

Product property: Passive

Frame: 105

Applicable for product codes:  
BE, TE

## ND NTech Villa Balcony door

Calculation of U-value in accordance 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.

Head Office: NorDan AS, Stasjonsveien 46. 4460 Moi, Norway. Web: [www.nordan.uk](http://www.nordan.uk)

### Report of standard model

Date: 02.07.2021

Version: TE/BE 105 Passiv

Type: Outward opening sash

Model: ND NTech Villa 105 Passiv

Glass configuration: 4E+18G+4+18G+4E Planitherm Ultra N\*, TGI\*, Argon

### Main results and dimensions

U-value: 0,76W/m<sup>2</sup>K

Width: 988mm

Height: 2088mm

Area: 2,063m<sup>2</sup>

Percent glass: 34,5%

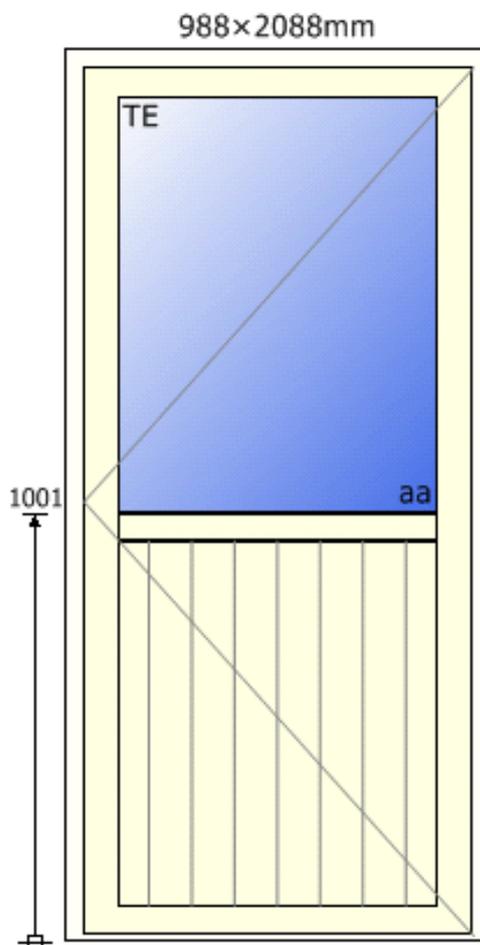
Percent panel: 30,2%

g-value: 0,53

LT-value: 0,74

Ug-value: 0,53W/m<sup>2</sup>K

Up-value: 0,46W/m<sup>2</sup>K



# U-value Calculations - ND NTech Villa Balcony passive door



Document ID: 000913(1.00)

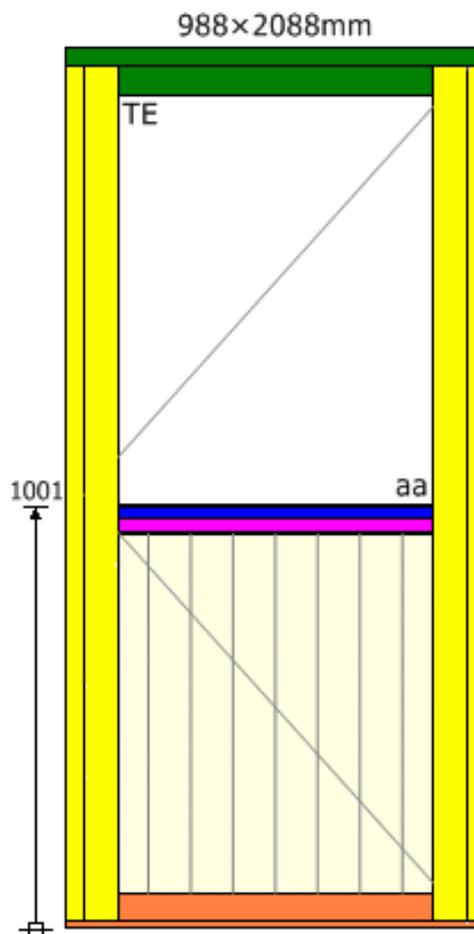
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Colour	Uf (W/m <sup>2</sup> K)	Width (m)	Name
Yellow	0,93	0,124	Jamb profile
Green	0,84	0,125	Head profile
Blue	1,73	0,031	Midrail profile
Pink	0,92	0,031	Midrail profile
Orange	1,60	0,096	Sill profile

Color	Uf (W/m <sup>2</sup> K)	Element area (m <sup>2</sup> )	*Percent element (%)
Yellow	0,93	0,245	11,90
Green	0,84	0,107	5,20
Yellow	0,93	0,245	11,90
Blue	1,73	0,023	1,15
Pink	0,92	0,023	1,15
Orange	1,60	0,083	4,00
Sum		0,726	35,30

\*: Figure in relation to the whole window

# U-value Calculations - ND NTech Villa Balcony passive door



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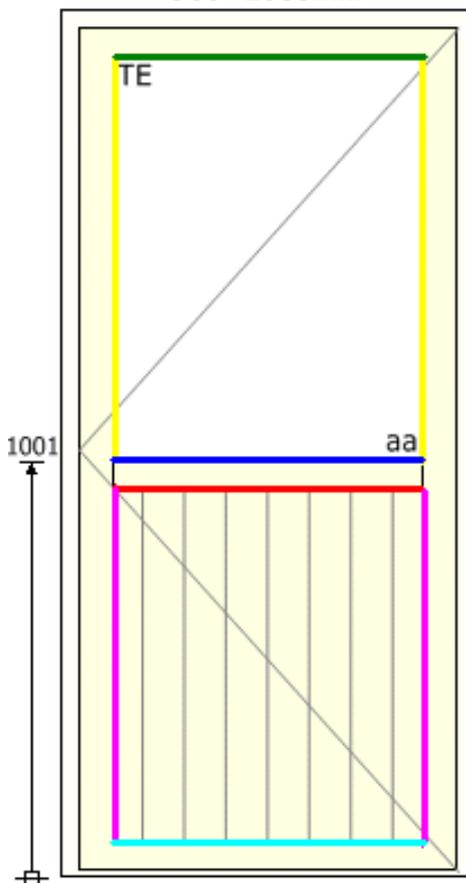
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Colour	PSI	Length (m)	Name
Yellow	0,038	1,924	TGI Jamb
Green	0,038	0,740	TGI Head
Blue	0,038	0,740	TGI Sill
Pink/Red/Cyan	0,000		Ins.Panel

Color	Spacer length (m)	L Psi spacer (W/K)	*L Psi spacer (%)
Yellow	0,962	0,037	28,5
Green	0,740	0,028	21,5
Yellow	0,962	0,037	28,5
Blue	0,740	0,028	21,5
Sum	3,404	0,130	100

\*: Figure in relation to the spacer

## U-Value window frame (U<sub>f</sub>) Calculation according to EN ISO 10077-2

### ND NTech Villa Balcony door Head

This example shows glas thicknes 39 - 51mm:

$$U_t = 0,7556 \text{ W/m}^2\text{K}$$

$$B_f = 125 \text{ mm}$$

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

$$L_f^{2D} = U_t * L$$

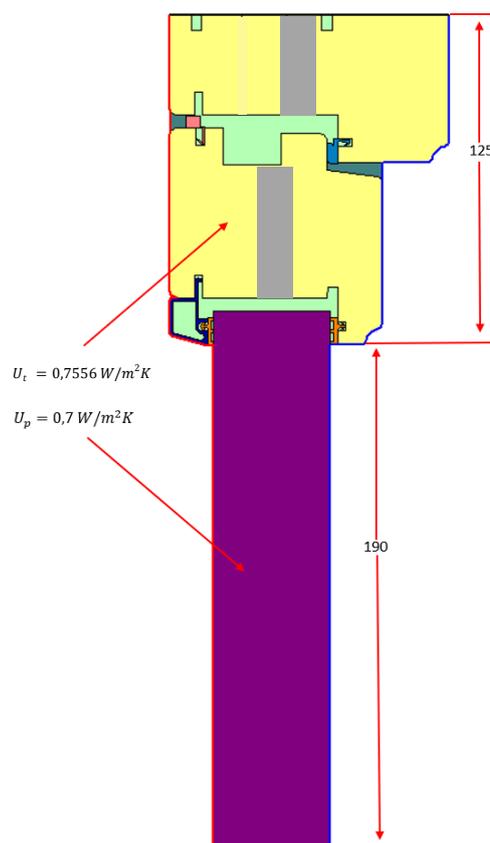
$$L_f^{2D} = 0,7556 * (0,125 + 0,19) = 0,238 \text{ W/mK}$$

$$U_f = \frac{0,238 - (0,7 * 0,19)}{0,125} = 0,84 \text{ W/m}^2\text{K}$$

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
Brush gasket DX1466	0,15	0,9
Gasket QL	0,03	0,9
Frame cavity- Cen slightly ventilated		
Frame cavity-Cen Simplified		

U <sub>t</sub>	U <sub>p</sub>	L <sub>f</sub> <sup>2D</sup>	U <sub>f</sub>
Glas thicknes 20-32mm			
Glas thicknes 33-38mm			
Glas thicknes 39-51mm			
0,7556	0,70	0,238	0,84



### ND NTech Villa Balcony door Jamb by glass

This example shows glas thicknes 39 - 51mm:

# U-value Calculations - ND NTech Villa Balcony passive door



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$$U_t = 0,7908 \text{ W/m}^2\text{K}$$

$$B_f = 124 \text{ mm}$$

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

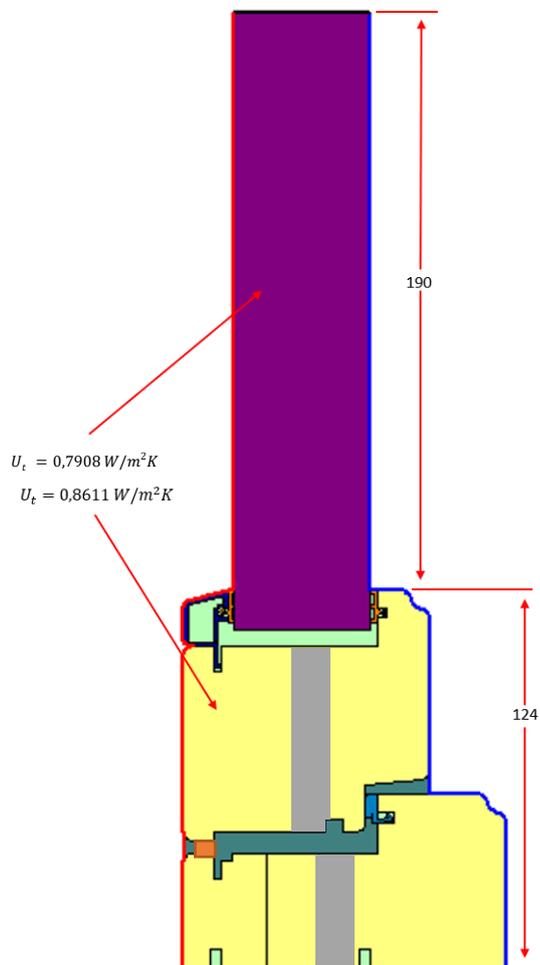
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0,7908 * (0,124 + 0,19) = 0,2483 \text{ W/mK}$$

$$U_f = \frac{0,2483 - (0,7 * 0,19)}{0,124} = 0,93 \text{ W/m}^2\text{K}$$

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

Material:	$\lambda$ (W/mK)	$\rho$
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	
0,7908	0,70	0,2483	0,93

## ND NTech Villa Balcony door Jamb by panel

This example shows glas thicknes 39 - 51mm:

$$U_t = 0,6889 \text{ W/m}^2\text{K}$$

$$B_f = 124 \text{ mm}$$

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

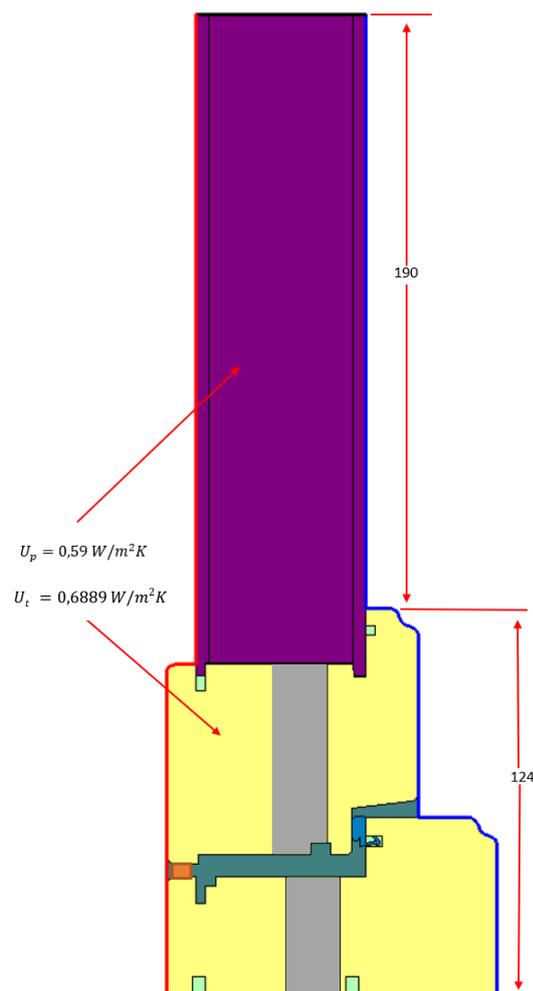
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0,6889 * (0,124 + 0,19) = 0,2163 \text{ W/mK}$$

$$U_f = \frac{0,2163 - (0,59 * 0,19)}{0,124} = 0,84 \text{ W/m}^2\text{K}$$

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

Material:	λ(W/mK)	e
 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			
0,6889	0,59	0,2163	0,84

## ND NTech Villa Balcony door Over panel

This example shows glas thicknes 39 - 51mm:

$$U_t = 0,8443 \text{ W/m}^2\text{K}$$

$$B_f = 31 \text{ mm}$$

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

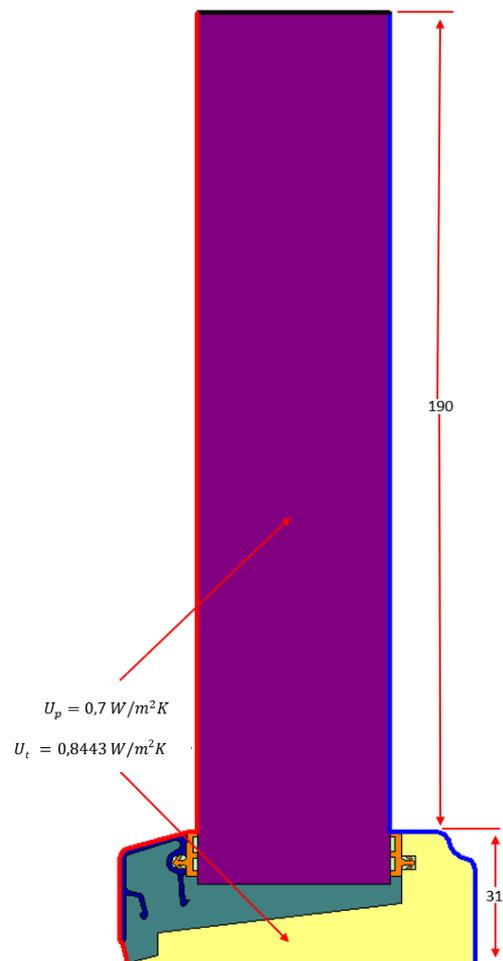
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0,8443 * (0,031 + 0,19) = 0,1866 \text{ W/mK}$$

$$U_f = \frac{0,1866 - (0,7 * 0,19)}{0,031} = 1,73 \text{ W/m}^2\text{K}$$

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

Material:	$\lambda$ (W/mK)	$\rho$
 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			
0,8443	0,70	0,1866	1,73

## ND NTech Villa Balcony door Under panel

This example shows glas thicknes 39 - 51mm:

$$U_t = 0,6362 \text{ W/m}^2\text{K}$$

$$B_f = 31 \text{ mm}$$

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

$$L_f^{2D} = U_t * L$$

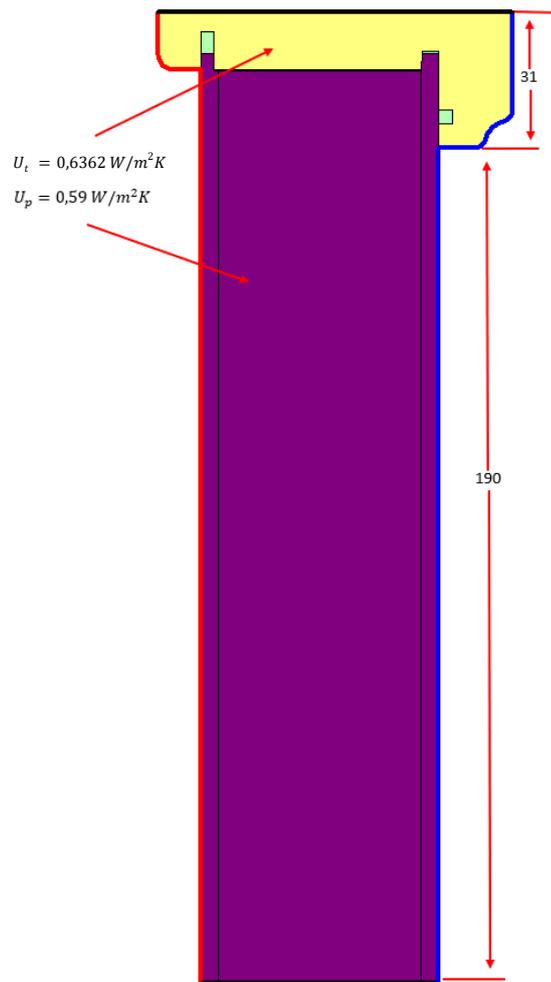
$$L_f^{2D} = 0,6362 * (0,031 + 0,19) = 0,1406 \text{ W/mK}$$

$$U_f = \frac{0,1406 - (0,59 * 0,19)}{0,031} = 0,92 \text{ W/m}^2\text{K}$$

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			
0,6362	0,59	0,1406	0,92



## ND NTech Villa Balcony door Cill panel

This example shows glas thicknes 39 - 51mm:

$$U_t = 0,929 \text{ W/m}^2\text{K}$$

$$B_f = 96 \text{ mm}$$

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

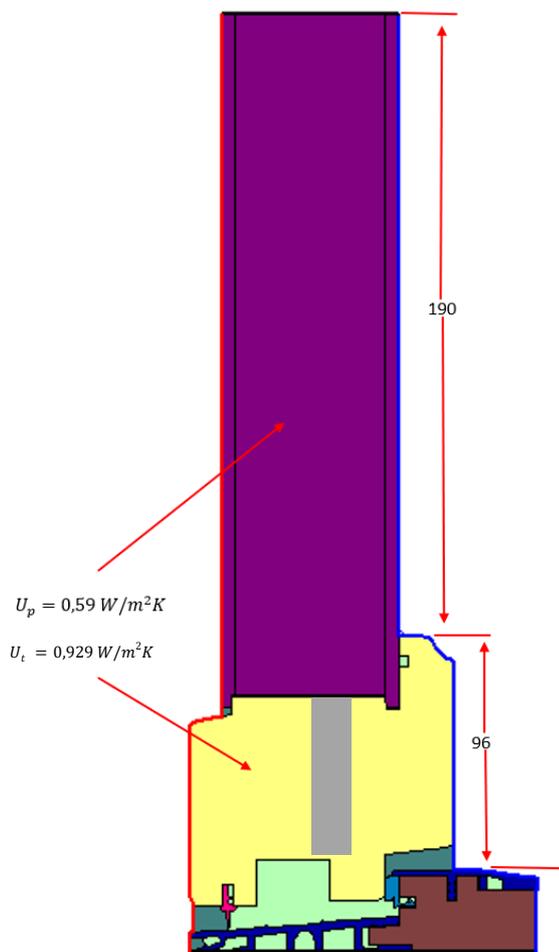
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 0,929 * (0,096 + 0,19) = 0,2657 \text{ W/mK}$$

$$U_f = \frac{0,2657 - (0,59 * 0,19)}{0,096} = 1,6 \text{ W/m}^2\text{K}$$

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			
0,929	0,59	0,2657	1,6

## ND NTech Villa Balcony door Cill MP

This example shows glas thicknes 39 - 51mm:

$$U_t = 1,096 \text{ W/m}^2\text{K}$$

$$B_f = 136 \text{ mm}$$

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

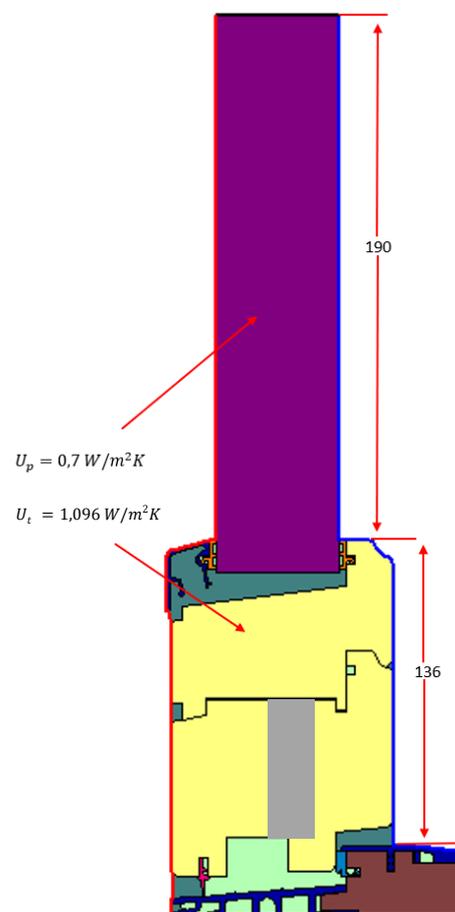
$$L_f^{2D} = U_t * L$$

$$L_f^{2D} = 1,096 * (0,136 + 0,19) = 0,3574 \text{ W/mK}$$

$$U_f = \frac{0,3574 - (0,7 * 0,19)}{0,136} = 1,65 \text{ W/m}^2\text{K}$$

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

Material:	λ(W/mK)	ϑ
 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			
1,096	0,70	0,3574	1,65