KMC - Tak

Use: Roof
Against exterior

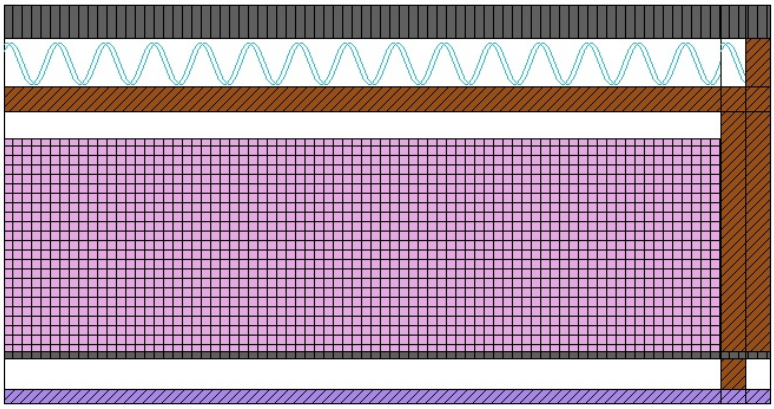
Thermal capacity
[kJ/m²K]

k1[1] : **15.3**
Cm 10cm (24h): 13.6
Cm 3cm (2h): 10.1

Source: Custom

Geometry
Thickness [mm]: 359

Exterior EN ISO 6946



Interior

1

U value

Static
0.1799 **[W/m²K]**

Periodic transmittance
(U24)
0.111 **[W/m²K]**

Rsi: 0.10 [m²K/W]

Rse: 0.04 [m²K/W]

Meteo: Basel-Binningen (CH), Altitude of building site : 500 m (+184 m)

Section 1 (Section proportion 93%)

	Material name:	Thick. [cm]	Sd [m]	λ [W/mK]	μ [-]	ρ [kg/m³]	c [wh/kgK]	R [m²K/W]
	Rsi							0.100
1	Rigips : RFI	1.25	0.09	0.25	7	800	0.267	0.05
2	CEN : Air layer	2.8	0.01	0.173	1	1.23	0.278	0.162
3	Isover : Vario Xtra	0.03	10.15	0.2	33834	266	0.444	0.001
4	SIA 381/1 : Rockwool mat 60-120 kg/m³	19.5	0.2	0.036	1	90	0.167	5.417
5	CEN : Air layer	2.5	0.01	0.16	1	1.23	0.278	0.156
6	CEN : Typical construction timber CEN	2.3	2.76	0.13	120	500	0.444	0.177
7	CEN : Air layer	4.5	0.01	0.279	1	1.23	0.278	0.081
8	CEN : Clay tiles	3	0.3	1	10	2000	0.222	0.015
	Rse							0.070
	dUg= 0 [W/m²K], dUf= 0 [W/m²K]						dR	0
							RT	**6.229**

frsi = 0.982 [-], frsi,min,cond = 0.726 [-], frsi,min,moist = 0.750 [-]

Dynamic thermal characteristics (EN ISO 13786)

Period T= 0 [h] +24 [h]

U-Value factors

Static		0.161	[W/m²K]		
Periodic transmittance (U24)		0.122	[W/m²K]		
Time shift	0h/24h:	18.28	[h]	-12h/+12h:	-5.72 [h]
Ampl. temp. ext.-int	7.6 [-]	Decrement		0.757	[-]

Transfer matrices

	Modulo		Time shift	
Z11	7.63	[-]	10.32	[h]
Z21	33.88	[W/m²K]	2.89	[h]
Z12	8.23	[m²K/W]	17.72	[h]
Z22	36.62	[-]	10.3	[h]

Areal heat capacities

k1[1]	Interior	14.28	[kJ/m²K]
k2[1]	Exterior	62.7	[kJ/m²K]

Thermal admittances

			Time shift	
Internal	0.93	[W/m²K]	4.6	[h]
External	4.45	[W/m²K]	4.58	[h]

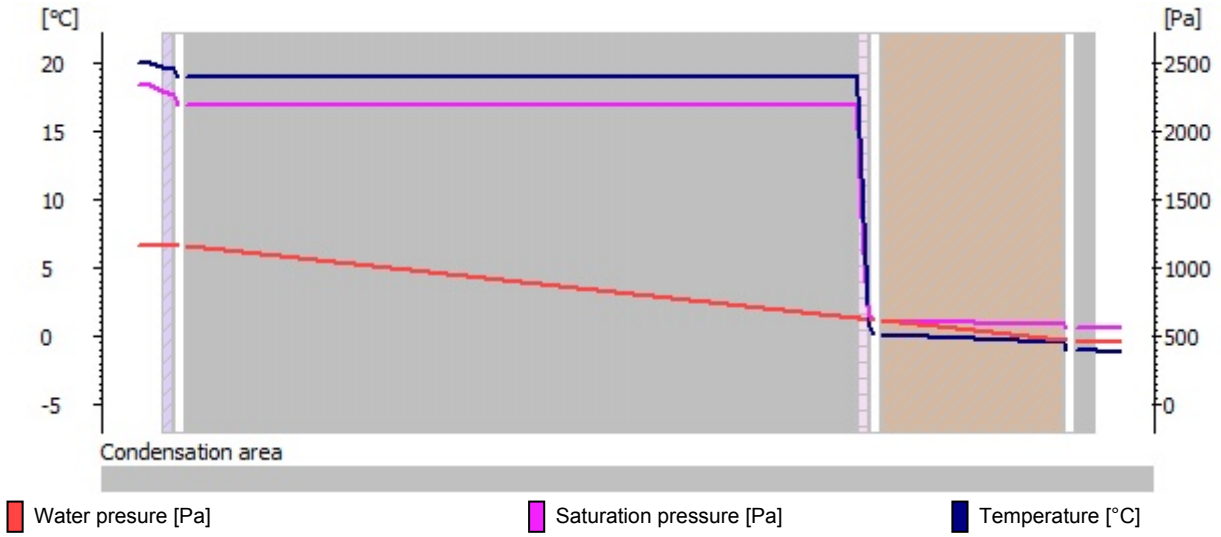
[1] calculated with Rsi/Rse

Hygrothermal caracteristics

First Month: January	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Security factor
Interior													
Temperature [°C]	20	20	20	20	20	20	20	20	20	20	20	20	-
Relative humidity [%]	49.7	50.8	54.5	57.6	64	68.3	71.8	71.8	65.7	60.6	53.9	51.2	
Exterior													
Temperature [°C]	-1.22	-0.02	3.88	6.68	11.3	14.3	16.6	16.5	12	7.98	2.48	0.08	-
Relative humidity [%]	82.7	78.5	69.9	68.1	71.2	70	68.7	70.2	77.3	82.3	84.8	84	

Ma: accumulated moisture contents
Gc: rate of condensation

Graphs in equivalent air thickness: January



Water presure [Pa] Saturation pressure [Pa] Temperature [°C]

Equivalent air width of the section: 13.6 [m]

No condensation in the section

Section 2 (Section proportion 3%)

	Material name:		Thick. [cm]	Sd [m]	λ [W/mK]	μ [-]	ρ [kg/m³]	c [wh/kgK]	R [m²K/W]
	Rsi								0.100
1	Rigips : RFI		1.25	0.09	0.25	7	800	0.267	0.05
2	CEN : Typical construction timber CEN		2.8	3.36	0.13	120	500	0.444	0.215

3	Isover : Vario Xtra		0.03	10.15	0.2	33834	266	0.444	0.001
4	CEN : Typical construction timber CEN		22	26.4	0.13	120	500	0.444	1.692
5	CEN : Typical construction timber CEN		2.3	2.76	0.13	120	500	0.444	0.177
6	CEN : Air layer		4.5	0.01	0.279	1	1.23	0.278	0.081
7	CEN : Clay tiles		3	0.3	1	10	2000	0.222	0.015
		Rse							0.070
		dUg= 0 [W/m²K], dUf= 0 [W/m²K]						dR	0
								RT	**2.402**

frsi = 0.982 [-], frsi,min,cond = 0.726 [-], frsi,min,moist = 0.750 [-]

Dynamic thermal characteristics (EN ISO 13786)

Period T= 0 [h] +24 [h]

U-Value factors

Static		0.416	[W/m²K]		
Periodic transmittance (U24)		0.046	[W/m²K]		
Time shift	0h/24h:	8.6	[h]	-12h/+12h:	-15.4 [h]
Ampl. temp. ext.-int	53.5 [-]	Decrement		0.11	[-]

Transfer matrices

	Modulo		Time shift	
Z11	53.49	[-]	17.93	[h]
Z21	228.93	[W/m²K]	9.74	[h]
Z12	21.87	[m²K/W]	3.4	[h]
Z22	93.58	[-]	19.21	[h]

Areal heat capacities

k1¹	Interior	33.65	[kJ/m²K]
k2¹	Exterior	58.65	[kJ/m²K]

Thermal admittances

			Time shift	
Internal	2.45	[W/m²K]	2.53	[h]
External	4.28	[W/m²K]	3.81	[h]

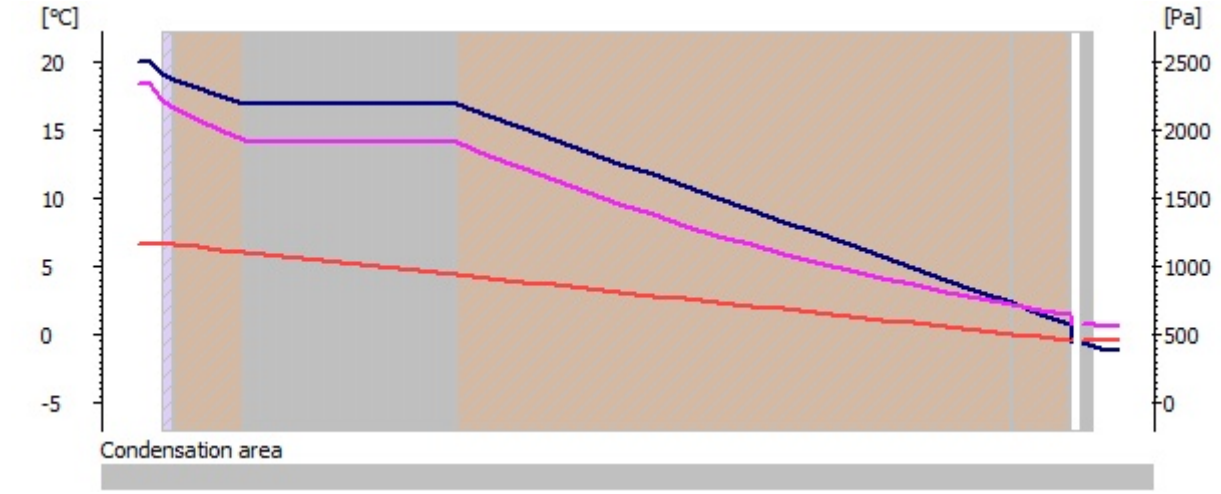
¹ calculated with Rsi/Rse

Hygrothermal caracteristics

First Month: January	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Security factor
Interior													
Temperature [°C]	20	20	20	20	20	20	20	20	20	20	20	20	-
Relative humidity [%]	49.7	50.8	54.5	57.6	64	68.3	71.8	71.8	65.7	60.6	53.9	51.2	
Exterior													
Temperature [°C]	-1.22	-0.02	3.88	6.68	11.3	14.3	16.6	16.5	12	7.98	2.48	0.08	-
Relative humidity [%]	82.7	78.5	69.9	68.1	71.2	70	68.7	70.2	77.3	82.3	84.8	84	

Ma: accumulated moisture contents
Gc: rate of condensation

Graphs in equivalent air thickness: January



Water presure [Pa] Saturation pressure [Pa] Temperature [°C]

Equivalent air width of the section: 43.1 [m]

No condensation in the section

Section 3 (Section proportion 3%)

Material name:		Thick. [cm]	Sd [m]	λ [W/mK]	μ [-]	ρ [kg/m³]	c [wh/kgK]	R [m²K/W]
Rsi								0.100
1 Rigips : RFI		1.25	0.09	0.25	7	800	0.267	0.05
2 CEN : Air layer		2.8	0.01	0.173	1	1.23	0.278	0.162
3 Isover : Vario Xtra		0.03	10.15	0.2	33834	266	0.444	0.001
4 CEN : Typical construction timber CEN		22	26.4	0.13	120	500	0.444	1.692
5 CEN : Typical construction timber CEN		2.3	2.76	0.13	120	500	0.444	0.177
6 CEN : Typical construction timber CEN		4.5	5.4	0.13	120	500	0.444	0.346
7 CEN : Clay tiles		3	0.3	1	10	2000	0.222	0.03
Rse								0.040
dUg= 0 [W/m²K], dUf= 0 [W/m²K]							dR	0
							RT	**2.599**

frsi = 0.982 [-], frsi,min,cond = 0.726 [-], frsi,min,moist = 0.750 [-]

Dynamic thermal characteristics (EN ISO 13786)

Period T= 0 [h] +24 [h]

U-Value factors

Static		0.385	[W/m²K]		
Periodic transmittance (U24)		0.036	[W/m²K]		
Time shift	0h/24h:	7.8	[h]	-12h/+12h:	-16.2 [h]
Ampl. temp. ext.-int	53.3 [-]	Decrement		0.094	[-]

Transfer matrices

	Modulo		Time shift	
Z11	53.25	[-]	18.54	[h]
Z21	263.13	[W/m²K]	10.26	[h]
Z12	27.58	[m²K/W]	4.2	[h]
Z22	136.26	[-]	19.92	[h]

Areal heat capacities

k1[1]	Interior	26.49	[kJ/m²K]
k2[1]	Exterior	67.7	[kJ/m²K]

Thermal admittances

			Time shift	
Internal	1.93	[W/m²K]	2.34	[h]
External	4.94	[W/m²K]	3.71	[h]

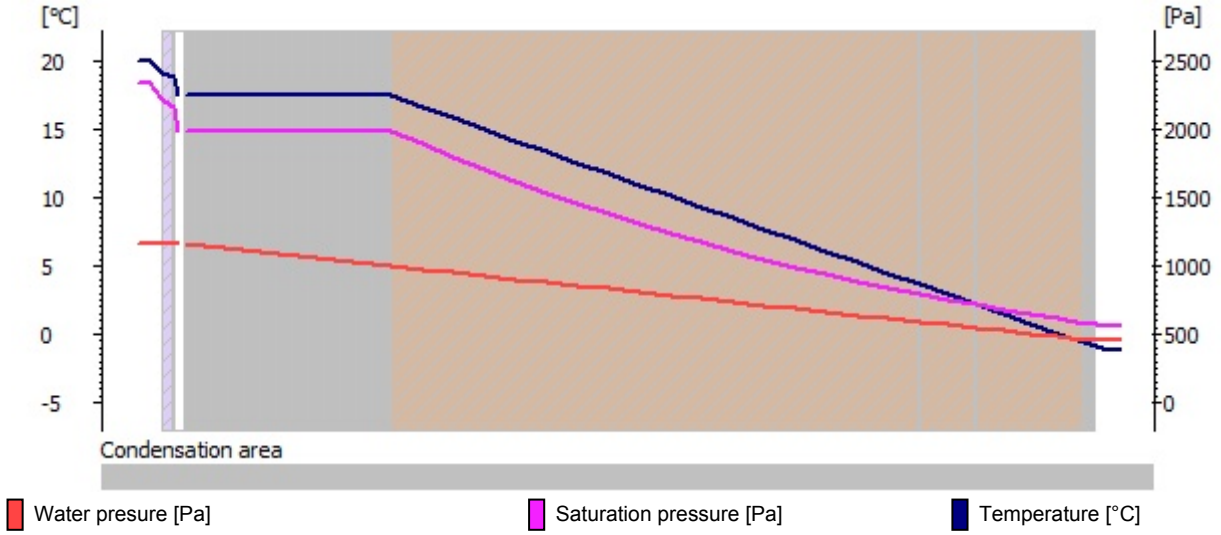
[1] calculated with Rsi/Rse

Hygrothermal caracteristics

First Month: January	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Security factor
Interior													
Temperature [°C]	20	20	20	20	20	20	20	20	20	20	20	20	-
Relative humidity [%]	49.7	50.8	54.5	57.6	64	68.3	71.8	71.8	65.7	60.6	53.9	51.2	
Exterior													
Temperature [°C]	-1.22	-0.02	3.88	6.68	11.3	14.3	16.6	16.5	12	7.98	2.48	0.08	-
Relative humidity [%]	82.7	78.5	69.9	68.1	71.2	70	68.7	70.2	77.3	82.3	84.8	84	

Ma: accumulated moisture contents
Gc: rate of condensation

Graphs in equivalent air thickness: January



Equivalent air width of the section: 45.1 [m]

No condensation in the section