

# Steco MESNER Separating wall

internal wall  
created on 5.2.2018

## Thermal protection

$U = 0,17 \text{ W}/(\text{m}^2\text{K})$

Beidseitig beheizt: Keine Anforderung\*

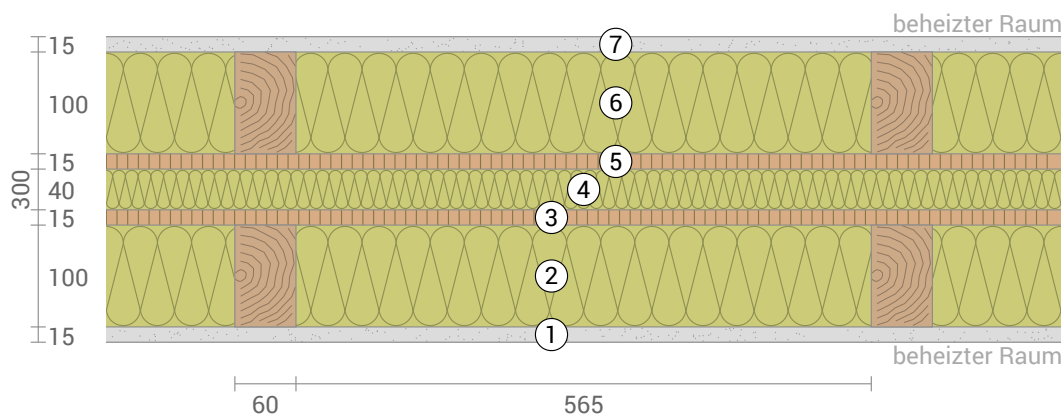
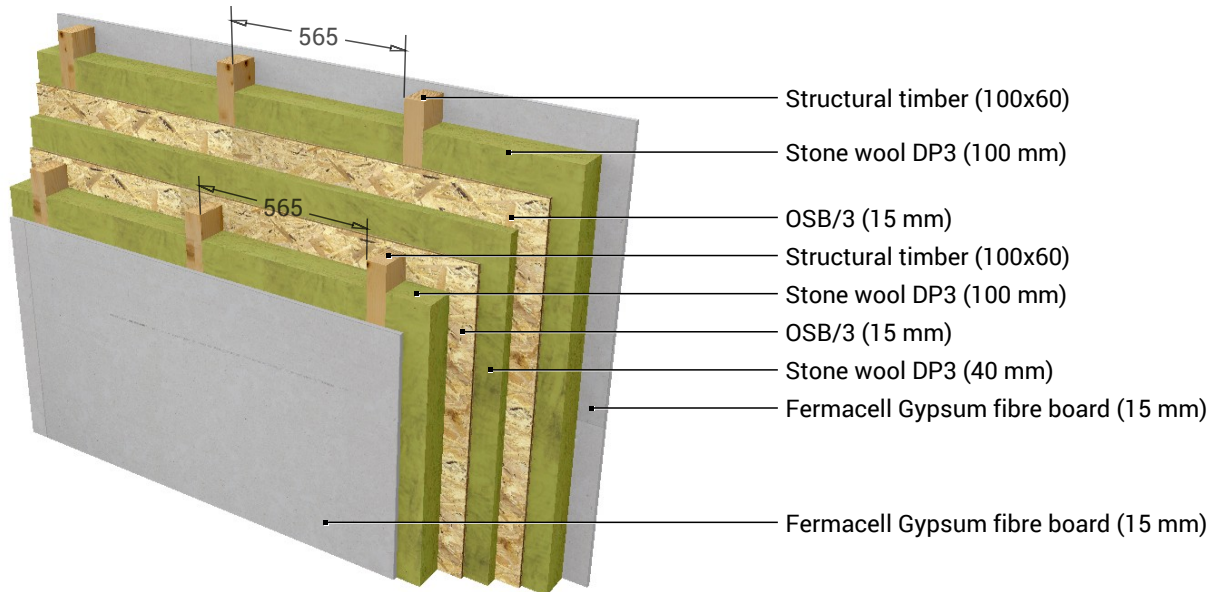


## Moisture proofing

Drying reserve:  $435 \text{ g}/\text{m}^2\text{a}$   
No condensate

## Heat protection

Temperature amplitude damping: 41  
phase shift: 12,8 h  
Thermal capacity inside:  $44 \text{ kJ}/\text{m}^2\text{K}$



- ① Fermacell Gypsum fibre board (15 mm)
- ② Stone wool DP3 (100 mm)
- ③ OSB/3 (15 mm)
- ④ Stone wool DP3 (40 mm)
- ⑤ OSB/3 (15 mm)
- ⑥ Stone wool DP3 (100 mm)
- ⑦ Fermacell Gypsum fibre board (15 mm)

Inside air :  $20,0^\circ\text{C} / 50\%$   
Inside air 2:  $20,0^\circ\text{C} / 50\%$   
Surface temperature.:  $20,0^\circ\text{C} / 20,0^\circ\text{C}$

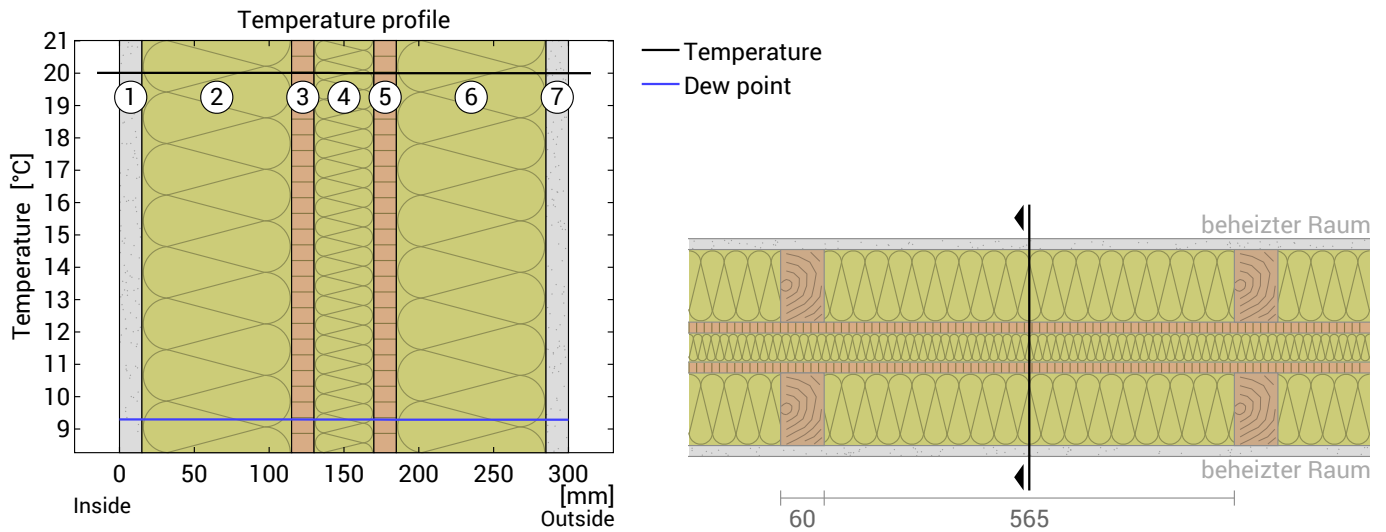
sd-value: 7,7 m  
Drying reserve:  $435 \text{ g}/\text{m}^2\text{a}$

Thickness: 30,0 cm  
Weight:  $68 \text{ kg}/\text{m}^2$   
Heat capacity:  $90 \text{ kJ}/\text{m}^2\text{K}$

EnEV Bestand     EnEV16 Neubau     EnEV14 Neubau     EnEV Bestand (Nichtwohngeb.)

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## Temperature profile



- ① Fermacell Gypsum fibre board (15 mm)
- ② Stone wool DP3 (100 mm)
- ③ OSB/3 (15 mm)
- ④ Stone wool DP3 (40 mm)
- ⑤ OSB/3 (15 mm)
- ⑥ Stone wool DP3 (100 mm)
- ⑦ Fermacell Gypsum fibre board (15 mm)

**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	$\lambda$ [W/mK]	R [m <sup>2</sup> K/W]	Temperatur [°C]		Weight [kg/m <sup>2</sup> ]
				min	max	
	Thermal contact resistance*		0,130	20,0	20,0	
1	1,5 cm Fermacell Gypsum fibre board	0,320	0,047	20,0	20,0	17,3
2	10 cm Stone wool DP3	0,039	2,564	20,0	20,0	2,7
	10 cm Structural timber (9,6%)	0,130	0,769	20,0	20,0	4,3
3	1,5 cm OSB/3	0,130	0,115	20,0	20,0	9,3
4	4 cm Stone wool DP3	0,039	1,026	20,0	20,0	1,2
5	1,5 cm OSB/3	0,130	0,115	20,0	20,0	9,3
6	10 cm Stone wool DP3	0,039	2,564	20,0	20,0	2,7
	10 cm Structural timber (9,6%)	0,130	0,769	20,0	20,0	4,3
7	1,5 cm Fermacell Gypsum fibre board	0,320	0,047	20,0	20,0	17,3
	Thermal contact resistance*		0,130	20,0	20,0	
	30 cm Whole component		5,971			68,4

\*Thermal contact resistances according to DIN 6946 for the U-value calculation.  $R_{si}=0,25$  and  $R_{se}=0,04$  according to DIN 4108-3 were used for moisture proofing and temperature profile.

Surface temperature inside (min / average / max): 20,0°C 20,0°C 20,0°C  
Surface temperature outside (min / average / max): 20,0°C 20,0°C 20,0°C

## Steco MESNER Separating wall, $U=0,17 \text{ W}/(\text{m}^2\text{K})$

### Moisture proofing

This calculation was carried out with a user-defined climate for the winter period, which deviates from DIN 4108-3.

This calculation:   inside: 20.01°C   50%           outside: 20°C   50%  
 Requested by DIN 4108-4:                                   inside: 20°C   50%           outside: -5°C   80%

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

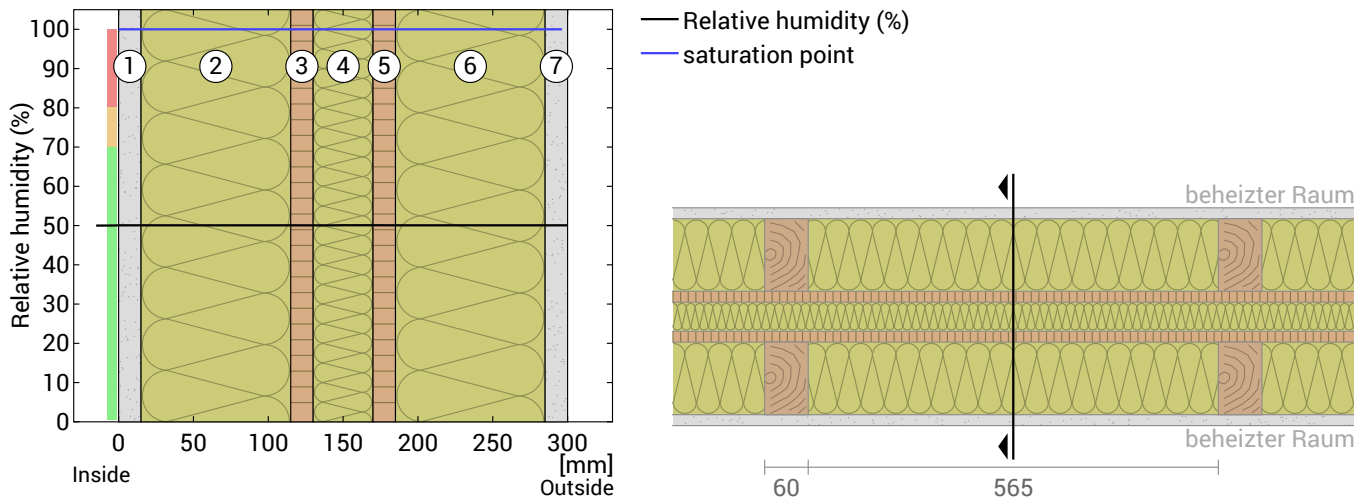
The drying reserve of this component is 435 g/(m<sup>2</sup>a). Required by DIN 68800-2: at least 100 g/(m<sup>2</sup>a).

#	Material	sd-value [m]	Condensate		Weight
			[kg/m <sup>2</sup> ]	[Gew.-%]	[kg/m <sup>2</sup> ]
1	1,5 cm Fermacell Gypsum fibre board	0,19	-		17,3
2	10 cm Stone wool DP3	0,10	-		2,7
	10 cm Structural timber (9,6%)	2,00	-	-	4,3
3	1,5 cm OSB/3	2,25	-	-	9,3
4	4 cm Stone wool DP3	0,04	-		1,2
5	1,5 cm OSB/3	4,50	-	-	9,3
6	10 cm Stone wool DP3	0,10	-		2,7
	10 cm Structural timber (9,6%)	5,00	-	-	4,3
7	1,5 cm Fermacell Gypsum fibre board	0,19	-		17,3
	30 cm Whole component	7,65			68,4

### Humidity

The temperature of the inside surface is 20,0 °C leading to a relative humidity on the surface of 50%. Mould formation is not expected under these conditions.

The following figure show the relative humidity inside the component.



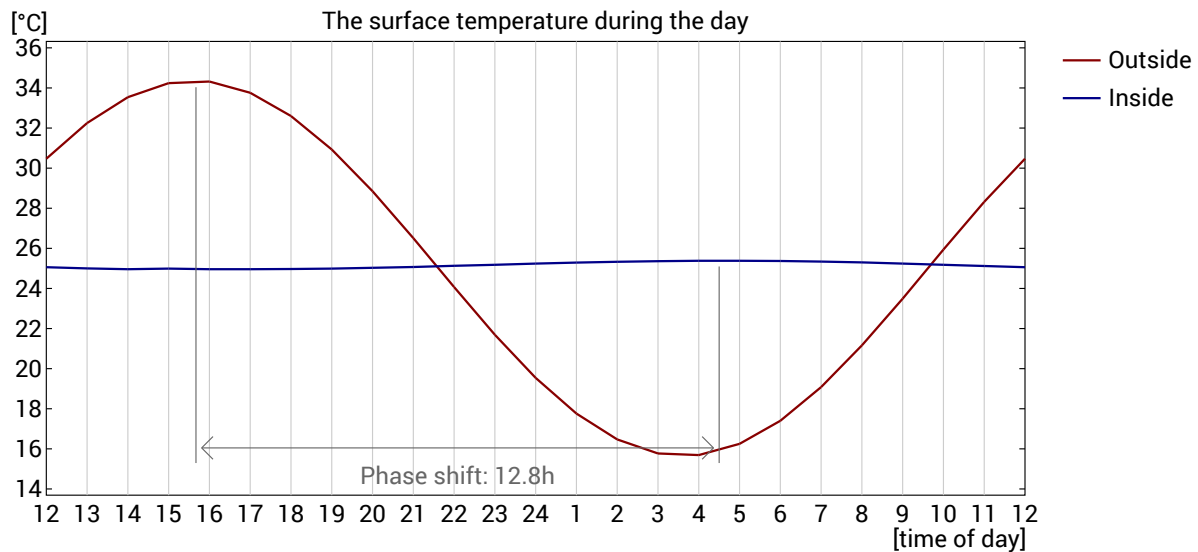
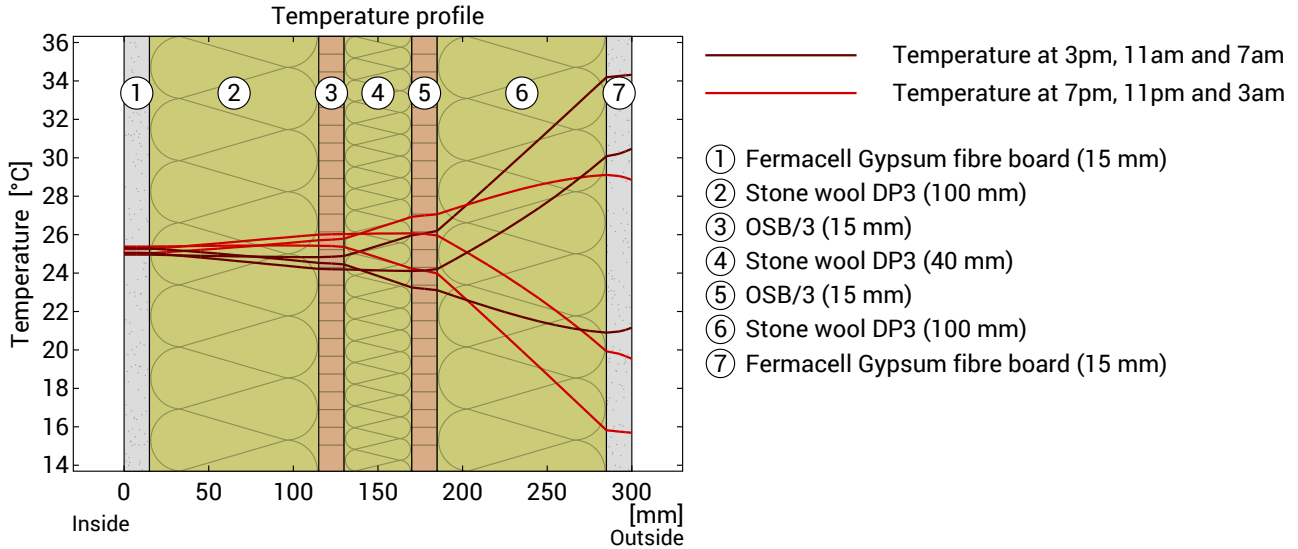
- ① Fermacell Gypsum fibre board (15 mm)    ④ Stone wool DP3 (40 mm)    ⑦ Fermacell Gypsum fibre board (15 mm)  
 ② Stone wool DP3 (100 mm)    ⑤ OSB/3 (15 mm)  
 ③ OSB/3 (15 mm)    ⑥ Stone wool DP3 (100 mm)

To calculate the diffusion currents a two-dimensional finite element method was used. More information on the section 'humidity' on the input form.

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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*	12,8 h	Time of maximum interior temperature	4:30
Amplitude attenuation **	41,2	Thermal fluctuation on exterior surface:	18,7°C
TAV ***	0,024	Temperature fluctuation on interior surface	0,5°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:  $TAV = 1 / \text{amplitude attenuation}$

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