Certification report | Zertifizierungsbericht

Passive House Institute

Building system
Bausystem

for cool, temperate climate

für kühl-gemäßigtes Klima

Product I Produkt:	**THEPASSIVHAUS**
Client I Auftraggeber:	**Advanced Housing Systems Ltd.**
Construction | Konstruktion:	**Lightweight timber construction | Holzleichtbau**
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Content | Inhalt

1 Introduction | *Einleitung*

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)

Passivhäuser stellen aufgrund der Möglichkeit, auf ein separates Heizsystem zu verzichten, hohe Anforderungen an die Qualität der verwendeten Bauteile. Dabei steigen die Anforderungen, je kälter das Klima ist. Darum hat das Passivhaus Institut Regionen gleicher Anforderung identifiziert und für diese Zertifizierungskriterien festgelegt. Die Kriterien sind auf der Homepage des Passivhaus Instituts als kostenfreier Download verfügbar.

Werden die unten zusammengefassten Anforderungen erreicht und ist eine gut geplante luftdichte Ebene nachgewiesen, kann ein Produkt als "Zertifizierte Passivhaus Komponente" ausgezeichnet werden.

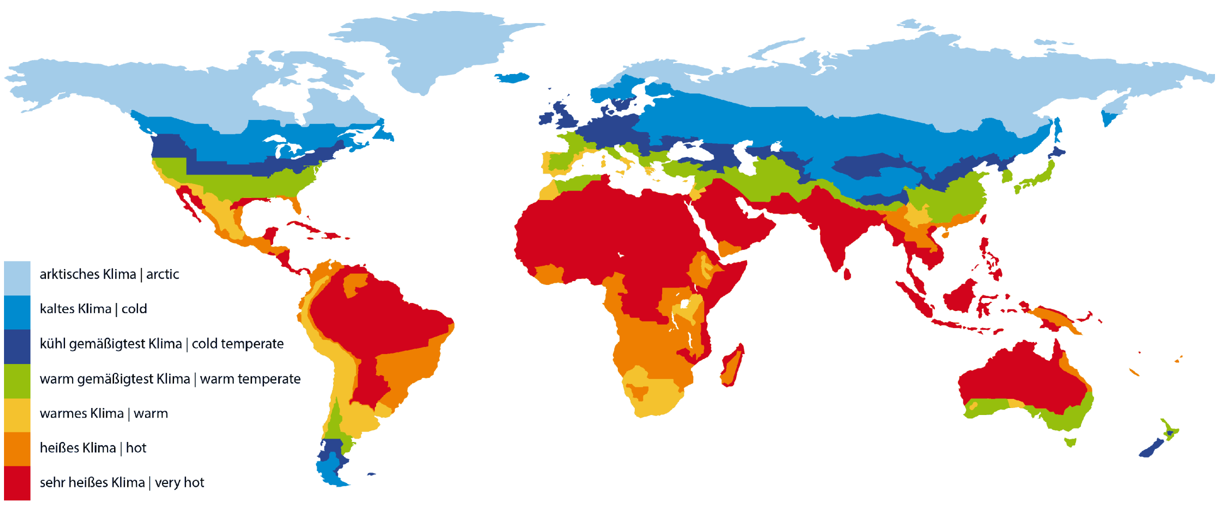
Table 1: Adequate certification criteria

Climate zone	**Hygiene criterion**	**Comfort criterion**	**Efficiency criteria**		
	$f_{Rsi=0.25\ m^2K/W} \geq$ [3]	U-value of the installed window[1] ≤	U-value opaque to ambient $U_{opaque} * f_{PHI}^{2} \leq$	Purely opaque details $f_{Rsi=0.25\ m^2K/W} \geq$	Absence of thermal bridges $\Psi_a \leq$ [4]
	[-]	[W/(m²K)]	[W/(m²K)]	[-]	[W/(mK)]
1 Arctic	0.80	0.45 (0.35)	0.09	0.90	0.01
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	

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

2 $f_{R,\ PHI}$: Reduction factor: always 1, exception: areas in contact with the ground and towards the unheated basement: 0.6

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



2 Description of the certified system | *Systembeschreibung*

2.1 Opaque building envelop | *Opake Gebäudehülle*

THEPASSIVHAUS is a lightweight timber construction system with insulated concrete formwork for basement construction.

The timber assembly is insulated using Knauf glass wool products (Knauf Frametherm Roll/Slab, λ_R 0,038 W/(mK); Knauf Earthwool Omnifit Roll 0,048 W/(mK)). The ICF assembly is insulated using EPS products (Kay-Cel EPS 200E, λ_R 0,041 W/(mK); Kay-Cel EPS 250/300E, λ_R 0,040 W/(mK).

The system was simulated in one-, two- and three-dimensions in accordance with ISO 6946 and ISO 10211, the results are shown below and right. A hygrothermal assessment was carried out using the simplified Glaser method in line with ISO 13788 for all wall, roof and floor types; in accordance with the Passive House criteria, no risk of moisture accumulation or interstitial condensation was found.

THEPASSIVHAUS ist ein Holzleichtbausystem, mit Betonschalungsstein (BSS) für den Kellerbau.

Die Holzkonstruktion ist mit Glaswolleprodukten von Knauf gedämmt (Knauf Frametherm Roll/Slab, λ_R 0,038 W/(mK); Knauf Earthwool Omnifit Roll 0,048 W/(mK)). Der BSS-Aufbau ist mit EPS-Produkten gedämmt (Kay-Cel EPS 200E, λ_R 0,041 W/(mK); Kay-Cel EPS 250/300E, λ_R 0,040 W/(mK)).

Das System wurde ein-, zwei- und dreidimensional nach ISO 6946 und ISO 10211 modelliert. Eine hygrothermische Bewertung wurde mit dem vereinfachten Glaser-Verfahren nach ISO 13788 für alle Wand-, Dach- und Bodentypen durchgeführt; entsprechend den Passivhaus-Kriterien wurde kein Risiko von Feuchtigkeitsansammlung oder interstitieller Kondensation festgestellt.

2.2 Windows | *Fenster*

Installation type 1 refers to the E98 Passive entrance door from Urban Front Ltd., in a fully opaque configuration; the Ud-installed value shown is based on a reference size of 1,1 by 2,2 m. Type 2 refers to the Ultra Insulated outward-opening window from Green Building Store, using a Ug-value of 0,70 W/(m²K) and based on a reference size of 1,23 by 1,48 m. Type 3 refers to the Primus Slide double sliding door from ENERsign GmbH. For the latter, the average frame values are shown and the mullion is excluded, but the actual installed Uw-value is shown. This is based on a reference size of 2,4 by 2,5 m and uses a Ug-value of 0,70 W/(m²K).

Einbautyp 1 bezieht sich auf die E98 Passivhaustür von Urban Front Ltd. in einer vollständig opaken Konfiguration; der angegebene Ud-Einbauwert basiert auf einer Referenzgröße von 1,1 mal 2,2 m. Typ 2 bezieht sich auf die Ultra Insulated Outward-Opening-Window von Green Building Store, mit einem Ug-Wert von 0,70 W/(m²K) und basierend auf einer Referenzgröße von 1,23 mal 1,48 m. Typ 3 bezieht sich auf die Primus Slide Doppelschiebetür von ENERsign GmbH. Für letztere werden die durchschnittlichen Rahmenwerte gezeigt und der Pfosten ist ausgeschlossen, aber der tatsächlich installierte Uw-Wert wird gezeigt. Dieser basiert auf einer Referenzgröße von 2,4 mal 2,5 m und verwendet einen Ug-Wert von 0,70 W/(m²K).

2.3 Airtightness concept | *Luftdichtheitskonzept*

The Passive House level of airtightness is achieved by way of suitable membrane (SIGA Majrex 200), with joints sealed using appropriate airtightness tape. Windows and doors are installed using flexible gaskets and are connected to the airtight membrane using airtightness tape. Service penetrations are to be sealed using suitable gaskets or tape.

Die Luftdichtheit auf Passivhausniveau wird durch eine geeigneten Membran (SIGA Majrex 200) erreicht, deren Fugen mit einem passenden Luftdichtheitsband abgedichtet werden. Fenster und Türen werden mit flexiblen Dichtungen eingebaut und mit einem Luftdichtheitsband an die Luftdichtheitsfolie angeschlossen. Service-Durchdringungen sind mit geeigneten Dichtungen oder Bändern abzudichten.

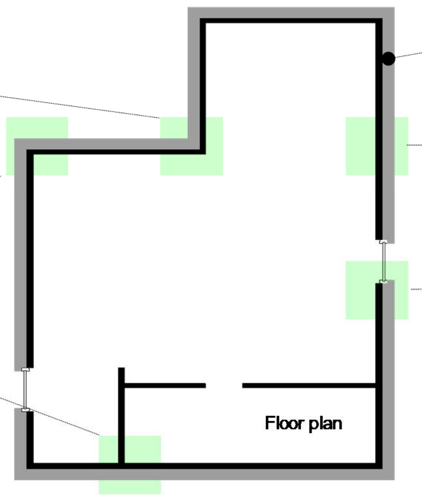
3 Evaluation | *Bewertung*

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. This use might make sense in certain circumstances.

Das Passivhaus Institut hat weltweite Komponentenanforderungen für sieben Klimazonen basierend auf Hygiene, Komfort- und Wirtschaftlichkeitskriterien definiert. Grundsätzlich können Komponenten, welche für Klimate mit höheren Anforderungen zertifiziert sind, auch in Klimaten mit geringeren Anforderungen eingesetzt werden. Dies kann im Einzelfall auch wirtschaftlich sein..

4 Summary of the results | *Zusammenfassung der Ergebnisse*

(grey)	Thermal bridge not calculated
(light green)	Criteria achieved
(yellow)	Efficieny driteria not achieved
(orange)	Hygiene- or comfortcriterion not achieved



EW01	External wall
U [W/(m²K)]	0,13
Thickness [m]	0,344

EWIC01	
Ext.w.-inner corner	
Ψ [W/(mK)]	0,030
$f_{Rsi=0,25\ m^2K/W}$	0,96

EWCB01	
Ext.w.construction beam	
Ψ [W/(mK)]	0,007
$f_{Rsi=0,25\ m^2K/W}$	0,96

EWEC01	
Ext.w.-outer corner	
Ψ [W/(mK)]	-0,048
$f_{Rsi=0,25\ m^2K/W}$	0,91

WISI			Window side
Typ	01	02	03
b_f [m]	0,1545	0,118	0,133
U_f [W/(m²K)]	1,39	0,93	0,661
Ψ_g [W/(mK)]	0,002	0,025	0,0193
Ψ_i [W/(mK)]	-0,0005	0,001	0,006
$f_{Rsi=0,25\ m^2K/W}$	0,76	0,75	0,72

EWIW01	
Ext.w.-internal wall	
Ψ [W/(mK)]	0,001
$f_{Rsi=0,25\ m^2K/W}$	0,96

ROVE01	
Verge	
Ψ [W/(mK)]	-0,049
$f_{Rsi=0,25\ m^2K/W}$	0,90

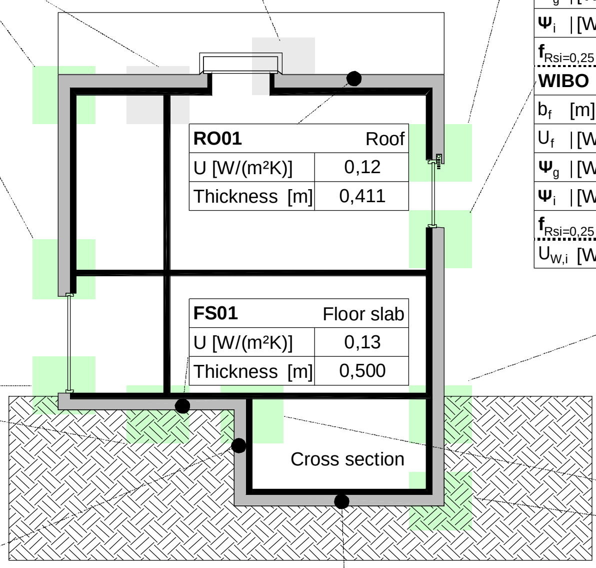
ROIW01	
Roof - internal wall	
Ψ [W/(mK)]	
$f_{Rsi=0,25\ m^2K/W}$	

RWSI01	
Roof window top	
Ψ [W/(mK)]	
$f_{Rsi=0,25\ m^2K/W}$	

WITO			Window top
Type	01	02	03
b_f [m]	0,127	0,118	0,124
U_f [W/(m²K)]	1,12	0,93	0,73
Ψ_g [W/(mK)]	0,001	0,025	0,019
Ψ_i [W/(mK)]	0,006	0,006	0,012
$f_{Rsi=0,25\ m^2K/W}$	0,73	0,75	0,80
WIBO			Window bottom
b_f [m]	SEE WITH01	0,14	0,127
U_f [W/(m²K)]		0,90	0,83
Ψ_g [W/(mK)]		0,027	0,019
Ψ_i [W/(mK)]		-0,004	-0,001
$f_{Rsi=0,25\ m^2K/W}$		0,73	0,70
$U_{W,i}$ [W/(m²K)]		0,84	0,78

EWCE01	
Ext.w.-ceiling	
Ψ [W/(mK)]	0,010
$f_{Rsi=0,25\ m^2K/W}$	0,93

WITH01	
Window threshold	
b_f [m]	0,142
U_f [W/(m²K)]	1,26
Ψ_e [W/(mK)]	0,001
Ψ_i [W/(mK)]	0,019
$f_{Rsi=0,25\ m^2K/W}$	0,71
$U_{W,i}$ [W/(m²K)]	0,77



RO01	Roof
U [W/(m²K)]	0,12
Thickness [m]	0,411

FS01	Floor slab
U [W/(m²K)]	0,13
Thickness [m]	0,500

BWBC01 Basem.w.-basem.c.	
Ψ [W/(mK)]	0,004
$f_{Rsi=0,25\ m^2K/W}$	0,87

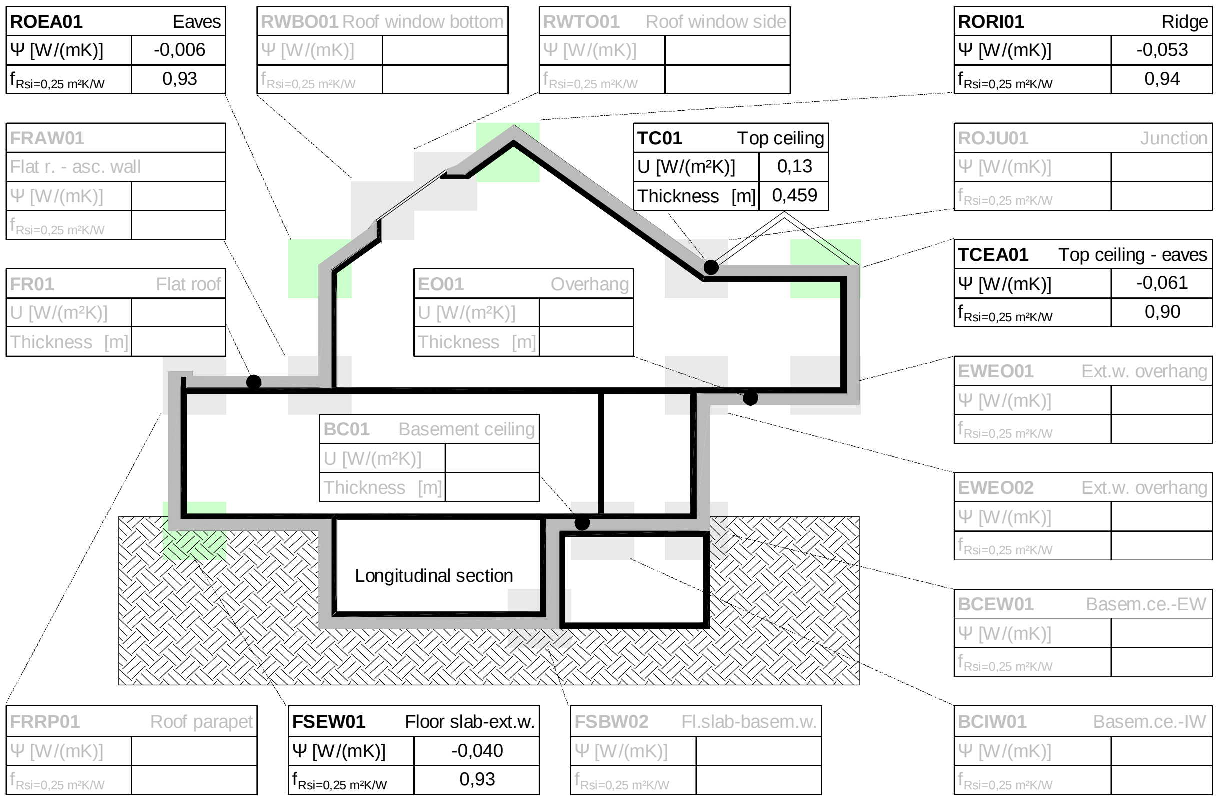
FSIW01	
Fl.slab-intern.w	
Ψ [W/(mK)]	0,000
$f_{Rsi=0,25\ m^2K/W}$	0,93

BWFS01 Basem.w.-floor slab	
Ψ [W/(mK)]	0,058
$f_{Rsi=0,25\ m^2K/W}$	0,95

FSBW01	Fl.slab-basem.w.
Ψ [W//mK]	-0,034
$f_{Rsi=0,25\ m^2K/W}$	0,90

BW01	Basement wall
U [W/(m²K)]	0,10
Thickness [m]	60,50

FS02	Floor slab	U [W/(m²K)]	0,11	Thickness [m]	0,55



5 Using the results in the PHPP | *Verwendung der Ergebnisse im 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.

Die folgenden Punkte sind für die Arbeit mit den hier zusammengefassten Ergebnissen im Passivhaus Projektierungs-Paket (PHPP:

- *Die im regulären Aufbau der Bauteile vorkommenden Wärmebrücken ist über äquivalente Wärmeleitfähigkeiten der betreffenden Bauteilschichten bereits in den U-Werten der Konstruktionen erfasst und müssen nicht weiter berücksichtigt werden.*
- *Alle linearen Wärmebrücken gelten für den Außenmaßbezug.*
- *Zusätzliche punktförmige Wärmebrücken sind zu berücksichtigen.*

6 Legal information | Rechtliche Hinweise

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.

Die folgenden Informationen sind bei der Planung und Ausführung der in diesem Bericht gezeigten Details zu beachten:

Die Detailzeichnungen in diesem Bericht sind schematisch und beispielhaft. Sie müssen evtl. auf die Spezifika auszuführender Gebäude angepasst werden. Hygrothermische Aspekte wurden im Rahmen dieser Zertifizierung nicht betrachtet. Wo nötig sollten diese Betrachtungen entsprechend den gültigen Regeln der Technik vorgenommen werden. Die Verantwortung der Umsetzung oben genannter Punkte obliegt dem Hersteller oder Anwender des Bausystems.

Die vorliegende Dokumentation erlaubt keine Rückschlüsse auf andere, als die überprüften Punkte. Sie stellt insbesondere keinen Ersatz für einen Bauaufsichtliche Zulassung dar.

Aus der Zertifizierung oder diesem Bericht und den darin veröffentlichten Informationen können keine Ansprüche gegen das Passivhaus Institut Darmstadt Dr. Wolfgang Feist abgeleitet werden.

Appendix 1: U-value of building assemblies

Anhang 1: Bauteil-U-Werte

Advanced Housing Systems Ltd.: THEPASSIVHAUS ID: for cool, temperate climate

Acronym	Building assembly description	Interior insulation?
RO01	Roof	

Heat transmission resistance [m²K/W]

Orientation of building element: 1-Roof | Adjacent to: 3-Ventilated | interior R_{si}: 0,10 | exterior R_{se}: 0,10

U-value determined by 2D thermal simulation (see appendix 2)

length of model [m]	Δϑ [K]	thermal flux [W/m]	U-value [W/(m²K)]
0,600	30	2,08109	0,116

U-value determined according to PHPP

Material of Layer	λ [W/(mK)]	Description	Thickness [mm]
Fermacell Gypsum Fibre	0,400	BBA Certificate value + 25% safety margin	24,0
Air gap + timber	0,160	Equivalent value determined by simulation	25,0
Knauf Frametherm + timber	0,049	Equivalent value determined by simulation	45,0
Knauf Frametherm + timber	0,041	Equivalent value determined by simulation	260,0
Knauf Frametherm + timber	0,049	Equivalent value determined by simulation	45,0
Panelvent Sheathing Board	0,125	Manufacturer Datasheet + 25% safety margin	12,0

Percentage of sec. 1 | Percentage of sec. 2 | Percentage of sec. 3 | Total: 41,1 cm

100% | U-value: 0,116 W/(m²K)

U-value supplement: W/(m²K) **U-value:** 0,116 W/(m²K)

Acronym	Building assembly description	Interior insulation?
TC01	Top ceiling	

Heat transmission resistance [m²K/W]

Orientation of building element: 1-Roof | Adjacent to: 3-Ventilated | interior R_{si}: 0,10 | exterior R_{se}: 0,10

U-value determined by thermal simulation (see appendix 2)

length of model [m]	Δϑ [K]	thermal flux [W/m]	U-value [W/(m²K)]
0,600	30	2,2780	0,127

U-value determined according to PHPP

Material of Layer	λ [W/(mK)]	Description	Thickness [mm]
Fermacell Gypsum Fibre	0,400	BBA Certificate value + 25% safety margin	24,0
Air gap + timber	0,153	Equivalent value determined by simulation	25,0
Softwood / OSB board	0,130	Standard value according to ISO 10456	10,0
Knauf Loft Roll + timber	0,058	Equivalent value determined by simulation	100,0
Knauf Loft Roll 44	0,053	DoP value, plus safety margin according to DIN 4108-4	300

Percentage of sec. 1 | Percentage of sec. 2 | Percentage of sec. 3 | Total: 45,9 cm

100%

U-value supplement: W/(m²K) **U-value:** 0,127 W/(m²K)

Acronym	Building assembly description	Interior insulation?
EW01	External wall	

Heat transmission resistance [m²K/W]

Orientation of building element: 2-Wall | Adjacent to: 3-Ventilated | interior R_{si}: 0,13 | exterior R_{se}: 0,13

U-value determined by 2D thermal simulation (see appendix 2)

length of model [m]	Δϑ [K]	thermal flux [W/m]	U-value [W/(m²K)]
0,600	30	2,16079	0,120

U-value determined according to PHPP

Material of Layer	λ [W/(mK)]	Description	Thickness [mm]
Fermacell Gypsum Fibre	0,400	BBA Certificate value + 25% safety margin	12
Knauf Frametherm + timber	0,043	Equivalent value determined by simulation	90
Knauf Frametherm + timber	0,038	Equivalent value determined by simulation	140
Knauf Frametherm + timber	0,043	Equivalent value determined by simulation	90
Panelvent Sheathing Board	0,125	Manufacturer Datasheet + 25% safety margin	12

Percentage of sec. 1 | Percentage of sec. 2 | Percentage of sec. 3 | Total: 34,4 cm

100% | U-value: 0,120 W/(m²K)

U-value supplement 0,011 W/(m²K) **U-value:** 0,132 W/(m²K)

Acronym	Building assembly description	Interior insulation?
FS01	**Floor slab - ground level**	

Heat transmission resistance [m²K/W]

Orientation of building element	Adjacent to	interior R_{si}	exterior R_{se}
3-Ground	2-Ground	0,17	0,00

U-value determined by thermal simulation (see appendix 2)

length of model [m]	Δϴ [K]	thermal flux [W/m]	U-value [W/(m²K)]
1,000	30	3,9609	0,132

U-value determined according to PHPP

Material of Layer	λ [W/(mK)]	Description	Thickness [mm]
Concrete, 1% steel	2,300	Standard value according to ISO 10456	200
Kay-Cel EPS 200E	0,041	DoP value, plus safety margin according to DIN 4108-4	300
		Total	50,0 cm

U-value supplement: W/(m²K)

U-value: 0,132 W/(m²K)

R-value 7,576 m²K/W

Assembly no.		Interior insulation?
EW02	**Basement wall**	

Heat transmission resistance [m²K/W]

Orientation of building element	Horizontal	interior R_{si}	0,13
Adjacent to	Ground	exterior R_{se} :	0,00

U-value determined by 2D thermal simulation (see appendix 2)

length of model [m]	Δϴ [K]	thermal flux [W/m]	U-value [W/(m²K)]
1,000	30	2,9603	0,099

Area section 1	λ [W/(mK)]	Description	Thickness [mm]
Interior plaster	0,570	Standard value according to ISO 10456	5
Kay-Cel EPS 200E	0,041	DoP value, plus safety margin according to DIN 4108-4	150
Concrete, 1% steel	2,300	Standard value according to ISO 10456	200
Kay-Cel EPS 250/300E	0,040	DoP value, plus safety margin according to DIN 4108-4	250
		Total	60,5 cm

U-value supplement W/(m²K)

U-value: 0,099 W/(m²K)

Assembly no.		Interior insulation?
FS02	**Floor slab - basement level**	

Heat transmission resistance [m²K/W]

Orientation of building element	Down	interior R_{si}	0,17
Adjacent to	Ground	exterior R_{se} :	0,00

U-value determined by 2D thermal simulation (see appendix 2)

length of model [m]	Δϴ [K]	thermal flux [W/m]	U-value [W/(m²K)]
1,000	30	3,3308	0,111

Area section 1	λ [W/(mK)]	Area section 2 (optional) / λ [W/(mK)] / Area section 3 (optional) / λ [W/(mK)]	Thickness [mm]
Kay-Cel EPS 250/300E	0,040	DoP value, plus safety margin according to DIN 4108-4	50
Concrete, 1% steel	2,300	Standard value according to ISO 10456	200
Kay-Cel EPS 250/300E	0,040	DoP value, plus safety margin according to DIN 4108-4	300
		Total	55,0 cm

U-value supplement W/(m²K)

U-value: 0,111 W/(m²K)

Condensation check according to ISO 13788

Glaser Method, carried out using PHI Condensation Tool

EW01 - timber frame external wall

Location temperatures	Heating load [° C]	**-0,7**	Cooling load [° C]	**19,6**	*Hours* 1
Assembly definition	*θe [° C]* 28,0	*φe (θe)* 90%	*θi [° C]* 20,0	*φi (θi)* 65%	

Assembly no.	Building assembly description	Interior insulation?	Ft	Radiation effect	Solar rad.	Sol. rad. fact.	Eff. Solar rad.
EW01	**Timber frame external wall**	**No**	1,00	**Active**	750	1,0	**750**
					[W/m²]	[-]	[W/m²]

		Heat transmission resistance [m²K/W]	DT Roof 13788	Radiation attributes			Limits	PHI	User defined
Orientation of building element	**2 - Wall**	interior Rsi: 0,13	0,00	Reflectivity:		Clima zone 4			
Adjacent to	**3 - Ventilated**	exterior Rse: 0,13		Absorptivity:	0,90	Region Warm-temperate	U-value	0,30	
For condensation or mould growth on opaque surfaces		interior Rsi: 0,25		Emissivity:	0,90	Location GB0005a-Exeter	fRsi min 0,25	0,82	

Pos.	Area section	λ [W/(mK)]	Thickness [mm]	μ [-]	S_d [m]	R [m²K/W]	Temperature [° C]	p_v [Pa]	RH [%]
i	Interior air						**20,00**	**1519**	**65%**
0	Rsi - Interior surface					0,130	21,39	1519	60%
1	**Fermacell Gypsum Fibre**	**0,400**	**12**	**10,0**	0,12	0,030	21,71	1527	59%
2	**Knauf Frametherm Roll/Slab 32**	**0,038**	**90**	**1,0**	0,09	2,368	47,03	1532	14%
3	**SIGA Majpell 25**	**100,000**	**0,3**	**83.333,3**	25,00	0,000	47,03	3118	29%
4	**Knauf Frametherm Roll/Slab 32**	**0,038**	**70**	**60,0**	4,20	1,842	66,73	3385	13%
5	**Knauf Frametherm Roll/Slab 32**	**0,038**	**70**	**1,0**	0,07	1,842	86,43	3389	6%
6	**Knauf Frametherm Roll/Slab 32**	**0,038**	**90**	**1,0**	0,09	2,368	111,75	3395	2%
7	**Panelvent Sheathing Board**	**0,125**	**12**	**4,4**	0,05	0,096	112,77	3398	2%
8	**Tyvek Reflex**	**100,000**	**0,3**	**100,0**	0,03	0,000	112,77	3400	2%
9									
10									
0	Rse - Exterior surface					0,130	112,77	3400	2%
e	Exterior air						**114,16**	**3400**	**90%**

Total Values	**34,46**		**29,65**	**8,807**	**-10,69**	**-1,27E-08**	**0**
	[cm]		[m]	[m²K/W]	**q tot** [W/m2]	**g** [kg/(m²s)]	Cond. Interfaces

Radiation effect	Active		Surfaces DT				
Exterior Sol-Air Temperature	**114,16**	**1,39**	**94,16**	SRI value	**6**	Aged SRI value	**10**
	[°C]	[Int DT°C]	[Ext-Int DT°C]		[-]		[-]

Verifications

Condensation Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
13,22	**22,64**	**Yes**

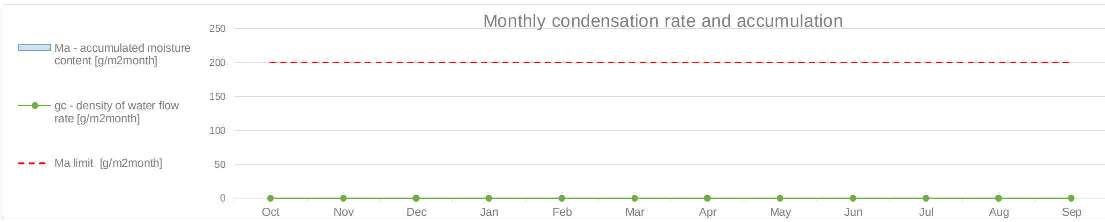
Mold growth Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
16,69	**22,64**	**Yes**

f_{Rsi}		
$f_{Rsi\,min}$	f_{Rsi} Project	Verified
0,82	**0,97**	**Yes**

gc [g/m² * h]
g_c
0,00

U-Value [W/(m²K)]		
min	Project	Verified
0,300	**0,114**	**Yes**

Monthly Condensation rate and accumulation within the whole assembly



	10	11	12	1	2	3	4	5	6	7	8	9
Days	31	30	31	31	28	31	30	31	30	31	31	30
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.		Verification status:
EW01		**Assembly verified**

	Verification status per month: Is the 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
	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
	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
Temp. factor at the internal surface	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
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.											

EW02 - insulated concrete formwork basement wall

Location temperatures	Heating load [° C]	-0,7	Cooling load [° C]	19,6	Hours	1
Assembly definition	θe [° C] 28,0	φe (θe) 90%	θi [° C] 20,0	φi (θi) 65%		

Assembly no.	Building assembly description	Interior insulation?	Ft	Radiation effect	Solar rad.	Sol. rad. fact.	Eff. Solar rad.
EW02	ICF basement wall	No	1,00	Active	750	1,0	750
			Adjacent to ground is selected		[W/m²]	[-]	[W/m²]

	Heat transmission resistance [m²K/W]		DT Roof 13788	Radiation attributes		Clima zone	4	Limits	PHI	User defined
Orientation of building element: 2 - Wall	interior Rsi:	0,13	0,00	Reflectivity:		Region	Warm-temperate	U-value	0,30	
Adjacent to: 2 - Ground	exterior Rse:	0,00		Absorptivity:	0,90	Location	GB0005a-Exeter	fRsi min 0,25	0,82	
For condensation or mould growth on opaque surfaces	interior Rsi:	0,25		Emissivity:	0,90					

Pos.	Area section	λ [W/(mK)]	Thickness [mm]	μ [-]	S_d [m]	R [m²K/W]	Temperature [° C]	p_v [Pa]	RH [%]
i	Interior air						20,00	1519	65%
0	Rsi - Interior surface					0,130	#DIV/0!	#DIV/0!	#DIV/0!
1	Interior plaster 10456	0,570	5	10,0	0,05	0,009	#DIV/0!	#DIV/0!	#DIV/0!
2	EPS 200E (DoP + DIN 4108)	0,041	150	60,0	9,00	3,659	#DIV/0!	#DIV/0!	#DIV/0!
3	Reinforced concrete	2,300	200	130,0	26,00	0,087	#DIV/0!	#DIV/0!	#DIV/0!
4	EPS 250/300E	0,040	100	60,0	6,00	2,500	#DIV/0!	#DIV/0!	#DIV/0!
5	EPS 250/300E	0,040	100	60,0	6,00	2,500	#DIV/0!	#DIV/0!	#DIV/0!
6	EPS 250/300E	0,040	50	60,0	3,00	1,250	#DIV/0!	#DIV/0!	#DIV/0!
7	RIW Sheet Seal 226	100,000	1,5	100,0	0,15	0,000	#DIV/0!	#DIV/0!	#DIV/0!
8									
9									
10									
0	Rse - Exterior surface					0,000	#DIV/0!	#DIV/0!	#DIV/0!
e	Exterior air						#DIV/0!	#DIV/0!	90%
	Total Values		60,65		50,20	10,134	#DIV/0!	#DIV/0!	0
			[cm]		[m]	[m²K/W]	q tot [W/m2]	g [kg/(m²s)]	Cond. Interfaces

	Radiation effect: Active	Surfaces DT					
Exterior Sol-Air Temperature	#DIV/0!	#DIV/0!	#DIV/0!	SRI value	6	Aged SRI value	10
	[°C]	[Int DT°C]	[Ext-Int DT°C]		[-]		[-]

Verifications

Condensation Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
13,22	#DIV/0!	#DIV/0!

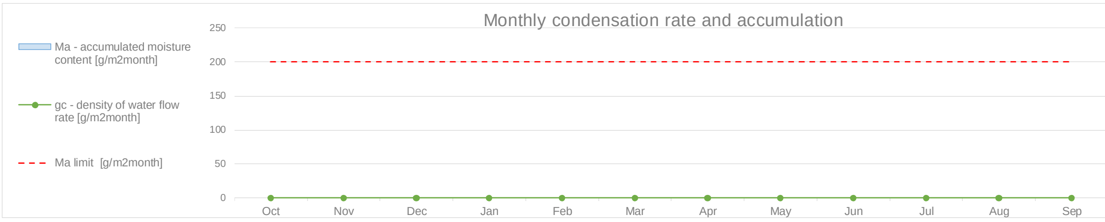
Mold growth Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
16,69	#DIV/0!	#DIV/0!

f_{Rsi}		
$f_{Rsi\ min}$	f_{Rsi} Project	Verified
0,82	#DIV/0!	#DIV/0!

gc [g/m² * h]
g_c
#DIV/0!

U-Value [W/(m²K)]		
min	Project	Verified
0,300	0,099	Yes

Monthly Condensation rate and accumulation within the whole assembly



	10	11	12	1	2	3	4	5	6	7	8	9
Days	31	30	31	31	28	31	30	31	30	31	31	30
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.		Verification status:
EW02		Assembly verified

	Verification status per month: Is the 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
	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
	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
Temp. factor at the internal surface	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
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.											

■ = Assumed value, no data available

RO01 - timber frame pitched roof

Location temperatures	Heating load [° C]	-0,7	Cooling load [° C]	19,6		Hours	1	
Assembly definition	θe [° C]	28,0	φe (θe)	90%	θi [° C]	20,0	φi (θi)	65%

Assembly no.	Building assembly description	Interior insulation?	Ft	Radiation effect	Solar rad.	Sol. rad. fact.	Eff. Solar rad.
RO01	Timber frame pitched roof	No	1,00	Active	750	1,0	750
					[W/m²]	[-]	[W/m²]

		Heat transmission resistance [m²K/W]		DT Roof 13788	Radiation attributes		Clima zone	4	Limits	PHI	User defined
Orientation of building element	1 - Roof	interior Rsi:	0,10	0,00	Reflectivity:						
Adjacent to	3 - Ventilated	exterior Rse:	0,10		Absorptivity:	0,90	Region	Warm-temperate	U-value	0,30	
For condensation or mould growth on opaque surfaces		interior Rsi:	0,25		Emissivity:	0,90	Location	GB0005a-Exeter	fRsi min 0,25	0,82	

Pos.	Area section	λ [W/(mK)]	Thickness [mm]	μ [-]	S_d [m]	R [m²K/W]	Temperature [° C]	p_v [Pa]	RH [%]
i	Interior air						20,00	1519	65%
0	Rsi - Interior surface					0,100	20,79	1519	62%
1	Fermacell Gypsum Fibre	0,400	12	10,0	0,12	0,030	21,03	1559	63%
2	Fermacell Gypsum Fibre	0,400	12	10,0	0,12	0,030	21,27	1599	63%
3	Air gap acc. ISO 6946	0,156	25	0,3	0,01	0,160	22,54	1601	59%
4	SIGA Majrex 200	100,000	0,3	16.666,7	5,00	0,000	22,54	2730	100%
5	Knauf Frametherm Roll/Slab 32	0,038	140	1,0	0,14	3,684	51,74	3314	25%
6	Knauf Frametherm Roll/Slab 32	0,038	90	1,0	0,09	2,368	70,52	3344	10%
7	Knauf Frametherm Roll/Slab 32	0,038	90	1,0	0,09	2,368	89,29	3374	5%
8	Panelvent Sheathing Board	0,125	12	4,4	0,05	0,096	90,05	3392	5%
9	Tyvek Supro	100,000	0,3	83,3	0,025	0,000	90,05	3400	5%
10									
0	Rse - Exterior surface					0,100	90,05	3400	5%
e	Exterior air						90,84	3400	90%

Total Values		38,16		5,65	8,937	-7,93	-6,66E-08	1
		[cm]		[m]	[m²K/W]	q tot [W/m2]	g [kg/(m²s)]	Cond. Interfaces

Radiation effect	Active		Surfaces DT				
Exterior Sol-Air Temperature	90,84	0,79	70,84	SRI value	6	Aged SRI value	10
	[°C]	[Int DT°C]	[Ext-Int DT°C]		[-]		[-]

Verifications

Condensation Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
13,22	21,95	Yes

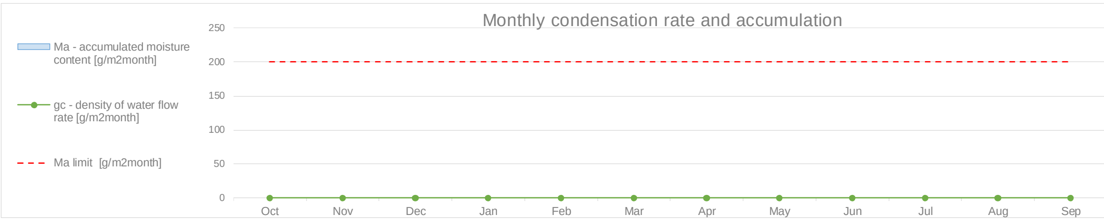
Mold growth Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
16,69	21,95	Yes

f_{Rsi}		
$f_{Rsi\,min}$	f_{Rsi} Project	Verified
0,82	0,97	Yes

gc [g/m² * h]
g_c
1,05

U-Value [W/(m²K)]		
min	Project	Verified
0,300	0,112	Yes

Monthly Condensation rate and accumulation within the whole assembly



	10	11	12	1	2	3	4	5	6	7	8	9
Days	31	30	31	31	28	31	30	31	30	31	31	30
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	1	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.		Verification status:
RO01		Assembly verified

	Verification status per month: Is the 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
	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
	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
Temp. factor at the internal surface	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
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.											

TC01 - timber frame cold roof

Location temperatures	Heating load [° C]	-0,7	Cooling load [° C]	19,6	Hours	1
Assembly definition	θe [° C] 28,0	φe (θe) 90%	θi [° C] 20,0	φi (θi) 65%		

Assembly no.	Building assembly description	Interior insulation?	Ft	Radiation effect	Solar rad.	Sol. rad. fact.	Eff. Solar rad.
RO02	Timber frame cold roof	No	1,00	Active	750	1,0	750
					[W/m²]	[-]	[W/m²]

	Heat transmission resistance [m²K/W]	DT Roof 13788	Radiation attributes		Clima zone	4	Limits	PHI	User defined
Orientation of building element: 1 - Roof	interior Rsi: 0,10	0,00	Reflectivity:						
Adjacent to: 3 - Ventilated	exterior Rse: 0,10		Absorptivity:	0,90	Region	Warm-temperate	U-value	0,30	
For condensation or mould growth on opaque surfaces	interior Rsi: 0,25		Emissivity:	0,90	Location	GB0005a-Exeter	fRsi min 0,25	0,82	

Pos.	Area section	λ [W/(mK)]	Thickness [mm]	μ [-]	S_d [m]	R [m²K/W]	Temperature [° C]	p_v [Pa]	RH [%]
i	Interior air						20,00	1519	65%
0	Rsi - Interior surface					0,100	20,89	1519	62%
1	Fermacell Gypsum Fibre	0,400	12	10,0	0,12	0,030	21,16	1559	62%
2	Fermacell Gypsum Fibre	0,400	12	10,0	0,12	0,030	21,42	1599	63%
3	Air gap acc. ISO 6946	0,156	25	0,3	0,01	0,160	22,85	1601	58%
4	SIGA Majrex 200	100,000	0	16.666,7	5,00	0,000	22,85	2782	100%
5	Knauf Loft Roll 44	0,053	100	1,0	0,10	1,887	39,62	3300	46%
6	Knauf Loft Roll 44	0,053	100	1,0	0,10	1,887	56,40	3333	20%
7	Knauf Loft Roll 44	0,053	100	1,0	0,10	1,887	73,18	3367	9%
8	Knauf Loft Roll 44	0,053	100	1,0	0,10	1,887	89,95	3400	5%
9									
10									
0	Rse - Exterior surface					0,100	89,95	3400	5%
e	Exterior air						90,84	3400	90%

Total Values	44,93 [cm]	5,65 [m]	7,967 [m²K/W]	-8,89 q tot [W/m2]	-6,66E-08 g [kg/(m²s)]	1 Cond. Interfaces

Radiation effect: Active

			Surfaces DT			
Exterior Sol-Air Temperature	90,84 [°C]	0,89 [Int DT°C]	70,84 [Ext-Int DT°C]	SRI value 6 [-]	Aged SRI value 10 [-]	

Verifications

Condensation Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
13,22	22,18	Yes

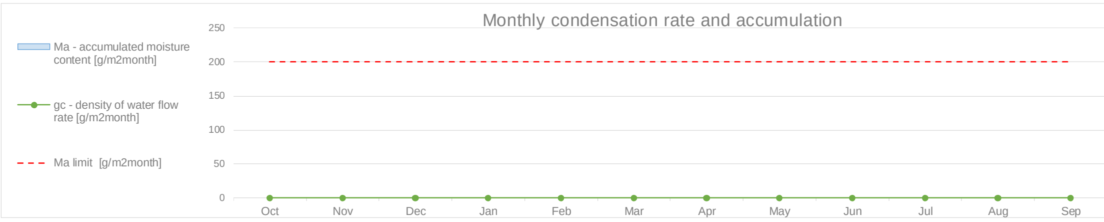
Mold growth Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
16,69	22,18	Yes

f_{Rsi}		
$f_{Rsi\,min}$	f_{Rsi} Project	Verified
0,82	0,97	Yes

gc [g/m² * h]
g_c
0,94

U-Value [W/(m²K)]		
min	Project	Verified
0,300	0,126	Yes

Monthly Condensation rate and accumulation within the whole assembly



	10	11	12	1	2	3	4	5	6	7	8	9
Days	31	30	31	31	28	31	30	31	30	31	31	30
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.		Verification status:
RO02		Assembly verified

	Verification status per month: Is the 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
	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
	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
Temp. factor at the internal surface	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
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.											

FS01 - insulated concrete formwork floor slab (ground level)

Location temperatures	Heating load [° C]	-0,7	Cooling load [° C]	19,6	Hours 1
Assembly definition	θe [° C] 28,0	φe (θe) 90%	θi [° C] 20,0	φi (θi) 65%	

Assembly no.	Building assembly description	Interior insulation?	Ft	Radiation effect	Solar rad.	Sol. rad. fact.	Eff. Solar rad.
FS01	**ICF ground level floor slab**	**No**	1,00	**Active**	750	1,0	**750**
			Adjacent to ground is selected		[W/m²]	[-]	[W/m²]

		Heat transmission resistance [m²K/W]	DT Roof 13788	Radiation attributes		Clima zone	4	Limits	PHI	User defined
Orientation of building element	**3 - Floor**	interior Rsi: 0,17	0,00	Reflectivity:		Region	Warm-temperate	U-value	0,30	
Adjacent to	**2 - Ground**	exterior Rse: 0,00		Absorptivity:	0,90	Location	GB0005a-Exeter	fRsi min 0,25	0,82	
For condensation or mould growth on opaque surfaces		interior Rsi: 0,25		Emissivity:	0,90					

Pos.	Area section	λ [W/(mK)]	Thickness [mm]	μ [-]	S_d [m]	R [m²K/W]	Temperature [° C]	p_v [Pa]	RH [%]
i	Interior air						**20,00**	**1519**	**65%**
0	Rsi - Interior surface					0,170	#DIV/0!	#DIV/0!	#DIV/0!
1	**Reinforced concrete**	**2,300**	**200**	**130,0**	26,00	0,087	#DIV/0!	#DIV/0!	#DIV/0!
2	**EPS 200E (DoP + DIN 4108)**	**0,041**	**300**	**60,0**	18,00	7,317	#DIV/0!	#DIV/0!	#DIV/0!
3									
4									
5									
6									
7									
8									
9									
10									
0	Rse - Exterior surface					0,000	#DIV/0!	#DIV/0!	#DIV/0!
e	Exterior air						**#DIV/0!**	**#DIV/0!**	**90%**
	Total Values		**50,00**		**44,00**	**7,574**	**#DIV/0!**	**#DIV/0!**	**0**
			[cm]		[m]	[m²K/W]	q tot [W/m2]	g [kg/(m²s)]	Cond. Interfaces

	Radiation effect: Active		Surfaces DT				
Exterior Sol-Air Temperature	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	SRI value	**6**	Aged SRI value	**10**
	[°C]	[Int DT°C]	[Ext-Int DT°C]		[-]		[-]

Verifications

Condensation Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
13,22	**#DIV/0!**	**#DIV/0!**

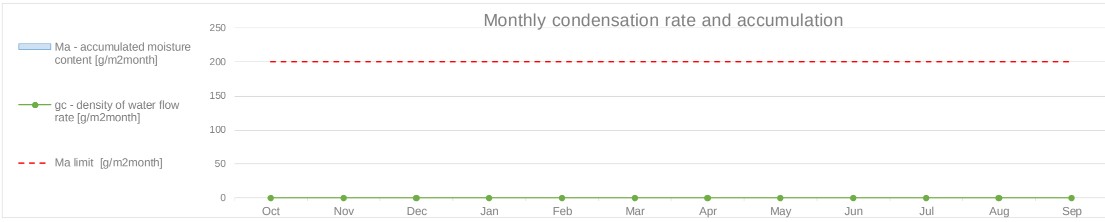
Mold growth Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
16,69	**#DIV/0!**	**#DIV/0!**

f_{Rsi}		
$f_{Rsi\,min}$	f_{Rsi} Project	Verified
0,82	**#DIV/0!**	**#DIV/0!**

gc [g/m² * h]
g_c
#DIV/0!

U-Value [W/(m²K)]		
min	Project	Verified
0,300	**0,132**	**Yes**

Monthly Condensation rate and accumulation within the whole assembly



	10	11	12	1	2	3	4	5	6	7	8	9
Days	31	30	31	31	28	31	30	31	30	31	31	30
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.		Verification status:
FS01		**Assembly verified**

	Verification status per month: Is the 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
	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
	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
Temp. factor at the internal surface	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
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.											

FS02 - insulated concrete formwork floor slab (basement level)

Location temperatures	Heating load [° C]	-0,7	Cooling load [° C]	19,6	Hours	1
Assembly definition	θe [° C]	28,0	φe (θe)	90%	θi [° C] 20,0 / φi (θi)	65%

Assembly no.	Building assembly description	Interior insulation?	Ft	Radiation effect	Solar rad.	Sol. rad. fact.	Eff. Solar rad.
FS01	ICF ground level floor slab	No	1,00	Active	750	1,0	750
			Adjacent to ground is selected		[W/m²]	[-]	[W/m²]

	Heat transmission resistance [m²K/W]		DT Roof 13788	Radiation attributes					
Orientation of building element	3 - Floor	interior Rsi: 0,17	0,00	Reflectivity:		Clima zone	4	Limits / PHI / User defined	
Adjacent to	2 - Ground	exterior Rse: 0,00		Absorptivity:	0,90	Region	Warm-temperate	U-value	0,30
For condensation or mould growth on opaque surfaces		interior Rsi: 0,25		Emissivity:	0,90	Location	GB0005a-Exeter	fRsi min 0,25	0,82

Pos.	Area section	λ [W/(mK)]	Thickness [mm]	μ [-]	S_d [m]	R [m²K/W]	Temperature [° C]	p_v [Pa]	RH [%]
i	Interior air						20,00	1519	65%
0	Rsi - Interior surface					0,170	#DIV/0!	#DIV/0!	#DIV/0!
1	EPS 250/300E	0,040	50	60,0	3,00	1,250	#DIV/0!	#DIV/0!	#DIV/0!
2	Reinforced concrete	2,300	200	130,0	26,00	0,087	#DIV/0!	#DIV/0!	#DIV/0!
3	EPS 250/300E	0,040	300	60,0	18,00	7,500	#DIV/0!	#DIV/0!	#DIV/0!
4									
5									
6									
7									
8									
9									
10									
0	Rse - Exterior surface					0,000	#DIV/0!	#DIV/0!	#DIV/0!
e	Exterior air						#DIV/0!	#DIV/0!	90%
	Total Values		55,00 [cm]		47,00 [m]	9,007 [m²K/W]	#DIV/0! q tot [W/m2]	#DIV/0! g [kg/(m²s)]	0 Cond. Interfaces

Radiation effect: Active		Surfaces DT				
Exterior Sol-Air Temperature	#DIV/0! [°C]	#DIV/0! [Int DT°C]	#DIV/0! [Ext-Int DT°C]	SRI value 6 [-]	Aged SRI value	10 [-]

Verifications

Condensation Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
13,22	#DIV/0!	#DIV/0!

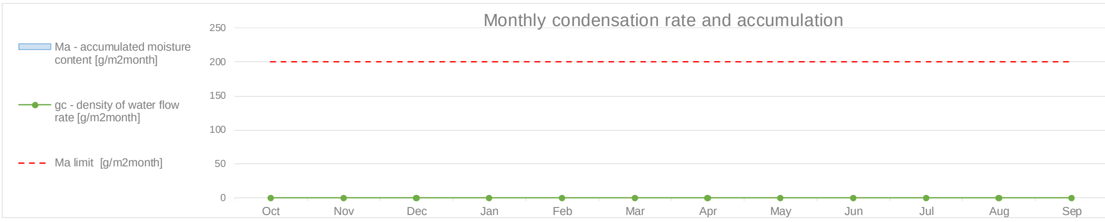
Mold growth Rsi 0,25 [° C]		
T_{min}	T_{si} Project	Verified
16,69	#DIV/0!	#DIV/0!

f_{Rsi}		
$f_{Rsi\ min}$	f_{Rsi} Project	Verified
0,82	#DIV/0!	#DIV/0!

gc [g/m² * h]
g_c
#DIV/0!

U-Value [W/(m²K)]		
min	Project	Verified
0,300	0,111	Yes

Monthly Condensation rate and accumulation within the whole assembly



	10	11	12	1	2	3	4	5	6	7	8	9
Days	31	30	31	31	28	31	30	31	30	31	31	30
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.		Verification status:
FS01		Assembly verified

	Verification status per month: Is the 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
	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
	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
Temp. factor at the internal surface	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
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.											

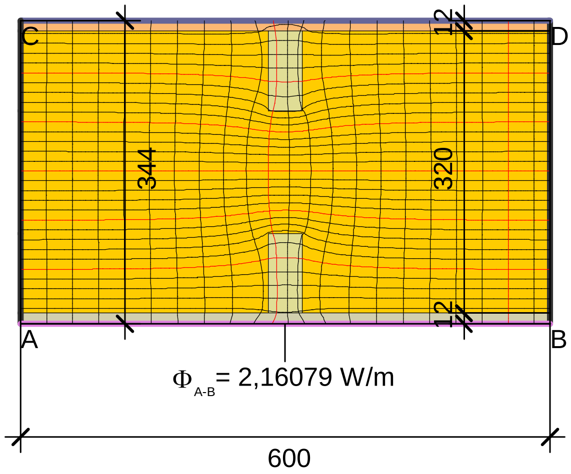
Appendix 2: Thermal simulations | Wärmestromsimulationen

Passive House Institute

Wall, roof, ground | Wand, Dach, Boden
Windows | Fenster

Wall, roof, ground | Wand, Dach, Boden

EXTERNAL WALL

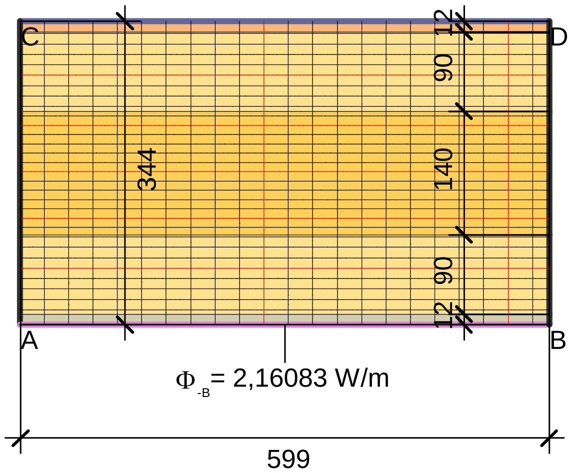


$$U_{eq\,A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior vent. | Außen belüftet		-10,000	0,130		
Interior | Innen		20,000	0,130		
Adiabatic | Adiabat	0,000				

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

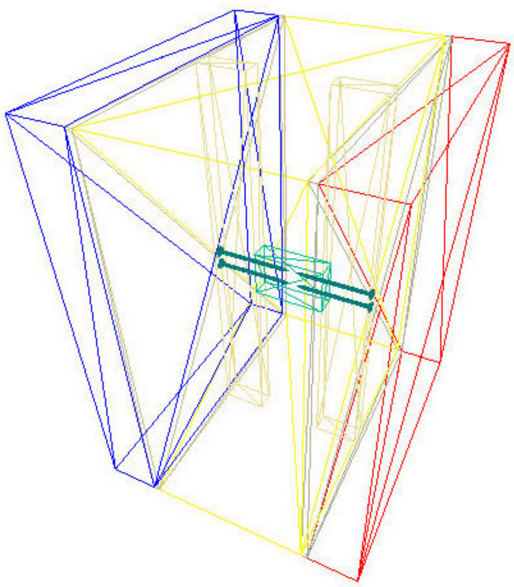
EXTERNAL WALL - EQUIVALENT VALUES



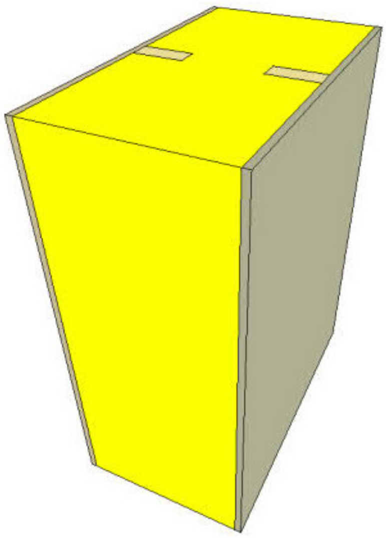
$$U_{eq\,A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}599} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior vent. | Außen belüftet		-10,000	0,130		
Interior | Innen		20,000	0,130		
Adiabatic | Adiabat	0,000				

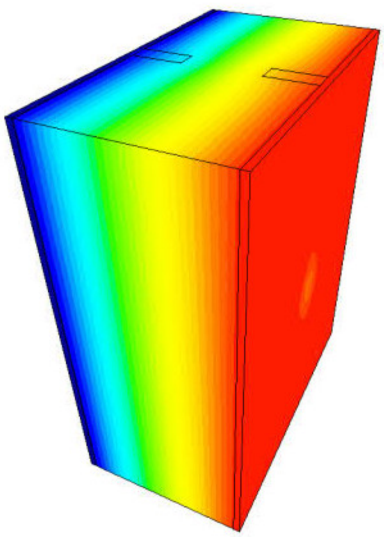
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	



A



B



C

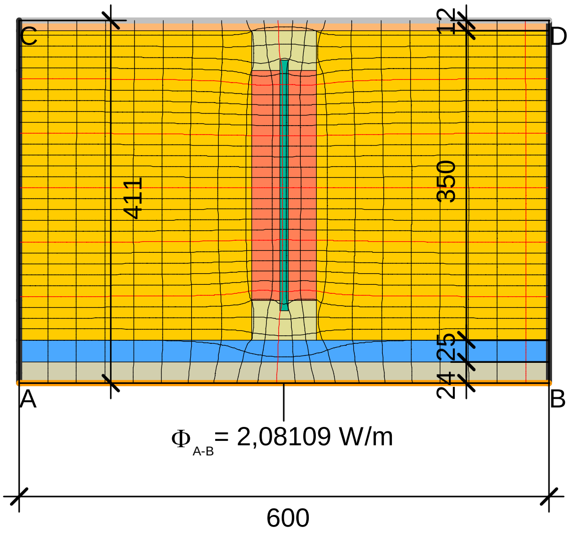
The external wall assembly of THEPASSIVHAUS comprises vertical timber studs (38 x 90 mm), connected horizontally by timber blocks (140 x 30 x 90 mm), fastened using 4x 150 mm steel screws, each with a diameter of 6 mm. An x-ray view of the assembly is shown left, top (A).

In order to establish the thermal effect of the connecting blocks and screws on the U-value of the external wall, these penetrations were modelled in 3D according to ISO 10211, using the material thermal conductivities shown in the material legend on the pervious page. Images of the thermal model are shown left, middle (B) and bottom (C), the latter showing the isothermal distribution.

Two models were constructed, the first to reflect the real construction, the second without the connecting block and screws to represent the 'undisturbed' wall. A heat flow difference of 0,11 W was then measured between the two models.

When divided by the modelled temperature differential of 30K and then multiplied by the inverse of the area (0,6 m x 0,54 m = 0,324 m²), the delta-U of 0,11 W/(m²K) is found. This figure is added to the final certified value shown in Appendix 1.

PITCHED ROOF

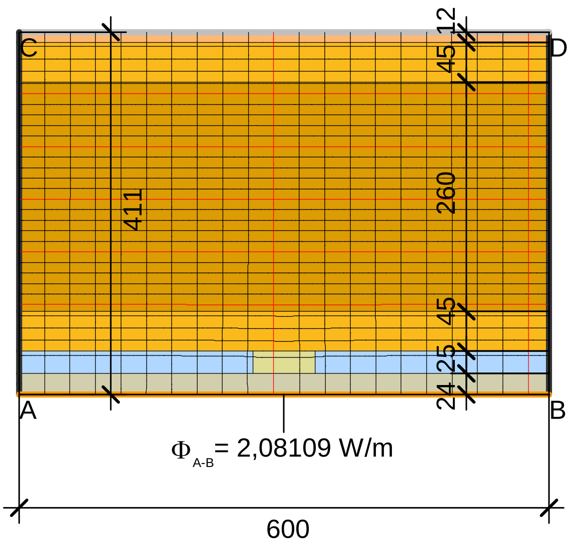


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,081}{30,000 \cdot 0,600} = 0,116\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood flow parallel I Weichholz Q parallel	0,290	0,900	0,640
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior roof | Außen Dach		-10,000	0,100		
Interior up. | Innen auf.		20,000	0,100		
Adiabatic | Adiabat	0,000				

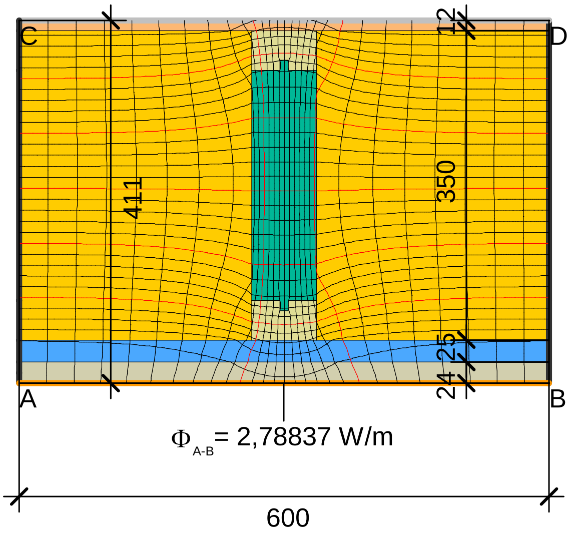
PITCHED ROOF - EQUIVALENT VALUES



$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,081}{30,000 \cdot 0,600} = 0,116\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 3	0,049	0,900	0,640
GW+timber equivalent 4	0,041	0,900	0,640
Luftschicht, ruhend, aufwärts, Dicke: 25 mm	0,156	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

PITCHED ROOF

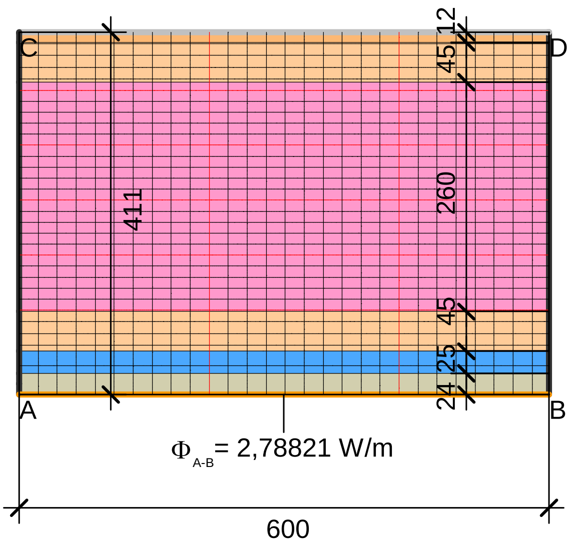


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,788}{30,000 \cdot 0,600} = 0,155\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood flow parallel I Weichholz Q parallel	0,290	0,900	0,640
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior roof | Außen Dach		-10,000	0,100		
Interior up. | Innen auf.		20,000	0,100		
Adiabatic | Adiabat	0,000				

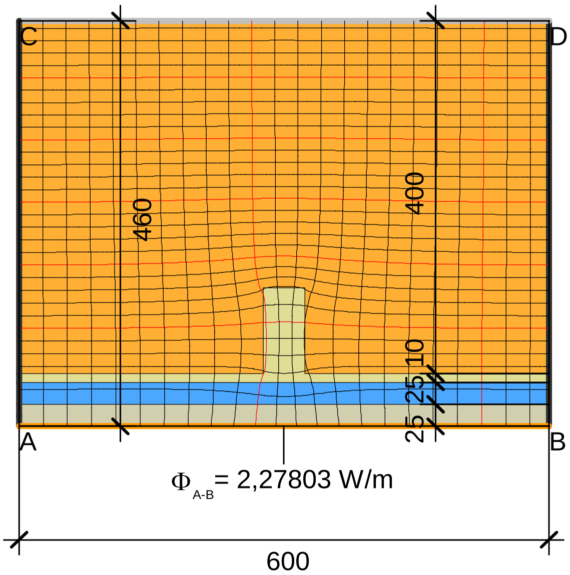
PITCHED ROOF - EQUIVALENT VALUES



$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,788}{30,000 \cdot 0,600} = 0,155\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 3a	0,062	0,900	0,640
GW+timber equivalent 4a	0,058	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	

COLD ROOF

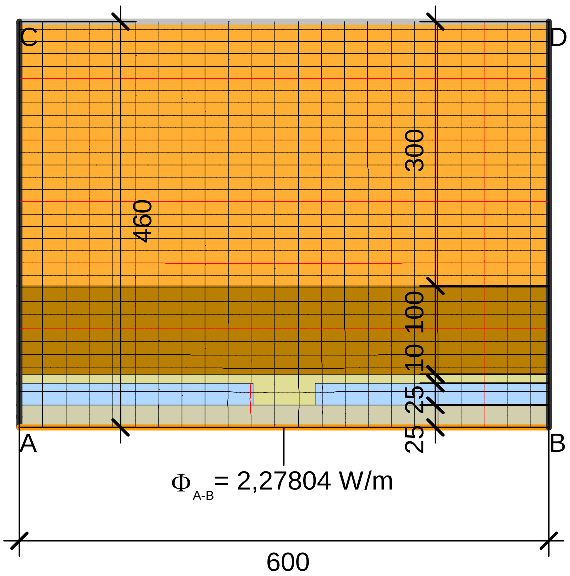


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}278}{30{,}000 \cdot 0{,}600} = 0{,}127\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Knauf Loft Roll 44 (DoP + DIN 4108)	0,053	0,900	0,640
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior roof | Außen Dach		-10,000	0,100		
Interior up. | Innen auf.		20,000	0,100		
Adiabatic | Adiabat	0,000				

COLD ROOF - EQUIVALENT VALUES

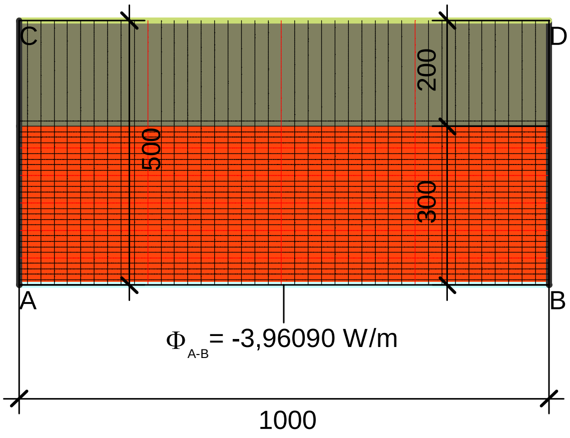


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}278}{30{,}000 \cdot 0{,}600} = 0{,}127\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 5	0,058	0,900	0,640
Knauf Loft Roll 44 (DoP + DIN 4108)	0,053	0,900	0,640
Luftschicht, ruhend, aufwärts, Dicke: 25 mm	0,156	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior roof | Außen Dach		-10,000	0,100		
Interior up. | Innen auf.		20,000	0,100		
Adiabatic | Adiabat	0,000				

FLOOR SLAB - GROUND LEVEL

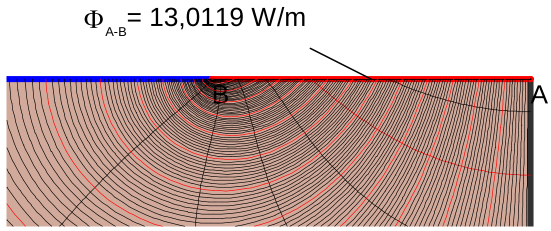


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{3{,}961}{30{,}000 \cdot 1{,}000} = 0{,}132\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640

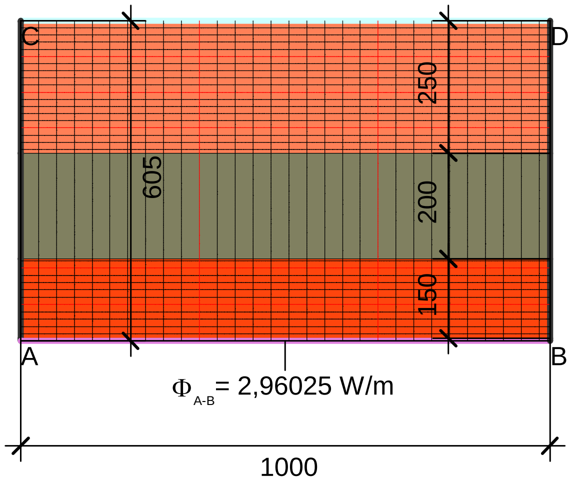
Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Gorund I Erdreich		-10,000			
Int. flux down I Innen abwärts		20,000	0,170		
Adiabatic | Adiabat	0,000				

FLOOR SLAB - GROUND LEVEL EQUIVALENT SURFACE RESISTANCE CALCULATION



Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
EQ FS: 1/Ufs		20,000	7,576		
Exterior | Außen		-10,000	0,040		
Adiabatic | Adiabat	0,000				

BASEMENT WALL

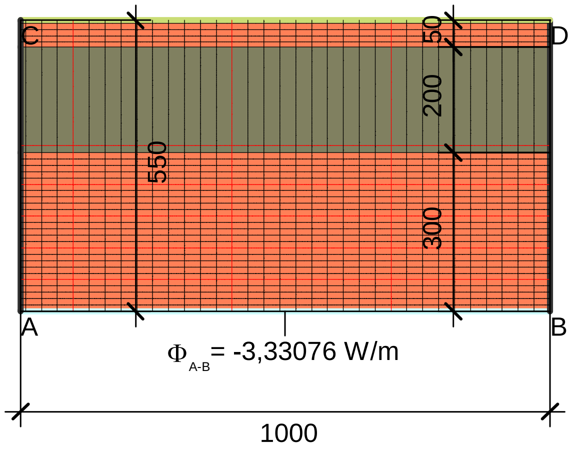


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}960}{30{,}000 \cdot 1{,}000} = 0{,}099\ W/(m^2 \cdot K)$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Interior plaster I Gipsputz 10456	0,570	0,900	0,080
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Adiabatic | Adiabat	0,000				
Gorund I Erdreich		-10,000			
Interior | Innen		20,000	0,130		

FLOOR SLAB - BASEMENT LEVEL

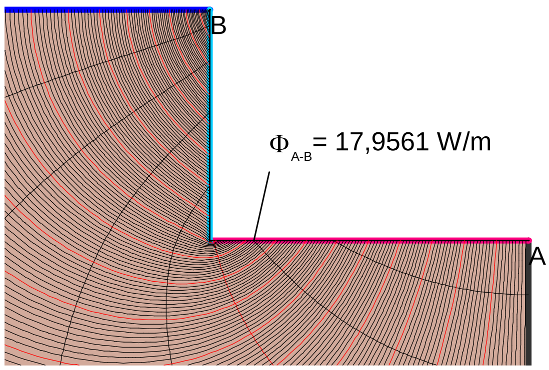


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{3,331}{30,000 \cdot 1,000} = 0,111\ W/(m^2 \cdot K)$$

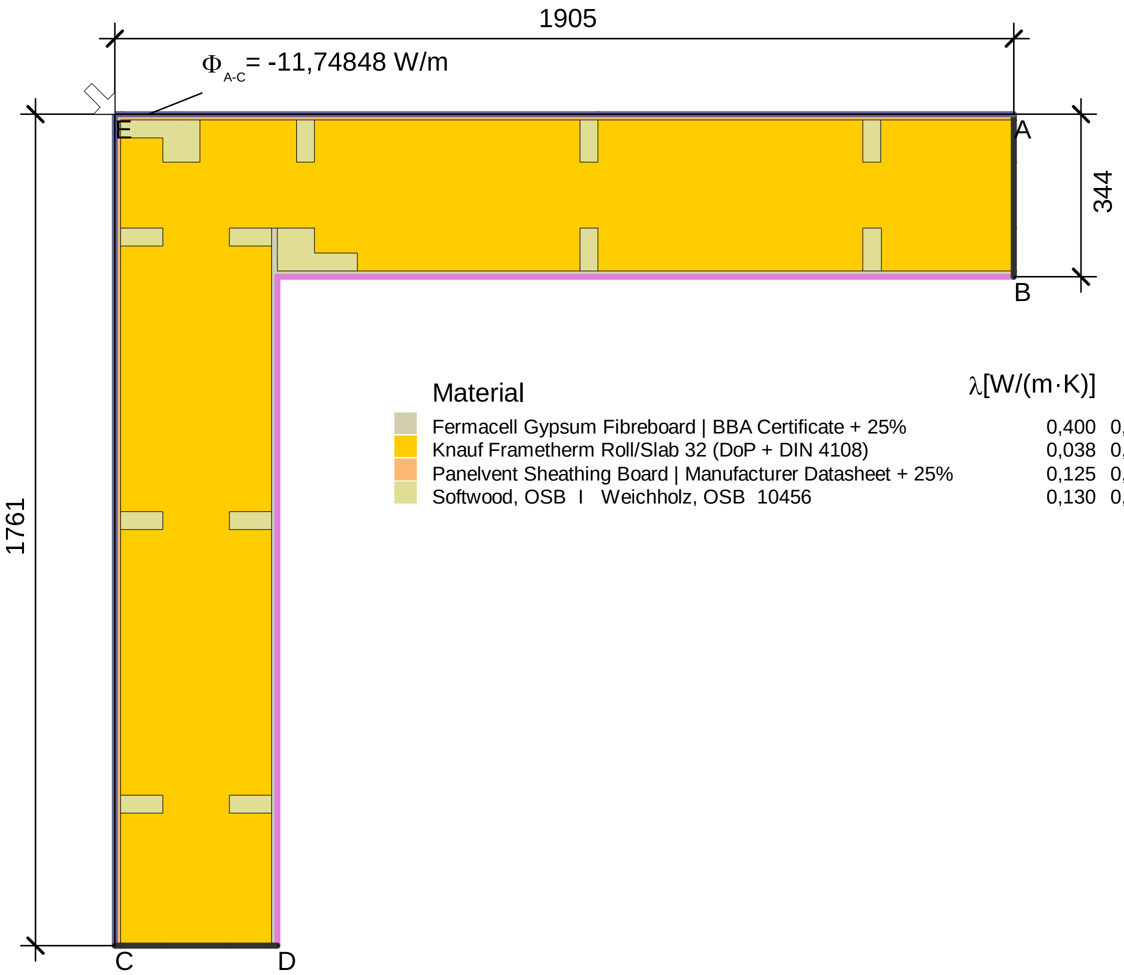
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Gorund I Erdreich		-10,000			
Int. flux down I Innen abwärts		20,000	0,170		
Adiabatic | Adiabat	0,000				

FLOOR SLAB - BASEMENT LEVEL EQUIVALENT SURFACE RESISTANCE CALCULATION

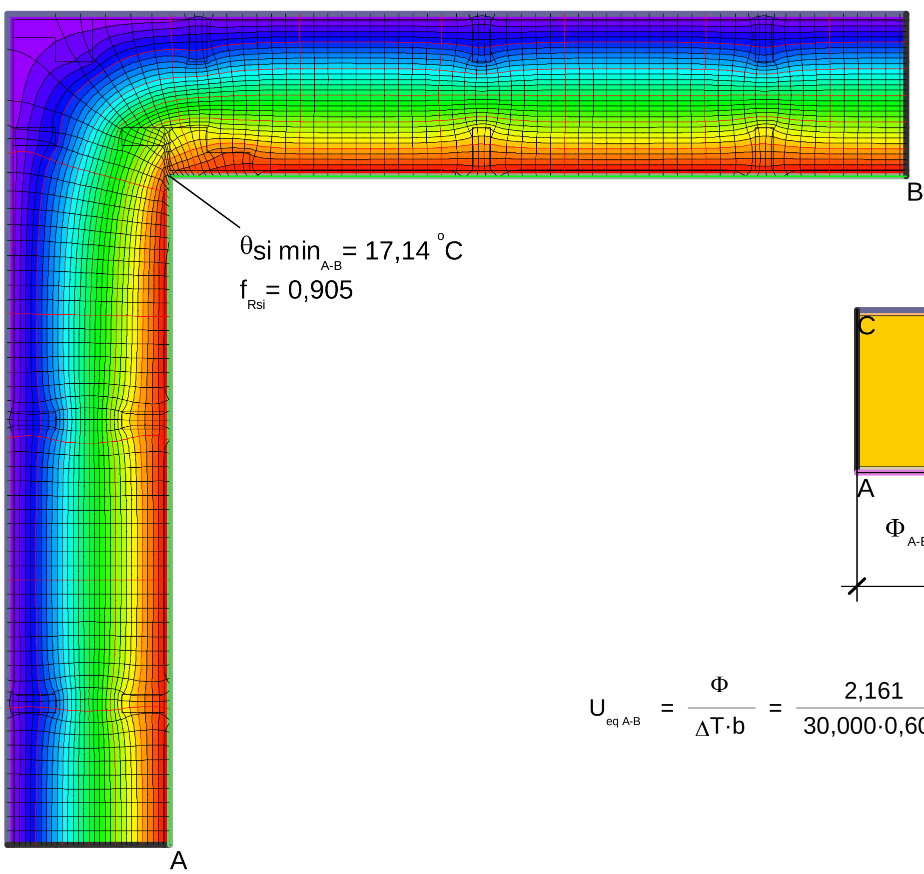


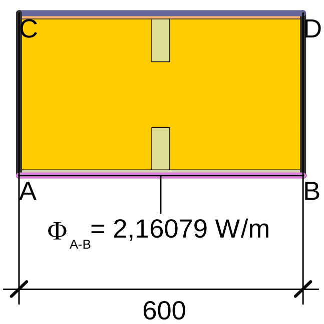
Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
EQ BW_basement: 1/Ufs		20,000	10,101		
EQ FS_basement: 1/Ufs		20,000	9,009		
Exterior | Außen		-10,000	0,040		
Adiabatic | Adiabat	0,000				



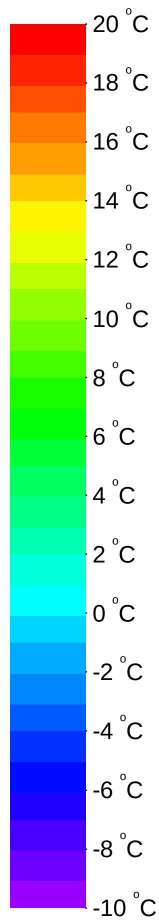
	Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
	Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
	Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
	Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
	Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

$$\Psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{11,748}{30,000} - 0,120 \cdot 1,905 - 0,120 \cdot 1,761 = -0,048 \text{ W/(m·K)}$$





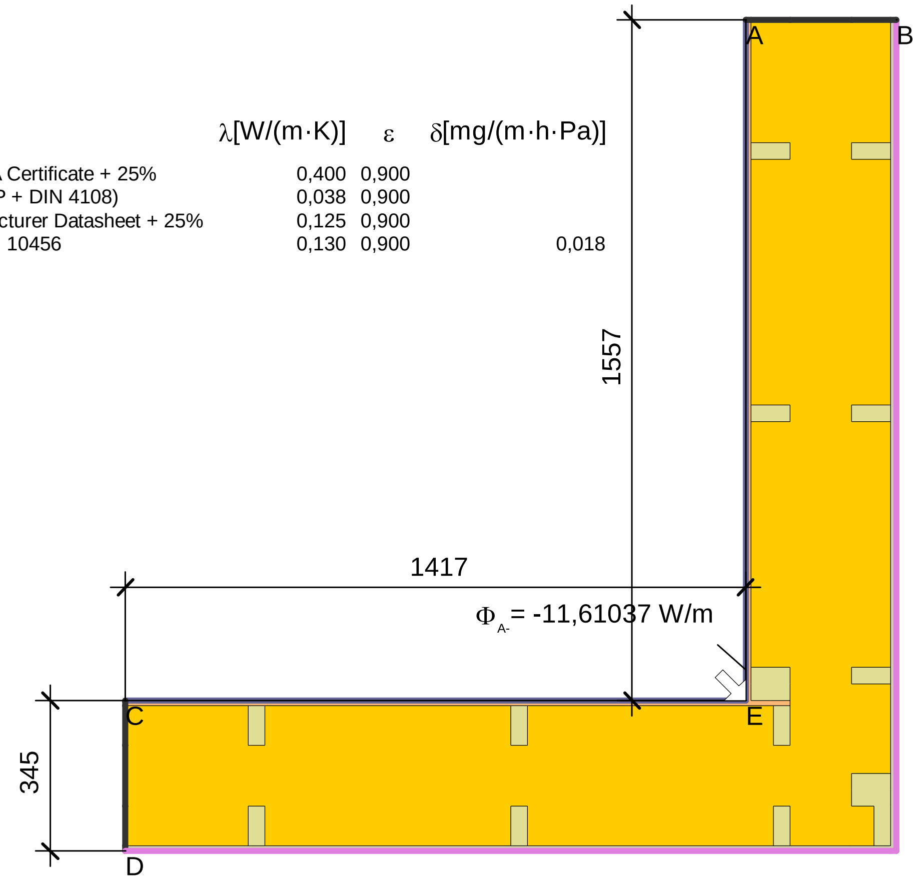
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120 \text{ W/(m}^2\text{·K)}$$



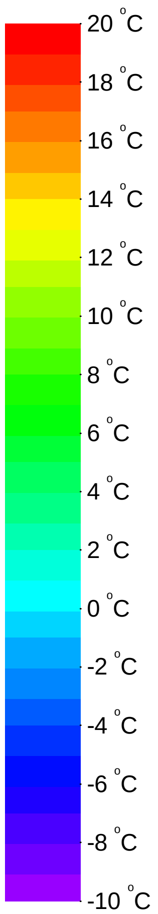
EW1_EW1_ec1 - External Wall, Exterior Corner Connection

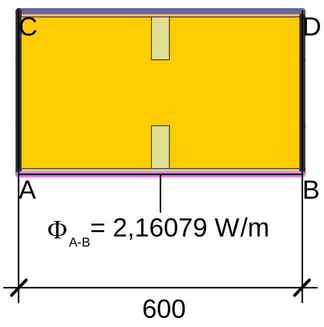
Passive House Institute

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

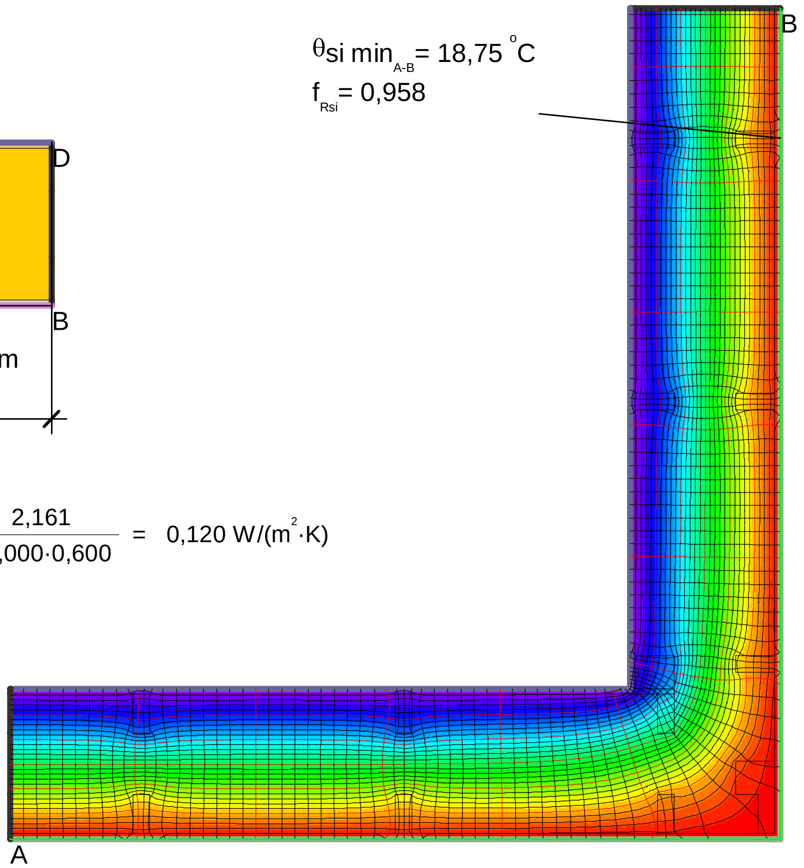


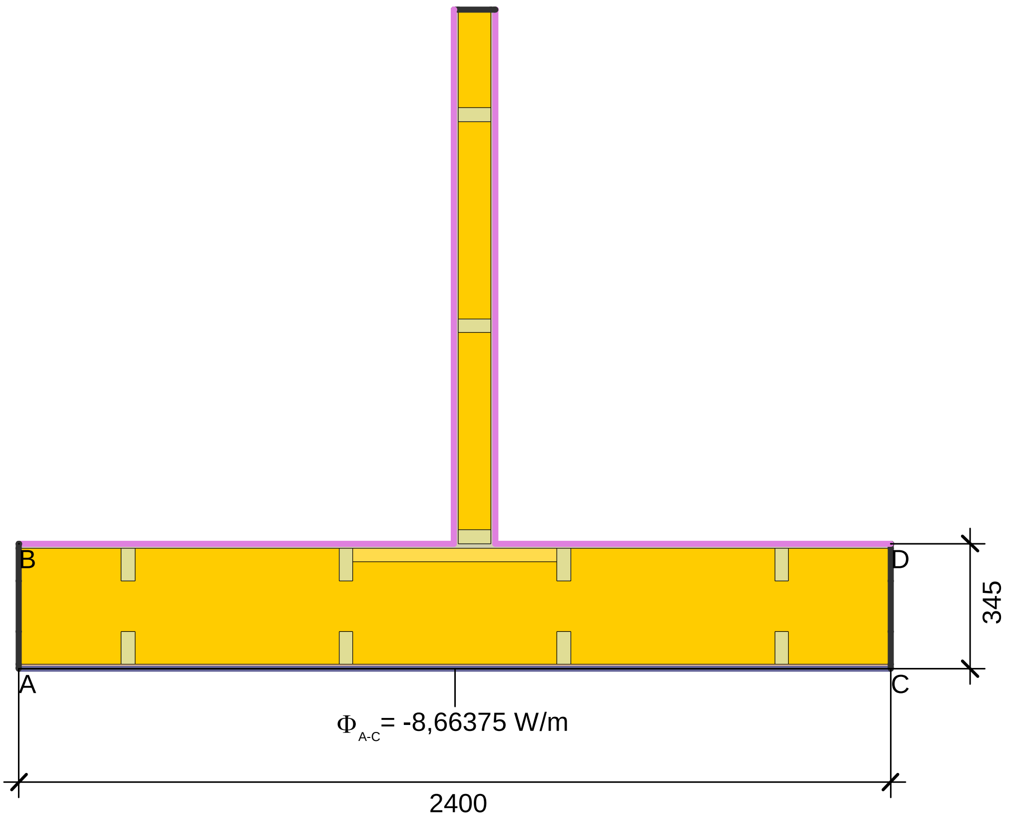
$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{11,610}{30,000} - 0,120 \cdot 1,557 - 0,120 \cdot 1,417 = 0,030 \text{ W/(m·K)}$$



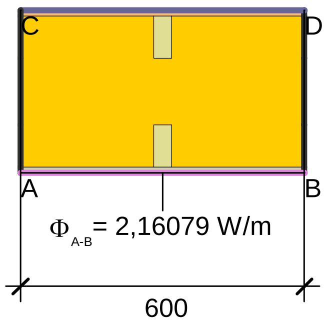


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120 \text{ W/(m}^2\text{·K)}$$

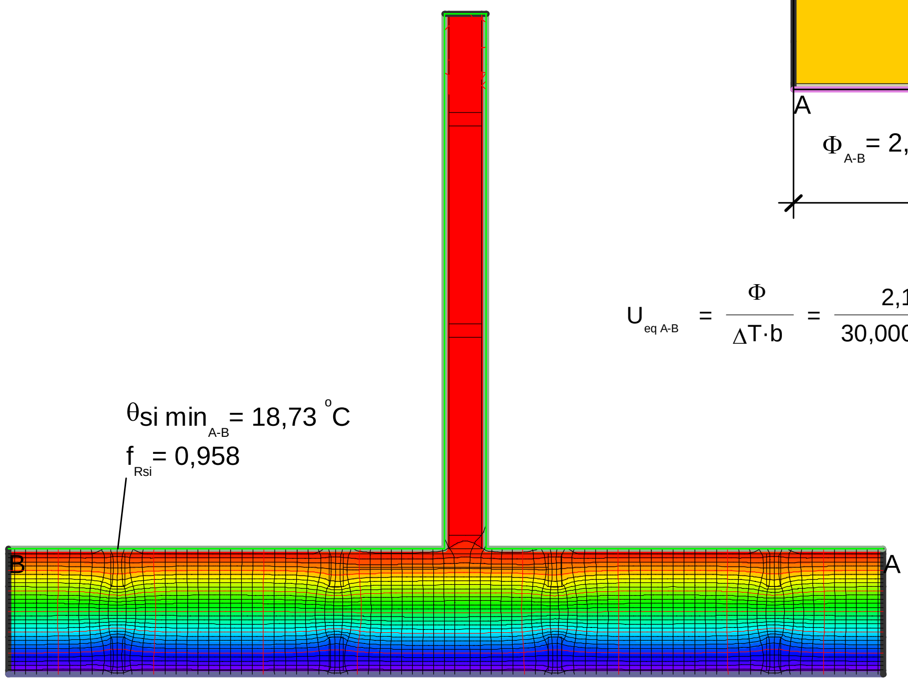


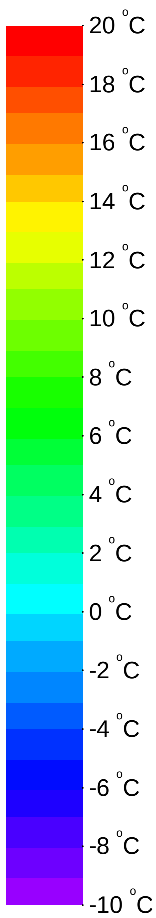


$$\psi_{A\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 = \frac{8,664}{30,000} - 0,120 \cdot 2,400 = 0,001\ W/(m \cdot K)$$

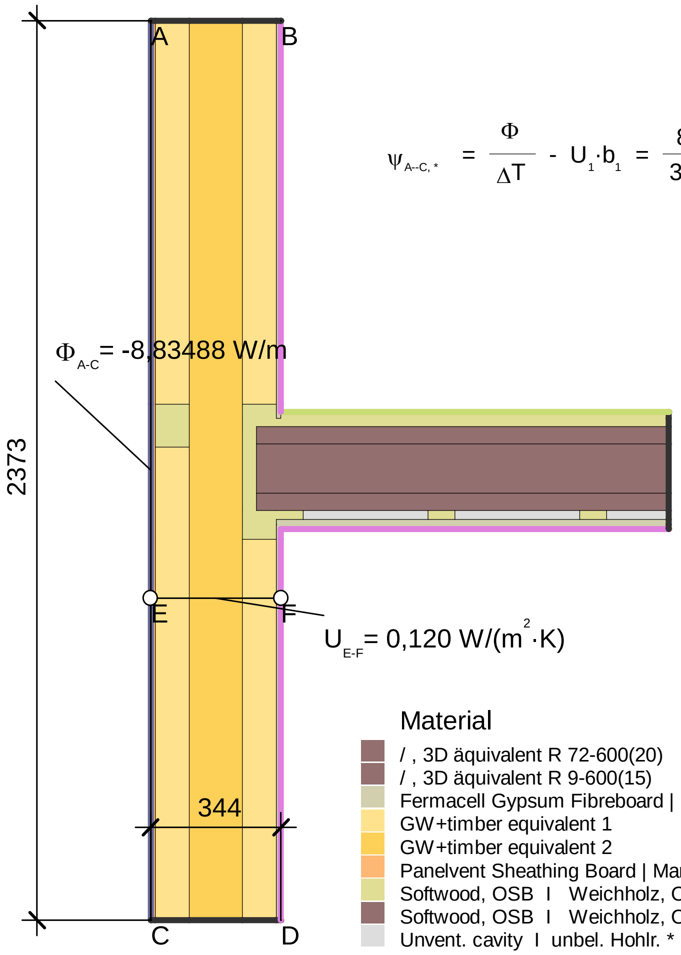


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120\ W/(m^2 \cdot K)$$





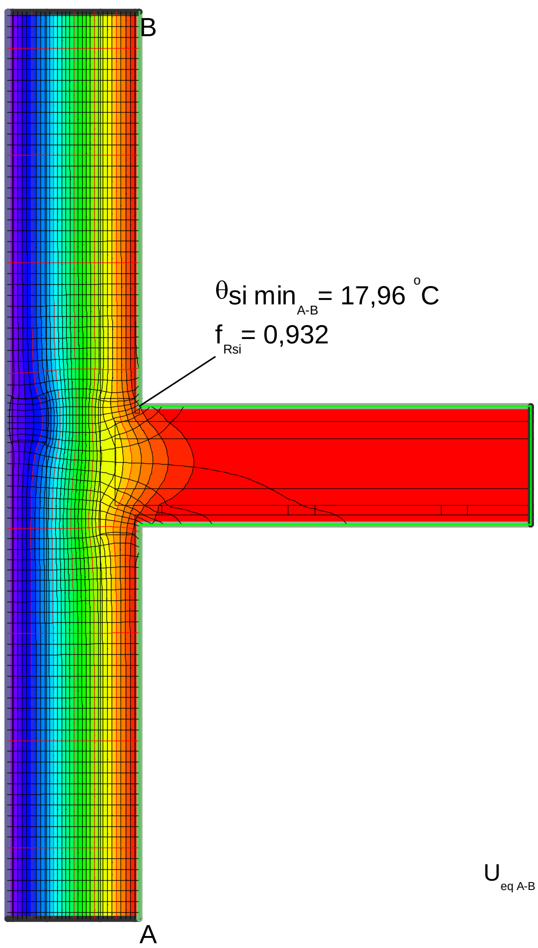
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

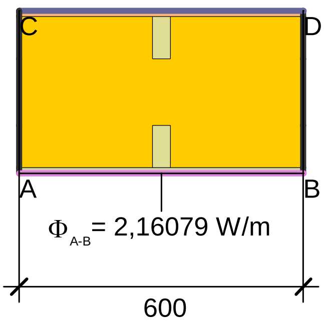


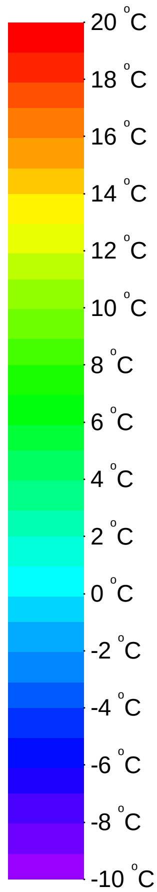
$$\psi_{A\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 = \frac{8,835}{30,000} - 0,120 \cdot 2,373 = 0,010 \text{ W/(m·K)}$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ , 3D äquivalent R 72-600(20)	0,058	0,900	0,640
/ , 3D äquivalent R 9-600(15)	0,052	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Softwood, OSB I Weichholz, OSB 10456 / , 3D äquivalent R 72-600(18)	0,058	0,900	0,640
Unvent. cavity I unbel. Hohlr. *			0,640

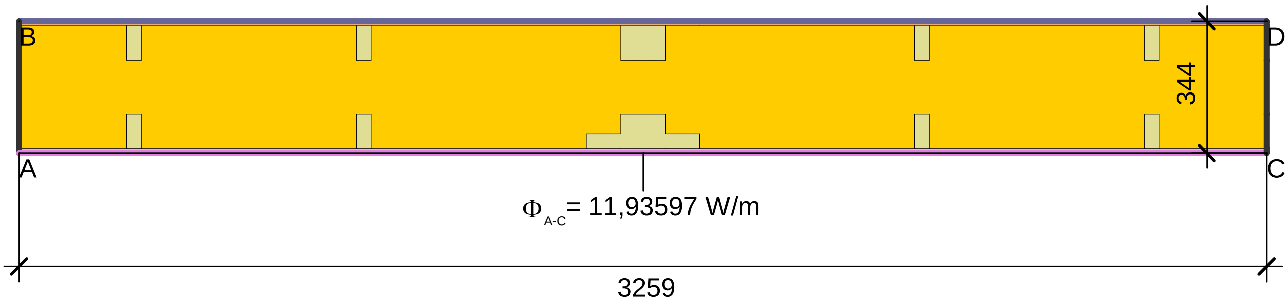
* EN ISO 10077-2:2017, 6.4.3



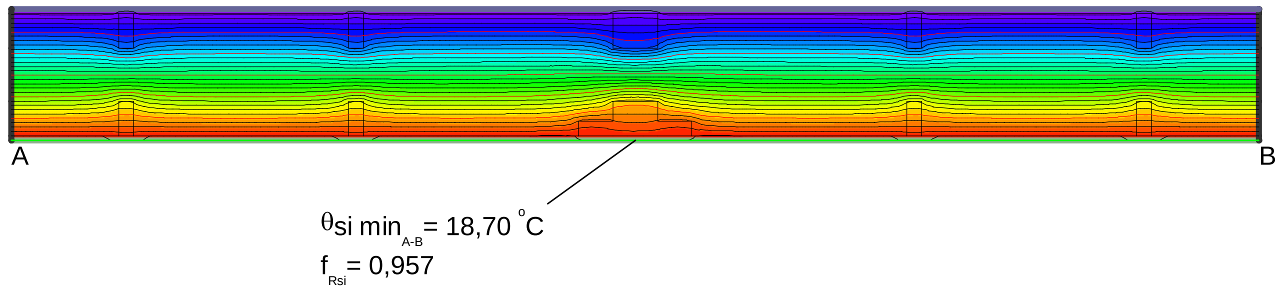




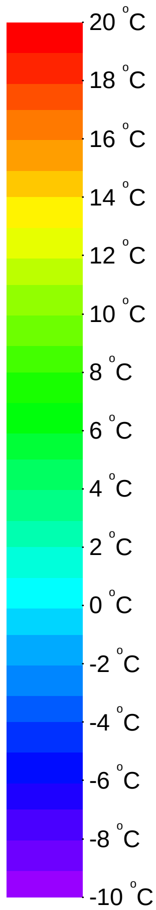
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120 \text{ W/(m}^2\text{·K)}$$

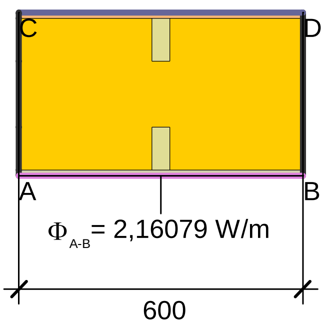


$$\psi_{A-C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 = \frac{11,936}{30,000} - 0,120 \cdot 3,259 = 0,007\ W/(m \cdot K)$$

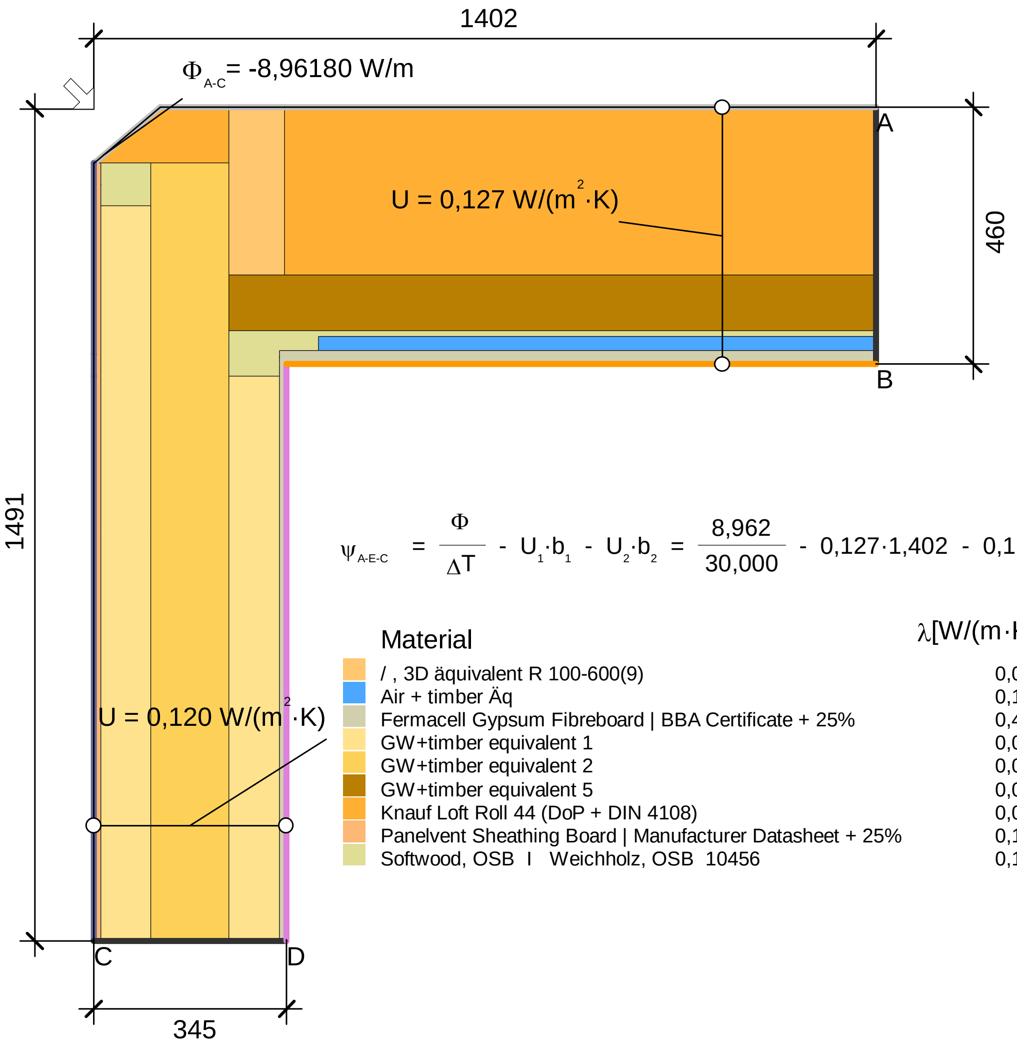


	Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
	Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
	Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
	Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
	Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018



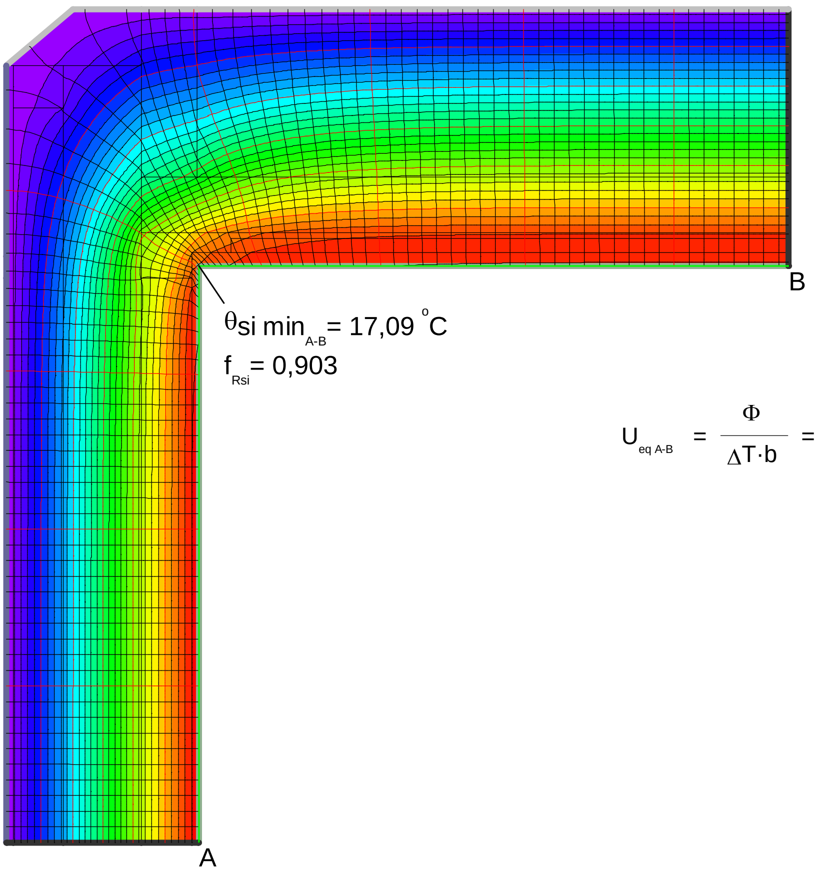


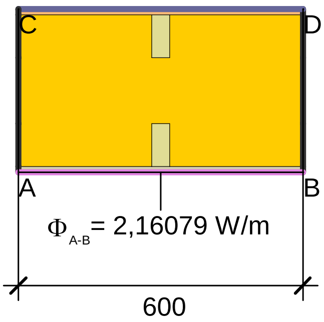
$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120\ W/(m^2 \cdot K)$$



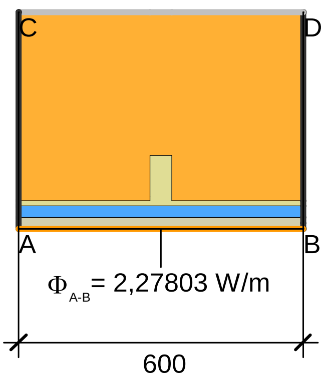
$$\psi_{A\text{-}E\text{-}C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8{,}962}{30{,}000} - 0{,}127 \cdot 1{,}402 - 0{,}120 \cdot 1{,}491 = -0{,}058 \text{ W/(m·K)}$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ , 3D äquivalent R 100-600(9)	0,093	0,900	0,640
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
GW+timber equivalent 5	0,058	0,900	0,640
Knauf Loft Roll 44 (DoP + DIN 4108)	0,053	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

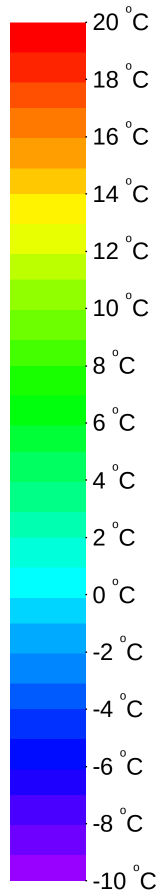




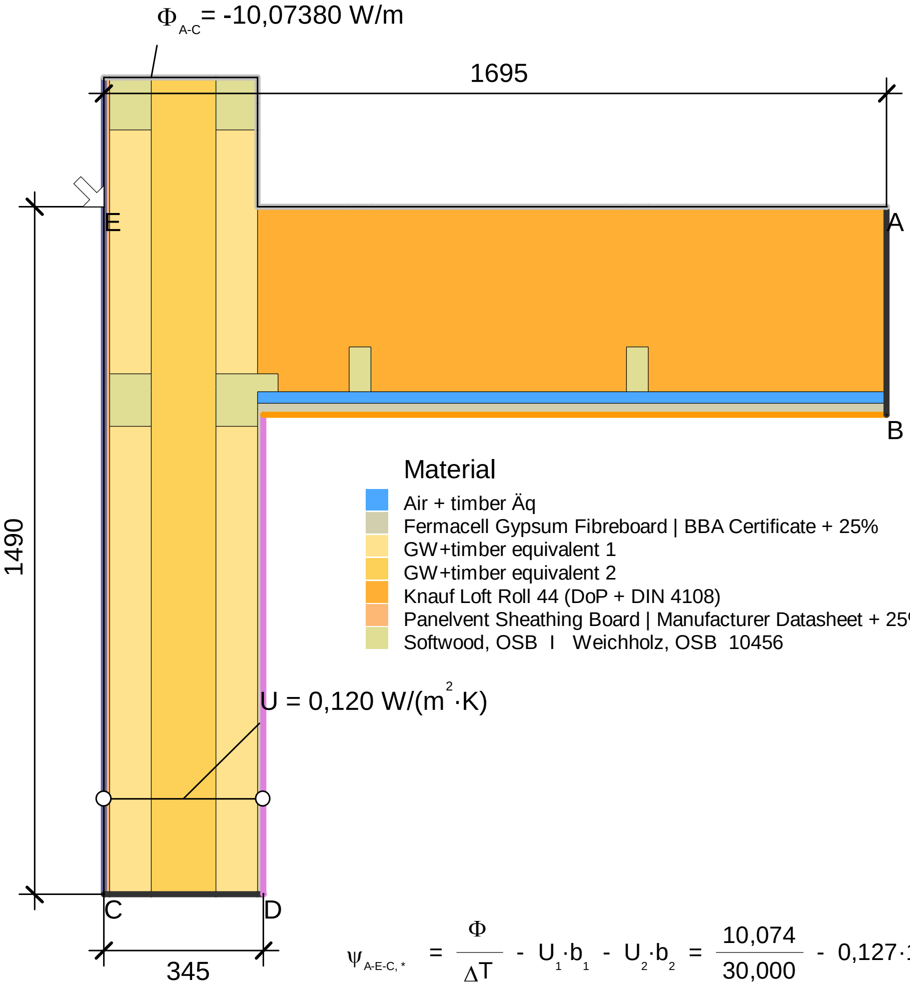
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$



$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}278}{30{,}000 \cdot 0{,}600} = 0{,}127 \text{ W/(m}^2\text{·K)}$$

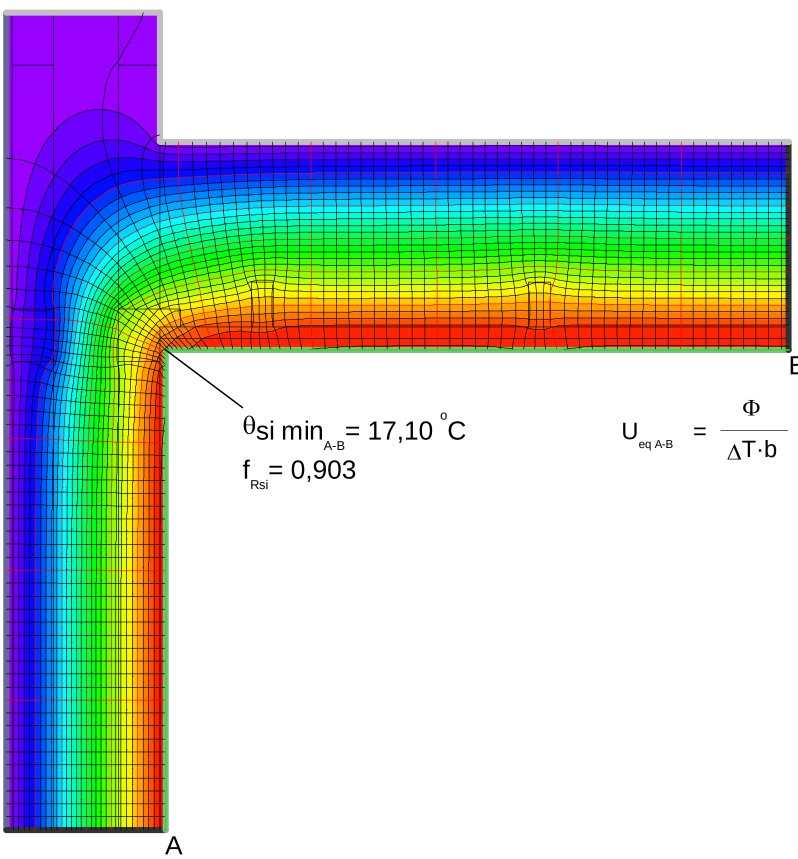


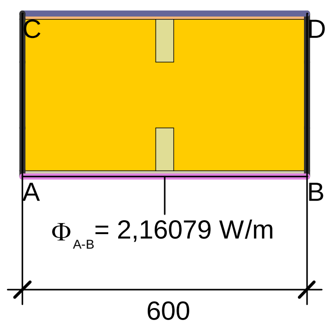
EW1_CE3 - Roof Eaves (Cold Roof) Connection



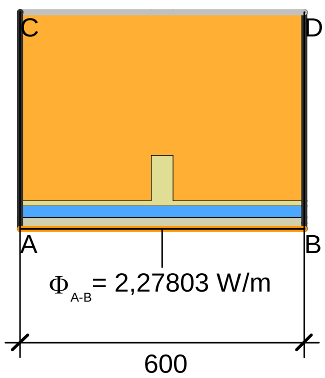
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Knauf Loft Roll 44 (DoP + DIN 4108)	0,053	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

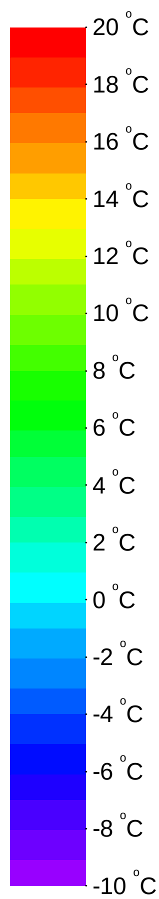
$$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{10,074}{30,000} - 0,127 \cdot 1,695 - 0,120 \cdot 1,490 = -0,058 \text{ W/(m·K)}$$



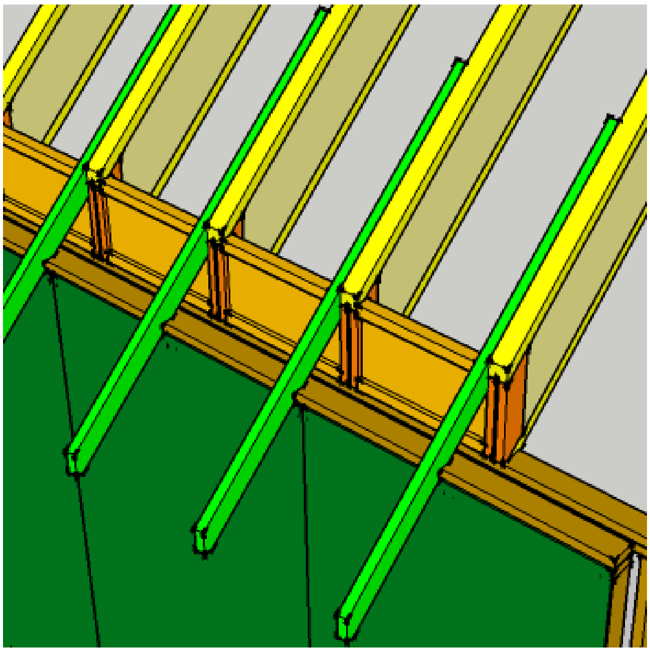


$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120 \text{ W/(m}^2\text{·K)}$$

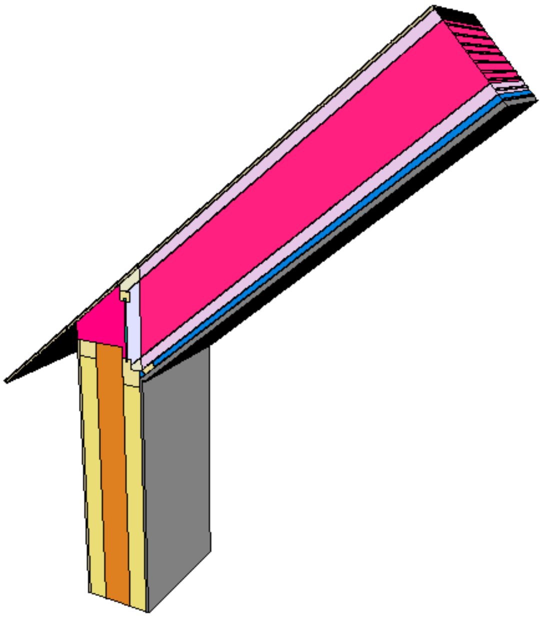




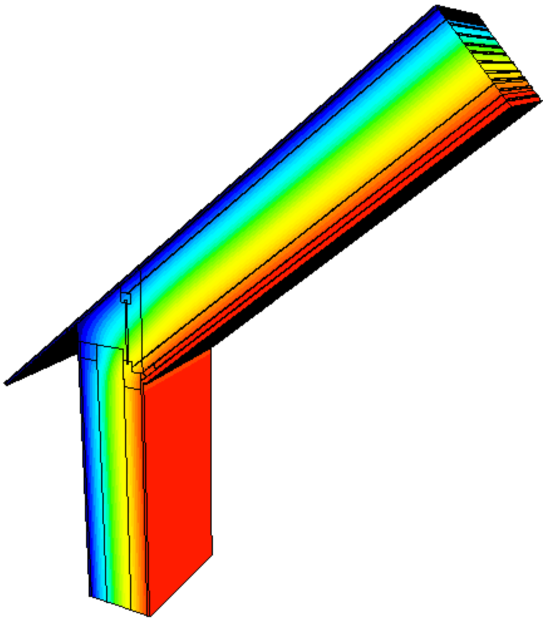
$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,278}{30,000 \cdot 0,600} = 0,127 \text{ W/(m}^2\text{·K)}$$



A



B



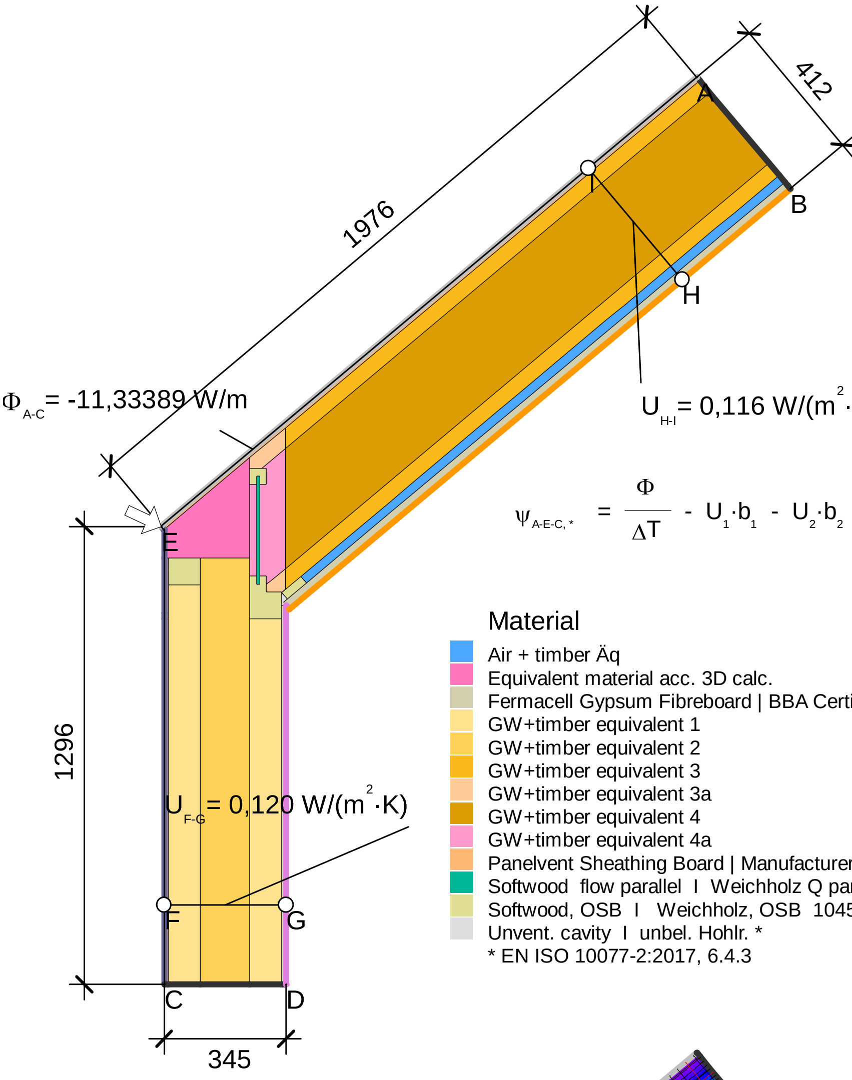
C

The roof assembly of THEPASSIVHAUS include rafter extensions, comprising 90 mm x 38 mm timber elements, fastened laterally to the timber I-beam rafters. The elements are 1820 mm long in total, and protrude past the external wall elements by 600 mm.

The extensions must be modelled in three-dimensions in order that their thermal effect can be taken into account in standard two-dimensional modelling according to ISO 10211 using an equivalent thermal conductivity at the point of intersection. To this end, two three-dimensional models were constructed using the information provided by Advanced Housing Systems (A), one including the timber extensions and one with a replacement 'block' at the point of intersection (B - highlighted).

The heat flow was measured through the former and was found to be 7,20 W; the isothermal distribution of the model is shown by (C) and the thermal conductivities used can be found in the materials legend on the following page.

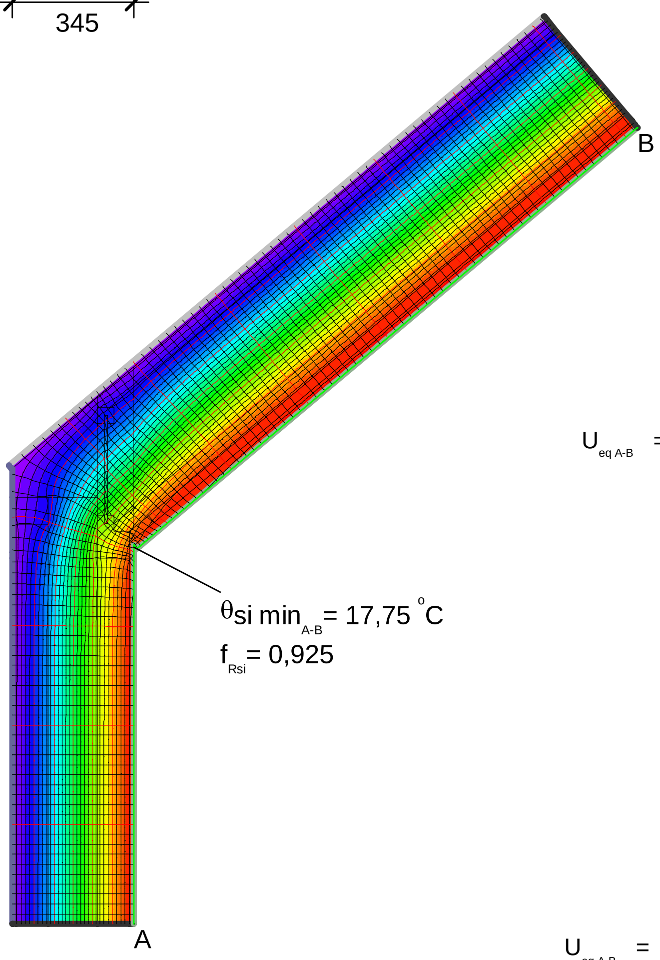
The thermal conductivity of the replacement block in the latter was then adjusted to achieve the same heat flow; the equivalent thermal conductivity was found to be 0,064 W/(mK). Its use in the two-dimensional modelling of the intersection can be seen on the following page.

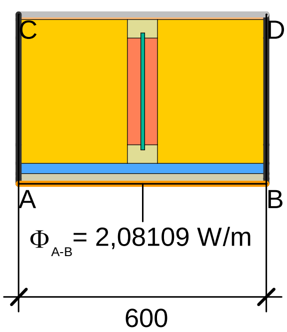


$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{11{,}334}{30{,}000} - 0{,}116 \cdot 1{,}976 - 0{,}120 \cdot 1{,}296 = -0{,}006 \text{ W/(m·K)}$$

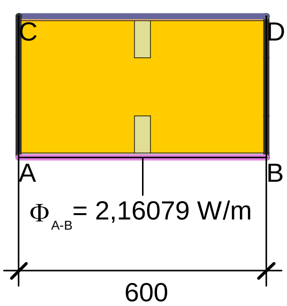
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Equivalent material acc. 3D calc.	0,064	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
GW+timber equivalent 3	0,049	0,900	0,640
GW+timber equivalent 3a	0,062	0,900	0,640
GW+timber equivalent 4	0,041	0,900	0,640
GW+timber equivalent 4a	0,058	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood flow parallel I Weichholz Q parallel	0,290	0,900	0,640
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Unvent. cavity I unbel. Hohlr. *			0,640

* EN ISO 10077-2:2017, 6.4.3

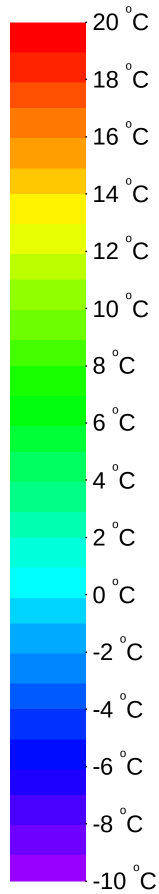


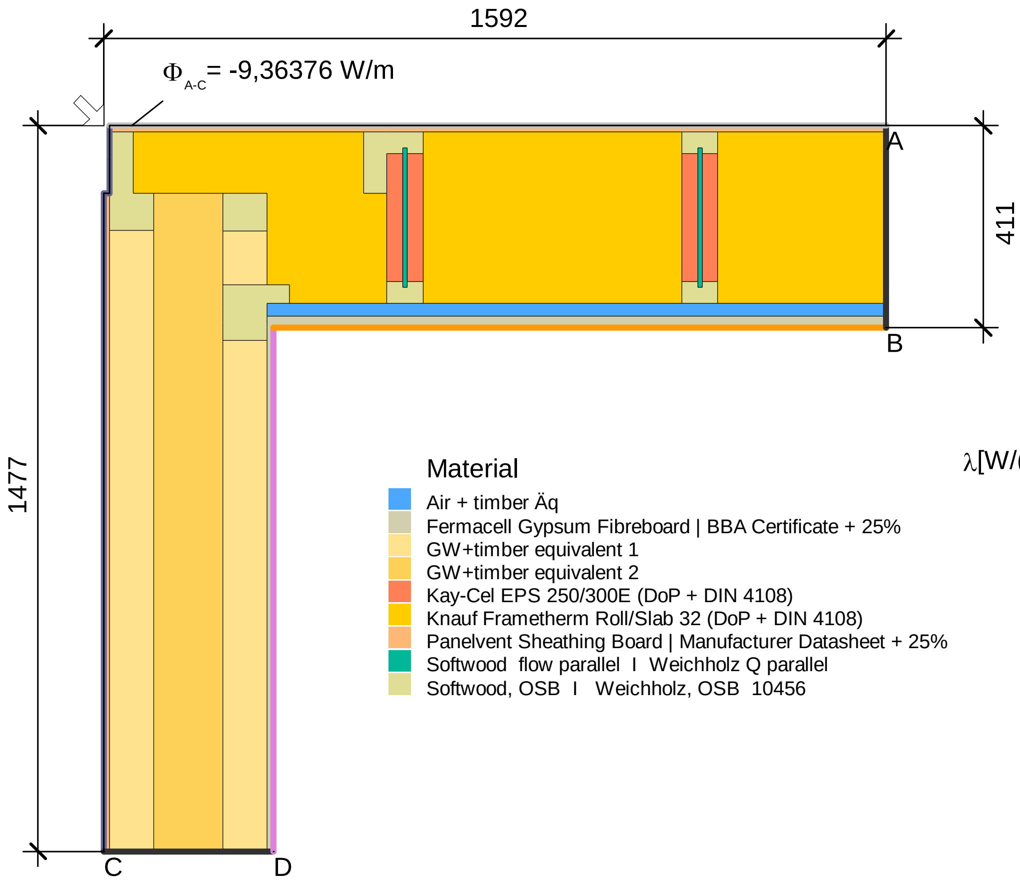


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}081}{30{,}000 \cdot 0{,}600} = 0{,}116 \text{ W/(m}^2\text{·K)}$$



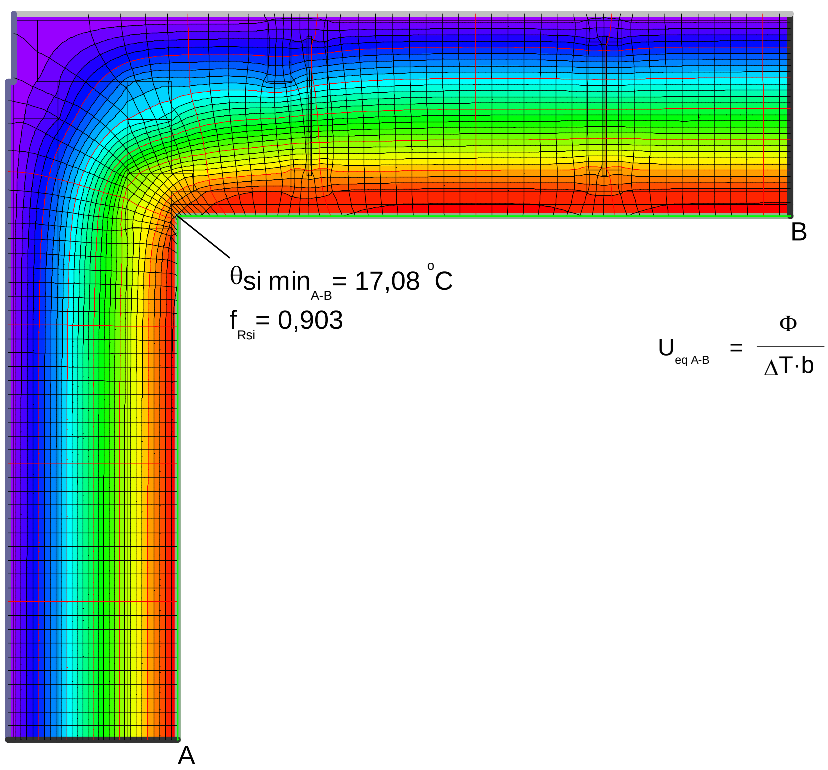
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

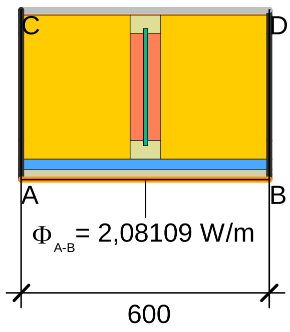




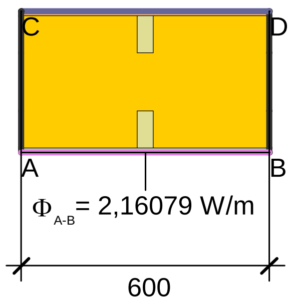
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood flow parallel I Weichholz Q parallel	0,290	0,900	0,640
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{9,364}{30,000} - 0,116 \cdot 1,592 - 0,120 \cdot 1,477 = -0,049 \text{ W/(m·K)}$$

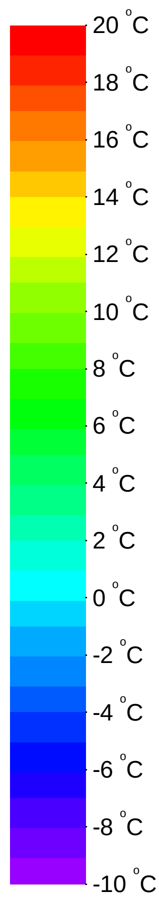




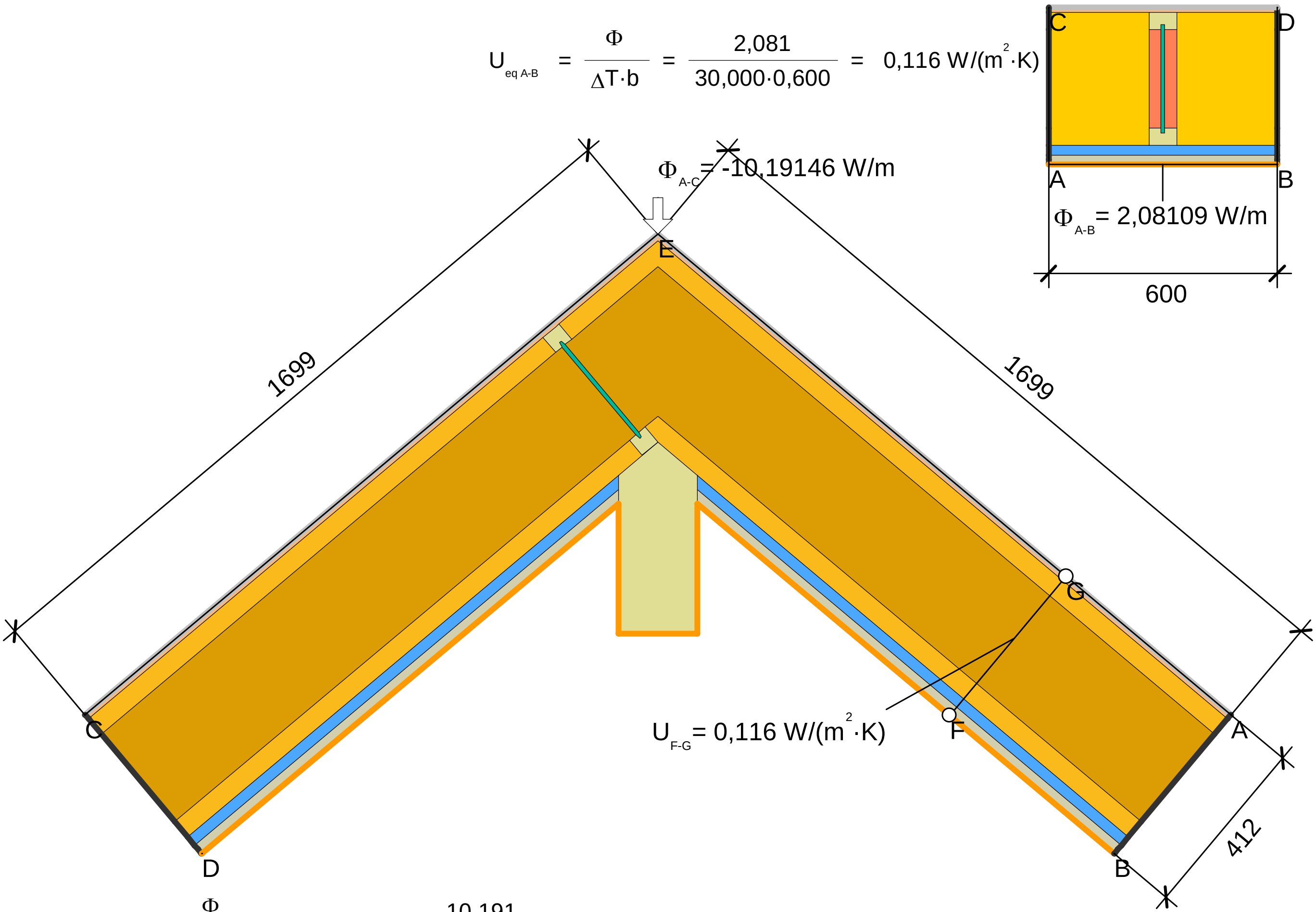
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,081}{30,000 \cdot 0,600} = 0,116 \text{ W/(m}^2\text{·K)}$$



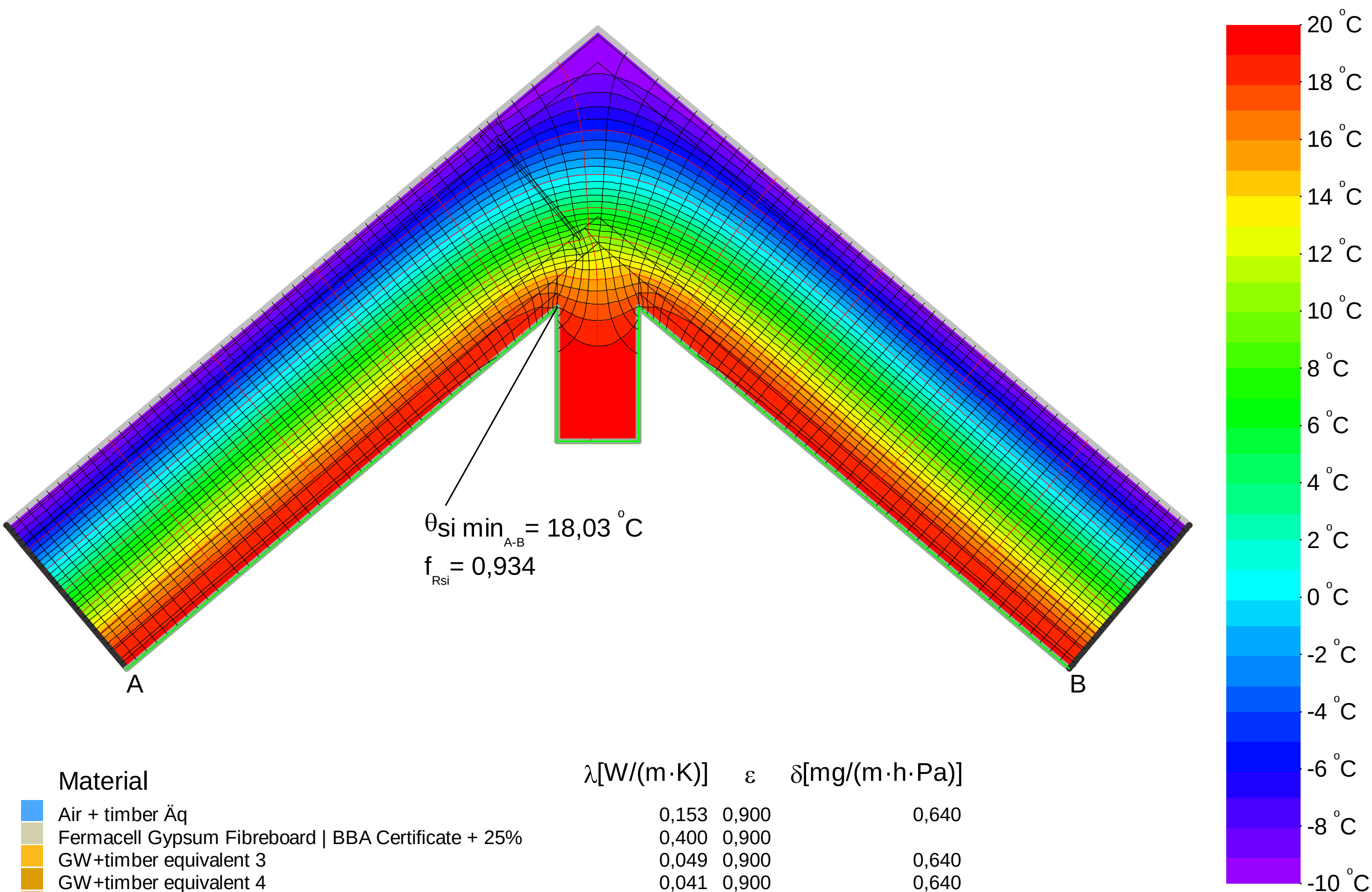
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120 \text{ W/(m}^2\text{·K)}$$



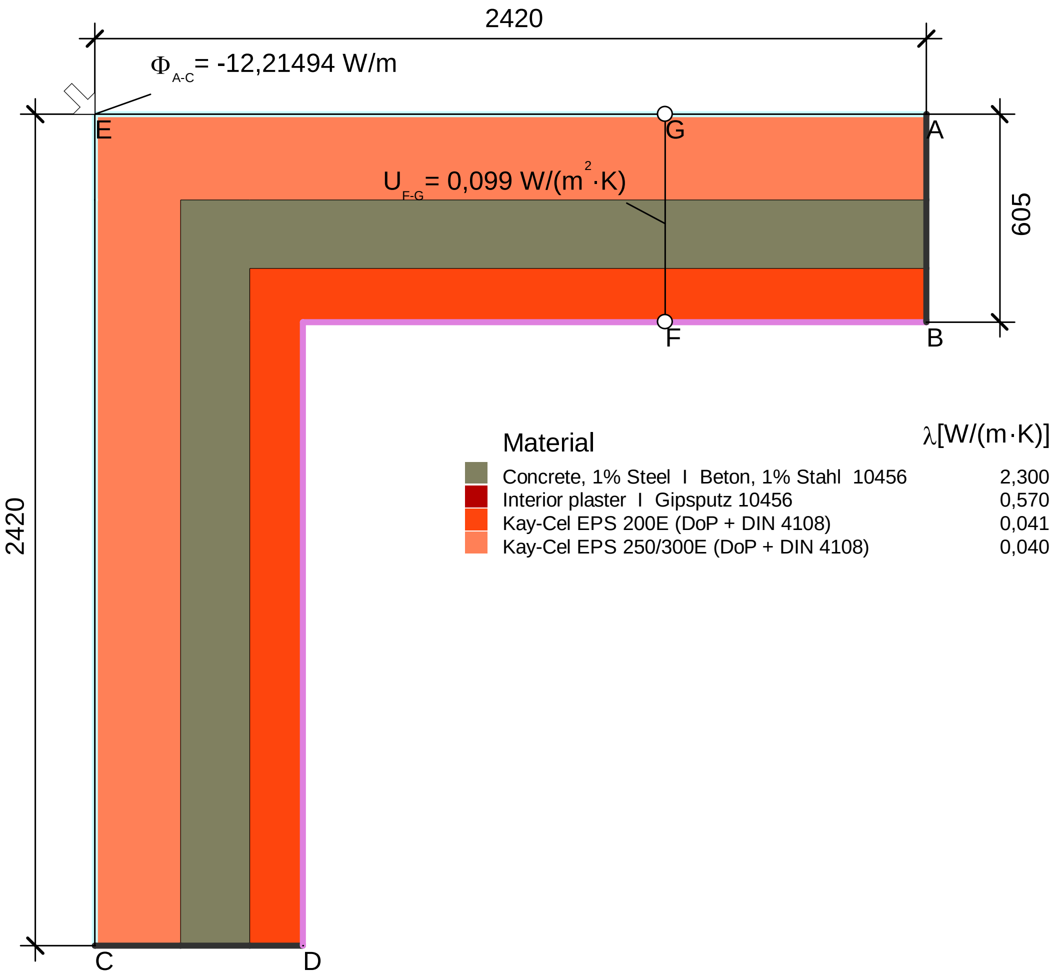
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,081}{30,000 \cdot 0,600} = 0,116\ W/(m^2 \cdot K)$$



$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{10,191}{30,000} - 0,116 \cdot 1,699 - 0,116 \cdot 1,699 = -0,053\ W/(m \cdot K)$$

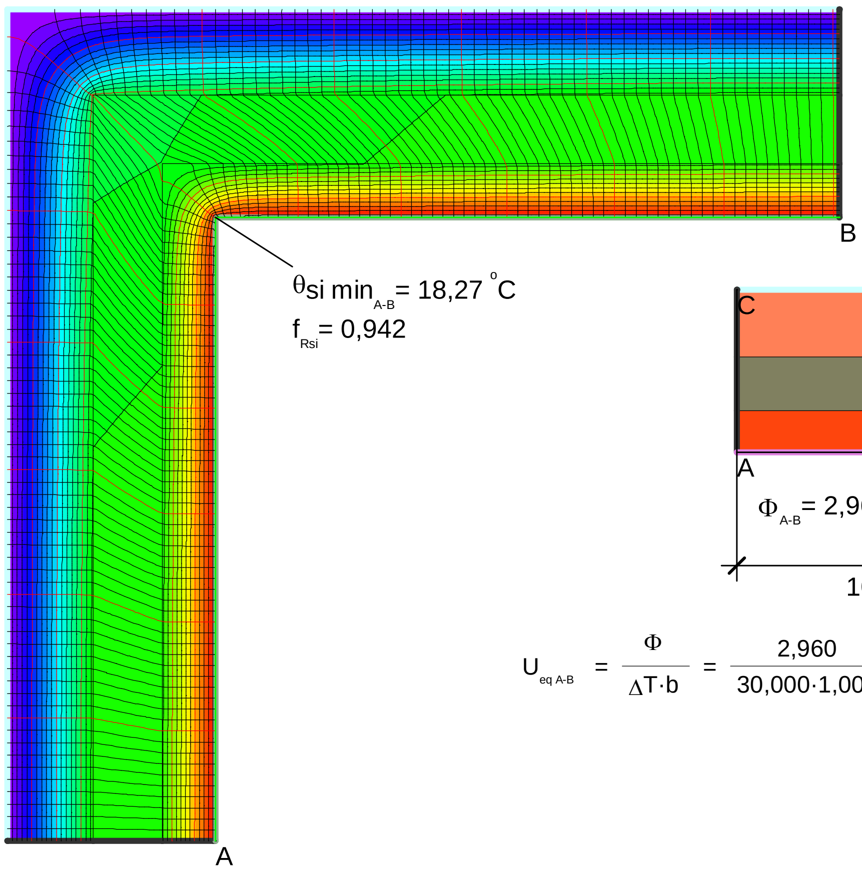


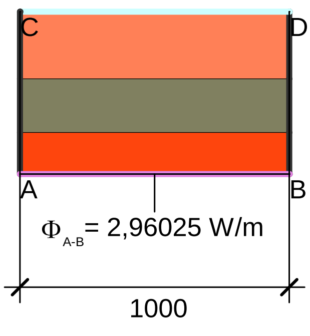
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Air + timber Äq	0,153	0,900	0,640
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 3	0,049	0,900	0,640
GW+timber equivalent 4	0,041	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood flow parallel I Weichholz Q parallel	0,290	0,900	0,640
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018



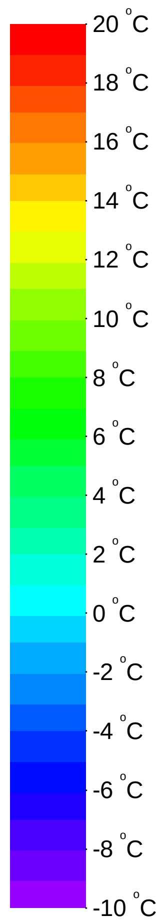
	Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
	Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
	Interior plaster I Gipsputz 10456	0,570	0,900	0,080
	Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
	Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640

$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{12{,}215}{30{,}000} - 0{,}099 \cdot 2{,}420 - 0{,}099 \cdot 2{,}420 = -0{,}070 \text{ W/(m·K)}$$

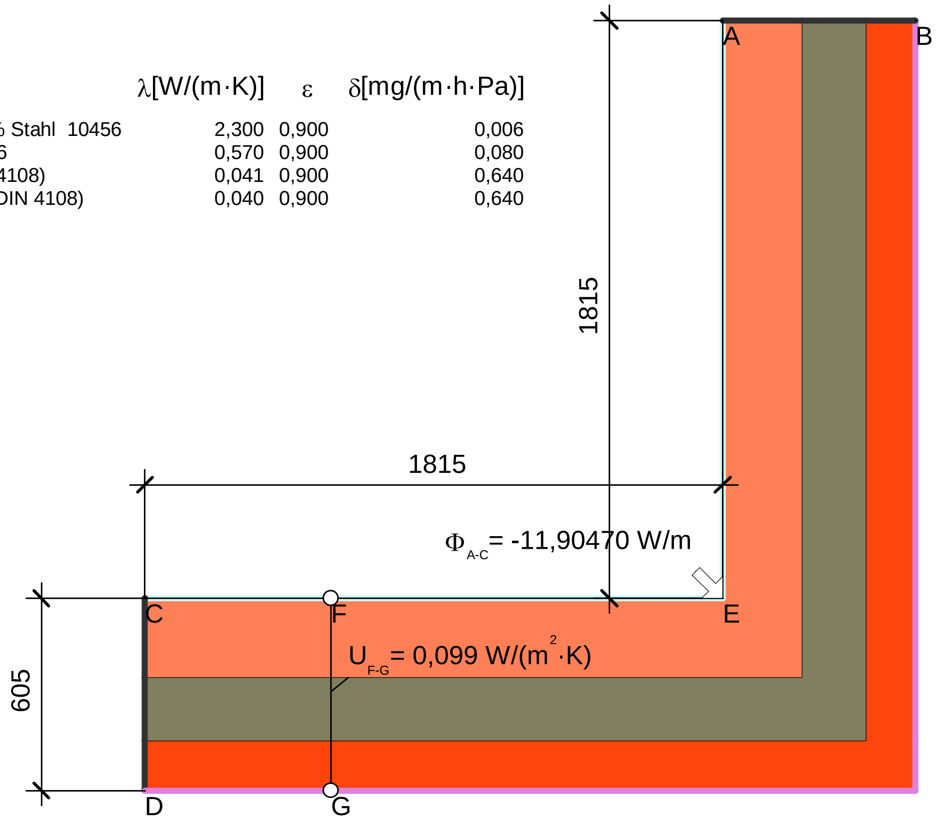




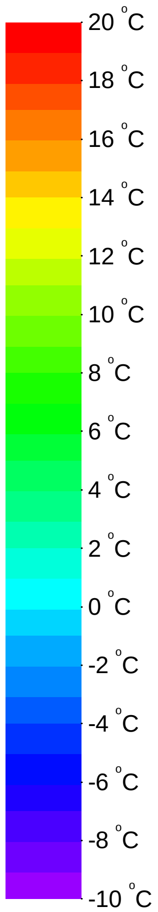
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}960}{30{,}000 \cdot 1{,}000} = 0{,}099 \text{ W/(m}^2\text{·K)}$$

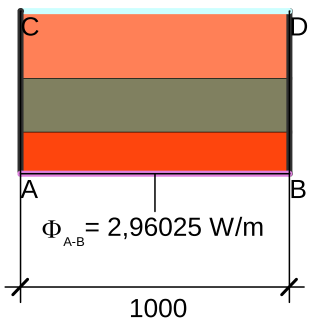


Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Interior plaster I Gipsputz 10456	0,570	0,900	0,080
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640

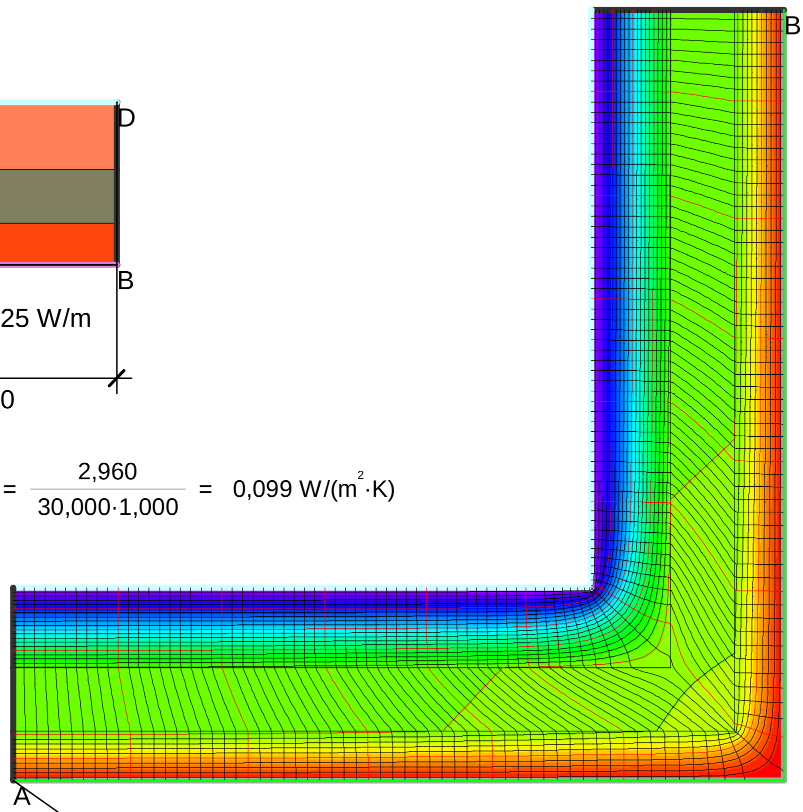


$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{11{,}905}{30{,}000} - 0{,}099 \cdot 1{,}815 - 0{,}099 \cdot 1{,}815 = 0{,}039 \text{ W/(m·K)}$$





$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}960}{30{,}000 \cdot 1{,}000} = 0{,}099 \text{ W/(m}^2\text{·K)}$$



$\theta si\ min_{A\text{-}B} = 19{,}32\ ^{\circ}C$

$f_{Rsi} = 0{,}977$

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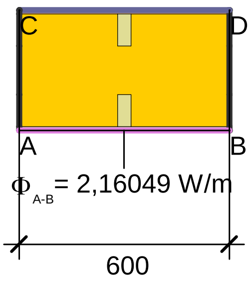
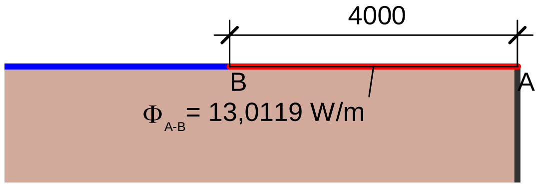
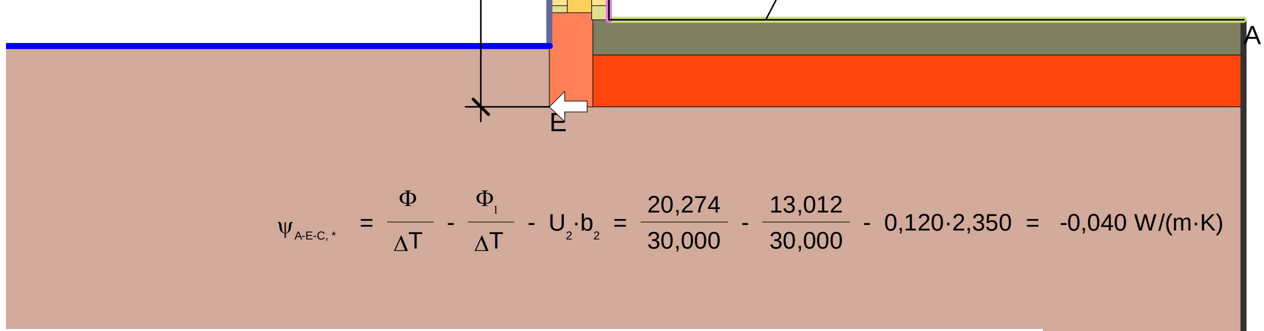
$$U_{eq\,A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}160}{30{,}000 \cdot 0{,}600} = 0{,}120\ W/(m^2 \cdot K)$$



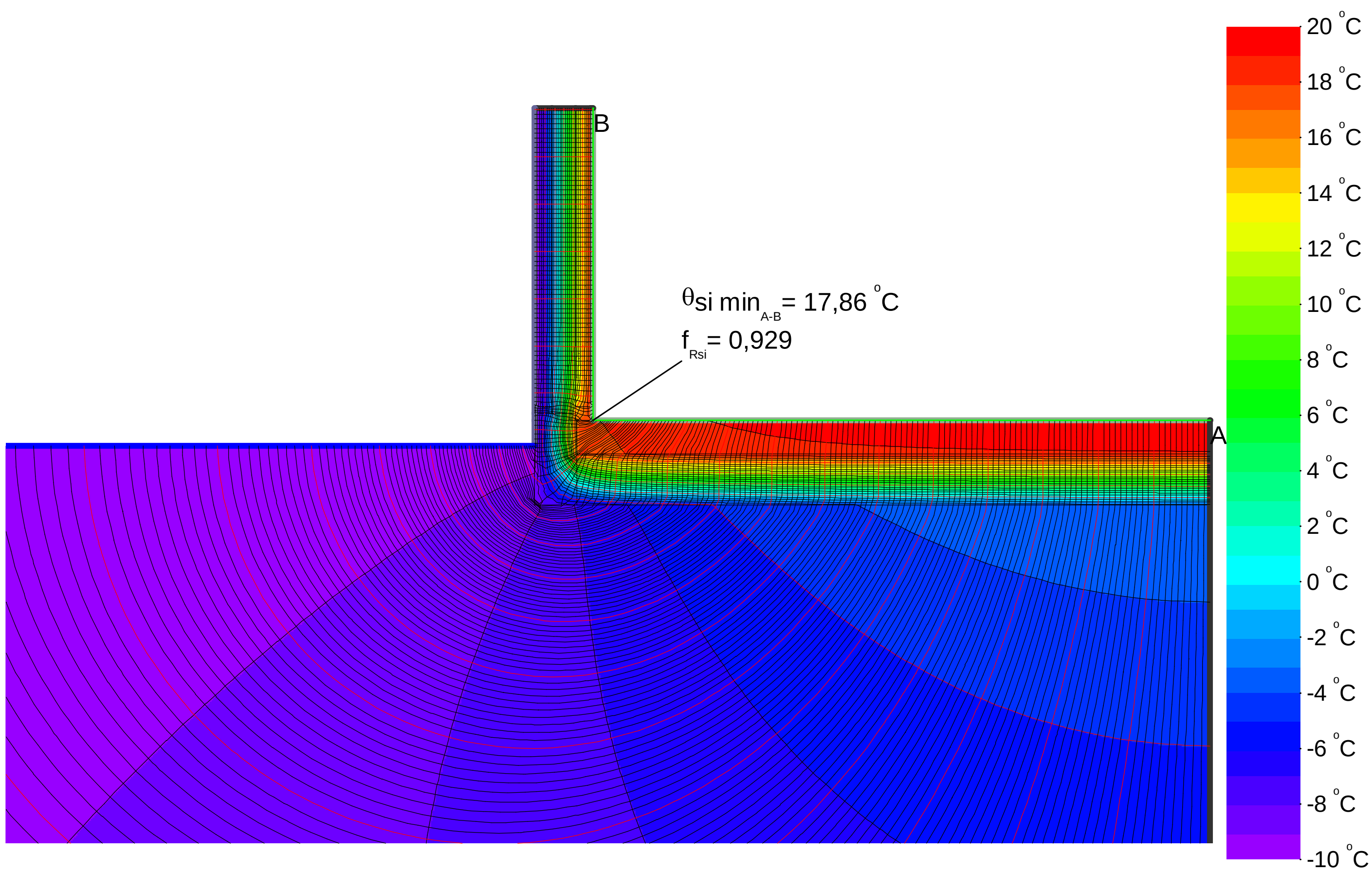


Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Adiabatic | Adiabat	0,000				
EQ FS: 1/Ufs		20,000	7,576		
Exterior | Außen		-10,000	0,040		

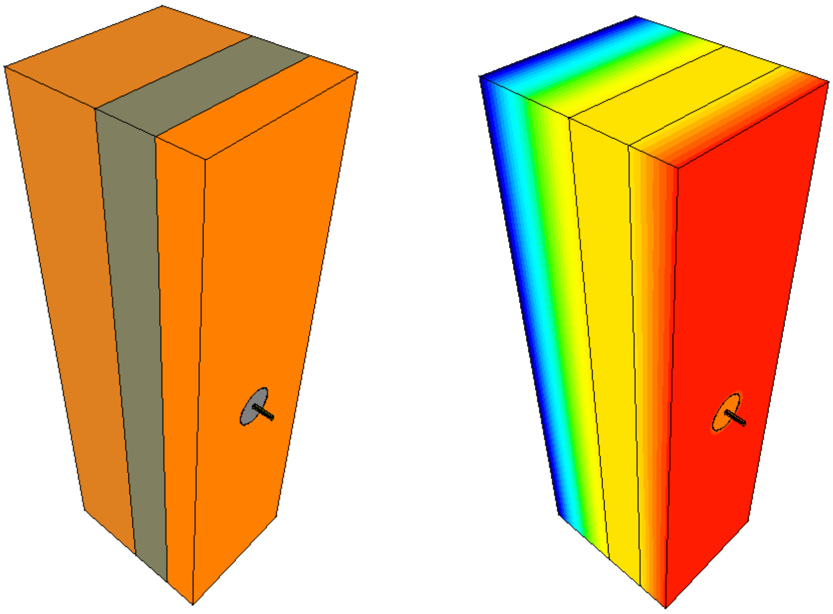


$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{20{,}274}{30{,}000} - \frac{13{,}012}{30{,}000} - 0{,}120 \cdot 2{,}350 = -0{,}040\ W/(m \cdot K)$$

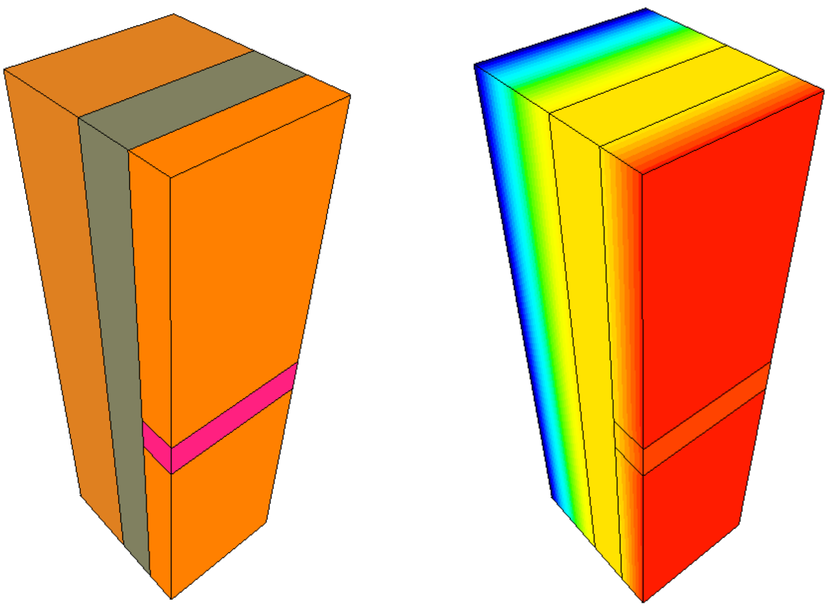
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Ground I Erdreich	2,000	0,900	0,013
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018



FS1_EW1 - Floor Slab to Exernal Wall Connection



Model A, reflecting the real construciton



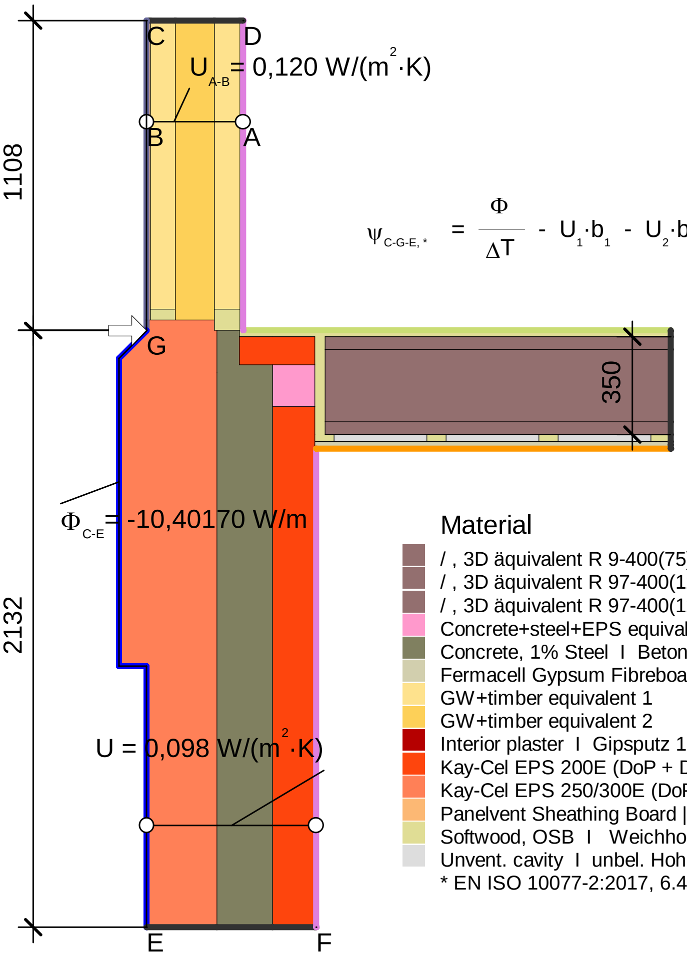
Model B, to establish the equivalent conductivity

At the junction between concrete formwork basement wall and lightweight timber basement ceiling, THEPASSIVHAUS features cylindrical reinforced concrete elements that penetrate the inner EPS layer, upon which the basement ceiling is mounted.

In order to establish the thermal effect of these elements on the linear heat loss coefficient and surface temperature of this connection, these penetrations were modelled in 3D according to ISO 10211, using the material thermal conductivities shown in the material legend on the following page.

Two models were constructed, the first (A) to reflect the real construction, the second (B) with a continuous 'bar' in place of the penetration. A heat flow of 3,27 W was then measured through the 'real' construction, and then the thermal conducitivty of the continous bar adjusted to achieve the same heat flow.

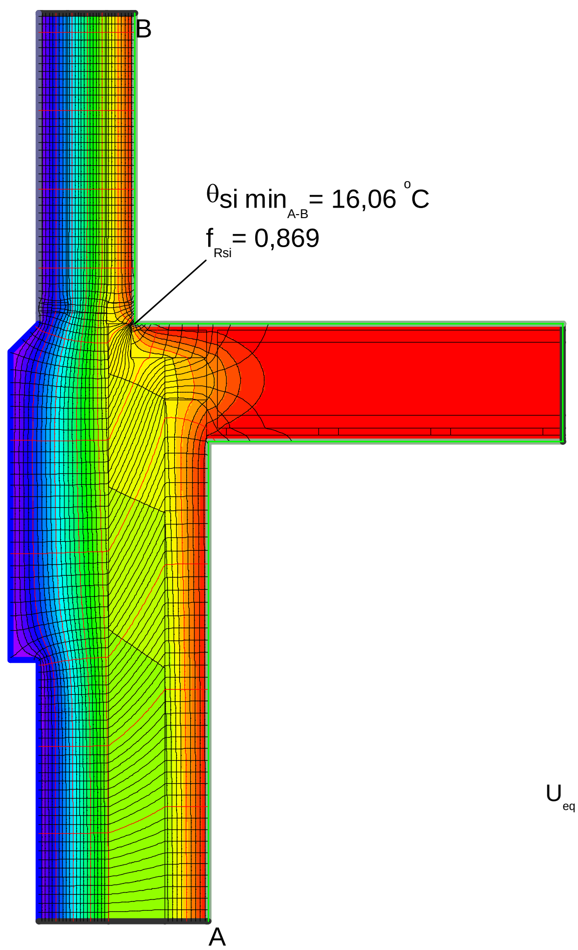
This equivalent thermal conductivity of 0,257 W/(mK) is then used to represent the proportions of steel, concrete and EPS insulation in the following two-dimensional connection details.

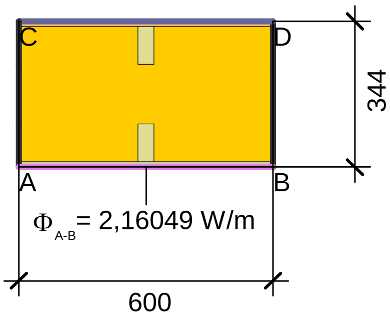


$$\psi_{C\text{-}G\text{-}E,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{10{,}402}{30{,}000} - 0{,}120 \cdot 1{,}108 - 0{,}098 \cdot 2{,}132 = 0{,}004 \text{ W/(m·K)}$$

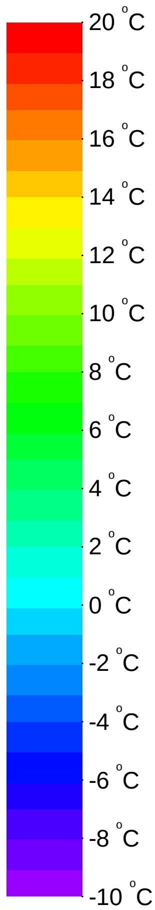
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ , 3D äquivalent R 9-400(75)	0,050	0,900	0,640
/ , 3D äquivalent R 97-400(126)	0,068	0,900	0,640
/ , 3D äquivalent R 97-400(127)	0,068	0,900	0,640
Concrete+steel+EPS equivalent	0,257	0,900	0,640
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Interior plaster I Gipsputz 10456	0,570	0,900	0,080
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Unvent. cavity I unbel. Hohlr. *			0,640

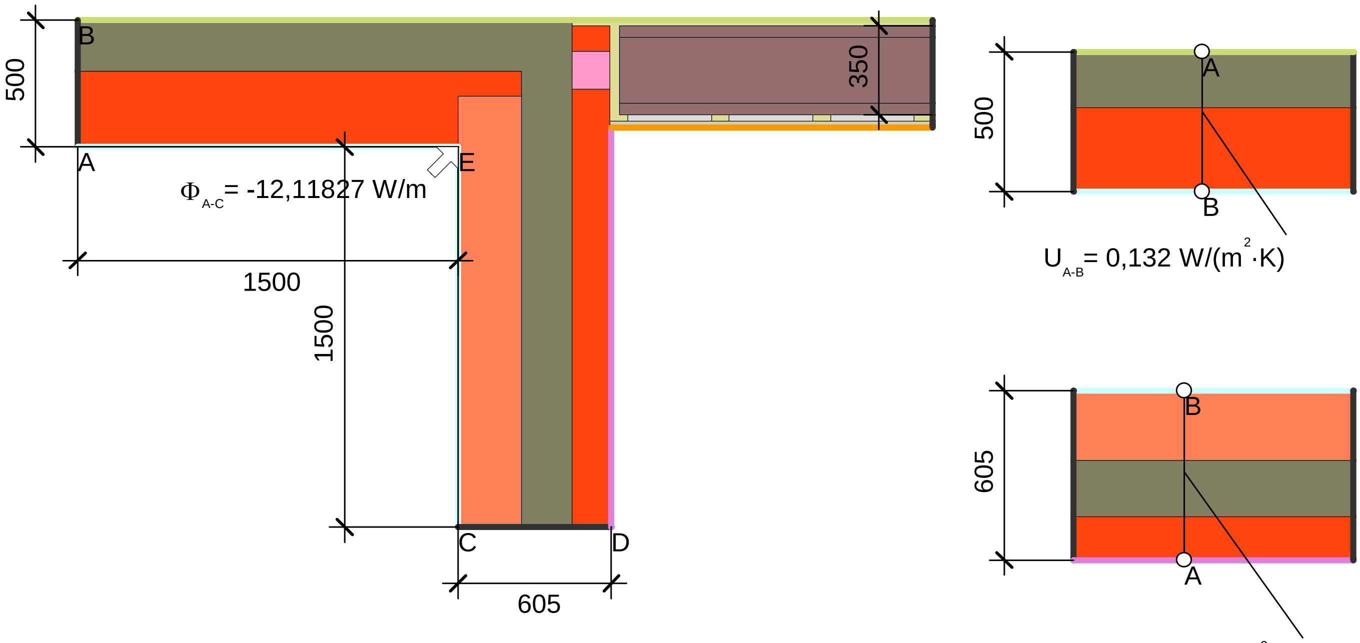
* EN ISO 10077-2:2017, 6.4.3





$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}160}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

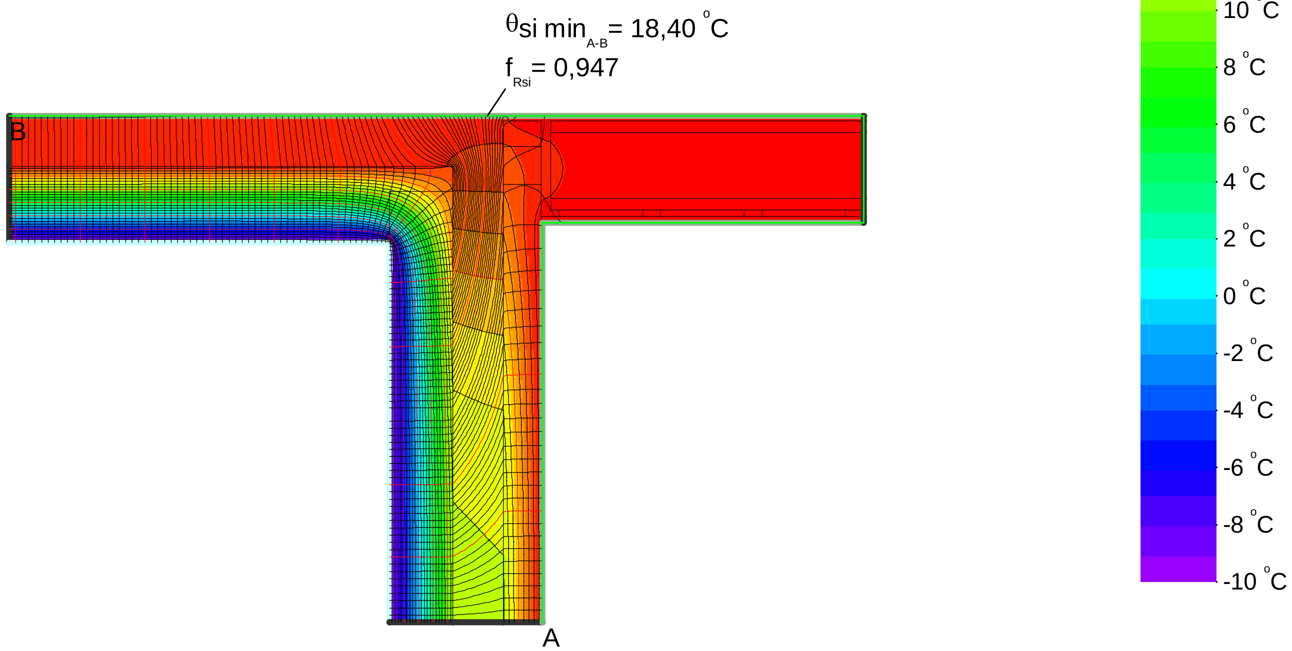




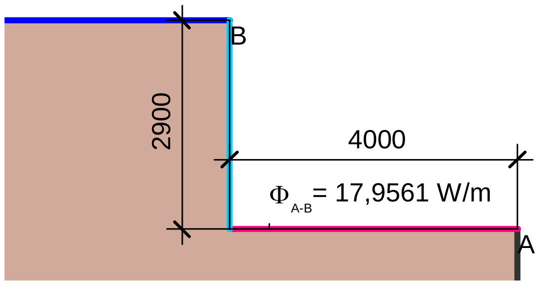
$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{12{,}118}{30{,}000} - 0{,}132 \cdot 1{,}500 - 0{,}099 \cdot 1{,}500 = 0{,}058 \text{ W/(m·K)}$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ , 3D äquivalent R 9-400(77)	0,050	0,900	
/ , 3D äquivalent R 97-400(130)	0,068	0,900	
/ , 3D äquivalent R 97-400(131)	0,068	0,900	
Concrete+steel+EPS equivalent	0,257	0,900	0,640
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Interior plaster I Gipsputz 10456	0,570	0,900	0,080
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Unvent. cavity I unbel. Hohlr. *			0,640

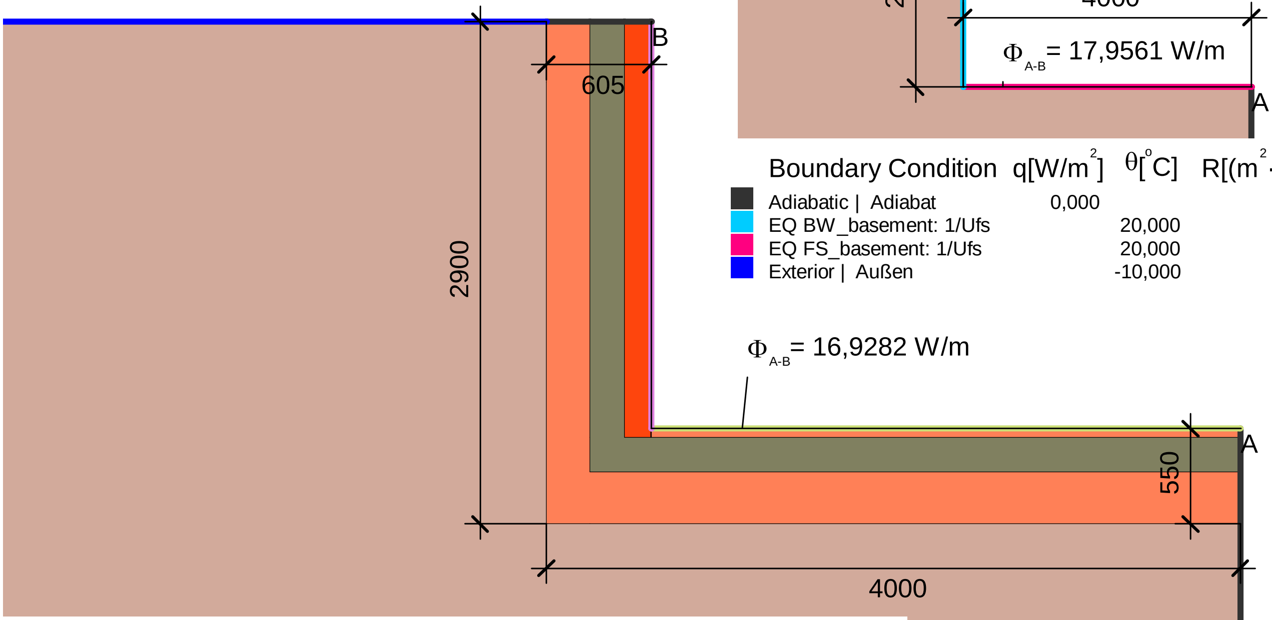
* EN ISO 10077-2:2017, 6.4.3



EW2_FS1_CE1 - Basement Wall to Floor Slab, Basement Ceiling Connection

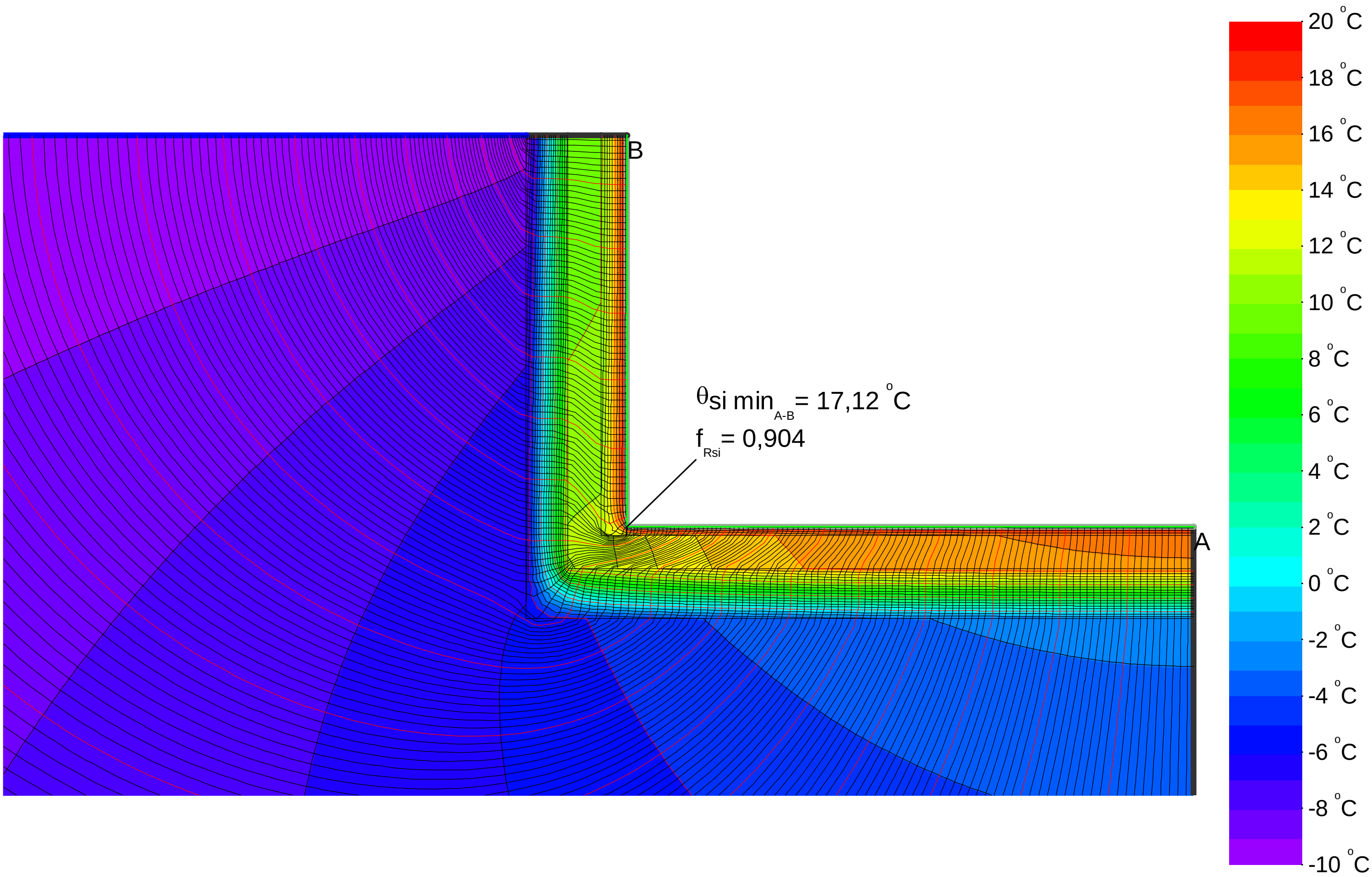


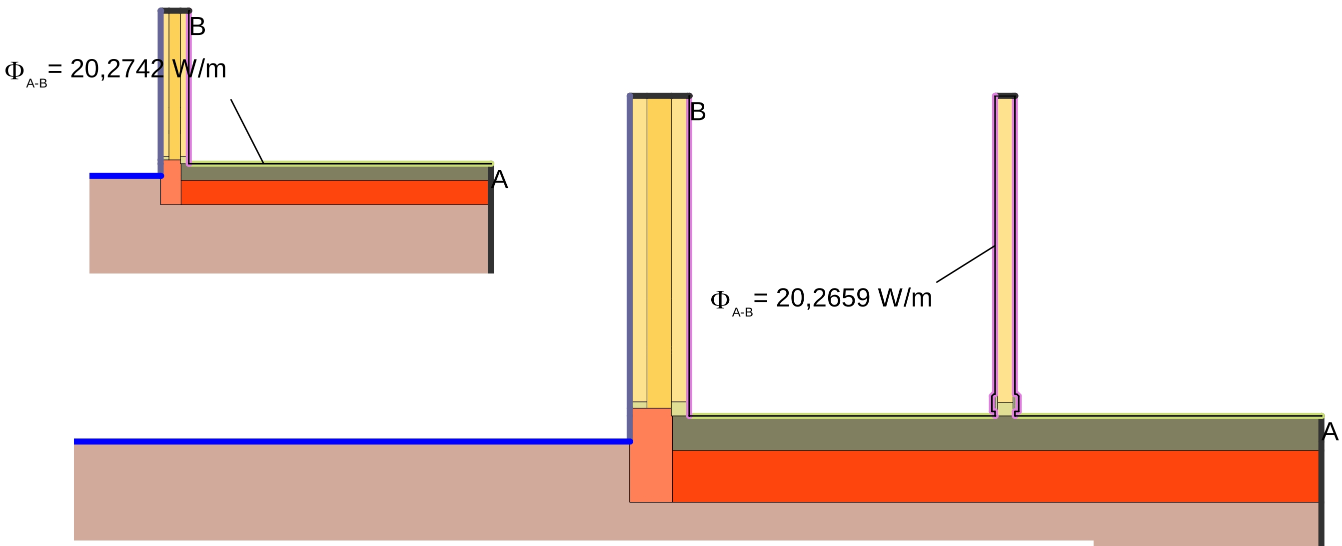
Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Adiabatic | Adiabat	0,000				
EQ BW_basement: 1/Ufs		20,000	10,101		
EQ FS_basement: 1/Ufs		20,000	9,009		
Exterior | Außen		-10,000	0,040		



Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Ground I Erdreich	2,000	0,900	0,013
Interior plaster I Gipsputz 10456	0,570	0,900	0,080
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640

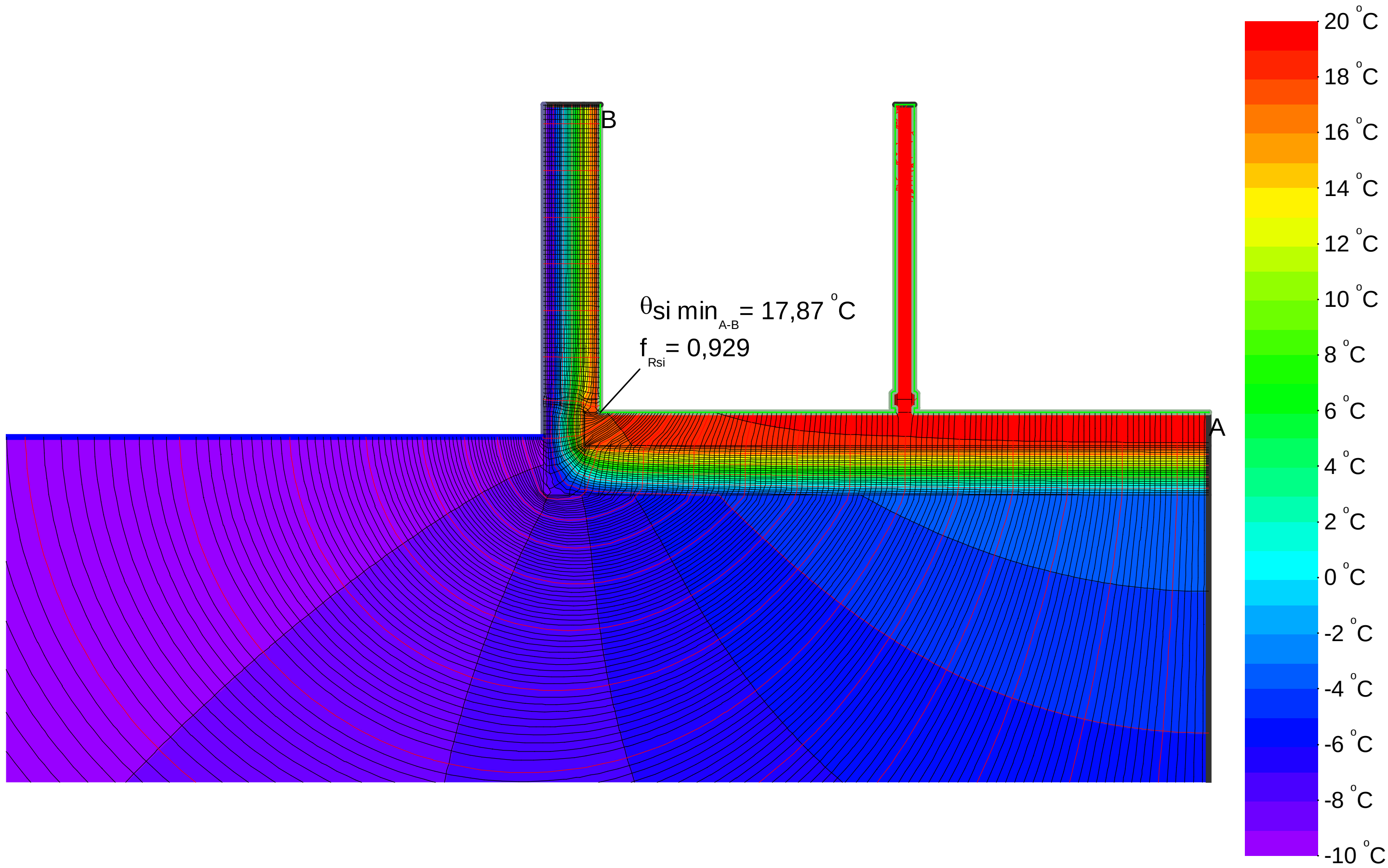
$\Psi_{FSBW} = ((Q_{FSBW(DIST.)} - Q_{FSBW(UNDIST.)}) / \Delta\theta) = ((16{,}9282 - 17{,}9561) / 30) = -0{,}034$ W/mK





Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Ground I Erdreich	2,000	0,900	0,013
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018

$$\Phi_{FSIW} = ((\Phi_{FSEW+FSIW} - \Phi_{FSEW}) / \Delta T) = ((20{,}2659 - 20{,}2742) / 30) = 0{,}00 \text{ W/mK}$$



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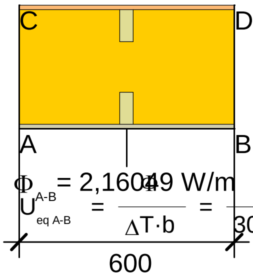
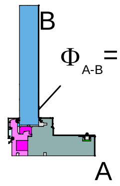
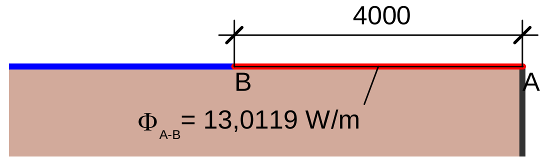


Φ_{A-B} = 2,16049 W/m

$U_{eq\ A-B} = \frac{\Phi_{A-B}}{\Delta T \cdot b} = \frac{2,160}{30,000 \cdot 0,600} = 0,120\ W/(m^2 \cdot K)$

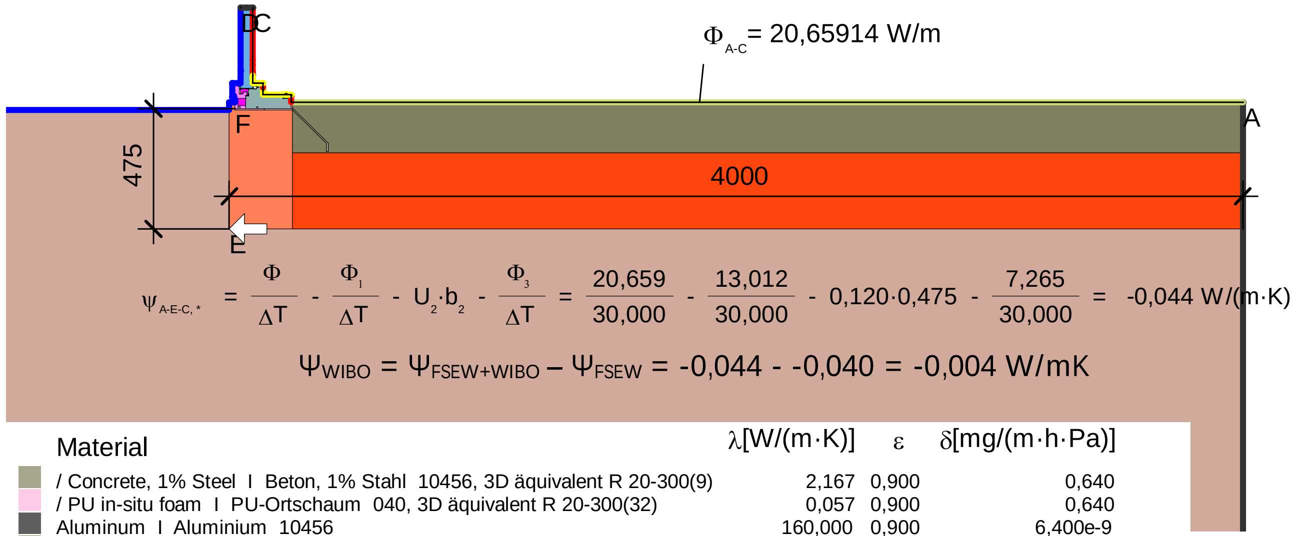


Φ_{A-B} = 7,2655 W/m



Φ_{A-B} = 13,0119 W/m

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Adiabatic | Adiabat	0,000				
EQ FS: 1/Ufs		20,000	7,576		
Exterior | Außen		-10,000	0,040		



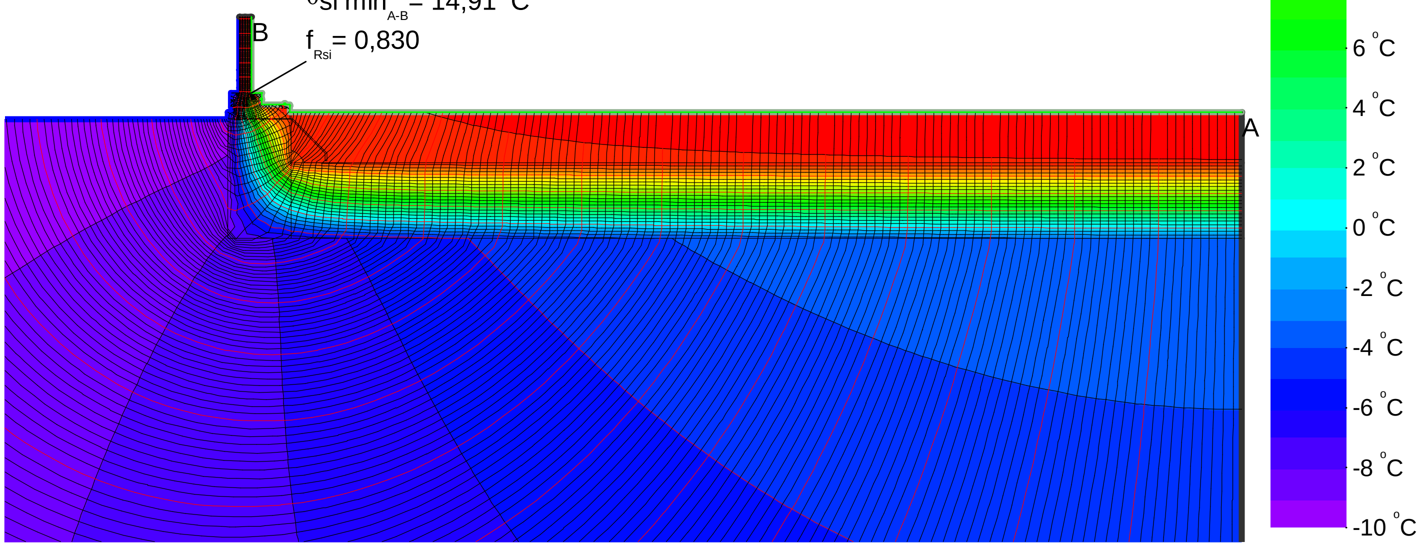
Φ_{A-C} = 20,65914 W/m

$$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 - \frac{\Phi_3}{\Delta T} = \frac{20,659}{30,000} - \frac{13,012}{30,000} - 0,120 \cdot 0,475 - \frac{7,265}{30,000} = -0,044\ W/(m \cdot K)$$

$$\Psi_{WIBO} = \Psi_{FSEW+WIBO} - \Psi_{FSEW} = -0,044 - -0,040 = -0,004\ W/mK$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ Concrete, 1% Steel I Beton, 1% Stahl 10456, 3D äquivalent R 20-300(9)	2,167	0,900	0,640
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(32)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
ENERcell	0,060	0,900	0,640
EPDM	0,250	0,900	
EPDM foam | Moosgummi	0,050	0,900	
Ground I Erdreich	2,000	0,900	0,013
Insulation Wärmedämmung 032	0,032	0,900	0,640
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PE-Insulation I Wärmedämmung 035	0,035	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Polyvinylchloride (PVC)	0,170	0,900	1,280e-5
Spruce, Fir I Fichte, Tanne	0,110	0,900	
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

* EN ISO 10077-2:2017, 6.4.3



$\theta_{si\ min\ A-B}$ = 14,91 °C

f_{Rsi} = 0,830

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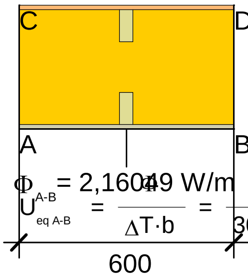
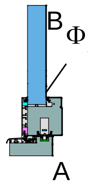
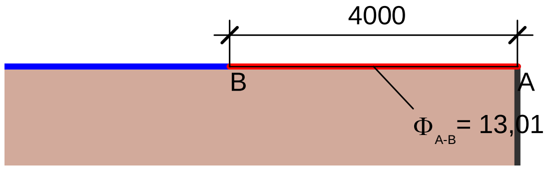


Φ_{A-B} = 2,16049 W/m

$$U_{eq\,A-B} = \frac{\Phi_{A-B}}{\Delta T \cdot b} = \frac{2,160}{30,000 \cdot 0,600} = 0,120\ W/(m^2 \cdot K)$$

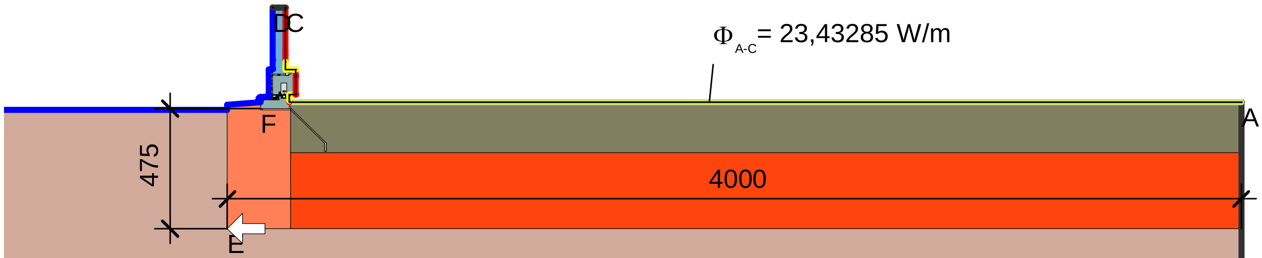


Φ_{A-B} = 9,8594 W/m



Φ_{A-B} = 13,0119 W/m

Boundary Condition	$q[W/m^2]$	$\theta[^\circ C]$	$R[(m^2 \cdot K)/W]$	ε	$\varphi[\%]$
Adiabatic | Adiabat	0,000				
EQ FS: 1/Ufs		20,000	7,576		
Exterior | Außen		-10,000	0,040		



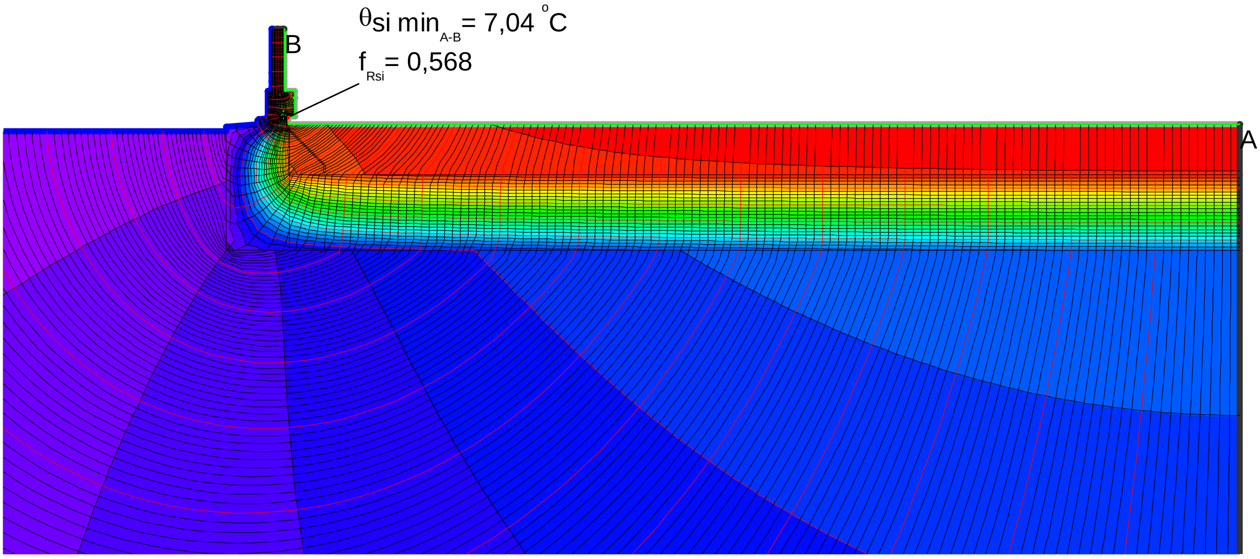
Φ_{A-C} = 23,43285 W/m

$$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 - \frac{\Phi_3}{\Delta T} = \frac{23,433}{30,000} - \frac{13,012}{30,000} - 0,120 \cdot 0,475 - \frac{9,859}{30,000} = -0,038\ W/(m \cdot K)$$

$$\Psi_{WIBO} = \Psi_{FSEW+WIBO} - \Psi_{FSEW} = -0,038 - -0,040 = 0,002\ W/mK$$

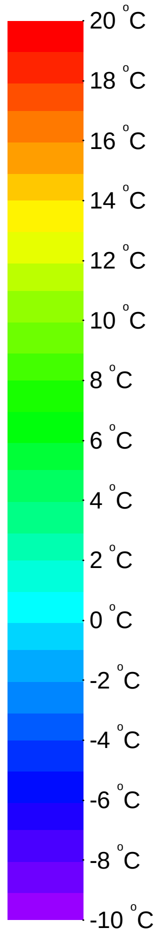
Material	$\lambda[W/(m \cdot K)]$	ε	$\delta[mg/(m \cdot h \cdot Pa)]$
/ Concrete, 1% Steel I Beton, 1% Stahl 10456, 3D äquivalent R 20-300(11)	2,167	0,900	0,640
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(34)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
ENERcell	0,060	0,900	0,640
EPDM	0,250	0,900	
EPDM foam | Moosgummi	0,050	0,900	
Ground I Erdreich	2,000	0,900	0,013
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PE-Insulation I Wärmedämmung 035	0,035	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Polyvinylchloride (PVC)	0,170	0,900	1,280e-5
Spruce, Fir I Fichte, Tanne	0,110	0,900	
Steel I Stahl (1)	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

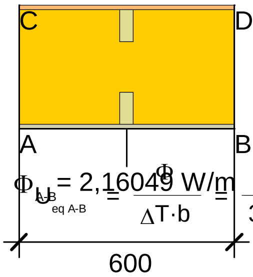
* EN ISO 10077-2:2017, 6.4.3



$\theta si\ min_{A-B}$ = 7,04 °C

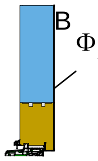
f_{Rsi} = 0,568



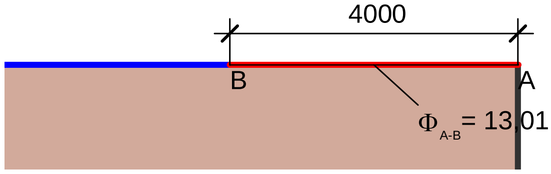


$\Phi_{A-B} = 2{,}16049$ W/m

$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}160}{30{,}000 \cdot 0{,}600} = 0{,}120\ W/(m^2 \cdot K)$

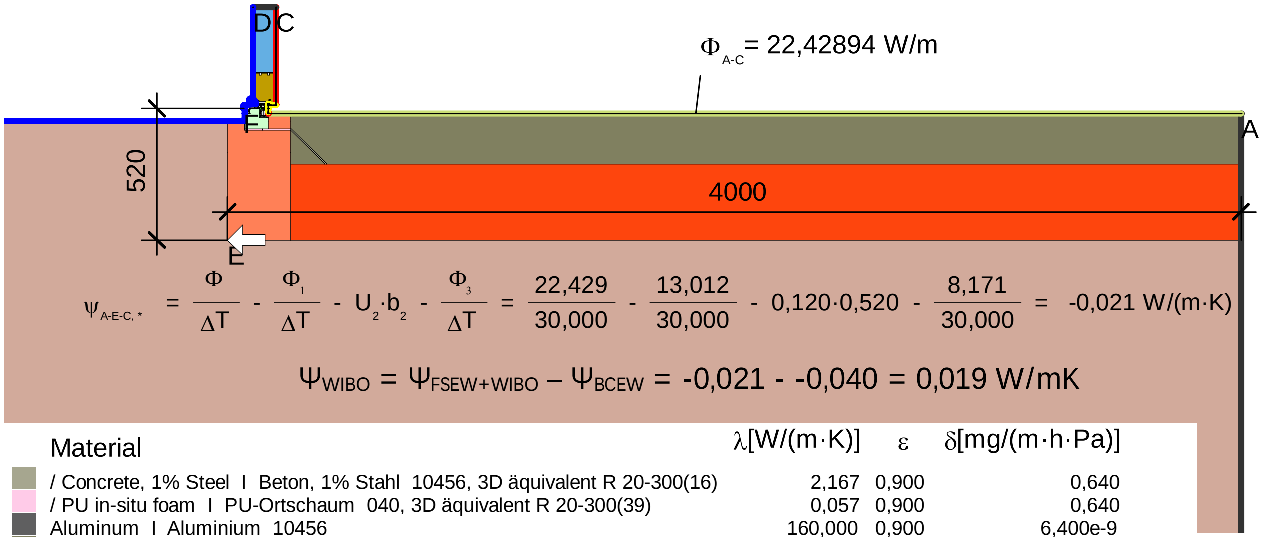


$\Phi_{A-B} = 8{,}1715$ W/m



$\Phi_{A-B} = 13{,}0119$ W/m

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Adiabatic | Adiabat	0,000				
EQ FS: 1/Ufs		20,000	7,576		
Exterior | Außen		-10,000	0,040		



$\Phi_{A-C} = 22{,}42894$ W/m

$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 - \frac{\Phi_3}{\Delta T} = \frac{22{,}429}{30{,}000} - \frac{13{,}012}{30{,}000} - 0{,}120 \cdot 0{,}520 - \frac{8{,}171}{30{,}000} = -0{,}021\ W/(m \cdot K)$

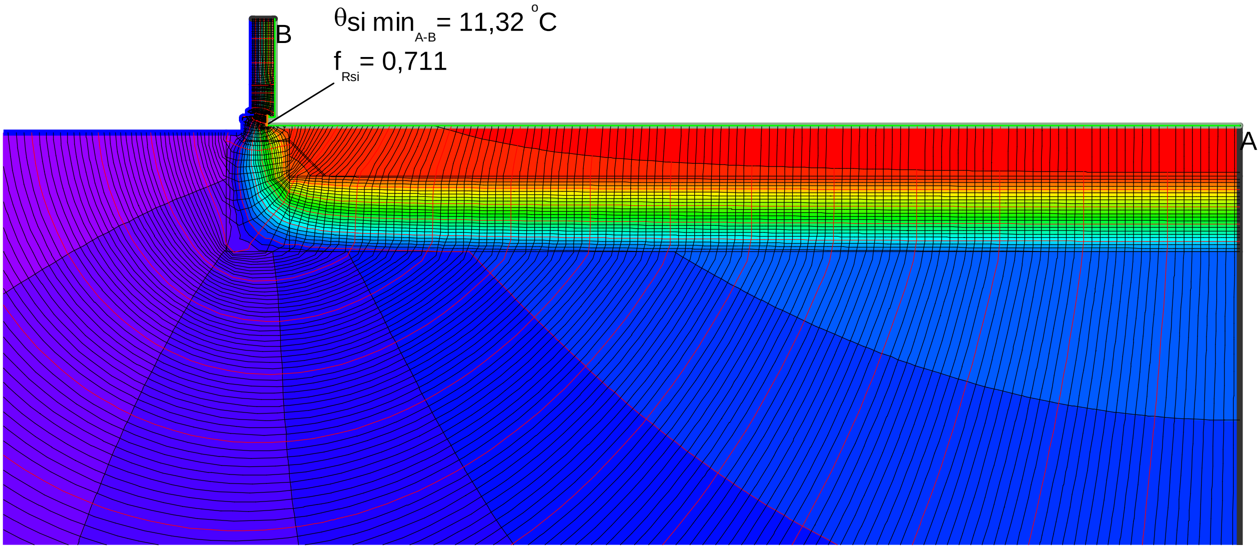
$\Psi_{WIBO} = \Psi_{FSEW+WIBO} - \Psi_{BCEW} = -0{,}021 - -0{,}040 = 0{,}019\ W/mK$

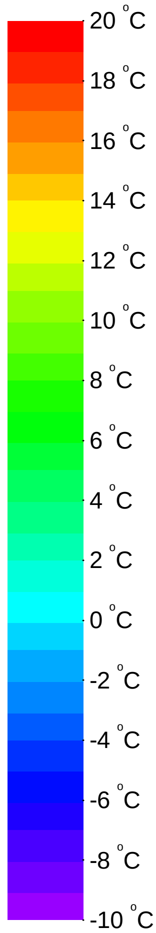
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ Concrete, 1% Steel I Beton, 1% Stahl 10456, 3D äquivalent R 20-300(16)	2,167	0,900	0,640
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(39)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
Concrete, 1% Steel I Beton, 1% Stahl 10456	2,300	0,900	0,006
EPDM	0,250	0,900	
Ground I Erdreich	2,000	0,900	0,013
Kay-Cel EPS 200E (DoP + DIN 4108)	0,041	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Pine | Kiefer	0,130	0,900	
Polyvinylchloride (PVC) (1)	0,170	0,900	1,280e-5
Silicone I Silikon	0,350	0,900	
TOP® - Thermal Threshold Beam	0,036	0,900	0,640
Unvent. cavity I unbel. Hohlr. *			0,640

* EN ISO 10077-2:2017, 6.4.3

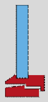
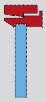
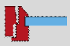
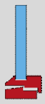
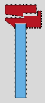
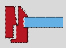
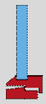
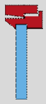
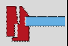
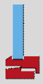
$\theta si\ min_{A-B} = 11{,}32\ °C$

$f_{Rsi} = 0{,}711$



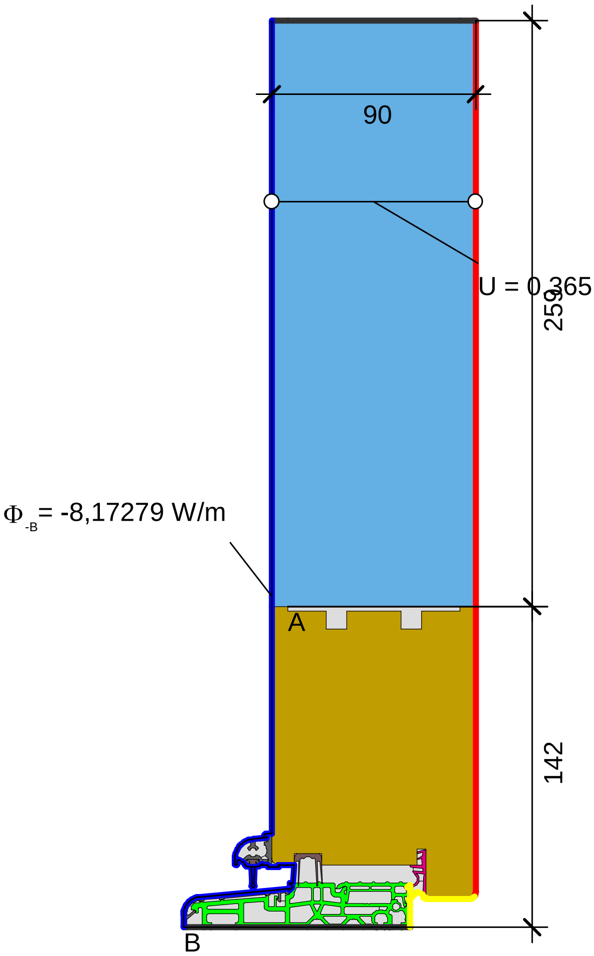


Windows | Fenster

		01			02			03			01
Frame values | Rahmenwerte		Bottom	Top	Side	Bottom	Top	Side	Bottom	Top	Side	Bottom barrier-free
		Unten	Oben	Seitl.	Unten	Oben	Seitl.	Unten	Oben	Seitl.	Unten barri-erefrei
Spacer I Abstandhalter: with secondary sealing.											
Frame width Rahmenbreite	**b_f** [mm]	142	129	154,5	140	118	118				142
U-value frame Rahmen-U-Wert	**Uf** [W/(m²K)]	1,26	1,10	1,39	0,90	0,93	0,93				1,26
Ψ-glass edge Glasrand-Ψ-Wert	**Ψg** [W/(mK)]	0,001	0,004	0,002	0,027	0,025	0,025				0,001
U-value window Fenster-U-Wert	**Uw** [W/(m²K)] @U_g = 0,70 W/(m²K)	**0,708**			**0,837**						
Passive House effiziency class Passivhaus Effizienzklasse		**phC**			**phB**						
Installation | Einbau											
	$f_{Rsi=0,25m^2K/W}$	0,725	0,725	0,760	0,734	0,749	0,754				0,711
	$\Psi_{install}$ [W/(mK)]	0,019	0,006	-0,001	-0,004	0,006	0,001				0,019
	$U_{W, installed}$ [W/(m²K)]	0,72			0,84						

Window description

Installation type 1 refers to the E98 Passive entrance door from Urban Front Ltd., in a fully opaque configuration; the Ud-installed value shown is based on a reference size of 1,1 by 2,2 m. Type 2 refers to the Ultra Insulated outward-opening window from Green Building Store, using a Ug-value of 0,70 W/(m²K) and based on a reference size of 1,23 by 1,48 m. Type 3 refers to the Primus Slide double sliding door from ENERsign GmbH. For the latter, the average frame values are shown and the mullion is excluded, but the actual installed Uw-value is shown. This is based on a reference size of 2,4 by 2,5 m and uses a Ug-value of 0,70 W/(m²K).



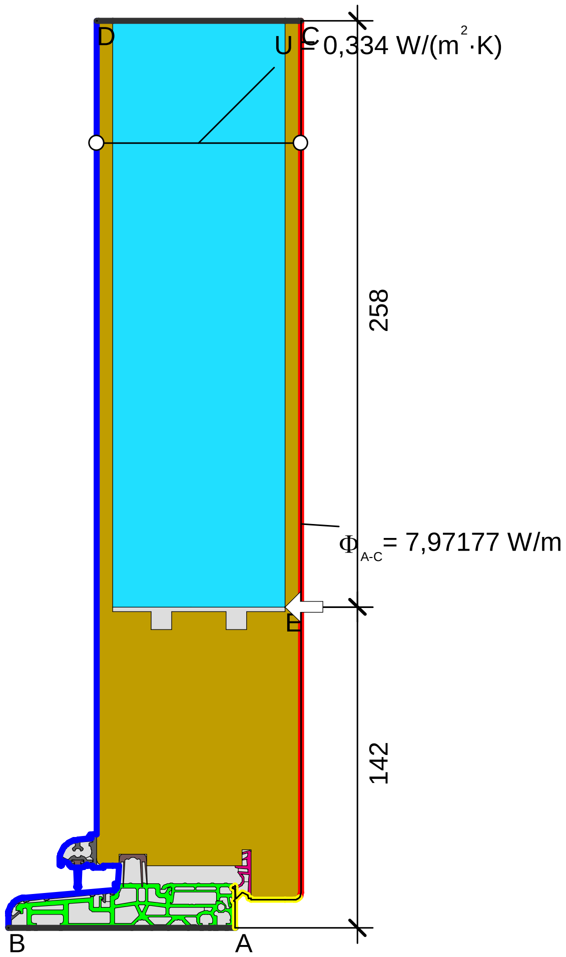
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
EPDM	0,250	0,900	
Panel I Maske	0,035	0,900	
Pine | Kiefer	0,130	0,900	
Polyvinylchloride (PVC)	0,170	0,900	1,280e-5
Silicone I Silikon	0,350	0,900	
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

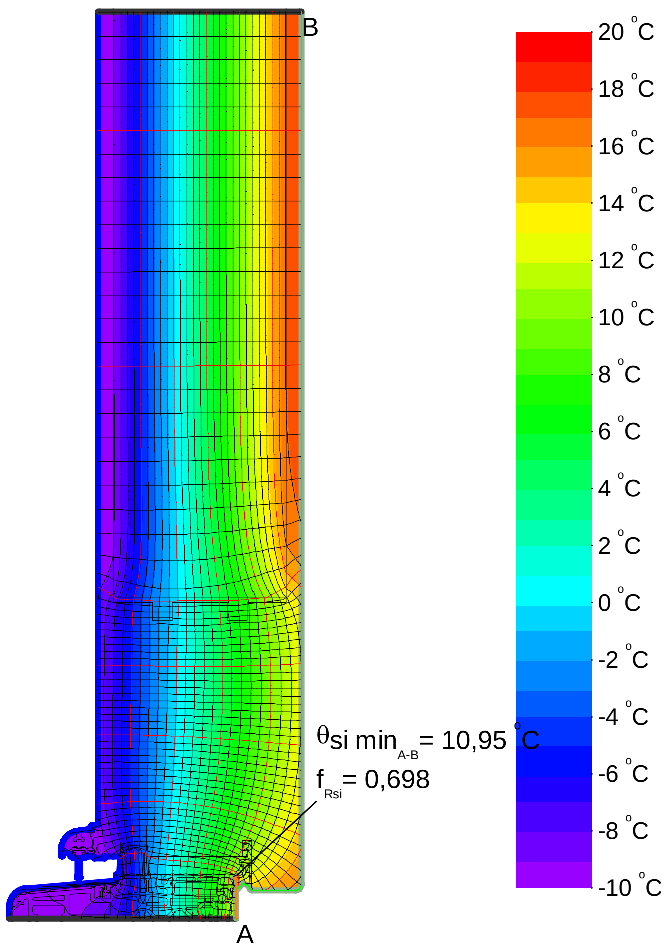
* EN ISO 10077-2:2017, 6.4.3

Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior | Außen		-10,000	0,040		
Interior, frame, normal		20,000	0,130		
Interior, frame, reduced		20,000	0,200		
Adiabatic | Adiabat	0,000				
e 0,9 Cavity I Hohlraum				0,900	

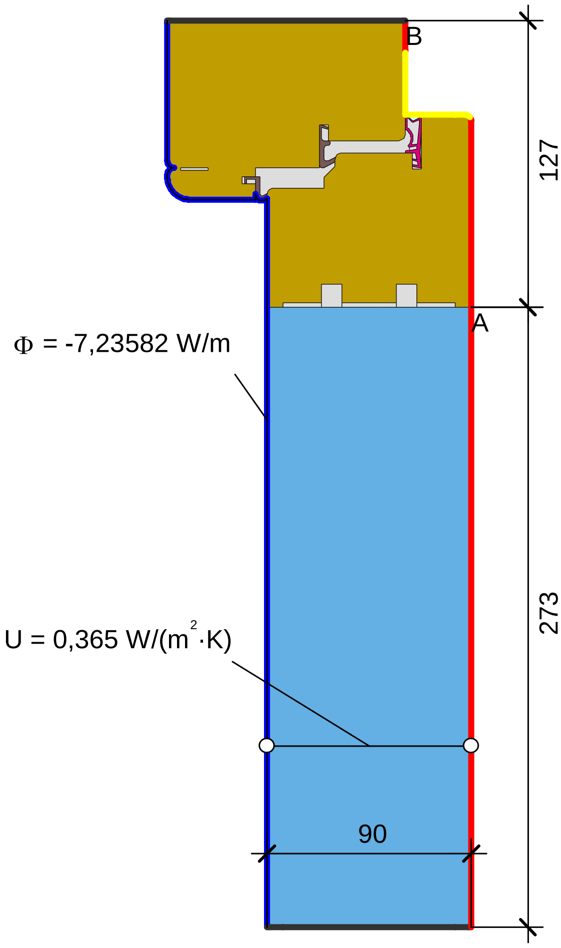
Boundary Condition	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε	φ[%]
Exterior | Außen		-10,000	0,040		
fRsi: Interior I Innen		20,000	0,250		
Adiabatic | Adiabat	0,000				
e 0,9 Cavity I Hohlraum				0,900	

$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{8{,}173}{30{,}000} - 0{,}365 \cdot 0{,}259}{0{,}142} = 1{,}259\ W/(m^2 \cdot K)$$





$$\Psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{7{,}972}{30{,}000} - 1{,}259 \cdot 0{,}142 - 0{,}334 \cdot 0{,}259 = 0{,}001\ W/(m \cdot K)$$



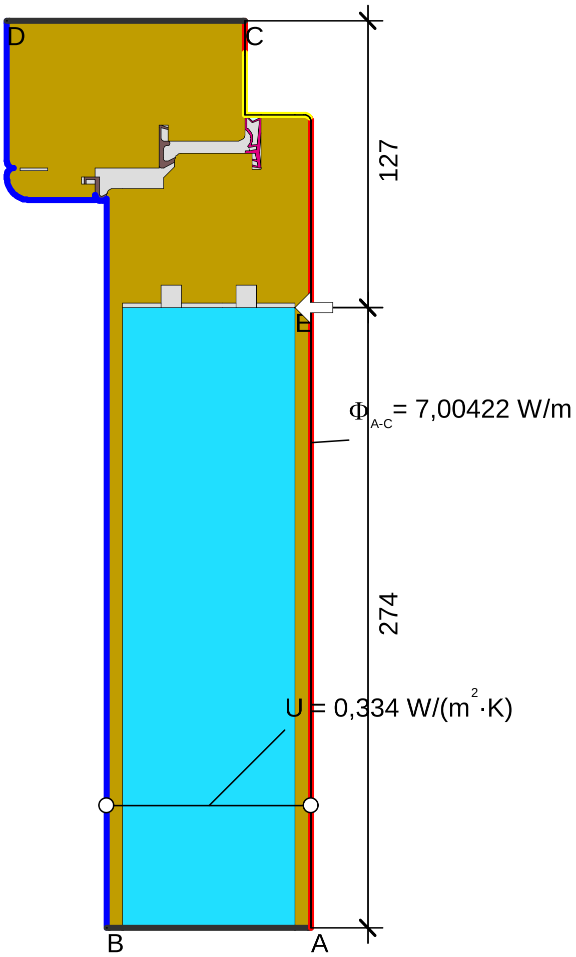
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
EPDM	0,250	0,900	
Panel I Maske	0,035	0,900	
Pine | Kiefer	0,130	0,900	
Silicone I Silikon	0,350	0,900	
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

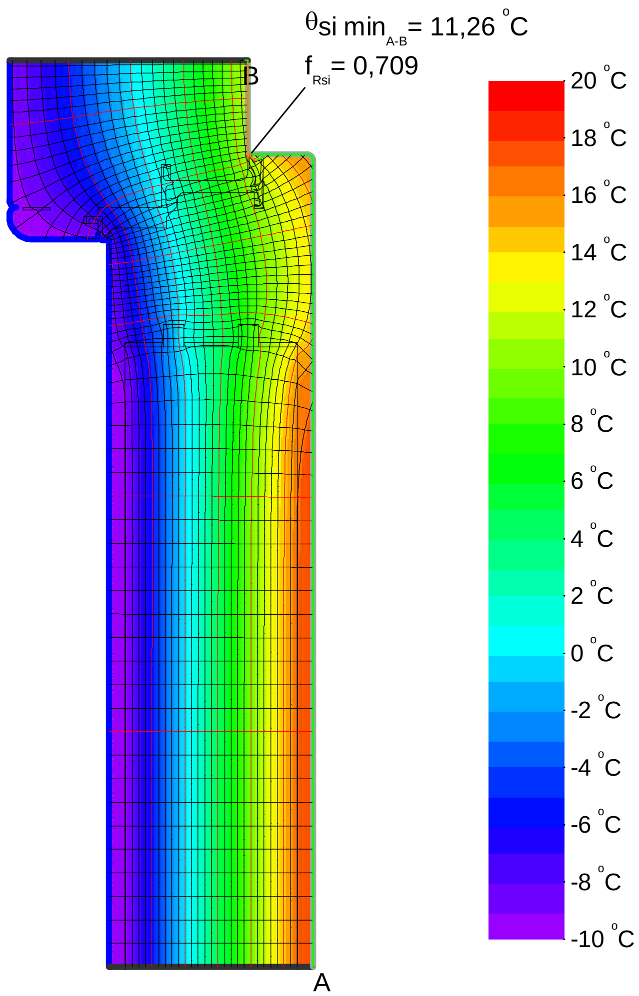
* EN ISO 10077-2:2017, 6.4.3

Boundary Condition	$q[W/m^2]$	$\theta[^\circ C]$	$R[(m^2 \cdot K)/W]$	ε	φ[%]
Exterior | Außen		-10,000	0,040		
Interior, frame, normal		20,000	0,130		
Interior, frame, reduced		20,000	0,200		
Adiabatic | Adiabat	0,000				
e 0,9 Cavity I Hohlraum				0,900	

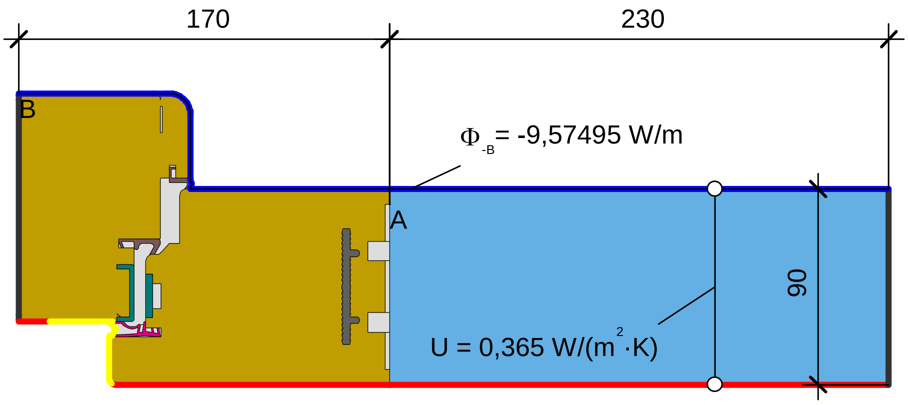
Boundary Condition	$q[W/m^2]$	$\theta[^\circ C]$	$R[(m^2 \cdot K)/W]$	ε	φ[%]
Exterior | Außen		-10,000	0,040		
fRsi: Interior I Innen		20,000	0,250		
Adiabatic | Adiabat	0,000				
e 0,9 Cavity I Hohlraum				0,900	

$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{7,236}{30,000} - 0,365 \cdot 0,274}{0,127} = 1,118\ W/(m^2 \cdot K)$$

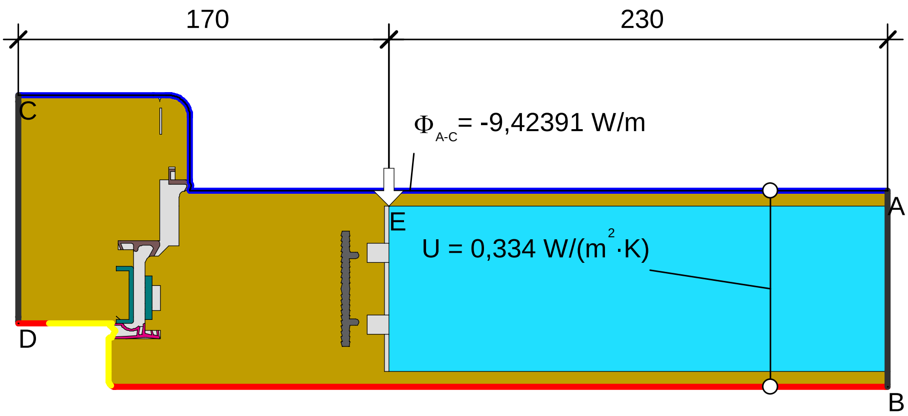




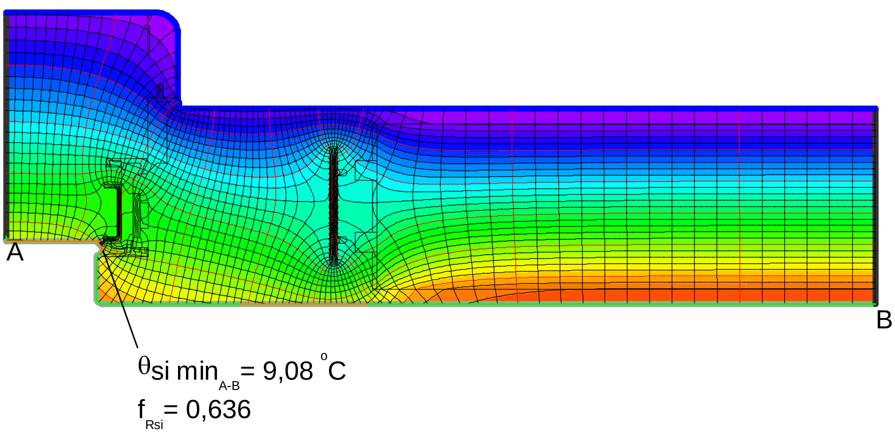
$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{7,004}{30,000} - 0,334 \cdot 0,274 - 1,118 \cdot 0,127 = 0,001\ W/(m \cdot K)$$

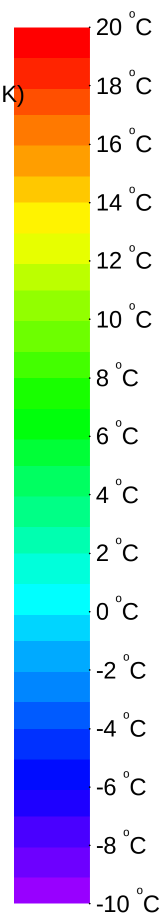


$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{9,575}{30,000} - 0,365 \cdot 0,230}{0,170} = 1,382\ W/(m^2 \cdot K)$$



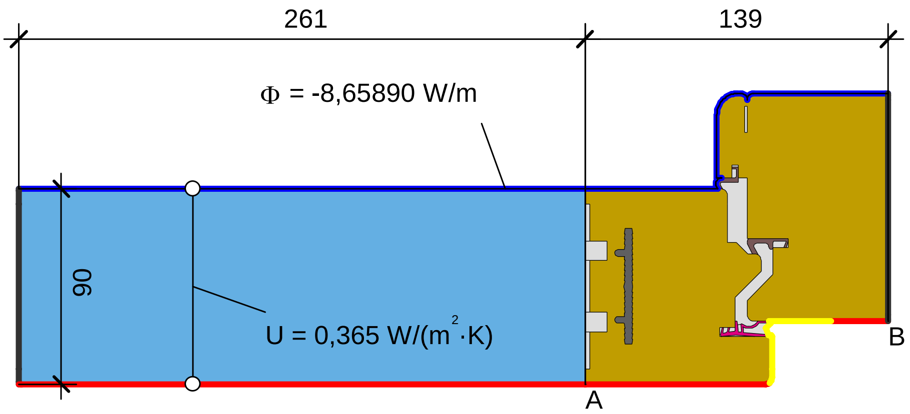
$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{9,424}{30,000} - 0,334 \cdot 0,230 - 1,382 \cdot 0,170 = 0,002\ W/(m \cdot K)$$



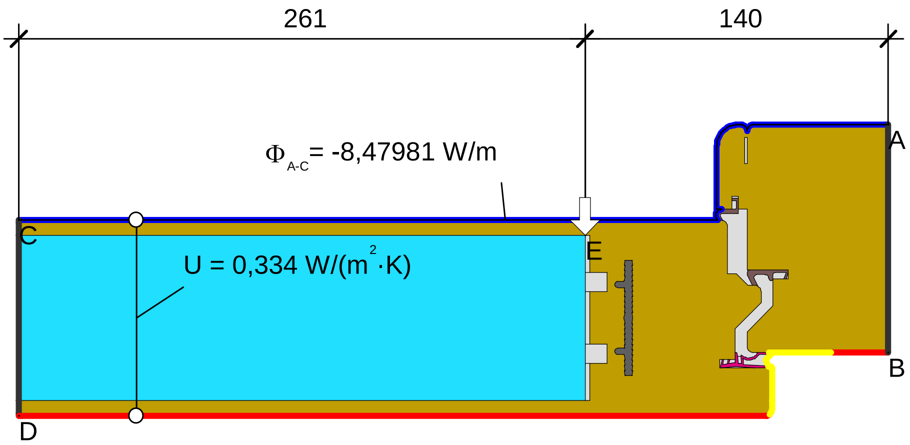


Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
EPDM	0,250	0,900	
Panel I Maske	0,035	0,900	
Pine | Kiefer	0,130	0,900	
Silicone I Silikon	0,350	0,900	
Steel I Stahl	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

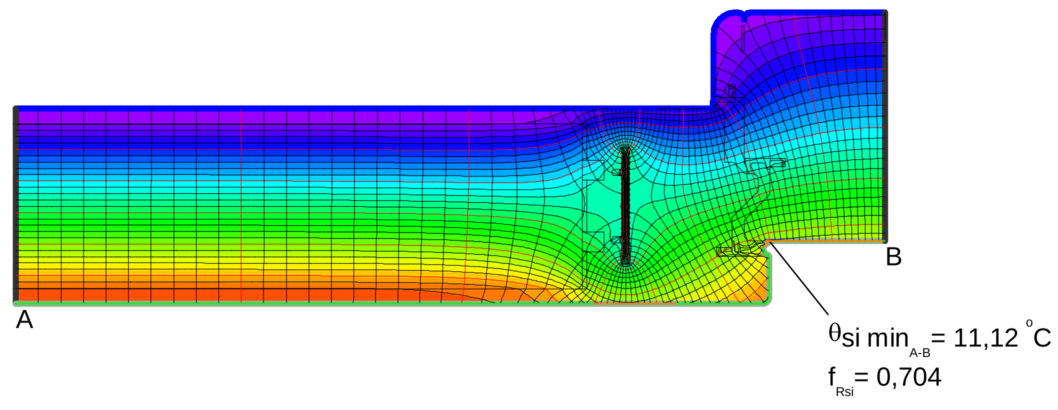
* EN ISO 10077-2:2017, 6.4.3

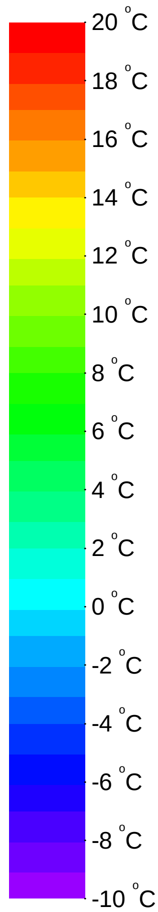


$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{8{,}659}{30{,}000} - 0{,}365 \cdot 0{,}261}{0{,}140} = 1{,}388\ \mathrm{W/(m^2 \cdot K)}$$



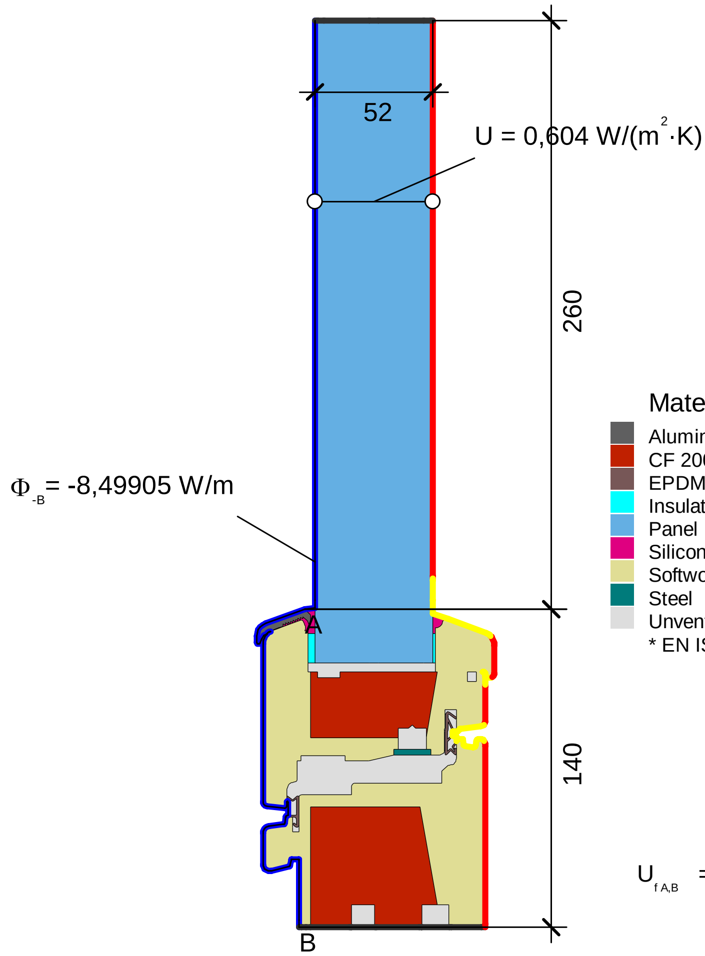
$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8{,}480}{30{,}000} - 1{,}388 \cdot 0{,}140 - 0{,}334 \cdot 0{,}261 = 0{,}002\ \mathrm{W/(m \cdot K)}$$





Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
EPDM	0,250	0,900	
Panel I Maske	0,035	0,900	
Pine | Kiefer	0,130	0,900	
Silicone I Silikon	0,350	0,900	
Unvent. cavity I unbel. Hohlr. *			0,640

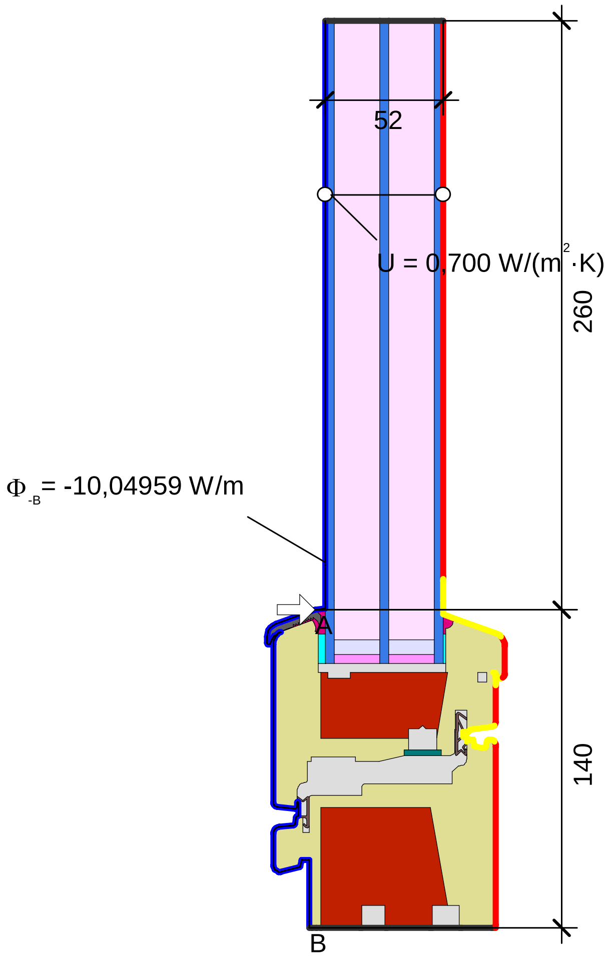
* EN ISO 10077-2:2017, 6.4.3

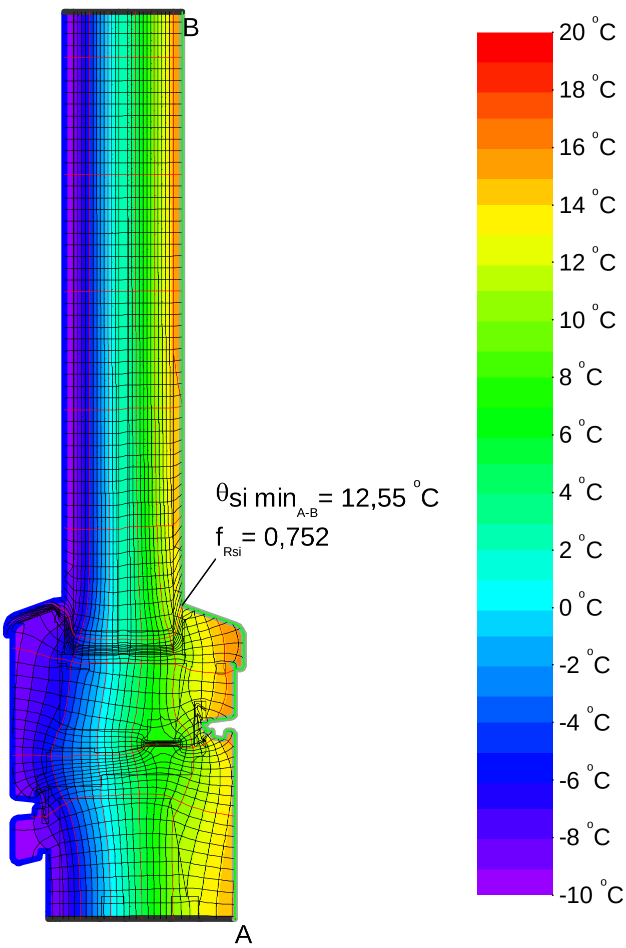


Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
CF 200 046	0,046	0,900	0,640
EPDM	0,250	0,900	
Insulation tape I Vorlegeband	0,060	0,900	0,640
Panel I Maske	0,035	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Steel I Stahl	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640

* EN ISO 10077-2:2017, 6.4.3

$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{8{,}499}{30{,}000} - 0{,}604 \cdot 0{,}260}{0{,}140} = 0{,}901\ \mathrm{W/(m^2 \cdot K)}$$

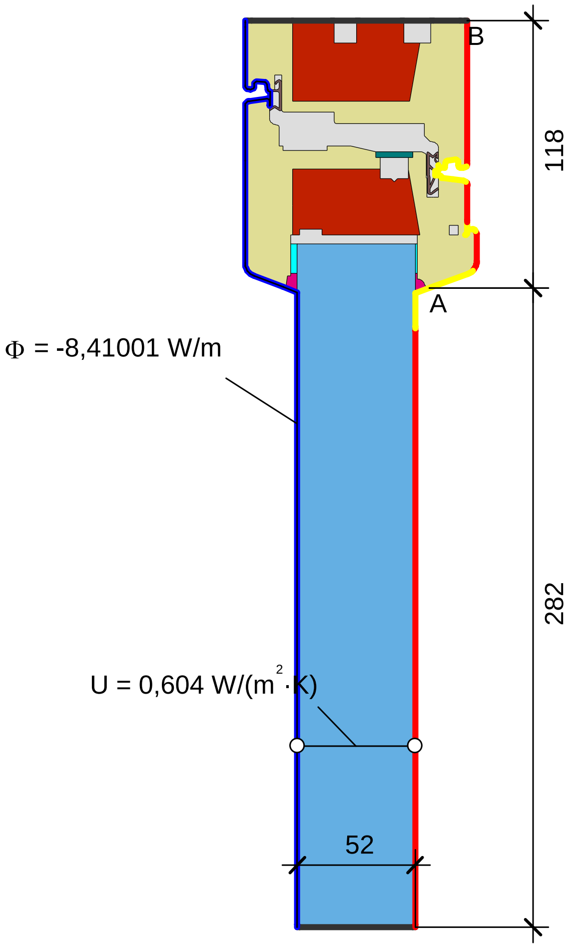




$$\psi_{ed\,A} = \frac{\Phi}{\Delta T} - U_g \cdot b_g - U_f \cdot b_f = \frac{10{,}050}{30{,}000} - 0{,}700 \cdot 0{,}260 - 0{,}901 \cdot 0{,}140 = 0{,}027\ \mathrm{W/(m \cdot K)}$$

OB1 - Window Bottom (Openable)

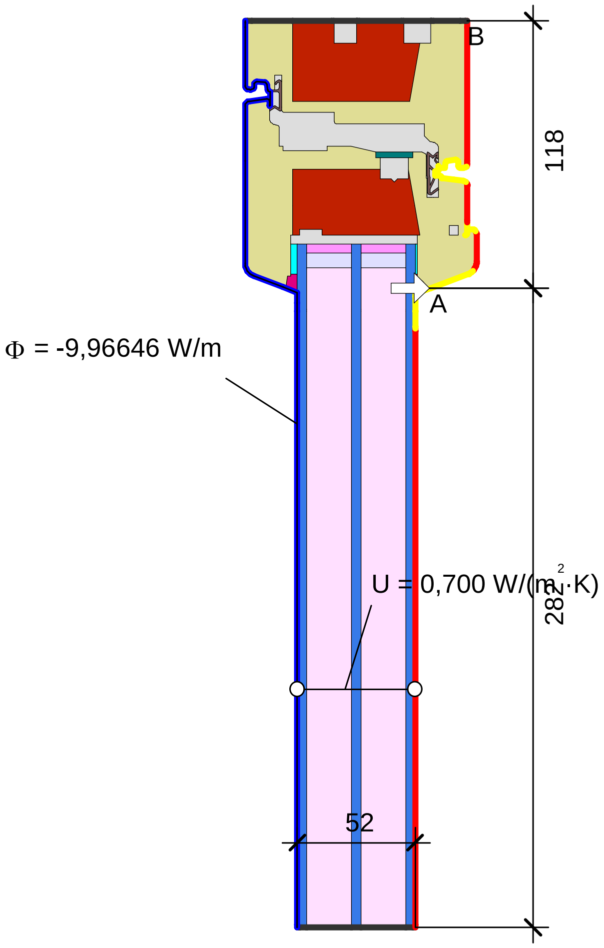
Passive House Institute

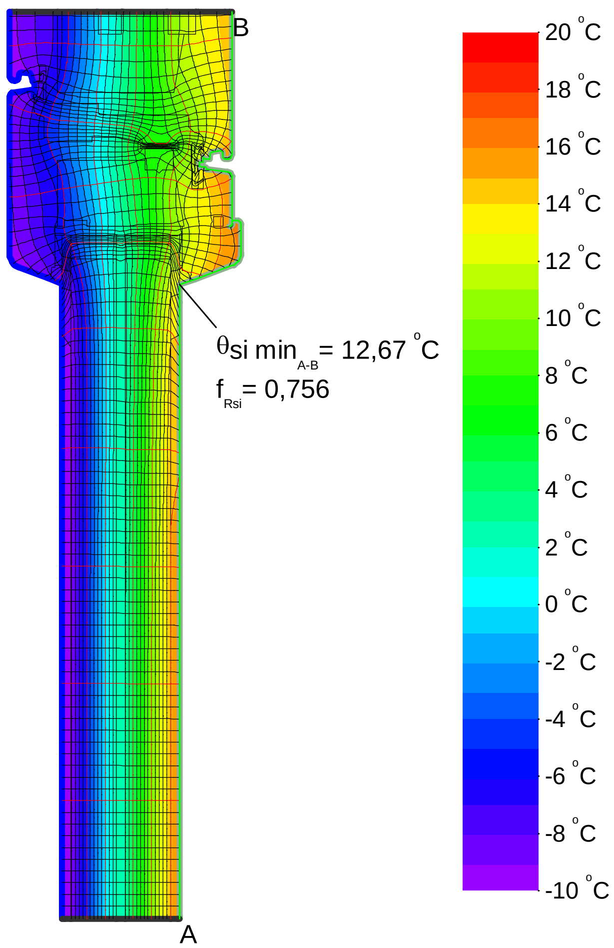


Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
CF 200 046	0,046	0,900	0,640
EPDM	0,250	0,900	
Insulation tape | Vorlegeband	0,060	0,900	0,640
Panel I Maske	0,035	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Steel I Stahl	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640

* EN ISO 10077-2:2017, 6.4.3

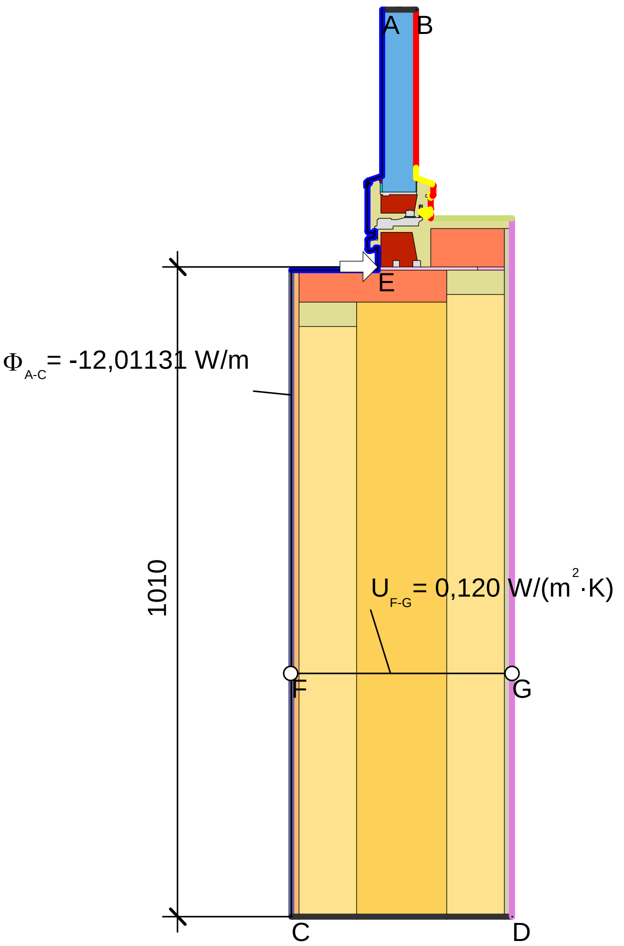
$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{8{,}410}{30{,}000} - 0{,}604 \cdot 0{,}282}{0{,}118} = 0{,}932\ \mathrm{W/(m^2 \cdot K)}$$

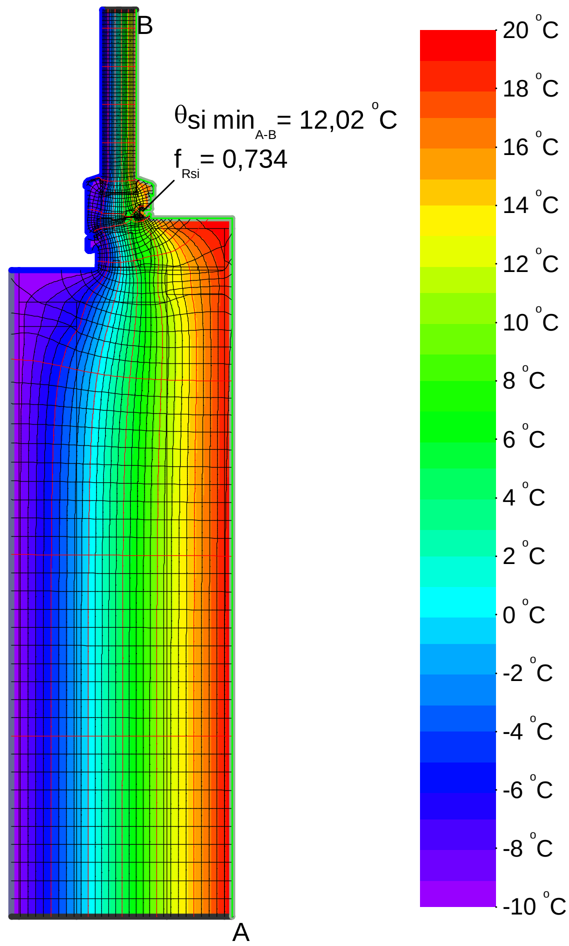




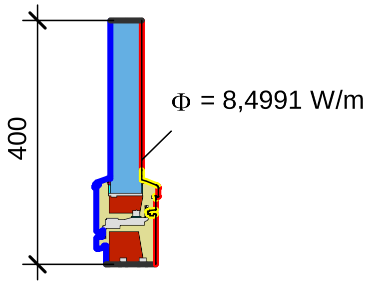
$$\psi_{ed\,A} = \frac{\Phi}{\Delta T} - U_g \cdot b_g - U_f \cdot b_f = \frac{9{,}966}{30{,}000} - 0{,}700 \cdot 0{,}282 - 0{,}932 \cdot 0{,}118 = 0{,}025\ \mathrm{W/(m \cdot K)}$$

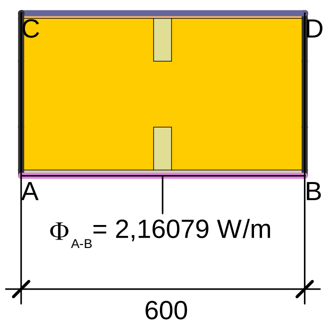
OH1 - Window Top, Side (Openable)





$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{12{,}011}{30{,}000} - \frac{8{,}499}{30{,}000} - 0{,}120 \cdot 1{,}010 = -0{,}004 \text{ W/(m·K)}$$

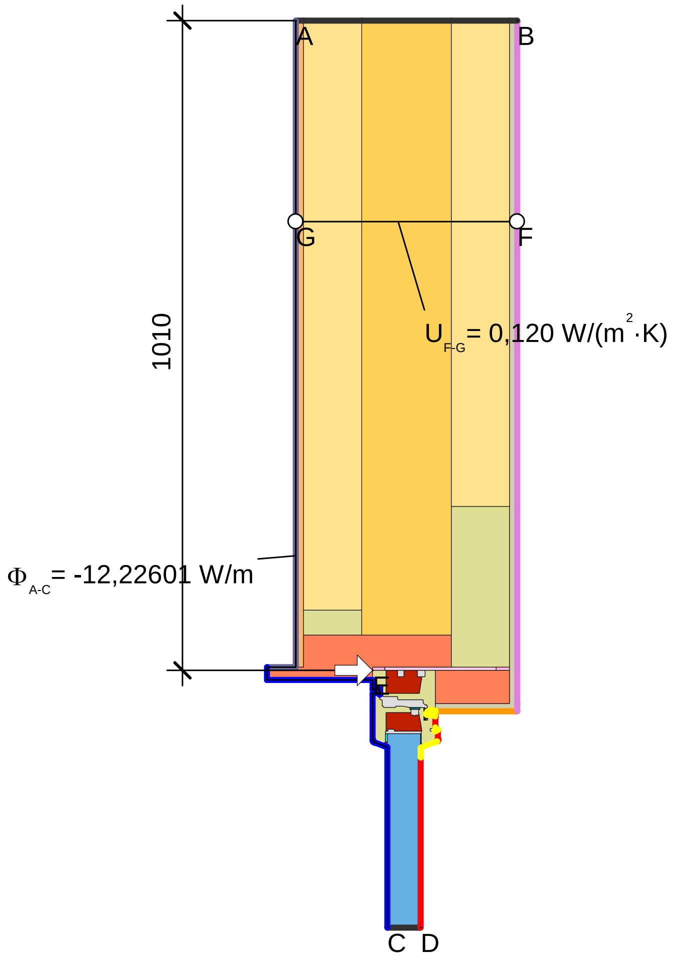


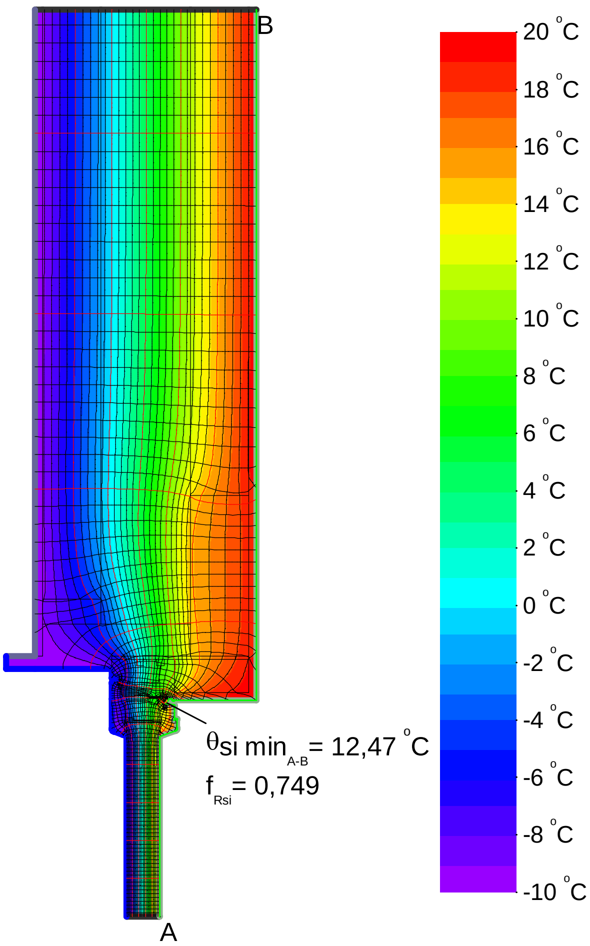


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

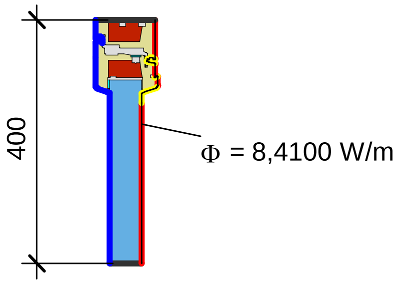
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(92)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
CF 200 046	0,046	0,900	0,640
EPDM	0,250	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Steel I Stahl	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640

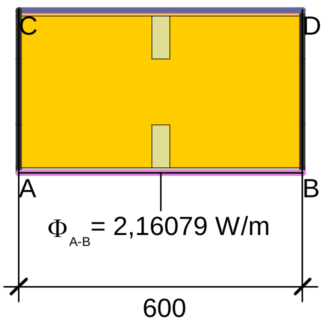
* EN ISO 10077-2:2017, 6.4.3





$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - \frac{\Phi_2}{\Delta T} = \frac{12{,}226}{30{,}000} - 0{,}120 \cdot 1{,}010 - \frac{8{,}410}{30{,}000} = 0{,}006 \text{ W/(m·K)}$$

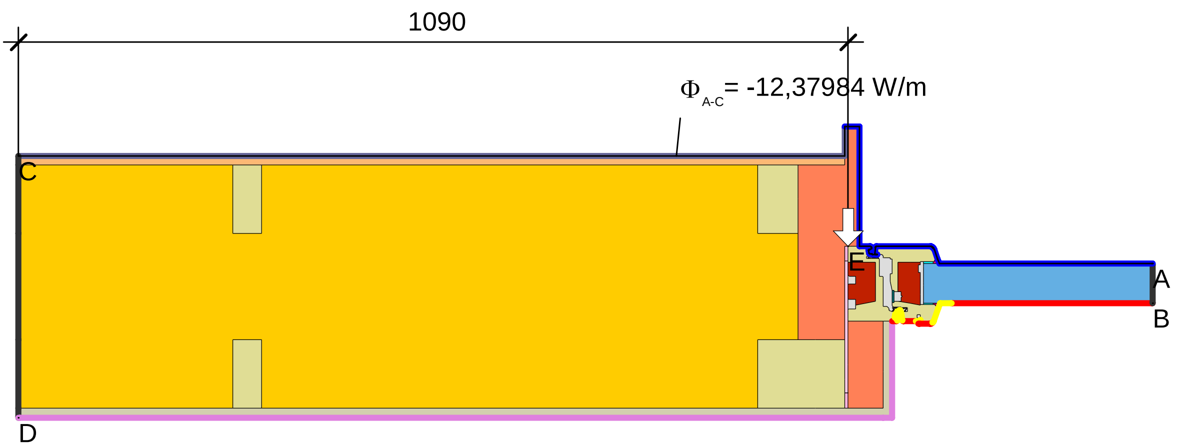


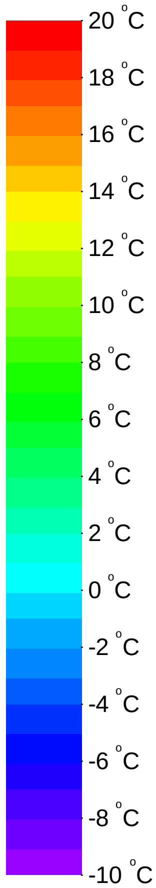


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

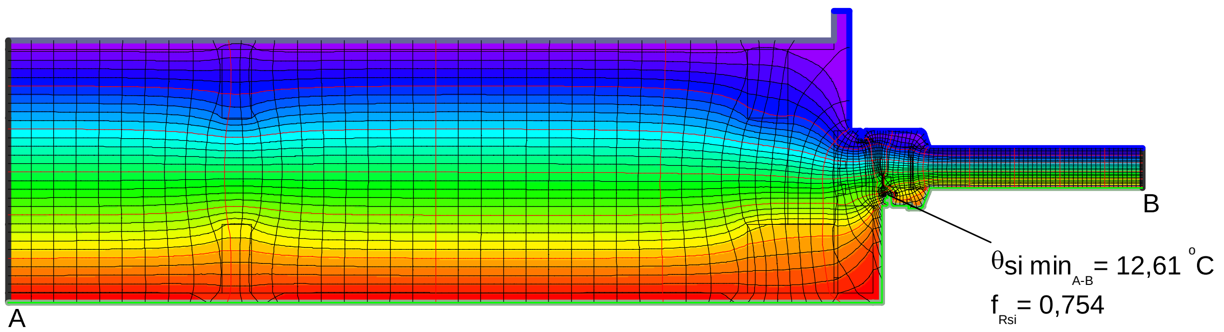
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(94)	0,057	0,900	0,640
CF 200 046	0,046	0,900	0,640
EPDM	0,250	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Steel I Stahl	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640

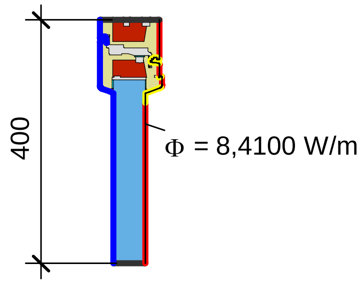
* EN ISO 10077-2:2017, 6.4.3

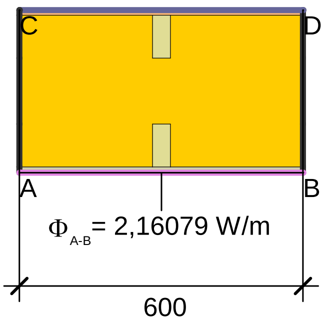




$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{12{,}380}{30{,}000} - \frac{8{,}410}{30{,}000} - 0{,}120 \cdot 1{,}090 = 0{,}001 \text{ W/(m·K)}$$



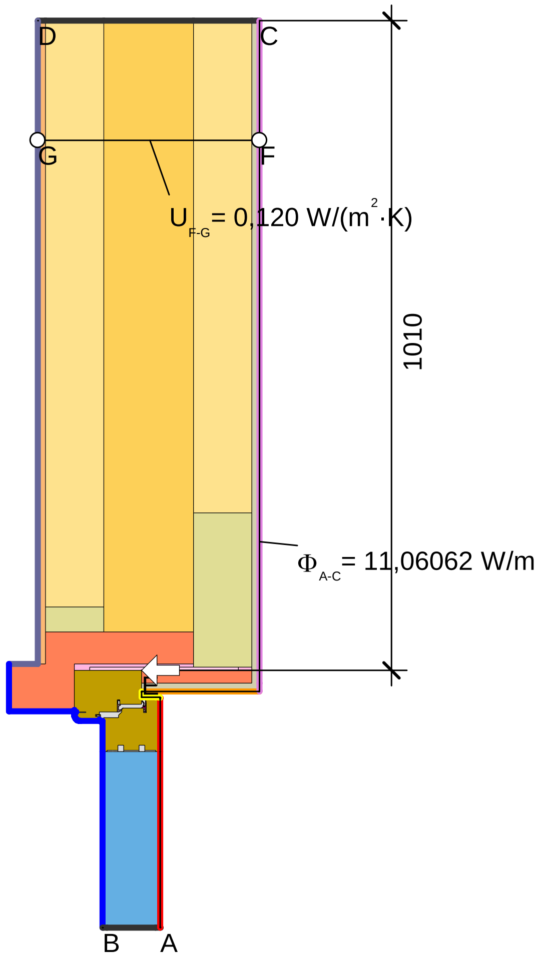


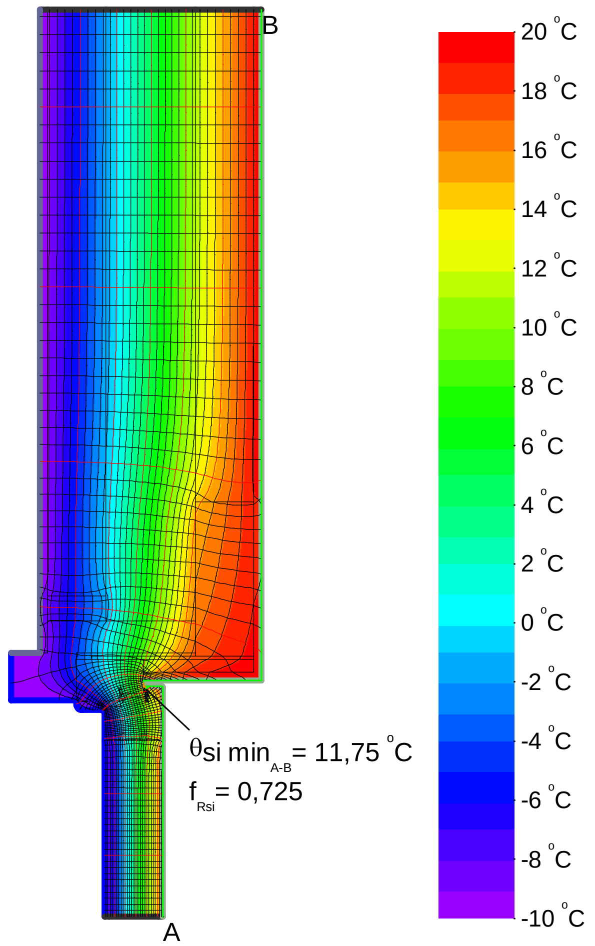


$$U_{eq\,A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

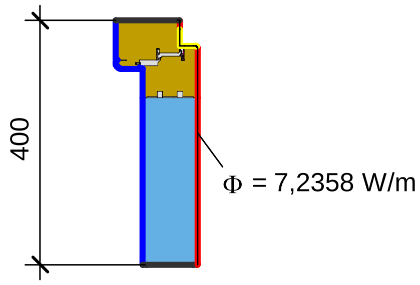
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(96)	0,057	0,900	0,640
CF 200 046	0,046	0,900	0,640
EPDM	0,250	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Steel I Stahl	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640

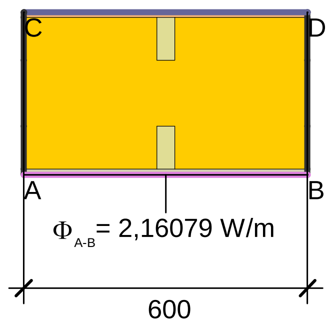
* EN ISO 10077-2:2017, 6.4.3





$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_l}{\Delta T} - U_2 \cdot b_2 = \frac{11{,}061}{30{,}000} - \frac{7{,}236}{30{,}000} - 0{,}120 \cdot 1{,}010 = 0{,}006\ \text{W/(m·K)}$$

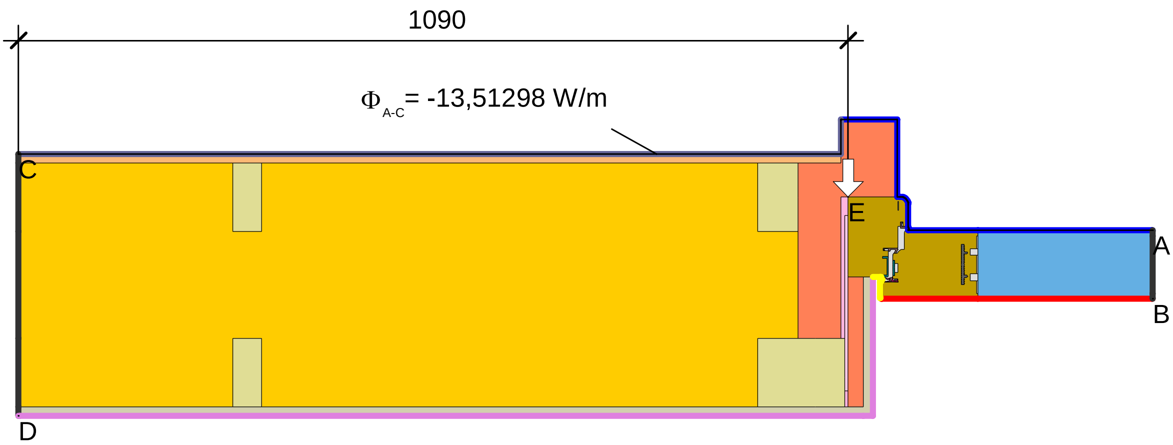




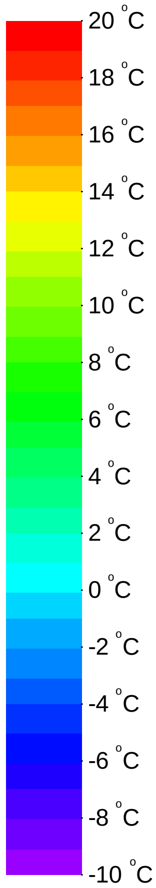
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120\ \text{W/(m}^2\text{·K)}$$

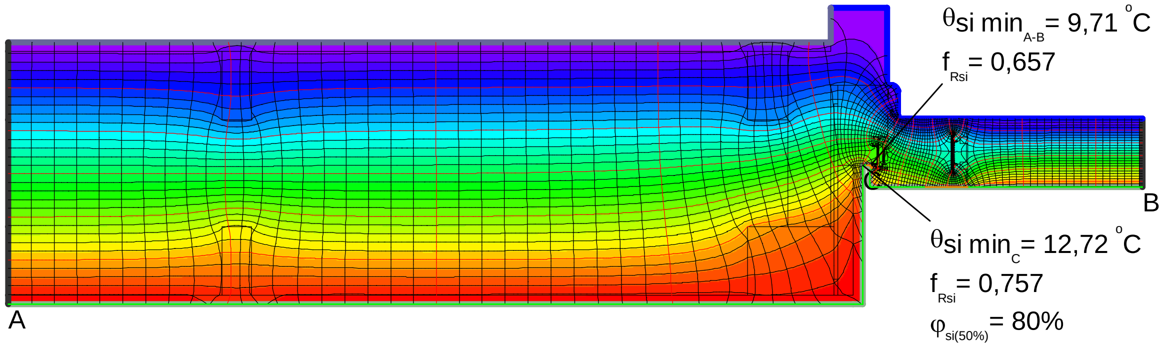
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(86)	0,057	0,900	0,640
EPDM	0,250	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Pine | Kiefer	0,130	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

* EN ISO 10077-2:2017, 6.4.3



$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{13{,}513}{30{,}000} - \frac{9{,}575}{30{,}000} - 0{,}120 \cdot 1{,}090 = 0{,}000 \text{ W/(m·K)}$$





$\theta_{si\ min_{A\text{-}B}} = 9{,}71\ ^{\circ}C$

$f_{Rsi} = 0{,}657$

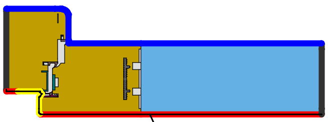
$\theta_{si\ min_{C}} = 12{,}72\ ^{\circ}C$

$f_{Rsi} = 0{,}757$

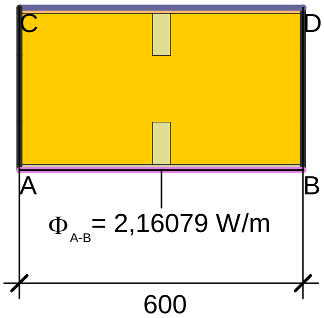
$\varphi_{si(50\%)} = 80\%$

$\varphi_{100\%} = 63\%$

$\varphi_{80\%} = 50\%$



$\Phi = 9{,}5750$ W/m



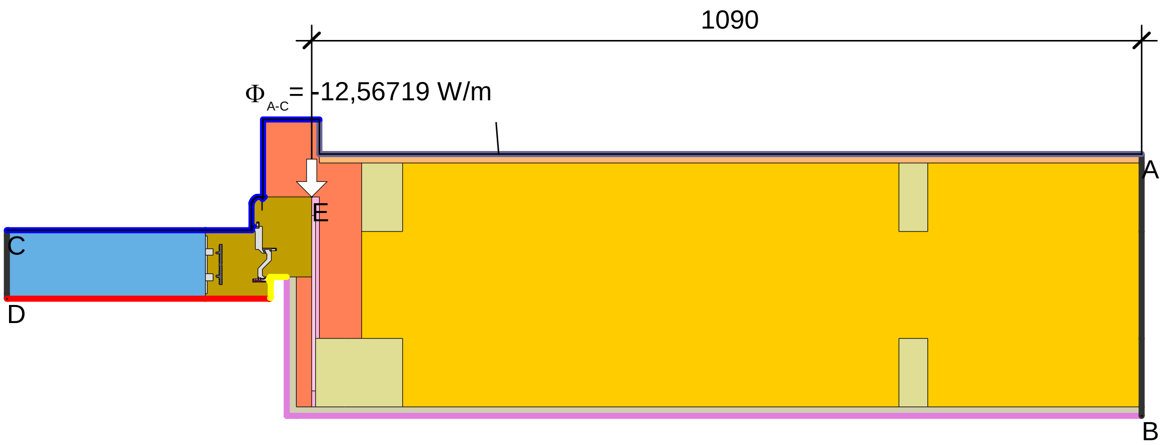
$\Phi_{A\text{-}B} = 2{,}16079$ W/m

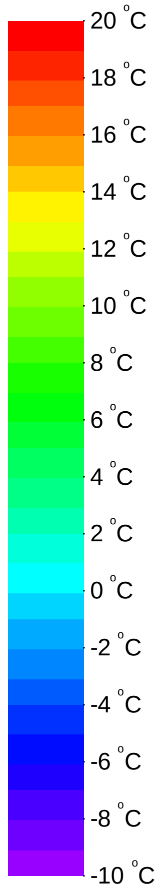
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(88)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
EPDM	0,250	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Pine | Kiefer	0,130	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Steel I Stahl (2)	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

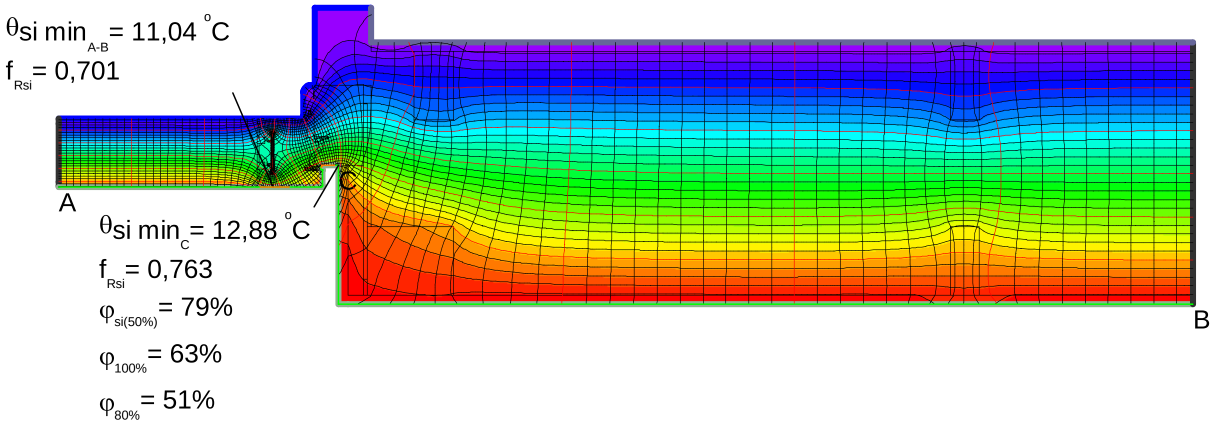
* EN ISO 10077-2:2017, 6.4.3

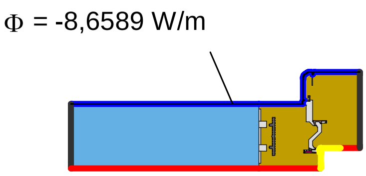
EW1_DJ1_1 - Entrance Door Locking Side Connection

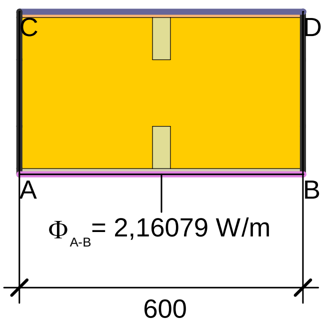




$$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - \frac{\Phi_2}{\Delta T} = \frac{12{,}567}{30{,}000} - 0{,}120 \cdot 1{,}090 - \frac{8{,}659}{30{,}000} = -0{,}001 \text{ W/(m·K)}$$



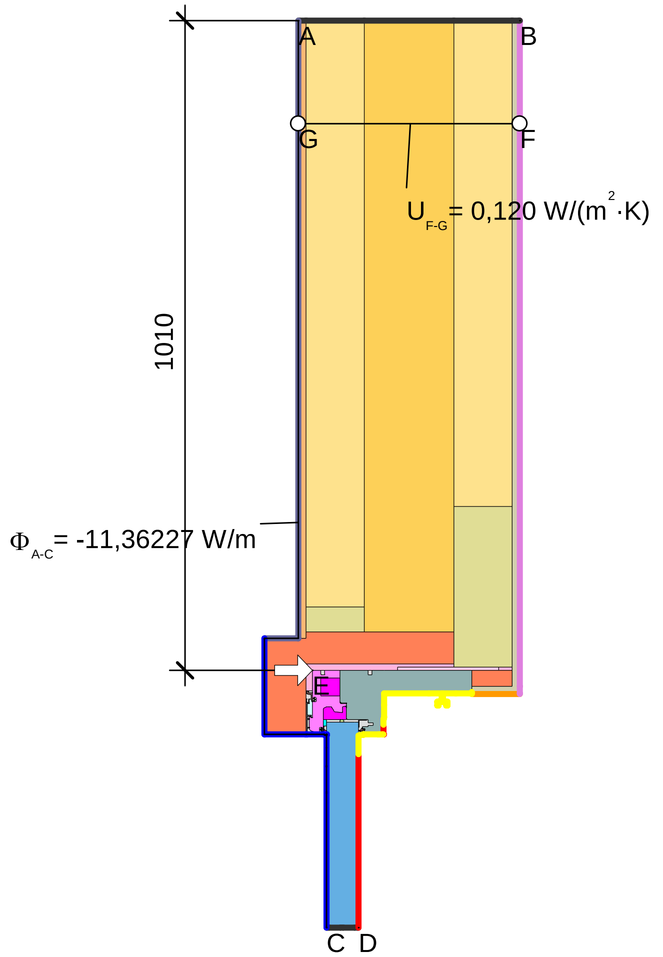


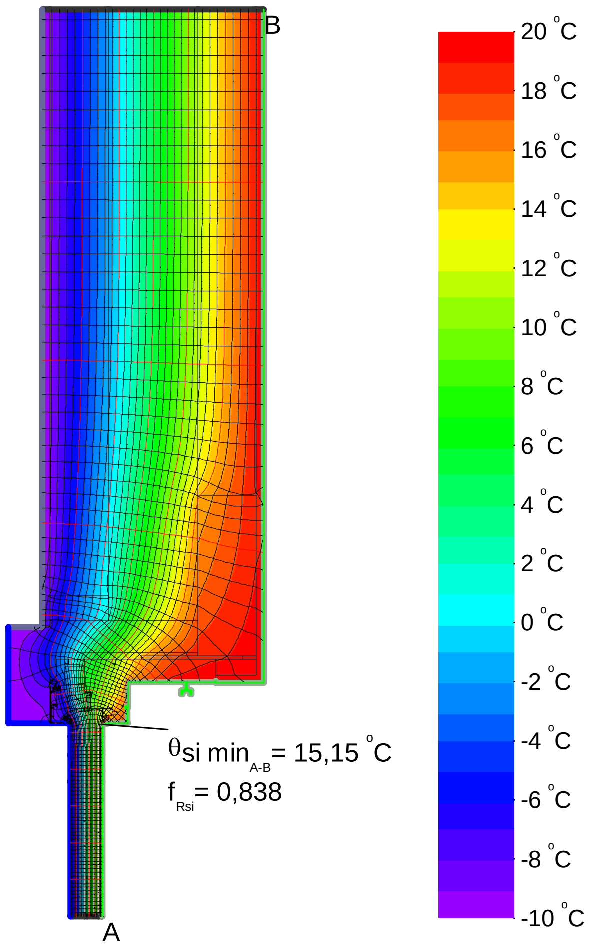


$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120 \text{ W/(m}^2\text{·K)}$$

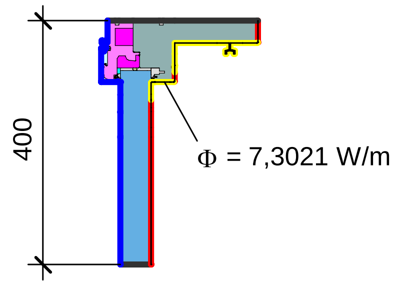
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(90)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
EPDM	0,250	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Pine | Kiefer	0,130	0,900	
Silicone I Silikon	0,350	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Unvent. cavity I unbel. Hohlr. *			0,640

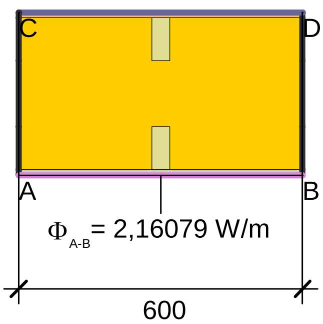
* EN ISO 10077-2:2017, 6.4.3





$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - \frac{\Phi_2}{\Delta T} = \frac{11{,}362}{30{,}000} - 0{,}120 \cdot 1{,}010 - \frac{7{,}302}{30{,}000} = 0{,}014\ \text{W/(m·K)}$$

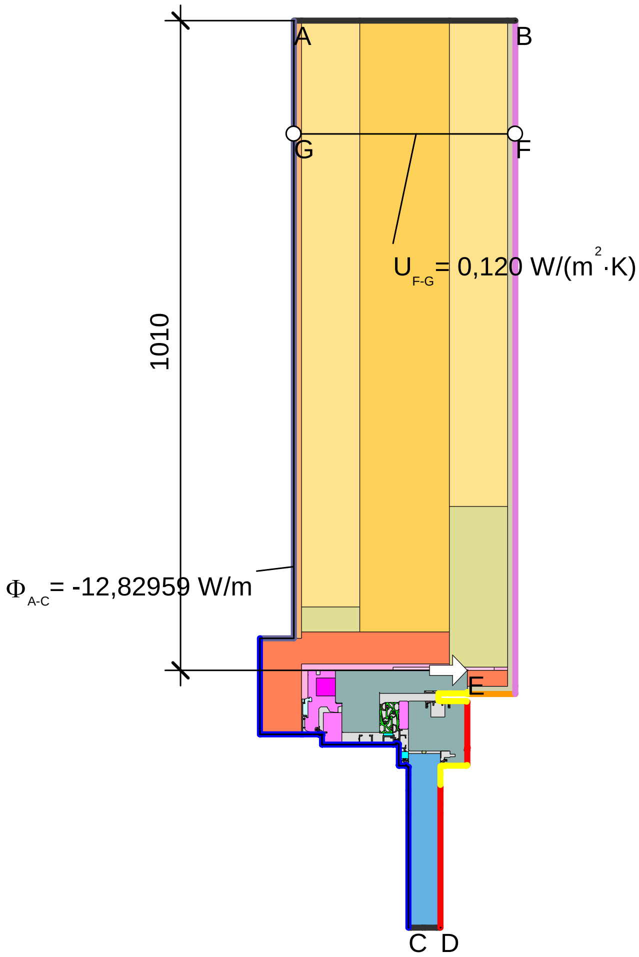


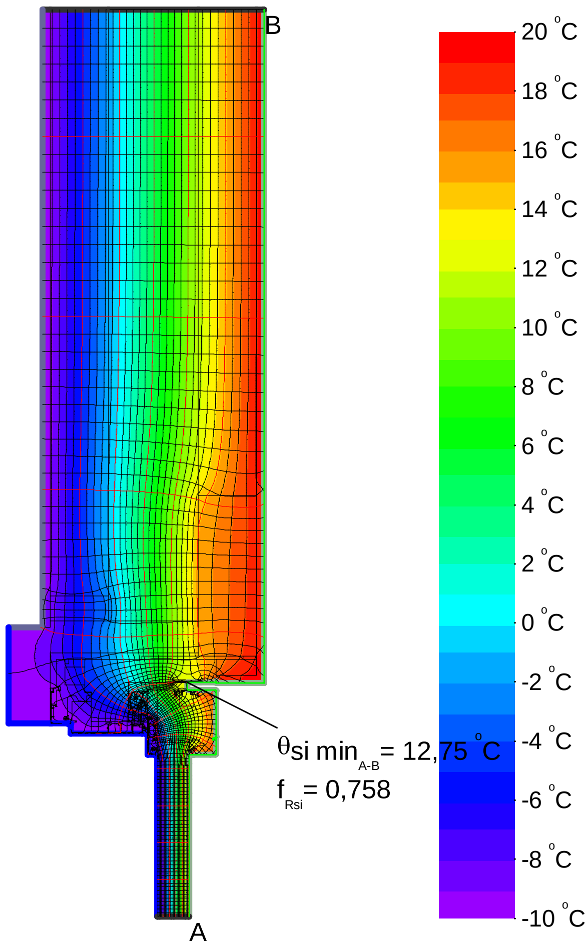


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2{,}161}{30{,}000 \cdot 0{,}600} = 0{,}120\ \text{W/(m}^2\text{·K)}$$

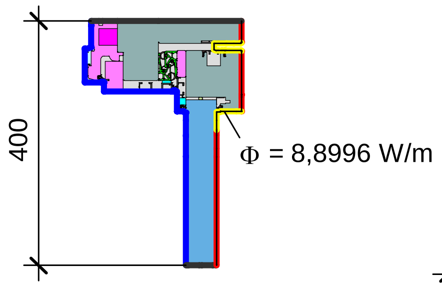
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(67)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
ENERcell	0,060	0,900	0,640
EPDM	0,250	0,900	
EPDM foam | Moosgummi	0,050	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Insulation Wärmedämmung 032	0,032	0,900	0,640
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PE-Insulation I Wärmedämmung 035	0,035	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Spruce, Fir I Fichte, Tanne	0,110	0,900	
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

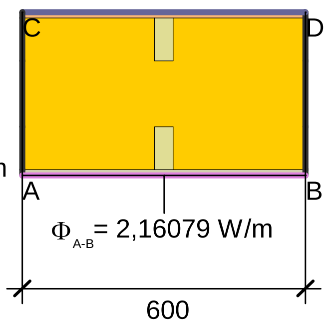
* EN ISO 10077-2:2017, 6.4.3





$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - \frac{\Phi_2}{\Delta T} = \frac{12,830}{30,000} - 0,120 \cdot 1,010 - \frac{8,900}{30,000} = 0,010 \text{ W/(m·K)}$$

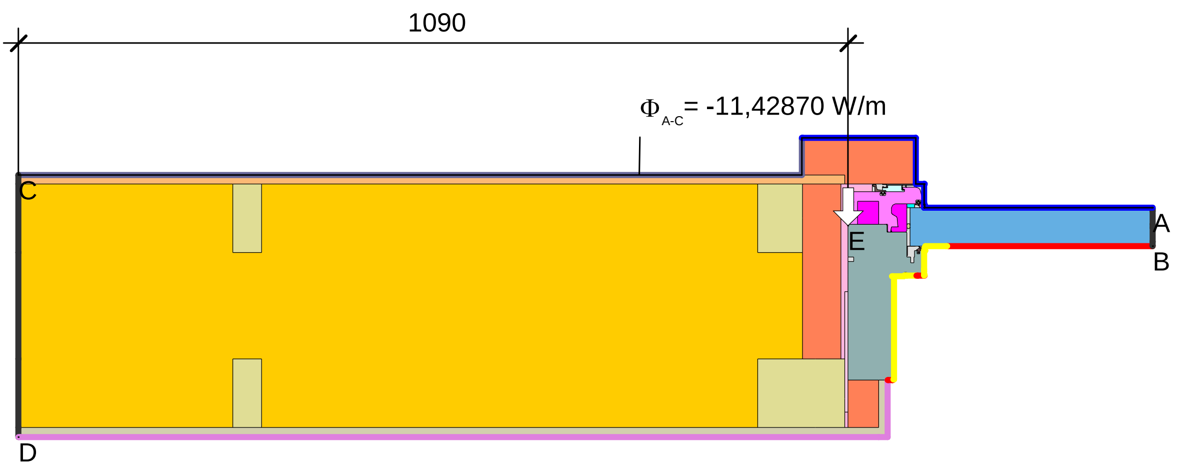




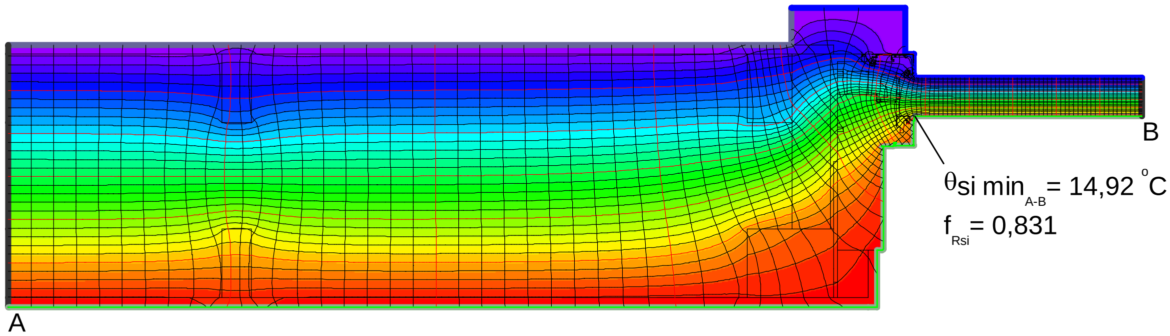
$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120 \text{ W/(m}^2\text{·K)}$$

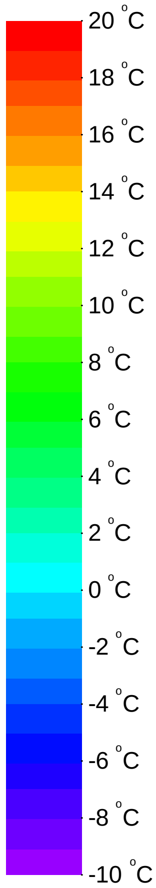
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(68)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
ENERcell	0,060	0,900	0,640
EPDM	0,250	0,900	
EPDM foam | Moosgummi	0,050	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
GW+timber equivalent 1	0,043	0,900	0,640
GW+timber equivalent 2	0,038	0,900	0,640
Insulation Wärmedämmung 032	0,032	0,900	0,640
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
PE-Insulation I Wärmedämmung 035	0,035	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Polyvinylchloride (PVC)	0,170	0,900	1,280e-5
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Spruce, Fir I Fichte, Tanne	0,110	0,900	
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

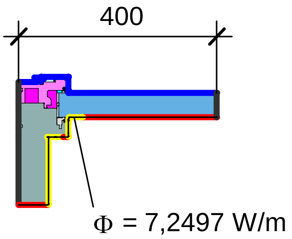
* EN ISO 10077-2:2017, 6.4.3

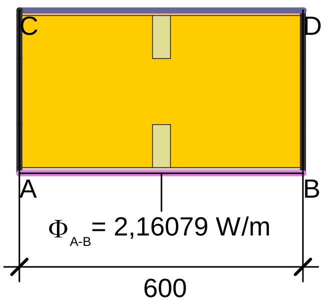


$$\psi_{A\text{-}E\text{-}C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{11,429}{30,000} - \frac{7,250}{30,000} - 0,120 \cdot 1,090 = 0,008 \text{ W/(m·K)}$$





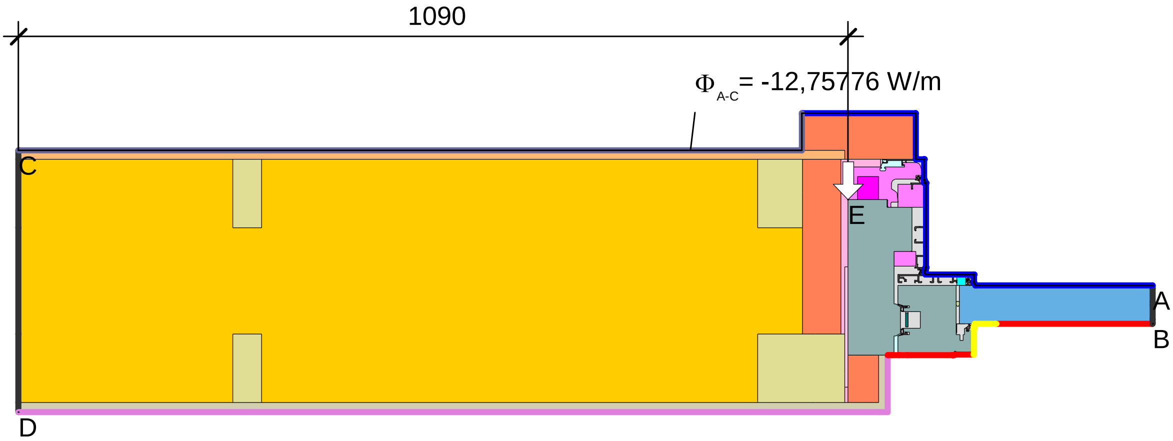


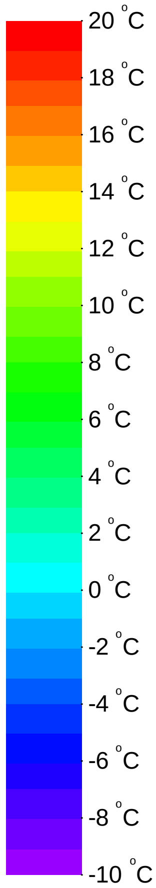


$$U_{eq\ A\text{-}B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120 \text{ W/(m}^2\text{·K)}$$

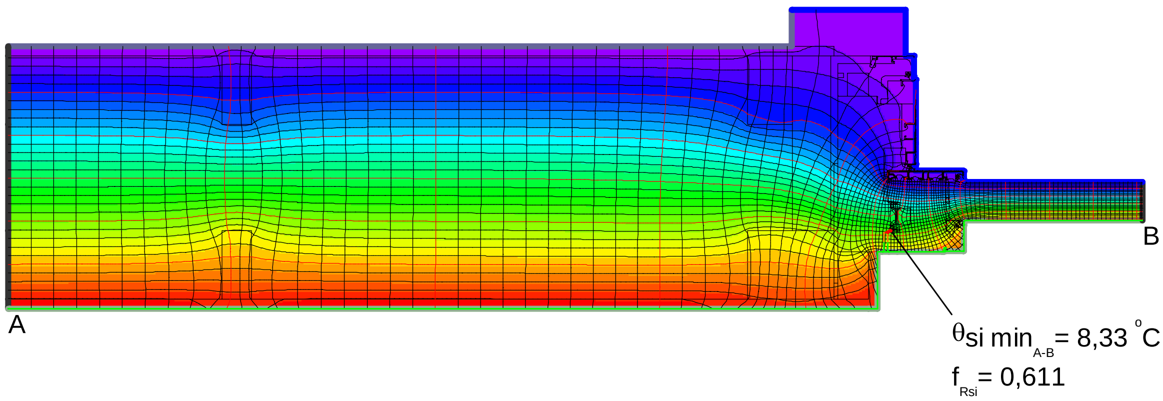
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(69)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
ENERcell	0,060	0,900	0,640
EPDM	0,250	0,900	
EPDM foam | Moosgummi	0,050	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Insulation Wärmedämmung 032	0,032	0,900	0,640
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Nicht definiertes Material (1)	1,000	0,900	1,000
PE-Insulation I Wärmedämmung 035	0,035	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Spruce, Fir I Fichte, Tanne	0,110	0,900	
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

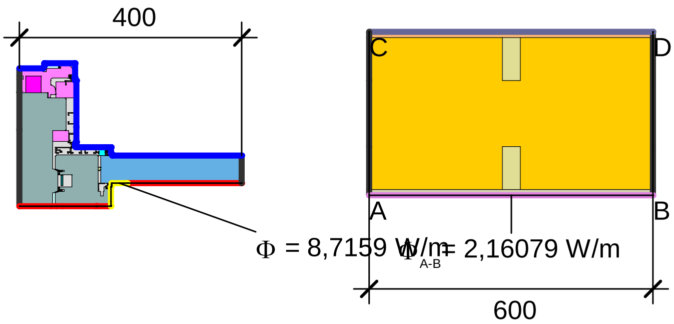
* EN ISO 10077-2:2017, 6.4.3





$$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - \frac{\Phi_1}{\Delta T} - U_2 \cdot b_2 = \frac{12,758}{30,000} - \frac{8,716}{30,000} - 0,120 \cdot 1,090 = 0,004\ W/(m \cdot K)$$





$$U_{eq\ A-B} = \frac{\Phi}{\Delta T \cdot b} = \frac{2,161}{30,000 \cdot 0,600} = 0,120\ W/(m^2 \cdot K)$$

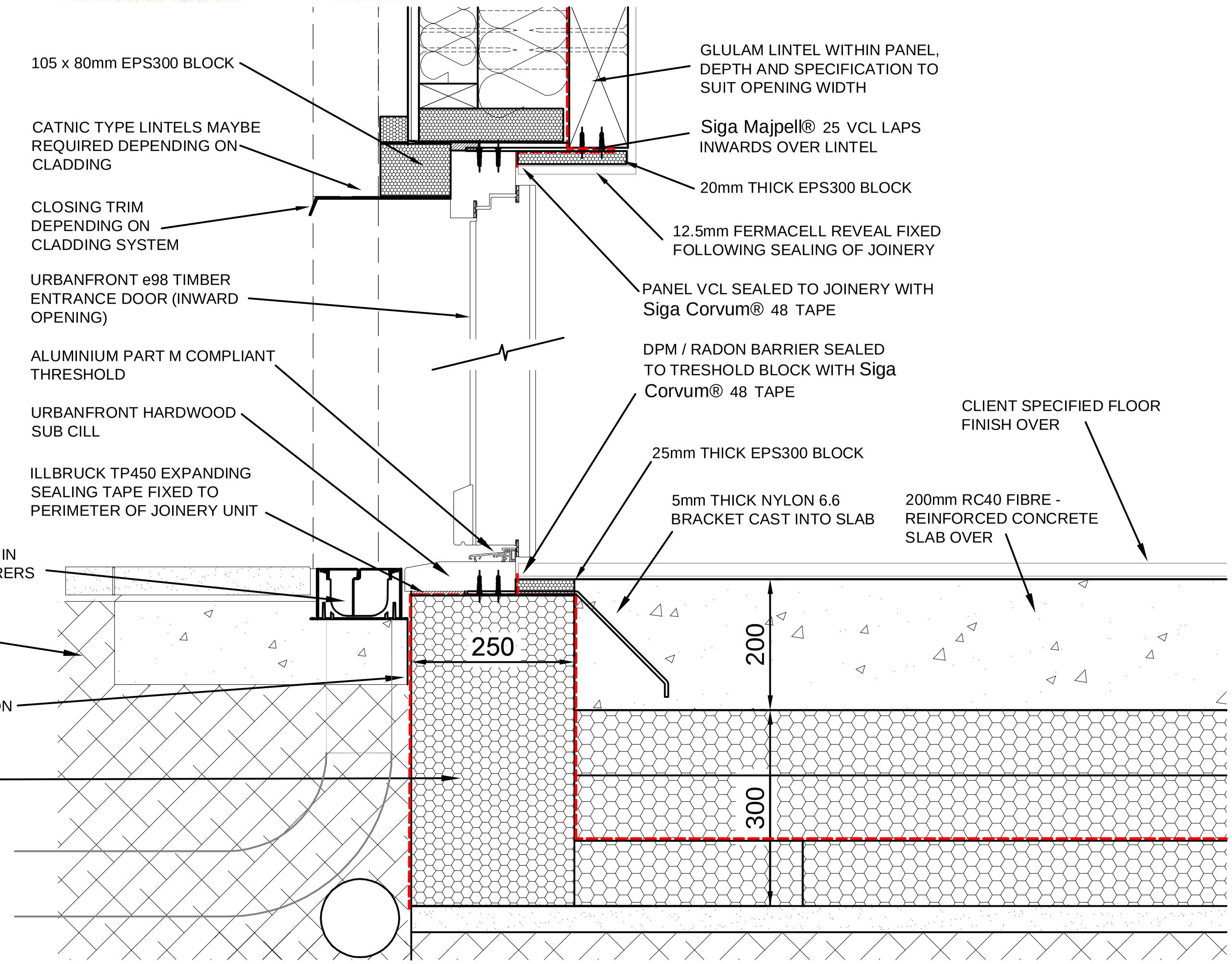
Material	λ[W/(m·K)]	ε	δ[mg/(m·h·Pa)]
/ PU in-situ foam I PU-Ortschaum 040, 3D äquivalent R 20-300(70)	0,057	0,900	0,640
Aluminum I Aluminium 10456	160,000	0,900	6,400e-9
ENERcell	0,060	0,900	0,640
EPDM	0,250	0,900	
EPDM foam | Moosgummi	0,050	0,900	
Fermacell Gypsum Fibreboard | BBA Certificate + 25%	0,400	0,900	
Insulation Wärmedämmung 032	0,032	0,900	0,640
Insulation tape | Vorlegeband	0,060	0,900	0,640
Kay-Cel EPS 250/300E (DoP + DIN 4108)	0,040	0,900	0,640
Knauf Frametherm Roll/Slab 32 (DoP + DIN 4108)	0,038	0,900	
Nicht definiertes Material (1)	1,000	0,900	1,000
PE-Insulation I Wärmedämmung 035	0,035	0,900	0,640
PU in-situ foam I PU-Ortschaum 040	0,040	0,900	0,010
Panel I Maske	0,035	0,900	
Panelvent Sheathing Board | Manufacturer Datasheet + 25%	0,125	0,900	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900	0,018
Spruce, Fir I Fichte, Tanne	0,110	0,900	
Steel I Stahl (1)	50,000	0,900	6,400e-9
Unvent. cavity I unbel. Hohlr. *			0,640
slightly vent. cav. I leicht bel. Hohlr. *			0,640

* EN ISO 10077-2:2017, 6.4.3

Appendix 3: Manufacturers drawings | Zeichnungen des Herstellers

Passive House Institute

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



WI-TH

Advanced Housing Systems

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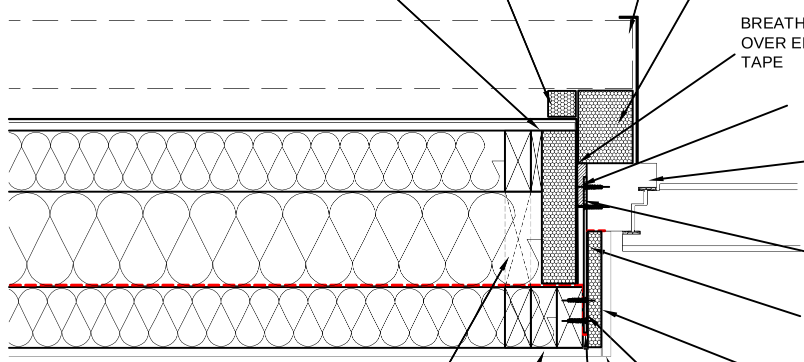
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE: ENTRANCE DOOR HEAD AND CILL
PROJECT: PASSIVHAUS STANDARD DETAIL
CLIENT:
DATE: 21/1/2021
DWG No. WI-TH
REV:
DWG SCALE. 1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



WI-ED

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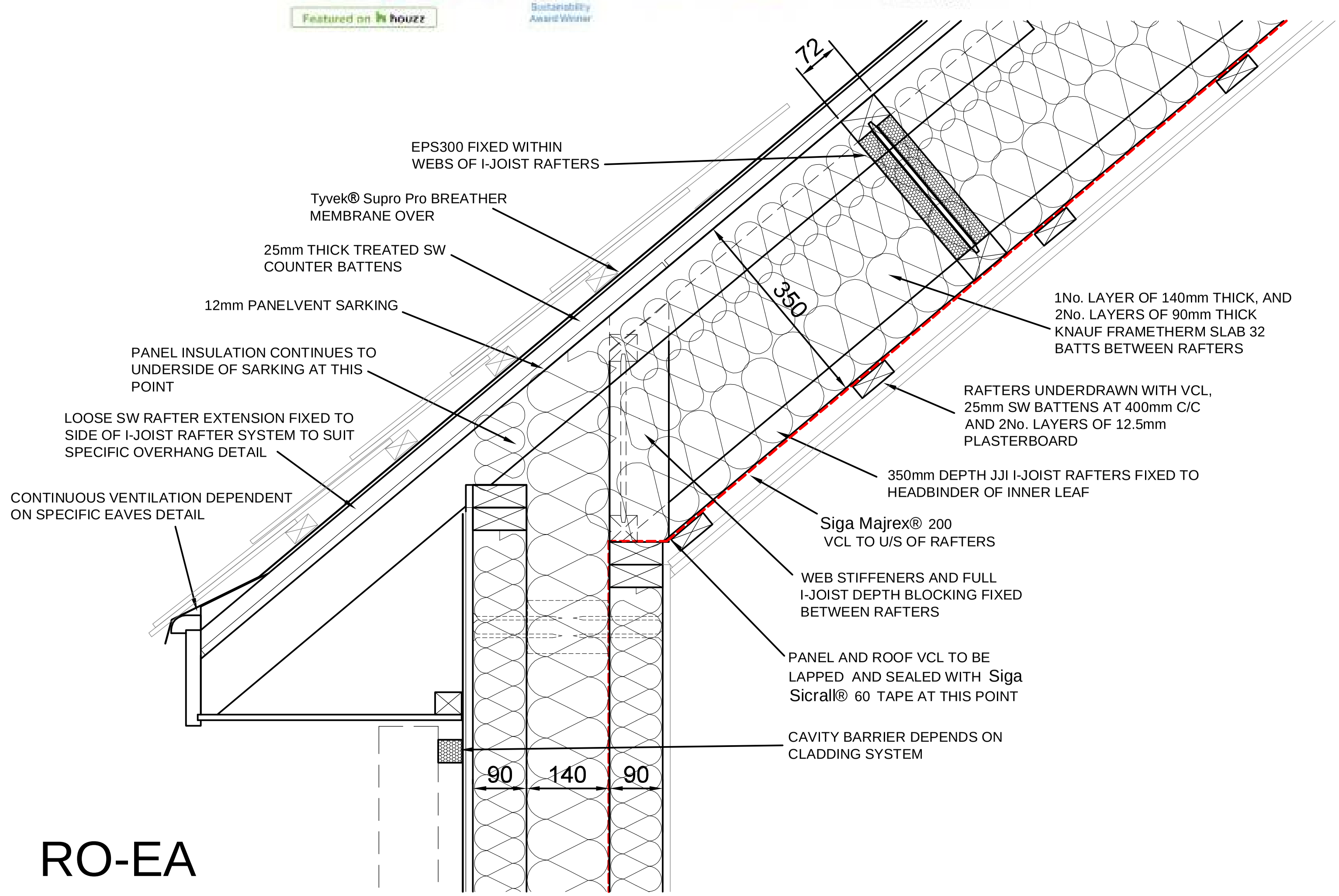
BUTTERLEIGH SAWMILL, BUTTERLEIGH, CULLOMPTON, DEVON, EX15 1PP
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	ENTRANCE DOOR JAMB		
PROJECT:	PASSIVEHAUS STANDARD DETAIL		
CLIENT:			
DATE:	21/1/2021	DWG No.	WIED
REV:		DWG SCALE:	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



RO-EA

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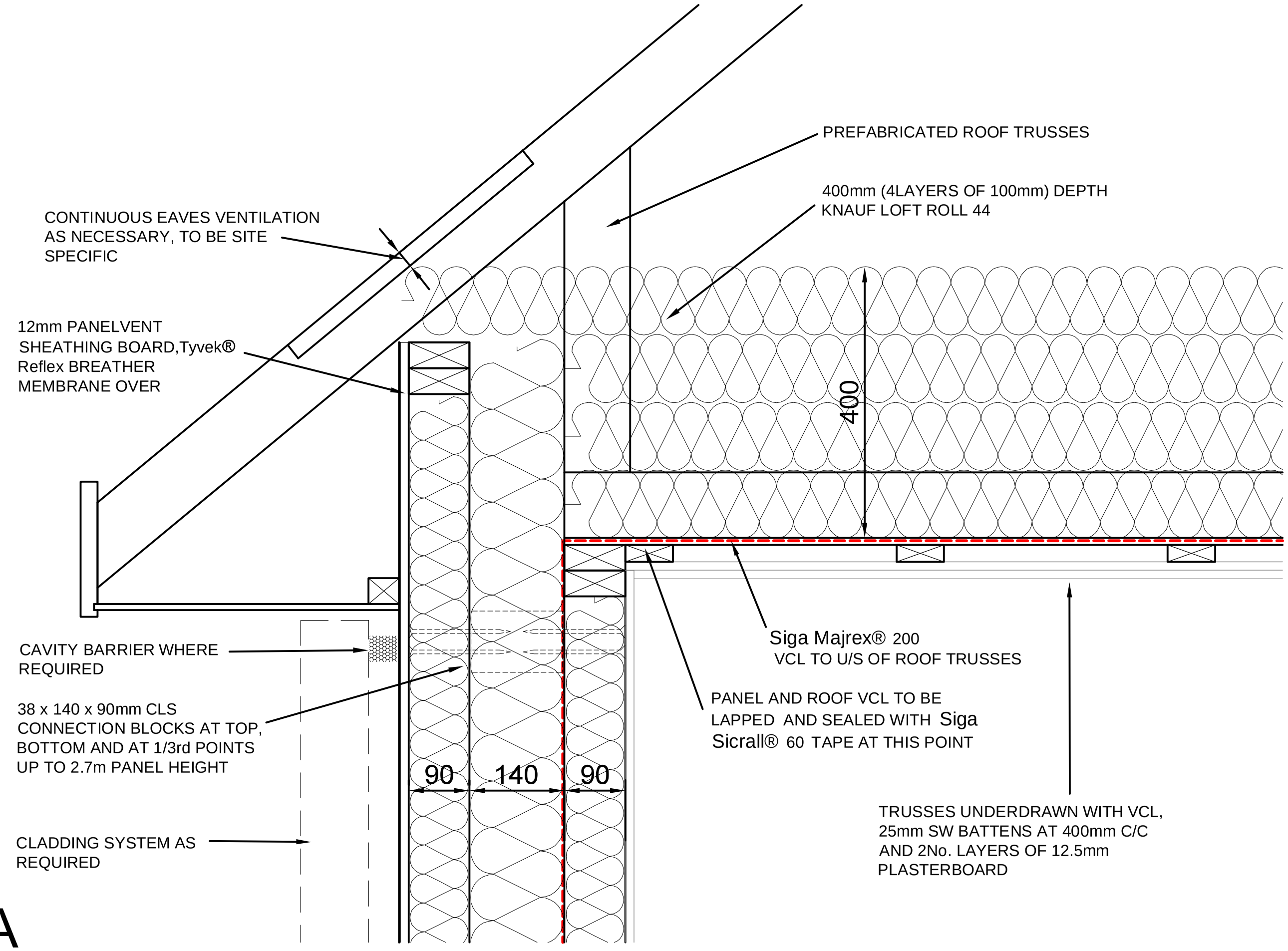
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE: EXTERNAL WALL TO RAFTER
PROJECT: PASSIVHAUS STANDARD DETAIL
CLIENT:
DATE: 21/1/2021
DWG No. RO-EA
REV:
DWG SCALE: 1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



RO-EA

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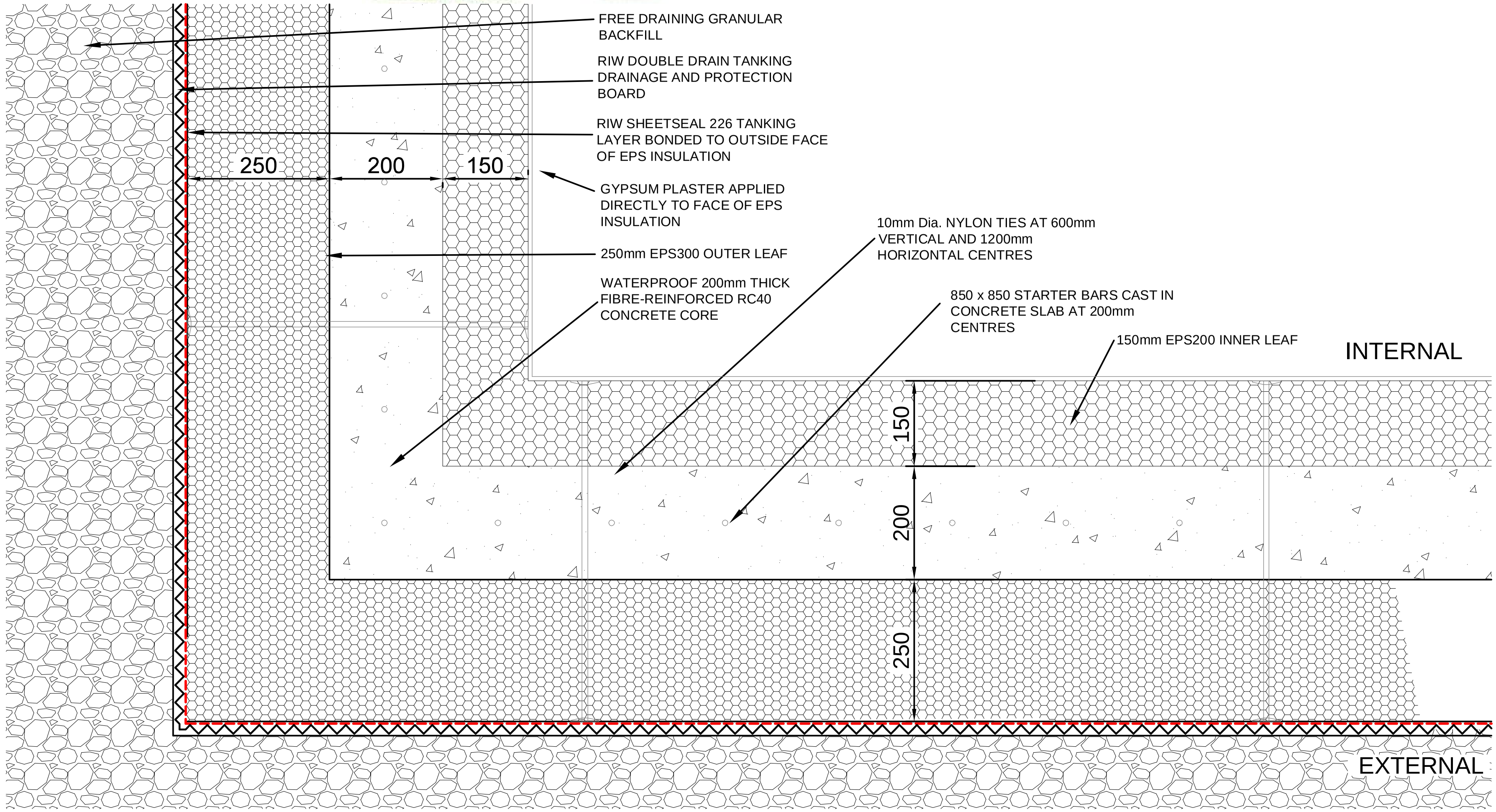
BUTTERLEIGH SAWMILL, BUTTERLEIGH, CULLOMPTON, DEVON, EX15 1PP
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE: EXTERNAL WALL TO ROOF TRUSS
PROJECT: PASSIVHAUS STANDARD DETAIL
CLIENT:
DATE: 21/1/2021
DWG No. RO-EA
REV:
DWG SCALE: 1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



BW-EC

Advanced Housing Systems

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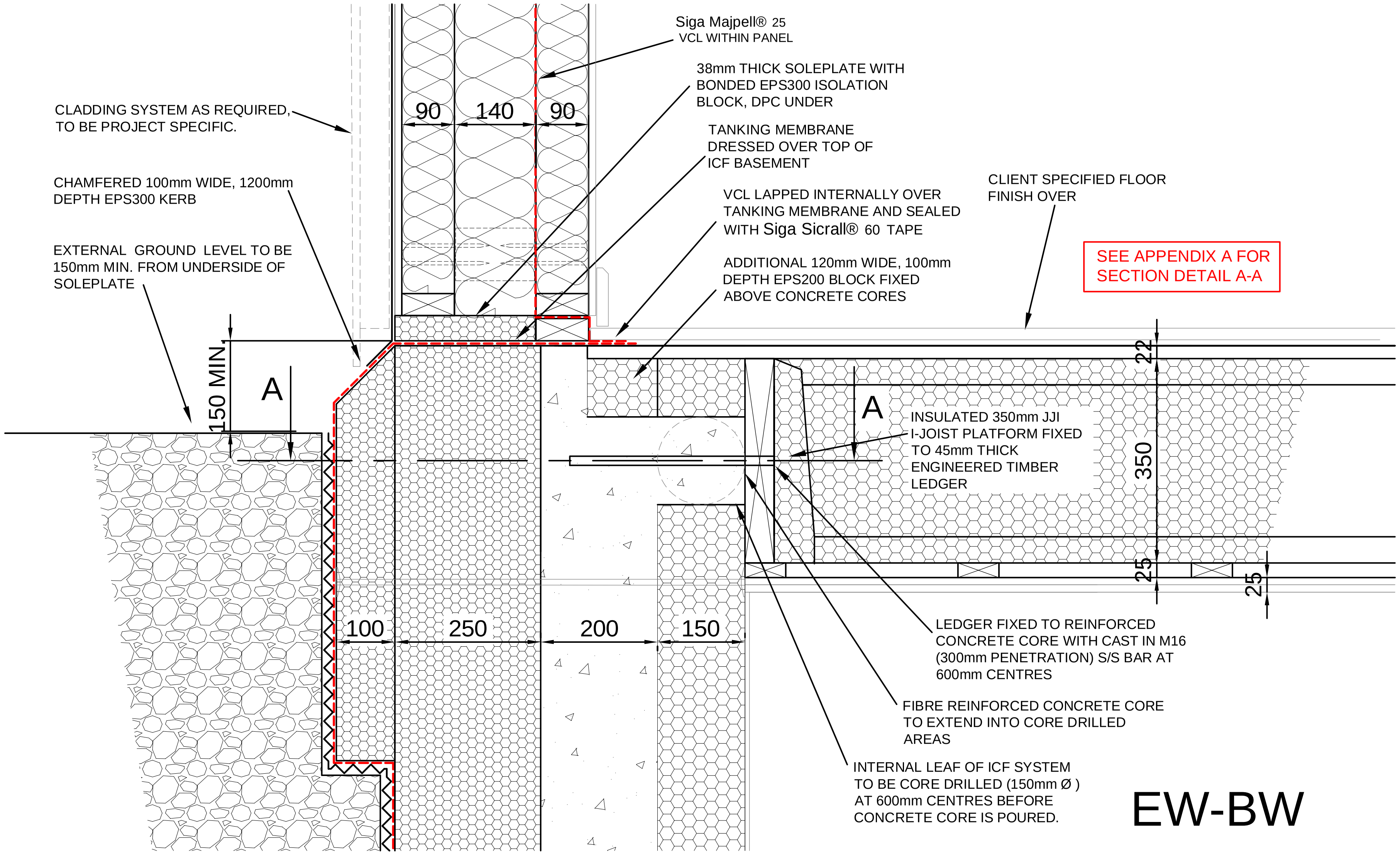
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	ICF BASEMENT EXTERNAL CORNER
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	BW-EC
REV:	
DWG SCALE.	1:10



BRICKNELL & FOWLER GROUP

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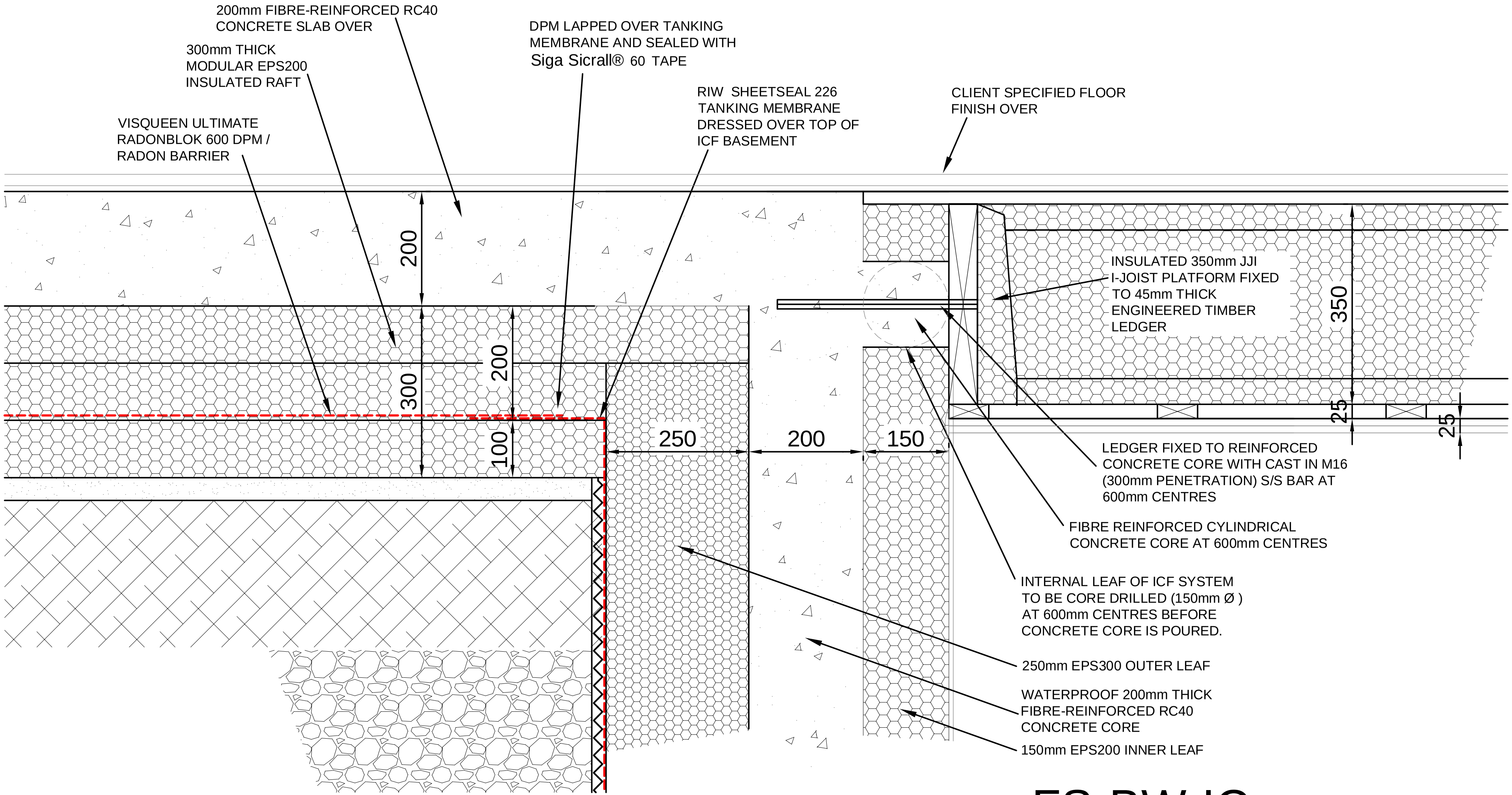
www.advancedfoundationsystems.co.uk
www.bricknellandfowler.com

JERSEY | DEVON | LONDON

Job title	Job No.	Dwg No.
Passivhaus Standard Details	PHID	EW-BW
Drawing	**Date**	**Scale**
ICF Basement Wall To External Wall Panel	10/5/2021	1:10
Client	**Drawn**	**Rev.**
-	NTFD	-

This drawing must be read in conjunction with ll other drawings, details and specification issued by the Architect, Structural Engineer and other Consultants or approved specialists. Discrepancies between any other drawings, details and/or specifications must be referred to the Architect within a reasonable amount of time prior to the commencement of the work. It is the Contractor's responsibility to ensure that all work is carried out in accordance with all statutory requirements and to the approval of the Building Control Officer. All roof and structural timbers, unless otherwise stated, are to be vacuum preservative treated by approved methods before delivery to site. All roof decking or external plywood to be W.B.P Bonded external grade. All materials are to comply with the latest British Standard Specification or have an Agreement Certificate, or in the event of neither to the approval of the Architect. The Contractor is responsible for all setting out of the works and are to work to written dimensions only, do not scale off drawings. All dimensions and setting out must be checked on site. If in any doubt refer to the Architect prior to the commencement of the works.

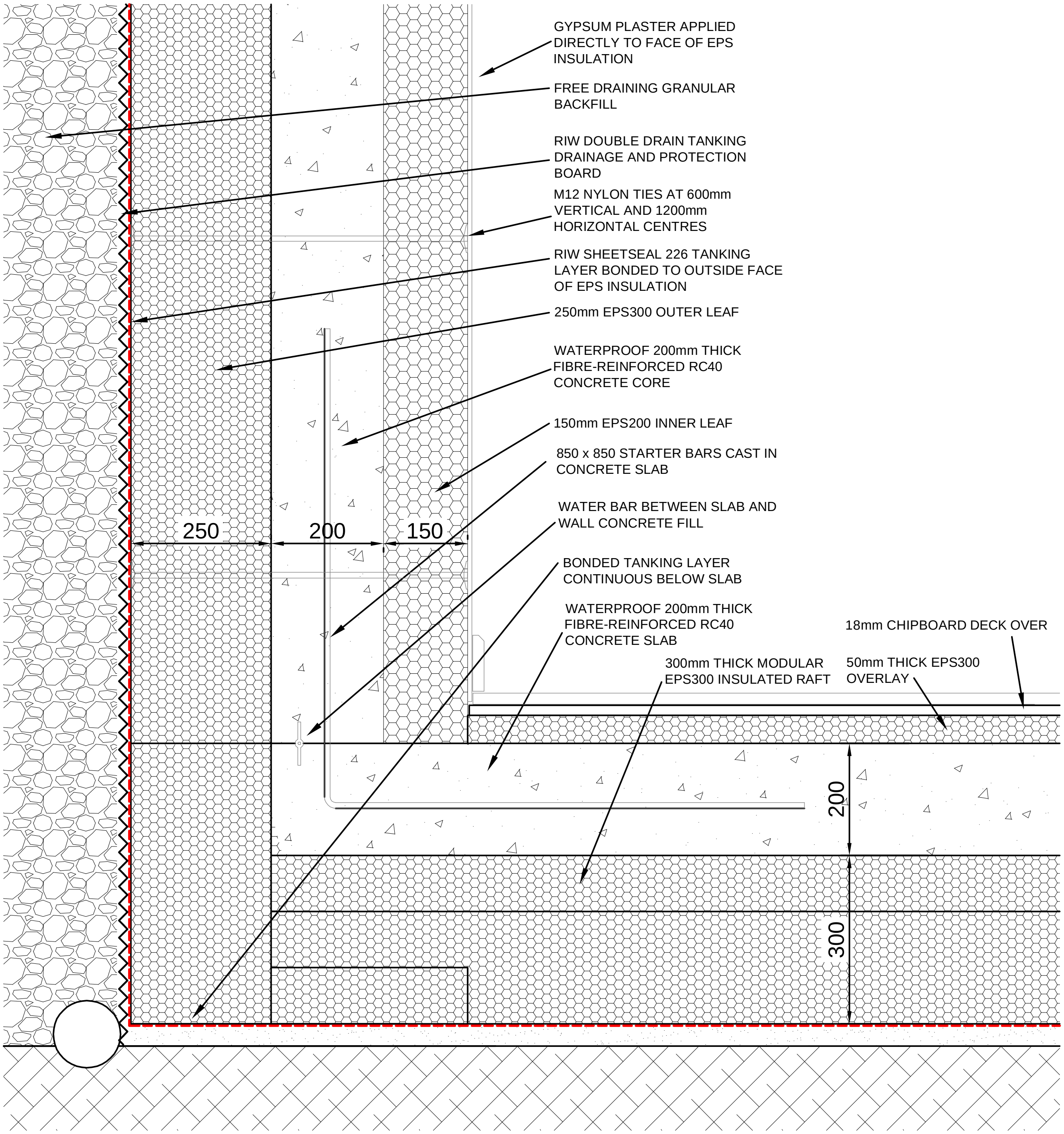


FS-BW-IC

BRICKNELL & FOWLER GROUP www.advancedhousingsystems.co.uk www.advancedfoundationsystems.co.uk www.bricknellandfowler.com JERSEY | DEVON | LONDON	Job title: Passivhaus Standard Details	Job No.: PHID	Dwg No.: FS-BW-IC
	Drawing: ICF Basement Wall To Floor Slab At Internal Junction	Date: 10/5/2021	Scale: 1:10
	Client: -	Drawn: NTFD	Rev.: -

This drawing must be read in conjunction with all other drawings, details and specification issued by the Architect, Structural Engineer and other Consultants or approved specialists. Discrepancies between any other drawings, details and/or specifications must be referred to the Architect within a reasonable amount of time prior to the commencement of the work. It is the Contractor's responsibility to ensure that all work is carried out in accordance with all statutory requirements and to the approval of the Building Control Officer. All roof and structural timbers, unless otherwise stated, are to be vacuum preservative treated by approved methods before delivery to site. All roof decking or external plywood to be W.B.P Bonded external grade. All materials are to comply with the latest British Standard Specification or have an Agreement Certificate, or in the event of neither to the approval of the Architect. The Contractor is responsible for all setting out of the works and are to work to written dimensions only, do not scale off drawings. All dimensions and setting out must be checked on site. If in any doubt refer to the Architect prior to the commencement of the works.

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



BW-FS

Passivhaus Trust
Featured on houzz
Sustainability Award Winner
BREEAM
TRADA
AECB
As seen on Channel 4
Flat Pack Mansions
Grand Designs

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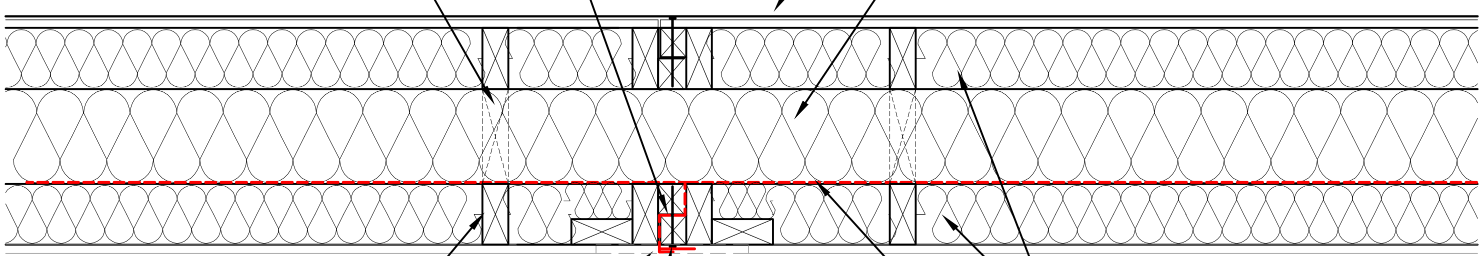
TITLE:	ICF BASEMENT WALL TO SLAB		
PROJECT:	PASSIVHAUS STANDARD DETAIL		
CLIENT:			
DATE:	21/1/2021	DWG No.	BW-FS
REV:		DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



EW

Advanced Housing Systems
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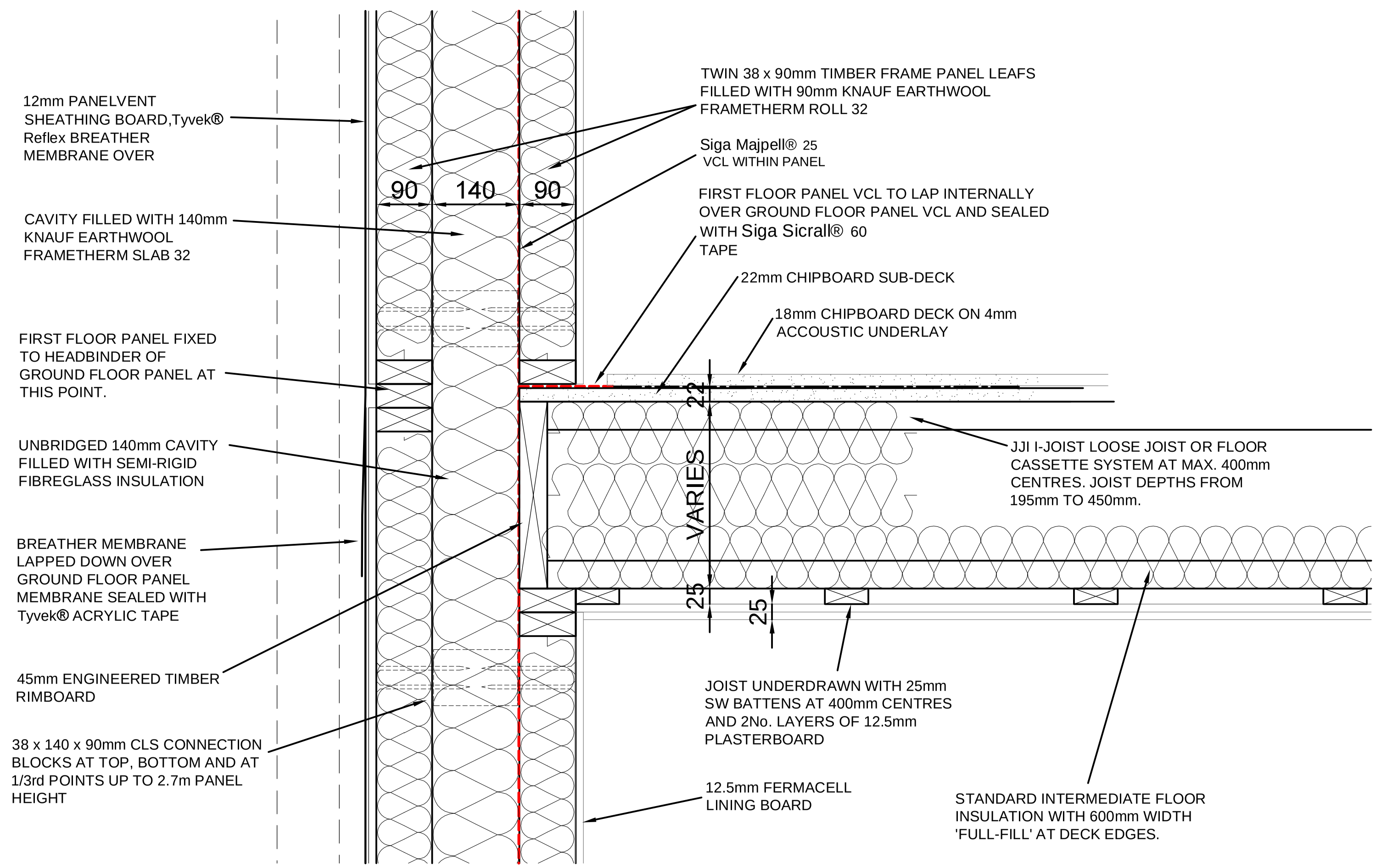
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	INLINE WALL PANEL CONNECTION
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	EW
REV:	
DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



EW-CE

Advanced Housing Systems
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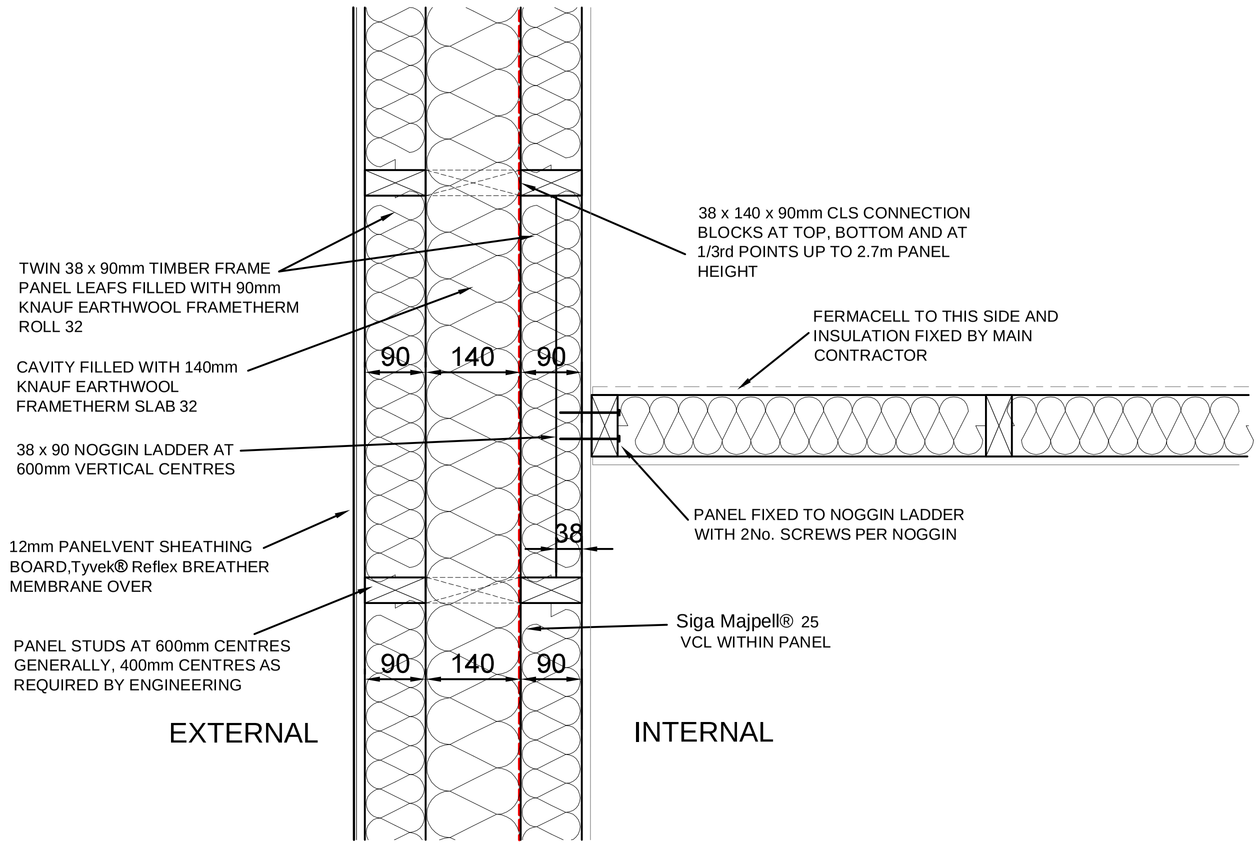
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE: INTERMEDIATE FLOOR TO WALL
PROJECT: PASSIVHAUS STANDARD DETAIL
CLIENT:
DATE: 21/1/2021
DWG No. EW-CE
REV:
DWG SCALE. 1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**

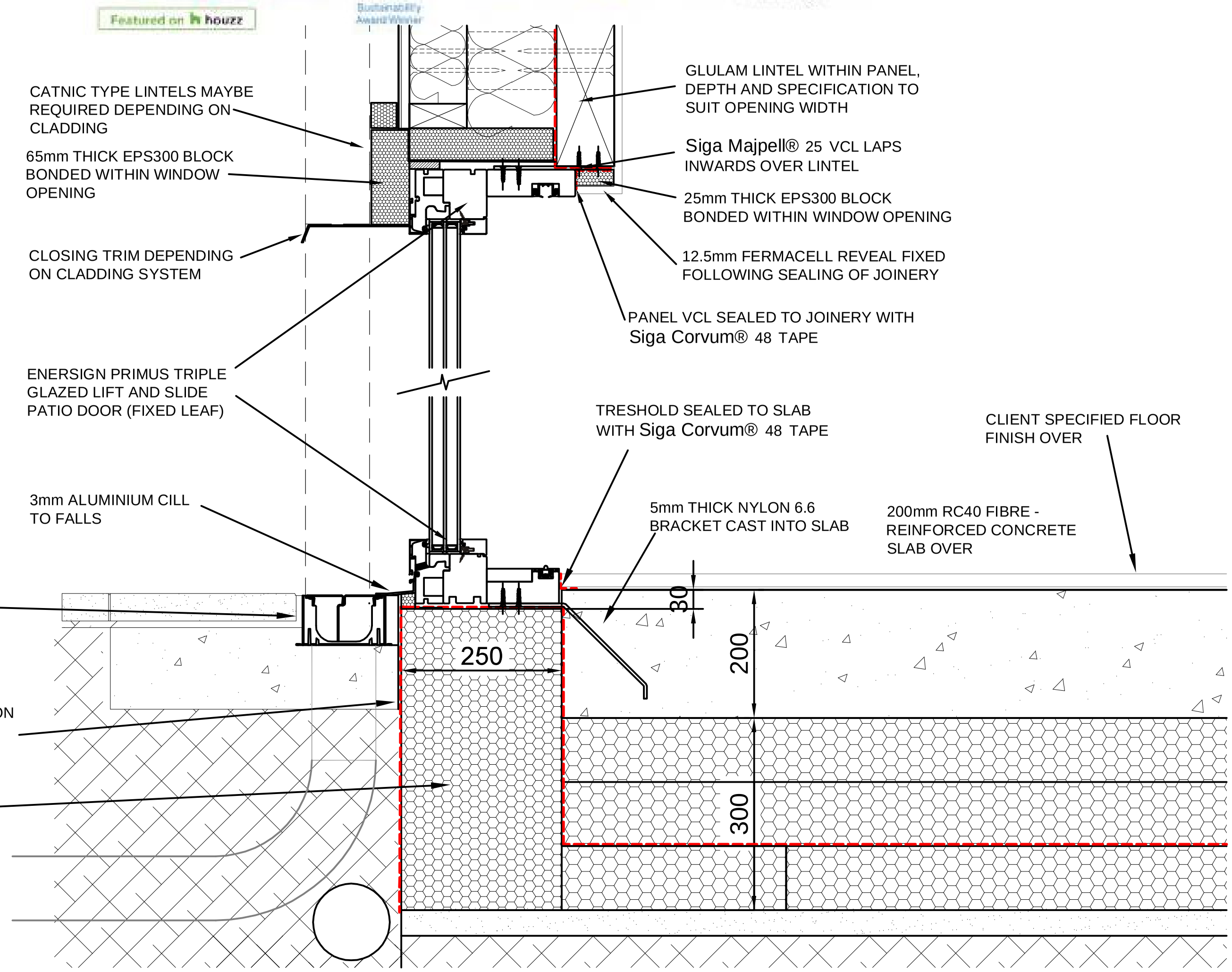


EW-IW

Advanced Housing Systems
BUTTERLEIGH SAWMILL, BUTTERLEIGH, CULLOMPTON, DEVON, EX15 1PP
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	INTERNAL WALL TO EXTERNAL WALL
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	EW-IW
REV:	
DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



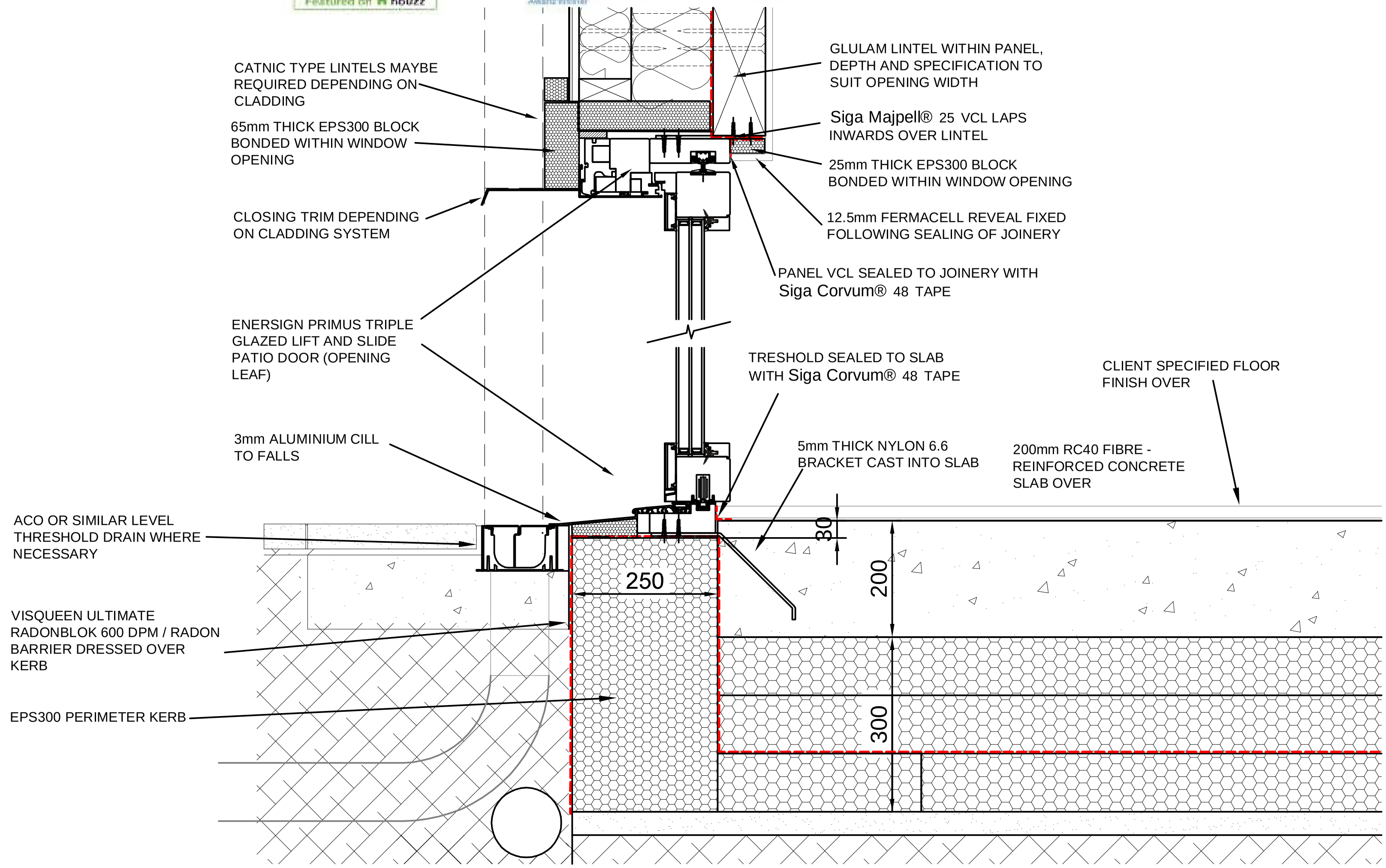
FIXED LEAF
WI-TD

Advanced Housing Systems

BUTTERLEIGH SAWMILL, BUTTERLEIGH, CULLOMPTON, DEVON, EX15 1PP
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	PATIO DOOR HEAD AND CILL
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	WI-TD
REV:	
DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



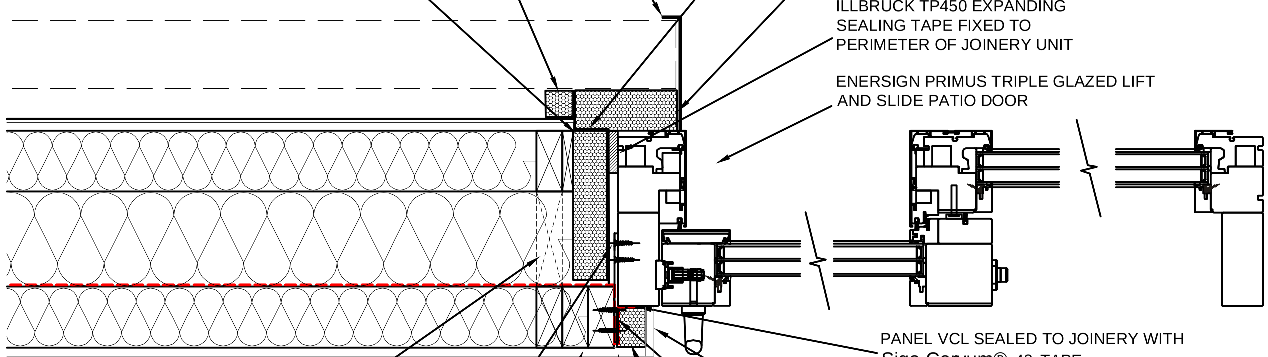
SLIDING LEAF
EW-TD

Advanced Housing Systems

BUTTERLEIGH SAWMILL, BUTTERLEIGH, CULLOMPTON, DEVON, EX15 1PP
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	PATIO DOOR HEAD AND CILL
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	WI-TD
REV:	
DWG SCALE:	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**

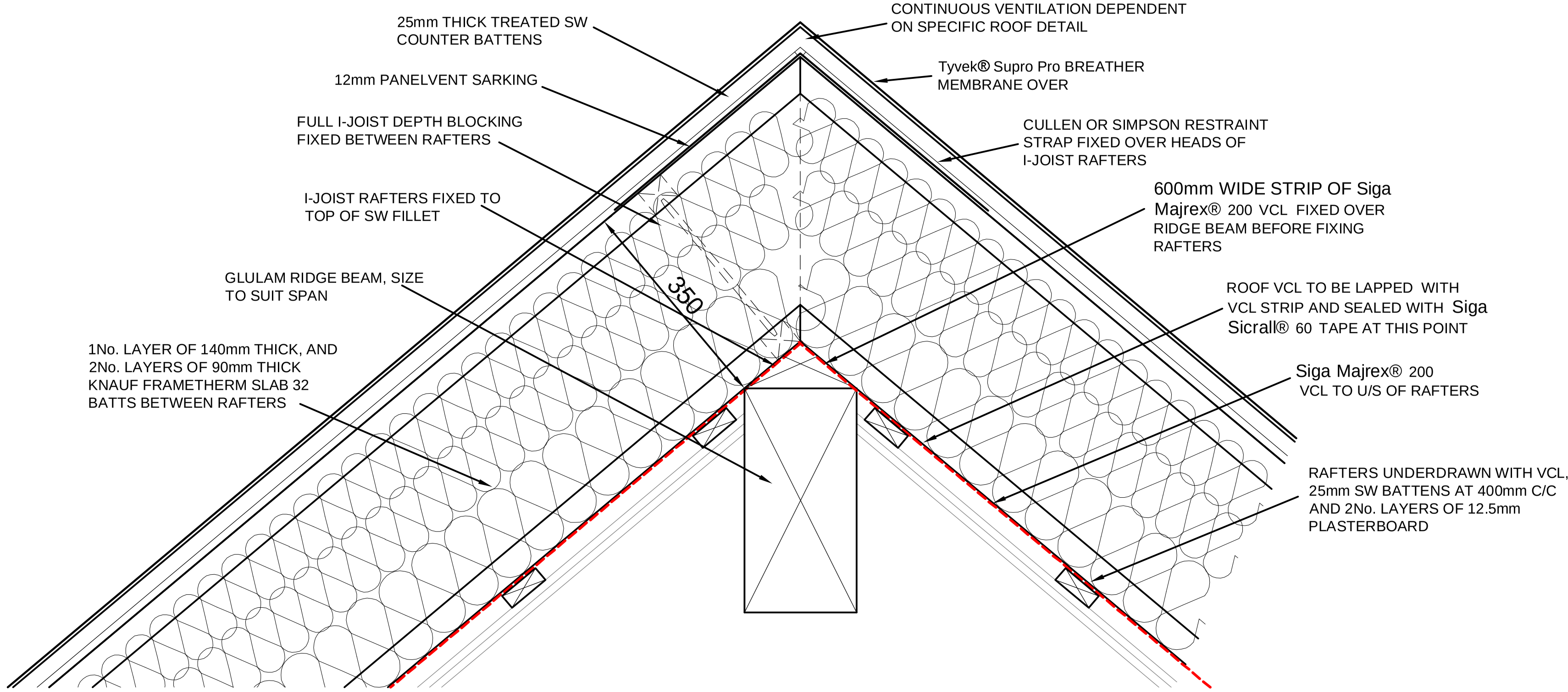


WI-TD

Advanced Housing Systems
BUTTERLEIGH SAWMILL, BUTTERLEIGH, CULLOMPTON, DEVON, EX15 1PP
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	PATIO DOOR JAMB
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	WI-TD
REV:	
DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



RO-RI

Advanced Housing Systems
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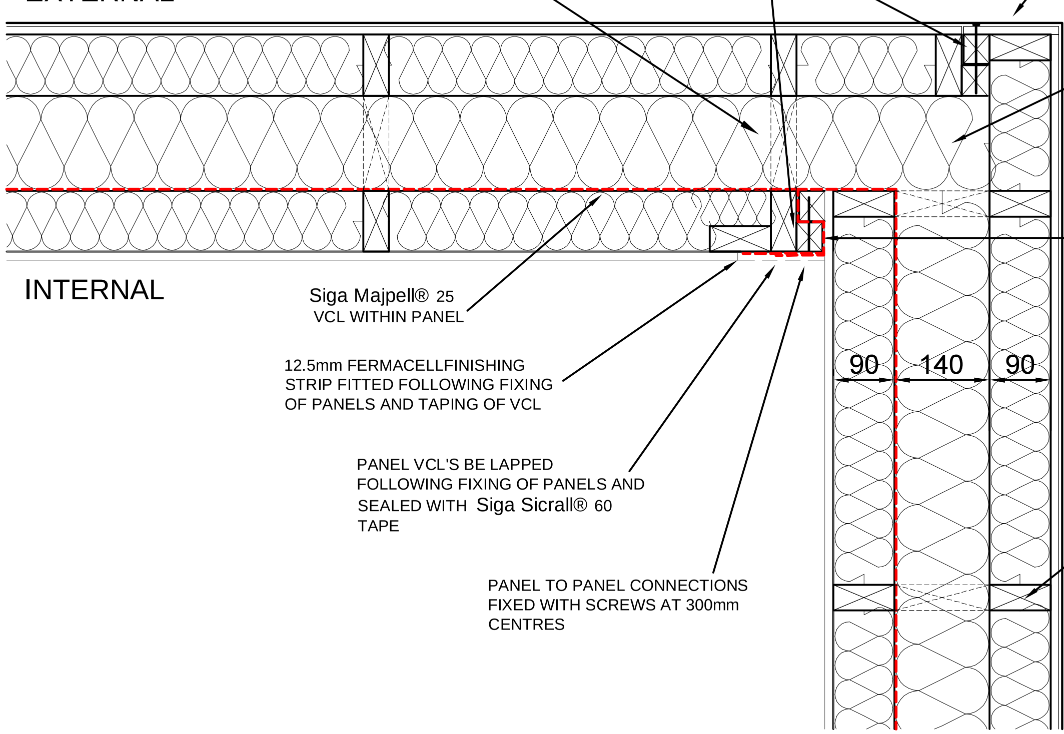
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	RAFTER TO RIDGE BEAM
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	RO-RI
REV:	
DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



EW-EC

Advanced Housing Systems

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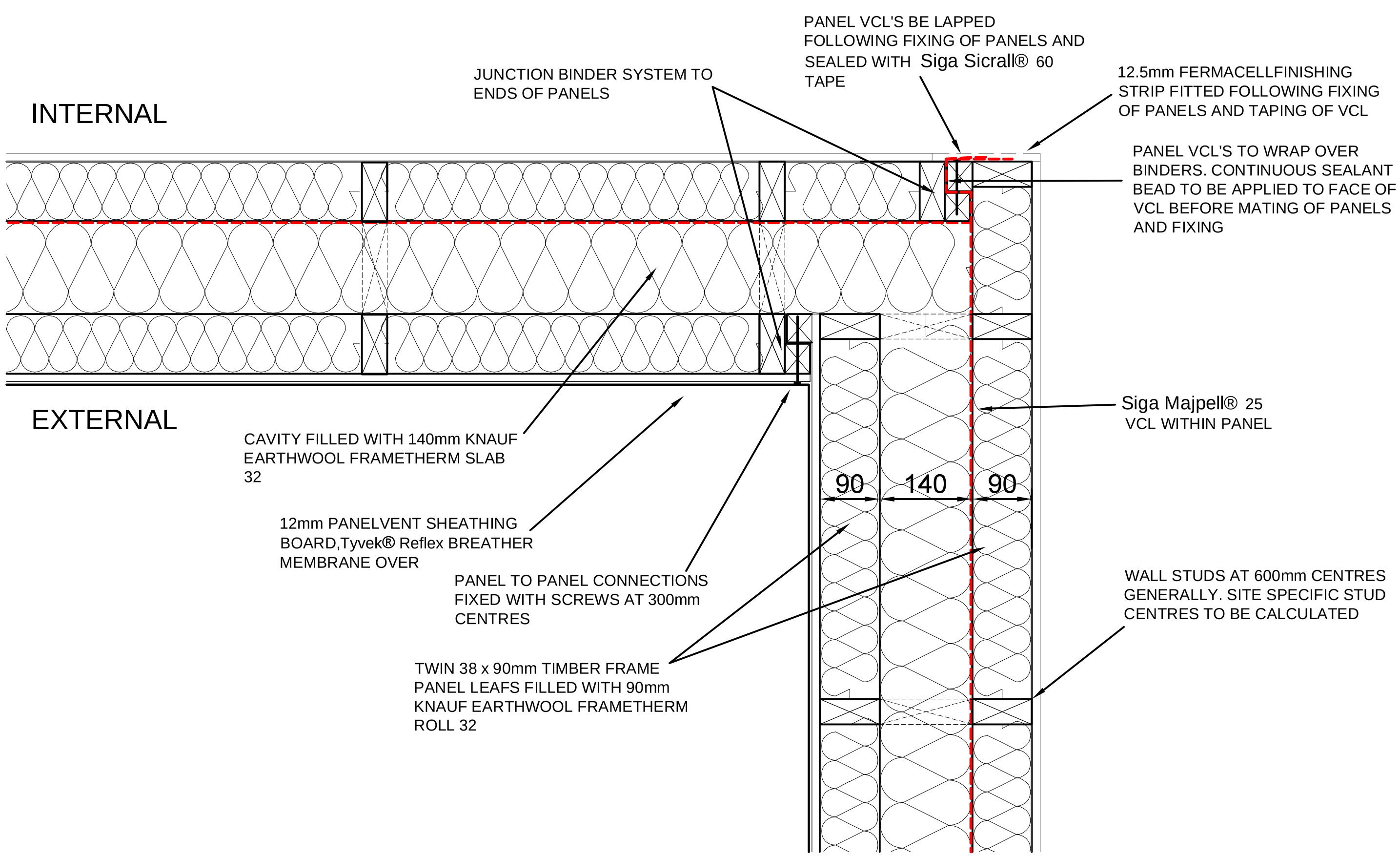
TITLE: EXTERNAL WALL EXTERNAL CORNER
PROJECT: PASSIVHAUS STANDARD DETAIL
CLIENT:
DATE: 21/1/2021 DWG No. EW-EC
REV: DWG SCALE. 1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



EW-IC

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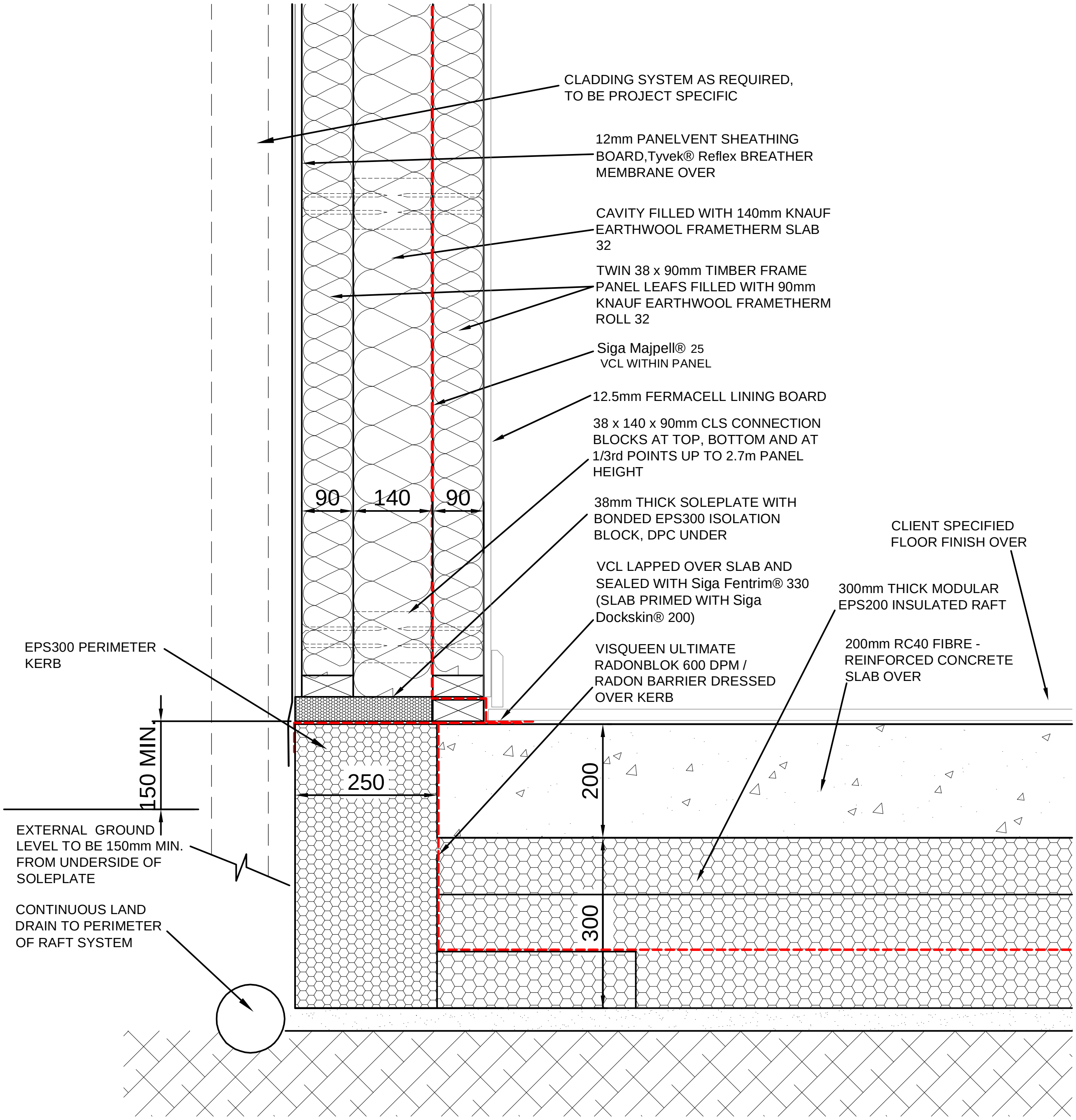
TITLE: EXTERNAL WALL INTERNAL CORNER
PROJECT: PASSIVHAUS STANDARD DETAIL
CLIENT:
DATE: 21/1/2021
REV:
DWG No. EW-IC
DWG SCALE. 1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



FS-EW

Passivhaus Trust · Featured on houzz · BREEAM · TRADA · AECB · Sustainability Award Winner

As seen on Channel 4
Flat Pack Mansions
Grand Designs

TITLE:	WALL PANEL TO FLOOR SLAB
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	FS-EW
REV:	
DWG SCALE.	1:10

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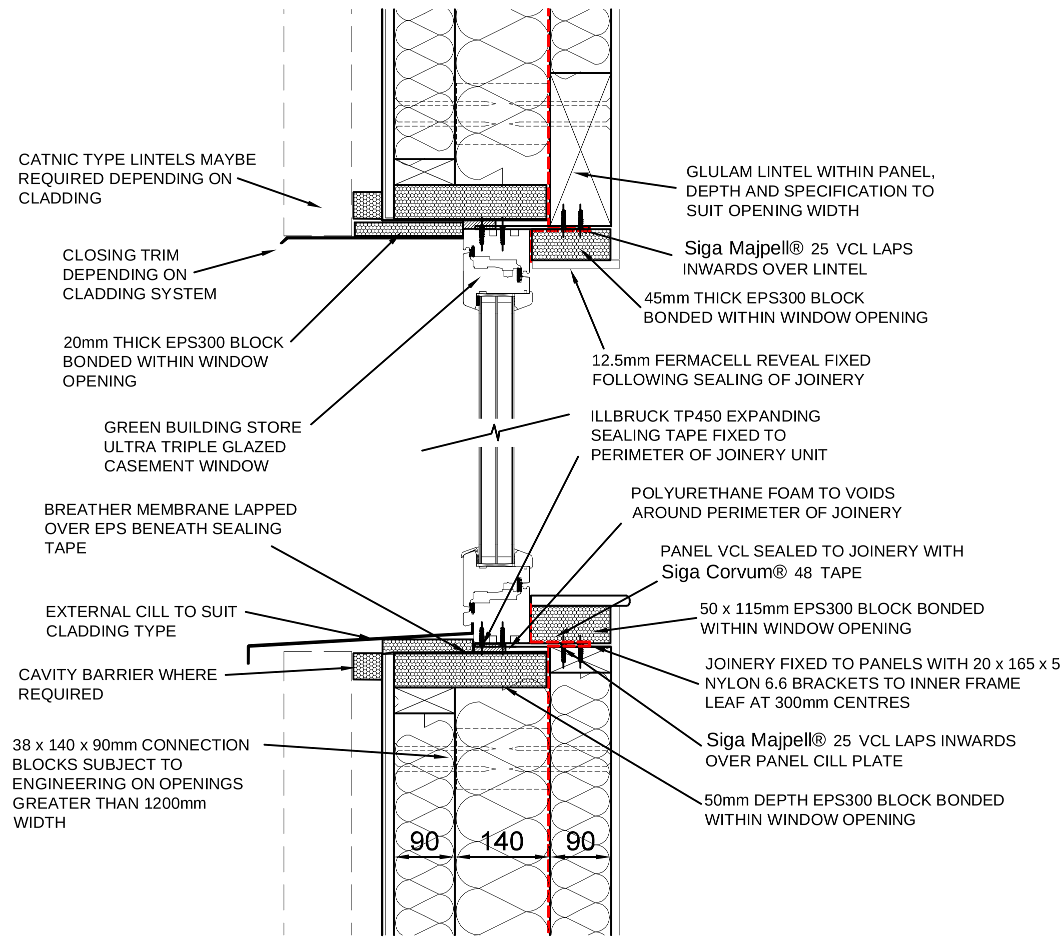

WI-TO/ WI-BO

Advanced Housing Systems
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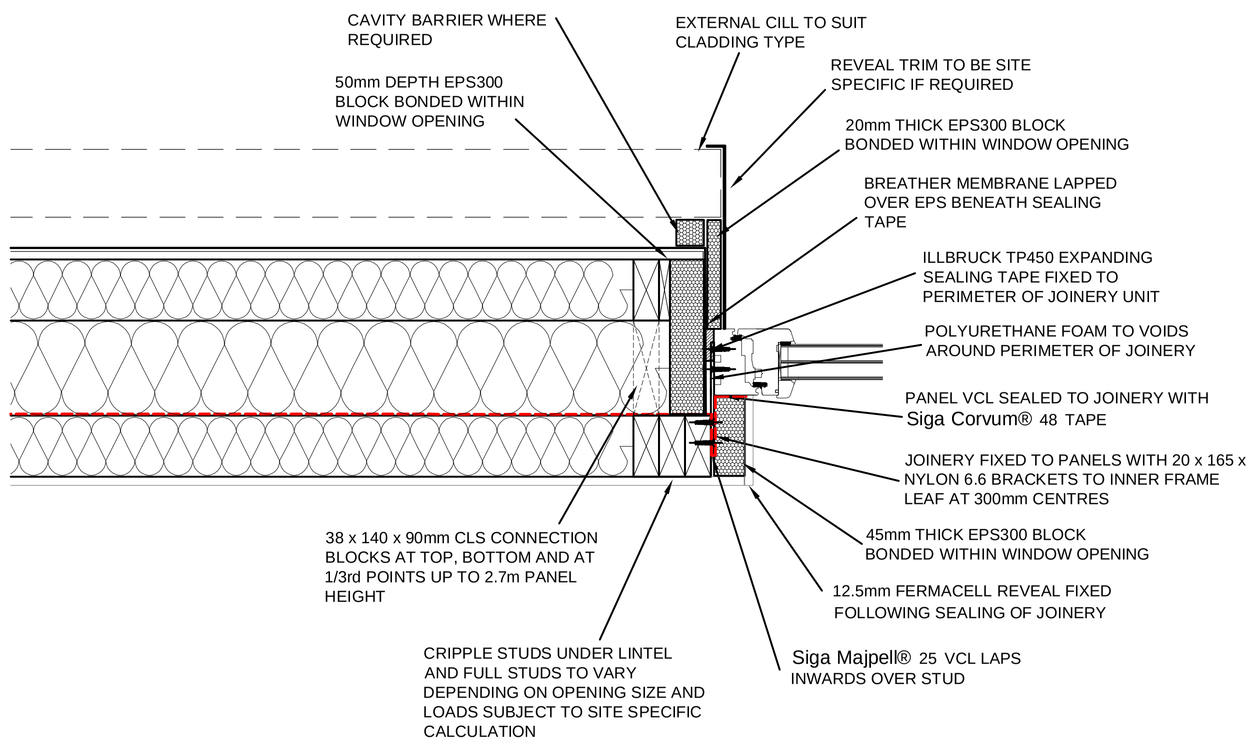
TITLE:	WINDOW OPENING HEAD AND CILL		
PROJECT:	PASSIVHAUS STANDARD DETAIL		
CLIENT:			
DATE:	21/1/2021	DWG No.	WITO/WIBO
REV:		DWG SCALE.	1:10



WI-SI

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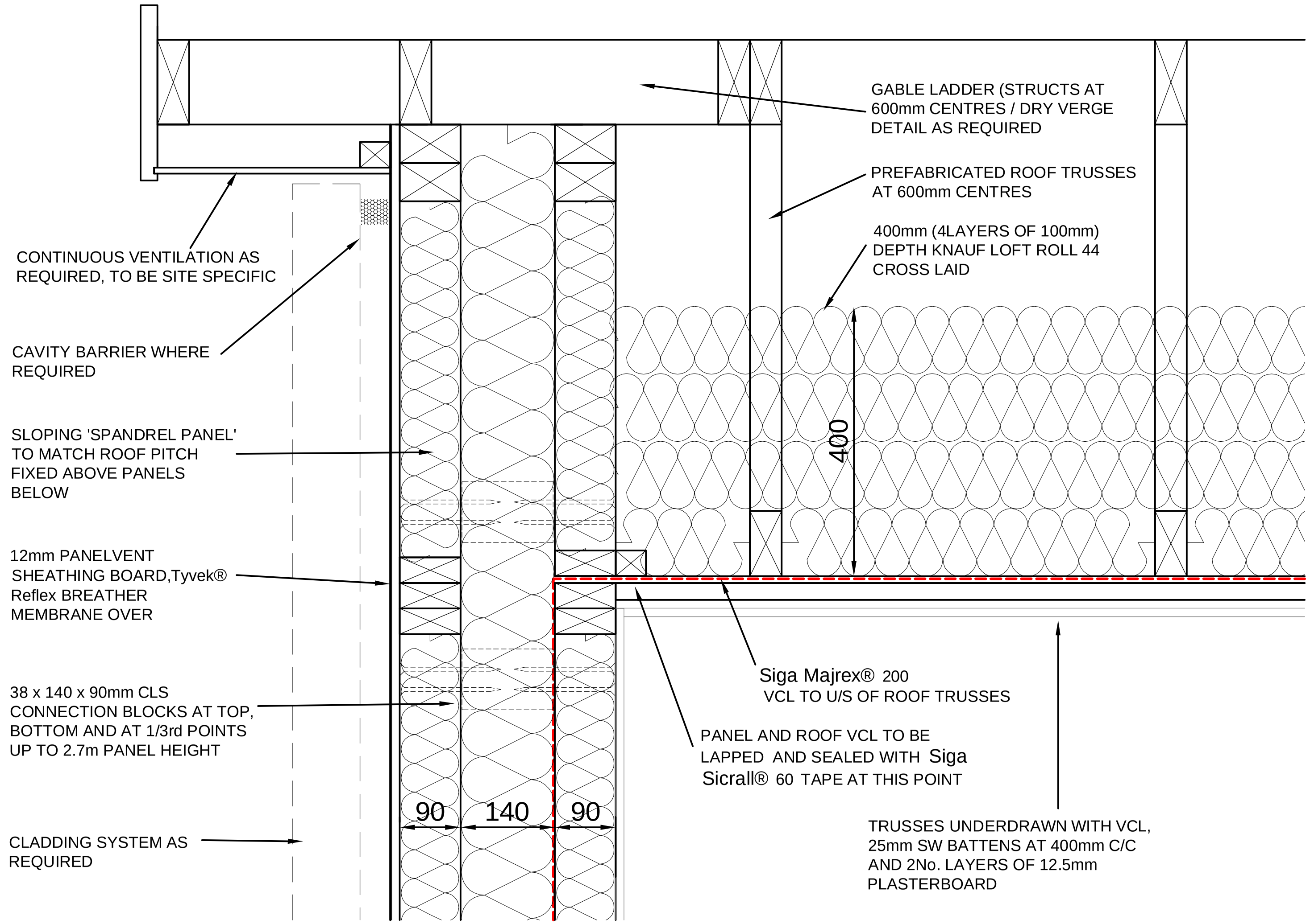
TITLE:	WINDOW OPENING JAMB
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	WI-SI
REV:	
DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



VERGE DETAIL
RO-EA

Advanced Housing Systems
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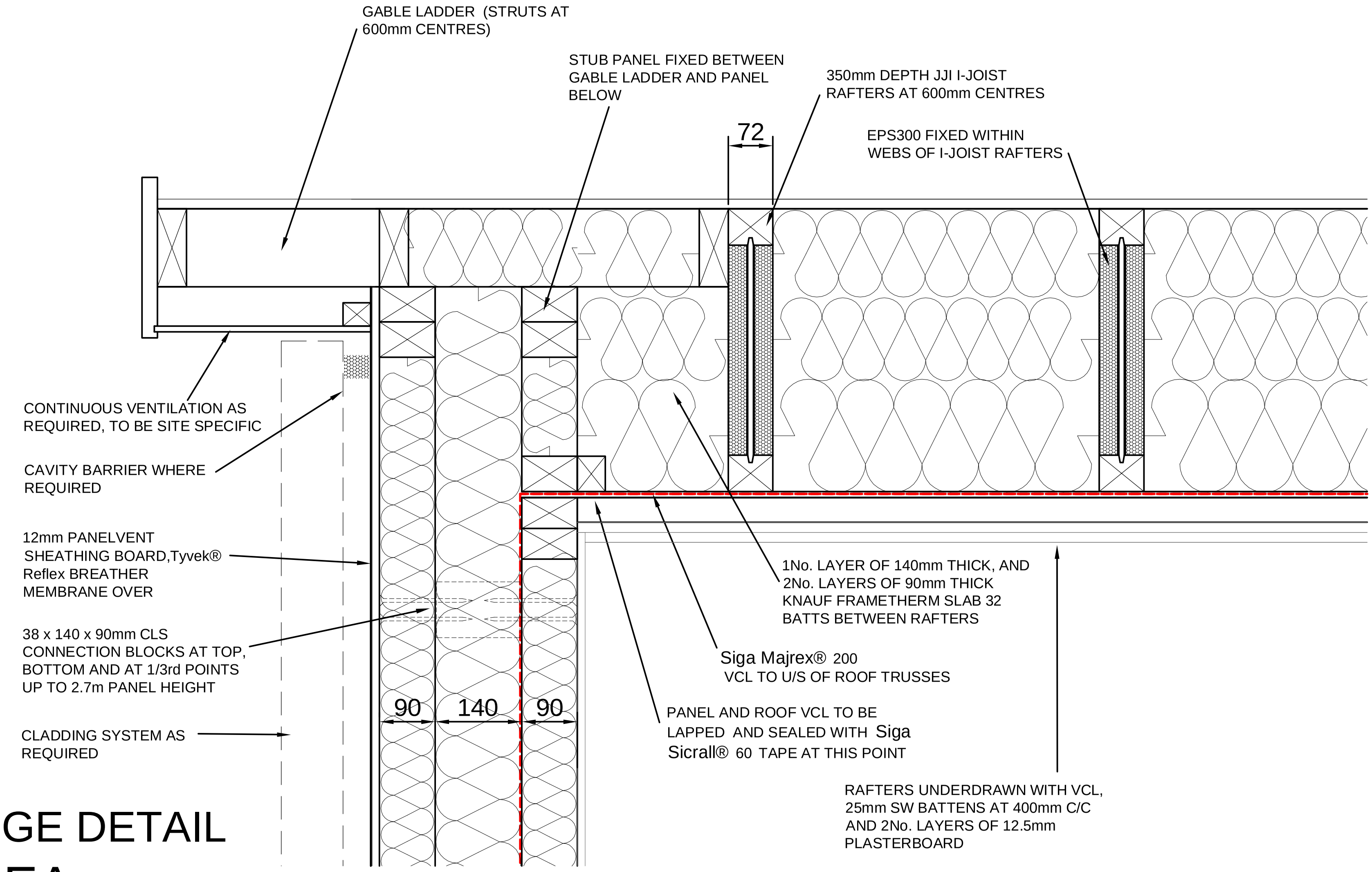
TITLE:	EXTERNAL WALL TO ROOF TRUSS
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	5/4/2021
DWG No.	RO-EA (VERGE)
REV:	
DWG SCALE.	1:10

DO NOT SCALE FROM THIS DRAWING - **IF IN DOUBT ASK!**



VERGE DETAIL RO-EA

Advanced Housing Systems
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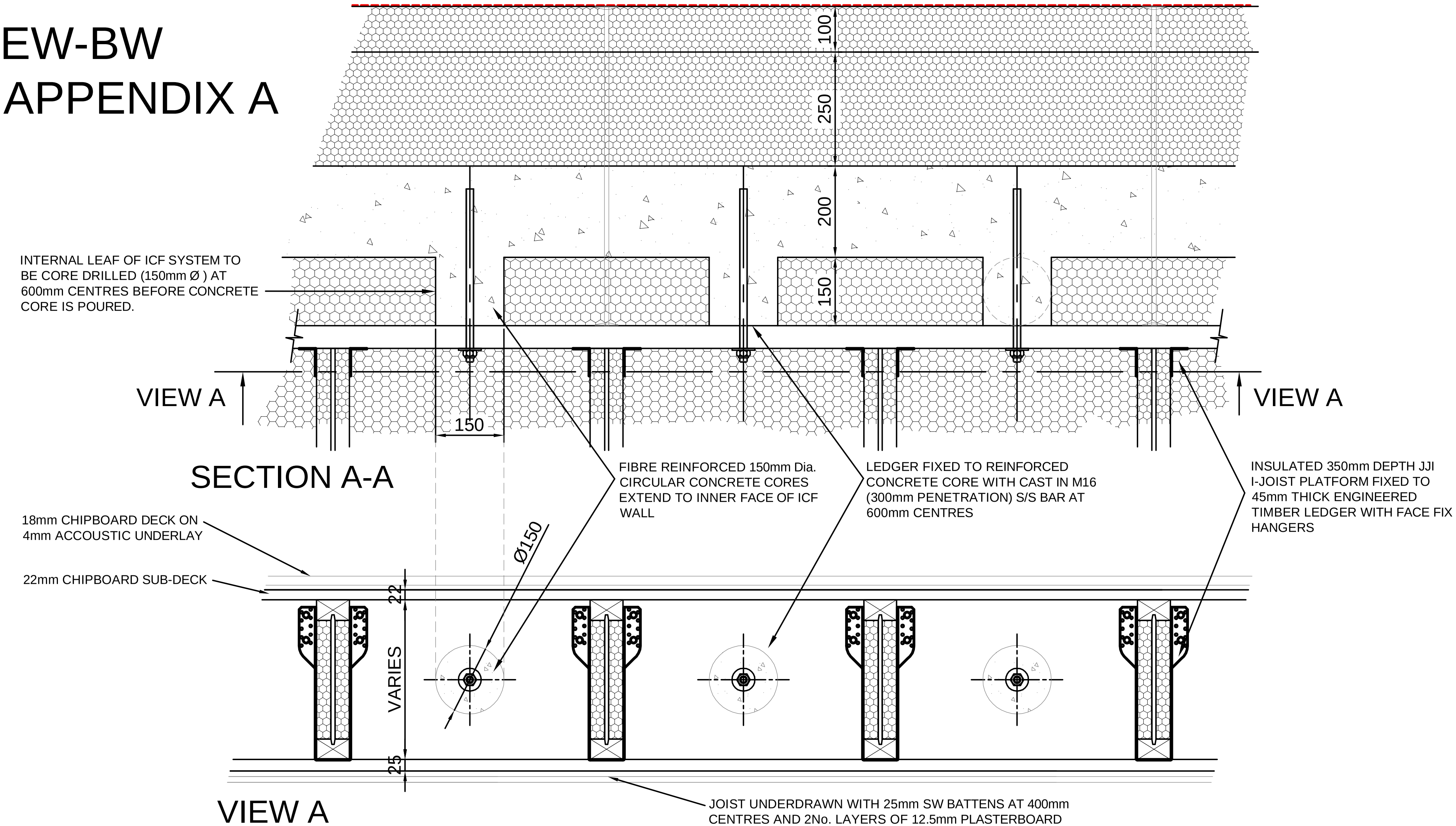
admin@advancedhousingsystems.co.uk Tel: +44 (0) 207 1931461, +44 (0) 1534 721600

TITLE:	EXTERNAL WALL TO RAFTER
PROJECT:	PASSIVHAUS STANDARD DETAIL
CLIENT:	
DATE:	21/1/2021
DWG No.	RO-EA (VERGE)
REV:	
DWG SCALE.	1:10

EW-BW
APPENDIX A



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JERSEY | DEVON | LONDON

Job title	Job No.	Dwg No.
Passivhaus Standard Details	PHID	EW-BW
Drawing: ICF Basement Wall Appendix A	Date: 10/5/2021	Scale: 1:10
Client: -	Drawn: NTFD	Rev.: -

This drawing must be read in conjunction with ll other drawings, details and specification issued by the Architect, Structural Engineer and other Consultants or approved specialists. Discrepancies between any other drawings, details and/or specifications must be referred to the Architect within a reasonable amount of time prior to the commencement of the work. It is the Contractor's responsibility to ensure that all work is carried out in accordance with all statutory requirements and to the approval of the Building Control Officer. All roof and structural timbers, unless otherwise stated, are to be vacuum preservative treated by approved methods before delivery to site. All roof decking or external plywood to be W.B.P Bonded external grade. All materials are to comply with the latest British Standard Specification or have an Agreement Certificate, or in the event of neither to the approval of the Architect. The Contractor is responsible for all setting out of the works and are to work to written dimensions only, do not scale off drawings. All dimensions and setting out must be checked on site. If in any doubt refer to the Architect prior to the commencement of the works.