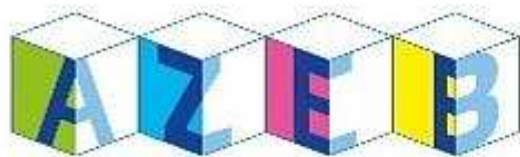


# Warm, temperate & warm climate



**Affordable Zero**  
Energy Buildings



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# Manufacturer Window

# Daimaru Kogyo LTD smartwin compact hpl double

Country



Climate



Material

Timber HPL

## Description of baseline window

Double glazed (3/14/3) Timber window with aluminium Spacer. Shaded by venetian blind. In the region interior shading is common. For the reason of comparability, the screen was used.

Installed in the construction layer with insulated shutter box.

## Description of Passive House window

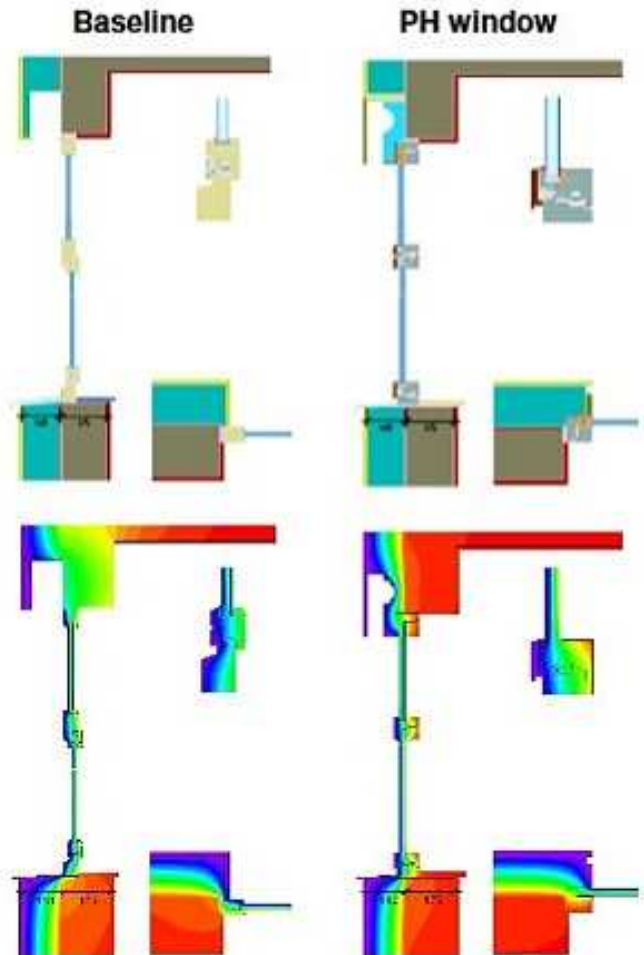
HPL clad version of smartwin compact: Timber frame (Spruce/Fir, 0.11 W/(mK)), insulated by low dense timber-fiber board (0,04 W/(mK)). Glazing: 4/16/4, glass intersection: 15 mm. Spacer: SWISSPACER Ultimate.

Shaded by fabric screen in narrow case built by the window manufacturer to minimize the thermal bridge.

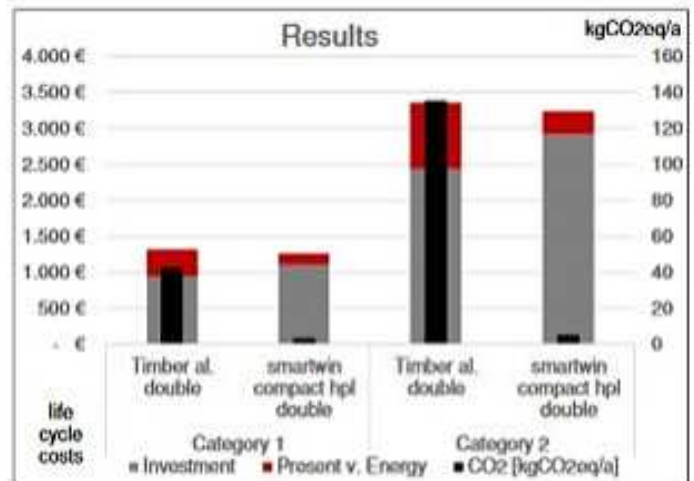
Installed in the insulation layer by wooden frame connector. Airtightness by plaster able tape.



Fabric screen turned 180° for low thermal bridge in thin insulation layer



Japan JP0004a-Takamatsu (	Category 1		Category 2	
	Timber al. double	smartwin compact hpl double	Timber al. double	smartwin compact hpl double
$U_g$ [W/(m <sup>2</sup> K)]	1,44	1,12	1,44	1,12
$U_f$ [W/(m <sup>2</sup> K)]	1,76	1,15	1,66	1,06
$U_w$ [W/(m <sup>2</sup> K)]	1,71	1,21	1,75	1,24
$U_{w,f}$ [W/(m <sup>2</sup> K)]	2,59	1,24	2,50	1,29
Glass fraction	69%	76%	6%	71%
g	60%	64%	60%	64%
Shading factor	10%	12%	10%	12%
Investment	945 €	1.107 €	2.441 €	2.916 €
Present v. Energy	371 €	156 €	915 €	318 €
LCC	1.316 €	1.263 €	3.356 €	3.234 €
LCC Saving		52 €		123 €
LCC Saving		4%		4%
CO <sub>2</sub> [kgCO <sub>2</sub> /a]	43	4	135	5
CO <sub>2</sub> Saving		39		130
CO <sub>2</sub> Saving		91%		96%



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# Manufacturer Window **Blumer-Lehmann smartwin compact hpl triple**

Country 

Climate 

Material **Timber HPL**

## Description of baseline window

Double glazed (4/16/4) Timber Aluminium window with aluminium Spacer. Shaded by fabric screen. In the region interior shading is common. For the reason of comparability, the screen was used.

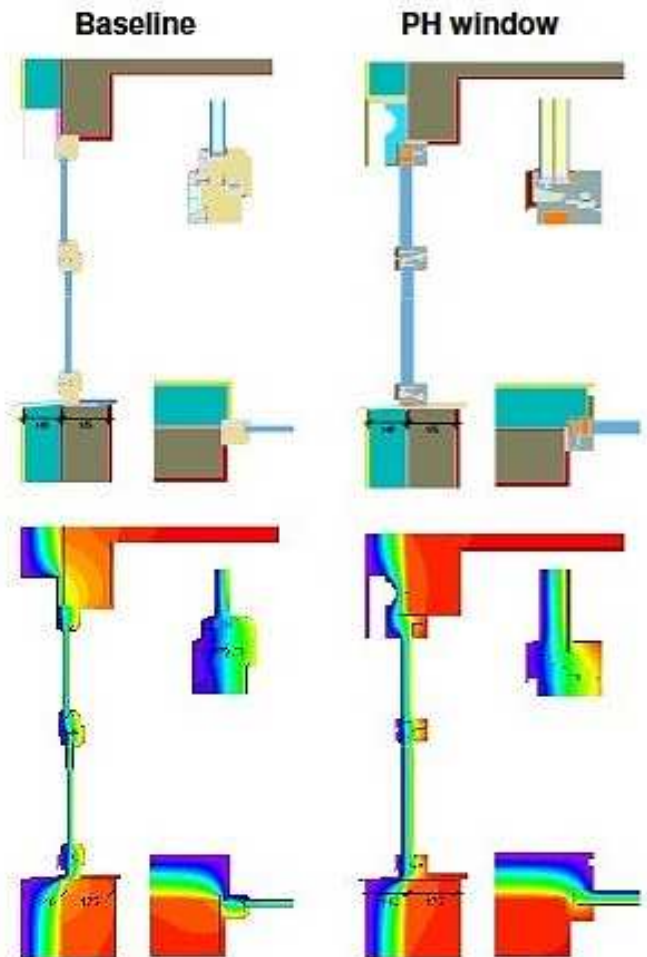
Installed at the edge of the construction layer with insulated shuttercase.

## Description of Passive House window

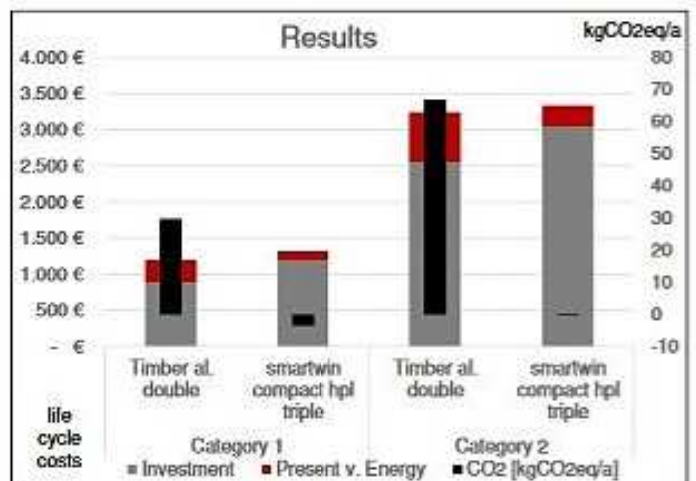
Timber frame (Spruce/Fir, 0.11 W/(mK)), insulated by low dense timber-fiber board (0.04 W/(mK)). Glazing: 4/18/4/18/4, Glass intersection: 15 mm. Spacer: SWISSPACER Ultimate.

Shaded by fabric screen in narrow case built by the window manufacturer to minimize the thermal bridge. Installed in the insulation layer by wooden frame connector. Airtightness by plaster able tape.

Window-production has not started yet.



China CN0001a-Shanghai	Category 1		Category 2	
	Timber al. double	smartwin compact hpl triple	Timber al. double	smartwin compact hpl triple
$U_g$ [W/(m <sup>2</sup> K)]	1,45	0,60	1,45	0,60
$U_f$ [W/(m <sup>2</sup> K)]	1,40	0,86	1,42	0,78
$U_w$ [W/(m <sup>2</sup> K)]	1,64	0,73	1,76	0,75
$U_{w,f}$ [W/(m <sup>2</sup> K)]	2,06	0,79	2,09	0,82
Glass fraction	67%	76%	66%	71%
g	60%	60%	60%	60%
Shading factor	10%	12%	10%	12%
Investment	885 €	1.198 €	2.554 €	3.051 €
Present v. Energy	317 €	122 €	690 €	288 €
LCC	1.202 €	1.320 €	3.244 €	3.339 €
LCC Saving		-118 €		-95 €
LCC Saving		-10%		-3%
CO <sub>2</sub> [kgCO <sub>2</sub> eq/a]	30	-4	67	0
CO <sub>2</sub> Saving		33		67
CO <sub>2</sub> Saving		112%		101%





# Manufacturer Window

# SEDA. windows&doors smartwin compact hpl double

Country



Climate



Material

Timber HPL

## Description of baseline window

Thermally separated, double IGU-glazed (4/16air/4) aluminum window. Depth of frame: 46 mm. Spacer: Aluminium. Installed in the construction layer with reveal insulation. Shaded by fabric screen. Exterior shading is not common in the region. The screen was chosen for reasons of compatibility.

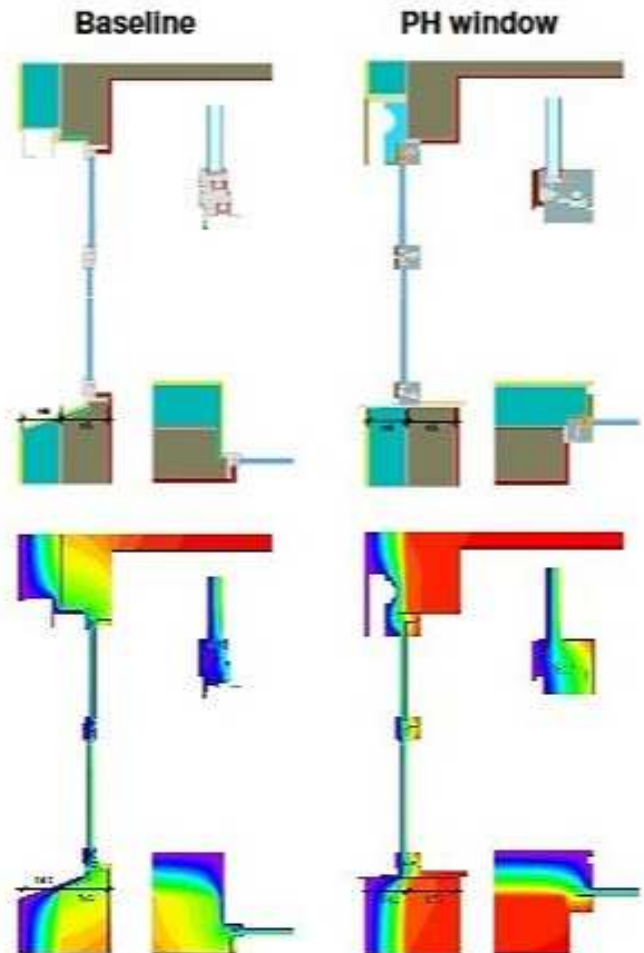
Comfort- as well as hygiene criterion are not achieved.

## Description of Passive House window

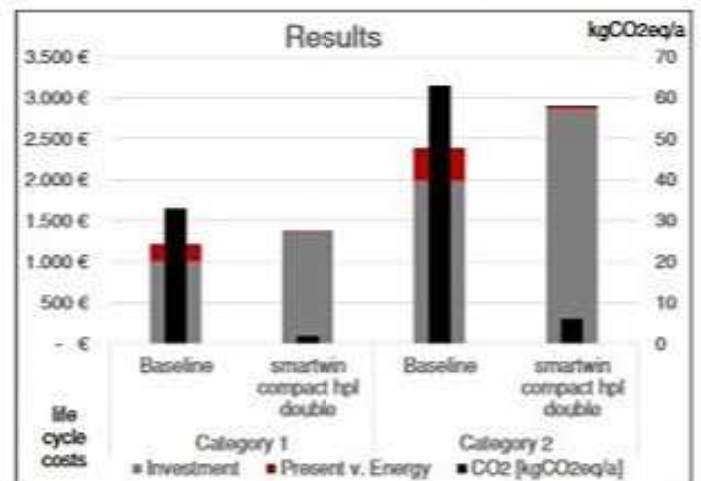
Timber frame (Spruce/Fir, 0.11 W/(mK)), insulated by low dense timber-fiber board (0.04 W/(mK)). Glazing: 4/16/4, glass intersection: 15 mm. Spacer: SWISSPACER Ultimate. Glazing, wood and hardware importet.

Shaded by venetian fabric screen in narrow case built by the window manufacturer to minimize the thermal bridge.

Installed in the insulation layer by wooden frame connector. Airtightness by plaster able tape.



New Zealand NZ0001a - Auckland	Category 1		Category 2	
	Baseline	smartwin compact hpl double	Baseline	smartwin compact hpl double
$U_g$ [W/(m <sup>2</sup> K)]	1,36	1,12	1,36	1,12
$U_f$ [W/(m <sup>2</sup> K)]	3,26	1,15	3,15	1,06
$U_w$ [W/(m <sup>2</sup> K)]	2,08	1,21	2,16	1,24
$U_{w,i}$ [W/(m <sup>2</sup> K)]	3,62	1,24	3,34	1,28
Glass fraction	73%	76%	76%	71%
g	64%	64%	64%	64%
Shading factor	10%	12%	10%	12%
Investment	1.005 €	1.370 €	1.987 €	2.864 €
Present v. Energy	213 €	12 €	405 €	39 €
LCC	1.217 €	1.383 €	2.392 €	2.903 €
LCC Saving		165 €		512 €
LCC Saving		-14%		-21%
CO <sub>2</sub> [kgCO <sub>2</sub> eq/a]	33	2	63	6
CO <sub>2</sub> Saving		31		57
CO <sub>2</sub> Saving		94%		90%



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# Manufacturer Window

# SEDA. windows&doors smartwin compact hpl double

Country



Climate



Material

Timber HPL

## Description of baseline window

Double glazed traditional New Zealand wooden window with double IGU-glazing (4/6air/4) and aluminium spacer. Depth of frame: 42 mm.

The frame is not painted in the factory, so for painting at the building site, 8% were added on the net window price. Installed in the construction layer with reveal insulation. Shaded by fabric screen. In the region interior shading is common. For the reason of comparability, the screen was used.

Installed in the construction layer with reveal insulation.

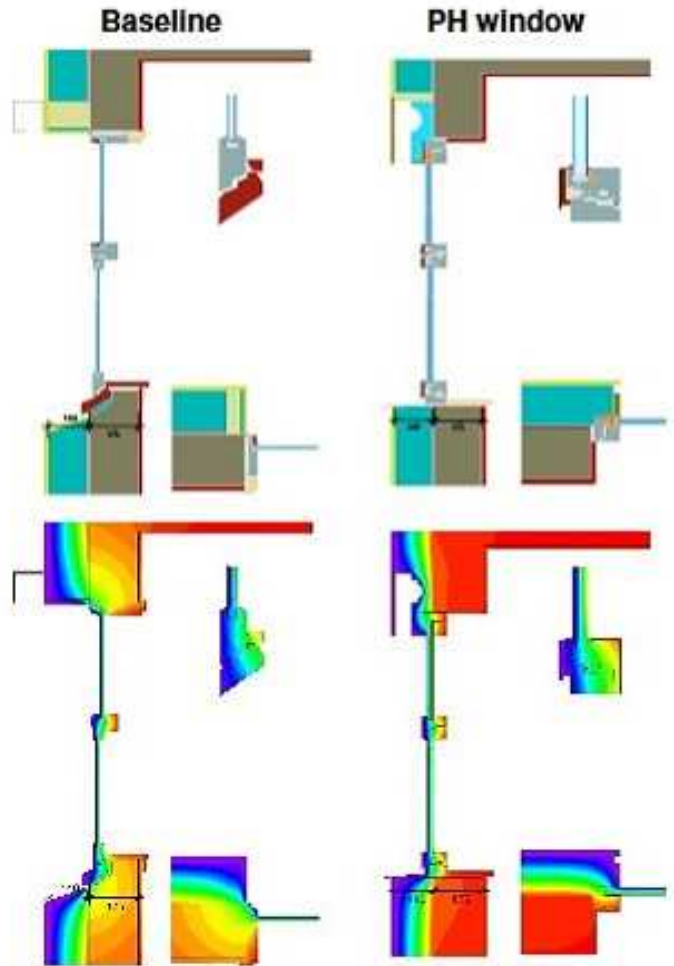
Comfort- as well as hygiene criterion are not achieved.

## Description of Passive House window

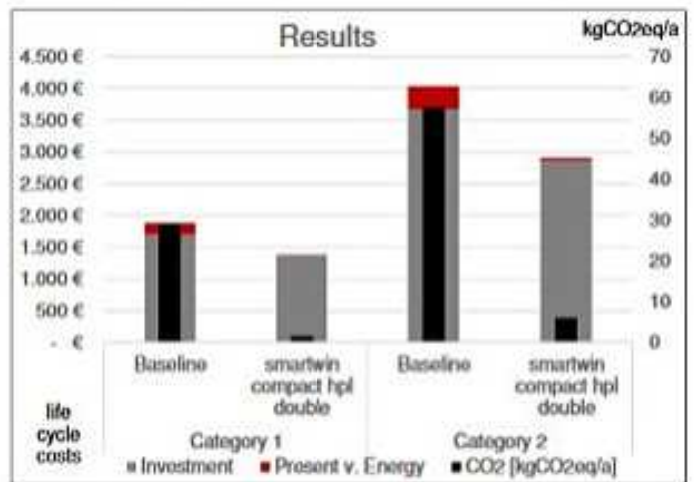
Timber frame (Spruce/Fir, 0.11 W/(mK)), insulated by low dense timber-fiber board (0.04 W/(mK)). Glazing: 4/16/4, glass intersection: 15 mm. Spacer: SWISSPACER Ultimate. Glazing, wood and hardware importet.

Shaded by venetian fabric screen in narrow case built by the window manufacturer to minimize the thermal bridge.

Installed in the insulation layer by wooden frame connector. Airtightness by plaster able tape.



New Zealand NZ0001a Auckland	Category 1		Category 2	
	Baseline	smartwin compact hpl double	Baseline	smartwin compact hpl double
$U_g$ [W/(m <sup>2</sup> K)]	2,45	1,12	2,45	1,12
$U_f$ [W/(m <sup>2</sup> K)]	1,57	1,15	1,36	1,06
$U_w$ [W/(m <sup>2</sup> K)]	2,39	1,21	2,15	1,24
$U_{w,j}$ [W/(m <sup>2</sup> K)]	3,36	1,24	2,86	1,28
Glass fraction	77%	76%	56%	71%
g	63%	64%	63%	64%
Shading factor	10%	12%	10%	12%
Investment	1.696 €	1.370 €	3.669 €	2.864 €
Present v. Energy	166 €	11 €	371 €	39 €
LCC	1.882 €	1.381 €	4.040 €	2.903 €
LCC Saving		502 €		1.136 €
LCC Saving		27%		28%
CO <sub>2</sub> [kgCO <sub>2</sub> eq/a]	29	2	58	6
CO <sub>2</sub> Saving		27		52
CO <sub>2</sub> Saving		94%		89%



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