

best wood **CLT BOX – CEILING FS**

The solution for multi-storey wood construction

Winner in the category
"Best Product Innovation
Building Shell"

ARCHITECTS' DARLING
AWARDS 2020



GOLD

Heinze



**bundespreis
ecodesign**
nominiert



An excellent product. For anyone who wants to aim high.

best wood CLT BOX – CEILING FS is a wooden box element consisting of CLT panels with ribbed beams glued between them. The integrated rafter sound-proofing provides improved impact sound insulation in the low-frequency range, which is ideal for multi-storey wood construction.

Winner of the ARCHITECTS' DARLING AWARD 2020 GOLD in the "Best Product Innovation Building Shell" category. It was also nominated for the 2022 German Ecodesign Award, Germany's highest national award for ecological design.



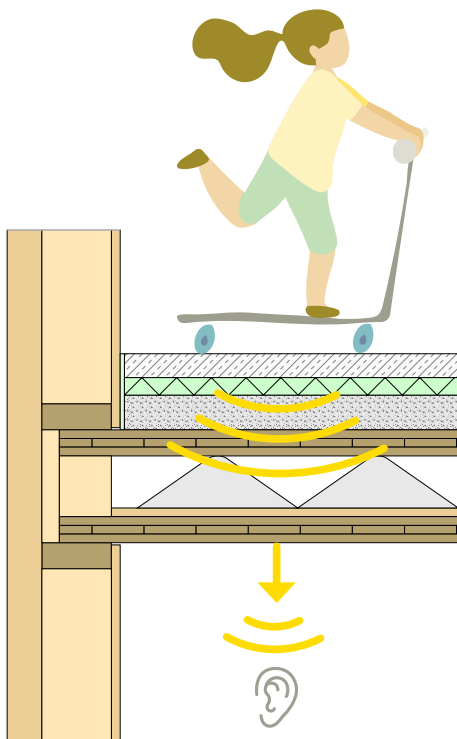


■ ■ Increased soundproofing

Interfering footstep noise from the neighbours is hardly noticeable

For wooden separating floors in **multi-storey** wood construction (apartment blocks, office blocks), the requirement for the standard impact sound level $L'_{n,w}$ according to DIN 4109-1:2018-01 is ≤ 53 dB.

Unfortunately, the interfering low-frequency sound transmission of less than 100 Hz, which particularly occurs when walking or when children are playing, is not taken into consideration in this case.



For good impact sound protection that fulfils both the requirements of the standards and the subjective feelings of the residents, the low-frequency range between 50 Hz and 100 Hz must also be examined. With regard to this, it is a case of taking the spectrum adaptation value $C_{1,50-2500}$ beyond the requirement value of $L'_{n,w}$ into consideration. For this additional requirement value, the following target values are defined in the brochure of the *Wood Information Service "Soundproofing in Wooden Construction"* (2019) (free download available from www.informationsdienst-holz.com):

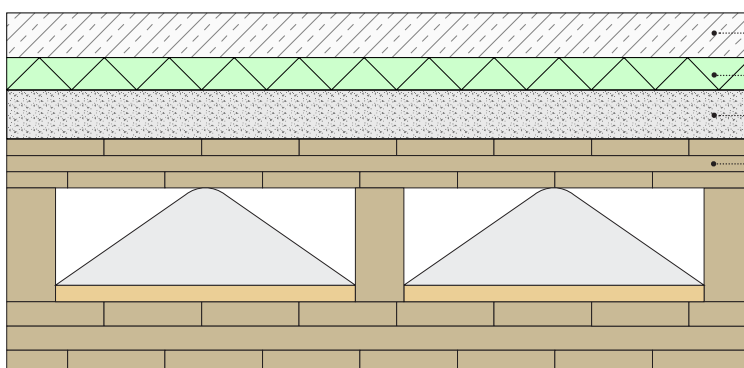
"Footstep noise no longer interfering"

$L_{n,w} + C_{1,50-2500} \leq 50$ dB (soundproofing level BASIC+)

"Footstep noise no longer interfering or hardly perceptible"

$L_{n,w} + C_{1,50-2500} \leq 47$ dB (soundproofing level COMFORT)

Possible soundproofing level design COMFORT on the CLT BOX – CEILING FS:



50 mm wet screed

40 mm ISOVER Acoustic EP1

60 mm honeycomb fill

290 mm best wood CLT BOX – CEILING FS



Impact sound $L_{n,w} = 42.1$ dB

$C_{1,50-2500} = +1$ dB

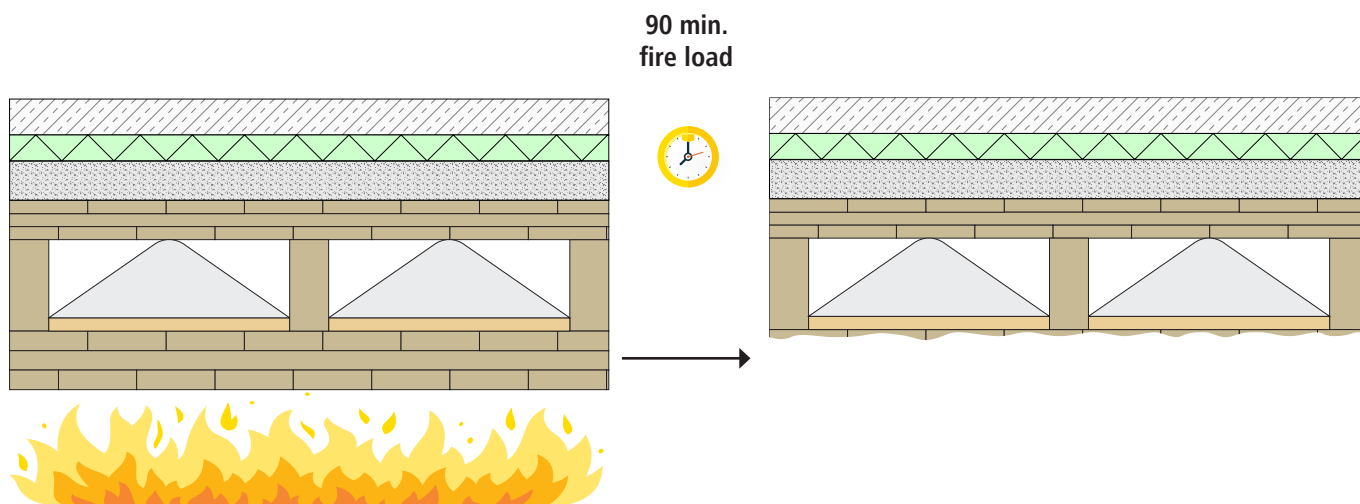
$L_{n,w} + C_{1,50-2500} = 43.1$ dB ≤ 47 dB

Airborne sound $R_w = 72.7$ dB

■ ■ Fire protection up to F90 / REI 90

Visible solid wood ceiling and fire protection? – No problem!

Separating floor fire resistance of up to F 90 / REI 90 is required in multi-storey wood construction. The best wood CLT BOX – CEILING FS was tested for fire resistance of F 90 or REI 90 at MFPA Leipzig GmbH. The result was impressive! 90-minute fire resistance was achieved with just the 90 mm thick lower CLT panel. No fire penetrated into the cavity of the CLT BOX – CEILING FS. The best wood acoustic board that was installed and the best wood CHIPPINGS remained unaffected even after 90 minutes. With a required fire resistance of F 60 or REI 60, the thickness of the lower CLT panel can be reduced to 60 mm.



Delivery options (best wood CLT BOX – CEILING FS is available in direct sales)

Format Length: 2.30–16.00 m, from 440 mm 8.00–16.00 m; width: 900–1200 mm; height: 220–490 mm

Specification

Acoustic board	placed in the rafter and glued to the lower CLT panel ex works (wood fiber acoustic board)
Drillings	ex works (for putting in the customer-provided chippings)
Chippings	supplied in the required quantity and in 25 kg PE bags and put in by the customer on site
Chippings plan	included in scope of delivery

Installation variants
at element joint:



■ ■ Statics

A planner's dream

The best wood CLT BOX – CEILING FS makes it possible to have large spans without supports and therefore provides a considerable amount of design flexibility in the layout. We have developed the dimensioning software best wood STATICS to help you in your planning. Constructions with best wood CLT BOX – CEILING FS can be therefore quickly, reliably and easily measured. best wood STATICS is available to you free of charge on our website at www.schneider-holz.com/de/service/planung-und-beratung/best-wood-statics/.

■ ■ Dimensioning aid best wood **CLT BOX – CEILING FS** (lower CLT panel 90 mm)



Perm. loads* [kN/m²]	Live loads [kN/m²]	Span length of single span beams [m]						Span length of double span beams [m]					
		6.00	7.00	8.00	9.00	10.00	11.00	3.00	4.00	5.00	6.00	7.00	8.00
1.00	1.00	250/80	310/80	310/120	290/80	310/80	350/80	250/80	250/80	250/80	250/80	310/80	310/120
	1.50				330/120	330/80	370/80						
	2.00					310/80	350/80						
	3.00					350/100	390/100						
	5.00					390/100	430/100			250/100	250/100	310/100	
2.50	1.00	290/80	250/80	290/80	330/80	370/80	410/80	250/80	250/80	250/80	290/80	250/100	250/100
	1.50				330/120	370/80	410/120						
	2.00					390/80	430/80						
	3.00					350/80	390/80					250/120	250/120
	5.00					370/100	410/100			250/100	290/100	270/120	310/120
4.00	1.00	250/80	290/80	330/80	370/80	410/100	470/80	250/80	250/80	250/100	250/100	250/120	250/120
	1.50				370/100	430/80	470/80						
	2.00					430/100	490/100						
	3.00					390/100	450/100			250/120	270/120	310/120	350/120
	5.00					450/100	510/100			270/120	310/120	350/120	390/120

* The dead weight of the best wood CLT BOX – CEILING FS and the chippings in the rafter has already been taken into account.

These tables are only intended for pre-dimensioning and are no substitute for structural analysis.

R90

Fire resistance:



Example for a CLT BOX– CEILING FS in a multi-family house:

Design values:

Permanent load $g = 2.50 \text{ kN/m}^2$
Live load $q = 3.00 \text{ kN/m}^2$
Span length $l = 9.00 \text{ m}$

Result: 350/80

Thickness of ceiling = 350 mm
Rib width = 80 mm
Charring rate = R90

The following parameters and certificates were taken into account in the calculations for the dimensioning aid best wood CLT BOX – CEILING FS:

Element width: 1.25 m

Verification with 40 kg/m² chippings in the CLT BOX – CEILING FS

Certificate of load-bearing capacity according to DIN EN 1995-1-1:2010-12 with NA:2013-08

Certificate of structural fire design according to DIN EN 1995-1-2:2010-12 with NA:2010-12

Upper CLT panel: 60 mm; lower CLT panel: 90 mm

Application class 1

Load duration class of the intermittent load: medium

$\Psi_2 = 0.3$; $k_{def} = 0.60$; C24

Ultimate limit state: Certificate of bending stress, certificate of (rolling) shear stress

Serviceability limit state: Initial deflection $\leq l/300$; final deflection $\leq l/200$; total deflection $\leq l/300$

Verification of vibration: Width of the ceiling panel $b = 1.2 \cdot l$; additional rigidity EI_{xy} from 5 cm screed slab; modal damping ratio $\zeta = 0.03$; limitation of acceleration $a \leq 0.4 \text{ m/s}^2$

■ ■ Technical data

best wood **CLT BOX – CEILING FS**

Wooden box element for multi-storey wood construction with soundproofing and fire protection requirements



Soundproofing and fire protection up to F 60 / REI 60

Structure

Total height [mm]	GLULAM ribs width [mm]	GLULAM ribs height [mm]	Lower CLT panel [mm]	Upper CLT panel [mm]
220	80/100/120 mm depending on statics. Dimensioning with best wood STATICS .	100	60	60
240		120	60	60
260		140	60	60
280		160	60	60
300		180	60	60
320		200	60	60
340		220	60	60
360		240	60	60
380		260	60	60
400		280	60	60
420		300	60	60
440		320	60	60
460		340	60	60
480		360	60	60

Soundproofing and fire protection up to F 90/REI 90

Total height [mm]	GLULAM ribs width [mm]	GLULAM ribs height [mm]	Lower CLT panel [mm]	Upper CLT panel [mm]
250	80/100/120 mm depending on statics. Dimensioning with best wood STATICS .	100	90	60
270		120	90	60
290		140	90	60
310		160	90	60
330		180	90	60
350		200	90	60
370		220	90	60
390		240	90	60
410		260	90	60
430		280	90	60
450		300	90	60
470		320	90	60
490		340	90	60

■ ■ Finishing options (invoiced profile dimensions)

UV-PROTECT PACKAGE or COLOR PACKAGE

surface cosmetics; sanded look; UV-Protect, soft white, alpine white and light grey; other colours by request; with removable transport protection film

ACOUSTIC DESIGN PACKAGE

saw cuts 2/6 mm; distance between saw cuts 50 mm; coverage widths from 900 to 1200 mm at 50 mm intervals available;
clarify proof of fire protection

JOINERY

Drilling, milling, notches, bevel cuts, countersinking and many more

Do you have a plan? We have the tools.

The products are quickly adapted to the structural requirements using our digital statics, soundproofing and fire resistance planning aids.





On comes the light

We offer compatible lighting systems for all of our ceilings as a simple solution for matters concerning lighting. The dimmable LED lighting systems are high quality and impress with their timeless design.



Nowadays the solution in many areas consists of LEDs, whose efficiency is enhanced by intelligent light controls and innovative operating devices.

Suitable holes for the recess mounted lights drilled in the factory make installation child's play, the lamps just need to be cabled and clipped in place. Surface mounted lights can be directly attached to the ceiling.



Supplied with

Lighting system

Operating device (transformer)

About best wood SCHNEIDER®

The Schneider company group is a regionally operating family-run company with headquarters in Eberhardzell. At the highest technical level, we produce all supporting wood components and wood fiber insulation boards for modern wood and passive house construction and pellets for ecological heating with more than 600 employees.



Good for nature, good for us all. Tested & certified.

From round wood to finished product including energy requirement, we implement everything in a closed raw material cycle in our production facilities in Southern Germany.

best wood Schneider realises energy-efficient production in accordance with DIN ISO 50001 when doing this. The wood raw material is utilised 100 % to the last chip.

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Subject to technical modification. Errors excepted.
Version: December 2024

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