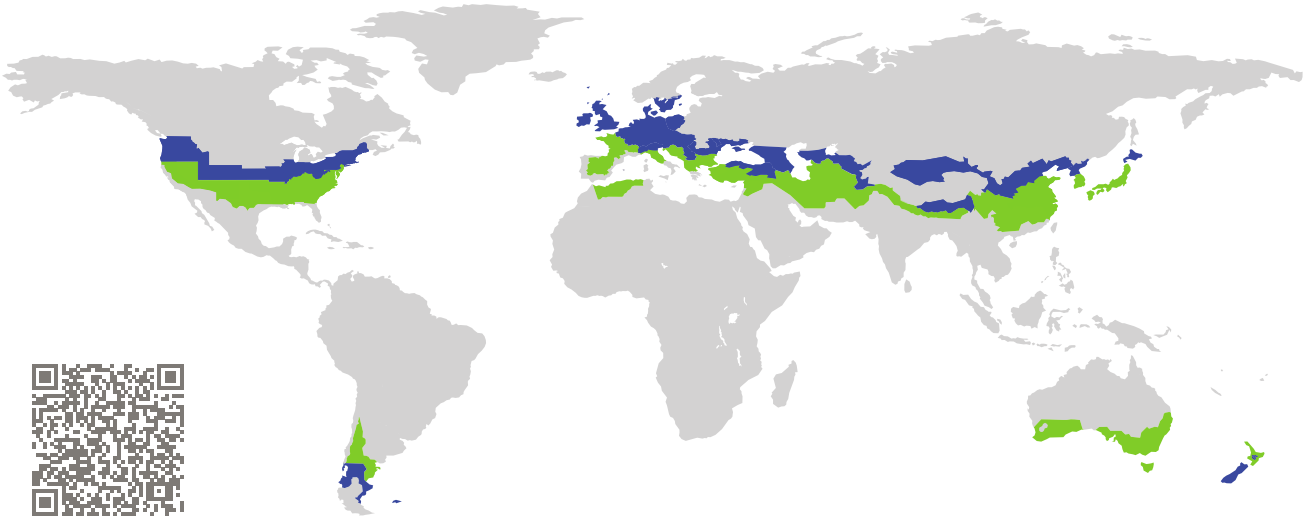
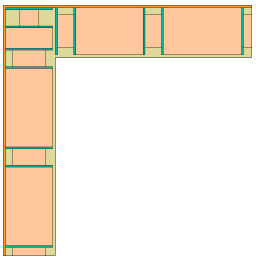
CERTIFICATE

Certified Passive House Component

Component-ID 1997cs03 valid until 31st December 2025

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany





Category: **Construction system**

Manufacturer: **Biobuilds S.R.L., Cluj Napoca, Romania**

Product name: **Modular**

Hygiene criterion

The mininum temperature factor of the interior surfaces is $f_{Rsi=0.25\,m^2\,K/W} \geq 0.70$

Comfort criterion

The U-value of the installed windows is $U_{wi} \leq 0.85\,W/(m^2\,K)$

Efficiency criteria

Heat transfer coefficient of building envelope: $U * f_{PHI} \leq 0.15\,W/(m^2\,K)$

Temperature factor of opaque junctions: $f_{Rsi=0.25\,m^2\,K/W} \geq 0.86$

Thermal bridge-free design for key connection details: $\Psi \leq 0.01\,W/(m\,K)$

An airtightness concept for all components and connection details was provided.

It was confirmed that the structure will dry out within 12 months and there is no risk of moisture-related damage.

cool, temperate climate

CERTIFIED COMPONENT

Passive House Institute

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Opaque building envelope

Modular is a lightweight modular timber construction system, insulated with mineral wool (Isover Super Profi 0,035 W/(mK)). The modules are fastened together using steel bolts and then covered with a weathertight membrane, before being clad with a timber rainscreen and roofing materials. The system is prefabricated in Biobuilds' manufacturing facility, allowing for fast delivery and assembly times. The construction is deemed suitable for passive houses, as both the regular U-values of the exterior components are below 0.15 W/(m²K) and the connections meet the criteria of 'thermal bridge-free'. The surface temperatures of all connections meet the surface temperature requirements.

Windows

Analysis was undertaken using a generic, passive house standard timber frame, triple-glazed window unit, featuring phA thermal values for the spacer and a polysulfide secondary seal. The calculations undertaken demonstrate that the window installa-tion locations are suited to the cool-temperate climate zone, with no risk of surface condensation or subsequent mould growth.

Airtightness concept

The Modular system uses 18mm thick AGEPAN OSB boards to the inside, taped with proprietary airtightness tape. To the exterior, the modules are covered with Rothoblaas Traspir Felt EVO UV 210 membrane; Nail Plaster Sealant Tape is applied over all fixings.

Summary of values

Opaque assemblies		U-value W/(m² K)	Thickness mm
exterior wall	(EW1) 	0.14	334
flat roof	(FR1) 	0.14	336
floor slab	(FS1) 	0.14	336

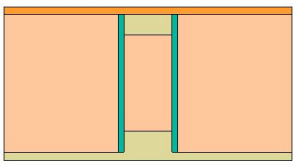
Frame Cuts with ”Standard window - cool-temperate” from ”dummy window manufacturer” (0002)					
Frame values			Frame width b_f mm	U-value frame U_f W/(m^2 K)	Ψ-glazing edge Ψ_g W/(m K)	Temp. Factor $f_{Rsi=0.25}$ [-]
Bottom	(OB1)		100	0.89	0.028	0.69
Top	(OH1)		100	0.76	0.028	0.71
Lateral	(OJ1)		100	0.76	0.028	0.71
Threshold	(OT1)		100	0.98	0.032	0.65
Spacer: PHI phA Spacer				Secondary seal: Polysulfide		

Junctions	U1 U2 U3 W/(m² K)	Ψ-value Ψ W/(m K)	Temp. factor $f_{Rsi=0.25}$ [-]
Ceiling integration into exterior wall (EW1_EW1_CE_1)	0.14 0.14	0.025	0.897
Exterior corner exterior wall (EW1_EW1_ec_1)	0.14 0.14	–0.044	0.855
Interior corner exterior wall (EW1_EW1_ic_1)	0.14 0.14	0.043	0.945
Internal wall integration into exterior wall (EW1_EW1_IW_1)	0.14 0.14	–0.001	0.938
Panel joint exterior wall (EW1_EW1_pj_1)	0.14 0.14	0.000	0.933
Window head operable window in exterior wall to flat roof (EW1_FR1_OH1_rp_1)	0.14 0.14 0.76	–0.006	0.815
Window head operable window in exterior wall to flat roof (EW1_FR1_OH1_rp_2)	0.14 0.14 0.76	–0.006	0.811
Roof parapet flat roof (EW1_FR1_rp_1)	0.14 0.14	–0.041	0.861
Roof parapet flat roof (EW1_FR1_rp_2)	0.14 0.14	–0.049	0.872
Window bottom operable window in exterior wall (EW1_OB1_1)	0.14 0.89	0.018	0.787
Window bottom operable window in exterior wall (EW1_OB1_2)	0.14 0.89	0.049	0.735
Window jamb operable window in exterior wall (EW1_OJ1_1)	0.14 0.76	0.017	0.818
Internal wall integration into flat roof (FR1_FR1_IW_1)	0.14 0.14	–0.001	0.935
Panel joint flat roof (FR1_FR1_pj_1)	0.14 0.14	0.034	0.924
Threshold to floor slab (FS1_EW1_OT1_1)	0.14 0.14 0.98	0.047	0.731
Threshold to floor slab (FS1_EW1_OT1_2)	0.14 0.14 0.98	0.022	0.756

Junctions	U1 U2 U3 W/(m² K)	Ψ-value Ψ W/(m K)	Temp. factor $f_{Rsi=0.25}$ [-]
Exterior wall plinth on floor slab (FS1_EW1_1) 	0.14 0.14	–0.041	0.860
Exterior wall plinth on floor slab (FS1_EW1_2) 	0.14 0.14	–0.047	0.865
Internal wall integration into floor slab (FS1_FS1_IW_1) 	0.14 0.14	–0.001	0.934
Panel joint floor slab (FS1_FS1_pj_2) 	0.14 0.14	0.034	0.923

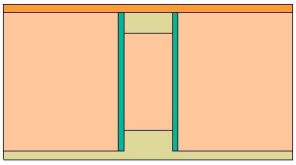
Opaque Assemblies

exterior wall (EW1)



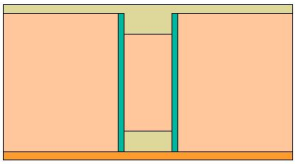
Material	Lambda W/(m K)	Thickness (mm)
softwood, OSB – perpendicular to grain direction	0.130	18
Timber + mineral wool equivalent (wall)	0.046	300
AGEPAN DWD	0.090	16
	Total thickness: 334 mm	
	Rsi: 0.13 m^2 K/W	
	Rse: 0.13 m^2 K/W	
	U-value: 0.14 W/(m^2 K)	

flat roof (FR1)



Material	Lambda W/(m K)	Thickness (mm)
softwood, OSB – perpendicular to grain direction	0.130	18
Timber + mineral wool equivalent (roof)	0.047	300
AGEPAN DWD	0.090	18
	Total thickness: 336 mm	
	Rsi: 0.10 m^2 K/W	
	Rse: 0.10 m^2 K/W	
	U-value: 0.14 W/(m^2 K)	

floor slab (FS1)

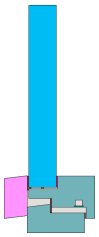


Material	Lambda W/(m K)	Thickness (mm)
softwood, OSB – perpendicular to grain direction	0.130	18
Timber + mineral wool equivalent (floor)	0.047	300
AGEPAN DWD	0.090	18
	Total thickness: 336 mm	
	Rsi: 0.17 m^2 K/W	
	Rse: 0.04 m^2 K/W	
	U-value: 0.14 W/(m^2 K)	

Frame Cuts with ”Standard window - cool-temperate” from ”dummy window manufacturer” (0002)

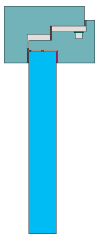
Bottom

b_f = 100 mm
U_f = 0.89 W/(m^2 K)
Ψ_g = 0.028 W/(m K)
f_{Rsi} = 0.69



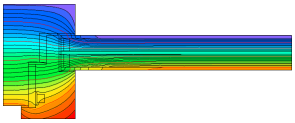
Top

b_f = 100 mm
U_f = 0.76 W/(m^2 K)
Ψ_g = 0.028 W/(m K)
f_{Rsi} = 0.71



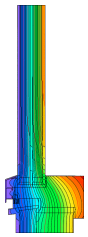
Lateral

b_f = 100 mm
U_f = 0.76 W/(m^2 K)
Ψ_g = 0.028 W/(m K)
f_{Rsi} = 0.71



Threshold

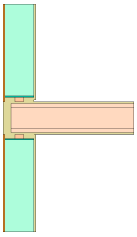
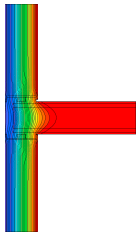
b_f = 100 mm
U_f = 0.98 W/(m^2 K)
Ψ_g = 0.032 W/(m K)
f_{Rsi} = 0.65



Junctions

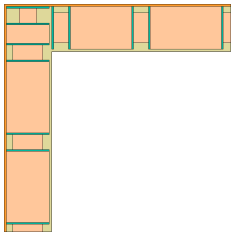
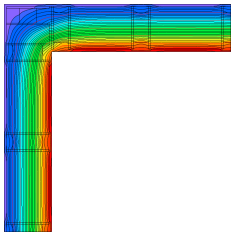
Ceiling integration
into exterior wall (EW1_EW1_CE_1)

U_{EW1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
Ψ = 0.025 W/(m K)
f_{Rsi} = 0.897

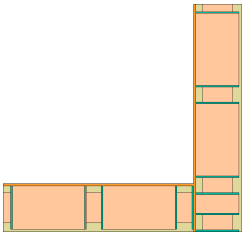
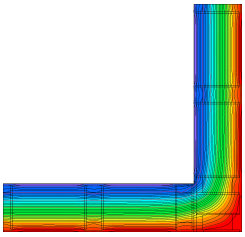
Exterior corner
exterior wall (EW1_EW1_ec_1)

U_{EW1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
Ψ = –0.044 W/(m K)
f_{Rsi} = 0.855

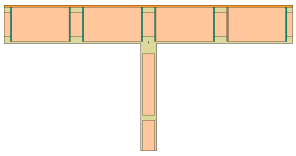
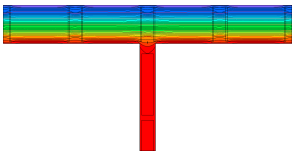
Interior corner
exterior wall (EW1_EW1_ic_1)

U_{EW1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
Ψ = 0.043 W/(m K)
f_{Rsi} = 0.945

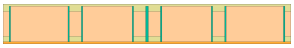
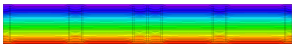
Internal wall integration
into exterior wall (EW1_EW1_IW_1)

U_{EW1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
Ψ = –0.001 W/(m K)
f_{Rsi} = 0.938

Panel joint
exterior wall (EW1_EW1_pj_1)

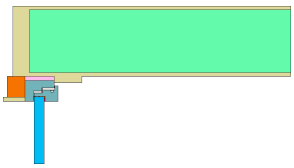
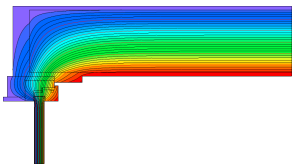
U_{EW1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
Ψ = 0.000 W/(m K)
f_{Rsi} = 0.933

Window head

operable window in exterior wall to flat roof (EW1_FR1_OH1_rp_1)

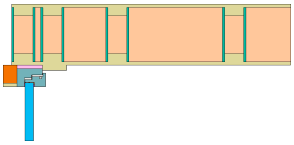
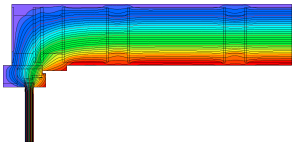
U_{EW1} = 0.14 W/(m² K)
U_{FR1} = 0.14 W/(m² K)
U_{OH1} = 0.76 W/(m² K)
Ψ = –0.006 W/(m K)
f_{Rsi} = 0.815

Window head

operable window in exterior wall to flat roof (EW1_FR1_OH1_rp_2)

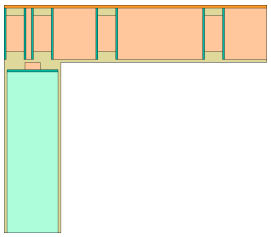
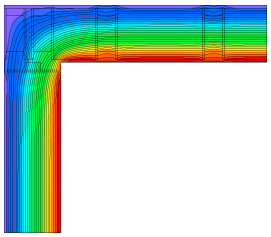
U_{EW1} = 0.14 W/(m² K)
U_{FR1} = 0.14 W/(m² K)
U_{OH1} = 0.76 W/(m² K)
Ψ = –0.006 W/(m K)
f_{Rsi} = 0.811

Roof parapet

flat roof (EW1_FR1_rp_1)

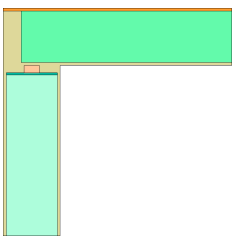
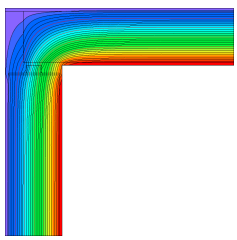
U_{EW1} = 0.14 W/(m² K)
U_{FR1} = 0.14 W/(m² K)
Ψ = –0.041 W/(m K)
f_{Rsi} = 0.861

Roof parapet

flat roof (EW1_FR1_rp_2)

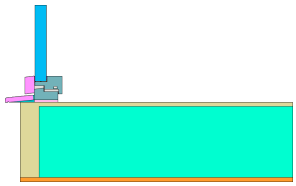
U_{EW1} = 0.14 W/(m² K)
U_{FR1} = 0.14 W/(m² K)
Ψ = –0.049 W/(m K)
f_{Rsi} = 0.872

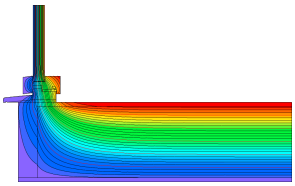



Window bottom

operable window in exterior wall (EW1_OB1_1)

U_{EW1} = 0.14 W/(m² K)
U_{OB1} = 0.89 W/(m² K)
Ψ = 0.018 W/(m K)
f_{Rsi} = 0.787

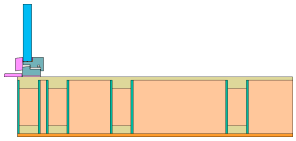


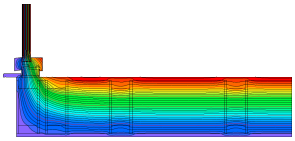


Window bottom

operable window in exterior wall (EW1_OB1_2)

U_{EW1} = 0.14 W/(m² K)
U_{OB1} = 0.89 W/(m² K)
Ψ = 0.049 W/(m K)
f_{Rsi} = 0.735

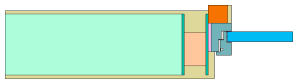


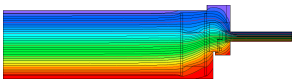


Window jamb

operable window in exterior wall (EW1_OJ1_1)

U_{EW1} = 0.14 W/(m² K)
U_{OJ1} = 0.76 W/(m² K)
Ψ = 0.017 W/(m K)
f_{Rsi} = 0.818

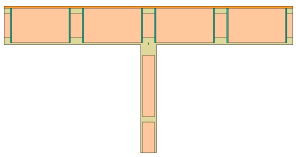


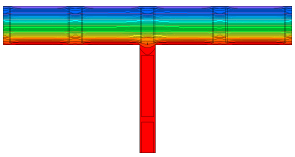


Internal wall integration

into flat roof (FR1_FR1_IW_1)

U_{FR1} = 0.14 W/(m² K)
U_{FR1} = 0.14 W/(m² K)
Ψ = –0.001 W/(m K)
f_{Rsi} = 0.935

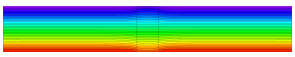




Panel joint

flat roof (FR1_FR1_pj_1)

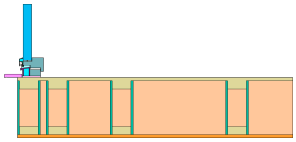
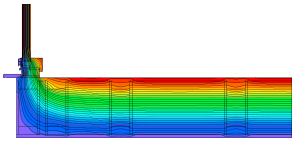
U_{FR1} = 0.14 W/(m² K)
U_{FR1} = 0.14 W/(m² K)
Ψ = 0.034 W/(m K)
f_{Rsi} = 0.924



Threshold

to floor slab (FS1_EW1_OT1_1)

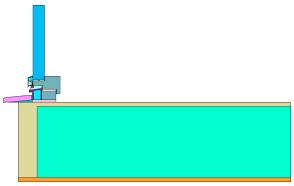
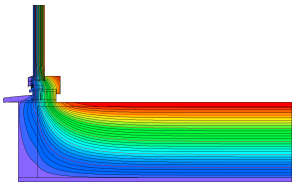
U_{FS1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
U_{OT1} = 0.98 W/(m² K)
Ψ = 0.047 W/(m K)
f_{Rsi} = 0.731

Threshold

to floor slab (FS1_EW1_OT1_2)

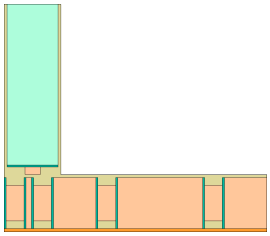
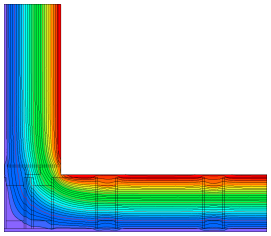
U_{FS1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
U_{OT1} = 0.98 W/(m² K)
Ψ = 0.022 W/(m K)
f_{Rsi} = 0.756

Exterior wall plinth

on floor slab (FS1_EW1_1)

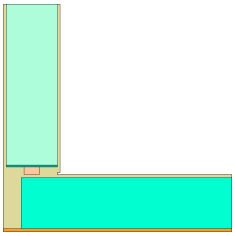
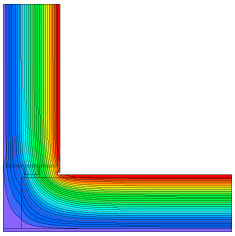
U_{FS1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
Ψ = –0.041 W/(m K)
f_{Rsi} = 0.860

Exterior wall plinth

on floor slab (FS1_EW1_2)

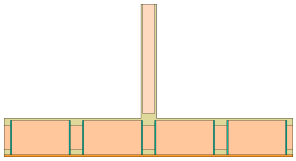
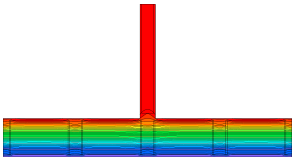
U_{FS1} = 0.14 W/(m² K)
U_{EW1} = 0.14 W/(m² K)
Ψ = –0.047 W/(m K)
f_{Rsi} = 0.865

Internal wall integration

into floor slab (FS1_FS1_IW_1)

U_{FS1} = 0.14 W/(m² K)
U_{FS1} = 0.14 W/(m² K)
Ψ = –0.001 W/(m K)
f_{Rsi} = 0.934

Panel joint

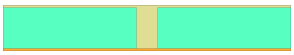
floor slab (FS1_FS1_pj_2)

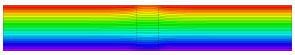
U_{FS1} = 0.14 W/(m² K)

U_{FS1} = 0.14 W/(m² K)

Ψ = 0.034 W/(m K)

f_{Rsi} = 0.923





Disclaimer: The Passive House Institute GmbH (PHI) carries out heat transfer analyses according to the standards set out in the document "Criteria and Algorithms for Certified Passive House Components: Opaque Construction Systems" and based on information provided by the manufacturer. It is the responsibility of the project leader, e.g. the architect to ensure the appropriate assessments have been carried out for specific buildings, which may include more detailed analyses than those carried out for this certification. Use of a certified Passive House component does not guarantee that a construction project will achieve the Passive House, EnerPHit or PHI Low Energy Building standard. In all cases full details are to be made available by the manufacturer on request to the engaged certified Passive House designer or certifier, who will be permitted to check these against the construction information and to perform on-site checks as part of the quality assurance process.