### VENTILATED Technological FAÇADES Marble FAÇADES











THE SURFACES COMPANY

TECHNOLOGICAL MARBLE for ventilated facades

TECHNICAL CHARACTERISTICS



ADVANTAGES OF VENTILATED FACADES

ANCHORING AND SETTING SYSTEMS

COLOURS, finishes, sizes and formats

PROJECTS



Environmental Commitment, Service, Human equipment a Certifications

ANCHORING SYSTEMS





# THE SURFACES COMPANY



**COMPAC** is a pioneering European company in the manufacture and marketing of technological marble and quartz surfaces made using the engineered stone system.

Founded in 1974 in a small town in Valencia province, Spain, this courageous family company has been growing continuously since then to become a prestigious international corporation with production centres today in Spain and Portugal, and a presence on five continents thanks to proprietary warehouses and a network of over 250 associated dealers or distributors. This company has a deep-rooted culture of technological innovation addressed to satisfying both the practical needs of the building trade and the achievement of attractive, personalised and healthful spaces in the home.

This commitment to ensuring the daily well-being of users and expressing creativity marks the guidelines for ongoing research and investigation at COMPAC, summing up to one word for the future: SUSTAINABILITY. COMPAC's ongoing concern since its foundation has always been to use materials derived from technological innovation to make quality products that enhances the characteristics and performance of the original material without losing any of their natural values.







# Special COMPAC for ventilated facades

COMPAC marble is a reconstituted natural stone, from Spain, composed of highly pure minerals, polymer binder, and unique additives mixture. In outdoor applications, both polymer binder and additives are specially incorporated into the natural stone, to fully endow it to resist weather and environmental conditions (such as the UV radiation, frost, heat, humidity, etc.).

In order to achieve this protection against all kind of climate agents, COMPAC is currently using patented technology.

As a result, production process allows COMPAC to supply stones with extraordinary mechanical properties, and insignificant degree of porosity; therefore, COMPAC MARBLES are very suitable in many applications, indoors as well as outdoors.

In the past 35 years COMPAC has been providing building solutions (comprising design, architecture and construction) to numerous partners worldwide.



**COMPAC Technological Marble** was conceived from a forwardlooking understanding of the limitations of natural stone for use in modern construction due to its lack of homogeneity and its shortage as a raw material.

Intensive quarrying operations and the large amounts of unused waste materials from extraction activities inspired us to search for an advanced product capable of expressing today's innovative aesthetics while meeting all the practical needs of modern architecture and ensuring sustainability and complete respect for the environment.



By subjecting the mixture to a vibrocompactation process we ensure a homogenous distribution of minerals, and then a vacuuming **process eliminates all air** from the mixture, giving COMPAC Technological Marble its most highly appreciated feature for use in ventilated façades: absence of pores and negligible water or humidity absorption.



These characteristics ensure that our products only require maintenance which is simple and economic, while ensuring that their mechanical properties are superior to those of natural stone (no fissuring or fragile areas).

This product is made in compact blocks from which panels of different thickness are obtained, based on client needs.

The most frequent thicknesses for our slabs are 10mm, 12mm, 14mm (which is the norm for ventilated façades), 20mm and 30 mm.

Slabs are obtained by cutting blocks using sawing machinery equipped with a series of diamond-tipped discs spaced to obtain the corresponding slab thicknesses. Before receiving a surface finish, the slabs are subjected to a calibration process to ensure that all sizes (width, length and thickness) are always within tolerances and ranges allowed by current standards.

The final surface finish is achieved using polishers equipped with abrasive heads that use wet friction to provide the appropriate texture for each surface.

The COMPAC Technological Marble production plant in Gandía (Valencia-Spain) has a capacity of 2 million m<sup>2</sup> per year.

# Reconstitution Process

→ Selection of suitable rocks As per the required technical specifications (from Spanish quarries)

Addition of chemical compounds to improve diverse technical specifications of the natural stone. → Block production Size: 306x123x85 cms Polymerization

• COMPAC marble blocks are cut into slabs, which are subsequently processed to the required finish (polish, honed, aged, bush hammered or brushed); after, the slabs can be cut into the required tile size.



# Comparatives with other materials

Material	Wind resistance (kN/m2) (crack charge)	Density (kg/m3)	Water absorption (%)	Porosity (%)	Impact Resistance	Colour life	Frost Resistance	Thermal shock resistance
COMPAC MARBLE	<b>11,4</b> (measures of the pieces 60x60x1,4 cm)	2450	< 0,1	Insignificant	1 J → Resistant 3 J → Resistant 10 → Breakage without loosening	ок	ок	ок
Other Natural Marbles	-	2600 - 2700	0,2 - 1	0,2 - 1,5	-	Depend on the variety	ок	Necessary to test
Limestone	-	2600	2,5 - 3,5	5 - 10	-D	Depend on the variety	Necessary to test	Necessary to test
Granite (*)	<b>5,4</b> (measures of the piece 00x100x3 cm)	2700	0,1 - 0,4	1	-	Depend on the variety	ОК	ок
Porcelain (*)	<b>6,7</b> (measures of the pieces 66x44x1 cm)	2410	< 0,1	insignificant	1,5 J $\rightarrow$ Fissure without breakage 10 J $\rightarrow$ Breakage without loosening	Not available	Not available	ок
Composite wood - polymer (*)	<b>5 - 8</b> (to usual measures)	1350	-	-	-	Not available	Not available	Not available
Polymer Concrete(*)	<b>12,2</b> (measures of the pieces 60x40x1,1 cm)	2400	< 0,1	insignificant	-	ОК	ОК	ок



Our production process permits multiple designs to be obtained with a highly aesthetic appeal, thanks to which unique, customised projects can be designed in accordance with end user specifications and tastes.







This is also a hygienic product and is easy to clean and maintain, and like natural stone, COMPAC Technological Marble can be polished to highlight its original gloss and appeal.

With a hardness rating similar to that of natural stone, COMPAC Technological Marble has an impact and breakage resistance which is much greater thanks to its superior flexibility.

The flexure resistance rating of COMPAC Technological Marble is approximately 30 MPa, which is why the critical breakage load for this material is extremely high even in the lower thicknesses. Thanks to this property, materials with a thickness of 14mm can be used in conventional façade formats (60x60 or 120x60).

It is a lighter product and is therefore easier to transport, handle, cut and set.



Unlike natural stone, however, COMPAC Technological Marble is homogenous, meaning it can be applied on large-scale surfaces without noticeable differences in colour or tone. **Property consistency:** 

The production process used to obtain **COMPAC Technological Marble** allows us to guarantee its outstanding properties at all times, from one batch to another.

#### Ultraviolet radiation resistance:





With a porosity of practically zero, water absorption is minimal, thereby achieving a product with a high level of resistance to stains and climatic conditions such as rain and frost.



# 3 TECHNICAL SPECIFICATIONS



SPECIFICATIONS	TEST METHOD	UNITS	TYPICAL VALUES		_		
			1	2	3	_	
REACTION TO FIRE (EUROCLASSES)	EUROCLASSES UNE - EN - ISO 9239 - 1:2002 and ISO 1716:2002	EUROCLASSES	A2fl s1	A2fl s1	A2fl s1		
COEFICIENTE DE DILATACIÓN TÉRMICA	UNE EN 14617 - 11:2006 Test method for agglomerated stone. Determination of thermal expansion coefficient	°C - 1	14,8x10e - 6	26,4x10e - 6	15,4x10e - 6	The values shown in this factsheet are indicative only and therefore not legally birding. For further	
FLEXURAL RESISTANCE	UNE EN 14617 - 2:2005 Test method for agglomerated stone. Determination of flexural resistance	MPa	25,5	25,6	19,1	contact our technical department.	
IMPACT RESISTANCE	UNE EN 14617 - 9:2005 Test method for agglomerated stone. Determination of impact resistance	J	5	6	3	1 PERLA CLARO BLANCO MICRO MARFIL STONE AFION	
WATER ABSORPTION	UNE EN 14617 - 1:2005 Test method for agglomerated stone. Determination of apparent density and water absorption	%	0,042	0,072	0,091	FIDJI OR BERING MICRO THASSOS	
COMPRESSIVE STRENGTH	UNE EN 14617 - 15:2005 Test method for agglomerated stone. Determination of compressive strength	MPa	133,9	137,0	127,5	2 CARAMELO NACARADO BEIGE FARAYA CREMA ALTEA CREMA VALENCIA	
APPARENT DENSITY	UNE EN 14617 - 1:2005 Test method for agglomerated stone. Determination of apparent density and water absorption	g/cm³	2,49	2,46	2,53	3 OPALE IVORE CRYPTO BASALT MARS	
SCRATCH HARDNESS	UNE EN 101 Ceramic tiles Determination of the hardness to the bordered one of the surface according to MOHS	MOHS	3 - 4	3 - 4	3 - 4	CUIVRE TRAVERTINE	
ABSORPTION COMPRESSIVE STRENGTH APPARENT DENSITY SCRATCH HARDNESS	UNE EN 14617 - 1:2005 Test method for agglomerated stone. Determination of apparent density and water absorption UNE EN 14617 - 15:2005 Test method for agglomerated stone. Determination of compressive strength UNE EN 14617 - 1:2005 Test method for agglomerated stone. Determination of apparent density and water absorption UNE EN 101 Ceramic tiles Determination of the hardness to the bordered one of the surface according to MOHS	% MPa g/cm <sup>3</sup> MOHS	0,042 133,9 2,49 3 - 4	0,072 137,0 2,46 3 - 4	0,091 127,5 2,53 3 - 4	AFION FIDJI OR BERING MICRO THA 2 CARAMELC NACARADO BEIGE FAR/ CREMA ALT CREMA ALT CRE	

ACCELERATED AGEING OF ARTIFICIAL MARBLE UNE 48-251-92 Test method using alternating cycles of ultraviolet light and condensation

No alterations observed such as loss of gloss, fissuring, surface whitening, etc.

	TEST	TEST METHOD	VALUES
CHEMICAL RESISTANCE TO ACID ATTACK Class C1	FROST RESISTANCE	UNE EN 14617 - 5:2005	RESISTANT
Materials maintaining less than 60% of their reference reflection value after 8 hours. CHEMICAL RESISTANCE TO ALKALI ATTACK	THERMAL SHOCK RESISTANCE	UNE EN 14617 - 6:2005	RESISTANT
Class C4 Materials maintaining at least 80% of their reference reflection value after 8 hours.	RESISTANCE TO CHEMICALS	UNE EN 14617 - 10:2005	C4 (bases) and C1 (acids)
	DIMENSIONAL STABILITY	UNE EN 14617 - 12:2005	CLASS A



4 ADVANTAGES OF VENTILATED FACADES

Ventilated façades are a vertical

cladding system for buildings that

enclosing a ventilated air chamber

and a layer of continuous thermal

insulation against the inner

uses an outer cladding material



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#### Energy efficiency:

Ventilated façades are ideal for reducing energy costs in buildings. Thermal insulation is placed in a continuous layer to prevent heat transfer from metal framework edges and vertical supports.

### Protection against atmospheric agents:

The outer leaf receives the direct impact of rain and sun, but it minimises these effects by being separated from the inner leaf and buffered by an air chamber.

#### Elimination of condensation and humidity from the "chimney effect":

The air behind the outer leaf is heated and therefore rises, taking with it the humidity deposited on the thermal insulation.

#### Choice of aesthetic composition:

In view of the great flexibility in choosing cladding modules, building façade design is made easy.

#### Ideal for restoral work:

With a simple assembly over an existing wall, a façade can be restored easily and quickly, improving aesthetic and technical conditions, with no need to disturb dwellers or users of the building.

### Performance thoroughly tested.





building wall.

COLOURS



With any purchase of over 15,000 square metres of COMPAC Technological Marble, we can prepare any colour required by the client to order.

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#### Sizes and formats

Standard thicknesses are 14mm, 20mm and 30mm depending on the anchoring system.

STANDARD FORMATS	THICKNI (mm)	ESS WEIGHT (kg)
600 x 400 mm	14	8,2
600 x 600 mm	14	12,3
1000 x 300 mm	14	10,3
1200 x 300 mm	14	12,3
1200 x 600 mm	14	24,7

NONSTANDARD SIZES Thickness of 14mm up to 1500x600mm ANCHORING SYSTEMS AND INSTALLATION



Ventilated façades are a vertical cladding system for buildings that uses an outer cladding material enclosing a ventilated air chamber and a layer of continuous thermal insulation against the inner building wall.

For over 20 years COMPAC Technological Marble has been used as cladding material for ventilated façades in many countries, and we now have over 1.5 million squares metres of this material successfully installed.

Some international companies specialising in ventilated façade systems, like VETISOL France, have even developed systems especially designed for use with COMPAC Technological Marble.

#### **ADHESIVE SYSTEM**

Cladding pieces are joined to the substructure using an adhesive. Today's major advances in adhesives technology now provide a series of products that comply with all the requirements for use in ventilated façade systems. These systems are usually combined with some kind of mechanical anchoring system.



Ventilated Façade with Continuous Anchoring and Back Adhesive.

#### CLAMPS

This system has been frequently used to make ventilated façades clad with ceramic tiles. The clamps may be either hidden or visible. There are various qualities and characteristics of clamping systems on the market, but from the standpoint of safety, these anchoring systems have the lowest resistance to wind pressure.

Ventilated Façade with Anchoring Points on Hidden Lip.

#### HIDDEN EDGE-GROOVED SYSTEM

In this system, the horizontal edges of the slabs are grooved along their entire length. The profiles have a lip which fits into the groove, as shown on the close-up below. This system of installing a ventilated façade presents a series of advantages that should be highlighted:

- They are safest on the market, as the entire length of the panel rests on the anchoring device.
- They can be used with a wide variety of formats and can be adjusted to any height. They take diverse lip sizes and different separation distances from the wall. A wide variety of façade designs can be made by combining different size pieces.



Ventilated Façade with Continuous Anchoring on Edge Groove.

#### HIDDEN BACK-GROOVED SYSTEM

This system was conceived as a further development to edge grooved systems and present the same advantages.

In this variant, however, the horizontal anchors are joined to the cladding at the factory itself. The cladding pieces fitted with these anchoring systems are joined to the vertical or horizontal structural profiles on site.

#### PIVOT FASTENING SYSTEM

This is a classic fastening system used to anchor natural stone to a ventilated façade. It is not practical for thinner pieces as the diameter of the pivot itself is usually around 5mm.

This system is now becoming obsolete compared to newer solutions offering more safety and versatility, such as grooved edge or back profiles.



Ventilated Façade with Continuous Anchoring on Back Groove.



Ventilated Façade with Pivot Fastening System



#### Experience in ventilated façades

COMPAC has ample experience in the application of Technological Marble products outdoors, as in ventilated façades.

COMPAC Technological Marble has been successfully installed in ventilated façade systems with excellent results in a vast array of projects around the world, both in countries with high temperatures such as the Arab Emirates, Asia, Latin America and southern Europe, and in colder countries like Poland and France.

VETISOL is a French company specialising in the design and installation of ventilated façades, applying its own anchoring system for use with COMPAC Technological Marble products from the early 90s.

VETISOL has been awarded a French "Avis Technique" technical certificate for their façade system using COMPAC Technological Marble products.

Over one million square metres of outdoor cladding have been installed around the world since the 1990s.





#### Services

ADVISORY SERVICES FOR ARCHITECTURAL PROJECTS SYSTEM RECOMMENDATIONS PLANS AND SPECIFICATIONS **TECHNICAL VISITS** DESCRIPTIVE REPORTS ENGINEERING AND TECHNICAL PROJECTS VENTILATED FAÇADE EXECUTION PROJECTS SELECTION OF APPROPRIATE INSULATION SCHEDULES MATERIAL OPTIMISATION **REDIWA C.A.T./VETISOL® ANCHORING SYSTEMS** COMPATIBILITY WITH OTHER VISIBLE AND HIDDEN ANCHORING SYSTEMS DESIGN, SECURITY, EFFICIENCY AND QUALITY TOTALLY QUALIFIED INSTALLATION TURNKEY PROJECT EXECUTION EXPERT MANPOWER TECHNICAL CONTROL OF WORKS EXECUTION COMPLIANCE WITH APPLICABLE STANDARDS

# 7 PROJECTS UNDERTAKEN





PROJECT	COUNTRY	COLOURS	SIZES (cm)
303 Homes	France	Or - Afion	100x60x1,4
Appart City	France	Blanco Micro	120x60x1,4
Bellini - La Defense	France	Cripto	120x60x1,4
Hospital Helfaut	France	Granite Rose	60x20x2
Hôtel Balldins	France	Afion	60x60x1,4
Le Plan Déau	France	Opale	60x60x2
Les Ellipses	France	Rosa Stone	120x60x2
Maison de Retraite	France	Cuivre - Basalt	60x60x1,4
Saint Aubin les Elbeufs	France	Afion	60x60x1,4
SNI Logement	France	Opale	60x60x1,4
St Léger du Bourg Denis	France	Afion	60x60x1,4
Ma Campagne	France - Angouleme	Afion - Perla Claro	60x60x1,4
Hotel Wilson	France - Bègles	Or	60x40x1,4
Piscine	France - Caluire	Blanco Micro	60x60x1,4
Canteleu	France - Canteleu	Perla Claro - Crema Marfil	120x60x1,4
St. Michel Hospital	France - Clermond Ferrand	Perla Claro - Afion	Various Sizes
Résidence ABG	France - Courbevoie	Opale - Basalt	Various Sizes
Kremlin Bicetre 2	France - Kremlin Bicetre	Crema Marfil - Or	Various Sizes
Les Taïlls	France - Le Mans	Cuivre - Travertin	60x60x1,4
Maison de Retraite	France - Levallois	Blanco Micro	120x60x1,4
Copro	France - Limoges	Ivoire	60x60x1,4
HLM	France - Limoges	Blanco Micro	60x60x1,4

PROJECT	COUNTRY	COLOURS	SIZES (cm)
Avenue Thiers	France - Lyon	Crema Marfil	Various Sizes
EPHAD Rennes	France - Rennes	Crema Marfil	120x60x2
Lycée Rabelais	France - Saint Brieuc	Mars	150x60x2
Collège Pierre de Coubertin	France - St Jean de Braye	Blanco Micro	60x60x1,4
Collège P. st M. Curie	France - Troyes	Crema Marfil	60x60x1,4
Rondo Fitness Club	Japan	Nacarado	150x20x3
Harbourg Tower	Lebanon	Nacarado	120x60x2
Horizon Tower	Lebanon	Siena - Nacarado Silken	120x60x2
Manara Towers	Lebanon	Micro Thassos Silken	120x60x2
Samara Tower	Lebanon	Siena Silken	120x60x2
Al ManaraTower	Lebanon - Beirut	Crema Marfil	60x60x3
Hotel Justyna	Poland	Cuivre - Travertin	60x60x1,4
Al Baraha Tower	Qatar - Doha	Beige Faraya Honed	60x60x2
Al JasraTower	Qatar - Doha	Dakar Honed	75x65x2
Wedding Palace-Jeddah	Saudi Arabia	Caramelo Polished	120x60x2
Centro de Investigación Médica	Spain - Navarra	Perla Claro	60x60x1,4
Residential Building	Spain - Pamplona	Basalt - Opale	120x60x1,4
Residential Housing	Spain - Valencia	Micro Thassos Silken	120x55x2 & 120x75x2
Ayuntamiento de Zaragoza	Spain - Zaragoza	Afion	Various Sizes
Hotel AH Zaragoza	Spain - Zaragoza	Blanco Micro Pulido	120x60x1,4
Zorlu Business Center	Turkey - Istambul	Beige Faraya	60x60x3
Hight St. Glasgow	United Kingdom	Blanco Micro	60x60x1,4











































# Environmental commitment

Since its inception COMPAC has been strongly committed to responsibility in the protection of the environment. In 1975 nearly 80% of COMPAC products were made using raw materials derived from unused portions of other processes. Today this level is above 95% and **our aim is to reach 100%.** 

# Our water recovery and treatment plants enable us to reuse 95% of our water consumption.

From 2003, we have been implementing an environmental policy whose aim is to compensate the total CO2 emissions impact by 2015. Under this plan we have already reforested over 5,000 native trees in Portugal, which is above one-third of the total target of 12,000 trees.



### Service

COMPAC has its own network of dealers and warehouses around the world. This presence on five continents guarantees that COMPAC fulfils one of its basic premises in the relation to clients: **speed in service.** 

Speed in sales and after-sales services.

**Speed** in delivery, with a capacity for supplying materials for all kinds of projects.

Speed in resolving incidents.

### Human resources |Certifications

Over our 40-year history we have always been governed by values involving professionalism, trust and respect. Friendly relations, proximity to clients and respect for the competition are rules that we always strive to bear in mind in all our relations. Our commitment to innovation and respect for the environment encourages us to make ongoing efforts in research in our R&D&I Department in collaboration with major resin manufacturers and numerous Technology Institute and universities around the world.

Thanks to this commitment, COMPAC has obtained widespread recognition, exemplified by a series of certifications from international bodies, of note among which is our acknowledgement from the Greenguard Environmental Institute (GEI). The GEI, whose mission is protecting human health and quality of life by improving indoor air quality and reducing chemical exposure, extends their certificate to products like COMPAC that comply with indoor air quality standards regulating volatile organic compounds (VOCs). The certification marks given are **Greenguard Indoor Air Quality Certified and Greenguard Children & Schools Certified**, with the latter being one of the strictest standards in the industry for products used in spaces for children.





Avis Technique



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### Avis Technique 2/10-1425

Annule et remplace l'Avis Technique 2/03-986

### Vétisol Vétirail

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- Usine : Sté MARMOL COMPAC E-Gandia

Distributeur : VETISOL SA

## COMPAC marble floor tiles are certified by Avis Technique.

COMPAC surfaces for use on building façades together with  $\mathsf{VETISOL} \circledast$  "CRISTO"

cladding obtained an "Avis Technique" from France's CSTBat.

This procedure allows walls type XIII to be built, with impermeability being assured by the support, calling for a masonry or concrete base support covered with a thin mortar layer.

#### SCOPE OF USE

Limited by technical note ("Avis Technique"), particularly in relation to exposure to wind.

Cladding classification r2 e3 V1a4 E2/3 T3 I3 R3

Fire classification for this cladding is A2 (B-s3, d0).

#### COMPONENTS

#### • Cladding panels

These are marble-polyester mortar pieces with thicknesses of 14mm or 20mm, with fronts in polished, silken, matt or hammered finishes.

All edges calibrated and squared:

#### • Standard panel

Structure	Format	Thickness	Horizontal edge treatment	
Metallic	600 x 1500	14 mm	grooved	
Metallic	900 x 1500	14 mm	ungrooved	
Metallic	900 x 1500	20 mm	grooved	
And the 600x400, the 600x600, etc				

#### **VETISOL AXONOMETRIC SYSTEM**



Examples of anchoring systems with partner companies



#### **VETISOL SYSTEM - DETAIL ON CORNER PROFILING**



ANGLE DETAIL



Note: These details are indicative and may vary depending on the project and type of anchor chosen.

#### WANDEGAR SYSTEM 2001 - DETAILS ON CORNER SECTIONS



CORNER DETAIL



CORNER DETAIL



WANDEGAR SYSTEM 2001 - ENCLOSURE DETAILS OF GLUED HOLLOWS

LATERAL GABLE - JAMBS



#### WANDEGAR SYSTEM 2001 - ENCLOSURE DETAILS OF HOLLOWS WITH FRAMES

LATERAL GABLE - JAMBS



#### WANDEGAR SYSTEM 2001 - VERTICAL SECTION DETAIL - ESC.1/5

LOWER SECTION - BEGINNING



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