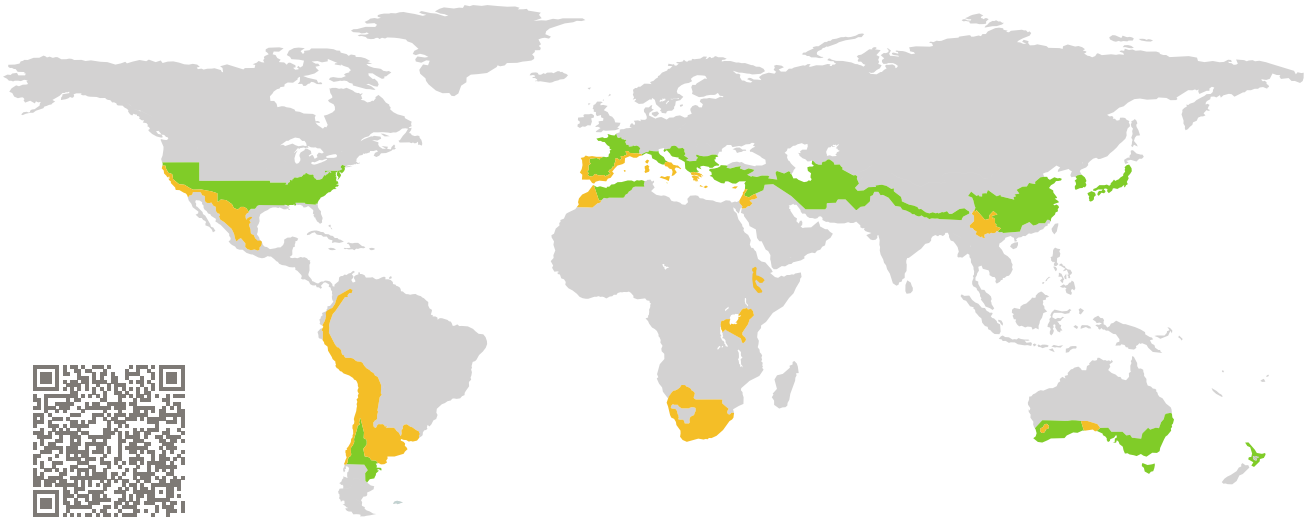
# CERTIFICATE

**Certified Passive House Component**

Component-ID 1394ws04 valid until 31st December 2020

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany



| | |
|---|---|
| Category: | **Window system** |
| Manufacturer: | **Piva Group S.p.A., Roncanova di Gazzo Veronese (VR), Italy** |
| Product name: | **PVC Piva Serie MD** |

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

| | | | |
|---|---|---|---|
| Comfort | $U_W$ = 1.00 | ≤ | 1.00 W/(m² K) |
| | $U_{W,\text{installed}}$ | ≤ | 1.05 W/(m² K) |
| | with $U_g$ | = | 0.90 W/(m² K) |
| Hygiene | $f_{Rsi=0.25}$ | ≥ | 0.65 |
| Airtightness | $Q_{100}$ = 0.25 | ≤ | 0.25 m³/(h m) |

warm, temperate climate

phB

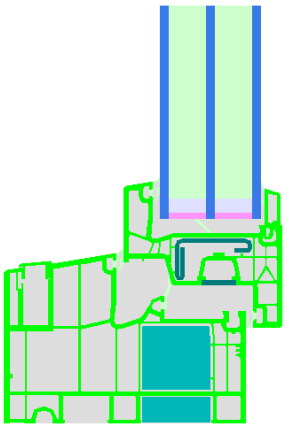
| Passive House efficiency class | phE | phD | phC | phB | phA |
|---|---|---|---|---|---|

CERTIFIED COMPONENT

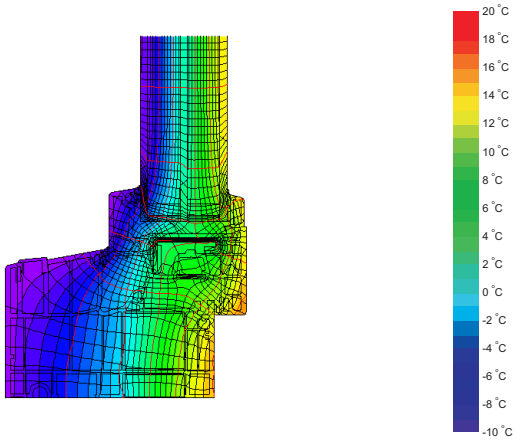
Passive House Institute

www.passivehouse.com

**Piva Group S.p.A.**
Via Roma, 139, 37060 Roncanova di Gazzo Veronese (VR), Italy
☎ +39 0442 536111 | ✉ info@pivagroupspa.com | http://www.pivagroupspa.com |



Calculation model




Isothermal

## Description

PVC-windowframe with steel-reinforcements inside the bottom and lateral sash. Insulation fillings (0.035 W/(mK)) inside the bottom blind frame. The temperature factor is not achieved at the flying mullion. Pane thickness: 48 mm (4/18/4/18/4), spacer: Multitech. The airtightness was tested at a single-sash tilt-and turn-window. Pane thickness: 48 mm (4/18/4/18/4), rebate depth: 18 mm. Spacer: Multitech.

## Explanation

The window U-values were calculated for the test window size of 2.46 m × 1.48 m with $U_g$ = 0.90 W/(m$^2$ K). If a higher quality glazing is used, the window U-values will improve as follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| Glazing | $U_g$ = | 0.90 | 0.70 | 0.61 | 0.52 | W/(m$^2$ K) |
| | | ↓ | ↓ | ↓ | ↓ | |
| Window | $U_W$ = | 1.00 | 0.86 | 0.79 | 0.73 | W/(m$^2$ K) |

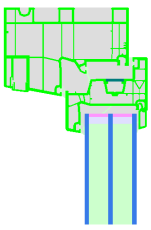
Transparent building components are classified into efficiency classes depending on the heat losses through the opaque part. The frame U-Values, frame widths, thermal bridges at the glazing edge, and the glazing edge lengths are included in these heat losses. A more detailed report of the calculations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

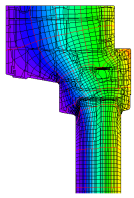
Further information relating to certification
can be found on www.passivehouse.com and passipedia.org.

| Frame values | | | Frame width $b_f$ mm | $U$-value frame $U_f$ W/(m² K) | $\Psi$-panel edge $\Psi_g$ W/(m K) | Temp. Factor $f_{Rsi=0.25}$ [-] |
|---|---|---|---|---|---|---|
| Top | (to) | | 116 | 0.96 | 0.024 | 0.73 |
| Side | (s) | | 116 | 1.04 | 0.024 | 0.73 |
| Bottom | (bo) | | 116 | 0.94 | 0.024 | 0.71 |
| Top fixed | (tof) | | 82 | 0.87 | 0.024 | 0.72 |
| Side fixed | (sf) | | 82 | 0.87 | 0.024 | 0.72 |
| Bottom fixed | (bof) | | 82 | 0.87 | 0.024 | 0.72 |
| Mullion flying | (fm) | | 146 | 1.29 | 0.023 | 0.62 |
| Mullion fixed | (m) | | 98 | 1.24 | 0.023 | 0.69 |
| Mullion 1 casement | (m1) | | 132 | 1.24 | 0.023 | 0.67 |
| Transom fixed | (tf) | | 98 | 1.24 | 0.023 | 0.69 |
| Transom 1 casement | (t1) | | 132 | 1.24 | 0.023 | 0.67 |
| Spacer: MULTITECH | | | | Secondary seal: Polysulfid | | |

Top

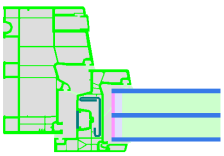
$b_f$ = 116.00 mm
$U_f$ = 0.96 W/(m² K)
$\Psi_g$ = 0.024 W/(m K)
$f_{Rsi}$ = 0.73

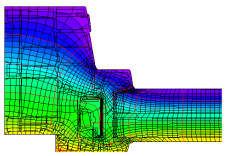




Side

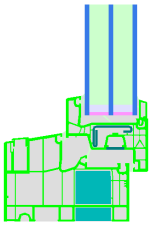
$b_f$ = 116.00 mm
$U_f$ = 1.04 W/(m² K)
$\Psi_g$ = 0.024 W/(m K)
$f_{Rsi}$ = 0.73

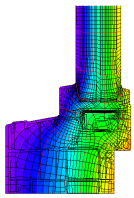




## Bottom

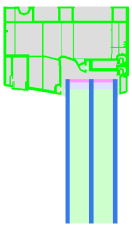
$b_f$ = 116.00 mm
$U_f$ = 0.94 W/(m² K)
$\Psi_g$ = 0.024 W/(m K)
$f_{Rsi}$ = 0.71

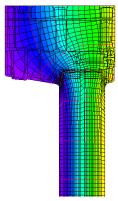




## Top
fixed

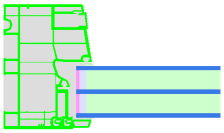
$b_f$ = 82.00 mm
$U_f$ = 0.87 W/(m² K)
$\Psi_g$ = 0.024 W/(m K)
$f_{Rsi}$ = 0.72

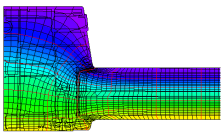




## Side
fixed

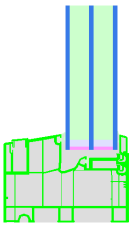
$b_f$ = 82.00 mm
$U_f$ = 0.87 W/(m² K)
$\Psi_g$ = 0.024 W/(m K)
$f_{Rsi}$ = 0.72

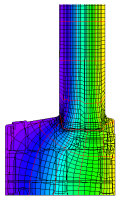




## Bottom
fixed

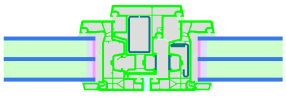
$b_f$ = 82.00 mm
$U_f$ = 0.87 W/(m² K)
$\Psi_g$ = 0.024 W/(m K)
$f_{Rsi}$ = 0.72

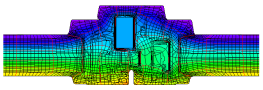




## Mullion
flying

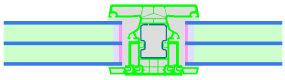
$b_f$ = 146.00 mm
$U_f$ = 1.29 W/(m² K)
$\Psi_g$ = 0.023 W/(m K)
$f_{Rsi}$ = 0.62

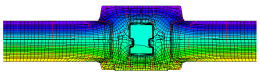




## Mullion
fixed

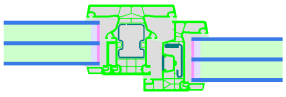
$b_f$ = 98.00 mm
$U_f$ = 1.24 W/(m² K)
$\Psi_g$ = 0.023 W/(m K)
$f_{Rsi}$ = 0.69

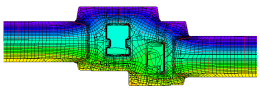




## Mullion
1 casement

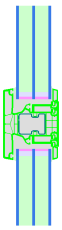
$b_f$ = 132.00 mm
$U_f$ = 1.24 W/(m² K)
$\Psi_g$ = 0.023 W/(m K)
$f_{Rsi}$ = 0.67

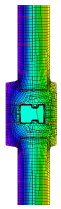




## Transom
fixed

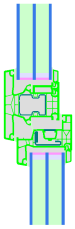
$b_f$ = 98.00 mm
$U_f$ = 1.24 W/(m² K)
$\Psi_g$ = 0.023 W/(m K)
$f_{Rsi}$ = 0.69

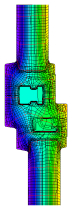




## Transom
1 casement

$b_f$ = 132.00 mm
$U_f$ = 1.24 W/(m² K)
$\Psi_g$ = 0.023 W/(m K)
$f_{Rsi}$ = 0.67

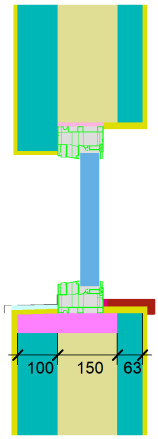




## Validated installations

### Solid timber (fixed glazed)

$U_{Wall}$ = 0.17 W/(m² K)

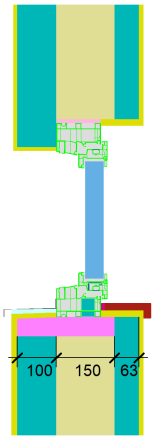



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.015 |
| Left | 0.015 |
| Right | 0.015 |
| Bottom | 0.021 |

$U_{W,installed}$ = 1.03 W/(m² K)

### Solid timber (operable)

$U_{Wall}$ = 0.17 W/(m² K)

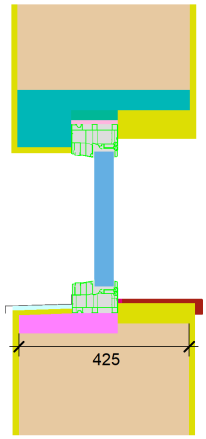



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.016 |
| Left | 0.016 |
| Right | 0.016 |
| Bottom | 0.024 |

$U_{W,installed}$ = 1.04 W/(m² K)

### Monolithic construction (fixed glazed)

$U_{Wall}$ = 0.19 W/(m² K)

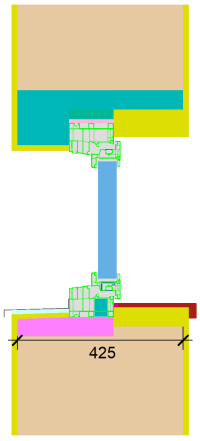



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.018 |
| Left | 0.018 |
| Right | 0.018 |
| Bottom | 0.025 |

$U_{W,installed}$ = 1.04 W/(m² K)

### Monolithic construction (operable)

$U_{Wall}$ = 0.19 W/(m² K)

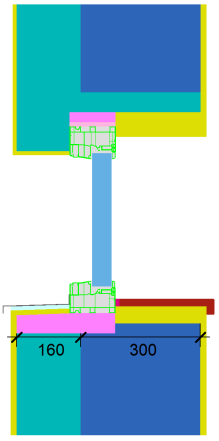



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.021 |
| Left | 0.021 |
| Right | 0.021 |
| Bottom | 0.028 |

$U_{W,installed}$ = 1.05 W/(m² K)

### Exterior insulation and finishing system (EIFS) (fixed glazed)

$U_{Wall}$ = 0.17 W/(m² K)

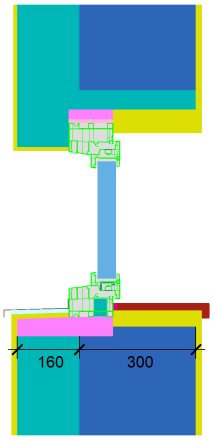



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.009 |
| Left | 0.009 |
| Right | 0.009 |
| Bottom | 0.036 |

$U_{W,installed}$ = 1.04 W/(m² K)

### Exterior insulation and finishing system (EIFS) (operable)

$U_{Wall}$ = 0.17 W/(m² K)




| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.011 |
| Left | 0.011 |
| Right | 0.011 |
| Bottom | 0.040 |

$U_{W,installed}$ = 1.04 W/(m² K)