Exterior wall, U=0,263 W/m²K

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thermal protection

U = 0,26 W/m²K

EnEV Bestand*: U<0,24 W/m²K

excellent insufficient

Moisture proofing

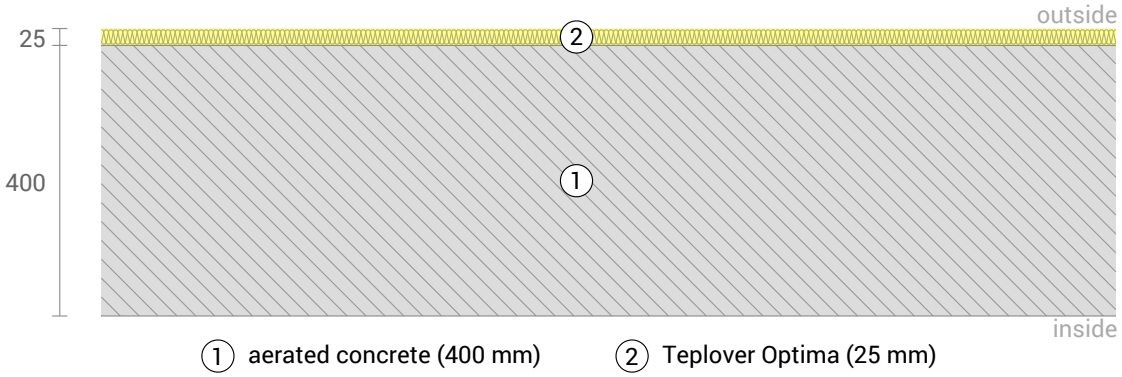
No condensate

excellent insufficient

Heat protection

Temperature amplitude damping: >100
phase shift: non relevant
Thermal capacity inside: 110 kJ/m²K

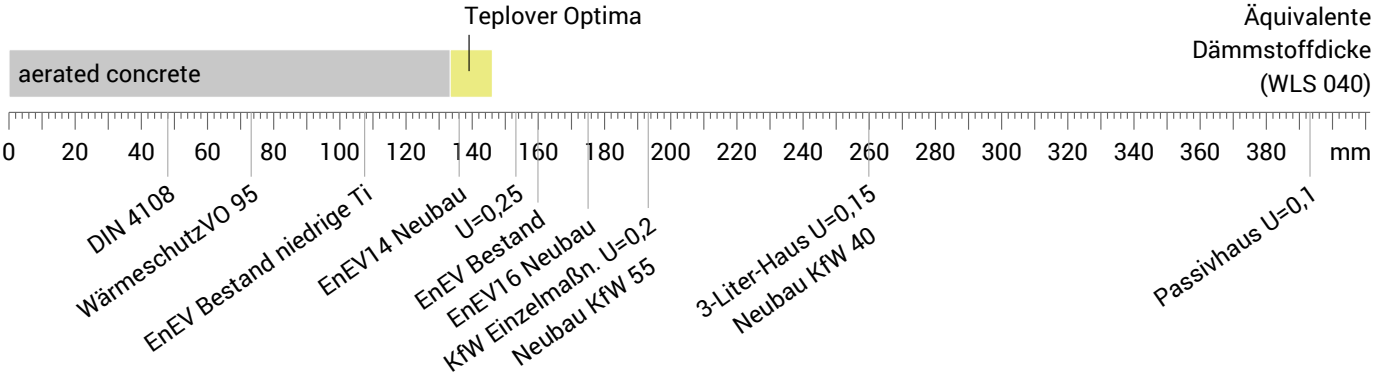
excellent insufficient



1 aerated concrete (400 mm) 2 Teplover Optima (25 mm)

Impact of each layer and comparison to reference values

For the following figure, the thermal resistances of the individual layers were converted in millimeters insulation. The scale refers to an insulation of thermal conductivity 0,040 W/mK.



Inside air :	20,0°C / 50%			Thickness:	42,5 cm
Outside air:	-10,0°C / 80%		sd-value: 2,1 m	Weight:	207 kg/m²
Surface temperature.:	18,1°C / -9,7°C			Heat capacity:	206 kJ/m²K

*Comparison to the maximum U-value according to the german EnEV 2014/2016 for first-time installation or renewal of Außenwänden (Anlage 3, Tabelle 1, Zeile 1).

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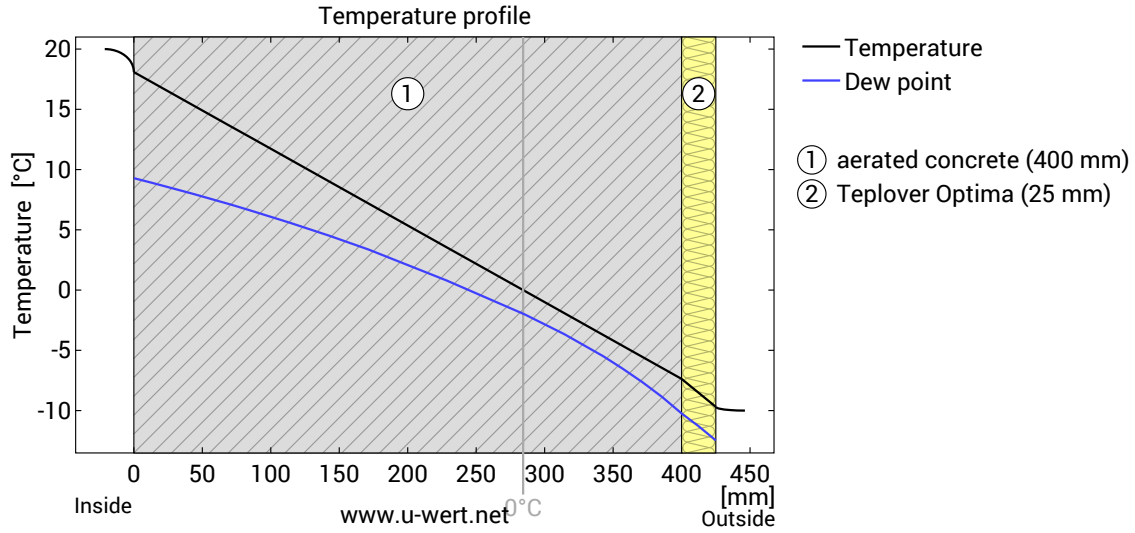
Temperature profile



Temperature and dew-point temperature in the component. 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 temperature, no condensation occurs. If the curves have contact, condensation occurs at the corresponding position.

Layers (from inside to outside)

#		Material	λ [W/mK]	R [m²K/W]	Temperatur [°C] min	max	Weight [kg/m²]
		Thermal contact resistance*		0,130	18,1	20,0	
1	40 cm	aerated concrete	0,120	3,333	-7,4	18,1	200,0
2	2,5 cm	Teplover Optima	0,082	0,305	-9,7	-7,4	7,5
		Thermal contact resistance*		0,040	-10,0	-9,7	
	42,5 cm	Whole component		3,808			207,5

*Wärmeübergangswiderstände gemäß DIN 6946 für die U-Wert-Berechnung. Für Feuchteschutz und Temperaturverlauf wurden Rsi=0,25 und Rse=0,04 gemäß DIN 4108-3 verwendet.

Surface temperature inside (min / average / max):	18,1°C	18,1°C	18,1°C
Oberflächentemperatur außen (min / mittel / max):	-9,7°C	-9,7°C	-9,7°C

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Moisture proofing

Diese Berechnung wurde mit einem benutzerdefinierten Klima für die Tauperiode durchgeführt, das von der DIN 4108-3 abweicht.

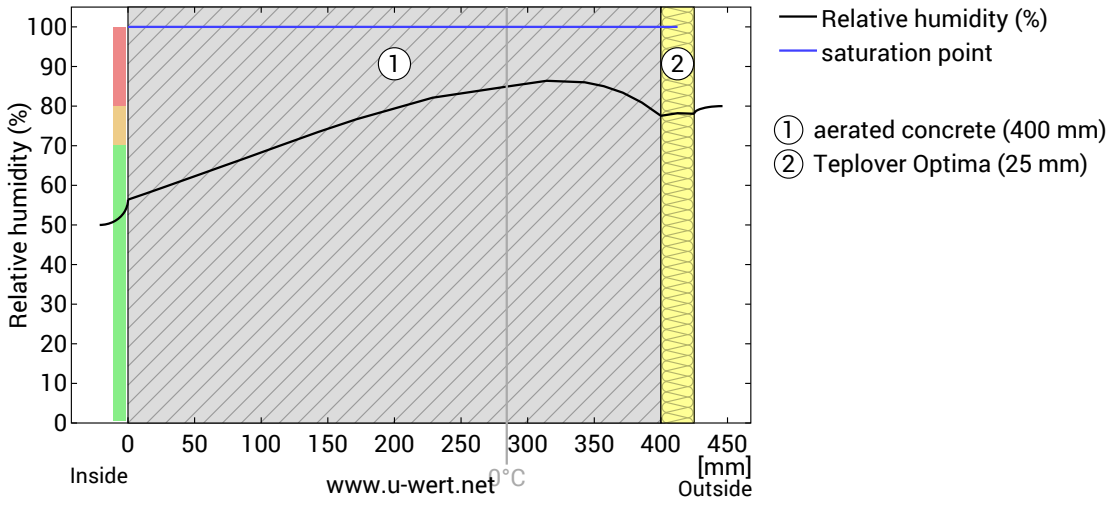
Für diese Berechnung angenommen:	innen:	20°C	50%	außen:	-10°C	80%
In der DIN 4108-3 gefordert:	innen:	20°C	50%	außen:	-5°C	80%

This component is free of condensate under the given climate conditions.

#		Material	sd-value [m]	Condensate [kg/m²]	[Gew.-%]	Weight [kg/m²]
1	40 cm	aerated concrete	2,00	-		200,0
2	2,5 cm	Teplover Optima	0,10	-		7,5
	42,5 cm	Whole component	2,10			207,5

Humidity

The temperature of the inside surface is 18,1 °C leading to a relative humidity on the surface of 56%.Mould formation is not expected under these conditions.
The following figure show the relative humidity inside the component.



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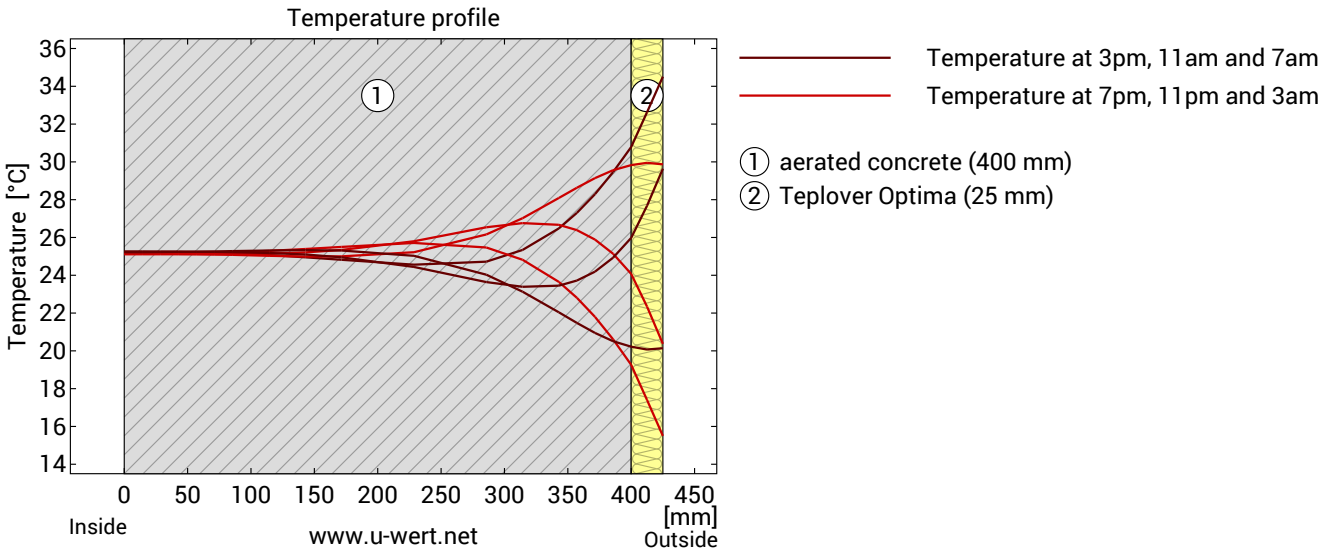
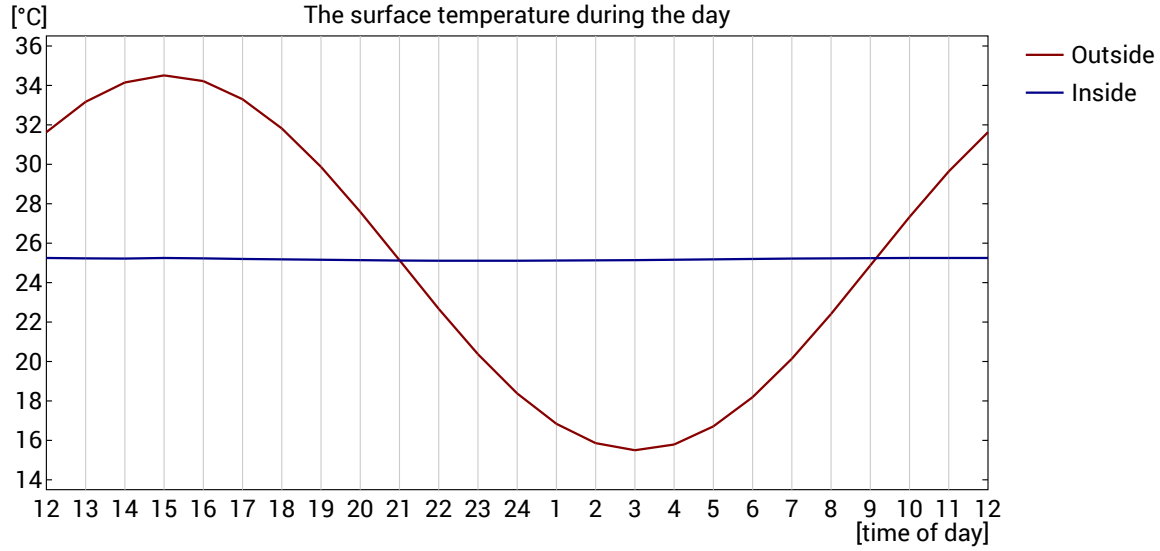
Heat protection

For the analysis of the heat protection, the temperature changes within the component were simulated during a hot summer day:





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*	non relevant		
Amplitude attenuation **	>100	Thermal fluctuation on exterior surface:	19,0°C
TAV***	0,008	Temperature fluctuation on interior surface	0,1°C

* 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 / amplitude attenuation