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to Article 29 of the Regulation (EU)  
No 305/2011 of the European  
Parliament and of the Council of 9  
March 2011

MEMBER OF EOTA



## European Technical Assessment ETA-07/0141 of 2023/10/13

### I General Part

**Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S**

**Trade name of the construction product:**

Rockpanel Durable 8 mm finish Colours and  
Rockpanel Durable 8 mm finish ProtectPlus

**Product family to which the above construction product belongs:**

Prefabricated mineral wool boards with organic or inorganic finish and with specified fastening system

**Manufacturer:**

ROCKWOOL B.V.  
Industrieweg 15  
NL-6045 JG Roermond  
Tel. +31 475 353 000  
Fax +31 475 353 550

**Manufacturing plant:**

ROCKWOOL B.V. / Rockpanel  
Konstruktieweg 2  
NL-6045 JD Roermond

**This European Technical Assessment contains:**

34 pages including 4 annexes which form an integral part of the document

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

European Assessment Document (EAD) no. EAD 090001-00-0404 for Prefabricated compressed mineral wool boards with organic or inorganic finish and with specified fastening system

**This version replaces:**

The previous ETA with the same number issued on 2021-12-03

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## II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

### 1 Technical description of product

#### General

Rockpanel Durable 8 mm finishes Colours and Rockpanel Durable 8 mm finish ProtectPlus is prefabricated compressed mineral wool boards with thermo-setting synthetic binders. The boards are fastened to timber, aluminium or steel subframes. Fastening to the timber subframe is carried out with corrosion resistant nails or screws or by bonding (with an intermediate Rockpanel strip with specified finish). Fastening to aluminium subframe is carried out with corrosion resistant rivets or by bonding.

Fastening to steel subframe is carried out with corrosion resistant screws or rivets

Mechanical fasteners, gaskets, adhesives with primers, strips for bonding and aluminium profiles are specified by the ETA-holder.

The Rockpanel Durable Colours panels are surface treated on one side with water-borne primer layers and a water-borne colored paint, in a range of colors.

The Rockpanel Durable ProtectPlus panels are surface treated on one side with water-borne primer layers, a water-borne colored paint, which has been provided with an extra anti-graffiti clear coat on the color paint. The finishes “Woods”, “Stones”, “Chameleon” and “Textured” contain an additional design layer on top of the colored paint.

The physical properties of the panels are indicated in table 1.

**Table 1**

Property	Value
Thickness, nominal	8 mm
Length, max	3050 mm
Width, max	1250 mm
Density, nominal	1050 kg/m <sup>3</sup>
Bending strength, length and width	$f_{05} \geq 27 \text{ N/mm}^2$
Modulus of elasticity	$m(E) \geq 4015 \text{ N/mm}^2$
Thermal conductivity EN 10456	0,37 W/(m • K)
Cumulative dimensional change	Length: 0,085 % Width: 0,084 %
Coefficient of thermal expansion, length and width	$\alpha = 10,5 \cdot 10^{-6} \text{ }^\circ\text{K}^{-1}$
Coefficient of moisture expansion 23 °C/50 %RH to 95 %RH	0,302 mm/m after 4 days

#### Finishes

The finish is indicated in table 2. The paints are provided in a number of colours.

Table 2	Finish Rockpanel Durable boards
Rockpanel Durable Colours: (water-borne polymer emulsion paint)	Colourpaint [a]
Rockpanel Durable ProtectPlus: (water-borne polymer emulsion paint with anti-graffiti clear coat)	Clear coat pure or Clear coat with wood design “Woods” e.g.: Teak, Alder, Cherry, etc. or Clear coat with design “Textured” (includes a rough surface) e.g. Volcarox Carrara white, Volcarox Sapphire Blue etc. or Clear coat with stone design “Stones” e.g. Mineral Chalk, Basalt Anthracite etc. or with metallic particles “Metals” e.g. Aluminium, Brass, etc. and Clear coat with design “Chameleon”.

[a] Also available with a water-borne polymer emulsion primer for painting on the building site

The colourfastness of the panels is indicated in table 3.

Table 3	Colourfastness Rockpanel Colours
Property	Value (ISO 105 A02)
Colour fastness after 5000 hours artificial weathering (TR010 Class S)	Rockpanel Durable Colours: 3-4 or better Rockpanel Durable ProtectPlus: 4 or better

#### Subframes

The panels are attached to the building by fixing to a sub-frame of aluminium, steel or wood.

The vertical battens should have a minimum thickness of 28 mm (solid wood).

Also LVL battens (Laminated Veneer Lumber) with a minimum thickness of 27 mm, according to EN 14374, can be used (Ultralam R, CE 0672-CPD-I)

#### Appropriate preservative treatment of subframes

Use the appropriate part of EN 335 to identify the “use class” of a given service environment and geographical location. Table 1 in EN 335 will assist in determining the biological agents that can attack timber in certain situations. The user can then consider the type and duration of performance required select an appropriate level of durability and ensure that the timber or wood-based product specified has either, as a natural (see EN 350-2) or an acquired characteristic durability as the result of appropriate preservative treatment (see EN 351-1).

The minimum thickness of the vertical aluminium profiles is 1,5 mm. The aluminium is AW-6060 according to EN 755-2. The  $R_m/R_{p0,2}$  value is 170/140 for profile T6 and 195/150 for profile T66.

The minimum thickness of the vertical steel profiles is either 1,0 mm [a] ( steel quality is S320GD +Z EN 10346 number 1.0250 , or equivalent for cold forming), or 1,5 mm [a] (steel quality EN 10025-2:2004 S235JR number 1.0038).

[a] *The minimum coating thickness (Z or ZA) is determined by the corrosion rate (amount of corrosion loss in thickness per year) which depends on the specific outdoor atmospheric environment.*

*The Zinc Life Time Predictor can be used to calculate the Corrosion Rate in  $\mu\text{m}/\text{y}$  for a Z coating: <http://www.galvinfo.com:8080/zclp/> [copyright The International Zinc association].*

*The coating designation (classification which determines the coating mass) shall be agreed between the contractor and the building owner.*

*Alternatively a hot dip galvanized coating according to EN ISO 1461 can be used.*

## Joins

### Horizontal joints on metal sub-constructions

The horizontal joints between the panels can be open in the case of steel supports or aluminium rail supports.

### Horizontal joints on timber sub-constructions

The horizontal joints between the panels are made with a Rockpanel “A” extruded aluminium chair profile or equivalent in the case of panels mechanically fixed on timber battens. The chair profile has an overlap of at least 15 mm on the board above the profile. See annex 1.

An EPDM gasket is fixed to the timber battens. In the event it concerns a non-ventilated construction a 3 mm thick EPDM foam gasket (self-adhering backside) is obliged. If the horizontal joint is closed with an aluminium chair profile, the vertical joint is backed with the 60 mm wide gasket and for the intermediate battens the 36 mm gasket is used.

In the case of open horizontal joints the width of the gasket 15 mm at both sides wider than the batten.

## Fasteners

The panels are mechanically fixed or bonded either to vertical timber (with intermediate Rockpanel strips and specified finish) or aluminium subframe. The mechanical fastening to steel subframe is carried out with stainless steel screws or stainless steel rivets. The mechanical fastening to timber battens is carried out

with either Rockpanel stainless steel screws 4,5× 35 mm no 1.4401 or 1.4578 (EN 10088) with heads in the colour of the panels or Rockpanel ring shank nails. Ring shank nails are available: option 1 "Rockpanel High Performance nail": 2,7/3,1 x 35 mm (dimensions according table 8.2) or option 2 "Rockpanel standard nail": 2,7/2,9x 32 /40 mm (dimensions standard version according table 8.1). The ring shank nails must be from stainless steel quality no. 1.4401 or 1.4578 (EN 10099) with heads in the with heads in the colour of the panels.

Fastening to aluminium is carried out with aluminium EN AW-5019 (AIMg5) rivets, head diameter 14 mm, shank diameter 5 mm, head colour coated. The mechanical fastening to steel subframe is carried out with either EN 10088 (no 1.4578) rivets, head diameter 15 mm, body diameter 5 mm, head colour coated, or EN 10088 (no 1.4567) rivets, head diameter 14 mm, body diameter 5 mm, head colour coated.

For correct fixing, a riveting tool with rivet spacer must be used , see annex 3 Table 8.4.

For fixing to steel frames also a stainless steel EN 10088 no. 1.4404 self- drilling screw, head diameter 12 mm is available. The screw is available in 5.5 x 25 for clamping thickness up to 10 mm and in 5,5 x 35 mm for clamping thickness up to 19 mm. See annex 3 table 8.5.

Bonding to both timber (with intermediate Rockpanel strips and specified finish) and aluminium rails is carried out with Rockpanel Tack-S adhesive. The bonding shall be carried out in accordance with the manufacturer’s instructions. See annex 1. Bonding is only allowed on vertical sub-constructions with a drained cavity for ventilated applications.

The maximum fixing distances, hole diameter and design value of the axial load appears from annex 2, tables 5, 6 and 7.

The installation method with the use of fixed points and moving points appears from table 7 and figure 8.

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

The boards are intended for external cladding and for fascias and soffits. The cladding on vertical timber battens with mechanically fixed boards can be carried out with or without ventilated cavities at the back. The cladding on vertical timber battens provided with mechanically fixed Rockpanel strips (with specified

finish) with the bonding system must be carried out with a ventilated cavity at the back. The cladding on vertical aluminum or steel support shall be carried out with a ventilated cavity at the back. See annex 1.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the kit of 50 years.

In addition, for aluminium support systems intended to be used for facades:

In some member states national climate conditions may reduce the service life of the aluminium support system to 35 years or more.

An additional assessment of the aluminium support system might be necessary to comply with Member State regulations or administrative provisions.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

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

Characteristic	Assessment of characteristic
<b>3.2 Safety in case of fire (BWR 2)</b>	
Reaction to fire	The aluminium profiles are classified as <b>Euroclass A1</b> in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364 Classification of panels: See table 4
<b>3.3 Hygiene, health and the environment (BWR 3)</b>	
Dangerous substances	The kit does not contain/release dangerous substances *), except Formaldehyde concentration 0,0105 mg/m <sup>3</sup> Formaldehyde class E1  The used fibres are not potential carcinogenic No biocides are used in the Rockpanel boards No flame retardant is used in the boards No cadmium is used in the boards.
Water vapour permeability	<b>Durable Colours:</b> $S_d < 1,80 \text{ m}$ at 23°C and 85 %RH <b>Durable ProtectPlus:</b> $S_d < 3,5 \text{ m}$ at 23°C and 85 %RH  The designer shall consider the relevant needs for ventilation, heating and insulation to minimise condensation in service.
Water permeability incl. joints for non-ventilated applications	<b>No performance assessed</b>
<b>3.4 Safety and accessibility in use (BWR 4)</b>	
In absence of national regulations the design values $X_d$ may be calculated as indicated in the ETA (see tables 6-1 up to and including 6-10). Below is mentioned the safety factors which has been used in the calculation of the design values. Fixing position and design value $X_d$ of the axial load M/E/C (Middle/Edge/Corner) of mechanical fixings corresponding to the wind load resistance (load acting perpendicular to the façade) <i>Remark:</i> Design value $X_d$ obtained by dividing the characteristic value $X_k$ by a partial factor $\gamma_M$ : $X_d = X_k / \gamma_M$	<b>Rockpanel rivets:</b> To an aluminium subframe, design value $X_d$ : <b>654/309/156 N</b> (Annex 2 Table 6-1 row (16))  <b>Rockpanel Screws for steel</b> To a steel subframe design value $X_d$ : <b>533/241/118</b> (Annex 2 Table 6-2 row (16))  <b>Rockpanel screws for timber:</b> Design value $X_d$ depends on the modification factor $k_{mod}$ , the strength class of the wood and the different material factors $\gamma_M$ . Boards to a solid timber subframe: see Annex 2 Tables 6-3 and 6-4, row (25), (26) and (27). Strips to a solid timber subframe (bonding system): see Annex 2 Tables 6-7 and 6-8, row (21), (22) and (23).  <b>Rockpanel High performance nails:</b> Design value $X_d$ depends on the modification factor $k_{mod}$ , the strength class of the wood and the different material factors $\gamma_M$ . Boards to a solid timber subframe see Annex 2 Table 6-6, row (25), (26) and (27).

Characteristic	Assessment of characteristic				
<p>Shear strength mechanical fixings Characteristic values</p>	<p><b>Rockpanel nails – standard version:</b> Design value <math>X_d</math> depends on the modification factor <math>k_{mod}</math>, the strength class of the wood and the different material factors <math>\gamma_M</math>. Boards to a solid timber subframe see Annex 2 Table 6-5, row (25), (26) and (27). Strips to a solid timber subframe (bonding system): see Annex 2 Table 6-9 and Table 6-10 row (21), (22) and (23).</p> <p><b>Rockpanel nails (standard and High-Performance version):</b> Failure load: <b>1325 N</b> Deformation: <b>15 mm</b></p> <p><b>Rockpanel rivets:</b> Failure load: <b>1722 N</b> Deformation: <b>1,7 mm</b></p> <p><b>Rockpanel screws (applies to screws to steel and screws to timber):</b> Failure load: <b>1549 N</b> Deformation: <b>9 mm</b></p>				
<p>Characteristic and design initial tensile strength Tack-S adhesive [a] Partial factor for material property <math>\gamma_M = 4</math> (tensile caused by wind load)</p>	<table border="1"> <tr> <td data-bbox="719 875 981 1234"> <p>Conditions +23°, -20°C, -40°C and +80°C</p> </td> <td data-bbox="981 875 1487 1234"> <p>Contact surfaces: rear of the board onto ProtectPlus: <math>X_k = 6,94 \text{ N/mm}^2</math> and <math>X_d = 1,74 \text{ N/mm}^2</math> ; rear of the board onto Colours: <math>X_k = 8,30 \text{ N/mm}^2</math> and <math>X_d = 2,08 \text{ N/mm}^2</math> Rear of the board onto primer 586: <math>X_k = 4,58 \text{ N/mm}^2</math> and <math>X_d = 1,15 \text{ N/mm}^2</math></p> </td> </tr> <tr> <td data-bbox="719 1234 981 1312"> <p>Conditions +23°, -20°C, and +80°C</p> </td> <td data-bbox="981 1234 1487 1312"> <p>Contact surfaces: rear of the board onto aluminium: <math>X_k = 5,92 \text{ N/mm}^2</math> and <math>X_d = 1,48 \text{ N/mm}^2</math></p> </td> </tr> </table>	<p>Conditions +23°, -20°C, -40°C and +80°C</p>	<p>Contact surfaces: rear of the board onto ProtectPlus: <math>X_k = 6,94 \text{ N/mm}^2</math> and <math>X_d = 1,74 \text{ N/mm}^2</math> ; rear of the board onto Colours: <math>X_k = 8,30 \text{ N/mm}^2</math> and <math>X_d = 2,08 \text{ N/mm}^2</math> Rear of the board onto primer 586: <math>X_k = 4,58 \text{ N/mm}^2</math> and <math>X_d = 1,15 \text{ N/mm}^2</math></p>	<p>Conditions +23°, -20°C, and +80°C</p>	<p>Contact surfaces: rear of the board onto aluminium: <math>X_k = 5,92 \text{ N/mm}^2</math> and <math>X_d = 1,48 \text{ N/mm}^2</math></p>
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<p>Characteristic and design initial tensile strength FoamTape[a]</p>	<table border="1"> <tr> <td data-bbox="719 1312 981 1693"> <p>Conditions +23°</p> </td> <td data-bbox="981 1312 1487 1693"> <p>Contact surfaces: - rear of the board onto ProtectPlus: <math>X_k = X_d = 0,73 \text{ N/mm}^2</math> Contact surfaces: - rear of the board onto Colours: <math>X_k = X_d = 1,17 \text{ N/mm}^2</math> Contact surfaces: rear of the board onto aluminium: <math>X_k = X_d = 0,47 \text{ N/mm}^2</math> Contact surfaces: - rear of the board onto primer 586: <math>X_k = X_d = 0,86 \text{ N/mm}^2</math></p> </td> </tr> </table>	<p>Conditions +23°</p>	<p>Contact surfaces: - rear of the board onto ProtectPlus: <math>X_k = X_d = 0,73 \text{ N/mm}^2</math> Contact surfaces: - rear of the board onto Colours: <math>X_k = X_d = 1,17 \text{ N/mm}^2</math> Contact surfaces: rear of the board onto aluminium: <math>X_k = X_d = 0,47 \text{ N/mm}^2</math> Contact surfaces: - rear of the board onto primer 586: <math>X_k = X_d = 0,86 \text{ N/mm}^2</math></p>		
<p>Conditions +23°</p>	<p>Contact surfaces: - rear of the board onto ProtectPlus: <math>X_k = X_d = 0,73 \text{ N/mm}^2</math> Contact surfaces: - rear of the board onto Colours: <math>X_k = X_d = 1,17 \text{ N/mm}^2</math> Contact surfaces: rear of the board onto aluminium: <math>X_k = X_d = 0,47 \text{ N/mm}^2</math> Contact surfaces: - rear of the board onto primer 586: <math>X_k = X_d = 0,86 \text{ N/mm}^2</math></p>				
<p>Characteristic and design initial shear strength Tack-S adhesive [a] Partial factor for material property <math>\gamma_M = 40</math> (shear caused by permanent load)</p>	<table border="1"> <tr> <td data-bbox="719 1693 981 2101"> <p>Conditions +23°, -20°C, -40°C and +80°C</p> </td> <td data-bbox="981 1693 1487 2101"> <p>Contact surfaces: rear of the board onto ProtectPlus and Colours: <math>X_k = 7,00 \text{ N/mm}^2</math> and <math>X_d = 0,175 \text{ N/mm}^2</math> Contact surfaces: rear of the board onto aluminium: <math>X_k = 8,58 \text{ N/mm}^2</math> and <math>X_d = 0,214 \text{ N/mm}^2</math> Contact surfaces: rear of the board onto primer 586: <math>X_k = 7,69 \text{ N/mm}^2</math> and <math>X_d = 0,192 \text{ N/mm}^2</math></p> </td> </tr> </table>	<p>Conditions +23°, -20°C, -40°C and +80°C</p>	<p>Contact surfaces: rear of the board onto ProtectPlus and Colours: <math>X_k = 7,00 \text{ N/mm}^2</math> and <math>X_d = 0,175 \text{ N/mm}^2</math> Contact surfaces: rear of the board onto aluminium: <math>X_k = 8,58 \text{ N/mm}^2</math> and <math>X_d = 0,214 \text{ N/mm}^2</math> Contact surfaces: rear of the board onto primer 586: <math>X_k = 7,69 \text{ N/mm}^2</math> and <math>X_d = 0,192 \text{ N/mm}^2</math></p>		
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[a] For the partial load factor  $\gamma_F = 1.5$  shall be taken[a] For the partial load factor  $\gamma_F = 1.5$  shall be taken[a] For the partial load factor  $\gamma_F = 1.5$  shall be taken

Characteristic	Assessment of characteristic
Characteristic and design initial shear strength FoamTape[a] Partial factor for material property $\gamma_M = 20$ (shear caused by temporary load)	
Condition +23°	Contact surfaces: rear of the board onto ProtectPlus and Colours : $X_k = 1,00$ ; $X_d = 0,05 \text{ N/mm}^1$ Contact surfaces: rear of the board onto aluminium: $X_k = 0,99 \text{ N/mm}^1$ ; $X_d = 0,05 \text{ N/mm}^1$ Contact surfaces: rear of the board onto primer 586: $X_k = 0,85 \text{ N/mm}^1$ ; $X_d = 0,04 \text{ N/mm}^1$
<i>[a] For the partial load factor <math>\gamma_F = 1.5</math> shall be taken</i>	
Deformation shear declared Tack-S adhesive	
Conditions +23°, -40°C, -20°C, and +80°C:	Contact surfaces: rear of the board onto - ProtectPlus and Colours: 7,5 to 12,7 mm Contact surfaces: rear of the board onto - aluminium: 9,0 to 12,2 mm Contact surfaces: rear of the board onto - primer 586: 9,4 to 12,2 mm
Impact resistance For definition of use category see Annex 6 Table 12	
Panels without a horizontal joint	Rockpanel durable 8 mm with finish Colours or finish protect plus fulfils the requirements for use category I. See impact use categories in table 9, annex 4
Panels with a horizontal joint ready accessible and vulnerable to impacts	Rockpanel durable 8 mm with finish Colours or finish ProtectPlus fulfils the requirements for use category II. See impact use categories in table 9, annex 4
Dimensional stability	
Cumulative dimensional change % Coefficient of thermal expansion $10^{-6} \text{ }^\circ\text{K}^{-1}$ Coefficient of moisture expansion 42% RH difference after 4 days mm/m	Length: 0,085 / Width: 0,084 Length: 10,5 / Width: 10,5 Length: 0,288 / Width: 0,317
Wind load resistance M/E/C	
Average strength, N	<b>Rivets: 1449 / 617 / 311</b> (according to Annex 2 Table 6-1)  <b>Screws for timber: 1105 / 482 /236</b> (according to Annex 2 Table 6-3 and Table 6-4)  <b>Screws for steel: 1105/482/236</b> (according to annex 2 Table 6-2)  <b>Nails – standard version: 1009 / 627 / 397</b> (according to Annex 2 Table 6-5)  <b>Nails - High performance version: 1009/627/397</b> (according to annex 2 Table 6-6)



Characteristic	Assessment of characteristic
Average failure load N/m <sup>2</sup>	<p><b>Rivets: 2567 / 2769 / 2958</b> (according to Annex 2 Table 6-1)</p> <p><b>Screws for timber: 1992 / 2161 / 2243</b> (according to Annex 2 Table 6-3)</p> <p><b>Screws for steel: 1992/2161/2243</b> (according to annex Table 6-2)</p> <p><b>Nails – standard version : 2637 / 4131 / 5162</b> (according to Annex 2 Table 6-5)</p> <p><b>Nails - High performance version: 2637/4131/5162</b> (according to annex 2 Table 6-6)</p>
Mechanical resistance of panels	<b>See section 1, table 1</b>
Resistance to Hygrothermal cycles	<b>Pass</b>
Immersion in water without UV	
21 Days	<p>Characteristic tensile strength for contact surfaces: rear of the board onto ProtectPlus and Colours: <math>X_k = 2,80 \text{ N/mm}^1</math></p> <p>Contact surfaces rear of the board onto primer 586: <math>X_k = 5,44 \text{ N/mm}^1</math></p> <p>Contact surfaces: rear of the board onto aluminium: <math>X_k = 3,12 \text{ N/mm}^1</math></p>
42 days	<p>Characteristic tensile strength for contact surfaces: rear of the board onto ProtectPlus and Colours: <math>X_k = 2,22 \text{ N/mm}^1</math></p> <p>Contact surfaces: rear of the board onto primer 586: <math>X_k = 4,73 \text{ N/mm}^1</math></p> <p>Contact surfaces: rear of the board onto aluminium: <math>X_k = 2,58 \text{ N/mm}^1</math></p>
Humidity and NaCl	Characteristic tensile strength for contact surfaces: rear of the board onto aluminium: $X_k = 6,03 \text{ N/mm}^1$
Humidity and SO <sub>2</sub>	Characteristic tensile strength for contact surfaces: rear of the board onto aluminium: $X_k = 6,67 \text{ N/mm}^1$
<b>3.7 Sustainable use of natural resources (BWR 7)</b>	No performance assessed
<b>3.8 Aspects of durability</b>	
Resistance to Xenon Arc exposure	<b>Pass</b>

\*) In addition to the specific clauses relating to dangerous substances contained in this 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.

**Table 4** Reaction to fire classification

The panels have been classified in accordance with EN 13501-1 with the following parameters:

<b>Table 4</b> Euroclass classification of different constructions with Rockpanel boards			
Fixing method	Ventilated or non-ventilated	vertical wooden subframe	vertical aluminium subframe
		Durable Colours and Durable ProtectPlus	
mechanically fixed	Non-ventilated. Cavity filled with mineral wool	<b>B-s1,d0</b> closed horizontal joint	
	Ventilated with EPDM gasket on the battens [a] [d]	<b>B-s2,d0</b> open 6 mm horizontal joint	
	Ventilated with 6 or 8 mm Rockpanel strips on the battens [b] [d]	<b>B-s2,d0</b> open 6 mm horizontal joint	
	Ventilated with 9 mm wind board in front of insulation and > 20 mm cavity, with EPDM gasket on the battens.	<b>B-s1, d0</b> open 6 mm horizontal joint	
	Ventilated with 8 mm Rockpanel strips on the battens [b]	<b>B-s1,d0</b> open 6 mm horizontal joint for finish white and black [c]	
bonded	ventilated with 8 mm RockPanel strips on the battens [b]	<b>B-s2,d0</b> open 6 mm horizontal joint	
	ventilated		<b>B-s2,d0</b> open 6 mm horizontal joint

[a] width of the gasket 15 mm at both sides wider than the batten

[b] width of the strip 15 mm at both sides wider than the batten

[c] also valid for a mixture of the the colours white and black

[d] also valid for boards with a primer finish

**Field of application**

Further to the limitations described in section 1 of the ETA, the following field of application applies.

**Euroclass classification**

The classification mentioned in table 4 is valid for the following end use conditions:

**Mounting:**

- Mechanically fixed or adhered as described in table 4, which are attached to the subframe mentioned below
- Adhered to a wooden subframe with intermediate Rockpanel strips mechanically fixed
- The panels are backed with min. 50 mm mineral wool insulation with density 30-70 kg/m<sup>3</sup> according to EN 13162 with a cavity between the panels and the insulation (mechanically fixed)
- The panels are backed with min. 40 mm mineral wool insulation with density 30-70 kg/m<sup>3</sup> according to EN 13162 without an air gap between the wooden subframe (mechanically fixed – non ventilated)
- The panels are backed with min. 50 mm mineral wool insulation with density 30-70 kg/m<sup>3</sup> according to EN 13162 with a cavity between the panels and the insulation (fixing method Adhesive Rockpanel Tack-S)

**Substrates:**

- Concrete walls, masonry walls, timber framing

**Insulation:**

- Ventilated constructions: The battens are backed with min. 50 mm mineral wool insulation with density 30-70 kg/m<sup>3</sup> according to EN 13162 with a cavity of min. 28 mm between the panels and the insulation
- Non-ventilated constructions: The panels are backed with min. 40 mm mineral wool insulation with 30-70 kg/m<sup>3</sup> between the battens and min. 50 mm with density 30-70 kg/m<sup>3</sup> behind the battens without air gap
- Ventilated construction and fixing method adhesive Rockpanel Tack-S: The panels are backed with min. 50 mm mineral wool insulation with density 30-70 kg/m<sup>3</sup> according to EN 13162 with a cavity of of min. 36 mm between the panels and the insulation
- Results are also valid for all greater thickness of mineral wool insulation layer with the same density and the same or better reaction to fire classification
- Results are also valid for the same type of panel used without insulation, if the substrate chosen according to EN 13238 is made of panel with Euro class A1 or A2 (e.g. fibre-cement panel)

Subframe:

- Vertical softwood battens without fire retardant treatment, thickness minimum 28 mm
- Test results are also valid for the same type of panel with aluminium or steel frame
- Test results are also valid for the same type of panel with vertical LVL battens, without fire retardant treatment, thickness minimum 27 mm

Fixings:

- Results are also valid with higher density of the fixing devices
- Test results are also valid for the same type of panel fixed by rivets made of the same material of screws and vice versa

Cavity:

- Unfilled or filled with insulation of stone wool with a nominal density 30-70 kg/m<sup>3</sup> according to EN 13162
- The depth of the cavity is minimum 28 mm
- Test results are also valid for other higher thickness of air space between the back of the board and the insulation

Joints:

- Vertical joints are with either an EPDM foam gasket (3 mm non compressive thickness), flat EPDM gasket (0,75 mm) or Rockpanel strip backing as described in table 4. Horizontal joints can be open (ventilated constructions) or with an aluminium profile (ventilated and non-ventilated constructions)
- The result from a test with an open horizontal joint is also valid for the same type of panel used in applications with horizontal joints closed by steel or aluminium profiles

The classification is also valid for the following product parameters:

Thickness:

- Nominal 8 mm

Density

Nominal 1050 kg/m<sup>3</sup>

**Aspects related to the performance of the product**

All materials shall be manufactured by ROCKWOOL B.V. or by subcontractors under the responsibility of ROCKWOOL B.V.

The European Technical Assessment is issued for the product on the basis of agreed data/information, deposited with ETA-Danmark, which describes the product that has been assessed and judged. Changes to the product or production process, which could result in

this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

Installation details and application details for the man on site are given by ROCKWOOL B.V. / Rockpanel in the manufacturer's application guide technical dossier which forms part of the documentary material for this ETA. On every pallet label and/or on the protective film of every board the website is printed which guides the end user to the most actual information.

For non-ventilated use, the substrate shall be airtight.

The boards are in general mounted with a joint width of between 5 and 8 mm.

If the junctions are to be sealed, only durable sealants should be used with a good adhesion on the edges of the boards and a good UV-stability. To prevent sticking to the subframe, a PE-film or tape can be used.

The boards for external cladding shall not be fixed over building or settlement joints. Where settlement joints are located in the building the same movements of the building and substructure shall be possible in the external cladding.

The water diffusion resistance of the boards is declared as a means for the designer to decide whether they are sufficiently vapour permeable, especially when used for cladding without ventilated cavities at the back. The designer can then establish that condensation in the entire wall as a result of water vapour diffusion will not occur or will occur only to an extent where damage is not caused during the condensation period and the wall will dry out again during the evaporation period. The designer shall consider the critical moisture content for all the integrated materials.

For non-ventilated intended use, the pressure level preceding the pressure level where leakage occurs is declared as a means for the designer to decide on the necessity of the use of a vapour control membrane.

The panels should not be taken into account when designing a timber stud wall to resist racking forces.

The holes for the fixings are drilled into the panels not less than 15 mm from a vertical edge and 50 mm from a horizontal edge (see Annex 2). The panels are fixed making sure that the screws are not over-tightened.

## **4 Attestation and verification of constancy of performance (AVCP)**

### **4.1 AVCP system**

According to the decision 2003/640/EC of the European Commission as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1, since there is a clearly identifiable stage in their production which results in an improvement of fire performance due to the limiting of organic material.

## **5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

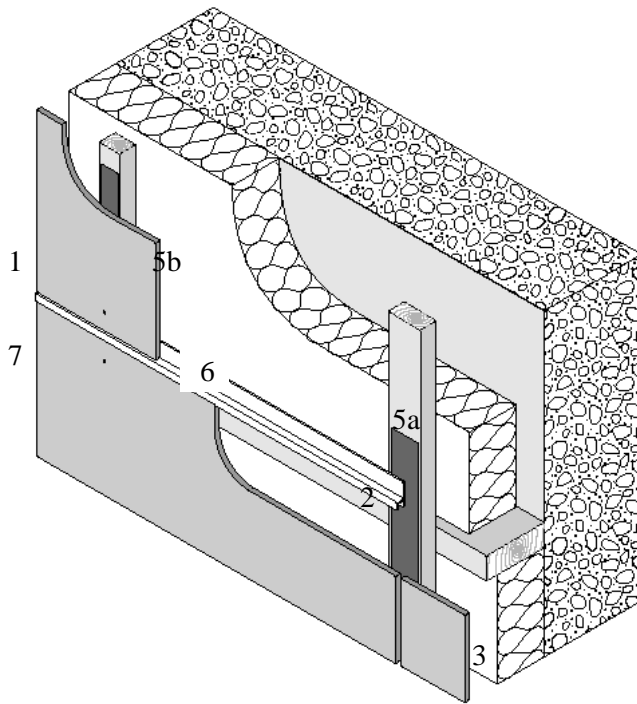
Issued in Copenhagen on 2023-10-13 by



Thomas Bruun  
Managing Director, ETA-Danmark

**Annex 1**  
**Pre-fabricated compressed mineral wool boards with organic or inorganic finish**

Figure 1a. Ventilated intended use on vertical timber battens



1. Compressed mineral wool board with organic or inorganic finish
2. EPDM gasket. For non-ventilated application (picture 1b), the EPDM foam gasket is obliged.
3. Timber beam
4. Vapour barrier
5. Batten: a - joint and b - intermediate
6. Insulation
7. Rockpanel "A" – 8 mm extruded aluminium chair profile or equivalent

Figure 1b. Non ventilated intended use on vertical timber battens

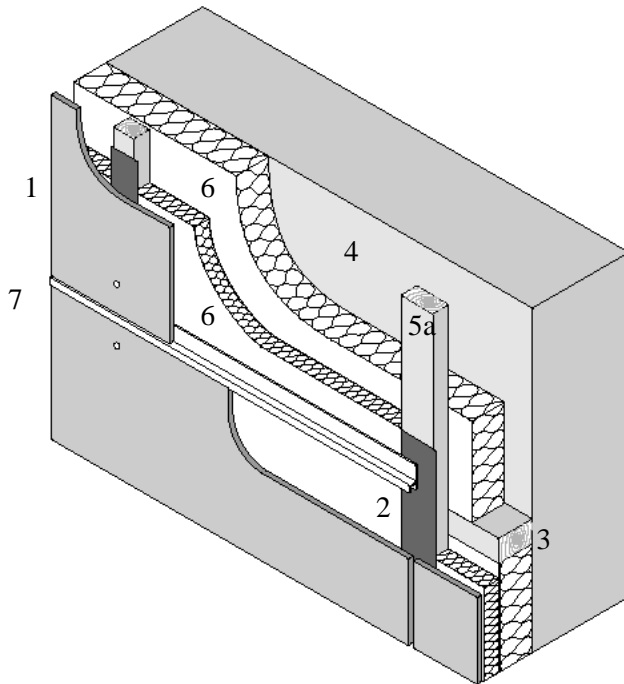
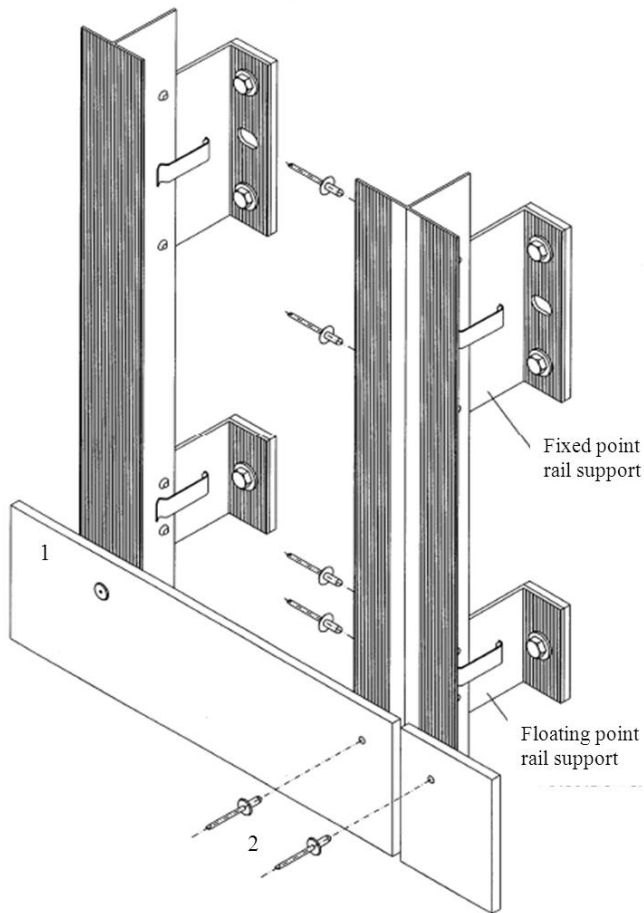
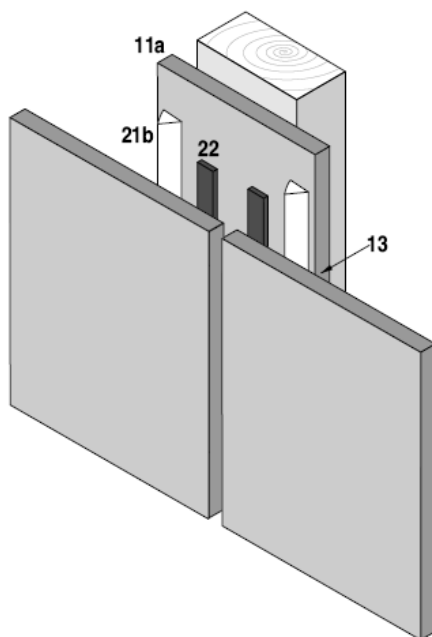


Figure 2. Ventilated intended use on vertical metal subframe



1. Compressed mineral wool board with organic or inorganic finish
2. Rivet fixing or equivalent

Figure 3. Bonding with Tack-S. Only on ventilated intended use



- 11a 8 mm Rockpanel Durable strip, finish 'ProtectPlus' (version without structure) or 'Colours'; strips mechanically fixed with Rockpanel nails or screws
13. Reverse of the board primered with 'MSP Transparent' or '586'
- 21b. Triangular adhesiveridge with a height of 9 mm
22. 'FoamTape' self adhesive on two sides 3\*12 mm

Figure 4 Bonding with Tack-S onto aluminum subframe

Figure 4.1 Vertical joints between boards

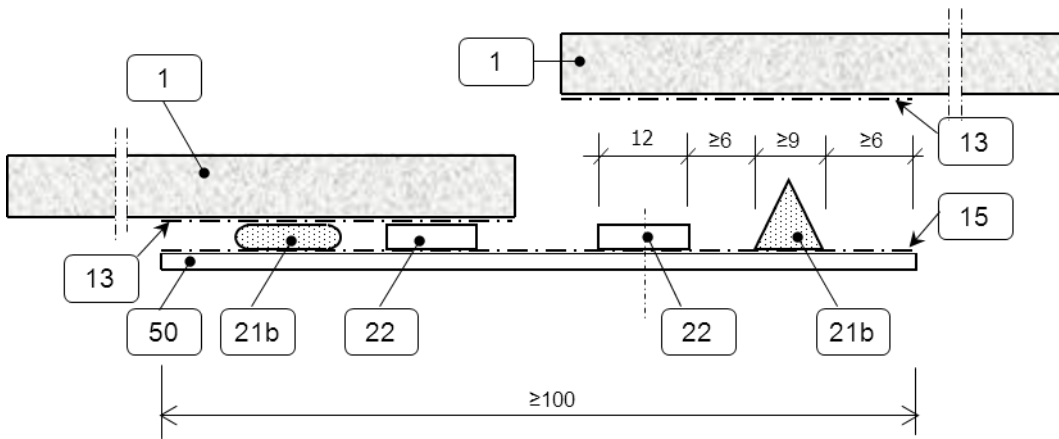
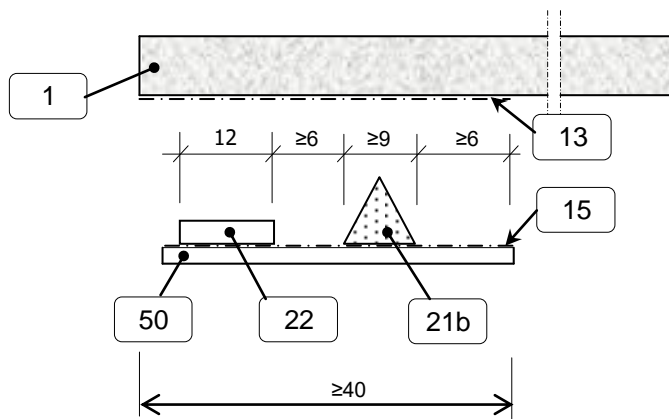


Figure 4.2 Bonding onto end profiles and onto intermediate profiles



- 1 Compressed mineral wool board with organic or inorganic finish
- 13 'Primer MSP' applied with a roller in one layer or 'primer 586'
- 15 "Prep M" one-step pretreatment
- 21b 'Tack-S' continuous triangular adhesive ridge of 9 mm
- 22 'FoamTape' self adhesive on two sides 3\*12 mm (with a release foil on one side)
- 50 Aluminium subframe

Figure 5 Bonding with Tack-S onto wooden subframe with intermediate 8 mm Rockpanel strips

Figure 5.1 Vertical joints between boards

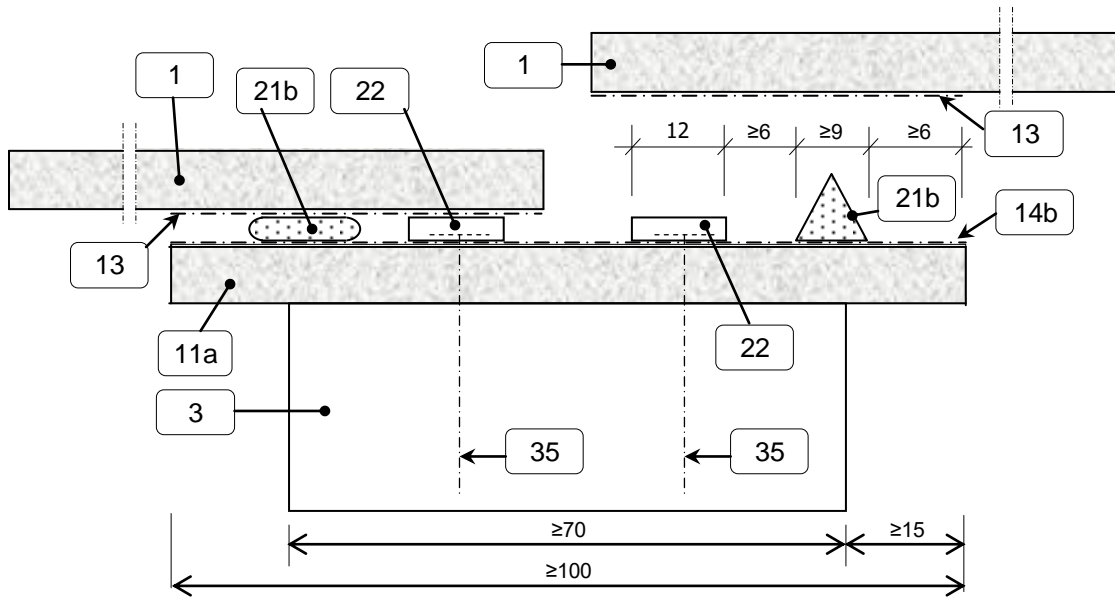
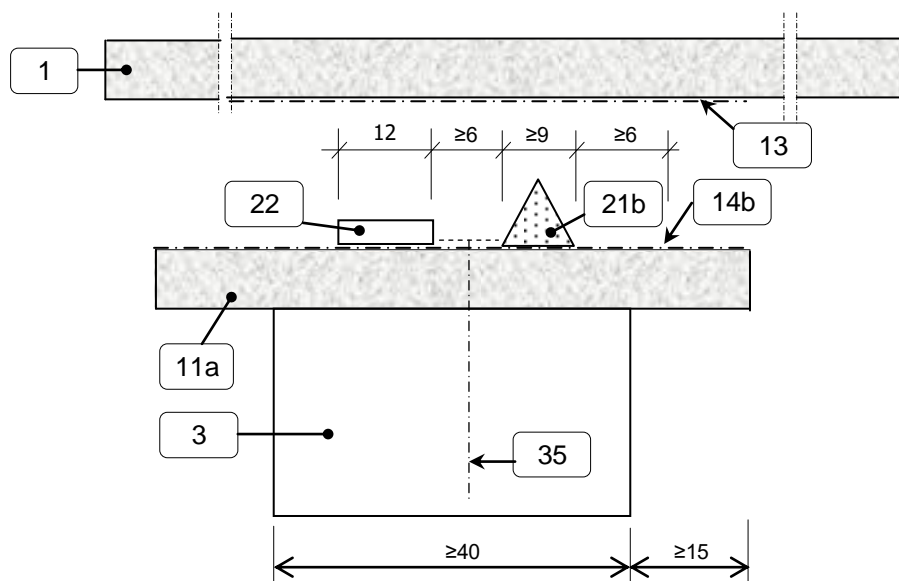


Figure 5.2 End batten and intermediate batten



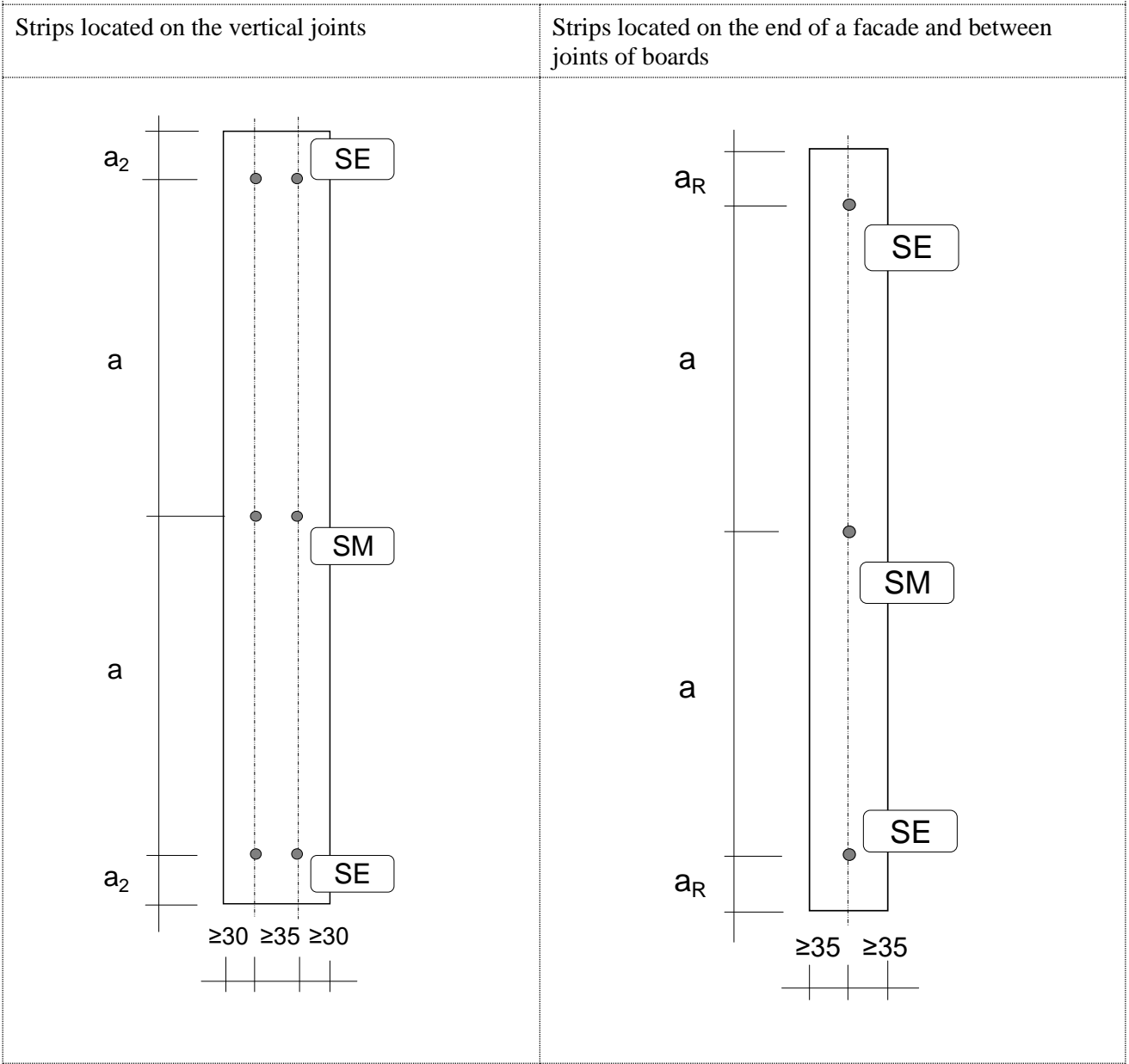
- 1 Compressed mineral wool board with organic or inorganic finish
- 3 Subframe
- 11a Rockpanel strip with specified finish mechanically fixed in accordance with Annex 2
- 13 'Primer MSP' applied with a roller in one layer or 'primer 586'
- 14b 'Liquid 1' cleaner
- 21b 'Tack-S' continuous triangular adhesive ridge of 9 mm
- 22 'FoamTape' self adhesive on two sides 3\*12 mm (with a release foil on one side)
- 35 Mechanically fixed – screw or nail according to annex 3



**Annex 2**

**Mechanically fixing of Rockpanel strips for adhesive bonding of Rockpanel boards**  
**Minimum edge distances, fixing locations in the strip and maximum fixing distances**

Figure 6. Fixing locations of Rockpanel strips for a wooden subframe



SM: fixing on the ‘middle’ locations of a strip

SE: fixing on the end locations of a strip

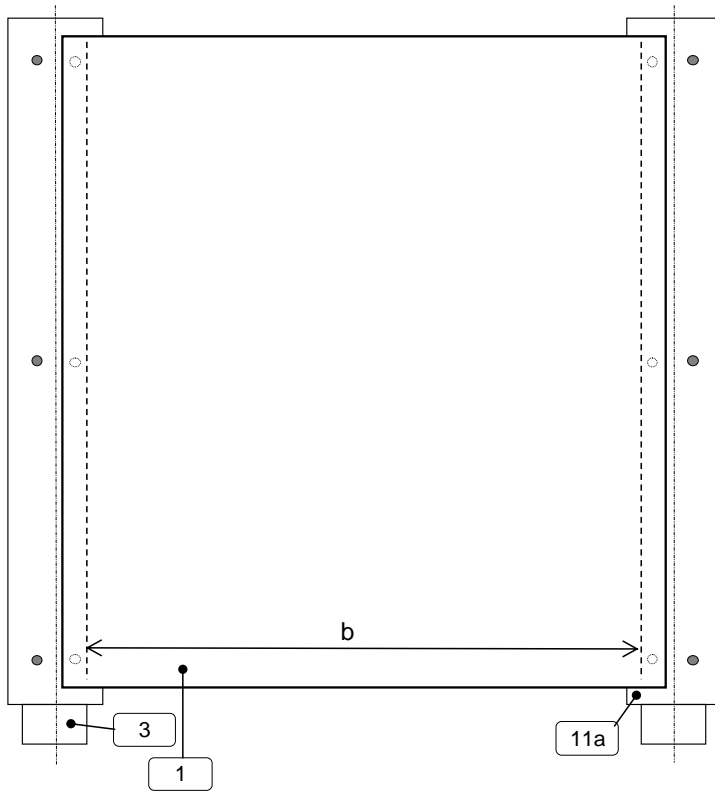
Hole diameters in accordance with Table 7.

Fixed points in the middle of the length of a strip.

Fixing distances 8 mm Rockpanel strips		
Fixing	Fixing distance	
	$a_{max}$	$a_2$
Screw	400 mm	$\geq 50$ mm
Nail	300 mm	$\geq 50$ mm

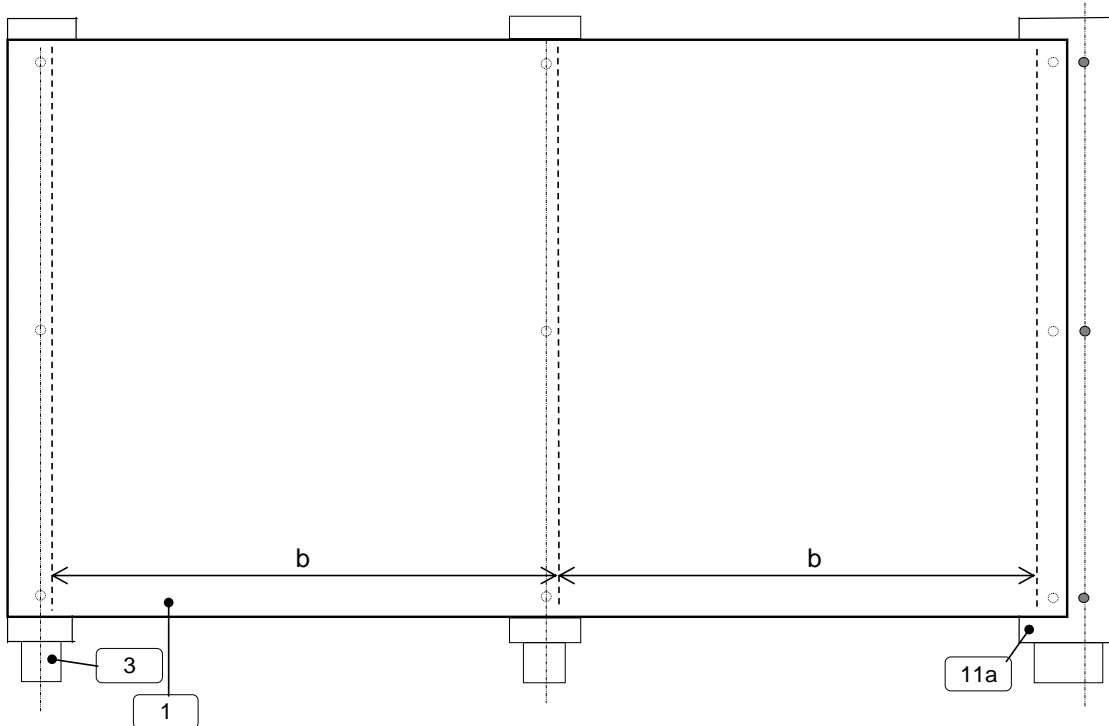
Figure 7. Examples adhesive bonding onto Rockpanel strips

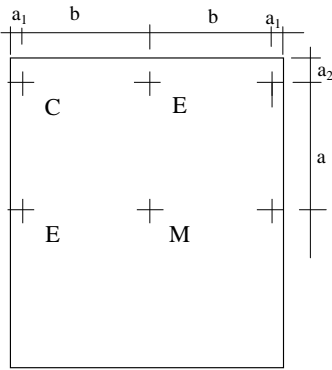
1-Field



- 1 Rockpanel board
- 3 Subframe: vertical wooden battens
- 11a 8 mm Rockpanel strip with specified finish
- b center distance adhesive ridges: max 600 mm

2-Field or more





C: Fixing in corner  
 E: Fixing at edge  
 M: Fixing at intermediate position

See Figure 8 for examples of possible installation methods

*Remark*  
 Rivet fixing only with a riveting tool with rivet spacer

<b>Table 5: Minimum edge distances and maximum distances between fastenings in mm</b>				
<b>Fixing type</b>	$b_{max}$	$a_{max}$	$a_1$	$a_2$
Screw	600	600	15	50
Nail	600	400	15	50
Rivet	600	600	15	50
Adhesive	600	Continuously applied triangular adhesive ridge of 9 mm		

<b>Table 6: Design axial load <math>X_d = X_k / \gamma_M</math> for 8 mm board fixings</b>				
The characteristic wind load must be multiplied with $\gamma_F = 1,5$				
<b>Fixing type</b>		Position M	Position E	Position C
Rivet [a] according to table 6.1		654 N	309 N	156 N
Screw and board fixing on steel sub-construction according table 6.2		533 N	241 N	118 N
Screw and board fixing on timber sub-construction		see Table 6-3 row (25), (26), (27)		
Screw and the use of a 8 mm Rockpanel strip onto timber sub-construction [b]		see Table 6-4 row (25), (26), (27)		
Combination <b>screw</b> and 8 mm intermediate strips for bonding purposes		see Table 6-8 row (21), (22), (23)		
Combination <b>screw</b> and 8 mm end strips or joint strips for bonding purposes		see Table 6-7 row (21), (22), (23)		
<b>Nail – standard version</b>		see Table 6-5 row (25), (26), (27)		
<b>Nail – high performance version</b>		see Table 6-6 row (25), (26), (27)		
Combination <b>nail – standard version</b> and 8 mm intermediate strips for bonding purposes		see Table 6-10 row (21), (22), (23)		
Combination <b>nail – standard version</b> and 8 mm end strips or joint strips for bonding purposes		see Table 6-9 row (21), (22), (23)		
Adhesive [c]		rear board onto specified finish	Characteristic axial load $X_k$ N/mm <sup>1</sup>	Design axial load $X_d = X_k / \gamma_M$ N/mm <sup>1</sup>
shear	-40°C, -20°C, +23°C and +80°C	strips with ProtectPlus	7,00	0,175
		strips with Colours		
		‘primer 586’	7,69	0,192
		Aluminium	8,58	0,214
tensile	-40°C, -20°C, +23°C and +80°C	strips with ProtectPlus	6,94	1,735
		strips with Colours	8,30	2,075
		‘primer 586’	4,58	1,145
	-20°C, +23°C and +80°C	Aluminium	5,92	1,48
FoamTape	Rear board onto		Characteristic $X_k$ N/mm <sup>1</sup>	Design $X_d$ N/mm <sup>1</sup>
shear	+23°C	strips with ProtectPlus and Colours	1,00	0,05
		‘primer 586’	0,85	0,04
		Aluminium	0,99	0,05
			Characteristic $X_k$ and design $X_d$ N/mm <sup>1</sup>	
tensile	+23°C	strips with ProtectPlus	0,73	
		strips with Colours	1,17	
		‘primer 586’	0,86	
		Aluminium	0,47	

[a] For correct fixing, a riveting tool with rivet spacer must be used

[b] With reduced withdrawal capacity because of the effective length  $l_{eff}$  of the threaded part

[c] With a triangle of 9 by 9 mm, deformed to a rectangle with a thickness of 3 mm (thickness of foam tape), see annex 1

<b>Table 6-1:</b> Characteristic axial load $X_k$ and design value of the axial load $X_d = X_k / \gamma_M$ for the combination <b>rivet</b> and 8 mm boards				
board thickness	8 mm			(1)
location of the fixing in the board	M-middle	E-edge	C-corner	(2)
pull-through N				(3)
characteristic pull-through N	1308	810	540	(4)
material factor Rockpanel $\gamma_M$	2,0	2,0	2,0	(5)
design value $X_d$ of the pull-through N	<b>654</b>	405	270	(6)
wind suction				(7)
average wind load in N/m <sup>2</sup>	2567	2769	2958	(8)
average strength N	1449	617	311	(9)
material factor Rockpanel $\gamma_M$	2,0	2,0	2,0	(10)
design value $X_d$ of the pull-through N	725	<b>309</b>	<b>156</b>	(11)
pull-out strength				(12)
manufacturer's declaration N	1300	1300	1300	(13)
material factor aluminium $\gamma_M$	1,3	1,3	1,3	(14)
design value $X_d$ of the pull-out N	1000	1000	1000	(15)
design value of the axial load $X_d = X_k / \gamma_M$ for the combination <b>rivet</b> and 8 mm boards	<b>654</b>	<b>309</b>	<b>156</b>	(16)
board span b	600			(17)
fixing distance a	600			(18)

[a] For correct fixing, a riveting tool with rivet spacer must be used

<b>Table 6-2:</b> Characteristic axial load $X_k$ and design value of the axial load $X_d = X_k / \gamma_M$ for the combination steel, screw and 8 mm boards				
Board thickness	8 mm			(1)
	M-middle	E-edge	C-corner	(2)
Pull-through				(3)
Characteristic pull-through N	1066	850	617	(4)
material factor Rockpanel $\gamma_M$	2,0	2,0	2,0	(5)
design value $X_d$ of the pull-through N	<b>533</b>	425	309	(6)
Wind suction				(7)
average wind load in N/m <sup>2</sup>	1992	2161	2243	(8)
average strength N	1105	482	236	(9)
material factor Rockpanel $\gamma_M$	2,0	2,0	2,0	(10)
design value $X_d$ of the pull-through N	553	<b>241</b>	<b>118</b>	(11)
pull-out strength				(12)
manufacturer's declaration N	1100	1100	1100	(13)
material factor steel $\gamma_M$	1,3	1,3	1,3	(14)
design value $X_d$ of the pull-out N	846	846	846	(15)
design value of the axial load $X_d = X_k / \gamma_M$ for the combination steel screw and 8 mm boards	<b>533</b>	<b>241</b>	<b>118</b>	(16)
board span b	600			(17)
fixing distance a	600			(18)

<b>Table 6-3:</b> Characteristic axial load $X_k$ and <b>design</b> value of the axial load $X_d = X_k / \gamma_M$ for the combination solid timber, <b>screw</b> and 8 mm boards (with the use of gaskets), with $\alpha \geq 30^\circ$ [e]					
board thickness		8 mm			(1)
location of the fixing in the board		M-middle	E-edge	C-corner	(2)
pull-through N					
characteristic pull-through N		1066	850	617	(4)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)		2,0	2,0	2,0	(5)
<b>design</b> value $X_d$ of the pull-through N		<b>533</b>	<b>425</b>	<b>309</b>	(6)
wind suction					
average wind load in N/m <sup>2</sup>		1992	2161	2243	(8)
average strength N		1105	482	236	(9)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)		2,0	2,0	2,0	(10)
<b>design</b> value $X_d$ of the pull-through N		<b>553</b>	<b>241</b>	<b>118</b>	(12)
withdrawal capacity					
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]					
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	858 [b]	858 [b]	858 [b]
	C24	$\rho_k = 350 \text{ kg/m}^3$	922 [b]	922 [b]	922 [b]
modification factor for $k_{mod}$			$k_{mod}$ [a]		
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]					
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	$858 \cdot k_{mod}$	$858 \cdot k_{mod}$	$858 \cdot k_{mod}$
	C24	$\rho_k = 350 \text{ kg/m}^3$	$922 \cdot k_{mod}$	$922 \cdot k_{mod}$	$922 \cdot k_{mod}$
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1,30$ [withdrawal capacity]		
<b>design</b> value $X_d$ of the axial withdrawal capacity N					
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b><math>660 \cdot k_{mod}</math></b>	<b><math>660 \cdot k_{mod}</math></b>	<b><math>660 \cdot k_{mod}</math></b>
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b><math>709 \cdot k_{mod}</math></b>	<b><math>709 \cdot k_{mod}</math></b>	<b><math>709 \cdot k_{mod}</math></b>
<b>design value of the axial load</b> $X_d = X_k / \gamma_M$ N		<b>minimum value of the rows:</b>			
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b>(6) (12) (23)</b>	<b>(6) (12) (23)</b>	<b>(6) (12) (23)</b>
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b>(6) (12) (24)</b>	<b>(6) (12) (24)</b>	<b>(6) (12) (24)</b>
board span b		600			
fixing distance a		600			

[a]: modification factor  $k_{mod}$  depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[b]: with reduced thread diameter to fulfil the minimum  $l_{ef}$  demand ( $d = l_{ef} / 6 = 24,75/6 = 4,12 \text{ mm}$ );

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 30^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.38), (8.39) and (8.40)

[e]:  $\alpha$  is the angle between the screw axis and the grain direction

<b>Table 6-4:</b> Characteristic axial load $X_k$ and <b>design</b> value of the axial load $X_d = X_k / \gamma_M$ for the combination solid timber, screw and 8 mm boards (with the use of <b>Rockpanel strips</b> nominal 8 mm), with $\alpha \geq 30^\circ$ [e]						
board thickness		8 mm (with the use of a gasket)				(1)
location of the fixing in the board		M-middle	E-edge	C-corner		(2)
pull-through N						(3)
characteristic pull-through N		1066	850	617		(4)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)		2,0	2,0	2,0		(5)
<b>design</b> value $X_d$ of the pull-through N		<b>533</b>	<b>425</b>	<b>309</b>		(6)
wind suction						(7)
average wind load in N/m <sup>2</sup>		1992	2161	2243		(8)
average strength N		1105	482	236		(9)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)		2,0	2,0	2,0		(10)
<b>design</b> value $X_d$ of the pull-through N		<b>553</b>	<b>241</b>	<b>118</b>		(12)
withdrawal capacity						(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]						(14)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	336 [b]	336 [b]	336 [b]	(15)
	C24	$\rho_k = 350 \text{ kg/m}^3$	361 [b]	361 [b]	361 [b]	(16)
modification factor for $k_{mod}$			$k_{mod}$ [a]			(17)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]						(18)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	$336 \cdot k_{mod}$	$336 \cdot k_{mod}$	$336 \cdot k_{mod}$	(19)
	C24	$\rho_k = 350 \text{ kg/m}^3$	$361 \cdot k_{mod}$	$361 \cdot k_{mod}$	$361 \cdot k_{mod}$	(20)
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1,30$ [withdrawal capacity]			(21)
<b>design</b> value $X_d$ of the axial withdrawal capacity N						(22)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b><math>258 \cdot k_{mod}</math></b>	<b><math>258 \cdot k_{mod}</math></b>	<b><math>258 \cdot k_{mod}</math></b>	(23)
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b><math>278 \cdot k_{mod}</math></b>	<b><math>278 \cdot k_{mod}</math></b>	<b><math>278 \cdot k_{mod}</math></b>	(24)
<b>design value of the axial load</b> $X_d = X_k / \gamma_M$ N		<b>minimum value of the rows:</b>				(25)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b>(6) (12) (23)</b>	<b>(6) (12) (23)</b>	<b>(6) (12) (23)</b>	(26)
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b>(6) (12) (24)</b>	<b>(6) (12) (24)</b>	<b>(6) (12) (24)</b>	(27)
board span b		600				(28)
fixing distance a		600				(29)

[a]: modification factor  $k_{mod}$  depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[b]: with reduced thread diameter to fulfil the minimum  $l_{ef}$  demand ( $d = l_{ef} / 6 = 16,75/6 = 2,79 \text{ mm}$ );

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 30^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.38), (8.39) and (8.40)

[e]:  $\alpha$  is the angle between the screw axis and the grain direction

<b>Table 6-5:</b> Characteristic axial load $X_k$ and <b>design</b> value of the axial load $X_d = X_k / \gamma_M$ for the combination solid timber, <b>nail – standard version</b> 32 mm and 8 mm boards (with the use of gaskets) , with $\alpha \geq 80^\circ$ [e]					
board thickness		8 mm (with the use of a gasket)			(1)
location of the fixing in the board		M-middle	E-edge	C-corner	(2)
pull-through N					
characteristic pull-through N		752	674	577	(4)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)		2,0	2,0	2,0	(5)
<b>design</b> value $X_d$ of the pull-through N		<b>376</b>	<b>337</b>	<b>289</b>	(6)
wind suction					
average wind load in N/m <sup>2</sup>		2637	4131	5162	(8)
average strength N		1009	627	397	(9)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)		2,0	2,0	2,0	(10)
<b>design</b> value $X_d$ of the pull-through N		<b>505</b>	<b>314</b>	<b>199</b>	(12)
withdrawal capacity					
characteristic withdrawal capacity $F_{ax,k,Rk}$ [c] [d]					
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	168	168	168
	C24	$\rho_k = 350 \text{ kg/m}^3$	201	201	201
modification factor for $k_{mod}$			$k_{mod}$ [a]		
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [c] [d]					
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	$168 \cdot k_{mod}$	$168 \cdot k_{mod}$	$168 \cdot k_{mod}$
	C24	$\rho_k = 350 \text{ kg/m}^3$	$201 \cdot k_{mod}$	$201 \cdot k_{mod}$	$201 \cdot k_{mod}$
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1,30$ [withdrawal capacity]		
<b>design</b> value $X_d$ of the axial withdrawal capacity N					
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	<b><math>129 \cdot k_{mod}</math></b>	<b><math>129 \cdot k_{mod}</math></b>	<b><math>129 \cdot k_{mod}</math></b>
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	<b><math>155 \cdot k_{mod}</math></b>	<b><math>155 \cdot k_{mod}</math></b>	<b><math>155 \cdot k_{mod}</math></b>
<b>design value of the axial load</b> $X_d = X_k / \gamma_M$ N			<b>minimum value of the rows:</b>		
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	<b>(6) (12) (23)</b>	<b>(6) (12) (23)</b>	<b>(6) (12) (23)</b>
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	<b>(6) (12) (24)</b>	<b>(6) (12) (24)</b>	<b>(6) (12) (24)</b>
board span b		600			(28)
fixing distance a		600			(29)

[a]: modification factor  $k_{mod}$  depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 80^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.23-a) and DIN EN 1995-1-1/NA:2010-12 Table NA.15

[e]:  $\alpha$  is the angle between the screw axis and the grain direction



Table 6-6: Characteristic axial load $X_k$ and design value of the axial load $X_d = X_k / \gamma_M$ for the combination solid timber, nail, high performance version 35 mm and 8 mm boards (with the use of gaskets) , with $\alpha \geq 80^\circ$ [e]						
board thickness			8 mm (with use of a gasket)			(1)
location of the fixing in the board			M-middle	E-edge	C-corner	(2)
Pull-through N						(3)
characteristic pull-through N			752	674	577	(4)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)			2,0	2,0	2,0	(5)
design value $X_d$ of the pull-through N			376	337	289	(6)
Wind suction						(7)
average wind load in N/m <sup>2</sup>			2637	4131	5162	(8)
average strength N			1009	627	397	(9)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)			2,0	2,0	2,0	(10)
design value $X_d$ of the pull-through N			505	314	199	(11)
Withdrawal capacity						(12)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [c] [d]						(13)
Strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	403	403	403	(14)
	C24	$\rho_k = 350 \text{ kg/m}^3$	482	482	482	(15)
modification factor for $k_{mod}$			$k_{mod}$ [a]			(16)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [c] [d]						(17)
Strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	$403 \cdot k_{mod}$	$403 \cdot k_{mod}$	$403 \cdot k_{mod}$	(18)
	C24	$\rho_k = 350 \text{ kg/m}^3$	$482 \cdot k_{mod}$	$482 \cdot k_{mod}$	$482 \cdot k_{mod}$	(19)
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1,30$ [withdrawal capacity]			(20)
design value $X_d$ of the axial withdrawal capacity N						(21)
Strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	$310 \cdot k_{mod}$	$310 \cdot k_{mod}$	$310 \cdot k_{mod}$	(22)
	C24	$\rho_k = 350 \text{ kg/m}^3$	$370 \cdot k_{mod}$	$370 \cdot k_{mod}$	$370 \cdot k_{mod}$	(23)
design value of the axial load $X_d = X_k / \gamma_M$ N						minimum value of the rows: (24)
Strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	(6)(11)(22)	(6)(11)(22)	(6)(11)(22)	(25)
	C24	$\rho_k = 350 \text{ kg/m}^3$	(6)(11)(23)	(6)(11)(23)	(6)(11)(23)	(26)
Board span b			600			(27)
Fixing distance a			400			(28)

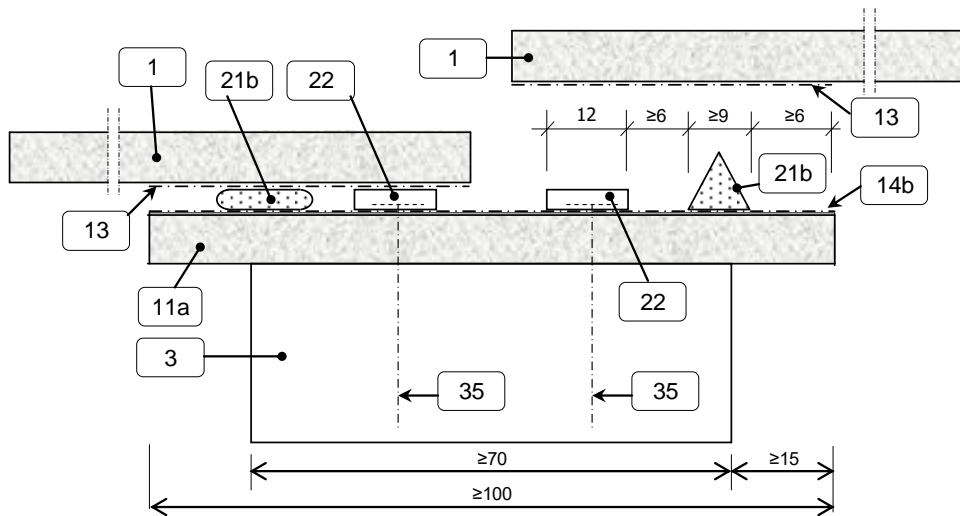
[a]: modification factor  $k_{mod}$  depends on the service class (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 80^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.23-a) and DIN EN 1995-1-1/NA:2010-12 Table NA.15

[e]:  $\alpha$  is the angle between the screw axis and the grain direction

**Table 6-7:** Characteristic axial load  $X_k$  and design value of the axial load  $X_d = X_k / \gamma_M$  for the combination solid timber, screw and 8 mm end strips or joint strips, with  $\alpha \geq 30^\circ$  [e]



Remark: for the explanation of the numbers see Figure 5

strip thickness	8 mm		(1)		
location of the fixing in the strip (see figure 6)	middle SM	start and end SE	(2)		
design value $X_d$ of the pull-through N in accordance with Annex 2 Table 6-2 row (6)	<b>425</b> location E	<b>309</b> location C	(3)		
wind suction			(4)		
average wind load in N/m <sup>2</sup>	4392	4392	(5)		
average strength N	823	247	(6)		
material factor Rockpanel $\gamma_M$ (manufacturers declaration)	2,0	2,0	(7)		
design value $X_d$ of the pull-through N	<b>412</b>	<b>124</b>	(8)		
withdrawal capacity in accordance with Table 6-2 Annex 2			(9)		
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]			(10)		
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	858 [b]	858 [b]	(11)
	C24	$\rho_k = 350 \text{ kg/m}^3$	922 [b]	922 [b]	(12)
modification factor for $k_{mod}$		$k_{mod}$ [a]		(13)	
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]					(14)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	$858 \cdot k_{mod}$	$858 \cdot k_{mod}$	(15)
	C24	$\rho_k = 350 \text{ kg/m}^3$	$922 \cdot k_{mod}$	$922 \cdot k_{mod}$	(16)
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1,30$ [withdrawal capacity]		(17)
design value $X_d$ of the axial withdrawal capacity N					(18)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b><math>660 \cdot k_{mod}</math></b>	<b><math>660 \cdot k_{mod}</math></b>	(19)
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b><math>709 \cdot k_{mod}</math></b>	<b><math>709 \cdot k_{mod}</math></b>	(20)
<b>design value of the axial load <math>X_d = X_k / \gamma_M</math> N</b>			<b>minimum value of the rows:</b>		(21)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b>(3) (8) (19)</b>	<b>(3) (8) (19)</b>	(22)
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b>(3) (8) (20)</b>	<b>(3) (8) (20)</b>	(23)
board span b Figure 7			600		(24)
fixing distance a Figure 6			500		(25)

[a]: modification factor  $k_{mod}$  depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

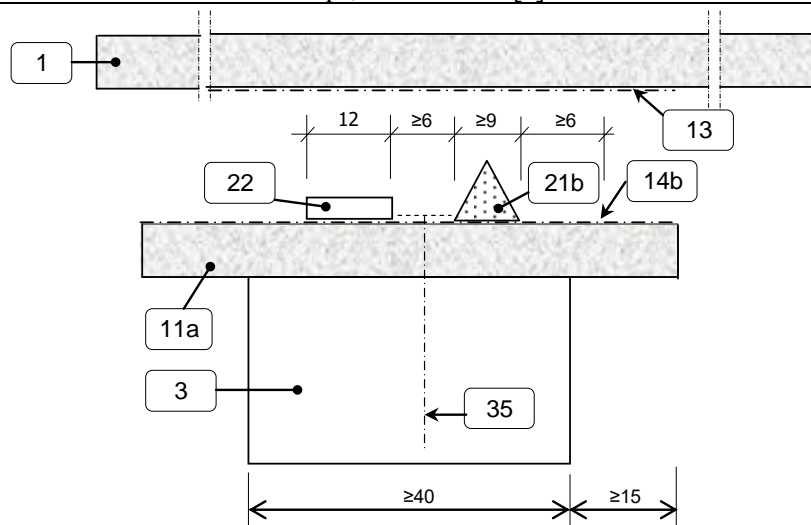
[b]: with reduced thread diameter to fulfil the minimum  $l_{ef}$  demand ( $d = l_{ef} / 6 = 24,75/6 = 4,12 \text{ mm}$ );

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 30^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.38), (8.39) and (8.40)

[e]:  $\alpha$  is the angle between the screw axis and the grain direction

**Table 6-8:** Characteristic axial load  $X_k$  and design value of the axial load  $X_d = X_k / \gamma_M$  for the combination solid timber, screw and 8 mm intermediate strips, with  $\alpha \geq 30^\circ$  [e]



Remark: for the explanation of the numbers see Figure 5

strip thickness	8 mm		(1)		
location of the fixing in the strip (see figure 6)	middle SM	start and end SE	(2)		
design value $X_d$ of the pull-through N in accordance with Annex 2 Table 6-2 row (6)	<b>425</b> location E	<b>309</b> location C	(3)		
wind suction			(4)		
average wind load in N/m <sup>2</sup>	4606	4606	(5)		
average strength N	1770	531	(6)		
material factor Rockpanel $\gamma_M$ (manufacturers declaration)	2,0	2,0	(7)		
design value $X_d$ of the pull-through N	<b>885</b>	<b>266</b>	(8)		
withdrawal capacity in accordance with Table 6-2 Annex 2			(9)		
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]			(10)		
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	858 [b]	858 [b]	(11)
	C24	$\rho_k = 350 \text{ kg/m}^3$	922 [b]	922 [b]	(12)
modification factor for $k_{mod}$		$k_{mod}$ [a]		(13)	
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]					(14)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	$858 \cdot k_{mod}$	$858 \cdot k_{mod}$	(15)
	C24	$\rho_k = 350 \text{ kg/m}^3$	$922 \cdot k_{mod}$	$922 \cdot k_{mod}$	(16)
material factor (NA to) EN 1995-1-1:2004+A1:2008		$\gamma_M = 1,30$ [withdrawal capacity]		(17)	
design value $X_d$ of the axial withdrawal capacity N					(18)
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b><math>660 \cdot k_{mod}</math></b>	<b><math>660 \cdot k_{mod}</math></b>	(19)
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b><math>709 \cdot k_{mod}</math></b>	<b><math>709 \cdot k_{mod}</math></b>	(20)
<b>design value of the axial load <math>X_d = X_k / \gamma_M</math> N</b>		<b>minimum value of the rows:</b>		(21)	
strength class wood (EN 338)	C18	$\rho_k = 320 \text{ kg/m}^3$	<b>(3) (8) (19)</b>	<b>(3) (8) (19)</b>	(22)
	C24	$\rho_k = 350 \text{ kg/m}^3$	<b>(3) (8) (20)</b>	<b>(3) (8) (20)</b>	(23)
board span b Figure 7	600				(24)
fixing distance a Figure 6	400				(25)

[a]: modification factor  $k_{mod}$  depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

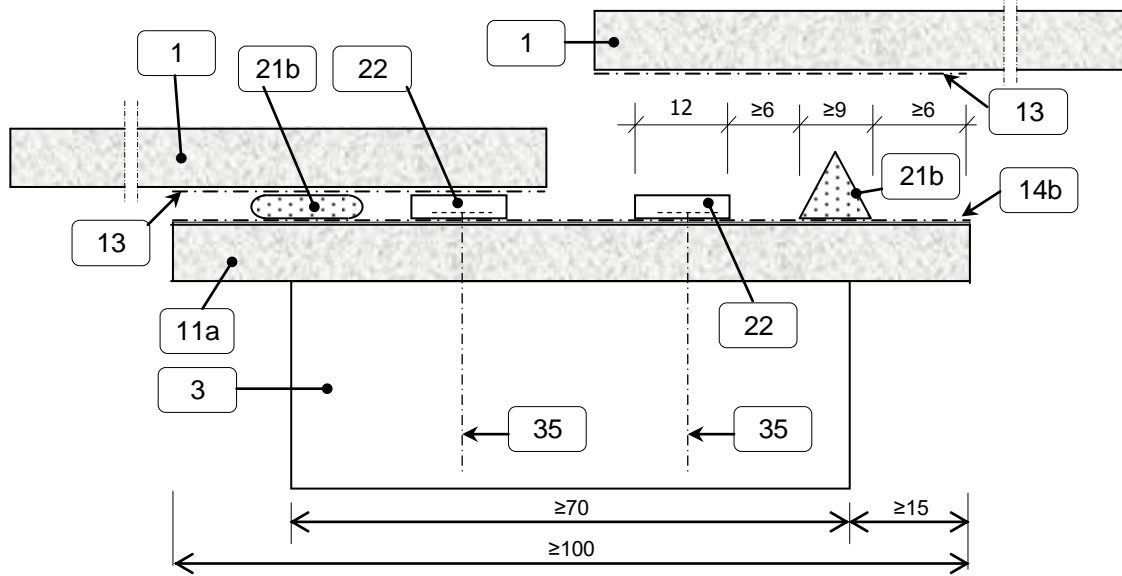
[b]: with reduced thread diameter to fulfil the minimum  $l_{ef}$  demand ( $d = l_{ef} / 6 = 24,75/6 = 4,12 \text{ mm}$ );

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 30^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.38), (8.39) and (8.40)

[e]:  $\alpha$  is the angle between the screw axis and the grain direction

**Table 6-9:** Characteristic axial load  $X_k$  and design value of the axial load  $X_d = X_k / \gamma_M$  for the combination solid timber, **nail 32 mm standard version** and 8 mm end strips or joint strips, with  $\alpha \geq 80^\circ$  [e]



Remark: for the explanation of the numbers see Figure 5

strip thickness	8 mm		(1)		
location of the fixing in the strip (see figure 6)	middle SM	start and end SE	(2)		
design value $X_d$ of the pull-through N in accordance with Annex 2 Table 6-4 row (6)	<b>337</b> location E	<b>289</b> location C	(3)		
wind suction			(4)		
average wind load in N/m <sup>2</sup>	4503	4503	(5)		
average strength N	506	152	(6)		
material factor Rockpanel $\gamma_M$ (manufacturers declaration)	2,0	2,0	(7)		
design value $X_d$ of the pull-through N	<b>253</b>	<b>76</b>	(8)		
withdrawal capacity in accordance with Table 6-4 Annex 2			(9)		
characteristic withdrawal capacity $F_{ax,k,Rk}$ [c] [d]			(10)		
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	280	280	(11)
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	334	334	(12)
	modification factor for $k_{mod}$		$k_{mod}$ [a]		(13)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [c] [d]					(14)
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	$168 \cdot k_{mod}$	$168 \cdot k_{mod}$	(15)
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	$201 \cdot k_{mod}$	$201 \cdot k_{mod}$	(16)
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1,30$ [withdrawal capacity]		(17)
design value $X_d$ of the axial withdrawal capacity N					(18)
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	<b><math>129 \cdot k_{mod}</math></b>	<b><math>129 \cdot k_{mod}</math></b>	(19)
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	<b><math>155 \cdot k_{mod}</math></b>	<b><math>155 \cdot k_{mod}</math></b>	(20)
<b>design value of the axial load <math>X_d = X_k / \gamma_M</math> N</b>			<b>minimum value of the rows:</b>		(21)
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	<b>(3) (8) (19)</b>	<b>(3) (8) (19)</b>	(22)
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	<b>(3) (8) (20)</b>	<b>(3) (8) (20)</b>	(23)
board span b Figure 7			600		(24)
fixing distance a Figure 6			300		(25)

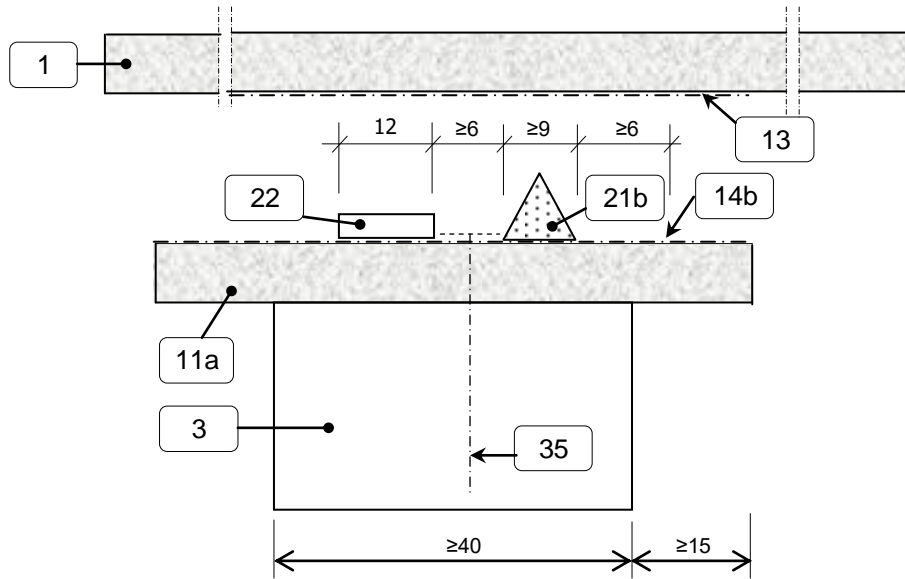
[a]: modification factor  $k_{mod}$  depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 80^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.23-a) and DIN EN 1995-1-1/NA:2010-12 Table NA.15

[e]:  $\alpha$  is the angle between the nail axis and the grain direction

**Table 6-10:** Characteristic axial load  $X_k$  and design value of the axial load  $X_d = X_k / \gamma_M$  for the combination solid timber, **nail 32 mm standard version** and 8 mm intermediate strips, with  $\alpha \geq 80^\circ$  [e]



Remark: for the explanation of the numbers see Figure 5

strip thickness	8 mm		(1)
location of the fixing in the strip (see figure 6)	middle SM	start and end SE	(2)
design value $X_d$ of the pull-through N in accordance with Annex 2 Table 6-4 row (6)	<b>337</b>	<b>289</b>	(3)
wind suction			(4)
average wind load in N/m <sup>2</sup>	3078	3078	(5)
average strength N	887	266	(6)
material factor Rockpanel $\gamma_M$ (manufacturers declaration)	2,0	2,0	(7)
design value $X_d$ of the pull-through N	<b>444</b>	<b>133</b>	(8)
withdrawal capacity			(9)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [c] [d]			(10)
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	280 [b]
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	334 [b]
	modification factor for $k_{mod}$		$k_{mod}$ [a]
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [c] [d]			(14)
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	$168 \cdot k_{mod}$
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	$201 \cdot k_{mod}$
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1,30$ [withdrawal capacity]
design value $X_d$ of the axial withdrawal capacity N			(18)
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	<b><math>129 \cdot k_{mod}</math></b>
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	<b><math>155 \cdot k_{mod}</math></b>
<b>design value of the axial load <math>X_d = X_k / \gamma_M</math> N</b>			<b>minimum value of the rows:</b>
strength class	C18	$\rho_k = 320 \text{ kg/m}^3$	<b>(3) (8) (19)</b>
wood (EN 338)	C24	$\rho_k = 350 \text{ kg/m}^3$	<b>(3) (8) (20)</b>
board span b Figure 7			600
fixing distance a Figure 6			300

[a]: modification factor  $k_{mod}$  depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[c]: angle  $\alpha$  between shaft and the wood grain:  $\alpha \geq 80^\circ$

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.23-a) and DIN EN 1995-1-1/NA:2010-12 Table NA.15

[e]:  $\alpha$  is the angle between the nail axis and the grain direction

For bonded applications the Rockpanel strip (item 11a on figure 3 in annex 1) must be mechanically fixed in such a way that it can move tension free on the wooden battens.

Therefore, the Rockpanel strip is mounted with fixed points and with moving points. The hole diameters for the fixing points are indicated in table 7 (screw and nail fixing).

The characteristic loads which may be taken for the combination Rockpanel strips and fixings (screw and nail fixing), are given in table 6-7, 6-8, 6-9 and 6-10 (position E and C).

The characteristic loads which may be taken for the combination boards and fixings (rivet, screw and nail fixing), are given in table 6-1, 6-2, 6-3, 6-4, 6-5 and 6-6 (position M, E and C)

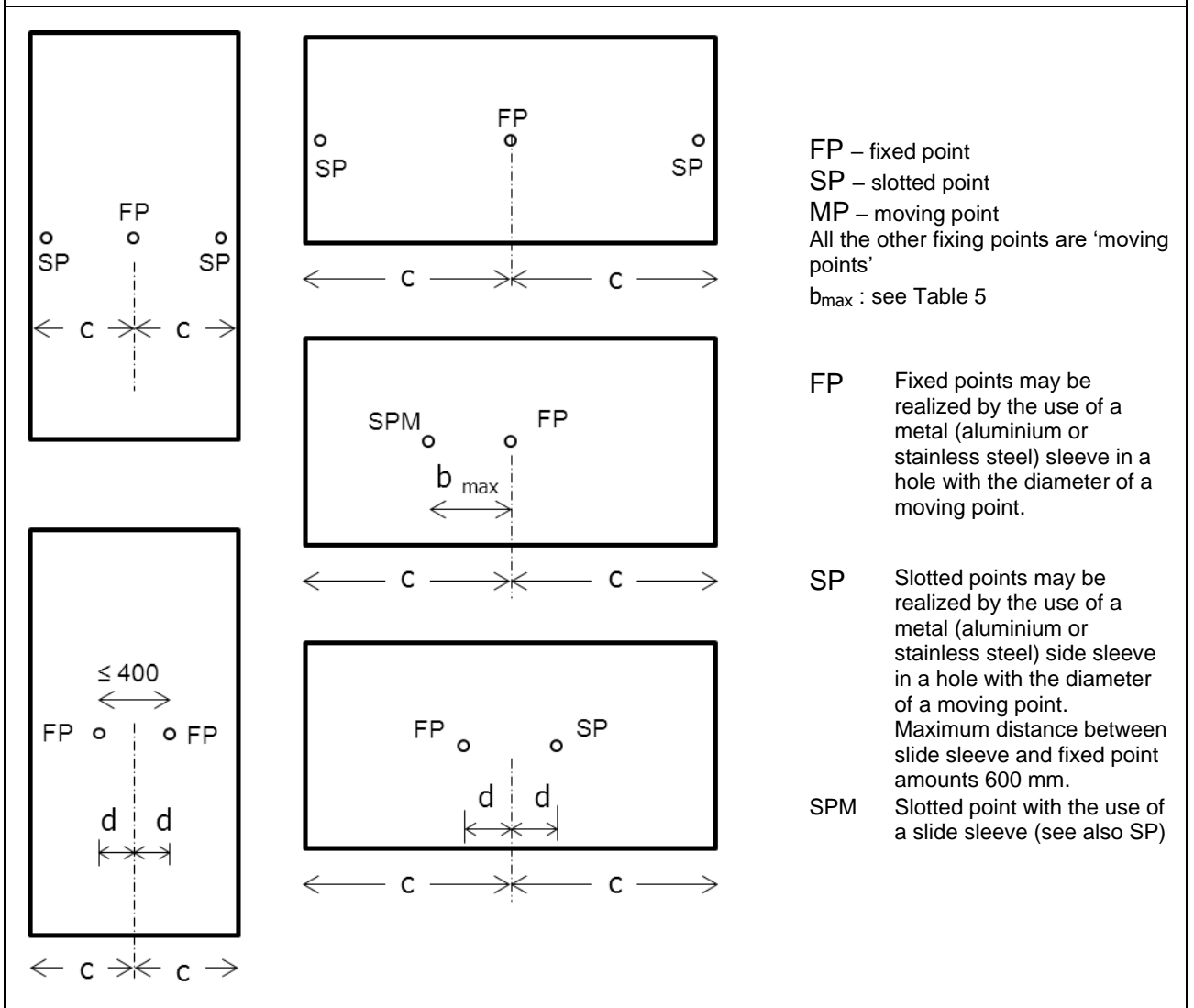
<b>Table 7. Hole dimensions [mm] for Rockpanel boards mechanically fixed and Rockpanel strip in bonded applications</b>				
Fixing type	Fixed point	Moving point	Slotted points	Board dimension considered
Screw for timber	3,2	6,0	3,4 x 6,0	1200*3050
Nail	2,5	3,8	2,8 x 4,0	1200*1750 [b]
Rivet [a]	5,2	8,0	5,2 x 8,0	1200*3050
Screw for steel	4,3	8,0	4,3 x 8,0	1200*3050

Edge distances:  $a_1 \geq 15$  mm and  $a_2 \geq 50$  mm

[a] For correct fixing, a riveting tool with rivet spacer must be used

[b]: In the case of a larger panel length, and certain climatic conditions, a tension between shaft and panel-hole may occur.

**Fig. 8 : Examples of possible installation methods with the use of fixed points and slotted points**



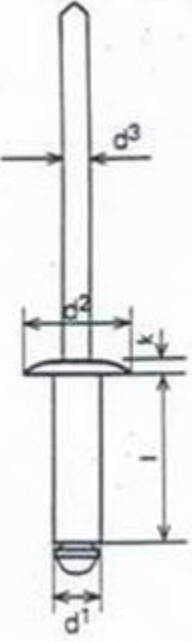
**Annex 3**  
**Fastener specification for wooden subframes**

<b>Table 8.1</b>	<u>Ring-shank nail</u> – standard version 2,7/2,9 x 32 and 2,7/2,9 x 40 mm
Stainless steel in accordance with EN 10088 - Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
$d = 2,6 - 2,8$ $d_2 = 2,8 - 3,0$ $l$ for nail 32 = 31 – 32,5 $l$ for nail 40 = 39 – 40,5 $l_2$ for nail 32 = 24 – 26 $l_2$ for nail 40 = 32 – 34 $l_p = \leq 4,8$ $l_g = l_2 - l_p$ $d_h = 5,8 - 6,3$ $h_t = 0,8 - 1,0$	

<b>Table 8.2</b>	<u>Ring-shank nail</u> , High Performance version 2,7/3,1 x 35 mm
Stainless steel in accordance with EN 10088 – Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
$d_n = 2,7 \pm 0,1$ $d_1 = 3,1 \pm 0,1$ $L_n = 35 \pm 1,0$ $L_2 = 28 \pm 1,0$ $L_g = 25 \pm 1,0$ $L_p = 3 \pm 0,5$ $D_h = 6 \pm 0,2$ $H_t = 0,9 \pm 0,1$	

<b>Table 8.3</b>	<u>Torx screws</u> 4,5 x 35 mm
Stainless steel in accordance with EN 10088 - Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
$d = 4,3 - 4,6$ $d_s = 3,3 - 3,4$ $d_h = 9,6 - 10,4$ $l = 35 - 1,25$ $l_g = 26,25 - 28,5$	

**Table 8.4 - Fastener specification for metal sub-frames**

<b>Rivet aluminium or stainless steel</b>					
		SFS Aluminium	SFS Stainless steel A4 [a]	MBE Aluminium	MBE stainless steel [b]
	Code	AP14-50180-S	SSO-D15-50180	1290406	1290806
	Body	aluminium EN AW-5019 (AlMg5) in accordance with EN 755-2	stainless steel material number 1.4578 in accordance with EN 10088	aluminium EN AW-5019 (AlMg5) in accordance with EN 755-2	stainless steel material number 1.4567 in accordance with EN 10088
	Mandrel	stainless steel material number 1.4541 in accordance with EN 10088	stainless steel material number 1.4541 in accordance with EN 10088	stainless steel material number 1.4541 in accordance with EN 10088	stainless steel material number 1.4541 in accordance with EN 10088
	Pull-out strength	$F_{mean,n} = 2038$	$F_{mean,n} = 1428$	$F_{mean,10} = 2318$	$F_{mean,10} = 3212$
		$s = 95$	$s = 54$	$s = 85$	$s = 83$
		$F_{u,5} = 1882$	$F_{u,5} = 1339$	$F_{u,5} = 2155$	$F_{u,5} = 3052$
	$d^1$	5	5	5	5
	$d^2$	14	15	14	14
	$d^3$	2,7	2,7	2,7	2,95
	$l$	18	18	18	16
	$k$	1,5	1,5	1,5	1,5
	profile	aluminium $t \geq 1,5$ mm	steel $t \geq 1,0$ mm [a]	aluminium $t \geq 1,8$ mm	steel $t \geq 1,5$ mm [b]

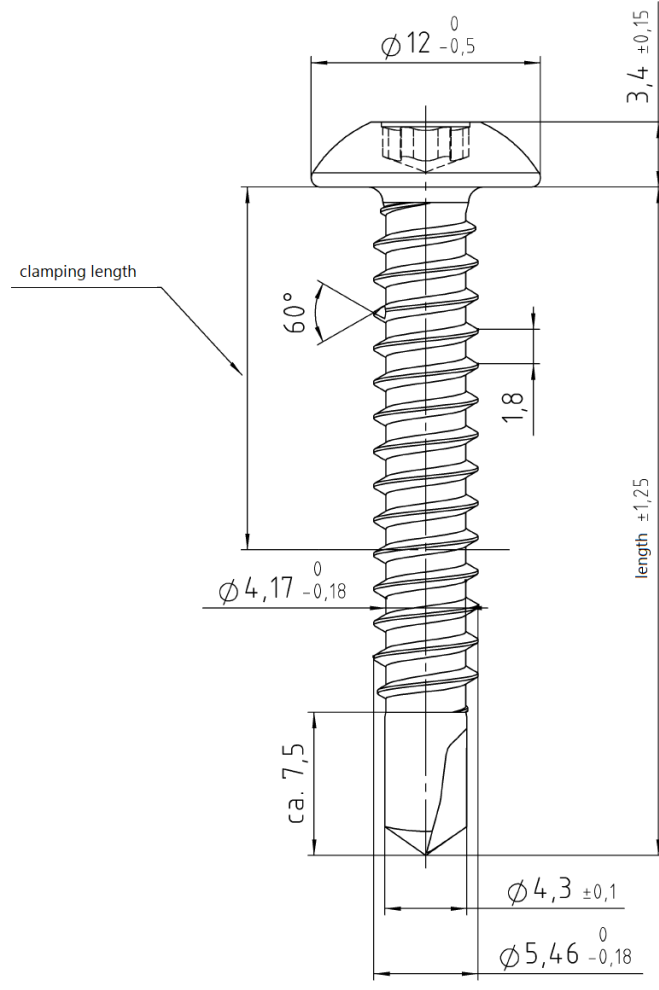
- [a] : The minimum thickness of the vertical steel profiles is 1,0 mm. The steel quality is S320GD +Z EN 10346 number 1.0250 (or equivalent for cold forming). For minimum coating thickness see [c]
- [b] : The minimum thickness of the vertical steel profiles is 1,5 mm. The steel quality is EN 10025-2:2004 S235JR number 1.0038. For minimum coating thickness see [c]
- [c] : The minimum coating thickness (Z or ZA) is determined by the corrosion rate (amount of corrosion loss in thickness per year) which depends on the specific outdoor atmospheric environment (the Zinc Life Time Predictor can be used to calculate the Corrosion Rate in  $\mu\text{m}/\text{y}$  for a Z coating: <http://www.galvinfo.com:8080/zclp/> (copyright The International Zinc association)).  
The coating designation (classification which determines the coating mass) shall be agreed between the contractor and the building owner.  
Alternatively a hot dip galvanized coating according to EN ISO 1461 can be used.



**Table 8.5** self-drilling screw for steel sub-constructions code JT6-FR-3 -5,5 x L

Stainless steel A4 in accordance with EN ISO 3506

Length:  
 25 mm → clamping length 9 mm  
 35 mm → clamping length 19 mm



**Annex 4****Table 9 – Impact resistance: Definition of use categories**

Use category	Description
I	A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.
II	A zone liable to impacts from thrown or kicked objects, but in public locations where the height of the kit will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care.
III	A zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.
IV	A zone out of reach from ground level

The hard body impact with steel ball represents the action from heavy, non-deformable objects, which accidentally hit the kit.