INSTITUTO DE CIENCIAS DE LA CONSTRUCCIÓN EDUARDO TORROJA

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

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European Technical Assessment

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English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the ETA:	Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)
Trade name of the construction product:	BB-T-REM (kit based on TMCS buildbond® FR)
Product family to which the construction product belongs:	Kits for external wall claddings mechanically fixed
Manufacturer:	ALUBUILD L.d.a. Parque Industrial de Gême, 4730-180 Vila Verde – Portugal www.alubuild.com
Manufacturing plant(s):	ALUBUILD L.d.a. Parque Industrial de Gême, 4730-180 Vila Verde – Portugal
This European Technical Assessment contains:	14 pages including 3 Annexes which form an integral part of the assessment. Annex C contains confidential information and is not included in the ETA when is publicly available.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of:	European Assessment Document (EAD) 090062-01-0404. Ed. October 2021. Kits for external wall claddings mechanically fixed.

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

SPECIFIC PARTS

1. Technical description of the product (kit)

The assessed kit for ventilated external wall cladding mechanically fixed "BB-T-REM" (family A), is based on Thin Metal Composite Sheets(1) (hereinafter TMCS) "buildbond® FR", which are manufactured by the ETA-holder. This cladding kit is mechanically fastened to its subframe, fixed to the external walls of new or existing buildings (retrofit). An insulation layer can be fixed on the external wall. The kit comprises other components as specified in Table 1, which are factory produced by the ETA – holder or by suppliers.

Table 1: Definition of components of the kit BB-T-REM

Component	**Material (reference)**	**Dimensions** [Tolerances] (mm)
Cladding	Boards foreseen to be perforated and riveted (on site) from TMCS buildbond® FR, with physical and mechanical characteristics shown in Annex B and following dimensions:	Standard length: 3200, 4000, 5000, 6000 [0.0 /+3] Standard width: 1000, 1194, 1250, 1500, 1600, 2000 [0.0 /+2] Standard thickness: 4 [± 0.2]
Subframe (vertical, profiles used to fix the cladding elements	Ref: 01.00.002 ("T-70"): T -shape section vertical or horizontal profiles for general use (joints and intermediate positions) made of raw finished extruded alloyed aluminium 6063 T5/T6 (see Fig.2a) Ref 01.00.003 ("T-40"): T -shape section vertical profiles (optional for intermediate positions only) made of raw finished extruded alloyed aluminium 6063 T5/T6 (see Fig.2b)	Length: 2000-6000 [0;+20] Shank depth/thickness: 61 / 1.8 Flange width/thickness: 70 / 2.0 Length: 2000-6000 [0;+20] Depth/thickness: 61 / 1.8 Flange width/thickness: 40 / 2.0
Fixings Elements used to fix cladding to subframe elements	ISO 15977 - 5,0 × 12 AIA/St, blind rivets made of (optionally lacquered) aluminium head 14 mm and body made of stainless steel A2, according to EN ISO 15977 (e.g. SFS AP14-S-50120), and for aggressive exposure conditions, body made of stainless steel A4 (SFS SSO-D15-50140-A4).	--
Brackets: Elements used as load transmission between the subframe and the substrate wall.	Ref. 01.01.001, 01.01.002, 01.01.003, 01.01.004, 01.01.005, 01.01.006, 01.01.007, 01.01.008, 01.01-009: L-shape profiles made of extruded and mechanized alloyed aluminium EN AW 6063 T5/T6, raw finished sheet with perforation (and lateral tongues) for fastening T-70 or T-40 profiles with fixings described below	Ref. 01.01.001 to 01.01.007: Height: 60 Width: 48 Thickness 3 Depth: 50, 67, 84, 101, 118, 135 and 152 respectively Ref. 01.01.008 and 01.01-009: Height: 60 Width: 48 Thickness: 5 Depth: 169 and 186 respectively
Fixings between subframe elements (vertical profiles to brackets)	Self-drilling screws [Ø x L] 5.5 x 19 stainless steel A2 (SFS SDA 5/3.5-H 13- S4-5.5x20 - 2 units (1 each side)	--

(1) Also known as Aluminium Composite Panel (ACP)

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

2.1 Intended use

The kit is intended to be used for ventilated external wall claddings which can be fixed to the external walls of new or existing buildings. The assessed kit is a non-load-bearing construction system, and therefore, does not contribute to the stability of the wall on which are installed, neither to ensure the air tightness of the building structure, but it can contribute to durability of the works by providing enhanced protection from the effect of weathering.

2.2 Relevant general conditions for the use of the kit

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

2.3 Design of the kits in works

The design of external wall cladding for ventilated façade using the kit should consider:
- The mechanical characteristic values of the components (e.g. cladding, fixings and subframe) in order to resist the actions applying on the specific work.
- The substrate material to define the suitable anchorages.
- The possible movements of substrate and the position of the building expansion joints.
- The dilatation of components of the kits and of the panels.
- The category of corrosivity of the atmosphere of the works [(2)].
- Because joints are not watertight, the first layer behind ventilated air space must be composed by materials with low water absorption.
- The construction of singular parts of façade (e.g. base, top, corners, windows, etcetera).
- If the entire building must comply with the specific building regulations, particularly concerning fire and wind load resistance, of the Member States in which the work has been built.

2.4 Installation of the kits in works

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

2.5 Use, maintenance and repair of the works

Maintenance of the assembled system or components of the kit includes inspections on site, taking into account the following aspects:
- Regarding the panels: Appearance of any damage such as cracking, delamination o detachment due to permanent and irreversible deformation.
- Regarding metallic components: Presence of corrosion or water accumulation.
- Necessary repairs should be done rapidly, using the same kit components and following the repair instructions given by ETA holder.

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

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

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

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

1 Reaction to fire:

Kit has been assessed [3] according to Tests/Classifications Reports cited below:

- Based on buildbond® FR: B-s1,d0. (Tests/Classification/reports 4601T22 issued by AFITI, 2024).

This classification is referred to Standard EN 13501-1 [4] and have been obtained from tests results carried out according to their applicable Standards EN ISO 11925-2 [5], EN 13823 [6].
In relation to the reaction to fire on rear side, it is considered above classifications are applicable.

2 Façade fire performance of kits cladded with TMCS No performance assessed

3 Propensity to undergo continuous smouldering: No performance assessed.

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

4. Watertightness of joints (protection against driving rain):

Purposeless for claddings kits with open joints. Kit is not watertight according to cl. 2.2.4 of EAD.

5 Water absorption of cladding:

No performance assessed.

6 Water permeability and water vapour permeability:

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

7. Drainability:

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

8 Content, emission and/or release of dangerous substances: No performance assessed.

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

9 Wind load resistance:

The kit behaviour exposed to wind pressure is most favourable than when exposed to wind suction. Therefore, wind pressure tests have been avoided and wind pressure resistance of kit can be considered as equal to wind suction resistance. Wind suction resistance of cladding kit has been determined by structural calculations supplemented by tests carried out according to cl. 2.2.9 of EAD, on several rigs of most unfavourable modules but representative enough of the cladding kit based on. Criteria for the validation of the calculation and summaries of tests results are indicated in Table 2 at the following pages:

(3) A European reference fire scenario has not been laid down for facades. In some Member States, the classification of the cladding kits according to Standard EN 13501-1 might not be sufficient for the use in façades. An additional assessment of the kits according to the national provision (e.g. on the basis of a large scale test) might be necessary to comply with Member State Regulations, until the existing European classification system has been completed.
(4) EN 13501-1:2019. Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.
(5) EN ISO 11925-2:2011. Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test.
(6) EN 13823:2021. Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item.

Criteria for the validation of the calculation:

1. Maximum tensile strength for calculation on aluminium sheets: mín. $R_{p0,2}$ /1,5= 80 MPa/1,5=51 MPa
2. Maximum wind load obtained by testing $Q_{test} \geq Q_{cal}$ in kN/m^2.
3. Maximum deflection of vertical profiles vs wind suction: ≤ L/200 mm and ≤ 15 mm, where L is distance between brackets.
4. Maximum admissible displacement in the centre of the rear side of the cladding element shall be:
   - Instantaneous displacement:
     - $f_{test,\ inst} \leq f_{cal}$ =L/30, (where L is the maximum horizontal distance between vertical profiles or dimension (length or height, of cladding element), and
     - $f_{test,\ inst} \leq f_{cal}$ = 40 mm (in any case)
   - Permanent accumulated displacement:
     - $f_{test,\ perm} \leq$ 1.5 mm (in any case)
5. Failure criteria: f_1: Breakage of any cladding element • f_2: Failure of fixing • f_3: Failure of detachment of the frame • f_4: Significant permanent deflection affecting stability or agreed to applicant ≥ 3 mm

Riveted boards module on vertical substructure	**Load Q_{test} (kN/m^2)**	**Type of failure**	**Max. displacement (mm)**	
			Instantaneous	**Permanent**
B1: LxH=1007x770 mm riveted on 2 profiles **Max. wind load resistance Q_{cal}: 0.6 kN/m^2** - 3 rivets max. vertical distance: 370 mm - Rivets max. horizontal distance: 976 mm - Border rivets distance: 15 mm - Distance between 2 T-70 vertical profiles: 980 mm - Distance between 3 L-brackets: 970 mm	0.6	None	15.95	0.71
	Remarks: - At 1.0 kN/m^2, reached ultimate limit state and max. admissible permanent deflection (≥ 3 mm) - At 2.0 kN/m^2, reached end of test without breakage			
B2: LxH=1937x770 mm riveted on 3 profiles **Max.wind load resistance Q_{cal}: 0.6 kN/m^2** - 3 rivets max. vertical distance: 370 mm - 3 rivets max. horizontal distance: 955 mm - Border rivets distance: 15 mm - Max. distance between 3 T-70/T-40/T-70 vert. profies: 968 mm - Max. distance between 3 L-brackets: 975 mm	0.6	None	14.36	1.40
	Remarks: - At 1 kN/m^2, reached ultimate limit state, and max. permanent deflection (≥ 3 mm) - At 2.0 kN/m^2, reached end of test without breakage			
Riveted boards module on bidirectional substructure	**Load Q_{test} (kN/m^2)**	**Type of failure**	**Max. displacement (mm)**	
			Instantaneous	**Permanent**
B3: LxH=1007x770 mm riveted on 2 profiles/perim. **Max. wind load resistance Q_{cal}: 0.8 kN/m^2** - 3 Rivets max. vertical distance: 370 mm - 3 Rivets max. horizontal distance: 483 mm - Border rivets distance: 15 mm - Distance between 2 T-70 vertical profiles: 980 mm - Distance between L-brackets: 980 mm	0.8	None	10.59	0.67
	Remarks: - At 1.4 kN/m^2, reached ultimate limit state, - At 1.8 kN/m^2, reached end of test without breakage			
B4: LxH=1937x770 mm riveted on 3 profiles/perim **Max.wind load resistance Q_{cal}: 0.8 kN/m^2** - 3 max. vertical distance: 370 mm - 3 Rivets max. horizontal distance: 493 mm - Border rivets distance: 15 mm - Distance between 3 T-70/Tt-40/T-70: 980 mm - Distance between L-brackets:980 mm	0.8	None	9.39	1.03
	Remarks: - At 1.4 kN/m^2, reached ultimate limit state, - At 1.8 kN/m^2, reached end of test without breakage			

10 Resistance to horizontal point loads

It has been assessed according to cl. 2.2.10 of EAD on the kit configuration cited below. Results are shown in Table 3.

Table 3: Resistance of horizontal point loads

Riveted Board: 535x1180 mm	Deformation (mm)			Remarks
	Initial loaded 500 N	After 1 minute loaded 500 N	After 1 minute unloaded	
buildbond® FR	0.00	10.21	0.13	No reduction of performances

11 Impact resistance

It has been assessed according to cl. 2.2.11 of EAD on rig cladded with buildbond® FR. Results and use categories obtained are described below in Table 4.

Table 4: Impact test results results of kit BB-T-REM

Kit	Impact	Energy	Ball	Remarks
BB-T-REM Riveted boards LxH (mm) 493X1038	hard body	1 J	0.5 kg	No deterioration (superficial damage without cracking).
		3 J	0.5 kg	
		10 J	1.0 kg	
	soft body	10 J	3.0 kg	
		60 J	3.0 kg	
		300 J	50 kg	No deterioration (significant permanent deflection without cracking).
		400 J	50 kg	
Use category				(I) A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.

12-28 Mechanical resistance

They have been assessed according to the respective parts of cl. 2.2.12 to 2.2.15 of EAD, on the relevant components of the family A when applicable, as indexed below:

- Related to the cladding element:
  12. Bending strength of cladding element (TMCP): Table 5
  13. Resistance of the grooved cladding element: Not applicable for family A.
  14. Resistance of the cladding element at dowel hole: Not applicable for family A.
  15. Resistance to long term or permanent dead load: No performance assessed.
- Resistance of the connection between the cladding element and the cladding fixing:
  16. Pull through resistance: Table 6.
  17. Pull through resistance under shear loads: Table 7.
  18. Axial resistance: Not applicable for family A.
  19. Shear load resistance: Not applicable for family A.
  20. Combined tension and shear load resistance: Not applicable for family A.
  21. Resistance of slot: Not applicable for family A.
- Mechanical resistance of cladding fixing:
  22. Resistance to vertical load: Not applicable for family A.
  23. Pull-through resistance of fixings from profile: Not applicable for family A.
  24. Resistance of punctual cladding fixing: Not applicable for family A.
- Mechanical resistance of subframe components:
  25. Resistance of profiles: Table 8.
  26. Tension/pull out resistance of subframe fixings: Table 9.
  27. Shear resistance of subframe fixings: No performance assessed.
  28. Bracket resistance (horizontal and vertical loads): Tables 10 and 11.

12. Bending strength of cladding element:

It has been assessed according to cl. 2.2.12.1 and 2.2.16.9* of EAD on kits cladded with TMCS (thin metal composite sheets) buildbond® FR. Results and use categories obtained are described below in Table 5.

Table 5: Bending strength results of cladding element (TMCS buildbond® FR)

Test arrangement	Resistance (N/mm²)		
	R_m (average value)	R_C (characteristic value*)	Remarks
4P-Bending test	115.92	114.53	*Test method clause 2.2.4 of EAD 210046-00-1201: - 2.2.4.1: 4P: Four-point test arrangement - 2.2.4.2: 3P: Three point test arrangement - *Calculations according to clause N.1.of EAD 090062-01-0404
3P-Bending test	117.85	114.20	

15. Resistance to long term or permanent dead load: No performance assessed (NPA

16. Pull through resistance:

It has been assessed according to cl. 2.2.12.5 of EAD on samples of TMCS (thin metal composite sheets) buildbond® FR and rivets described at Table 1. Results and use categories obtained are described below in Table 6.

Table 6: Pull-through resistance results of kit BB-T-REM

Specimen	Supporting ring Ø (mm)	Fixing position	Failure load (N)		Type of failure
			$F_{u.m}$ (average value)	$F_{u,C}$ (characteristic value*)	
buildbond® FR	180	Corner	1414.5	1254.4	Punctioning
		Centre	2789.4	2646.1	Punctiniong
		Lateral	1019.8	951.8	Flexural deformation of board
		Corner	237.6	158.7	Flexural deformation of board
	270	Centre	2802.3	2717.8	Punctiniong
		Lateral	734.8	676.0	Flexural deformation of board
		Corner	83.74	49.52	Flexural deformation of board
	350	Centre	2777.8	2658,8	Punctiniong
		Lateral	727.3	679.4	Flexural deformation of board
		Corner	78.9	45.0	Flexural deformation of board

17. Pull-through resistance under shear loads:

It has been assessed according to cl. 2.2.12.6 of EAD on samples of TMCS (thin metal composite sheets)

Table 7: Pull-through resistance under shear loads results of kit BB-T-REM

Specimen	Fixing position	Failure load (N)		
		$F_{u,m}$ (average value)	$F_{u,C}$ (characteristic value*)	Remarks
buildbond® FR	Border	3676.2	2825.6	Breakage of rivet - *Cálculado según cláusula N.1 del DEE 090062-01-0404
	Corner	3890.2	3400.7	

buildbond® FR and rivets described at Table 1. Results obtained are described below in Table 7.

25. Resistance of profiles:

It has been assessed according to cl. 2.2.12.14 of EAD. Results obtained are described below Table 8:

Table 8: Resistance results of aluminium profiles

Ref.	Type (Extruded T-shape)	Area (mm²)	Moment of Inertia (mm⁴)	E mod. (GPa) (EN 1999 1-1)	Alloy EN AW	Mechanical characteristics (minimum)				
						R_m (MPa)	$R_{p0,2}$ (MPa)	A (%)	A_{50mm} (%)	HBW
01.00.002	T-70	244.45	I_x: 83627 I_y: 57194	70	6063 T5/T6	≥ 270	≥ 225	≥ 8	≥ 6	90
01.00.003	T-40	184.45	I_x: 70443 I_y: 10695							

26. Tension/Pull out resistance of subframe fixings:

It has been assessed according to cl. 2.2.12.15 of EAD on samples as described at Table 1 of ETA. Results obtained are described below in Table 9:

Table 9: Pull-out resistance results of fixings from profile

Specimen	Failure load (kN)		
	$F_{u,m}$ (average value)	$F_{u,C*}$ (characteristic value)	Remarks
Screw to profile T	2.40	1.9	Thickness of aluminium base: 1.8 mm

27. Shear load resistance of subframe fixings: No performance assessed

28. Bracket resistance:

It has been assessed according to cl. 2.2.12.17 of EAD on brackets as described at Table 1 of ETA. Results obtained are described below in Tables 10 and 11:

Table 10: Resistance results of brackets to vertical loads

Ref.01.01.001 L_w = 50 mm	**Load (N)**				**Remarks**
	$F_{i,r}$	**$F_{1,d}$**	**$F_{3,d}$**	**$F_{i,u}$**	
$F_{i,m}$ (average value)	1168,7	2011,4	3942,6	4797,9	$F_{i,r}$: Permanent deformation after unloading ΔL=0,2%·L_W=0,10 mm $F_{1,d}$: Displ. under load d=1 mm $F_{3,d}$: Displ. under load d=3 mm $F_{i,u}$: Displ. under load d=5 mm
$F_{i,c}$ (characteristic value)	910,0	1643,0	3595,8	4305,0	
Ref.01.01.003 L_w = 84 mm	**Load (N)**				**Remarks**
	$F_{i,r}$	**$F_{1,d}$**	**$F_{3,d}$**	**$F_{i,u}$**	
$F_{i,m}$ (average value)	362,3	644,4	1632,9	2227,6	$F_{i,r}$: Permanent deformation after unloading ΔL=0,2%·LW=0,17 mm $F_{1,d}$: Displ. under load d=1 mm $F_{3,d}$: Displ. under load d=3 mm $F_{i,u}$: Displ. under load d=5 mm Results extends for bracket ref. 01.01.002
$F_{i,c}$ (characteristic value)	164,6	511,7	1456,9	1969,5	
Nota: Ref. 01.01.004 to ref.01.01.009: Prestación no evaluada					

Table 11: Bracket resistance to horizontal loads

Ref.01.01.001 L_w = 50 mm	**Load (N)**		**Remarks**
	$F_{I,1}$	**$F_{i,u}$**	
Mean value Fi,m	2778,53	6526,39	$F_{I,1}$: Displ. under load d=1 mm $F_{i,u}$: Displ. under load d=6 mm (agreed) Extended results for ref. 01.01.002 to 008
Characteristic value Fi,c	2655,6	6425,40	
Ref.01.01.003 L_w = 186 mm	**Load (N)**		**Remarks**
	$F_{I,1}$	**$F_{i,u}$**	
Mean value Fi,m	6803.9	12026.1	$F_{I,1}$: Displ. under load d=1 mm $F_{i,u}$: Displ. under load d=6 mm (agreed)
Characteristic value Fi,c	5874.4	9279.4	

29. Resistance to seismic loads (out of plane fund.l vibration period): No performance assessed.

30. Resistance to seismic loads. Out of plane acceleration: No performance assessed.

31. Resistance to seismic loads. In-plane displacement: No performance assessed.

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

32. Airborne sound insulation: No performance assessed

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

33. Thermal resistance. Not relevant as the cladding kit does not include the thermal insulation

- **Aspects of Durability**

They have been assessed according to cl. 2.2.16 of EAD, which address cl. 2.2.16.9 when cladding kits are based on TMCS buildbond® FR. The related characteristics (expressed in general as decay after required exposures) and obtained results are indexed below and shown in Tables 12 to 14

34. **Hygrothermal behaviour**
  - 34.1. Kit family A: Not applicable
  - 34.2. Cladding mat.: See § 43

35. Behavior after pulsating loads
  - 35.1. Kit family A: Not applicable
  - 35.2. Cladding mat.: See § 43

36. Freeze-thaw resistance
  - 36.1. Kit family A: Not applicable
  - 36.2. Cladding mat.: See § 43

37. Behaviour after immersion in water
  - 37.1. Kit family A: Not applicable
  - 37.2. Cladding mat.: See § 43

38. Dimensional stability
  - 38.1. Kit family A: Not applicable
  - 38.2. Cladding mat.: See § 43

39. Linear Thermal Expansion
  - 39.1. Kit family A: Not applicable
  - 39.2. Cladding mat: No perf. assessed

40. Chemical and biological resistance
  - 40.1. Kit family A: Not applicable
  - 40.2. Cladding mat.: Not perf. assessed

41. UV radiation resistance
  - 41.1. Kit family A: Not applicable
  - 41.2. Cladding mat.: See § 43

42. Corrosion
  - 42.1. Metallic components of kits: Table 12
  - 42.2. Cladding mat.See Table 13

43. Accelerated ageing behaviour of kits when cladding element is made of TMCS

  - 43.1. buildbond® FR: Decay of delamination resistance by peeling test (torque peel strength):
    - After hygrothermal cycles: Table 14
    - After immersion 6 h in boiling water (torque peel strength): Table 14
    - After immersion in water 500 h at 20 ºC: Table 14
    - After freeze-thaw cycles: Table 14
    - After long term exposure to heat: Table 14

  - 43.2. buildbond® FR: Decay of flexural resistance (bending strength in four point tests):
    - After hygrothermal cycles: No performance assessed
    - After immersion 6 h in boiling water (torque peel strength): No performance assessed
    - After immersion in water 500 h at 20 ºC: No performance assessed
    - After freeze-thaw cycles: No performance assessed
    - After long term exposure to heat: No performance assessed

  - 43.3. buildbond® FR: Decay of other characteristics:
    - Flexural stiffness after short term exposure: No performance assessed
    - Resistance of routed and returned edge of TMCP after TPB test: Not applicable for family A
    - Resistance of slot and its fixing devices after pull-out-pulsating loads: Not applicable for family A

Table 12: Corrosion resistance of subframe components made of aluminium profiles

Kit	Type	Alloy	Protection	Corrosion resistance
Aluminium profiles	Vertical profiles	EN AW 6063 T5/T6	Raw finished	Durability rating: B (Eurocode 9) (7)
	Bracket	EN AW 6063 T5/T6	Raw finished	
According to ch. 4 Durability of Eurocode 9, under normal atmospheric conditions (e.g. rural, moderate industrial or urban areas), aluminium alloys profiles as listed above can be used without the need for surface protection to avoid loss of bearing capacity. In severe environments, especially those with a high chloride content, attention must be paid to the risk of galvanic corrosion. Some form of insulation between aluminium and more noble metals (e.g. carbon steel, stainless steel, copper) is recommended.				

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

Table 13: Corrosion resistance of cladding element made of coil coated aluminium after exposure to spray salt fog

Component		Corrosion infiltration	Blistering
Cladding material	**Lacquering material**		
buildbond® FR	PVDF 70/30	No esthetical defects after 500 and1000 h*	
*Key: Index 3 according to EN 1396: Aluminium and aluminium alloys. Coil coated sheet and strip for general applications. Specifications			
Corrosivity category: No performance assessed			

Table 14: Torque peel strength results at initial conditions and after exposures

TMCS	Specimen	Torque peel strength N.mm/mm)					
		Initial state T_{INI}		38. Hygrothermal cycles		39. 6h water 90º C	
		Front sheet	Rear sheet	Front sheet	Rear sheet	Front sheet	Rear sheet
buildbond® FR	1	361,2	296,6	356,0	259,3	343,6	271,4
	2	355,9	303,5	348,5	241,4	324,7	259,8
	3	356,3	289,3	341,6	242,0	349,0	224,1
	Av.value per sheet	357,8	296,5	348,7	247,6	339,1	251,8
	Av.value (N.mm/mm)	$T_{INI,av}$= 327,1		$T_{INI,av}$= 298,1		$T_{i,6h,90ºC}$= 295,4	
	Relative change ΔT (%)	--		ΔT_h= 91,1		$\Delta T_{i,6h,90ºC}$= 90,3	
	Defects	None		None		None	

Table 14 (cont.): Torque peel strength results at initial conditions and after exposures

TMCS	Specimen	Torque peel strength N.mm/mm)					
		40. 500 h water 20ºC		41. 2500 h. 80ºC		42. Freeze-Thaw cycles	
		Front sheet	Rear sheet	Front sheet	Rear sheet	Front sheet	Rear sheet
buildbond® FR	1	356,5	232,8	308,7	239,5	305,6	267,9
	2	370,5	278,8	316,7	197,1	311,2	287,5
	3	353,6	280,5	310,7	235,6	346,1	256,3
	Av.value per sheet	360,2	264,0	312,0	224,1	321,0	270,6
	Av.value (N.mm/mm)	$T_{i,500h,20ºC}$= 312,1		$T_{It,80ºC,av}$= 268,1		$T_{f/t,av}$= 295,8	
	Relative change ΔT (%)	$\Delta T_{i,500h,20ºC}$= 95,4		$\Delta T_{It,80ºC,av}$= 81,9		$\Delta T_{f/t}$= 90,4	
	Defects	None		None		None	

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

4.1 System of assessment and verification of constancy of performances

According to the decision 2003/640/EC of the European Commission [8] the system of assessment and verification of constancy of performances (see Annex V to Regulation (EU) No 305/2011) given in the following Table applies:

Table 15: System AVCP applied

Product(s)	Intended use(s)	Level(s) or class (es)	System (s)
Kit BB-T-REM based on buildbond® FR	kit for external wall claddings	All / any	1

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

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

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Madrid, 3rd January 2025

Director

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

Annex A: General schemes

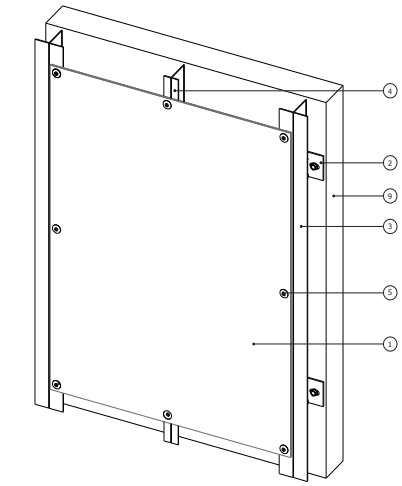


Fig. 1a. General view

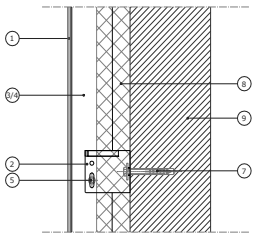


Fig. 1b. Vertical Section

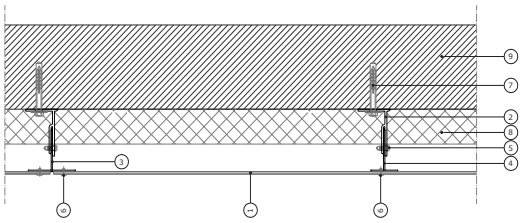


Fig. 1c. Horizontal section

1 TMCS **BUILDBOND FR**

2 Bracket L-section

3 Vertical T profile, ref. 01.00.002

4 Vertical intermediate T profile, ref. 01.00.003

5 Screw 5.5x22 s.s. A2 (1 per side), e.g.. SFS SDA 5/3.5-H 13-S4 5.5x22

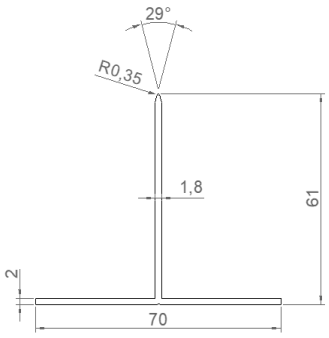
6 Blind rivet 5,0 x12 (head 16mm) body made of aluminium (AiA) and stud made of stainless steel A2, e.g. SFS intec AP14-S-5,0xL

7 Anchor to substrate

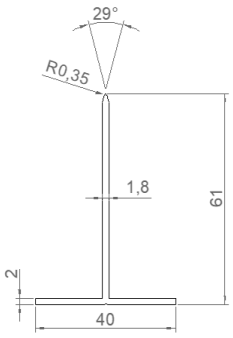
8 Thermal insulation

9 Substrate

Figure 1. Scheme of example of BB-T – REM cladding kit (vertical substructure)



Ref. 01.00.002



Ref. 01.00.003

Figure 2. Schemes of T-Profiles (substructure)

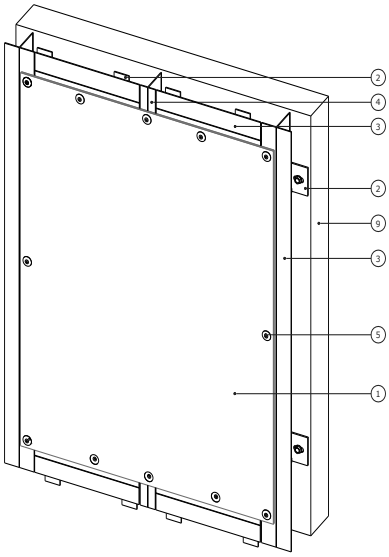


Fig. 2a. General view

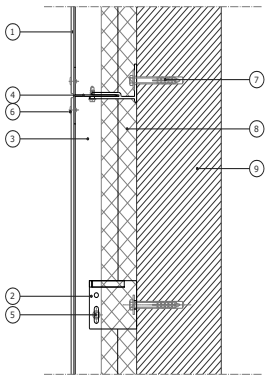


Fig. 2b. Vertical section

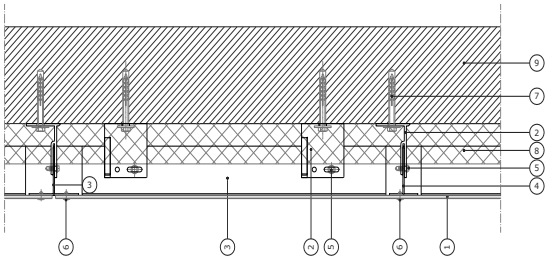


Fig. 2c. Horizontal section

1 TMCS **BUILDBOND FR**

2 Bracket L

3 T vertical standard profile (70 mm width), ref. 01.00.002

4 T vertical optional intermediate profile (40 mm width), ref. 01.00.003

5 Screw 5.5x22 stainless steel A2 (1 per side), e.g. SFS SDA 5/3.5-H 13-S4 5.5x

6 Blind rivet 5,0 x12 (head 16mm) body aluminium alloy (AiA) and stud made of stainless steel A2, e.g.. SFS intec AP14-S-5,0xL

7 Anchor to substrate

8 Thermal insulation

9 Substrate

Figure 3. Example of BB-T – REM cladding kit (bidirectional substructure)

Annex B: Complementary physical and mechanical data of buildbond® FR

Table B.1: Physical characteristics declared data

TMCS	Material		Characteristics	Value
buildbond® FR	Removable protection film		Aspect: Thickness (µm):	White and grey 100
	Coating of alloyed aluminium external sheet : PVDF 70/30		Thickness primer (mm): Thickness lacquered layer (mm):	≥ 25 ≥ 40
	External sheet of coated alloyed aluminium (see Table B.2)		Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0.5±0.05 23 x 10^{-6}
	Adhesive		Thickness (mm): Colour:	0.05 Transparent
	Solid core composed mainly by LDPE and mineral fire retardand compounds		Aspect: Thickness (mm): Composition: Density (kg/m^3):	Dark grey 3 Confidential (Annex C) 1 400-1 600
	Adhesive		Thickness (mm): Colour:	0.05 Transparent
	Rear sheet of coated alloyed aluminium	See Table 2.2 for alloys	Thickness (mm): Linear thermal expansion coefficient (K^{-1}):	0.5±0.05 23 x 10^{-6}
	Coating of alloyed aluminium inner sheet	PE coating	Thickness (µm):	5±2

Table B.2: Aluminium alloy mechanical characteristics declared data

TMCS	Material	Characteristic			Value
buildbond® FR	External/rear sheet of coated alloyed aluminium EN AW 5005/3005/3105 H42 or H44 or H46 and 5754 H24	E Modulus (MPa)			70 000
		Tensile strength R_m (MPa) (3)	5005 3005 3105	H42	125-165
				H44	145-185
				H46	165-205
			5754	H24	240-280
		Yield strength R_p 0,2 (MPa) (3)	5005 3005 3105	H42	>80
				H44	>110
				H46	>135
			5754	H24	>160
		Elongation A_{50} (%) (3)	5005 3005 3105	H42	>4
				H44	>3
				H46	>2
			5754	H24	>6

Annex C: Control plan

This confidential information and is not included in the European Technical Assessment when that assessment is publicly available: C.1. Quality control of components of kits manufactured by suppliers or ETA holder.