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

MEMBER OF EOTA

European Technical Assessment ETA-13/0648 of 02/11/2015

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 Natural Durable 8 mm and 10 mm ROCKPANEL Natural Xtreme 8 mm and 10 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 Group Konstruktieweg 2 NL-6045 JD Roermond
This European Technical Assessment contains:	29 pages including 6 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, edition May 2015.
This version replaces:	The previous ETA with the same number and validity from 2013-06-21 to 2018-06-21

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product
General
ROCKPANEL 'Natural Durable' 8 and 10 mm and ROCKPANEL 'Natural Xtreme' 8 and 10 mm are prefabricated compressed mineral wool boards with thermo-setting synthetic binders. The boards are fastened to timber, aluminum or steel subframes. Fastening to the timber subframe is carried out with corrosion resistant nails or screws. Fastening to aluminium or steel subframe is carried out with corrosion resistant rivets. Mechanical fasteners, gaskets and aluminum profiles are specified by the ETA-holder.

The ROCKPANEL 'Natural' panels are not surface treated with an organic or inorganic finish.

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

The physical properties of the 'Xtreme' panels are indicated in Table 2.

Table 1 Physical properties of the 'Durable'

Property	Value
Thickness and tolerances mm	8 ± 0,5/10 ± 0,5
Length, max mm	3050
Width, max mm	1250
Density, nominal and tolerances	1050 kg/m^3 ±150
Bending strength, length and width	$f_{05} \geq 27$ N/mm^2
Modulus of elasticity N/mm^2	m(E) ≥ 4015
Thermal conductivity	0,37 W/(m • K)
Cumulative dimensional change according to EN 438-2	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 92% RH	≤ 0,302 mm/m after 4 days

Table 2 Physical properties of the 'Xtreme'

Property	Value
Thickness and tolerances mm	8 ± 0,5/ 10 ± 0,5
Length, max	3050 mm
Width, max	1250 mm
Density, nominal and tolerances	1200 kg/m^3 ±100
Bending strength, length and width	$f_{05} \geq 34,5$ N/mm^2
Modulus of elasticity N/mm^2	m(E) ≥ 5260
Thermal conductivity	0,43 W/(m • K)
Cumulative dimensional change according to EN 438-2	Length: ≤ 0,096 % Width: ≤ 0,098 %
Coefficient of thermal expansion, length and width	α = 11,0 (10^{-6} K^{-1})
Coefficient of moisture expansion 23° C/50% RH to 92% RH	≤ 0,324 mm/m after 4 days

Finishes
The boards are not supplied with an organic or inorganic finish which allows a natural weathering and colouration of the surface of the boards.

Subframes
The panels are attached to the building by fixing to a subframe of aluminum, 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 wooden 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 aluminum profiles is 1,5 mm. The aluminum is AW-6060 according to EN 755-2. The $R_m/R_{p0,2}$ values 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

Aluminum profiles

The horizontal joints between the panels can be open in the case of ROCKPANEL strips or EPDM foam gasket. The strips or gasket are 15 mm wider than the batten at both sides.
The horizontal joints between the panels are made with a ROCKPANEL 'A' extruded aluminum 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, Figure 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 aluminum 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 or metal subframe.

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 or 40 mm no 1.4401 or 1.4578 (EN 10088) with heads in the colour of the panels.

Fastening to aluminum is carried out with aluminum EN AW-5019 (AlMg5) 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 Annex 3-1.

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 Annex 3-1.

The maximum fixing distances, edge distances and hole dimensions appear from Annex 2-1 of the ETA.
The design value of the axial load appears from Annex 2-2 up to and including 2-9, Tables 6 up to and including 13.
The installation method with the use of fixed points and moving points appears from Annex 2-1, Table 5 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 ventilated cavities at the back. See Annex 1 Figure 1.
The cladding on vertical aluminum or steel support shall be carried out with a ventilated cavity at the back. See Annex 1 Figure 2.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the kit of 25 years for regions with a mean annual radiant exposure not exceeding 5 GJ/m², provided that they are subject to appropriate use and maintenance. EOTA Technical Report 010 contains the map of Europa with the mean annual radiant exposure by global solar radiation: http://www.eota.be/en-GB/content/technical-reports/11/

In addition, for aluminum support systems intended to be used for facades:
In some member states national climate conditions may reduce the service life of the aluminum support system to 35 years or more.

An additional assessment of the aluminum 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 of the board in its intended use as a cladding kit	
	The aluminum and steel profiles are classified as **Euroclass A1**
	Classification of panels: See Table 3

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

Table 3 Euroclass classification of different constructions with ROCKPANEL boards

Fixing method	**Ventilated**	**Vertical wooden subframe 'Natural' in the composition / thicknesses**	
		'Durable' 8 mm	**'Xtreme' 10 mm**
Mechanically fixed	Ventilated with EPDM gasket on the battens [a]	**B-s2,d0** open 6 mm horizontal joint	

[a] width of the gasket 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 3 is valid for the following end use conditions:

Mounting:
- Mechanically fixed as described in Table 3, 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)

Substrates:
- Concrete walls, masonry walls

Insulation:
- Ventilated constructions: The battens are backed with min. 50 mm mineral wool insulation with density 30-70 kg/m³ with an air gap of min. 28 mm between the panels and the insulation
- Results are also valid for all greater thickness of mineral wool insulation layer with the same density and the same or better reaction to fire classification
- Results are also valid for the panels without insulation, if the substrate chosen according to EN 13823 is made of panel with Euro-class 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 aluminum 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
- 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 as described in Table 3 and horizontal joints can be open or with an aluminum profile
- Test results are also valid in the case of using 6 mm ROCKPANEL strips instead of EPDM foam gaskets
- Test results are also valid for higher thicknesses of ROCKPANEL strips
- 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 aluminum profiles

The classification is also valid for the following product parameters:

Thickness:

- Nominal 8 mm, individual tolerances ± 0,5 mm
- Nominal 10 mm, individual tolerances ± 0,5 mm

Density

- Nominal 1050 kg/m^3 , individual tolerances -150 / +150 kg/m^3
- Nominal 1200 kg/m^3 , individual tolerances -100 / +100 kg/m^3

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 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	
	'Natural' all versions**:** s_d < **0,20 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 tightness of joints	
	No performance determined
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 EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3.4 Safety and accessibility in use (BWR 4)	
Wind load resistance	
Mechanical properties of panels	**See section 1, Table 1 and Table 2**
Design value of axial loads	
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 13). 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 : $X_d = X_k / \gamma_M$ The design value X_d of a material property can be expressed in general terms as $X_d = \eta \times X_k / \gamma_m$; γ_m ROCKPANEL = 1,6; conversion factor η = 0,8 (aged bending strength divided by the f_{05} (Table 17, Annex 4-2))	**ROCKPANEL rivets** (both 'Durable' and 'Xtreme') **:** 'Natural' 10 mm to an aluminum subframe, design value X_d: **654/309/156 N** See Annex 2-2 Table 6 row (16) **ROCKPANEL screws** (both 'Durable' and 'Xtreme'): Design value X_d depends on the modification factor k_{mod}, the strength class of the wood and the different material factors γ_M. 'Natural' 8 mm boards to a wooden subframe: see Annex 2-3 Table 7 and Annex 2-4 Table 8 rows (25), (26) and (27). 'Natural' 10 mm boards to a wooden subframe: see Annex 2-5 Table 9 and Annex 2-6 Table 10 rows (25), (26) and (27). **ROCKPANEL nails** (both 'Durable' and 'Xtreme'): Design value X_d depends on the modification factor k_{mod} , the strength class of the wood and the different material factors γ_M. 'Natural' 8 mm boards to a wooden subframe see Annex 2-7 Table 11, row (25), (26) and (27). 'Natural' 10 mm boards to a wooden subframe see Annex 2-8 Table 12 and Annex 2-9 Table 13 rows (25), (26) and (27).

Characteristic		Assessment of characteristic
Pull/out and pull/through resistance of fasteners and mechanical resistance of boards		
	Pull-out resistance of fasteners	**ROCKPANEL screws:** Fastener specification according to Table 15. Characteristic withdrawal capacity F_{ax} : 'Natural Durable' 8 mm and 'Natural Xtreme' 8 mm, with the use of a gasket: Annex 2-3 Table 7 row (15) and (16) 'Natural Durable' 8 mm and 'Natural Xtreme' 8 mm, with the use of a 8 mm strip: Annex 2-4 Table 8 row (15) and (16) 'Natural Durable' 10 mm and 'Natural Xtreme' 10 mm, with the use of a gasket: Annex 2-5 Table 9 row (15) and (16) 'Natural Durable' 10 mm and 'Natural Xtreme' 10 mm, with the use of a 8 mm strip: Annex 2-6 Table 10 row (15) and (16) Design value X_d depends on the modification factor k_{mod} , the strength class of the wood and the material factor γ_M . Row (23) and (24) in Table 7, 8, 9 and 10 contain the design value X_d of the axial withdrawal capacity for both strength classes C18 and C24
		ROCKPANEL nails: Fastener specification according to according to Table 15. Characteristic withdrawal capacity F_{ax} : 'Natural Durable' 8 mm and 'Natural Xtreme' 8 mm, 32 mm nail with the use of a gasket: Annex 2-7 Table 11 row (15) and (16) 'Natural Durable' 8 mm and 'Natural Xtreme' 8 mm, 40 mm nail with the use of a strip: Annex 2-8 Table 12 row (15) and (16) 'Natural Durable' 10 mm and 'Natural Xtreme' 10 mm, 40 mm nail with the use of a gasket: Annex 2-9 Table 13 row (15) and (16) Design value X_d depends on the modification factor k_{mod} , the strength class of the wood and the material factor γ_M . Row (22) and (23) in Table 11, 12 and 13 contain the design value X_d of the axial withdrawal capacity for both strength classes C18 and C24.
		Rivets Fastener specification according to Table 14. Characteristic withdrawal capacity 'Natural Durable' 10 mm and 'Natural Xtreme' 10 mm: Annex 2-2 Table 6 row (13)
	Pull-through resistance of boards	**ROCKPANEL screws:** Fastener specification according to Table 15. Characteristic pull-through: 'Natural Durable' 8 mm and 'Natural Xtreme' 8 mm: Annex 2-3 Table 7 and Annex 2-4 Table 8 row (4) 'Natural Durable' 10 mm and 'Natural Xtreme' 10 mm: Annex 2-5 Table 9 and Annex 2-6 Table 10 row (4) Row (6) in these tables contain the design value of the pull-through resistance for the different fixing locations.
		ROCKPANEL nails: Fastener specification according to table 15 'Natural Durable' 8 mm and 'Natural Xtreme' 8 mm: - characteristic pull-through: Annex 2-7 Table 11 and Annex 2-8 Table 12 row (4) 'Natural Durable' 10 mm and 'Natural Xtreme' 10 mm: - characteristic pull-through: Annex 2-9 Table 13 row (4) Row (6) in these tables contains the design value of the pull-through resistance for the different fixing locations.
		Rivets Fastener specification according to Table 14. 'Natural Durable' 10 mm and 'Natural Xtreme' 10 mm: - characteristic pull-through: Annex 2-2 Table 6 row (4)

Characteristic	Assessment of characteristic
Wind suction and pressure resistance	
Resistance to wind load M/E/C	
Average strength N 10 mm 'Natural Durable' and 'Xtreme'	**Rivets: 1449 / 617 / 311** (according to Annex 2-2 Table 6) **Screws: 1105 / 482 /236** (according to Annex 2-5 Table 9 and Annex 2-6 Table 10) **Nails: 1009 / 627 / 397** (according to Annex 2-9 Table 13)
Average strength N 8 mm 'Natural Durable' and 'Xtreme'	**Screws: 902 / 363 / 222** (according to Annex 2-3 Table 7) **Nails: 716 / 314 / 263** (according to Annex 2-7 Table 11 and Annex 2-8 Table 12
Average failure load N/mm²: 10 mm 'Natural Durable' and 'Xtreme'	**Rivets: 2567/ 2769 / 2958** (according to Annex 2-2 Table 6) **Screws: 1992 / 2161 / 2243** (according to Annex 2-5 Table 9 and Annex 2-6 Table 10) **Nails : 2637 / 4131 / 5162** (according to Annex 2-9 Table 13)
Average failure load N/mm²: 8 mm 'Natural Durable' and 'Xtreme'	**Screws: 4980 / 5412 / 5547** (according to Annex 2-3 Table 7) **Nails: 3043 / 3406 / 5148** (according to Annex 2-7 Table 11 and Annex 2-8 Table 12
Mechanical resistance	
Characteristic shear strength mechanical fixings Average values	**ROCKPANEL nails** (both 'Durable' and 'Xtreme')**:** 'Natural' 8 mm Failure load: **1062 N** Deformation: **12 mm** 'Natural' 10 mm Failure load: **1325 N** Deformation: **15 mm** **ROCKPANEL rivets** (both 'Durable' and 'Xtreme')**:** 'Natural' 10 mm Failure load: **1722 N** Deformation: **1,7 mm** **ROCKPANEL screws** (both 'Durable' and 'Xtreme')**:** 'Natural' 8 mm Failure load: **1182 N** Deformation: **8 mm** 'Natural' 10 mm Failure load: **1549 N** Deformation: **9 mm**
Impact resistance [a]	
'Natural Durable' and 'Xtreme' 8 mm Panels with and without a horizontal joint.	Hard body impact - steel ball 0,5 kg (3J): Category III, II and I Soft body impact 3 kg (10J): Category IV and III
'Natural Durable' 10 mm Panels without a horizontal joint	Hard body impact - steel ball 0,5 kg (1J): Category IV Hard body impact – steel ball 0,5 kg (3J): Category III, II and I Hard body impact – steel ball 1 kg (10J): Category II and I Soft body impact 3 kg (10J): Category IV and III Soft body impact 3 kg (60J): Category II and I Soft body impact 50 kg (300J): Category II
'Natural Durable' 10 mm Panels with a horizontal joint ready accessible and vulnerable to impacts	Hard body impact - steel ball 0,5 kg (1J): Category IV Hard body impact – steel ball 0,5 kg (3J): Category III, II and I
'Natural Xtreme' 10 mm Panels without a horizontal joint	Hard body impact - steel ball 0,5 kg (1J): Category IV Hard body impact – steel ball 0,5 kg (3J):Category III, II and I Hard body impact – steel ball 1 kg (10J): Category II and I Soft body impact 3 kg (10J): Category IV and III Soft body impact 3 kg (60J): Category II and I Soft body impact 50 kg (300J): Category II Soft body impact 50 kg (400J): category I
'Natural Xtreme' 10 mm Panels with a horizontal joint ready accessible and vulnerable to impacts	Hard body impact - steel ball 0,5 kg (1J): Category IV Hard body impact – steel ball 0,5 kg (3J):Category III, II and I Hard body impact – steel ball 1 kg (10J): Category II and I Soft body impact 3 kg (10J): Category IV and III Soft body impact 3 kg (60J): Category II and I Soft body impact 50 kg (300J): Category II
[a] For definition of use category see Annex 6 Table 19	

Characteristic	Assessment of characteristic
Hygrothermal behaviour	
Resistance to Hygro-thermal cycles	**Pass**
Dimensional stability	
Cumulative dimensional change %	**'**Durable' - Length: 0,085 / width: 0,084 'Xtreme' - Length: 0,096 / width: 0,098
Coefficient of thermal expansion 10^{-6} K^{-1}	'Durable' - Length: 10,5 / width: 10,5 'Xtreme' - Length: 11,1 / width: 10,8
Coefficient of moisture expansion 42% RH difference after 4 days mm/m	'Durable' - Length: 0,288 / width: 0,317 'Xtreme' - Length: 0,320 / width: 0,328
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. / ROCKPANEL Group

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. in the manufacturer's application guide technical dossier, which forms part of the documentary material for this ETA. On every pallet label 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 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.

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 (8 mm boards) or 20 mm (10 mm boards) from a vertical edge and 50 mm from a horizontal edge (see Annex 2-1). 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

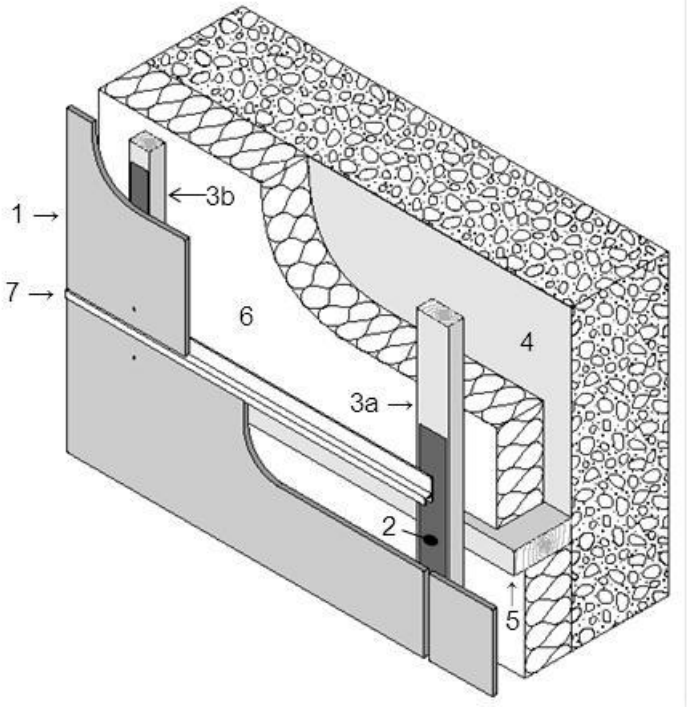
Issued in Copenhagen on 2015-11-02 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex 1

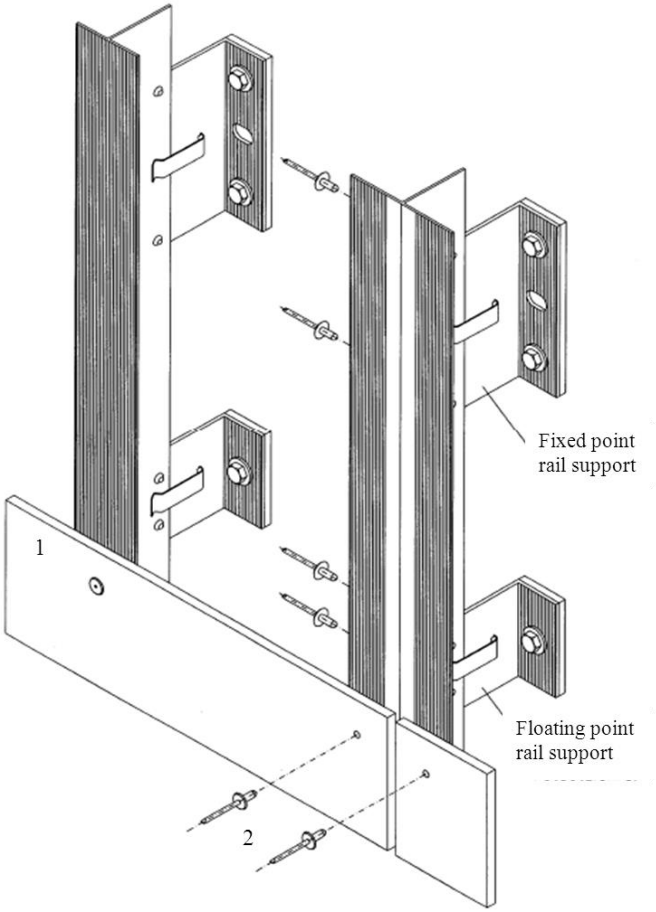
Pre-fabricated compressed mineral wool boards with organic or inorganic finish

Figure 1. Ventilated intended use on vertical timber battens



1. Compressed mineral wool board
2. EPDM foam gasket
3. Subframe:
   a - joint batten and
   b – intermediate batten
4. Vapour barrier
5. Timber beam
6. Insulation
7. ROCKPANEL ‘A’ – 8 mm aluminum chair profile or equivalent

Figure 2. Ventilated use on vertical metal support

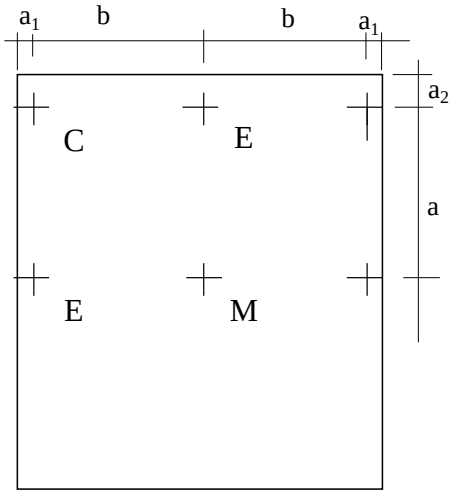


1. Compressed mineral wool board with organic or inorganic finish
2. Rivet fixing

Annex 2-1

Minimum edge distances, hole diameter and maximum characteristic and design loads

Table 4 Minimum edge distances and maximum distances between fastenings in mm

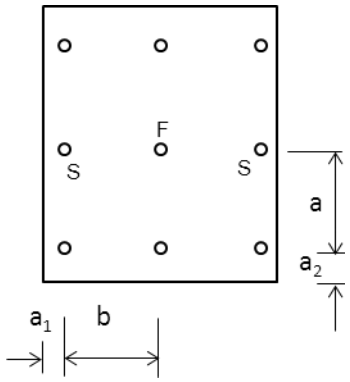


Fixing locations concerning loads
M: Fixing at intermediate position
E: Fixing at edge
C: Fixing in corner

Fixing type	b_{max}		a_{max}		a_1		a_2
	8 mm	10 mm	8 mm	10 mm	8 mm	10 mm	8/10
Rivet [a]	---	600	---	600	---	20	50
Screw	400	600	300	600	15	20	50
Nail	480	600	300	400	15	20	50

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

Table 5 : Positioning fixing points and hole dimensions [mm]

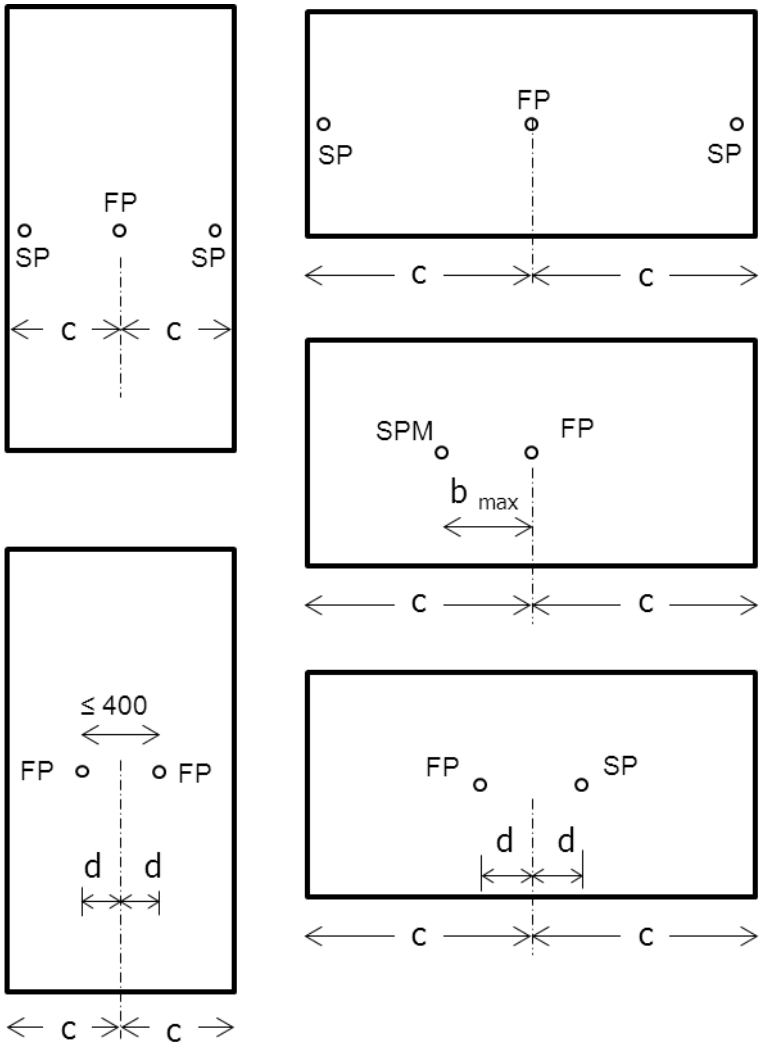


F	Fixed point [a]
S	Slotted point [a]
All other positions	Moving points [a]
Edge distances a_1 and a_2 in accordance with Table 4	

Fixing type	Fixed point	Moving point	Slotted points horizontally	Board dimension considered width * length	
				'Durable'	'Xtreme'
Screw	3,2	6,0	3,4 x 6,0	1250 * 3050	1250 * 2900 [b]
Nail	2,5	4,0	2,8 x 4,0	1250 *1600 [b]	1250 * 1400 [b]
Rivet [a]	5,1	8,0	5,1 x 8,0	1250 * 3050	1250 * 3050

[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 (aluminum 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 (aluminum 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 2-2

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

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 13). In these tables the safety factors are mentioned which have been used in the calculation of the design values.

Characteristic fixing load of a **rivet** fixing

The characteristic fixing loads which may be taken for the combination rivet and 10 mm ROCKPANEL 'Natural Durable' and 10 mm ROCKPANEL 'Natural Xtreme' boards, for the position M, E or C, are given in Table 6 row (4), (9) and (13).

Table 6: Characteristic axial load X_k and design value of the axial load $X_d = X_k / \gamma_M$ for the combination **rivet** [a] and 10 mm 'Natural Durable' and 10 mm 'Natural Xtreme' boards

board thickness		10 mm			(1)
location of the fixing in the board		M-middle	E-edge	C-corner	(2)
pull-through N					(3)
	characteristic pull-through N	1308	810	540	(4)
	material factor ROCKPANEL γ_M (manufacturer's declaration)	2,0	2,0	2,0	(5)
	design value X_d of the pull-through N	**654**	405	270	(6)
wind suction					(7)
	average wind load in N/m²	2567	2769	2958	(8)
	average strength N	1449	617	311	(9)
	material factor ROCKPANEL γ_M (manufacturer's declaration)	2,0	2,0	2,0	(10)
	design value X_d of the pull-through N	725	**309**	**156**	(11)
pull-out strength					(12)
	manufacturer's declaration N	1300	1300	1300	(13)
	material factor aluminum 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 10 mm boards		**654**	**309**	**156**	(16)
	board span b	600			(17)
	fixing distance a	600			(18)

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

Characteristic fixing load of a **screw** fixing

The characteristic fixing loads which may be taken for the combination screw and 8 mm ROCKPANEL 'Natural Durable' or ROCKPANEL 'Natural Xtreme' boards, for the position M, E or C, are given in Table 7 and 8:

- for strength class C18 row (4), (9) and (15)
- for strength class C24 row (4), (9) and (16)

The characteristic fixing loads which may be taken for the combination screw and 10 mm ROCKPANEL 'Natural Durable' or ROCKPANEL 'Natural Xtreme' boards, for the position M, E or C, are given in Table 9 and 10:

- for strength class C18 row (4), (9) and (15)
- for strength class C24 row (4), (9) and (16)

Annex 2-2 continued

Characteristic fixing load of a **nail** fixing

The characteristic fixing loads which may be taken for the combination nail 32 mm and 8 mm ROCKPANEL 'Natural Durable' or 8 mm ROCKPANEL 'Natural Xtreme' boards, for the position M, E or C, are given in Table 11:

- for strength class C18 row (4), (9) and (15)
- for strength class C24 row (4), (9) and (16)

The characteristic fixing loads which may be taken for the combination nail 40 mm and 8 mm ROCKPANEL 'Natural Durable' or 8 mm ROCKPANEL 'Natural Xtreme' boards, for the position M, E or C, are given in Table 12:

- for strength class C18 row (4), (9) and (15)
- for strength class C24 row (4), (9) and (16)

The characteristic fixing loads which may be taken for the combination nail 40 mm and 10 mm ROCKPANEL 'Natural Durable' or 10 mm ROCKPANEL 'Natural Xtreme' boards, for the position M, E or C, are given in Table 13:

- for strength class C18 row (4), (9) and (15)
- for strength class C24 row (4), (9) and (16)

Annex 2-3

Table 7: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination **screw** and 8 mm 'Natural Durable' or 8 mm 'Natural Xtreme' 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				*668*	*460*	*340* (4)
material factor ROCKPANEL γ_M (manufacturer's 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 ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0* (10)
design value X_d of the pull-through N				**451**	**182**	**111** (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 $\boldsymbol{X_d} = X_k / \gamma_M$ N				**minimum value of the rows:**		(25)
strength class	C18	ρ_k = 320 kg/m³		**(3) (7) (15)**	**(3) (7) (15)**	**(3) (7) (15)** (26)
wood (EN 338)	C24	ρ_k = 350 kg/m³		**(3) (7) (16)**	**(3) (7) (16)**	**(3) (7) (16)** (27)
board span b				400		(28)
fixing distance a				300		(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 ($d = l_{ef} / 6 = 24,75/6 = 4,12$ mm) ;

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

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

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

Annex 2-4

Table 8: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination **screw** and 8 mm 'Natural Durable' or 8 mm 'Natural Xtreme' (with the use of 8 mm ROCKPANEL strips), with $\alpha \geq 30°$ [e]

board thickness				8 mm (with the use of a 8 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 ROCKPANEL γ_M (manufacturer's 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 ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N				**451**	**182**	**111**	(12)
withdrawal capacity							(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]							(14)
strength class wood (EN 338)	C18	$\rho_k = 320$ kg/m³		336 [b]	336 [b]	336 [b]	(15)
	C24	$\rho_k = 350$ kg/m³		361 [b]	361 [b]	361 [b]	(16)
modification factor for k_{mod}				k_{mod} [a]			(17)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]							(18)
strength class wood (EN 338)	C18	$\rho_k = 320$ kg/m³		336 • k_{mod}	336 • k_{mod}	336 • k_{mod}	(19)
	C24	$\rho_k = 350$ kg/m³		361 • k_{mod}	361 • k_{mod}	361 • k_{mod}	(20)
material factor (NA to) EN 1995-1-1:2004+A1:2008				$\gamma_M = 1{,}30$ [withdrawal capacity]			(21)
design value X_d of the axial withdrawal capacity N							(22)
strength class wood (EN 338)	C18	$\rho_k = 320$ kg/m³		258 • k_{mod}	258 • k_{mod}	258 • k_{mod}	(23)
	C24	$\rho_k = 350$ 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	$\rho_k = 320$ kg/m³		**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26)
	C24	$\rho_k = 350$ kg/m³		**(6) (12) (24)**	**(6) (12) (24)**	**(6) (12) (24)**	(27)
board span b				400			(28)
fixing distance a				300			(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 ($d = l_{ef} / 6 = 16{,}75/6 = 2{,}79$ mm) ;

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

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

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

Annex 2-5

Table 9: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination **screw** and 10 mm 'Natural Durable' or 10 mm 'Natural Xtreme' boards (with the use of gaskets), with $\alpha \geq 30°$ [e]

board thickness				10 mm (with the use of a gasket)			(1)
location of the fixing in the board				M-middle	E-edge	C-corner	(2)
pull-through N							(3)
characteristic pull-through N				*1066*	*850*	*617*	(4)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(5)
design value X_d of the pull-through N				**533**	**425**	**309**	(6)
wind suction							(7)
average wind load in N/m²				1992	2161	2243	(8)
average strength N				*1105*	*482*	*236*	(9)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N				**553**	**241**	**118**	(12)
withdrawal capacity							(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]							(14)
strength class wood (EN 338)	C18	$\rho_k = 350$ kg/m^3		701 [b]	701 [b]	701 [b]	(15)
	C24	$\rho_k = 350$ kg/m^3		753 [b]	753 [b]	753 [b]	(16)
modification factor for k_{mod}				k_{mod} [a]			(17)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]							(18)
strength class wood (EN 338)	C18	$\rho_k = 350$ kg/m^3		701 • k_{mod}	701 • k_{mod}	701 • k_{mod}	(19)
	C24	$\rho_k = 350$ kg/m^3		753 • k_{mod}	753 • k_{mod}	753 • k_{mod}	(20)
material factor (NA to) EN 1995-1-1:2004+A1:2008				$\gamma_M = 1{,}30$ [withdrawal capacity]			(21)
design value X_d of the axial withdrawal capacity N							(22)
strength class wood (EN 338)	C18	$\rho_k = 350$ kg/m^3		539 • k_{mod}	539 • k_{mod}	539 • k_{mod}	(23)
	C24	$\rho_k = 350$ kg/m^3		579 • k_{mod}	579 • k_{mod}	579 • 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	$\rho_k = 320$ kg/m^3		**(3) (7) (15)**	**(3) (7) (15)**	**(3) (7) (15)**	(26)
	C24	$\rho_k = 350$ kg/m^3		**(3) (7) (16)**	**(3) (7) (16)**	**(3) (7) (16)**	(27)
board span b				600			(28)
fixing distance a				600			(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 ($d = l_{ef}/ 6 = 22{,}75/6 = 3{,}79$ mm) ;

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

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

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

Annex 2-6

Table 10: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination **screw** and 10 mm 'Natural Durable' or 10 mm 'Natural Xtreme' boards (with the use of 8 mm ROCKPANEL strips), with $\alpha \geq 30°$ [e]

board thickness				10 mm (with the use of a 8 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				*1066*	*850*	*617*	(4)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(5)
design value X_d of the pull-through N				**533**	**425**	**309**	(6)
wind suction							(7)
average wind load in N/m²				1992	2161	2243	(8)
average strength N				*1105*	*482*	*236*	(9)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N				**553**	**241**	**118**	(12)
withdrawal capacity							(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [c] [d]							(14)
strength class	C18	ρ_k = 320 kg/m³		248 [b]	248 [b]	248 [b]	(15)
wood (EN 338)	C24	ρ_k = 350 kg/m³		266 [b]	266 [b]	266 [b]	(16)
modification factor for k_{mod}				k_{mod} [a]			(17)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [b] [c] [d]							(18)
strength class	C18	ρ_k = 350 kg/m³		248 • k_{mod}	248 • k_{mod}	248 • k_{mod}	(19)
wood (EN 338)	C24	ρ_k = 350 kg/m³		266 • k_{mod}	266 • k_{mod}	266 • k_{mod}	(20)
material factor (NA to) EN 1995-1-1:2004+A1:2008				γ_M = 1,30 [withdrawal capacity]			(21)
design value X_d of the axial withdrawal capacity N							(22)
strength class	C18	ρ_k = 350 kg/m³		191 • k_{mod}	191 • k_{mod}	191 • k_{mod}	(23)
wood (EN 338)	C24	ρ_k = 350 kg/m³		205 • k_{mod}	205 • k_{mod}	205 • 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	C18	ρ_k = 350 kg/m³		**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26)
wood (EN 338)	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 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 ($d = l_{ef} / 6 = 16,75/6 = 2,79$ mm) ;

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

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

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

Annex 2-7

Table 11: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination 32 mm **nail** and 8 mm 'Natural Durable' or 8 mm 'Natural Xtreme' boards (with the use of gaskets)

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				*455*	*374*	*311*	(4)
material factor ROCKPANEL γ_M (manufacturer's 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/m²				3043	3406	5148	(8)
average strength N				*716*	*314*	*263*	(9)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N				**358**	**157**	**132**	(12)
withdrawal capacity							(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [b] [d]							(14)
strength class	C18	ρ_k = 320 kg/m³		168	168	168	(15)
wood (EN 338)	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] [b] [d]							(18)
strength class	C18	ρ_k = 320 kg/m³		168 • k_{mod}	168 • k_{mod}	168 • k_{mod}	(19)
wood (EN 338)	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	C18	ρ_k = 320 kg/m³		129 • k_{mod}	129 • k_{mod}	129 • k_{mod}	(23)
wood (EN 338)	C24	ρ_k = 350 kg/m³		155 • k_{mod}	155 • k_{mod}	155 • k_{mod}	(24)
design value of the axial load $\boldsymbol{X_d} = \boldsymbol{X_k} / \boldsymbol{\gamma_M}$ N				**minimum value of the rows:**			(25)
strength class	C18	ρ_k = 320 kg/m³		**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26)
wood (EN 338)	C24	ρ_k = 350 kg/m³		**(6) (12) (24)**	**(6) (12) (24)**	**(6) (12) (24)**	(27)
board span b				480			(28)
fixing distance a				300			(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 ($d = l_{ef}/ 8 = 16,2/8 = 2,02$ mm) ;

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

Annex 2-8

Table 12: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination 40 mm **nail** and 8 mm 'Natural Durable' or 8 mm 'Natural Xtreme' boards (with the use of 8 mm ROCKPANEL strips)

board thickness				8 mm (with the use of 8 mm strips)			(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 ROCKPANEL γ_M (manufacturer's 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/m²				3043	3406	5148	(8)
average strength N				*716*	*314*	*263*	(9)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N				**358**	**157**	**132**	(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		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] [b] [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 $\boldsymbol{X_d} = \boldsymbol{X_k} / \boldsymbol{\gamma_M}$ 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				480			(28)
fixing distance a				300			(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 = 16,2/8 =2,02 mm) ;

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

Annex 2-9

Table 13: Characteristic axial load X_k and **design** value of the axial load $\boldsymbol{X_d} = X_k / \gamma_M$ for the combination 40 mm **nail** and 10 mm 'Natural Durable' or 10 mm 'Natural Xtreme' boards (with the use of gaskets)

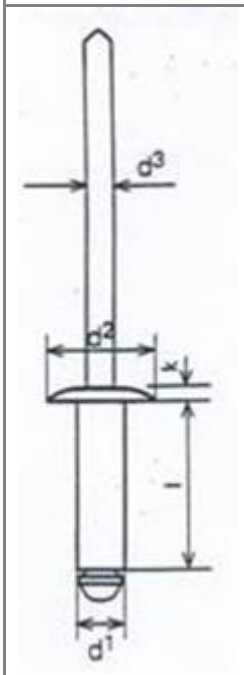
board thickness				10 mm (with the use of a gasket)			(1)
location of the fixing in the board				M-middle	E-edge	C-corner	(2)
pull-through N							(3)
characteristic pull-through N				*752*	*674*	*577*	(4)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(5)
design value X_d of the pull-through N				**376**	**337**	**289**	(6)
wind suction							(7)
average wind load in N/m²				2637	4131	5162	(8)
average strength N				*1009*	*627*	*397*	(9)
material factor ROCKPANEL γ_M (manufacturer's declaration)				*2,0*	*2,0*	*2,0*	(10)
design value X_d of the pull-through N				**505**	**314**	**199**	(12)
withdrawal capacity							(13)
characteristic withdrawal capacity $F_{ax,k,Rk}$ [d]							(14)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³		296	296	296	(15)
	C24	ρ_k = 350 kg/m³		354	354	354	(16)
modification factor for k_{mod}				k_{mod} [a]			(17)
axial withdrawal capacity $F_{ax,k,Rk} \cdot k_{mod}$ [a] [d]							(18)
strength class wood (EN 338)	C18	ρ_k = 320 kg/m³		228• k_{mod}	228• k_{mod}	228• k_{mod}	(19)
	C24	ρ_k = 350 kg/m³		272• k_{mod}	272• k_{mod}	272• 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		**228** • k_{mod}	**228** • k_{mod}	**228** • k_{mod}	(23)
	C24	ρ_k = 350 kg/m³		**272** • k_{mod}	**272** • k_{mod}	**272** • k_{mod}	(24)
design value of the axial load $\boldsymbol{X_d = X_k / \gamma_M}$ N				**minimum value of the rows:**			(25)
strength class	C18	ρ_k = 320 kg/m³		**(6) (12) (23)**	**(6) (12) (23)**	**(6) (12) (23)**	(26
wood (EN 338)	C24	ρ_k = 350 kg/m³		**(6) (12) (24)**	**(6) (12) (24)**	**(6) (12) (24)**	(27)
board span b				600			(28)
fixing distance a				400			(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

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

Annex 3-1

Table 14 - Fastener specification for metal subframes

Rivet aluminum or stainless steel					
		SFS Aluminum	SFS Stainless steel A4 [a]	MBE Aluminum	MBE stainless steel [b]
	Code	AP14-50180-S	SSO-D15-50180	1290406	1290806
	Body	aluminum EN AW-5019 (AlMg5) in accordance with EN 755-2	stainless steel material number 1.4578 in accordance with EN 10088	aluminum 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	aluminum t ≥ 1,5 mm	steel t ≥ 1,0 mm [a]	aluminum 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.

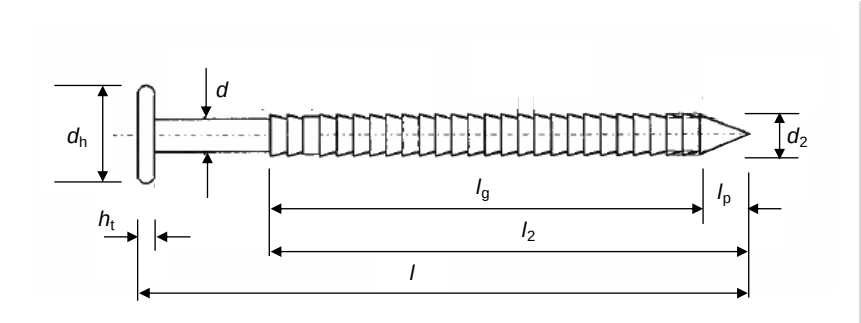
Annex 3-2

Table 15 - Fastener specification for wooden subframes

Ring-shank nail

Stainless steel in accordance with EN 10088
Material number 1.4401 or 1.4578

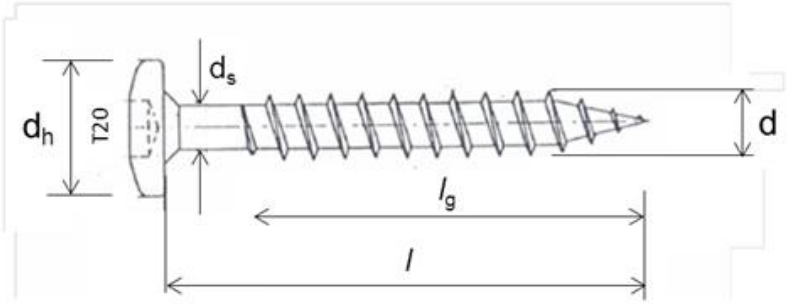
d = 2,6 – 2,8
d_2 = 2,8 – 3,0
l for nail 32 = 31 – 32,5
l for nail 40 = 39 – 40,5
l_2 for nail 32 = 24 – 26
l_2 for nail 40 = 32 – 34
l_p = ≤ 4,8
l_g = l_2 - l_p
d_h = 5,8 – 6,3
h_t = 0,8 – 1,0



Torx screws

Stainless steel in accordance with EN 10088
Material number 1.4401 or 1.4578

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 4-1

Table 16 - Control plan for the manufacturer for the product 'Natural Durable'

Nr	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
(1)	(2)	(3)	(4)	(5)	(6)
Factory production control (FPC) 'Natural Durable' [including testing of samples in accordance with a prescribed test plan][1]					
1	Board thickness	EN 325	8 ± 0,5 mm 10 ± 0,5 mm	40 [a]	One board for every 200 boards produced
2	Density	EN 323	1050 ±150 kg/m^3	40 [a]	One board for every 200 boards produced
3	Bending strength dry parallel and perpendicular to the production direction	EN 310	$f_{05} \geq 27$ N/mm²	20 (length) + 20 (width) [a]	One board for every 200 boards produced
4	Bending strength after ageing parallel and perpendicular to the production direction	EN 310 Ageing in accordance with description in Table 10	lowest individual strength f ≥ 22N/mm²	3 (length) + 2 (width)	One board for every 200 boards produced
5	Water absorption after 4 days	see Table 10	≤ 2 weight % after 4 days; if sample fails, the 2nd sample must be tested.	1 (2 in the case of fail)	One board for every 200 boards produced
6	Organic material content (resin binder)	Glowing at 650° for at least 60 min. *Remark: time depends on the type of oven*	12,0 ± 1,5 weight %	40 [a]	One board for every 200 boards produced
7	Reaction to fire [b]	EN 13162 loss on ignition Table B.2	Table 1 EN 13501-1	Three specimens [b]	every two years
The below mentioned controls are carried out by the sub-supplier and the documentation is maintained by the board manufacturer as part of his FPC					
8	Dowel-type fasteners for timber structures		EN 14592, Annex ZA.2 Procedure for attestation of conformity		Every 3 years
9	EPDM foam gasket		Manufacturers declaration		Every 3 years

[a] amount of samples from four different boards

[b] Small components, e.g. gaskets and seals shall be considered on the basis of EOTA Technical Report TR 021

1 The control plan has been deposited at the ETA-Danmark A/S

Annex 4-2

Table 17- Control plan for the manufacturer for the product 'Natural Xtreme'

Nr	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
(1)	(2)	(3)	(4)	(5)	(6)
Factory production control (FPC) 'Natural Xtreme' [including testing of samples in accordance with a prescribed test plan] [1]					
1	Board thickness	EN 325	8 ± 0,5 mm 10 ± 0,5 mm	40 [a]	One board for every 200 boards produced
2	Density	EN 323	1200 ±100 kg/m^3	40 [a]	One board for every 200 boards produced
3	Bending strength dry parallel and perpendicular to the production direction	EN 310	$f_{05} \geq 34,5$ N/mm²	20 (length) + 20 (width) [a]	One board for every 200 boards produced
4	Bending strength after ageing parallel and perpendicular to the production direction	EN 310 Ageing in accordance with description in Table 10	lowest individual strength $f \geq 28$ N/mm²	3 (length) + 2 (width)	One board for every 200 boards produced
5	Water absorption after 4 days	see Table 10	≤ 2 weight % after 4 days; if sample fails, the 2nd sample must be tested.	1 (2 in the case of fail)	One board for every 200 boards produced
6	Organic material content (resin binder)	Glowing at 650° for at least 60 min. *Remark: time depends on the type of oven*	14,5 ± 0,5 weight %	40 [a]	One board for every 200 boards produced
7	Reaction to fire [b]	EN 13162 loss on ignition Table B.2	Table 1 EN 13501-1	Three specimens [b]	every two years
The below mentioned controls are carried out by the sub-supplier and the documentation is maintained by the board manufacturer as part of his FPC					
8	Dowel-type fasteners for timber structures		EN 14592, Annex ZA.2 Procedure for attestation of conformity		Every 3 years
9	EPDM foam gasket		Manufacturers declaration		Every 3 years

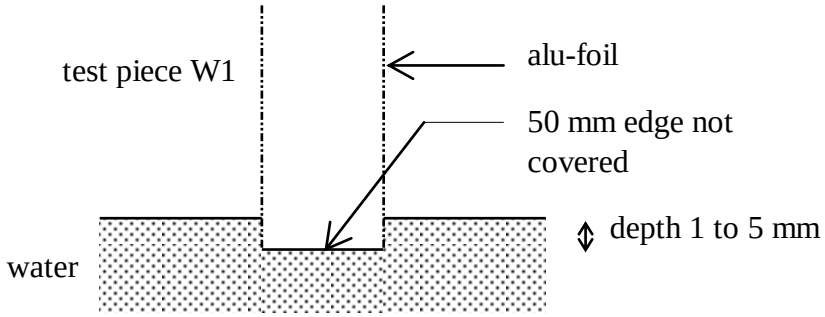
[a] amount of samples from four different boards

[b] Small components, e.g. gaskets and seals shall be considered on the basis of EOTA Technical Report TR 021

1 The control plan has been deposited at the ETA-Danmark A/S

Annex 5

Table 18- Special methods of control and testing used for the evaluation

<table>
<tr><td colspan="3">Bending strength after ageing</td></tr>
<tr><td></td><td colspan="2">Ageing of the 5 test pieces in (tab) water from 70º C (with surface tension changing additives : for instance 0,5 ml Triton per litre) for 30 minutes.
Determination of the bending strength in accordance with EN-310 within 20 minutes after the ageing period in a test room with an air temperature between 17 and 23° C.</td></tr>
<tr><td colspan="3">Water absorption</td></tr>
<tr><td></td><td colspan="2">The water absorption by the edges must be determined on test pieces W1 in the size 50*400 mm.
The dimensions and the weight of the test pieces are determined.
The sample is wrapped with aluminum foil with the exception of one 50 mm edge.
The test pieces are vertically placed in a bucket with tab water, with the 50 mm size without aluminum foil horizontally in the water. The edge must be 1 to 5 mm in the water (without additives).</td></tr>
<tr><td></td><td colspan="2">Test conditions:</td></tr>
<tr><td></td><td>Water temperature</td><td>17 - 23° C</td></tr>
<tr><td></td><td>Room temperature</td><td>17 - 23° C</td></tr>
<tr><td></td><td colspan="2"> 
</td></tr>
</table>

Annex 6

Table 19 -Control plan for the notified body; corner stones

Nr	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
(1)	(2)	(3)	(4)	(5)	(6)
Initial type-testing of the product (ITT)					
1	Testing to determine the product performance has been carried out under the responsibility of the TAB as part of the procedure to issue the ETA				
Initial inspection of factory and factory production control (FPC)					
1	See table 16 and 17				
Continuous surveillance, judgment and assessment of factory production control (FPC)					
1	See table16 and 17				

Table 20 –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.