

# CERTIFICATE

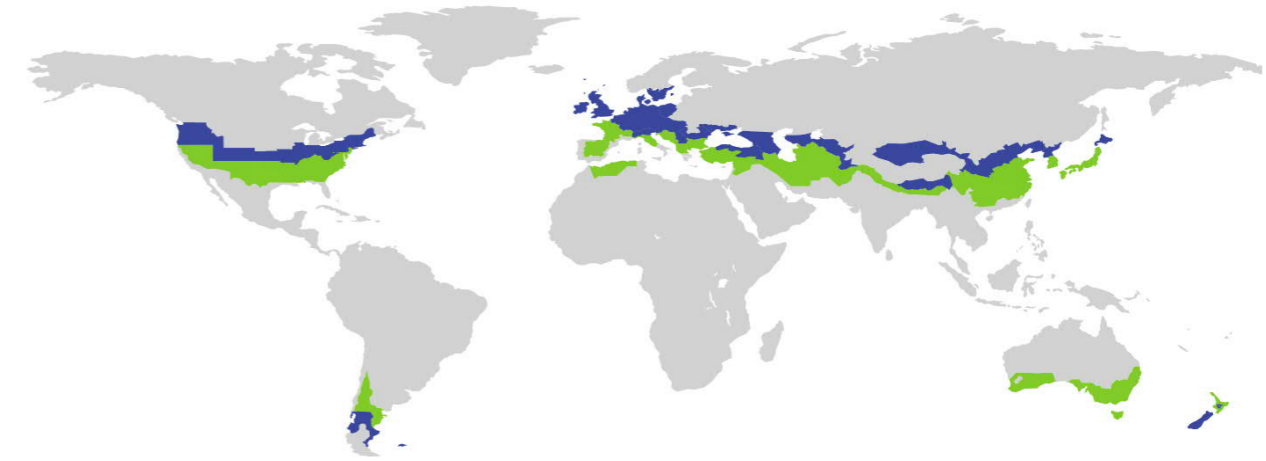
Certified Passive House Component

ID: 1380cs03 valid until 31. December 2021

Passive House Institute  
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## Additional thermal bridges

Name	Thermal bridge	$f_{Rsi}$	Description
TCEA02	$\Psi = -0,05 \text{ W}/(\text{mK})$	0,90	Cold roof to external wall



Category	<b>Construction system   Steel construction</b>
Manufacturer	<b>Weifang Tailai Steel Structure Engineering Co., Ltd. Shandong Province, CHINA</b>
Product name	<b>Light Steel Construction System</b>

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  $f_{Rsi=0,25\text{m}^2\text{K/W}} \geq 0,70$

### 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  $U \cdot f_{PHI} \leq 0,15 \text{ W}/(\text{m}^2\text{K})$

Temperature factor of opaque junctions  $f_{Rsi=0,25\text{m}^2\text{K/W}} \geq 0,86$

Thermal bridge-free design for key connection details  $\Psi \leq 0,01 \text{ W}/(\text{mK})$

An airtightness concept for all components and connection details was provided

cool, temperate climate



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COMPONENT**

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**Opaque building envelope**

With the Light Steel Construction System the wintertime thermal insulation of buildings can be ensured. The system is constructed out of lightweight steel profiles, connected using timber/OSB connectors. The assembly is insulated to the outside and within the service cavity using mineral wool (<math>\leq 0,04 \text{ W/mK}</math>) and with EPS (<math>\leq 0,035 \text{ W/mK}</math>) to the interior. For the purpose of certification, a number of three-dimensional simulations were carried out to determine the effective thermal conductivity of insulation plus steel profiles where these create regularly occurring or point thermal bridges. The certification does not take into account point thermal bridges caused by structural columns or e.g. balcony connections, which will need to be assessed separately. As investigated, the system is deemed suitable for passive houses in the cool-temperate climate zone, as both the regular U-values of the exterior components are below  $0,15 \text{ W/m}^2\text{K}$  and the connections meet the criteria of 'thermal bridge free'. The surface temperature of all connections (with the exception of window connections) meet the surface temperature requirements.

**Windows**

For the purposes of certification a standard passive house window (Veka Pkastics Shanghai Ltd. Softline 82 MD PSR,  $U_w = 0,80 \text{ W/m}^2\text{K}$  with  $U_g = 0,70 \text{ W/m}^2\text{K}$ ) 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  $0,05 \text{ W/m}^2\text{K}$  greater than the  $U_w$  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 interior of exterior wall surfaces are plastered over the entire surface, down to the unfinished floor and up to the unfinished ceiling. The interior of external walls for lightweight construction are covered over to the interior with continuous airtight membranes, with joints sealed using suitable airtightness tape.

**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

Efficiency criteria not achieved  
Hygiene or comfort criterion not achieved

