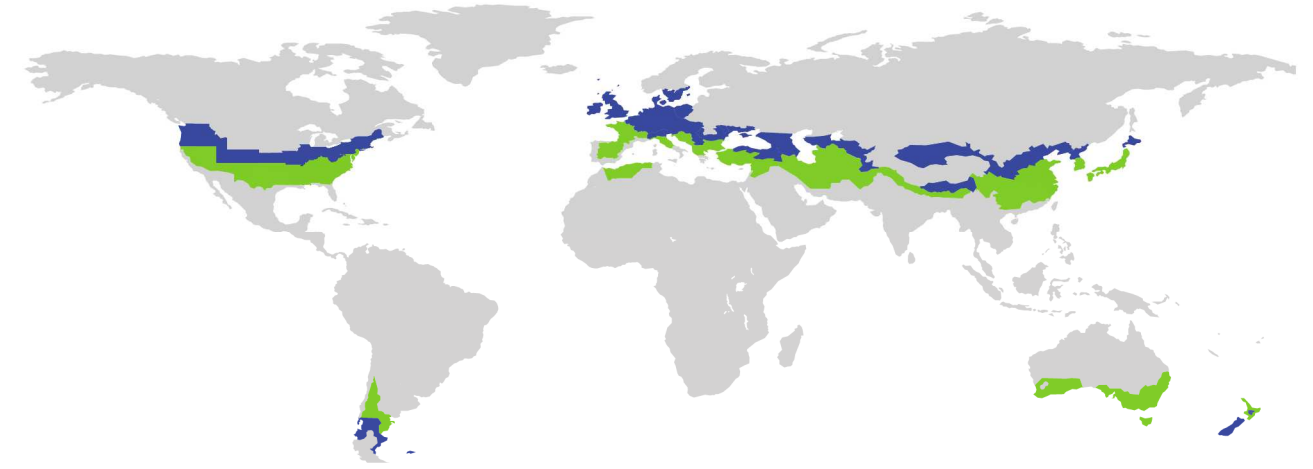


# CERTIFICATE

Certified Passive House Component

ID: 0831ws03 valid until 31. December 2017

Passive House Institute  
Dr. Wolfgang Feist  
64342 Darmstadt  
GERMANY



Category **Construction system | Lightweight timber Construction**  
Manufacturer **pro Passivhausfenster GmbH  
Oberaudorf  
GERMANY**  
Product name **smartshell timberframe E**

**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

$$U_{w,i} \leq 0.85 \text{ W}/(\text{m}^2\text{K})$$

### Efficiency criteria

Heat transfer coefficient of building envelope

$$U \cdot f_{PHI} \leq 0.15 \text{ W}/(\text{m}^2\text{K})$$

Temperaturfactor of opaque junctions

$$f_{Rsi=0,25m^2K/W} \geq 0.86$$

Thermal bridge free design for key connection details

$$\Psi \leq 0.01 \text{ W}/(\text{m}^2\text{K})$$

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



### Opaque building envelop

The construction system is built on a concrete floor slab supported completely with EPS insulation. The timber frame walls are constructed with studs at 60cm centres with OSB fixed on the inside and wood fibre board and breather membrane fixed to the outside. The service cavity is formed with 47x47mm battens with mineral insulation between and gypsum board on the room side. The rain-screen cladding is fixed on battens which are fixed through to the timber studs. The upper floors are formed with metal web joists with OSB deck and gypsum screed. The roof construction is formed with rafters at 60cm spacings with cellulose insulation between, breather membrane above with battens and roof tiles. An airtightness membrane is fitted below with cross battens and gypsum board over.

### Windows

The certification was done with the window smart-win solar i, which is a very slim pA-class window with triple 18 mm argon glazing, Swisspacer Ulti-mate spacer bar with PU secondary seal. A special feature of smatwin solar i is, that the reveal be-comes part of the windows frame. In No. 01, the window is installed at the outer wood-fibre board. In No. 02, it is installed deeper in the wall, see certification report.

### Airtightness concept

The airtightness layer in the walls is OSB board. The OSB boards are sealed together and to the windows with an air-tightness tape. The OSB board must be of sufficient air-tightness. An airtightness membrane is fitted to the ceiling with air-tightness tape at all junctions and connections.

### 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. This use might make sense in certain circumstances.

Thermal bridge not calculated  
Criteria achieved

Efficiency criteria not achieved  
Hygiene- or comfort criterion not achieved

