



Certification report | Zertifizierungsbericht

Passive House Institute

Building system Wandsystem



for the warm temperate climate
für das warm-gemäßigtes Klima

Product | Produkt: **Termoarcilla® EIFS Wall**

Client | Auftraggeber: **Consortio Termoarcilla**

Construction | Konstruktion **Solid construction with EIFS |
Massivbauweise mit WDVS**

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1 Introduction

Because a separate heating system is not necessarily required in Passive Houses, high demands are placed on the quality of the building components used. The colder the climate, the higher the requirements for the components. To cover this, PHI has identified regions of similar requirements, and defined certification criteria. These criteria are available for free download at the website of the Passive House Institute.

If the below summarized requirements are met and a well-designed airtightness layer is proven, the label "Certified Passive House Component" can be awarded by the Passive House Institute (PHI)

Table 1: Certification criteria depending on the climate zone

Climate zone	Hygiene criterion ⁸	Comfort criterion	Efficiency criteria			Moisture criteria ⁶	
			U-value of the exterior building component $U_{opaque} * f_{R, PHI} \leq$	Purely opaque details $f_{Rsi=0.25} m^2K/W \geq^3$	Absence of thermal bridges $\Psi_a \leq^4$	Condensation	Ma limit according to DIN EN ISO 13788 \leq
	[-]	[W/(m ² K)]	[W/(m ² K)]	[-]	[W/(mK)]	[-]	[g/m ²]
1 Arctic	0.80	0.45 (0.35)	0.09	0.90	0.010 ⁵	Condensation should be completely evaporated at the end of 12 months	200 ⁷
2 Cold	0.75	0.65 (0.52)	0.12	0.88			
3 Cool, temperate	0.70	0.85 (0.70)	0.15	0.86			
4 Warm, temperate	0.65	1.05 (0.90)	0.25	0.82			
5 Warm	0.55	1.25 (1.10)	0.50	0.74			
6 Hot	None	1.25 (1.10)	0.50	0.74			
7 Very hot	None	1.05 (0.90)	0.25	0.82			

1 applies for vertical windows with a test size of 1.23*1.48 m. The criteria for other transparent building components can be taken from the relevant certification criteria. Value in brackets: respective reference glazing.

2 $f_{R, PHI}$: Reduction factor: always 1.0, exception: areas in contact with the ground and towards the unheated basement in the climate zones 1 – 4: 1.6; e. g. for climate zone 3 the U-value criterion becomes 0.25 W/(m²K).

3 $f_{Rsi=0.25} m^2K/W \geq$ see certification criteria.



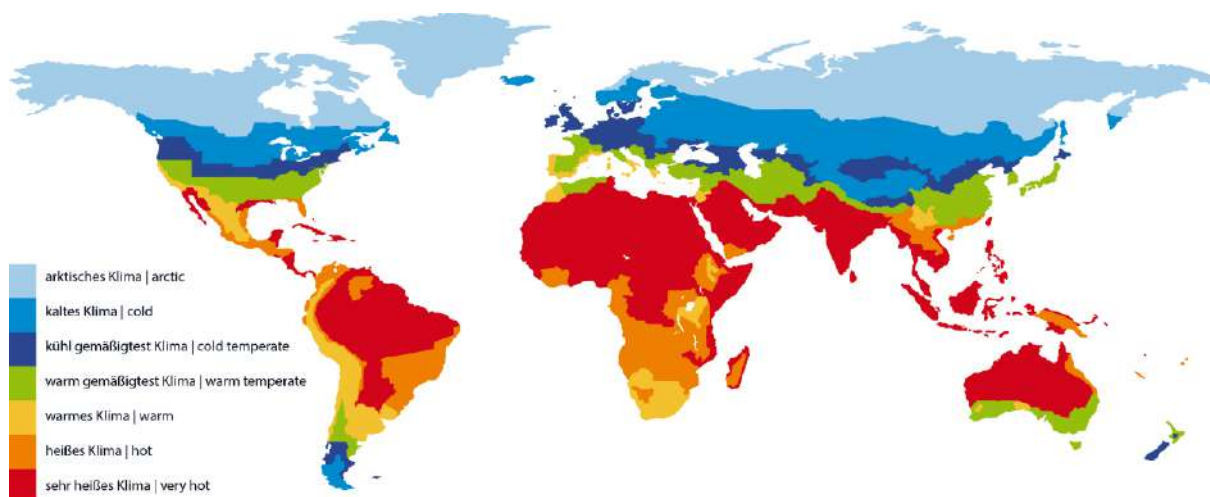
4 as a thermal bridge loss coefficient based on external dimensions and length. Specific constructions such as inner edges are exempted from this criterion.

5 Geometric thermal bridges, where the insulation thickness around the junction is consistent, but the calculation methodology results in a Psi-value of $> 0.010 \text{ W}/(\text{mK})$, are exempt from this criterion.

6 These criteria are based on the Glaser Method and allow an assessment of the likelihood of the occurrence of interstitial condensation during the winter. This method brings more reliable results for lightweight and airtight components used in cool and non-humid locations away from the equator that do not contain materials with a large water or heat storage capacity. Where the criteria are not met following this approach, a dynamic simulation according to EN 15026 can be carried out to provide greater detail. It is the responsibility of the architect to ensure the appropriate assessments have been carried out for specific buildings, which may include more detailed analyses than those carried out for this certification. In addition on-site measurements like airtightness testing as well as trained tradespeople help to ensure construction quality.

7 The Ma limit (maximum accumulated moisture content) is based on the ISO 13788 and reflects the maximum amount of condensate in order to prevent run-off of liquid water from watertight surfaces. It may make sense in certain cases to calculate a more specific Ma limit according to the materials present in the wall, roof and floor constructions.

8 For door thresholds the dew point criterion applies according to the certification criteria.



2 Description of the certified system

2.1 Opaque building envelope

The system consists of a Termoarcilla® blocks wall with a 15 mm thick interior gypsum plaster, an exterior insulation finishing system (EIFS) 140 mm thick, and a gypsum board on the interior side with a 60 mm thick service cavity between the finish board and the wall.

The Termoarcilla® wall is formed by placing the blocks with horizontal mortar joints. The exterior insulation system includes EPS insulation panels (0.035 W/(mK)) fixed to the blocks with adhesive and

mechanical fasteners, and a multilayer base coat reinforced with mesh. The interior wall finish is built with a galvanized steel structure on which the gypsum board is screwed.

The system has been assessed according to the Passive House Institute's criteria for opaque construction systems, and has been validated as suitable for Passive House projects in the warm-temperate and warm climate zones.

2.2 Windows

For the purposes of certification, a standard passive house window ($U_w = 1.00 \text{ W}/(\text{m}^2\text{K})$ with $U_g = 0.90 \text{ W}/(\text{m}^2\text{K})$) was used. The overall U-value of the installed window of standard size (1.23 m wide by 1.48 m tall) should be no more than $0.05 \text{ W}/(\text{m}^2\text{K})$ greater than the U_w to ensure occupant comfort.

This criterion is met with a window installation solution aligned with the exterior thermal insulation. This construction solution is solved with a wooden support profile on the window sill and metal L-profile anchors on the jambs and lintel.

2.3 Airtightness concept

The system's airtightness is achieved as follows: the interior gypsum plaster layer serves as the airtight layer of the envelope. For junctions with windows and doors, special airtightness tapes are used on

the interior face, maintaining continuity with the gypsum plaster. All junctions with other construction elements use special tapes or airtight paint solutions to ensure the airtightness line of the facade remains consistent in the interior gypsum plaster.

3 Evaluation

The Passive House Institute has defined international component criteria for seven climate zones based on hygiene, comfort and affordability criteria. In principle, components which have been certified

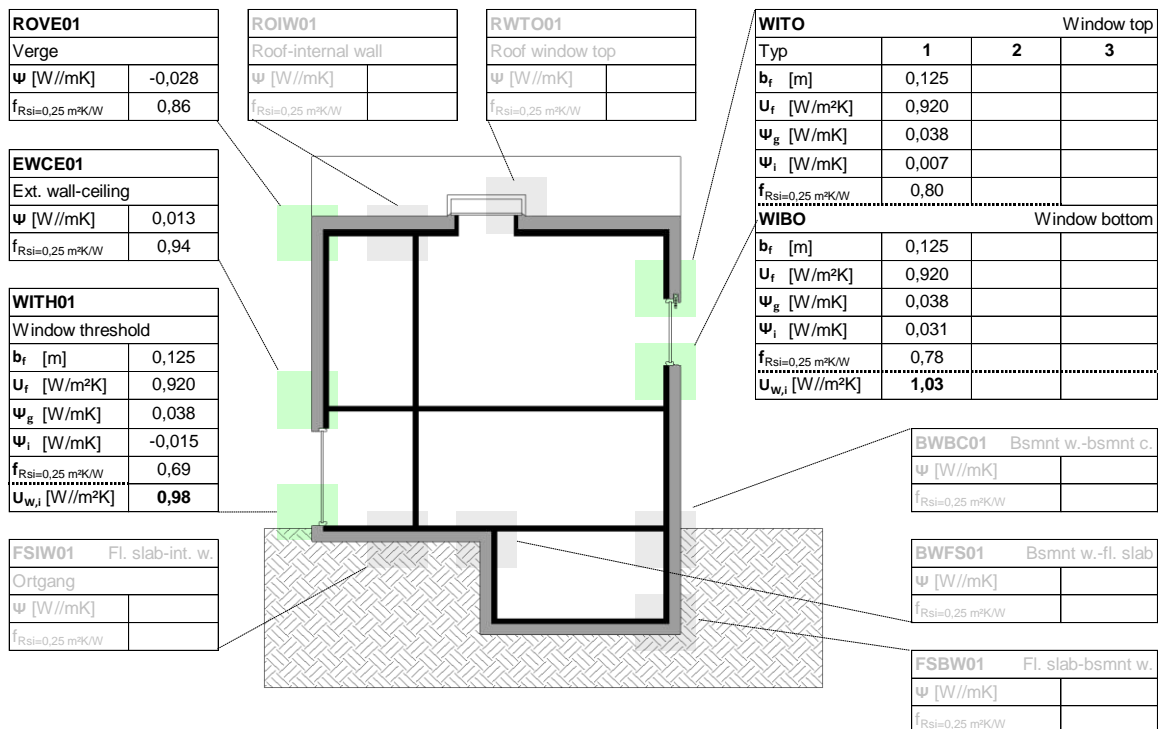
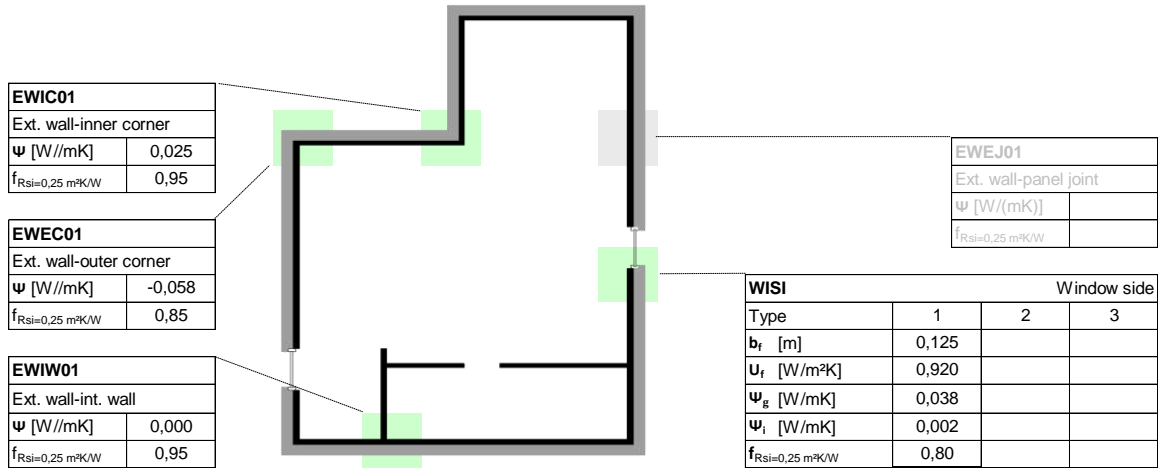
for climate zones with higher requirements may also be used in climates with less stringent requirements. Their use might make economic sense in certain circumstances.

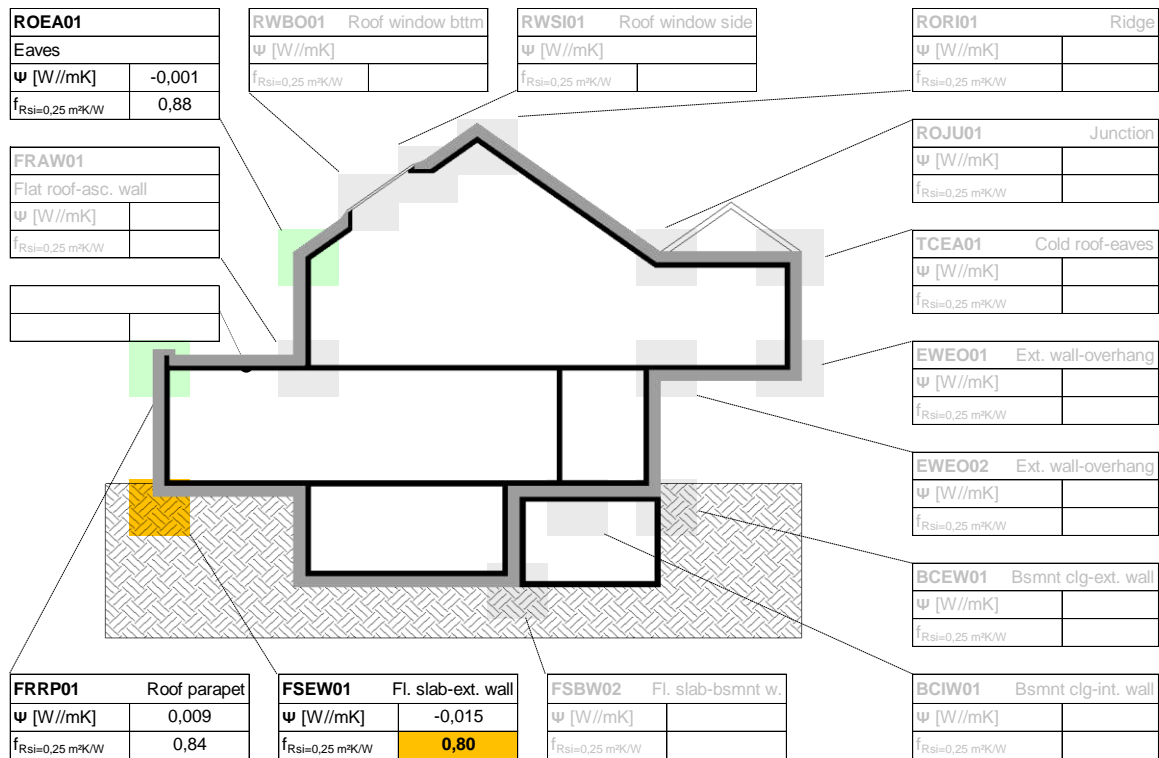


4 Summary of the results

Thermal bridge not calculated
 Criteria achieved

Efficiency criteria not achieved
 Hygiene or comfort criterion not achieved





5 Using the results in the PHPP

The following points are relevant for working with the here presented results in the Passive House Planning Package (PHPP):

- For the system being certified here, the thermal bridges in the regular construction of the buildings shell resulting from regularly occurring interruptions are already included in the U-values by using equivalent thermal conductivities for the materials of the interrupted layers. They do not have to be considered further.
- The results of the calculation of the linear thermal transmittance are always determined based on the external dimensions.
- Additional point thermal bridges may have to be taken into account.



6 Legal information

The following information should be kept in mind when planning and executing the detail solutions documented in this report:

The detail drawings in this documentation are schematic and might be adapted for specific constructions. Sealing of the construction against moisture and the absence of condensation as well as the check of hygrothermal matters was not the subject of this examination. Where necessary, this should be carried out in accordance with the accepted technical standards. The responsibility for checking the above mentioned points lies with the applicant for the certification procedure and/or the user.

The present documentation does not allow conclusions to be drawn regarding other characteristics of the examined construction that may determine its performance and quality. In particular, this documentation is not a substitute for building authority approval.

The scope of the examination and accountability of the certification is limited to the testing routines with regard to compliance with the stated criteria of the Passive House Institute. A legal basis for making any claims against the Passive House Institute Darmstadt Dr. Wolfgang Feist based on the information provided in this report is excluded.





Appendix 1: U-value of building assemblies

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Description of building assembly						Assembly no.	
Thermoclay wall EIFS - Fachada termoarcilla SATE						01ud	
Orientation of building assembly (or R_{si})			2-Wall		Interior insulation?		
Adjacent to (or R_{se})			1-Outdoor air		U-value supplement [W/(m ² K)]		
					0.041		
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
Gypsum board I Gipskartonplatten 900 kg/m ³ 10456	0.250					15	
Air layer, unventilated, horizontal, thickness: 60 mm + steel stuts	0.361					60	
Interior plaster I Gipsputz 10456	0.570					15	
Thermoclay 19 + mortar joints	0.325					190	
EPS 035	0.035					140	
Percentage of sec. 1:	100%	Percentage of sec. 2:		Percentage of sec. 3:			
Heat transmission resistance coefficients						Total thickness [cm]:	
Interior R_{si} :		0.13	m ² K/W		42.0		
Exterior R_{se} :		0.04	m ² K/W		U-value [W/(m ² K)]:		
						0.241	



Condensation check according to ISO 13788

Glaser Method, carried out using PHI Condensation Tool

EW1 - external wall

Assembly no.	Building assembly description		Interior insulation?	Ft	Radiation effect	Solar rad.	Sol. rad. fact.	Eff. Solar rad.
EW01	Termoarçilla SATE		No	1.00	Active	750	1.0	750
						[W/m ²]	[]	[W/m ²]
Heat transmission resistance [m ² K/W]				DT Roof 13788	Radiation attributes			
Orientation of building element		interior Rsi:	0.13	0.00	Reflectivity:			
Adjacent to		exterior Rse:	0.04		Absorptivity:	0.50		
For condensation or mould growth on opaque surfaces		interior Rsi:	0.25		Emissivity:	0.90		
					Clima zone	4	Limits	PHI
					Region	Warm-temperate	U-value	0.30
					Location	ES0001b-Madrid	fRsi min 0.25	0.82
							User defined	

Pos.	Area section	λ [W/(mK)]	Thickness [mm]	μ [-]	S _d [m]	R [m ² K/W]	Temperature [°C]	p _v [Pa]	RH [%]
i	Interior air						20.00	1519	65%
0	Rsi - Interior surface					0.130	20.58	1519	63%
1	Gypsum board Gipskartonplatten 900 kg/m ³ 10456	0.250	25	10.0	0.25	0.100	21.02	1563	63%
2	Air layer, unventilated, horizontal, thickness: 60 mm	0.333	60	1.0	0.06	0.180	21.82	1573	60%
3	Interior plaster Gipsputz 10456	0.570	15	8.0	0.12	0.026	21.94	1594	61%
4	EQ_EW1 Termoarçilla 19 + mortar joints	0.325	190	10.0	1.90	0.584	24.53	1924	63%
5	Mörtel, Zement, Sand	1.000	10	8.0	0.08	0.010	24.58	1938	63%
6	EPS 035	0.035	140.0	60.0	8.40	4.000	42.33	3400	41%
7									
8									
9									
10									
0	Rse - Exterior surface					0.040	42.33	3400	41%
e	Exterior air						42.51	3400	90%

Total Values		44.00	10.81	5.071	-4.44	-3.48E-08	0
		[cm]	[m]	[m ² K/W]	q tot [W/m ²]	g [kg/(m ² s)]	Cond. Interfaces

Radiation effect		Active	Surfaces DT	
Exterior Sol-Air Temperature	42.51	0.58	22.51	
	[°C]	[Int DT °C]	[Ext-Int DT °C]	

SRI value	58	Aged SRI value	46
	[]		[]

Verifications		
Condensation Rsi 0,25 [°C]		
T _{min}	T _{sa} Project	Verified
13.22	21.08	Yes
Mold growth Rsi 0,25 [°C]		
T _{min}	T _{sa} Project	Verified
16.69	21.08	Yes
f _{Rsi}		
f _{Rsi} min	f _{Rsi} Project	Verified
0.82	0.95	Yes
g _c [g/m ² * h]		
g _c	0.00	
U-Value [W/(m ² K)]		
min	Project	Verified
0.300	0.197	Yes

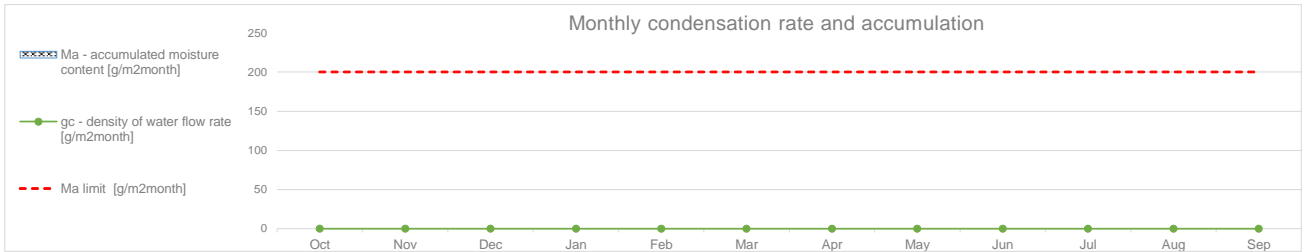


Condensation check according to ISO 13788

Glaser Method, carried out using PHI Condensation Tool

EW1 - external wall

Monthly Condensation rate and accumulation within the whole assembly



Days	10	11	12	1	2	3	4	5	6	7	8	9
Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
gc - density of water flow rate [g/m²month]	0	0	0	0	0	0	0	0	0	0	0	0
Ma - accumulated moisture content [g/m²month]	0	0	0	0	0	0	0	0	0	0	0	0
Ma limit [g/m²month]	200	200	200	200	200	200	200	200	200	200	200	200
Comments												
Interfaces with condensation	0	0	0	0	0	0	0	0	0	0	0	0

Monthly Condensation rate and accumulation within each layer

Drying potential - Long term evaluation

Verifications

Assembly no. EW1													Verification status: Assembly verified
Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
Condensation Rsi 0,25 [° C]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
One or more months have internal surface condensation temperature not verified. Please revise the assembly.													
Mold growth Rsi 0,25 [° C]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
One or more months have internal surface mould growth temperature below the mould growth surface temperature													
f_{Rsi}	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
One or more months have the temperature factor at the internal surface not verified. Please revise the assembly.													
Ma [g/m²month]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Max acc. Moisture content	Condensation is completely evaporated												
Ma [g/m²month]													Yes
Moisture evaporation	Maximum accumulation of condensate does not exceed the Ma limit												
Drying potential													Yes
Over 10 years	The drying potential of building component is verified over a period of 10 years.												





Appendix 2: Thermal simulations | Wärmestromsimulationen

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Wall, roof | Wand, Dach

Windows | Fenster

Ground | Boden

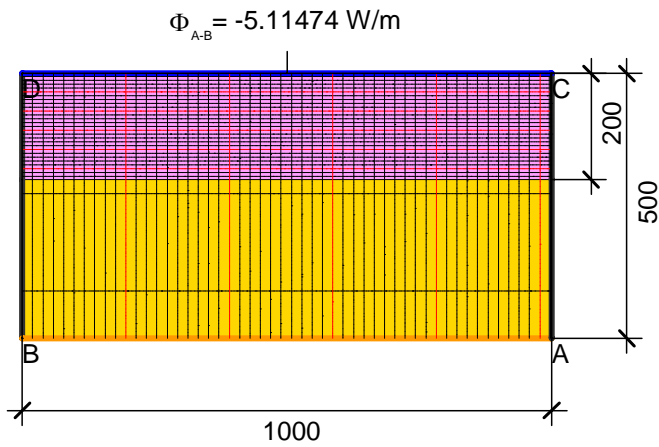


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Wall, roof | Wand, Dach



Flat Roof - RO1 (section 1)



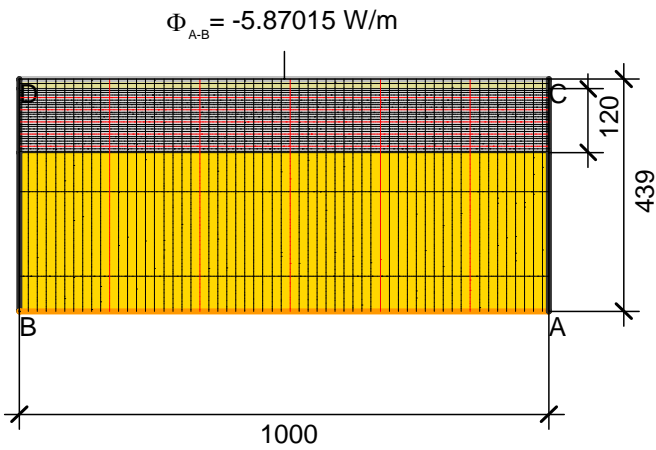
Material	λ [W/(m·K)]	ϵ
Clay slab filler block (300 mm; RT 0,32 m ² ·K/W)	0.938	0.900
XPS 037	0.037	0.900

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiabat	0.000			
Exterior Außen		-10.000	0.040	
Interior up. Innen auf.		20.000	0.100	

$$U_{\text{eq A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{5.115}{30.0 \cdot 1.0} = 0.170 \text{ W/(m}^2 \cdot \text{K)}$$



Pitched Roof - RO2 (section 1)



Material	λ [W/(m·K)]	ϵ
Clay slab filler block (300 mm; RT 0,32 m ² ·K/W)	0.938	0.900
Onduline PIR 027	0.027	0.900
Softwood, OSB I Weichholz, OSB 10456	0.130	0.900

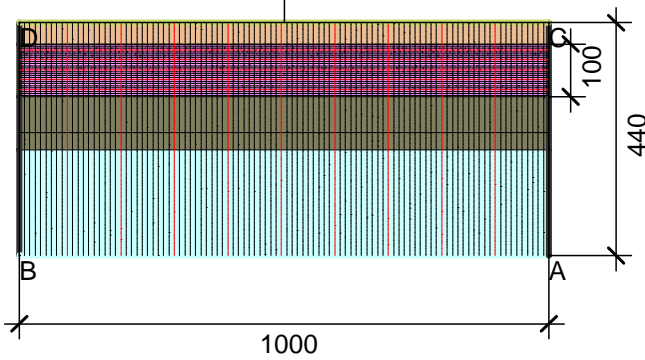
Boundary Condition	q[W/m ²]	θ [°C]	R[(m ² ·K)/W]	ϵ
Adiabatic Adiatat	0.000			
Exterior roof Außen Dach		-10.000	0.100	
Interior up. Innen auf.		20.000	0.100	

$$U_{\text{eq A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{5.87}{30.0 \cdot 1.0} = 0.196 \text{ W/(m}^2 \cdot \text{K)}$$



Floor slab - FS1

$$\Phi_{A-B} = 9.89541 \text{ W/m}$$



Material	λ [W/(m·K)]	ϵ
Cement screed Zement-Estrich 4108	1.400	0.900
Concrete, 1% Steel Beton, 1% Stahl 10456	2.300	0.900
Eq_ventilated crawl space	2.300	0.900
XPS 037	0.037	0.900

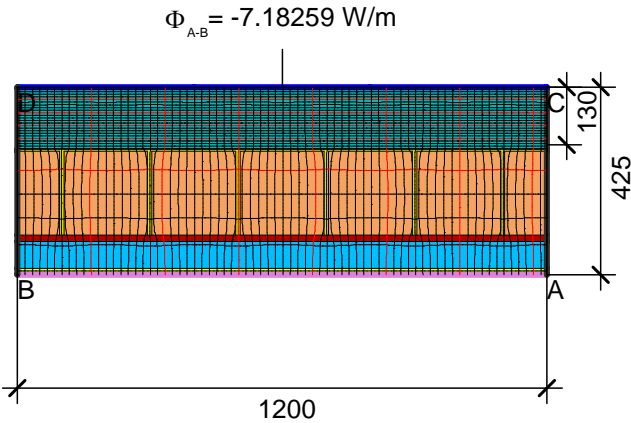
Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiabat	0.000			
Gorund Erdreich		-10.000		
Int. flux down Innen abwärts		20.000	0.170	

$$U_{\text{eq A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{9.895}{30.0 \cdot 1.0} = 0.330 \text{ W/(m}^2 \cdot \text{K)}$$



External wall 1 - EW1

Vertical section



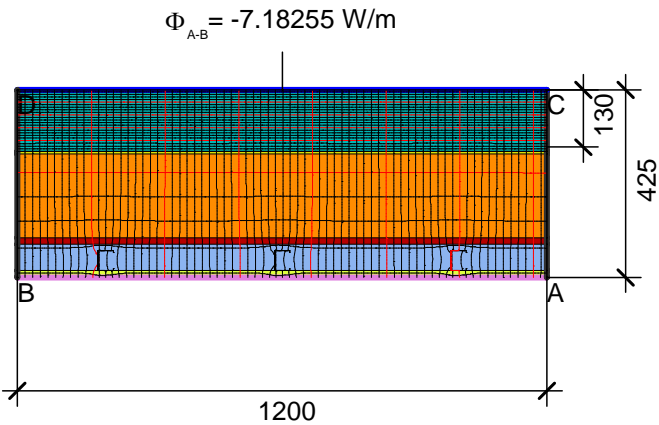
Material	λ [W/(m·K)]	ϵ
EPS 035	0.035	0.900
EQ_EW1 Air layer, unvent, horiz, thickness 60 mm + steel studs	0.361	0.900
Gypsum board Gipskartonplatten 900 kg/m ³ 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Mörtel, Zement, Sand	1.000	0.900
Thermoclay blocks 19 cm	0.292	0.900

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiabat	0.000			
Exterior Außen		-10.000	0.040	
Interior Innen		20.000	0.130	

$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.183}{30.0 \cdot 1.2} = 0.200 \text{ W/(m}^2 \cdot \text{K)}$$

External wall 1 - EW1

Horizontal section: thermoclay blocks - no mortar head joints (vertical)

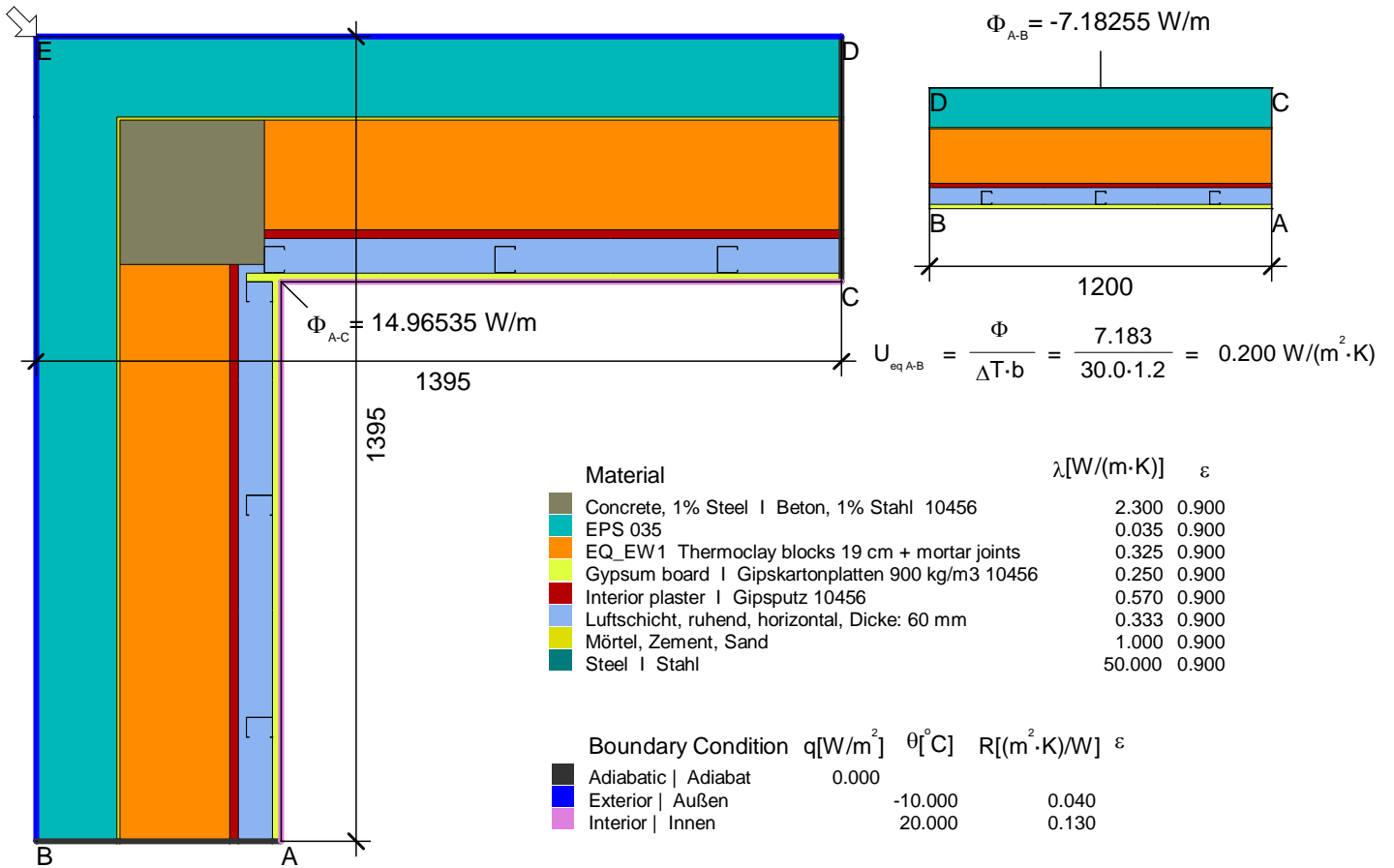


Material	λ [W/(m·K)]	ϵ
EPS 035	0.035	0.900
EQ_EW1 Thermoclay blocks 19 cm + mortar joints	0.325	0.900
Gypsum board Gipskartonplatten 900 kg/m ³ 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Luftschicht, ruhend, horizontal, Dicke: 60 mm	0.333	0.900
Mörtel, Zement, Sand	1.000	0.900
Steel Stahl	50.000	0.900

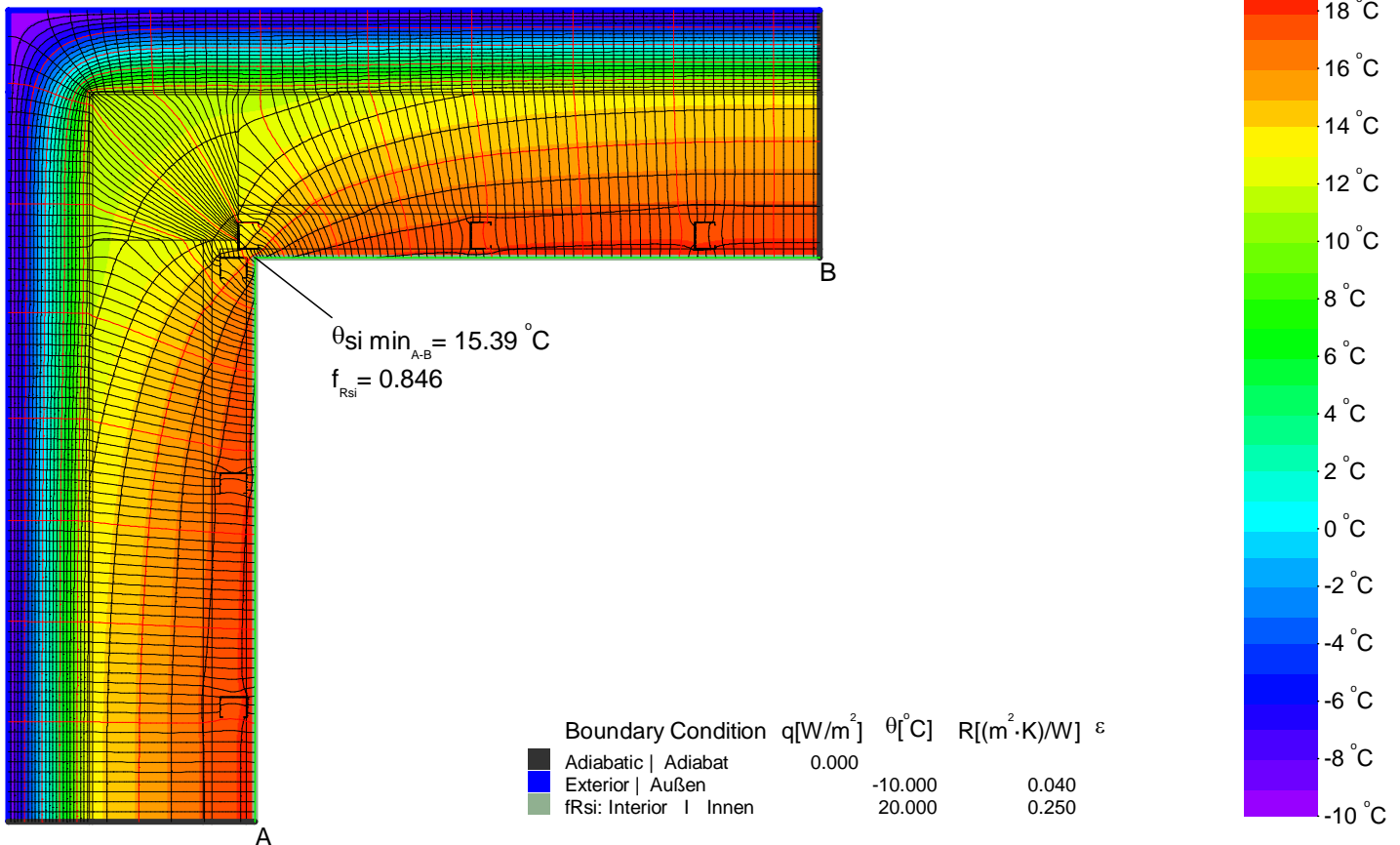
Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiabat	0.000			
Exterior Außen		-10.000	0.040	
Interior Innen		20.000	0.130	

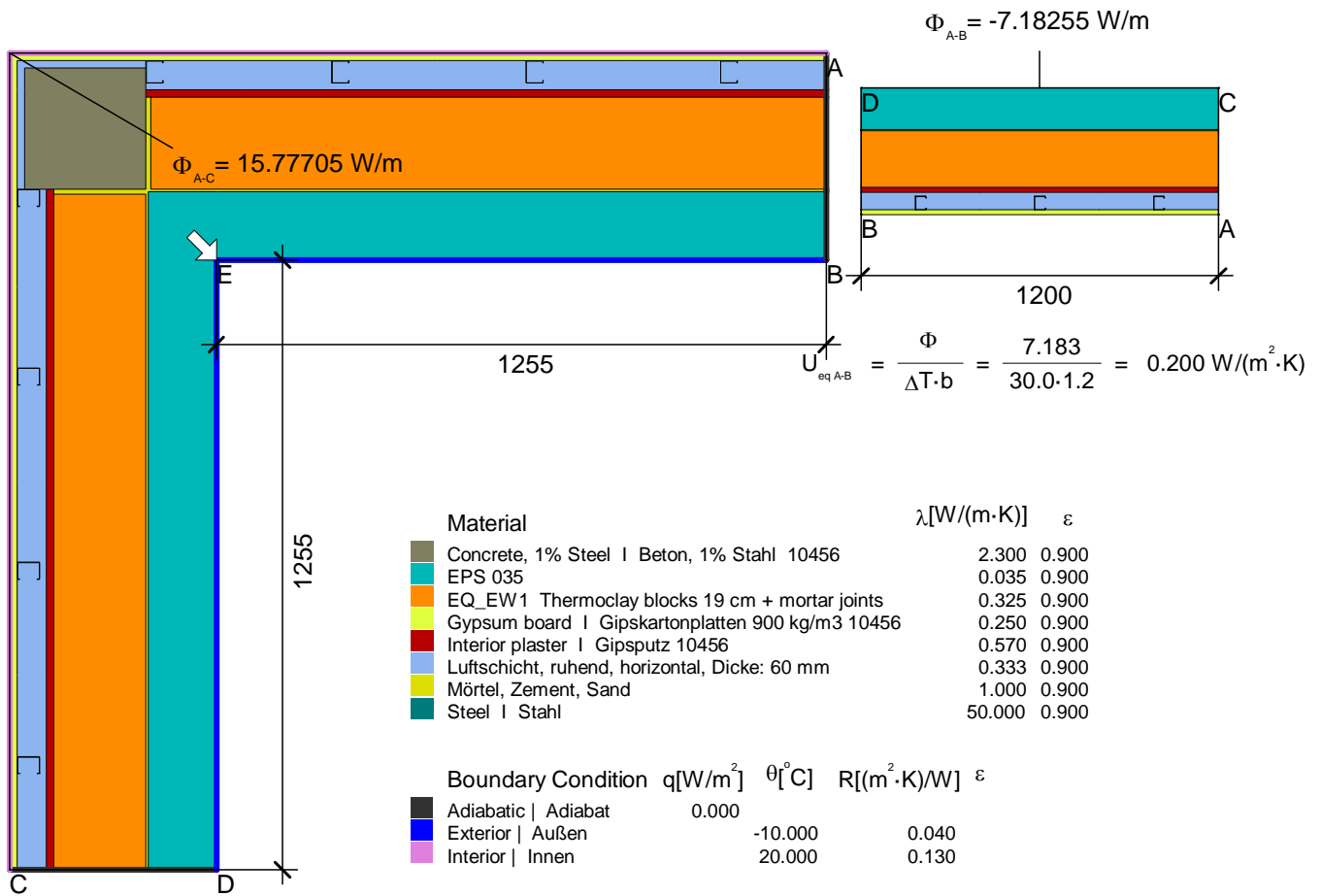
$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.183}{30.0 \cdot 1.2} = 0.200 \text{ W/(m}^2 \cdot \text{K)}$$



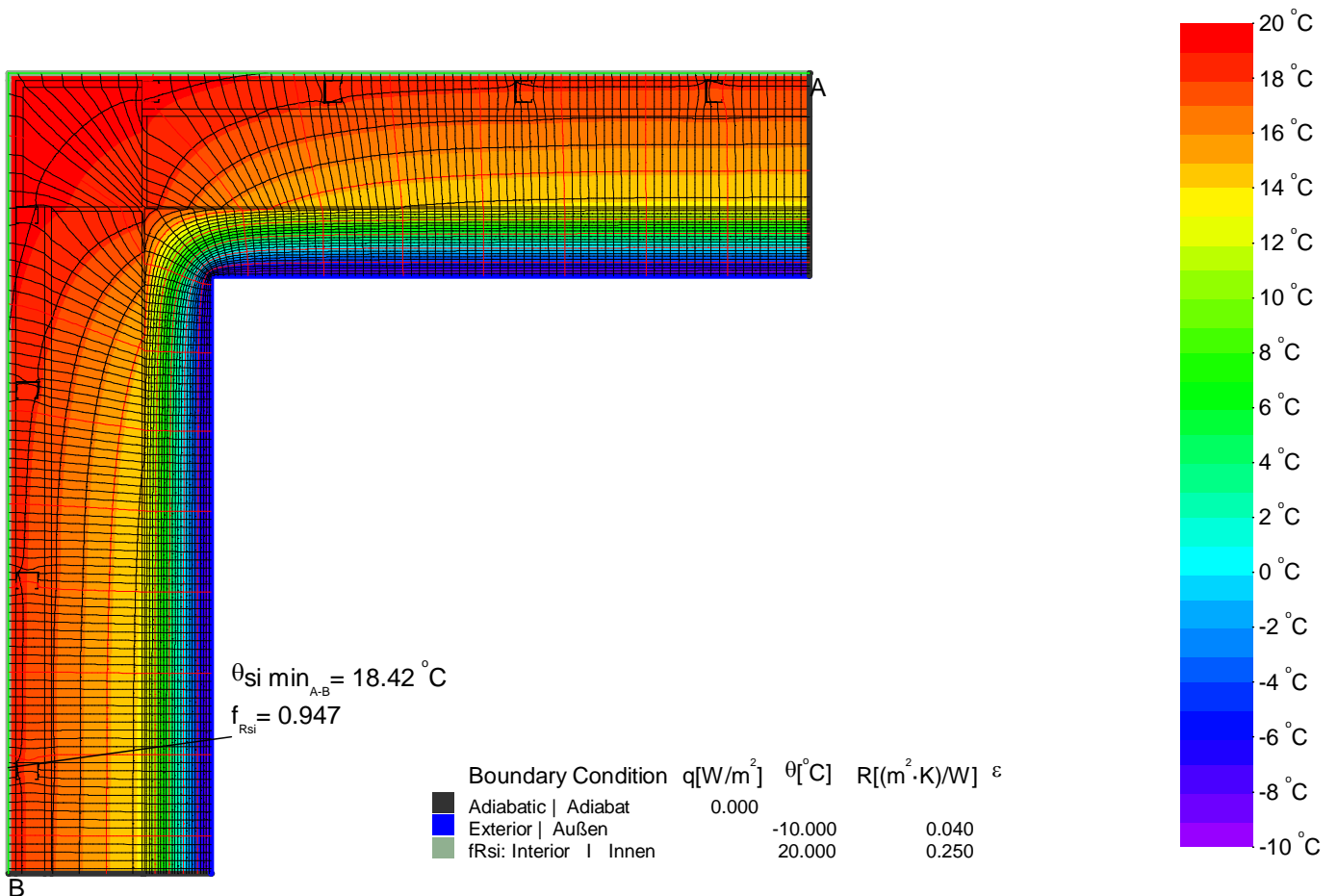


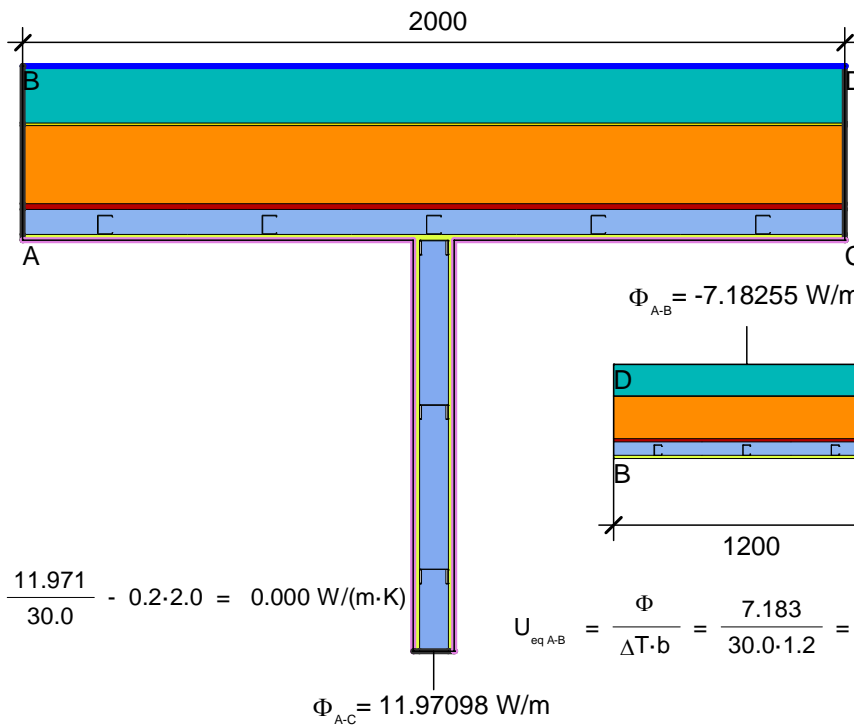
$$\Psi_{A-E,C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{14.965}{30.0} - 0.2 \cdot 1.395 - 0.2 \cdot 1.395 = -0.058 \text{ W}/(\text{m} \cdot \text{K})$$





$$\psi_{A-E-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{15.777}{30.0} - 0.2 \cdot 1.255 - 0.2 \cdot 1.255 = 0.025 \text{ W}/(\text{m} \cdot \text{K})$$





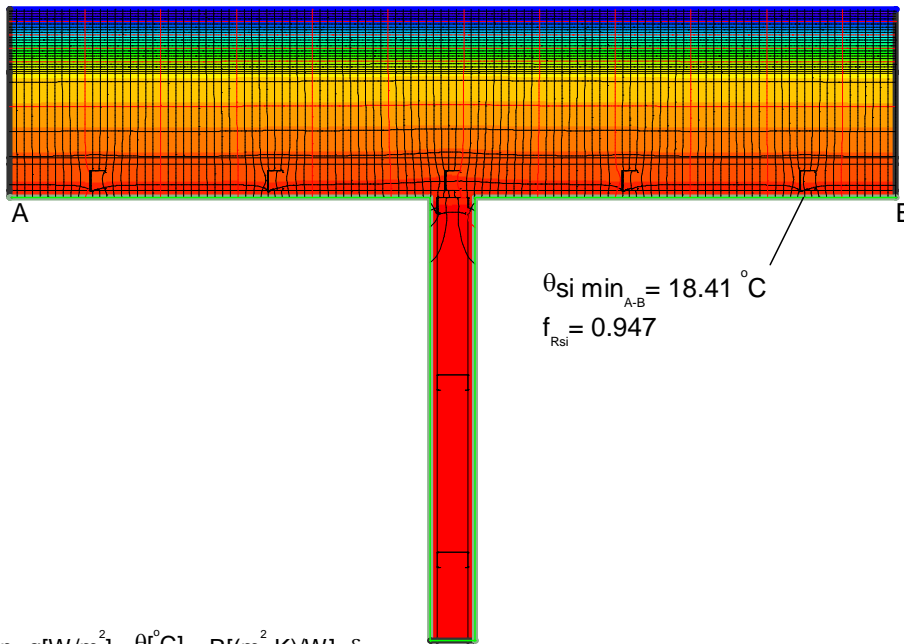
$$\psi_{A-C} = \frac{\Phi}{\Delta T} - U_i \cdot b_i = \frac{11.971}{30.0} - 0.2 \cdot 2.0 = 0.000 \text{ W}/(\text{m} \cdot \text{K})$$

$$U_{\text{eq A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.183}{30.0 \cdot 1.2} = 0.200 \text{ W}/(\text{m}^2 \cdot \text{K})$$

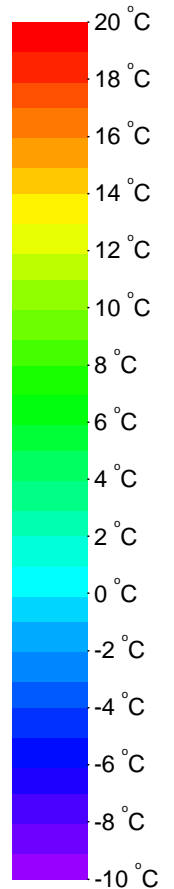
$$\Phi_{A-C} = 11.97098 \text{ W/m}$$

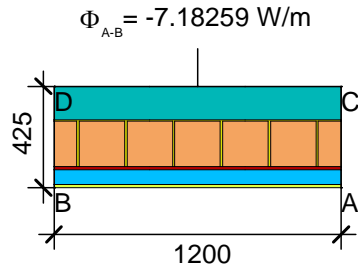
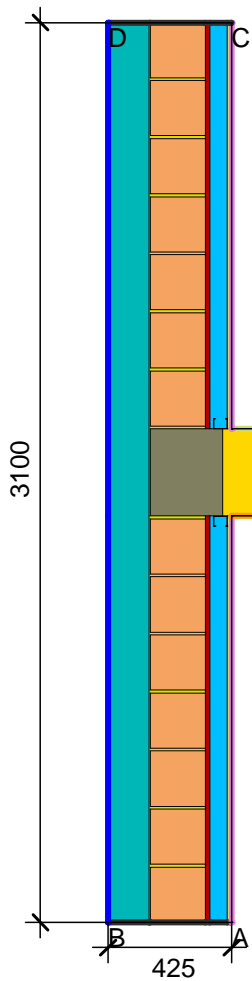
Material	λ [W/(m·K)]	ϵ
EPS 035	0.035	0.900
EQ_EW1 Thermoclay blocks 19 cm + mortar joints	0.325	0.900
Gypsum board Gipskartonplatten 900 kg/m ³ 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Luftschicht, ruhend, horizontal, Dicke: 60 mm	0.333	0.900
Luftschicht, ruhend, horizontal, Dicke: 70 mm	0.389	0.900
Mörtel, Zement, Sand	1.000	0.900
Steel Stahl	50.000	0.900
Unvent. cavity unbel. Hohlr. *		
* EN ISO 10077-2:2017, 6.4.2		

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiabat	0.000			
Exterior Außen	-10.000		0.040	
Interior Innen	20.000		0.130	
e 0,9 Cavity Hohlraum				0.900



Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiabat	0.000			
Exterior Außen	-10.000		0.040	
fRsi: Interior Innen	20.000		0.250	





$$\Phi_{A-B} = -7.18259 \text{ W/m}$$

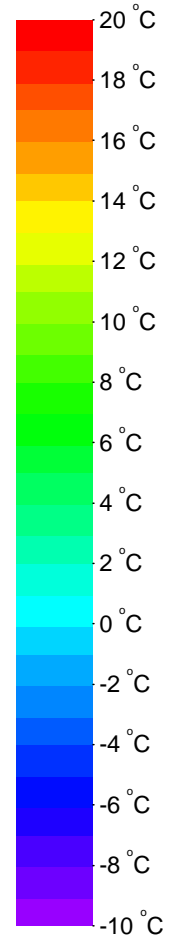
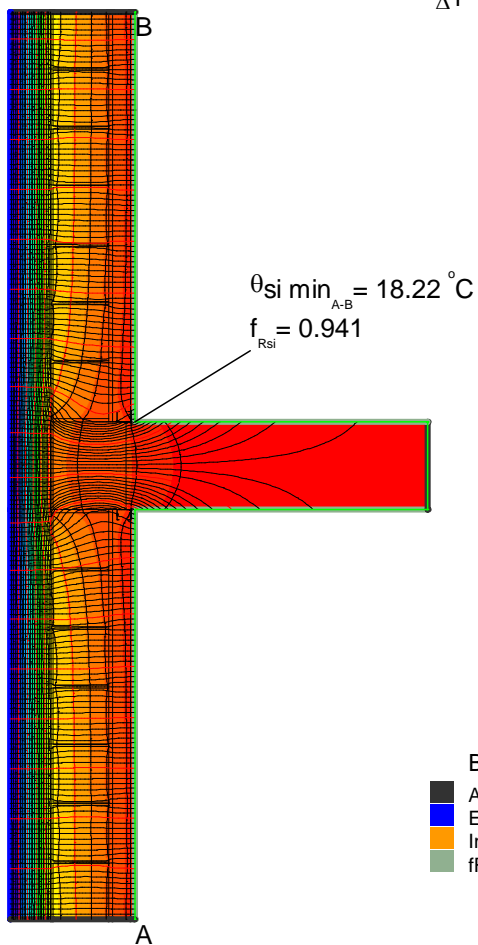
$$U_{\text{eq A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.183}{30.0 \cdot 1.2} = 0.200 \text{ W}/(\text{m}^2 \cdot \text{K})$$

$$\Phi_{A-C} = 18.95352 \text{ W/m}$$

Material	λ [W/(m·K)]	ϵ
Clay slab filler block (300 mm; RT 0,32 m2·K/W)	0.938	0.900
Concrete, 1% Steel Beton, 1% Stahl 10456	2.300	0.900
EPS 035	0.035	0.900
EQ_EW1 Air layer, unvent, horiz, thickness 60 mm + steel studs	0.361	0.900
Gypsum board Gipskartonplatten 900 kg/m3 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Mörtel, Zement, Sand	1.000	0.900
Steel Stahl	50.000	0.900
Thermoclay blocks 19 cm	0.292	0.900

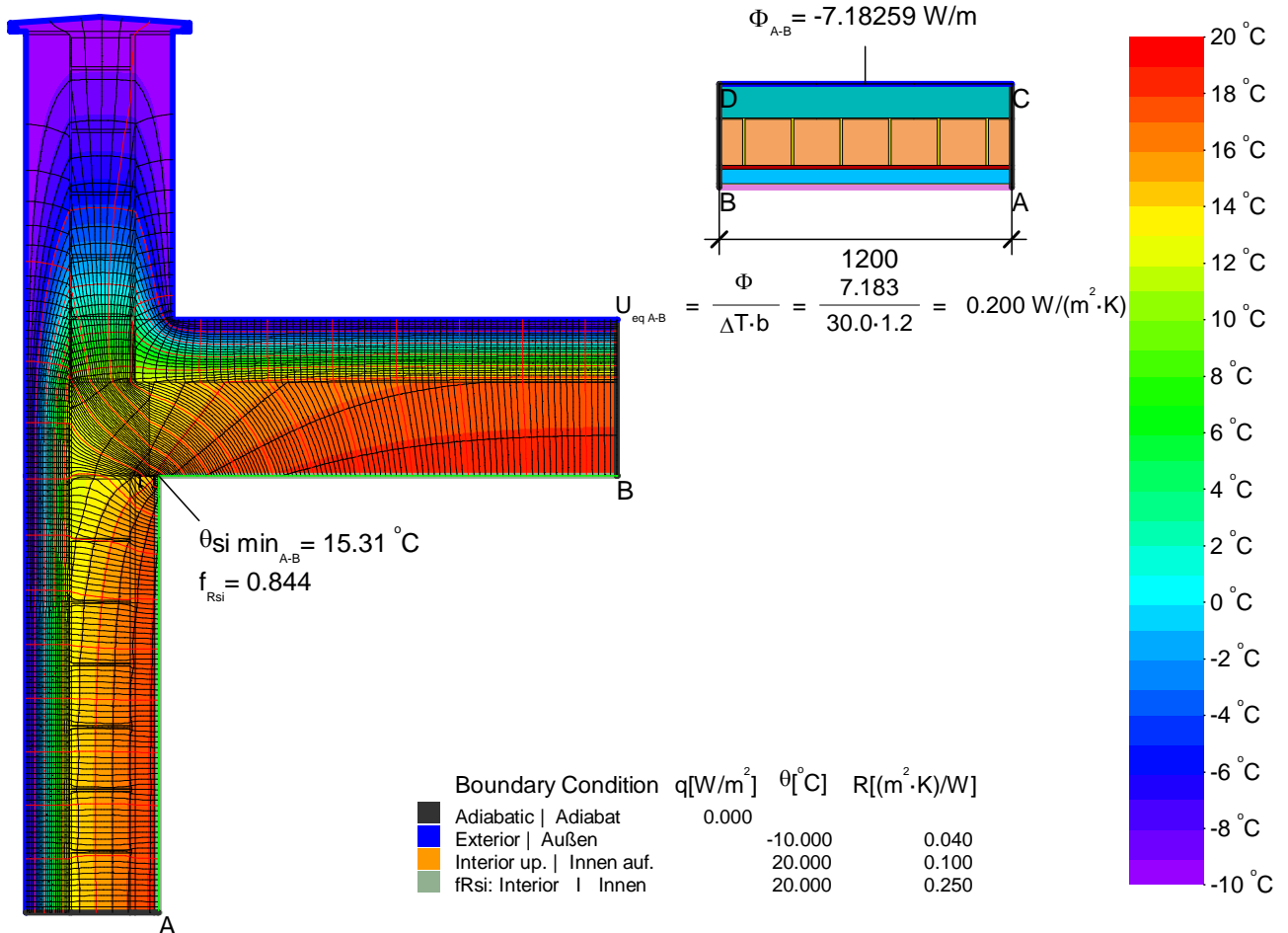
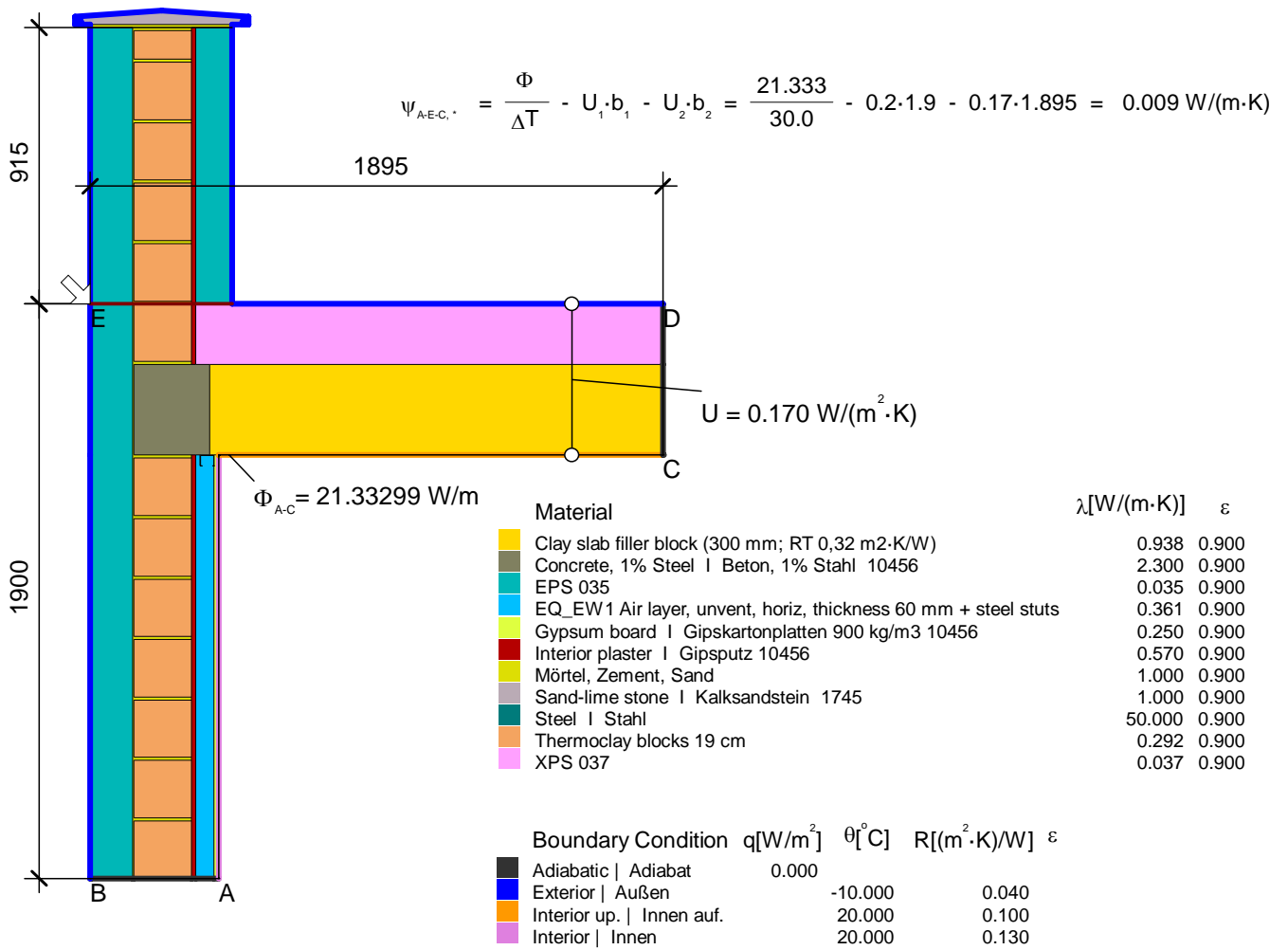
Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiat	0.000			
Exterior Außen		-10.000	0.040	
Int. flux down Innen abwärts		20.000	0.170	
Interior up. Innen auf.		20.000	0.100	
Interior Innen		20.000	0.130	

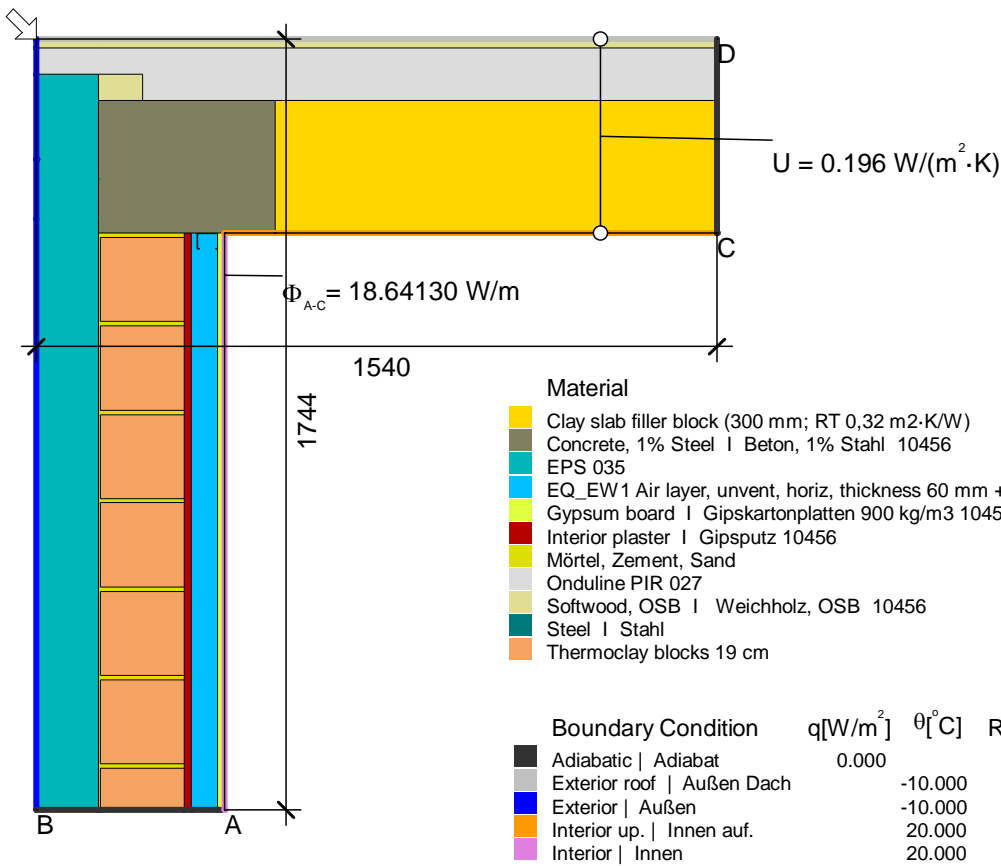
$$\psi_{A-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 = \frac{18.954}{30.0} - 0.2 \cdot 3.1 = 0.013 \text{ W}/(\text{m} \cdot \text{K})$$



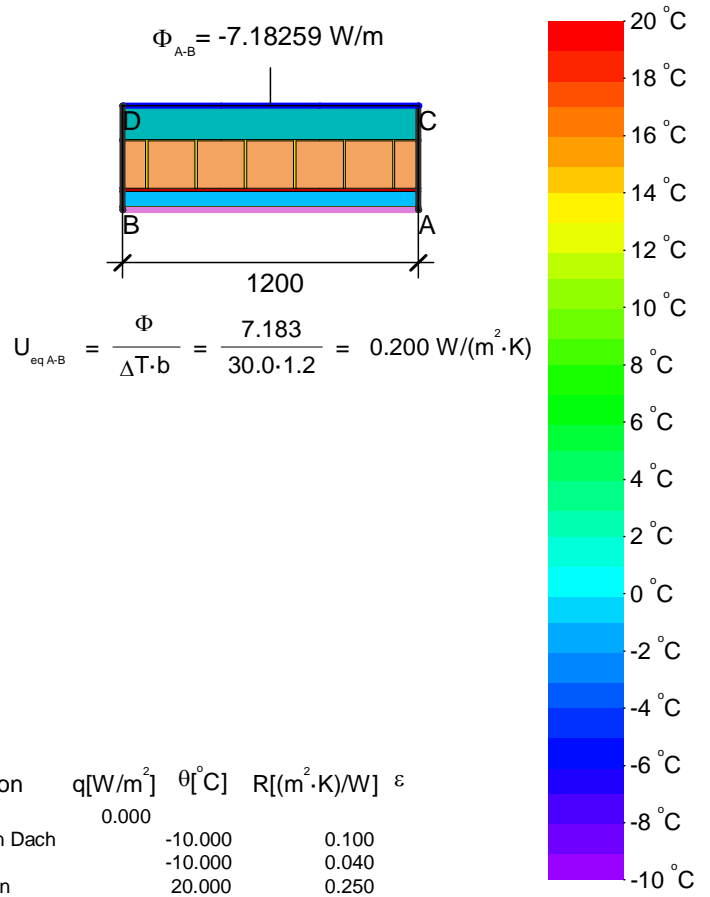
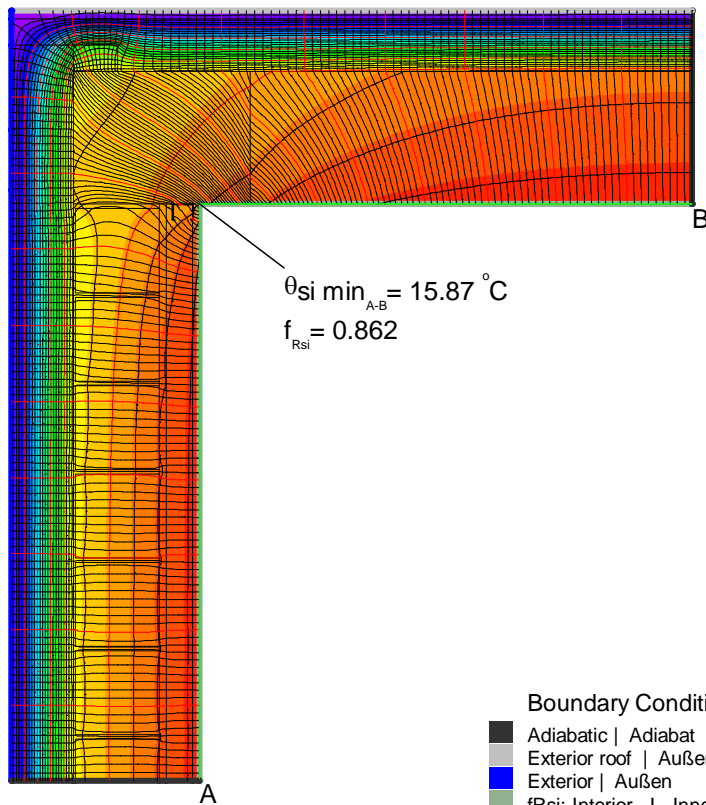
Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiat	0.000			
Exterior Außen		-10.000	0.040	
Interior up. Innen auf.		20.000	0.100	
fRsi: Interior Innen		20.000	0.250	

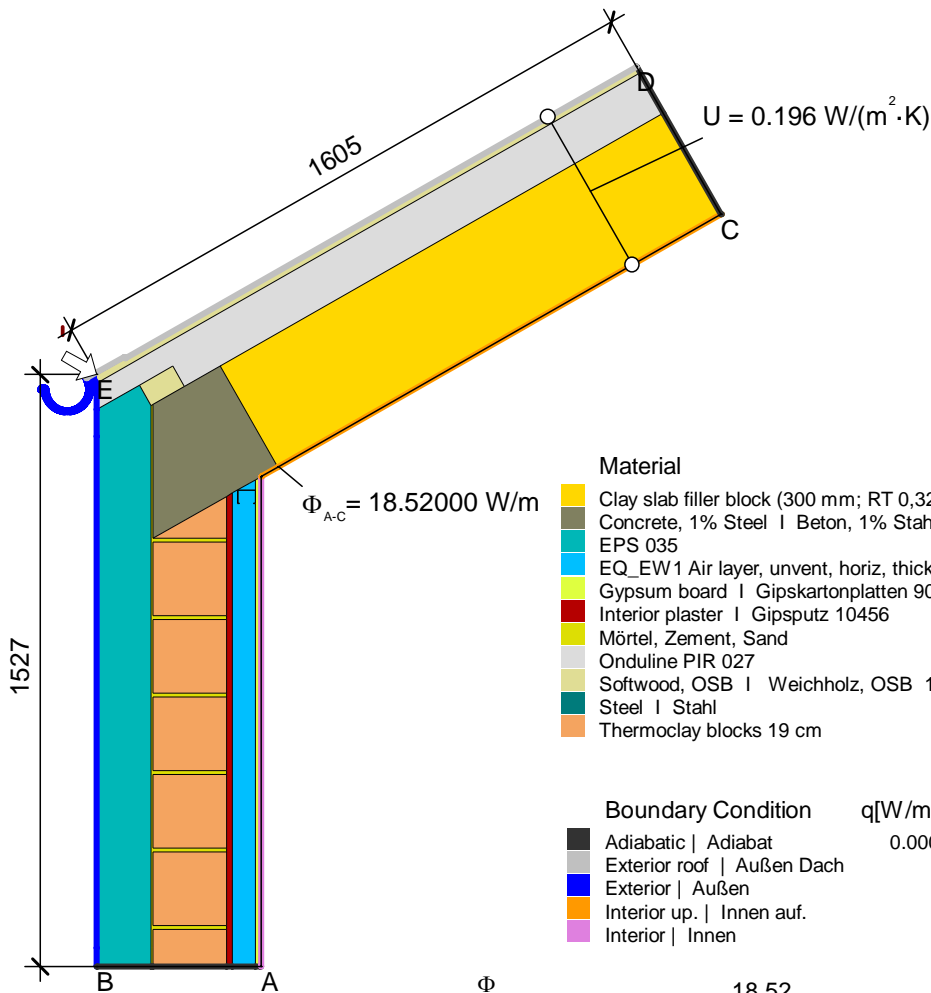




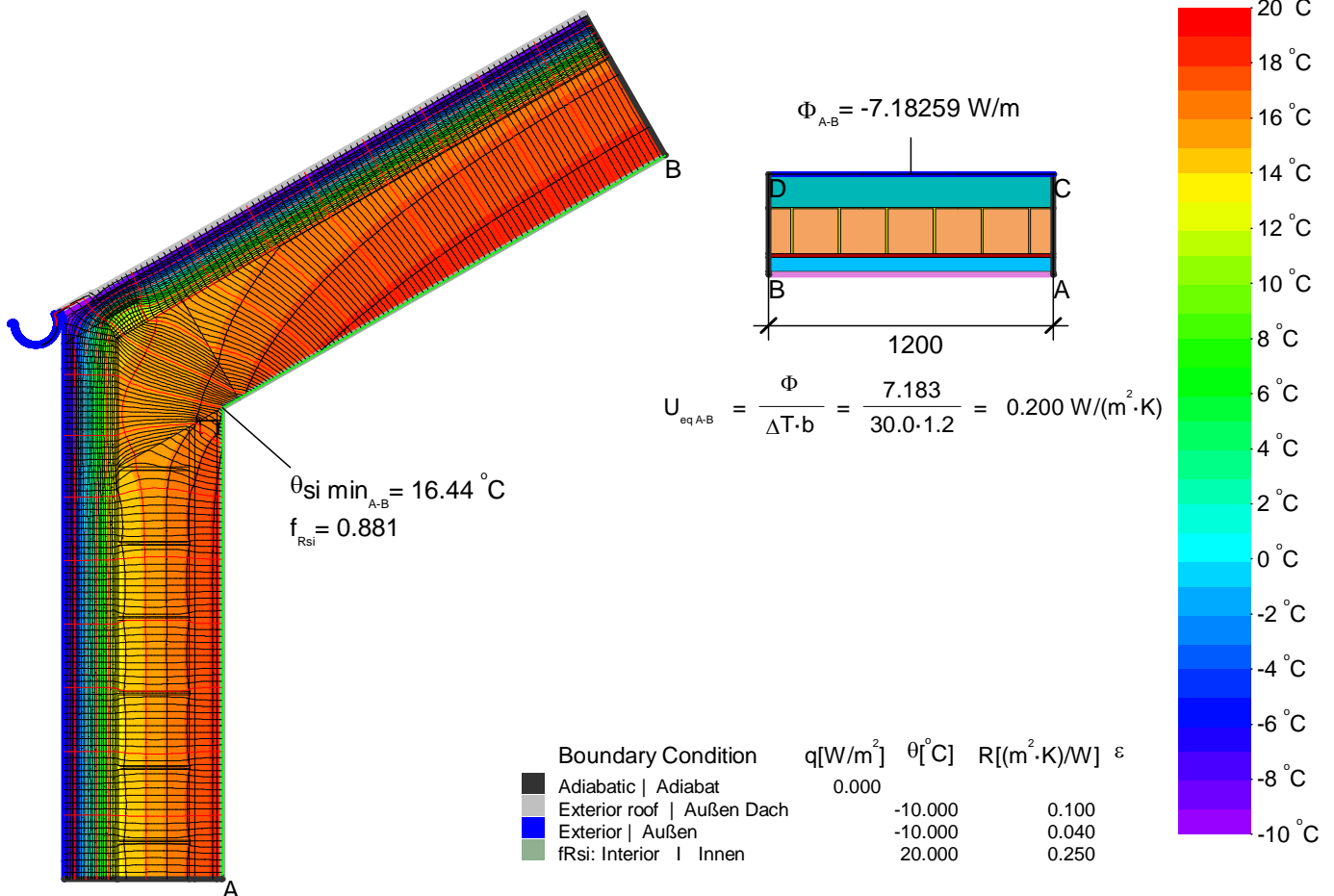


$$\Psi_{A-E-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{18.641}{30.0} - 0.2 \cdot 1.744 - 0.196 \cdot 1.54 = -0.028 \text{ W}/(\text{m} \cdot \text{K})$$





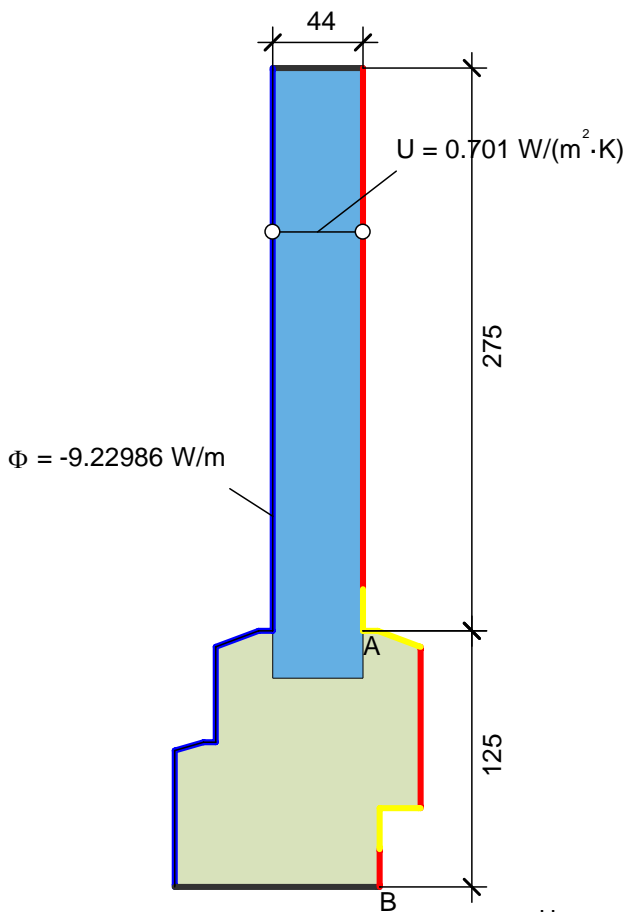
$$\Psi_{A-E,C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{18.52}{30.0} - 0.2 \cdot 1.527 - 0.196 \cdot 1.605 = -0.001 \text{ W}/(\text{m} \cdot \text{K})$$



Windows | Fenster

		1			2			3			1	
		Bottom	Top	Side	Bottom	Top	Side	Bottom	Top	Side	Bottom barrier-free	
frame values Rahmenwerte	Spacer Abstandhalter: Swisspacer Ultimate with PU secondary seal											
	Frame width Rahmenbreite	b_f [mm]	125	125	125							125
	U-value frame Rahmen-U-Wert	U_f [W/(m²K)]	0,92	0,92	0,92							0,92
	Ψ-glass edge Glasrand-Ψ-Wert	Ψ_g [W/(mK)]	0,038	0,038	0,038							0,038
	U-value window Fenster-U-Wert	U_w [W/(m²K)] @ $U_g = 0,52$ W/(m²K)	1,00									
	Passive House efficiency class Passivhaus Effizienzklasse		phC									
	Installation Einbau	$f_{Rsi=0,25m^2K/W}$	0,783	0,802	0,797							0,685
		$\Psi_{install}$ [W/(mK)]	0,031	0,007	0,002							-0,015
$U_{w, installed}$ [W/(m²K)]		1,03										



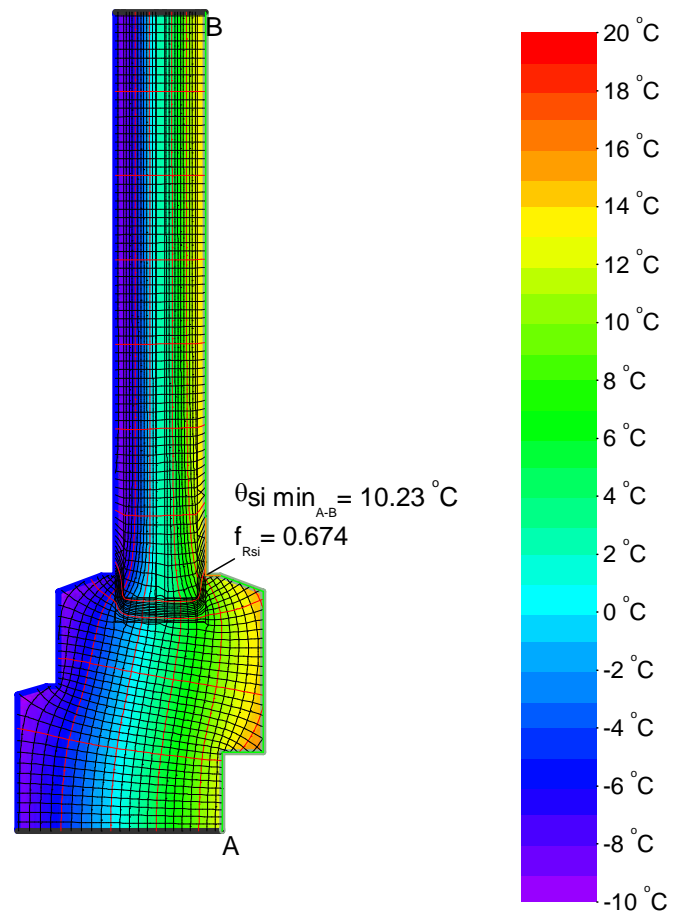
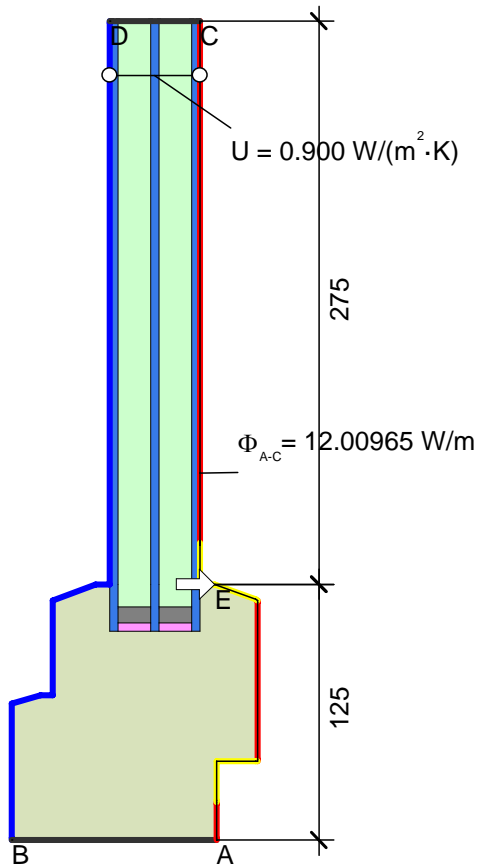


Material	λ [W/(m·K)]	ϵ
Panel Maske	0.035	0.900
Standard frame Standardrahmen	0.113	0.900

Boundary Condition	q [W/m²]	θ [°C]	R [(m²·K)/W]
Adiabatic Adiabat	0.000		
Exterior Außen		-10.000	0.040
Interior, frame, normal		20.000	0.130
Interior, frame, reduced		20.000	0.200

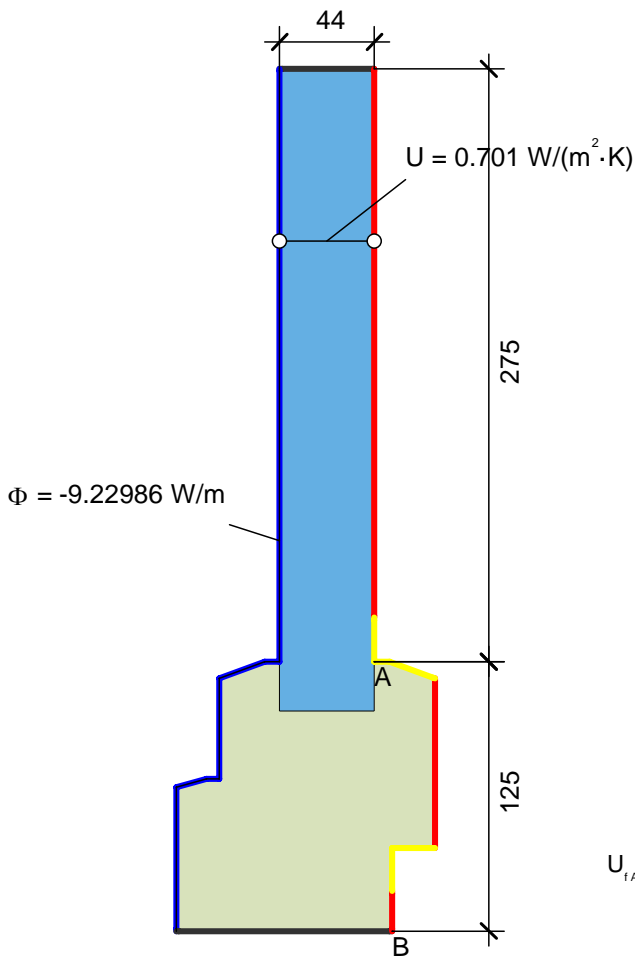
Boundary Condition	q [W/m²]	θ [°C]	R [(m²·K)/W]
Adiabatic Adiabat	0.000		
Exterior Außen		-10.000	0.040
fRsi: Interior Innen		20.000	0.250

$$U_{fAB} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{9.23}{30.0} - 0.701 \cdot 0.275}{0.125} = 0.920 \text{ W}/(\text{m}^2 \cdot \text{K})$$



$$\Psi_{A-E,C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{12.01}{30.0} - 0.92 \cdot 0.125 - 0.9 \cdot 0.275 = 0.038 \text{ W}/(\text{m} \cdot \text{K})$$



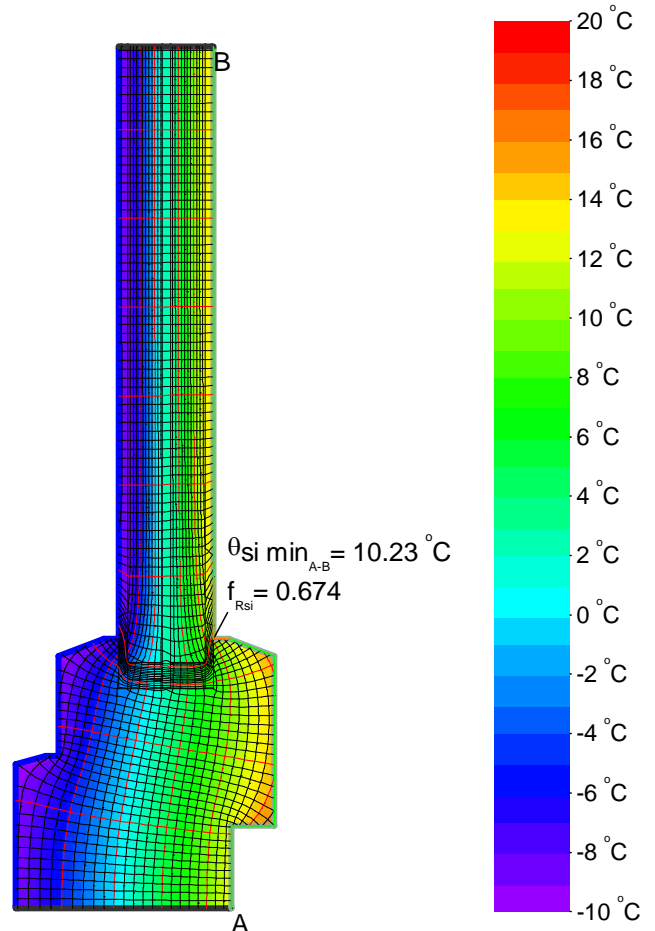
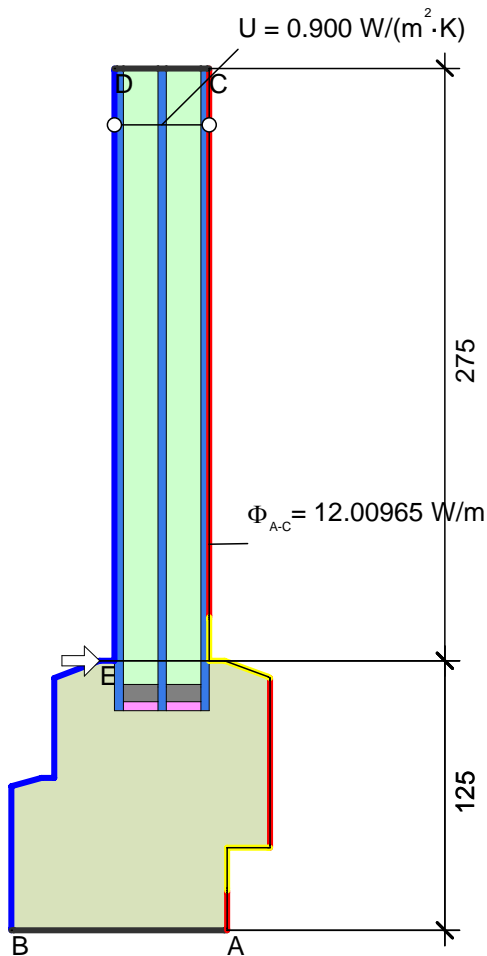


Material	λ [W/(m·K)]	ϵ
Panel Maske	0.035	0.900
Standard frame Standardrahmen	0.113	0.900

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]
Adiabatic Adiabat	0.000		
Exterior Außen	-10.000		0.040
Interior, frame, normal	20.000		0.130
Interior, frame, reduced	20.000		0.200

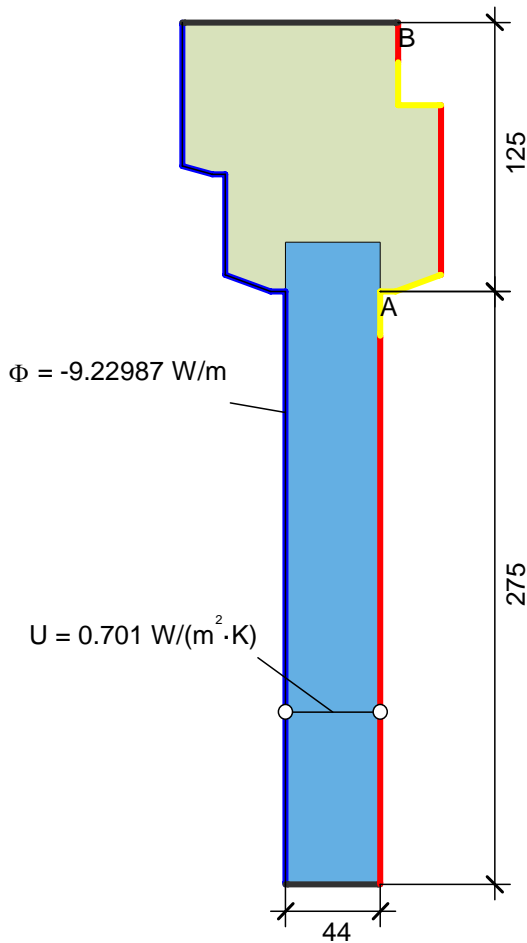
Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]
Adiabatic Adiabat	0.000		
Exterior Außen	-10.000		0.040
fRsi: Interior Innen	20.000		0.250

$$U_{fAB} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{9.23}{30.0} - 0.701 \cdot 0.275}{0.125} = 0.920 \text{ W/(m}^2 \cdot \text{K)}$$



$$\Psi_{A-E-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{12.01}{30.0} - 0.92 \cdot 0.125 - 0.9 \cdot 0.275 = 0.038 \text{ W/(m}^2 \cdot \text{K)}$$



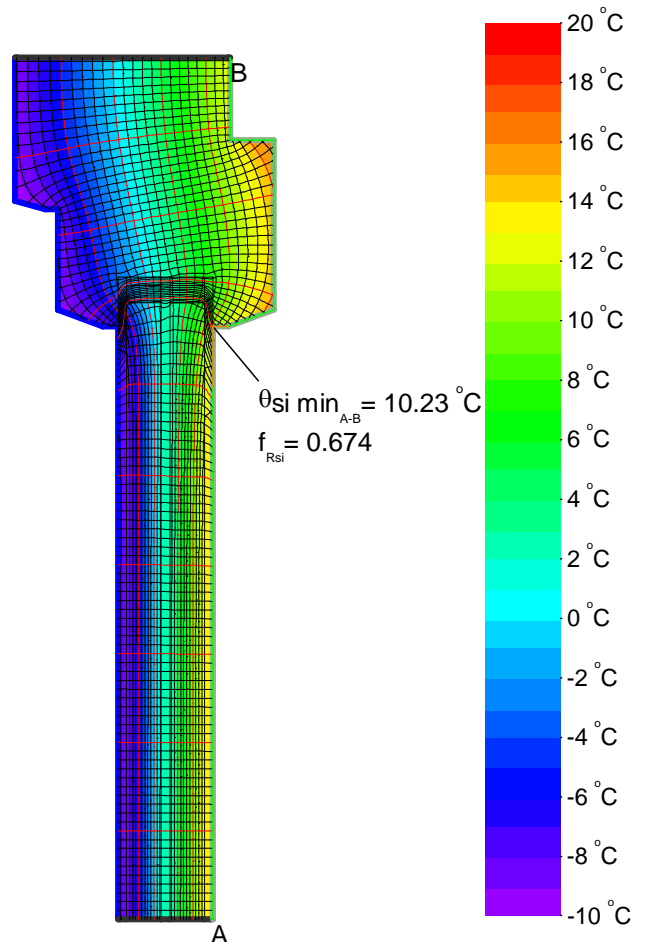
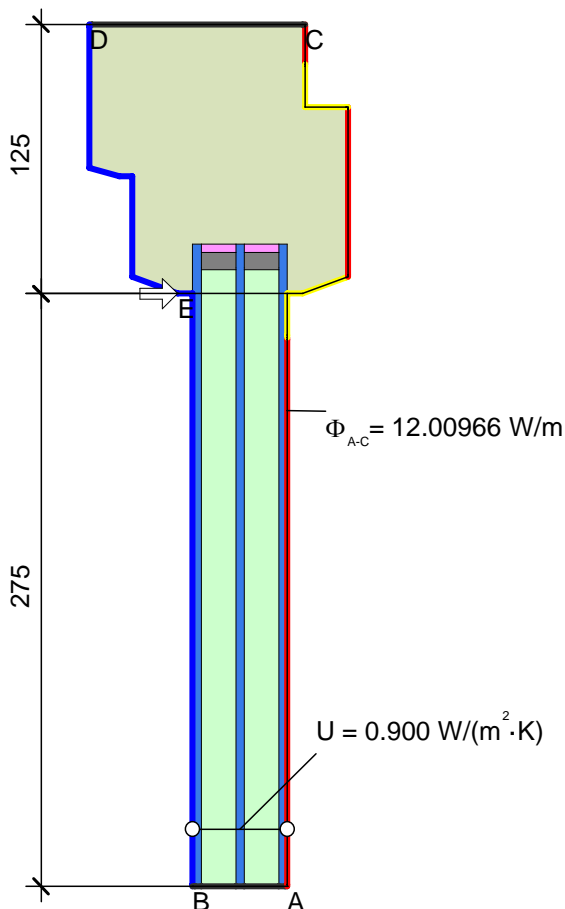


Material	λ [W/(m·K)]	ϵ
Panel I Maske	0.035	0.900
Standard frame Standardrahmen	0.113	0.900

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]
Adiabatic Adiatat	0.000		
Exterior Außen		-10.000	0.040
Interior, frame, normal		20.000	0.130
Interior, frame, reduced		20.000	0.200

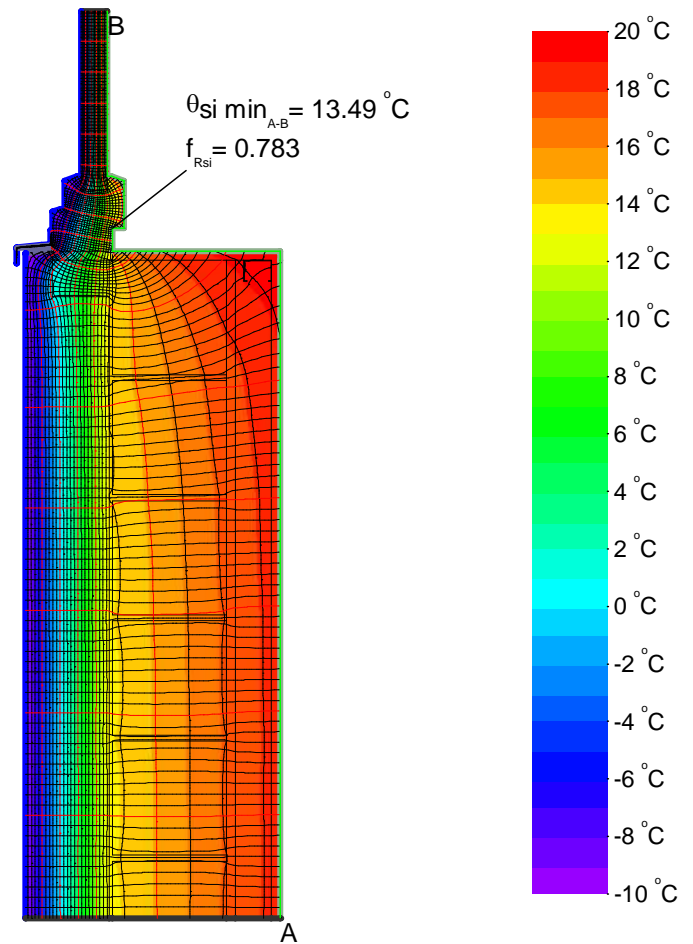
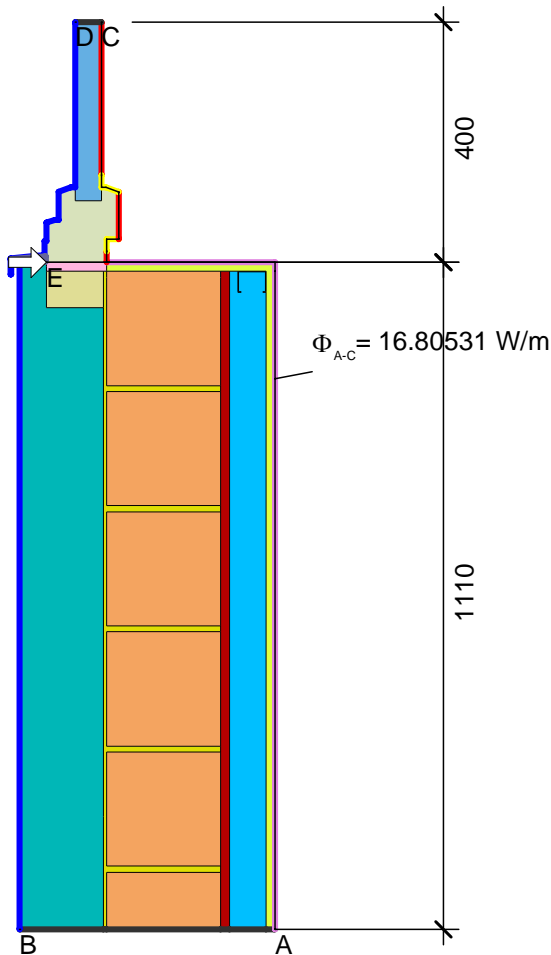
Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]
Adiabatic Adiatat	0.000		
Exterior Außen		-10.000	0.040
fRsi: Interior Innen		20.000	0.250

$$U_{f,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{9.23}{30.0} - 0.701 \cdot 0.275}{0.125} = 0.920 \text{ W}/(\text{m}^2 \cdot \text{K})$$



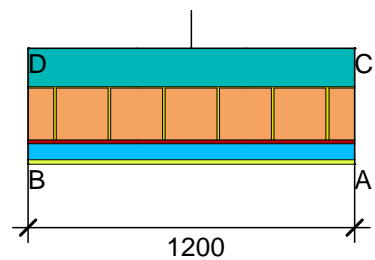
$$\Psi_{A-E-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{12.01}{30.0} - 0.9 \cdot 0.275 - 0.92 \cdot 0.125 = 0.038 \text{ W}/(\text{m}^2 \cdot \text{K})$$





$$\psi_{A-E-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - \frac{\Phi_2}{\Delta T} = \frac{16.805}{30.0} - 0.2 \cdot 1.11 - \frac{9.23}{30.0} = 0.031 \text{ W}/(\text{m} \cdot \text{K})$$

$$\Phi_{A-B} = -7.18259 \text{ W/m}$$

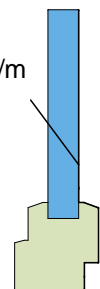


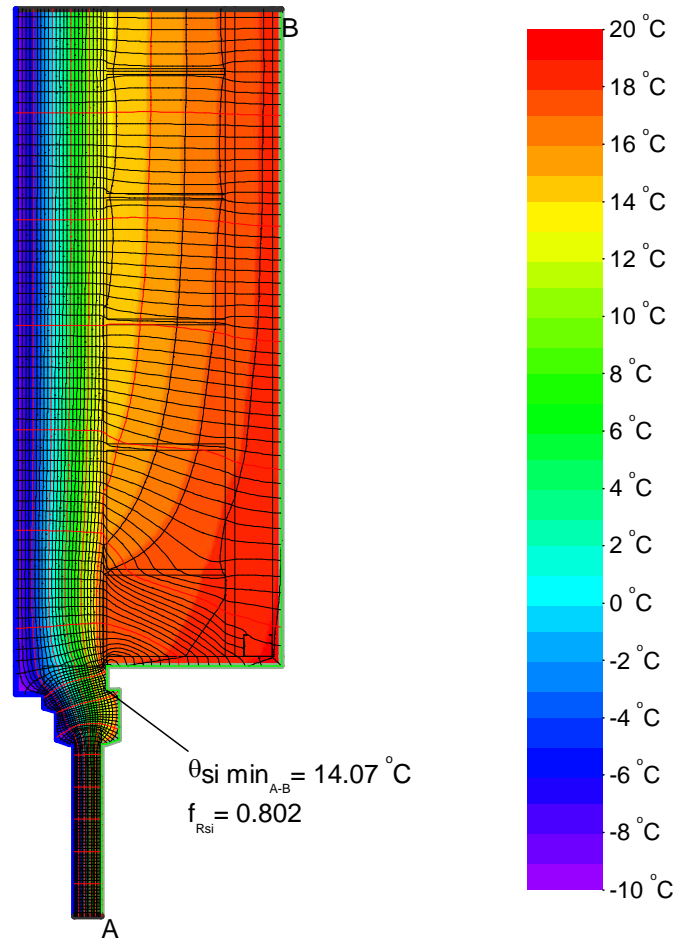
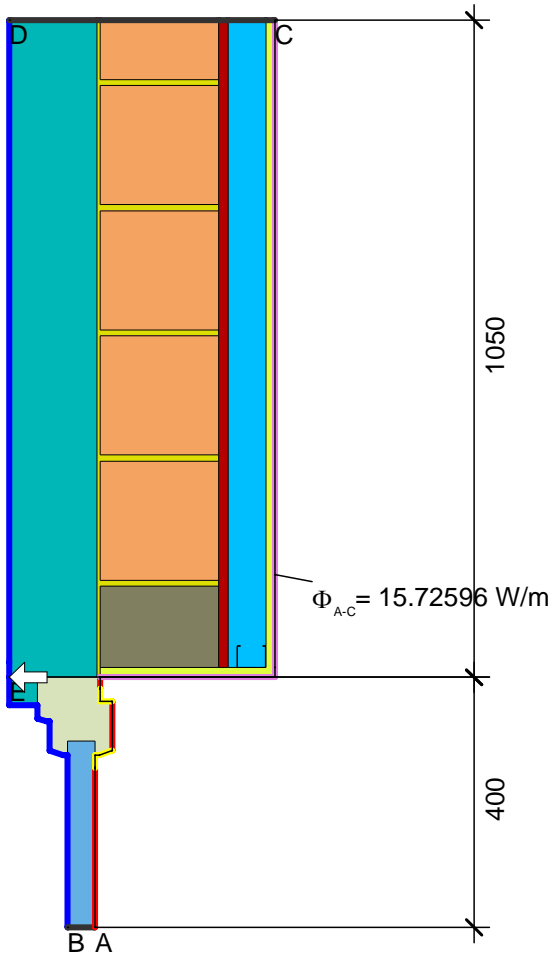
Material	λ [W/(m·K)]	ϵ
Aluminum Aluminium 10456	160.000	0.900
EPDM	0.250	0.900
EPS 035	0.035	0.900
EQ_EW1 Air layer, unvent, horiz, thickness 60 mm + steel stuts	0.361	0.900
Gypsum board Gipskartonplatten 900 kg/m ³ 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Mörtel, Zement, Sand	1.000	0.900
PU in-situ foam PU-Ortschaum 040	0.040	0.900
Panel Maske	0.035	0.900
Softwood, OSB Weichholz, OSB 10456	0.130	0.900
Standard frame Standardrahmen	0.113	0.900
Steel Stahl	50.000	0.900
Thermoclay blocks 19 cm	0.292	0.900

$$U_{\text{eq A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.183}{30.0 \cdot 1.2} = 0.200 \text{ W}/(\text{m}^2 \cdot \text{K})$$

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiat	0.000			
Exterior vent. Außen belüftet		-10.000	0.130	
Exterior Außen		-10.000	0.040	
Interior Innen		20.000	0.130	
Interior, frame, normal		20.000	0.130	
Interior, frame, reduced		20.000	0.200	

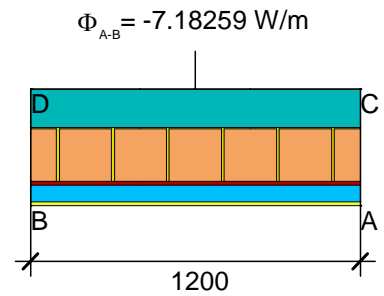
$$\Phi = 9.2299 \text{ W/m}$$





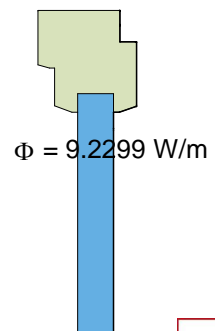
$$\psi_{A-E-C} = \frac{\Phi}{\Delta T} - \frac{\Phi_i}{\Delta T} - U_2 \cdot b_2 = \frac{15.726}{30.0} - \frac{9.23}{30.0} - 0.2 \cdot 1.05 = 0.007 \text{ W/(m}\cdot\text{K)}$$

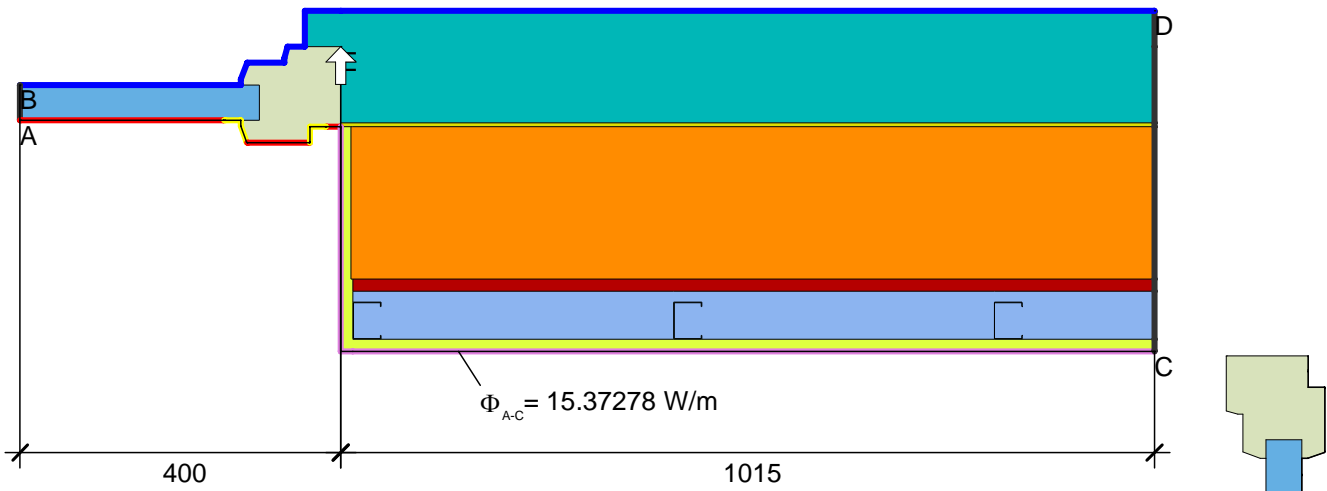
Material	λ [W/(m·K)]	ϵ
Concrete, 1% Steel Beton, 1% Stahl 10456	2.300	0.900
EPS 035	0.035	0.900
EQ_EW1 Air layer, unvent, horiz, thickness 60 mm + steel studs	0.361	0.900
Gypsum board Gipskartonplatten 900 kg/m ³ 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Mörtel, Zement, Sand	1.000	0.900
Panel Maske	0.035	0.900
Standard frame Standardrahmen	0.113	0.900
Steel Stahl	50.000	0.900
Thermoclay blocks 19 cm	0.292	0.900



$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.183}{30.0 \cdot 1.2} = 0.200 \text{ W/(m}^2\cdot\text{K)}$$

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiatat	0.000			
Exterior Außen		-10.000	0.040	
Interior Innen		20.000	0.130	
Interior, frame, normal		20.000	0.130	
Interior, frame, reduced		20.000	0.200	



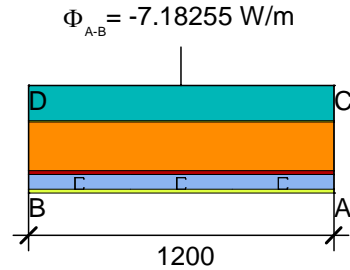


$$\Psi_{A-E-C} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{15.373}{30.0} - \frac{9.23}{30.0} - 0.2 \cdot 1.015 = 0.002 \text{ W}/(\text{m} \cdot \text{K})$$

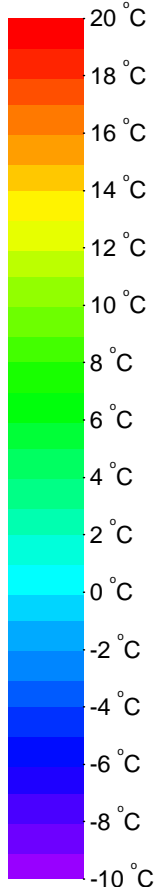
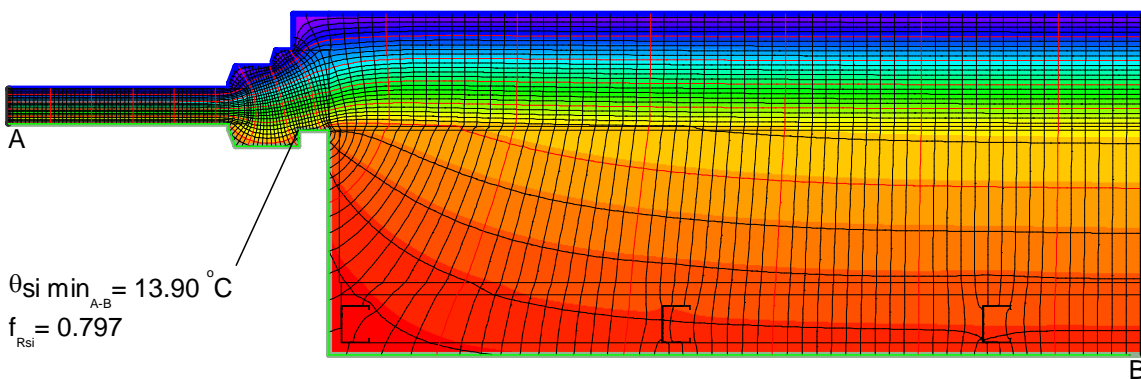
$$\Phi = 9.2299 \text{ W/m}$$

Material	λ [W/(m·K)]	ϵ
EPS 035	0.035	0.900
EQ_EW1 Thermoclay blocks 19 cm + mortar joints	0.325	0.900
Gypsum board Gipskartonplatten 900 kg/m ³ 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Luftschicht, ruhend, horizontal, Dicke: 60 mm	0.333	0.900
Mörtel, Zement, Sand	1.000	0.900
Panel Maske	0.035	0.900
Standard frame Standardrahmen	0.113	0.900
Steel Stahl	50.000	0.900

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiat	0.000			
Exterior Außen		-10.000	0.040	
Interior Innen		20.000	0.130	
Interior, frame, normal		20.000	0.130	
Interior, frame, reduced		20.000	0.200	



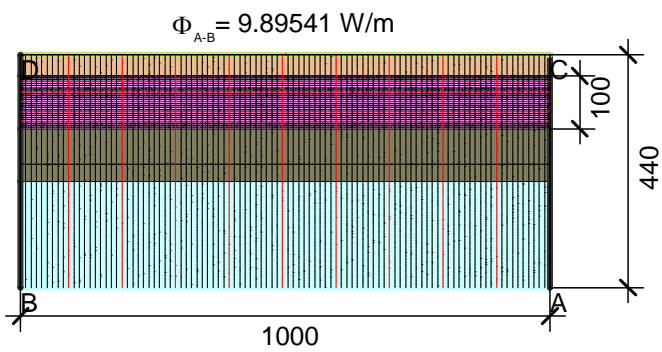
$$U_{eq \text{ A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.183}{30.0 \cdot 1.2} = 0.200 \text{ W}/(\text{m}^2 \cdot \text{K})$$



Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Exterior Außen		-10.000	0.040	
fRsi: Interior Innen		20.000	0.250	
Adiabatic Adiat	0.000			



Ground | Boden

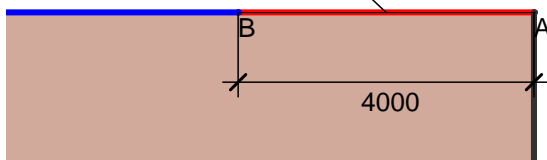


$$U_{\text{eq A-B}} = \frac{\Phi}{\Delta T \cdot b} = \frac{9.895}{30.0 \cdot 1.0} = 0.330 \text{ W/(m}^2 \cdot \text{K)}$$

Material	$\lambda[\text{W}/(\text{m} \cdot \text{K})]$	ϵ
Cement screed Zement-Estrich 4108	1.400	0.900
Concrete, 1% Steel Beton, 1% Stahl 10456	2.300	0.900
Eq_ventilated crawl space	2.300	0.900
XPS 037	0.037	0.900

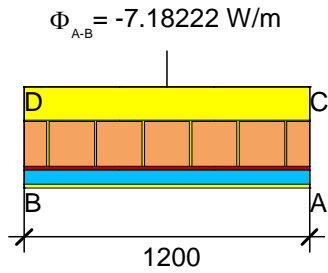
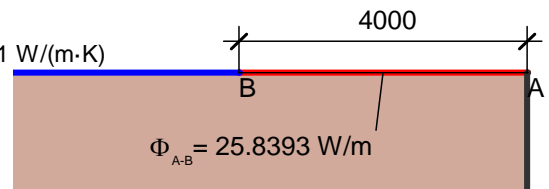
Boundary Condition	$q[\text{W}/\text{m}^2]$	$\theta[^\circ\text{C}]$	$R[(\text{m}^2 \cdot \text{K})/\text{W}]$	ϵ
Adiabatic Adiat	0.000			
Gorund Erdreich		-10.000		
Int. flux down Innen abwärts		20.000		0.170

$\Phi_{A-B} = 25.8393 \text{ W/m}$



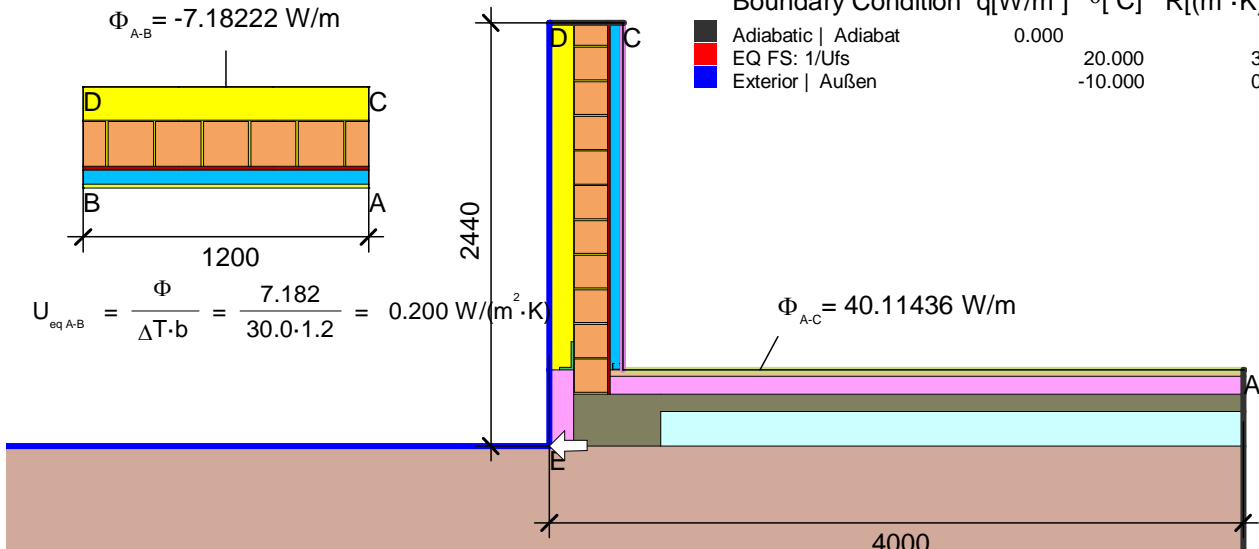
Boundary Condition	$q[\text{W}/\text{m}^2]$	$\theta[^\circ\text{C}]$	$R[(\text{m}^2 \cdot \text{K})/\text{W}]$	ϵ
Adiabatic Adiat	0.000			
EQ FS: 1/Ufs		20.000		3.030
Exterior Außen		-10.000		0.040

$$\psi_{A-E-C} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{40.114}{30.0} - \frac{25.839}{30.0} - 0.2 \cdot 2.44 = -0.011 \text{ W/(m}\cdot\text{K)}$$



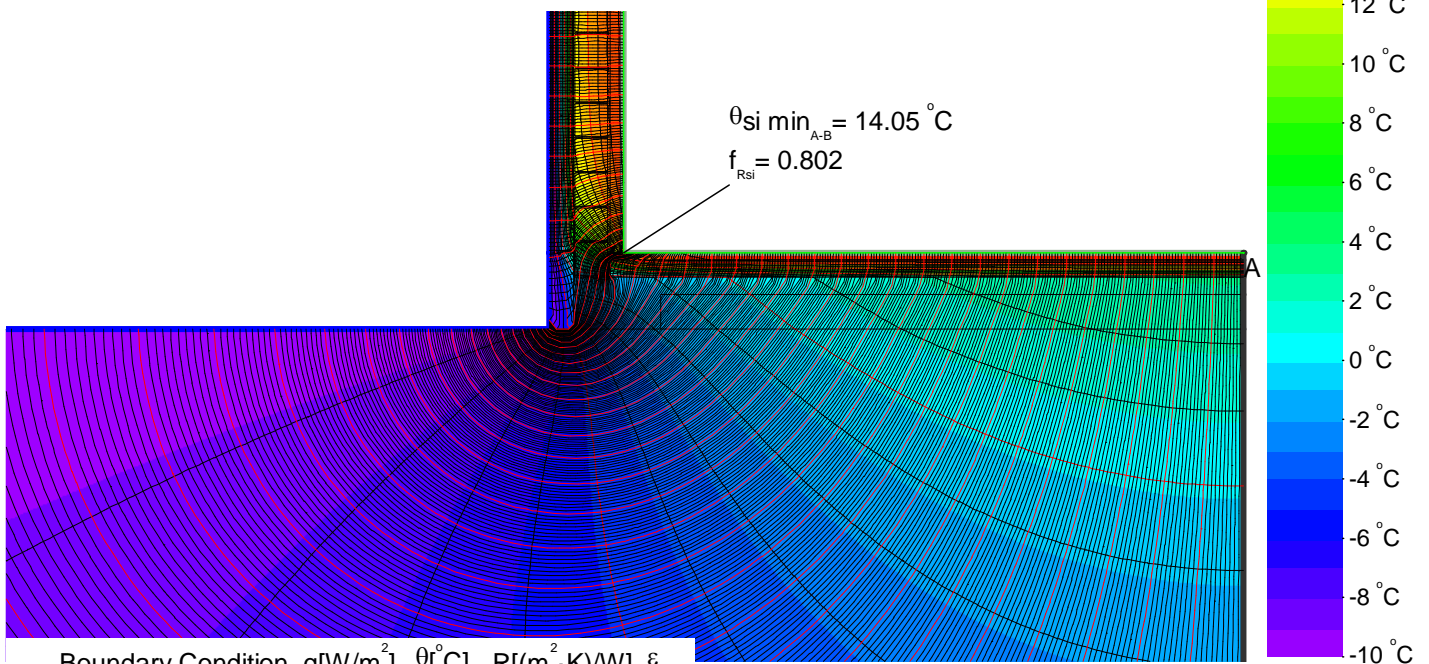
$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.182}{30.0 \cdot 1.2} = 0.200 \text{ W/(m}^2\cdot\text{K)}$$

Boundary Condition	$q[\text{W/m}^2]$	$\theta[^\circ\text{C}]$	$R[(\text{m}^2\cdot\text{K})/\text{W}]$	ϵ
Adiabatic Adiat	0.000			
EQ FS: 1/Ufs		20.000	3.030	
Exterior Außen		-10.000	0.040	



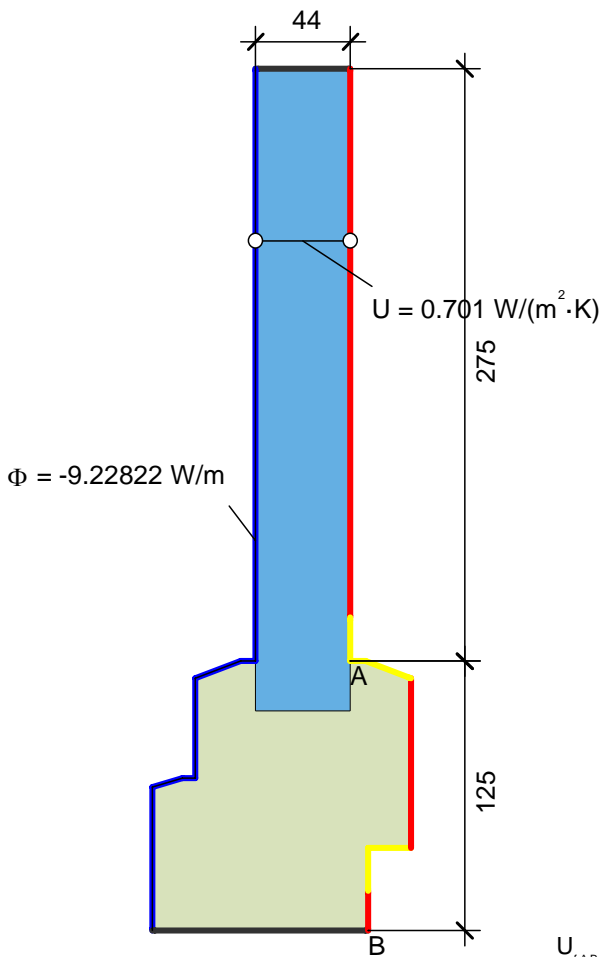
Material	$\lambda[\text{W}/(\text{m}\cdot\text{K})]$	ϵ
Air layer, unvent, horiz, thickness 60 mm + steel studs	0.361	0.900
Cement screed Zement-Estrich 4108	1.400	0.900
Concrete, 1% Steel Beton, 1% Stahl 10456	2.300	0.900
EPS 035	0.035	0.900
Eq_ventilated crawl space	2.300	0.900
Ground Erdreich	2.000	0.900
Gypsum board Gipskartonplatten 900 kg/m3 10456	0.250	0.900
Interior plaster Gipsputz 10456	0.570	0.900
Mörtel, Zement, Sand	1.000	0.900
PVC-U hart(Polyvinylchlorid)	0.170	0.900
Steel Stahl	50.000	0.900
Thermoclay blocks 19 cm	0.292	0.900
XPS 037	0.037	0.900

Boundary Condition	$q[\text{W/m}^2]$	$\theta[^\circ\text{C}]$	$R[(\text{m}^2\cdot\text{K})/\text{W}]$	ϵ
Adiabatic Adiat	0.000			
Exterior Außen		-10.000	0.040	
Int. flux down Innen abwärts		20.000	0.170	
Interior Innen		20.000	0.130	



Boundary Condition	$q[\text{W/m}^2]$	$\theta[^\circ\text{C}]$	$R[(\text{m}^2\cdot\text{K})/\text{W}]$	ϵ
Exterior Außen		-10.000	0.040	
fRsi: Interior Innen		20.000	0.250	
Adiabatic Adiat	0.000			



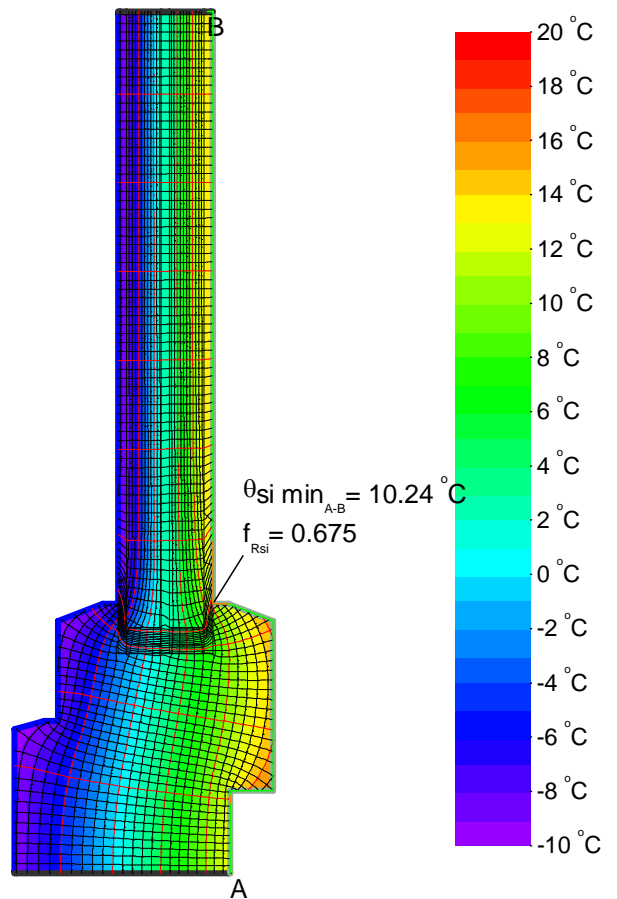
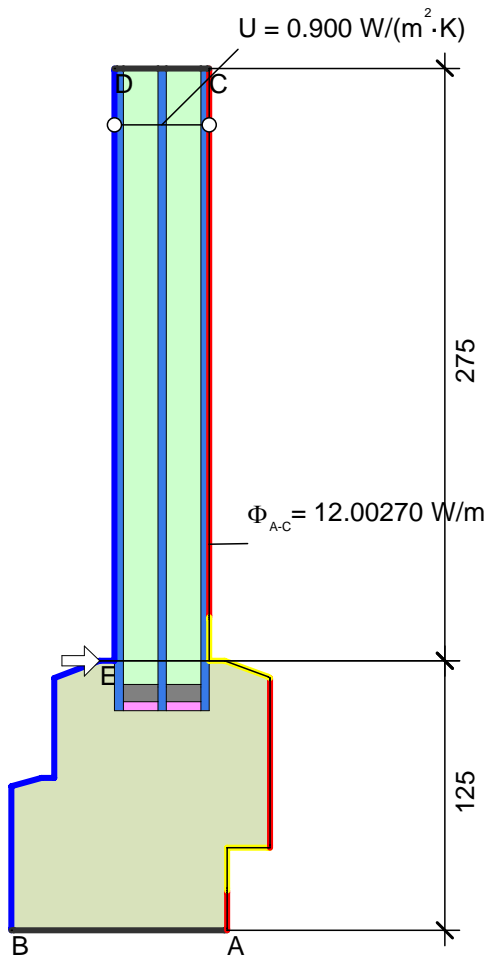


Material	λ [W/(m·K)]	ε
Panel Maske	0.035	0.900
Standard frame Standardrahmen	0.113	0.900

Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ε
Adiabatic Adiat	0.000			
Exterior Außen		-10.000	0.040	
Interior, frame, normal		20.000	0.130	
Interior, frame, reduced		20.000	0.200	

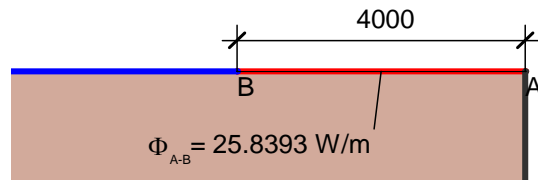
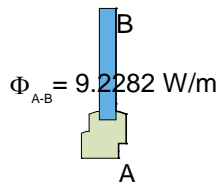
Boundary Condition	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ε
Adiabatic Adiat	0.000			
Exterior Außen		-10.000	0.040	
fRsi: Interior Innen		20.000	0.250	

$$U_{TAB} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_i} = \frac{\frac{9.228}{30.0} - 0.701 \cdot 0.275}{0.125} = 0.919 \text{ W}/(\text{m}^2 \cdot \text{K})$$



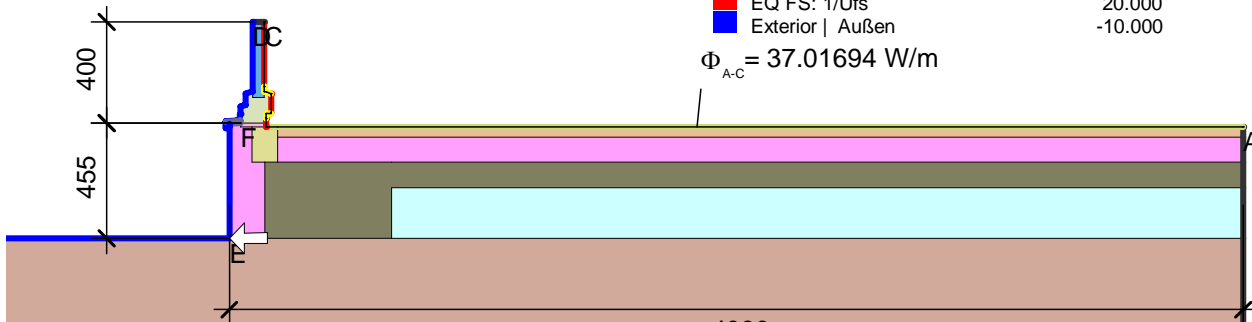
$$\Psi_{A-E-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{12.003}{30.0} - 0.919 \cdot 0.125 - 0.9 \cdot 0.275 = 0.038 \text{ W}/(\text{m} \cdot \text{K})$$





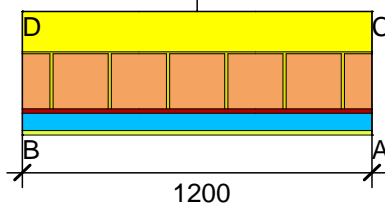
Boundary Condition	q[W/m ²]	θ[C]	R[(m ² ·K)/W]	ε
Adiabatic Adiatat	0.000			
EQ FS: 1/Ufs		20.000		3.030
Exterior Außen		-10.000		0.040

Φ_{A-C} = 37.01694 W/m



Material	λ[W/(m·K)]	ε
Aluminum Aluminium 10456	160.000	0.900
Cement screed Zement-Estrich 4108	1.400	0.900
Concrete, 1% Steel Beton, 1% Stahl 10456	2.300	0.900
EPDM	0.250	0.900
Eq_ventilated crawl space	2.300	0.900
Ground Erdreich	2.000	0.900
PU in-situ foam PU-Ortschaum 040	0.040	0.900
Panel Maske	0.035	0.900
Softwood, OSB Weichholz, OSB 10456	0.130	0.900
Standard frame Standardrahmen	0.113	0.900
XPS 038	0.038	0.900

Boundary Condition	q[W/m ²]	θ[C]	R[(m ² ·K)/W]	ε
Adiabatic Adiatat	0.000			
Exterior vent. Außen belüftet		-10.000	0.130	
Exterior Außen		-10.000	0.040	
Int. flux down Innen abwärts		20.000	0.170	
Interior, frame, normal		20.000	0.130	
Interior, frame, reduced		20.000	0.200	

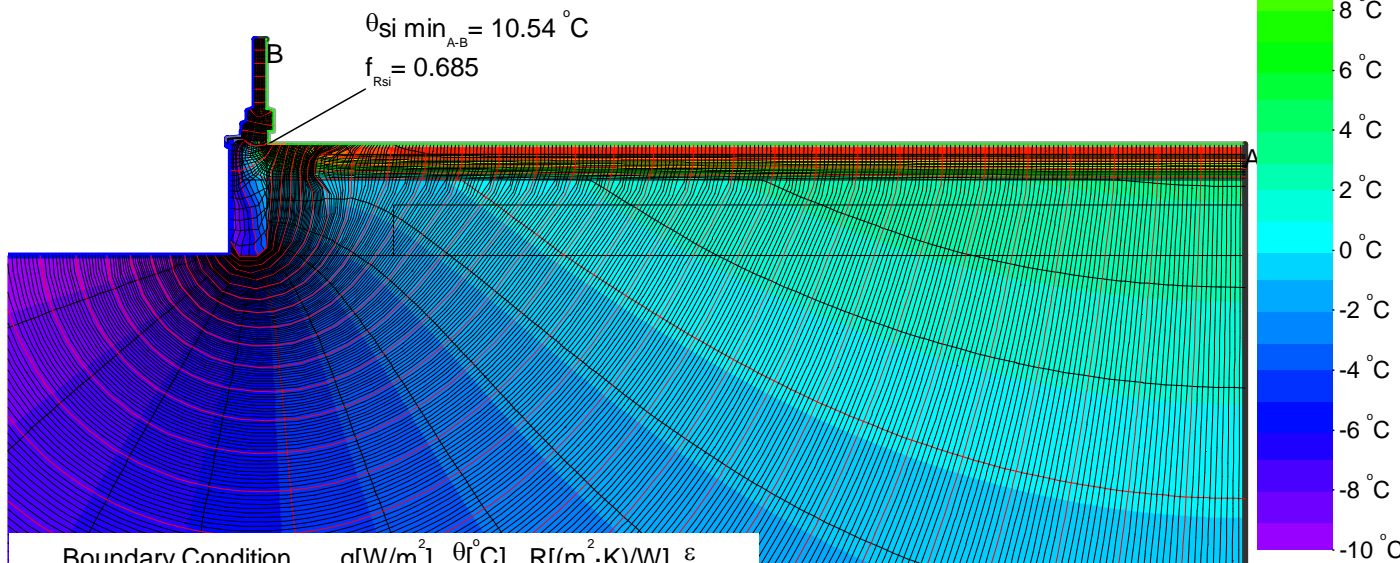


Φ_{A-B} = -7.18222 W/m

$$U_{eq A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{7.182}{30.0 \cdot 1.2} = 0.200 \text{ W}/(\text{m}^2 \cdot \text{K})$$

$$\Psi_{A-E,C} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 - \frac{\Phi_3}{\Delta T} = \frac{37.017}{30.0} - \frac{25.839}{30.0} - 0.2 \cdot 0.455 - \frac{9.228}{30.0} = -0.026 \text{ W}/(\text{m} \cdot \text{K})$$

$$\Psi_{WITH} = \Psi_{FSEW+WITH} - \Psi_{FSEW01} = -0.026 - (-0.011) = 0.015 \text{ W}/\text{mK}$$



Boundary Condition	q[W/m ²]	θ[C]	R[(m ² ·K)/W]	ε
Adiabatic Adiatat	0.000			
Exterior vent. Außen belüftet		-10.000	0.130	
Exterior Außen		-10.000	0.040	
fRsi: Interior Innen		20.000	0.250	





Appendix 3: Manufacturers drawings | Zeichnungen des Herstellers

Passive House Institute



Passive House Institute

Exterior wall – exterior corner
Muro exterior – esquina exterior

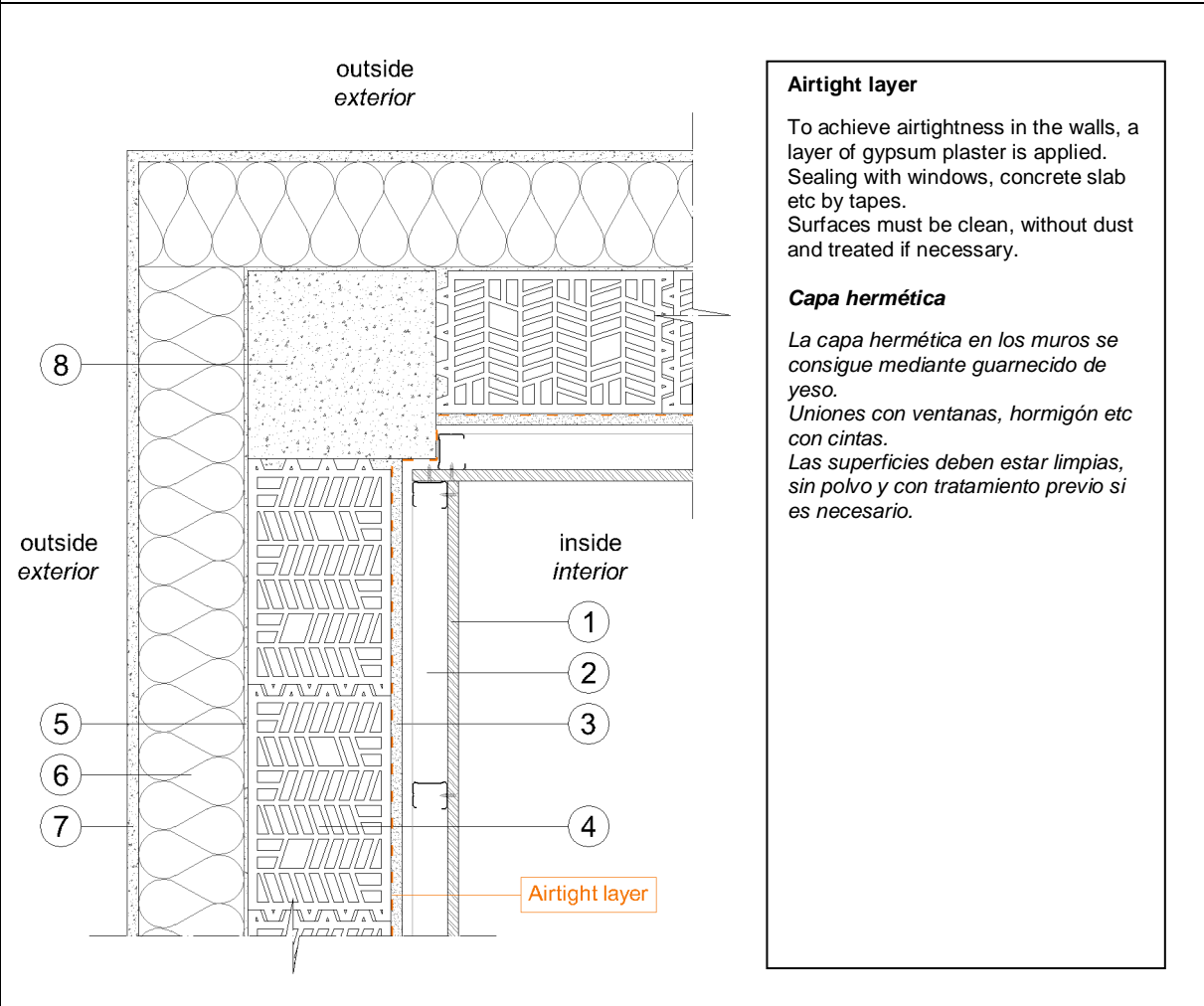
01 EW1_EW1_ec1

01 EWec



**CONSORCIO
TERMOARCILLA**

Design drawing – Horizontal cross-section / Detalle constructivo – Sección horizontal



From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall							
1	Gypsum board / <i>Placa yeso laminado</i>	0.250	1.5				
2	Air layer + steel studs / <i>Cámara de aire + perfiles de acero galvanizado</i>	0.361	6				
3	Gypsum plaster / <i>Guarnecido de yeso</i>	0.570	1.5				
4	Termoarcilla 19 / <i>Termoarcilla 19</i>	0.325	19				
5	Cement mortar / <i>Mortero de cemento</i>	1.000	0.5				
6	Thermal insulation EPS / <i>Aislamiento térmico EPS</i>	0.035	14				
7	Exterior plaster / <i>Mortero exterior</i>	1.000	1.5				
Other materials (materials not in the standard components)							
				8	Concrete column / <i>Pilar de hormigón</i>	2.300	-

Exterior wall – interior corner
Muro exterior – esquina interior

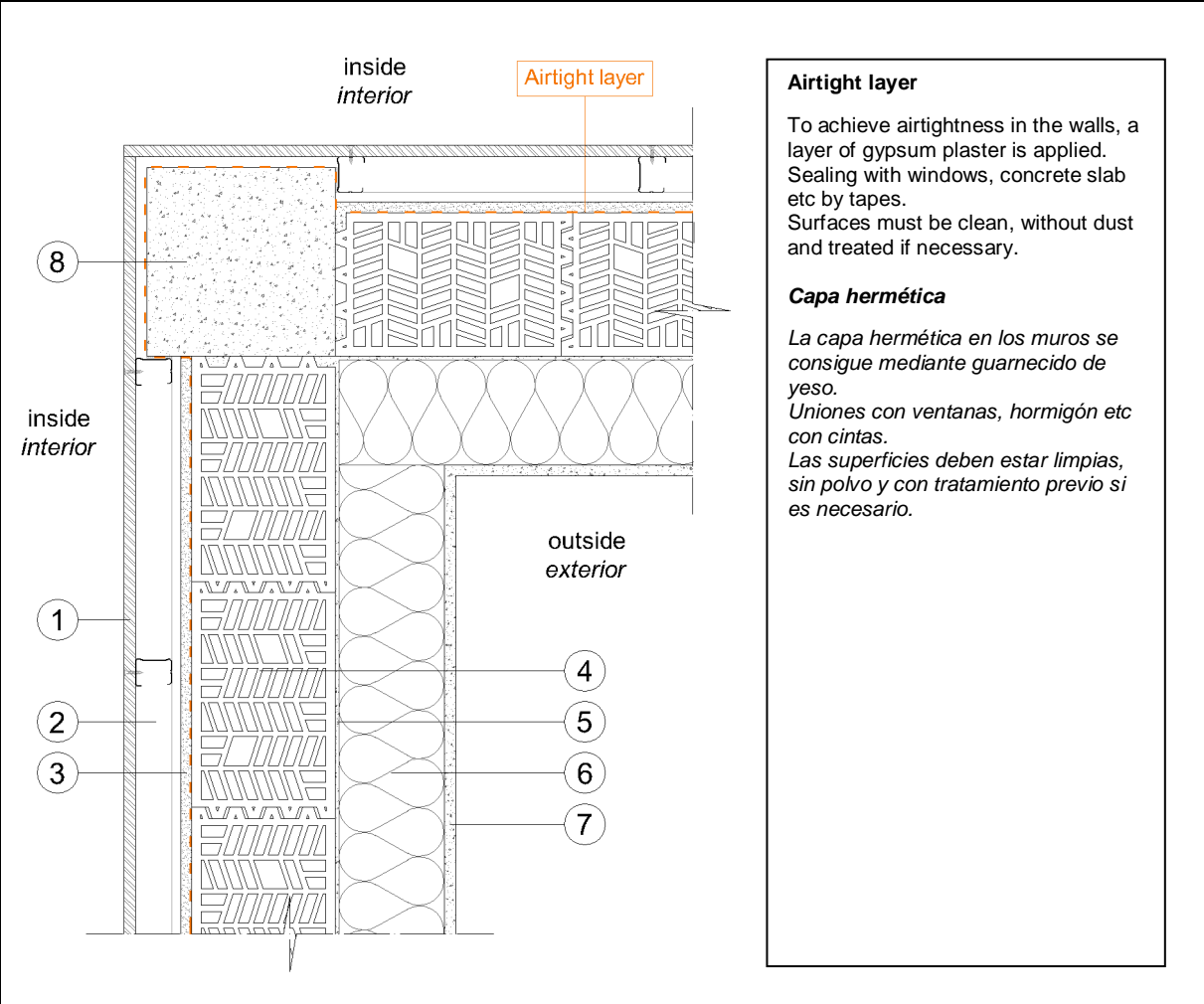
02 EW1_EW1_ic1

02 EWic



**CONSORCIO
TERMOARCILLA**

Design drawing – Horizontal cross-section / Detalle constructivo – Sección horizontal



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall							
1	Gypsum board / Placa yeso laminado	0.250	1.5				
2	Air layer + steel studs / Cámara de aire + perfiles de acero galvanizado	0.361	6				
3	Gypsum plaster / Guarnecido de yeso	0.570	1.5				
4	Termoarcilla 19 / Termoarcilla 19	0.325	19				
5	Cement mortar / Mortero de cemento	1.000	0.5				
6	Thermal insulation EPS / Aislamiento térmico EPS	0.035	14				
7	Exterior plaster / Mortero exterior	1.000	1.5				
Other materials (materials not in the standard components)							
				8	Concrete column / Pilar de hormigón	2.300	-

Ceiling connection
Muro exterior – forjado intermedio

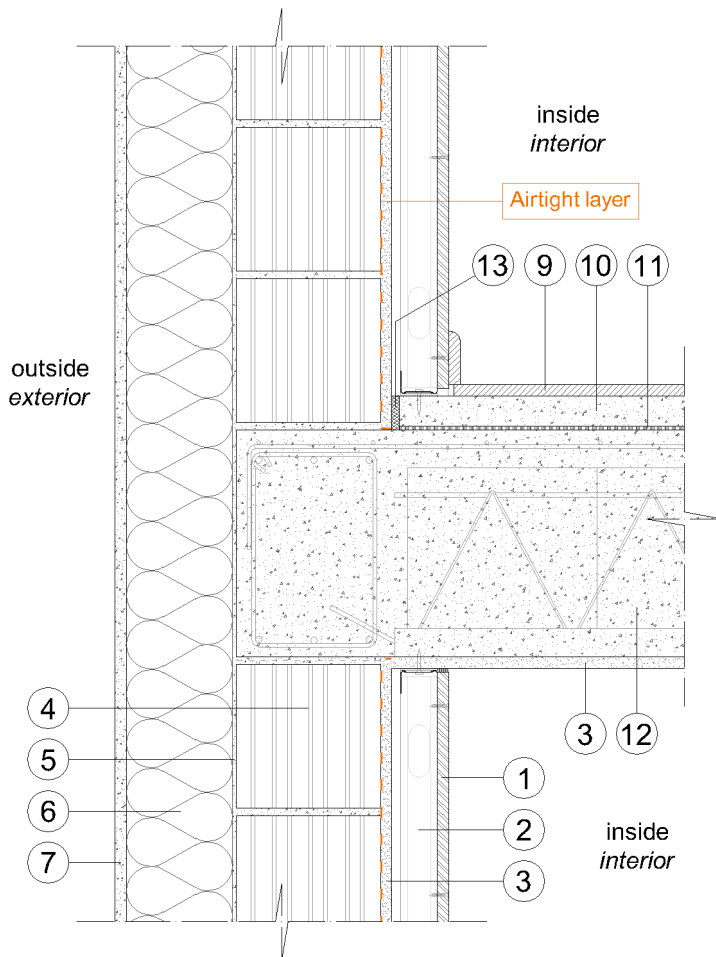
04 EW1_EW1_CE1

04 EWCE



**CONSORCIO
TERMOARCILLA**

Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall				Standard component : Ceiling			
1	Gypsum board / Placa yeso laminado	0.250	1.5	9	Ceramic finishing / Baldosa cerámica	-	-
2	Air layer + steel studs / Cámara de aire + perfiles de acero galvanizado	0.361	6	10	Cement mortar / Mortero de cemento	-	-
3	Gypsum plaster / Guarnecido de yeso	0.570	1.5	11	Anti-impact sheet / Lámina anti-impacto	-	-
4	Termoarcilla 19 / Termoarcilla 19	0.325	19	12	Beam and clay block floor slab / Forjado de bovedilla cerámica	0.938	30
5	Cement mortar / Mortero de cemento	1.000	0.5	3	Gypsum plaster / Guarnecido de yeso	0.570	1.5
6	Thermal insulation EPS / Aislamiento térmico EPS	0.035	14				
7	Exterior plaster / Mortero exterior	1.000	1.5				
Other materials (materials not in the standard components)							
				13	Joint / Junta	-	-

Parapet

Muro exterior – cubierta plana

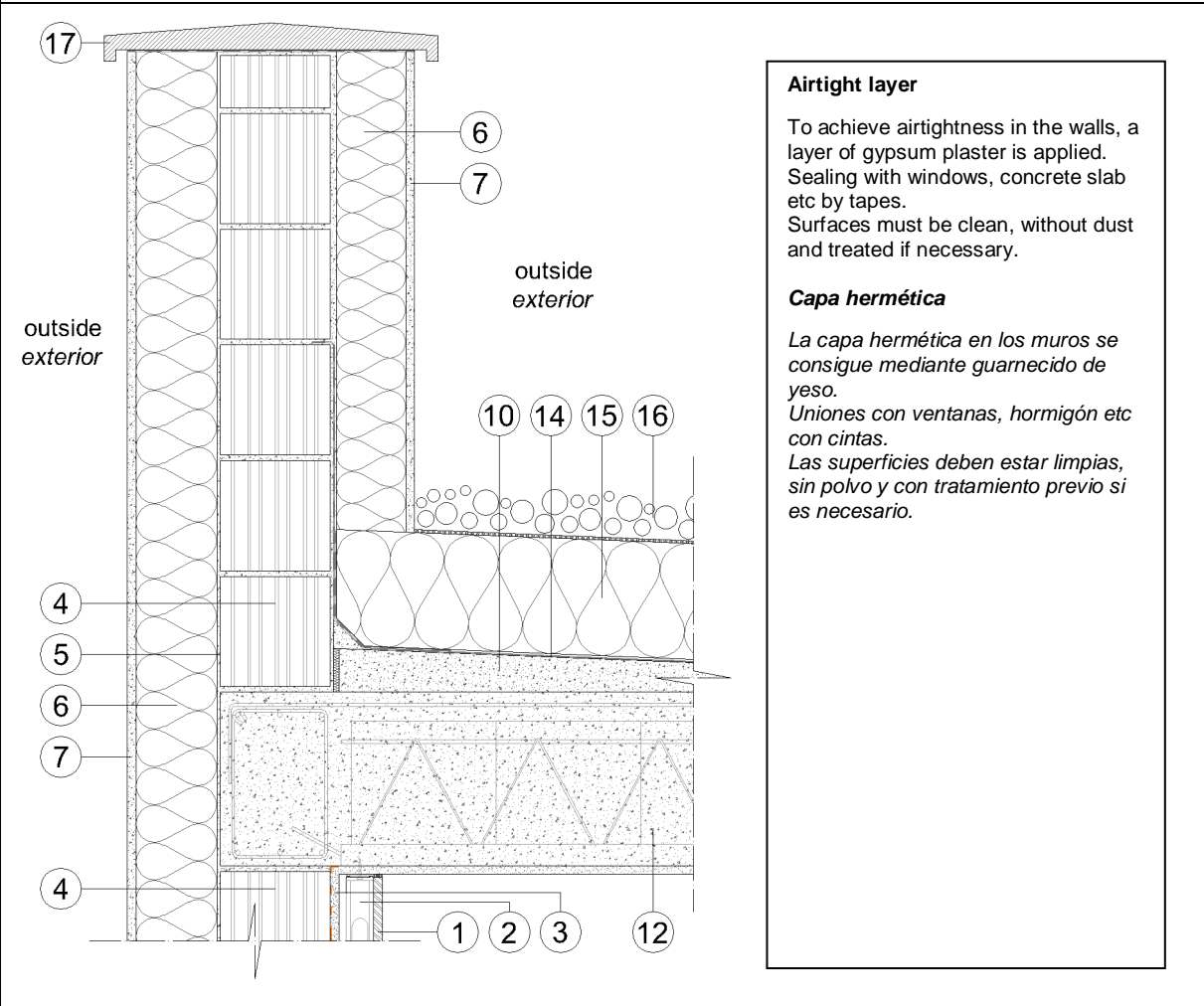
05 EW1_RO1_pp1

05 EWRO



**CONSORCIO
TERMOARCILLA**

Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall				Standard component : Flat roof			
1	Gypsum board / <i>Placa yeso laminado</i>	0.250	1.5	3	Gypsum plaster / <i>Guarnecido de yeso</i>	0.570	1.5
2	Air layer + steel studs / <i>Cámara de aire + perfiles de acero galvanizado</i>	0.361	6	12	Beam and clay block floor slab / <i>Forjado de bovedilla cerámica</i>	0.938	30
3	Gypsum plaster / <i>Guarnecido de yeso</i>	0.570	1.5	10	Cement screed / <i>Mortero de cemento</i>	-	-
4	Termoarcilla 19 / <i>Termoarcilla 19</i>	0.325	19	14	Waterproofing / <i>Impermeabilización</i>	-	-
5	Cement mortar / <i>Mortero de cemento</i>	1.000	0.5	15	Thermal insulation XPS / <i>Aislamiento térmico XPS</i>	0.037	14
6	Thermal insulation EPS / <i>Aislamiento térmico EPS</i>	0.035	14	16	Gravel / <i>Grava</i>	-	-
7	Exterior plaster / <i>Mortero exterior</i>	1.000	1.5				
Other materials (materials not in the standard components)							
				17	Coping stone / <i>Albardilla</i>	1.000	-

Eaves

Muro exterior – cubierta inclinada

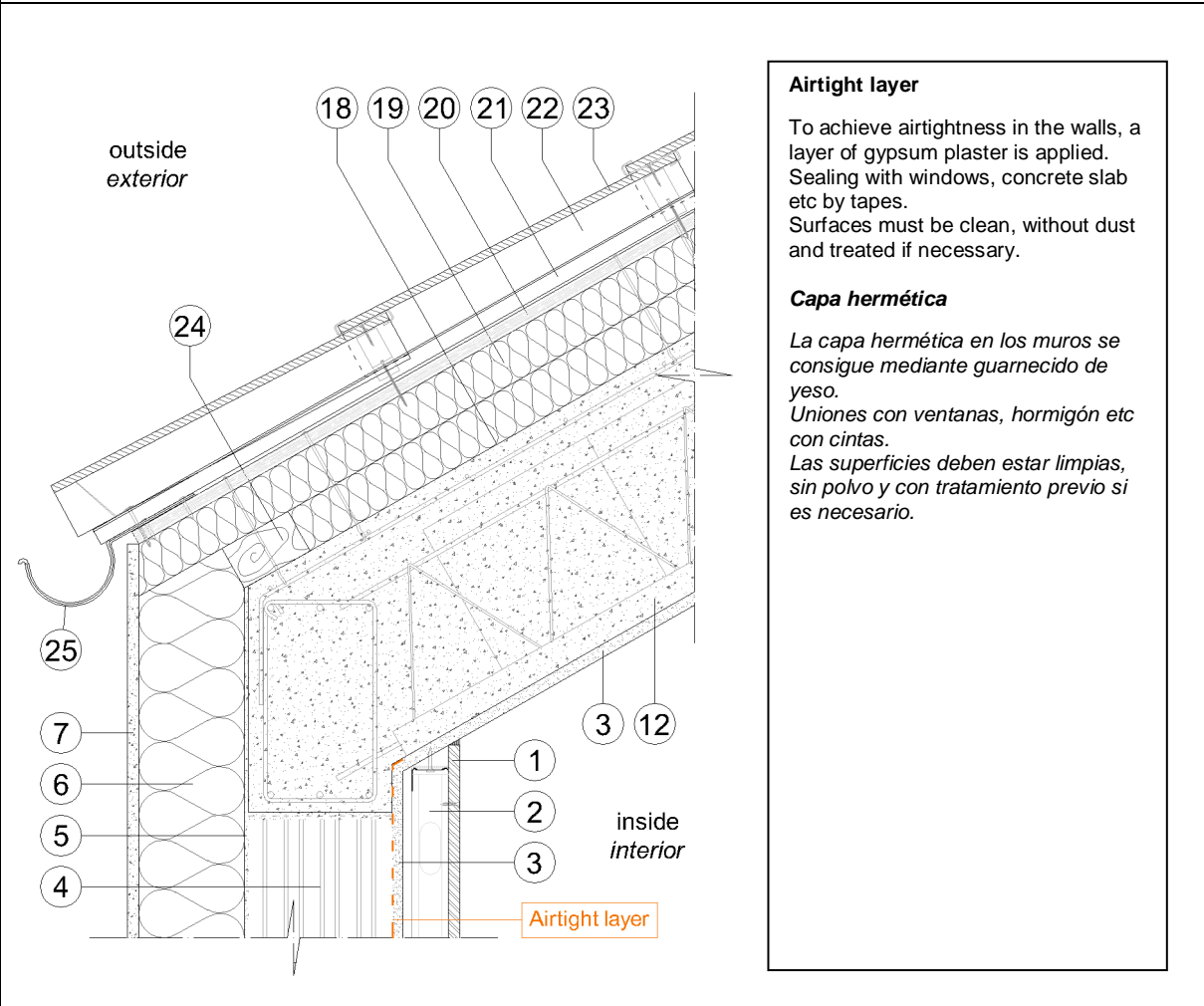
06 EW1_RO2_ea1

06 EWRO



CONSORCIO
TERMOARCILLA

Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

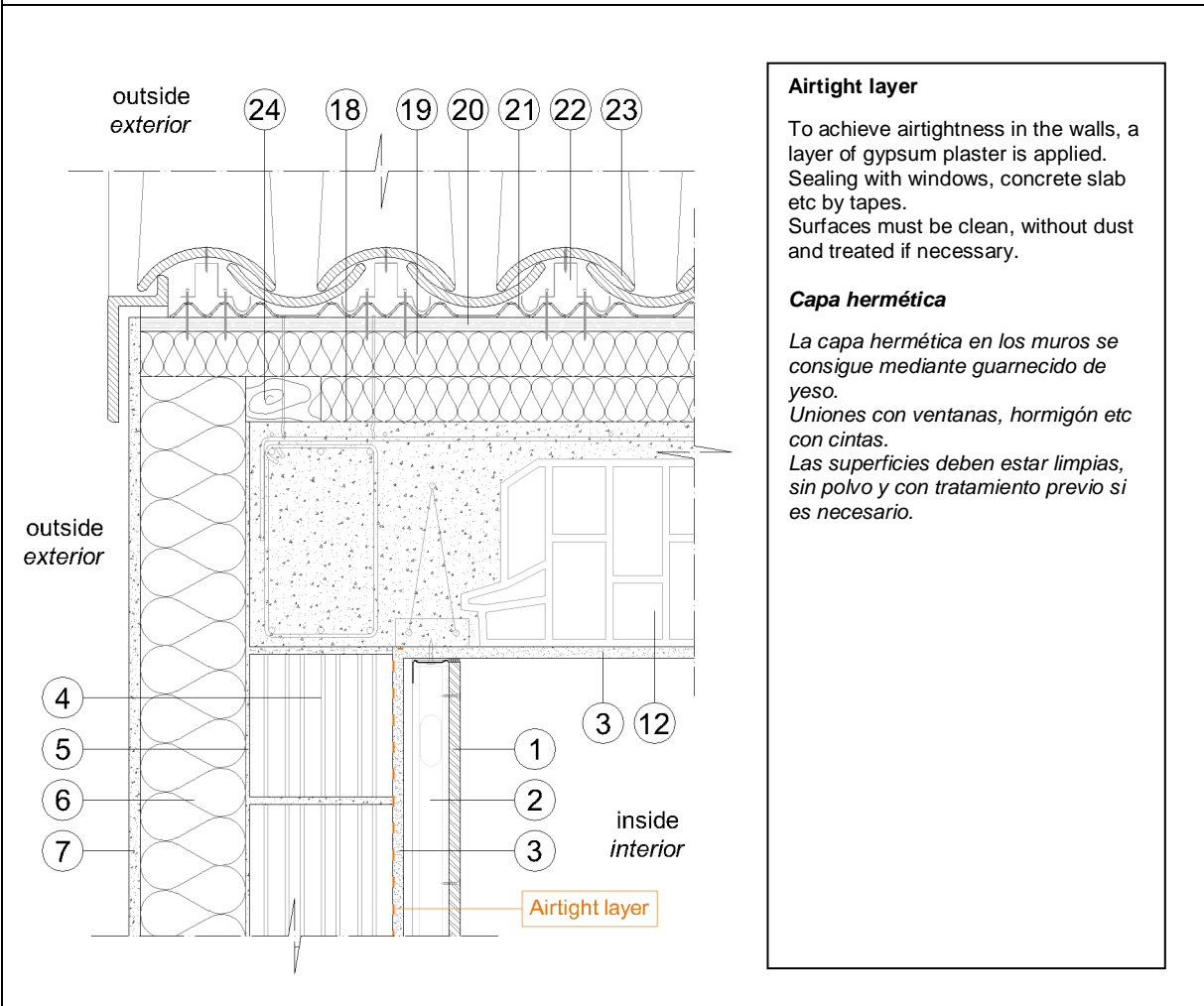
From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall				Standard component : Pitched roof			
1	Gypsum board / Placa yeso laminado	0.250	1.5	3	Gypsum plaster / Guarnecido de yeso	0.570	1.5
2	Air layer + steel studs / Cámara de aire + perfiles de acero galvanizado	0.361	6	12	Beam and clay block floor slab / Forjado de bovedilla cerámica	0.938	30
3	Gypsum plaster / Guarnecido de yeso	0.570	1.5	18	Vapor barrier / Barrera de vapor	-	-
4	Termoarcilla 19 / Termoarcilla 19	0.325	19	19	Thermal insulation PIR / Aislamiento térmico PIR	0.027	12
5	Cement mortar / Mortero de cemento	1.000	0.5	20	Wooden board / Tablero de madera	0.130	1.9
6	Thermal insulation EPS / Aislamiento térmico EPS	0.035	14	21	Waterproofing / Impermeabilización	-	-
7	Exterior plaster / Mortero exterior	1.000	1.5	22	Air layer / Cámara de aire	-	-
				23	Tiles / Tejas	-	-
				Other materials (materials not in the standard components)			
				24	Softwood / Madera	0.130	-
				25	Gutter / Canalón	-	-

Verge
Muro exterior – cubierta inclinada

07 EW1_RO2_ve1
07 ROVE



Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall				Standard component : Pitched roof			
1	Gypsum board / Placa yeso laminado	0.250	1.5	3	Gypsum plaster / Guarnecido de yeso	0.570	1.5
2	Air layer + steel studs / Cámara de aire + perfiles de acero galvanizado	0.361	6	12	Beam and clay block floor slab / Forjado de bovedilla cerámica	0.938	30
3	Gypsum plaster / Guarnecido de yeso	0.570	1.5	18	Vapor barrier / Barrera de vapor	-	-
4	Termoarcilla 19 / Termoarcilla 19	0.325	19	19	Thermal insulation PIR / Aislamiento térmico PIR	0.027	12
5	Cement mortar / Mortero de cemento	1.000	0.5	20	Wooden board / Tablero de madera	0.130	1.9
6	Thermal insulation EPS / Aislamiento térmico EPS	0.035	14	21	Waterproofing / Impermeabilización	-	-
7	Exterior plaster / Mortero exterior	1.000	1.5	22	Air layer / Cámara de aire	-	-
				23	Tiles / Tejas	-	-
				Other materials (materials not in the standard components)			
				24	Softwood / Madera	0.130	-

Window bottom connection
Instalación inferior ventana

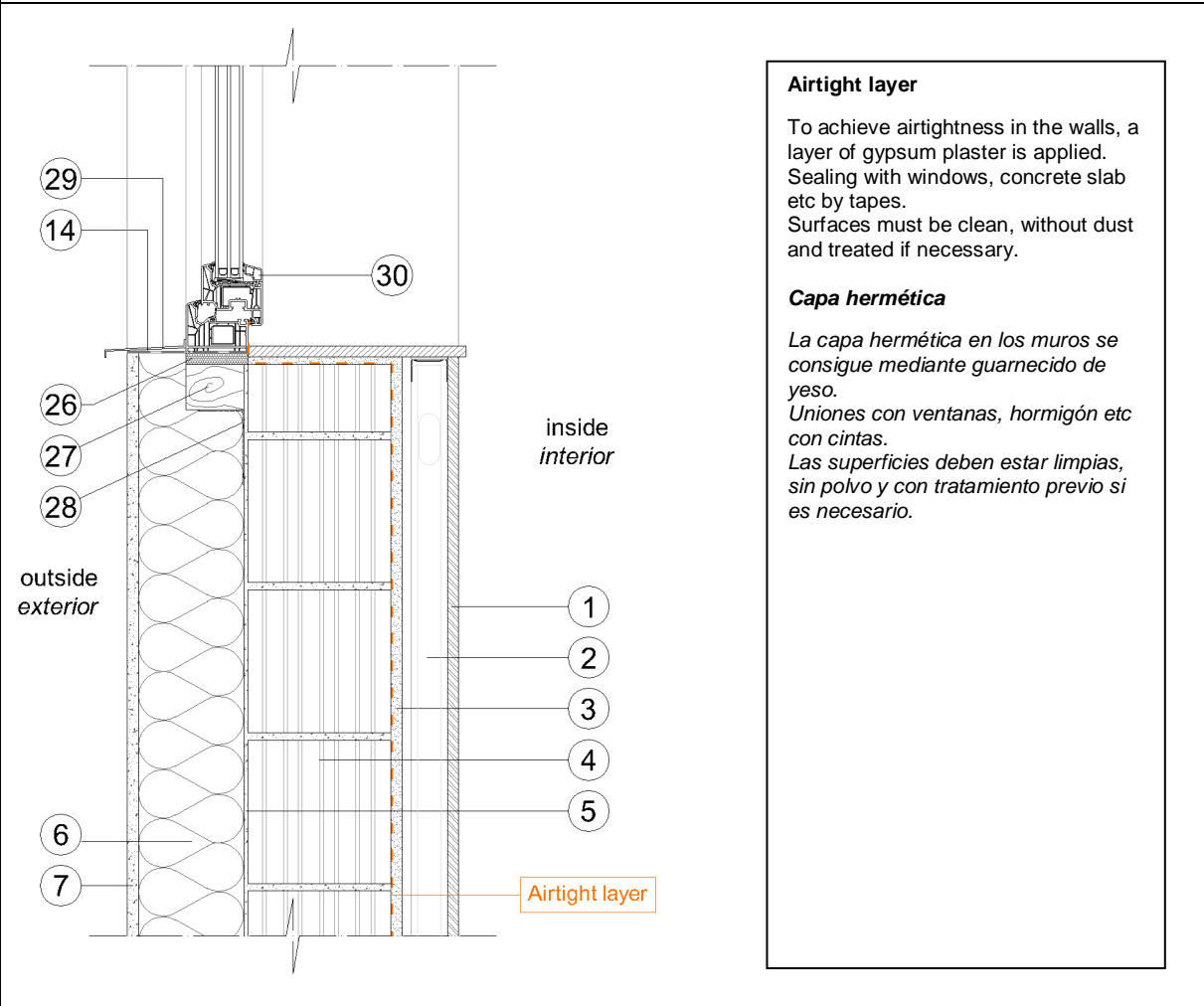
08 EW1_OB1_1

08 WIBO



**CONSORCIO
TERMOARCILLA**

Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall							
1	Gypsum board / <i>Placa yeso laminado</i>	0.250	1.5				
2	Air layer + steel studs / <i>Cámara de aire + perfiles de acero galvanizado</i>	0.361	6				
3	Gypsum plaster / <i>Guarnecido de yeso</i>	0.570	1.5				
4	Termoarcilla 19 / <i>Termoarcilla 19</i>	0.325	19				
5	Cement mortar / <i>Mortero de cemento</i>	1.000	0.5				
6	Thermal insulation EPS / <i>Aislamiento térmico EPS</i>	0.035	14				
7	Exterior plaster / <i>Mortero exterior</i>	1.000	1.5				
Other materials (materials not in the standard components)							
				14	Waterproofing / <i>Impermeabilización</i>	-	-
				26	PU in-situ foam / <i>Espuma de poliuretano</i>	0.040	1.5
				27	Wooden subframe / <i>Prearco de madera</i>	0.130	-
				28	Steel piece / <i>Pieza acero galvanizado</i>	-	-
				29	Window sill / <i>Vierteaguas</i>	-	-
				30	PVC piece / <i>Pieza PVC</i>	0.113	-

Window top connection
Instalación superior ventana

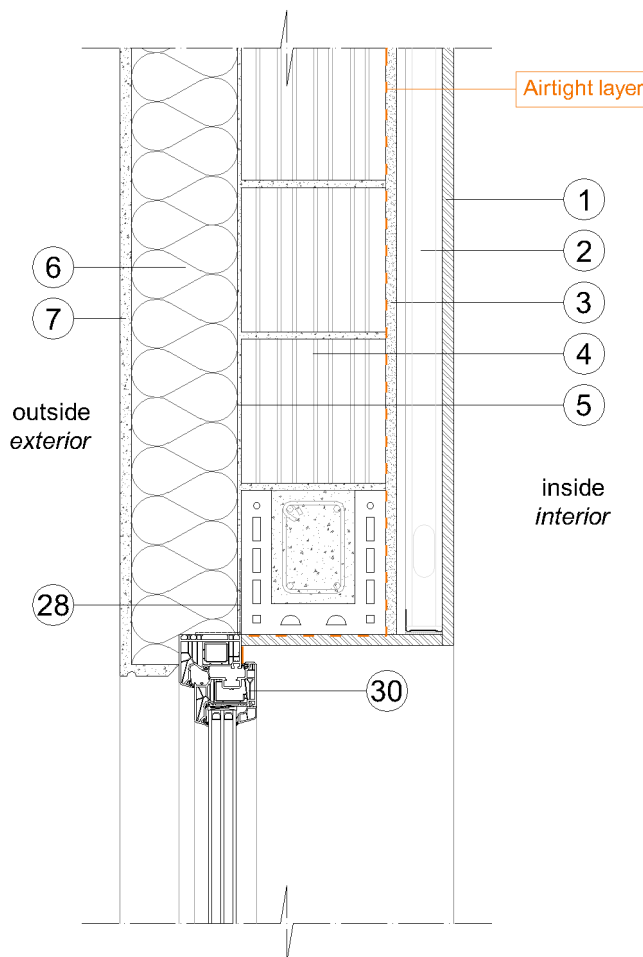
09 EW1_OH1_2a

09 WITO



**CONSORCIO
TERMOARCILLA**

Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

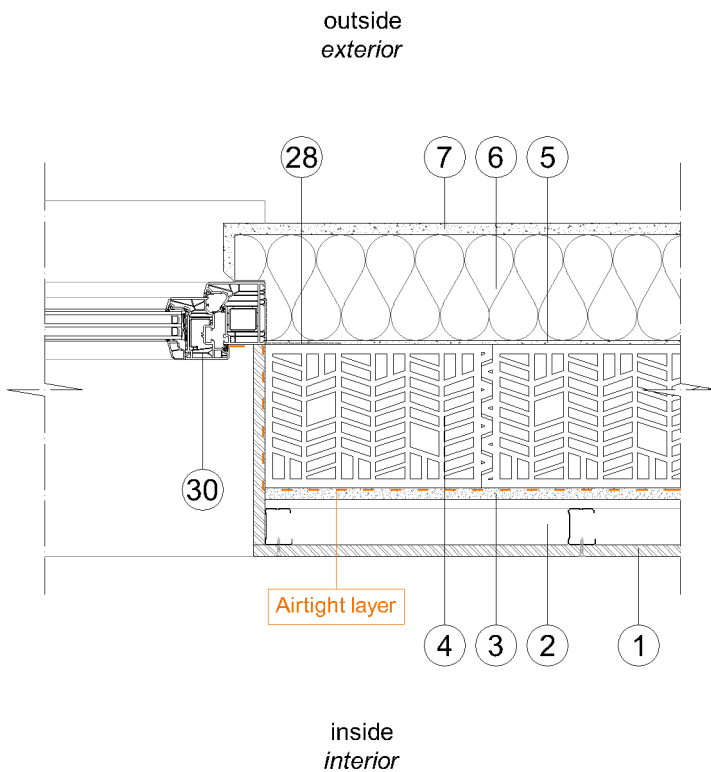
From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall							
1	Gypsum board / <i>Placa yeso laminado</i>	0.250	1.5				
2	Air layer + steel studs / <i>Cámara de aire + perfiles de acero galvanizado</i>	0.361	6				
3	Gypsum plaster / <i>Guarnecido de yeso</i>	0.570	1.5				
4	Termoarcilla 19 / <i>Termoarcilla 19</i>	0.325	19				
5	Cement mortar / <i>Mortero de cemento</i>	1.000	0.5				
6	Thermal insulation EPS / <i>Aislamiento térmico EPS</i>	0.035	14				
7	Exterior plaster / <i>Mortero exterior</i>	1.000	1.5				
Other materials (materials not in the standard components)							
				28	Steel piece / <i>Pieza acero galvanizado</i>	-	-
				30	PVC piece / <i>Pieza PVC</i>	0.113	-

Window side connection
Instalación lateral ventana

10 EW1_OJ1_1a
10 WISI



Design drawing – Horizontal cross-section / Detalle constructivo – Sección horizontal



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall							
1	Gypsum board / <i>Placa yeso laminado</i>	0.250	1.5				
2	Air layer + steel studs / <i>Cámara de aire + perfiles de acero galvanizado</i>	0.361	6				
3	Gypsum plaster / <i>Guarnecido de yeso</i>	0.570	1.5				
4	Termoarcilla 19 / <i>Termoarcilla 19</i>	0.325	19				
5	Cement mortar / <i>Mortero de cemento</i>	1.000	0.5				
6	Thermal insulation EPS / <i>Aislamiento térmico EPS</i>	0.035	14				
7	Exterior plaster / <i>Mortero exterior</i>	1.000	1.5				
Other materials (materials not in the standard components)							
				28	Steel piece / <i>Pieza acero galvanizado</i>	-	-
				30	PVC piece / <i>Pieza PVC</i>	0.113	-

Floor slab edge

Muro exterior – forjado sanitario

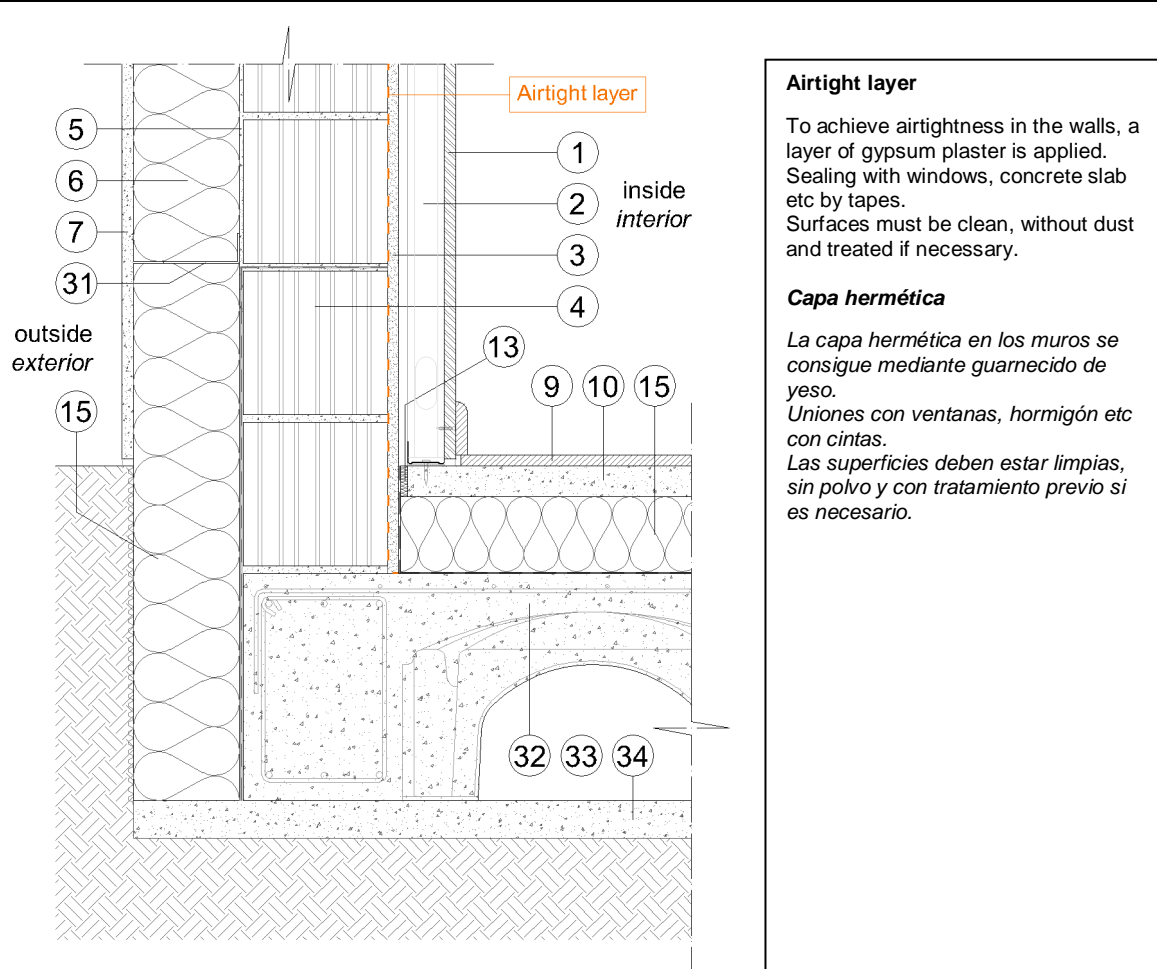
11 FS1_EW1

11 FSEW



**CONSORCIO
TERMOARCILLA**

Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

From the inside towards the outside				λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside				λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall						Standard component : Floor slab					
1	Gypsum board / Placa yeso laminado	0.250	1.5	9	Ceramic finishing / Baldosa cerámica	-	-				
2	Air layer + steel studs / Cámara de aire + perfiles de acero galvanizado	0.361	6	10	Cement screed / Mortero de cemento	1.400	4				
3	Gypsum plaster / Guarnecido de yeso	0.570	1.5	15	Thermal insulation XPS / Aislamiento térmico XPS	0.037	10				
4	Termoarcilla 19 / Termoarcilla 19	0.325	19	32	Concrete slab / Forjado de hormigón	2.300	10				
5	Cement mortar / Mortero de cemento	1.000	0.5	33	Ventilated crawl space / Cámara ventilada	2.300	20				
6	Thermal insulation EPS / Aislamiento térmico EPS	0.035	14	34	Concrete / Hormigón de limpieza	-	-				
7	Exterior plaster / Mortero exterior	1.000	1.5								
Other materials (materials not in the standard components)											
				15	Thermal insulation XPS / Aislamiento térmico XPS	0.037	14				
				31	PVC-U piece / Perfil PVC-U	0.170	-				

Window bottom – floor slab
Umbral terreno balconera

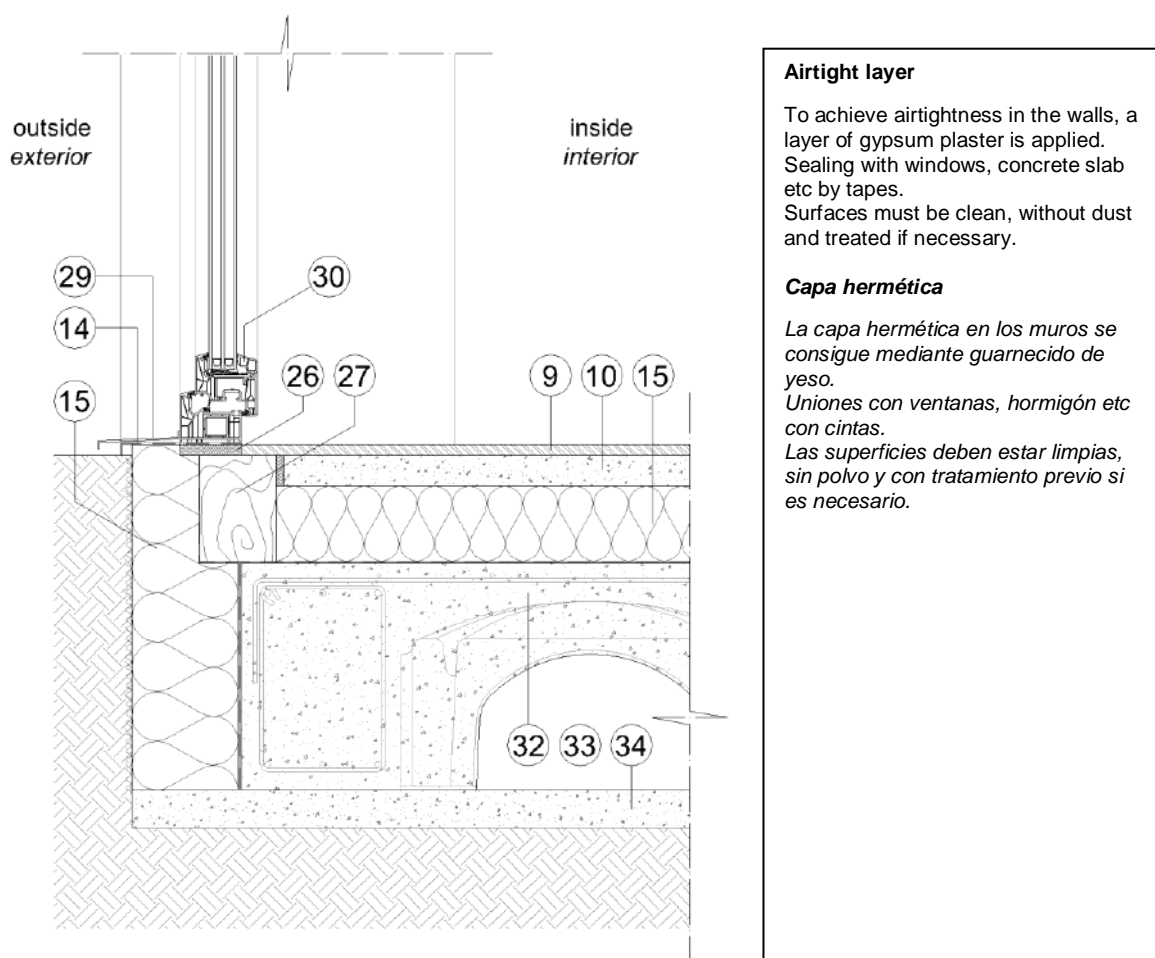
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**CONSORCIO
TERMOARCILLA**

Design drawing – Vertical cross-section / Detalle constructivo – Sección vertical



Airtight layer

To achieve airtightness in the walls, a layer of gypsum plaster is applied. Sealing with windows, concrete slab etc by tapes. Surfaces must be clean, without dust and treated if necessary.

Capa hermética

La capa hermética en los muros se consigue mediante guarnecido de yeso. Uniones con ventanas, hormigón etc con cintas. Las superficies deben estar limpias, sin polvo y con tratamiento previo si es necesario.

From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]	From the inside towards the outside		λ [W/(mK)]	Thick ness [cm]
Standard component : Exterior wall				Standard component : Floor slab			
1	Gypsum board / <i>Placa yeso laminado</i>	0.250	1.5	9	Ceramic finishing / <i>Baldosa cerámica</i>	-	-
2	Air layer + steel studs / <i>Cámara de aire + perfiles de acero galvanizado</i>	0.361	6	10	Cement screed / <i>Mortero de cemento</i>	1.400	4
3	Gypsum plaster / <i>Guarnecido de yeso</i>	0.570	1.5	15	Thermal insulation XPS / <i>Aislamiento térmico XPS</i>	0.037	10
4	Termoarcilla 19 / <i>Termoarcilla 19</i>	0.325	19	32	Concrete slab / <i>Forjado de hormigón</i>	2.300	10
5	Cement mortar / <i>Mortero de cemento</i>	1.000	0.5	33	Ventilated crawl space / <i>Cámara ventilada</i>	2.300	20
6	Thermal insulation EPS / <i>Aislamiento térmico EPS</i>	0.035	14	34	Concrete / <i>Hormigón de limpieza</i>	-	-
7	Exterior plaster / <i>Mortero exterior</i>	1.000	1.5				
Other materials (materials not in the standard components)							
				14	Waterproofing / <i>Impermeabilización</i>	0.250	-
				15	Thermal insulation XPS / <i>Aislamiento térmico XPS</i>	0.037	14
				26	PU in-situ foam / <i>Espuma de poliuretano</i>	0.040	1.5
				27	Wooden subframe / <i>Prearco de madera</i>	0.130	-
				29	Door sill / <i>Vierteaguas</i>	-	-
				30	PVC piece / <i>Pieza PVC</i>	0.113	-