U-values for used compositions

ID	Type	Material	d [m]	λ [W/mK]	R_i [m^2K/W]	
F1	Flooring	Marmoleum Forbo Vivace	0,003	0,190	0,016	*I*
	Adhesive	Forbo Eurosafe Lino Plus	0,001	0,220	0,005	
	Leveling panels	Forbo QuickFit panels	0,007	0,051	0,137	
	Distribution layer	Reinforced concrete C20/25	0,060	1,580	0,038	
	Thermal insulation	EPS 150 S	0,150	0,038	3,947	*E*
	ΣR_i				4,143	
	R_{si}				0,170	
	R_{se}				0,000	
	R_T [m^2K/W]				4,313	
	U [W/m^2K]				**0,232**	

ID	Type	Material	d [m]	λ [W/mK]	R_i [m^2K/W]	
F2	Flooring	Ceramic tiles Rako Vanity	0,007	1,010	0,007	*I*
	Adhesive	Schönox SEK	0,003	1,160	0,003	
	Waterproof layer	Schönox HA	0,001	1,160	0,001	
	Distribution layer	Reinforced concrete C20/25	0,060	1,580	0,038	
	Thermal insulation	EPS 150 S	0,150	0,038	3,947	*E*
	ΣR_i				3,996	
	R_{si}				0,170	
	R_{se}				0,000	
	R_T [m^2K/W]				4,166	
	U [W/m^2K]				**0,240**	

ID	Type	Material	d [m]	λ [W/mK]	R_i [m^2K/W]	
R1	Interior plaster	Profimix JM 303	0,010	0,990	0,010	*I*
	Floor structure	Reinforced concrete C40/45	0,250	1,580	0,158	
	Vapour barrier	Glastek 40 Special Mineral	0,004	0,210	0,019	
	Thermal insulation (min. th.)	EPS 150 S	0,220	0,038	5,789	*E*
	ΣR_i				5,977	
	R_{si}				0,100	
	R_{se}				0,040	
	R_T [m^2K/W]				6,117	
	U [W/m^2K]				**0,163**	

ID	Type	Material	d [m]	λ [W/mK]	R_i [m^2K/W]	
R2	Interior plaster	Profimix JM 303	0,010	0,990	0,010	*I*
	Load-bearing panels	Ytong roof panel	0,150	0,192	0,781	
	Vapour barrier	Glastek 40 Special Mineral	0,004	0,210	0,019	
	Thermal insulation	Kingspan Kooltherm K5 (PIR)	0,080	0,021	3,810	*E*
	ΣR_i				4,620	
	R_{si}				0,100	
	R_{se}				0,040	
	R_T [m^2K/W]				4,760	
	U [W/m^2K]				**0,210**	

ID	Type	Material	d [m]	λ [W/mK]	R_i [m^2K/W]	
W1	Interior plaster	Profimix JM 303	0,010	0,990	0,010	*I*
	Masonry (non-load bearing)	Heluz AKU 25	0,250	0,330	0,758	
	Adhesive	Profimix LM 710	0,004	1,160	0,003	
	Thermal insulation	Kingspan Kooltherm K15 (PIR)	0,130	0,020	6,500	*E*
	ΣR_i				7,271	
	R_{si}				0,130	
	R_{se}				0,130	
	R_T [m^2K/W]				7,531	
	U [W/m^2K]				**0,133**	

ID	Type	Material	d [m]	λ [W/mK]	R_i [m^2K/W]	
W2	Interior plaster	Profimix JM 303	0,010	0,990	0,010	*I*
	Wall (load-bearing)	Reinforced concrete C40/45	0,200	1,580	0,127	
	Adhesive	Profimix LM 710	0,004	1,160	0,003	
	Thermal insulation	Kingspan Kooltherm K15 (PIR)	0,130	0,020	6,500	*E*
	ΣR_i				6,640	
	R_{si}				0,130	
	R_{se}				0,130	
	R_T [m^2K/W]				6,900	
	U [W/m^2K]				**0,145**	

ID	Type	Material	d [m]	λ [W/mK]	R_i [m^2K/W]	
W3	Interior plaster	Profimix JM 303	0,010	0,990	0,010	*I*
	Masonry (load-bearing)	Ytong P4-500	0,200	0,152	1,316	
	Adhesive	Profimix LM 710	0,004	1,160	0,003	
	Thermal insulation	Kingspan Kooltherm K5 (PIR)	0,060	0,021	2,857	
	Adhesive	Profimix LM 710	0,004	1,160	0,003	
	Coating	Mineral scratch coat Cemix 058	0,002	0,990	0,002	*E*
	ΣR_i				4,192	
	R_{si}				0,130	
	R_{se}				0,040	
	R_T [m^2K/W]				4,362	
	U [W/m^2K]				**0,229**	

Openings

ID	# [-]	w [m]	h [m]	A_i [m^2]	A [m^2]	U_w [W/m^2K]
O01	10	900	2300	2,070	20,700	0,79
O02	10	1400	1500	2,100	21,000	0,77
O04	10	900	2300	2,070	20,700	0,79
O05	10	1400	1500	2,100	21,000	0,77
O07	20	500	1000	0,500	10,000	0,92
O08	24	1000	1200	1,200	28,800	0,82
O09	19	1500	1500	2,250	42,750	0,76
O10	19	1100	1500	1,650	31,350	0,79
O11	10	900	1500	1,350	13,500	0,81
O12	11	2000	1500	3,000	33,000	0,75
O20	20	900	2300	2,070	41,400	0,79
O21	6	1500	2200	3,300	19,800	0,74
Total area					**304,000**	**0,783**

D09	2	864	2002	1,730	3,459	1,20
D13	3	1900	2150	4,085	12,255	1,20
Total area					**15,714**	

D01	3	1900	2150	4,085	12,255	0,98
Total area					**12,255**	

Example calculation

Wood-Aluminum window Slavona HA110

$$U_w = \frac{A_g \cdot U_g + A_w \cdot U_w + I_g \cdot \psi_g}{A_w}$$

Width	1,4	m
Height	1,5	m
Frame w.	0,1	m
A_g	1,560	m^2
A_f	0,540	m^2
l_g	5,000	m
U_g	0,600	W/m^2K
U_f	0,860	W/m^2K
ψ_g	0,043	W/mK
U_w	0,760	W/m^2K

Areas of constructions and openings

Ground floor						
ID	l_1 [m]	h_1 [m]	A_1 [m^2]	Corr. [m^2]	Windows [m^2]	Doors [m^2]
F1			1556,500			
F2			183,060			
R1						
R2						
W1	104,660	3,870	405,034		25,05	8,17
W2	79,493	4,120	327,511	39,985		4,085
W5	96,147	3,870	372,089			12,255
W3						

First floor						
ID	l_2 [m]	h_2 [m]	A_2 [m^2]	Corr. [m^2]	Windows [m^2]	Doors [m^2]
F1						
F2						
R1						
R2						
W1	141,700	3,000	425,100		67,25	
W2	96,883	3,250	314,870	35,425	62,4	
W5	34,867	3,250	113,318			
W3						

Second floor						
ID	l_3 [m]	h_3 [m]	A_3 [m^2]	Corr. [m^2]	Windows [m^2]	Doors [m^2]
F1						
F2						
R1			1776,130	-48,232		
R2			28,010			
W1	141,700	3,000	425,100		82,1	
W2	96,883	3,250	314,870	107,121	62,4	
W5	40,867	3,000	122,601			
W3			44,615			3,459

Final area			
ID	ΣA_j [m^2]	Openings [m^2]	A_i [m^2]
F1	1556,500	0,000	**1556,500**
F2	183,060	0,000	**183,060**
R1	1727,898	0,000	**1727,898**
R2	28,010	0,000	**28,010**
W1	1255,234	-177,770	**1077,464**
W2	1139,781	-128,885	**1010,896**
W5	608,008	-12,255	**595,753**
W3	44,615	-8,259	**36,356**

U-value of glass facade

	[W/m^{2}K]	
U_g	0,700	U-value of glazing
U_m	1,600	U-value of mullion
U_t	1,600	U-value of transom
U_f	1,700	U-value of door/window frame

	[m^2]	
A_g	158,005	Area of glazing
A_m	5,690	Area of mullion
A_t	7,409	Area of transom
A_f	25,400	Area of door/window frame
A_{cw}	196,504	Area of facade

	[m]	
$l_{m,f}$	113,800	Length of mullions
$l_{t,f}$	148,180	Length of transoms

	[W/mK]	
$\psi_{m,f}$	0,070	Linear bridge of mullion frame
$\psi_{t,f}$	0,070	Linear bridge of transom frame

$$U_{cw} = \frac{\sum A_g U_g + \sum A_m U_m + \sum A_t U_t + \sum A_f U_f + \sum l_{m,f}\psi_{m,f} + \sum l_{t,f}\psi_{t,f}}{A_{cw}}$$

Results		
U_{cw}	0,983	U-value of facade
f_w	0,804	A_w/A ratio
$U_{N,20}$	1,182	Required U-value
$U_{rec,20}$	1,004	Recommended U-value

Energy label of building envelope (ČSN 73 0540)

ID	A_i [m^2]	U_i [W/m^2K]	b_i	H_{Ti} [W/K]		U_{Ni} [W/m^2K]	$H_{Ti,N}$ [W/K]
F1 (ground)	1317,890	0,232	0,43	130,957		0,450	254,165
F1 (inst. corr.)	238,610	0,232	0,29	15,807		0,600	40,905
F2 (ground)	183,060	0,240	0,43	18,833		0,450	35,304
R1	1727,898	0,163	1,00	282,482		0,240	414,696
R2	28,010	0,210	1,00	5,885		0,240	6,722
W1	1077,464	0,133	1,00	143,068		0,300	323,239
W2	1010,896	0,145	1,00	146,504		0,300	303,269
W5	595,753	0,983	1,00	585,373		1,182	704,447
W3	36,356	0,229	1,00	8,335		0,300	10,907
Windows	304,000	0,783	1,00	238,162		1,500	456,000
Doors	15,714	1,200	1,00	18,857		1,700	26,715
Doors (glass)	12,255	0,983	1,00	12,041		1,700	20,834

	A [m^2]	ΔU_{tbm} [W/m^2K]		$H_{T\psi,X}$ [W/K]		ΔU_{tbm} [W/m^2K]	$H_{T\psi,X}$ [W/K]
T. bridges	6547,906	0,020		130,958		0,020	130,958

	A [m^2]	U_{em} [W/m^2K]	Cl.	H_T [W/K]		$U_{em,N,20}$ [W/m^2K]	$H_{T,N}$ [W/K]
Total	6547,906	**0,265**	**B**	1737,262		0,417	2728,159

Design temperatures	
θ_{im} [°C]	20
θ_e [°C]	-15
θ_z [°C]	5
$\theta_{inst.corr.}$ [°C]	10

Min.	Class	Max.
0,000	**A**	**0,208**
0,208	**B**	**0,312**
0,312	**C**	**0,417**

According to ČSN 73 0540 the building is classified as class B with U_{em} = 0,262 W/m^2K.

There is no condensation in used constructions during the model year.