This Technical Manual has been published by Zanette to illustrate the physical and technical characteristics of ZIP panels which together with simple notions of design, installation, transportation and maintenance can make the concept of ventilated wall easy and effective.

The different regulatory requirements of each country, where the ZIP will be positioned, have to take into account the following characteristics.
## Technical details

<table>
<thead>
<tr>
<th>ZIP - Technical characteristics</th>
<th>Law</th>
<th>Test result</th>
</tr>
</thead>
</table>
| Standard dimensions            | EN 14992 2007 | 1200 x 2400 mm
|                                |           | 1200 x 3600 mm |
| Thickness                       | EN 14992 2007 | 15 mm standard |
|                                |           | According to the matrix at request |
| Specific weight                 | NF P 18-459 | 15 mm = kg/m² 33 |
| Flexural strength               | EN 12467 2007 | 13 - 18 MPa |
| Elastic modulus                 | NF EN 1170-5 | E cm² 20 GPa |
| Fire resistance                 | EN 13501-1 2009 | A1 |
| Keil point fastening extraction | Keil system | 2,00 kN |
| Compressive strength            | EN 13369 2004 | 125 MPa |
| Impact resistance               | EN 14019 2004 | Grade E5 |
| Abrasion resistance             | ASTM C 501-84 | 160 |
| Freeze resistance               | EN 12467 2007 | Grade A |
| Immersion in hot water          | EN 12467 2012 | Grade A |

The technology of ZIP is based on the use of GRC (Glass Reinforced Cement). The innovative mixing, with a low ratio water / cement makes the product slightly porous and highly durable compared to conventional concrete.

Smaller size are possible with the cutting of the standard slabs (excluding wastages). On request slabs cut-to-size.
1. Ventilated wall

The origins of the system to build with a ventilated façade came from the system of the ancient Romans and perfect themselves over the centuries in the northern European countries where it came used to preserve nature products. Also called “GRANITE TO OPEN JOINT” was made up from wooden constructions with air gap permitting water drainage and evaporation. A double skin therefore increased the performance of the building without compromising the typology of materials. It is understood that for the humid and rainy climates this system allowed to have healthy the “SANI” environments reducing a lot condensate or mold phenomena.

The main characteristic of a ventilated facade are:

• External skin consisting on the cutting of a panel.
• An air space.
• An insulating wall that controls air leaks.
• A substructure of aluminium or wood with a thickness able to contain insulating material plus the chamber air.
• A rigid insulation barrier (Thermostop) between the underside structure and the existing wall.

With this sequence we could have these advantages:

• In winter the heat of the building is maintained inside and the cold air does not go directly on the structure of the building.
• In the summer, thanks to the natural ventilation given by the chamber air, there is an internal cooling when outside temperatures are high.
• Most sunlight affects the external skin of the building (ZIP).
• The heat that passes over ZIP is partially dissipated by ventilation.
• Another big advantage for high buildings is that the control of the temperature minimized the structural movement.

Unlike traditional constructions, Ventilated Wall System eliminates those weaknesses called thermal bridges. In fact, these Thermal Bridges most commonly found amongst connections between floor and wall increase speed of loss of heat causing superficial condensation which over time cause the damages to the building. All this does not exist with the Ventilated Wall thanks to the continuity of insulation without thermal bridges, eliminating any risk of condensation inside the building. The acoustic performance of the ventilated wall system are very effective increasing the comfort living of buildings.

In conclusion buildings built or upgraded with this system type provide an healthier living environment.
1.1 Introduction to ZIP

The evolution of GRC (Glass Reinforced Cement) has brought Zanette over time to a production of slabs of ZIP. The possibilities of having thin slabs with high mechanical resistances make this product particularly suitable for facade cladding systems ventilated. The ZIP allows to change the external aesthetic appearance of a building without any structural intervention, fast, economical and resistant in time. With the use of suitable under support structures ZIP permit to create a perfect ventilated wall, with excellent values of insulation, thus guaranteeing a high production energy saving. Due to its particular cementitious composition, ZIP maintains its integrity physics, mechanics and aesthetics much longer compared to traditional metal coating systems or ceramics, even in environments with climatic conditions more extreme. The insertion of glass fiber reinforcement gives to the product excellent bending mechanical resistance and traction, without having to take into account the smallest cover required by metal armor. This product allows to produce elements of large dimensions with very thin thickness, which can fit any architectural requirement. ZIP with thicknesses of 15 millimetres can reach important sizes up to 3600 ± 4000 mm in length and 1200 in width.

The benefits of using ZIP:

- RESISTANT
- LIGHT
- THIN
- BIG STANDARD DIMENSIONS
- FIREPROOF
- CERTIFIED
- CUSTOMIZABLE
- VERSATILE
- MATERIAL EFFECT / ASPECT
- RECYCLABLE
1.2 Application on ventilated wall

ZIP slabs find their own greater application area as coating system for ventilated walls. The slabs must be mounted on a rigid substructure but at the same time flexible, stable and levelled, statically dimensioned in such a way as not to transfer loads to the coating slabs. The substructure must also be mounted and secured on a properly dimensioned support wall and verified (Sisma, wind, pressures and depressions and distances from other buildings) for additional stresses given by the ventilated wall.

The substructures can be made in steel, aluminium or in wood, and must be able to accommodate the layer of insulation and the air chamber where the ventilation takes place. The structure should be designed for two types of fixing VISIBLE and INVISIBLE from which you can choose the finishes and colouring together with any corner elements or special elements.
ZIP offer to architects a creative vision of the future. We offer many possibilities of use, standard or customization for new construction, to the realization of coatings dedicated to restoration or renovation projects of existing buildings, where compatibility and coordination is required with the landscaping context and respect of any urban constraints.

In such cases the performance and technical characteristics of ZIP allow concrete constructive solutions, thanks to the ability of a versatile production that can make artefacts, design, with the care of traditional Italian craftsmanship.

3D modelling, full-size prototypes, (mock-up) tests and resistance tests.
Zanette has an organized technical platform to develop with the designer the production solutions also for custom facade claddings.

1.3 Design possibilities
1.4 Behavior and Fire resistance

For fire behavior and fire resistance Zanette has carried out on ZIP several tests according to the current relevant European regulations.

ZIP thanks to its cement composition guarantees excellent performance of fire resistance.


1.5 Geographical location

Climate - Wind – Earthquake

To figure out how to make a ventilated wall in a building we have to look at a lot of information that we can summarize:

- Height and design of the building
- Geographic location
- Climate of the Territory
- Wind
- Earthquake

If the building is near the sea or the mountain will have different needs and behaviors as well depending on the respective wind.

If near an airport the building will have a loading forces high or vortex occurrences.

The Territory will also have influences on heights elevate if the surrounding environment is flat, without hills, mountains etc.

As for the wind in addition to the previous points, it can be very important the positioning of other buildings around as they may hinder the free flow causing, cause “diverted” or “accelerated” of the complex flow patterns.

The design of the building has an effect on how the pressure of the wind can be distribute.

The height of the building must be evaluated. The speed of the wind increases with the height.

The presence of an earthquake with the territory must necessarily predict a proper design.

1.6 Insulation and thermal bridges

To create a high performance ventilated wall must leave a minimum ventilation space to prevent leakage of heat compared to the outside in winter but also in summer. It is necessary to place a layer of material insulating.

When choosing the insulating layer, they are very important transmittance values, specific Lambda value of the material which is expressed in W / mK (watt per Kelvin meter) and defines the ability of the material to transmit the heat based on the thickness used.

Obviously, lower this value and greater it will be the performance of the building.

For the ventilated walls the insulation ideally must be compact, non-friable, fire-retardant, breathable, and resistant to the and the wind that will be inside the air chamber due to pressure and depression.

Very important is that the insulation is firmly secured in its place for the duration of the façade without the possibility of detachment they would have to foreclose the effectiveness of isolation itself as well as to compromise the structure itself and mold formations and condensates. Mechanical fixings are usually applied and / or non-combustible glue fasteners in the entity of no. 5 per square meter, subject to prescriptions other than part of the insulation manufacturer.

In addition to isolation a very important point are the possible thermal bridges that the ventilated wall solves almost totally, thanks to the positioning of the insulation outside the building.

Attention must be paid to connections of the substructure to the supporting wall and the insulation joints. In the first case the use of a “Thermostop” is sufficient while in the second case the problem is solved by placing insulation in two overlapping layers avoiding any leakage.
2. Tests and certifications

ZIP is a CE marked product, made in Italy with state-of-the-art equipment, whose production process is constantly monitored and periodically verified by the major institutes of European certification. In fact since 2004 the system management and quality of Zanette is ISO 9001 certified.

- Conformity Certificate “CE” Zanette S.r.l.: Certificate No 0407-CPR-282
- Conformity Certificate “FPC” Zanette S.r.l.: Certificate No 209 PC/CLS/3
- Resistance static loading: Test report No 316534
- Asbestos free: Test report No 316535
- Heat rain cycling: Test report No 316536
- Freeze-thaw cycling: Test report No 316537
- Soak-dry cycling: Test report No 316538
- Water impermeability: Test report No 316539
- Immersion in hot water: Test report No 327548
  - Test report No 316543/8472/CPR
  - Test report No 316542/8471/CPR
  - Test report No 316541/8470/CPR
  - Test report No 316540/8469/CPR

2.1 Zanette a certified reality

The CRZ (Zanette Research Center) keeps constantly evolving and updating the norms and consequent methods of certification.

In addition to ISO Quality Management System, ZIP is subject to CE marking which allow it to circulate with a kind of Passport Technician in the European Union Market.

You can access the area for updates download at www.zanette.com
2.2 Eco – sustainable building

ZIP have been compared with the aluminium and HPL panels (that are the systems most commonly used). The results show advantageous really interesting for our product.

Gas emissions – greenhouse effect. ZIP are one of the best solution on the market among the cladding systems, to realize an eco-friendly building, both during manufacturing process than the replacement and final disposal.

Water consumption. The water consumption to produce ZIP is limited at the hydration of concrete and not at the processing cycles. So the water consumption is 3 times less than aluminium solutions and 6 times less HPL solutions.

Waste and productions residues. ZIP production, generates waste considered completely inert. Their pollution value is comparable to the lighter aluminium. Instead HPL production appears the most polluting both during manufacturing process than the final disposal.

2.3 Recycling of slabs

An increasingly frequent concern today is to understand what will happen to the materials at the end of their cycle of life, how they are disposed of and what they do to the environment.

ZIP and everything that is part of the ventilated wall can be separated, divided and recycled differently.

Simple materials such as sand, cement, glass fibres can be crushed and reused as substrates or inert materials. This factor lowers CO₂ emissions and reduces energy consumption.

The project sustainability Zanette

The ZANETTE company has always looked at the sustainability of buildings.

That’s why ZIP sought to increase energy efficiency of new buildings and upgrading the old ones.

ZIP has a process traced with low water consumption and its total reuse, electricity comes from photovoltaic plants positioned in the roof while thermal energy is extracted from co-generation plants using European tracked vegetable oil.

The production plants grow to 25,000 square meters built on an area of 50,000 square meters.

New types of buildings are design with thermal-break walls, window frames and roofs as per regulations to avoid unnecessary energy dispersion and to give a comfort living environment.
3. Design with ZIP

For the design of a new building or upgrading solutions we have to be taken into account constructive solution according to criteria of industrial processing, using standard formats or their sub-multiples avoiding the use of expensive special elements.

In the distribution of the single elements it’s very important the position of doors and windows, corners that added to the size of the joints can affect the use of the only elements came from "Standard" slabs.

The production of ZIP develops essentially on two slabs formats 1200x2400 or 1200x3600.

A careful design optimizes the realization optimizes cuts on standard plates by managing a part economic value given by “wastages”.

Realizing a project using one ventilated wall can be schematized as follows:

- Feasibility with the product chosen in the formats, colours, finishes, corners, door and window joints.
- Choice of fixing type: VISIBLE or INVISIBLE
- Structural diagram and relative rough calculation
- Realization of final project drawings

3.1 Facade cladding guidelines

Depending on the type of building to be covered and the type of façade to be installed, some general warnings must be taken into account:

The substructure package + coating panels is an element anchored to the building to be coated, but structurally independent.

The facade cladding does not contribute to the static stability of the building.

The supporting structure must therefore be adequately calculated to be able to withstand the loads added by cladding.

It is advisable that the supporting structure is designed and performed to facilitate the installation of the substructure of the facade coating, with respect to linearity and simplicity of fixing elements.

The fixing of the coating panels to the bottom structure must be suitably designed to withstand not just the stresses of the elements and the elements atmospheric agents, but must also take account of any possible accidental bumps.

In case of special work on panels, or addition of elements that may alter its stability or stiffness, it is necessary to study appropriate fixing systems based on the particular case.
3.2 Substructure guidelines

To design a substructure and anchoring system to the wall of a facade cladding, many factors need to be taken into account. The aspects which affect the sizing and technical features of this type of substructure, which only in appearance may seem like a standard element, are many:

- Characteristics and situation of the supporting structure to which anchoring, with brackets and fixing elements appropriately sized and treated against rust.
- Resistance to external stresses as a push of the wind, seismic movements, etc. according to the prescriptions of local regulations.
- Weight and dimensions of coating panels, according to such as dimensioning the step of the hardware to the substructure.
- The fixation must be designed to absorb the movements of the panels, without subjecting tension elements and unsupervised stresses.
- Sizing an appropriate insulation layer and ventilation between the supporting structure and the covering panels.

3.3 Fixing system of standard slabs

The fixing systems for the sub-structures provided for panels ZIP belong to two different categories, Visible and Invisible, that mainly affect two aspects:

- Aesthetic appearance of the ventilated façade at close range.
- Economic aspect according to the modularity of the selected slabs.

As far as VISIBLE fixing is concerned, it is obtained using a single lower vertical structure underneath fixed and calculated to the supporting structure by means of special rivets or screws, create the facade in a simple and economical way even during installation.

INVISIBLE fixing can be made with several Standard defined systems. The mechanical system “KEIL” is developed by means of a bush inserted inside the slab, or special glue “SIKATACK” or similar.

Less used there are also other systems such as milling “KERF” by overlaying “Shingle system” or inside the cells, make the façade clean even by near obviously with a more articulated work in both design, under construction and assembly.

More information and technical details are developed in the following chapters where it explained distances fixing from the edges and many other useful information.
3.4 Fixing system with rivet or screw on sight

Fixing a rivet is realized predisposing on the slab ZIP of the through holes in the position and amount needed to overcome the stresses to which the slab will be subjected to operating phase (according to the table below). These holes will have to coincide with the aluminium substructure, on which holes are to be made works on the diameter of the rivet - screw, which will fix the slab underneath supporting structure. To allow differential expansion between slabs ZIP fastened with rivets - screw, and under the supporting structure, the holes will have a diameter of 9 mm, while the rivet will have a diameter of 5.1 mm.

At the installation stage you will have to make sure to include bushings on the central holes before the fixation of the rivet. These will go to create gods fixed points, unlike those without bushing, thus allowing the sliding of the slab, following the diagram below.

Substructure for fixing on sight

<table>
<thead>
<tr>
<th>Material</th>
<th>Min. distance from edge bars of the panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium with brackets and vertical T or L</td>
<td>30 mm</td>
</tr>
<tr>
<td>Wooden with horizontal - vertical warping</td>
<td>30 mm</td>
</tr>
</tbody>
</table>

Diagram for Determining the visible Fixing Points with \( nxn \) type (Multiple fixing points in H and V).

Diagram for Determining the visible Fixing Points with \( 2x2 \) type (2 fixations points in H and 2 in V).

Diagram for Determining the visible Fixing Points with \( 2x1 \) type (2 fixations points in H and multiples in V).

Diagram for Determining the visible Fixing Points with \( nx2 \) type (Multiple fixing points in H and 2 in V).
## 3.5 Slabs with invisible fixation

The invisible fixation is made by predisposing on the slab ZIP with 15 mm of thickness, with internal milling holes with inner diameter 9 mm, outer 7 mm, and depth 10 mm, in position and in the amount needed to withstand the stresses to which will be subjected to the slab during exercise (according to the table below). On these holes, previously performed in drilling centers Zanette, will then be put into operation a Keil Hs expansion tip 10 mm or equivalent, in which the clamping bracket will be attached to the under the structure by means of a special bolt, tightened with a pair of 2.00 / 4.00 Nm, which will guarantee the dowel the appropriate fixing to the plate. Between the bracket and the plate will have to always insert a rubber gasket or sponge that enhances the coupling between the two surfaces.

The plates, equipped with brackets in the expected amount, will come then hooked to the substructure, adequately prepared, leaving a minimum joint of 8 mm, which can be adjusted by adjusting the appropriate screws in the structure.

If horizontal joints are planned in the design of width greater than 20 mm, the panels will be able to be removed individually, later on laying of the entire facade.

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### Diagram for Determining the invisible Fixing Points with \( m \times n \) type (Multiple fixing points in H and V).  
Diagram for Determining the invisible Fixing Points with \( 2 \times 2 \) type (2 fixations points in H and 2 in V).

### Diagram for Determining the invisible Fixing Points with \( m \times 2 \) type (2 fixations points in H and multiples in V).  
Diagram for Determining the invisible Fixing Points with \( 2 \times 2 \) type (2 fixations points in H and 2 in V).

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### Substructure invisible fastening system

<table>
<thead>
<tr>
<th></th>
<th>Min. distance from longitudinal edge bars</th>
<th>Max. distance from longitudinal edge bars</th>
<th>Min. distance from transversal edge bars</th>
<th>Max. distance from transversal edge bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium with brackets mullions and horizontal profiles</td>
<td>50 mm</td>
<td>100 mm</td>
<td>50 mm</td>
<td>200 mm</td>
</tr>
</tbody>
</table>

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Download video: www.zanette.com
3.6 Installation Order

In order to get a good result in the installation phase of ZIP, it is always advisable to maintain a pre-set order of assembly at the beginning of the laying, so you can correct any error of the slabs or of the underlying structures when installing. The position of each slab is fixed by a schedule production list which allows the installer to accurately identify the type of slab to be installed.

The minimum joint between the slabs, both in vertical and horizontal position, is 8 mm so to obtain a good regulation and a normal thermal expansion of the product.

3.7 Junction between the panels

The junction between the panels is a fundamental aspect to consider, as it concerns both mechanical and aesthetic aspects:

Substructures and coating panels are subject to expansion due to variability of external agents. It is therefore essential to calculate these variations of dimensions and displacements to accommodate the join that must be between the panels. The minimum gap width should be 8/10 mm.

Also the expansion and movement of the structure, in which the panel will be anchored, must be taken into account for the dimensioning of the joints between the panels.

In the case of a ventilated wall, the joints must be able to provide adequate ventilation and drainage of possible standing water.

If a gap of more than 8/10 mm is required, it would be advisable to provide closure elements, gaskets or profiles, suitable to meet the aesthetic needs required.

ZIP Zanette Innovation Panel
3.8 Corner possibilities

For the corners with ZIP can be used multiple solutions, which in all cases, due to the reduced thickness of the slabs, make the angular joint elegant and discrete.

**Corner joint with standard sharp edge.**
Derived from the direct alignment of the slabs' heads, reinforcing the inner part with a metal element to give rigidity and resistance to the slabs against any accidental impacts.

**Corner joint with standard profile.**
Derived from the alignment of the heads connected to a metal profile, with the same colour of the slab or different colour, to mark the corner joint firmly.

**Corner joint with 45° standard edge.**
Derived from the alignment of the heads of the slabs cut at 45°, reinforcing the inner part with a metallic element to give rigidity and strength to the slabs against any accidental impacts.

**Three-dimensional corner. Special elements.**
Made of a single three-dimensional element with a maximum size of 600x600 mm and a length of 2400 or 3600 mm.
It is recommended to use 300x300 lengths, 2400 cm length for ease of installation and handling.

3.9 Doors and windows

For the alignment of panels with ZIP in correspondence with windows and doors can be used multiple solutions, which in all cases, due to the reduced thickness of the slabs, make the angular joint elegant and discrete.
3.10 Special elements

In addition to the standard rectangular slab there are some special elements that allow continuous corner finishes without open edges. Here are some examples.

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. dimensions of special elements - mm</th>
<th>Finishings of special elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>A</td>
<td>2400</td>
<td>600</td>
</tr>
<tr>
<td>B</td>
<td>1200</td>
<td>3600</td>
</tr>
<tr>
<td>C</td>
<td>1200</td>
<td>3600</td>
</tr>
<tr>
<td>D</td>
<td>450</td>
<td>2400</td>
</tr>
</tbody>
</table>

- ✓ Recommended finishing.
- ✗ Possible finishing not recommended due to the migration of fibres in the surface.

ZIP Zanette Innovation Panel
3.11 Other types of fixation and substructures

Fixing of panels in wooden structures.

All the previously described system can be applied on a sub-structure in wood instead of aluminium. The system consists of a wooden batten, consisting of a series of vertical uprights, to which a series of horizontal struts are screwed, which, appropriately dimensioned, makes the fastening structure for the slabs.

Fixing panels with adhesive.

Adhesive fixing is achieved by applying, on the inside of the plate ZIP perfectly rectified, the particular bonding systems to the substructure properly laid out. The fixing system must be of the type “Sika Tack Panel” or equivalent, and may only be applied by companies authorized to use the above system, so the operating instructions of the glue product must be observed as a general rule.

Essential weather conditions such as a temperature between 5 and 35°C and a humidity less than 75% shall be observed. Therefore the laying conditions with adhesive fixing should be evaluated from time to time according to the various processes.

Fixing panels with shingle system

A variant of the classic coplanar arrangement of the slabs is one with one side topped with the adjacent slab, with the aesthetic effect of a wall covered with a shingle system.

Fixing panels with Kerf system.

Among the types of invisible fixation, Kerf system, usually used for stone, can also be applied to ZIP. Made for sheet form no more than 600 mm in width, this fixing solution greatly increases the invisible fastening possibilities.
3.12 Colours and finishes

Further to the existing range of 14 standard colours, it is possible to have special colours at customer’s request always using the same colouring process.

The different colours can have 5 finishes:

- **NATURAL** a natural concrete finishing
- **BRUSHED** the tiny grains of silicon have been highlighted.
- **ORANGE PEEL APPEARANCE** a mix between brushed and bush hammered processing.
- **BUSH HAMMERED** rustic and raw effect of the material.
- **UNIFORM** finishing, a protective pigmented coat is applied, with more or less covering capacity, giving to the surface a matt or glossy effect.

On ZIP can be applied also water-repellent treatment, anti-graffiti coating and wet effect, all tested and certified in our inside laboratories.
Today, building means to cause impacts on the environment at all levels (energy consumption, waste production ...). In addition, products used in construction, maintenance or cleaning are still too often aggressive and sometimes toxic and seriously harmful to man and to the environment.

In this point, Zanette has been committed to a process of sustainable development from the beginning by researching, short-range raw materials, and also a respectful environment protective treatment. Conscious of current environmental hazards, Zanette, along with its suppliers, develops ecological products. Most of the raw materials we use to protect our plates are:

- **Formulated with water**
- **Biodegradable over 90%** (according to OECD standards)
- **Without or with low VOC content** (Volatile Organic Compounds)
- **Without solvent / silicone free**
- **Non-toxic / Not dangerous**
- **Non-flammable**

The protective equipment used by Zanette has an exceptional longevity of about three times higher than that of other products on the market. Our savoir-faire allows us to provide ten-year insurance guarantee for the good grip on the PROTECT range.

So, the buildings protected with our products, get a longer lifespan while remaining clean and new much longer. Our products reduce the use of water and chemicals at the time of restoration and maintenance.

We can therefore propose three types of products that can also have different shades of fully opaque, semi-opaque, glossy or brilliant seeds: **PROTECT – IDRO CF – PROTECT ANTIGRAFFITI.**

### PROTECT

Through surface treatment with hydro and oil repellent products you can protect all the materials produced by Zanette. This surface treatment has different features and many advantages:

- **Water repellent**, **Oleo-repellent**, **Anti-graffiti**. Avoids the formation of efflorescence, Anti-chewing gums and anti-mold.
- It is applied on the slabs after their maturation directly in the centers of production of Zanette by means of sophisticated automated equipment that ensures correct metering per square meter avoiding accumulations of materials.
- **Features**: Biodegradable, Colourless, Stain-resistant, Protects against frost.

**Hydro and oleo-repellent**

The treatment “PROTECT” protects the main causes of degradation, such as dirt, stains of any kind, air pollution, grease, infiltration, and so on. The treated substrates resist penetration of water, oil and dirt. The cleaning of the treated surfaces is thus guaranteed.

### Pigmentation

**Pigmentation** can be transparent or pigmented with low percentages up to a total coverage. Unlike painting, it is a semi-transparent impregnating product that respects the minerality of materials obviously compatible with concrete. The final colour depends on the colour of the veneer and the colour of the support of Zanette products in the concrete mass. Protect is a non-film-like product; the support remains permeable to the air and water vapor, mono-component that does not require the application of a primer to uniform the bottom.

### The Protect system: customized colouring

The Protect range’s colours includes 42 standard colours and 8 “special” colours. A standard colour has a 100% coverage index by generating the product called by Zanette “UNIFORM”. Zanette with sophisticated machinery is able to shade these shades and offer a degree of opacity more or less high, keeping the same performances. The final colour of a treated surface will always be the result of the combination: stain colour on the colour of the substrate. A colour with low cover index will be less covering. In this case, the initial colour of the media will have a greater interaction on the final colour.

### IDRO CF

Zanette constantly searching for innovative products, has studied a simple application product that is able to let breathe ZIP giving the characteristic of hydro-repellent oil. IDRO CF is a hydro and oily repellent product ideal for protecting all alkaline surfaces from penetrations of water, from problems caused by moisture, dirty also grease and graffiti.

The application of IDRO CF allows to contain and in some cases completely block the appearance of efflorescence on the surface of the support. Totally invisible and colourless after drying, IDRO CF does not alter the appearance or colour of the treated material. Always in aqueous phase, IDRO CF can be applied to the GRC support 24 hours after production. It can be used on site and in industry during the production of prefabricated concrete elements.

### PROTECT ANTIGRAFFITI

As a result of many customer requests for anti-scratch protection, Zanette has tested a very effective product at external laboratories: **PROTECT ANTIGRAFFITI** protects for a long time the main causes of degradation such as dirt, stains of any kind, atmospheric pollution, dirty grease, infiltration etc.

**PROTECT ANTIGRAFFITI** allows permanent protection of treated surfaces. Resists tens of lavage (using the scratch-resistant Graffi 2010 cleaner) and the surface does not need to be protected again after removing the graffiti.

**Pigmentation**

**PROTECT ANTIGRAFFITI** is suitable for concrete. Unlike painting, it is a semi-transparent product that respects the minerality of materials. Colour finishing depends on the colour of the veneer and the colour of the support. **PROTECT ANTIGRAFFITI** is a non-film-forming product; the support therefore remains permeable to air and water vapour.

**PROTECT ANTIGRAFFITI** is used on all types of vertical concrete, both inside and outside: concrete, reinforced concrete, cement fibrous, HPC concrete, etc.

### The PROTECT ANTIGRAFFITI system:

Customized colouring

The **PROTECT ANTIGRAFFITI** sample includes 42 standard colours and 8 “special” colours. A standard colour has a 100% coverage index. These colours can blend and offer a degree of more or less opacity, preserving the same performance.

The final colour of a treated surface will always be the result of the combination: stain colour on the colour of the substrate. A colour with low cover index will be less covering. In this case, the initial colour of the substrate will have a greater interaction on the final colour.
3.14 Graphic Customizations

Zanette’s experience on the façades can be distinguished by customizations. Thanks to automated technologies, logos with engraving and varnishing are possible. Customization options are complemented by the reproduction of particular graphics or textures with computerized cutting and drilling operations.

Thanks to constant research and experimentation, our center of robotised processing ensures precision and speed in consecutive machining of slabs and more in depth.

3.15 Supply Management

Zanette is able to respond in a timely manner to the on-site delivery of products through a proven manufacturing and supply management system in Italy and abroad.

A group to build end to rely on.
The production synergies of Zanette factories are also a production systems, which assures where necessary, reliable solutions for the client who need delivery priority or special supply at the constructions site.
3.16 Aesthetic characteristics ZIP

NATURAL PRODUCT
Concrete is considered a natural product and Zanette sees it as such, with all its advantages and different modes of expression. Seeing a surface born with the various shades of colour and lighting effects has always been an interesting moment shared with architects and customers, different are colourful surfaces flat and without "LIFE" but you can still reach with Zanette treatments.

Also in the colouring of cement paste, the focus is on meeting the ecological needs of modern and simple design. Working with natural raw materials brings advantages but also some particularities.

The market always asks for products with low porosity, homogeneous colour and smooth surfaces, large format uniforms that however are not part of our type of production and sustainable philosophy.

In choosing our production cycle we wanted to tackle a "Green" path avoiding chemical treatments or very sophisticated processes to maintain the authenticity of the natural product.

CHROMATIC SHADES
Shades, different shades, differences in workmanship inside and small imperfections are a fundamental feature of our handmade product that we can consider "natural" material with a different plate based on the daily cast that are affected by the influence of climatic factors.

NATURAL PHENOMENON OF EFFLORESCENCE
When the cement 525 CEM 1, during its transformation separates calcium hydroxide, dissolving in water it can migrate to the outer surface of the ZIP panel, through an evaporation process.

This phenomenon occurs when hydroxide of calcium is returned to the surface and is converted in calcium carbonate.

This inevitable natural process amplified by unfavourable weather conditions, leads to the deposition of calcium carbonate on the surface, as efflorescence of white colour.

Above all in strong colours, with a simple passage of water the effect will tend to disappear manifesting itself in forms always smaller in a season.

Zanette puts available a cleaner with a low dosage of acid sulphuric 3% that with an application and subsequent quick rinse can accelerate the elimination of these efflorescence.

PRODUCT PECULIARITY
Since concrete is a natural product, despite the ZIP sheets are the product of serial industrial processes, each sheet retains its uniqueness as it were a single element.

Differences in colour, shades of hues, small porosity micro-differences are the peculiarities of a material product, so they are not to be considered non-conformities. Below are some examples of the main characteristics of the slabs.

WATER BEHAVIOR
The concrete is hygroscopic, therefore subject to absorption of uneven water, that’s why Zanette in spite of it the low porosity especially in the finished slabs NATURAL (obtained without any removal of the concrete skin) applies a water-repellent protective coat which reduces its permeability making it less exposed to the climatic conditions that will however be able to influence always in the panel, especially during the drying phases in large panels that can then show up with dry edges compared to some central parts.

MASS COLOURING YIELD
Zanette uses natural dyes from the best brands, which, nevertheless, are to small variations over time. Heat, high solar irradiation and dry climate can accelerate the process of discolouration (especially for strong-tone hues) over time. Zanette recommends protecting the ZIP panels, with special treatments that improve and lengthen the colour seal over time.

There are also anti-graffiti treatments, and matte or glossy lotus effects that can increase and improve yield over time.

LARGE-SIZE SHEETS
In large coating applications, optical phenomena occur due to different absorption, which cannot be detected on small sample panels.

Small micro-cracks due to expansion or shrinkage, contrasted by random glass fibres and glass fibre mesh, do not affect the technical features of the slab, as supported by bending tests, which are constantly monitored by Zanette.

ZIP Zanette Innovation Panel
3.17 Detailed

SUPPLY OF ZIP PANELS
“Ex works” supply from our production plant in Forcata di Fornaci, ZP, of ZIP with inner fibreglass mesh to avoid slab collapse in case of impact.

- Colour: (See colour chart - ZIP technical manual), external finish: (See finishing table - ZIP technical manual) 15 mm thick (Weight 33.00 Kg/m²), to be installed by your specialized technician on suitable support structure (or on your modular cells).

The ZIP panels will have maximum dimensions, 1200 x 2400/3600 or sub-multiple measures, calibrated on the part not in sight, cut, shaped and worked at the factory. Any production scraps deriving from the formation of non-standard panels will be accounted for separately after the production schedules have been reviewed.

Finish and the shade of slabs not treated with uniform protective products is heterogeneous, a fundamental features for the cement produced at different times.

CORNER FORMATION
Formation of corner elements.

Surcharge for production of three-dimensional single-block corner elements, with maximum width of 400 x 400 mm and maximum length 2400/3600 mm.

These elements can have the same mass colour of the flat cover panels, but only Natural smooth external finish.

Beveled corners with a 45° cut. Panel juxtaposition angle using a 45° cut of the thickness of the panels for about 10/11 mm, leaving a corner of about 4/5 mm at 90° to prevent breakage in the event of impact.

Corner flap creation.

Surcharge for corner flaps on panels, for a maximum height of 10 cm, with the same mass colour of the flat cover panels, but only Natural smooth external finish. (See Special Parts - ZIP Technical Manual).

PREPARATION FOR FASTENING SYSTEMS
Preparation of the Keil or Fischer-type truncated conical holes for concealed fastening.

- Keil-type truncated-hole drilling for retractor fastening at a distance of about … x … cm from one hole to the other.

Preparation of the Keil or Fischer for retractor fastening.

Supply of Keil or Fischer-type expansion insert h=10 mm, in order to connect the aluminium under-structure and the covering panels, complete with a special bolt. Preparation of through-hole drilling for surface fastening. Creation of through-hole for surface fastening with rivet or screw, at distance of about … x … cm from one hole to the other, including supply, if any. Supply of rivet or screw insert in the same colour for surface fastening. Supply of colour-on-colour rivet or screw for panel fastening to the sub-frame.

PROTECTIVE TREATMENTS
Water repellent protective treatment made of 2 coats applied at the factory, which protects the external surface of the panels, maintaining the material effect on surfaces.

Colour-on colour pigmented uniform protective treatment made of 2 coats applied at the factory, which protects the external surface of the panels and gives colour uniformity of the installed product.

Colour-on colour or transparent anti-graffiti protective treatment, made of 2 coats applied at the factory, which protects panel from any vandalism.

TRANSPORT
Transportation of products to your work site ……………….. carried out by our qualified vehicles or carriers, including suitable packaging; unloading is to be performed by customer by means of suitable lifting means.

SUB-STRUCTURES
Retractable aluminium sub-structures for mechanical fastening.

- Sub-structure to support cladding plates for concealed fastening, made of special profiles in natural aluminium, using wall brackets, complete with Thermoslot insert in contact with masonry, with vertical frame in T or L profiles and horizontal frame with C profiles, including C-clamps for fastening of sub-frame to Keil or Fischer inserts prepared in the panels.

Calculated and sized according to project overloads, provided by a leading manufacturing company.

Aluminium sub-structures for surface fastening.

- Sub-structure to support cladding plates for surface fastening, made of special profiles in natural aluminium, using wall brackets, complete with including travel costs, board and lodging, any burden required to execute work safely, costs of thermostop insert in contact with masonry, with vertical frame in T or L profiles calculated and sized according to project overloads, provided by a leading manufacturing company.

ENGINEERING AND INSTALLATION
Engineering and preparation of production abacus. Realization of engineering for the study of the facades, including charges for the survey at the installation site, the overall drawings of façades, the creation of abacuses for cladding panel production

and cutting, the study of details of intra-doses and connection flashings, the study of details for the installation and anything else necessary for the execution of works in a workmanlike manner.

Installation of sub-structures and cladding panels.

Installation of support structures and covering panels, with open joints between 6 and 10 mm wide, carried out by specialized employees, lifting equipment and suction tools to handle slabs at height, as well as scaffolding or rental of aerial platforms.

SUPPLY OF INSULATING MATERIALS
Supply of glass wool insulating panel.

- Supply of glass wool insulating Isover X60 VN, d 0.032 W/mk type panel, paired to bituminous film forming a waterproof barrier.

Total thickness …….. mm for panels measuring 0.60x1,40 m

Supply of polystyrene insulating panel.

- Supply of polystyrene insulating Sirap Gemastir-type panel for initial wainscoting with thickness of 200 mm.

Supply of polystyrene insulation with thickness of 200 mm per pillar …….. mm.

Supply of adhesive to glue wool and polystyrene.

- Supply of Mapetherm AR 1 day-type glue to bond the 1st layer of wool and plinth polystyrene in quantities of about 5.00 Kg/m².

Supply of dowels to fasten the wool insulating panel.

- Supply of screw-on FF CS 8/100-type dowels, complete with insulating disc D/140 in quantities of about 6 pcs/m².

SUPPLY AND Installation
Supply and installation, cladding of ventilated external facade for vertical or sloped walls, with the use of ZIP containing fibreglass in order to avoid slab collapse.

External surface finish …….. …… colour …….. …… with impregnating protective treatment, about 15 mm thick.

The ZIP will have maximum dimensions, 1200 x 3600 or sub-multiple measures, calibrated on the part not in sight, cut, shaped and worked at the factory. The ZIP cladding panels, will be installed on a suitable aluminium substructure appropriately sized and calculated to withstand seismic stresses and wind gusts, supplied by a leading certified company using the Keil system for concealed mechanical fastening/mechanical fixing system with concealed rivet/concealed glue fixing system, and will be installed according to a specific abacus made on site, with 8/10 mm grout.

Between the load-bearing wall and the ZIP cladding panels, we will interpose an insulating layer of rock wool coupled with bituminous film to form a waterproof barrier with thickness of …….. cm, d …….. W/mk, complete with fastenings to the underlying wall, to reach a total transmittance of the buffer package μ <……….. W/m²k.

The supply and installation of connection tin-smithery, intra-doses on holes, ventilation grilles and anything else not expressly specified, are excluded from the cost quoted.
4. Transport

An organized logistics system provides us with an efficient and monitored management of every product that leaves our plants; each checklist can be easily checked allowing quick traceability of each component of the order.

To avoid deformation or breakage, the sheets are located on a resistant pallets that are specifically made to ensure rigidity and support on the entire support surface. Important: The pallet must be abundant, or protrude beyond the slab, at least 1 cm on each side and be reinforced to guarantee abnormal flexing.

The dimensions of the pallets must be optimized for container transport.

4.1 Packing

Organization and care of packing allows the product to always reach the destination site and in the best conditions. Each panel is carefully protected and arranged for shipping on 3 types of packaging:

- **Pallets** (photo A)
- **Cage** (photo B)
- **Closed crate** (photo C).

<table>
<thead>
<tr>
<th>Technical information</th>
<th>Unit</th>
<th>1200x2400x15 slab</th>
<th>1200x3600x15 slab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery</td>
<td></td>
<td>ZANETTE - Forcate facility (PN)</td>
<td></td>
</tr>
<tr>
<td>Slab surface</td>
<td>m²</td>
<td>2,88</td>
<td>4,32</td>
</tr>
<tr>
<td>Slab weight</td>
<td>kg</td>
<td>95</td>
<td>142</td>
</tr>
<tr>
<td>Slab weight for m²</td>
<td>kg</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Slab per pallet</td>
<td>#</td>
<td>19 - 20</td>
<td>15 - 18</td>
</tr>
<tr>
<td>m² per pallet</td>
<td>m²</td>
<td>54 ÷ 58</td>
<td>60 ÷ 78</td>
</tr>
<tr>
<td>Pallet weight</td>
<td>kg</td>
<td>≥ 50</td>
<td>≥ 100</td>
</tr>
<tr>
<td>Total pallet weight</td>
<td>kg</td>
<td>2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

Pallet size must be optimized for container transport.
4.2 Packaging and Handling

Packaging to be created in sequence is a very important phase that guarantees the arrival on site of materials not damaged during transport. Even the recommended handling of each shipment must be carried out with the appropriate equipment in order to avoid breakage or damage, which, if of minor entity, can be repaired with special kits.

Important: To ensure safe handling and avoid damage to slabs, it is necessary to use pallets with non-deformable structure. We also recommend that you follow the brief and useful handling and storage instructions shown on the following pages.

4.3 Work on site, maintenance and cleaning

Drilling and cutting.
ZIP panels, make it easy to carry out normal adjustment or repair work on site. For through or Keil type holes, it is advisable to use tools approved by the manufacturer. For manual cutting of slabs, it is sufficient to use electric tools with blades or diamond-coated discs with a rotation speed of 13,000 rpm. Preparing suitable perpendicular cutting guides will guarantee greater precision and finish quality, on suitable supports that prevent breakage.

Cleaning and maintenance.
For the normal cleaning of ZIP panels, we recommend water and neutral detergent; water-cleaning machines can be used with pressure not greater than 0.3 bar max. Any treatment areas subject to natural superficial degradation can be restored with products compatible with the original treatment; however, our Technical Assistance Service remains ready to provide you with professional solutions and products for correct maintenance and cleaning of your façade.

ZIP Repair Kit (Hard - Soft)
An easy and quick repair of slabs which suffered non-structural damage can easily be done on site with ZIP Repair Kit. The kit contains everything necessary for long-lasting repair, does not require the use of special equipment and is compatible with any protection products.

ZIP Repair Kit is available in the following versions:
HARD 5 kg package for deep repairs.
SOFT 1 kg package for superficial repairs.

6. “Rough slab”

ZIP is also available in the version “Rough slab”; slab with standard dimension rough edge for customer who wants to customize their dimension and finishes.

6.1 Technical specifications “Rough slabs”
### Technical specifications

<table>
<thead>
<tr>
<th>Nominal dimension</th>
<th>mm</th>
<th>1250x2450</th>
<th>1250x3650</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>mm</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Minimum guaranteed</td>
<td>mm</td>
<td>1200x2400</td>
<td>1200x3600</td>
</tr>
<tr>
<td>Slab area</td>
<td>m²</td>
<td>3.00</td>
<td>4.50</td>
</tr>
<tr>
<td>Weight of the slab</td>
<td>kg</td>
<td>≃ 101</td>
<td>≃ 150</td>
</tr>
<tr>
<td>Weight, per m² of the slab</td>
<td>kg</td>
<td>≃ 33</td>
<td>≃ 33</td>
</tr>
</tbody>
</table>

### Thickness “Rough slabs” (SP)

<table>
<thead>
<tr>
<th>Tolerance mm</th>
<th>H1 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 1</td>
<td>1 - 10 *</td>
</tr>
</tbody>
</table>

* Depending on the finishes request.

ZIP arrive on pallets in packages suitable for unloading as requested by the customer (10/15/20 Q.li) positioned on top of each other with a special polyethylene foam mattress of about 2 mm interposed.

After performing the operations using water, the pieces must be dried on both sides and positioned on suitable supports, with a maximum support distance of 40 cm, which guarantee good ventilation throughout the piece for at least 6-8 hours. Subsequently the slabs can be packed on pallets that guarantee perfect flatness both during transport and storage, always overlapping the closed cell polyethylene foam mat.

It is advisable to insert the instructions on board the package.

### 4.4. HANDLING AND STORAGE MODES.

#### Cutting with disk

<table>
<thead>
<tr>
<th>Disk rotation parameters</th>
<th>Cutting parameters (mm/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø Disk</td>
<td>Spindle rotation /min</td>
</tr>
<tr>
<td>300</td>
<td>2500 - 3000</td>
</tr>
<tr>
<td>350</td>
<td>2000 - 2500</td>
</tr>
<tr>
<td>400</td>
<td>1500 - 2000</td>
</tr>
<tr>
<td>450</td>
<td>1000 - 1500</td>
</tr>
</tbody>
</table>

**IMPORTANT:**

Indicative values to be tested based on the type and brand of the tools.

#### Shaped cutting with cutter

<table>
<thead>
<tr>
<th>Cutting tool cutter thickness</th>
<th>Lowering (mm/min.)</th>
<th>Advancement (mm/min.)</th>
<th>Spindle rotation (/min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 mm</td>
<td>150 - 200</td>
<td>200 - 400</td>
<td>2000 - 5000 Variable base on the diametre</td>
</tr>
</tbody>
</table>
Disclaimer

This Technical Manual 1.1 has been conceived with the aim of provide guidelines and provide useful planning tips, installation and maintenance and processing of the slabs ZIP. The information contained reflects the state of the art of knowledge technical-scientific and operational possessed by the manufacturer at the time of publication, we therefore invite you to refer to the latest updated version, always available at www.zanette.com in the download area.

For the above, Zanette is not responsible for any damage that should occur in application of the information and suggestions contained in this technical manual, because of information and suggestions alone, they always go preventively verified by the user.

Zanette Srl also reserves the right to make technical modifications to any kind without notice and without communication direct to any part.

When the material is delivered, it is advisable to check the colour taking into consideration the shades, workmanship and dimensions of ZIP because they will not be accepted complaints about material laid with defects already present at time of delivery.

In the event of claim it is advisable to notify urgently Zanette Srl and their experts who will support you.