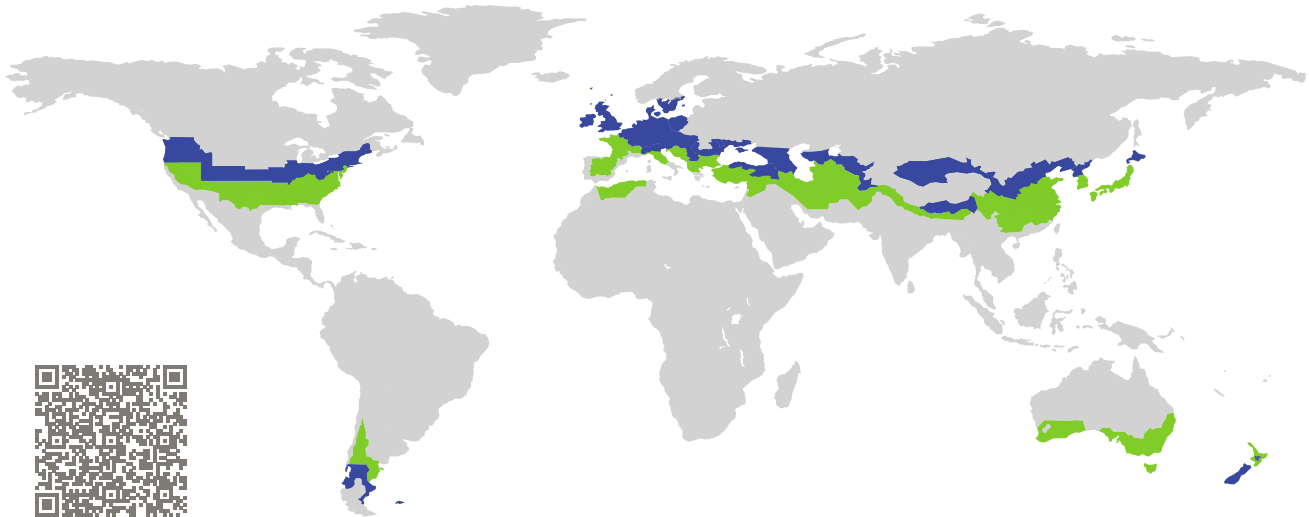


CERTIFICATE

Certified Passive House Component

Component-ID 1552wi03 valid until 31st December 2020

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany

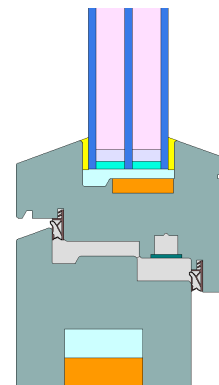


Category: **Window Frame**
Manufacturer: **Rangate,
Blaine, WA,
United States of America**
Product name: **108-92 Rangate PassiveFLEX
Tilt-Turn**

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

Comfort $U_W = 0.80 \leq 0.80 \text{ W}/(\text{m}^2 \text{ K})$
 $U_{W,\text{installed}} \leq 0.85 \text{ W}/(\text{m}^2 \text{ K})$
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

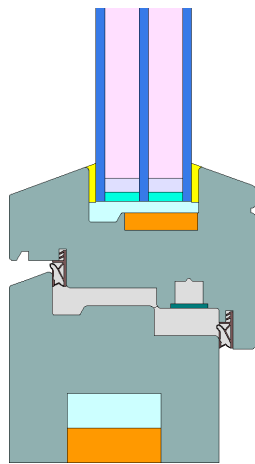
phD

phC

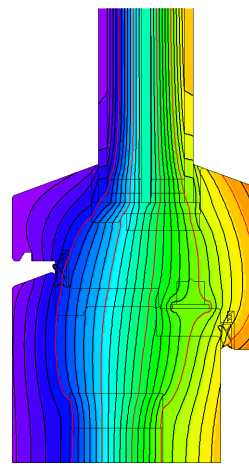
phB

phA

www.passivehouse.com



Calculation model



Isothermal

Description

Tilt-Turn timber frame (0.11 W/mK) with cork (0.045 W/mK) and aerogel - blanket (0.020 W/mK) insulation inside the sash and main frame. Spacer: Super Spacer Tri-seal with butyl secondary sealing. Pane thickness: 42 mm (4/15/4/15/4), rebate depth: 15 mm.

Explanation


The window U-values were calculated for the test window size of 1.23 m × 1.48 m with $U_g = 0.70 \text{ W}/(\text{m}^2 \text{ K})$. If a higher quality glazing is used, the window U-values will improve as follows:

Glazing	$U_g =$	0.70	0.64	0.58	0.54	W/(m ² K)
		↓	↓	↓	↓	
Window	$U_W =$	0.80	0.76	0.72	0.70	W/(m ² K)

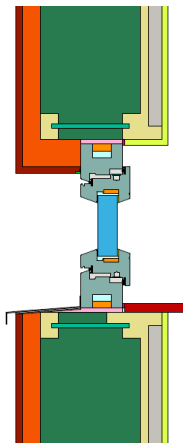
Transparent building components are classified into efficiency classes depending on the heat losses through the opaque part. The frame U-Values, frame widths, thermal bridges at the glazing edge, and the glazing edge lengths are included in these heat losses. A more detailed report of the calculations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

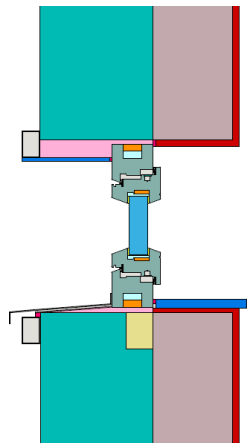
The Passive House Institute has defined international component criteria for seven climate zones. In principle, components which have been certified for climate zones with higher requirements may also be used in climates with less stringent requirements. In a particular climate zone it may make sense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

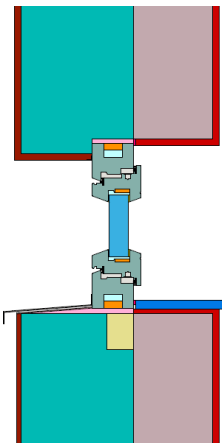
Further information relating to certification can be found on www.passivehouse.com and passipedia.org.

Frame values			Frame width b_f mm	U -value frame U_f W/(m ² K)	Ψ -panel edge Ψ_g W/(m K)	Temp. Factor $f_{Rsi=0.25}$ [-]
Top	(to)		130	0.83	0.024	0.73
Side	(s)		130	0.83	0.024	0.73
Bottom	(bo)		130	0.83	0.024	0.73
Mullion flying	(fm)		128	0.88	0.024	0.73
			Spacer: Super Spacer TriSeal / T-Spacer Premium		Secondary seal: Butyl	

Validated installations

Lightweight timber (operable)	
$U_{Wall} = 0.13 \text{ W/(m}^2 \text{ K)}$	
	
$\Psi_{install}$	W/(m K)
Top	0.012
Side	0.012
Bottom	0.028
$U_{W,installed} = 0.85 \text{ W/(m}^2 \text{ K)}$	

Ventilated facade	
$U_{Wall} = 0.13 \text{ W/(m}^2 \text{ K)}$	
	
$\Psi_{install}$	W/(m K)
Top	0.009
Side	0.009
Bottom	0.031
$U_{W,installed} = 0.84 \text{ W/(m}^2 \text{ K)}$	

Exterior insulation and finishing system (EIFS) (operable)	
$U_{Wall} = 0.13 \text{ W/(m}^2 \text{ K)}$	
	
$\Psi_{install}$	W/(m K)
Top	0.011
Side	0.011
Bottom	0.031
$U_{W,installed} = 0.85 \text{ W/(m}^2 \text{ K)}$	

