Acoustic panel ceiling

Acoustic panel ceiling

The acoustic panels are a convenient and functional material offering numerous applications for ceiling and wall finishing. Various types of panel fastening are possible: CD profiles, lathing as well as T profiles or fastening onto a wall with glue.

The use of acoustic panels in the decoration of ceilings and walls improves acoustic microclimate of rooms, ensures noise absorption, thereby creating a comfortable working and living environment. Owing to the excellent acoustic, aesthetic and mechanical properties, the panels are particularly well-suited for public buildings — offices, educational establishments, as well as premises with higher humidity — spas, fitness gyms, swimming pools, production and residential premises. They are widely used for finishing in professional sound processing studios, cinemas, concert halls and recreation centres, where limiting sound distribution and permeability is particularly important.

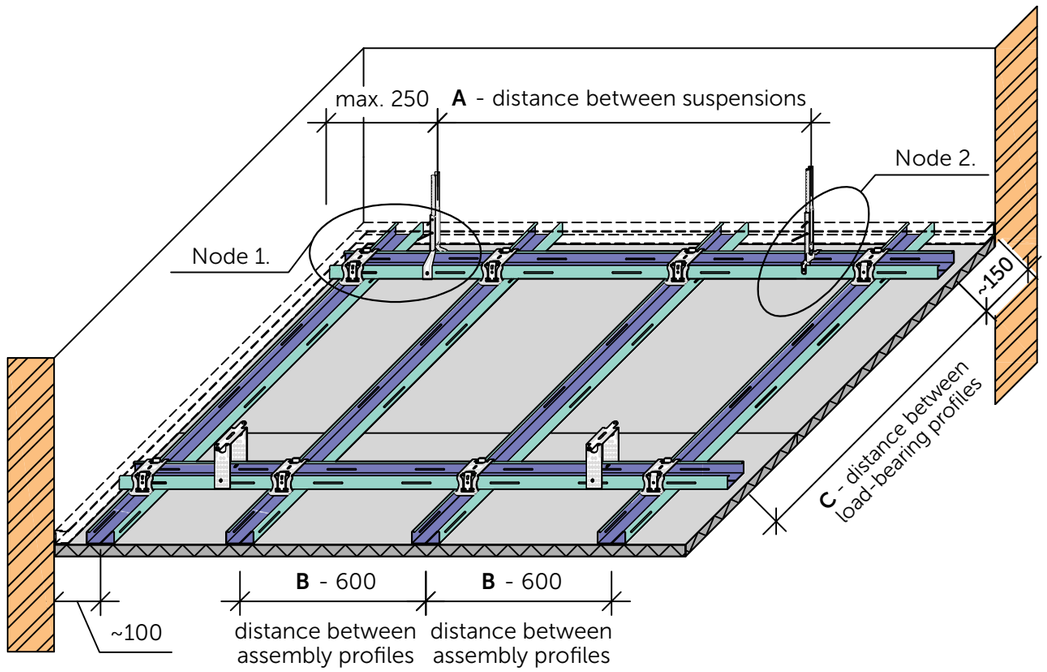
The ceiling structure is formed of a steel tin profile frame or wooden lath, T-type profile grid elements elements, which are fastened with special suspension elements to the load-bearing structures. The type of suspension elements depends on the load-bearing ceiling structure, as well as on the mineral wool used for increasing sound absorption.

Acoustic panel ceiling

Panels for mounting with screws

Fastening on CD metal sections

The frame is made of perpendicularly arranged CD type metal profiles 60/27/0,6 mm. CD profile placement, fastening onto load-bearing structures and connections between elements are implemented according to CD type profile manufacturer guidelines. Placements of suspension elements and frame bearing capacities are stated in the table below.

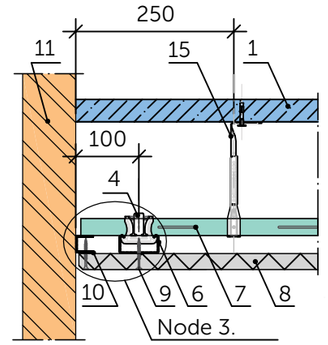


Maximum mounting distances of frame elements

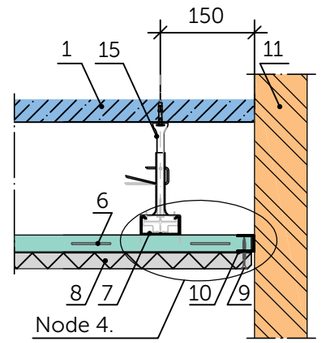
Load-bearing profile CD 60/27/0,6 mm	Assembly profile CD 60/27/0,6 mm	**A** - distances between suspension elements/fastenings			Double ceilings
		Load class kN/m²			
Distance **C** - mm	Distance **B** - mm	Up to 0,15	Up to 0,30	Up to 0,50	Up to 0,65
600	600	1150	900	750	700
900	600	1000	800		
1000	600	950	750		
1200	600	900			
Must use suspensions with load-bearing capacity ≥ 0.40 kN					

CD profile frame perimeter fastening sections and explanation

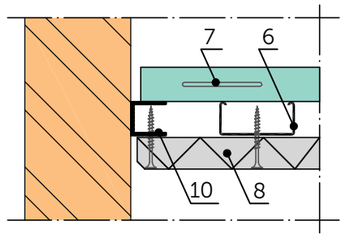
Node 1.
Joint between short edges



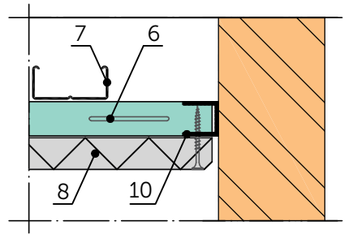
Node 2.
Joint between longitudinal edges



Node 3.



Node 4.



**In drawings used nonius suspension with bearing capacity 0,40 kN*

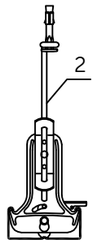
Explanation of numbering

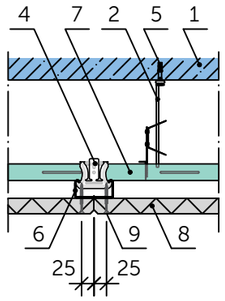
1. Load-bearing structure
2. Quick suspension with anchor fixation
3. U-type clamp
4. Cross connector for CD profile
5. Conical anchor ≥ M6
6. CD assembly profile 60x27x0,6 mm
7. CD load-bearing profile 60x27x0,6 mm
8. CEWOOD Acoustic panels
9. CEWOOD screws 4,65x45 mm or galvanized woodscrews with head Ø ≥ 9 mm
10. UD perimeter profile 28x27
11. Existing wall structure
15. Nonius suspension with bearing capacity 0,40 kN

Fastening types of CD profiles on to load-bearing structure

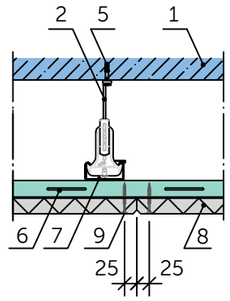
Assembly profile is attached to a load-bearing profile using corss conector for CD profiles. A CD profile frame is fastened onto load-bearing sturcture using quick suspension, U-type clamp or nonius type fastening. See detailed explanations below.

Quick suspension with anchor fastening element
Load-bearing capacity 0,15 kN



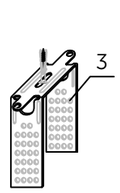


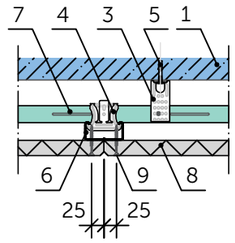
Joint between longitudinal edges



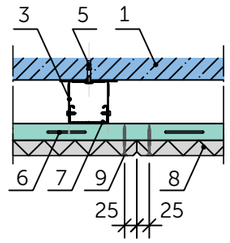
Joint between short edges

U-type clamp for direct fastening
Load-bearing capacity 0,4 kN



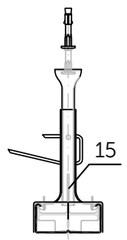


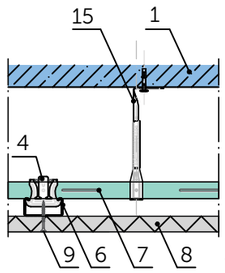
Joint between longitudinal edges



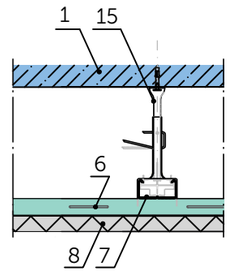
Joint between short edges

Nonius type suspension with adjustable height
Load-bearing capacity 0,4 kN





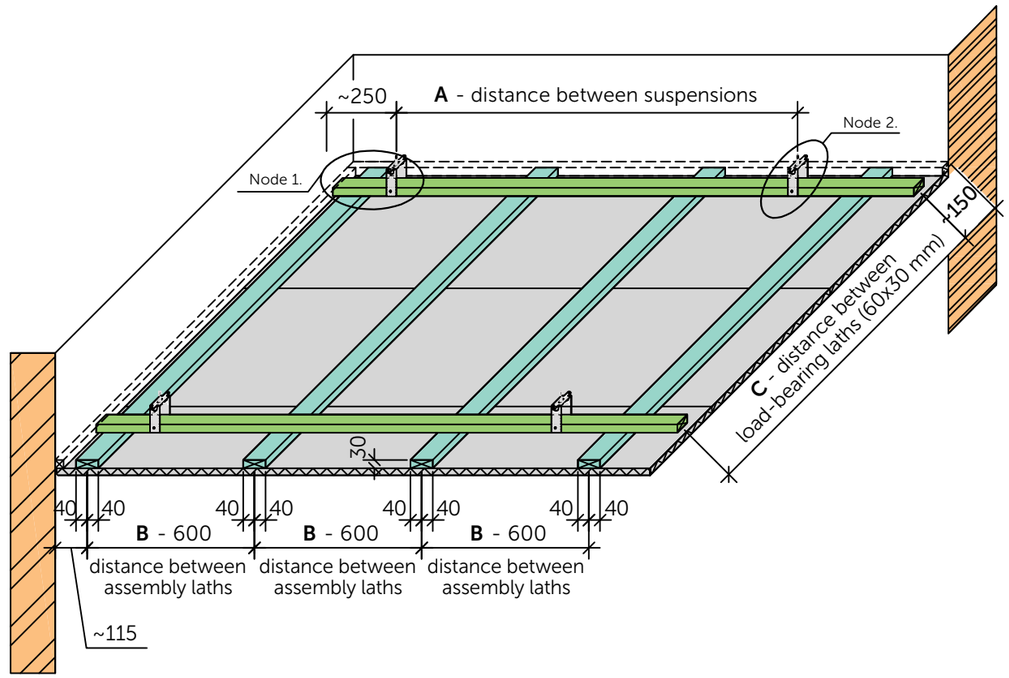
Joint between longitudinal edges



Joint between short edges

Fastening on wood laths

The frame is made of perpendicularly arranged wooden laths. Placements of suspension elements and frame-bearing capacities are stated in the table below.



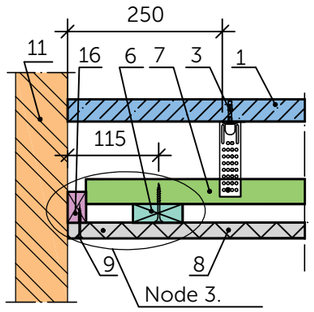
Maximum mounting distances of frame elements

Load-bearing lath, min. cross section 60/30 mm	Assembly lath, min. cross section 80/30 mm	**A** - distance between suspension elements/fastenings Load class kN/m²		
Distance **C** - mm	Distance **B** - mm	up to 0.15	up to 0.30	up to 0.50
600	600	1150	900	750
900	600	1000	800	
1000	600	950		
1200	600	900		
Must use suspensions with load resistance of 0.40 kN Assume minimal load-bearing lath cross section of 60x30 mm				

Wooden lath frame fastening sections and explanation

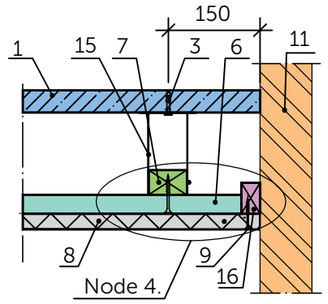
Node 1.

Joint between short edges

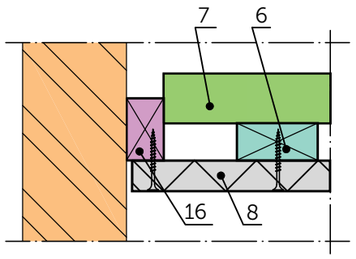


Node 2.

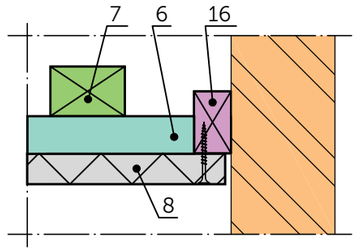
Joint between longitudinal edges



Node 3.



Node 4.



**The drawings show U-type clamp suspension with bearing capacity 0,40 kN*

Explanation of numbering

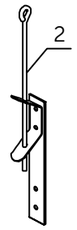
1. Load-bearing structure
3. U-type clamp
5. Conical anchor ≥ M6
6. Assembly lath min. 80x30(h) mm
7. Load-bearing lath min 60x30(h) mm
8. CEWOOD Acoustic panels
9. CEWOOD screws 4,65x45 mm or galvanized woodscrews with head Ø ≥ 9 mm
11. Existing wall structure
16. Perimeter wooden lath 30x50(h) mm

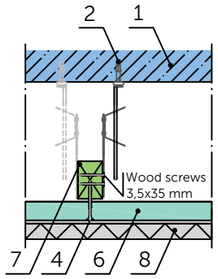
Fastening types of wooden laths onto a load-bearing structure

Assembly laths are attached to a load-bearing laths using wood screws. A wooden lath frame is fastened on to load-bearing sturcture using quick suspension, U-type clamp or with anchors directly to load-bearing structure. Detalized explanations see below.

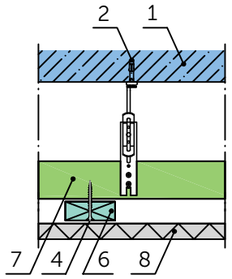
Quick suspension with anchor fastening element

Load-bearing capacity 0,15 kN





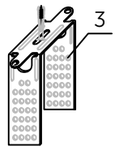
Joint between longitudinal edges (alternating fastening)

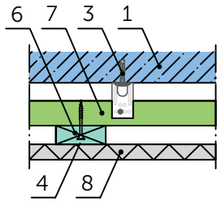


Joint between short edges, load-bearing lath min. 60x30(h) mm

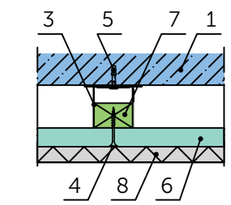
U-type clamp for direct fastening

Load-bearing capacity 0,4 kN





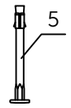
Joint between longitudinal edges

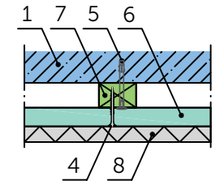


Joint between short edges

Double-layer frame direct fastening with anchor

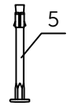
Anchor type must be applied onto a load-bearing structure type

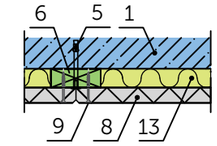




Single-layer frame direct fastening with anchor

Assebly laths are fixed directly onto a load-bearning structure
Fastening type usable if ceiling leveling is not required

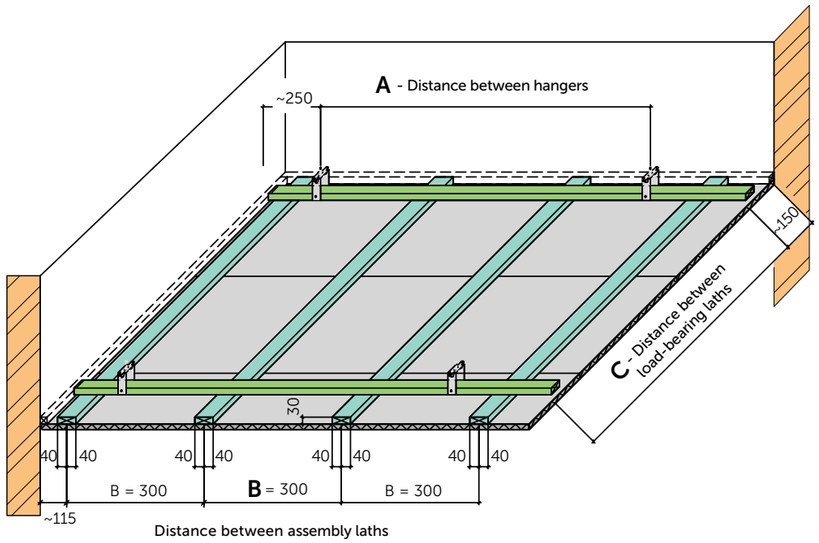




Impact resistance guidelines

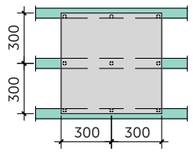
CEWOOD ceiling structures have passed the ball impact tests, so they can be safely installed in various sports facilities. All provided ceiling types have been tested and can be used only with a maximum substructure step of a **300 mm** between profiles/laths.

Substructure scheme

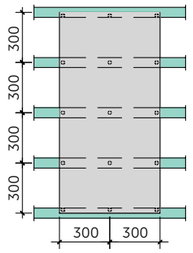


Distance between assembly laths

Screw locations and count

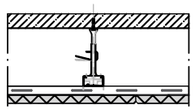
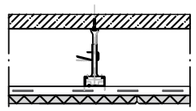
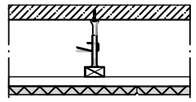
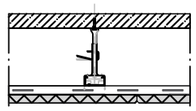


600x600 mm panels fasten with 9 screws

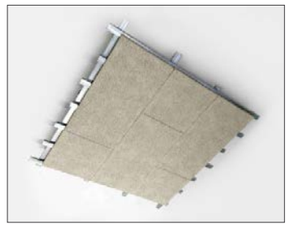


1200x600 mm panels fasten with 15 screws

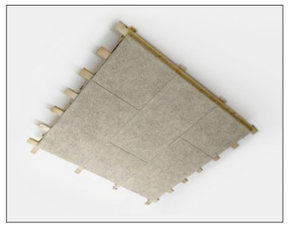
Descriptions of constructions

Construction	Description	Substructure type	Distance A	Distance B	Distance C	Screws	Impact resistance class
According DIN18032-PART3 and EN 13694/ANNEX D							
	CEWOOD A2 25 mm panel 1200x600 mm, 600x600 mm	Metal profile frame	≤900 mm	**≤300 mm**	≤900 mm	15 pcs/panel	1A
According DIN18032-PART 3							
	CEWOOD 35 mm panel 1200x600 mm, 600x600 mm	Metal profile frame	≤900 mm	**≤300 mm**	≤600 mm	15 pcs/panel	1A
	CEWOOD 35 mm panel 1200x600 mm, 600x600 mm	Wooden lath frame	≤900 mm	**≤300 mm**	≤600 mm	15 pcs/panel	1A
According EN 13694/ANNEX D							
	CEWOOD 25 mm panel 1200x600 mm, 600x600 mm	Metal profile frame	≤900 mm	**≤300 mm**	≤900 mm	15 pcs/panel	2A

Visualisation



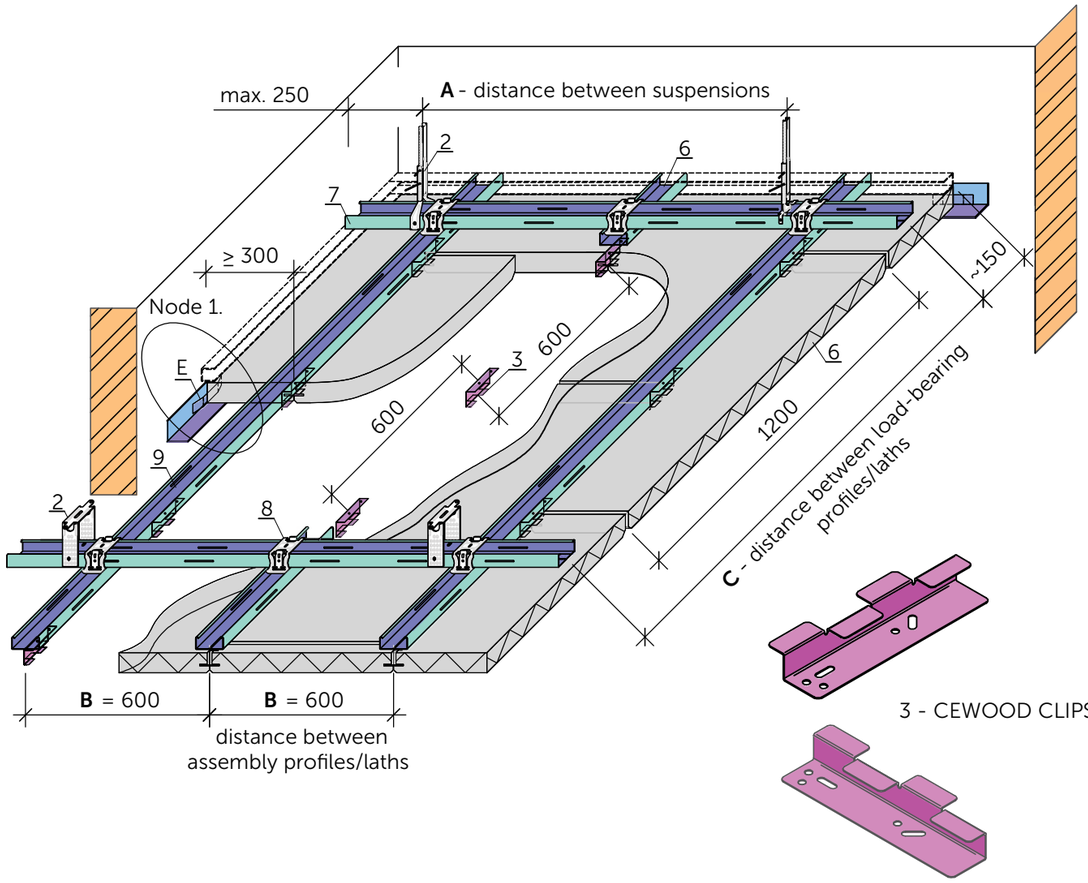
Metal profile frame



Wooden lath frame

CEWOOD Acoustic panel mounting with CEWOOD clips

The substructure frame can be made of CD type metal profiles or wooden laths. The frame can be attached to load-bearing structures with a U-type suspension, wire or quick suspension, as well as a nonius type clamp. For more detailed information about frame assembly see pages 34-39.



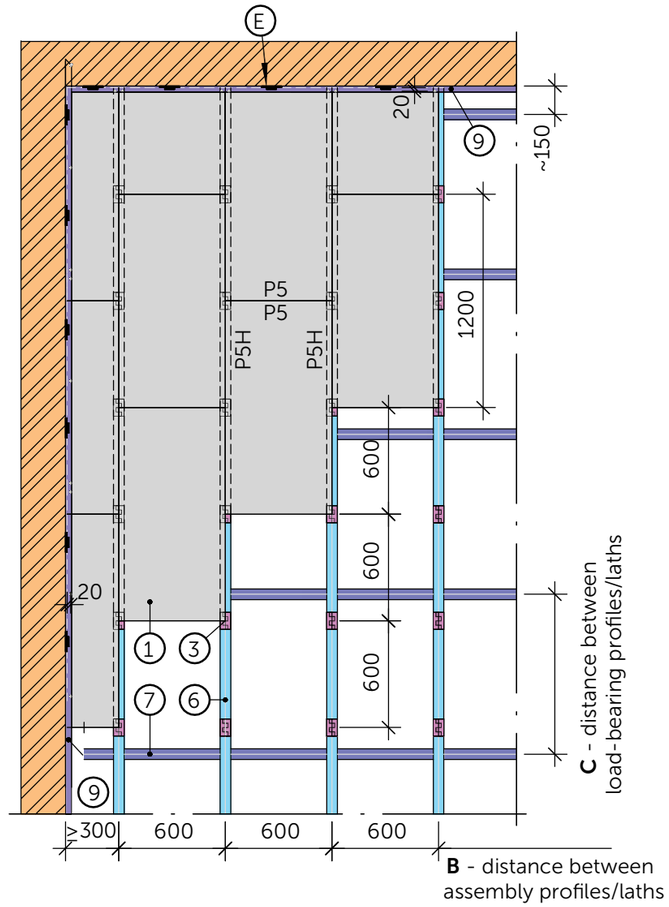
3 - CEWOOD CLIPS

Maximum mounting distances of frame elements

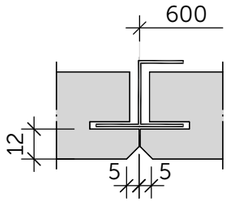
Load-bearing profiles/laths	Assembly profiles/laths	**A** - distances between suspension elements/fastenings	
		Load class kN/m²	
Distance **C** - mm	Distance **B** - mm	Up to 0,15	Up to 0,30
600	600	1150	900
900	600	1000	800
1000	600	950	750
1200	600	900	
Must use suspensions with load-bearing capacity ≥ 0.40 kN			

CEWOOD clip assembly guidelines on metal CD and wooden lath frame

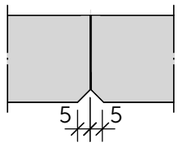
Each CEWOOD panel 25 mm or 35 mm with dimensions 1200x600 mm is supported with 6 clips, 600x600 mm panels are supported with 4 clips. CEWOOD panels on long edge has profile P5H, but short edge - P5.

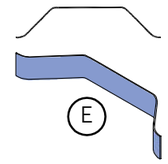


CEWOOD long edge profile P5H



CEWOOD short edge profile P5





E - Spring type support

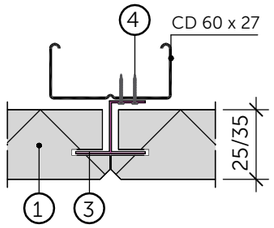
Explanation of numbering

1. CEWOOD Acoustic panels
2. Suspension element
3. CEWOOD clip
4. Fastening screw 4,0x25 mm
5. Conical anchor ≥ M6
6. Metal CD or wooden lath assembly profile
7. Metal CD or wooden lath load-bearing profile
8. Cross connector for CD profiles
9. Wall L profile L35/35 mm

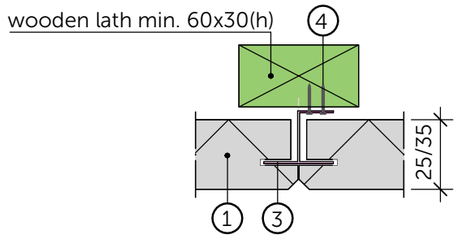
E - Spring type support

CEWOOD clip fastening on different substructure

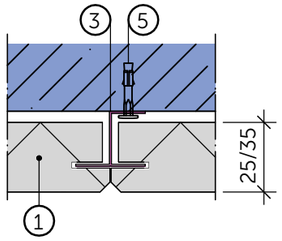
CEWOOD clip fastening on CD profile



CEWOOD clip fastening on wooden lath

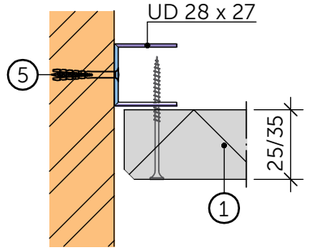


CEWOOD clip direct fastening to load-bearing structure

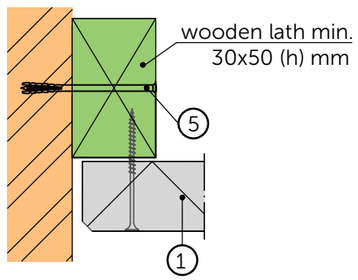


Ceiling perimeter fastening when ceilings fastened with CEWOOD clips

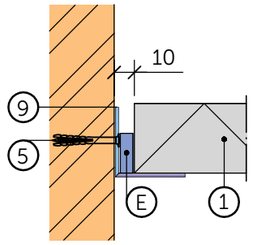
Fastening on perimeter metal profile



Fastening on perimeter wooden lath



Supporting perimeter with wall L profile L35x35 mm



General instructions

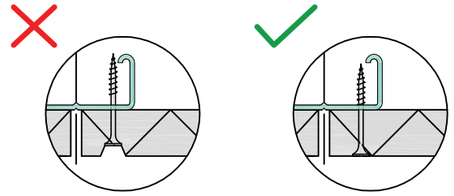
Screwing instructions

The frame assembly element step must be 600 mm or less, which has to correspond to the width of the CEWOOD panels. Start mounting the panels from the middle of the room, gradually moving to the edges. Screw fastening step must be less than 600 mm. The distance from the edge of the panel to the the screw must not exceed 25 mm. A standard 1200x600 mm panel requires 6 screws, a 600x600 mm panel requires 4 screws.

Special CEWOOD screws with a larger head are recommended for fastening the panels.

Self-drilling for metal constructions or wood screws for wooden constructions are recomended, if CEWOOD screws are not used. The screw head should be with head diameter D≥9 mm.

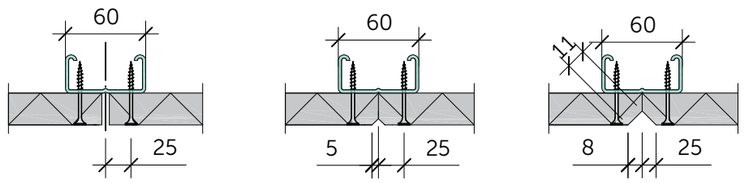
(!) Do not submerge the screws into the CEWOOD panels! The head of the screw must be left the same level as the visible surface of the board.



Minimal screw dimensions depending on frame structure and panel thickness

Minimal screw dimensions		
Frame structure/CEWOOD panel thickness	**25 mm**	**35 mm**
CD metal profile frame – self-drilling screws	4.5x45 mm	4.5x50 mm
Wooden lath frame – wood screws	4.5x50 mm	4.5x60 mm

CEWOOD panel edge profile types

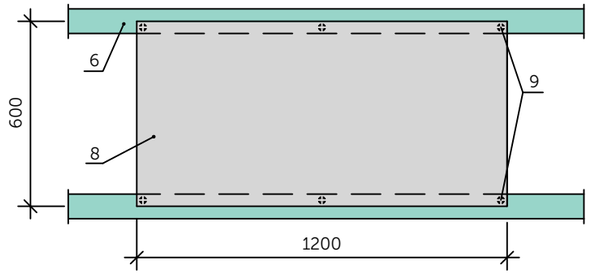


Aproximate screw consumption

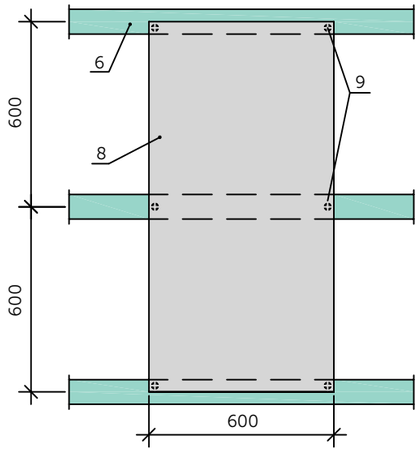
Panel pattern/dimensions	Screw consumption, pcs/m²	
	600/600 mm	**600/1200 mm**
Standard screw pattern scheme. Panel thickness 25 mm, 35 mm.	12	9

Standard screw pattern for CEWOOD Acoustic panels

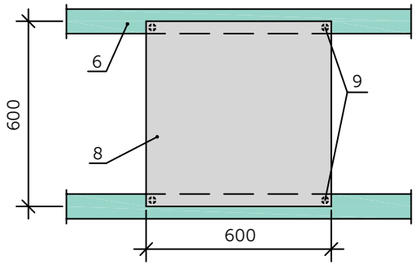
Fastening of 25 mm and 35 mm thick CEWOOD Acoustic panels with screws onto metal CD assembly profiles or wooden assembly laths.



Panel 1200x600 mm fastened with 6 screws longitudinally



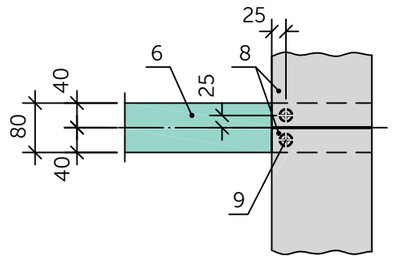
Panel 1200x600 mm fastened with 6 screws

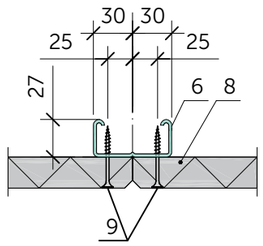


Panel 600x600 mm with 4 screws

Screw locations

The connection seam between panels must always be formed under the frame assembly element.





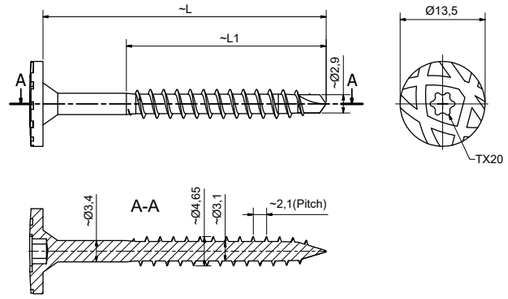
Explanation of numbering

1. Load-bearing structure
6. Frame assembly element (CD profile or wooden lath)
8. CEWOOD Acoustic panels
9. CEWOOD screws 4,65x45 mm or galvanized woodscrews with head Ø ≥ 9 mm

Acoustic panel screw

Product data

Technical data	
Head:	Ø13.8 mm flat head with TX20 recess
Diameter:	Ø4.65 mm
Shaft:	12 mm
Drill point:	#1S
Drill capacity:	0.5 - 1.5 mm (Steel S280GD)
Material:	Hardened steel
Surface treatment:	ZYTEC™ GX
Corrosivity category:	C3 (high) according to EN ISO 12944-2



TX recess Hardened steel

Product range

Art.no.	Item name	Thread [mm]	Length L [mm]	Shaft [mm]	Drill point	Drill cap. [mm]	Head [mm]	Unit
17770	TRABO FH 4.65 X 45 #1S TX20	Ø4.65	45/64	12	#1S	0.5 - 1.5	Ø13.5 TX20	250

Advantages

- Suitable for fastening of acoustic panels to steel or wood
- Large head for better load distribution
- Specially designed pattern on the head for better concealing
- Surface treated with ZYTEC™ GX for optimal corrosion protection
- Available in more than 500 colours (Qualicoat certified facade quality powder)

Design resistance

The design resistance of the screw is determined in accordance with EN 1993-1-3:2006 + AC:2009 and EN 1995-1-1:2004 + AC:2006 + A1:2008 + A2:2014.

The resistance when loaded in tension, N_{Rd}, appears from the table on the right and is the minimum value of the pull-out resistance of the supporting object and the tension resistance of the screw. Thus, the pull-through resistance of the fixed object is not taken into account.

The theoretical values must be considered indicatively since the conditions of the construction site may vary. Practical tests of the specific application are recommended for verification of the listed values.

Assumptions:

Fixed object: Steel S280GD - EN 10346
Supporting object: Steel S280GD - EN 10346
Supporting object: Structural wood, C24
Density, ρ_k = 350 kg/m^3
Withdrawal parameter, $f_{ax,k}$ = 11 N/mm^2

L = Length of the screw [mm]
t_I = Thickness of the fixed object [mm]
t_{II} = Thickness of the supporting object [mm]

All resistances are stated in kN (1 kN ≈ 100 kg)
Safety factor: γ_M = 1.35, k_{mod} = 0.90

Design resistance when loaded in tension, N_{Rd} [kN] - Steel support	
t_{II} \ L	45
0.50	0.28
0.63	0.35
0.75	0.42
0.88	0.49
1.00	0.56
1.25	0.70
1.50	0.84

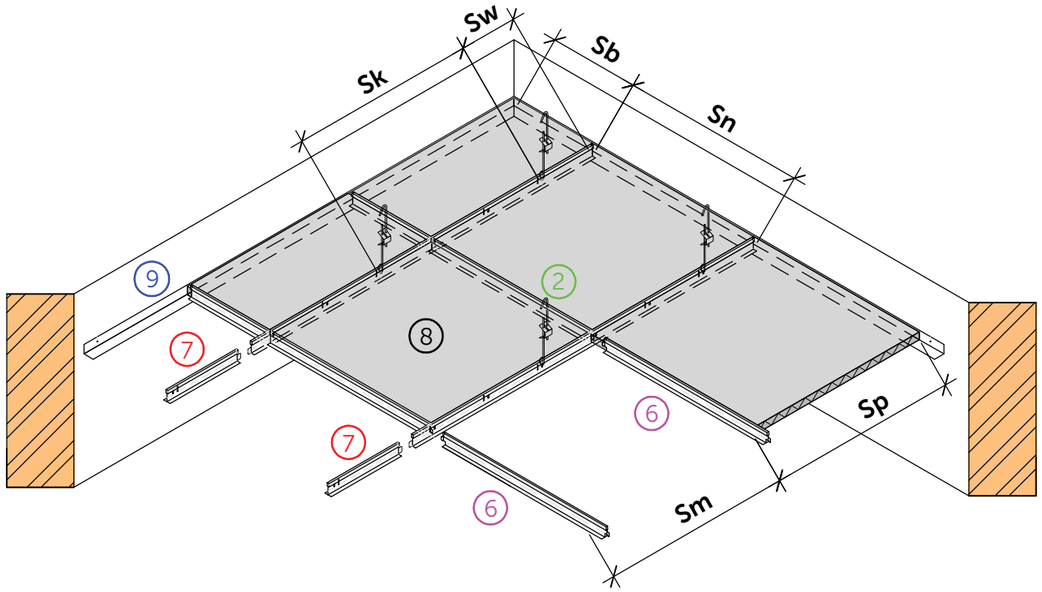
Design resistance when loaded in tension, N_{Rd} [kN] - Wooden support	
t_I \ L	45
5	1.00
10	1.00
15	0.91
20	0.74
25	0.57

Acoustic panel ceiling

Panels for suspension in T-type profile frame ceilings

T-type profile frame assembly

The procedure and methods of assembling the ceiling frame are determined by the manufacturer of structures. This informative material shows some examples of mounting solutions to create safe structures for CEWOOD panel suspension. The T-type profile step is defined depending on the structural load provided the permissible flexure of 1/500 length. The step between the load-bearing profiles for CEWOOD Acoustic panel ceilings – 1200 or 600 mm, distance between mounting profiles – 600 mm. Permissible distances for suspension elements are provided in the table below.



T-type ceiling frame elements:

2 - Suspensions; 6 - Cross profile; 7 - Load-bearing profile; 8 - CEWOOD Acoustic panels; 9 - Perimeter profile

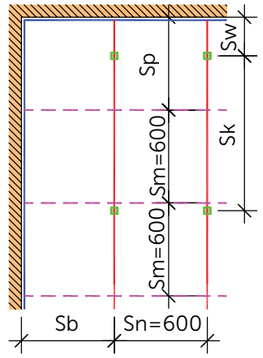
Maximum mounting distances between frame elements

Frame load capacity kN/m²	0.12	0.15		0.20		0.25
Step between load-bearing profiles **Sn**, mm	1200	1200	600	600	600	600
Step between suspensions **Sk**, mm	≤ 1000	≤ 900	≤1100	≤1000	≤1000	≤1000
Distance from suspension to wall **Sw**, mm	≤ 250	≤ 250	≤250	≤200	≤200	≤200
Step between cross profiles **Sm**, mm	600	600	600	600	1200	600
The dimensions of **Sb** and **Sp** shall be determined depending on the room size. Max. distance from wall must not exceed 600 mm. With higher loads, the step between suspensions must be accordingly reduced.						

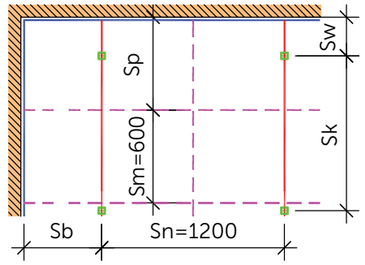
T-type profile frame elements and placement options

Profile placement for 595x595 mm panel assembly

a) Distance between load-bearing profiles
Sn = 600 mm

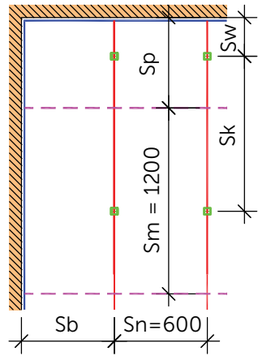


b) Distance between load-bearing profiles
Sn = 1200 mm

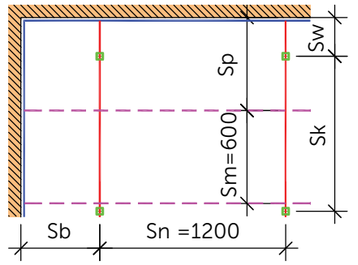


Profile placement for 1195x595 mm panel assembly

a) Distance between load-bearing profiles
Sn = 600 mm

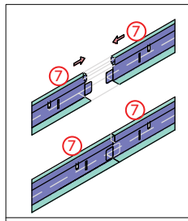
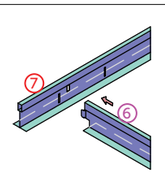
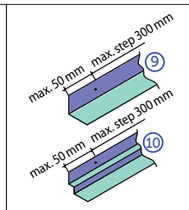
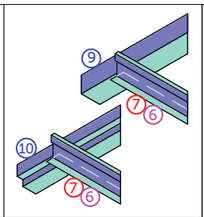
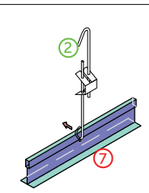


b) Distance between load-bearing profiles
Sn = 1200 mm



2 - Suspensions; 6 - Cross profile; 7 - load-bearing profile; 9 - Perimeter profile

T-type profile element connection and explanation

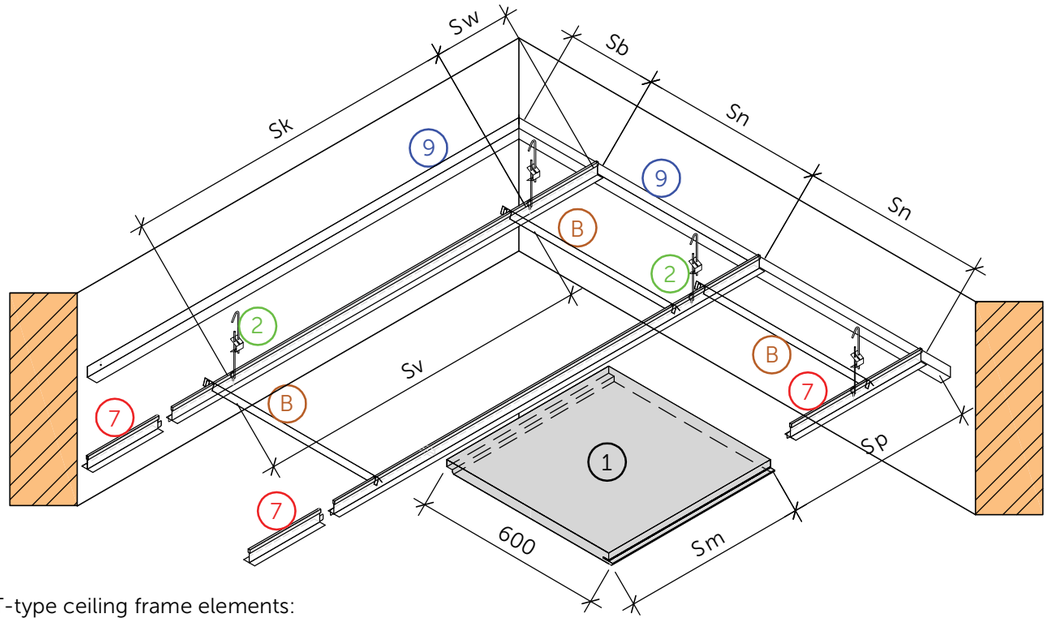
				
7- Load-bearing profile connection	**6**- Cross profile and load-bearing profile connection	**9** - Perimeter angle profile **10** - Gradual perimeter angle profile	Perimeter profile and frame profile connection	**2** - Quick, wire or nonius suspension

Gradual perimeter angle profile is applicable to P0G; P5G edge profiles, see profile guidelines on pages 16-18.

CEWOOD Acoustic panels on hidden T-type profile frame

CEWOOD panels on hidden T-type profile frame allows creating a continuous ceiling plane without visible panel fastening elements. To assemble these ceilings, P5S edge profile panels must be used. The ceiling construction is easy to open and dismantle. The ceiling panels rests on T-type T35/38 mm profiles. Similar profiles of other manufacturers with appropriate load-bearing capacity can also be used. To access the interceiling space, the liftable end of the panel must be found and lifted. In order to create larger access openings, separate distance profiles B must also be dismantled.

(!) Maximal panel size available 600x600 mm. Minimal panel thickness 35 mm.



T-type ceiling frame elements:

2 - Suspensions; 6 - Cross profile; 7 - Load-bearing profile T35/38; 9 - Perimeter profile; B - Distance profile

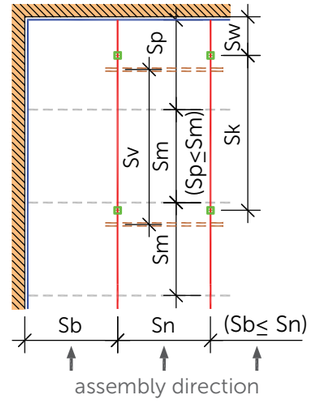
Maximum mounting distances between frame elements

Frame load capacity kN/m²	0.15	0.2	0.25	0.3
Step between load-bearing profiles **Sn**, mm	600	600	600	600
Step between suspensions **Sk**, mm	≤1100	≤1000	≤1000	≤800
Distance from suspension to wall **Sw**, mm	≤ 250	≤200	≤200	≤200
CEWOOD panel maximum size **Sm**, mm	600	600	600	600
CEWOOD panel minimum thickness, mm	35	35	35	35
The dimensions of **Sb** and **Sp** are determined depending on the room size. Max. distance from wall must not exceed 600 mm. With higher loads, the step between suspensions must be accordingly reduced.				

Hidden T-type profile frame elements and placement options

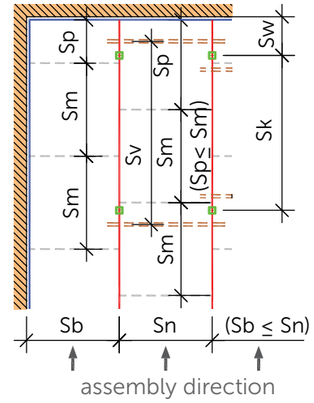
Profile placement for 595x595 mm panels

a) Distance between load-bearing profiles ***Sn = 600 mm***.



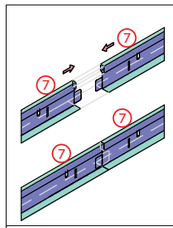
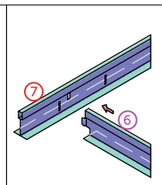
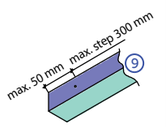
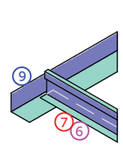
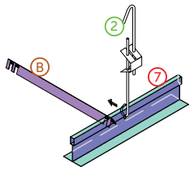
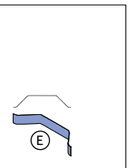
Profile placement for 1195x595 mm panels

a) Distance between load-bearing profiles ***Sn = 600 mm***.

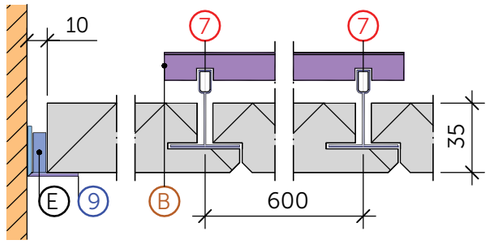


2 - Suspensions; 6 - Cross profile; 7 - Load-bearing profile T35/38; 9 - Perimeter profile; B - Distance profile; E - Spring type support

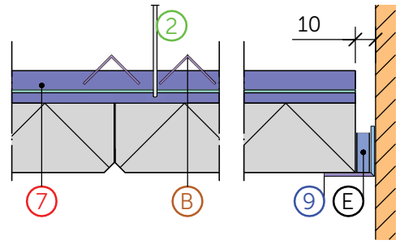
T-type profile element connection and explanation

					
7- Load-bearing profile connection	6- Cross profile and load-bearing profile connection	9- Perimeter angle profile	Perimeter profile and frame profile connection	2 - Suspension B - Distance fastening profile	E - Spring type support

T-type profile frame fastening sections



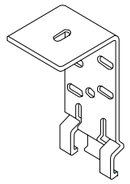
Direction with panel edge profiles P5S

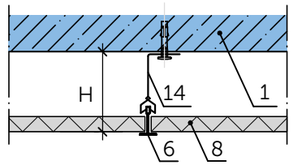


Direction with panel edge profiles P5

Fastening types of T-type profiles onto a load-bearing structure

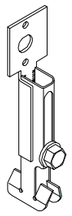
Hook with non-adjustable height

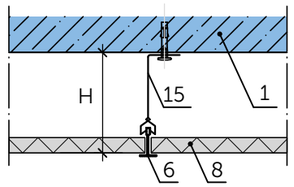




Joint between the edges

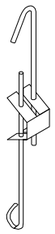
Hook with adjustable height

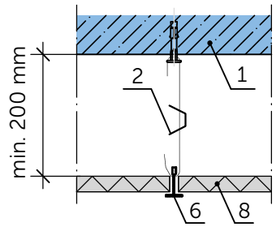




Joint between the edges

Quick suspension with adjustable height





Joint between the edges

Suspension type parameters

Suspension type	CEWOOD panel thickness, mm	Suspension height H, mm	Suspension load-bearing capacity, kN
Quick suspension	15	180	0.15
	25	200	
	35	220	
Nonius type suspension	15, 25, 35	200	0.15
Hook with non-adjustable height	15, 25, 35	50, 80, 100	0.45
Hook with adjustable height	15, 25, 35	82- 113	0.15

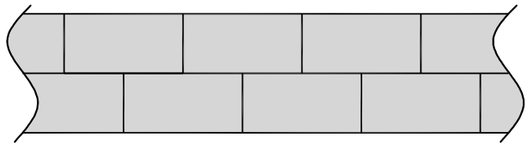
Acoustic panel ceiling

Ceiling solutions

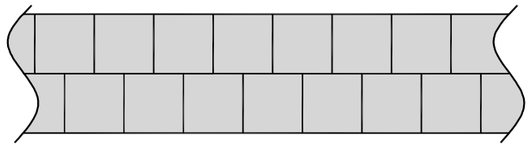
CEWOOD Acoustic panel placement patterns

Panels staggered by half of panel length

CEWOOD Acoustic panel dimensions 1200x600 mm

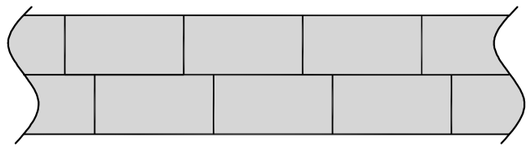


CEWOOD Acoustic panel dimensions 600x600 mm

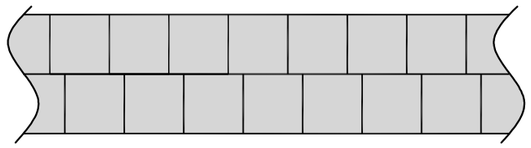


Panels staggered by third of panel length

CEWOOD Acoustic panel dimensions 1200x600 mm

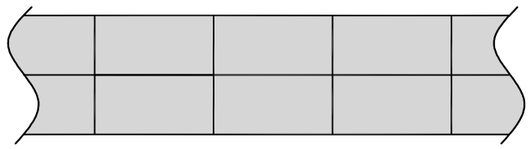


CEWOOD Acoustic panel dimensions 600x600 mm

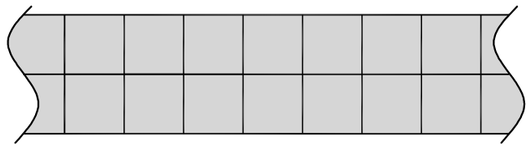


Panels aligned

CEWOOD Acoustic panel dimensions 1200x600 mm



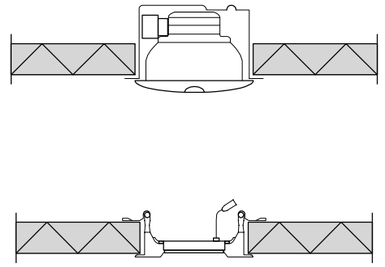
CEWOOD Acoustic panel dimensions 600x600 mm



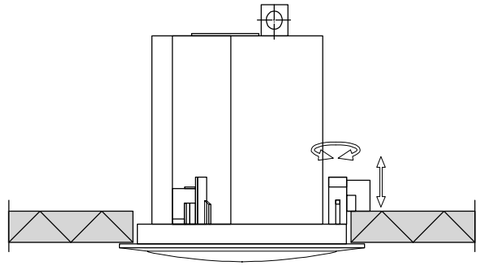
Installation of lights, speakers and similar devices into CEWOOD Acoustic panels

The placement and type of ceiling lights, speakers and similar devices in CEWOOD panels are determined by the construction project. Devices which are intended for installation in the suspended ceiling must be used. The device must be assembled according to the device manufacturer's assembly instructions. The assembly instructions must indicate the device's dimensions, weight and dimensions of the required mounting openings and they must not exceed the limits stated below.

Lights



Speakers



Ceiling frames are designed for a total calculated load of up to 0.1 kN (~10kg) per frame element running meter.

Permissible openings made into CEWOOD Acoustic panels and load-bearing capacity of fasteners

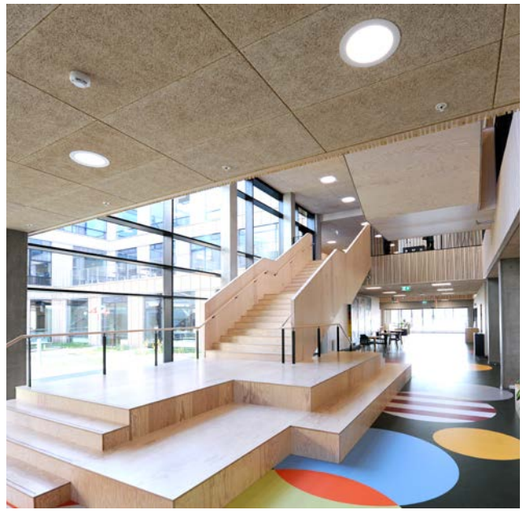
CEWOOD Acoustic panel thickness, mm	Permissible weight of the built-in device, kg	Permissible dimensions of an opening		Fastener load-bearing capacity, N (~KG)	
		Diameter, mm	Edge length, mm	Self-drilling dowel with wood screw Ø 4.5 mm	Wood screw Ø 4.5 mm
15	1.2	150	120	10 (~ 1.0)	10 (~ 1.0)
25	3.5	200	175	30 (~ 3.0)	20 (~ 2.0)
35	6	300	275	40 (~ 4.0)	25 (~ 2.5)

Heavier devices can be attached directly to the load-bearing structure or an additional support structure can be created. An opening for inserting the device can be cut with a jigsaw or circular hole saw. The edges of an opening must be smoothed and painted. Holes or cut-outs should be placed in the center of the panel.

Self drilling dowel

Wood screw

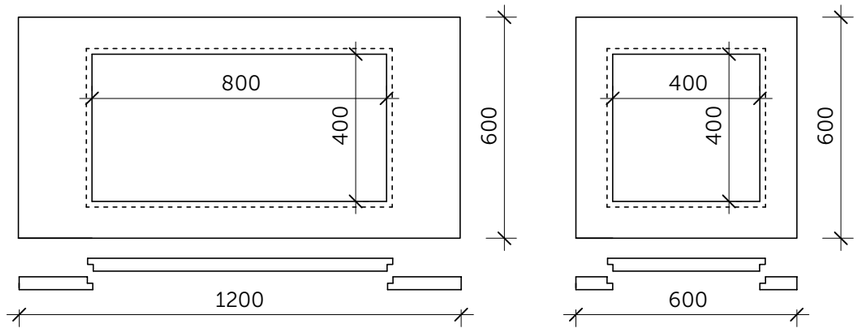
Recessed lights installed into the ceiling



CEWOOD Acoustic panels with inspection hatches

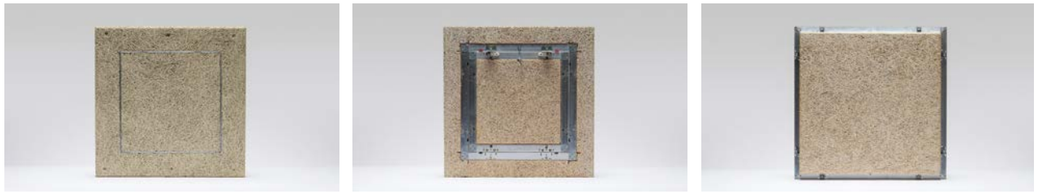
CEWOOD manufactured inspection hatches are available in various sizes. They are built-in elements into the ceiling panels without any additional frame. Hatches are designed for access to any kind of comunications, that are located behind the ceilings. Panels with inspection hatches are mounted according to the same guidelines as the standard acoustic ceiling panels. A hatch door is fully removable and reinsertable as needed. Visually, the hatches merge with the ceilings and form a smooth ceiling surface.

Maximum opening dimensions for hatches in CEWOOD Acoustic panels



Hatches can be made into 25 and 35 mm CEWOOD Acoustic or barcode panels and fastened with screws in metal, wood substructure or suspended in T-profile frame. Panels with hatches must be fastened with the standard screw pattern.

Light metal inspection hatches can also be made. CEWOOD Acoustic ceiling panels can be incorporated into the frame. These types of hatches should be used if very frequent use is expected or ceilings must fulfil requirements of impact resistance.

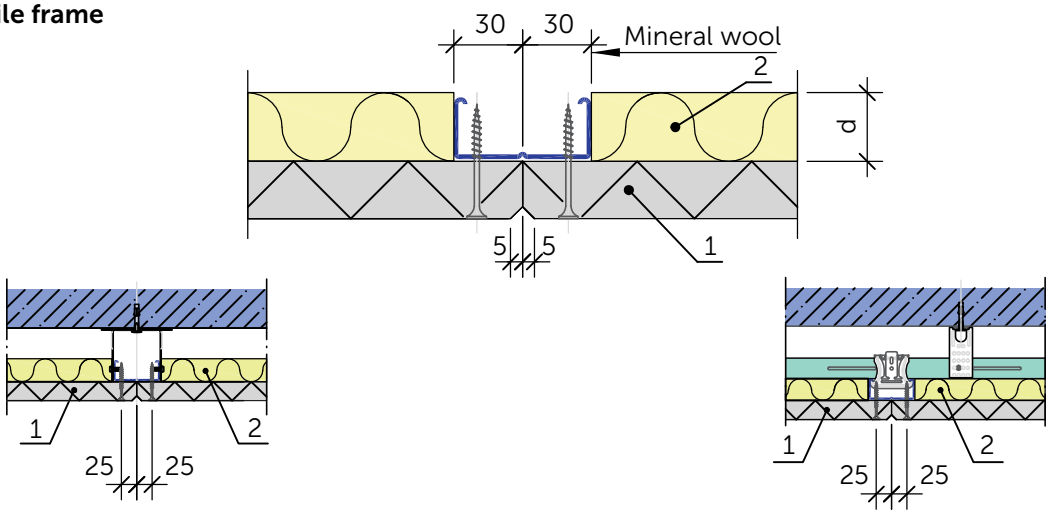


CEWOOD panels with an extra mineral wool layer for the highest sound absorption

If CEWOOD Acoustic panels are fastened with extra mineral wool onto the outer building construction elements, a vapor barrier film must be laid under CEWOOD panels.

- Type and thickness of mineral wool shall be determined in the building project, in lie with the CEWOOD sound absorption test results. See pages 24-29.
- Ceiling frame element and suspension element distances must be reduced according to the ceiling load applied.

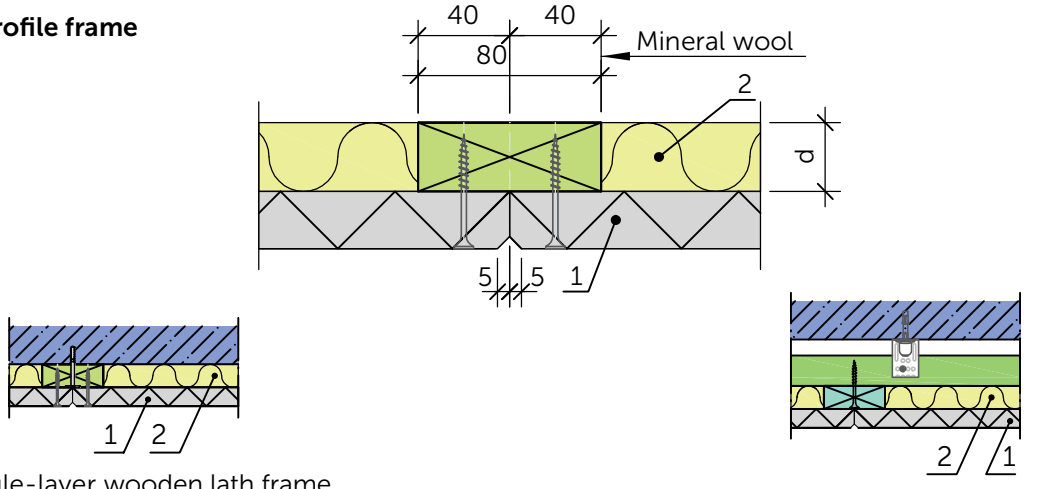
Metal CD profile frame



a. Single-layer metal frame

b. Metal frame

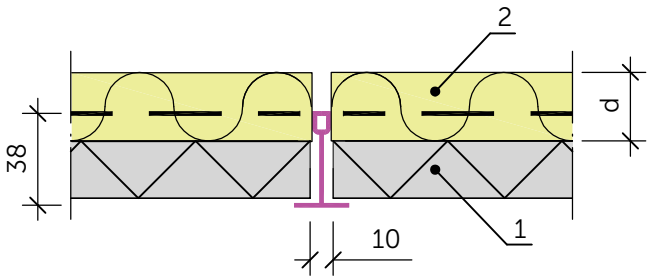
Wooden lath profile frame



a. Single-layer wooden lath frame

b. Wooden lath frame

T-type profile frame



Explanation of numbering

1. CEWOOD Acoustic panel
2. Mineral wool