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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA
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European Technical Assessment

ETA-17/0992 of 09.04.2018

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	eggo®
Product family to which the construction product belongs	Prefabricated wood-based loadbearing stressed skin panels
Manufacturer	Egg Holz Kälin AG Eggerstrasse 1 8847 Egg Switzerland
Manufacturing plant	Egg Holz Kälin AG Eggerstrasse 1 8847 Egg Switzerland
This European Technical Assessment contains	28 pages including 5 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	ETAG 019, Prefabricated wood-based loadbearing stressed skin panels, edition November 2004, used according to Article 66 (3) of Regulation (EU) № 305/2011 as European Assessment Document.
This European Technical Assessment replaces	European Technical Assessment ETA-17/0992 of 19.01.2018.

Remarks

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may be made with the written consent of Österreichisches Institut für Bautechnik. Any partial reproduction has to be identified as such.

Specific parts

1 Technical description of the product

1.1 General

This European Technical Assessment (ETA)[1] applies to the open and closed box load bearing stressed skin panels

eggo®– box element (EK)
eggo®– floor element (EB)
eggo®– heavy load element (ES)
eggo®– roof element (ED)

eggo®-elements are factory made large-size floor and roof elements in softwood. The eggo®-elements have parallel skins and ribs at regular distances, see Annex 1.

Type according to ETAG 019[2], Clause 2.1:

- Open or closed box type with skins rigidly bonded to the entire length of the ribs with an adhesive
- 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.

eggo® and the boards for its manufacturing correspond to the specifications given in the Annexes 1 and 2. The material characteristics, dimensions and tolerances of eggo®, not indicated in these Annexes, are given in the technical file[3] 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 338.

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.

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1 In 2018 ETA-17/0992 was firstly issued as European Technical Assessment ETA-17/0992 of 19.01.2018 and amended to ETA-17/0992 of 09.04.2018.

2 Reference documents are listed in Annex 5.

3 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.

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

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 eggo®-elements and finger joints conforms to EN 15425 or EN 301.

1.2.3 Thermal insulation products

Thermal insulation products inserted into the eggo®-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 eggo®-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 eggo®-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 eggo®-elements are intended to be used as load bearing or non-load bearing elements 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 1995-1-1. 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 eggo®-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 eggo®-elements. Verification of stability of the works including application of loads on the products is not subject to the European Technical Assessment.

The following conditions shall be observed:

- Design of the eggo®-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 eggo®-elements.
- In service, the eggo®-elements are not exposed to detrimental moisture. The definitions of service classes 1 and 2 according to EN 1995-1-1 apply.
- The eggo®-elements are installed correctly.

Design of the products may be according to EN 1995-1-1 and EN 1995-1-2, taking into account of Annexes 2 and 3 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 characteristics of the eggo®-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 eggo® of 50 years, when installed in the works, provided that the product is 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 experience[4].

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.

[4] 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	Product performance
Basic requirement for construction works 1: Mechanical resistance and stability [1)]		
1	Load bearing capacity	Annex 2
2	Serviceability	Annex 2
3	Moisture content	Annex 2
Basic requirement for construction works 2: Safety in case of fire		
4	Reaction to fire	Annex 2
5	Resistance to fire	Annex 2
Basic requirement for construction works 3: Hygiene, health and the environment		
6	Water vapour permeability and moisture resistance	Annex 2
7	Water tightness	No performance assessed.
8	Content, emission and/or release of dangerous substances	3.1.1 and Annex 2
Basic requirement for construction works 4: Safety and accessibility in use		
9	Slipperiness of floors	No performance assessed.
10	Impact resistance	Annex 2
Basic requirement for construction works 5: Protection against noise		
11	Airborne sound insulation	Annex 2
12	Impact sound insulation	Annex 2
13	Sound absorption	No performance assessed.
Basic requirement for construction works 6: Energy economy and heat retention		
14	Thermal resistance	Annex 2
15	Air permeability	No performance assessed.
16	Thermal inertia	Annex 2
[1)] These characteristics also relate to basic requirement for construction works 4.		

3.1.1 Hygiene, health and the environment

The release of dangerous substances is determined according to Guideline for European Technical Approval ETAG 019, “Prefabricated wood-based loadbearing stressed skin panels”, Edition November 2004, used as European Assessment Document. No dangerous substances is the performance of eggo® in this respect.

NOTE In addition to the specific clauses relating to dangerous substances contained in the European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.2 Assessment methods

3.2.1 General

The assessment of the essential characteristics in Clause 3.1 of eggo® 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 Guideline for European Technical Approval ETAG 019, "Prefabricated wood-based loadbearing stressed skin panels", Edition November 2004, used as European Assessment Document.

3.2.2 Identification

The European Technical Assessment for eggo® 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.

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/EC the system of assessment and verification of constancy of performance to be applied to eggo® is System 1. System 1 is detailed in Commission Delegated Regulation (EU) № 568/2014 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 plan[5];

(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).

[5] 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.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

5.1 Tasks for the manufacturer

5.1.1 Factory production control

In the manufacturing plant the manufacturer shall establish and continuously maintain a factory production control. All procedures and specification adopted by the manufacturer shall be documented in a systematic manner. The factory production control shall ensure the constancy of performances of eggo® with regard to the essential characteristics.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan. The incoming raw materials shall be subject to controls by the manufacturer before acceptance. Check of incoming materials shall include control of inspection documents presented by the manufacturer of the raw materials.

The frequencies of controls conducted during manufacturing and on the assembled product are defined by taking account of the manufacturing process of the product and are laid down in the control plan.

The results of factory production control are recorded and evaluated. The records include at least the following data:

- Designation of the product, basic materials and components
- Type of control or test
- Date of manufacture of the product and date of testing of the product or basic materials or components
- Results of controls and tests and, if appropriate, comparison with requirements
- Name and signature of person responsible for factory production control

The records shall be kept at least for ten years time after the construction product has been placed on the market and shall be presented to the notified product certification body involved in continuous surveillance. On request they shall be presented to Österreichisches Institut für Bautechnik.

5.1.2 Declaration of performance

The manufacturer is responsible for preparing the declaration of performance. When all the criteria of the assessment and verification of constancy of performance are met, including the certificate of conformity issued by the notified product certification body, the manufacturer shall draw up a declaration of performance.

5.2 Tasks for the notified product certification body

5.2.1 Initial inspection of the manufacturing plant and of factory production control

The notified product certification body shall verify the ability of the manufacturer for a continuous and orderly manufacturing of eggo® according to the European Technical Assessment. In particular the following items shall be appropriately considered

- Personnel and equipment
- The suitability of the factory production control established by the manufacturer
- Full implementation of the control plan

5.2.2 Continuous surveillance, assessment and evaluation of factory production control

The notified product certification body shall visit the factory at least once a year for routine inspection. In particular the following items shall be appropriately considered

- 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.

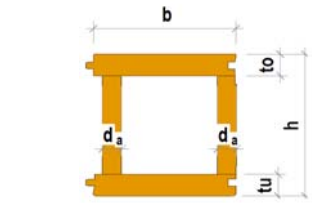
Issued in Vienna on 09.04.2018
by Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits

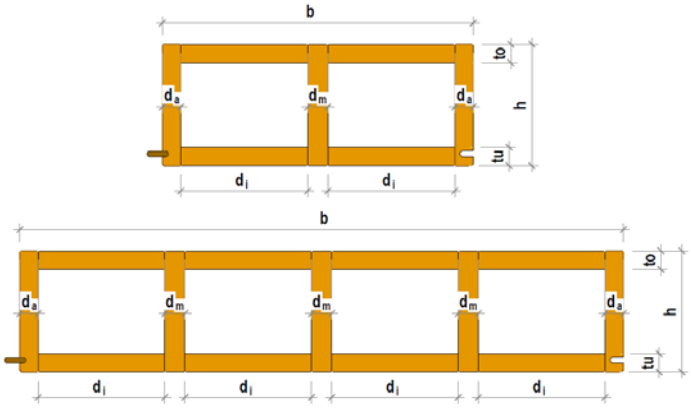
Managing Director

eggo®– box element (EK)



Height h	≤ 320 mm
Width b	≤ 200 mm
Thickness of ribs d_a	27 mm – 33 mm
Thickness skin tu	25 mm – 97 mm
Thickness skin to	25 mm – 40 mm
Length L	≤ 18 m
Spacing of stiffeners	≤ 1.25 m

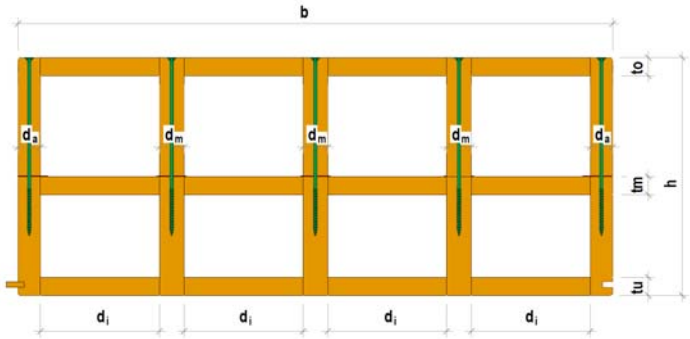
eggo®– floor element (EB)



Height h	≤ 320 mm
Width b	≤ 514 / 1 000 mm
With of lamellae d_i	210 mm
Thickness of outer ribs d_a	30.5 mm
Thickness of inner ribs d_m	33.5 mm
Thickness skin tu	25 mm – 97 mm
Thickness skin to	25 mm – 97 mm
Number of boxes	≤ 2 / 4
Length L	≤ 18 m
Spacing of stiffeners	≤ 1.25 m

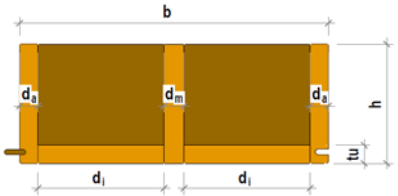
eggo®	Annex 1
Product specification	of European Technical Assessment ETA-17/0992 of 09.04.2018

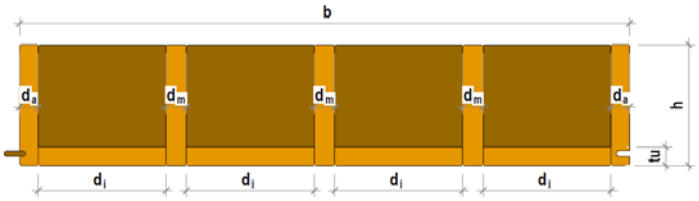
eggo®– heavy load element (ES)



Height h	300 < h ≤ 500 mm
Width b	≤ 1 000 mm
With of lamellae d_i	200 mm
Thickness of outer ribs d_a	37.5 mm
Thickness of inner ribs d_m	41.5 mm
Thickness skin tu	31 mm – 97 mm
Thickness skin tm	31 mm
Thickness skin to	31 mm – 97 mm
Number of boxes	≤ 4
Length L	≤ 18 m
Spacing of stiffeners	≤ 1.25 m

eggo®– roof element (ED)



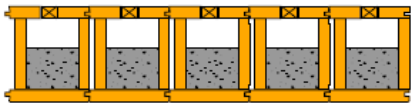


Height h	≤ 240 mm
Width b	≤ 514 / 1 000 mm
With of lamellae d_i	210 mm
Thickness of outer ribs d_a	30.5 mm
Thickness of inner ribs d_m	33.5 mm
Thickness skin tu	31 mm – 97 mm
Number of boxes	≤ 2 / 4
Length L	≤ 18 m
Spacing of stiffeners	≤ 1.0 m

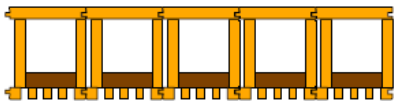
eggo®	Annex 1
Product specification	of European Technical Assessment ETA-17/0992 of 09.04.2018

Examples of assemblies of eggo®– box elements (EK)

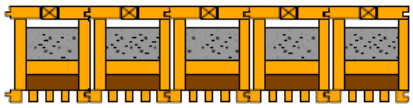
Airborne and impact sound insulation



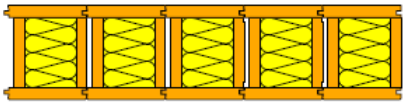
Sound absorption



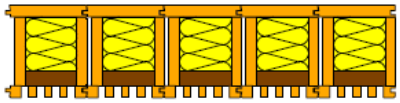
Airborne and impact sound insulation and sound absorption



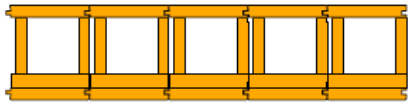
Thermal insulation



Thermal insulation and sound absorption

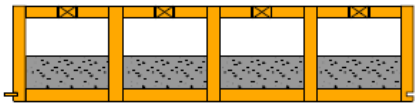


Resistance to fire

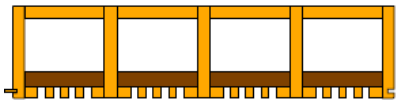


Examples of assemblies of eggo®– floor elements (EB)

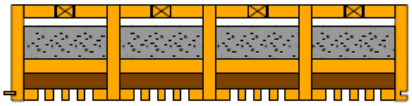
Airborne and impact sound insulation



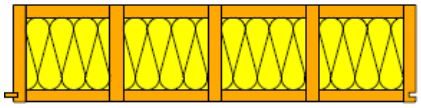
Sound absorption



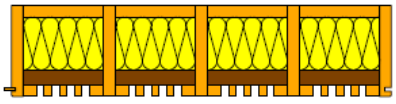
Airborne and impact sound insulation and sound absorption



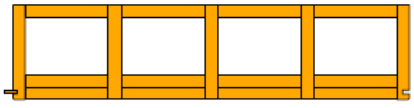
Thermal insulation



Thermal insulation and sound absorption



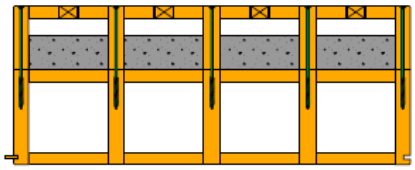
Resistance to fire



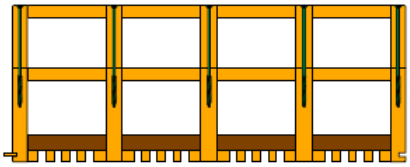
eggo®	Annex 1
Product specification	of European Technical Assessment ETA-17/0992 of 09.04.2018

Examples of assemblies of eggo®– heavy load elements (ES)

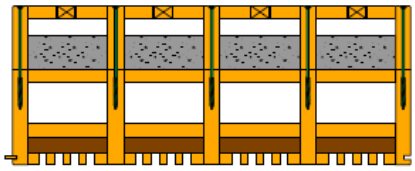
Airborne and impact sound insulation



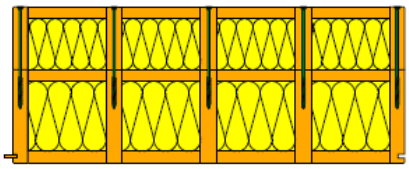
Sound absorption



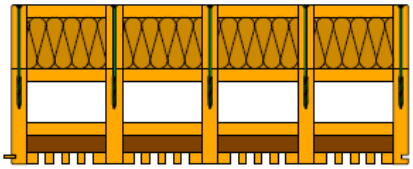
Airborne and impact sound insulation and sound absorption



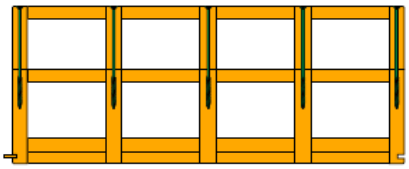
Thermal insulation



Thermal insulation and sound absorption

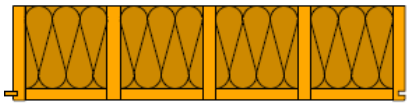


Resistance to fire

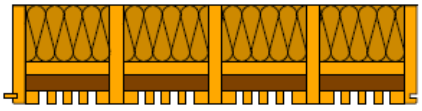


Examples of assemblies of eggo®– roof elements (ED)

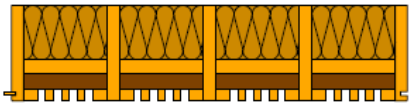
Thermal insulation



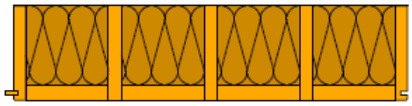
Sound absorption



Thermal insulation and sound absorption



Resistance to fire



eggo®	Annex 1
Product specification	of European Technical Assessment ETA-17/0992 of 09.04.2018

Table 2: Product characteristics of eggo®

BWR	Essential characteristic	Assessment method	Level / Class / Description
1	**Mechanical resistance and stability**		
	Load bearing capacity and serviceability	EN 1995-1-1 (Eurocode 5) [1)]	
	– Exemplary load bearing capacity (bending, shear)		Example, see Figure 1 and 2
	– Floor, exemplary serviceability for deflection w = l / 500		Example, see Figure 3 and 4
	– Roof, exemplary serviceability for deflection w = l / 350		Example, see Figure 5 and 6
	Moisture content	EN 13183-2	10 % ± 2 %

[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.

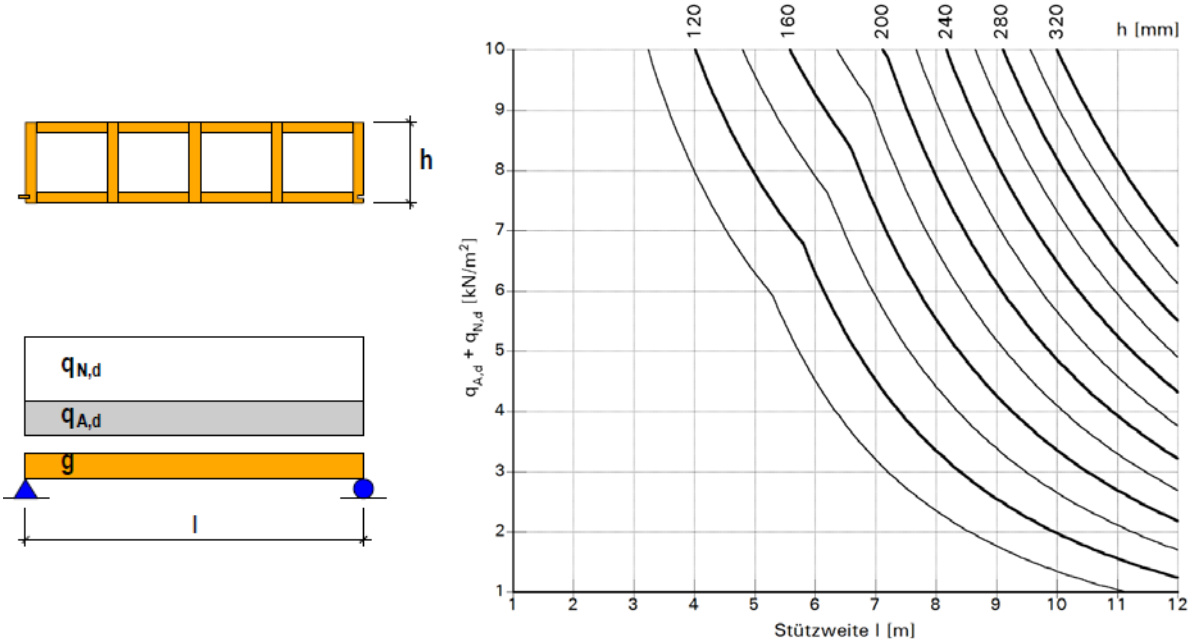


Figure 1: eggo®–floor element (EB) – Exemplary load bearing capacity for bending and shear for superimposed load $q_{A,d}$ and imposed load $q_{N,d}$ in service class 1, γ_G = 1.35, γ_M = 1.30, k_{mod} = 0.80, k_{cr} = 0.50, self-weight g included (tu = to = 31 mm, d_a = 30.5 mm, d_m = 33.5 mm)

eggo®	Annex 2
Characteristic data of eggo®	of European Technical Assessment ETA-17/0992 of 09.04.2018

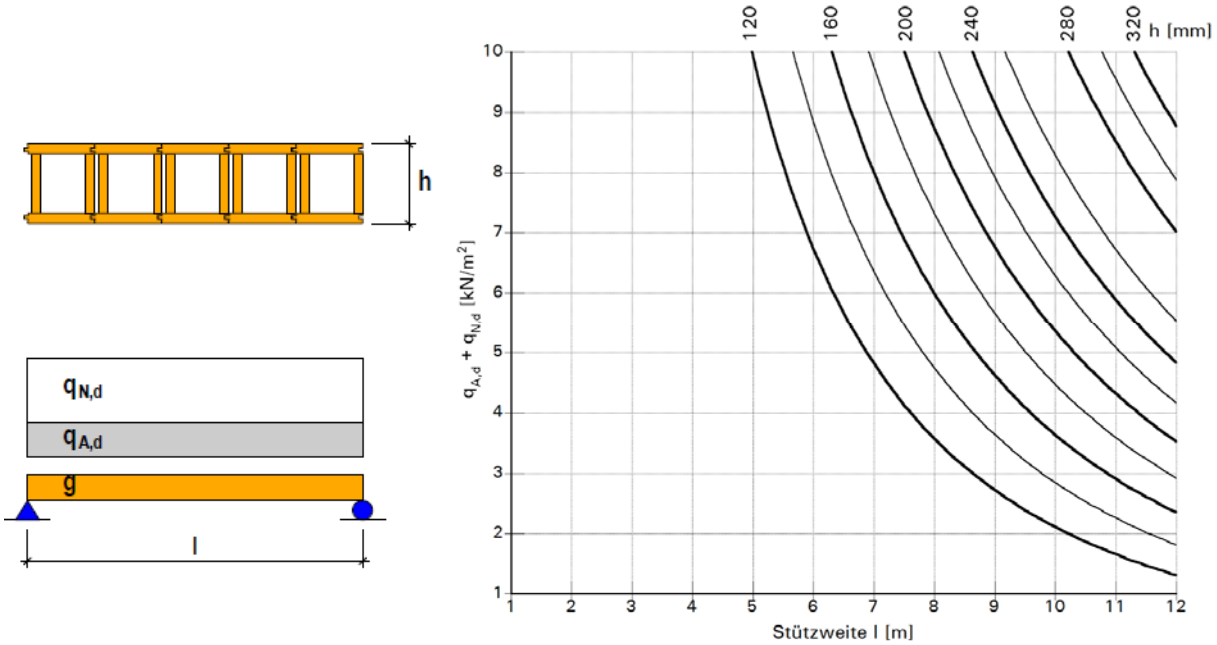


Figure 2: eggo®–box element (EK) – Exemplary load bearing capacity for bending and shear for superimposed load $q_{A,d}$ and imposed load $q_{N,d}$ in service class 1, γ_G = 1.35, γ_M = 1.30, k_{mod} = 0.80, k_{cr} = 0.50, self-weight g included (tu = to = 31 mm, d_a = 27 mm)

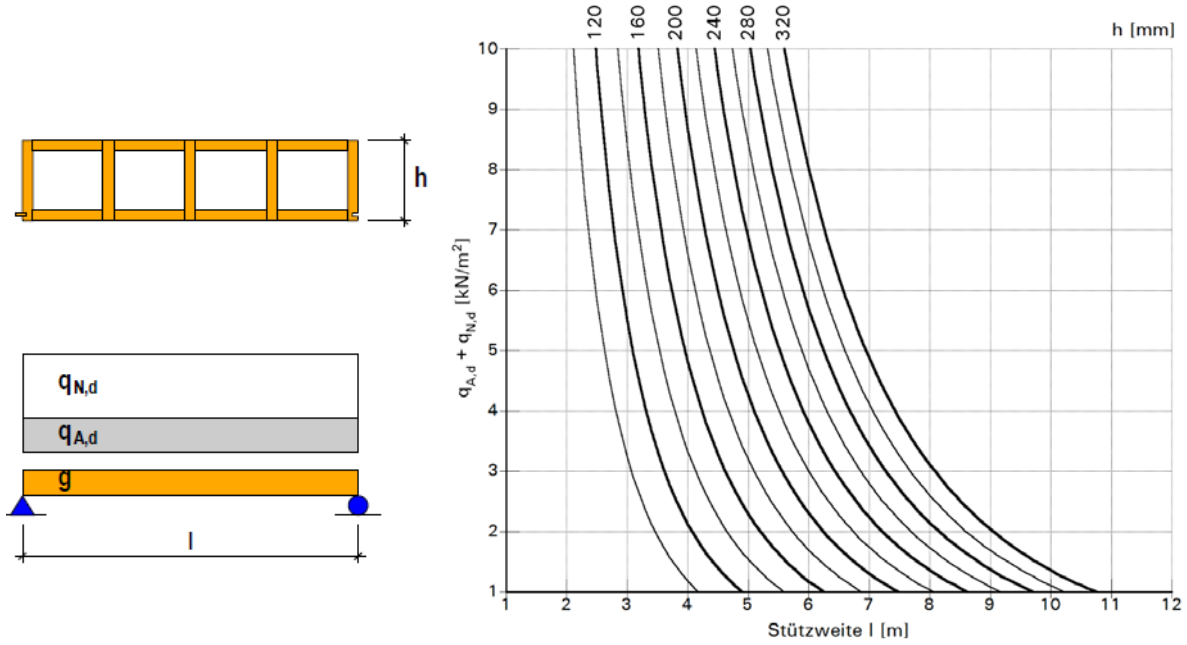


Figure 3: eggo®–floor element (EB) – Floor, exemplary serviceability for deflection w_{Cd} = l / 500 in infrequent loadcase, superimposed load $q_{A,d}$ and imposed load $q_{N,d}$ in service class 1, γ_G = 1, self-weight g included, creep active part considered by 67 % of total load (tu = to = 31 mm, d_a = 30.5 mm, d_m = 33.5 mm)

eggo®	Annex 2
Characteristic data of eggo®	of European Technical Assessment ETA-17/0992 of 09.04.2018

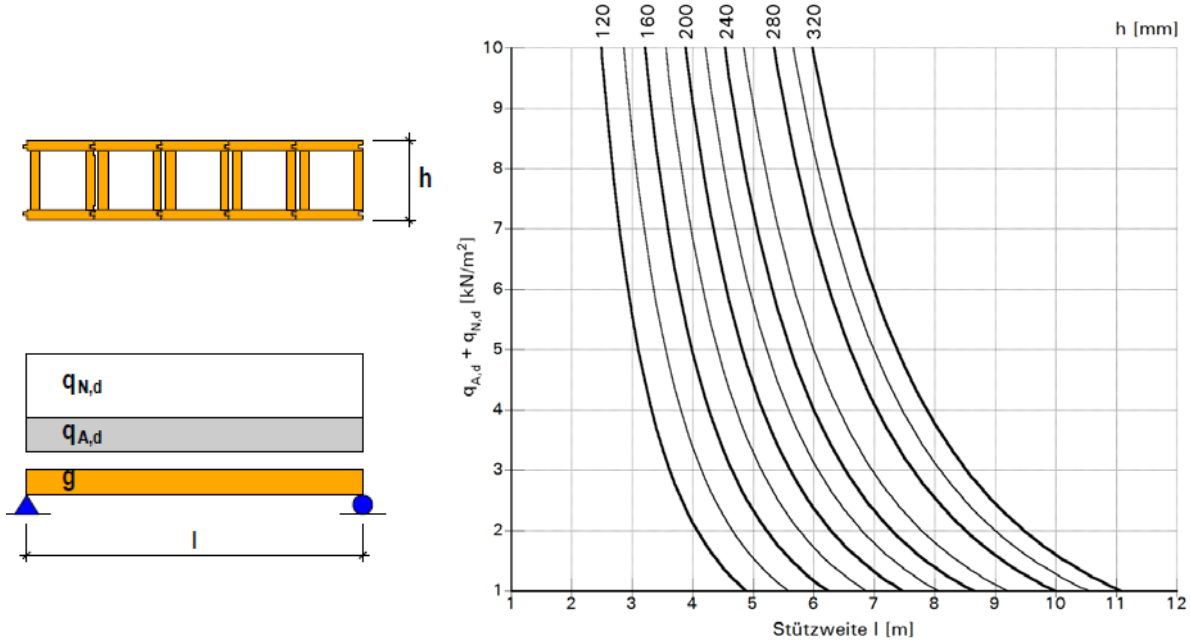


Figure 4: eggo®–box element (EK) – Floor, exemplary serviceability for deflection w_{Cd} = l / 500 in infrequent loadcase, superimposed load $q_{A,d}$ and imposed load $q_{N,d}$ in service class 1, γ_G = 1, self-weight g included, creep active part considered by 67 % of total load (tu = to = 31 mm, da = 27 mm)

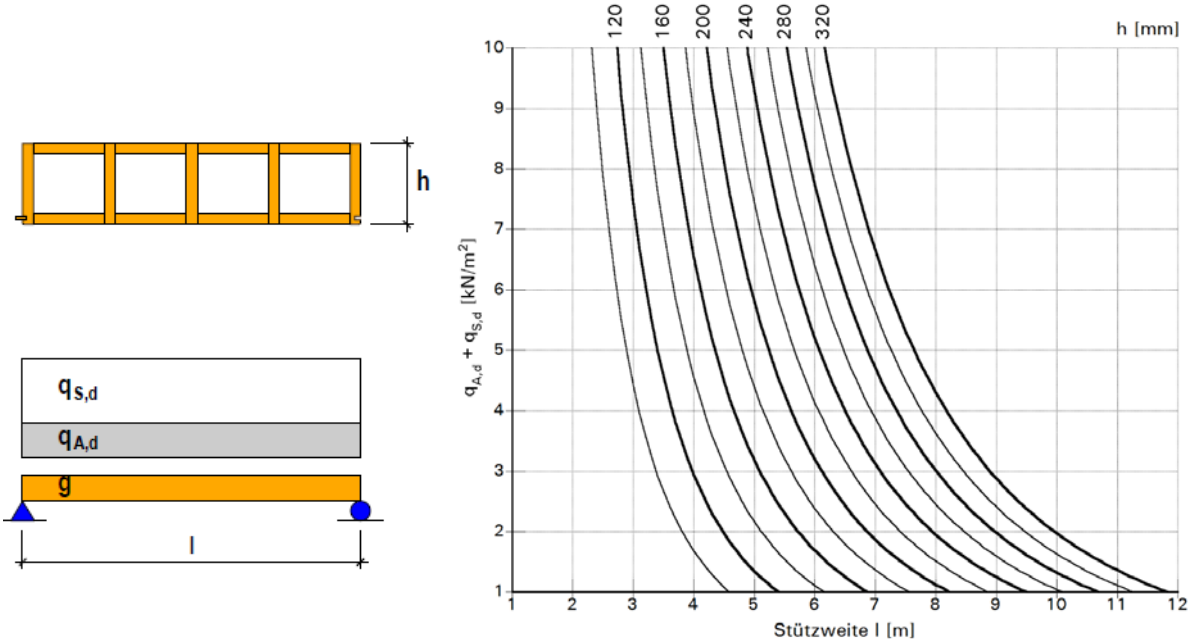


Figure 5: eggo®–floor element (EB) – Roof, exemplary serviceability for deflection w_{Cd} = l / 350 in frequent loadcase, superimposed load $q_{A,d}$ and snow load $q_{S,d}$ in service class 1, γ_G = 1, self-weight g included, creep active part considered by 83 % of total load (tu = to = 31 mm, da = 30.5 mm, dm = 33.5 mm)

eggo®	Annex 2
Characteristic data of eggo®	of European Technical Assessment ETA-17/0992 of 09.04.2018

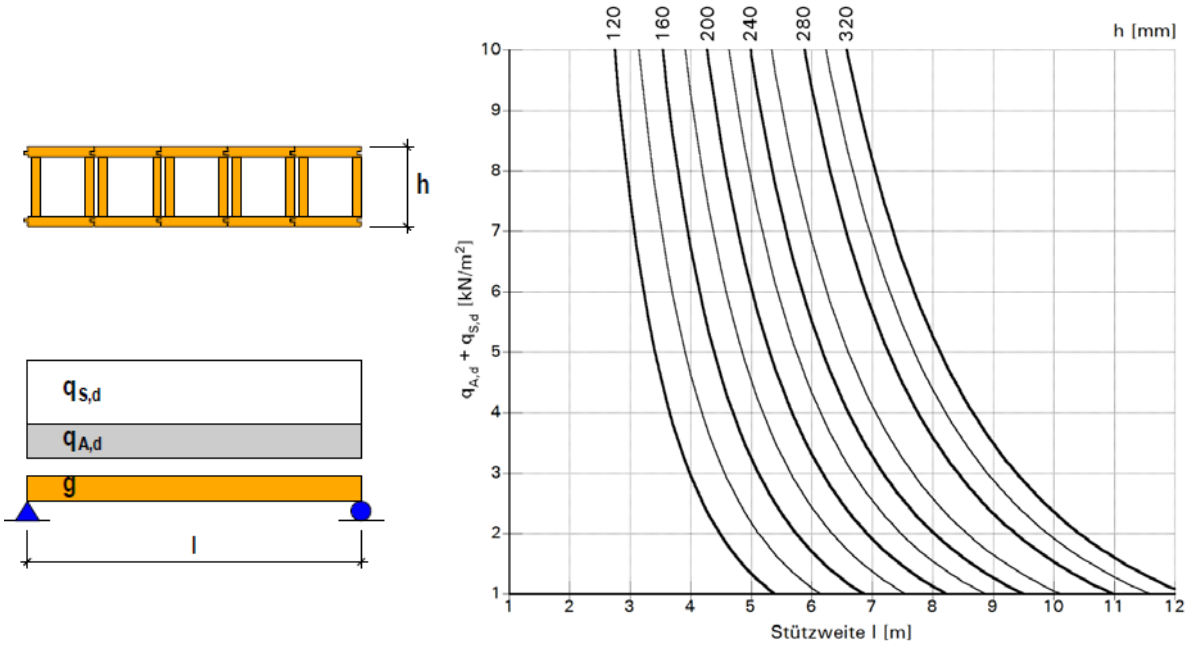


Figure 6: eggo®–box element (EK) – Roof, exemplary serviceability for deflection w_{Cd} = l / 350 in frequent loadcase, superimposed load $q_{A,d}$ and snow load $q_{S,d}$ in service class 1, γ_G = 1, self-weight g included, creep active part considered by 83 % of total load (tu = to = 31 mm, d_a = 27 mm)

eggo®	Annex 2
Characteristic data of eggo®	of European Technical Assessment ETA-17/0992 of 09.04.2018

BWR	Essential characteristic	Assessment method	Level / Class / Description
2	**Reaction to fire of eggo®-elements without perforation**		
	Floors, roofs	EN 13501-1	D-s1, d0
	eggo®-elements: box element, floor element, heavy load element, roof element Overall thickness of load bearing eggo®-elements……≥ 120 mm Thickness of skins and ribs in planed spruce……≥ 25 mm		
	Floorings	The product does not include floorings.	
	Reaction to fire of eggo®-elements with perforation		
	Floors, roofs	EN 13501-1	D-s1, d0
	eggo®-elements with perforation Type BS 9, BS 9-ZL, BS 15, BS 15-ZL, BS 20, BS 20-ZL, BL 20-250, BL 20-250-ZL, BV 30, BV 30-ZL, BV 20, BV 20-ZL, BV 15, BV 15-ZL, BV 9, BV 9-ZL, SS 8-400, SS 8-400-ZL, SV 8-400, SV 8-400-ZL, see Annex 3 Thickness of skins and ribs in planed spruce……≥ 25 mm		
	Floorings	The product does not include floorings.	
	Resistance to fire		
	Charring rate for calculation of fire resistance		
	Standard elements	EN 1995-1-2	β = 0.8 mm/min
	Perforated elements	EN 1995-1-2	see Annex 3
3	**Hygiene, health and environment**		
	Water vapour permeability μ	EN ISO 10456	50 (dry) to 20 (wet)
	Content, emission and/or release of dangerous substances – Formaldehyde	EN 717-1	E1
4	**Safety and accessibility in use**		
	Impact resistance	ETAG 019, Clause 5.4.2	Satisfactory

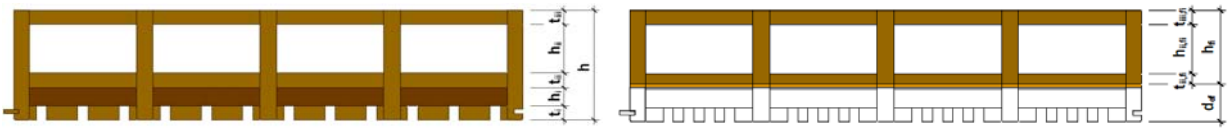
BWR	Essential characteristic	Assessment method	Level / Class / Description
5	**Protection against noise**		
	Exemplary airborne sound insulation of eggo®-elements for floors and roofs		
	Examples of eggo®-elements as given in Annex 4	EN ISO 10140-2, EN ISO 717-1	For weighted sound reduction index, R_w (C; C_{tr}), see Annex 4
	Exemplary impact sound insulation of eggo®-elements for floors		
	Examples of eggo®-elements as given in Annex 4	EN ISO 10140-3, EN ISO 717-1	For weighted normalised impact sound pressure level, $L_{n,w}$ (C_I), see Annex 4
6	**Energy economy and heat retention**		
	Thermal resistance Input parameters for calculation of thermal resistance acc. to EN ISO 6946 and EN ISO 10211		
	– Thermal conductivity λ of spruce wood	EN ISO 10456	0.12 W/(m·K)
	– Thermal conductivity λ of thermal insulation product	According to the specification of the product	
	Thermal inertia		
	– Char. density of spruce wood	EN 338	350 kg/m³
	– Heat capacity c_p of spruce wood	EN ISO 10456	1 600 J/(kg·K)
	– Thermal conductivity	See above	

eggo®	Annex 2
Characteristic data of eggo®	of European Technical Assessment ETA-17/0992 of 09.04.2018

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

Charring rate of eggo®-elements with perforation

Improvement of the acoustic performance is performed by perforating the lower skin with holes or slots. The types of perforation together with their charring rates β_1 are shown below. The charring rate of the acoustic elements can be determined by:



$d_{ef} = d_{char} + d_{red} = t_1 \cdot \beta_1 + t_2 \cdot \beta_2 + t_3 \cdot \beta_3 + t_4 \cdot \beta_4 + 7$ mm

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

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

$t = \sum t_i$..... required fire resistance time

t_1 ..... charring time in the area of the perforated skin

$t_{2,}\ t_4$ ..... charring time in the area of insulation product

t_3 ..... charring time in the area of wooden lamellae

β_1 ..... charring rate of perforated skin according to Annex 3

$\beta_{2/4} = 0.9 \cdot \sqrt{\frac{450}{\rho_{iso}}}$ mm/min charring rate for insulation product of wood fibre

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

$\beta_{2/4}$ = 1.6 mm/min charring rate for insulation product of mineral fibre (reaction to fire class A2-s1, d0 or better)

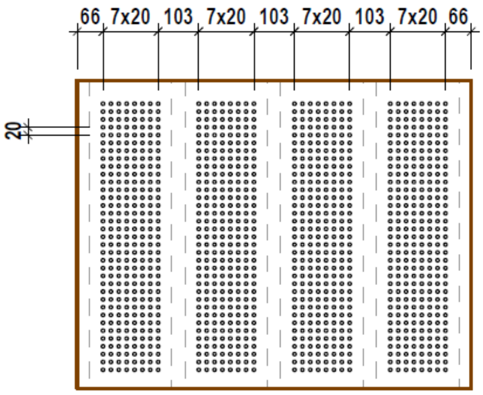
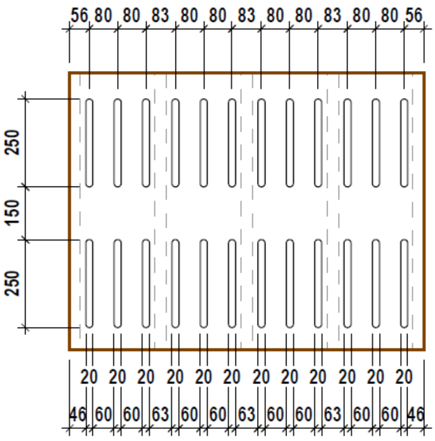
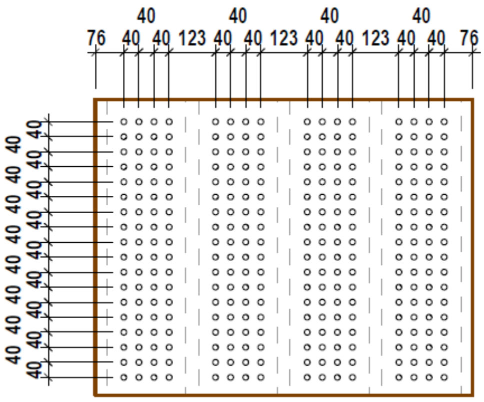
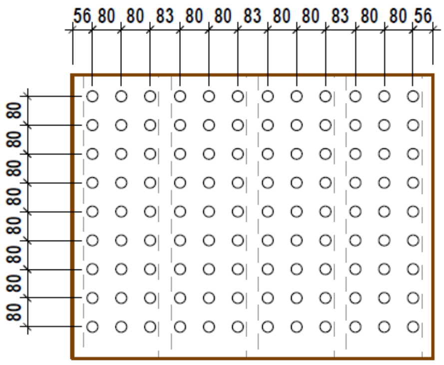
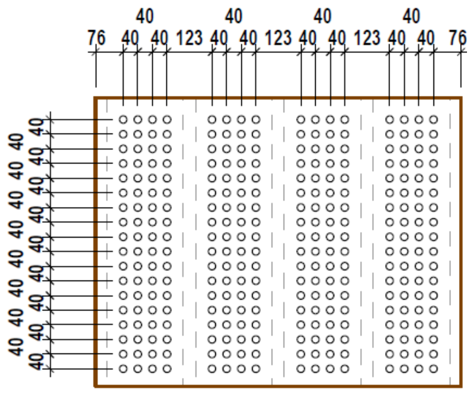
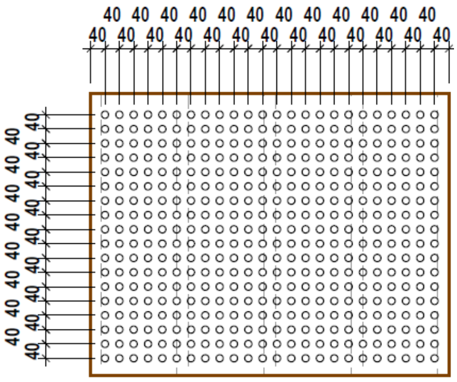
β_3 = 0.8 mm/min charring rate of wooden lamellae

d_{red} = 7 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

eggo®	Annex 3
Resistance to fire – Charring rates	of European Technical Assessment ETA-17/0992 of 09.04.2018

Charring rates for eggo®-elements with perforation

<table>
<tr><th>Type of eggo®-element</th><th>Charring rate β₁ in mm/min</th><th>Type of eggo®-element</th><th>Charring rate β₁ in mm/min</th></tr>
<tr><td>BS 9 and BS 9 ZL
 
</td><td>0.83</td><td>BL 20-250 and BL 20-250 ZL
 
</td><td>1.81</td></tr>
<tr><td>BS 15 and BS 15-ZL
 
</td><td>0.82</td><td>BV 30 and BV 30-ZL
 
</td><td>1.20</td></tr>
<tr><td>BS 20 and BS 20 ZL
 
</td><td>0.90</td><td>BV 20 and BV 20-ZL
 
</td><td>1.50</td></tr>
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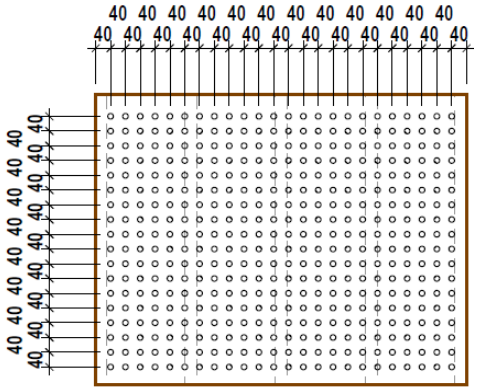
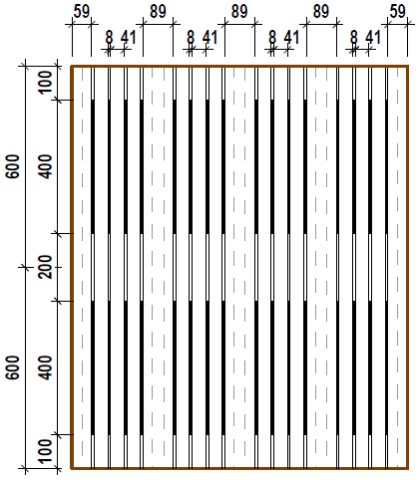
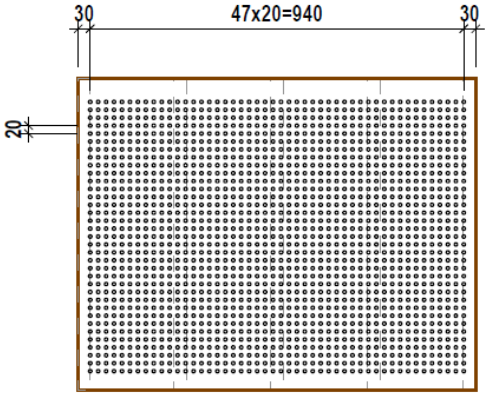
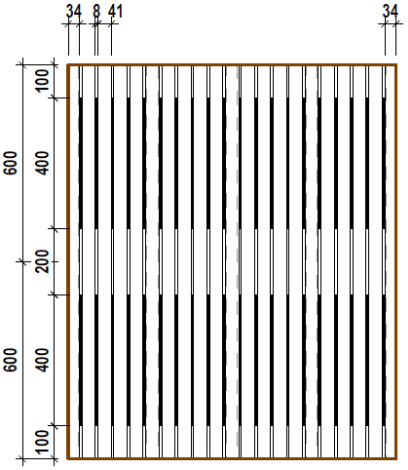
eggo®	Annex 3
Resistance to fire – Charring rates	of European Technical Assessment ETA-17/0992 of 09.04.2018

Type of eggo®-element	Charring rate β_1 in mm/min	Type of eggo®-element	Charring rate β_1 in mm/min
BV 15 and BV 15 ZL 	1.20	**SS 8-400 and SS 8-400-ZL** 	1.10
BV 9 and BV 9-ZL 	0.95	**SV 8-400 and SV 8-400-ZL** 	3.00

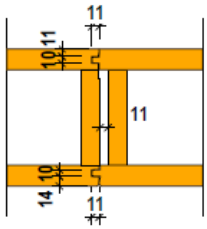
eggo®	Annex 3
Resistance to fire – Charring rates	of European Technical Assessment ETA-17/0992 of 09.04.2018

Joints between the eggo®-elements

Floors and roofs of fire resistance classes REI30 and REI60 shall be provided with appropriate joints between the eggo®-elements.

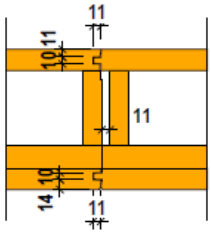
eggo®–box elements (EK)

REI 30



Joint width 11 mm
Joint with groove and tongue

REI 60

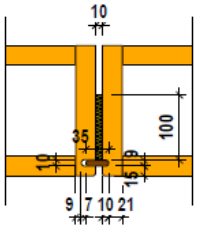


Joint width 11 mm
Joint with groove and tongue

Dimensions in mm

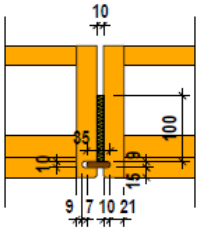
eggo®–floor element (EB)

REI 30



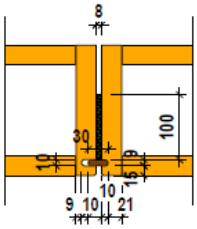
Joint width 10 mm
Joint with groove and separate tongue
Joint insulation[1)]

REI 60



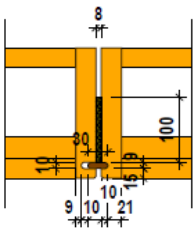
Joint width 10 mm
Joint with groove and separate tongue
Joint insulation[1)]

REI 30



Joint width 8 mm
Joint with groove and separate tongue
Joint insulation[1)]

REI 60

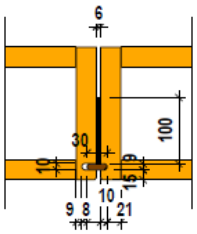


Joint width 8 mm
Joint with groove and separate tongue
Joint insulation[1)]

[1)] Joint insulation mineral wool 20 x 100 mm, 25 kg/m³, reaction to fire class at least A1

eggo®	Annex 3
Resistance to fire - Joints	of European Technical Assessment ETA-17/0992 of 09.04.2018

REI 30

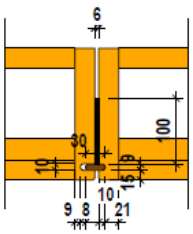


Joint width 6 mm

Joint with groove and separate tongue

Joint insulation[2)]

REI 60



Joint width 6 mm

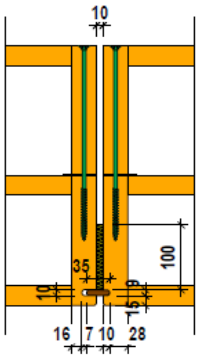
Joint with groove and separate tongue

Joint insulation[2)]

[2)] Joint insulation mineral wool 12 x 100 mm, 25 kg/m³, reaction to fire class at least A1

eggo®–heavy load element (ES)

REI 30

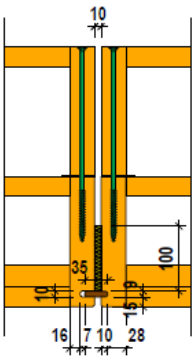


Joint width 10 mm

Joint with groove and separate tongue

Joint insulation[1)]

REI 60



Joint width 10 mm

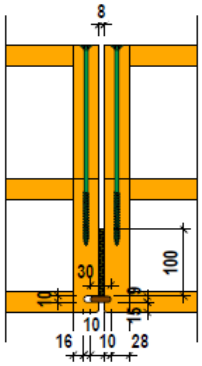
Joint with groove and separate tongue

Joint insulation[1)]

Dimensions in mm

eggo®	Annex 3
Resistance to fire - Joints	of European Technical Assessment ETA-17/0992 of 09.04.2018

REI 30

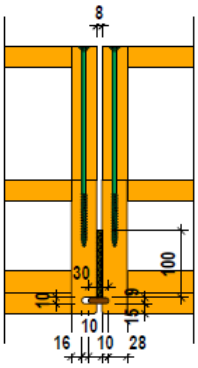


Joint width 8 mm

Joint with groove and separate tongue

Joint insulation[1)]

REI 60



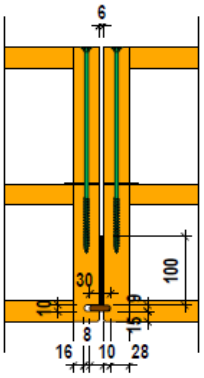
Joint width 8 mm

Joint with groove and separate tongue

Joint insulation[1)]

[1)] Joint insulation mineral wool 20 x 100 mm, 25 kg/m³, reaction to fire class at least A1

REI 30

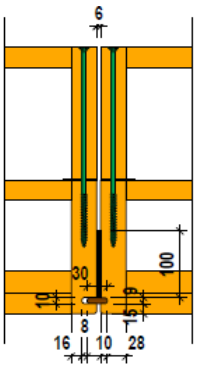


Joint width 6 mm

Joint with groove and separate tongue

Joint insulation[2)]

REI 60



Joint width 6 mm

Joint with groove and separate tongue

Joint insulation[2)]

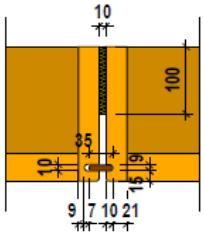
[2)] Joint insulation mineral wool 12 x 100 mm, 25 kg/m³, reaction to fire class at least A1

Dimensions in mm

eggo®	Annex 3
Resistance to fire - Joints	of European Technical Assessment ETA-17/0992 of 09.04.2018

eggo®–roof element (ED)

REI 30

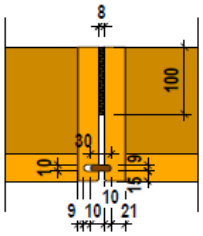


Joint width 10 mm

Joint with groove and separate tongue

Joint insulation[1)]

REI 30

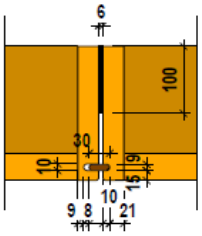


Joint width 8 mm

Joint with groove and separate tongue

Joint insulation[1)]

REI 30



Joint width 6 mm

Joint with groove and separate tongue

Joint insulation[2)]

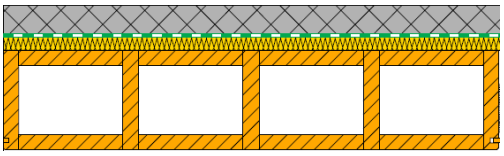
[1)] Joint insulation mineral wool 20 x 100 mm, 25 kg/m³, reaction to fire class at least A1

[2)] Joint insulation mineral wool 12 x 100 mm, 25 kg/m³, reaction to fire class at least A1

Dimensions in mm

eggo®	Annex 3
Resistance to fire - Joints	of European Technical Assessment ETA-17/0992 of 09.04.2018

Examples with improved airborne and impact sound performance

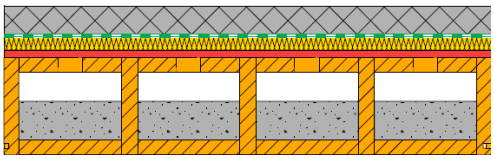


60 mm	Cement screed m' = 150 kg/m²
0.1 mm	PE-foil
30 mm	Impact sound insulation board ρ = 87.4 kg/m³, s' = 6 MN/m³
200 mm	eggo®– floor element EB 200 m' = 46.4 kg/m²

Mass per unit area of assembly: m' ≅ 199 kg/m²

$R_w(C; C_{tr})$ = 57 (-2; -8) dB

$L_{n,w}(C_I)$ = 63 (-3) dB

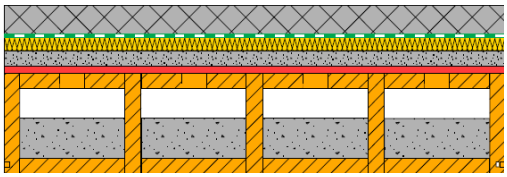


60 mm	Cement screed m' = 150 kg/m²
0.1 mm	PE-foil
30 mm	Impact sound insulation board ρ = 87.4 kg/m³, s' = 6 MN/m³
15 mm	OSB, 8.6 kg/m²
200 mm	eggo®– floor element EB 200 m' = 146.4 kg/m² including ballast weight: aggregates from calcium carbonate [1)]

Mass per unit area of assembly: m' ≅ 308 kg/m²

$R_w(C; C_{tr})$ = 74 (-2; -8) dB

$L_{n,w}(C_I)$ = 50 (-7) dB



60 mm	Cement screed m' = 150 kg/m²
0.1 mm	PE-foil
30 mm	Impact sound insulation board ρ = 87.4 kg/m³, s' = 6 MN/m³
30 mm	Ballast weight in paperboard honeycombs, 45 kg/m²
15 mm	OSB, 8.6 kg/m²
200 mm	eggo®– floor element EB 200 m' = 146.4 kg/m² including ballast weight: aggregates from calcium carbonate [1)]

Mass per unit area of assembly: m' ≅ 353 kg/m²

$R_w(C; C_{tr})$ = 81 (-4; -11) dB

$L_{n,w}(C_I)$ = 37 (0) dB

[1)] Aggregates from calcium carbonate, apparent density ρ = 1 400 to 1 600 kg/m³

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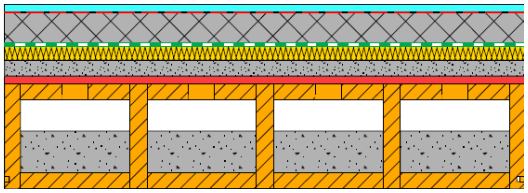
Airborne and impact sound insulation	of European Technical Assessment ETA-17/0992 of 09.04.2018

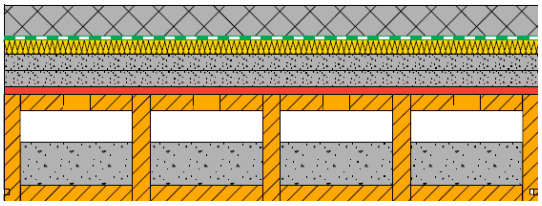


15 mm	Parquet flooring, 8.3 kg/m²
2 mm	Separation geotextile, 0.23 kg/m²
60 mm	Cement screed m' = 150 kg/m²
0.1 mm	PE-foil
30 mm	Impact sound insulation board ρ = 87.4 kg/m³, s' = 6 MN/m³
30 mm	Ballast weight in paperboard honeycombs, 45 kg/m²
15 mm	OSB, 8.6 kg/m²
200 mm	eggo®– floor element EB 200 m' = 146.4 kg/m² including ballast weight: aggregates from calcium carbonate [1)]

Mass per unit area of assembly : m' ≅ 361 kg/m²

$R_w(C; C_{tr})$ = 81 (-4; -11) dB

$L_{n,w}(C_I)$ = 35 (1) dB



60 mm	Cement screed m' = 150 kg/m²
0.1 mm	PE-foil
30 mm	Impact sound insulation board ρ = 87.4 kg/m³, s' = 6 MN/m³
2 x 30 mm	Ballast weight in paperboard honeycombs, 2 x 45 kg/m²
15 mm	OSB, 8.6 kg/m²
200 mm	eggo®– floor element EB 200 m' = 146.4 kg/m² including ballast weight: aggregates from calcium carbonate [1)]

Mass per unit area of assembly : m' ≅ 398 kg/m²

$R_w(C; C_{tr})$ = 83 (-4; -11) dB

$L_{n,w}(C_I)$ = 35 (2) dB

[1)] Aggregates from calcium carbonate, apparent density ρ = 1 400 to 1 600 kg/m³

eggo®	Annex 4
Airborne and impact sound insulation	of European Technical Assessment ETA-17/0992 of 09.04.2018

Guideline for European Technical Approval ETAG 019 “Prefabricated wood-based loadbearing stressed skin panels”, Edition November 2004, used as European Assessment Document

EN 301 (11.2017), Adhesives, phenolic and aminoplastic, for load-bearing timber structures – Classification and performance requirements

EN 338 (04.2016), Structural timber – Strength classes

EN 717-1 (10.2004), Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method

EN 1995-1-1 (11.2004), +AC (06.2006), +A1 (06.2008), +A2 (05.2014), Eurocode 5 – Design of timber structures – Part 1-1: General – Common rules and rules for buildings

EN 1995-1-2 (11.2004) +AC (06.2006), +AC (03.2009), Eurocode 5 – Design of timber structures – Part 1-2: General – Structural fire design

EN 13183-2 (04.2002), Moisture content of a piece of sawn timber – Part 2: Estimation by electrical resistance method

EN 13501-1+A1 (09.2009), Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 15425 (02.2008), Adhesives – One component polyurethane for load bearing timber structures – Classification and performance requirements

EN ISO 10140-2 (09.2010), Acoustics – Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation

EN ISO 10140-3 (09.2010), Acoustics – Laboratory measurement of sound insulation of building elements – Part 3: Measurement of impact sound insulation

EN ISO 717-1 (03.2013, Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation

EN ISO 717-2 (03.2013), Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation

EN ISO 6946 (12.2007), Building components and building elements – Thermal resistance and thermal transmittance – Calculation method

EN ISO 10211 (12.2007), Thermal bridges in building construction – Heat flows and surface temperatures - Detailed calculations

EN ISO 10456 (12.2007), +AC (12.2009), Building materials and products – Hygrothermal properties – Tabulated design values and procedures for determining declared and design thermal values

eggo®	Annex 5
Reference documents	of European Technical Assessment ETA-17/0992 of 09.04.2018