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European Technical Assessment

**ETA 15/0916
of 24/08/2024**

English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the European Technical Assessment:

Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)

Trade name of the construction product

FRONTEK PLUS and
FRONTEK OMEGA PLUS

Product family to which the construction product belongs

Kit for external wall claddings mechanically fixed

Manufacturer

GRUPO GRECO GRES INTERNACIONAL, S.L.
Avda. Castilla La Mancha, 1.
45240 ALAMEDA DE LA SAGRA
(Toledo) España
website: www.grecogres.com

Manufacturing plant(s)

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Avda. Castilla La Mancha, 1.
45240 ALAMEDA DE LA SAGRA
(Toledo) España

This European Technical Assessment contains

21 pages including 4 Annexes, which form an
integral part of this assessment. Annex D 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

EAD 090062-01-0404. Ed. October 2021.
Kits for external wall claddings mechanically fixed.

This version replaces

ETA 15/0916 (version 1) of 23/11/2015

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SPECIFIC PART

1. Technical description of the product

The assessed kits⁽¹⁾ for ventilated external wall claddings mechanically fixed in ventilated façades "FRONTEK PLUS" and "FRONTEK OMEGA PLUS" are classified as family C, according to the EAD 090062-01-0404: *Kit for external wall claddings mechanically fixed*, edition October 2021 (hereinafter EAD).

The kit components are defined in table 1.1; they are factory produced by the ETA holder or a supplier.

TABLE 1.1 – DEFINITION OF THE KIT COMPONENTS					
Generic components		FRONTEK PLUS Horizontal (Family C)	FRONTEK PLUS Vertical (Family C)	FRONTEK OMEGA PLUS (Family C)	Technical description in
Cladding elements		Ceramic plates FRONTEK ⁽²⁾ produced by GRUPO GRECO GRES INTERNACIONAL, S.L. Extruded porcelain stoneware.		Ceramic plates FRONTEK OMEGA ⁽³⁾ produced by GRUPO GRECO GRES INTERNACIONAL, S.L. Extruded porcelain stoneware.	Annex A
Cladding fixings Elements used to secure the cladding plates to the subframe ⁽⁴⁾	Clips	Stainless steel A2 (AISI 304)			Annex B
	Screws Clips to Vertical profile	Self-drilling Screws A2 Stainless steel Ø 4,2 L=13			
Subframe Intermediate assembly used as load transmission between Cladding elements and the substrate ⁽⁵⁾	Vertical profiles ⁽⁶⁾	T profile Extruded aluminium ⁽⁷⁾			
	Brackets ⁽⁸⁾	L bracket Extruded aluminium			
	Screws Vertical profile to Brackets	Self-drilling Screws A2 Stainless steel Ø 5,5 L=22			
Auxiliary components	Anchorage to substrate	Not assessed, anchorages have to be defined according to the substrate material and the resistance requires due to the envisages actions			Annex C

2. Specification of the intended use in accordance with the applicable EAD

2.1 Intended use

FRONTEK PLUS and FRONTEK OMEGA PLUS kits are intended to be used for ventilated external wall claddings which can be fixed to the external wall of new or existing buildings. An insulation layer is usually fixed on the external wall.

The substrate walls are made of masonry (bricks or blocks), concrete (cast on site or as prefabricated panels), timber or metal frame. Insulation material is defined in accordance with an EN standard or an ETA and is not manufactured by GRUPO GRECOGRES INTERNACIONAL, S.L.

The kit for ventilated external wall claddings is non-load-bearing construction system. It does not contribute to the stability of the wall on which is installed, neither to ensure the air tightness of the building structure but it 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 kit

The provisions made in this European Technical Approval are based on an assumed working life of 25 years as minimum, provided that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met.

(1) "Kit" means a construction product placed on the market by a single manufacturer as set of at least two separate components that need to be put together to be incorporated in the construction work (Art. 2 n.º 2 CPR n.º 305/2011)

(2) Dimensional features, physical – mechanical properties in Annex A and Geometric features in figure 2.

(3) Dimensional features, physical – mechanical properties in Annex A and Geometric features in figure 2.

(4) Geometric features in figure 3.

(5) Not manufactured by GRUPO GRECOGRES INTERNACIONAL, S.L.

(6) Geometric and mechanical features in Annex B and figure 4.

(7) Physical and mechanical properties in Annex B.

(8) Geometric and mechanical features in Annex B and figures 5.1 and 5.2.



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 means for choosing the right product in relation to the expected economically reasonable working life of the works.

2.3 Design of the kit

The design of the external wall cladding system for ventilated façade using the “FRONTEK PLUS” and “FRONTEK OMEGA PLUS” kits should take into account:

- The substrate material to define the suitable anchorages, assuming that the substrate meets the mechanical requirements (resistance to static and dynamic actions) and ensures airtightness, watertightness and water vapour permeability.
- The mechanical characteristic values of the kit components (e.g. cladding elements, cladding fixings and subframe) and the cladding or external wall elements in order to resist the actions (dead loads, wind loads, etc.) applying on the specific work. National safety factor must be used.
- The possible movements of the substrate and the position of the building expansion joints.
- The dilation of the kit components and of the plates.
- The category of corrosivity of the atmosphere of the works ⁽⁹⁾.
- Because joints are not watertight, materials with low water absorption must compose the first layer behind ventilated air space.
- Insulation layer, usually fixed on the external wall should be defined in accordance with a harmonized standard or a European technical assessment.
- The construction of façade specific parts (e.g. base, top, corners, windows etc.)
- If the entire building must comply with the specific building regulations, particularly concerning fire and wind-load resistances of the Member State where the work is to be built.

2.4 Installation of the kit in works

Installation should be carried out according to the ETA holder's specifications and using the specific kit components, 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 kit components includes inspections on site, taking into account the following aspects:

- Regarding the tiles: appearance of any damage such as cracking 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.

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

The assessment of “FRONTEK PLUS” and “FRONTEK OMEGA PLUS” kits for fastening cladding and external wall elements according to the Basic Work Requirements (BWR) was carried out in compliance with the EAD 090062-01-0404. The characteristics of the components shall correspond to the respective values laid down in the technical documentation of this ETA, checked by IETcc. In table 3.1 a summary of “FRONTEK PLUS” and “FRONTEK OMEGA PLUS” kits performance.

(9) (E.g. See table 1 of Standard EN ISO 12944-2: 1998. Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments.



TABLE 3.1 – SUMMARY OF “FRONTEK PLUS” and “FRONTEK OMEGA PLUS” kits PERFORMANCE						
Basic Works Requirement	Nº	Essential characteristic		ETA section	Performance	
BWR 2 Safety in case of fire	1	Reaction to fire		3.1	A1	
	2	Façade fire performance		--	Not assessed	
	3	Propensity to undergo continuous smouldering		--	Not relevant (thermal insulation is not a kit component)	
BWR 3 Hygiene, health and the environment	4	Watertightness of joints (protection against driving rain)		3.2	Not watertight (open joints)	
	5	Water absorption		--	Not relevant (use in ventilated façades)	
	6	Water vapour permeability		--	Not relevant (use in ventilated façades)	
	7	Drainability		3.3	See figures 6.1, 6.2, 7.1, 7.2, 8.1, 8.2, 9, 10.1 and 10.2.	
	8	Content and/or release of dangerous substances		--	Not assessed	
BWR 4 Safety and accessibility in use	9	Wind load resistance		3.4	FRONTEK PLUS horizontal up to 1000 x 400, 4 clips	3200 Pa
	FRONTEK PLUS horizontal up to 1200 x 600, 4 clips				2600 Pa	
	FRONTEK PLUS horizontal up to 1800 x 600, 6 clips				2800 Pa	
	FRONTEK PLUS vertical up to 1000 x 400, 4 clips				3200 Pa	
	FRONTEK PLUS vertical up to 1200 x 600, 4 clips				2600 Pa	
	FRONTEK PLUS vertical up to 1800 x 600, 6 clips				2600 Pa	
	FRONTEK OMEGA PLUS up to 1000 x 307, 4 clips				4000 Pa	
	FRONTEK OMEGA PLUS up to 1200 x 307, 4 clips				3900 Pa	
	10	Resistance to horizontal point loads		--	Not assessed	
	11	Impact resistance		3.5	Category IV	
	12	Mechanical resistance of cladding elements	Bending strength of cladding element	3.6	FRONTEK	≥ 28 N/mm²
	FRONTEK OMEGA		≥ 25 N/mm²			
	13		Resistance of grooved cladding element	3.7	FRONTEK PLUS horizontal (GROOVE)	0.39 kN
					FRONTEK PLUS vertical (HOLE)	0.38 kN
		FRONTEK OMEGA PLUS			0.19 kN	
	21	Mechanical resistance of cladding fixing	Resistance to vertical load	3.8	See § 3.8	
	Pull-through resistance of fixings from horizontal profile		--	Not assessed		
	Resistance of metal clip		--	Not assessed		
	24	Mechanical resistance of profiles		3.9	See § 3.9	
	25	Mechanical resistance of subframe fixing	Tension/pull-out resistance	--	Not assessed	
	26		Shear load resistance			
	27	Bracket mechanical resistance (horizontal and vertical load)		3.10	See tables 3.10.1 and 3.10.2	
	28	Resistance to seismic loads. Out-of-plane fundamental vibration period and acceleration. In-plane displacement.		--	Not assessed	
	BWR 5 Protection against noise	29	Airborne sound insulation		--	Not assessed
BWR 6 Energy economy and heat retention	30	Thermal resistance		--	Thermal insulation is not a kit component	
Durability	31	Hygrothermal behaviour		3.11	See § 3.11	
	32	Behaviour after pulsating load		--	Not assessed	
	33	Freeze-thaw resistance of cladding element		--	Not assessed	
	34	Behaviour after immersion in water of cladding element		--	Not assessed	
	35	Dimensional stability	by humidity	3.12	See § 3.12	
			by temperature			
	36	Chemical and biological resistance of the cladding elements		--	Not assessed	
	37	UV radiation resistance of the cladding elements		--	Not assessed	
38	Corrosion of metal components		3.13	See § 3.13		



3.1 Reaction to fire – BWR 2

Reaction to fire of the whole kit according to Commission Delegated Regulation (EU) 2016/364 and EN 13501-1 is:

Class A1 without need of testing according to Decision 96/603/EC as amended.

This classification is valid if the insulation layer placed in the ventilated air space is made of a non-combustible material (e.g. mineral wool) or if the layer behind the cladding elements is a mineral substrate like masonry or concrete (A1).

In other cases, the class of reaction to fire has not been assessed.

A European reference fire scenario has not been laid down for facades. In some Member States, the classification of external wall cladding kits according to Standard EN 13501-1 might not be sufficient for the use in facades. An additional assessment of the system 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.

3.2 Watertightness of joints (protection against driving rain) – BWR 3

Joints between the cladding elements in the external wall claddings for ventilated façades are open, therefore “FRONTEK PLUS” and “FRONTEK OMEGA PLUS” kits are not watertight.

3.3 Drainability – BWR 3

On the basis of the construction details (see figures 6.1, 6.2, 7.1, 7.2, 8.1, 8.2, 9, 10.1 and 10.2) the available technical knowledge, experience and the installation criteria, it is considered that the water which penetrates into the air space or the condensation water can be drained out from the cladding without accumulation or moisture damage or leakage into the substrate.

3.4 Wind load resistance – BWR 4

Wind load resistance has been assessed for each type of kit (see table 1.1) with the weakest mechanically configuration (worst case) according to the resistance values of the main components and main connexions given in clauses 3.6 to 3.9). Table 3.4.1 indicates the maximum wind load resistance, Q , in $[kN/m^2]$ for each type of kit

TABLE 3.4.1: MAXIMUM WIND LOAD RESISTANCE		
TYPE OF KIT	CONFIGURATION	MAXIMUM WIND LOAD RESISTANCE Q $[kN/m^2]$
FRONTEK PLUS Horizontal	Any configuration with cladding elements FRONTEK $L \leq 1000$, $H \leq 400$ and 4 clips for each cladding element Vertical profile distance $D \leq 1000$	3.2
	Any configuration with cladding elements FRONTEK $1000 < L \leq 1200$, $400 < H \leq 600$ and 4 clips for each cladding element Vertical profile distance $1000 < D \leq 1200$	2.6
	Any configuration with cladding elements FRONTEK $1200 < L \leq 1800$, $400 \leq H \leq 600$ and 6 clips for each cladding element Extra vertical profile in the middle of the cladding element	2.8
FRONTEK PLUS Vertical	Any configuration with cladding elements FRONTEK $L \leq 1000$, $H \leq 400$ and 4 clips for each cladding element Vertical profile distance $D \leq 400$	3.2
	Any configuration with cladding elements FRONTEK $1000 < L \leq 1200$, $400 < H \leq 600$ and 4 clips for each cladding element Vertical profile distance $400 < D \leq 600$	2.6
	Any configuration with cladding elements FRONTEK $1200 < L \leq 1800$, $400 \leq H \leq 600$ and 6 clips for each cladding element Vertical profile distance $400 < D \leq 600$	
FRONTEK OMEGA PLUS	Any configuration with cladding elements FRONTEK OMEGA $L \leq 1000$	4
	Any configuration with cladding elements FRONTEK OMEGA $L \leq 1200$	3.9

Besides, wind load resistance has been tested, according to § 2.2.9 and the method specified in Annex E of EAD, for different cases depending on the type of kit considered. The kit behaviour exposed to wind pressure is 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.

The worst cases have been tested: minimum thickness, maximum width and maximum separation between cladding fixings and subframe components. Test results are given in table 3.4.2. For other



assembled systems, wind load resistance obtained by calculation on the basis of the mechanical resistance of the kit components should not be higher than the maximum load given in table 3.4.1.

TABLE 3.4.2: WIND SUCTION TEST RESULT			
TEST SPECIMEN ⁽¹⁰⁾	MAXIMUM LOAD Q (Pa)	DISPLACEMENT UNDER MAXIMUM LOAD [DEFLECTION AFTER 1 MIN RECOVERY] (mm)	TYPE OF FAILURE
a. FRONTEK PLUS horizontal – 1000 x 400	3200	8.92 (3.02)	None ⁽¹¹⁾
b. FRONTEK PLUS horizontal – 1200 x 600	2600	8.20 (1.95)	Crack in groove and fixing deformation.
c. FRONTEK PLUS horizontal – 1800 x 600	2800	12.19 (4.17)	Crack in groove
d. FRONTEK PLUS vertical – 1000 x 400	3200	4.18 (0.12)	None ⁽¹²⁾
e. FRONTEK PLUS vertical – 1200 x 600	2600	10.02 (3.05)	Crack in the hole of the plate
f. FRONTEK PLUS vertical – 1800 x 600	2600	8.50 (2.80)	Crack in the hole of the plate
g. FRONTEK OMEGA PLUS – 1000 x 307	4000 ⁽¹³⁾	4.13 (1.26)	None
h. FRONTEK OMEGA PLUS – 1200 x 307	4000 ⁽¹⁴⁾	7.99 (1.77)	None
a. Test specimen: Horizontal config. – Cladding elements FRONTEK – 1000mm x 400mm x 19.5mm, 4 stainless steel clips for each plate, maximum distance between vertical profiles according to the plate format – 1000mm, vertical distance between brackets – 1000mm			
b. Test specimen: Horizontal config. – Cladding elements FRONTEK – 1200mm x 600mm x 19.5mm, 4 stainless steel clips for each plate, maximum distance between vertical profiles according to the plate format – 1200mm, vertical distance between brackets – 1100mm			
c. Test specimen: Horizontal config. – Cladding elements FRONTEK – 1800mm x 600mm x 19.5mm, 6 stainless steel clips for each plate, distance between vertical profiles – 900mm, vertical distance between brackets – 1100mm			
d. Test specimen: Vertical config. – Cladding elements FRONTEK – 1000mm x 400mm x 19.5mm, 4 stainless steel clips for each plate, maximum distance between vertical profiles according to the plate format – 400mm, vertical distance between brackets – 1000mm			
e. Test specimen: Vertical config. – Cladding elements FRONTEK – 1200mm x 600mm x 19.5mm, 4 stainless steel clips for each plate, maximum distance between vertical profiles according to the plate format – 600mm, vertical distance between brackets – 1100mm			
f. Test specimen: Vertical config. – Cladding elements FRONTEK – 1800mm x 600mm x 19.5mm, 6 stainless steel clips for each plate, distance between vertical profiles – 600mm, vertical distance between brackets – 1100mm			
g. Test specimen: Cladding elements FRONTEK OMEGA – 1000mm x 307mm x 20mm, 4 stainless steel clips for each plate, maximum distance between vertical profiles according to the plate format – 1000mm, vertical distance between brackets – 1000mm			
h. Test specimen: Cladding elements FRONTEK OMEGA – 1200mm x 307mm x 19.5mm, 4 stainless steel clips for each plate, maximum distance between vertical profiles according to the plate format – 1200mm, vertical distance between brackets – 1100mm			

3.5 Impact resistance – BWR 4

Impact resistance has been assessed according to § 2.2.11 and the method specified in Annex G of EAD.

According with the test results the degree of exposure according to use category defined in table G.3.1 in clause G.3 of Annex G of “FRONTEK PLUS” and “FRONTEK OMEGA PLUS” kits for vertical exterior wall claddings is the Category IV. Therefore, these kits can be used in zone out of reach from ground level in which the risk to be hit by a thrown object is very low because the height of the kit limit the size of the impact (e.g., high façade levels in buildings, not including the subsequent above ground level or the façade base. Cleaning gondolas should not be used on the facade).

3.6 Bending strength of cladding element – BWR 4

Bending strength of the cladding element has been tested according to EN 10545-4: 2019.

Mean and characteristic values of test are indicated in table 3.6.1.

TABLE 3.6.1 – BENDING STRENGTH OF CLADDING ELEMENT MEAN AND CHARACTERISTIC VALUES		
TEST SPECIMEN DIMENSIONS (mm)	FAILURE LOAD (N)	MOR (MPa)
	Mean value	Mean value
FRONTEK PLUS 1000 x 400 x 19.5	3534.60	36.36
FRONTEK PLUS 1800 x 400 x 19.5	1529.67	28.58
FRONTEK OMEGA PLUS 1000 x 307 x 20	3149.87	42.10
FRONTEK OMEGA PLUS 1200 x 307 x 20	1591.50	25.61

(10) Characteristics of component are indicated in Annex A and B.

(11) The test had to be stopped at 3400Pa because the equipment did not achieve stabilization. No failure occurs.

(12) The test had to be stopped at 3400Pa because the equipment did not achieve stabilization. No failure occurs.

(13) Test equipment limit. No failure occurs.

(14) Test equipment limit. No failure occurs.



3.7 Resistance of grooved cladding element – BWR 4

Resistance of grooved cladding element has been tested according to § 2.2.12.2 and the method specified in Annex H of EAD.

Tests results are indicated in table 3.7.1.

TABLE 3.7.1: RESISTANCE OF GROOVED CLADDING ELEMENT TEST RESULT			
TEST SPECIMEN	FAILURE LOAD (N)		FAILURE MODE
	F _m	F _{u,s}	
FRONTEK PLUS Horizontal (GROOVE)	463	387	Deformation of clip
FRONTEK PLUS Vertical (HOLE)	464	374	Crack of the cladding element Clip deformation ≤ 1mm
FRONTEK OMEGA PLUS	362	195	Deformation of clip

3.8 Resistance to vertical load – BWR 4

Resistance to vertical load has been tested according to § 2.2.12.11 and the method specified in section J.1 of Annex J of EAD.

After two measurements in one subsequent hour the increment of displacement was less than 0,1mm.

3.9 Mechanical resistance of profiles – BWR 4

The following characteristics of the profiles are given in Annex B:

- Form and dimensions of profiles sections.
- Inertia of profiles sections.

3.10 Bracket mechanical resistance (horizontal and vertical load) – BWR 4

Resistance of the brackets and their fixings under tension and shear loads was assessed by calculation using the specifications defined in § 2.2.12.17 and annex L of EAD.

The calculation results are indicated in table 3.10.1 and 3.10.2.

TABLE 3.10.1: RESISTANCE TO VERTICAL LOAD OF BRACKETS – CALCULATION RESULT				
BRACKETS DIMENSIONS (e=3mm)	F _r (N) ΔL=0.2% de L	F _{td} (N) ΔL=1mm	F _{sd} (N) ΔL=3mm	F _u (N) failure
50 x 60 x 123	2600	2700	4200	Purposeless
50 x 80 x 123	1750	1550	2700	Purposeless
50 x 120 x 123	1050	700	1450	Purposeless
50 x 150 x 123	750	450	1000	Purposeless

TABLE 3.10.2: RESISTANCE TO HORIZONTAL LOAD OF BRACKETS – CALCULATION RESULT		
BRACKETS DIMENSIONS	F _c (N) ΔL=1mm	F _u (N) Failure
50 x 60 x 60	1700	Purposeless
50 x 80 x 60	1600	Purposeless
50 x 120 x 60	1490	Purposeless
50 x 150 x 60	1400	Purposeless
50 x 60 x 123	3100	Purposeless
50 x 80 x 123	2950	Purposeless
50 x 120 x 123	2700	Purposeless
50 x 150 x 123	2600	Purposeless

3.11 Hygrothermal behaviour – Durability

Hygrothermal behaviour test has been carried out according to the method indicated in § 2.2.15.1 and section M.1 of annex M of EAD.

During the test cycles, none of the following defects occurs:

- deterioration such as cracking or delamination of the cladding element that allows water penetration to the insulation



- detachment of the cladding element
- Irreversible deformation

This system is therefore assessed as resistant to hygrothermal cycles.

The joint in "FRONTEK PLUS" and in "FRONTEK OMEGA PLUS" kits are not watertight so the insulation layer shall be made of EPS to EN 13163, XPS to EN 13164, PUR to EN 13165, phenolic foam to EN 13166 or mineral wool to EN 13162 (WS or WL(P), depending on the national regulations.

3.12 Dimensional stability – Durability

The tabulated values of cladding and subframe are included in Annexes 1 and 2 following the standards:

- for ceramics EN ISO 10545-8
- for aluminium EN 1999-1

3.13 Corrosion of metal components

The vertical profiles and the brackets are made of aluminium alloy AW-6063 according to EN 573, EN 755 and EN 1999-1-1 and their minimum thickness is 2mm.

The durability class is B according to (Eurocode 9) EN 1999-1-1:2007+A1:2009 Design of aluminium structures. General structural rules. Table 3.1a y and Table.C.1 in Annex C.

Therefore, these components may be used in the following external atmospheric exposure: rural environment, moderate industrial/urban environment, but excluding industrial marine environment. These components may be used in other external atmospheric conditions exposure if the components are protected as indicated in EN 1999-1-1.

The cladding fixings and subframe fixings are made of A2 (AISI 304) stainless steel according to EN ISO 3506-1.

The category of corrosivity is C4 (high corrosivity).

Therefore, as defined in ISO 9223, these components may be used in indoor environments with high frequency of condensation and high pollution from production process (e.g. industrial processing plants, swimming pools) and in outdoor environments, temperate zone, with high pollution (e.g polluted urban areas, industrial areas, coastal areas without spray of salt water) or, subtropical and tropical zone, with medium pollution.

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

4.1 System of attestation of conformity

According to the decision 2003/640/EC of the European Commission ⁽¹⁵⁾ the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) N° 305/2011) given in the following table applies:

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Kits for external wall claddings based on ceramic tiles fastened to the subframe by invisible fixings FRONTEK PLUS and FRONTEK OMEGA PLUS	External finishes of walls	Any	2+

(15) Official Journal of the European Communities L226/21 of 10.09.2003



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

Technical details necessary for the implementation of the AVCP system are laid down in the quality control plan deposited at the Instituto de Ciencias de la Construcción Eduardo Torroja.

Issued in Madrid, 24th August 2024

by

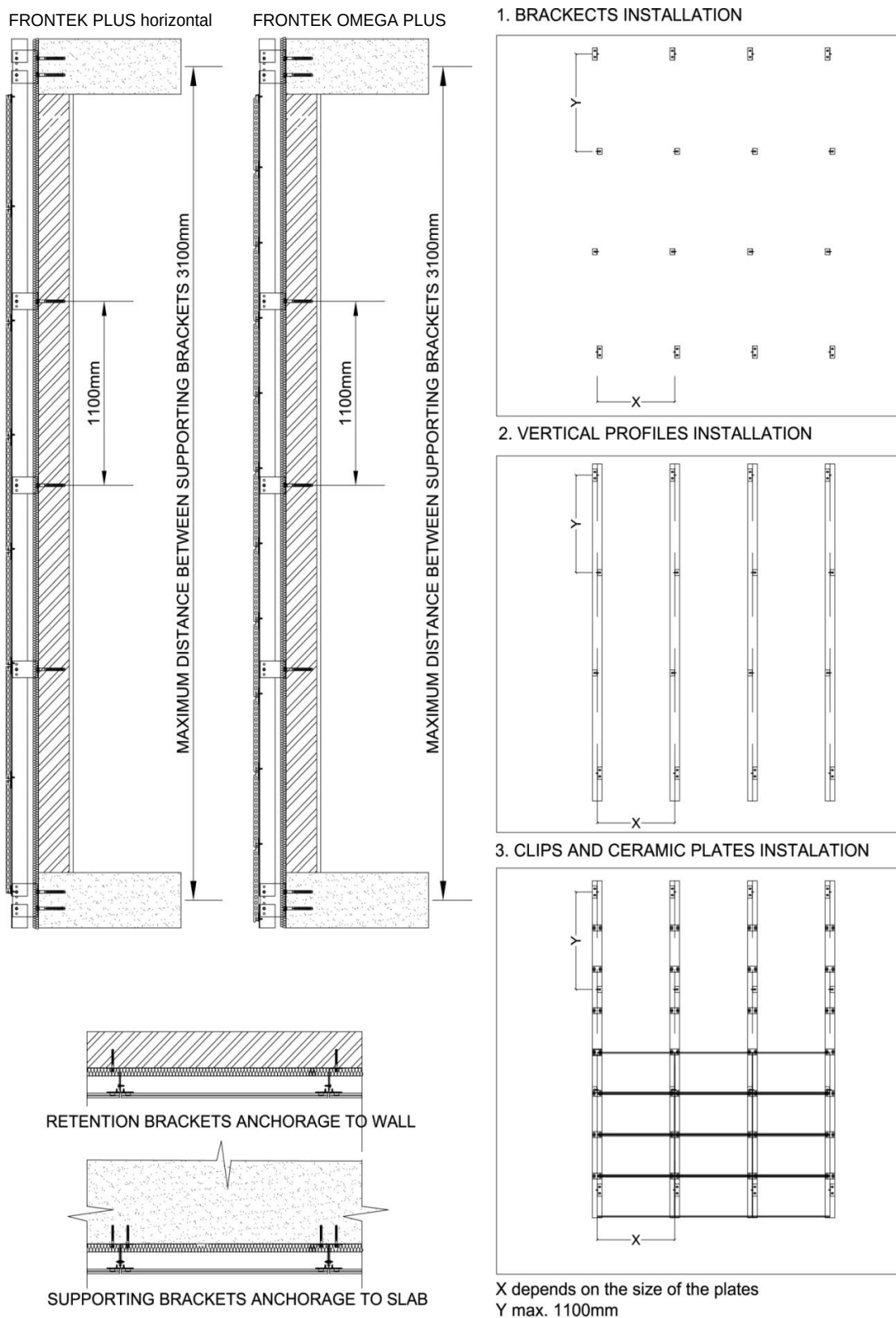
Ángel Castillo Talavera

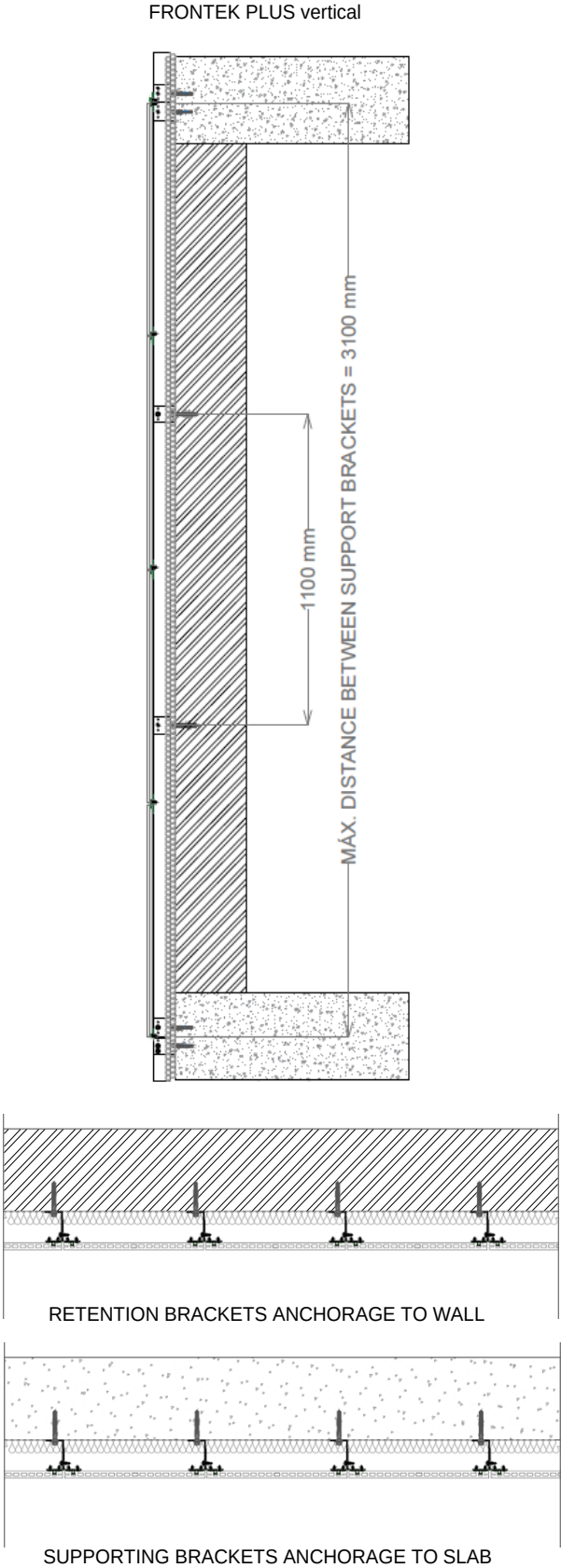
Director

on behalf of Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc-CSIC)

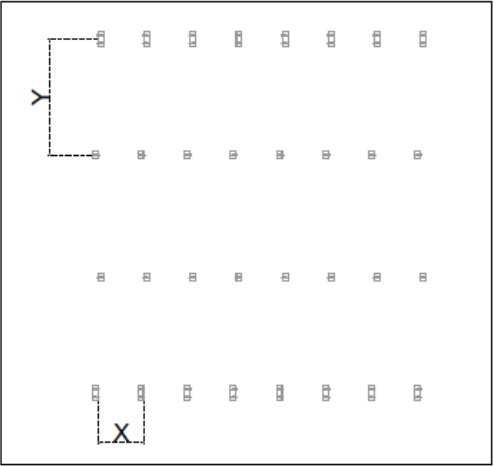


FIGURE 1: GENERAL CONFIGURATION OF THE SYSTEM

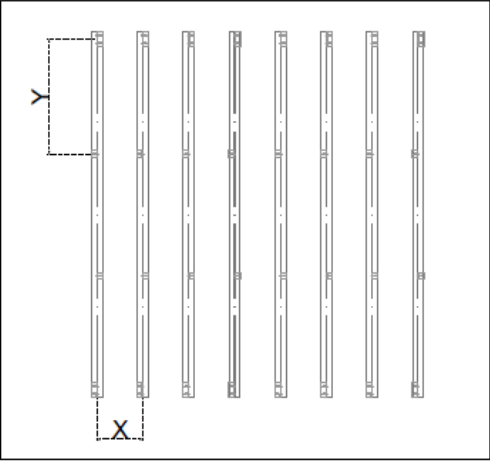




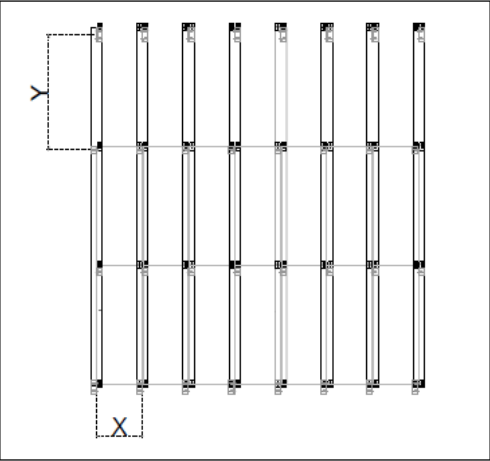
1. BRACKTES INSTALLATION



2. VERTICAL PROFILES INSTALLATION



3. CLIPS AND CERÁMIC PLATE INSTALLATION



X depends on the size of the plates
Y max. 1100mm



FIGURE 2: CERAMIC PLATE DETAIL

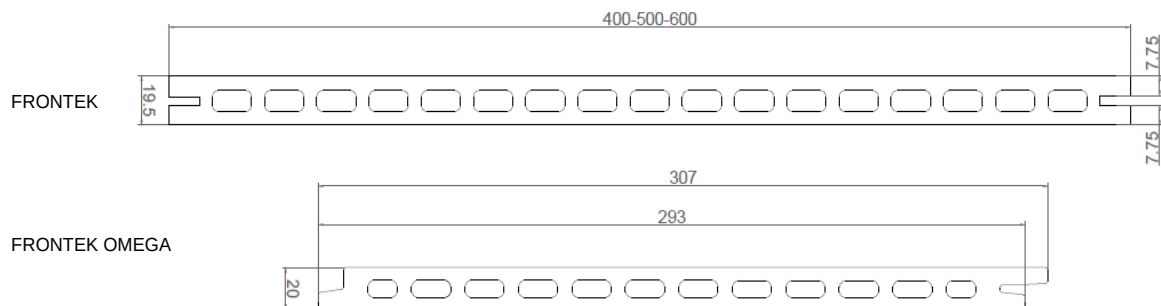
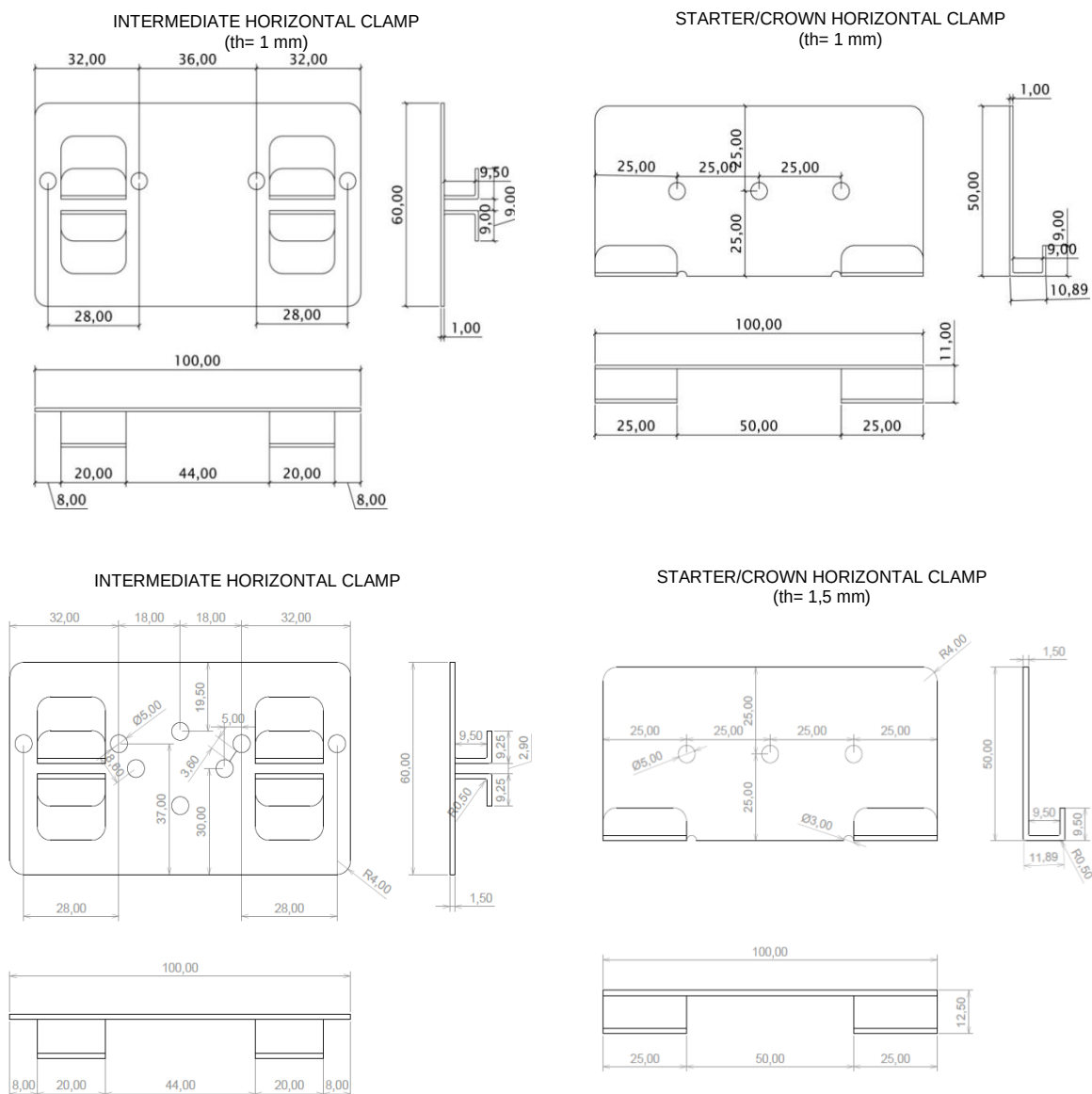
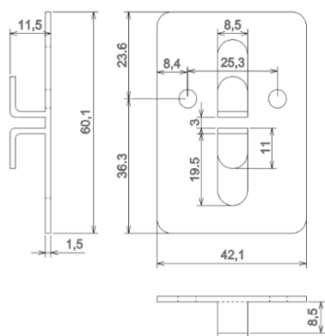


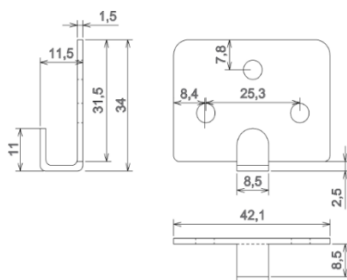
FIGURE 3: CLADDING FIXINGS (CLAMPS)



INTERMEDIATE VERTICAL CLAMP
(th= 1,5 mm)



STARTER/CROWN VERTICAL CLAMP
(th= 1,5 mm)



TURNING CLAMP
(th= 1,5 mm)

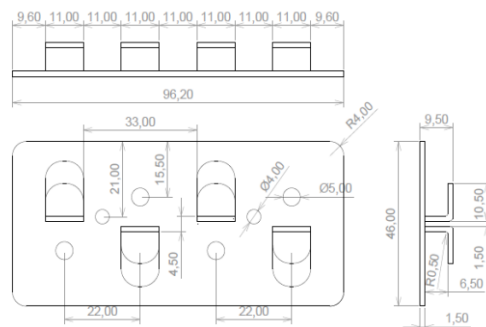


FIGURE 4: ALUMINIUM VERTICAL PROFILE

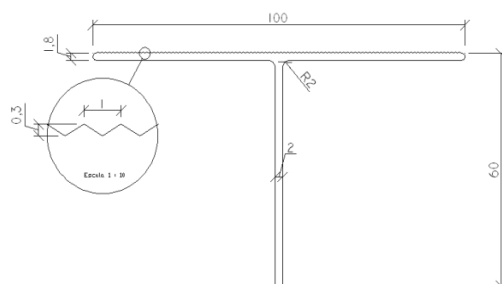


FIGURE 5.1: ALUMINIUM SUPPORTING BRACKETS

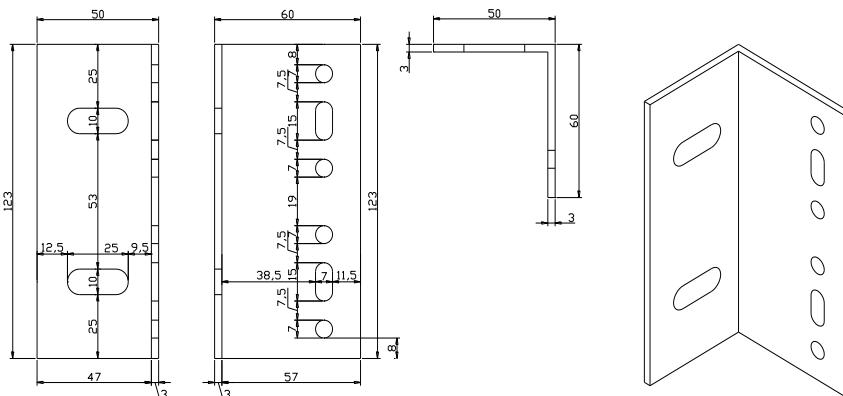


FIGURE 5.2: ALUMINIUM RETENTION BRACKETS

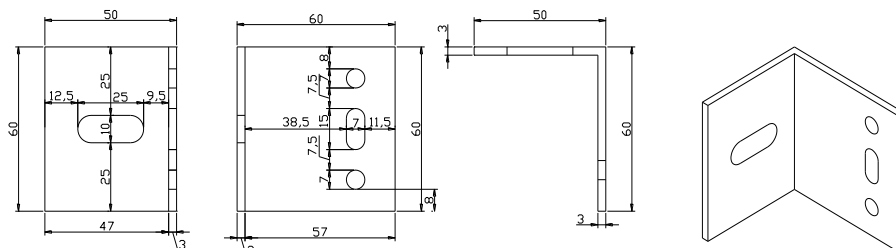


FIGURE 6.1: DETAIL OF TOP AND BASE – FRONTEK PLUS HORIZONTAL

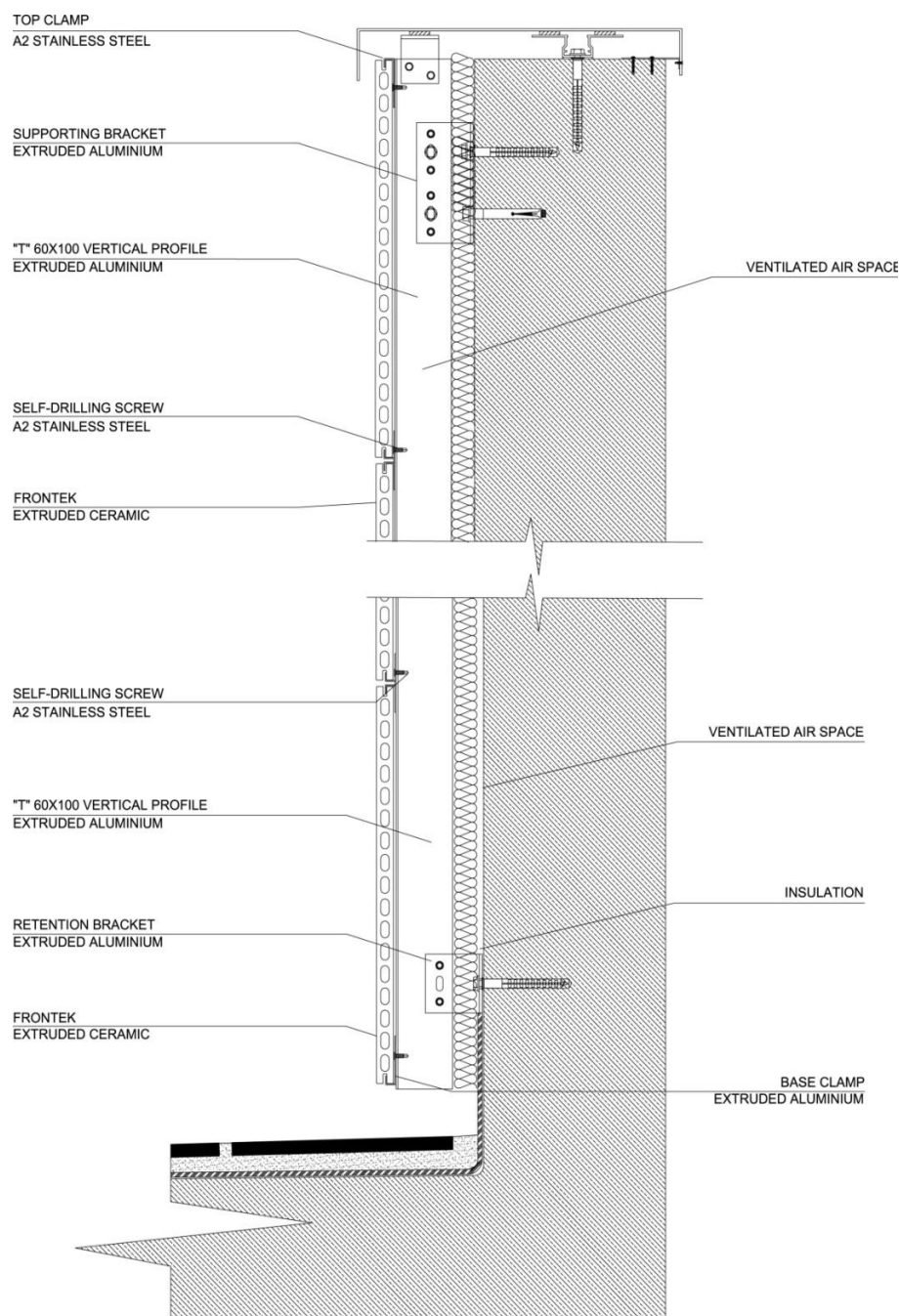


FIGURE 6.2: DETAIL OF TOP AND BASE – FRONTEK OMEGA PLUS

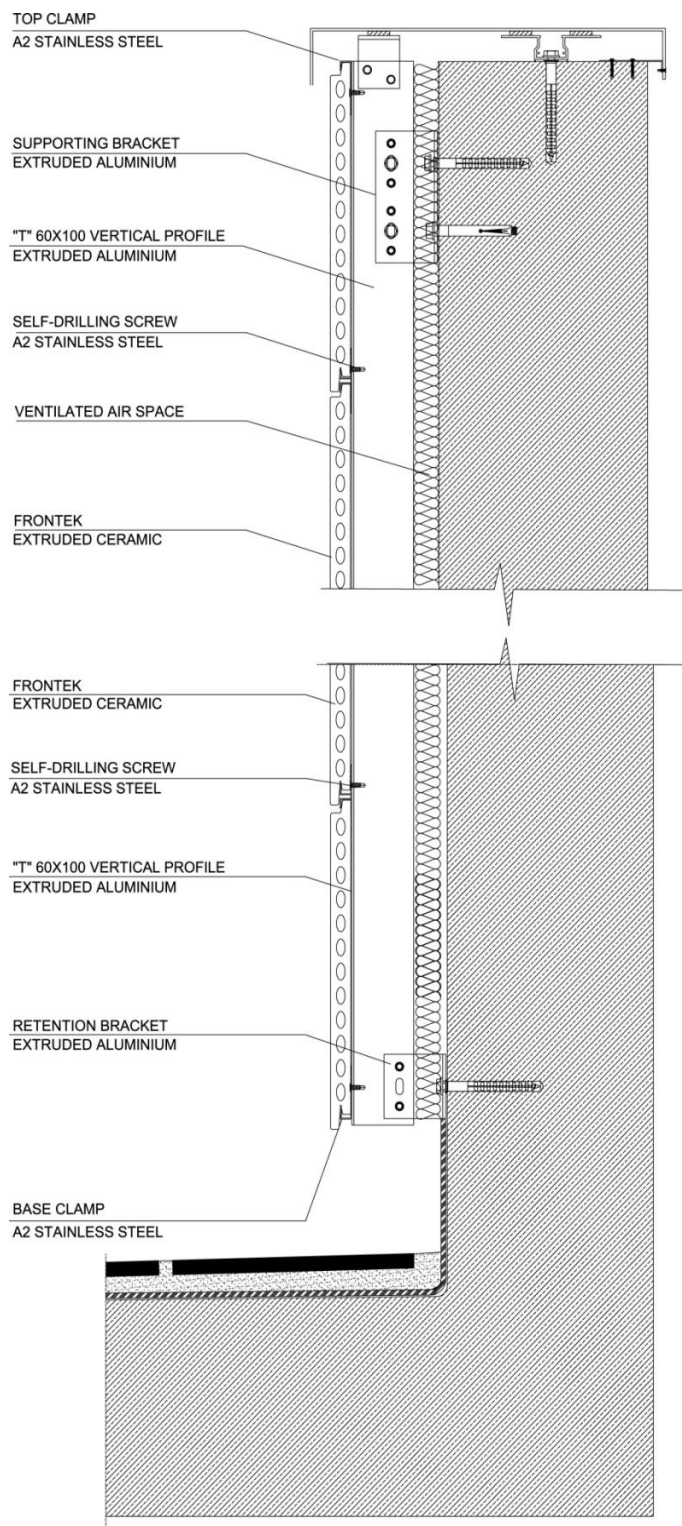


FIGURE 7.1: DETAILS OF EXTERNAL CORNER – FRONTEK PLUS HORIZONTAL AND FRONTEK OMEGA PLUS

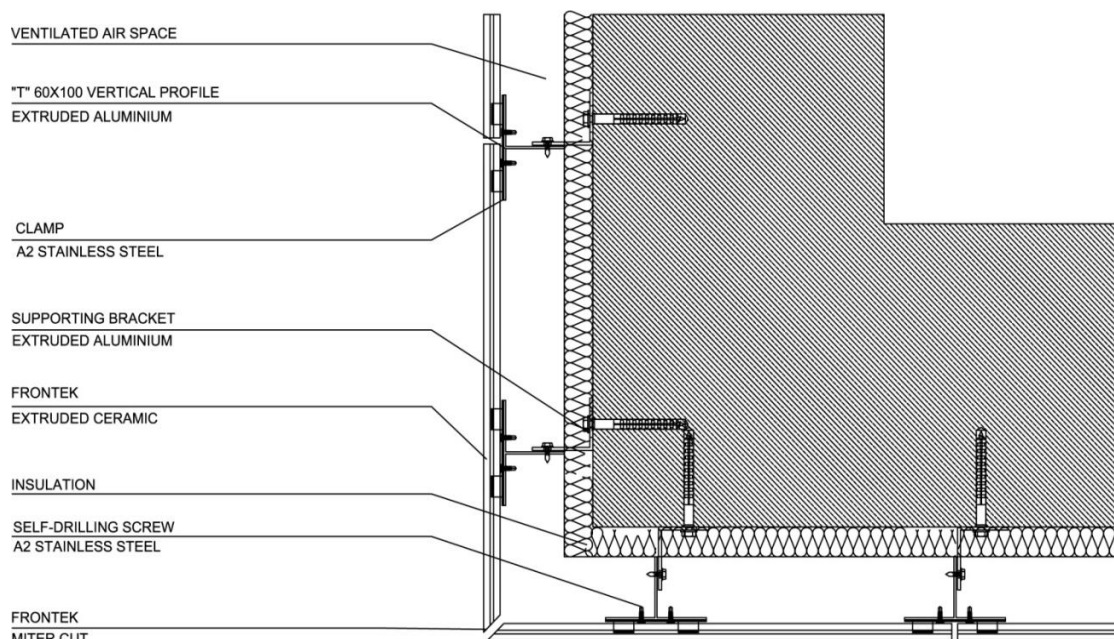


FIGURE 7.2: DETAILS OF EXTERNAL CORNER – FRONTEK PLUS VERTICAL

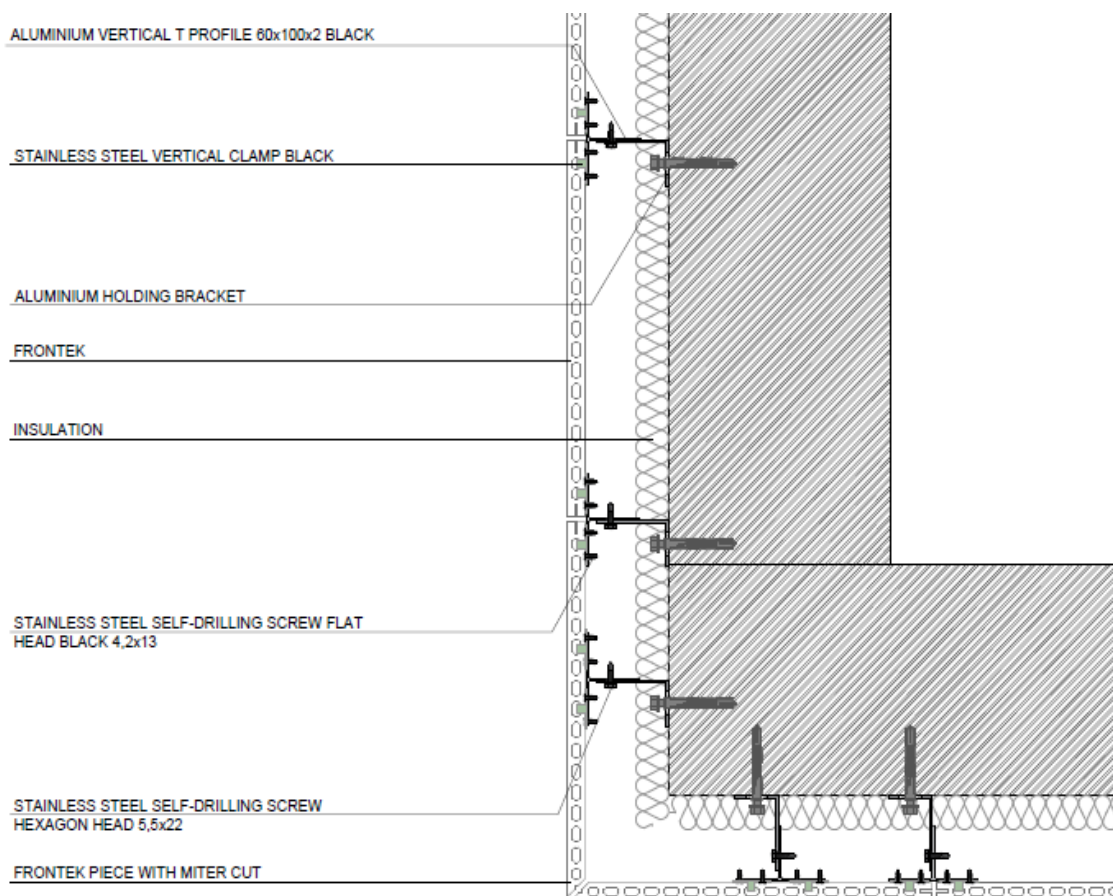


FIGURE 8.1: DETAILS OF INTERNAL CORNER – FRONTEK PLUS HORIZONTAL AND FRONTEK OMEGA PLUS

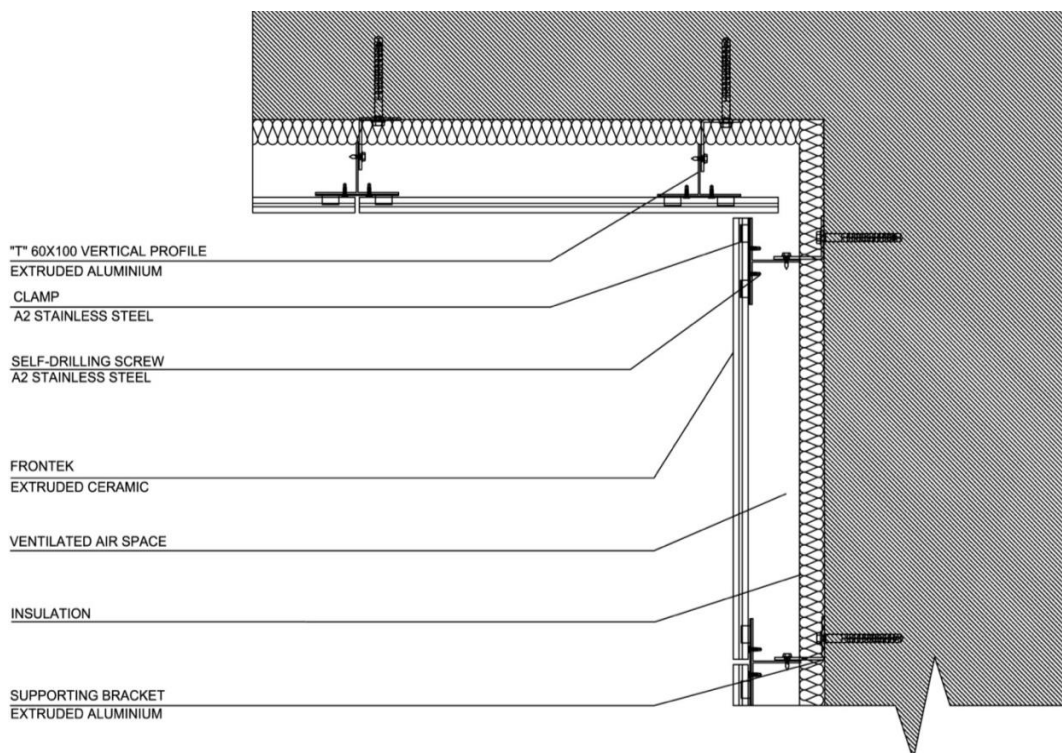


FIGURE 8.2: DETAILS OF INTERNAL CORNER – FRONTEK PLUS VERTICAL

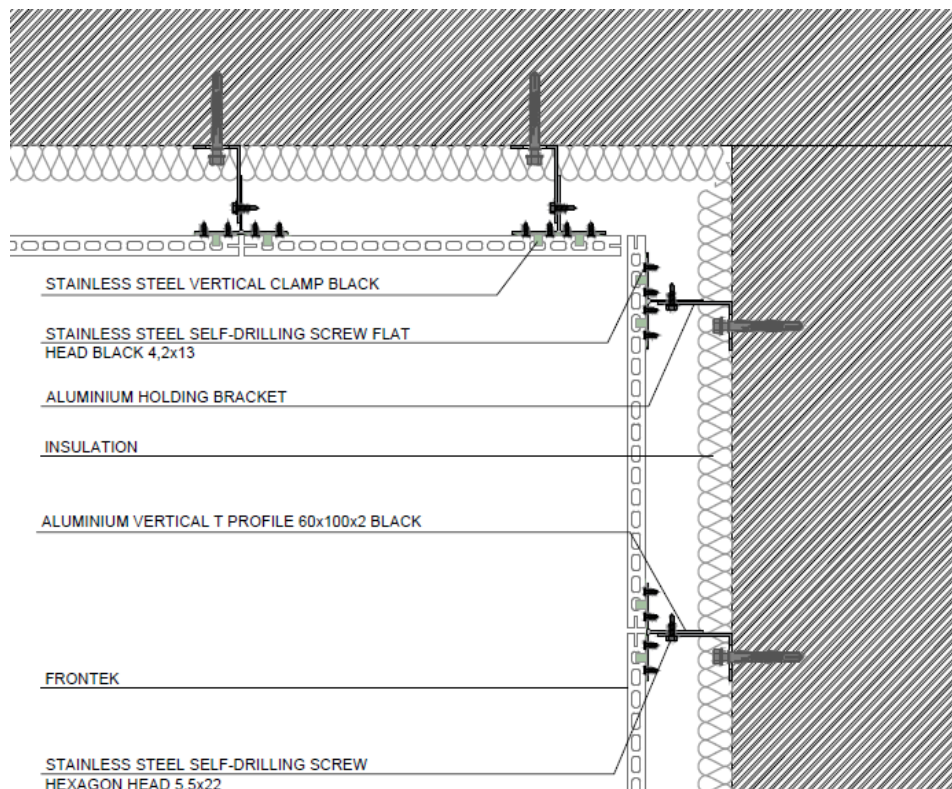


FIGURE 9: VERTICAL EXPANSION JOINT

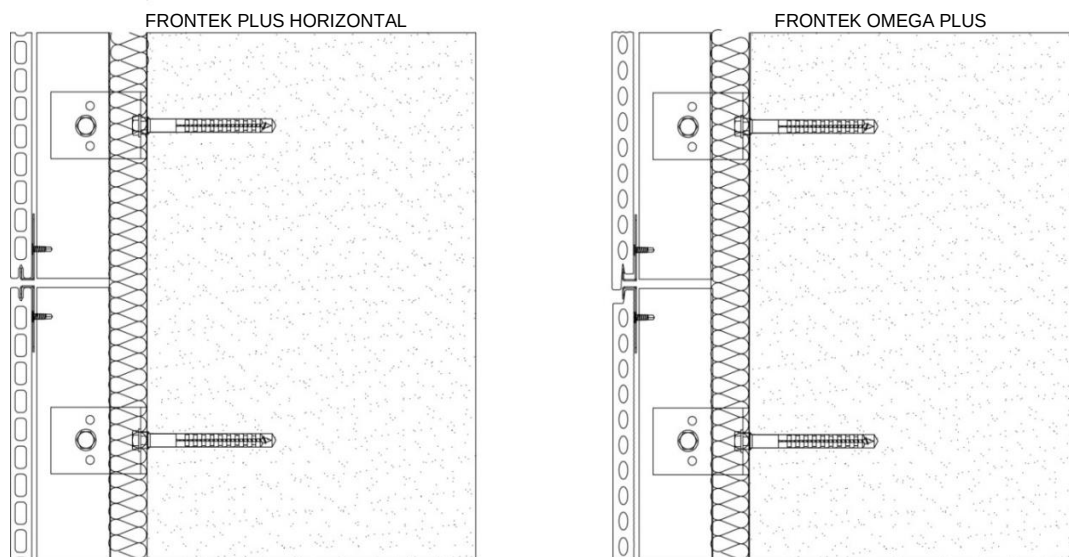


FIGURE 10.1: HORIZONTAL EXPANSION JOINT – FRONTEK PLUS HORIZONTAL AND FRONTEK OMEGA PLUS

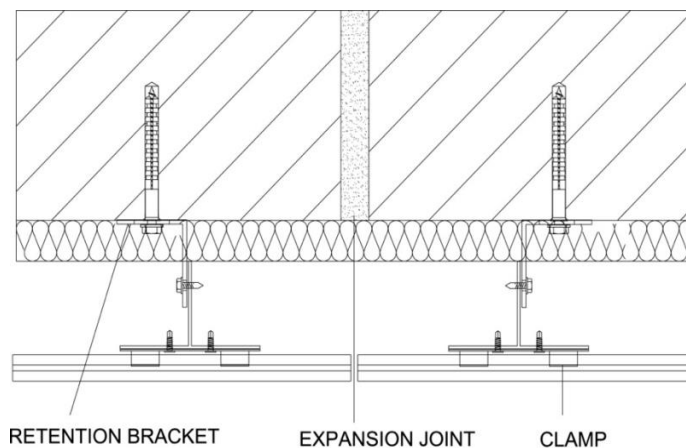
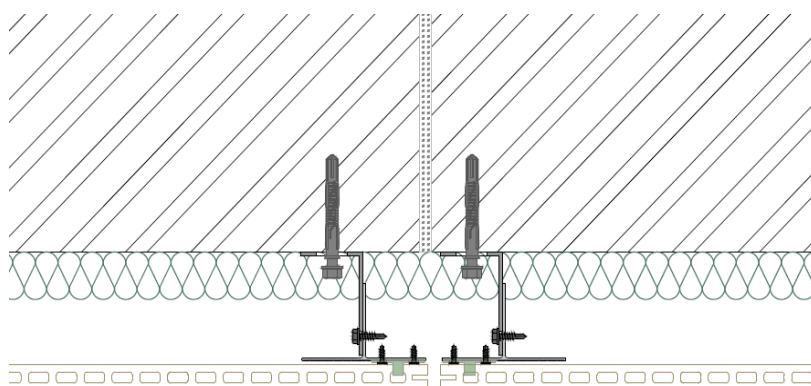


FIGURE 10.2: HORIZONTAL EXPANSION JOINT – FRONTEK PLUS VERTICAL



Note: The details shown in figures above are approximate and must be defined for each project. These details concern the kit for ventilated external wall claddings and may not be used as justification for compliance with the CTE basic requirements.



Annex A: Cladding element specifications

Dimensional features

STANDARD DIMENSIONS ⁽¹⁶⁾					
	Nominal size(mm)	Lenght (mm)	Aprox. width (mm)	Aprox. thickness (mm)	Weight (kg/m ²)
FRONTEK PLUS	400 / 500 / 600 x 600	600	400 / 500 / 600	19.5	32.5
	400 / 500 / 600 x 800	800			
	400 / 500 / 600 x 900	900			
	400 / 500 / 600 x 1000	1000			
	400 / 500 / 600 x 1200	1200			
	400 / 500 / 600 x 1400	1400			
	400 / 500 / 600 x 1600	1600			
	400 / 500 / 600 x 1800	1800			
FRONTEK OMEGA PLUS	307 x 600	600	307	20	33
	307 x 800	800			
	307 x 900	900			
	307 x 1000	1000			
	307 x 1200	1200			

Classification, dimensional tolerance and physical properties

CLASIFICATION		
Manufacturing method	Extruded	
Water absorption (E _b)	E _b ≤ 0.5 % (Group AI _a) – FRONTEK and FRONTEK OMEGA	
DIMENSIONAL TOLERANCE		
Lenght and Width (mm)	0.2	%
Thickness (mm)	10	%
Squareness (mm)	0.4	%
Flatness (mm)	0.2	%
PHYSICAL PROPERTIES		
Bulk density	± 2,3	g/cm ³
Water absorption	≤ 3	%
Flexural strength	≥ 28 - FRONTEK	N/mm ²
	≥ 25 - FRONTEK OMEGA	N/mm ²
Coefficient of linear thermal expansion	≤ 9x10 ⁻⁶	K ⁻¹
Reaction to fire	A1	

(16) Available smaller dimensions with the same thickness



Annex B: Fixings and Subframe specifications

Aluminium Physical and mechanical properties

Symbolic and numeric designation	6063	AlMgSi
Treatment	T5	
Protection	Raw finished	
PHYSICAL PROPERTIES		
Specific weight	2,7 g/cm ³	
Coefficient of linear thermal expansion (20 a 100 °C)	23,6·10 ⁻⁶ °K	
Elastic modulus	69.500 MPa	
Poisson coefficient	0,33	
MECHANICAL PROPERTIES		
Tensile strength (R _m)	≥175 MPa	
Elastic limit (R _{p0,2})	≥ 130 MPa	
Elongation (A _{50mm})	≥ 8%	
According to EN 755-2 ⁽¹⁷⁾ and EN 12020-1 ⁽¹⁸⁾		

Cladding fixings (Clamps) Geometrical and mechanical features

Reference	Intermediate horizontal clamp	Starter /Crown horizontal clamp	Intermediate vertical clamp	Starter /Crown vertical clamp	Turning clamp
Dimensions	Figure 3 of ETA 15-0916				

Vertical profiles Geometrical and mechanical features

Reference	T 60x100
Section (mm ²)	290.48
Perimeter (mm)	357.39
Weight (kg/m)	0.783
x _c (mm)	50,00
I _{xc} (cm ⁴)	9.55
r _{xc} (mm)	18.13
y _c (mm)	47
I _{yc} (cm ⁴)	14.27
r _{yc} (mm)	22.17

Brackets Geometrical and mechanical features

Reference	50 x 60 x 60/123 (e=3mm)	50 x 80 x 60/123 (e=3mm)	50 x 100 x 60/123 (e=3mm)	50 x 120 x 60/123 (e=3mm)
Section (mm ²)	321	381	441	501
Perimeter (mm)	220	260	300	340
x _c (mm)	37.5	39.2	40.5	41.5
I _{xc} (cm ⁴)	11.83	25.97	47.57	77.88
r _{xc} (mm)	19.2	26.1	32.8	39.4
y _c (mm)	17.48	25.8	34.5	43.5
I _{yc} (cm ⁴)	7.55	8.16	8.61	8.95
r _{yc} (mm)	15.33	14.6	13.9	13.4

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

(18) EN 12020-1 Aluminium and aluminium alloys. Extruded precision profiles in alloys en aw-6060 and en aw-6063. Part 1: technical conditions for inspection and delivery.



Stainless steel screw between vertical profiles and brackets

Description	hex head self-drilling screw
Standard	DIN 7504K EN ISO 15480:2000 ⁽¹⁹⁾
Diameter	5.5 mm
Length	22 mm
Material	Stainless steel A2 (AISI 304)
Standard	EN ISO 3506-1: 2010 ⁽²⁰⁾
Steel resistance class	70
Tensile strength (R _m)	700 MPa
Elastic limit (R _{p0.2})	450 MPa

Stainless steel screw between vertical profiles and clips

Description	self-drilling screw with countersunk head
Standard	DIN 7504P EN ISO 15482:2000 ⁽²¹⁾
Diameter	4.2 mm
Length	13 mm
Material	Stainless steel A2
Standard	EN ISO 3506-1: 2010
Steel resistance class	50
Tensile strength (R _m)	500 MPa
Elastic limit (R _{p0.2})	210 MPa

Annex C: Anchorage to substrate

The fixings between the subframe and the substrate are not part of the kit, therefore have not been assessed, even so it is important define type, position and number of the anchorage according to the substrate material and the resistance required due to the envisaged actions. When possible, CE marking according to the ETA via EAD 330232-00-0601, 330499-00-0601, 330747-00-0601, and 330076-00-0604 (etc.) is recommended.

Annex D: Confidential information

Quality control of components of kits manufactured by suppliers or ETA holder.
This confidential information is not included in the European Technical Assessment when that assessment is publicly available.

(19) EN ISO 15480:2000 Hexagon washer head drilling screws with tapping screw thread (ISO 15480:1999).

(20) EN ISO 3506-1:2010 Mechanical properties of corrosion-resistant stainless steel fasteners - Part 1: Bolts, screws and studs (ISO 3506-1:2009).

(21) EN ISO 15482:2000 Cross recessed countersunk head drilling screws with tapping screw thread (ISO 15482:1999)

