

Note: Currently certificates are only being issued for the climate regions arctic, cold, cool-temperate, warm-temperate and warm.

1 Preface

On account of the fact that it is possible to dispense with a separate heating system in Passive House buildings, stringent demands apply for the quality of the components that are used. Besides an excellent standard of thermal insulation, a high level of airtightness, highly efficient ventilation heat recovery and Passive House windows, the absence of thermal bridges at the thermal envelope is of utmost importance for the proper functioning of a Passive House building. The Passive House Institute has launched the "Certified Passive House Component – Façade Anchor" and the "Certified Passive House Component - Corbel" seal in order to define a reliable standard in this regard.

2 Temperature criterion

Thermal bridges are weak points in the thermal envelope of the building. These weak points result in a higher heat flow and a lower temperature of the interior surface of the relevant building component associated with this. Surface temperatures that are too low may impair comfort and also cause high relative humidity and therefore increase the risk of mould and structural damage.

In order to prevent these effects, the temperature of the interior surface must not fall below 17 °C at any point (see Section 5 for boundary conditions):

$$\theta_{Si,min} \geq 17 \text{ °C}$$

Alternatively:

**Proof using the temperature factor and thermal resistance $R_{Si} = 0.25 \text{ m}^2\text{K/W}$
according to Table 1 for the respective climate zone.**

The minimum surface temperatures are stated in the certificates.

3 Energy criterion

The assessment and quantification of thermal bridges is decisive for the correct energy balance of a specific building. The Passive House Institute therefore indicates the

thermal bridge coefficients of certified components in the certificates as a major part of the investigations.

However, the specific value is given as the load class dependent efficiency value Eff_{fa} [W/kN.K], which gives a practicable parameter for the preliminary project planning of Passive House buildings, and the more universal delta U-value (ΔU [W/(m².K)]) for a reference façade of an example building (see Reference Façade in Section 6).

Here, ΔU is the additional heat loss which results from the use of the facade anchors of the example building. Façade anchors which allow for a higher load-bearing capacity are granted higher thermal bridge coefficients here because these enable greater flexibility of project planning and implementation.

Table 1 - Requirement values

Climate zone	Hygiene criterion	Temperature criterion	Efficiency	
	$f_{\text{Rsi}} = 0.25 \text{ m}^2.\text{K/W} \geq^3$	Purely opaque details $f_{\text{Rsi}} = 0.25 \text{ m}^2.\text{K/W} \geq^3$	U-value of external component without thermal bridge $U_{\text{opak}} * f_{\text{R PHI}} \leq$	Eff. _{fa} (Specific load-dependent heat loss)
	[-]	[-]	[W/(m ² .K)]	[W/(kN.K)]
1 Artic	0.80	0.90	0.09	0.200
2 Cold	0.75	0.88	0.12	
3 Cool temperate	0.70	0.86	0.15	
4 Warm temperate	0.65	0.82	0.25	
5 Warm	0.55	0.74	0.50	
6 Hot	None	0.74	0.50	
7 Very hot	None	0.82	0.25	
³ $f_{\text{Rsi}} = 0.25 \text{ m}^2.\text{K/W}$, in a cool-temperate climate, the temperature criterion can also be met by achieving a minimum surface temperature of 17 °C under standard conditions (see the table of thermal resistance values in Section 5)				

Definition of “Certified Passive House Component – Façade Anchor”





The Certified Passive House Component – Façade Anchor seal may be granted for a construction in an external surface if the total of the thermal bridges of the relevant component (façade anchors in this case) divided by the area of the component (the façade area of the reference building in this case) and the area-specific weight of the façade cladding and sub-construction is less than or equal to 0.200 W/(kN.K):

$$\frac{\left(\frac{\sum(\Psi_j \cdot l) + \sum\chi_j}{A} \right)}{G} \leq 0,200 \text{ W / (kNK)}$$

where:

- Ψ thermal bridge coefficient (linear thermal bridge) [W/(m.K)]
- l length of thermal bridge [m]
- χ thermal bridge coefficient (point thermal bridge) [W/K]
- A reference area (e.g. exterior wall, roof...) [m²]
- j index over corresponding elements in the relevant area
- G dead load of the façade cladding and the sub-construction [kN/m²]

Table 2 - Passive House efficiency classes for facade anchors

Efficiency class	Requirement	Designation
	< 0.200 W/(kN.K)	certifiable component
	< 0.070 W/(kN.K)	basic component
	< 0.030 W/(kN.K)	advanced component
	< 0.010 W/(kN.K)	very advanced component

The limit values always refer to specific building components which are used in the customary manner in a building. In each case the thermal bridges should be included in the energy balance.

If the effective heat transfer coefficient (undisturbed heat transfer coefficient of the reference situation + thermal bridge addition coefficient of the facade anchors) exceeds the recommended reference value for the respective climate, the necessary additional insulation thickness for compensation is specified on the certificate).

Note: The class phA+ can only be achieved with a $\Delta U < 0.01 \text{ W/(m}^2\text{.K)}$.

In addition to facade anchors for ventilated façades, brackets and rail systems for double-skin masonry constructions can also be certified. The requirement values are identical.

4 Airtightness

Proof of airtightness of the connection detail and its practicability should be provided.

5 Boundary conditions and calculation of characteristic values

Outdoor temperature: -10 °C

Heat transmission resistance outside: 0.04 m².K/W; 0.13 m².K/W with rear-ventilated façade

Interior temperature: 20 °C

Heat transmission resistance inside: 0.13 m².K/W

The characteristic values are calculated using three-dimensional heat flow simulations.

The following reference wall build-up is used for certification:

Rear-ventilated façade; alternatively masonry with rear ventilation






Insulation thickness, climate dependent (0.035 W/(m.K)) see Table 3

Concrete wall 175 mm

Interior plaster 15 mm

The climate zone applicable for the certification is based on the location of the manufacturer; a manufacturer may also hold certificates which exceed the requirements of the respective climate zone.

Table 3 - Wall construction of the reference façades

Climate zone	U-value reference façade [W/(m ² .K)]	Insulation thickness [mm]
 arctic climate CERTIFIED COMPONENT Passive House Institute	0.09	380
 cold climate CERTIFIED COMPONENT Passive House Institute	0.12	280
 cool, temperate climate CERTIFIED COMPONENT Passive House Institute	0.14	240
 warm, temperate climate CERTIFIED COMPONENT Passive House Institute	0.26	120
 warm climate CERTIFIED COMPONENT Passive House Institute	0.48	60

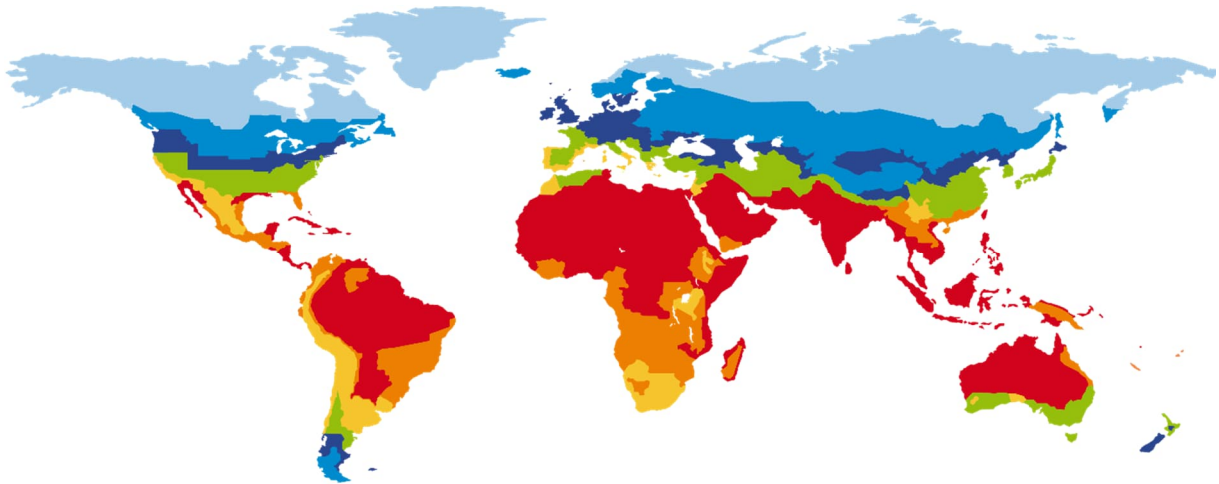


Figure 1 - Demarcation of regions with identical requirements

6 Reference façade

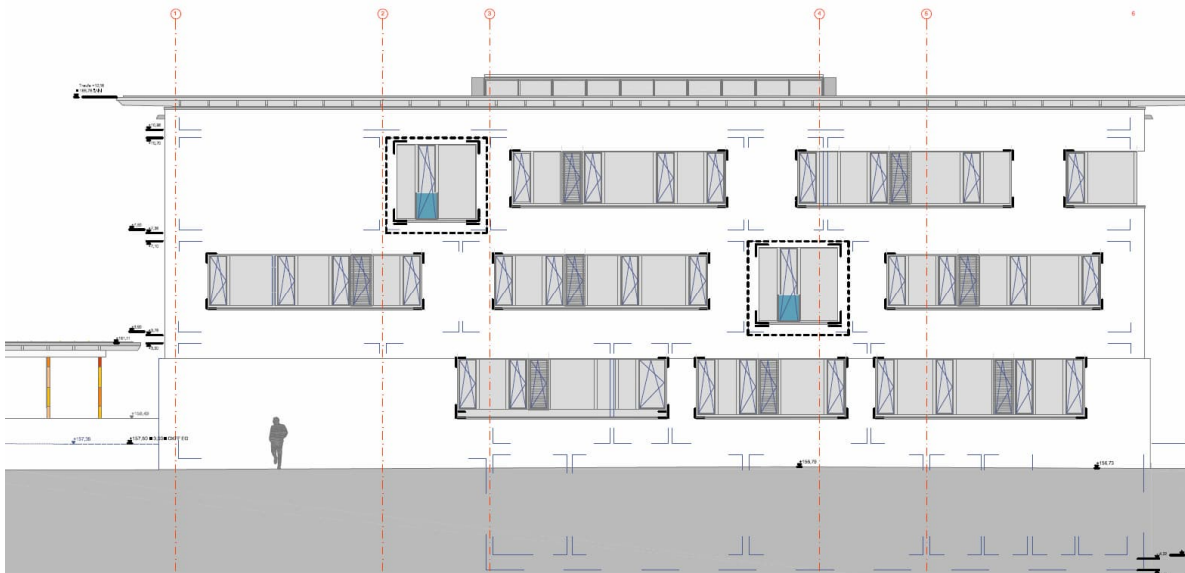


Figure 2 - Reference façade

A layout drawing shall be submitted for the shown façade. This will take into account the configuration of the wall build-up (see Section 5). Furthermore, proof of the load capacity and suitability in accordance with the established rules and norms shall be provided by the manufacturer.

For this, a structural analysis shall be submitted for the reference façade specifying the design load case taking into account the respective façade weight of the selected façade cladding with the sub-construction.

The layout drawing must be prepared for the entire façade and must contain the depiction and calculation of all sliding and fixed points.

Fasteners for the double-skin masonry must be taken into account.

The plate format and choice of sub-construction is left to the certificate applicant to decide.

Orientation of the façade: SE

Wind zone 1 (EN 1991)

Wind speed v_{ref} (m/s): 22.5 m/s

Velocity pressure q_{ref} (kN/m²): 0.32 kN/m²

Terrain category 3: regions with uniform vegetation or buildings or with single objects at distances of less than 20 times the height of hindrances (e.g. villages, suburban development, woodlands).

7 Load class calculation

Using the provided documents for assessment of the load capability taking into account the chosen façade cladding and the respective sub-construction, classification into different load classes will be carried out based on the layout drawings. The energy criterion for at least one load class must be complied with. If suitability for load classes of greater façade weights is verified, the component will also meet the requirements for a Certified Passive House Component for a lower load class standard.

If no information is provided regarding the dead load of the sub-construction, this will be assumed to be 0.02 kN/m².

Load Class 1: dead load of cladding & sub-construction ≤ 0.10 kN/m²

(e.g. aluminium sandwich panel with plastic core, corrugated aluminium sheet)

Load Class 2: dead load of cladding & sub-construction ≤ 0.15 kN/m²

(e.g. synthetic materials)

Load Class 3: dead load of cladding & sub-construction ≤ 0.20 kN/m²

(e.g. fibre cement panel)

Load Class 4: dead load of cladding & sub-construction ≤ 0.25 kN/m²

(e.g. acrylic glass)

Load Class 5: dead load of cladding & sub-construction ≤ 0.30 kN/m²

(e.g. ceramic, concrete)

Load Class 6: dead load of cladding & sub-construction > 0.30 kN/m²

(e.g. marble, stone façades)

8 Documents to be submitted

Phase 1:

- Construction drawings in dwg/dxf format
- 3D model of the sliding points and fixed points in ACIS (.sat) format from self-contained solids

Dateiformat:

ACIS

Ausgabe als

☒ Volumenkörper-/Oberflächengeometrie

☐ 3D-Kurven

☐ Skizzenelemente exportieren

Version: 5,0

Einheit: Millimeter

☒ Flächen-/Kanteneigenschaften exportieren

☒ Periodische Flächen trennen

☐ Mehrkörper-Teil in einen einzelnen ACIS-Körper schreiben

- Information relating to assembly/installation instructions stating the fastening elements
- Proof of thermal conductivities (rated values)
- Approval papers

Phase 2:

- Layout drawings for the reference façade
- Information about the size of the panel/plate, sub-construction and cladding
- Structural analysis for the respective load class

9 Certification procedure

The certification criteria and calculation regulations for Passive House-suitable opaque components come into full effect with the publication of this document. With the implementation of these regulations, the previous criteria lose their validity. Previously issued certificates retain their protection. The conversion of old certificates is done upon request and commissioning. Layout adjustments with only seal modifications are free of charge; new calculations are subject to a fee. The Passive House Institute reserves the right to make future changes.

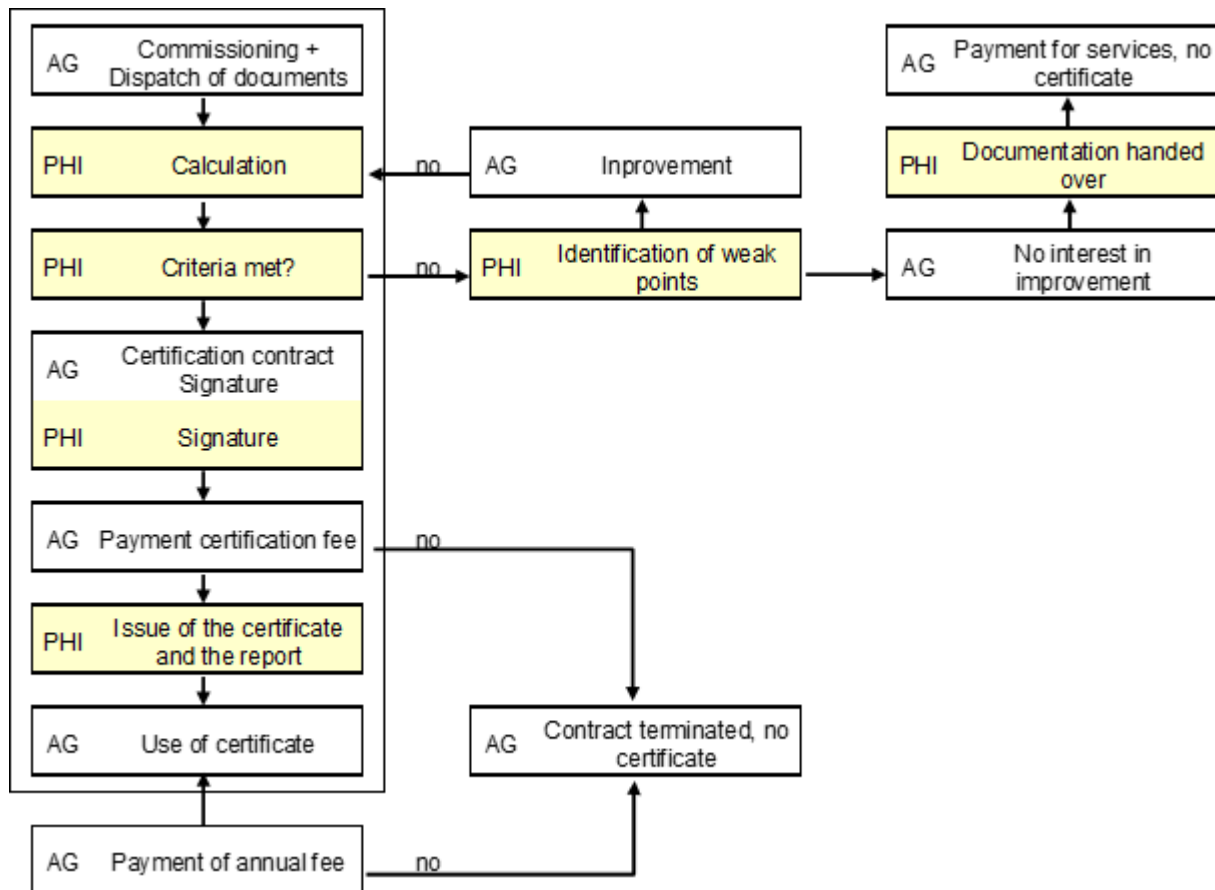


Figure 3 - Certification procedure

Certificate (upon successful certification process, payment of the annual fee, and submission of the signed, stamped, and dated contractual documents regarding the general terms and conditions and use of the component seal):

Issuance of the certificate by the Passive House Institute. Presentation of the certified product in the institute's component database and in the Passive House Planning Package (PHPP) database, as well as in the newsletters of the iPHA and IG Passivhaus networks, and provision of the component seal as a vector graphic.