

Acoustic performance tests on CLT

STORA ENSO BUILDING SOLUTIONS

Acoustic performance tests - Project Dataholz

The following measurements with regard to acoustic performance were performed by the European accredited body Technical University of Graz

Labor für Bauphysik
Institut für Hoch- und Industriebau TU Graz
Inffeldgasse 24, A- 8010 Graz

The tests were performed according to following international standards:

R_w according to **ÖNORM EN ISO 10140-2**,
rating according to **ÖNORM EN ISO 717-1**

L_n according to **ÖNORM EN ISO 10140-3**,
rating according to **ÖNORM EN ISO 717-2**

Content:

1. Flat roof - **with dry lining**
2. Flat roof - **without dry lining**
3. Flat roof - **not ventilated, with dry lining**
4. compartment floor - **suspended, impact sound absorbing subflooring TPS**
[s' = 35MN/m³]
5. compartment floor - **suspended, impact sound absorbing subflooring TPDS**
[s' = 10MN/m³]
6. intermediate floor - **not suspended, loos filling**
7. intermediate floor - **not suspended, bonded filling**
8. External wall - **with ventilated cladding, with dry lining on wooden battens**
9. External wall - **with ventilated cladding, with dry lining on resilient clips**

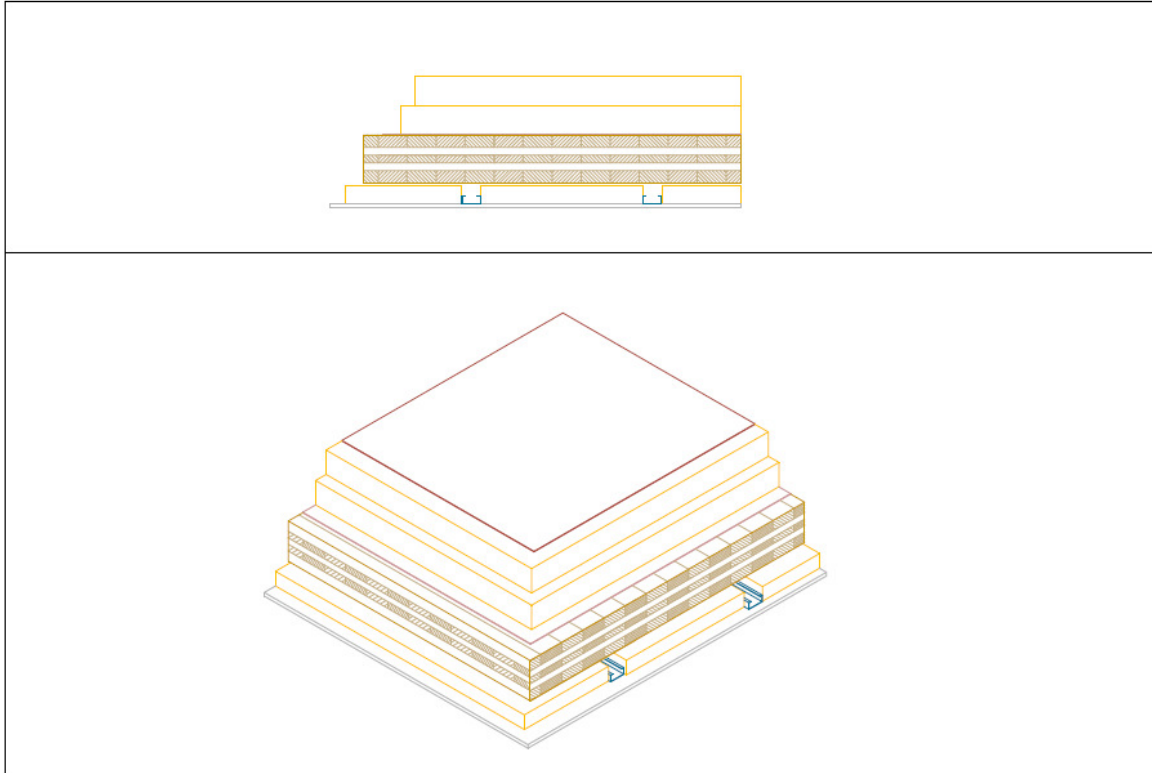


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1. Flat roof - with dry lining



Building components:

2mm	sealing sheet
100mm	Insulation material (polystyrene EPS)
100mm	Insulation material (polystyrene EPS)
0,1mm	sealing sheet
125mm	cross laminated timber
70mm	Nonius suspension for CD 60x27 Universal Bracket, the space between is filled with 60mm mineral wool
12,5mm	gypsum plasterboard GKB

Weighted Sound **Reduction Index:**

$R_w(C;C_{tr}) = 48 (-3; -9) \text{ dB}$

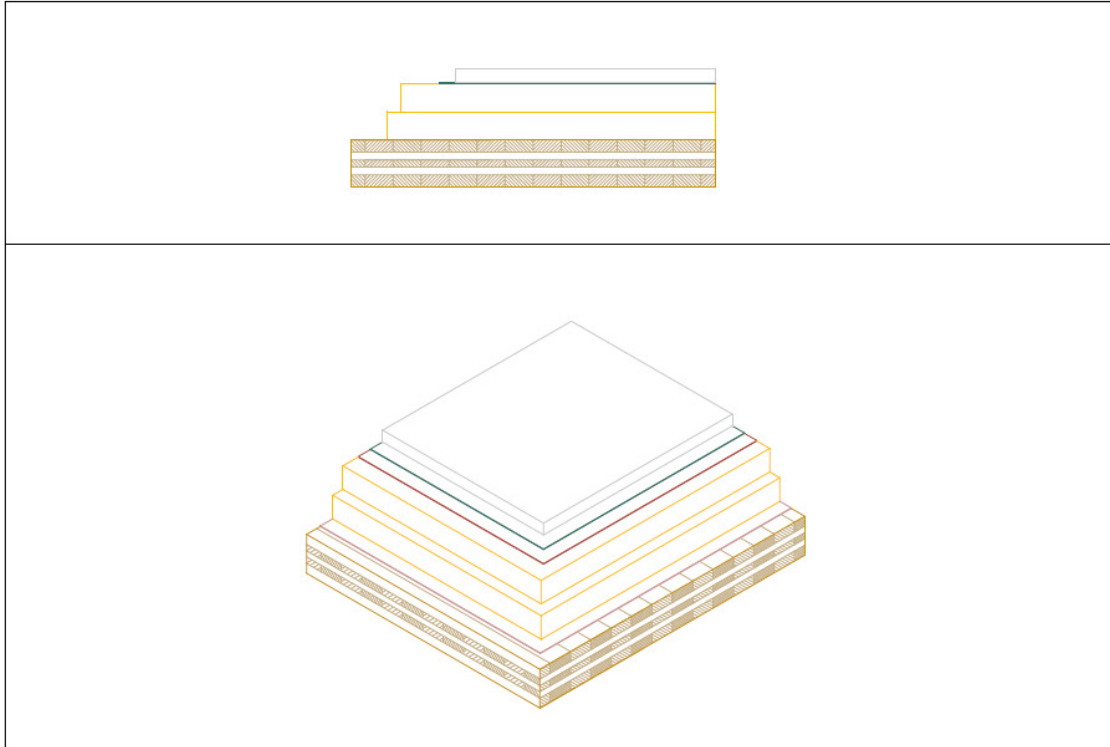


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2. Flat roof - without dry lining



Building components:

50mm	fill gravel 16-32, ~1600kg/m ³
0,7mm	separation nonwoven
2mm	sealing sheet
100mm	mineral wool
100mm	mineral wool
0,1mm	sealing sheet
125mm	CLT 5s

Weighted Sound Reduction Index:

$R_w(C;C_{tr}) = 44 (0;-3) \text{ dB}$

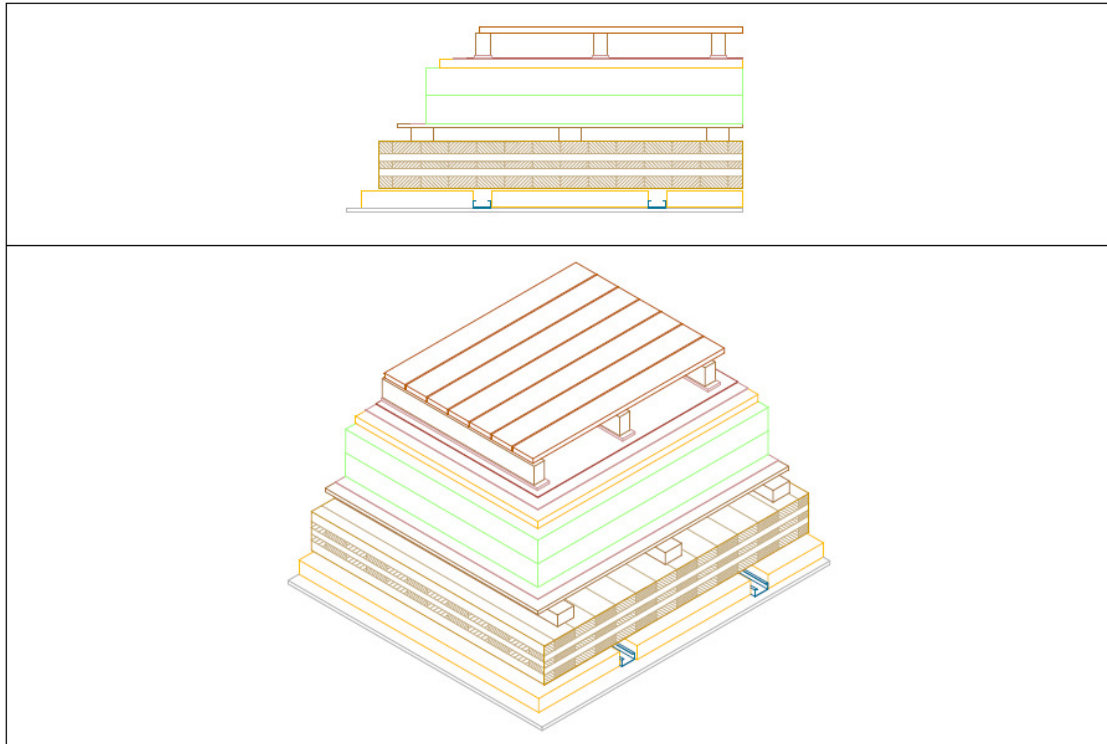


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3. Flat roof - not ventilated, with dry lining



Building components:

20mm	wooden boarding, pine 20/100
80mm	wooden battens, spruce 50/80, (floating construction)
10mm	structure preservation mat (in stripes under the battens)
2mm	roofing membrane (Renofol CV)
0,1mm	sealing sheet (PE)
30mm	impact sound absorbing subflooring MW-T
100mm	Polystyrene (EPS)
100mm	Polystyrene (EPS)
0,1mm	sealing sheet (PE)
15mm	OSB Plate
150mm	CLT
70mm	Nonius suspension for CD 60x27 Universal Bracket, the space between is filled with 60mm mineral wool
12.5mm	gypsum plasterboard

Weighted Sound **Reduction Index:**

$R_w(C;C_{tr}) = 57 (-4; -11) \text{ dB}$

Weighted **Normalised Impact Sound Pressure Level:**

$L_{nw}(C_I) = 52 (3) \text{ dB}$

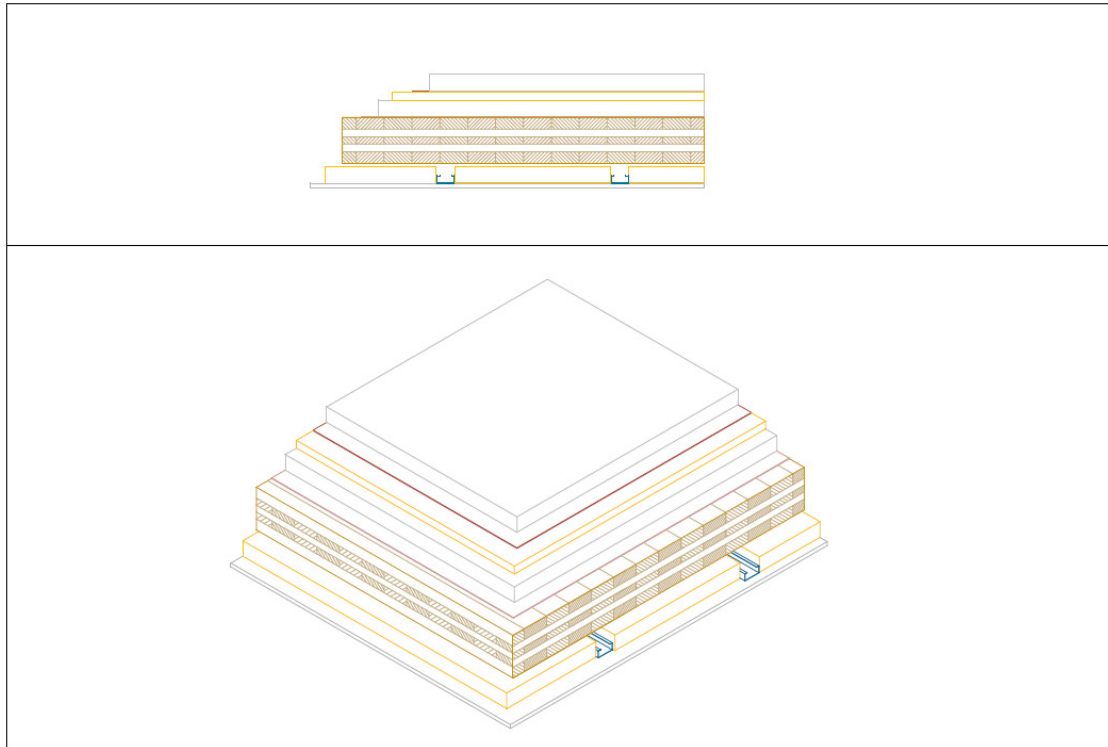


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4. compartment floor - **suspended, impact sound absorbing subflooring TPS [$s' = 35\text{MN/m}^3$]**



Building components:

60mm	cement screed
0.05mm	plastic separation layer
30mm	impact sound absorbing subflooring MW-T [$s' = 35\text{MN/m}^3$]
60mm	fill (1700 kg/m ³)
0.1mm	trickling protection
150mm	CLT
70mm	Nonius suspension for CD 60x27 Universal Bracket, the space between is filled with 60mm mineral wool
12.5mm	gypsum plasterboard

Weighted Sound **Reduction Index:**

$$R_w(C;C_{tr}) = 62 (-2; -8) \text{ dB}$$

Weighted **Normalised Impact Sound Pressure Level:**

$$L_{nw}(C_I) = 53 (3) \text{ dB}$$

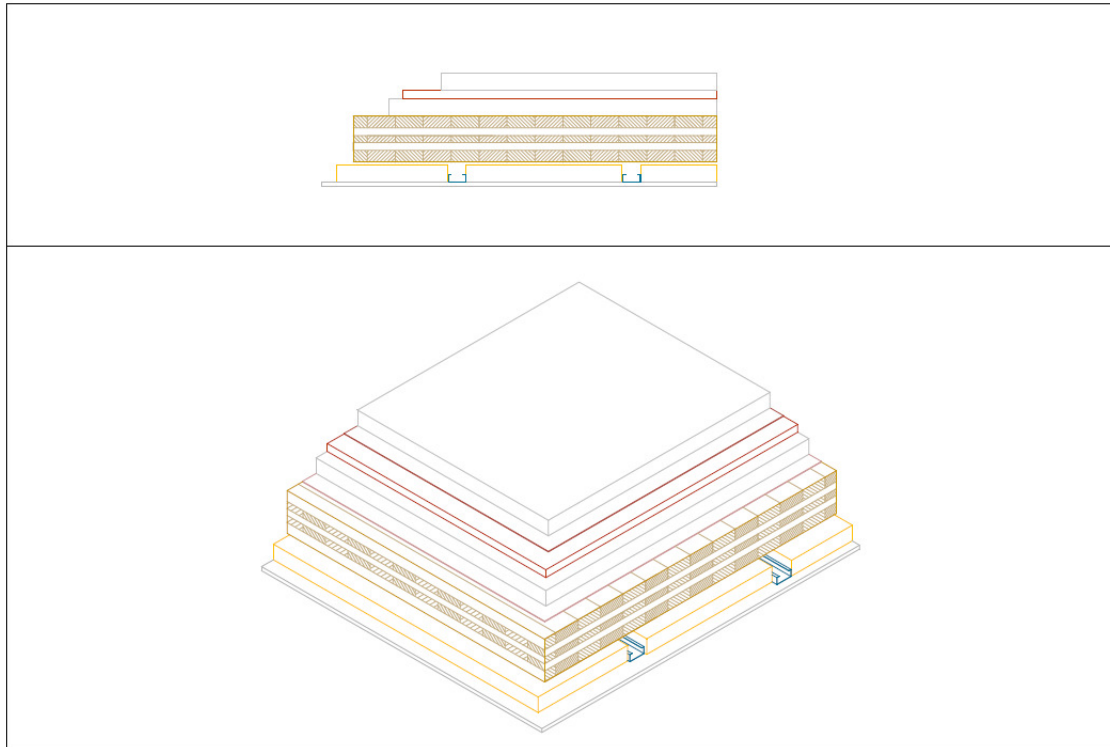


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5. compartment floor - **suspended, impact sound absorbing subflooring TPDS [s'=10MN/m³]**



Building components:

60mm	cement screed
0.05mm	plastic separation layer
30mm	impact sound absorbing subflooring [s'= 10MN/m ³]
60mm	fill (1700 kg/m ³)
0.1mm	trickling protection
150mm	CLT
70mm	Nonius suspension for CD 60x27 Universal Bracket, the space between is filled with 60mm mineral wool
12.5mm	gypsum plasterboard

Weighted Sound **Reduction Index:**

$$R_w(C;C_{tr}) = 62 (-2; -6) \text{ dB}$$

Weighted **Normalised Impact Sound Pressure Level:**

$$L_{nw}(C_I) = 46 (2) \text{ dB}$$

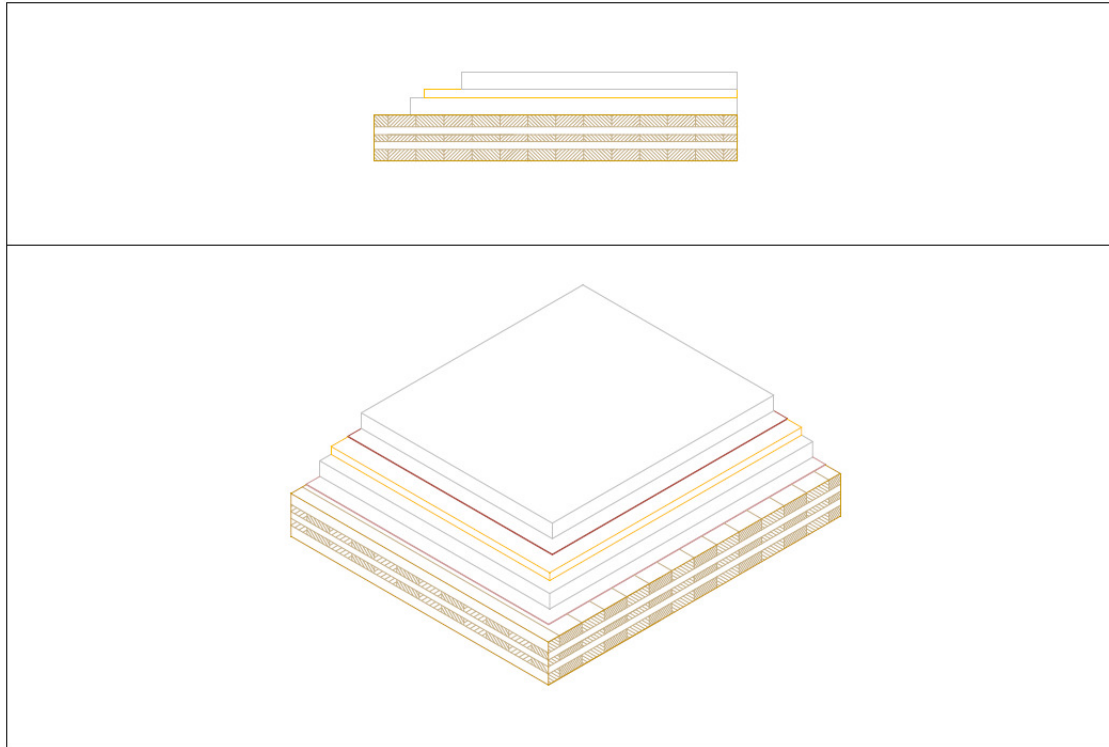


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6. intermediate floor - not suspended, loos filling



Building components:

60mm	cement screed
0.05mm	plastic separation layer
30mm	impact sound absorbing subflooring [$s' = 35 \text{ MN/m}^3$]
60mm	loos filling (grain size 2/4; $\sim 1700 \text{ kg/m}^3$)
0.1mm	trickling protection
150mm	CLT

Weighted Sound **Reduction Index:**

$$R_w(C;C_{tr}) = 60 (-2; -6) \text{ dB}$$

Weighted **Normalised Impact Sound Pressure Level:**

$$L_{nw}(C_I) = 57 (-1) \text{ dB}$$

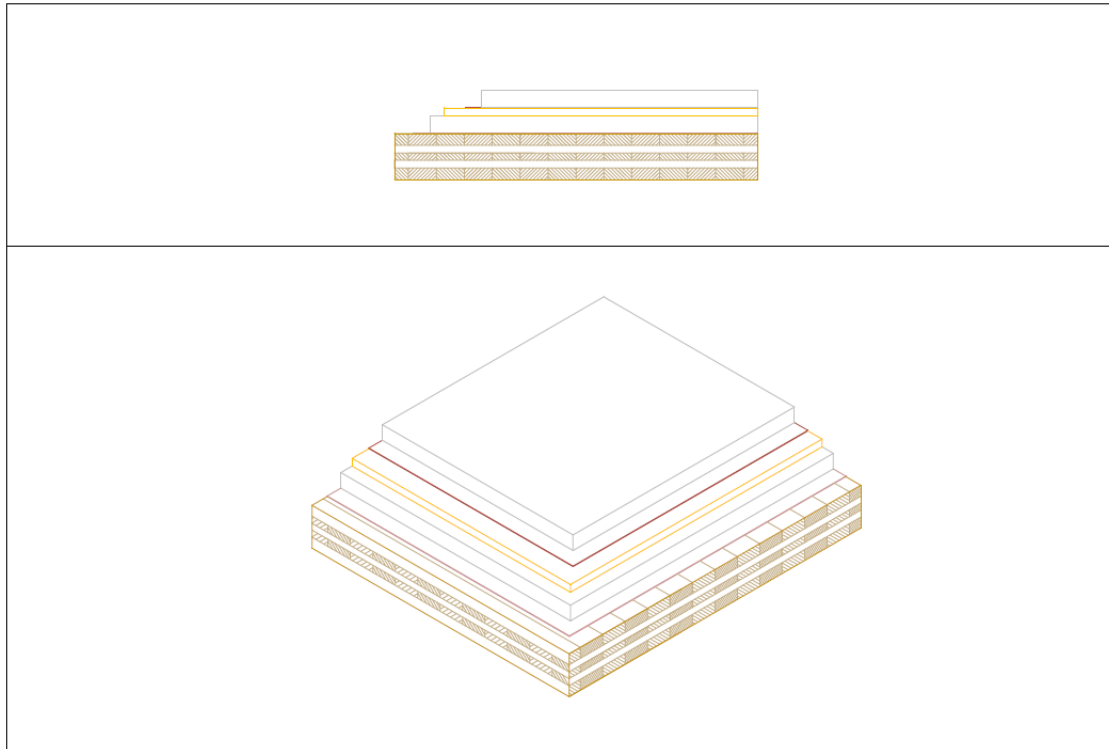


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7. intermediate floor - not suspended, bonded filling



Building components:

60mm	cement screed
0.05mm	plastic separation layer
30mm	impact sound absorbing subflooring [$s' = 35\text{MN/m}^3$]
60mm	bonded filling (grain size 2/4; $\sim 1840\text{ kg/m}^3$)
0.1mm	trickling protection
150mm	CLT

Weighted Sound **Reduction Index**:

$$R_w(C;C_{tr}) = 54 (-2; -6) \text{ dB}$$

Weighted **Normalised Impact Sound Pressure Level**:

$$L_{nw}(C_I) = 65 (-2) \text{ dB}$$

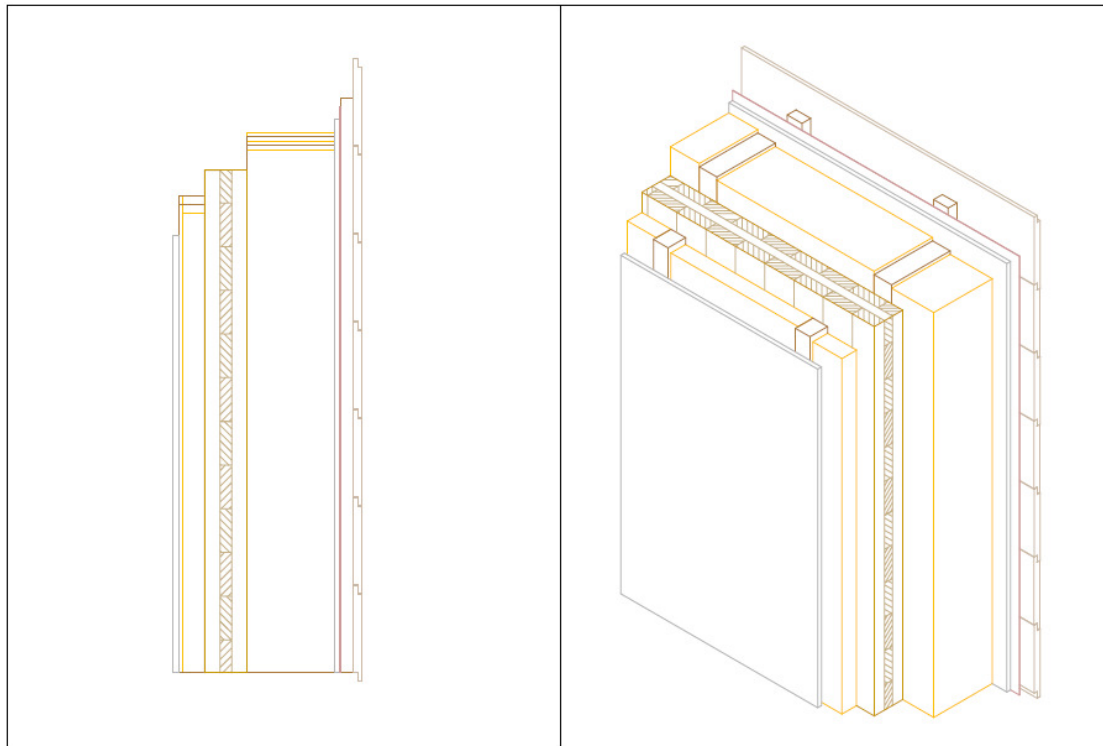


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8. External wall - with ventilated cladding, with dry lining on wooden battens



Building components:

20mm	wooden cladding
30mm	wooden battens (30/50)
0,3mm	vapour - permeable membrane
15mm	gypsum fibre board
200mm	solid construction timber (200/60, e= 62,5cm) the space between is filled with Thermo-Hemp (hemp-fiber insulation material)
94mm	CLT
60mm	wooden battens (60/60), the space between is filled with 50mm mineral wool
12,5mm	gypsum plasterboard GKF

Weighted Sound **Reduction Index:**

$R_w(C;C_{tr}) = 46 (-2; -5) \text{ dB}$

wooden cladding with closed sides, open at the top and bottom

Weighted Sound **Reduction Index:**

$R_w(C;C_{tr}) = 45 (-1; -4) \text{ dB}$

wooden cladding is open all around

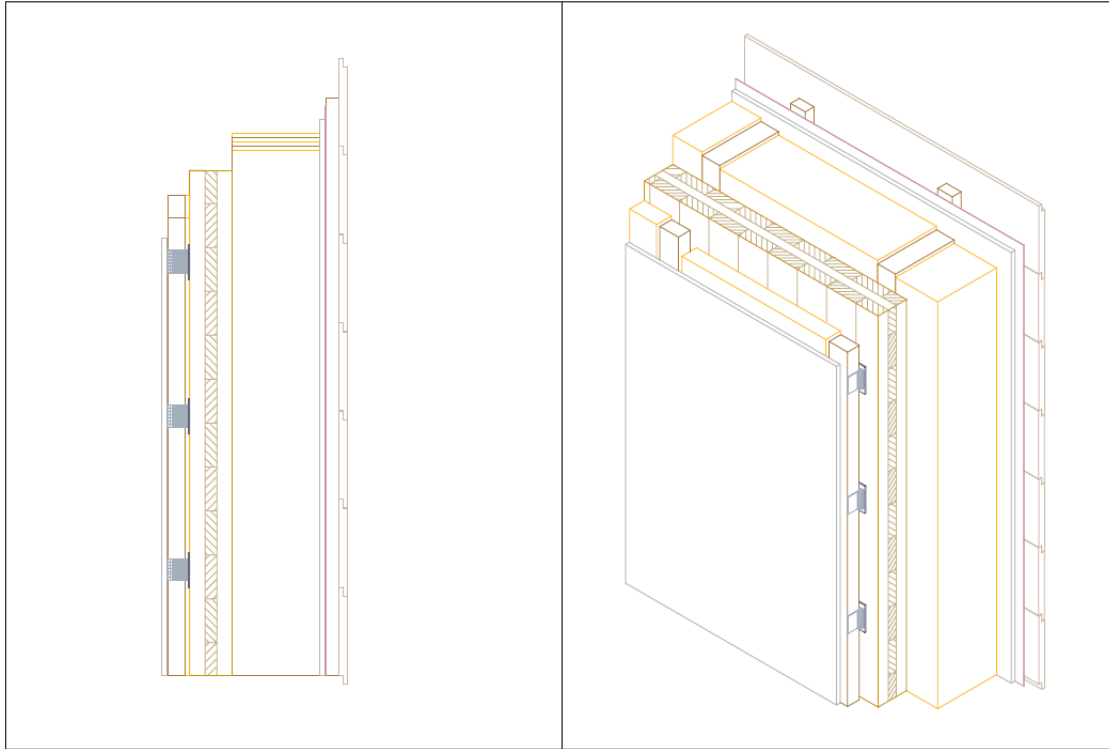


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9. External wall - with ventilated cladding, with dry lining on resilient clips



Building components:

20mm	wooden cladding
30mm	wooden battens (30/50)
0,3mm	vapour - permeable membrane
15mm	gypsum fibre board
200mm	solid construction timber (200/60, e= 62,5cm) the space between is filled with: a.: Thermo-Hemp (hemp-fibre insulation material) b.: STEICOflex (wood-fibre insulation material)
94mm	CLT
70mm	wooden battens (60/60mm, e=75cm) mounted on resilient clips, the space between is filled with 50mm mineral wool
12,5mm	gypsum plasterboard GKF

Weighted Sound **Reduction Index:**

$$R_w (C;C_{tr}) = 51 (-2; -7) \text{ dB}$$

a. with Thermo-Hemp

Weighted Sound **Reduction Index:**

$$R_w (C;C_{tr}) = 53 (-2; -8) \text{ dB}$$

b. with STEICOflex



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