



**INSTITUTO DE CIENCIAS
DE LA CONSTRUCCIÓN
EDUARDO TORROJA**

*C/ Serrano Galvache n. 4 28033 Madrid (Spain)
Tel.: (34) 91 302 04 40 Fax: (34) 91 302 07 00
direccion.ietcc@csic.es www.ietcc.csic.es*



European Technical Assessment

**ETA 19/0052
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English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the ETA	Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)
Trade name of the construction product	EPSILON "T"
Product family to which the construction product belongs	Kit composed by subframe and fixings for fastening cladding and external wall elements
Manufacturer	Fachadas del Norte, S.L. Avda. de la Coruña, nº162. 15185 CERCEDA (A Coruña) España
Manufacturing plant(s)	Fachadas del Norte, S.L. Avda. de la Coruña, nº162. 15185 CERCEDA (A Coruña) España
This European Technical Assessment contains	18 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	European Assessment Document (EAD) 090034-00-0404. Ed. June 2016. Kit composed by subframe and fixings for fastening cladding and external wall elements

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SPECIFIC PART

1. Technical description of the product

The assessed kit, composed by subframe and fixings for fastening cladding and external wall elements EPSILON “T”, is fixed to the external wall of new or existing buildings (retrofit). An insulation layer is usually fixed on the external wall.

This subframe and fixing kit is classified as type 3, according to the EAD 090034-00-0404: *Kit composed by subframe and fixings for fastening cladding and external wall elements*, edition June 2016 (hereinafter EAD 090034-00-0404).

The kits are made of components mechanically assembled. Adhesive are used exclusively as ancillary components, being their contribution to the mechanical resistance of the kit ignored (mechanical characteristics of the components are tested without adhesive).

The kits components are defined in table 1; they are factory produced by the ETA holder or a supplier.

Components		Material		Sizes [mm]	
Skin element fixings ⁽¹⁾	Elements ⁽²⁾ used to secure skin elements to the subframe	DELTA clip	Extruded aluminium 6060/6063-T5	12 x 45,4-34,4 x 3-1,2	(see figure 2)
Subframe	Vertical profiles ⁽³⁾ used to fix the skin element fixings	Extruded aluminium 6060/6063-T5		T 40x100 t=2,5 L 44x40 t=2,5	(see figure 3)
	Brackets ⁽⁴⁾ used to fix the vertical profiles	Extruded aluminium 6060/6063-T5		(60+40) x 80 x 3 (100+40) x 80 x 4,5 (140+40) x 80 x 5 (60+40) x 46 x 3 (100+40) x 46 x 4,5 (140+40) x 46 x 5	Supporting brackets (see figure 4.1) Retention brackets (see figure 4.2)
Ancillary material	Fixings between brackets and vertical profile	Stainless steel A2 self-drilling screw (hexagonal head)		Ø 5.5 L=25	
	Fixings between vertical profile and skin element fixings	Stainless steel A2 self-drilling screw (special head)		Ø 4.8 L=19	
Auxiliary components	Adhesive	Polymer filler MS		See annex 3	
	Anchorage to substrate	-			

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

2.1 Intended use

The EPSILON “T” kit is intended to be used for mechanical fastening of skin elements in façade with air space, ventilated or not, which can be fixed to supporting structure and the external wall in new or existing buildings.

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 Fachadas del Norte, S.L.

The subframe and fixing kits are non-load-bearing construction elements. They do not contribute to the stability of the structure on which are installed, neither to ensure the airtightness 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 kit

The provisions made in this European Technical Assessment, according to the EAD, 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.

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 kits

The design of subframe and fixing kits for fastening cladding and external wall elements using EPSILON “T” kit should take into account:

(1) Manufactured by Fachadas del Norte, S.L.
(2) See Annex A (Fixings and subframe specifications).
(3) Not manufactured by Fachadas del Norte, S.L.
(4) Manufactured by Fachadas del Norte, S.L.

- 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. skin element 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 ⁽⁵⁾.
- 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 kits 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 systems or kit components includes inspections on site, taking into account the following aspects:

- Regarding the cladding elements 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 this kit for fastening cladding and external wall elements according to the Basic Work Requirements (BWR) was carried out in compliance with the EAD 090034-00-0404. The characteristics of the components shall correspond to the 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

The reaction to fire of the EPSILON "T" kit was verified from the reaction to fire of their components.

The main components of the kit are made of aluminium and stainless steel. Therefore, the kit and all their main components comply with the requirements of class A1, in accordance with the EC Decision 96/603/EC (as amended) without the need for testing on the basis of the list in that decision.

This classification is valid if the insulation layer placed in the ventilated air space is made of a non-combustible material (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

(5) (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.

the use in facades. An additional assessment of the system according to the national provision (e.g. based on a large-scale test) might be necessary to comply with Member State Regulations, until the existing European classification system has been completed.

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

2 Wind load resistance

The wind load resistance was determined by calculation and also by testing according to cl. 2.2.2 and the method specified in Annex B of EAD.

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 test specimens (Type 3) were selected to include the biggest cladding⁽⁶⁾, the thickest element, the maximum distance between cladding fixings, the maximum distance between vertical profiles and an approx. distance between brackets of 750 mm.

The calculated values for the tested specimen are indicated in table 2.

TABLE 2 – WIND SUCTION RESISTANCE CALCULATED VALUES								
TEST SPECIMEN	CALCULATED MAXIMUM LOAD							
	HORIZONTAL LOAD OF SKIN ELEMENT FIXINGS F_i (N) (characteristic value)		SUCTION (Pa)	HORIZONTAL LOAD OF BRACKETS F_m (N) (characteristic value)		SUCTION (Pa)	PROFILE DEFLECTION	SUCTION (Pa)
	EPSILON “T” (Type 3)	4 mm MAX. PERM. DEF.	174	970	1mm PERM. DEF.	1150	2400	1/200

The test results for the tested specimen are indicated in table 3.

TABLE 3 – WIND SUCTION RESISTANCE TEST RESULTS				
TEST SPECIMEN	TEST			
	MAXIMUM LOAD Q (Pa)	TYPE OF FAILURE	MAXIMUM DEFLECTION UNDER LOAD (mm)	MAXIMUM PERMANENT DEFLECTION (mm)
EPSILON “T” (Type 3)	2400	Grooves of generic skin element break and skin element fixings present a significant permanent deformation	12.33	5.24

3 Resistance to vertical load of the whole assembled system

The resistance to vertical load of the whole assembled system was determined by calculation and also by testing according to cl. 2.2.3 and the method specified in Annex C of EAD.

Taking into account the mechanical resistance of the components of the system (skin element fixings, brackets and profiles) the calculated resistance to vertical load of is 236 N (characteristic value of resistance to vertical load of skin element fixings, see § 4 of this ETA).

The test specimens were selected to include the biggest cladding⁽⁸⁾, the thickest element, the maximum distance between cladding fixings, the maximum distance between vertical profiles.

The values required according to Annex C of EAD to define the resistance to vertical load of the whole assembled system are indicated in table 4.

TABLE 4 –RESISTANCE LIMIT TO VERTICAL LOAD OF THE WHOLE ASSEMBLED SYSTEM AND DEAD LOADS				
TEST SPECIMEN	Resistance limit to vertical load R_v (N)	Nº of fixings supporting vert. load	Dead load Q_w (N)	Additional dead load Q_{ad} (N)
EPSILON “T” (Type 3)	354	2	194	514

R_v = Mean value of vertical load for 1mm irreversible deformation of the skin fixing element (punctual clip) obtained according to Annex D of EAD.

Q_w = Dead load of the generic skin element

Q_{ad} = Additional dead load calculated according to Annex C of EAD.

Even if maximum resistance to vertical load of the fixings and subframe kit is 514N the test specimen had been tested using an additional dead load equivalent to two generic skin elements (388 N). This additional dead load can always be bear to the generic skin element and R_v resulting is lower than the mean value of vertical load for 1mm irreversible deformation of the skin fixing element.

(6) See Annex C (generic skin elements specifications).

(7) Value calculated on “L” profile, the weakest one.

(8) See Annex C (generic skin elements specifications).

The test results are indicated in table 5.

TEST SPECIMEN	N° of fixings supporting vert. load	Dead load $Q_w(N)$	Additional dead load $Q_{ad}(N)$	INITIAL DEFLECTION (mm)		AFTER 24h DEFLECTION (mm)		DEFLECTION DIFFERENCE (mm)	
EPSILON "T" (Type 3)	2	194	388	0.13	0.07	0.18	0.10	0.05	0.03

4 Resistance to vertical load of skin element fixings

The resistance to vertical load of skin element fixings was determined by testing according to cl. 2.2.4 and the method specified in Annex D of EAD.

The test results are indicated in table 6.

TEST SPECIMEN	1 mm PERMANENT DEFORMATION $F_i(N)$		FAILURE VALUE $F_{iu}(N)$		MODE OF FAILURE
	Mean value	Characteristic value	Mean value	Characteristic value	
	DELTA clip	354	235.53	367.15	

5 Resistance to horizontal load of skin element fixings

The resistance to horizontal load of skin element fixings was determined by testing according to cl. 2.2.5 and the method specified in Annex D of EAD.

The test results are indicated in table 7.

TEST SPECIMEN	1 mm PERMANENT DEFORMATION $F_i(N)$		FAILURE VALUE $F_{iu}(N)$		MODE OF FAILURE
	Mean value	Characteristic value	Mean value	Characteristic value	
	DELTA clip	129.40	74.17	215.25	

6 Resistance to pulsating load of skin element fixings

No performance assessed according to cl. 2.2.6 of EAD

7 Resistance of skin element fixings in case of inaccuracies of installation

Performance not relevant for fixings type 3

8 Pull-through resistance of fixings (from profile)

No performance assessed according to cl. 2.2.8 of EAD

9 Pull-out resistance of fixings (from profile)

No performance assessed according to cl. 2.2.9 of EAD

10 Inertia and resistance of profiles

See Annex A of this ETA

11 Resistance of vertical load of brackets

The resistance of vertical load of brackets was determined by testing according to cl. 2.2.11 and the method specified in Annex H of EAD.

The test results are indicated in table 8.

TABLE 8 – RESISTANCE TO VERTICAL LOAD OF BRACKETS								
BRACKETS DIMENSIONS	F _v (N) ΔL=0.2% de L Residual distortion		F _{1d} (N) ΔL=1mm Displacement		F _{3d} (N) ΔL=3mm Displacement		F _s (N) ΔL=5 mm Displacement Significant permanent distortion (≥2mm)	
	Mean value	Char. value	Mean value	Char. value	Mean value	Char. value	Mean value	Char. value
(60+40) x 80 x 3	776.80	416.69	1202.01	772.34	1515.71	1196.77	1836.06	1583.11
(100+40) x 80 x 4.5	821.75	615.37	1017.85	703.27	1837.57	1593.72	2238.62	1983.20
(140+40) x 80 x 5	548.80	249.28	603.07	390.91	1334.51	1006.54	1693.01	1300.04

12 Resistance of horizontal load of brackets

The resistance of vertical load of brackets was determined by testing according to cl. 2.2.12 and the method specified in Annex H of EAD.

The test results are indicated in table 9.

TABLE 9 – RESISTANCE TO HORIZONTAL LOAD OF BRACKETS				
BRACKETS DIMENSIONS	F _m (N) ΔL=1mm Residual distortion		F _s (N) ΔL=5 mm Displacement Significant permanent distortion (≥2mm)	
	Mean value	Char. value	Mean value	Char. value
(60+40) x 80 x 3	1769	1307.97	2613.91	2193.74
(100+40) x 80 x 4.5	3910	1663.94	5460.66	3389.64
(140+40) x 80 x 5	3040	2190.27	6297.19	5002.32
(60+40) x 46 x 3	1566	1147.38	2284.16	1925.29
(100+40) x 46 x 4.5	1890	1223.81	4132.65	3181.99
(140+40) x 46 x 5	2912	1855.20	4591.93	3611.66

13 Mechanical characteristics of subframe fixings

See Annex A of this ETA

14 Corrosion

The material and corrosion protection of the kit components are defined in the relevant table of Annex A.

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 ⁽⁹⁾ the system of assessment and verification of constancy of performances (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 composed by subframe and fixings for fastening cladding and external wall elements "B-202D and B-202C"	Subframe and fixing kits for mechanical fastening of skin elements	-	2+

⁽⁹⁾ Published in the Official Journal of the European Communities L226/21 of 10.09.2003. See www.new.eur-lex.europa.eu/oj/direct-access.html

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 plan deposited at the Instituto de Ciencias de la Construcción Eduardo Torroja.



Instituto de Ciencias de la Construcción Eduardo Torroja
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

c/ Serrano Galvache nº 4. 28033 Madrid.
Tel: (34) 91 302 04 40 Fax. (34) 91 302 07 00
www.ietcc.csic.es



On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja
Madrid, 6th March 2019

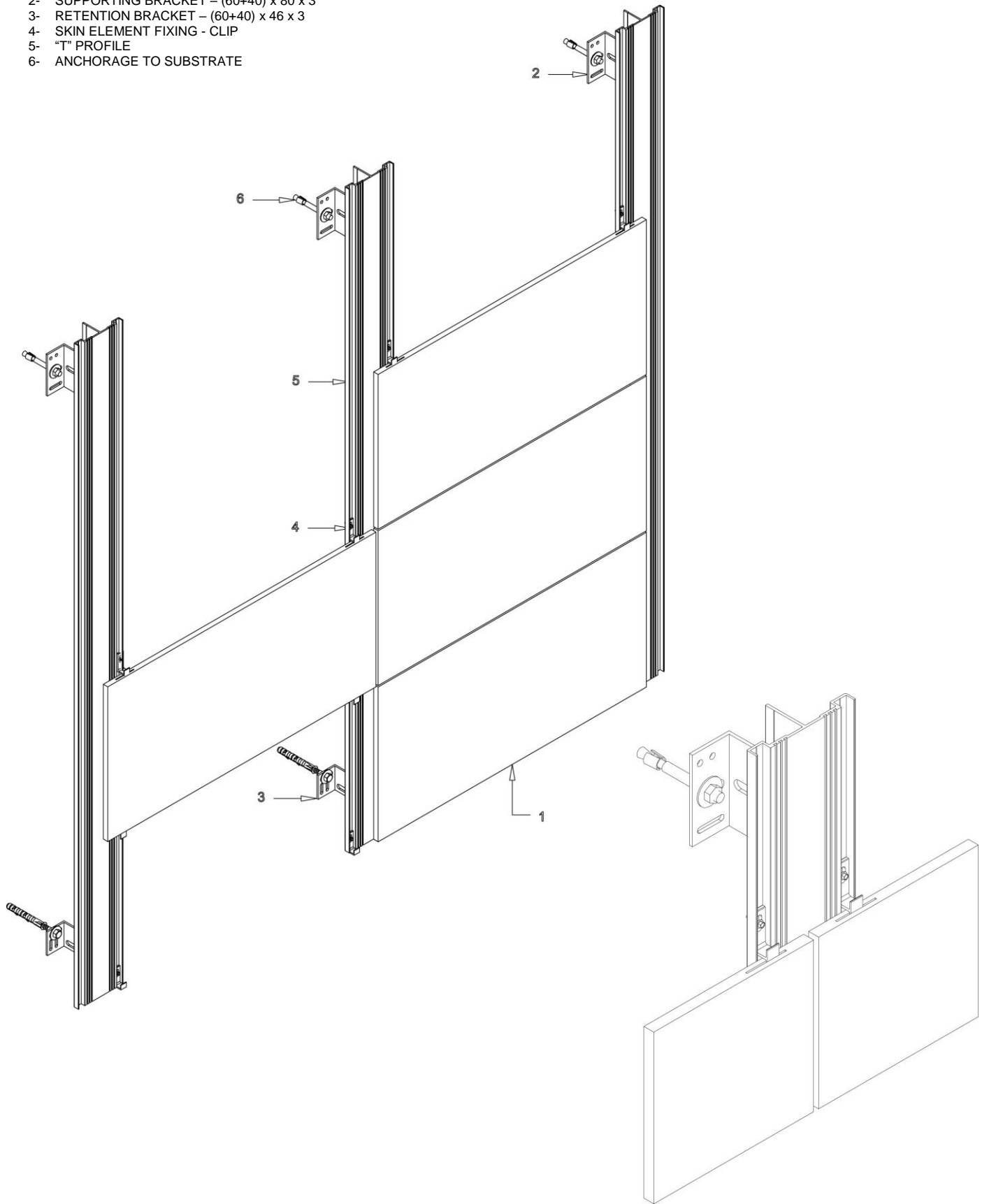


Director

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 National requirements.

FIGURE 1: GENERAL CONFIGURATION

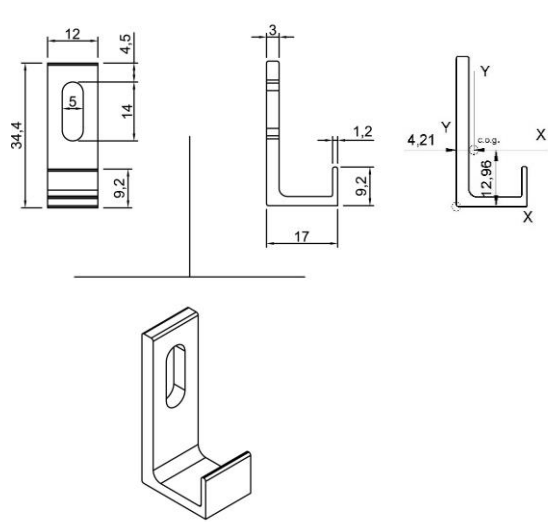
- 1- GENERIC SKIN ELEMENT (CERAMIC PLATE)
- 2- SUPPORTING BRACKET – (60+40) x 80 x 3
- 3- RETENTION BRACKET – (60+40) x 46 x 3
- 4- SKIN ELEMENT FIXING - CLIP
- 5- "T" PROFILE
- 6- ANCHORAGE TO SUBSTRATE



SYSTEM COMPONENTS

FIGURE 2: SKIN-ELEMENT FIXING

2.1: STARTING AND ENDING CLIP



2.2: CLIP BETWEEN TWO SKIN ELEMENTS

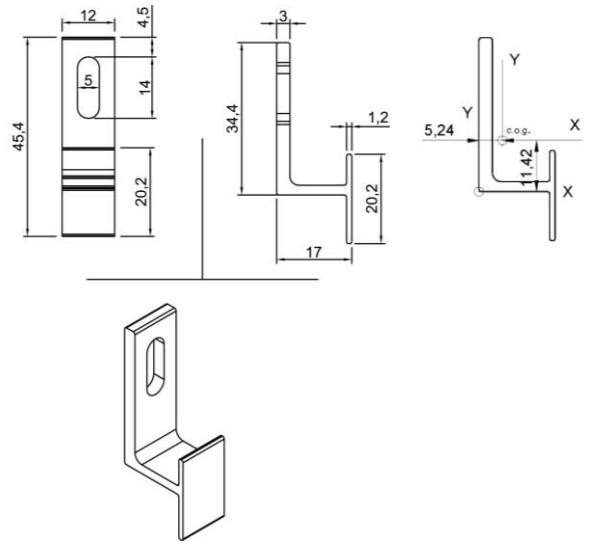
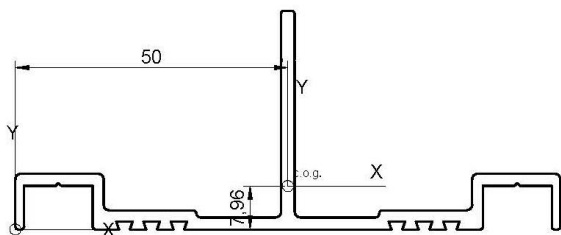
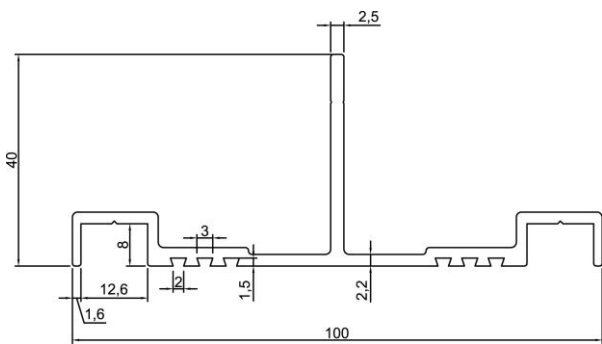


FIGURE 3: VERTICAL PROFILE SYSTEM

3.1: "T" PROFILE 100 x 40 x 2.5



3.2: "L" PROFILE 44 x 40 x 2.5

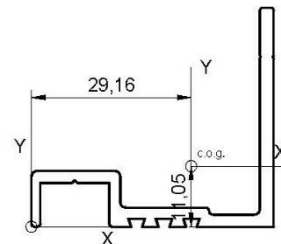
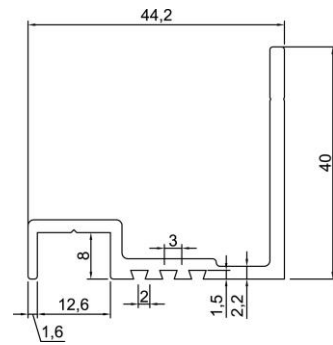
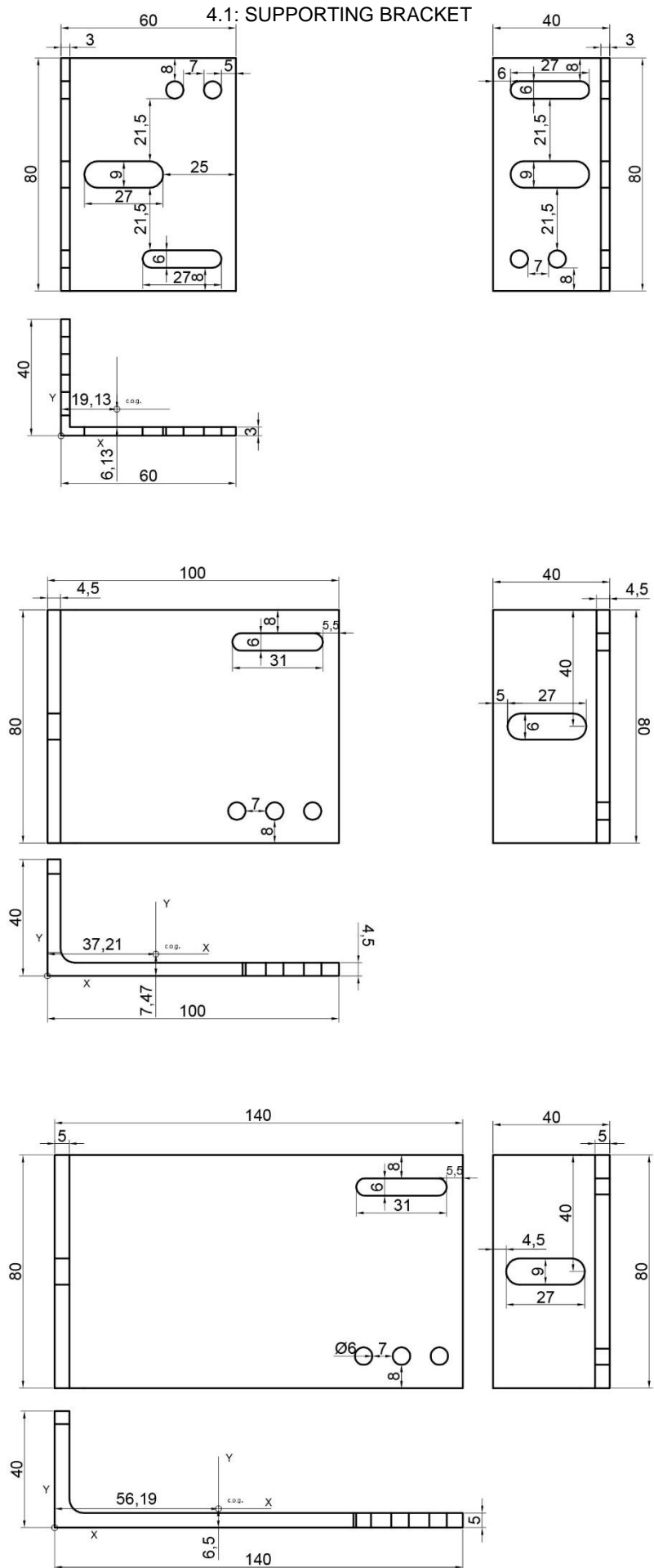


FIGURE 4: BRACKETS

4.1: SUPPORTING BRACKET



4.2: RETENTION BRACKET

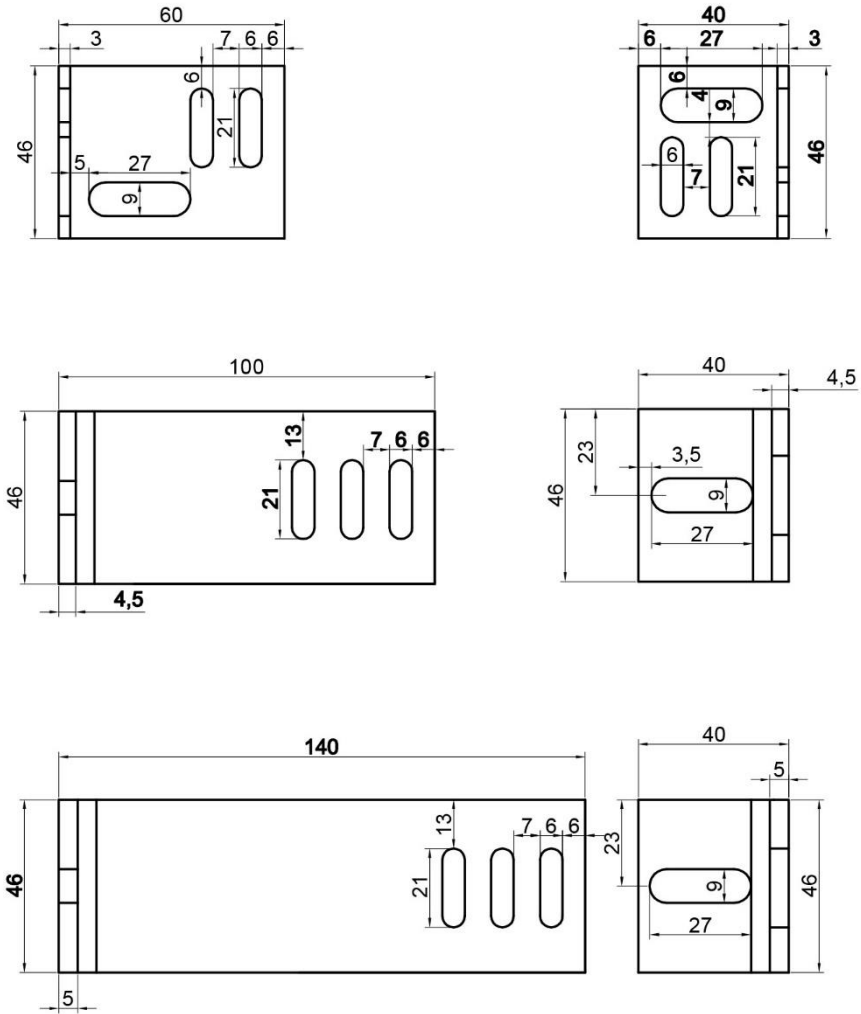


FIGURE 5: REPLACEMENT CLIP

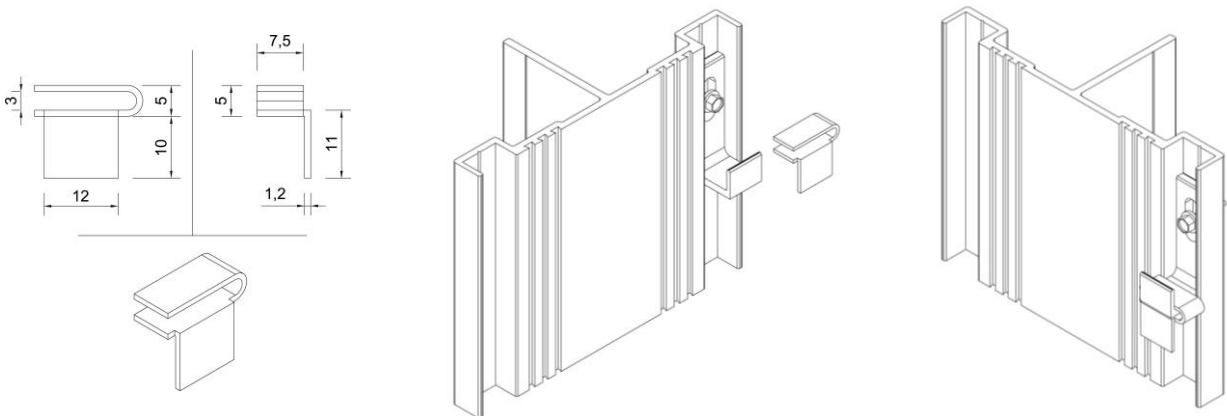
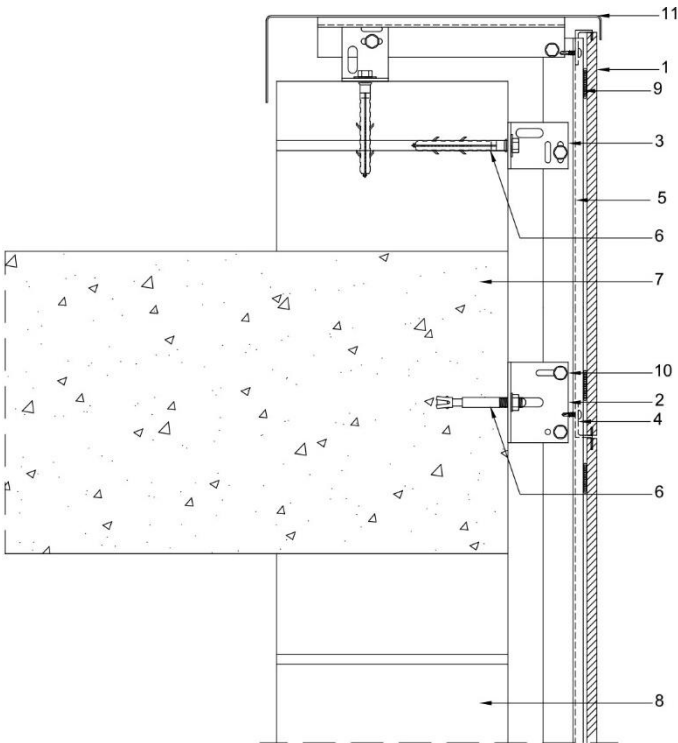
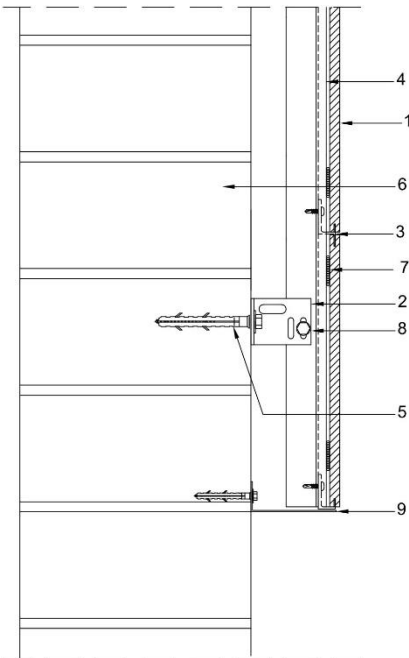


FIGURE 6: DETAIL OF CROWN AND BASE

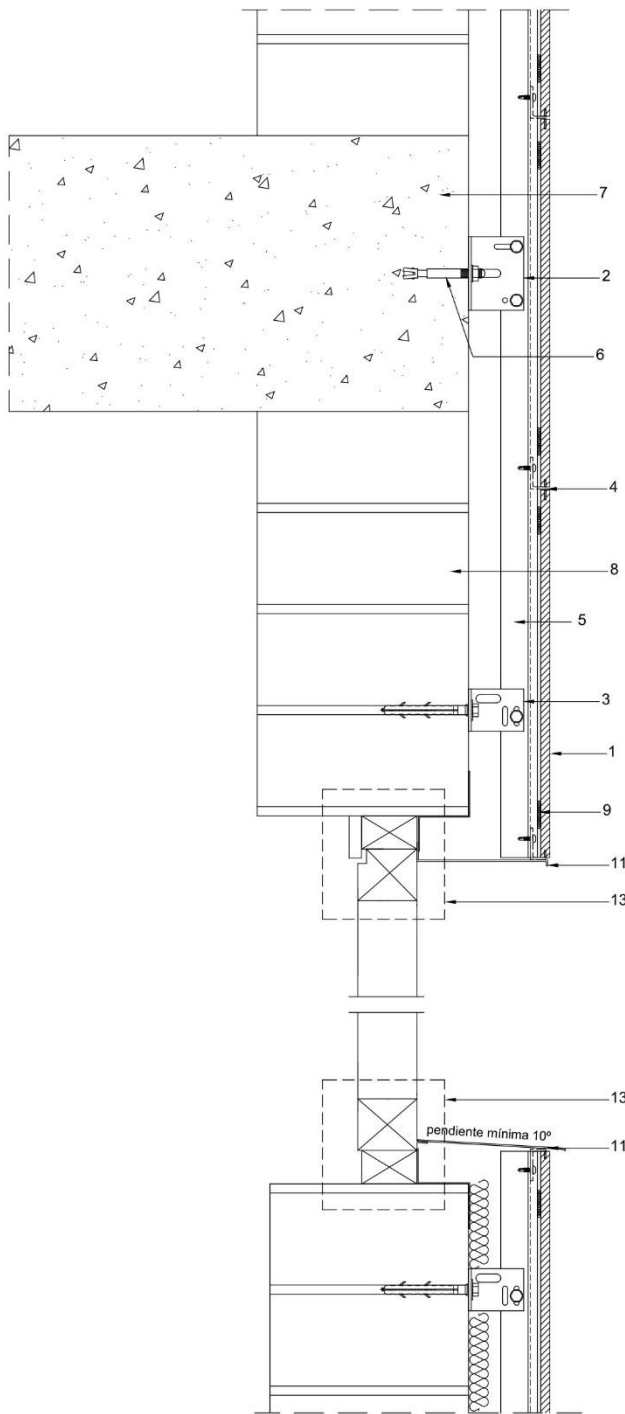


- 1- CERAMIC PLATE
- 2- SUPPORTING BRACKET (60+40) 80x3
- 3- RETENTION BRACKET (60+40) 46x3
- 4- CLIP
- 5- "T" PROFILE
- 6- ANCHORAGE TO SUBSTRATE
- 7- SUBSTRATE-LOAD BEARING
- 8- SUBSTRATE
- 9- FILLER MS
- 10- SELF-DRILLING SCREWS, ANCHORING BETWEEN SUBFRAME ELEMENTS
- 11- ALUMINIUM TOP



- 1- CERAMIC PLATE
- 2- RETENTION BRACKET (60+40) 46x3
- 3- CLIP
- 4- "T" PROFILE
- 5- ANCHORAGE TO SUBSTRATE
- 6- SUBSTRATE
- 7- FILLER MS
- 8- SELF-DRILLING SCREWS, ANCHORING BETWEEN SUBFRAME ELEMENTS
- 9- ALUMINIUM NET

FIGURE 7: WINDOW DETAIL



- 1- CERAMIC PLATE
- 2- SUPPORTING BRACKET (60+40) 80x3
- 3- RETENTION BRACKET (60+40) 46x3
- 4- CLIP
- 5- "T" PROFILE
- 6- ANCHORAGE TO SUBSTRATE
- 7- SUBSTRATE-LOAD BEARING
- 8- SUBSTRATE
- 9- FILLER MS
- 10- SELF-DRILLING SCREWS, ANCHORING BETWEEN SUBFRAME ELEMENTS
- 11- ALUMINIUM WINDOW FRAME
- 12- "L" PROFILE
- 13- WINDOW DETAILS TO DEFINE

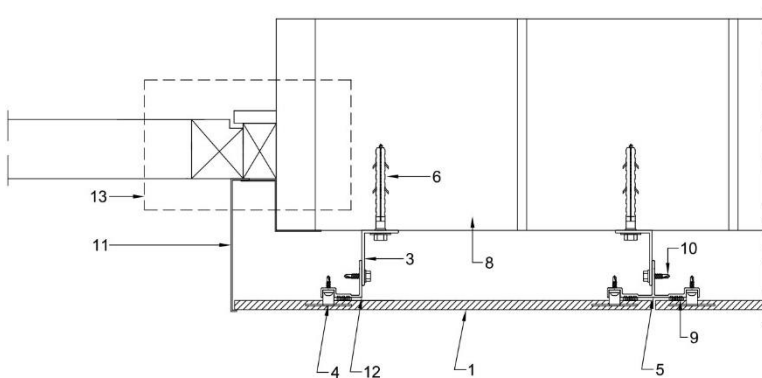
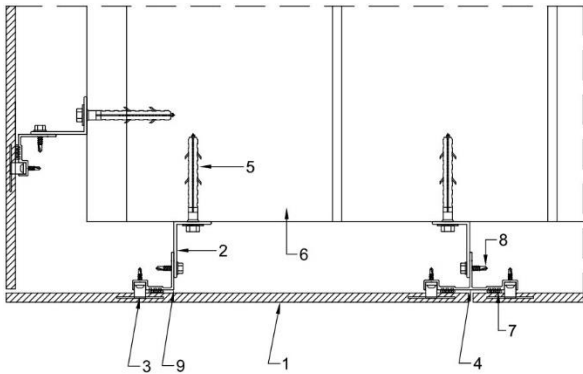
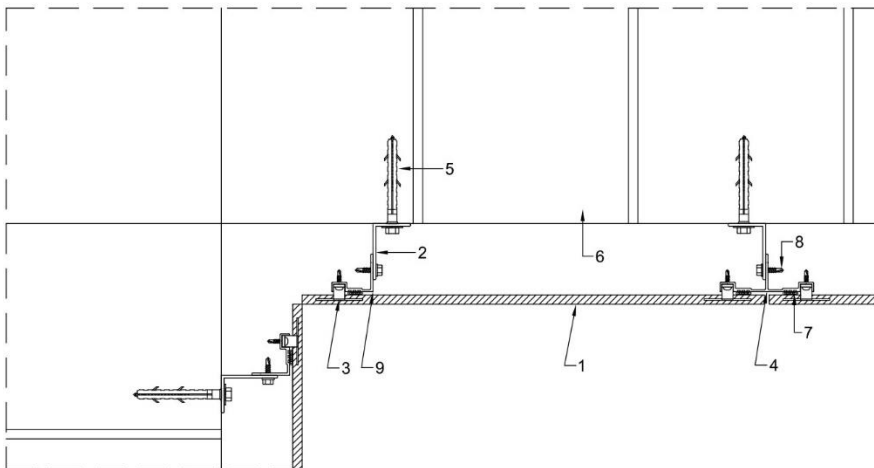


FIGURE 8: DETAIL OF INTERNAL AND EXTERNAL CORNER

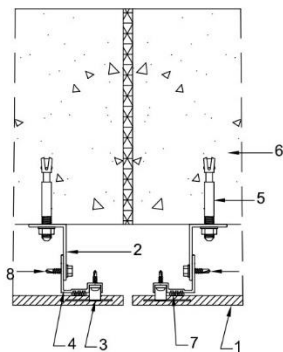


- 1- CERAMIC PLATE
- 2- RETENTION BRACKET (60+40) 46x3
- 3- CLIP
- 4- "T" PROFILE
- 5- ANCHORAGE TO SUBSTRATE
- 6- SUBSTRATE
- 7- FILLER MS
- 8- SELF-DRILLING SCREWS, ANCHORING BETWEEN SUBFRAME ELEMENTS
- 9- "L" PROFILE



- 1- CERAMIC PLATE
- 2- RETENTION BRACKET (60+40) 46x3
- 3- CLIP
- 4- "T" PROFILE
- 5- ANCHORAGE TO SUBSTRATE
- 6- SUBSTRATE
- 7- FILLER MS
- 8- SELF-DRILLING SCREWS, ANCHORING BETWEEN SUBFRAME ELEMENTS
- 9- "L" PROFILE

FIGURE 9: JOINT DETAIL



- 1- CERAMIC PLATE
- 2- SUPPORTING BRACKET (60+40) 80x3
- 3- CLIP
- 4- "L" PROFILE
- 5- ANCHORAGE TO SUBSTRATE
- 6- SUBSTRATE
- 7- FILLER MS
- 8- SELF-DRILLING SCREWS, ANCHORING BETWEEN SUBFRAME ELEMENTS

Annex A: Fixings and Subframe specifications

A.1 Material of fixings and subframe

Aluminium physical and mechanical properties

Symbolic designation	EN AW-Al MgSi		
Numeric designation	EN AW 6060/6063 ⁽¹⁰⁾ AlMg0,7Si		
Treatment	T5		
Corrosion protection	Brackets and clips	Anodic oxidation	Class 15 or 20 ⁽¹¹⁾
	Vertical profiles	Lacquered (thickness $\geq 90\mu\text{m}$)	Class SEASIDE ⁽¹²⁾
PHYSICAL PROPERTIES			
Density	2.7 g/cm ³		
Coefficient of linear thermal expansion (20 ^o -100 ^o C)	2.4 · 10 ⁻⁵ °C ⁻¹		
Elastic modulus	68600 MPa		
Poisson coefficient	0.33		
MECHANICAL PROPERTIES			
Tensile strength (R _m)	≥ 175 MPa		
Elastic limit (R _{p0,2})	≥ 130 MPa		
Elongation (A _{50mm})	≥ 6 %		
Brinell hardness	65 HB		
According to EN 755-2: 2016 ⁽¹³⁾ and EN 12020-1: 2008 ⁽¹⁴⁾			

A.2 Skin elements fixings

Metallic punctual clip

Reference	Intermediate	Starting and Ending
Section (mm ²)	156	143
Perimeter (mm)	136	114
Weight (kg/m)	0.4212	0.3861
x _c (mm)	5.24	4.21
I _{xc} (cm ⁴)	2.1099	1.6892
r _{xc} (mm)	11.6297	10.8685
y _c (mm)	11.42	12.96
I _{yc} (cm ⁴)	0.5399	0.3609
r _{yc} (mm)	5.8829	5.0237

A.3 Subframe specifications

Vertical profiles geometrical and mechanical features

Reference	T 40x100	L 40x44
Section (mm ²)	393	229.8
Perimeter (mm)	364	210.1
Weight (kg/m)	1.06	0.62
x _c (mm)	± 50.00	± 29.16
I _{xc} (cm ⁴)	3.5809	2.8778
r _{xc} (mm)	± 9.54	± 11.20
y _c (mm)	± 7.96	± 11.05
I _{yc} (cm ⁴)	29.6443	5.2209
r _{yc} (mm)	± 27.47	± 15.07

(10) Aluminium alloy 6060/6063 T5 is classified as class B according to (Eurocode 9): EN 1999-1-1:2007+A1:2009 Design of aluminium structures. General structural rules. Table 3.1 and Table.C.1 in Annex C.

(11) Mean thickness 15 μ or 20 μ according to the quality mark QUALANOD

(12) According to the quality mark QUALICOAT

(13) EN 755-2: 2016 Aluminium and aluminium alloys. Extruded rod/bar, tube and profiles. Part 2: Mechanical properties.

(14) EN 12020-1: 2008 Aluminium and aluminium alloys. Extruded precision profiles in alloys EN AW-6060 and EN AW-6063. Part 1: technical conditions for inspection and delivery.

Brackets geometrical and mechanical features

Supporting bracket			
Reference	L 60x40	L 100x40	L 140x40
Thickness (mm)	3	4.5	5
Section (mm ²)	291	615	880
Perimeter (mm)	200	278	358
Weight (kg/m)	0.78	1.66	2.38
x _c (mm)	± 19.13	37.21	56.19
I _{xc} (cm ⁴)	4.0262	6.4718	7.5328
r _{xc} (mm)	11.76	10.26	9.25
y _c (mm)	± 9.13	7.47	6.50
I _{yc} (cm ⁴)	10.9852	64.9488	179.5113
r _{yc} (mm)	19.43	32.49	45.16

A.4 Subframe fixings

Stainless steel screw between bracket and vertical profile

DIN 7504K	Description	hex head self-drilling screw
	Standard	DIN 7504K ⁽¹⁵⁾ EN ISO 15480:2000 ⁽¹⁶⁾
DIN 7504N	Description	Cross recessed pan head self-drilling screw
	Standard	DIN 7504N ⁽¹⁷⁾ EN ISO 15481:2000 ⁽¹⁸⁾
	Head	TORX
	Diameter	5.5 mm
	Length	19-50 mm
	Material	Stainless steel A2 (AISI 304)
	Standard	EN ISO 3506-1: 2010 ⁽¹⁹⁾
	Steel resistance class	60
	Tensile strength (R_m)	600 MPa
	Elastic limit (R_{p0.2})	450 MPa
	Pull-out resistance	2.7kN (Sheet thickness 3mm)
	Shear strength	11.1 kN

Stainless steel screw between vertical profile and clip

Description	TORX special head self-drilling screw
Diameter	4.8 mm
Length	19 mm
Material	Stainless steel A2
Standard	EN ISO 3506-1: 2010
Pull-out resistance	1.9 kN (Sheet thickness 1,5mm)
Torsional resistance	11.4 Nm
Shear strength	9.4 kN

⁽¹⁵⁾ DIN 7504K hex head self-drilling screw.

⁽¹⁶⁾ EN ISO 15480:2000 Hexagon washer head drilling screws with tapping screw thread (ISO 15480:1999).

⁽¹⁷⁾ DIN 7504N Cross recessed pan head self-drilling screw.

⁽¹⁸⁾ EN ISO 15480:2000 Cross recessed pan head drilling screws with tapping screw head (iso 15481:1999).

⁽¹⁹⁾ EN ISO 3506-1:2010 Mechanical properties of corrosion-resistant stainless steel fasteners - Part 1: Bolts, screws and studs (ISO 3506-1:2009).

Annex B: Auxiliary components

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 and when possible, CE marking according to the ETA via ETAG 001, ETAG 020 or ETAG 029 is recommended.

Adhesive: Polymer filler MS

Type	SOLTEC MS40 B
Density at 20° C	1.40 ± 0.05 to 1.55 ± 0.05 g/ml
Application temperature	+ 5° C to + 45° C
Shore Hardness A (DIN 53505)	Ac. 40
Modulus at 100 % (DIN 53504)	Ac. 1 MPa
Elongation at fracture (DIN 53504)	Ac. 300 %
Modulus of rupture (DIN 53504)	Ac. 1.4 MPa
Temperature resistance	- 30° C to + 90° C

Annex C: Generic skin element

Dry pressed ceramic plates Dimensional features

STANDARD DIMENSIONS ⁽²⁰⁾				
Nominal size(mm)	Lenght (mm)	Width (mm)	Thickness (mm)	Weight (kg)
300x600	600	300	11	9,45
600x600	600	600	11	9,90
450x900	900	450	11	11,14
600x1200	1200	600	11	19,80

Classification, dimensional tolerance and physical properties⁽²¹⁾

CLASIFICACION		
Manufacturing method	Dry pressing (Group BI _a)	
Water absorption (E)	≤ 0,5 % (Group BI _a)	
DIMENSIONAL TOLERANCE		
Lenght and Width (mm)	± 0,6	%
Thickness (mm)	± 5,0	%
Squareness (mm)	± 0,6	%
Flatness (mm)	± 0,5	%
PHYSICAL PROPERTIES		
Bulk density	2,35 ± 0.1	g/cm ³
Water absorption	≤ 0,5	%
Flexural strength	≥ 35	MPa
Breaking load	≥ 1.300	N
coefficient of linear thermal expansion	± 7x10 ⁻⁶	K ⁻¹
Resistance to termal shock	Resistant	
Frost resistance	Resistant	
Reaction to fire	A1	

(20) Available smaller dimensions with the same thickness.

(21) EN 14411:2016 Ceramic tiles - Definitions, classification, characteristics and marking.