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Authorised and notified according toArticle 29 of the Regulation (EU) No 305/2011 of the European Parliamentand of the Council of 9 March 2011

MEMBER OF EOTA

European Technical Assessment ETA-07/0141 of 2021/12/03

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 2020-05-05

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the 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 with a four-layer water-borne polymer emulsion paint on one side, in a range of colours.

The Rockpanel Durable ProtectPlus panels are surface treated with a four-layer water-borne polymer emulsion paint on one side, which has been provided with an extra anti-graffiti clear coat as a fifth layer on the colour 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^3
Bending strength, length and width	$f_{05} \geq 27$ N/mm^2
Modulus of elasticity	m(E) $\geq$ 4015 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	α = 10,5 10^{-6} °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 texture “Woods” e.g.: Teak, Alder, Cherry, Clearcoat with stone texture "Stones" e.g. Mineral Chalk, Basalt Anthracite etc., or with metallic particles e.g. Metallics Aluminium, Briliant Karbo, Chameleon etc.

[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 μm/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.

Joints

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.

A 3 mm thick EPDM foam gasket (self-adhering backside) is fixed to the timber battens. 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 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 aluminium 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 addititition, 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
3.2 Safety in case of fire (BWR 2)	
Reaction to fire	The aluminium profiles are classified as **Euroclass A1** Classification of panels: See table 4
3.3 Hygiene, health and the environment (BWR 3)	
Dangerous substances	The kit does not contain/release dangerous substances *), except Formaldehyde concentration 0,0105 mg/m^3 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	**Durable Colours:** S_d < **1,80 m** at 23°C and 85 %RH **Durable ProtectPlus:** S_d < **3,5 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	**No performance assessed**
3.4 Safety and accessibility in use (BWR 4)	
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) *Remark:* Design value X_d obtained by dividing the characteristic value X_k by a partial factor γ_M : $X_d = X_k / \gamma_M$	**Rockpanel rivets:** To an aluminium subframe, design value X_d : **654/309/156 N** (Annex 2 Table 6-1 row (16)) **Rockpanel Screws for steel** To a steel subframe design value X_d: **533/241/118** (Annex 2 Table 6-2 row (16)) **Rockpanel screws for timber:** Design value X_d depends on the modification factor k_{mod} , the strength class of the wood and the different material factors γ_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). **Rockpanel High performance nails:** Design value X_d depends on the modification factor $k_{mod,}$ the strength class of the wood and the different material factors γ_M . Boards to a solid timber subframe see Annex 2 Table 6-6, row (25), (26) and (27).

Characteristic	Assessment of characteristic
	Rockpanel nails – standard version: Design value X_d depends on the modification factor k_{mod} , the strength class of the wood and the different material factors γ_M . 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).
Shear strength mechanical fixings Characteristic values	**Rockpanel nails (standard and High-Performance version):** Failure load: **1325 N** Deformation: **15 mm** **Rockpanel rivets:** Failure load: **1722 N** Deformation: **1,7 mm** **Rockpanel screws (applies to screws to steel and screws to timber):** Failure load: **1549 N** Deformation: **9 mm**

Characteristic and design initial tensile strength Tack-S adhesive *[a]* Partial factor for material property γ_M= 4 (tensile caused by wind load)	
Conditions +23°, -20°C, -40°C and +80°C	Contact surfaces: rear of the board onto ProtectPlus: X_k = 6,94 N/mm¹ and X_d = 1,74 N/mm¹ ; rear of the board onto Colours: X_k = 8,30 N/mm¹ and X_d = 2,08 N/mm¹ Rear of the board onto primer 586: X_k = 4,58 N/mm¹ and X_d = 1,15 N/mm¹
Conditions +23°, -20°C, and +80°C	Contact surfaces: rear of the board onto aluminium: X_k = 5,92 N/mm¹ and X_d= 1,48 N/mm¹

[a] For the partial load factor γ_F = 1.5 shall be taken

Characteristic and design initial tensile strength FoamTape*[a]*	
Conditions +23°	Contact surfaces: - rear of the board onto ProtectPlus: $X_k = X_d$ = 0,73 N/mm¹ Contact surfaces: - rear of the board onto Colours: $X_k = X_d$ = 1,17 N/mm¹ Contact surfaces: rear of the board onto aluminium: $X_k = X_d$ = 0,47 N/mm¹ Contact surfaces: - rear of the board onto primer 586: $X_k = X_d$ = 0,86 N/mm¹

[a] For the partial load factor γ_F = 1.5 shall be taken

Characteristic and design initial shear strength Tack-S adhesive *[a]* Partial factor for material property γ_M= 40 (shear caused by permanent load)	
Conditions +23°, -20°C, -40°C and +80°C	Contact surfaces: rear of the board onto ProtectPlus and Colours: X_k = 7,00 N/mm¹ and X_d = 0,175 N/mm¹ Contact surfaces: rear of the board onto aluminium: X_k = 8,58 N/mm¹ and X_d = 0,214 N/mm¹ Contact surfaces: rear of the board onto primer 586: X_k = 7,69 N/mm¹ and X_d = 0,192 N/mm¹

[a] For the partial load factor γ_F = 1.5 shall be taken

Characteristic	Assessment of characteristic
Characteristic and design initial shear strength FoamTape[a] Partial factor for material property γ_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 N/mm¹ Contact surfaces: rear of the board onto aluminium: X_k = 0,99 N/mm¹ ; X_d = 0,05 N/mm¹ Contact surfaces: rear of the board onto primer 586: X_k = 0,85 N/mm¹ ; X_d = 0,04 N/mm¹

[a] For the partial load factor γ_F = 1.5 shall be taken

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	Hard body impact - steel ball 0,5 kg (1J): Categoy IV Hard body impact – steel ball 0,5 kg (3J): Category III, II and I Hard body impact – steel ball 1 kg (10J): Category II and I Soft body impact 3 kg (10J): Category IV and III Soft body impact 3 kg (60J): Category II and I Soft body impact 50 kg (300J): Category II
Panels with a horizontal joint ready accessible and vulnerable to impacts	Hard body impact - steel ball 0,5 kg (1J): Category IV Hard body impact – steel ball 0,5 kg (3J): Category III, II and I

Dimensional stability	
Cumulative dimensional change % Coefficient of thermal expansion 10^{-6} °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	**Rivets: 1449 / 617 / 311**(according to Annex 2 Table 6-1) **Screws for timber: 1105 / 482 /236** (according to Annex 2 Table 6-3 and Table 6-4) **Screws for steel: 1105/482/236** (according to annex 2 Table 6-2) **Nails – standard version: 1009 / 627 / 397** (according to Annex 2 Table 6-5) **Nails - High performance version: 1009/627/397** (according to annex 2 Table 6-6)

Characteristic	Assessment of characteristic
Average failure load N/m²	**Rivets: 2567 / 2769 / 2958** (according to Annex 2 Table 6-1) **Screws for timber: 1992 / 2161 / 2243** (according to Annex 2 Table 6-3) **Screws for steel: 1992/2161/2243** (according to annex Table 6-2) **Nails – standard version : 2637 / 4131 / 5162** (according to Annex 2 Table 6-5) **Nails - High performance version: 2637/4131/5162** (according to annex 2 Table 6-6)
Mechanical resistance of panels	**See section 1, table 1**
Resistance to Hygrothermal cycles	**Pass**
Immersion in water without UV	
21 Days	Characteristic tensile strength for contact surfaces: rear of the board onto ProtectPlus and Colours: X_k = 2,80 N/mm¹ Contact surfaces rear of the board onto primer 586: X_k = 5,44 N/mm¹ Contact surfaces: rear of the board onto aluminium: X_k = 3,12 N/mm¹
42 days	Characteristic tensile strength for contact surfaces: rear of the board onto ProtectPlus and Colours: X_k = 2,22 N/mm¹ Contact surfaces: rear of the board onto primer 586: X_k = 4,73 N/mm¹ Contact surfaces: rear of the board onto aluminium: X_k = 2,58 N/mm¹

Humidity and NaCl	Characteristic tensile strength for contact surfaces: rear of the board onto aluminium: X_k = 6,03 N/mm¹
Humidity and SO_2	Characteristic tensile strength for contact surfaces: rear of the board onto aluminium: X_k = 6,67 N/mm¹

3.7 Sustainable use of natural resources (BWR 7) No performance assessed

3.8 Aspects of durability

Resistance to Xenon Arc exposure **Pass**

*) 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:

Table 4 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-s1,d0** closed horizontal joint	
	Ventilated with EPDM gasket on the battens [a] [d]	**B-s2,d0** open 6 mm horizontal joint	
	Ventilated with 6 or 8 mm Rockpanel strips on the battens [b] [d]	**B-s2,d0** 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-S1, d0** open 6 mm horizontal joint	
	Ventilated with 8 mm Rockpanel strips on the battens [b]	**B-s1,d0** open 6 mm horizontal joint for finish white and black [c]	
bonded	ventilated with 8 mm RockPanel strips on the battens [b]	**B-s2,d0** open 6 mm horizontal joint	
	ventilated		**B-s2,d0** 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/m³ 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/m³ 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/m³ 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/m³ 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/m³ between the battens and min. 50 mm with density 30-70 kg/m³ 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/m³ 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/m³ 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 an EPDM foam gasket backing or Rockpanel strip backing as described in table 4 and 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^3

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

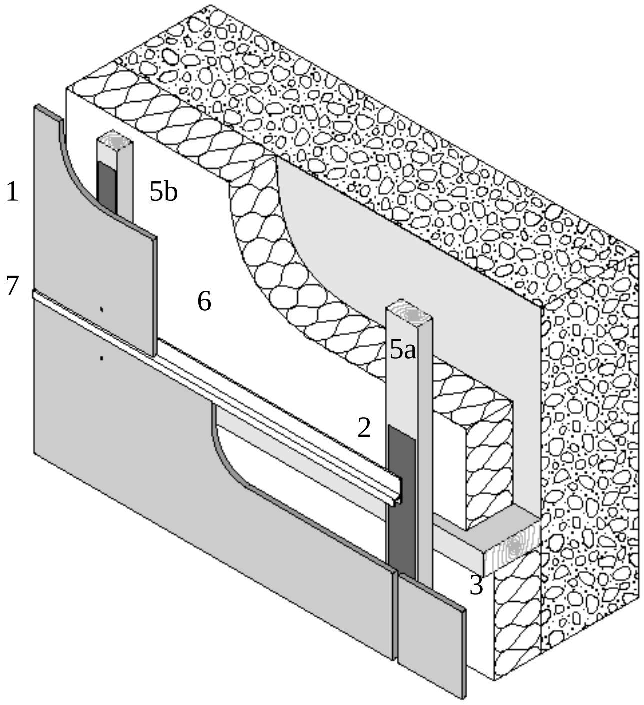
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2021-12-03 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 foam gasket
3. Timber beam
4. Vapour barrier
5. Batten: a - joint and b - intermediate
6. Insulation
7. Rockpanel "A" – 8 mm extruded aluminiumchairprofile or equivalent

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

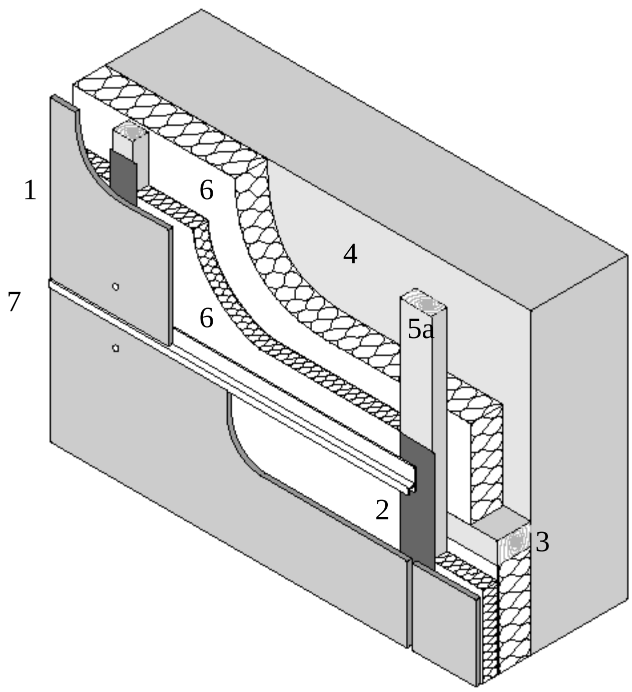
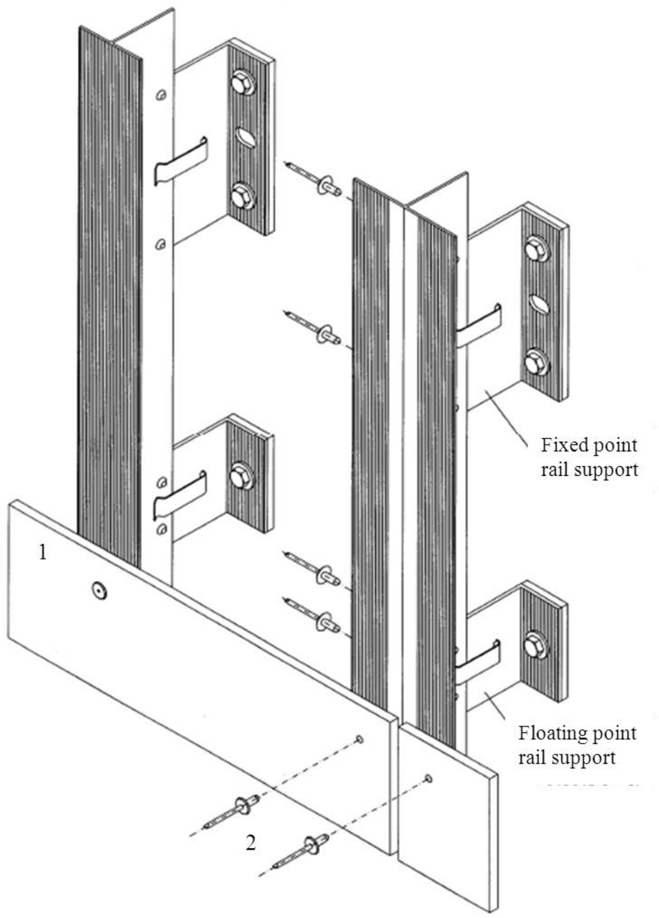
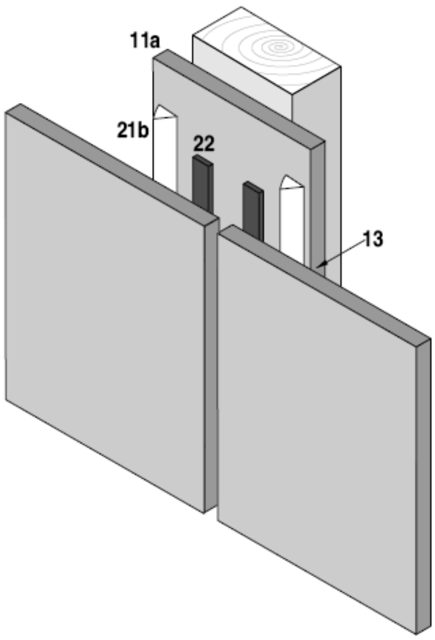


Figure 2. Ventilated intended use on vertical metal subframe



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

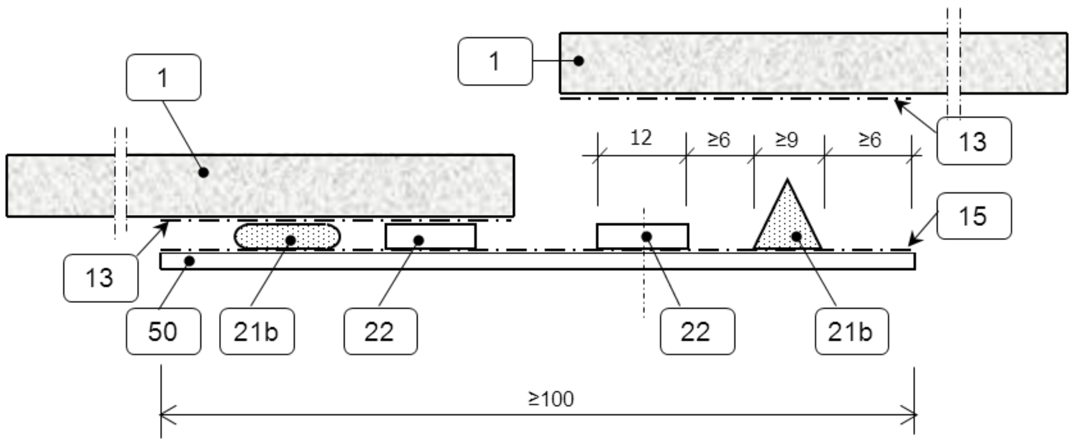
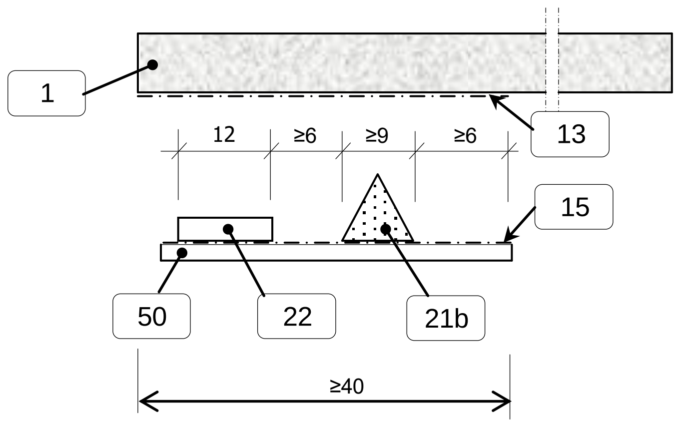


Figure 4.2 Bonding onto end profiles and onto intermediate profiles



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

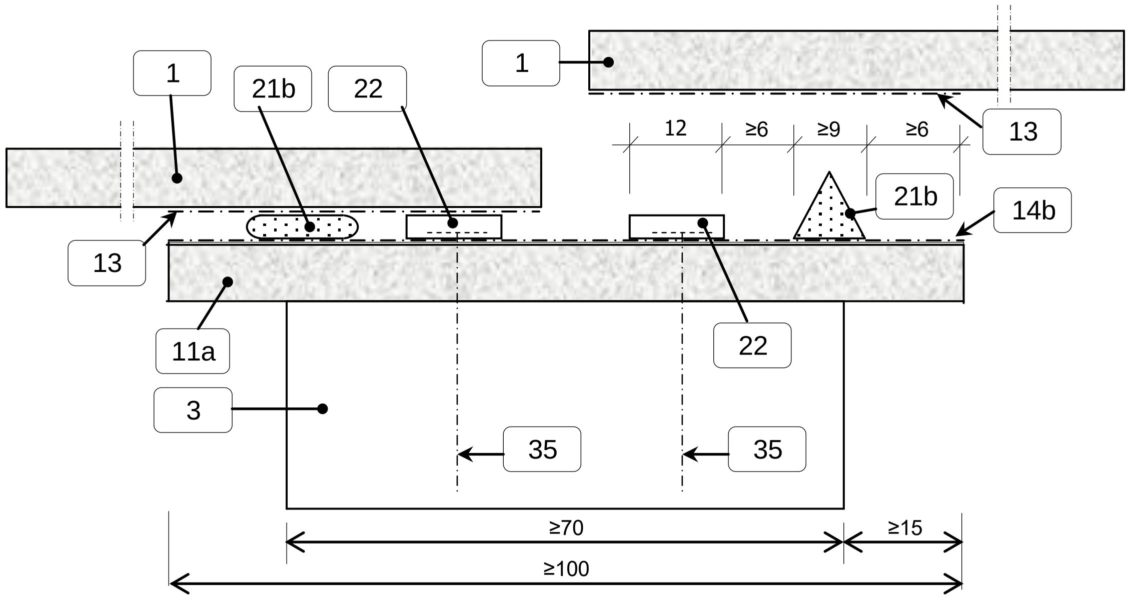
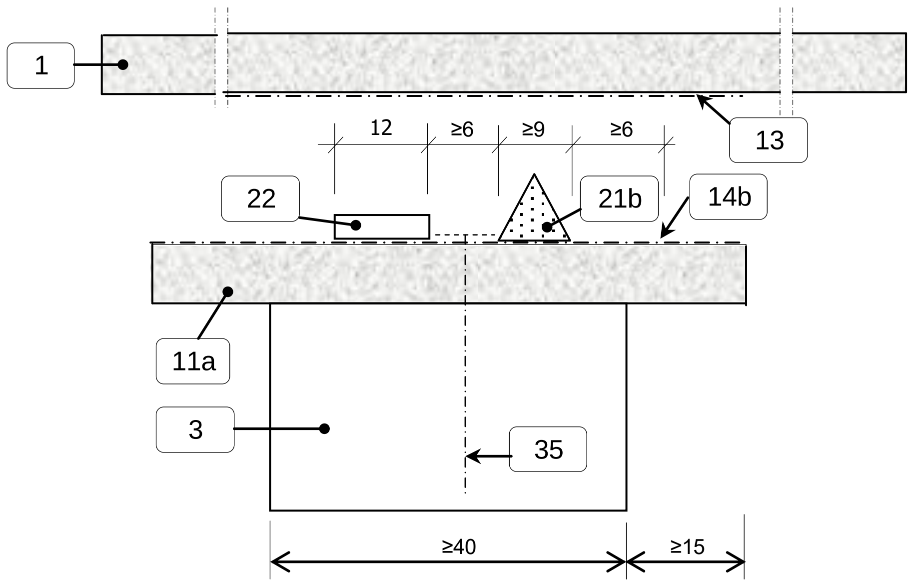
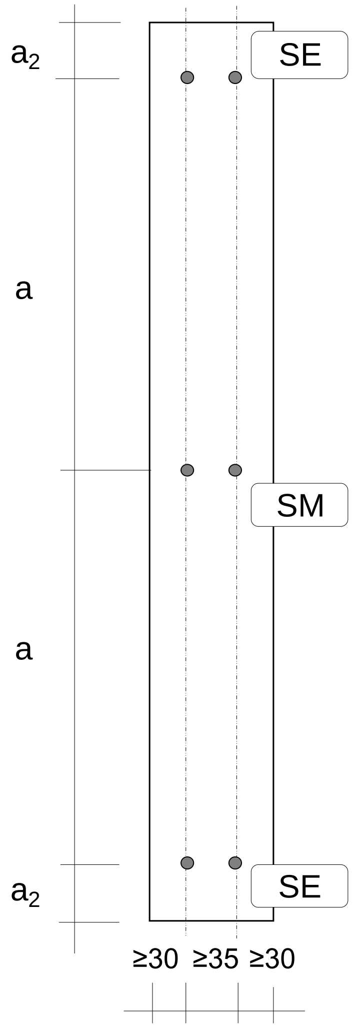
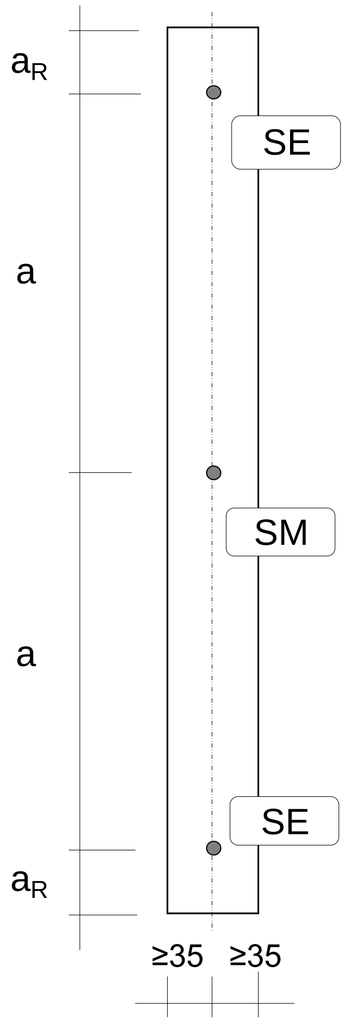


Figure 5.2 End batten and intermediate batten



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

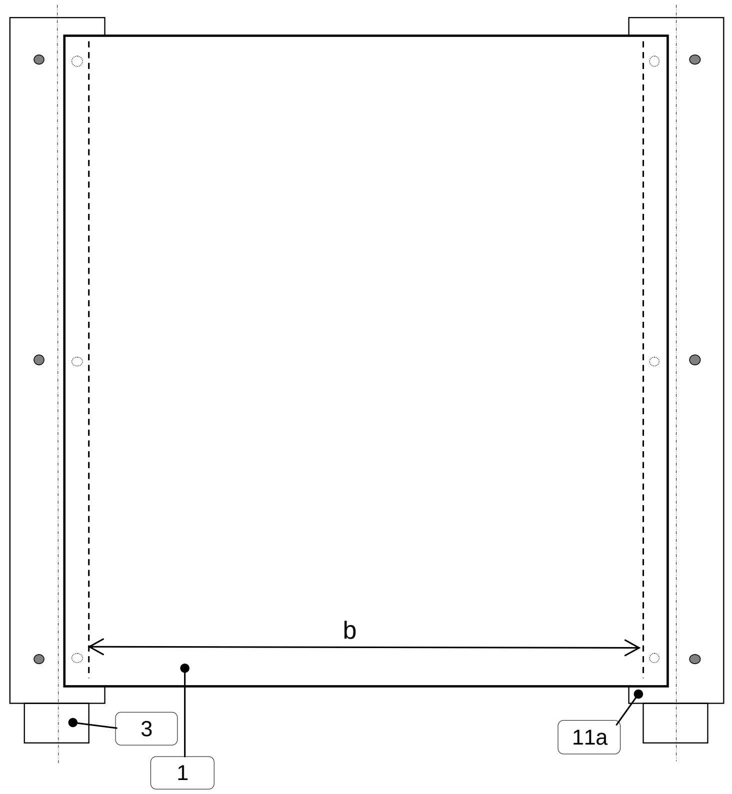
Annex 2
Mechanically fixing of Rockpanel strips for adhesive bonding of Rockpanel boards
Minimum edge distances, fixing locations in the strip and maximum fixing distances

Figure 6. Fixing locations of Rockpanel strips for a wooden subframe	
Strips located on the vertical joints	Strips located on the end of a facade and between joints of boards
	
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	≥ 50 mm
Nail	300 mm	≥ 50 mm

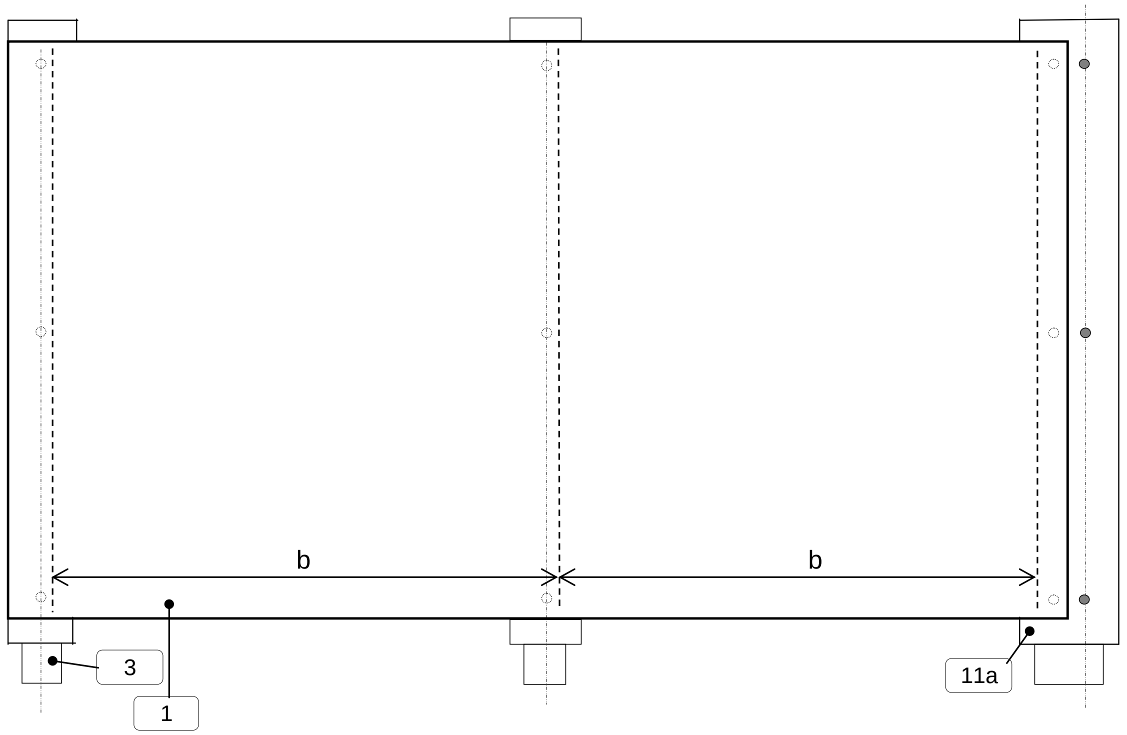
Figure 7. Examples adhesive bonding onto Rockpanel strips

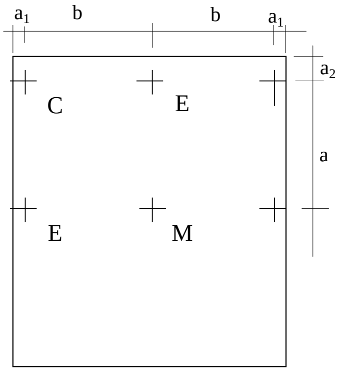
1-Field



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

Table 5: Minimum edge distances and maximum distances between fastenings in mm

Fixing type	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		

Table 6: Design axial load $X_d = X_k / \gamma_M$ for 8 mm board fixings
The characteristic wind load must be multiplied with $\gamma_F = 1,5$

Fixing type	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 **screw** and 8 mm intermediate strips for bonding purposes	see Table 6-8 row (21), (22), (23)		
Combination **screw** and 8 mm end strips or joint strips for bonding purposes	see Table 6-7 row (21), (22), (23)		
Nail – standard version	see Table 6-5 row (25), (26), (27)		
Nail – high performance version	see Table 6-6 row (25), (26), (27)		
Combination **nail – standard version** and 8 mm intermediate strips for bonding purposes	see Table 6-10 row (21), (22), (23)		
Combination **nail – standard version** 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/mm¹	Design axial load $X_d = X_k / \gamma_M$ N/mm¹
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/mm¹	Design X_d N/mm¹
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/mm¹	
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

Table 6-1: Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **rivet** 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 γ_M	2,0	2,0	2,0	(5)
	design value X_d of the pull-through N	**654**	405	270	(6)
wind suction					(7)
	average wind load in N/m²	2567	2769	2958	(8)
	average strength N	1449	617	311	(9)
	material factor Rockpanel γ_M	2,0	2,0	2,0	(10)
	design value X_d of the pull-through N	725	**309**	**156**	(11)
pull-out strength					(12)
	manufacturer's declaration N	1300	1300	1300	(13)
	material factor aluminium γ_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 **rivet** and 8 mm boards		**654**	**309**	**156**	(16)
	board span b	600			(17)
	fixing distance a	600			(18)

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

Table 6-2: 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 γ_M		2,0	2,0	2,0	(5)
	design value X_d of the pull-through N		533	425	309	(6)
Wind suction						(7)
	average wind load in N/m²		1992	2161	2243	(8)
	average strength N		1105	482	236	(9)
	material factor Rockpanel γ_M		2,0	2,0	2,0	(10)
	design value X_d of the pull-through N		553	241	118	(11)
pull-out strength						(12)
	manufacturer's declaration N		1100	1100	1100	(13)
	material factor steel γ_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			533	241	118	(16)
	board span b		600			(17)
	fixing distance a		600			(18)

Table 6-3: 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 boards (with the use of gaskets), with α≥ 30° [e]

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			*1066*	*850*	*617*	(4)
	material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(5)
	design value X_d of the pull-through N			**533**	**425**	**309**	(6)
wind suction							(7)
	average wind load in N/m²			1992	2161	2243	(8)
	average strength N			*1105*	*482*	*236*	(9)
	material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(10)
	design value X_d of the pull-through N			**553**	**241**	**118**	(12)
withdrawal capacity							(13)
	characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]						(14)
	strength class	C18	$\rho_k = 320\ kg/m^3$	858 [b]	858 [b]	858 [b]	(15)
	wood (EN 338)	C24	$\rho_k = 350\ kg/m^3$	922 [b]	922 [b]	922 [b]	(16)
	modification factor for k_{mod}			k_{mod} [a]			(17)
	axial withdrawal capacity $F_{ax,k,Rk} . k_{mod}$ [a] [b] [c] [d]						(18)
	strength class	C18	$\rho_k = 320\ kg/m^3$	858 • k_{mod}	858 • k_{mod}	858 • k_{mod}	(19)
	wood (EN 338)	C24	$\rho_k = 350\ kg/m^3$	922 • k_{mod}	922 • k_{mod}	922 • k_{mod}	(20)
	material factor (NA to) EN 1995-1-1:2004+A1:2008			γ_M = 1,30 [withdrawal capacity]			(21)
	design value X_d of the axial withdrawal capacity N						(22)
	strength class	C18	$\rho_k = 320\ kg/m^3$	**660** • k_{mod}	**660** • k_{mod}	**660** • k_{mod}	(23)
	wood (EN 338)	C24	$\rho_k = 350\ kg/m^3$	**709** • k_{mod}	**709** • k_{mod}	**709** • k_{mod}	(24)
design value of the axial load $X_d = X_k / \gamma_M$ N				**minimum value of the rows:**			(25)
	strength class	C18	$\rho_k = 320\ kg/m^3$	**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26)
	wood (EN 338)	C24	$\rho_k = 350\ kg/m^3$	**(6) (12) (24)**	**(6) (12) (24)**	**(6) (12) (24)**	(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 ($d = l_{ef} / 6 = 24{,}75/6 = 4{,}12$ mm) ;
[c]: angle α between shaft and the wood grain: α ≥ 30°
[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.38), (8.39) and (8.40)
[e]: α is the angle between the screw axis and the grain direction

Table 6-4: 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 boards (with the use of **Rockpanel strips** nominal **8** mm), with α≥ 30° [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 γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(5)
design value X_d of the pull-through N			**533**	**425**	**309**	(6)
wind suction						(7)
average wind load in N/m²			1992	2161	2243	(8)
average strength N			*1105*	*482*	*236*	(9)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N			**553**	**241**	**118**	(12)
withdrawal capacity						(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]						(14)
strength class	C18	$\rho_k = 320$ kg/m³	336 [b]	336 [b]	336 [b]	(15)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	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	C18	$\rho_k = 320$ kg/m³	336 • k_{mod}	336 • k_{mod}	336 • k_{mod}	(19)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	361 • k_{mod}	361 • k_{mod}	361 • k_{mod}	(20)
material factor (NA to) EN 1995-1-1:2004+A1:2008			γ_M = 1,30 [withdrawal capacity]			(21)
design value X_d of the axial withdrawal capacity N						(22)
strength class	C18	$\rho_k = 320$ kg/m³	**258** • k_{mod}	**258** • k_{mod}	**258** • k_{mod}	(23)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	**278** • k_{mod}	**278** • k_{mod}	**278** • k_{mod}	(24)
design value of the axial load $X_d = X_k / \gamma_M$ N			**minimum value of the rows:**			(25)
strength class	C18	$\rho_k = 320$ kg/m³	**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	**(6) (12) (24)**	**(6) (12) (24)**	**(6) (12) (24)**	(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 mm) ;

[c]: angle α between shaft and the wood grain: α ≥ 30°

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

[e]: α is the angle between the screw axis and the grain direction

Table 6-5: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination solid timber, **nail – standard version** 32 mm and 8 mm boards (with the use of gaskets) , with α≥ 80° [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			*752*	*674*	*577*	(4)
material factor Rockpanel γ_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/m²			2637	4131	5162	(8)
average strength N			*1009*	*627*	*397*	(9)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N			**505**	**314**	**199**	(12)
withdrawal capacity						(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [c] [d]						(14)
strength class	C18	$\rho_k = 320$ kg/m³	168	168	168	(15)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	201	201	201	(16)
		modification factor for k_{mod}	k_{mod} [a]			(17)
axial withdrawal capacity $F_{ax,k,Rk} . k_{mod}$ [a] [c] [d]						(18)
strength class	C18	$\rho_k = 320$ kg/m³	168 • k_{mod}	168 • k_{mod}	168 • k_{mod}	(19)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	201 • k_{mod}	201 • k_{mod}	201 • k_{mod}	(20)
material factor (NA to) EN 1995-1-1:2004+A1:2008			$\gamma_M = 1{,}30$ [withdrawal capacity]			(21)
design value X_d of the axial withdrawal capacity N						(22)
strength class	C18	$\rho_k = 320$ kg/m³	**129 •** k_{mod}	**129 •** k_{mod}	**129 •** k_{mod}	(23)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	**155 •** k_{mod}	**155•** k_{mod}	**155 •** k_{mod}	(24)
design value of the axial load $\boldsymbol{X_d = X_k / \gamma_M}$ N			**minimum value of the rows:**			(25)
strength class	C18	$\rho_k = 320$ kg/m³	**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	**(6) (12) (24)**	**(6) (12) (24)**	**(6) (12) (24)**	(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

[c]: angle α between shaft and the wood grain: α ≥ 80°

[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]: α 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 α≥80° [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 γ_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/m²			2637	4131	5162	(8)
average strength N			1009	627	397	(9)
material factor Rockpanel γ_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	ρ_k = 320 kg/m3	403	403	403	(14)
	C24	ρ_k = 350 kg/m3	482	482	482	(15)
	modification factor for kmod		k_{mod} [a]			(16)
axial withdrawal capacity $F_{ax,k,Rk}$. k_{mod} [a] [c] [d]						(17)
Strength class wood (EN 338)	C18	ρ_k = 320 kg/m3	403 • k_{mod}	403 • k_{mod}	403 • k_{mod}	(18)
	C24	ρ_k = 350 kg/m3	482 • k_{mod}	482 • k_{mod}	482 • k_{mod}	(19)
	material factor (NA to) EN 1995-1-1:2004+A1:2008		γ_M = 1,30 [withdrawal capacity]			(20)
design value X_d of the axial withdrawal capacity N						(21)
Strength class wood (EN 338)	C18	ρ_k = 320 kg/m3	310 • k_{mod}	310 • k_{mod}	310 • k_{mod}	(22)
	C24	ρ_k = 350 kg/m3	370 • k_{mod}	370 • k_{mod}	370 • 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	ρ_k = 320 kg/m3	(6)(11)(22)	(6)(11)(22)	(6)(11)(22)	(25)
	C24	ρ_k = 350 kg/m3	(6)(11)(23)	(6)(11)(23)	(6)(11)(23)	(26)
Board span b			600			(27)
Fixing distance a			400			(28)

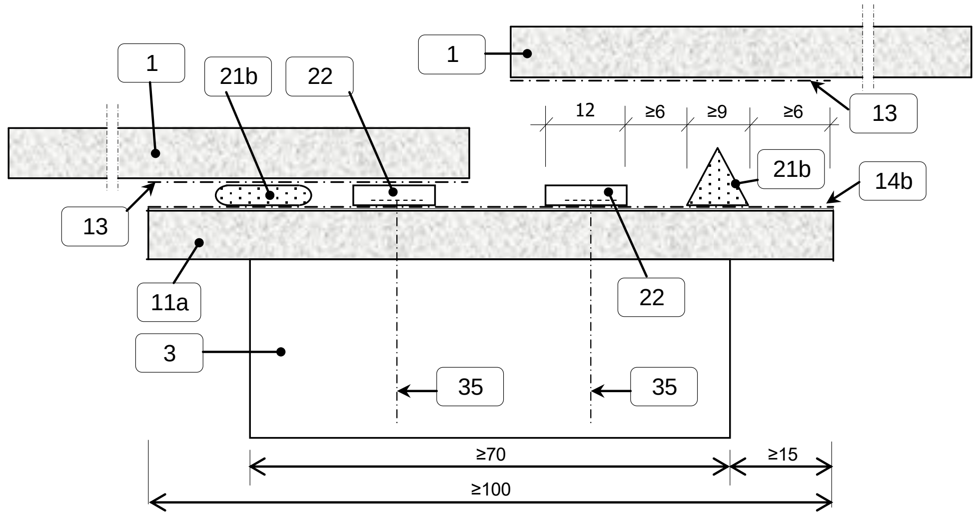
[a]: modification factor kmod depends on the service class (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[c]: angle α between shaft and the wood grain: α ≥ 80°

[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]: α 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 α≥ 30° [e]

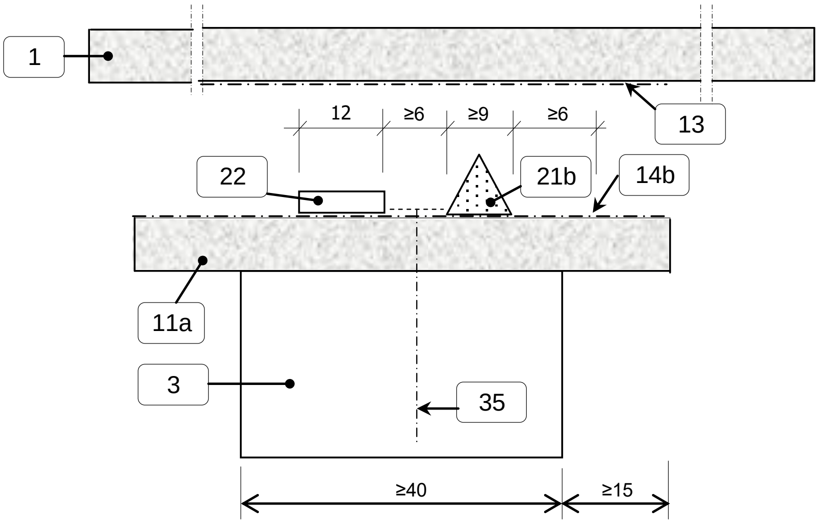


Remark: for the explanation of the numbers see Figure 5

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)			**425** location E	**309** location C	(3)
wind suction					(4)
average wind load in N/m²			4392	4392	(5)
average strength N			*823*	*247*	(6)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	(7)
design value X_d of the pull-through N			**412**	**124**	(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	C18	ρ_k = 320 kg/m³	858 [b]	858 [b]	(11)
wood (EN 338)	C24	ρ_k = 350 kg/m³	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	C18	ρ_k = 320 kg/m³	858 • k_{mod}	858 • k_{mod}	(15)
wood (EN 338)	C24	ρ_k = 350 kg/m³	922 • k_{mod}	922 • k_{mod}	(16)
material factor (NA to) EN 1995-1-1:2004+A1:2008			γ_M = 1,30 [withdrawal capacity]		(17)
design value X_d of the axial withdrawal capacity N					(18)
strength class	C18	ρ_k = 320 kg/m³	**660** • k_{mod}	**660** • k_{mod}	(19)
wood (EN 338)	C24	ρ_k = 350 kg/m³	**709** • k_{mod}	**709** • k_{mod}	(20)
design value of the axial load $X_d = X_k / \gamma_M$ N			**minimum value of the rows:**		(21)
strength class	C18	ρ_k = 320 kg/m³	**(3) (8) (19)**	**(3) (8) (19)**	(22)
wood (EN 338)	C24	ρ_k = 350 kg/m³	**(3) (8) (20)**	**(3) (8) (20)**	(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 mm) ;
[c]: angle α between shaft and the wood grain: α≥ 30°
[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.38), (8.39) and (8.40)
[e]: α 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 α≥ 30° [e]

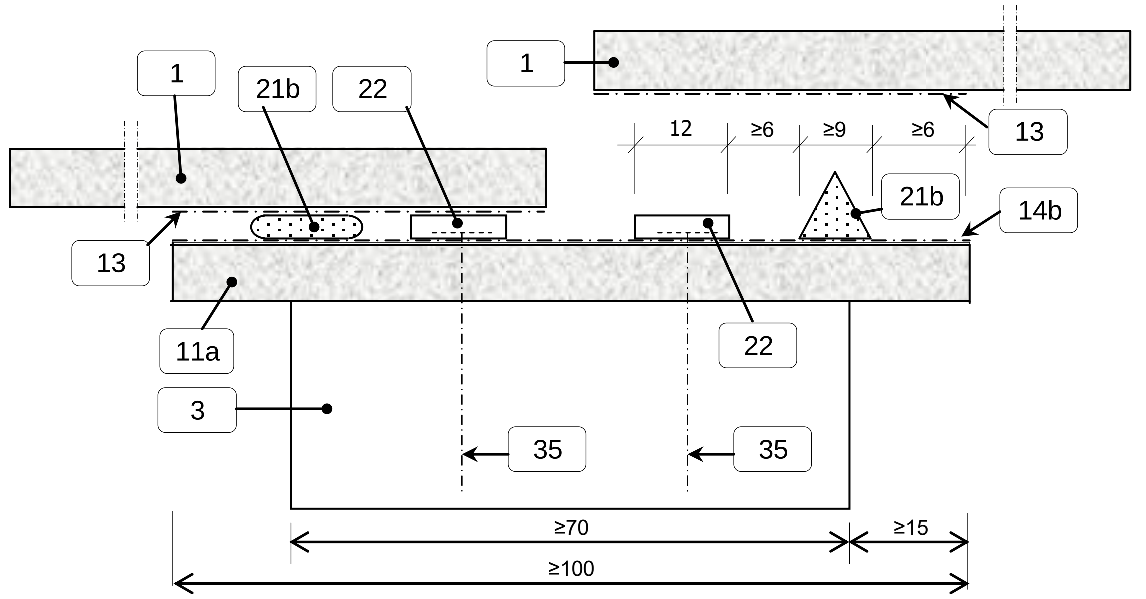


Remark: for the explanation of the numbers see Figure 5

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)			**425** location E	**309** location C	(3)
wind suction					(4)
average wind load in N/m²			4606	4606	(5)
average strength N			*1770*	*531*	(6)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	(7)
design value X_d of the pull-through N			**885**	**266**	(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	C18	$\rho_k = 320$ kg/m³	858 [b]	858 [b]	(11)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	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	C18	$\rho_k = 320$ kg/m³	858 • k_{mod}	858 • k_{mod}	(15)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	922 • k_{mod}	922 • k_{mod}	(16)
material factor (NA to) EN 1995-1-1:2004+A1:2008			γ_M = 1,30 [withdrawal capacity]		(17)
design value X_d of the axial withdrawal capacity N					(18)
strength class	C18	$\rho_k = 320$ kg/m³	**660** • k_{mod}	**660** • k_{mod}	(19)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	**709** • k_{mod}	**709** • k_{mod}	(20)
design value of the axial load $X_d = X_k / \gamma_M$ N			**minimum value of the rows:**		(21)
strength class	C18	$\rho_k = 320$ kg/m³	**(3) (8) (19)**	**(3) (8) (19)**	(22)
wood (EN 338)	C24	$\rho_k = 350$ kg/m³	**(3) (8) (20)**	**(3) (8) (20)**	(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 ($d = l_{ef} / 6 = 24{,}75/6 = 4{,}12$ mm) ;
[c]: angle α between shaft and the wood grain: α≥ 30°
[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 (D) formula (8.38), (8.39) and (8.40)
[e]: α 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 α≥ 80° [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)			**337** location E	**289** location C	(3)
wind suction					(4)
average wind load in N/m²			4503	4503	(5)
average strength N			*506*	*152*	(6)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	(7)
design value X_d of the pull-through N			**253**	**76**	(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	ρ_k = 320 kg/m³	280	280	(11)
wood (EN 338)	C24	ρ_k = 350 kg/m³	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	ρ_k = 320 kg/m³	168 • k_{mod}	168 • k_{mod}	(15)
wood (EN 338)	C24	ρ_k = 350 kg/m³	201 • k_{mod}	201 • k_{mod}	(16)
material factor (NA to) EN 1995-1-1:2004+A1:2008			γ_M = 1,30 [withdrawal capacity]		(17)
design value X_d of the axial withdrawal capacity N					(18)
strength class	C18	ρ_k = 320 kg/m³	**129** • k_{mod}	**129** • k_{mod}	(19)
wood (EN 338)	C24	ρ_k = 350 kg/m³	**155** • k_{mod}	**155** • k_{mod}	(20)
design value of the axial load $X_d = X_k / \gamma_M$ N			**minimum value of the rows:**		(21)
strength class	C18	ρ_k = 320 kg/m³	**(3) (8) (19)**	**(3) (8) (19)**	(22)
wood (EN 338)	C24	ρ_k = 350 kg/m³	**(3) (8) (20)**	**(3) (8) (20)**	(23)
board span b Figure 7			600		(24)
fixing distance a Figure 6			300		(25)

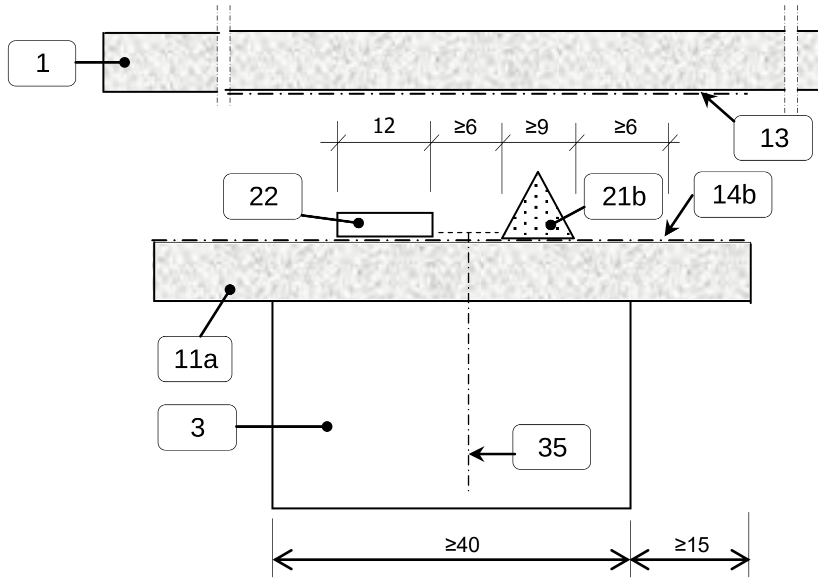
[a]: modification factor k_{mod} depends on the serviceclass (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1

[c]: angle α between shaft and the wood grain: α≥ 80°

[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]: α 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 α≥ 80° [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)			**337**	**289**	(3)
wind suction					(4)
average wind load in N/m²			3078	3078	(5)
average strength N			*887*	*266*	(6)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	(7)
design value X_d of the pull-through N			**444**	**133**	(8)
withdrawal capacity					(9)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [c] [d]					(10)
strength class wood (EN 338)	C18	$\rho_k = 320$ kg/m³	280 [b]	280 [b]	(11)
	C24	$\rho_k = 350$ kg/m³	334 [b]	334 [b]	(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 wood (EN 338)	C18	$\rho_k = 320$ kg/m³	168 • k_{mod}	168 • k_{mod}	(15)
	C24	$\rho_k = 350$ kg/m³	201 • k_{mod}	201 • 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	$\rho_k = 320$ kg/m³	**129** • k_{mod}	**129**• k_{mod}	(19)
	C24	$\rho_k = 350$ kg/m³	**155** • k_{mod}	**155** • k_{mod}	(20)
design value of the axial load $X_d = X_k / \gamma_M$ N			**minimum value of the rows:**		(21)
strength class wood (EN 338)	C18	$\rho_k = 320$ kg/m³	**(3) (8) (19)**	**(3) (8) (19)**	(22)
	C24	$\rho_k = 350$ kg/m³	**(3) (8) (20)**	**(3) (8) (20)**	(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 α between shaft and the wood grain: α≥ 80°

[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]: α 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)

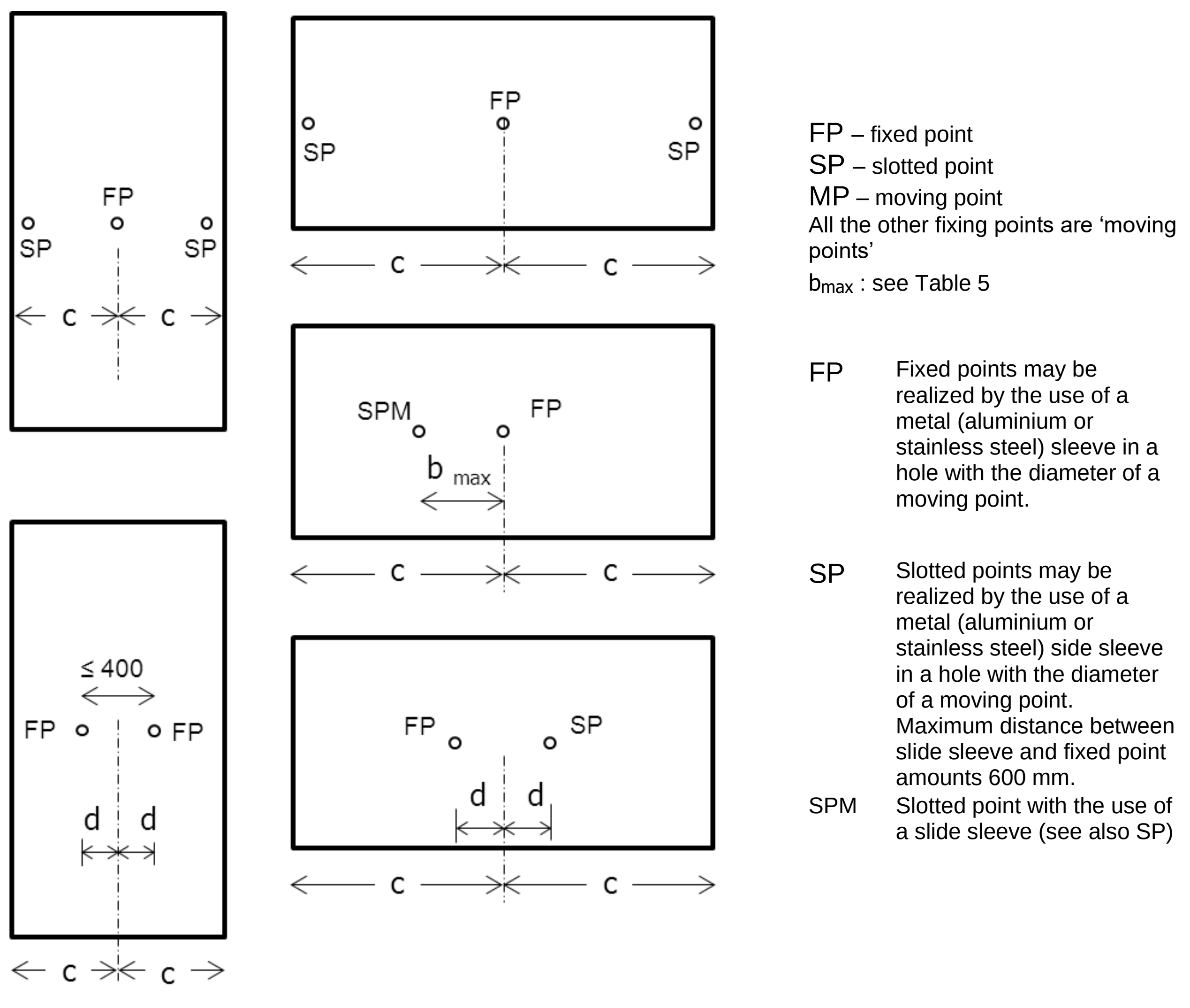
Table 7. Hole dimensions [mm] for Rockpanel boards mechanically fixed and Rockpanel strip in bonded applications

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

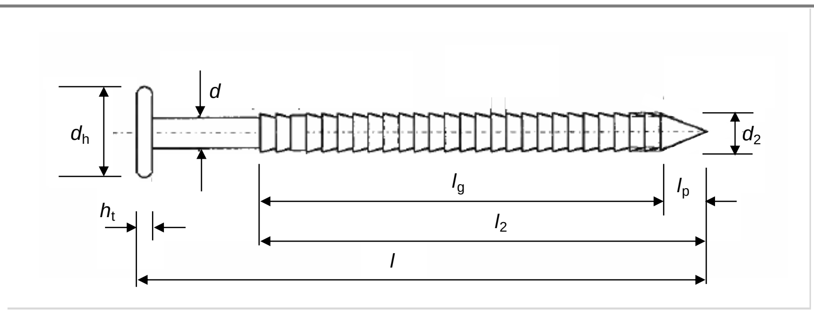
Table 8.1	Ring-shank nail – standard version 2,7/2,9 x 32 and 2,7/2,9 x 40 mm
Stainless steel in accordance with EN 10088 - Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
d = 2,6 – 2,8 d_2 = 2,8 – 3,0 l for nail 32 = 31 – 32,5 l for nail 40 = 39 – 40,5 l_2 for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

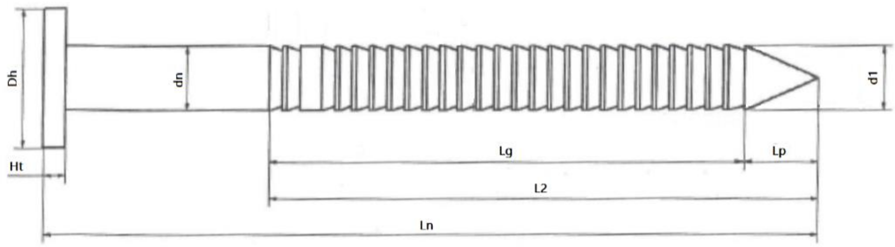
Table 8.2	Ring-shank nail, High Performance version 2,7/3,1 x 35 mm
Stainless steel in accordance with EN 10088 – Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
dn = 2,7 ± 0,1 d1 = 3,1 ± 0,1 Ln = 35 ± 1,0 L2 = 28 ± 1,0 Lg = 25 ± 1,0 Lp =3 ± 0,5 Dh =6 ± 0,2 Ht =0,9 ± 0,1	

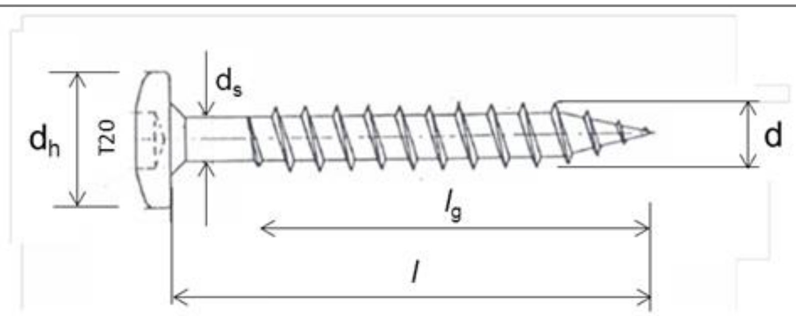
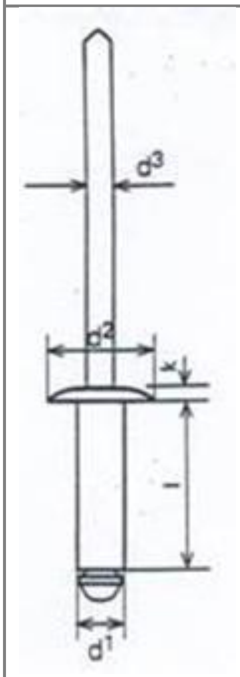
Table 8.3	Torx screws 4,5 x 35 mm
Stainless steel in accordance with EN 10088 - Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
d = 4,3 – 4,6 d_s = 3,3 – 3,4 d_h = 9,6 - 0,4 l = 35 -1,25 l_g = 26,25 – 28,5	

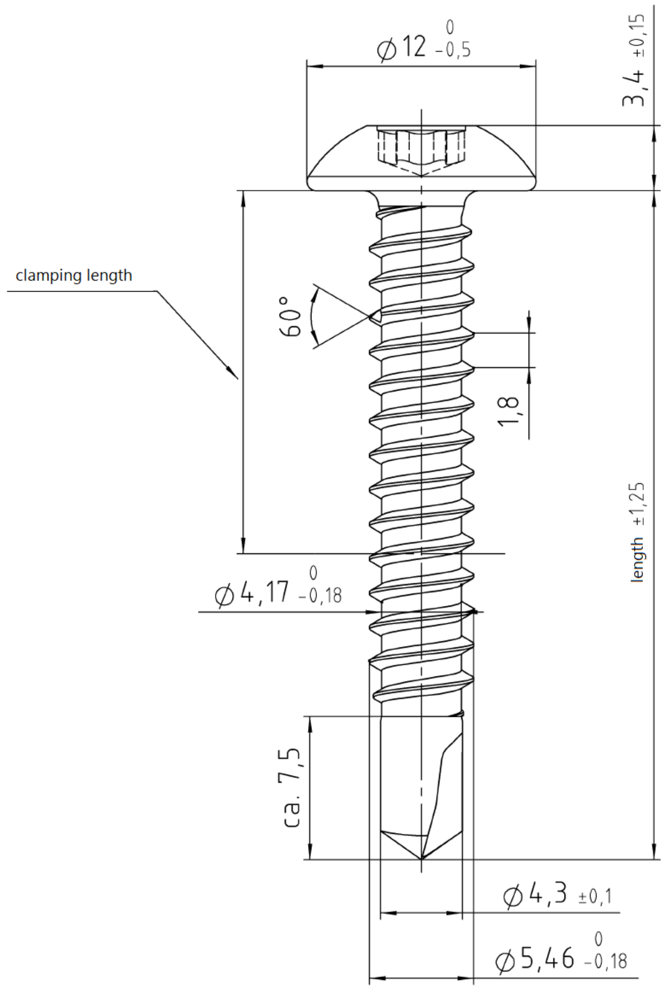
Table 8.4 - Fastener specification for metal sub-frames

Rivet aluminium or stainless steel					
		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 ≥ 1,5 mm	steel t ≥ 1,0 mm [a]	aluminium t ≥ 1,8 mm	steel t ≥ 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 µm/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, whichaccidentally hit the kit.