CIMENTO®

Outdoor Wall Panels
Technical Information

INDEX

SAI Industry srl - Via J.F. Kennedy, 107/a - 30027 San Donà Di Piave (VE) - ITALY - T: +39 0421 65422 - F: +39 0421 308084 - info@saiindustry.org
C.F e P.IVA IT 04029080274 - R.E.A. VE 359123 - C.C.I.A.A. di Venezia - Iscrizione Registro Imprese VE 04029080274 - C.S. € 10.000,00 i.v.

1. Product description

The **CIMENTO HELIOS CC1** system represents an efficient, safe, easy and high-end technology solution for the installation of **CIMENTO®** panels as ventilated facades.

The system is composed as follow:

- a load-bearing aluminium substructure, characterized by: high mechanical performance, perfectly suitable for different types and shapes of walls; fast & easy installation; easy to maintain a vertical line; easy regulation of gaps between the panels during the installation.
The type of brackets used allows the realization of gaps for ventilation with dimension between 70 and 225 mm length, optimizing the energy performance based on planning needs.

- a chemical hidden anchor of the panels with high mechanical and safety performances. All metal items have been realized in inox stainless steel AISI 316 cat. a4 to ensure the best durability and resistance to loads; the nut, the most important item to join the system, is fixed inside a pre-hole behind the panel using an epoxy structural system CE certified (UNI EN 1504-4:2004, 1504-9:2008). The aluminium brackets, which allow the fixing of the panels to the substructure, are fixed to the nuts by means of special screws with hexagonal head, fitted with a specific safety washer which ensures a perfect resistance to any mechanical stress and vibrations.

- a fiberconcrete support th.10mm with Cimento finish. The panel is characterized by a high value in terms of durability; it is certified cat.a5 by the law UNI EN 12467:2012. In order to achieve the best precision of the sheet, after the finish application, it is cut on size? Site? and drilled behind using a cnc machine in order to apply the recessed nuts.

2. Technical features

In accordance to the law for continue facades UNI EN 13830:2005, CIMENTO HELIOS CC1 system has been submitted to experimental tests for "determination of impact resistance" (UNI EN 12600:2002-14019:2014) and for "wind load" (UNI EN 12179:2002).

The analysis on the external side of the panel, has been certified Class 5 for impact resistance in correspondence of the fixing anchors (point a image 1): any breaks or deformation happening until fall height of 950mm.

The panel has been certified Class 0 with reference to the impact resistance between the anchors (point b image 1); after the break point the panels did not move from the substructure because the impact did not damage the anchors.

NB point b not on image

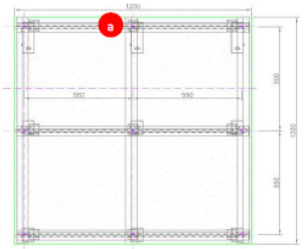

Image 1: drawing of the sample CIMENTO HELIOS CC1 system submitted to experimental tests with

For the test referring to the wind resistance, the system has been submitted to the dynamic loads of pressure in order to verify the disfigurations due to the load of the substructure and the fiberconcrete panel through the installation of movement transducers on the critical points (photo 1). The resistance of the system to positive pressure (air thrust to the external surface) is higher than 3400 pa; at the end of the test any breaks or durable deformations appeared both for the panel and the substructure. The dynamic deformations curves measured during the test are shown in the image 2. The resistance of the system to negative pressure (air thrust from the internal side of the panel to the external), it is until 3200 pa; at 3400 pa the panel brakes and some fixing anchors have been detached.

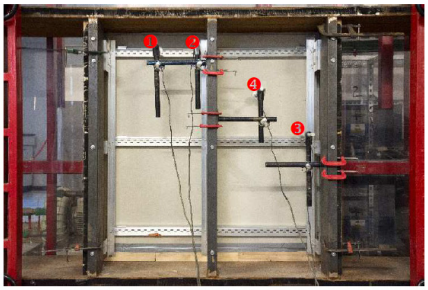

Photo 1: CIMENTO HELIOS CC1 system during the tests for wind load resistance. It Is visible the fixing structure built for the test; the 4no transducers of movement to measure the deformations of the panel (point 3,4) and of the substructure (point 1,2).

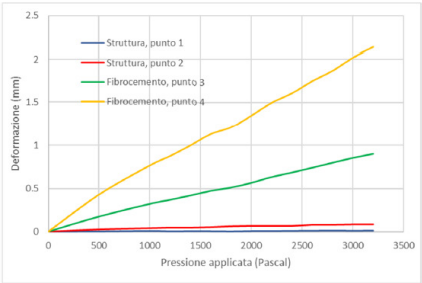

Image 2: Graphic representation of maximum deformations the fixing system and the fiberconcrete underwent (measure point photo 1) during the test of resistance to wind in positive pressure.

The tables below report further physical-mechanical data with reference to the epoxy resin used to fix the nut behind the fiberconcrete support; then, you will find graphical and photographical information of the fixing system and the hidden substructure.

PHYSICAL AND MECHANICAL PROPERTIES OF EPOXY	HARDENING TEMPERATURE		
	+23°C	+30°C	+40°C
Compression Resistance (ASTM D695-95, 14days hardening)	~39 MPa	~43 MPa	~56 MPa
Curve Resistance (DIN EN ISO 178, 14days hardening)	~38 MPa	~38 MPa	~42 MPa
Traction Resistance (ISO 517, 14days hardening)	~22 MPa	~24 MPa	~25 MPa
Adhesion to concrete (EN ISO 4624, EN 1542, EN 12188, 7days hardening)	>3 MPa	-	-
Adhesion to steel (EN ISO 4624, EN 1542, EN 12188, 3days di hardening)	10-14 MPa	11-15 MPa	13-17 MPa
Elastic module to traction (ISO 517, 14days hardening)	~2.750 MPa	-	-
Elastic module to Curve (DIN EN ISO 178, 14days hardening)	2.600 MPa	-	-
Elastic module to compression (ASTM D695-95, 14days hardening)	~2.100 MPa	-	-
Extension (ISO 527, 14days hardening)	1,0±0,1%		

PHYSICAL AND MECHANICAL PROPERTIES OF FIBERCONCRETE SUPPORT			
PARAMETER	VALUE	PARAMETER	VALUE
Basic weight	≥1.6 Kg/dm^3	Resistant to curve – perpendicular to fiber	32 N/mm^2
Water Absorption	≤25%	Resistant to curve – parallel to fiber	22 N/mm^2
Balance of natural humidity	10-15%	Resistant to compression	40 N/mm^2
Thermal conductivity	0.36 W/mK	Elastic modul E	13000 N/mm^2
Coefficient thermal expansion	1.0e-5°C^{-1}	Tolerance of thickness on panel 10mm	±1mm
Expansion on extreme conditions (-5:+100°C; 20:90% U.R.)	1.5mm/m	Vapour permeability Q	45
Fire resistance (class)	A2-s1,d0	Durability Class (EN 12467:2012)	Cat.A

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3. Fixing structure (for a complete description of the characteristics of the system please refer to the datasheet available on request)

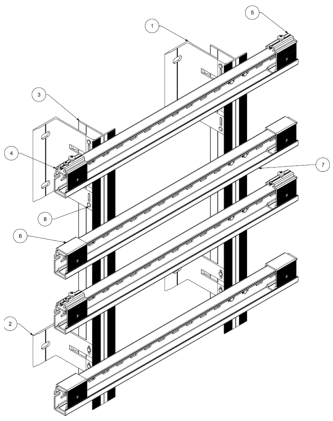


Image 3: Example of fixing structure with numbering of each element.

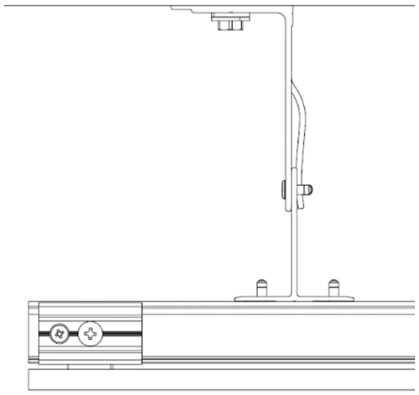
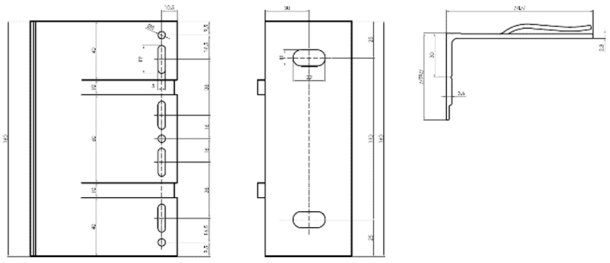
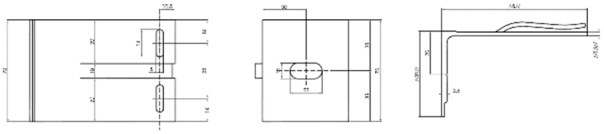


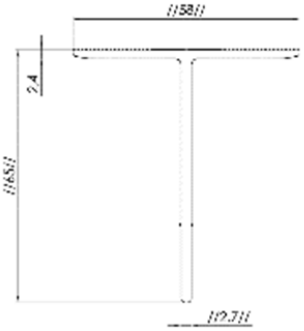
Image 4: Complete structure, plan view.



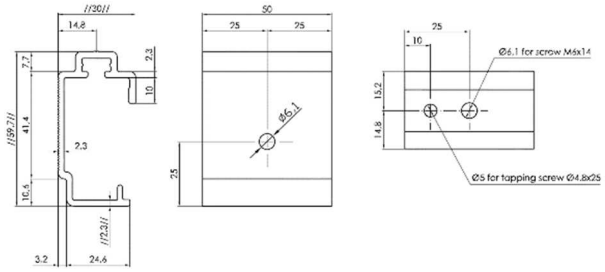
1: Payload bracket (available in 6no height, from 50mm to 180mm to adjust the depth of gaps)



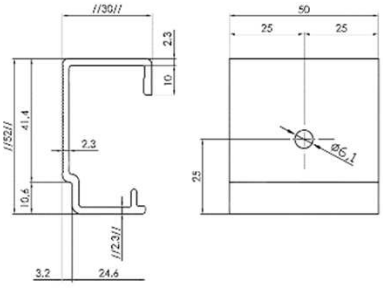
2: Control bracket (available in 6no height, from 50mm to 180mm to adjust the depth of gaps)



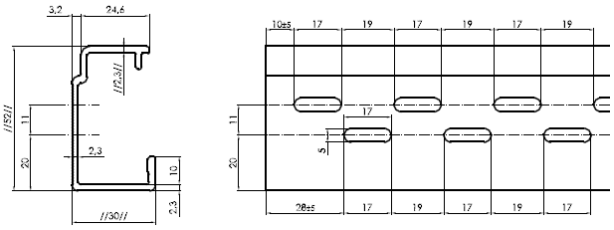
3: T vertical profile lenght 600cm



4-5: Bracket for panel support with inclination adjustable, complete of fix point (4) or without.



6: Bracket for panel support



7: Horizontal C profile
8: Tear rivet size. 4.8x10mm

4. System of fixing to CIMENTO® panel

(for a complete description of the characteristics of the system please refer to the datasheet available on request)

Photo 1: back side of the sheet with nut and washer to distribute ? loads.

Photo 2: detail of the bracket for the panel (with screw to adjust the level) fixed to the nut. The security washer guarantees the best grip of the hex screw for the mechanical stress and vibrations.

Photo 3: side view of the hidden fixing system.

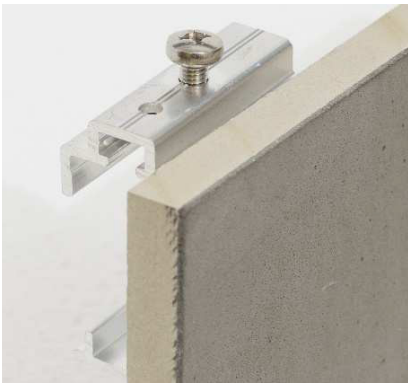


Photo 4: detail of **CIMENTO®** finish in correspondence of the anchor.

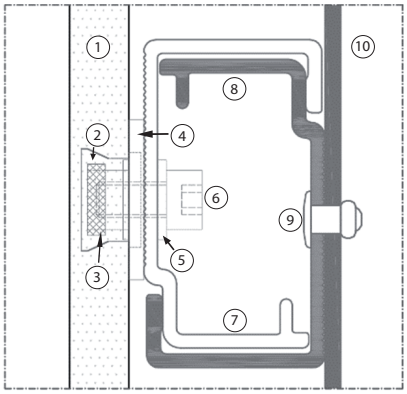


Image 5: section of fixing system in correspondece of the anchor.
1 – Cimento FBC panel
2 – Hole to fix the recessed nut using epoxy
3 – M6 nut
4 – Washer to divide loads
5 – Security washer
6 – Hex head screw
7 – Bracket support
8 – Horizontal C profile
9 – Rivet
10 – Vertical T profile

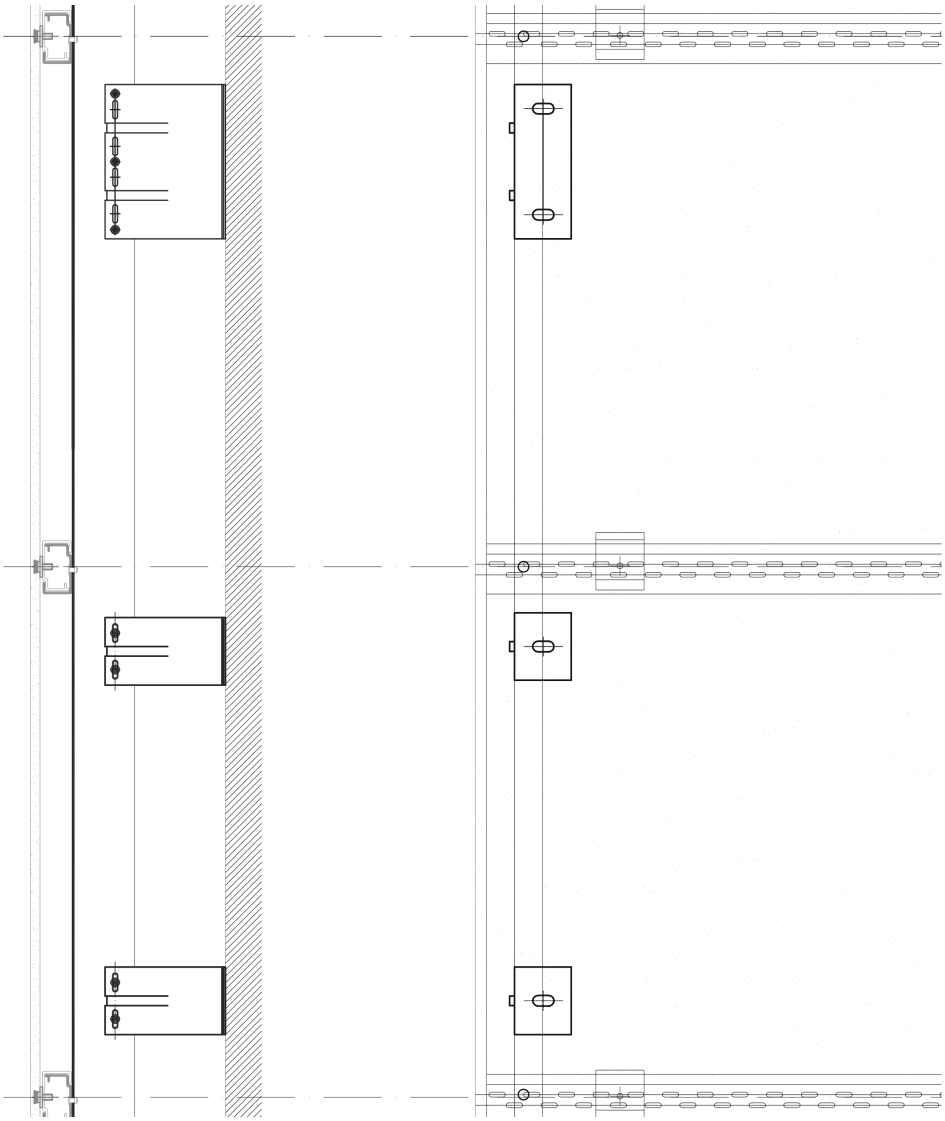


Image 6: section of details and back view of the substructure and Cimento FBC panel.

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