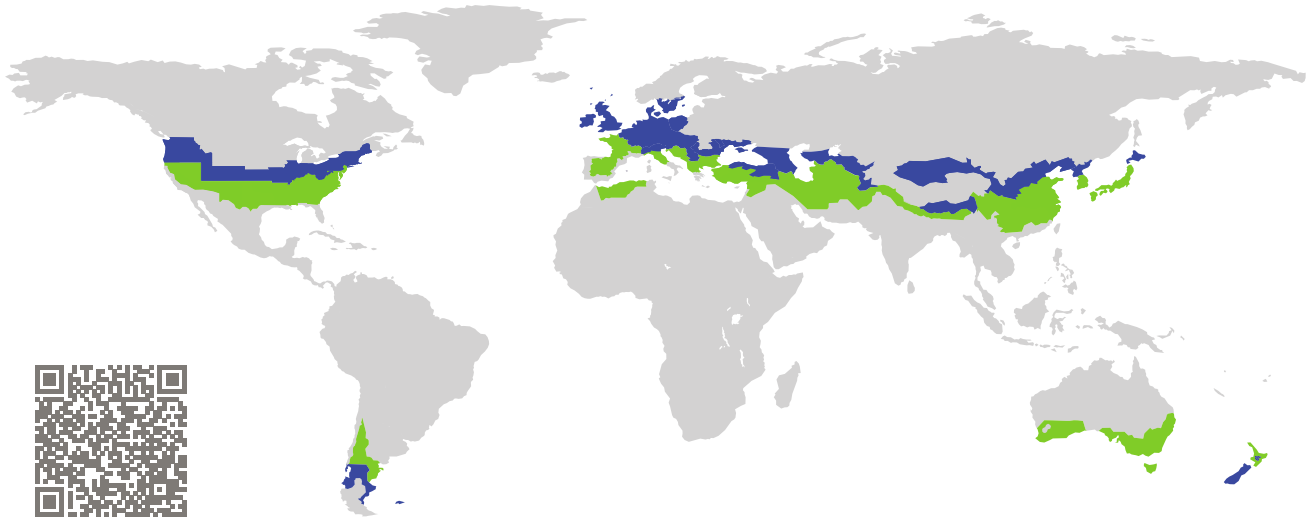


# CERTIFICATE

Certified Passive House Component

Component-ID 1022cw03 valid until 31st December 2018

Passive House Institute  
Dr. Wolfgang Feist  
64283 Darmstadt  
Germany



Category: **Curtain Wall**  
Manufacturer: **RAICO Bautechnik GmbH,  
Pfaffenhausen,  
Germany**  
Product name: **THERM+50 FS-I**

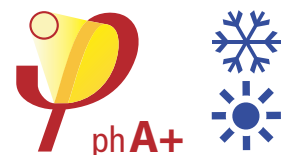
**This certificate was awarded based on the following  
criteria for the cool, temperate climate zone**

Comfort  $U_{CW} = 0.79 \leq 0.80 \text{ W}/(\text{m}^2 \text{ K})$   
 $U_{CW, \text{installed}} \leq 0.85 \text{ W}/(\text{m}^2 \text{ K})$   
with  $U_g = 0.70 \text{ W}/(\text{m}^2 \text{ K})$

Hygiene  $f_{Rsi=0.25} \geq 0.70$



cool, temperate climate



**CERTIFIED  
COMPONENT**

Passive House Institute

Passive House  
efficiency class

phE

phD

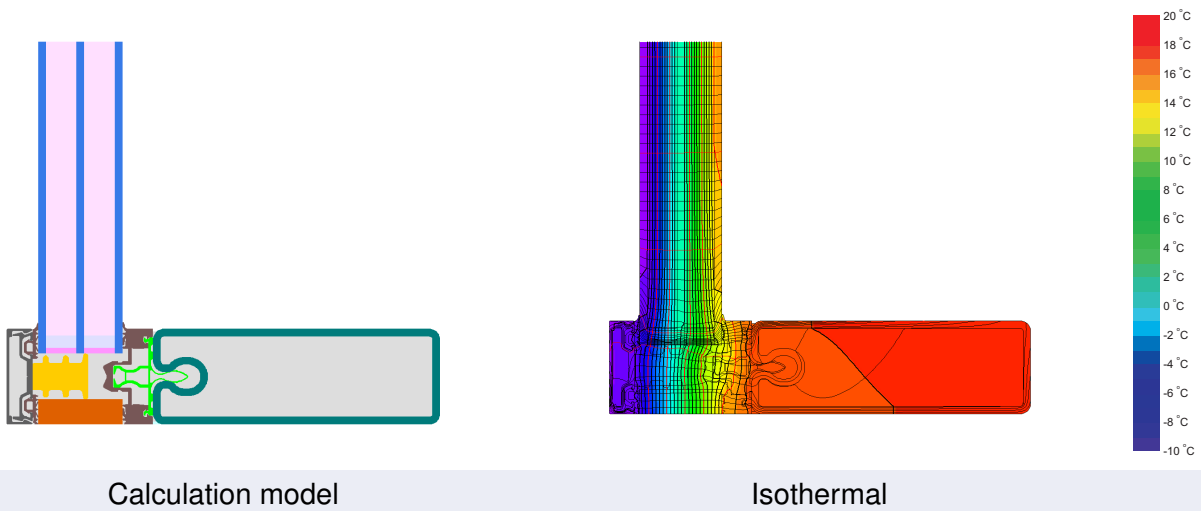
phC

phB

phA

phA+

[www.passivehouse.com](http://www.passivehouse.com)



Calculation model Isothermal

**Description**

Construction: Steel aluminum curtain wall with insulation inside the glazing rebate (0.038 W/(mK)) with aluminium foil applied on the inside. Pane thickness: 44 mm (4/16/4/16/4), rebate depth: 13 mm, spacer: SWISSPACER Ultimate. Different versions of pressureplate, coverstrip and insulating material are available and have been evaluated. These values can be provided by the system provider and the PHI on request.

**Explanation**







The element U-values were calculated for the test element size of 1.20 m × 2.50 m with  $U_g = 0.70 \text{ W}/(\text{m}^2 \text{ K})$ . If a higher quality glazing is used, the element U-values will improve as follows:

Glazing	$U_g =$	0.70	0.64	0.58	0.52	W/(m <sup>2</sup> K)
		↓	↓	↓	↓	
Element	$U_{CW}$	0.79	0.73	0.68	0.62	W/(m <sup>2</sup> K)

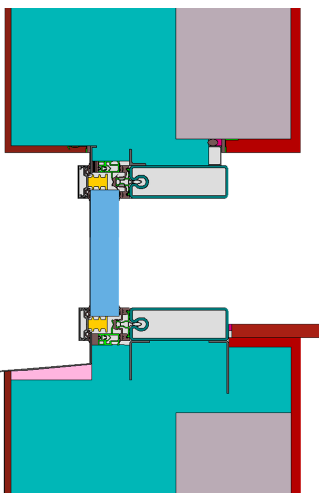
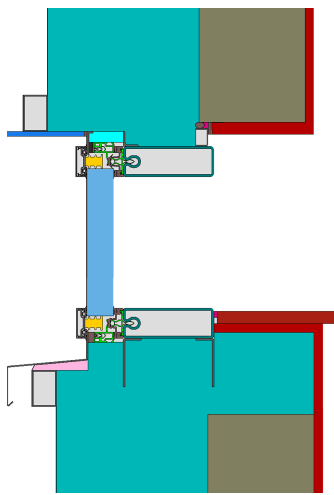
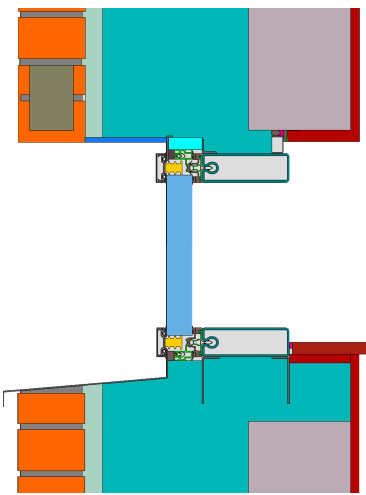
Transparent building components are sorted into efficiency classes depending on the heat losses through the opaque part. The frame U-Values, frame widths, thermal bridges at the glazing edge and the glazing edge lengths are included in these heat losses. A more detailed report of the calculations performed in the context of certification is available from the manufacturer.

The Passive House Institute has defined international component criteria for seven climate zones. In principle, components that have been certified for climate zones with higher thermal requirements may also be used in climates with less stringent requirements. In a particular climate zone it may make sense to use a component of a higher thermal quality which has been certified for a climate zone with more stringent requirements.

Further information relating to certification can be found on [www.passivehouse.com](http://www.passivehouse.com) and [passipedia.org](http://passipedia.org).

Frame values			Frame width $b_f$ mm	$U$ -value frame $U_f^1$ W/(m <sup>2</sup> K)	$\Psi$ -panel edge $\Psi_g$ W/(m K)	Temp. Factor $f_{Rsi=0.25}$ [-]
Top fixed	(tof)		50	0.78	0.030	0.78
Side fixed	(sf)		50	0.78	0.030	0.78
Bottom fixed	(bof)		50	0.78	0.030	0.78
Mullion fixed	(m)		50	0.90	0.031	0.78
Transom fixed	(tf)		50	0.93	0.030	0.78
Transom 1 casement	(t1)		90	1.07	0.028	0.68
Spacer: SWISSPACER Ultimate			Secondary seal: Polysulfide			
Thermal glass carrier bridge <sup>2</sup> $\chi_{GT} = 0.004$ W/K						

### Validated installations

Exterior insulation and finishing system (EIFS) (fixed glazed)		Ventilated facade (fixed glazing)		Cavity wall (fixed glazing)	
$U_{Wall} = 0.13$ W/(m <sup>2</sup> K)		$U_{Wall} = 0.13$ W/(m <sup>2</sup> K)		$U_{Wall} = 0.13$ W/(m <sup>2</sup> K)	
					
$\Psi_{install}$	W/(m K)	$\Psi_{install}$	W/(m K)	$\Psi_{install}$	W/(m K)
Top	0.044	Top	0.042	Top	0.043
Left	0.044	Left	0.042	Left	0.043
Right	0.044	Right	0.042	Right	0.043
Bottom	0.050	Bottom	0.054	Bottom	0.054
$U_{W,installed} = 0.84$ W/(m <sup>2</sup> K)		$U_{W,installed} = 0.84$ W/(m <sup>2</sup> K)		$U_{W,installed} = 0.84$ W/(m <sup>2</sup> K)	

<sup>1</sup> Includes  $\Delta U = 0.21$  W/(m<sup>2</sup> K). Determined through 3D - FEM Simulation

<sup>2</sup> Determined through 3D - FEM Simulation . Glass carrier type : Non-Metallic

