

100mm Warmshell External Old Sextons, SGY 0QY

Exterior wall
created on 30.5.2025

Thermal protection

$$U = 0,33 \text{ W/(m}^2\text{K)}$$

GEG 2020/24 Bestand*: $U < 0,24 \text{ W/(m}^2\text{K)}$ 

Moisture proofing

Condensate: 149 g/m²

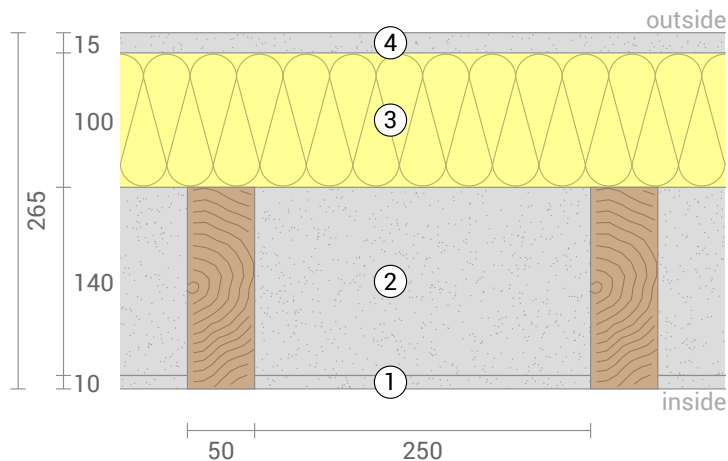
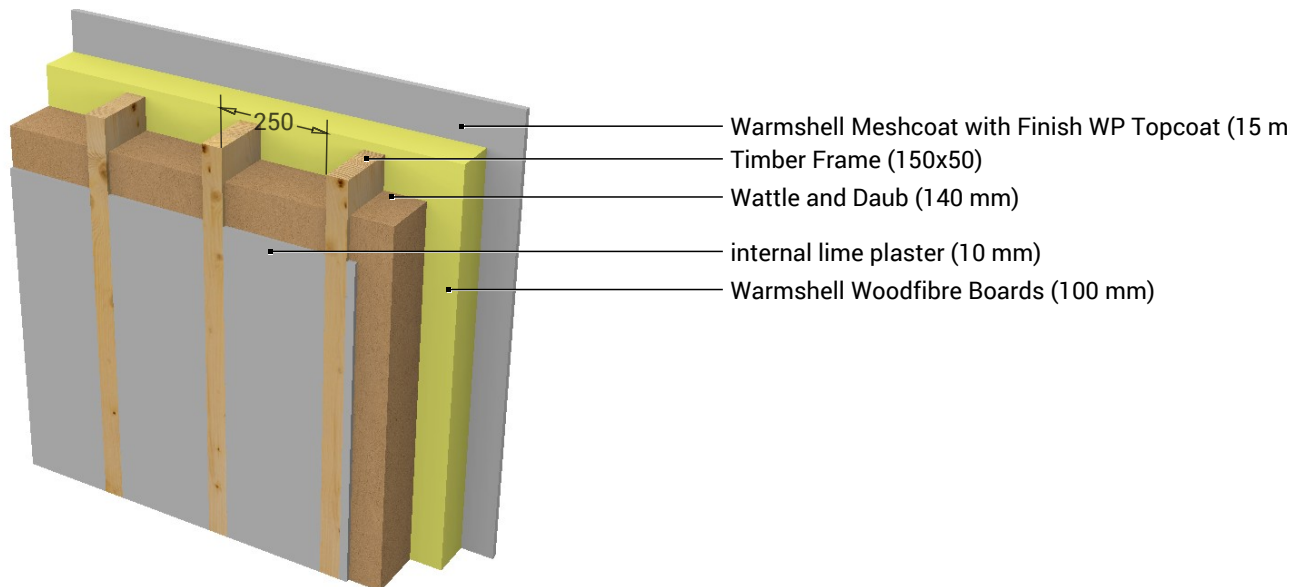
Dries 3 days

Drying reserve: 4818 g/m²a

Heat protection

Temperature amplitude damping: 76

phase shift: 13,3 h

Thermal capacity inside: 211 kJ/m²K

① internal lime plaster (10 mm)

② Wattle and Daub (140 mm)

③ Warmshell Woodfibre Boards (100 mm)

④ Warmshell Meshcoat with Finish WP Topcoat (15 mm)

Inside air : 20,0°C / 50%

Outside air: -5,0°C / 80%

Surface temperature.: 17,9°C / -4,7°C

sd-value: 1,4 m

Drying reserve: 4818 g/m²a

Thickness: 26,5 cm

Weight: 256 kg/m²Heat capacity: 278 kJ/m²K☐ GEG 2020/24 Bestand☐ BEG Einzelmaßn.☐ GEG 2023/24 Neubau☒ DIN 4108

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U-Value calculation according to DIN EN ISO 6946

#	Material	Dicke [cm]	λ [W/mK]	R [m ² K/W]
	Thermal contact resistance inside (Rsi)			0,130
1	internal lime plaster	1,00	0,700	0,014
2	Wattle and Daub	14,00	0,420	0,333
	Timber Frame (Width: 5 cm)	15,00	0,130	1,154
3	Warmshell Woodfibre Boards	10,00	0,040	2,500
4	Warmshell Meshcoat with Finish WP Topcoat	1,50	0,500	0,030
	Thermal contact resistance outside (Rse)			0,040

Thermal contact resistances have been taken from DIN 6946 Table 7.

Rsi: heat flow direction horizontally

Rse: heat flow direction horizontally, outside: Direct contact to outside air

Upper limit of thermal resistance $R_{\text{tot;upper}} = 3,158 \text{ m}^2\text{K/W}$.

Lower limit of thermal resistance $R_{\text{tot;lower}} = 3,093 \text{ m}^2\text{K/W}$.

Check applicability: $R_{\text{tot;upper}} / R_{\text{tot;lower}} = 1,021$ (maximum allowed: 1,5)

The procedure may be used.

Thermal resistance $R_{\text{tot}} = (R_{\text{tot;upper}} + R_{\text{tot;lower}})/2 = 3,125 \text{ m}^2\text{K/W}$

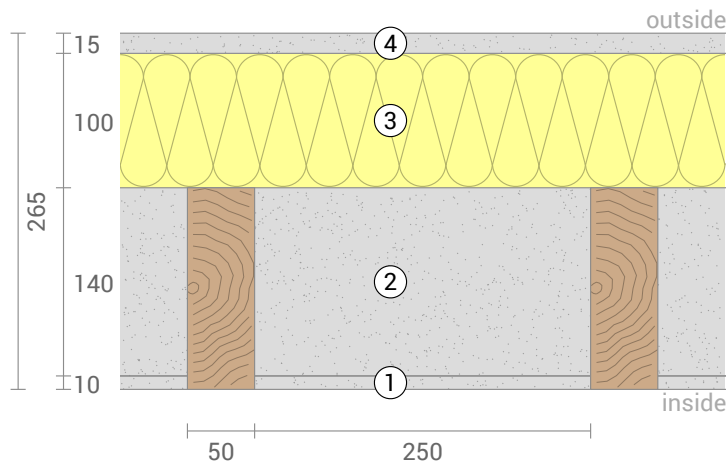
Estimated maximum relative uncertainty according to section 6.7.2.5: 1,0%

Heat transfer coefficient $U = 1/R_{\text{tot}} = 0,320 \text{ W/(m}^2\text{K)}$

Corrections for air gaps / mechanical fastening elements

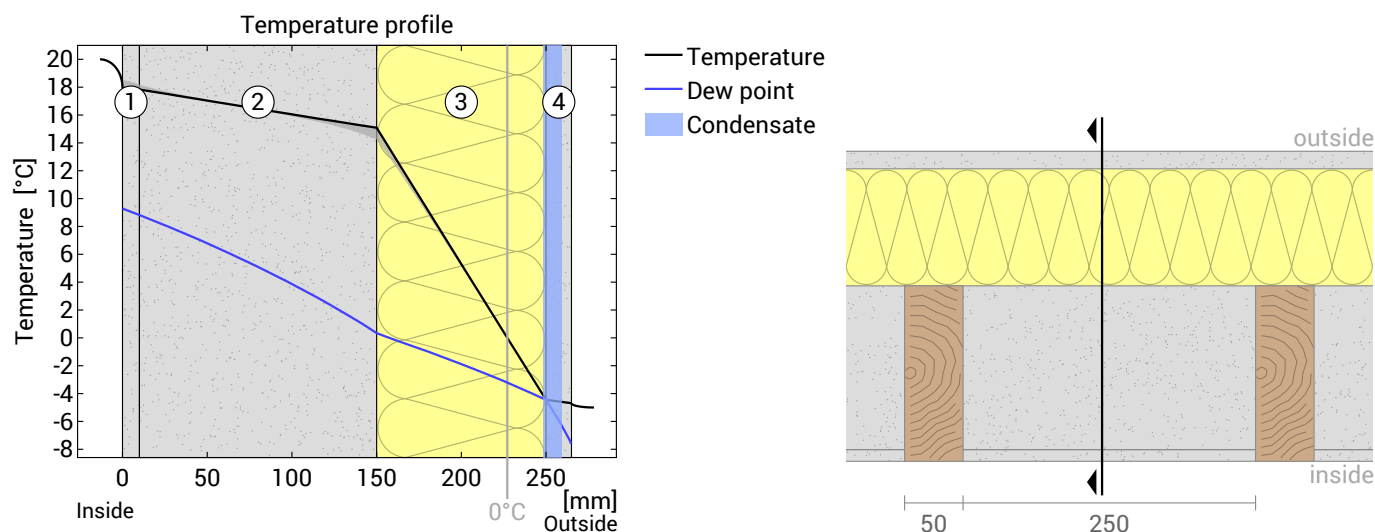
Anchorage of layer 3 (Warmshell Woodfibre Boards) $\Delta U = 0,010 \text{ W/(m}^2\text{K)}$

Corrected heat transfer coefficient $U_c = 0,33 \text{ W/(m}^2\text{K)}$



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Temperature profile



Left: Temperature and dew-point temperature at the place marked in the right figure. The dew-point indicates the temperature, at which water vapour condensates. As long as the temperature of the component is everywhere above the dew point, no condensation occurs. If the curves have contact, condensation occurs at the corresponding position.

Right: The component, drawn to scale.

Layers (from inside to outside)

#	Material	λ [W/mK]	R [m ² K/W]	Temperatur [°C]		Weight [kg/m ²]
				min	max	
	Thermal contact resistance*		0,250	17,9	20,0	
1	1 cm internal lime plaster	0,700	0,014	17,8	18,2	12,1
2	14 cm Wattle and Daub	0,420	0,333	14,7	18,0	198,3
	15 cm Timber Frame (Width: 5 cm)	0,130	1,154	14,3	18,6	11,3
3	10 cm Warmshell Woodfibre Boards	0,040	2,500	-4,5	15,1	14,5
4	1,5 cm Warmshell Meshcoat with Finish WP Topcoat	0,500	0,030	-4,7	-4,5	19,5
	Thermal contact resistance*		0,040	-5,0	-4,7	
	26,5 cm Whole component		3,107			255,7

*Thermal contact resistances according to DIN 4108-3 for moisture protection and temperature profile. The values for the U-value calculation can be found on the page 'U-value calculation'.

Thermal bridges

The U-value includes the following surcharges for air gaps and / or mechanical fasteners in accordance with DIN 6946:

Anchorage of layer 3 (Warmshell Woodfibre Boards) 0,010 W/(m²K)

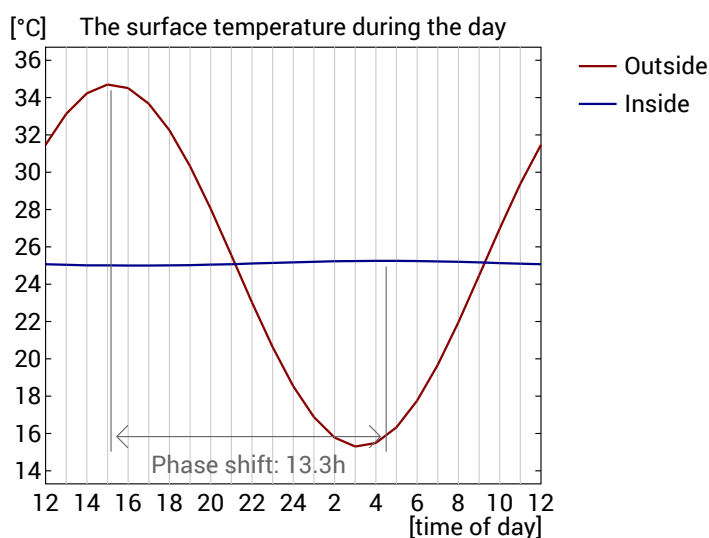
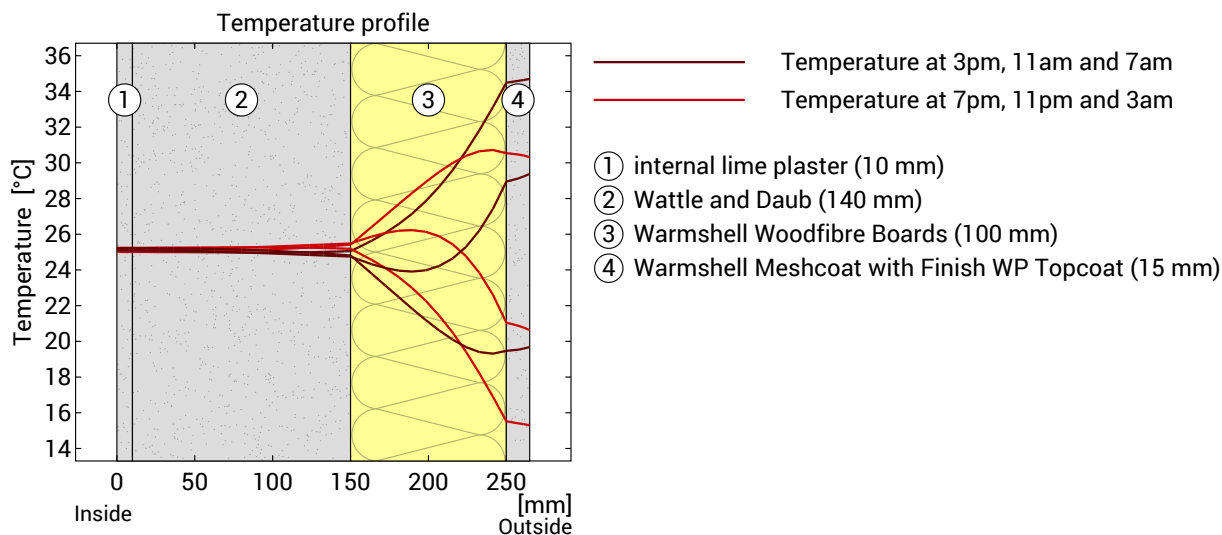
Surface temperature inside (min / average / max): 17,9°C 18,1°C 18,6°C

Surface temperature outside (min / average / max): -4,7°C -4,7°C -4,7°C

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Heat protection

The following results are properties of the tested component alone and do not make any statement about the heat protection of the entire room:



Top: Temperature profile within the component at different times. From top to bottom, brown lines: at 3 pm, 11 am and 7 am and red lines at 7 pm, 11 pm and 3 am.

Bottom: Temperature on the outer (red) and inner (blue) surface in the course of a day. The arrows indicate the location of the temperature maximum values . The maximum of the inner surface temperature should preferably occur during the second half of the night.

Phase shift*	13,3 h	Heat storage capacity (whole component):	278 kJ/m ² K
Amplitude attenuation **	76,3	Thermal capacity of inner layers:	211 kJ/m ² K
TAV ***	0,013		

* The phase shift is the time in hours after which the temperature peak of the afternoon reaches the component interior.

** The amplitude attenuation describes the attenuation of the temperature wave when passing through the component. A value of 10 means that the temperature on the outside varies 10x stronger than on the inside, e.g. outside 15-35 °C, inside 24-26 °C.

*** The temperature amplitude ratio TAV is the reciprocal of the attenuation: $TAV = 1 / \text{amplitude attenuation}$

Note: The heat protection of a room is influenced by several factors, but essentially by the direct solar radiation through windows and the total amount of heat storage capacity (including floor, interior walls and furniture). A single component usually has only a very small influence on the heat protection of the room.

The calculations presented above have been created for a 1-dimensional cross-section of the component.