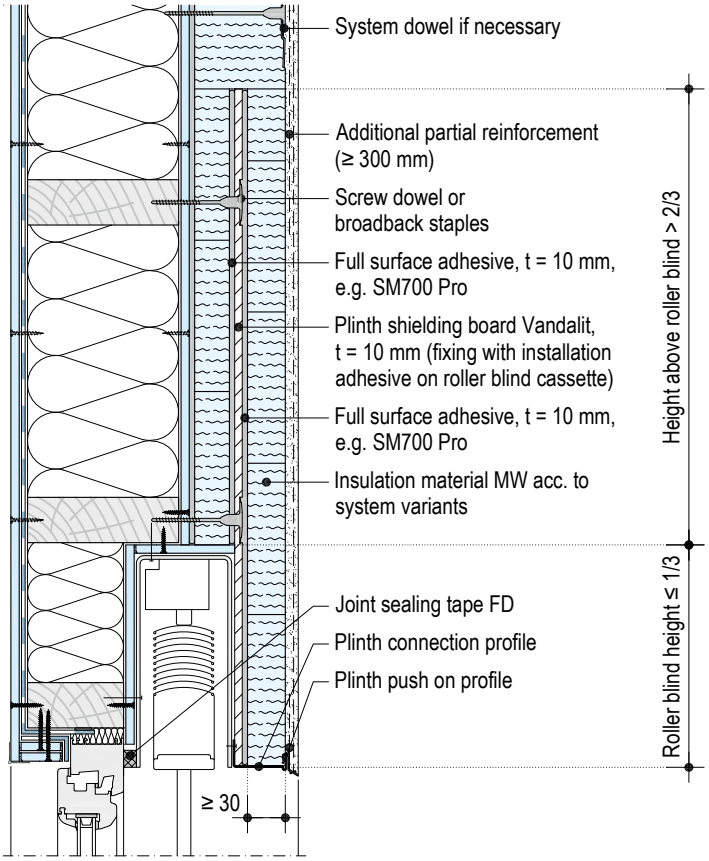
## Connection to sun screening (continued)

Scale 1:10 I Dimensions in mm

### WE202.de-FE-V6 Integrated roller blind unit




### WE202.de-FE-V7 Roller blind




**Notes**

Rear-side coating of the plinth protection board Vandalit as moisture protection is recommended.

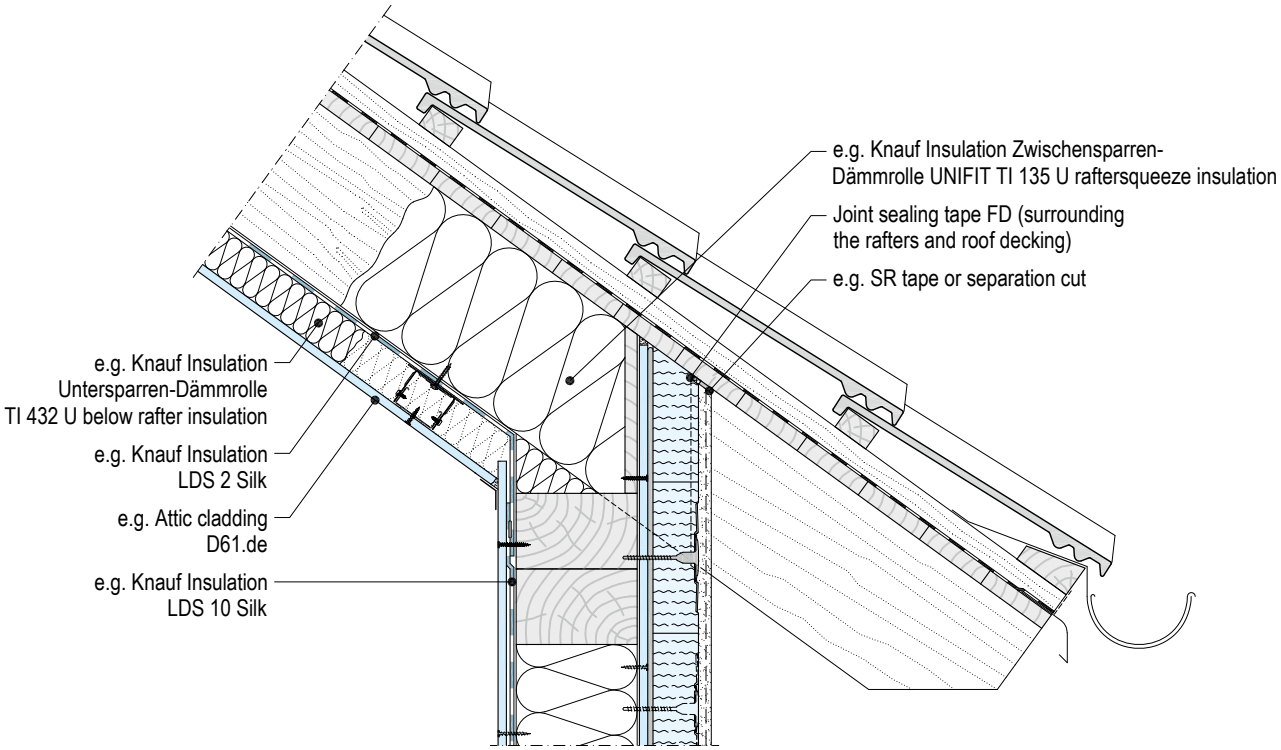
Ensure that all openings (interface gaps) are sealed.

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

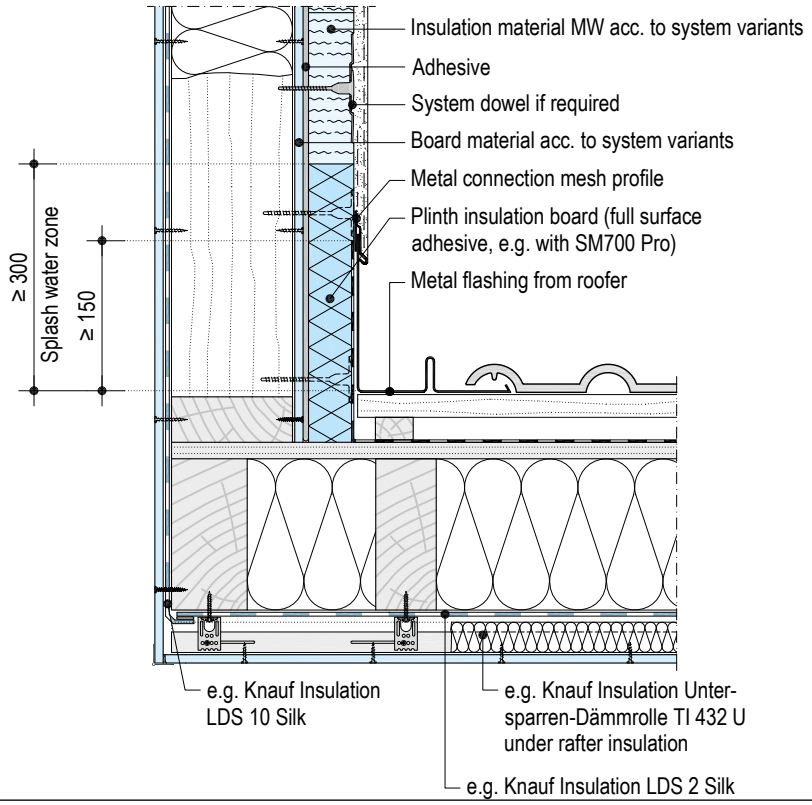
Scale 1:10 I Dimensions in mm

### WE202.de-DA-V1 Eaves connection to roof weatherboarding




### WE202.de-DA-V3 Connection to rising wall - dormer wing

With metal connection mesh profile



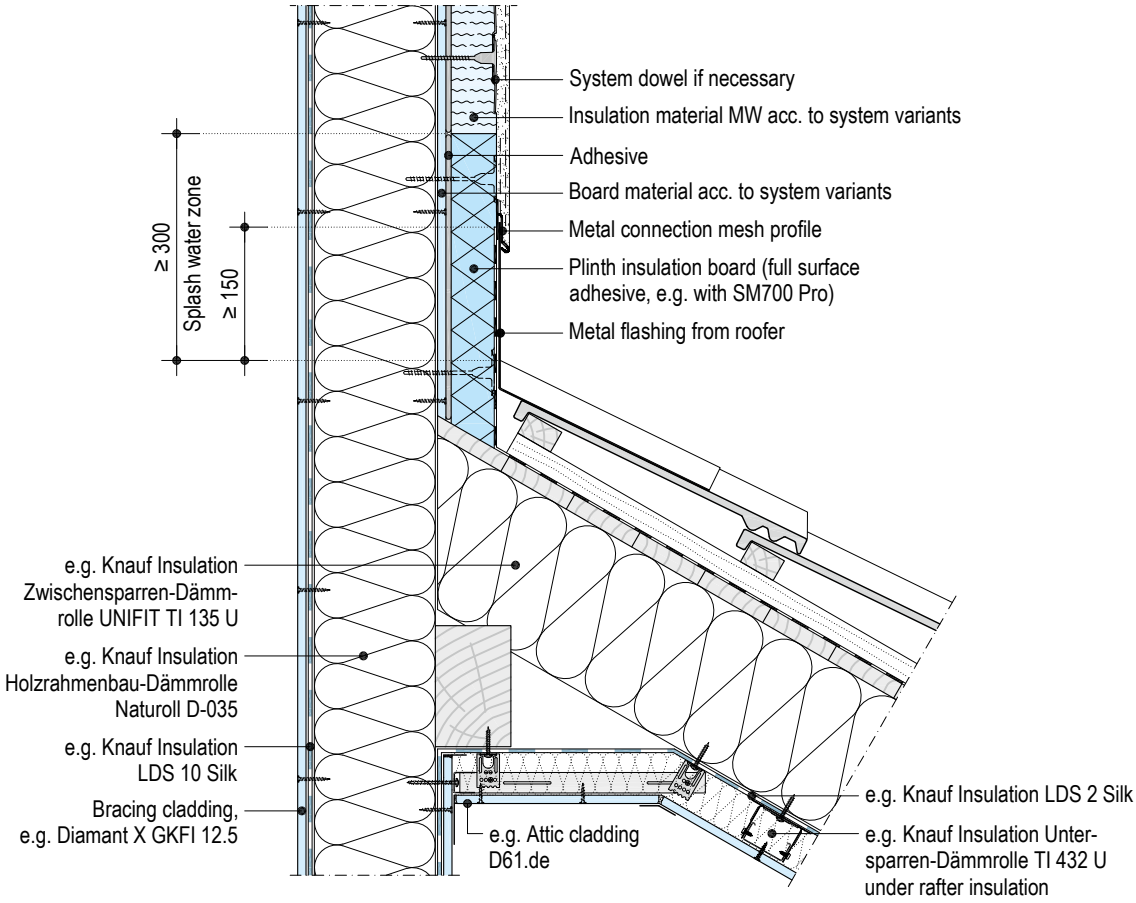

| | |
|---|---|
| **Note** | Observe guideline “Metallanschlüsse an Putz und Wärmedämm-Verbundsysteme - *Metal connections to render and external thermal insulation composite systems*”, (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany as well as the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

## Connections to roof (continued)

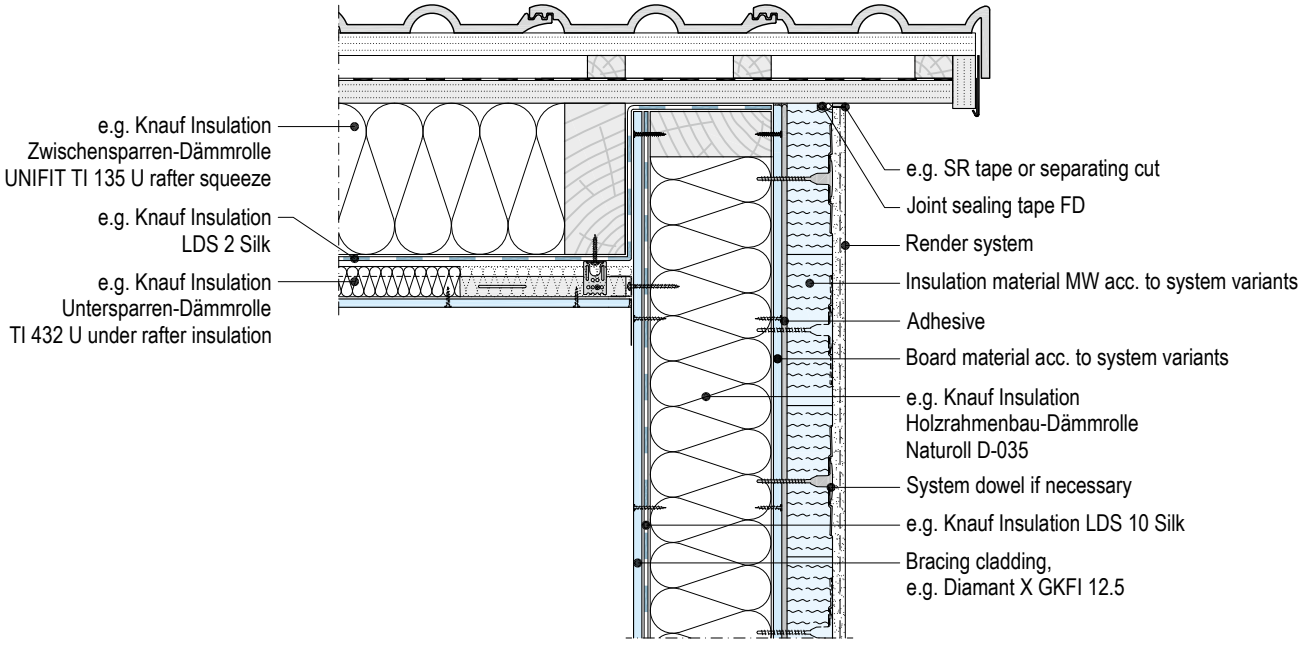
Scale 1:10 I Dimensions in mm

### WE202.de-DA-V6 Pitched roof connection to rising wall

With metal connection mesh profile




### WE202.de-DA-V5 Bargeboard connection

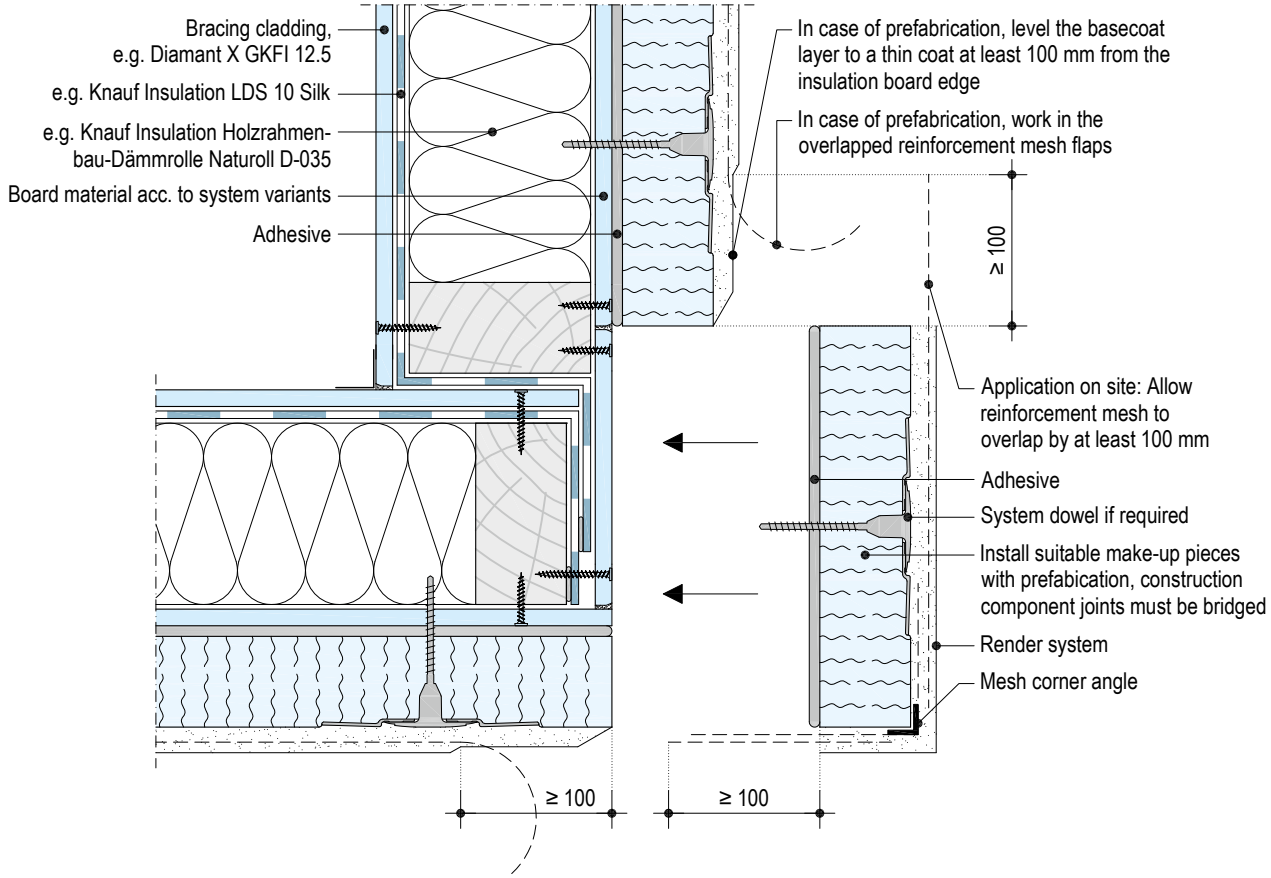



| Note | Observe guideline “Metallanschlüsse an Putz und Wärmedämm-Verbundsysteme - *Metal connections to render and external thermal insulation composite systems*”, (German only) from the Fachverband der Stuckateure für Ausbau und Fassade Baden Württemberg, Germany as well as the DIN 18531. |
|---|---|

## Connection to building corner

Scale 1:5 I Dimensions in mm

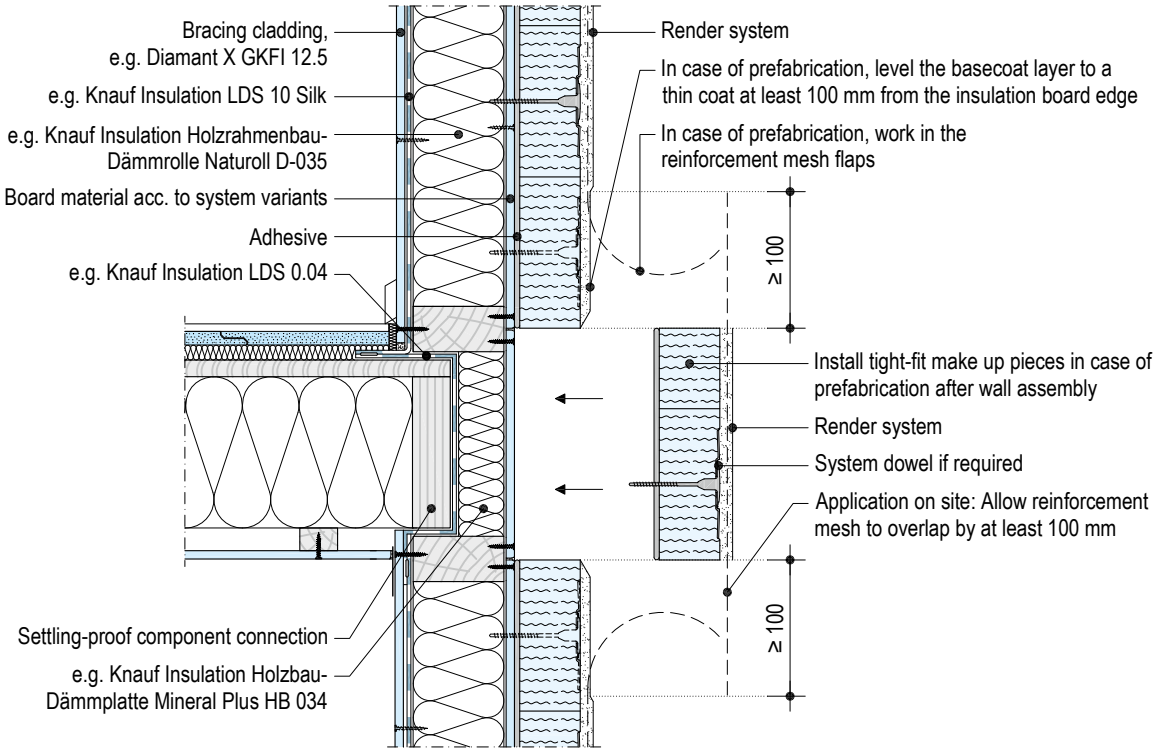
### WE202.de-EX-H1 Connection to building corner




## Junction between stories

Scale 1:10 I Dimensions in mm

### WE202.de-EX-V1 Connection to junction between stories

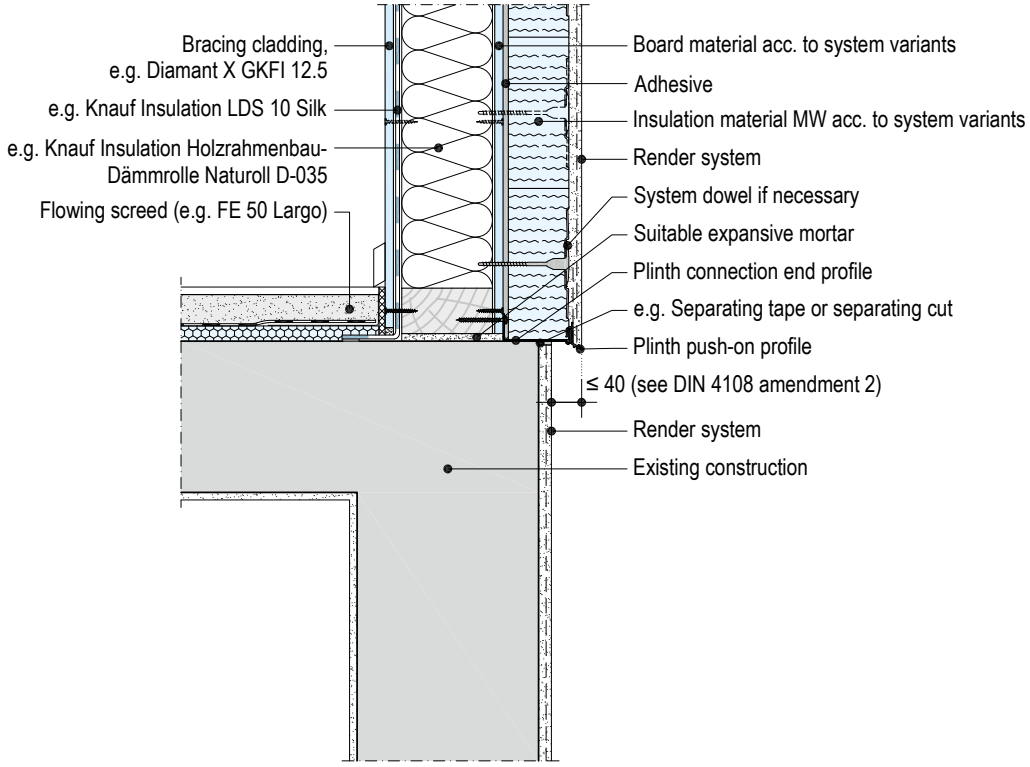


## Vertical extension

Scale 1:10 I Dimensions in mm

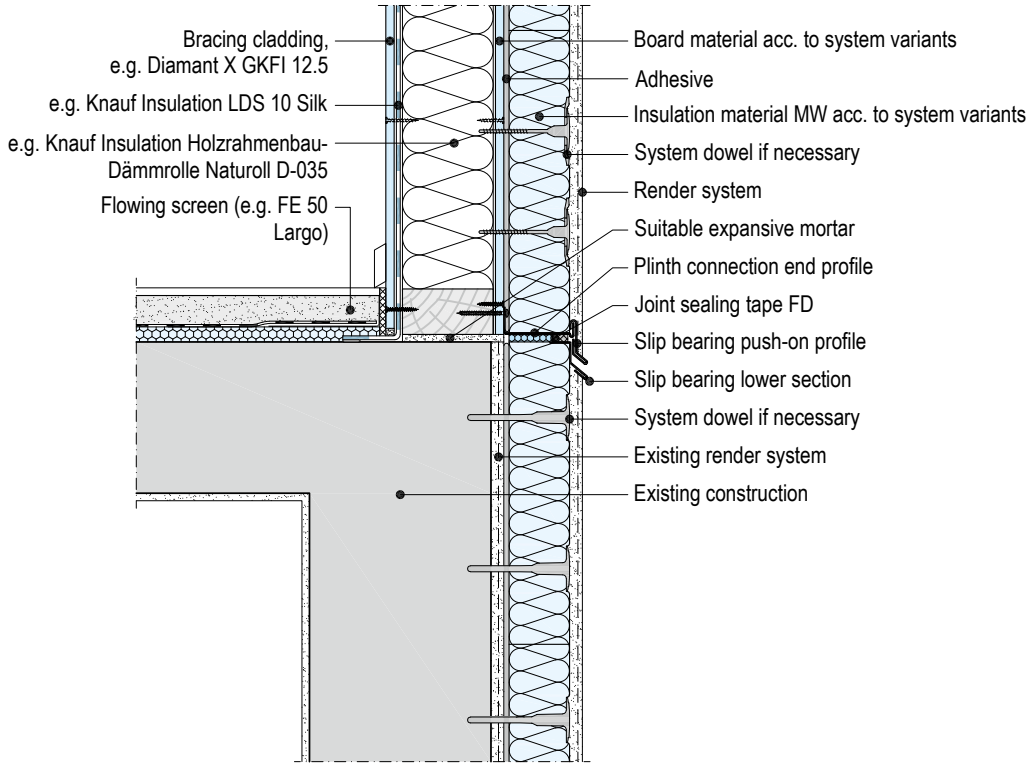
### WE202.de-EX-V2 Vertical extension on existing storey

Existing building not remodelled, up to building class 3




### WE202.de-EX-V3 Vertical extension on existing storey

Existing building remodelled, up to building class 3

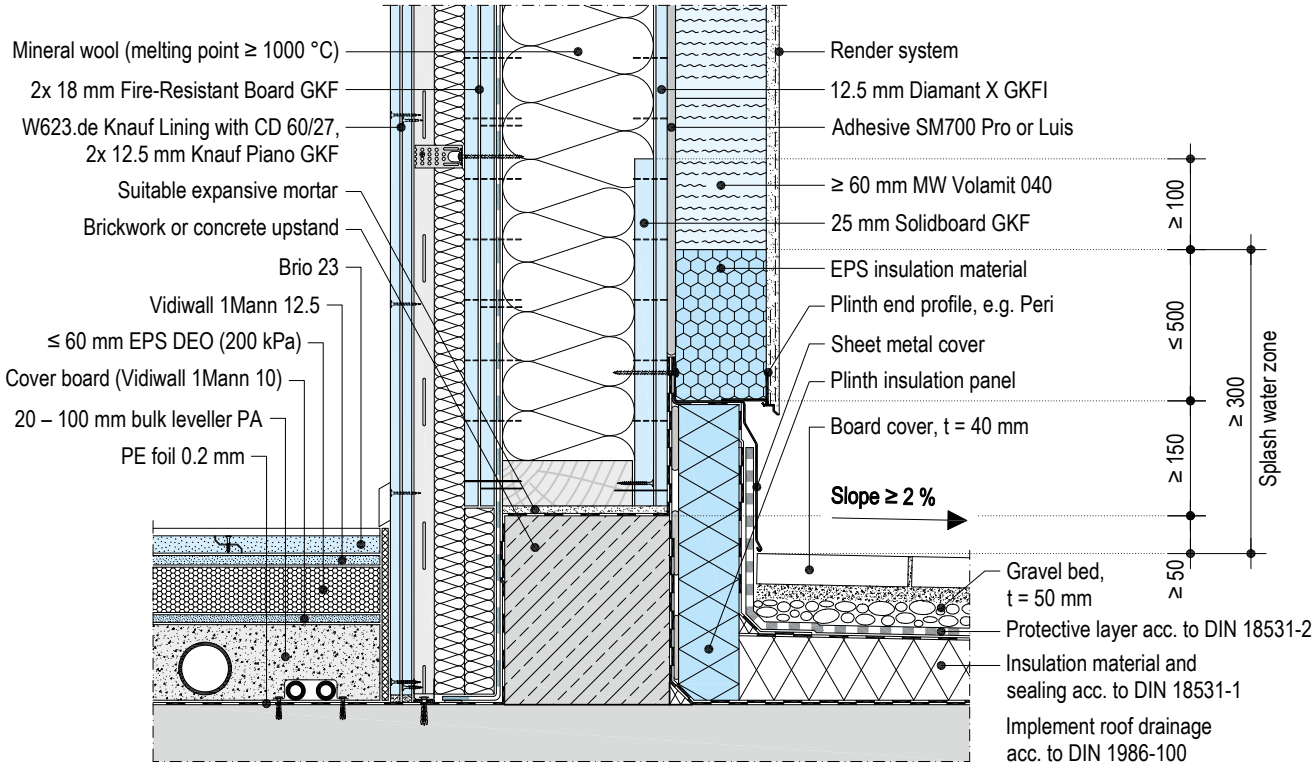


## Vertical extension (continuation)

Scale 1:10 I Dimensions in mm

### WE202.de-EX-V4 Recessed vertical extension on existing storey

Staggered storey with fire protection encasement $K_2$60 (cladding criteria) in building class 4




**plus** **Extension of the fire resistance proof of usability**
Prior consultation in acc. to page 4 recommended

| | |
|---|---|
| **Note** | Observe the DIN 18531, DIN 18533, DIN 1986-100 as well as the DHV leaflet “Praxisgerechte Sockelausbildung - practical plinth design of the German association Deutschen Holzfertigbau-Verbandes e. V. |

## Preconditions

Protect the insulation material against moisture.

All connections and detail features must be clarified before application.

All substrates must be stable, dry and even and feature a bond strength of at least ≥ 0.08 N/mm$^2$. For this purpose, bond strength tests of the adhesive to be used on the board material must be performed after storage in climatic chambers. The existing coatings need to be professionally assessed for their permanent compatibility with the adhesive.

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.
Unevenness up to 10 mm may be covered.

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 oin 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).

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 |
| Pastol Dry | RITMO L plus | B4-2L | Ø 25 mm | Up to 20 m |
| | G4 | D3-4 | Ø 25 mm | Up to 25 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 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.net

## Insulation material – bonding

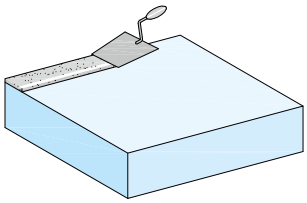
### Adhesive side of the insulation materials

Use for bonding the marked or non-compacted side of the insulation material. Bond the non-coated side in case of one side coated insulation panels.

### Manual adhesive application on insulation panel

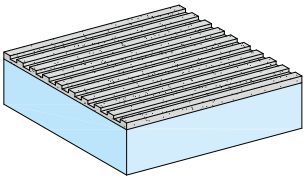
#### Surface press filling

This is undertaken manually and must always be done if the insulation panel is not coated on the adhesive side. If the insulation panel is coated on one side, the coated side always faces outwards and is coated in the system with a basecoat. Press on a thin layer of adhesive with pressure before applying more adhesive. In a second work step, apply adhesive wet on wet to the insulation panel.



#### Full-surface bonding

On even substrates, it is possible to apply the adhesive mortar on the entire surface of the insulation panel with a notched trowel.



### Machine applied adhesive application on substrate

#### Full-surface bonding

Alternatively, the adhesive can be applied to the full surface directly on even substrates. Apply the insulation panels immediately by pushing, floating and pressing. Only apply a maximum of 3 m of adhesive mortar in advance. Run a notched trowel through the adhesive directly before applying the insulation panels.

| | |
|---|---|
| **Notes** | The insulation panel edges may not be coated or soiled to avoid thermal bridges. No adhesive may be applied to the joints.<br>The insulation panels may be held in place in addition to the fixation by using suitable mechanical fasteners (e.g. stainless steel broadback staples).<br>Please ensure that the setting process of the adhesive is not affected by dynamic effects. |

### Plinth and splash water zone

Inspect / supplement the building waterproof sealing before insulation work. The insulated plinth insulation panels with plinth splash water zone must be up to a height of at least 300 mm above ground level insulation panels.

Adhesively bond plinth insulation panels with 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 board 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 boards and plaster system in the plinth area see page 48 to 63.

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 or wood and wood frame construction*” from the German Informationsvereins Holz e. V.

## Insulation material – application

The substrate 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 temperature must be ≥ 0 °C when placing a dowel.

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 62). Peri plinth connection profile is inserted between the perimeter insulation and the façade insulation panel.

Apply insulation boards immediately to the fresh adhesive by pushing, floating and pressing. Apply the insulation boards precisely and continuously starting from the bottom with the joints staggered at ≥ 100 mm (half board length recommended for joint staggering).

Avoid cross joints, e.g. on opening corners. At corners of openings (windows, doors), the insulation boards are to be laid in such a way that the butt joints are preferably not present in the immediate corner. Adhesive bonding of insulation panels up to a thickness of 200 mm without corner grooving is possible.

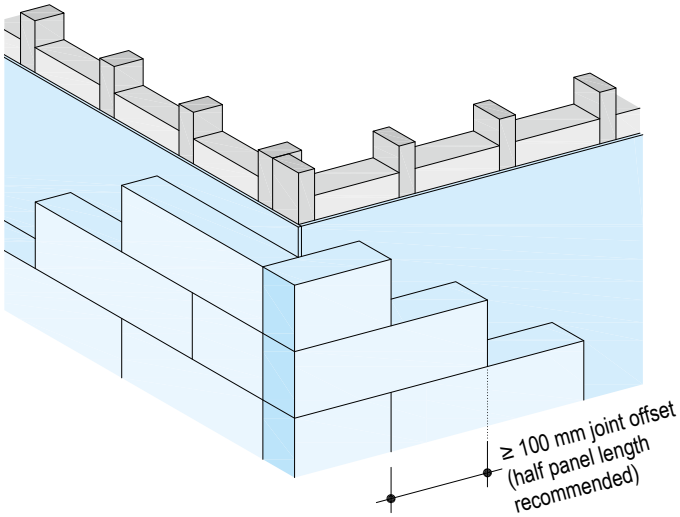
Adhesive may not be applied to the insulation panel joints. Open joints must be filled. Joints up to 5 mm in width can be filled with B1 foam, panel joints > 5 mm or skips can be cleanly sealed using equivalent insulation material strips.

The mineral wool insulation materials boards 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. 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.

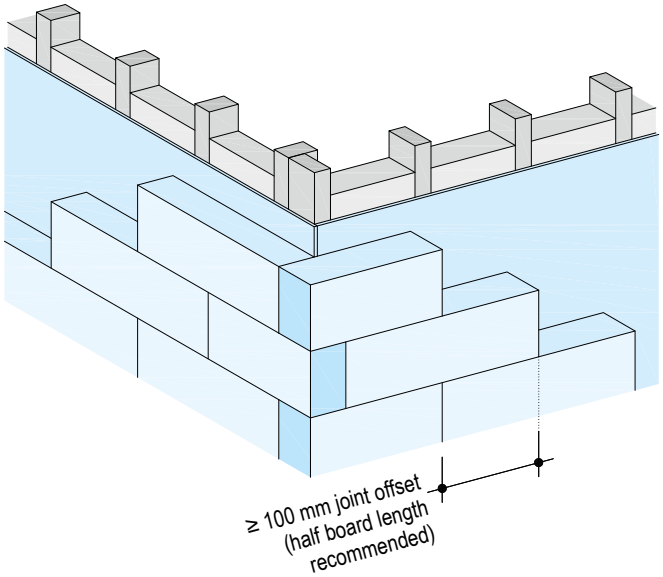
Allow a setting time of at least 48 hours before continuing work.

### Corner configuration

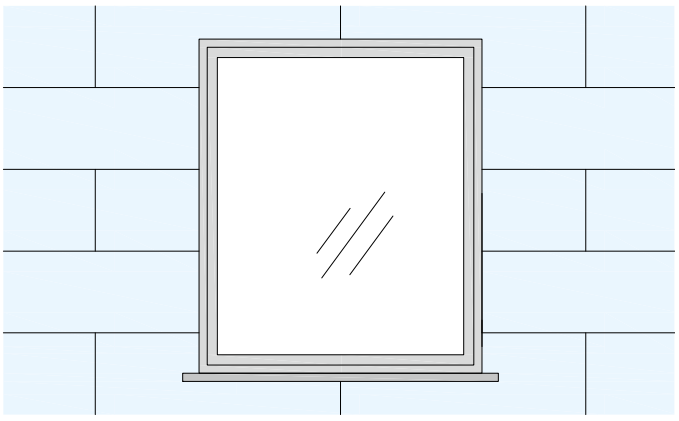
**Up to 200 mm insulation material thickness without corner grooving**




**More than 200 mm with corner grooving**




### Window and door openings



Avoid cross joints

## Insulation material – Section sizes without area boundary joints

Surface flush dowel installation

| Insulation material | Insulation material thickness | Plaster system thickness | Maximum section size | Maximum weight of the plaster system (wet) |
|---|---|---|---|---|
| MW Wolle 035 plus M2 | > 200 mm | > 9 mm | 7.5 m x 7.5 m | 30 kg/m² |
| | | > 9 mm | 10 m x 12 m | 22 kg/m² |
| | | ≤ 9 mm | 50 m x 25 m | 22 kg/m² |

## Insulation material – Dowelling

The substrate must be sufficiently stable to allow the use of dowels. Insulation materials must be structurally fastened with approved dowels. The scheme overview on page 19 indicates which dowelling is necessary as well as the number of dowels.

The number of dowels can be taken from the tables on page 21 to 27. The wind loads can be read off using the simplified method on page 20. The wind loads can also be determined acc. to EN 1991-1-4 and EN 1991-1-4/NA. Unless otherwise specified in the system approvals, the arrangement of the dowels on the exterior walls must comply with appendix A of the DIN 55699:2017-08.

Apply 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. The anchoring depth is at least 35 mm in all cases in solid wooden substrates or at least the thickness of the board material in case of screwed-through design including at protrusion of at least 10 mm. Other fasteners not specified in the National Technical Approval / type approval Z-33.47-899 are not permissible.

In case of dowel placement just on the surface, the minimum spacing of the dowel shaft to the edge of the panel is 150 mm and to the other dowel shafts 200 mm. The dowels must be evenly distributed across the surface.

The substrate temperature must be ≥ 0 °C when placing a dowel. The exposure to UV light with direct exposure to sunlight for the dowel and insulation panel may not exceed 6 weeks.

### Dowels under the mesh

Dowelling can commence after the adhesive has dried sufficiently. The dowel patterns on page 49 to 57 must be considered.

### Dowels through the mesh

The dowel must be set in the fresh basecoat layer after the application of the basecoat and the embedding of the reinforcing mesh. Then immediately (wet plaster on wet plaster) apply a second layer of basecoat. The dowels must be evenly distributed across the surface.

### MW Wolle 035 plus L
### MW Wolle 035 plus LX
### MW Wolle 035 plus M2

In addition to adhesive bonding the insulation panels will generally require dowelling. Installation can be surface flush under the mesh. When dowelling through the reinforcement mesh, the dowels can only be placed on the surface. When using screw dowels with additional Dübelteller VT 2G and STR-Rondelle MW dowel plates, installation can be surface flush or as a recessed installation. Use of additional dowel plates / rondelles with a diameter of 90 mm can lead to a reduction in the number of dowels.

Fastening to the approved board materials can be undertaken independently of the studs as with solid wood substrates.

### MW Volamit 040

Constructive dowelling with 4 dowels/m² is recommended for mineral wool lamellae that are only glued for wind loads ≤ 1.59 kN/m². If the wind load is ≥ 1.6 kN/m², the mineral wool lamella must always be dowelled in addition to glued, see overview on page 19. In case of dowelling under the mesh reinforcement an additional dowel plate (diameter 140 mm) must be used.

In case of additional anchoring on board materials the anchoring may not be undertaken in solid wood.

### Dowelling in the board material

Schraubdübel STR H A2 dowel may only be used for anchoring on cementitious particle boards acc. to DIN EN 13986 (DIN EN 634-2) and DIN 20000-1 or used acc. to the abZ. The density of the cementitious particle boards must be at least 1300 kg/m³ and the thickness must be at least 16 mm. Here the glueing of MW Volamit 040 using Luis adhesive may only be for board materials with a homogenous surface made of the finest particles. The dowels must be screwed in so that the cutting point must protrude by at least 10 mm beyond the wooden board material. The wooden composite boards used as cladding for wall panels must be connected to the spars of the wall panels in such a way that the rated value of the withdrawal capacity of this connection is at least equal to the rated value of the withdrawal capacity of the screw anchors attached to the wooden composite boards.

### Selection of the installation method

The selection depends on a number of factors. It is necessary to consider the insulation panel selected, the insulation thickness, the existing substrate and the wind load. See page 19 to 28.

### Plinth and splash water zone

Apply additional constructional, mechanical fixing of the plinth insulation boards 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).

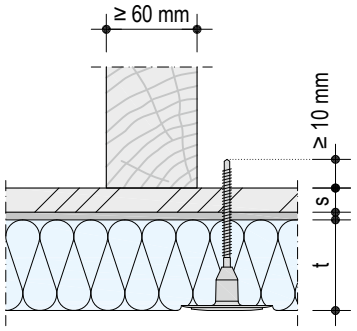
## Insulation material – Dowelling (continuation)

**Dowel**

Scheme drawings

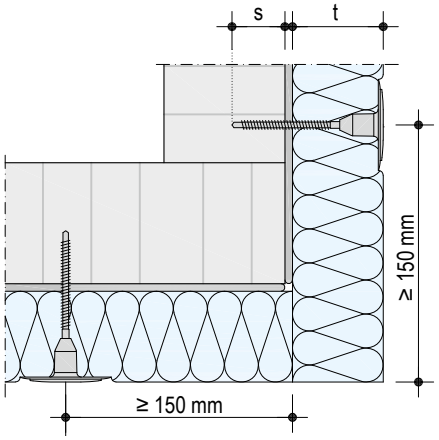
**Schraubdübel STR H A2 dowel** (acc. to abZ)

**Timber frame construction**




The anchoring is undertaken independently of the studs.

**Solid wooden substrate**




Dowel arrangement in the board surface:

- Permissible spacing of the dowel shaft to the panel edge: ≥ 150 mm
- Permissible spacing between the dowel shafts: ≥ 200 mm

*t = insulation material thickness*

*S = anchoring depth ≥ 35 mm or ≥ thickness of panel material (+ minimum 10 mm)*

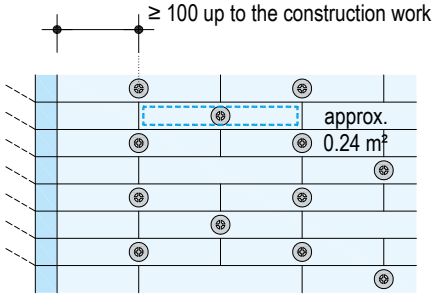
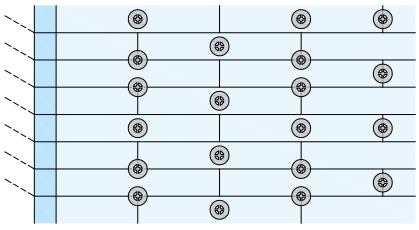
The EN 1995-1-1 and EN 1995-1-1/NA apply for the required perimeter spacings.

## Panel format 1200 mm x 200 mm

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **3** dowels/m² |   | **5** dowels/m² |  |

Dowel ratings online see: knauf.de/duebelrechner.

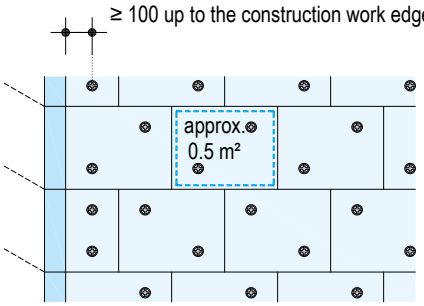
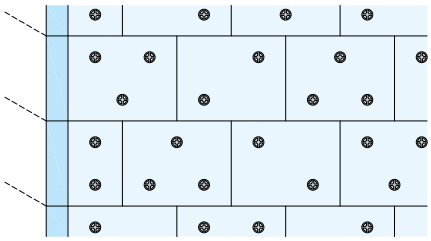
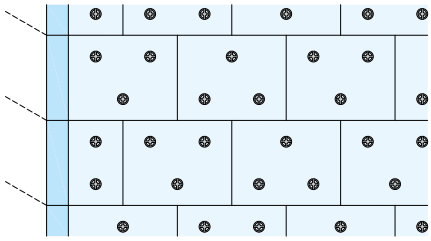
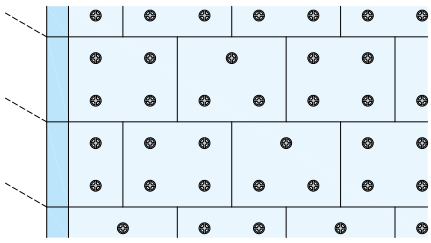
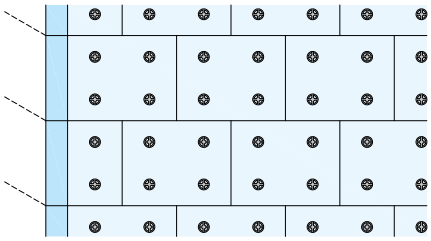
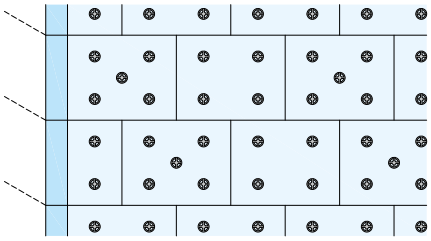
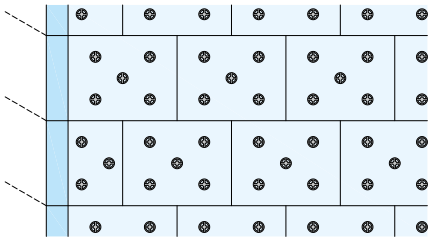
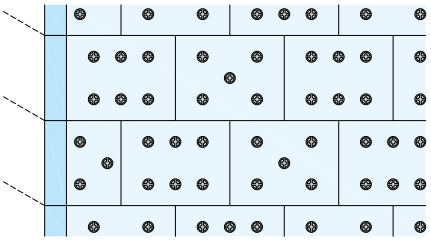
| | |
|---|---|
| **Notes** | The dowel spacing to the panel edge of ≥ 150 mm must be observed.<br>The dowels must be evenly distributed across the panel surface.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 800 mm x 625 mm

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **4** dowels/m² |  | **5** dowels/m² |  |
| **6** dowels/m² |  | **7** dowels/m² |  |
| **8** dowels/m² |  | **9** dowels/m² |  |
| **10** dowels/m² |  | **11** dowels/m² |  |

Dowel ratings online see: knauf.de/duebelrechner.

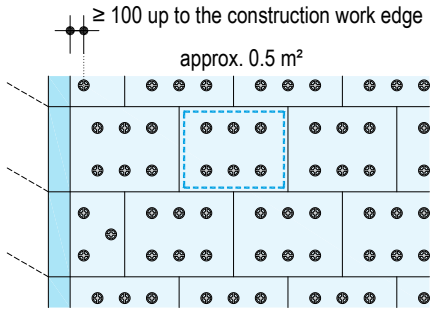
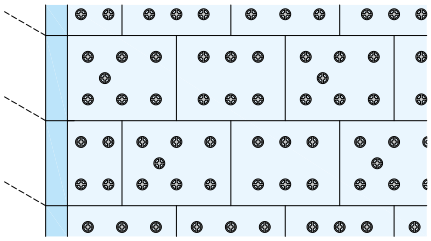
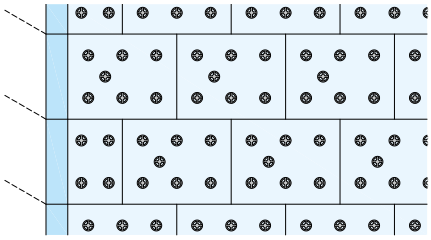
| Notes | |
|---|---|
| | The dowels placed in the insulation panel surface must exhibit a minimum spacing of the dowel shaft to the panel edge of 150 mm and 200 mm to the other dowel shafts.<br>The dowels must be evenly distributed across the panel surface.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 800 mm x 625 mm (continuation)

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **12** dowels/m² |  | **13** dowels/m² |  |
| **14** dowels/m² |  | | |

Dowel ratings online see: knauf.de/duebelrechner.

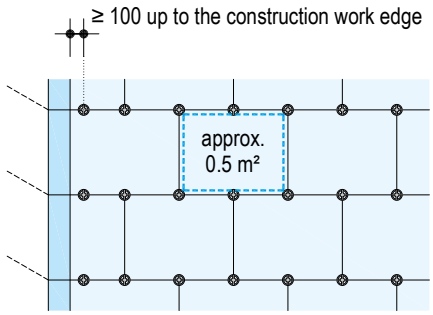
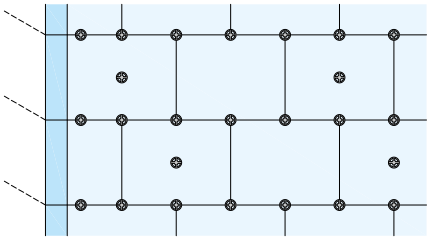
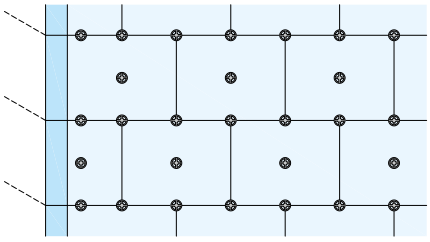
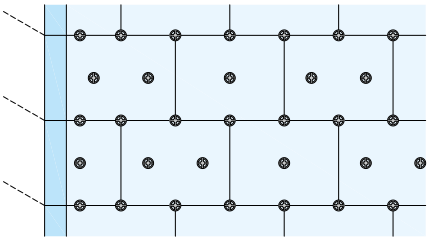
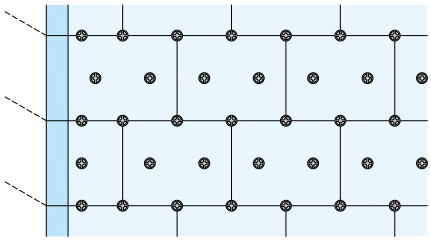
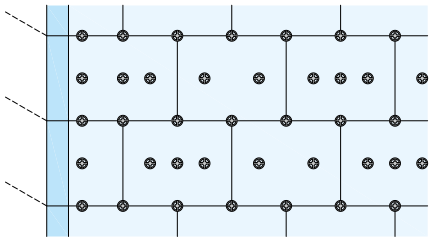
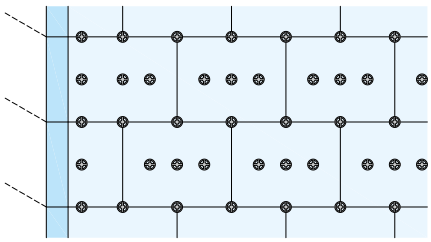
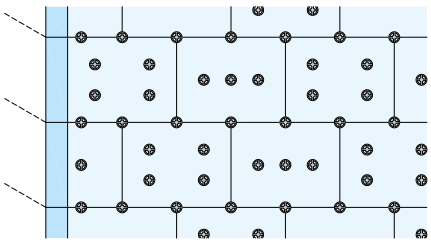
| Notes | |
|---|---|
| | The dowels placed in the insulation panel surface must exhibit a minimum spacing of the dowel shaft to the panel edge of 150 mm and 200 mm to the other dowel shafts.<br>The dowels must be evenly distributed across the panel surface.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 800 mm x 625 mm (continuation)

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **4** dowels/m² |  | **5** dowels/m² |  |
| **6** dowels/m² |  | **7** dowels/m² |  |
| **8** dowels/m² |  | **9** dowels/m² |  |
| **10** dowels/m² |  | **11** dowels/m² |  |

Dowel ratings online see: knauf.de/duebelrechner.

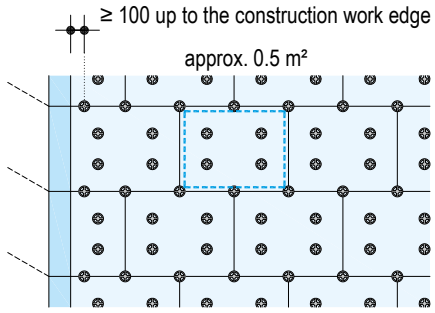
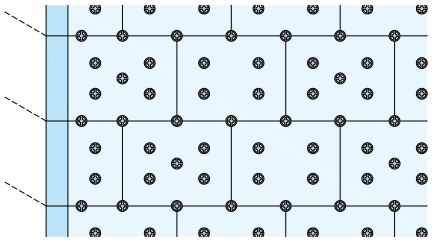
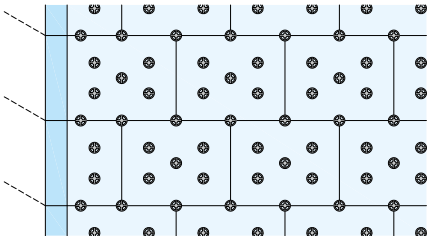
| Notes | |
|---|---|
| | The axial spacing of the dowels to one another of ≥ 200 mm must be retained.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 800 mm x 625 mm (continuation)

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **12** dowels/m² |  | **13** dowels/m² |  |
| **14** dowels/m² |  | | |

Dowel ratings online see: knauf.de/duebelrechner.

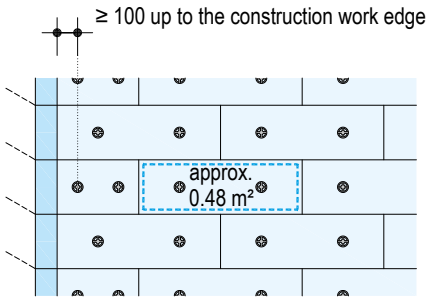
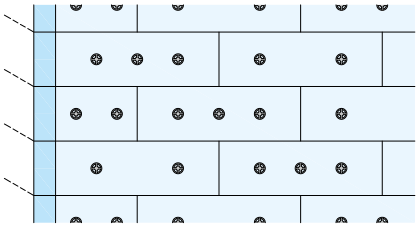
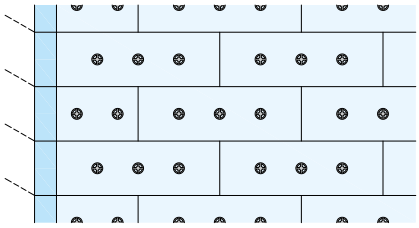
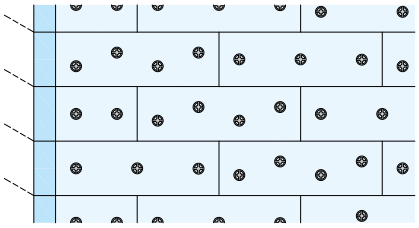
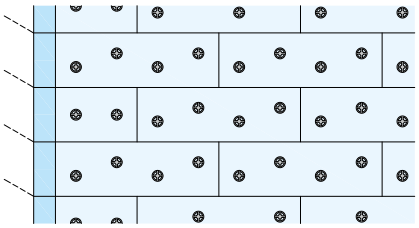
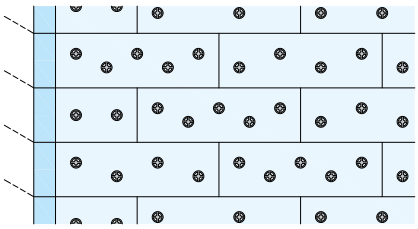
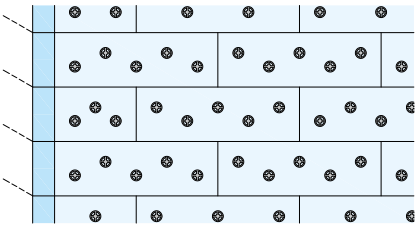
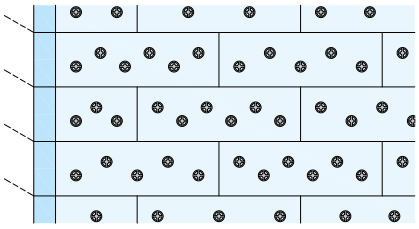
| Notes | |
|---|---|
| | The axial spacing of the dowels to one another of ≥ 200 mm must be retained.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 1200 mm x 400 mm

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **4** dowels/m² |  | **5** dowels/m² |  |
| **6** dowels/m² |  | **7** dowels/m² |  |
| **8** dowels/m² |  | **9** dowels/m² |  |
| **10** dowels/m² |  | **11** dowels/m² |  |

Dowel ratings online see: knauf.de/duebelrechner.

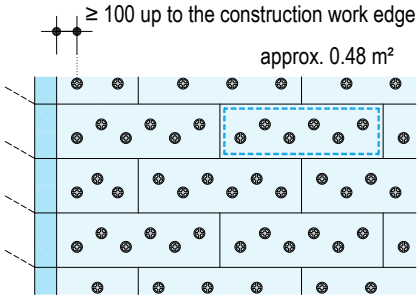
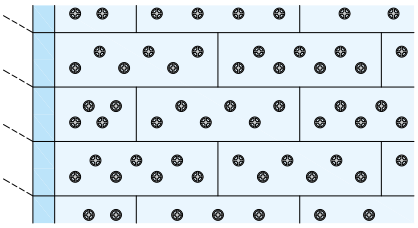
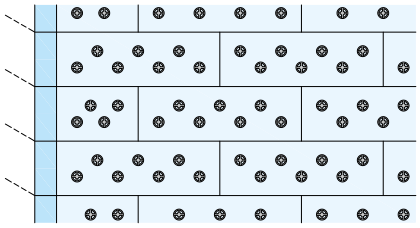
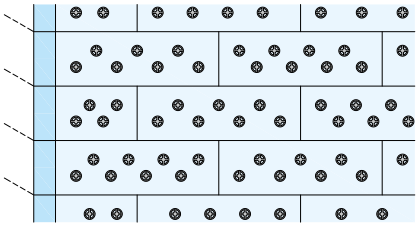
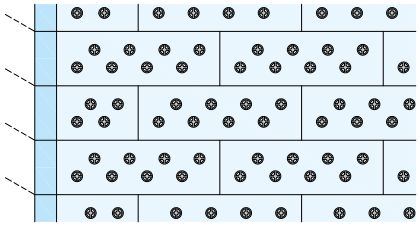
| | |
|---|---|
| **Notes** | The dowels placed in the insulation panel surface must exhibit a minimum spacing of the dowel shaft to the panel edge of 150 mm and 200 mm to the other dowel shafts.<br>The dowels must be evenly distributed across the panel surface.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 1200 mm x 400 mm (continuation)

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **12** dowels/m² |  | **13** dowels/m² |  |
| **14** dowels/m² |  | **15** dowels/m² |  |
| **16** dowels/m² |  | | |

Dowel ratings online see: knauf.de/duebelrechner.

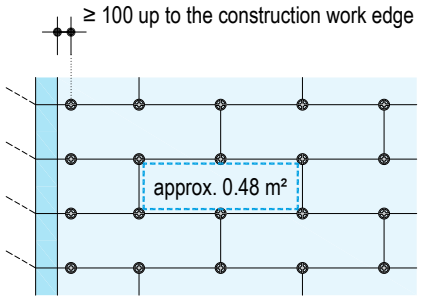
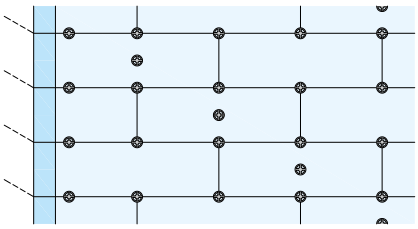
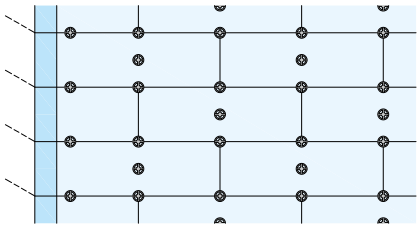
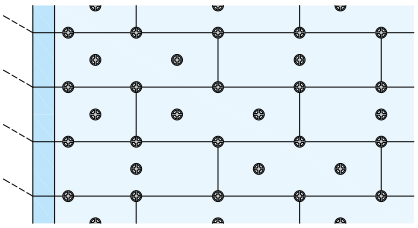
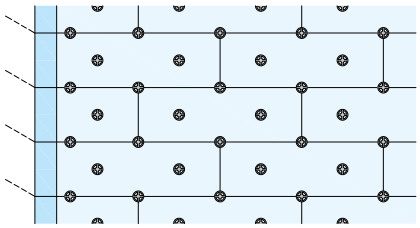
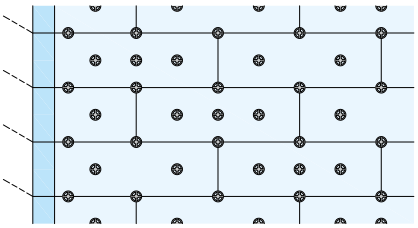
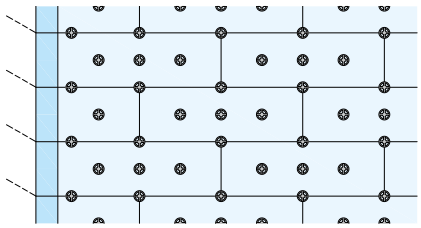
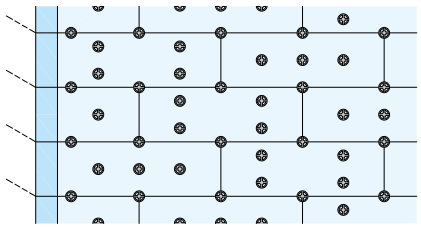
| | |
|---|---|
| **Notes** | The dowels placed in the insulation panel surface must exhibit a minimum spacing of the dowel shaft to the panel edge of 150 mm and 200 mm to the other dowel shafts.<br>The dowels must be evenly distributed across the panel surface.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 1200 mm x 400 mm (continuation)

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **4** dowels/m² |  | **5** dowels/m² |  |
| **6** dowels/m² |  | **7** dowels/m² |  |
| **8** dowels/m² |  | **9** dowels/m² |  |
| **10** dowels/m² |  | **11** dowels/m² |  |

Dowel ratings online see: knauf.de/duebelrechner.

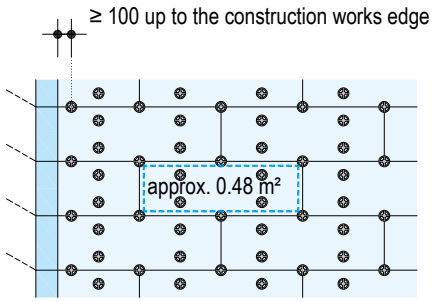
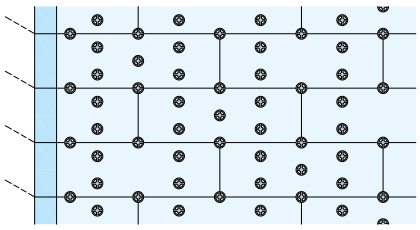
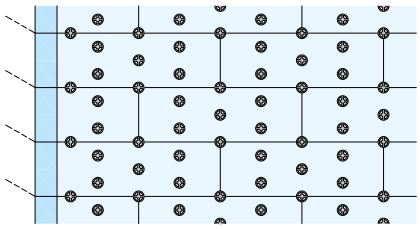
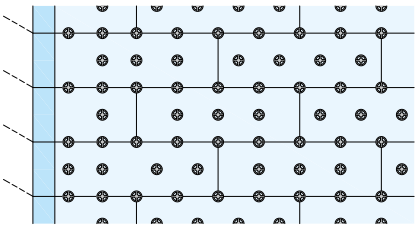
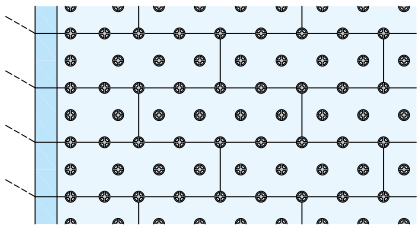
| Notes | |
|---|---|
| | The axial spacing of the dowels to one another of ≥ 200 mm must be retained.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |

## Panel format 1200 mm x 400 mm (continuation)

Scheme drawings I Dimensions in mm

**Surface flush dowelling under the mesh** following the Certificate of Usability Z-33.47-899

**Dowel arrangement in the board surface**

| Number of dowels | Dowel arrangement | Number of dowels | Dowel arrangement |
|---|---|---|---|
| **12** dowels/m² |  | **13** dowels/m² |  |
| **14** dowels/m² |  | **15** dowels/m² |  |
| **16** dowels/m² |  | | |

Dowel ratings online see: knauf.de/duebelrechner.

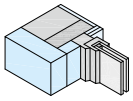
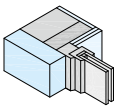
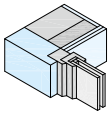
| Notes | The axial spacing of the dowels to one another of ≥ 200 mm must be retained.<br>Dowel scheme for dowel application through the mesh see DIN 55699:2017-08. |
|---|---|

## 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 |
| Roma | With shadow gap, two-part profile 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 | 240 | 240 | – | 240 | 240 | – | 240 | 240 | – |
| Duo G6 | B | 240 | 240 | – | 240 | 240 | – | 240 | 240 | – |
| Milano | A | 240 | 240 | – | 240 | 240 | – | 240 | 240 | – |
| Universal Pro | A | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 |
| Roma | A | 240 | 240 | – | 240 | 240 | – | 240 | 240 | – |

**Notes**

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

When using window connection profiles, the current 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 to windows and roller shutters in rendering, external thermal insulation composite system and drywalling" (German only) must be observed.

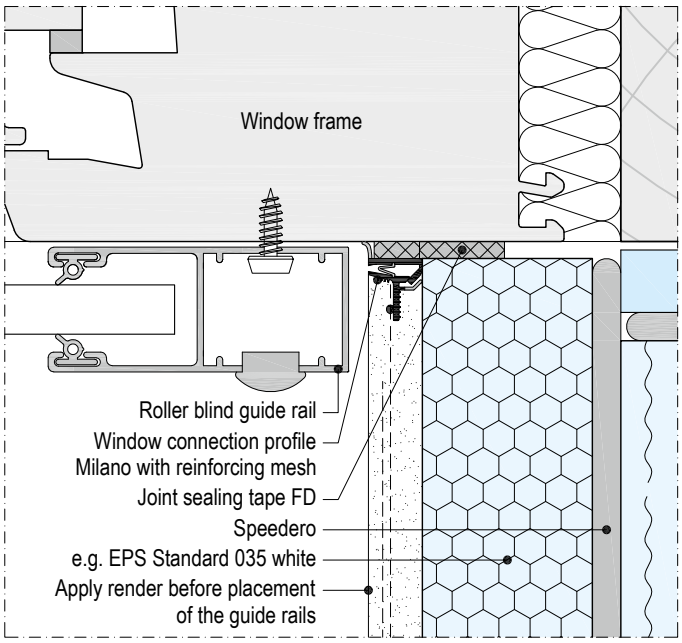
For coloured metal and plastic windows, the use of profiles with high shear resistance (higher movement class, e.g. instead of class B → class A) is recommended.

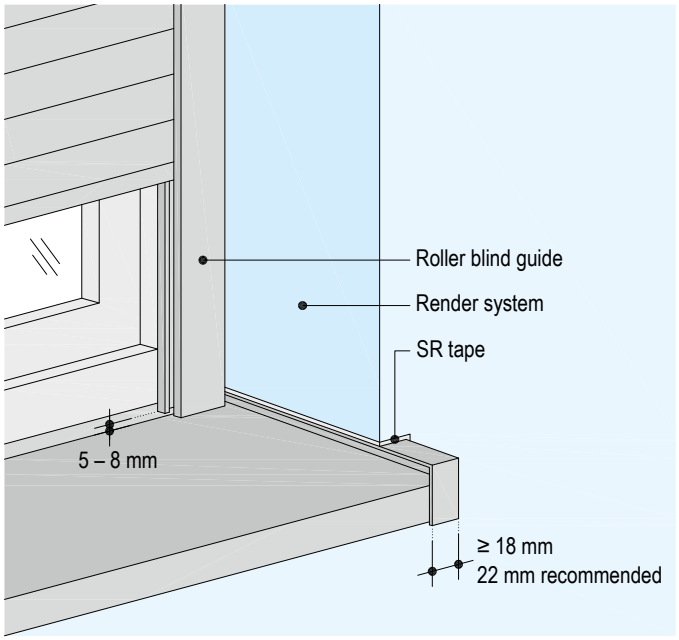
### Use of adhesively bonded window connection profiles

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)

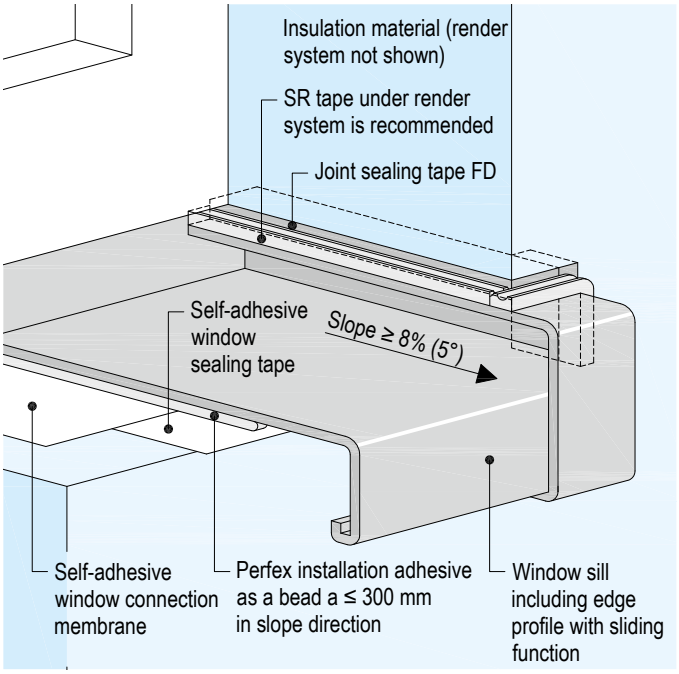
### Window connection with roller blind guide rails




Scheme drawings

### Connection to window sill side section

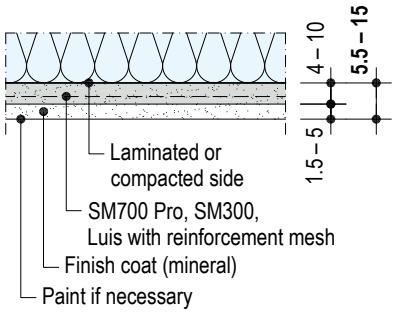



Example: Application in conjunction with a second water channelling level

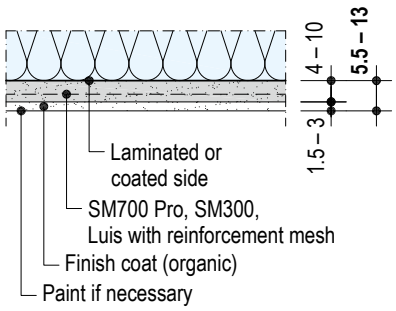
## Applied render system

Dimensions in mm

**Mineral based**




**Mineral / organic**




## Reinforcement (basecoat) layer

### Façade reinforcement

| System | Basecoat | Layer thickness | Reinforcement mesh | Mesh arrangement in the reinforcement layer | Mesh reinforcement joint overlap |
|---|---|---|---|---|---|
| Mineral based<br>Mineral / organic | SM700 Pro | 5 – 10 mm | 4x4 mm or 5x5 mm | ■ Up to 4 mm: at centre<br>■ > 4 to 7 mm: upper half<br>■ > 7 mm: in the upper third | ≥ 100 mm |
| | SM300 | 5 – 7 mm | | | |
| | Luis | 4 – 5 mm | | | |

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

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

| Finish coat | Graining | Luminosity of the finish coating<br>Siliconharz-EG-Farbe paint, Autol, Fassadol, Minerol, MineralAktiv Fassadenfarbe paint | | | Autol TSR[1]<br>Fassadol TSR[1] |
|---|---|---|---|---|---|
| | 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 | ● | ● | ● | – |
| Conni S, Addi S | 1.5 – 3.0 | ● | ● | ● | ● |

*1) Functionality only on white, newly created finish 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)

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 basecoat layer. Apply a full covering of basecoat to the mesh.

The mesh is arranged in the centre when the basecoat thickness is up to 4 mm, for > 4 to 7 mm layer thickness it is in the upper half of the basecoat layer and for > 7 mm in the exterior third.

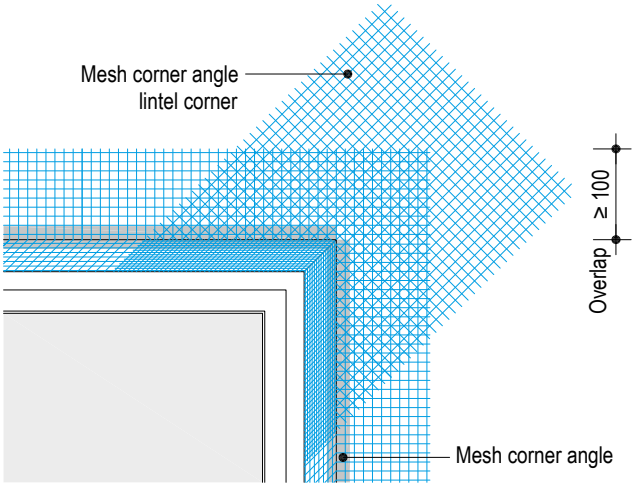
If a double reinforcement is necessary (see table on page 60), the lower reinforcing mesh is applied with a respective overlap of approx 100 mm in the first basecoat layer of 2 to 3 mm without creases. After the basecoat layer has hardened, the second basecoat mesh is embedded with a joint overlap of ≥ 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 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.
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

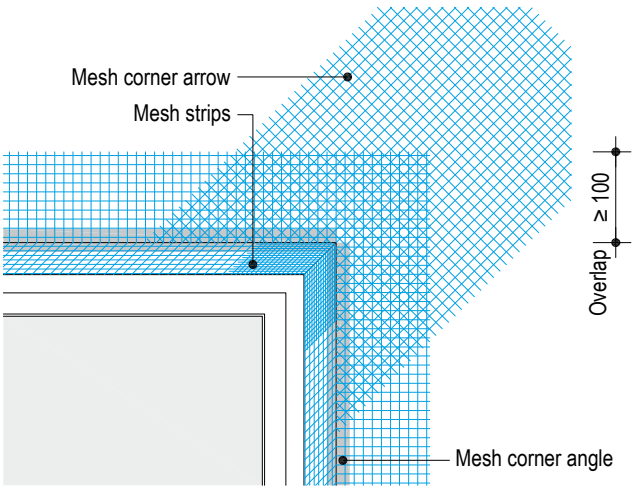
Dimensions in mm

**Image 1**




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

**Image 2**




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

### Basecoat drying time

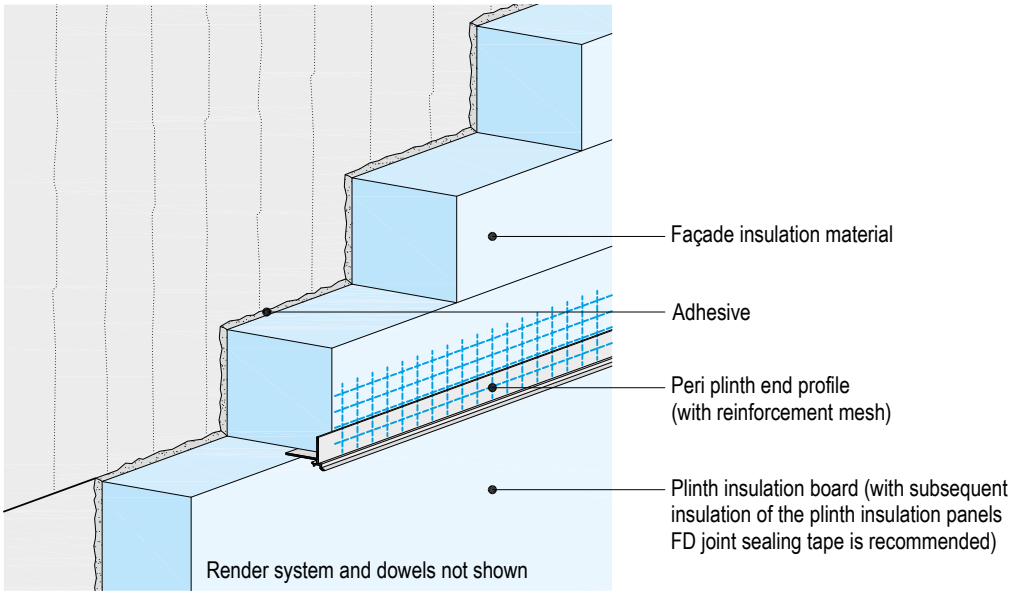
Before application of a further coating (primer/basecoat) it is important to ensure that the basecoat is fully dry. The minimum drying time is generally approx. 1 day/mm layer thickness. With unfavourable weather conditions (e.g. high levels of air humidity or low temperatures) the drying time is extended, 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 preferably at 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 materail, push in the Peri plinth connection profile between the perimeter / plinth insulation or Peri installation rail and the façade insulation, 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. In case of Conni and Addi on SM700 Pro, SM300 and Luis: 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 – 5 |
| 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 | 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) at a total thickness ≥ 7 mm.*
2) *Only in conjunction with Sockel-SM as a basecoat.*

## Final coat (continued)

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.

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).

The 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 full 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**

Apply SM700 Pro for sponged surfaces with a layer thickness of approx. 3 mm to the basecoat. The drying time of the basecoat can be reduced to 1 day if the basecoat layer is applied with SM700 Pro. Start sponging or free texturing with initial setting of the SM700 Pro.

**MineralAktiv Scheibenputz 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 final coat must be mixed thoroughly. When necessary, a small quantity of water may be added to set the application consistence. 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**

After the top coat in the area contacting the soil has dried, apply moisture protection. For this purpose, the Sockel-Dicht is applied in two layers in a minimum thickness of 2.5 mm, commencing with the building sealing (overlapping approx. 50 mm to 100 mm) up to at least 50 mm above the edge of the ground line over the perimeter/plinth insulation panels and the subsequent finish coat.

**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.

## 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 a fleece laminated dimpled sheet up to the edge of the ground line is recommended.

## 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

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.

For finsih coats Noblo and Conni S a paint coat of Siliconharz-EG-Farbe paint is required.

Apply a thin and even paint coat crosswise without joints on the fully hardened and dried final 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/leitfaden.<br>Observe the Code of Practice "Egalisationsanstriche auf Edelputzen – Farbtonegalisierende Beschichtung - Equalization coats on finishing plasters”, see also vdpm.info/services/downloads/broschueren-und-merkblaetter. |

## 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 DIN 18550-1 standard. 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 (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 to 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<br>WE202a.de Mineral based | WE202c.de Mineral / organic |
|---|---|---|---|---|---|---|
| **Bonding layer** per m² plinth, e.g. on bituminous waterproof sealing | | | | | | |
| ●[1] | | Sockel-Dicht | Full surface application | kg | 3.8 | |
| **Adhesive** per m² | | | | | | (100 % adhesive area ratio) |
| ● | ● | SM700 Pro | Full surface notched trowel surface | kg | 4.5 | |
| ● | ● | SM300 | | kg | 4.3 | |
| ● | | Sockel-SM | | kg | 8.0 | |
| ●[2] | | Sockel-SM Pro | | kg | 8.0 | |
| | ● | Luis | | kg | 3.5 | |
| | ● | Pastol Dry | | kg | 2.4 | |
| **Insulation material** per m² | | | | | | |
| ● | | Plinth insulation board | Insulation material thickness: Up to 240 mm → Integration into the soil: Up to 3 m | m² | 1 | |
| | ● | MW Volamit 040 | Thickness 60 – 200 mm | m² | 1 | |
| | ● | MW Wolle 035 plus L | Thickness 60 – 200 mm | m² | 1 | |
| | ● | MW Wolle 035 plus LX | Thickness 80 – 200 mm | m² | 1 | |
| | ● | MW Wolle 035 plus M2 | Thickness 60 – 240 mm | m² | 1 | |
| **Plinth connection** per m | | | | | | Only with recessed plinth |
| | ● | Plinth connection profile | Projection of 30 to 240 mm | m/m | 1 | |
| | ● | Plinth profile | Plinth profile with drip edge and reinforcement mesh for layer thickness 6 mm, 10 mm or 4 mm | m/m | 1 | |
| | ● | Assembly kit plinth end profiles | Fasteners | Set/m | 0.04 | |
| | ● | Peri plinth end profile | Max. layer thickness 7 mm | m/m | 1 | |
| | ● | Peri installation rail | Plastic profile for supporting Peri plinth connection profile, projection of 50 to 200 mm | m/m | 1 | |
| | ● | Peri extension | Broadening with insulation thickness > 200 mm | m/m | 1 | |
| **Dowel** per m² façade insulation material[3] | | | | | | |
| ● | | Schlagdübel CNplus 8 insulation anchor nail | Anchoring depth s ≥ 35 mm, ≥ 55 mm for categories D and E | pcs. | 2 dowels per plinth insulation board 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 A2 dowel | Anchoring depth s ≥ 35 mm or ≥ thickness of board material (+ 10 mm projection) | pcs. | Number of dowels[3] dependent on the wind load, see tables on page 21 to 27 | |

*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 board.*

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

| Plinth | Façade | System components | | Remark | Unit | Quantity as average value WE202a.de Mineral based | WE202c.de Mineral / organic |
|---|---|---|---|---|---|---|---|
| **Dowel** per m² façade insulation material | | | | | | | |
| | ● | Dowel plate SBL 140 plus | | For anchoring of MW Volamit 040 | pcs. | Number of dowels dependent on the wind load, see tables on page 21 to 27 | |
| | ● | Dübelteller VT 2G dowel plate | | For surface flush recessed anchoring of MW panels | | | |
| **Basecoat** per m² | | | | | | | |
| ● | ● | SM300 [1] | | Layer thickness 5 – 7 mm | kg | 7.6 – 10.5 | 7.6 – 10.5 |
| ● | ● | SM700 Pro | | Layer thickness 5 – 10 mm | kg | 7.0 – 13.0 | 7.0 – 13.0 |
| ● | | 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 |
| | ● | Luis | | Layer thickness 4 – 5 mm | kg | 7.2 | 7.2 |
| **Reinforcement mesh** per m² | | | | | | | |
| ● | ● | Reinforcement mesh 4x4 mm | | 100 mm joint overlap | m² | 1.1 | 1.1 |
| ● | ● | Reinforcement mesh 5x5 mm | | | 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<br>3.0 mm<br>5.0 mm | Layer thickness 2 mm<br>Layer thickness 3 mm<br>Layer thickness 5 mm | kg<br>kg<br>kg | 3.2<br>3.4<br>5.0 | –<br>–<br>– |
| ● | ● | RP 240 | 2.0 mm<br>3.0 mm<br>5.0 mm | Layer thickness 2 mm<br>Layer thickness 3 mm<br>Layer thickness 5 mm | kg<br>kg<br>kg | 3.1<br>3.8<br>5.0 | –<br>–<br>– |
| ● | ● | Noblo | 1.5 mm[4]<br>2.0 mm<br>3.0 mm | Layer thickness 1.5 mm<br>Layer thickness 2 mm<br>Layer thickness 3 mm | kg<br>kg<br>kg | 2.3<br>2.8<br>3.4 | –<br>–<br>– |
| ● | ● | Noblo Filz | 1.0 mm<br>1.5 mm | Layer thickness 2 mm<br>Layer thickness 3 mm | kg<br>kg | 3.2<br>4.6 | –<br>– |
| ● | ● | MineralAktiv Scheibenputz floated render | 1.5 mm<br>2.0 mm<br>3.0 mm | Layer thickness 1.5 mm<br>Layer thickness 2 mm<br>Layer thickness 3 mm | kg<br>kg<br>kg | 2.4<br>3.2<br>4.2 | –<br>–<br>– |

*1) Only in conjunction with finish coats of SP 260 Pro, RP 260, Noblo, MineralAktiv Scheibenputz floating render and Conni S.*

*2) In conjunction with Sockel-SM Pro as a finish coat. With total layer thickness ≥ 7 mm moisture protection woth 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 | | Remark | Unit | Quantity as average value<br>WE202a.de<br>Mineral based | <br>WE202c.de<br>Mineral / organic |
|---|---|---|---|---|---|---|---|
| **Finish coat** per m² | | | | | | | |
| | | | **Grain size** | | | | |
| ● | ● | 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)] | | 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 |
| **Moisture protection** per m² | | | | | | | |
| ● | | Sockel-Dicht | | Layer thickness min. 2.5 mm (two coats) | kg | 3.8 | 3.8 |
| **Primer** per m² | | | | | | | |
| ● | ● | Casiol Grund | | Undiluted | l | 0.17 | – |
| **Coat** per m² | | | | | | | |
| ● | ● | Siliconharz-EG-Farbe paint | | Single coat[3)] | l | 0.17 – 0.22[4)] | 0.17 – 0.22[4)] |
| ● | ● | Autol | | Double coat | l | 0.25 – 0.40 | 0.25 – 0.40 |
| ● | ● | Autol TSR[5)] | | Double coat | l | 0.25 – 0.40 | 0.25 – 0.40 |
| ● | ● | Fassadol | | Double coat | l | 0.30 – 0.45 | 0.30 – 0.45 |
| ● | ● | Fassadol TSR[5)] | | Double coat | l | 0.35 – 0.45 | 0.35 – 0.45 |
| ● | ● | Minerol | | Double coat | l | 0.25 – 0.40 | – |
| ● | ● | MineralAktiv Fassadenfarbe paint | | Double coat | l | 0.28 – 0.40 | 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) Required on finish coat Noblo and Conni S.*

*5) Functionality only on at least 5 mm thick mineral reinforcement layer and only on white, newly created finish coats possible.*

# Information on sustainability

## Knauf WARM WALL Plus MW in Timber Construction

### Information on the sustainability of Knauf WARM WALL Plus MW 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
  German seal of approval for environmentally sustainable building from the 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

*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 (German energy saving ordinance) requirements

**LEED**

*Materials and Resources*

- Credit: Regional materials
  Availability depending on location of building. Information on request.

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**

**Knauf Direct**
Technical Advisory Service:

**knauf-direkt@knauf.com**

www.knauf.de

WE202.de/eng/10.22/0/Dbl

**Knauf Gips KG** Am Bahnhof 7, 97346 Iphofen, Germany



**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.**