

## Flat roof - fdroba01a-00

flat roof, timber frame construction, not ventilated, with dry lining, suspended, other surface

### Performance rating

**Fire protection performance** REI 30

maximum span = 5 m; maximum load  $E_{d,fi} = 2,6 \text{ kN/m}^2$   
 Classified by HFA

#### Germany

F30

Load  $E_{d,fi}$  according to the German certification document

Corresponding proof: DIN 4102-4:2016-05, Tabelle 10.19, Zeile 1

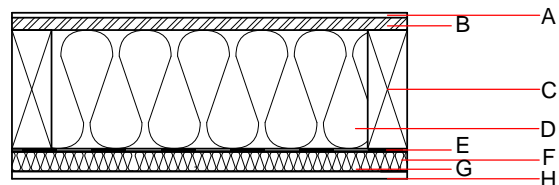
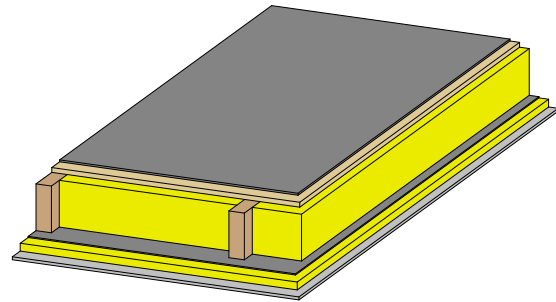
**Thermal performance** U Diffusion 0.15  $\text{W}/(\text{m}^2\text{K})$  suitable

Attention: Due to the application of a moisture-adaptive vapour barrier an object-related proof according to protection against moisture (diffusion) is mandatory. A hygrothermic simulation is necessary (e.g. WUFI)  
 Calculated by TUM

**Acoustic performance**  $R_w (C;C_{tr})$   $L_{n,w} (C_i)$  51(-4;-9) dB

Assessed by Müller-BBM

**Mass per unit area** m 156.70  $\text{kg}/\text{m}^2$



**Note: ATTENTION:** Regarding protection against moisture an object-related proof in terms of parameter like e.g. climate, shading class etc. is required. Therefore a hygrothermic simulation is necessary (e.g. WUFI), a simple Glaser calculation is not allowed.

### 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<br>EN |
|---|-----------|--|---------------------|-----------------|--------|-------|------------------------|
|   |           |  | $\lambda$           | $\mu$ min – max | $\rho$ | c     |                        |
| A |           | Plastic roofing membrane / metal sheeting on structured separation layer |                     |                 |        |       | E                      |
| B | 25.0      | OSB  | 0.130               | 200             | 600    | 1.700 | D                      |
| C | 240.0     | construction timber (80/...; e=800)                                      | 0.120               | 50              | 450    | 1.600 | D                      |
| D | 240.0     | mineral wool [040; 30; $\geq 1000^\circ\text{C}$ ]                       | 0.040               | 1               | 30     | 1.030 | A1                     |
| E |           | moisture-adaptive vapour retarder  |                     |                 |        |       | E                      |
| F | 40.0      | acoustic hanger  |                     |                 |        |       |                        |
| G | 40.0      | mineral wool [040; 30; $\geq 1000^\circ\text{C}$ ]                       | 0.040               | 1               | 30     | 1.030 | A1                     |
| H | 15.0      | gypsum plaster board type DF   | 0.250               | 10              | 800    | 1.050 | A2                     |

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

#### Database ecoinvent

$OI_{kon}$  43.0

Calculated by HFA

#### Database GaBi (ÖKOBAUDAT)

|   |                  |         |
|---|------------------|---------|
| Built-in renewable materials                  | kg               | 32.900  |
| Biogenic carbon in $\text{kg CO}_2\text{-e.}$ | $\text{kg CO}_2$ | 48.940  |
| Energy use of Primary Energy                  | MJ               | 761.390 |
| Share of renewable PE                         | %                | 24.190  |

Calculated by TUM

## Details of sustainability rating

### Database ecoinvent

| Lifecycle<br>(Phases) | GWP<br>[kg CO <sub>2</sub> -e.] | AP<br>[kg SO <sub>2</sub> -e.] | EP<br>[kg PO <sub>4</sub> -e.] | ODP<br>[kg R11-e.] | POCP<br>[kg Ethen-e.] |  |
|-----------------------|---------------------------------|--------------------------------|--------------------------------|--------------------|-----------------------|--|
| A1 - A3               | -9.510                          | 0.191                          | 0.057                          | 2,93E-6            | 0.038                 |  |

| Lifecycle<br>(Phases) | PERE<br>[MJ] | PERM<br>[MJ] | PERT<br>[MJ] | PENRE<br>[MJ] | PENRM<br>[MJ] | PENRT<br>[MJ] |
|-----------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| A1 - A3               | 65.837       | 449.585      | 515.422      | 478.730       | 92.312        | 571.042       |

### Database GaBi (ÖKOBAUDAT)

| Lifecycle<br>(Phases) | GWP<br>[kg CO <sub>2</sub> -e.] | AP<br>[kg SO <sub>2</sub> -e.] | EP<br>[kg PO <sub>4</sub> -e.] | ODP<br>[kg R11-e.] | POCP<br>[kg Ethen-e.] |  |
|-----------------------|---------------------------------|--------------------------------|--------------------------------|--------------------|-----------------------|--|
| A1 - A3               | -21.259                         | 0.152                          | 0.022                          | 1,18E-6            | 0.028                 |  |
| C1 - C4               | 54.980                          | 0.003                          | 0.003                          | 7,08E-8            | 0.000                 |  |
| A1 - C4               | 36.890                          | 0.157                          | 0.026                          | 1,26E-6            | 0.029                 |  |

| Lifecycle<br>(Phases) | PERE<br>[MJ] | PERM<br>[MJ] | PERT<br>[MJ] | PENRE<br>[MJ] | PENRM<br>[MJ] | PENRT<br>[MJ] |
|-----------------------|--------------|--------------|--------------|---------------|---------------|---------------|
| A1 - A3               | 182.764      | 570.582      | 752.588      | 558.562       | 61.117        | 619.740       |
| C1 - C4               | 0.952        | -563.858     | -562.908     | 10.624        | -13.238       | -2.614        |
| A1 - C4               | 184.204      | 6.982        | 190.427      | 577.188       | 47.943        | 625.192       |