STONEGLASS®

HIGH-PERFORMANCE HURRICANE-READY VENTILATED FACADE SYSTEM

ENGINEERED FOR MIAMI-DADE, FLORIDA COASTAL AND HURRICANE-PRONE REGIONS

CERTIFIED WIND LOAD RESISTANCE

≥ 6,200 Pa

Enhanced Trust80®
Structural Subframe
High-Performance MICROGLASS® Cladding Panels
Reduced Anchorage Spacing for Increased Structural Stability
Superior Mechanical Performance Compared to Standard Porcelain Cladding Systems

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Developed to address the demanding wind-load conditions typically associated with Miami-Dade and other hurricane-exposed coastal environments.

Combining a certified high-performance substructure with mechanically superior MICROGLASS® panels, the system provides an advanced technical platform for high-rise, coastal and hurricane-zone architectural applications.

Ideal for projects requiring exceptional wind resistance, concealed fixing technology, long-term durability and future compliance with project-specific U.S. certification requirements.

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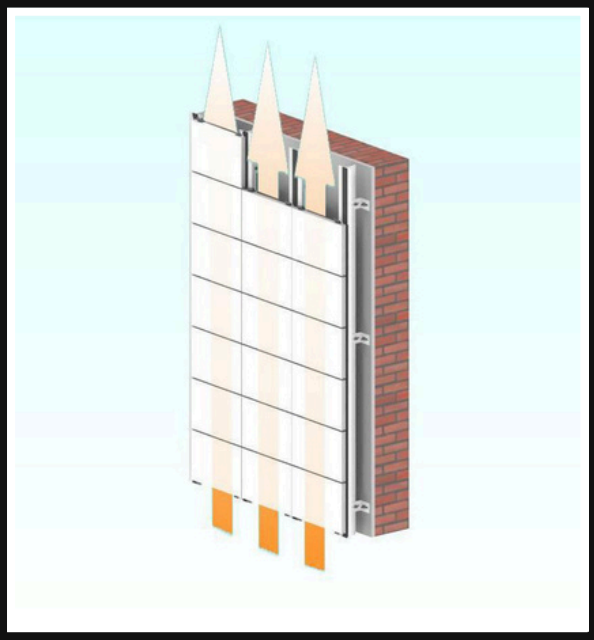
Ventilated Façades Systems

A ventilated façade is an advanced building envelope system designed to enhance both the performance and aesthetics of new or existing buildings.

The system creates an air cavity between the external cladding and the wall, allowing continuous airflow thus improving thermal insulation, moisture control, and overall energy efficiency.

Ventilated facades provide superior sustainability, lower maintenance costs and better durability.



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Hidden System

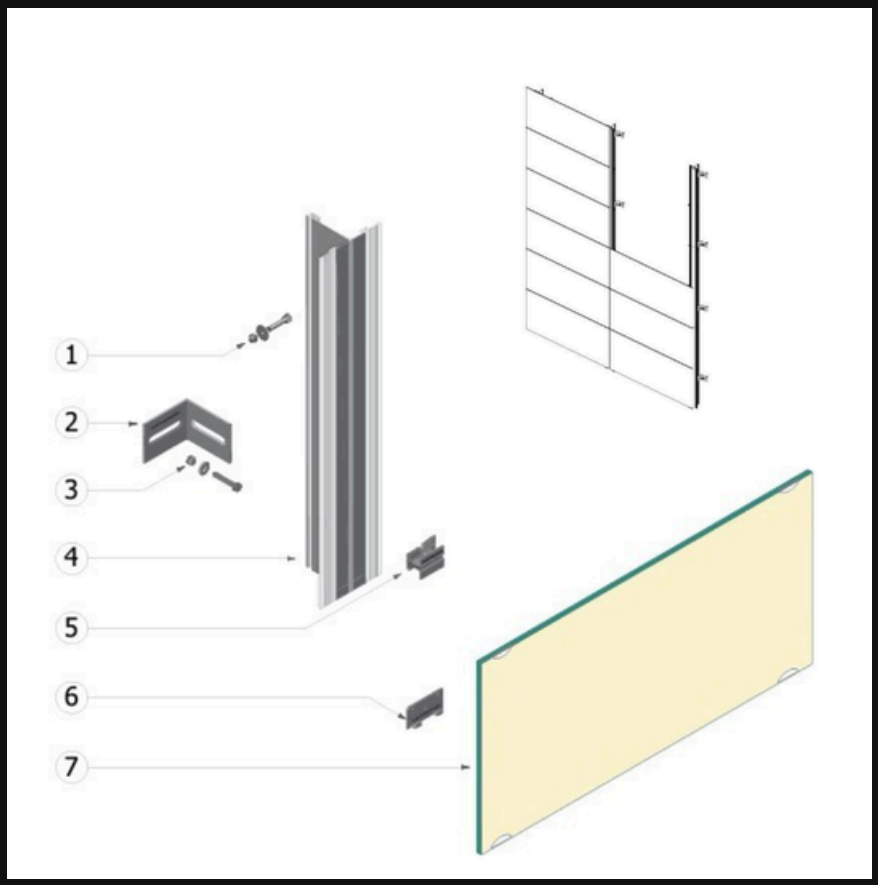
Our hydden system is composed by:

TERRAMILANO ENGINEERING high performance sub-structure

1. Bolt M6
2. St80 support L section
3. bracket Wall dowel
4. Trust 80 vertical T section
5. profile S10 hook
6. AM 4.1 starting hook

STONEGLASS external cladding panels

7. Façade panel



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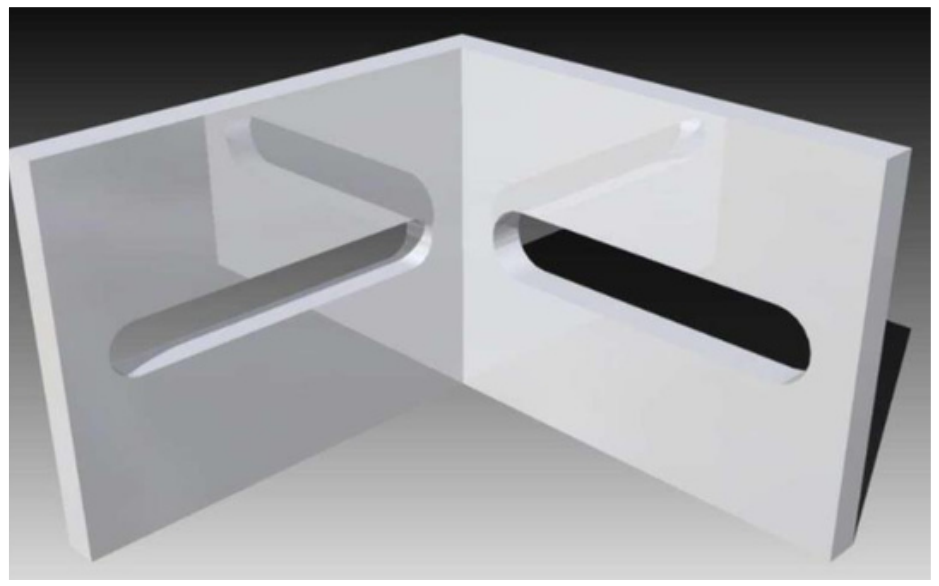
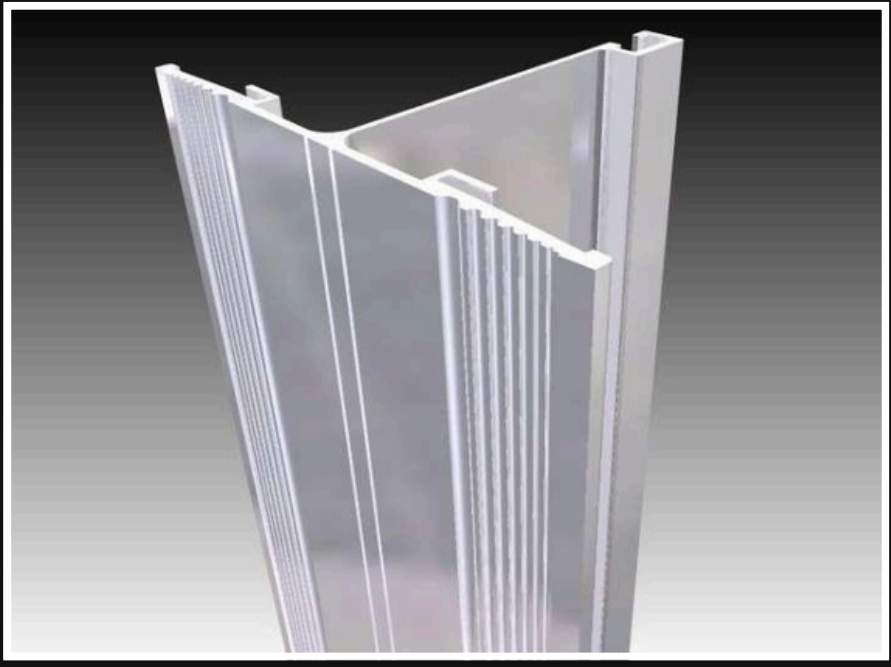
Support bracket series St80® obtained by extruding raw aluminum alloy 6060 T5





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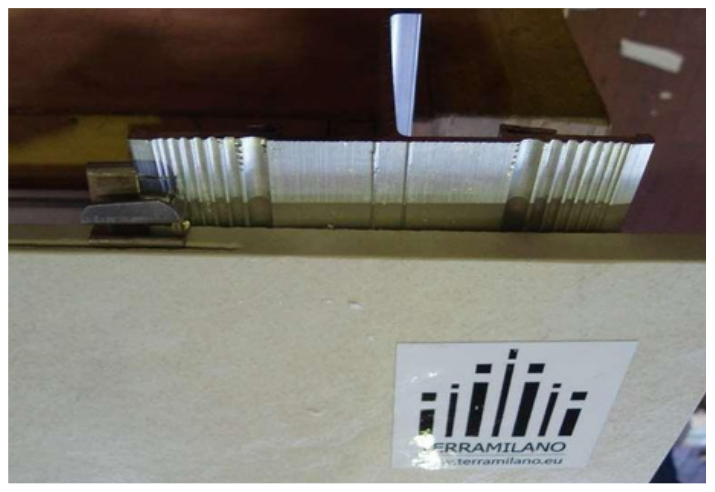
The S10 Terramilano series is designed to maximize the elastic performance of both the stoneware slabs and the metal components that make up the substructure, ensuring optimal load distribution and structural reliability (see load tests in the Annex).



The concealed kerf fixing system uses specially machined grooves on the back side of the panels, allowing hidden hooks and anchors to securely support the cladding without visible fasteners on the exterior surface.

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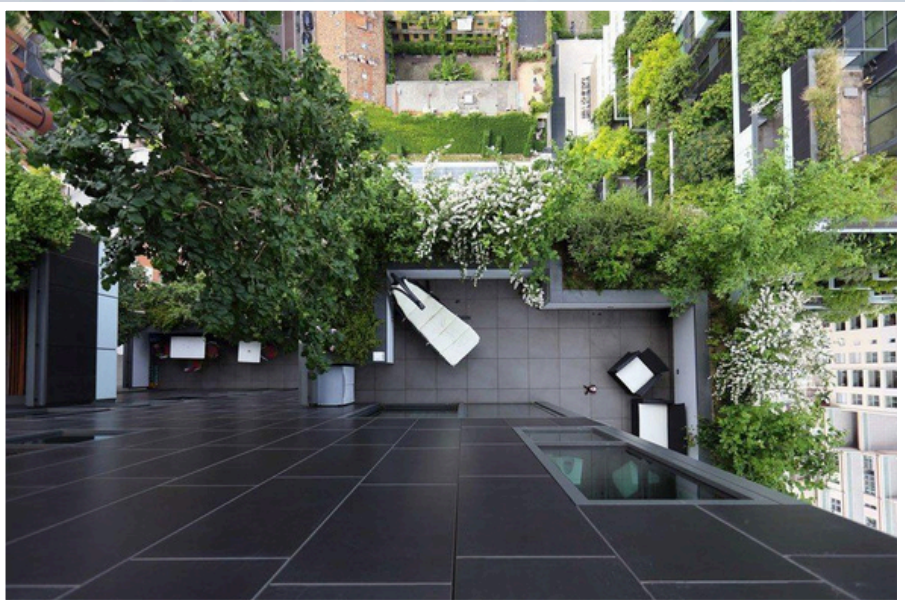

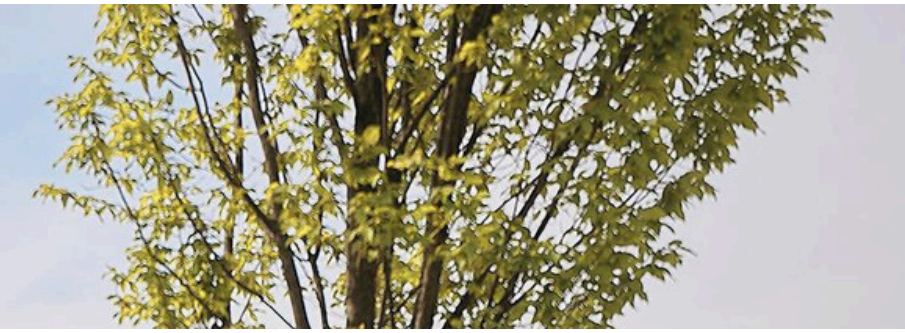

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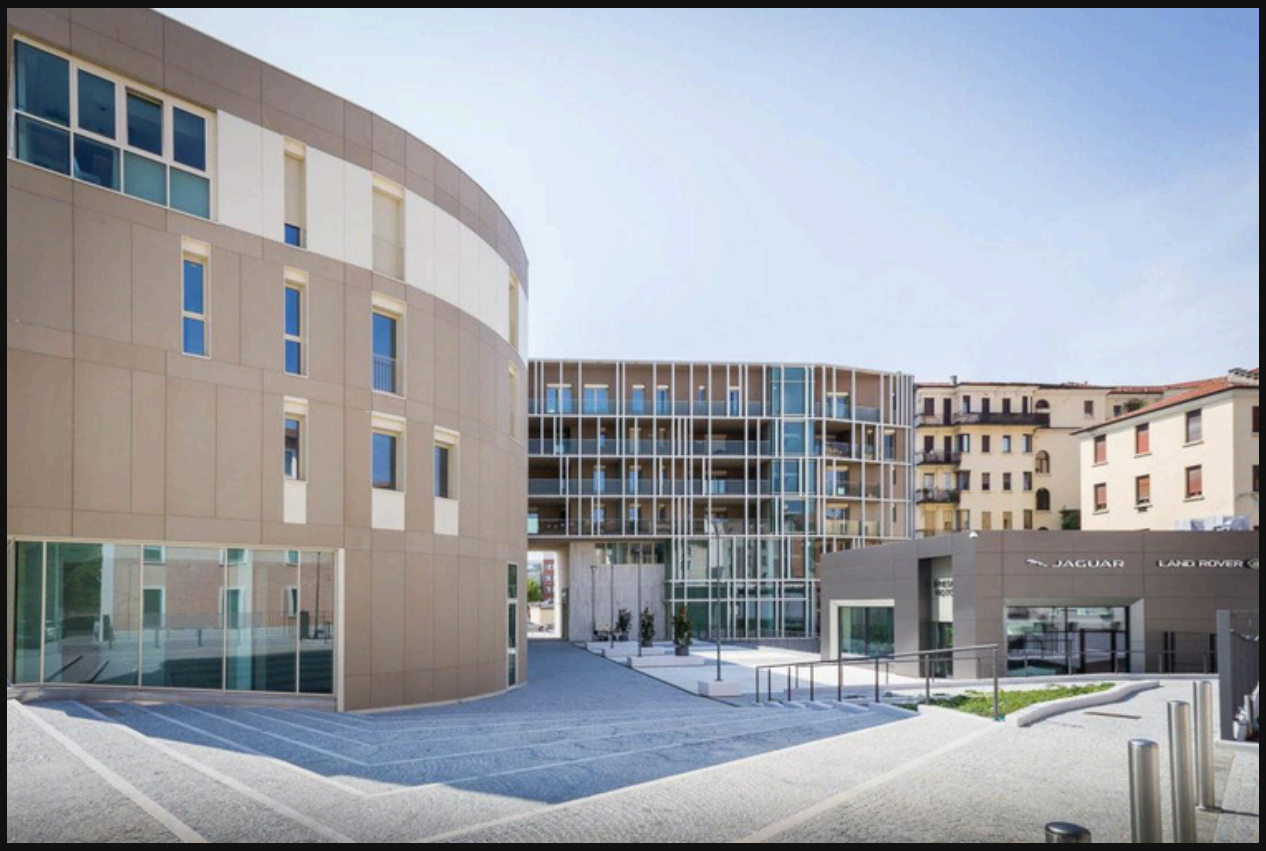

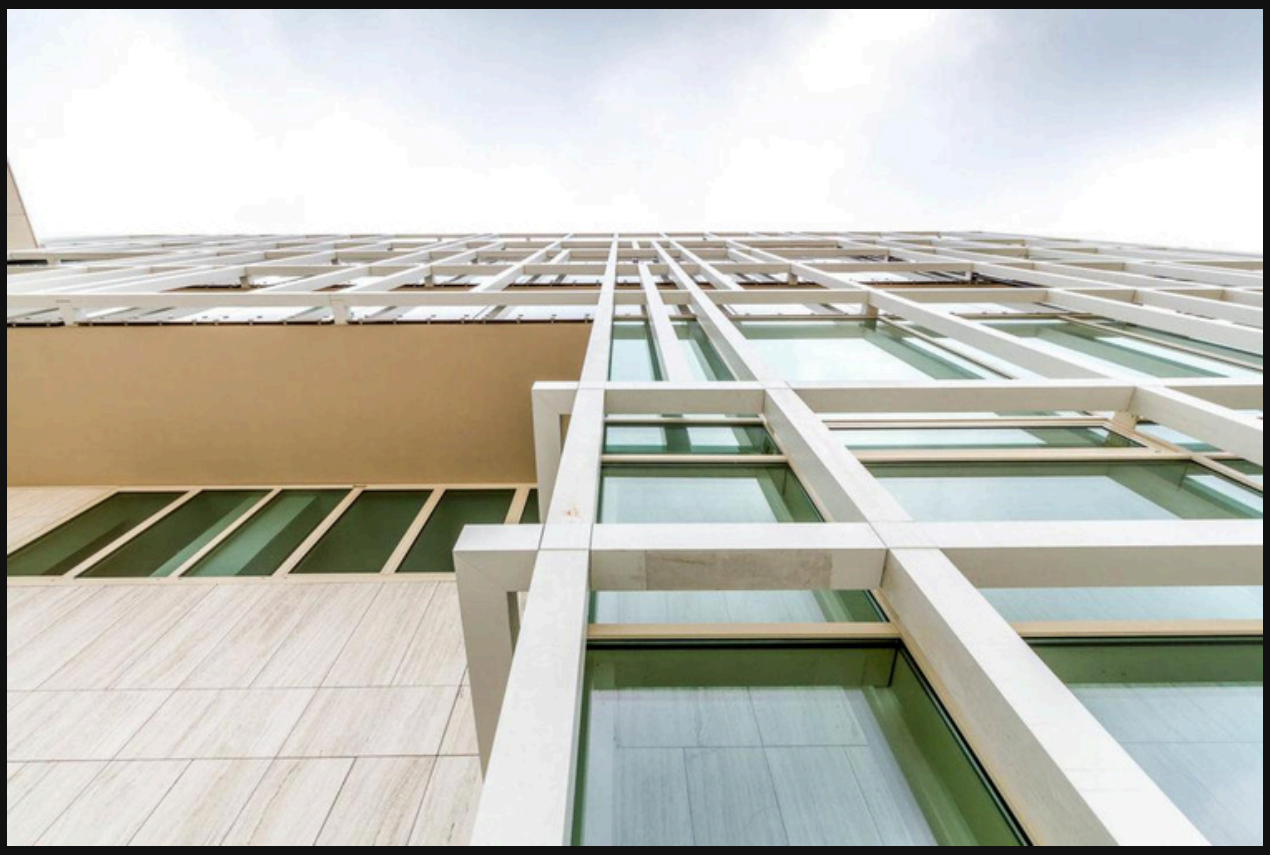

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TECHNICAL ASSESSMENT REPORT ON THE COMPATIBILITY OF THE TERRAMILANO ENGINEERING® SUBSTRUCTURE SYSTEM WITH MICROGLASS® PANELS

INTRODUCTION

The purpose of this technical report is to assess the suitability of the high-performance metal substructure system TERRAMILANO ENGINEERING® for use with MICROGLASS® cladding panels.

The system has already been certified and extensively employed in applications utilizing porcelain stoneware panels. Through a comparative analysis of the physical and mechanical properties of the materials involved, this report aims to demonstrate the compatibility of the proposed cladding material and the expected equivalent or enhanced performance of the resulting façade system.

SYSTEM DESCRIPTION

The system consists of a support structure composed of vertical “Trust 80” T-profiles manufactured from mill-finish 6060-T5 aluminum alloy, measuring 110×80×H2400 mm with a thickness of 2 mm and installed at 600 mm centers.
The profiles are mechanically anchored to the substrate wall using “St 80” L-shaped brackets made of S235 galvanized steel, measuring 80×120×60 mm with a thickness of 3 mm.
The cladding panels are attached to the supporting structure by means of “S10” hooks manufactured from AISI 316 austenitic stainless steel. The hooks are snap-fitted into the vertical profiles and connected to the panels through a kerf-cut anchoring system, ensuring proper panel flatness and accurate verticaand horizontal alignment.

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EXISTING CERTIFICATION

The attached certification report, “Resistance to Wind Load,” issued by Istituto Giordano S.p.A. on April 17, 2018, in accordance with ETAG 034-1:2012 and the guidelines of the European Organisation for Technical Assessment (EOTA), documents a wind pressure resistance of greater than or equal to 6,200 Pa.

The certified configuration consisted of:

• Vertical “Trust 40” T-profiles in mill-finish 6060-T5 aluminum alloy, measuring 110×40×H2400 mm with a thickness of 2 mm, installed at 1,200 mm centers;

• “St 80” L-shaped brackets in S235 galvanized steel;

• “S10” hooks in AISI 316 austenitic stainless steel.

As stated at the bottom of page 7, “at the negative pressure level of 6,200 Pa, no significant deformation of the metal substructure was observed.”

COMPARISON OF MATERIAL PROPERTIES

Material	Porcelain Stoneware	MICROGLASS®
Dimensions	1200 x H600 mm	1200 x H600 mm
Thickness	9 mm	10 mm
Water Absorption	0.6%	0.0%
Modulus of Rupture	35 N/mm2	42.3 N/mm2
Breaking Load	1,300 N	2,168 N
Coefficient of Thermal Expansion	7 x 10-6/°C	1.21 x10-6/C°

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These properties indicate greater dimensional stability and superior mechanical resistance compared with the porcelain stoneware panels used in the certified configuration.

TECHNICAL EVALUATION

Based on the available physical and mechanical properties and on the comparison with the previously tested configuration, the TERRAMILANO ENGINEERING® system equipped with MICROGLASS® panels may be considered technically compatible with the certified substructure system.

Furthermore, considering that:

- MICROGLASS® exhibits superior mechanical performance compared to the porcelain stoneware panels used during certification testing;
- the system evaluated in this report utilizes “Trust 80” profiles instead of the smaller and lighter certified “Trust 40” profiles;
- the evaluated system employs a reduced profile spacing of 600 mm compared to the certified spacing of 1,200 mm, resulting in increased overall substructure stiffness and a greater number of anchorage points through the “S10” hook system;

it is reasonable to conclude that the structural behavior of the TERRAMILANO ENGINEERING® system incorporating MICROGLASS® panels is expected to be at least equivalent to, and with a high degree of confidence superior to, the certified porcelain stoneware configuration.

Nevertheless, final structural verification shall be carried out in accordance with project-specific design requirements and all applicable regulations and standards in the United States market, including the provisions of the International Building Code (IBC) and ASCE 7, governing wind load determination and structural design requirements.

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R.E.A. c/o C.C.I.A.A. (RN) 156766
Registro Imprese di Rimini n. 00 549 540 409

TEST REPORT No. 350737

Place and date of issue: Bellaria-Igea Marina - Italy, 17/04/2018

Customer: TERRAMILANO ENGINEERING S.r.l. - Via Fratelli Cervi, 6 – 20054 SEGRATE (MI) - Italy

Date testing requested: 21/02/2018

Order number and date: 75870, 23/02/2018

Date sample received: 06/03/2018

Date of testing: 06/03/2018

Purpose of testing: resistance to wind load on external wall claddings in accordance with guideline ETAG 034-1:2012

Place of testing: Istituto Giordano S.p.A. - Strada Erbosa Uno, 72 - 47043 Gatteo (FC) - Italy

Origin of sample: sampled and supplied by the Customer

Identification of sample received: No. 2018/0476

Sample name*

The test sample is called “Exposed System (TruSt40)”.

(*) according to that stated by the Customer.

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Description of sample*

The test sample consists of external wall cladding composed of No. 2 porcelain stoneware slabs, nominal dimensions 1200 mm × 600 mm and nominal thickness 9 mm each, with connection to an metallic substructure.

The metallic substructure is composed of:

– extruded aluminium profile “TruSt40”, alloy 6060T5 crude;

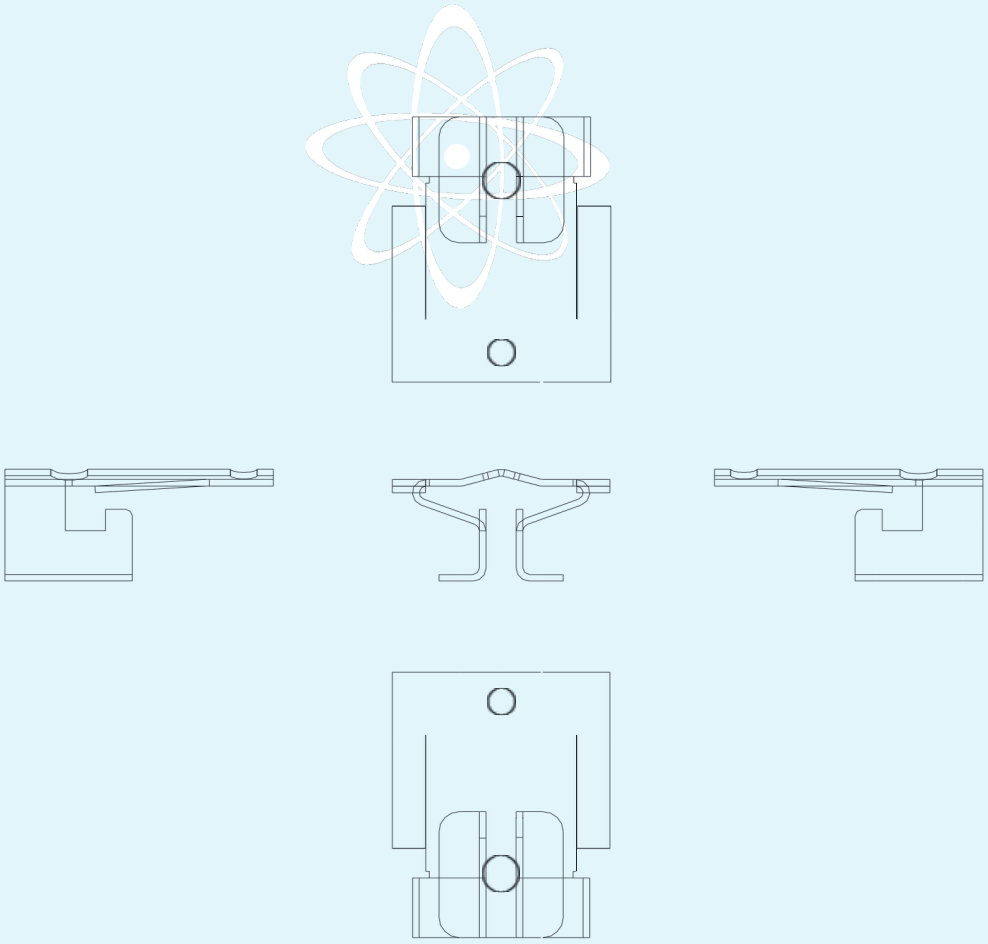
– extruded aluminium brackets “St40”, alloy 6060T5 crude;

– metal anchors for aluminium brackets, nominal diameter 8 mm;

– profile-bracket fastening with nuts and bolts in stainless steel;

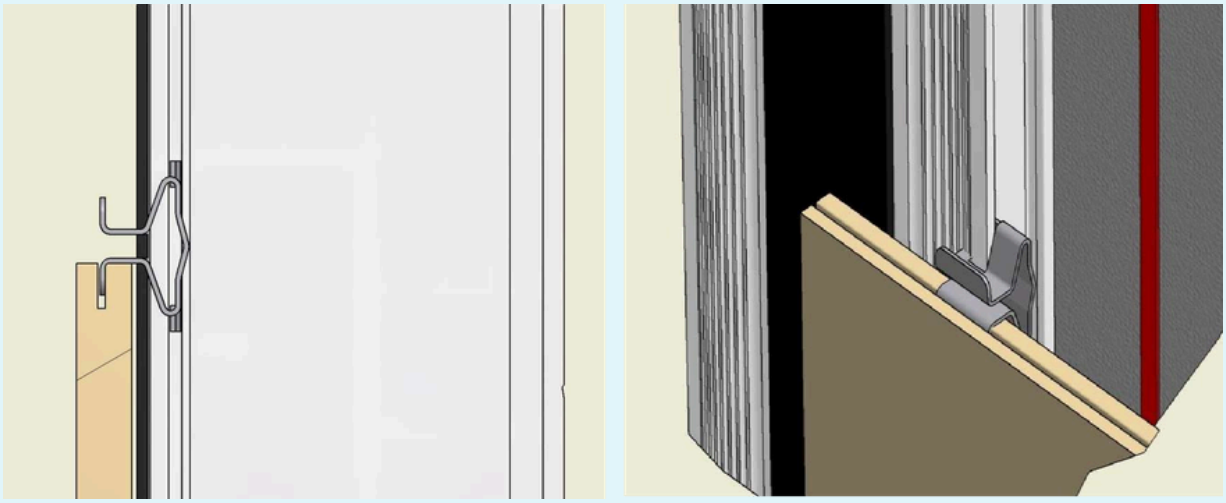
– fixing hooks “S10” in harmonic stainless steel AISI 304 for anchor of the slab at the substructure.

Further details of sample specifications can be seen in Customer-supplied schematic drawings shown hereafter.



Schematic drawing of the fixing hook.

(*) according to that stated by the Customer.



Schematic drawings of the sample.

Photograph of the sample.

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Normative references

The test was carried out in accordance with EOTA (European Organisation for Technical Approvals) guideline ETAG 034-1:2012 edition April 2012 “Guideline for European technical approval of kits for external wall claddings - Part I: Ventilated cladding kits comprising cladding components and associated fixings”.

Test apparatus

The test was carried out using a computerised semiautomatic control and measurement system capable of performing the suction test, complete with No. 6 Gefran rectilinear displacement transducers with cylindrical case to measure deflection model “PZ34S150” (apparatus in-house identification codes: “EDI017A”, “EDI017B”, “EDI017C”, “EDI017D”, “EDI017E” and “EDI017F”).

Test method

The sample was fitted to the test rig and underwent the wind suction test (negative pressure) with measurement of deformation whilst loaded and recording of permanent deflection in accordance with clause 5.4.1 “Wind load resistance” of ETAG 034-1:2012.

More specifically, the following test procedure was performed:

– pre-load step of 300 Pa during which no measurements were taken;

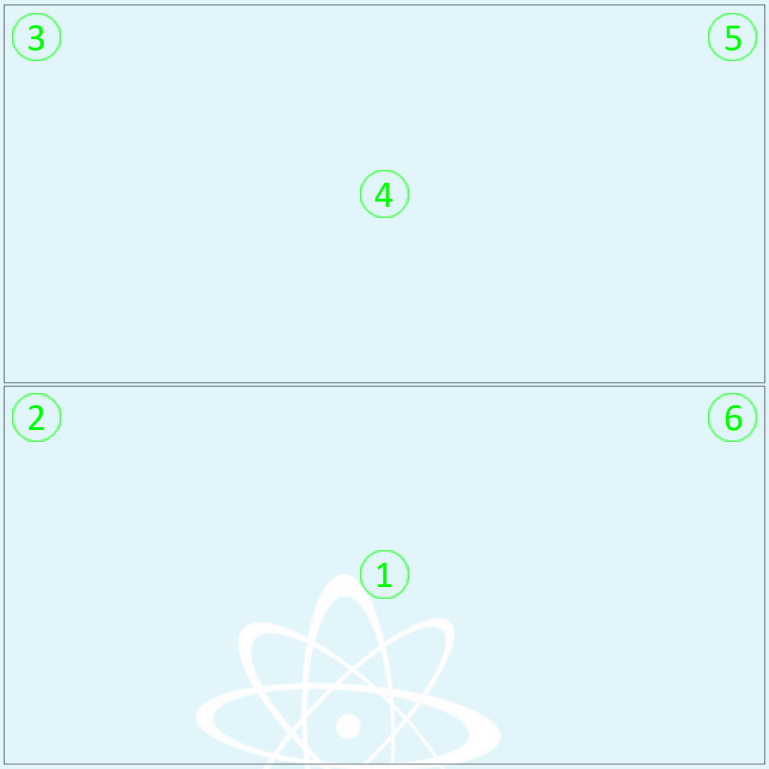
– pre-load step of 300 Pa during which no measurements were taken and sensors were reset after removal of load;

– step of 500 Pa;

– step of 1000 Pa;

– subsequent steps of 200 Pa until sample failure occurred or up to the test apparatus limit.

Deflections was measured for each pressure step after maintaining load constant for at least 10 s and after reducing pressure to zero, permanent deflection was noted after at least 1 min recovery.



Deformation measurement points scheme.

Environmental conditions during test

Ambient temperature	(18 ± 2) °C
Relative humidity	(40 ± 5) %

Test results

Negative pressure [Pa]	**Deflection**					
	at point "1" [mm]	**at point "2"** [mm]	**at point "3"** [mm]	**at point "4"** [mm]	**at point "5"** [mm]	**at point "6"** [mm]
0	0,00	0,00	0,00	0,00	0,00	0,00 0,21
500	0,59	0,19	0,00	0,81	0,00	

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Negative pressure [Pa]	Deflection					
	at point "1" [mm]	at point "2" [mm]	at point "3" [mm]	at point "4" [mm]	at point "5" [mm]	at point "6" [mm]
0	0,03	0,02	0,00	0,01	0,00	0,01
1000	1,83	0,58	0,00	1,90	0,00	0,62
0	0,07	0,05	0,00	0,03	0,00	0,02
1200	2,39	0,78	0,00	2,38	0,00	0,78
0	0,07	0,06	0,00	0,06	0,00	0,03
1400	2,90	1,00	0,00	2,88	0,00	1,00
0	0,09	0,08	0,00	0,08	0,00	0,06
1600	3,64	1,20	0,00	3,35	0,00	1,21
0	0,12	0,11	0,00	0,08	0,00	0,08
1800	4,06	1,38	0,00	3,83	0,00	1,41
0	0,13	0,14	0,00	0,09	0,00	0,09
2000	4,61	1,59	0,00	4,36	0,11	1,65
0	0,16	0,14	0,00	0,09	0,00	0,09
2200	5,28	1,80	0,00	4,93	0,09	1,89
0	0,18	0,16	0,00	0,11	-0,13	0,12
2400	5,86	2,02	0,00	5,46	0,17	2,14
0	0,18	0,17	0,00	0,13	-0,16	0,13
2600	6,43	2,25	0,00	5,96	0,28	2,40
0	0,21	0,17	0,00	0,13	-0,19	0,14
2800	7,04	2,46	0,01	6,56	0,33	2,63
0	0,22	0,20	0,00	0,15	-0,20	0,18
3000	7,65	2,68	0,06	7,17	0,49	2,90
0	0,23	0,22	0,02	0,16	-0,24	0,20
3200	8,33	2,99	0,18	7,84	0,68	3,20
0	0,25	0,23	0,02	0,17	-0,26	0,22
3400	8,78	3,21	0,27	8,26	0,79	3,49
0	0,27	0,23	0,02	0,18	-0,27	0,26
3600	9,40	3,39	0,31	8,82	0,88	3,73
0	0,25	0,24	-0,02	0,20	-0,27	0,29
3800	9,99	3,64	0,41	9,35	1,03	3,98

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Negative pressure [Pa]	Deflection					
	at point "1" [mm]	at point "2" [mm]	at point "3" [mm]	at point "4" [mm]	at point "5" [mm]	at point "6" [mm]
0	0,29	0,24	-0,06	0,19	-0,28	0,32
4000	10,41	3,80	0,48	10,13	1,15	4,17
0	0,30	0,29	-0,07	0,23	-0,28	0,34
4200	11,14	4,13	0,58	10,69	1,28	4,54
0	0,30	0,28	-0,07	0,24	-0,28	0,35
4400	11,73	4,25	0,60	10,99	1,34	4,63
0	0,30	0,29	-0,09	0,26	-0,28	0,36
4600	12,52	4,54	0,71	11,88	1,51	4,94
0	0,30	0,31	-0,09	0,29	-0,26	0,40
4800	12,93	4,72	0,76	12,34	1,62	5,10
0	0,30	0,31	-0,07	0,29	-0,24	0,40
5000	13,59	5,00	0,84	12,96	1,75	5,44
0	0,32	0,35	-0,07	0,33	-0,23	0,43
5200	14,06	5,27	0,99	13,85	1,93	5,73
0	0,32	0,37	-0,09	0,37	-0,19	0,44
5400	14,63	5,49	1,02	13,84	2,03	5,97
0	0,32	0,36	-0,09	0,35	-0,21	0,45
5600	15,45	5,79	1,10	14,70	2,17	6,21
0	0,32	0,40	-0,07	0,38	-0,18	0,50
5800	16,08	5,98	1,22	15,23	2,34	6,47
0	0,32	0,42	-0,09	0,40	-0,16	0,52
6000	16,96	6,30	1,24	15,54	2,43	6,62
0	0,35	0,47	-0,07	0,43	-0,15	0,54
6200	**17,11**	**6,44**	**1,29**	**16,57**	**2,53**	**6,95**
0	0,38	0,51	-0,07	0,49	-0,15	0,57

After the test, from a visual examination no evident deformations to the metallic substructure were found.

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Photograph of the sample during the test.

Findings

On the basis of the tests performed and the results obtained, the test sample, comprising an external wall cladding called “Exposed System (TruSt40)” submitted by the company TERRAMILANO ENGINEERING S.r.l. - Via Fratelli Cervi, 6 - 20054 SEGRATE (MI) - Italy, is assigned the performance as regards the tests specified in the following table.

Test type	Test standard	Result
Resistance to wind load	ETAG 034-1:2012	**≥ 6200 Pa**

The results given refer exclusively to the test sample itself and are only valid under the same conditions in which testing was carried out.

Test Technician
(Dott. Ing. Paolo Bertini)

Head
of Security and Safety Laboratory
(Dott. Andrea Bruschi)

Chief Executive Officer
(Dott. Arch. Sara Lorenza Giordano)

Firmato digitalmente da SARA LORENZA GIORDANO