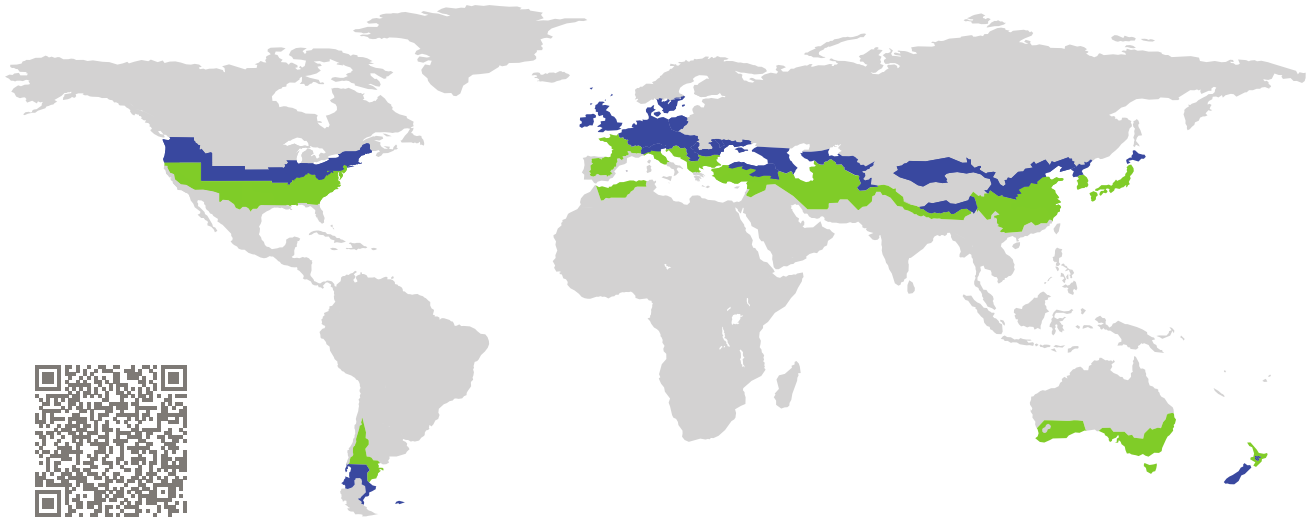


CERTIFICATE

Certified Passive House Component

Component-ID 1947wi03 valid until 31st December 2025

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany

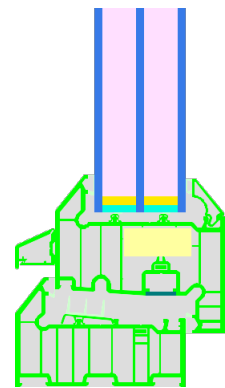


Category: **Window Frame**
Manufacturer: **Liniar Ltd.,
Derby,
United Kingdom**
Product name: **Zero | 90 Tilt & Turn**

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 $f_{Rsi=0.25} \geq 0.70$



Passive House
efficiency class

phE

phD

phC

phB

phA

www.passivehouse.com

cool, temperate climate

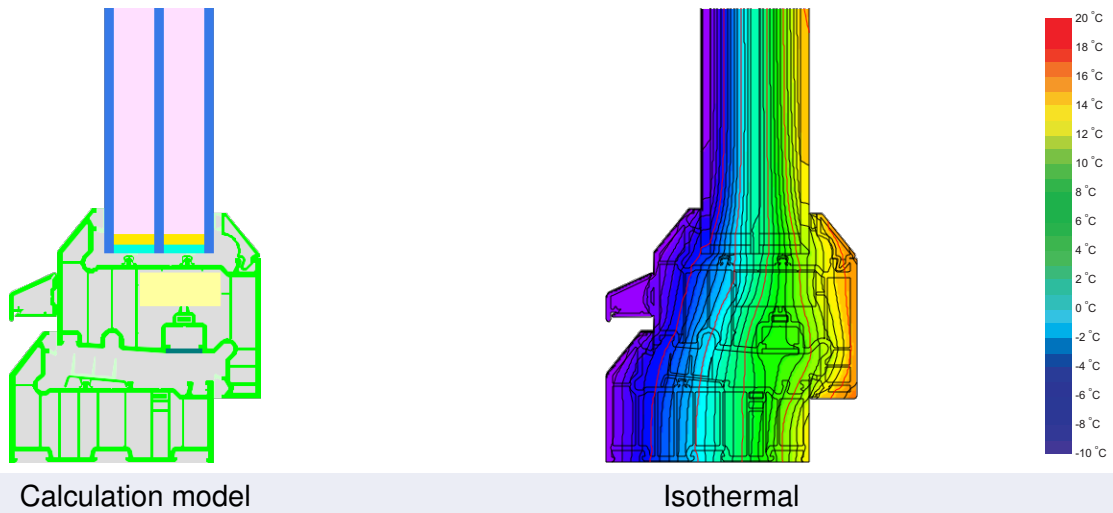


ph B



**CERTIFIED
COMPONENT**

Passive House Institute



Description

PVC window frame, insulated by phenolic foam (Kingspan Kooltherm, 0,022 W/(mK)). Maximum unit size without reinforcement is 1.5m by 1.5m. No colour restrictions. Pane thickness: 48 mm (4/18/4/18/4), rebate depth: 20 mm. Spacer: SuperSpacer Premium with butyl secondary seal.

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	0.52	W/(m ² K)
		↓	↓	↓	↓	
Window	$U_w =$	0.80	0.76	0.72	0.68	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.

Validated installations

Formwork blocks (operable)		Lightweight timber (operable)		Exterior insulation and finishing system (EIFS) (operable)	
$U_{Wall} = 0.15 \text{ W}/(\text{m}^2 \text{ K})$		$U_{Wall} = 0.13 \text{ W}/(\text{m}^2 \text{ K})$		$U_{Wall} = 0.13 \text{ W}/(\text{m}^2 \text{ K})$	
<p>Exterior plaster 1.0 W/(mK) EPS 0.035 W/(mK) Concrete 2.3 W/(mK) EPS 0.035 W/(mK) Interior plaster 0.57 W/(mK)</p>		<p>Exterior plaster 1.0 W/(mK) Wood fibre board 0.050 W/(mK) Cellulose 0.040 W/(mK) OSB-board 0.13 W/(mK) Insulation 0.040 W/(mK) Plasterboard 0.25 W/(mK)</p>		<p>Exterior plaster 1.0 W/(mK) EPS 0.035 W/(mK) Adhesive 0.70 W/(mK) Sand-lime brick 1.0 W/(mK) Interior plaster 0.57 W/(mK)</p>	
<p>Insulation 0.040 W/(mK)</p>		<p>point connection made from timber battens</p>		<p>Suitable fastening, e.g. mounting frame or bracket, but only protruding as far as necessary for fixing the window</p>	
$\Psi_{install}$	W/(m K)	$\Psi_{install}$	W/(m K)	$\Psi_{install}$	W/(m K)
Top	0.012	Top	0.017	Top	0.013
Side	0.012	Side	0.017	Side	0.013
Bottom	0.021	Bottom	0.026	Bottom	0.030
$U_{W,installed} = 0.84 \text{ W}/(\text{m}^2 \text{ K})$		$U_{W,installed} = 0.86 \text{ W}/(\text{m}^2 \text{ K})$		$U_{W,installed} = 0.85 \text{ W}/(\text{m}^2 \text{ K})$	

Frame values		Frame width b_f mm	U -value frame U_f W/(m ² K)	Ψ -glazing edge Ψ_g W/(m K)	Temp. Factor $f_{Rsi=0.25}$ [-]
Mullion 1 casement	(1M1)	125	0.83	0.022	0.73
Bottom	(OB1)	112	0.86	0.022	0.74
Top	(OH1)	112	0.86	0.022	0.73
Lateral	(OJ1)	112	0.86	0.022	0.73
Spacer: Super Spacer Premium			Secondary seal: Butyl		

