VENTILATED FACADES

DESCRIPTION

A ventilated facade is a construction method whereby a physical separation is created between the outside of the facade and the interior wall of the building. This separation creates an open cavity allowing the exchange of the air contained between the wall and the outer cladding.

BENEFITS

Ventilated façades offer a range of advantages and provide great added-value to a product:

- Thermal insulation
- Acoustic insulation
- Aesthetic
- Functional
- Constructional

APPLICATIONS

- New builds
- Renovations
- Remodelling
- Efficient buildings
- Protection of buildings exposed to adverse weather conditions
- Facade redesigns

ANCHORAGE SYSTEMS

Four different fixing systems for ventilated facades, to fulfill both aesthetic and functional project requirements.

- Visible system or visible clip
- Concealed system with hidden clip
- Concealed system with chemical adhesive or masa system
- Concealed system - karrat S7 system

INTEGRATED SERVICE

Thanks to its Technical Solutions professional team, we can offer a detailed study of the planned facade that includes:

- Facade Modulation
- Study of loads on the substructure
- Detailed budget
Cladding the outer wall of a building with a ventilated façade system is the most effective construction method for resolving key problems relating to damp and thermal insulation and for improving the acoustic insulation index of the building, without sacrificing the aesthetics of the finishes.

A ventilated façade works by creating a physical gap between the outside of the façade and the interior wall of the building. The air in that cavity heats up and the difference in density between the air in the cavity and the air outside generates a natural flow of air from the bottom towards the top.

The impact of this phenomenon is greater at times when the building is subjected to long hours of intense sunshine. At such times, part of the thermal radiation is reflected by the cladding and the part which penetrates into the air cavity is eliminated thanks to the air renewal caused by the flow of air.

The ventilated facade consists of the following elements:

- **Cladding**: Defines the outer face of the façade and is made up of ceramic tiles.
- **Fixing system**: A set of resistant elements that transmit forces received by the cladding to the support.
- **Insulation**: Located on the exterior side of the supporting wall.
- **Support (walls, slab, etc.)**: Resistant structural element located on the interior side of the façade which transmits the forces the façade withstands to the structure of the building.
- **Air chamber**: The cavity formed by the separation between the Cladding and the Insulation.

The air cavity within the ventilated facade system offers various advantages: thermal, acoustic, aesthetic and functional benefits all create substantial added value to the project.
DESCRIPTION

VENTILATED FACADES

RIGHT SIDE ELEVATION

Project: Universidad building
Location: Granada, Spain
Internal heat flow: Laying insulation on the exterior part of the wall and the floor structure prevents thermal bridges across the entire façade. Heat loss towards the outside in winter is blocked, as is the heat coming from the outside in summer, resulting in energy savings of between 15% and 35%, both in terms of heating and air conditioning.
**External heat flow:** In addition, laying insulation on the exterior part of the wall and the floor structure provides the building with greater thermal mass. This increases the building’s thermal inertia, thus generating significant energy savings and producing a more comfortable ambience. The wall tile acts as a screen, reflecting a great deal of the solar radiation and preventing it from entering the building.

**Plumb alignment:** It is not necessary to plumb the exterior wall as plumbing of the facade cladding is obtained through the anchorage devices.

**Rendering:** Rendering of the outer face of the wall is not required as it is covered by the insulation material and cladding.

**It is not necessary to build a cavity wall:** A cavity in the supporting walls to accommodate the insulation material is unnecessary as insulation is fitted on the outer side of the main wall.

**Easy to replace:** Anchorage design enables fast replacement of the tiles in both exposed and hidden systems.

**Facade refurbishing:** The ventilated facade system is a fast, simple method of refurbishment, offering the opportunity to improve the building’s thermal characteristics by fitting insulation on the outer face of the existing facade.
**BENEFITS**

**FUNCTIONAL**

Elimination of condensation on the interior side of the wall: This is the result of fitting the insulation on the exterior side of the wall. The temperature difference between air in the cavity and exterior air, in conjunction with the gaps between the tiles, leads to the creation of an airflow known as the “chimney-stack effect” which eliminates humidity in wet conditions and prevents condensation on the outside of the insulation should such conditions exist.

Weatherproofing: Cladding with ceramic tiles provides high resistance to ultraviolet radiation, rain and extreme temperatures.

Increased durability: Avoids expansion and contraction in the structural support, eliminating the appearance of cracks and fractures.

Minimum maintenance: Only in the case of breakages.

Easy to clean: Cleaning a tile-clad facade is quick and easy as it is a wallcovering of tiles.

The treatment ensures that the facade can self-clean.
The exposed system is one in which the tile anchorage elements are visible. In this case the fixing components can be painted the same colour as the tile in order to improve the appearance of the facade finish.

There are different methods of attaching the tile with a visible clip.

The choice of system, whether it is one of those shown below or one of the others available on the market, will depend on the client’s needs and preferences.

Below are three suggestions:

- **T-profile system.** The visible clips are screwed directly in onto the profile.

- **Visible clip system consisting of a bracket** that anchors the profile to the wall, a hollow profile to which the support system is fixed, and finally, the clips that fix the tile to the structure.

- **System anchored directly to the wall** without any type of frame.
EXPOSED SYSTEM

SYSTEMS

PLANT

SECTION

CERAMIC FLASHING

METAL FLASHING

CERAMIC JAMB

METAL JAMB

CERAMIC LINTEL

METAL LINTEL

1. PORCELAIN TILE
2. STAINLESS STEEL CENTRAL DOUBLE CLIP
3. STAINLESS STEEL CENTRAL SIN GLE CLIP
4. STAINLESS STEEL DOUBLE MOUNTING CLIP
5. STAINLESS STEEL DOUBLE MOUNTING CLIP

6. ALUMINIUM T-PROFILE
7. ALUMINIUM L-PROFILE
8. ALUMINIUM RETAINING BRACKET, FIXED POINT
9. ALUMINIUM RETAINING BRACKET, SLIDING
10. STAINLESS STEEL OCTAGONAL-HEAD SELF-TAPPING SCREW
11. STAINLESS STEEL CENTRAL DOUBLE CLIP
12. STAINLESS STEEL CENTRAL SIN GLE CLIP
13. STAINLESS STEEL DOUBLE MOUNTING CLIP
14. STAINLESS STEEL DOUBLE MOUNTING CLIP

15. ETA-APPROVED ANCHOR
16. THERMAL INSULATION
17. THERMAL BRIDGE BREAK
18. METALLIC BORDER
19. THERMAL INSULATION
20. METALLIC BORDER
21. THERMAL BRIDGE BREAK
22. METALLIC BORDER

23. STAINLESS STEEL FLAT-HEAD SELF-TAPPING SCREW
24. RIVET + SEALANT
25. OMEGA BRACKET
26. LWB RETAINING WALL
SYSTEMS

CONCEALED SYSTEM

The ventilated facade system with mechanical fastening by means of a hidden clip is a reliable solution that has been extensively tested in the construction sector. It offers the reliability of a mechanical attachment with the aesthetic benefits that a concealed system provides.

The hidden clip system uses a set number of standard slots at the ends of the tile. These slots are made onsite in order to control the quality of the system and the correct implementation of the installation.

There are a number of different hidden-clip attachment methods.

Three examples are shown below:

- System consisting of a structure formed by vertical and horizontal profiles. The horizontal profiles are the ones that hold the tiles by means of a continuous horizontal clip. In turn, the horizontal profiles are secured to the vertical profiles, and these are anchored to the wall by means of standard brackets.

- System consisting of adjustable brackets and vertical profiles, without the use of horizontal profiles. In this case, the tile is attached by means of four separate slots located in the edges of the tile, as shown in the diagram below.

- As with the previous system, the tile is fixed in place using the slots in its edges, but in this case it is anchored to the wall at specific points as shown in the diagram below.
The MASA System is a concealed system that uses high-performance elastic polymer adhesive to attach the tiles.

The main advantage of this system is that it removes the need for a mechanical fastener and therefore eliminates the need for machined tiles, significantly reducing system costs.

To ensure proper adhesion of the aluminium profile to the tile, a mechanical fixing clip is used while the adhesive sets.

Once the adhesive has set, the fixing clip is removed. The MASA system has been developed as a system for creating façades with thin, large-format porcelain stoneware.

Thanks to the use of the laminated porcelain tile, it is currently possible to clad a building with 3x1m tiles that have the durability of porcelain, but without overloading the building’s walls (it weighs only 7.8kg/m²).
CONCEALED SYSTEM WITH CHEMICAL ADHESIVE OR MASA SYSTEM

- PLANT
- SECTION
- CERAMIC JAMB
- METAL JAMB
- CERAMIC FLASHING + LINTEL
- METAL FLASHING + LINTEL

ANCHORAGE
"T" PROFILE
ADHESIVE
PORCELAIN TILE

SINTERCLAD
SINTER SOLUTIONS

TECHNICAL SOLUTIONS
CONCEALED SYSTEM WITH CHEMICAL ADHESIVE OR MASA SYSTEM

PLANT

SECTION

CERAMIC FLASHING

METAL FLASHING

CERAMIC JAMB

METAL JAMB

CERAMIC LINTEL

METAL LINTEL

1. PORCELAIN TILE
2. THERMAL INSULATION
3. RETENTION BRACKET
4. VERTICAL PROFILE (MULLION) PF–AL-T-A
5. VERTICAL PROFILE (MULLION) PF–AL-L-A
6. VERTICAL PROFILE (MULLION) PF–AL-J-A
7. CLIP GR-SO-PH-80-T
8. CLIP GR-SO-PH-40-T
9. HEXAGONAL SELF-TAPPING SCREW M 6.3X25 A2
10. SELF-TAPPING SCREW M 4.2X13 A2
11. POLYURETHANE CHEMICAL ADHESIVE
12. DOUBLE-SIDED TAPE
13. LOCK KEY
14. LOAD BEARING WALL
15. NEUTRAL SILICONE SEALANT
The Karrat S7 system is a hidden mechanical fastening system that enables subsequent removal of tiles.

It is a direct attachment system, resulting from an industrial process in which a horizontal aluminium profile is incorporated into the tile. This is used to attach the tile to an aluminium substructure already fixed to the exterior of the building.

The function of the horizontal (double horizontal) profiles is to channel the load transmitted by the tiles (the weight of the tiles themselves and the force of the wind). These profiles are simply attached to the vertical profiles with self-drilling screws. A joint pin (horizontal joint) has been designed in order to transmit shear stresses and allow free expansion of the material. This joint pin should be installed near where the vertical and horizontal profiles meet.
SYSTEMS

CONCEALED SYSTEM S7 KARRAT

- PLAN
- SECTION
- CERAMIC JAMB
- METAL JAMB
- CERAMIC FLASHING + LINTEL
- METAL FLASHING + LINTEL
- ANCHORAGE
- BRACKET
- INSULATION
- VERTICAL PROFILE
- HORIZONTAL PROFILE
- KARRAT PROFILE
- PORCELAIN TILE
DESCRIPTION

In the construction sector, EWIS stands for EXTERNAL WALL INSULATION SYSTEM. Thanks to its effective thermal-insulation properties, this system is used around the world as a means to achieve thermal conditioning in both warm and cold climates.

BENEFITS

- High insulation capacity for its low weight and low density format
- Energy saving
- The surface requires no prior treatment
- Does not excessively overload the structure of the building
- Ease and speed of execution
- Eliminates thermal bridges
- Reasonably priced

APPLICATIONS

- Buildings exposed to high and/or low temperatures
- Renovation of non-insulated buildings
- Energy-efficient buildings
- Any building subject to the need for thermal insulation

COMPONENTS

The EXTERNAL WALL INSULATION SYSTEM (EWIS) comprises:

- Adhesive
- Thermal insulation panels
- Reinforced structural plaster
- Adhesives for attaching ceramic tiles
- Grouting
- Sealants
- Porcelain tiles

COMPREHENSIVE SOLUTION

EWIS has evolved a great deal with regard to the resilience of the materials employed, namely the insulation, cladding and reinforced fibre, and can be used in buildings with a height of up to 20 metres.
The EXTERNAL WALL INSULATION SYSTEM (EWIS) is a simple solution that considerably increases a building’s energy efficiency. This is primarily down to the elimination of thermal bridges by installing a continuous insulating layer that is in turn protected by ceramic cladding.

Originating from Central Europe, the system consists of gluing an insulating layer of EPS panels to the outer layer of the building envelope onto which a mortar-soaked mesh onto which the finishing plaster is subsequently applied. This system was conceived as a means to protect against the cold and save energy.

Presently, thanks to its proven insulation properties, it is used around the world as a means of achieving effective thermal conditioning, in both warm and cold climates.

Although conceptually there have been view changes, the EWI System has evolved greatly with regard to the resistance of the materials used, both the insulation and the surface finishes and reinforced fibre.

The system is used massively for renovation projects of non-insulated buildings, due to the low weight transfer to the existing structure, because it does not interfere with the internal workings and for its moderate price.

**APPLICATIONS**

- Buildings exposed to high and/or low temperatures
- Renovation of non-insulated buildings
- Energy-efficient buildings
- Any building subject to the need for thermal insulation

**BEFORE**

**AFTER**

Project: Residential building block
Location: Guadalajara, Spain

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**DESCRIPTION**

**EWIS**

**BENEFITS**

- High insulation capacity for its low weight and low density format.
- Energy saving
- The surface requires no prior treatment
- Does not excessively overload the structure of the building
- Ease and speed of execution
- Eliminates thermal bridges
- Reasonably priced
COMPONENTS

1. ADHESIVE: Mono-component cement-based mortar with selected fine-grained sand, synthetic resins and special additives. For the gluing of the thermal insulation panels.

2. THERMAL INSULATION PANELS. From extruded (XPS) or expanded (EPS) polystyrene. Compliant with UNE - EN 13164 and UNE - EN 13163 standards, respectively.

3. REINFORCED STRUCTURAL PLASTER. Consists of three components:
   - Bi-component plastering mortar with an R2 classification, compliant with EN 1504 – 3 standard.
   - Special mesh made from fibreglass. Positioned between two layers of plastering mortar.
   - 7mm galvanised steel coach screws. Maximum fastener thickness of 160 mm, with 10 mm diameter nylon anchoring plugs and thermal cutting washers. Placement 4-5 screws/m².

4. ADHESIVES FOR ATTACHING TILES. With three characteristics:
   - Superior adhesion (C2 classification according to EN 12004 and ISO 13007)
   - Highly elastic (S2 classification according to EN 12004 and ISO 13007)
   - Prolonged exposure time (E classification according to EN 12004 and ISO 13007) or quick exposure times (F classification according to EN 12004 and ISO 13007) or reduced vertical sliding (T classification according to EN 12004 and ISO 13007).

5. GROUTING. Products with mechanical-resistance properties should be used, with a CG2 classification (W classification also recommended, with superior reduced water absorption) according to the EN 13888 standard. The width of the joint should cushion any movement between the tiles and should have a thickness of approximately 5 mm.

6. SEALANTS. To seal the expansion joints.

7. PORCELAIN. The porcelain tiles specified for the system, must have a maximum format of 50 x 150 cm for a 3.5 mm thickness and 30x60 cm for a standard 10 mm thickness, always bearing in mind a maximum building height of 20 metres. Tiles with light-coloured tones, more specifically, with a refractive index of over 20%, should be used.
DESCRIPTION

Raised Access Flooring, is the ideal solution for floors covering installations which need frequent modifications and verifications.

BENEFITS

- Better appearance with installations hidden beneath the flooring
- Easy set up and maintenance of installations
- Improved thermal and acoustic insulation of the building
- Easy installation and maintenance
- Better outdoor drainage
- Correction of uneven outdoor surfaces
- Wide range of designs in catalogue

APPLICATIONS

Indoor:
- Financial, Insurance Offices, and all kind of activity which requires lot of installations
- Public Administration and State offices
- Industrial Administration
- Buildings Data Center and Call-Center Distribution Centers
- Universities, libraries, and other educational facilities

Outdoor:
- Terraces
- Car parks
- Swimming pools
- Beachfront premises
- Parks and gardens

TIPOLOGY

Raised flooring has basic components.

Indoor

- Panel:
  - Upper covering
  - Core
  - Lower covering
  - Edge trim

- Metallic structure:
  - Stringers
  - Pedestals

Outdoor

- Panels
- Pedestals

HIGH RESISTANCE

The strength of our RAISED FLOORS can be adapted to fit the needs of the project in question. Depending on the number of pedestals used (4, 5 or 9), a 600x600x20mm tile can withstand more than 1000kg/ml.
Raised flooring, also known as RAISED ACCESS FLOORING, is the ideal solution for floors covering installations which need frequent modifications and verifications in areas such as: data-centres, hospitals, offices, hotels, exhibitions and conference halls.

All these types of buildings generally require numerous electrical installations, air conditioning, data-transfer, audiovisual installations whose maintenance need to be very frequent and due to continuous technological advances may need updating often also.

Raised flooring is a construction system which consists of a panel platform that is elevated on height-adjustable pedestals creating a void air chamber which can be used to house numerous technical structures, permitting rapid access and alterations to the technical structures installed.
BENEFITS

INDOORS

- Improves the appearance and organisation of spaces by hiding installations below the flooring.
- Creates a space for storing different technical installations, which facilitates maintenance and enables changes to be made without the need for any construction work.
- Improved thermal and acoustic insulation of the building by creating an air space within the floor.
- Adaptable and versatile system in case of changes in the use of the building.
- A renovation option for historic buildings, allowing them to be adapted to current living requirements (water pipes, electrical installations, etc.).
- All its components offer high mechanical resistance and excellent reaction to fire.
- Thanks to very low dimensional tolerances it is very easy to replace panels.
- Extensive catalogue of available materials; any finishes can be used to create the floor.

OUTDOORS

A raised access floor (RAF) system for OUTDOORS entails creating a false floor on top of an existing one by establishing an intermediate space which can house various installations and facilitates water drainage.

The advantages of using RAISED ACCESS FLOORS for OUTDOORS:

- The use of raised access flooring is ideal for areas where there will be a great deal of installations or which may require the installation of underfloor air cooling systems.
- Easy removal and access to the interior for maintenance purposes.
- Improved sound insulation.
- Improved water drainage.
- Facilitates discharge of water.
APPLICATIONS

Indoors

Financial, Insurance Offices, and all kind of activity which requires lot of installations / Public Administration and State offices / Industrial Administration Buildings / Data Center and Call-Center / Distribution Centers / Universities, libraries, and other educational facilities

INSTALLATION

To begin, ensure that the surface where the system is to be installed is clean and stable.

The next step is to stake out the surface according to the format of the chosen ceramic tile. It is worth noting that a pedestal should be placed at least every 75 cm.

Once the staking out is done, place the two pedestals that go at either end of a longitudinal stringer, and from here start setting up the entire support system for the ceramic tiles. As the system is laid out, the height of the pedestals should be adjusted in response to project requirements.

First, lay the longitudinal stringers, supporting them on the pedestals. If you wish, these stringers can incorporate a PVC strip in the form of inverted 'T' that will help mark the exact position where the ceramic tiles will later go, and will also mark the correct joint width between the tiles (when used as reinforcement for large-format ceramic tiles, they will have a PVC strip without the 'T' shape).

SYSTEM COMPONENTS

Indoor raised access floors are made up of two basic components:

- PANEL
- METALLIC STRUCTURE
## PANEL COMPONENTS

### THE TOP LAYER
- The top layer is made of water proof, fire resistant porcelain tile with high mechanical strength, the ideal option for dealing with the traffic the raised access flooring must withstand.

### CORE
- The core is a reinforcement applied to the underside of the tile, which itself provides the required mechanical strength with respect to both loads and impacts. The core can be made from 3 different materials, and should be selected according to project priorities.

### UNDER LAYER
- This layer provides stiffness, greater thermal and acoustic insulation, and protects the underside of the core. The material used depends on the chosen core material.

### EDGE BANDING OR TRIM
- The edging used to protect the face of the panels and the rough edges of the ceramic tiles. They also facilitate correct placement. Always made of PVC.

## APPLICATIONS

### INDOORS

#### PANEL COMPONENTS

- Panel is made of:
  1. THE TOP LAYER
  2. CORE
  3. UNDER LAYER
  4. EDGE BANDING OR TRIM

#### UPPER COVERING

<table>
<thead>
<tr>
<th>PANEL NAME</th>
<th>UNDER LAYER MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORE 48M</td>
<td>MOISTURE RESISTANT MELAMINE BOARD</td>
</tr>
<tr>
<td>CORE 40C</td>
<td>PRIMER, MELAMINE BOARD OR ALUMINIUM SHEET</td>
</tr>
<tr>
<td>CORE 25P</td>
<td>PRIMER</td>
</tr>
</tbody>
</table>

#### TECHNICAL SOLUTIONS

<table>
<thead>
<tr>
<th>PANEL NAME</th>
<th>CORE THICKNESS (mm)</th>
<th>TOTAL THICKNESS (mm)</th>
<th>WEIGHT (Kg/m²)</th>
<th>FIRE CLASSIFICATION (EN 13501)</th>
<th>CLASSIFICATION (EN 12825)</th>
<th>CHARACTERISTICS</th>
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</thead>
<tbody>
<tr>
<td>CORE 48M</td>
<td>38</td>
<td>48</td>
<td>54</td>
<td>Bfls1</td>
<td>2/2/A/1</td>
<td>++ GOOD VALUE ++ MEDIUM RESISTANCE TO FIRE</td>
</tr>
<tr>
<td>CORE 40C</td>
<td>30</td>
<td>40</td>
<td>67,50</td>
<td>A1</td>
<td>2/2/A/1</td>
<td>++ HIGH RESISTANCE TO FIRE ++ MORE EXPENSIVE</td>
</tr>
<tr>
<td>CORE 25P</td>
<td>15</td>
<td>25</td>
<td>67,50</td>
<td>A1</td>
<td>4/2/A/1</td>
<td>++ MEDIUM PRICE ++ HIGH RESISTANCE TO FIRE ++ ULTIMATE LOAD</td>
</tr>
</tbody>
</table>
APPLICATIONS

METAL STRUCTURE COMPONENTS

The structure made up of pedestals and stringers supports the floor tile while ensuring the required height and rigidity:

- PEDESTALS: The elements that give the floor its required height, which varies according to the project. One of their most notable advantages is that they are easily adjustable, as they are fitted with a threaded bolt. They are usually made of galvanized steel and the upper part is typically covered with plastic to prevent noises. The pedestal head generally incorporates plastic anti-noise joints as well as attachment lugs.

- STRINGERS: They provide greater mechanical reinforcement (stability and strength) and act as a support for any accessories to be mounted on the floor (grilles, junction boxes, etc.). As with the pedestals, they are typically made of galvanized steel and they have plastic anti-noise strips fixed along their top edge.

Whether or not they are used depends on the technical characteristics of the raised access floor, specifically the required height and the load that it has to bear.

APPLICATIONS

INDOORS

OUTDOORS

Terraces / Car parks / Swimming pools / Beachfront premises / Parks and gardens
APPLICATIONS

OUTDOORS

INSTALLATION

Steps to follow for correct installation of an outdoor raised access floor:

1. Study carried out by our technical department to guarantee the correct design and placement of pedestals, thus ensuring an optimal system.
2. After finishing the waterproofing, drainage and laying the screed, next comes staking out the pedestals and adjusting their height in-situ. The maximum height of the pedestals (in the drains) should be borne in mind, as well as the minimum heights (perimeters: vertical barriers and access points to the deck or terrace).
3. Pedestals fixed in place using adhesive, according to the designs provided by technical department.
4. The tiles should be rested on a pedestal at least at all four corners. The number of pedestals to use always depends on the chosen format and the mechanical strength required.
5. To close the system at the edges, set back the pedestals or use them as a support for a partition.

Depending on the project requirements and the loads that the floor is expected to bear, the distribution of pedestals will vary:

**DISTRIBUTION A: 4 PEDESTALS**

Thickened tile: 600x600x20mm
Performance: 3.5 Pedestals/m²
Resistance: 750Kg/ml

**DISTRIBUTION B: 5 PEDESTALS**

Thickened tile: 600x600x20mm
Performance: 3.5 Pedestals/m²
Resistance: 750Kg/ml

**DISTRIBUTION C: 9 PEDESTALS**

Thickened tile: 600x600x20mm
Performance: 3.5 Pedestals/m²
Resistance: 750Kg/ml
APPLICATIONS

OUTDOORS

15mm and 20mm-thick porcelain tile recreates a number of architectural materials such as cement, wood and stone.

Along with the excellent technical qualities of porcelain tiles, these thicknesses ensure a high breaking strength and a natural look - important qualities for all types of outdoor use. In addition, its thickness and mechanical properties make this material an ideal solution for paving high traffic areas, using standard installation techniques.

What differentiates the 15mm tile from the 20mm tile can be seen in the special tactile-surface pieces, suitable for indicating the existence of architectural and urban barriers to pedestrians, particularly those with visual impairments (in accordance with regulation UNE-CEN / TS 15209)

SYSTEM COMPONENTS

The system is composed of three parts:

01 THICKENED TILE
02 PEDESTALS
03 PEDESTAL ADHESIVE
04 THICKENED TILE

Two types of thickened porcelain stoneware tile:

01 20mm thickness
02 15mm thickness

These are thick enough to withstand the breaking load required by law for such uses. The 15mm-thick tile results in a breaking strength above 7000 Newtons (approximately 700Kg) and the 20mm-thick tile results in a breaking strength of 12,000 Newtons, in accordance with ISO 10545-4 (a regulation that measures the resistance of the tile on a standalone basis - simply supported on two of its sides without being compacted with the bonding material). This value is sufficiently high for use in urban flooring in correct conditions on stable, compacted bedding material and with an appropriate bonding agent.

STANDARDS FOR INDICATORS FOR TACTILE PAVING UNE-CEN/TS 15209

<table>
<thead>
<tr>
<th>Resistance to Breakage (kN/cm²)</th>
<th>Water Absorption (%)</th>
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</thead>
<tbody>
<tr>
<td>UNE-EN ISO 10545-4</td>
<td>UNE-EN ISO 10545-3</td>
</tr>
<tr>
<td>20mm</td>
<td>15mm</td>
</tr>
<tr>
<td>&gt;50N/mm² (500kg/cm²)</td>
<td>&lt;0.05%</td>
</tr>
<tr>
<td>15mm</td>
<td>&gt;50N/mm² (500kg/cm²)</td>
</tr>
<tr>
<td>HORMIGON CONCRETE</td>
<td></td>
</tr>
<tr>
<td>&lt;10N/mm² (100kg/cm²)</td>
<td>2-4%</td>
</tr>
</tbody>
</table>

30X30 CENTER 15MM
PEDESTALS:

Plastic (PVC) weatherproof pedestals. They are the support on which the tile rests; the height of the system can be determined by twisting the pedestal head up or down. Small tabs create horizontal joints between tiles, which are left open to facilitate water drainage. The tabs can easily be removed by cutting them where they come into contact with a vertical barrier, leaving an open joint of about 0.5 mm between tiles and vertical barriers.

The base of these pedestals can have a slight tilt to adapt to the slope of the support. Thus, different models (1%, 1.5% or 2%) are recommended depending on the slope of the terrace or deck. As such, the maximum gradient for a raised access floor is 2%. In addition, the person responsible for the installation should turn the ridge (a small bump at the base of the pedestal) towards the drain. Other technical features:

- Mechanical compression strength of up to 1,200 kg / unit.
- Resistant to aqueous solutions of inorganic salts, acids and alkalis.
- Resistant to most organic solvents such as alcohol, esters and ketones. Not resistant to oxidizing agents such as nitric or sulfuric acid and halogenated hydrocarbon solvents such as petrol.

PEDESTAL ADHESIVE:

The third and final component of the system is the adhesive. It is a polyurethane adhesive that absorbs any possible movement of the tiles. It is used to fasten the tile to the pedestal and also to fix the pedestal to the ground. For proper adhesion of all components the following distribution of adhesive is recommended.