

GRANITECH®

# PORCELAIN PANEL RAINSCREEN SYSTEMS



# GRANITECH ENGINEERING

## PORCELAIN PANEL RAINSCREEN SYSTEMS

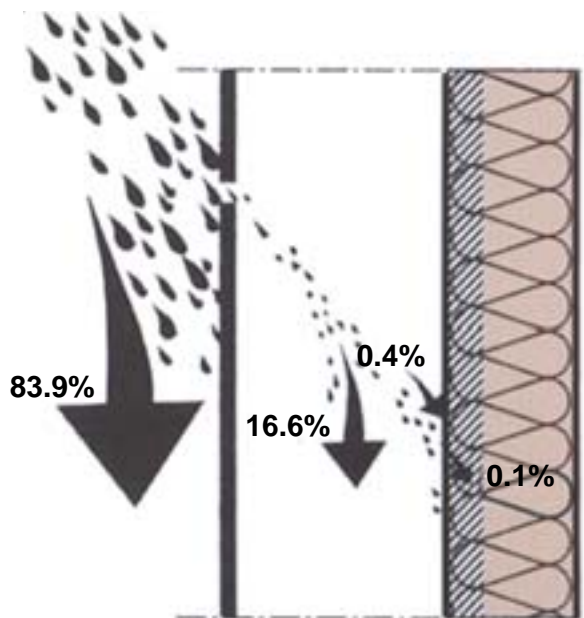
### WHAT IS A PORCELAIN PANEL RAINSCREEN SYSTEM?

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

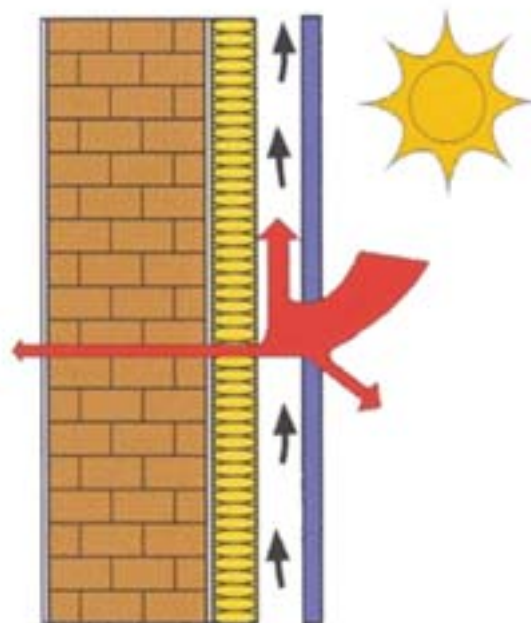
This highly engineered curtain wall system consists of an aluminum sub frame that is attached to the building using aluminum profiles, separating the porcelain façade from the building structure. This creates an air cavity that removes heat from solar radiation and promotes continuous drying of any moisture 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



Thermal Performance

# RECLADDING



Layout of the Attachment Primary and Secondary Attachment L-Bracket



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



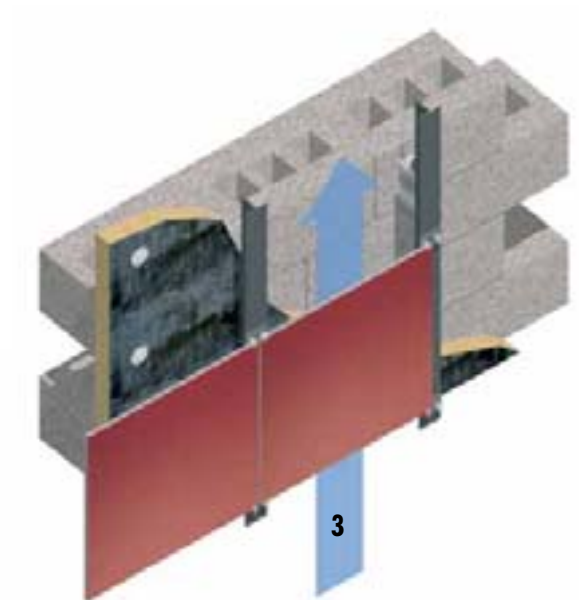
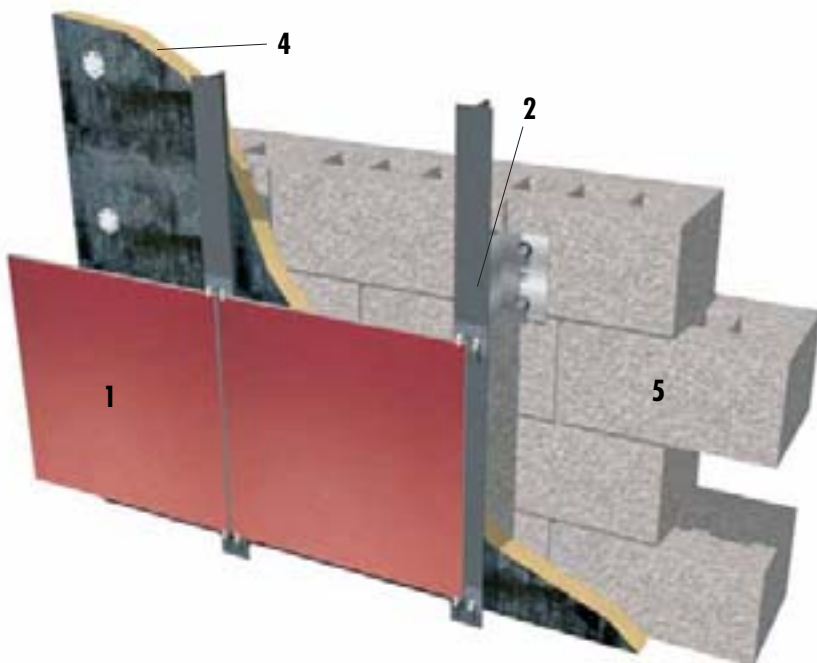
Cut-To-Size Slabs Installed onto the Highly Engineered Sub-Frame and Adhered to the Extruded Aluminum Profiles with Structural Silicon

# THE FUNCTIONAL LAYERS

**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























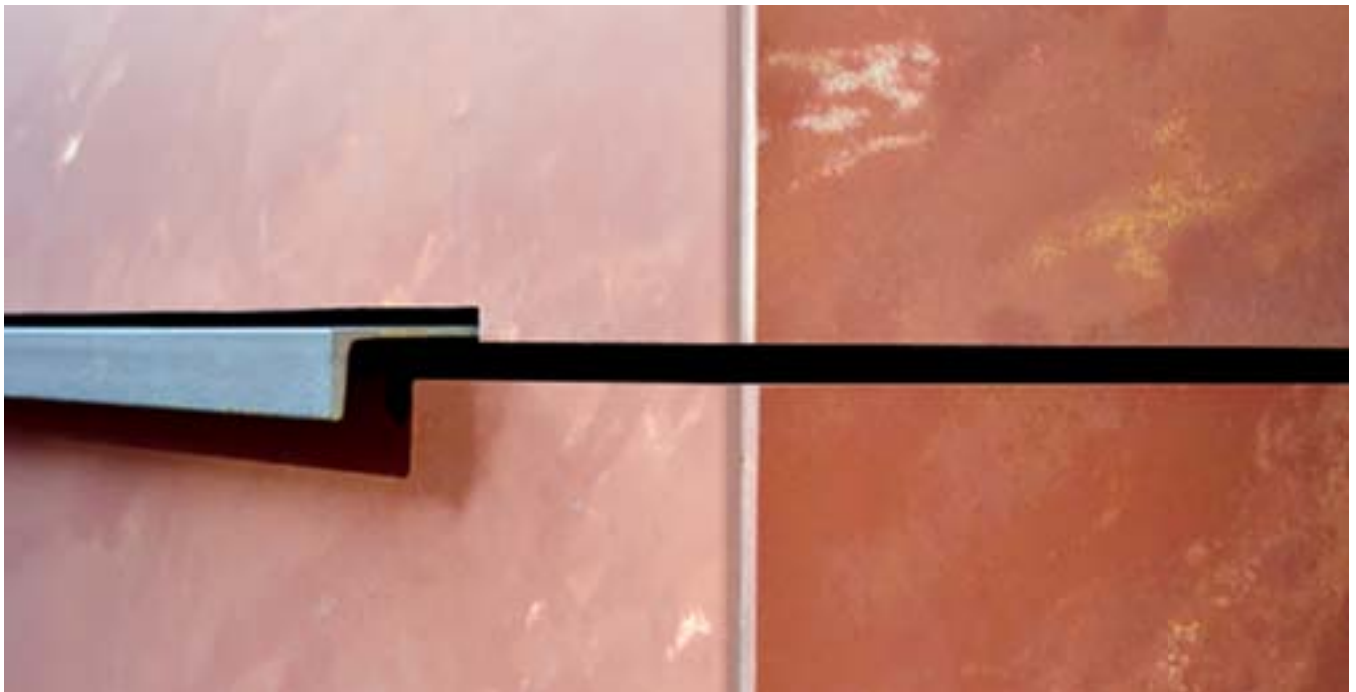














## THERMAL ANALYSIS

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 intensifies 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 hat, einen Vergleich zwischen zwei in Italien sehr verbreiteten Arten des Mauerwerks anzustellen. Die thermischen und energetischen Eigenschaften wurden zunächst mit und dann ohne hinterlüftete Fassade analysiert, um so – auch im Sinne der jüngsten italienischen gesetzesvertretenden 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

Neben den unzweifelhaften Vorteil der darin besteht, dass durch das Mauerwerk weniger Energie verloren geht, und so die Energie gespart werden kann, erlauben die hinterlüfteten Fassaden eines der grossen Probleme von aus Trägern und Stützen bestehendem Mauerwerk zu lösen: die Wärmebrücke. Dieses Phänomen tritt an Geschosdecken und allen Unterbrechungen im Mauerwerk auf, wie die hier gezeigten Simulationen zeigen: Der Wärmestrom wird an den Geschosdecken intensiver. Die Verlegung von Dämmstoffen aussen an der zu verkleidenden Wand kann dieses Problem lösen.

## 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. Leurs 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 Législatif italien n°192/2005 et modifications suivantes.

- 1\_Quadrillage avec éléments finis
- 2\_Direction du flux thermique
- 3\_Distribution des températures
- 4\_Intensité du flux thermique

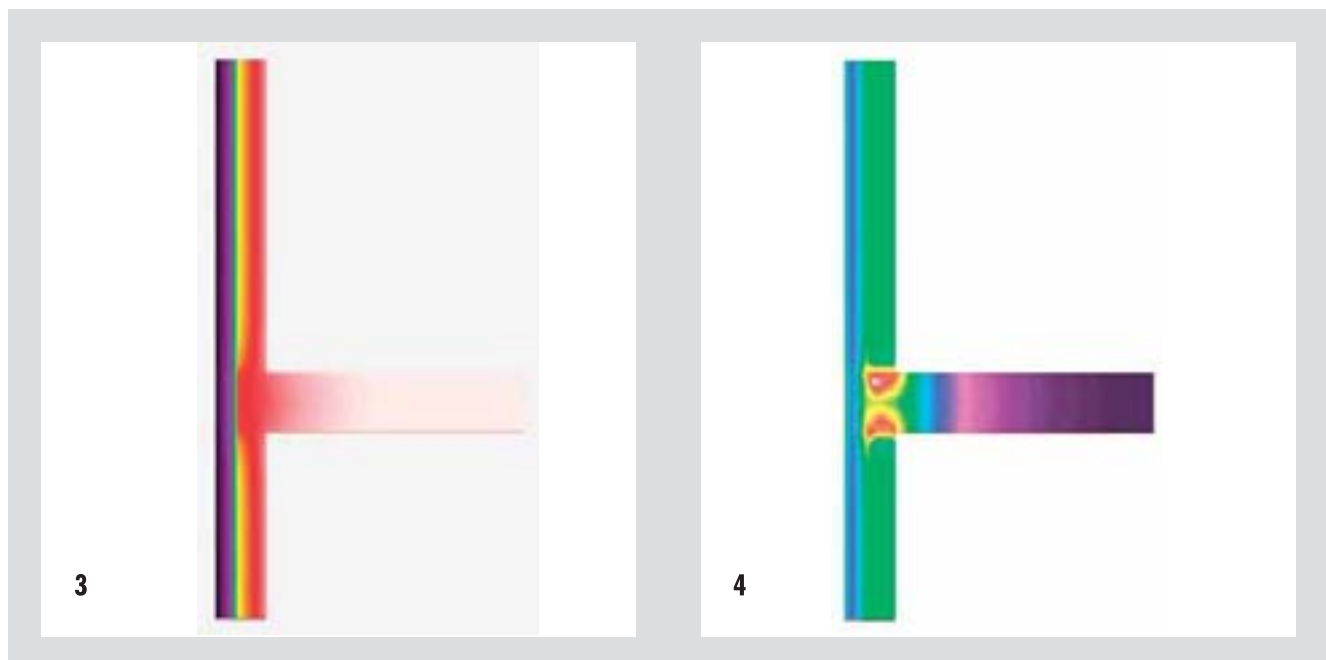
Non seulement les façades ventilées comportent des avantages indiscutables en termes de dissipation énergétique, mais elles suppriment aussi l'un des grands problèmes des structures à base de poutres et piliers : le pont thermique. Ce phénomène se produit au niveau des greniers et de toutes les interruptions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

## DISTRIBUZIONE DELLE TEMPERATURE

Temperature distribution\_Temperaturverteilung\_Distribution des températures

## INTENSITA' DEL FLUSSO TERMICO

Thermal flux magnitude\_Intensität des Wärmestroms\_Intensité du flux thermique



PARETI VENTILATE  
VENTILATED FACADES\_HINTERLÜFTETE FASSADEN\_FAÇADES VENTILÉES

ANALISI TERMICA\_THERMAL ANALYSIS\_THERMISCHE ANALYSE\_ANALYSE THERMIQUE

Elementi strutturali\_Structural Elements\_Bauteile\_Éléments de la structure

1\_Parete ventilata\_Ventilated façade\_Hinterlüftete fassade\_Façade ventilée

Lastre in ceramica tecnica\_Technical ceramic slab\_Platten aus technischer Keramik\_Dalles en céramique technique

Camera di ventilazione\_Chamber of ventilation\_Hinterlüftungsraum\_Chambre de ventilation

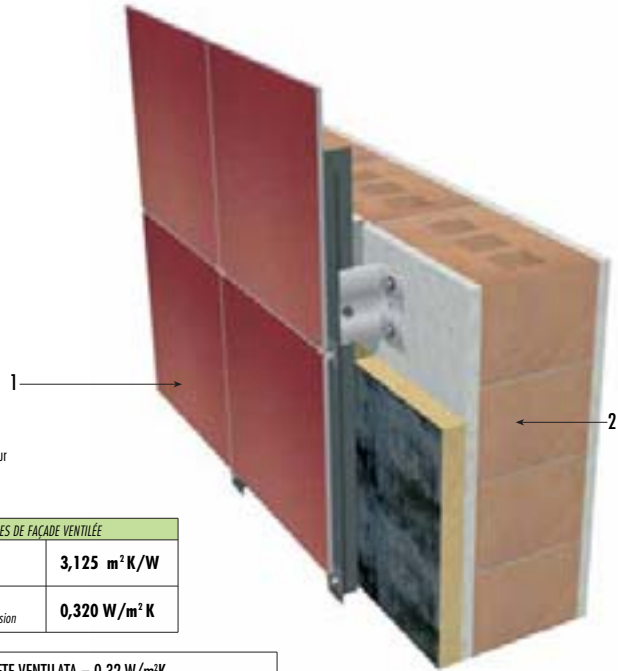
Isolante in PSE\_PSE Insulator\_Dämmmaterial aus PSE\_Isolateur en PSE

2\_Muratura in laterizio\_Brick wall\_Ziegelmauerwerk\_Maçonnerie de briques

Intonaco\_Plaster\_Putz\_Enduit

Laterizio doppiouni sp. 25 cm\_25 cm thick honeycomb brick\_Hochlochziegel Stärke 25 cm\_brique "doppio uni" de 25 cm d'épaisseur

Intonaco\_plaster\_Putz\_enduit



PRESTAZIONI PARETE VENTILATA_VENTILATED FAÇADE PERFORMANCES_LEISTUNGEN DER HINTERLÜFTETEN FASSADE_PERFORMANCES DE FAÇADE VENTILÉE			
Spessore Thickness_Stärke_Épaisseur	0,40 m	Resistenza Resistance_Belastbarkeit_Résistance	3,125 m <sup>2</sup> K/W
Massa superficiale Surface mass_Oberflächengewicht_Masse surfacique	361,05 kg/m <sup>2</sup>	Trasmittanza Transmittance_Wärmedurchgangskoeffizient_Coefficient de transmission	0,320 W/m <sup>2</sup> K

Secondo la Normativa vigente DLGS 192 la Trasmittanza massima accettabile è pari a 0,34 W/m<sup>2</sup>K  
According to the DLGS 192 normative in force the maximum acceptable transmittance is equal to 0,34 W/m<sup>2</sup>K  
Gemäß der geltenden Norm Rechtsverordnung 192 beträgt die zulässige maximaler Wärmedurchgang 0,34 W/m<sup>2</sup>K  
Selon la normative en vigueur DLGS 192 le coefficient de transmission maximum acceptable est égal à 0,34 W/m<sup>2</sup>K

PARETE VENTILATA = 0,32 W/m<sup>2</sup>K  
Ventilated façade\_Hinterlüftete fassade\_Façade ventilée  
MURATURA IN LATERIZIO = 1,4826 W/m<sup>2</sup>K  
Brick wall\_Ziegelmauerwerk\_Maçonnerie de briques

PARETE VENTILATA\_VENTILATED FAÇADE\_HINTERLÜFTETE FASSADE\_FAÇADE VENTILÉE

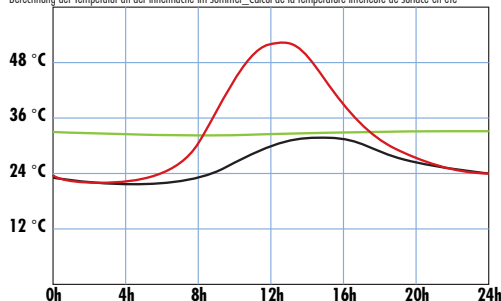
Luogo Place_Ort_Lieu	Castellaro (RE)	Zona Area_Gebiet_Région	E	Gradi giorno Day degree_Gradtag_Degrés jour	23,83 °C
Trasmittanza massima Maximum transmittance maximaler Wärmedurchgang_Coefficient de transmission maximum	0,34 W/m <sup>2</sup> K	Trasmittanza della struttura Transmittance of structure Wärmedurchgang der Struktur_Coefficient de transmission de la structure	0,32 W/m <sup>2</sup> K	Struttura regolamentare secondo DLGS 192 Structure compliant with legislative Decree 192 Vorschriftsmässige Struktur nach gesetzlicher Verordnung 192 Structure réglementaire selon le d.lgs italien n°192	
Mese critico Critical month_kritischer Monat_Mois critique	Gennaio_January Januar_Janvier	Resistenza minima accettabile Minimum acceptable resistance akzeptable Mindestbelastbarkeit_Résistance minimale acceptable	2,2087 m <sup>2</sup> K/W	Struttura regolamentare Structure compliant with regulations_Vorschriftsmässige Struktur Structure réglementaire	
Fattore di temperatura Temperature factor Temperaturfaktor_Facteur de température	0,8868	Resistenza totale dell'elemento Total resistance of element Gesamtlastbarkeit des Elements_Résistance totale de l'élément	3,125 m <sup>2</sup> K/W		

MURATURA SENZA PARETE VENTILATA\_WALL WITHOUT VENTILATED FAÇADE\_MAUERWERK OHNE HINTERLÜFTETE FASSADE\_MUR SANS FAÇADE VENTILÉE

Trasmittanza massima Maximum transmittance maximaler Wärmedurchgang_Coefficient de transmission maximum	0,34 W/m <sup>2</sup> K	Trasmittanza della struttura Transmittance of structure Wärmedurchgang der Struktur_Coefficient de transmission de la structure	1,4826 W/m <sup>2</sup> K	Struttura non regolamentare secondo DLGS 192 Structure not compliant with legislative decree 192 Gemäss gesetzlicher Verordnung 192 nicht vorschriftsmässige Struktur_Structure non réglementaire selon le d.lgs italien n°192	
Mese critico Critical month_kritischer Monat_Mois critique	Gennaio_January Januar_Janvier	Resistenza minima accettabile Minimum acceptable resistance akzeptable Mindestbelastbarkeit_Résistance minimale acceptable	2,2087 m <sup>2</sup> K/W	Struttura non regolamentare Structure not compliant with regulations_Nicht vorschriftsmässige Struktur Structure non réglementaire	
Fattore di temperatura Temperature factor Temperaturfaktor_Facteur de température	0,8868	Resistenza totale dell'elemento Total resistance of element Gesamtlastbarkeit des Elements_Résistance totale de l'élément	0,6745 m <sup>2</sup> K/W		

TIPOLOGIA MATERIALE Type of Material_Art des Materials_Type de matériau	Spessore (m) Thickness_Stärke_Épaisseur	Massa superficiale (kg/m <sup>2</sup> ) Surface Mass_Oberflächengewicht Masse surfacique	Resistenza (m <sup>2</sup> K/W) Resistance_Belastbarkeit Résistance	Spessore equivalente d'aria (m) Equivalent air thickness_Äquivalente Luftstärke Épaisseur équivalente lame d'air
<b>Superficie esterna</b> External surface_Aussenfläche_Surface extérieure			0,0400	
Lastre in ceramica tecnica Technical ceramic slab_Platten aus technischer Keramik_Dalles en céramique technique	0,010	23,00	0,010	2,000
Camera debolmente ventilata spessore 50 mm Poorly ventilated chamber, thickness 50 mm_Schwach hinterlüftete Kammer mit 50 mm Stärke Espace peu ventilé, épaisseur 50 mm	0,050	0,05	0,0900	0,050
PSE in lastre ricavate da blocchi conforme a UNI 7819 PSE in slabs cut from blocks complying with UNI 7819_PSE-Platten, aus Blöcken gemäss UNI 7819 Plaques de PSE obtenues à partir de blocs conformément à la norme UNI 7819	0,080	2,00	2,35	2,400
Intonaco di calce e gesso Limestone and plaster_Kalk- und Gipsputz_Enduit chaux/plâtre	0,010	12,00	0,0172	0,100
Laterizi doppiouni spessore 25 cm 25 cm thick honeycomb bricks_Hochlochziegel Stärke 25 cm briques "doppio uni" de 25 cm d'épaisseur	0,250	297,00	0,4700	3,7500
Intonaco di calce e gesso Limestone and plaster_Kalk- und Gipsputz_Enduit chaux/plâtre	0,015	21,00	0,0259	0,150
<b>Superficie interna</b> Internal surface_Innenfläche_Surface intérieure			0,1300	

CALCOLO DELLA TEMPERATURA SUPERFICIALE INTERNA ESTIVA\_Calculation of summer inside surface temperature  
Berechnung der Temperatur an der Innenfläche im Sommer\_Calcul de la température intérieure de surface en été



**Temperatura aria esterna**  
External air temperature  
Temperatur Aussenluft  
Température de l'air extérieur

**Temperatura superficiale esterna**  
External surface temperature  
Temperatur Aussenfläche  
Température extérieure de surface

**Temperatura superficiale interna**  
Internal surface temperature  
Temperatur Innenfläche  
Température intérieure de surface

FATTORE DI TEMPERATURA\_Temperature factor  
Temperaturfaktor\_Facteur de température

Mese Month Monat Mois	Pressione di saturazione interna (PA) Internal saturation pressure (PA) Interner Sättigungsdruck (PA) Pression de saturation intérieure (PA)	Temperatura minima superficiale °C Minimum surface temperature in °C Mindesttemperatur an der Oberfläche °C Température minimale de surface °C	Fattore di temperatura Temperature factor Temperaturfaktor Facteur de température
OTTOBRE_October Oktober_Octobre	2045	17,86	0,6807
NOVEMBRE_November November_Novembre	2045	17,86	0,8329
DICEMBRE_December Dezember_Décembre	2045	17,86	0,8756
GENNAIO_January Januar_Janvier	2045	17,86	0,8868
FEBBRAIO_February Februar_Février	2045	17,86	0,8727
MARZO_March März_Mars	2045	17,86	0,8187
APRILE_April April_Avril	2045	17,86	0,7069

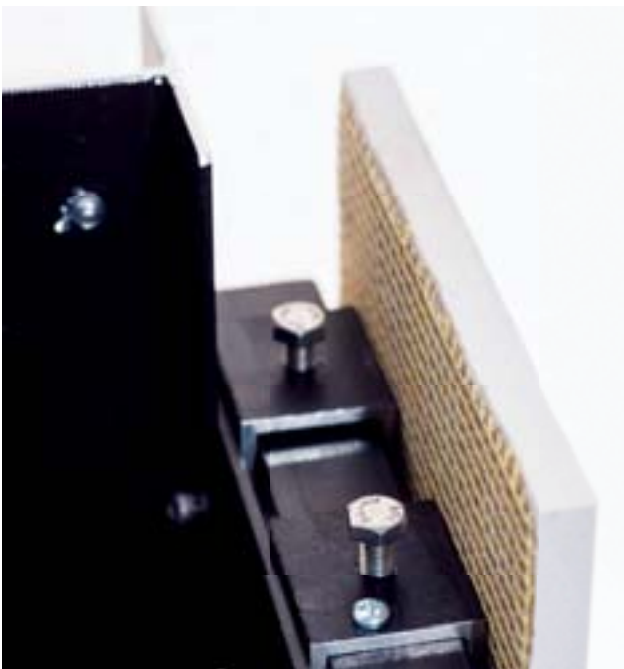
# ANCHORING SYSTEMS

## 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.
- GHS System is used with 8mm and 10mm thick porcelain slabs.



GHS System



GHV System



## GHL – STRUCTURAL SILICON ADHESION SYSTEM

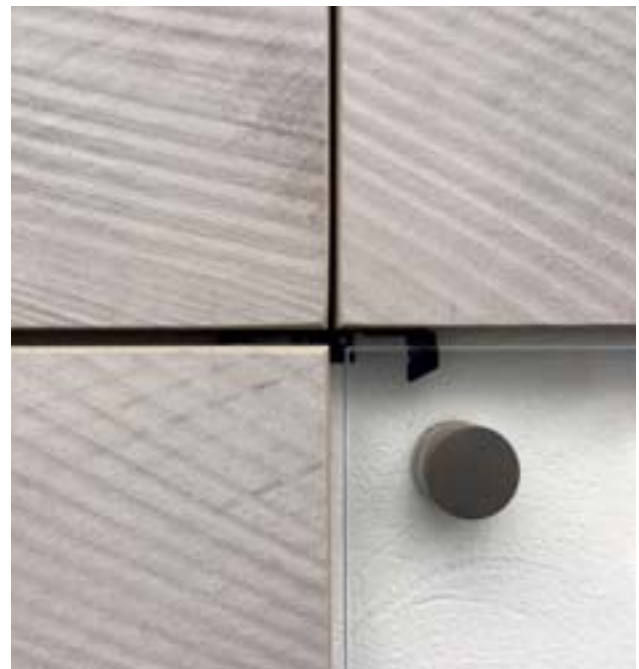
- Structural silicon is used in lieu of traditional mechanical anchors to adhere the 5'x10'x6mm thick porcelain slabs.
- The cut-to-size slabs are fabricated at the factory and shipped to the jobsite with the structural support frame already adhered.
- C-Brackets are screwed to the aluminum structural 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.

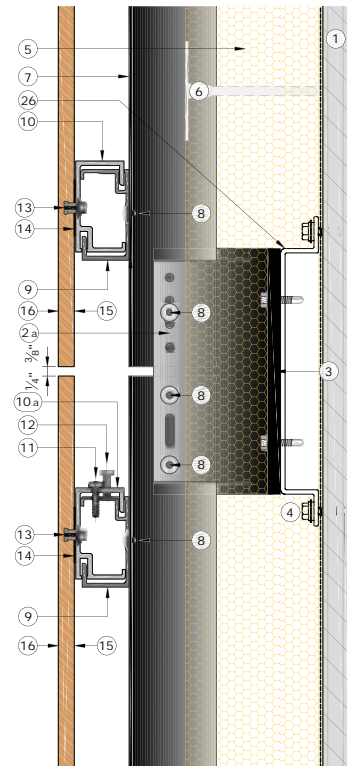
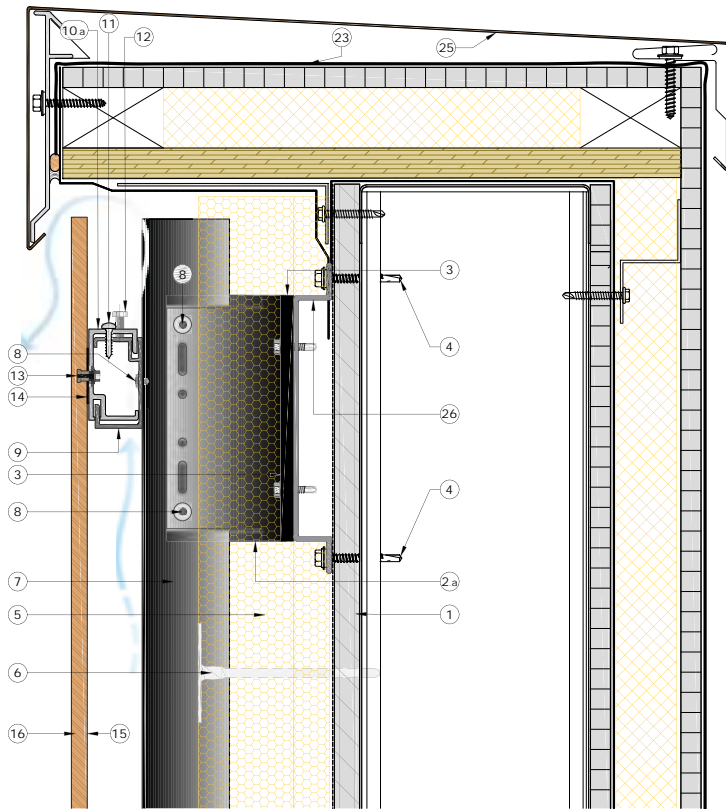


GHL System

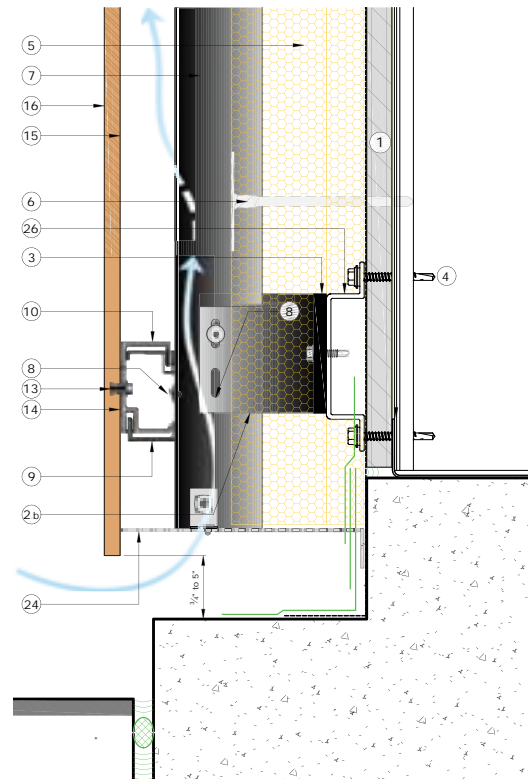


GHS2 System

# GHS ANCHORING SYSTEM

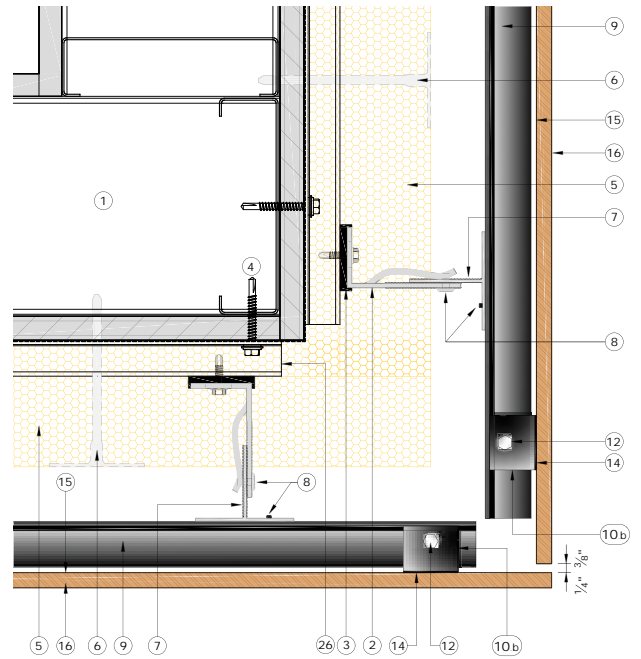
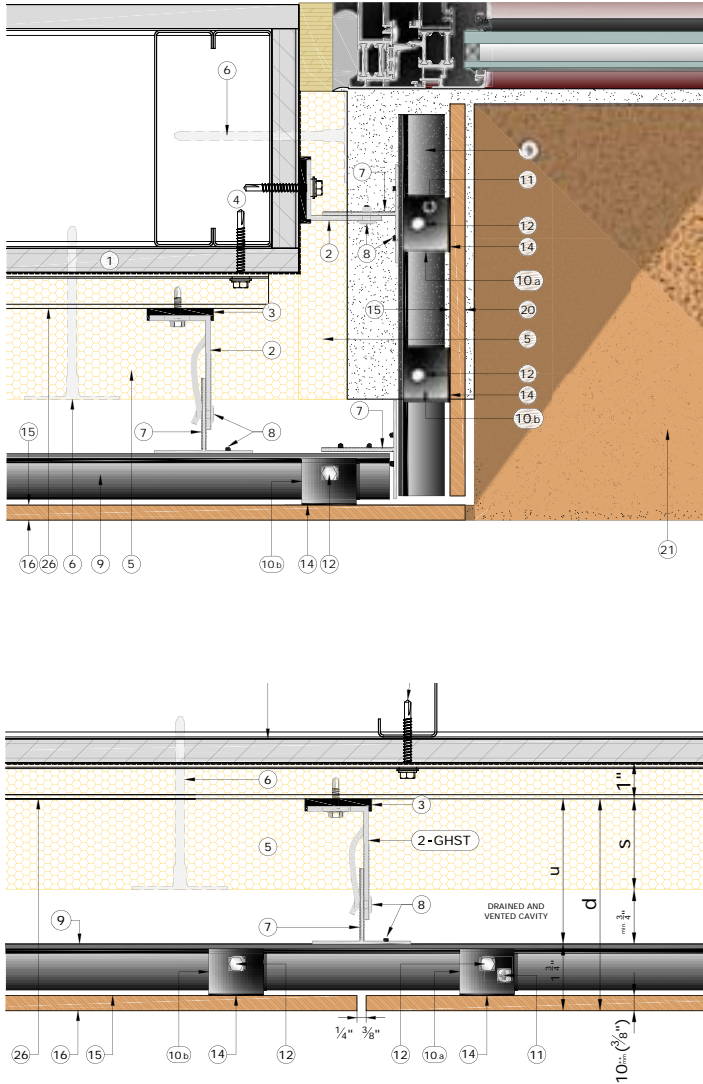


- 1 – Exterior sheathing on cold formed metal framing
- 2 – L-bracket – Powder coated (black) Al 6060-T6
- 3 – Thermal break spacer
- 4 – Wall anchors
- 5 – Continuous thermal insulation
- 6 – Plastic anchor – to fasten thermal insulation to wall
- 7 – Vertical T-profile – Powder coated (black) Al 6060-T6
- 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





# GHS ANCHORING SYSTEM

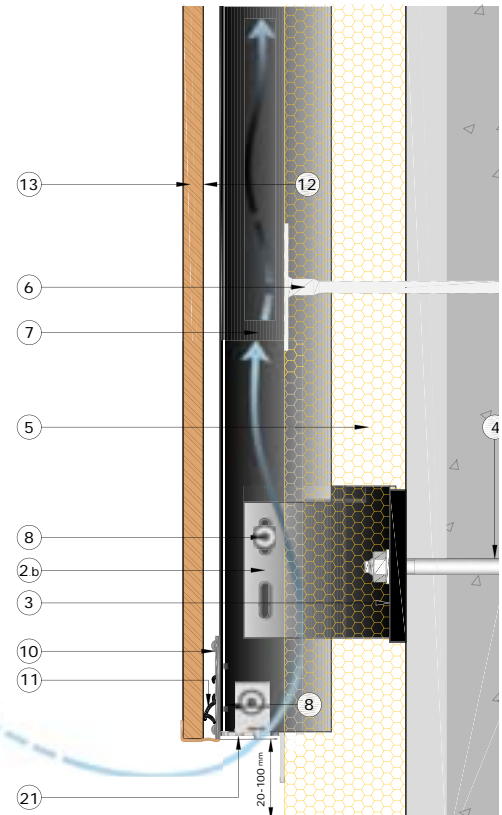
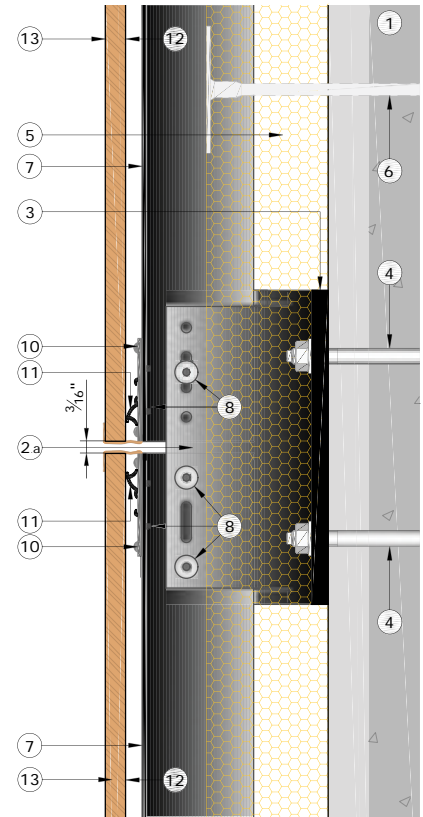
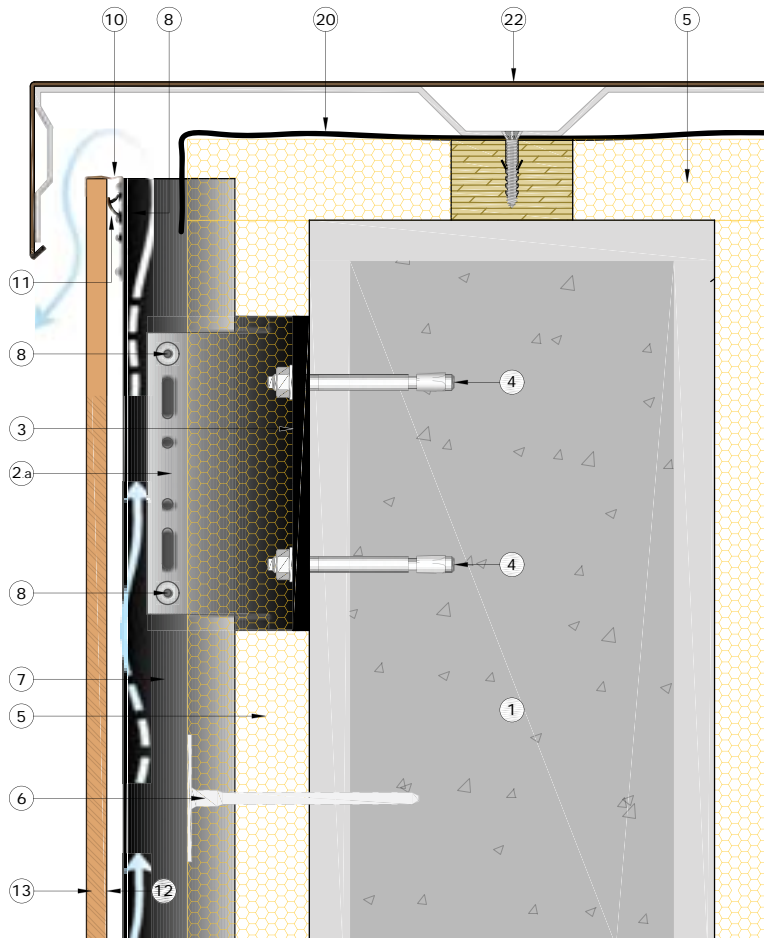


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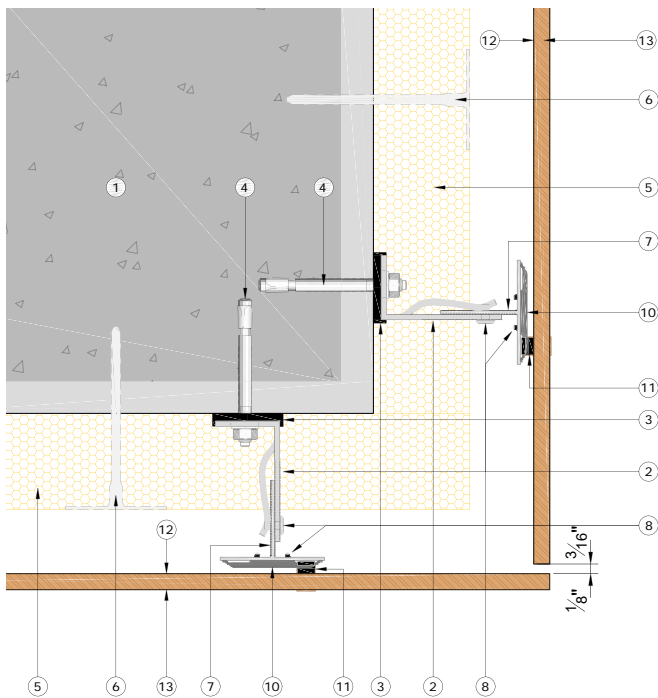
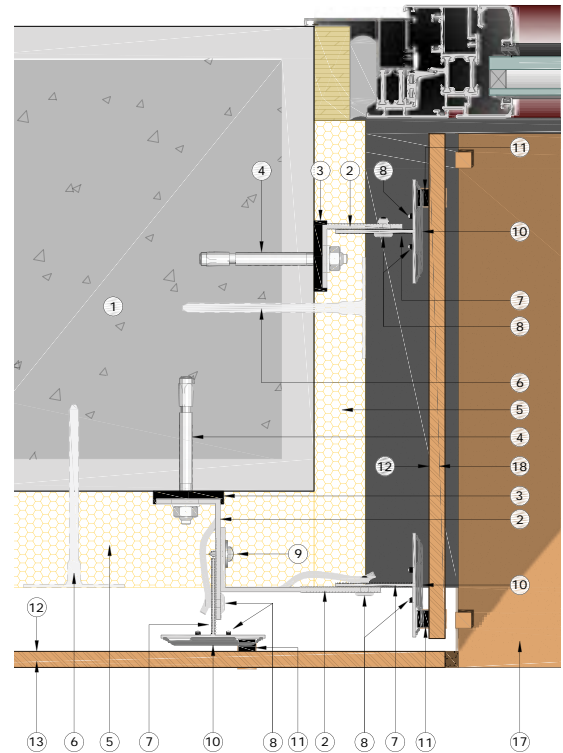
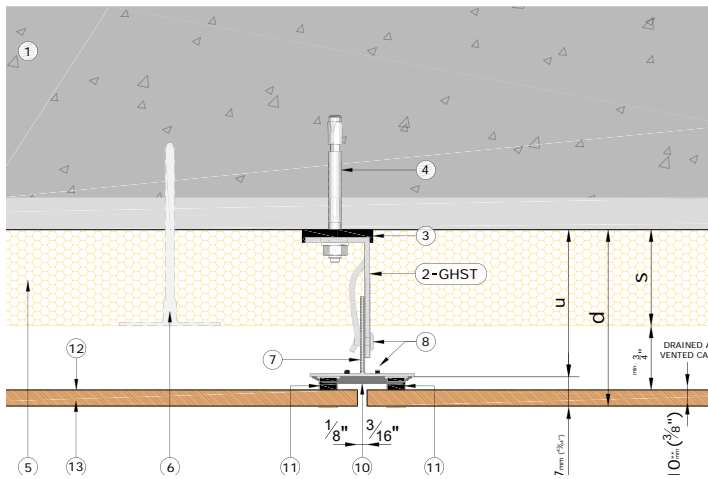
# GHV ANCHORING SYSTEM



- 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 – 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

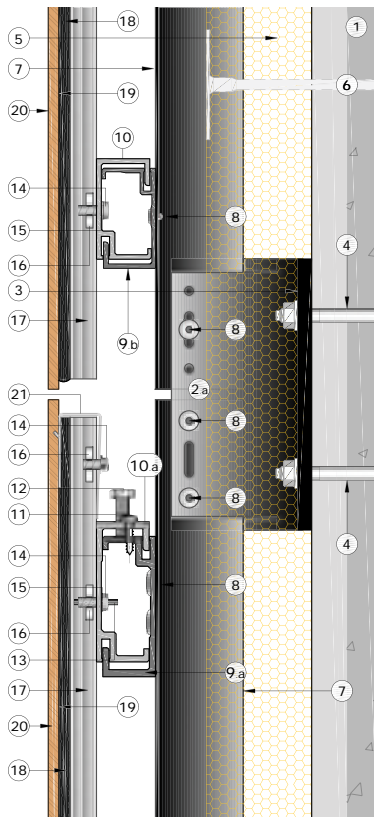
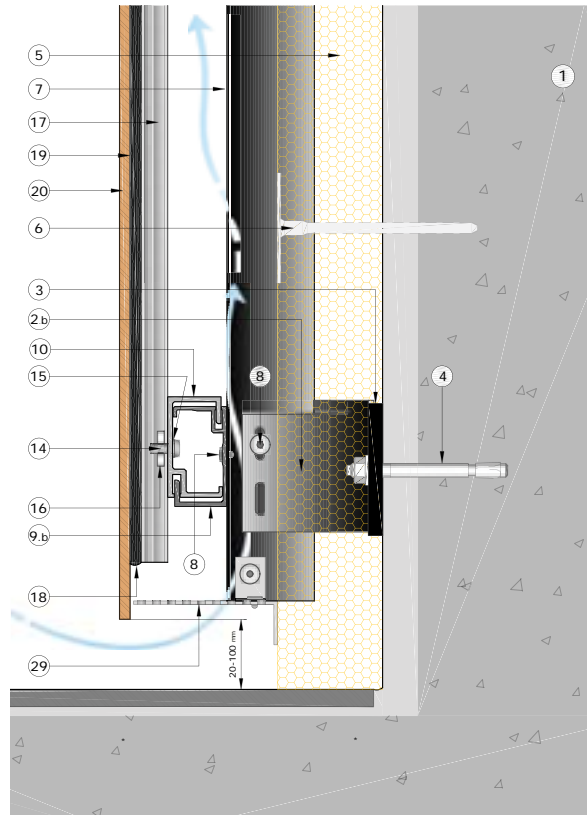
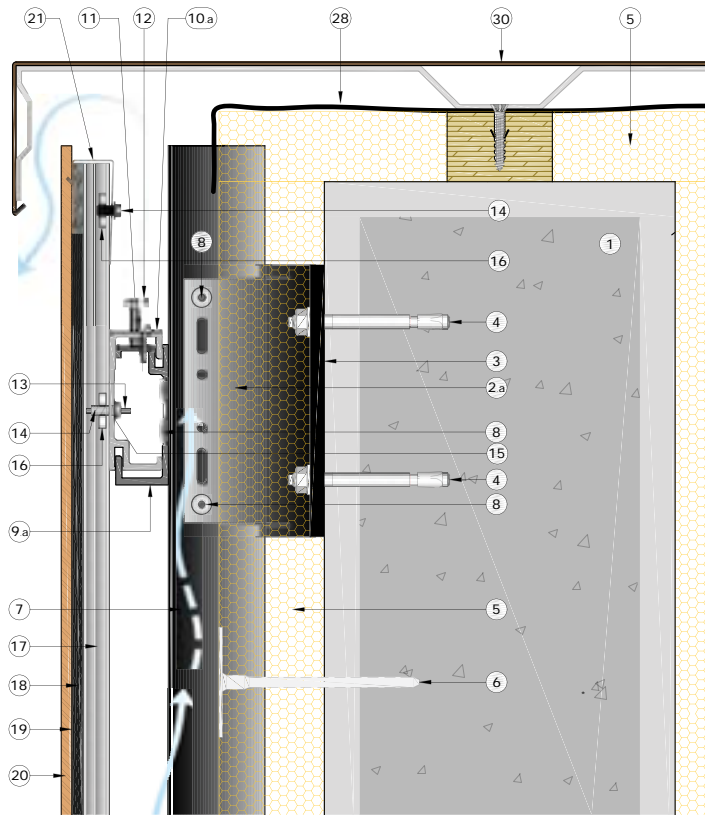


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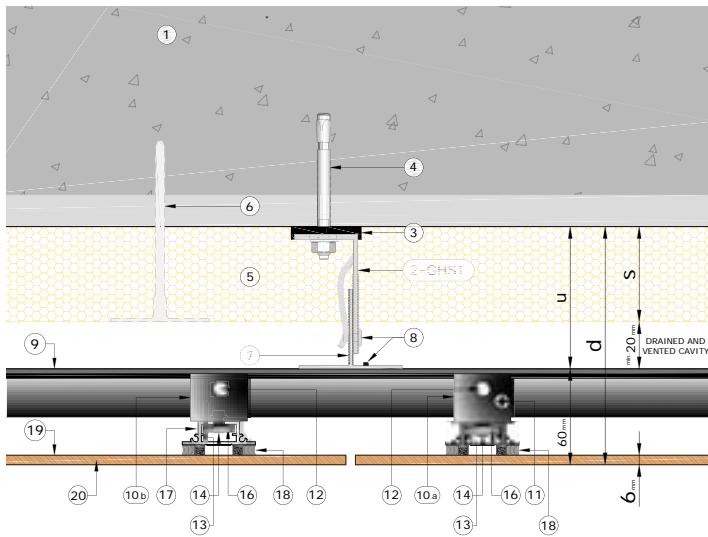
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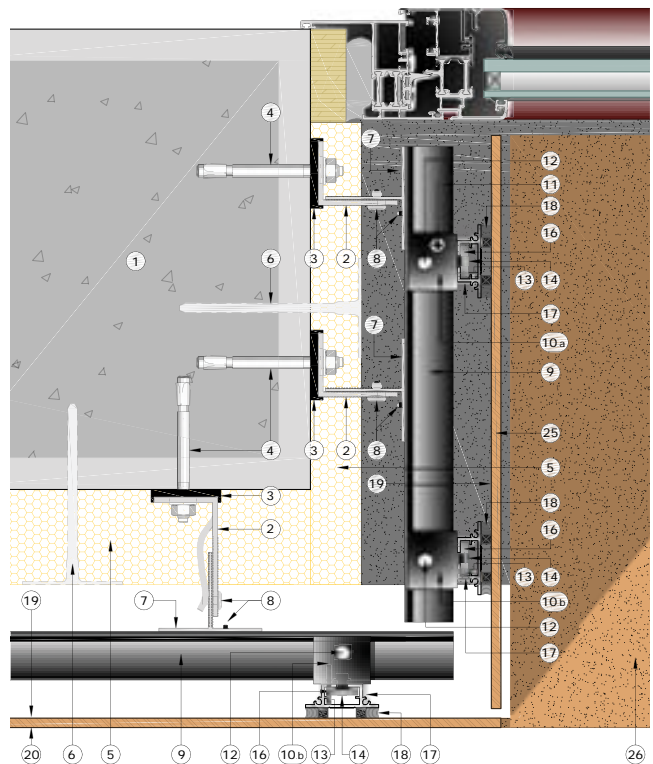
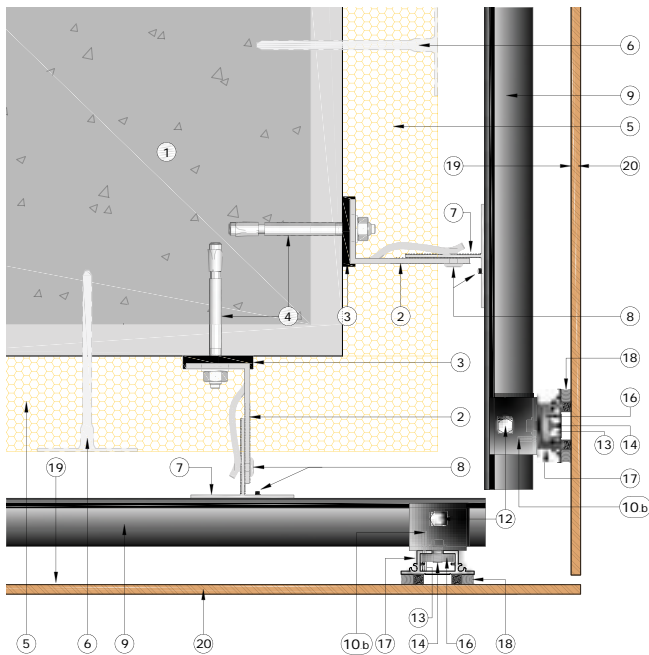
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- 5 – Thermal insulation
- 6 – Plastic anchor - to fasten thermal insulation to wall
- 7 – Vertical T-profile – Powder coated (black) Al 6060-T6
- 8 – Stainless steel or aluminum rivet
- 9 – Horizontal rail C-profile -Powder coated (black) Al 6060-T6
- 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

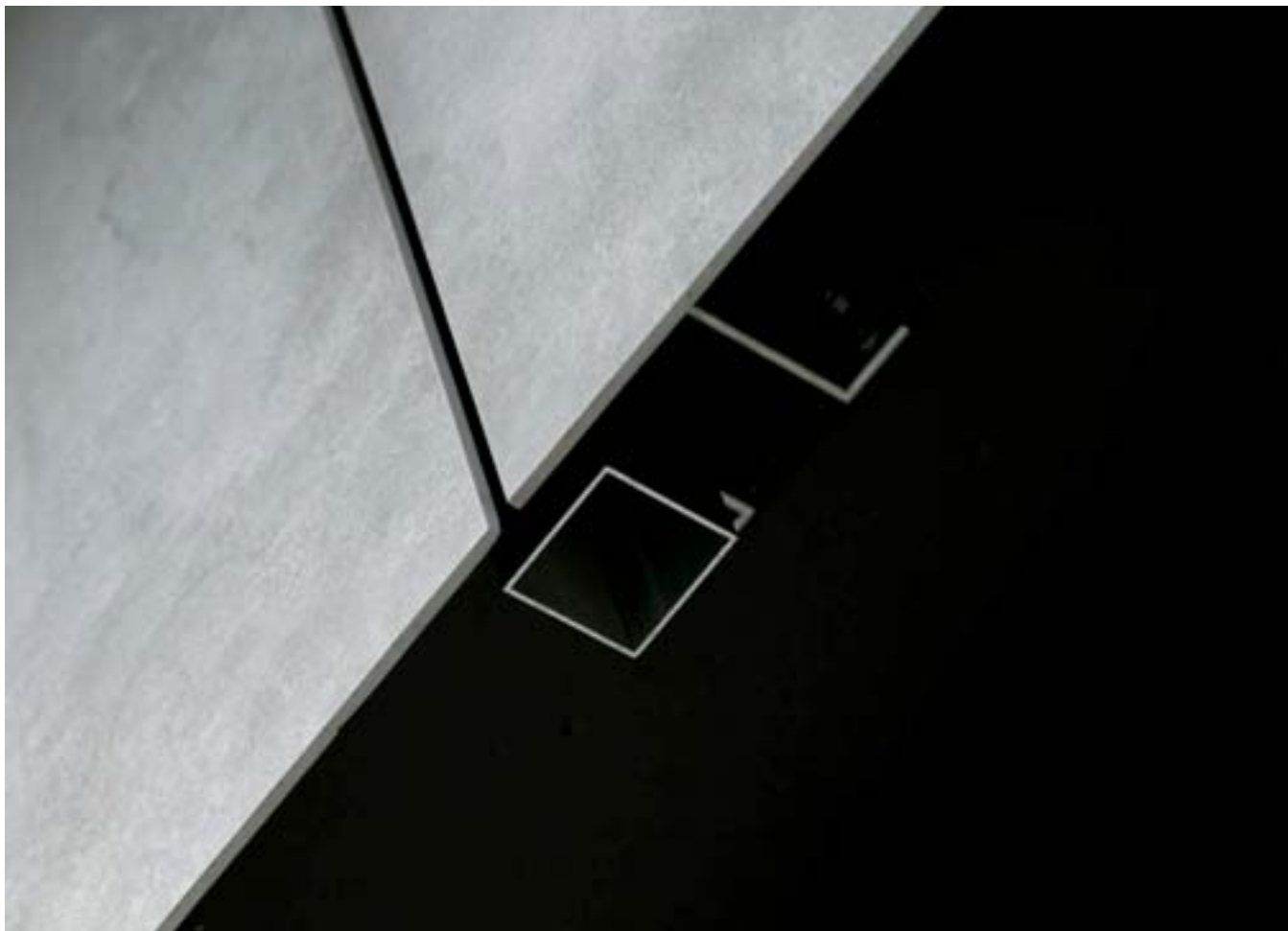


# GHL ANCHORING SYSTEM

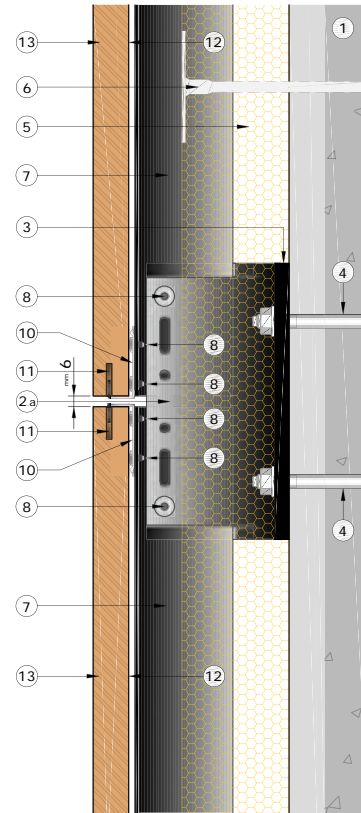
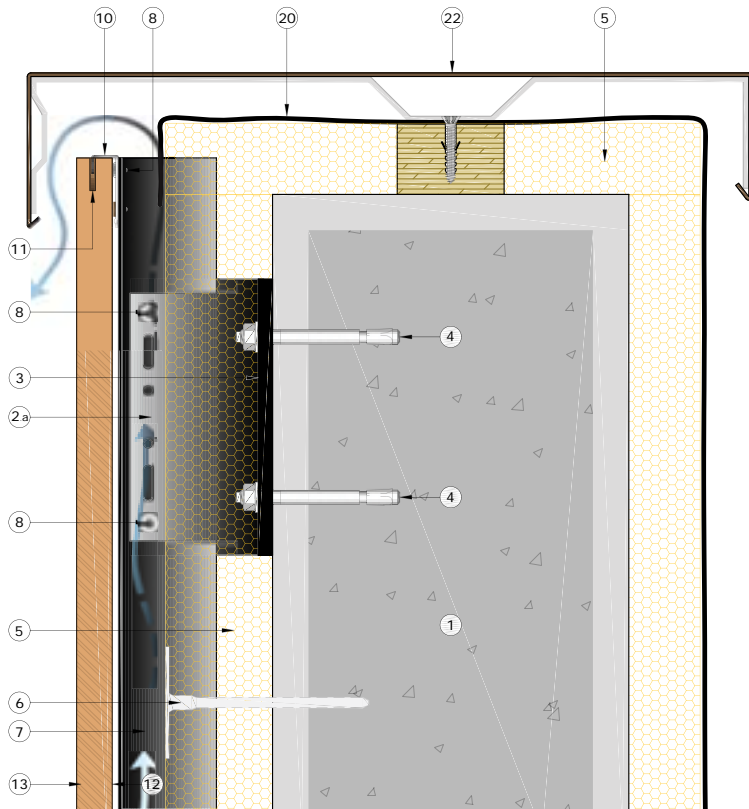


- 1 – Backup wall
- 2\* – L-bracket - Powder coated (black) Al 6060-T6
- 3 – Thermal break spacer
- 4 – Wall anchors
- 5 – Thermal insulation
- 6 – Plastic anchor - to fasten thermal insulation to wall
- 7 – Vertical T-profile – Powder coated (black) Al 6060-T6
- 8 – Stainless steel or aluminum rivet
- 9 – 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

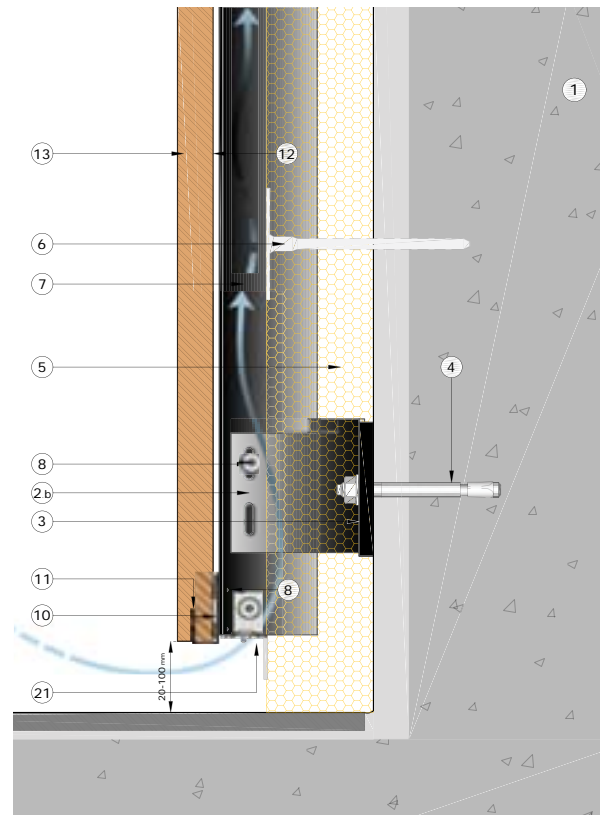




# GHS2 ANCHORING SYSTEM

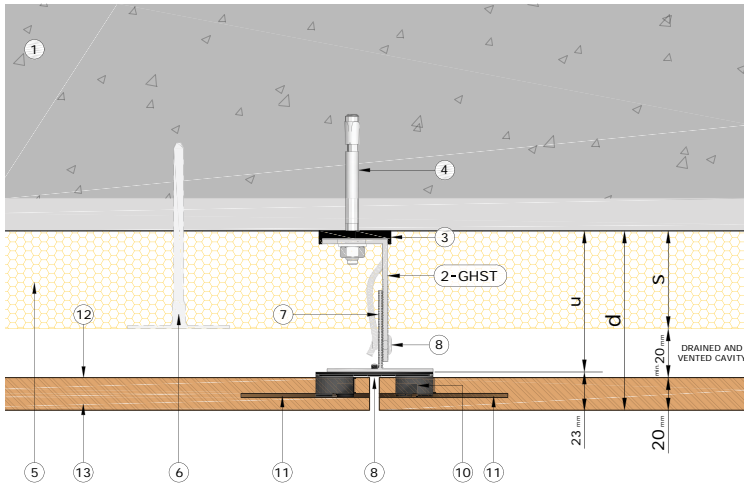


- 1 – Backup wall
- 2 – L-bracket– Powder coated (black) Al 6060-T6
- 3 – Thermal break spacer
- 4 – Wall anchors
- 5 – Thermal insulation
- 6 – Plastic anchor – to fasten thermal insulation to wall
- 7 – Vertical T-profile – Powder coated (black) Al 6060-T6
- 8 – Stainless steel or aluminum rivet
- 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
- 20 – Water proofing
- 21 – Micro-perforated aluminum grille
- 22 – Metal cop

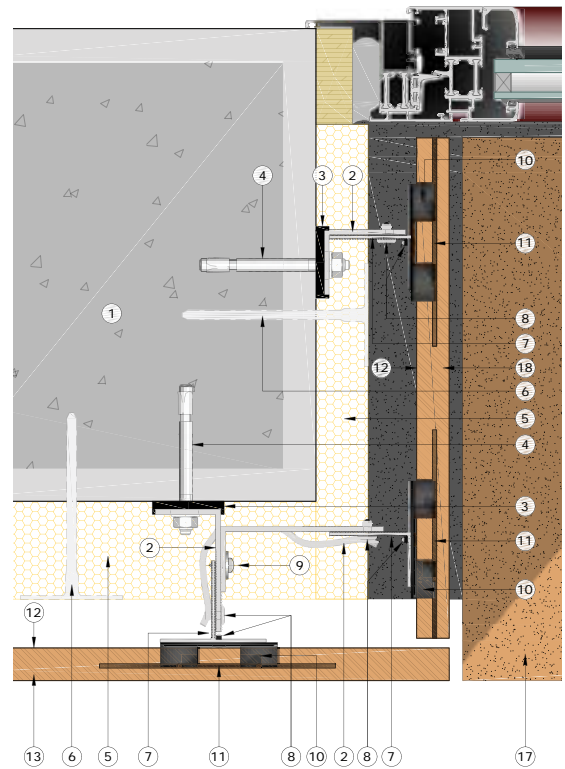
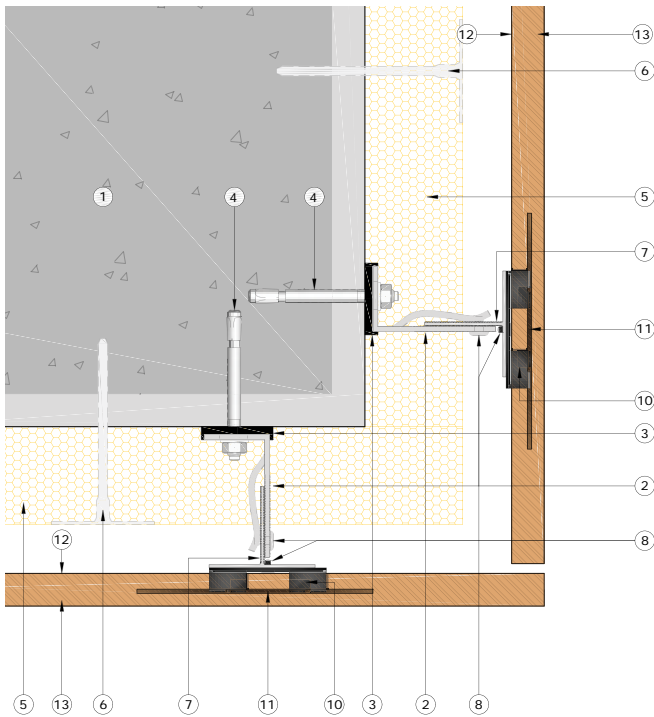




# GHS2 ANCHORING SYSTEM



- 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
- 20 – Water proofing
- 21 – Micro-perforated aluminum grille
- 22 – Metal cop







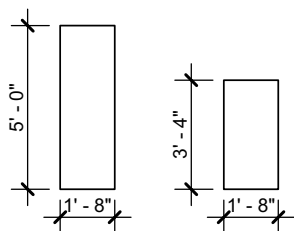
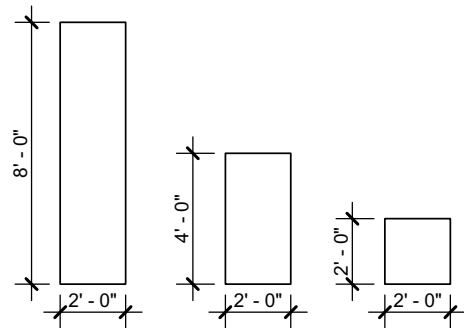
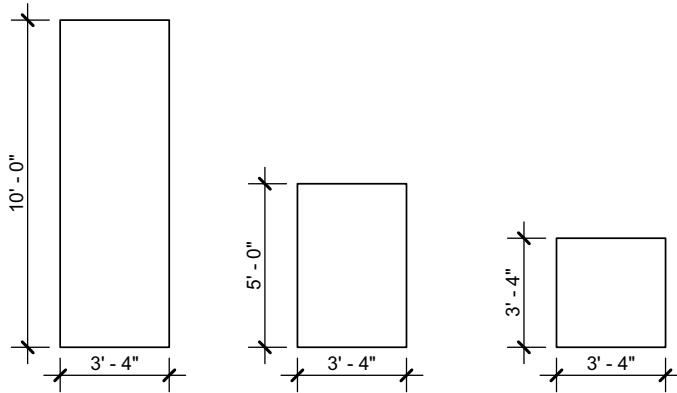
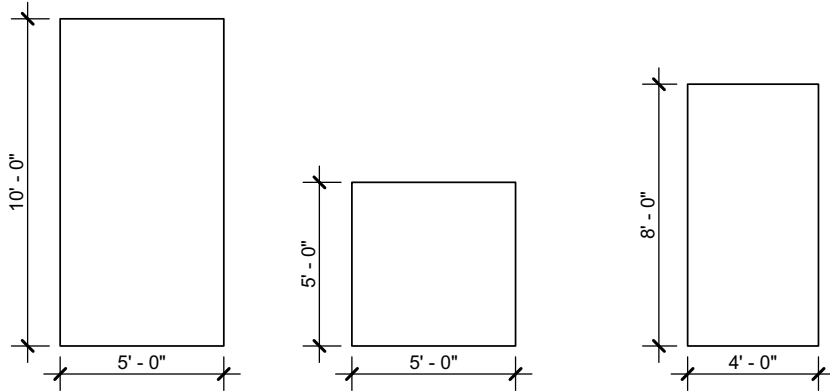


# FEATURES

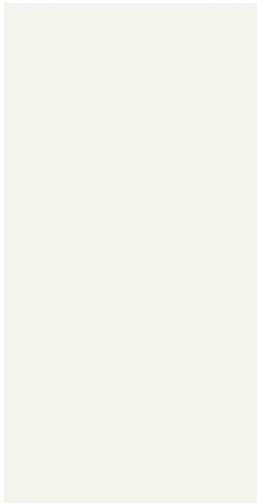
- ICC-Evaluation, IBC, ESR 3793 compliant – Masonry walls
- Supported by our turn-key engineering team
- Offers 4 different anchoring systems to fit all tile sizes
- Helps eliminating thermal bridging
- Cuts building's energy cost
- Satisfies California Building Energy Code Article 21
- Qualifies for 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



BIANCO CARRARA



MOONSKY



URBAN GREAT IVORY



NIGHTSKY



CLOUDSKY



SILVER PLANE



WHITE RESIN



URBAN GREAT WHITE



MAXIMUM PREMIUM WHITE



DARK RESIN



MAXIMUM CALACATTA STATUARIO



SHELLSTONE BONE



SHELLSTONE AMBER



BOIS URBAN BLANCHE



MEGALITH MEGAWHITE



ASTER MAXIMUM MERCURY

# FIANDRE MIAMI-DADE TEST REPORT

**SCOPE OF WORK**

TAS 202 AND TAS 203 TESTING ON THE GHS MAXI10 SYSTEM, VENTILATED FAÇADE SYSTEM

**REPORT NUMBER**

H5589.04-109-18

**TEST DATE(S)**

02/15/18 – 02/28/18

**ISSUE DATE**

04/30/18

**RECORD RETENTION END DATE**

02/28/28

**MIAMI-DADE COUNTY NOTIFICATION NO.**

ATI 17055

**LABORATORY CERTIFICATION NO.**

16-0421.02

**PAGES**

22

**DOCUMENT CONTROL NUMBER**

ATI 00651 (08/21/17)

RT-R-AMER-Test-2816

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**TEST REPORT FOR FIANDRE**

Report No.: H5589.04-109-18

Date: 04/30/18

**REPORT ISSUED TO**

**FIANDRE**

Via Radici, 112, 42014  
Castellarano (Reggio Emilia)  
ITALY

**SECTION 1**

**SCOPE**

Intertek Building & Construction (B&C) was contracted by Fiandre to perform TAS 202 and TAS 203 testing in accordance with Florida Building Code for High Velocity Hurricane Zone and Miami-Dade County requirements on their GHS Maxi10 System, Ventilated Façade System. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at the Intertek B&C test facility in York, Pennsylvania. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

This product was originally tested as the StonePeak Ceramics, Inc. series/model GHS Maxi10 System, Ventilated Façade System and is a reissue of the original report no. H5589.01-109-44. This report is reissued in the name of Fiandre through written authorization from StonePeak Ceramics, Inc.



For INTERTEK B&C:

**COMPLETED BY:** Ken R. Stough  
Lead Technician – Product  
**TITLE:** Testing  
**SIGNATURE:** *Ken R. Stough*  
Digitally signed by Ken R. Stough  
**DATE:** 04/30/18

**REVIEWED BY:** Joseph A. Reed, P.E.  
**TITLE:** Senior Director  
**SIGNATURE:** *Joseph A. Reed*  
Digitally signed by Joseph A. Reed  
**DATE:** 04/30/18

KRS:abo

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This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample(s) tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

## TEST REPORT FOR FIANDRE

Report No.: H5589.04-109-18

Date: 04/30/18

### SECTION 2

#### SUMMARY OF TEST RESULTS

The specimen(s) tested met the performance requirements set forth in the protocols.

**Product Type:** Ventilated Façade System

**Series/Model:** GHS Maxi10 System

SPEC.	TEST PROTOCOL	DESIGN PRESSURE
1	TAS 202/203	-89.0 psf
3	TAS 202/203	-89.0 psf
4	TAS 203	-89.0 psf

### SECTION 3

#### TEST METHOD(S)

The specimens were evaluated in accordance with the following:

*TAS 202-94, Criteria for Testing Impact & Non Impact Resistant Building Envelope Components Using Uniform Static Air Pressure*

*TAS 203-94, Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*

### SECTION 4

#### MATERIAL SOURCE/INSTALLATION

Test specimen(s) were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek B&C for a minimum of ten years from the test completion date.

Installation of the tested product was performed by the client.

### SECTION 5

#### EQUIPMENT

**BABS:** 004869

**Transducers:** 65987, WT00139, 65989, WT00141, INT00147, INT00150, INT00146, INT00145, INT0153

**Weather Station:** 63316

**Control Panel:** 5644

**Mule:** A1225



## TEST REPORT FOR FIANDRE

Report No.: H5589.04-109-18

Date: 04/30/18

### SECTION 6

#### LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
John Penta	StonePeak Ceramics, Inc.
Paul Virgilio S.E	Virgilio & Associates
Richard E. Hartman	Intertek B&C
Kyle W. Ruth	Intertek B&C
Timothy J. McGill	Intertek B&C
Joseph A. Reed, P.E.	Intertek B&C
Ken R. Stough	Intertek B&C

### SECTION 7

#### TEST SPECIMEN DESCRIPTION

Product Type: Ventilated Façade System

Series/Model: GHS Maxi10 System

#### Product Size(s):

OVERALL AREA: 13.6 m <sup>2</sup> (146.6 ft <sup>2</sup> )	WIDTH		HEIGHT	
	millimeters	inches	millimeters	inches
Overall size	4512	177-5/8	3019	118-7/8
Façade panel (3)	3000	118-1/8	1000	39-3/8
Façade panel (3)	1499	59	1000	39-3/8

**TEST REPORT FOR FIANDRE**

Report No.: H5589.04-109-18

Date: 04/30/18

**Frame Construction: Test Specimens #1, #2 and #4 (CMU)**

FRAME MEMBER	MATERIAL	DESCRIPTION
Spacer and L-brackets	Aluminum	Stamped, single aluminum L-bracket, 1-9/16" wide by 2-15/16" long by 3-15/16" tall and secured to the CMU wall using one 3/8" diameter Hilti Kwik bolt per bracket utilizing a thermal isolator (plastic pad) between the bracket and the CMU wall. Refer to Drawing No. NOA-E01.
Spacer and L-brackets	Aluminum	Stamped, double aluminum L-bracket, 1-9/16" wide by 6-1/16" long by 3-15/16" tall and secured to the CMU wall using two 3/8" diameter Hilti Kwik bolt per bracket utilizing a thermal isolator (plastic pad) between the bracket and the CMU wall. Refer to Drawing No. NOA-E01.
Horizontal upper and lower profile	Aluminum	Extruded, powder coated (black) aluminum C-profile rails, four profiles 1-3/16" wide by 3-1/8" high secured to the vertical profile with two large head stainless steel rivets per vertical profile on the upper and one rivet on the lower profile.
Upper and lower C-clamp	Aluminum	Extruded, powder coated (black) aluminum C-clamp profile, 1-3/16" wide by 3-1/8" high secured to the backside of the ceramic panel with hidden mechanical Keil anchors, two per clamp.
Vertical profile	Aluminum	Extruded, powder coated (black) aluminum tube channel profile, seven profiles 2-3/8" wide by 2-3/8" high, secured to the L-bracket using two #10 x 3/4" self-tapping screws.

## TEST REPORT FOR FIANDRE

Report No.: H5589.04-109-18

Date: 04/30/18

### Frame Construction: Test Specimen #3 (Steel stud)

FRAME MEMBER	MATERIAL	DESCRIPTION
L-brackets	Aluminum	Stamped, single aluminum L-bracket, 1-9/16" wide by 2-15/16" long by 3-15/16" tall and secured to the steel stud wall using one #10 x 3/4" self-tapping screws per bracket. Refer to Drawing No. NOA-E01.
L-brackets	Aluminum	Stamped, single aluminum L-bracket, 1-9/16" wide by 2-15/16" long by 3-15/16" tall and secured to the steel stud wall using two #10 x 3/4" self-tapping screws per bracket. Refer to Drawing No. NOA-E01.
Hat channel	Aluminum	Extruded, 4-3/4" wide by 1" tall, secured to the steel studs with two 1/4" x 1-3/4" Elco Bi-flex self-tapping screws per stud.
Hat Channel	Aluminum	Extruded, 8-1/16" wide by 1" tall, secured to the steel studs with two 1/4" x 1-3/4" Elco Bi-Flex self-tapping screws per stud.
Horizontal upper and lower profile	Aluminum	Extruded, powder coated (black) aluminum C-profile rails, four profiles 1-3/16" wide by 3-1/8" high secured to the vertical profile with two large head stainless steel rivets per vertical profile on the upper and one rivet on the lower profile.
Upper and lower C-clamp	Aluminum	Extruded, powder coated (black) aluminum C-clamp profile, 1-3/16" wide by 3-1/8" high secured to the backside of the ceramic panel with hidden mechanical Keil anchors, two per clamp.
Vertical profile	Aluminum	Extruded, powder coated (black) aluminum tube channel profile, seven profiles 2-3/8" wide by 2-3/8" high, secured to the L-bracket using two #10 x 3/4" self-tapping screws.

# ICC-ES Evaluation Report

**ESR-3793**

Reissued March 2019

This report is subject to renewal March 2021.

[www.icc-es.org](http://www.icc-es.org) | (800) 423-6587 | (562) 699-0543

A Subsidiary of the International Code Council®

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**  
**Section: 07 44 16—Porcelain Enameled Faced Panels**

**REPORT HOLDER:**

**STONEPEAK CERAMICS**

**EVALUATION SUBJECT:**

**PORCELAIN TILES VENTILATED FAÇADE SYSTEM**

**ADDITIONAL LISTEE:**

**GRANITIFIANDRE S.P.A**

## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

2015 and 2012 *International Building Code*® (IBC)

**Properties evaluated:**

- Physical properties
- Weather resistance
- Wind load resistance
- Noncombustible construction

## 2.0 USES

The Porcelain Tiles Ventilated Façade System is used as a nonload-bearing exterior wall covering on nonfire-resistance-rated buildings of all construction types under the IBC. The Porcelain Tiles Ventilated Façade System may be used on the exterior face of exterior walls of buildings required to be Type I, II, III or IV construction that are not greater than 40 feet (12.2) in height above grade in accordance with IBC 1403.5.

## 3.0 DESCRIPTION

### 3.1 General:

The Porcelain Tiles Ventilated Façade System is an open-jointed exterior wall covering system of porcelain panels with a substructure that allows air to circulate between the panels and the exterior face of the installed water-resistive barrier. The panels are mounted on the substructure of extruded aluminum attachment brackets, aluminum framing members and rivets, with stainless steel visible fixing clips (GHV exposed anchoring system) or Keil anchors (GHS concealed fastening system). The system weighs a maximum of 5.85 pounds per square foot (280 N/m<sup>2</sup>).

## 3.2 Components:

**3.2.1 Porcelain Tiles:** The porcelain panels comply with the requirements for rectified and porcelain panels in ANSI A137.1. The tiles measure nominally 2 feet wide by 4 feet long (610 mm by 1219 mm) and are nominally 8 millimeters thick (0.31 inch). The panels contain a 5.5 mm deep (0.22 inch) predrilled hole for the installation with the GHS anchoring system (concealed fastening system). The porcelain panels are classified as noncombustible in accordance with ASTM E136.

**3.2.2 Substructure:** The substructure is a system of aluminum T-profile and horizontal rail framing members with L-brackets and C-bracket attachment brackets. The T-profiles are 2.56 inches (65 mm) wide and have a 2.17-inch (55 mm) leg. The L-brackets are 1.57 inches (40 mm) wide by 1.97 inches (50 mm) deep. The C-brackets (top and bottom clamps) are 1.20 inches (30.4 mm) wide by 2.26 inches (57.3 mm) deep. See Figure 1.

**3.2.3 Fastening Systems:** The connection to the porcelain panels is made by either an exposed GHV anchoring system or a GHS Keil concealed undercut anchor.

**3.2.3.1 Exposed Fastening System (GHV System):** For the exposed anchoring system, the porcelain panels are attached to framing members using the GHV anchor hooks. There are three different GHV anchors; GHV cross exposed anchors, GHV vertical side anchors or GHV top or bottom anchors. See Figure 2.

**3.2.3.2 Concealed Fastening System (GHS System):** For the concealed anchoring system, C-brackets are attached to the panels through 5.5 mm (0.22-inch) pre-drilled holes in the panels with Keil anchors. Keil anchors consist of a crosswise slotted anchor sleeve with an M6 internal thread, at the upper edge of which a hexagon is formed to it and a respective hexagon screw with a tooth lock washer formed to it, made of stainless steel. See Figure 4.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

The Porcelain Tiles Ventilated Façade System must be installed in accordance with the manufacturer's published installation instructions, the project-specific structural calculations and details, and this report. A copy of the installation instructions must be available on the jobsite during construction.

## 4.2 Design:

The allowable wind loads for the Porcelain Tiles Ventilated Façade System given in Table 1, are for the attachment of the substructure to the underlying wall, and must equal or exceed the design uniform transverse wind loads determined in accordance with IBC Chapter 16. The attachment of the brackets to the supporting structure or exterior wall framing to withstand gravity and transverse forces must be designed by a licensed design professional in accordance with the IBC, and the details must be submitted to the code official for approval. The allowable loads must be reduced to the capacity of the attachment system connections if these are less than the allowable load values for the wall cladding system.

## 4.3 Installation:

The Porcelain Tiles Ventilated Façade System must be installed over wall assemblies complying with IBC Section 1403.3, capable of supporting the imposed loads, including, but not limited to, transverse wind loads. The substructure L-brackets must be securely fastened to the supporting wall with corrosion-resistant fasteners that are compatible with the substructure materials and wall assembly substrate.

Exterior wall assemblies on which the system is to be installed must include flashing, a water-resistive barrier, a means of draining water, and protection against condensation in accordance with IBC Section 1403.2. When use is on Type I, II, III and IV construction, the exterior wall must be covered with a water-resistive barrier recognized in a current ICC-ES evaluation report, that has a flame-spread rating of 25 or less and a smoke developed rating of 450 or less in accordance with ASTM E84 (UL723). The water-resistive barrier must be installed in accordance with the manufacturer's installation instructions.

**4.3.1 Substructure System Installation:** The system must be installed over wall assemblies complying with IBC Section 1403.3, using the substructure components described in Section 3.2.2 of this report. The L-brackets must be fastened to the building substrate according to the design at a maximum spacing of 32 inches (812 mm) on center, both vertically and horizontally. The vertical T-profiles must be attached to the L-brackets using  $\frac{3}{16}$ -inch-diameter-by- $\frac{1}{2}$ -inch-long (4.8 mm by 12 mm) stainless steel rivets. The horizontal rails must be attached to the T-profiles at every intersection in accordance with the manufacturer's published installation instructions.

For the concealed fastening system, the aluminum C-brackets must be attached to the panels at a maximum spacing of 20 inches (508 mm) on center horizontally and 16 inches (406 mm) on center in the horizontal position and at a maximum of 16 inches on center horizontally and 20 inches (508 mm) on center vertically when the longest side of the tile is in the vertical position.

### 4.3.2 Panel Fastening:

**4.3.2.1 Exposed Fastening System (GHV Anchors):** For the exposed fastening systems, the porcelain panels must be attached to the substructure using GHV anchors. The appropriate GHV anchor is fastened to the vertical T-profile framing member using  $\frac{1}{8}$ -inch-diameter stainless steel rivets and porcelain panels are attached to framing members using GHV anchors hooks. See Figure 3.

**4.3.2.2 Concealed Fastening System (GHS Keil Anchor):** For the concealed fastening systems the panels must be attached to the substructure using GHS Keil anchors. The C-brackets are attached to the back of the porcelain panels through the 5.5 mm (0.22-inch) pre-drilled

holes in the panels with the Keil anchors. The top adjusting C-brackets with leveling screws must be installed in the upper holes of the panels and the bottom C-bracket must be installed into the lower holes of the panel. See Figure 5.

## 5.0 CONDITIONS OF USE

The Porcelain Tiles Ventilated Façade System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. If there is a conflict between the manufacturers' published installation instructions and this report, this report governs.
- 5.2 The underlying substructure and wall must be adequate to resist the design positive and negative transverse wind loads and the gravity loads of the system.
- 5.3 Drawings, design details and calculations verifying compliance with this report and adequacy of the connections to the substrate, must be submitted to the code official for approval. The drawings and calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is constructed.
- 5.4 The maximum allowable wind pressures for the Porcelain Tiles Ventilated Façade System are shown in Table 1. The design wind pressures must not exceed the allowable capacities shown in Table 1. The capacity of the supporting wall and substrate, and the capacity of the connections used to attach the system to the wall, must exceed the demands of gravity forces and design wind pressure.
- 5.5 A water-resistive barrier complying with IBC Section 1404.2 must be installed behind the wall cladding system.
- 5.6 The panels are manufactured in Crossville, Tennessee under a quality control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

- 6.1 Reports of panel properties testing in accordance with ANSI A137.1.
- 6.2 Reports of panel resistance to temperature cycling testing.
- 6.3 Reports of panel flexural strength testing in accordance with ASTM C880-09.
- 6.4 Reports of anchorage strength testing in accordance with ASTM C1354-09.
- 6.5 Reports of transverse wind load testing of the system in accordance with ASTM E330, Procedure B.
- 6.6 Reports of panel noncombustibility testing in accordance with ASTM E136.

## 7.0 IDENTIFICATION

- 7.1 The StonePeak Ceramics Porcelain Tiles Ventilated Façade System panels are labeled with the manufacturer's name (StonePeak Ceramics) or the name of the additional listee (GranitiFiandre S.P.A.), the product name (Porcelain Tiles Ventilated Façade System), the panel punch number, production year, and the evaluation report number (ESR-3793).



DEPARTMENT OF REGULATORY AND ECONOMIC RESOURCES (RER)  
 BOARD AND CODE ADMINISTRATION DIVISION  
**NOTICE OF ACCEPTANCE (NOA)**

MIAMI-DADE COUNTY  
 PRODUCT CONTROL SECTION  
 11805 SW 26 Street, Room 208  
 Miami, Florida 33175-2474  
 T (786) 315-2590 F (786) 315-2599  
[www.miamidadecounty.com/economy](http://www.miamidadecounty.com/economy)

**Fiandre**  
**Via Raici, 112**  
**Castellano, Italy 42014**

**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 Façade System**

**APPROVAL DOCUMENT:** Drawing No. **GHSMAXI10-N1**, titled "Fiandre 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 05/14/2019, 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.**



*[Signature]*  
 06/03/2019

NOA No. 18-0924.03  
 Expiration Date: June 13, 2024  
 Approval Date: June 13, 2019  
 Page 1

**NOTICE OF ACCEPTANCE: EVIDENCE SUBMITTED**

**A. DRAWINGS**

1. Drawing No. **GHSMAXI10-N1**, titled "Fiandre 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 05/14/2019.

**B. TESTS "Submitted under NOA # 18-0924.01"**

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 "Submitted under NOA # 18-0924.01"**

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 "Submitted under NOA # 18-0924.01"**

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. **RJ5185F-1-REV1**, dated 12/27/2016, revised on 02/19/2019 signed and sealed by V. Andrew Tan, P.E.

**F. STATEMENTS "Submitted under NOA # 18-0924.01"**

1. Statement letter of code conformance to the 6<sup>th</sup> edition (2017) FBC issued by Wolters Engineering, Inc., dated 08/02/2018, signed and sealed by Scott Wolters, P.E.
2. Statement letter of no financial interest issued by Wolters Engineering, Inc., dated 08/02/2018, signed and sealed by Scott Wolters, P.E.
3. Private label agreement dated 08/01/2018.



06/03/2019

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Carlos M. Utrera, P.E.  
Product Control Examiner  
NOA No. 18-0924.03  
Expiration Date: June 13, 2024  
Approval Date: June 13, 2019







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