

The background image is a detailed architectural cross-section of a facade system. It shows a concrete slab above and below a window opening. The window is framed by a dark frame with a double-stud construction. A third-party rainscreen facade is installed between the studs. The system includes a Kew profile, insulation, and various fasteners. A white panel with a blue grid pattern is visible on the left side of the window.

WM412C.1

Double Stud, KEW Profile, Third-Party Rainscreen Facade, Installed Between Floors



Aluminium panels



Ceramic tiles



WM412C.1

Double stud, KEW profile, third-party rainscreen facade, installed between floors

In this WM412C.1 system the Knauf Exterior Wall facade profiles 150 are boxed in one another, providing the necessary support to allow for the attachment of cladding materials. The cladding is mounted to the AQUAPANEL® Cement Board Outdoor simply using a hat profile and because the required insulation is already installed inside the drywall, the advantages of drywall and rear-ventilated rainscreen facades are combined in a very thin construction of only 355 mm. With this solution the versatility of AQUAPANEL® Cement Board Outdoor becomes apparent: rather than simply being just a render carrier, it provides the basis for a wide range of decorative claddings, such as aluminium, granite stone and glass.



Glass panels



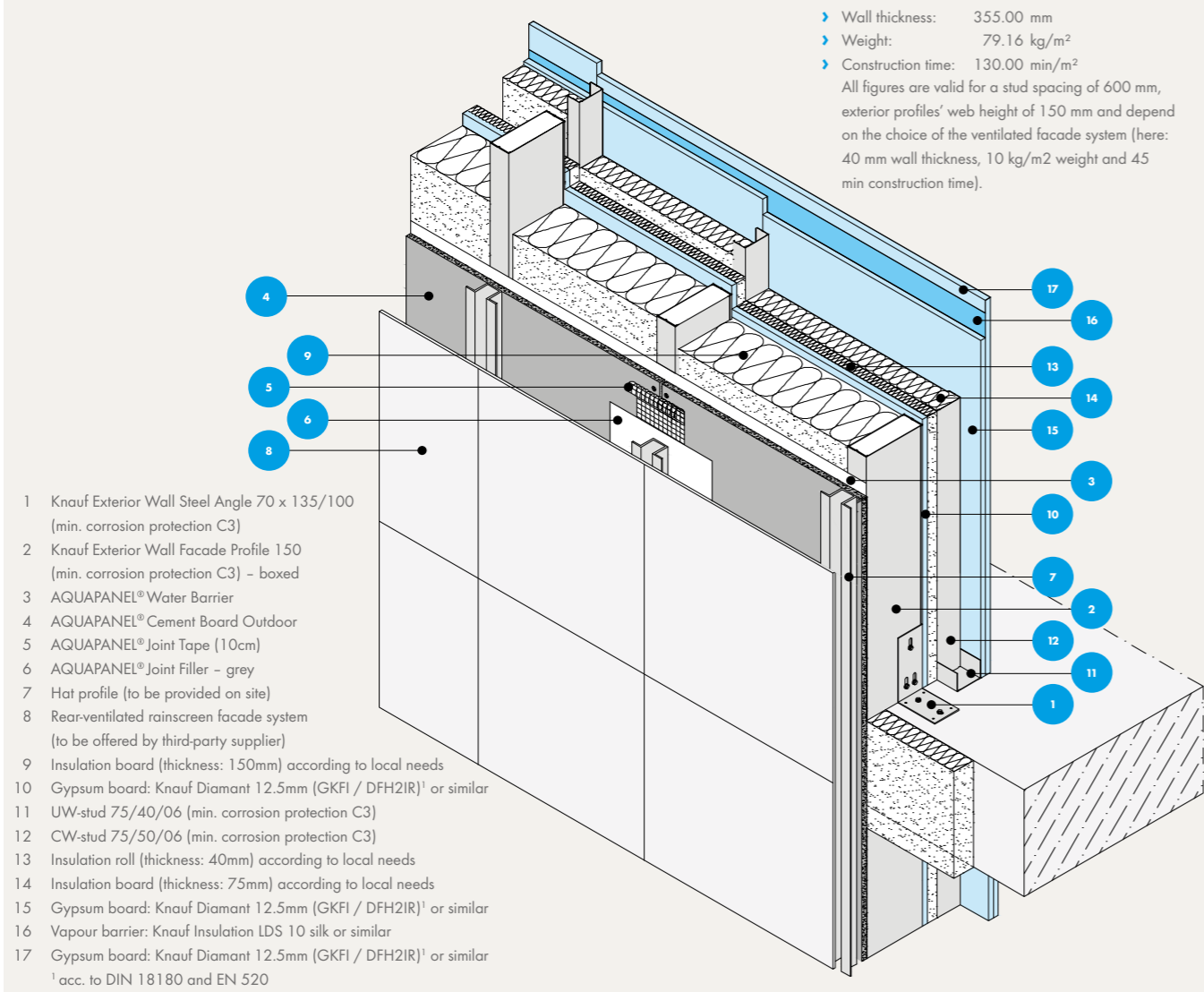
Granite plates



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Axonometry



Characteristics of the construction

- ▶ The rear ventilated rainscreen façade serves as weather protection.
- ▶ The rear ventilated facade construction is not part of the Knauf Exterior Wall construction.
- ▶ To be able to take the additional load from the cladding, the KEW Profile 150 is applied boxed.
- ▶ The exterior stud frame with the KEW Profiles 150 (boxed) transfers the wind-loads and the dead-load (incl. the dead-load from the cladding) into the primary structure.
- ▶ Building physics suitable for residential and non-residential buildings (≥19°C), e. g. residential buildings, office buildings, hotels, hospitals, schools, etc.
- ▶ On the interior side of the exterior stud frame an intermediate board (Knauf Diamant Board – GKFI/DFH2IR) is applied. This allows a simplification of the static calculation (avoiding the torsional flexural buckling) as well as a general improvement in the area of fire resistance and sound protection performance.
- ▶ The interior stud frame consisting of corrosion protected Knauf CW profiles and UW runners, assumes the function of the room-side airtightness and the fall protection.
- ▶ Both stud frames are thermally decoupled with an undisturbed intermediate insulation layer.

Particularities for the assembly

- ▶ An appropriate corrosion protection is to be considered, at least C3 according to EN ISO 12944.
- ▶ The KEW Profile 150 has to be fixed to the load-bearing structure using the KEW Steel Angel 70x135/100 and the KEW Screws 4,8x20; use appropriate anchors, e. g. concrete screws or bolt anchors acc. to the static calculation.
- ▶ The exterior stud-frame is built without UW runner. The alignment of the Profiles is done with the positioning of the KEW Steel Angle 70x135/100.
- ▶ The interior stud frame is to be designed as Knauf shaft wall type W628.
- ▶ The interior stud frame can be used as installation area. Consider, that the connection between penetrations and vapour barrier have to be vapour-tight.

Preliminary design acc. to EN 1993-1-3 for Knauf Exterior Wall Profile 150 (boxed)

Wind load w_e (kN/m ²)	span (m); wall heights								
	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0
0.4									
0.5									
0.6									
0.7									
0.8									
0.9									
1.0									
1.1									
1.2									
1.3									
1.4									
1.5									
1.6									
1.7									
1.8									
1.9									
2.0									
2.1									
2.2									
2.3									
2.4									
2.5									
2.6									
2.7									

Span table is used to show how the substructure needs to be dimensioned as a function of wind loads [kN/m²] according to national standards and the span widths of the profiles, which are determined (usually synonymous with floor height).

The substructure shown in the table comprises a combination of the two boxed KEW profile 150, fixed to the KEW steel angle 70x135/100 with a KEW screw (boxed construction of the profile is needed to carry the loads of the third-party rainscreen facade).

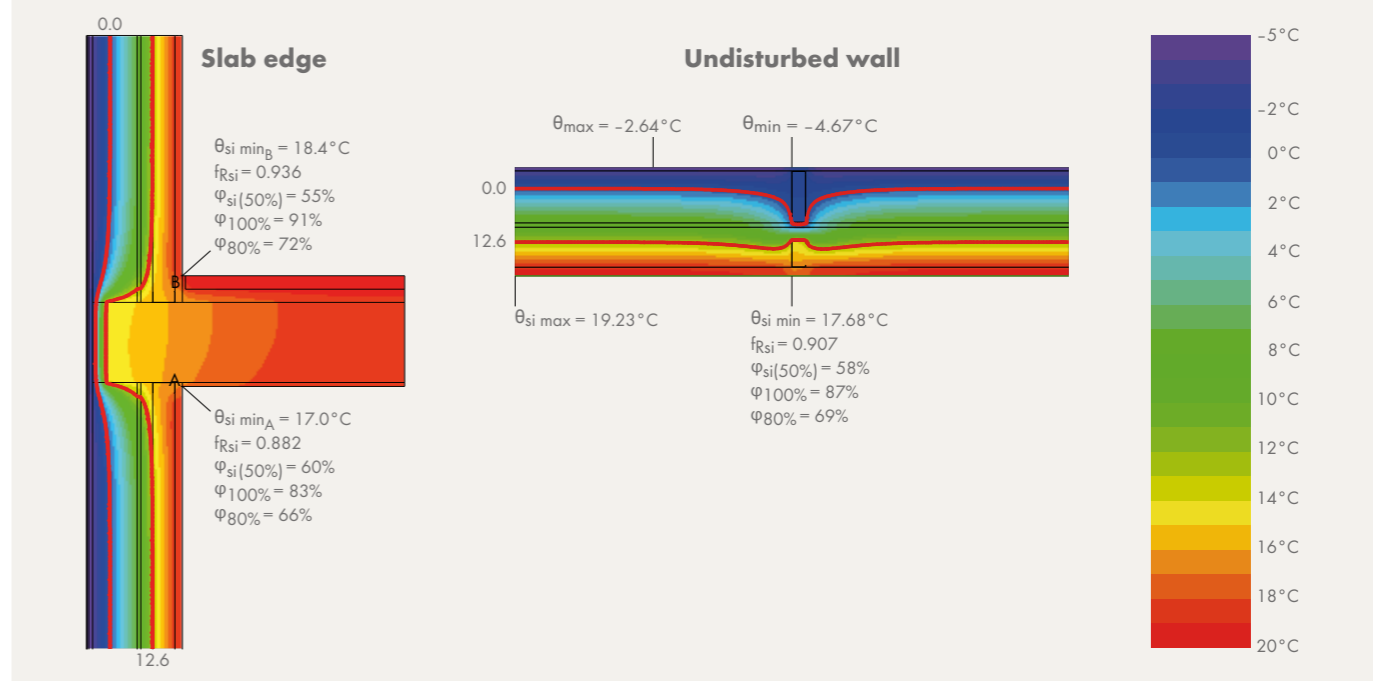
Please note: the table provides an indication for preliminary design purposes only. This must be subsequently verified by an object-related structural calculation, following the relevant local norms and guidelines. The choice of anchors to transfer the loads into the primary structure should only be made on the basis of this project-specific structural design.

■ 600 mm stud spacing
■ On request
■ 400 mm stud spacing

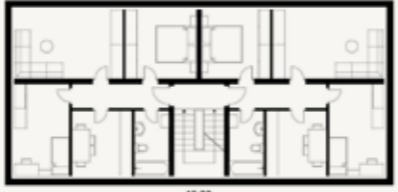
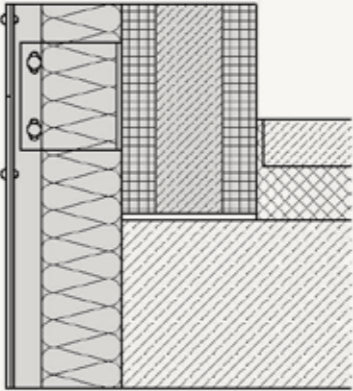
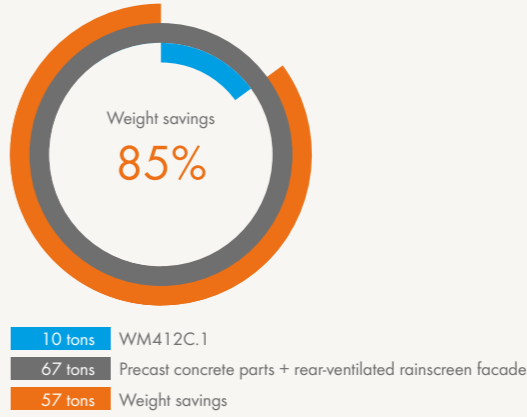
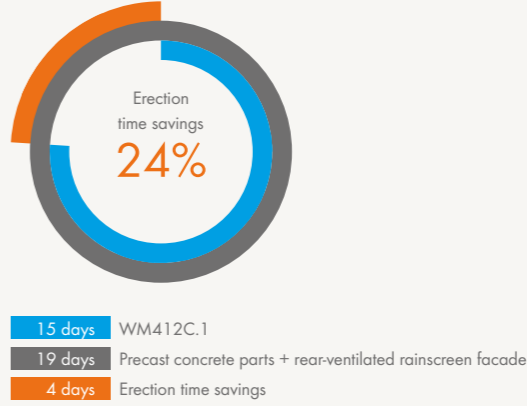


Building-physical features

Heat transition coefficient* $U_{w=U_0+U_{WB, Profile}}$ (undisturbed wall, metal profiles are taken into account) – [W/m ² K]	0.189
Thermal bridge heat transfer at slab edge (linear thermal transmittance) Psi-value/ Ψ -value – [W/mK]	0.172
Sound reduction index R_w^* – [dB]	73.8**
Fire performance (i ↔ o)	EI30

Temperature fields and isotherms*

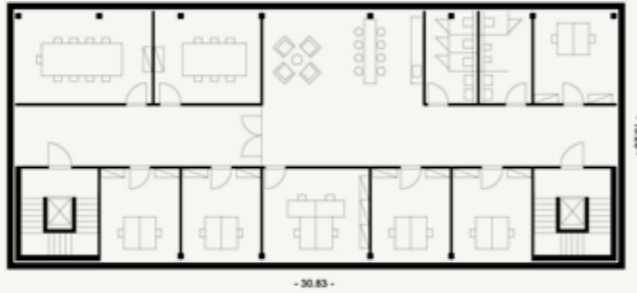
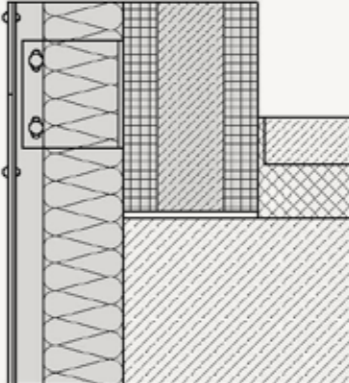

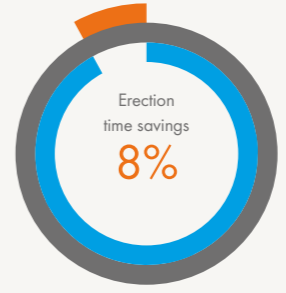
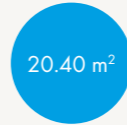
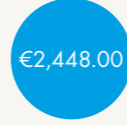


*Valid for a stud spacing of 600 mm and exterior profiles' web height of 100 mm **See test certificate PB SWW15 029 (Impact of rear-ventilated facade construction is not taken into account)

Economic advantages (example: floor extension)		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
<p>Building perimeter (m): 58 m</p> <p>Floor height: 3 m</p> <p>Exterior wall surface per floor: 174 m²</p> <p>Number of floors: 1</p> <p>Wall opening share: 25%</p> <p>Opening surface: 43.50 m²</p> <p>Net exterior wall surface: 130.50 m²</p>			
Cost-influencing factors ¹		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
Weight	<p>Based on a specific intended use and location of a building, the dead weight is the most important factor of the total loads, which can be influenced by planning. Basically, lower loads enable a leaner structure and thus significant cost savings.</p> <p>The calculation of explicit cost saving amounts for load-bearing walls and ceilings as well as foundations achieved by the weight reduction when using the Knauf Exterior Wall is generically not possible, since this is always to be calculated projectspecifically on the basis of floor plan geometries, spans and the load-bearing capacity of the building ground.</p>		
Erection time	<p>With a longer production time considerable costs for the personnel employment are connected, additionally a longer building process means a longer supply of building site facilities, whose costs should be minimised. The efficient construction of the Knauf Exterior Wall as well as the shorter drying times and the significantly lower weather dependency compared to massive constructions offer a considerable cost reduction potential and entail much less risk in the planning of the construction process.</p>		
Revenue-influencing factors ¹		compared to ...	Precast concrete parts + rear-ventilated rainscreen facade
Space	<p>By using the Knauf Exterior Wall more space can be realised inside the building with a comparable thermal insulation value. Consequently, rentable space and resulting rental income are larger. For landlords and investors, the best possible use of the land area plays an important role. By using the Knauf Exterior Wall, this area efficiency and land utilisation are significantly improved.</p>		 <p>Space gain when using WM412C.1 compared to precast concrete parts + rear-ventilated rainscreen facade</p>
Rental income			 <p>Additional income through rental (in €/year)²</p>

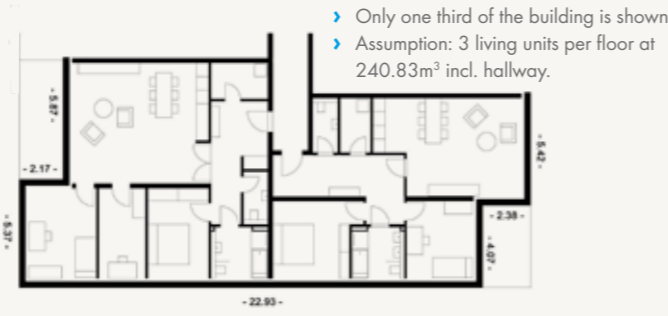
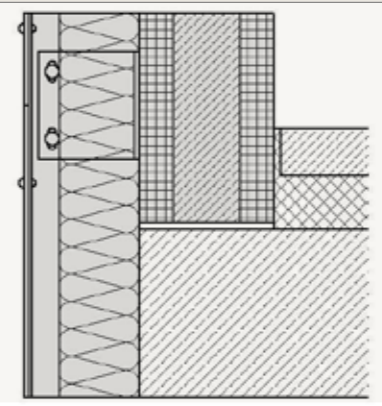

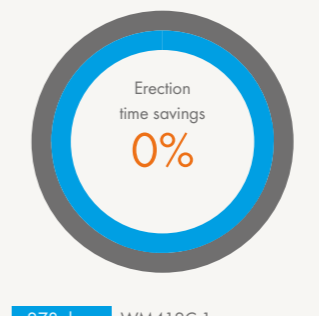
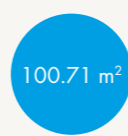

¹Figures are based on a study by Prof. Dr. Bert Bielefeld of the University of Siegen, Germany. All measurements use comparable U-values.

²Rental income based (in €/m² per month): 10.00€

Economic advantages (example: office building)		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
<p>Building perimeter (m): 88.1 m</p> <p>Floor height: 3.5 m</p> <p>Exterior wall surface per floor: 308.35 m²</p> <p>Number of floors: 3</p> <p>Wall opening share: 33%</p> <p>Opening surface: 305.26 m²</p> <p>Net exterior wall surface: 619.78 m²</p> 			
Cost-influencing factors ¹		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
Weight	<p>Based on a specific intended use and location of a building, the dead weight is the most important factor of the total loads, which can be influenced by planning. Basically, lower loads enable a leaner structure and thus significant cost savings.</p> <p>The calculation of explicit cost saving amounts for load-bearing walls and ceilings as well as foundations achieved by the weight reduction when using the Knauf Exterior Wall is generically not possible, since this is always to be calculated projectspecifically on the basis of floor plan geometries, spans and the load-bearing capacity of the building ground.</p>		 <p>Weight savings 85%</p> <ul style="list-style-type: none"> 49 tons WM412C.1 318 tons Precast concrete parts + rear-ventilated rainscreen facade 268 tons Weight savings
Erection time	<p>With a longer production time considerable costs for the personnel employment are connected, additionally a longer building process means a longer supply of building site facilities, whose costs should be minimised. The efficient construction of the Knauf Exterior Wall as well as the shorter drying times and the significantly lower weather dependency compared to massive constructions offer a considerable cost reduction potential and entail much less risk in the planning of the construction process.</p>		 <p>Erection time savings 8%</p> <ul style="list-style-type: none"> 62 days WM412C.1 68 days Precast concrete parts + rear-ventilated rainscreen facade 6 days Erection time savings
Revenue-influencing factors ¹		compared to ...	Precast concrete parts + rear-ventilated rainscreen facade
Space	<p>By using the Knauf Exterior Wall more space can be realised inside the building with a comparable thermal insulation value. Consequently, rentable space and resulting rental income are larger. For landlords and investors, the best possible use of the land area plays an important role. By using the Knauf Exterior Wall, this area efficiency and land utilisation are significantly improved.</p>		 <p>20.40 m²</p> <p>Space gain when using WM412C.1 compared to precast concrete parts + rear-ventilated rainscreen facade</p>
Rental income			 <p>€2,448.00</p> <p>Additional income through rental (in €/year)²</p>


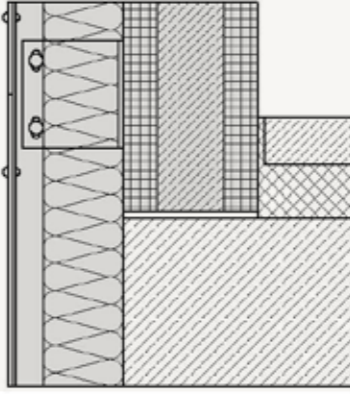
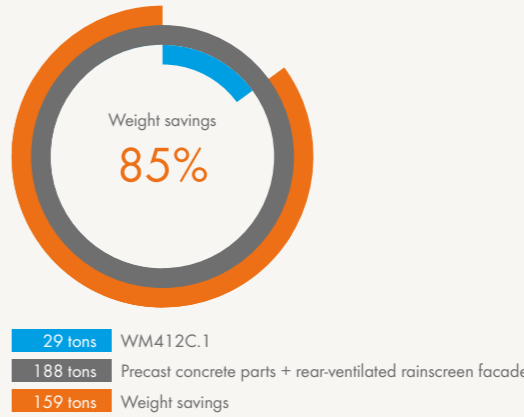
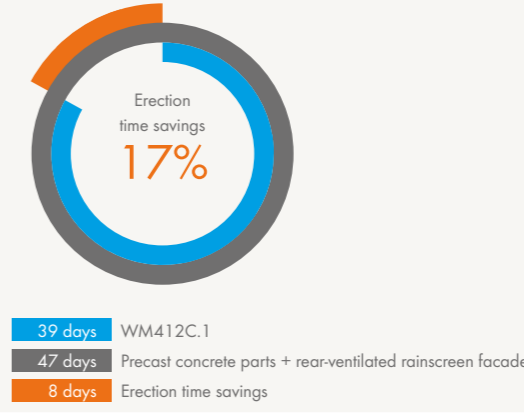
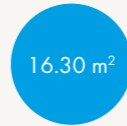
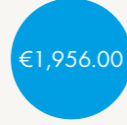
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²Rental income based (in €/m² per month): 10.00€

Economic advantages (example: high-rise residential building)		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
<p>Building perimeter (m): 144 m</p> <p>Floor height: 3 m</p> <p>Exterior wall surface per floor: 432 m²</p> <p>Number of floors: 9</p> <p>Wall opening share: 25%</p> <p>Opening surface: 972 m²</p> <p>Net exterior wall surface: 2,916. m²</p>	 <p> Only one third of the building is shown. Assumption: 3 living units per floor at 240.83m³ incl. hallway. </p>		
Cost-influencing factors ¹		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
Weight	<p>Based on a specific intended use and location of a building, the dead weight is the most important factor of the total loads, which can be influenced by planning. Basically, lower loads enable a leaner structure and thus significant cost savings.</p> <p>The calculation of explicit cost saving amounts for load-bearing walls and ceilings as well as foundations achieved by the weight reduction when using the Knauf Exterior Wall is generically not possible, since this is always to be calculated projectspecifically on the basis of floor plan geometries, spans and the load-bearing capacity of the building ground.</p>		 <p>Weight savings 85%</p> <ul style="list-style-type: none"> 231 tons WM412C.1 1,494 tons Precast concrete parts + rear-ventilated rainscreen facade 1,263 tons Weight savings
Erection time	<p>With a longer production time considerable costs for the personnel employment are connected, additionally a longer building process means a longer supply of building site facilities, whose costs should be minimised. The efficient construction of the Knauf Exterior Wall as well as the shorter drying times and the significantly lower weather dependency compared to massive constructions offer a considerable cost reduction potential and entail much less risk in the planning of the construction process.</p>		 <p>Erection time savings 0%</p> <ul style="list-style-type: none"> 278 days WM412C.1 278 days Precast concrete parts + rear-ventilated rainscreen facade 0 days Erection time savings
Revenue-influencing factors ¹		compared to ...	Precast concrete parts + rear-ventilated rainscreen facade
Space	<p>By using the Knauf Exterior Wall more space can be realised inside the building with a comparable thermal insulation value. Consequently, rentable space and resulting rental income are larger. For landlords and investors, the best possible use of the land area plays an important role. By using the Knauf Exterior Wall, this area efficiency and land utilisation are significantly improved.</p>		 <p>Space gain when using WM412C.1 compared to precast concrete parts + rear-ventilated rainscreen facade 100.71 m²</p>
Rental income			 <p>Additional income through rental (in €/year)² €12,085.20</p>


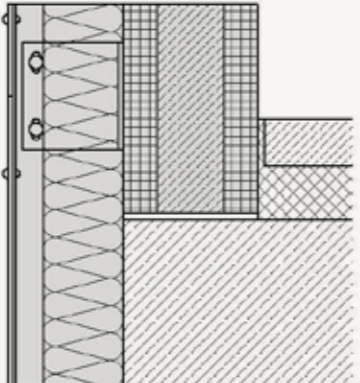

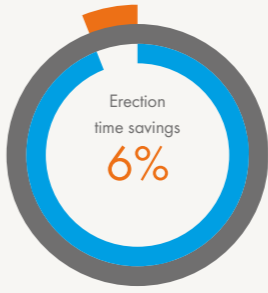

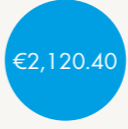
¹Figures are based on a study by Prof. Dr. Bert Bielefeld of the University of Siegen, Germany. All measurements use comparable U-values.

²Rental income based (in €/m² per month): 10.00€

Economic advantages (example: hospital extension)		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
<p>Building perimeter (m): 61 m</p> <p>Floor height: 4 m</p> <p>Exterior wall surface per floor: 244 m²</p> <p>Number of floors: 2</p> <p>Wall opening share: 25%</p> <p>Opening surface: 122. m²</p> <p>Net exterior wall surface: 366 m²</p>			
Cost-influencing factors ¹		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
Weight	<p>Based on a specific intended use and location of a building, the dead weight is the most important factor of the total loads, which can be influenced by planning. Basically, lower loads enable a leaner structure and thus significant cost savings.</p> <p>The calculation of explicit cost saving amounts for load-bearing walls and ceilings as well as foundations achieved by the weight reduction when using the Knauf Exterior Wall is generically not possible, since this is always to be calculated projectspecifically on the basis of floor plan geometries, spans and the load-bearing capacity of the building ground.</p>		 <p>Weight savings 85%</p> <p>29 tons WM412C.1 188 tons Precast concrete parts + rear-ventilated rainscreen facade 159 tons Weight savings</p>
Erection time	<p>With a longer production time considerable costs for the personnel employment are connected, additionally a longer building process means a longer supply of building site facilities, whose costs should be minimised. The efficient construction of the Knauf Exterior Wall as well as the shorter drying times and the significantly lower weather dependency compared to massive constructions offer a considerable cost reduction potential and entail much less risk in the planning of the construction process.</p>		 <p>Erection time savings 17%</p> <p>39 days WM412C.1 47 days Precast concrete parts + rear-ventilated rainscreen facade 8 days Erection time savings</p>
Revenue-influencing factors ¹		compared to ...	Precast concrete parts + rear-ventilated rainscreen facade
Space	<p>By using the Knauf Exterior Wall more space can be realised inside the building with a comparable thermal insulation value. Consequently, rentable space and resulting rental income are larger. For landlords and investors, the best possible use of the land area plays an important role. By using the Knauf Exterior Wall, this area efficiency and land utilisation are significantly improved.</p>		 <p>16.30 m²</p> <p>Space gain when using WM412C.1 compared to precast concrete parts + rear-ventilated rainscreen facade</p>
Rental income			 <p>€1,956.00</p> <p>Additional income through rental (in €/year)²</p>

¹Figures are based on a study by Prof. Dr. Bert Bielefeld of the University of Siegen, Germany. All measurements use comparable U-values.

²Rental income based (in €/m² per month): 10.00€

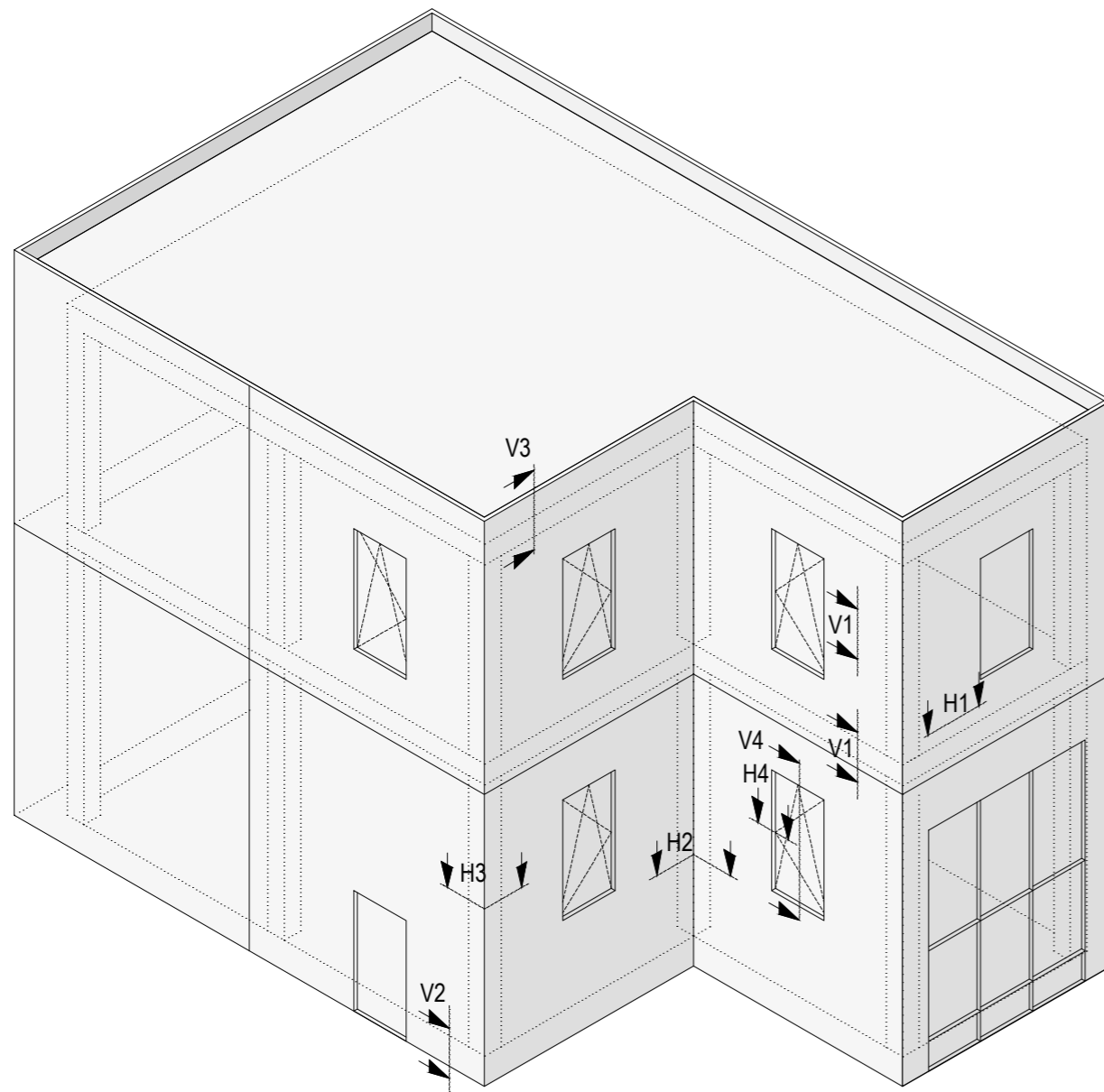
Economic advantages (example: retail shop)		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
<p>Building perimeter (m): 135 m</p> <p>Floor height: 5.5 m</p> <p>Exterior wall surface per floor: 742.5 m²</p> <p>Number of floors: 1</p> <p>Wall opening share: 50%</p> <p>Opening surface: 371.25 m²</p> <p>Net exterior wall surface: 371.25 m²</p>	 <p>Only a part of the building is shown.</p>		
Cost-influencing factors ¹		compared with ...	Precast concrete parts + rear-ventilated rainscreen facade
Weight	<p>Based on a specific intended use and location of a building, the dead weight is the most important factor of the total loads, which can be influenced by planning. Basically, lower loads enable a leaner structure and thus significant cost savings.</p> <p>The calculation of explicit cost saving amounts for load-bearing walls and ceilings as well as foundations achieved by the weight reduction when using the Knauf Exterior Wall is generically not possible, since this is always to be calculated projectspecifically on the basis of floor plan geometries, spans and the load-bearing capacity of the building ground.</p>		 <p>Weight savings 85%</p> <ul style="list-style-type: none"> 29 tons WM412C.1 190 tons Precast concrete parts + rear-ventilated rainscreen facade 161 tons Weight savings
Erection time	<p>With a longer production time considerable costs for the personnel employment are connected, additionally a longer building process means a longer supply of building site facilities, whose costs should be minimised. The efficient construction of the Knauf Exterior Wall as well as the shorter drying times and the significantly lower weather dependency compared to massive constructions offer a considerable cost reduction potential and entail much less risk in the planning of the construction process.</p>		 <p>Erection time savings 6%</p> <ul style="list-style-type: none"> 37 days WM412C.1 39 days Precast concrete parts + rear-ventilated rainscreen facade 2 days Erection time savings
Revenue-influencing factors ¹		compared to ...	Precast concrete parts + rear-ventilated rainscreen facade
Space	<p>By using the Knauf Exterior Wall more space can be realised inside the building with a comparable thermal insulation value. Consequently, rentable space and resulting rental income are larger. For landlords and investors, the best possible use of the land area plays an important role. By using the Knauf Exterior Wall, this area efficiency and land utilisation are significantly improved.</p>		 <p>Space gain when using WM412C.1 compared to precast concrete parts + rear-ventilated rainscreen facade 17.67 m²</p>
Rental income			 <p>Additional income through rental (in €/year)² €2,120.40</p>

¹Figures are based on a study by Prof. Dr. Bert Bielefeld of the University of Siegen, Germany. All measurements use comparable U-values.

²Rental income based (in €/m² per month): 10.00€

CONSTRUCTION DRAWINGS

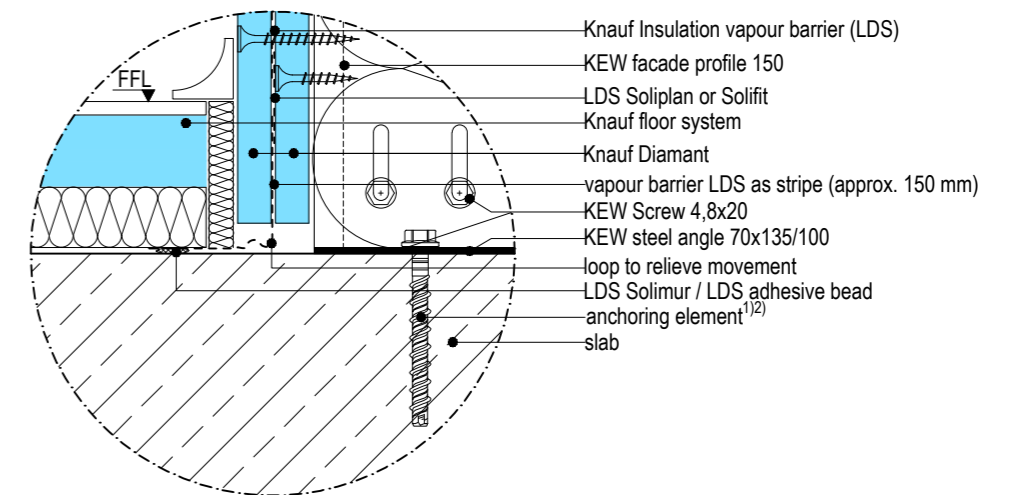
Section overview



Index	Description
V1	Main section, vertical
V2	Vertical section - connection to base
V3	Vertical section - connection to parapet
V4.1	Vertical section window, lintel
V4.2	Vertical section window, parapet
H1	Main section, horizontal
H2	Horizontal section - interior corner without expansion joint
H3	Horizontal section - exterior corner without column
H4	Horizontal section window

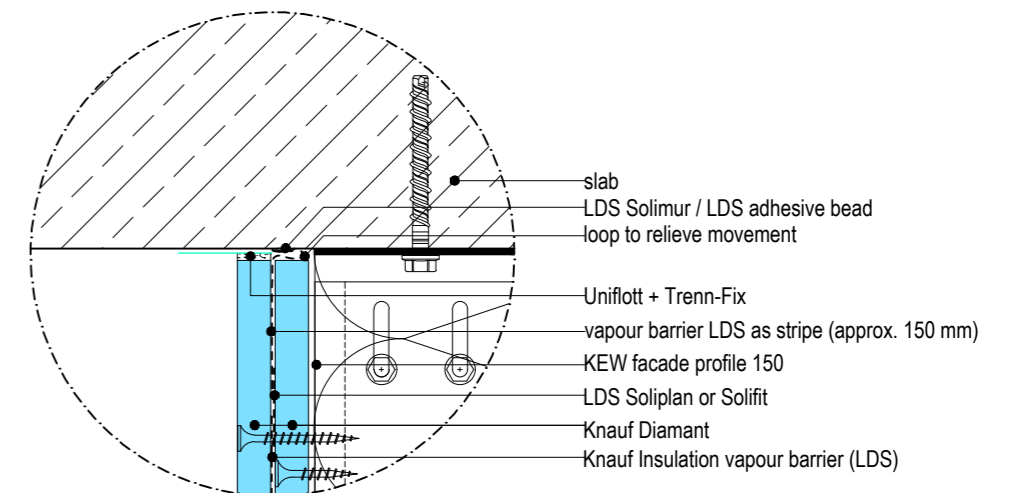
Detail A: Vertical foil lining LDS and connection to floor slab

Details scale 1:2.5



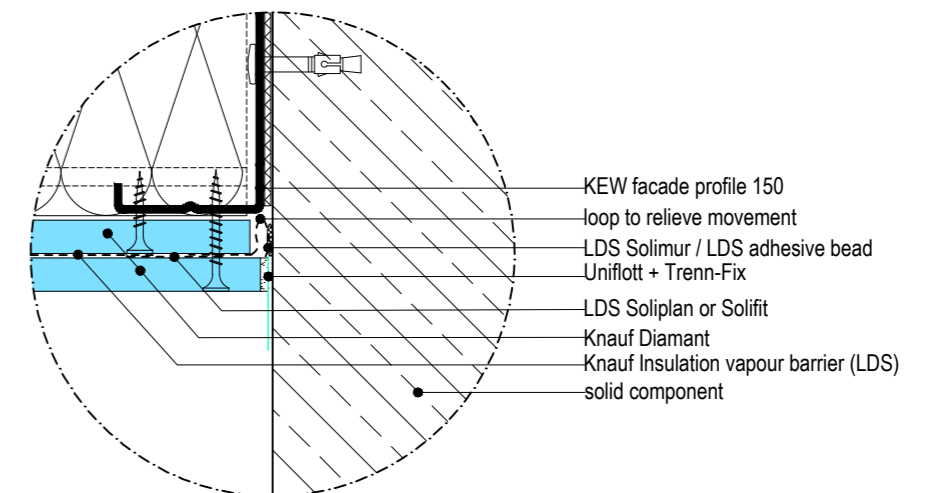
Detail B: Vertical foil lining LDS and connection to ceiling slab

Details scale 1:2.5



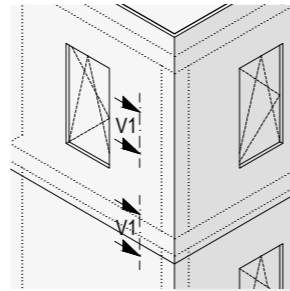
Detail C: Horizontal foil linings and connection to solid wall

Details scale 1:2.5

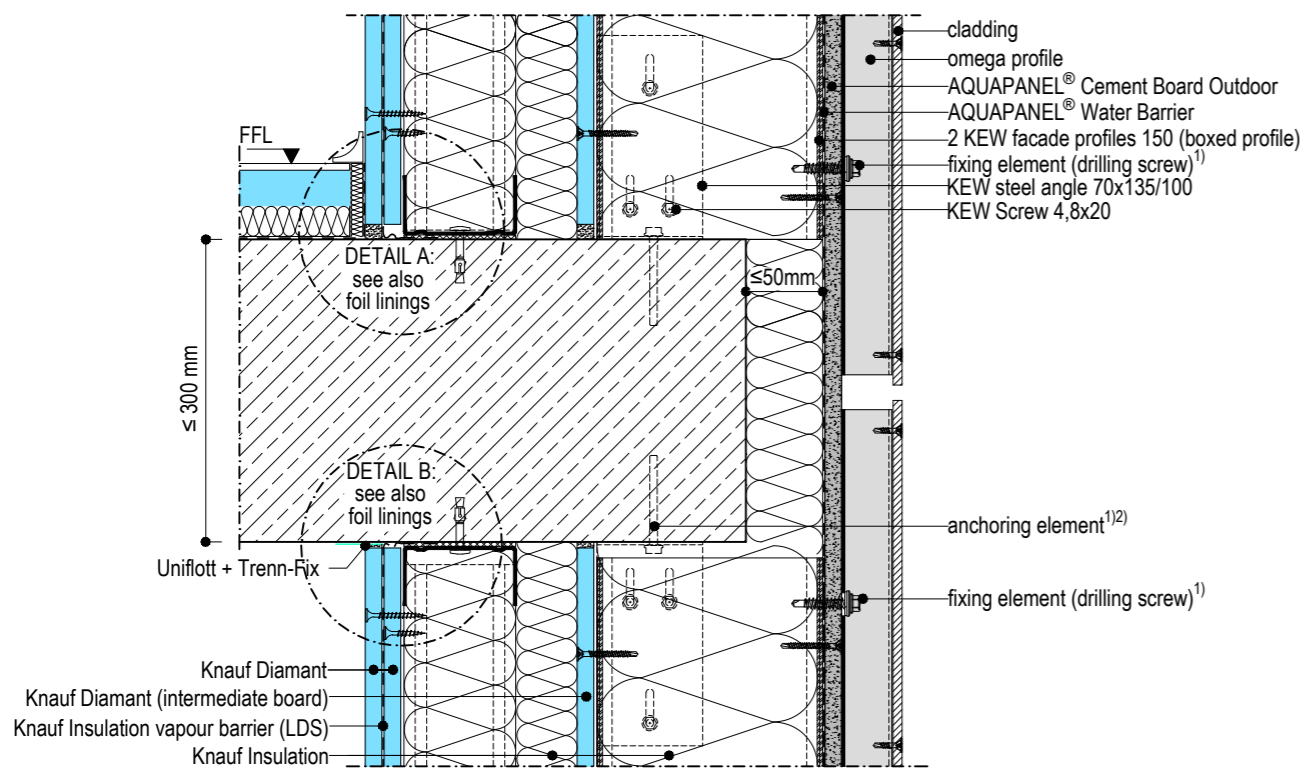


Notes

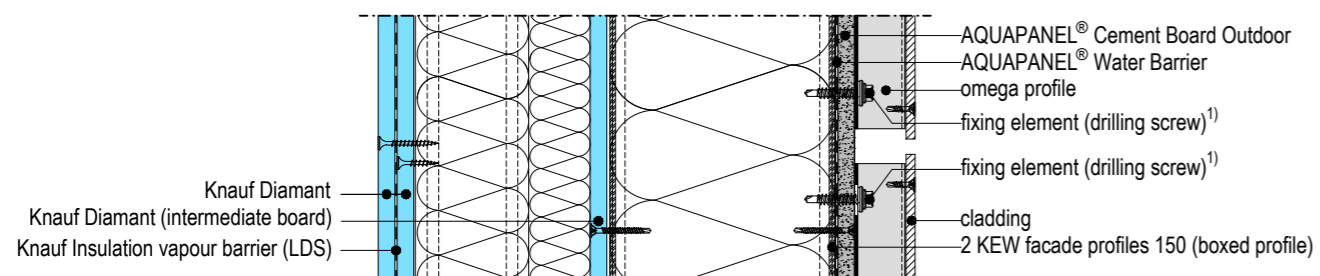
- › The drawings illustrating the general concept of how the system works and interfaces with other construction components.
- › The drawings do not substitute an execution design.
- › Follow the local standards and guidelines for the planning and structural design.
- › The technical specifications and information on the products given in the technical data sheets and system descriptions / approvals must be observed.



V1 Vertical section - connection to end plate Details scale 1:5



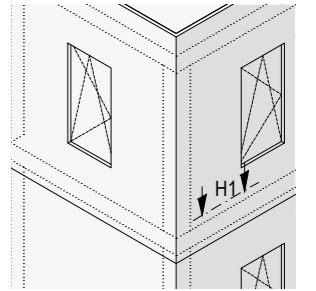
V1 Vertical section - connection to board Details scale 1:5



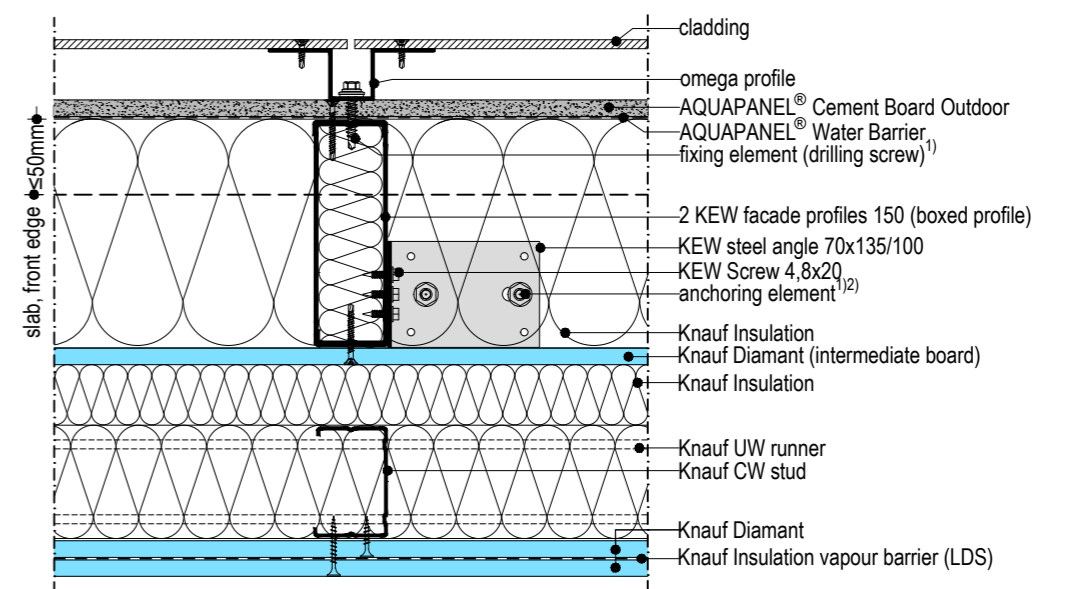
¹according to static wcalculation ²observe edge distance!

Notes

- › The drawings illustrating the general concept of how the system works and interfaces with other construction components.
- › The drawings do not substitute an execution design.
- › Follow the local standards and guidelines for the planning and structural design.
- › The technical specifications and information on the products given in the technical data sheets and system descriptions / approvals must be observed.



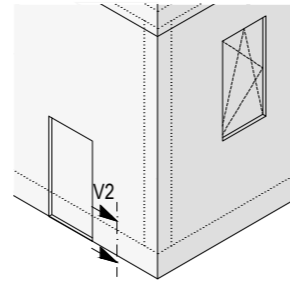
H1 Horizontal section Details scale 1:5



¹according to static calculation ²observe edge distance!

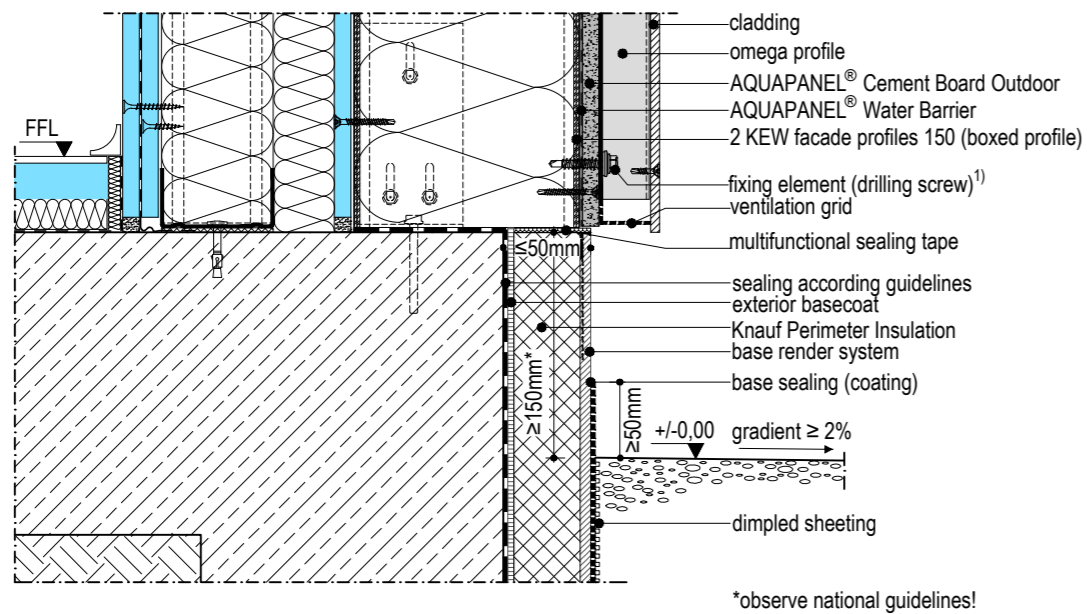
Notes

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V2 Vertical section - connection to base

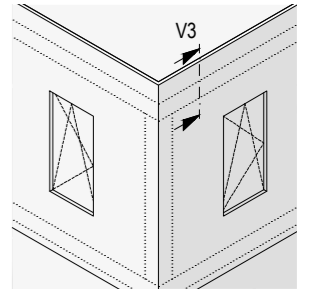
Details scale 1:5



¹according to static calculation ²observe edge distance!

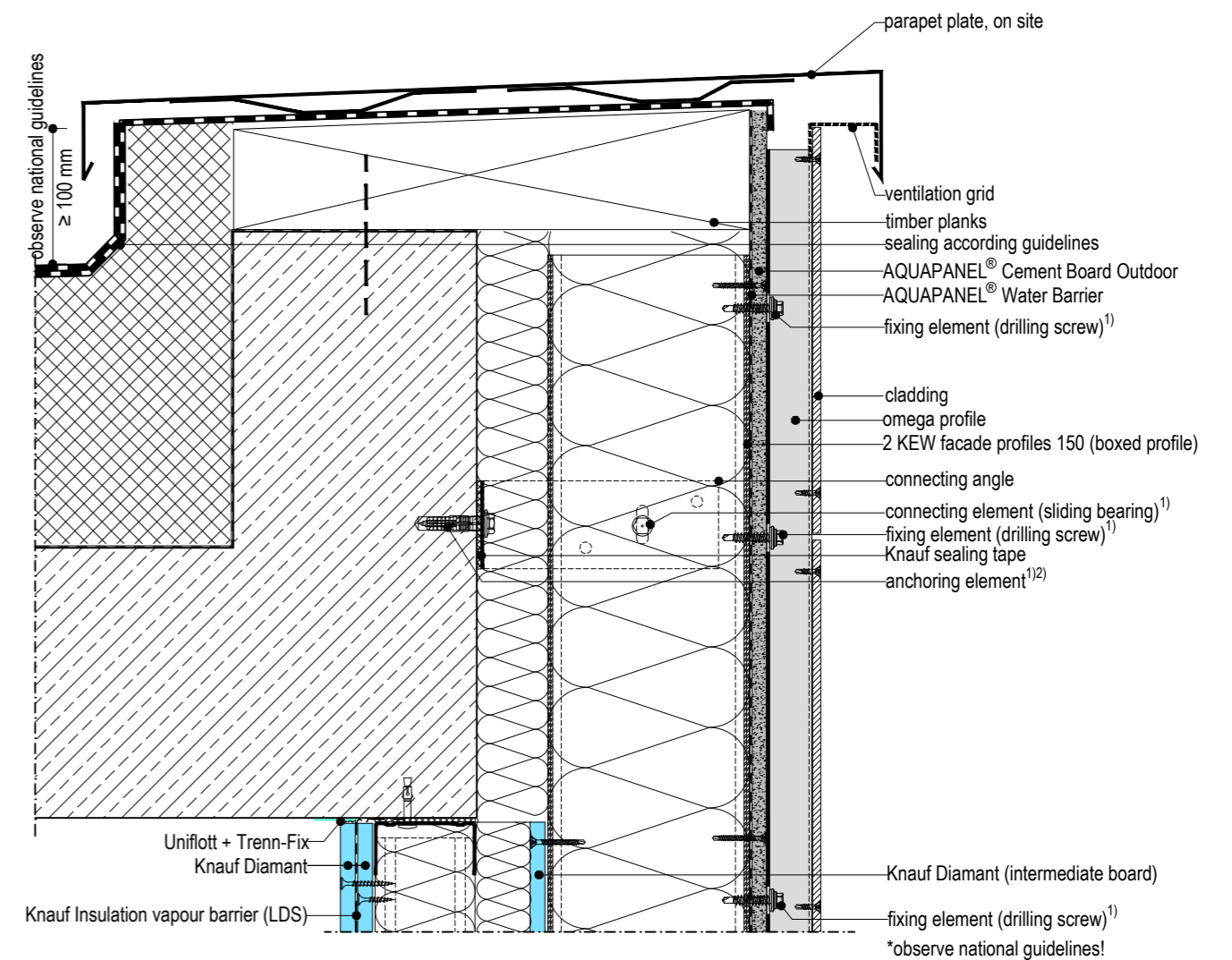
Notes

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V3 Vertical section - connection to parapet

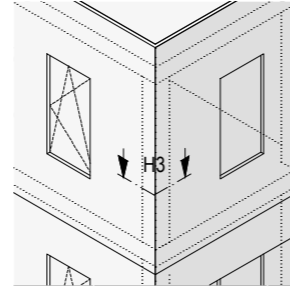
Details scale 1:5



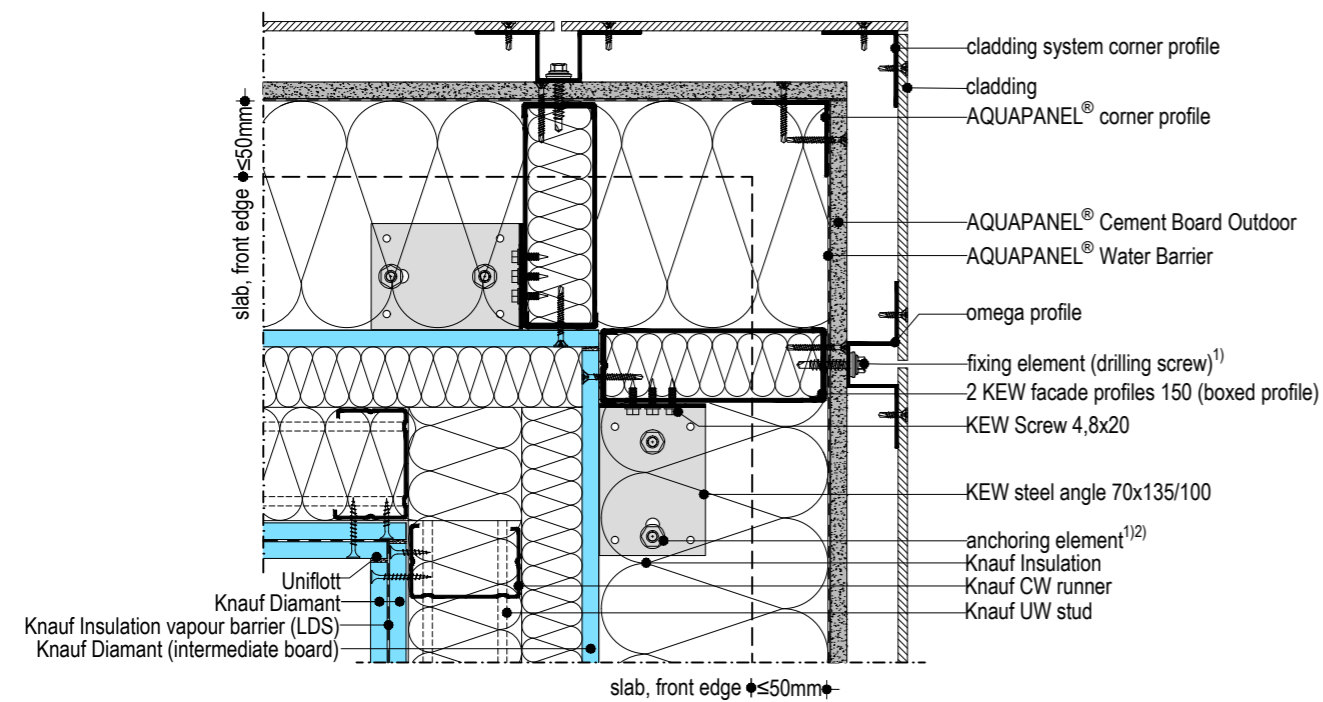
¹according to static calculation ²observe edge distance!

Notes

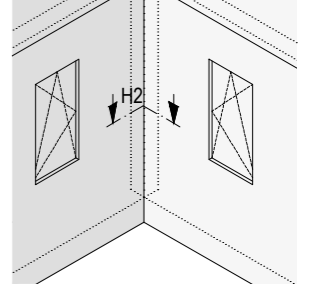
- › The drawings illustrating the general concept of how the system works and interfaces with other construction components.
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**H3** Horizontal section - exterior corner without column

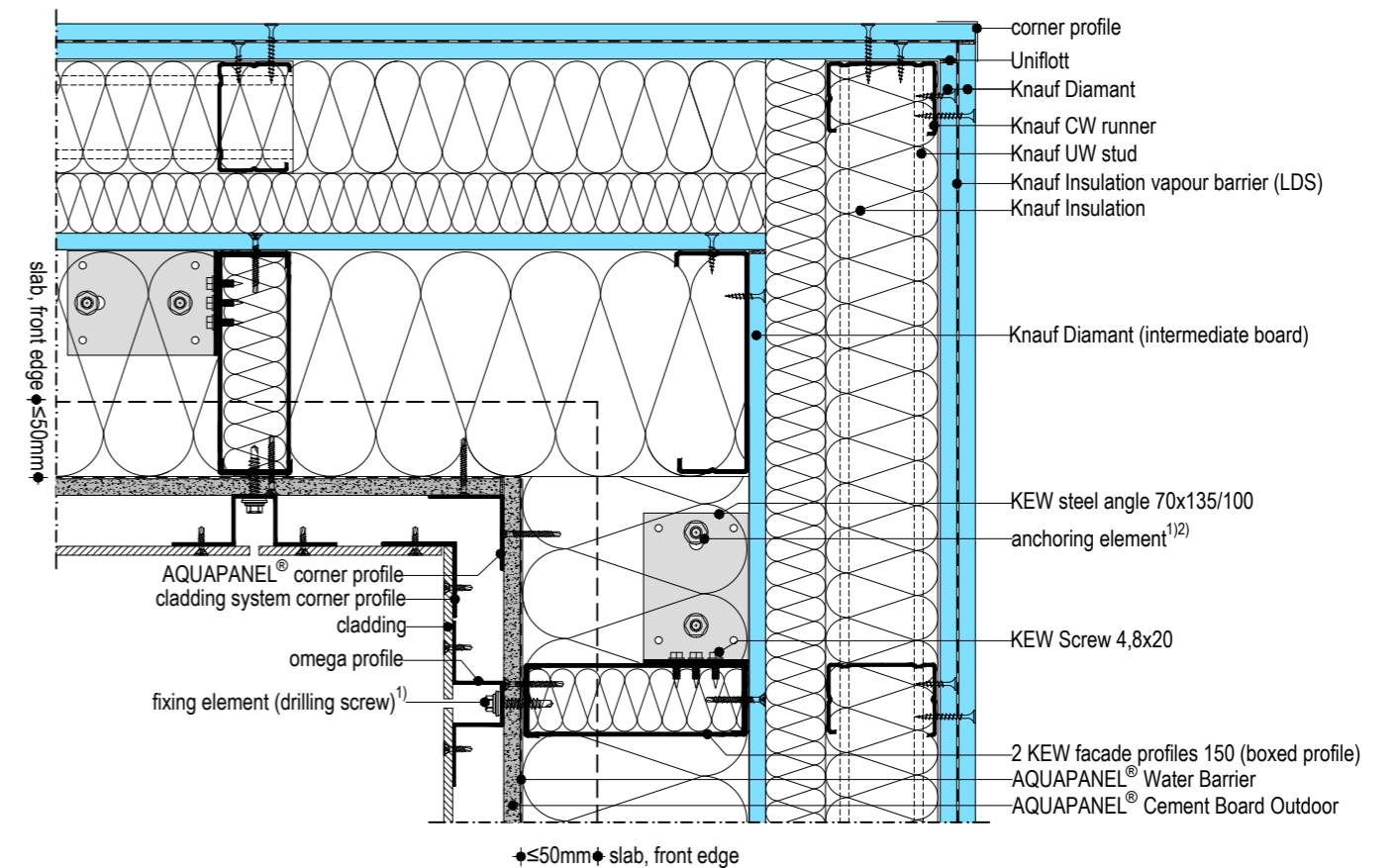
Details scale 1:5

¹according to static calculation²observe edge distance!**Notes**

- › The drawings illustrating the general concept of how the system works and interfaces with other construction components.
- › The drawings do not substitute an execution design.
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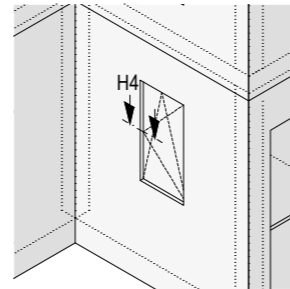
**H2** Horizontal section - interior corner without expansion joint

Details scale 1:5

¹according to static calculation²observe edge distance!

Notes

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Notes

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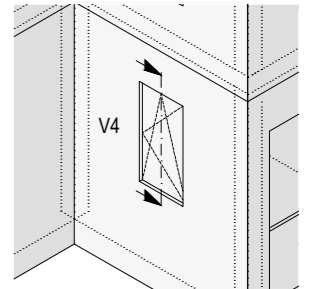
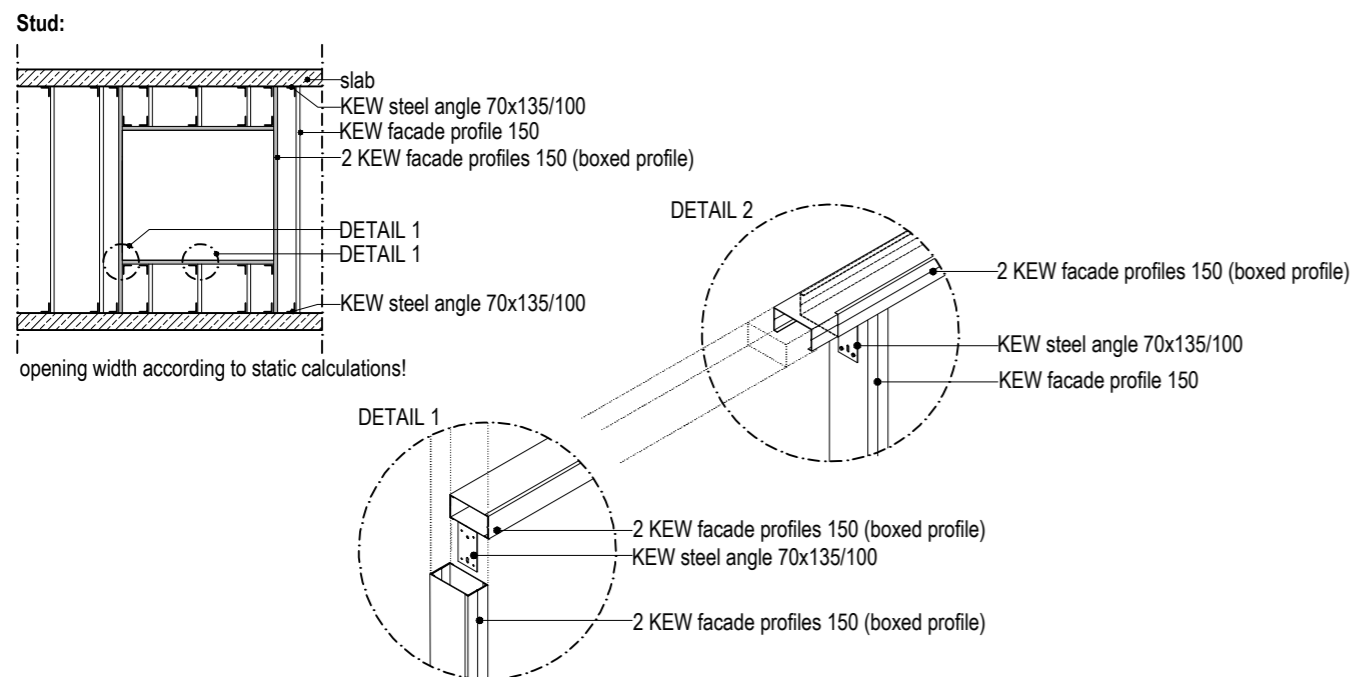
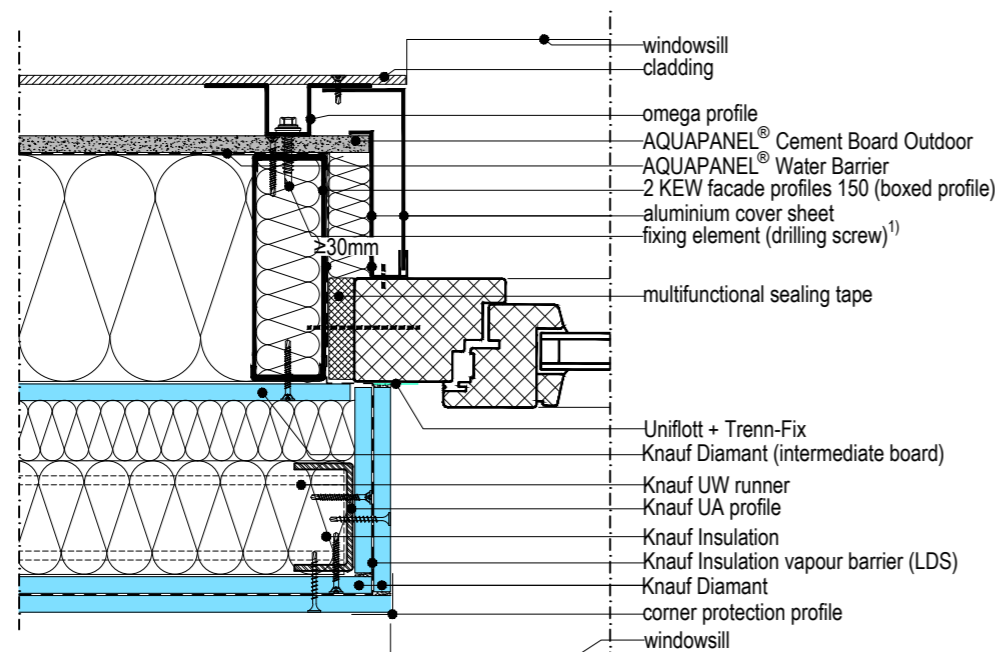


Illustration - Auxiliary structure



H4 Horizontal section - window

Details scale 1:5

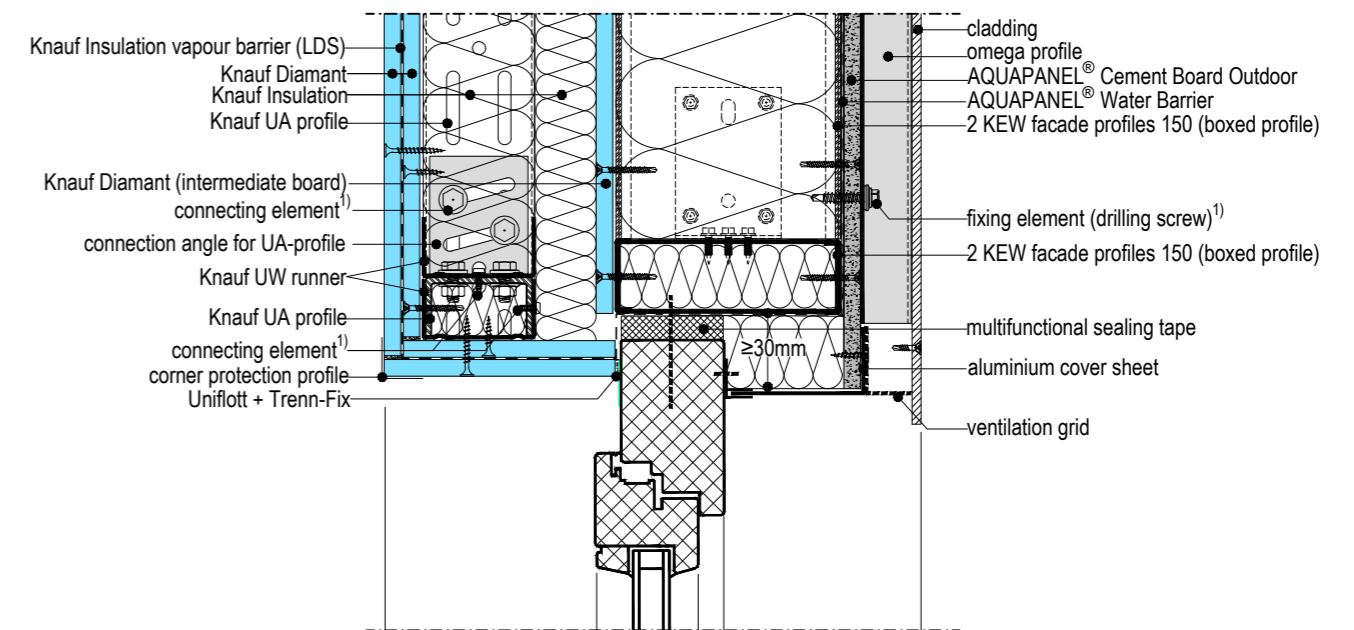


¹⁾according to static calculation

²⁾observe edge distance!

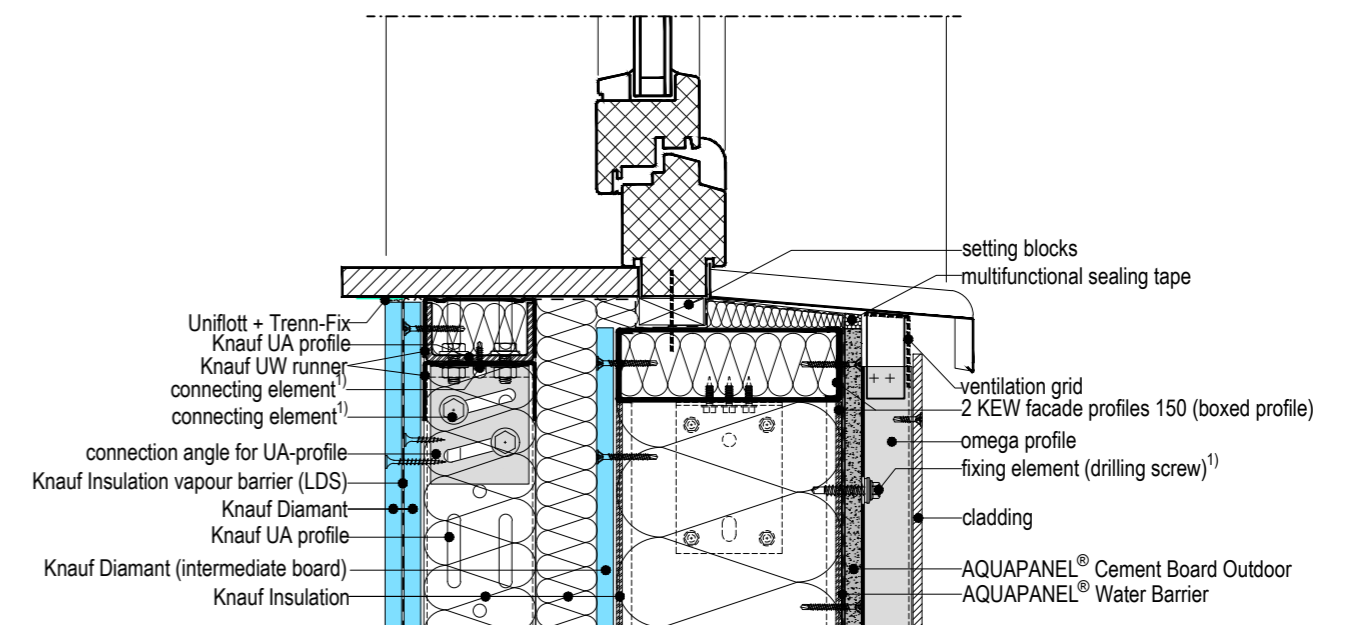
V4.1 Vertical section - lintel

Details scale 1:5



V4.2 Vertical section - parapet

Details scale 1:5



¹⁾according to static calculation

²⁾observe edge distance!

SPECIFICATIONS

Legend for text selections	
Optional items	Orange
Information to be supplemented by the contracting party	Blue

Item	Quantity	Performance description	Unit price	Total price
1		<p>Knauf Exterior Wall as double stud system, installed between floors with intermediate board, type WM412C.1; plus ventilated rainscreen façade system by customer</p> <p>Non load-bearing exterior wall with cement-bonded board as exterior planking; inorganic and approved according to the building regulation, as substrate for different finishing materials and options; application in accordance with the manufacturer's guidelines</p> <p>Two shells consisting of metal studs to include thermal insulation, described in details below; friction-locked and tension-free fixed to the floor slabs, and if necessary to columns and walls.</p> <p>The exterior stud frame is consisting of KEW Profiles 150. Friction-locked and tension-free connection to the floor slabs with KEW Steel Angle 70x135/100 fixed to the profile with KEW Screw; type, dimension and quantity of the fasteners and fixing elements depending on structural requirements and to be approved according to the building regulations.</p> <p>Choose the interior stud frame acc. to the manufacturer's instructions. Depending on wall-height and possible façade openings, CW or UA profiles are used. Stud spacing acc. to manufacturer's instructions.</p> <p>All stud frames are to be aligned accurately and delivered as well as installed according to the following specification. Corrosion protection according to EN ISO 12944-2, but minimum Category C3.</p> <p>The following formal dimensions and cross-sections are minimum requirements. The application has to be carried out according to a verifiable structural analysis.</p> <p>Thermal insulation of the façade construction, consisting of: mineral insulation board according to EN 13162, non-combustible A1 according to EN 13501-1. Thermal conductivity $\lambda = 0.035 \text{ W/m}^2\text{K}$, water repellent.</p> <p>Constructional specifications: Thermal insulation: _____ $\text{W/m}^2\text{K}$ Sound insulation: _____ dB (rated soundproofing) Fire protection: _____</p>		

Delete as applicable

Legend for text selections	
Optional items	Orange
Information to be supplemented by the contracting party	Blue

Item	Quantity	Performance description	Unit price	Total price
1.10		<p>Façade constructions and insulating materials</p> <p>Knauf Aquapanel double stud system, type WM412C.1</p> <p>Standard build-up – inside to outside (without fire protection requirement).</p> <p><u>The dimensions can vary according to static or constructive requirements:</u></p> <ul style="list-style-type: none"> › 12.5 mm gypsum board, Knauf Diamant board (GKFI/DFH2IR) › Knauf Insulation vapour barrier layer LDS 10 Silk › 75 mm Knauf profile UW 75/40/06 and CW 75/50/06 with 75 mm thermal insulation acc. to local requirements; stud distance: standard 600 mm › 12.5 mm Knauf Diamant board GKFI/DFH2IR › Knauf KEW Profile (according to static and constructional requirements) with thermal insulation board acc. to local requirements; stud distance: 600 or 400 mm incl. the fixation at top and bottom slab with KEW Steel Angle 70x135/100; incl. anchoring according to the static calculation › Aquapanel Water Barrier › Aquapanel Cement Board Outdoor with Aquapanel joint tape 10 cm and joint filler grey › Aquapanel exterior basecoat with Aquapanel reinforcing mesh <p>Deliver construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer's instructions, complete and ready-made.</p> <p>000,000 m²</p>		

Delete as applicable

Legend for text selections	
Optional items	Orange
Information to be supplemented by the contracting party	Blue

Item	Quantity	Performance description	Unit price	Total price
1.20		<p>In addition – window opening</p> <p>The construction of a window opening, in addition to item 1.10, incl. connection work to the windows and window sills, interior and exterior.</p> <p>Opening size: L X W Other: Incl. all render profiles, sealing tapes, corner protection profiles, diagonal render reinforcements, etc.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 Unit</p>		
1.30		<p>In addition – door/gate opening</p> <p>The construction of a door/gate opening, in addition to item 1.10, incl. connection work to the door/gate, interior and exterior</p> <p>Opening size: L X W Other: Incl. all render profiles, sealing tapes, corner protection profiles, diagonal render reinforcements, etc.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 Unit</p>		
1.40		<p>In addition – metal-glass façade (Column and beam construction)</p> <p>The construction of an opening for a metal-glass façade, in addition to item 1.10 incl. connection work to the metal-glass façade, interiors and exteriors</p> <p>Opening size: L X W Other: Incl. all render profiles, sealing tapes, corner protection profiles, diagonal render reinforcements, etc.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 Unit</p>		

Delete as applicable

Legend for text selections	
Optional items	Orange
Information to be supplemented by the contracting party	Blue

Item	Quantity	Performance description	Unit price	Total price
1.50		<p>In addition – on-site penetration</p> <p>Construction of a penetration in addition to item 1.10 (e.g. pipes, emergency spillways, etc.); incl. connection work; use suitable sealing material, e. g. Compriband or similar, exteriors</p> <p>Opening size: L X W Other: Incl. all plaster strips, sealing tapes, corner protection rails, diagonal reinforcements, etc.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 Unit</p>		
1.60		<p>In addition – outside corner of façade</p> <p>Construction of an external corner of a façade in addition to item 1.10, incl. all corner profiles, etc.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 m</p>		
1.70		<p>In addition – inside corner of façade</p> <p>Construction of an internal corner of a façade in addition to item 1.10, incl. corner reinforcement, etc.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 m</p>		

Delete as applicable

Legend for text selections	
Optional items	Orange
Information to be supplemented by the contracting party	Blue

Item	Quantity	Performance description	Unit price	Total price
1.80		<p>In addition – expansion joint (horizontal/vertical)</p> <p>Construction of system-related expansion joints in addition to item 1.10, incl. all expansion joint profiles</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 m</p>		
1.90		<p>In addition – structural joint</p> <p>Construction of a structural joint in addition to item 1.10, incl. all expansion joint profiles.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 m</p>		

Delete as applicable

Legend for text selections	
Optional items	Orange
Information to be supplemented by the contracting party	Blue

Item	Quantity	Performance description	Unit price	Total price
1.1		<p>Surface treatment interiors</p>		
1.1.10		<p>Interior finish – gypsum board</p> <p>Filling the joints of gypsum boards with Knauf Uniflott and cover the screw heads, quality level Q2</p> <p>Location: elevation no. : _____ axis no. : _____</p> <p>Miscellaneous: Incl. reveals and lintels</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer’s instructions, complete and ready-made.</p> <p>000,000 m²</p>		

Delete as applicable

Legend for text selections	
Optional items	Orange
Information to be supplemented by the contracting party	Blue


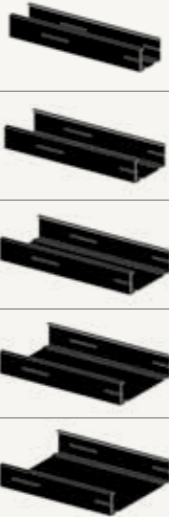
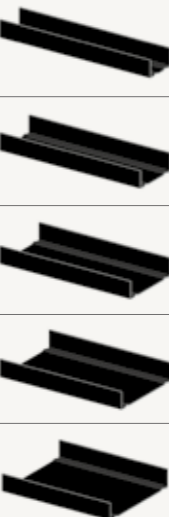
Item	Quantity	Performance description	Unit price	Total price
1.2		Further services		
1.2.10		<p>*** Optional item: Scaffolding brackets</p> <p>GELOG scaffolding brackets for the described wall structure, dimensioning according to statics. Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer's instructions, complete and ready-made.</p> <p>000,000 Unit</p>		
1.2.20		<p>Detail and implementation planning</p> <p>Preparation of the detail and implementation planning, incl. the details and installation plans for the steel substructure and the AQUAPANEL® Cement Board Outdoor as well as the anchoring system.</p> <p>Before execution, all planning and construction results have to be signed off by the contractor and the structural engineer.</p> <p>1 lump sum</p>		
1.2.30		<p>Proof of stability</p> <p>Preparation of verifiable static calculation of the substructure, incl. screw connections, dowels, anchors, etc. This must be submitted by the contractor before start of execution and signed off by the responsible inspecting structural engineer.</p> <p>1 lump sum</p>		
1.2.40		<p>*** Optional item: Mock-up</p> <p>Creation of a complete mock-up, Size: approx. a x b m Location: elevation no. : _____ axis no. : _____</p> <p>Mock-up for subsequent incorporation into the façade / Mock-up has to be removed afterwards / Mock-up will be erected separately from site (location to be defined)</p> <p>If necessary in coordination with other disciplines as specified by the architect.</p> <p>Deliver, construct and assemble according to the enclosed planning and documentation in accordance with the manufacturer's instructions, complete and ready-made.</p> <p>1 lump sum</p>		












Delete as applicable

PRODUCT RANGE

Stud framework



Easy to work with and install, the components used to create our stud frames include profiles, angles, screws and sealing strips, all available in a wide range of specifications and geometries to meet any design requirement. All profiles have organic coating and galvanizing (minimum corrosion category C3 according to EN ISO 12944) to ensure long-term protection.

Profiles	Web height (mm)	Flange width (mm)	Nominal thickness (mm)	Weight (approx kg/m)
Knauf Exterior Wall Profile 150  <ul style="list-style-type: none"> Point of use: exterior stud frame Designed to absorb and transmit wind and dead loads Interlaceable Enables a preliminary static design according to EUROCODE 3 (in combination with Knauf Exterior Wall Steel Angle and Knauf Exterior Wall Screw) Black coated Minimum corrosion protection C3 	150	50	1.0	2.0
CW Profiles  <ul style="list-style-type: none"> Point of use: exterior and interior stud frame Black coated Minimum corrosion protection C3 	50	50	0.6	0.7
	75			0.8
	100			0.9
	125			1.0
	150			1.2
UW Profiles  <ul style="list-style-type: none"> Point of use: exterior and interior stud frame Black coated Minimum corrosion protection C3 	50	40	0.6	0.5
	75			0.7
	100			0.8
	125			0.9
	150			1.0

Profiles		Web height (mm)	Flange width (mm)	Nominal thickness (mm)	Weight (approx kg/m)
UA Profiles		50	40	2.0	1.7
		75			2.0
		100			2.3
Connecting angles			Width (mm)	Length (mm)	Nominal thickness (mm)
Knauf Exterior Wall Steel Angle 70x135/100			70	135/100	1.5
Anschlusswinkel (Korrosionsschutz C3 - C5M)			50	80	1.5
			75		
			100		
Screws and anchors				Width (mm)	Length (mm)
Knauf Exterior Wall Screw				4.8	20
Deckennagel Korrosionsschutz A4				6.0	30
Universal-Schraube FN				4.3	35 65
Decoupling tape		Width (mm)	Roll length (mm)	Thickness (mm)	Nominal thickness (mm)
Decoupling tape		30	30,000	3.2	1.5
		50			
		70			
		95			




Insulation



Available in panels and rolls for easy installation, mineral wool from Knauf Insulation is suitable for a wide range of applications, including inside stud frames, in the space between interior and exterior frames, as well as in front of floors to reduce thermal bridges between the Knauf Exterior Wall with AQUAPANEL Technology® and concrete slabs.

Insulation for metal constructions		Width (mm)	Length (mm)	Thickness (mm)	m ² /Package
Knauf Insulation Metallbau-Dämmplatte FCB 035		625	1,250	50	9.38
				75	6.25
				150	3.13
Knauf Insulation Universalrolle classic 035		1,200	13,000	40	15.60
				50	12.60
				60	10.44
				80	7.56
				100	6.24
				120	5.28
				140	4.44
				160	3.96
				180	3.48
				200	3.12
220	3.48				
240	3.24				


Exterior lining



To ensure that the Knauf Exterior Wall acquires its water resistant properties, AQUAPANEL® Cement Board Outdoor is fitted on top of AQUAPANEL® Water Barrier, a highly windproof, rainproof and permeable layer which can be easily fixed on exterior studs by using adhesive tape. Complemented with specially developed system accessories including AQUAPANEL® Joint Filler, AQUAPANEL® Tape as well as AQUAPANEL® Maxi Screws with special coatings for added corrosion protection, the result is a complete – and completely reliable – lining system of AQUAPANEL® products.

Water barrier		Width (mm)	Roll Length (mm)		
AQUAPANEL® Water Barrier	 <ul style="list-style-type: none"> Water resistant and wind tight membrane Used as a water conducting layer directly behind AQUAPANEL® Cement Board Outdoor Diffusion equivalent air layer thickness (sd): 0.025m 	1,500	50,000		
Adhesive tapes		Width (mm)	Roll Length (mm)		
Knauf Insulation LDS Solitop	 <ul style="list-style-type: none"> One-sided reinforced adhesive tape made of polyethylene Specially developed for outdoor use Used for bonding overlaps and penetrations of the AQUAPANEL® Water Barrier 	60	40,000		
		150	25,000		
Cement boards					
AQUAPANEL® Cement Board Outdoor		Width (mm)	Length (mm)	Thickness (mm)	Weight (approx kg/m²)
 <ul style="list-style-type: none"> Cement board Easy Edge™ Building material class: A1, non-combustible 100% water resistant Bending radius 1-3m (in dry state) 	900	1,200	12.5	16	
	900	1,250			
	900	2,400			
	900	2,500			
	1,200	900			
	1,200	2,000			
	1,200	2,400			
	1,200	2,500			
	1,200	2,800			
	1,200	3,000			
	1,250	900			
	1,250	2,000			
1,250	2,500				

Screws			Length (mm)
AQUAPANEL® Maxi Screw SN25		<ul style="list-style-type: none"> With countersunk head and nail tip 	25
AQUAPANEL® Maxi Screw SN39			29
AQUAPANEL® Maxi Screw SN55			55
AQUAPANEL® Maxi Screw SB25		<ul style="list-style-type: none"> With countersunk head and drill tip 	25
AQUAPANEL® Maxi Screw SB39			39

Material of substructure	Steel framework				
	0.6mm ≤ x ≤ 1.0mm			1.0mm < x ≤ 2.0mm	
Metal thickness	Single layer	Double layer	Triple layer	Single layer	Double layer
AQUAPANEL® Maxi Screw SN25	x				
AQUAPANEL® Maxi Screw SN39	x	x			
AQUAPANEL® Maxi Screw SN55			x		
AQUAPANEL® Maxi Screw SB25				x	
AQUAPANEL® Maxi Screw SB39				x	x

Joint filler		Coverage (ca kg/m²)	Storage life (approx month)	Weight (kg/bag)
AQUAPANEL® Joint Filler – grey	 <ul style="list-style-type: none"> Cement-bound joint filling material Full-surface skimcoating of joints Reinforced with AQUAPANEL® Tape 10cm 	0.7	12	20

Joint tapes		Width (mm)	Roll length (mm)
AQUAPANEL® Tape 10cm	 <ul style="list-style-type: none"> Glass fabric joint tape Alkali-resistant coating Colour: blue Mesh size: 4x4mm 	100	50,000
			20,000
AQUAPANEL® Exterior Reinforcing Tape	 <ul style="list-style-type: none"> Glass fabric joint tape Alkali-resistant coating Colour: blue Mesh size: 4x4mm 	200	50,000

Exterior finishing

Knauf Exterior Wall is able to accommodate a wide range of finishes, so whatever you want to achieve, it's achievable. It is compatible with a wide range of third-party ventilated constructions, including aluminium panels, ceramic tiles, glass panels, granite plates, high-pressure compact laminate and many more, so there is no limit on design potential. Planning, specification and detailed design of the rainscreen facade carried out by third party.



Glass panels



Aluminium panels



Granite plates





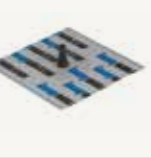







High-pressure compact laminate

Interior lining

Knauf Exterior Wall systems include an unrivalled choice of fully compatible lining boards to meet any specification need, including moisture rating, impact resistance, fire rating and sound reduction. For specialist applications in wet and humid areas, AQUAPANEL® Cement Board Indoor has been specifically developed to provide a robust and reliable solution, including in swimming pools and steam saunas. All boards come with comprehensive accessories including vapour control layers, sealant tapes, joint fillers, adhesives and screws.


Vapour barriers			Width (mm)	Roll length (mm)
Knauf Insulation LDS 10 Silk 	<ul style="list-style-type: none"> › Vapour control membrane made of high strength polypropylene spun-bonded fabric › Diffusion equivalent air layer thickness (sd): 10m › Approx 140g/m² 	3,000	50,000	
Adhesive tapes			Width (mm)	Roll length (mm)
Trenn-Fix 	<ul style="list-style-type: none"> › Special coated paper strip › Adhesive along one edge › Used as separation strip between dry-built surfaces and other constructional elements › Used between dry-built surfaces to generate a sliding separation 	65	50,000	
Knauf Insulation LDS Soliplan 	<ul style="list-style-type: none"> › One-sided adhesive tape made of kraftpaper › Used for durable air-tight bonding of vapour barrier overlaps and fitting edges 	60	40,000	
Knauf Insulation LDS Solitwin 	<ul style="list-style-type: none"> › One-sided reinforced adhesive tape made of low-density polyethylene (LDPE) › With centre-slit backing paper › Used for durable and elastic air-tight bonding of the vapour barrier in corner areas and window connections 	60	25,000	
Knauf Insulation LDS Solifit 	<ul style="list-style-type: none"> › One-sided reinforced adhesive tape made of low-density polyethylene (LDPE) › Used for durable and elastic air-tight bonding of vapour barrier overlaps and penetrations, when flexible connections are necessary (e.g. pipes, beams, etc.) 	60	25,000	
Knauf Insulation LDS Solifit S 	<ul style="list-style-type: none"> › One-sided reinforced adhesive tape made of low-density polyethylene (LDPE) › Used for durable and elastic air-tight bonding of vapour barrier overlaps and penetrations, when flexible connections are necessary (e.g. pipes, beams, etc.) › No peeling, collection and disposal of the release paper required › Easy handling by fingerlift › Tape tears by hand 	60	25,000	
Knauf Insulation LDS Kleberaube 	<ul style="list-style-type: none"> › Elastic, double-sided adhesive tape › Used for safe, durable and elastic bonding of the vapour barrier to flanking building parts 	25	8,000	

Liquid adhesive		Capacity (ml)	Storage life (approx month)		
Knauf Insulation LDS Solimur		600	24		
		310	24		
Adhesive primer		Coverage (approx m)	Storage life (approx month)		
Knauf Insulation LDS Primer		25-30 (100mm application width)	18		
Air-tight sleeves		Diameter (mm)	Width (mm)	Length (mm)	
Knauf Insulation LDS Universalmanschette		75-125	400	400	
Knauf Insulation LDS Leitungsmanschette		8-12	150	150	
Knauf Insulation LDS Leitungsmanschette 6-fach		4-11	230	230	
Gypsum boards		Width (mm)	Length (mm)	Thickness (mm)	Weight (approx kg/m²)
Diamant 12.5mm (GKFI/DFH2IR)		1,250	2,000	12.5	9.4
			2,500		

Drywall screws		Width (mm)	Length (mm)	
Diamantschraube XTN		3.9	23	
			33	
			38	
			55	
Diamantschraube XTB		3.9	35	
			55	
Gypsum filler		Coverage (approx. kg/m²)	Storage life (approx month)	Weight (kg/bag)
Uniflott		0.5	9	5
				25

Interior finishing

From primers, renders, skim coatings and paint, Knauf offers a full range of surface finishes for every need – from standard to high-end Q4 specifications with minimal marks, traces or shading caused by shallow light angles. The end result will depend on the decorative finish required as well as the skills of the contractor.

Finishing plaster		Coverage (approx. kg/m²)	Storage life (approx month)	Weight (kg/bag)
Super Finish		1.6	12	20

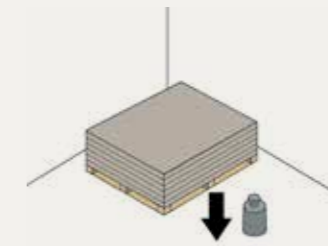


PRODUCT HANDLING

Boards



- › Always carry the boards upright, or use board rollers. Handle with fork lift or crane as palletted goods. Take care not to damage corners and edges when setting the boards down. Place boards down on their long edge before laying them flat.

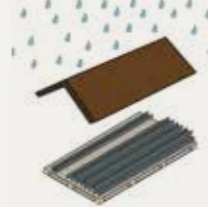


- › Ensure that the base is strong enough to support the boards.



- › Protect boards from moisture and weathering before they are installed. Boards which have become damp must be dried on both sides on a flat surface prior to fitting. Before installing, condition the boards to the ambient temperature and humidity.

Profiles



- › Protect profiles from moisture and weathering before they are installed. Products should not be left permanently exposed to the elements.

Powder materials



- › Store bags in a dry place and in original packaging.



- › Do not apply joint fillers in temperatures less than +5°C.

Health and safety

- › Avoid unnecessary dust on job site when using electrical saw. Keep sanding and other dust generation to a minimum. Maintain adequate ventilation and/or wear suitable protection.
- › Exercise care when using power tools and take all necessary precautions.
- › Follow instructions on packaging when applying system accessories.
- › When using powdered products, mix with water in well-ventilated conditions. Avoid contact with eyes and skin. In the event of contact with the eyes, irrigate with plenty of clean water immediately.
- › When handling insulation or cutting boards which contain glassfibre, wear suitable protection including face mask and gloves. Wear protective glasses when working overhead.
- › Follow national health and safety regulations at all times.

The product data sheets and material safety data sheets are available on our website www.AQUAPANEL.com/downloads.

Insulation

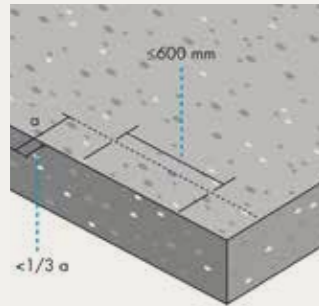


- › Insulation materials are supplied enclosed in packaging which is designed for short term protection only. For longer term protection on site, the product should be stored either indoors, or under cover and off the ground. Products should not be left permanently exposed to the elements.

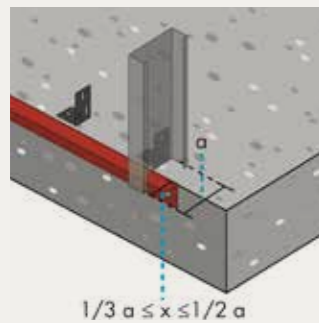
INSTALLATION

1. Exterior Stud Frame

The steel framework must be designed according to the static requirements of the construction.



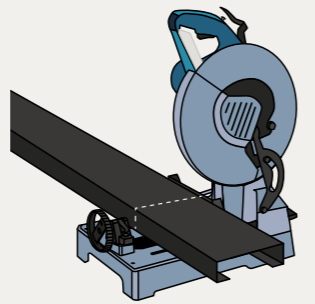
1.1 For an exterior wall, installed between floors, the maximum permissible cantilever of the studs is one third of their web height. If the cantilever exceeds this amount, the studs have to be supported by a steel angle, installed in front of the floors (even here an excess of a maximum cantilever of half of the web height is not allowed). In this system Knauf Exterior Wall Profiles with a web height of 150 mm are used, resulting in a maximum cantilever of 50 mm without the need of additional support.



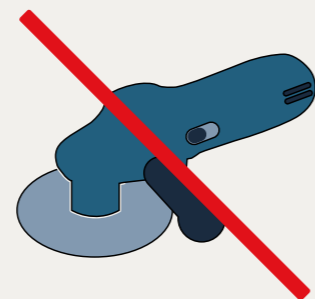
1.2 For the correct alignment of the Knauf Exterior Wall, the vertical alignment of the slab edges of the skeleton construction is measured over all floors. To guarantee straight exterior walls, display the course of the walls on the floors, ceilings and columns before installing the profiles. It is recommended to use a chalk line, a cross-line laser or a rotating laser for these tasks.



1.3 Cut profiles up to 0.7 mm thickness to appropriate length using manual or electrical steel cutter or use an electrical circular saw with special metal blade.



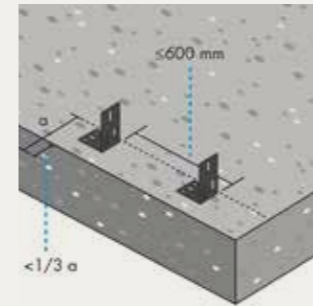
1.4 Metal thicknesses bigger than 0.7 mm cannot be cut by manual steel cutters. Electric separating tools need to be used. The tool has to be selected according to the coating system. This is especially important for lacquers and other organic coatings, which are damaged by the influence of temperature and flying sparks. The use of band saws, low speed chop saws (≤ 1500 rpm) or special circular saws for cold cuts without flying sparks is highly recommended. Cut edges of corrosion-protected profiles with a nominal thickness bigger than 1.5 mm have to be treated with corrosion protection coating (e.g. Drystar-Korrosionsschutzlack C3/C5M).



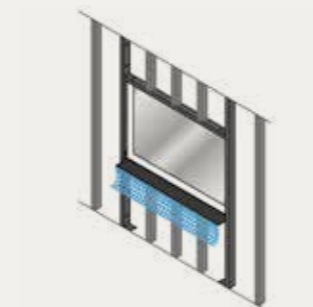
1.5 The use of separation methods causing sparks (e.g. angle grinders) destroy the corrosion protection of the profiles.



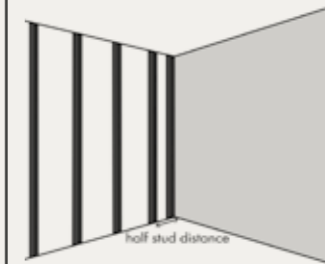
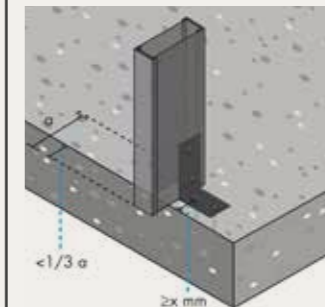
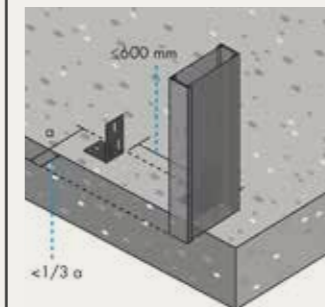
1.6 Use an appropriate drilling machine to drill holes into the reinforced concrete for the anchors.



1.7 Fix Knauf Exterior Wall Angles 70x135/100 at ceilings and floors using approved anchoring means according to local building regulations (fire resistance) and static requirements (type and quantity of fasteners). The minimum distance of the fasteners to the floor end depends on the type of fastener used. Do not use plastic plugs due to fire regulations. Please respect the mandatory borehole diameters and depths for the screw anchors.

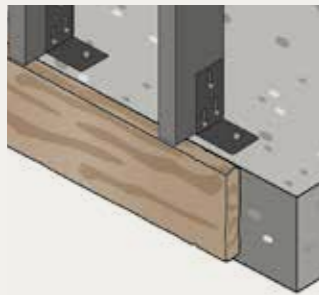


1.8 It is recommended to create the window/door openings first, before installing the studs of the undisturbed parts of the wall, because substantial time savings can be realized. Actually manufacturers can build windows in advance and transport them to the site, because they can work to precise plans and dimensions. So they are ready for immediate installation, while the rest of the studs are set up. The openings and its auxiliary structure have to be designed in accordance with building static requirements.

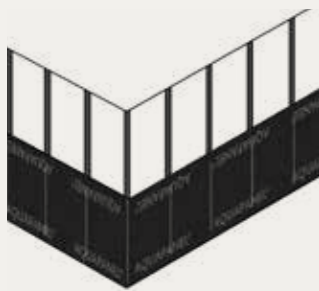


1.9 For this system two Knauf Exterior Wall Profiles need to be interlaced as a box for each stud, due to static requirements for the ventilated rainscreen construction. Follow rules of distances: the distance between the vertical KEW Profiles is dependent on room height and static calculations (600 mm in maximum), the maximum distance between the first two studs next to other building elements such as walls and columns is half the distance calculated for the undisturbed wall. For instance 300 mm for walls with a normal stud spacing of 600 mm. Where KEW Profiles are directly connected to these building elements, use decoupling tape. For attaching the KEW Profiles to the KEW Steel Angles 70 x 135/100 use KEW Screws 4.8 x 20. In doing so, apply 3 screws at the bottom of the slotted holes in each of the KEW Steel Angles (at the floor and at the ceiling). This way possible tensions are avoided. The KEW Profiles are cut to length as usual in drywall construction: generally 10mm shorter than the distance between head and foot point.

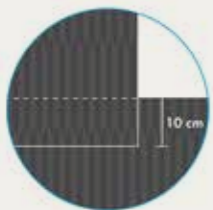
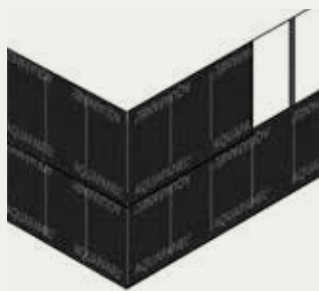
2. Installing the Water Barrier



2.1 To prevent thermal bridges at the floor ends insulate the section in front of floors with a layer of glass wool insulation according to building physical requirements, before applying the water barrier. Note: The longer the cantilever, the thicker the insulation in front of the floors.



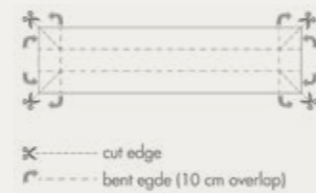
2.2 Before mounting AQUAPANEL® Cement Board Outdoor it is required to install the water and windproof AQUAPANEL® Water Barrier to protect the insulation. Start at the bottom of the wall and install the water barrier horizontally. Secure this foil temporarily by using double-sided adhesive tape, followed by the prompt installation of the boards. Therefore only install as much stretches of the foil, which you are able to cover by boards in one day. Overlap all horizontal and vertical joints of the water barrier at least 10 cm. The horizontal overlap is already marked on the product by two dashed lines. The overlaps themselves do not need to be masked by adhesives.



› Option 1: Installing the water barrier onto window openings



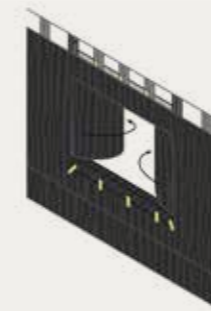
2.3 Approximate to the wall opening from below. If the windows are not installed up to this moment, first cover the lintel area of the opening with a narrow strip of AQUAPANEL® Water Barrier and secure it with adhesive tape. Make sure that the installed strip overlaps at least 10 cm (see exemplary pattern with cut and bent edges).



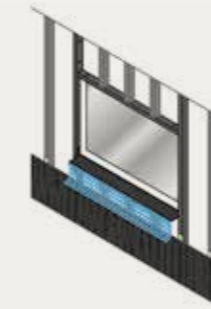
2.4 Cover the opening with one or more stretches of AQUAPANEL® Water Barrier just the same way as for the undisturbed areas of the wall. After that cut the foil horizontally at the lintel and the parapet and vertically in the middle of the window opening and open the resulting protrusions like window shutters to the outside (see picture).



2.5 Like the lintel, also the parapet of the window opening has to be covered with AQUAPANEL® Water Barrier. Therefore again cut a narrow strip of the foil and install it with adhesive tape. Also here the strip has to overlap at least 10 cm (see exemplary pattern with cut and bent edges above).

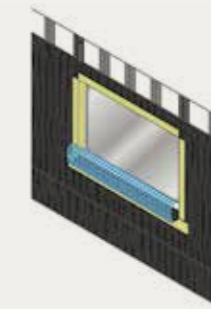
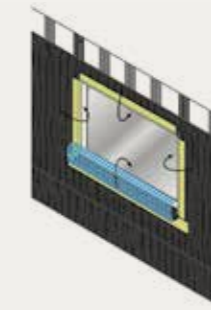
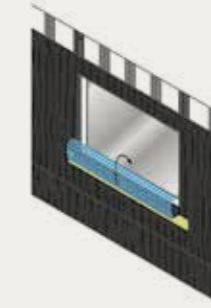
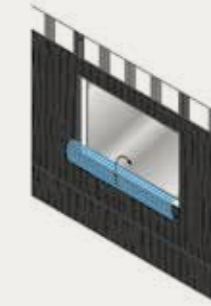


› Option 2: Installing the water barrier over preinstalled windows



2.6 Fold the protrusions of the AQUAPANEL® Water Barrier inwards and secure it with tape so that it remains properly stretched at the vertical reveals.

2.7 Reinforce window corners with an extra piece of tape, which is adhered directly in the window corners and to some extent pulled over the edges on the outside and inside surface of the wall (e.g. Knauf Insulation LDS Solitwin is particularly suited for this application).



2.4 Cut out the area of the water barrier, which is covering the window, alongside the reveals, lintel and parapet.

2.5 Fold up the reinforcing mesh underneath the windowsill and secure the water barrier at the parapet with an adhesive tape (e.g. Knauf Insulation LDS Solitop).

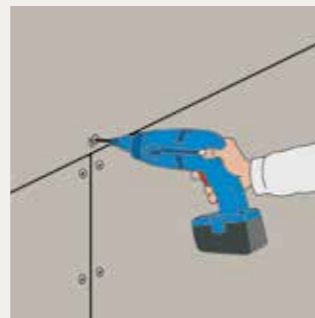
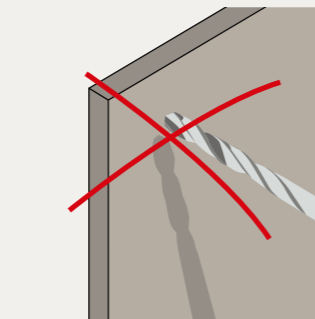
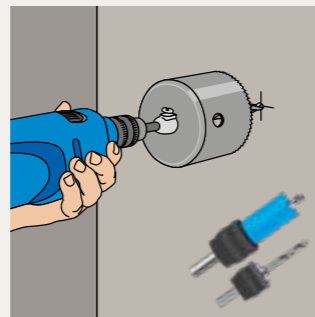
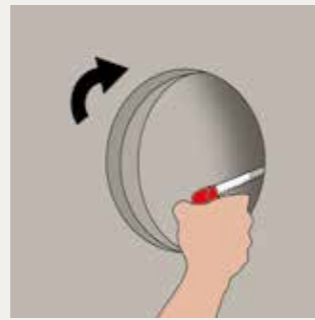
2.6 Finally secure the water barrier lengthwise along the edges of the reveals and the lintel.

3. Exterior Board Installation

3.1 Mark the desired shape or opening on the board with pencil and ruler. Use a knife to score the cement or gypsum boards on one side along the line so that the mesh resp. thick paper is cut. Snap the scored edge and cut the mesh/paper on the rear side.



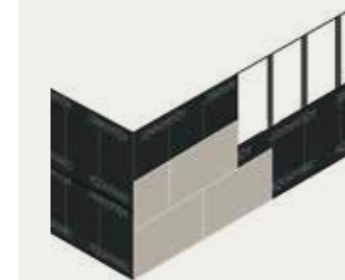
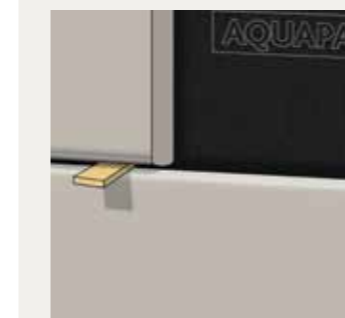
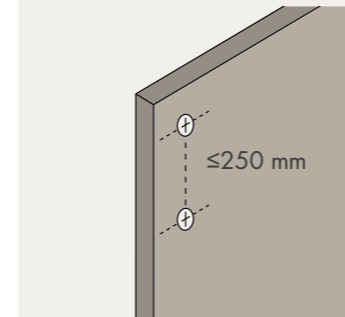
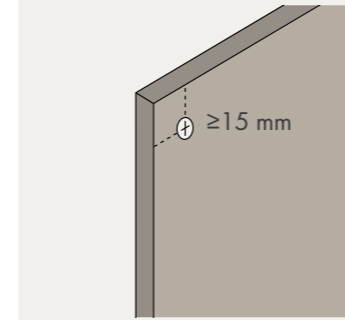
3.2 For sharp-edged cuts, for example, exterior edges, use a hand-held circular saw with a dust extractor or a pendulum jigsaw. Use of a carbide or diamond-tipped saw blade is recommended.



3.3 To make cut-outs for wiring and pipes, use a jigsaw or hole saw. The diameter of the opening should be approximately 10 mm greater than the diameter of the pipe. The remaining gap can be closed with a cuff, suitable sealant or sealing strip.

3.4 Generally, no pre-drilling of boards is required. However, pre-drilling of boards and profiles is needed if the material thickness of the profiles exceeds 2 mm (according to static requirements) or when blind rivets are used instead of screws.

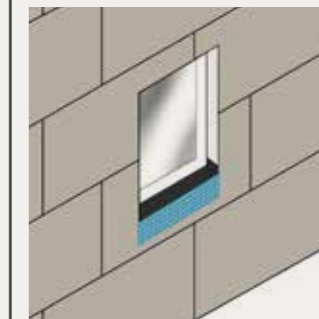
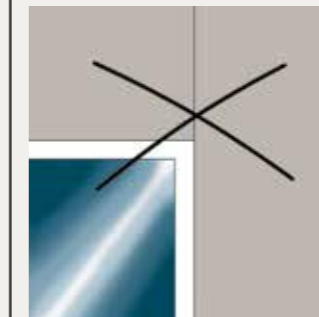
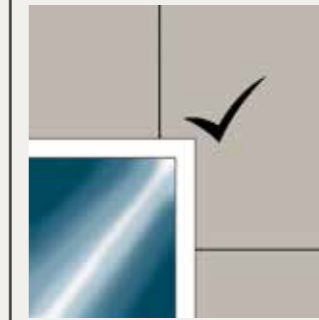
3.5 To fasten the boards with screws use a screw gun with depth stop (comprising overturned sleeve and a stop sleeve). This ensures that all screws are countersunk in the same correct way. Fasten AQUAPANEL® Cement Board Outdoor to the stud frame with AQUAPANEL® Maxi Screws. First fasten the screws in the centre of the cement boards, then work towards the edges. During installation, make sure the cement boards fit closely to the substructure. Screws should not be overtightened.



3.6 Follow rules of distances: the screw spacing must not exceed 250 mm and the spacing from the edge has to be at least 15 mm.

3.7 Apply AQUAPANEL® Cement Board Outdoor panels horizontally. Arrange front edge joints (vertical) on centre of profile flanges. Leave a gap of 3-5 mm between boards alongside the long and front edges (horizontal and vertical) using a suitable spacer. Front edge joints (vertical) must be staggered by at least one stud spacing.

Note: Hairline cracks on the surface of the AQUAPANEL® Cement Board Outdoor are no indications of loss of strength or function, as long as embedded glass fibre mesh is intact.



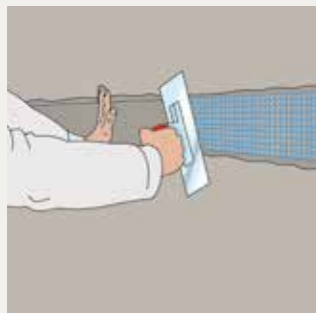
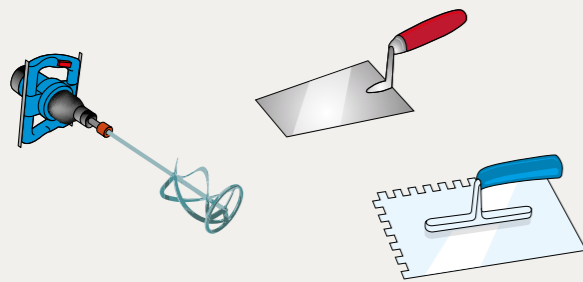
3.8 Take the boards up to the parapet, reveals and parapet of the window or the door. There must be no continuous joints as these could lead to cracks and leaks. The spacing between the board joints and the imaginary extensions (horizontal and vertical) of the window frames has to be at least 150 mm.

Note: If the windows are already installed, just make sure to fold up the reinforcing mesh underneath the windowsill before fixing AQUAPANEL® Cement Board Outdoor beneath the parapet.

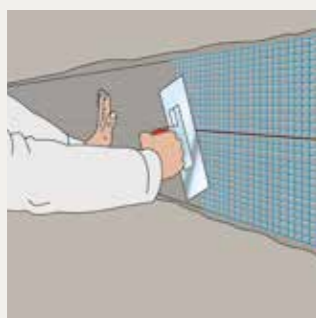
4. Joint Treatment



4.1 Immediately after fixing the boards, protect the wall from weathering by filling all the joints with AQUAPANEL® Joint Filler – grey. Use an agitator to mix the joint filler. A tool with 600 rpm is recommended.



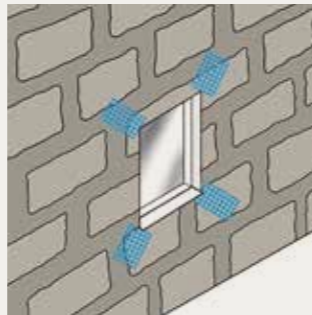
4.2 Right after that embed AQUAPANEL® Tape (10 cm) centred alongside all joints.



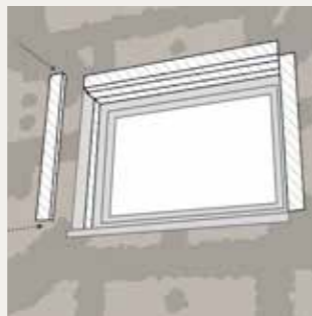
4.3 If later only one coat of paint is to be applied onto AQUAPANEL® Exterior Basecoat or AQUAPANEL® Exterior Basecoat – white, use AQUAPANEL® Exterior Reinforcing Tape which has a width of 20 cm.



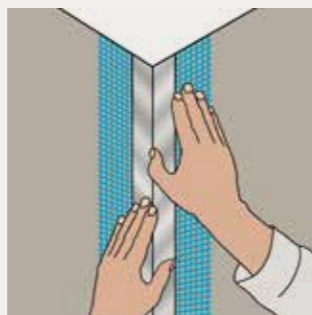
4.4 Finally cover the screw heads with AQUAPANEL® Joint Filler – grey.



4.5 Reinforce the boards next to the door and window corners with a narrow strip of AQUAPANEL® Reinforcing Mesh (size 50 x 30 cm, applied at an angle of 45° to the corners - see picture).



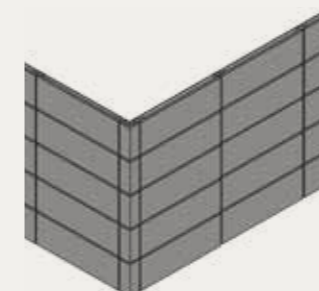
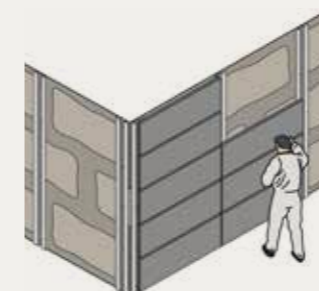
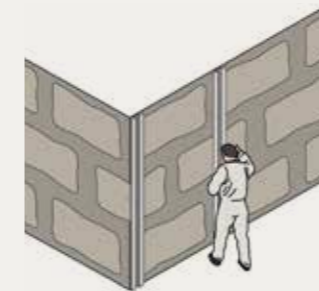
4.6 Mount appropriate PVC-plaster profiles at the corners and edges of the windows to protect them. Embed it in AQUAPANEL® Joint Filler grey.



4.7 Outside corners are reinforced by applying a PVC-corner profile with AQUAPANEL® Joint Filler - grey.

Note: In this state the building envelope is closed. The wall surface may now be freely exposed to the weather for up to six months, before applying rainscreen facade elements. As a result, interior works (including screeding and the installation of stud frames, vapour barrier, lining and insulation) can progress.

5. Third-Party Rainscreen Facade Construction



5.1 A hat profile serves as the substructure for 3rd-party rear-ventilated rainscreen facade systems. Mounted directly onto the AQUAPANEL® Cement Board Outdoor, it enables slim and light construction designs. Place the hat profile (e.g. Hutprofil 98/15/06) vertically with its web in the middle of the stud flanges. Fix it with appropriate screws (e.g. EJOT JT3-2-6,0 x 35) to the substructure. Please contact the manufacturer of the respective facade system for fastening alternatives. If scaffolding anchors are present, pass them through the AQUAPANEL® Cement Board Outdoor and close the remaining holes with plastic plugs when dismantling the scaffold.

6. Insulation of the Exterior Stud Frame



6.1 At first the exterior stud frame has to be insulated. Use the right product for the job depending on whether thermal insulation, acoustic insulation or fire protection is required. Insulation materials are easy to handle and install, being lightweight and easily cut to size. Where necessary, use an appropriate knife on flat surface to cut.



6.2 To minimise thermal bridges insulation should fill the complete stud spaces. Do not use small pieces.

7. Installation of the Intermediate Gypsum Board



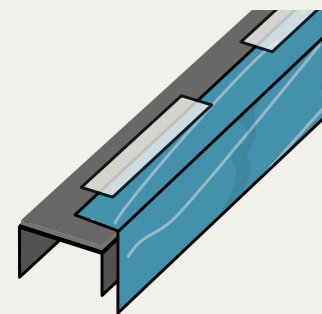
7.1 Subsequent to the installation of the insulation, mount the intermediate gypsum board (GKFI) with AQUAPANEL® Maxi Screws SN 25 to the exterior stud frame. Here a joint treatment is not necessary.

Note: At this stage protection against falling is ensured and the scaffold on the exterior can be dismantled.

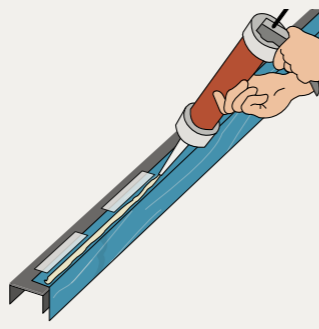
8. Interior Stud Frame



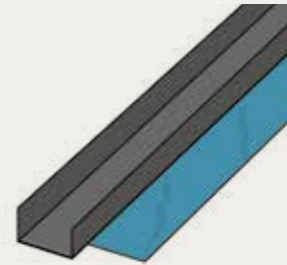
8.1 To prevent thermal and acoustic bridges and to compensate uneven surfaces, adhere self-adhesive decoupling tape to the web of the UW runner.



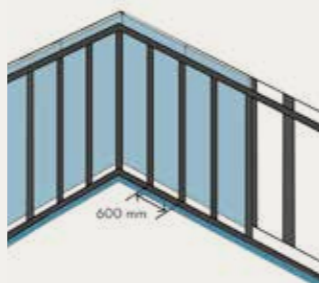
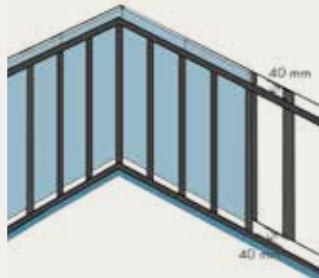
8.2 To guarantee an air-tight connection of the vapour barrier to floors and ceilings, in a first step adhere a 15 cm wide strip of the vapour barrier with an appropriate adhesive tape (e.g. Knauf Insulation LDS Soliplan) on top of the decoupling tape.



8.3 Secondly apply an appropriate elastic, durably strong pasty adhesive (e.g. Knauf Insulation LDS Solimur) or a double-sided adhesive tape (e.g. Knauf Insulation LDS Kleberaube), before mounting the profiles to the floor and to the ceiling.



8.4 Please consider the scope of application (fire protection) and static requirements, when deciding upon type and number of fasteners. When using the hammer-in steel metal anchor A4 to fix the UW profiles to floors or ceilings the borehole needs to have a diameter of 6 mm and a depth of 45 mm. Use an appropriate drilling machine to drill the boreholes into the reinforced concrete. The distance between intermediate board and interior stud frame should be 40 mm.



8.5 Cut and install the CW profiles vertically according to floor height (stud spacing max. 600 mm). If CW profiles are connected to flanking building parts such as columns or massive walls, use decoupling tape to prevent thermal and acoustic bridges.

9. Installation of the Intermediate Insulation



9.1 Fill the 40 mm gap between the interior and the exterior stud frame with appropriate insulation material (e.g. glass wool 16kg/m³ with a thermal conductivity rating of 035).

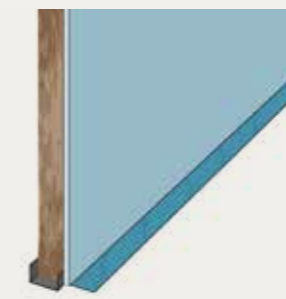
10. Interior Lining



10.1 Fill the interior stud frame with insulation material in the same way like described before for the exterior stud frame.



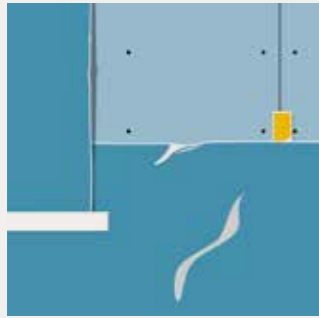
10.2 In most cases electrical and pipe installations inside the exterior wall are not necessary. If those installations however cannot be avoided, lay these installations solely through the interior stud frame. For cut-outs e.g. for pipes, services, either use studs with special pre-fabricated slots or use a hole saw to cut out the required openings.



10.3 Before installing the first layer of gypsum boards (GKFI), make sure all electrical installation has been completed. Place the panel edges in the middle of the stud flanges. Fix the gypsum boards (GKFI) with appropriate screws (e.g. Knauf Diamant-schrauben XTN 3.9x23) to the substructure. Penetration of the metal substructure has to be at least 10 cm. Follow rules of distances: the screw spacing must not exceed 750 mm (board width: 1250 mm in a vertical board positioning) resp. 600 mm (board width: 625 mm in horizontal board positioning) and the spacing from the edge has to be at least 10 mm (half-rounded tapered edges) resp. 15 mm (cut edges). Fill joints fully (e.g. standard gypsum board application with half-rounded tapered edges). Use trowel to fill joints with suitable joint filler (e.g. Uniflott).



10.4 Fix the free end of the 15 cm wide vapour barrier strip onto the first layer of gypsum boards with an appropriate adhesive tape.



10.5 Install the Knauf Insulation LDS 10 Silk vapour barrier over the entire surface. The vapour barrier must overlap where more than one sheet is placed. Overlaps, window connections and pipe and service penetrations have to be sealed with appropriate adhesion tapes (e.g. Knauf Insulation LDS Soliplan, Solitwin or Solifit S) in order to obtain optimum air tightness. Mount gypsum boards (GKFI) in front of the vapour barrier. Work in staggered method; stagger at least one stud space.



10.6 To fix the boards to the substructure use an appropriate drywall screw (e.g. Knauf Diamantschraube XTN 3.9x38). Penetration of the metal substructure has to be at least 10 cm. Follow rules of distances: the screw spacing must not exceed 250 mm (board width: 1250 mm in vertical board positioning) resp. 200 mm (board width: 625 mm in horizontal board positioning) and the spacing from the edge has to be at least 10 mm (half-rounded tapered edges) resp. 15 mm (cut edges).



10.7 Fill joints fully (e.g. standard gypsum board application with half-rounded tapered edges). Use trowel to fill joints with suitable joint filler (e.g. Uniflott).



10.8 Run the trowel progressively down the joint applying sufficient pressure to squeeze out entrapped air. Allow the joint filler to set for approx. 1 hour. If required, sand lightly to remove any high spots. Remove surface dust.



10.9 Apply an additional thin layer of joint filler and remove any surplus filler. Create a smooth and levelled transition to the board surface with Trowel or Wide Spatula. Feather out application beyond the joints - approximately 100 to 200 mm.



10.10 Allow the joint filler to set for approx. 1 hour. If required, sand lightly to remove any high spots. Remove surface dust.

11. Interior Finishing

For detailed information about interior finishing options, please contact your local Knauf organisation.



MATERIAL CONSUMPTION & ERECTION TIME

Product Group	Materials (from the inside to the outside)	Thickness (mm)	Weight per m ² (kg)	Material consumption per m ²	Unit	Installation time per m ² (min)
Interior stud framework (600 mm stud spacing)	Knauf Diamant (GKFI/DFH2IR) or similar	12.50	12.80	1	m ²	30
	Knauf Diamantschraube XTN 3,9 x 23 mm	-	-	7	pcs.	
	Knauf Diamantschraube XTN 3,9 x 38 mm	-	-	15	pcs.	
	Knauf Uniflott or similar	-	0.40	0.4	kg	
	Knauf Trennfix or similar	-	-	0.9	m	
	Knauf Insulation LDS 10 silk or similar	-	-	1.1	m ²	
	Knauf Insulation LDS adhesive tape	-	-	1	pcs.	
	Knauf Diamant (GKFI/DFH2IR) or similar	12.50	12.80	1	m ²	
	CW 75/50/06 C3	-	1.60	2	linear m	
	UW 75/40/06 C3	-	0.49	0.7	linear m	
	Knauf Dichtungsband 50 mm	-	-	0.7	linear m	
	Knauf Deckennagel A4	-	-	0.9	pcs.	
	Insulation board according to local needs	75.00	1.35	1	m ²	
Intermediate insulation	Intermediate insulation according to local needs	40.00	0.72	1	m ²	3
Intermediate panelling	Knauf Diamant (GKFI/DFH2IR) or similar	12.50	12.80	1	m ²	5
	AQUAPANEL® Maxi Screw SN25	-	-	15	pcs.	
Exterior stud framework (600 mm stud spacing)	2x KEW Profile 150 (min. corrosion protection C3) - boxed	-	6.80	4	linear m	30
	Anchoring means (to be provided on site)	-	-	3	pcs.	
	KEW Steel Angle 70x135/100 (min. corrosion protection C3)	-	-	1.5	pcs.	
	KEW Screw 4.8 x 20 (rustproofed)	-	-	4.5	pcs.	
	Insulation board according to local needs	150.00	2.70	1	m ²	
Water barrier / windproofing	AQUAPANEL® Water Barrier	-	-	1.1	m ²	2
	Adhesive tape	-	-	1	pcs.	
Exterior lining	AQUAPANEL® Cement Board Outdoor	12.50	16.00	1	m ²	15
	AQUAPANEL® Maxi Screw SN39	-	-	15	pcs.	
	AQUAPANEL® Joint Tape (10cm)	-	-	2.1	linear m	
	AQUAPANEL® Joint Filler - grey	-	0.70	0.7	kg	
Finishing	Third-party rainscreen facade incl. hat profile	40.00	10.00	1	m ²	45
Sum		355.00	79.16			130

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