# External wall - awrhhi04a-08

external wall, timber frame construction, ventilated, with dry lining, with cladding, other surface

## Performance rating

| | | |
|---|---|---|
| **Fire protection performance** | **REI from inside** | 60 |
| | **REI from outside** | 30 |

maximum ceiling height = 3 m; maximum load $E_{d,fi}$ = 19,2 kN/m
Classified by MA39
Classified by HFA

**Germany**

F60 (from inside)/F30 (from outside)

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

Corresponding proof: F60 (from inside): manufacturer-specific; F30 (from outside): DIN 4102-4:2016-05

| | | |
|---|---|---|
| **Thermal performance** | **U** | 0.21 W/(m²K) |
| | **Diffusion** | suitable |

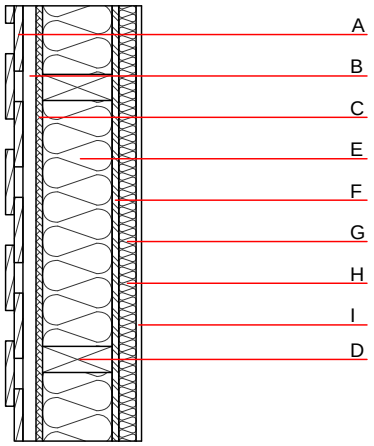
Calculated by TUM

| | | |
|---|---|---|
| **Acoustic performance** | **$R_w$ ($C;C_{tr}$)** | 50(-3;-10) dB |
| | **$L_{n,w}$ ($C_I$)** | |

Battens for the ventilation space screwed onto the structural timber together with vertical battens for the dry lining screwed directly onto the ledger beams will result in Rw(C;Ctr)=43(-1;-5)
Assessed by MA39
Assessed by Müller-BBM

| | | |
|---|---|---|
| **Mass per unit area** | **m** | 58.90 kg/m² |

Calculation based on gypsum plaster board type DF




## 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 |
|---|---|---|---|---|---|---|---|
| | | | λ | μ min – max | ρ | c | EN |
| A | 24.0 | larch wood external wall cladding | 0.155 | 150 | 600 | 1.600 | D |
| B | 30.0 | spruce wood battens offset (30/50; 30/80) - ventilation | 0.120 | 50 | 450 | 1.600 | D |
| C | 15.0 | fibreboard (MDF) | 0.140 | 11 | 600 | 1.700 | D |
| D | 160.0 | construction timber (60/..; e=625) | 0.120 | 50 | 450 | 1.600 | D |
| E | 160.0 | mineral wool [040; 33; ≥1000°C] | 0.040 | 1 | 33 | 1.030 | A1 |
| F | 15.0 | OSB | 0.130 | 200 | 600 | 1.700 | D |
| G | 40.0 | spruce wood cross battens (a=400) ≥ 40mm | 0.120 | 50 | 450 | 1.600 | D |
| H | 40.0 | mineral wool [040; 33; ≥1000°C] | 0.040 | 1 | 33 | 1.030 | A1 |
| I | 12.5 | gypsum plaster board type DF or | 0.250 | 10 | 800 | 1.050 | A2 |
| I | 12.5 | gypsum fibre board | 0.320 | 21 | 1000 | 1.100 | A2 |

## Sustainability rating (per m²)

**Database ecoinvent**

| | |
|---|---|
| **$OI3_{Kon}$** | 28.8 |

Calculated by HFA

**Database GaBi (ÖKOBAUDAT)**

| | | |
|---|---|---|
| **Built-in renewable materials** | **kg** | 44.790 |
| **Biogenic carbon in kg $CO_2$-e.** | **kg $CO_2$** | 65.060 |
| **Energy use of Primary Energy** | **MJ** | 625.850 |
| **Share of renewable PE** | **%** | 30.69 |

Calculated by TUM

## Details of sustainability rating

### Database ecoinvent

| Lifecycle (Phases) | GWP [kg $CO_2$-e.] | AP [kg $SO_2$-e.] | EP [kg $PO_4$-e.] | ODP [kg R11-e.] | POCP [kg Ethen-e.] | |
|---|---|---|---|---|---|---|
| A1 - A3 | | 0.158 | 0.054 | 1,68E-6 | 0.055 | |

| Lifecycle (Phases) | PERE [MJ] | PERM [MJ] | PERT [MJ] | PENRE [MJ] | PENRM [MJ] | PENRT [MJ] |
|---|---|---|---|---|---|---|
| A1 - A3 | 121.147 | 705.445 | 826.592 | 405.913 | 28.891 | 434.804 |

### Database GaBi (ÖKOBAUDAT)

| Lifecycle (Phases) | GWP [kg $CO_2$-e.] | AP [kg $SO_2$-e.] | EP [kg $PO_4$-e.] | ODP [kg R11-e.] | POCP [kg Ethen-e.] | |
|---|---|---|---|---|---|---|
| A1 - A3 | | 0.116 | 0.020 | 1,69E-6 | 0.024 | |
| C1 - C4 | | 0.002 | 0.002 | 1,01E-7 | 0.000 | |
| A1 - C4 | | 0.120 | 0.023 | 1,80E-6 | 0.025 | |

| Lifecycle (Phases) | PERE [MJ] | PERM [MJ] | PERT [MJ] | PENRE [MJ] | PENRM [MJ] | PENRT [MJ] |
|---|---|---|---|---|---|---|
| A1 - A3 | 190.894 | 759.915 | 950.662 | 415.708 | 31.938 | 447.720 |
| C1 - C4 | 0.810 | -754.509 | -753.699 | 11.691 | -21.400 | -9.710 |
| A1 - C4 | 192.092 | 5.666 | 197.609 | 433.757 | 10.590 | 444.420 |