

Detailed Thermal Modelling Report

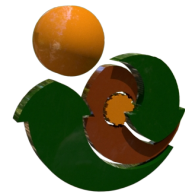
Project: Prodomo

Detail: 102 Threshold

THERMAL MODELLER
Robert Ryan IAB TM 015
CLIENT
Prodomo

ISSUE
30/06/2025

DRAWN BY
RR



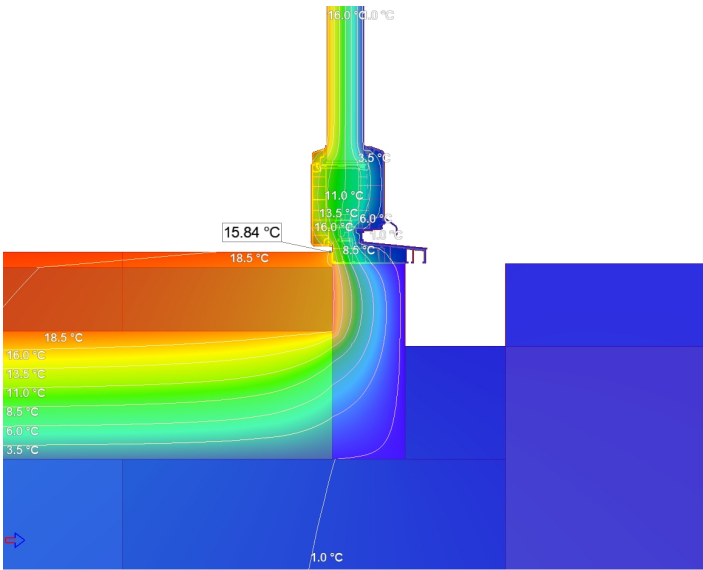
Earth Cycle Technologies
25 Hawkstown Park
Wicklow Town
Co. Wicklow
www.earthcycle.co



Psi Value Passive House	W/mK -0.0138	For Passive Houses Measured to External Dimensions
Psi Value DEAP or NEAP	W/mK 0.0929	For SAP or BER Calculations Measured To Building Regulations
Chi Value	W/K N/A	Chi Values are for Points or Clips and are simply multiplied by a length or amount of 1

Calculated fRsi using 0.25 m2K/W Resistances internally and 0C externally	Calculated fRsi 0.792 Temp 15.84 C	
Storage Building	Suitable	>0.3
Office/Retail	Suitable	>0.6
Residential	Suitable	>0.75
Sports Hall, Kitchens, Canteens	Not Suitable	>0.8
Buildings with High Humidity Eg. Swimming Pools, Laundry, Breweries	Not Suitable	>0.9

See table D1 TGD Part L



Suitable

This detail is suitable for the uses in the table marked in green

Risk Of Condensation

This detail has a risk of condensation for the uses marked orange but may pass with certain conditions or with a calculation using lower surface resistances

Not Suitable

This detail cannot be used for the Uses marked in Red

Modelling Parameters	
Number of Nodes in Model	12149
PA Ratio for Calculated R-ground	0.5
Actual Ground Resistance 13370	0.914 m²K/W
Actual Floor U-value w Ground	0.122 W/m²K
Modelling Floor U-value w Ground	0.110 W/m²K
Modelling Wall U-value (generic)	0.1500 W/m²K
Modelling Window U-value	01.020 W/m²K

Continued

Use of alternative products with different properties will render these calculations invalid. Changes to the geometry in the junctions and the buildup materials in any way will also invalidate the use of this report.

Otherwise, this detail calculation may be used by the client for library purposes and if all parts are the same the calculations can be re-used.

This calculation has not been tested for other climates or boundaries other than what is stated in the report. Further simulation or adjustment of the calculation of the internal temperatures is your responsibility and may be needed in some cases. Earth Cycle can make these adjustments if needed for a fee.

General Conventions

U-values listed in the report for the calculation of Psi Values are modelling U-values as Per BR 497:2016. Actual project U-values are calculated as per EN ISO 6946:2017 with the effect of the ground as per ISO EN 13370 and the conventions of all contained standards. The U-values reflecting actual construction are very different to that of modelling U-values

Detailed U-value calculation of actual U-values are also attached but not used for the calculation of Psi as this is not convention.

Air Spaces as per updated EN ISO 6946:2017 and not that of listed in BR497 as Standard listed is now out of date. However, the standard values for temperatures across the cavity are still used as per NSAI guidance from BR 497

DISCLAIMER

This is NOT a Detail but rather an arrangement of construction materials to which a PSI value is given. Use only for qualified personnel as note

DISCLAIMER

Materials and workmanship and all associated building regulations apply to all constructions, failure to comply with the relevant building practices, achieve the airtightness results or if the building is constructed with defects in the weathering, water shed, or airtightness invalidates the calculations given here. These calculations are based on target performances and defect free construction.

No Interstitial condensation calculations were performed as part of this. It is assumed you have already carried that out and if in doubt please notify us so that we can calculate (for a fee) and assess moisture safety.

Report Summary

Detailed Thermal Modelling Report

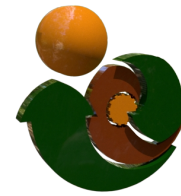
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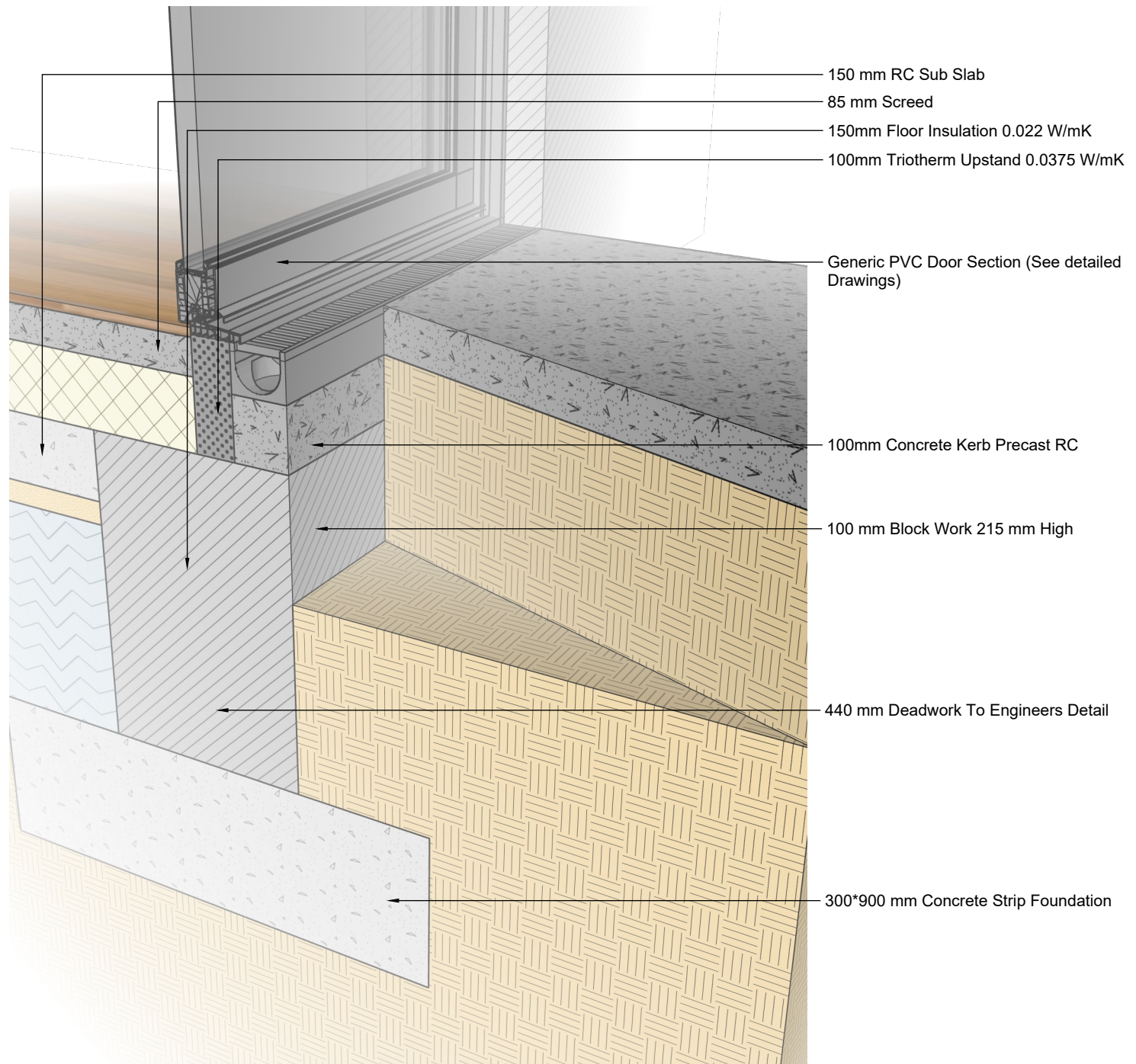
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Calculated Drawings

Not To Scale Diagramatic Materials

Detailed Thermal Modelling Report

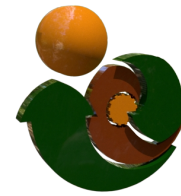
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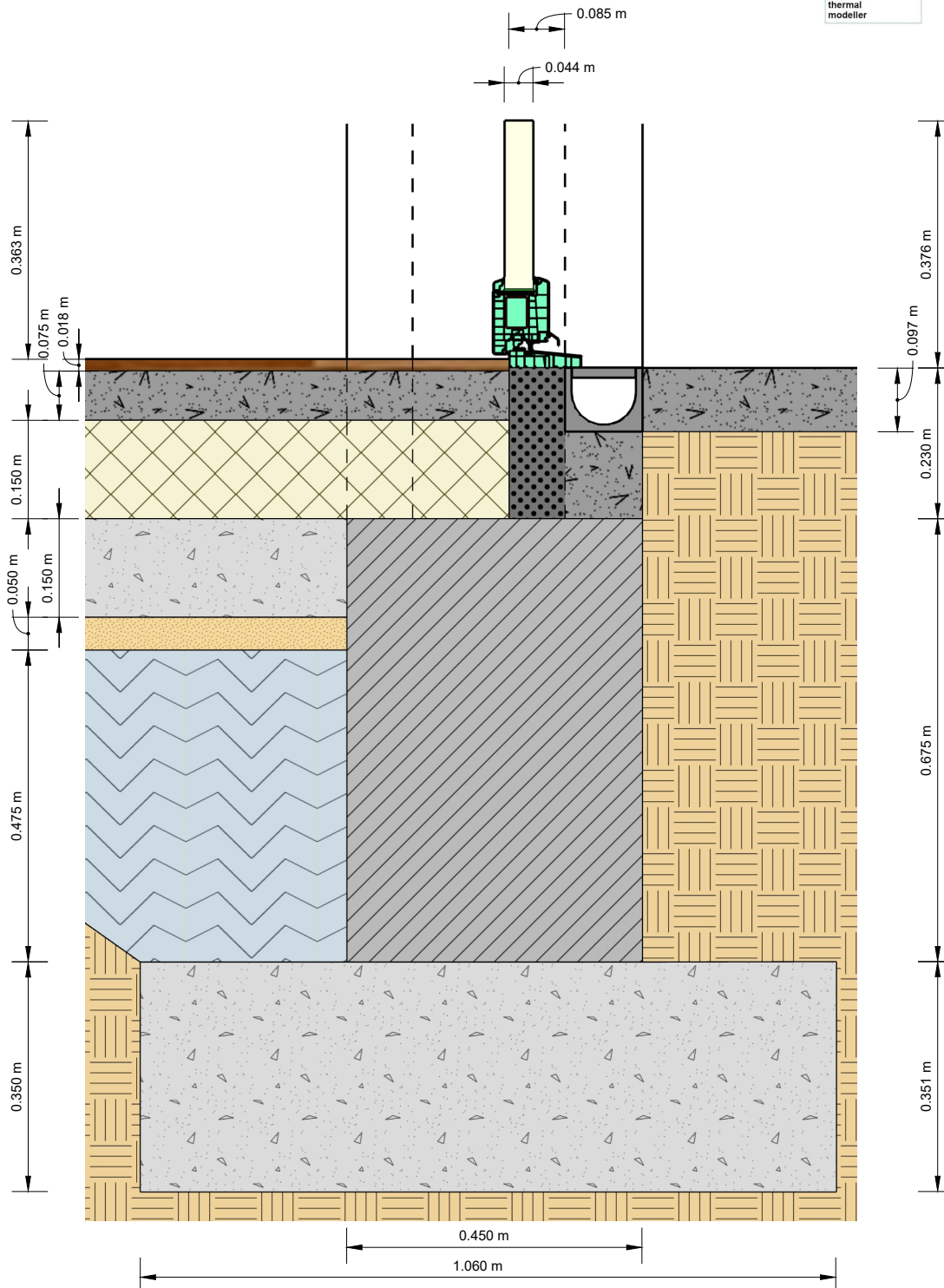
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Calculated Drawings

Scale 1:10 @ A4 Geometry 1

Detailed Thermal Modelling Report

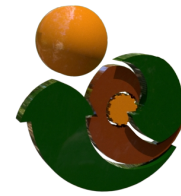
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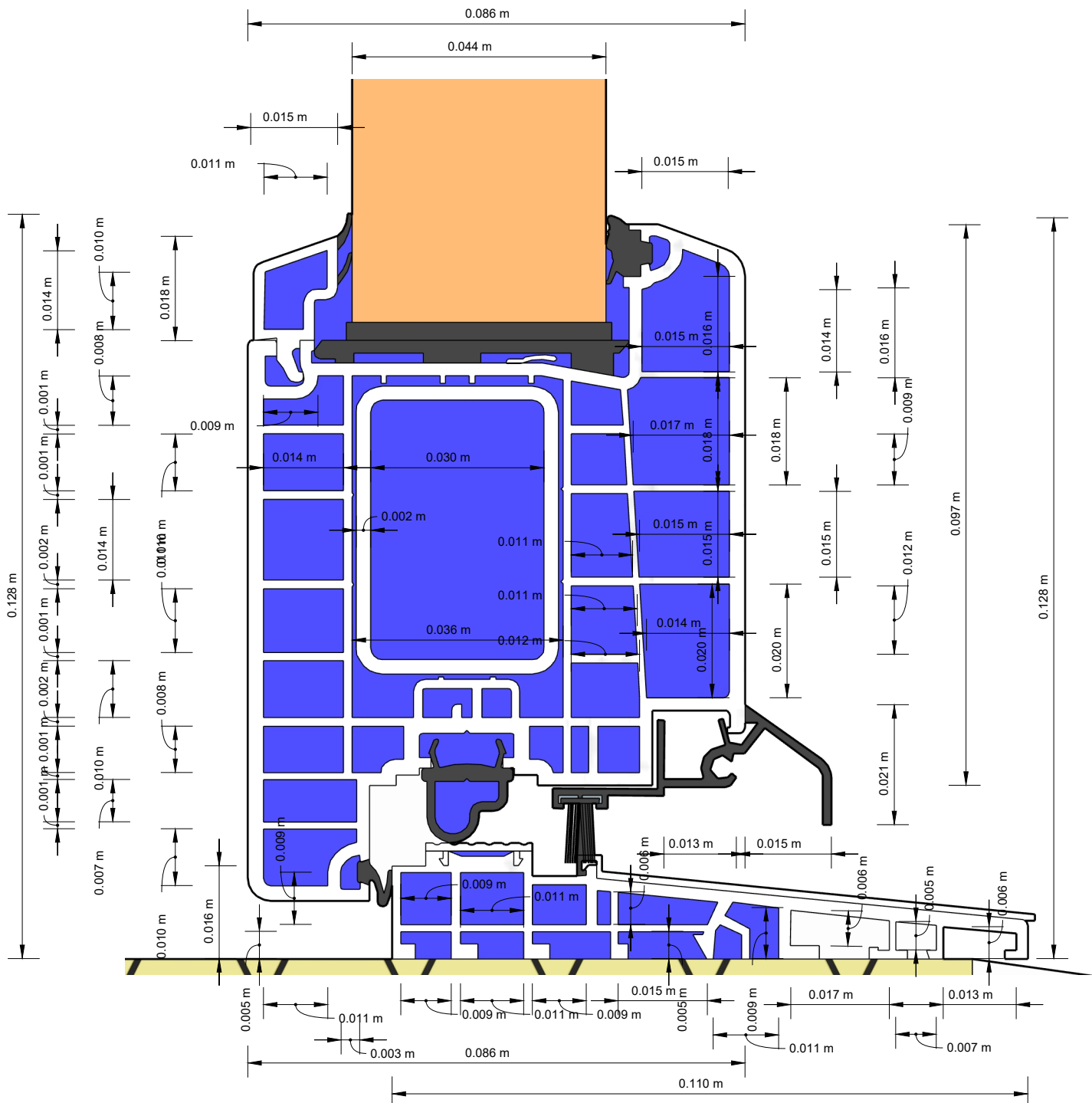
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Calculated Drawings

Scale 1:1 @ A4

Detailed Thermal Modelling Report

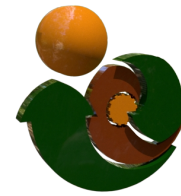
Project: Prodomo

Detail: 102 Threshold

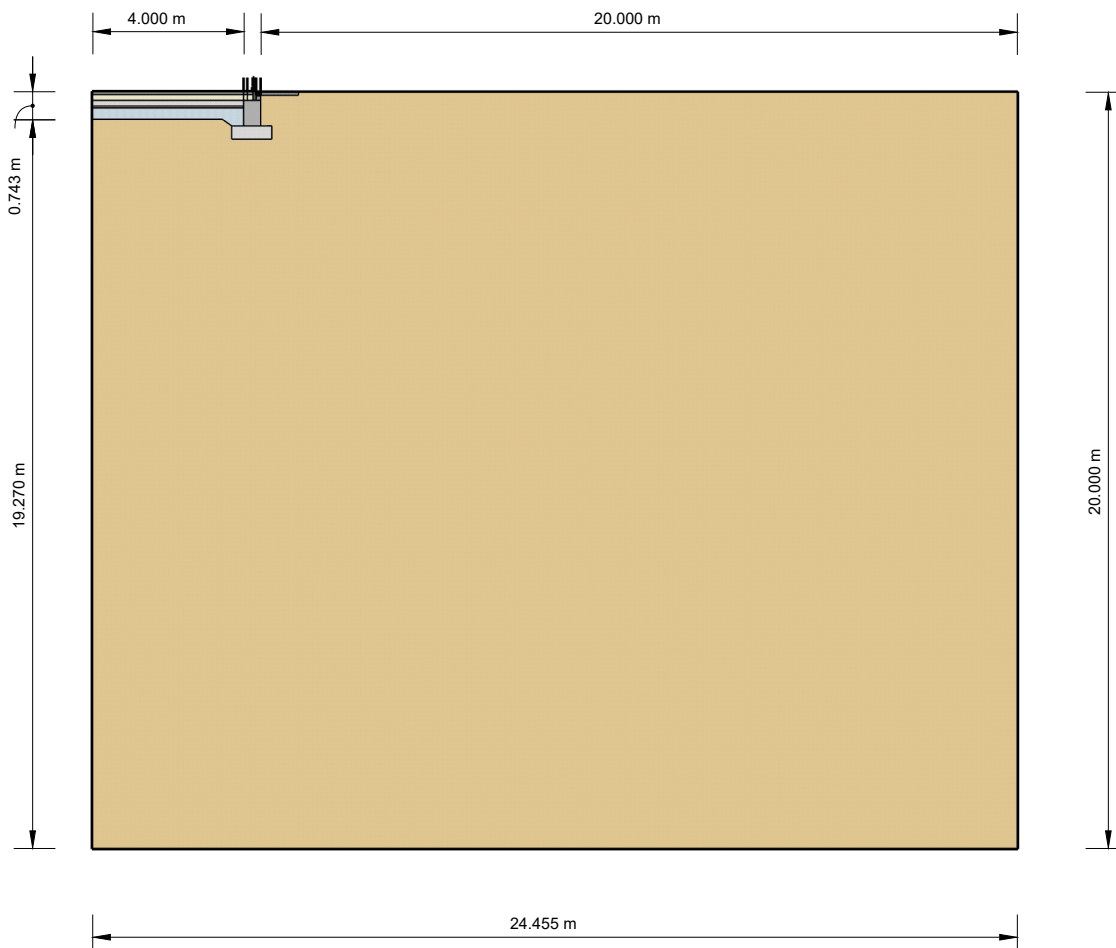
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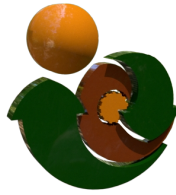


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Calculated Drawings

Scale 1:200 @ A4



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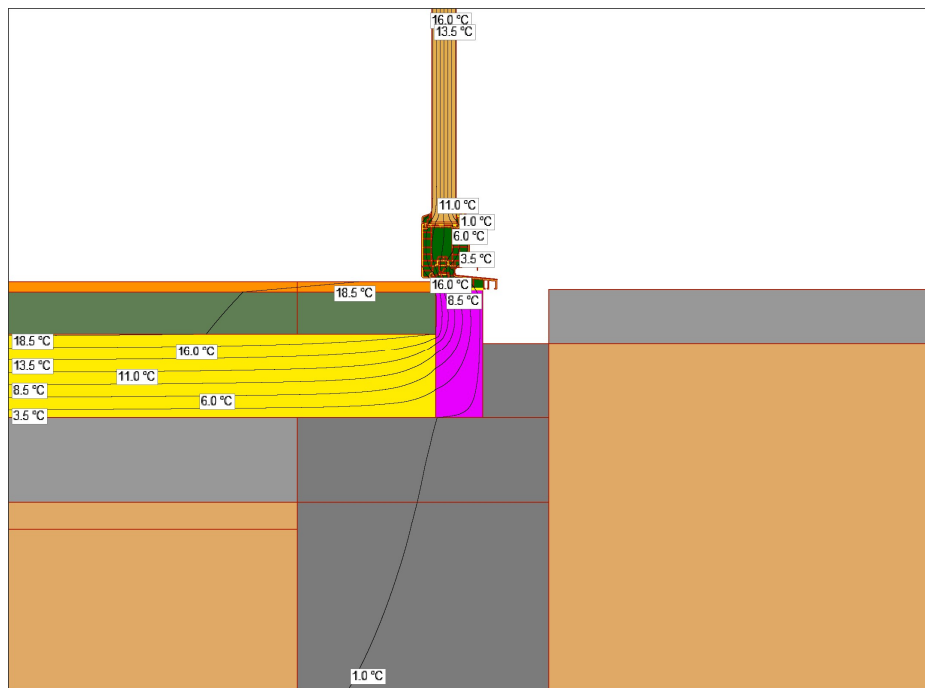
Modelling Software Reports

Project: Prodomo

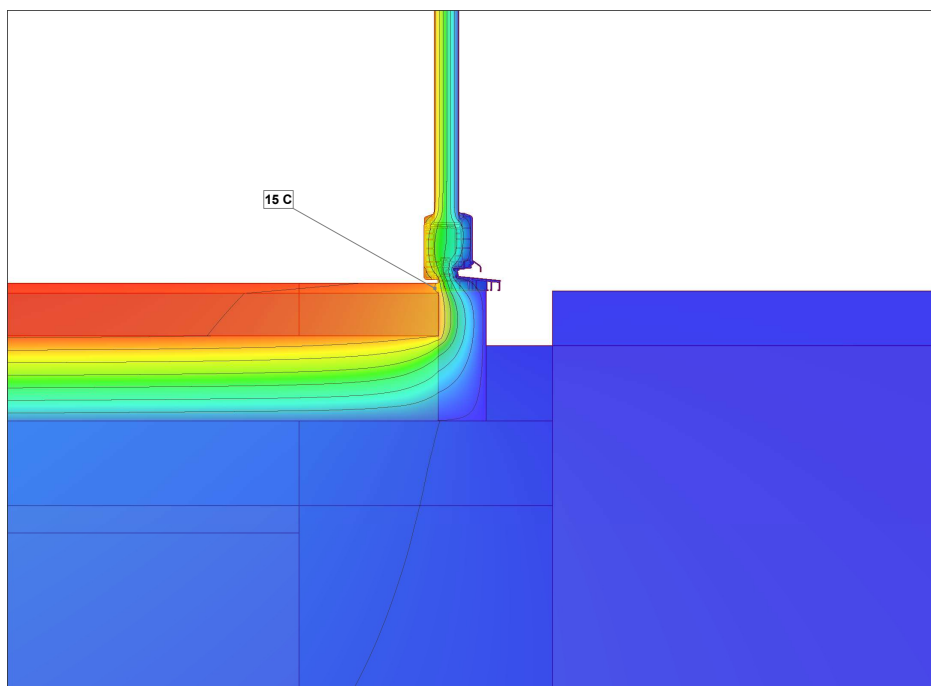
Detail: 102 Threshold

Linear transmittance
Surface Temperature

$\psi_1 = -0.0138 \text{ W/mK}$ $\psi_2 = 0.0929 \text{ W/mK}$
13.62 °C (on Window) 15 C on Floor fRsi = 0.75



Heat Flow and Isotherms

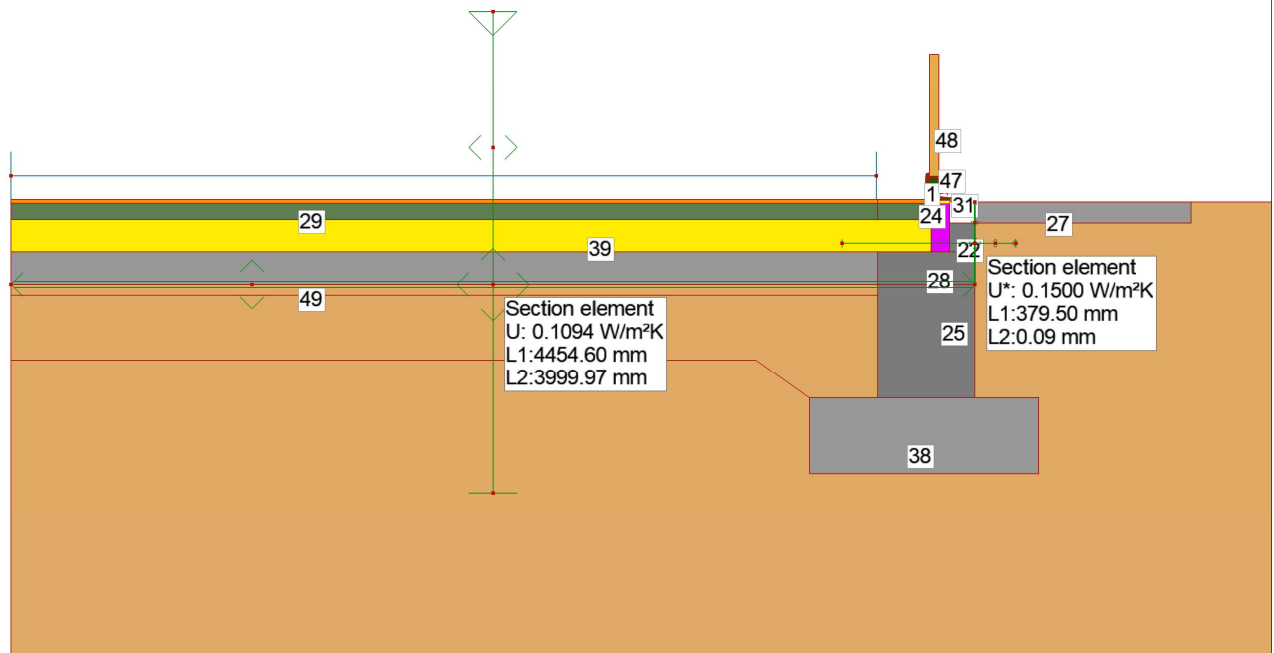


Date: 30/06/2025

File: 2025 06 27 1642 Threshold Detail - Iteration 2-3

Software: Mold Simulator - 7.1.3 b2092 64bit

Psi Calculation - Technical Parameters EN-ISO 10211:2018



Linear transmittance $\psi_1 = -0.0138 \text{ W/mK}$ $\psi_2 = 0.0929 \text{ W/mK}$

ψ Calculation Information

L2D, with bridge:	1.09339 W/mK
L1D, without bridge 1:	1.10717 W/mK
L1D, without bridge 2:	1.00052 W/mK
ΔT :	20.00 °C
Total Heat Flow in:	
Total Heat Flow External Boundary:	0.0000 W/m
Total Heat Flow Sheltered Boundary:	-0.0247 W/m
Flow error ISO10211 C2e:	0.000052
Flow error ISO10211 C2d:	0.006719 %
Number of Nodes In Model:	

ψ calculus

$$\psi = [\Phi / \Delta T] - \sum [U \times L]$$

$$\psi_1 = [21.86784 \text{ W/m} / 20.00 \text{ °C}] - [1.10717 \text{ W/mK}] = -0.01378 \text{ W/mK}$$

$$\psi_2 = [21.86784 \text{ W/m} / 20.00 \text{ °C}] - [1.00052 \text{ W/mK}] = 0.09287 \text{ W/mK}$$

Section element
Transmittance U = 0.1094 W/m²K
Length 1 = 4455 mm
Length 2 = 4000 mm

Section element
Transmittance U = 0.1500 W/m²K
Length 1 = 380 mm
Length 2 = 0 mm

Modelling U-values and Resistances

Name	Thickness [mm]	R [m²K/W]	Color
Internal	0.00	0.1700	Red
Timber (0.130)	18.00	0.1385	Orange
Screed (1.600)	75.00	0.0469	Green
PIR (0.022)	150.00	6.8182	Yellow
Reinforced (with 2 % of steel) (2.500)	150.00	0.0600	Grey

Floor Modelling U-value 0.1286 W/m²K for Psi Calculation Only

Wall Modelling U-value 0.1500 W/m²K for Psi Calculation Only (Assumed)

Window Modelling U-value 0.1500 W/m²K for Psi Calculation Only U-factor

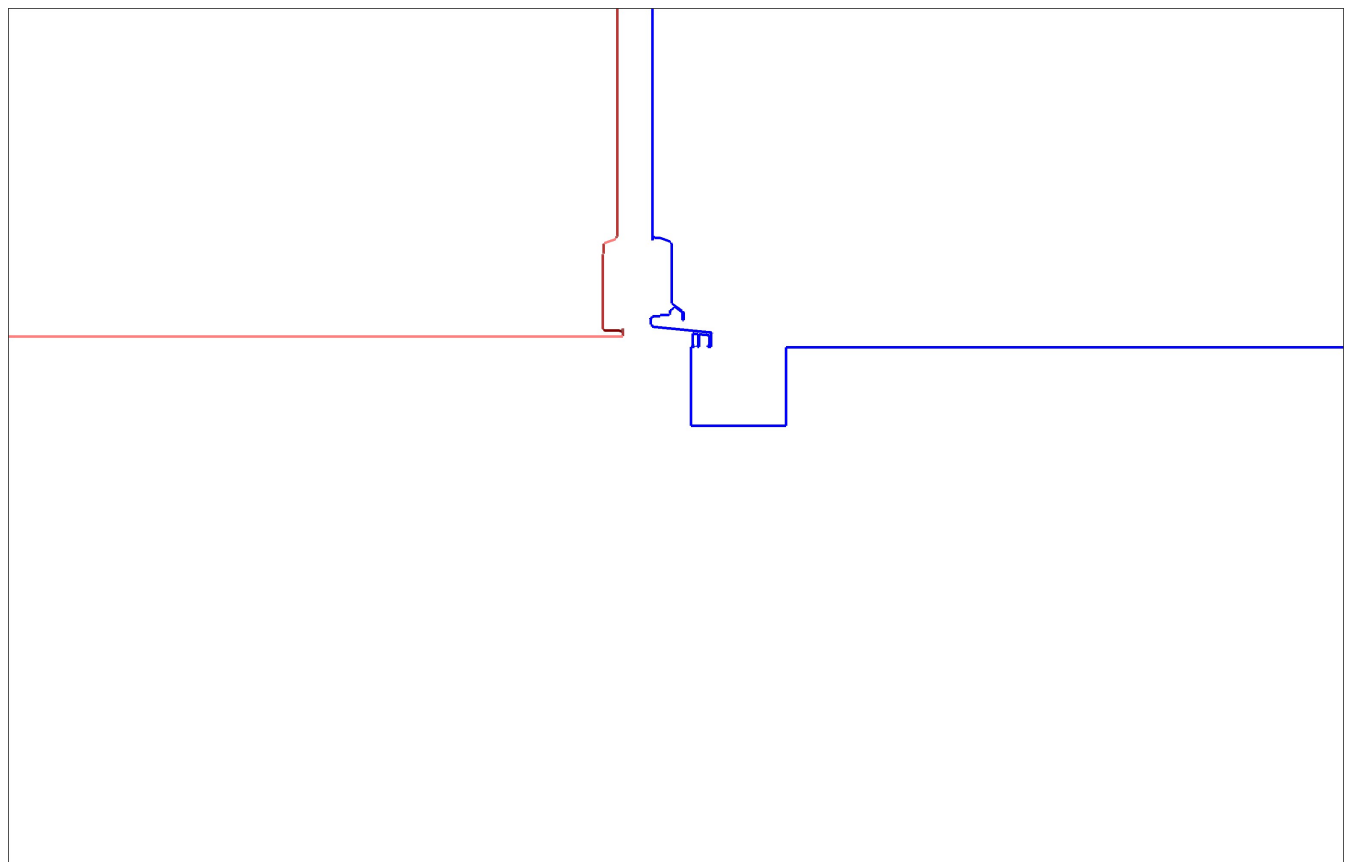
File: 2025 06 27 1642 Threshold Detail - Iteration 2-3

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Psi Calculation - Technical Parameters
EN-ISO 10211:2018



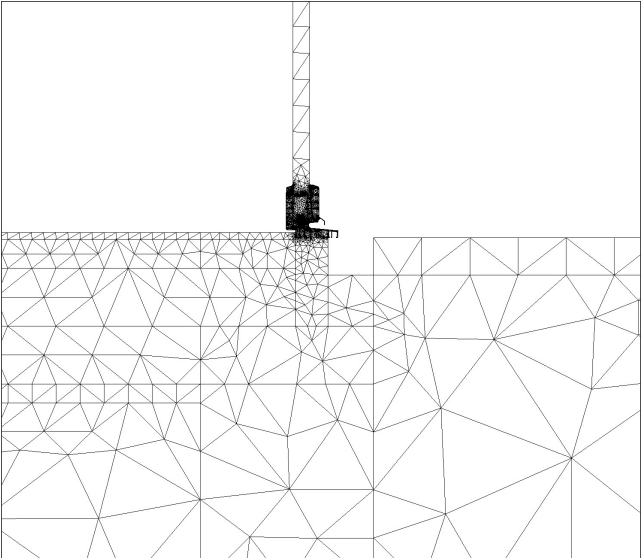
Psi and fRsi Boundary Conditions

Psi Boundary Conditions

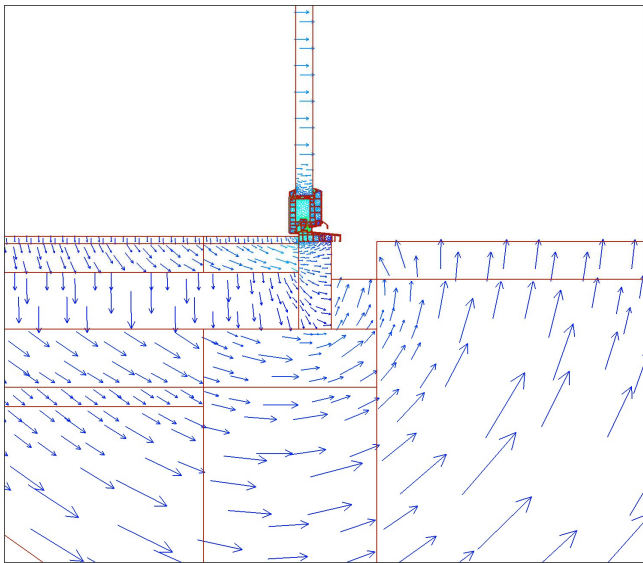
ID	Name	Col.	Group	Air T [°C]	Boundary T [°C]	R [m²K/W]	R type
0	Internal	Red	0	20.000	-	0.1000 - 0.1700	ISO 6946 Internal simplified
2	External	Blue	0	0.000	-	0.0400	Constant
3	Adiabatic	Black	0	-	-	-	Constant

fRsi Boundary Conditions

ID	Name	Col.	Air T [°C]	R [m²K/W]	R type
0	Internal	Red	20.000	0.2500	Constant
1	Ground	Yellow	-	-	Constant
2	External	Blue	0.000	0.0400	Constant
3	Adiabatic	Black	-	-	Constant



Mesh Subdivision



Heat Flux Direction

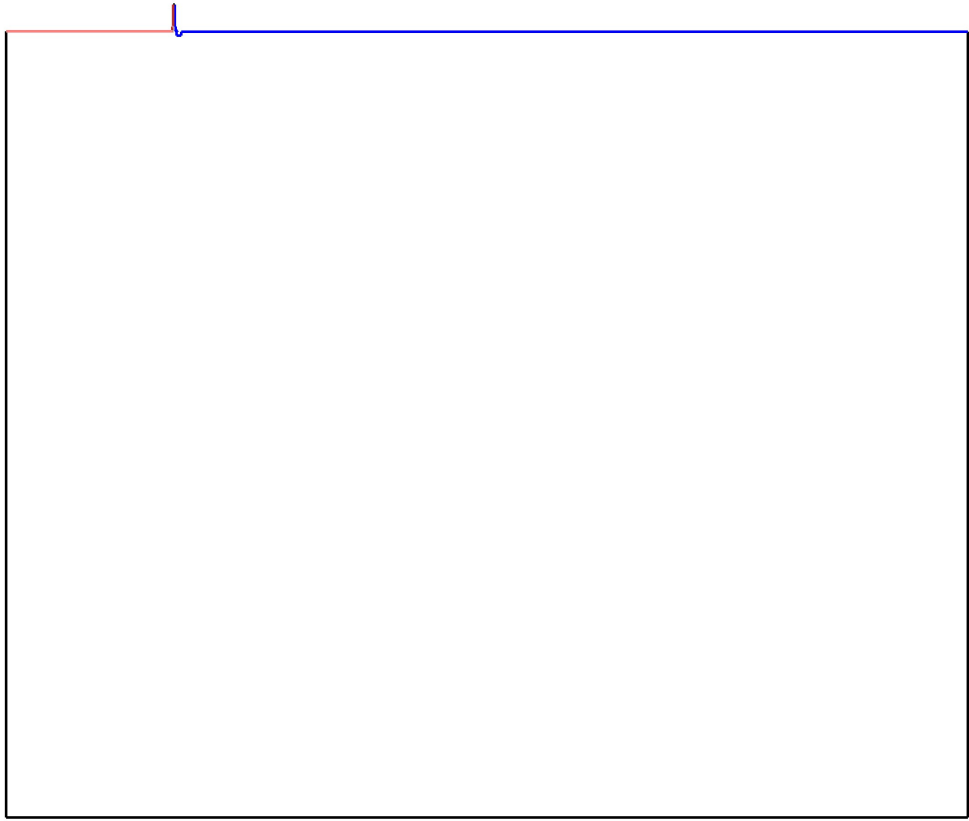
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Psi Calculation - Technical Parameters
EN-ISO 10211:2018



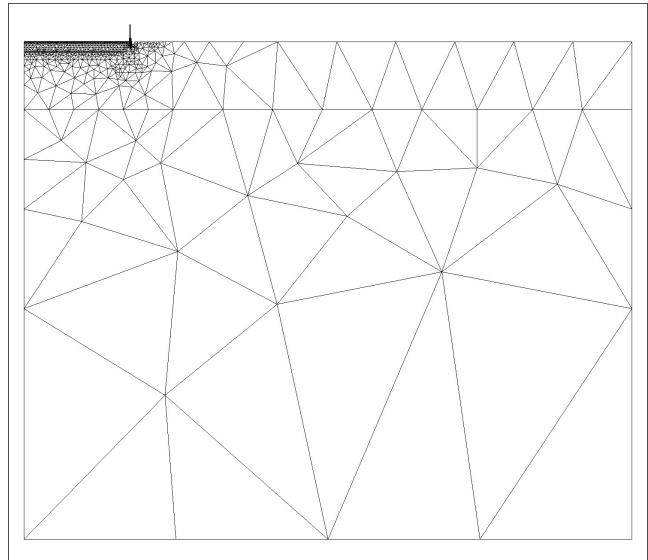
Psi and fRsi Boundary Conditions

Psi Boundary Conditions

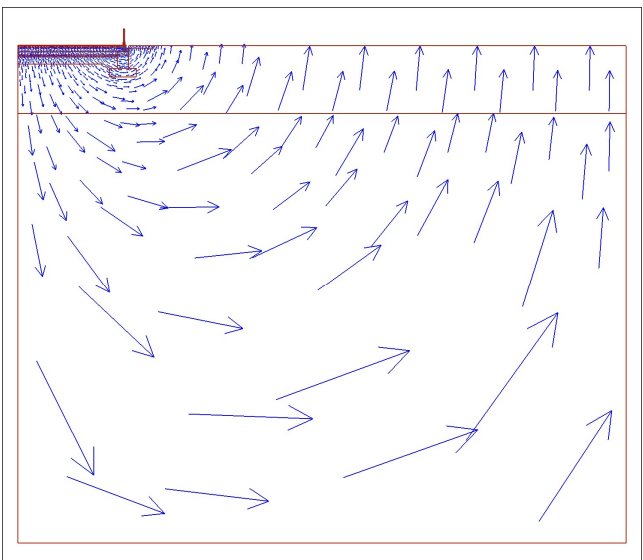
ID	Name	Col.	Group	Air T [°C]	Boundary T [°C]	R [m²K/W]	R type
0	Internal	Red	0	20.000	-	0.1000 - 0.1700	ISO 6946 Internal simplified
2	External	Blue	0	0.000	-	0.0400	Constant
3	Adiabatic	Black	0	-	-	-	Constant

fRsi Boundary Conditions

ID	Name	Col.	Air T [°C]	R [m²K/W]	R type
0	Internal	Red	20.000	0.2500	Constant
1	Ground	Yellow	-	-	Constant
2	External	Blue	0.000	0.0400	Constant
3	Adiabatic	Black	-	-	Constant



Mesh Subdivision



Heat Flux Direction

Date: 30/06/2025

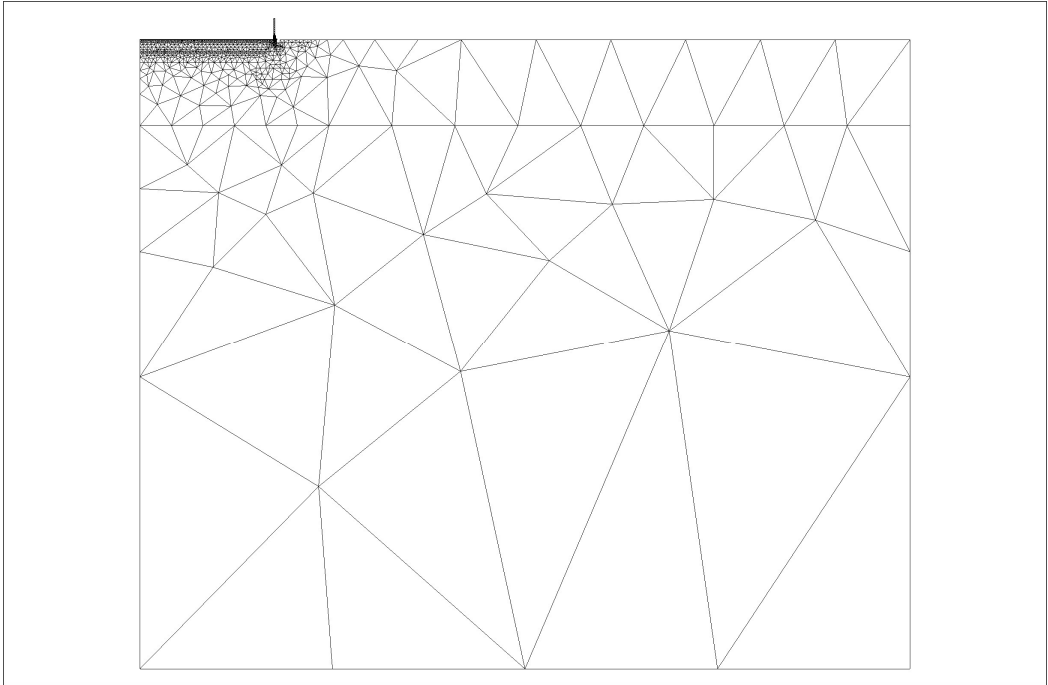
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Software: Mold Simulator - 7.1.3 b2092 64bit

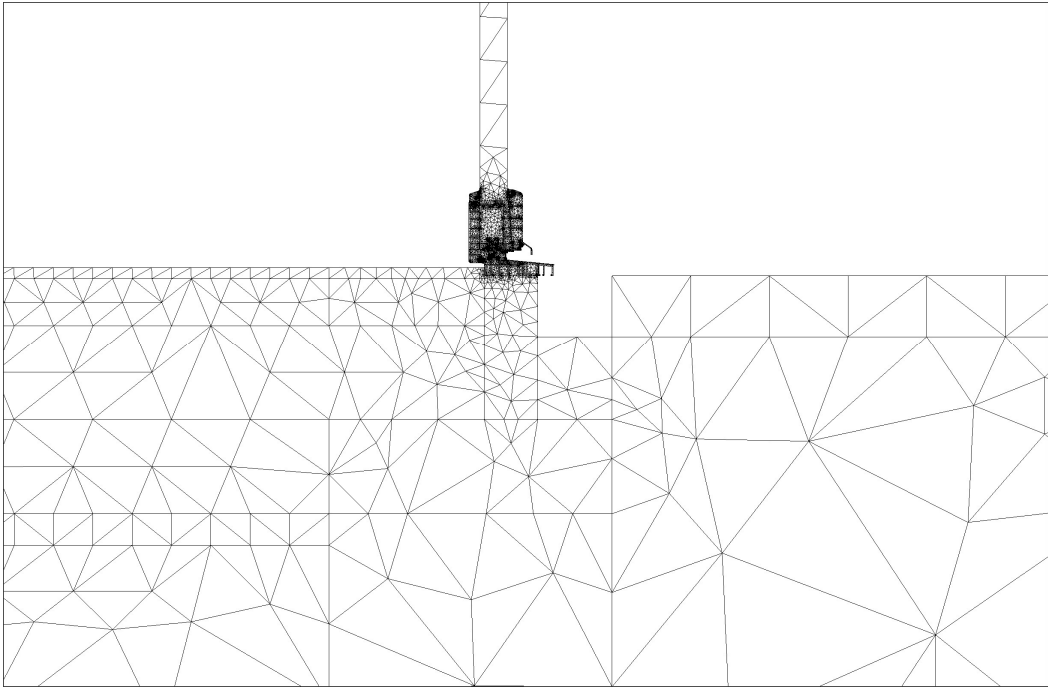


Mold Simulator

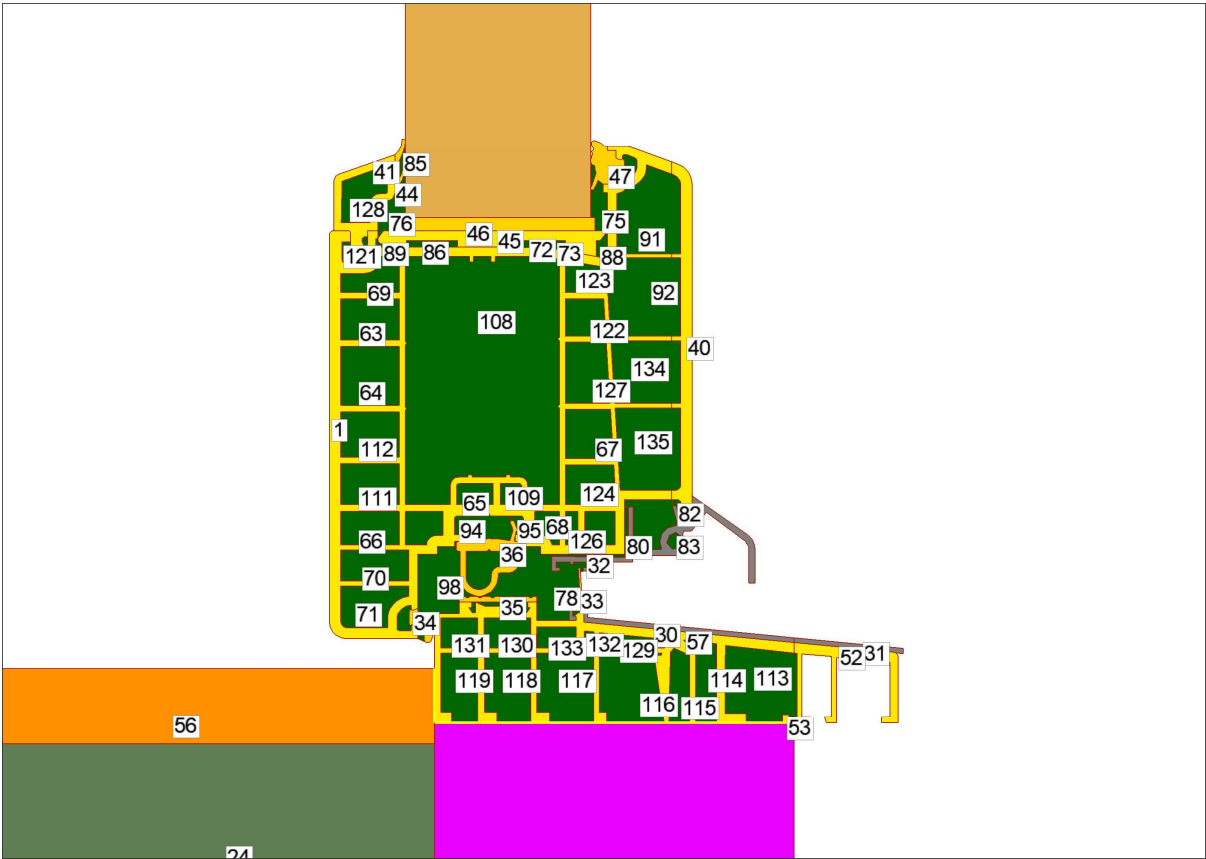
Subdivision



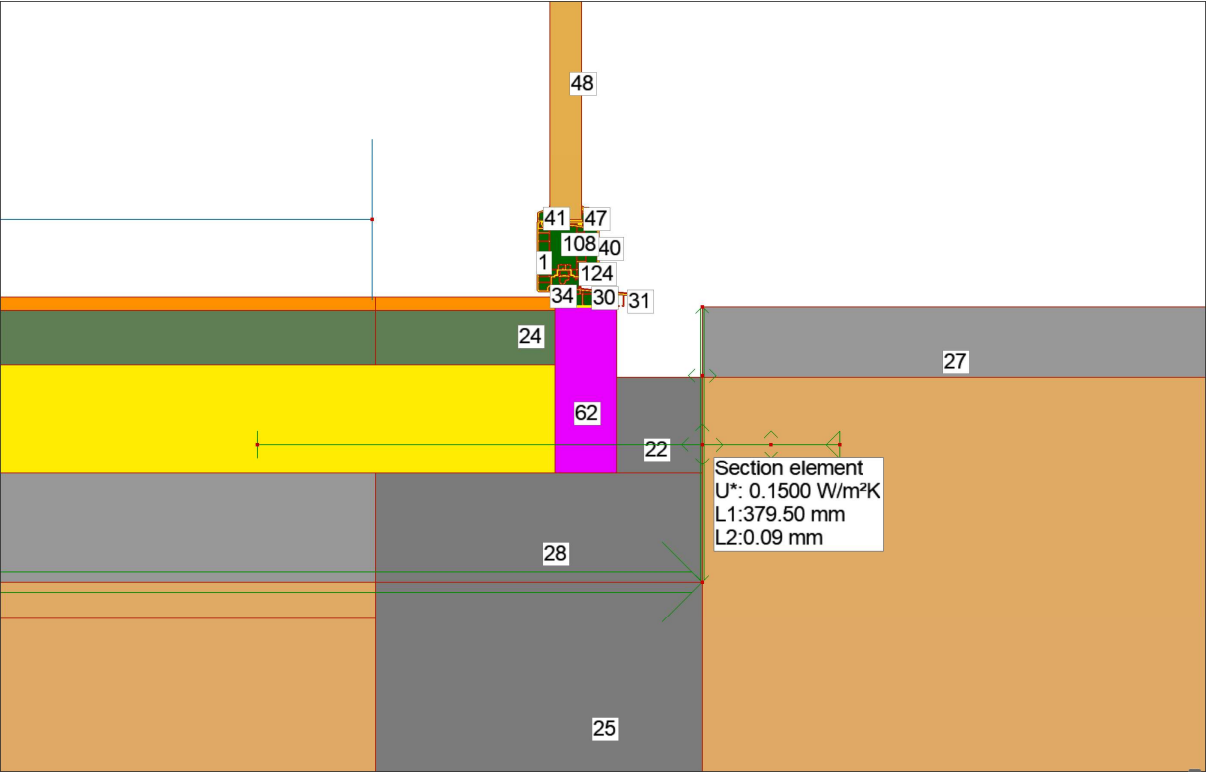
Subdivision (Zoomed)



Psi Calculation - Technical Parameters
EN-ISO 10211:2018



Psi and fRsi Materials



Date: 30/06/2025

File: 2025 06 27 1642 Threshold Detail - Iteration 2-3

Software: Mold Simulator - 7.1.3 b2092 64bit



Psi Calculation - Technical Parameters EN-ISO 10211:2018

Material List

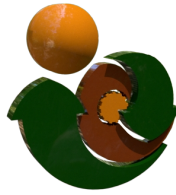
ID	Name	Conductivity [W/mK]	Color
101	6946 unventilated	0.0410	
102	6946 unventilated	0.0293	
103	6946 unventilated	0.0258	
104	6946 unventilated	0.0397	
105	6946 unventilated	0.0257	
106	6946 unventilated	0.0295	
107	6946 unventilated	0.0370	
108	6946 unventilated	0.1784	
109	6946 unventilated	0.0406	
110	6946 unventilated	0.0518	
111	6946 unventilated	0.0668	
112	6946 unventilated	0.0685	
113	6946 unventilated	0.0715	
82	6946 unventilated	0.0318	
114	6946 unventilated	0.0517	
115	6946 unventilated	0.0507	
116	6946 unventilated	0.0680	
117	6946 unventilated	0.0670	
118	6946 unventilated	0.0626	
119	6946 unventilated	0.0574	
120	6946 unventilated	0.0300	
121	6946 unventilated	0.0408	
123	6946 unventilated	0.0486	
124	6946 unventilated	0.0567	
125	6946 unventilated	0.0467	
126	6946 unventilated	0.0391	
127	6946 unventilated	0.0583	
128	6946 unventilated	0.0544	
129	6946 unventilated	0.0376	
130	6946 unventilated	0.0541	
131	6946 unventilated	0.0511	
132	6946 unventilated	0.0340	
133	6946 unventilated	0.0453	
134	6946 unventilated	0.0711	
135	6946 unventilated	0.0723	
63	6946 unventilated	0.0675	
64	6946 unventilated	0.0706	
65	6946 unventilated	0.0477	
66	6946 unventilated	0.0631	
67	6946 unventilated	0.0589	
68	6946 unventilated	0.0443	
69	6946 unventilated	0.0579	
70	6946 unventilated	0.0641	
71	6946 unventilated	0.0656	
72	6946 unventilated	0.0358	
73	6946 unventilated	0.0353	
74	6946 unventilated	0.0346	
75	6946 unventilated	0.0434	
76	6946 unventilated	0.0440	
77	6946 unventilated	0.0316	
78	6946 unventilated	0.0749	
79	6946 unventilated	0.0285	
80	6946 unventilated	0.0316	
81	6946 unventilated	0.0538	
122	6946 unventilated	0.0527	
83	6946 unventilated	0.0343	
84	6946 unventilated	0.0316	
85	6946 unventilated	0.0305	
86	6946 unventilated	0.0428	
87	6946 unventilated	0.0297	
88	6946 unventilated	0.0334	
89	6946 unventilated	0.0330	
90	6946 unventilated	0.0350	
91	6946 unventilated	0.0724	
92	6946 unventilated	0.0750	
93	6946 unventilated	0.0515	
94	6946 unventilated	0.0342	
95	6946 unventilated	0.0342	
96	6946 unventilated	0.0252	
97	6946 unventilated	0.0263	
98	6946 unventilated	0.0623	
99	6946 unventilated	0.0526	
100	6946 unventilated	0.0296	
30	Aluminium (anodized/coated)	160.0000	
31	Aluminium (anodized/coated)	160.0000	
32	Aluminium (anodized/coated)	160.0000	
22	Block	1.3300	
25	Block	1.3300	
28	Block	1.3300	
48	Panel	0.0350	
39	PIR	0.0220	
1	PVC rigid	0.1700	
53	PVC rigid	0.1700	
57	PVC rigid	0.1700	
40	PVC rigid	0.1700	
41	PVC rigid	0.1700	
45	PVC rigid	0.1700	
52	PVC rigid	0.1700	
27	Reinforced (with 2 % of steel)	2.5000	
38	Reinforced (with 2 % of steel)	2.5000	
51	Reinforced (with 2 % of steel)	2.5000	
23	Sand and gravel	2.0000	
26	Sand and gravel	2.0000	
50	Sand and gravel	2.0000	
49	Sand and gravel	2.0000	
24	Screed	1.6000	
29	Screed	1.6000	
33	Silicone pure	0.3500	
35	Silicone pure	0.3500	
36	Silicone pure	0.3500	
47	Silicone pure	0.3500	
34	Silicone pure	0.3500	
44	Silicone pure	0.3500	
43	Silicone pure	0.3500	
46	Silicone pure	0.3500	
55	Timber	0.1300	
56	Timber	0.1300	
62	TrioTherm	0.0410	

File: 2025 06 27 1642 Threshold Detail - Iteration 2-3

Date: 30/06/2025

Software: Mold Simulator - 7.1.3 b2092 64bit





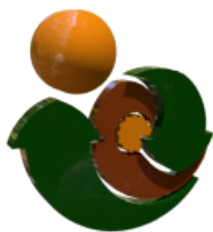
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Modelled Air Spaces

Project: Prodomo

Detail: 102 Threshold



Earth Cycle Technologies

Slab on Grade Heat Loss Calculator (ISO 13370)

Geometry and Construction

Floor Area (m²):

Perimeter Length (m):

Wall Thickness (m):

Edge Insulation Width (m):

Soil Properties

Soil Thermal Conductivity (W/mK):

Thermal Properties

Internal Temperature (°C):

External Temperature (°C):

Floor Construction U-Value (W/m²K):

Edge Insulation Resistance (m²K/W):

Results

Intermediate Calculations

Characteristic Dimension (B): 4.000 m

Floor Resistance (Rf): 7.042 m²K/W

Equivalent Thickness (dt): 14.515 m

Effective Ground Resistance (Rgeff): 0.914 m²K/W

Perimeter/Area Ratio: 0.500 m⁻¹

Final Results

Total U-value: 0.122 W/m²K

Total Heat Flow: 156.65 W

Input Parameters

Floor Area: 64 m²

Perimeter Length: 32 m

Wall Thickness: 0.35 m

Soil Conductivity: 2 W/mK

Floor U-value: 0.142 W/m²K

Internal Temperature: 20 °C

External Temperature: 0 °C

U-value calculation

by BRE U-value Calculator version 2.04g

Printed on 22 May 2025 at 18:47

Element type: Floor - Slab-on-ground floor

Calculation Method: BS EN ISO 6946, BS EN ISO 13370

Thermal resistance of floor construction:

<u>Layer</u>	<u>d (mm)</u>	<u>λ layer</u>	<u>λ bridge</u>	<u>Fraction</u>	<u>Density</u>	<u>Sp. heat</u>	<u>R layer</u>	<u>R bridge</u>	<u>Description</u>
1	85	1.600			1800	1000	0.170		Rsi
2	150	0.022			20	1030	0.053		Screed
	<u>235 mm</u>						<u>6.818</u>		insulation
							7.041		

Total resistance: Upper limit: 7.041 Lower limit: 7.041 Ratio: 1.000 Average: 7.041 m²K/W

Ground parameters:

Perimeter P: 32.00 m

Wall thickness: 350 mm

Area A: 64.00 m²

Ground type: Sand/gravel ($\lambda = 2.0$ W/m·K)

P/A: 0.500

Rse: 0.04 m²K/W

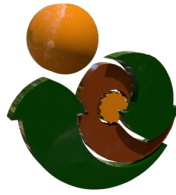
U-value 0.122

U-value (rounded) 0.12 W/m²K

Heat capacity per m² (κ) 153.0 kJ/m²K

Calculated by:

audiobob@live.com



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Material Data Sheets

Project: Prodomo

Detail: 102 Threshold

Technical data:

Material:	high-density EPS (expanded polystyrene), high ductility
Colour:	grey
Compressive load bearing capacity at max. total deformation of 2 %:	1,260 kg/dm ²
Compressive load bearing capacity at 60 x 40 mm: (blaugelb Spacer Block)	5,800 N
Compressive load bearing capacity at 210 x 53 mm: (blaugelb Shim Block HST)	15,510 N
Fire behaviour: DIN 4102-1:1998-05	B2
Thermal conductivity nominal value λ_D : DIN EN 12667 DIN 10456:2010-05	$\lambda = 0.041 \text{ W/m}^{\circ}\text{K}$
Air permeability: EN 12207	Class 4
Water vapour diffusion resistance: DIN EN ISO 12572	380 – 550 μ
Bending strength: DIN EN 12089	$\geq 650 \text{ kPa}$
Compression stress (10 %) compression: DIN EN 13163:2015-04	$\geq 2,500 \text{ kPa}$
Compression stress (2 %) compression: DIN EN 13163:2015-04	$\geq 1,100 \text{ kPa}$
Shear strength: DIN EN ISO 14130	0.217 N/mm ²
Screw withdrawal value: (Frame screw Fix FK-T30 7.5 x 62 mm)	2,100 N
Water absorption after 28 days under water: DIN 12087	$\leq 1.5 \text{ vol. \%}$
Compatibility with conventional building materials:	compatible, except for solvents, solvent-bearing materials and materials that are not polystyrene-compatible
Ageing resistance:	mould-proof, does not rot

FLOOR

DECLARATION OF PERFORMANCES

No. UTherm FLOOR LE v4

Unique identification code of the product-type: **UTHERM FLOOR LE**
Intended use/s: **Thermal insulation for buildings**
Manufacturer: **UNILIN division insulation, Waregemstraat 112, B-8792, Belgium**
System/s of AVCP: **System 3**
Harmonized standard: **EN 13165:2012+A2:2016**
Notified bodies: **0751, 1136 & 1173**

Essential characteristics		Performance (NPD = No Performance Declared)
Thermal resistance	Thermal resistance R_0 [m ² .K/W]	0.90 for d_N 20 mm 9.05 for d_N 200 mm
	Thermal conductivity λ_D [W/m.K]	0.022
	Thickness tolerance	T2
Reaction to fire		E
Durability of reaction to fire against heat, weathering, ageing/degradation		Reaction to fire does not change with time
Compressive strength	Compressive stress or compressive strength	CS(10/Y)150
Tensile/flexural strength	Tensile strength perpendicular to faces	TR80
Durability of thermal resistance against heat, weathering, ageing/degradation	Dimensional stability under specified temperature and humidity conditions	DS(70,90)3 DS(-20,-)1
	Deformation under specified compressive load and temperature conditions	NPD
Durability of compressive strength against ageing/degradation	Compressive creep	NPD
Water permeability	Long term water absorption by total immersion	WL(T)2
	Flatness after one sided wetting	NPD
Water vapour permeability	Water vapour transmission	NPD
Acoustic absorption index	Sound absorption	NPD
Release of dangerous substances to the indoor environment		NPD (No harmonised test method available)
Continuous glowing combustion		NPD (No harmonised test method available)

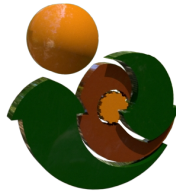
The performance of the product identified above is in conformity with the set of declared performances. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:



Pascal Meirsschaert
Director Innovation & Technical Services Unilin Insulation

Desselgem, 10/01/2024



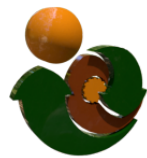
Earth Cycle Technologies
25 Hawkstown Park
Wicklow Town
Co. Wicklow
www.earthcycle.co



Actual U-value Calculations

Project: Prodomo

Detail: 102 Threshold



U-Value Calculator

Surface Resistance - Interior (Rsi):

Surface Resistance - Exterior (Rse):

Description	Thickness (m)	Conductivity (W/mK)	Bridging %	Bridging Conductivity (W/mK)	Vertical Bridging
Layer 1	0.085	1.6	0	0	☒
Layer 2	0.15	0.022	0	0	☒
Layer 3	0	0	0	0	☒
Layer 4	0	0	0	0	☒
Layer 5	0	0	0	0	☒
Layer 6	0	0	0	0	☒
Layer 7	0	0	0	0	☒
Layer 8	0	0	0	0	☒
Layer 9	0	0	0	0	☒
Layer 10	0	0	0	0	☒
Layer 11	0	0	0	0	☒
Layer 12	0	0	0	0	☒
Layer 13	0	0	0	0	☒
Layer 14	0	0	0	0	☒

Results:

Supplemental U-value for fixings (W/m²K):

Total Resistance: 7.04131 m²K/W

U-value (without bridging): 0.142 W/m²K

U-value (with bridging): 0.142 W/m²K

U-value (ISO 6946 + supplemental): 0.142 W/m²K

Layer Visualization

Rotation (degrees): 30°

