ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
Fax +45 72 24 59 04
Internet www.etadanmark.dk

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

European Technical Assessment ETA-08/0343 of 2025/02/10

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 6 mm finish Uni
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:	16 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 2014-09-16

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

General

Rockpanel Durable 6 mm finish Uni are prefabricated compressed mineral wool boards with thermo-setting synthetic binders. The boards are fastened to timber subframes. Fastening to the timber subframes is carried out with corrosion resistant nails or screws. Mechanical fasteners, joint strips and aluminium profiles are specified by the ETA-holder.

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

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

Table 1	**Physical properties Rockpanel Durable boards**
Property	**Nominal Value**
Thickness	6 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	0,37 W/(m · K)
Coefficient of thermal expansion, length and width	α = 10.5 10^{-6} °K^{-1}
Coefficient of moisture expansion 23 °C/50 %RH to 92 %RH	0.303 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 Uni: (water-borne polymer emulsion coating)	Colour paint

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	Rockpanel Durable Uni: 3-4 or better

Subframes

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

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

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

Aluminium profiles

The horizontal joints between the panels can be open in the case of a ventilated construction (subframe protection appears from Table 4). Open joints are not watertight and the construction behind the battens shall establish the water tightness of the structure.

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.

Foam gasket

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 a 60 mm wide gasket and for the intermediate battens the 36 mm gasket is used.

In 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 battens or vertical timber battens with intermediate Rockpanel strips. 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. See Annex 3, Table 8.1 and 8.2.

The maximum fixing distances, hole diameter and the design value of the axial load appears from Annex 2, Tables 5.1, 6.1, 6.2, 7.1 and 7.2.

The installation method with the use of fixed points and moving points appears from Table 5.2 and 5.3.

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

The boards are intended for external cladding and for fascia's 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 provisions made in this European Technical Assessment are based on an assumed intended working life of the kit of 50 years.

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

Characteristic	Assessment of characteristic
3.2 Safety in case of fire (BWR 2)	
Reaction to fire	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 Uni:** s_d < **1.80 m** at 23°C and 85% RH The designer shall consider the relevant needs for ventilation and the critical moisture content for all the integrated materials.
Water permeability incl. joints for non-ventilated applications	No Performance determined
3.4 Safety 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, 6.2, 7.1 and 7.2). 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 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 See Annex 2 Table 6.1 and 6.2, 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 See Annex 2 Table 7.1 and 7.2, row (25), (26) and (27) (for edge distances and distances between fasteners: see Annex 2, Table 5.1)
Shear strength mechanical fixings Characteristic values	Rockpanel nails: Failure load: 1062 N, Deformation: 12 mm Rockpanel screws: Failure load: 1182 N, Deformation: 8 mm
Impact resistance For definition of use category see Annex 4 Table 9	Hard body impact– steel ball 0.5 kg: Category III Soft body impact – ball 3 kg : Category III

Characteristic	Assessment of characteristic
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 ·10^{-6} Width: 10.5 · 10^{-6} °K^{-1} Length: 0.288 Width: 0.317
Wind load resistance M/E/C	Characteristic strength Screws : 902 / 363 / 222 N Nails : 716 / 314 / 263 N Failure load: Screws: 4980 / 5412 / 5547 N/m² Nails : 3043 / 3406 / 5148 N/m²
Mechanical resistance of panels	See Section 1, Table 1
3.7 Sustainable use of natural resources (BWR 7)	No performance determined
3.8 Related aspects of durability and serviceability	
Resistance to Hygrothermal cycles	**Pass**
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:

Fixing method	Ventilated or non-ventilated	Vertical wooden battens
		Durable Uni
Mechanically fixed	Ventilated with gasket on the batten [a]	**B-s2,d0** open 6 mm horizontal joint
	Ventilated with Rockpanel strips 6 or 8 mm on the battens [b]	**B-s2,d0** open 6 mm horizontal joint
	Non-ventilated Cavity filled with mineral wool	**B-s1,d0** closed 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

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

Substrates:
- The results are also valid for a wall made of timber frame (see “Insulation” for the backing of the panels)

Insulation:
- Ventilated constructions: The panels are backed with minimal 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.
- Non-ventilated constructions: The panels are backed with min. 40 mm mineral wool insulation with density 30-70 kg/m^3 between the battens and min. 50 mm with density 30-70 kg/m^3 behind the battens without an air gap
- 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
- Test 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

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

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:
- The depth of the cavity is minimum 28 mm
- Unfilled or filled with insulation of mineral wool with a density 30-70 kg/m^3 according to EN 13162
- Test results are also valid for other higher thicknesses 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 or with an aluminium profile.
- 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 valid for the following product parameters:

Thickness:
- Nominal 6 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 identifies 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 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 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

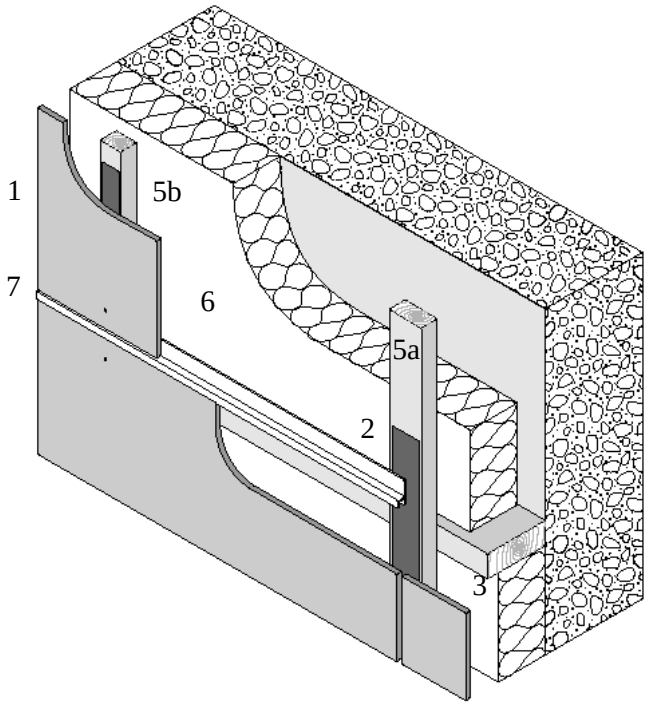
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2025-02-10 by

Thomas Bruun
Managing Director, ETA-Danmark

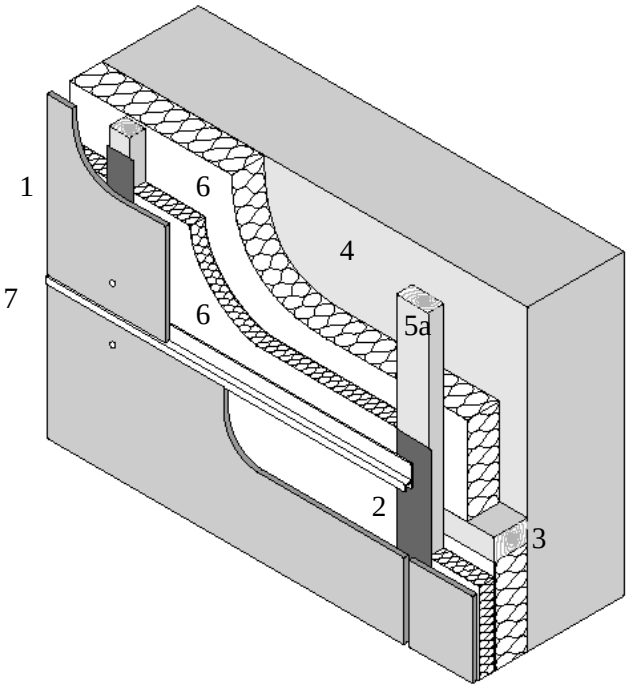
Annex 1
Pre-fabricated compressed mineral wool boards with organic or inorganic finish

Figure 1. Ventilated intended use



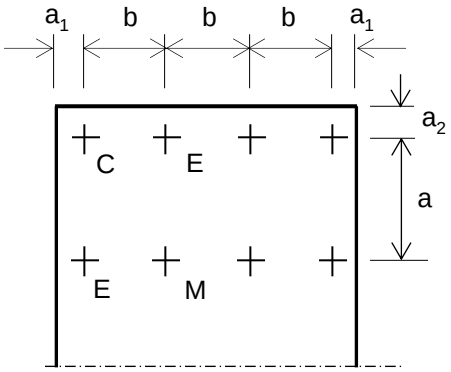
1. Compressed mineral wool board with organic or inorganic finish
2. EPDM foam gasket
3. Timber beam
4. Vapour barrier
5. Batten: a - joint and b - intermediate
6. Insulation
7. Rockpanel “A” – 6 mm extruded aluminium chair-profile or equivalent

Figure 2. Non-ventilated intended use



Annex 2
Maximum edge distances, hole diameter and maximum design value of the axial load X_d

Table 5.1 Minimum edge distances, maximum distances between fastenings and hole diameter of fixing points

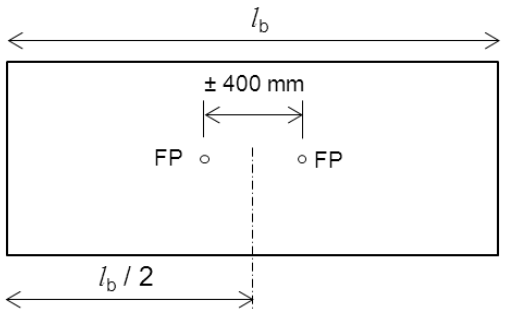


C: Fixing in corner
E: Fixing in edge
M: Fixing at intermediate position

Fixing	Distances [mm]				Hole diameter fixing [mm]		
Type	b_{max}	a_{max}	a_1	a_2	fixed	moving	slotted
Screw	400	300	≥ 15	≥ 50	3.2	6.0	3.4 x 6.0
Nail	480	300	≥ 15	≥ 50	2.5	4.0 [a]	2.8 x 4.0

[a]: board length considered: 1600 mm; In case of a larger panel length, and certain climate conditions, a tension between shaft and panel-hole may occur.

Table 5.2 Installation method with the use of two fixed points vertically and horizontally positioned.



FP: fixed point;
l_b : length board
All the other fixing points are 'moving points'

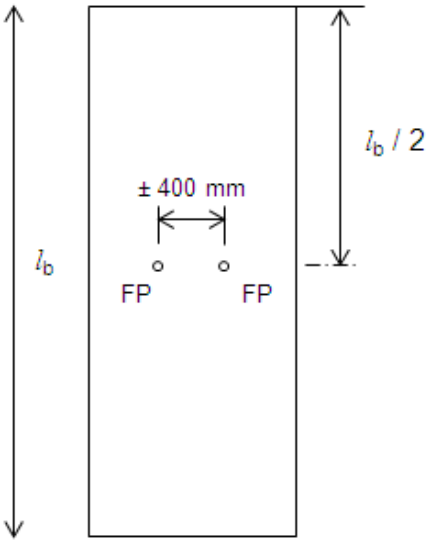
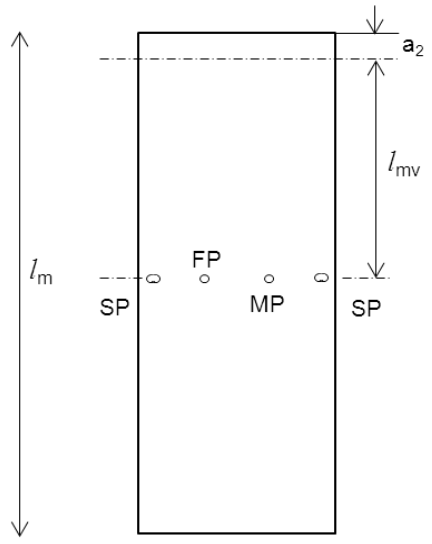
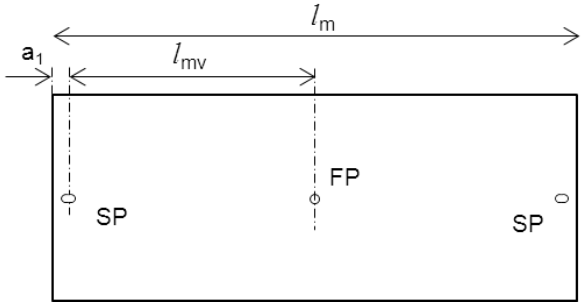


Table 5.3 Installation method with the use of a fixed point and two slotted points.





FP: fixed point
SP: slotted point
MP: moving point
All the other fixing points are 'moving points'
$l_{mv} = \pm l_m / 2$

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.

Design values X_d of the **mechanical** fixings screw and nail.

In absence of national regulations the design values X_d may be calculated as indicated in the ETA (see Tables 6 and 7). In these tables the safety factors are mentioned which have been used in the calculation of the design values.

Torx Screw / 'Durable' 6 mm / gasket / subframe wood

Table 6.1	Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the construction **screw** and 6 mm Durable boards (with the use of gaskets), with $\alpha \geq 30°$ [e]						
Board thickness				6 mm			*(1)*
Location of the fixing in the board				M-middle	E-edge	C-corner	*(2)*
Pull-through N							*(3)*
	Characteristic pull-through N			668	460	340	*(4)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0	*(5)*
	Design value X_d of the pull-through N			334	230	170	*(6)*
Wind suction							*(7)*
	Average wind load in N/m²			4980	5412	5547	*(8)*
	Average strength N			902	363	222	*(9)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0	*(10)*
	Design value X_d of the pull-through N			451	182	111	*(11)*
Withdrawal capacity							*(12)*
	Characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]						*(13)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	963 [b]	963 [b]	963 [b]	*(14)*
		C24	ρ_k = 350 kg/m³	1035 [b]	1035 [b]	1035 [b]	*(15)*
	Modification factor for k_{mod}			k_{mod} [a]			*(16)*
	Axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]						*(17)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m³	963 · k_{mod}	963 · k_{mod}	963 · k_{mod}	*(18)*
		C24	ρ_k = 350 kg/m³	1035 · k_{mod}	1035 · k_{mod}	1035 · 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	741 · k_{mod}	741 · k_{mod}	741 · k_{mod}	*(22)*
		C24	ρ_k = 350 kg/m³	796 · k_{mod}	796 · k_{mod}	796 · 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	**(3) (7) (22)**	**(3) (7) (22)**	**(3) (7) (22)**	*(25)*
		C24	ρ_k = 350 kg/m³	**(3) (7) (23)**	**(3) (7) (23)**	**(3) (7) (23)**	*(26)*
Board span b				400			*(27)*
Fixing distance a				300			*(28)*

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

[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand ($d = l_{ef} / 6 = 26.25/6 = 4.30$ mm) ;

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

[d]: calculation in accordance with EN 1995-1-1+C1+A1:2008 formula (8.38), (8.39) and (8.40)

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

Torx Screw / 'Durable' 6 mm / Rockpanel strip / subframe wood

Table 6.2	Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the construction **screw** and 6 mm Durable boards (with the use of strips), with $\alpha \geq 30°$ [e]					
Board thickness				6 mm (with the use of a 6 mm strip)		*(1)*
Location of the fixing in the board				M-middle	E-edge	C-corner	*(2)*
Pull-through N							*(3)*
	Characteristic pull-through N			668	460	340	*(4)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0	*(5)*
	Design value X_d of the pull-through N			334	230	170	*(6)*
Wind suction							*(7)*
	Average wind load in N/m^2			4980	5412	5547	*(8)*
	Average strength N			902	363	222	*(9)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0	*(10)*
	Design value X_d of the pull-through N			451	182	111	*(11)*
Withdrawal capacity							*(12)*
	Characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]						*(13)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m^3	588 [b]	588 [b]	588 [b]	*(14)*
		C24	ρ_k = 350 kg/m^3	632 [b]	632 [b]	632 [b]	*(15)*
	Modification factor for k_{mod}			k_{mod} [a]			*(16)*
	Axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]						*(17)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m^3	588 · k_{mod}	588 · k_{mod}	588 · k_{mod}	*(18)*
		C24	ρ_k = 350 kg/m^3	632 · k_{mod}	632 · k_{mod}	632 · 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/m^3	452 · k_{mod}	452 · k_{mod}	452 · k_{mod}	*(22)*
		C24	ρ_k = 350 kg/m^3	486 · k_{mod}	486 · k_{mod}	486 · 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/m^3	**(3) (7) (22)**	**(3) (7) (22)**	**(3) (7) (22)**	*(25)*
		C24	ρ_k = 350 kg/m^3	**(3) (7) (23)**	**(3) (7) (23)**	**(3) (7) (23)**	*(26)*
Board span b				400			*(27)*
Fixing distance a				300			*(28)*

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

[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand ($d = l_{ef} / 6 = 21.15/6 = 3.52$ mm) ;

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

[d]: calculation in accordance with EN 1995-1-1+C1+A1:2008 formula (8.38), (8.39) and (8.40)

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

Nail 32 mm / 'Durable' 6 mm / gasket / subframe wood

Table 7.1	Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **32 mm nail** and 6 mm Durable boards (with the use of gaskets)					
Board thickness				6 mm (with the use of a 6 mm strip)		*(1)*
Location of the fixing in the board				M-middle	E-edge	C-corner *(2)*
Pull-through N						*(3)*
	Characteristic pull-through N			455	374	311 *(4)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0 *(5)*
	Design value X_d of the pull-through N			228	187	156 *(6)*
Wind suction						*(7)*
	Average wind load in N/m^2			3043	3406	5148 *(8)*
	Average strength N			716	314	263 *(9)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0 *(10)*
	Design value X_d of the pull-through N			358	157	132 *(11)*
Withdrawal capacity						*(12)*
	Characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [d]					*(13)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m^3	217	217	217 *(14)*
		C24	ρ_k = 350 kg/m^3	259	259	259 *(15)*
	Modification factor for k_{mod}			k_{mod} [a]		*(16)*
	Axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [d]					*(17)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m^3	217 · k_{mod}	217 · k_{mod}	217 · k_{mod} *(18)*
		C24	ρ_k = 350 kg/m^3	259 · k_{mod}	259 · k_{mod}	259 · 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/m^3	167 · k_{mod}	167 · k_{mod}	167 · k_{mod} *(22)*
		C24	ρ_k = 350 kg/m^3	199 · k_{mod}	199 · k_{mod}	199 · 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/m^3	**(3) (7) (22)**	**(3) (7) (22)**	**(3) (7) (22)** *(25)*
		C24	ρ_k = 350 kg/m^3	**(3) (7) (23)**	**(3) (7) (23)**	**(3) (7) (23)** *(26)*
Board span b				480		*(27)*
Fixing distance a				300		*(28)*

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

[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand (d = l_{ef} / 8 = 18.4/8 =2.30 mm);

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 formula (8.23 a)

Nail 40 mm / 'Durable' 6 mm / Rockpanel strip / subframe wood

Table 7.2	Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **40 mm nail** and 6 mm Durable boards (with the use of strips)					
Board thickness				6 mm (with the use of a 6 mm strip)		*(1)*
Location of the fixing in the board				M-middle	E-edge	C-corner	*(2)*
Pull-through N							*(3)*
	Characteristic pull-through N			455	374	311	*(4)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0	*(5)*
	Design value X_d of the pull-through N			228	187	156	*(6)*
Wind suction							*(7)*
	Average wind load in N/m^2			3043	3406	5148	*(8)*
	Average strength N			716	314	263	*(9)*
	Material factor γ_M Rockpanel (manufacturers declaration)			2.0	2.0	2.0	*(10)*
	Design value X_d of the pull-through N			358	157	132	*(11)*
Withdrawal capacity							*(12)*
	Characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [d]						*(13)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m^3	271	271	271	*(14)*
		C24	ρ_k = 350 kg/m^3	325	325	325	*(15)*
	Modification factor for k_{mod}			k_{mod} [a]			*(16)*
	Axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [d]						*(17)*
	Strength class wood (EN 338)	C18	ρ_k = 320 kg/m^3	271 · k_{mod}	271 · k_{mod}	271 · k_{mod}	*(18)*
		C24	ρ_k = 350 kg/m^3	325 · k_{mod}	325 · k_{mod}	325 · 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/m^3	209 · k_{mod}	209 · k_{mod}	209 · k_{mod}	*(22)*
		C24	ρ_k = 350 kg/m^3	250 · k_{mod}	250 · k_{mod}	250 · 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/m^3	**(3) (7) (22)**	**(3) (7) (22)**	**(3) (7) (22)**	*(25)*
		C24	ρ_k = 350 kg/m^3	**(3) (7) (23)**	**(3) (7) (23)**	**(3) (7) (23)**	*(26)*
Board span b				480			*(27)*
Fixing distance a				300			*(28)*

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

[b]: with reduced thread diameter to fulfil the minimum l_{ef} demand ($d = l_{ef} / 8 = 20.6/8 = 2.57$ mm) ;

[d]: calculation in accordance with EN 1995-1-1:2004 + AC:2006 + A1:2008 formula (8.23 a)

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

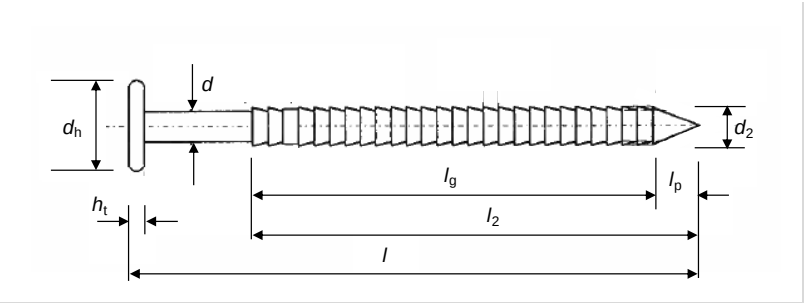
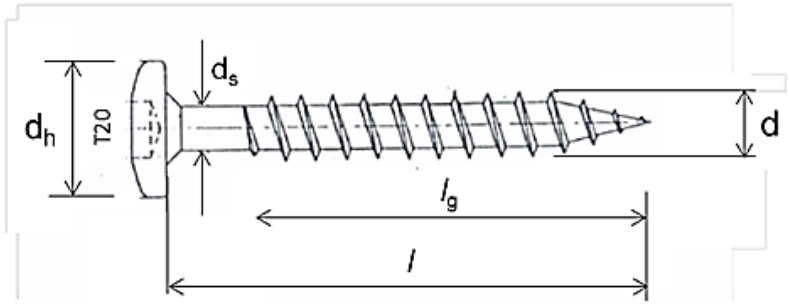


Table 8.2 Torx screws 4,5 x 35 mm

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



Annex 4

Table 9 – Impact resistance: Definition of use categories

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

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