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European Technical Assessment

ETA 13/0312
of 14.01.2022



General part

Technical Assessment Body issuing the ETA: ITeC	
ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment)	
Trade name of the construction product	Kits for Knauf External Wall Systems WM111C; WM211C; WM311C; WM411C; WM111G; WM211G; WM311G; WM411G.
Product family to which the construction product belongs	Kits for non-load bearing mineral board external wall systems.
Manufacturer	KNAUF GIPS KG Am Bahnhof 7 97346 Iphofen Germany
Manufacturing plant(s)	According to Annex N kept by ITeC.
This European Technical Assessment contains	73 pages including 10 annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of	EAD 090120-00-0404 <i>Kits for non-load bearing mineral board external wall systems. July 2018</i>
This ETA replaces	ETA 13/0312, issued on 31.07.2018.

General comments

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may be made, with the written consent of issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

Specific parts of the European Technical Assessment

1 Technical description of the product

This ETA refers to the following kits:

- 1) Kit for Knauf External Wall Systems WM111.C; WM211.C; WM311.C; WM411.C¹ with or without renderings (see clauses A1.1 & A1.2 of Annex 1).

This kit consists of six rendering systems (different combinations of base-coats and finishing coats), the AQUAPANEL® Cement Board Outdoor as external-board, its joint treatment and its board-fixings, three types of internal-boards (cement board, gypsum fibre board and gypsum board), its joint treatment and its board-fixings, three galvanized steel subframes (two with non-slotted profiles and one with slotted profiles), one galvanized steel interior subframe (non-slotted profiles), mineral wool thermal insulation (in the subframe cavities) and, optionally, the flexible sheet for waterproofing and the flexible sheet for vapour control.

- 2) Kit for Knauf External Wall Systems WM111.G; WM211.G; WM311.G; WM411.G without rendering (see clause A1.2 of Annex 1).

This kit consists of two types of external-boards (gypsum fibre board and gypsum board with mat reinforcing), its joint treatment and its board-fixings, and the other components indicated for the kit above, except the rendering systems.

Kit components are given in table 1.1 related with Knauf External Wall Systems components.

Table 1.1: External wall system components.

Assembled system layer	Knauf External Wall Systems WM111.C; WM211.C; WM311.C; WM411.C	Knauf External Wall Systems WM111.G; WM211.G; WM311.G; WM411.G	Technical description
Rendering systems (only for Use 1 according to clause 1.2)	FC: Finishing coat	---	Annex 2
	P: Primer	---	
	BC: Base-coat	---	
	M: Reinforcing mesh	---	
External layer	EB: AQUAPANEL® Cement Board Outdoor	EB: VIDIWALL HI gypsum fibre external-board	Annex 3
		EB: GUARDEX gypsum with mat reinforcing external-board	
	EBF: External board-fixings	EBF: External board-fixings	Annex 7
Internal or intermediate layer	WPL: Flexible sheet for waterproofing (optional) (*)		Annex 4
	IB: Internal or intermediate boards	IB: Internal or intermediate boards	
	IBF: Internal board-fixings	IBF: Internal board-fixings	
External subframe (single or double wall)	VCL: Flexible sheet for vapour control (optional) (*)		Annex 5
	ExS: Galvanized steel profiles		
Internal subframe (double wall)	InS: Galvanized steel profiles		Annex 6
	Fixings between the substrates and the supporting structure (*)		
Other	Thermal insulation (*)		Annex 7
(*) These components may be not part of the kit, but they are always part of the assembled system. They are not supplied by the kit manufacturer; however, they are available on the market, and they have to meet the specifications indicated in this ETA (see Annex 5 and Annex 7).			

¹ W = wall; M = metallic subframe; *first number* = assembled system family (1 = single wall without internal horizontal subframe; 2 = single wall with internal horizontal subframe; 3 = double wall without intermediate board; 4 = double wall with intermediate board); *second number* = non load-bearing or load-bearing wall (1 = non load-bearing); *third number* = ventilated or non-ventilated wall (1 = non-ventilated; 2 = ventilated); C = cement as external-board material; G = gypsum as external-board material.

Detailed information and data of all the components are given in the annexes of this ETA.

The flexible sheet for waterproofing may be used on the assembled systems depending on the climatic conditions of the works where the system is installed; however, the thermal insulation and the fixings between the subframes and the supporting structure are always needed for the execution of the assembled systems and they should be chosen accordingly following the specifications given in this ETA. In the case of fixings, the supporting structure material and the resistance required due to wind load (shear strength) must be considered.

Other elements of the external walls that neither are part of the kit nor the system are:

- External finishings² (bonded and/or mechanically fixed) in case of the Use 2, use as substrate walls (see clause 1.2).
- Internal finishings (e.g., renderings, primers, paints and tiles).
- Windows and doors.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

1) Kit for Knauf External Wall Systems WM111.C; WM211.C; WM311.C; WM411.C is to be used as:

- Use 1: Complete external wall³ systems in non-ventilated façades when the kit includes the rendering system.
- Use 2: Substrate wall⁴ systems in ventilated and non-ventilated façades when the kit does not include the rendering systems.

2) Kit for Knauf External Wall Systems WM111.G; WM211.G; WM311.G; WM411.G to be used as:

- Use 2: Substrate wall systems in ventilated and non-ventilated façades when the kit does not include the rendering systems.

This ETA covers the kits for families 1 to 4 according to table 1.1 of EAD 090120-00-0404 as shown in tables of Annex 1.

The provisions made in this European Technical Assessment are based on an assumed working life of at least 25 years for the kits. The indications given on the working life cannot be interpreted as a guarantee given by the producer but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

Knauf External Wall Systems are made of non-load bearing construction components. They do not contribute directly to the stability of the wall on which they are installed, but they may contribute to its durability by providing enhanced protection from the effect of weathering.

Knauf External Wall Systems with metallic subframes that are not interrupted by the structural floors (continuous subframes fixed to the front of the structural floors such as in curtain walling) are not covered by this ETA.

Construction details are given in Annex 8.

² The exterior finishings are not part of the kit, however, the generic exterior finishings provided for the substrate walls are described in Annex 10.

³ Non load-bearing complete building envelope.

⁴ Substrate of exterior finishings (bonded and/or mechanically fixed). In this case, the assessment as complete building envelope (with exposition to external weather conditions) is not part of this ETA.

3 Performance of the product and reference to the methods used for its assessment

The assessment of the kits for Knauf External Wall Systems for the intended use was performed following EAD 090120-00-0404 *Kits for non-load bearing mineral board external wall systems*.

Table 3.1: Summary of the performance (see also detailed performances in relevant annexes).

Basic Working Requirement	EAD clause	Essential characteristic	Performance	
			Use 1	Use 2
Product: Kit for Knauf External Wall Systems	Intended use:	Use 1: Complete external wall systems in non-ventilated façades when the kit includes the rendering system.		
		Use 2: Substrate wall systems in ventilated and non-ventilated façades when the kit does not include the rendering systems.		
BWR 2 Safety in case of fire	2.2.1	Reaction to fire	See table A1.1.5	See table A1.2.5
	2.2.2	Resistance to fire	See table A1.1.5	See table A1.2.5
	2.2.3	Façade fire performance	Not assessed	
	2.2.4	Propensity to undergo continuous smouldering	Not assessed	
BWR 3 Hygiene, health and the environment	2.2.5	Watertightness (protection against driving rain)	See table A1.1.5	See table A1.2.5
	2.2.6	Water absorption	See table A1.1.5	See table A1.2.5
	2.2.7	Water vapour permeability	See table A1.1.5	See table A1.2.5
	2.2.8	Condensation risk	Not assessed	
	2.2.9	Air permeability	See table A1.1.5	See table A1.2.5
	2.2.10	Content, emission and/or release of dangerous substances	Not assessed	
BWR 4 Safety and accessibility in use	2.2.11	Wind load resistance	See clause 3.1	
	2.2.12	External eccentric vertical load resistance	Not relevant	Not assessed
	2.2.13	Internal eccentric vertical load resistance	Not assessed	
	2.2.14	Internal horizontal linear static load resistance	Not assessed	
	2.2.15	External impact resistance	See table A1.1.5	See table A1.2.5
	2.2.16	Internal impact resistance	See table A1.1.5	See table A1.2.5
	2.2.17	Resistance to horizontal point loads	Not assessed	Not relevant
	2.2.18.1	Bond strength	See table A1.1.5	Not relevant
	2.2.18.2	Bending strength of the board	See table A1.1.5	See table A1.2.5
	2.2.18.3	Embedding/Shear strength	See table A1.1.5	See table A1.2.5
	2.2.18.4	Fixing pull-through / pull-out strength	See table A1.1.5	See table A1.2.5
2.2.18.5	Resistance of profiles	See table A1.1.5	See table A1.2.5	
BWR 5 Protection against noise	2.2.19	Airborne sound insulation	Not assessed	
	2.2.20	Sound absorption	Not assessed	
BWR 6 Energy economy and heat retention	2.2.21	Thermal resistance	See Annex 9	
	2.2.22	Thermal inertia	Not assessed	
	2.2.23	Heat capacity	Not assessed	
Durability	2.2.24.1	Accelerated ageing behaviour	See table A1.1.5	See table A1.2.5
	2.2.24.2	Cracking strength due to board deformation	Not assessed	
	2.2.24.3	Dimensional stability by humidity	See table A1.1.5	See table A1.2.5
		Dimensional stability by temperature	See table A1.1.5	See table A1.2.5
	2.2.24.4	Moisture content	See table A1.1.5	See table A1.2.5
	2.2.24.5	Corrosion	See table A1.1.5	See table A1.2.5
2.2.24.6	UV radiation resistance	See table A1.1.5	See table A1.2.5	

Complementary information:

Requirements with respect to the mechanical resistance and stability of non-load bearing parts of the works are not included in the Basic Works Requirement *Mechanical resistance and stability* (BWR 1) but are treated under the Basic Works Requirement *Safety and accessibility in use* (BWR 4).

3.1 Wind load resistance

The wind load resistance of the kits has been assessed according to clause 2.2.11 of EAD 090120-00-0404.

Tables A1.1.5 and A1.2.5 in Annex 1 give the wind load resistance obtained in the tests carried out for Knauf External Wall Systems.

In addition, tables 3.1.1 to 3.1.3 give the wind load resistance for other assembled systems with different span of kit subframe components considering the weakest vertical profile.

Table 3.1.1: Wind load resistance for kits with galvanized steel non slotted C/U-profiles as external subframe.

Span between (mm)		Characteristic value Q (kN/m ²) (*)	Failure limit condition
Vertical profiles	Structural floors, L		
400	2000	≤ 1,8	Failure load obtained during the wind load test (1800 Pa)
	2250		
	2500	≤ 1,5	Deflection of vertical profiles L/250
	2750	≤ 1,2	
	3000	≤ 0,9	
	3250	≤ 0,7	
	3500	≤ 0,6	
600	2000	≤ 1,6	Elastic limit of the vertical profiles > 140 MPa
	2250	≤ 1,3	Deflection of the vertical profiles L/250
	2500	≤ 1,0	
	2750	≤ 0,8	
	3000	≤ 0,6	
	3250	≤ 0,5	
	3500	≤ 0,4	

(*) Calculated values using simple beam uniformly distributed load formulas. Values for the weakest vertical profile C75x50x1,0.

Table 3.1.2: Wind load resistance for kits with galvanized steel non-slotted CW/UW-profiles as external subframe.

Span between (mm)		Characteristic value Q (kN/m ²) (*)	Failure limit condition
Vertical profiles	Structural floors, L		
400	2000	≤ 1,1	Failure load obtained during the wind load test (1100 Pa)
	2250		
	2500		
	2750		
	3000	≤ 1,0	Deflection of the vertical profiles L/250
	3250	≤ 0,8	
	3500	≤ 0,7	
600	2000	≤ 1,1	Failure load obtained during the wind load test (1100 Pa)
	2250	≤ 1,1	Elastic limit of the profile material Re = 140 MPa
	2500		
	2750	≤ 0,9	Deflection of the vertical profiles L/250
	3000	≤ 0,7	
	3250	≤ 0,6	
	3500	≤ 0,4	

(*) Calculated values using simple beam uniformly distributed load formulas. Values for the weakest vertical profile CW100x50x0,6.

Table 3.1.3: Wind load resistance for kits with galvanized steel slotted RY/SKY-profiles as external subframe.

Span between (mm)		Characteristic value Q (kN/m ²) (*)	Failure limit condition
Vertical profiles	Structural floors, L		
400	2000	≤ 2,3	Failure load obtained during the wind load test (2350 Pa)
	2250		
	2500		
	2750		
	3000	≤ 2,3	Deflection of the vertical profiles L/500
	3250	≤ 1,8	
	3500	≤ 1,5	
600	2000	≤ 2,3	Failure load obtained during the wind load test (2350 Pa)
	2250		
	2500	≤ 1,9	Failure load obtained during the wind load test (2350 Pa).
	2750	≤ 1,5	
	3000	≤ 1,2	Deflection of the vertical profiles L/500
	3250	≤ 1,0	
	3500	≤ 0,8	

(*) Calculated values using simple beam uniformly distributed load formulas. Values for the weakest vertical profile RY145x50x1,0.

In other configurations of the assembled system (other subframe components), the wind load resistance may be calculated according to:

- Maximum tension of the vertical profiles, see elastic limit of profile material in Annex 4.
- Maximum deflection of the vertical profiles, L/250.
- This calculated wind load value should not be greater than the maximum resistance given in tables A1.1.5 or A1.2.5 of Annex 1.

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

According to the decision 2003/640/EC, as amended of the European Commission⁵, the systems of AVCP (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table apply.

Table 4.1: Applicable AVPC system.

Product	Intended use		Level or class	System
Kits for non-load bearing mineral board external wall systems	Complete external wall	not subject to fire regulations	Any	2+
		subject to fire regulations	B,s1-d0	3
	Substrate wall	Ventilated and non-ventilated façades	Any	2+
			A2-s1,d0	3 or 4

⁵ 2003/640/EC – Commission Decision of date 4 September 2003, published in the Official Journal of the European Union (OJEU) L226/21 of 10/09/2003.

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

All the necessary technical details for the implementation of the AVCP system are laid down in the *Control Plan* deposited with the ITeC⁶, with which the factory production control shall be in accordance.

Issued in Barcelona on 14 January 2022

by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart
Technical Director, ITeC

⁶ The *Control Plan* is a confidential part of the ETA and is only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

ANNEX 1 - KNAUF EXTERNAL WALL SYSTEMS

A1.1 – COMPLETE EXTERNAL WALL SYSTEMS

Table A1.1.1: Description of Knauf External Wall System with rendering WM111.C – Family 1.

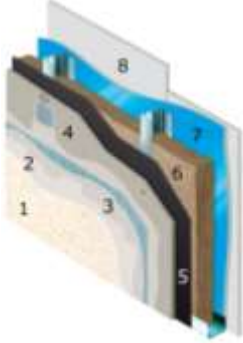
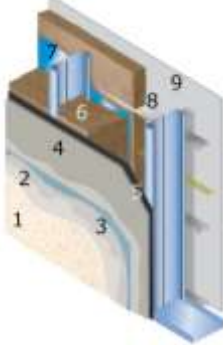
	Family 1 – single wall without internal horizontal profile																												
	Use 1: Complete building envelope in non-ventilated façades Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water. Subframe material: Galvanized steel.																												
<ol style="list-style-type: none"> 1. Finishing coat 2. Primer 3. Base-coat and reinforcing mesh 4. External-board and joint treatment 5. Flexible sheet for waterproofing (optional) 6. Subframe and thermal insulation. 7. Flexible sheet for vapour control (optional) 8. Internal-boards and joint treatment. 	System main components:																												
	<table border="1"> <tr> <td>Rendering systems</td> <td></td> <td>See Annex 2</td> </tr> <tr> <td>External layer</td> <td>Cement external board</td> <td>See clause A3.1</td> </tr> <tr> <td rowspan="2">Internal layer</td> <td>Cement internal-board</td> <td>See clause A4.1</td> </tr> <tr> <td>Gypsum internal-boards</td> <td>See clause A4.2</td> </tr> <tr> <td rowspan="2">External subframe</td> <td>Non-slotted profiles</td> <td>See clause A5.1</td> </tr> <tr> <td>Slotted profiles</td> <td>See clause A5.2</td> </tr> <tr> <td>Thermal insulation</td> <td></td> <td>See clause A7.1</td> </tr> <tr> <td>Flexible sheet for waterproofing (optional)</td> <td></td> <td>See clause A7.2</td> </tr> <tr> <td>Flexible sheet for vapour control (optional)</td> <td></td> <td>See clause A7.3</td> </tr> <tr> <td>Fixings between the subframe and the supporting structure (optional) (*)</td> <td></td> <td>See table A5.1.7</td> </tr> </table>	Rendering systems		See Annex 2	External layer	Cement external board	See clause A3.1	Internal layer	Cement internal-board	See clause A4.1	Gypsum internal-boards	See clause A4.2	External subframe	Non-slotted profiles	See clause A5.1	Slotted profiles	See clause A5.2	Thermal insulation		See clause A7.1	Flexible sheet for waterproofing (optional)		See clause A7.2	Flexible sheet for vapour control (optional)		See clause A7.3	Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7
Rendering systems		See Annex 2																											
External layer	Cement external board	See clause A3.1																											
Internal layer	Cement internal-board	See clause A4.1																											
	Gypsum internal-boards	See clause A4.2																											
External subframe	Non-slotted profiles	See clause A5.1																											
	Slotted profiles	See clause A5.2																											
Thermal insulation		See clause A7.1																											
Flexible sheet for waterproofing (optional)		See clause A7.2																											
Flexible sheet for vapour control (optional)		See clause A7.3																											
Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7																											
(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective annexes.																													

Table A1.1.2: Description of Knauf External Wall System with rendering WM211.C – Family 2.

	Family 2 – single wall with internal horizontal profile																															
	Use 1: Complete building envelope in non-ventilated façades Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water. Subframe material: Galvanized steel.																															
<ol style="list-style-type: none"> 1. Finishing coat 2. Primer 3. Base-coat and reinforcing mesh 4. External-board and joint treatment 5. Flexible sheet for waterproofing (optional) 6. External subframe and thermal insulation 7. Flexible sheet for vapour control (optional) 8. Internal subframe and thermal insulation. 9. Internal-boards and joint treatment. 	System main components:																															
	<table border="1"> <tr> <td>Rendering systems</td> <td></td> <td>See Annex 2</td> </tr> <tr> <td>External layer</td> <td>Cement external board</td> <td>See clause A3.1</td> </tr> <tr> <td rowspan="2">Internal layer</td> <td>Cement internal-board</td> <td>See clause A4.1</td> </tr> <tr> <td>Gypsum internal-boards</td> <td>See clause A4.2</td> </tr> <tr> <td rowspan="2">External subframe</td> <td>Non-slotted profiles</td> <td>See clause A5.1</td> </tr> <tr> <td>Slotted profiles</td> <td>See clause A5.2</td> </tr> <tr> <td>Internal subframe</td> <td>Non-slotted Z-profiles</td> <td>See clause A6.2</td> </tr> <tr> <td>Thermal insulation</td> <td></td> <td>See clause A7.1</td> </tr> <tr> <td>Flexible sheet for waterproofing (optional)</td> <td></td> <td>See clause A7.2</td> </tr> <tr> <td>Flexible sheet for vapour control (optional)</td> <td></td> <td>See clause A7.3</td> </tr> <tr> <td>Fixings between the subframe and the supporting structure (optional) (*)</td> <td></td> <td>See table A5.1.7</td> </tr> </table>	Rendering systems		See Annex 2	External layer	Cement external board	See clause A3.1	Internal layer	Cement internal-board	See clause A4.1	Gypsum internal-boards	See clause A4.2	External subframe	Non-slotted profiles	See clause A5.1	Slotted profiles	See clause A5.2	Internal subframe	Non-slotted Z-profiles	See clause A6.2	Thermal insulation		See clause A7.1	Flexible sheet for waterproofing (optional)		See clause A7.2	Flexible sheet for vapour control (optional)		See clause A7.3	Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7
Rendering systems		See Annex 2																														
External layer	Cement external board	See clause A3.1																														
Internal layer	Cement internal-board	See clause A4.1																														
	Gypsum internal-boards	See clause A4.2																														
External subframe	Non-slotted profiles	See clause A5.1																														
	Slotted profiles	See clause A5.2																														
Internal subframe	Non-slotted Z-profiles	See clause A6.2																														
Thermal insulation		See clause A7.1																														
Flexible sheet for waterproofing (optional)		See clause A7.2																														
Flexible sheet for vapour control (optional)		See clause A7.3																														
Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7																														
(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective annexes.																																

Complete non-load bearing external wall systems		Annex A1.1 of European Technical Assessment ETA 13/0312
Knauf External Wall systems with rendering	WM111.C; WM211.C; WM311.C; WM411.C	

Table A1.1.3: Description of Knauf External Wall System with rendering WM311.C – Family 3.

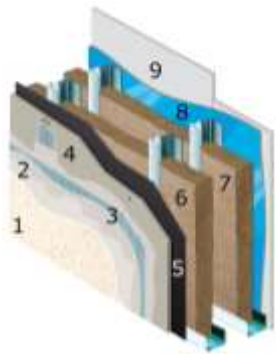
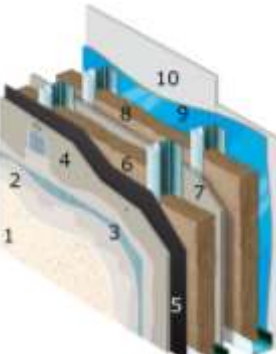
	Family 3 – double wall without intermediate board	
	Use 1: Complete building envelope in non-ventilated façades Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water. Subframe material: Galvanized steel.	
<ol style="list-style-type: none"> 1. Finishing coat 2. Primer 3. Base-coat and reinforcing mesh 4. External-board and joint treatment 5. Flexible sheet for waterproofing (optional) 6. External subframe and thermal insulation 7. Internal subframe and thermal insulation 8. Flexible sheet for vapour control (optional) 9. Internal-boards and joint treatment. 	System main components:	
	Rendering systems	See Annex 2
	External layer	Cement external board See clause A3.1
	Internal layer	Cement internal-board See clause A4.1
		Gypsum internal-boards See clause A4.2
	External subframe	Non-slotted profiles See clause A5.1
		Slotted profiles See clause A5.2
	Internal subframe	Non-slotted profiles See clause A6.1
	Thermal insulation	See clause A7.1
	Flexible sheet for waterproofing (optional)	See clause A7.2
	Flexible sheet for vapour control (optional)	See clause A7.3
	Fixings between the subframe and the supporting structure (optional) (*)	See table A5.1.7
(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective annexes.		

Table A1.1.4: Description of Knauf External Wall System with rendering WM411.C – Family 4.

	Family 4 – double wall with intermediate board	
	Use 1: Complete building envelope in non-ventilated façades Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water. Subframe material: Galvanized steel.	
<ol style="list-style-type: none"> 1. Finishing coat 2. Primer 3. Base-coat and reinforcing mesh 4. External-board and joint treatment 5. Flexible sheet for waterproofing (optional) 6. External subframe and thermal insulation 7. Intermediate-boards and joint treatment 8. Internal subframe and thermal insulation 9. Flexible sheet for vapour control (optional) 10. Internal-boards and joint treatment. 	System main components:	
	Rendering systems	See Annex 2
	External layer	Cement external board See clause A3.1
		External board-fixing
	Internal or intermediate layer	Cement internal-board See clause A4.1
		Gypsum internal-boards See clause A4.2
	External subframe	Non-slotted profiles See clause A5.1
		Slotted profiles See clause A5.2
	Internal subframe	Non-slotted profiles See clause A6.1
	Thermal insulation	See clause A7.1
	Flexible sheet for waterproofing (optional)	See clause A7.2
	Flexible sheet for vapour control (optional)	See clause A7.3
	Fixings between the subframe and the supporting structure (optional) (*)	See table A5.1.7
(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective annexes.		

Complete non-load bearing external wall systems**Knauf External Wall systems with rendering****WM111.C; WM211.C; WM311.C; WM411.C****Annex A1.1**

of European Technical Assessment ETA 13/0312

Table A1.1.5: Performance for Knauf External Wall Systems with rendering. Families 1 to 4.

Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration	Performance	
Basic Works Requirement 2: Safety in case of fire				
1	Reaction to fire (external surface)	AQUAPANEL® Outdoor (EB-1) as external-board and rendering system (RS-01 to RS-06)	B-s1,d0	
	Reaction to fire (internal surface)	AQUAPANEL® Indoor (IB-1) as internal-board Vidiwall (IB-2), Diamant (IB-3) or Standard gypsum boards (IB-4 or IB-5) as internal-board	A1 A2-s1,d0	
2	Resistance to fire	AQUAPANEL® Outdoor (EB-1) as external-board and at least two Diamant (IB-3) gypsum internal-boards (minimum thickness 30,0 mm = 15,0 + 15,0 mm)	EI-90 (i → o)	
		AQUAPANEL® Outdoor (EB-1) as external-board and at least two Standard (IB-4) gypsum internal-boards (minimum thickness 25 mm = 12,5 + 12,5 mm)	EI-60 (i → o)	
		AQUAPANEL® Outdoor (EB-1) as external-board and other type of internal-boards, AQUAPANEL® Indoor (IB-1) or Vidiwall (IB-2) or with only one gypsum internal-board (IB-3 to IB-5)	Not assessed	
3	Façade fire performance		Not assessed	
4	Propensity to undergo continuous smouldering		Not assessed	
Basic Works Requirement 3: Hygiene, health and the environment				
5	Watertightness of external surfaces (protection against driving rain)	AQUAPANEL® Outdoor (EB-1) as external-board, any rendering system (RS-01 to RS-06) with and without flexible sheet of waterproofing (WPL-2 or WPL-3)	1350 Pa without water penetration	
6	Water absorption by capillarity	AQUAPANEL® Outdoor (EB-1) as external-board and rendering system (RS-01 to RS-06)	without ageing	0,13 kg/m ² (after 3 min) 0,16 kg/m ² (after 1 h) 0,78 kg/m ² (after 24 h)
			after hygrothermal cycles	0,04 kg/m ² (after 3 min) 0,14 kg/m ² (after 1 h) 0,62 kg/m ² (after 24 h)
		AQUAPANEL® Outdoor (EB-1) as external-board and base coat (BC-1 to BC-3)	without ageing	0,24 kg/m ² (after 3 min) 0,59 kg/m ² (after 1 h) 1,24 kg/m ² (after 24 h)
			after hygrothermal cycles	0,20 kg/m ² (after 3 min) 0,62 kg/m ² (after 1 h) 1,22 kg/m ² (after 24 h)
Water permeability (water column)			Not assessed	
Water absorption of the boards		AQUAPANEL® Outdoor (EB-1)	21,2% by mass	
Watertightness of the breather membrane		Flexible sheet for waterproofing (WPL-2 or WPL-3)	W1	
7	Water vapour permeability of the rendering system	RS-01 on AQUAPANEL® Outdoor (EB-1)	μ = 45	
		RS-02 on AQUAPANEL® Outdoor (EB-1)	μ = 41	
		RS-03 to RS-06 on AQUAPANEL® Outdoor (EB-1)	Not assessed	
	Water vapour permeability of the boards	AQUAPANEL® Outdoor (EB-1)		Not assessed
		AQUAPANEL® Indoor (IB-1)		μ = 50
		Vidiwall (IB-2)		μ = 21
		Diamant (IB-3)		μ = 10 (dry) / 4 (wet)
		Standard (IB-4)		μ = 10 (dry) / 4 (wet)
		Standard + BV (IB-5)	Board	μ = 10 (dry) / 4 (wet)
			Aluminium sheet	S _d = 1500 m
Water vapour permeability of the thermal insulation	Mineral Wool		μ = 1	
Water vapour permeability of the breather membrane	Flexible sheet for waterproofing (WPL-2 or WPL-3)		S _d = 0,025 m	
	Vapour control sheet (VCL-1 to VCL-4)		S _d = 100 m	
8	Condensation risk		Not assessed	

Complete non-load bearing external wall systems		Annex A1.1 of European Technical Assessment ETA 13/0312
Knauf External Wall systems with rendering	WM111.C; WM211.C; WM311.C; WM411.C	

Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration	Performance	
9	Air permeability	AQUAPANEL® Outdoor (EB-1) as external-board and rendering system (RS-01 to RS-06)	Class A4 0,00 m ³ /m ² .h at 50 Pa; < 1,50 m ³ /m ² .h at 100 Pa to 600 Pa	
10	Content, emission and/or release of dangerous substances		Not assessed	
Basic Works Requirement 4: Safety and accessibility in use				
11	Wind load resistance	AQUAPANEL® Outdoor (EB-1) as external-board and non-slotted C/U-profiles (ExS-1 to ExS-4) with maximum span between vertical profiles 600 mm	1800 Pa; $\delta \leq L/250$ See also clause 3.1	
		AQUAPANEL® Outdoor (EB-1) as external-board and non-slotted CW/UW-profiles (ExS-5 to ExS-7) with maximum span between vertical profiles 600 mm	1100 Pa; $\delta \leq L/250$ See also clause 3.1	
		AQUAPANEL® Outdoor (EB-1) as external-board and non-slotted RY/SKY-profiles (ExS-8 to ExS-13) with maximum span between vertical profiles 600 mm	2350 Pa; $\delta \leq L/500$ See also clause 3.1	
12	External eccentric vertical load resistance		Not relevant	
13	Internal eccentric vertical load resistance		Not assessed	
14	Internal horizontal linear static load resistance		Not assessed	
15	External impact resistance	AQUAPANEL® Outdoor (EB-1) as external-board, rendering system (RS-01 to RS-06) and non-slotted C/U-profiles or CW/UW-profiles (ExS-1 to ExS-7) with maximum span between vertical profiles 600 mm	Resists (Category II): - Hard body 0,5 kg, 3 J - Hard body 1,0 kg, 10 J (deterioration, no penetration) - Soft body 3,0 kg, 60 J - Soft body 50,0 kg, 400 J	
		AQUAPANEL® Outdoor (EB-1) as external-board and slotted RY/SKY-profiles (ExS-8 to ExS-13)	Not assessed	
16	Internal impact resistance	At least two (15,0 + 15,0 mm) gypsum internal-boards (IB-3 to IB-5) in families 3 and 4 (double wall) with maximum span between vertical profiles 600 mm	Category IV	
		At least two (15,0 + 15,0 mm) gypsum internal-boards (IB-3 to IB-5), and external subframe of non-slotted profiles C/U-profiles or CW/UW profiles (ExS-1 to ExS-7) in family 1 (single wall) with maximum span between vertical profiles 600 mm		
		Only one (12,5 mm or 15,0 mm) gypsum internal-board (IB-3 to IB-5) or with two gypsum internal-board (IB-3 to IB-5) with total thickness less than 15,0+15,0 mm in family 3 and 4 (double wall) with maximum span between vertical profiles 600 mm	Category I	
		Only one (12,5 mm or 15,0 mm) gypsum internal-board (IB-3 to IB-5) or with two gypsum internal-board (IB-3 to IB-5) with total thickness less than 15,0+15,0 mm, and external subframe of non-slotted profiles C/U-profiles or CW/UW profiles (ExS-1 to ExS-7) in family 1 (single wall) with maximum span between vertical profiles 600 mm		
		Internal-boards AQUAPANEL® Cement Board Indoor (IB-1) and Vidiwall (IB-2) in family 1, 3 or 4	Not assessed	
		Slotted profiles RY/SKY-profiles (ExS-8 to ExS-13) as external subframe in family 1, 3 or 4 In family 2		
17	Resistance to horizontal point loads	AQUAPANEL® Outdoor (EB-1) as external-board and rendering system (RS-01 to RS-06) with maximum span between vertical profiles 600 mm	No visible deformation	
18	Bond strength	AQUAPANEL® Outdoor (EB-1) as external-board and rendering system (RS-01 to RS-06)	without ageing	R _m = 0,30 MPa R _{min} = 0,20 MPa 100% cohesive rupture in the board
			after hygrothermal cycles	R _{min} = 0,20 MPa
			after freeze-thaw cycles	Not assessed

Complete non-load bearing external wall systems		Annex A1.1 of European Technical Assessment ETA 13/0312
Knauf External Wall systems with rendering	WM111.C; WM211.C; WM311.C; WM411.C	

Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration		Performance
		AQUAPANEL® Outdoor (EB-1) as external-board and base coat (BC-1 to BC-3)	without ageing	R _m = 0,40 MPa R _{min} = 0,30 MPa BC-1 & BC-2: 100% cohesive rupture in the board BC-3: 92% cohesive rupture in the board
			after hygrothermal cycles	R _{min} = 0,15 MPa
19	Bending strength of the board	AQUAPANEL® Outdoor (EB-1)		f _{m,0,k} = 5,0 MPa f _{m,90,k} = 8,1 MPa
		AQUAPANEL® Indoor (IB-1)		6,0 MPa
		Vidiwall (IB-2)	Longitudinal	5,5 MPa
			Transversal	
		Diamant (IB-3)	Longitudinal	5,0 MPa
			Transversal	2,0 MPa
Standard (IB-4) & Standard + BV (IB-5)	Longitudinal	5,1 MPa		
	Transversal	2,0 MPa		
20	Embedding/Shear strength	AQUAPANEL® Outdoor (EB-1) and screw (EBF-1 or EBF-2) Ø4,2 mm	Corner (a _{edge} ≥ 21 mm)	F _m = 540 N; F _c = 420 N
			Border (a _{edge} ≥ 15 mm)	F _m = 700 N; F _c = 400 N
		AQUAPANEL® Indoor (IB-1), Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)		Not assessed
21	Pull-through resistance	AQUAPANEL® Outdoor (EB-1)		F _c = 390 N
		AQUAPANEL® Indoor (IB-1)		F _c = 280 N
		Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)		Not assessed
	Pull-out resistance	External vertical profiles (EVP-1 to EVP-13)		F _m = 840 N; F _c = 630 N
22	Resistance of profiles			See Annex 5
Basic Works Requirement 5: Protection against noise				
23	Airborne sound insulation		Not assessed	
	Airflow resistivity of the thermal insulation	Mineral wool		See Annex 7
24	Sound absorption			Not assessed
Basic Works Requirement 6: Energy economy and heat retention				
25	Thermal resistance	External or internal subframe with C/U-profiles or CW/UW-profiles and other kit components given in Annex 9 in family 1, 3 & 4.		See Annex 9
		External or internal subframe with C/U-profiles or CW/UW-profiles and other kit components different to those given in Annex 9 in family 1, 3 & 4.		Not assessed
		External or internal subframe with RY/SKY-profiles (ExS-10 to ExS-13 and InS-1 to InS-9) in all families.		Not assessed
		In family 2		Not assessed
26	Thermal inertia			Not assessed
27	Heat capacity			Not assessed
Durability				
28	Accelerated ageing behaviour	Hygrothermal behaviour		No defects
		Freeze thaw behaviour		Not assessed
		Combined hygrothermal and freeze thaw behaviour		Not assessed
29	Cracking strength due to board deformation			Not assessed

Complete non-load bearing external wall systems		Annex A1.1 of European Technical Assessment ETA 13/0312
Knauf External Wall systems with rendering	WM111.C; WM211.C; WM311.C; WM411.C	

Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration	Performance	
30	Dimensional stability by humidity	AQUAPANEL® Outdoor (EB-1)	Expansion (65 % to 85 %)	Length: 0,2 mm/m Thickness: 0,02 %
		Shrinkage (65 % to 30 %)	Length: - 0,4 mm/m Thickness: - 0,04 %	
		AQUAPANEL® Indoor (IB-1)	Expansion (65 % to 85 %)	Length: 0,3 mm/m Thickness: 0,09%
		Shrinkage (65 % to 30 %)	Length: - 0,3 mm/m Thickness: - 0,06 %	
	Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)	Not assessed		
Linear thermal expansion	Galvanized steel subframes (ExS-1 to ExS-13 and InS-1 to InS-9)	$\alpha = 12 \mu\text{m}/\text{m}\cdot\text{K}^{-1}$ for $T \leq 100 \text{ }^\circ\text{C}$		
31	Moisture content	AQUAPANEL® Outdoor (EB-1)	10,3% by mass	
		AQUAPANEL® Indoor (IB-1), Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)	Not assessed	
32	Corrosion	External subframes (ExS-1 to ExS-13) and InS-1 to InS-9)	See steel corrosion protection in Annex 5	
		Internal subframes (InS-1 to InS-9)	See steel corrosion protection in Annex 6	
33	UV radiation resistance	Flexible sheet for waterproofing (WPL-2 and WPL-3)	See Annex 7.2	

Complete non-load bearing external wall systems		Annex A1.1
Knauf External Wall systems with rendering	WM111.C; WM211.C; WM311.C; WM411.C	of European Technical Assessment ETA 13/0312

A1.2 – SUBSTRATE WALL SYSTEMS

Table A1.2.1: Description of Knauf External Wall System without rendering WM111.C – Family 1.

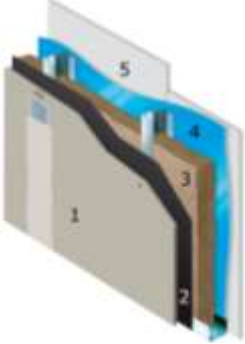
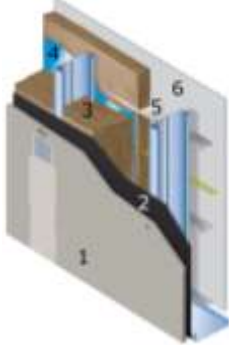
	Family 1 – Single wall without internal horizontal profile		
	<p>Use 2: Substrate of exterior finishings in ventilated and non-ventilated façades</p> <p>Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water.</p> <p>Subframe material: Galvanized steel.</p>		
<ol style="list-style-type: none"> 1. External-board and joint treatment 2. Flexible sheet for waterproofing (optional) 3. Subframe and thermal insulation. 4. Flexible sheet for vapour control (optional) 5. Internal-boards and joint treatment. 	System main components:		
	External layer	Cement external board	See clause A3.1
		Gypsum external board	See clause A3.2
	Internal layer	Cement internal-board	See clause A4.1
		Gypsum internal-boards	See clause A4.2
	External subframe	Non-slotted profiles	See clause A5.1
		Slotted profiles	See clause A5.2
	Thermal insulation		See clause A7.1
	Flexible sheet for waterproofing (optional)		See clause A7.2
	Flexible sheet for vapour control (optional)		See clause A7.3
Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7	
<p>(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective annexes.</p>			

Table A1.2.2: Description of Knauf External Wall System without rendering WM211.C – Family 2.

	Family 2 – Single wall with internal horizontal profile		
	<p>Use 2: Substrate of exterior finishings in ventilated and non-ventilated façades</p> <p>Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water.</p> <p>Subframe material: Galvanized steel.</p>		
<ol style="list-style-type: none"> 1. External-board and joint treatment 2. Flexible sheet for waterproofing (optional) 3. External subframe and thermal insulation. 4. Flexible sheet for vapour control (optional) 5. Internal subframe and thermal insulation. 6. Internal-boards and joint treatment. 	System main components:		
	External layer	Cement external board	See clause A3.1
		Gypsum external board	See clause A3.2
	Internal layer	Cement internal-board	See clause A4.1
		Gypsum internal-boards	See clause A4.2
	External subframe	Non-slotted profiles	See clause A5.1
		Slotted profiles	See clause A5.2
	Internal subframe	Non-slotted Z-profiles	See clause A6.2
	Thermal insulation		See clause A7.1
	Flexible sheet for waterproofing (optional)		See clause A7.2
Flexible sheet for vapour control (optional)		See clause A7.3	
Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7	
<p>(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective annexes.</p>			

Substrate non-load bearing external wall systems		Annex 1.2 of European Technical Assessment ETA 13/0312
Knauf External Wall systems without rendering	WM111.C; WM211.C; WM311.C; WM411.C WM111.G; WM211.G; WM311.G; WM411.G	

Table A1.2.3: Description of Knauf External Wall System without rendering WM311.C – Family 3

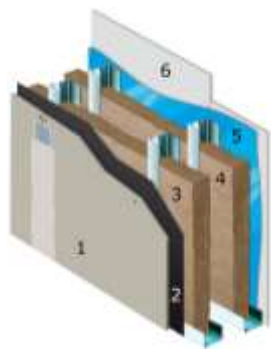
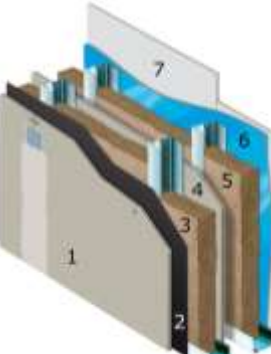
	Family 3 – Double wall without intermediate board		
	<p>Use 2: Substrate of exterior finishings in ventilated and non-ventilated façades</p> <p>Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water.</p> <p>Subframe material: Galvanized steel.</p>		
<ol style="list-style-type: none"> 1. External-board and joint treatment 2. Flexible sheet for waterproofing (optional) 3. External subframe and thermal insulation. 4. Flexible sheet for vapour control (optional) 5. Internal subframe and thermal insulation. 6. Internal-boards and joint treatment. 	System main components:		
	External layer	Cement external board	See clause A3.1
		Gypsum external board	See clause A3.2
	Internal layer	Cement internal-board	See clause A4.1
		Gypsum internal-boards	See clause A4.2
	External subframe	Non-slotted profiles	See clause A5.1
		Slotted profiles	See clause A5.2
	Internal subframe	Non-slotted profiles	See clause A6.2
	Thermal insulation		See clause A7.1
	Flexible sheet for waterproofing (optional)		See clause A7.2
Flexible sheet for vapour control (optional)		See clause A7.3	
Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7	
<p>(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective Annexes.</p>			

Table A1.2.4: Description of Knauf External Wall System without rendering WM411.C – Family 3.

	Family 4 – Double wall with intermediate board		
	<p>Use 2: Substrate of exterior finishings in ventilated and non-ventilated façades</p> <p>Release scenario with respect to dangerous substances: IA2: Indirect contact to indoor air. S/W2: Product with indirect contact to soil, ground- and surface water.</p> <p>Subframe material: Galvanized steel.</p>		
<ol style="list-style-type: none"> 1. External-board and joint treatment 2. Flexible sheet for waterproofing (optional) 3. External subframe and thermal insulation. 4. Intermediate-board and joint treatment. 5. Internal subframe and thermal insulation. 6. Flexible sheet for vapour control (optional) 7. Internal-board and joint treatment. 	System main components:		
	External layer	Cement external board	See clause A3.1
		Gypsum external board	See clause A3.2
	Internal or intermediate layer	Cement internal-board	See clause A4.1
		Gypsum internal-boards	See clause A4.2
	External subframe	Non-slotted profiles	See clause A5.1
		Slotted profiles	See clause A5.2
	Internal subframe	Non-slotted profiles	See clause A6.2
	Thermal insulation		See clause A7.1
	Flexible sheet for waterproofing (optional)		See clause A7.2
Flexible sheet for vapour control (optional)		See clause A7.3	
Fixings between the subframe and the supporting structure (optional) (*)		See table A5.1.7	
<p>(*) These components are not part of the kit, but they are always part of the assembled system. They are not supplied by the manufacturer; however, they are available on the market and they have to meet the specifications indicated in the respective annexes.</p>			

Substrate non-load bearing external wall systems		Annex 1.2 of European Technical Assessment ETA 13/0312
Knauf External Wall systems without rendering	WM111.C; WM211.C; WM311.C; WM411.C WM111.G; WM211.G; WM311.G; WM411.G	

Table A1.2.5: Performance for Knauf External Wall Systems without rendering. Families 1 to 4.

Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration	Performance	
Basic Works Requirement 2: Safety in case of fire				
1	Reaction to fire (external surface)	AQUAPANEL® Outdoor (EB-1) or Guardex (EB-3) as external-boards	A1	
		Vidiwall HI (EB-2) as external-board	A2-s1,d0	
	Reaction to fire (internal surface)	AQUAPANEL® Indoor (IB-1) as internal-board	A1	
		Vidiwall (IB-2), Diamant (IB-3) or Standard gypsum boards (IB-4 or IB-5) as internal-boards	A2-s1,d0	
2	Resistance to fire	AQUAPANEL® Outdoor (EB-1) as external-board and at least two Diamant (IB-3) gypsum internal-boards (minimum thickness 30,0 mm = 15,0 + 15,0 mm)	EI-90 (i → o)	
		AQUAPANEL® Outdoor (EB-1) as external-board and at least two Standard (IB-4) gypsum internal-boards (minimum thickness 25 mm = 12,5 + 12,5 mm)	EI-60 (i → o)	
		AQUAPANEL® Outdoor (EB-1) as external-board and other type of internal-boards, AQUAPANEL® Indoor (IB-1) or Vidiwall (IB-2) or with only one gypsum internal-boards (IB-3 to IB-5)	Not assessed	
		Vidiwall HI (EB-2) as external-boards and any type of internal-board (IB-1 to IB-5)	Not assessed	
		Guardex (EB-3) as external-boards and any type of internal-board (IB-1 to IB-5)	Not assessed	
3	Façade fire performance		Not assessed	
4	Propensity to undergo continuous smouldering		Not assessed	
Basic Works Requirement 3: Hygiene, health and the environment				
5	Watertightness of external surfaces (protection against driving rain)		For use with watertight exterior-finishing	
6	Water absorption by capillarity		Not relevant	
	Water permeability (water column)		Not relevant	
	Water absorption of the boards	AQUAPANEL® Outdoor (EB-1)		21,2% by mass
		Vidiwall HI (EB-2) – Partial immersion		300 g/m ²
		Guardex (EB-3) - Total immersion		10%
Watertightness of the breather membrane	Flexible sheet for waterproofing (WPL-2 or WPL-3)		W1	
7	Water vapour permeability of the boards	AQUAPANEL® Outdoor (EB-1)	Not assessed	
		Vidiwall HI (EB-2)	μ = 15	
		Guardex (EB-3)	μ = 10 (dry) / 4 (wet)	
		AQUAPANEL® Indoor (IB-1)	μ = 50	
		Vidiwall (IB-2)	μ = 21	
		Diamant (IB-3)	μ = 10 (dry) / 4 (wet)	
		Standard (IB-4)	μ = 10 (dry) / 4 (wet)	
	Standard + BV (IB-5)	Board	μ = 10 (dry) / 4 (wet)	
		Aluminium sheet	S _d = 1500 m	
	Water vapour permeability of the thermal insulation	Mineral Wool		μ = 1
Water vapour permeability of the breather membrane	Flexible sheet for waterproofing (WPL-2 or WPL-3)		S _d = 0,025 m	
	Vapour control sheet (VCL-1 to VCL-4)		S _d = 100 m	
8	Condensation risk		Not assessed	
9	Air permeability	AQUAPANEL® Outdoor (EB-1) as external-board	class A4 0,00 m ³ /m ² ·h at 50 Pa < 1,50 m ³ /m ² ·h at 100 to 600 Pa	
		Vidiwall HI (EB-2) or Guardex (EB-3) as external-boards	Not assessed	
10	Content, emission and/or release of dangerous substances		Not assessed	

Substrate non-load bearing external wall systems		Annex 1.2 of European Technical Assessment ETA 13/0312
Knauf External Wall systems without rendering	WM111.C; WM211.C; WM311.C; WM411.C WM111.G; WM211.G; WM311.G; WM411.G	

Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration	Performance	
Basic Works Requirement 4: Safety and accessibility in use				
11	Wind load resistance	AQUAPANEL® Outdoor (EB-1) as external-board and non-slotted C/U-profiles (ExS-1 to ExS-4) with maximum span between vertical profiles 600 mm	1800 Pa; $\delta \leq L/250$ See also clause 3.1	
		AQUAPANEL® Outdoor (EB-1) as external-board and non-slotted CW/UW-profiles (ExS-5 to ExS-7) with maximum span between vertical profiles 600 mm	1100 Pa; $\delta \leq L/250$ See also clause 3.1	
		AQUAPANEL® Outdoor (EB-1) as external-board and non-slotted RY/SKY-profiles (ExS-8 to ExS-13) with maximum span between vertical profiles 600 mm	2350 Pa; $\delta \leq L/500$ See also clause 3.1	
		Vidiwall HI (EB-2) or Guardex (EB-3) as external-boards and non-slotted or slotted profiles (ExS-1 to ExS-13)	Not assessed	
12	External eccentric vertical load resistance		Not assessed	
13	Internal eccentric vertical load resistance		Not assessed	
14	Internal horizontal linear static load resistance		Not assessed	
15	External impact resistance	AQUAPANEL® Outdoor (EB-1) as external-board and non-slotted C/U-profiles or CW/UW-profiles (ExS-1 to ExS-7) with maximum span between vertical profiles 600 mm	Resists: - Soft body 3,0 kg, 60 J - Soft body 50,0 kg, 400 J	
		AQUAPANEL® Outdoor (EB-1) as external-board and slotted RY/SKY-profiles (ExS-8 to ExS-13)	Not assessed	
		Vidiwall HI (EB-2) or Guardex (EB-3) as external-boards and non-slotted or slotted profiles (ExS-1 to ExS-13)	Not assessed	
16	Internal impact resistance	At least two (15,0 + 15,0 mm) gypsum internal-boards (IB-3 to IB-5) in families 3 and 4 (double wall)	Category IV	
		At least two (15,0 + 15,0 mm) gypsum internal-boards (IB-3 to IB-5), and external subframe of non-slotted profiles C/U-profiles or CW/UW profiles (ExS-1 to ExS-7) in family 1 (single wall)		
		Only one (12,5 mm or 15,0 mm) gypsum internal-board (IB-3 to IB-5) or with two gypsum internal-boards (IB-3 to IB-5) with total thickness less than 15,0+15,0 mm in family 3 and 4 (double wall)	Category I	
		Only one (12,5 mm or 15,0 mm) gypsum internal-board (IB-3 to IB-5) or with two gypsum internal-boards (IB-3 to IB-5) with total thickness less than 15,0+15,0 mm, and external subframe of non-slotted profiles C/U-profiles or CW/UW profiles (ExS-1 to ExS-7) in family 1 (single wall)		
		Internal-boards AQUAPANEL® Cement Board Indoor (IB-1) and Vidiwall (IB-2) in family 1, 3 or 4	Not assessed	
		Slotted profiles RY/SKY-profiles (ExS-8 to ExS-13) as external subframe in family 1, 3 or 4		
		In family 2		
17	Resistance to horizontal point loads		Not relevant	
18	Bond strength		Not relevant	
19	Bending strength of the board	AQUAPANEL® Outdoor (EB-1)	5,0 MPa	
		Vidiwall HI (EB-2)	Longitudinal	5,5 MPa
			Transversal	
		Guardex (EB-3)	Longitudinal	6,0 MPa
			Transversal	2,4 MPa
		AQUAPANEL® Indoor (IB-1)		6,0 MPa
		Vidiwall (IB-2)	Longitudinal	5,5 MPa
			Transversal	
		Diamant (IB-3)	Longitudinal	5,0 MPa
			Transversal	2,0 MPa
Standard (IB-4) & Standard + BV (IB-5)	Longitudinal	5,1 MPa		
	Transversal	2,0 MPa		

Substrate non-load bearing external wall systems		Annex 1.2 of European Technical Assessment ETA 13/0312
Knauf External Wall systems without rendering	WM111.C; WM211.C; WM311.C; WM411.C WM111.G; WM211.G; WM311.G; WM411.G	

Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration	Performance		
20	Embedding/Shear strength	AQUAPANEL® Outdoor (EB-1) and screw (EBF-1 or EBF-2) Ø4,2 mm	Corner ($a_{\text{edge}} \geq 21$ mm)	$F_m = 540$ N; $F_c = 420$ N	
			Border ($a_{\text{edge}} \geq 15$ mm)	$F_m = 700$ N; $F_c = 400$ N	
		Vidiwall HI (EB-2) and screw (EBF-5 or EBF-6) Ø3,9 mm	Corner ($a_{\text{edge}} \geq 21$ mm)	$F_m = 630$ N; $F_c = 530$ N	
			Border ($a_{\text{edge}} \geq 15$ mm)	$F_m = 930$ N; $F_c = 770$ N	
		Guardex (EB-3) and screw (EBF-5 or EBF-6) Ø3,5 mm	Corner ($a_{\text{edge}} \geq 21$ mm)	$F_m = 350$ N; $F_c = 270$ N	
			Border ($a_{\text{edge}} \geq 15$ mm)	$F_m = 440$ N; $F_c = 370$ N	
AQUAPANEL® Indoor (IB-1), Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)			Not assessed		
21	Pull-through resistance	AQUAPANEL® Outdoor (EB-1)	$F_c = 390$ N		
		Vidiwall HI (EB-2) and Guardex (EB-3)	Not assessed		
		AQUAPANEL® Indoor (IB-1)	$F_c = 280$ N		
	Pull-out resistance	Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)	Not assessed		
External vertical profiles (EVP-1 to EVP-13)		$F_m = 840$ N; $F_c \geq 630$ N			
22	Resistance of profiles		See Annex 5		
Basic Works Requirement 5: Protection against noise					
23	Airborne sound insulation		Not assessed		
	Airflow resistivity of the thermal insulation	Mineral wool	See Annex 7		
24	Sound absorption		Not assessed		
Basic Works Requirement 6: Energy economy and heat retention					
25	Thermal resistance	External or internal subframe with C/U-profiles or CW/UW-profiles and other kit components given in Annex 9 in family 1, 3 & 4.	See Annex 9		
		External or internal subframe with C/U-profiles or CW/UW-profiles and other kit components different to those given in Annex 9 in family 1, 3 & 4.	Not assessed		
		External or internal subframe with RY/SKY-profiles (ExS-10 to ExS-13 and InS-1 to InS-9) in all families.	Not assessed		
		In family 2	Not assessed		
26	Thermal inertia		Not assessed		
27	Heat capacity		Not assessed		
Durability					
28	Accelerated ageing behaviour	Hygrothermal behaviour	Depends on the exterior-finishing		
		Freeze thaw behaviour	Not assessed		
		Combined hygrothermal and freeze thaw behaviour	Not assessed		
29	Cracking strength due to board deformation		Not assessed		
30	Dimensional stability by humidity	AQUAPANEL® Outdoor (EB-1)	Expansion (65 % to 85 %)	Length: 0,2 mm/m Thickness: 0,02 %	
			Shrinkage (65 % to 30 %)	Length: - 0,4 mm/m Thickness: - 0,04 %	
		Vidiwall HI (EB-2) and Guardex (EB-3)		Not assessed	
		AQUAPANEL® Indoor (IB-1)	Expansion (65 % to 85 %)	Length: 0,3 mm/m Thickness: 0,09%	
	Shrinkage (65 % to 30 %)		Length: - 0,3 mm/m Thickness: - 0,06 %		
	Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)		Not assessed		
Linear thermal expansion	Steel subframes (ExS-1 to ExS-13 and InS-1 to InS-9)	$\alpha = 12 \mu\text{m/m}\cdot\text{K}^{-1}$ for $T \leq 100$ °C			

Substrate non-load bearing external wall systems
Knauf External Wall systems without rendering
**WM111.C; WM211.C;
WM311.C; WM411.C
WM111.G; WM211.G;
WM311.G; WM411.G**
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Nr	Essential characteristic	Kit for Knauf External Wall Systems relevant configuration	Performance
31	Moisture content	AQUAPANEL® Outdoor (EB-1)	10,3% by mass
		Vidiwall HI (EB-2) and Guardex (EB-3)	Not assessed
		AQUAPANEL® Indoor (IB-1), Vidiwall (IB-2), Diamant (IB-3), Standard (IB-4) or Standard + BV (IB-5)	Not assessed
32	Corrosion	External subframes (ExS-1 to ExS-13) and InS-1 to InS-9)	See steel corrosion protection in Annex 5
		Internal subframes (InS-1 to InS-9)	See steel corrosion protection in Annex 6
33	UV radiation resistance	Flexible sheet for waterproofing (WPL-2 and WPL-3)	See Annex 7.2

Substrate non-load bearing external wall systems		Annex 1.2 of European Technical Assessment ETA 13/0312
Knauf External Wall systems without rendering	WM111.C; WM211.C; WM311.C; WM411.C WM111.G; WM211.G; WM311.G; WM411.G	

ANNEX 2 - RENDERING SYSTEMS COMPONENTS

Table A2.1: TYPES AND COMPOSITION OF RENDERING SYSTEMS.

Characteristic		Types					
		RS-01	RS-02	RS-03	RS-04	RS-05	RS-06
Generic components	Finishing coat (FC)	FC-1	FC-4	FC-3	FC-5	FC-3	FC-5
	Primer (P)	P-1	P-2	P-3			
	Base-coat (BC)	BC-1		BC-2		BC-3	
	Reinforcing mesh (M)	M-1					
Range of application thickness (mm)		5 - 9	5 - 11	5 - 11	5 - 11	5 - 11	5 - 11
Mass per square meter (kg/m ²)		7,3 – 11,6	7,3 – 13,8	6,5 – 12,5	6,5 – 12,9	6,6 – 12,6	6,6 – 13,0
PCS _s -value	(MJ/kg)	≤ 3,1	≤ 1,0	≤ 2,7	≤ 1,1	≤ 0,4	≤ 1,1
	(MJ/m ²)	≤ 31,9	≤ 12,3	≤ 31,1	≤ 12,8	≤ 4,9	≤ 12,8
Reaction to fire		B-s1,d0					
Water absorption by capillarity (kg/m ²) (*)	after 3 min. (**)	0,02	0,04	0,13	0,04	0,10	0,05
	after 1 h. (***)	0,02	0,15	0,06	0,14	0,07	0,16
	after 24 h. (***)	0,19	0,43	0,32	0,78	0,28	0,71
Bond strength (MPa) (*)	Mean	0,57	0,48	0,31	0,37	0,32	0,69
	Minimum	0,51	0,43	0,26	0,22	0,28	0,52
	Cohesive rupture	100%	100%	100%	100%	100%	100%
Thermal conductivity - $\lambda_{23/80}$ W/(m·K) (*)		< 0,45	< 0,45	ND	ND	ND	ND
Thermal resistance - $R_{23/80}$ (m ² ·K)/W (*)		> 0,04	> 0,04	ND	ND	ND	ND
(*) Rendering system applied on the AQUAPANEL® Cement Board Outdoor (EB-1).							
(**) Values from initial immersion.							
(***) Values from 3 minutes immersion.							
ND = not defined.							

Table A2.2: Trade name of rendering system components.

Generic component	Code	Trade name	Reference
Finishing coat	FC-1	Pintura lisa flexible GRC	---
	FC-3	AQUAPANEL® Exterior Mineral Finish – white	EN 998-1
	FC-4	Acabado Pétreo GRC	EN 15824
	FC-5	AQUAPANEL® Exterior Dispersion Plaster - white	EN 15824
Primer (before render or paint)	P-1	Imprimación GRC	---
	P-2	Imprimación Fondo Pétreo GRC	---
	P-3	AQUAPANEL® Base-coat Primer	---
Base-coat	BC-1	Mortero Superficial AQUAPANEL® Outdoor	EN 998-1
	BC-2	AQUAPANEL® Exterior Base-coat - white	EN 998-1
	BC-3	AQUAPANEL® Exterior Base-coat	EN 998-1
Reinforcing mesh	M-1	AQUAPANEL® Reinforcing Mesh	EAD 040016-00-0404
"---" = not applicable.			

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Characteristics		Reference	FC-1	
Trade name		---	Pintura lisa flexible GRC	
Generic type		EN 1062-1	Acrylic paint with binder based on a siloxane modified acrylic resins and soluble in water	
Range of application thickness (mm)		---	≤ 0,2	
Coverage (l/m ²)		---	≤ 0,250	
Density of delivered product – liquid (kg/m ³)		A.3.1 of EAD 090120-00-0404 or EN ISO 2811-1	1400 ± 50	
Particle size (%) > 40 µm		EN 787-7	0,46	
Organic content	Dry extract (liquid)	A.5 of EAD 090120-00-0404	65,7	
	Ash content (%) at 450 °C	A.6.1 of EAD 090120-00-0404	64,7	
	PCS _s -value	(MJ/kg)	EN ISO 1716	8,3
		(MJ/m ²)		2,3
"---" = not applicable.				

Characteristics		Reference	FC-3	
Trade name		---	AQUAPANEL® Exterior Mineral Finish – white	
Designation		EN 998-1	CR – Coloured rendering mortar	
Range of application thickness (mm)		---	≤ 2,0	
Coverage (kg/m ²)		---	≤ 3,0	
Density of delivered product – powder (kg/m ³)		A.3.1 of EAD 090120-00-0404	1680 ± 50	
Particle size (%)	< 2 mm	EN 1015-1 or A.4 of EAD 090120-00-0404	100	
	< 1 mm		61	
	< 0,5 mm		57	
Bulk density of fresh mortar - water 25% (kg/m ³)		EN 1015-6 or A.3.3 of EAD 090120-00-0404	1700 ± 50	
Consistence - water 25% (mm)		EN 1015-3	155	
Dry bulk density of hardened mortar (kg/m ³)		EN 1015-10	1450 ± 50	
Mechanical characteristics of hardened mortar	Flexural strength (MPa)	EN 1015-11	1,5 to 5,0 (CSII)	
	Compressive strength (MPa)		> 3,0	
	Static modulus of elasticity at break (MPa)	A.7 of EAD 090120-00-0404	0,40	
	Tensile strength at break (MPa)		1753	
	Elongation at break (mm)		0,09	
Organic content	Ash content (%) at 450 °C	A.6.1 of EAD 090120-00-0404	99,7	
	PCS _s -value	MJ/kg	EN ISO 1716	0,0
		MJ/m ²		
"---" = not applicable.				

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Characteristics		Reference	FC-4	FC-5
Trade name		---	Acabado Pétreo GRC	AQUAPANEL® Exterior Dispersion Plaster - white
Generic type		EN 15824	Acrylic mortar with binder based on a modified acrylic copolymers and soluble in water	Water based organic resin plaster and soluble in water
Range of application thickness (mm)		---	≤ 2,2	≤ 2,2
Coverage (kg/m ²)		---	≤ 3,3	≤ 3,1
Density of delivered product – paste (kg/m ³)		A.3.1 of EAD 090120-00-0404	1650 ± 50	1900 ± 50
Particle size (%)	< 2 mm	EN 1015-1 or A.4 of EAD 090120-00-0404	99,5	99,4
	< 1 mm		76	71
	< 0,5 mm		68	67
Bulk density of fresh mortar (kg/m ³)		EN 1015-6 or A.3.3 of EAD 090120-00-0404	1650 ± 50	1900 ± 50
Consistence (mm)		EN 1015-3	165	170
Dry bulk density of hardened mortar (kg/m ³)		EN 1015-10	1700 ± 50	1950 ± 50
Mechanical characteristics of hardened mortar	Flexural strength (MPa)	EN 1015-11	1,5 to 5,0 (CSII)	1,5 to 5,0 (CSII)
	Compressive strength (MPa)			
	Static modulus of elasticity at break (MPa)	A.7 of EAD 090120-00-0404	0,45	0,14
	Tensile strength at break (MPa)		198	66
	Elongation at break (mm)		1,03	0,78
Organic content	Dry extract – paste (%)	A.5 of EAD 090120-00-0404	76,5	85,5
	Ash content (%) at 450 °C	A.6.1 of EAD 090120-00-0404	88,0	89,3
	PCS _s -value	MJ/kg	3,3	2,5
		MJ/m ²	10,8	7,8

“---” = not applicable.

Characteristics		Reference	P-1	P-2	P-3	
Trade name		---	Imprimación GRC	Imprimación Fondo Pétreo GRC	AQUAPANEL® Base-coat Primer	
Generic type		EN 1062-1	(i)	(i)	(ii)	
Range of application thickness (mm)		---	≤ 0,2	≤ 0,2	≤ 1,0	
Coverage (kg/m ²)		---	≤ 0,20	≤ 0,17	≤ 0,15	
Density of delivered product – liquid (kg/m ³)		A.3.1 of EAD 090120-00-0404 or EN ISO 2811-1	1050 ± 50	1500 ± 50	1050 ± 50	
Organic content	Dry extract – liquid (%)	A.5 of EAD 090120-00-0404	9,3	65,7	21,8	
	Ash content (%) at 450 °C	A.6.1 of EAD 090120-00-0404	2,0	81,0	34,4	
	PCS _s -value	MJ/kg	EN ISO 1716	27,4	4,5	20,7
		MJ/m ²		28,8	0,6	2,6

(i) Acrylic primer with binder based on modified acrylic copolymers and soluble in water.
(ii) Aqueous dispersion of an acrylic-acid ester copolymer, limestone and additives.
“---” = not applicable.

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Table A2.7 – OUTDOOR MINERAL BASE-COATS.					
Characteristics		Reference	BC-1	BC-2	BC-3
Trade name		---	Mortero Superficial AQUAPANEL® Outdoor	AQUAPANEL® Exterior Base-coat - white	AQUAPANEL® Exterior Base-coat
Designation		EN 998-1	GP – General purpose rendering/plastering mortar		
Range of application thickness (mm)		---	5 – 7	4 – 6	5 – 7
Coverage (kg/m ²)		---	7,3 – 10,2	6,0 – 8,0	6,6 – 9,2
Density of delivered product – powders (kg/m ³)		A.3.1 of EAD 090120-00-0404	1300 ± 150	1350 ± 150	1500 ± 150
Particle size (%)	size < 2 mm	EN 1015-1 or A.4 of EAD 090120-00-0404	100	100	100
	size < 1 mm		100	100	95
	size < 0,5 mm		81	81	58
Bulk density of fresh mortar - water 25% (kg/m ³)		EN 1015-6 or A.3.3 of EAD 090120-00-0404	1650 ± 150	1450 ± 150	1650 ± 150
Consistence - water 25% (mm)		EN 1015-3	147	138	164
Dry bulk density of hardened mortar (kg/m ³)		EN 1015-10	1450 ± 150	1300 ± 150	1450 ± 150
Mechanical characteristics of hardened mortar	Flexural strength (MPa)	EN 1015-11	1,5 to 5,0 (CSII)	1,5 to 5,0 (CSII)	1,5 to 5,0 (CSII)
	Compressive strength (MPa)		> 5,0	> 5,0	> 5,0
	Static modulus of elasticity at break (MPa)	A.7 of EAD 090120-00-0404	ND	1,24	ND
	Tensile strength at break (MPa)		ND	4803	ND
	Elongation at break (mm)		ND	0,07	ND
	Dynamic modulus of elasticity (MPa)	A.7.1 of EAD 090120-00-0404	7561	5552	7381
	Shrinkage - 28 d (mm/m)		< 1,2	< 1,1	< 1,2
Organic content	Ash content (%) at 450 °C	A.6.1 of EAD 090120-00-0404	98,7	99,7	99,3
	PCS _s -value	EN ISO 1716	0,0	0,0	0,0
	MJ/kg MJ/m ²				
Water absorption by capillarity (kg/m ²) (*)	after 3 min. (**)	Annex E of EAD 090120-00-0404	0,24	0,18	0,12
	after 1 h. (***)		0,59	0,07	0,07
	after 24 h. (***)		1,24	0,41	0,37
Bond strength (MPa) (*)	Mean	EN 1015-12	0,42	0,45	0,57
	Minimum		0,39	0,33	0,48
	Cohesive rupture		100%	100%	92%
(*) Base coat applied on the AQUAPANEL® Cement Board Outdoor (EB-1). (**) Values from initial immersion. (***) Values from 3 minutes immersion. "----" = not applicable. ND = not defined.					

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Table A2.8: REINFORCING MESH.			
Characteristics		Reference	M-1
Trade name		---	AQUAPANEL® Reinforcing Mesh
Generic type		EN 13496	Glass fiber reinforcing mesh
Width (m)		A.10 of EAD 090120-00-0404	1,0
Thickness (mm)			0,5
Grid width (mm)			4 x 4
Superficial mass (g/m ²)		A.9 of EAD 090120-00-0404	160 ± 10
Tear resistance (N) for 50 mm		EN 13496	2500
Ash content (%) at 625 °C		Cl. 2.2.2 of EAD 040016-00-0404	82,6
Organic content (%)			17,4
PCS _s -value	MJ/kg	EN ISO 1716	5,80
	MJ/m ²		0,93
"---" = not applicable.			

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ANNEX 3 - EXTERNAL LAYER

A3.1 - CEMENT EXTERNAL-BOARD

Generic component	Code	Trade name	Reference
Cement external-board	EB-1	AQUAPANEL® Cement Board Outdoor	ETA 07/0173
Joint filler for cement external-board	EJF-1	Mortero de juntas AQUAPANEL® Outdoor	---
	EJF-2	AQUAPANEL® Joint Filler - grey	---
Joint tape for cement external-board	EJT-1	AQUAPANEL® Exterior Reinforcing Tape	---
	EJT-2	AQUAPANEL® Tape (10 cm)	---
Fixings for cement boards	EBF-1	AQUAPANEL® Maxi Screw SN (needle point)	EN 14566
	EBF-2	AQUAPANEL® Maxi Screw SB (drill point)	EN 14566

“---” = not applicable.

Characteristics	Reference	EB-1
Trade name	---	AQUAPANEL® Cement Board Outdoor
Thickness (mm)	ETA 07/0173	12,50 ± 1,25 mm
Width (mm)		≤ 1250
Length (mm)		≤ 3000
Apparent density – dry (kg/m ³)		1200 ± 175
Reaction to fire		A1
Heat-rain resistance		Pass for Category B
Freeze-thaw resistance		R _{L,FTC} = 0,91 for Category B
Air permeability		Not permeable
Thermal conductivity (W/(m·K))		ND

“---” = not applicable.
ND = not defined.

Characteristics	Reference	EJF-1	EJF-2
Trade name	---	Mortero de juntas AQUAPANEL® Outdoor	AQUAPANEL® Joint Filler - grey
Designation	EN 998-1	GP – General purpose rendering/plastering mortar	
Bulk density of fresh mortar (kg/m ³)	EN 1015-6	1600 - 1700	1400 - 1500
Dry bulk density of hardened mortar (kg/m ³)	EN 1015-10	1150 - 1250	1150 - 1370
Ash content (%) at 450 °C	A.6.1 of EAD 090120-00-0404	98,0	99,7
Reaction to fire	EN 13501-1	A1	A1

“---” = not applicable.

Cement external-board and ancillary components
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Table A3.1.4: JOINT TAPE FOR CEMENT EXTERNAL BOARD.

Characteristics	Reference	EJT-1	EJT-2
Trade name	---	AQUAPANEL® Exterior Reinforcing Tape	AQUAPANEL® Tape (10 cm)
Generic type	EN 13496	Glass fibre reinforcing joint tape	
Width (m)	---	0,33	0,10
Thickness (mm)	---	0,5	
Grid width (mm)	---	4 x 4	
Superficial mass (g/m ²)	---	160 ± 10	
"---" = not applicable.			

Table A3.1.5 –FIXINGS FOR CEMENT BOARDS

Characteristics	Reference	EBF-1	EBF-2
Trade name	---	AQUAPANEL® Maxi Screw SN (needle point)	AQUAPANEL® Maxi Screw SB (drill point)
Generic type	EN 14566	Drywall self-tapping normal screw for profile thickness up to 0,7 mm	Drywall self-drilling screw for profile thickness up to 2,25 mm
Diameter x length (mm)	---	4,2 x L (L ≥ 25)	4,2 x L (L ≥ 25)
Pin shape	---	Needle point	Drill point
Material type	EN 10083 or EN 10084	Carbon steel case hardened and galvanized	Carbon steel case hardened and galvanized
Corrosion protection	EN ISO 12944-6	Class C4 long	Class C4 long
Bending resistance	EN 14566	> 10 ⁰	> 10 ⁰
Hardness (HRC) at 600HV	EN ISO 6508-1	55	55
Pull out strength screw/profile (N)	EN 14566	> 450	> 450
Reaction to fire	EN 13501-1	A1	A1
"---" = not applicable.			

Cement external-board and ancillary components
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A3.2 - GYPSUM WITH FIBROUS REINFORCING EXTERNAL-BOARDS**Table A3.2.1:** Trade name of gypsum boards external layer components.

Generic component		Code	Trade name	Reference
Gypsum with fibrous reinforcing external-board		EB-2	Vidiwall HI (GF-W1)	EN 15283-2
		EB-3	Guardex (GM-H2)	EN 15283-1
Joint filler for gypsum external-board	for EB-2	IJF-1 (*)	Uniflott	EN 13963
	for EB-3	EJA-1	Power-Elast	---
Joint tape for gypsum external-board	for EB-2	IJT-1 (*)	Knauf paper joint tape	EN 13963
		IJT-2 (*)	Knauf joint tape Kurt	
Fixings for gypsum boards	for EB-2 & EB-3	EBF-1	AQUAPANEL® Maxi Screw SN (needle point) (**)	EN 14566
		EBF-2	AQUAPANEL® Maxi Screw SB (drill point) (**)	

(*) Same components of gypsum internal-board IB-2 (see Annex A4.2).
(**) Same components of Cement external-board EB-a) (see Annex A3.1).
"---" = not applicable.

Table A3.2.2: GYPSUM WITH FIBROUS REINFORCING EXTERNAL BOARDS.

Characteristics		Reference	EB-2	EB-3	
Trade name		---	Vidiwall Hi	Guardex	
Designation		EN 15283-2 / EN 15293-1	GF-W1	GM-H2	
Thickness (mm)			12,5 ± 0,5 15,0 ± 0,5	12,5 ± 0,7	
Width (mm)			1200 / 1245 / 1250 (- 4,+ 0)	900 / 1200 (- 4,+ 0)	
Length (mm)			Variable (- 5, + 0)	Variable (- 5, + 0)	
Apparent density -dry (kg/m ³)			1000 - 1250	800 ± 50	
Bending strength	Longitudinal		5,5 MPa (≥ 707 N for t = 15 mm); (≥ 490 N for t = 12,5 mm)	≥ 6 MPa (≥ 538 N)	
	Transversal			≥ 2,4 MPa (≥ 210 N)	
Reaction to fire			A2-s1,d0	A1	
Thermal conductivity (W/(m·K))			EN ISO 10456	0,30	0,25

"---" = not applicable.

Table A3.2.3: JOINT FILLER FOR GYPSUM WITH FIBROUS REINFORCING EXTERNALBOARDS.

Characteristics		Reference	EJA-1
Trade name		---	Power-Elast
Designation		EN 15651-1	Hybrid-Polymer
Tensile stress-strain (MPa)		ISO 37	2,0 – 2,4
Extension to break (%)		ISO 8339	200 – 300
Shore A hardness		ISO 868	38 - 43

"---" = not applicable.

Gypsum with fibrous reinforcing external-boards and ancillary components
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ANNEX 4 - INTERNAL LAYER

A4.1 - CEMENT INTERNAL-BOARD

Generic component	Code	Trade name	Reference
Cement internal-board	IB-1	AQUAPANEL® Cement Board Indoor	ETA 17/0856
Joint adhesive for cement board	IJA-1	AQUAPANEL® Joint Adhesive (PU)	---
Joint filler for cement internal-board (*)	IJF-9	AQUAPANEL® Joint Filler & Skim Coating - white	---
Joint tape for cement board (*)	EJT-2	AQUAPANEL® Tape (10 cm)	---
Fixings for cement boards (*)	EBF-1	AQUAPANEL® Maxi Screw SN (needle point)	EN 14566
	EBF-2	AQUAPANEL® Maxi Screw SB (drill point)	
(*) Same components of cement external-board EB-1 (see Annex A3.1). "---" = not applicable.			

Characteristics	Reference	EB-1
Trade name	---	AQUAPANEL® Cement Board Indoor
Thickness (mm)	EN 12467	12,50 ± 1,25
Width (mm)		≤ 1250
Length (mm)		≤ 3000
Apparent density – dry (kg/m ³)		1100 ± 100
Reaction to fire		A1
Water absorption (% by mass)		29,3
Thermal conductivity (W/(m·K))		Not assessed
"---" = not applicable.		

Characteristics	Reference	IJA-1	IJF-9
Trade name	---	AQUAPANEL® Joint Adhesive (PU)	AQUAPANEL® Joint Filler & Skim Coating - white
Designation	EN 12765	1K PUR adhesive, high viscosity	---
	EN 998-1	---	GP – General purpose rendering/plastering mortar
Moisture resistance	EN 12765	Class C4	---
Mass (g/m)	---	1,5	ND
Bulk density of fresh mortar (kg/m ³)	EN 1015-6	ND	1300 - 1400
Open time (min) at 20 °C and 65 % HR	---	50	ND
Ash content (%) at 450 °C	A.6.1 of EAD 090120-00-0404	ND	99,6
"---" = not applicable. ND = not defined.			

<p>Cement internal-board and ancillary components Technical description</p>	<p>Annex 4.1 of European Technical Assessment ETA 13/0312</p>
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A4.2 – GYPSUM INTERNAL OR INTERMEDIATE-BOARDS

Generic component	Code	Trade name	Reference
Gypsum fibre internal or intermediate board	IB-2	Vidiwall (GF-W2)	EN 15283-2
Gypsum internal or intermediate board	IB-3	Diamant (DFH11 or DFH2IR)	EN 520
	IB-4	Standard (A)	
Gypsum internal-board with vapour control sheet	IB-5	Standard (A + BV)	EN 14190
Joint filler for gypsum internal or intermediate boards	IJF-1	Uniflott	EN 13963
	IJF-2	Jointfiller normal	
	IJF-3	Knauf Unik 1h	
	IJF-4	Knauf Unik 2h	
	IJF-5	Knauf Unik 4h	
	IJF-6	Knauf Unik versátil 30´	
	IJF-7	Knauf Unik Hydro 1h	
	IJF-8	Knauf Unik 24h	
Joint tape for gypsum internal or intermediate boards	IJT-1	Knauf paper joint tape	EN 14566
	IJT-2	Knauf joint tape Kurt	
Fixings for gypsum boards (*)	IBF-1	Diamant screw TUN (XTN needle point)	EN 14566
	IBF-2	Diamant screw TSD (HGP drill point)	
	IBF-3	Vidiwall screw TMN (TN needle point)	
	IBF-4	Drywall screw TSD (drill point)	
	IBF-5	Vidiwall screw TMN (needle point)	
	IBF-6	Vidiwall screw TSD (TD drill point)	

(*) Same components of gypsum external-boards EB-2 & EB-3 (see Annex A3.2).

Characteristics		Reference	IB-2	IB-3	IB-4	IB-5	
Trade name		---	Vidiwall	Diamant	Standard	Standard	
Designation			GF-W2	DFH11 or DFH2IR	A	A + VB	
Thickness	Board (mm)	EN 15283-2 / EN 520 / EN 14190	12,5 ± 0,5 15,0 ± 0,5	12,5 ± 0,5 15,0 ± 0,5	12,5 ± 0,5 15,0 ± 0,5 18,0 ± 0,7 20,0 ± 0,8 25,0 ± 0,8	12,5 ± 0,5 15,0 ± 0,5	
	Aluminium sheet (µm)		---	---	---	30	
Width (mm)			1200 / 1250 (- 4,+ 0)	1200 (- 4,+ 0)	1200 (- 4,+ 0) 900 (+ 0, - 4)	1200 (- 4,+ 0)	
Length (mm)			Variable (- 5, + 0)	Variable (- 5, + 0)	Variable (- 5, + 0)	Variable (- 5, + 0)	
Apparent density -dry (kg/m ³)			1000 - 1250	> 1000	> 680	> 600	
Paper grammage (g/m ²)			EN ISO 536	---	< 220	< 190	< 220
Aluminium density (kg/m ³)			EN 12524	---	---	---	2800
Reaction to fire			EN 15283-2 / EN 520 / EN 14190	A2-s1,d0	A2-s1,d0	A2-s1,d0	A2-s1,d0
Thermal conductivity (W/(m·K))		EN ISO 10456	0,30	0,27	0,21 (boards 12,5 mm to 18,0 mm) 0,23 (boards 20,0 mm and 25,0 mm)	0,21	

“---” = not applicable.

Gypsum internal or intermediate boards and ancillary components
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Table A4.2.3: JOINT FILLER FOR GYPSUM INTERNAL OR INTERMEDIATE BOARDS.

Characteristics	Reference	IJF-1	IJF-2	IJF-3	IJF-4	IJF-5	IJF-6	IJF-7	IJF-8
Trade name	---	Uniflott	Jointfiller normal	Knauf Unik 1h	Knauf Unik 2h	Knauf Unik 4h	Knauf Unik versátil 30'	Knauf Unik Hydro 1h	Knauf Unik 24h
Designation	EN 13963	4B	3A	3B	3B	3B	3B	3B	2A
Reaction to fire	EN 13963 / EN 13501-1	A1	A2-s1,d0	A1	A1	A1	A1	A1	A2-s1,d0

“---” = not applicable.

Table A4.2.4: JOINT TAPE FOR GYPSUM INTERNAL OR INTERMEDIATE BOARDS.

Characteristics	Reference	IJT-1	IJT-2
Trade name	---	Knauf paper joint tape	Knauf joint tape Kurt
Generic type	EN 13963	Paper join tape	Paper join tape
Width (mm)		50	50
Thickness (mm)		0,18	0,28
Mass (g/m)	---	7,5	7,0

“---” = not applicable.

Table A4.2.5: FIXINGS FOR GYPSUM WITH FIBROUS REINFORCING INTERNAL-BOARDS.

Characteristics	Reference	IBF-1	IBF-2	IBF-3	IBF-4	IBF-5	IBF-6
Trade name	---	Diamant screw PSN (XTN needle point)	Diamant screw PSD (HGP drill point)	Vidiwall screw TMN (TN needle point)	Drywall screw TSD (drill point)	Vidiwall screw TMN (needle point)	Vidiwall screw TSD (TD drill point)
Generic type	EN 14566	Drywall self-tapping normal screw for profile thickness up to 0,7 mm	Drywall self-drilling screw for profile thickness up to 2,25 mm	Drywall self-tapping normal screw for profile thickness up to 0,7 mm	Drywall self-drilling screw for profile thickness up to 2,25 mm	Drywall self-tapping normal screw for profile thickness up to 0,7 mm	Drywall self-drilling screw for profile thickness up to 2,25 mm
Diameter x length (mm)		3,9 x L (L ≥ 23)	3,9 x L (L ≥ 38)	3,5 x L (L ≥ 25) 4,2 x 70 4,8 x 90	3,5 x L (L ≥ 25)	3,9 x L (L ≥ 22)	ND
Pin shape		Needle point	Drill point	Needle point	Drill point	Needle point	Drill point
Material type	EN 10083-2	C22	C22	C22	C22	C22	C22
Corrosion protection	EN ISO 9227	Class 48	Class 48	Class 48	Class 48	Class 48	Class 48
Bending resistance	EN 14566	> 15°	> 15°	> 15°	> 15°	> 15°	> 15°
Hardness (HRC)	EN ISO 6508-1	55	55	55	55	55	55
Pull out force screw/profile (N)	EN 14566	> 450	> 450	> 450	> 450	> 450	> 450

“---” = not applicable.
ND = not defined.

Gypsum internal or intermediate boards and ancillary components
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ANNEX 5 - EXTERNAL SUBFRAMES

A5.1 – GALVANIZED STEEL SUBFRAME WITH NON-SLOTTED PROFILES

Table A5.1.1: TYPES AND COMPOSITION OF GALVANIZED STEEL SUBFRAMES WITH NON-SLOTTED PROFILES.

Components	Types						
	ExS-1	ExS-2	ExS-3	ExS-4	ExS-5	ExS-6	ExS-7
Non-slotted vertical profile	EVP-3	EVP-4	EVP-5	EVP-6	EVP-7	EVP-8	EVP-9
Non-slotted horizontal profile	EHP-2		EHP-3		EHP-4	EHP-5	EHP-6
Fixing between profiles	FSF-1 / FSF-2 / FSF-3						
Fixings between horizontal profiles and supporting structure (optional)	This component is an optional kit component. This means that it can be delivered by the ETA holder as a kit component or it can be bought by the kit user on the open market. In any case, see the specifications given in the table A5.1.7.						

Table A5.1.2: GALVANIZED STEEL EXTERNAL SUBFRAME WITH NON-SLOTTED PROFILES.

Generic component	Code	Trade name	Reference	
Non-slotted vertical profile	EVP-3	Knauf C-profile	EN 14195	
	EVP-4			C 75x50x2,0
	EVP-5			C 100x50x1,0
	EVP-6	C 100x50x2,0		
	EVP-7	Knauf CW-profile		CW 100x50x0,6
	EVP-8			CW 125x50x0,6
	EVP-9			CW 150x50x0,6
Non-slotted horizontal profile	EHP-2	Knauf U-profile	EN 14195	
	EHP-3			U 75x40x0,7
	EHP-4	Knauf UW-profile		U 100x40x0,7
	EHP-5			UW 100x40x0,6
	EHP-6			UW 125x40x0,6
Fixing between profiles	FSF-1	Knauf PMN screw (LN Screw)	EN 14566	
	FSF-2	Knauf PSD (LB Screw)		
	FSF-3	Open end blind rivet with break pull mandrel and protruding head. AIA/AIA (acc. EN ISO 15981)		---
"---" = not applicable.				

External subframe - Non-slotted galvanized steel profiles
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Characteristics		EVP-3	EVP-4	EVP-5	EVP-6	EVP-7 (*)	EVP-8	EVP-9
Trade name		Knauf C-profile				Knauf CW-profile		
Form		See Figure A5.1.1						
Designation		C 75x50x1,0	C 75x50x2,0	C 100x50x1,0	C 100x50x2,0	CW 100x50x0,6	CW 125x50x0,6	CW 150x50x0,6
Dimensions	Web width (mm) - a	73,0 ± 0,5	73,0 ± 0,5	98,0 ± 0,5	98,0 ± 0,5	98,5 ± 0,5	123,5 ± 0,5	148,5 ± 0,5
	Flange width (mm) – b/c	48,0 ± 0,5	48,0 ± 0,5	48,0 ± 0,5	48,0 ± 0,5	48,0 ± 0,5 50,0 ± 0,5	47,0 ± 0,5 49,0 ± 0,5	47,0 ± 0,5 49,0 ± 0,5
	Fold (mm) – m/n	5,0 ± 0,5	6,0 ± 0,5	5,0 ± 0,5	6,0 ± 0,5	5,0 ± 0,5	5,0 ± 0,5	5,0 ± 0,5
	Thickness (mm) - e	1,00 ± 0,07	2,00 ± 0,14	1,00 ± 0,07	2,00 ± 0,14	0,60 ± 0,05	0,60 ± 0,05	0,60 ± 0,05
	Length (mm)	Various	Various	Various	Various	Various	Various	Various
	X1g (mm)	37,16	36,34	49,73	49,74	49,73	62,29	74,84
Y1g (mm)	13,71	14,18	12,08	12,51	11,92	10,32	9,32	
Cross-section area (mm ²)		154,88	181,5	176,6	358,7	108,3	120,5	133,8
Moment of inertia	Ixx (mm ⁴)	46788	89703	51270	98462	32093	32531	34179
	Iyy (mm ⁴)	147463	290813	284276	564850	175740	289912	444288
Cross-section modulus	Wxx (mm ³)	1326	2576	1389	2699	866	863	884
	Wyy (mm ³)	3969	7826	5716	11357	3534	4654	5937
(*) This profile is the same profile as the internal profile C100x50x0,6 (IVP-7).								

Characteristics		EHP-2	EHP-3	EHP-4 (*)	EHP-5	EHP-6
Trade name		Knauf U-profile			Knauf UW-profile	
Form		See Figure A5.1.2				
Designation		U 75x40x0,7	U 100x40x0,7	UW 100x40x0,6	UW 125x40x0,6	UW 150x40x0,6
Dimensions	Web width (mm) - a	75,0 ± 1,0	100,0 ± 1,0	100,0 ± 1,0	125,0 ± 1,0	150,0 ± 1,0
	Flange width (mm) – b/c	40,0 ± 0,5	40,0 ± 0,5	40,0 ± 0,5	40,0 ± 0,5	40,0 ± 0,5
	Thickness (mm) - e	0,70 ± 0,06	0,70 ± 0,06	0,60 ± 0,05	0,60 ± 0,05	0,60 ± 0,05
	Length (mm)	Various	Various	Various	Various	Various
	X1g (mm)	37,50	50,00	50,00	62,50	75,00
Y1g (mm)	10,54	9,11	9,09	8,01	7,16	
Cross-section area (mm ²)		89	104	94,88	108,09	121,34
(*) This profile is the same profile as internal profile U100x40x0,55 (IHP-7).						

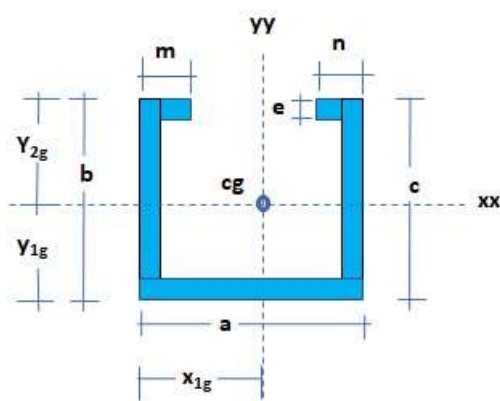


Figure A5.1.1: Knauf C-profile & Knauf CW-profile.

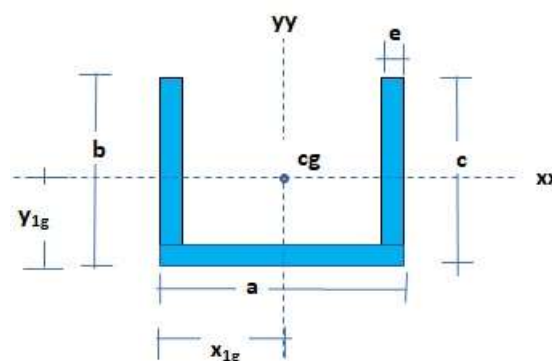
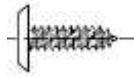




Figure A5.1.2: Knauf U-profile & Knauf UW-profile.

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Characteristic	Reference	Material properties
Type of material	EN 10346	DX51D (1.0226)
Corrosion protection		Z275 / Z450 / ZM250
Density (kg/m ³)		7850
Yield A ₈₀ (%)	EN 1993-1	≥ 22
Fracture stress - R _m (MPa)		270 ≤ R _m ≤ 500
Elastic limit – Re (MPa)		≥ 140
Modulus of elasticity – E (MPa)		210.000
Shear modulus – G (MPa)		81.000
Poisson ratio in elastic stage - ν		0,3
Thermal expansion coefficient - α (μm/m·K ⁻¹) for T ≤ 100 °C		12
Reaction to fire	EN 13501-1	A1 (without organic covering)

Characteristics	Reference	FSF-1	FSF-2	FSF-3	
Trade name	---	Knauf LN Screw	Knauf LB Screw	---	
Generic type	EN 14566 (screw) EN ISO 15981 (rivet)	PMN	PSD	Blind rivet	
Dimensions (mm)	Screw	EN 14566	3,5 x 9 mm 3,5 x 16 mm	3,5 x 9 mm 3,5 x 16 mm	---
	Rivet	EN ISO 15981	---	---	d1 = 3,2 mm L = 10,0 mm d2 = 6,7 mm
Material properties	Screw	EN 10083 or EN 10084	C22	C22	---
	Rivet	EN ISO 15981	---	---	Aluminium alloy A1A
Corrosion protection	Screw	EN ISO 9227	Class 48	Class 48	---
	Rivet	---	---	---	Aluminium alloy A1A
Hardness (HRC)	EN ISO 6508-1	55 HRC	55 HRC	---	
Pull-out strength screw/profile (N)	EN 14566	> 450	> 450	---	
Shear strength – rivet (N)	EN ISO 15981	---	---	> 500	
Tensile strength – rivet (N)				> 670	
Form	---				

“---” = not applicable.

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Table A5.1.7: FIXINGS BETWEEN HORIZONTAL PROFILES & SUPPORTING STRUCTURE.		
Characteristics		Minimum required specification
Generic type		The fixings between profiles and supporting structure must be chosen taking into account the supporting structure material (e.g. normal concrete, cracked concrete, masonry, steel structure, etc.) and also the minimum specifications indicated in this table.
Diameter		≥ M6
Material (*)		Galvanized steel (minimum corrosion protection equivalent to Z275, Z450 or ZM250) Stainless steel (A2 or A4)
Maximum distance between two fixings		≤ 600 mm
Minimum shear strength		≥ 2,0 kN or higher than the reaction due to wind load.
Other	Reference	The fixings between profiles and supporting structure may be CE marked according to an ETA on the basis of the relevant EAD as long as this CE marking is mandatory in the Member State where the kit is used.
	Serviceability	The serviceability conditions such as load directions, material of supporting structure (concrete type, masonry type, etc.), minimum distance to edges, etc. must be taken into account.
(*) The fixing material must guarantee the electrochemical compatibility between the different materials.		

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A5.2 – GALVANIZED STEEL SUBFRAME WITH SLOTTED PROFILES

Table A5.2.1: TYPES AND COMPOSITION OF EXTERNAL SUBFRAMES WITH SLOTTED PROFILES.						
Components	ExS-8	ExS-9	ExS-10	ExS-11	ExS-12	ExS-13
Slotted vertical profile	EVP-10	EVP-11	EVP-12	EVP-13	EVP-14	EVP-15
Slotted horizontal profile	EHP-7		EHP-8		EHP-9	
Fixing between profiles (*)	FSF-1 / FSF-2 / FSF-3					
Fixings between horizontal profiles and supporting structure (optional) (*)	This component is an optional kit component. This means that it can be delivered by the ETA holder as a kit component or it can be bought by the kit user on the open market. In any case, see the specifications given in the table A5.1.7.					
(*) These components are the same components of non-slotted profiles subframes.						

Table A5.2.2: GALVANIZED STEEL EXTERNAL SUBFRAME WITH SLOTTED PROFILES.			
Generic component	Code	Trade name	Reference
Slotted vertical profile	EVP-10	Knauf RY-profile	RY 145x50x1,0
	EVP-11		RY 145x50x2,0
	EVP-12		RY 195x50x1,0
	EVP-13		RY 195x50x2,0
	EVP-14		RY 250x50x1,0
	EVP-15		RY 250x50x2,0
Slotted horizontal profile	EHP-7	Knauf SKY-profile	SKY 145x50x1,0
	EHP-8		SKY 195x50x1,0
	EHP-9		SKY 250x50x1,0
Fixing between profiles (*)	FSF-1	Knauf PMN screw (LN Screw)	
	FSF-2	Knauf PSD (LB Screw)	
	FSF-3	Open end blind rivet with break pull mandrel and protruding head. AIA/AIA (acc. EN ISO 15981)	
(*) These fixings are the same fixings of non-slotted profiles subframes (see table A5.1.6). “---” = not applicable.			

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Characteristics		EVP-10	EVP-11	EVP-12	EVP-13	EVP-14	EVP-15
Trade name		Knauf RY-profile					
Form		See figure A5.2.1					
Designation		RY 145x50x1,0	RY 145x50x2,0	RY 195x50x1,0	RY 195x50x2,0	RY 250x50x1,0	RY 250x50x2,0
Dimensions	Web width (mm) - ht	144,0 ± 0,5	144,0 ± 0,5	194,0 ± 0,5	194,0 ± 0,5	249,0 ± 0,5	249,0 ± 0,5
	Flange width (mm) – b1/b2	48,0 ± 0,5 52,0 ± 0,5	48,0 ± 0,5 54,0 ± 0,5	48,0 ± 0,5 52,0 ± 0,5	48,0 ± 0,5 54,0 ± 0,5	48,0 ± 0,5 52,0 ± 0,5	48,0 ± 0,5 54,0 ± 0,5
	Wing (mm) - ct	10,5	13,5	10,5	13,5	10,5	13,5
	Thickness (mm)	1,0 ± 0,1	2,0 ± 0,1	1,0 ± 0,1	2,0 ± 0,1	1,0 ± 0,1	2,0 ± 0,1
	Length (mm)	Various	Various	Various	Various	Various	Various
	Dy (mm)	72,0	72,5	97,5	97,5	125,0	125,0
Cross-section area (mm ²)	A _{nom}	255,8	518,0	305,8	618,0	360,8	728,0
	A _{eff}	115,9	348,3	115,9	348,3	116,9	361,7
Moment of inertia (*)	I _{y,2m} (mm ⁴)	508929	963294	787698	1458333	1339286	2420635
	I _{y,4m} (mm ⁴)	720635	1373016	1277778	2380952	2277778	4134921
Cross-section modulus (**)	W _{y,2m} (mm ³)	2983	8091	4046	10989	5503	14914
	W _{y,4m} (mm ³)	5726	15497	7817	21120	10149	27429
(*) Inertia of the profile cross-section must be calculated by interpolation according to the equation: $I_{y,Lm} = I_{y,2m} + (L/2 - 1)(I_{y,4m} - I_{y,2m})$ where: $I_{y,Lm}$ = Inertia for a profile length L $I_{y,2m}$ = Inertia for a profile length L = 2,0 m $I_{y,4m}$ = Inertia for a profile length L = 4,0 m (**) Cross-section modulus must be calculated by interpolation according to the equation: $W_{y,Lm} = W_{y,2m} + (L/2 - 1)(W_{y,4m} - W_{y,2m})$, where: $W_{y,Lm}$ = Cross-section modulus for a profile length L $W_{y,2m}$ = Cross-section modulus for a profile length L = 2,0 m $W_{y,4m}$ = Cross-section modulus for a profile length L = 4,0 m							

Characteristics		EHP-4	EHP-5	EHP-6
Trade name		Knauf SKY-profile		
Form		See figure A5.2.2		
Designation		SKY 145x50x1,0	SKY 195x50x1,0	SKY 250x50x1,0
Dimensions	Web width (mm) - ht	147,5 ± 0,5	197,5 ± 0,5	252,5 ± 0,5
	Flange width (mm) – b1/b2	57,0 ± 0,5	57,0 ± 0,5	57,0 ± 0,5
	Thickness (mm)	1,0 ± 0,1	1,0 ± 0,1	1,0 ± 0,1
	Length (mm)	Various	Various	Various
	Dz (mm)	73,8	98,8	126,3
Cross-section area (mm ²)	A _{nom}	252,8	302,8	357,8
	A _{eff}	57,2	57,2	57,7
Moment of inertia (*)	I _{y,2m} (mm ⁴)	863095	1418651	2609127
	I _{y,4m} (mm ⁴)	1222222	2309524	4500000
Cross-section modulus (**)	W _{y,2m} (mm ³)	3000	3806	4491
	W _{y,4m} (mm ³)	3216	3922	4491

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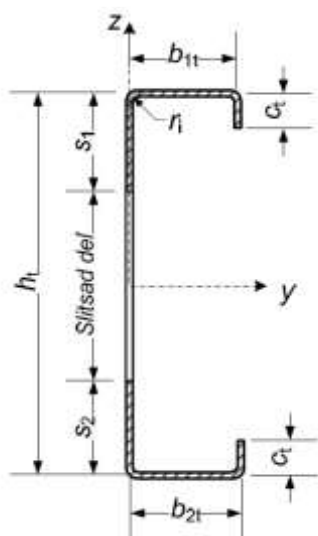


Figure A5.2.1: Knauf RY-profiles.

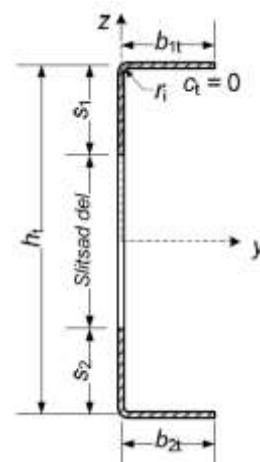


Figure A5.2.2: Knauf SKY-profiles.

Table A5.2.5: MATERIAL OF EXTERNAL SLOTTED PROFILES.		
Characteristic	Reference	Material properties
Type of material	EN 10346	S350 GD (1.0529)
Corrosion protection		Z275 / Z450 / ZM250
Density (kg/m ³)		7850
Yield A ₈₀ (%)	EN 1993-1	≥ 16
Fracture stress – Rm (MPa)		≥ 420
Elastic limit – Re (MPa)		≥ 350
Modulus of elasticity – E (MPa)		210.000
Shear modulus – G (MPa)		G = 81.000 MPa
Poisson ratio in elastic stage - ν		ν = 0,3
Thermal expansion coefficient - α (μm/m·K ⁻¹) for T ≤ 100 °C		12
Reaction to fire	EN 13501-1	A1 (without organic covering)

External subframe - Slotted galvanized steel profiles
Technical description

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ANNEX 6 - INTERNAL SUBFRAMES

A6.1 – GALVANIZED STEEL INTERNAL SUBFRAME FOR FAMILY 3 AND FAMILY 4

Table A6.1.1: TYPES AND COMPOSITION OF INTERNAL SUBFRAMES WITH NON-SLOTTED PROFILES.							
Components	InS-1	InS-2	InS-3	InS-4	InS-5	InS-6	InS-7
Non-slotted vertical profile	IVP-1	IVP-2	IVP-3	IVP-4	IVP-5	IVP-6	IVP-7
Non-slotted horizontal profile	IHP-1	IHP-2	IHP-3	IHP-4	IHP-5	IHP-6	IHP-7
Fixing between profiles (*)	FSF-1 / FSF-2 / FSF-3						
Fixings between horizontal profiles and supporting structure (optional) (*)	This component is an optional kit component. This means that it can be delivered by the ETA holder as a kit component or it can be bought by the kit user on the open market. In any case, see the specifications given in the table A5.1.7.						
(*) These components are the same components of external subframes (see Annex 5).							

Table A6.1.2: GALVANIZED STEEL INTERNAL SUBFRAME COMPONENTS FOR FAMILIES 3 & 4.			
Generic component	Code	Trade name	Reference
Non-slotted vertical profile	IVP-1	Knauf C-profile & Knauf CW-profile	C 48x35x0,6
	IVP-2		CW 50x50x0,6
	IVP-3		C 70x38x0,6
	IVP-4		CW 75x50x0,6
	IVP-5		C 90x40x0,6
	IVP-6		C 100x40x0,6
	IVP-7		CW 100x50x0,6
Non-slotted horizontal profile	IHP-1	Knauf U-profile & Knauf UW-profile	U 48x30x0,55
	IHP-2		UW 50x40x0,6
	IHP-3		U 70x30x0,55
	IHP-4		UW 75x40x0,6
	IHP-5		U 90x30x0,55
	IHP-6		U 100x35x0,55
	IHP-7		UW 100x40x0,6
Fixing between profiles (*)	FSF-1	Knauf PMN screw (LN Screw)	EN 14566
	FSF-2	Knauf PSD (LB Screw)	
	FSF-3	Open end blind rivets with break pull mandrel and protruding head. AIA/AIA (acc. EN ISO 15981)	---
(*) These fixings are the same fixings of external subframes (see table A5.1.6). “---” = not applicable.			

Internal subframes for family 3 and family 4
Technical description

Annex 6.1
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Assessment ETA 13/0312

Characteristics		IVP-1	IVP-2	IVP-3	IVP-4	IVP-5	IVP-6	IVP-7 (*)
Trade name		Knauf C-profile & Knauf CW-profile						
Form		See Figure A6.1.1						
Designation		C	CW	C	CW	C	C	CW
		48x35x0,6	50x50x0,6	70x38x0,6	75x50x0,6	90x40x0,6	100x40x0,6	100x50x0,6
Dimensions	Web width (mm) - a	48,5 ± 0,5	48,5 ± 0,5	68,8 ± 0,5	73,5 ± 0,5	88,8 ± 0,5	98,8 ± 0,5	98,5 ± 0,5
	Flange width (mm) – b/c	36,0 ± 0,5 34,0 ± 0,5	50,0 ± 0,5 48,0 ± 0,5	39,0 ± 0,5 37,0 ± 0,5	50,0 ± 0,5 48,0 ± 0,5	41,0 ± 0,5 39,0 ± 0,5	41,0 ± 0,5 39,0 ± 0,5	50,0 ± 0,5 48,0 ± 0,5
	Fold (mm) – m/n	5,0 ± 0,5	5,0 ± 0,5	5,0 ± 0,5	5,0 ± 0,5	5,0 ± 0,5	5,0 ± 0,5	5,0 ± 0,5
	Thickness (mm) - e	0,60 ± 0,05	0,60 ± 0,05	0,60 ± 0,05	0,60 ± 0,05	0,60 ± 0,05	0,60 ± 0,05	0,60 ± 0,05
	Length (mm)	Various	Various	Various	Various	Various	Various	Various
	X1g (mm)	23,77	24,56	33,95	37,16	44,90	49,93	49,73
Y1g (mm)	10,00	15,70	9,64	13,54	9,24	8,76	11,92	
Cross-section area (mm ²)		66,1	81,8	80,9	91,5	93,6	98,9	108,3

(*) This profile is the same profile that external profile CW100x50x0,6 (EVP-7).

Characteristics		IHP-1	IHP-2	IHP-3	IHP-4	IHP-5	IHP-6	IHP-7 (*)
Trade name		Knauf U-profile & Knauf UW-profile						
Form		See Figure A6.1.2						
Designation		U	UW	U	UW	U	U	UW
		48x30x0,55	50x40x0,6	70x30x0,55	75x40x0,6	90x30x0,55	100x35x0,55	100x40x0,6
Dimensions	Web width (mm) - A	48,5 ± 0,5	50,0 ± 0,5	70,0 ± 0,5	75,0 ± 0,5	90,0 ± 0,5	100,0 ± 0,5	100,0 ± 0,5
	Flange width (mm) – B /C	30,0 ± 0,5	40,0 ± 0,5	30,0 ± 0,5	40,0 ± 0,5	30,0 ± 0,5	30,0 ± 0,5	40,0 ± 0,5
	Thickness (mm) - e	0,55 ± 0,05	0,60 ± 0,05	0,55 ± 0,05	0,60 ± 0,05	0,55 ± 0,05	0,55 ± 0,05	0,60 ± 0,05
	Length (mm)	Various	Various	Various	Various	Various	Various	Various
	Xg (mm)	24,00	25,00	35,00	37,50	45,00	50,00	50,00
Y1g (mm)	8,51	12,51	7,10	10,52	6,18	7,39	9,09	
Cross-section area (mm ²)		51,40	56,40	61,90	81,60	71,50	81,10	94,88

(*) This profile is the same profile as external profile UW100x40x0,55 (EHP-4).

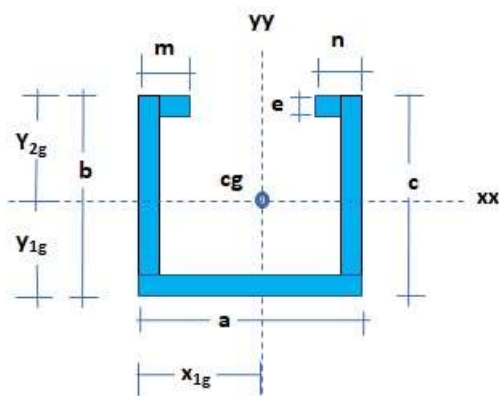


Figure A6.1.1: Knauf C-profile.

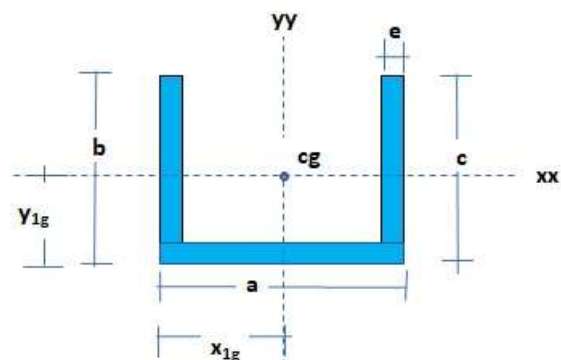


Figure A6.1.2: Knauf U-profile.

Internal subframes for family 3 and family 4
Technical description

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Characteristic	Reference	Material properties
Type of material	EN 10346	DX51D (1.0226)
Corrosion protection		Z140
Density (kg/m ³)		7850
Yield A ₈₀ (%)	EN 1993-1	≥ 22
Fracture stress – Rm (MPa)		270 ≤ Rm ≤ 500
Elastic limit – Re (MPa)		≥ 140
Modulus of elasticity – E (MPa)		210.000
Shear modulus – G (MPa)		81.000
Poisson ratio in elastic stage - ν		0,3
Thermal expansion coefficient - α (µm/m·K ⁻¹) for T ≤ 100 °C		12
Reaction to fire	EN 13501-1	A1 (without organic covering)

Internal subframes for family 3 and family 4
Technical description

Annex 6.1
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A6.2 – GALVANIZED STEEL INTERNAL SUBFRAME FOR FAMILY 2**Table A6.2.1: TYPES AND COMPOSITION OF INTERNAL SUBFRAMES WITH NON-SLOTTED PROFILES.**

Components	InS-8	InS-9
Non-slotted Z horizontal profile	IHP-8	IHP-9
Fixing between profiles (*)	FSF-1 / FSF-2 / FSF-3	
Fixings between horizontal profiles and supporting structure (optional) (*)	This component is an optional kit component. This means that it can be delivered by the ETA holder as a kit component or it can be bought by the kit user on the open market. In any case, see the specifications given in the table A5.1.7.	
(*) These components are the same components of external subframes (see Annex 5).		

Table A6.2.2: GALVANIZED STEEL INTERNAL SUBFRAME COMPONENTS FOR FAMILY 2.

Generic component	Code	Trade name	Reference
Non-slotted Z horizontal profile	IHP-8	Knauf Z-profile	EN 14195
	IHP-9		
Fixing between profiles (*)	FSF-1	Knauf PMN screw (LN Screw)	EN 14566
	FSF-2		
(*) These fixings are the same fixings of external subframes (see Table A5.1.6).			

Table A6.2.3: GEOMETRIC CHARACTERISTICS OF INTERNAL Z-PROFILES FOR FAMILY 2.

Characteristics	IHP-8	IHP-9
Designation	Z 40x70x25x0,7	Z 40x95x25x0,7
Dimensions	Web width (mm)	70,0 ± 0,5
	Flange width (mm)	40,0 ± 0,5
	Thickness (mm)	0,7 ± 0,1
	Length (mm)	Various
Form	See Figure A6.2.1	See Figure A6.2.2

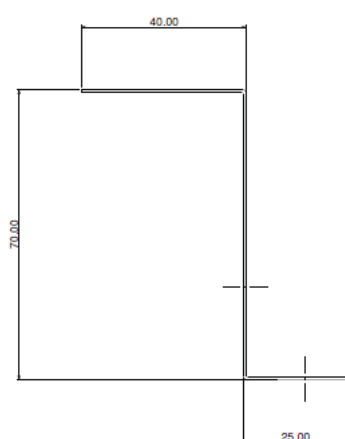


Figure A6.2.1: Profile Z 40x70x25x0,7.

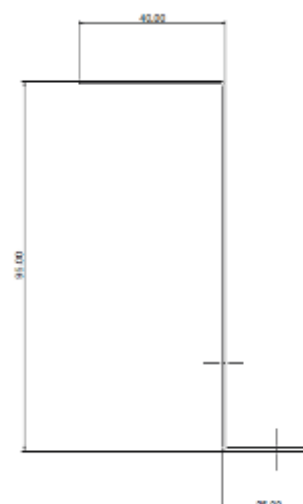


Figure A6.2.2: Profile Z 40x95x25x0,7.

Internal subframes for family 2 – Z-profile
Technical description

Annex 6.2
of European Technical
Assessment ETA 13/0312

Characteristic	Reference	Material properties
Type of material	EN 10346	S350 GD (1.0529)
Corrosion protection		Z275
Density (kg/m ³)		7850
Yield A ₈₀ (%)	EN 1993-1	≥ 16
Fracture stress – Rm (MPa)		≥ 420
Elastic limit – Re (MPa)		≥ 350
Modulus of elasticity – E (MPa)		210.000
Shear modulus – G (MPa)		81.000
Poisson ratio in elastic stage - ν		0,3
Thermal expansion coefficient - α ($\mu\text{m}/\text{m}\cdot\text{K}^{-1}$) for T ≤ 100 °C		12
Reaction to fire	EN 13501-1	A1 (without organic covering)

Internal subframes for family 2 – Z-profile
Technical description

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ANNEX 7 - OTHER COMPONENTS

A7.1 - MINERAL WOOL THERMAL INSULATION

Table A7.1.1: MINERAL WOOL THERMAL INSULATION.	
Generic component	Reference
Thermal insulation to be incorporated in the cavities of external and internal subframes (*)	EN 13162
(*) Thermal insulation material must be rigid enough in order to prevent the downfall of the material.	

Table A7.1.2: MINERAL WOOL.		
Characteristics	Reference	
Generic type	EN 13162	Mineral Wool (MW)
Thickness (mm)	EN 823	40 – 200 (minimum tolerance T3)
Short term water absorption by partial immersion (kg/m ²)	EN 1609	< 1,0
Long term water absorption by total immersion (%)	EN 12087	< 3,0
Reaction to fire	EN 13501-1	A1
Water vapour permeability - μ	EN ISO 10456	$\mu = 1$
Airflow resistivity (kPa·s/m ³)	EN 29053	≥ 5
Thermal conductivity and thermal resistance - λ_D (W/(m·K))	EN 13162	$\leq 0,040$ (*)
Durability	EN 13162	Acceptable for reaction to fire and thermal conductivity
(*) The values indicated in Annex 9 are calculated with $\lambda_D = 0,036$ W/(m·K).		

Mineral wool thermal insulation
Technical description

Annex 7.1
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A7.2 - FLEXIBLE SHEET FOR WATERPROOFING (OPTIONAL)

Table A7.2.1: Trade name of flexible sheet for waterproofing.			
Generic component	Code	Trade name	Reference
Flexible sheet for waterproofing	WPL-2	Dupont™ Tyvek® Housewrap (1060B)	EN 13859-2
	WPL-3	AQUAPANEL® Water Barrier	

Table A7.2.2: FLEXIBLE SHEET FOR WATERPROOFING (OPTIONAL).				
Characteristic		Reference	WPL-2	WPL-3
Trade name		---	Dupont™ Tyvek® Housewrap	AQUAPANEL® Water Barrier
Generic type		EN 13859-2	Water vapour permeable water barrier	
Thickness (µm)		EN 1849-2	175	500
Mass per unit area (g/m ²)			60 ± 5	130 ± 5
Reaction to fire		EN 13501-1	E	E
Water vapour transmission – Sd (m)		EN ISO 12572	≤ 0,025	0,03 ± 0,02
Watertightness		EN 1928 (method A)	W1	W1
Maximum tensile strength (N) per 50 mm		EN 12311-1	MD: 310 ± 50 XD: 310 ± 50	MD: 210 ± 30 XD: 150 ± 30
Elongation at maximum tensile strength (%)			MD: 17 ± 5 XD: 20 ± 6	MD: 50 ± 15 XD: 40 ± 15
Resistance to tearing - nail shank (N)		EN 12310-1	MD: 55 ± 20 XD: 50 ± 20	MD: 130 ± 30 XD: 130 ± 30
Artificial ageing by UV and heat (relative values: after/before aged)	Maximum tensile strength (%)	EN 1297 & EN 1296 EN 12311-1	MD: 80 XD: 80	MD: 100 XD: 100
	Elongation at maximum tensile strength (%)		MD: 70 XD: 70	MD: 80 XD: 75
	Watertightness	EN 1297 & EN 1296 EN 1928 (method A)	W1	W1
MD = machine direction (longitudinal). XD = transverse (cross) direction.				

Flexible sheet for waterproofing (optional)
Technical description

Annex 7.2
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A7.3 – VAPOUR CONTROL SHEET (OPTIONAL)

Generic component	Code	Trade name	Reference
Vapour control sheet	VCL-1	LDS 2 Silk	EN 13984
	VCL-2	LDS 10 Silk	
	VCL-3	LDS 100 (WKW)	
	VCL-4	LDS 100 (WKS)	

Characteristic	Reference	VCL-1	VCL-2	VCL-3	VCL-4	
Trade name	---	LDS 2 Silk	LDS 10 Silk	LDS 100 (WKW)	LDS 100 (WKS)	
Generic type	EN 13984	Type A. Vapour control sheet				
Material	EN 13984	FPP. Flexible polypropylene		LDPE. Low density polyethylene		
Thickness (mm)	EN 1849-2	0,350 mm	0,360 mm	0,200 mm	0,190 mm	
Mass per unit area (g/m ²)		110 ± 10%	140 ± 10%	188 ± 7%	170 ± 10%	
Reaction to fire	EN 13501-1	E	E	E	E	
Water vapour permeability – Sd (m)	EN 1931	≥ 2,0	≥ 10,0	≥ 100,0		
Resistance to tearing - nail shank (N)	Longitudinal	EN 12310-1	70	110	115	42
	Transversal				125	40
Maximum tensile strength (N) for 50 mm	Longitudinal	EN 12311-2	170	190	170	130
Maximum tensile strength (N) for 50 mm	Transversal					
Elongation at max. tensile strength (%)	Longitudinal	EN 12311-2	50	40	250	400
Elongation at max. tensile strength (%)	Transversal					
Durability (± 50 % Sd)	Ageing at 70°C	EN 1296 / EN 1931	Pass	Pass	Pass	---

Vapour control sheet (optional)
Technical description

Annex 7.3
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Assessment ETA 13/0312

ANNEX 8 - CONSTRUCTION DETAILS

Contents of Annex 8

Kit family (see table 1.1 of EAD 090120-00-0404)	Complete building envelope wall	Substrate wall
Family 1: Single wall without internal horizontal profile	Clause 8.1	Clause 8.2
Family 2: Single wall with additional internal horizontal profile	Clause 8.3	Clause 8.4
Family 3: Double wall without intermediate board	Clause 8.5	Clause 8.6
Family 4: Double wall with intermediate board	Clause 8.7	Clause 8.8

Legend (for all figures in Annex 8)

- | | |
|--|---|
| 1. Roof edge flashing profile (roof parapet). | 18. Internal horizontal profile. |
| 2. Finishing, gutter profile for lintels, and edges. | 19. Internal vertical profile. |
| 3. Rendering system. | 20. Internal layer (only one or several boards). |
| 4. Top profile. | 21. Internal horizontal Z-profile. |
| 5. External finishing (not considered in the ETA). | 22. Anchor between profile and building structure (optional). |
| 6. External layer. | 23. Structural floor. |
| 7. Flexible sheet for waterproofing (optional). | 24. Building structure. |
| 8. Joints treatment (joint filler / joint tape). | 25. Internal layer. |
| 9. Movement joint profile. | 26. Window frame. |
| 10. Sealed joint. | 27. Blind box. |
| 11. External horizontal profile. | 28. Blind. |
| 12. External vertical profile. | 29. Flashing. |
| 13. Thermal insulation. | 30. Pavement. |
| 14. Thermal insulation. | 31. Framework. |
| 15. Angle profile (ancillary component). | 32. Plinth. |
| 16. Air space cavity. | 33. Joint. |
| 17. Non-ventilated air space cavity. | |

A8.1 – FAMILY 1 – COMPLETE EXTERNAL WALL SYSTEM

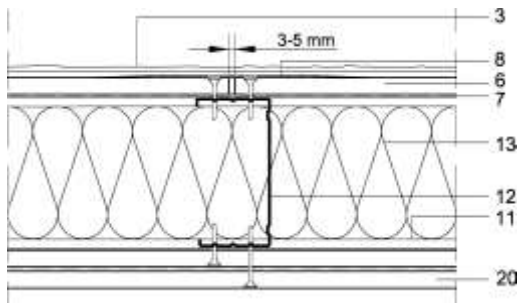


Figure A8.1.1: Horizontal cross-section.

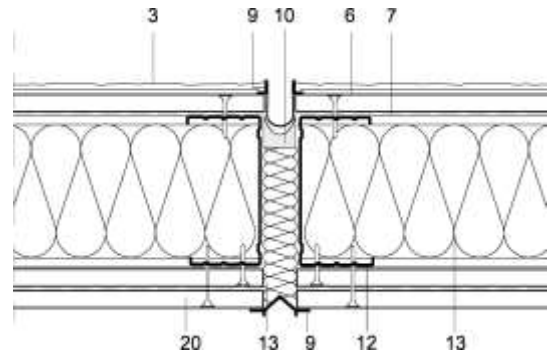


Figure A8.1.2: Movement joint.

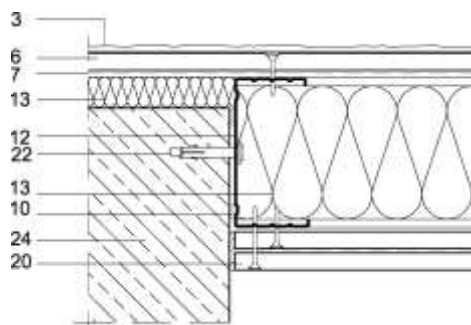


Figure A8.1.3: Connection with column.

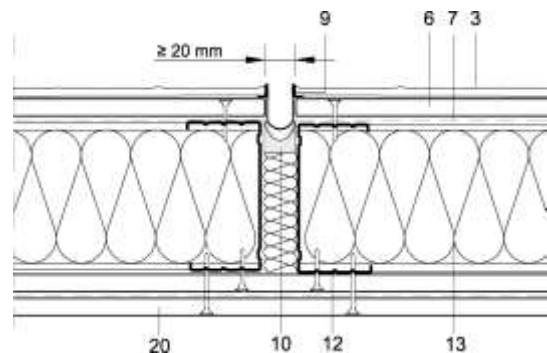


Figure A8.1.4: Superficial control joint.

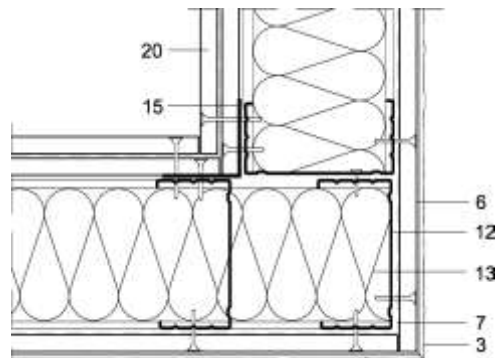


Figure A8.1.5: Convex corner.

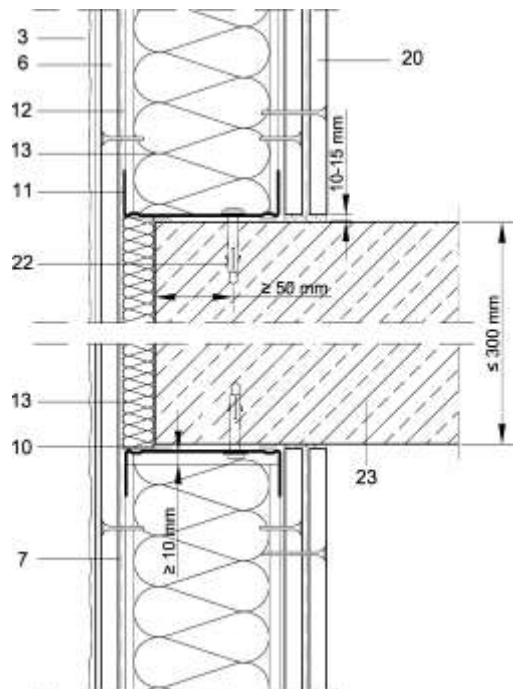


Figure A8.1.7: Connection with structural floor.

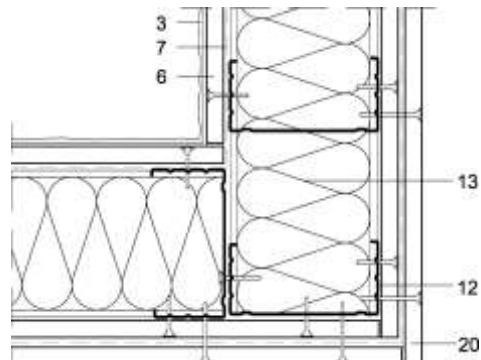


Figure A8.1.6: Concave corner.

Construction details Knauf non-load bearing external wall systems		Annex 8.1 of European Technical Assessment ETA 13/0312
Complete wall with rendering Family 1	WM111C	

A8.2 – FAMILY 1 – SUBSTRATE EXTERNAL WALL SYSTEM

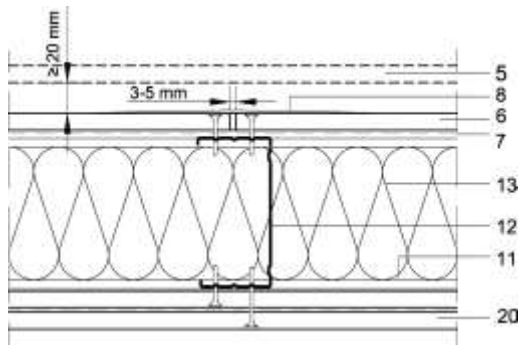


Figure A8.2.1: Horizontal cross-section.

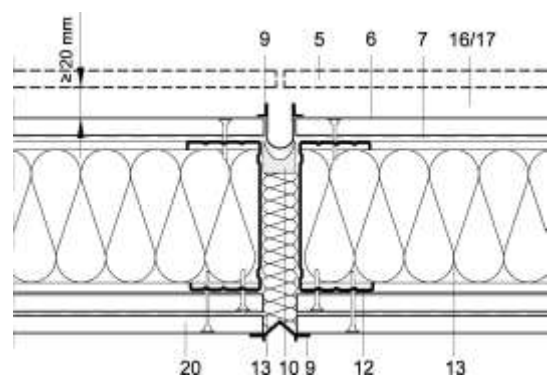


Figure A8.2.2: Movement joint.

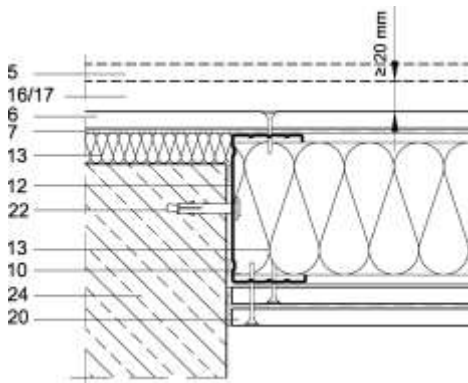


Figure A8.2.3: Connection with column.

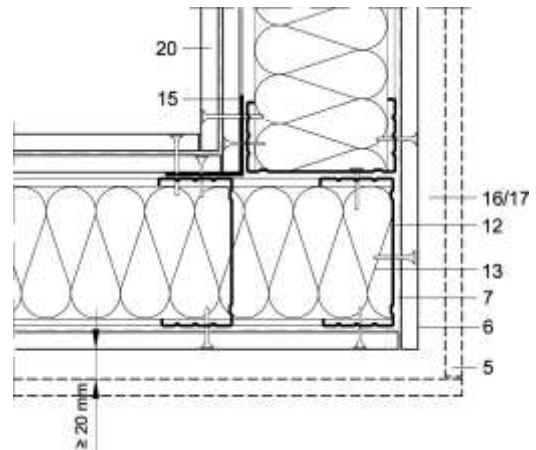


Figure A8.2.4: Convex corner.

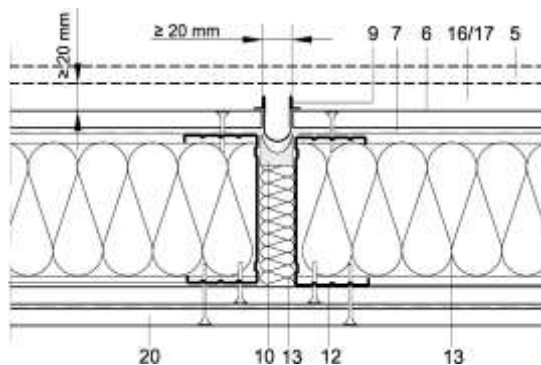


Figure A8.2.5: Superficial control joint.

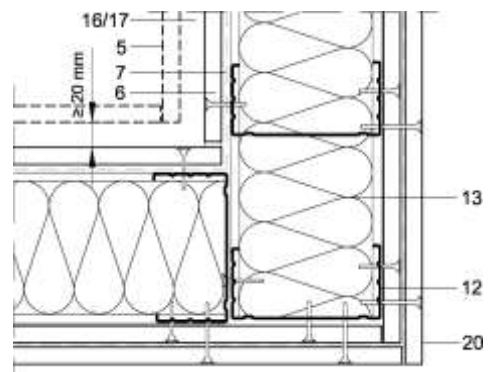


Figure A8.2.6: Concave corner.

Construction details		Annex 8.2 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering	WM111C	
Family 1	WM111G	

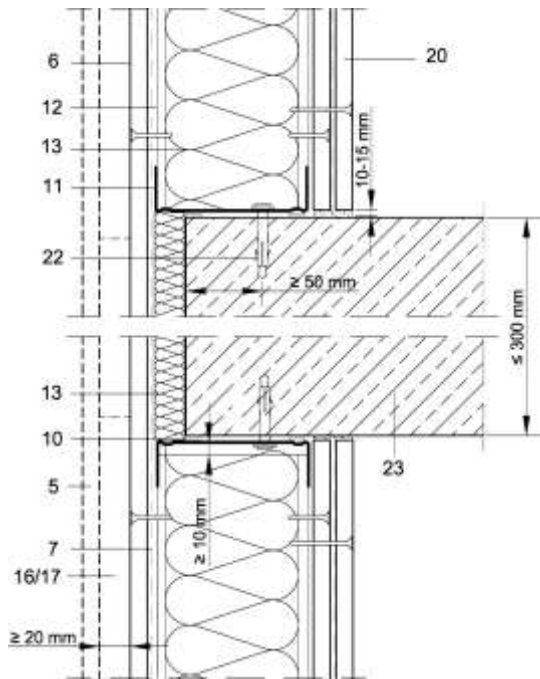


Figure A8.2.7: Connection with structural floor. Not interrupted external-board.

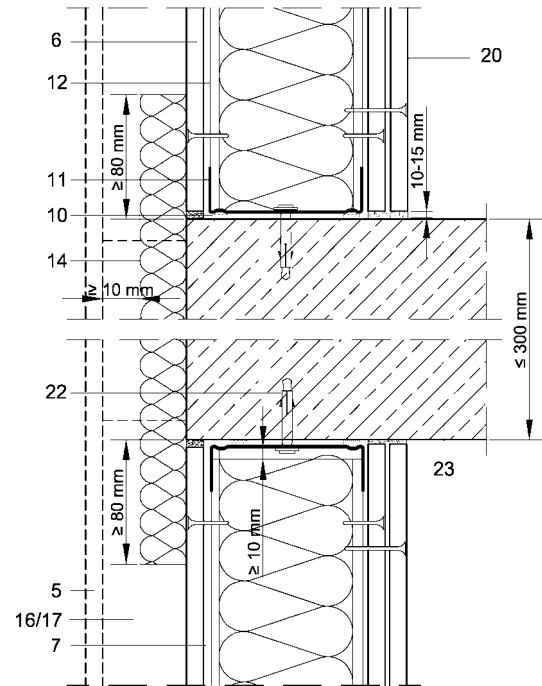


Figure A8.2.8: Connection with structural floor. Interrupted external-board.

Construction details		Annex 8.2 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering	WM111C	
Family 1	WM111G	

A8.3 – FAMILY 2 – COMPLETE EXTERNAL WALL SYSTEM

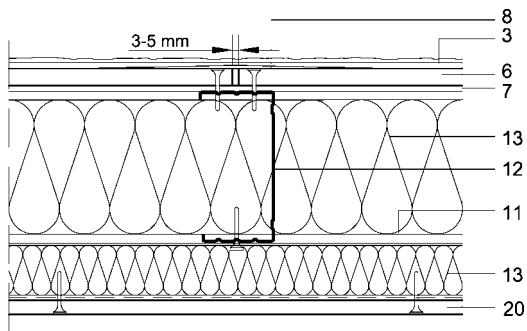


Figure A8.3.1: Horizontal cross-section.

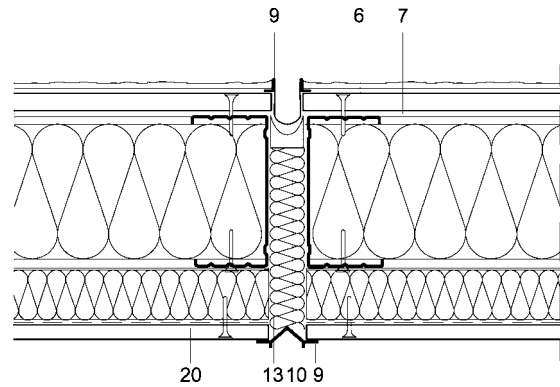


Figure A8.3.2: Movement joint.

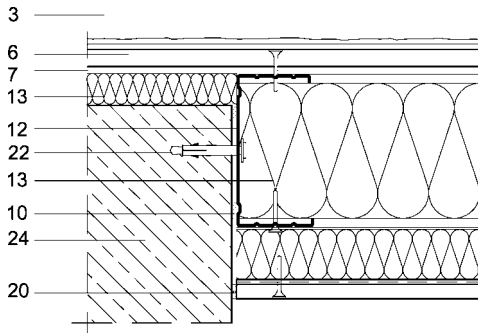


Figure A8.3.3: Connection with column.

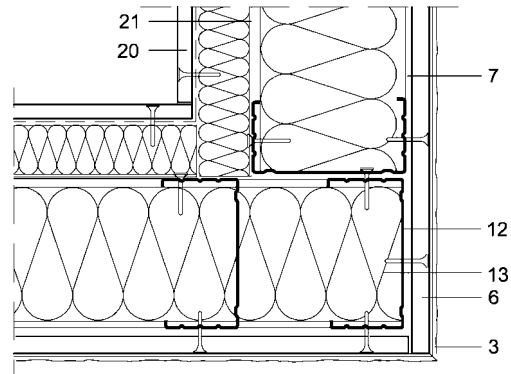


Figure A8.3.4: Convex corner.

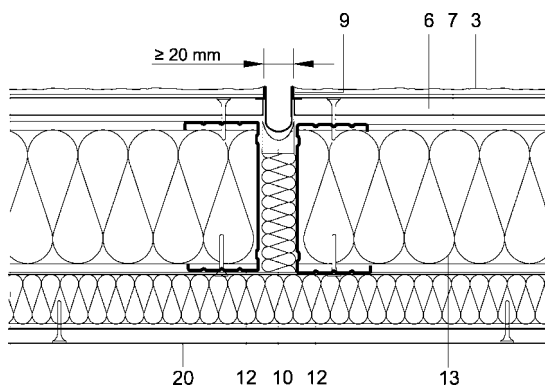


Figure A8.3.5: Superficial control joint.

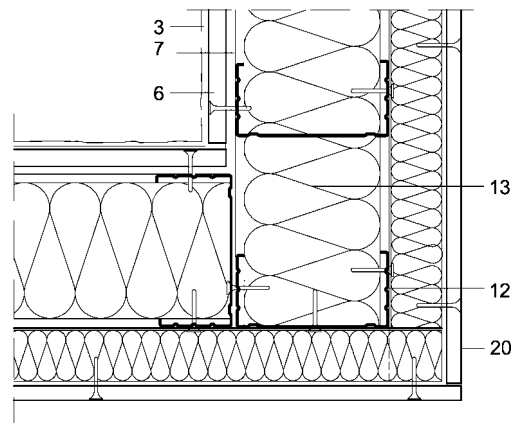


Figure A8.3.6: Concave corner.

Construction details Knauf non-load bearing external wall systems		Annex 8.3 of European Technical Assessment ETA 13/0312
Complete wall with rendering Family 2	WM211C	

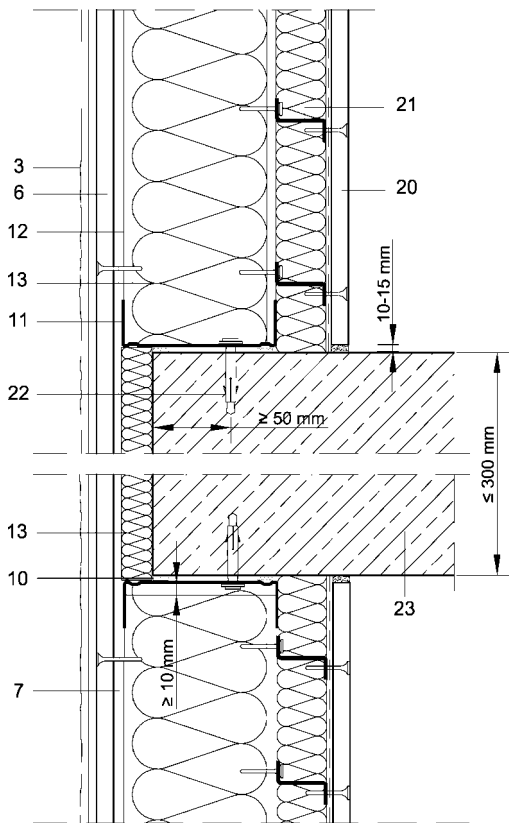


Figure A8.3.7: Connection with structural floor.

Construction details Knauf non-load bearing external wall systems		Annex 8.3 of European Technical Assessment ETA 13/0312
Complete wall with rendering Family 2	WM211C	

A8.4 – FAMILY 2 – SUBSTRATE EXTERNAL WALL SYSTEM

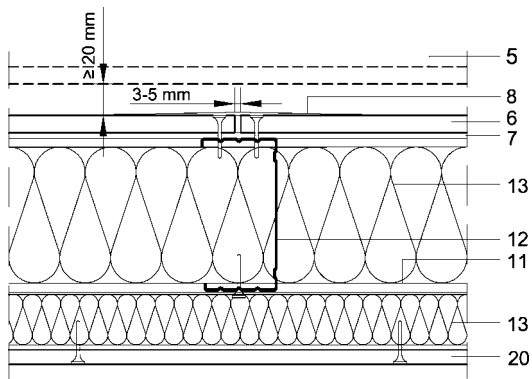


Figure A8.4.1: Horizontal cross-section.

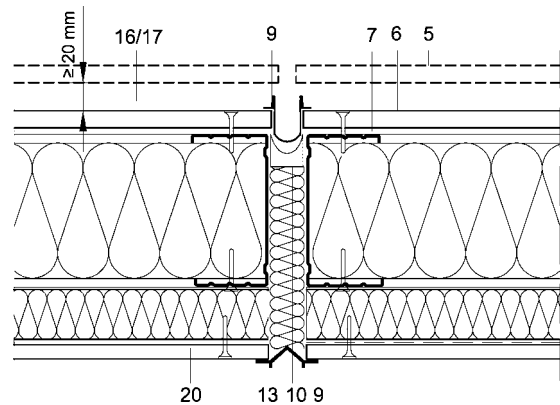


Figure A8.4.2: Movement joint.

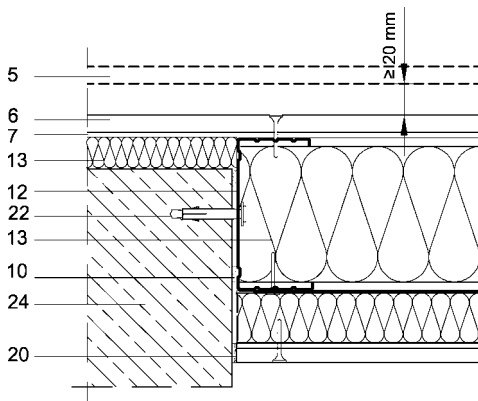


Figure A8.4.3: Connection with column.

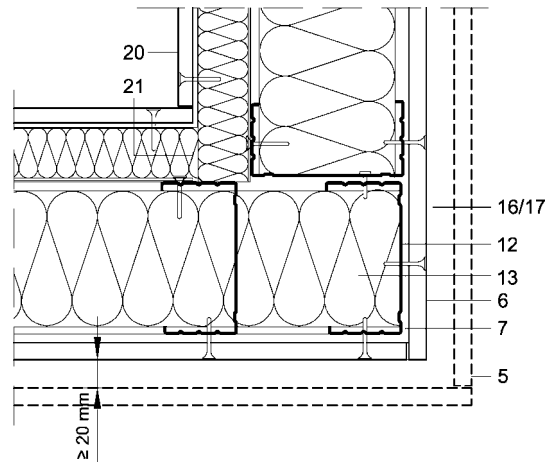


Figure A8.4.4: Convex corner.

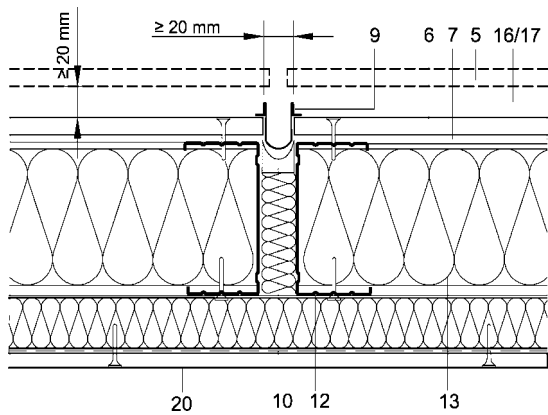


Figure A8.4.5: Superficial control joint.

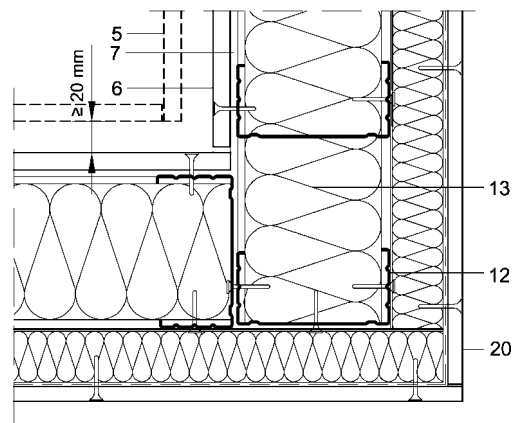


Figure A8.4.6: Concave corner.

Construction details		Annex 8.4 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering Family 2	WM211C WM211G	

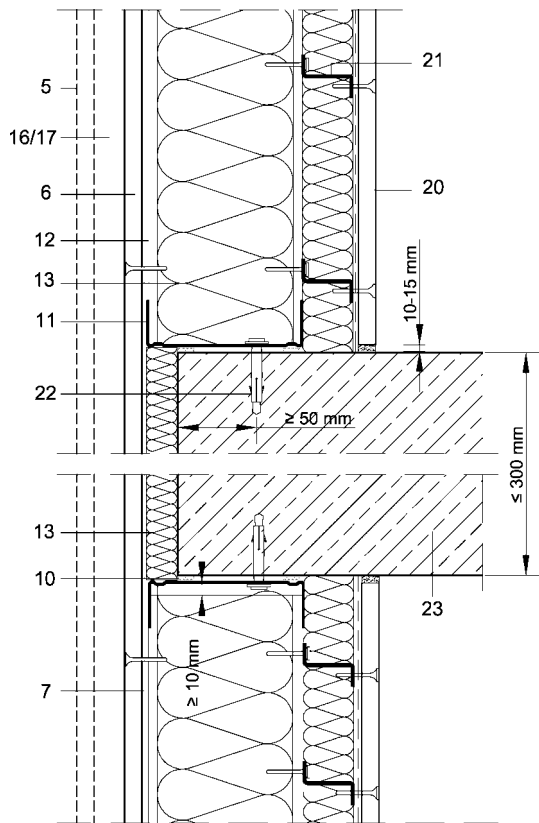


Figure A8.4.7: Connection with structural floor. Not interrupted external-board.

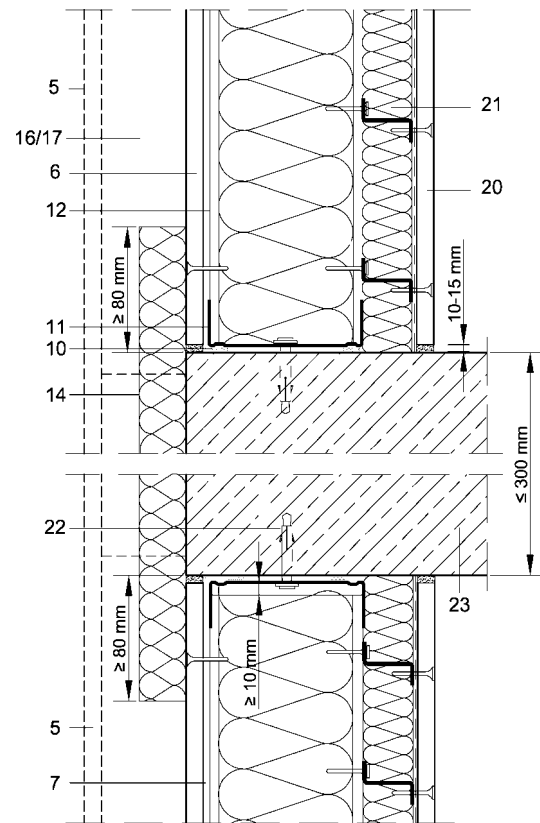


Figure A8.4.8: Connection with structural floor. Interrupted external-board.

Construction details		Annex 8.4 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering	WM211C	
Family 2	WM211G	

A8.5 – FAMILY 3 – COMPLETE EXTERNAL WALL SYSTEM

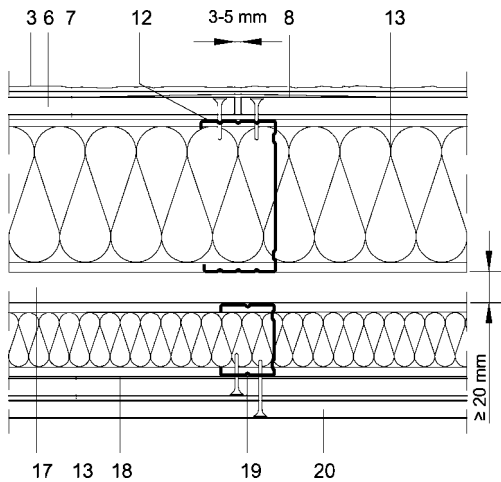


Figure A8.5.1: Horizontal cross-section.

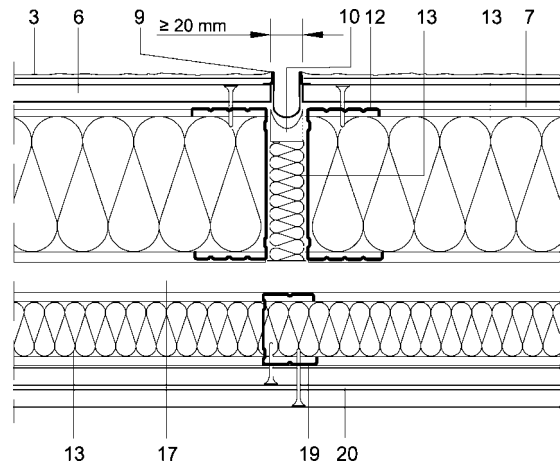


Figure A8.5.2: Superficial control joint.

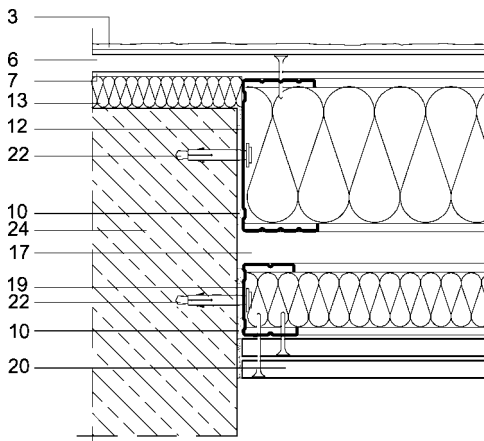


Figure A8.5.3: Connection with column.

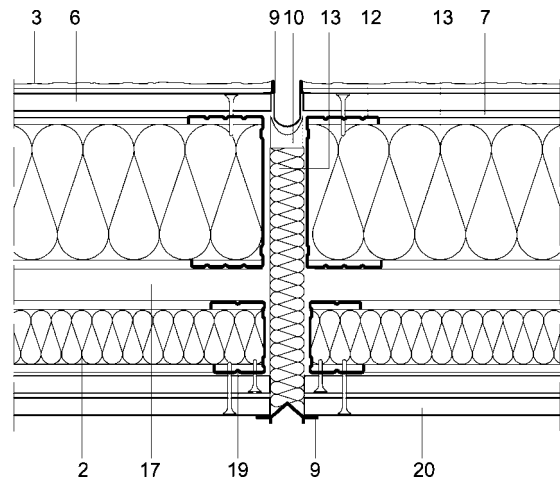


Figure A8.5.4: Movement joint.

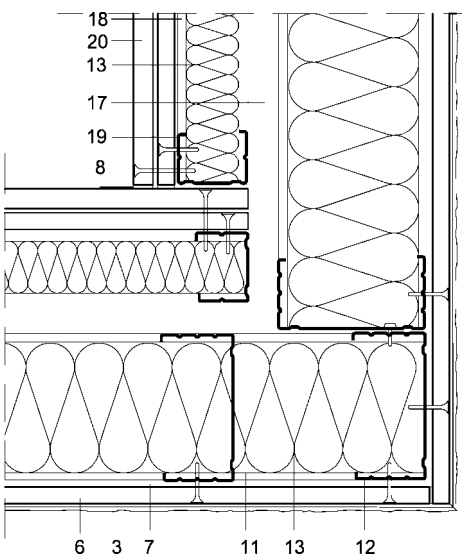


Figure A8.5.5: Convex corner.

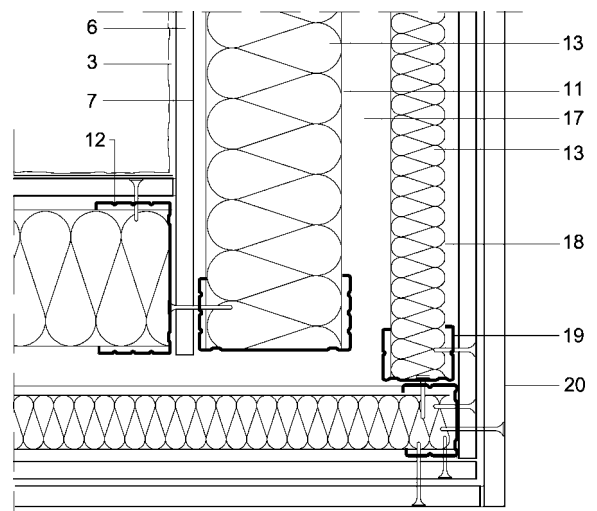


Figure A8.5.6: Concave corner.

Construction details		Annex 8.5 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Complete wall with rendering Family 3	WM311C	

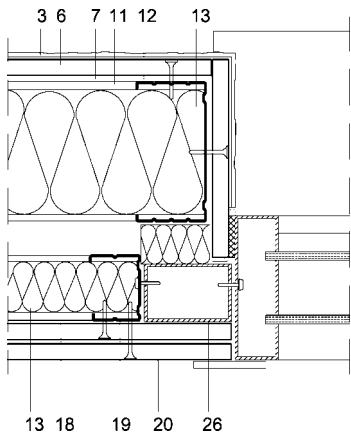


Figure A8.5.7: Connection with window jamb.

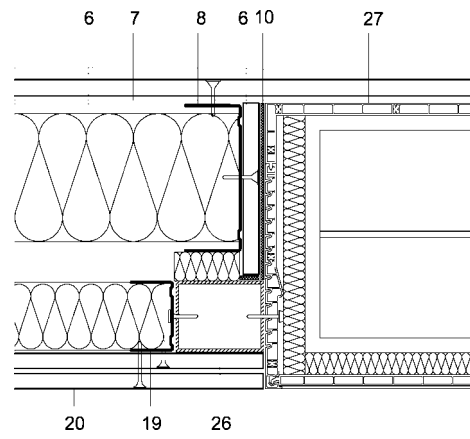


Figure A8.5.8: Connection with jamb window and blind.

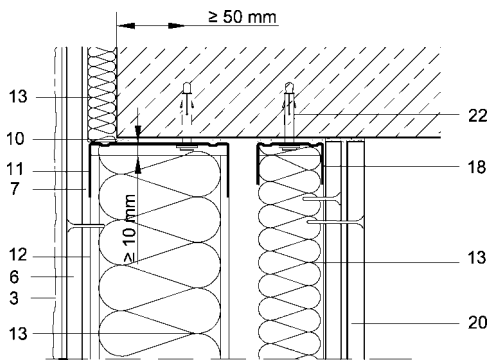


Figure A8.5.9: Connection with structural floor.

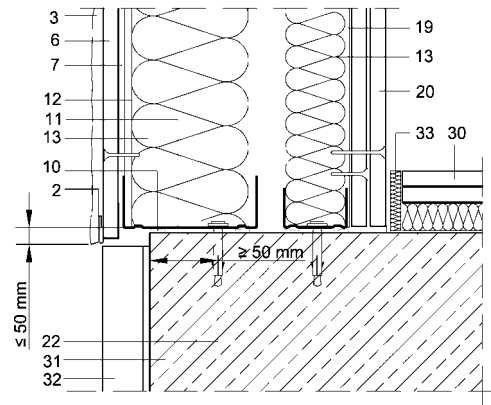


Figure A8.5.10: Base edge.

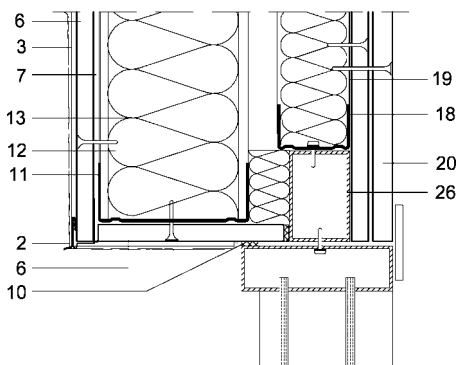


Figure A8.5.11: Connection with lintel.

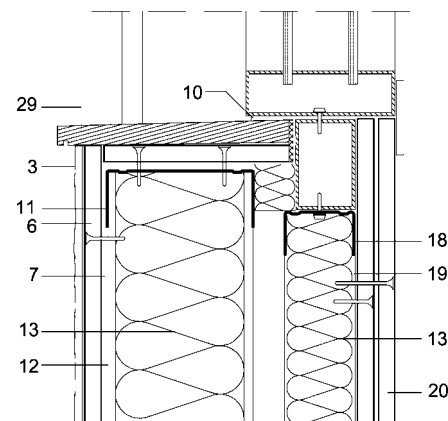


Figure A8.5.12: Connection with window sill.

Construction details		Annex 8.5 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Complete wall with rendering Family 3	WM311C	

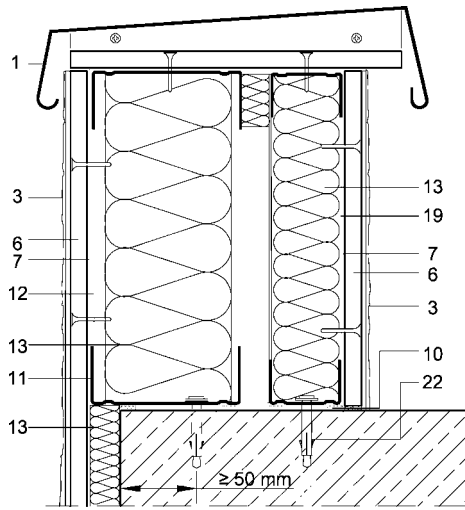


Figure A8.5.13: Roof edge.

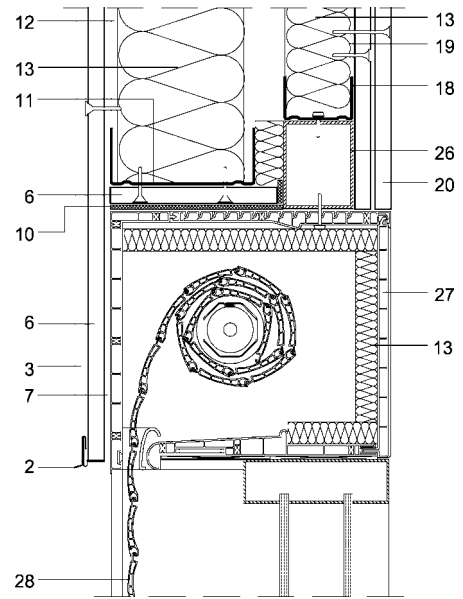


Figure A8.5.14: Connection with lintel with sunblind box.

Construction details Knauf non-load bearing external wall systems		Annex 8.5 of European Technical Assessment ETA 13/0312
Complete wall with rendering Family 3	WM311C	

A8.6 – FAMILY 3 – SUBSTRATE EXTERNAL WALL SYSTEM

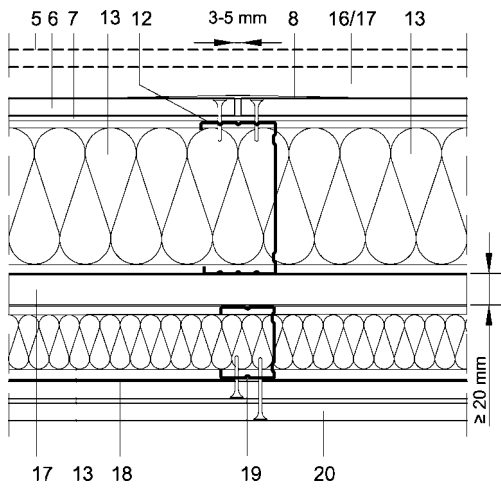


Figure A8.6.1: Horizontal cross-section.

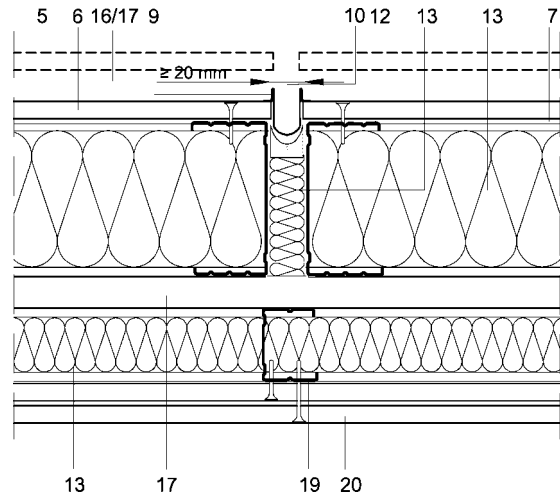


Figure A8.6.2: Superficial control joint.

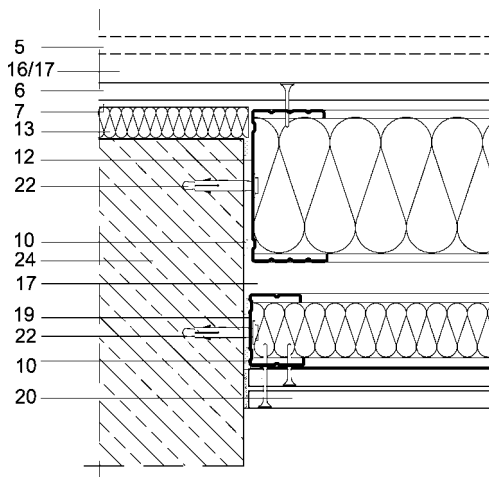


Figure A8.6.3: Connection with column.

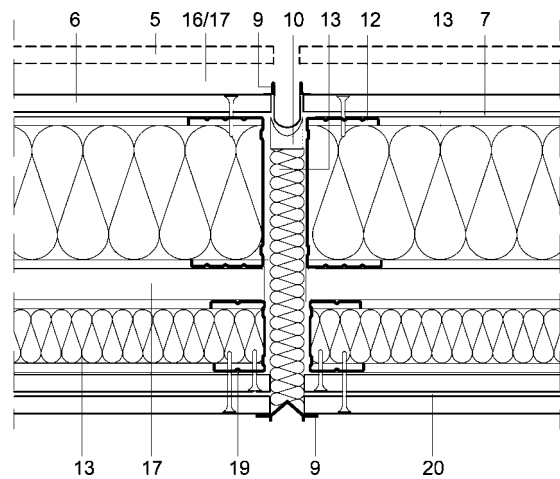


Figure A8.6.4: Movement joint.

Construction details		Annex 8.6 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering	WM311C	
Family 3	WM311G	

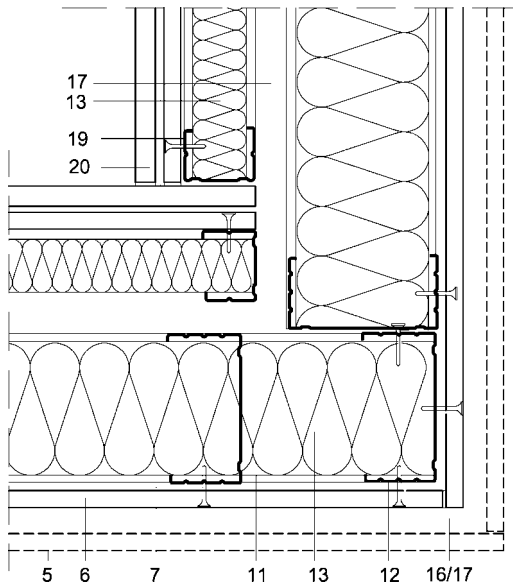


Figure A8.6.5: Convex corner.

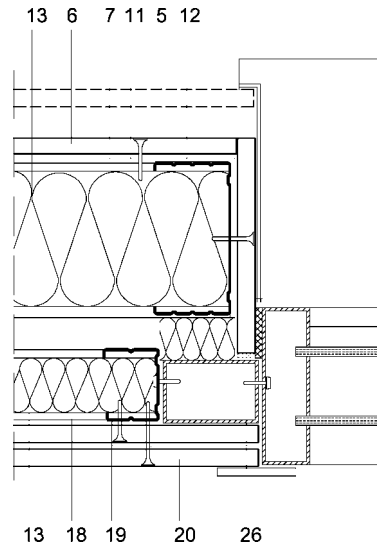


Figure A8.6.6: Connection with window jamb.

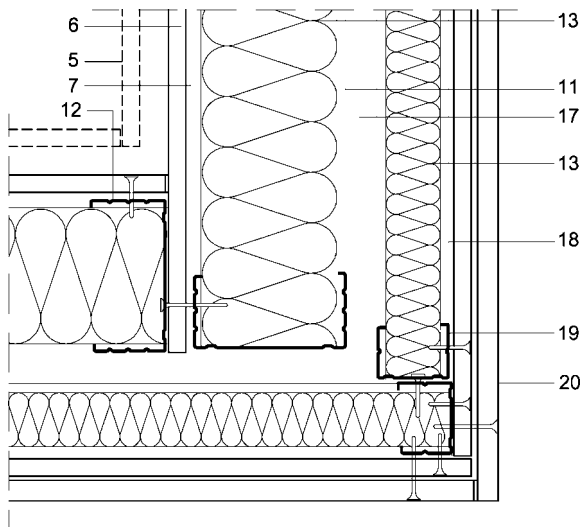


Figure A8.6.7: Concave corner.

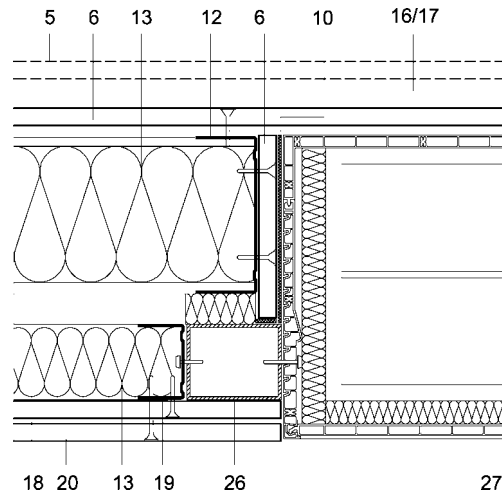


Figure A8.6.8: Connection with jamb window and blind.

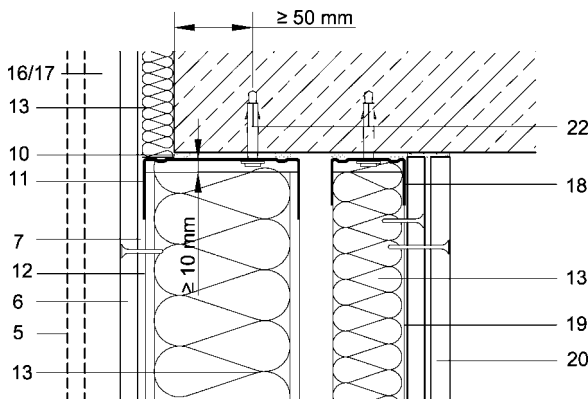


Figure A8.6.9: Connection with structural floor.

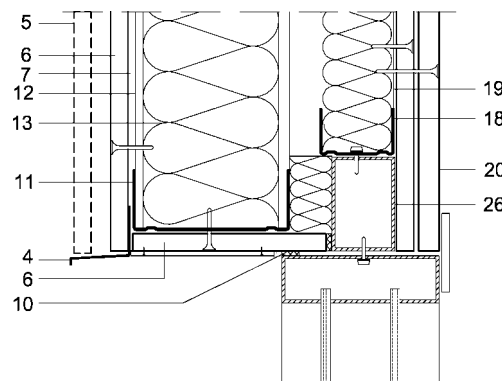


Figure A8.6.10: Connection with lintel.

Construction details		Annex 8.6 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering Family 3	WM311C WM311G	

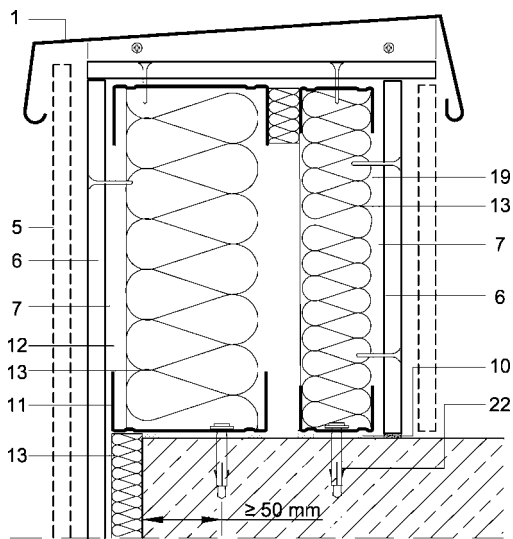


Figure A8.6.11: Roof edge.

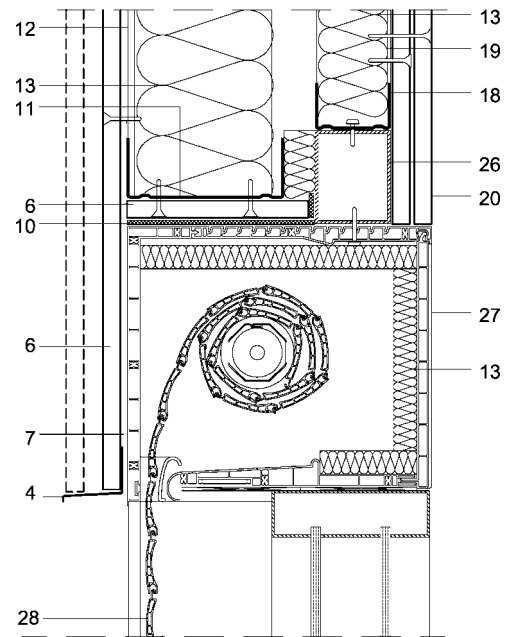


Figure A8.6.12: Connection with lintel with sun blind box.

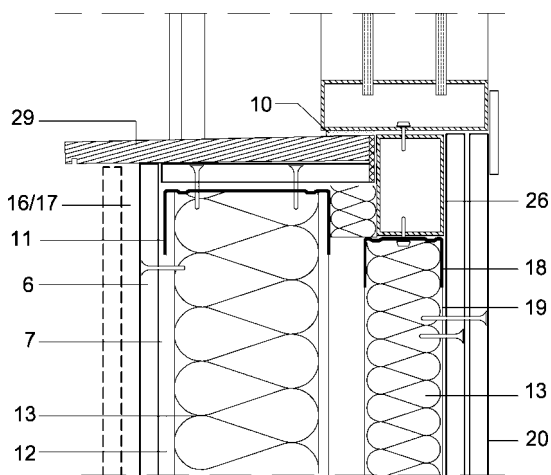


Figure A8.6.13: Connection with window sill.

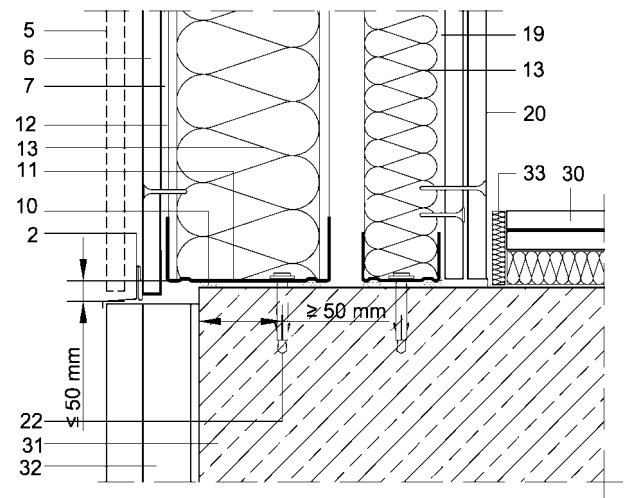


Figure A8.6.14: Base edge.

Construction details		Annex 8.6 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering Family 3	WM311C WM311G	

A8.7 – FAMILY 4 – COMPLETE EXTERNAL WALL SYSTEM

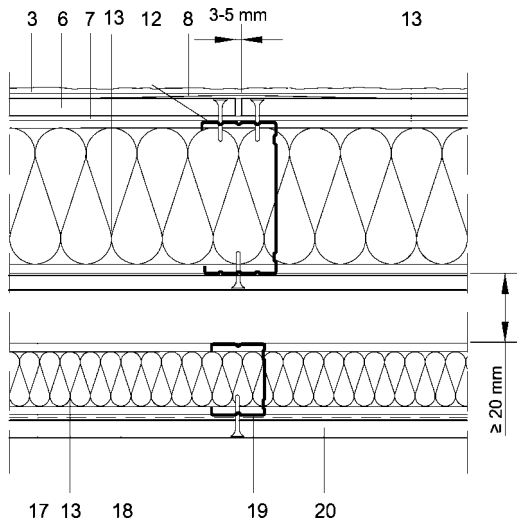


Figure A8.7.1: Horizontal cross-section.

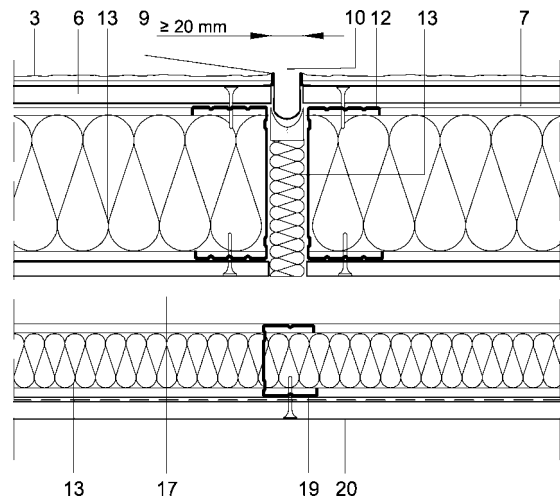


Figure A8.7.2: Superficial control joint.

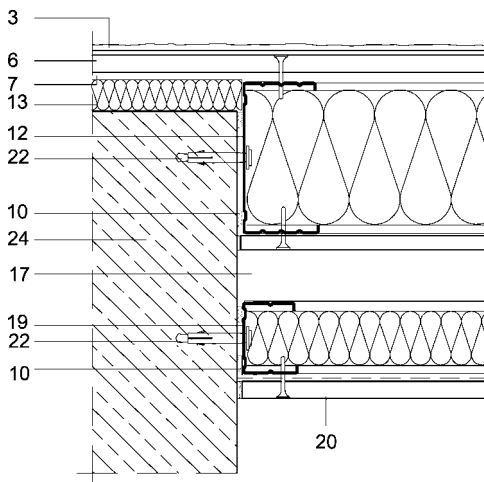


Figure A8.7.3: Connection with column.

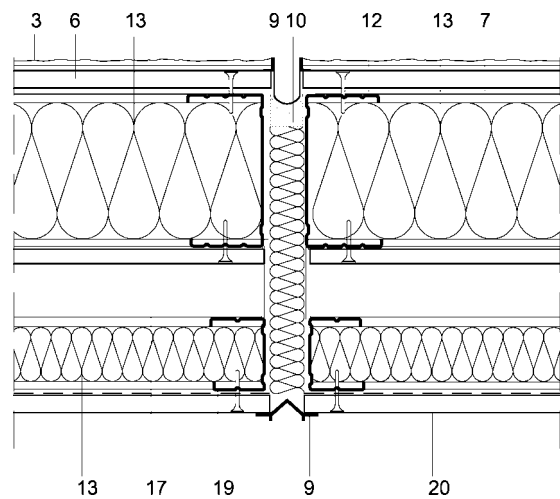


Figure A8.7.4: Movement joint.

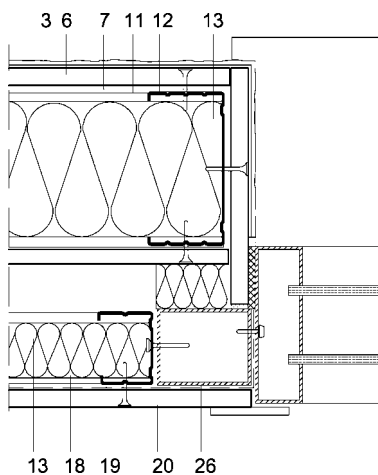


Figure A8.7.5: Connection with window jamb.

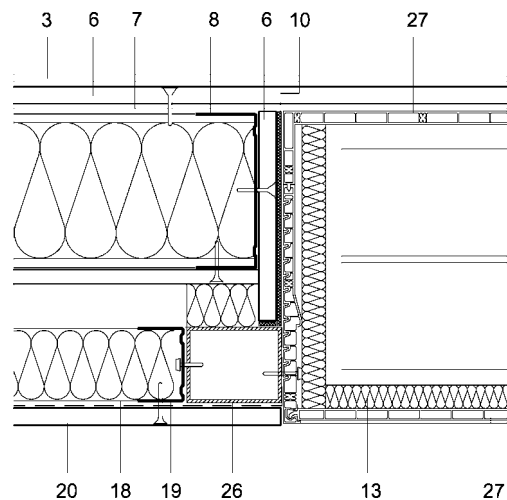


Figure A8.7.6: Connection with jamb window and blind.

Construction details Knauf non-load bearing external wall systems		Annex 8.7 of European Technical Assessment ETA 13/0312
Complete wall with rendering Family 4	WM411C	

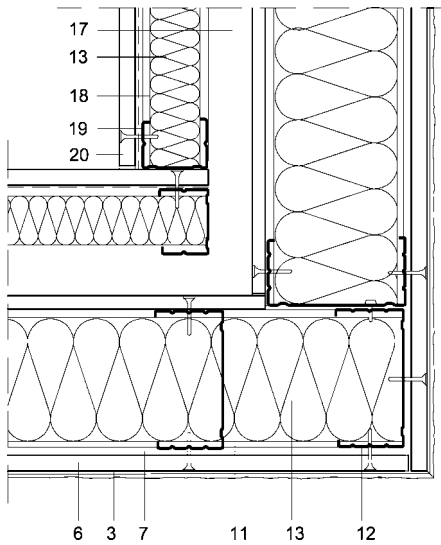


Figure A8.7.7: Convex corner.

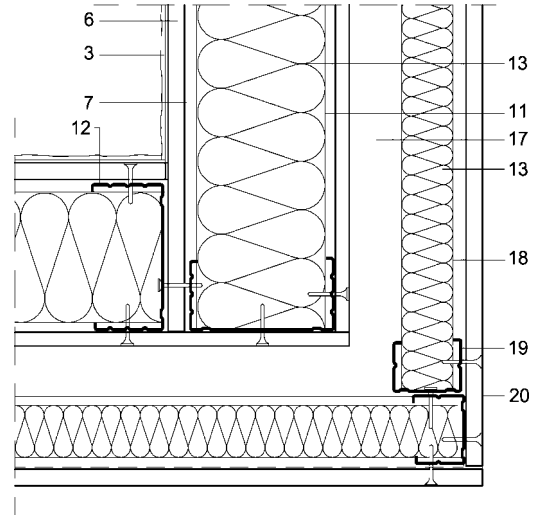


Figure A8.7.8: Concave corner.

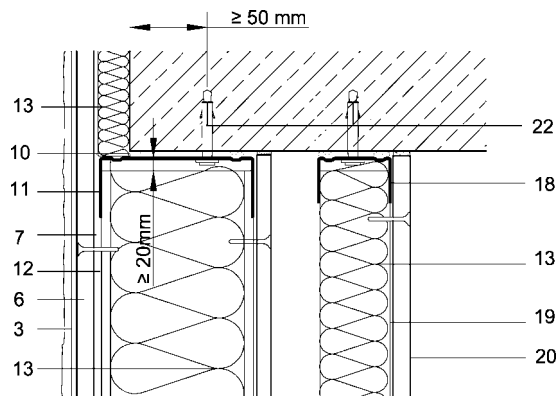


Figure A8.7.9: Connection with structural floor.

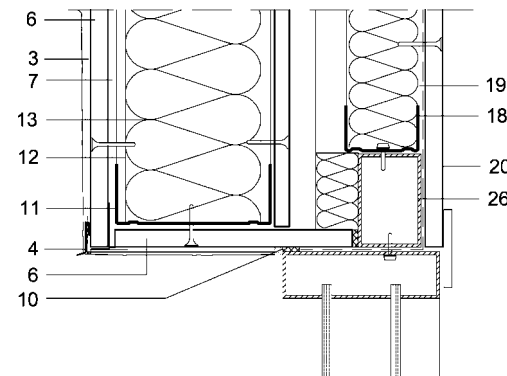


Figure A8.7.10: Connection with lintel.

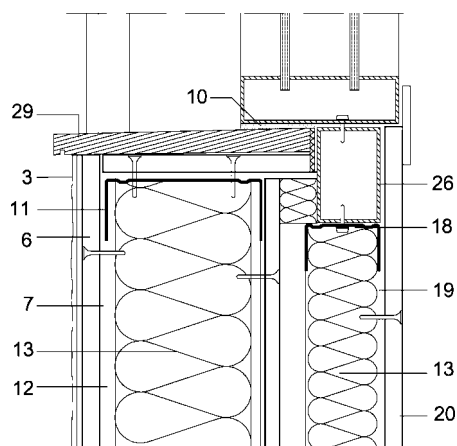


Figure A8.7.11: Connection with window sill.

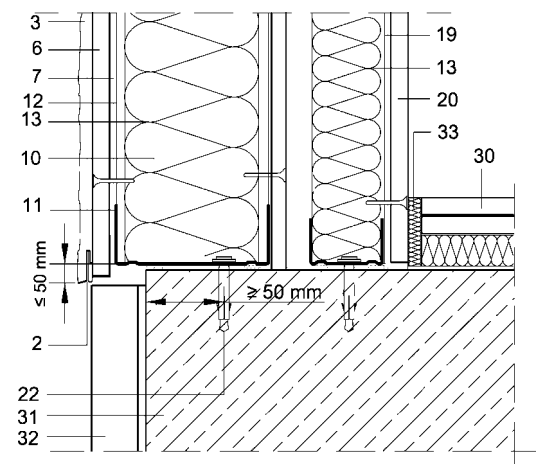


Figure A8.7.12: Base edge.

Construction details Knauf non-load bearing external wall systems		Annex 8.7 of European Technical Assessment ETA 13/0312
Complete wall with rendering Family 4	WM411C	

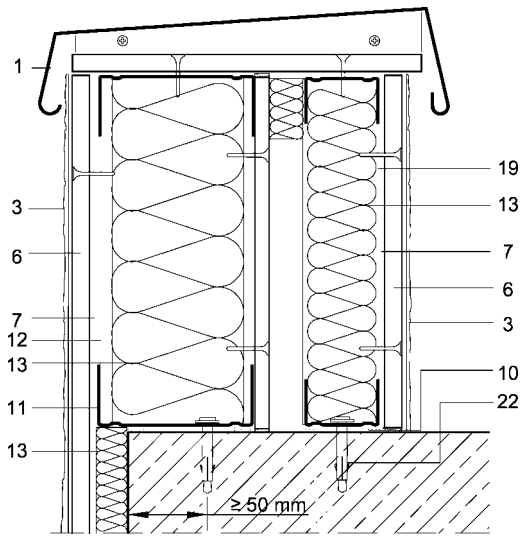


Figure A8.7.13: Roof edge.

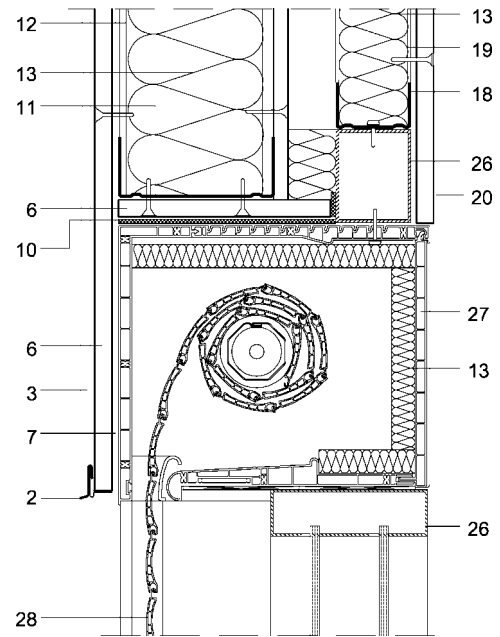


Figure A8.7.14: Connection with lintel with sun blind box.

Construction details Knauf non-load bearing external wall systems		Annex 8.7 of European Technical Assessment ETA 13/0312
Complete wall with rendering Family 4	WM411C	

A8.8 – FAMILY 4 – SUBSTRATE EXTERNAL WALL SYSTEM

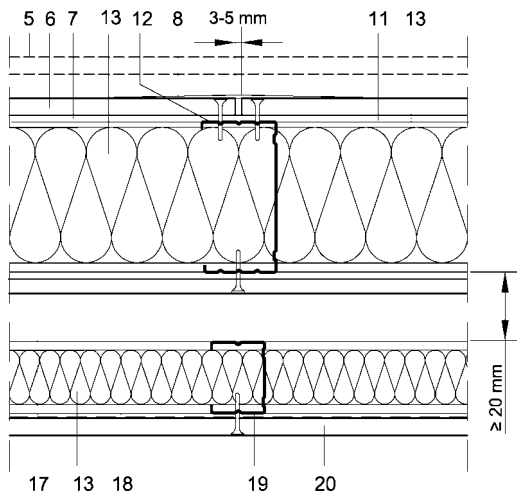


Figure A8.8.1: Horizontal cross-section.

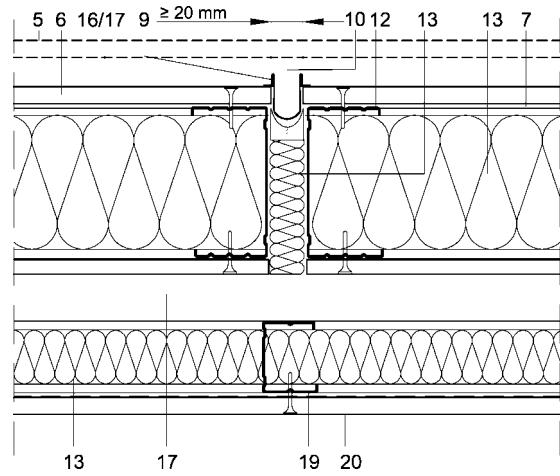


Figure A8.8.2: Superficial control joint.

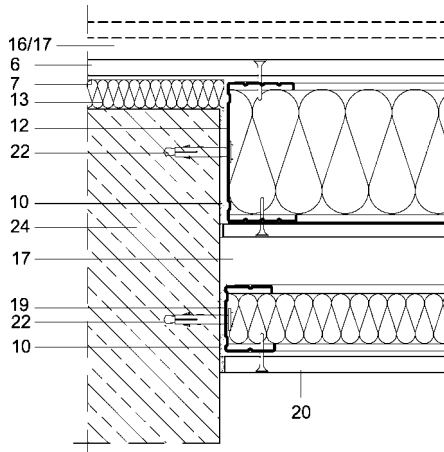


Figure A8.8.3: Connection with column.

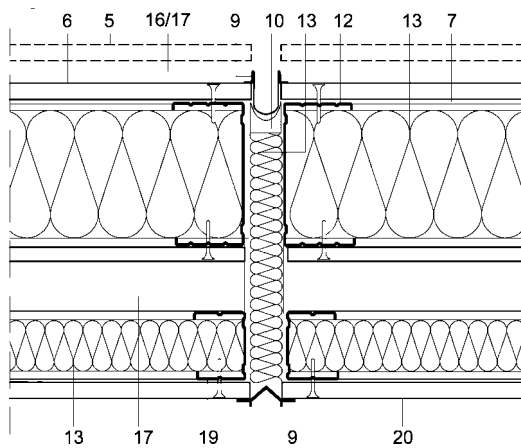


Figure A8.8.4: Movement joint.

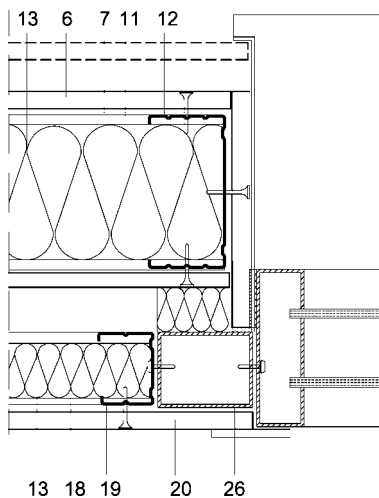


Figure A8.8.5: Connection with window jamb.

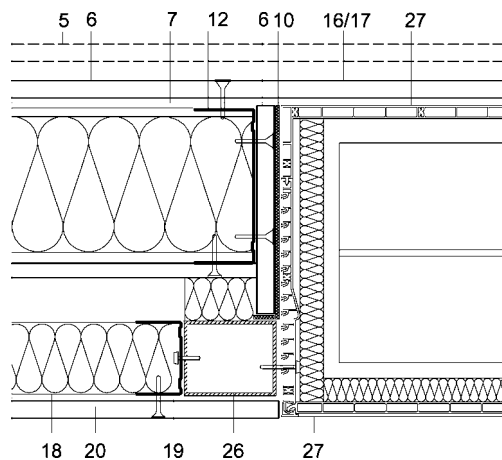


Figure A8.8.6: Connection with jamb window and blind.

Construction details		Annex 8.8 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering Family 4	WM411C WM411G	

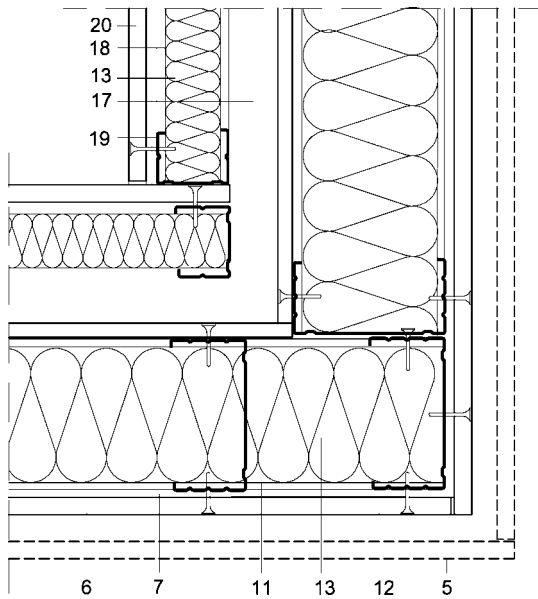


Figure A8.8.7: Convex corner.

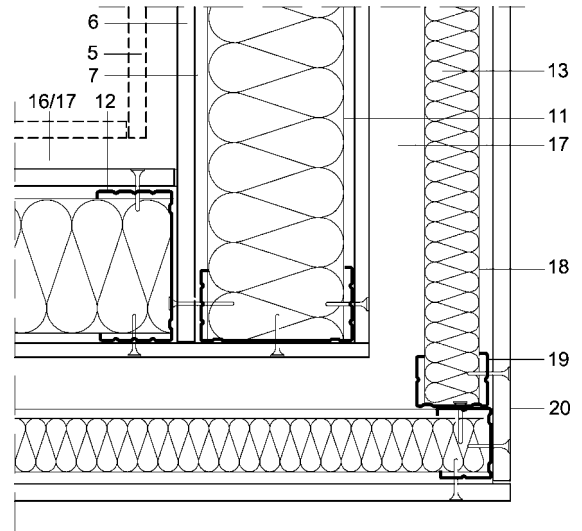


Figure A8.8.8: Concave corner.

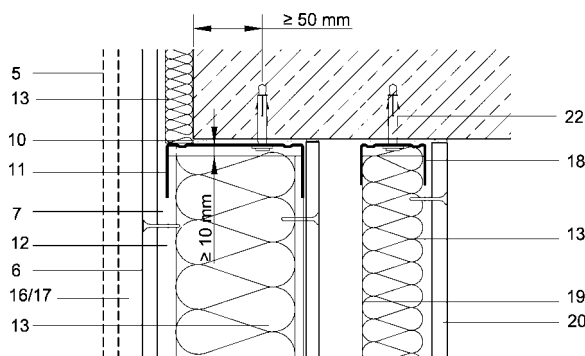


Figure A8.8.9: Connection with structural floor.

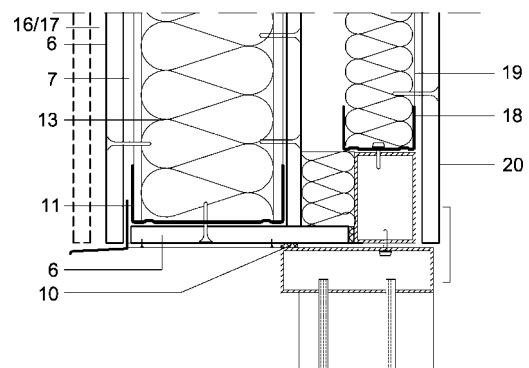


Figure A8.8.10: Connection with lintel.

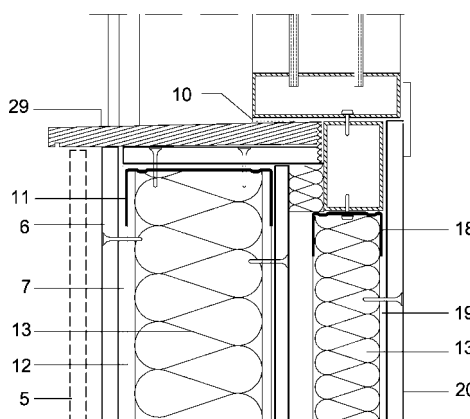


Figure A8.8.11: Connection with window sill.

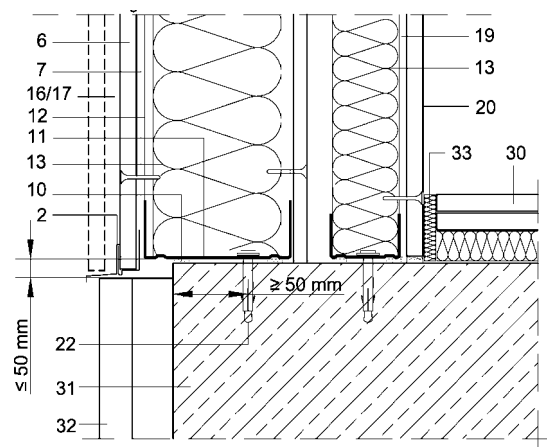


Figure A8.8.12: Base edge.

Construction details		Annex 8.8 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering Family 4	WM411C WM411G	

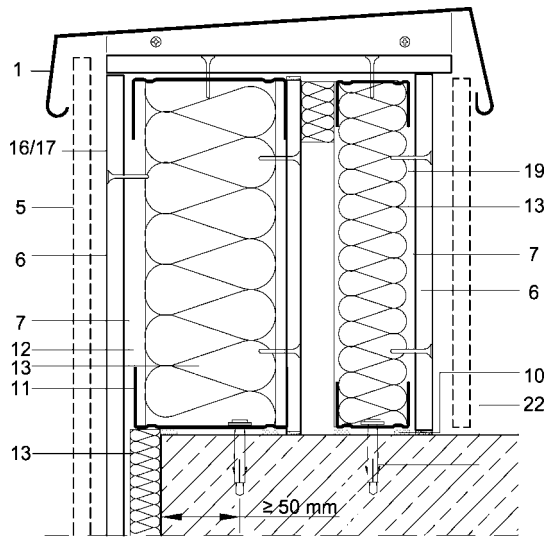


Figure A8.8.13: Roof edge.

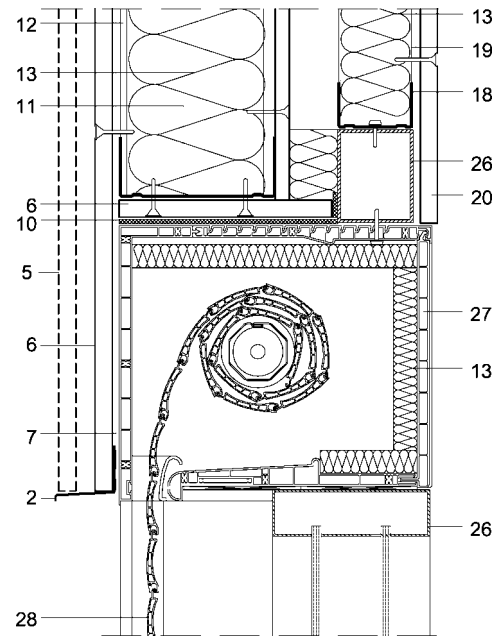


Figure A8.8.14: Connection with lintel with sun blind box.

Construction details		Annex 8.8 of European Technical Assessment ETA 13/0312
Knauf non-load bearing external wall systems		
Substrate wall without rendering	WM411C	
Family 4	WM411G	

ANNEX 9 - THERMAL TRANSMITTANCE AND f_{Rsi} VALUES

The following tables show the thermal transmittances and f_{Rsi} values for the worst configuration of assembled systems of family 1, 3 and 4.

These values have been calculated according to EN ISO 10211-1 and EN ISO 10211-2 and for the following boundary conditions and characteristics of components.

Boundary conditions:

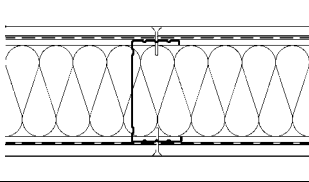
- Exterior temperature: 2,6 °C
- Exterior relative humidity: 86 %
- Interior temperature: 20 °C
- Interior relative humidity: 55 %

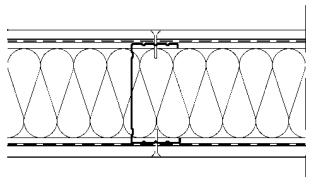
Hygrothermal characteristics of components:

Component		Dimensions (mm)	λ (W/(m·K))	μ	Reference
Aquapanel® Cement Board Outdoor		12,5	0,35	66	ETA 07/0173
Dupont™ Tyvek® Housewrap (1060B)		0,18	---	$S_d = 0,02$ m	EN 13859-2
External subframe	C profile	C75x50x2	50	∞	EN ISO 10456
		C100x50x2			
	U profile	U75x40x0,7			
		U100x40x0,7			
Internal subframe	C profile	C48x35x0,6			
		C70x40x0,6			
	U profile	U48x30x0,55			
		U70x30x0,55			
MW		40	0,036	1	EN 13162
		60			
		80			
Standard gypsum internal-board (IB-4)		12,5	0,25	10	EN ISO 10456
		15,0			
Gypsum internal-board with vapour barrier (IB-5)	Board	15,0	160	50000	EN ISO 10456
	Vapour barrier	0,03			

“---” = not applicable.

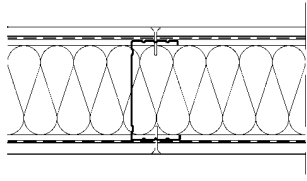
Assembled system configurations:

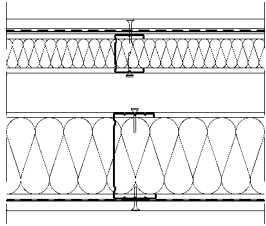
		1) WM111C system (family 1):		
		<ul style="list-style-type: none"> - Wall with C75x50x2 vertical profiles + MW 60 mm + GB12,5 + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U_{eq}-value (W/(m²·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f_{Rsi}
Horizontal central cross-section		0,78	---	0,673
Horizontal bottom and upper cross-section		1,02	---	0,702
Openings	Horizontal cross-section by lintel and sill	---	0,81	0,608
	Horizontal cross-section by jamb	---	0,35	0,586
	Vertical cross-section by the flange of vertical profile in the middle of opening	---	0,03	0,539
	Vertical cross-section by lintel and sill in the middle of opening	---	0,19	0,587
Concave corner	Horizontal central cross-section	---	0,25	0,684
	Horizontal bottom and upper cross-section	---	0,40	0,695
Convex corner	Horizontal central cross-section	---	0,31	0,520
	Horizontal bottom and upper cross-section	---	0,48	0,506
Concrete structural floor connexion	Vertical central cross-section	---	0,69	0,723
	Vertical cross-section by the flange of vertical profile	---	0,85	0,708
	Vertical cross-section by the web of vertical profile	---	0,77	0,539
Concrete pillar connexion	Horizontal central cross-section	---	0,74	0,642
	Horizontal bottom and upper cross-section	---	0,94	0,603
Concrete pillar connexion in convex corner	Horizontal central cross-section	---	0,90	0,573
	Horizontal bottom and upper cross-section	---	1,09	0,565
"---" = not applicable.				

		2) WM111C system (family 1):		
		<ul style="list-style-type: none"> - Wall with C100x50x2 vertical profiles + MW 80 mm + GB15,0 + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U_{eq}-value (W/(m²·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f_{Rsi}
Central cross-section		0,71	---	0,639
Bottom and upper cross- section		0,93	---	0,726
Openings	Horizontal cross-section by lintel and sill	---	0,84	0,618
	Horizontal cross-section by jamb	---	0,36	0,594
	Vertical cross-section by the flange of vertical profile in the middle of opening	---	0,02	0,540
	Vertical cross-section by lintel and sill in the middle of opening	---	0,19	0,599
Concave corner	Horizontal central cross-section	---	0,26	0,699
	Horizontal bottom and upper cross-section	---	0,44	0,717
Convex corner	Horizontal central cross-section	---	0,31	0,536

Thermal transmittance and f_{Rsi} values**Annex 9**

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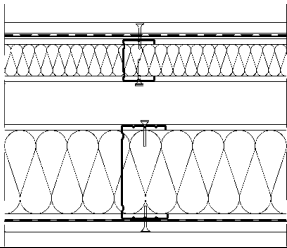
		2) WM111C system (family 1):		
		<ul style="list-style-type: none"> - Wall with C100x50x2 vertical profiles + MW 80 mm + GB15,0 + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U _{eq} -value (W/(m ² ·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f _{Rsi}
Concrete structural floor connexion	Horizontal bottom and upper cross-section	---	0,48	0,524
	Vertical central cross-section	---	0,68	0,733
	Vertical cross-section by the flange of vertical profile	---	0,84	0,722
	Vertical cross-section by the web of vertical profile	---	0,76	0,549
Concrete pillar connexion	Horizontal central cross-section	---	0,73	0,633
	Horizontal bottom and upper cross-section	---	0,91	0,600
Concrete pillar connexion in convex corner	Horizontal central cross-section	---	0,86	0,568
	Horizontal bottom and upper cross-section	---	1,04	0,566
"---" = not applicable.				

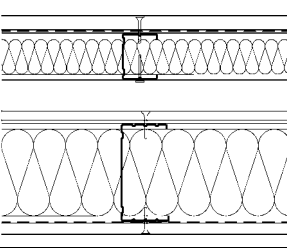
		3) WM311C system (family 3)		
		<ul style="list-style-type: none"> - Wall with C75x50x2 external vertical profiles + MW 60 mm + air cavity of thickness 20 mm + C48x35x0,6 internal vertical profile + MW 40 mm + GB12,5 + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U _{eq} -value (W/(m ² ·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f _{Rsi}
Horizontal central cross-section		0,54	---	0,777
Horizontal bottom and upper cross-section		0,75	---	0,782
Openings	Horizontal cross-section by lintel and sill	---	0,34	0,728
	Horizontal cross-section by jamb	---	0,22	0,710
	Vertical cross-section by lintel and sill in the middle of opening	---	0,09	0,767
Concave corner	Horizontal central cross-section	---	0,06	0,869
	Horizontal bottom and upper cross-section	---	0,16	0,801
Convex corner	Horizontal central cross-section	---	0,12	0,688
	Horizontal bottom and upper cross-section	---	0,23	0,626
Concrete structural floor connexion	Vertical central cross-section	---	0,83	0,701
	Vertical cross-section by the flange of vertical profile	---	0,96	0,684
	Vertical cross-section by the web of vertical profile	---	1,10	0,536
Concrete pillar connexion	Horizontal central cross-section	---	0,90	0,650
	Horizontal bottom and upper cross-section	---	1,06	0,641
Concrete pillar connexion in convex corner	Horizontal central cross-section	---	0,85	0,504
	Horizontal bottom and upper cross-section	---	0,99	0,526
"---" = not applicable.				

Thermal transmittance and f_{Rsi} values

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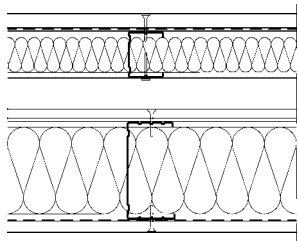
		4) WM311C system (family 3)		
		<ul style="list-style-type: none"> - Wall with C100x50x2 external vertical profiles + MW 80 mm + air cavity of thickness 20 mm + C48x35x0,6 internal vertical profile + MW 40 mm + GB15,0 + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U_{eq}-value (W/(m²·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f_{Rsi}
Horizontal central cross-section		0,52	---	0,785
Horizontal bottom and upper cross-section		0,72	---	0,792
Openings	Horizontal cross-section by lintel and sill	---	0,35	0,734
	Horizontal cross-section by jamb	---	0,22	0,718
	Vertical cross-section by lintel and sill in the middle of opening	---	0,09	0,781
Concave corner	Horizontal central cross-section	---	0,08	0,878
	Horizontal bottom and upper cross-section	---	0,18	0,849
Convex corner	Horizontal central cross-section	---	0,13	0,684
	Horizontal bottom and upper cross-section	---	0,24	0,625
Concrete structural floor connexion	Vertical central cross-section	---	0,81	0,711
	Vertical cross-section by the flange of vertical profile	---	0,93	0,699
	Vertical cross-section by the web of vertical profile	---	1,12	0,533
Concrete pillar connexion	Horizontal central cross-section	---	0,88	0,649
	Horizontal bottom and upper cross-section	---	1,04	0,646
Concrete pillar connexion in convex corner	Horizontal central cross-section	---	0,80	0,493
	Horizontal bottom and upper cross-section	---	0,94	0,522
"---" = not applicable.				

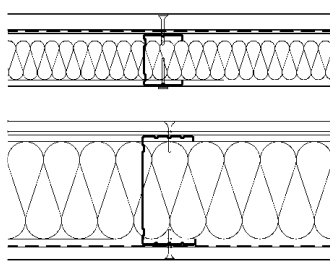
		5) WM411C system (family 4)		
		<ul style="list-style-type: none"> - Wall with C75x50x2,0 external vertical profiles + MW 60 mm + GB12,5 + air cavity of thickness 20 mm + C70x40x0,6 internal vertical profile + MW 60 mm + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U_{eq}-value (W/(m²·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f_{Rsi}
Horizontal central cross-section		0,45	---	0,772
Horizontal bottom and upper cross-section		0,63	---	0,798
Openings	Horizontal cross-section by lintel and sill	---	0,29	0,739
	Horizontal cross-section by jamb	---	0,20	0,717
	Vertical cross-section by lintel and sill in the middle of opening	---	0,10	0,758
Concave corner	Horizontal central cross-section	---	0,06	0,864
	Horizontal bottom and upper cross-section	---	0,18	0,826
Convex corner	Horizontal central cross-section	---	0,12	0,695
	Horizontal bottom and upper cross-section	---	0,24	0,681
		Vertical central cross-section	---	0,81

Thermal transmittance and f_{Rsi} values

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		5) WM411C system (family 4) <ul style="list-style-type: none"> - Wall with C75x50x2,0 external vertical profiles + MW 60 mm + GB12,5 + air cavity of thickness 20 mm + C70x40x0,6 internal vertical profile + MW 60 mm + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U _{eq} -value (W/(m ² ·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f _{Rsi}
Concrete structural floor connexion	Vertical cross-section by the flange of vertical profile	---	0,94	0,692
	Vertical cross-section by the web of vertical profile	---	1,10	0,556
Concrete pillar connexion	Horizontal central cross-section	---	0,88	0,651
	Horizontal bottom and upper cross-section	---	1,04	0,647
Concrete pillar connexion in convex corner	Horizontal central cross-section	---	0,80	0,492
	Horizontal bottom and upper cross-section	---	0,94	0,527
"---" = not applicable.				

		6) WM411C system (family 4) <ul style="list-style-type: none"> - Wall with C100x50x2,0 external vertical profiles + MW 80 mm + GB15,0 + air cavity of thickness 20 mm + C70x40x0,6 internal vertical profile + MW 60 mm + GB(VB)15,0. - Span between vertical profiles 400 mm. - Non-slotted profiles. 		
Calculated cross-sections		Thermal transmittance U _{eq} -value (W/(m ² ·K))	Linear thermal transmittance, Ψ (W/(m·K))	Factor f _{Rsi}
Horizontal central cross-section		0,43	---	0,783
Horizontal bottom and upper cross-section		0,59	---	0,810
Openings	Horizontal cross-section by lintel and sill	---	0,29	0,749
	Horizontal cross-section by jamb	---	0,20	0,727
	Vertical cross-section by lintel and sill in the middle of opening	---	0,09	0,775
Concave corner	Horizontal central cross-section	---	0,11	0,875
	Horizontal bottom and upper cross-section	---	0,16	0,847
Convex corner	Horizontal central cross-section	---	0,12	0,705
	Horizontal bottom and upper cross-section	---	0,23	0,692
Concrete structural floor connexion	Vertical central cross-section	---	0,79	0,714
	Vertical cross-section by the flange of vertical profile	---	0,91	0,706
	Vertical cross-section by the web of vertical profile	---	1,13	0,557
Concrete pillar connexion	Horizontal central cross-section	---	0,86	0,648
	Horizontal bottom and upper cross-section	---	1,01	0,651
Concrete pillar connexion in convex corner	Horizontal central cross-section	---	0,72	0,485
	Horizontal bottom and upper cross-section	---	0,85	0,530
"---" = not applicable.				

ANNEX 10 - DESIGN, INSTALLATION, MAINTENANCE AND REPAIR CRITERIA

A10.1 Design

The design of the non-load bearing external wall systems using the kits defined in this ETA should observe the following criteria:

- The assembled system design must be checked by calculation taking into account the mechanical characteristic values of relevant components (boards, profiles and fixings) in order to resist the actions (dead loads, wind loads, etc.) applying on the specific works. National safety factors must be used.
- The distances between vertical profiles must be 600 mm or 400 mm.
- The design must also accommodate specified thermal movements of components and also structural movements of the supporting structure without inducing damage to the assembled system or components.
- The assembled system design must be carried out following the standard construction details given in Annex 8. For specific conditions of the works, other solutions could be used taking into account the following aspects:
 - The weakest points of the façade are the connections with the openings (lintel, sill and jamb), the connections with the structural floors, and, in the case of the complete building envelope, the continuity and the complete application of the rendering system on the external board. Therefore, the design of these points requires special attention.
 - Flexible sheet of waterproofing is an optional component. However, in general, the use of flexible sheet of waterproofing in the assembled system is recommended by the ETA holder.
 - Vapour control sheet is an optional component that can be used to decrease risk of water condensation.
- Corrosion protection of subframe components must be chosen taking into account the category of corrosivity of the atmosphere (see ISO 9223) in which will be the works.
- Fixings between horizontal profiles and supporting structure must be chosen according to the supporting structure material and minimum resistance required due to maximum wind load (shear strength).
- The assessment of risk of water condensation of the complete solution in the case of substrate wall systems (e.g. by means of EN ISO 13788) must distinguish between ventilated and non-ventilated façade.
- The assembled systems without rendering used as substrate may be used as the following generic exterior finishings and specifications:
 - Cladding systems with mechanically fixed subframe (according to the relevant EAD in which the supporting cladding fixings (e.g. supporting brackets) must be fixed on the supporting structure of the building and must not be fixed on the substrate wall.
 - In the case of cladding systems with open joints (in ventilated façades) the substrate wall must always include the flexible sheet for waterproofing.
 - Bonded exterior finishing (e.g. ETICS, tiles, etc.). This kind of finishings shall be assessed considering each exterior-board material.

A10.2 Installation

The installation of the non-load bearing external wall systems using the kits defined in this ETA should observe the following criteria:

- The installation of the kits must be carried out in accordance with ETA holder instructions and the design and drawings prepared for the specific works. It is the responsibility of the ETA holder to ensure that the information on these provisions is given to those concerned.
- Special attention is required for the installation of the weakest points of the façade (connections with the openings (lintel, sill and jamb), the connections with the structural floors, and, in the case of complete building envelope, the continuity and the complete application of the rendering system on the external board).
- The installation of the kits must be carried out by installation companies and by installation staff which have been trained and authorized by the ETA holder.

A10.3 Maintenance and repair

Maintenance of the assembled systems or kit components includes inspections on site, taking into account the following aspects:

- Regarding the rendering systems and boards: the appearance of any damage such as cracking, detachment, delamination, mould presence due to permanent moisture or permanent irreversible deformation.
- Regarding the subframe components: the presence of corrosion or presence of water accumulation.

When necessary, any repair to localised damaged areas must be carried out with the same kit components and following the repair instructions given by the ETA holder.