



INSTITUTO DE CIENCIAS
DE LA CONSTRUCCIÓN EDUARDO TORROJA
C/ Serrano Galvache n.º 4. 28033 Madrid
Tel.: (+34) 91 3020440
e-mail: dit@ietcc.csic.es
web: dit.ietcc.csic.es



NATIONAL TECHNICAL APPROVAL:

No 553p/26

General area/Intended use:

External cladding of ventilated façades or ceilings with cassettes or panels coming from aluminum composite panels

Trade name:

STB-CH, STB-T-CH, STB-T-CH-PRO, STB-SZ, STB-T-SZ, STB-REM, STB-T-REM systems (with STACBOND® FR and STACBOND® A2 composite panels)

DIT-holder:

ECO BIERZO COMPOSITE S.L.

Headquarters:

Place of manufacture:

Calle Isaac Prado Bodelón s/n
Polígono Industrial La Rozada, Parcela 2
24516 Parandones, Toral de los Vados (León)
www.stacbond.com

Validity. From:

To:

April 20th, 2026
April 20th, 2031
(Conditioned to annual follow-up)

This Document consists of 43 pages including 1 annex



MEMBER OF:

EUROPEAN UNION FOR TECHNICAL APPROVAL IN CONSTRUCTION

UNION EUROPEENNE POUR L'AGREMENT TECHNIQUE DANS LA CONSTRUCTION

UNIÓN EUROPEA PARA LA EVALUACIÓN DE LA IDONEIDAD TÉCNICA EN CONSTRUCCIÓN

EUROPÄISCHE UNION FÜR DAS AGREMENT IN BAUWESEN

VERY IMPORTANT

The NATIONAL TECHNICAL APPROVAL EI DOCUMENTO DE IDONEIDAD TÉCNICA constitutes, by definition, a favorable technical assessment by the Instituto de Ciencias de la Construcción Eduardo Torroja. It does not have, by itself, any administrative effect, or represents a use authorization or guarantee. The responsibility of the IETcc does not reach aspects related with Intellectual Property or Industrial Property or product, system or production or installation procedures patent rights that appear on the DITplus.

The NATIONAL TECHNICAL APPROVAL PLUS (from now on DITplus) is a favorable technical assessment by the Instituto de Ciencias de la Construcción Eduardo Torroja that, based on the DIT procedure, assesses voluntary aspects not covered by CE-marking.

The DITplus is based on the established principles on the "Application Document" developed by the Union Européenne pour l'Agrément technique dans la construction (UEAtc) and can be applied based on a harmonized norm or a European Technical Assessment, according to the Construction Products Regulation (2024/3110).

Before using the material, system or procedure referred to herein, a thorough understanding of the Document is required; therefore, the holder of the Document must provide it in its entirety.

The modification of the product specifications or not respecting the use conditions, and the Experts' Committee remarks, will void the present technical assessment.

C.D.U.: 69.022.325/692.232.4
Bardage Cladding kit

DECISSION NO 553p/26

THE DIRECTOR OF THE INSTITUTO DE CIENCIAS DE LA CONSTRUCCIÓN EDUARDO TORROJA,

- pursuant to Decree No. 3652/1963, dated December 26, issued by the Office of the Prime Minister, which authorizes the Instituto de Ciencias de la Construcción Eduardo Torroja to issue the NATIONAL TECHNICAL APPROVAL of non-traditional construction materials, systems and procedures used in building and public works, and pursuant to Order no. 1265/1998, dated December 23, of the Ministry of Relations with the Spanish Parliament and Senate and the Secretariat of the Government, that regulates its issuance,
- considering article 5.2, section 5, of the Building Technical Code (from now on CTE) of the conformity with the CTE of innovative products, equipment, and systems, which establishes that a constructive system is in accordance with the CTE if it has a favorable technical assessment for the intended use,
- considering the Regulation for the issuance of the National Assessment Plus Document DITplus, dated in May 2005, revised on December 2018, that regulates the issuance of the DITplus,
- considering the established specifications on the DIT follow-up Regulation of October 28th, 1998,
- pursuant to the current Bylaws of *l'Union Européenne pour l'Agrément technique dans la construction (UEAtc)*,
- according to the request submitted by ECO BIERZO COMPOSITE S.L. for the RENEWAL of the NATIONAL ASSESSMENT DOCUMENT DITplus 553p/19 issued for the ventilated Façade cladding systems and false ceilings by "**STB-CH**", "**STB-T-CH**", cassettes (excluding STACBOND® PE panels and including the "**STB-T-CH-PRO**" system), "**STB-SZ**" and "**STB-T-SZ**", including new components, and by riveted panels "**STB-REM**" and "**STB-T-REM**", made of STACBOND® FR and STACBOND® A2 composite panels, and also new FEVE and HDPE finishes,
- taking into account the reports of work and factories visits performed by IETcc representatives, the test reports of tests conducted on the IETcc (included on reports no. 22.767, 22.627, 21.837, 21.048, 20.717, 21.693, 20.439 and 20.114) test reports for tests conducted on other laboratories (AFITI No. 4972T23 parts 1 and 2m and No. 5125T24 parts 1 and 2), and the remarks made by the Experts' Committee, established according the DIT Regulation,

DECIDES:

To issue the NATIONAL TECHNICAL ASSESSMENT PLUS DOCUMENT number 553p/26, the ventilated Façade cladding systems "**STB-CH**", "**STB-T-CH**", "**STB-T-CH-PRO**", "**STB-SZ**", "**STB-T-SZ**", "**STB-REM**" and "**STB-T-REM**", considering that,

The technical assessments performed allow to conclude that these systems are **PURSUANT OF THE TECHNICAL BUILDING CODE (CTE)**, given that the full content of this Document is fully respected and in particular the following conditions:

GENERAL CONDITIONS

The present NATIONAL TECHNICAL ASSESSMENT PLUS DOCUMENT (DITplus) assesses exclusively the constructive systems proposed by the holder, and as they are described herein, that for each case, in accordance with current Regulations, these must be accompanied by the required technical design and conducted with appropriate works supervision. The technical design must include the actions that each system transfers to the general building structure, assuring that these are admissible. For each case, the holder of this DITplus, after reviewing the technical design, will offer sufficient technical assistance that will allow the calculation and definition of the systems for works execution, including all necessary information of each component.

CALCULATION CONDITIONS

Optionally and by request, the holder will check according with the calculation conditions indicated on the Technical Report of this DITplus, the stability, resistance and admissible deformation of the systems, justifying the suitability of the systems to withstand the mechanical efforts that might derive from the corresponding service and limit state actions, with the conditions established by current Regulation and for the concrete geographical location.

MANUFACTURING AND CONTROL CONDITIONS

The manufacturer must maintain the self-control that currently performs over raw materials, manufacturing process, and finished product, according to the indications given on section 5 of this Document.

USE AND INSTALLATION CONDITIONS

These systems do not contribute to building stability. System installation must be performed by qualified companies, within the scope of this DITplus. These companies will guarantee that the installation is done pursuing the conditions and scope covered by the present Document, respecting the remarks made by the Experts' Committee. All dispositions required will be respected relative to the scaffolding stability during installation, to the risk of suspended loads falling, protection of people and, in general, considering all dispositions included on current Work Health and Safety regulations.

ISSUANCE CONDITIONS

It must be considered that except variants based on cassettes with glued stiffeners, the rest of assessed systems have the European Technical Assessment ETA 15/0655, based on the European assessment document EAD 090062-01-0404 January 2024 edition. Kits for external wall claddings mechanically fixed and that also, STACBOND FR and A2 panels have a European Technical Assessment ETA 25/0550 based on the European assessment document 210046-00-12.01 February 2018 edition; therefore, it must have its corresponding Declarations of Performance, EVCP certificates and CE markings. This DIT plus is contingent upon the manufacturer maintaining the Production Conformity Certificate / Constancy of Performance to be able to make the aforementioned Declaration of Performance (CE marking).

VALIDITY

The present NATIONAL TECHNICAL ASSESSMENT PLUS DOCUMENT No 553p/26 is valid for a period of five years, conditioned to:

- that the manufacturer does not modify any of the product specifications indicated on the present National Technical Assessment Plus Document, and the CE-markings of the systems remain valid,
- that the manufacturer performs systematic self-control of the production as indicated on the Technical Report,
- that there is a yearly follow-up, done by the Institute, which will check the compliance with the aforementioned conditions, visiting, if required, some of the newest works.

With the favorable result of the follow-up, the IETcc will emit yearly a certificate that must accompany the DITplus, to give it validity.

This Document must, therefore, be renewed before April 20th, 2031.

Madrid, April 20th, 2026

THE DIRECTOR OF THE INSTITUTO DE CIENCIAS
DE LA CONSTRUCCIÓN EDUARDO TORROJA

TECHNICAL REPORT

1. PURPOSE

Systems based on suspended cassettes "STB-CH", (and its variants "STB-T-CH", and "STB-T-CH-PRO")¹; of fixed cassettes "STB-SZ" (and its variant "STB-T-SZ") and riveted panels "STB-REM" (and its variant "STB-T-REM"), are intended for new works or renewal of ventilated façades external claddings and false ceilings with panels made of STACBOND® FR and STACBOND® A2² composite panels, that present the design considered decorative finish. Systems are intended to be fixed mechanically to an aluminum substructure made of profiles, fixed to the structure or buildings' load bearing walls.

2. SYSTEM DESCRIPTIONS

Assessed systems are composed of:

- Cladding based on STACBOND® FR or STACBOND® A2 panels or cassettes, delivered by the holder, or by companies recognized by the holder, and mechanized by the holder or qualified companies³.
- Specific pieces according to the system, meant for the punctual fixing of the cladding to the substructure, including glued vertical stiffening pieces, horizontal profiles with the corresponding supporting pieces, or with starter profiles), defined by the holder and delivered by the holder or by companies recognized by the holder, or by third parties.
- Substructure (brackets, profiles and beams depending on the system, and other supplementary profiles), defined by the holder, specialized companies recognized by the holder or third parties.
- Specific fixings for connecting the cladding to the substructure and between substructure elements, defined by the holder, by specialized companies recognized by the holder, or by third parties.
- Accessories, defined by the holder to resolve singular points of the façade, delivered by the holder or by other companies.

Fastening of the substructure, or thermal insulation that could be part of a ventilated façade are not a part of the system, and due to this are not assessed. Table 1 summarizes the main variables for a preliminary design:

Table 1. General preliminary design variables

System (Figures)	Cladding	Specific fixing pieces (references)	Substructure		Joint width (mm)
			Profile	Bracket	
STB-CH (1a – 1d)	Suspended cassette with/without stiffener (hidden fixing)	- Suspension kit: (05.19.013) (05.19.130) - Glued vert./hor. stiffener + supporting pieces (05.19.101)	Ω	U, TT	10- 20
STB-T-CH (2a – 2d)		- Suspension kit: (05.19.062) (05.19.130) - Glued vert./hor. stiffener + supporting pieces (05.19.101)	TΩ	L	
STB-T- CH-PRO (3a – 3c)		- Suspension kit: (05.19.130) (05.19.088) - Glued vert./hor. stiffener + supporting pieces (05.19.101)	TΩ	L	
STB-SZ (4a – 4c)	Fixed cassette with/without stiffener (hidden fixing)	S,Z Profiles - Glued vert./hor. stiffener + supporting pieces (05.19.101)	Ω	U, TT	Vert.: 8-20
STB-T-SZ (5a – 5c)			T, L	L	Horiz.: 8-20
STB-REM (6a – 6b)	Unidirection al or bidirectional riveted panel (visible fixing)	--	Ω*, **	U, TT	5-20
STB-T- REM (7a – 7b)		--	T*, L	L	

* : Can be a beam for bidirectional substructure

** : Includes a beam in the case of bidirectional substructure, including also the connecting piece between profiles and beams.

2.1. STB-CH, STB-T-CH, and STB-T-CH-PRO

Cladding systems based on cassettes made of STACBOND® FR or STACBOND® A2 panels, suspended to the substructure by specific pieces screwed to the profiles indicated on Table 1. On non-stiffened cassettes or with vertical stiffeners, the suspension is made by tabs mechanized previously on the side flanges or in the vertical stiffening profile. On horizontally stiffened cassettes, the stiffening profiles will be suspended to the substructure by means of supporting pieces.

¹ Example of combined denomination: STB-(T)-CH-(PRO).

² Also known as thin metal composite sheets (according to Commission Implementing Decision, of May 28th, 2019).

³ Recognized by the holder upon request, considering at least the technical support given, e.g., delivering this Document, technical details dossier, handling manual, forming, installation and its capacity and/or technical experience.

2.2. STB-SZ and STB-T-SZ

Cladding system based on cassettes made from STACBOND® FR, A2 panels, with or without hidden stiffeners, fixed horizontally mechanically between them by “S” and “Z” extruded profiles. The cladding-profile connection is done by self-tapping screws. For stiffened cassettes, the profile-stiffener connection will be done by mechanical-adhesive bonding.

2.3. STB-REM and STB-T-REM

Cladding systems based on panels made of STACBOND® FR, or STACBOND® A2 panels, fixed to the substructure profiles by means of rivets. Depending on the substructure used we distinguish two variants:

2.3.1. Bidirectional riveted system

System of panels riveted to a substructure made of profiles (vertical profiles) and beams (horizontal profiles), on such a way that the panel can be riveted on all its perimeter. All profiles will be connected to the supporting wall by brackets. If more lines of rivets are needed so the panel stands larger loads, extra profiles will be placed on intermediate areas.

2.3.2. Unidirectional riveted system

Unidirectional riveted system, only over profiles.

3. MATERIALS AND COMPONENTS

3.1. Cladding

Cassettes and panels can be delivered by the holder or by third parties recognized by the holder, made from any STACBOND® panel. Cassettes, unlike panels -which are generally flat- typically have a parallelepiped shape and are produced by milling cuts such that, when folded to a 90° angle relative to the panel, will define four perimetral bends, called “flanges” (Fig. 8). These will allow, with their shape, to reduce cassette deformation and, by using specific accessories and a proper machining, to define the connection of cassettes to the substructure. The decorative finish is the result of the pre-treatment of the surface destined for visible face of the cladding. There are:

- Standard cassettes or panels, for the general part of the cladding, according to modulation.
- Special cassettes or panels⁴, e.g., for corners, nooks, starting points and capping and finishing parts of the façade.

STACBOND® composite panels are sandwich panels that are the result of an industrial process on a line that consists on adhering on a continuous

way, two alloyed aluminum sheets on both sides of the core. These can be either low density polyethylene and flame retardant mineral compounds (STACBOND® FR), and a fully mineral core (STACBOND® A2). Declared specifications are shown on Table 2.

Table 2. Declared specifications of panels

Specification		STACBOND® FR	STACBOND® A2
Nominal widths (mm) [tolerances]		1000 [0;+2]	1000 [0;+2]
		1250 [0;+2]	1250 [0;+2]
		1500 [0;+2]	1500 [0;+2]
		1600 [0;+2]	1600 [0;+2]
		2000 [0;+2]	2000 [0;+2]
Nominal lengths (mm) ⁵ [tolerances]		2000 [0,+10]	2000 [0,+10]
		3200 [0;+10]	3200 [0;+10]
		4000 [0;+10]	4000 [0;+10]
		5000 [0;+10]	5000 [0;+10]
		6000 [0;+10]	6000 [0;+10]
Squareness (Difference between diagonals mm)		± 3.0	± 3.0
Nominal thickness [tolerances] (mm)		4 [-0.15;+0.1]	4 [-0.15;+0.1]
Weight/surface (kg/m ²) [tolerance %]		7.3 [±8%]	9.3 [±8%]
E-I bending stiffness (kN·cm ² /m) (DIN 53293) ⁶		≥ 240	≥ 240
Delamination by peeling (N/mm) (ASTM D903-98) ⁷	Trav.	≥ 7	≥ 3
	Long.	≥ 5	≥ 3
Delamination by peeling (N/mm) (ASTM D 1781) ⁸		≥ 75	≥ 75
Charact. resistance of 4P flex.(MPa) R _{bend,INI,K} (ETA 25/0550)		93.72	96.75
Charact. resistance of 3P flex. (MPa) R _{flex,K} (ETA 25/0550)		104.79	96.06

3.1.1. Cassettes

3.1.1.1. Non-stiffened cassettes

These are elements that are formed on a workshop, factory or at-place on a clean and protected from the elements area, made from aforementioned panels and other accessory elements (plates and rivets). This can be delivered by the holder, or by specialized workshops recognized by the holder, which will follow the manufacturing specifications established by the holder.

- STB-CH, STB-T-CH, and STB-T-CH PRO system: On the STB-CH system and its variants, the suspended cassettes always have a complementary flange on their horizontal top side. On the side flanges it will have at least two tabs, that, once fitted over the different suspension kits, will allow to secure the cassette to the substructure. There are, depending on the depth of the side, vertical flanges of 40 or 45 mm. In the case of the 40 mm flange, there will be always used, as reinforcement, riveted plates for

⁴ For the configuration of curved or chamfered cassettes, the holder must be consulted.

⁵ The holder declares that by request, can manufacture panels of length > 6000 mm [0; +10].

⁶ DIN 53293: Testing of sandwiches. Bending test. There is no record of a version of the UNE-EN standard to date

⁷ ASTM D 903-98: Standard Test Method for Peel or Stripping Strength of Adhesive Bonds. There is no record of a version of the UNE-EN standard to date

⁸ ASTM D 1781-98(2012): Standard Test Method for Climbing Drum Peel for adhesives. There is no record of a version of the UNE-EN standard to date

each tab of 10 mm width. These plates will be specific pieces (ref. 19.019) of 2mm thick aluminum and alloy 1050 and will be riveted or screwed to their corresponding flanges and/or vertical stiffeners, by fixings specified in section 3.3. For cassettes with 45 mm flanges and 15 mm thick tabs, it could be used, if needed to help forming, rectangular forming plates ref. 05.19.050 of 28 x 33 x 2 mm and 1050 alloy, or rectangular pieces of the own composite panel.

- **STB-SZ and STB-T-SZ:** On the STB-SZ and its variant, the fixed panels present 30 mm deep flanges. On its horizontal flanges S and Z profiles are riveted. Maximum distance between rivets is 500 mm.

3.1.1.2. Stiffened cassettes

In the case of large size cassettes, provision must be made for the placement of vertical or horizontal stiffener bonded to their back faces, as indicated below:

- **Vertical stiffeners:** There are different types of profiles or pieces depending on the considered system. In any case, for fixing to cladding, the adhesive subsystem described in section 3.2.3 will be used and complementary fixings according to Table 9.
- **STB-CH, STB-T-CH, and STB-T-CH PRO:** will be bonded profiles with complementary fixings, L-shaped transversal section, machined from STACBOND® FR or A2 panels, including tabs for the connection from suspension kits fixed to Ω , T- Ω or T-CH-PRO profiles.
- **STB-SZ:** will be 200 mm long pieces (ref. 05.99.231) glued, made from 6063 T6 alloyed aluminum, with a transversal section of 30 mm width, 70 mm depth and 1.4 mm thickness, allowing its screwing to the inner face of the Ω shaft.
- **STB-T-SZ:** will be 200 mm long pieces (ref. 05.19.049) glued, made from 6063 T6 alloyed aluminum, with a transversal section of 28 x 35,5 x 20 with 2 mm thickness, screwed to the outer face of the T profile.
- **Horizontal stiffeners (STB-CH, STB-T-CH, STB-T-CH-PRO, STB-SZ and STB-T-SZ):** Will be 6063 T6 alloyed aluminum extruded profiles, ref. 05.19.107, bonded to the substructure by the adhesive subsystem indicated in section 3.1.4, and also with complementary fixations. These stiffeners will be fixed to the profiles by means of hangers, defined in section 3.2.5.2.

3.1.2. Panels

These are cladding elements of the STB-REM and STB-T-REM systems. They are produced by machining (cutting and predrilling) of STACBOND® FR or A2 panels. They may be supplied by the holder, or by specialized workshops recognized by the holder, which will follow the fabrication specifications established by the holder. A series of machining operations will be done in the panels to introduce in them the required rivets. With this machining fixed or expansion points will be obtained, depending on their diameter, and will be placed in such a way that allows the proper expansion of panels (Fig. 14).

3.1.3. STACBOND® panels

The materials from which cassettes and panels described above are obtained are listed below:

3.1.3.1. Lacquered alloyed aluminum sheets.

EN AW 3005 H42/H44 or 3105 H42/H44/H46 or 5005 H42/H44, or also EN AW 1050/1080 alloyed aluminum sheets according to UNE-EN 573-3, UNE-EN 485-2, and UNE-EN 1396 norms. Declared specifications are listed in table 3:

Table 3. Declared specifications of sheets

Specifications		Value
Thickness of lacquered sheet (mm)		0.48
[exterior/interior]		[± 0.02]
Modulus of Elasticity E (GPa)		70
Linear thermal expansion coefficient (mm/m.K ⁻¹)		24x10 ⁻⁶
EN AW 3005 H42	Tensile strength R_m (MPa)	≥ 145
	Elastic limit $R_{p0.2}$ (MPa)	≥ 110
	Elongation A_{50} (%)	≥ 5
EN AW 3005 H44	Tensile strength R_m (MPa)	≥ 170
	Elastic limit $R_{p0.2}$ (MPa)	≥ 130
	Elongation A_{50} (%)	≥ 4
EN AW 3105 H42	Tensile strength R_m (MPa)	≥ 130
	Elastic limit $R_{p0.2}$ (MPa)	≥ 105
	Elongation A_{50} (%)	≥ 6
EN AW 3105 H44	Tensile strength R_m (MPa)	≥ 150
	Elastic limit $R_{p0.2}$ (MPa)	≥ 120
	Elongation A_{50} (%)	≥ 4
EN AW 3105 H46	Tensile strength R_m (MPa)	≥ 175
	Elastic limit $R_{p0.2}$ (MPa)	≥ 150
	Elongation A_{50} (%)	≥ 3
EN AW 5005 H42	Tensile strength R_m (MPa)	≥ 125
	Elastic limit $R_{p0.2}$ (MPa)	≥ 80
	Elongation A_{50} (%)	≥ 4
EN AW 5005 H44	Tensile strength R_m (MPa)	≥ 145
	Elastic limit $R_{p0.2}$ (MPa)	≥ 110
	Elongation A_{50} (%)	≥ 3
EN AW 1050 / 1080	Tensile strength R_m (MPa)	≥ 100
	Elastic limit $R_{p0.2}$ (MPa)	≥ 90
	Elongation A_{50} (%)	≥ 1

Faces of aluminum sheets that are exposed to the elements, are lacquered with an organic continuous coating system (bilayer or Tri layer) applied continuously of PVDF (polyvinylidene fluoride), or FEVE (fluoroethylene vinyl ether), or HDPE (high

(polyurethane),⁹ with specifications indicated on Table 4. The internal non exposed faces of the sheets are coated with a protective layer made of 6µm thick polyester coating. Over internal faces in direct contact with the core a primer is applied to facilitate adhesion.

Table 4. Coating specifications

Specification	PVDF	Mirror (PVDF)	FEVE	HDPE	PE	PU
Thk.1 layer (μm)	--	--	--	--	20	20
Thk.2 layers (μm)	27-30	2,5	27-30	25-40	25-30	--
Thk.3 layers (μm)	43-51	--	36-46	35-55	--	--
Gloss at 60° (Gloss unit)	30 ± 5	> 80	5-90	5-90	5-90	25-35
Pencil hardness	HB	≥ F	≥F	≥F	≥F	≥F
Flexibility	1 T	2 T	1T	1T	1T	1T
MEK resistance	100	≥ 50	> 100			
Corrosion resistance index	Index 3					
Moisture resistance (1000h)	No defects					
UV Resistance: Color retention (ΔE) and gloss retention 60° (%)	R _{uv} 4				R _{uv} 3	

3.1.3.2. Core specifications

Specifications are detailed on Table 5.

Table 5. Core Specifications

Panel	Composition	Density kg/m ³	Aspect
FR	Low density polyethylene with flame retardant mineral compounds	1600 ±10 %	Dark grey
A2	Mineral compound and organic binder	2100 ±10 %	Light grey

3.1.3.3. Adhesive

Product with a specific composition, which applied continuously during panel manufacturing, allow permanent bonding between sheets and core.

3.1.3.4. Protective film

70µm thick film, to protect the visible face of possible bumps or scratches until panel is installed in the final location of the works, with arrows indicating the lamination sense.

3.1.4. Stiffener bonding subsystems

- **Vertical stiffeners:** A subsystem consisting of a cleaner, optionally a black or non-transparent primer, double faced adhesive tape to guarantee the thickness of the bead, and a specific single-component white adhesive, made of polyurethane that cures upon contact with moisture is used. Declared specifications of the adhesive are indicated on Table 6¹⁰.

Table 6. Adhesive specifications

Specification	Value
Density (kg/l)	1.1
Skin formation time at 23 °C and 50% RH (min)	35
Service temperature (° C)	-40 to +90
Application temperature (° C)	+5 to +40
Max. allowable tensile stress (MPa)	0.15
Max. allowable shear force (MPa)	0.12

- **Horizontal stiffeners:** There are two options:
 - Subsystem defined for vertical stiffeners, always using primer in the stiffening profile, and not using the double sided tape due that the thickness to be guaranteed is 1.6 mm.
 - Subsystem consisting of a transparent 3M cleaner of fast evaporation and not solvent, and the double sided adhesive tape, sensible to pression made of grey acrylic foam and a red removable protective film, with 1.6mm of thickness and 25 mm width, with ref. STB-3M-160GF25 is used, Declared specifications of the tape are indicated on Table 7:

Table 7. Double sided tape specifications ref. STB-3M160GF25

Specification	Value
Length (m)	33
Service temperature (° C)	-40 to + 93
Application temperature (° C)	≥ 10

3.2. Substructure

Substructure is the means of connection of the light cladding with the supporting or structural element of the building, allowing also the existence of the ventilated space. It is composed of the following elements:

3.2.1. Brackets

These are the elements meant to transfer loads from the substructure to the supporting element (see fig. 19). Depending on the type of profile, it can be as follows:

- **TT brackets (STB-CH, STB-REM, and STB-SZ):** made of profiles with TT shape, configured by a 6063 T6 aluminum extruded profile (ref. 05.19.004 to 05.19.007) and with depths comprised between 59 and 104mm) or by EN AW 6005A T6 alloyed aluminum (ref. 05.19.030 to 05.19.039) and with depths between 119 and 254 mm.
- **U brackets (STB-CH, STB-REM, and STB-SZ):** made of folded metal sheets with U shape of 5005 H24 aluminum, 3 mm thick and depths of 59mm (ref. 05.19.046) or 74mm (ref 05.19.047).

⁹ In accordance of the holder's standard color chart, and thicknesses and tolerances according to UNE-EN 1396 norm. Other colors and finishes can be applied at customer request and after checking with the holder. Some colors are exclusively manufactured in tri layer finish.

¹⁰ Sikatack Panel System. Optionally, other adhesives with equal or superior specifications to the declared and with favorable technical assessment may be used.

- L brackets (STB-T-CH, STB-T-CH-PRO, STB-T-REM, and STB-T-SZ): made of folded metal sheets with L shape made of 5005 H24 aluminum, and distinguishing between:
 - Support and retention (or “double L”) (ref. 05.19.042 of 68 mm depth, and ref. 05.19.045 of 92 mm depth) of 3 mm thickness.
 - Retention and support (or “simple L”) of 3mm thickness (ref. 05.19.041, 05.19.044, 05.19.051, and 05.19.052 with respective depths of 68, 92, 116 and 140 mm).
 - Retention and support (or “simple L”) of 5 mm thickness (ref. 05.19.053 to 05.19.056 with respective depths of 164, 188, 212 and 236 mm).
- Retention or support brackets (“double L” or “simple L”) made of stainless steel AISI 304 or 430 (ref. 05.19.078 to 05.19.085 and ref. 05.19.112 to 05.19.119) with depths between 61 and 229 mm.

3.2.2. Profiles and beams

These are the profiles used for cladding fixing. Depending of the system, distinguishing between:

- **STB-CH, STB-SZ and STB-REM:** They share the Ω transverse shaped profiles (ref. 05.19.003), made of extruded alloyed 6063 T6 aluminum, with natural finish, and specifications indicated in Table 8.

Table 8. Specifications of Ω profiles

Specifications	Value
Thickness of shaft/flanges (mm)	2.0 (05.19.003)
Max. manufacturing length (m)	6.5
Theoretical weight (kg/m)	0.91
Moment of inertia W_x (cm ³)	3.12
Profile inertia I_x (cm ⁴)	≥ 6.04
Profile inertia I_y (cm ⁴)	≥ 15.35

- **STB-T-CH:** Profiles with T Ω transverse shaped profiles (ref. 05.19.061), and if an intermediate profile is needed, L profile (ref. 05.19.059, for fixing horizontal stiffener supports), made of extruded 6063 T6 alloyed aluminum, with natural finish and specifications indicated in Table 9.

Table 9. Specification of T, T Ω and L profiles

T profile (STB-T-REM, STB-T-SZ) ref.05.19.043)	Value
Thickness of shaft/flanges (mm)	2,0
Theoretical weight (kg/m)	0.73
Moment of inertia W_x (cm ³)	2.02
Profile inertia I_x (cm ⁴)	9.66
Profile inertia I_y (cm ⁴)	7.47
T Ω profile (STB-T-CH) ref.05.19.061	Value
Thickness of shaft/flanges (mm)	2.0
Theoretical weight (kg/m)	0.74
Moment of inertia W_x (cm ³)	1.72
Profile inertia I_x (cm ⁴)	8.13
Profile inertia I_y (cm ⁴)	8.63
L profile (STB-T-REM, STB-T-SZ, STB-T-CH) Ref. 19.059	Value
Thickness of shaft/flanges (mm)	2.0

Theoretical weight (kg/m)	0.55
Moment of inertia W_x (cm ³)	1.86
Profile inertia I_x (cm ⁴)	8.02
Profile inertia I_y (cm ⁴)	2.83
L-CH-PRO profile (STB-T-CH-PRO) (ref. 05.19.120)	Value
Thickness of shaft/flanges (mm)	1.8
Theoretical weight (kg/m)	0.83
Moment of inertia W_x (cm ³)	4.61
Profile inertia I_x (cm ⁴)	8.11
Profile inertia I_y (cm ⁴)	9.63
T-CH-PRO profile (STB-T-CH-PRO) ref. 05.19.092	Value
Thickness of shaft/flanges (mm)	2.0
Theoretical weight (kg/m)	0.58
Moment of inertia W_x (cm ³)	2.02
Profile inertia I_x (cm ⁴)	15.11
Profile inertia I_y (cm ⁴)	2.95

- **STB-T-CH-PRO:** Profiles with T Ω transverse section (ref. 05.19.092) and if an intermediate profile is needed, L-CH-PRO profile (ref. 05.19.120, for fixing horizontal stiffener supports), made of extruded aluminum 6063 T6 profiles, with 6.5m of maximum length, natural finish and specifications indicated in Table 9.
- **STB-T-REM and STB-T-SZ:** Profiles with T transverse section (ref. 05.19.043 and if an intermediate profile is needed, L profile (ref. 05.19.059), made of extruded aluminum 6063 T6 profiles, with 6.5m of maximum length, natural finish and specifications indicated in Table 9.

3.2.3. Adjustable suspension pieces for cassettes

Pieces on which the pre-existing tabs in the side flanges of suspended cassettes are fixed. Pieces are distinguished by the following, depending on the system:

- **STB-CH:** Standard piece (ref. 05.19.013) for Omega profiles, made of 6063 T6 alloyed extruded aluminum, with median thickness of the profile of 2.5 mm, theoretical weight of 0.89kg/m and natural finish. It presents the hanging area protected by a PVC piece of 2.3 mm thickness.
- **STB-CH y STB-T-CH:** Piece (ref. 05.19.130), valid for the T, T-Omega and Omega profiles made of 6063 T6 alloyed extruded aluminum with median thickness of the profile of 2.5 mm, theoretical weight of 0.81 kg/m and natural finish. It presents the hanging area protected by a PVC piece of 2.3 mm thickness.
- **STB-T-CH:** Standard piece (ref. 05.19.062) for the T-Omega profile, made of 6063 T6 alloyed extruded aluminum with median thickness of the profile of 2.5 mm, theoretical weight of 0.89 kg/m and natural finish. It presents the hanging area protected by a PVC piece of 2.3 mm thickness.
- **STB-T-CH-PRO:** “PRO” pieces with screw holder and included screw (STB-T-CH-PRO) (ref. 05.19.088), for the T-CH-PRO profile, made of 6063 T6 alloyed extruded aluminum with

median thickness of the profile of 2.5 mm, theoretical weight of 0.99 kg/m and natural finish. It presents the hanging area protected by a PVC piece of 2.3 mm thickness, with ref. 05.19.087.

3.2.4. S and Z profiles

- **STB-SZ, STB-T-SZ:** Extruded 6063 T6 alloyed aluminum profiles, named S (05.19.121) and Z (05.19.122), interlocking with tongue-and-groove joints, to which cassettes are fixed with rivets.

3.2.5. Accessories

The following items must be used.

3.2.5.1. Cladding starter profile

- **STB-SZ, STB-T-SZ, STB-CH, STB-T-CH, and STB-T-CH-PRO:** Profile on which the S profile of the "SZ" system cassettes will interlock and the CH fixing profiles. This profile is offered in 6500 mm bars, with ref. 05.19.099, is fixed to the omega or T profiles by two 4.2x19 DIN 7504 K A2 self-tapping screws (ref. STB-T0610, optionally lacquered) on each fixing and also a special PVC protection will be used to avoid transmission of vibrations, with ref. 05.19.128, that is presented in 200 m rolls or in 41 mm pieces for anti-backlash gasket, with ref. 05.19.129.

3.2.5.2. Horizontal stiffener supports

They come in three sizes and various references are offered depending on the system:

- Long: ref. 05.19.101 (STB-T-SZ, STB-SZ) and 05.19.106 (STB-CH, STB-T-CH, and STB-T-CH-PRO), (fig. 16).
- Short: ref. 05.19.100 (STB-T-SZ) and 05.19.105 (STB-T-CH-and STB-T-CH-PRO) (fig. 17).
- Mini: ref. 05.19.109 (STB-CH, STB-T-CH, and STB-T-CH-PRO) and 05.19.110 (STB-T-SZ, STB-SZ), (fig. 18).

3.2.5.3 CH fixing clips

CH clip for tongue-and-groove fixing of cassettes (STB-CH, STB-T-CH, and STB-T-CH-PRO) (Ref. 05.19.108): Are pieces made of extruded 6063 T6 alloyed profiles with 2 mm thickness. Its installation will be mandatory for cassettes with horizontal stiffeners and in the case of starting of the façade, a stiffening profile will be installed 150mm from the bottom of the cassette, connected to the starting profile of the cladding (05.19.099).

3.3. Fixations

3.3.1 Fixations for cassette forming

They are used for the formation of corners, connection of vertical stiffeners to cassette flanges and for fixing the reinforcement plates to tabs. It will be open end blind rivets with break pull mandrel ISO 15977¹¹ - 4,8 x 12 AIA/St, of dimensions (Ø x L) 4.8 x 12 mm, with aluminum head and A2 stainless steel mandrel, fixing capacity between 4 to 8 mm, according to UNE-EN ISO 15977¹¹, with ref. STB-R0300 (optionally lacquered). For fixation of horizontal stiffeners to vertical flanges of cassettes, screws will be used (ref. STB-T0700), optionally lacquered, with tensile resistance of 5.82 kN and shearing: 4.11 kN.

3.3.2 Substructure fixings

Fasteners listed in Table 10 are distinguished as follows.

Table 10. Substructure fixings

System (use)	Fastener	Resist. (median v.)
STB-REM, STB-T-REM (panel to Ω, T profile)	Blind rivet ISO 15977 ¹¹ 5.0x12 Al/St A2, Ø head ≥14mm. Ref. STB-R0100 (opt. lacquered)	Tensile Z _b : 2500N Shear Q _b : 1820N
STB-CH, STB-T-CH, (suspension p. to Ω, TΩ profiles, fixing clip to cassette) STB-SZ, STB- STB-T-SZ, (Z profile to profile)	Self-tapping screw 4.2x16 DIN 7504 N/K ¹² , ^{13, 14} of A2 stainless steel, cross recessed pan head, or hexagon washer head. Ref. STB-T0600 and STB-T0610	Tensile Z _b : 5800 N Shear Q _b : 3700 N
STB-SZ, STB-T-SZ (cassette to S or Z profiles)	Blind rivet ISO 15977 ¹¹ 4.8x12 Al/St A2, with head of Ø ≥ 9.5mm. Ref. STB-R0300 (opt. lacquered)	Tensile F _z : 2200 N Shear Q _b : 1640 N
STB-REM (Bonding piece for Ω profiles)	Blind rivet ISO 15977 ¹¹ 4.8x12 Al/St A2, with head of Ø ≥ 9.5mm. Ref. STB-R0300 (opt. lacquered.)	Tensile F _z : 2200 N Shear Q _b : 1640 N
STB-CH, STB-SZ, STB-REM (TT, U bracket-Ω profile). STB-T-CH, STB-T-REM,	Self-tapping screw 5,5x20 (optionally 5,5x19) A2 stainless steel. Ref. STB-T0300,	Tensile Z _b : 7850 N Shear Q _b : 5235 N

¹¹ UNE-EN ISO 15977:2003. Open end rivets with break pull mandrel and protruding head. AIA/St (ISO 15977:2002).

¹² German norm of extended use in Spain, revoked and replaced by UNE-EN 15481:2000. Cross recessed pan head drilling screw with tapping screw head (ISO 15481:1999)

¹³ UNE-EN ISO 15481: . Cross recessed pan head drilling screw with tapping screw head. Remark: also known as DIN 7504-N (Revoked German norm)

¹⁴ UNE-EN ISO 15480: Fasteners. Hexagon washer head drilling screws with tapping screw head. Remark: Also known as DIN 7504-K (Revoked German norm)

STB-T-SZ (L bracket to T, L profile)	STB-T0310, STB-T0311 and STB-T0312	
--------------------------------------	------------------------------------	--

Table 10 (cont.). Substructure fixings

System (use)	Fastener	Resist. (median v.)
STB-CH, STB-SZ STB-REM (TT or U bracket to Ω profile)	M6x60 or M6x70 through-bolt with hex. head, class A EN ISO 4017	Class ≥ 50 . R. tensile. ≥ 500 MPa. Breaking load ≥ 23 Nm
	Flat washer C $\varnothing 6$ mm UNE-EN ISO 7092	Hardness HV 140
	Type 1 hex nut, class A, thread 6 EN-ISO 4032 ¹⁵	Class ≥ 50 (UNE EN-ISO 3506-2)

4 MANUFACTURING

4.1. Production, machining, and panel forming plant

These components are manufactured and sold by the holder, on its plant placed in Polígono Industrial La Rozada, in Toral de los Vados (León) where coils are continuously coated and composite panels are made.

Manufacturing of panels follows the following process: starting from raw materials previously kneaded, it is obtained, applying heat and pressure, a sheet forming material, that later on across a continuous production line, receives by bonding on both sides, metallic sheets of the same width. At the end of the line, by cutting, finished product panels are obtained, that present the finish on the visible face (it is also possible to obtain a finish in both faces). Cassettes, ready for installation in the worksite, are prepared at the factory or in specialized workshops, following the forming specifications and preparations established by the holder.

4.2. Product presentation

STACBOND®FR and A2 panels are identified by a printing system that codifies the panel on its backside, including the following information: STACBOND FR/A2 . color – sense, date, and time of manufacturing-complete traceability data. In the visible face a label with the same information is placed.

4.3. Rest of components

Both the rest of components and accessories are supplied (but not manufactured) by the holder or by suppliers linked to its business group, together with the quality certificates of each material.

5 QUALITY ASSURANCE

Quality controls are made of all elements that compose the panel, following procedures

established by the manufacturer. The quality system of the holder is certified by Bureau Veritas according to UNE-EN ISO 9001 and UNE-EN ISO 14001 norms. The rest of components and accessories are provided by suppliers together with the quality certificates of each material.

Controls are centered on each of the phases of the manufacturing process, starting with the supplied raw materials. It exists a specific Technical Instruction for quality reception of raw materials and its documentation. The self-control process includes the following phases:

5.1. Raw materials control

5.1.1. Metallic sheets

Depending on the metal used, control on the alloy is done by checking the quality certificates given by the supplier, which must be between the tolerances specified by the norm (related to mechanical specifications, composition, and thickness). Also, it is at least one control per coil done by checking the nominal thickness and its tolerance. On lacquered aluminum sheets it is controlled also, and at least once per coil:

- Coating thickness, according to UNE-EN 13523-1 norm.
- Coating gloss: at least one control per coil is done according to UNE-EN 13523-2 norm.
- Color differences (chromatic coordinates): At least one control per coil according to ISO 7724-3 norm.

5.1.2. Cores

The control of the raw materials from which the core is obtained is done by controlling the supplier certificate of each raw material.

5.2. Finished product control

Controls are done per manufacturing day, according to the specifications of the internal technical instructions, regarding manufactured panel thickness and degree of bonding of the metal sheets to the core. The measure of 4 mm panel thickness has the objective of controlling that dimensional tolerances indicated in Table 2 are not exceeded. The bonding in the separation of the cover of the core must be above the to the indicated in Table 2 and are evaluated according to the internal inspection checklist, done in the beginning of production, with each change of coil and each change of batch, by using the test method indicated in ASTM D 903 norm.

6 LABELING, PACKAGING, TRANSPORT, RECEPTION AT WORKSITE, HANDLING AND STORAGE

¹⁵ UNE-EN ISO 4032:2012. Fasteners. Hexagon regular nuts (style 1). A and B class products (ISO 4032:2012). Remark: Also known as DIN 934.

Panels are palletized in timber pallets and strapped to prevent damage during transport, which must be conducted horizontally, never stacking more than six pallets for STACBOND®FR or four for STACBOND®A2 one above the other. Storage must be done horizontally to avoid possible deformations that effect on its flatness and in other aspects that might impact on the panel quality. Maximum storage period will be eight months.

7 INSTALLATION AT WORKSITE

7.1. General specifications

7.1.1. Project definitions

Prior to installing the system, the project will determine the breakdown of the façade into cassettes or panels and the corresponding substructure. To that end, it is recommended to have defined at least the following aspects:

- Substructure profiles, brackets, and its fastenings. In particular, the maximum permissible deflection or overhang of the support in relation with the horizontal adjustment clearance allowed by the brackets shall be specified.
- Thickness of the ventilated chamber and thermal isolation.
- Breakdown of the external cladding in cassettes or panels, in general part and singular points of the façade, considering also the joint definition.
- Resolution of singular points.

7.1.2. Work Organization

Both in new works and in renewals the status of the supporting wall must be checked first. Later on, anchoring brackets will be installed, and afterwards, if possible, thermal isolation (the use of rigid plates of non-hydrophile, class A mineral wool it is recommended), before installing profiles. Afterwards, the general part of the cladding will be installed in ascending sense (blind parts) and finally the connecting cassettes (corners, singular points, etc.).

7.1.3. Installing companies

System installation must be done by the holder or by qualified companies.

7.2. Installation

7.2.1. Support preparation

The substructure must be properly aligned with the objective of guaranteeing the flatness of the cladding system. Before installing the panel system, an in-situ pull-out test of brackets to assure stability and the support ability to withstand loads. The façade installer will check the status of the support and the support flatness before installing the system, which must be done in such a way that the leveling and flatness is correct to assure an

adequate flatness and expansion (with a gap of 10mm between profiles).

7.2.2. Substructure fixing

First and last brackets will be placed at a maximum of 250 mm of the ends of the profile. The maximum length of the installed profile will be 6500 mm. The profile will be fastened to the brackets described above. On retention brackets changes due to the linear expansion of the profile will be allowed.

7.2.3. Installation of external cladding

In the installation phase, special attention must be put into the direction of the cladding elements (marked with an arrow in the protective film and the hidden face). It is recommended not to remove the protective film until a maximum of 30 days after installation. For longer time frames it must be consulted with the holder.

7.2.4. Cassettes (STB-CH, STB-T-CH, STB-T-CH-PRO, STB-SZ and STB-T-SZ)

Special attention must be paid to the directionality of the cassettes (marked with an arrow on the protective film and the hidden face). Once installed and completed the façade area, the film must be removed to avoid an excessive exposition to the sunlight and the outdoors conditions complicate the removal afterwards, as indicated above.

7.2.4.1 Suspended non-stiffened cassettes (STB-CH, STB-T-CH, and STB-T-CH-PRO)

The position of the suspension pieces must be placed first, and afterwards, if the modulation allows it, to install the cassettes by lines and always in an ascending sense, placing the tabs of the cassettes over the suspension pieces and later fastening them to the profiles by the holes and slots placed in the horizontal double upper flange.

7.2.4.1 Fixed non-stiffened cassettes (STB-SZ and STB-T-SZ)

To install the cassettes, it is recommended to previously rivet the cassette to the S profile in the lower part and the Z profile on the upper part. Later on, it will be installed by inserting the S profile of the top cassette over the Z profile of the lower cassette, except on the first row, where the S profile (ref. 05.19.121) will be inserted into the starting profile (ref. 05.19.099) of the lower cassette. Z profiles may be installed vertically and screwed to the flange of the Omega profile in window enclosures. It can be both installed by columns or rows and in any case in ascending sense. Between the S and Z profiles and between the S profile and the starting profile, a gap-filling gasket strip must be installed, ref. 05.19.129.

7.2.4.2 Fixed stiffened cassettes (STB-SZ and STB-T-SZ)

In case that is necessary to install vertical stiffening profiles in the STB-SZ and STB-T-SZ systems, these will be screwed before to the flanges of the Ω

profile or the face of the T profile, to apply the adhesive over the face of the stiffening profile and later on install the cassette. Both for installing stiffeners or for the screwing of the Z piece to the profile, fastenings described on Table 9 will be used.

7.2.4.3 Cassettes with glued stiffeners

Before installing cassettes and, if required, before gluing stiffening profiles to the backside of the cassette, the following phases will be followed:

7.2.4.3.1 Vertical stiffeners

- Cleaning: Dust and dirt will be removed by using mechanical procedures and never using solvents. This cleaning will consist on a more or less deep sanding depending on the existing dirt, and afterwards dust must be vacuumed, or blown by air pressure. For later cleaning and degreasing a special degreasing cleaner will be used.
- Priming of the zone (optional): Once the area is clean a black primer will be applied to reinforce the adhesion of the putty.
- Placement of double sided adhesive tape: Once the area is primed and after the wait time of priming has passed, the double side tape will be placed, that will hold the piece until the adhesive polymerizes and also will ensure the minimum thickness of the adhesive.
- Adhesive application: The application of special adhesive for composite panel bonding will be always done over the cassette by applying a bead.
- Stiffener placement: The stiffener will be placed in such a way that all its surface is coated by the adhesive. Afterwards it will be riveted on its top and bottom parts.

7.2.4.3.2. Horizontal stiffeners

- Cleaning of the surfaces of the fasteners, both the panel and profile, with a quick evaporation solvent, such as isopropyl alcohol, heptane, or acetone, with the adequate caution measures indicated in the installation manual of the adhesive manufacturer. It should be scrubbed with a cloth or damp in solvent and clean paper and make straight strokes and in one sense only, this operation must be repeated twice.
- Placement of the bonding system, which can be done by the placement of a 3M VHB 25mm width and 1.6 mm thick tape. Optionally, in the case of using the bonding subsystem SIKATACK PANEL the application of the special adhesive for the bonding of composite panel must be done applying a bead with a thickness of 1.6mm, without the requirement of priming in the cassette side, but being mandatory on the side of the stiffener, and without the requirement of double sided tape.

- Stiffener installation: It will be installed in such a manner that all the surface is coated with adhesive or in contact with the double sided tape. Afterwards it will be bonded mechanically to the side flanges by means of a A2 stainless steel 4.2x20 screw with ref. STB-T0700.

7.2.5. Panels (STB-REM and STB-T-REM)

The direction of the panels must be considered (marked with an arrow on the protective film and on its hidden face). Once installed and completed the façade area, the film must be removed to avoid excessive exposition to sunlight and outdoor conditions can difficult the removal afterwards, as indicated above.

7.2.5.1. Bidirectional riveted system

For installation purposes, substructure must be installed first; later on, if the modulation allows it, panels will be installed by rows and in any case, always in ascending order, riveting them to the flanges of the profiles, both vertical and horizontal.

7.2.5.2. Unidirectional vertical riveted system

If the modulation allows it, install panels by rows and always in ascending order, riveting them to the flanges of the profiles.

7.2.6. Singular points

Samples of capping and starting of façades, corners and others are shown in section 14.3.

7.3. Maintenance and repair

The specifications indicated on the CTE will be mainly considered, table 6.1 of DB HS S1- section 6. The holder considers as regular maintenance, to perform two visual annual inspections and if needed, to perform at least a yearly cleaning of panels or cassettes by using a mixture of tap water and non-alkaline, non-abrasive detergent to clean the surface. The washing will be done by means of a soft brush, or with a damp sponge, or with help of a moderate pressure cleaning machine. The use of solvents, or sanding paper, or a bristle brush is not allowed. To repair punctual damage, (for ex. graffiti, etc.) and/or the replacement of cladding, the holder must be contacted.

8 CALCULATION CRITERIA

8.1 Wind calculations

For pre-dimensioning, the cladding (without considering anchors to support), in the tables pre-dimensioning samples (annex 1) are shown following this criteria:

- Max. instantaneous permissible deflection f_{max} in the center of the visible face of the cassette or panel: $L/30$, (being L, the maximum distance between profiles or vertical stiffening profiles of the cassette), and always $f_{max} \leq 40$ mm. Maximum accumulated permissible deflection: 1.5 mm.

- Maximum allowable tensile stress (increased by a factor of 1.5): 80 MPa.
- The most unfavorable characteristic values and the pull-out values of each tab, applying a safety factor of 2.07, are indicated in Table 11, depending on core, type of suspension and system.
- Maximum deflection of profile I/200, being I the distance between brackets.
- Characteristic value of maximum admissible load (displacement=1.5mm) of pull-out of horizontal stiffener support pieces: 166.7 N (large) or 119.6 N (normal or mini).

Pre-dimensioning tables (Annex 1) are:

- STB-CH, STB-T-CH, and STB-T-CH-PRO systems
 - Table A1.1: Horizontal modulation of cassettes with or without glued vertical stiffeners¹⁶, and with vertical flanges of 40 or 45 mm depth.
 - Table A1.2: Vertical modulation of cassettes with or without glued vertical stiffeners¹⁶, and with vertical flanges of 40 or 45 mm depth.
- STB-REM and STB-T-REM systems
 - Table A1.3: Horizontal modulation of panels over unidirectional substructure¹⁷.
 - Table A1.4: Vertical modulation of panels over unidirectional substructure¹⁷.
- STB-SZ and STB-T-SZ systems
 - Table A1.5 and A1.6: Fixed cassettes with or without glued vertical stiffeners¹⁶.

In any case it is recommended to request a calculation note to the holder, which, using the INFINICLAD calculation software, can indicate in a more precise manner the distance between profiles, brackets and number of tabs, rivets or stiffeners that the studied cassette will need.

8.2 Expansion calculation

The holder also has calculation software to verify expansion, according to the chosen finish, building orientation and climate zone, valid for all the color chart (dark, clear, and intermediate).

9 USAGE GUIDELINES

As declared by the DITplus holder, the installation of the system has been performed since 2008 and to date, the sold surface amounts to various millions of m². Also, it has sent to the IETcc various references of use. The IETcc has visited some of the works, and sent user surveys, with satisfactory results.

Visits done do not have the objective of checking the installed surface with the systems or its

specifications, but to check visually the conditions of installation of the system, that is, both the proper constructive viability and possible incidences on the installation of different applicants, environments and supports.

Table 11. Tab pull-out values

Type of panel and suspension		Values	
		Charact. value F _{u,5} (N)	Calculation value (N)
Sistema STB-(T)-CH			
STACBOND®FR Reinforced tab (10,5mm)	Suspension 05.19.013 / 05.19.062	800	386
STACBOND®A2 Reinforced tab (10,5mm)	Suspension 05.19.013 / 05.19.062	960	464
STACBOND®FR Non-reinforced tab (15mm)	Suspension 05.19.013 / 05.19.062	870	420
	Suspension 05.19.130	900	435
STACBOND®A2 Non-reinforced tab (15mm)	Suspension 05.19.013 / 05.19.062	900	435
	Suspension 05.19.130	820	396
STB-T-CH-PRO system			
STACBOND®FR Non-reinforced tab (15mm)	Suspension 05.19.088	960	464
STACBOND®A2 Non-reinforced tab (15mm)	Suspension 05.19.088	930	449

10 TESTS

Below are summarized the main results made¹⁸ or supervised by the IETcc:

10.1. Identification tests

Table 12. Panels

Specifications		STACBOND® FR	
		Value	Requirement
Thickness (mm)		4.07	4 ± 0.2
Panel peeling resist. ASTM D 1781 (N.mm/mm)	Ext. face-core	247.65	≥ 50
	Int. face-core	215.95	≥ 50
Panel peeling res. ASTM D 17 (N.mm/mm) Mirror	Ext. face-core	312.3	≥ 50
	Int. face-core	520.7	≥ 50
4P flexural stiffness (daN x m ² /m)	Q: 60 daN	41.40	≥ 24
	Q: 20 daN	48.10	≥ 24
4P flexural stiffness (MPa)	R _{bend ini,av}	93.78	--
	R _{bend ini, k}	93.72	--
Specification		STACBOND® A2	
		Value	Requirement
Thickness (mm)		4.07	4 ± 0.2
Panel peeling resist. ASTM D 1781 (N.mm/mm)	Ext. face-core	103.97	≥ 18
	Int. face-core	130.17	≥ 18
4P flexural stiffness (daN x m ² /m)	Q: 60 daN	42.89	≥ 24
	Q: 20 daN	52.89	≥ 24
4P flexural stiffness (MPa)	R _{bend ini,av}	96.78	--
	R _{bend ini, k}	96.75	--

¹⁶ Always check with the holder for horizontal stiffeners.

¹⁷ Always check with the holder for bidirectional substructure

¹⁸ IETcc reports 22.720, 21.837, 20.717, 20.439 and 20.114 y 22.762 parts I, II and III), and test reports from AFITI. no. 4972T23 parts 1 and 2 for A2 and no. 5125T24 parts 1 and

2, for FR, for the renewal of this document DITplus and the ETA 15/0655. Some results of the current ETA 15/0655 are reproduced on this DIT plus to aid in informing the user. Check that ETA for more test results.

Table 13. Reaction to fire

Systems	STACBOND®	
	FR	A2
STB-(T)-CH-(PRO), STB-(T)-REM, STB-(T)-SZ	B-s1,d0*	A2-s1,d0*
*except panels with HDPE finish, which have not been assessed		

Table 14. Reaction to horizontal load

STB-REM* system 1200x110 mm panel riveted in corners	STACBOND®	
	FR	A2
Initial deformation after applying a 500 N load (mm)	0.00	0.00
Deformation after 1 min. of 500 N load (mm)	8.81	6.72
Deformation after 1 min. of unload (mm)	0.03	0.06
* extrapolable to STB-(T)-CH-(PRO), STB-T-REM and STB-(T)-SZ		

10.2. Material suitability tests

10.2.1. STB system tests

Table 15. Wind suction resistance of STB-CH with STACBOND® FR/A2 cassettes

Rig 4. STB-CH: FR cassette l-h-d: 900:2160-45 mm non-stiffened, 5 non-reinforced tabs in vertical flanges	Q (kPa)	Max. Instantane ous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 1.2 kPa - Dist. between brackets: 938mm - Dist. between profiles: 920 mm - Simple lower flange - Dist. between tabs: 490 mm - Tab width: 15 mm - Def. measured in center of cassette	1.2	23.79	0.33	1
	1.8	31.67	0.63	2, 4
	2.0	34.73	0.87	5
*: SLS: Service limit state; ULS: Ultimate limit state ¹ applicable to A2 cassette (=stiffness) & to STB-T-CH, STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≥ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≥ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.2·1.5=1.8 KPa ⁵ End of test due to bending of the lower horizontal flange				
Rig 5. STB-CH: FR Cassette l-h-d: 900:2160-40 mm non-stiffened, 5 reinforced tabs / vertical flange	Q (kPa)	Max. Instantane ous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 1.2 kPa - Dist. between brackets: 938mm - Dist. between profiles: 920 mm - Simple lower flange - Dist. between tabs: 490 mm - Tab width: 10.5 mm - Def. measured in center of cassette	1.4	27.30	0.69	1
	1.6	30.10	0.83	2
	2.0	37.30	1.41	3
	2.4	44.65	2.20	4
	2.6	NR	NR	5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette (=stiffness) & to STB-T-CH, STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≥ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≥ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.6·1.5=2.4 KPa ⁵ End of test due to tab fracture				

Table 15 (cont). Wind suction resistance of STB-CH with STACBOND® FR/A2 cassettes

Rig 9 M2-A2-1: STB-CH-A2 l-h-d: 900:2165-45 mm not stiffened, with 5 non-reinforced tabs / vertical flanges	Q (kPa)	Max. Instantane ous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 1.2 kPa - Dist. between brackets: 775mm - Dist. between profiles: 910 mm - Simple lower flange - Dist. between tabs: 500 mm - Tab width: 15 mm	1.2	27.06	0.43	1
	1.4	30.06	0.53	2
	1.6	NR	NR	4, 5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to FR cassette (= stiffness) & to STB-T-CH, STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.3 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.2·1.5=1.8 KPa ⁵ End of test as agreed by the parties				
Rig 3-A2-1: STB-CH -A2 l-h-d: 900:800-45 mm not stiffened, 4 non-reinforced tabs / vertical flanges	Q (kPa)	Max. Instantane ous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 2.2 kPa - Dist. between brackets: 838mm - Dist. between profiles: 920 mm - Simple lower flange - Dist. between tabs: 200 mm - Tab width: 15 mm	2.2	19.18	1.52	1,3
	2.6	33.44	8.83	2
	3.0	42.96	10.99	4,6
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to FR cassette (= stiffness) & to STB-T-CH, STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=2.2·1.5=3.3 KPa ⁵ End of test as agreed by the parties				
Rig 6: STB-CH-FR l-h-d: 1820:665-45 mm with vert. stiffener, 2 non-reinforced tabs / vertical flange	Q (kPa)	Max. Instantane ous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 0.6 kPa - Dist. between brackets: 995mm - Dist. between profiles: 920 mm - Simple lower flange - Dist. between tabs: 461 mm - Tab width: 15 mm	0.6	1.26	0.07	1
	1.4	4.84	2.05	3
	2.0	14.62	5.38	4
	2.6	NR	NR	5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette (=stiffness) & to STB-T-CH, STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.4·1.5=2.1 KPa ⁵ End of test due to lower central tab fracture				
Rig M4-A2-2: STB-CH-A2 l-h-d: 1820:1082-45 mm with vert. stiffener, 4 non-reinforced tabs / vertical flange	Q (kPa)	Max. Instantane ous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 1.0 kPa - Dist. between brackets: 838mm - Dist. between profiles: 920 mm - Simple lower flange - Dist. between tabs: 293 mm - Tab width: 15 mm	1.0	11.61	0.32	1
	2.4	23.70	1.48	3
	2.6	NR	NR	4, 5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to FR cassette (= stiffness) & to STB-T-CH, STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=2.4·1.5=3.6 KPa ⁵ End of test due to lower central tab fracture				

Table 16. Wind suction resistance of STB-T-CH - STACBOND® FR/A2 cassettes

Rig 1: STB-T-CH-FR l-h-d: 1950-1000-45 mm 1 vertical stiffener, 3 non-reinforced tabs in vertical flanges.	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 0.8 kPa	0.8	8.10	0.89	1
- Dist. between brackets: 1000 mm	1.6	14.03	1.54	3
- Dist. between profiles: 980 mm	2.4	20.44	2.58	4
- Simple lower flange	2.6	NR	NR	5
- Dist. between tabs: 397 mm				
- Tab width: 15 mm				
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette (=stiffness) & to STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=32.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.6·1.5=2.4 KPa ⁵ End of test due to lower central tab fracture				
Rig 1: STB-T-CH-FR l-h-d: 1950-1300-45 mm 1 vertical stiffener, 4 non-reinforced tabs in vertical flanges.	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 0.8 kPa	0.8	10.47	0.44	1
- Dist. between brackets: 1000 mm	1.6	14.03	1.54	3
- Dist. between profiles: 980 mm	2.4	20.44	2.58	4
- Simple lower flange	2.8	27.5	3.05	5
- Dist. between tabs: 365 mm				
- Tab width: 15 mm				
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to FR cassette (= stiffness) & to STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=32.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=2.0·1.5=3.0 KPa ⁵ End of agreed test without fracture or detachment				
Rig B4.1.1.3: STB-T-CH-FR l-h-d: 1102-1828-45 mm 2 vertical stiffeners., 6 non-reinforced tabs in vertical flanges	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 1.6 kPa	1.6	15.31	1.49	1, 3
- Dist. between brackets: 1000 mm	2.4	24.22	2.04	4
- Dist. between profiles: 1102 mm	3.4	NR	NR	5
- Simple lower flange				
- Dist. between tabs: 365 mm				
- Tab width: 15 mm				
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette (=stiffness) & to STB-T-CH-PRO ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=36.7 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.6·1.5=2.4 KPa ⁵ End of test due to lower left tab fracture				

Table 17. Wind suction resistance STB-SZ - STACBOND® FR/A2 cassettes

Rig 6: STB-SZ - FR l-h-d: 1820-575-30 mm non stiffened	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load q _e : 1.6 kPa	1.6	9.52	0.32	1
- Dist. between brackets: 938 mm	2.4	14.28	0.46	4
- Dist. between profiles: 920 mm	3.0	17.58	0.63	5
- Simple vert. and hor. flanges				
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette (= stiffness) ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.4·1.5=2.4 KPa ⁵ End of agreed test without fracture or detachment				
Rig M5-A2-1: STB-SZ - A2 l-h-d: 1820-575-30 mm non-stiffened	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*
- Max. adm. load. q _e : 1.6 kPa	1.6	10.96	0.65	1
- Dist. between brackets: 938 mm	2.4	17.02	1.15	4, 5
- Dist. between profiles: 920 mm				
- Simple vert. and hor. flanges				
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to FR cassette (=stiffness) ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.4·1.5=2.1 KPa ⁵ End of agreed test without fracture or detachment				

Table 18. Wind suction resistance of STB-T-SZ with STACBOND® FR/A2 cassettes

Rig B.4.2.1: STB-T-SZ- FR l-h-d: 1102-902-30 mm non-stiffened 2 TQ profiles	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load. q _e : 1.4 kPa	1.4	17.58	1.41	1
- Dist. between brackets: 938 mm	1.8	22.21	3.40	--
- Dist. between profiles: 920 mm	2.0	NR	NR	4,5
- Simple vert. and hor. flanges				
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.4·1.5=2.1KPa ⁵ End of agreed test without fracture or detachment				
Rig B.1-2: STB-T-SZ- FR l-h-d: 2894-940-30 mm 4 TQ profiles 2 horizontal stiffeners	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load. q _e : 0.6 kPa	0.6	3.25	0.98	1
- Dist. between brackets: 938 mm	0.8	4.47	1.39	3
- Dist. between profiles: 920 mm	1.2	7.20	2.48	4
- Simple vert. and hor. flanges	3.0	--	--	5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.4·1.5=2.1KPa ⁵ End of agreed test without fracture or detachment				
Rig. B.2-2DC: STB-T-SZ- FR l-h-d: 2289-960-30 mm 2 TQ profiles and intermediate L 1 horizontal stiffener	Q (kPa)	Max. Instantaneous deflection d _{in} (mm)	Max. Cumulative deflection d _{pa} (mm)	Rem*.
- Max. adm. load. q _e : 0.6 kPa	0.6	4.70	0.28	1
- Dist. between brackets: 938 mm	1.0	8.49	1.32	3
- Dist. between profiles: 920 mm	1.4	13.20	2.25	4
- Simple vert. and hor. flanges	1.8	19.21	3.84	5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 cassette ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=38.15 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresponding to ULS Q _{ULS} (for min Q _{SLS}) ≤ q _d = q _e γ=1.4·1.5=2.1KPa ⁵ End of agreed test without fracture or detachment				

Table 19. Wind suction resistance of STB-REM with STACBOND® FR panels

Rig 1: STB-REM Discontinuous panel 900x772x4 mm – unidirectional substructure	Q (kPa)	Max. Inst. deflection d _{in} (mm)	Max. Cum. deflection d _{pa} (mm)	Rem*.
- Max. adm. load. q _e : 1.2 kPa	1.2	24.10	0.94	1
- Dist. between brackets: 995 mm	1.6	30.73	1.30	2
- Dist. between profiles: 920 mm	1.8	33.66	1.44	3
- Rivets vert. dist.: ≤ 734 mm	2.4	42.31	2.00	4, 5
- Rivets hor. dist.: ≤ 862 mm				
- Dist. rivets to edge: 19 mm				
- Def. measured in center of panel				
*: SLS: Service limit state; ULS: Ultimate limit state ¹ q _e : applicable to A2 panel (similar stiffness) & STB-T-REM (> Inertia) ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresp. to ULS Q _{ULS} (for min Q _{SLS}) q _d ≤ Q _{ELS} γ=1.6·1.5=2.4 KPa ⁵ End of agreed test without fracture or detachment				
Rig 2: STB-REM Discontinuous panel 900-772-4 mm – bidirectional substructure	Q (kPa)	Max. Inst. deflection d _{in} (mm)	Max. Cum. deflection d _{pa} (mm)	Rem*.
- Max. adm. load. q _e : 1.2 kPa	1.2	13.27	1.32	1
- Dist. between brackets: 938 mm	1.8	18.60	1.49	3
- Dist. between profiles: 920 mm	2.6	24.93	1.88	4
- Dist. between beams: 792 mm				
- Rivets vert. dist.: ≤ 734 mm	3.4	NR	NR	5
- Rivets hor. dist.: ≤ 431 mm				
- Dist. rivets to edge: 19 mm				
- Def. measured in center of panel				
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ q _e : applicable to A2 panel (similar stiffness) & STB-T-REM (> Inertia) ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresp. to ULS Q _{ULS} (for min Q _{SLS}) q _d ≤ Q _{ELS} γ=1.8·1.5=2.7 KPa ⁵ End of agreed test without fracture or detachment				

Table 20. Wind load resistance for STB-T-REM with STACBOND® FR panels

Rig B-1: STB-T-REM Discontinuous panel 1019-940-4 mm – unidirectional substructure	Q (kPa)	Max. Inst. deflection d _{in} (mm)	Max. Cum. deflection d _{pa} (mm)	Rem*
- Max. adm. load q _e : 1.2 kPa	1.2	28.99	1.17	1
- Dist. between brackets: 938 mm	1.4	31.75	1.20	2
- Dist. between profiles: 1002 mm	1.6	36.24	1.78	3
- Rivets vert. dist.: ≤ 227 mm	1.8	39.80	2.31	--
- Rivets hor. dist.: ≤ 927 mm	2.0	43.11	2.67	--
- Dist. rivets to edge: 15 mm	2.2	43.12	3.47	--
- Def. measured in center of panel	2.4	NR	NR	4
	2.6	NR	NR	--
	2.8	NR	NR	5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 panel ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=33.4 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresp. to ULS Q _{ULS} (for min Q _{SLS}) q _d ≤ Q _{ELS} γ = 1.6; 1.5=2.4 KPa ⁵ End of agreed test without fracture or detachment				
Rig B1: STB-T-REM Continuous panel 1892-940-4 mm – unidirectional substructure	Q (kPa)	Max. Inst. deflection d _{in} (mm)	Max. Cum. deflection d _{pa} (mm)	Rem*
- Max. adm. load q _e : 1.4 kPa	1.2	24.40	0.92	--
- Dist. between brackets: 938 mm	1.4	28.02	1.09	1
- Dist. between profiles: 920 mm	1.6	31.71	1.34	2
- Rivets vert. dist.: ≤ 227 mm	1.8	34.86	1.35	--
- Rivets hor. dist.: ≤ 1005 mm	2.0	38.47	1.37	3
- Dist. rivets to edge: 19 mm	2.2	41.01	1.95	--
- Def. measured in center of panel	2.4	44.56	2.46	4
	2.6	47.71	3.03	--
	2.8	NR	NR	5
*: SLS: Service limit state; ULS: Ultimate limit state; NR: not registered ¹ applicable to A2 panel ² Q corresponding to SLS Q _{SLS} if d _{in} max. admissible ≈ L/30=30.6 mm ³ Q corresponding to SLS Q _{SLS} if d _{pa} max. admissible ≈ 1.5 mm ⁴ Q corresp. to ULS Q _{ULS} (for min Q _{SLS}) q _d ≤ Q _{ELS} γ = 1.6; 1.5=2.4 KPa ⁵ End of agreed test without fracture or detachment				

Table 21. Resistance to permanent loads

Reference	Max. deflection (mm) initial value (t=0sec)	Max. deflection (mm) initial value (t=1 month)	Rem.
FR cassette (ceiling) with glued stiffener 6 non-reinforced tabs, dim: 1400x1200x45mm	20.01	20.17	No failure

10.2.2. Tests over components

10.2.2.1. STB-(T)-CH-(PRO) system

Table 22. Tab pull-out (cassette)

STB- CH, STB-T-CH STACBOND® initial resistance		FR (kN)	A2 (kN)	Rem.
Reinforced (tab width 10.5 mm) c+s.p. ref. 05.19.013+Ω	F _{median}	0.97	1.05	1
	F _{U,5}	0.80	0.96	
Non-reinforced (tab width 15 mm) + s.p. ref. 05.19.013+Ω	F _{median}	0.92	0.97	2
	F _{U,5}	0.87	0.90	
Non-reinforced (tab width 15 mm) + s.p. ref. 05.19.130+Ω	F _{median}	0.95	0.95	2
	F _{U,5}	0.90	0.82	
STB-T-CH-Pro system STACBOND® initial resistance		FR (kN)	A2 (kN)	Rem.
Non-reinforced (tab width 15 mm) +s.p. ref. 05.19.088+TΩ	F _{median}	1.04	1.03	2
	F _{U,5}	0.96	0.93	
Rem. F _{U,5} (kN) : Characteristic value. 1: Deformation of tab + reinforcement, and failure of tab 2: Deformation and failure of tab Results of 05.19.013 suspension piece are extended to the suspension piece 05.19.062 with T-omega profile				

Table 23. Resistance of horizontal stiffener supports

Reference	F (N) median v.	F _{id} (N) characteristic v.	Rem.
Large	163.61	82.57	Load for accumulated permanent deformation = 1.0 mm no fracture
Short	96.08	77.05	

10.2.2.2. STB-(T)-SZ system

Table 24. S and Z profiles resistance

Vert. load	Max. load (kN)		Remarks
	F _m (median value)	F _{U,5} (char. Value)	
S profile	0.83	0.79	--
Hor. load	Max. load (kN)		Remarks
	F _m (median value)	F _{U,5} (char. Value)	
Z profile	1.62	1.38	Flap deformation without fracture
Punching	Max. load (kN)		Remarks
	F _m (median value)	F _{U,5} (char. Value)	
Z+ STB-300 screw	2.94	2.54	--

10.2.2.3. STB-(T)-REM system

Table 25. Punching STACBOND® FR

Punching shear resistance (STB-REM / STB-T-REM)				
ring Ø (mm)	Rivet position	F _{U,m} (N) (median value)	F _{U,5} (N) (charac. value)	No/Type of predominant failure
50	Center	3528.0	3281.1	5 P
	Corner	1465.9	1177.5	5 P
120	Center	2608.6	2400.0	5 R
	Side	1791.2	1538.11	4 R, 1 D
230	Corner	--	--	5 D
	Center	2636.47	2285.9	5 R
	Side	1134.1	928.6	5 D
310	Corner	--	--	5 D
	Center	2690.6	2592.8	3 R, 2 P
	Side	1426.0	1206.2	2 R, 3 D
	Corner	--	--	5 D
Rem: No and type of failures for 5 individual values: R. Rivet breaks. D: Panel deformation without fracture. P: Panel punching				

Table 26. Punching STACBOND® A2

Punching shear resistance (STB-REM / STB-T-REM)				
ring Ø (mm)	Rivet position	F _{U,m} (N) (median value)	F _{U,5} (N) (charac. value)	No/Type of predominant failure
50	Center	2557.6	2493.7	5 P
	Corner	863.9	796.1	5 P
120	Center	2191.3	2090.1	5 P
	Side	766.9	743.6	5 P
230	Corner	--	--	5 D
	Center	2217.2	2016.3	5 P
	Side	757.1	590.6	5 P
310	Corner	--	--	5 D
	Center	2259.6	2190.8	5 P
	Side	669.0	628.5	5 P
	Corner	--	--	5 D
Rem: No and type of failures for 5 individual values: R. Rivet breaks. D: Panel deformation without fracture. P: Panel punching				

Table 27. Shearing (STB-REM/STB-T-REM)

Shearing resistance of STACBOND® FR panels			
Rivet position	F _{U,m} (N) (median value)	F _{U,5} (N) (charac. value)	No/Type of predominant failure
Center	2634.7	2486.5	Panel tear
Corner	2618.1	2444.0	
Shearing resistance of STACBOND® A2 panels			
Rivet position	F _{U,m} (N) (median value)	F _{U,5} (N) (charac. value)	No/Type of predominant failure
Center	2740.8	2460.6	Panel tear
Corner	3017.1	2843.1	

10.2.2.4. Other components

Table 28. Mechanical resistance of brackets

Resistance of brackets against horizontal loads			
Reference	F _{1d} (N) Displac.=1 mm median value	F _{1d} (N) Displac.=1 mm m charact. value	Remarks
05.19.061 (L – 116 mm) (aluminum)	1564.9	736.2	Load value that provokes def=1mm, no fracture
05.19.054 (L – 188 mm) (aluminum)	3135.8	2511.5	Load value that provokes def=1mm, no fracture
05.19.081 (L – 133 mm) (stainless steel)	1456.7	1089.6	Load value that provokes def=1mm, no fracture
05.19.082 (L – 157 mm) (stainless steel)	4038.3	1931.2	Load value that provokes def=1mm, no fracture
Resistance of brackets against horizontal loads			
Reference	F _{1d} (N) Displac.=1 mm median value	F _{1d} (N) Displac.=1 mm m charact. value	Remarks
05.19.061 (L – 116 mm) (aluminum)	238.30	119.13	Load value that provokes def=1mm, no fracture
05.19.054 (L – 188 mm) (aluminum)	238.90	143.4	Load value that provokes def=1mm, no fracture
05.19.081 (L – 133 mm) (stainless steel)	925.51	607.00	Load value that provokes def=1mm, no fracture
05.19.082 (L – 157 mm) (stainless steel)	562.40	206.90	Load value that provokes def=1mm, no fracture

10.2. Durability tests

Table 29. Bonding subsystem resistance

Pull-out of horizontal stiffening profile + Sikatack adhesive bead of 100x15x1.6 mm length + primer in both sides of STACBOND panels (failure load N) after 28 days					
Value	Initial	Heat 24 h at 80°C	Freeze-thaw cycles	45°C Water immersion 21 days	Rem.
Median	1959.64	2412.67	3359.81	3967.09	Cohesive failure of adhesive bead
Charact.	1746.7	2081.5	2852.9	3741.80	
Pull-out of horizontal stiffening profile with STB-3M adhesive tape + STACBOND panels (failure load N)					
Value	Initial	Heat 24 h at 80°C	Freeze-thaw cycles	45°C Water immersion 21 days	Rem.
Median	780.09	886.84	746.82	738.68	Adhesive
Charact.	666.90	866.70	457.5	684.8	

Table 30. Panel durability

Decay of peeling resistance of panels (N.mm/mm)		
Ageing	STACBOND® FR	STACBOND® A2
Water imm. for 6h at 90°C	> 75% initial value	> 75% initial value
Freeze-thaw cycles	> 75% initial value	> 75% initial value
Water imm. for 500h at 20°C	> 75% initial value	> 75% initial value
Hygrothermal cycles	> 75% initial value	> 75% initial value
2500h air at 80°C	> 75% initial value	> 75% initial value

Table 31. Coating durability

Coating sample	Internal STB color code	Defects after exposition			
		Acetic acid salt spray			
		500 h		500 h	
PU	Textured White STB-4C3	No blistering, oxidation, cracking, flaking, filiform corrosion, or changes in color or gloss			
FEVE	Spectra Autum STB-S09				
	Carbon (black) STB-408	No blistering, oxidation, cracking, flaking, filiform corrosion, or changes in color or gloss	No generalized ¹ blistering. No oxidation, cracking, flaking, filiform corrosion or changes in color or gloss		
	Traffic Red STB-411				
PVDF 3-L	Spectra Sunset STB-S08				
PVDF 2L	Silver Metallic STB-203C				
	Pure white STB-420				
	Mouse grey STB-458				
	Black STB-415				
HDPE	Pure white STB-420	Slight blistering ² . No oxidation, cracking, flaking, filiform corrosion or changes in color or gloss	Slight blistering ² . No oxidation, cracking, flaking, filiform corrosion or changes in color or gloss		
	Marengo grey STB-509				
	Black velvet STB-525				
Remark 1: Occasional blistering in the sample edge					
Remark 2: Occasional blistering in cuts and borders of Ø 1.5 mm					
Sample	Defects after UV B exposition				
	500 h	1000 h	1500 h	2000 h	
STB-GR0	No defects or visually appreciable discoloration				
STB-P04					
STB-CT1					
STB-H04					
STB-TR1					
STB-W08					
STB-R04					

11 ASSESSMENT OF SUITABILITY OF USE

11.1. Compliance with national regulations

11.1.1. SE – Structural Safety

The assessed ventilated façade cladding systems do not contribute to the building's stability and because of this the Basic Exigences of structural safety do not apply to it. Anyway, the mechanical behavior of the ventilated façade cladding should be, on one side, not compromising the compliance of the rest of Basic Exigences and Safety of Use and Habitability, as indicated in the Building Regulations Law and on the other, it has to be such that resists and transfers to the supports its own loads and horizontal loads, with an admissible deformation, according to the Technical Code of Building Basic Document relative to Structural Safety – Actions in buildings (DB-SE-AE).

The use of ventilated cladding systems for façades requires the preparation of a technical design in accordance with the regulations in force. On this design stability, resistance and admissible deformations will be checked, justifying that the solution selected is adequate for withstanding the mechanical efforts that can derive from the loads corresponding to ultimate and service states. The calculation will be personalized depending on the location and height of the building and values established in the technical design. Also, special attention will be paid to localized instability phenomena that wind can produce in determined parts of buildings, especially in tall buildings.

The support of the ventilated façade systems, that typically consists of an enclosure wall, must comply with the essential requirements that are specific to it, considering also the loads and requirements that the ventilated façade system transfers to this wall. Bonding between the substructure of the system and the enclosure wall must be considered so during the use period extreme limit tensions or limit durability values are not exceeded. Behavior against wind suction has been experimentally assessed with tests done over different rigs of standard and/or unfavorable configurations between supports; complying safely with the values established for them by the calculation criteria of the holder.

11.1.2. SI – Safety in case of fire

Composition of the cladding, including isolation, must comply with the CTE, Basic Safety Document against Fire (DB-SI) in case the building or work in question is included on its scope of application. According to the tests presented, the values obtained by panels or cassettes systems made of STACBOND® panels allow to comply for any height, the requirement of B-s3,d0 established to limit fire propagation on the exterior of determined buildings, and also by internal surfaces of the chambers in ventilated façades, when the following conditions are met:

- Without thermal isolation or with thermal isolation made of mineral wool A1 and thickness ≥ 50 mm and density of 70 kg/m^3 .
- Claddings indicated on Table 4
- Joints equal or narrower than the test one, this means, open joints with a horizontal joint equal or lower at 500 mm of the bottom part of the sample, vertical joint ≤ 200 mm of the interior of the corner and joint width in installation of 10 mm or less.

As in all ventilated façade systems, in case of fire it can produce chimney effect propagation, because of that, fire behavior specifications must be respected and if needed, provide fire breaking areas. In any case, please note that the façade design must comply with the DB-SI 2 with the objective of avoiding vertical and horizontal fire propagation.

11.1.3. SUA – Safety of use and accessibility

The CTE does not specify requirements or categories related to safety of use for ventilated façade systems. Anyway, for lower parts of buildings, it is recommended to add an intermediate profile fixed to the backside of the cladding or have adequate protection to avoid marks and deformations in case of impacts. From the impact test results with hard and soft body, assessed systems have a category of use I, described in Table 32.

Table 32. Use categories

Category	Description
I	Surfaces accessible to the public, placed at floor level or in other areas exposed to possible hard body impacts (not vandalic)
II	Surfaces placed in exposed to direct impacts caused by hits or objects thrown from public areas, where the height of the object will limit the size of the impact, or in protected zones placed at lower levels.
III	Areas that are unlikely to be damaged by normal impacts caused by people or by objects thrown to them.
IV	Surfaces non-accessible from outside floor.

11.1.4. HS - Public health

The full enclosure solution must guarantee the minimum required watertightness level required for the building on which it is included, as described on the CTE-DB-HS, with the objective of satisfying the basic requirement of humidity protection (HS 1). The ventilated air chamber can have the consideration of "High resistance against filtration barrier" (B3) as described in the CTE DB-HS, HS-1, section 2.3.2, given that all specifications established on that document are respected (for ex. thickness of the ventilated air chamber between 3 to 10 cm thick, joints and quantity of openings, etc.).

Cladding systems based on suspended cassettes can contribute to obtaining a better watertightness of the façade. In any case, special attention must be paid to the design of the façade, to the inclusion of windows and lighting elements, and the adequate resolution of special points etc. to obtain adequate watertightness on these points, avoiding accumulation and filtration of water.

System components, as declared by the manufacturer of them, do not contain or free dangerous substances according to national and European regulations.

11.1.5. *HR – Protection against noise*

This assessment does not consider the contribution of the System to the acoustic behavior of the enclosure. The full solution of the system and fundamentally the supporting wall plus isolation must be compliant with the CTE requirements.

11.1.6. *HE - Energy saving*

The full constructive solution of cladding must comply with the requirements of the Technical Building Code CTE-DB-HE relative to energy saving, regarding hygrothermal behavior. For the purpose of calculating thermal transmission of the cladding, as described in the Supporting Document to the Basic Document DB-HE of the Technical Building Code (DA DB-HE / 1, CTE), the ventilated chamber will be considered as “highly ventilated air chamber”, and the total thermal resistance of the cladding can be obtained by neglecting the thermal resistance of the air chamber and the other layers between the air chamber and the external environment, and including an external surface resistance corresponding to idle wind, equal to the surface resistance of the same element (HE-1, Appendix E).

The verification of the limitation of superficial and interstitial condensation humidity must be performed according to what is established in the Supporting Document to the Basic Document DB-HE 2 of the Technical Building Code (DA-DB-HE / 2, CTE), on its section 4.

For those cases outside of the application scope of the aforementioned Basic Document, or if actions exceeding those considered on that document are expected, a specific study that is relative to the provision of maximal admissible deformations and failure values of connections from the cladding to the substructure.

11.2. **Product use. Use limitations**

Aspects related to the calculation against wind action, included in section 8 of this Document, refer to the scope of application of the Basic Structural Safety Document, relative to Building Actions of the CTE (DB-SE-A). It has not been assessed for the concession of this document, the seismic behavior of the cladding systems.

According to Chapter 4. Durability of Eurocode 9¹⁹, under normal atmospheric conditions (for ex. in rural, moderately industrial, or urban areas) the profiles made of aluminum alloys with natural finish can be used without the requirement of superficial coating. Natural aluminum profiles can be classified

as Class B without testing and are valid for neutral environments.

Test results over lacquered sheets show that they are resistant to the effect of neutral salt spray.

There is no correspondence to date in the state of the art between corrosivity categories and exposition to acetic acid salt spray test results. The results obtained do allow a qualitative differentiation of behavior between the PU, FEVE, PVDF and HDPE assessed finishes. In any case the holder should be consulted regarding the suitability of the finish related to the outdoor environment to which it will be exposed.

11.3. **Waste management**

The specifications included in the Royal Decree 105/2008 that regulates the Production and Management of Construction and Demolition Wasted, and the regional regulations that apply will be followed. For this, the recognized installer will adhere to the main contractor's Waste Management Plan.

The holder has a system of recovery and recycling of waste.

11.4. **Maintenance and service conditions**

It is considered that the system durability is satisfactory considering that the installed façade is submitted to proper use and maintenance.

11.5. **Appearance and aesthetic**

The versatility of possible claddings both in terms of format and color is a key characteristic thanks to the available standard color chart. In case of Mirror finish, the holder's instructions for panel machining and installation will be mandatory and followed closely.

11.6. **Follow-up conditions**

The concession of the DITplus is linked to the maintenance of a yearly follow-up of production control in factory of the manufacturer and if needed of some of the works executed. This follow-up does not constitute an endorsement or guarantee of works performed.

11.7. **Other aspects**

11.7.1 *Environmental product declaration (EPD)*

The holder has EPD for STACBOND® FR and STACBOND® A2 panels according to ISO 14025 and 15804 norms, related to life cycle analysis.

11.7.2 *BIM information*

The holder has available, for each assessed system, BIM files of it.

¹⁹ UNE-EN 1999-1-2:2007. Eurocode 9: Design of aluminum structures. Part 1-2: Structural fire design (Ratified by AENOR in June 2011.)

12. CONCLUSIONS

Considering:

- that during the manufacturing process a quality control is performed that comprises a self-control system for which the manufacturer verifies the suitability of raw materials, manufacturing process, and final product;
- that other elements are manufactured by companies that assure the required quality and homogeneity of them;
- that the manufacturing and installation process is verified enough by practice;
- test results obtained and work visits done;

Based on the remarks of the DITplus Committee of Experts, systems proposed by the manufacturer are deemed suitable for use.

The reporter:

D. Eduardo Lahoz Ruiz. Ph.D., Architect

13. REMARKS FROM THE COMMITTEE OF EXPERTS²⁰

The main remarks of the Committee of Experts²¹ were as follows:

- It must be verified that none of the metal components incorporated into the system will cause corrosion problems.
- The building's expansion joints shall be considered in relation to the joints of the cladding.
- As the profiles are discontinuous, connecting pieces of the system shall be used to assure the flatness of each section and that the vertical substructure can adequately allow both thermal expansion and possible deflections of the structural support element
- For façades in general, consideration should be given to the cleaning procedure of the cladding. If a basket system is used, rails or other measures should be provided to prevent damage to the cladding.

- It is recommended that in cladding areas with impact risk, reinforced panels on its backside should be used, either with an additional profile or mortared in place.
- It should be considered that dark color panels are more sensible to solar radiation, so for enclosures placed in high temperature areas and exposed to solar radiation the color selection should be carefully considered related to cladding expansion and should be verified with the holder.
- Please note that in ventilated façade systems, the external cladding sheet does not guarantee the watertightness of the enclosure itself. Also, it is recommended to request the DIT holder specific support over design and execution of gaps and singular points. In particular, it is considered mandatory in the design of window gaps, the provision of the adequate slope in lintels and drip edges.
- On environments with corrosivity categories C4 or C5 according to the EN ISO 9223²² norm, for example in high exposure to chlorides, it is recommended to use AISI 316 stainless steel for fastenings.
- It will be verified that the type of anchoring defined in the design is adequate for the type and status of the support. The type of anchoring will be indicated in the Building Book.
- It is recommended to include a copy of this DITplus into the Building Book.
- Please note that depending on the building location, its shape and dimensions, wind suction and pressure values can be over the ones described in the current regulation, and this should be considered in calculations.
- Considering the metallic masses of the systems and their exposition, grounding of the system should be studied according to the Low Tension Electrotechnical Regulation in force.

²⁰ The Committee of Experts, according to the Granting Regulation of DIT (M.O. of 23/12/1988), has the function of assessing about the test plan and the technical assessment procedure to be followed and proposed by the IETcc.

Comments and remarks done by the members of the Committee, do not suppose by themselves a technical endorsement or preferential recommendation of use of the assessed system.

Responsibility of the Committee of Experts does not reach the following aspects:

- a) Intellectual property or patent rights of the product or system.
- b) Marketing rights of the product or system.
- c) Works finished or ongoing where the product or system has been installed, used or maintained, nor either about design, construction methods nor training of operators involved.

²¹ The Committee of Experts for external ventilated façade cladding systems was composed by representatives of the following agencies and organizations:

- Acciona Construcción S.A.
- Asociación de Empresas de Control de Calidad y Control Técnico Independiente (AECCTI).

- Asociación Española de Normalización (UNE).
- Asociación para el Fomento de la Investigación y la Tecnología de la Seguridad contra incendios (AFITI).
- General Council of Technical Architects of Spain (CGATE).
- Control Técnico y Prevención de Riesgos S.A (CPV).
- Dragados S.A.
- Higher Technical School of Architecture (U.P.M).
- Higher Technical School of Building (U.P.M).
- Higher Technical School of Agricultural, Alimentary and Biosystems (U.P.M).
- Higher Civil Engineering School (U.P.M.)
- Ministry of Defense – Unit of Works, Installation and Maintenance (MINISDEF – UOIM).
- Spanish Office of Patents and Trademarks (O.E.P.M).
- Eduardo Torroja Construction Sciences Institute (IETcc).

²² UNE EN ISO 9223:2012. Corrosion of metals and alloys. Atmospheric corrosivity. Classification, determination and estimation.

- Please note the importance of keeping the assessed rank of open joints width between cladding elements during its use and

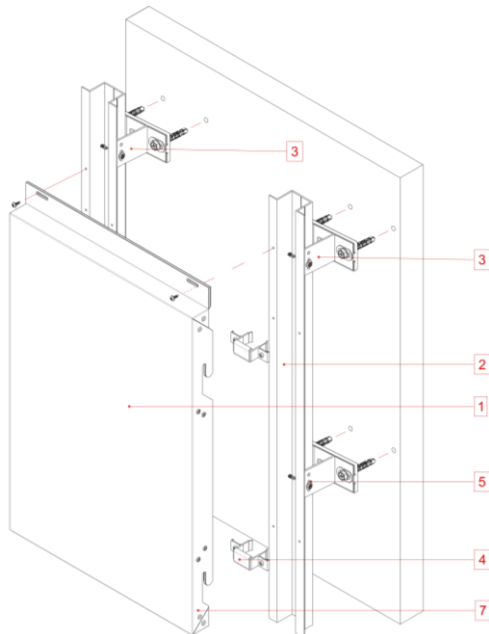
maintenance period, so a worsening of the behavior against fire is avoided.

14. GRAPHICAL INFORMATION

REMARK: All constructive details indicated in the following figures are simplified technical solutions. The design of the façade depends on each building and must adapt to the current regulation. All dimensions are in mm.

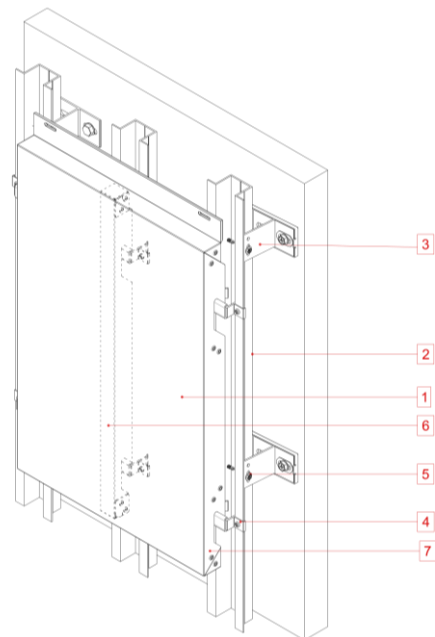
14.1. General system configurations

FIG.1a. STB-CH for non-stiffened cassettes



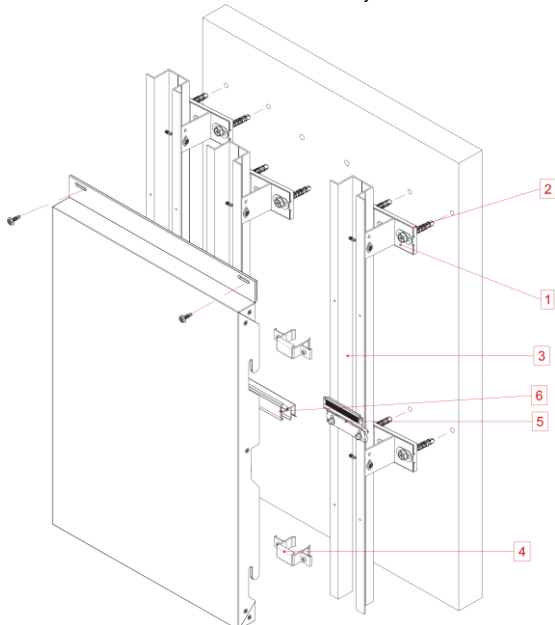
1. Cassette made of STACBOND® FR or A2 panels
2. Omega profile ref. 05.19.003
3. TT bracket ref. 05.19.004 to 05.19.007 or ref. 05.19.030 to 05.19.039
4. Suspension piece ref. 05.19.013 or 05.19.130
5. M6x60/70 through-bolt with class A hexagonal head (alternatively two (1 on each side) self-tapping 5,5x20 A2 stainless steel screws with hexagonal head, ref. STB-T0300, optionally lacquered)

Fig.1b. STB-CH for vertically stiffened cassettes



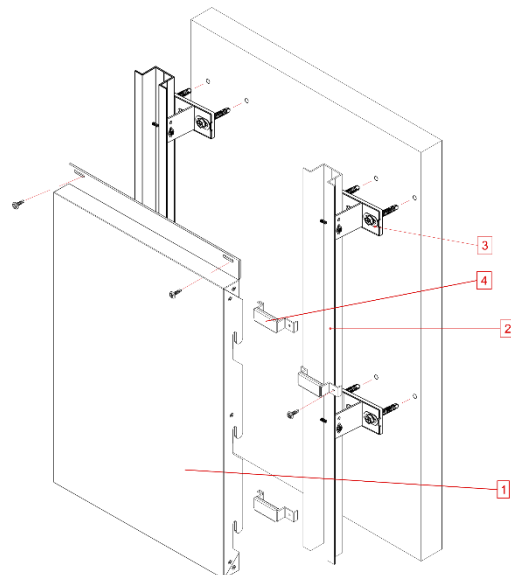
6. Intermediate stiffener made of STACBOND® FR or A2 panel fixed with adhesive system and riveted to the horizontal flanges, with ref. 05.19.025; 05.19.026; 05.19.027; 05.19.027.1; 05.19.027.2; 05.19.027.3
7. Reinforcement plate of tabs (only for 40mm flanges) ref. 19.019

FIG.1c. STB-CH for horizontally stiffened cassettes.



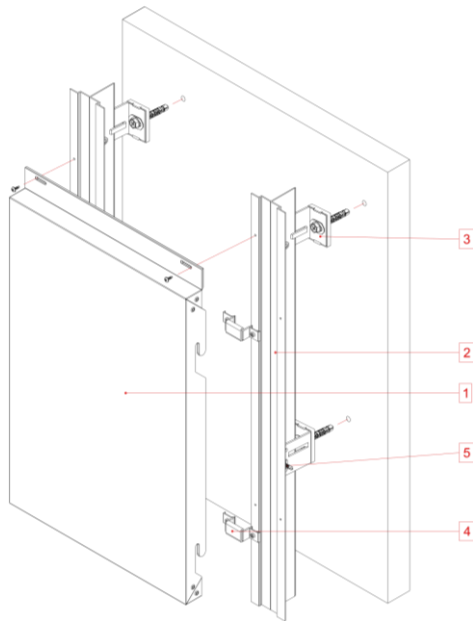
1. TT bracket ref. 05.19.004 to 05.19.007 or ref. 05.19.030 to 05.19.039
2. Isolating wedge for TT brackets ref. 05.19.069 or 05.19.073
3. Omega profile ref. 05.19.003
4. Suspension piece ref. 05.19.013 or 05.19.130
5. Horizontal stiffener support, ref. 05.19.109 (mini size, valid for screwing to the Ω wing) and ref. 05.19.106 (large size, valid for screwing to the Ω profile)
6. Extruded aluminum horizontal stiffener, ref. 05.19.107

FIG.1d. STB-CH for cassettes with suspension piece ref. 05.19.130



1. Cassette made of STACBOND® FR or A2 panels
2. Omega profile ref. 05.19.003
3. TT bracket ref. 05.19.004 to 05.19.007 or ref. 05.19.030 to 05.19.039
4. Suspension piece, ref. 05.19.130

FIG.2a. STB-T-CH for non-stiffened cassettes



1. Cassette made of STACBOND® FR or A2 panels (with or without intermediate vertical stiffener made of STACBOND® FR or A2 panels fixed with adhesive subsystem and riveted to horizontal flanges)
2. TQ profile, ref. 05.19.061
3. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
4. Suspension piece ref. 05.19.062 to 05.19.130
5. Fastening to profile screw (ref. STB-T0300, optionally lacquered), 5,5x20
6. Intermediate stiffener made of STACBOND® FR or A2 panel fixed with adhesive system and riveted to the horizontal flanges, with ref. 05.19.025; 05.19.026; 05.19.027; 05.19.027.1; 05.19.027.2; 05.19.027.3

FIG. 2b. STB-T-CH for vertically stiffened cassettes

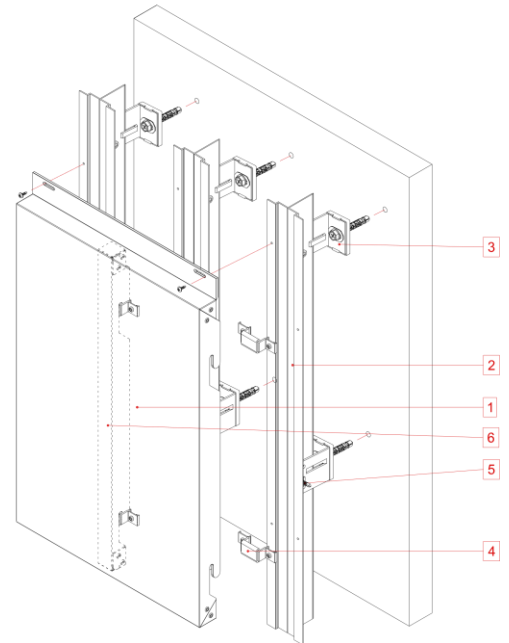
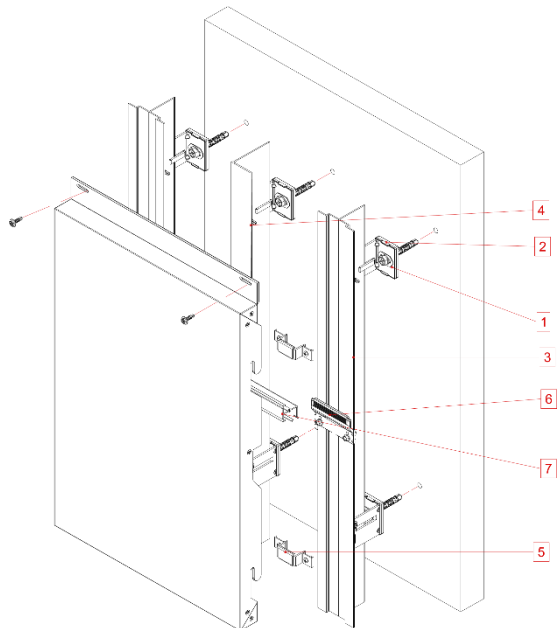
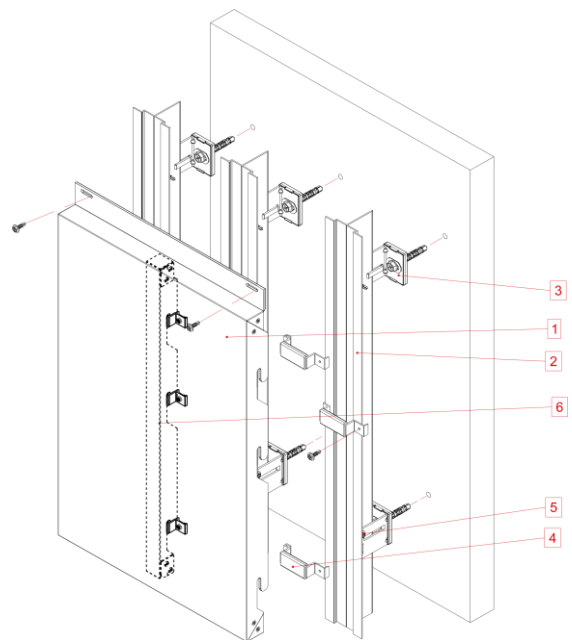


FIG.2c. STB-T-CH for horizontally stiffened cassettes.



1. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
2. Insulating wedge for L brackets, ref. 05.19.068
3. TQ profile ref. 05.19.061
4. L intermediate profile, ref. 05.19.059
5. Suspension piece ref. 05.19.062 o 05.19.130
6. Horizontal stiffener support, ref. 05.19.109 (mini size, valid for screwing to the QT wing), ref. 05.19.105 (normal size, valid for screwing to the L intermediate profile) and ref. 05.19.106 (large size, valid for screwing to the QT or T profiles)
7. Extruded aluminum horizontal stiffener, ref. 05.19.107

FIG.2d. STB-T-CH for cassettes with vertical stiffener and suspension piece ref. 05.19.130



1. Cassette made of STACBOND® FR or A2 panels
2. TQ profile ref. 05.19.061
3. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
4. Suspension piece, ref. 05.19.130
5. Self-tapping screw 4.8x19
6. Intermediate stiffener made of STACBOND® FR or A2 panel fixed with adhesive system and riveted to the horizontal flanges, with ref. 05.19.025; 05.19.026; 05.19.027; 05.19.027.1; 05.19.027.2; 05.19.027.3

FIG.3a. STB-T-CH-PRO for non-stiffened cassettes

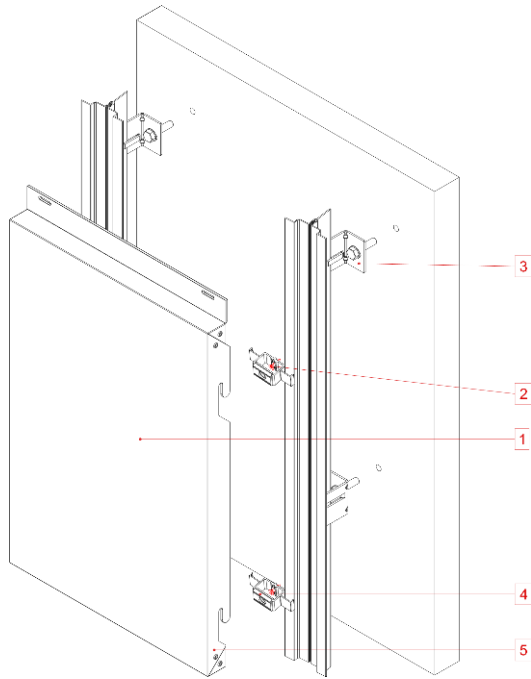
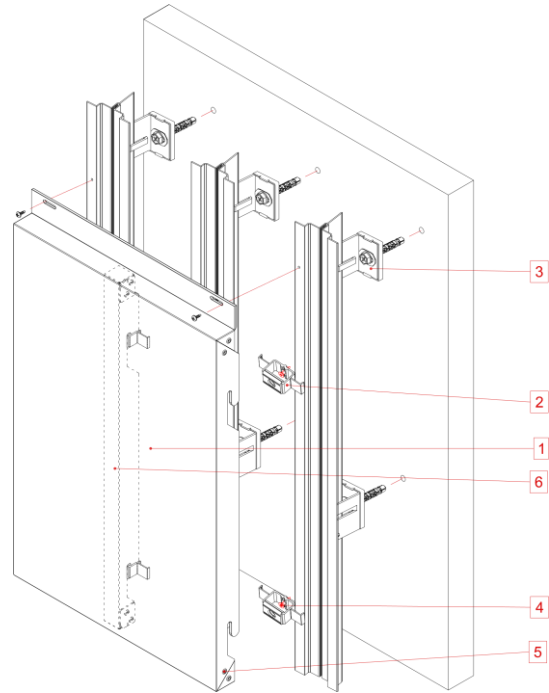
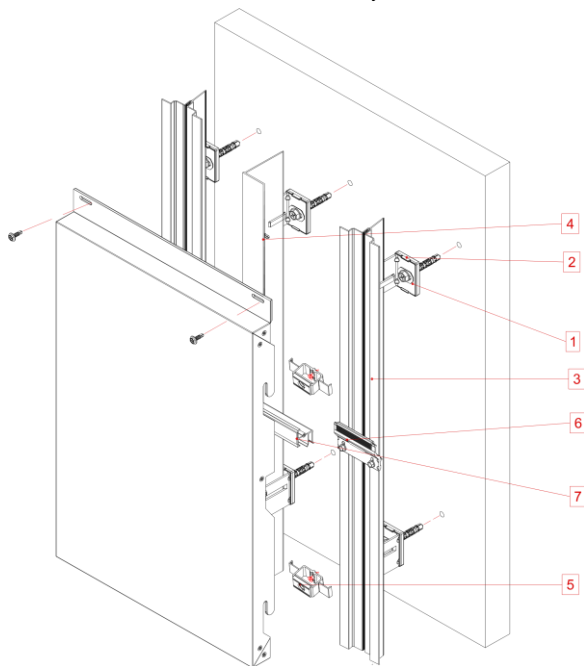


Fig.3b. STB-T-CH-PRO for vertically stiffened cassettes



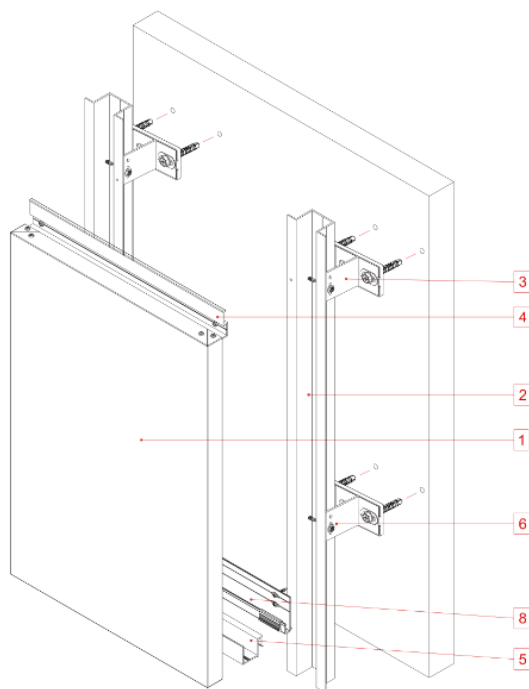
1. Cassette made of STACBOND® FR or A2 panels
2. Suspension piece STB-CH-PRO, ref. 05.19.088
3. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
4. Pre-installed screw on suspension piece
5. Forming plate for CH cassettes, con ref. 05.19.050
6. Intermediate stiffener made of STACBOND® FR or A2 panel fixed with adhesive system and riveted to the horizontal flanges, with ref. 05.19.025; 05.19.026; 05.19.027; 05.19.027.1; 05.19.027.2; 05.19.027.3

FIG.3c. STB-T-CH-PRO for horizontally stiffened cassettes



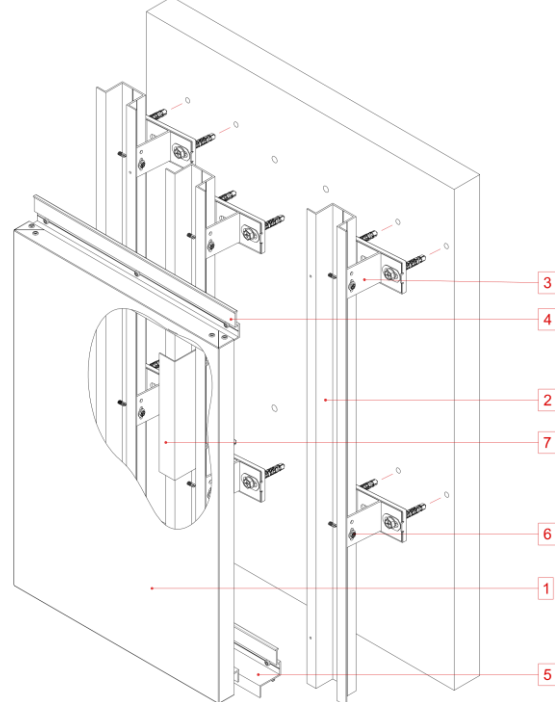
1. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
2. Insulating wedge for L brackets, ref. 05.19.068
3. T-CH-PRO profile ref. 05.19.092
4. L-CH-PRO intermediate profile, ref. 05.19.120
5. Suspension piece ref. 05.19.088
6. Horizontal stiffener support, ref. 05.19.109 (mini size, valid for screwing to the T-CH-PRO wing), ref. 05.19.105 (normal size, valid for screwing to the L-CH-PRO intermediate profile) and ref. 05.19.106 (large size, valid for screwing to the T-CH-PRO profiles)
7. Extruded aluminum horizontal stiffener, ref. 05.19.107

FIG.4a. STB-SZ for non-stiffened cassettes



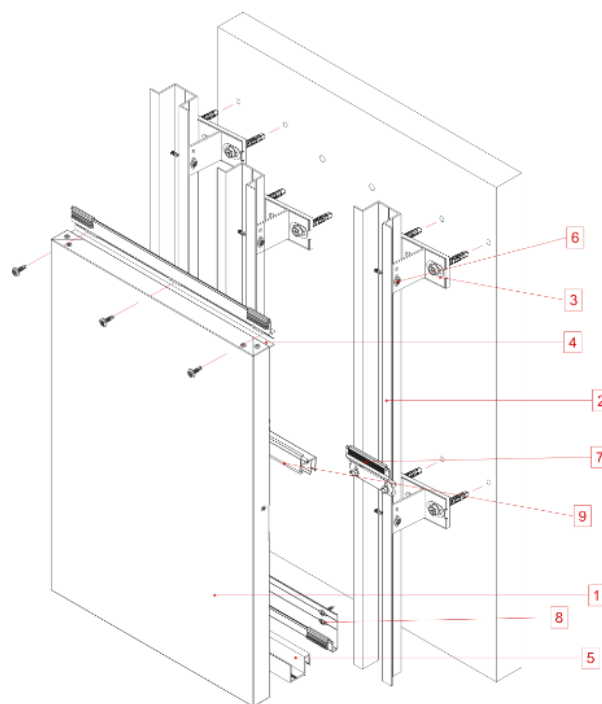
1. Cassette made of STACBOND® FR o A2 panels (with or without glued stiffener)
2. Omega profile ref. 05.19.003
3. TT bracket ref. 05.19.004 to 05.19.007 or ref. 05.19.030 to 05.19.039
4. S profile, ref. 05.19.121
5. Z profile, ref. 05.19.122

Fig.4b. STB-SZ for vertically stiffened cassettes



6. M6x60/70 through-bolt with class A hexagonal head (alternatively two (1 on each side) self-tapping 5,5x20 A2 stainless steel screws with hexagonal head, ref. STB-T0300, optionally lacquered)
7. Vertical stiffener (ref. 05.99.231)
8. Starter profile, ref. 05.19.099

FIG.4c. STB-SZ for horizontally stiffened cassettes



1. Cassette made of STACBOND® FR o A2 panels
2. Omega profile ref. 05.19.003
3. TT bracket ref. 05.19.004 to 05.19.007 or ref. 05.19.030 to 05.19.039
4. S profile, ref. 05.19.121
5. Z profile, ref. 05.19.122
6. M6x60/70 through-bolt with class A hexagonal head (alternatively two (1 on each side) self-tapping 5,5x20 A2 stainless steel screws with hexagonal head, ref. STB-T0300, optionally lacquered)
7. Vertical stiffener support, ref. 05.19.110 (mini size, valid for screwing to the Ω profile wings) and ref. 05.19.101 (large size, valid for screwing to the Ω profile)
8. Starter profile, ref. 05.19.099
9. Extruded aluminum horizontal stiffener, ref. 05.19.107

FIG.5a. STB-T-SZ for non-stiffened cassettes

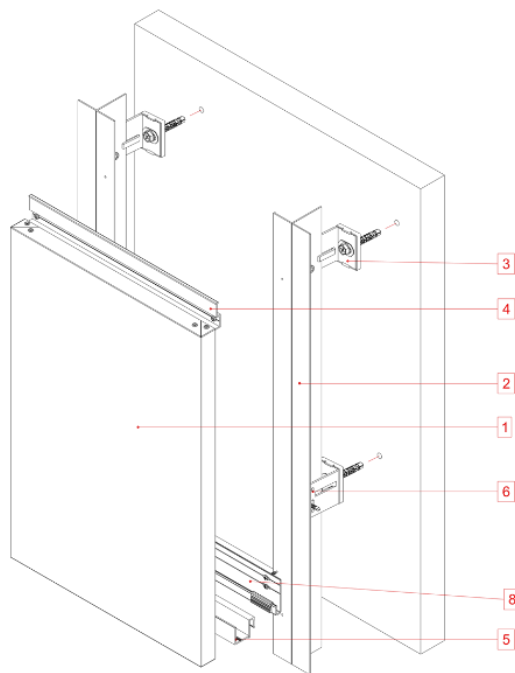
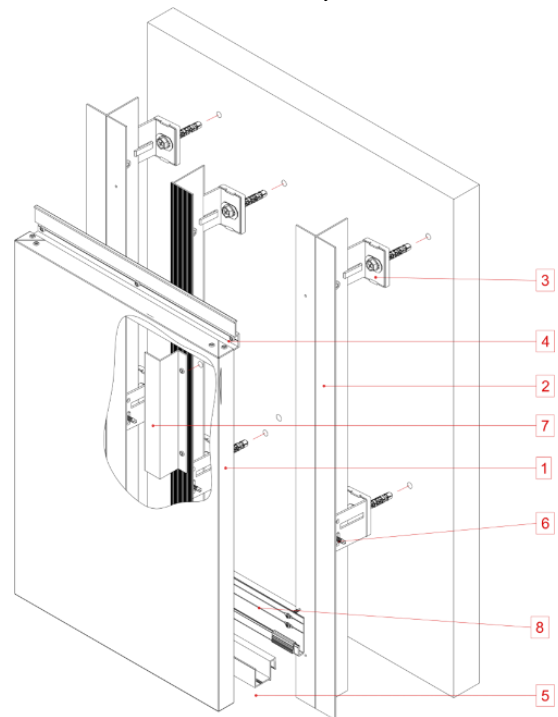
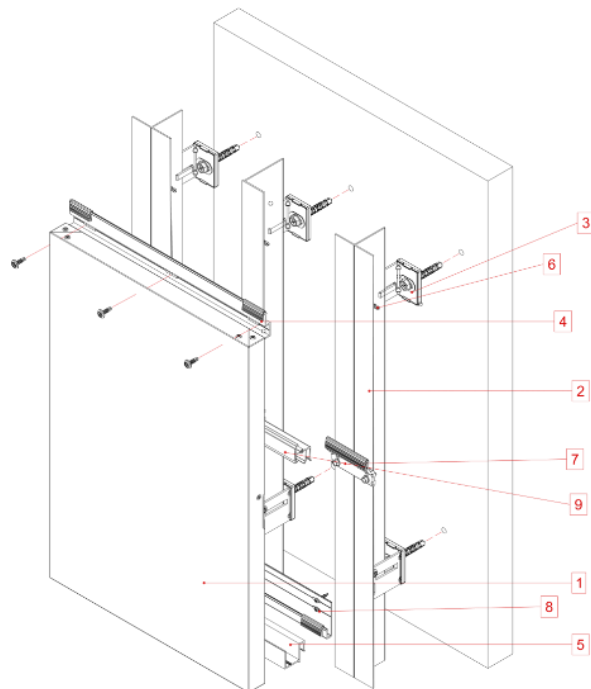


FIG.5b. STB-T-SZ for vertically stiffened cassettes



1. Cassette made of STACBOND® FR o A2 panels (with or without glued stiffener)
2. T profile ref. 05.19.043
3. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
4. S profile, ref. 05.19.121
5. Z profile, ref. 05.19.122
6. Fastening to profile screw (ref. STB-T0300, optionally lacquered), 5,5x20
7. Vertical stiffener ref. 05.19.231
8. Starter profile, ref. 05.19.099

FIG.5c. STB-T-SZ for horizontally stiffened cassettes



1. Cassette made of STACBOND® FR o A2 panels
2. T profile ref. 05.19.043
3. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
4. S profile, ref. 05.19.121
5. Z profile, ref. 05.19.122
6. Insulating wedge for L brackets, ref. 05.19.068
7. Horizontal stiffener support, ref. 05.19.110 (mini size, valid for screwing to the TQ profile wing), ref. 05.19.100 (normal size, valid for screwing to the intermediate L profile) and ref. 05.19.101 (large size, valid for screwing to T and TQ profiles)
8. Starter profile, ref. 05.19.099
9. Extruded aluminum horizontal stiffener, ref. 05.19.107

FIG.6a. STB –REM with unidirectional substructure

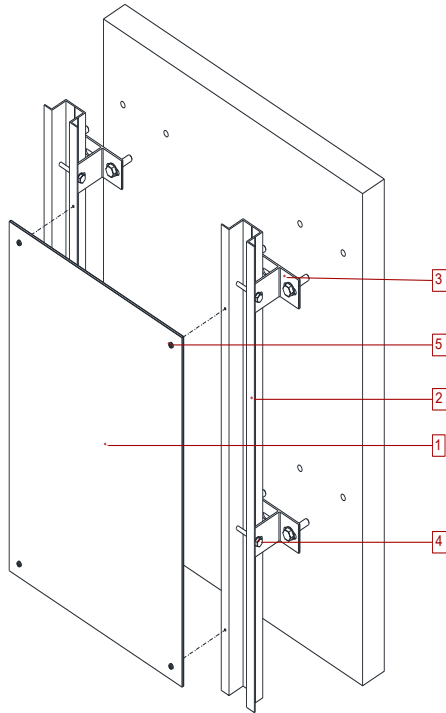
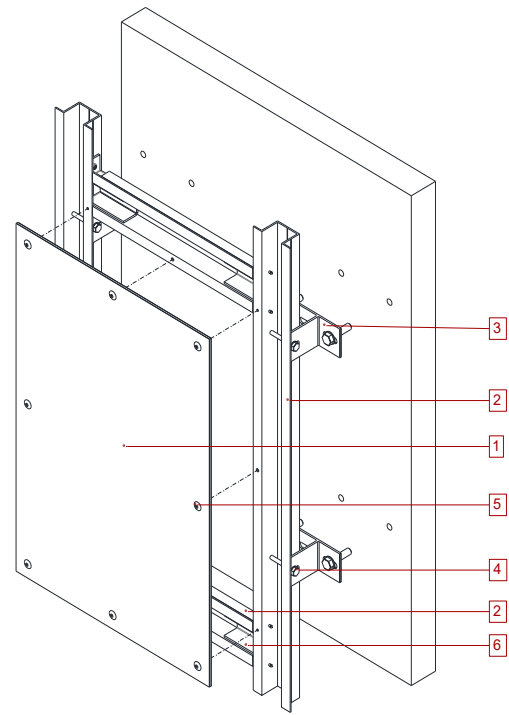


FIG.6b. STB –REM with bidirectional substructure



1. Panel made with STACBOND® FR or A2 panels
2. Omega profile ref. 05.19.003
3. TT bracket ref. 05.19.004 to 05.19.007 or ref. 05.19.030 to 05.19.039
4. M6x60/70 through-bolt with class A hexagonal head (alternatively two (1 on each side) self-tapping 5,5x20 A2 stainless steel screws with hexagonal head, ref. STB-T0300, optionally lacquered)
5. Blind rivet 5.0 x 12 with an alloyed aluminum body (AlMg5), A2/A4 stainless steel shank and a head of $d_e \geq \varnothing 14$ mm
6. Profile connection piece ref. 05.19.020

FIG.7a. STB –T- REM with unidirectional structure

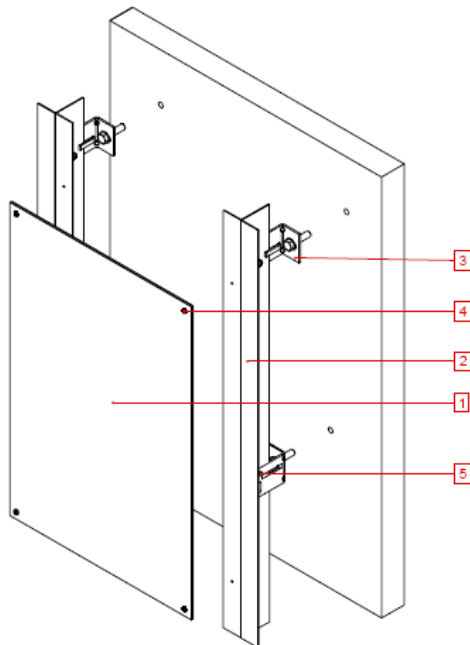
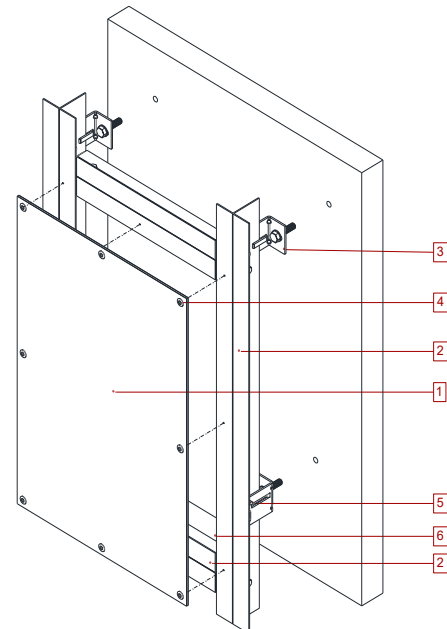


FIG.7b. STB –T- REM with bidirectional substructure



1. Panel made with STACBOND® FR or A2 panels
2. T profile ref. 05.19.053
3. L bracket ref. 05.19.041 to 05.19.042; 05.19.044 to 05.19.045; ref. 05.19.051 to 05.19.056 or ref. 05.19.078 to 05.19.085
4. Blind rivet 5.0 x 12 with an alloyed aluminum body (AlMg5), A2/A4 stainless steel shank and a head of $d_e \geq \varnothing 14$ mm
5. Fastening to profile screw (ref. STB-T0300, optionally lacquered), 5,5x20

FIG.8. Suspended cassette based on STACBOND® FR o A2 panels.

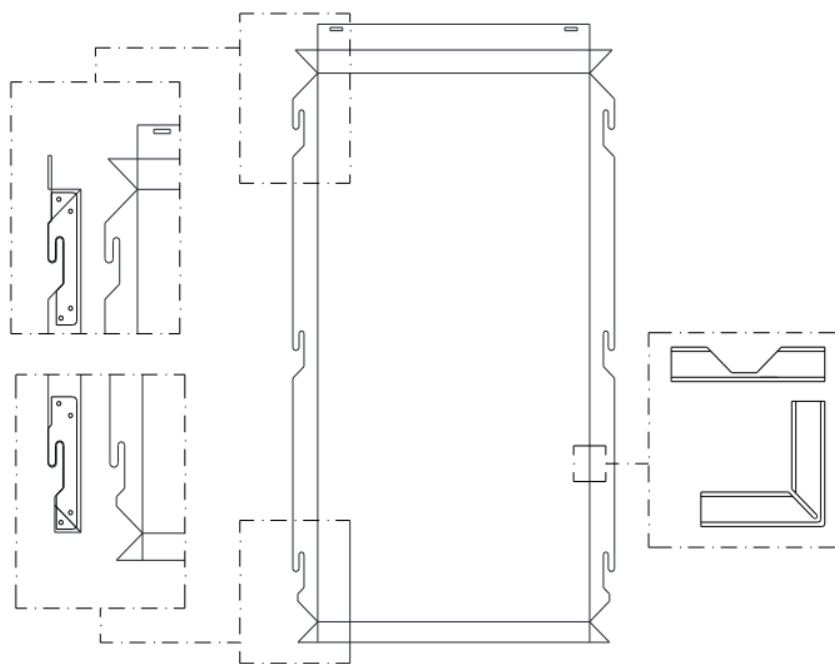


FIG.9. Standard suspension piece STB-CH (ref. 05.19.013)

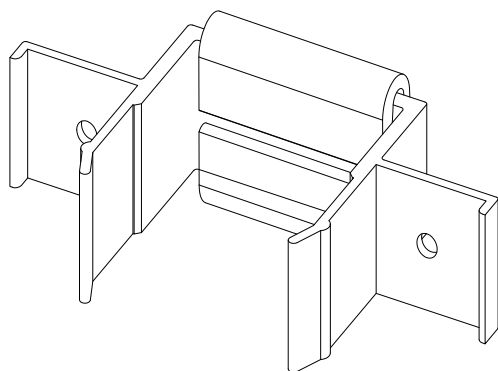


FIG.10. Standard suspension piece STB-T-CH (ref. 05.19.062)

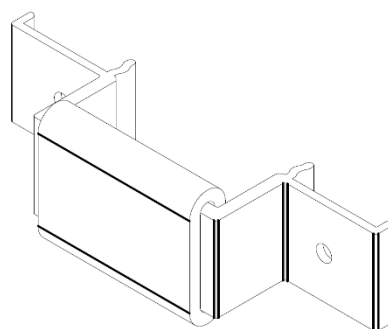


FIG. 11. Suspension piece STB (ref. 05.19.130)

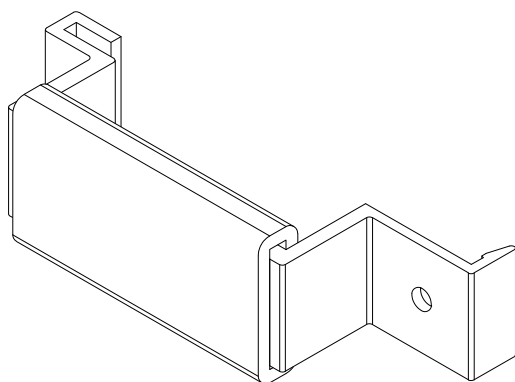


FIG. 12. Suspension piece STB-T-CH-PRO (ref. 05.19.088)

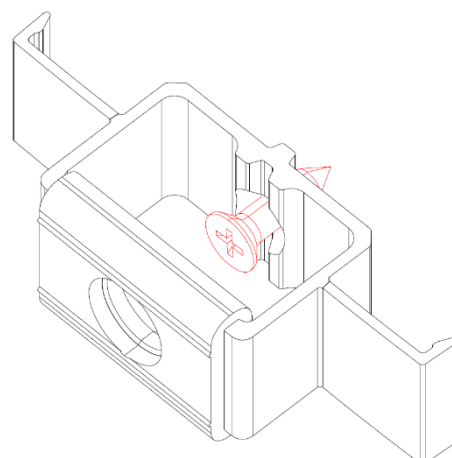
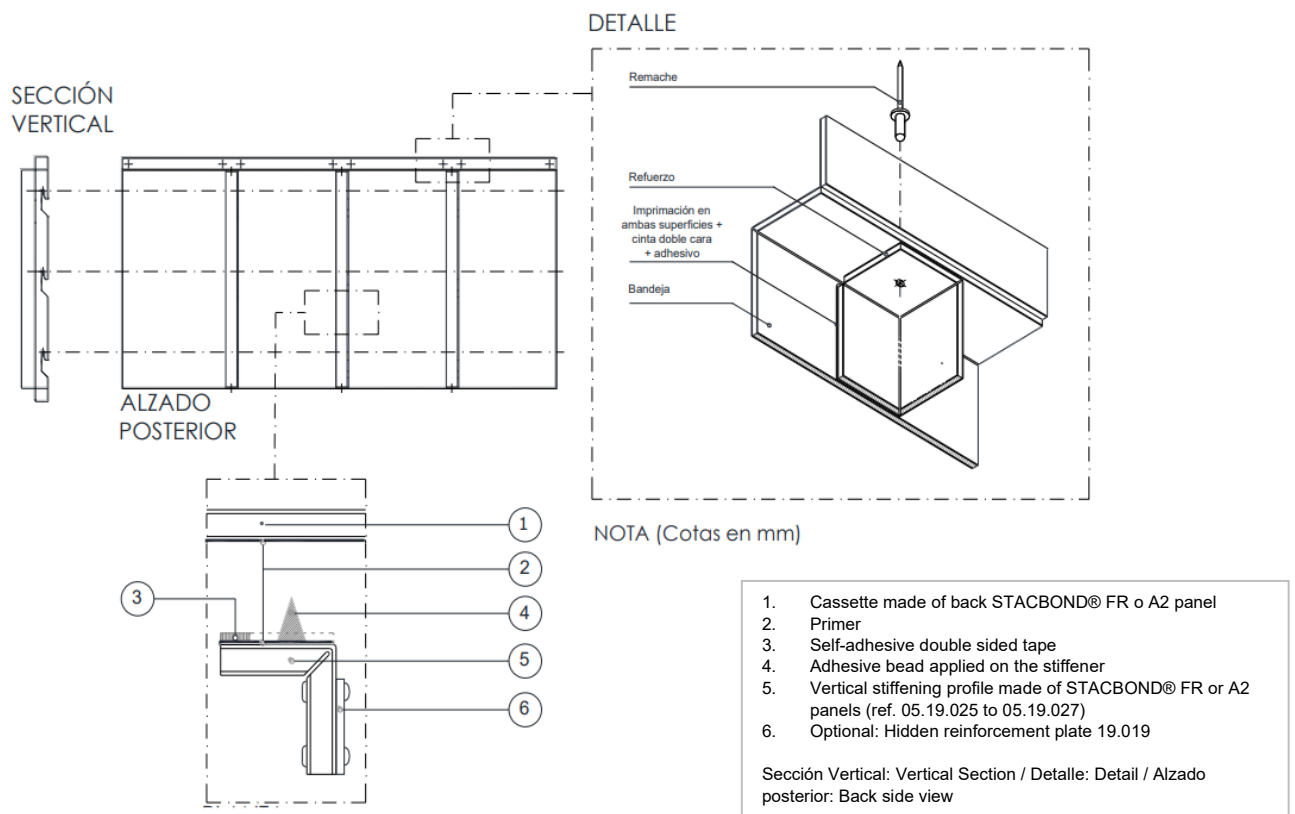


FIG.13. Examples of glued stiffeners and application of adhesive subsystem elements



3M tape detail

1. Cassette made of STACBOND® FR or A2 panels
2. 3M VHB double sided tape of 1.6mm thickness
3. Horizontal stiffening profile

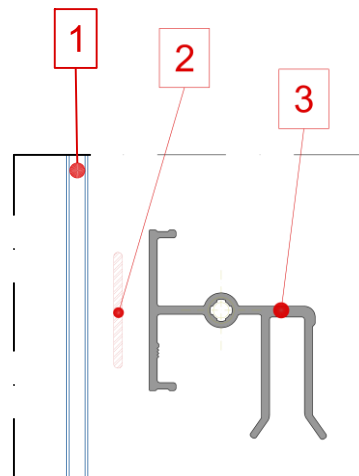
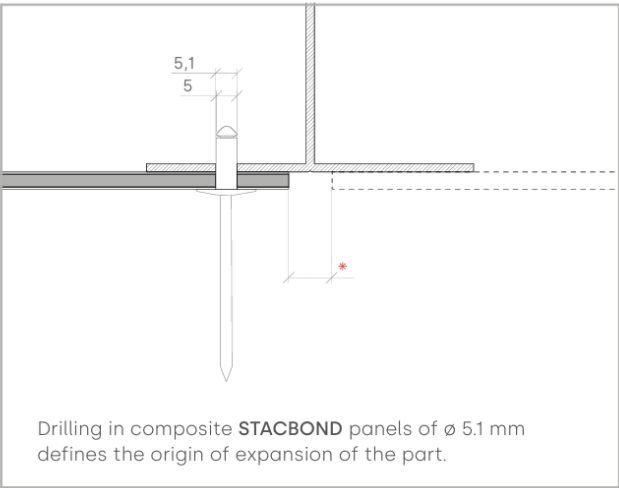


FIGURA 14: Fixed and expansion points REM system

FIXED POINTS **A**



SLIDING POINTS **B**

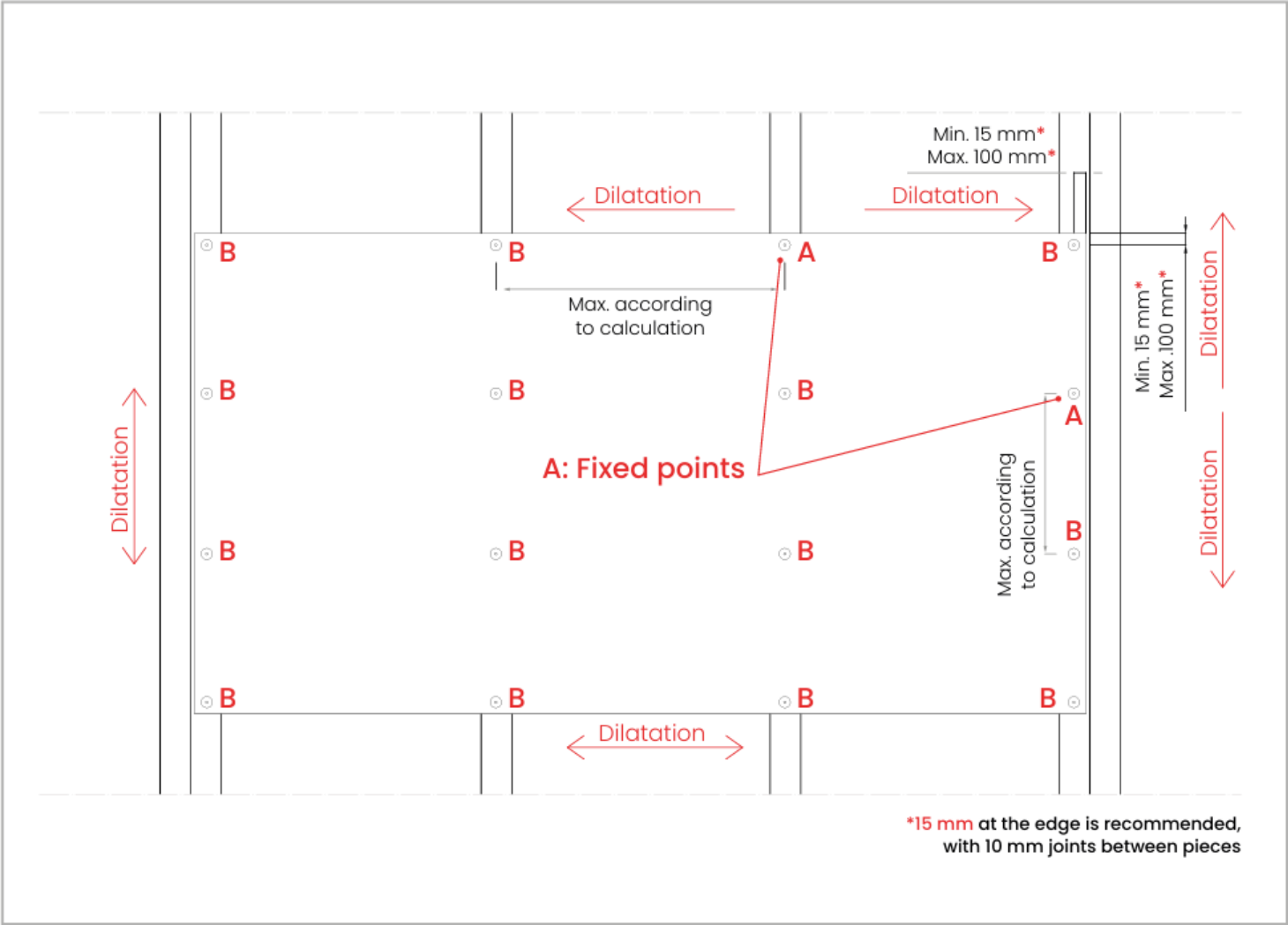
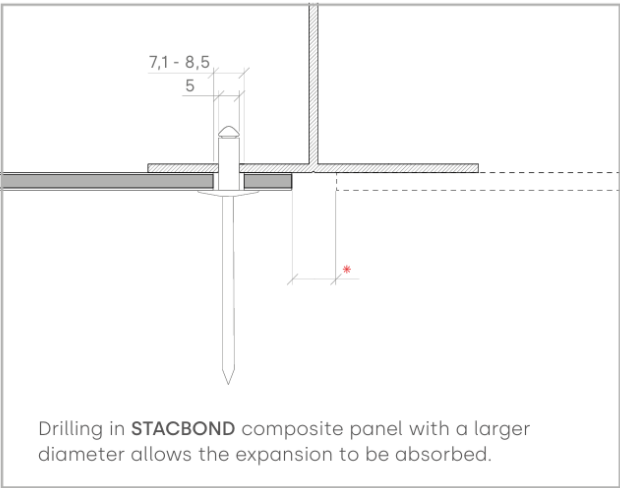


Fig. 15: Starter profile

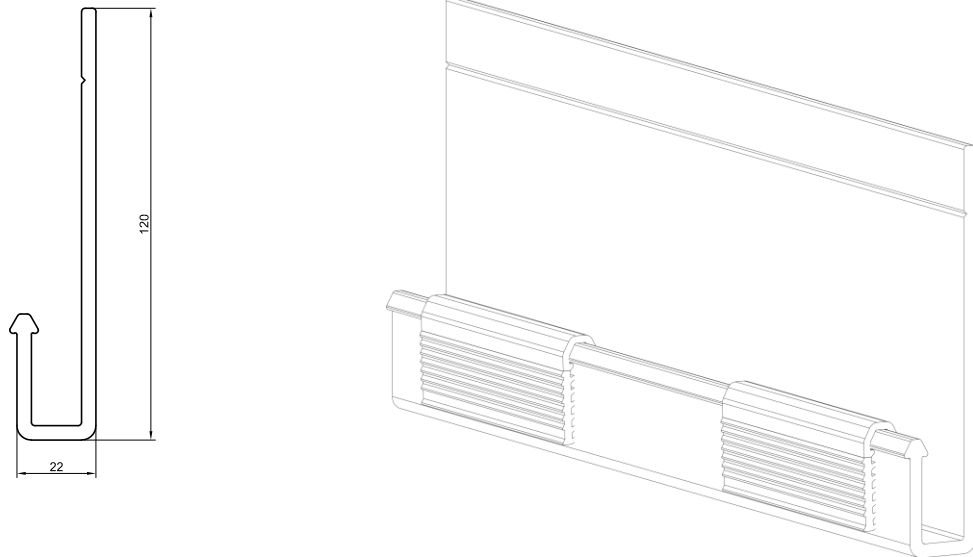


Fig. 16. SZ long horizontal stiffener support (ref. 05.19.101)

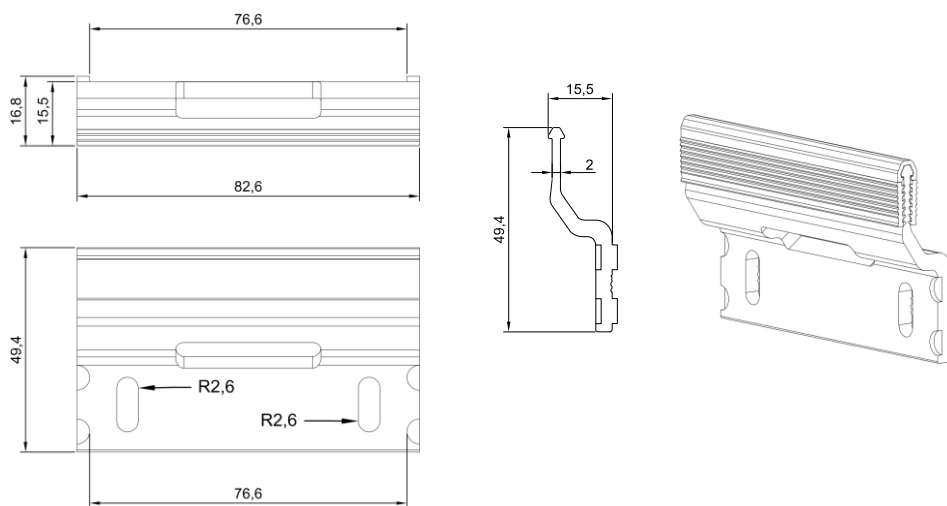


Fig. 17. SZ short horizontal stiffener support (ref. 05.19.100)

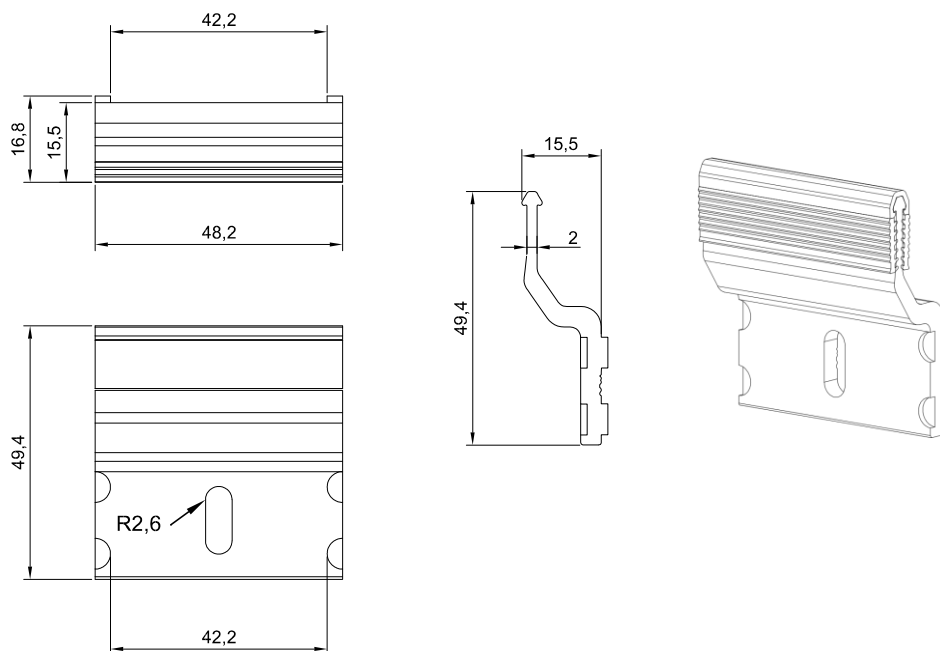


Fig. 18. SZ mini horizontal stiffener support (ref. 05.19.110)

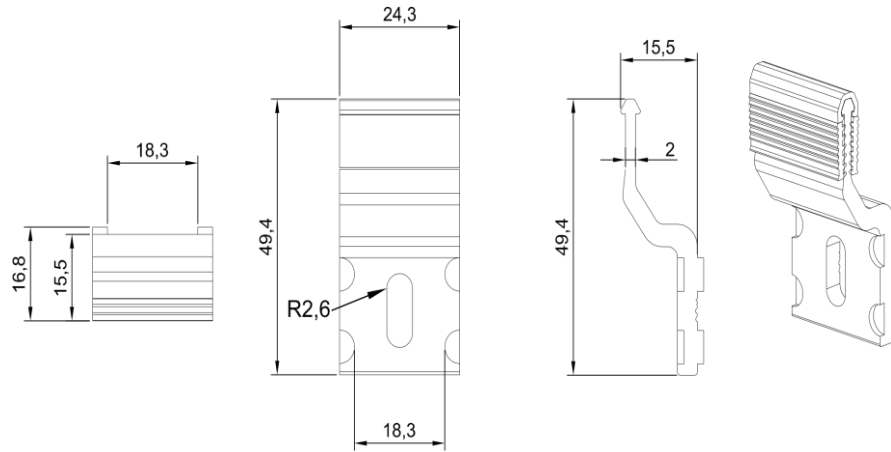


Fig. 17a. CH mini horizontal stiffener support (ref. 05.19.109)

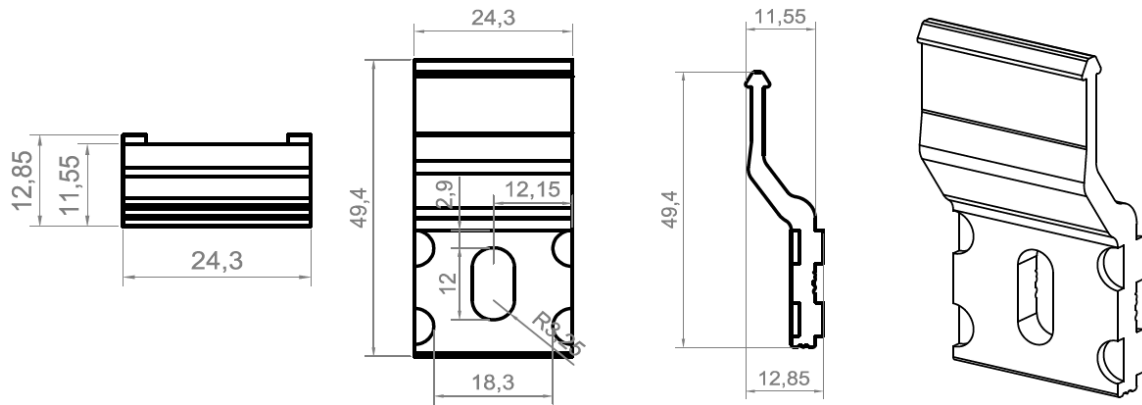


Fig. 17b. CH short stiffener support (ref. 05.19.105)

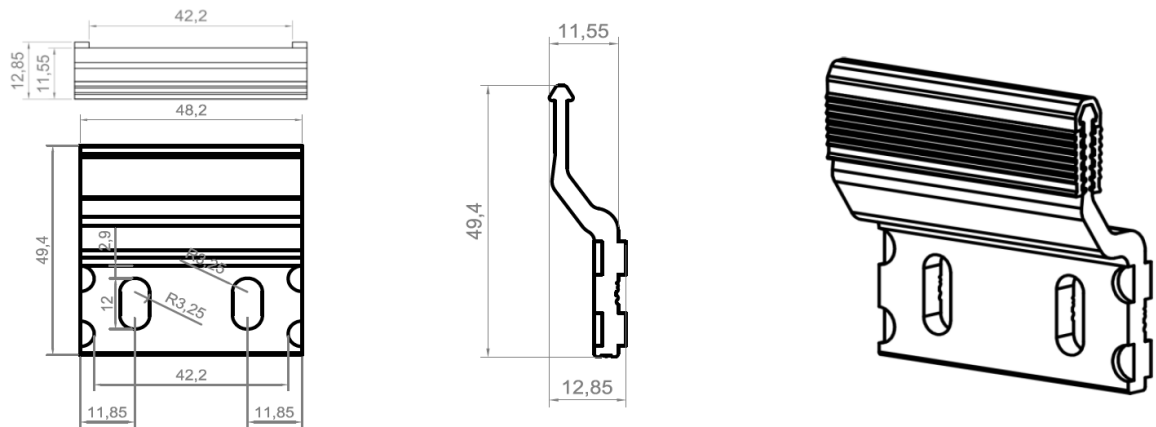


Fig. 17c. CH long stiffener support (ref. 05.19.106)

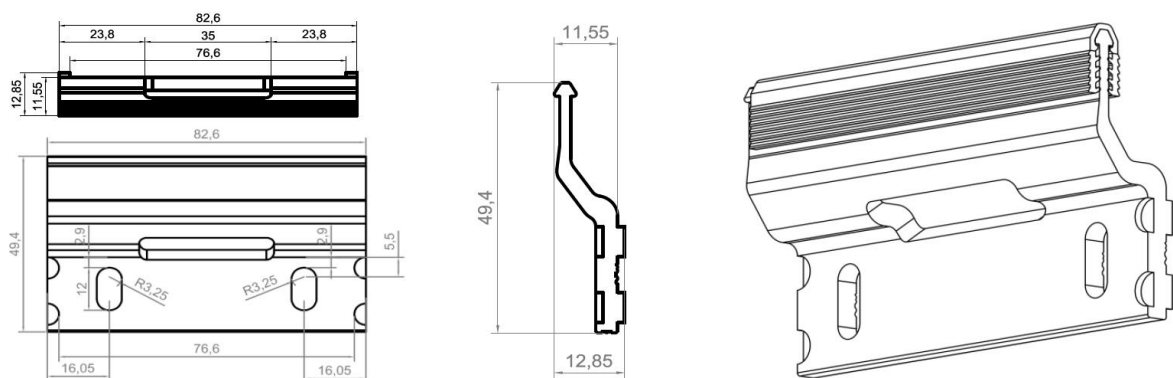


FIG.18a. S (ref. 05.19.121) and Z (ref. 05.19.122) profiles

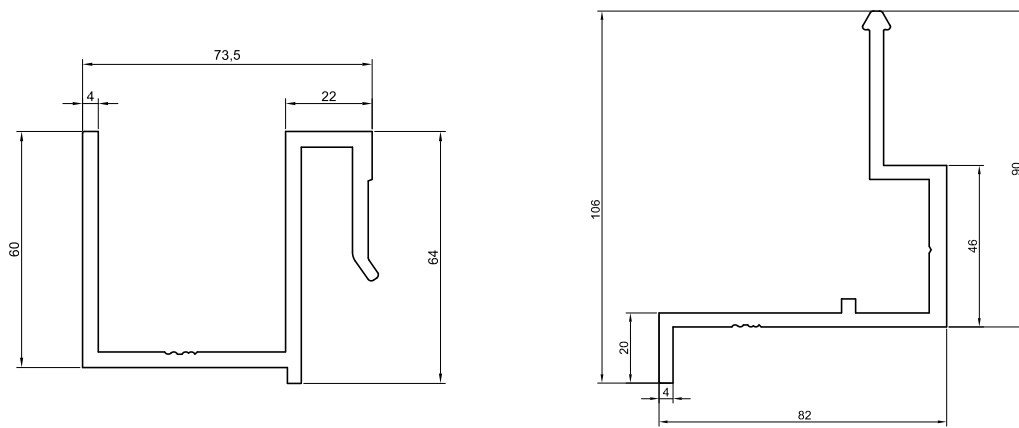


FIG 18b. Samples of Omega (ref. 05.19.003), T (ref. 05.16.043), L (ref. 05.19.059), T-Omega (ref. 05.19.061), and T-CH-PRO (05.19.092) profiles

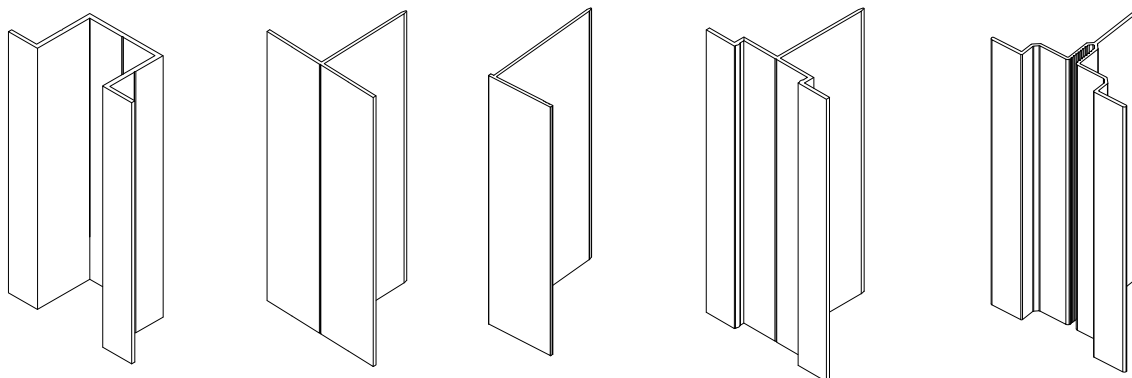


FIG.19. Samples of brackets

FIG. 19a. TT 57 (ref. 05.19.004) bracket

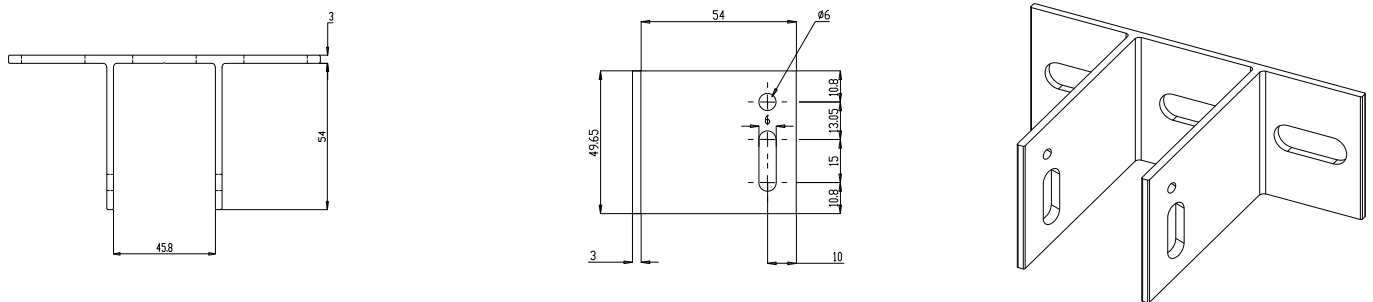


FIG. 19b. L 68 (ref. 05.19.041) bracket

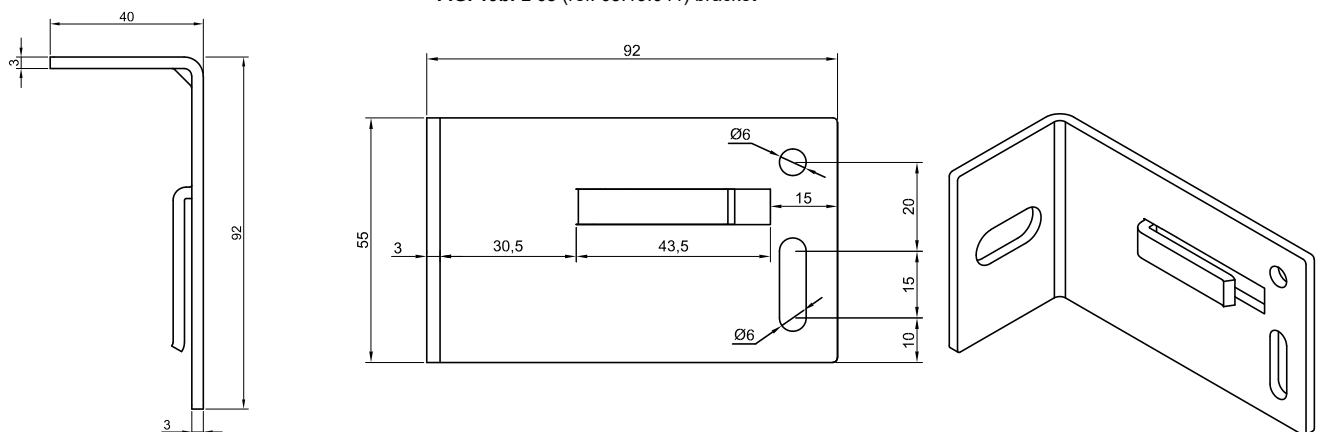


FIG. 19c. L 61 (ref. 05.19.078/05.19.112) stainless bracket

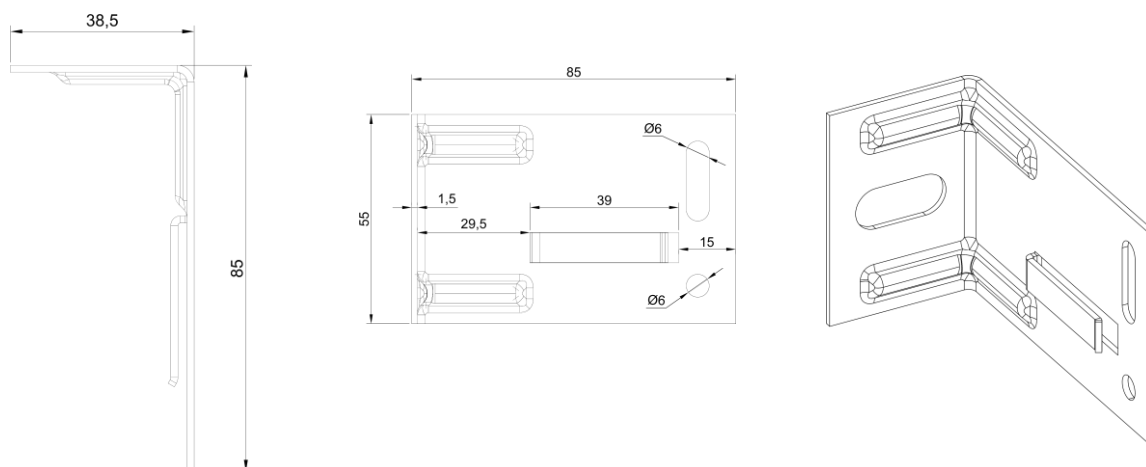


FIG. 19d. Double L 68 (ref. 05.19.042) bracket

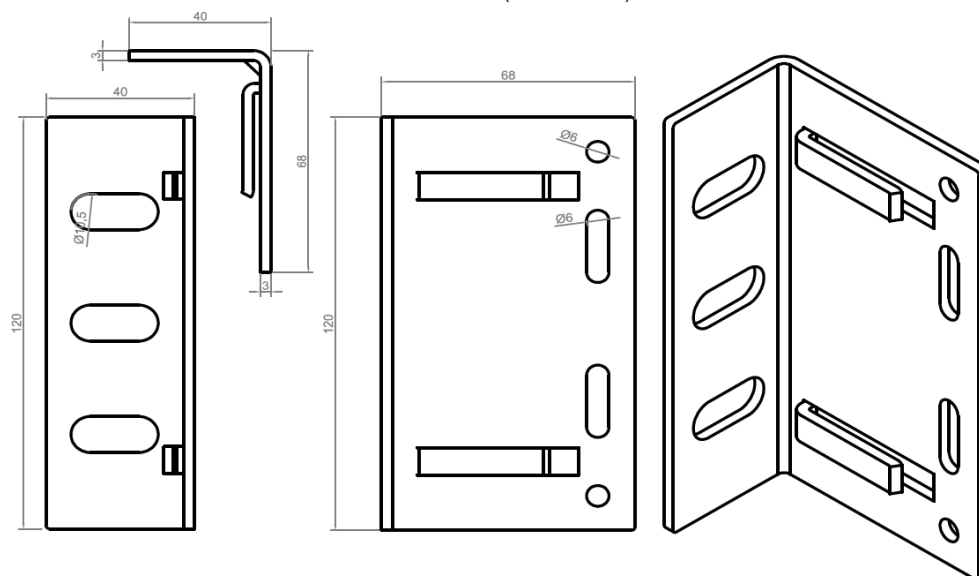


Fig. 19e. U 57 (ref. 05.19.046) bracket

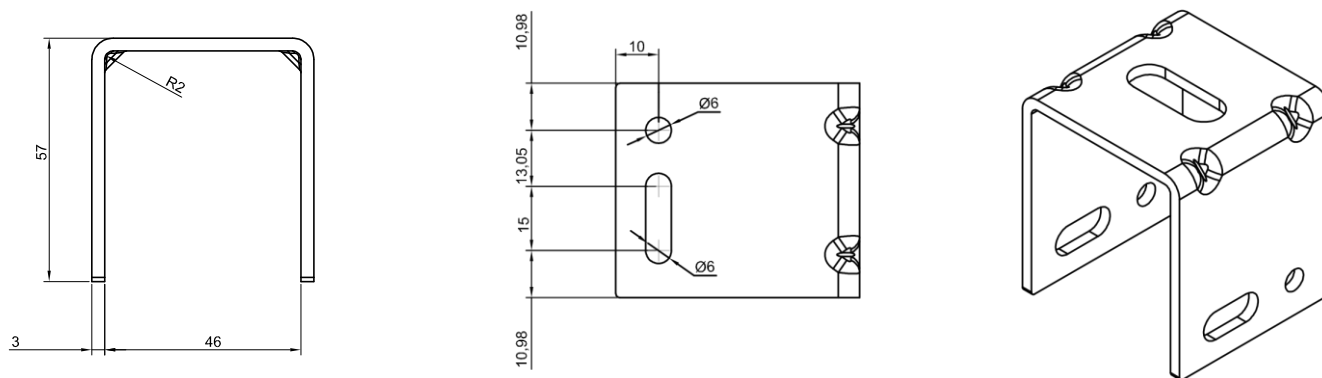


FIG.20. Horizontal stiffener (ref. 05.19.107)

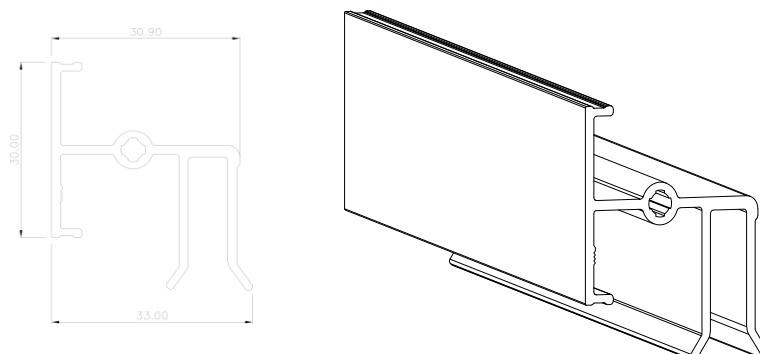
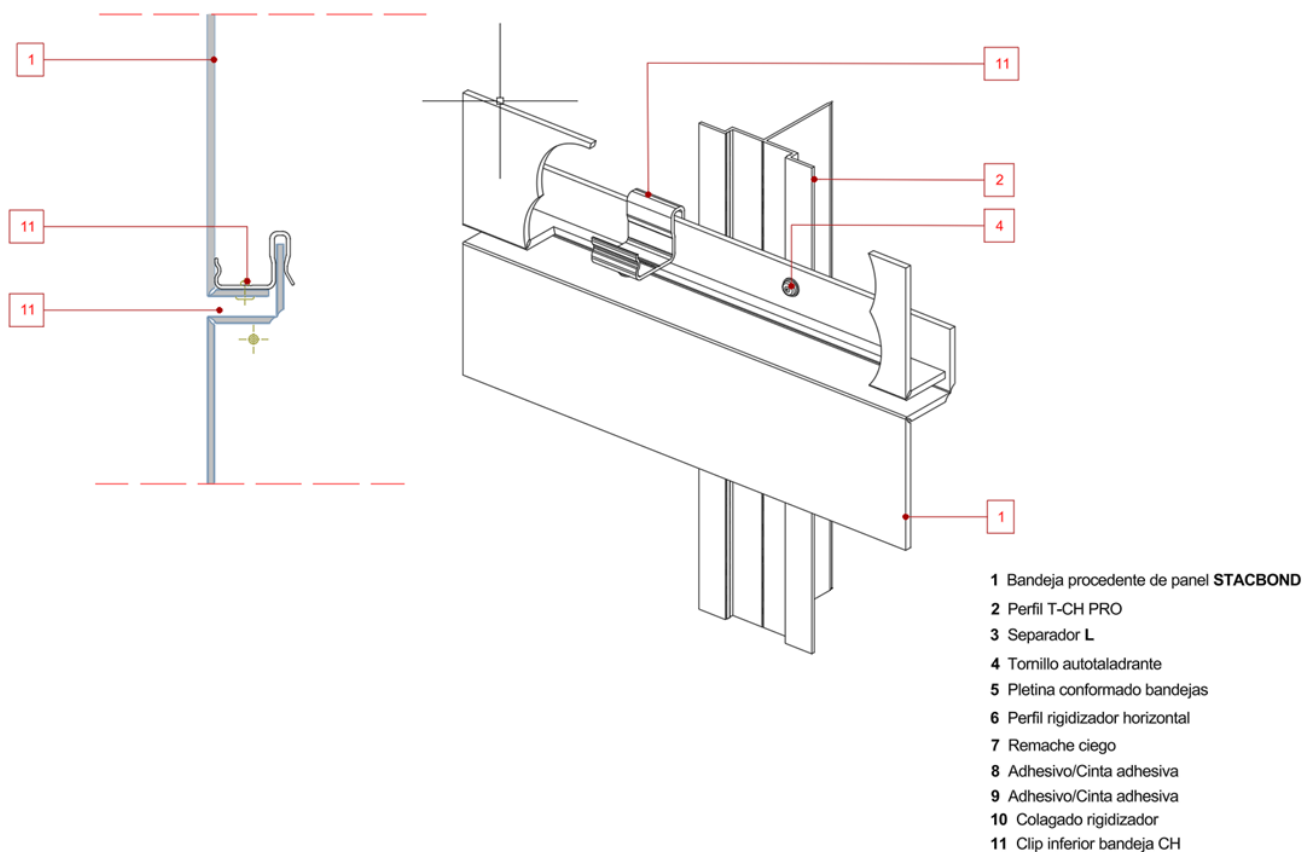


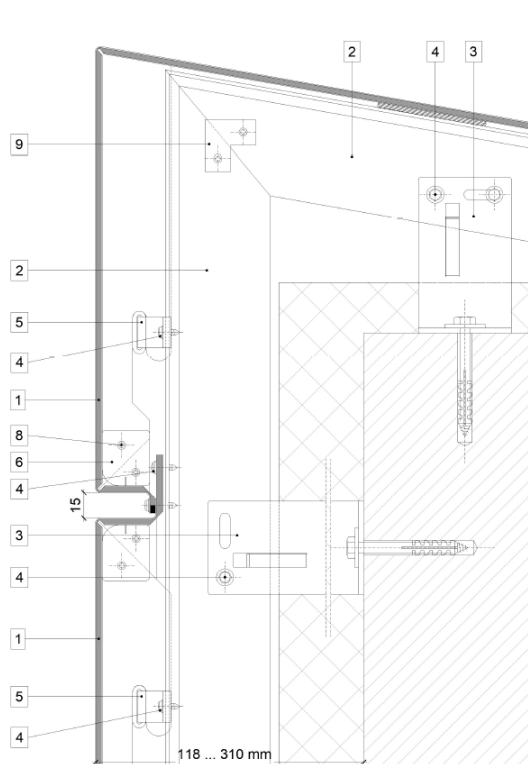
FIG.21. CH lower cassette clip



Key:

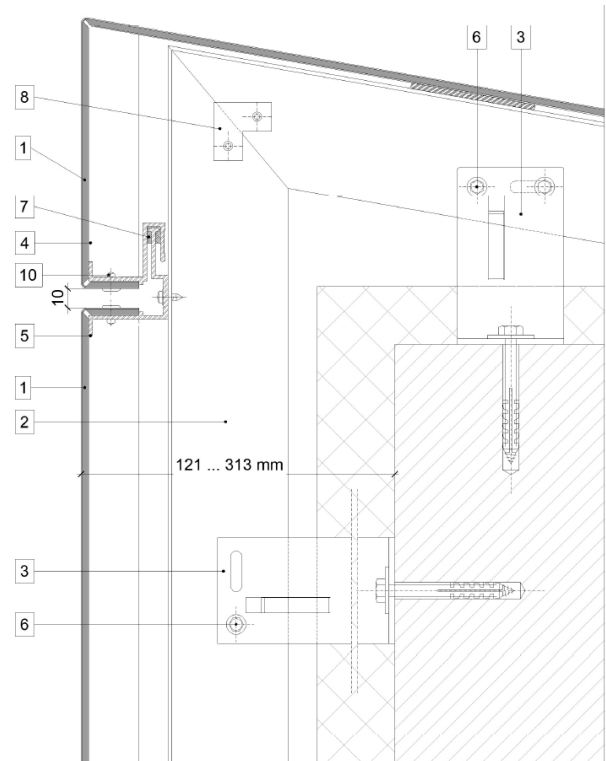
1. Cassette made of **STACBOND®** panel
2. CH-PRO profile
3. L bracket
4. Self-tapping screw
5. Panel forming plate
6. Horizontal stiffening profile
7. Blind rivet
8. Adhesive/tape
9. Adhesive/tape
10. Stiffener support
11. Lower CH cassette clip

FIG.22a. Samples of capping pieces
STB-T-CH CAPPING PIECE DETAIL



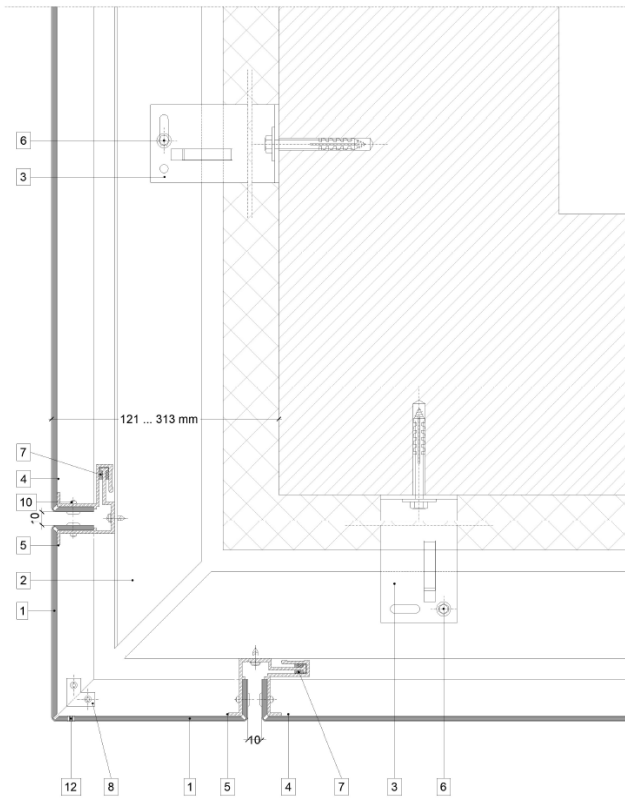
1. Cassette made of **STACBOND®** panel
2. T-Omega profile
3. L Bracket
4. Self-tapping screw
5. Suspension piece for external suspension
6. Cassette formation plate
8. Blind rivet
9. Aluminum plate for fixing and riveting

FIG.22b. Samples of capping pieces
STB-T-SZ CAPPING PIECE DETAIL



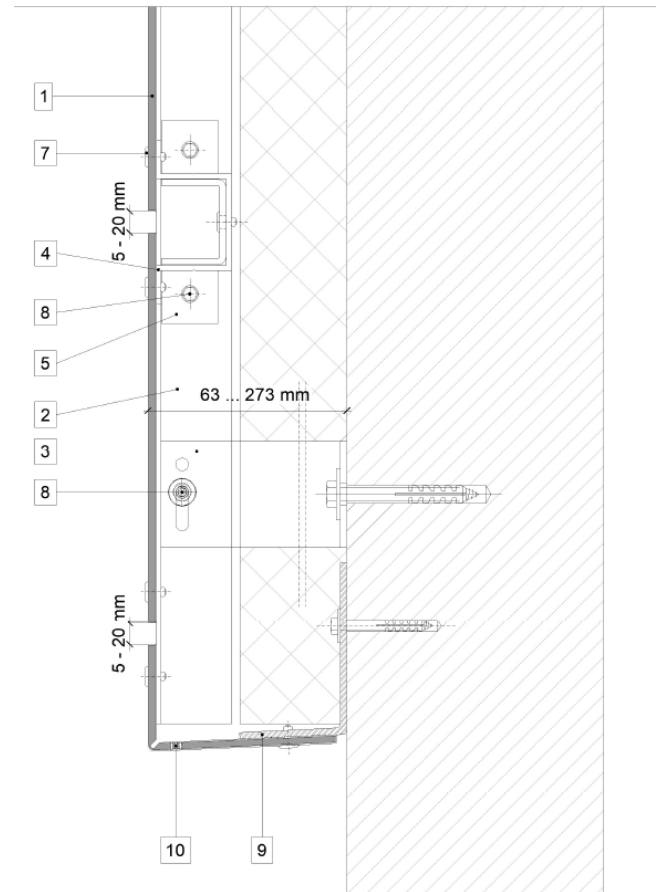
1. Cassette made of **STACBOND®** panel
2. T profile
3. L Bracket
4. S profile
5. Z profile
6. Self-tapping screw
7. EPDM gasket for SZ profile
8. Aluminum plate for fixing and riveting
10. Blind rivet

**FIG.23. Examples of false ceiling joints
STB-T-SZ FALSE CEILING DETAILS**



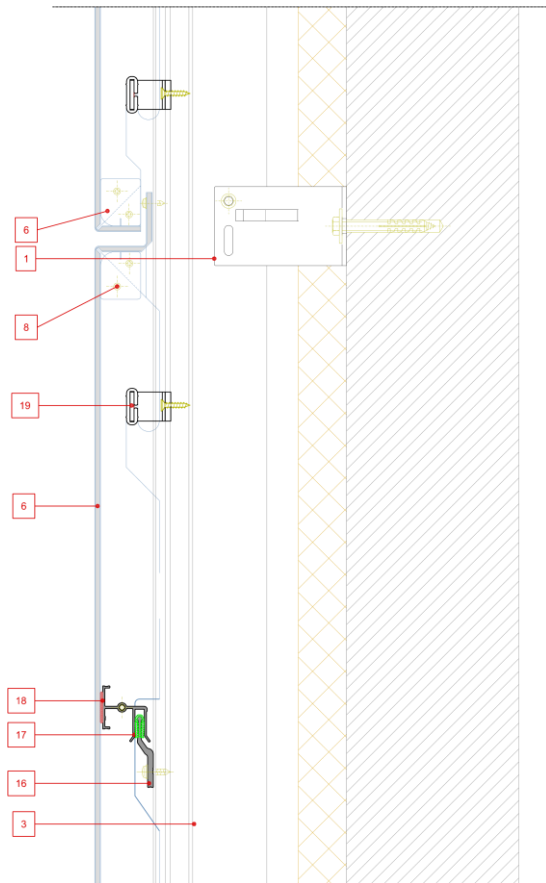
- 1. Cassette made of **STACBOND®** panel
- 2. T-Profile
- 3. L-Bracket
- 4. **S** profile
- 5. **Z** profile
- 6. Self-tapping screw
- 7. EPDM gasket for SZ profile
- 8. Riveted plate for joint panel reinforcement
- 10. Blind rivet
- 12. Draining perforations

**FIG.24. Examples of closing of air chamber
STB-REM AIR CHAMBER CLOSING DETAIL**



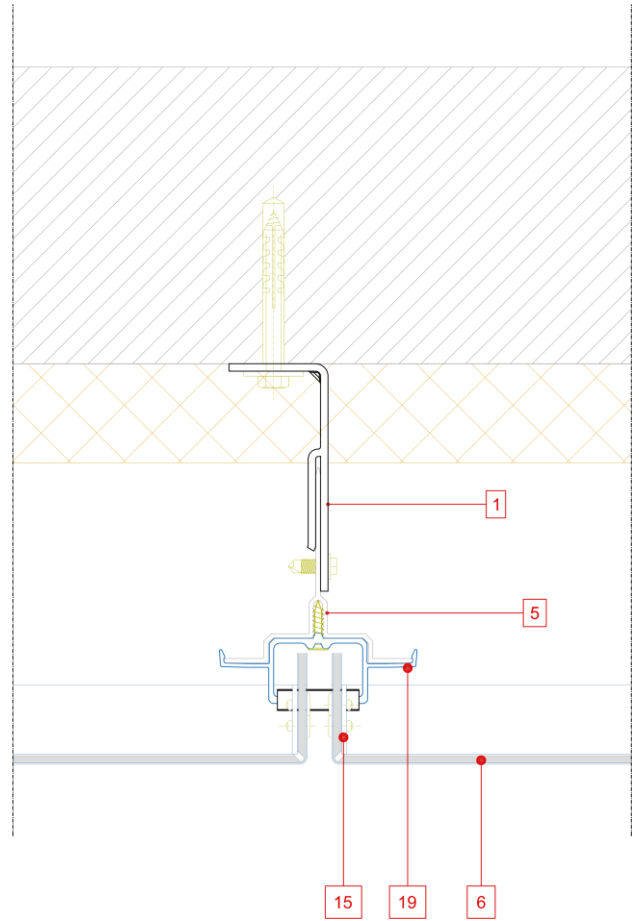
- 1. Panel made of **STACBOND®**
- 2. Omega profile
- 3. **Double T** bracket
- 4. Omega beam
- 5. STB-REM profile connection piece
- 7. Blind rivet
- 8. Self-tapping screws
- 9. Auxiliary profile
- 10. Draining perforations

FIG.25. Examples of starting of typical section with stiffener
STB-T-CH-PRO TYPICAL SECTION WITH STIFFENER



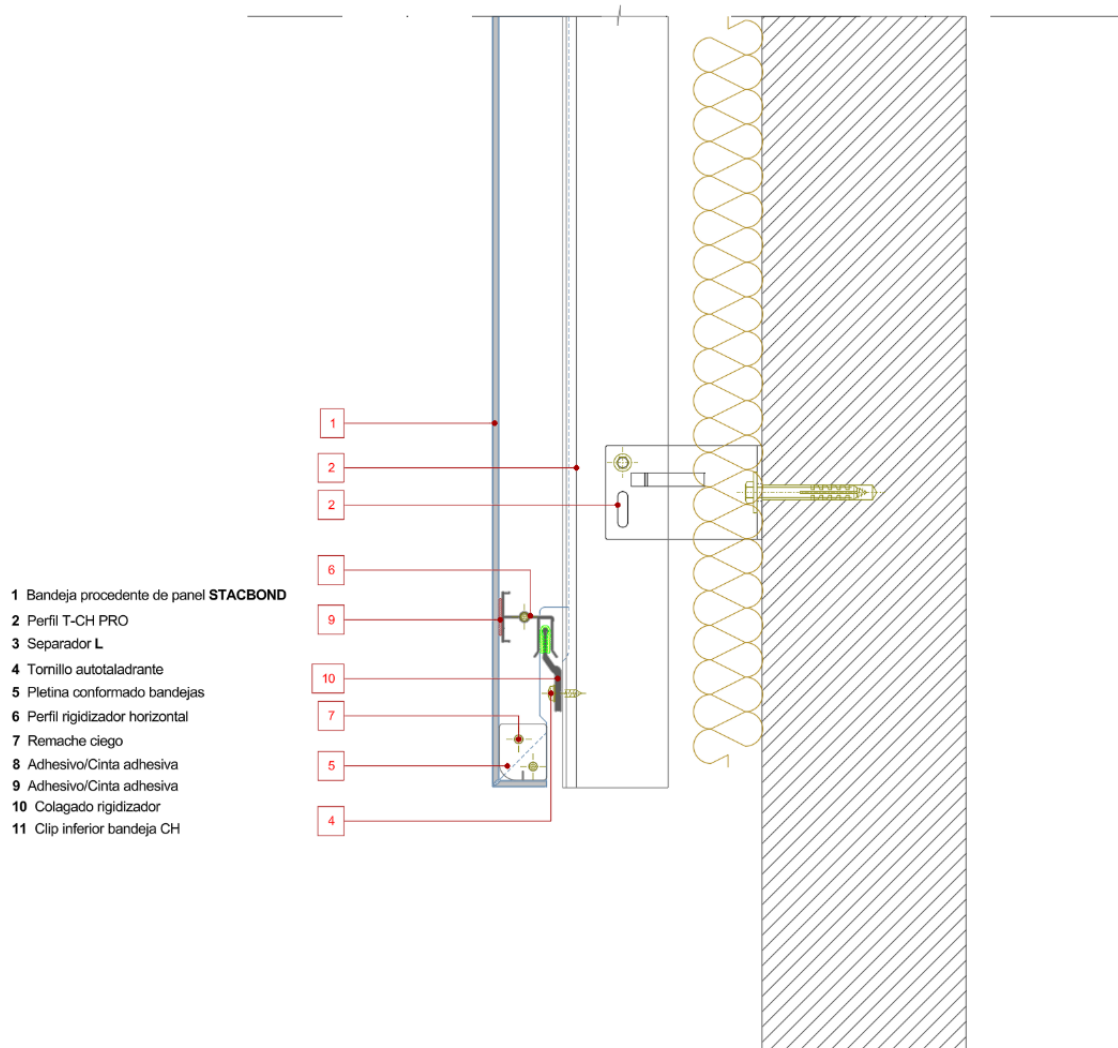
- 1 L bracket, ref. 05.19.041
- 2 TT bracket, ref. 05.19.004
- 3 T-CH-PRO profile, ref. 05.19.092
- 5 T-CH-PRO screw
- 6 Cassette made of STACBOND® FR or A2 panels

FIG.26. Horizontal section examples
HORIZONTAL SECTION OF STB-T-CH-PRO SYSTEM



- 10 STB-R0100 rivet
- 15 Cassette forming plate for CH, ref. 05.19.050
- 16 Stiffening support piece ref. 05.19.101, 05.19.100 or 05.19.110
- 17 Horizontal stiffening support ref. 05.19.107
- 18 Double sided structural tape ref. STB-3M160-GF25
- 19 CH-PRO suspension piece, ref. 05.19.088

FIG.27. Samples of typical starter section



Key: 1. Cassette made of STACBOND® panel; 2. T-CH-PRO profile; 3. L-bracket; 4. Self-tapping screw; 5. Cassette forming plate; 6. Stiffening profile; 7. Blind rivet; 8/9. Adhesive/tape; 10. Stiffener support; 11. Lower CH cassette clip

FIG 28. CASSETTE LAYOUT FOR WIND TABLES
 KEY: ALTO: HEIGHT, LARGO: LENGTH



ANNEX 1. Calculation tables of the DIT-holder

Table A1.1: STB-CH, STB-T-CH, STB-T-CH-PRO: Horizontal modulation (L,H): Visible cassette face dimensions / distance between vertical stiffeners or height between cassettes

Maximum length L depending on H:

Suction	Lmax	H=500		H=750		H=1000		H=1250		H=1500		H=1886	
		Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.
500	1310	2	1200	3	1200	4	1200	4	1200	5	1200	6	1200
	-	-	-	-	-	-	-	-	-	-	-	-	-
600	1240	2	1200	3	1200	3	1200	5	1200	5	1200	6	1200
700	1180	2	1000	3	1000	3	1000	4	1000	5	1000	6	1000
	1150	-	-	2	1000	-	-	3	1000	4	1000	4	1000
800	1140	-	-	3	1000	3	1000	4	1000	5	1000	-	-
	1130	2	1000	-	-	-	-	-	-	-	-	6	1000
	1070	-	-	2	1200	-	-	3	1000	3	1000	5	1000
900	1120	2	1000	3	1000	3	1000	-	-	-	-	-	-
	1110	-	-	-	-	-	-	4	1000	5	1000	6	1000
	1090	-	-	-	-	-	-	-	-	4	1000	5	1000
1000	1070	2	1000	3	1000	3	1000	-	-	5	1000	-	-
	1060	-	-	-	-	-	-	4	1000	4	1000	6	1000
1100	1030	2	857	3	857	-	-	-	-	4	857	6	857
	1000	-	-	-	-	3	1000	4	857	-	-	5	857
1200	990	2	857	3	857	3	857	4	857	5	857	-	-
	980	-	-	-	-	-	-	-	-	-	-	6	857
1400	940	2	750	3	750	3	750	-	-	-	-	6	750
	930	-	-	-	-	-	-	4	750	5	750	-	-
1600	890	2	667	3	667	3	667	-	-	5	667	6	667
	880	-	-	-	-	-	-	4	667	-	-	-	-
1800	840	2	667	3	667	3	667	4	667	5	667	6	667
	770	-	-	2	667	-	-	3	667	4	667	4	667
2000	830	2	600	3	600	3	600	4	600	5	600	6	600
	790	-	-	-	-	-	-	-	-	4	600	5	600
	690	-	-	2	750	-	-	3	600	-	-	4	600
2200	810	-	-	-	-	-	-	-	-	-	-	6	545
	790	2	545	3	545	3	545	4	545	5	545	5	545
2400	780	-	-	-	-	-	-	4	500	5	545	6	545
	760	2	545	3	545	3	545	-	-	4	545	5	545
2600	750	-	-	-	-	-	-	4	500	5	500	6	500
	690	2	545	3	545	3	545	-	-	4	500	5	500
2800	680	2	500	3	500	-	-	4	500	5	500	6	500
	660	-	-	-	-	3	500	-	-	-	-	5	500
	640	-	-	2	545	-	-	-	-	4	500	-	-
3000	680	2	462	3	462	-	-	4	462	5	462	6	500
	620	-	-	-	-	3	500	-	-	-	-	5	500
	450	-	-	2	750	-	-	3	750	4	750	4	750

Maximum load in brackets limited to 1.5kN. A pull-out test according to ETAG 020 must be done and the holder must be consulted if the load allowed by the supporting wall is under 1.5kN.

Table A1.2: STB-CH, STB-T-CH y STB-T-CH-PRO: Vertical modulation (H,L): Visible cassette face dimensions / distance between vertical stiffeners or height between cassettes. **Maximum height H depending on L:**

Suction	Hmax	L=500		L=750		L=1000		L=1250	
		Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.	Tab. No	Brackets max. sep.
500	8000	8	1200	8	1500	7	1200	8	1200
	7000	7	1000	7	1500	7	1200	7	1200
600	8000	8	1200	8	1500	8	1200	9	1200
	7000	-	-	7	1500	7	1200	8	1200
700	8000	9	1200	8	1200	9	1200	11	1200
	7000	8	1200	7	1200	8	1200	10	1200
800	8000	9	1000	8	1200	10	1200	12	1000
	7000	8	1000	7	1200	9	1200	11	1000
900	8000	10	1000	9	1200	11	1200	14	857
	7000	9	1000	8	1200	9	1200	-	-
1000	8000	10	1000	9	1200	12	1000	20	750
	7000	9	1000	8	1200	11	1000	18	750
1100	8000	10	1000	10	1200	13	857	-	-
	7000	9	1000	9	1200	11	857	-	-
	4160	6	1200	6	1200	7	857	17	750
1200	8000	10	1000	10	1200	14	857	-	-
	7000	9	1000	-	-	12	857	-	-
1400	8000	11	1000	12	1000	16	667	-	-
	7000	10	1000	11	1000	14	667	-	-
1600	8000	12	1000	14	857	-	-	-	-
	7000	11	1000	12	857	-	-	-	-
1800	8000	12	1000	15	750	-	-	-	-
	7000	11	1000	13	750	-	-	-	-
2000	8000	12	1000	17	667	-	-	-	-
	7000	11	1000	15	667	-	-	-	-
2200	8000	13	857	18	600	-	-	-	-
	7000	11	857	16	600	-	-	-	-
2400	8000	14	857	19	545	-	-	-	-
	7000	12	857	17	545	-	-	-	-
2600	8000	15	750	-	-	-	-	-	-
	7000	13	750	20	500	-	-	-	-
2800	8000	16	667	-	-	-	-	-	-
	7000	14	667	-	-	-	-	-	-
	4950	10	667	20	462	-	-	-	-
3000	8000	17	667	-	-	-	-	-	-
	7000	15	667	-	-	-	-	-	-
	4950	11	667	20	429	-	-	-	-

Maximum load in brackets limited to 1.5kN. A pull-out test according to ETAG 020 must be done and the holder must be consulted if the load allowed by the supporting wall is under 1.5kN.

Table A1.3: STB-REM/STB-T-REM unidirect.: Horizontal modulation Dim. / distances between intermediate profiles
Maximum length L depending on H:

Suction	Lmax	H=500		H=750		H=1000		H=1250		H=1500		H=2000	
		Rivet No	Brackets max. sep.	Rivet No	Brackets max. sep.	Rivet No	Brackets max. sep.	Rivet No	Brackets max. sep.	Rivet No	Brackets max. sep.	Rivet No	Brackets max. sep.
500	1000	2	1200	2	1200	3	1200	3	1200	3	1200	3	1200
600	1000	2	1200	2	1200	3	1200	3	1200	3	1200	3	1200
700	1000	2	1200	2	1200	3	1200	3	1200	3	1200	4	1200
800	1000	2	1200	2	1200	3	1200	3	1200	3	1200	4	1200
900	1000	2	1200	2	1200	3	1200	3	1200	3	1200	4	1200
1000	1000	2	1000	2	1000	3	1000	3	1000	3	1000	4	1000
1100	1000	2	857	3	857	3	857	3	857	4	857	4	857
1200	1000	2	857	3	857	3	857	4	857	4	857	5	857
1400	1000	3	667	3	667	4	667	5	667	6	667	7	667
1600	920	2	667	3	667	3	667	4	667	4	667	5	667
1800	910	2	600	3	600	3	600	4	600	5	600	6	600
2000	880	2	545	3	545	4	545	4	545	5	545	6	545
2200	850	2	500	3	500	4	500	4	500	5	500	6	500
	930	3	462	4	462	5	462	6	462	7	462	9	462
2400	810	2	500	3	500	4	500	-	-	5	500	6	500
	930	3	429	4	429	5	429	6	429	7	429	9	429
2600	780	2	462	-	-	-	-	-	-	-	-	6	462
	810	3	462	3	462	4	462	4	462	5	462	7	462
2800	780	2	429	3	429	4	429	4	429	5	429	6	429
	890	3	400	4	400	5	400	6	400	7	400	9	400
3000	780	2	400	3	400	4	400	4	400	5	400	6	400
	890	3	353	4	353	5	353	-	-	-	-	9	353

Maximum load in brackets limited to 1.5kN. A pull-out test according to ETAG 020 must be done and the holder must be consulted if the load allowed by the supporting wall is under 1.5kN.

Table A1.4. STB-REM/STB-T-REM undirect.: Vertical modulation. Dimensions or distances between intermediate profiles**Maximum height H depending on L:**

Suction	Hmax	L=500		L=750		L=1000	
		Rivet No	Brackets max. sep.	Rivet No	Brackets max. sep.	Rivet No	Brackets max. sep.
500	8000	10	1500	9	1500	9	1200
	7000	9	1500	-	-	-	-
600	8000	10	1500	9	1200	9	1200
	7000	9	1500	-	-	-	-
700	8000	10	1500	9	1200	10	1200
	7000	9	1500	-	-	9	1200
800	8000	10	1200	9	1200	11	1200
	7000	9	1200	-	-	10	1200
900	8000	11	1200	10	1200	12	1200
	7000	10	1200	9	1200	11	1200
1000	8000	10	1200	10	1200	12	1000
	7000	9	1200	9	1200	11	1000
1100	8000	11	1200	11	1200	14	857
	7000	10	1200	10	1200	12	857
1200	8000	11	1200	11	1200	17	857
	7000	10	1200	10	1200	14	857
1400	8000	12	1200	11	1000	-	-
	5660	9	1200	8	1000	17	667
1600	8000	12	1000	12	857	-	-
	4030	7	1000	7	857	-	-
1800	8000	12	1000	13	750	-	-
	7000	11	1000	11	750	-	-
2000	8000	12	1000	14	667	-	-
	7000	11	1000	12	667	-	-
2200	8000	12	857	15	600	-	-
	7000	11	857	13	600	-	-
2400	8000	12	857	16	545	-	-
	7000	11	857	14	545	-	-
2600	8000	13	750	17	500	-	-
	7000	12	750	15	500	-	-
2800	8000	13	667	18	462	-	-
	7000	12	667	16	462	-	-
3000	8000	14	667	20	429	-	-
	7000	12	667	17	429	-	-

Maximum load in brackets limited to 1.5kN. A pull-out test according to ETAG 020 must be done and the holder must be consulted if the load allowed by the supporting wall is under 1.5kN.

Table A1.5: STB-SZ, STB-T-SZ systems: Visible cassette face dimensions*. The number of profiles includes extremes.**Maximum length L depending on H:**

Suction	Lmax	H=500			H=750			H=1000		
		Profile No	Brackets max. sep.	Stiffener No	Profile No	Brackets max. sep.	Stiffener No	Profile No	Brackets max. sep.	Stiffener No
500	7000	6	1200	0	7	1200	0	7	1200	0
600	7000	7	1200	0	7	1200	0	7	1200	0
700	7000	7	1200	0	7	1200	0	8	1200	0
800	7000	7	1000	0	7	1000	0	8	1000	0
900	7000	7	1000	0	7	1000	0	9	1000	0
1000	7000	7	857	0	7	857	0	9	1000	0
1100	7000	7	750	0	8	857	0	9	1000	0
1200	7000	7	667	0	8	857	0	10	1000	0
1400	7000	8	667	0	8	667	0	-	-	-
	6750	7	600	0	-	-	-	10	1000	0
1600	7000	8	600	0	9	667	0	-	-	-
	5960	6	500	0	6	500	0	10	1000	0
1800	7000	8	545	0	9	600	0	-	-	-
	4090	5	545	0	6	667	0	10	545	0
2000	7000	8	500	0	9	545	0	-	-	-
	3140	4	462	0	5	600	0	4	462	6
2200	7000	8	429	0	9	500	0	-	-	-
	4080	5	429	0	6	545	0	5	429	7
2400	7000	9	462	0	9	462	0	9	462	11
2600	7000	9	429	0	10	462	0	9	429	11
2800	7000	9	400	0	10	429	0	9	400	11
3000	7000	9	353	0	10	400	0	9	353	11

* Check with the manufacturer different configurations with stiffeners, which will be obtained with the INFINICLAD calculation software and that can be of larger lengths than the ones included on this table, as the most unfavorable cases are considered. Number of stiffeners per profile.

Maximum load in brackets limited to 1.5kN. A pull-out test according to ETAG 020 must be done and the holder must be consulted if the load allowed by the supporting wall is under 1.5kN.

Table A1.6: STB-SZ, STB-T-SZ systems: Visible cassette face dimensions*.

Maximum length L depending on H:

Suction	Lmax	H=1250			H=1500			H=1930		
		Profile No	Brackets max. sep.	Stiffener No	Profile No	Brackets max. sep.	Stiffener No	Profile No	Brackets max. sep.	Stiffener No
500	7000	8	1200	0	6	1200	8	7	1200	9
600	7000	9	1200	0	7	1200	9	7	1200	9
700	7000	-	-	-	7	1200	9	7	1200	9
	6750	10	1200	0	7	1200	9	-	-	-
800	7000	-	-	-	7	1000	9	8	1000	10
	4040	10	1500	0	5	1200	7	5	1000	7
900	7000	-	-	-	7	1000	9	8	1000	10
	2990	10	1500	0	4	1200	6	4	1000	6
1000	7000	-	-	-	7	857	9	8	1000	10
	2260	10	1500	0	3	857	5	4	1000	2
1100	7000	7	750	9	7	750	9	8	857	10
1200	7000	8	857	10	8	857	10	9	1000	11
1400	7000	8	667	10	8	667	10	9	857	11
1600	7000	8	600	10	8	600	10	10	750	12
	5960	7	600	9	7	600	9	9	857	11
1800	7000	8	545	10	8	545	10	8	545	20
	4090	5	545	7	6	667	8	7	857	9
2000	7000	8	500	10	9	545	11	8	500	20
	3140	5	600	7	5	600	7	6	750	8
2200	7000	9	500	11	9	500	11	9	500	22
	4080	6	545	8	6	545	8	9	857	11
2400	7000	9	462	11	9	462	11	9	462	22
2600	7000	9	429	11	9	429	11	9	429	22
2800	7000	9	400	11	10	429	12	9	400	22
3000	7000	9	353	11	10	400	12	9	353	22

Maximum load in brackets limited to 1.5kN. A pull-out test according to ETAG 020 must be done and the holder must be consulted if the load allowed by the supporting wall is under 1.5kN.

- Example of use: Table A1.1: STB-CH/STB-T-CH/STB-T-CH-PRO: Calculate number and maximum profile distance and number of tabs for a horizontal cassette of 1820 mm x 665 mm x 45 mm for a wind load $q_e=1150\text{Pa}$
 - Initial data: H=665 mm and L = 1820 mm (not shown in tables)
 - Results: A vertical glued stiffener is required and an intermediate profile with a maximum distance of 990 mm and vertical flanges with 3 equidistant tabs.
 - H = 750 mm (≥ 665 mm)
 - L= 990 mm (profile distance)
 - Max. Distance between brackets: 857 mm
 - $Q_{\text{max. adm}} = 1200\text{Pa}$ ($\geq 1150\text{Pa}$)