# ND NTech Patio door

Calculation of U-value in avordance to NS-EN ISO 10077-1, 10077-2 and the programme “Therm”.
Centre U-value of glass is calculated in accordance to NS-EN 673.
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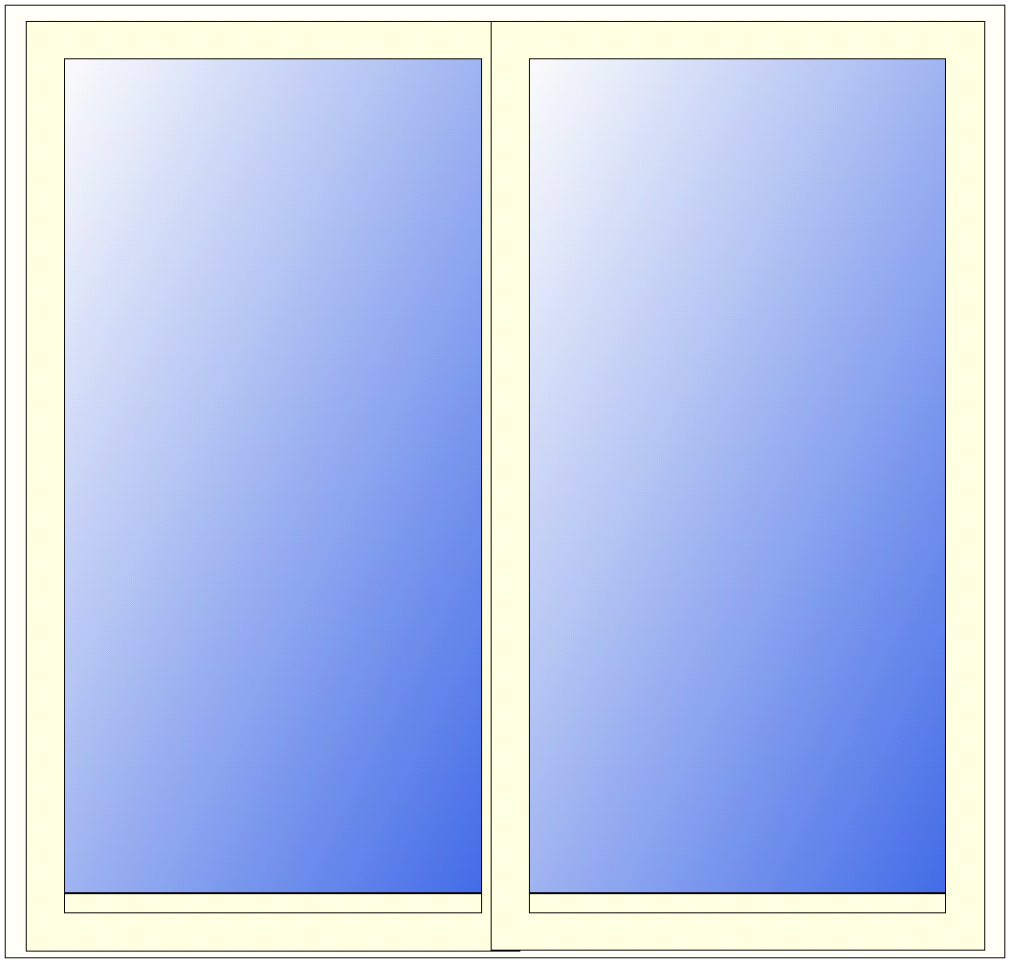
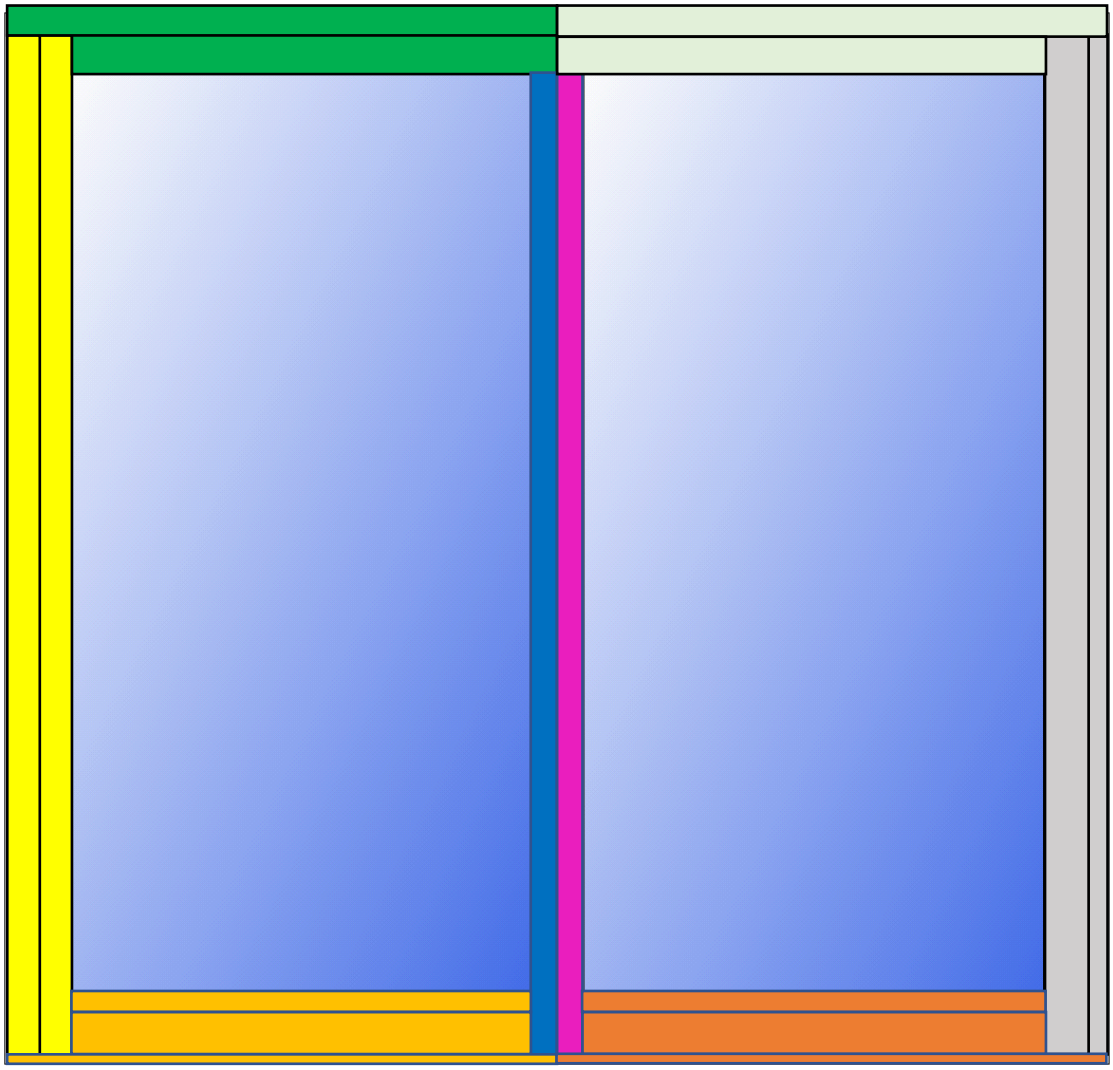
## Report of standard model

Date:
Version: SD, 2P
Type:
Model: ND NTech
Glass configuration: 4E+18G+4+18G+4E Planitherm Ultra N*, TGI*, Argon

## Main results and dimensions

U-value: 0,81W/m²K
Width: 2500mm
Height: 2180mm
Area: 5,45m²
Percent glass: 76,5%
g-value: 0,53
LT-value: 0,74
Ug-value: 0,53W/m²K

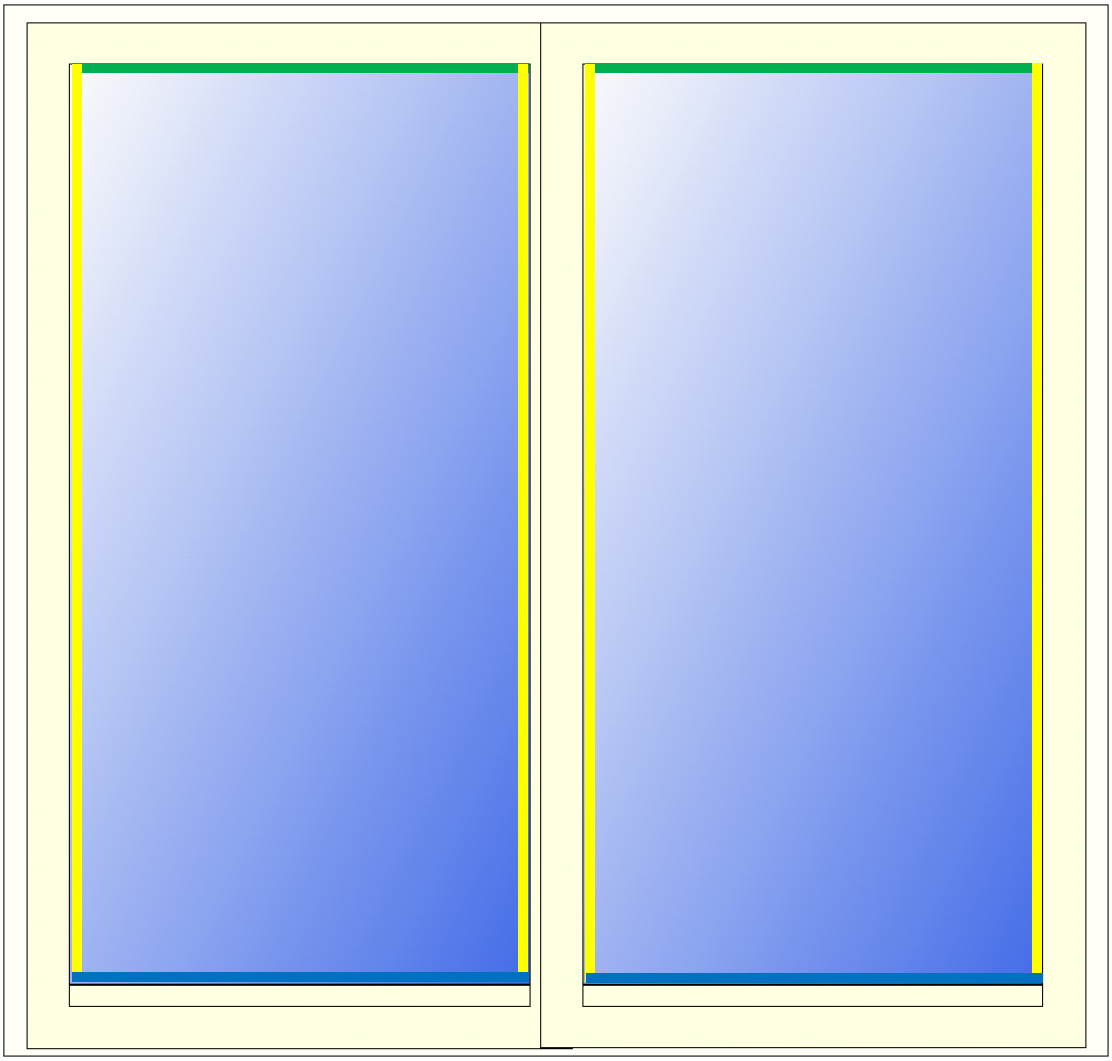




| Colour | Uf (W/m²K) | Width (m) | Name |
|---|---|---|---|
| | 1,18 | 0,123 | Jamb profile Left |
| | 1,09 | 0,123 | Jamb profile Right |
| | 1,23 | 0,111 | Head profile Left |
| | 1,95 | 0,111 | Head profile Right |
| | 1,21 | 0,049 | Midtrail profile Left |
| | 1,17 | 0,049 | Midtrail profile Right |
| | 1,53 | 0,136 | Sill profile Left |
| | 2,40 | 0,136 | Sill profile Right |

| Color | Uf (W/m²K) | Element area (m²) | *Percent element (%) |
|---|---|---|---|
| | 1,18 | 0,25 | 4,59 |
| | 1,23 | 0,13 | 2,39 |
| | 1,95 | 0,13 | 2,39 |
| | 1,09 | 0,25 | 4,59 |
| | 1,21 | 0,10 | 1,83 |
| | 1,16 | 0,10 | 1,83 |
| | 1,53 | 0,16 | 2,94 |
| | 2,40 | 0,16 | 2,94 |
| Sum | | 1,28 | 23,5 |

*: Figure in relation to the whole window



| Colour | PSI | Length (m) | Name |
|---|---|---|---|
| | 0,038 | 7,732 | TGI Jamb |
| | 0,038 | 2,156 | TGI Head |
| | 0,038 | 2,156 | TGI Sill |

| Color | Spacer length (m) | L Psi spacer (W/K) | *L Psi spacer (%) |
|---|---|---|---|
| | 3,866 | 0,147 | 32,1 |
| | 2,156 | 0,082 | 17,9 |
| | 3,866 | 0,147 | 32,1 |
| | 2,156 | 0,082 | 17,9 |
| Sum | 12,044 | 0,458 | 100 |

*: Figure in relation to the spacer

# U-Value window frame (Uf) Calculation according to EN ISO 10077-2

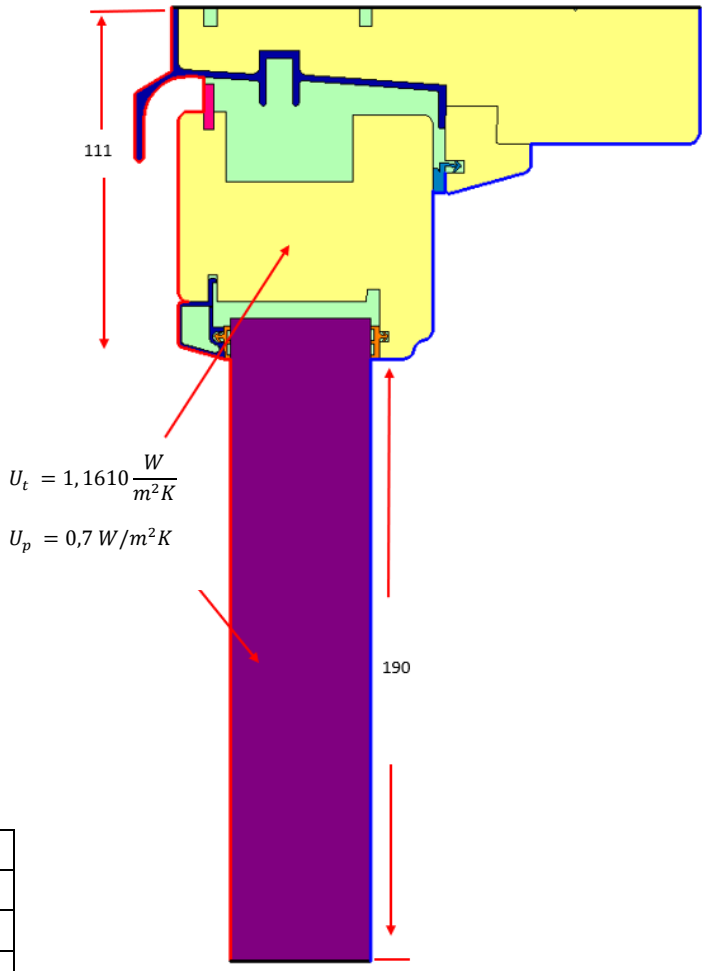
## ND NTech Villa Patio door
## Head

This example shows glas thicknes 39 - 51mm:

$U_t = 1,1610\ W/m^2K$
$B_f = 111\ mm$

$$U_f = \frac{L_f^{2D} - U_p * b_p}{b_f}$$
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 1,1610 * (0,111 + 0,19) = 0,349\ W/mK$$
$$U_f = \frac{0,349 - (0,7 * 0,19)}{0,111} = 1,95\ W/m^2K$$




| Boundary Conditions | Temp: °C | Hc: W/m²K |
|---|---|---|
| Exterior | 0 | 25 |
| Interior | 20 | 7,69 |

| Material: | λ(W/mK) | ρ |
|---|---|---|
| Pine | 0,12 | 0,9 |
| Aluminium | 160 | 0,9 |
| Panel | 0,035 | 0,9 |
| Gasket EPDM | 0,25 | 0,9 |
| Gasket QL | 0,03 | 0,9 |
| Frame cavity- Cen slightly ventilated | | |
| Frame cavity-Cen Simplified | | |

| $U_t$ | $U_p$ | $L_f^{2D}$ | $U_f$ |
|---|---|---|---|
| Glas thicknes 20-32mm | | | |
| | | | |
| Glas thicknes 33-38mm | | | |
| | | | |
| Glas thicknes 39-51mm | | | |
| 1,1610 | 0,70 | 0,349 | 1,95 |

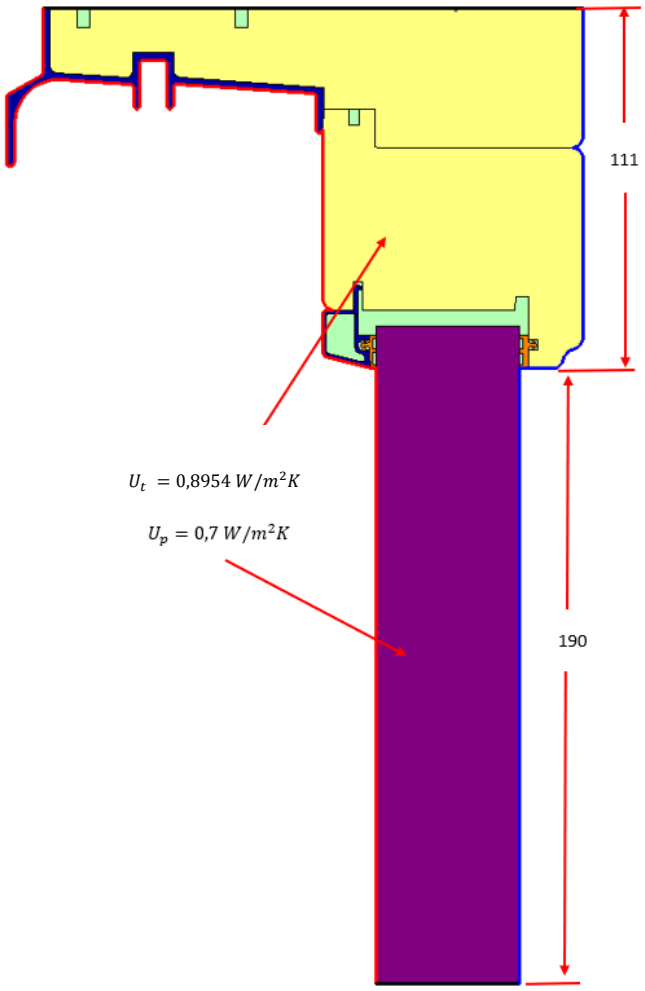
# ND NTech Villa Patio door
# Jamb by glass

This example shows glas thicknes 39 - 51mm:

$U_t = 0{,}8954\ W/m^2K$
$B_f = 111\ mm$

$$U_f = \frac{L_f^{2D} - U_p * b_p}{b_f}$$
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0{,}8954 * (0{,}111 + 0{,}19) = 0{,}270\ W/mK$$
$$U_f = \frac{0{,}270 - (0{,}7 * 0{,}19)}{0{,}111} = 1{,}23\ W/m^2K$$




| Boundary Conditions | Temp: °C | Hc: W/m²K |
|---|---|---|
| Exterior | 0 | 25 |
| Interior | 20 | 7,69 |

| Material: | λ(W/mK) | ϱ |
|---|---|---|
| Pine | 0,12 | 0,9 |
| Aluminium | 160 | 0,9 |
| Panel | 0,035 | 0,9 |
| Gasket EPDM | 0,25 | 0,9 |
| Gasket QL | 0,03 | 0,9 |
| Frame cavity- Cen slightly ventilated | | |
| Frame cavity-Cen Simplified | | |

| $U_t$ | $U_p$ | $L_f^{2D}$ | $U_f$ |
|---|---|---|---|
| Glas thicknes 20-32mm | | | |
| | | | |
| Glas thicknes 33-38mm | | | |
| | | | |
| Glas thicknes 39-51mm | | | |
| 0,8954 | 0,70 | 0,270 | 1,23 |

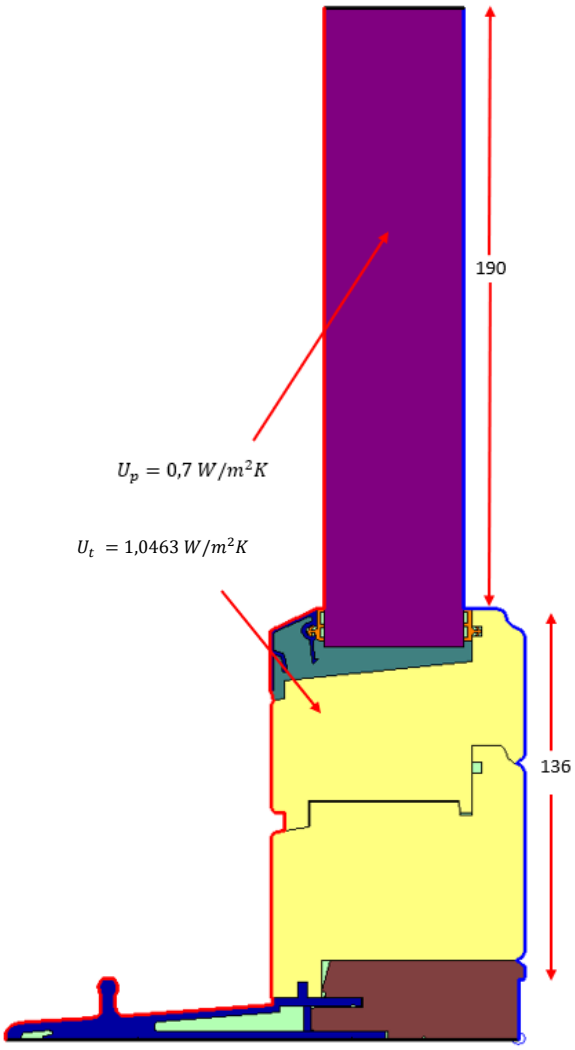
# ND NTech Villa Patio door
# Jamb by panel

This example shows glas thicknes 39 - 51mm:

$U_t = 1{,}0463\ W/m^2K$
$B_f = 136\ mm$

$$U_f = \frac{L_f^{2D} - U_p * b_p}{b_f}$$
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 1{,}0463 * (0{,}136 + 0{,}19) = 0{,}341\ W/mK$$
$$U_f = \frac{0{,}341 - (0{,}7 * 0{,}19)}{0{,}136} = 1{,}53\ W/m^2K$$




| Boundary Conditions | Temp: °C | Hc: W/m²K |
|---|---|---|
| Exterior | 0 | 25 |
| Interior | 20 | 7,69 |

| Material: | λ(W/mK) | ρ |
|---|---|---|
| Pine | 0,12 | 0,9 |
| Aluminium | 160 | 0,9 |
| Panel | 0,035 | 0,9 |
| Gasket EPDM | 0,25 | 0,9 |
| Gasket QL | 0,03 | 0,9 |
| Frame cavity- Cen slightly ventilated | | |
| Frame cavity-Cen Simplified | | |

| $U_t$ | $U_p$ | $L_f^{2D}$ | $U_f$ |
|---|---|---|---|
| Glas thicknes 20-32mm | | | |
| | | | |
| Glas thicknes 33-38mm | | | |
| | | | |
| Glas thicknes 39-51mm | | | |
| 1,0463 | 0,70 | 0,341 | 1,53 |

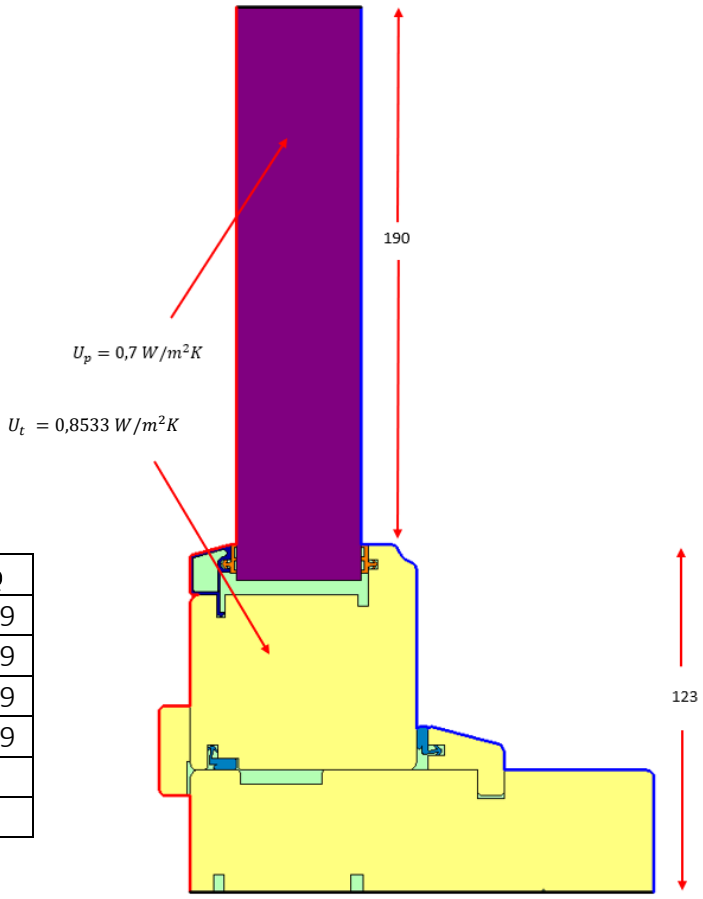
# ND NTech Villa Patio door
# Side – sliding fiels

This example shows glas thicknes 39 - 51mm:

$U_t = 0{,}8533\ W/m^2K$
$B_f = 123\ mm$

$$U_f = \frac{L_f^{2D} - U_p * b_p}{b_f}$$
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0{,}8533 * (0{,}123 + 0{,}19) = 0{,}267\ W/mK$$
$$U_f = \frac{0{,}267 - (0{,}7 * 0{,}19)}{0{,}123} = 1{,}09\ W/m^2K$$




| Boundary Conditions | Temp: °C | Hc: W/m²K |
|---|---|---|
| Exterior | 0 | 25 |
| Interior | 20 | 7,69 |

| Material: | λ(W/mK) | ρ |
|---|---|---|
| Pine | 0,12 | 0,9 |
| Aluminium | 160 | 0,9 |
| Panel | 0,035 | 0,9 |
| Gasket EPDM | 0,25 | 0,9 |
| Frame cavity- Cen slightly ventilated | | |
| Frame cavity-Cen Simplified | | |

| $U_t$ | $U_p$ | $L_f^{2D}$ | $U_f$ |
|---|---|---|---|
| Glas thicknes 20-32mm | | | |
| | | | |
| Glas thicknes 33-38mm | | | |
| | | | |
| Glas thicknes 39-51mm | | | |
| 0,8533 | 0,70 | 0,267 | 1,09 |

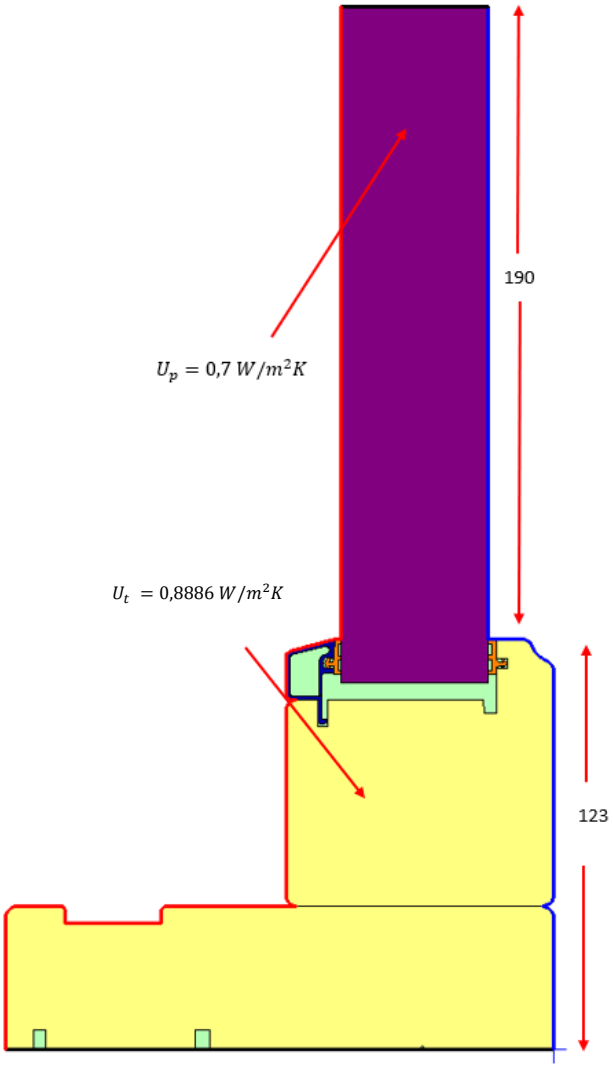
# ND NTech Villa Patio door
# Side – fixed field

This example shows glas thicknes 39 - 51mm:

$U_t = 0{,}8886\ W/m^2K$
$B_f = 123\ mm$

$$U_f = \frac{L_f^{2D} - U_p * b_p}{b_f}$$
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0{,}8886 * (0{,}123 + 0{,}19) = 0{,}278\ W/mK$$
$$U_f = \frac{0{,}278 - (0{,}7 * 0{,}19)}{0{,}123} = 1{,}18\ W/m^2K$$




| Boundary Conditions | Temp: °C | Hc: W/m²K |
|---|---|---|
| Exterior | 0 | 25 |
| Interior | 20 | 7,69 |

| Material: | λ(W/mK) | ϱ |
|---|---|---|
| Pine | 0,12 | 0,9 |
| Aluminium | 160 | 0,9 |
| Panel | 0,035 | 0,9 |
| Gasket EPDM | 0,25 | 0,9 |
| Frame cavity- Cen slightly ventilated | | |
| Frame cavity-Cen Simplified | | |

| $U_t$ | $U_p$ | $L_f^{2D}$ | $U_f$ |
|---|---|---|---|
| Glas thicknes 20-32mm | | | |
| | | | |
| Glas thicknes 33-38mm | | | |
| | | | |
| Glas thicknes 39-51mm | | | |
| 0,8886 | 0,70 | 0,278 | 1,18 |

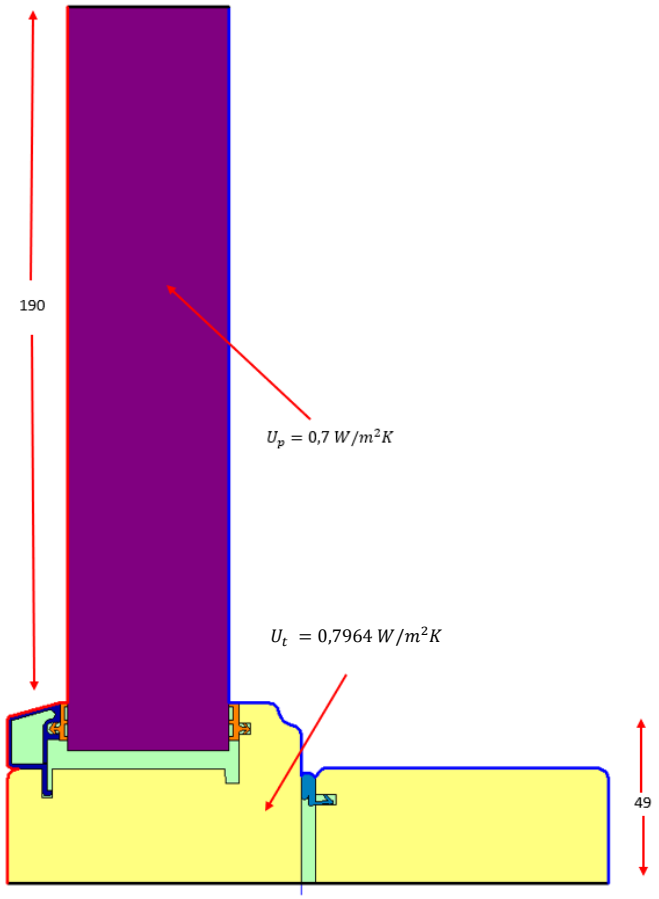
# ND NTech Villa Patio door
# Middel section – sliding field

This example shows glas thicknes 39 - 51mm:

$U_t = 0{,}7964\ W/m^2K$
$B_f = 49\ mm$

$$U_f = \frac{L_f^{2D} - U_p * b_p}{b_f}$$
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0{,}7964 * (0{,}049 + 0{,}19) = 0{,}190\ W/mK$$
$$U_f = \frac{0{,}190 - (0{,}7 * 0{,}19)}{0{,}049} = 1{,}16\ W/m^2K$$




| Boundary Conditions | Temp: °C | Hc: W/m²K |
|---|---|---|
| Exterior | 0 | 25 |
| Interior | 20 | 7,69 |

| Material: | λ(W/mK) | ρ |
|---|---|---|
| Pine | 0,12 | 0,9 |
| Aluminium | 160 | 0,9 |
| Panel | 0,035 | 0,9 |
| Gasket EPDM | 0,25 | 0,9 |
| Gasket QL | 0,03 | 0,9 |
| Climate gasket DX1466 | 0,15 | |
| Frame cavity- Cen slightly ventilated | | |
| Frame cavity-Cen Simplified | | |

| $U_t$ | $U_p$ | $L_f^{2D}$ | $U_f$ |
|---|---|---|---|
| Glas thicknes 20-32mm | | | |
| | | | |
| Glas thicknes 33-38mm | | | |
| | | | |
| Glas thicknes 39-51mm | | | |
| 0,7964 | 0,70 | 0,190 | 1,16 |

# ND NTech Villa Patio door
# Middel section – fixed field

This example shows glas thicknes 39 - 51mm:

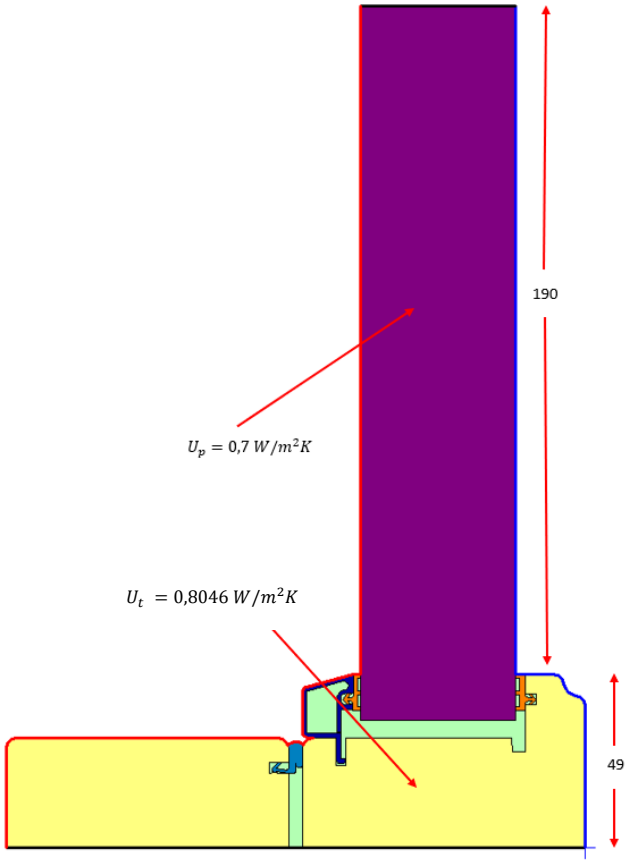
$U_t = 0{,}8046\ W/m^2K$
$B_f = 49\ mm$

$$U_f = \frac{L_f^{2D} - U_p * b_p}{b_f}$$
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0{,}8046 * (0{,}049 + 0{,}19) = 0{,}192\ W/mK$$
$$U_f = \frac{0{,}192 - (0{,}7 * 0{,}19)}{0{,}049} = 1{,}21\ W/m^2K$$

| Boundary Conditions | Temp: °C | Hc: W/m²K |
|---|---|---|
| Exterior | 0 | 25 |
| Interior | 20 | 7,69 |

| Material: | λ(W/mK) | ρ |
|---|---|---|
| Pine | 0,12 | 0,9 |
| Aluminium | 160 | 0,9 |
| Panel | 0,035 | 0,9 |
| Gasket EPDM | 0,25 | 0,9 |
| Gasket QL | 0,03 | 0,9 |
| Climate gasket DX1466 | 0,15 | 0,9 |
| Frame cavity- Cen slightly ventilated | | |
| Frame cavity-Cen Simplified | | |




| $U_t$ | $U_p$ | $L_f^{2D}$ | $U_f$ |
|---|---|---|---|
| Glas thicknes 20-32mm | | | |
| | | | |
| Glas thicknes 33-38mm | | | |
| | | | |
| Glas thicknes 39-51mm | | | |
| 0,8046 | 0,70 | 0,192 | 1,21 |