

**Pitched roof - sdshzx02-01**

pitched roof, exposed rafter, ventilated, -, without lining, wooden surface

**Performance rating**

**Fire protection performance** REI 30  
 maximum span = 5 m; maximum load  $E_{d,fi} = 5,29 \text{ kN/m}^2$  (with exposed beams 180/240 and fire protection cladding)  
 Classified by HFA  
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**Germany**  
 F30  
 Load  $E_{d,fi}$  according to the German certification document  
 Corresponding proof: DIN 4102-4:2016-05, Tabelle 10.24, Zeile 1

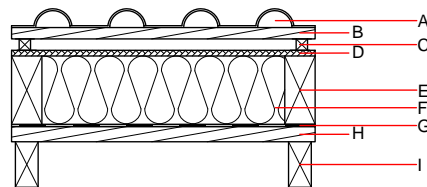
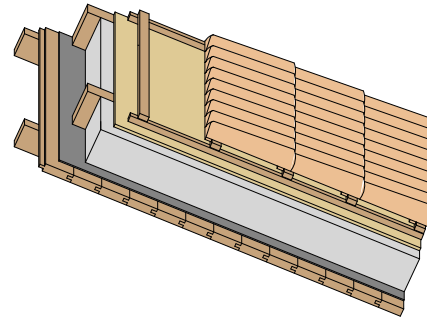
**Thermal performance** U Diffusion 0.17  $\text{W}/(\text{m}^2\text{K})$  suitable

Calculated by TUM

**Acoustic performance**  $R_w (C; C_{tr})$  44(-2;-8) dB  
 $L_{n,w} (C_i)$

Assessed by Müller-BBM

**Mass per unit area** m 114.60  $\text{kg}/\text{m}^2$



**Note:** The design of the under-roof construction and of the counter-battens have to be specified according to the roof pitch and the national requirements. Depending on the requirements (eg increased rainproof under-roof), an additional underlay is required.

**Register of building materials used for this application, cross-section** (from outside to inside, dimensions in mm)

	Thickness	Building material	Thermal performance				Reaction to fire EN
			$\lambda$	$\mu$ min - max	$\rho$	c	
A		concrete roof tile or tiled roof				2100	A1
B	30.0	spruce wood battens (30/50)	0.120	50	450	1.600	D
C	50.0	spruce wood counter battens (Austria: minimum height 50 mm), Germany 30 mm	0.120	50	450	1.600	D
D	15.0	fibreboard (MDF)	0.140	11	600	1.700	D
E	240.0	construction timber (80/...; e=800)	0.120	50	450	1.600	D
F	240.0	Cellulose fibre [040; 50]	0.040	1	50	2.000	E
G		vapour barrier $s_d \geq 2\text{m}$				1000	
H	40.0	spruce wood tongue and groove, fire protection cladding (Germany Minimum 50 mm)	0.120	50	450	1.600	D
I		construction timber in acc. with structural design	0.120	50	450	1.600	D

**Sustainability rating** (per  $\text{m}^2$ )

**Database ecoinvent**

$OI3_{kon}$  20.6

Calculated by HFA

**Database GaBi (ÖKOBAUDAT)**

<b>Built-in renewable materials</b>	kg	81.980
<b>Biogenic carbon in <math>\text{kg CO}_2\text{-e}</math>.</b>	kg $\text{CO}_2$	115.800
<b>Energy use of Primary Energy</b>	MJ	876.860
<b>Share of renewable PE</b>	%	33.88

Calculated by TUM

### Details of sustainability rating

#### Database ecoinvent

Lifecycle (Phases)	GWP [kg CO <sub>2</sub> -e.]	AP [kg SO <sub>2</sub> -e.]	EP [kg PO <sub>4</sub> -e.]	ODP [kg R11-e.]	POCP [kg Ethen-e.]	
A1 - A3		0.130	0.055	2,26E-6	0.031	

Lifecycle (Phases)	PERE [MJ]	PERM [MJ]	PERT [MJ]	PENRE [MJ]	PENRM [MJ]	PENRT [MJ]
A1 - A3	157.639	1039.238	1196.877	401.250	46.624	447.874

#### Database GaBi (ÖKOBAUDAT)

Lifecycle (Phases)	GWP [kg CO <sub>2</sub> -e.]	AP [kg SO <sub>2</sub> -e.]	EP [kg PO <sub>4</sub> -e.]	ODP [kg R11-e.]	POCP [kg Ethen-e.]	
A1 - A3		0.100	0.020	2,17E-6	0.021	
C1 - C4		0.011	0.008	1,83E-7	0.001	
A1 - C4		0.113	0.028	2,36E-6	0.022	

Lifecycle (Phases)	PERE [MJ]	PERM [MJ]	PERT [MJ]	PENRE [MJ]	PENRM [MJ]	PENRT [MJ]
A1 - A3	294.289	1333.742	1628.980	540.839	23.005	564.128
C1 - C4	2.053	-1161.796	-1159.743	29.847	-15.305	14.542
A1 - C4	297.040	171.946	469.935	579.820	7.700	587.804