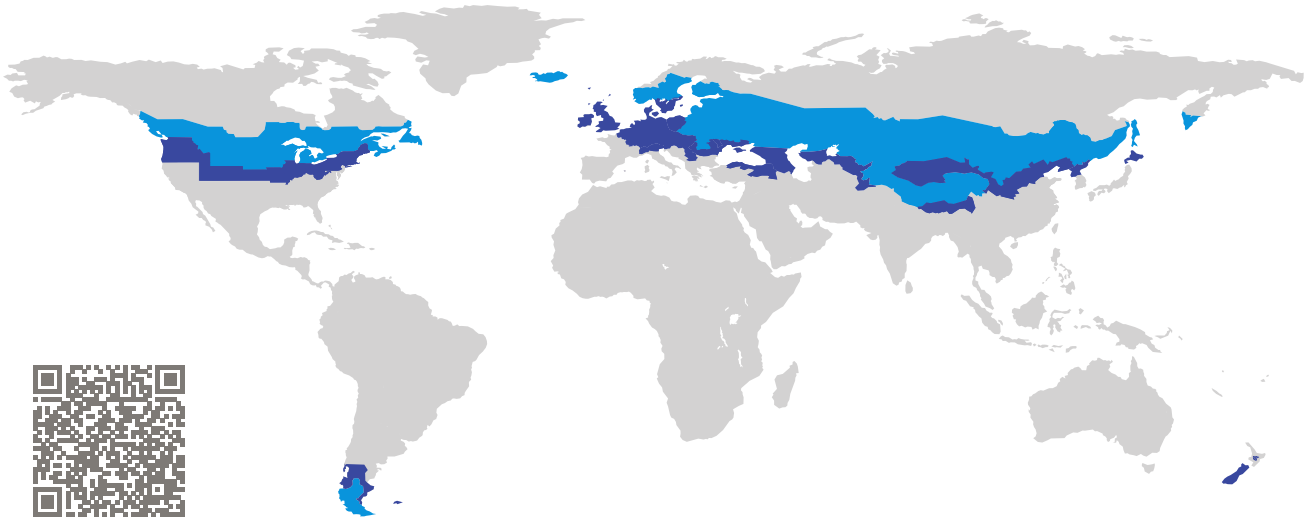
CERTIFICATE

Certified Passive House Component

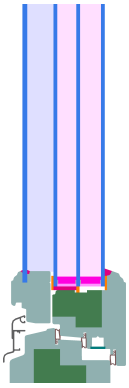
Component-ID 0550wi02 valid until 31st December 2017

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany



Category:	**Window frame (Coupled Window)**
Manufacturer:	**ZAO "BiTri", Moscow, Russian Federation**
Product name:	**RUKNA-1**

This certificate was awarded based on the following criteria for the cold climate zone



Comfort	$U_W = 0.58$	$\leq$	0.60 W/(m² K)
	$U_{W,\text{installed}}$	$\leq$	0.65 W/(m² K)
	with U_g [1]	=	0.47 W/(m² K)
Hygiene	$f_{Rsi=0.25}$	$\geq$	0.75

[1]The specified U_g value is determined using the reference glazing of the climate zone in conjunction with the additional pane.

cold climate

phA

CERTIFIED COMPONENT

Passive House Institute

Passive House efficiency class	phE	phD	phC	phB	phA

www.passivehouse.com

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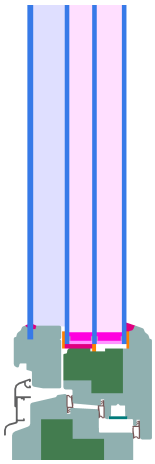
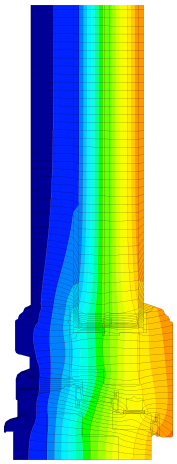


Calculation model



Isothermal

Description

Coupled timber window frame (fir/spruce 0,11 W/(mK)) with rainprotectiv aluminium cladding. Insulated by CompacFoam CF 150 (0,043 W/(mK)). Pane thickness: 87.3 mm (4/22/4/20/4), Rebate depth: 16 mm.

Explanation

The window U-values were calculated for the test window size of 1.23 m × 1.48 m with U_g = 0.52 W/(m^2 K). If a higher quality glazing is used, the window U-values will improve as follows:

Glazing [2]	U_g =	0.52	0.70	0.64	0.58	W/(m^2 K)
		↓	↓	↓	↓	
Window	U_W =	0.58	0.68	0.64	0.61	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.

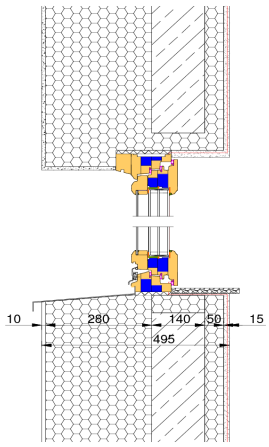
Further information relating to certification
can be found on www.passivehouse.com and passipedia.org.

[2]The specified U_g values refer to the thermally decisive pane.

Frame values		Frame width b_f mm	U-value frame U_f W/(m² K)	Ψ-glass edge Ψ_g W/(m K)	Temp. Factor $f_{Rsi=0.25}$ [-]
Top	(to)	116	0.63	0.021	0.79
Side	(s)	116	0.63	0.021	0.79
Bottom	(bo)	118	0.72	0.020	0.79
Mullion flying	(fm)	122	0.64	0.022	0.79
Spacer: Super Spacer TriSeal / T-Spacer Premium				Secondary seal: Polysulfide	

Validated installations

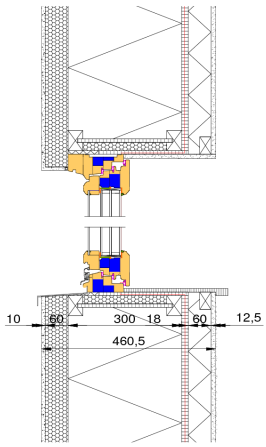
Insulated formwork blocks



$\Psi_{install}$	W/(m K)
Top	0.010
Side	0.010
Bottom	0.019

$U_{W,installed}$ = 0.61 W/(m² K)

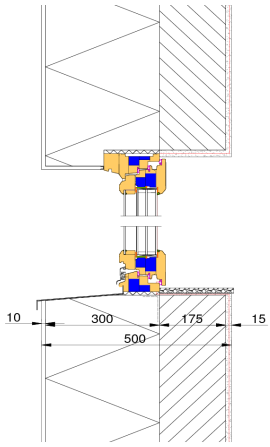
Timber frame



$\Psi_{install}$	W/(m K)
Top	0.020
Side	0.020
Bottom	0.028

$U_{W,installed}$ = 0.64 W/(m² K)

EIFS



$\Psi_{install}$	W/(m K)
Top	0.011
Side	0.011
Bottom	0.021

$U_{W,installed}$ = 0.62 W/(m² K)