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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA 20/0946 of 14.06.2022

General part

Technical Assessment Body issuing the ETA: ITeC ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment)	
Trade name of the construction product	**FTS 502B and FTS 502B+ kits**
Product family to which the construction product belongs	Subframe and fixing kit for fastening cladding elements and also external wall elements in ventilated or non-ventilated façades
Manufacturer	**LOUVELIA FACADE SOLUTIONS, S.L.** Av. Alcalde Caballero 16 ES-50014 Zaragoza Spain
Manufacturing plant(s)	Virgen del Buen Acuerdo, 2 Pol. Ind. Alcalde Caballero ES-50014 Zaragoza Spain
This European Technical Assessment contains	27 pages including 6 annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of	European Assessment Document, EAD 090034-00-0404 *Kit composed by subframe and fixings for fastening cladding and external wall elements*.
This ETA replaces	ETA 20/0946 issued on 22.01.2021

General comments

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Specific parts of the European Technical Assessment

1 Technical description of the product

This ETA refers to the kits FTS 502B and FTS 502B+ for fastening skin elements[1] (cladding elements and external wall elements)

FTS 502B and FTS 502B+ kits components are given in table 1.1.

Detailed information and data of all the components are given in the annexes of this ETA.

The following ventilated façade elements or components are not considered in this ETA:

- The skin elements[2].
- The fixings between the subframe and the supporting structure[3].
- The other layers of the façade, like insulation and internal layers.

The configuration of the assembled system is shown in Annex 1

FTS 502B and FTS 502B+ kits are made of mechanical components. Adhesives are not needed for assembly.

FTS 502B and FTS 502B+ kits are non-load bearing construction elements. They do not contribute to the stability of structure on which they are installed.

Table 1.1: Kit components.

N.	Generic component		FTS 502B (*)	FTS 502B+ (*)	Technical description in Annexes
1	Cladding fixing	Skin element fixing	Stainless steel clips FTS 502B	Stainless steel clips FTS 502B+	Annex 2
		Screw	Stainless steel screws		Annex 5
2	Subframe	Vertical profile	Aluminium alloy profiles		Annex 3
		Bracket	Aluminium alloy brackets		Annex 4
		Subframe fixing	Stainless steel screws		Annex 5
		Ancillary components	EPDM joint profile		Annex 5
(*) Kits belonging to type 2 and type 3 according to EAD 090034-00-0404.					

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

FTS 502B and FTS 502B+ kits are intended to be used as mechanical fastening of skin elements (claddings or external wall elements) in façades with air space, ventilated or not, and intended to be used on supporting structures[3] which meet the mechanical strength requirements.

[1] From now on this term refers to both cladding elements and external wall elements.

[2] If the skin elements are cladding elements, other EADs may apply (e.g. EAD 090062, EAD 090020, etc.).

[3] The term “supporting structure” refers to both of following descriptions:

- The wall, which in itself already meets the airtightness and mechanical strength requirements (resistance to static and dynamic loads). The substrate walls are made of masonry (clay, concrete or stone), concrete (cast on site or as prefabricated panels), timber or metal frame.
- The supporting structure of the building, which in itself does not meet the airtightness requirement but meets the mechanical strength requirements (resistance to static and dynamic loads). Usually, the supporting structures of the building are made of concrete (cast on site or prefabricated), timber or metal frame.
  In this case, the airtightness requirements are met by the internal leaves of the façade.

FTS 50B and FTS 502B+ kits are intended to be used for the fixing of skin elements ceramic tiles according to EN 14411 and/or natural stone according to EN 1469 (see clause A6.1 of Annex 6 for more information on the skin element specifications). In both cases of FTS 502B kit and FTS 502B+ kit, the skin elements may include or may not include grooves.

The skin elements are not part of the kit object of this ETA. The safety in use of the skin elements has to be assessed separately.

The provisions made in this European Technical Assessment are based on an assumed working life of at least 25 years for FTS 502B and FTS 502B+ kits. 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 products in relation to the expected economically reasonable working life of the works.

FTS 502B and FTS 502B+ kits are made of non-load bearing construction components. They do not contribute directly to the stability of the wall on which they are installed.

FTS 502B and FTS 502B+ kits are not intended to ensure the airtightness of the building envelope.

Detailed information and data regarding design, installation, maintenance and repair criteria are given in Annex 6.

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

The assessment of FTS 502B and FTS 502B+ kits for the intended was performed following the EAD 090034-00-0404 *Kit composed by subframe and fixings for fastening cladding and external wall elements*.

Table 3.1: Summary of the FTS 502B and FTS 502B+ kits performance (see also detailed performances in relevant clauses).

Product:	FTS 502B and FTS 502B+ kits	**Intended use:**	Mechanical fastening of skin elements (claddings or external wall elements) in façades with air space, ventilated or not.

Basic Works Requirement	**ETA clause**	**Essential characteristic**	**Performance**	
			FTS 502B	**FTS 502B+**
BWR 2 Safety in case of fire	3.1	Reaction to fire	B-s1,d0	
BWR 4 Safety and accessibility in use	3.2	Wind load resistance	See tables 3.2	
	---	Resistance to vertical load of the kit	Not assessed	
	3.3	Resistance to vertical load of skin element fixing	See table 3.3	
	3.4	Resistance to horizontal load of skin element fixing	See table 3.4	
	---	Resistance to pulsating load of skin element fixings	Not assessed	
	---	Resistance of skin element fixings in case of inaccuracies of installation	No relevant	
	3.5	Pull-through resistance of fixings from profile	See table 3.4	
	3.6	Pull-out resistance of subframe fixings from profile	See table 3.5	
	3.7	Inertia and resistance of profiles	See Annex 3	
	3.8	Resistance of vertical load of brackets	See table 3.6	
	3.9	Resistance of horizontal load of brackets	See table 3.7	
	3.10	Mechanical characteristics of subframe fixings	See table 3.5	
	3.11	Corrosion	See clause 3.11	

Complementary information:

Requirements with respect to the mechanical resistance and stability of non-load bearing parts of the works are not included in the Basic Works Requirement *Mechanical resistance and stability* (BWR 1) but are treated under the Basic Works Requirement *Safety and accessibility in use* (BWR 4).

The fire resistance requirement is applicable to the wall (made of masonry, concrete, timber or metal frame) and not to the FTS 502B and FTS 502B+ kits themselves.

3.1 Reaction to fire

Reaction to fire of FTS 502B and FTS 502B+ kits according to Commission Delegated Regulation (EU) 2016/364 and EN 13501-1 is class B-s1,d0. It is based on the relevant tests according to EN 13501-1 including EPDM joint profiles.

Note: A European reference fire scenario has not been laid down for façades. In some Member States, the classification of external wall claddings according to EN 13501-1 might not be sufficient for the use in façades. An additional assessment of external wall claddings according to national provisions (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 Wind load resistance

FTS 502B and FTS 502B+ kits wind load resistance has been determined according to clause 2.2.2 of EAD 090034-00-0404 considering the wind suction resistance tests and the mechanical resistance of the components (see clauses 3.3 to 3.10). Test results are given in tables 3.2.

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 obtained in the tests.

Table 3.2.1: Wind suction test results.

Test	System	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FTS 502B – Clip 13 mm	3800 (5)	9,61 (9)	0,66
Suction (2)		2200 (6)	8,63 (10)	1,11 (13)
Suction (3)		1800 (7)	7,87 (11)	0,61
Suction (4)		2200 (8)	8,09 (12)	0,71

(1) Test specimen 1: ceramic tiles as skin elements, two tiles 1200 mm x 400 mm, four tiles 600 mm x 400 mm, four tiles 1200 mm x 300 mm and eight tiles 600 mm x 300 mm with four clips at each tile; four vertical profiles at distances 1200 mm and 600 mm, four EPDM profiles; twelve brackets 60 x 80 x 60 x 3 mm (span 750 mm), and subframe fixings.

(2) Test specimen 2: ceramic tiles as skin elements, four tiles 1200 mm x 500 mm and eight tiles 600 mm x 500 mm with four clips at each tile; four vertical profiles at distances 1200 mm and 600 mm, four EPDM profiles; eight brackets 60 x 60 x 60 x 3 mm and four brackets 120 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.

(3) Test specimen 3: ceramic tiles as skin elements, four tiles 1500 mm x 500 mm and eight tiles 450 mm x 500 mm with four clips at each tile; four vertical profiles at distances 1500 mm and 450 mm, four EPDM profiles; eight brackets 60 x 60 x 60 x 3 mm and four brackets 120 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.

(4) Test specimen 4: ceramic tiles as skin elements, four tiles 1800 mm x 500 mm with six clips at each tile and eight tiles 300 mm x 500 mm with four clips at each tile; five vertical profiles at distances 900 mm and 300 mm, five EPDM profiles; ten brackets 60 x 60 x 60 x 3 mm and five brackets 120 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.

(5) Maximum load reached without kit failure (at test equipment limit).

(6) Groove breakage on the four corners, at union point with clips, of the central 1200 mm x 500 mm tile.

(7) Groove breakage on the upper corners, at union point with clips, of the central 1500 mm x 500 mm tile.

(8) Groove breakage at all union points with clips of the central 1800 mm x 500 mm tiles.

(9) Maximum displacement and deformation measured on the horizontal border of the central 1200 mm x 400 mm tile.

(10) Maximum displacement measured on the horizontal border of the central 1200 mm x 500 mm tile.

(11) Maximum displacement and deformation measured on the centre of the central 1500 mm x 500 mm tile.

(12) Maximum displacement and deformation measured on the right-span horizontal border of the 1800 mm x 500 mm tile.

(13) Maximum deformation measured on the corner of the central 1200 mm x 500 mm tile.

Table 3.2.2: Wind suction test results.

Test	System	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FTS 502B – Clip 15 mm TW18	3600 (2)	17,70 (3)	2,30

(1) Test specimen 1: ceramic tiles as skin elements, five tiles 1200 mm x 400 mm and ten tiles 600 mm x 400 mm with four clips for each panel; four vertical profiles at distances 1200 mm and 600 mm, four EPDM profiles; twelve brackets 60 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.

(2) Maximum load reached without kit failure (at test equipment limit).

(3) Maximum displacement and deformation measured on the centre of the central 1200 mm x 400 mm tile.

Table 3.2.3: Wind suction test results.

Test	System	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FTS 502B – Clip 15 mm GA20	3600 (5)	15,71 (9)	4,33
Suction (2)		1600 (6)	6,11 (10)	0,39
Suction (3)		2400 (7)	9,26 (11)	3,51
Suction (4)		1800 (8)	12,52 (12)	1,46

(1) Test specimen 1: ceramic tiles as skin elements, five tiles 1200 mm x 400 mm and ten tiles 600 mm x 400 mm with four clips for each tile; four vertical profiles at distances 1200 mm and 600 mm, four EPDM profiles; twelve brackets 60 x 80 x 60 x 3 mm (span 750 mm), and subframe fixings.

(2) Test specimen 2: ceramic tiles as skin elements, two tiles 1500 mm x 600 mm, two tiles 1500 mm x 400 mm, four tiles 450 mm x 600 mm and four tiles 450 mm x 400 mm with four clips at each tile; four vertical profiles at distances 1500 mm and 450 mm, four EPDM profiles; eight brackets 60 x 60 x 60 x 3 mm and four brackets 120 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.

(3) Test specimen 3: ceramic tiles as skin elements, two tiles 1800 mm x 600 mm with six clips at each tile, four tiles 1200 mm x 600 mm and four tiles 300 mm x 600 mm with four clips for each tile; five vertical profiles at distances 900 mm and 300 mm, five EPDM profiles; ten brackets 60 x 60 x 60 x 3 mm and five brackets 120 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.

(4) Test specimen 4: ceramic tiles as skin elements, Vertical configuration (all tiles are placed vertically): two tiles 1800 mm x 600 mm, four tiles 100 mm x 600 mm, three tiles 1500 mm x 400 mm and six tiles 250 mm x 400 mm with four clips at each tile; six vertical profiles at distances 600 mm and 400 mm, six EPDM profiles; twelve brackets 60 x 60 x 60 x 3 mm and six brackets 120 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.

(5) Maximum load reached without kit failure (at test equipment limit).

(6) Groove breakage on the corners, at union point with clips, of one side of the central 1500 mm x 600 mm tile.

(7) Groove breakage at all union points with clips of the central 1800 mm x 600 mm tiles.

(8) Groove breakage on the corners, at union points with clips, of the left-side 1800 mm x 600 mm tile.

(9) Maximum displacement and deformation measured on the centre of the central 1200 mm x 400 mm tile.

(10) Maximum displacement and deformation measured on the centre of tiles 1500 mm x 600 and tiles 1500 mm x 400 mm.

(11) Maximum displacement and deformation measured on the corner of the central 1800 mm x 600 tile, at the union point with the clip.

(12) Maximum displacement and deformation measured at the right vertical edge of the central 1800 mm x 600 tile, in the middle of the vertical profile.

Table 3.2.4: Wind suction test results.

Test	System	Maximum load Q (Pa)	Deflection under maximum load (mm)	Deflection after 1 min recovery (mm)
Suction (1)	FTS 502B+ – Clip GA20+	3600 (2)	11,40 (3)	1,33 (4)

(1) Test specimen 1: ceramic tiles as skin elements, two tiles 1200 mm x 600 mm, two tiles 1200 mm x 400 mm, four tiles 600 mm x 600 mm and four tiles 600 mm x 400 mm with four clips at each tile; four vertical profiles at distances 1200 mm

Table 3.2.4: Wind suction test results.

	and 600 mm, four EPDM profiles; eight brackets, four of 120 x 60 x 60 x 3 mm and eight of 60 x 60 x 60 x 3 mm (span 750 mm), and subframe fixings.
(2)	Groove breakage on the corners, at all union points with clips, of the 1200 mm x 600 mm tile and 1200 mm x 400 mm tile.
(3)	Maximum displacement measured on the centre of the central 1200 mm x 600 mm tile.
(4)	Maximum deformation measured on the centre of the lateral 600 mm x 600 mm tile.

3.3 Resistance to vertical load of skin element fixing

Resistance to vertical load of FTS 502B and FTS 502B+ kits skin element fixings have been tested; mean and characteristic values are given in table 3.3.

Table 3.3: Clips vertical load resistance.

Type of fixing device		**Resistance (N) at 1 mm of permanent deflection**		**Ultimate resistance (N)**		**Failure**
		F_m	**F_c**	**F_m**	**F_c**	
FTS 502B skin element fixing	Simple clip 15 mm TW18	246	183	548	383	Clip deformation
	Simple clip 13 mm	288	280	351	332	
	Double clip 13 mm	424	400	469	453	
	Simple clip 15 mm GA20	307	271	533	474	
	Simple clip 16 mm	243	222	438	404	
	Simple clip 17 mm	242	224	441	425	
	Simple clip 18 mm	206	189	413	380	
	Simple clip 19 mm	91	80	108	95	
	Simple clip 27 mm/1,5 mm	115	98	232	222	
FTS 502B+ skin element fixing	Clip GA20+	928	798	1613	1578	
	Simple clip 27 mm/2,5 mm	270	185	513	496	

Where:

F_m = mean value; F_c = characteristic value with a 75% confidence that 95% of results will be higher than this value.

3.4 Resistance to horizontal load of skin element fixing

Resistance to horizontal load of FTS 502B and FTS 502B+ kits skin element fixings have been tested; mean and characteristic values are given in table 3.4.

Table 3.4: Clips horizontal load resistance.

Type of fixing device		**Resistance (N) at 1 mm of permanent deflection**		**Ultimate resistance (N)**		**Failure**
		F_m	**F_c**	**F_m**	**F_c**	
FTS 502B skin element fixing	Simple clip 15 mm TW18 (*)	312	199	786	635	Clip deformation
	Simple clip 13 mm	678	509	746	697	
	Double clip 13 mm	(**)		506	479	
	Simple clip 15 mm GA20 (*)	303	237	497	452	
	Simple clip 16 mm (*)	286	228	574	543	
	Simple clip 17 mm (*)	321	253	651	512	
	Simple clip 18 mm (*)	366	348	691	622	
	Simple clip 19 mm	(**)		517	467	

Table 3.4: Clips horizontal load resistance.

FTS 502B+ skin element fixing	Simple clip 27 mm/1,5 mm (*)	319	235	551	444
	Clip GA20+ (*)	956	826	1908	1838
	Simple clip 27 mm/2,5 mm (*)	728	609	1328	1135

Where:

F_m = mean value; F_c = characteristic value with a 75% confidence that 95% of results will be higher than this value.

(*) Tested clips without assembling with the vertical profile. Higher resistance is expected for 1 mm of permanent deflection when assembled.

(**) This value has not been measured because of the excessive clip deflection before reaching 1 mm of permanent deflection.

3.5 Pull-through resistance of fixings

Pull-through resistance of fixings has been assessed by testing skin element fixings under horizontal load; mean and characteristic values are given in table 3.4.

3.6 Pull-out resistance of fixings on profiles

Pull-out resistance of fixings on profile minimum thickness 1,8 mm has been tested; mean and characteristic values are given in table 3.5.

Table 3.5: Pull-out resistance and shear strength of subframe screws.

Test specimen	**Pull-out resistance (N)**		**Shear strength (N)**	
	F_m	**F_c**	**F_m**	**F_c**
Profile: Thickness 1,8 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø4,8 mm, A2 stainless steel.	1938	929	5234	4956
Profile: Thickness 1,8 mm, AW-6063 aluminium alloy. Self-drilling screw: Ø5,5 mm, A2 stainless steel.	2155	1784		

Where:

F_m = mean value; F_c = characteristic value with a 75% confidence that 95% of results Will be higher than this value.

(*) Shear strength not tested. Minimum shear strength value from tested screw.

3.7 Inertia and resistance of profiles

The following characteristics of the profiles are given in Annex 3:

- Form and dimensions of the profile's sections.
- Inertia of the profile's sections.
- Minimum elastic limit of the profile's material.

3.8 Resistance to vertical load of brackets

Resistance to vertical load of brackets has been tested; mean and characteristic values are given in table 3.6.

Table 3.6: Bracket resistance to vertical load.

Bracket H x L x B x t (mm)	Resistance (N) at 1 mm of displacement		Resistance (N) at 3 mm displacement		Resistance (N) at ΔL = 0,2%·L mm permanent deflection		Ultimate resistance (N)	
	F_m	F_c	F_m	F_c	F_m	F_c	F_m	F_c
60 x 60 x 60 x 3 (*)	933	739	2150	1813	1256	987	4138	3746
60 x 80 x 60 x 3	367	269	933	739	844	719	3188	3029
60 x 100 x 60 x 3 (*)								
60 x 120 x 60 x 3	267	169	550	382	817	705	1839	1667
60 x 140 x 60 x 3 (*)								
60 x 160 x 60 x 3	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
60 x 180 x 60 x 3 (*)								
60 x 200 x 60 x 4	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)
60 x 220 x 60 x 4 (*)								
120 x 60 x 60 x 3 (*)	1500	1163	5900	5563	2457	1701	13557	12754
120 x 80 x 60 x 3	1033	519	2767	2572	1871	1359	9414	8708
120 x 100 x 60 x 3 (*)								
120 x 120 x 60 x 3	500	500	1567	1372	1529	1370	5229	4796
120 x 140 x 60 x 3 (*)								
120 x 160 x 60 x 3	159	112	448	378	341	190	848	757
120 x 180 x 60 x 3 (*)								
120 x 200 x 60 x 4	220	180	575	517	524	266	1165	1096
120 x 220 x 60 x 4 (*)								
180 x 60 x 60 x 3 (*)	1567	788	6867	6478	4667	3965	17900	17008
180 x 80 x 60 x 3	900	563	3367	2978	3250	2574	10713	10142
180 x 100 x 60 x 3 (*)								
180 x 120 x 60 x 3	567	372	2333	1632	2033	1750	5511	5027
180 x 140 x 60 x 3 (*)								
180 x 160 x 60 x 3	453	365	1016	969	793	660	1714	1613
180 x 180 x 60 x 3 (*)								
180 x 200 x 60 x 4	507	357	1184	1085	912	722	1994	1836
180 x 220 x 60 x 4 (*)								

Where:

L = length; H = height; B = base; t = thickness

F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

(*) Tested bracket which gives value to the other stronger brackets.

(**) Bracket not considered for this use.

3.9 Resistance to horizontal load of brackets

Resistance to horizontal load of brackets has been tested; mean and characteristic values are given in table 3.7.

Table 3.7: Bracket resistance to horizontal load.

Bracket H x L x B x t (mm)	Resistance (N) at 1 mm of permanent deflection		Ultimate resistance (N)	
	F_m	F_c	F_m	F_c
60 x 60 x 60 x 3 (*)	1380	472	3440	3050
60 x 80 x 60 x 3	1367	896	3417	3162
60 x 100 x 60 x 3				
60 x 120 x 60 x 3				
60 x 140 x 60 x 3 (*)				
60 x 160 x 60 x 3	2340	1480	4213	4016
60 x 180 x 60 x 3 (*)				
60 x 200 x 60 x 4	3838	2695	7343	6881
60 x 220 x 60 x 4 (*)				
120 x 60 x 60 x 3 (*)	1800	1371	5050	2683
120 x 80 x 60 x 3	2300	1766	4200	3810
120 x 100 x 60 x 3 (*)				
120 x 120 x 60 x 3				
120 x 140 x 60 x 3 (*)	2767	2068	5233	4482
120 x 160 x 60 x 3	1440	1148	2382	2251
120 x 180 x 60 x 3 (*)				
120 x 200 x 60 x 4	1888	1074	3565	3385
120 x 220 x 60 x 4 (*)				
180 x 60 x 60 x 3 (*)	1933	1405	4967	4457
180 x 80 x 60 x 3	2100	1239	4233	3724
180 x 100 x 60 x 3 (*)				
180 x 120 x 60 x 3				
180 x 140 x 60 x 3 (*)	2367	1857	4467	4016
180 x 160 x 60 x 3	1723	1492	2980	2843
180 x 180 x 60 x 3 (*)				
180 x 200 x 60 x 4	2629	2042	4708	4222
180 x 220 x 60 x 4 (*)				

Where:

H = height; L = length; B = base; t = thickness

F_m = mean values; F_c = characteristic values giving 75% confidence that 95% of results will be higher than this value.

(*) Tested bracket which gives value to the other stronger brackets.

3.10 Mechanical characteristic of subframe fixings

Shear load strength of subframe fixings has been tested (see table 3.5).

Tensile strength of subframe fixing at least meets the values given in the table 3.5 for pull-out resistance.

3.11 Corrosion

The skin element fixings of FTS 502B and FTS 502B+ kits (clips) are made of stainless steel 1.4301 according to EN 10088 and the subframe fixings are made of A2 stainless steel according to EN ISO 3506-1. Therefore, these components may be used in dry internal conditions or exposure in permanent damp internal conditions and also in external atmospheric exposure with high category of corrosivity of the atmosphere (included industrial and marine environment, C4 as defined in ISO 9223), provided that no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent or alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

The vertical profiles and the brackets are made of aluminium alloy AW-6063 according to EN 573, EN 1999 and EN 755. The durability is class B and the minimum thickness is 1,8 mm. 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.

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

According to the decision 2003/640/EC, as amended of the European Commission[4], the systems of AVCP (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table apply.

Table 4.1: Applicable AVCP system.

Product	Intended use	Level or class	System
Subframe and fixing kits for fastening cladding and external wall elements	External finishes of walls	Any	2+
	For uses subject to regulations on reaction to fire	B-s1,d0 (*)	3

(*) Class B,s1-d0 for FTS 502B and FTS 502B+ kits which contain the EPDM joint profiles.

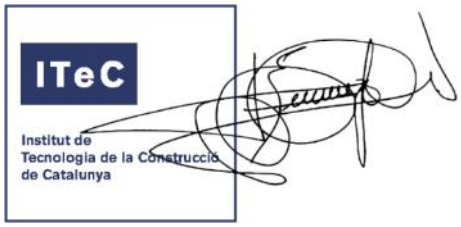
[4] 2003/640/EC – Commission Decision of date 4 September 2003, published in the Official Journal of the European Union (OJEU) L226/21 of 10/09/2003.

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

All the necessary technical details for the implementation of the AVCP system are laid down in the *Control Plan* deposited with the ITeC[5], with which the factory production control shall be in accordance.

Issued in Barcelona on 14 June 2022

by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart

Technical Director, ITeC

[5] The *Control Plan* is a confidential part of the ETA and is only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

ANNEX 1: FTS 502B and FTS 502B+ assembled system

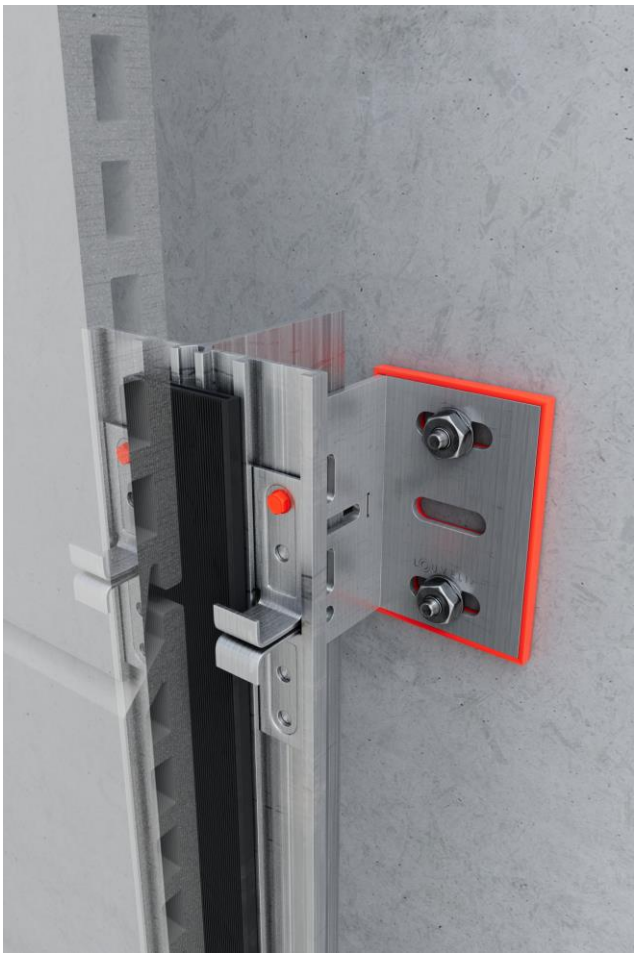


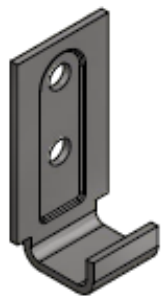
Figure A1.1: FTS 502B and FTS 502B + assembled systems.

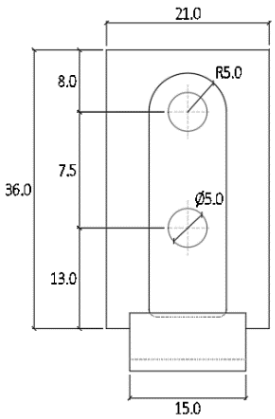
ANNEX 2: Fixing devices components

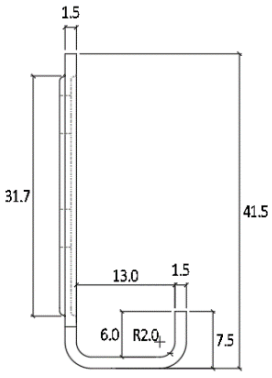
Table A2.1: Geometric and material properties of the clips.

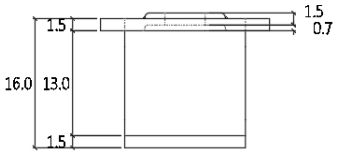
Geometry characteristics			
Form and dimensions (mm)	FTS 502B clips	Simple clip 13 mm	See figure A2.1
		Double clip 13 mm	See figure A2.2
		Simple clip 15 mm GA20	See figure A2.3
		Simple clip 15 mm TW18	See figure A2.4
		Simple clip 16 mm	See figure A2.5
		Simple clip 17 mm	See figure A2.6
		Simple clip 18 mm	See figure A2.7
		Simple clip 19 mm	See figure A2.8
		Simple clip 27 mm/1,5 mm	See figure A2.9
	FTS 502B+ clips	Clip GA20+	See figure A2.10
		Simple clip 27 mm/2,5 mm	See figure A2.11

Material properties		**Value**	**Reference**
Clips	Material	Stainless steel 1.4301 (X5CrNi18-10)	EN 10088-2
	Resistance to corrosion	Pass	
	Specific weight (kg/m^3)	7900	
	Elastic limit (MPa)	≥ 230	
	Tensile strength (MPa)	540 a 750	
	Elongation (%)	≥ 45	
	Modulus of elasticity at 20 ºC (GPa)	200	
	Poisson coefficient	0,3	
	Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))	16,0	



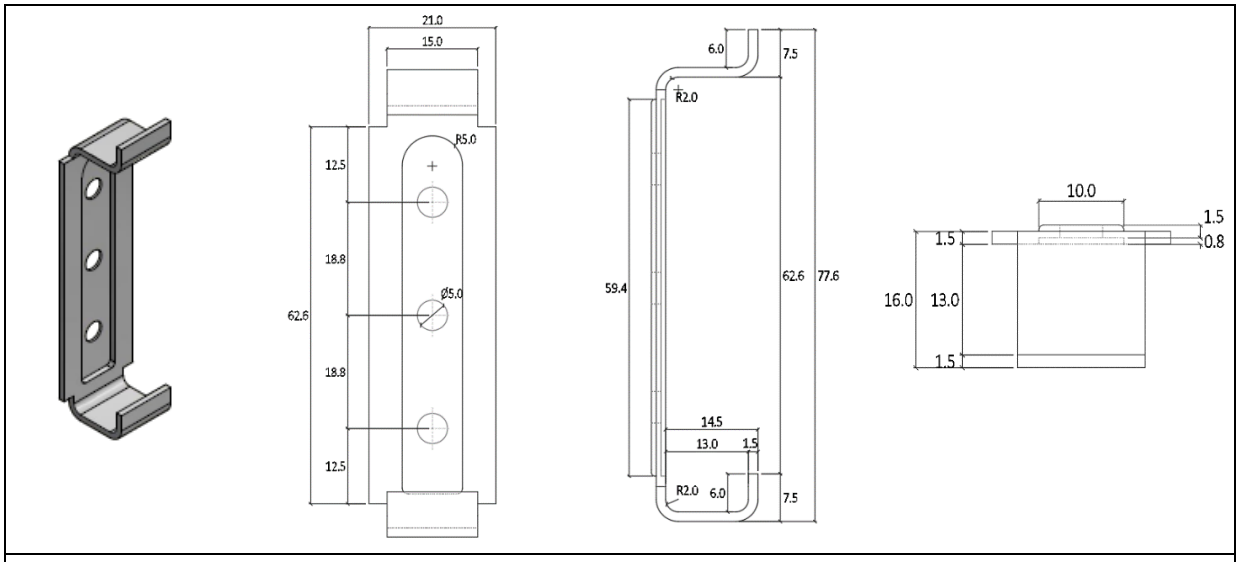






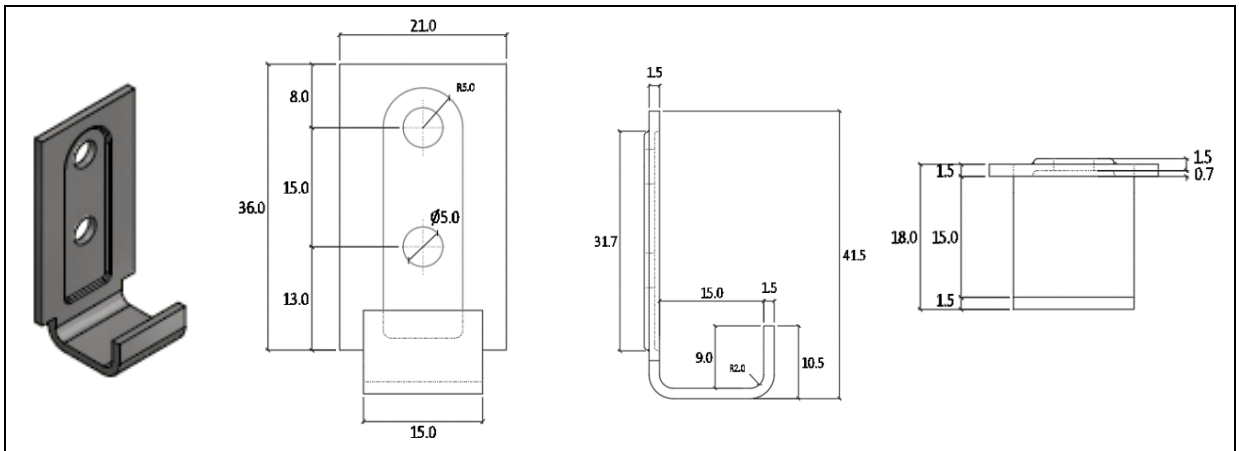
General view. Front view. Side view. Top view.

Figure A2.1: Simple clip 13 mm.



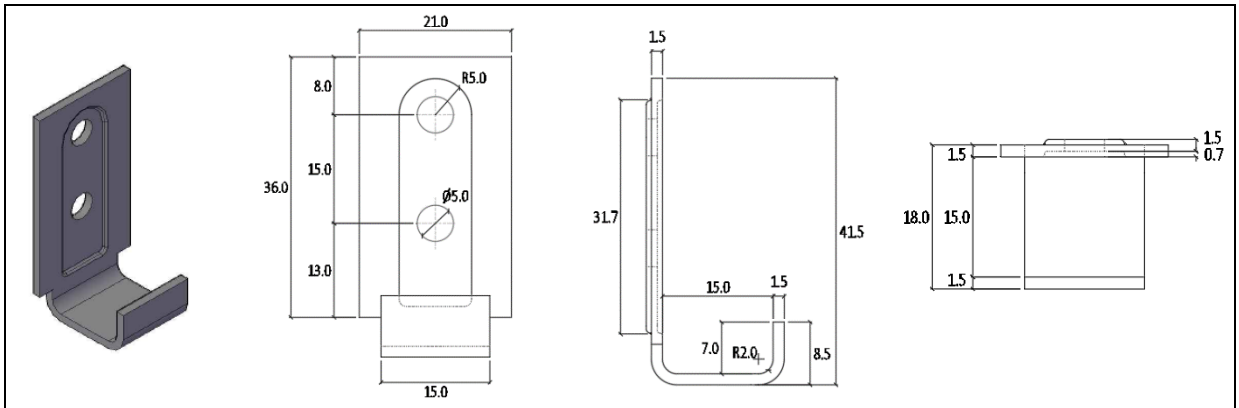
General view.	Front view.	Side view.	Top view.

Figure A2.2: Double clip 13 mm.



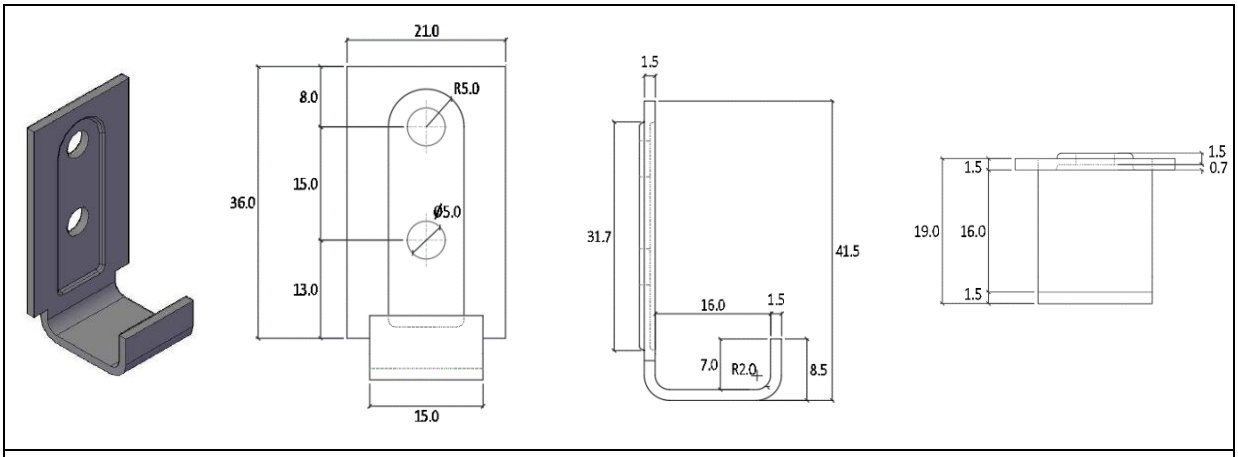
General view.	Front view.	Side view.	Top view.

Figure A2.3: Simple clip 15 mm GA20.



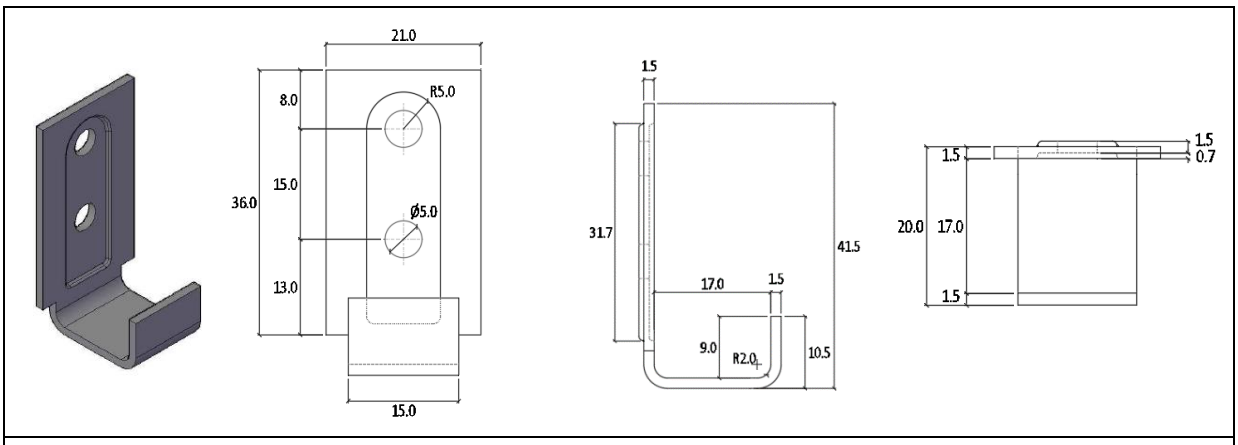
General view.	Front view.	Side view.	Top view.

Figure A2.4: Simple clip 15 mm TW18.



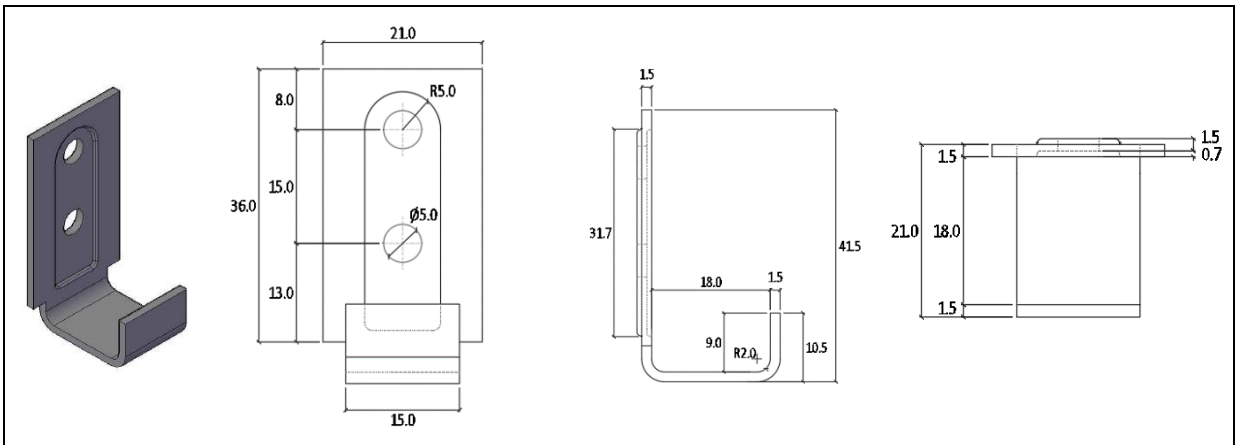
General view.	Front view.	Side view.	Top view.

Figure A2.5: Simple clip 16 mm.



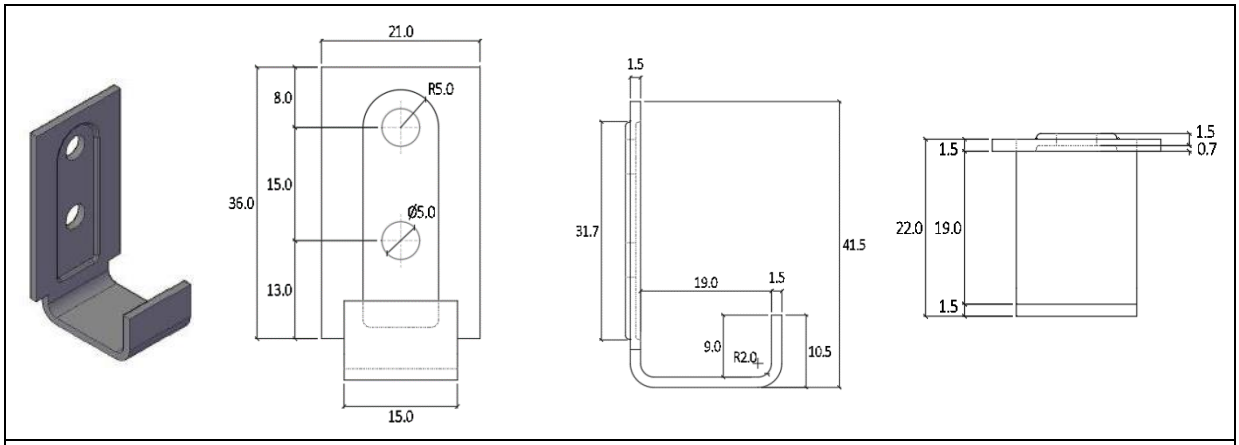
General view.	Front view.	Side view.	Top view.

Figure A2.6: Simple clip 17 mm.



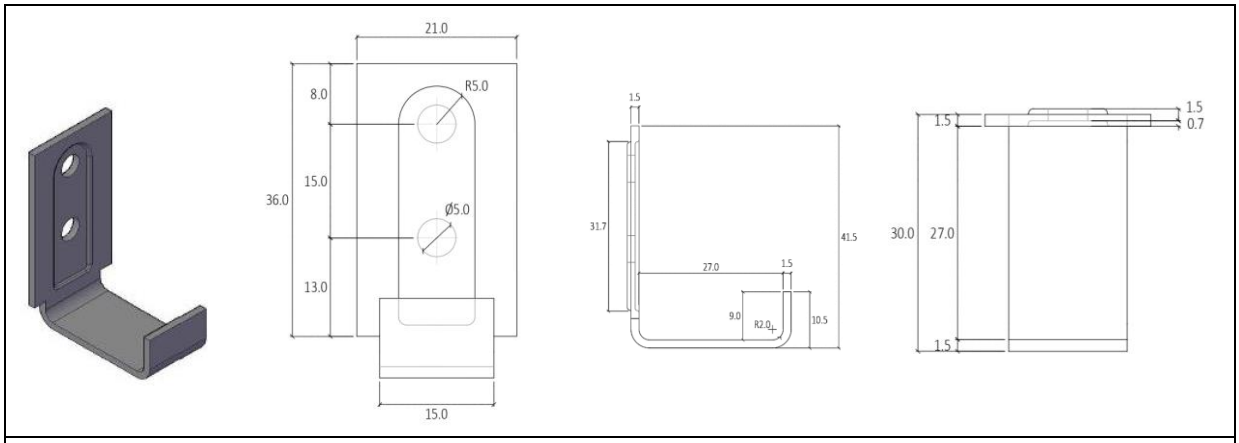
General view.	Front view.	Side view.	Top view.

Figure A2.7: Simple clip 18 mm.



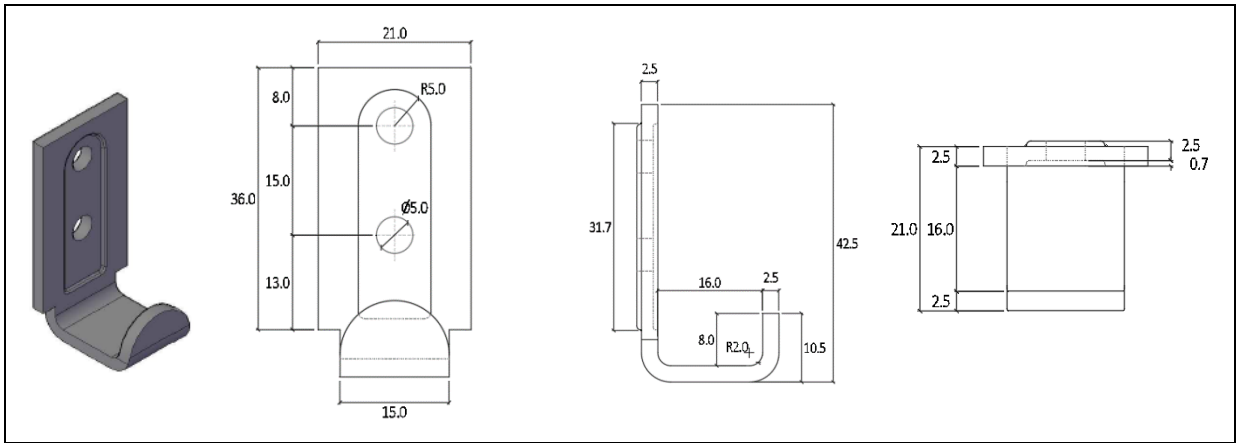
General view.	Front view.	Side view.	Top view.

Figure A2.8: Simple clip 19 mm.



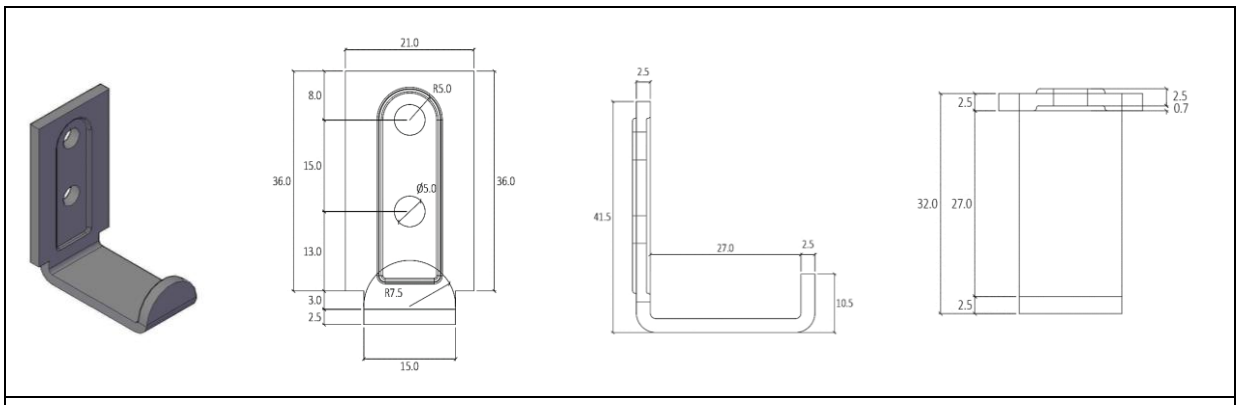
General view.	Front view.	Side view.	Top view.

Figure A2.9: Simple clip 27 mm/1,5 mm.



General view.	Front view.	Side view.	Top view.

Figure A2.10: Clip GA20+.



General view.	Front view.	Side view.	Top view.

Figure A2.11: Simple clip 27 mm/2,5 mm.

ANNEX 3: Subframe profiles

Table A3.1: Vertical profiles geometric and material properties.

Geometric properties							
Type of profile	**Form and dimensions (mm)**			**Weight per linear metre (kg/m)**	**Cross section (mm^2)**	**Inertia of profile section (cm^4)**	
						I_{xx}	**I_{yy}**
Profile FTS-502B-PV-Y	85 x 60 x 2,0	Figure A3.1	dy = 16,1	0,97	358	13,65	13,81
Start-end profile FTS-502B-PV-Y	50 x 60 x 2,0	Figure A3.2	dy = 20,2	0,64	264	11,89	2,94
Corner profile FTS-502B-PV-Y	60 x 60 x 2,0	Figure A3.3	dy = 31,3	1,57	581	34,18	32,08
Start-end profile FTS-502B+-PV-Y	50 x 60 x 2,8	Figure A3.4	dy = 22,3	0,95	353	16,62	3,70
Profile FTS-502B+-PV-Y	112 x 60 x 2,8	Figure A3.5	dy = 16,5	1,48	547	20,03	39,73
Profile FTS-502B+-PV-F	112 x 150 x 2,5	Figure A3.6	dy = 63,2	3,58	1335	428,91	129,03

Material properties		
Characteristic	**Value**	**Reference**
Material	EN AW-6063	EN 755 EN 1999-1
Treatment	T66	
Durability class	B	
Specific weight (kg/m^3)	2700	
Elastic limit (MPa)	200	
Elongation (%)	6	
Tensile strength (MPa)	245	
Modulus of elasticity (MPa)	70000	
Poisson coefficient	0,3	
Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))	23,0	

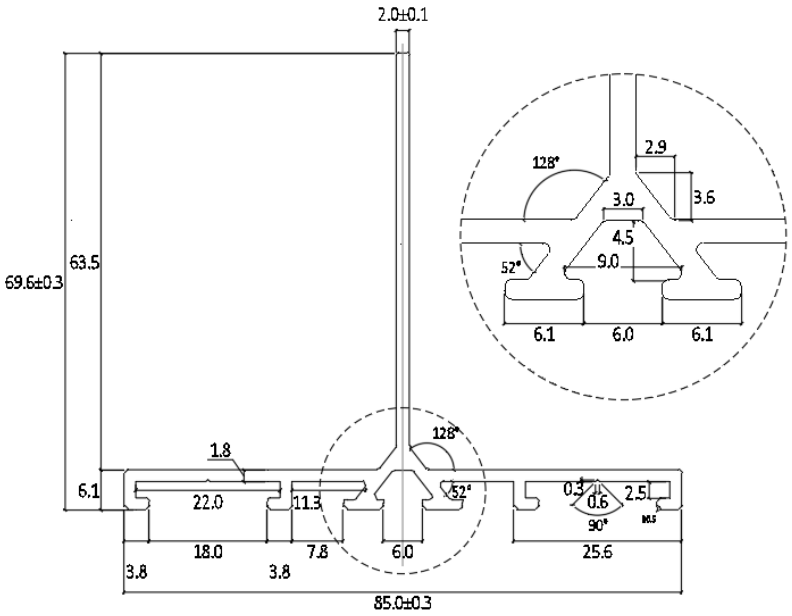


Figure A3.1: Profile FTS-502B-PV-Y.

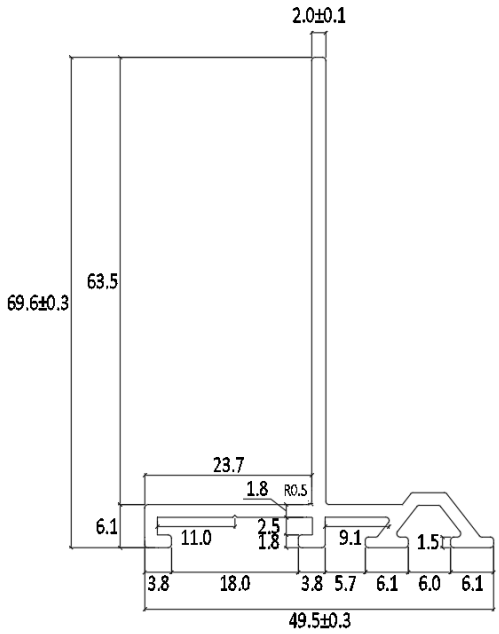


Figure A3.2: Start-end profile FTS-502B-PV-Y.

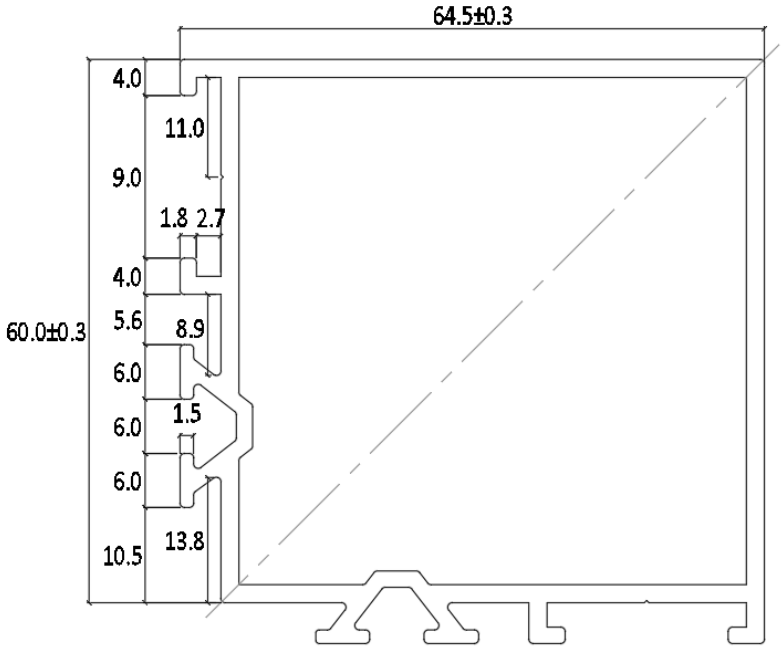


Figure A3.3: Corner profile FTS-502B-PV-Y.

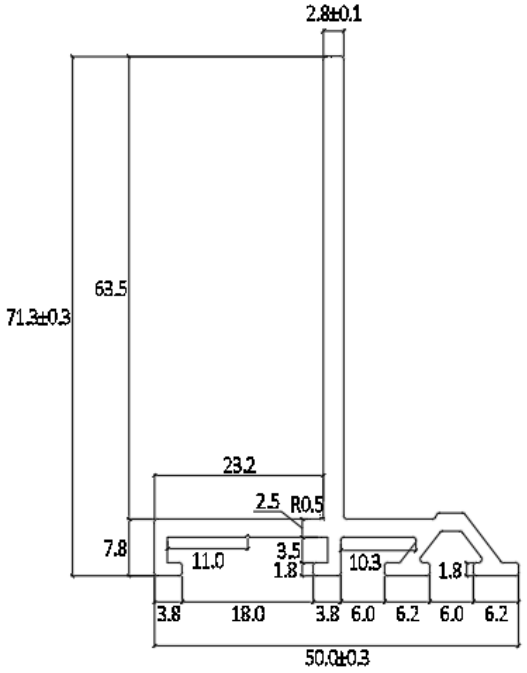


Figure A3.4: Start-end profile FTS-502B+-PV-Y.

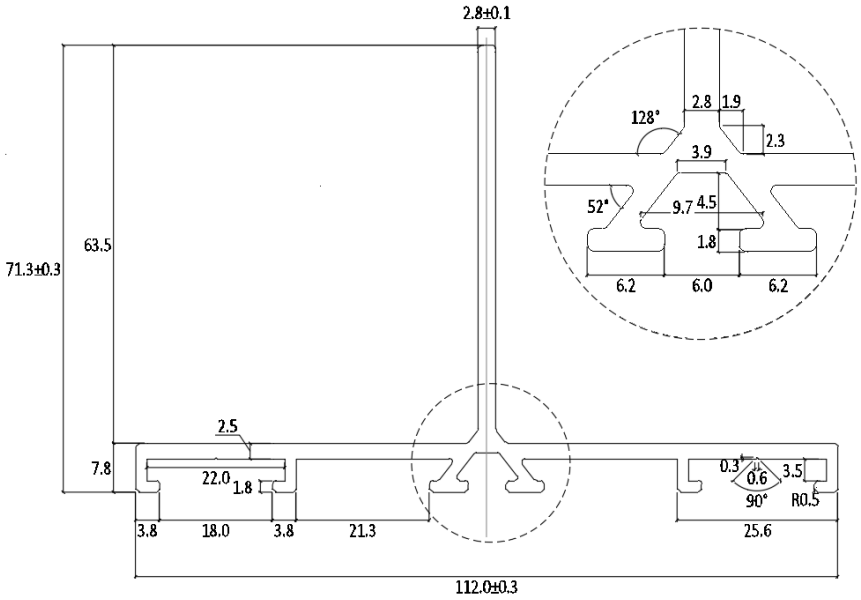


Figure A3.5: Profile FTS-502B+-PV-Y.

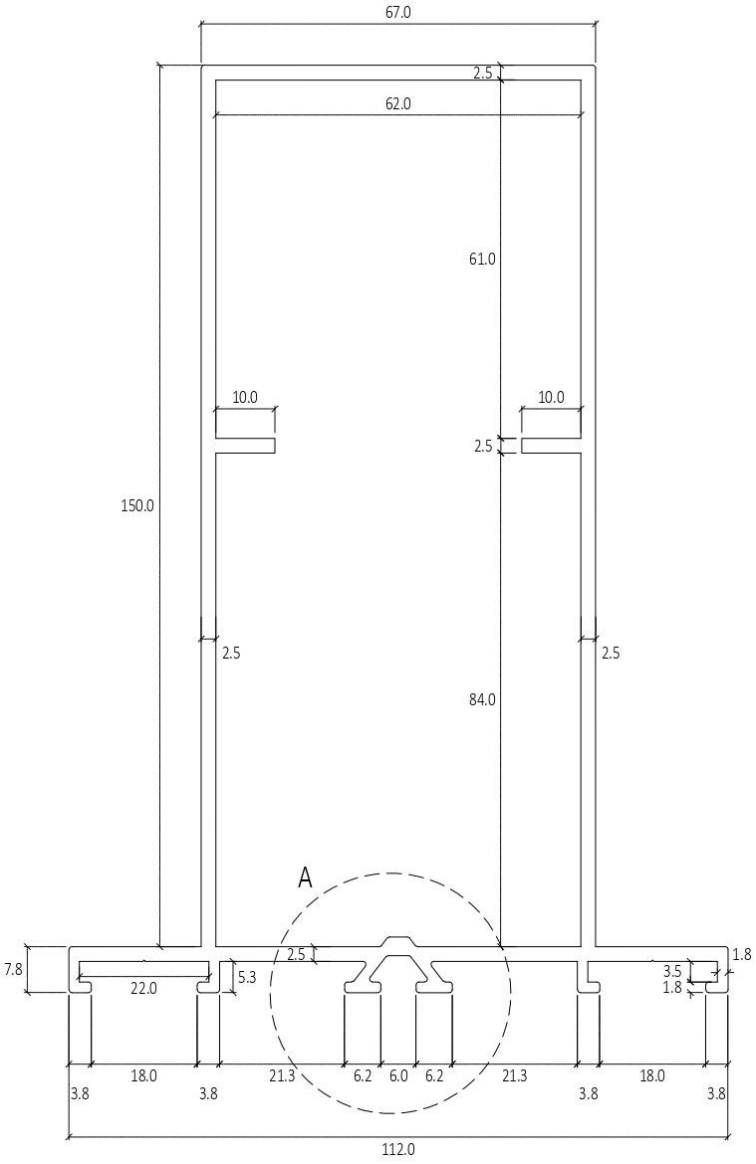
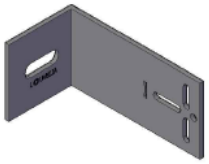


Figure A3.6: Profile FTS-502B+-PV-F.

ANNEX 4: Subframe brackets

Table A4.1: Bracket geometric and material properties. L = length; B = base; t = thickness.

Geometric properties				
Type of bracket			**Form and dimensions (mm)**	**Mass per unit (kg)**
Height 60 	60 x L x 60 x 3,0	L = 60	Figure A4.1	0,051
		L = 80		0,060
		L = 100		0,070
		L = 120		0,080
		L = 140		0,090
		L = 160		0,100
		L = 180		0,109
	60 x L x 60 x 4,0	L = 200		0,158
		L = 220		0,171
Height 120 	120 x L x 60 x 3,0	L = 60	Figure A4.2	0,099
		L = 80		0,119
		L = 100		0,138
		L = 120		0,158
		L = 140		0,177
		L = 160		0,197
		L = 180		0,216
	120 x L x 60 x 4,0	L = 200		0,313
		L = 220		0,339
Height 180 	180 x L x 60 x 3,0	L = 60	Figure A4.3	0,154
		L = 80		0,183
		L = 100		0,212
		L = 120		0,241
		L = 140		0,270
		L = 160		0,300
		L = 180		0,328
	180 x L x 60 x 4,0	L = 200		0,475
		L = 220		0,514

Material properties		
Characteristic	**Value**	**Reference**
Material	EN AW-6063	EN 755 EN 1999-1
Treatment	T5	
Durability class	B	
Specific weight (kg/m^3)	2700	
Elastic limit (MPa)	130	
Elongation (%)	6	
Tensile strength (MPa)	175	
Modulus of elasticity (MPa)	70000	
Poisson coefficient	0,3	
Coefficient of thermal expansion between 50 °C and 100 ºC (µm/(m·ºC))	23,0	

Table A4.1: Bracket geometric and material properties. L = length; B = base; t = thickness.

Geometric properties

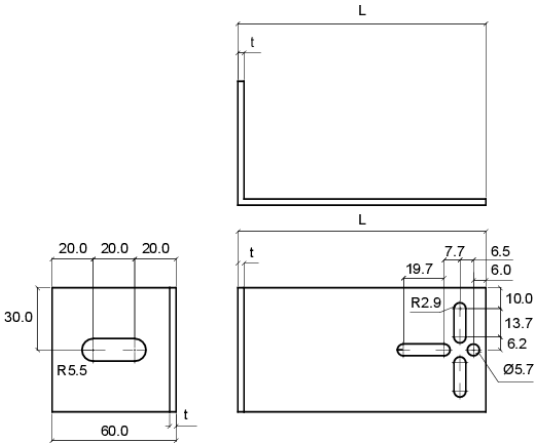


Figure A4.1: Bracket of height 60.

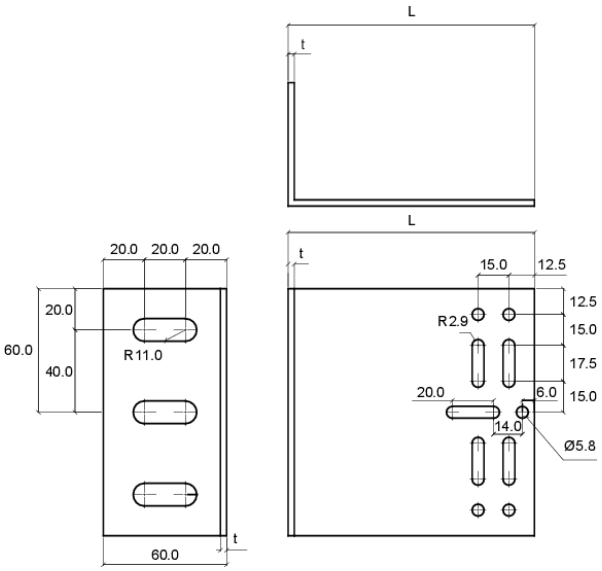


Figure A4.2: Bracket of height 120.

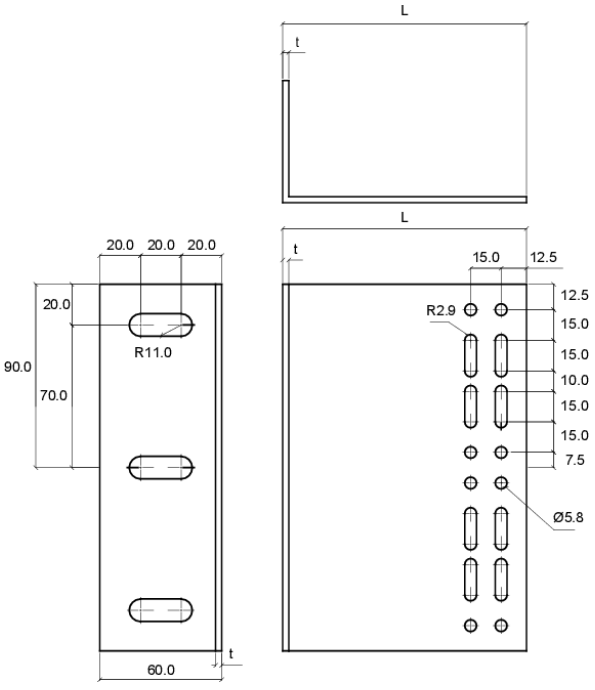


Figure A4.3: Bracket of height 180.

ANNEX 5: Subframe fixings and other components

A5.1. Subframe screws

Table A5.1: Subframe fixings.

Fixing elements	Geometry		Material		Reference
Position	**Type**	**Description**	**Type**	**Class**	---
Between skin element fixings (clips) and vertical profiles	Self-drilling screws	ST 4,8 x L	Stainless steel	A2-70	EN ISO 3506-1 EN ISO 3506-4 EN ISO 15480 EN ISO 10666
Between vertical profiles and brackets		ST 5,5 x L			

A5.2. EPDM joint profiles

Table A5.2: EPDM joint profiles.

Characteristic	Value		Reference
Trade name	**Double profile**	**Simple profile**	---
Material	EPDM		
Form	Figure A5.2a	Figure A5.2b	
Cross section (mm^2)	159	92	
Weight per linear metre (g/m)	199	116	
Density (kg/m^3)	1,25 ± 0,05		ISO 2781
Hardness, 3 seg (ShA)	70 ± 5		ISO 7619-1
Tensile strength (MPa)	> 7		ISO 37
Elongation at break (%)	> 250 (*)		
(*) Due to ageing, elongation at break can reach a value of 150 %.			

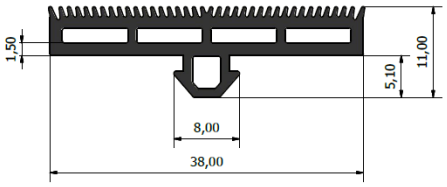


Figure A5.2a: Double EPDM joint profile.

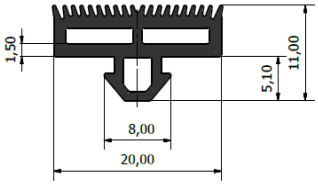


Figure A5.2b: Simple EPDM joint profile.

A5.3. Other components

Other products that do not pertain to the kits but are needed for the execution of the FTS 502B and FTS 502B+ kits in the works are the fixings between the brackets and the substrate. The main specifications to be met by these products to be used with the kit are:

- Fixings must be chosen according to the substrate or supporting structure material (concrete, masonry, timber or metal frame, etc.) and the resistance required due to wind load and dead load (pull-out and shear strength respectively).
- Fixings between the brackets and the substrate may be CE marked according to an ETA on the basis of the relevant EAD (see www.eota.eu) as long as this CE marking is mandatory in the Member State where the kit is used.

ANNEX 6: Design, installation, maintenance and repair criteria

A6.1 Design

The design of the subframe and fixings for fastener external skin elements using the kits should consider:

- For fastening cladding elements (the subframe is fixed on structural floors and also on a subframe wall), all the kit components defined in Annexes 2 to 5 may be used.
- The kits can be used for skin elements:
  - Without groove and thickness between 8 mm to 20 mm.
  - With groove and thickness of the inner tongue between 8 mm to 20 mm.

  The maximum weight and area shall be determined according to the mechanical properties of the kit components declared in this ETA (see clauses 3.3 to 3.10).
- It is assumed that the substrate wall meets the necessary requirements regarding the mechanical strength (resistance to static and dynamic loads) and airtightness, as well as the relevant resistance regarding watertightness and water vapour.
- It is assumed that the skin element meets the necessary requirements regarding the mechanical resistance and hygrothermal behaviour.
- The verification of the designed system by means of calculation, taking into account the mechanical characteristic values of the kit components in order to resist the actions (dead loads, wind loads, etc.) applying on the specific works. National safety factors and other national provisions must be followed.
- The selection and verification of the anchors between the brackets and the external walls (substrate), taking into account the substrate material and the minimum resistance required (pull-out and shear resistance) according to the envisaged actions obtained from the mechanical calculation of the designed system.
- The accommodation of the designed system movements to the substrate or structural movements.
- The execution of singular parts of the façade.
- The corrosion protection of the designed system metallic components taking into account the category of corrosivity of the atmosphere of works (e.g. acc. ISO 9223).
- The drainability of the ventilated air space between the skin elements and the insulation layer or the external wall accordingly.
- An insulation layer is usually fixed on the external wall and should be defined in accordance with a harmonized standard or a European technical assessment.
- When the skin element joints are not watertight, the first layer behind ventilated air space (e.g. insulation layer) should be composed by materials with low water absorption.

A6.2 Installation

Installation of the subframe and fixings for fastening external skin elements using the kits should be carried out:

- According to the specifications of the manufacturer and using the components specified in this ETA.
- In accordance with the design and drawings prepared for the specific works. The manufacturer should ensure that the information on these provisions is given to those concerned.
- By appropriately qualified staff and under the supervision of the technical responsible of the specific works.

A6.3 Maintenance and repair

Maintenance of the subframe and fixings for fastener external skin elements using the kits includes inspections on site, taking into account the following aspects:

- the appearance of any permanent irreversible deformation.
- the presence of corrosion or presence of water accumulation.

When necessary, any repair to localized damaged areas must be carried out with the same components and following the repair instructions given by the manufacturer.