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European Technical Assessment

ETA 14 / 0145 of 30/12/2020

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General Part

Technical Assessment Body issuing the ETA:

Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)

Trade name of the construction product:

etalbond® PE/FR Suspended Cassettes
etalbond® PE/FR Riveted Boards

Product family to which the construction product belongs:

Kits for external wall claddings mechanically fixed

Manufacturer:

ELVAL COLOUR S.A.
3rd km. Inofyta Peripheral Rd.
32011 Saint Thomas. Viotia. Greece
www.elval-colour.com

Manufacturing plant(s):

ELVAL COLOUR S.A.
3rd km. Inofyta Peripheral Rd.
32011 Saint Thomas. Viotia. Greece
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This European Technical Assessment contains:

25 pages including 3 Annexes which form an integral part of the assessment. Annex C contains confidential information and is not included in the ETA when is publicly available.

This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of:

European Assessment Document (EAD) 090062-00-0404. Ed. July 2018. Kits for external wall claddings mechanically fixed.

This ETA is a corrigendum of:

ETA 14/0145 version 3 issued on the 13/07/2020.

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SPECIFIC PARTS

1. Technical description of the product (kit)

The assessed kits for ventilated external wall claddings mechanically fixed are named as ⁽¹⁾ “etalbond® PE/FR Riveted Boards” (family A) and “etalbond® PE/FR Suspended Cassettes” (family G)⁽²⁾. All claddings are manufactured from thin metallic composite panels “etalbond® PE”, and “etalbond® FR”) and are manufactured by the ETA-holder ⁽³⁾. These claddings are mechanically fastened to their subframes, fixed to the external walls of new or existing buildings (retrofit). An insulation layer can be fixed on the external wall. The kits comprise other components as specified in Table 0, which are factory produced by the ETA – holder or by suppliers.

Table 0 – Definition of components of the kit				
Component		Material (Reference)		Size (mm) [Tolerances]
Subframe elements	Vertical and if required, horizontal profiles used to fix the cladding elements	etalbond® PE/FR Suspended Cassettes	E-97101 and E-97102: Ω-shape section profiles made of raw finished extruded alloyed aluminium EN AW 6060 T66 or 6063 T6, specific for “etalbond® PE/FR Suspended Cassettes”.	Length: 6000 Thickness: 2
		etalbond® PE/FR Riveted Boards	E-97001: T-shape section profile made of raw finished extruded alloyed aluminium EN AW 6060 T66 or 6063 T6, specific for “etalbond® PE/FR Riveted Boards”.	
Cladding (made of etalbond® composite panels)	Riveted boards	etalbond® PE: TMCP composed by two external alloyed aluminium sheets EN AW 3105 H44 (painted) and an internal core made of low-density polyethylene (LDPE).	etalbond® FR: TMCP composed by two external alloyed aluminium sheets EN AW 3105 H44 (painted) and an internal core made of low density polyethylene (LDPE) plus mineral compounds.	Length: ≤ 4000 mm [0.0 /+4] 4001-6000 mm [0.0 /+6] 6001-8000 mm: [0.0 /+10] Width: 1250, 1500 [0.0 /+4] Thickness: 3, 4 or 6 [± 0,2]
	Suspended cassettes with lateral simple folded flanges ≥ 35 mm or ≥ 50 mm depth, top horizontal double folded flange, and bottom horizontal simple or double folded flange. Reinforced slots width 14 mm.			
Fixings ⁽⁴⁾	Elements used to fix cladding and/or subframe elements	etalbond® PE/FR Riveted Boards	Blind rivet ISO 15977 5x12 AIA/St (d _k =14 mm) (code 07P512 ALSS); Open end blind rivet, with A2 (1.4541) stainless steel break pull mandrel diam.d=5 mm length 14 mm, and protruding aluminium head, optionally lacquered, d _k =14 mm (e.g. Gesipa 5,0x14,0 K14, flat head of AlMg ₃ , body of stainless steel).	--
			Angle aluminium EN AW 6060 T66 or 6063 T6, 40x40x3 mm; Foreseen for union of horizontal and vertical profiles E-97001 and blind rivets ISO 15977 5x12 AIA/St	--
		etalbond® PE/FR Suspended Cassettes	Reinforcing plate made of aluminium alloy EN AW 5754 H22 (raw finished) and/or H42 (painted) riveted to slots of vertical flange with Blind rivets ISO 15977 5x12 AIA/St (d _k =14 mm) (code 07P512 ALSS).	--
			Hanger ref. ET 720061.00: ψ-shape section profile and pin made of raw finished extruded alloyed aluminium EN AW 6060 T66 or 6063 T6, foreseen to be screwed to profile ref. E 97101 with self-drilling screw 4,2 x 32 stainless or galvanized steel.	--
Subframe fixing devices	Brackets: Elements used as load transmission between the subframe and the substrate wall.	07 Vario Q10 / 07 Vario Q15 / 07 Vario Q18 / 07 Vario Q21: L-shape profiles made of extruded and mechanized alloyed aluminium EN AW 6060 T66 or 6063 T6, or equivalent raw finished sheet with perforation (and lateral tongues) for fastening vertical profiles (e.g. upper position) with rivets described below.		Depth: From 100 to 210 Height: 90 Width : 60
		07 Vario 072 / 07 Vario 082 / 07 Vario Q102 / 07 Vario Q172: L-shape profiles made of extruded and mechanized alloyed aluminium EN AW 6060 T66 or 6063 T6, or equivalent raw finished sheet with perforation (and lateral tongues) for fastening vertical profiles (e.g. bottom position) with rivets described below.		Depth: From 40 to 160 Height: 160 Width : From 60 to 62
	Fixings between subframe elements	Blind rivet ISO 15977 5x12 AIA/St (d _k =11 mm) (code 07P481 ALSS); Open end blind rivet, with A2 (1.4541) stainless steel break pull mandrel diameter d=5 mm length 14 mm, and protruding aluminium head, option lacquered, d _k =11 mm. (e.g.Gesipa 5,0x14,0 K11, with flat head of AlMg ₃ and body of stainless steel). Blind rivets 4,8 x 12 Al/A2 (code 07P481 2AL25). Blind rivets 4,8 x 12 A2/A2 (code 07P481 2A2A25).		--
	Fixings for substrate	Examples: Anchor Fischer M8x97 galvanized steel for concrete (code 07M897F). Anchor Fischer M10x102 A4 steel for concrete (code 07M10102A-45).		--

(1) Kits were former and respectively known as Vario and Bravo cladding kits. Panel etalbond® PE formerly known as “etalbond®.

(2) Families described at Table 1.1 of European Assessment Document 090062-00-0404 (hereafter EAD) ed. July 2018.

(3) For further information see Annex A. Figures and Annex B. Complementary physical and mechanical data of components.

(4) For further information see Table 15.

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

2.1 Intended use

The kits “etalbond® PE/FR Riveted Boards” and “etalbond® PE/FR Suspended Cassettes” are intended to be used for ventilated external wall claddings which can be fixed to the external walls of new or existing buildings. The assessed kits are non-load-bearing construction systems, and therefore, they do not contribute to the stability of the wall on which are installed, neither to ensure the air tightness of the building structure. But they can contribute to durability of the works by providing enhanced protection from the effect of weathering.

2.2 Relevant general conditions for the use of the kits

The provisions made in this European Technical Assessment are based on an assumed working life of 25 years as minimum according to the EAD 090062-00-0404, provided that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a mean for choosing the right product in relation to the expected economically reasonable working life of the works.

2.3 Design of the kits in works

The design of external wall cladding for ventilated façade using the kits should consider:

- The mechanical characteristic values of the components (e.g. panels, cladding fixings and subframe) in order to resist the actions applying on the specific work. National safety factors, if required, must be used.
- The substrate material to define the suitable anchorages.
- The possible movements of substrate and the position of the building expansion joints.
- The dilatation of components of the kits and of the panels.
- The category of corrosivity of the atmosphere of the works ⁽⁵⁾.
- Because joints are not watertight, the first layer behind ventilated air space must be composed by materials with low water absorption.
- The construction of singular parts of façade (e.g. base, top, corners, windows, etc).
- If the entire building must comply with the specific building regulations, particularly concerning fire and wind load resistance, of the Member States in which the work has been built.

2.4 Installation of the kits in works

Installation should be carried out according to the ETA holder's specifications and using the specific components of the kits, manufactured by the ETA holder or by suppliers recognized by the ETA holder. Installation should be carried out by appropriately qualified staff and under the supervision of the technical responsible of the site.

2.5 Use, maintenance and repair of the works

Maintenance of the assembled system or components of the kit includes inspections on site, taking into account the following aspects:

- Regarding the panels: Appearance of any damage such as cracking, delamination or detachment due to permanent and irreversible deformation.
- Regarding metallic components: Presence of corrosion or water accumulation.
- Necessary repairs should be done rapidly, using the same kit components and following the repair instructions given by ETA holder.

(5) e.g. See Table 1 of Standard EN ISO 12944-2:2017. Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments.

3. Performance of the product and references to the methods used for its assessment

The assessment of the kits for ventilated external wall claddings according to the Basic Work Requirements (BWR) was carried out in compliance with the EAD 090062-00-0404. Characteristics of the components shall correspond to respective values laid down in the technical documentation of this ETA, checked by IETcc.

• **Basic Work Requirement 2: Safety in case of fire**

1. Reaction to fire:

Kits have been assessed ⁽⁶⁾ according to cl. 2.2.1 of EAD, as described below:

1.1.1 Classification of kit “etalbond® PE/FR Riveted Boards”, with cladding made of:

- a) Panels etalbond® PE: No performance assessed
- b) Panels etalbond® FR: Class B-s1, d0.

Based on Classification Report from EXOVA WARRINGTON n. 332164 issued on 8th of August 2013 which describe classification according to EN 13501-1 ⁽⁷⁾ obtained through tests carried out according to European Standards EN ISO 11925-2 ⁽⁸⁾ and EN 13823 ⁽⁹⁾.

1.1.2 Classification of kit etalbond® PE/FR Suspended Cassettes cladding kit, with cladding made of:

- a) Panels etalbond® PE: No performance assessed
- b) Panels etalbond® FR: Class B-s1, d0.

Based on Classification Report from EXOVA WARRINGTON n. 332164 issued on 8th of August 2013 which describe classification according to EN 13501-1 ⁽⁷⁾ obtained through tests carried out according to European Standards EN ISO 11925-2 ⁽⁸⁾ and EN 13823 ⁽⁹⁾.

In relation to the reaction to fire on rear side, it is considered above classifications as applicable.

2 Façade fire performance:

No performance assessed.

3 Propensity to undergo continuous smouldering:

No performance assessed.

(6) A European reference fire scenario has not been laid down for façades. In some Member States, the classification of the cladding kits according to Standard EN 13501-1 might not be sufficient for the use in façades. An additional assessment of the kits according to the national provision (e.g. on the basis of a large-scale test) might be necessary to comply with Member State Regulations, until the existing European classification system has been completed.

(7) EN 13501-1:2007+A1:2010. Fire classification of construction products and building elements-Part 1: Classification using data from reaction to fire tests.

(8) EN ISO 11925-2:2011. Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test.

(9) EN 13823:2012. Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item.

- **Basic Work Requirement 3: Hygiene, health and the environment**

4 Watertightness of joints (protection against driving rain):

4.1 Classification of “etalbond® PE/FR Riveted Boards” cladding kit:
Purposeless (kit is not watertight, according to cl. 2.2.4 of EAD).

4.2 Classification of “etalbond® PE/FR Suspended Cassettes” cladding kit:
Purposeless (kit is not watertight) according to cl. 2.2.4 of EAD.

5 Water absorption of cladding:

No performance assessed. Not relevant for ventilated façades according to cl. 2.2.5 of EAD.

6 Water permeability and water vapour permeability:

No performance assessed, as it is not relevant for ventilated façades according to cl. 2.2.6 of EAD.

7 Drainability:

According to cl. 2.2.7 of EAD, on the basis of the standard construction details the installation criteria of these kits and the technical knowledge and experience, it may be said the water which penetrates through joints into the air space or the condensation water can be drained out from the cladding without accumulation or moisture damage into the substrate.

8 Content, emission and/or release of dangerous substances:

No performance assessed.

- **Basic Work Requirement 4: Safety and accessibility in use**

9 Wind load resistance:

The kit behaviours exposed to wind pressure are most favourable than when exposed to wind suction. Therefore, wind pressure tests have been avoided and wind pressure resistance of kit can be considered as equal to wind suction resistance. Wind suction resistance of cladding kits has been determined by tests carried out according to cl. 2.2.9 of EAD, on several real scale rigs most unfavourably but representative enough of the different cladding kits based on “etalbond® PE” and “etalbond® FR” panels. Summaries of tests results, are indicated in Tables at the following pages:

- etalbond® PE/FR Riveted Boards (non continuous, bidirectional subframe): Table 1
- etalbond® PE/FR Riveted Boards (continuous, bidirectional subframe, centre-perimeter): Table 2
- etalbond® PE/FR Riveted Boards (continuous, bidirectional subframe, only perimeter): Table 3
- etalbond® PE/FR Riveted Boards (non continuous, bidirectional subframe): Table 4
- etalbond® PE/FR Suspended Cassettes (not reinforced slot): Table 5
- etalbond® PE/FR Suspended Cassettes (not reinforced slot): Table 6
- etalbond® PE/FR Suspended Cassettes (not reinforced slot): Table 7
- etalbond® PE/FR Suspended Cassettes (not reinforced slot): Table 8

Table 1: Summary of wind suction resistance results of etabond® PE/FR Riveted Boards. Set 1					
Cladding kit composition		Test results			
Ref.	Non continuous boards riveted to a bidirectional subframe	Load (Pa) ⁽¹⁰⁾	Type of failure ⁽¹¹⁾	Deflection (mm) ⁽¹²⁾	
				Permanent	Instantaneous
1.1.a	- etabond® PE 3 mm LxH=500 mm x 530 mm riveted on corners - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3400	None	0.04 – 0.61	3.05 – 15.86
		3600	None	0.67	16.69
		3800	None. End of test	--	16.83
1.1.b	- etabond® FR 3 mm LxH=500 mm x 530 mm riveted on corners - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3400	None	0.10 - 0.75	0.75 - 15.17
		3600	None	0.82	16.14
		3800	None. End of test	--	16.29
1.1.c	- etabond® PE 3 mm LxH =1010 mm x 530 mm riveted on corners and ½ lateral - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3400	None	0.07 – 0.63	4.06 – 21.27
		3600	None	0.70	22.42
		3800	None. End of test	--	49.29
1.1.d	- etabond® FR 3 mm LxH =1010 mm x 530 mm riveted on corners and ½ lateral - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3400	None	0.06 – 0.66	3.11 – 18.81
		3600	None	0.72	19.78
		3800	None. End of test	--	51.28
1.2.a	- etabond® PE 4 mm LxH=500 mm x 530 mm riveted on corners - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3200	None	0.05 - 0.59	2.27 - 11.74
		3400	None	0.46	12.37
		3600	None. End of test	0.50	12.98
1.2.b	- etabond® FR 4 mm LxH=500 mm x 530 mm riveted on corners - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3200	None	0.05 - 0.64	2.25 - 11.52
		3400	None	0.57	12.07
		3600	None. End of test	0.65	12.67
1.2.c	- etabond® PE 4 mm LxH =1010 mm x 530 mm riveted on corners and ½ lateral - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3200	None	0.08 – 0.67	2.88 – 15.10
		3400	None	0.69	15.88
		3600	None. End of test	0.88	16.74
1.2.d	- etabond® FR 4 mm LxH =1010 mm x 530 mm riveted on corners and ½ lateral - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 3200	None	0.12 – 0.30	3.20 – 17.88
		3400	None	0.88	18.83
		3600	None. End of test	0.92	19.90
1.3.a	- etabond® PE 6 mm LxH=500 mm x 530 mm riveted on corners - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 2400	None	0.08 - 0.23	1.33 - 6.51
		2600	None	0.27	6.99
		2800	None. End of test	0.27	7.48
1.3.b	- etabond® FR 6 mm LxH=500 mm x 530 mm riveted on corners - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 2400	None	0.05 - 0.17	1.15 - 6.04
		2600	None	0.20	6.48
		2800	None. End of test	0.21	6.97
1.3.c	- etabond® PE 6 mm LxH =1010 mm x 530 mm riveted on corners and ½ lateral - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets:795 mm	600 - 2400	None	0.06 - 0.59	1.95 - 9.51
		2600	None	0.69	10.33
		2800	None. End of test	0.89	11.32
1.3.d	- etabond® FR 6 mm LxH =1010 mm x 530 mm riveted on corners and ½ lateral - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 470 mm - Border rivets distance: 15 mm - Distance between vert. profiles: 963 mm / Distance between horiz. profiles: 550 mm - Distance between brackets: 795 mm	600 - 2400	None	0.01-0.51	0.03 - 5.35
		2600	None	0.58	5.93
		2800	None. End of test	0.67	6.54

(10) Maximum admissible wind load should be defined taken into account other criteria (e.g. national regulations, max. instantaneous deflection $\leq L/30$, etc).

(11) The following types of failures are considered: Breakage of any cladding element, failure of fixing, failure of detachment of the frame and significant permanent deflection (according to ETA-holder $d_p \geq 3$ mm)

(12) Indicated accumulated deflection values measured at centre of front side of cladding (or distance between vertical profiles if continuously supported).

Table 2: Summary of wind suction resistance results of etalbond® PE/FR Riveted Boards. Set 2					
Cladding kit composition		Test results			
Ref.	Continuous boards riveted (on centre, perimeter and central vertical profile) to a bidirectional subframe composed by 3 vert. profiles and 3 horiz. profiles	Load (Pa) ⁽¹⁰⁾	Type of failure ⁽¹¹⁾	Deflection (mm) ⁽¹²⁾	
				Permanent	Instantaneous
2.1.a	etalbond® PE 3 mm LxH =2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 493,5mm - Distance between brackets: 938 mm	600 - 3000	None	0.03 - 0.97	2.55 - 12.91
		3200	None	1.08	13.66
		3400	None. End of test	1.24	14.45
2.1.b	etalbond® FR 3 mm LxH =2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 493,5mm - Distance between brackets: 938 mm	600 - 3000	None	0.07 - 1.59	2.85 - 16.30
		3200	None	1.73	17.31
		3400	None. End of test	1.28	16.84
2.2.a	etalbond® PE 4 mm LxH =2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 493,5mm - Distance between brackets: 938 mm	600 - 3000	None	0.13 - 1.28	2.15 - 12.49
		3200	None	1.42	13.50
		3400	None. End of test	1.63	14.50
2.2.b	etalbond® FR 4 mm LxH =2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 493,5mm - Distance between brackets: 938 mm	600 - 3000	None	0.04 - 1.99	2.37 - 13.95
		3200	None	2.20	15.17
		3400	None. End of test	2.47	16.31

Table 3: Summary of wind suction resistance results of etalbond® PE/FR Riveted Boards. Set 3					
Cladding kit composition		Test results			
Ref.	Continuous boards riveted on perimeter & vertical central profile to a subframe composed of 3 vertical and 2 horizontal profiles	Load (Pa) ⁽¹⁰⁾	Type of failure ⁽¹¹⁾	Deflection (mm) ⁽¹²⁾	
				Permanent	Instantaneous
3.1.a	etalbond® PE 3 mm LxH=2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2000	None	0.49 - 2.48	11.47 - 30.88
		2.200	None	2.86	32.84
		2.400	Significant permanent deflection	3.30	35.16
3.1.b	etalbond® FR 3 mm LxH=2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2000	None	0.19 - 1.48	11.67 - 30.66
		2.200	None	1.74	32.66
		2.400	None. End of test	2.04	35.05
3.2.a	etalbond® PE 4 mm LxH=2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2200	None	0.32 - 1.60	9.84 - 27.90
		2400	None	1.90	29.53
		2600	None. End of test	2.15	31.48
3.2.b	etalbond® FR 4 mm LxH=2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987 mm - Distance between brackets: 938 mm	600 - 2200	None	0.42 - 2.12	9.01 - 27.33
		2400	None	2.46	28.99
		2600	None. End of test	2.80	31.10
3.3.a	etalbond® PE 6 mm LxH=2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987 mm - Distance between brackets: 938 mm	600 - 2600	None	0.04 - 1.31	4.19 - 18.17
		2800	None	1.52	19.04
		3000	None. End of test	1.79	20.20
3.3.b	etalbond® FR 6 mm LxH=2010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 495 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987 mm - Distance between brackets: 938 mm	600 - 2600	None	0.01 - 1.13	3.15 - 14.80
		2800	None	1.27	15.60
		3000	None. End of test	1.51	16.73

Table 4: Summary of wind suction resistance results of etalbond® PE/FR Riveted Boards. Set 4					
Cladding kit composition		Test results			
Ref.	Non continuous perimeter riveted boards to a subframe composed of vertical and horizontal profiles	Load (Pa) (10)	Type of failure (11)	Deflection (mm) (12)	
				Permanent	Instantaneous
4.1.a	etalbond® PE 3 mm LxH=1010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2200	None	0.19 - 1.57	9.41 - 23.98
		2400	None	1.83	25.53
		2600	None. End of test	2.60	25.92
4.1.b	etalbond® FR 3 mm LxH=1010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2200	None	0.21 - 1.81	9.85 - 26.91
		2400	None	1.99	29.07
		2600	None. End of test	2.21	31.03
4.2.a	etalbond® PE 4 mm LxH=1010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2000	None	0, 22 - 1.39	7.28 - 20.69
		2200	None	1.19	20.52
		2400	None. End of test	1.32	22.12
4.2.b	etalbond® FR 4 mm LxH=1010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2000	None	0.26 – 1.31	6.44 – 17.86
		2200	None	1.60	22.16
		2400	None. End of test	1.81	24.00
4.3.a	etalbond® PE 6 mm LxH=1010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2400	None	0.18 - 0.79	4.95 – 18.08
		2600	None	0.92	19.51
		2800	None. End of test	0.97	20.56
4.3.b	etalbond® FR 6 mm LxH=1010 mm x 1030 mm - Perimeter rivets max. vertical distance: 500 mm - Perimeter rivets max. horizontal distance: 490 mm - Border rivets distance: 15 mm - Distance between vertical profiles: 963 mm - Distance between horizontal profiles: 987mm - Distance between brackets: 938 mm	600 - 2400	None	0.23 - 1.09	3.84 – 15.38
		2600	None	1.25	16.70
		2800	None. End of test	1.35	17.68

Table 5: Summary of wind suction resistance results of etalbond® PE/FR Suspended Cassettes. Set 1

Cladding kit composition		Test Results			
Ref.	Cassettes with double return upper flange, simple return lower and lateral flanges and with not reinforced slot width = 14 mm	Load (Pa) (10)	Type of failure (11)	Deflection (mm) (12)	
				Permanent	Instantaneous
1.1.a	Cassettes (LxH = 900 mm x 900 mm), etalbond® PE 3 mm) - Lateral flange: depth 35 mm, 2 slots - Distance between slots: 700 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 1400	None	0.03 - 0.74	8.69 - 15.19
		1600	None	1.08	17.27
		1800	Significant permanent deflection ($d_p \geq 3$ mm) at centre. Buckling of lower horizontal flange	3.76	24.78
1.1.b	Cassettes (LxH=900 mm x 900 mm), (etalbond® FR 3 mm) - Lateral flange: depth 35 mm, 2 slots - Distance between slots: 700 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 1800	None	0.09 - 1.85	7.17 - 23.66
		2000	None	2.34	25.66
		2200	Significant permanent deflection ($d_p \geq 3$ mm) at centre. Buckling of lower horizontal flange	3.82	29.22
1.2.a	Cassettes (LxH = 900 mm x 900 mm), (etalbond® PE 3 mm) - Lateral flange: depth 35 mm, 3 slots - Distance between slots: 350 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 2200	None	0.04 - 1.48	7.03 - 22.81
		2400	None	1.95	25.38
		2600	Significant permanent deflection ($d_p \geq 3$ mm) at centre. Buckling of lower horizontal flange	3.18	29.64
1.2.b	Cassettes (LxH = 900 mm x 900 mm), (etalbond® FR 3 mm) - Lateral flange: depth 35 mm, 3 slots - Distance between slots: 350 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 2000	None	0.06 - 0.98	8.67 - 19.12
		2200	None	1.19	20.49
		2400	Significant permanent deflection ($d_p \geq 3$ mm) at centre. Buckling of lower horizontal flange	5.99	31.00
1.3.a	Cassettes (LxH = 900 mm x 900 mm), (etalbond® PE 4 mm) - Lateral flange: depth 35 mm, 2 slots - Distance between slots: 700 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 2600	None	0.14 - 1.34	5.96 - 22.02
		2800	None	1.41	23.19
		3000	Buckling of lower horizontal flange	2.01	26.17
1.3.b	Cassettes (LxH = 900 mm x 900 mm), (etalbond® FR 4 mm) - Lateral flange: depth 35 mm, 2 slots - Distance between slots: 700 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 2400	None	0.17 - 1.83	6.50 - 21.26
		2600	None	2.29	23.18
		2800	Significant permanent deflection ($d_p \geq 3$ mm) at centre. Buckling of lower horizontal flange	5.29	27.96
1.4.a	Cassettes (LxH = 900 mm x 900 mm), (etalbond® PE 4 mm) - Lateral flange: depth 35 mm, 3 slots - Distance between slots: 350 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 2800	None	0.08 - 0.82	6.11 - 17.54
		3000	None	2.34	26.92
		3200	Significant permanent deflection ($d_p \geq 3$ mm) at centre. Buckling of lower horizontal flange	3.08	29.26
1.4.b	Cassettes (LxH=900 mm x 900 mm), (etalbond® FR 4 mm) - Lateral flange: depth 35 mm, 3 slots - Distance between slots: 350 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 2200	None	0.06 - 1.46	6.58 - 19.79
		2400	None	2.50	22.87
		2600	Significant permanent deflection ($d_p \geq 3$ mm) at centre. Buckling of lower horizontal flange	3.79	25.81

Table 6: Summary of wind suction resistance results of etalbond® PE/FR Suspended Cassettes. Set 2					
Test specimen		Test Results			
Ref.	Cassettes with double return upper flange, simple return lower and lateral flanges, and with not reinforced slot of width = 14 mm	Load (Pa) (10)	Type of failure (11)	Deflection (mm) (12)	
				Permanent	Instantaneous
2.1	Cassettes (LxH=900 mm x1500 mm), (etalbond® PE 3 mm) - Lateral flange: Depth 35 mm, 4 slots - Distance between slots: 433 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 1000	None	0.16 - 1.12	8.03 - 3.83
		1200	None	2.06	17.18
		1400	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower flange	3.31	20.98
2.2	Cassettes (LxH=900 mm x1500 mm), (etalbond® FR 3 mm) - Lateral flange: Depth 35 mm, 4 slots - Distance between slots: 433 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 1200	None	0.07 - 1.38	6.47 - 14.36
		1400	None	2.32	20.37
		1600	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower flange	3.44	28.78
2.3	Cassettes (LxH=900 mm x1500 mm), (etalbond® PE 4 mm) - Lateral flange: Depth 35 mm, 4 slots - Distance between slots: 433 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 1400	None	0.14 - 1.54	6.57 - 16.86
		1600	None	2.51	20.10
		1800	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower flange	3.71	23.35
2.4	Cassettes (LxH=900 mm x1500 mm), (etalbond® FR 4 mm) - Lateral flange: Depth 35 mm, 4 slots - Distance between slots: 433 mm - Distance between vertical profiles: 920 mm - Distance between brackets: 938 mm	600 - 1600	None	0.23 - 1.83	5.99 - 17.96
		1800	None	2.64	20.93
		2000	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower flange	3.08	24.82

Table 7: Summary of wind suction resistance results of etalbond® PE/FR Suspended Cassettes. Set 3					
Test specimen		Test Results			
Ref.	Cassettes with double return upper flange, simple return lower and lateral flanges and with not reinforced slot width = 14 mm	Load (Pa) (10)	Type of failure (11)	Deflection (mm) (12)	
				Permanent	Instantaneous
3.1	Cassettes (LxH=1400 mm x 2300 mm), (etalbond® PE 4 mm) - Lateral flange: Depth 35 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600	None	0.18	13.85
		800	None	0.69	17.99
		1000	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower flange	4.54	25.93
3.2	Cassettes (LxH=1400 mm x 2300 mm), (etalbond® FR 4 mm) - Lateral flange: Depth 35 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600 - 1000	None	0.12 - 0.68	12.70 - 18.94
		1200	None	1.63	22.57
		1400	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower flange	5.41	29.64
3.3	Cassettes (LxH=1400 mm x2300 mm), (etalbond® PE 6 mm) - Lateral flange: Depth 35 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600 - 1000	None	0.11 - 0.48	11.38 - 17.82
		1200	None	1.19	21.50
		1400	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower horizontal flange	3.14	26.38
3.4	Cassettes (LxH=1400 mm x2300 mm), (etalbond® FR 6 mm) - Lateral flange: Depth 35 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600 - 800	None	0.24 - 0.61	11.04 - 14.82
		1000	None	1.72	19.60
		1200	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower flange	5.61	28.26

Test specimen		Test Results			
Ref.	Cassettes with double return upper flange, simple return lower and lateral flanges and with not reinforced slot width = 14 mm	Load (Pa) ⁽¹⁰⁾	Type of failure ⁽¹¹⁾	Deflection ⁽¹²⁾ (mm)	
				Permanent	Instantaneous
4.1	Cassettes (LxH=900 mm x 2300 mm), (etalbond® PE 4 mm) - Lateral flange: Depth 35 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600 - 1200	None	0.12 - 1.18	6.95 - 15.15
		1400	None	2.04	18.74
		1600	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower horizontal flange	3.58	23.27
4.2	Cassettes (LxH=900 mm x 2300 mm), (etalbond® FR 4 mm) - Lateral flange: Depth 35 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600 - 1400	None	0.07 - 0.98	5.73 - 15.91
		1600	None	2.29	20.08
		1800	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower horizontal flange	3.81	26.60
4.3	Cassettes (LxH=900 mm x 2300 mm), (etalbond® PE 4 mm) - Lateral flange: Depth 50 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600 - 2800	None	0.27 - 2.24	5.96 - 22.60
		3000	None	2.79	24.41
		3200	Significant permanent deflection ($d_p \geq 3$ mm) at centre of lower horizontal flange	3.53	26.52
4.4	Cassettes (LxH=900 mm x 2300 mm), (etalbond® FR 4 mm) - Lateral flange: Depth 50 mm, 5 slots - Distance between slots: 525 mm - Distance between vertical profiles: 963 mm - Distance between brackets: 938 mm	600 - 3000	None	0.08 - 1.40	4.38 - 19.20
		3200	None	1.56	20.58
		3400	None. End of test	2.06	22.18

10

Resistance to horizontal point loads:

It has been assessed according to cl. 2.2.10 of EAD on the kits. Results are shown in Table 9.

PANEL TYPE	Deformation (mm)			Remarks
	Initial loaded 500 N	After 1 minute loaded 500 N	After 1 minute unloaded	
etalbond® PE 3 mm	7,81	7,84	0,04	No reduction of performances on cladding of 3, 4 ,6 mm
etalbond® FR 3 mm	9,61	9,63	0,02	

11

Impact resistance

It has been assessed according to cl. 2.2.11 of EAD on kits cladded with “etalbond® PE and etalbond® FR”. Results and use categories obtained are described below in Table 10. In any case, cladding product presented sharp or cutting edges or surfaces able to cause injury to occupants or people nearby.

IMPACTS		etalbond® PE/FR Riveted Boards		etalbond® PE/FR Suspended Cassettes	
		etalbond® PE	etalbond® FR	etalbond® PE	etalbond® FR
hard body impact	1J	0.5 kg	No deterioration (superficial damage without cracking)		No deterioration (superficial damage without cracking)
	3J	0.5 kg	No deterioration (superficial damage without cracking)		No deterioration (superficial damage without cracking)
	10J	1.0 kg	No deterioration (superficial damage without cracking)		No deterioration (superficial damage without cracking)
soft body impact	10J	3.0 kg	No deterioration (superficial damage without cracking)		No deterioration (superficial damage without cracking)
	60J	3.0 kg	No deterioration (superficial damage without cracking)		No deterioration (superficial damage without cracking)
	300 J	50 kg	No deterioration (significant permanent deflection without cracking)		No deterioration (significant permanent deflection without cracking)
	400 J	50 kg	No deterioration (significant permanent deflection without cracking)		No deterioration (significant permanent deflection without cracking)
Use category		I: A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.		I: A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.	

Remark: Index of mechanical resistances

They have been assessed according to the respective parts of cl. 2.2.12 of EAD, on the relevant components of the applicable kit family, as indexed below, and developed in the following pages:

- Mechanical resistance of the cladding element:
 - 12. Bending strength of cladding element (TMCP): See Durability of this ETA.
 - 13. Resistance of the grooved cladding element: Not applicable for families A and G.
 - 14. Resistance of the cladding element at dowel hole: Not applicable for families A and G.
- Resistance of the connection between the cladding element and the cladding fixing:
 - 15. Pull through resistance (family A): Table 11.
 - 16. Pull through resistance under shear loads (family A): Table 12.
 - 17. Axial resistance: Not applicable for families A and G.
 - 18. Shear load resistance: Not applicable for families A and G.
 - 19. Combined tension and shear load resistance: Not applicable for families A and G.
 - 20. Resistance of slot (family G): Table 13.
- Mechanical resistance of cladding fixing:
 - 21. Resistance to vertical load: Not applicable for families A and G.
 - 22. Pull-through resistance of fixings from profile: Not applicable for families A and G.
 - 23. Resistance of metal clip: Not applicable for families A and G.
- Mechanical resistance of subframe components:
 - 24. Resistance of profiles: Table 14.
 - 25. Tension/pull out resistance of subframe fixings: Table 15.
 - 26. Shear load resistance of subframe fixings: Table 15.
 - 27. Bracket resistance (horizontal and vertical loads): Tables 16 and 17

Table 11: Pull-through resistance of cladding element										
Type of board	Support test ring Ø (mm)	Fixing position	Failure load (N)							Type of failure
			F ₁	F ₂	F ₃	F ₄	F ₅	F _m	F _{u,5}	
etalbond® PE 3 mm	150	Centre	2295,3	2440,2	2323,6	2400,2	2414,7	2375	2230	Punctured board
		Lateral	812	795,8	775,5	794,2	806,4	797	764	None. Board deformation
		Corner	209,9	172	211,6	187,1	214,3	198,98	155,67	None. Board deformed
	250	Centre	2480,9	2403,6	2477,3	2336,4	2666,9	2473	2185	4 rivets broken 1 board punctured
		Lateral	709,1	754,7	709,4	751,6	740,5	733	681	None. Board deformed
		Corner	117	96,1	89,1	98,2	96,2	99	64	None. Board deformed
	350	Centre	2425,8	2441,8	2542,2	1770,3	2414,9	2319	1595	Boards punctured
		Lateral	837,8	752,7	723,9	761,2	733,4	762	657	None. Board deformed
		Corner	121,6	99,7	95	86,6	84,2	97,42	2,33	None. Board deformed
etalbond® FR 3 mm	150	Centre	2316,4	2358,4	2369,5	2449,3	2340,7	2367	2250	4 boards punctured 1 board deformed (none)
		Lateral	948,5	916,8	944,9	793,3	907,6	902	755	None. Board deformed
		Corner	371,8	353,2	392,8	372,7	351,6	368	329	None. Board deformed
	250	Centre	2326,5	2295,4	2251,9	2175,7	2310	2272	2131	4 boards punctured 1 rivets broken
		Lateral	768,8	775,9	714,7	796,8	801,8	772	691	None. Board deformed
		Corner	109,3	125,8	108	117,5	124,1	117	98	None. Board deformed
	350	Centre	2373,2	2316,5	2351,4	2288,8	2332,8	2333	32	4 boards punctured 1 rivets broken
		Lateral	773,9	783,3	773,2	774,7	733,9	768	19	None. Board deformed
		Corner	121,6	99,7	95	86,6	84,2	97,42	14,90	None. Board deformed
etalbond® PE 4 mm	150	Centre	2571,3	2497,8	2420,7	2452,3	2445,2	2477	2339	3 broken rivets, 2 punctured boards
		Lateral	1067,9	1020,1	1079,5	1006,9	1079,9	1051	970	None. Board deformed
		Corner	254,3	282,5	312,7	247,1	312,6	282	209	None. Board deformed
	250	Centre	2680,2	2355,5	2408,1	2622,3	2656,9	2545	2041	Rivets broken
		Lateral	1037,3	1081,6	1012,2	1064,7	1051,4	1049	988	None. Board deformed
		Corner	128,5	112	118,2	113,9	139,4	122	96	None. Board deformed
	350	Centre	2791,6	2224,5	1786,3	2469,8	2835,1	2421	723	Rivets broken
		Lateral	1144,8	1088,4	1093,2	1109,6	1101,8	1108	1055	None. Board deformed
		Corner	114,2	109,5	117,2	134	126,5	120,28	97,29	None. Board deformed
etalbond® FR 4 mm	150	Centre	2420,8	2491,5	2521,2	2525,2	2511,4	2494	2394	4 boards punctured 1 rivets broken
		Lateral	1130	1226,1	1151,1	1134,1	1112,1	1151	1047	None. Board deformed
		Corner	284	272,2	332,1	299,8	314,6	300,54	245,02	None. Board deformed
	250	Centre	2420,3	2583,6	2351,4	1897,8	2576,6	2366	1713	4 boards punctured 1 rivets broken
		Lateral	989,6	1019,2	1030,4	919,1	901,5	972	836	None. Board deformed
		Corner	174,4	162,5	164,8	145,8	145	159	129	None. Board deformed
	350	Centre	2568,6	2521,3	2482,9	2442,6	2555,1	2514	2393	2 boards punctured 3 rivets broken
		Lateral	829,1	902,6	620,1	782,6	830,8	793	547	None. Board deformed
		Corner	88,7	124,5	102	104,4	92,9	102,50	70,16	None. Board deformed

Table 11 (continuation): Pull-through resistance of cladding element										
Type of board	Support test ring Ø (mm)	Fixing position	Failure load (N)							Type of failure
			F ₁	F ₂	F ₃	F ₄	F ₅	F _m	F _{u,5}	
etalbond® PE 6 mm	150	Centre	2725,8	2856,1	2820,7	2889,9	2925,6	2844	2665	Rivet breakage
		Lateral	1369,1	1285,3	1372,5	1338	1376,3	1348	1259	None. Board deformation
		Corner	339,9	267,6	316,2	280,1	273,1	295	191	None. Board deformation
	250	Centre	2843,5	2896,4	2772,1	2233,5	2855,4	2720	1526	Rivet breakage
		Lateral	1414,6	1540	1516,2	1526,4	1480,4	1496	1227	None. Board deformation
		Corner	161,6	138,8	133,2	152,6	133,4	144	64	None. Board deformation
	350	Centre	2760,4	2776,2	2776,6	2940,1	3003,9	2851	2820	2 boards punctured 3 rivets broken
		Lateral	1575,8	1557,7	1545,8	1565,8	1554,9	1560	1534	None. Board deformed
		Corner	145,6	149	147,8	170,4	150,8	152,72	129,27	None. Board deformed
etalbond® FR 6 mm	150	Centre	3121,1	3050,2	3094,1	3035,7	3000,5	3060	2949	4 rivets broken 1 board punctured
		Lateral	1474,6	1455,9	1449,8	1448,6	1407,5	1447,28	1390	None. Board deformation
		Corner	402	361,4	364,3	364,2	421,8	382,74	318,55	None. Board deformation
	250	Centre	3020	2883,7	2991,1	2920,9	2324,1	2828	2160	Rivets broken
		Lateral	921,7	957,4	932,6	934,7	1272,8	1004	652	None. Board deformation
		Corner	171,7	209,6	172,7	197,5	187,4	121	98	None. Board deformation
	350	Centre	2789,4	3043,5	2927,6	2939,1	2956,4	2931	2718	Rivets broken
		Lateral	1217,9	1177,7	1148,7	1255,9	1208	1202	1107	None. Board deformation
		Corner	164,4	144,9	174,2	172,8	163,9	164,04	136,81	None. Board deformation

* Key: F₁₋₅: Individual values. F_m: Mean value. F_{u,5}: Characteristic value (75% confidence that 95% of test results will be higher than this value)

Table 12: Pull-through resistance under shear load											
Type of board		Failure* load (N)									Failure
		F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F _m	F _{u,5}	
etalbond PE 3 mm	Border	3031	3254	3294	3101	3035	3745	3312	3253	2734	Rivets
	Corner	2681	2473	2612	2619	2552	2410	2435	2540	2324	
etalbond PE 4 mm	Border	3280	3824	2983	2988	3424	2054	3463	3145	1964	
	Corner	2865	2761	3024	2941	2603	2254	2846	2756	2213	
etalbond PE 6 mm	Border	3132	3173	2934	3034	2882	2928	3654	3105	2548	
	Corner	2945	2864	2975	2964	2643	3014	3161	2938	2606	
etalbond FR 3 mm	Border	2976	3154	3201	3376	2987	2760	2983	3062	2645	
	Corner	3068	3274	3042	2946	2848	3142	3186	3072	2768	
etalbond FR 3 mm	Border	2893	2878	2954	2943	2986	2786	3042	2926	2752	
	Corner	2806	3041	3052	2963	3047	2978	3021	2987	2804	
etalbond FR 6 mm	Border	3335	3271	3384	3220	3414	2994	3354	3282	2981	
	Corner	3402	3315	3046	3430	3367	3087	3153	3542	3209	

* Key: F₁₋₆=individual value.; F_m=mean value; F_{u,5}= characteristic value (75% confidence that 95% of the test results will be higher than this value).

Table 13: Mechanical fixing resistance of slots									
Type of board	Failure load* (kN)								Remarks
	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F _m	F _{u,5}	
etalbond® PE	3.05	3.15	3.13	2.45	3.15	3.07	3.00	2.30	Breakage of reinforced slot
etalbond® FR	3.19	3.14	3.08	3.28	3.37	3.22	3.21	2.95	

* Key: F₁₋₆: Individual values for reinforced slot from Etalbond® 3 mm. F_m: Mean value. F_{u,5}: Characteristic value (75% confidence that 95% of test results will be higher than this value).

Table 14: Resistance of aluminium profiles ⁽¹³⁾									
Profile	Type	Effective moment of a I _x area (cm ⁴)	E modulus (MPa) (EN 1999 1-1)	Alloy EN AW	Mechanical characteristics (minimum) (EN 755-2)				
					R _m (MPa)	R _{p0,2} (MPa)	A (%)	A _{50mm} (%)	HBW
E-97101 E-97102	Extruded Ω-shape Wing thickness = 2 mm	13.35 37.52	70.000	6063 T6 6060 T66	≥ 175	≥ 130	≥ 8	≥ 6	70
E-97001	Extruded T-shape Wing thickness = 2 mm	10.06			≥ 215	≥ 160	≥ 8	≥ 6	

Table 15: Mechanical data of fixings						
Fixed elements	Description	Geometry		Mechanical properties		
				Class	Characteristic tension load (N)	Characteristic shear load (N)
Bracket – vertical profile	Screw ISO 15480 ST 4,8x19 mm	Ø mm 4,8	L mm 19	50 EN ISO 3506-1	4330	2405
	Blind rivets: 4,8 x 12 A1A/St (code 07P481 ALSS) (Gesipa ref. 6300731)	4,8	12	--	2.700	1.800
	Blind rivets 4,8 x 12 A1/A2 (code 07P481 2AL25) (Gesipa ref. 6320209)				2.700	1.800
	Blind rivets 4,8 x 12 A2/A2 (code 07P481 2A2A25) (Gesipa ref. 6330630)				5.900	4.700
Board - profile	Blind rivet 5 x 14 A1A/St (Gesipa ref. 6324150)	5	14	--	2000	2800

Table 16: Resistance to horizontal load (tension) of brackets			
BRACKETS (Depth of wing perpendicular to substrate)	Results		Remarks
	F _{1d} (daN) ΔL=1mm	F _s (daN) failure	
VARIO Q8 (75mm)	425	No breakage. Purposeless	--
VARIO Q10 (100 mm)	208	No breakage. Purposeless	--
VARIO Q21 (210 mm)	143	No breakage. Purposeless	--

Table 17: Resistance to vertical load (shear) of bracket					
BRACKETS (Depth of wing perpendicular to substrate)	Results				Remarks
	F _r (daN) ΔL=0,2%.L mm	F _{1d} (daN) ΔL=1mm	F _{1d} (daN) ΔL=3mm	F _s (daN) failure	
VARIO Q8 (75mm)	148	225	263	No breakage. Purposeless	--
VARIO Q10 (100 mm)	52	82	106	No breakage. Purposeless	--
VARIO Q21 (210 mm)	23,5	32	47	No breakage. Purposeless	--

(13) EN 755-8:2009: Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties.

- **Basic Work Requirement 5: Protection against noise**

28 Airborne sound insulation

No performance assessed according to cl. 2.2.13 of EAD.

- **Basic Work Requirement 6: Energy economy and heat retention**

29 Thermal resistance

Not relevant as the cladding kit does not include the thermal insulation according to cl.2.2.14 of EAD.

- **Durability**

According to cl. 2.2.15 of EAD, which considers cl. 2.2.15.9 when cladding kits are based on TMCP, the assessment of durability is addressed to applicable characteristics 38 to 55 as described below:

- 30 Hygrothermal behaviour of the kit: Not relevant for the assessed kits
- 31 Behaviour after pulsating loads: See applicable characteristics from §.49 to §.50
- 32 Freeze-thaw resistance: See applicable characteristics from §.41 and §.46
- 33. Behaviour after immersion in water: See applicable characteristics from §.39 and §.40
- 34. Dimension stability: See applicable characteristics from §.38 to §.55
- 35. Chemical and biological resistance: Not relevant for the assessed kits
- 36. UV and radiation resistance: See applicable characteristics at §.53
- 37. Corrosion. Resistance of subframe:

Kit	Type	Alloy EN AW	Protection	Corrosion resistance (Eurocode 9) ⁽¹⁴⁾
etalbond® PE/FR Riveted Boards	Vertical profiles	6063 T6 6060 T66	Raw finished	Durability rating: B
etalbond® PE/FR Suspended Cassettes	Bracket	6063 T6 6060 T66	Raw finished	Durability rating: B

Key: According to chapter 4 Durability of Eurocode 9, under normal atmospheric conditions (e.g. rural, moderate industrial or urban areas), aluminium alloys profiles as listed above can be used without the need for surface protection to avoid loss of bearing capacity. Please contact to ETA holder for further information in case of different atmospheric conditions

38. Decay of delamination resistance after hygrothermal cycles:

PANEL TYPE	Mean value of peeling resistance after ageing		Remarks
	Front sheet	Rear sheet	
etalbond® PE	> 75% Initial value	> 75% Initial value	No cracks, or breakage
etalbond® FR	> 75% Initial value	> 75% Initial value	

39. Decay of delamination resistance after immersion in boiling water 6 h at 90° C:

PANEL TYPE	Mean value of peeling resistance after ageing		Remarks
	Front sheet	Rear sheet	
etalbond® PE	> 75% Initial value	> 75% Initial value	No cracks, or breakage
etalbond® FR	> 75% Initial value	> 75% Initial value	

(14) (Eurocode 9): EN 1999-1-1:2007+A1:2009 Design of aluminium structures. General structural rules. Annex C. Table.C.1. and Table 3.1

40. Decay of delamination resistance after immersion in water 500 h at 20° C:

Table 21: Decay of delamination resistance by peeling test			
PANEL TYPE	Mean value of peeling resistance after ageing		Mean value of peeling resistance after ageing
	Front sheet	Front sheet	
etalbond® PE	> 75% Initial value	> 75% Initial value	No cracks, or breakage
etalbond® FR	> 75% Initial value	> 75% Initial value	

41. Decay of delamination resistance after freeze-thaw cycles:

Table 22: Decay of delamination resistance by peeling test			
PANEL TYPE	Mean value of peeling resistance after ageing		Remarks
	Front sheet	Rear sheet	
etalbond® PE	> 75% Initial value	> 75% Initial value	No cracks, or breakage
etalbond® FR	> 75% Initial value	> 75% Initial value	

42. Decay of delamination resistance after long term exposure to heat (2500 h at hot dry air 80 °C):

Table 23: Decay of delamination resistance by peeling test			
PANEL TYPE	Mean value of peeling resistance after ageing		Remarks
	Front sheet	Rear sheet	
etalbond® PE	> 75% Initial value	> 75% Initial value	No cracks, or breakage
etalbond® FR	> 75% Initial value	> 75% Initial value	

43. Decay of flexural resistance after hygrothermal cycles*:

Table 24: Decay of resistance		
Sample	Mean value after ageing	Remarks
etalbond® PE	> 75% Initial value	No cracks, or breakage

44. Decay of flexural resistance after immersion in boiling water 6 h at 90° C*:

Table 25: Decay of resistance		
Sample	Mean value after ageing	Remarks
etalbond® PE	> 75% Initial value	No cracks, or breakage

45. Decay of flexural resistance after immersion in water 500 h at 20 °C*:

Table 26: Decay of resistance		
Sample	Mean value after ageing	Remarks
etalbond® PE	> 75% Initial value	No cracks, or breakage

46. Decay of flexural resistance after freeze-thaw cycles*:

Table 27: Decay of resistance		
Sample	Mean value after ageing	Remarks
etalbond® PE	> 75% Initial value	No cracks, or breakage

47. Decay of flexural resistance after long term exposure to heat (2500 h at hot dry air 80 °C)*:

Table 28: Decay of resistance		
Sample	Mean value after ageing	Remarks
etalbond® PE	> 75% Initial value	No cracks, or breakage

*Characteristics not applicable to panel etalbond® FR

48. Decay of flexural stiffness after short term exposure to heat (1 h. +80 °C):

Table 29: Decay of delamination resistance by peeling test		
PANEL TYPE	Mean value of decay of flexural stiffness (Increase of deflection at centre of van)	Remarks
	Front sheet	
etalbond® PE	< 1.25 x Initial value	No cracks, breakage or delamination
etalbond® FR	< 1.25 x Initial value	

49. Decay of resistance of routed and returned edge after TPB pulsating loads flexural test:

Table 30: Decay of resistance to TPB pulsating loads flexural test			
Characteristic	PANEL TYPE	Load (N)	Remarks
		Aged characteristic force $F_{u,5}$ *	
TPB test Flexural pull out pulsating loads	etalbond® PE	> 75% Initial value*	No cracks, breakage or delamination
	etalbond® FR	> 75% Initial value*	No cracks, breakage or delamination

50. Decay of resistance to slot and its fixing device after pull-out pulsating loads:

Table 31: Decay of resistance to pull out pulsating loads			
Characteristic	PANEL TYPE	Load (N)	Remarks
		Aged characteristic force $F_{u,5}$ *	
Reinforced slot	etalbond® PE	> 75% Initial value*	No cracks, breakage or delamination
	etalbond® FR	> 75% Initial value*	No cracks, breakage or delamination

* Key: $F_{u,5}$. Characteristic value (75% confidence that 95% of the test results will be higher than this value).
Reinforced slot from etalbond® panels (3 - 6mm) with 2 mm thick aluminium sheet

51. Corrosion infiltration after exposure to spray salt:

Table 32: Corrosion resistance of cladding element made of coil coated aluminium		
Component		Corrosion resistance
Cladding material	Material	
Etalbond metallic	PVDF 27-35 microns	Satisfactory *

* Key: Equivalent to a corrosion resistance index 3 according to EN 1396: Aluminium and aluminium alloys. Coil coated sheet and strip for general applications. Specifications.

52. Resistance to humidity:

Table 33: Corrosion resistance of cladding element made of coil coated aluminium (exposure to humidity)		
Component		Blistering
Cladding material	Material	
etalbond® etalbond® FR	PVDF	No defects after 500 and 1000 h*

* Key: Index 3 according to EN 1396:2015.: Aluminium and aluminium alloys. Coil coated sheet and strip for general applications. Specifications

53 Retention of bright and colour:

Table 34: Retention of bright (gloss units)					
Colour	Comercial ref.	Humidity	UVB & water 1500 h	Heat	Remarks
Metalized	Silver metallic	Gloss _{AGED} ≥ 0.8 Gloss _{INI}	Gloss _{AGED} ≥ 0.8 Gloss _{INI}	Gloss _{AGED} ≥ 0.8 Gloss _{INI}	OK

Table 35: Retention of Colour ΔE					
Colour	Comercial ref.	Humidity	UVB & water 1500 h	Heat	Remarks
Metalized	Silver metallic	--	--	--	Not required

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

4.1 System of assessment and verification of constancy of performances

According to the decision 2003/640/EC of the European Commission ⁽¹⁵⁾ the system of assessment and verification of constancy of performances (see Annex V to Regulation (EU) No 305/2011) given in the following Table applies:

Table 36: System AVCP applied			
Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
etalbond® PE Riveted Boards etalbond® PE Suspended Cassettes	kits for external wall claddings	All / any	2+
etalbond® FR Riveted Boards etalbond® FR Suspended Cassettes	kits for external wall claddings	All / any	1

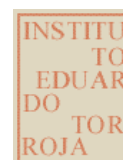
5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

The ETA is issued for the kits on the basis of agreed data / information which identify the products that have been assessed and judged. Detailed description and conditions of the manufacturing process of the kits, and all the relevant design and installation criteria of the kits are specified in the manufacturer's technical documentation deposited with the IETcc. It is the manufacturer's responsibility to make sure that all those who use the kits are appropriately informed of specific conditions according to sections 1, 2, 4 and 5 and including the annexes of this ETA.



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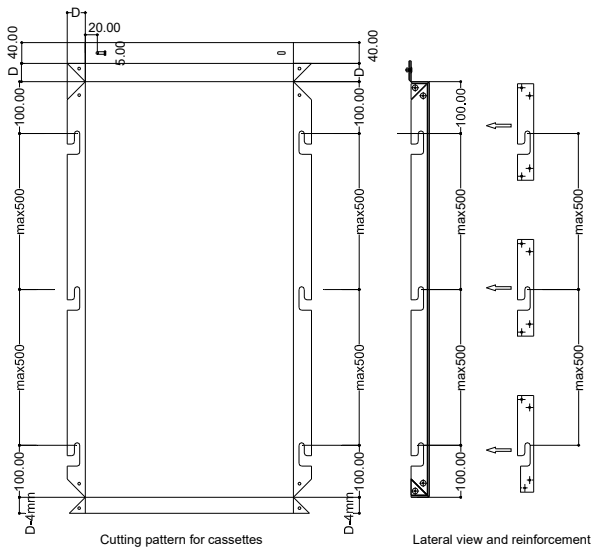


On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja
Madrid, 30th December 2020

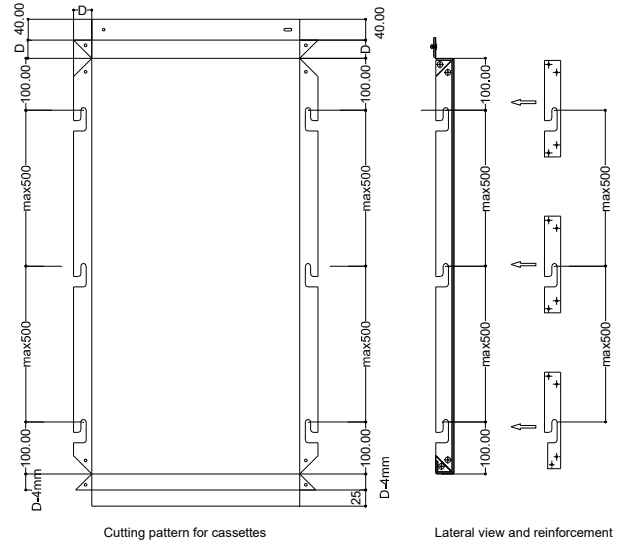
Director

(15) Published in the Official Journal of the European Union (OJEU) L226/21 of 10.09.2003. See www.new.eur-lex.europa.eu/oj/direct-access.html

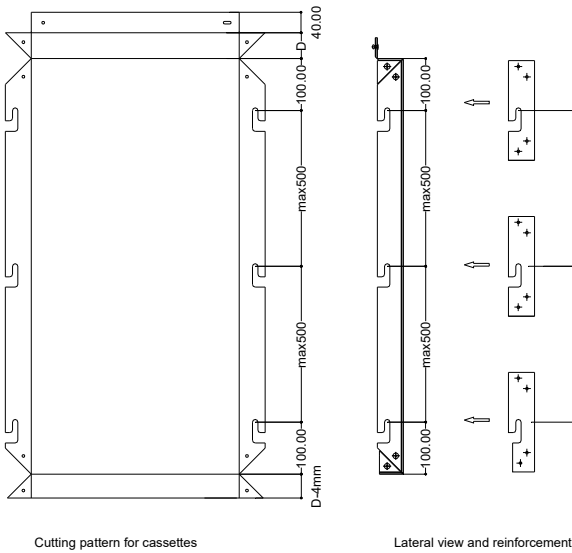
Annex A: General schemes



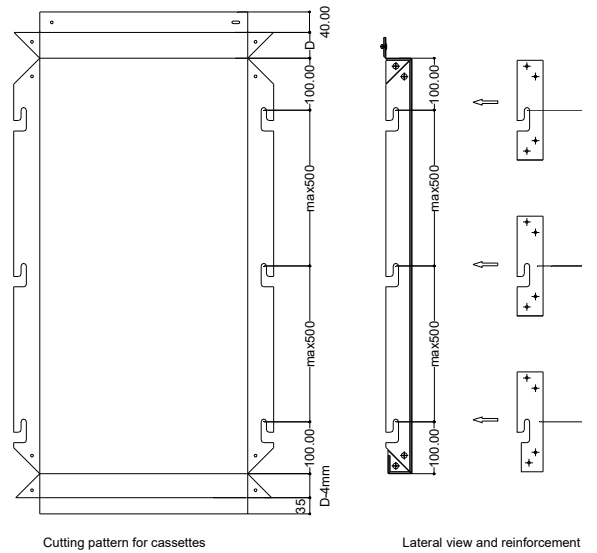
SINGLE FOLDED CASSETTE D=35



DOUBLE FOLDED CASSETTE D=35



SINGLE FOLDED CASSETTE D=50



DOUBLE FOLDED CASSETTE D=50

Fig. 1: Examples of cassettes for etalbond® PE/FR Suspended Cassettes.

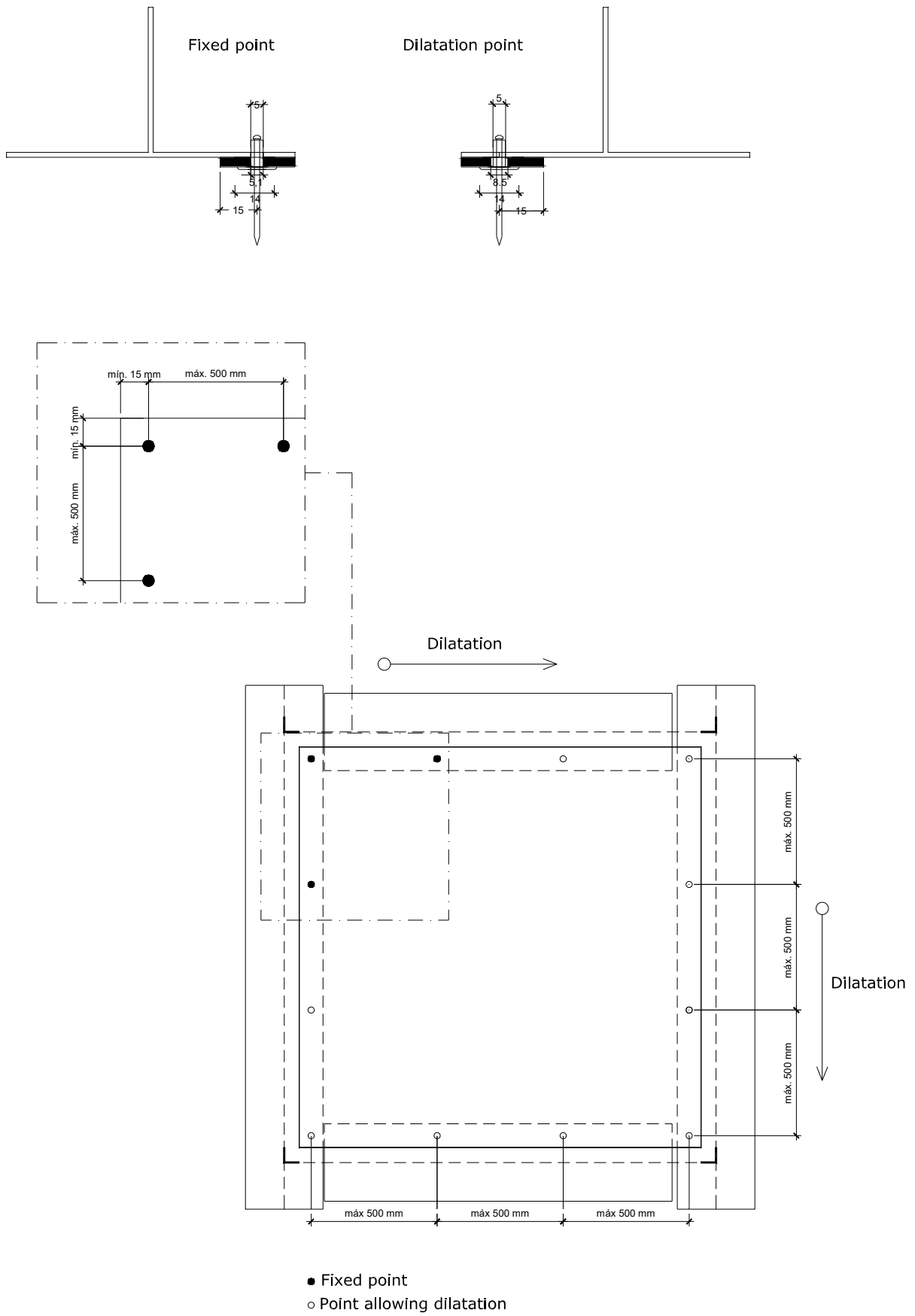


Fig. 2: Details and example of riveting for etalbond® PE/FR Riveted Boards.

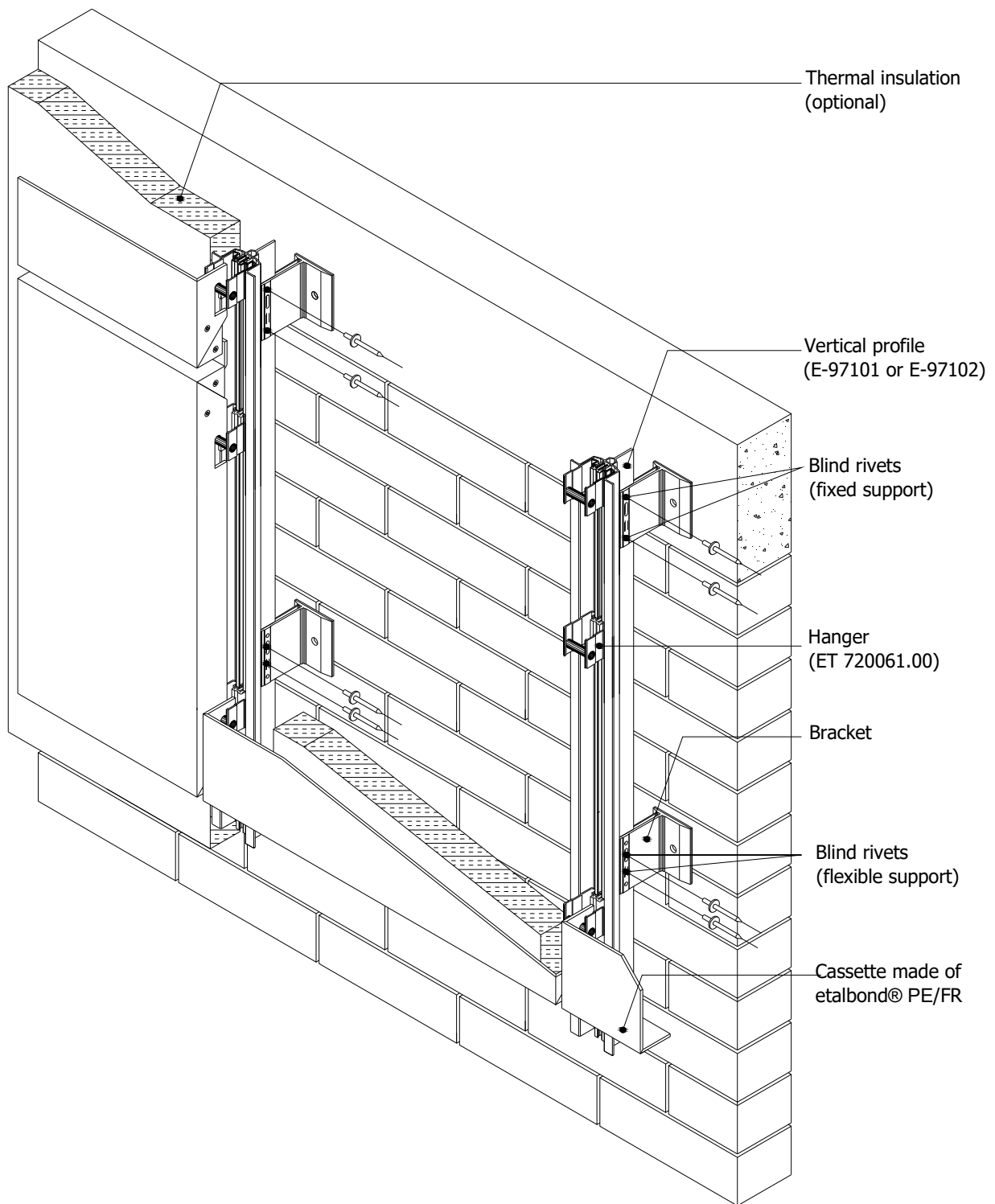


Fig. 3: General view of an example of etalbond® PE/FR Suspended Cassettes

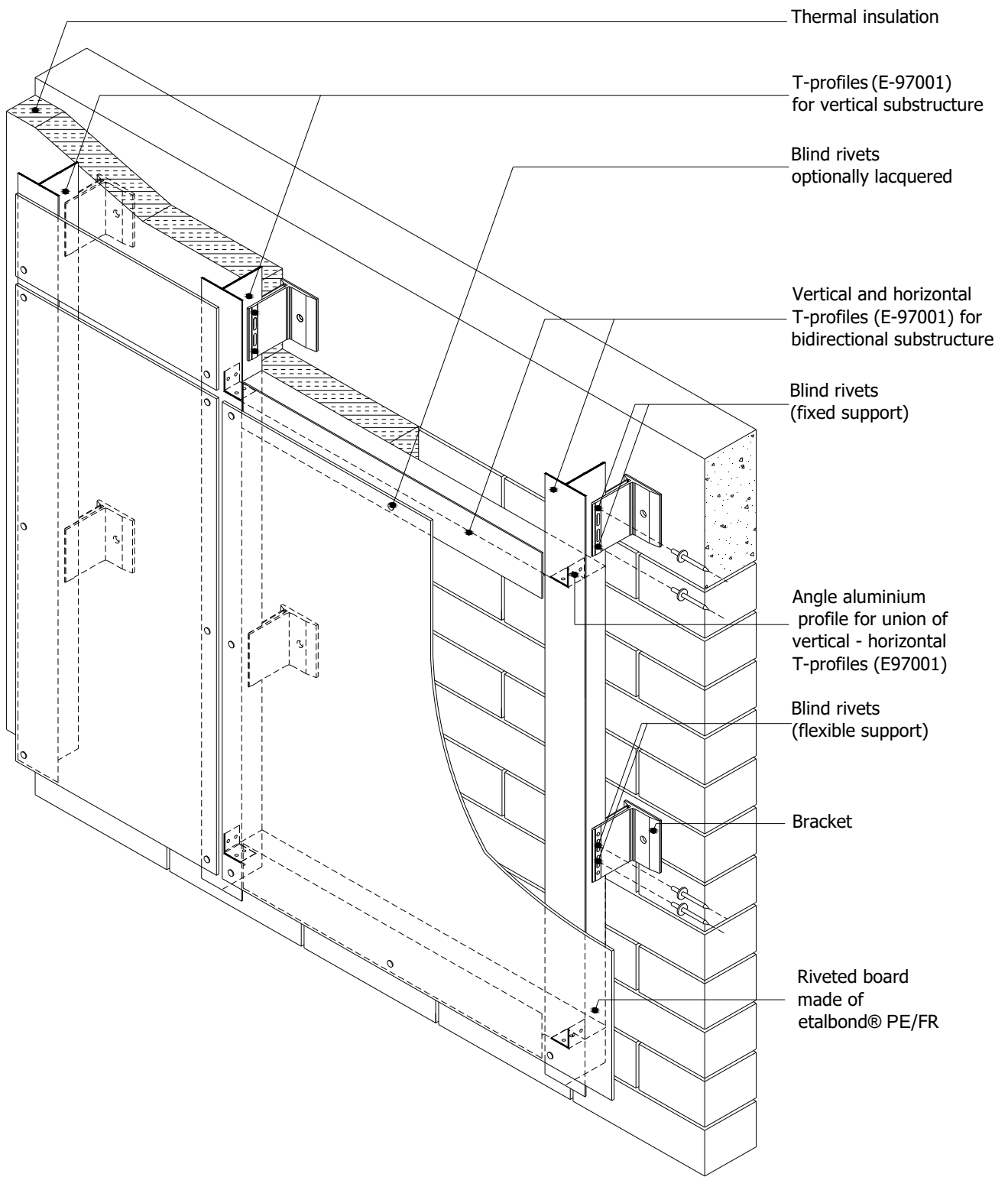


Fig. 4: General view of examples of etalbond® PE/FR Riveted Boards (Left: Unidirectional subframe. Right: Bidirectional subframe)

Annex B: Complementary physical and mechanical data of cladding kit elements

TMCP	Material	Characteristics	Value
etalbond® FR	Removable protection film	Aspect: Thickness (µm):	White and blue 70
	Coating layer (coloured PVDF)	Thickness (µm) PVDF-3 (70/30) Thickness (µm) PVDF-2 (70/30)	32 (± 3) 30 (± 3)
	External sheet of alloyed aluminium EN AW 3105 H44	Thickness (mm): Linear thermal expansion coefficient (K ⁻¹):	0.5 23 x 10 ⁻⁶
	Core of low density polyethylene plus mineral compounds	Aspect: Thickness (mm):	-- 2, 3 or 5
	External sheet of alloyed aluminium EN AW 3105 H44	Thickness (mm): Linear thermal expansion coefficient (K ⁻¹):	0.5 23 x 10 ⁻⁶
	Coating layer (primer)	Thickness (µm):	5 (± 2)
	etalbond® PE	Removable protection film	Aspect: Thickness (µm):
Coating layer (coloured PVDF)		Thickness (µm) PVDF-3 (70/30) Thickness (µm) PVDF-2 (70/30)	32 (± 3) 30 (± 3)
External sheet of alloyed aluminium EN AW 3105 H44		Thickness (mm): Linear thermal expansion coefficient (K ⁻¹):	0.5 23 x 10 ⁻⁶
Core of low density polyethylene		Aspect: Thickness (mm):	Black 2, 3 or 5
External sheet of alloyed aluminium EN AW 3105 H44		Thickness (mm): Linear thermal expansion coefficient (K ⁻¹):	0.5 23 x 10 ⁻⁶
Coating layer (primer)		Thickness (µm):	5 (± 2)

TMCP	Material	Characteristic	Value
etalbond® PE etalbond® FR (thickness 3,4 6 mm)	Alloyed aluminium sheet EN AW 3105 H44 (EN 1396)	E Modulus (MPa)	70 000
		Tensile strength R _m (MPa)	≥ 150
		Yield strength R _{p 0,2} (MPa)	≥ 120
		Elongation A ₅₀ (%)	≥ 3
	Peeling resistance between sheet (external or rear) and core (N.mm/mm) (standard test procedure: ASTM D 1781-98 carried out on TMCP thickness ≥ 3 mm)		

Brackets Type	Material	E modulus (MPa) (EN 1999-1-1)	Mechanical characteristics (EN 755-2)				
			R _m (MPa)	R _{p 0,2} (MPa)	A _{50mm} (%)	Coef. thermal expansion (K ⁻¹)	HBW
From VARIO Q8 to VARIO Q21	Allied aluminium 6063 T6 6060 T66	70.000	≥ 175 ≥ 215	≥ 130 ≥ 160	≥ 6 ≥ 6	23 x 10 ⁻⁶	70 75

Annex C: Confidential information

This confidential information and is not included in the European Technical Assessment when that assessment is publicly available:

- C.1. Quality control of components of kits manufactured by suppliers or ETA holder.