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European Technical Assessment

ETA-11/0137
of 27.08.2025

General part

Technical Assessment Body issuing the European Technical Assessment

Österreichisches Institut für Bautechnik (OIB)
Austrian Institute of Construction Engineering

Trade name of the construction product

LIGNATUR-box element (LKE), -surface element (LFE) and -shell element (LSE)

Product family to which the construction product belongs

Prefabricated wood-based loadbearing stressed skin panels

Manufacturer

Lignatur AG
Herisauerstraße 30
9104 Waldstatt
SWITZERLAND

Manufacturing plant

Lignatur AG
Herisauerstraße 30
9104 Waldstatt
SWITZERLAND

This European Technical Assessment contains

38 pages including 6 Annexes which form an integral part of this assessment.

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

European Assessment Document (EAD)
140022-00-0304 "Prefabricated wood-based loadbearing stressed skin panels".

This European Technical Assessment replaces

European Technical Assessment ETA-11/0137 of 31.05.2021.

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Specific parts

1 Technical description of the product

1.1 General

This European Technical Assessment¹ (ETA) applies to the open and closed box load bearing stressed skin panels

**LIGNATUR-box element (LKE)
LIGNATUR-surface element (LFE)
LIGNATUR-shell element (LSE)**

LIGNATUR-elements are factory made large-size floor and roof elements in softwood. The LIGNATUR-elements have parallel skins and ribs at regular distances.

Type according to EAD 140022-00-0304, Clause 1.1:

- Open or closed box type with skins rigidly bonded to the entire length of the ribs with an adhesive
- Without or with solid wood in the box, which contributes to the performance characteristics of the load-bearing capacity of the stressed skin panels
- Without or with thermal insulation products not contributing to the structural characteristics of the stressed skin panels

Beside thermal insulation products the boxes can be provided with ballast weight. The ballast weight does not contribute to the structural characteristics of the stressed skin panels.

LIGNATUR-elements and the boards for its manufacturing correspond to the specifications given in the Annexes 1 and 2. The material characteristics, dimensions and tolerances of LIGNATUR-elements, not indicated in these Annexes, are given in the technical file² of the European Technical Assessment.

Cladding, covering, rain and snow protection and connection to the structure as well as application of wood preservatives and flame retardants are not subject to the European Technical Assessment.

1.2 Components

1.2.1 Timber

Skins and ribs are made of softwood boards or softwood of rectangular cross section, i.e. visually or machine strength graded timber. Only technically dried wood is used.

Solid wood shall be classified according to EN 338³.

In longitudinal direction the softwood boards are jointed with finger joints, there are no butt joints. Between the ribs stiffeners are arranged at regular distances for stabilisation.

Solid wood can be placed between the ribs.

To improve the acoustic performance of the LIGNATUR-elements, the skin can be provided with a grid of holes or slots.

¹ The ETA-11/0137 was firstly issued in 2011 as European technical approval with validity from 28.04.2011, amended in 2012 with validity from 19.11.2012, amended and converted in 2014 to the European Technical Assessment ETA-11/0137 of 20.06.2014, 2019 amended to ETA-11/0137 of 04.11.2019, 2021 amended to ETA-11/0137 of 31.05.2021 and 2025 amended to ETA-11/0137 of 27.08.2025.

² The technical file of the European Technical Assessment is deposited at Österreichisches Institut für Bautechnik and, in so far as is relevant to the tasks of the notified product certification body involved in the assessment and verification of constancy of performance procedure, is handed over to the notified product certification body.

³ EN 338:2016

1.2.2 Adhesive

The skins and ribs are bonded by means of an adhesive to open or closed boxes. Directions of grain of skins and ribs are parallel.

The adhesive for bonding the LIGNATUR-elements and finger joints conforms to EN 15425⁴ or EN 301⁵.

1.2.3 Thermal insulation products

Thermal insulation products inserted into the LIGNATUR-elements such as mineral wool, wood fibre etc. conform to a harmonised European standard or a European Technical Assessment and shall be CE marked. Thermal insulation products do not contribute to the load bearing characteristics of the LIGNATUR-elements.

The thermal insulation products are not subject to the European Technical Assessment.

1.2.4 Ballast weight

Ballast weight inserted into the box elements such as concrete blocks, aggregates etc. does not contribute to the load bearing characteristics of the LIGNATUR-elements. Concrete blocks and aggregates conform to a harmonised European standard or a European Technical Assessment and shall be CE marked. For ballast weight with aggregates from calcium carbonate at least mineralogy, grain category, density as well as content of fines shall be given.

The ballast weight is not subject to the European Technical Assessment.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (thereafter EAD)

2.1 Intended use

The LIGNATUR-elements are intended to be used as load bearing or non-load bearing elements predominantly in floors and roofs. They may be used in a load bearing function or for load transmission stressed perpendicular as well as in plane of the element.

The product shall be subjected to static and quasi-static actions only.

The product is intended to be used in service classes 1 and 2 according to EN 1995-1-1⁶. Members which are directly exposed to the weather shall be provided with an effective protection for the product in service.

2.2 General assumptions

The LIGNATUR-elements are manufactured in accordance with the provisions of the European Technical Assessment using the manufacturing process as identified in the inspection of the manufacturing plant by Österreichisches Institut für Bautechnik and laid down in the technical file.

The manufacturer shall ensure that the requirements in accordance with the Clauses 1, 2 and 3 as well as with the Annexes of the European Technical Assessment are made known to those who are concerned with design and execution of the works.

Design

The European Technical Assessment only applies to the manufacture and use of the LIGNATUR-elements. Verification of stability of the works including application of loads on the products is not subject to the European Technical Assessment.

⁴ EN 15425:2023

⁵ EN 301:2023

⁶ EN 1995-1-1:2004 + AC:2006 + A1:2008 +A2:2014

The following conditions shall be observed:

- Design of the LIGNATUR-elements is carried out under the responsibility of an engineer experienced in such products.
- Design of the works shall account for the protection of the LIGNATUR-elements.
- In service, the LIGNATUR-elements are not exposed to detrimental moisture. The definitions of service classes 1 and 2 according to EN 1995-1-1 apply.
- The LIGNATUR-elements are installed correctly.

Design of the products may be according to EN 1995-1-1 and EN 1995-1-2⁷, taking into account of Annexes 2 to 5 of the European Technical Assessment.

Standards and regulations in force at the place of use shall be considered.

Packaging, transport, storage, maintenance, replacement and repair

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

Installation

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Ducts and services shall as far as possible be arranged not to affect the performances of the LIGNATUR-elements. If there are ducts or services between the skins or passing through the product, their effect on the stability, the safety in case of fire and the building physics characteristics shall be taken into consideration. The same principles apply to holes cut for another purpose.

Cutting of ribs and cutting of slots in the skins shall be avoided as much as possible and always requires special attention and assessment.

2.3 Assumed working life

The provisions made in the European Technical Assessment (ETA) are based on an assumed intended working life of the LIGNATUR-elements of 50 years, when installed in the works, provided that the cross laminated timber elements are subject to appropriate installation, use and maintenance (see Clause 2.2). These provisions are based upon the current state of the art and the available knowledge and experience⁸.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA nor by the Technical Assessment Body, but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

⁷ EN 1995-1-2:2004 + AC:2006 + AC:2009

⁸ The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product can also be shorter than the assumed working life.

3 Performance of the product and reference to the methods used for its assessment

3.1 Essential characteristics of the product

Table 1: Essential characteristics of the product and assessment methods

Essential characteristic	Method of assessment	Performance
Basic requirement for construction works 1: Mechanical resistance and stability ¹⁾		
Bending strength and/or bending moment resistance perpendicular to the skin (flatwise bending of the product)	EAD 140022-00-0304, Clause 2.2.2	Annex 2
Compression strength and/or resistance parallel to the skin (parallel and perpendicular to the grain as applicable)	EAD 140022-00-0304, Clause 2.2.3	Annex 2
Compression strength and/or resistance perpendicular to the skin (support reaction)	EAD 140022-00-0304, Clause 2.2.4	Annex 2
Shear strength and/or resistance perpendicular to the skin (flatwise bending of the product)	EAD 140022-00-0304, Clause 2.2.5	Annex 2
Racking resistance	Not relevant for use in floors and roofs. No performance assessed.	
Resistance to concentrated loads	EAD 140022-00-0304, Clause 2.2.7	Annex 2
Density	EAD 140022-00-0304, Clause 2.2.8	Annex 2
Creep and duration of the load	EAD 140022-00-0304, Clause 2.2.9	Annex 2
Dimensional stability	EAD 140022-00-0304, Clause 2.2.10	Annex 2
Basic requirement for construction works 2: Safety in case of fire		
Reaction to fire	EAD 140022-00-0304, Clause 2.2.11	Annex 2
Resistance to fire	EAD 140022-00-0304, Clause 2.2.12	Annex 2
Basic requirement for construction works 3: Hygiene, health and the environment		
Content, emission and/or release of dangerous substances	EAD 140022-00-0304, Clause 2.2.13	3.1.1 and Annex 2
Water vapour permeability and moisture resistance	EAD 140022-00-0304, Clause 2.2.14	Annex 2
Basic requirement for construction works 4: Safety and accessibility in use		
Impact/shock resistance	EAD 140022-00-0304, Clause 2.2.15	Annex 2
Basic requirement for construction works 5: Protection against noise		
Airborne sound insulation	EAD 140022-00-0304, Clause 2.2.16	Annex 2
Impact sound insulation	EAD 140022-00-0304, Clause 2.2.17	Annex 2

Sound absorption	EAD 140022-00-0304, Clause 2.2.18	Annex 2
Basic requirement for construction works 6: Energy economy and heat retention		
Thermal conductivity	EAD 140022-00-0304, Clause 2.2.19	Annex 2
Air permeability	EAD 140022-00-0304, Clause 2.2.20	Annex 2
Thermal inertia	EAD 140022-00-0304, Clause 2.2.21	Annex 2
Aspects of durability		
Natural durability	EAD 140022-00-0304, Clause 2.2.22	Annex 2
1) These characteristics also relate to basic requirement for construction works 4.		

3.1.1 Hygiene, health and the environment

The total release of volatile organic compounds (TVOC) and semi-volatile organic compounds (TSVOC) has been determined for the ceiling elements “LIGNATUR Standard” (without perforation) and “LIGNATUR acoustics type 3.1” (with perforation) according to EAD 140022-00-0304 clause 2.2.13.1 and EN 16516⁹. The loading factor used for emission testing was 0.5 m²/m³.

Product	TVOC after 3 days [mg/m ³]	TVOC after 28 days [mg/m ³]	TSVOC after 3 days [mg/m ³]	TSVOC after 28 days [mg/m ³]
LIGNATUR Standard (without perforation)	0,122	0,104	< 0,005	< 0,005
LIGNATUR acoustics type 3.1 (with perforation)	0,453	0,355	< 0,005	< 0,005

3.2 Assessment methods

3.2.1 General

The assessment of the essential characteristics in Clause 3.1 of the LIGNATUR-elements for the intended use, and in relation to the requirements for mechanical resistance and stability, for safety in case of fire, for hygiene, health and the environment, for safety and accessibility in use, for protection against noise and for energy economy and heat retention in use in the sense of the basic requirements for construction works № 1 to 6 of Regulation (EU) № 305/2011 has been made in accordance with European Assessment Document EAD 140022-00-0304 “Prefabricated wood-based loadbearing stressed skin panels”.

3.2.2 Identification

The European Technical Assessment for the LIGNATUR-elements is issued on the basis of agreed data that identify the assessed product. Changes to materials, to composition, to characteristics of the product, or to the production process could result in these deposited data being incorrect. Österreichisches Institut für Bautechnik should be notified before the changes are implemented, as an amendment of the European Technical Assessment is possibly necessary.

⁹ EN 16516:2017+A1:2020

4 Assessment and verification of constancy of performance (thereafter AVCP) system applied, with reference to its legal base

4.1 System of assessment and verification of constancy of performance

According to Commission Decision 2000/447/EC¹⁰ the system of assessment and verification of constancy of performance to be applied to the LIGNATUR-elements is System 1. System 1 is detailed in Commission Delegated Regulation (EU) № 568/2014¹¹ of 18 February 2014, Annex, 1.2., and provides for the following items

- (a) The manufacturer shall carry out
 - (i) factory production control;
 - (ii) further testing of samples taken at the manufacturing plant by the manufacturer in accordance with a prescribed test plan¹²;
- (b) The notified product certification body shall decide on the issuing, restriction, suspension or withdrawal of the certificate of constancy of performance of the construction product on the basis of the outcome of the following assessments and verifications carried out by that body:
 - (i) an assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product;
 - (ii) initial inspection of the manufacturing plant and of factory production control;
 - (iii) continuous surveillance, assessment and evaluation of factory production control.

4.2 AVCP for construction products for which a European Technical Assessment has been issued

Notified bodies undertaking tasks under System 1 shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Notified bodies shall therefore not undertake the tasks referred to in point 4.1 (b)(i).

¹⁰ Official Journal of the European Communities OJ L 180, 19.7.2000, p. 40

¹¹ Official Journal of the European Communities OJ L 157, 27.5.2014, p. 76

¹² The prescribed test plan has been deposited with Österreichisches Institut für Bautechnik and is handed over only to the notified product certification body involved in the procedure for the assessment and verification of constancy of performance. The prescribed test plan is also referred to as control plan.

- The manufacturing process including personnel and equipment
- The factory production control
- The implementation of the control plan

The results of continuous surveillance are made available on demand by the notified product certification body to Österreichisches Institut für Bautechnik. When the provisions of the European Technical Assessment and the control plan are no longer fulfilled, the certificate of constancy of performance is withdrawn by the notified product certification body.

Issued in Vienna on 27.08.2025
by Österreichisches Institut für Bautechnik

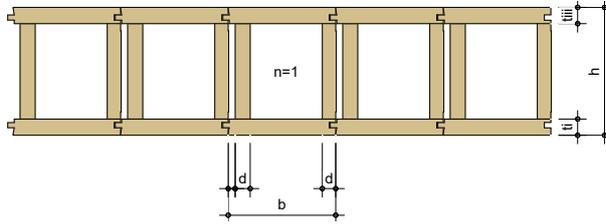
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Thomas Rockenschaub
Managing Director

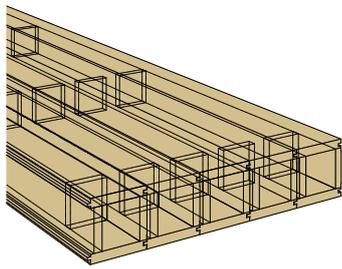
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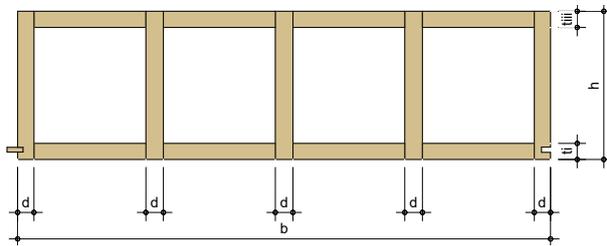
LIGNATUR – box element (LKE)



Height h	≤ 400 mm
Width b	≤ 250 mm
Thickness of ribs d	27 mm – 33 mm
Thickness skin ti	25 mm – 82 mm
Thickness skin tiii	25 mm – 82 mm
Number of boxes n	1
Length L	≤ 18 m
Spacing of stiffeners	≤ 1.2 m

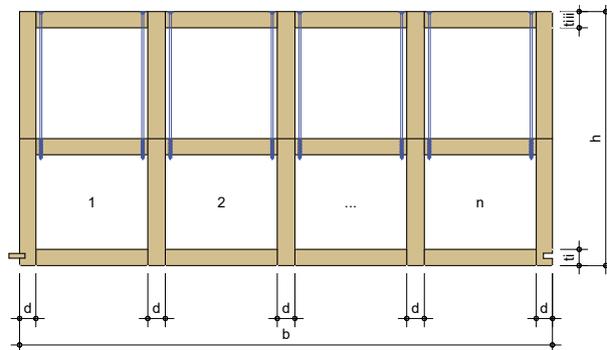


LIGNATUR – surface element (LFE)



Height h	≤ 400 mm
Width b	≤ 1 000 mm
Thickness of ribs d	27 mm – 80 mm
Thickness skin ti	25 mm – 82 mm
Thickness skin tiii	25 mm – 82 mm
Number of boxes n	≤ 4
Length L	≤ 18 m
Spacing of stiffeners	≤ 1.2 m

or



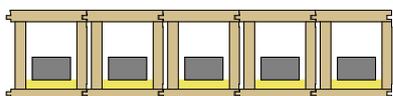
Height h	> 400 – 600 mm
Width b	≤ 1 000 mm
Thickness of ribs d	27 mm – 80 mm
Thickness skin ti	25 mm – 82 mm
Thickness skin tiii	25 mm – 82 mm
Number of boxes n	≤ 4
Length L	≤ 18 m
Spacing of stiffeners	≤ 1.2 m

LIGNATUR-elements	Annex 1 of European Technical Assessment ETA-11/0137 of 27.08.2025
Product specification	

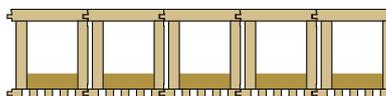
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Examples of assemblies of LIGNATUR – box elements (LKE)

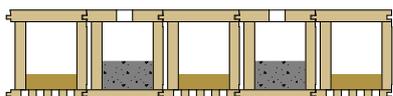
Airborne and impact sound insulation



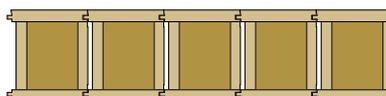
Sound absorption



Airborne and impact sound insulation and sound absorption

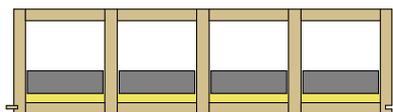


Thermal insulation

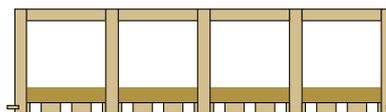


Examples of assemblies of LIGNATUR – surface elements (LFE)

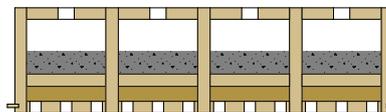
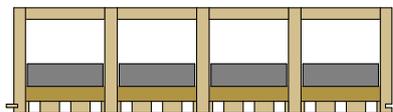
Airborne and impact sound insulation



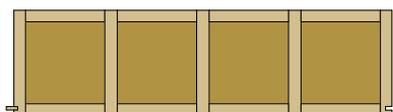
Sound absorption



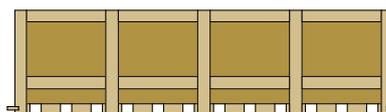
Airborne and impact sound insulation and sound absorption



Thermal insulation

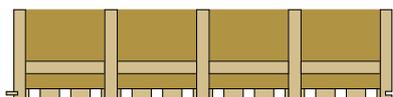


Thermal insulation and sound absorption



Example of an assembly of LIGNATUR – shell elements (LSE)

Sound absorption



LIGNATUR-elements	Annex 1 of European Technical Assessment ETA-11/0137 of 27.08.2025
Product specification	

Table 2: Product characteristics of LIGNATUR-elements

BWR	Essential characteristic	Assessment method	Level / Class / Description
1	Mechanical resistance and stability		
	Load bearing capacity and serviceability – Exemplary load bearing capacity perpendicular to the skin (bending, shear) – Floor, exemplary serviceability for deflection $w = l / 600$ – Roof, exemplary serviceability for deflection $w = l / 300$	EN 1995-1-1 (Eurocode 5) ¹⁾	Example, see Figure 1
	Moisture content		EN 13183-1 ¹³

¹⁾ The load bearing capacity is determined by calculation according to EN 1995-1-1, applying the characteristic values of softwood strength class C24 according to EN 338.

- g Permanent load (self-weight of LIGNATUR-element considered in calculation)
- q_N, q_A Imposed loads
- s Snow load
- γ = 1 Partial safety coefficient for serviceability

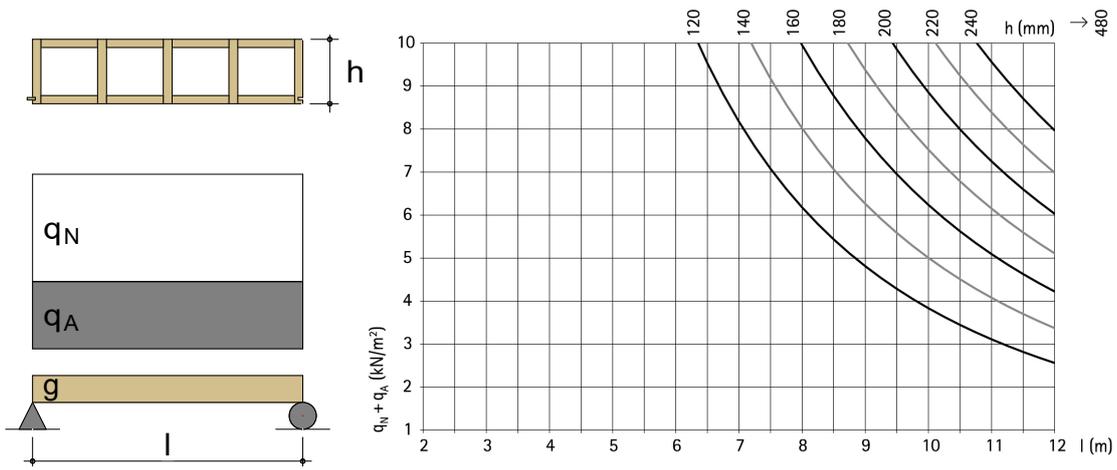


Figure 1: Exemplary load bearing capacity for bending and shear ($t_i = 31 \text{ mm}$, $t_{iii} = 31 \text{ mm}$, $d = 31 \text{ mm}$)

¹³ EN 13183-1:2002

LIGNATUR-elements	Annex 2 of European Technical Assessment ETA-11/0137 of 27.08.2025
Characteristic data of LIGNATUR-elements	

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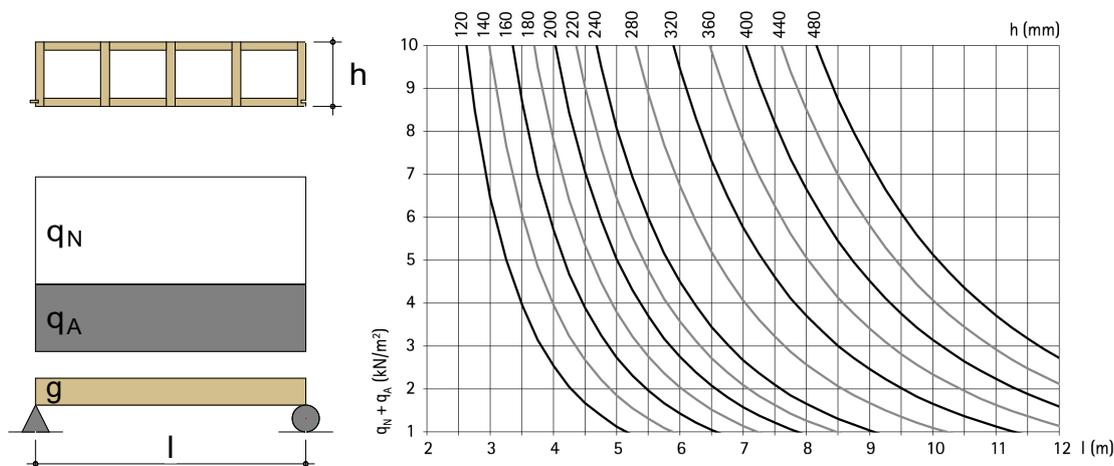


Figure 2: Floor, exemplary serviceability for deflection $w = l / 600$ ($t_i = 31$ mm, $t_{iii} = 31$ mm, $d = 31$ mm)

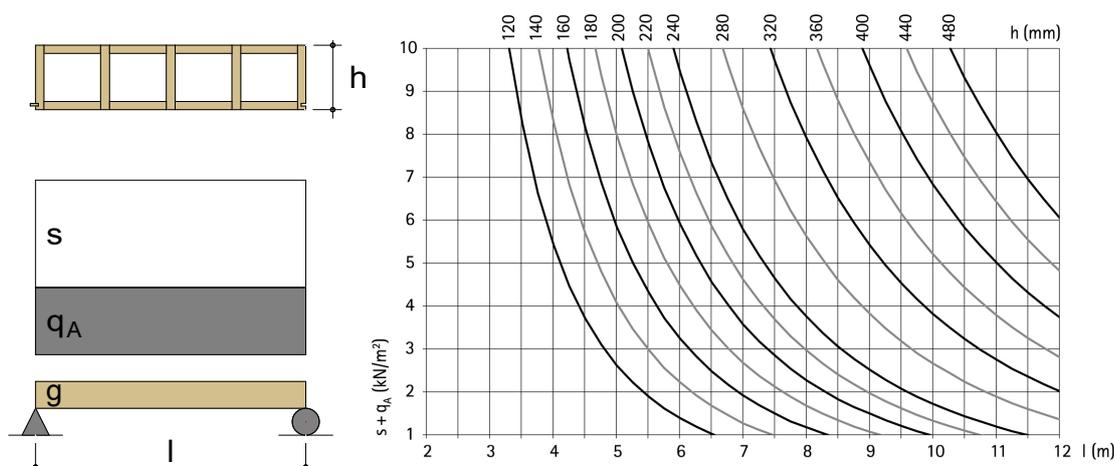


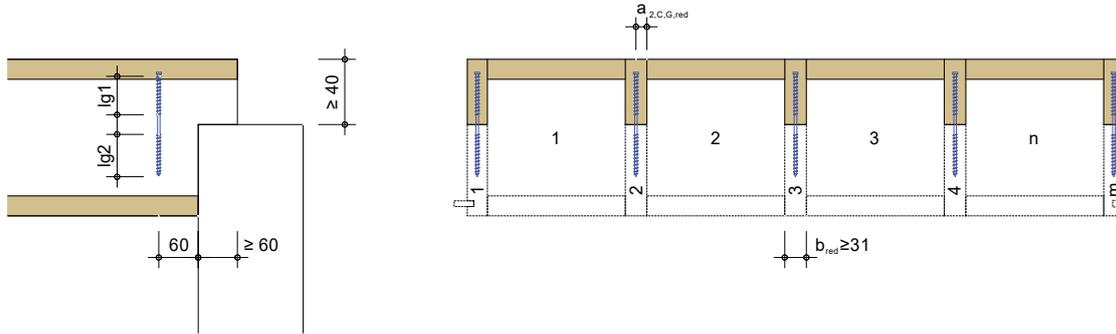
Figure 3: Roof, exemplary serviceability for deflection $w = l / 300$ ($t_i = 31$ mm, $t_{iii} = 31$ mm, $d = 31$ mm)

LIGNATUR-elements	Annex 2 of European Technical Assessment ETA-11/0137 of 27.08.2025
Characteristic data of LIGNATUR-elements	

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Transverse tension reinforcements of LIGNATUR-elements notched at the support

The transverse tension reinforcement of LIGNATUR-elements notched at the support with double-threaded screws ETA-11/0284, ETA 19/0553 or ETA 23/0366 is achieved in reference to EN 1995-1-1.



The verification of the screw reinforcement for the shown application and geometry can be carried out while observing the boundary conditions and using the strength values and the thread lengths l_{g1} and l_{g2} of the double-threaded screws according to the mentioned ETAs and EN 1995-1-1, even if reduced edge distances $a_{2,C,G} \geq 15$ mm and reduced minimum timber width $b_{red} \geq 31$ mm are used.

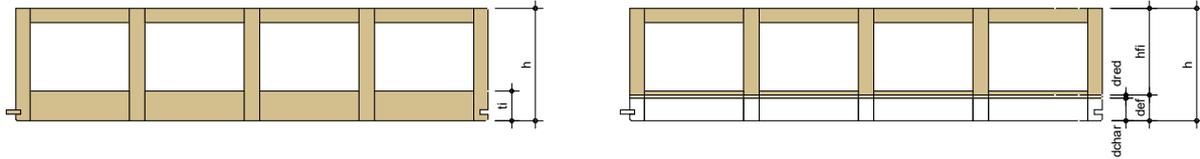
LIGNATUR-elements	Annex 3 of European Technical Assessment ETA-11/0137 of 27.08.2025
Characteristic data of LIGNATUR-elements	

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Resistance to fire is calculated with the residual cross section according to EC 5.

Charring rate of LIGNATUR-elements without perforation

The charring rate for elements made of spruce wood is 0.8 mm/min. The effective charring depths for determination of the residual cross section are:



Standard element

$$d_{ef} = d_{char} + d_{red} = t \cdot \beta_1 + 7 \text{ mm}$$

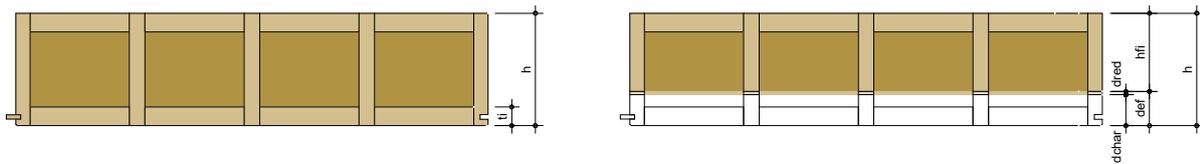
d_{ef} effective charring depth for determination of residual cross section

d_{char} depth of charred layer after required fire resistance time

t required fire resistance time

$\beta_1 = 0.8 \text{ mm/min}$ charring rate

$d_{red} = 7 \text{ mm}$ depth of layer for consideration of strength loss in areas adjacent to the charred layer



Standard elements with thermal insulation product of wood fibre

$$d_{ef} = d_{char} + d_{red} = t_1 \cdot \beta_1 + t_2 \cdot \beta_2 + 7 \text{ mm}$$

d_{ef} effective charring depth for determination of residual cross section

d_{char} depth of charred layer after required fire resistance time

$t = t_1 + t_2$ required fire resistance time

t_1 charring time in the area of the skin

t_2 charring time in the area of the thermal insulation product of wood fibre

$\beta_1 = 0.8 \text{ mm/min}$ charring rate

$\beta_2 = 0.9 \cdot \sqrt{\frac{450}{\rho_{iso}}}$ mm/min charring rate for thermal insulation product of wood fibre or

$\beta_2 = 1.6 \text{ mm/min}$ charring rate for thermal insulation product of mineral fibre (reaction to fire class min. A2-s1, d0 and melting point $\geq 1\,000^\circ\text{C}$)

ρ_{iso} density of thermal insulation product of wood fibre

$d_{red} = 7 \text{ mm}$ depth of layer for consideration of strength loss in areas adjacent to the charred layer

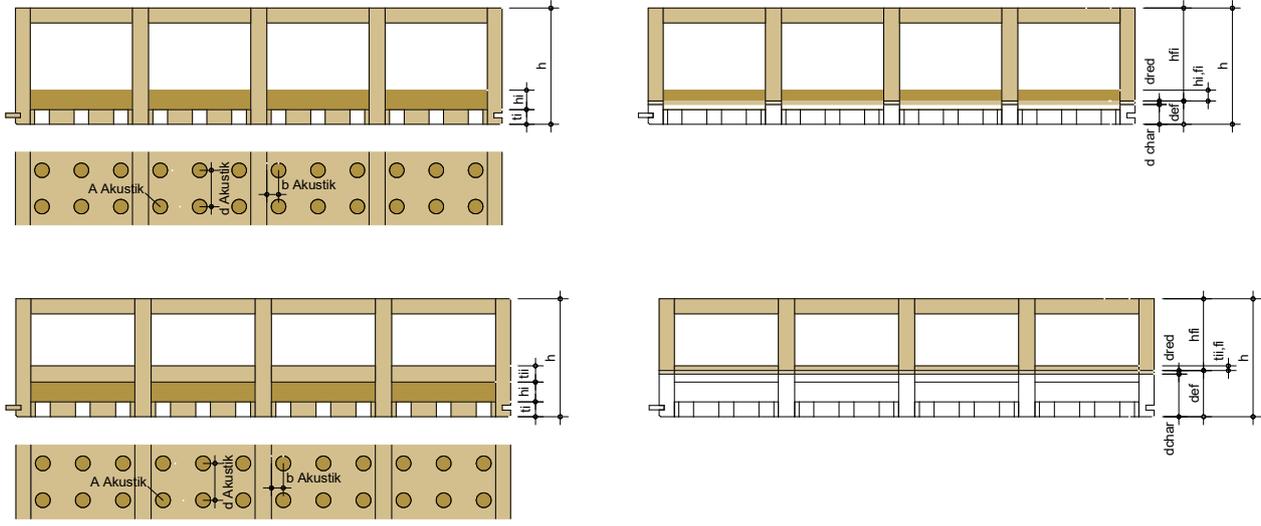
Dimensions in mm
 Time in minutes
 Density in kg/m^3

LIGNATUR-elements	Annex 4 of European Technical Assessment ETA-11/0137 of 27.08.2025
Resistance to fire – Charring rates	

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Charring rate of LIGNATUR-elements with perforation

To improve the acoustic performance, the lower skin can be perforated with holes or slots. Annex 6 shows the usual types of perforation. The charring rate of perforated skins can be determined by:



$$d_{ef} = d_{char} + d_{red} = t_1 \cdot \beta_1 + t_2 \cdot \beta_2 + t_3 \cdot \beta_3 + 7 \text{ mm}$$

d_{ef} effective charring depth for determination of residual cross section

d_{char} depth of charred layer after required fire resistance time

$t = t_1 + t_2 + t_3$...required fire resistance time

t_1 charring time in the area of the skin

t_2 charring time in the area of wood fibre

t_3 charring time in the area of wood

$\beta_1 = 0.22 \cdot k + 0.72$ mm/min charring rate

$$k = \frac{\frac{A_{Akustik}}{d_{Akustik}} \cdot 10^3}{b_{Akustik}^{1,5} \cdot t_i}$$

For $A_{Akustik}$, $b_{Akustik}$, $d_{Akustik}$ and t_i see Annex 6.

$$\beta_2 = 0.9 \cdot \sqrt{\frac{450}{\rho_{iso}}} \text{ mm/min charring rate for thermal insulation product of wood fibre}$$

$$\beta_3 = 0.8 \text{ mm}$$

ρ_{iso} density of thermal insulation product of wood fibre

$d_{red} = 7 \text{ mm}$ depth of layer for consideration of strength loss in areas adjacent to the charred layer

Dimensions in mm
 Time in minutes
 Density in kg/m³

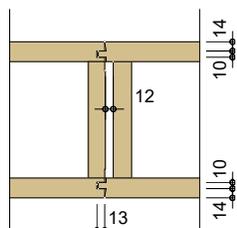
LIGNATUR-elements	Annex 4 of European Technical Assessment ETA-11/0137 of 27.08.2025
Resistance to fire – Charring rates	

Joints between the LIGNATUR-elements

LIGNATUR floors and roofs of fire resistance classes REI30, REI60 and REI90 shall be provided with appropriate joints between the LIGNATUR-elements.

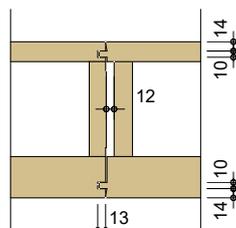
LIGNATUR box element

REI 30



Joint width 12 mm
Joint with groove and tongue

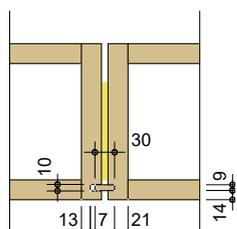
REI 60



Joint width 12 mm
Joint with groove and tongue

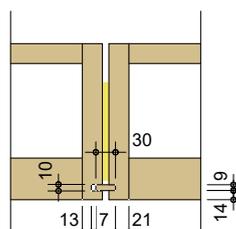
LIGNATUR surface element

REI 30



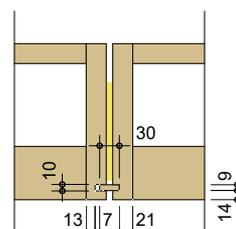
Joint width 10 mm
Joint with groove and separate tongue
Joint insulation ¹⁾

REI 60



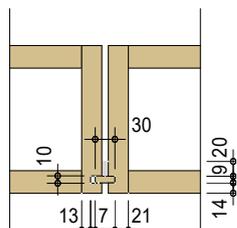
Joint width 10 mm
Joint with groove and separate tongue
Joint insulation ¹⁾

REI 90



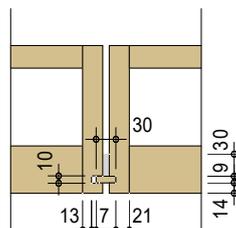
Joint width 10 mm
Joint with groove and separate tongue
Joint insulation ¹⁾

REI 30



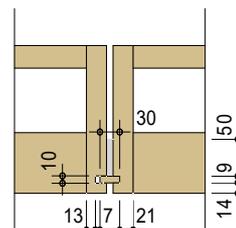
Joint width 10 mm
Joint with groove and separate tongue
Fire protection joint sealing tape, min. width 20 mm ²⁾

REI 60



Joint width 10 mm
Joint with groove and separate tongue
Fire protection joint sealing tape, min. width 30 mm ²⁾

REI 90

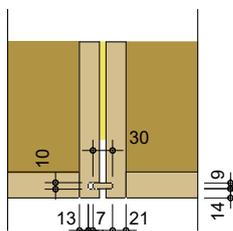


Joint width 10 mm
Joint with groove and separate tongue
Fire protection joint sealing tape, min width 50 mm ²⁾

LIGNATUR-elements	Annex 4 of European Technical Assessment ETA-11/0137 of 27.08.2025
Resistance to fire - Joints	

LIGNATUR shell element

REI 30



Joint width 10 mm

Joint with groove and separate tongue

Joint insulation¹⁾

Dimensions in mm

- 1) Joint insulation with reaction to fire class at least A2-s1,d0 and melting point $\geq 1\ 000^{\circ}\text{C}$
- 2) Fire protection joint sealing tape ISO-FLAME KOMBI F120

LIGNATUR-elements

Annex 4

Resistance to fire - Joints

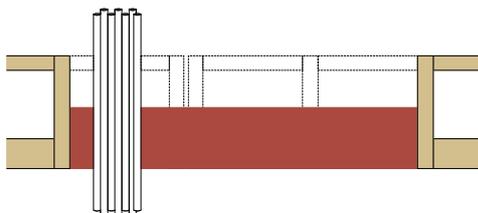
of European Technical Assessment
ETA-11/0137 of 27.08.2025

Preparation of LIGNATUR for Hilti-fire stopping according to ETA 18/1024

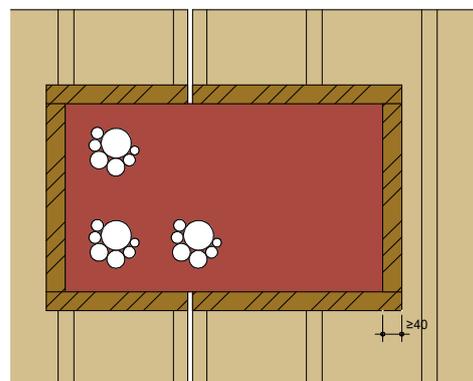
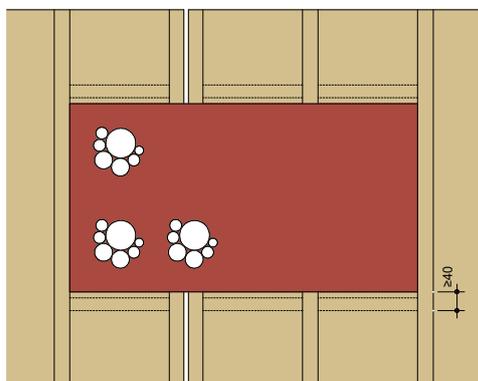
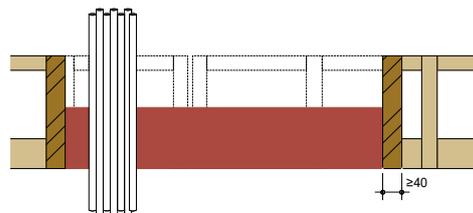
LIGNATUR-floors and –roofs of fire resistance class REI30, REI60 and REI90 are to be prepared accordingly in case of openings for fire stoppings.

Example: mixed penetration seal stone CFS-BL P according to ETA-18/1024

Edging with LIGNATUR-webs



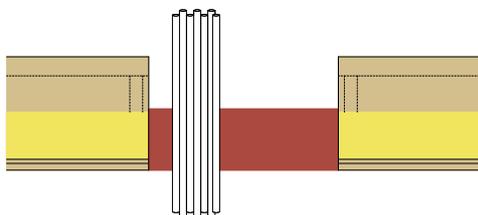
Edging with wooden reveal



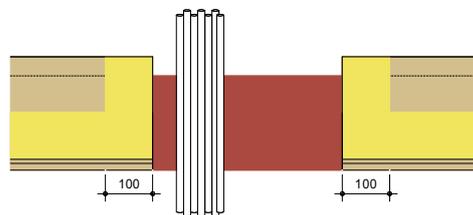
Dimension of the penetration seal according to European Technical Assessment for Hilti-fire stoppings.

The edging must be at least as high as the required height of the mixed penetration seal stone or the element height. If the element height is less than the required height of the mixed penetration seal stone, the element must be doubled locally.

Joint formation
 Example EI30, EI60



Joint formation
 Example EI 90



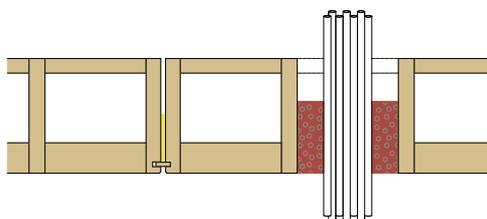
Joint insulation ¹⁾

¹⁾ Joint insulation with reaction to fire class at least A2-s1,d0 and melting point $\geq 1\ 000^{\circ}\text{C}$

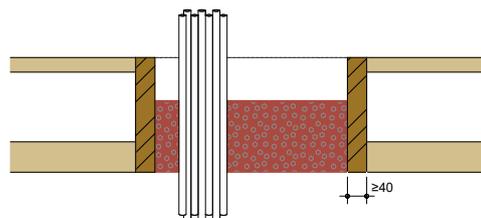
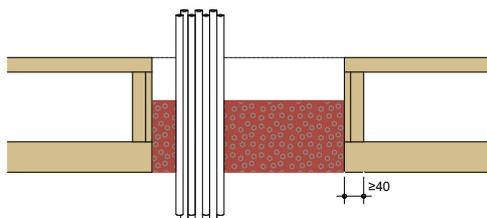
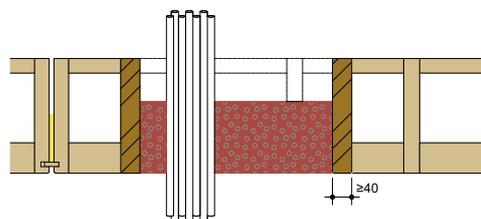
LIGNATUR-elements	Annex 4 of European Technical Assessment ETA-11/0137 of 27.08.2025
Resistance to fire – Preparation for Hilti-fire stopping	

Examples: penetration seals with fire protection foam CFS-F FX according to ETA-10/0109

Edging with LIGNATUR-webs



Edging with wooden reveal



Dimension of the penetration seal according to European Technical Assessment for Hilti-fire stoppings.

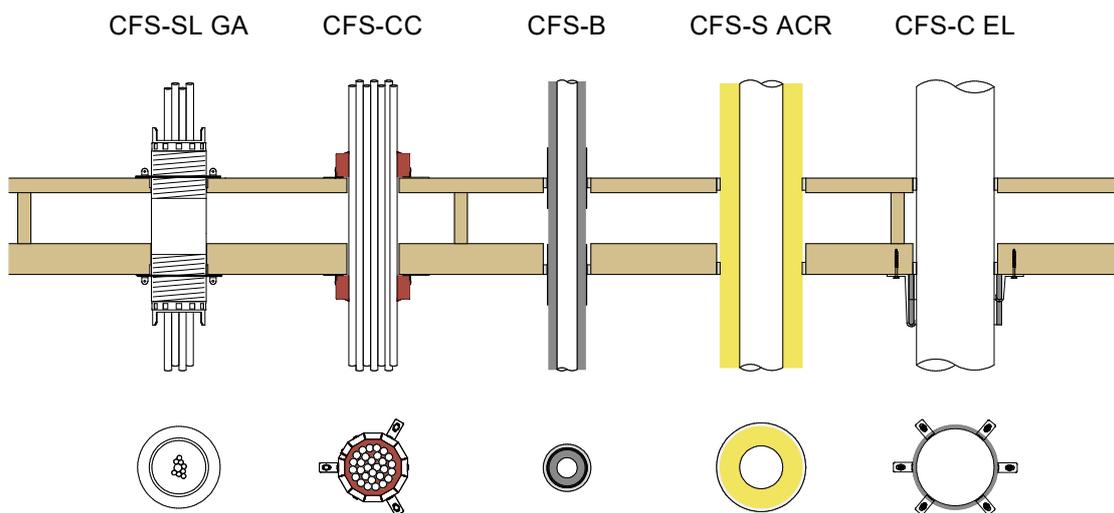
The edging must be at least as high as the required height of the fire protection foam or the element height. If the element height is less than the required height of the fire protection foam, the element must be doubled locally.

LIGNATUR-elements	Annex 4 of European Technical Assessment ETA-11/0137 of 27.08.2025
Resistance to fire – Preparation for Hilti-fire stopping	

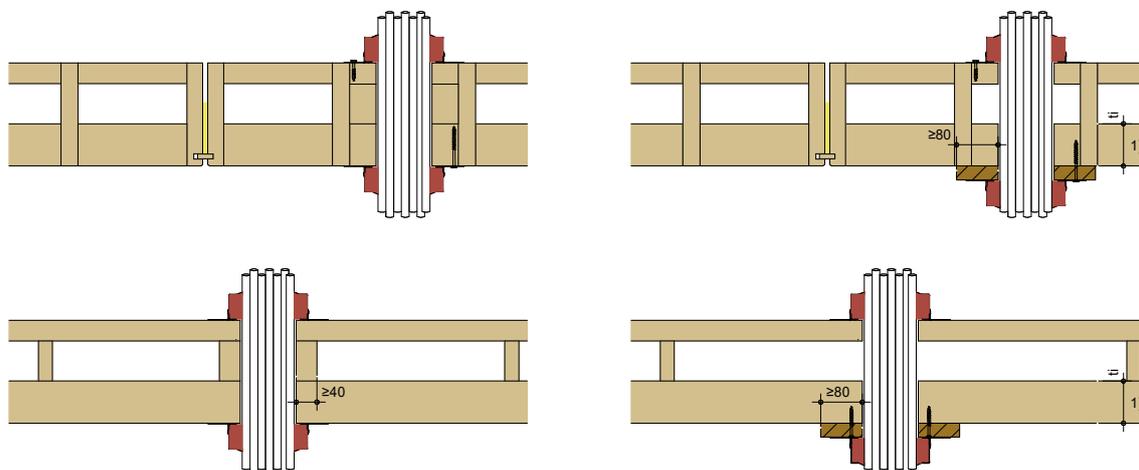
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Examples for single openings

- Fire protection sleeve CFS-SL GA according to ETA-20/1234
- fire protection cable collar CFS-CC according to ETA-13/0704
- fire protection wrap CFS-B according to ETA-20/0993
- acrylic fire protection sealant CFS-S ACR according to ETA-10/0292
- fire protection collar CFS-C EL according to ETA-14/0085



Standard example fire protection cable collar CFS-CC for the single openings shown above
 Preparation for massive box Preparation for empty box



Design according to European Technical Assessment for Hilti-fire stoppings.

1) If the lower skin t_i does not meet the requirements for the minimum thickness (58 mm for EI30, 64 mm for EI60 or 100 mm for EI90) it must be doubled with a wood-based panel.

LIGNATUR-elements	Annex 4 of European Technical Assessment ETA-11/0137 of 27.08.2025
Resistance to fire – Preparation for Hilti-fire stopping	

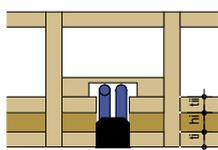
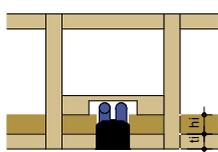
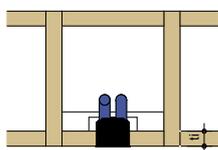
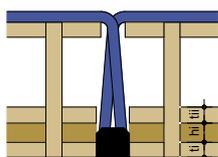
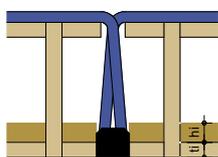
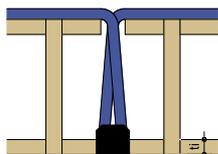
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Preparation of LIGNATUR for f-tronic fire protection socket BS3700 TC according to ETA 18/0628

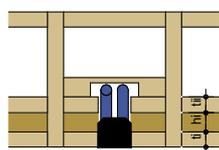
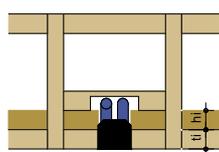
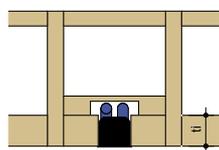
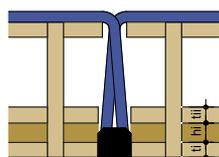
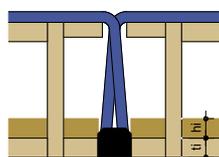
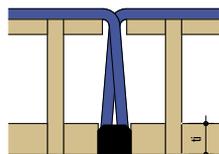
LIGNATUR-floors and –roofs of fire resistance class REI30, REI60 and REI90 are to be prepared accordingly in case of openings for fire protection sockets.

Examples for penetration seals for power devices with fire protection socket

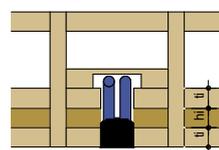
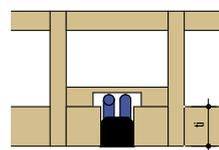
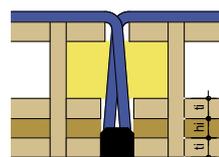
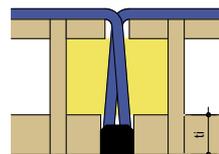
Examples EI 30



Examples EI60



Examples EI90



Design according to European Technical Assessment for f-tronic fire protection socket.

<p>LIGNATUR-elements</p>	<p>Annex 4</p>
<p>Resistance to fire – Preparation for f-tronic fire protection socket</p>	<p>of European Technical Assessment ETA-11/0137 of 27.08.2025</p>

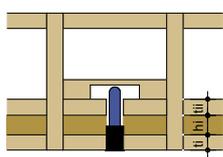
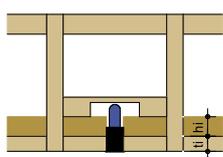
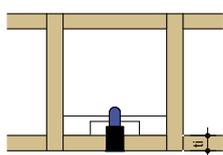
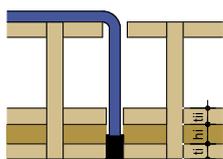
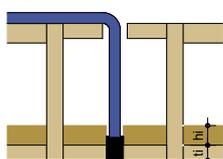
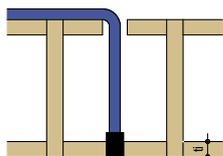
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Preparation of LIGNATUR für f-tronic fire protection outlet socket BS134 according to ETA 21/0879

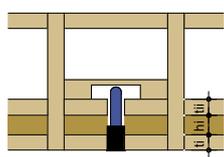
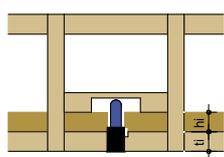
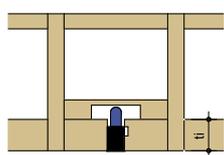
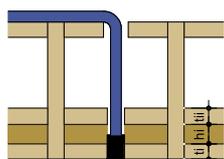
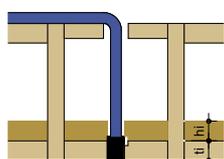
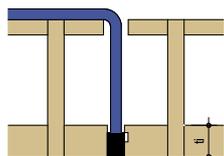
LIGNATUR-floors and –roofs of fire resistance class REI30, REI60 and REI90 are to be prepared accordingly in case of openings for fire protection sockets.

Examples for penetration seals for power devices with fire protection outlet socket

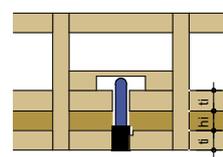
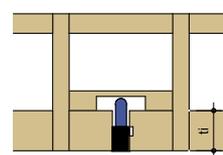
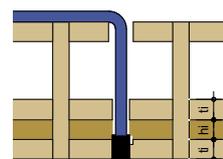
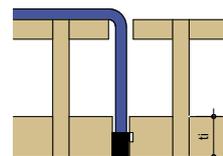
Examples EI 30



Examples EI60



Examples EI90

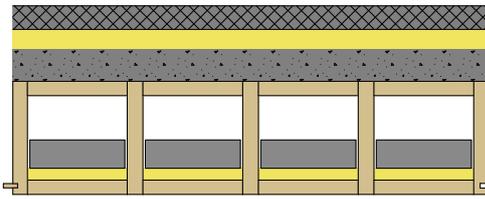


If the lower slat has a thickness $t_i \geq$ the maximum clamping thickness of the bracket, an undercut must be made to secure the socket.
 Design according to European Technical Assessment for f-tronic fire protection socket.

LIGNATUR-elements	Annex 4
Resistance to fire – Preparation for f-tronic fire protection outlet socket	of European Technical Assessment ETA-11/0137 of 27.08.2025

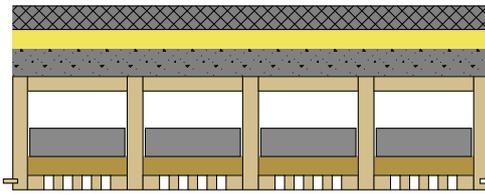
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Examples with improved airborne and impact sound performance



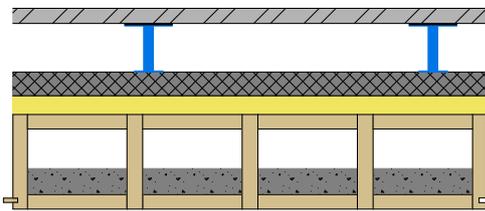
50 mm Cement screed $m' = 120 \text{ kg/m}^2$
 40 mm Impact sound insulation board
 $m' = 3.5 \text{ kg/m}^2$, $s' = 6 \text{ MN/m}^3$
 70 mm Ballast weight $m' = 105 \text{ kg/m}^2$
 240 mm LIGNATUR surface element silence12
 $m' = 71 \text{ kg/m}^2$ including ballast
 weight: concrete blocks¹⁾

Mass per unit area of assembly: $m' \cong 301 \text{ kg/m}^2$
 $R_w(\text{C}; \text{C}_{tr}) = 72 \text{ (-1; -5) dB}$
 $L_{n,w}(\text{C}_I) = 45 \text{ (-2) dB}$



50 mm Cement screed $m' = 120 \text{ kg/m}^2$
 40 mm Impact sound insulation board
 $m' = 3.5 \text{ kg/m}^2$, $s' = 6 \text{ MN/m}^3$
 60 mm Ballast weight $m' = 90 \text{ kg/m}^2$
 240 mm LIGNATUR surface element silence12
 with acoustics perforation
 $m' = 74 \text{ kg/m}^2$ including ballast
 weight: concrete blocks¹⁾

Mass per unit area of assembly: $m' \cong 288 \text{ kg/m}^2$
 $R_w(\text{C}; \text{C}_{tr}) = 71 \text{ (-1; -6) dB}$
 $L_{n,w}(\text{C}_I) = 43 \text{ (0) dB}$



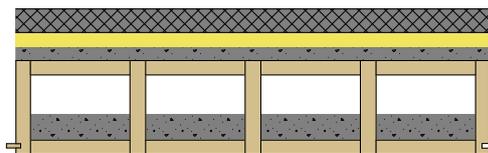
32 mm Gypsum fiberboard $m' = 52 \text{ kg/m}^2$, auf
 hollow floor columns 95 mm with
 5 mm insulation sheets
 50 mm Cement screed $m' = 120 \text{ kg/m}^2$
 40 mm Impact sound insulation board
 $m' = 3.5 \text{ kg/m}^2$, $s' = 7 \text{ MN/m}^3$
 200 mm LIGNATUR surface element
 $m' = 89.6 \text{ kg/m}^2$ including ballast
 weight: aggregates $m' = 50 \text{ kg/m}^2$

Mass per unit area of assembly: $m' \cong 267 \text{ kg/m}^2$
 $R_w(\text{C}; \text{C}_{tr}) = 74 \text{ (-4; -10) dB}$
 $L_{n,w}(\text{C}_I) = 43 \text{ (1) dB}$

¹⁾ Concrete blocks, density $\rho = 2\,250 \text{ kg/m}^3$

LIGNATUR-elements	Annex 5 of European Technical Assessment ETA-11/0137 of 27.08.2025
Airborne and impact sound insulation	

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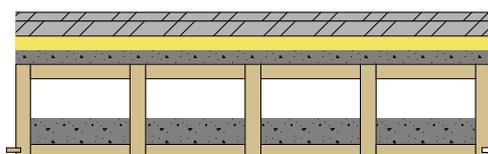


50 mm Cement screed $m' = 120 \text{ kg/m}^2$
 40 mm Impact sound insulation board
 $m' = 3.5 \text{ kg/m}^2$, $s' = 7 \text{ MN/m}^3$
 30 mm Ballast weight $m' = 47.2 \text{ kg/m}^2$
 200 mm LIGNATUR surface element
 $m' = 89.6 \text{ kg/m}^2$ including ballast
 weight: aggregates $m' = 50 \text{ kg/m}^2$

Mass per unit area of assembly: $m' \cong 260 \text{ kg/m}^2$

$R_w(\text{C}; \text{C}_{tr}) = 76 \text{ (-4; -10) dB}$

$L_{n,w}(\text{C}_i) = 42 \text{ (1) dB}$

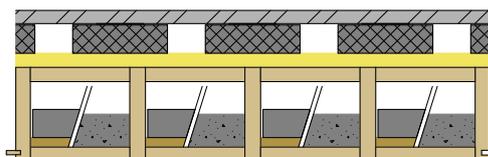


50 mm Gypsum fiberboards $m' = 81.3 \text{ kg/m}^2$
 30 mm Impact sound insulation board
 $m' = 2.7 \text{ kg/m}^2$, $s' = 9 \text{ MN/m}^3$
 30 mm Ballast weight $m' = 47.2 \text{ kg/m}^2$
 200 mm LIGNATUR surface element
 $m' = 89.6 \text{ kg/m}^2$ including ballast
 weight: aggregates $m' = 50 \text{ kg/m}^2$

Mass per unit area of assembly: $m' \cong 221 \text{ kg/m}^2$

$R_w(\text{C}; \text{C}_{tr}) = 73 \text{ (-4; -10) dB}$

$L_{n,w}(\text{C}_i) = 47 \text{ (1) dB}$



28 mm Gypsum fiberboard $m' = 45.4 \text{ kg/m}^2$
 2.8 mm Impact sound insulation fleece
 $m' = 2.4 \text{ kg/m}^2$
 60 mm Concrete blocks in stripes
 $m' = 89.4 \text{ kg/m}^2$
 30 mm Impact sound insulation board
 $m' = 4 \text{ kg/m}^2$, $s' \leq 15 \text{ MN/m}^3$
 200 mm LIGNATUR surface element silence12
 $m' = 117 \text{ kg/m}^2$ including ballast
 weight: aggregates $m' = 50 \text{ kg/m}^2$
 and concrete blocks¹⁾

Mass per unit area of assembly : $m' \cong 259 \text{ kg/m}^2$

$R_w(\text{C}; \text{C}_{tr}) = 72 \text{ (-2; -7) dB}$

$L_{n,w}(\text{C}_i) = 47 \text{ (-2) dB}$

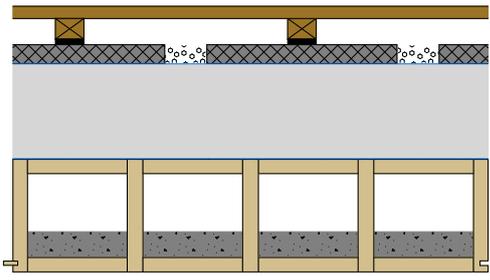
LIGNATUR-elements

Annex 5

Airborne and impact sound insulation

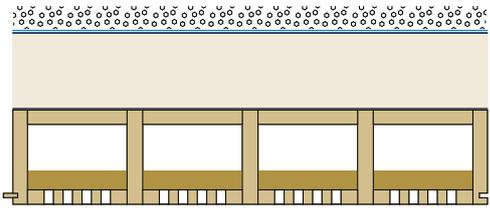
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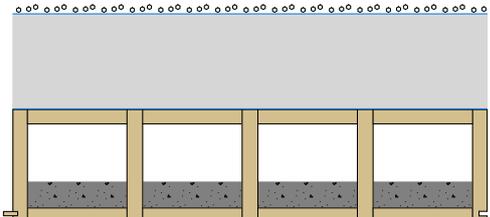
- 82 mm Wooden grating (26 mm boards on 44 mm baulks) on 12 mm Sylomer-bearing $m' = 15.8 \text{ kg/m}^2$
- 40 mm Concrete panels 400 x 400 mm, $m' = 77 \text{ kg/m}^2$
- 1.5 mm Polymer roof sheeting $m' = 2.1 \text{ kg/m}^2$
- 200 mm Expanded polystyrene $m' = 3.6 \text{ kg/m}^2$
- 240 mm LIGNATUR surface element $m' = 92.4 \text{ kg/m}^2$ including ballast weight: aggregates $m' = 50 \text{ kg/m}^2$

Mass per unit area of assembly: $m' \cong 191 \text{ kg/m}^2$
 $R_w(C; C_{tr}) = 60 (-1; -5) \text{ dB}$
 $L_{n,w}(C_i) = 37 (-2) \text{ dB}$



- 50 mm Gravel $m' = 75.9 \text{ kg/m}^2$
- 5,2 mm Elastomer bitumen welding membrane, $m' = 6.0 \text{ kg/m}^2$
- 3 mm Elastomer bitumen cold applied self-adhesive membrane $m' = 3.8 \text{ kg/m}^2$
- 160 mm Flat roof rigid foam insulation board $m' = 5.3 \text{ kg/m}^2$
- 2,5 mm Elastomer bitumen vapour barrier membrane $m' = 3.2 \text{ kg/m}^2$
- 200 mm LIGNATUR surface element with acoustic perforation $m' = 43.7 \text{ kg/m}^2$

Mass per unit area of assembly: $m' \cong 137,9 \text{ kg/m}^2$
 $R_w(C; C_{tr}) = 55 (-1; -5) \text{ dB}$

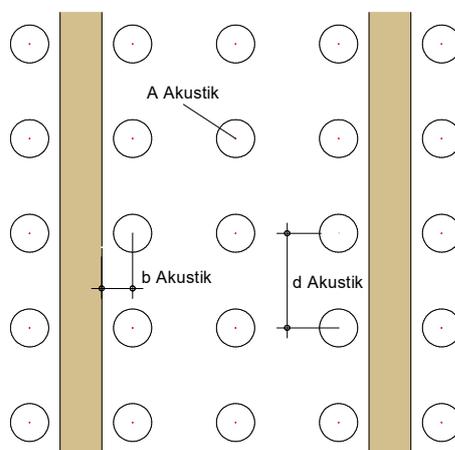
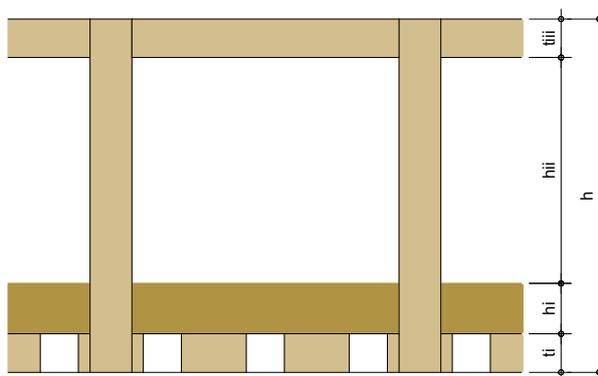
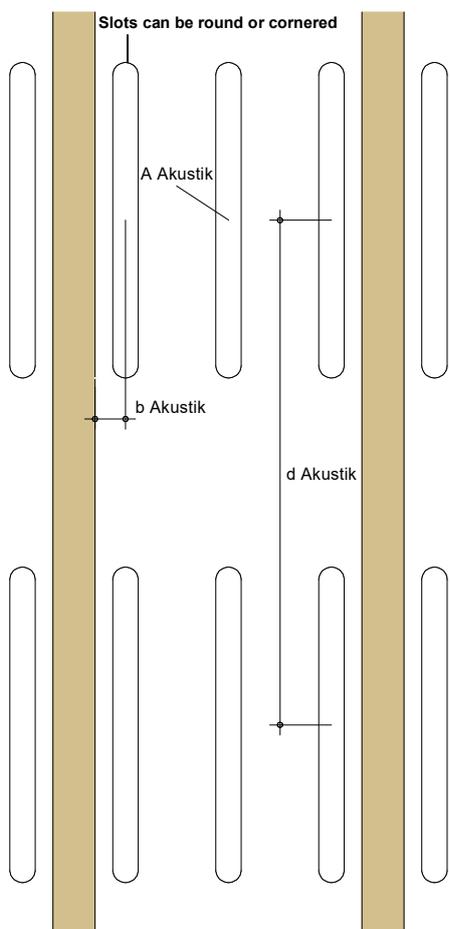


- 50 mm Gravel $m' = 87.3 \text{ kg/m}^2$
- 1.5 mm Polymer roof sheeting $m' = 2.1 \text{ kg/m}^2$
- 200 mm Expanded polystyrene $m' = 3.6 \text{ kg/m}^2$
- 240 mm LIGNATUR surface element $m' = 92.4 \text{ kg/m}^2$ including ballast weight: aggregates $m' = 50 \text{ kg/m}^2$

Mass per unit area of assembly: $m' \cong 186 \text{ kg/m}^2$
 $R_w(C; C_{tr}) = 64 (-2; -6) \text{ dB}$

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Perforated skins for acoustic elements



Example type 1

Type 1:	$A_{Akustik} = 5000 \text{ mm}^2$
Type 2:	$A_{Akustik} = 707 \text{ mm}^2$
Type 3:	$A_{Akustik} = 314 \text{ mm}^2$
Type 3.1:	$A_{Akustik} = 314 \text{ mm}^2$
Type 5:	$A_{Akustik} = 177 \text{ mm}^2$
Type 5.1:	$A_{Akustik} = 177 \text{ mm}^2$
Type 6:	$A_{Akustik} = 64 \text{ mm}^2$
Type 6.1:	$A_{Akustik} = 64 \text{ mm}^2$
Type 8:	$A_{Akustik} = 3420 \text{ mm}^2$
Type 8.1:	$A_{Akustik} = 3420 \text{ mm}^2$
Diverse:	$A_{Slot} \leq 5000 \text{ mm}^2$
	$A_{Hole} \leq 707 \text{ mm}^2$

Example type 3

$d_{Akustik} = 400 \text{ mm}$	$b_{Akustik} = 24 \text{ mm}$
$d_{Akustik} = 75 \text{ mm}$	$b_{Akustik} = 24 \text{ mm}$
$d_{Akustik} = 40 \text{ mm}$	$b_{Akustik} = 5 \text{ mm}$
$d_{Akustik} = 40 \text{ mm}$	$b_{Akustik} = 45 \text{ mm}$
$d_{Akustik} = 40 \text{ mm}$	$b_{Akustik} = 5 \text{ mm}$
$d_{Akustik} = 40 \text{ mm}$	$b_{Akustik} = 45 \text{ mm}$
$d_{Akustik} = 20 \text{ mm}$	$b_{Akustik} = 15 \text{ mm}$
$d_{Akustik} = 20 \text{ mm}$	$b_{Akustik} = 35 \text{ mm}$
$d_{Akustik} = 600 \text{ mm}$	$b_{Akustik} = 9 \text{ mm}$
$d_{Akustik} = 600 \text{ mm}$	$b_{Akustik} = 33 \text{ mm}$
$d_{Slot} \leq 600 \text{ mm}$	$b_{Slot} \geq 1 \text{ mm}$
$d_{Hole} \leq 75 \text{ mm}$	$b_{Hole} \geq 1 \text{ mm}$

LIGNATUR-elements

Sound absorption – Perforated skins

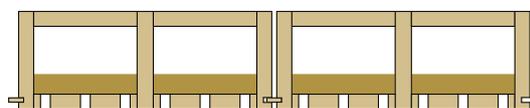
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Examples with improved sound absorption

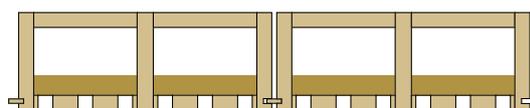
Absorber material: thermal insulation product of wood fibre, density $\rho < 110 \text{ kg/m}^3$

Dimensions: $h = 200 \text{ mm}$, $t_i = 31 \text{ mm}$, $h_i = 40 \text{ mm}$



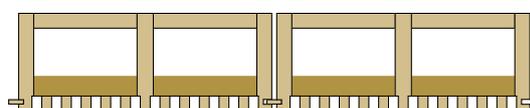
$\alpha_w = 0,55$

Acoustics type 1 Class of absorber: D
 Slot dimension: 20 / 250 mm
 Grid: 81 / 400 mm



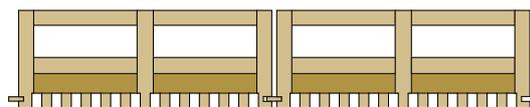
$\alpha_w = 0,50$

Acoustics type 2 Class of absorber: D
 Hole diameter: 30 mm
 Grid: 81/75 mm



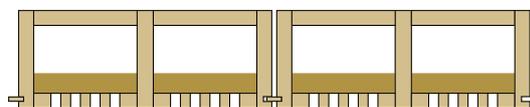
$\alpha_w = 0,90$

Acoustics type 3 Class of absorber: A
 Hole diameter: 20 mm
 Grid: 40 / 40 mm



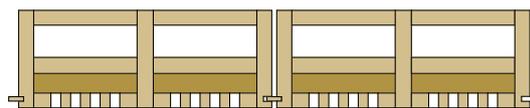
$\alpha_w = 0,85$

Acoustics type 3 ZL Class of absorber: B
 Hole diameter: 20 mm
 Grid: 40 / 40 mm



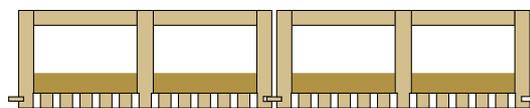
$\alpha_w = 0,75$

Acoustics type 3.1 Class of absorber: C
 Hole diameter: 20 mm
 Grid: 40 / 40 mm



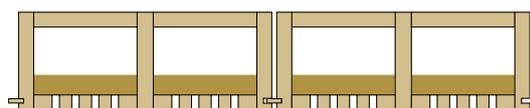
$\alpha_w = 0,60$

Acoustics type 3.1 ZL Class of absorber: C
 Hole diameter: 20 mm
 Grid: 40 / 40 mm



$\alpha_w = 0,65 \text{ (L)}$

Acoustics type 5 Class of absorber: C
 Hole diameter: 15 mm
 Grid: 40 / 40 mm



$\alpha_w = 0,50 \text{ (L)}$

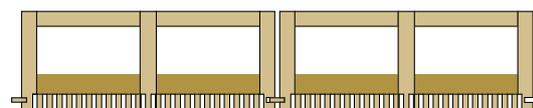
Acoustics type 5.1 Class of absorber: D
 Hole diameter: 15 mm
 Grid: 40 / 40 mm

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Sound absorption

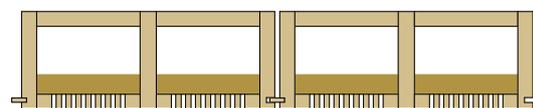
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$\alpha_w = 0,80$

Acoustics type 6 Class of absorber: B

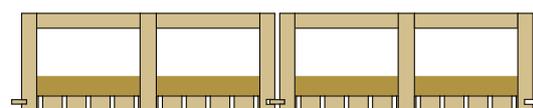
Hole diameter: 9 mm
Grid: 20 / 20 mm



$\alpha_w = 0,60$

Acoustics type 6.1 Class of absorber: C

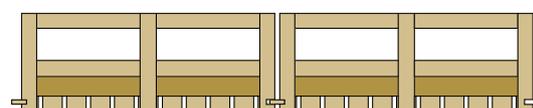
Hole diameter: 9 mm
Grid: 20 / 20 mm



$\alpha_w = 0,50$

Acoustics type 8 Class of absorber: D

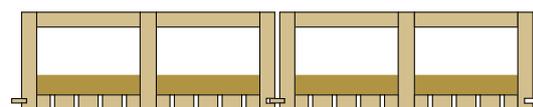
Slot dimension: 9 / 380 mm
Grid: 48 / 600 mm



$\alpha_w = 0,50$

Acoustics type 8 ZL Class of absorber: D

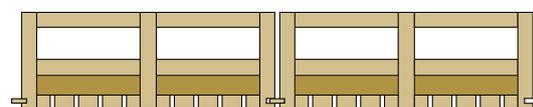
Slot dimension: 9 / 380 mm
Grid: 48 / 600 mm



$\alpha_w = 0,45$

Acoustics type 8.1 Class of absorber: D

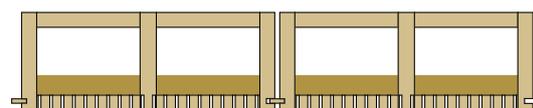
Slot dimension: 9 / 380 mm
Grid: 48 / 600 mm



$\alpha_w = 0,40$

Acoustics type 8.1 ZL Class of absorber: D

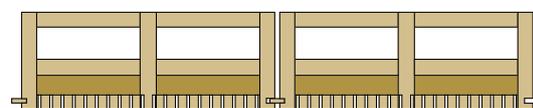
Slot dimension: 9 / 380 mm
Grid: 48 / 600 mm



$\alpha_w = 0,50$

Acoustics type 9 Class of absorber: D

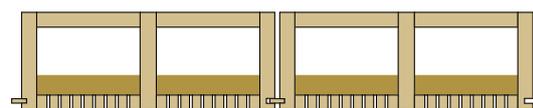
Slot dimension: 5.5 / 380 mm
Grid: 24 / 600 mm



$\alpha_w = 0,55$

Acoustics type 9 ZL Class of absorber: D

Slot dimension: 5.5 / 380 mm
Grid: 24 / 600 mm



$\alpha_w = 0,50$

Acoustics type 9.1 Class of absorber: D

Slot dimension: 5.5 / 380 mm
Grid: 24 / 600 mm

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