CERTIFICATE

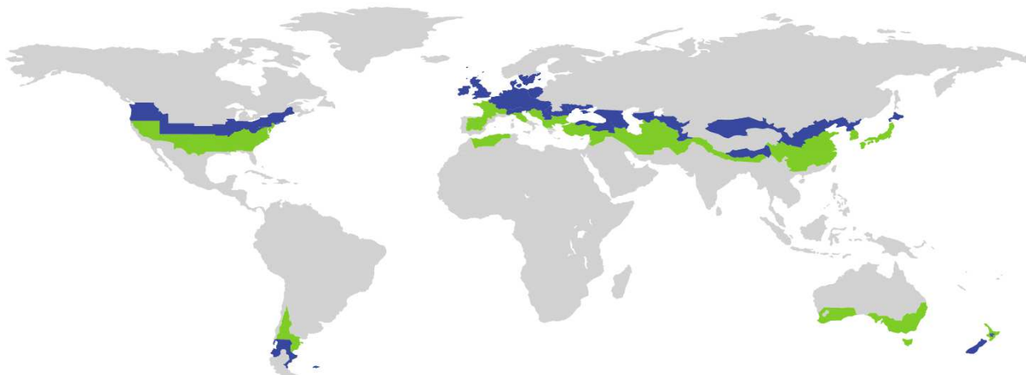
Certified Passive House Component

ID: 1170cs03 valid until 31. December 2018

Passive House Institute
Dr. Wolfgang Feist
64342 Darmstadt
GERMANY

Aditional thermal bridges

Name	Thermal bridge	f_{Rsi}	Description
EWPA01	X= 0,001 W/K	0,96	Steel fastening screw through external wall build-up



Category **Construction system | Lightweight timber construction**
Manufacturer **Phoenix Haus**
Colorado 81505
UNITED STATES OF AMERICA
Product name **The Alpha System**

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

Hygiene criterion

The minimum temperature factor of the interior surfaces is $f_{Rsi=0,25m^2K/W} \geq$ **0,70**

Comfort criterion

The U-value of the installed windows is $U_{W,i} \leq$ **0,85** W/(m²K)

Efficiency criteria

Heat transfer coefficient of building envelope	$U*f_{PHI} \leq$	**0,15** W/(m²K)
Temperature factor of opaque junctions	$f_{Rsi=0,25m^2K/W} \geq$	**0,86**
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

cool, temperate climate

CERTIFIED COMPONENT
Passive House Institute

Phoenix Haus
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Opaque building envelope

The Phoenix Haus Alpha System is a lightweight timber frame construction system, insulated with cellulose (0,040 W/mK), mineral wool (0,040 W/mK) and wood fiber (0,042 W/mK). The system uses solid timber supports for the external walls and timber I-beams for the roof construction.

The system is intended to be used with a ventilated rainscreen to the exterior; steel fastenings through the exterior insulation have been taken into account in the U-value calculation by means of 3D thermal simulation.

The system has been designed to meet the Passive House Institute criteria for opaque components in the cool-temperate climate zone, and is also suitable for use in the warm-temperate zone.

Windows

Analysis was undertaken using Pro Passivhausfenster GmbH 'Smartwin Compact' timber-aluminum frame, featuring a SuperSpacer Tri-Seal spacer and polysulfide secondary seal. Two window installation types have been calculated, '01' refers to the standard window installation, '02' refers to the glazed door installation, with the installed U-value displayed in the 'window threshold' section.

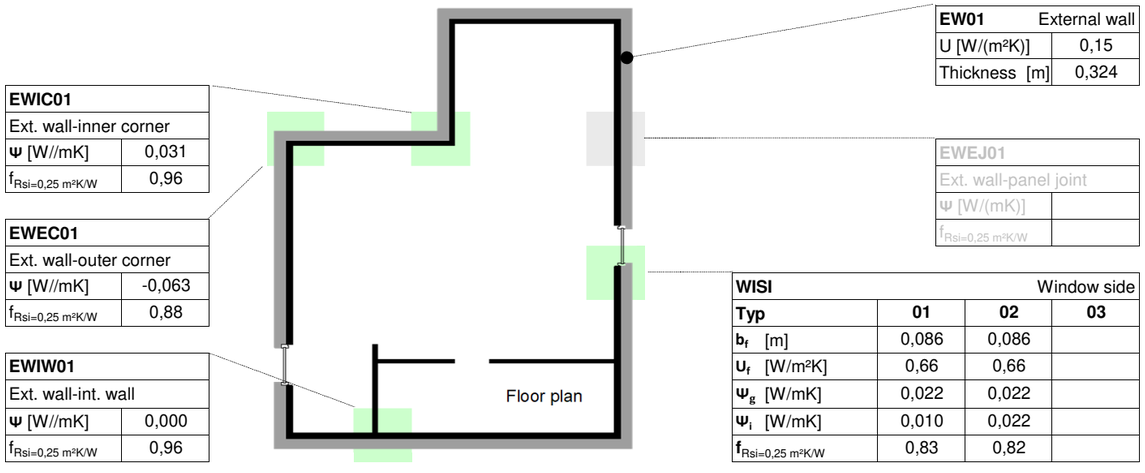
Airtightness concept

The airtightness of the construction system is achieved through the use of an airtight membrane (Intello Plus), fixed to the inside of the supporting joists and behind the service cavity. Joints are secured with specialist air tightness tape (Tescon Vana). The system also includes a wind- and waterproof membrane, fixed to the outside of the wood fiber insulation, with joints secured as above.

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 stringent 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]	0,031
$f_{Rsi=0,25\ m^2K/W}$	0,96

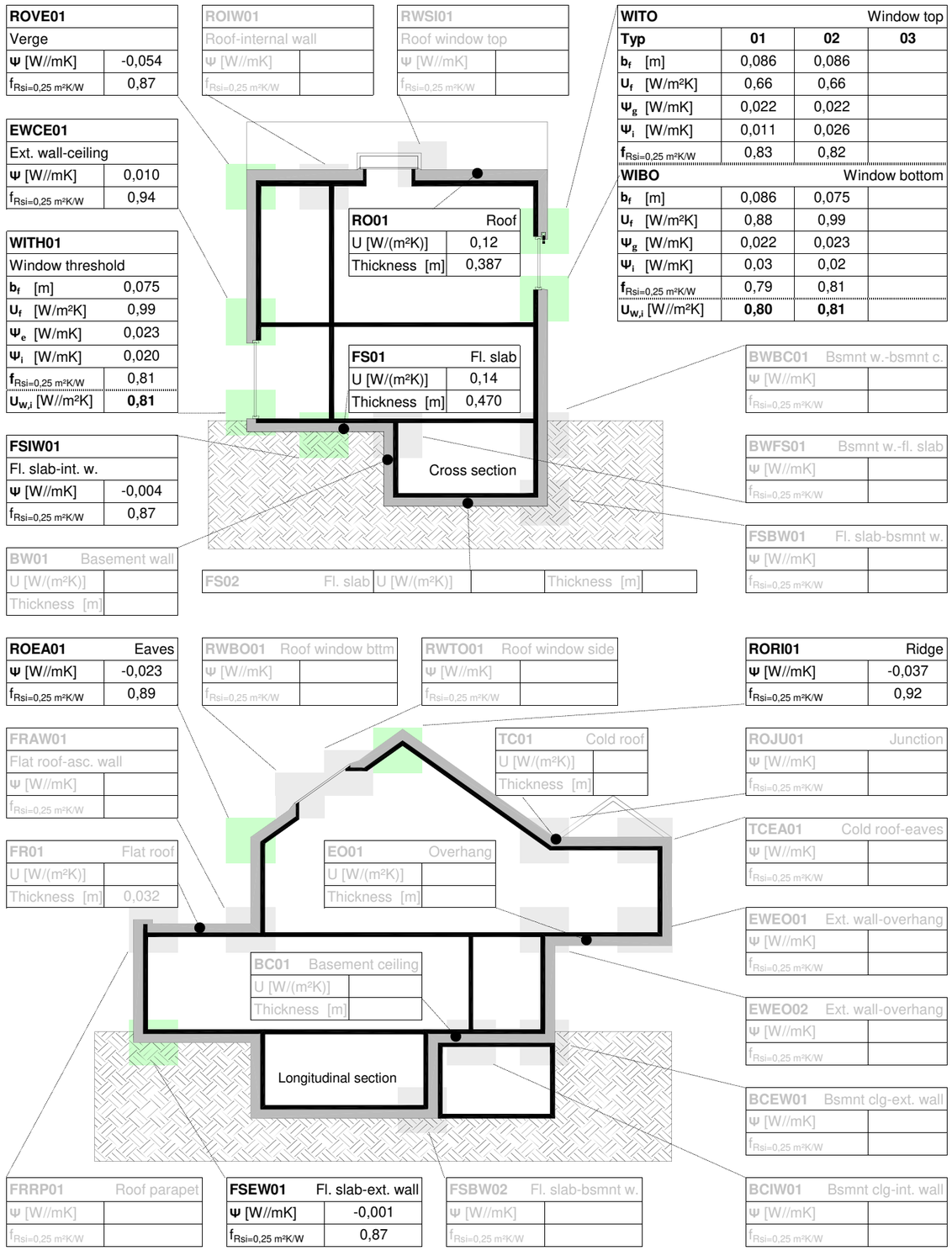
EWEC01	
Ext. wall-outer corner	
Ψ [W//mK]	-0,063
$f_{Rsi=0,25\ m^2K/W}$	0,88

EWIW01	
Ext. wall-int. wall	
Ψ [W//mK]	0,000
$f_{Rsi=0,25\ m^2K/W}$	0,96

EW01	External wall
U [W/(m²K)]	0,15
Thickness [m]	0,324

EWEJ01	
Ext. wall-panel joint	
Ψ [W/(mK)]	
$f_{Rsi=0,25\ m^2K/W}$	

WISI			Window side
Typ	**01**	**02**	**03**
b_f [m]	0,086	0,086	
U_f [W/m²K]	0,66	0,66	
Ψ_g [W/mK]	0,022	0,022	
Ψ_i [W/mK]	0,010	0,022	
$f_{Rsi=0,25\ m^2K/W}$	0,83	0,82	



ROVE01	
Verge	
Ψ [W//mK]	-0,023
$f_{Rsi=0,25\ m^2K/W}$	0,89

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

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

EWCE01	
Ext. wall-ceiling	
Ψ [W//mK]	0,010
$f_{Rsi=0,25\ m^2K/W}$	0,94

WITH01	
Window threshold	
b_f [m]	0,075
U_f [W/m²K]	0,99
Ψ_e [W/mK]	0,023
Ψ_i [W/mK]	0,020
$f_{Rsi=0,25\ m^2K/W}$	0,81
$U_{w,i}$ [W//m²K]	**0,81**

RO01	Roof
U [W/(m²K)]	0,12
Thickness [m]	0,387

FS01	Fl. slab
U [W/(m²K)]	0,14
Thickness [m]	0,470

FSIW01	
Fl. slab-int. w.	
Ψ [W//mK]	-0,004
$f_{Rsi=0,25\ m^2K/W}$	0,87

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

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

WITO			Window top
Typ	**01**	**02**	**03**
b_f [m]	0,086	0,086	
U_f [W/m²K]	0,66	0,66	
Ψ_g [W/mK]	0,022	0,022	
Ψ_i [W/mK]	0,011	0,026	
$f_{Rsi=0,25\ m^2K/W}$	0,83	0,82	

WIBO			Window bottom
b_f [m]	0,086	0,075	
U_f [W/m²K]	0,88	0,99	
Ψ_g [W/mK]	0,022	0,023	
Ψ_i [W/mK]	0,03	0,02	
$f_{Rsi=0,25\ m^2K/W}$	0,79	0,81	
$U_{w,i}$ [W//m²K]	**0,80**	**0,81**	

BWBC01	Bsmnt w.-bsmnt c.
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

BWFS01	Bsmnt w.-fl. slab
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

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

ROEA01	Eaves
Ψ [W//mK]	-0,023
$f_{Rsi=0,25\ m^2K/W}$	0,89

RWBO01	Roof window bttm
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

RWTO01	Roof window side
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

RORI01	Ridge
Ψ [W//mK]	-0,037
$f_{Rsi=0,25\ m^2K/W}$	0,92

FRAW01	
Flat roof-asc. wall	
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

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

ROJU01	Junction
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

FR01	Flat roof
U [W/(m²K)]	
Thickness [m]	0,032

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

TCEA01	Cold roof-eaves
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

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

EWEO01	Ext. wall-overhang
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

EWEO02	Ext. wall-overhang
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

BCEW01	Bsmnt clg-ext. wall
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

FRRP01	Roof parapet
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

FSEW01	Fl. slab-ext. wall
Ψ [W//mK]	-0,001
$f_{Rsi=0,25\ m^2K/W}$	0,87

FSBW02	Fl. slab-bsmnt w.
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	

BCIW01	Bsmnt clg-int. wall
Ψ [W//mK]	
$f_{Rsi=0,25\ m^2K/W}$	