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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-17/0620 of 16/08/2017

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 Uni 8 mm
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. Konstruktieweg 2 NL-6045 JD 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:	19 pages including 3 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:	

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product
General
ROCKPANEL Uni 8 mm are 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. Fastening to aluminium subframe is carried out with corrosion resistant rivets.
Fastening to steel subframe is carried out with corrosion resistant rivets
Mechanical fasteners, gaskets and aluminium profiles are specified by the ETA-holder.

The ROCKPANEL Uni panels are surface treated with a four-layer water-borne polymer emulsion paint on one side, in a range of colours.

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	$f_{05} \geq 24$ N/mm^2
Modulus of elasticity	m(E) $\geq$ 3567 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 Uni boards**
ROCKPANEL Uni: (water-borne polymer emulsion paint)	Colourpaint [a]

[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 UNI**
Property	**Value (ISO 105 A02)**
Colour fastness after 5000 hours artificial weathering (TR010 Class S)	ROCKPANEL Uni: 3 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 is 15 mm at both sides wider than the batten.

Fasteners

The panels are mechanically fixed either to vertical timber (with intermediate ROCKPANEL strips) or metal subframe. The mechanical fastening to steel subframe is carried out with 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 2,7/2,9 × 32 mm or 40 mm no 1.4401 or 1.4578 (EN 10088) with heads in the colour of the panels.

Fastening to aluminium is carried out with aluminium EN AW-5019 (AlMg5) 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 8.3.

Fastening to steel is carried out with stainless steel EN 10088 no 1.4578 rivets head diameter 15 mm or EN 10088 no. 1.4567 rivets, head diameter 14 mm, shank diameter 5 mm, head colour coated. (for correct fixing, a riveting tool with rivet spacer must be used), see Table 5 and Table 8.3

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 3.

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 ROCKPANEL strips 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 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
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 specified in TR 034, dated April 2013*), 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	**Uni:** S_d < **1,80 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 determined**
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 6-4). 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 : **581/274/138 N** (Annex 2 Table 6-1 row (16)) **ROCKPANEL screws:** 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 6-2 and 6-3, row (25), (26) and (27). **ROCKPANEL 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 6-4, row (25), (26) and (27).

Characteristic		Assessment of characteristic
	Shear strength mechanical fixings Characteristic values	**ROCKPANEL nails:** Failure load: **1177 N;** Deformation: **maximum 15 mm** **ROCKPANEL rivets:** Failure load: **1530 N;** Deformation: **maximum 1,7 mm** **ROCKPANEL screws:** Failure load: **1376 N;** Deformation: **maximum 9 mm**
	Impact resistance	No Performance assessed
	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: 1287/548/276** (according to Annex 2 Table 6-1) **Screws: 982/428/209** (according to Annex 2 Table 6-2 and Annex 2 Table 6-3) **Nails: 896/557/352** (according to Annex 2 Table 6-4)
	Average failure load N/m²	**Rivets: 2281/2461/2629** (according to Annex 2 Table 6-1) **Screws: 1770/1920/1993** (according to Annex 2 Table 6-2 and table 6-3) **Nails: 2343/3671/4588** (according to Annex 2 Table 6-4)
	Mechanical resistance of panels	**See section 1, table 1**
	Resistance to Hygrothermal cycles	**Pass**
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
		ROCKPANEL Uni	
mechanically fixed	Non-ventilated. Cavity filled with mineral wool[d]	**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 8 mm ROCKPANEL strips on the battens [b]	**B-s1,d0** open 6 mm horizontal joint for finish white and black [c]	

[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 as described in table 4, which are attached to the subframe mentioned below
- 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)

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
- Results are also valid for the panels without insulation, if the substrate chosen, according to EN 13823 is made of panel with Euro-class A1 or A2.
- 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

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 8mm

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 6 mm.

If the joints 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

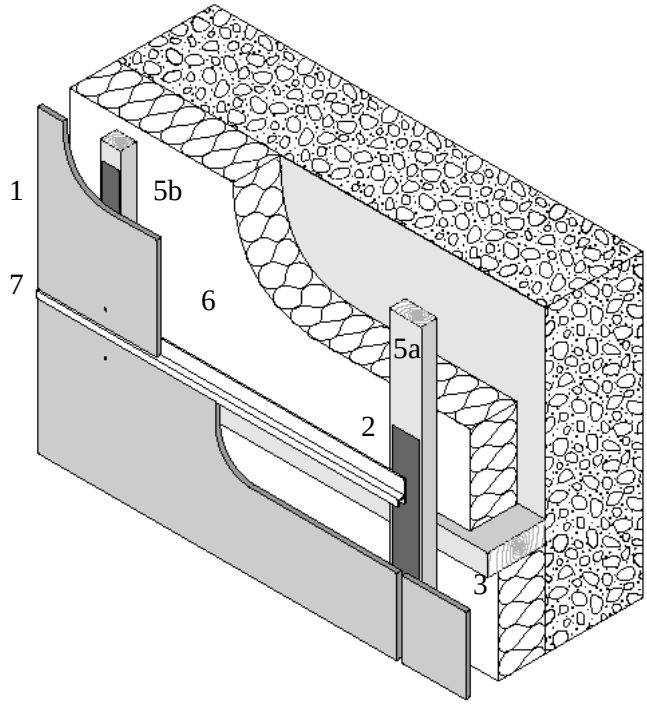
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2017-08-16 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

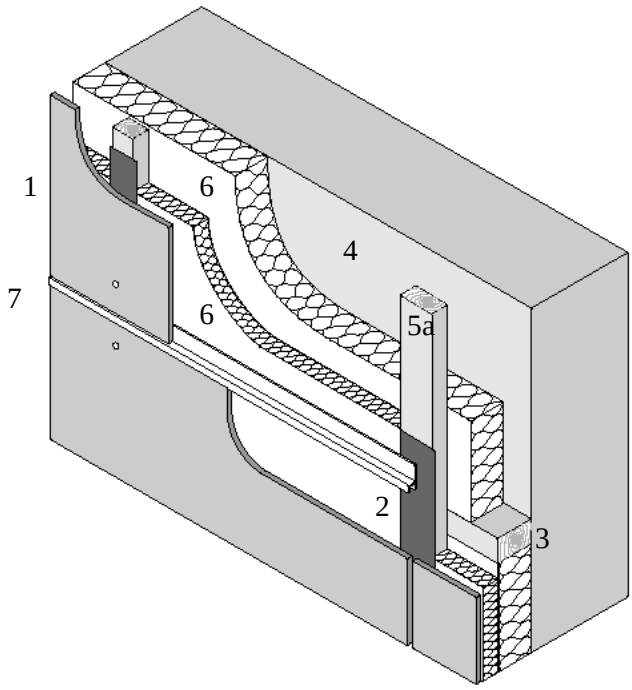
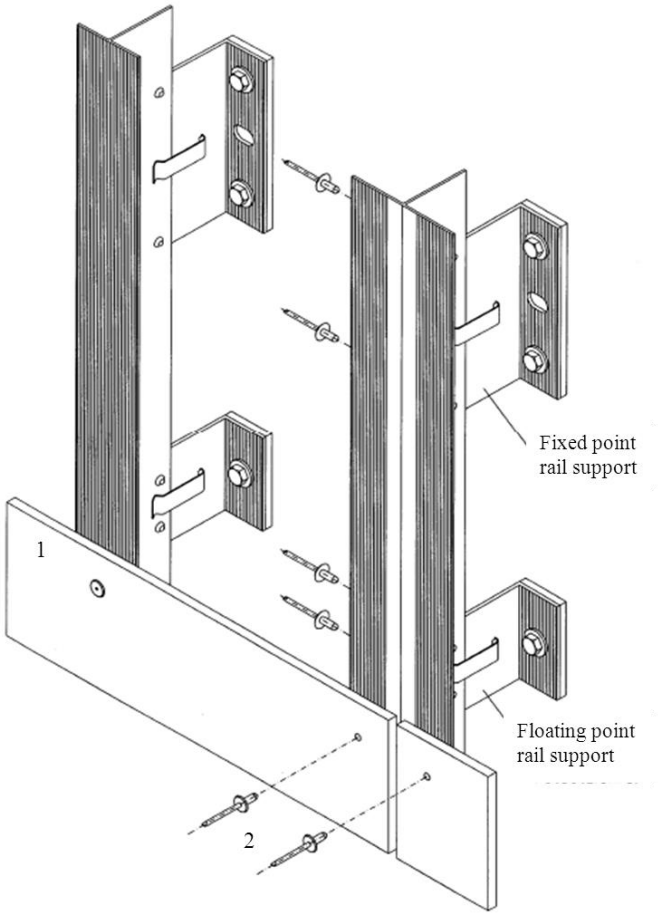
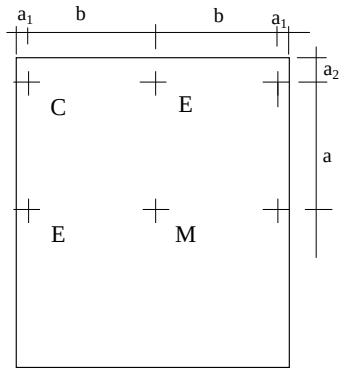


Figure 2. Ventilated intended use on vertical metal subframe



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

Annex 2
Minimum edge distances, fixing locations and maximum fixing distances



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

See Figure 3 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

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	581 N	274 N	138 N
Screw and board fixing	see Table 6-2 row (25), (26), (27)		
Screw and the use of a 8 mm RockPanel strip [b]	see Table 6-3 row (25), (26), (27)		
Nail	see Table 6-4 row (25), (26), (27)		

[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

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	1162	719	479	(4)
	material factor ROCKPANEL γ_M	2,0	2,0	2,0	(5)
	design value X_d of the pull-through N	**581**	359	239	(6)
wind suction					(7)
	average wind load in N/m²	2281	2461	2629	(8)
	average strength N	1287	548	276	(9)
	material factor ROCKPANEL γ_M	2,0	2,0	2,0	(10)
	design value X_d of the pull-through N	643	**274**	**138**	(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		**581**	**274**	**138**	(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 $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination solid timber, **screw** and 8 mm boards (with the use of gaskets), with $\alpha \geq 30°$ [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			*947*	*755*	*548*	(4)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(5)
design value X_d of the pull-through N			**473**	**377**	**274**	(6)
wind suction						(7)
average wind load in N/m²			1770	1920	1993	(8)
average strength N			*982*	*428*	*209*	(9)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N			**491**	**214**	**104**	(12)
withdrawal capacity						(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]						(14)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	858 [b]	858 [b]	858 [b]	(15)
	C24	ρ_k = 350 kg/m³	922 [b]	922 [b]	922 [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	ρ_k = 320 kg/m³	858 • k_{mod}	858 • k_{mod}	858 • k_{mod}	(19)
	C24	ρ_k = 350 kg/m³	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 wood (EN 338)	C18	ρ_k = 320 kg/m³	**660** • k_{mod}	**660** • k_{mod}	**660** • k_{mod}	(23)
	C24	ρ_k = 350 kg/m³	**709** • k_{mod}	**709** • k_{mod}	**709** • k_{mod}	(24)
design value of the axial load $\boldsymbol{X_d}$ = X_k / γ_M N			**minimum value of the rows:**			(25)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26)
	C24	ρ_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 ($d = l_{ef} / 6 = 24{,}75/6 = 4{,}12$ mm);

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

[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 6-3: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination solid timber, **screw** and 8 mm boards (with the use of **RockPanel strips** nominal **8** mm), with $\alpha \geq 30°$ [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			*947*	*755*	*548*	(4)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(5)
design value X_d of the pull-through N			**473**	**377**	**274**	(6)
wind suction						(7)
average wind load in N/m²			1770	1920	1993	(8)
average strength N			*982*	*428*	*209*	(9)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N			**491**	**214**	**104**	(12)
withdrawal capacity						(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]						(14)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	336 [b]	336 [b]	336 [b]	(15)
	C24	ρ_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 wood (EN 338)	C18	ρ_k = 320 kg/m³	336 • k_{mod}	336 • k_{mod}	336 • k_{mod}	(19)
	C24	ρ_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 wood (EN 338)	C18	ρ_k = 320 kg/m³	**258** • k_{mod}	**258** • k_{mod}	**258** • k_{mod}	(23)
	C24	ρ_k = 350 kg/m³	**278** • k_{mod}	**278** • k_{mod}	**278** • 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 wood (EN 338)	C18	ρ_k = 320 kg/m³	**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26)
	C24	ρ_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: $\alpha \geq 30°$

[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 $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination solid timber, **nail** 32 mm and 8 mm boards (with the use of gaskets) , with $\alpha \geq 80°$ [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			*668*	*599*	*512*	(4)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(5)
design value X_d of the pull-through N			**334**	**299**	**256**	(6)
wind suction						(7)
average wind load in N/m²			2343	3671	4588	(8)
average strength N			*896*	*557*	*352*	(9)
material factor Rockpanel γ_M (manufacturers declaration)			*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N			**448**	**278**	**176**	(12)
withdrawal capacity						(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [c] [d]						(14)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	168	168	168	(15)
	C24	ρ_k = 350 kg/m³	201	201	201	(16)
modification factor for k_{mod}			k_{mod} [a]			(17)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [c] [d]						(18)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	168 • k_{mod}	168 • k_{mod}	168 • k_{mod}	(19)
	C24	ρ_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			γ_M = 1,30 [withdrawal capacity]			(21)
design value X_d of the axial withdrawal capacity N						(22)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	**129** • k_{mod}	**129** • k_{mod}	**129** • k_{mod}	(23)
	C24	ρ_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 wood (EN 338)	C18	ρ_k = 320 kg/m³	**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26
	C24	ρ_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: $\alpha \geq 80°$

[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

The hole diameters for the fixed point, moving point and slotted point are indicated in table 7.

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 and 6-4 (position M, E and C)

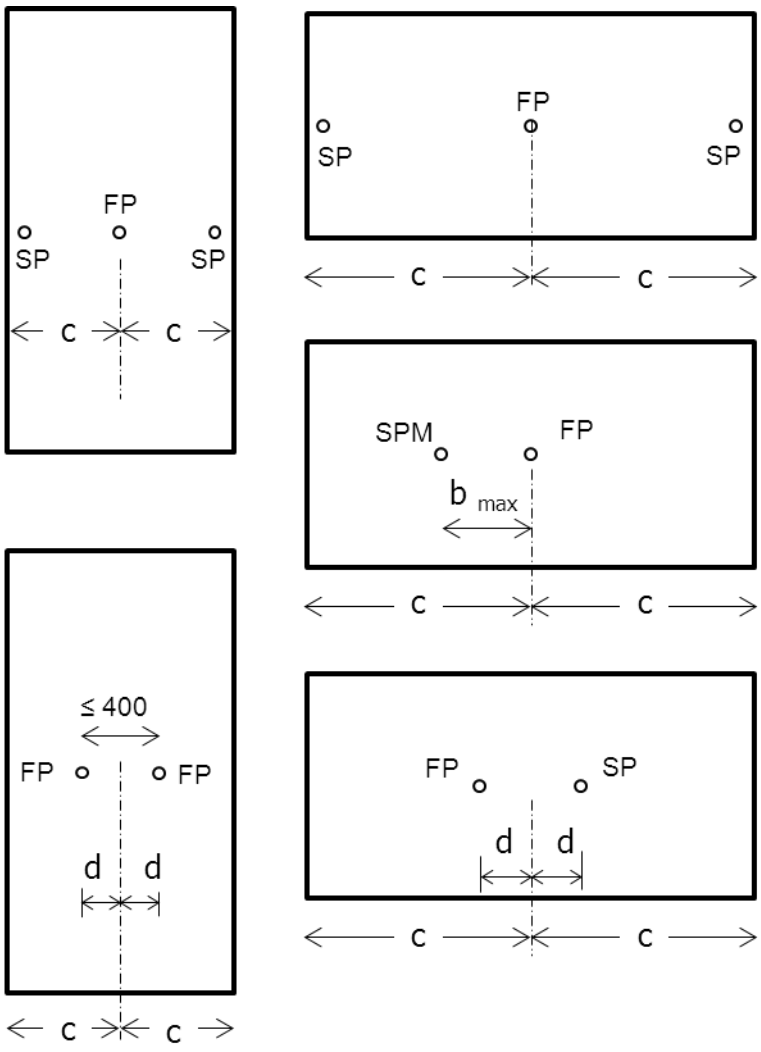
Table 7. Hole dimensions [mm] for Rockpanel boards mechanically fixed

Fixing type	Fixed point	Moving point	Slotted points	Board dimension considered
Screw	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
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. 3: Examples of possible installation methods with the use of fixed points and slotted points



FP – fixed point
SP – slotted point
MP – moving point
All the other fixing points are 'moving points'
b_{max} : see Table 5

FP	Fixed points may be realized by the use of a metal (aluminium or stainless steel) sleeve in a hole with the diameter of a moving point.
SP	Slotted points may be realized by the use of a metal (aluminium or stainless steel) side sleeve in a hole with the diameter of a moving point. Maximum distance between slide sleeve and fixed point amounts 600 mm.
SPM	Slotted point with the use of a slide sleeve (see also SP)

Annex 3
Fastener specification for wooden subframes

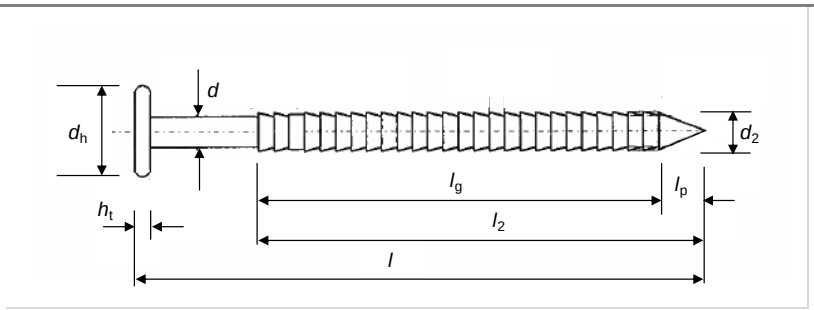
Table 8.1	Ring-shank nail 2,7/2,9 x 32 and 2,7/2,9 x 40 mm
Stainless steel in accordance with EN 10088 - Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
d = 2,6 – 2,8 d_2 = 2,8 – 3,0 l for nail 32 = 31 – 32,5 l for nail 40 = 39 – 40,5 l_2 for nail 32 = 24 – 26 l_2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

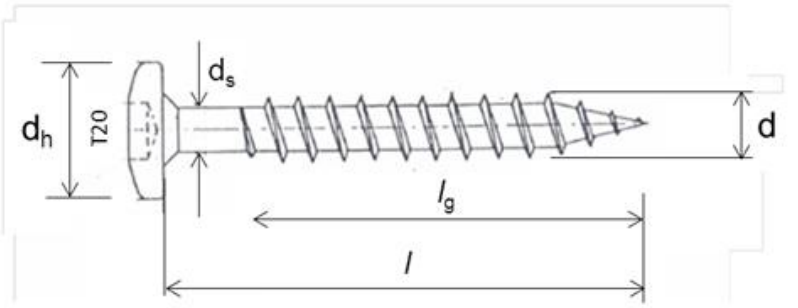
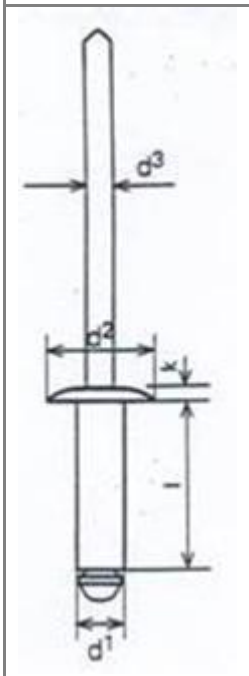
Table 8.2	Torx screws 4,5 x 35 mm
Stainless steel in accordance with EN 10088 - Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
d = 4,3 – 4,6 d_s = 3,3 – 3,4 d_h = 9,6 - 0,4 l = 35 -1,25 l_g = 26,25 – 28,5	

Table 8.3 - 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.