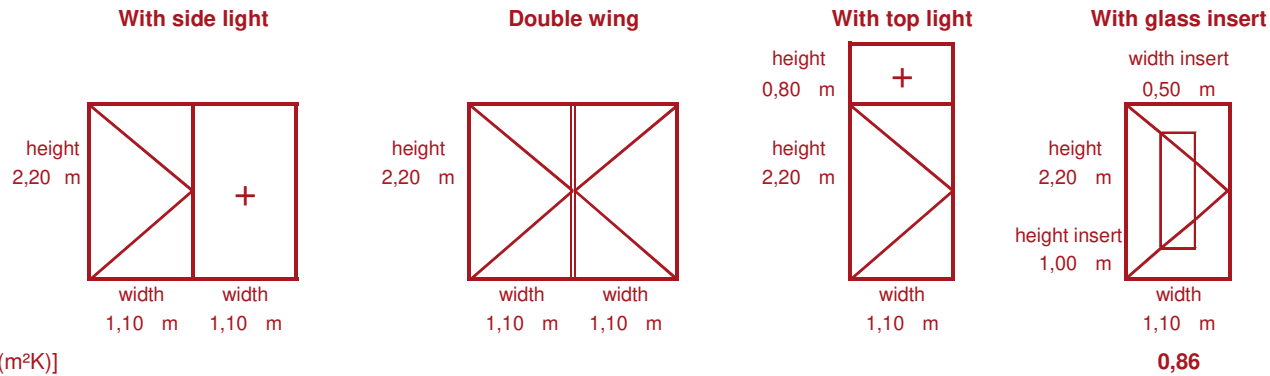


On behalf of: **Moralt AG, Hausham, GERMANY**
 Project/Product: **FERRO PASSIV FireSafe EI30 outward opening**

Description	Door leaf / Glazing		Uf value [W/(m²K)]				Frame Width [m]				Glazing Edge Ψ-value [W/(m²K)]				Temperature factor (min) $f_{Rsi=0,25}$ [-]	Overall U-value [W/(m²K)]
	U _{dI} -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		
FERRO PASSIV FireSafe EI30 outward opening	0,48		0,98	0,96	1,76	1,09	0,199	0,199	0,080	0,114	0,001	0,010	0,001	0,002	0,23	0,73
Glass insert	0,48	0,63										0,084			0,69	

Drawings and material data were provided by the manufacturer. The sole responsibility for the provided information lies with the manufacturer. The temperature factor for the cool-temperate climate zone is not achieved at the threshold nor at the glass insert.



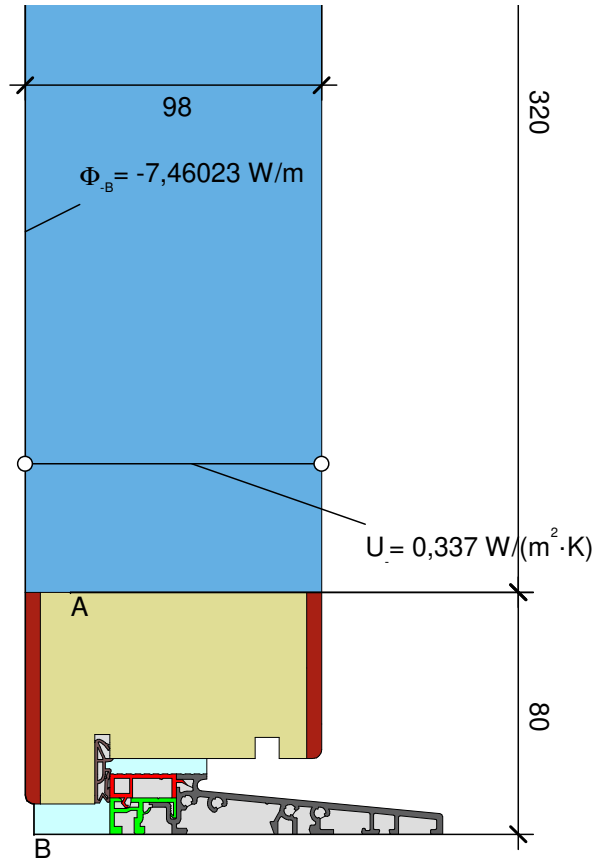
comfort criterion for cool-temperate climate zone achieved

U-value U_D [W/(m²K)]

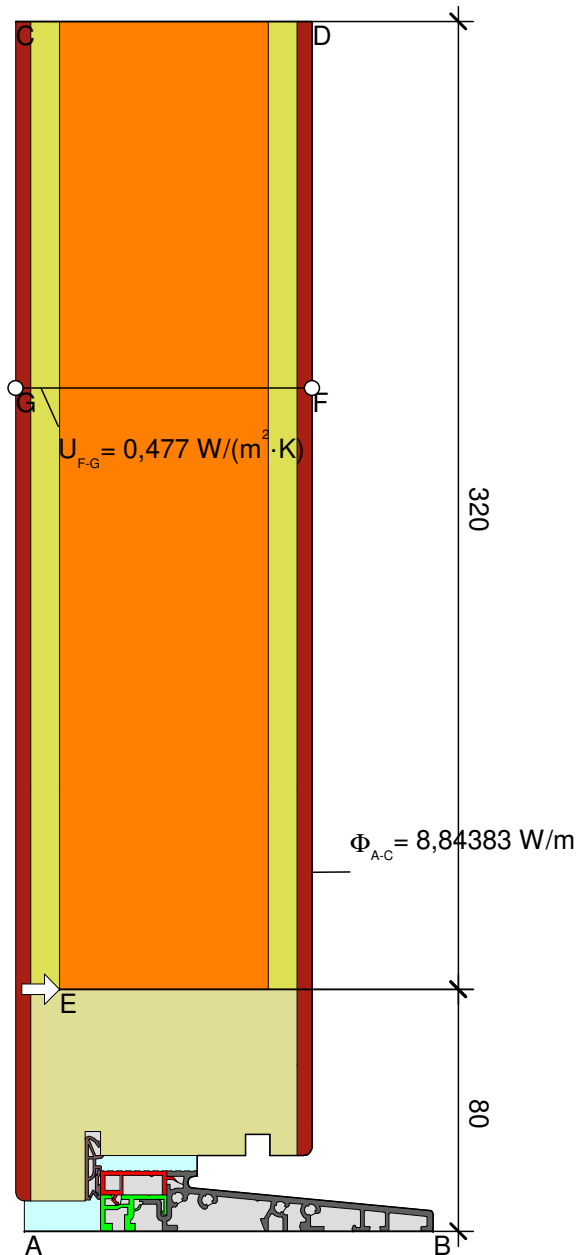


Material	λ [W/(m·K)]	ϵ
Aluminum I Aluminium 10456	160,000	0,900
EPDM	0,250	0,900
Insulation I Wärmedämmung 040	0,040	
Polyamide 25% Glassfiber	0,300	0,900
Polyvinylchloride (PVC)	0,170	0,900
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900
Unvent. cavity I unbel. Hohlr. **		
Wooden-based material I Holzwerkstoff 0.13	0,130	
slightly vent. cav. I leicht bel. Hohlr. **		
wooden-based material I Holzwerkstoff 0.18	0,180	0,900

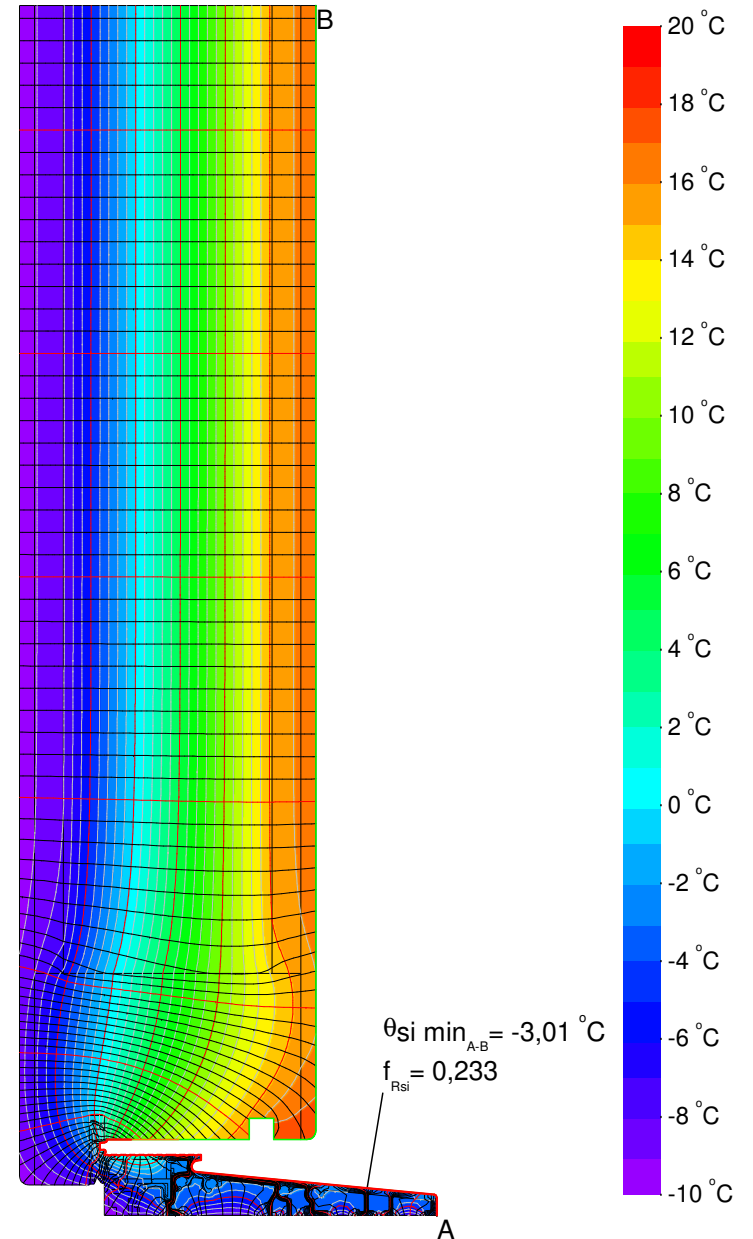
** EN ISO 10077-2:2017, 6.4.3



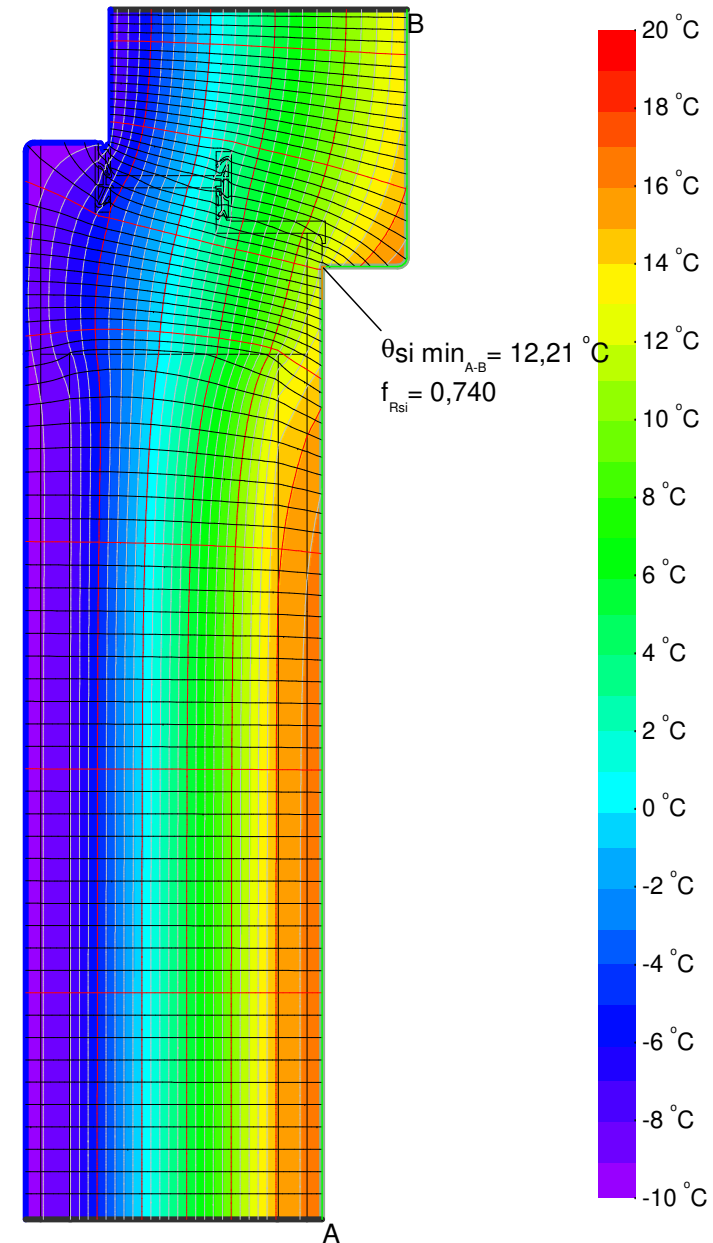
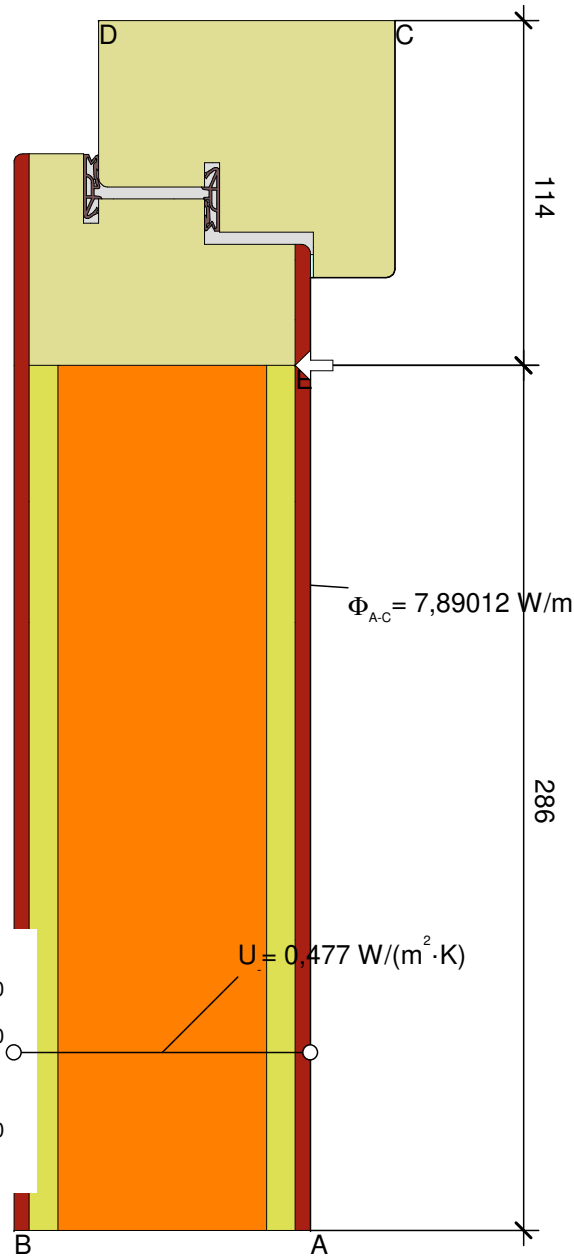
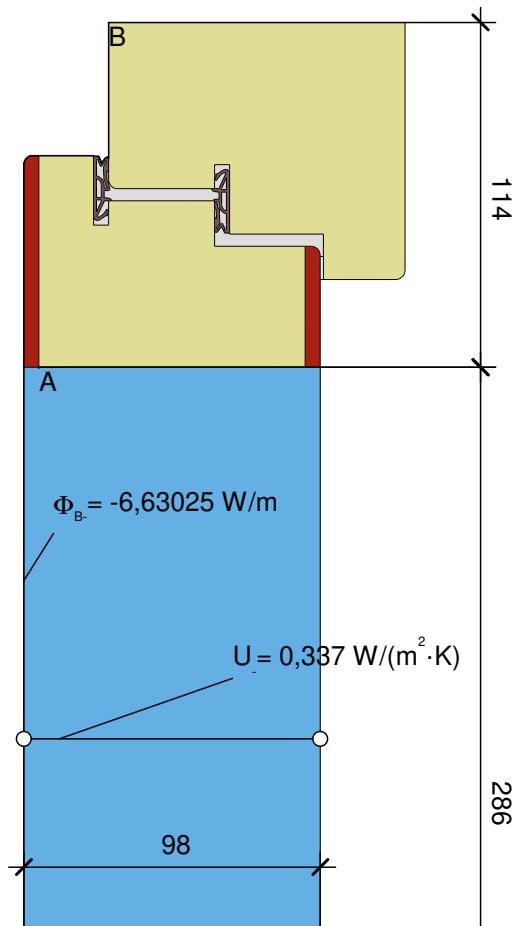
$$U_{fA,B} = \frac{\Phi}{\Delta T} - U_p \cdot b_p = \frac{7,460}{30,000} - 0,337 \cdot 0,320 = 1,762 \text{ W/(m}^2 \cdot \text{K)}$$



$$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8,844}{30,000} - 1,762 \cdot 0,080 - 0,477 \cdot 0,320 = 0,001 \text{ W/(m} \cdot \text{K)}$$



th - THRESHOLD I SCHWELLE



Material

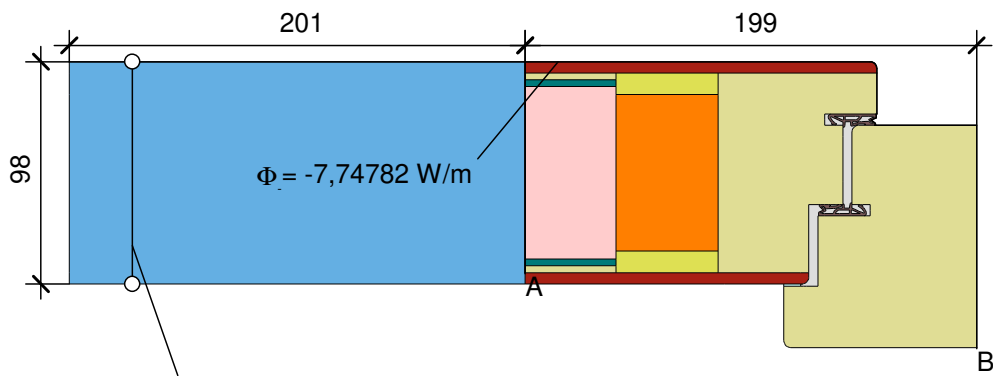
- EPDM
 - Insulation I Wärmedämmung 040
 - Softwood, OSB I Weichholz, OSB 10456
 - Unvent. cavity I unbel. Hohlr. **
 - Wooden-based material I Holzwerkstoff 0.13
 - slightly vent. cav. I leicht bel. Hohlr. **
 - wooden-based material I Holzwerkstoff 0.18
- ** EN ISO 10077-2:2017, 6.4.3

λ [W/(m·K)]	ϵ
0,250	0,900
0,040	
0,130	0,900
0,130	
0,180	0,900

$$U_{f,AB} = \frac{\Phi}{\Delta T} - U_p \cdot b_p = \frac{6,630}{30,000} - 0,337 \cdot 0,286 = 1,094 \text{ W/(m}^2 \cdot \text{K)}$$

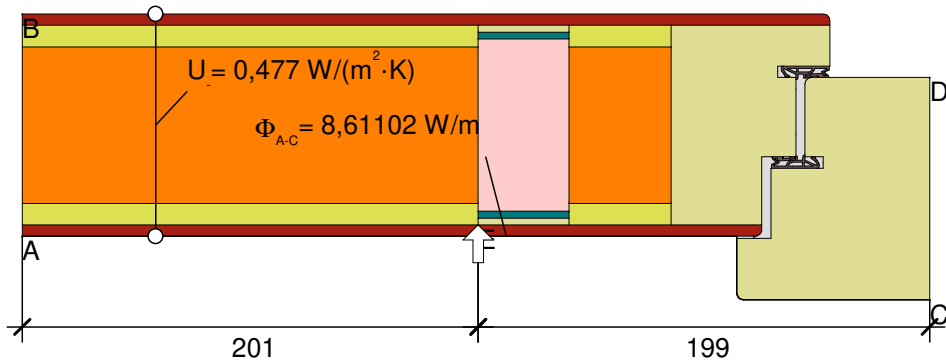
$$\psi_{A-E-C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{7,890}{30,000} - 0,477 \cdot 0,286 - 1,094 \cdot 0,114 = 0,002 \text{ W/(m}^2 \cdot \text{K)}$$

to - TOP I OBEN

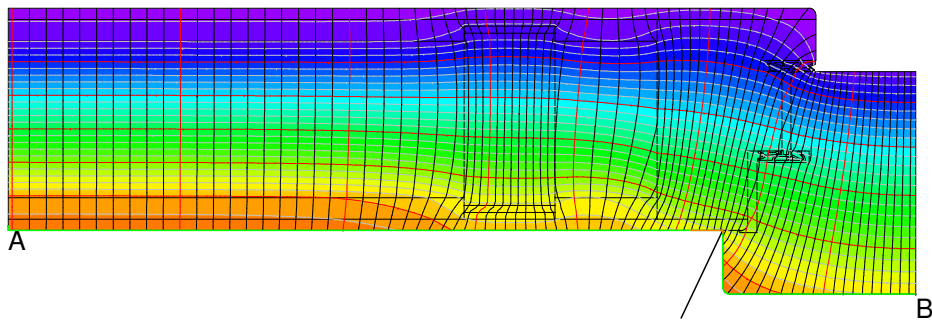


$$U_p = 0,337 \text{ W}/(\text{m}^2 \cdot \text{K})$$

$$U_{fAB} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_i} = \frac{\frac{7,748}{30,000} - 0,337 \cdot 0,201}{0,199} = 0,958 \text{ W}/(\text{m}^2 \cdot \text{K})$$



$$\psi_{A-E,C,*} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8,611}{30,000} - 0,477 \cdot 0,201 - 0,958 \cdot 0,199 = 0,001 \text{ W}/(\text{m} \cdot \text{K})$$



$\theta_{si \text{ min}}_{A-B} = 12,14 \text{ }^\circ\text{C}$
 $f_{Rsi} = 0,738$

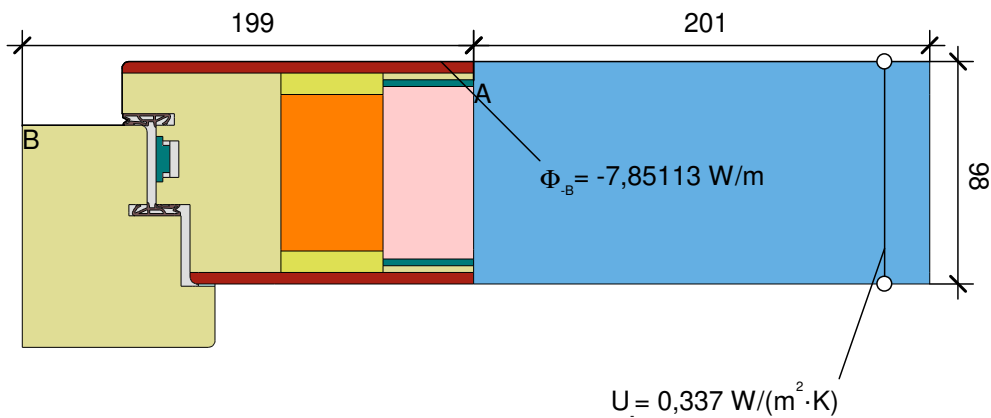
si HINGE SIDE | BANDSEITE

Material	λ [W/(m·K)]	ϵ
Balsa qsenkrecht 0.11 W/(mK)	0,110	
EPDM	0,250	0,900
Insulation I Wärmedämmung 040	0,040	
Softwood, OSB I Weichholz, OSB 10456	0,130	0,900
Steel I Stahl	50,000	
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/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiat	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

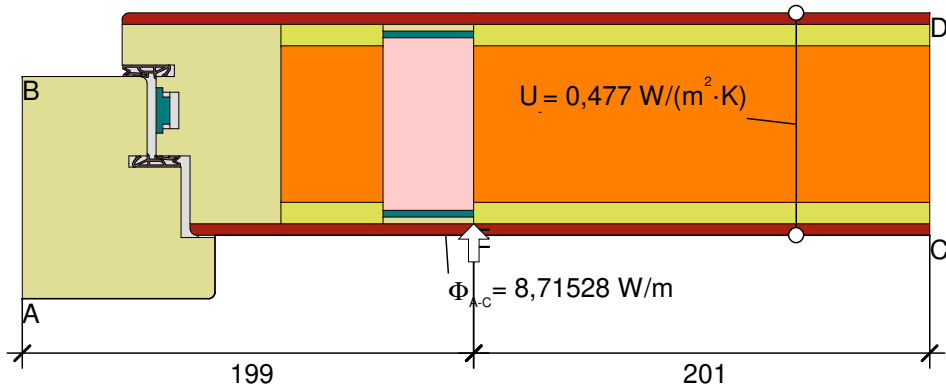
Randbedingung	q [W/m ²]	θ [°C]	R [(m ² ·K)/W]	ϵ
Adiabatic Adiat	0,000			
Exterior Außen		-10,000	0,040	
e 0,9 Cavity I Hohlraum				0,900
fRsi: Interior Innen		20,000	0,250	



Material	λ [W/(m·K)]	ϵ
Balsa qsenkrecht 0.11 W/(mK)	0,110	
EPDM	0,250	0,900
Insulation I Wärmedämmung 040	0,040	
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

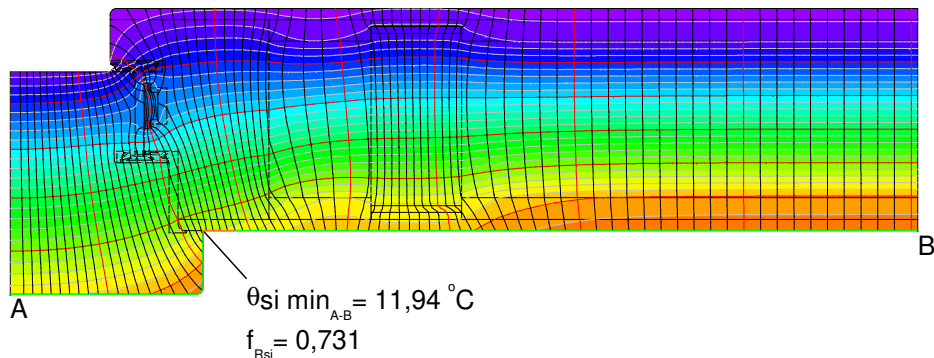
** EN ISO 10077-2:2017, 6.4.3

$$U_{fAB} = \frac{\frac{\Phi}{\Delta T} - U_p \cdot b_p}{b_f} = \frac{\frac{7,851}{30,000} - 0,337 \cdot 0,201}{0,199} = 0,975 \text{ W}/(\text{m}^2 \cdot \text{K})$$



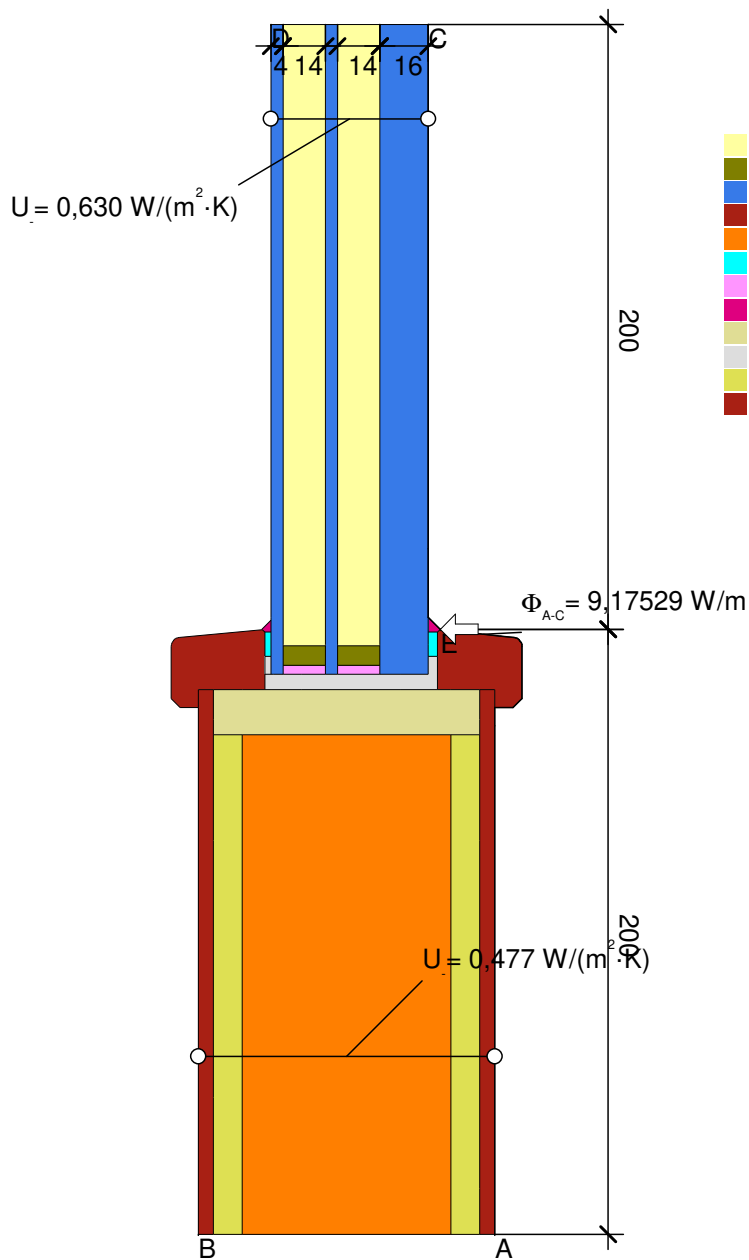
Randbedingung	q [W/m²]	θ [°C]	R [(m²·K)/W]	ϵ
Adiabatic Adiat	0,000			
Exterior Außen		-10,000	0,040	
Interior, frame, normal		20,000	0,130	
Interior, frame, reduced		20,000	0,200	
e 0,9 Cavity Hohraum				0,900

$$\psi_{A-E.C.} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{8,715}{30,000} - 0,975 \cdot 0,199 - 0,477 \cdot 0,201 = 0,001 \text{ W}/(\text{m} \cdot \text{K})$$

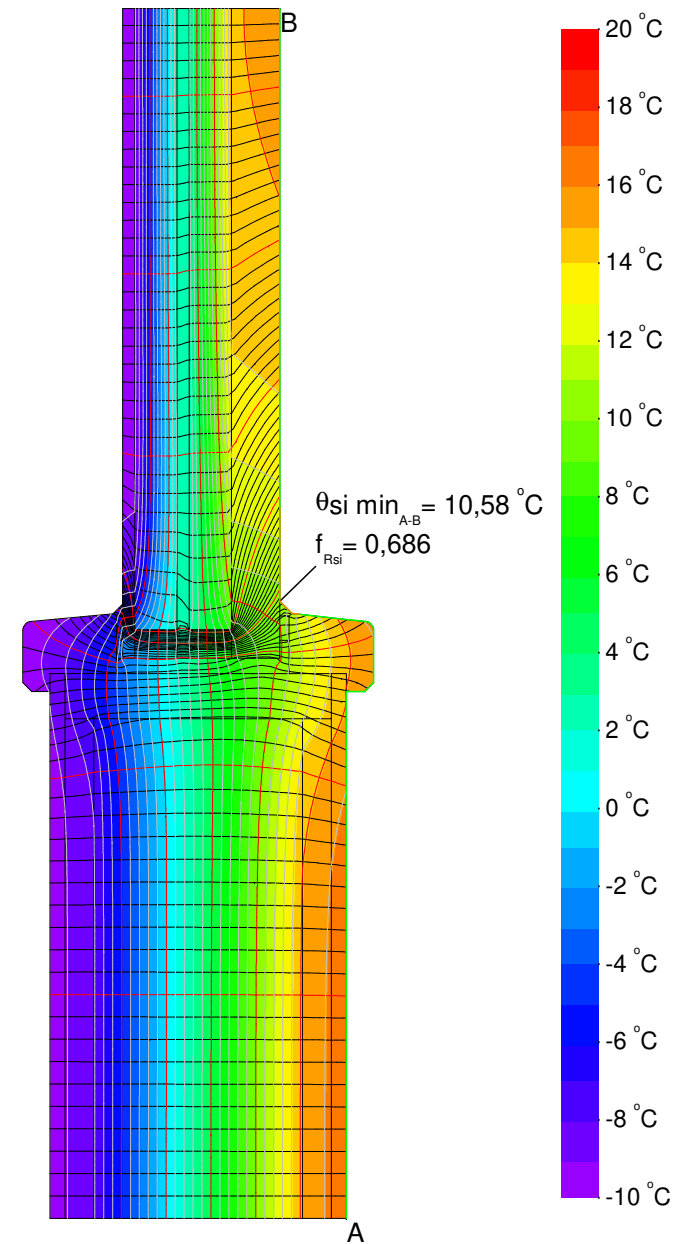


Randbedingung	q [W/m²]	θ [°C]	R [(m²·K)/W]	ϵ
Adiabatic Adiat	0,000			
Exterior Außen		-10,000	0,040	
e 0,9 Cavity Hohraum				0,900
fRsi: Interior Innen		20,000	0,250	

sh - LOCK SIDE | SCHLOSS SEITE



Material	λ [W/(m·K)]	ϵ
Ar14 in 52mmBrandschGlas U 0,63	0,020	
Chromatech	0,810	
Glass Glas	1,000	0,900
Hardwood Hartholz 0.18 700 kg/m3 10456	0,180	0,900
Insulation Wärmedämmung 040	0,040	
Insulation tape Vorlegeband	0,060	0,900
Polysulfide Polysulfid	0,400	0,900
Silicone Silikon	0,350	
Softwood, OSB Weichholz, OSB 10456	0,130	0,900
Unvent. cavity unbel. Hohlr. **		
Wooden-based material Holzwerkstoff 0.13	0,130	
wooden-based material Holzwerkstoff 0.18	0,180	
** EN ISO 10077-2:2017, 6.4.3		



$$\psi_{A-E-C} = \frac{\Phi}{\Delta T} - U_1 \cdot b_1 - U_2 \cdot b_2 = \frac{9,175}{30,000} - 0,477 \cdot 0,200 - 0,630 \cdot 0,200 = 0,084 \text{ W}/(\text{m} \cdot \text{K})$$