PORCELAIN PANEL
RAINSCREEN SYSTEMS
WHAT IS A PORCELAIN PANEL RAINSCREEN SYSTEM?

Porcelain Panel Rainscreen Systems have been widely used throughout Europe for more than 20 years, combining aesthetic appeal and continuous insulation features.

This highly engineered curtain wall system consists of an aluminum sub frame that is attached to the building using aluminum profiles, separating the porcelain façade from the building structure. This creates an air cavity that removes heat from solar radiation and promotes continuous drying of any moisture that may enter in the cavity through the tile joints. This process, also referred to as chimney effect, ultimately provides top protection from thermal bridging of the building.

The tile will be adhered to one of four anchoring systems, which can be installed on any of these building structures:

- Metal studs and traditional wood framing
- Masonry walls
- Brick walls
- Tilt up wall constructions
- CMU block walls

Open Joints Water Penetration

<table>
<thead>
<tr>
<th>Open Joints</th>
<th>Water Penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td>83.9%</td>
<td>16.6%</td>
</tr>
<tr>
<td>0.4%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Thermal Performance
RECLADDING

Layout of the Attachment Primary and Secondary Attachment L-Bracket

Installation of Ridged Insulation, Vertical T-Profiles, and Horizontal Rails

Cut-To-Size Slabs Installed onto the Highly Engineered Sub-Frame and Adhered to the Extruded Aluminum Profiles with Structural Silicon
A Porcelain Panel Rainscreen System is an articulated covering system requiring knowledge of the characteristics of each single functional layer it is made up of:

- Covering or External Facing
- Metal Load-Bearing Structure and Anchoring Elements
- Air Gap
- Insulating Layer
- Perimeter or Curtain Wall (this will determine the kind of anchors to be used)

1 - External Facing (cladding)
2 - Steel Load-Bearing Structure
4 - Insulating Layer
5 - Building Wall

3 - Ventilated Air Gap
projects  OSPEDALE DI CONEGLIANO / VENETO, ITALY
**THERMAL ANALYSIS**

The thermal analysis model for ventilated walls was created using PAN2 software, which made it possible to compare two different types of walls which are particularly common in Italy. The thermal and energy characteristics of these walls were analysed before and after the application of the ventilated wall, in order to determine – also with a view to the provisions of Italian Legislative Decree number 192/2005 and subsequent modifications – the advantages that may derive from applying such a system.

1. Finite element Mesh
2. Thermal flux vectors
3. Temperature distribution
4. Thermal flux magnitude

In addition to the undoubted advantages in terms of the dispersal of energy through the walls, ventilated facades make it possible to eliminate one of the main problems affecting structures with beams and pillars: heat bridges. This phenomenon occurs in floors and anywhere there is a break in the structure, as it can be seen in the simulations presented here: the thermal flux intensities at the floor. Laying insulation on the outside of the wall to be covered makes it possible to eliminate this problem.

**THERMISCHE ANALYSE**

Das Modell zur thermischen Analyse der hinterlüfteten Fassade wurde unter der Verwendung der Software PAN2 entwickelt; die es erlaubt, einen Vergleich zwischen zwei in Italien sehr verbreiteten Arten des Mauerwerks anzuzeigen. Die thermischen und energetischen Eigenschaften wurden zunächst mit und dann ohne hinterlüftete Fassade analysiert, um so – auch im Sinne der jüngsten italienischen gesetzesverwaltenden Rechtsverordnung 192/2005 in endgültiger Fassung – die Vorzüge zu überprüfen, die hinterlüftete Fassaden bringen.

1. Netz mit finiten Elementen
2. Richtung des Wärmestroms
3. Temperaturverteilung
4. Intensität des Wärmestroms


**ANALYSE THERMIQUE**

Pour la façade ventilée, le modèle de l’analyse thermique a été défini avec le logiciel PAN2, qui a permis de comparer deux types de maçonnerie très fréquents en Italie. Les propriétés thermiques et énergétiques ont tout d’abord été analysées sans la façade ventilée, puis avec la façade ventilée, afin de vérifier les avantages de ce genre de parement, notamment dans le cadre du récent Décret Légal du 192/2005 et modifications suivantes.

1. Quadrillage avec éléments finis
2. Direction du flux thermique
3. Distribution des températures
4. Intensité du flux thermique

Non seulement les façades ventilées comportent des avantages indiscutables en termes de dissipation énergétique, mais elles suppriment aussi l’un des grands problèmes des structures à base de poutres et piliers : le pont thermique. Ce phénomène se produit au niveau des gaines et de toutes les interruptions de structure, comme vous pouvez le constater sur les simulations ci-après : le flux thermique s’amplifie à la hauteur du gaine. L’application de l’isolant sur l’extérieur du mur permet d’éviter ce problème.

**DISTRIBUTIONE DELLE TEMPERATURE**

Temperature distribution, Temperaturverteilung, Distribution des températures

**INTENSITÀ DEL FLUSSO TERMICO**

Thermal flux magnitude, Intensität des Wärmestroms, Intensité du flux thermique
**PARETENI VENTILATE**
VENTILATED FACADES_HINTERLÜFTETE FASSADEN_FACADES VENTILÉES

**ANALISI TERMICA_THERMAL ANALYSIS_THERMISCHE ANALYSE_ANALYSE THERMIQUE**
Elementi strutturali_Structural Elements_Bauteile_Eléments de la structure

1. **Parete ventilata_Ventilated façade_Hinterlüftete Fassade_Façade ventilée**
Lustre in ceramica tecnica_Technical ceramic slabs_Steine aus keramischem Keramik_Dalles en céramique technique

<table>
<thead>
<tr>
<th>Core di ventilazione_Chamber of ventilation_Hinterlüftungsräume_Chaambre de ventilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolante in PSE in lastre ricavate da blocchi conforme a UNI 7819</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resistenza_Résistance_Belastbarkeit_Résistance minimale accettabile</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,125 m² K/W</td>
</tr>
</tbody>
</table>

**PARETE VENTILATA_VENTILATED FACADE_HINTERLÜFTETE FASSADE_FACAGE VENTILÉE**

<table>
<thead>
<tr>
<th>Lungo</th>
<th>Fino a</th>
<th>Zona Area</th>
<th>Grad giorno Day degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,34 m² K/W</td>
<td>0,32 m² K/W</td>
<td>2045</td>
<td></td>
</tr>
</tbody>
</table>

**MURATURA SENZA PARETE VENTILATA, WALL WITHOUT VENTILATED FACADE_MAUERWERK OHNE HINTERLÜFTETE FASSADE_MURURE SANS FACADE VENTILÉE**

<table>
<thead>
<tr>
<th>Masse superficiale (Kg/m²)</th>
<th>Spessore (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,8868</td>
<td>0,40</td>
</tr>
</tbody>
</table>

**TIPOLOGIA MATERIALE**
Type of Material, Art des Materials_Type de matériau

<table>
<thead>
<tr>
<th>Spessore (m)</th>
<th>Spessore (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,010</td>
<td>23,00</td>
</tr>
</tbody>
</table>

**CALCOLO DELLA TEMPERATURA SUPERFICIALE INTERNI FAZIA, Calculation of surface inner façade Temperatur der Innenflächen der Fassaden, Calcul de la température intérieure des façades**

<table>
<thead>
<tr>
<th>Temperatura superficiale esterna</th>
<th>Temperature superficial exteriors_Extérieur de la température superficielle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp. 2045</td>
<td>17,86</td>
</tr>
</tbody>
</table>

**FACTORI DI TEMPERATURA_Temperature factors_Faktoren der Temperatur_Facteurs de température**

<table>
<thead>
<tr>
<th>Muro</th>
<th>Mauer</th>
<th>Mur</th>
<th>Parete</th>
</tr>
</thead>
<tbody>
<tr>
<td>2045</td>
<td>17,86</td>
<td>17,86</td>
<td>17,86</td>
</tr>
</tbody>
</table>

**PRESTAZIONI PARETE VENTILATA, VENTILATED FACADE_HINTERLÜFTETE FASSADE_FACADE VENTILÉE**

**PARETE VENTILATA_VENTILATED FACADE_HINTERLÜFTETE FASSADE_FACADE VENTILÉE**

<table>
<thead>
<tr>
<th>Spessore</th>
<th>Masse superficiale (Kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,010</td>
<td>361,05</td>
</tr>
</tbody>
</table>

**MURATURA IN LATERIZIO = 1,426 W/m² K**

**TEMPERATURA ARIA ESTERNA_Temperature exterior air_Temperatur der Außenluft_Température de l'air extérieur**

<table>
<thead>
<tr>
<th>Muro</th>
<th>Mauer</th>
<th>Mur</th>
<th>Parete</th>
</tr>
</thead>
<tbody>
<tr>
<td>2045</td>
<td>17,86</td>
<td>17,86</td>
<td>17,86</td>
</tr>
</tbody>
</table>

**LA MURATURA NON REGOLATORE SEGUE LE DISPOSIZIONI DEL D.L.G.S. 192**

**Vorrichtungsmässige Struktur nach gesetzesverordnung 192**
ANCHORING SYSTEMS

**GHS — CONCEALED UNDERCUT ANCHOR SYSTEM**
- The GHS undercut anchor system uses horizontal rails, which are attached to the vertical T-Profiles and L-Brackets.
- C-Brackets fastened to the tile with the Keil concealed undercut tile transfers the load of the tile onto the curtain wall sub-frame.
- GHS System is used with 8mm and 10mm thick porcelain slabs.

**GHV — EXPOSED ANCHOR SYSTEM**
- The GHV exposed anchors attach the porcelain tiles directly to the vertical T-Profiles.
- The exposed anchors are painted to match with the porcelain slabs color being installed. The horizontal rails are eliminated with the GHV exposed system.
- GHV System is used with 8mm and 10mm thick porcelain slabs.
**GHL — STRUCTURAL SILICON ADHESION SYSTEM**

- Structural silicon is used in lieu of traditional mechanical anchors to adhere the 5’x10’x6mm thick porcelain slabs.
- The cut-to-size slabs are fabricated at the factory and shipped to the jobsite with the structural support frame already adhered.
- C-Brackets are screwed to the aluminum structural beams, which attach the slabs to the sub-frame horizontal rails located on the aluminum sub-frame.

**GHS2 — CONCEALED ANCHOR SYSTEM**

- The GHS2 concealed anchor attaches the porcelain tiles directly to the vertical T-Profiles.
- The concealed anchor’s shape and size are system specific and support the proper weight.
- GHS2 system is used with 20mm thick porcelain slabs.
GHS ANCHORING SYSTEM

1 - Exterior sheathing on cold formed metal framing
2 - L-bracket — Powder coated (black) Al 6060-T6
3 - Thermal break spacer
4 - Wall anchors
5 - Continuous thermal insulation
6 - Plastic anchor — to fasten thermal insulation to wall
7 - Vertical T-profile — Powder coated (black) Al 6060-T6
8 - Stainless steel or aluminum rivet
9 - Horizontal rail C-profile — Powder coated (black) Al 6060-T6
10* - Concealed clamp — Powder coated (black) Al 6060-T6
11 - Self tapping/fixing screw
12 - Leveling bolt
13 - “KEIL” concealed anchor
14 - Compressible gasket
15 - Fiberglass safety mesh
16 - Porcelain panel
17 - Brake metal jamb
18 - Brake metal sill
19 - Brake metal head
20 - Porcelain jamb
21 - Porcelain sill
22 - Porcelain head
23 - Water proofing
24 - Micro-perforated aluminum grille
25 - Metal coping
26 - Metal hat channel
1 - Exterior sheathing on cold formed metal framing
2 - L-bracket — Powder coated (black) Al 6060-T6
3 - Thermal break spacer
4 - Wall anchors
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6 - Plastic anchor — to fasten thermal insulation to wall
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23 - Water proofing
24 - Micro-perforated aluminum grille
25 - Metal coping
26 - Metal hat channel
1 - Backup wall
2 - L-bracket — Powder coated (black) Al 6060-T6
3 - Thermal break spacer
4 - Wall anchors
5 - Thermal insulation
6 - Plastic anchor — to fasten thermal insulation to wall
7 - Vertical T-profile — Powder coated (black) Al 6060-T6
8 - Stainless steel or aluminum rivet
9 - Fixing screw
10 - Exposed clips
11 - Compressible gasket
12 - Fiberglass safety mesh
13 - Porcelain panel
14 - Brake metal sill
15 - Brake metal jamb
16 - Brake metal head
17 - Porcelain sill
18 - Porcelain jamb
19 - Porcelain head
20 - Water proofing
21 - Micro-perforated aluminum grille
22 - Metal cop
GHV ANCHORING SYSTEM

1 - Backup wall
2 - L-bracket — Powder coated (black) Al 6060-T6
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5 - Thermal insulation
6 - Plastic anchor — to fasten thermal insulation to wall
7 - Vertical T-profile — Powder coated (black) Al 6060-T6
8 - Stainless steel or aluminum rivet
9 - Fixing screw
10 - Exposed clips
11 - Compressible gasket
12 - Fiberglass safety mesh
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18 - Porcelain jamb
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21 - Micro-perforated aluminum grille
22 - Metal cop
GHL ANCHORING SYSTEM

1 - Backup wall
2* - L-bracket - Powder coated (black) Al 6060-T6
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4 - Wall anchors
5 - Thermal insulation
6 - Plastic anchor - to fasten thermal insulation to wall
7 - Vertical T-profile — Powder coated (black) Al 6060-T6
8 - Stainless steel or aluminum rivet
9 - Horizontal rail C-profile - Powder coated (black) Al 6060-T6
10* - Concealed Clamp — Powder coated (black) Al 6060-T6
11 - Self tapping/fixing screw
12 - Leveling bolt
13 - Stainless steel pin
14 - Fully threaded set screw
15 - Split-lock washer
16 - Square nut
17 - Anodized aluminum omega profile
18 - Structural silicone sealant
19 - Fiberglass safety mesh
20 - Porcelain panel
21 - Stainless steel mechanical safety retention
22 - Porcelain head
23 - Brake metal sill
24 - Brake metal head
25 - Porcelain jamb
26 - Porcelain sill
27 - Porcelain head
28 - Water proofing
29 - Micro-perforated aluminum grille
30 - Metal coping
GHL ANCHORING SYSTEM

1 - Backup wall
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19 - Fiberglass safety mesh
20 - Porcelain panel
21 - Stainless steel mechanical safety retention
22 - Porcelain head
23 - Brake metal sill
24 - Brake metal head
25 - Porcelain jamb
26 - Porcelain sill
27 - Porcelain head
28 - Water proofing
29 - Micro-perforated aluminum grille
30 - Metal coping

DRAINED AND VENTED CAVITY

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* Indicates components that are optional or require additional specifications.
GHS2 ANCHORING SYSTEM

1 - Backup wall
2 - L-bracket—Powder coated (black) Al 6060-T6
3 - Thermal break spacer
4 - Wall anchors
5 - Thermal insulation
6 - Plastic anchor—to fasten thermal insulation to wall
7 - Vertical T-profile—Powder coated (black) Al 6060-T6
8 - Stainless steel or aluminum rivet
9 - Fixing screw
10 - Clips GH2
11 - Kerf cut to set porcelain anchors
12 - Fiberglass safety mesh
13 - Porcelain panel
14 - Brake metal sill
15 - Brake metal jamb
16 - Brake metal head
17 - Porcelain sill
18 - Porcelain jamb
19 - Porcelain head
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18 - Porcelain jamb
19 - Porcelain head
20 - Water proofing
21 - Micro-perforated aluminum grille
22 - Metal cop
FEATURES

- ICC-Evaluation, IBC, ESR 3793 compliant - Masonry walls
- Supported by our turn-key engineering team
- Offers 4 different anchoring systems to fit all tile sizes
- Helps eliminating thermal bridging
- Cuts building’s energy cost
- Satisfies California Building Energy Code Article 21
- Qualifies for LEED Innovation Energy Savings
- Maintenance and repair work can be done in individual tiles
- NOA-Evaluation, Miami Dade County code compliant (GHS)
10MM MADE IN USA
SLAB COLLECTIONS

TRUE WHITE
MAXIMUM PREMIUM WHITE
MAXIMUM CALACATTA STATUARIO
BIANCO CARRARA

ASTER MAXIMUM MERCURY
SILVER PLANE
NIGHTSKY
DARK RESIN
DIVISION: 0700 00—THERMAL AND MOISTURE PROTECTION
SECTION: 07 44 16—PORCELAIN ENAMELED FACED PANELS

REPORT HOLDER:

STONEPEAK CERAMICS
314 WEST SUPERIOR AVENUE
CHICAGO, ILLINOIS 60654

EVALUATION SUBJECT:

PORCELAIN TILES VENTILATED FACADE SYSTEM
StonePeak Ceramics, Inc.
314 West Superior St. #201
Chicago, IL 60654

Scope:
This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed and accepted by Miami-Dade County RER-Product Control Section to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).
This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Section (In Miami Dade County) and/or the AHJ (in areas other than Miami Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. RER reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Section that this product or material fails to meet the requirements of the applicable building code.
This product is approved as described herein, and has been designed to comply with the Florida Building Code, including the High Velocity Hurricane Zone.

Description: Series GHS MAXI-10 Porcelain-Ceramic Ventilated Facade System

Approval Document: Drawing No. GHSMAXI10-N1, titled “StonePeak GHS MAXI-10 Series Ceramic Composite Panel System”, sheets 1 through 8 of 8, dated 07/31/2018, prepared by Wolters Engineering, Inc., signed and sealed by Scott Wolters, P.E. on 04/09/2019, bearing the Miami-Dade County Product Control approval stamp with the Notice of Acceptance number and approval date by the Miami-Dade County Product Control Section.

Missile Impact Rating: Large and Small Missile Impact Resistant

Labeling: Each unit shall bear a permanent label with the manufacturer’s name or logo, city, state, model/series, and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.

Renewal of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.

Termination of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.

Advertisement: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.

Inspection: A copy of this entire NOA shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.
This NOA consists of this page 1 and evidence page E-1, as well as approval document mentioned above.
The submitted documentation was reviewed by Carlos M. Utrera, P.E.

NOA No. 18-0924.01
Expiration Date:
Approval Date:
Page 1
NOTICE OF ACCEPTANCE: EVIDENCE SUBMITTED

A. DRAWINGS

B. TESTS
1. Test reports on 1) Air Infiltration Test, per FBC, TAS 202-94
   2) Uniform Static Air Pressure Test, Loading per FBC TAS 202-94
   3) Water Resistance Test, per FBC, TAS 202-94
   4) Cyclic Wind Pressure Loading per FBC, TAS 203-94
   along with marked-up drawings of the GHS MAXI-10 Ventilated Façade System, prepared by Intertek, Test Report No. H5589.01-109-18, dated 04/16/2018, revised on 02/18/2019, signed and sealed by Daniel C. Culbert, P.E.

C. CALCULATIONS
1. Anchoring verification calculation prepared by Wolters Engineering, Inc., dated 08/01/2018, signed and sealed by Scott Wolters, P.E.

D. QUALITY ASSURANCE
1. Miami-Dade Department of Regulatory and Economic Resources (RER)

E. MATERIAL CERTIFICATIONS
1. Test report on Self-Ignition Temperature per ASTM D1929-12 on the Synthetic Fiber Tile Reinforcement Mesh, prepared by Intertek, Test Report No. J2163.01-106-18 R0, dated 01/10/2019, signed and sealed by Gary T. Hartman, P.E.
2. Test reports on Surface Burning Characteristics per ASTM E84-16 on the Porcelain Ceramic Tile, prepared by QAI Laboratories, Test Report No. R5185F-1-REV1, dated 12/27/2016, revised on 02/19/2019 signed and sealed by V. Andrew Tan, P.E.

F. STATEMENTS
2. Statement letter of no financial interest issued by Wolters Engineering, Inc., dated 08/02/2018, signed and sealed by Scott Wolters, P.E.

[Signature]
4/18/19

Carlos M. Utrera, P.E.
Product Control Examiner
NOA No. 18-0924.01
Expiration Date: Approval Date: