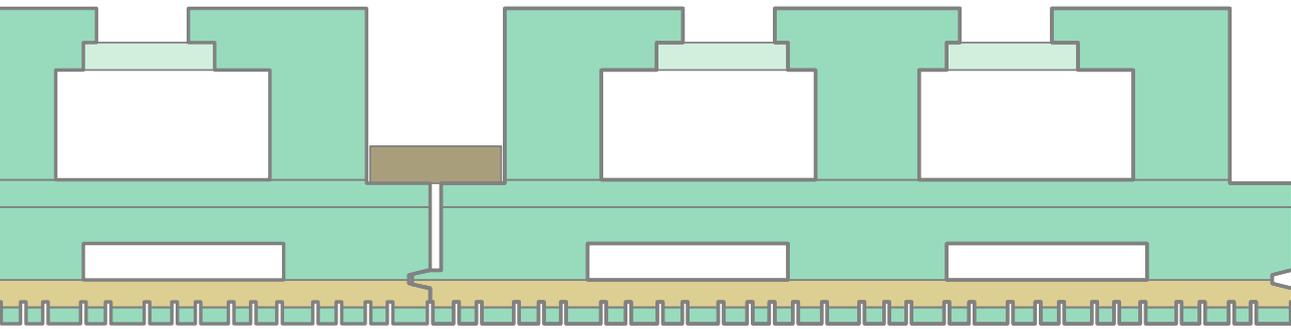


LIGNO Rippe-x

Technical data



Configurable cross-laminated timber web element
for sound-insulating structural ceiling components



LIGNO[®]
Configurable Cross-Laminated Timber

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LIGNO TREND®

Für eine nachhaltige Holz-Baukultur.

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Date 23/04/2020,
Subject to alternations.

Components with LIGNO Rippe-x Introduction



In the latest generation of Lignotrend structural ceiling elements too, a static load-bearing effect is combined with a high-quality, factory-finished visible surface in **real wood**, optionally with acoustic profile.

Element and visible surface are even more dimensionally stable: a **second transverse layer in the lower chord** and the so-called cross-laminated timber layer in the upper chord make the element even more tolerant to structurally related timber humidity changes. With **acoustic profiles the joint pattern is homogeneous like never before**: The showing-through of element joints under unfavourable conditions is now also consigned to the past.

As a cross-laminated timber **web** element, LIGNO Rippe-x utilises the timber efficiently without sacrificing the solidity. It is now fully **flexibly configurable for individual requirements** – be it as a ceiling for a detached house or as a highly sound-insulating ceiling for multi-storey buildings with fire resistance up to REI 90.

Noise protection

Due to their characteristics with regard to impact sound and airborne sound insulation, **separating ceilings of almost any kind are possible**, e.g. in multi-storey buildings, schools, offices, etc. Their use is also widespread in high-quality detached house construction, because they create a special quality of quietness due to **sound insulation in the low frequency area**. Disturbing, loud rumbling noises from the upper floor are minimised by following the **predefined, tested superstructures** ► **page 24**

Visible surface

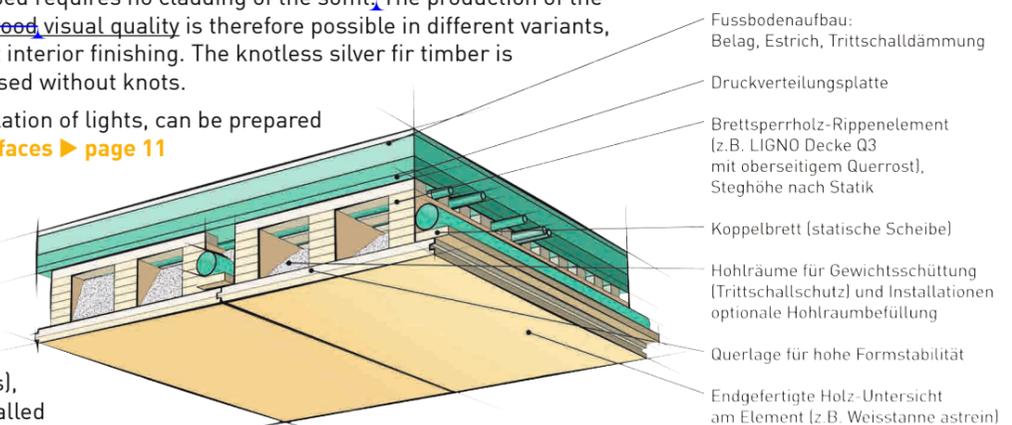
The noise protection described requires no cladding of the **soffit**. The production of the ceiling elements with **real wood visual quality** is therefore possible in different variants, which saves the subsequent interior finishing. The knotless silver fir timber is unique, because it is processed without knots.

Openings, e.g. for the installation of lights, can be prepared in the factory if desired. **Surfaces** ► **page 11**

Room acoustics

In case of requirements for a reduction of noise level and reverberation (e.g. in the construction of schools or offices, but also in modern living spaces), an **acoustic absorber** is installed during the production of the elements.

The visible layer is **profiled** accordingly with slats. **Acoustic profiles** ► **from page 9**



Span widths

Freedom of design in the floor plan is made possible by free **span widths**. Elements can be prepared in the factory for local reinforcements and flush-with-the-ceiling joists.

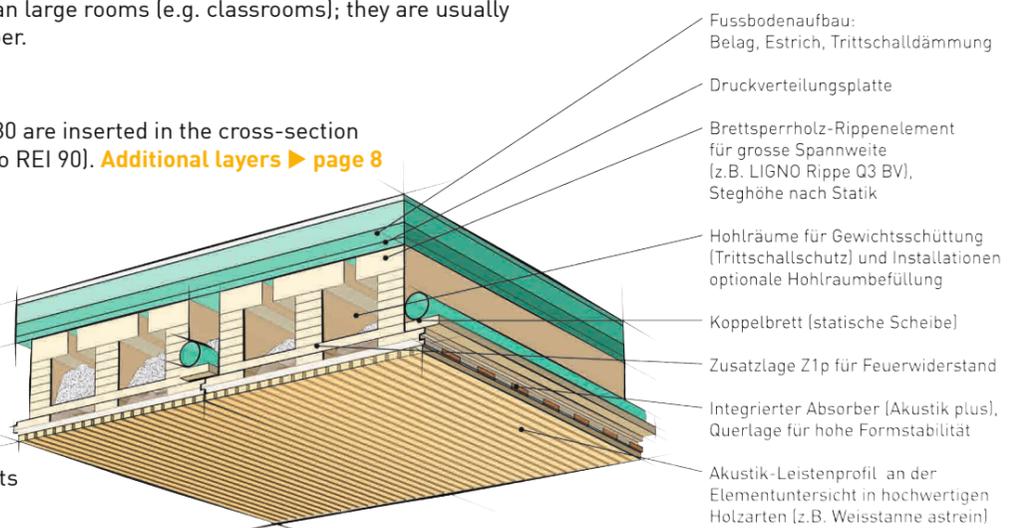
BV elements are used to span large rooms (e.g. classrooms); they are usually produced with a slight camber.

Fire resistance

Additional layers **_z26** to **_z80** are inserted in the cross-section for fire resistances (REI 30 to REI 90). **Additional layers** ► **page 8**

Construction biology

The **harmlessness to health** of the bonding is certified by the natureplus® certificate no. 0211-0606-014-1, which is based on stringent tests. The soft wood fibre material installed in acoustic elements is likewise certified.



Configuration procedure

Phase 1

Based on your requirements, preselect the component features:



Sound and thermal insulation

▶ from page 24

Selection of the component structure:
Tested superstructures, e.g. for increased noise protection, including low frequency, and for thermal insulation if applicable.



Implementation as a web or box element

▶ Page 6

Selection of the top side:
for the top-side installation layout, longitudinal and/or transverse on the ceiling, or as a level surface for the roof superstructure.



Statics

▶ Page 7

Definition of the approximate bar height (pre-dimensioning with Lignotrend LTB-x dimensioning program):
From normal to large span widths, with vibration verification.



Fire resistance

▶ Page 8

Arrangement of the so-called additional layer for fire protection R0 to REI90, bulkhead solutions for cable/pipe feed-throughs.



Installation space / additional absorber

▶ Page 8

If necessary: selection of the so-called plus layer.
Additional channels for cables/pipes/built-in components underneath the fire-protection layer.



Surface and room acoustics

▶ from page 9

Definition of the component soffit. Various types of timber including knotless, closed surfaces, acoustic slats/board profiles, integrated acoustic absorbers.

Phase 2

To determine the cross-sectional height, static dimensioning is carried out with the LTB dimensioning program ▶ page 7.

Your Lignotrend consultant will be glad to do that for you.



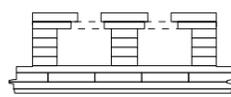
Example ceiling configuration for large span width	Example ceiling configuration for normal span width	Example ceiling configuration for normal span width	Example roof configuration for normal span width
R_w to 75 dB / $L_{n,w}$ to 37 dB	R_w to 75 dB / $L_{n,w}$ to 37 dB	R_w to 75 dB / $L_{n,w}$ to 37 dB	R_w to 64 dB / flexible U-value
High upper chord with longitudinal channel LIGNO Rippe Q3_bv	Upper chord with longitudinal channel LIGNO Rippe Q3	Upper chord with transverse grid, longitudinal channel underneath LIGNO Rippe Q3-r25	Closed upper chord LIGNO Block Q3
High bars for large span width or high load	Medium-height bars for medium span width or moderate load	Medium-height bars for medium span width or moderate load	Low bars for small/medium span width or low load
REI 60 with additional layer _z53	REI 60 with additional layer _z53	REI 30 with additional layer _z26	R0 without additional layer _z0
_p53 53 mm-high installation space	_p26 26 mm-high installation space	_p0 no additional installation space	_p0 no additional installation space
_a50g Acoustic absorber _625-20-4 <u>Stat profile</u> _WTL Silver fir, patterned _b0 untreated	_a0 without absorber _625-20-4 <u>Stat profile</u> _WTE Silver fir, economy _buv Light protection	_a50g Acoustic absorber _625-621-4 <u>Closed soffit</u> _EI <u>Knotless oak</u> _buv Light protection	_a50g Acoustic absorber _625-12n25-4:3D <u>Stat profile</u> _WTL Silver fir, patterned _b0 untreated
Ceiling component for large span width LIGNO Rippe Q3-x	Ceiling component for normal span width LIGNO Rippe Q3-x	Ceiling component for normal span width LIGNO Rippe Q3-x	Flat roof component with warm roof structure LIGNO Block Q3-x

Configuration of the element top side Optional installation grid

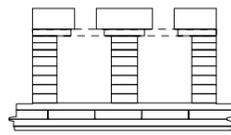
Transverse grid

A simple room-sided layout of small cable/pipe cross-sections (electrical, heating, fresh water) is possible on the top side of the element if it is configured with a transverse grid. Elaborate cutting to size of insulating panels for the floor structure becomes superfluous.

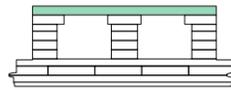
_r0



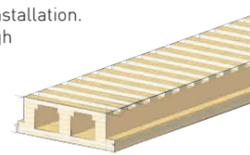
Top side with longitudinal channels
no transverse grid



_r25

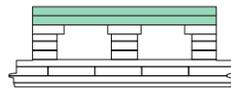


Top side with grid for transverse installation.
The gaps in the grid are 25 mm high
and approx. 62 mm wide.



up to element height 290

_r50



Top side with grid for transverse installation.
The gaps in the grid are 50 mm high
and approx. 62 mm wide.

up to element height 290

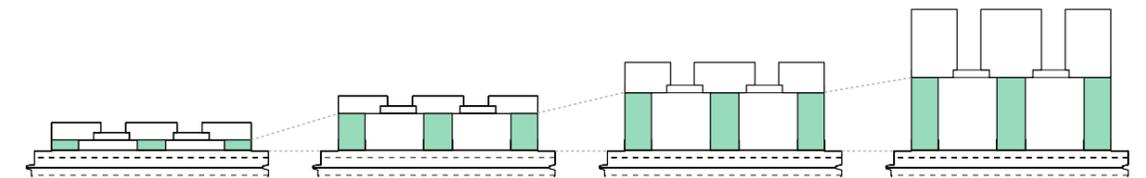
Configuration of the bar/element height Pre-dimensioning and static dimensioning

Element height (pre-dimensioning)

During the configuration, the element height is initially estimated.

The bar height results from the selection of the remaining configuration options, see tables ► [from page 12](#).

	low load	small span width	medium span width	large span width
high load		small span width	medium span width	large span width
		small span width with vibration verification	medium span width with vibration verification	large span width with vibration verification
Element height		150 170 190 210 230 250 270 290	310 330 350 370 390 410 410 450	



Element height (direct load-capacity verification)

With the free **LTB-x dimensioning software**, a configuration can be created with realistic pre-dimensioning and a verifiable proof. Download from ► www.lignotrend.com/ltb

For the so-called "**hot dimensioning**" (fire resistances R30, R60 and R90), a second, **separate verification** is to be carried out in which the theoretical residual cross-section is to be taken into account.

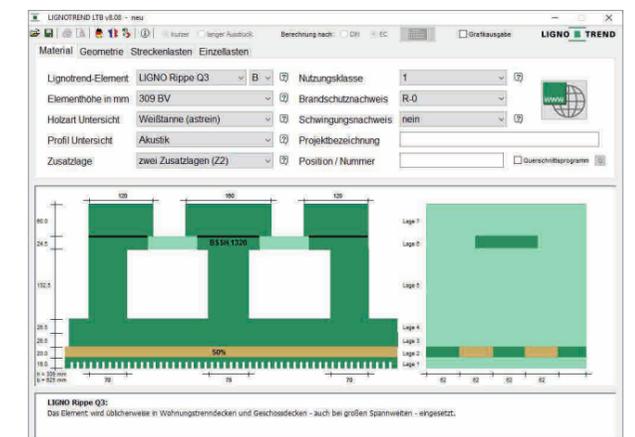


Plate load capacity

The **statically effective plate** is formed by coupling the element strips with butt boards. Softwood **butt boards** (C24, cross section 95 mm x 26.5 mm) as delivered as standard. These are fastened on site, for example with clamps. In the case of higher stresses, they can be replaced by veneered plywood strips, for example. Additional stiffening boards or diagonals are not usually necessary! **A static verification of the plate is necessary.**

► [Characteristic values from page 28](#)

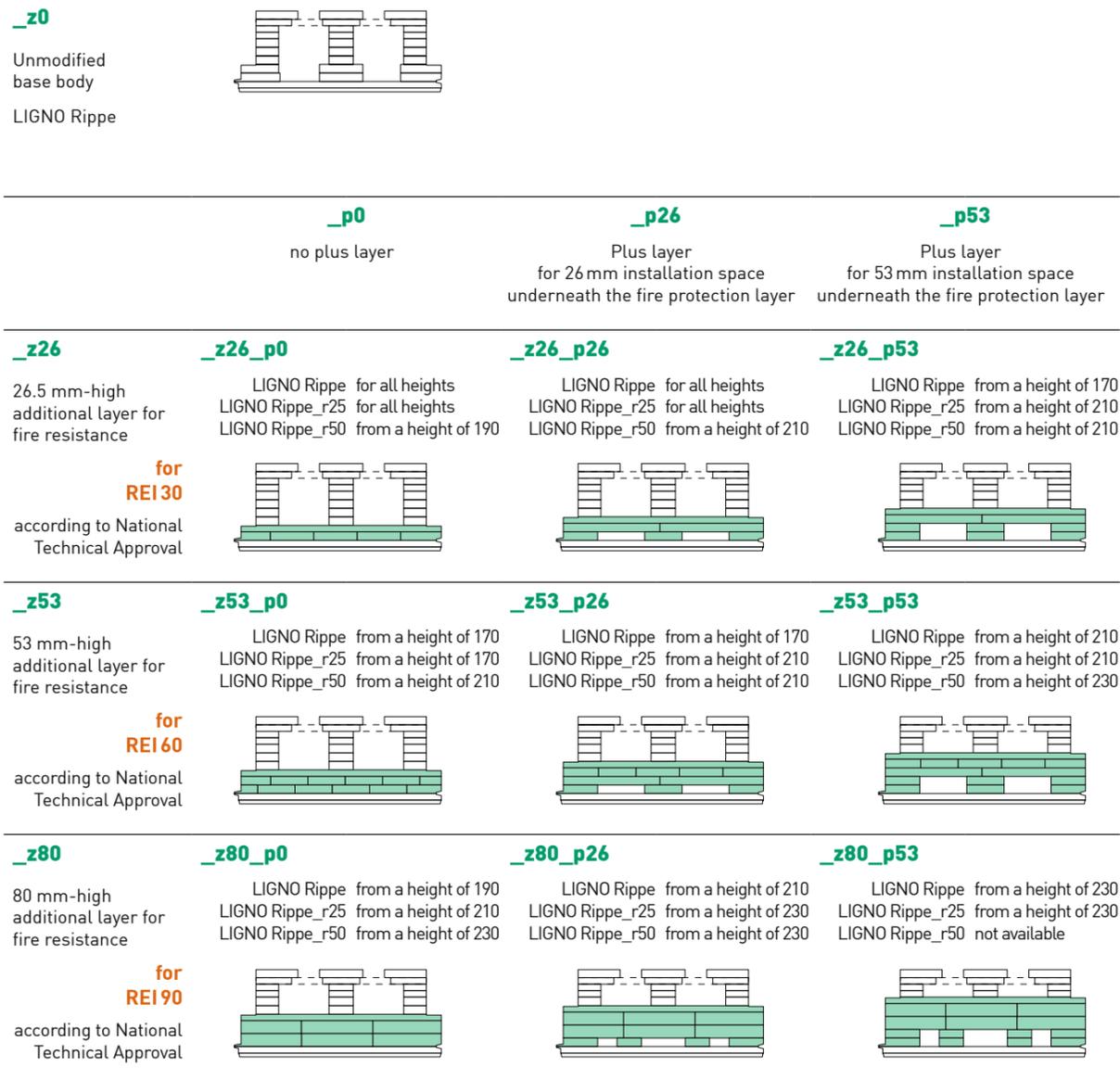
Configuration of the fire resistance Configuration of the lower installation area

Additional layers for fire resistance

For a calculable behaviour in case of fire, closed timber layers of different thicknesses are located above the soffit. They isolate the upper, load-bearing cross-sectional area from the soffit with acoustic absorber or from the lower installation area.

Plus layers for lower installation area

The lowering of the soffit using so-called plus layers enables the flexible layout of cables/pipes without having to penetrate the fire protection level. They increase the sound absorption capacity and allow the installation of spots.



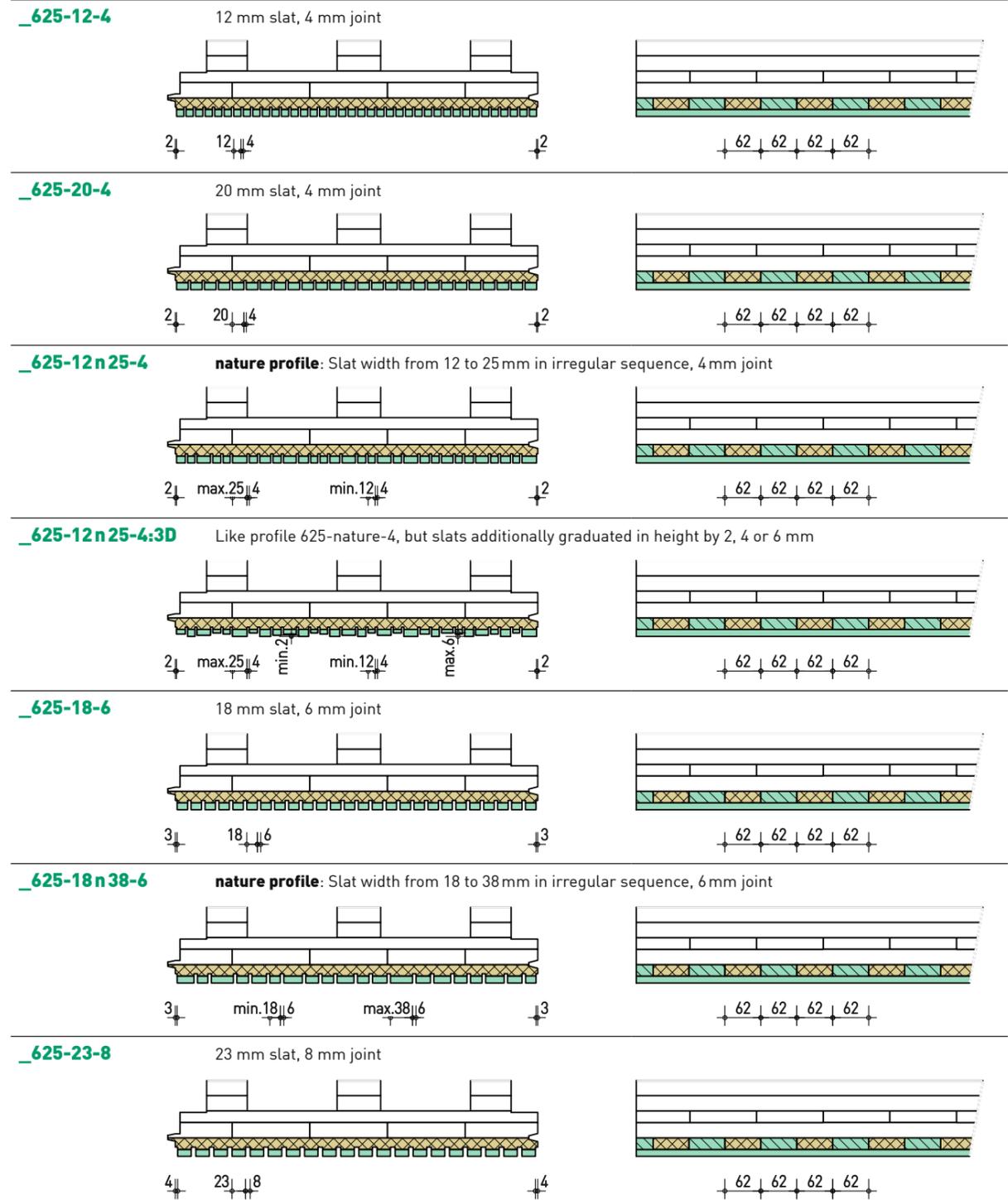
Configuration of the element soffit Acoustic profile, absorber _a50g

Sound-absorbing slat-profiles

To achieve a sound-absorbing effect of the element surface on the room side, the wood surface can be profiled ex works with joints. The transverse layer located underneath is then fitted with an absorber.

Transverse layer _a50g

with soft wood fibre acoustic absorber (50% of area)



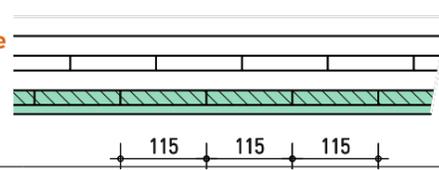
Configuration of the element soffit Low absorbent and closed profiles

Low sound-absorbent slat profiles

If a slat surface is desired, but a low sound absorption is sufficient, no acoustic absorber is placed in the transverse layer. Cross-sectional structure of the **profile variants otherwise analogous to the absorbent variants**.

Transverse layer _a0

with solid wood transverse layer, no absorber



Laminar, closed real wood soffit

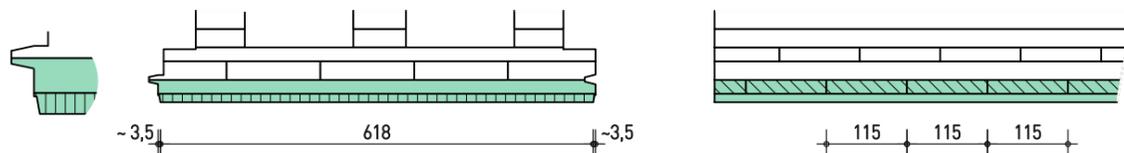
The element soffit can also be implemented with a closed real wood surface over the element width of 625 mm.

Transverse layer _a0

with solid wood transverse layer, no absorber

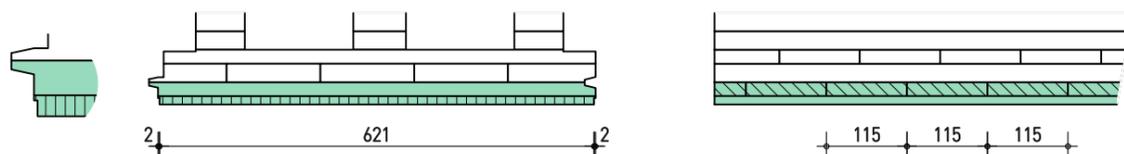
_625-618-7

V-shaped joint at lateral element butt joint



_625-621-4

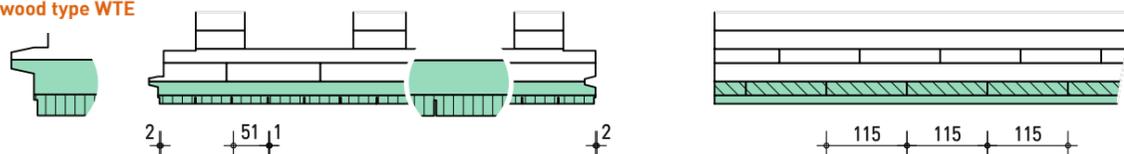
Sharp-edged 4 mm joint at lateral element butt joint



_625-51-1

for wood type WTE

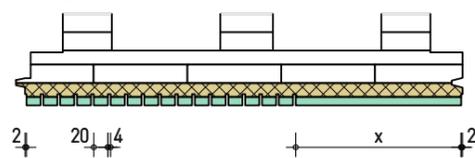
1 mm joint in the surface, sharp-edged 4 mm joint at lateral element butt joint



Special versions (on request)

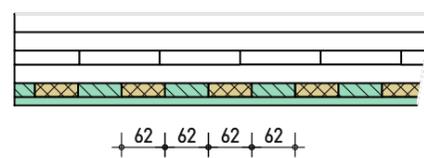
Profiling of partial surfaces

Only a part of the soffit is scored.



Transverse layer _a50g or _a0

Transverse layer with or without absorber



Acoustic perforation

Drilling the soffit provided this is technically feasible.

Transverse layer _a50g or _a0

Transverse layer with or without absorber

Configuration of the element soffit Type of timber, surface treatment

High-quality real wood soffit

With most types of timber, the single-layer boards used for the visible layer of the elements consist of lamella sections, which are connected lengthwise by vertical or horizontal finger-joints. Approx. every 2.87 m, the elements are coupled by a general butt joint, which is recognisable close up as a fine line over the 625 mm element width.

▶ The technical data sheet "LIGNO surfaces" contains a precise description of the timber character



Silver fir knotless, patterned _WTL	Vivid pattern, variation in brightness and colour
Silver fir knotless, patterned, impregnated _WTL-i	Like WTL, but impregnated for flame retardancy. <u>Only in conjunction with acoustic profile.</u> Required on the load-bearing element only in special cases.
Silver fir knotless, plain _WTS	Like WTL, but with less variation, finer grain. <u>Availability limited, please enquire about delivery time.</u>
Silver fir knotless, economy _WTE	Like WTL, but with wood irregularities. <u>Only in connection with the profile 625-51-1 and with acoustic profiles.</u>
Spruce knotless, plain _FIS	Comparable with WTS, but very little colour variation
Spruce knotless, plain, impregnated _FIS-i	Like FIS, but impregnated for flame retardancy. <u>Only in conjunction with acoustic profile.</u> Required on the load-bearing element only in special cases.
Spruce knotty (A qual.) _FI-ä	Grade with knots, homogeneous pattern, continuous lamellae without finger-joints. <u>Note: Knots may be conspicuous with narrow slat profiles.</u>
Knotless oak _EI	Vivid pattern, variation in the brightness, lamella joint visible only as a line (horizontal finger joints). <u>Availability/stock limited, please enquire about delivery time.</u>
Larch _LÄS	Vivid pattern, slight variation in brightness
Other types of timber	Should the element soffit be designed with a different type of timber? Contact the Lignotrend consultant; he will check the feasibility.

Inexpensive soffit without visible quality requirement

If the ceiling soffit is to be clad on site with plasterboard or implemented with a suspended ceiling, wood in a non-visible quality is used for the lowest layer.

Industrial quality _NSI	Single boards laid with joints or single-layer plates that are unsuitable for visible qualities. Different types of timber can be mixed in elements or pickings.
--------------------------------	--

Surface treatment

Light-protection primer, colourless	Glaze for light-coloured woods: Colourless UV-protection primer to prevent darkening of the wood. Suitable for interior use (not classified as toxic). Final treatment necessary if washout cannot be ruled out. Make: Adler Lignovit Interior UV 100 LT5.
--	---

Other surface treatments	An on-site application is recommended for other final treatments of the surface.
---------------------------------	--

Basic element configuration

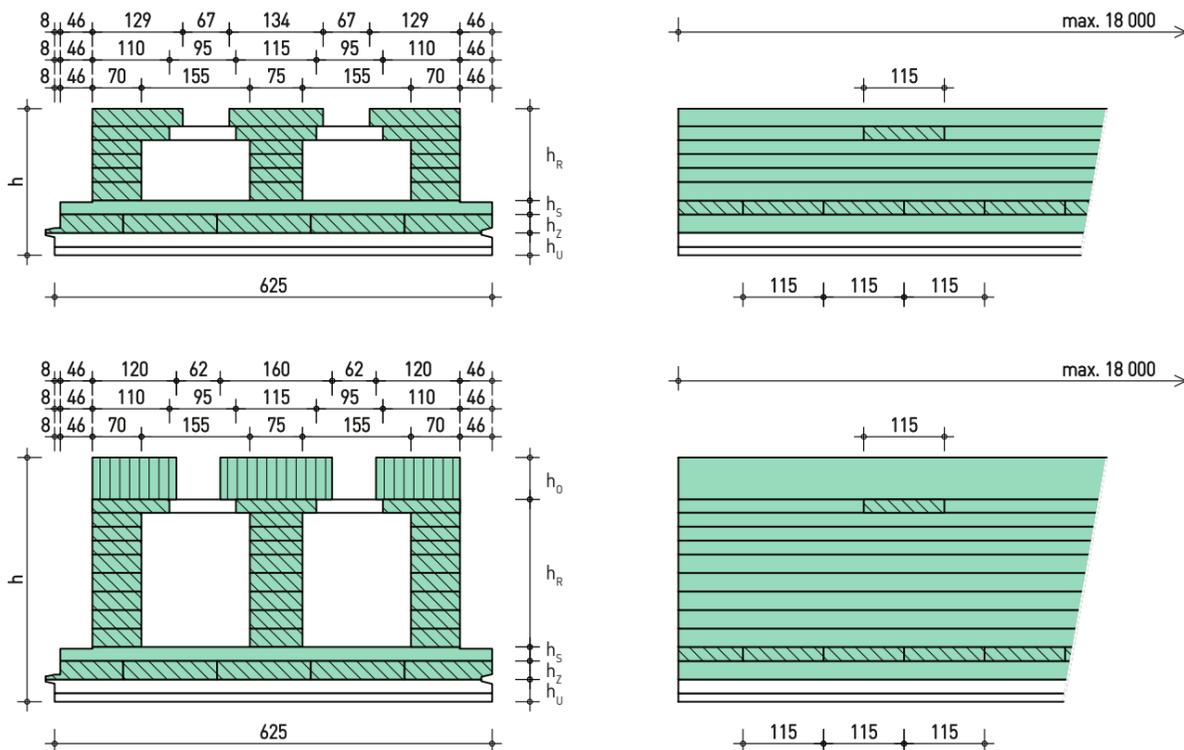
Fire resistance REI 30

LIGNO Rippe Q3_z26_p0

Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight Closed surface	Acoustic surface	Cavity	Bulk weight 1400 kg/m ³
150	≤ 15 m		71.5	58	53	0.032	45
170	≤ 15 m		91.5	61	56	0.045	63
190	≤ 18 m		111.5	65	60	0.058	82
210	≤ 18 m		131.5	68	63	0.072	100
230	≤ 18 m		151.5	72	67	0.084	118
250	≤ 18 m		171.5	75	70	0.098	137
270	≤ 18 m		191.5	79	74	0.111	155
290	≤ 18 m		211.5	82	77	0.124	173
310	≤ 18 m	60	171.5	91	86	0.125	176
330	≤ 18 m	60	191.5	95	90	0.138	194
350	≤ 18 m	60	211.5	98	93	0.152	212
370	≤ 18 m	80	211.5	105	100	0.159	222
390	≤ 18 m	100	211.5	111	106	0.167	234
410	≤ 18 m	120	211.5	118	113	0.173	242
430	≤ 18 m	140	211.5	124	119	0.180	252
450	≤ 18 m	160	211.5	131	126	0.187	262
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Additional layer **_z26** h_z 26.5 mm
 No plus layer **_p0** h_p -

Blocking layer h_s 20 mm
 Soffit h_u 32 mm



Configuration variants

- Visible surface, acoustic profiling
 ▶ from page 9
- Fire resistance REI 60 or REI 90
 ▶ Page 8
 (Examples on pages 16, 18)
- Installation space on the underside
- Improvement of the sound absorption
 ▶ Page 8
- Transverse installation on the top side
 ▶ Page 6
 (Example on pages 13)

Basic element configuration REI 30

for transverse installation on the element / under the floor structure

LIGNO Rippe Q3_r25_z26_p0

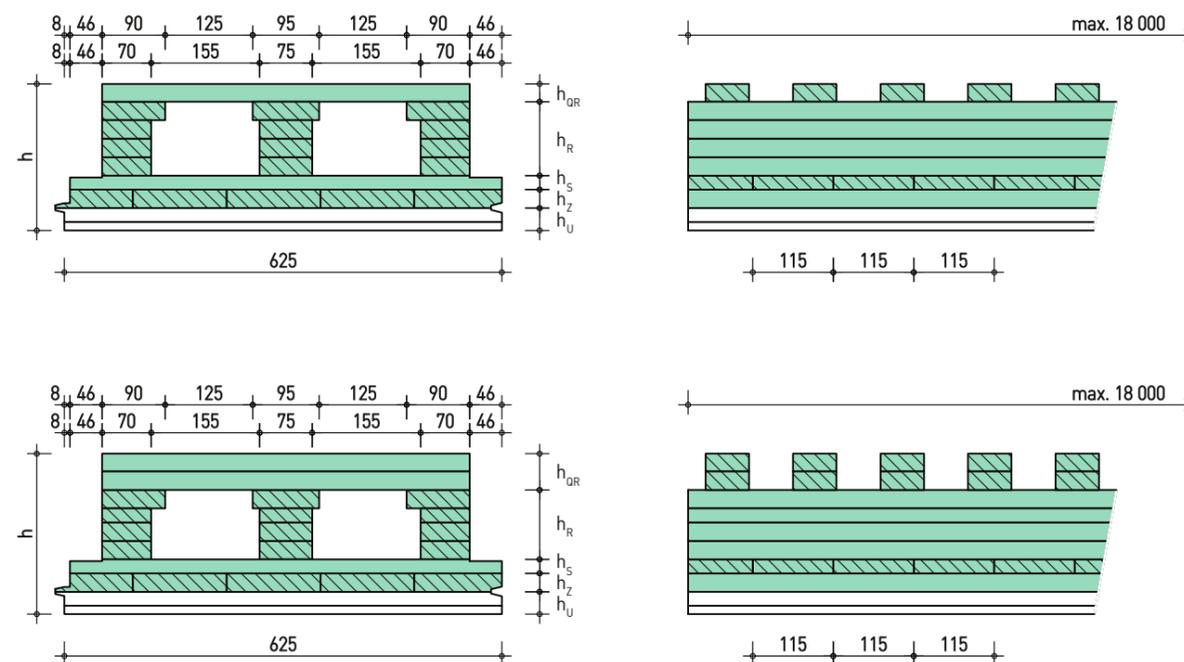
Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight Closed surface	Acoustic surface	Cavity	Bulk weight 1400 kg/m ³
170	≤ 15 m		66.5	58	53	0.052	72
190	≤ 18 m		86.5	62	57	0.065	91
210	≤ 18 m		106.5	65	60	0.078	109
230	≤ 18 m		126.5	69	64	0.091	127
250	≤ 18 m		146.5	72	67	0.104	146
270	≤ 18 m		166.5	76	71	0.118	165
290	≤ 18 m		186.5	79	74	0.130	183
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

LIGNO Rippe Q3_r50_z26_p0

Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight Closed surface	Acoustic surface	Cavity	Bulk weight 1400 kg/m ³
190	≤ 18 m		61.5	62	57	0.064	89
210	≤ 18 m		81.5	66	61	0.076	106
230	≤ 18 m		101.5	70	65	0.089	125
250	≤ 18 m		121.5	73	68	0.102	143
270	≤ 18 m		141.5	77	72	0.115	162
290	≤ 18 m		161.5	80	75	0.128	180
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Upper transverse grid **_r25** h_{OR} 25 mm
r50 h{OR} 50 mm
 Additional layer **_z26** h_z 26.5 mm
 No plus layer **_p0** h_p -

Blocking layer h_s 20 mm
 Soffit h_u 32 mm



Configuration variants

- Visible surface, acoustic profiling
 ▶ from page 9
- Fire resistance REI 60 or REI 90
 ▶ Page 8
- Installation space on the underside
- Improvement of the sound absorption
 ▶ Page 8

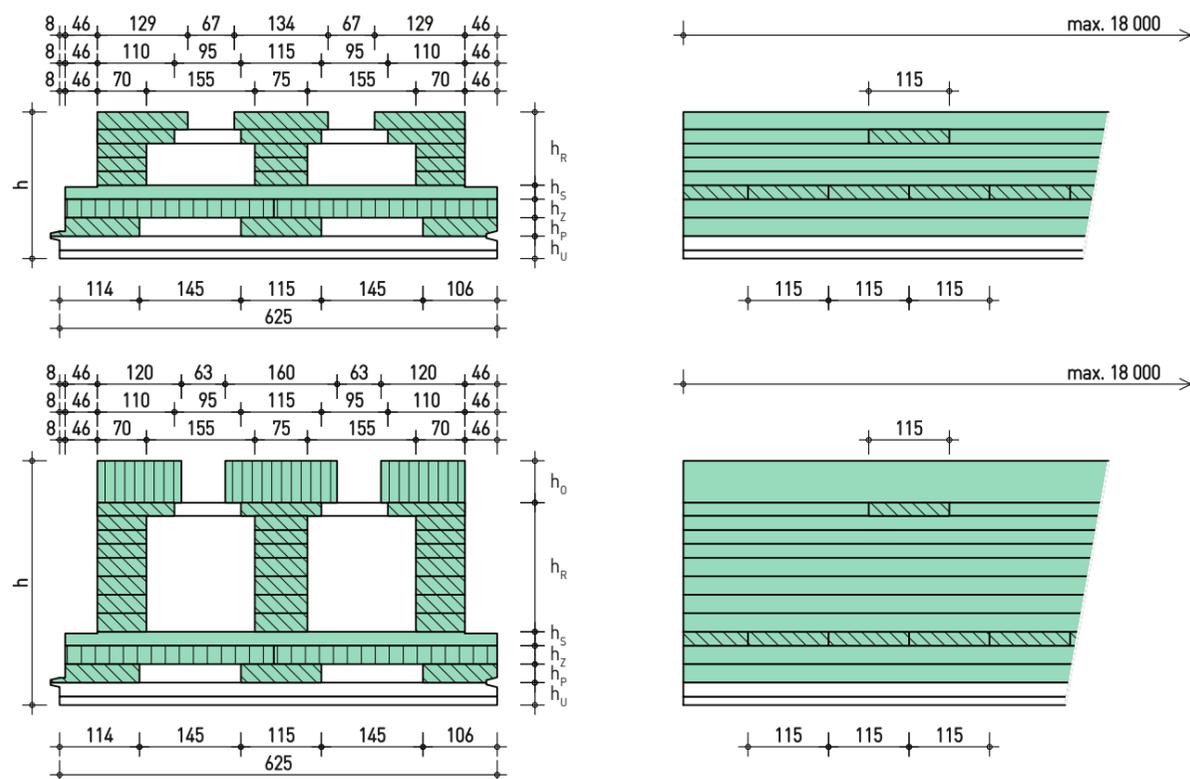
Basic element configurations REI 30 with installation area underneath the fire protection level

LIGNO Rippe Q3_z26_p26

Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight		Cavity	Bulk weight 1400 kg/m ³
				Closed surface	Acoustic surface		
150	≤ 15 m		45.0	60	55	0.015	21
170	≤ 15 m		65.0	64	59	0.028	39
190	≤ 18 m		85.0	67	62	0.041	57
210	≤ 18 m		105.0	71	66	0.054	76
230	≤ 18 m		125.0	74	69	0.067	94
250	≤ 18 m		145.0	78	73	0.080	112
270	≤ 18 m		165.0	81	76	0.093	131
290	≤ 18 m		185.0	85	80	0.106	149
310	≤ 18 m	60	145.0	94	89	0.109	153
330	≤ 18 m	60	165.0	97	92	0.122	171
350	≤ 18 m	60	185.0	101	96	0.136	190
370	≤ 18 m	80	185.0	107	102	0.143	200
390	≤ 18 m	100	185.0	114	109	0.150	210
410	≤ 18 m	120	185.0	120	115	0.157	220
430	≤ 18 m	140	185.0	127	122	0.164	230
450	≤ 18 m	160	185.0	133	128	0.172	240
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Additional layer **_z26** h_z 26.5 mm
Plus layer **_p26** h_p 26.5 mm

Blocking layer h_s 20 mm
Soffit h_u 32 mm



Configuration variants

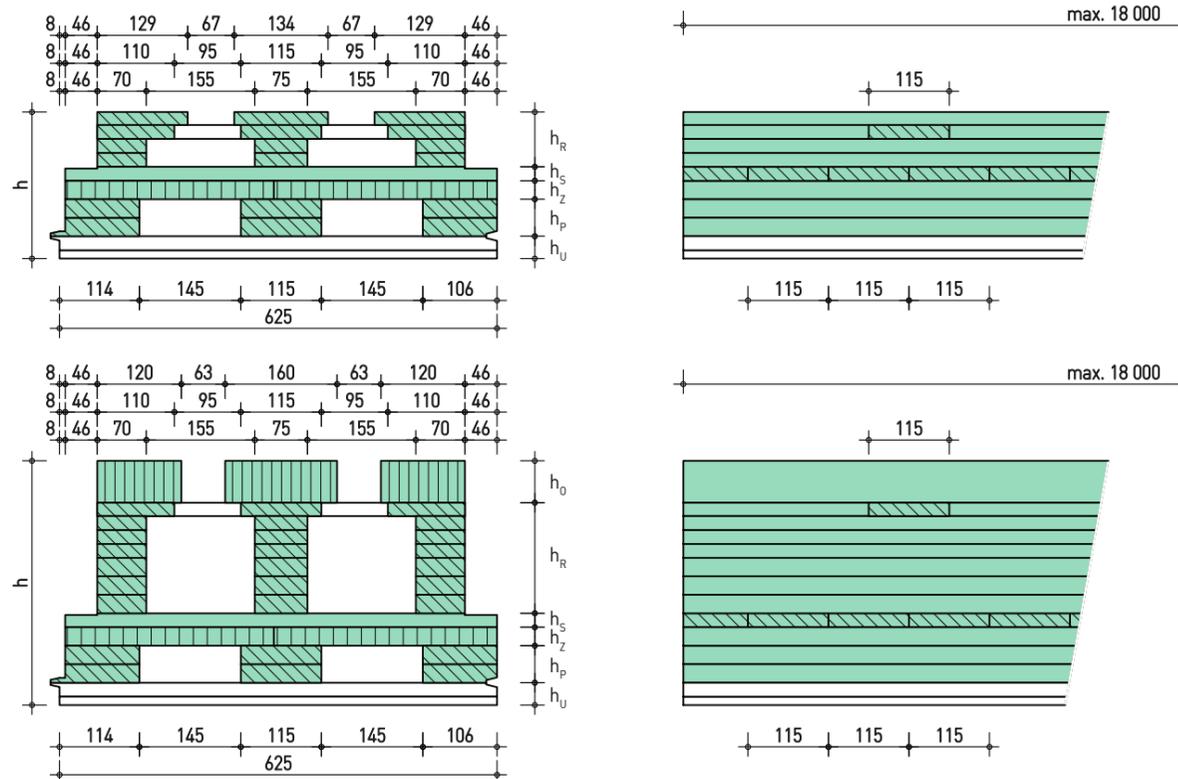
- Visible surface, acoustic profiling
▶ from page 9
- Fire resistance REI 60 or REI 90
▶ Page 8
(Examples on page 17)
- Larger installation space on the underside
- Improvement of the sound absorption
▶ Page 8
(Example on next page)
- Transverse installation on the top side
▶ Page 6
(possible up to an element height of 290)

LIGNO Rippe Q3_z26_p53

Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight		Cavity	Bulk weight 1400 kg/m ³
				Closed surface	Acoustic surface		
170	≤ 15 m		38.5	65	60	0.012	17
190	≤ 18 m		58.5	69	64	0.025	36
210	≤ 18 m		78.5	72	67	0.039	54
230	≤ 18 m		98.5	77	72	0.050	70
250	≤ 18 m		118.5	80	75	0.063	88
270	≤ 18 m		138.5	84	79	0.076	106
290	≤ 18 m		158.5	87	82	0.089	125
310	≤ 18 m	60	118.5	96	91	0.092	129
330	≤ 18 m	60	138.5	100	95	0.105	147
350	≤ 18 m	60	158.5	103	98	0.118	165
370	≤ 18 m	80	158.5	110	105	0.125	175
390	≤ 18 m	100	158.5	116	111	0.132	185
410	≤ 18 m	120	158.5	123	118	0.140	196
430	≤ 18 m	140	158.5	129	124	0.147	206
450	≤ 18 m	160	158.5	136	131	0.154	216
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Additional layer **_z26** h_z 26.5 mm
Plus layer **_p53** h_p 53 mm

Blocking layer h_s 20 mm
Soffit h_u 32 mm



Configuration variants

- Visible surface, acoustic profiling
▶ from page 9
- Fire resistance REI 60 or REI 90
▶ Page 8
(Examples on page 17)
- Transverse installation on the top side
▶ Page 6
(possible up to an element height of 290)

Basic element configuration

Fire resistance REI 60

LIGNO Rippe Q3_z53_p0

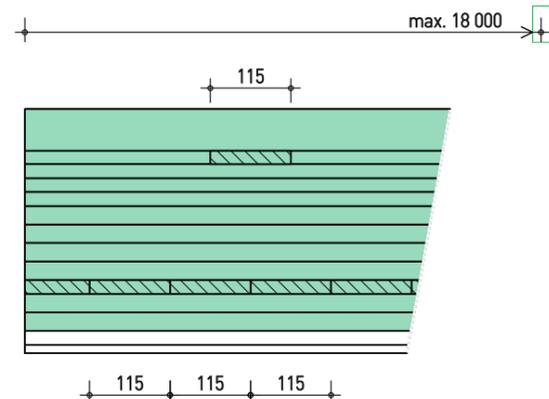
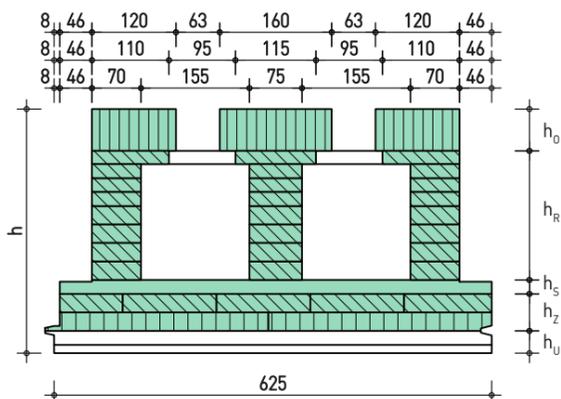
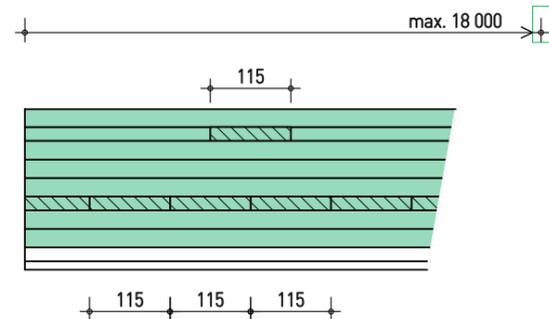
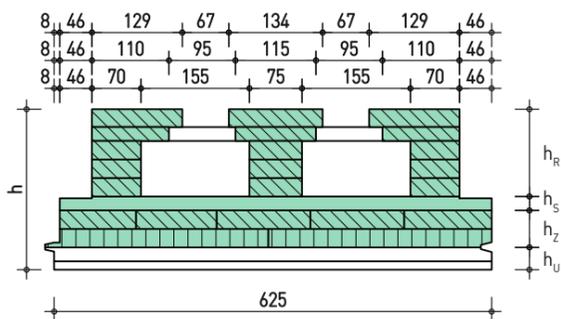
Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight		Cavity	Bulk weight 1400 kg/m ³
				Closed surface	Acoustic surface		
170	≤ 15 m		65.0	70	65	0.028	39
190	≤ 18 m		85.0	74	69	0.041	57
210	≤ 18 m		105.0	77	72	0.054	76
230	≤ 18 m		125.0	81	75	0.067	94
250	≤ 18 m		145.0	84	79	0.080	112
270	≤ 18 m		165.0	88	83	0.093	131
290	≤ 18 m		185.0	91	86	0.106	149
310	≤ 18 m	60	145.0	100	95	0.109	153
330	≤ 18 m	60	165.0	103	98	0.122	171
350	≤ 18 m	60	185.0	107	102	0.136	190
370	≤ 18 m	80	185.0	113	108	0.143	200
390	≤ 18 m	100	185.0	120	115	0.150	210
410	≤ 18 m	120	185.0	127	121	0.157	220
430	≤ 18 m	140	185.0	133	128	0.164	230
450	≤ 18 m	160	185.0	140	135	0.172	240
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Configuration variants

- Visible surface, acoustic profiling
▶ from page 9
- Fire resistance REI 90
▶ Page 8
(Example on pages 18)
- Installation space on the underside
- Improvement of the sound absorption
▶ Page 8
- Transverse installation on the top side
▶ Page 6
(possible up to an element height of 290)

Additional layer **_z53** h_z 53 mm
No plus layer **_p0** h_p -

Blocking layer h_s 20 mm
Soffit h_u 32 mm



Basic element configurations REI 60

with installation area underneath the fire protection level

LIGNO Rippe Q3_z53_p26

Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight		Cavity	Bulk weight 1400 kg/m ³
				Closed surface	Acoustic surface		
170	≤ 15 m		38.5	72	66	0.012	17
190	≤ 18 m		58.5	75	70	0.025	36
210	≤ 18 m		78.5	79	74	0.039	54
230	≤ 18 m		98.5	83	78	0.050	70
250	≤ 18 m		118.5	87	82	0.063	88
270	≤ 18 m		138.5	90	85	0.076	106
290	≤ 18 m		158.5	94	88	0.089	125
310	≤ 18 m	60	118.5	102	97	0.092	129
330	≤ 18 m	60	138.5	106	101	0.105	147
350	≤ 18 m	60	158.5	109	104	0.118	165
370	≤ 18 m	80	158.5	116	111	0.125	175
390	≤ 18 m	100	158.5	122	117	0.132	185
410	≤ 18 m	120	158.5	129	124	0.140	196
430	≤ 18 m	140	158.5	135	130	0.147	206
450	≤ 18 m	160	158.5	142	137	0.154	216
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Configuration variants

- Visible surface, acoustic profiling
▶ from page 9
- Fire resistance REI 90
▶ Page 8
- Larger installation space on the underside
- Improvement of the sound absorption
▶ Page 8
(Example at bottom of this page)
- Transverse installation on the top side
▶ Page 6
(possible up to an element height of 290)

Additional layer **_z53** h_z 53 mm
Plus layer **_p26** h_p 26.5 mm

Blocking layer h_s 20 mm
Soffit h_u 32 mm

LIGNO Rippe Q3_z53_p53

Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight		Cavity	Bulk weight 1400 kg/m ³
				Closed surface	Acoustic surface		
210	≤ 15 m		52.0	83	78	0.018	25
230	≤ 18 m		72.0	85	80	0.032	45
250	≤ 18 m		92.0	89	84	0.045	64
270	≤ 18 m		112.0	92	87	0.059	82
290	≤ 18 m		132.0	96	91	0.072	100
310	≤ 18 m	60	92.0	105	100	0.074	104
330	≤ 18 m	60	112.0	108	103	0.088	123
350	≤ 18 m	60	132.0	112	107	0.101	141
370	≤ 18 m	80	132.0	118	113	0.108	151
390	≤ 18 m	100	132.0	125	120	0.115	161
410	≤ 18 m	120	132.0	131	126	0.122	171
430	≤ 18 m	140	132.0	138	133	0.129	181
450	≤ 18 m	160	132.0	144	139	0.137	191
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Configuration variants

- Visible surface, acoustic profiling
▶ from page 9
- Transverse installation on the top side
▶ Page 6
(possible up to an element height of 290)

Additional layer **z53** h_z 53 mm
Plus layer **p53** h_p 53 mm

Blocking layer h_s 20 mm
Soffit h_u 32 mm

Basic element configuration

Fire resistance REI 90

LIGNO Rippe Q3_z80_p0

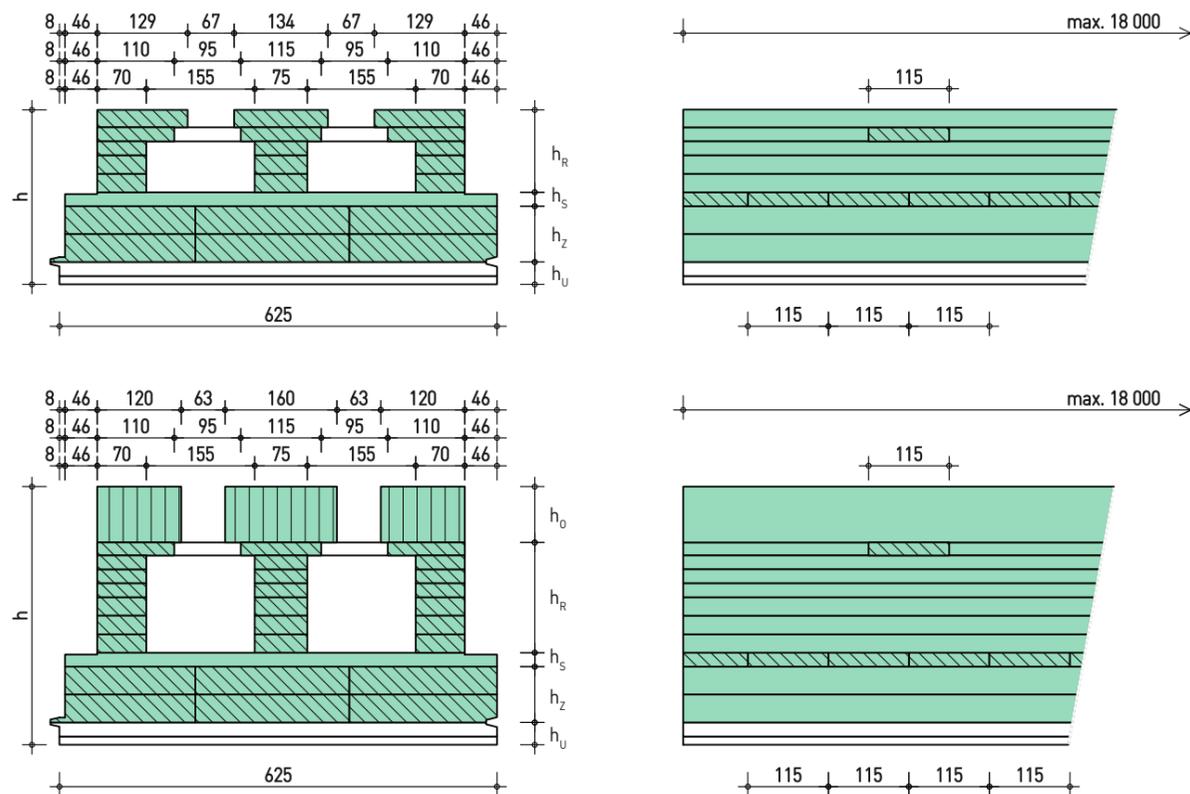
Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight Closed surface	Acoustic surface	Cavity	Bulk weight 1400 kg/m ³
190	≤ 18 m		58.0	81	76	0.025	35
210	≤ 18 m		78.0	85	80	0.038	54
230	≤ 18 m		98.0	89	84	0.050	69
250	≤ 18 m		118.0	93	88	0.063	88
270	≤ 18 m		138.0	96	91	0.076	106
290	≤ 18 m		158.0	100	95	0.089	125
310	≤ 18 m	60	118.0	109	104	0.092	128
330	≤ 18 m	60	138.0	112	107	0.105	147
350	≤ 18 m	60	158.0	116	111	0.118	165
370	≤ 18 m	80	158.0	122	117	0.125	175
390	≤ 18 m	100	158.0	129	124	0.132	185
410	≤ 18 m	120	158.0	135	130	0.139	195
430	≤ 18 m	140	158.0	142	137	0.147	205
450	≤ 18 m	160	158.0	148	143	0.154	215
mm		mm	mm	kg/m ²	kg/m ²	m ³ /m ²	kg/m ²

Additional layer **_z80** h_z 79.5 mm
 No plus layer **_p0** h_p -

Blocking layer h_s 20 mm
 Soffit h_u 32 mm

Configuration variants

-  Visible surface, acoustic profiling
 **▶ from page 9**
-  Larger installation space on the underside
 Improvement of the sound absorption
▶ Page 8
-  Transverse installation on the top side
▶ Page 6
 (possible up to an element height of 290)



Basic element configuration, non-visible for cladding or suspended ceiling

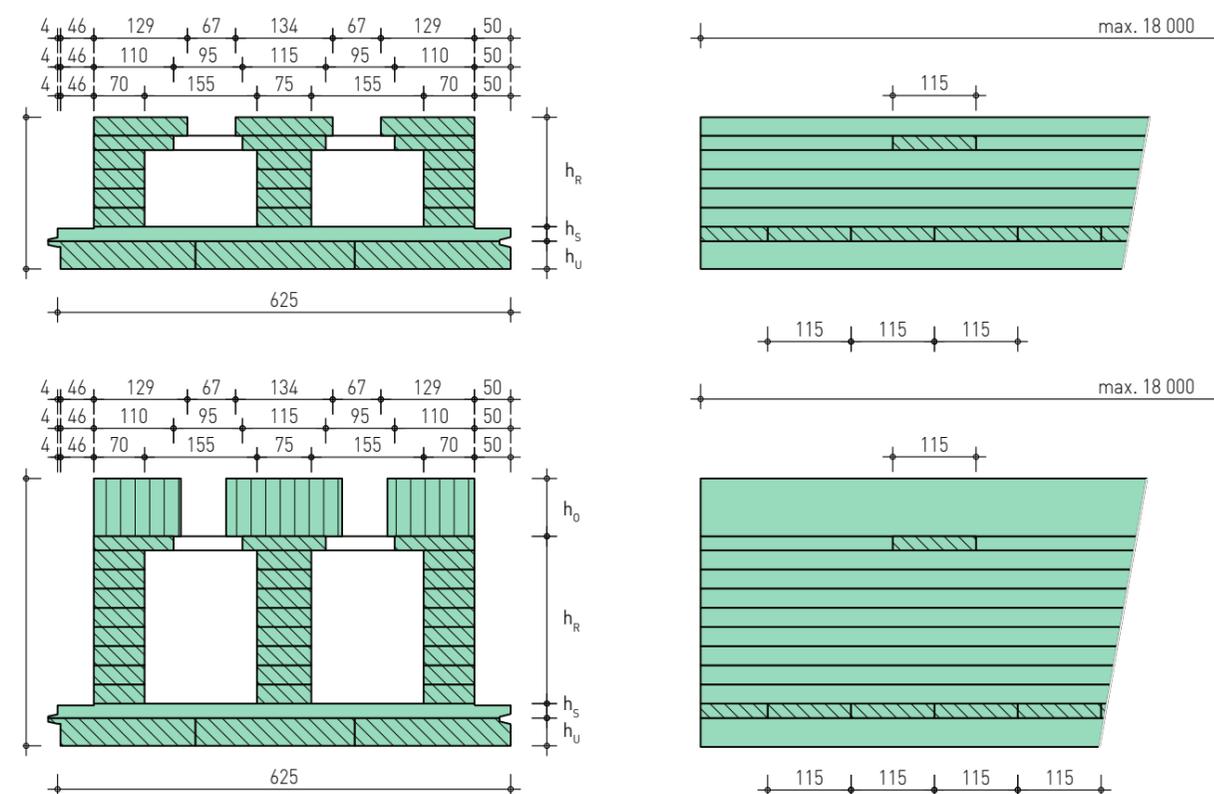
LIGNO Rippe Q3_nsi

Height	Recom- mended maximum length	Upper chord h_0	Web h_R	Dead weight Surface NSI closed	Cavity	Bulk weight 1400 kg/m ³
150	≤ 18 m		91.0	51	0.045	63
170	≤ 18 m		111.0	55	0.058	82
190	≤ 18 m		131.0	58	0.072	100
210	≤ 18 m		151.0	62	0.084	118
230	≤ 18 m		171.0	65	0.098	137
250	≤ 18 m		191.0	69	0.111	155
270	≤ 18 m		211.0	72	0.124	173
290	≤ 18 m		231.0	76	0.137	192
310	≤ 18 m	60	191.0	85	0.140	196
330	≤ 18 m	60	211.0	88	0.153	214
350	≤ 18 m	60	231.0	92	0.166	232
370	≤ 18 m	80	231.0	98	0.173	242
390	≤ 18 m	100	231.0	105	0.180	252
410	≤ 18 m	120	231.0	111	0.188	263
430	≤ 18 m	140	231.0	118	0.195	273
450	≤ 18 m	160	231.0	124	0.202	283
mm		mm	mm	kg/m ²	m ³ /m ²	kg/m ²

Blocking layer h_s 20 mm
 Lower chord h_u 39 mm

Further configuration options

-  Transverse installation on the top side
▶ Page 6
 (possible up to an element height of 290)



Characteristic values Acoustic absorption

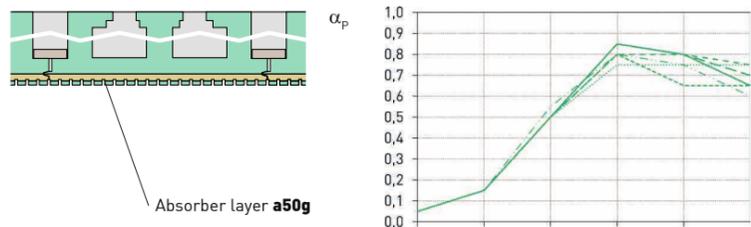


Key absorption figures

Subsequent interior finishing work for room acoustics absorbing suspended ceilings is rendered superfluous if the element is configured with an acoustic slat profile, see [▶ page 9](#). Natural soft wood fibre material is used as the absorber material. To improve the low-frequency properties, optional cavity insulation is inserted in the plus layer if necessary. Test report [▶ www.lignotrend.com](http://www.lignotrend.com)

LIGNO Rippe-x Q3 _z26/z53/z80_p0_a50g

all element heights

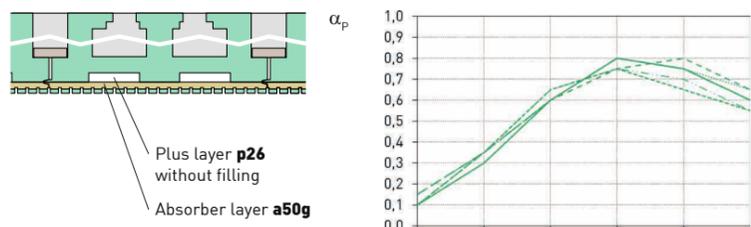


Additional layer is located directly behind the absorber layer, limited low-frequency absorption.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.45	0.55	0.56	D	MH	0.05	0.15	0.50	0.80	0.80	0.75
625-18-6	0.45	0.55	0.56	D		0.05	0.15	0.50	0.85	0.80	0.65
625-23-8	0.45	0.55	0.56	D	MH	0.05	0.15	0.50	0.85	0.80	0.70
625-20-4	0.45	0.55	0.53	D	MH	0.05	0.15	0.50	0.80	0.65	0.65
625-nature-4	0.45	0.55	0.56	D	MH	0.05	0.15	0.50	0.75	0.75	0.75
625-nature-6	0.45	0.55	0.56	D	MH	0.05	0.15	0.55	0.80	0.75	0.60

LIGNO Rippe-x Q3 _z26/z53/z80_p26_a50g

all element heights

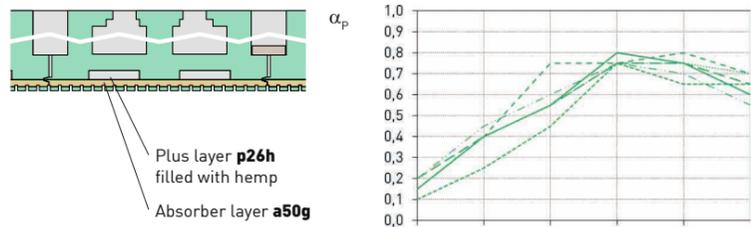


Plus layer with cavity behind the absorber layer, improved low-frequency absorption.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.60	0.60	0.62	C		0.10	0.35	0.60	0.75	0.80	0.65
625-18-6	0.60	0.60	0.62	C		0.10	0.30	0.60	0.80	0.75	0.60
625-23-8	0.60	0.60	0.62	C		0.15	0.35	0.60	0.80	0.75	0.60
625-20-4	0.65	0.60	0.59	C		0.10	0.35	0.65	0.75	0.65	0.55
625-nature-4	0.60	0.60	0.61	C		0.10	0.35	0.60	0.80	0.75	0.65
625-nature-6	0.65	0.60	0.62	C		0.15	0.35	0.65	0.75	0.70	0.55

LIGNO Rippe-x Q3 _z26/z53/z80_p26h_a50g

all element heights

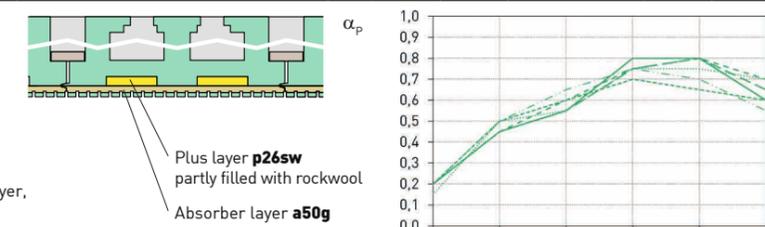


Plus layer with hemp-insulated cavity behind the absorber layer, improved low-frequency absorption.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.60	0.60	0.62	C		0.15	0.40	0.75	0.75	0.80	0.70
625-18-6	0.60	0.60	0.62	C		0.15	0.40	0.55	0.80	0.75	0.60
625-23-8	0.60	0.60	0.62	C		0.20	0.40	0.55	0.75	0.75	0.65
625-20-4	0.50	0.55	0.53	D	MH	0.10	0.25	0.45	0.75	0.65	0.65
625-nature-4	0.60	0.60	0.62	C		0.15	0.40	0.55	0.75	0.75	0.70
625-nature-6	0.65	0.60	0.62	C		0.20	0.45	0.60	0.75	0.70	0.55

LIGNO Rippe-x Q3 _z26/z53/z80_p26sw_a50g

all element heights

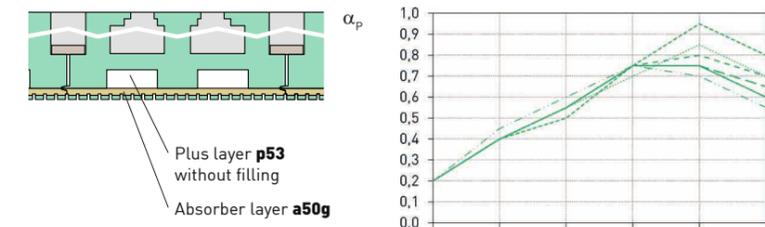


Plus layer with rockwool-insulated cavity behind the absorber layer, improved low-frequency absorption.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.65	0.65	0.65	C		0.20	0.45	0.60	0.75	0.80	0.70
625-18-6	0.65	0.65	0.65	C		0.20	0.45	0.55	0.80	0.80	0.60
625-23-8	0.65	0.65	0.65	C		0.20	0.45	0.55	0.75	0.80	0.65
625-20-4	0.65	0.60	0.62	C		0.20	0.50	0.60	0.70	0.65	0.60
625-nature-4	0.65	0.65	0.64	C		0.15	0.50	0.55	0.75	0.75	0.70
625-nature-6	0.70	0.65	0.65	C		0.20	0.50	0.65	0.75	0.70	0.55

LIGNO Rippe-x Q3 _z26/z53/z80_p53_a50g

all element heights

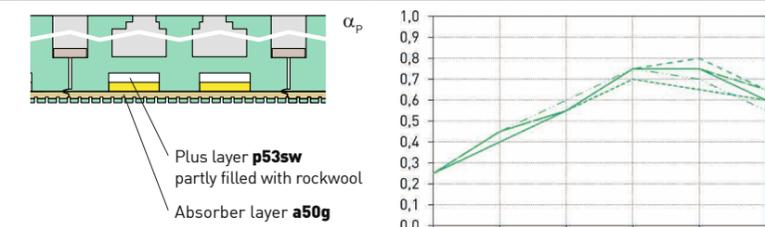


Plus layer with high cavity behind the absorber layer, improved low-frequency absorption.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.60	0.60	0.62	C		0.20	0.40	0.55	0.75	0.80	0.70
625-18-6	0.60	0.60	0.62	C		0.20	0.40	0.55	0.75	0.75	0.60
625-23-8	0.60	0.60	0.62	C		0.20	0.40	0.55	0.75	0.75	0.65
625-20-4	0.60	0.65	0.65	C	H	0.20	0.40	0.50	0.75	0.95	0.80
625-nature-4	0.60	0.60	0.62	C	H	0.20	0.40	0.55	0.70	0.85	0.70
625-nature-6	0.65	0.60	0.62	C		0.20	0.45	0.60	0.75	0.70	0.55

LIGNO Rippe-x Q3 _z26/z53/z80_p53sw_a50g

all element heights



Plus layer with partly rockwool-insulated cavity behind the absorber layer, improved low-frequency absorption.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.65	0.60	0.62	C		0.25	0.45	0.55	0.75	0.80	0.65
625-18-6	0.60	0.60	0.62	C		0.25	0.40	0.55	0.75	0.75	0.60
625-23-8	0.65	0.60	0.62	C		0.25	0.45	0.55	0.75	0.75	0.65
625-20-4	0.65	0.60	0.59	C		0.25	0.45	0.55	0.70	0.65	0.60
625-nature-4	0.65	0.60	0.62	C		0.25	0.45	0.55	0.75	0.75	0.65
625-nature-6	0.65	0.60	0.62	C		0.25	0.45	0.60	0.75	0.70	0.55

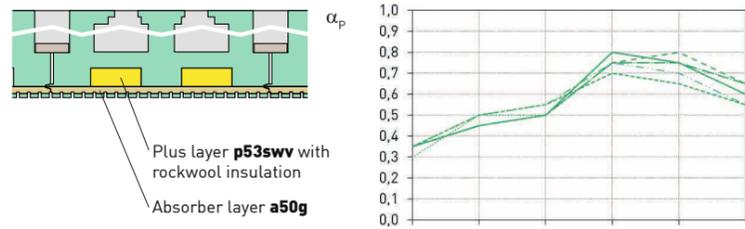
Online room acoustics calculation for investigating the room acoustics properties of rooms

[▶ www.lignotrend.com/raumakustik-rechner](http://www.lignotrend.com/raumakustik-rechner)

Note: This calculation software merely determines the absorber area required for the described cubature and does not make any statement regarding the location of the absorber areas in the room. The results should therefore be regarded as an orientation and are not a substitute for an expert in room acoustics (e.g. specialist engineer).

LIGNO Rippe Q3
_z26/z53/z80_p53swv_a50g

all element heights

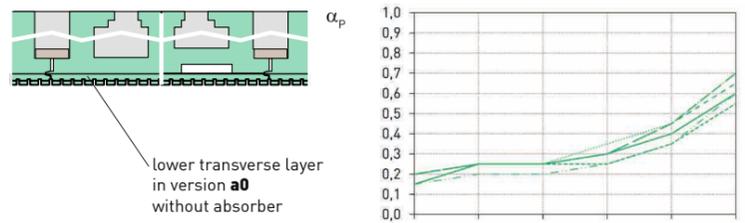


Plus layer with completely rockwool-insulated cavity behind the absorber layer, improved low-frequency absorption.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.60	0.65	0.63	C		0.35	0.45	0.50	0.75	0.80	0.65
625-18-6	0.60	0.65	0.63	C		0.35	0.45	0.50	0.80	0.75	0.60
625-23-8	0.60	0.65	0.63	C		0.35	0.45	0.50	0.75	0.75	0.65
625-20-4	0.65	0.60	0.59	C		0.35	0.50	0.55	0.70	0.65	0.55
625-nature-4	0.60	0.60	0.62	C		0.30	0.50	0.50	0.75	0.75	0.65
625-nature-6	0.65	0.65	0.63	C		0.35	0.50	0.55	0.75	0.70	0.55

LIGNO Rippe Q3
_z26/z53/z80_p0/p26/p53_a0

all element heights



Element without absorber layer. The scoring produces a slight absorption effect.

Profile	α_w	NRC	SAA	SAK	Shape	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
625-12-4	0.30	0.30	0.31	D	H	0.20	0.25	0.25	0.30	0.45	0.65
625-18-6	0.30	0.30	0.30	D	H	0.15	0.25	0.25	0.30	0.40	0.60
625-23-8	0.30	0.30	0.31	D	H	0.20	0.25	0.25	0.30	0.45	0.70
625-20-4	0.30	0.25	0.27	D	H	0.20	0.25	0.25	0.25	0.35	0.55
625-nature-4	0.35	0.30	0.33	D	H	0.20	0.25	0.25	0.35	0.45	0.70
625-nature-6	0.25	0.25	0.26	E	H	0.15	0.20	0.20	0.25	0.35	0.60

Online room acoustics calculation for investigating the room acoustics properties of rooms

► www.tignotrend.com/raumakustik-rechner

Note: This calculation software merely determines the absorber area required for the described cubature and does not make any statement regarding the location of the absorber areas in the room. The results should therefore be regarded as an orientation and are not a substitute for an expert in room acoustics (e.g. specialist engineer).

Sound insulation Requirements



Requirements for airborne and impact sound insulation of ceilings (examples)

Component	Noise protection	according to DIN 4109		according to SIA 181 (2006) ⁴	
		Airborne sound R'_{w}	Impact sound $L'_{n,w}$	Airborne sound D'_i	Impact sound L'
Detached houses: Ceilings	normal	≥ 50 dB ¹	≤ 56 dB ¹	≥ 52 dB	≤ 53 dB
	increased	≥ 55 dB ¹	≤ 46 dB ^{1,2}	≥ 55 dB	≤ 50 dB
Multi-storey houses with apartments / work rooms: Apartment isolating ceiling, ceilings between common rooms	normal	≥ 54 dB	≤ 53 dB	not possible	not possible
	increased	≥ 55 dB ¹	≤ 46 dB ¹	≥ 55 dB	≤ 50 dB
Schools: Ceilings between classrooms or similar rooms	normal	≥ 55 dB	≤ 53 dB	≥ 57 dB	≤ 48 dB
	increased	≥ 55 dB ³	≤ 46 dB ³	≥ 60 dB	≤ 45 dB

¹ Recommendation from Supplement 2 of DIN 4109

² Softly elastic floor coverings may be allowed for

³ Ceiling between classrooms and "particularly loud" rooms

⁴ Values apply to moderate noise sensitivity.

In case of higher sensitivity, the requirements are stricter in each case by 5 dB.

The currently valid DIN 4109 does not yet contain a requirement for taking into account the C_i value. According to SIA 181, it can be taken into account by including it in the usage agreement with the building owner.

Requirements for the airborne sound insulation of exterior components (examples)

according to DIN 4109				according to SIA 181 (2006) ²			
Noise level range [decisive exterior noise level]		Airborne sound attenuation $R'_{w,res}$		Requirements for protection against airborne sound D_e			
		Office rooms	Living rooms, hotel rooms, classrooms	Degree of disturbance due to exterior noise	low sensitivity	medium sensitivity	high sensitivity
I	56 to 60 dB	≥ 30 dB	≥ 30 dB	small	≥ 22 dB	≥ 27 dB	≥ 32 dB
II	61 to 65 dB	≥ 30 dB	≥ 35 dB	considerable to very strong	$\geq L_r - 38$ dB	$\geq L_r - 33$ dB	$\geq L_r - 28$ dB
III	66 to 70 dB	≥ 35 dB	≥ 40 dB		($L_r - 30$ dB)	($L_r - 25$ dB)	($L_r - 20$ dB)
IV	71 to 75 dB	≥ 40 dB	≥ 45 dB	(Values in brackets apply to the night)			
V	76 to 80 dB	≥ 45 dB	≥ 50 dB	L _r Assessment level according to the regulation of the Noise Protection Ordinance			
VI		≥ 50 dB	1				

¹ The requirements must be defined here on the basis of the local conditions.

² The specified values represent the normal requirement, increased requirement in each case 3 dB stricter.

Characteristic values with regard to building physics (heat/humidity)

The usage case of the (upwardly open) LIGNO Rippe cross-laminated timber web element as an exterior component is comparatively rare and usually only occurs in the case of ceilings that run from the interior to the areas of loggias or roof patios.

In this case the Lignotrend consultants and the engineers from the Lignotrend internal Technical Service can also provide **thermal conductivities** and **vapour diffusion resistance figures** for ceiling elements as well as support with the detailed planning where necessary.

Noise protection characteristic values

Structural ceilings

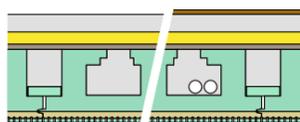
Impact sound and airborne sound with structural ceilings

Ceiling components made of LIGNO achieve very good values for the standard impact sound level $L_{n,w}$ and for the sound insulation value R_w , even without cladding on the underside. If implemented appropriately, separating ceilings with increased noise protection can also be realised. Only those products that are equivalent in terms of the noise-relevant characteristic values to the products specified in the test reports (e.g. density, dynamic stiffness) may be used in the structure!

Specified values are laboratory values; **a reserve is therefore to be taken into account in the verification for the secondary sound paths!** The following must be adhered to: existing $R'_w \geq$ required R'_w as well as existing $L'_{n,w} \leq$ required $L'_{n,w}$.

Test report ► www.lignotrend.com

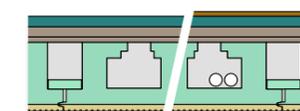
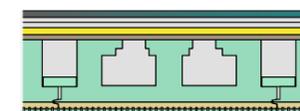
Structural ceilings with cement screed



Covering	-	-	Floating covering
Screed	50 mm Cement screed	50 mm Cement screed	50 mm Cement screed
Impact sound	40/35 mm Mineral fibre impact sound insulation Isover Akustic EP1 (dyn. rigidity $s' = 5 \text{ MN/m}^3$)	35/30 mm Mineral fibre impact sound insulation G+H 73T (Isover Akustic EP1, dyn. rigidity $s' = 5 \text{ MN/m}^3$)	35/30 mm Mineral fibre impact sound insulation G+H 73T (Isover Akustic EP1, dyn. rigidity $s' = 5 \text{ MN/m}^3$)
Pressure distribution	15 mm Pressure distribution board soft wood fibre, Gutex Standard-n	15 mm Pressure distribution board soft wood fibre, Gutex Standard-n	15 mm Pressure distribution board soft wood fibre, Gutex Standard-n
Load-bearing element	LIGNO Rippe Q3-x Filling according to left-hand gap	LIGNO Rippe Q3-x Filling according to left-hand gap	LIGNO Rippe Q3-x Filling according to left-hand gap
196 kg/m² Limestone gravel 1400 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-330 LIGNO Rippe Q3-x_z53_p0-370	$L_{n,w} = 37 \text{ dB}$ $C_{1,50-2500} = +7 \text{ dB}$ $R_w = 78 \text{ dB}$ 168 30649/X15+X16		
147 kg/m² Limestone gravel 1400 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-250 LIGNO Rippe Q3-x_z53_p26-330	$L_{n,w} = 40 \text{ dB}$ $C_{1,50-2500} = +8 \text{ dB}$ $C_1 = 0 \text{ dB}$ $R_w = 75 \text{ dB}$ 168 30649/X11+X12		
94 kg/m² Limestone gravel 1400 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-210 LIGNO Rippe Q3-x_z53_p0-230		$L_{n,w} = 45 \text{ dB}$ $C_{1,50-2500} = +7 \text{ dB}$ $C_1 = 0 \text{ dB}$ $R_w > 70 \text{ dB}$ 980202.T22-60	$L_{n,w} = 37 \text{ dB}$ $C_{1,50-2500} = +11 \text{ dB}$ $C_1 = 0 \text{ dB}$ $R_w > 70 \text{ dB}$ 980202.T22-50 980202.L22-50
83 kg/m² Expanded clay 750 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-250 LIGNO Rippe Q3-x_z53_p26-330	$L_{n,w} = 45 \text{ dB}$ $C_{1,50-2500} = +8 \text{ dB}$ $C_1 = 0 \text{ dB}$ $R_w = 73 \text{ dB}$ 168 30649/X11+X12		
without filling	$L_{n,w} = 55 \text{ dB}$ $C_{1,50-2500} = +8 \text{ dB}$ $C_1 = 0 \text{ dB}$ $R_w = 66 \text{ dB}$ 168 30649/X11+X12		



Structural ceilings with dry screed



Covering	-	-	Floating covering
Screed	18 mm Precast screed Knauf GIFAfloor Hugo L18	30 mm Dry screed element Fermacell	30 mm Dry screed element Fermacell
Impact sound	32/30 mm Sound insulation board PhoneStar Tri Wolf Bavaria (dyn. rigidity $s' = 32.6 \text{ MN/m}^3$) 20 mm Mineral fibre impact sound insulation Isover Akustic EP3 (dyn. rigidity $s' = 40 \text{ MN/m}^3$)	32/30 mm Soft wood fibre impact sound insulation, Gutex Thermofloor	32/30 mm Soft wood fibre impact sound insulation, Gutex Thermofloor
Pressure distribution	15 mm Pressure distribution board soft wood fibre, Gutex Standard-n	15 mm Pressure distribution board soft wood fibre, Gutex Standard-n	15 mm Pressure distribution board soft wood fibre, Gutex Standard-n
Load-bearing element	LIGNO Rippe Q3-x Filling according to left-hand gap	LIGNO Rippe Q3-x Filling according to left-hand gap	LIGNO Rippe Q3-x Filling according to left-hand gap
94 kg/m² Limestone gravel 1400 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-210 LIGNO Rippe Q3-x_z53_p0-230		$L_{n,w} = 49 \text{ dB}$ $C_{1,50-2500} = +6 \text{ dB}$ $R_w > 67 \text{ dB}$ 980202.T22-110 980202.L22-110	$L_{n,w} = 47 \text{ dB}$ $C_{1,50-2500} = +8 \text{ dB}$ $R_w > 67 \text{ dB}$ 980202.T22-120
98 kg/m² Limestone gravel 1400 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-210 LIGNO Rippe Q3-x_z53_p0-230		$L_{n,w} = 44 \text{ dB}$ $C_{1,50-2500} = +6 \text{ dB}$ $C_1 = +2 \text{ dB}$ $R_w = 69 \text{ dB}$ 18-002898-PR02 PB X03-F03-04-de-01	NEW

Secondary sound paths

The extent of the secondary sound paths depends on the implementation of the ceiling itself at the respective node as well as the structure and sound insulation of the adjoining wall components.

The complete interruption of the beam at delicate detail points is usually most favourable. If that is not possible, a more favourable characteristic value can be achieved by use of the gravel filling and/or suitable isolation of the compartments.

On request we will provide a **combination matrix for the respectively relevant flank transmission assessment variable $D_{n,f,w}$** for the verification of many combinations of LIGNO Rippe/Decke and cross-laminated timber walls in different thicknesses as well as timber frame walls.

The engineers from our internal Technical Service will advise you on the carrying out of the verification or implementation.

Taking into account walking noises

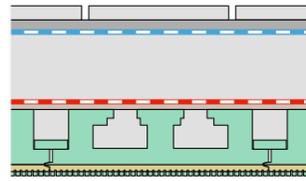
Consideration of low sound frequencies is recommended for a good sound insulation quality of timber ceilings in order to be able to estimate how well the transmission of muffled, rumbling walking noises is prevented. Although there is no requirement (yet) in the standards, the sum of impact sound level and spectrum adaptation value $L_{n,w} + C_{1,50-2500}$ can be taken as a comparison value for two component superstructures.

Noise protection characteristic values

Roof patios, sound-insulating flat roofs



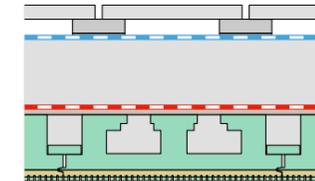
Roof patios with pebbles



NEW

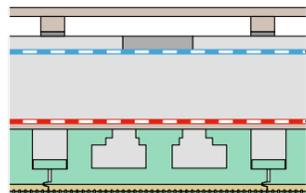
Covering	40 mm	Concrete slabs, 91 kg/m ²	40 mm	Concrete slabs, 91 kg/m ²	40 mm	Concrete slabs, 91 kg/m ²
	30 mm	Fine aggregate (grading 5/8), 39 kg/m ²	30 mm	Fine aggregate (grading 5/8), 39 kg/m ²	30 mm	Fine aggregate (grading 5/8), 39 kg/m ²
Supports					5 mm	Attic protection mat, ZinCo SSM 45
Roof sealing	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra
Impact sound	140 mm	Flat roof insulating board PUR (dyn. rigidity s' = 28 MN/m ³)	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)
Pressure distribution	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)
Load-bearing element	LIGNO Rippe Q3-x Filling according to left-hand gap		LIGNO Rippe Q3-x Filling according to left-hand gap		LIGNO Rippe Q3-x Filling according to left-hand gap	
98 kg/m² Limestone gravel 1400 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-210 LIGNO Rippe Q3-x_z53_p0-230	L_{n,w} = 46 dB C _{1,50-2500} = +7 dB C ₁ = +1 dB R_w = 65 dB		L_{n,w} = 44 dB C _{1,50-2500} = +9 dB C ₁ = +1 dB R_w = 66 dB		L_{n,w} = 40 dB C _{1,50-2500} = +11 dB C ₁ = 0 dB R_w = 57 dB	
	18-002112-PR01 PB 14-F01-04-de-01		18-002112-PR01 PB 15-F01-04-de-01		18-002112-PR01 PB 30-F01-04-de-01	

Roof patios on paving support pads



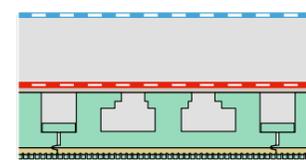
Covering	40 mm	Concrete slabs, 91 kg/m ²	40 mm	Concrete slabs, 91 kg/m ² on paving support pads PA20plus	40 mm	Concrete slabs, 91 kg/m ² on paving support pads PA20plus
	30 mm	Fine aggregate (grading 5/8), 39 kg/m ²	30 mm	Fine aggregate (grading 5/8), 39 kg/m ²	30 mm	Fine aggregate (grading 5/8), 39 kg/m ²
Supports					12 mm	Sylomer support s' < 40MN/m ³
Roof sealing	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra
Impact sound	58 mm	Patio insulating board UltraVIP (dyn. rigidity s' = 48 MN/m ³)	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)
Pressure distribution	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)
Load-bearing element	LIGNO Rippe Q3-x Filling according to left-hand gap		LIGNO Rippe Q3-x Filling according to left-hand gap			
L_{n,w} = 44 dB C _{1,50-2500} = +9 dB C ₁ = 0 dB R_w = 55 dB	L_{n,w} = 38 dB C _{1,50-2500} = +6 dB C ₁ = -1 dB R_w = 51 dB		L_{n,w} = 43 dB C _{1,50-2500} = +5 dB C ₁ = -2 dB R_w = 51 dB			
	18-002112-PR01 GAS 01-F01-04-de-01 (TE1)		18-002112-PR01 PB 17-F01-04-de-01		18-002112-PR01 PB 16-F01-04-de-01	

Roof patios with wooden grid



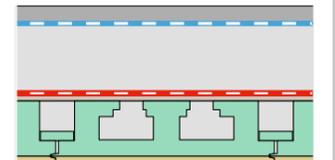
Covering	26 mm	Larch floorboards	26 mm	Larch floorboards	26 mm	Larch floorboards
	44 mm	Support wedges	44 mm	Support wedges	44 mm	Support wedges
Supports					12 mm	Sylomer support s' < 40MN/m ³
					40 mm	Concrete slabs, 50 kg/m ² , in between Fine aggregate (grading 5/8), 39kg kg/m ² .
Roof sealing	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra
Impact sound	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)
Pressure distribution	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)
Load-bearing element	LIGNO Rippe Q3-x Filling according to left-hand gap		LIGNO Rippe Q3-x Filling according to left-hand gap		LIGNO Rippe Q3-x Filling according to left-hand gap	
98 kg/m² Limestone gravel 1400 kg/m ³ e.g. LIGNO Rippe Q3-x_z26_p0-210 LIGNO Rippe Q3-x_z53_p0-230	L_{n,w} = 35 dB C _{1,50-2500} = +14 dB C ₁ = +5dB R_w = 64 dB		L_{n,w} = 40 dB C _{1,50-2500} = +10 dB C ₁ = +5 dB R_w = 55 dB		R_w = 45 dB	
	18-002112-PR01 PB 18-F01-04-de-01		18-002112-PR01 PB 29-F01-04-de-01		18-002112-PR01 GAS 01-F01-04-de-01 (FA1)	

Membrane roof



Roof sealing	2.5 mm	EPDM roofing felt, alwitra
Impact sound	200 mm	Flat roof insulating board Rockwool Hardrock 040 (dyn. rigidity s' = 20 MN/m ³)
Pressure distribution	22 mm	OSB 4 TOP (Egger)
Load-bearing element	LIGNO Rippe Q3-x Filling according to left-hand gap	
R_w = 56 dB	L_{n,w} = 64 dB	
	18-002112-PR01 GAS 01-F01-04-de-01 (FA1)	

Roof with pebble covering



Covering	50 mm	Pebble grading 4/16 87 kg/m ²	50 mm	Pebble grading 4/16 87 kg/m ²	50 mm	Pebble grading 4/16 87 kg/m ²
Supports					5 mm	Attic protection mat, ZinCo SSM 45
Roof sealing	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra	2.5 mm	EPDM roofing felt, alwitra
Impact sound	200 mm	Flat roof insulating board Rockwool Hardrock 040 (dyn. rigidity s' = 20 MN/m ³)	200 mm	Flat roof insulating board Rockwool Hardrock 040 (dyn. rigidity s' = 20 MN/m ³)	200 mm	Flat roof insulating board EPS 035 DAA (dyn. rigidity s' = 30 MN/m ³)
Pressure distribution	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)	22 mm	OSB 4 TOP (Egger)
Load-bearing element	LIGNO Rippe Q3-x Filling according to left-hand gap		LIGNO Rippe Q3-x Filling according to left-hand gap		LIGNO Rippe Q3-x Filling according to left-hand gap	
R_w = 56 dB	R_w = 64 dB		R_w = 55 dB		R_w = 64 dB	
	18-002112-PR01 GAS 01-F01-04-de-01 (FA1)		18-002112-PR01 GAS 01-F01-04-de-01 (FE1)		18-002112-PR01 GAS 01-F01-04-de-01 (FD1)	

Plate characteristic values LIGNO Rippe Q3_r25 and _r50

LIGNO Rippe Q3_r25										
_z0_p0_NSi			_z0_p0		_z26_p0		_z26_p26		_z26_p53	
$V_{R,k,xy} = 31.8 \text{ kN}$ $GA_{ef} = 34916 \text{ kN}$			$V_{R,k,xy} = 33.1 \text{ kN}$ $GA_{ef} = 14203 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$	
Height	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$
150	52.4	32.3	114.1	70.2	91.7	56.4	108.9	67.0		
170	67.1	41.3	128.8	79.3	106.3	65.4	123.5	76.0		
190	81.4	50.1	144.0	88.6	121.0	74.5	138.2	85.1		
210	96.1	59.1	158.7	97.7	135.3	83.3	153.4	94.4	171.5	105.5
230	110.8	68.2	173.4	106.7	150.0	92.3	168.1	103.4	186.2	114.6
250	125.4	77.2	188.1	115.7	164.7	101.3	182.8	112.5	200.9	123.6
270	139.8	86.0	202.4	124.5	179.4	110.4	197.4	121.5	215.5	132.6
290	154.4	95.0	217.0	133.6	193.7	119.2	211.8	130.3	229.8	141.4
mm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm

LIGNO Rippe Q3_r50										
_z0_p0_NSi			_z0_p0		_z26_p0		_z26_p26		_z26_p53	
$V_{R,k,xy} = 31.8 \text{ kN}$ $GA_{ef} = 34916 \text{ kN}$			$V_{R,k,xy} = 33.1 \text{ kN}$ $GA_{ef} = 14203 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$	
Height	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$
150	52.4	32.3	114.1	70.2	91.7	56.4	108.9	67.0		
170	67.1	41.3	128.8	79.3	106.3	65.4	123.5	76.0		
190	81.4	50.1	144.0	88.6	121.0	74.5	138.2	85.1		
210	96.1	59.1	158.7	97.7	135.3	83.3	153.4	94.4	171.5	105.5
230	110.8	68.2	173.4	106.7	150.0	92.3	168.1	103.4	186.2	114.6
250	125.4	77.2	188.1	115.7	164.7	101.3	182.8	112.5	200.9	123.6
270	139.8	86.0	202.4	124.5	179.4	110.4	197.4	121.5	215.5	132.6
290	154.4	95.0	217.0	133.6	193.7	119.2	211.8	130.3	229.8	141.4
mm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm

LIGNO Rippe Q3_r25										
_z53_p0			_z53_p26		_z53_p53		_z80_p0		_z80_p26	
$V_{R,k,xy} = 37.5 \text{ kN}$ $GA_{ef} = 41169 \text{ kN}$			$V_{R,k,xy} = 37.5 \text{ kN}$ $GA_{ef} = 41169 \text{ kN}$		$V_{R,k,xy} = 37.5 \text{ kN}$ $GA_{ef} = 41169 \text{ kN}$		$V_{R,k,xy} = 48.1 \text{ kN}$ $GA_{ef} = 52813 \text{ kN}$		$V_{R,k,xy} = 48.1 \text{ kN}$ $GA_{ef} = 52813 \text{ kN}$	
Height	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$
170	139.9	86.1								
190	154.6	95.1								
210	169.8	104.5	187.9	115.6	206.0	126.8	205.3	126.3		
230	184.5	113.5	202.6	124.7	220.7	135.8	220.0	135.4	242.3	149.1
250	199.2	122.6	217.2	133.7	235.3	144.8	234.6	144.4	257.0	158.1
270	213.8	131.6	231.9	142.7	250.0	153.9	249.3	153.4	271.6	167.2
290	228.1	140.4	246.2	151.5	264.3	162.7	263.6	162.2	285.9	176.0
mm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm

LIGNO Rippe Q3_r50										
_z0_p0_NSi			_z0_p0		_z26_p0		_z26_p26		_z26_p53	
$V_{R,k,xy} = 31.8 \text{ kN}$ $GA_{ef} = 34916 \text{ kN}$			$V_{R,k,xy} = 33.1 \text{ kN}$ $GA_{ef} = 14203 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$		$V_{R,k,xy} = 27.1 \text{ kN}$ $GA_{ef} = 29741 \text{ kN}$	
Height	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$
190	62.0	38.1	124.6	76.7	100.7	62.0				
210	76.6	47.2	139.3	85.7	115.9	71.3	134.0	82.4	152.1	93.6
230	91.3	56.2	153.9	94.7	130.6	80.3	148.6	91.5	166.7	102.6
250	106.0	65.2	168.6	103.8	145.2	89.4	163.3	100.5	181.4	111.6
270	120.3	74.0	182.9	112.6	159.9	98.4	178.0	109.5	196.1	120.7
290	135.0	83.1	197.6	121.6	174.2	107.2	192.3	118.3	210.4	129.5
mm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm

LIGNO Rippe Q3_r50										
_z53_p0			_z53_p26		_z53_p53		_z80_p0		_z80_p26	
$V_{R,k,xy} = 37.5 \text{ kN}$ $GA_{ef} = 41169 \text{ kN}$			$V_{R,k,xy} = 37.5 \text{ kN}$ $GA_{ef} = 41169 \text{ kN}$		$V_{R,k,xy} = 37.5 \text{ kN}$ $GA_{ef} = 41169 \text{ kN}$		$V_{R,k,xy} = 48.1 \text{ kN}$ $GA_{ef} = 52813 \text{ kN}$		$V_{R,k,xy} = 48.1 \text{ kN}$ $GA_{ef} = 52813 \text{ kN}$	
Height	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$	I_z	$M_{R,k,z}$
210	150.4	92.5	168.4	103.7						
230	165.0	101.6	183.1	112.7	200.3	123.3	200.5	123.4	221.9	136.6
250	179.7	110.6	197.8	121.7	215.0	132.3	215.2	132.4	236.6	145.6
270	194.4	119.6	212.5	130.8	229.7	141.3	229.9	141.5	251.3	154.6
290	208.7	128.4	226.8	139.6	244.9	150.7	244.2	150.3	266.5	164.0
mm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm	10^3 cm^4	kNm

Design proposals Wall connections

Connection to solid timber wall Elements with closed surface

Connection to solid timber wall Elements with acoustic profile

Connection to timber frame wall with over-insulation

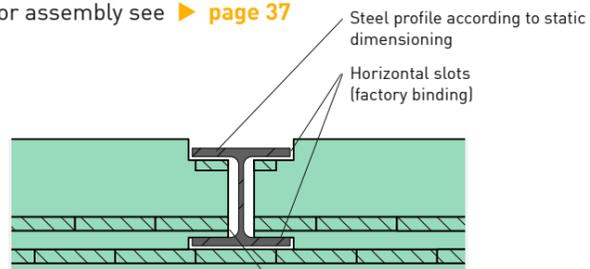
Design proposals

Joists, wall supports

Cut-outs

Flush-with-the-ceiling joist (steel profile)

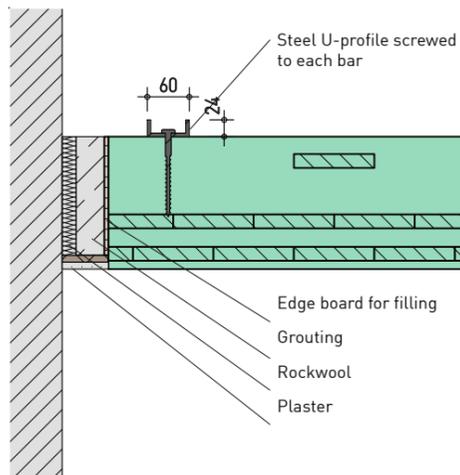
A continuous ceiling element, for assembly see [▶ page 37](#)



- Assembly procedure:
1. Laying on temporary yoke
 2. On-site vertical cut for steel bar
 3. Insert steel beam and line

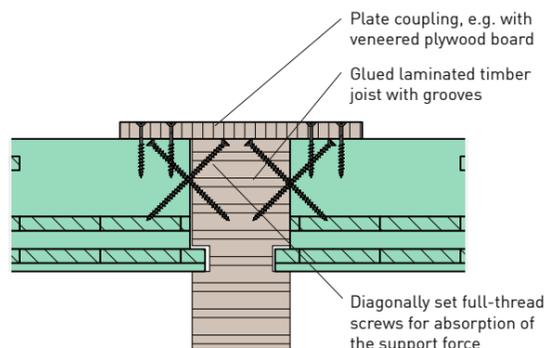
Chimney cut-out

Elements with closed surface



Flush-with-the-ceiling joist (glued laminated timber)

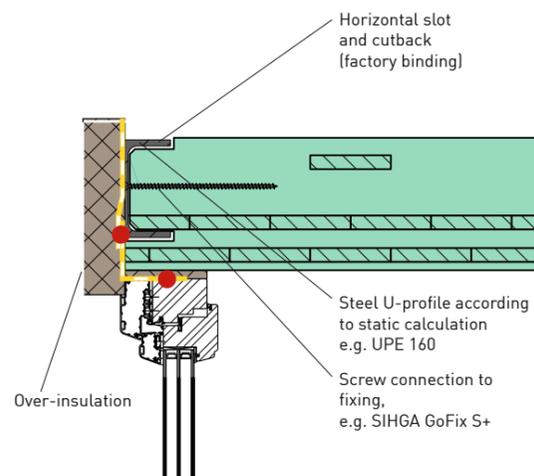
Full-thread screws, diagonal



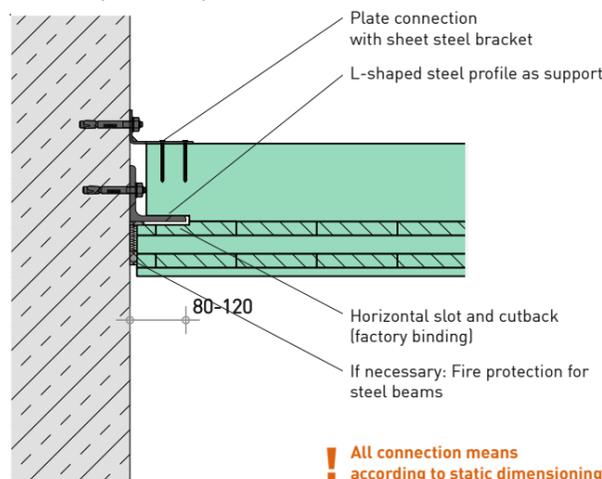
! Joist and connection means according to static dimensioning

Flush-with-the-ceiling window lintel / edge joist

Elements with closed surface



Wall support, concrete wall with L-shaped steel profile



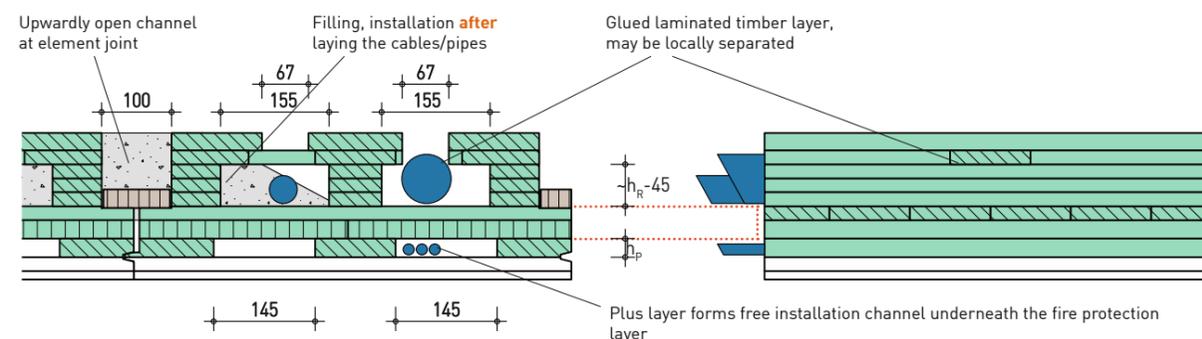
! All connection means according to static dimensioning

Cable/pipe layout

Installation options

Longitudinal installation (e.g. LIGNO Rippe Q3_z26_p26)

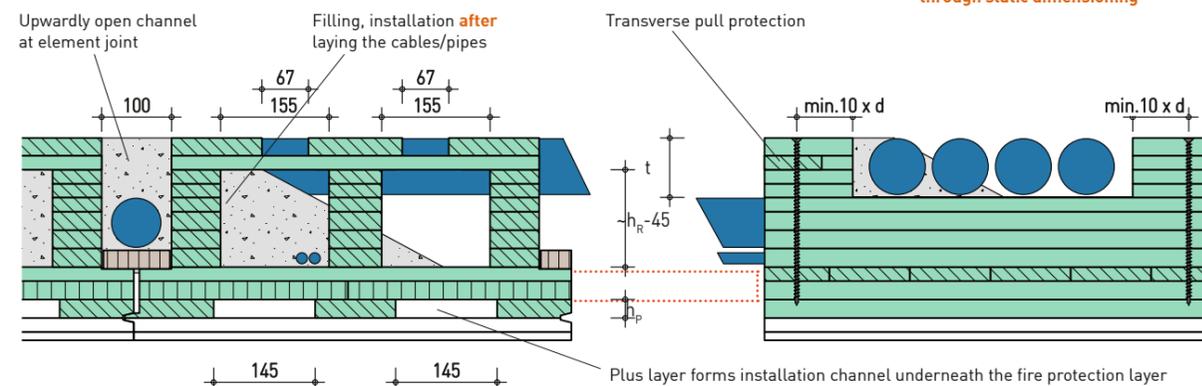
above and below the fire protection layer in existing channels



Longitudinal and transverse installation (e.g. LIGNO Rippe Q3_z26_p26)

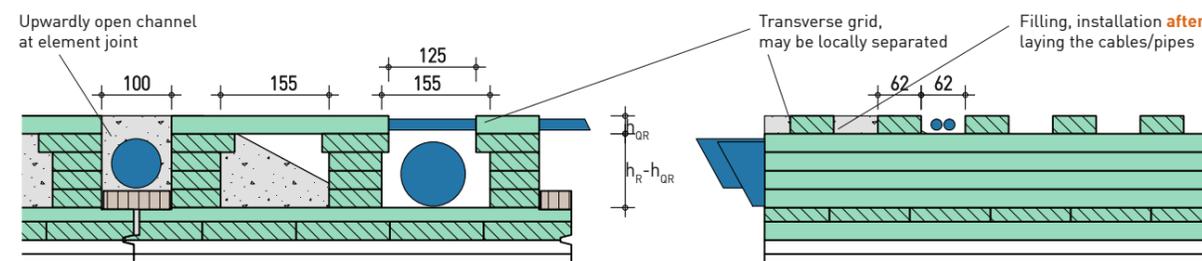
with additional top-sided jaggging and transverse pull protection

! Position and depth of the jaggging are limited – definition must take place through static dimensioning



Longitudinal and transverse installation (e.g. LIGNO Rippe Q3_r25_z26_p0)

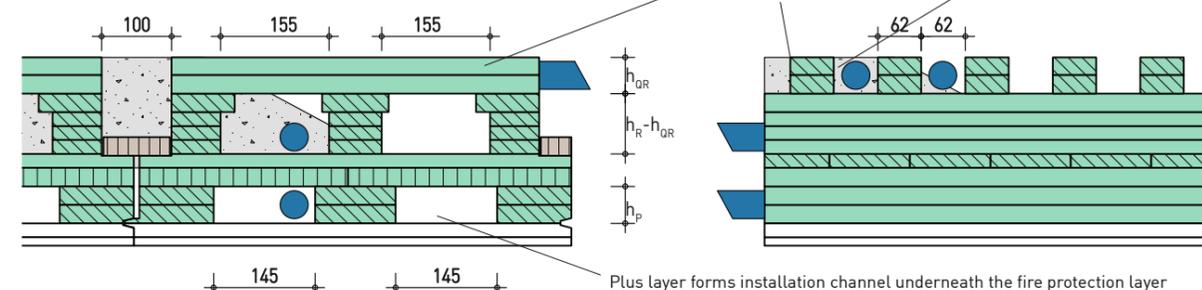
in transverse grid and existing channels, configuration according to [▶ Seite 6](#)



Longitudinal and transverse installation in LIGNO Rippe Q3_r50_z26_p53)

above the fire protection level in the transverse grid and existing channels, underneath in the plus layer, configuration according to [▶ Seiten 6 and 8](#)

! Position and depth of the jaggging are limited – definition must take place through static dimensioning



Cable/pipe layout Fire protection compatible bulkhead



Tested detailed solutions

For the feeding of cables/pipes of various types through ceiling components of the fire resistance classes REI 60 and REI 90, tested solutions were developed with the bulkhead manufacturer HILTI. For a detailed report, see ► [Data sheet "Fire protection compatible cable/pipe layout"](#).

Assembly procedure general



Step 1: Laying

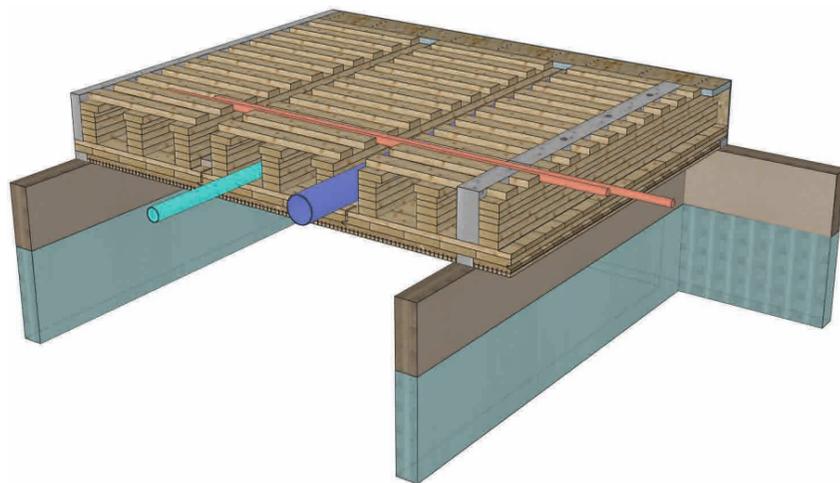
The ceiling elements are laid strip-wise and pulled together laterally – if necessary, a rafter or a clamp can be used as an aid. After aligning the elements, each element is fixed to the walls.

Step 2: Plate formation

After checking the soffit, the butt boards can be inserted and fixed (see ► [page 28](#)). If not factory-fitted, edge boards are attached to prevent the filling from flowing out later. The following storey can be erected.

Step 3: Installation of cables/pipes (after completion of the building shell)

The cables/pipes are installed in the longitudinal and transverse channels.
For available installation area, see ► [page 33](#).

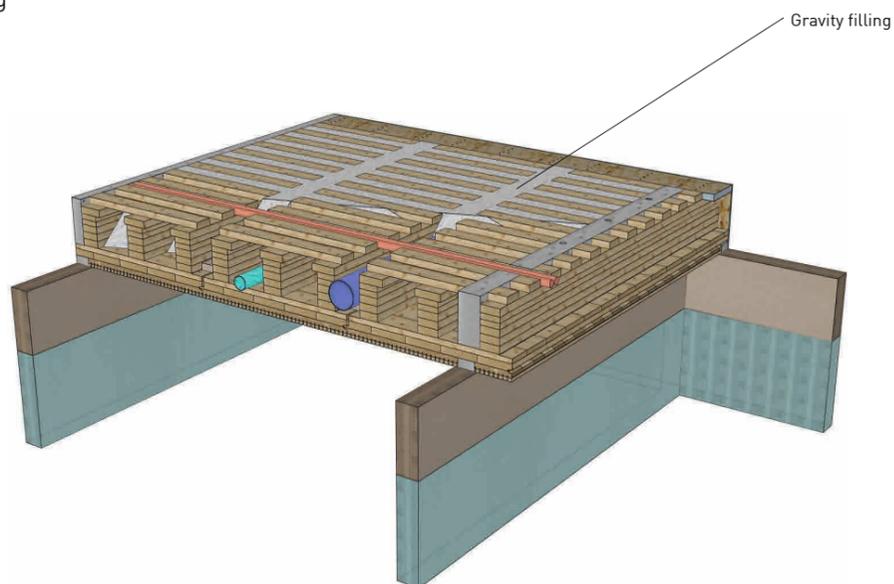


Step 4: Gravel filling and ceiling construction

After installing the cables/pipes, the cavities are filled and the floor structure is installed with impact sound insulation and covering. Please note the material specifications for tested noise protection characteristic values, see ► [page 23](#).

Installation procedure for limestone gravel:

- Blowing in from silo vehicle (e.g. Lignotrend blowing service)
- Pouring from big bag
- Bagged goods



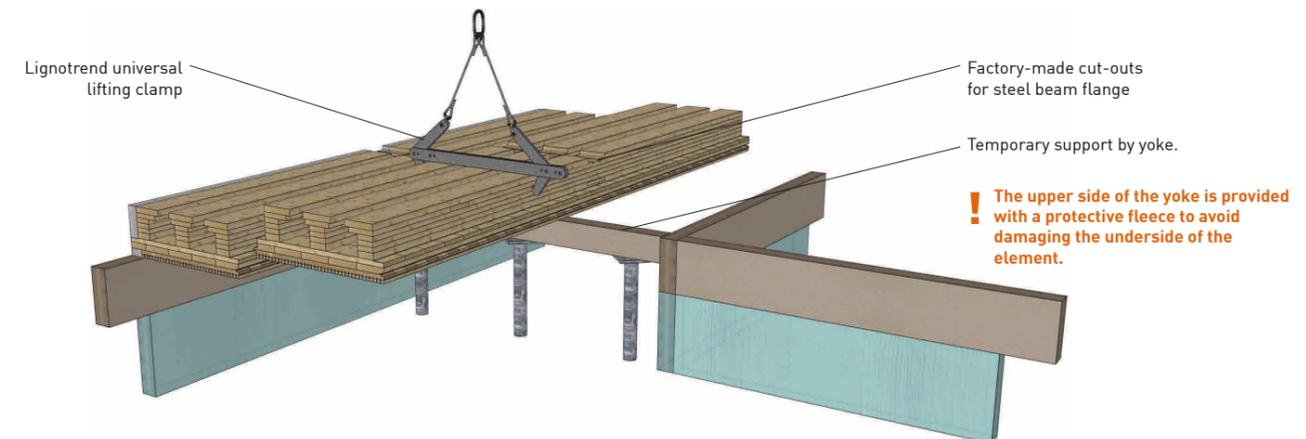
Assembly procedure Flush-with-the-ceiling steel girders



Step 1: Yoke preparation and installation

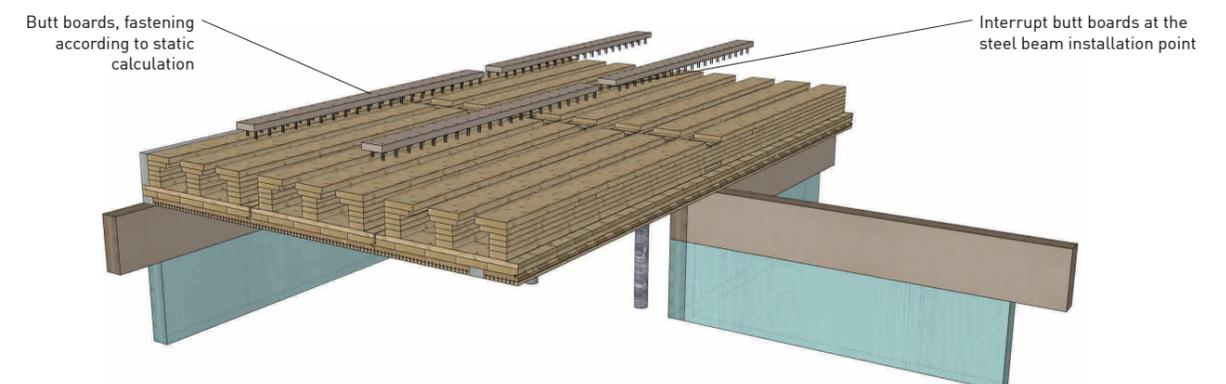
A yoke is erected and levelled at the hypothetical support height in the axis of the steel beam that is to be installed later. Subsequently, the ceiling elements can be installed following the normal procedure.

For construction details, see ► [page 32](#).



Step 2: Fixing the ceiling

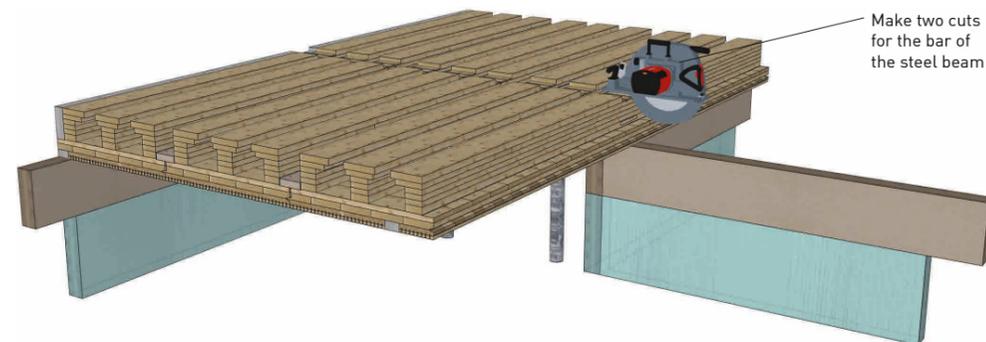
The ceiling plate is fixed to the wall construction, butt boards installed.



HOTLINE
in case of questions about
installation
+49 7755 9200-0

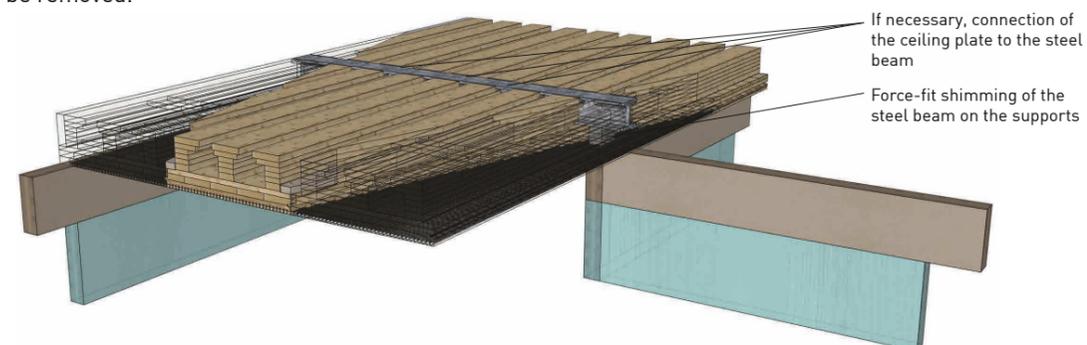
Step 3: Cut for steel bar

For the installation of the steel profile, the ceiling elements in the beam axis are separated on site.

**Step 4: Support of steel beam, removal of yoke**

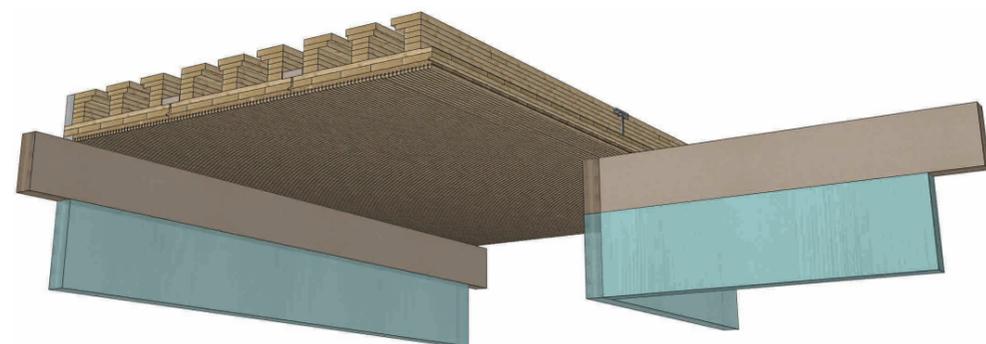
The steel beam is shimmed with a force fit at its support points. If statically foreseen, the ceiling plate is connected via the steel beam.

The yoke can be removed.

**Step 5: Result: Continuous soffit**

Without changing the laying direction, a continuous soffit is created.

The steel beam is located, protected against fire, behind the fire protection layer; coating is not necessary.



Processing instructions

Incoming goods / unloading

- Unload the elements from the truck pallet by pallet if possible
- When unloading with a strap:
Insert a board underneath so that the edges of the visible surface are not damaged

**Intermediate storage**

- Store protected against splash water and level on suitable support wedges
- Protect against moisture and long-term solar irradiation
- No long-term outdoor storage!
(also not under foil, otherwise danger of formation of dew and mould!)

**Assembly**

- To protect the visible surface, use only the illustrated or equivalent lifting tools
- For protection against dirt, wear clean gloves when assembling

**Weather protection**

- **Keep a large tarpaulin at the ready (for use in case of thunderstorms, for example)**
- **Apply the first sealing layer (e.g. weatherproof vapour barrier) as soon as possible after assembly.**

Coupling to the plate

- Fastening with clamps according to statics, see also ► page 24. Plate connection to wall construction with screws according to statics.
- The butt boards are used as boards for the packaging pallets when delivering.
Use the dismantled pallets for the element joint.

Important note:

- **When installing elements with acoustic profile, attention must be paid to the width of the acoustic joint in the butt joint.**
- **Before fixing each element: check the butt joint from the underside of the ceiling!**

In addition, the general application notes on Lignotrend cross-laminated timber products are to be observed.

► **Assembly hotline +49 (0) 77 55 – 92 00-0**

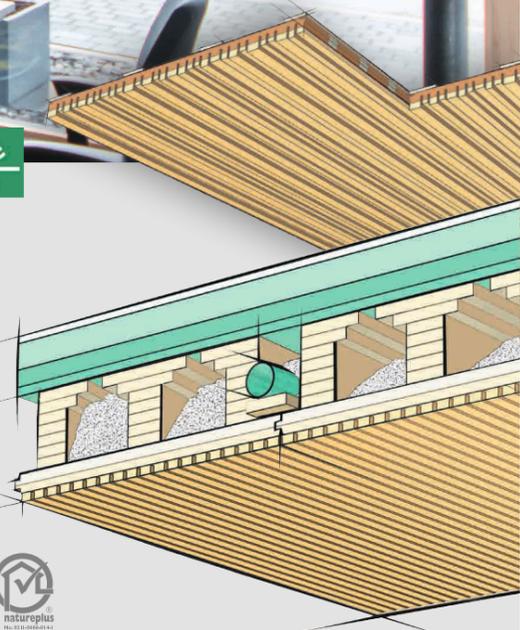


Load-bearing roof component with Akustik nature:3D profile (Officed building in Breitnau, planning: faller³, Breitnau).



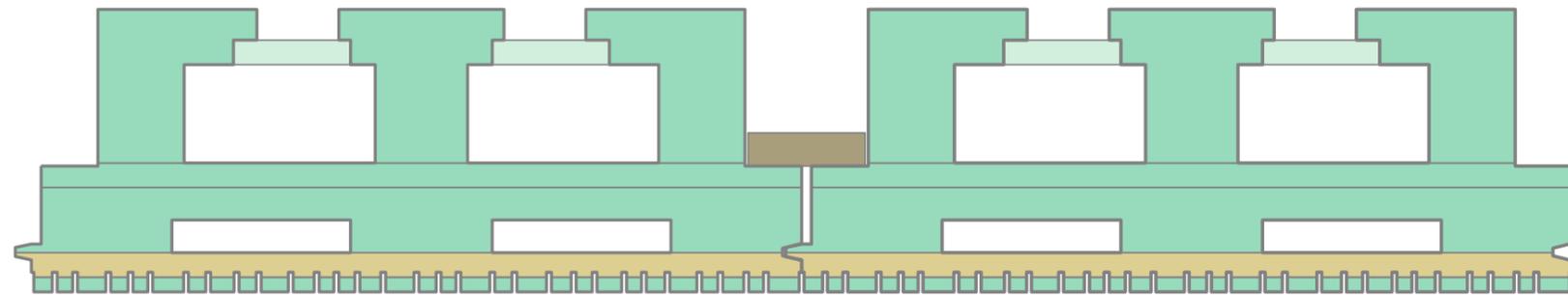
With the new **Akustik nature:3D** surface option, LIGNO glued laminated timber enters the third dimension - on all solid **web** and box elements up to building class 5, configured individually for your construction requirements:

- with **increased noise protection**, including against walking noises
- with fire resistance **up to REI 90**
- **architecturally** appealing with knotless surfaces, acoustically active if desired
- **Harmless in terms of building biology**



LIGNO Rippe-x

Technical data

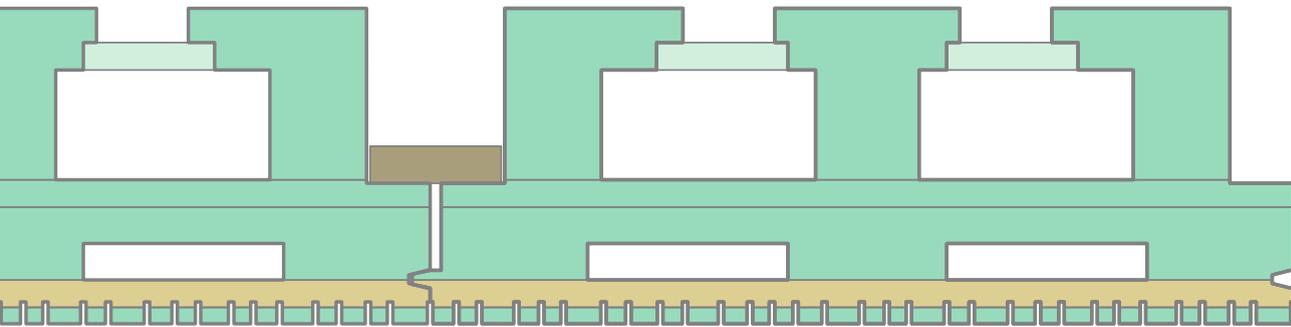


Configurable cross-laminated timber web element for sound-insulating structural ceiling components



LIGNO Rippe-x

Technical data



Configurable cross-laminated timber **web** element
for sound-insulating structural ceiling components



LIGNO[®]
Configurable Cross-Laminated Timber