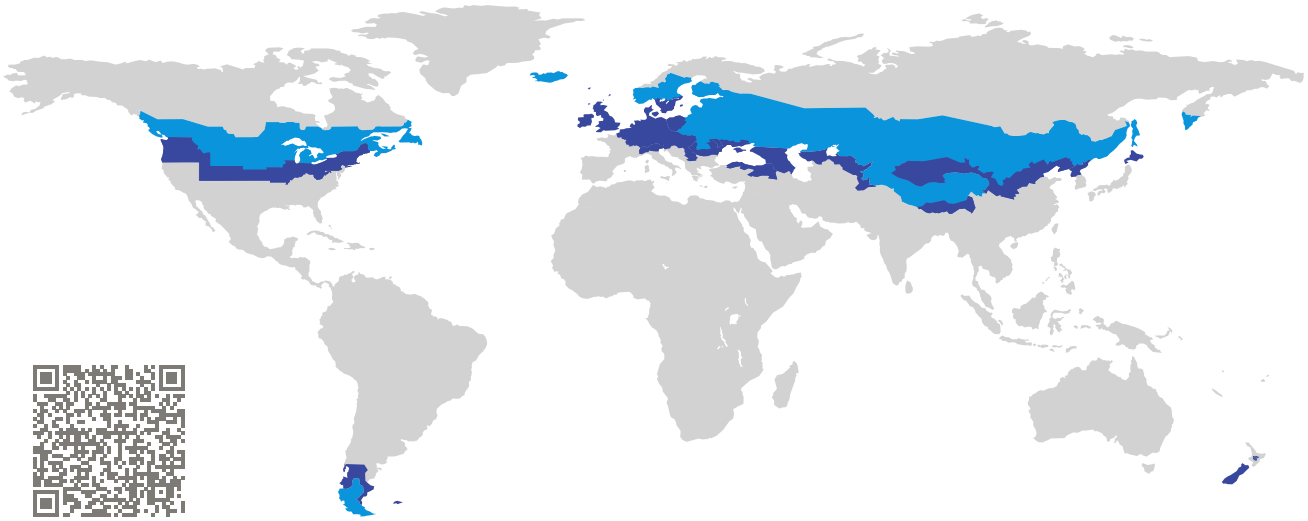
# CERTIFICATE

**Certified Passive House Component**

Component-ID 1194ws02 valid until 31st December 2022

Passive House Institute
Dr.Wolfgang Feist
64283 Darmstadt
Germany



Category: **Window system**

Manufacturer: **ENERsign GmbH, Wittlich, Germany**

Product name: **ENERsign primus**

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

| | | | |
|---|---|---|---|
| Comfort | $U_W$ = 0.60 | ≤ | 0.60 W/(m² K) |
| | $U_{W,\text{installed}}$ | ≤ | 0.65 W/(m² K) |
| | with $U_g$ | = | 0.52 W/(m² K) |
| Hygiene | $f_{Rsi=0.25}$ | ≥ | 0.75 |
| Airtightness | $Q_{100}$ = 0.16 | ≤ | 0.25 m³/(h m) |

cold climate

phA

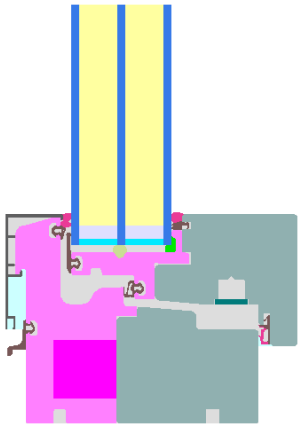
CERTIFIED COMPONENT

Passive House Institute

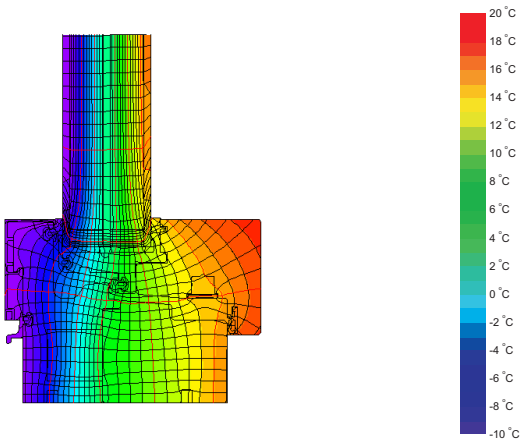
| Passive House efficiency class | phE | phD | phC | phB | phA |
|---|---|---|---|---|---|

www.passivehouse.com

**ENERsign GmbH**
Dr. Oetker Straße 28, 54516 Wittlich, Germany
☎ +49 6571 95398-0 | ✉ info@enersign.com | http://www.enersign.com |



Calculation model




Isothermal

## Description

Aluminium cladded timber frame (0,11 W/(mK)), insulated by ENERcell (0,06 W/(mK)) and EPS-Foam (0,032 W/(mK)). Q100 = 0,16 $m^3$/(hm) testet at a window with flying mullion Stulpfenster (2,26 * 2,51 m). Pane thickness: 48 mm (4/18/4/18/4), rebate depth: 15 mm, spacer: SWISSPACER Ultimate with polyurethane as secondary seal. At the threshold and the side-section with handle the temperature facort for the cold climate is not achieved. Never the less, this values are much better than usual.

## Explanation

The window U-values were calculated for the test window size of 2.46 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 | $U_g$ = | 0.52 | 0.70 | 0.61 | 0.35 | W/($m^2$ K) |
| | | ↓ | ↓ | ↓ | ↓ | |
| Window | $U_W$ = | 0.60 | 0.74 | 0.67 | 0.47 | W/($m^2$ K) |

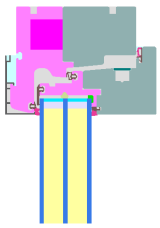
Transparent building components are classified into efficiency classes depending on the heat losses through the opaque part. The frame U-Values, frame widths, thermal bridges at the glazing edge, and the glazing edge lengths are included in these heat losses. A more detailed report of the calculations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

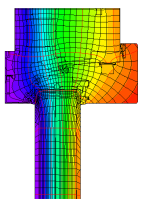
Further information relating to certification
can be found on www.passivehouse.com and passipedia.org.

| Frame values | | | Frame width $b_f$ mm | $U$-value frame $U_f$ W/(m² K) | $\Psi$-glazing edge $\Psi_g$ W/(m K) | Temp. Factor $f_{Rsi=0.25}$ [-] |
|---|---|---|---|---|---|---|
| Top | (to) |  | 100 | 0.64 | 0.020 | 0.77 |
| Side | (s) |  | 100 | 0.64 | 0.020 | 0.77 |
| Bottom | (bo) |  | 100 | 0.64 | 0.020 | 0.77 |
| Top fixed | (tof) |  | 100 | 0.58 | 0.019 | 0.78 |
| Side fixed | (sf) |  | 100 | 0.58 | 0.019 | 0.78 |
| Bottom fixed | (bof) |  | 100 | 0.61 | 0.019 | 0.78 |
| Threshold | (th) |  | 100 | 1.09 | 0.022 | 0.71 |
| Door side | (sh) |  | 171 | 0.70 | 0.022 | 0.74 |
| Mullion flying | (fm) |  | 100 | 0.65 | 0.020 | 0.77 |
| Mullion fixed | (m) |  | 120 | 0.58 | 0.019 | 0.78 |
| Mullion 1 casement | (m1) |  | 120 | 0.63 | 0.020 | 0.77 |
| Corner | (ec) |  | 342 | 0.31 | 0.019 | 0.75 |
| Transom fixed | (tf) |  | 120 | 0.61 | 0.019 | 0.78 |
| Transom 1 casement | (t1) |  | 120 | 0.66 | 0.020 | 0.77 |
| Spacer: SWISSPACER Ultimate | | | | Secondary seal: Polyurethan | | |

Top

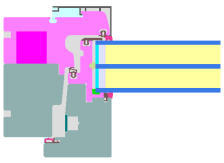
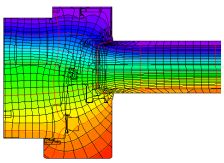
$b_f$ = 100.00 mm
$U_f$ = 0.64 W/(m² K)
$\Psi_g$ = 0.020 W/(m K)
$f_{Rsi}$ = 0.77





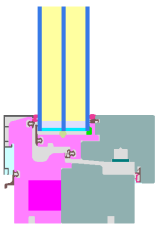
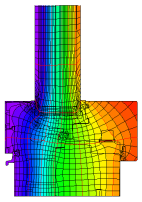
## Side

$b_f$ = 100.00 mm
$U_f$ = 0.64 W/(m² K)
$\Psi_g$ = 0.020 W/(m K)
$f_{Rsi}$ = 0.77

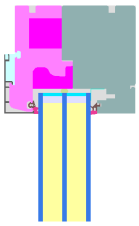
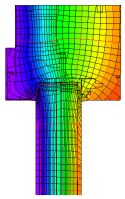
## Bottom

$b_f$ = 100.00 mm
$U_f$ = 0.64 W/(m² K)
$\Psi_g$ = 0.020 W/(m K)
$f_{Rsi}$ = 0.77

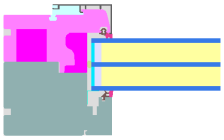
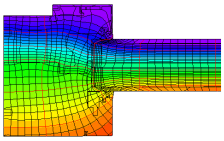
## Top
fixed

$b_f$ = 100.00 mm
$U_f$ = 0.58 W/(m² K)
$\Psi_g$ = 0.019 W/(m K)
$f_{Rsi}$ = 0.78

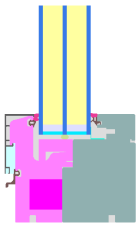
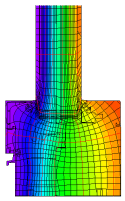
## Side
fixed

$b_f$ = 100.00 mm
$U_f$ = 0.58 W/(m² K)
$\Psi_g$ = 0.019 W/(m K)
$f_{Rsi}$ = 0.78

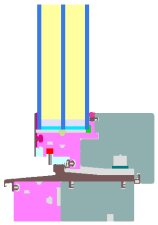
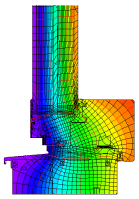
## Bottom
fixed

$b_f$ = 100.00 mm
$U_f$ = 0.61 W/(m² K)
$\Psi_g$ = 0.019 W/(m K)
$f_{Rsi}$ = 0.78

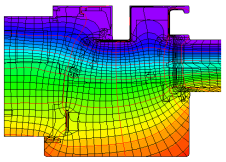
## Threshold

$b_f$ = 100.00 mm
$U_f$ = 1.09 W/(m² K)
$\Psi_g$ = 0.022 W/(m K)
$f_{Rsi}$ = 0.71

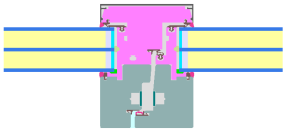
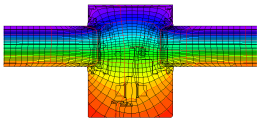
## Door
side

$b_f$ = 171.00 mm
$U_f$ = 0.70 W/(m² K)
$\Psi_g$ = 0.022 W/(m K)
$f_{Rsi}$ = 0.74

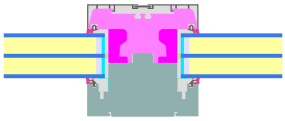
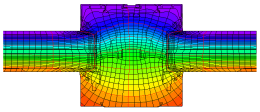
## Mullion
flying

$b_f$ = 100.00 mm
$U_f$ = 0.65 W/(m² K)
$\Psi_g$ = 0.020 W/(m K)
$f_{Rsi}$ = 0.77

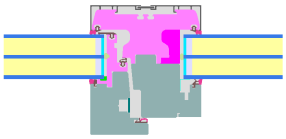
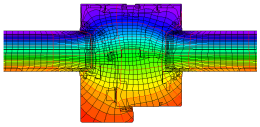
## Mullion
fixed

$b_f$ = 120.00 mm
$U_f$ = 0.58 W/(m² K)
$\Psi_g$ = 0.019 W/(m K)
$f_{Rsi}$ = 0.78

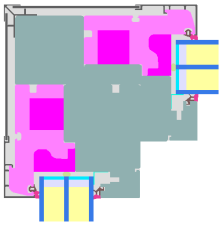
## Mullion
1 casement

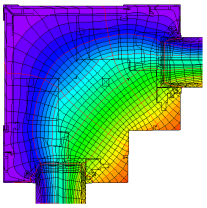
$b_f$ = 120.00 mm
$U_f$ = 0.63 W/(m² K)
$\Psi_g$ = 0.020 W/(m K)
$f_{Rsi}$ = 0.77

## Corner

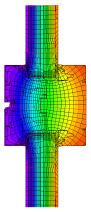
$b_f$ = 342.00 mm
$U_f$ = 0.31 W/(m² K)
$\Psi_g$ = 0.019 W/(m K)
$f_{Rsi}$ = 0.75





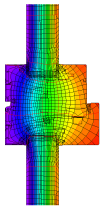
## Transom
fixed

$b_f$ = 120.00 mm
$U_f$ = 0.61 W/(m² K)
$\Psi_g$ = 0.019 W/(m K)
$f_{Rsi}$ = 0.78



## Transom
1 casement

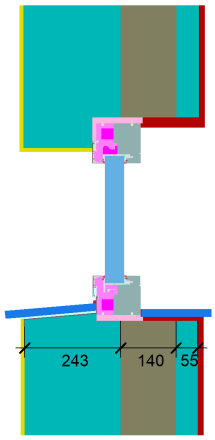
$b_f$ = 120.00 mm
$U_f$ = 0.66 W/(m² K)
$\Psi_g$ = 0.020 W/(m K)
$f_{Rsi}$ = 0.77



## Validated installations

### Formwork blocks (fixed)

$U_{Wall}$ = 0.11 W/(m² K)

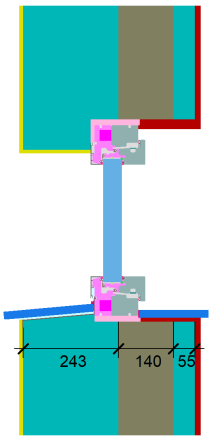



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.110 |
| Left | 0.002 |
| Right | 0.002 |
| Bottom | 0.029 |

$U_{W,installed}$ = 0.70 W/(m² K)

### Formwork blocks (operable)

$U_{Wall}$ = 0.11 W/(m² K)

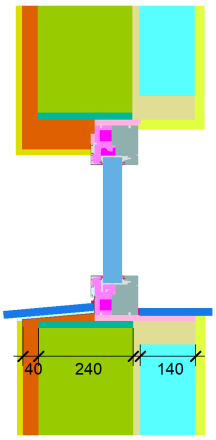



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.011 |
| Left | 0.000 |
| Right | 0.000 |
| Bottom | 0.029 |

$U_{W,installed}$ = 0.63 W/(m² K)

### Lightweight timber (fixed glazed)

$U_{Wall}$ = 0.10 W/(m² K)

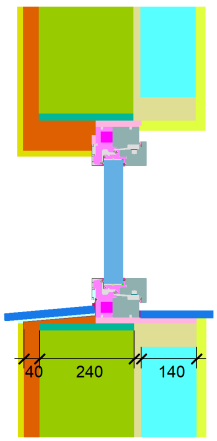



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.015 |
| Left | 0.011 |
| Right | 0.011 |
| Bottom | 0.030 |

$U_{W,installed}$ = 0.64 W/(m² K)

### Lightweight timber (operable)

$U_{Wall}$ = 0.10 W/(m² K)

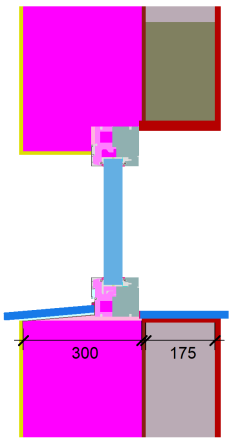



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | 0.015 |
| Left | 0.008 |
| Right | 0.008 |
| Bottom | 0.030 |

$U_{W,installed}$ = 0.64 W/(m² K)

### Exterior insulation and finishing s (EIFS) top (fixed glazing))

$U_{Wall}$ = 0.10 W/(m² K)

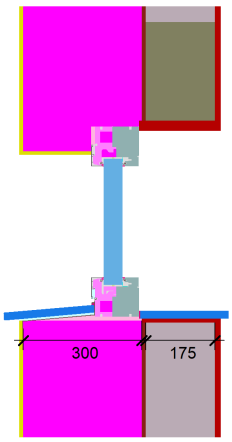



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | –0.002 |
| Left | 0.000 |
| Right | 0.000 |
| Bottom | 0.011 |

$U_{W,installed}$ = 0.61 W/(m² K)

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

$U_{Wall}$ = 0.10 W/(m² K)

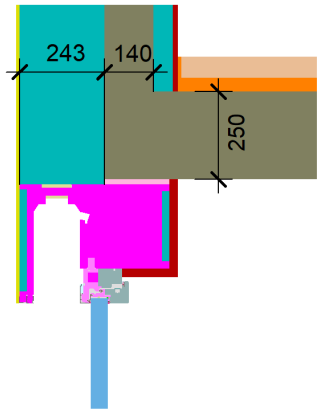



| $\Psi_{install}$ | W/(m K) |
|---|---|
| Top | –0.002 |
| Left | –0.002 |
| Right | –0.002 |
| Bottom | 0.011 |

$U_{W,installed}$ = 0.60 W/(m² K)

## Formwork blocks - top (operable) with shutter 1

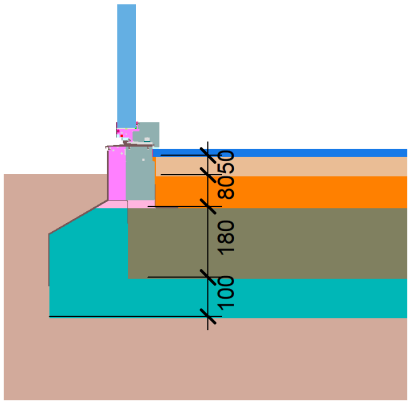
$U_1$ = 0.11 [W/(m² K)]




$\Psi_{install}$ = 0.02 W/(m K)

## Formwork blocks - threshold (operable)

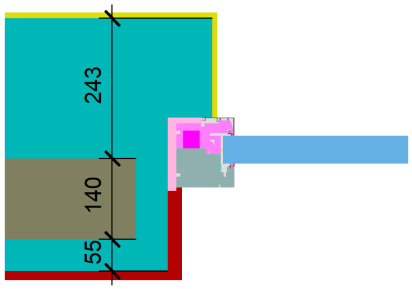
$U_1$ = 0.11 $U_2$ = 0.20 [W/(m² K)]




$\Psi_{install}$ = 0.03 W/(m K)

## Formwork blocks side (fixed)

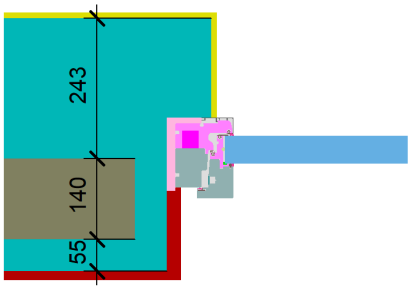
$U_1$ = 0.11 [W/(m² K)]




$\Psi_{install}$ = 0.00 W/(m K)

## Formwork blocks side (operable)

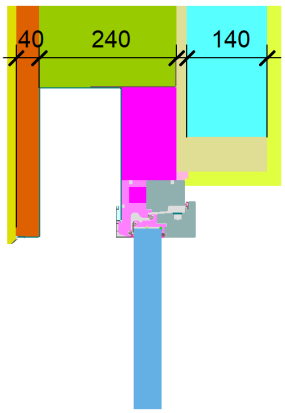
$U_1$ = 0.11 [W/(m² K)]




$\Psi_{install}$ = 0.00 W/(m K)

## Lighthweight timber top (operable) with shutter 1

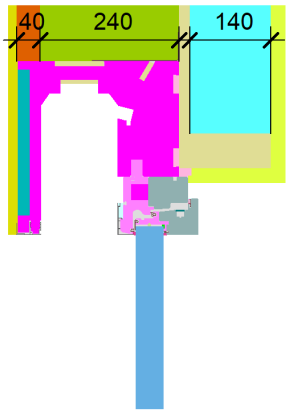
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.03 W/(m K)

## Lighthweight timber top (operable) with shutter 2

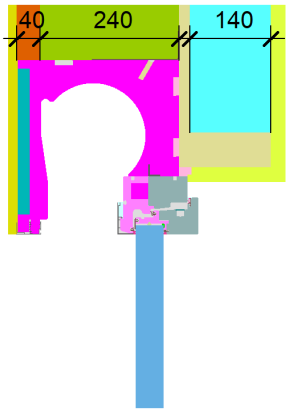
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.03 W/(m K)

## Lighthweight timber top (operable) with roller 1

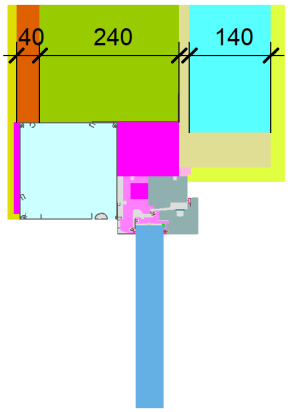
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.05 W/(m K)

## Lighthweight timber top (operable) with roller 2

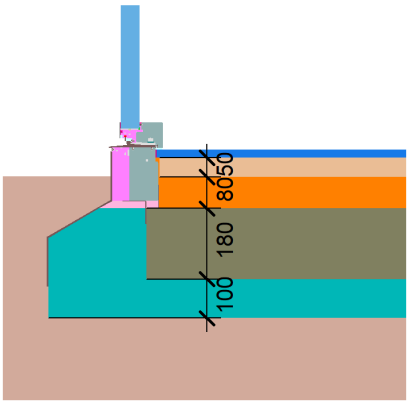
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.02 W/(m K)

## Lighthweight timber - threshold (operable)

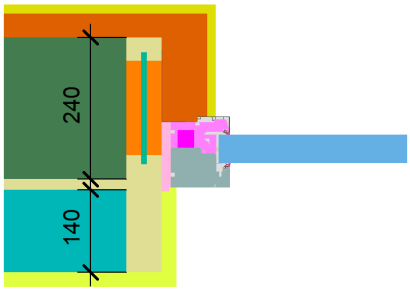
$U_1$ = 0.10 $U_2$ = 0.20 [W/(m² K)]




$\Psi_{install}$ = 0.04 W/(m K)

## Lighthweight timber side (fixed glazed)

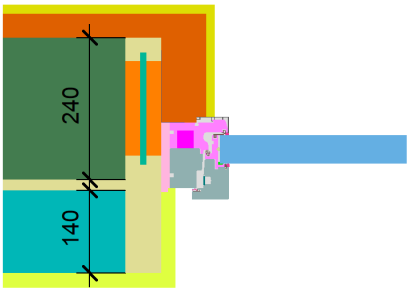
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.01 W/(m K)

## Lighthweight timber side (operable)

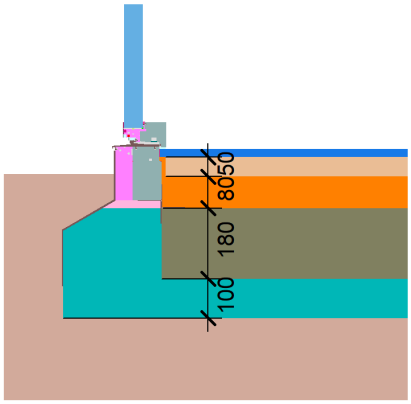
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.01 W/(m K)

## Exterior insulation and finishing s (EIFS) threshold (operable)

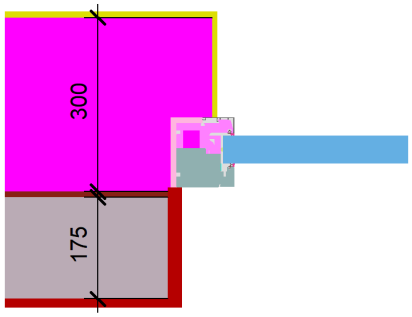
$U_1$ = 0.10 $U_2$ = 0.20 [W/(m² K)]




$\Psi_{install}$ = −0.01 W/(m K)

## Exterior insulation and finishing s (EIFS) side (fixed glazed)

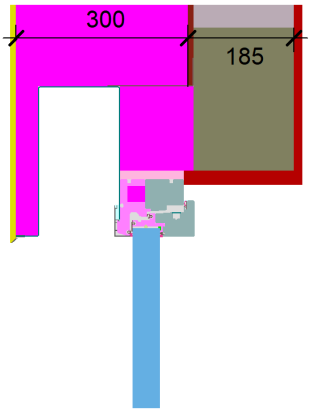
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.00 W/(m K)

## EIFS top (operable) with shutter 1

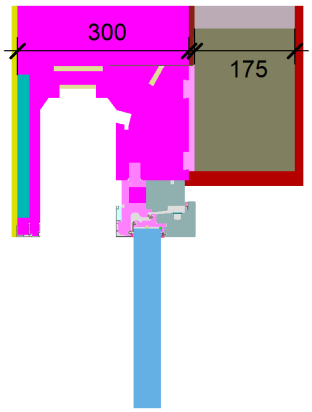
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.04 W/(m K)

## EIFS top (operable) with shutter 2

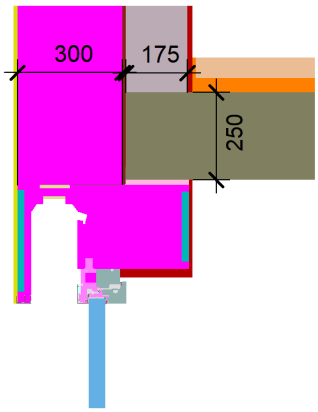
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.04 W/(m K)

## EIFS top (operable) with shutter 3

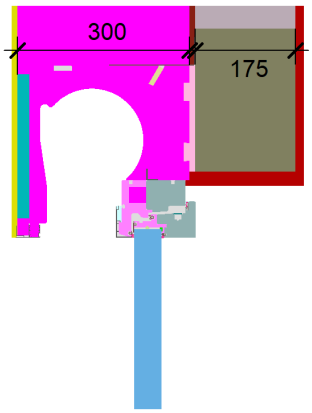
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.03 W/(m K)

## EIFS top (operable) with rollerblind 1

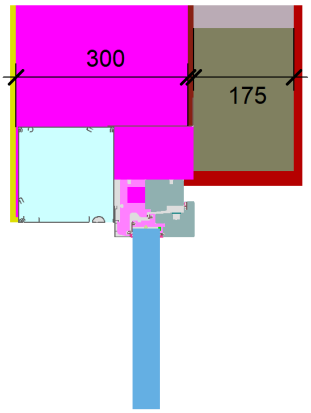
$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.06 W/(m K)

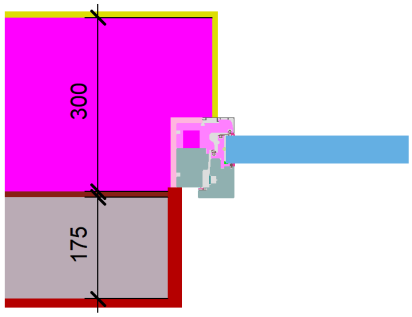
## EIFS top (operable) with rollerblind 2

$U_1$ = 0.10 [W/(m² K)]




$\Psi_{install}$ = 0.02 W/(m K)

$U_1$ = 0.10 [W/(m$^2$ K)]




$\Psi_{install}$ = –0.00 W/(m K)