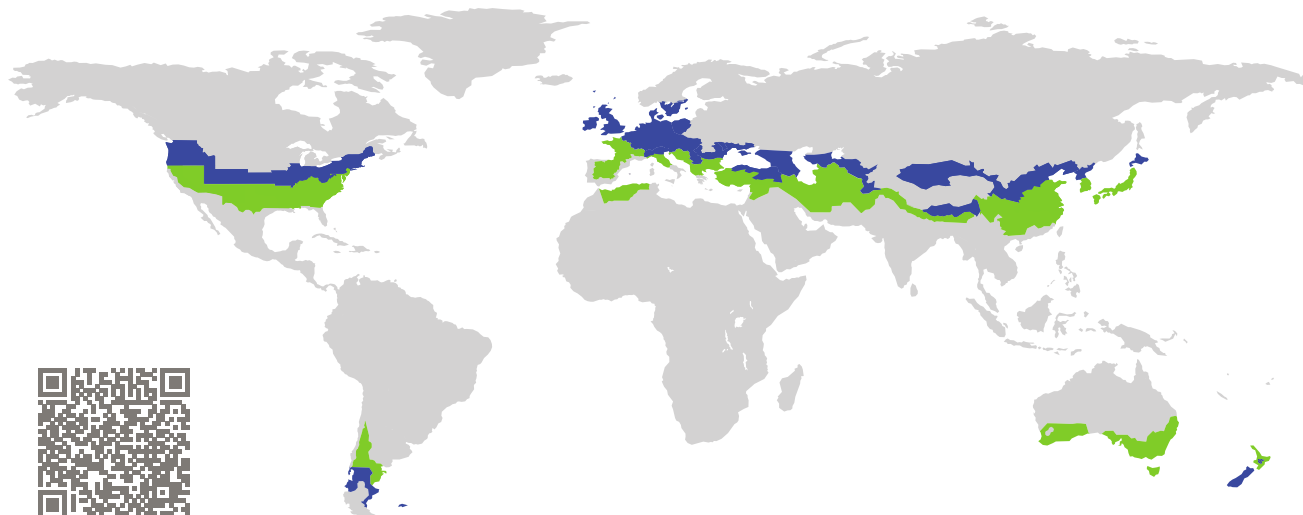


# CERTIFICATE

Certified Passive House Component

Component-ID 1022cw03 valid until 31st December 2017

Passive House Institute  
Dr. Wolfgang Feist  
64283 Darmstadt  
Germany

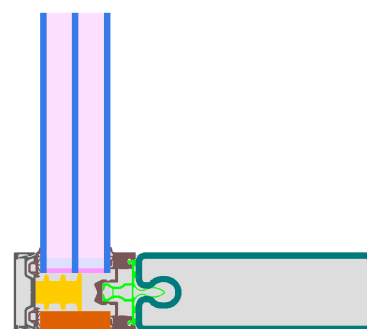


Category: **Curtain Wall**  
Manufacturer: **RAICO Bautechnik GmbH,  
Pfaffenhausen,  
Germany**  
Product name: **THERM+50 FS-I**

**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

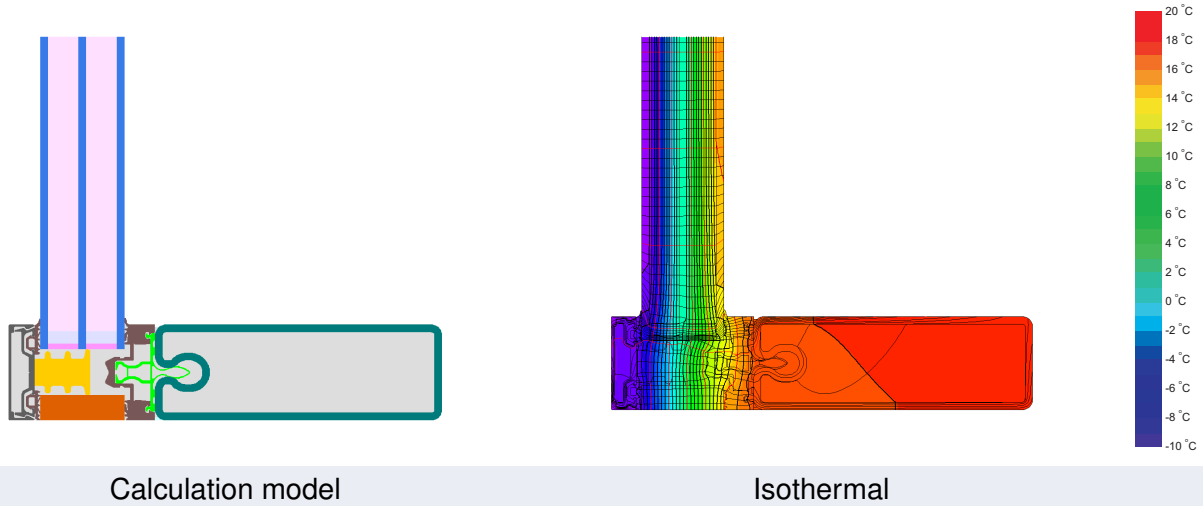
phC

phB

phA

phA+

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



### 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)

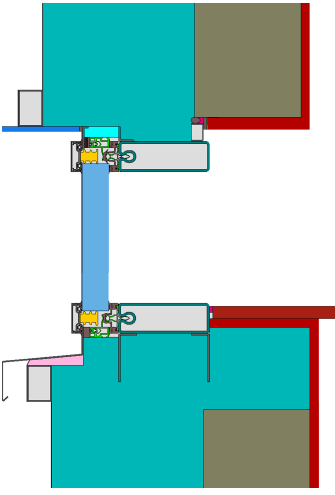
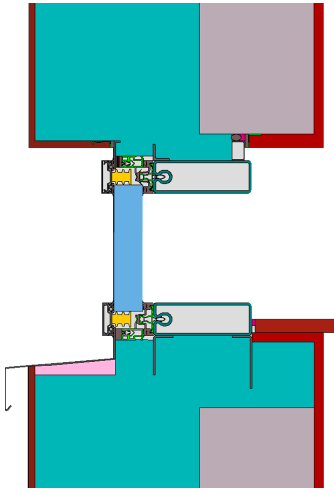
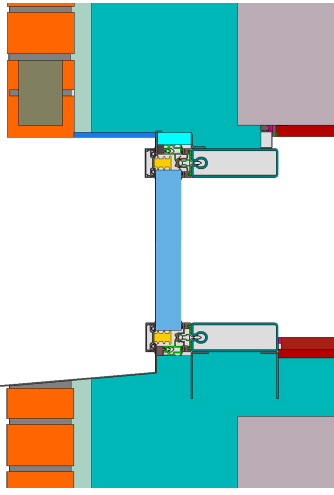
Transparent building components are classified into efficiency classes depending on the heat losses through the opaque part. The frame U-Values, frame widths, thermal bridges at the glazing edge, and the glazing edge lengths are included in these heat losses. A more detailed report of the calculations 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 which have been certified for climate zones with higher 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)	$\Psi$ -glass 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

Ventilated facade (fixed glazing)	Exterior insulation and finishing system (EIFS) (fixed glazed)	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 0.042	Top 0.044	Top 0.043
Left 0.042	Left 0.044	Left 0.043
Right 0.042	Right 0.044	Right 0.043
Bottom 0.054	Bottom 0.050	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 . Glas support type : Non-Metallic

