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

MEMBER OF EOTA

European Technical Assessment ETA-13/0204 of 2025/07/03

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 Lines^2 Smooth 10 mm finish Colours Rockpanel Lines^2 Textured 10 mm finish Colours
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:	18 pages including 5 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 2015-11-10

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1. Technical description of the product

General

Rockpanel Lines² Smooth and Rockpanel Lines² Textured, tongue and groove panels with thickness 10 mm and finish Colours are prefabricated compressed mineral wool panels with thermo-hardening synthetic binders. The tongue and groove panels are fastened to timber subframes.
Fastening of the panels to the timber subframe is carried out with corrosion resistant nails or screws.
Mechanical fasteners, gaskets, aluminium and steel profiles are specified by the ETA-holder.

The Rockpanel Lines² Smooth panels are surface treated with layers water-borne emulsion coating on one side, in a range of colours.
The Rockpanel Lines² Textured panels are surface treated with layers water-borne emulsion coating on one side, in a range of colours. The front side of the board has a slightly textured surface with depths between the product tolerances of +/- 0.5 mm.

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

Table 1:

Property	Value
Thickness, nominal	10 mm
Length, max	3050 mm
Panel width, working width	S: 164 / 146 mm XL: 295 / 277 mm
Density, nominal	1050 kg/m³
Bending strength, length and width	$f_{05} \geq 27.0$ N/mm²
Modulus of elasticity	$m(E) \geq 4015$ N/mm²
Cumulative dimensional change according to EN 438-2	Length : ≤ 0.085 % Width : ≤ 0.084 %
Thermal conductivity EN 10456	0.37 W/(m·K)
Coefficient of thermal expansion, length and width	$\alpha = 10.5 \cdot 10^{-6}$ [K^{-1}]
Coefficient of moisture expansion 23°C/50% RH to 92% RH	≤ 0.302 mm/m after 4 days

Finishes

The finishes are indicated in Table 2. The coatings are provided in a number of colours.

Table 2:

Rockpanel Lines² Smooth and Rockpanel Lines² Textured, finish Colours	Colourpaint (water-borne polymer emulsion coating)

The colour fastness of the panels is indicated in Table 3.

Table 3:

Colour fastness after 5000 hours artificial weathering (TR010 climate class S)	
	Value (ISO 105 A02)
finish Colours:	3-4 or better

Subframes

The panels are attached to the building by fixing to a subframe of wood.

The vertical timber 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).

Joints

The horizontal seams are automatically covered by the overlaid board.
If all the joints of the tongue and groove panels are located between the vertical battens of the subframe, a gasket on the subframe is not required. In the case vertical joints are collected on the subframe, the durability of the timber has either as a natural or an acquired characteristic durability as the result of appropriate preservative treatment.

Aluminium profiles

A Rockpanel starting profile "K" (Figure 1) can be used for placement of the lowest section of Lines².
In vertical use of Lines², the horizontal joints between the panels are made with a Rockpanel "A" extruded chair profile or equivalent. The chair profile has an overlap of at least 15 mm on the board above the profile.

Foam gasket

If all the joints of the tongue and groove panels are located between the vertical battens of the subframe, a gasket on the subframe is not required.

Fasteners
The panels are mechanically fixed to a vertical or a horizontal timber subframe. The mechanical fastening to timber battens is carried out with either stainless steel flat-top screws 3,5 x 30 mm no. 1.4301, 1.4401 or 1.4578 (EN 10088) or Rockpanel ring-shank nails 2,1/2,3 x 27 mm no. 1.4401 or 1.4578 (EN 10088), see Table 12 and 13.

The maximum fixing distances and edge distances appear from the tables in Annex 2, the hole diameter from Table 11. The design load and characteristic load appears from Annex 2 of the ETA.

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

The boards are intended for external cladding according to Figure 1 and for fascias and soffits. The cladding on vertical or horizontal timber battens with mechanically fixed panels can be carried out with ventilated cavities at the back.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the kit of 50 years, provided that they are subject to appropriate use and maintenance.

The indications given regarding 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

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

Table 4. Euroclass classification of different constructions with Rockpanel Lines[2] panels

Fixing method	Set-up	Vertical timber subframe
Mechanically fixed	Ventilated	B-s2,d0

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 to a wooden subframe
- The panels are backed with min. 50 mm mineral wool insulation with density 30-70 kg/m^3 according to EN 13162 with a cavity between the back of the board and the insulation.

Substrates:
- Concrete walls, masonry walls

Insulation:
- The subframe is backed with min. 50 mm mineral wool insulation with density 30-70 kg/m^3 according to EN 13162 with a cavity between the panels and the insulation.
- Results are also valid for a greater thickness of mineral wool insulation with the same density and the same or better reaction to fire classification.
- The results also apply to panels without insulation, if the substrate chosen according to EN 13238 is made of a panel with Euroclass A1 or A2 (e.g. fibre-cement panels).

Subframe:
- Vertical softwood battens without fire retardant treatment, thickness minimum 28 mm.
- Test results are also valid for the same type of panel with a metal subframe.
- 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.
- 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 behind the subframe.

Joints:
Horizontal application
- Vertical joints are open without gasket backing or Rockpanel strip backing as described in Table 4; the horizontal seams are automatically covered by the overlaid board.

Vertical application
- 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 valid for the following product parameters:

Thickness:
- Nominal 10 mm

Density
- Nominal 1050 kg/m^3

Characteristic	Assessment of characteristic
3.3 Hygiene, health and the environment (BWR 3)	
Content, emission and/or release of dangerous substances	Use category: Outdoor S/W2 The kit does not contain/release dangerous substances except: Formaldehyde concentration 0.0105 mg/m^3 Formaldehyde class E1* The used fibers 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	s_d declared ≤ 1.8 m at 23°C and 85 %RH The designer shall consider the relevant needs for ventilation, heating and insulation to minimize condensation in service.
Water permeability incl. joints for non-ventilated applications	**No Performance Assessed**
Drainability	**See section 'Aspects related to the performance of the product'**

*) 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.

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 up to and including 9). Below the safety factors are listed which have been used in the calculation of the design values.

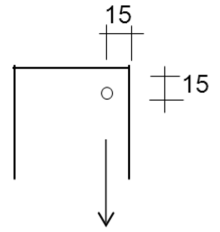
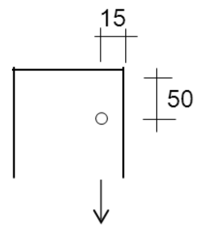
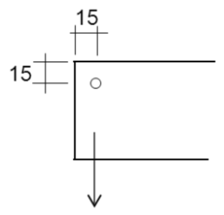
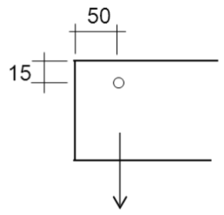
Design values of axial loads	
Fixing position and design value X_d of the axial load M/C (Middle/Corner) of mechanical fixings corresponding to the wind load resistance (load acting perpendicular to the façade). *Remark:* Design value X_d is obtained by dividing the characteristic value X_k by a partial factor γ_M : $X_d = X_k / \gamma_M$ The design value X_d of a material property can be expressed in general terms as $X_d = \eta * X_k / \gamma_M$ For Rockpanel γ_m = 1.6. The conversion factor η = 0.8 [aged bending strength divided by the f_{05}] As a result γ_M = 2.0	**Lines[2] 10 mm with screw fixing:** Fastener specification according to Table 13. Table 6 and 7, row (26) and (27) contain the design value of the axial load $X_d = X_k / \gamma_M$ for the different fixing locations and board thicknesses. Tables include wind suction results according to "wind suction and pressure resistance" row (9) and (10) **Lines[2] 10 mm with nail fixing:** Fastener specification according to Table 12. Table 8 and 9, row (26) and (27) contain the design value of the axial load $X_d = X_k / \gamma_M$ for the different fixing locations and board thicknesses. Tables include wind suction results according to "wind suction and pressure resistance" row (9) and (10)

Characteristic	**Assessment of characteristic**

Wind load resistance	
Pull-out and pull-through resistance of fasteners and mechanical resistance of boards	
Pull-out resistance of fasteners	**Lines² 10 mm with screw fixing:** Fastener specification according to Table 13. Table 6 and 7 row (15) and (16) contain the characteristic withdrawal capacity F_{ax} for both strength classes C18 and C24 according to EN 338. Design value X_d depends on the modification factor k_{mod} , the strength class of the wood and the material factor γ_M . Row (26) and (27) contain the design value X_d of the axial withdrawal capacity for both strength classes C18 and C24.
	Lines² 10 mm with nail fixing: Fastener specification according to Table 12. Table 8 and 9 row (15) and (16) contain the characteristic withdrawal capacity F_{ax} for both strength classes C18 and C24 according to EN 338. Design value X_d depends on the modification factor k_{mod} , the strength class of the wood and the material factor γ_M . Row (26) and (27) contain the design value X_d of the axial withdrawal capacity for both strength classes C18 and C24.
Pull-through resistance of panels	**Lines² 10 mm with screw fixing:** Fastener specification according to Table 13. Table 6 and 7 row (5) contain the characteristic pull-through for two different fixing locations. Row (7) contains the design value of the pull-through resistance for the different fixing locations.
	Lines² 10 mm with nail fixing: Fastener specification according to Table 12. Table 8 and 9 row (5) contain the characteristic pull-through for two different fixing locations. Row (7) contains the design value of the pull-through resistance for the different fixing locations.

Wind load resistance	
Wind suction and pressure resistance	
Resistance to wind load M/C corrected for f_{05} declared (27 N/mm²)	
Average strength (N) with single screw fixing	Lines² S – Annex 2.1 Table 6: location M/C: 574/170 Lines² XL – Annex 2.1 Table 6: location M/C: 596/231
Average strength (N) with double screw fixing	Lines² S – Annex 2.2 Table 7: location M/C: 592/170 Lines² XL – Annex 2.2 Table 7: location M/C: 714/231
Average strength (N) with single nail fixing	Lines² S – Annex 2.3 Table 8: location M/C: 325/241 Lines² XL – Annex 2.3 Table 8: location M/C: 377/297
Average strength (N) with double nail fixing	Lines² S – Annex 2.4 Table 9: location M/C: 562/241 Lines² XL – Annex 2.4 Table 9: location M/C: 695/297
Average failure load (N/m²) with single screw fixing	Lines² S – Annex 2.1 Table 6: location M/C: 5110/3700 Lines² XL – Annex 2.1 Table 6: location M/C: 2797/2647
Average failure load (N/m²) with double screw fixing	Lines² S – Annex 2.2 Table 7: location M/C: 5272/3700 Lines² XL – Annex 2.2 Table 7: location M/C: 3351/2647
Average failure load (N/m²) with single nail fixing	Lines² S – Annex 2.3 Table 8: location M/C: 2895/5243 Lines² XL – Annex 2.3 Table 8: location M/C: 1768/3400
Average failure load (N/m²) with double nail fixing	Lines² S – Annex 2.4 Table 9: location M/C: 5006/5243 Lines² XL – Annex 2.4 Table 9: location M/C: 3264/3400

Characteristic	**Assessment of characteristic**

Mechanical resistance				
Shear strength				
Lines[2] 10 mm mechanical fixings – Average values				
				
Nail 2,1/2,3 x 27 mm	795	914	838	866
Screw 3,5 x 30 mm	822	1083	1124	1074

Impact resistance [a]						
Table 5 Shatter properties – Degrees of exposure in use						
		Energy J	Category IV	Category III	Category II	Category I
Impact by hard body	0.5 kg	1	Pass	-	-	-
	0.5 kg	3	-	Pass	Pass	Pass
	1 kg	10	-	-	Damaged by impact at the bottom	

[a] For 'definition of use category' see Table 14

Mechanical resistance	See section 1, Table 1

3.8 Aspects of durability

Resistance to Hygrothermal cycles	**Pass**
Dimensional stability	**See section 1, Table 1**
Immersion in water without UV	**Not relevant**
Humidity and NaCl	**Not relevant**
Humidity and SO_2	**Not relevant**
Resistance to Xenon Arc exposure	**Pass**

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.

The boards are in general mounted with a joint width of at least 5 and up to 8 mm (and a minimum of 3 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 cladding kit shall be designed and installed so that water which penetrates in the air space or condensation water shall be drained out of the installed kit without accumulation or moisture damage or leakage into the substrate or the wall cladding kit.

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.

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 15 mm from a horizontal edge (See Tables 6, 7, 8, 9 and 10). The panels are fixed making sure that the screws are not over-tightened.

Panel fixing with fixed points and moving points in accordance with Table 11.

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

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 provided for in the applicable EAD

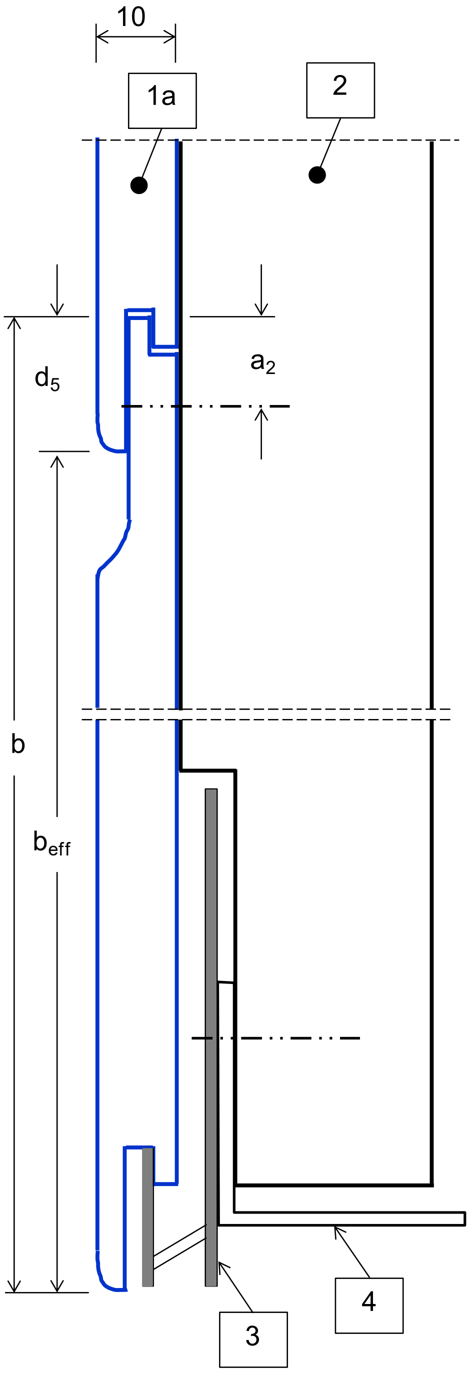
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2025-07-03 by

Thomas Bruun
Managing Director, ETA-Danmark

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

Figure 1. Mounting details and fixing dimensions Rockpanel Lines²



1a	Lines² S or XL
2	Subframe
3	Aluminium starter trim ‘K’
4	Ventilation strip
b	S: 164 mm; XL: 295 mm
b_{eff}	S: 146 mm; XL: 277 mm
d_5	18 mm
a_2	15 mm

Annex 2

Annex 2.1

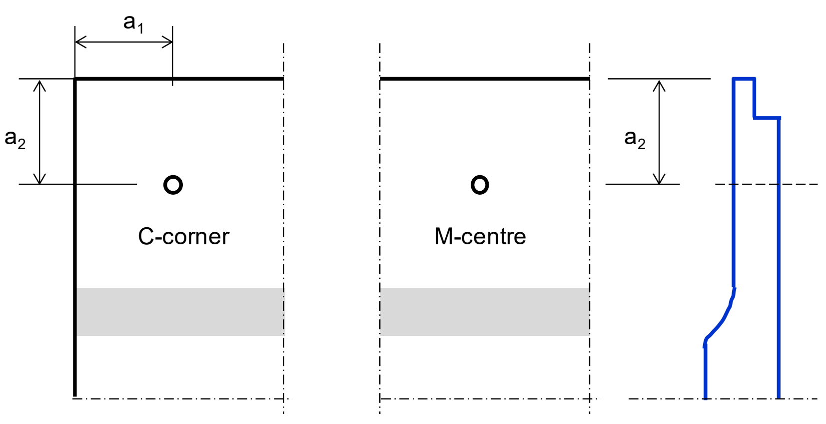
Table 6. Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **Flat-top Screw 3,5x30** and Tongue 6.3 mm, with α ≥ 30° [c] corrected for f_{05} declared (27 N/mm²)

Item			M-centre S	M-centre XL	C-corner S	C-corner XL	
Tongue of Lines² 10 mm			6.3 mm				*(1)*
Location of the fixing in the panel			M-centre (1 screw)		C-corner (1 screw)		*(2)*
Panel type			S	XL	S	XL	*(3)*
Pull-through N							*(4)*
Characteristic pull-through N			407	407	438	438	*(5)*
Material factor Rockpanel γ_M			2.0		2.0		*(6)*
Design value X_d of the pull-through N			**204**	**204**	**219**	**219**	*(7)*
Wind suction							*(8)*
Average wind load in N/m²			5110	2797	3700	2647	*(9)*
Average strength N			574	596	170	231	*(10)*
Material factor Rockpanel γ_M			2.0		2.0		*(11)*
Design value X_d of the pull-through N			**287**	**298**	**85**	**116**	*(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	538		538		*(15)*
	C24	ρ_k = 350 kg/m³	578		578		*(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 wood (EN 338)	C18	ρ_k = 320 kg/m³	538 * k_{mod}		538 * k_{mod}		*(19)*
	C24	ρ_k = 350 kg/m³	578 * k_{mod}		578 * k_{mod}		*(20)*
Material factor (NA to) EN 1995-1-1+C1+A1/A2:2014			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	414 * k_{mod}		414 * k_{mod}		*(23)*
	C24	ρ_k = 350 kg/m³	445 * k_{mod}		445 * k_{mod}		*(24)*
Design value of the axial load $X_d = X_k / \gamma_M$ N			**minimum value of the rows:**				*(25)*
Strength class wood (EN 388)	C18	ρ_k = 320 kg/m³	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	*(26)*
	C24	ρ_k = 350 kg/m³	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	*(27)*
Board span b			600				*(28)*
Fixing distance a			Type S: 146 / XL: 277				*(29)*

[a]: modification factor k_{mod} depends on the service class (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1.
[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand ($d = l_{ef} / 6 = 22.5 / 6 = 3.2$ mm).
[c]: α is the angle between the screw axis and the wood grain direction: α ≥ 30°.
[d]: calculation in accordance with EN 1995-1-1+C1+A1/A2:2014 formula (8.38), (8.39) and (8.40)

Fixing locations

$a_1 \geq 15$ mm
$a_2 = 15$ mm



Annex 2

Annex 2.2

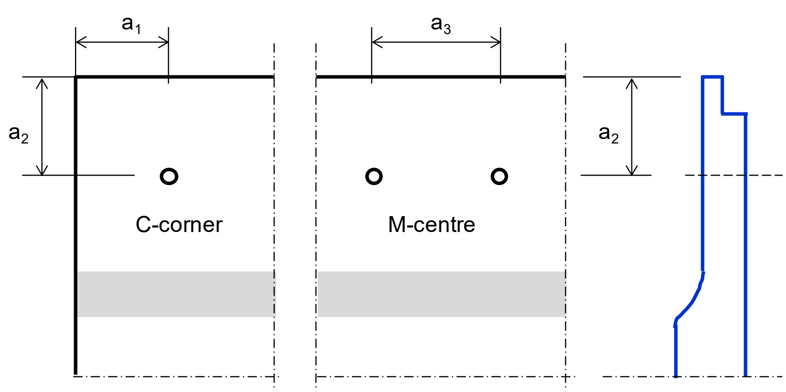
Table 7. Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **Flat-top Screw 3,5x30** and Tongue 6.3 mm, with $\alpha \geq 30°$ [c] corrected for f_{05} declared (27 N/mm²)

Tongue of Lines[2] 10 mm			6.3 mm				*(1)*
Location of the fixing in the panel			M-centre (2 screws)		C-corner (1 screw)		*(2)*
Panel type			S	XL	S	XL	*(3)*
Pull-through N (single screw)							*(4)*
Characteristic pull-through N			407	407	438	438	*(5)*
Material factor Rockpanel γ_M			2.0		2.0		*(6)*
Design value X_d of the pull-through N			**204**	**204**	**219**	**219**	*(7)*
Wind suction (double screw)							*(8)*
Average wind load in N/m²			5272	3351	3700	2647	*(9)*
Average strength N			592	714	170	231	*(10)*
Material factor Rockpanel γ_M			2.0		2.0		*(11)*
Design value X_d of the pull-through N			**296**	**357**	**85**	**116**	*(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	538		538		*(15)*
	C24	ρ_k = 350 kg/m³	578		578		*(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 wood (EN 338)	C18	ρ_k = 320 kg/m³	538 * k_{mod}		538 * k_{mod}		*(19)*
	C24	ρ_k = 350 kg/m³	578 * k_{mod}		578 * k_{mod}		*(20)*
Material factor (NA to) EN 1995-1-1+C1+A1/A2:2014			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	414 * k_{mod}		414 * k_{mod}		*(23)*
	C24	ρ_k = 350 kg/m³	445 * k_{mod}		445 * k_{mod}		*(24)*
Design value of the axial load $X_d = X_k / \gamma_M$ N			**minimum value of the rows:**				*(25)*
Strength class wood (EN 388)	C18	ρ_k = 320 kg/m³	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	*(26)*
	C24	ρ_k = 350 kg/m³	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	*(27)*
Board span b			600				*(28)*
Fixing distance a			Type S: 146 / XL: 277				*(29)*

[a]: modification factor k_{mod} depends on the service class (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1.
[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand ($d = l_{ef} / 6 = 22.5 / 6 = 3.2$ mm).
[c]: α is the angle between the screw axis and the wood grain direction: $\alpha \geq 30°$.
[d]: calculation in accordance with EN 1995-1-1+C1+A1/A2:2014 formula (8.38), (8.39) and (8.40)

Fixing locations

$a_1 \geq 15$ mm
$a_2 = 15$ mm
$a_3 \geq 20$ mm



Annex 2

Annex 2.3

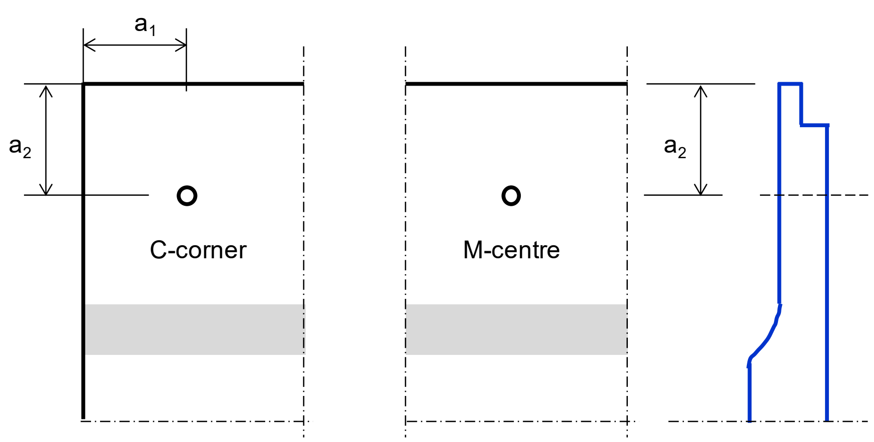
Table 8. Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **Nail 2,1/2,3 x 27 mm** and Tongue 6.3 mm, corrected for f_{05} declared (27 N/mm²)

Tongue of Lines² 10 mm				6.3 mm				*(1)*
Location of the fixing in the panel				M-centre (1 nail)		C-corner (1 nail)		*(2)*
Panel type				S	XL	S	XL	*(3)*
Pull-through N								*(4)*
	Characteristic pull-through N			385	385	408	408	*(5)*
	Material factor Rockpanel γ_M			2.0		2.0		*(6)*
	Design value X_d of the pull-through N			**193**	**193**	**204**	**204**	*(7)*
Wind suction								*(8)*
	Average wind load in N/m²			2895	1768	5243	3400	*(9)*
	Average strength N			325	377	241	297	*(10)*
	Material factor Rockpanel γ_M			2.0		2.0		*(11)*
	Design value X_d of the pull-through N			**163**	**189**	**121**	**149**	*(12)*
Withdrawal capacity								*(13)*
	Characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [d]							*(14)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	154		154		*(15)*
		C24	ρ_k = 350 kg/m³	184		184		*(16)*
	Modification factor for k_{mod}			k_{mod} [a]				*(17)*
	Axial withdrawal capacity $F_{ax,k,Rk}$ * k_{mod} [a] [b] [d]							*(18)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	154 * k_{mod}		154 * k_{mod}		*(19)*
		C24	ρ_k = 350 kg/m³	184 * k_{mod}		184 * k_{mod}		*(20)*
	Material factor (NA to) EN 1995-1-1+C1+A1/A2:2014			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	119 * k_{mod}		119 * k_{mod}		*(23)*
		C24	ρ_k = 350 kg/m³	142 * k_{mod}		142 * k_{mod}		*(24)*
Design value of the axial load $X_d = X_k / \gamma_M$ N				**minimum value of the rows:**				*(25)*
	Strength class wood (EN 388)	C18	ρ_k = 320 kg/m³	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	*(26)*
		C24	ρ_k = 350 kg/m³	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	*(27)*
	Board span b			600				*(28)*
	Fixing distance a			Type S: 146 / XL: 277				*(29)*

[a]: modification factor k_{mod} depends on the service class (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1.
[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand ($d = l_{ef} / 8 = 15.5 / 8 = 1.94$ mm).
[d]: calculation in accordance with EN 1995-1-1+C1+A1/A2:2014 formula (8.23a)

Fixing locations

$a_1 \geq 15$ mm
$a_2 = 15$ mm



Annex 2

Annex 2.4

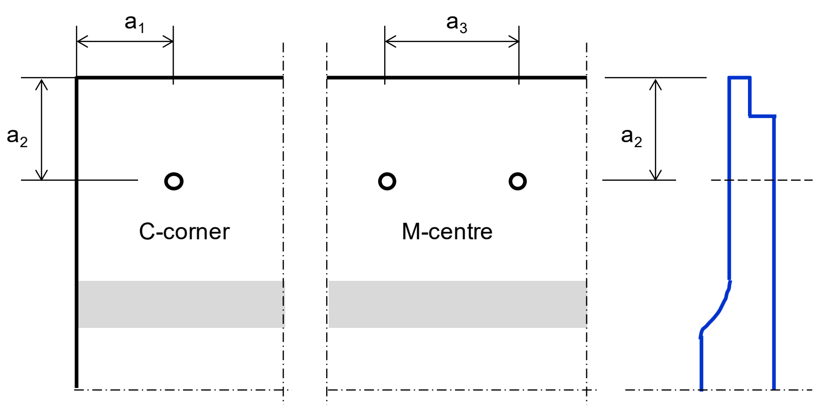
Table 9. Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **Nail 2,1/2,3 x 27 mm** and Tongue 6.3 mm, corrected for f_{05} declared (27 N/mm²)

Tongue of Lines² 10 mm				6.3 mm				*(1)*
Location of the fixing in the panel				M-centre (2 nails)		C-corner (1 nail)		*(2)*
Panel type				S	XL	S	XL	*(3)*
Pull-through N (single nail)								*(4)*
	Characteristic pull-through N			385	385	408	408	*(5)*
	Material factor Rockpanel γ_M			2.0		2.0		*(6)*
	Design value X_d of the pull-through N			**193**	**193**	**204**	**204**	*(7)*
Wind suction (double nail)								*(8)*
	Average wind load in N/m²			5006	3264	5243	3400	*(9)*
	Average strength N			562	695	241	297	*(10)*
	Material factor Rockpanel γ_M			2.0		2.0		*(11)*
	Design value X_d of the pull-through N			**281**	**348**	**121**	**149**	*(12)*
Withdrawal capacity								*(13)*
	Characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [d]							*(14)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	154		154		*(15)*
		C24	ρ_k = 350 kg/m³	184		184		*(16)*
	Modification factor for k_{mod}			k_{mod} [a]				*(17)*
	Axial withdrawal capacity $F_{ax,k,Rk}$ * k_{mod} [a] [b] [d]							*(18)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	154 * k_{mod}		154 * k_{mod}		*(19)*
		C24	ρ_k = 350 kg/m³	184 * k_{mod}		184 * k_{mod}		*(20)*
	Material factor (NA to) EN 1995-1-1+C1+A1/A2:2014			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	119 * k_{mod}		119 * k_{mod}		*(23)*
		C24	ρ_k = 350 kg/m³	142 * k_{mod}		142 * k_{mod}		*(24)*
Design value of the axial load $X_d = X_k / \gamma_M$ N				**minimum value of the rows:**				*(25)*
	Strength class wood (EN 388)	C18	ρ_k = 320 kg/m³	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	(7)(12)(23)	*(26)*
		C24	ρ_k = 350 kg/m³	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	(7)(12)(24)	*(27)*
	Board span b			600				*(28)*
	Fixing distance a			Type S: 146 / XL: 277				*(29)*

[a]: modification factor k_{mod} depends on the service class (humidity conditions) and the load-duration class according to the National Annex of EN 1995-1-1.
[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand ($d = l_{ef} / 8 = 15.5 / 8 = 1.94$ mm).
[d]: calculation in accordance with EN 1995-1-1+C1+A1/A2:2014 formula (8.23a)

Fixing locations

$a_1 \geq 15$ mm
$a_2 = 15$ mm
$a_3 \geq 20$ mm



Annex 3

Fixing positions

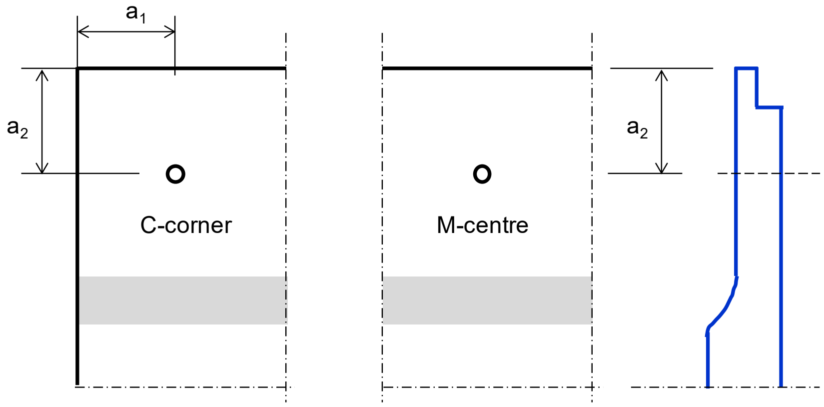
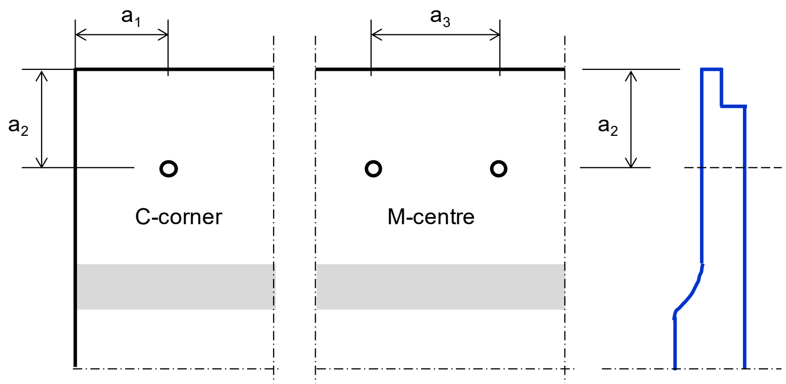
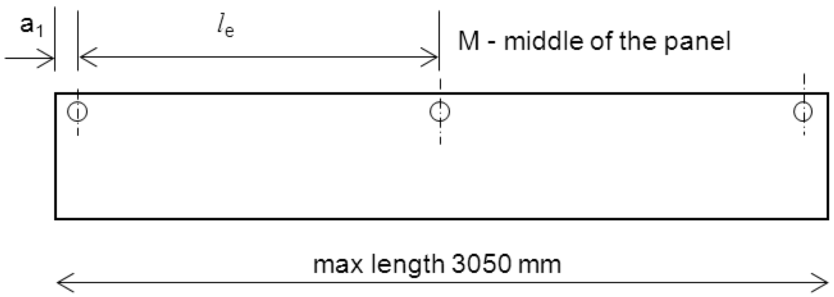
Table 10. Lines^2 10 mm – Fixing positions M/C	
$a_1 \geq 15$ mm $a_2 = 15$ mm M: single fixing	
$a_1 \geq 15$ mm $a_2 = 15$ mm $a_3 \geq 20$ mm M: double fixing	

Table 11. Hole diameter mm for Lines^2 type S and XL		
	Diameter hole	
fixing	M – middle of the panel	Other locations
Nail	2.0	3.0
Screw	2.5	3.5 [a]



[a] The consequence of these diameters is that under certain circumstances a tension perpendicular to the shaft of the fixings in the fixing locations can occur.

Annex 4

Fastener specification

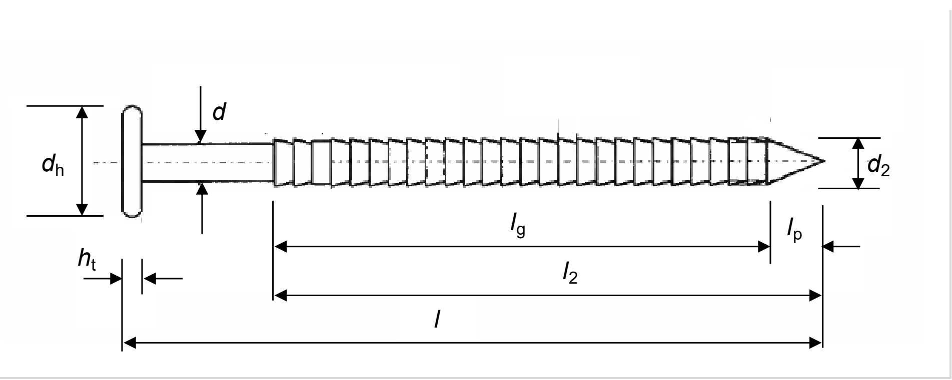
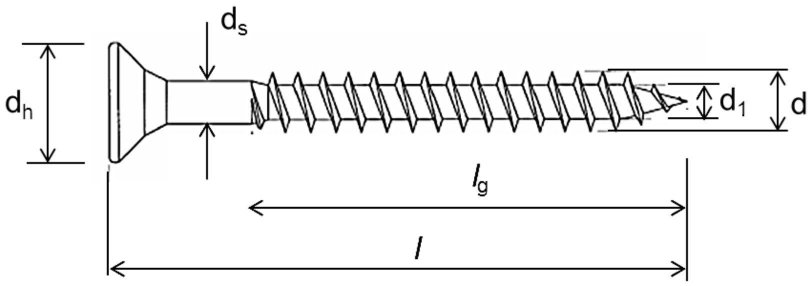
Table 12. Ring-shank nail 2.1/2.3 x 27 mm	
Stainless steel in accordance with EN 10088 – Material number 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012	
d = 2.1 d_2 = 2.4 – 2.2 l = 27.0 – 26.0 l_p = ≤ 3.5 l_g = l_2 - l_p d_h = 4.8 – 4.5 h_t = 0.7 – 0.5	

Table 13. Flat-top screws 3.5 x 30 mm	
Stainless steel in accordance with EN 10088 – Material number 1.4301, 1.4401 or 1.4578 Definitions in accordance with EN 14592:2008+A1:2012 Minimum required dimensions (mm)	
d = 3.5 – 3.2 $0.6 \cdot d \leq d_1 \leq 0.9 \cdot d$ l ≥ 29.0 l_g ≥ 22.5 d_h = 7.0 – 6.6 d_s = 2.6 – 2.3	

Annex 5

Impact resistance

Table 14. Impact resistance: Definition of use categories

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

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