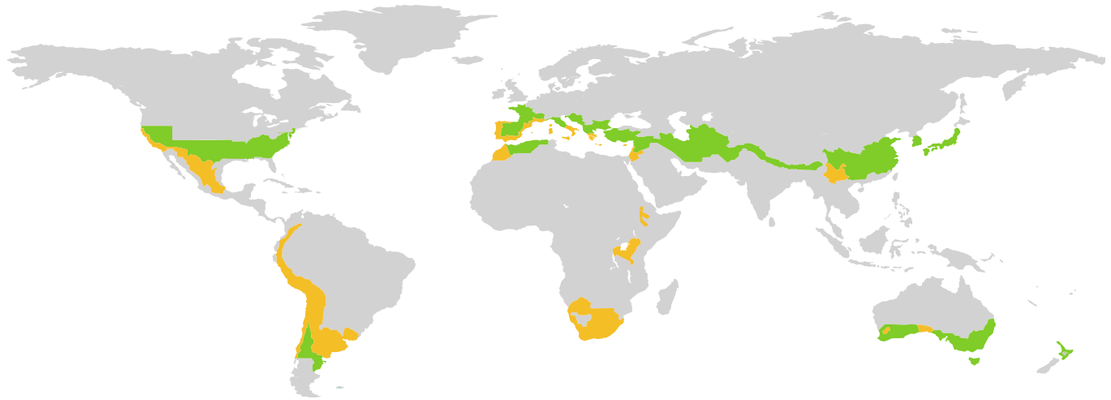
CERTIFICATE

Certified Passive House Component

ID: 1625cs04 valid until 31. December 2023

Passive House Institute
Dr. Wolfgang Feist
64342 Darmstadt
GERMANY



Category	**Construction system | Lightweight timber construction**
Manufacturer	**Thermochip SLU** **Carballeda de Valdeorras (Ourense)** **España**
Product name	**Thermochip HOUSING SATE-COAT**

This certificate for the warm, temperate climate zone was awarded based on the following criteria

Hygiene criterion

The minimum temperature factor of the interior surfaces is	$f_{Rsi=0,25m^2K/W} \geq$	**0.65**

Comfort criterion

The U-value of the installed windows is	$U_{W,i} \leq$	**1.05** W/(m²K)

Efficiency criteria

Heat transfer coefficient of building envelope	$U*f_{PHI} \leq$	**0.30** W/(m²K)
Temperature factor of opaque junctions	$f_{Rsi=0,25m^2K/W} \geq$	**0.82**
Thermal bridge-free design for key connection details	$\Psi \leq$	**0.01** W/(mK)

An airtightness concept for all components and connection details was provided

warm, temperate climate

CERTIFIED COMPONENT
Passive House Institute

Thermochip SLU
A Medua s/n 32330 Carballeda de Valdeorras (Ourense) España
Phone: | +34 988 33 55 85 | lfernandez@thermochip.com | www.thermochip.com

Opaque building envelope

With the Thermochip HOUSING Construction System the wintertime thermal insulation of buildings can be ensured. The system is constructed out of timber studs, beams and an outer sandwich panel. The sandwich panel (12/140/12 mm) comprises a board of fibre cement to the outside, a core of XPS (</=0,036 W/mK) and internal composite board with cellulose fibres. To the interior a service cavity provides a space for the building services and protects the airtightness layer.

The certification does not take into account point thermal bridges caused by structural columns or e.g. balcony connections, which must to be assessed separately. As investigated, the system is deemed suitable for passive houses in the warm-temperate climate zone, as the regular U-values of the exterior components are below 0,25 W/m²K and the connections meet the criteria of 'thermal bridge free'. The surface temperature of all connections meet the hygiene requirements.

Windows

For the purposes of certification a standard passive house window (Uw = 1,00 W/m²K with Ug = 0,90 W/m²K) was used. The overall U-value of the installed window of standard size (1,23 m wide by 1,48 m tall) should be no more than 0,05 W/m²K greater than the Uw to ensure occupant comfort - this criteria is met in this instance.

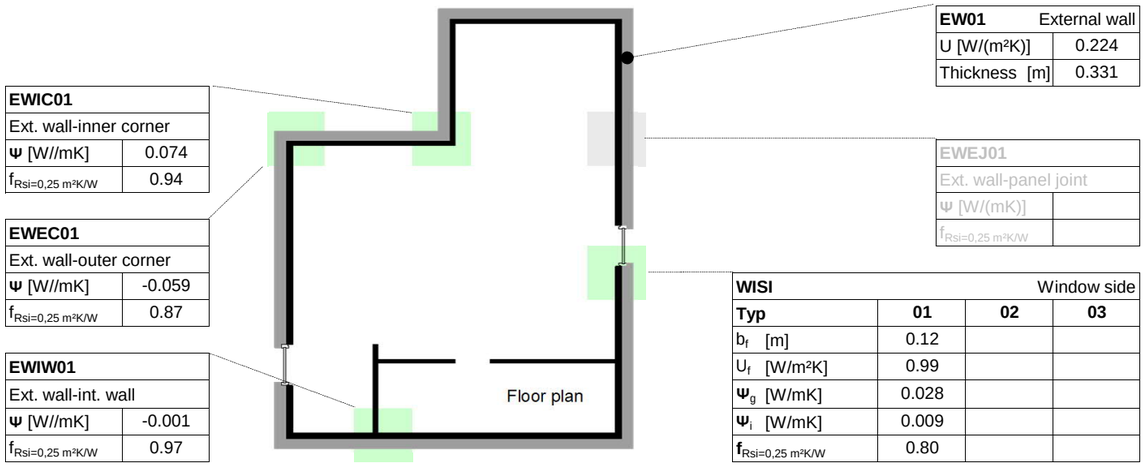
Airtightness concept

Airtightness of the system is achieved in the following way: windows and doors are installed with permanently elastic sealing materials and suitable airtight connection membranes and profiles. The airtight layer is located in the gypsum fibre board in the inner side of the sandwich panel. Joints between panels and connections with other building elements are sealed with Soudal Soudatight SP airtight paint.

Explanatory notes

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 strin-gent requirements. Their use might make economic sense in certain circumstances.

Thermal bridge not calculated
Criteria achieved
Efficieny criteria not achieved
Hygiene or comfort criterion not achieved



EWIC01	
Ext. wall-inner corner	
Ψ [W//mK]	0.074
$f_{Rsi=0,25\ m²K/W}$	0.94

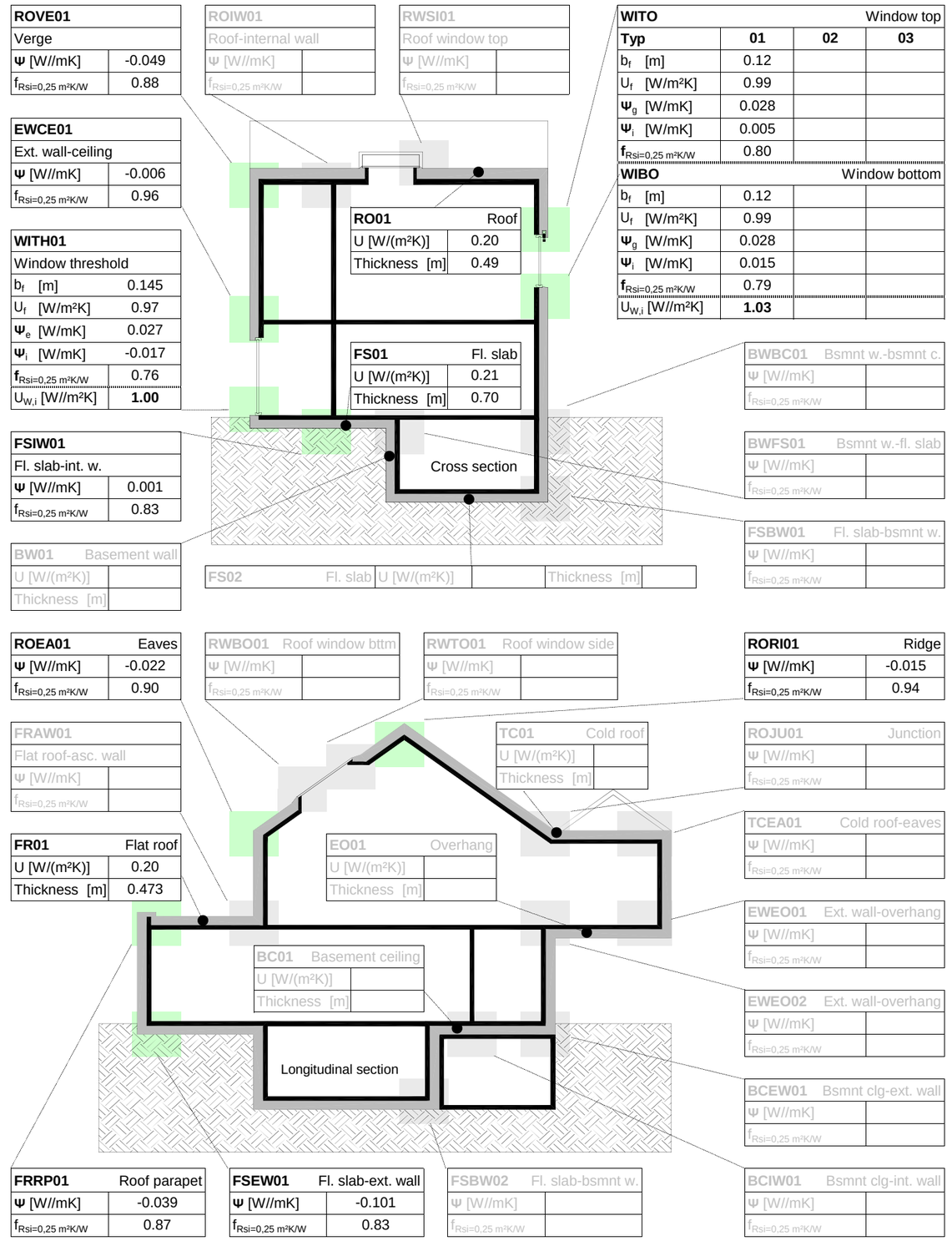
EWEC01	
Ext. wall-outer corner	
Ψ [W//mK]	-0.059
$f_{Rsi=0,25\ m²K/W}$	0.87

EWIW01	
Ext. wall-int. wall	
Ψ [W//mK]	-0.001
$f_{Rsi=0,25\ m²K/W}$	0.97

EW01	External wall
U [W/(m²K)]	0.224
Thickness [m]	0.331

EWEJ01	
Ext. wall-panel joint	
Ψ [W/(mK)]	
$f_{Rsi=0,25\ m²K/W}$	

WISI	Window side		
Typ	**01**	**02**	**03**
b_f [m]	0.12		
U_f [W/m²K]	0.99		
Ψ_g [W/mK]	0.028		
Ψ_i [W/mK]	0.009		
$f_{Rsi=0,25\ m²K/W}$	0.80		



ROVE01	
Verge	
Ψ [W//mK]	-0.049
$f_{Rsi=0,25\ m²K/W}$	0.88

ROIW01	
Roof-internal wall	
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

RWSI01	
Roof window top	
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

WITO	Window top		
Typ	**01**	**02**	**03**
b_f [m]	0.12		
U_f [W/m²K]	0.99		
Ψ_g [W/mK]	0.028		
Ψ_i [W/mK]	0.005		
$f_{Rsi=0,25\ m²K/W}$	0.80		

WIBO	Window bottom		
b_f [m]	0.12		
U_f [W/m²K]	0.99		
Ψ_g [W/mK]	0.028		
Ψ_i [W/mK]	0.015		
$f_{Rsi=0,25\ m²K/W}$	0.79		
$U_{W,i}$ [W//m²K]	**1.03**		

EWCE01	
Ext. wall-ceiling	
Ψ [W//mK]	-0.006
$f_{Rsi=0,25\ m²K/W}$	0.96

RO01	Roof
U [W/(m²K)]	0.20
Thickness [m]	0.49

WITH01	
Window threshold	
b_f [m]	0.145
U_f [W/m²K]	0.97
Ψ_e [W/mK]	0.027
Ψ_i [W/mK]	-0.017
$f_{Rsi=0,25\ m²K/W}$	0.76
$U_{W,i}$ [W//m²K]	**1.00**

FS01	Fl. slab
U [W/(m²K)]	0.21
Thickness [m]	0.70

BWBC01	Bsmnt w.-bsmnt c.
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

FSIW01	
Fl. slab-int. w.	
Ψ [W//mK]	0.001
$f_{Rsi=0,25\ m²K/W}$	0.83

BWFS01	Bsmnt w.-fl. slab
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

FSBW01	Fl. slab-bsmnt w.
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

BW01	Basement wall
U [W/(m²K)]	
Thickness [m]	

FS02	Fl. slab	U [W/(m²K)]		Thickness [m]	

ROEA01	Eaves
Ψ [W//mK]	-0.022
$f_{Rsi=0,25\ m²K/W}$	0.90

RWBO01	Roof window bttm
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

RWTO01	Roof window side
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

RORI01	Ridge
Ψ [W//mK]	-0.015
$f_{Rsi=0,25\ m²K/W}$	0.94

FRAW01	
Flat roof-asc. wall	
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

TC01	Cold roof
U [W/(m²K)]	
Thickness [m]	

ROJU01	Junction
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

FR01	Flat roof
U [W/(m²K)]	0.20
Thickness [m]	0.473

EO01	Overhang
U [W/(m²K)]	
Thickness [m]	

TCEA01	Cold roof-eaves
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

EWEO01	Ext. wall-overhang
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

BC01	Basement ceiling
U [W/(m²K)]	
Thickness [m]	

EWEO02	Ext. wall-overhang
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

BCEW01	Bsmnt clg-ext. wall
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

FRRP01	Roof parapet
Ψ [W//mK]	-0.039
$f_{Rsi=0,25\ m²K/W}$	0.87

FSEW01	Fl. slab-ext. wall
Ψ [W//mK]	-0.101
$f_{Rsi=0,25\ m²K/W}$	0.83

FSBW02	Fl. slab-bsmnt w.
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	

BCIW01	Bsmnt clg-int. wall
Ψ [W//mK]	
$f_{Rsi=0,25\ m²K/W}$	