PHPP Input Data-Sheet

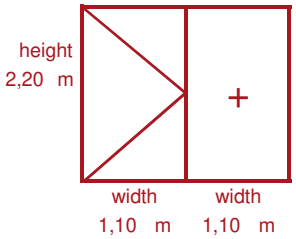
Short report | Based on ISO 10077-2 | Performed by: Passive House Institute Dr. Wolfgang Feist, Author: Dr.-Ing. Benjamin Krick

On behalf of: Moralt AG, Hausham, GERMANY
Project/Product: FERRO PASSIV

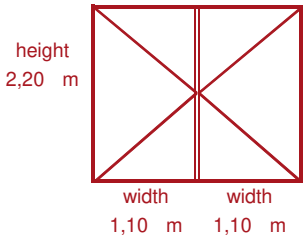
Description	Door leaf / Glazing		Uf value [W/(m²K)]				Frame Width [m]				Glazing Edge Ψ-value [W/(m²K)]				Temperature factor (min)	Overall U-value
	U_{dl}-value [W/(m²K)]	U_g-value [W/(m²K)]	Lock s.	Hinge s.	Sill	Head	Lock s.	Hinge s.	Sill	Head	Lock s.	Hinge s.	Sill	Head	$f_{Rsi=0,25}$ [-]	[W/(m²K)]
FERRO PASSIV	0,37		1,12	1,38	1,96	1,38	0,199	0,114	0,080	0,114	0,001	0,003	0,003	0,003	0,46	**0,71**
FERRO PASSIV side light		0,60	1,09	1,09	1,09	1,09	0,087	0,087	0,087	0,087	0,026	0,026	0,026	0,026	0,71	**0,77**
Flying mullion	0,37	0,60	1,01				0,284				0,001				0,72	
Mullion 1 casement	0,37	0,60	1,13				0,252				0,014				0,69	
Transom 1 casement	0,37	0,60	1,31				0,167				0,014				0,70	
Glass insert	0,37	0,60									0,040				0,76	

Drawings and material data were provided by the manufacturer. The sole resonibility for the provided information lies with the manufacturer.
fRsi and PSIg- values of side- and top light were determined with Ug=0,7 W/(m²K).

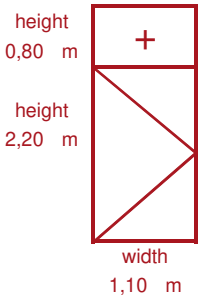
With side light



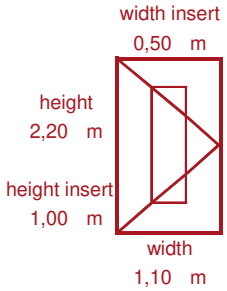
Double wing



With top light



With glass insert

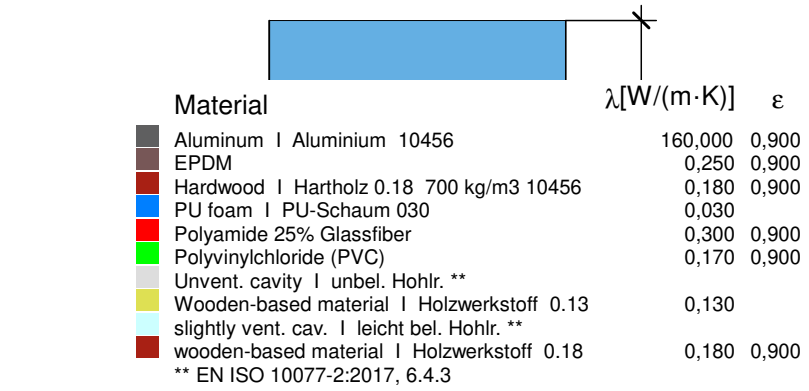


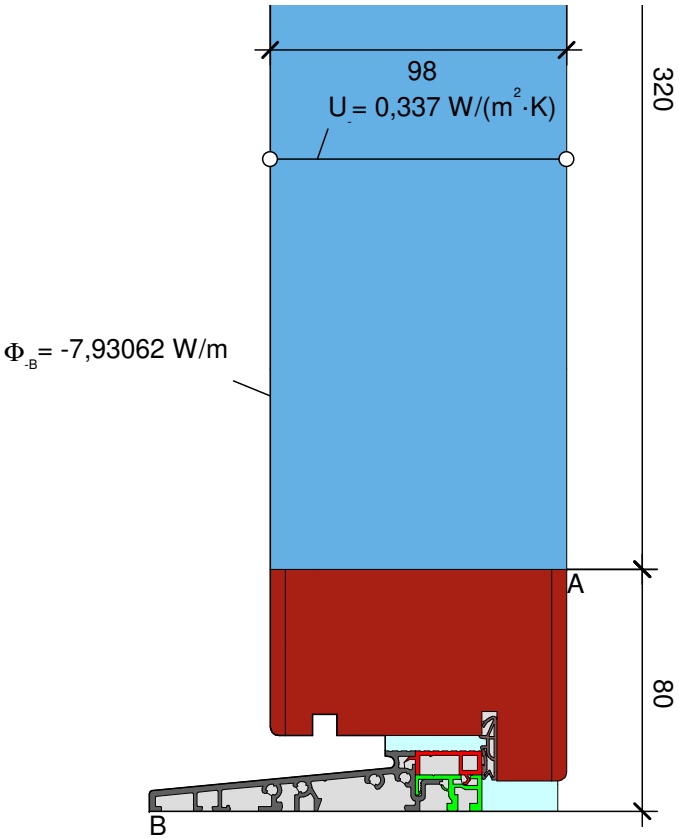
comfort criterion for cool-temperate climate zone achieved

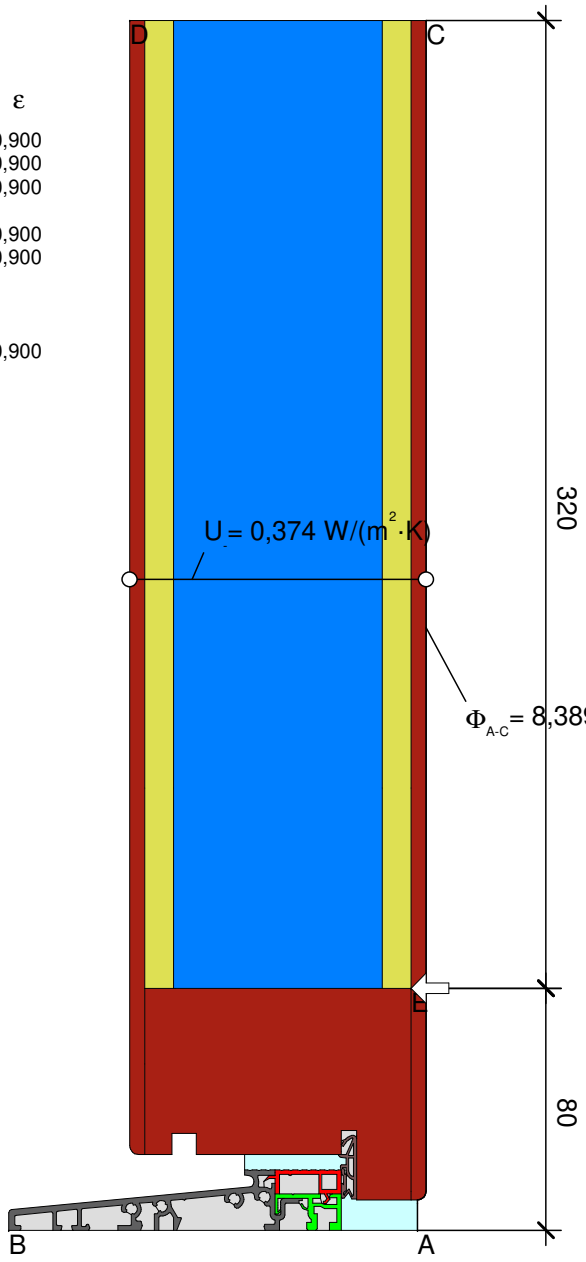
U-value U_D [W/(m²K)]	0,73	0,67	0,75	0,80

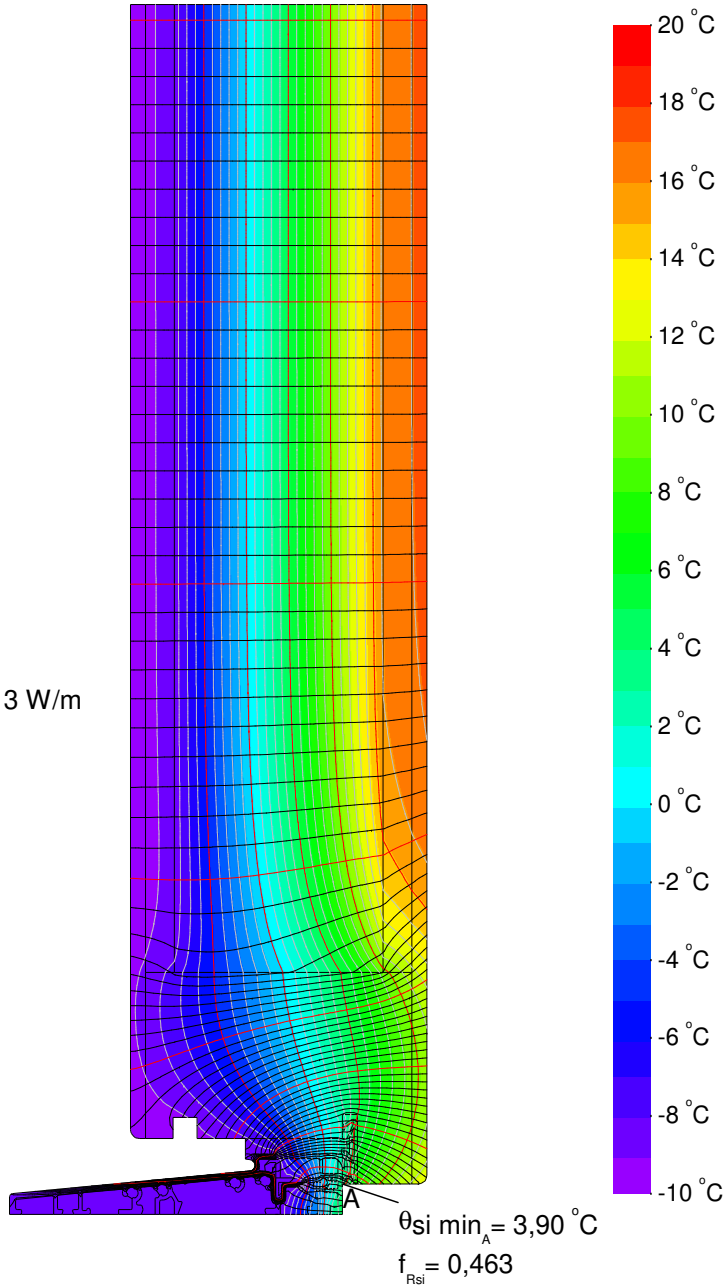
Suitable for climate zone

arctic	cold	cool-temperate	warm-temperate	warm	hot	very hot
		✓	✓	✓	✓	✓





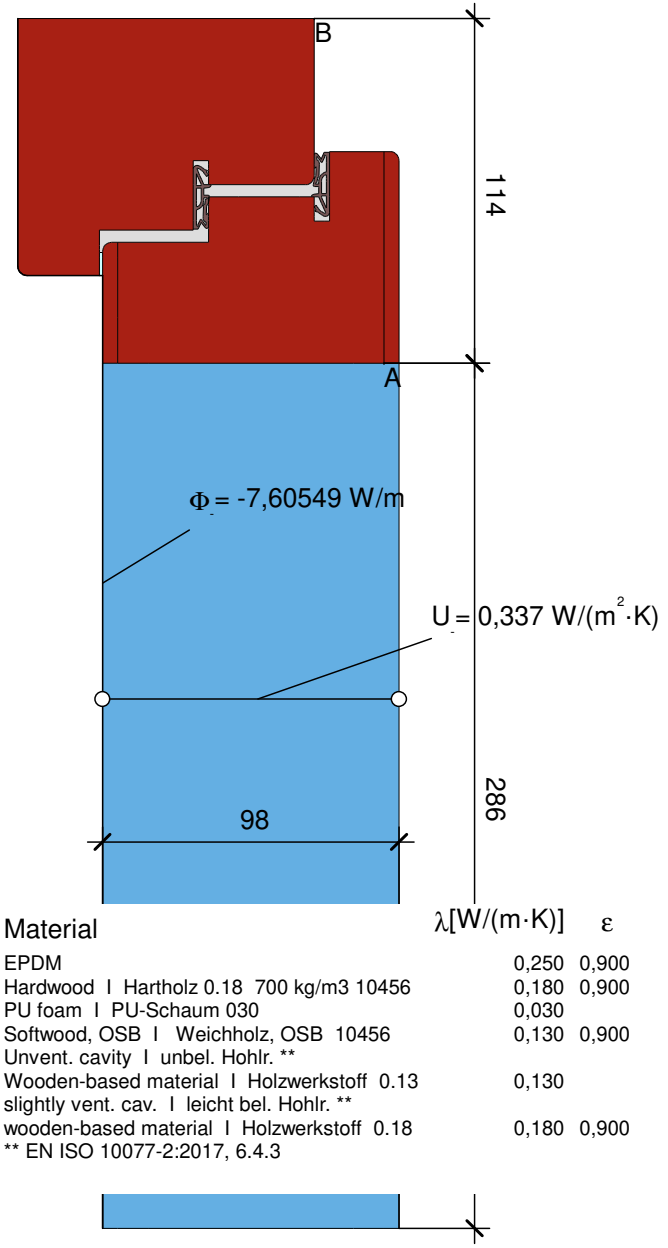




$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{7{,}931}{30{,}000} - 0{,}337 \cdot 0{,}320}{0{,}080} = 1{,}958\ \text{W/(m}^2\cdot\text{K)}$$

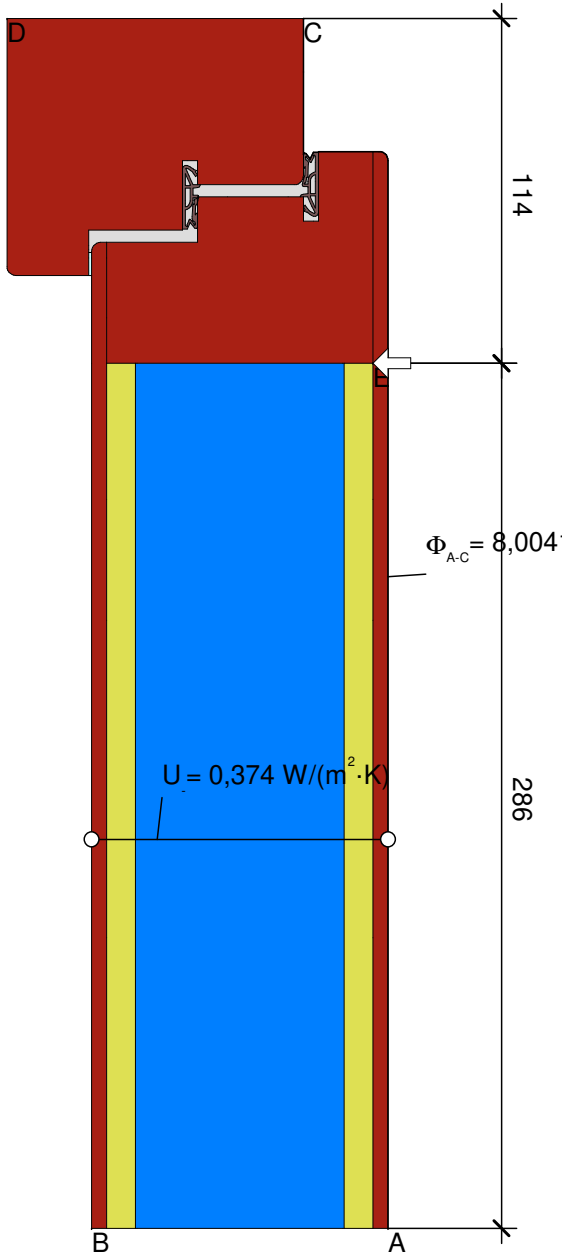
$$\psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8{,}389}{30{,}000} - 1{,}958 \cdot 0{,}080 - 0{,}374 \cdot 0{,}320 = 0{,}003\ \text{W/(m·K)}$$

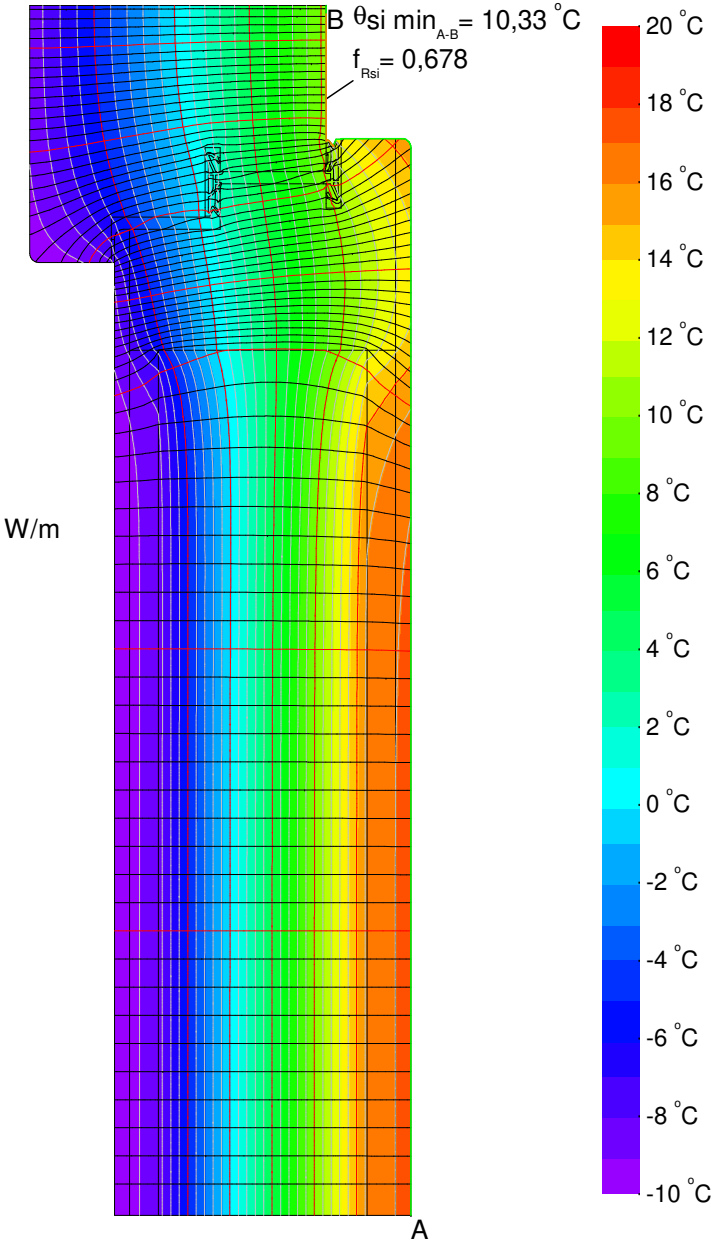
th - THRESHOLD I SCHWELLE



Material	λ[W/(m·K)]	ε
EPDM	0,250	0,900
Hardwood I Hartholz 0.18 700 kg/m3 10456	0,180	0,900
PU foam I PU-Schaum 030	0,030	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900
Unvent. cavity I unbel. Hohlr. **		
Wooden-based material I Holzwerkstoff 0.13	0,130	
slightly vent. cav. I leicht bel. Hohlr. **		
wooden-based material I Holzwerkstoff 0.18	0,180	0,900

** EN ISO 10077-2:2017, 6.4.3

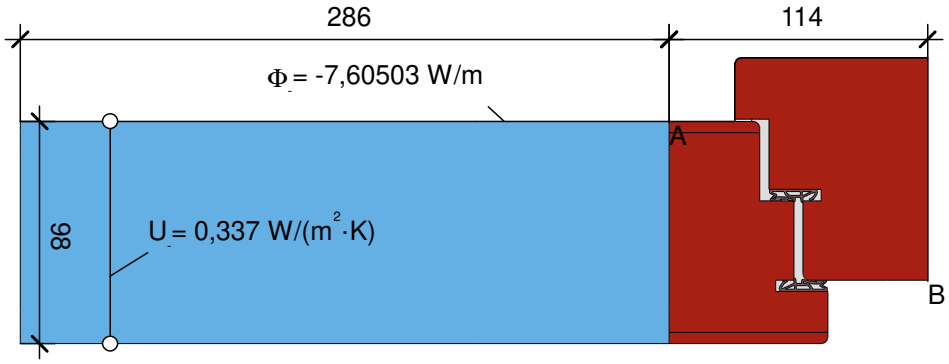




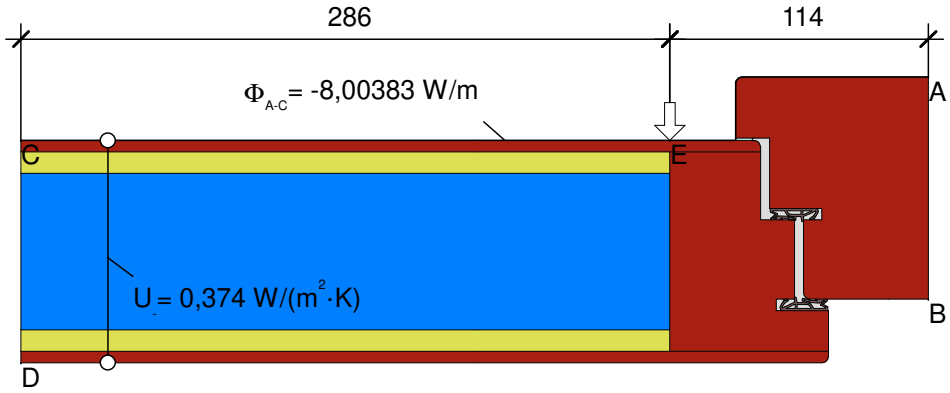
$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{7{,}605}{30{,}000} - 0{,}337 \cdot 0{,}286}{0{,}114} = 1{,}379\ \text{W/(m}^2\text{·K)}$$

$$\psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8{,}004}{30{,}000} - 0{,}374 \cdot 0{,}286 - 1{,}379 \cdot 0{,}114 = 0{,}003\ \text{W/(m·K)}$$

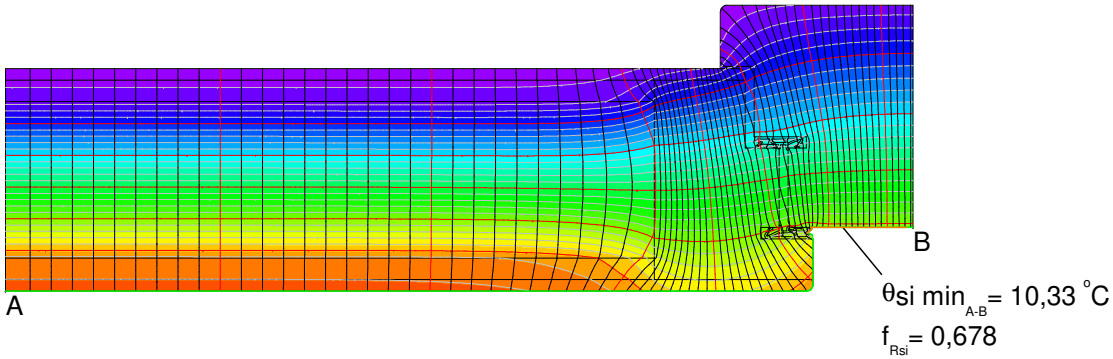
to - TOP I OBEN



$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{7{,}605}{30{,}000} - 0{,}337 \cdot 0{,}286}{0{,}114} = 1{,}379\ W/(m^2 \cdot K)$$



$$\psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8{,}004}{30{,}000} - 1{,}379 \cdot 0{,}114 - 0{,}374 \cdot 0{,}286 = 0{,}003\ W/(m \cdot K)$$

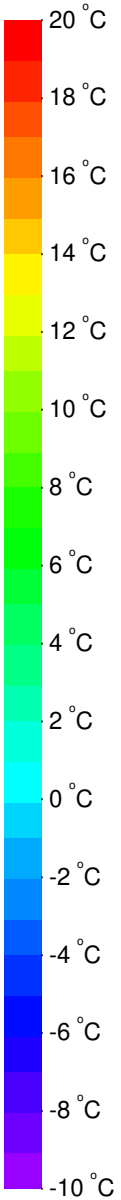


Material	λ[W/(m·K)]	ε
EPDM	0,250	0,900
Hardwood I Hartholz 0.18 700 kg/m3 10456	0,180	0,900
PU foam I PU-Schaum 030	0,030	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900
Unvent. cavity I unbel. Hohlr. **		
Wooden-based material I Holzwerkstoff 0.13	0,130	
slightly vent. cav. I leicht bel. Hohlr. **		
wooden-based material I Holzwerkstoff 0.18	0,180	0,900

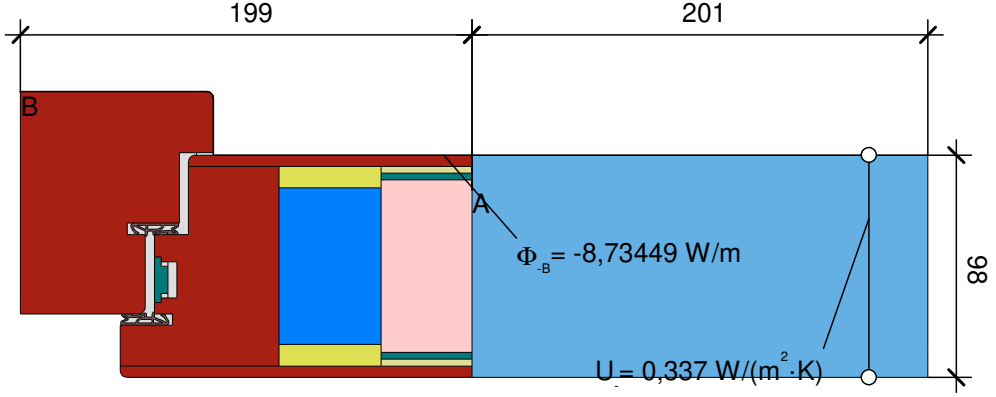
** EN ISO 10077-2:2017, 6.4.3

Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
Interior, frame, normal		20,000	0,130	
Interior, frame, reduced		20,000	0,200	
e 0,9 Cavity I Hohlraum				0,900

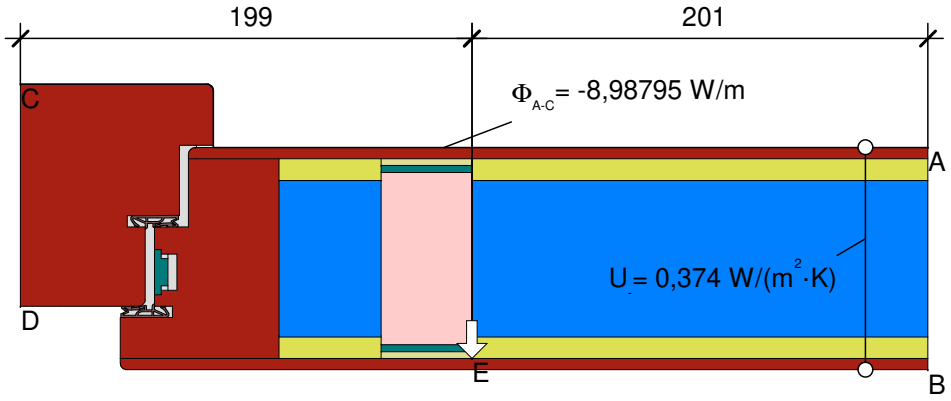
Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
e 0,9 Cavity I Hohlraum				0,900
fRsi: Interior | Innen		20,000	0,250	



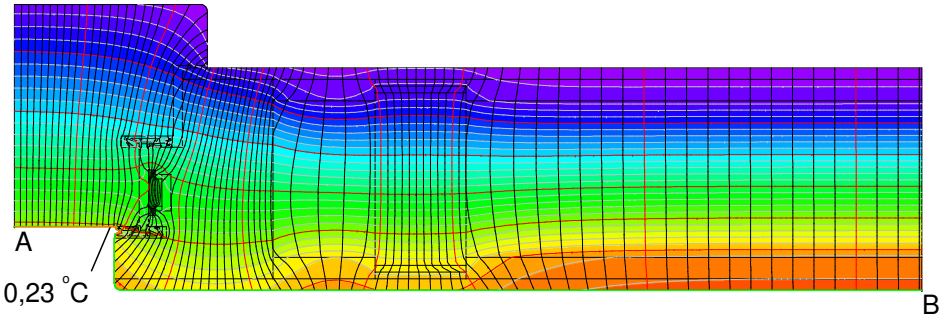
si HINGE SIDE I BANDSEITE



$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{8{,}734}{30{,}000} - 0{,}337 \cdot 0{,}201}{0{,}199} = 1{,}123\ \mathrm{W/(m^2 \cdot K)}$$



$$\psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8{,}988}{30{,}000} - 0{,}374 \cdot 0{,}201 - 1{,}123 \cdot 0{,}199 = 0{,}001\ \mathrm{W/(m \cdot K)}$$



$\theta_{si\ min\,A\text{-}B}$= 10,23 °C

f_{Rsi}= 0,674

Material	λ[W/(m·K)]	ε
Balsa qsenkrecht_0.11 W/(mK)	0,110	
EPDM	0,250	0,900
Hardwood I Hartholz 0.18 700 kg/m3 10456	0,180	0,900
PU foam I PU-Schaum 030	0,030	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900
Steel I Stahl	50,000	0,900
Unvent. cavity I unbel. Hohlr. **		
Wooden-based material I Holzwerkstoff 0.13	0,130	
slightly vent. cav. I leicht bel. Hohlr. **		
wooden-based material I Holzwerkstoff 0.18	0,180	0,900

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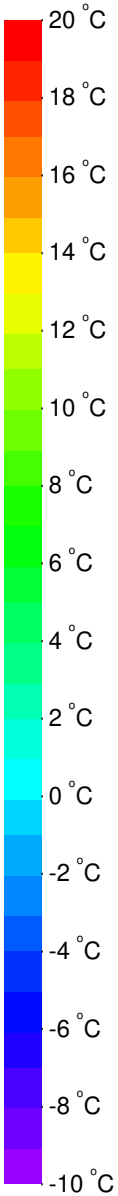
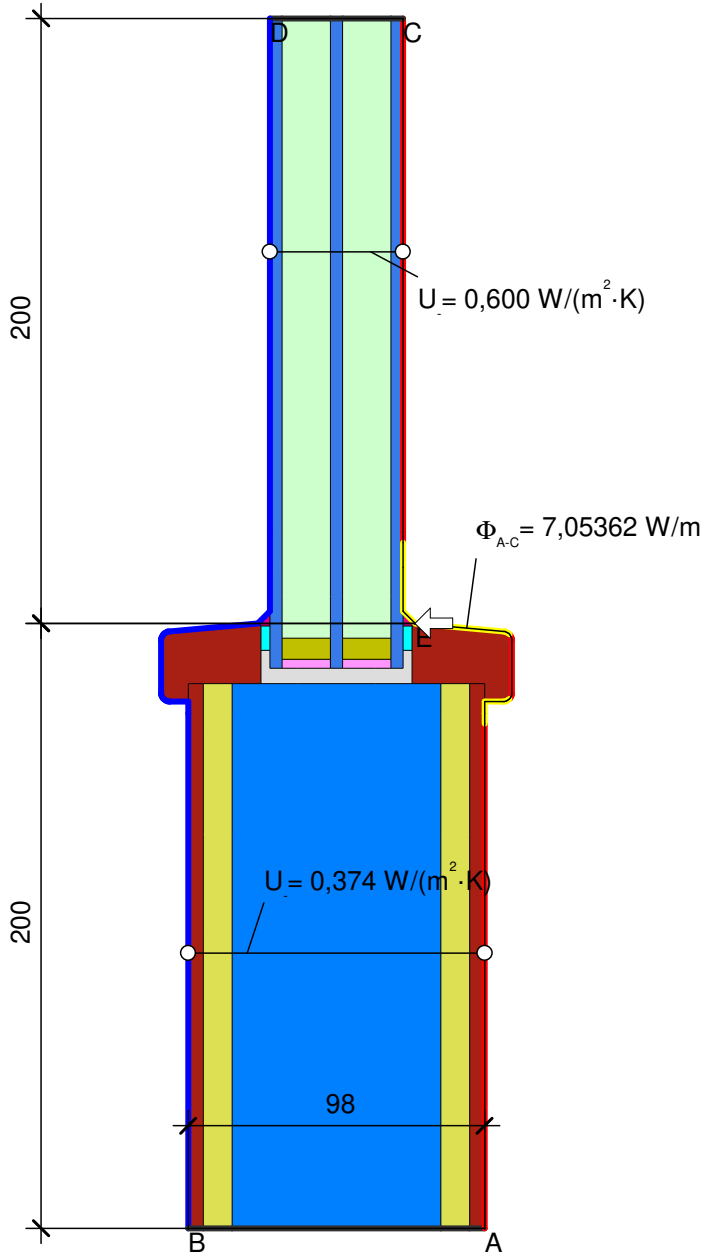
Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
Interior, frame, normal		20,000	0,130	
Interior, frame, reduced		20,000	0,200	
e 0,9 Cavity I Hohlraum				0,900

Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
e 0,9 Cavity I Hohlraum				0,900
fRsi: Interior | Innen		20,000	0,250	



sh - LOCK SIDE | SCHLOSS SEITE



Material	λ[W/(m·K)]	ε
Ar16 in 44mm Ug 0,60	0,022	
Glass I Glas	1,000	0,900
Hardwood I Hartholz 0.18 700 kg/m3 10456	0,180	0,900
Insulation tape | Vorlegeband	0,060	0,900
PU foam I PU-Schaum 030	0,030	0,900
Polysulfide I Polysulfid	0,400	0,900
Silicone I Silikon	0,350	
Thermix LowPsi [cert]	0,155	
Unvent. cavity I unbel. Hohlr. **		
Wooden-based material I Holzwerkstoff 0.13	0,130	
wooden-based material I Holzwerkstoff 0.18	0,180	

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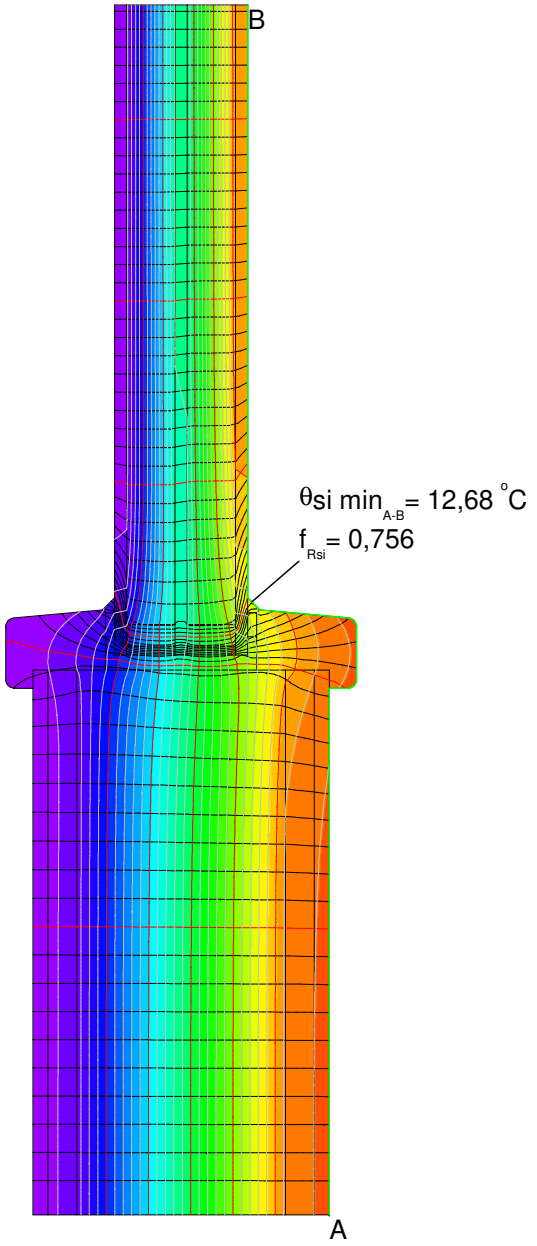
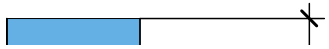


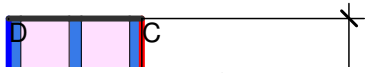
$$\psi_{A\text{-}E\text{-}C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{7{,}054}{30{,}000} - 0{,}374 \cdot 0{,}200 - 0{,}600 \cdot 0{,}200 = 0{,}040 \text{ W/(m·K)}$$

GLASS INSERT I GLASEINSATZ

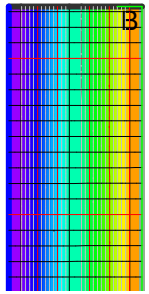


Material	λ[W/(m·K)]	ε
Ar16 in 44 mm U 0,7	0,026	
Glass I Glas	1,000	0,900
Hardwood I Hartholz 0.18 700 kg/m3 10456	0,180	0,900
Insulation tape | Vorlegeband	0,060	0,900
Polysulfide I Polysulfid	0,400	0,900
Silicone I Silikon	0,350	
Spruce, Fir I Fichte, Tanne	0,110	0,900
Thermix LowPsi [cert]	0,155	
Unvent. cavity I unbel. Hohlr. **		

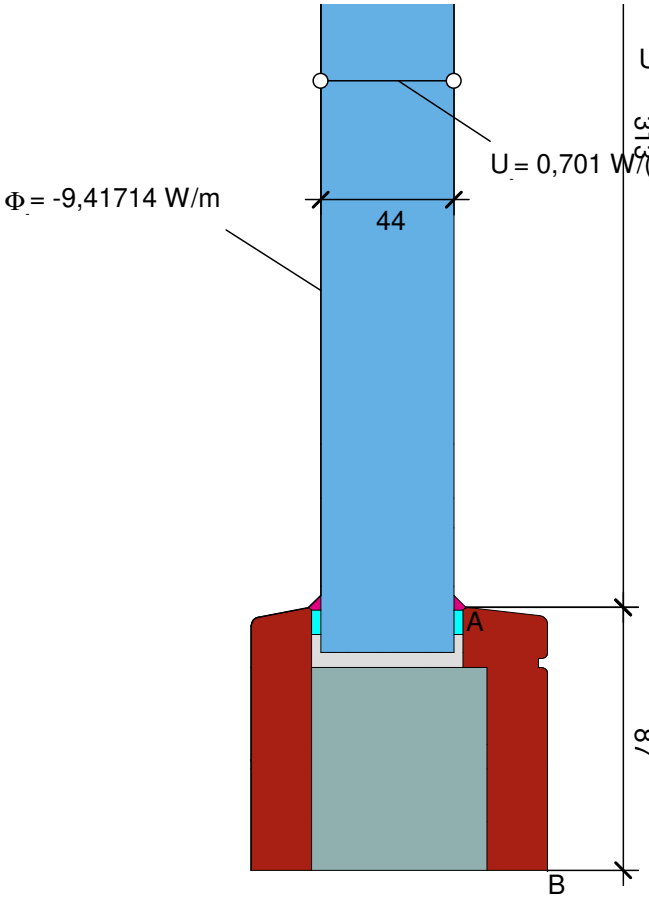
** EN ISO 10077-2:2017, 6.4.3

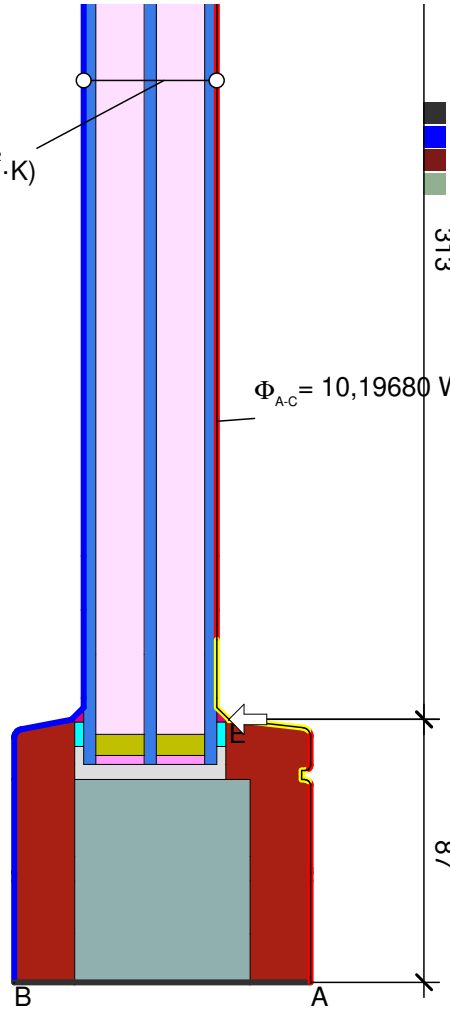


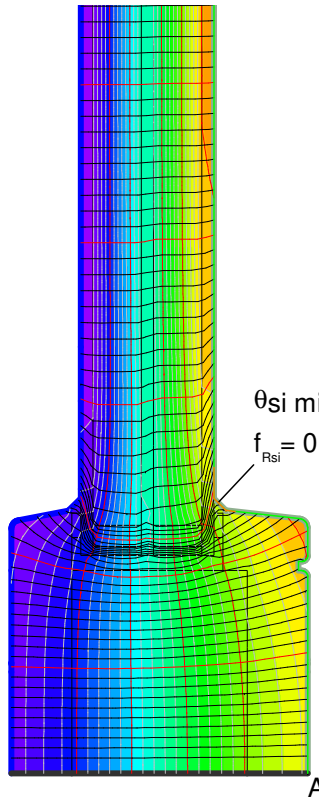
Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
Interior, frame, normal		20,000	0,130	
Interior, frame, reduced		20,000	0,200	
e 0,9 Cavity I Hohlraum				0,900

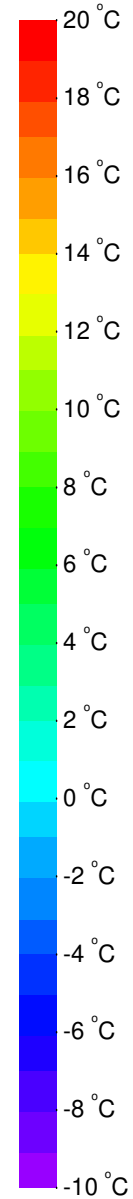


Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
e 0,9 Cavity I Hohlraum				0,900
fRsi: Interior | Innen		20,000	0,250	





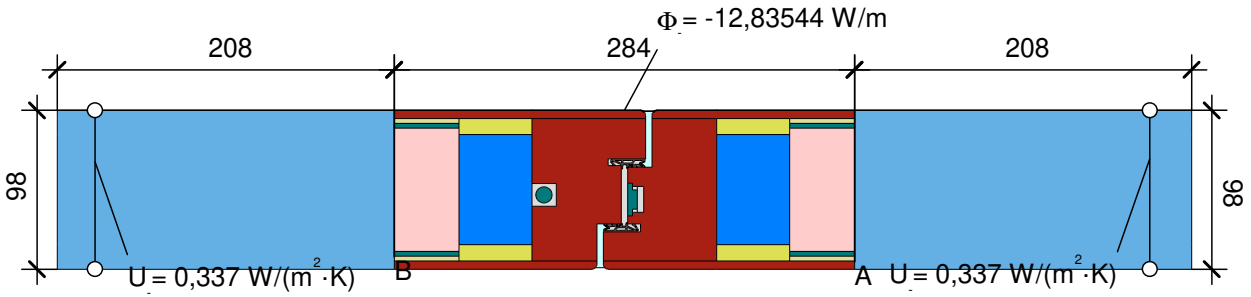




$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{9{,}417}{30{,}000} - 0{,}701 \cdot 0{,}313}{0{,}087} = 1{,}088\ \mathrm{W/(m^2 \cdot K)}$$

$$\Psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{10{,}197}{30{,}000} - 1{,}088 \cdot 0{,}087 - 0{,}700 \cdot 0{,}313 = 0{,}026\ \mathrm{W/(m \cdot K)}$$

bof - BOTTOM FIXED | UNTEN FEST VERGLAST



$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_{p1}\cdot b_{p1} - U_{p2}\cdot b_{p2}}{b_f} = \frac{\frac{12{,}835}{30{,}000} - 0{,}337\cdot 0{,}208 - 0{,}337\cdot 0{,}208}{0{,}284} = 1{,}013\ \mathrm{W/(m^2\cdot K)}$$

Material	λ[W/(m·K)]	ε
Balsa qsenkrecht_0.11 W/(mK)	0,110	
EPDM	0,250	0,900
Hardwood I Hartholz 0.18 700 kg/m3 10456	0,180	0,900
PU foam I PU-Schaum 030	0,030	0,900
Softwood, OSB I Weichholz, OSB 10456	0,130	
Steel I Stahl	50,000	0,900
Unvent. cavity I unbel. Hohlr. **		
Wooden-based material I Holzwerkstoff 0.13	0,130	
slightly vent. cav. I leicht bel. Hohlr. **		
wooden-based material I Holzwerkstoff 0.18	0,180	0,900

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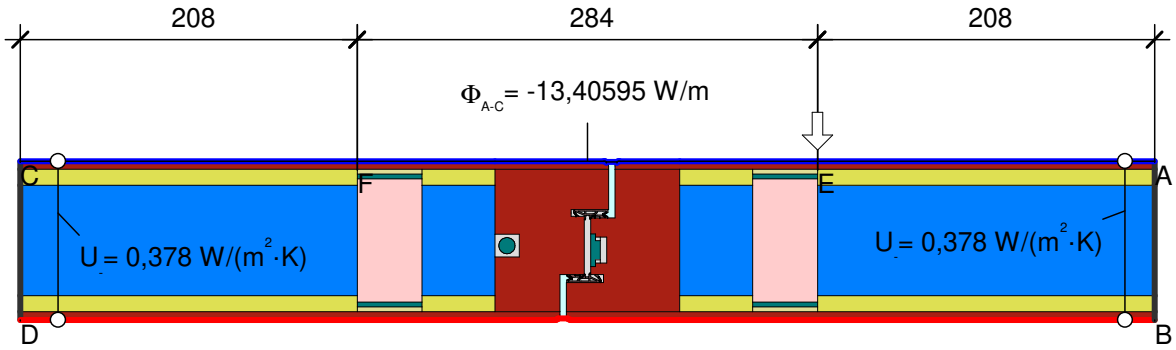
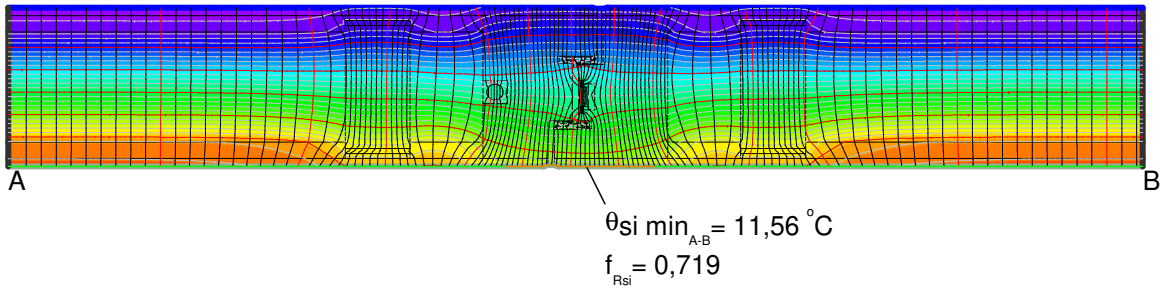


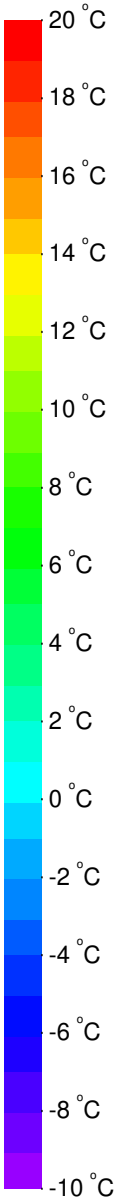
Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
Interior, frame, normal		20,000	0,130	
e 0,9 Cavity I Hohlraum				0,900

$$\Psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1\cdot b_1 - U_2\cdot b_2 - U_3\cdot b_3 = \frac{13{,}406}{30{,}000} - 0{,}378\cdot 0{,}208 - 1{,}013\cdot 0{,}284 - 0{,}378\cdot 0{,}208 = 0{,}002\ \mathrm{W/(m\cdot K)}$$

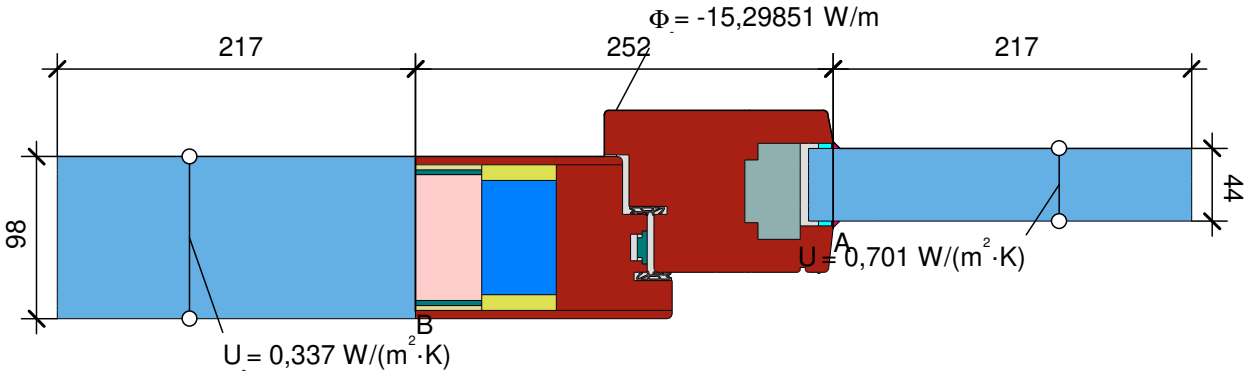
Psi(E) = Psi(F) = Psi(A-E-C) / 2 = 0,002 / 2 = 0,001 W/(mK)



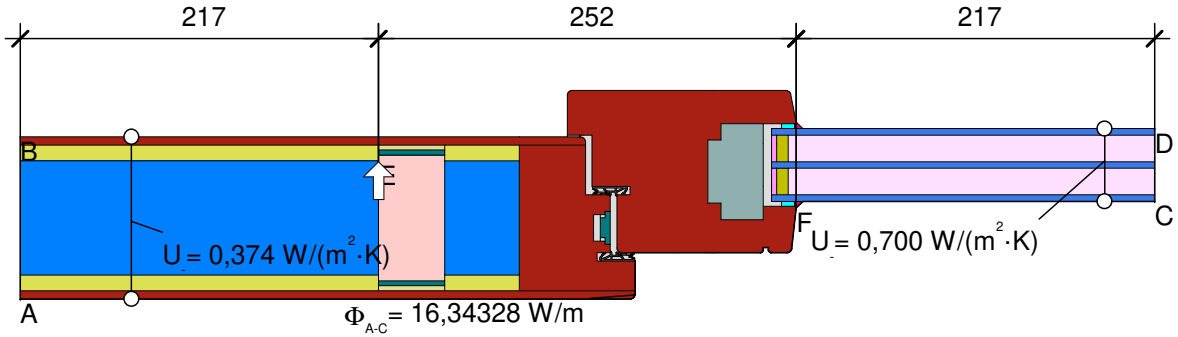
Randbedingung	q[W/m²]	θ[°C]	R[(m²·K)/W]	ε
Adiabatic | Adiabat	0,000			
Exterior | Außen		-10,000	0,040	
e 0,9 Cavity I Hohlraum				0,900
fRsi: Interior | Innen		20,000	0,250	



fm FLYING MULLION | STULP



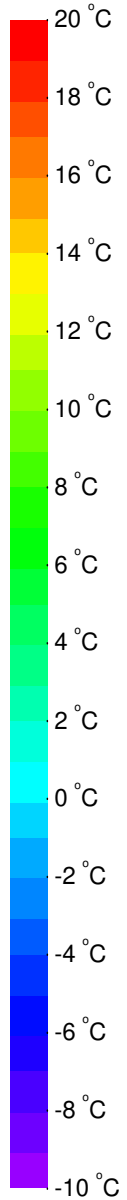
$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_{p1}\cdot b_{p1} - U_{p2}\cdot b_{p2}}{b_f} = \frac{\frac{15{,}299}{30{,}000} - 0{,}701\cdot 0{,}217 - 0{,}337\cdot 0{,}217}{0{,}252} = 1{,}130\ \mathrm{W/(m^2\cdot K)}$$



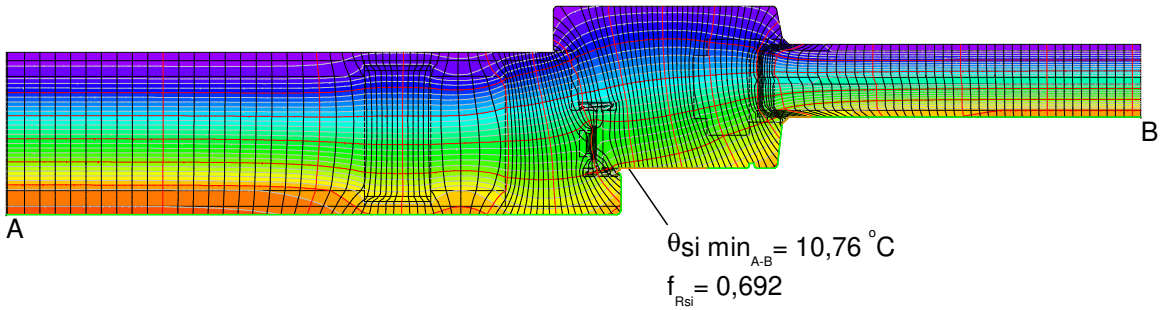
$$\psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1\cdot b_1 - U_2\cdot b_2 - U_3\cdot b_3 = \frac{16{,}343}{30{,}000} - 0{,}374\cdot 0{,}217 - 1{,}130\cdot 0{,}252 - 0{,}700\cdot 0{,}217 = 0{,}027\ \mathrm{W/(m\cdot K)}$$

Material	λ[W/(m·K)]	ε
Ar16 in 44 mm U 0,7	0,026	
Balsa qsenkrecht 0.11 W/(mK)	0,110	
EPDM	0,250	0,900
Glass I Glas	1,000	0,900
Hardwood I Hartholz 0.18 700 kg/m3 10456	0,180	0,900
Insulation tape | Vorlegeband	0,060	0,900
PU foam I PU-Schaum 030	0,030	
Polysulfide I Polysulfid	0,400	0,900
Silicone I Silikon	0,350	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900
Spruce, Fir I Fichte, Tanne	0,110	0,900
Steel I Stahl	50,000	0,900
Thermix LowPsi [cert]	0,155	
Unvent. cavity I unbel. Hohlr. **		
Wooden-based material I Holzwerkstoff 0.13	0,130	
slightly vent. cav. I leicht bel. Hohlr. **		
wooden-based material I Holzwerkstoff 0.18	0,180	0,900

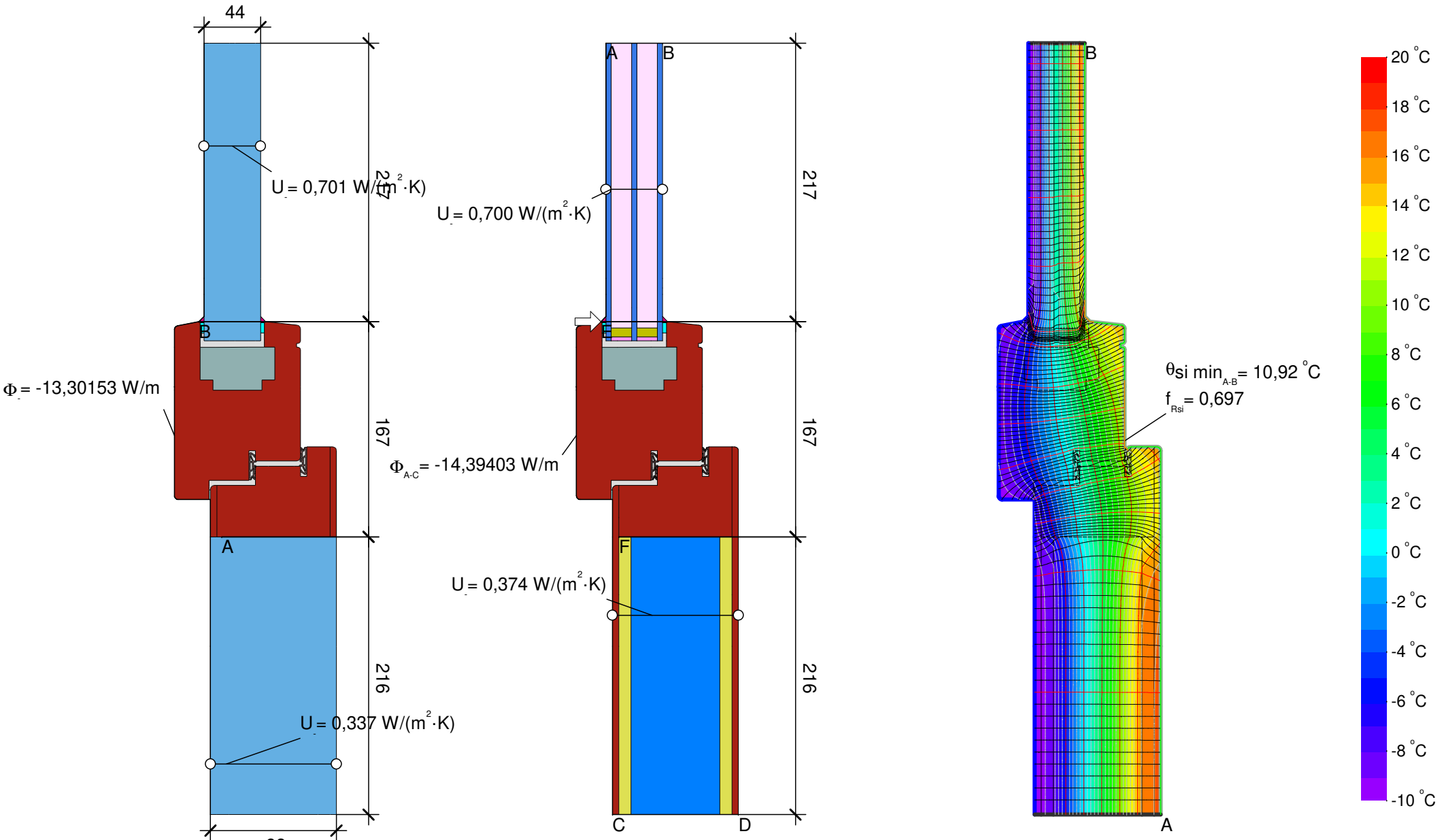
** EN ISO 10077-2:2017, 6.4.3



Psi(E) = Psi(F) = Psi(A-E-C) / 2 = 0,027 W/(mK) / 2 = 0,014 W/(mK)



m1 MULLION, 1 SASH | PFOSTEN 1 FLÜGEL



$$U_{f\,A,B} = \frac{\frac{\Phi}{\Delta T} - U_{p1}\cdot b_{p1} - U_{p2}\cdot b_{p2}}{b_f} = \frac{\frac{13{,}302}{30{,}000} - 0{,}337\cdot 0{,}216 - 0{,}701\cdot 0{,}217}{0{,}167} = 1{,}308\ \mathrm{W/(m^2\cdot K)}$$

$$\psi_{A\text{-}E\text{-}C,\,*} = \frac{\Phi}{\Delta T} - U_1\cdot b_1 - U_2\cdot b_2 - U_3\cdot b_3 = \frac{14{,}394}{30{,}000} - 0{,}700\cdot 0{,}217 - 1{,}308\cdot 0{,}167 - 0{,}374\cdot 0{,}216 = 0{,}028\ \mathrm{W/(m\cdot K)}$$

Psi(E) = Psi(F) = Psi(A-E-C) / 2 = 0,028 / 2 = 0,014 W/(mK)

m1a MULLION, 1 SASH | PFOSTEN 1 FLÜGEL