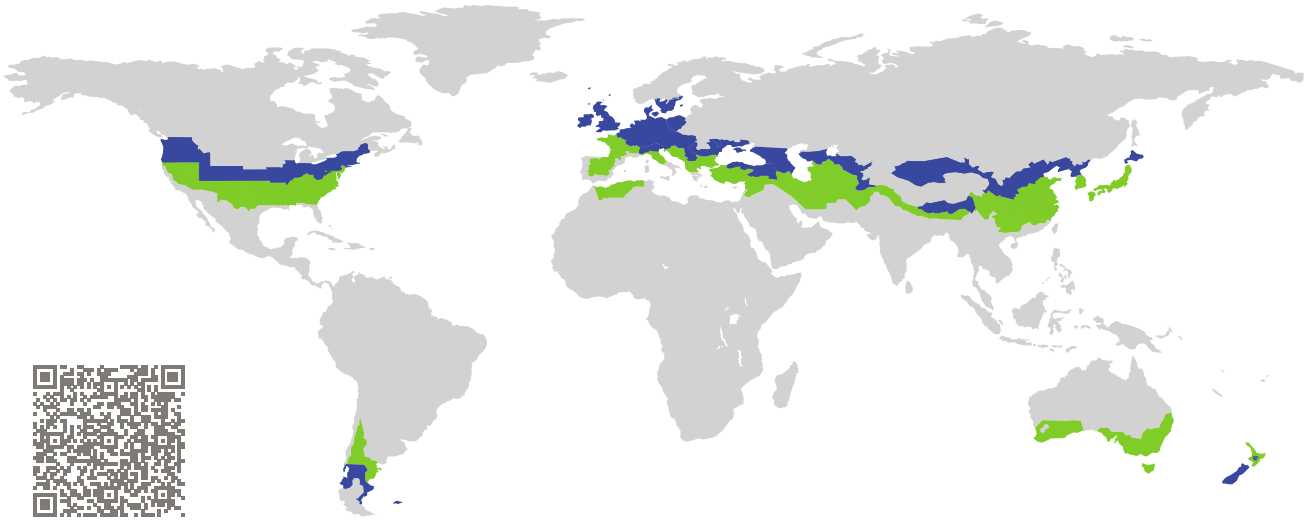
ZERTIFIKAT

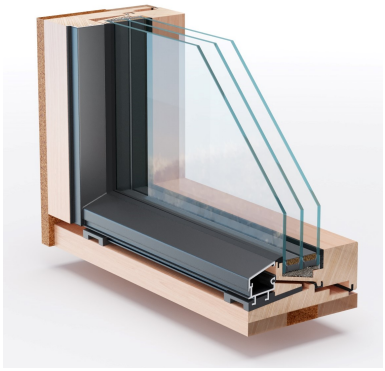
Zertifizierte Passivhaus-Komponente

Komponenten-ID 1894ws03 gültig bis 31. Dezember 2024

Passivhaus Institut
Dr. Wolfgang Feist
64283 Darmstadt
Deutschland



Kategorie:	**Fenster System**
Hersteller:	**pro Passivhausfenster GmbH, Oberaudorf, Deutschland**
Produktname:	**smartwin solar**



Folgende Kriterien für die kühl-gemäßigte Klimazone wurden geprüft

Behaglichkeit	$U_W = 0{,}78$	$\leq$	0,80 W/(m² K)
	$U_{W,\text{eingebaut}}$	$\leq$	0,85 W/(m² K)
	mit U_g	=	0,70 W/(m² K)
Hygiene	$f_{Rsi=0{,}25}$	$\geq$	0,70
Luftdichtheit	$Q_{100} = 0{,}24$	$\leq$	0,25 m³/(h m)

kühl-gemäßigtes Klima

phA

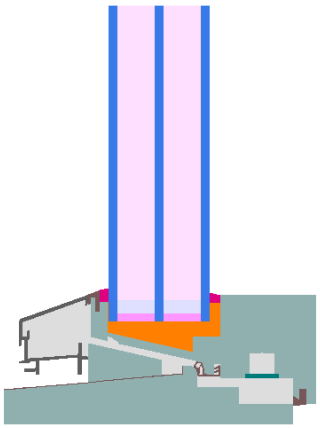
ZERTIFIZIERTE KOMPONENTE

Passivhaus Institut

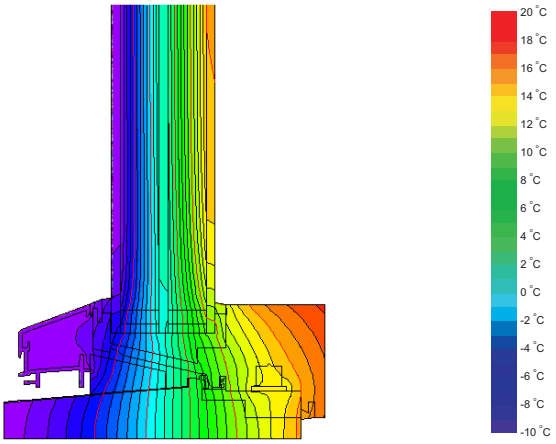
Passivhaus-Effizienzklasse	phE	phD	phC	phB	phA

www.passiv.de

pro Passivhausfenster GmbH
Martin-Greif-Straße 20, 83080 Oberaudorf, Deutschland
☎ +49 8033 / 30 40 98 | ✉ ff@propassivhausfenster.net | http://www.propassivhausfenster.net |



Berechnungsmodell



Isothermengrafik

Beschreibung

Holz-Aluminiumfensterrahmen (Tanne/Fichte 0,11 W/(mK)) mit Naturfaserdämmung, 0,040 W/(mK). Lastabtragung des Glases über spezielle Eckstücke. Die Kennwert der Luftdichtheit wurde an einer Kombination aus Festverglasung und Drehkipp-Flügel, Elementgröße 2,0m*2,6 m ermittelt. Der Fenstereinbau wird individuell durch den Hersteller geplant. Glasstärke: 48 mm (4/18/4/18/4), Glaseinstand: 15 mm. Abstandhalter: SWISSPACER Ultimate.

Erläuterung

Die Fenster-U-Werte wurden für die Prüffenstergröße von 2,46 m × 1,48 m bei U_g = 0,70 W/(m² K) berechnet. Werden höherwertige Verglasungen eingesetzt, verbessern sich die Fenster-U-Werte wie folgt:

Verglasung	U_g =	0,70	0,64	0,58	0,52	W/(m² K)
		↓	↓	↓	↓	
Fenster	U_W =	0,78	0,73	0,68	0,63	W/(m² K)

Transparente Bauteile werden abhängig von den Wärmeverlusten durch den opaken Teil in Effizienzklassen eingestuft. In diese Wärmeverluste gehen die Rahmen-U-Werte, die Rahmenbreiten, Glasrand und die Glasrandlängen ein. Ein ausführlicher Bericht über die im Rahmen der Zertifizierung durchgeführten Berechnungen ist beim Hersteller erhältlich.
Das Passivhaus Institut hat weltweite Komponentenanforderungen für sieben Klimazonen definiert. Grundsätzlich können Komponenten, die für Klimazonen mit höheren Anforderungen zertifiziert sind, auch in Klimazonen mit geringeren Anforderung eingesetzt werden. Es kann wirtschaftlich sinnvoll sein, in einer Klimazone eine thermisch höherwertige Komponente, die für eine Klimazone mit strengeren Anforderungen zertifiziert wurde, einzusetzen.

Weitere Informationen zur Zertifizierung
sind unter www.passiv.de und www.passipedia.de verfügbar.

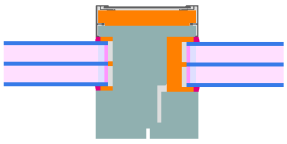
Rahmen-Kennwerte			Rahmenbreite b_f mm	Rahmen-U-Wert U_f W/(m² K)	Glasrand-Ψ-Wert Ψ_g W/(m K)	Temperaturfaktor $f_{Rsi=0,25}$ [-]
Pfosten fest	(0M1)		110	0,69	0,028	0,71
Pfosten fest	(0M2)		110	0,82	0,027	0,69
Riegel fest	(0T1)		110	0,74	0,027	0,70
Riegel fest	(0T2)		110	0,82	0,027	0,69
Pfosten 1 Flügel	(1M1)		80	0,84	0,027	0,71
Pfosten 1 Flügel	(1M2)		110	0,78	0,027	0,71
Pfosten 1 Flügel	(1M3)		80	0,95	0,026	0,70
Pfosten 1 Flügel	(1M4)		110	0,95	0,026	0,69
Riegel 1 Flügel	(1T1)		80	0,83	0,027	0,70
Riegel 1 Flügel	(1T2)		110	0,83	0,028	0,70
Riegel 1 Flügel	(1T3)		80	0,87	0,026	0,70
Riegel 1 Flügel	(1T4)		110	0,90	0,026	0,69
Pfosten 2 Flügel	(2M1)		110	0,75	0,026	0,72
Pfosten 2 Flügel	(2M2)		110	0,90	0,026	0,71
Riegel 2 Flügel	(2T1)		110	0,81	0,026	0,72
Riegel 2 Flügel	(2T2)		124	0,81	0,026	0,71
Riegel 2 Flügel	(2T3)		110	0,87	0,026	0,71
Riegel 2 Flügel	(2T4)		124	0,89	0,026	0,71
Unten fest	(FB1)		62	0,68	0,028	0,71
Abstandhalter: MULTITECH G				Sekundärdichtung: Polysulfid		

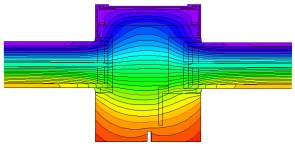
Rahmen-Kennwerte		Rahmenbreite b_f mm	Rahmen-U-Wert U_f W/(m² K)	Glasrand-Ψ-Wert Ψ_g W/(m K)	Temperaturfaktor $f_{Rsi=0,25}$ [-]
Oben fest	(FH1)	62	0,67	0,027	0,72
Seitlich fest	(FJ1)	62	0,67	0,027	0,72
Stulp	(FM1)	92	0,76	0,026	0,72
Stulp	(FM2)	92	0,87	0,026	0,71
Unten	(OB1)	62	0,84	0,026	0,71
Oben	(OH1)	62	0,77	0,026	0,72
Seitlich	(OJ1)	62	0,77	0,026	0,72
Schwelle	(OT1)	67	0,91	0,027	0,70

Abstandhalter: MULTITECH G | Sekundärdichtung: Polysulfid

Pfosten
fest

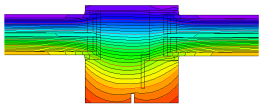
b_f = 110 mm
U_f = 0,69 W/(m² K)
Ψ_g = 0,028 W/(m K)
f_{Rsi} = 0,71





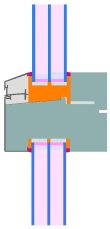
Pfosten
fest

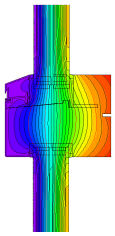
b_f = 110 mm
U_f = 0,82 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,69



Riegel
fest

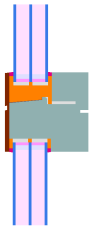
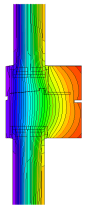
b_f = 110 mm
U_f = 0,74 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,70





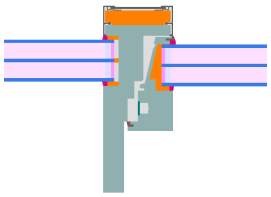
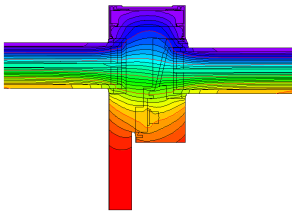
Riegel
fest

b_f = 110 mm
U_f = 0,82 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,69

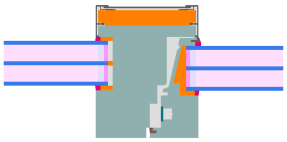
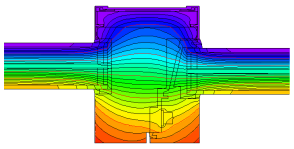
Pfosten
1 Flügel

b_f = 80 mm
U_f = 0,84 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,71

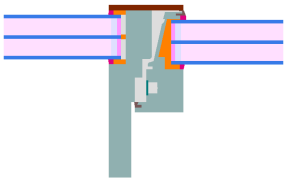
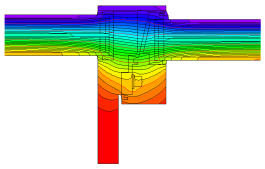
Pfosten
1 Flügel

b_f = 110 mm
U_f = 0,78 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,71

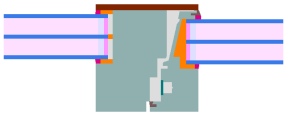
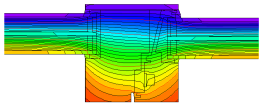
Pfosten
1 Flügel

b_f = 80 mm
U_f = 0,95 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,70

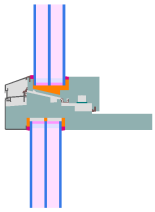
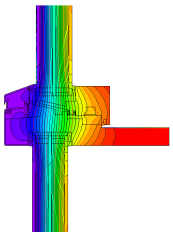
Pfosten
1 Flügel

b_f = 110 mm
U_f = 0,95 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,69

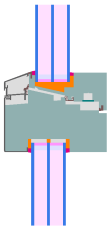
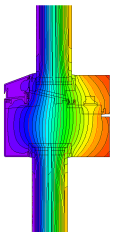
Riegel
1 Flügel

b_f = 80 mm
U_f = 0,83 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,70

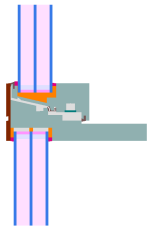
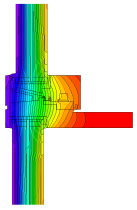
Riegel
1 Flügel

b_f = 110 mm
U_f = 0,83 W/(m² K)
Ψ_g = 0,028 W/(m K)
f_{Rsi} = 0,70

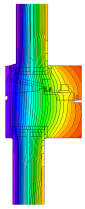
Riegel
1 Flügel

b_f = 80 mm
U_f = 0,87 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,70

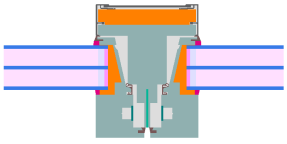
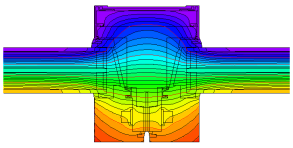
Riegel
1 Flügel

b_f = 110 mm
U_f = 0,90 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,69

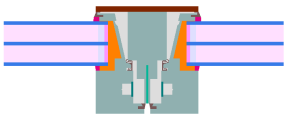
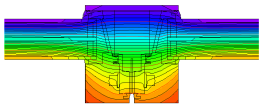
Pfosten
2 Flügel

b_f = 110 mm
U_f = 0,75 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,72

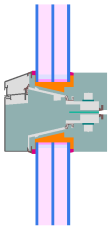
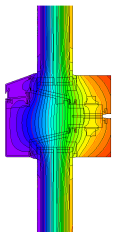
Pfosten
2 Flügel

b_f = 110 mm
U_f = 0,90 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,71

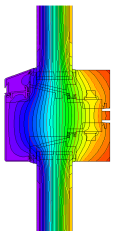
Riegel
2 Flügel

b_f = 110 mm
U_f = 0,81 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,72

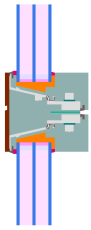
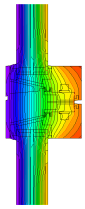
Riegel
2 Flügel

b_f = 124 mm
U_f = 0,81 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,71

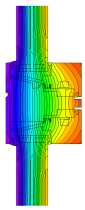
Riegel
2 Flügel

b_f = 110 mm
U_f = 0,87 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,71

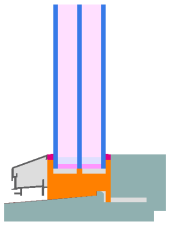
Riegel
2 Flügel

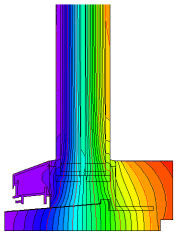
b_f = 124 mm
U_f = 0,89 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,71

Unten
fest

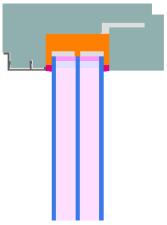
b_f = 62 mm
U_f = 0,68 W/(m² K)
Ψ_g = 0,028 W/(m K)
f_{Rsi} = 0,71

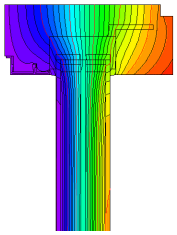




Oben
fest

b_f = 62 mm
U_f = 0,67 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,72



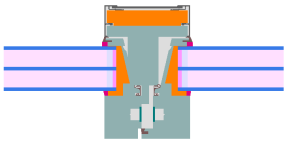


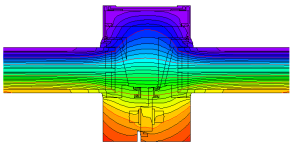
Seitlich
fest

b_f = 62 mm
U_f = 0,67 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,72

Stulp

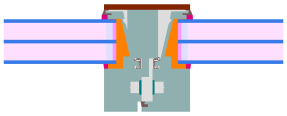
b_f = 92 mm
U_f = 0,76 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,72

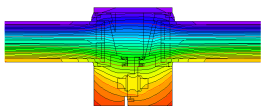




Stulp

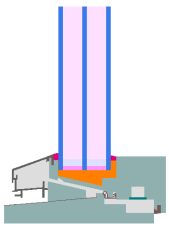
b_f = 92 mm
U_f = 0,87 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,71

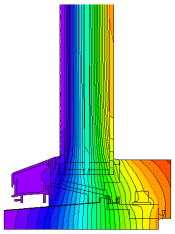




Unten

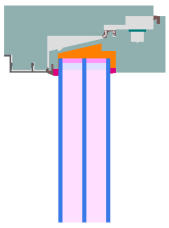
b_f = 62 mm
U_f = 0,84 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,71

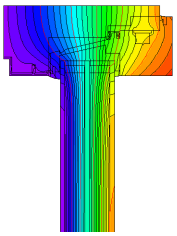




Oben

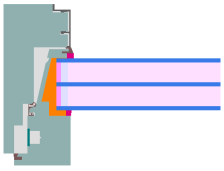
b_f = 62 mm
U_f = 0,77 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,72

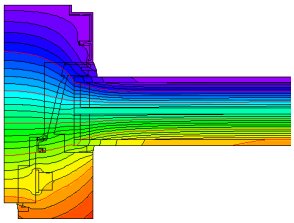




Seitlich

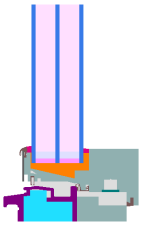
b_f = 62 mm
U_f = 0,77 W/(m² K)
Ψ_g = 0,026 W/(m K)
f_{Rsi} = 0,72





Schwelle

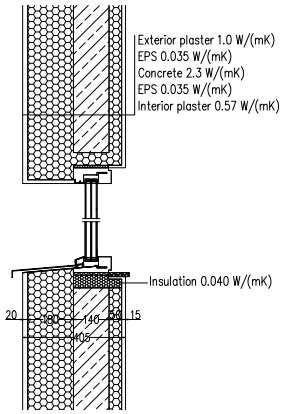
b_f = 67 mm
U_f = 0,91 W/(m² K)
Ψ_g = 0,027 W/(m K)
f_{Rsi} = 0,70



Geprüfte Einbausituationen

Betonschalungsstein (fest verglast)

U_{Wand} = 0,15 W/(m² K)

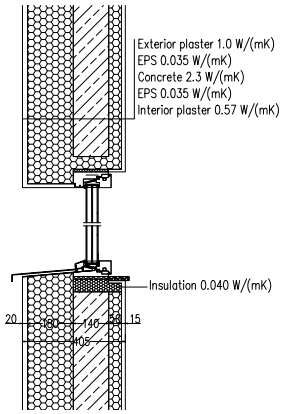


Ψ_{einbau}	W/(m K)
Oben	0,013
Links	0,013
Rechts	0,013
Unten	0,024

$U_{W,eingebaut}$ = 0,82 W/(m² K)

Betonschalungsstein (öffenbar)

U_{Wand} = 0,15 W/(m² K)

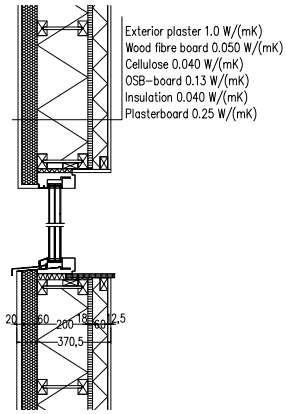


Ψ_{einbau}	W/(m K)
Oben	0,013
Links	0,013
Rechts	0,013
Unten	0,026

$U_{W,eingebaut}$ = 0,82 W/(m² K)

Holzleichtbau (fest verglast)

U_{Wand} = 0,13 W/(m² K)

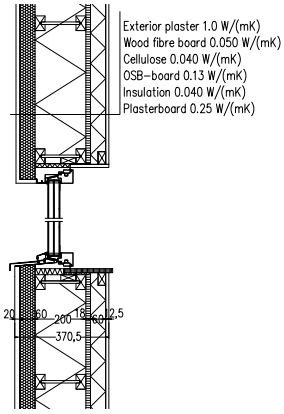


Ψ_{einbau}	W/(m K)
Oben	0,015
Links	0,015
Rechts	0,015
Unten	0,018

$U_{W,eingebaut}$ = 0,82 W/(m² K)

Holzleichtbau (öffenbar)

U_{Wand} = 0,13 W/(m² K)

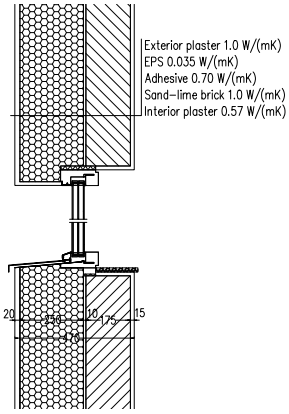


Ψ_{einbau}	W/(m K)
Oben	0,015
Links	0,015
Rechts	0,015
Unten	0,020

$U_{W,eingebaut}$ = 0,82 W/(m² K)

Wärmedämmverbundsystem (WDVS) (fest verglast)

U_{Wand} = 0,13 W/(m² K)

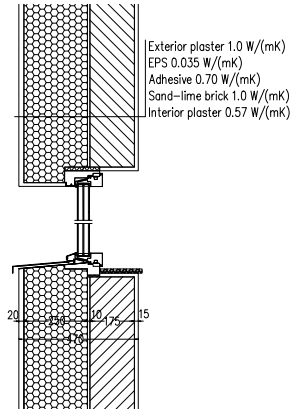


Ψ_{einbau}	W/(m K)
Oben	0,017
Links	0,017
Rechts	0,017
Unten	0,019

$U_{W,eingebaut}$ = 0,82 W/(m² K)

Wärmedämmverbundsystem (WDVS) (öffenbar)

U_{Wand} = 0,13 W/(m² K)

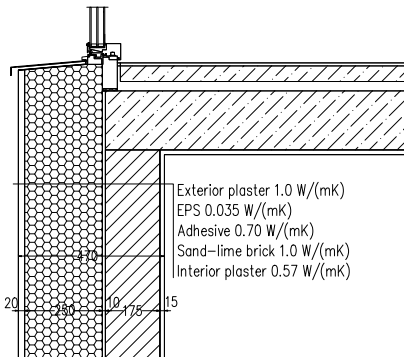


Ψ_{einbau}	W/(m K)
Oben	0,018
Links	0,018
Rechts	0,018
Unten	0,022

$U_{W,eingebaut}$ = 0,83 W/(m² K)

Wärmedämmverbundsystem (WDVS)
Schwelle (öffenbar)

U_1 = 0,13 [W/(m² K)]



Ψ_{einbau} = 0,03 W/(m K)