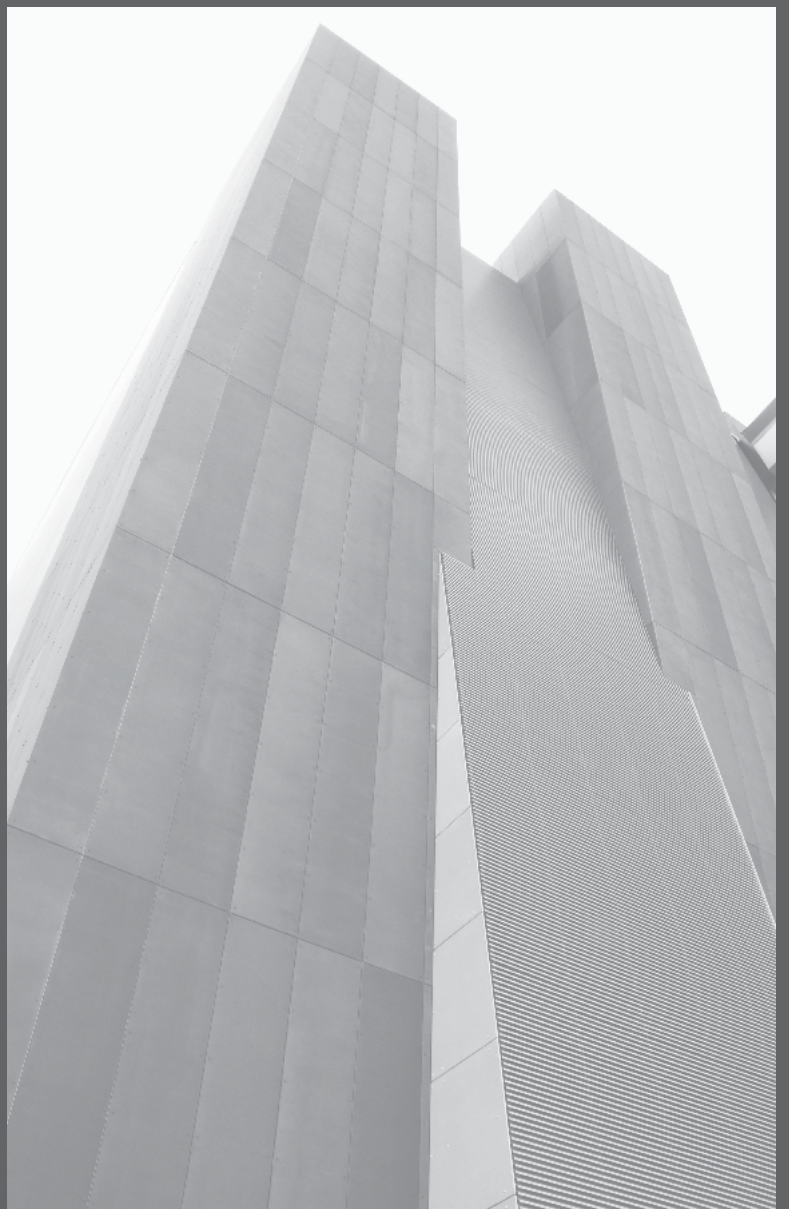


polycon[®]

The Book



polycon



Bisonspoor Maarssen,
Netherlands



Polycon 2014

Content

1.0 Basic description

1.1	About Polycon GFRC material	15–16
	Basic presentation	
	The possibility of using	
	Appearance	
	Surfaces	
	Coloring	
1.2	Production method	17
1.3	Basic technical characteristics quality and parameters	18–19
	Natural character	
	Quality	
	Environment	
1.4	Primary color and surface card	24–36
1.5	Sandblasted surface	37
1.6	Hydrophobization, antigraffiti	38–39
1.7	Graphic concrete™	44–55
1.8	Reckli catalog of imprinting formliners	56–72

2.0 The possibility of using

2.1	Facade facing	83–84
	Ventilated facades	
	Shape and corner elements	
	Production of components tailored to the project	
2.2	Other possibility of using	85–87
	Interior design	
	Furniture	
	Acoustic panels	
	Benches and street furniture	
	Flowerpots	
	Reception and bar desks	

3.0 TioCem

3.1	Basic description of the technology	97–98
3.2	The possibility of using	99

4.0 Basic anchorage systems

4.1	Riveting	110–128
	Details of the system (QV1)	
4.2	Bonding	130–149
	Details of the system (QV2)	
4.3	Keil	150–168
	Details of the system (QV6)	

5.0 Material processing

5.1	Production – directly into molds	173
5.2	Formatting and milling	174–175
5.3	Drilling	176
5.4	Waterjet cutting	177

6.0 Handling, treatment and storage

6.1	How to deal with the material on site	181
6.2	Acceptance of goods	182
6.3	Handling and the most frequent mistakes when handling	182
6.4	Using the rocker arm on the crane	183
6.5	Shape deformation	183
6.6	Storage on site and moisture penetration	183–184
6.7	Surface cleaning	184
6.8	Repair kit and its using	185–187

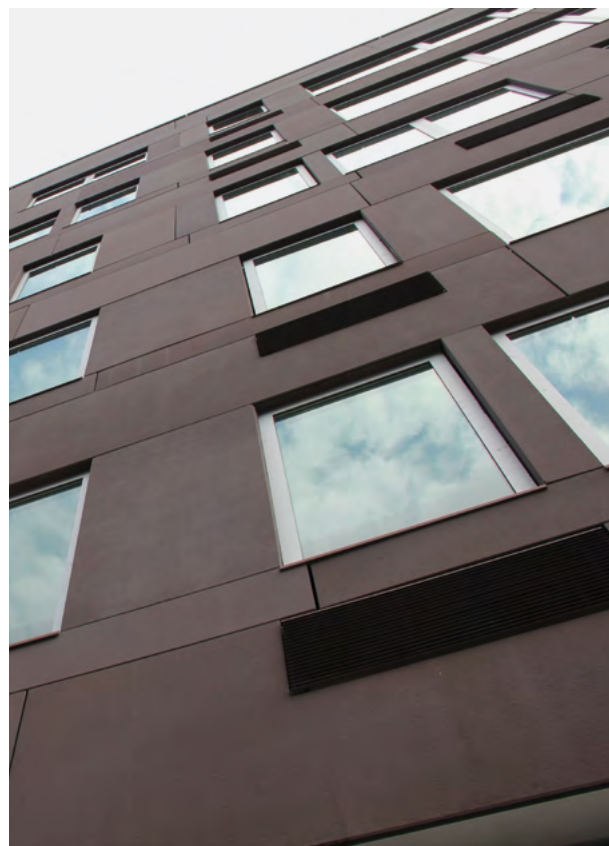
7.0 Technical characteristics of the material

7.1	Basic material properties	191
7.2	Natural character	192
7.3	Possibilities of color and surface differences	193–194
7.4	Thickness	194
7.5	Caverns, shrinkage cracks, tension trajectories	195
7.6	Shape deformation due to changes in temperature and humidity	196–197
7.7	Concrete efflorescence	198

8.0 Customer service

8.1	Technical support	203
8.2	Sample implementations	204
8.3	Cooperation with authorized professional institutions	205
8.4	Necessary documents and information for pricing	206
8.5	Diagram of the entire process – ordering, production, shipping with gross HMG	207
8.6	Support and samples	208–209





New York, Manhattan
USA



Chur,
Switzerland





10.

1.0 Basic description

1.1 About the material GFRC Polycon

Basic presentation

Polycon glass fiber reinforced concrete is non-combustible (A1) concrete composite with properties that enhances the architectural requirements of structures in solution. It improves fundamentally aesthetic requirements for implementation and finally makes a significant contribution for economic savings in building industry. Prescriptions of Polycon composite materials are based on the mixtures of cement, fine aggregate, water, dispersed alkali resistant glass fiber and other material additives. In this form Polycon material retains its unique properties that guarantee the highest quality of building components with regard to their long-term aesthetic and functional requirements.

The possibility of using

Polycon glass fiber reinforced concrete can be effectively used in the design and implementation of structural elements not only outdoor but also in interior design. Due a wide spectrum of imprinting structural matrices application, as well as an additional surface treatment, this can be easily accomplished by a huge variety of different visible surfaces, not only for the cladding board materials and panels, but also for complicated shape architectural elements, shapes and spatial elements and design solitaires. None of the products from material Polycon is limited by "dimensional constraints", which completely eliminates the issue of waste and residual materials which disproportionately burden the economy of works beyond the normal calculated costs. Their contribution is significant in the context of environmental requirements.



1.0 Basic description

1.1 About the material GFRC Polycon

Appearance

Completely natural character is the principal advantage of GFRC material Polycon, which fulfills the sense of the basic characteristics of "Living Facade". Each realization gets by that an absolutely unique character that is defined against a completely uniform, artificial and standard material. Significantly greater freedom for their own ideas is also available for the implementation of designs and ideas; this makes it possible to reproduce the most architectural styles and elements without taking into account the standardized formats, colors or surfaces. The Polycon material can materialize your dreams into reality.

Surfaces

The material Polycon can materialize your dreams into reality. Visible structure surfaces from Polycon glass-fiber reinforced concrete products can be realized from hundreds of patterns and surface structures (plaster, wood, masonry, stone and rocks, geometric patterns, oriental structures, disruptive patterns, ribbed and corrugated profiles, slip-resistant structures, texts, numbers, logos, pictograms, autotypic matrix, engraved structures). It is also possible to define a completely unique request to perform a visible surface according to your preferences and fantasies.

Coloring

Components of Polycon material can be delivered with completely the natural design, ie. without any colored pigments but also the material can be pigmented during the production using a suitable color pigments according to the desired shade of pigmented glass-fiber-concrete mass. Characteristic appearance of natural materials is still maintained by material coloring. If interested, you can also adjust the surfaces using paint suitable for alkaline substrates. Surface finishing with special resins is also possible. Using of coating compositions suppress the creation of the characteristic appearance that is formed by unified paints.



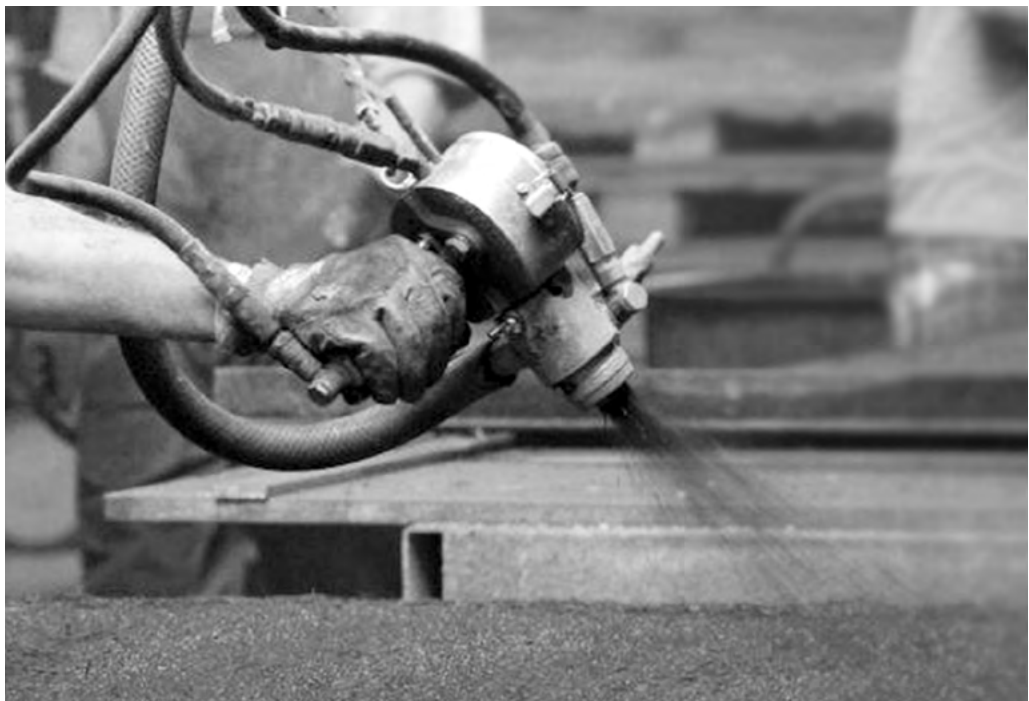
1.0 Basic description

1.2 Production method

The highest values with regard to strength parameters are achieved by direct manual pressurized spraying, that ensures uniform deposition alkali-resistant glass fibers in the sprayed surface (mass). The positive water ratio and the duration of flat oriented fiber dispersed in matrix ensures that the material will stand even in high demands for its using and this takes consistent mechanical properties.

The method of pressure spraying is being used for Polycon glass-fiber reinforced concrete elements producing. Basic material production matrix is pressed into the pump to the spray gun. "Endless" stream of alkali-resistant glass fibers is automatically fed in the same time. The fiber is formatted by passing by the gun to the required length. By means of compressed air cement mixture is sprayed together with fiberglass in layers into the prepared molds. Glass-fiber reinforced concrete elements Polycon are produced in multiple layers, wherein each layer have a thickness of about 3–4 mm. During pressure spraying layers are continuously compacted and the process is repeated until the desired thickness.

After the primary strength of the intermediate products reaching, they are demoulded and moved to the aging space for storage and further processing (see Material Processing).



1.0 Basic description

1.3 Basic technical characteristics quality and parameters

Natural character

Polycon glass-fiber-concrete composite is a material, whose basic characteristic is the natural appearance. Irregularities in the context of color tonality, not entirely consistent and unified surface, small surface tension trajectories caverns, including the inclusion of material inequalities represent the typical material properties that distinguish it from unified artificial surfaces. Just this material irregularities form the basic difference between invention and uniformity.

Projects implemented by the Polycon material acquire their own character due its unique properties, because the material continuously responds to external stimuli related to external influences and creates not yet realized objects. Therefore, the individual projects become completely unique and unrepeatable.

Polycon Material is hard, tough, and long-lasting. Due to the possibility of production of thin-walled elements is also cost-effective. Polycon material is categorized as non-combustible class A1 in accordance with EN 13501. 1 (Fire classification of construction products and buildings).



Quality

An important aspect for material selection and its actual implementation is general agreement in the essential requirements within the expected realization design. It is Important to learn the final customer or user from the beginning thoroughly with all facts which relate to the present work and inform them with all details of material specifications. It is appropriate that all active participants in the implementation process are informed about these facts prior the final products implementation of individual projects. When all the facts and circumstances relating to the project are defined in advance clearly and distinctly, then the overall impression of the overall implementation will have maximum efficiency and lead to customer satisfaction. The total clarification of technical details (including the approval of the submitted samples, the scope of which correspond proportionately making the final solution) allows to solve in advance all aspects relating to the required specifications and final design.

1.0 Basic description

1.3 Basic technical characteristics quality and parameters

Environment

Especially primary, rich and naturally occurring mineral materials are used for the production of glass-fiber reinforced concrete. Glass-fiber reinforced concrete is stable mineral-based material and is almost inert.

Although glass-fiber reinforced concrete is produced mainly from primary raw materials, this is very environmentally friendly technology. When compared with other materials, concrete products and structures are generally durable, weather resistant, low-impact of degradation effects. This is related to lower costs of operation, maintenance or restoration.

Substantial reduction of cement and energy is a major advantage of Polycon glass-fiber reinforced concrete elements production with regard to the environment in comparison with conventional cements, comparable materials in the manufacture of the same surface area (m^2), because the glass-fiber reinforced concrete is being used for the production of thin-walled elements. More elements can be transported in comparison with reinforced concrete elements due to the small thickness and low weight. It takes a direct effect to both the cost and the environment (carbon footprint). Compared to bulky reinforced concrete panels which need heavy machinery for moving, here is a possibility of manual material handling. With regard to its parameters they can be manipulated manually or by small power using.

Custom manufacturing enables effective planning and optimization, minimizing waste and maximum utilization of all production processes, resources and energy.

Possible wastes are harmless because the glass-fiber reinforced concrete is composed of inorganic materials. Recycling of concrete can be used during the demolition of concrete buildings and glass-fiber reinforced concrete. The resulting material can be used for example as a material for base layers and different backfilling and landscaping. It can replace other materials (for example, from natural sources). The energy for their acquisition and exploitation is not necessary to spend. This can achieve cost savings and the environmental soundness. In addition, the economically and energy-intensive processing of iron reinforcement is not necessary (unlike reinforced concrete) because the reinforcement in glass-fiber-concrete consists of scattered glass fiber.

Active reduction of the concentration of pollutants in the air is achieved by using photocatalytic cement by glass-fiber-concrete elements using on building facades (See chapter 3.0 TioCem).



A modern, multi-story building with a white, textured facade. The building features several horizontal bands of windows and a large glass entrance at the base. The sky is clear blue, and there are power lines running across the top of the frame. A few small trees are planted in front of the building, and a road is visible in the foreground.

FORUM
NOVÁ KAROLÍNA

Ostrava,
Czech Republic





Zlín,
Czech Republic



Primary color and surface card

Shade number

Name

01.1

Natural white

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 01.1

Name of the color shade

Natural white (01.1)

Surface

Smooth (S)

**Designation**

F 01.1

Name of the color shade

Natural white (01.1)

Surface

Fine structure (F)

**Designation**

P 01.1

Name of the color shade

Natural white (01.1)

Surface

Gross structure (P)

Shade number

Name

02.1

Concrete grey

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 02.1

Name of the color shade

Concrete grey (02.1)

Surface

Smooth (S)

**Designation**

F 02.1

Name of the color shade

Concrete grey (02.1)

Surface

Fine structure (F)

**Designation**

P 02.1

Name of the color shade

Concrete grey (02.1)

Surface

Gross structure (P)

Shade number

Name

03.1

Velvety grey

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 03.1

Name of the color shade

Velvety grey (03.1)

Surface

Smooth (S)

**Designation**

F 03.1

Name of the color shade

Velvety grey (03.1)

Surface

Fine structure (F)

**Designation**

P 03.1

Name of the color shade

Velvety grey (03.1)

Surface

Gross structure (P)

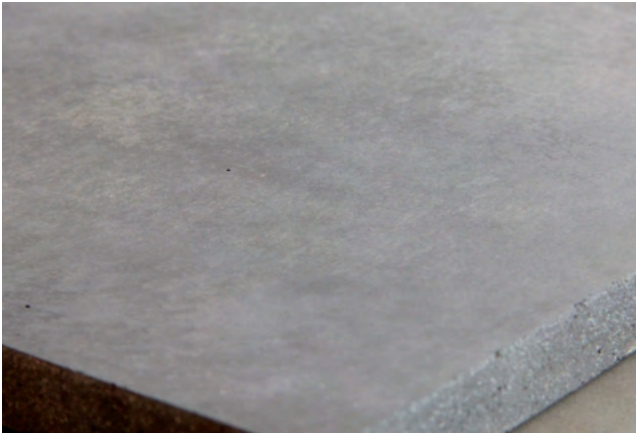
Shade number

Name

04.1

Anthracite grey

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

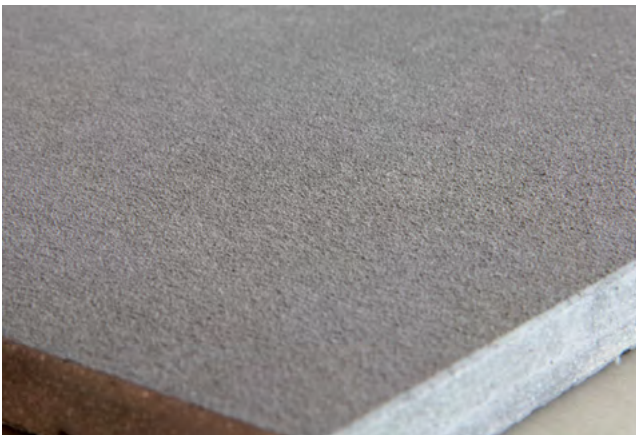
S 04.1

Name of the color shade

Anthracite grey (04.1)

Surface

Smooth (S)

**Designation**

F 04.1

Name of the color shade

Anthracite grey (04.1)

Surface

Fine structure (F)

**Designation**

P 04.1

Name of the color shade

Anthracite grey (04.1)

Surface

Gross structure (P)

Shade number

Name

05.1

Graphite grey

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

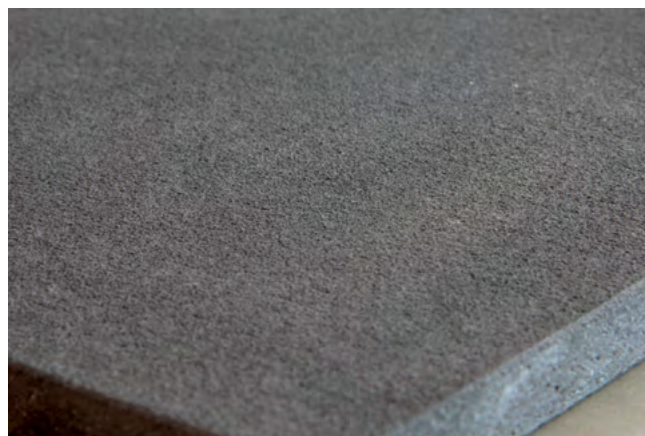
S 05.1

Name of the color shade

Graphite grey (05.1)

Surface

Smooth (S)

**Designation**

F 05.1

Name of the color shade

Graphite grey (05.1)

Surface

Fine structure (F)

**Designation**

P 05.1

Name of the color shade

Graphite grey (05.1)

Surface

Gross structure (P)

Shade number

Name

06.1

Ivory

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 06.1

Name of the color shade

Ivory (06.1)

Surface

Smooth (S)

**Designation**

F 06.1

Name of the color shade

Ivory (06.1)

Surface

Fine structure (F)

**Designation**

P 06.1

Name of the color shade

Ivory (06.1)

Surface

Gross structure (P)

Shade number

Name

07.1

Sandstone

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 07.1

Name of the color shade

Sandstone (07.1)

Surface

Smooth (S)

**Designation**

F 07.1

Name of the color shade

Sandstone (07.1)

Surface

Fine structure (F)

**Designation**

P 07.1

Name of the color shade

Sandstone (07.1)

Surface

Gross structure (P)

Shade number

Name

08.1

Brick red

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 08.1

Name of the color shade

Brick red (08.1)

Surface

Smooth (S)

**Designation**

F 08.1

Name of the color shade

Brick red (08.1)

Surface

Fine structure (F)

**Designation**

P 08.1

Name of the color shade

Brick red (08.1)

Surface

Gross structure (P)

Shade number

Name

09.1

Malachite green

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 09.1

Name of the color shade

Malachite green (09.1)

Surface

Smooth (S)

**Designation**

F 09.1

Name of the color shade

Malachite green (09.1)

Surface

Fine structure (F)

**Designation**

P 09.1

Name of the color shade

Malachite green (09.1)

Surface

Gross structure (P)

Shade number

Name

010.1 Travertine brown

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 010.1

Name of the color shade

Travertine brown (010.1)

Surface

Smooth (S)

**Designation**

F 010.1

Name of the color shade

Travertine brown (010.1)

Surface

Fine structure (F)

**Designation**

P 010.1

Name of the color shade

Travertine brown (010.1)

Surface

Gross structure (P)

Shade number

Name

011.1 Slate brown

This color shade is part of the standard color material collection upon request the standard shade can be combined with various pigments as required to achieve a completely unique color design.

**Designation**

S 011.1

Name of the color shade

Slate brown (011.1)

Surface

Smooth (S)

**Designation**

F 011.1

Name of the color shade

Slate brown (011.1)

Surface

Fine structure (F)

**Designation**

P 011.1

Name of the color shade

Slate brown (011.1)

Surface

Gross structure (P)

1.0 Basic description

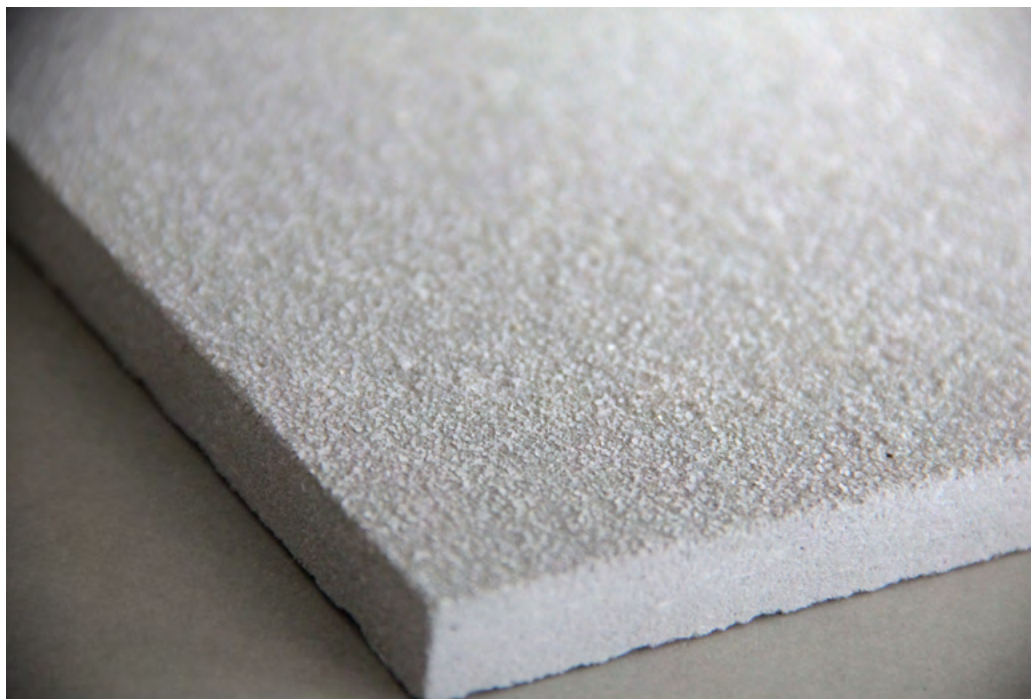
1.5 Sandblasted surface

Exposed aggregate surface is specially coated exposed surface of the Polycon material. It is a chemical process whereby a high aesthetic assessed to the open surface structure, that its purely natural character enhancing the visual uniqueness surface.

The process of chemical "sanding" of the structure surface gives the facade tiles unique visual property. Their originality lies in the fact that the surface of the tiles is not inherently seamlessly unified and the same. Each individual plate retains its uniqueness due to the wide spectrum of visual grading layers. This is determined by using the wide framework of material components. The whole production process is completely unified and every single plate passes through an identical manufacturing process. Therefore, the final design of the surface structure is given only due to controlled erosion process of board surface structure. Quite unique surface of each plate is the result of a chemical process. In the context of the application it creates in each facade the unique character and natural appearance. Now this is quite intentionally sought and used by architects for its uniqueness and unrepeatability. The spectrum of surface heterogeneity and diversity of panel boards within this surface modification is one of the basic characteristics of glass-fiber reinforced concrete material. Therefore, this surface structure is chosen as the required solution.

This type of treatment is designed primarily for flat slabs and tiles due to technological progress driven erosion surface structures, because there can be the irregularities in the visible unity of the form elements. At the corner elements or shapes demanding elements (where different areas are interconnected) the scrubbed of surface structures can exhibit with an increased separation of the material in these related areas, corners and edges.

Due to the open structure in the use of the hydrophobic coating is recommended. This significantly reduces the possibility of water absorption in the visible structure of the material and thus contributes to the maintenance of his enduring aesthetic values.



1.0 Basic description

1.6 Hydrophobization, antigraffiti

Hydrophobization

Resistance of the surface structures of glass-fiber reinforced concrete Polycon products can be increased using the hydrophobization to external influences such as water, dirt, grease, frost, chemical and deicing compositions. Correct use of the appropriate type hydrophobization can easily achieve better functional and useful properties of glass-fiber reinforced concrete cladding, especially with regard to its long-term use under technical aesthetic requirements. Hydrophobized products have substantially reduced water absorption of the surface layers and the associated effects.

Hydrophobization of surfaces is functional method for longer life and high long-term serviceability. Hydrophobization basic principle is to increase the surface tension of the material and increasing the wetting (contact) angle of water, which is achieved by using a hydrophobic substance on the functional surface of the material pores. Within the technical description the principle of the hydrophobicization it can be formulated as a change in the physicochemical properties of the treated material, which substantially increases at the interface of solid and gaseous environment the so-called the wetting (contact) angle for water. Water easily penetrates into the pores of building materials due to its large surface tension and small wetting angle. However, if we increase the contact angle of water, it cannot wet the surface and penetrate into the surface much more difficult. The hydrophobic substance on the surface of the material must be very thin (invisible to the eye), to almost not to diminish diameter of material pores, thus, in order to avoid elimination half throughput, which must be maintained (WARNING – Important the water-repellency is not to be confused with waterproofing!). Water cannot create a continuous surface on hydrophobized surface thus surface is not wetted with water and water easily flows in the form of beads.

Lifetime of hydrophobizing the on the material surface is directly depending on the kind and type of the structure, especially on the specific type of environment in which the products are used, it can takt to 10 years.



1.0 Basic description

1.6 Hydrophobization, antigraffiti

Antigraffiti

It is in the general sense of the type of creative expression working in public space technology application of paint, often in the form of a spray or markers. The most common form is spraying of graffiti spray paint on surfaces of various materials (concrete, brick, glass, ...).

Sprays – this kind of paint containing binder, usually an organic resin, and the solid color, usually an inorganic pigment.

Markers – are useful mostly on smooth surfaces (smooth cut or polished stone, metal, glass, plastics, etc.). They comprise a solution of an organic dye, which is applied to the pen tip described surface. If they are to be removed with water colors, colored markers liquid still contains dissolved organic binder.

The difference between the two "systems" is obvious.

While in the case of spray, a substantial part coloring ingredient in solid particulate form (with the exception of the present organic dyes) can penetrate into the porous structure is limited. In the case of markers coloring component dissolved in the liquid easily penetrates into the space between the crystalline limestone and marble materials with high porosity (sandstone, limestone, plaster, etc.). Inorganic pigments (as part of sprays) are very stable to light and it is usually not possible to change their chemical structure, without challenging the substrate. In contrast, organic dyes (contained in the pens) can be under certain circumstances chemically decompose and thereby change their color or bleach completely.

The different behavior of markers and spray make effect when cleaning. Solubility of organic dyes markers in appropriate solvents on the one hand gives the possibility to facilitate their removal, but also causes a danger that, when such a cleaning portion penetrates deeper color components into the structure of the purified material and remains unremoved. This is also true for the soluble component of sprays. When cleaning sprays we try to dissolve or soften the paint binder and then insoluble colored pigment particles is mechanically removed (eg high pressure water).



Amriswil,
Switzerland





Antwerp,
Belgium



1.0 Basic description

1.7 Graphic concrete™

Technology Graphic Concrete™ is based on innovation of interior architect Samuli Naamanka. At the end of the 90th years of the last century Samuli began develop retarding and printing methods for production of drawings and designs on concrete surfaces. The inspiration was to create a real industrial product for large surfaces and tools which would get enabled architects to be visually creative. Traditional methods were based primarily on crafts and represented a small part of the art. Finally, his techniques were patented and the company Graphic ConcreteLtd. establishment in 2002.

Polycon Products offers this technology architects, they can use it for design of concrete facades and use the possibilities of prefabrication process. Industrial Architecture™ with Graphic concrete technology started in Finland and soon the first pieces were realized. The first facades used designs with simple stripes. When the architects began to understand the possibilities of this new technology, repetitive patterns began to appear more and more frequently. Repeating patterns designed by architects come under the brand GCPro™ to distinguish them from GCCollection™. This is a separate collection of repeating patterns by Graphic Concrete.

Among the examples of design areas (where the Graphic Concrete™ technology is being used) now belongs prefabricated facades, sound barrier, the dividing wall of the building, precast concrete slab floors. The company enjoying a good growth and many of its projects are transnational in scope. Innovative technology Graphic Concrete™ is here briefly described.

The basic idea is the retarder application to the surface of a special membrane, which is subsequently applied by Polycon material. Retarders, which are printed on the membrane finish the concrete surface that the surface layer does not allow the product solidify in the form. Thus, the surface layer solidifies slowly and subsequently it can be washed out. The normal depth of pattern called fine exposure is approximately 1 mm. Architects can creatively use these very simple tools to create a variety of surfaces on the concrete choosing colored aggregates, by coloring the concrete surface layer and especially by applying suitable pattern to a concrete surface. Patterned smooth and completely exposed rougher surface constitute the final result

Production of Polycon technology Graphic Concrete™ runs in the factory. Membranes are printed by Graphic Concrete Ltd.

Polycon technology Graphic Concrete™ product method allows you to produce high quality molded components and panels it and offers for designers a new product range. Manufacturer of Polycon material in collaboration with Graphic Concrete Ltd. cooperates throughout whole construction process through the phases of planning, production and construction, until the final concrete surfaces are finished and they become generally known.

The presented samples and offered standard designs enable us to become a part of the local culture through architectural applications of Graphic Concrete™ technology by design of motives that come directly from the local area of your implementation

The mission of Polycon technology Graphic Concrete™ products is to be specific.

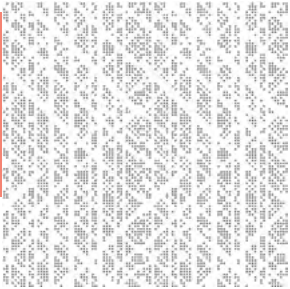
Catalog Graphic concrete™

1.0 Basic description

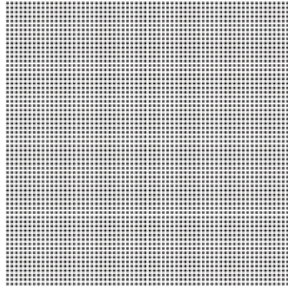
1.7 Graphic concrete™
Catalog of membranes

GCGeo

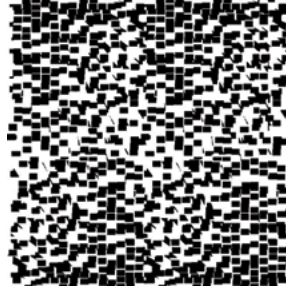
Atom Cross



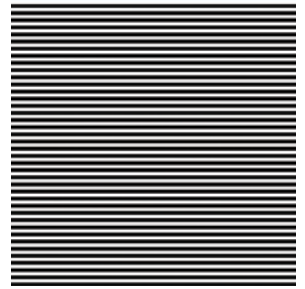
Circles



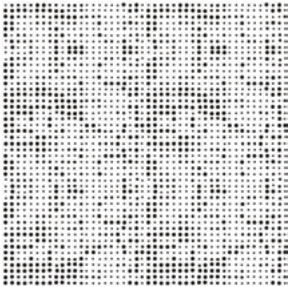
Extrude



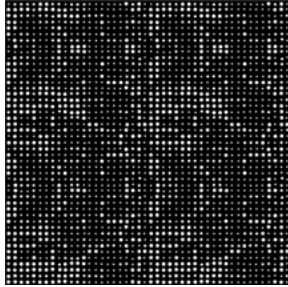
Stripes horizontal



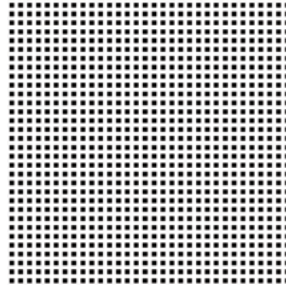
Piksel



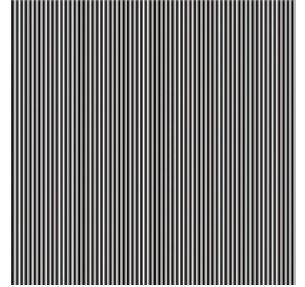
Piksel negativ



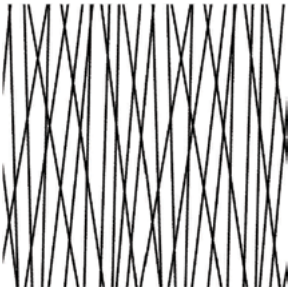
Squares



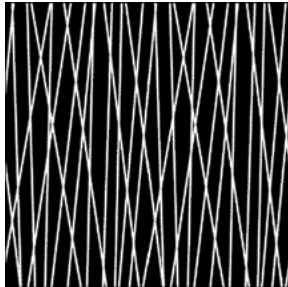
Stripes vertical



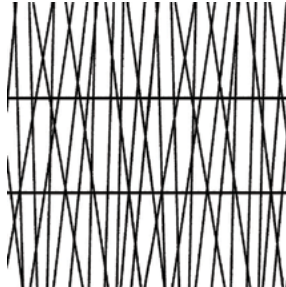
Vertex



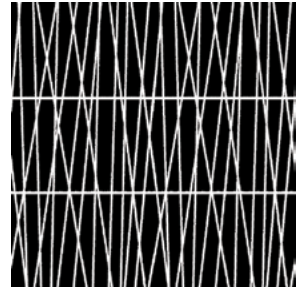
Vertex negativ



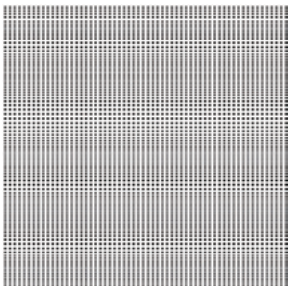
Vertices



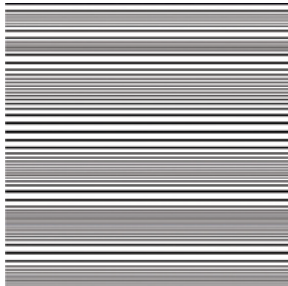
Vertices negativ



Wave Squares

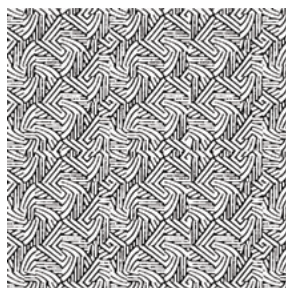


Wave Stripes



GCOrnaments

Dead End



GroundSlab

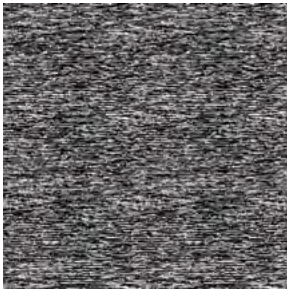


1.0 Basic description

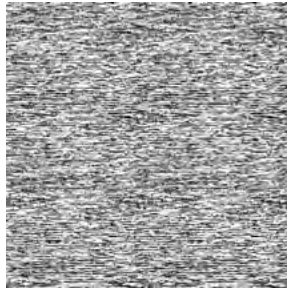
1.7 Graphic concrete™
Catalog of membranes

GCTexture

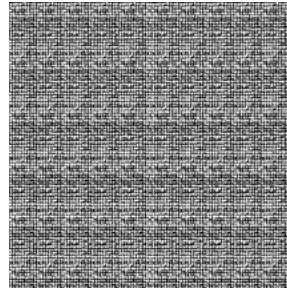
Textilia



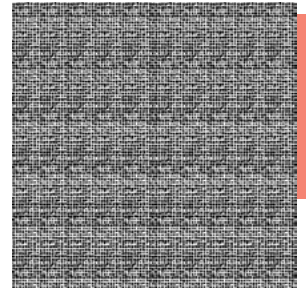
Textilia negativ



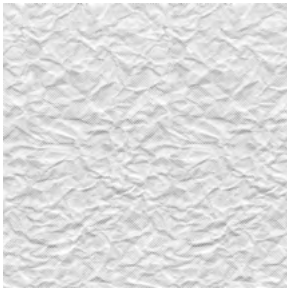
Turtle



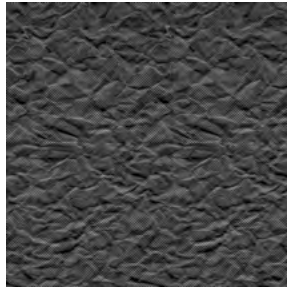
Turtle negativ



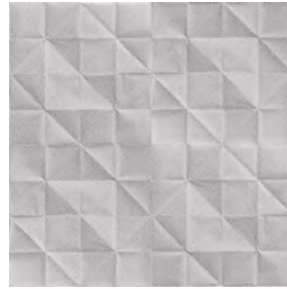
Wrinkle



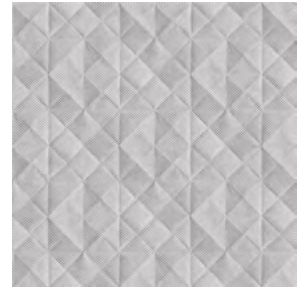
Wrinkle negativ



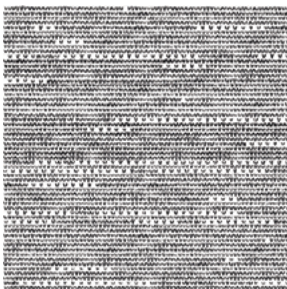
Folded Check



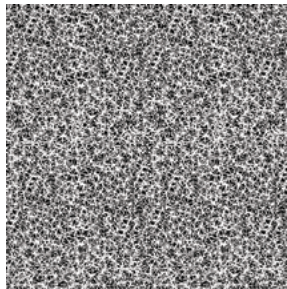
Folded Plaid



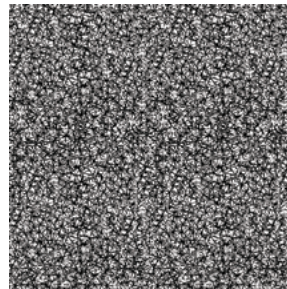
Knit



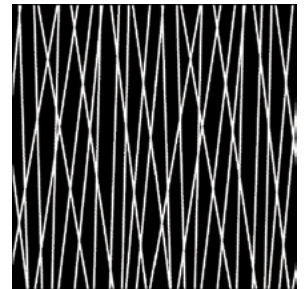
Stars



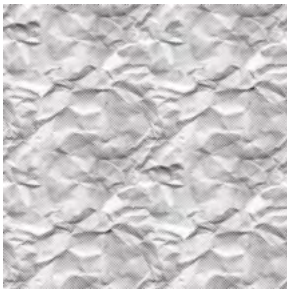
Stars negativ



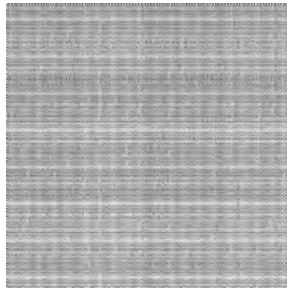
Vertex negativ



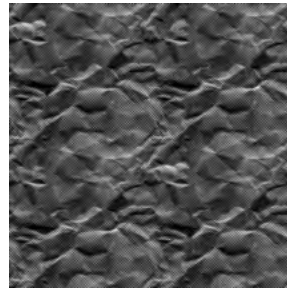
Wave Squares



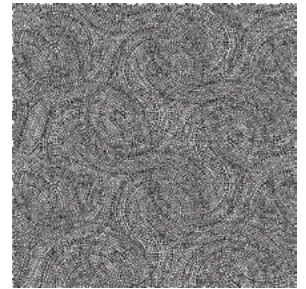
Wave Stripes



Crumple negativ



Sketchbook

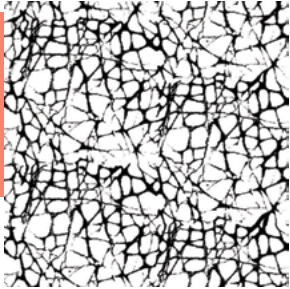


1.0 Basic description

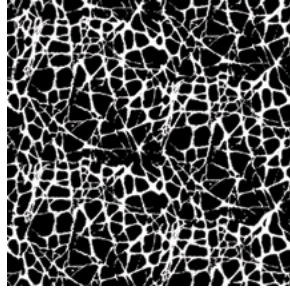
1.7 Graphic concrete™ Catalog of membranes

GCNature

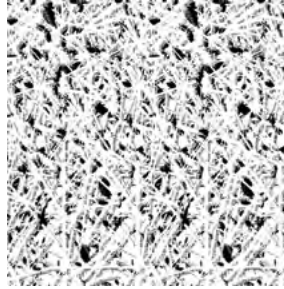
Juniper



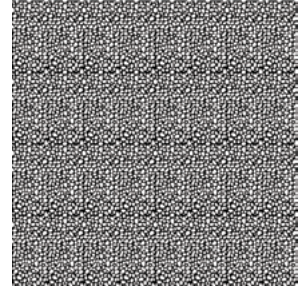
Juniper negativ



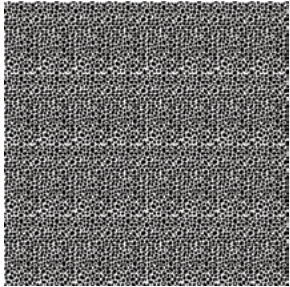
Haystack



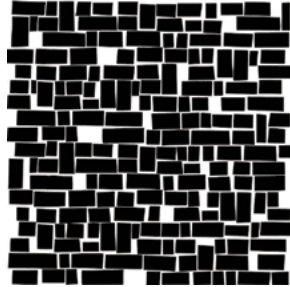
Pebbles 25



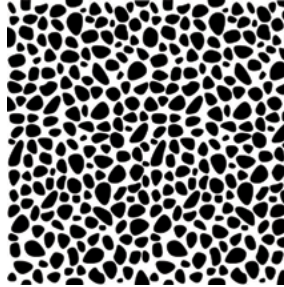
Pebbles 25 negativ



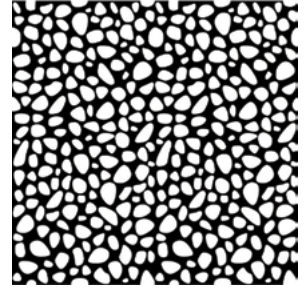
Piksel negativ



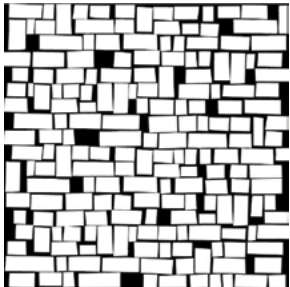
Pebbles 100 negativ



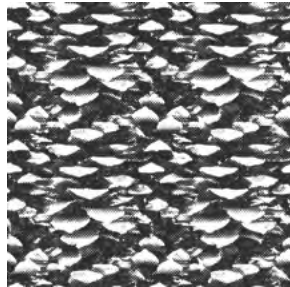
Pebbles 100



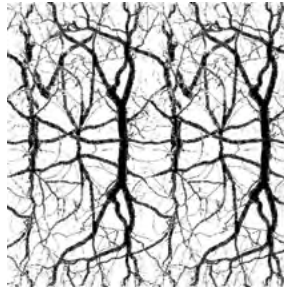
Irolro negativ



Cone



Roots



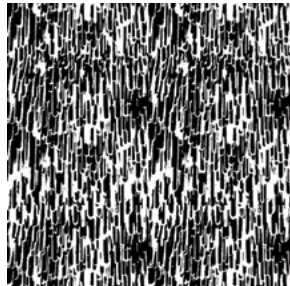
Drip down



Birch



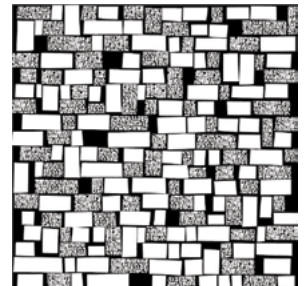
Drip down negativ



Irony



Irony negativ



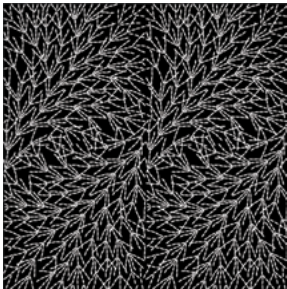
Birch+tailpiece

1.0 Basic description

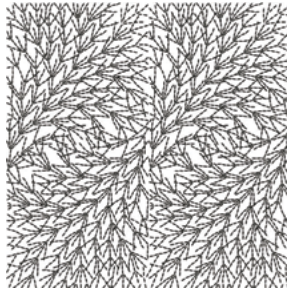
1.7 Graphic concrete™ Catalog of membranes

GCFlow

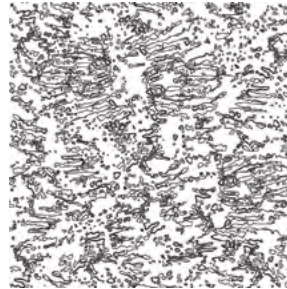
Swarm negativ



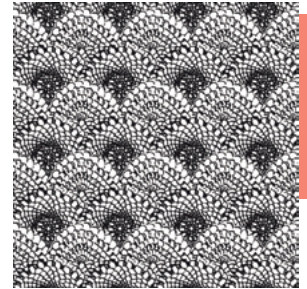
Swarm



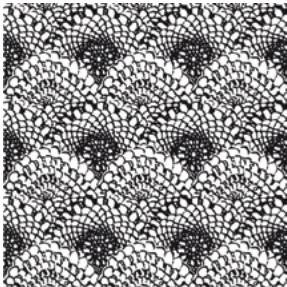
Shoreline



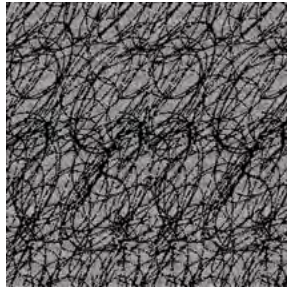
Nostalgia medium



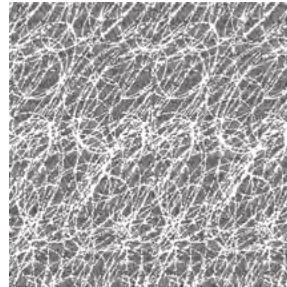
Nostalgia



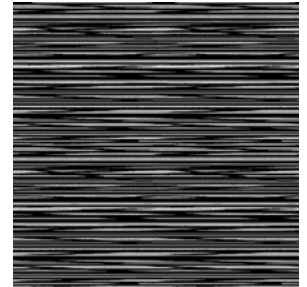
Mosaic Ellipse negativ



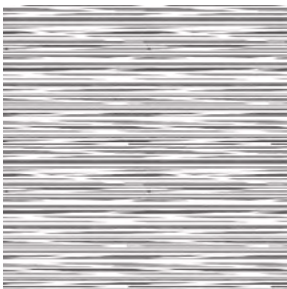
Mosaic Ellipse



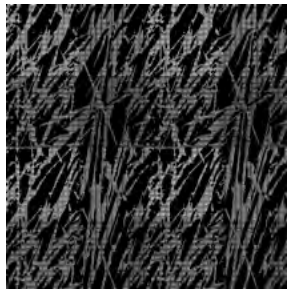
Ikat negativ



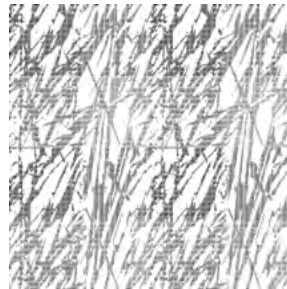
Ikat



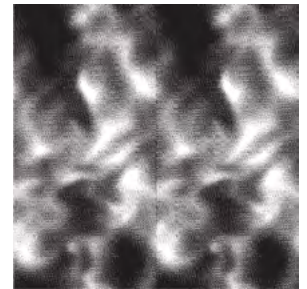
Grass negativ



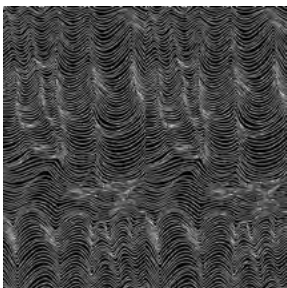
Grass



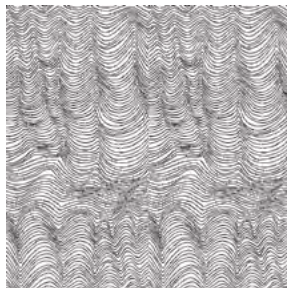
Flame



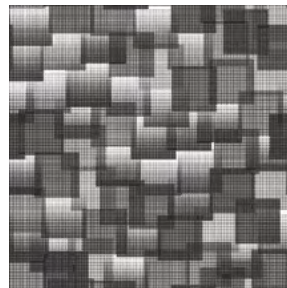
Contour Line negativ



Contour Line

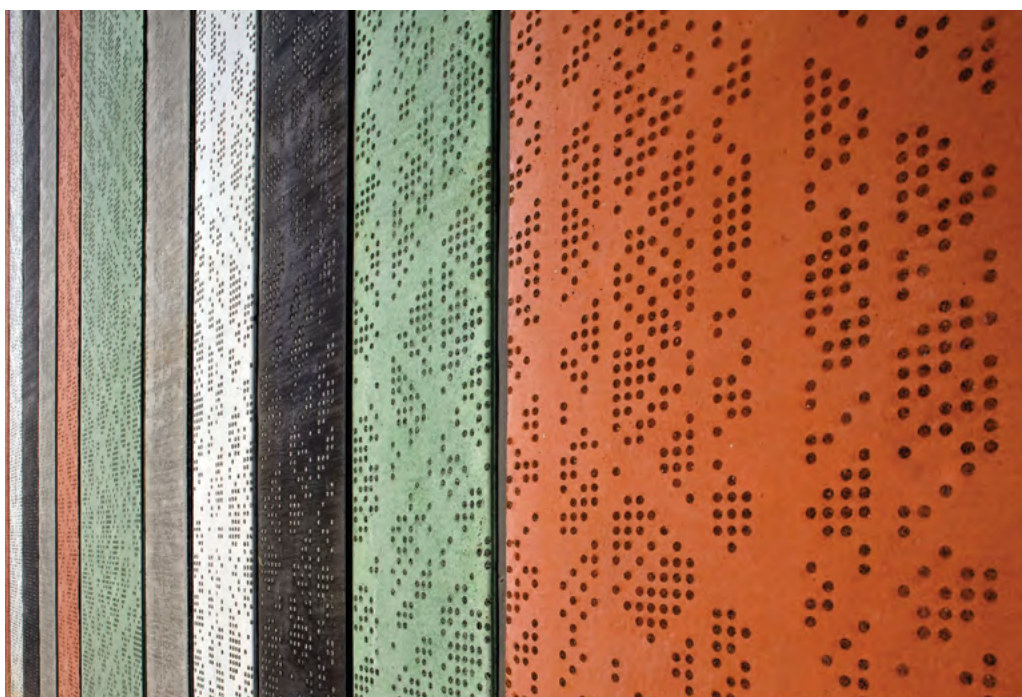


Caleidoscope



1.0 Basic description

1.7 Graphic concrete™ Catalog of membranes



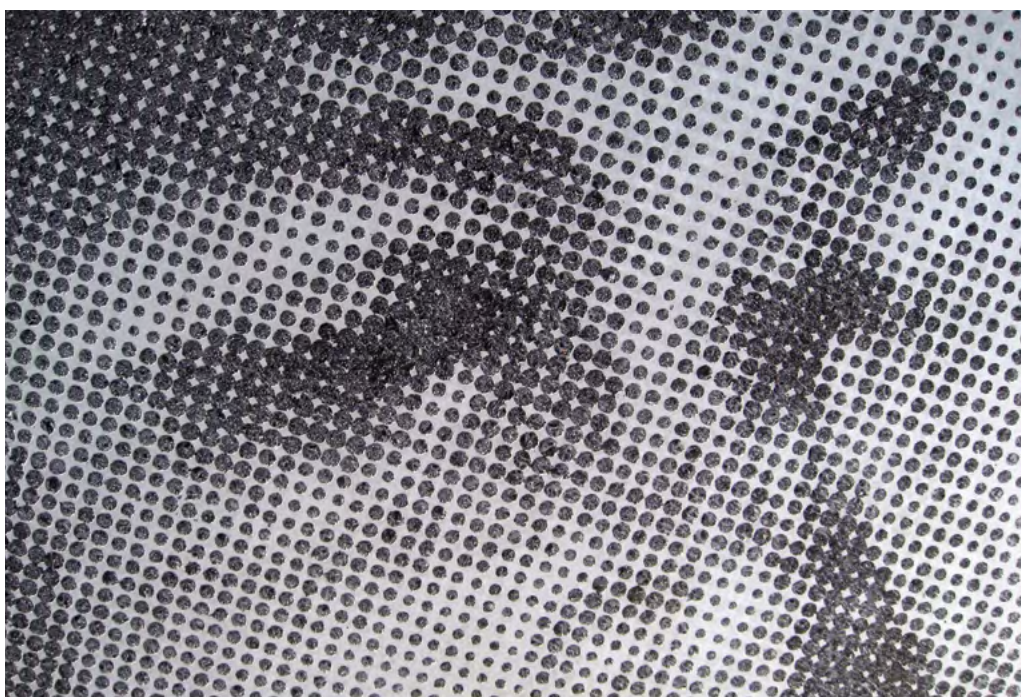
1.0 Basic description

1.7 Graphic concrete™ Catalog of membranes



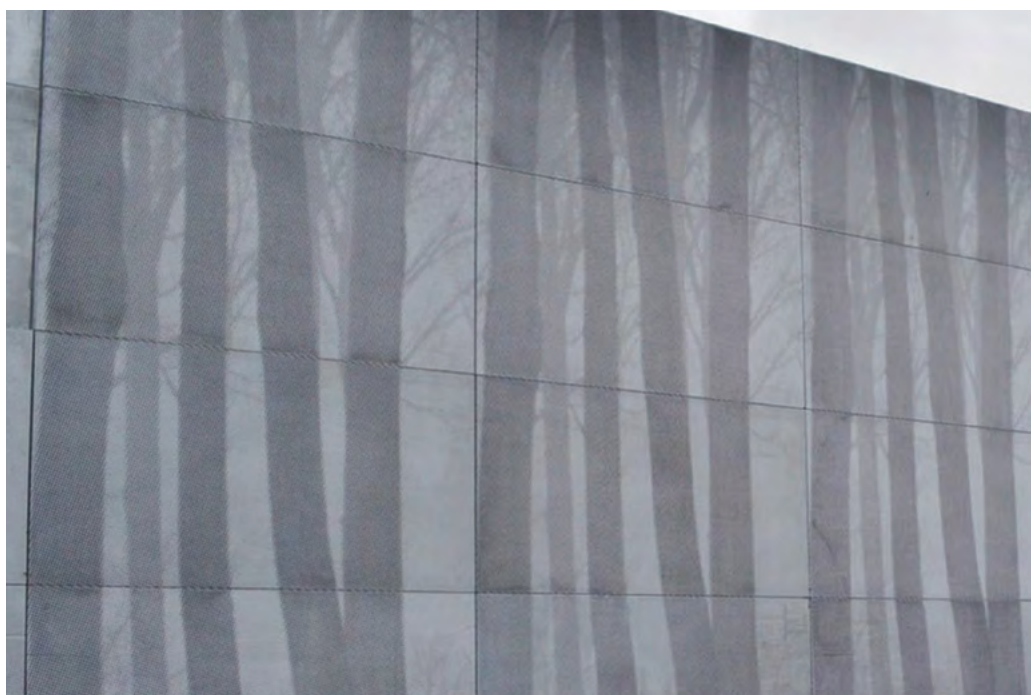
1.0 Basic description

1.7 Graphic concrete™ Catalog of membranes

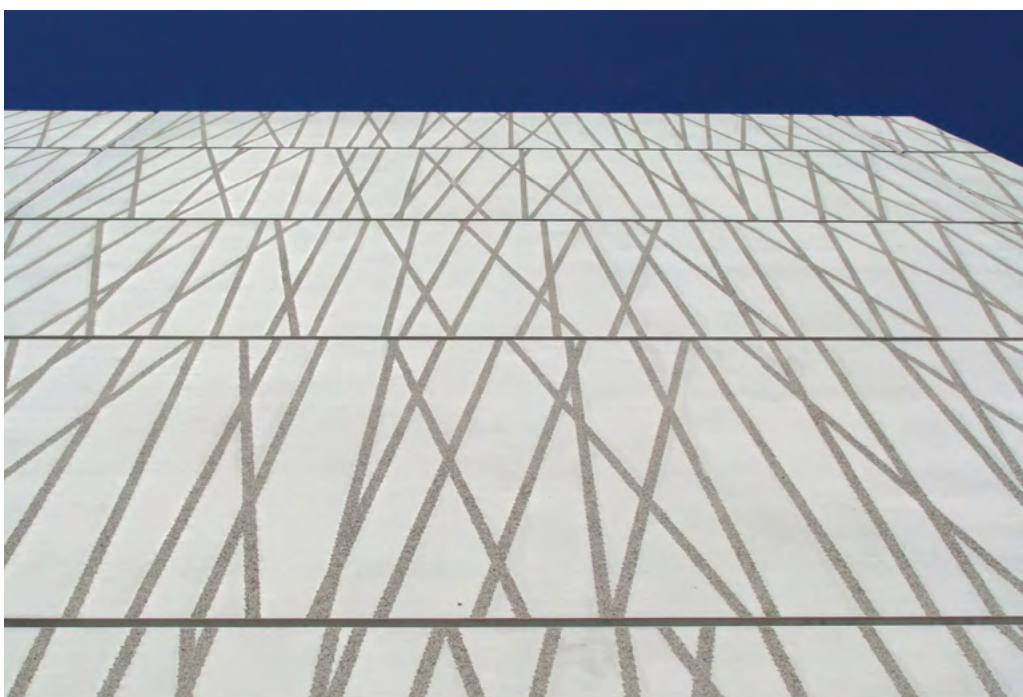


1.0 Basic description

1.7 Graphic concrete™
Catalog of membranes



- 1.0 Basic description
- 1.7 Graphic concrete™
Catalog of membranes
-



1.0 Basic description

1.7 Graphic concrete™ Catalog of membranes



1.0 Basic description

1.8 Reckli catalog of imprinting formliners

Elastic structural formliners and their use in the manufacture of glass-fiber reinforced concrete elements represent unlimited design options visible surfaces. The architectural design is limited by the form type. Using the matrix eliminates almost all of limits of the glass-fiber reinforced concrete applicability. It is possible to form a facade design elements, acoustic elements, walkable elements and last but not least, garden architecture elements. The matrix is made from elastic polyurethane, whose high flexibility, elasticity and resilience enable seamless and completely demoulding and its texture reproducibility.

RECKLI® company catalog, can you choose about 250 standard structures, from stone imitations, wood and rocks to the Oriental and imaginative structures. Offer of design is not bounded by standard structures; individual matrix can be created according to your design. Model in 1:1 scale is produced the first, elastic matrix is made on this model and it serves as negative form of glass-fiber-concrete surface. Individual matrix offers unbounded design possibilities of structured visible surfaces. Only the technical limits of elastic polyurethane subsequent handling and transport must be taken into account.

Some textures create the visible area of a uniform facade structure and create the impression of monolithic facade. Due to the matrix repeatability the economic and aesthetic work can be achieved.

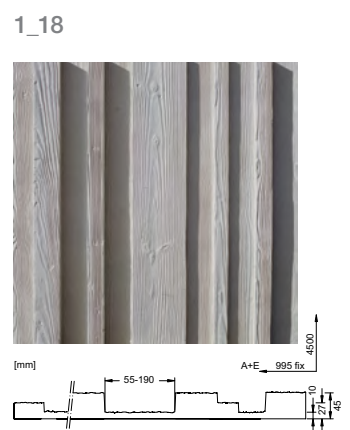
Innovative RECKLI® Photo-Gravur technology transfers photo to the facade by a special texturing of surface. The system creates a larger or smaller surface structure according to the resolution and then impression of photograph design concrete facade is created. This is a computer image transfer method for timber form milling technology. First of all the pictures are scanned and then converted to 256 gray levels.

Operating file is generated for the photo transferring to a wood form. The file contains special instructions for the CNC machining center. Milled model is used as a template for elastic RECKLI® – matrix manufacturing. Elasticity, quality and reproducibility enable aesthetically and economically enjoy a technology rendering of visually similar concrete surfaces Embossed surface Photo-Gravur creates an original image due to the impact of light and shadow. As each structure Photo-Gravur also revives through the play of lights and shadows on the facade. Matrix size is bounded by the maximum disposing forms size and maximum cutter flat size. Single parts of photos can be stacked together to create an overall picture.

3D matrix

This technology is unique because it is not just the view of geometric contours, but different height and depth creates a three-dimensional effect. Especially in interior the projecting texture forms the dominant features of the design. Milling 3D technique allows transfer the image to the model 3D in various levels. Then the model is used as the template for the RECKLI® matrix. Matrix size is bounded by the maximum disposing forms size and maximum cutter flat size.

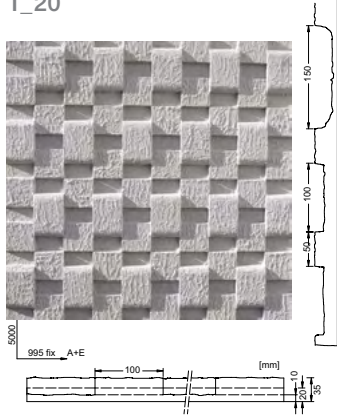
Reckli catalog of imprinting formliners



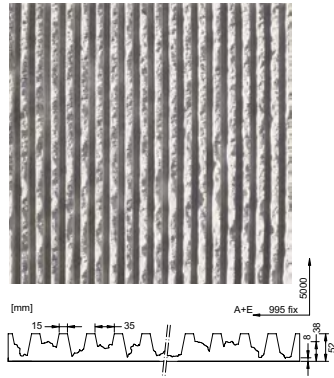
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

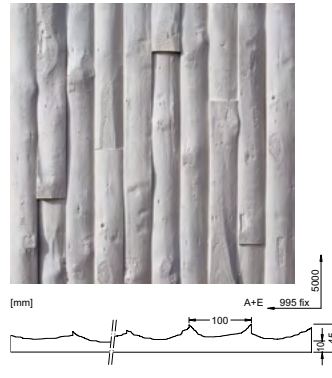
1_20



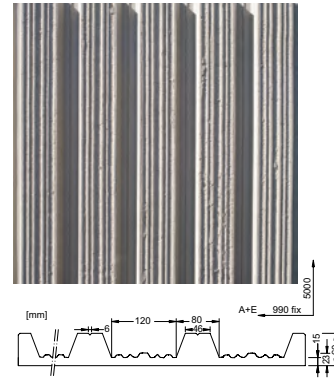
1_21



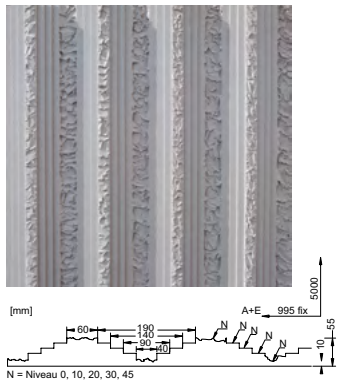
1_24



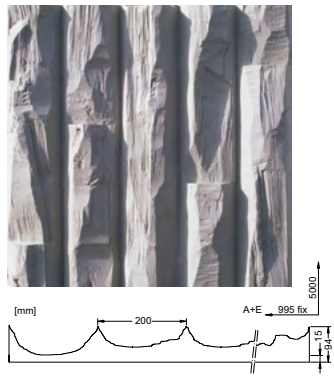
1_25



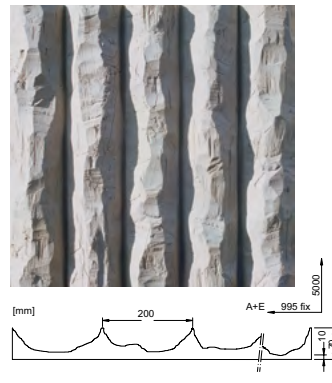
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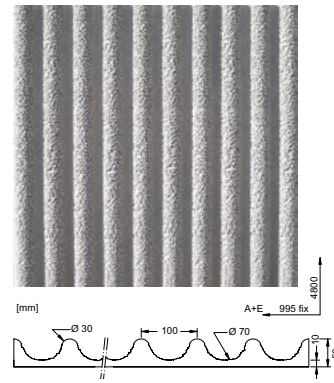
1_27



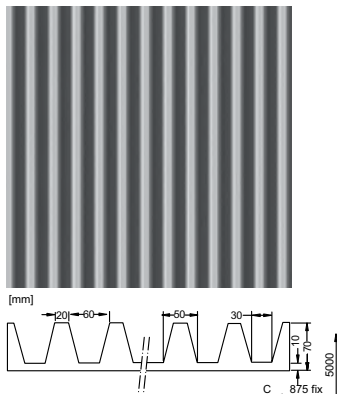
1_28



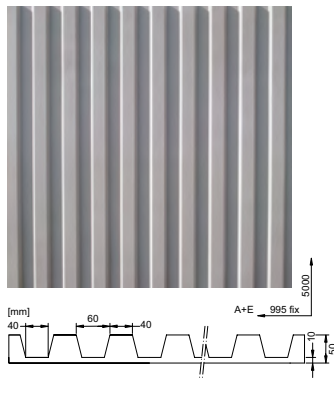
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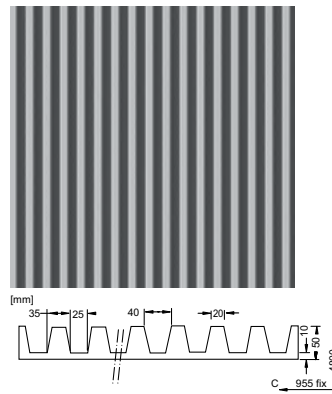
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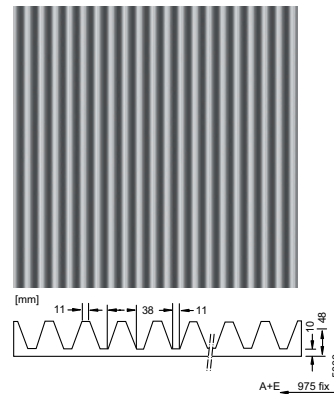
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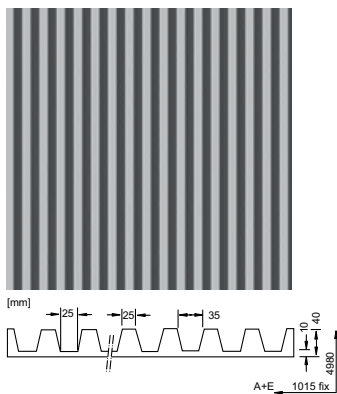
1_32



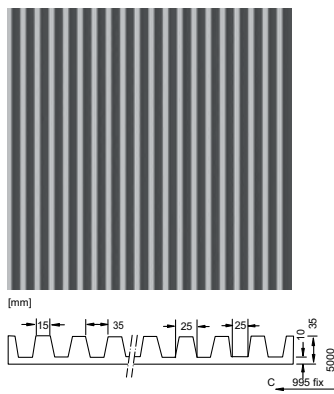
1_33



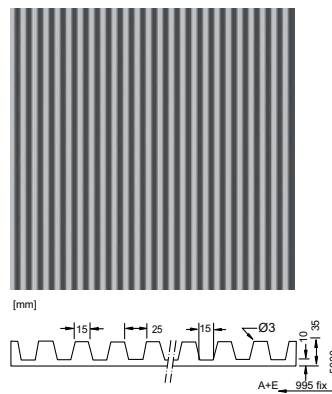
1_34



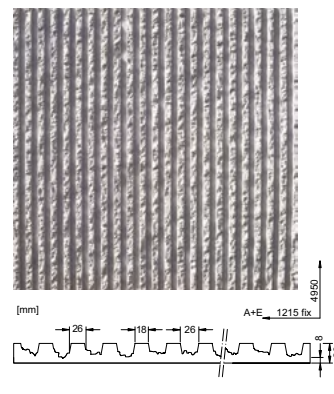
1_35



1_36



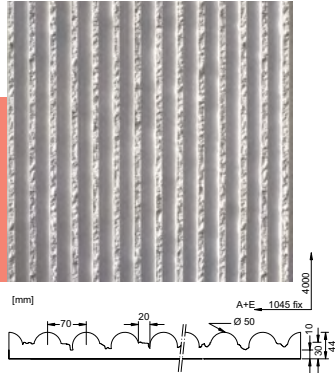
1_37



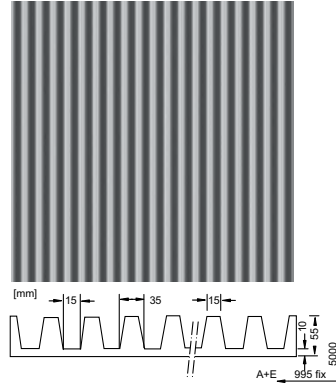
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

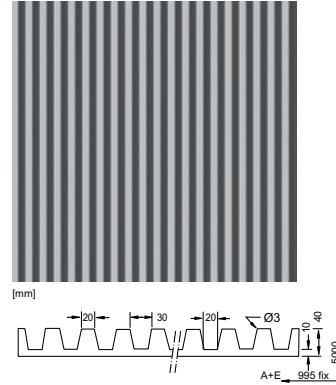
1_38



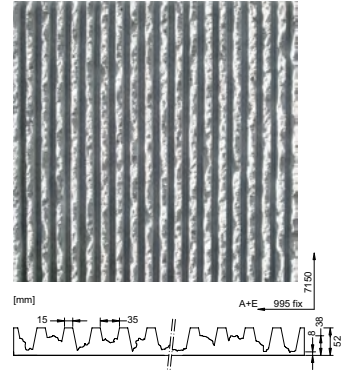
1_39



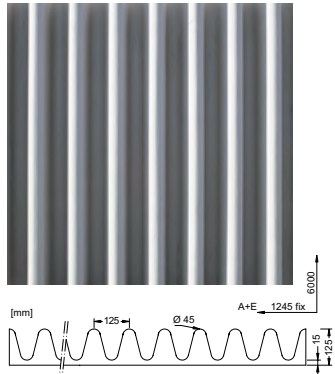
1_40



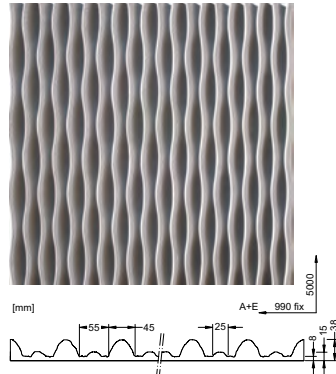
1_40



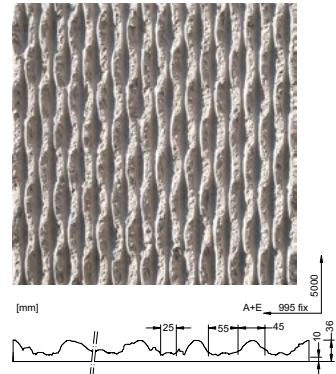
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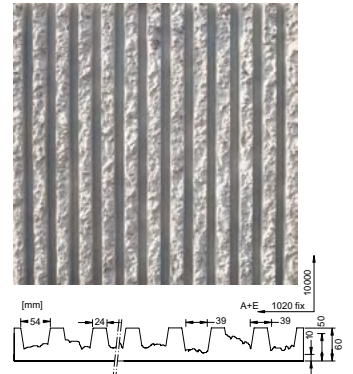
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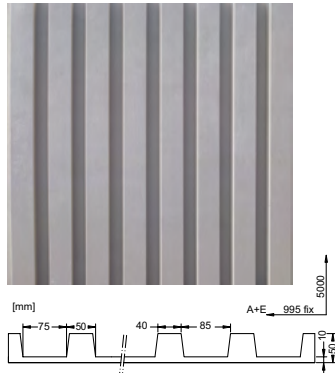
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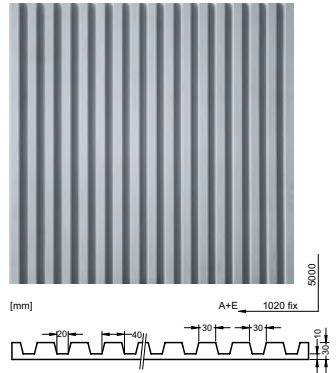
1_45



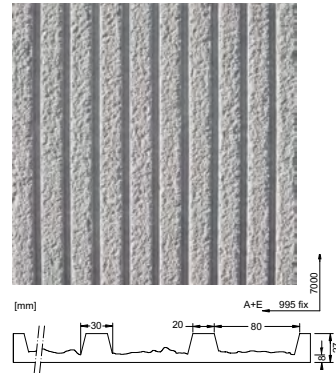
1_46



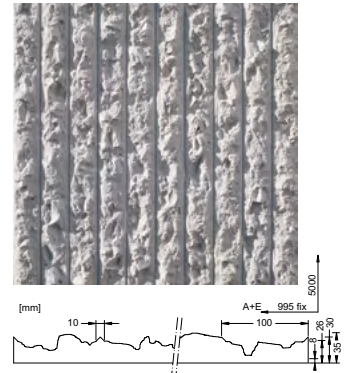
1_47



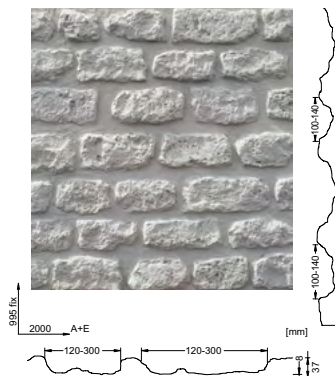
1_124



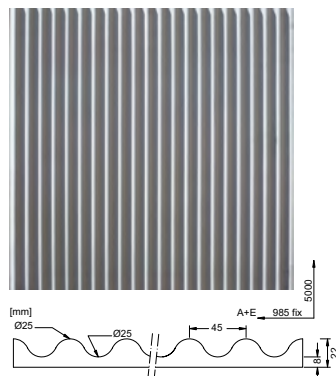
1_126



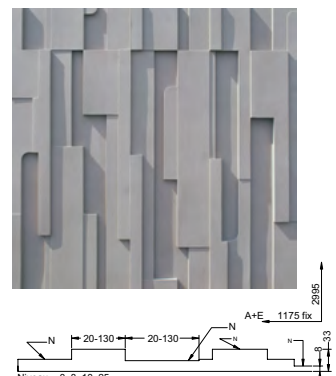
1_127



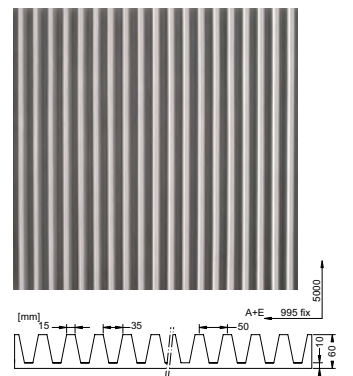
1_134



1_138



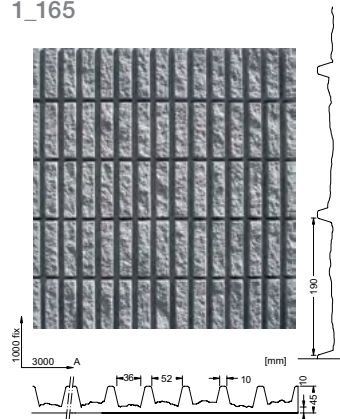
1_148



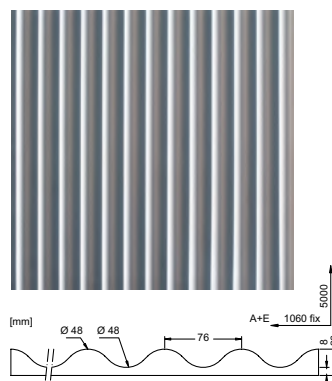
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

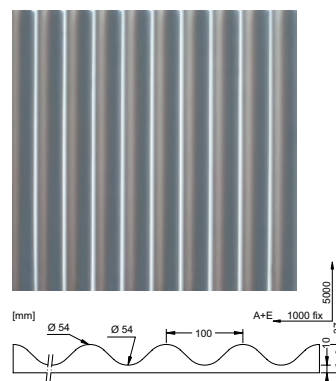
1_165



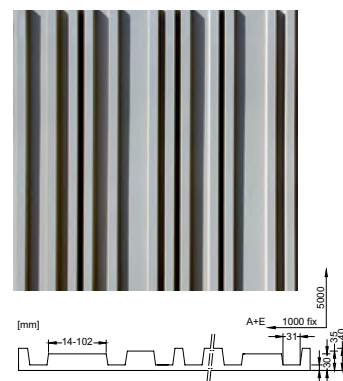
1_171



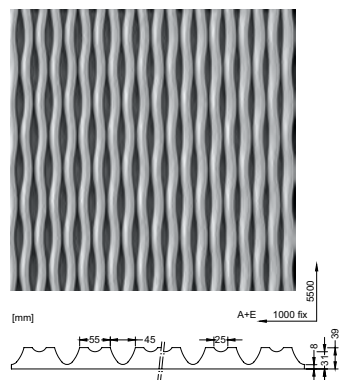
1_172



1_173



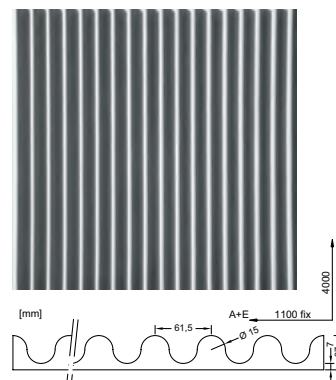
1_174



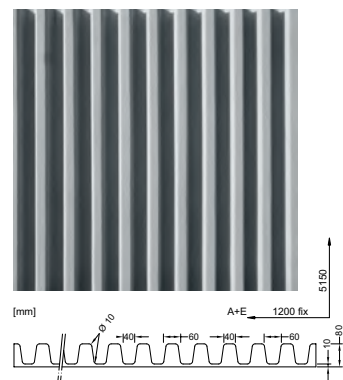
1_176



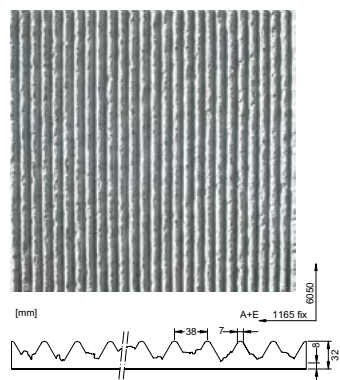
1_198



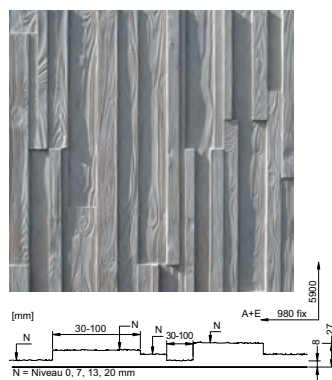
1_199



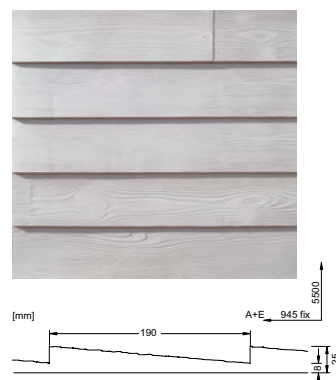
1_316



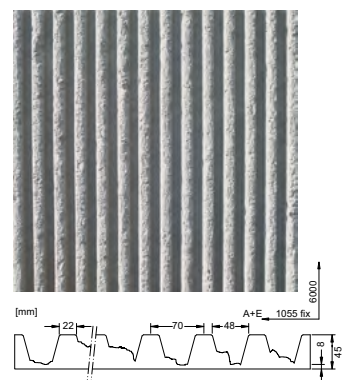
1_317



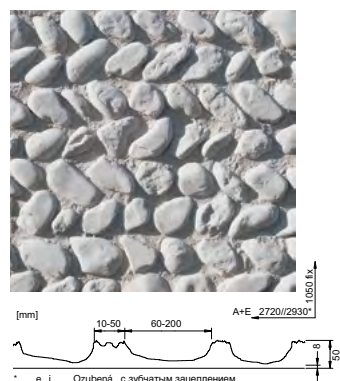
1_331



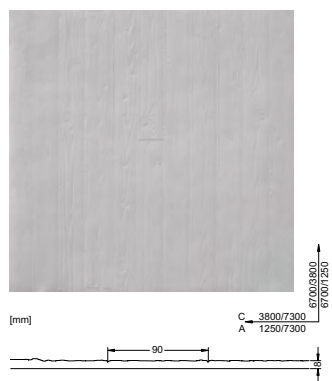
1_347



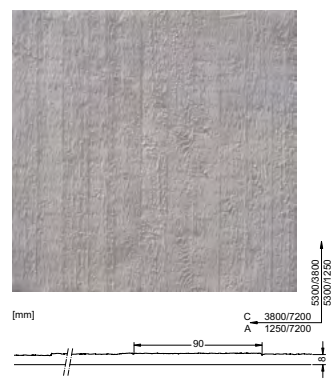
1_352



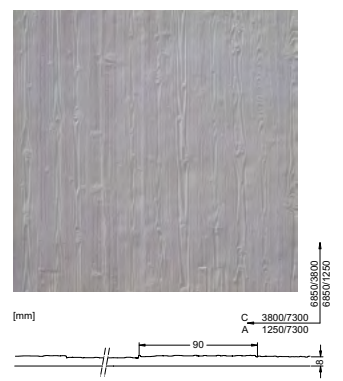
2_20



2_21



2_22



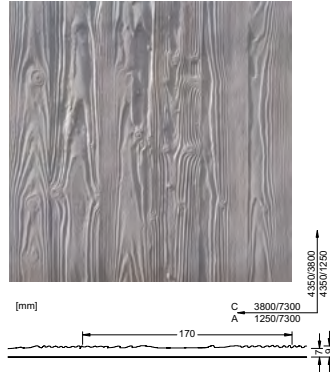
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

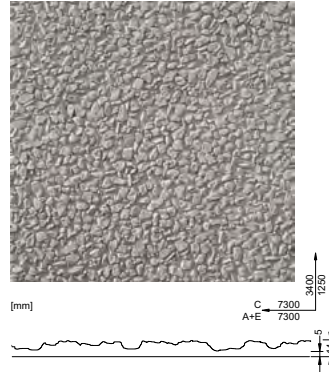
2_23



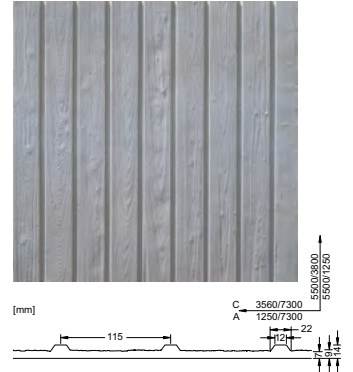
2_24



2_41



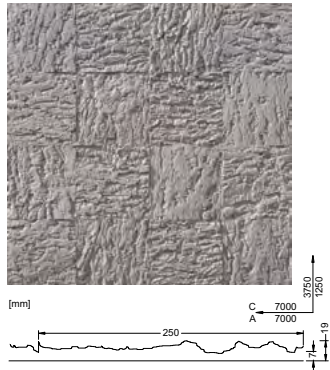
2_26



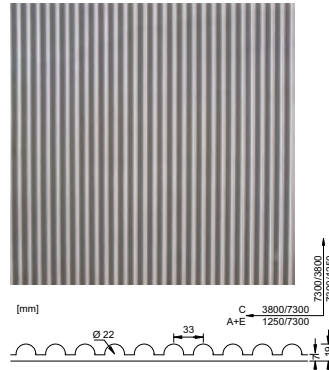
2_27



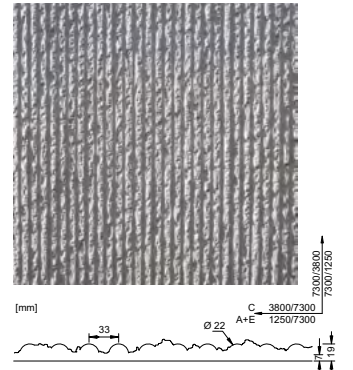
2_28



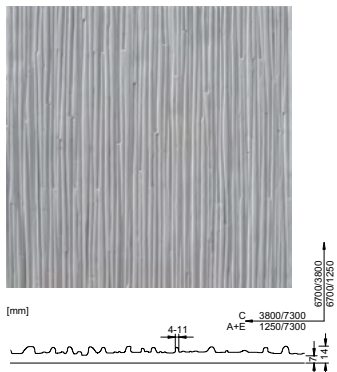
2_29



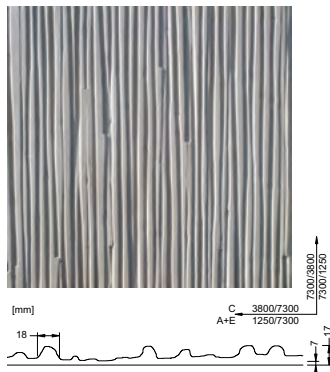
2_30



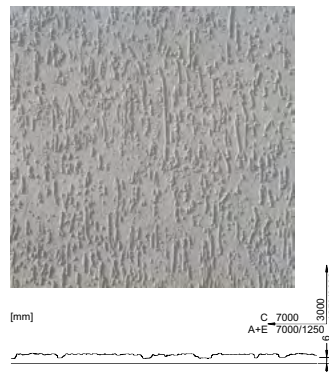
2_31



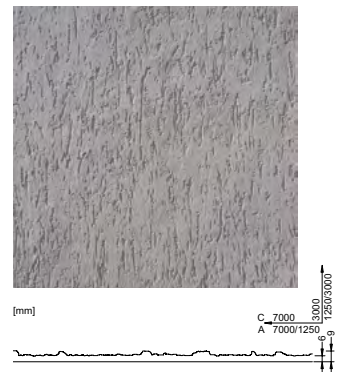
2_32



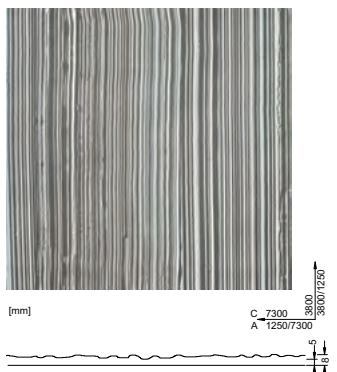
2_33



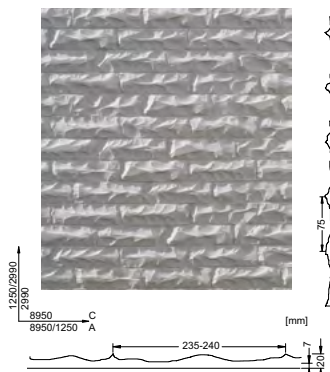
2_34



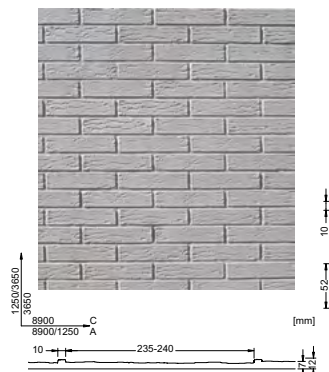
2_37



2_39



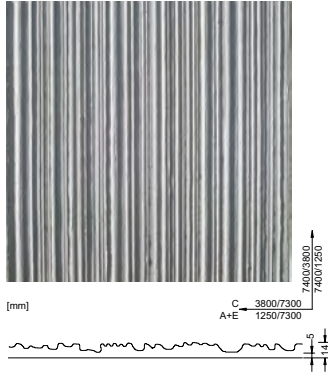
2_40



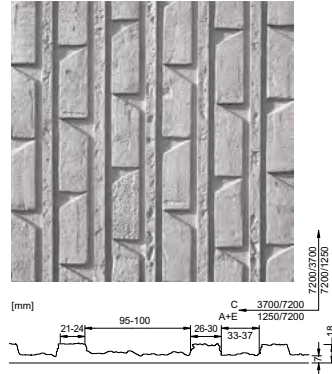
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

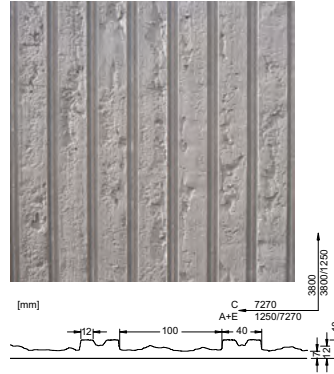
2_42



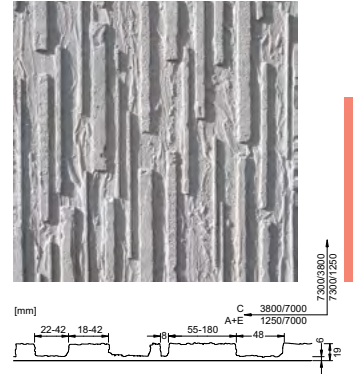
2_43



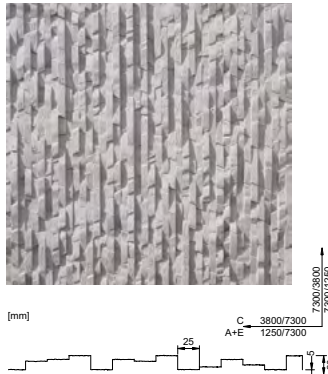
2_44



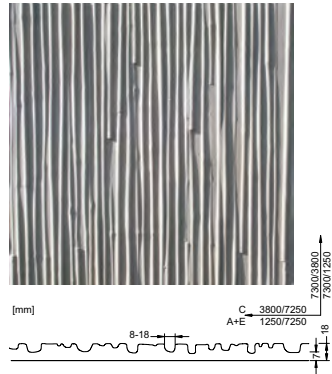
2_45



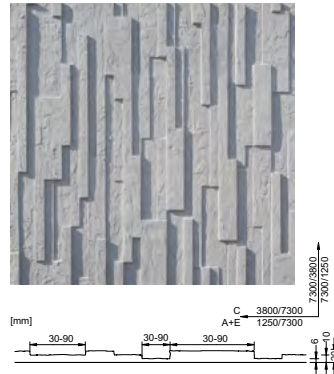
2_47



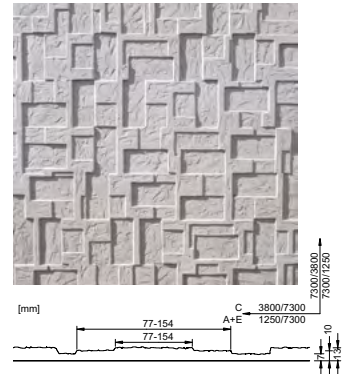
2_48



2_49



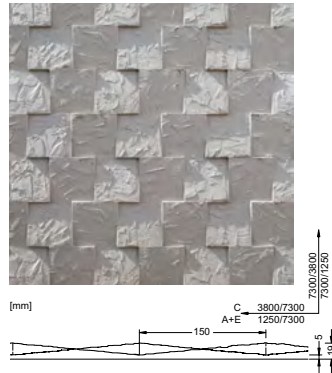
2_50



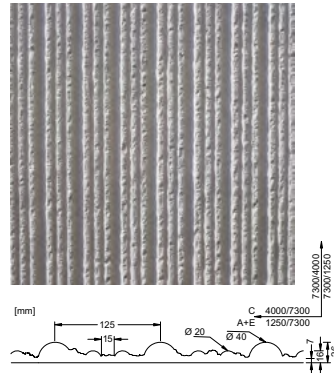
2_51



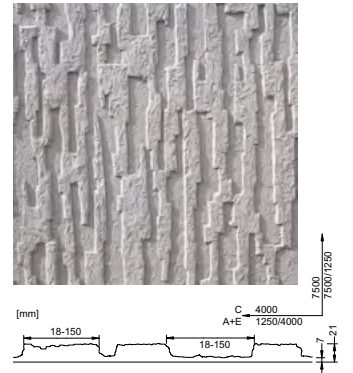
2_53



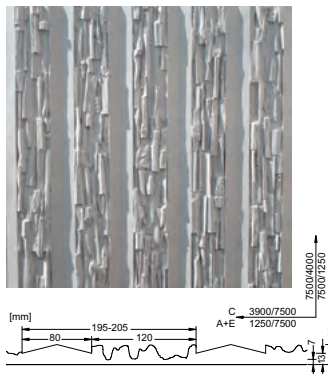
2_56



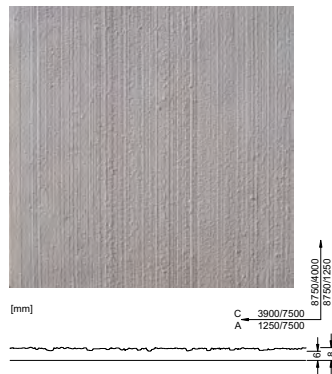
2_57



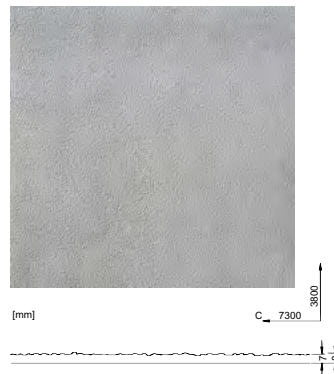
2_59



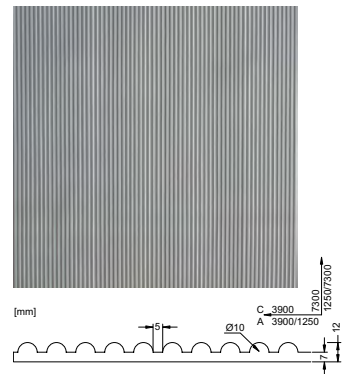
2_61



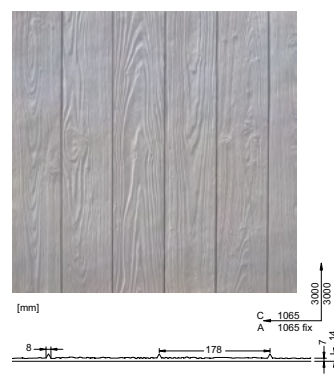
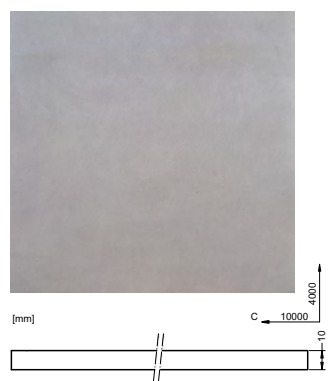
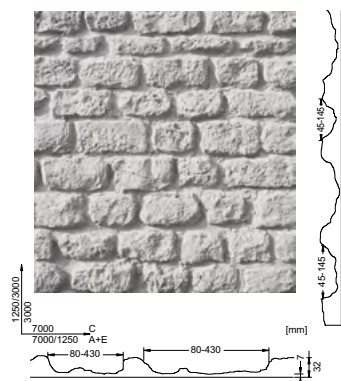
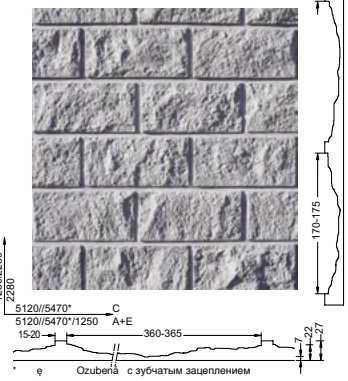
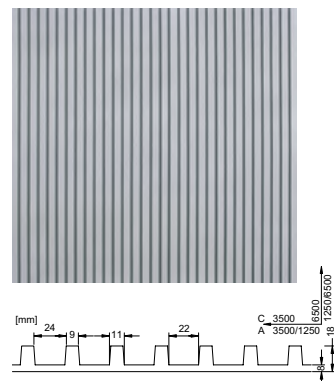
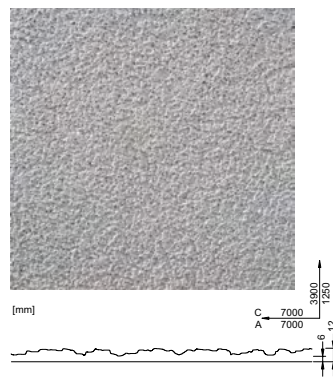
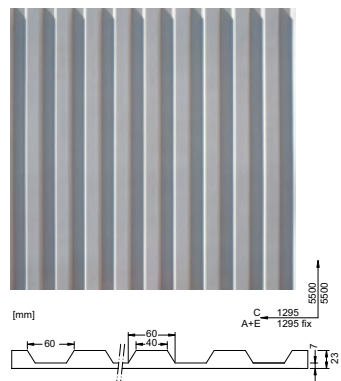
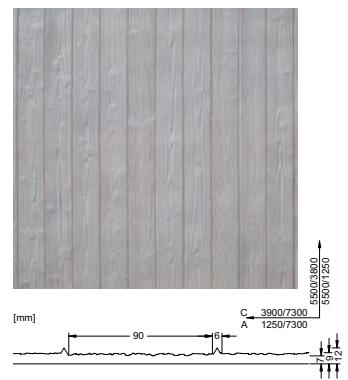
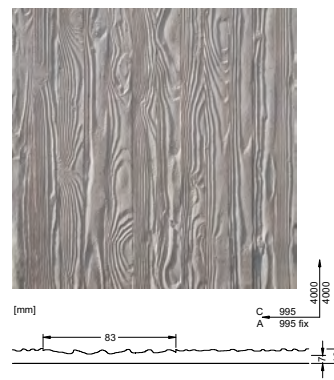
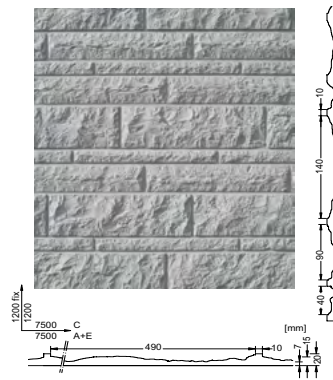
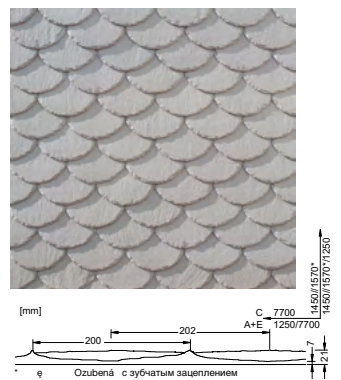
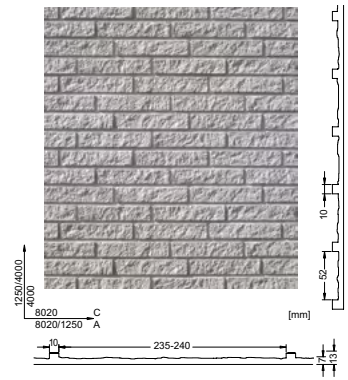
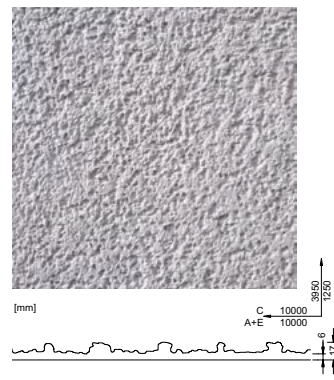
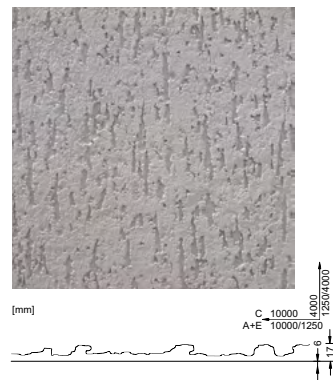
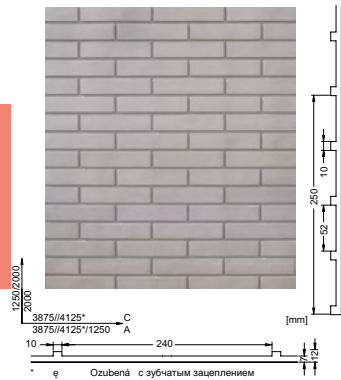
2_62



2_63



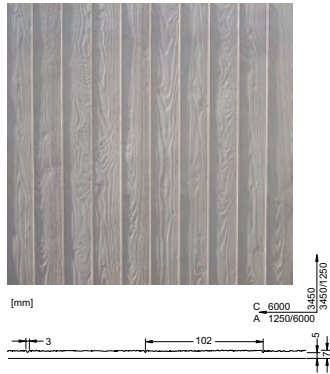
1.8 Reckli catalog of imprinting formliners



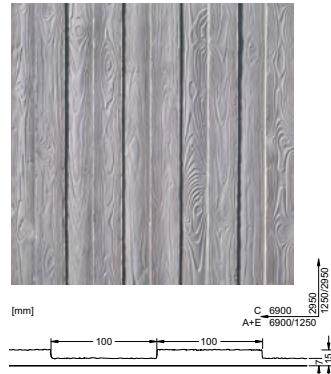
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

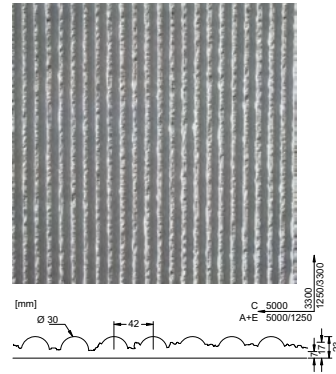
2_83



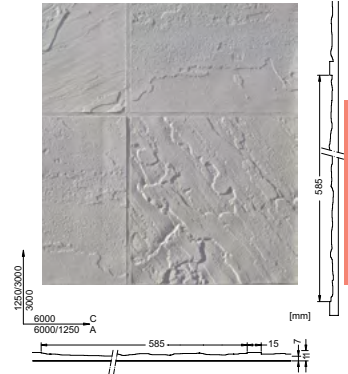
2_84



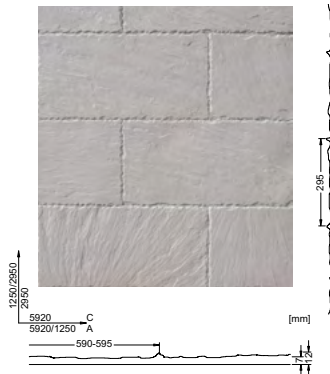
2_87



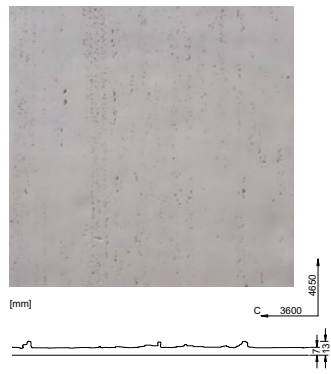
2_88



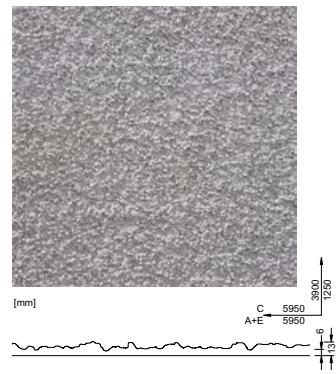
2_89



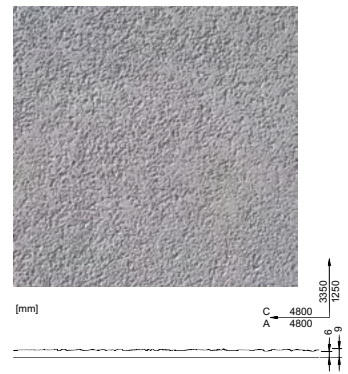
2_90



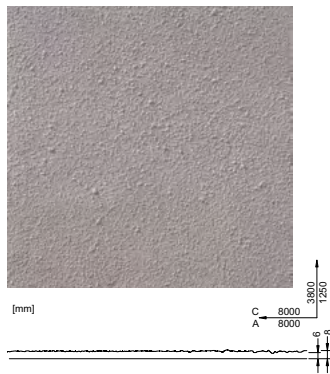
2_91



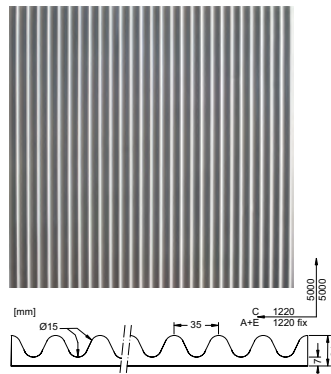
2_92



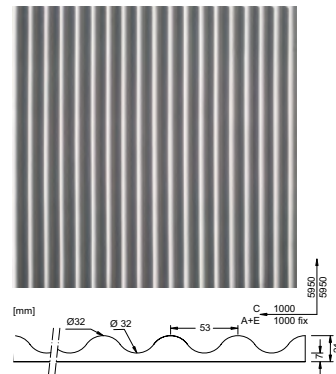
2_93



2_94



2_95



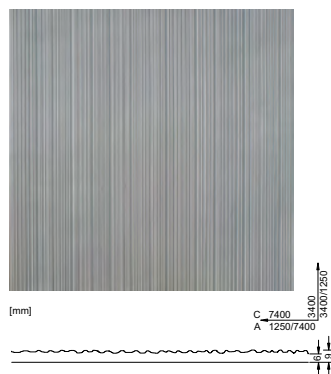
2_96



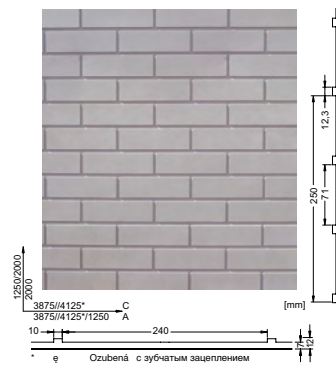
2_97



2_98



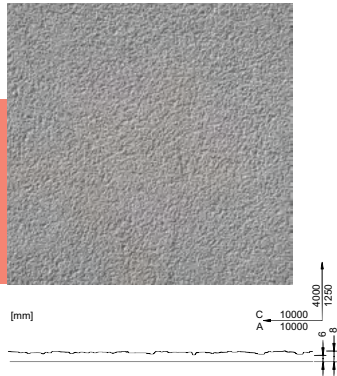
2_99



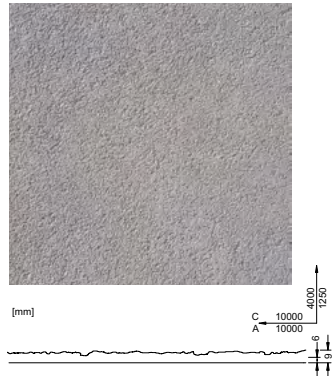
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

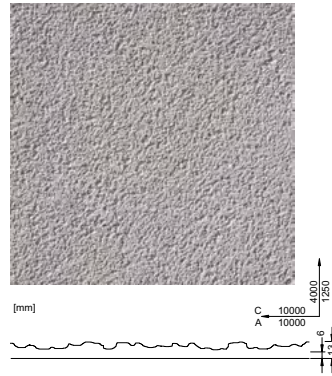
2_102



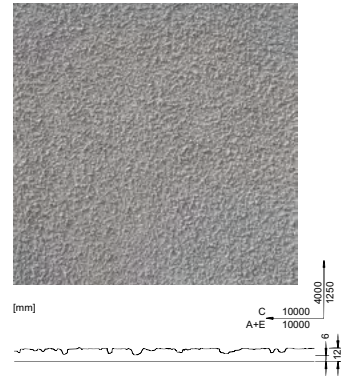
2_103



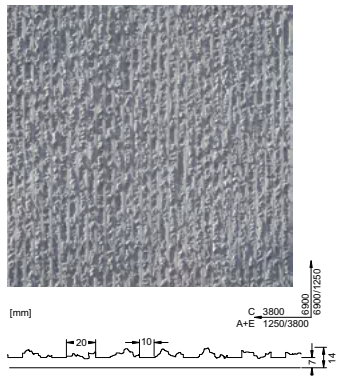
2_104



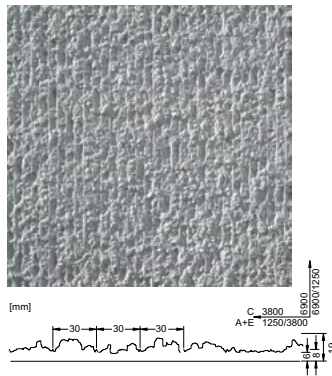
2_105



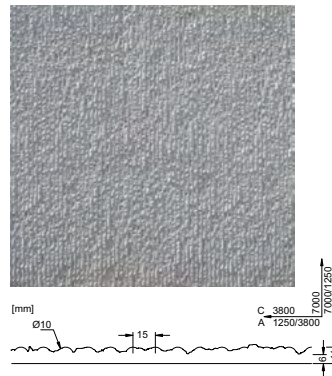
2_106



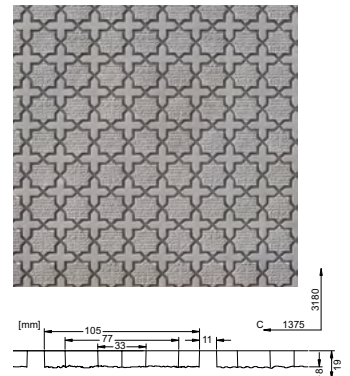
2_107



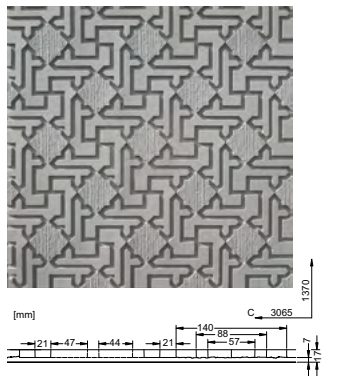
2_108



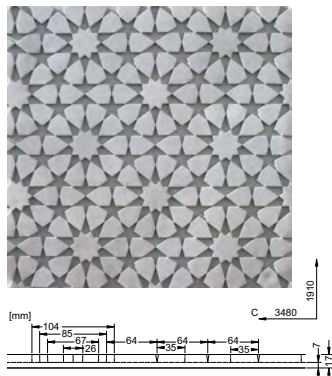
2_109



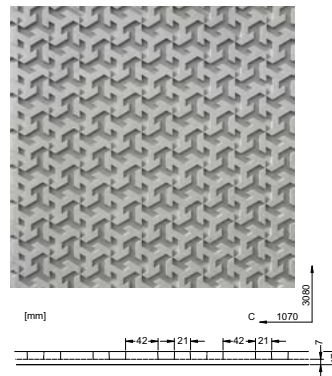
2_110



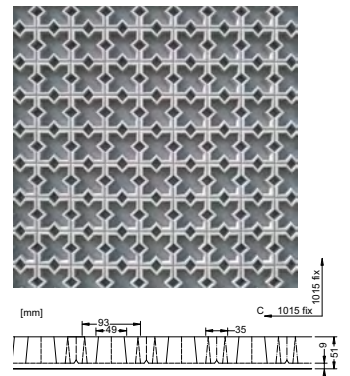
2_111



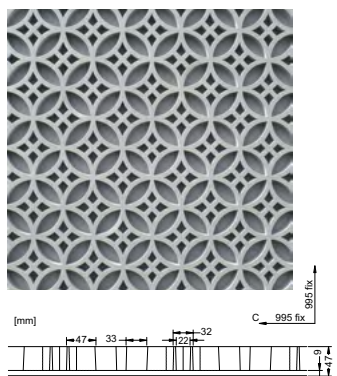
2_112



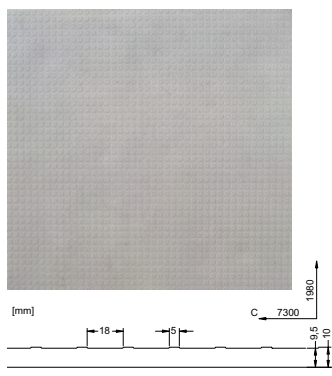
2_213



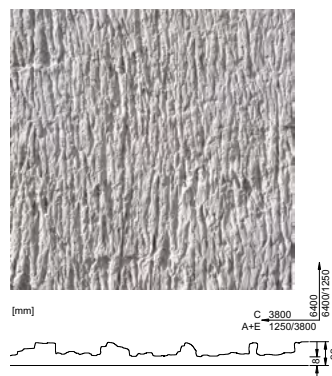
2_114



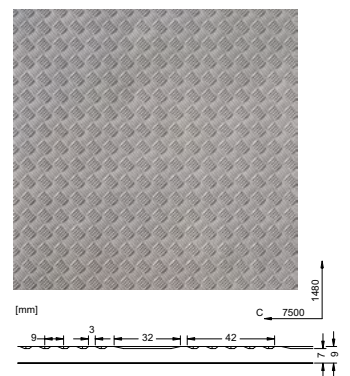
2_115



2_116



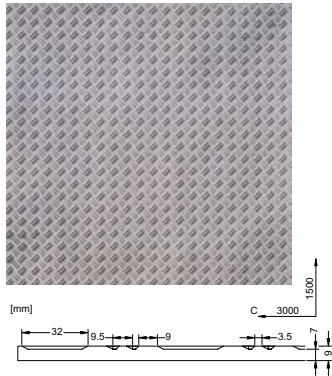
2_117



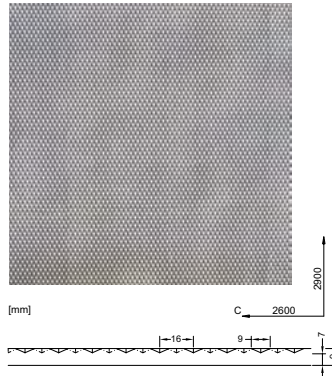
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

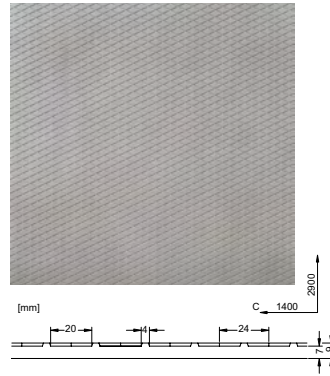
2_118



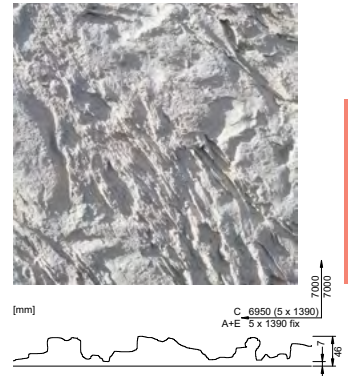
2_119



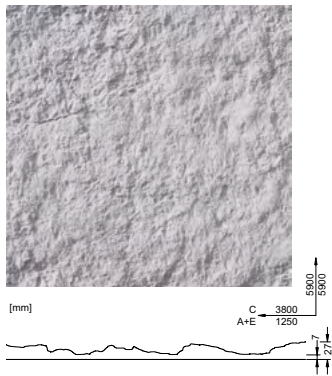
2_120



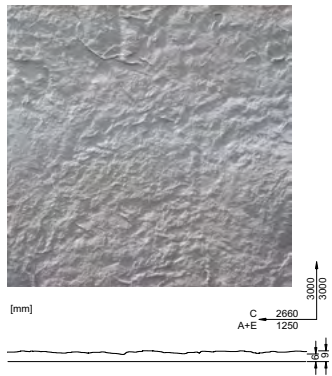
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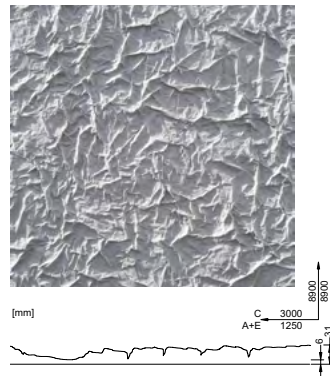
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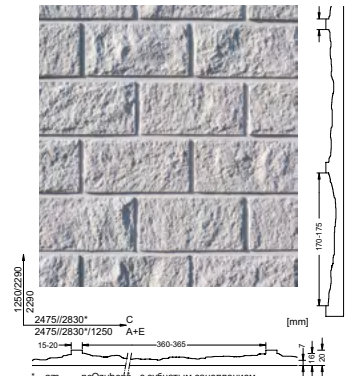
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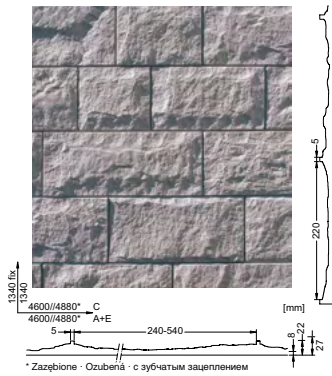
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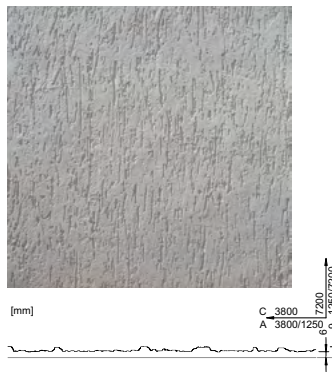
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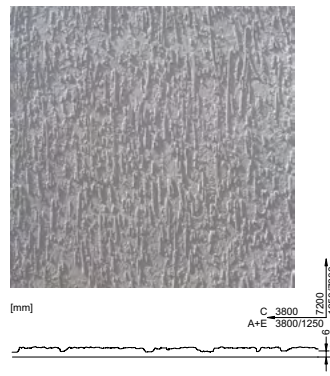
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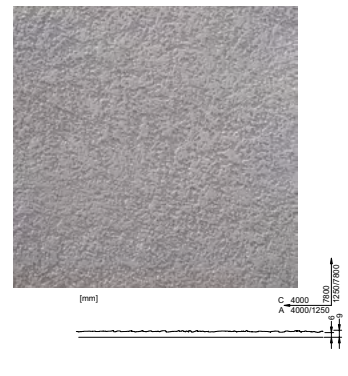
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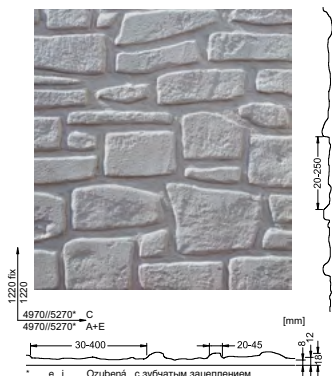
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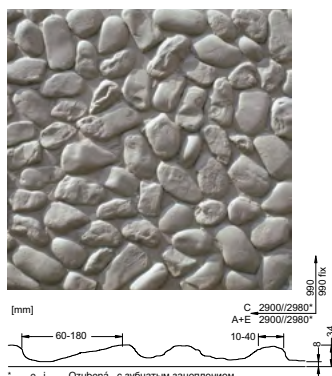
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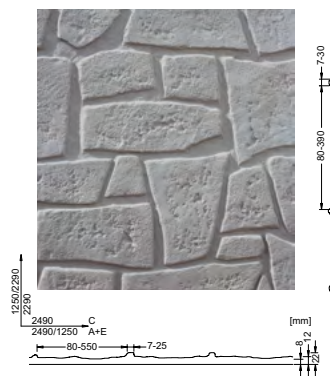
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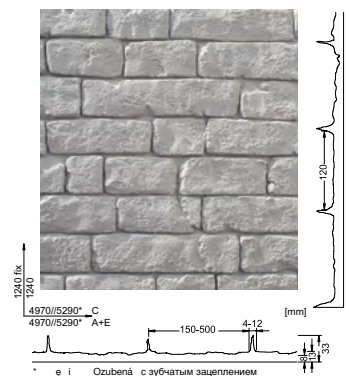
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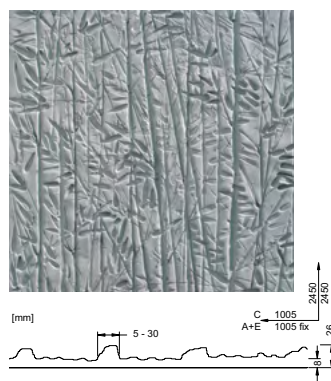


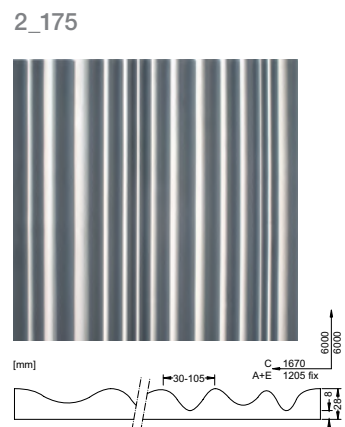
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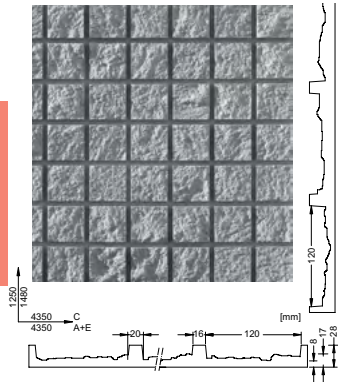




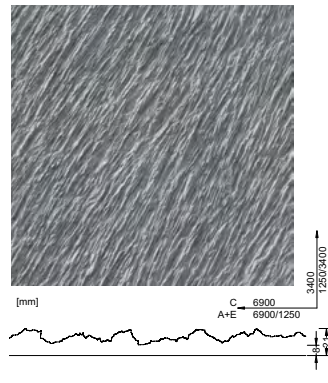
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

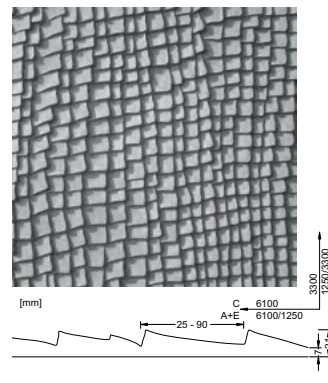
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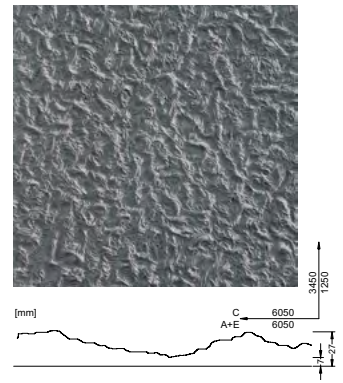
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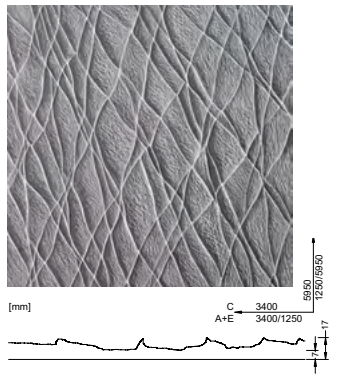
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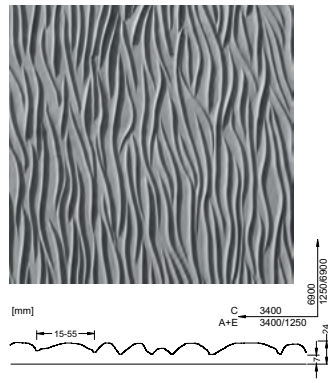
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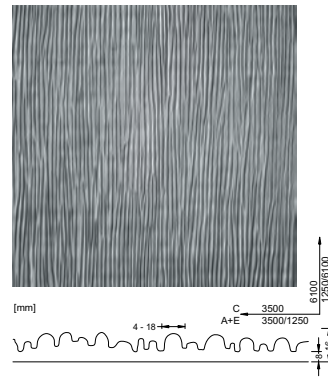
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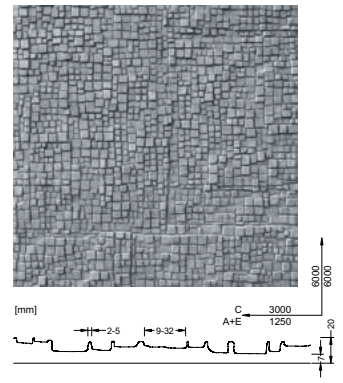
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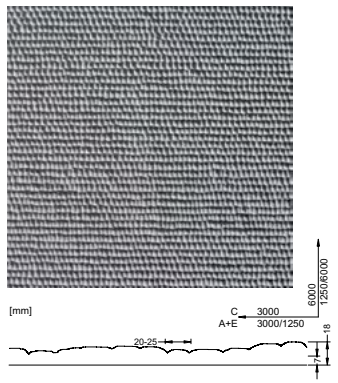
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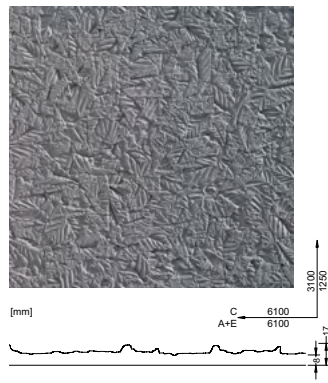
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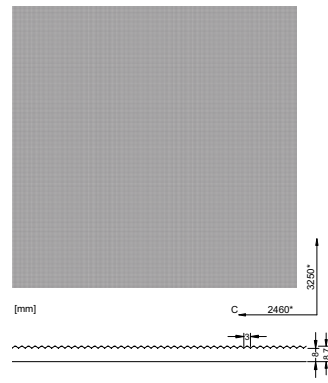
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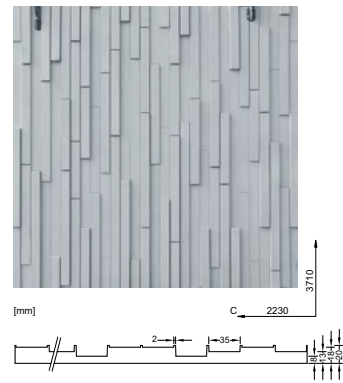
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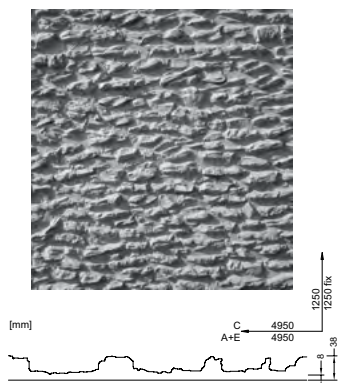
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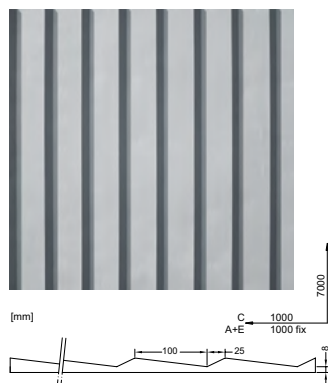
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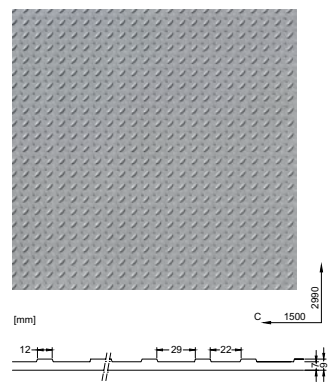
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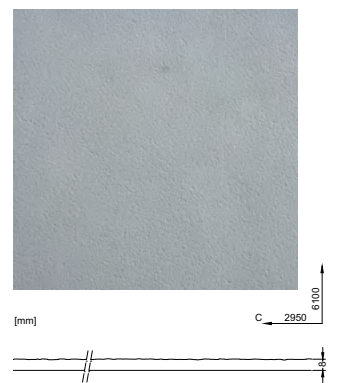
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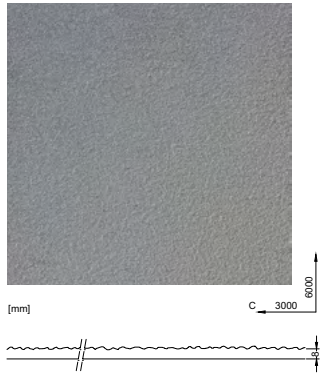
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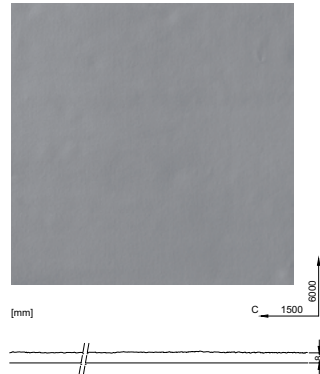
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

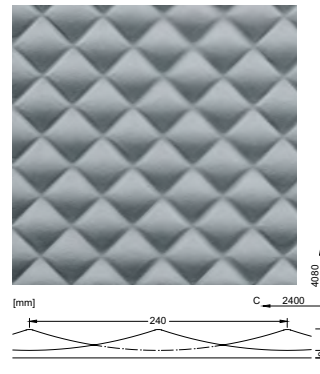
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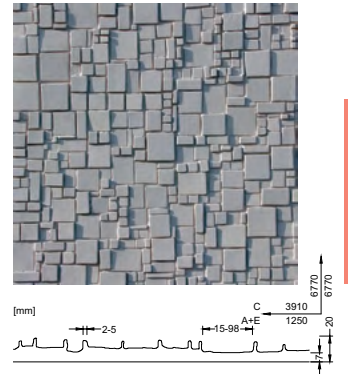
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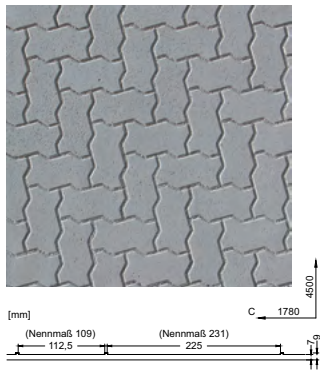
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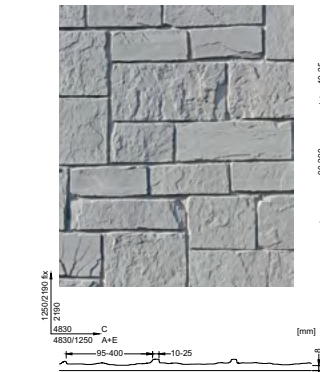
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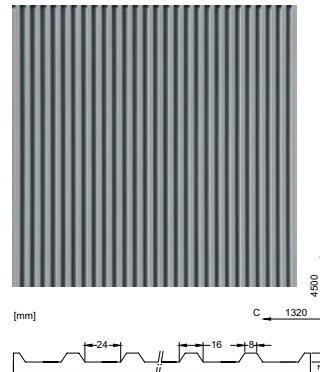
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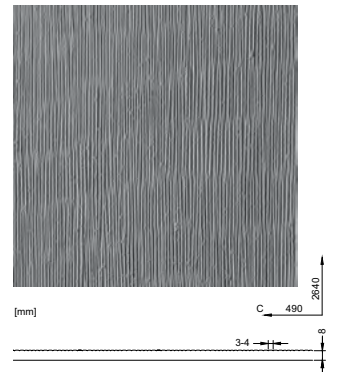
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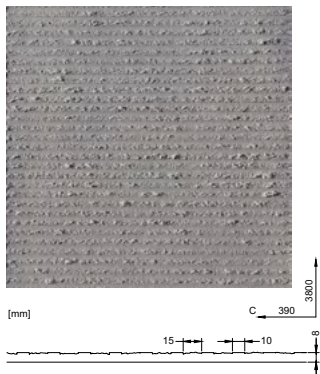
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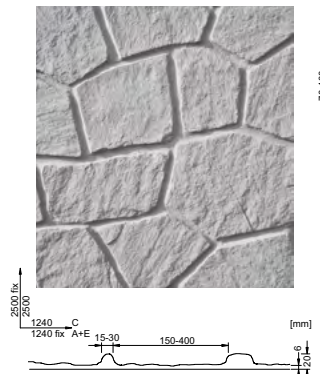
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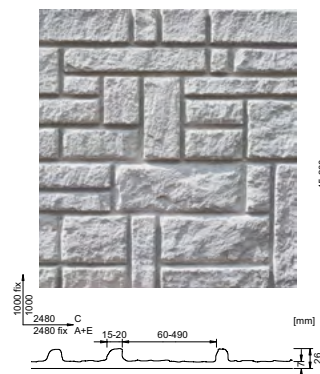
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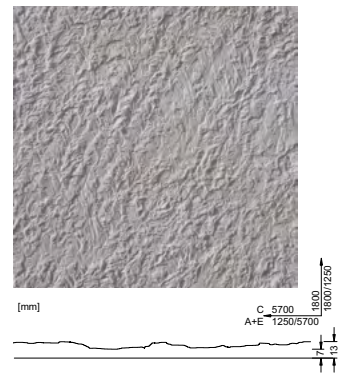
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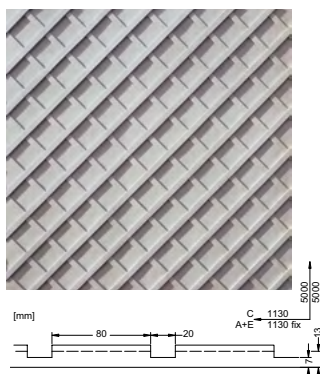
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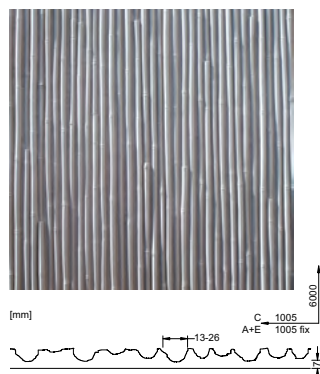
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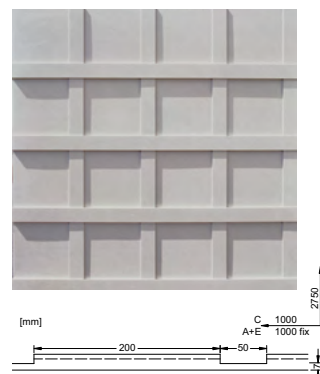
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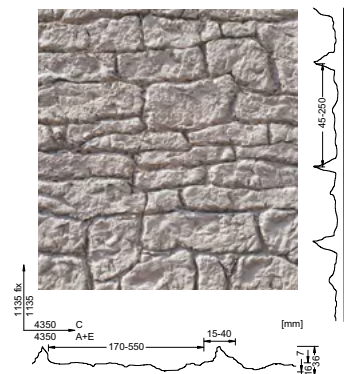
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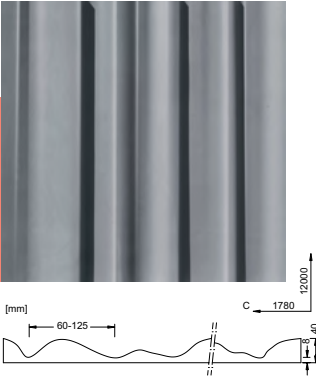
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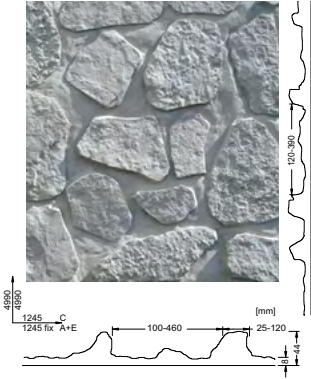
1.0 Basic description

1.8 Reckli catalog of imprinting formliners

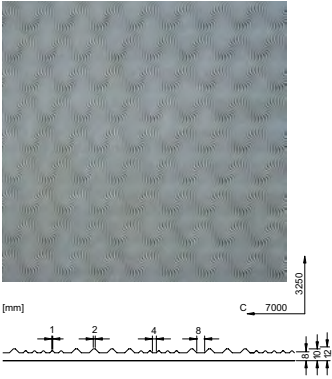
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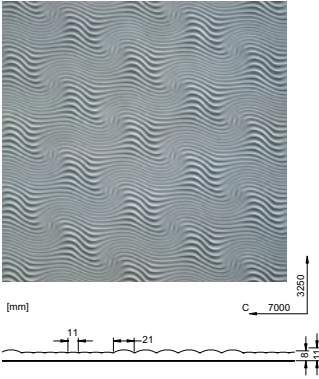
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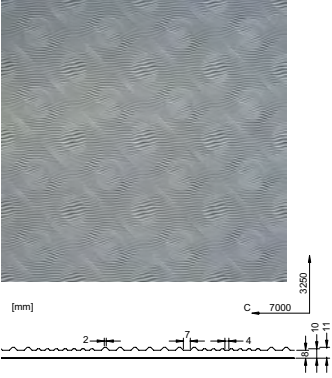
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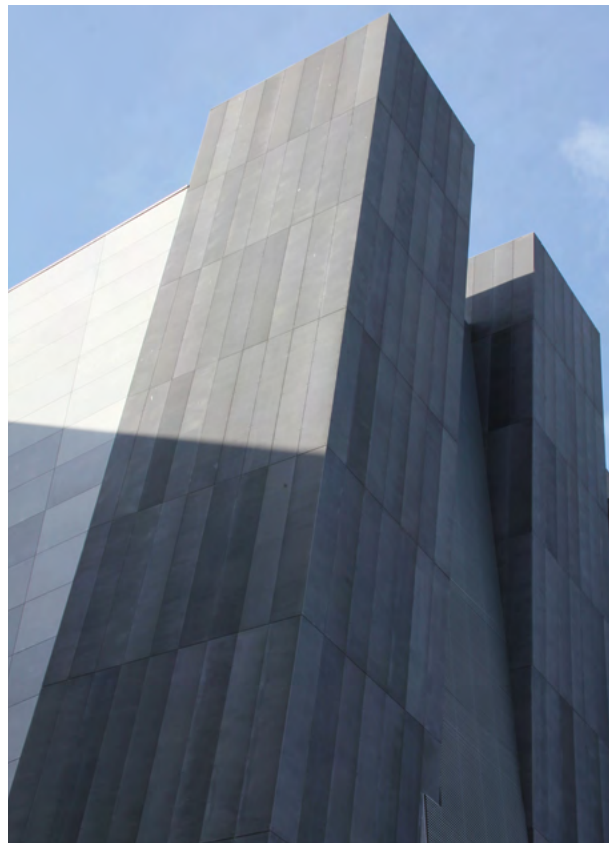
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2_603







Haarlem,
Netherlands



Venlo,
Netherlands





Prague,
Czech Republic





20.

2.0 The possibilities of using

2.0 The possibilities of using

Content

2.1 Facade facing

Ventilated facades

Shape and corner elements

Production of components tailored to the project

2.2 other possibilities of using

Interior design

Furniture

Acoustic panels

Benches and street furniture

Flowerpots

Reception and bar desks

2.0 The possibilities of using

2.1 Facade facing

Polycon glass-fiber-concrete tiles bring into the architecture freedom, creativity and harmony of nature. With the huge variability of possible solutions individual implementations can be designed as unique projects without any restrictions. High potential material for the design and implementation of various projects can be widely applied within the requirements of both classic design and modern design. A large number of surface structures can also be effectively used (see page 44–72) or a completely unique and unique surface proposes of specific projects that will be quite unique and not comparable with any other project.

Standard colors and also high production flexibility can be used for design of completely unique mix color shade materials according to your wishes and requirements. The possibility of flexible pigmentation is not restricted to any minimum quantity and can be used for any project or implementation.

The possibility of straight board tile production and also its shape and dimension of manufacturing flexibility makes the material Polycon completely unique.

Polycon products can be manufactured in almost any shape shown; the limitation is given up to your imagination. Facade form elements (such as corners, jambs, lintels, parapet panels, etc.) can be easily manufactured from one piece without gap solution for individual panels.

The primary advantage of Polycon ventilated facades is the possibility of air circulation and the possibility of exhaust insulating of the facade cladding panels which form the main aesthetic component of the entire project. It is important to choose such solution already in planning, which allows you to take advantage of ventilated facades and thus to increase the long-term high utilities of the project. An important aspect is to ensure adequate ventilation gaps, which are determined by project rules (according to the norms of the project).

The substructure ventilated facades must be designed and expertly analyzed by responsible authorized person of the client (the designer) with regard to the weight load of the whole structure, especially with regard to sufficient static stability of the entire system and material characteristics of Polycon material. The substructure must be made from sufficiently strong and stable material (aluminum, steel), which ensures its supporting structural function throughout the life of the facade facing. Suitable types of solutions of the substructure are shown on page 106–168, there are depicted some of the possible types and solutions including system details. Maximum ensuring of rectifications of the individual elements (in x, y, z axes) is an important consideration of substructure and facing design in order to maintain individual component correct positioning according to the implementation requirements.

In addition the lower supporting structure must take into account the wind load in its proposal, which is to be analyzed for each location and type of project. In the framework normative requirements this can be done differently for different regions.

Analysis of the location of each tiles of the facade framework is the next factor influencing the design of the supporting structure, because the plates in the surface of the facade could have different values than the static plates located in the corners of buildings or in the attic part.

Ventilated facades

Ventilated facades from Polycon materials are an integral part of modern architecture. High reliability and long life of the materials ensures economically and aesthetically effective solutions not only with regard to a wide range of possible solutions but also to the optimal humidity and temperature regime of realized structures including the important requirements for fire and environmental safety.

2.0 The possibilities of using

2.1 Facade facing

Building-physical benefits of ventilated facades:

- Thermal insulation
- Fire protection
- Protection against heavy rain
- Sound insulation
- Long life
- Protection against cold

Shape and corner elements

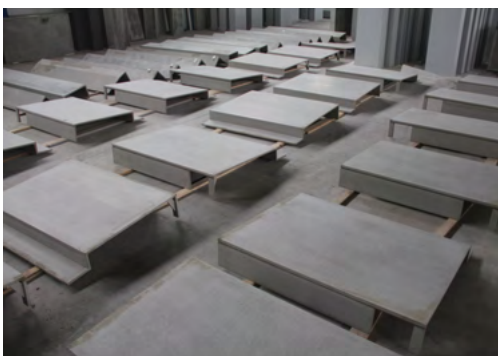
Unleash your imagination and make freedom for ideas. You no longer need to deal the tiles only with flat plate. Polycon material enables creative solutions to each idea. Shape diversity and production flexibility offers elegant solutions for design of difficult details. Individual parts and components can be manufactured due manufacturing technology of pressure sprayed concrete exactly according to the requirements of individual projects. Appropriately shaped form allows the production of thin concrete panels and tiles completely according to individual requirements of each implementation. Dimensional variety of manufactured elements allows to solve the requirements not only in 2D but also in 3D shapes.

Corner elements and formal corner facade elements, including elements of attic, now can be implemented within a single product design without solutions of emerging gaps and consequences.

Structurally complex details can be solved now simply by using Polycon shaped element.

Production of components tailored to the project

Requirements for individual solutions are often found within each project. Polycon material allows to solve such requirements to the last detail. Manufacture of individual components and elements may be easily adapted to the actual realization of the requirements not only in shape but also the surface or color. If the proposed project for various reasons (claims of conservation, respecting the unity of the surrounding buildings, penetrations through the cladding, the individual requirements of clients, etc.) must be adapted to the specific (often atypical) requirements, these requirements can be effectively taken into account due to manufacturing flexibility of production technology, the product can be individually adapted to these requirements.



2.0 The possibilities of using

2.2 Other possibilities of using

Interior design

It is a vocabulary of modern architecture in which the concrete has (in addition to the traditional design) also a significant aesthetic design feature. The current architectural trends prefer uncovered concrete surfaces that are visible both indoors and outdoors. Advanced manufacturing technologies are reflected mainly in visual design. Glass-fiber reinforced concrete is enhanced by new purpose-added material components, which improve it and ensure its excellent technical and optical properties.

Furniture

Polycon Glass-fiber-concrete composites constitute the expression of your individuality, within the collection of interior elements, accurate lines and geometric shapes with smooth surfaces or selected surface structures; allow implementing of simple solutions by unusual way. Tables, benches, stairs, tiles, pots and other form elements are solved with an ease and uniqueness, which retains its manuscript and high dynamics. Attractive use of material properties, appearance, strength and aesthetic character is the endeavor of designers together with maintaining practicality and utility. Beautiful and unique interior and exterior is a sophisticated play of shapes, surfaces and structures, where will you, your friends, colleagues or partners feel good and comfortable. Implementation of these elements from Polycon material allows you to materialize your ideas and dreams...

Acoustic panels

For its excellent properties and aesthetic possibilities of glass-fiber reinforced concrete, this is also used for the design and production of technically complex systems in acoustics and noise control area. On one side it is based on the wishes and requirements of the customer and on the other side it is based on cooperation with experts dealing with the design and measurement of specific solutions acoustic systems and components.

The room and building acoustics:

- Conference rooms and Congress centers
- Theaters and cultural centers
- Concert and lecture halls
- Schools and educational institutions
- Noise barriers

Benches and street furniture

The combination of glass-fiber reinforced concrete and different materials are also used to create the functional elements serving not only for rest and meals. It features easy installation, low weight, ease of maintenance, durability, UV resistance. It is also possible to take advantage of the atypical designs according to customer requirements (shape, color, structure, etc.). Everything can also supplemented by various garden decorations (solitary complex shape elements, exterior siding, etc.). The main products are benches, tables, chairs.

Examples of using: gardens, parks, recreational areas, rest areas, terraces and restaurants.

2.0 The possibilities of using

2.2 Other possibilities of using

Flowerpots

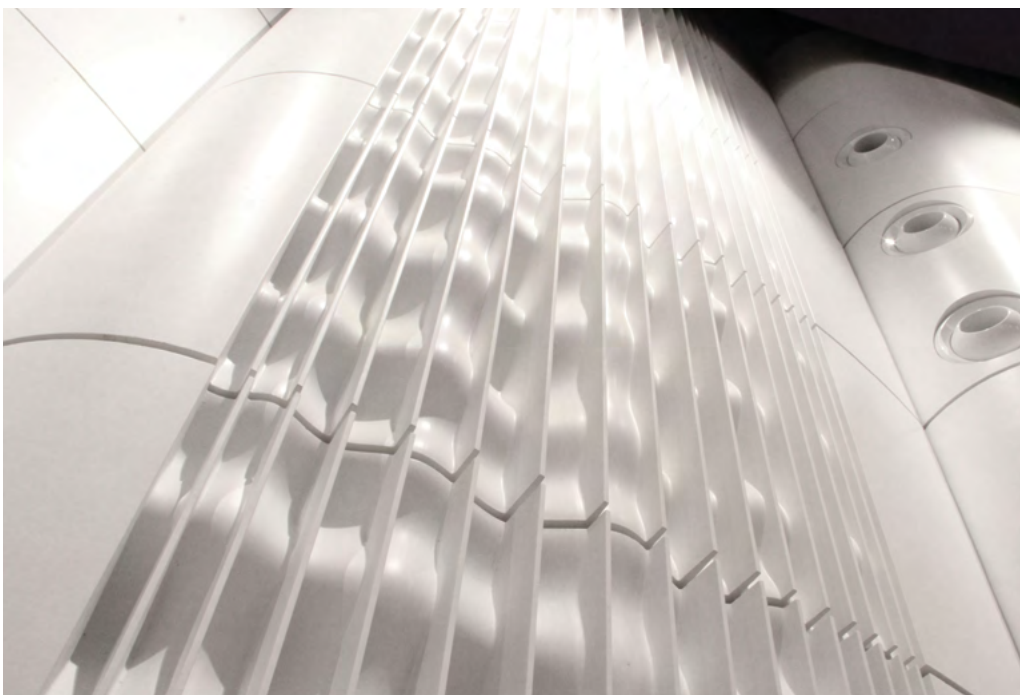
Bulk containers and flowerpots excel in strength, light weight, aesthetic appearance and shape – the possibility of atypical designs according to customer requirements (shape, color, structure, etc.). They offer functional and aesthetic solutions, they can serve simultaneously as barriers, railings, partitions, etc.

Examples of using: gardens, terraces, balconies, roofs, plazas, public spaces and other representative.

Reception and bar desks

They have an original appearance due to their colors and markings typical for glass fiber reinforced concrete. Each board is unrepeatable and therefore, unique artwork.

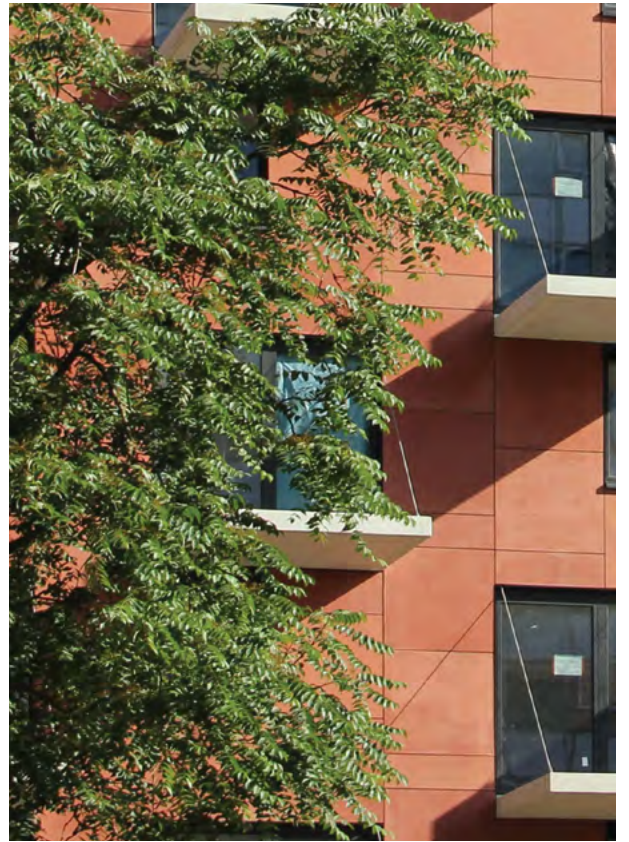
Examples of using: kitchen and wash-boards, reception desks.



- 2.0 The possibilities of using
 - 2.2 Other possibilities of using
-







Leuven,
Belgium



Pillows (design Lucie
Koldová and Dan Yeffet),
Czech Republic





Venlo,
Netherlands



A photograph of a modern building with a large glass facade and a tiered base, overlaid with a green tint and a large white number 30.

30.

3.0 TioCem

3.0 TioCem

3.1 Basic description of the technology

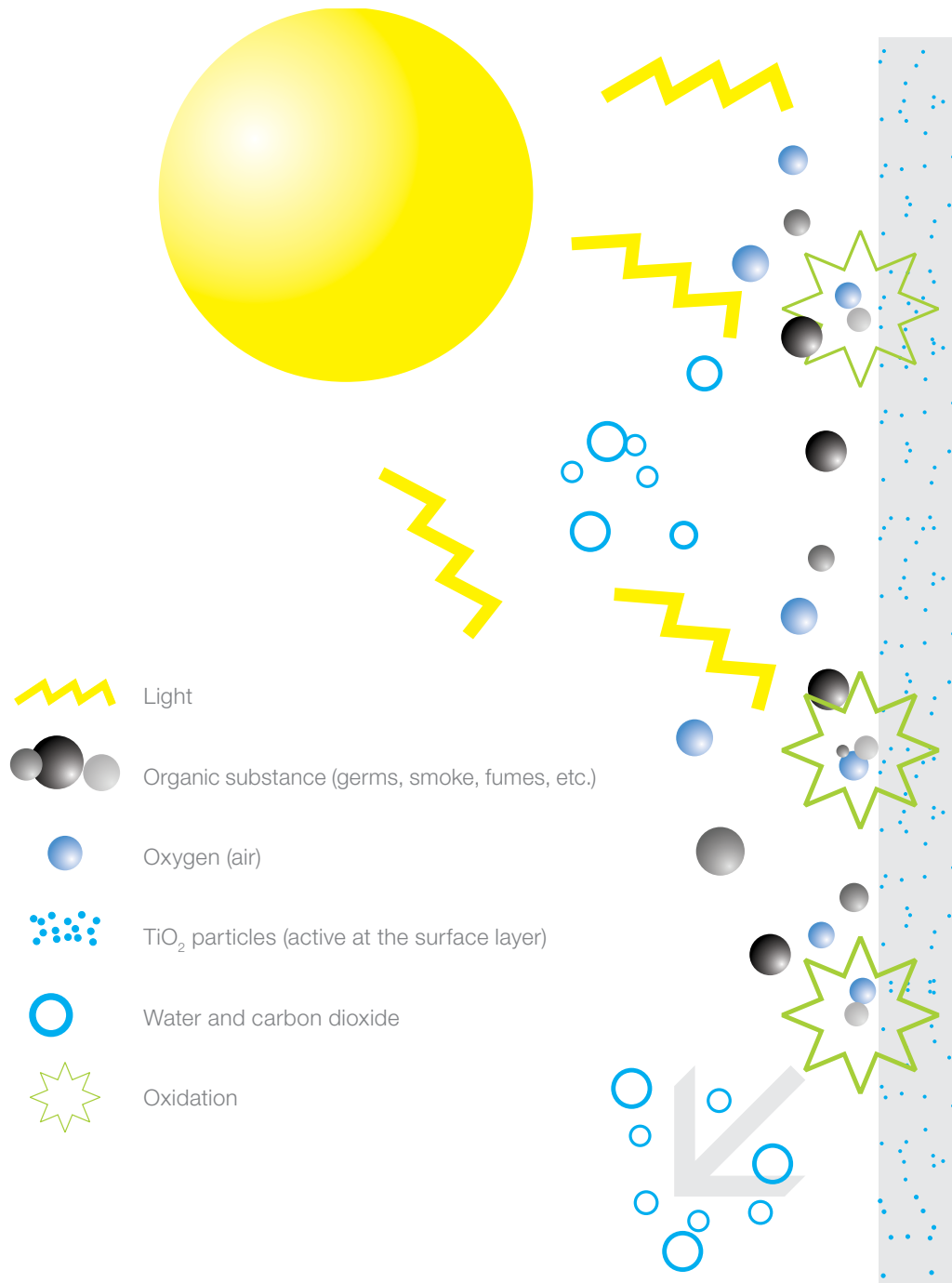
-
- The basis of TX Active technology is photocatalysis, which leads to degradation of harmful substances in the air and on the surface of the final product and building.
 - Using of the **photocatalyst**, substances accelerating the natural decomposition of impurities occurs during exposure to light to decompose the hazardous substances in the vicinity, such as nitrogen oxides NO_x , and because of this property are to have these materials have self-cleaning ability.
 - **Photocatalyst** is a substance accelerating **photolysis**, which is a natural process of decomposition of substances by light. Takes place wherever is the light and the suitable material. Rate of this natural reaction is relatively low, then speed up the whole process can be achieved by using a special substance called photocatalyst. Accelerated photolysis is therefore called photocatalysis.
 - **The catalyst** is a substance which initiates the chemical reaction, but is leaving the reaction in the same form and amount in which it entered. Photocatalyst is kind of a catalyst for its catalytic function requires exposure of light rays. Efficacy of photocatalyst is usually changed with the wavelength of radiation to which it is exposed.
 - **Photocatalysis** is a process of chemical decomposition of substances in the presence of of photocatalyst and the light. Primarily generated free electron pair-electron hole and hydroxyl radicals is secondary generated by contact of photocatalyst excited molecules and water vapor and decompose present organic and inorganic substances. Specific industrial applications principle of photocatalysis can vary mainly the type of catalyst. Nanocrystalline TiO_2 activated by UV-A radiation is the most commonly used
 - **Photocatalysis** can decompose particularly nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), ammonia (NH_3), hydrogen sulfide (H_2S), chlorinated hydrocarbons (e. g. , CH_2Cl_2 , CHCl_3 , CCl_4 , C_2HCl_3 , C_2Cl_4), dioxins, chlorobenzenes , chlorophenol, simple hydrocarbons (e. g. CH_3OH , $\text{C}_2\text{H}_5\text{OH}$, CH_3COOH , CH_4 , C_2H_6 , C_3H_8 , C_2H_4 , C_3H_6), aromatic hydrocarbons (benzene, phenol, toluene, ethylbenzene, o-xylene), pesticides (Tradimefon, Primicarb, Asulam, Diazinon, MPMC, Atrazine), as well as bacteria, viruses, fungi or micro dust.
 - **NO_x** is a common designation of two major pollutants NO_x , and NO and NO_2 . These are gases formed during combustion processes in the presence of nitrogen, NO is then oxidized in the atmosphere to dangerous NO_2 . Waste incineration plants, heating plants and other industrial operations may belong between point sources of NO_x . Expert sources say that the amount of NO_x generated by the combustion process increases with the flame temperature. Fireboxes with high flame temperatures are characterized by higher NO_x formation by direct oxidation of nitrogen. But their significant advantage is obtained by the possibility of harmlessly dispose the wide range of wastes, where extremely high flame temperature allows a perfect decomposition of the basic oxides. Emissions of pollutants from large local sources in the developed world are subjected to careful checks of the legal limits. The use of advanced technology treatment of flue gases (for example, SCR, SNCR) leads to a significant reduction of the amount of NO_x in the flue gas and thus to reduce the production of NO_x from these point sources. But NO_x is generated wherever something is burning, including in domestic boilers, stoves and ovens. It is estimated that more than half of the amount of NOx is produced by human activity; they come from internal combustion engines of vehicles. This proportion is growing steadily with increasing intensity of road and air transport. Monitoring NO_x emissions from transport is almost impossible due to the enormous number of sources. Urban areas and other densely populated places are the most exposed to traffic. Small heat source in homes in these areas cause a further increase in the concentration of nitrogen oxides. Higher area additionally may act as a barrier to the natural flow of air and further deteriorate the quality of air. This phenomenon is known as "canyon effect". NO_x are triggering elements for the formation of ground-level ozone. Direct inhalation of nitrogen oxides or their subsequent products can lead to respiratory diseases; elevated concentrations can also seriously damage other animals and plants.
 - Photocatalytic oxidation of NO_x to harmless NO_3 -is a contact reaction, which is activated by light and it occurs only at the surface. Produced NO_3 -is not toxic or hazardous to health. It is neutralized on the surface of glass-fiber reinforced concrete and it is washed away during the first rain.
-

3.0 TioCem

3.1 Basic description of the technology



Contact with the active surface of TiO_2 initiates the reaction of atmospheric oxygen with organic compounds (fumes, carcinogens, odor molecules, viruses, bacteria, etc). This creates minerals – primarily water and carbon dioxide.



3.0 TioCem

3.2 Other possibilities of using

- Speed of photocatalytic reaction depends on the light intensity, the concentration of pollutants and the air flow. In laboratory tests there was 40 % of the NO_x for immediate oxidation to NO_3^- . Natural daylight is sufficient to start the photocatalytic effect.
- During normal weather, the air can be purified by photocatalysis because it leads to the elimination of nitrogen oxides, aldehydes, benzene and chlorinated aromatic compounds. The current measurements showed that even in case of bad weather (ie, the sun does not shine directly and UV radiation is low) is very high amounts of pollutants eliminated.
- Polycon Glass-fiber reinforced concrete with TX Active technology due to its self-cleaning ability can maintain the original aesthetic quality of surface cleanliness and color scheme; it helps to reduce maintenance costs. The material can be colored by using inorganic pigments to achieve a large amount of shades from white through red to dark shades of gray.
- The use of paints or hydrophobization is recommended that you consult or directly check – some types are completely unsuitable, while others do not have a negative impact to photoactivity.
- TX Active materials have a pronounced "anti-graffiti" property, although they can partially suppress the graffiti. Modern colors used by graffiti makers often contain substances that block UV-A radiation. This leads to a significant reduction of the photocatalytic effect. After removing graffiti by conventional methods, the surface material is fully functional again.
- Glass-fiber reinforced concrete with TX Active can be used anywhere – where UV radiation occurs as natural (as a component of sunlight) or artificial, coming from the installed light sources. In a view of the above properties it is widely used especially for the realization of façade panels, tiles tunnels, buildings street furniture...

... They clean themselves:

- They prevent the development of algae, moss and lichen
- They break down organic dirt adhering
- Self-cleaning of material is supported by super hydrophilic surface properties
- They keep the aesthetic values of buildings

... They clean environment:

- They break down most of the harmful substances in the air
- They break down the large majority of pollutants coming from the exhaust gases
- They help prevent the formation of ground-level ozone
- They have significant environmental benefits



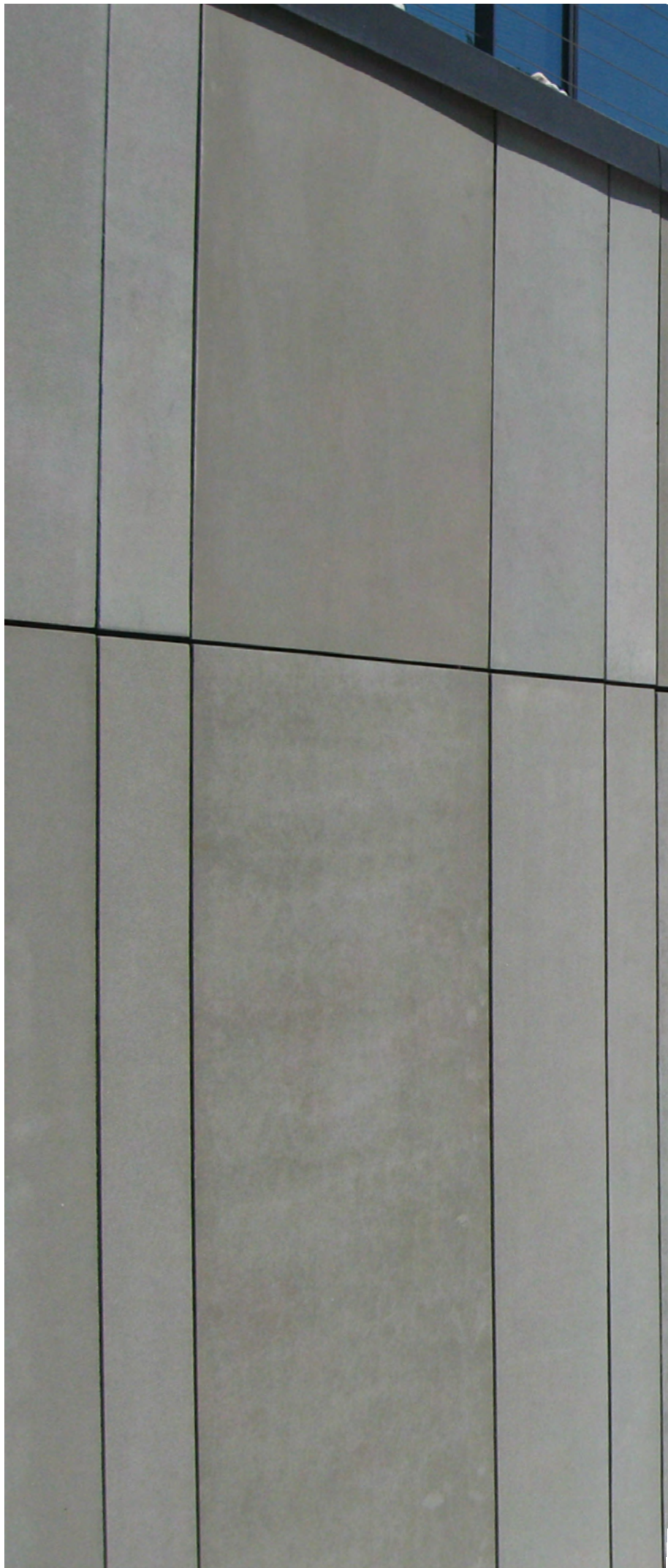


Ostrava,
Czech Republic





Amsterdam,
Netherlands



Prague,
Czech Republic



4.



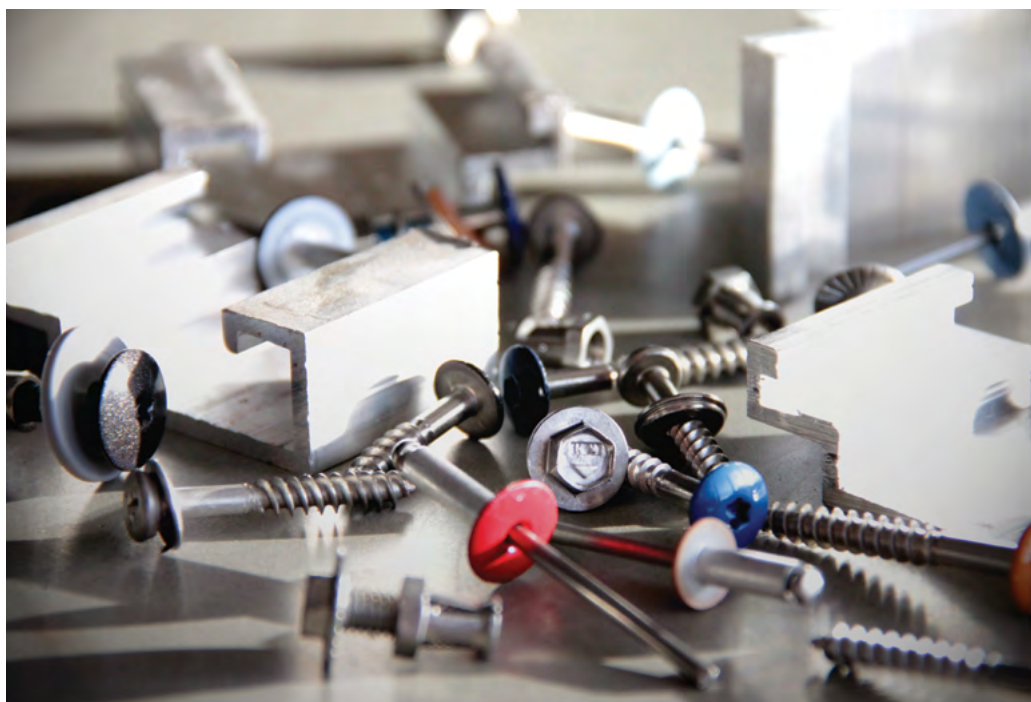
4.0 Basic anchorage systems

4.0 Basic anchorage systems

Facade cladding material Polycon is proposed as ventilated facade system. Because the system must meet the required normative regulations, the chosen solution must provide for suitable and desired air circulation within the ventilated gap. Structural separation of the individual components (ie. thermal insulation and Polycon cladding) is one of the important characteristics of ventilated facades system. Properly created space (ventilation gap) effectively controls the heat and moisture balance in the building and leads to a variety of construction and physical and economic benefits.

Polycon cladding panels must be properly installed on solid, stable and suitably dimensioned bearing structures, which were static analysed and proportionally sized. In any case, any force or load from the supporting structures must not be transferred to a cladding material. The well-designed supporting structure must eliminate all these influences and must not expose cladding of these stress kinds. Customer, resp. Implementation company must verify the stability of the proposed construction by static analysis with sufficient safety factor. In the structural design and proper sizing of anchor points it is necessary to take increased attention for possible wind load (suction), which has a significant impact for the overall stability and security of the proposed structure.

Polycon Facade facing can be anchored to a steel or aluminum grating, however, it must be always in accordance with the technical prerequisites for safe implementation. Design of the supporting structure must respect the whole material properties of glass-fiber-Polycon concrete with sufficient safety factors that the final version designed construction was safe and long-term functional. Anchors of supporting structure alternatively can be visible, such as screws or rivets or conversely some of the hidden (invisible) anchoring systems can be used. Within the hidden anchoring it is possible to use chemical or mechanical anchoring methods. Suitable variant of the selected system must be designed by the Client (or a company) to meet all the functional and aesthetic parameters of safe design while respecting the functional and technical parameters of Polycon glass-fiber-concrete composites.



4.0 Basic anchorage systems

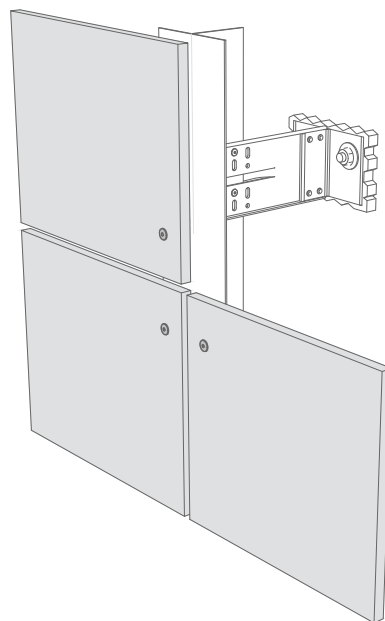
4.1 Riveting
System details (QV1)

Riveting System Details (QV1)

4.0 Basic anchorage systems

4.1 Riveting System details (QV1)

Mechanical fixing
of rear-ventilated panels
using the rivets



Mechanical fixing of rear-ventilated panels using the rivets

Summary of use

Cladding panels are mounted to vertically positioned profiles by rivets. These vertical profiles are attached to the supports. The supports are attached directly to the front wall using bolts or anchors.

Instructions for vented system installation

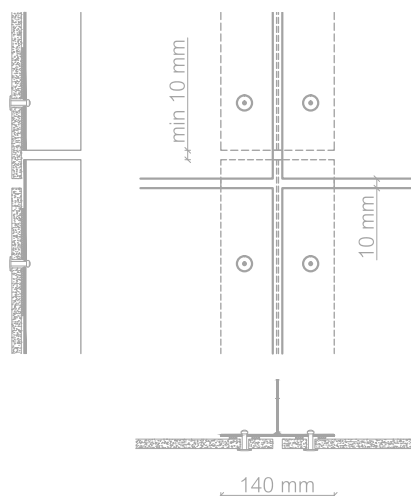
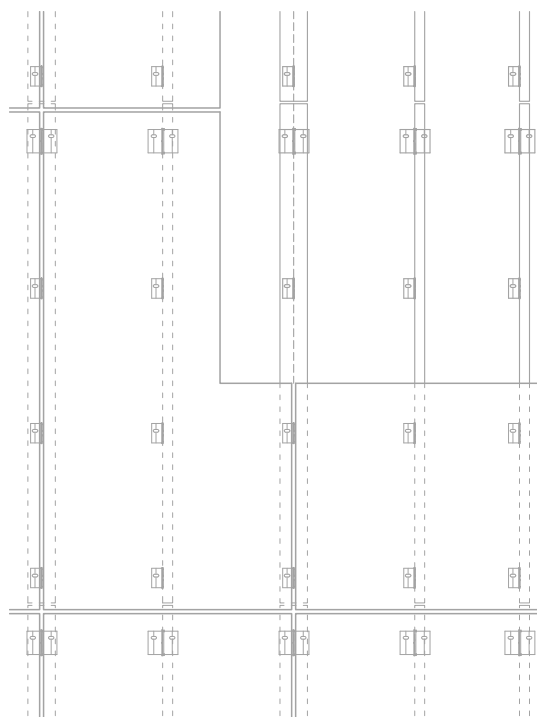
1. Supports are attached to the base of the wall / building using anchors or bolts. Number of supports (pillars) and the distance between them (static diagram) is determined by the static analysis and it is illustrated in the installation plan.
2. Vertical profiles are fixed to the wall supports using rivets for each profile is only one firm support. All other points are flexible.
3. Rivets are placed to the center of circular holes (solid support) or oval holes (flexible supports), to create the capacity for thermal motions of profiles for both directions.
4. Vertical profiles must be leveled before the final mounting on the wall supports. Precise leveling of vertical profiles through alignment deviations along the wall construction is carried out using different lengths of wall anchors.
5. The panels are attached to the aluminum frame using rivets.

Important

- Anchors are fixed to a solid base (concrete or metal). For each project is required to perform static analysis.
- Building foundation / base must be designed at the beginning, calculated and verified for holding the load (weight and wind) of ventilated facade panels.

Requirements and recommendations

- Vertical profiles in gaps need to have a width with respect to tolerances necessary for installation of cladding panels – 140 mm (min. 110 mm).
- The distance between the vertical profiles is at least 10 mm.
- Fixing a panel on the two vertical profiles is not allowed.
- Vertical bars must be mounted in a perfect vertical position and in the same plane.
- Coated aluminum profiles prevent them from being seen through the joint unwanted reflections.
- Thermal pad between the wall and the support reduces the thermal bridge through aluminum construction.
- Static analysis must take account of the individuality of the project, specific conditions and local regulations. It provides security control verification and components optimization.



Mechanical fixing of rear-ventilated panels using the rivets

Instructions for installaton of the cladding panels

Polycon drilled panels are attached to the structure with fixed and sliding points.

The two fixed points are created for each cladding panel with fixed brackets. These shall ensure that each panel is attached to the structure precisely and without stress.

These two fixed point of the panel must never be attached to the same support profile and the panel must be placed in a position of as much as possible in the center.

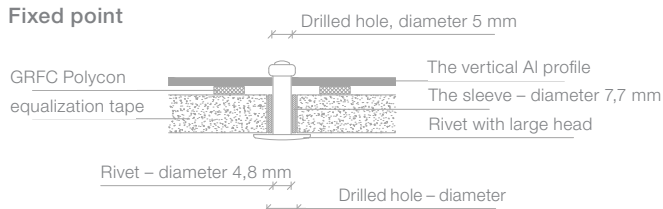
Position of fixed points of side panels must be the same, ie. at the center and the left. This ensures that it can not interfere with one panel to another.

The holes in the vertical profiles (diameter 5 mm) for facing panels fixing with rivets must be accurately aligned with predrilled holes in the panel (diameter 8 mm) to achieve compensation range without tension.

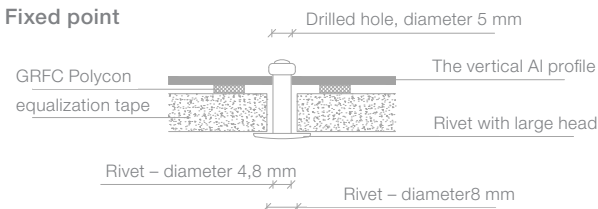
Important

The exact number and position of holes on each panel must be agreed upon the static analysis.

Fixed point



Fixed point



Blind rivet with a large head

Panel thickness: 10/13/15 mm
Dimensions: \varnothing 4,8 x 20/22/24 mm
Head diameter 16 mm

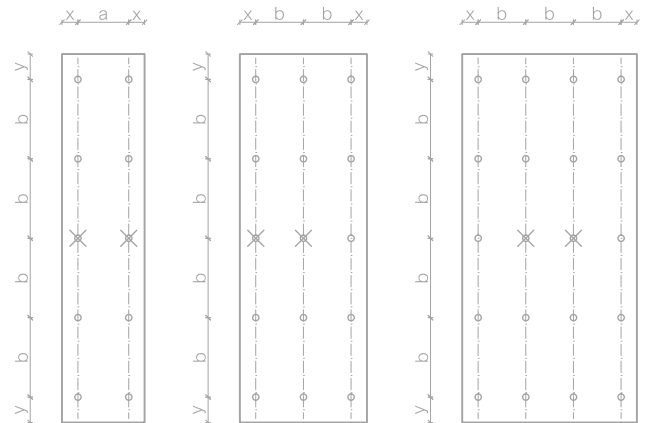
Sleeve of fixed point

Panel thickness: 10/13/15 mm
Dimensions: \varnothing 7,7 x 5 x 9/11/14 mm

Diameter of holes drilled in the Polycon panels \varnothing 8 mm
Diameter of holes drilled in the construction diameter 5 mm

Equalization tape

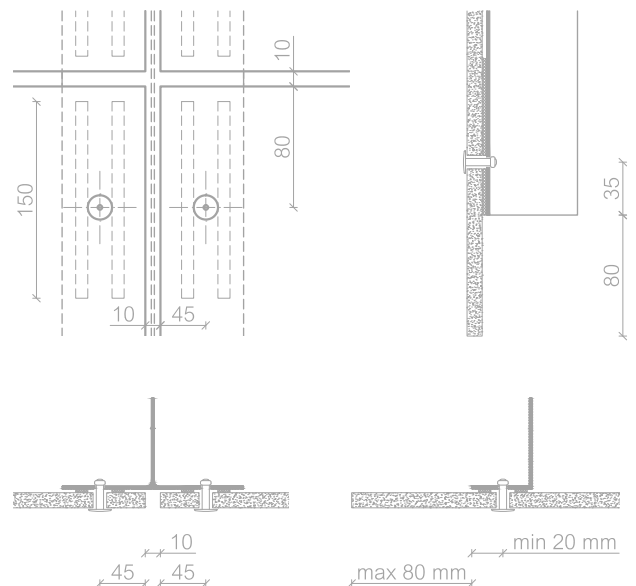
Material: rubber adhesive tape
Dimensions: 10 x 3 mm



Panel thickness diameter 10 mm 13 mm 15 mm

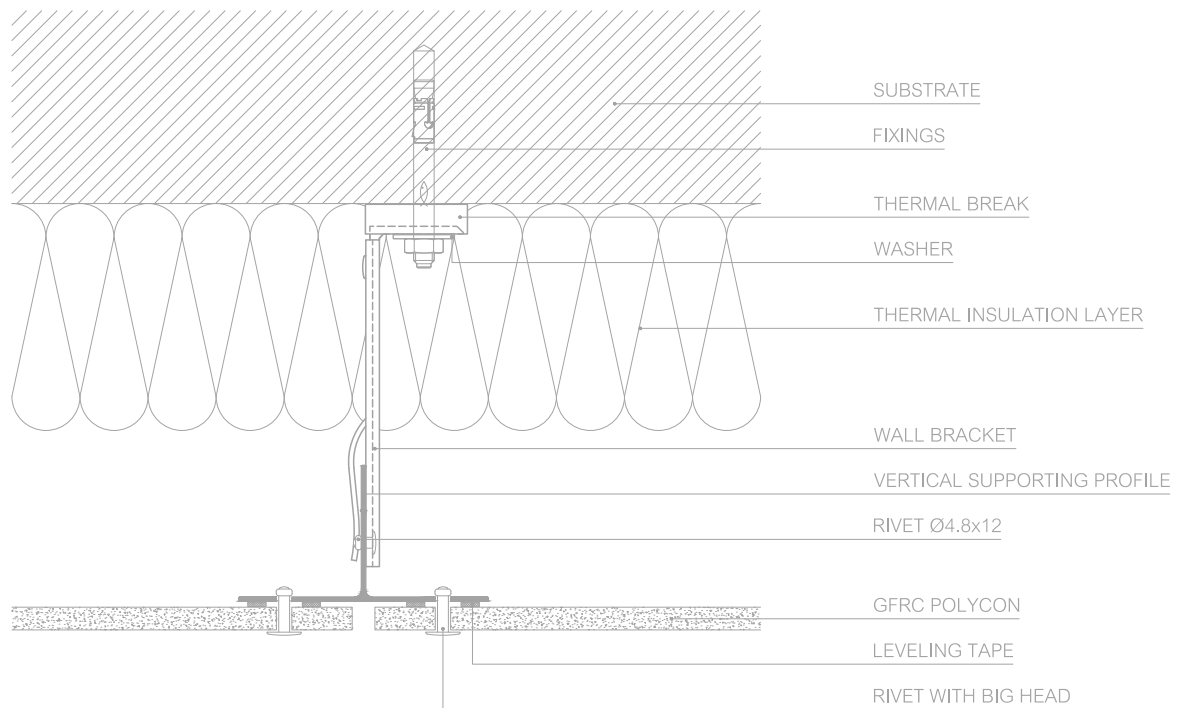
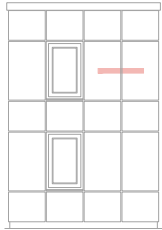
Maximum spacing „a“	450 mm	500 mm	550 mm
Maximum spacing „b“	500 mm	550 mm	600 mm
Distance from the edge „x“	40–50 mm		
Distance from the edge „y“	50–80 mm		

Spacing consolidating listed in the table can be used asa base for the initial scheduling and then they must be agreed upon the static analysis.



QV1

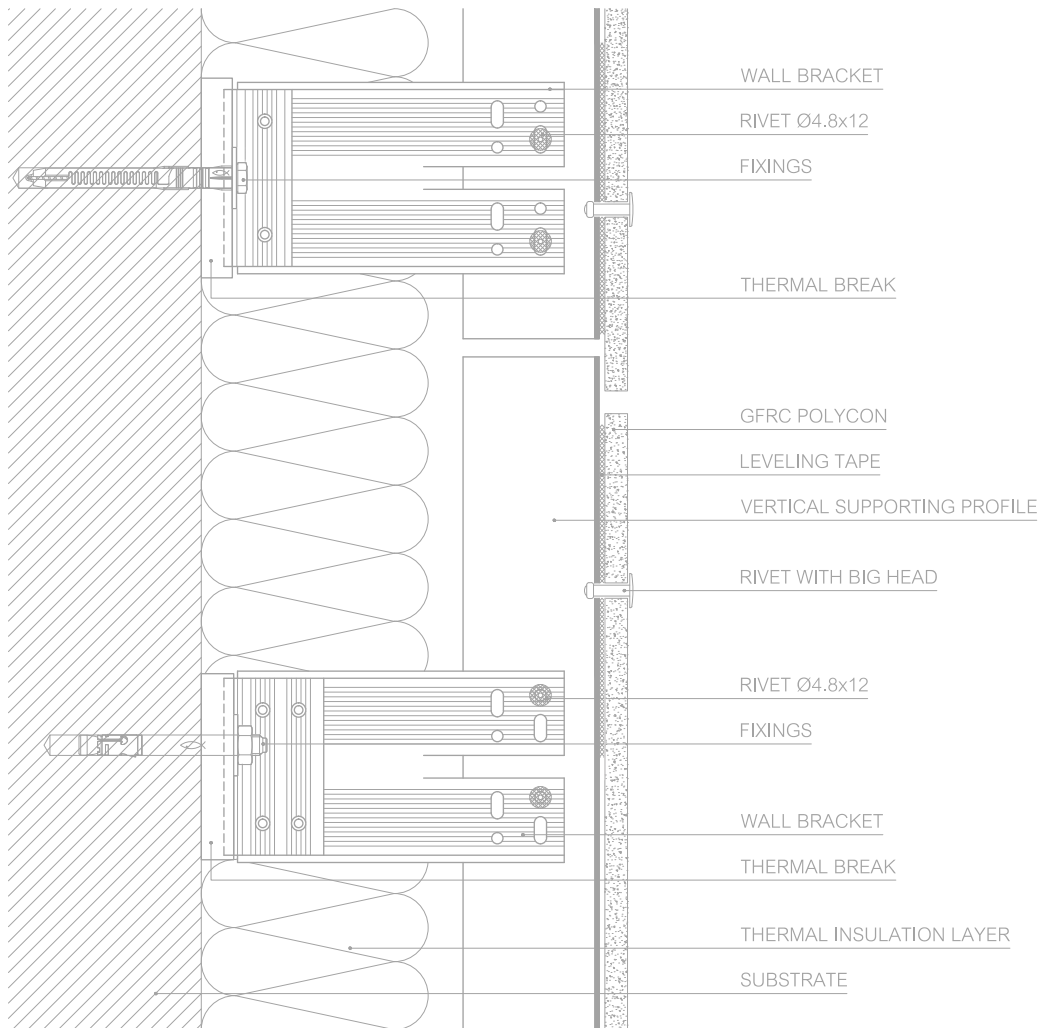
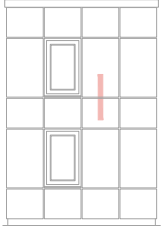
Mechanical fixing of rear-ventilated panels using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

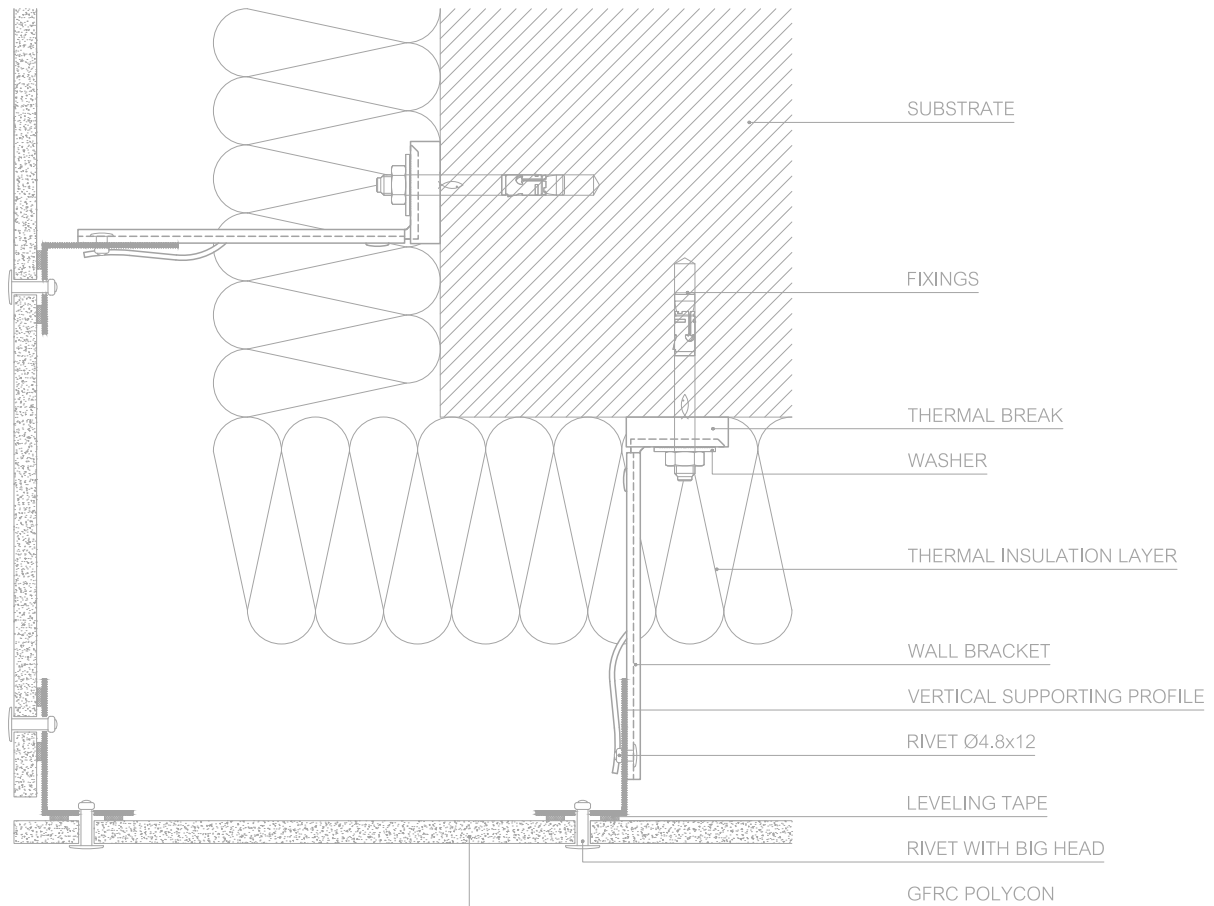
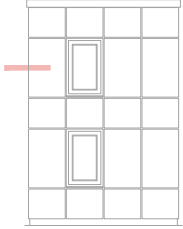
Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

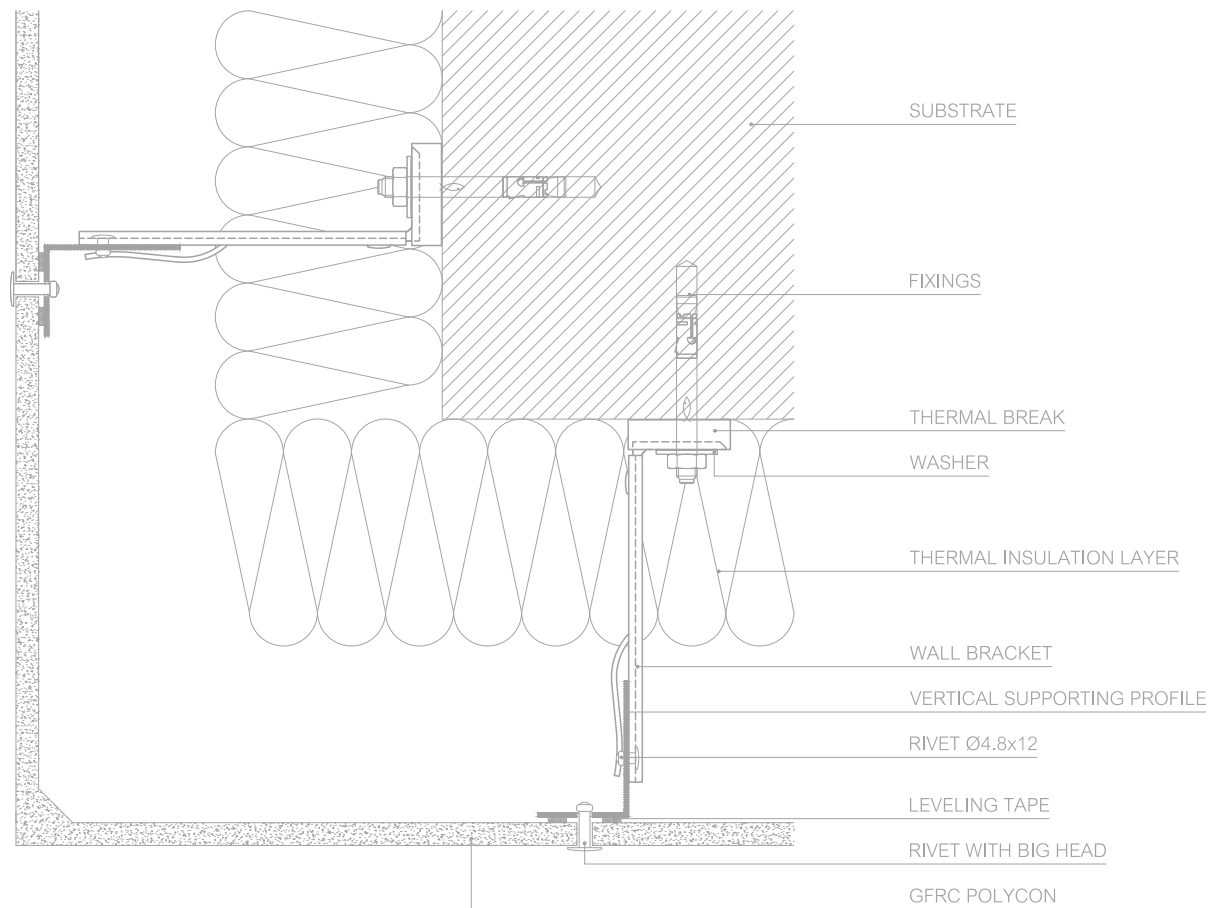
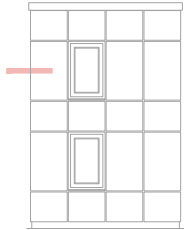
**Mechanical fixing
of rear-ventilated panels
using the rivets**



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

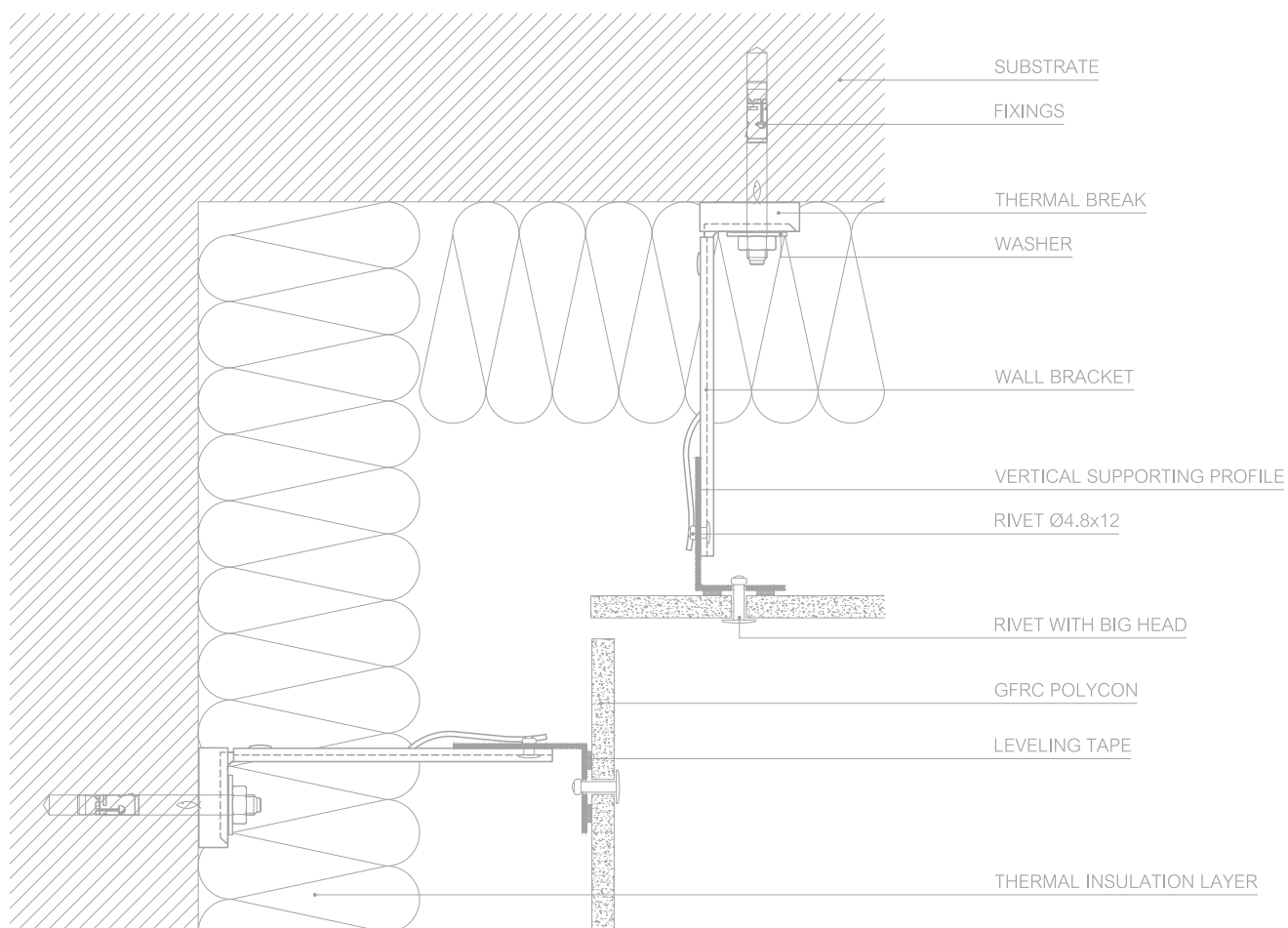
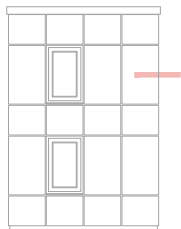
Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

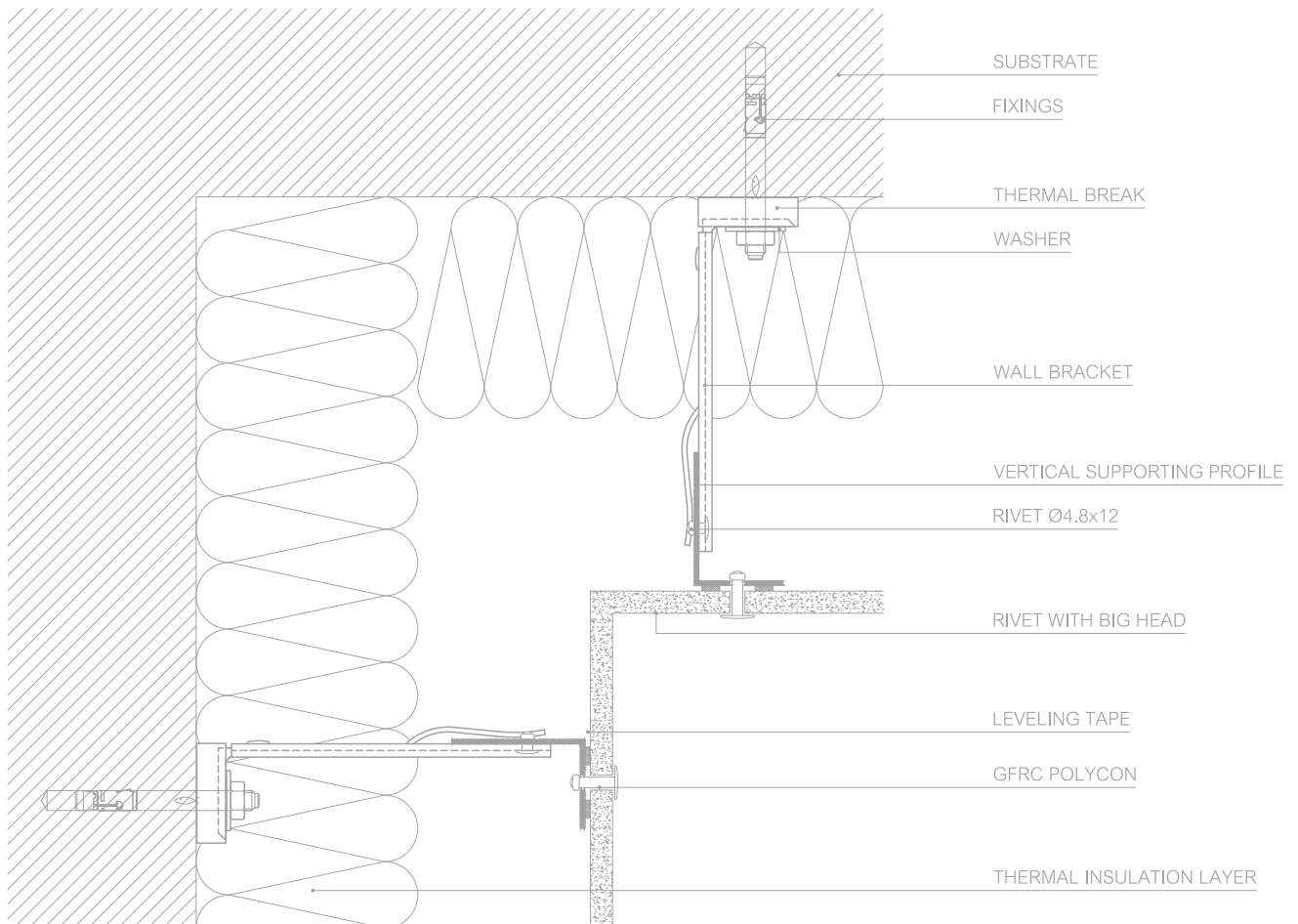
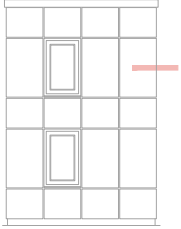
Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

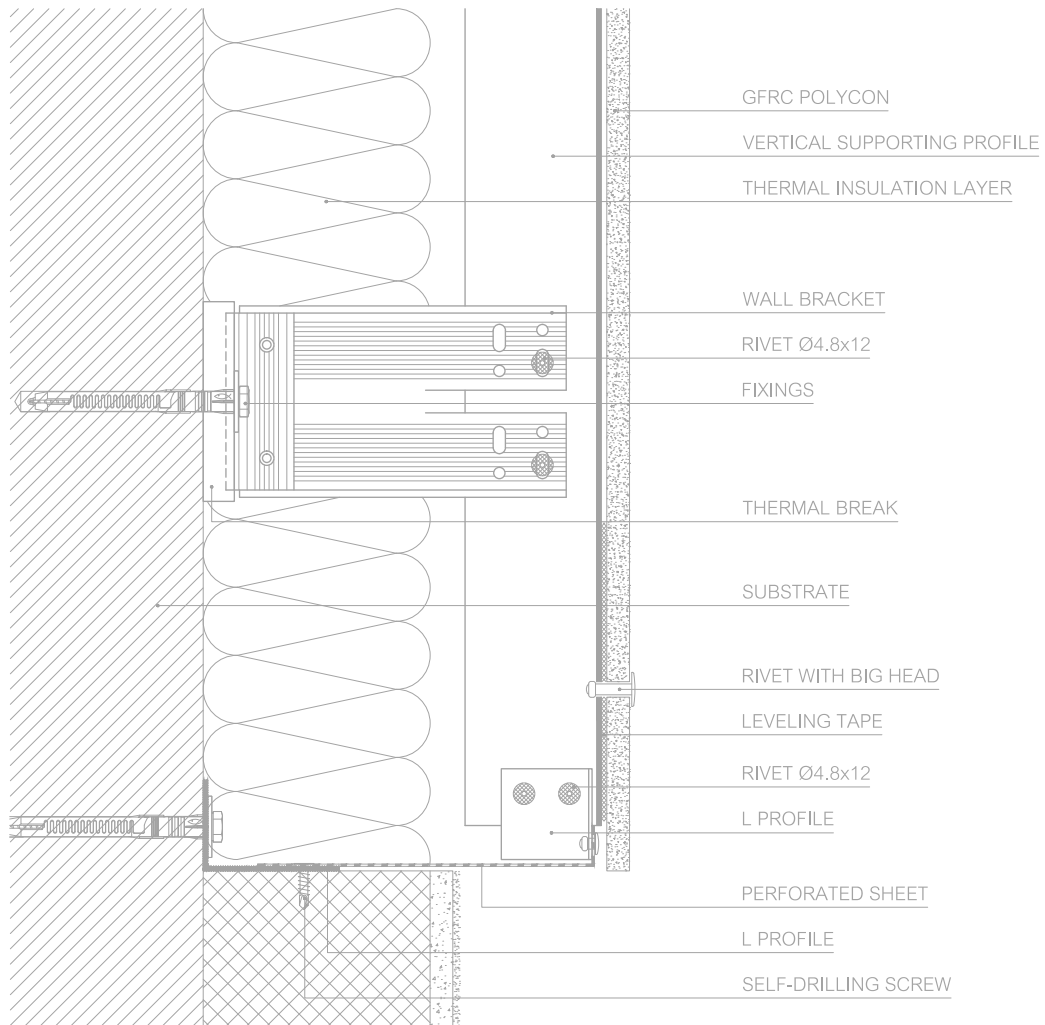
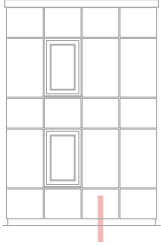
**Mechanical fixing
of rear-ventilated panels
using the rivets**



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

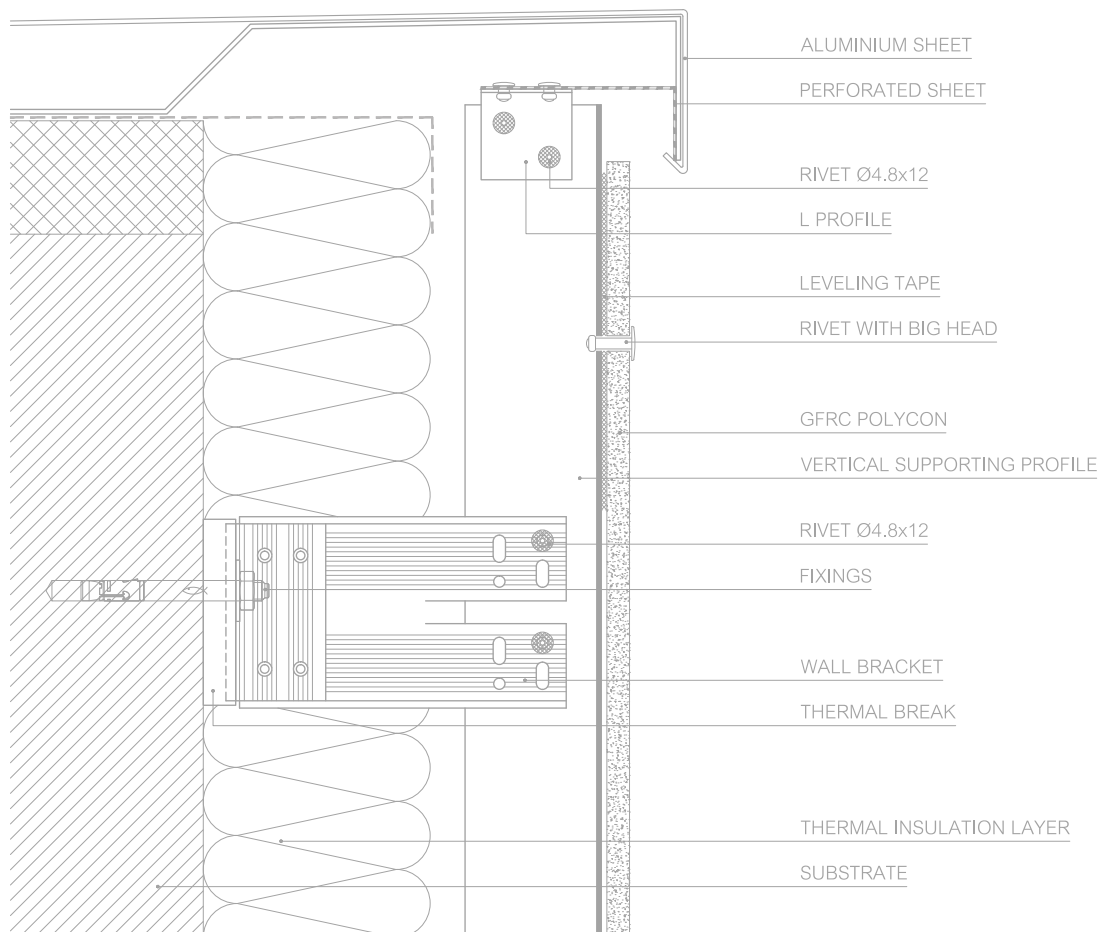
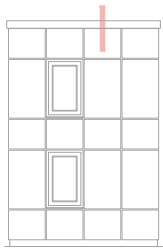
Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

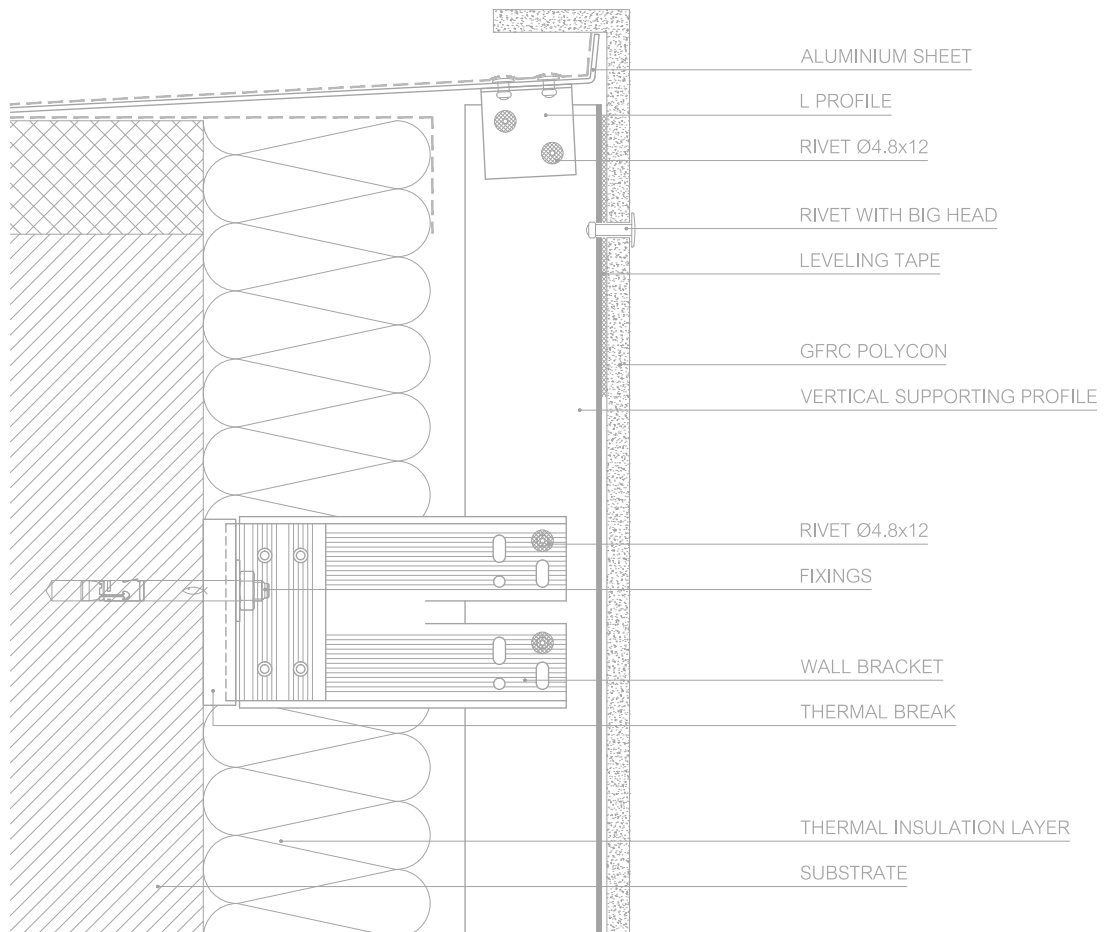
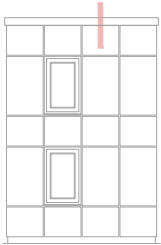
Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

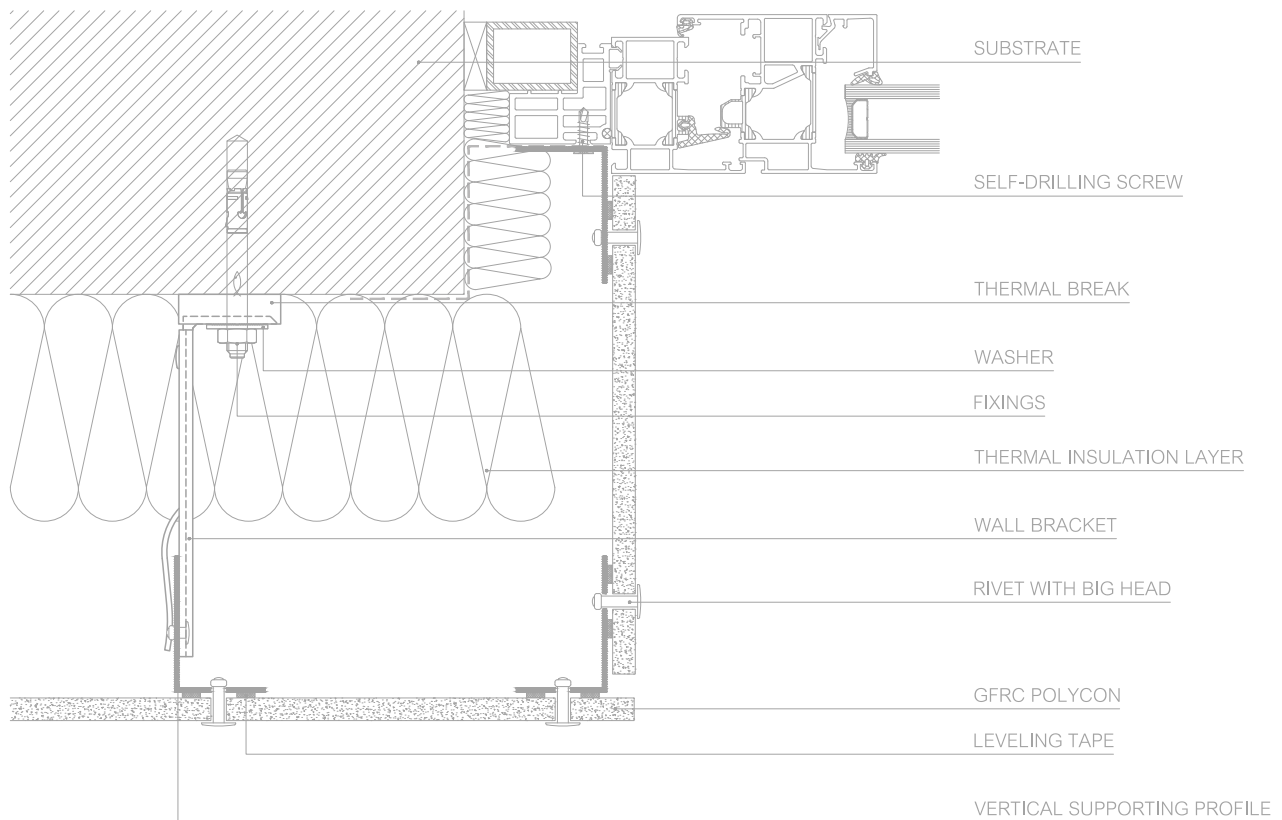
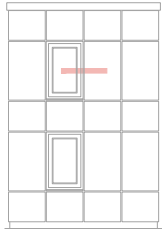
Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

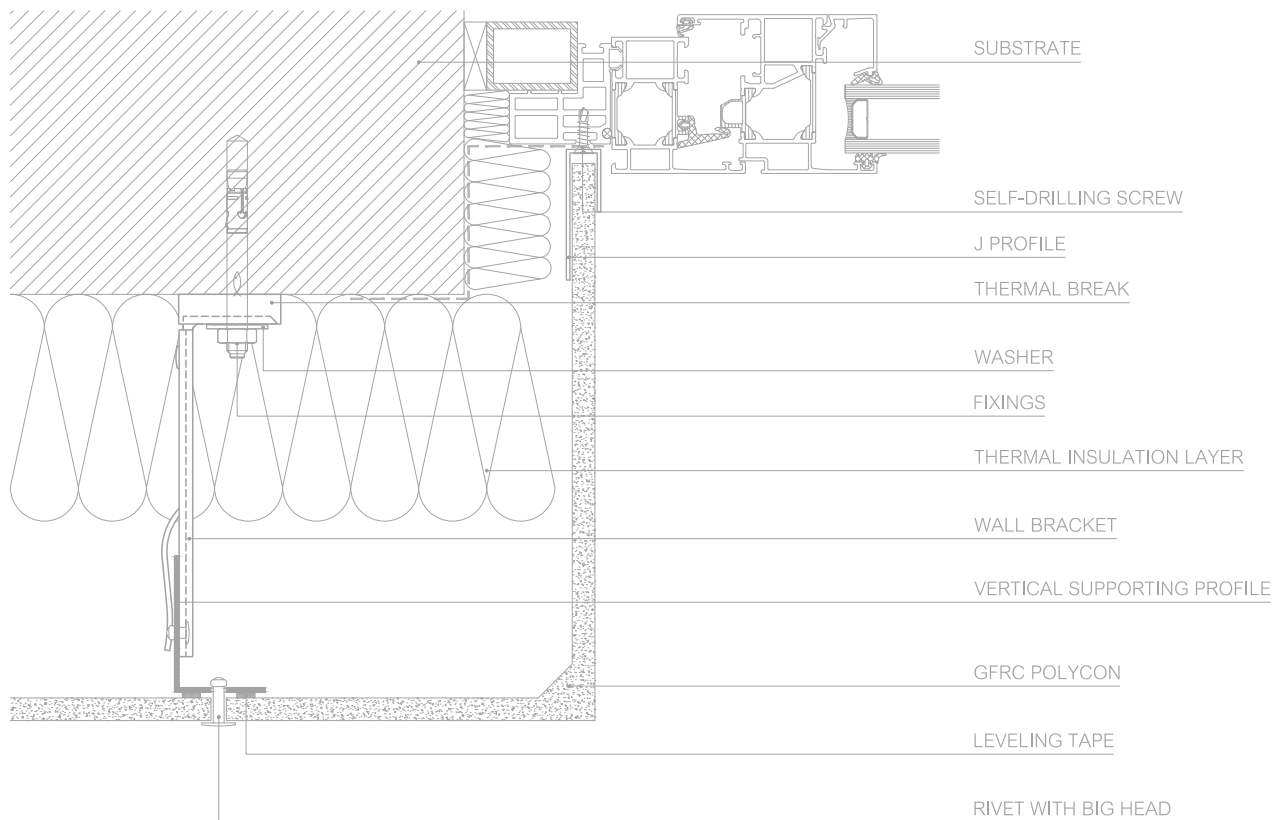
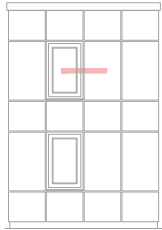
**Mechanical fixing
of rear-ventilated panels
using the rivets**



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

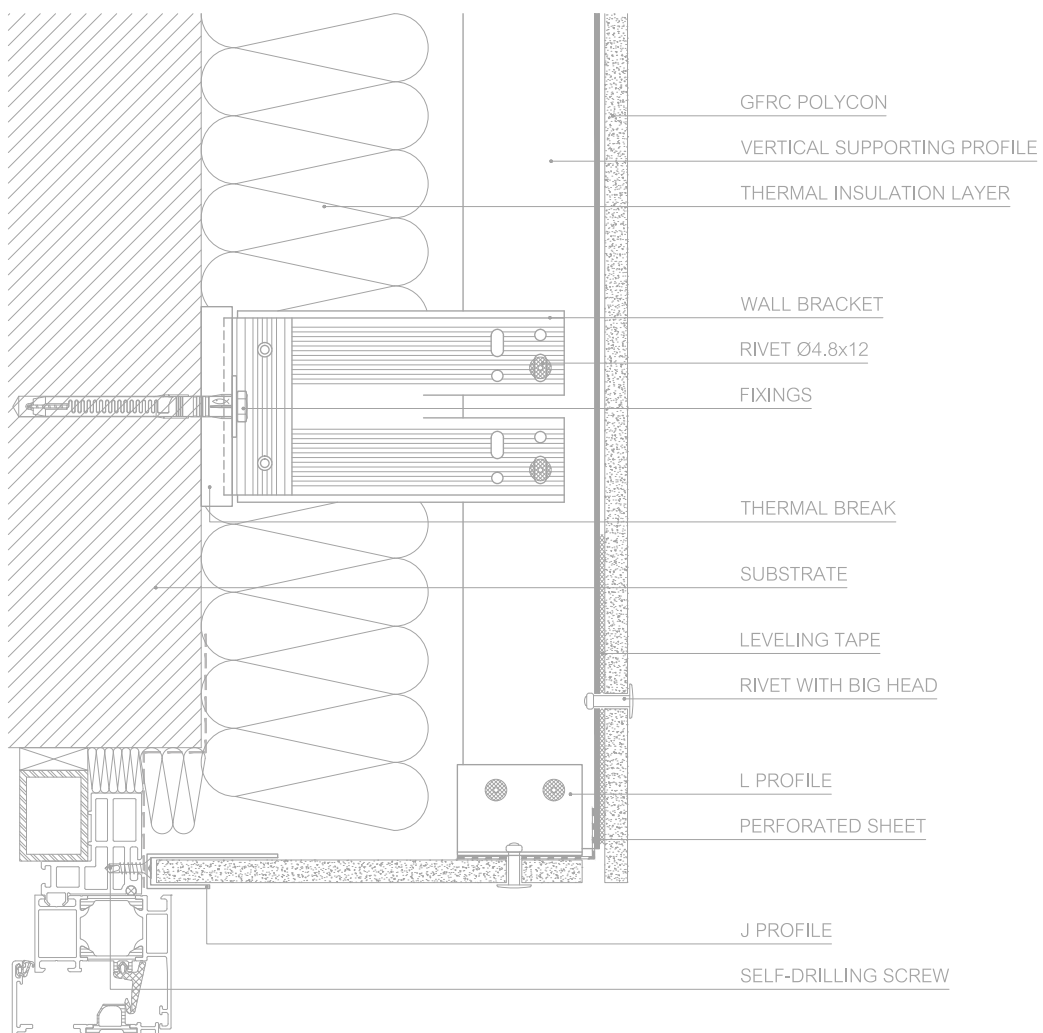
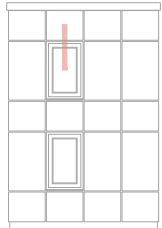
Mechanical fixing of rear-ventilated panels using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

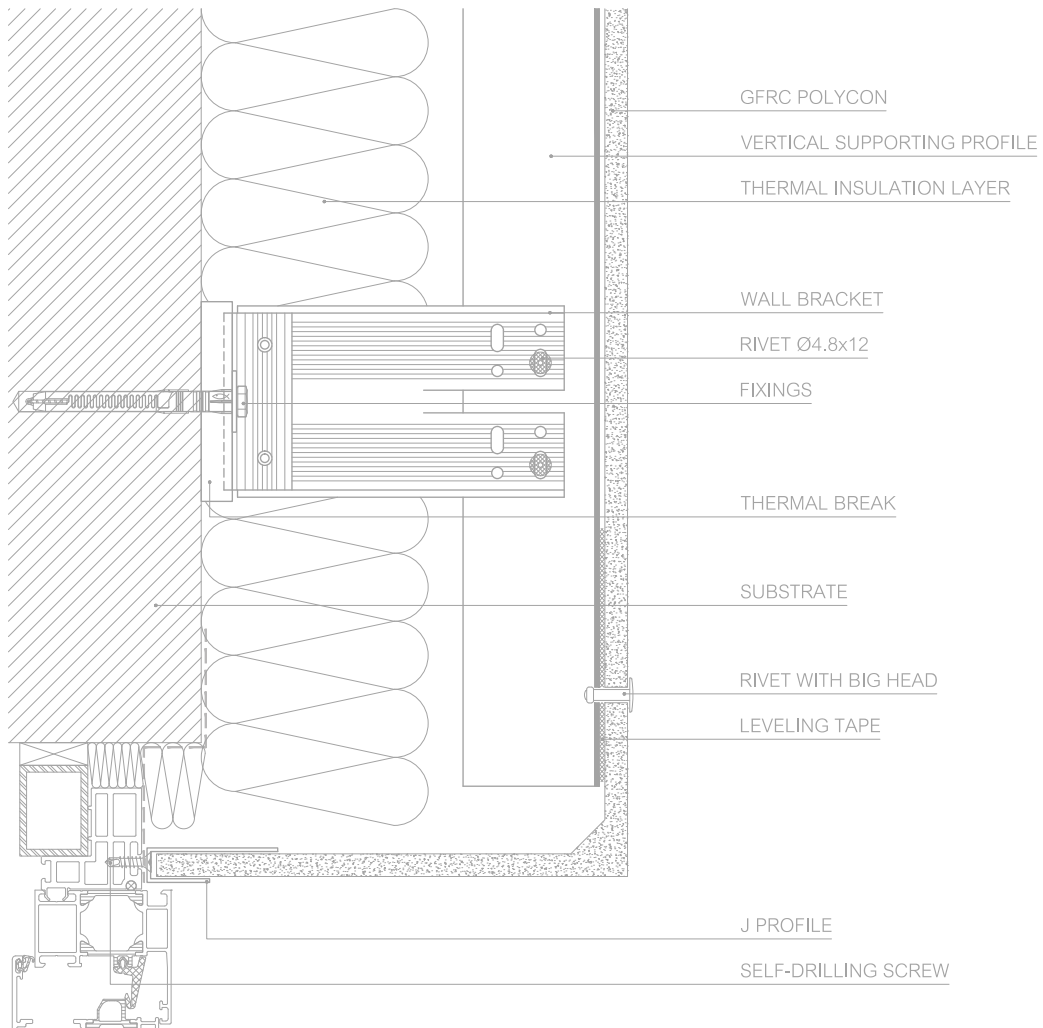
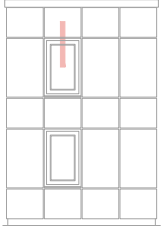
Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

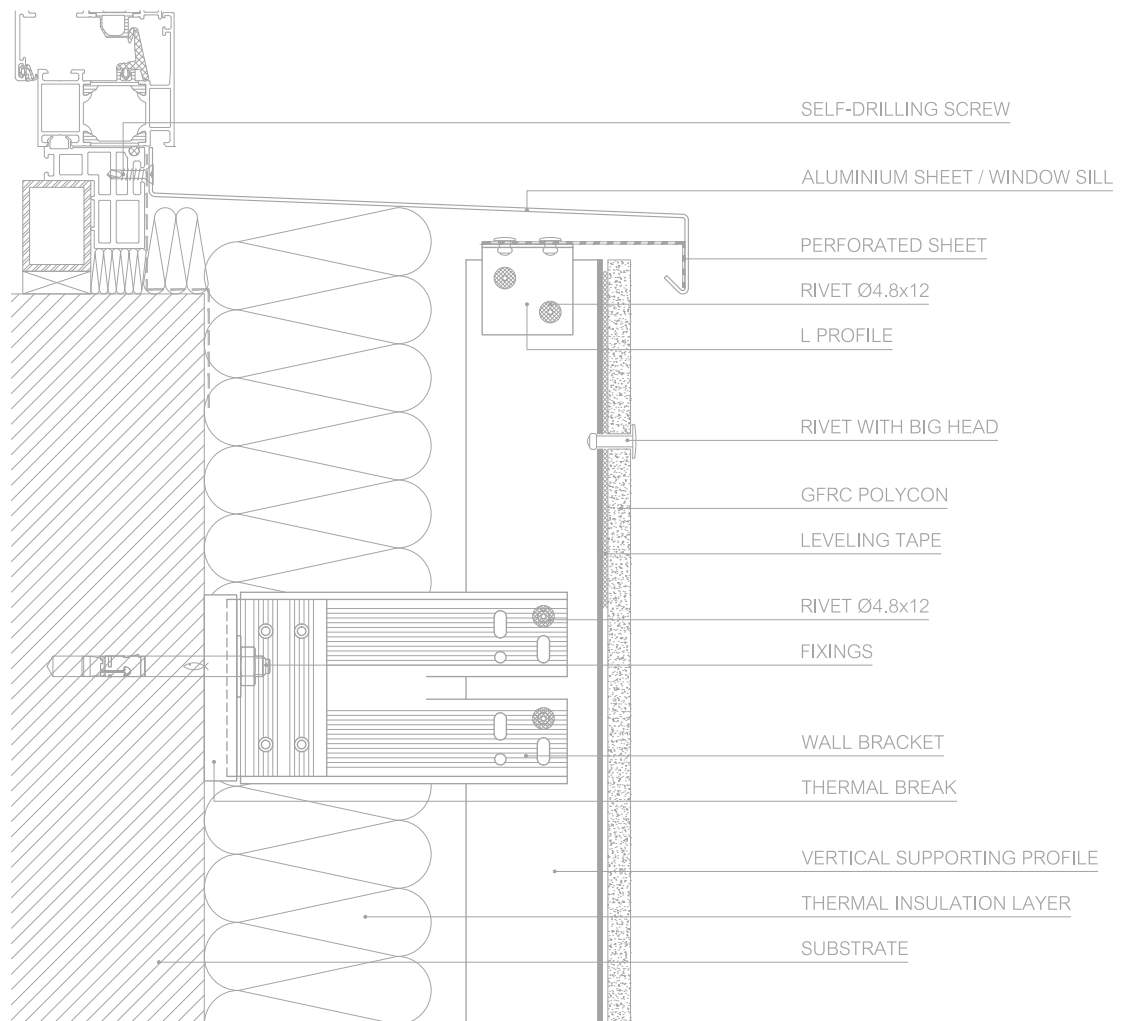
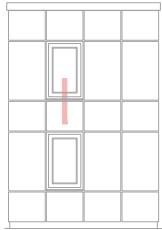
**Mechanical fixing
of rear-ventilated panels
using the rivets**



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV1

Mechanical fixing
of rear-ventilated panels
using the rivets



Specification of profiles accessories and their location must be agreed upon the static analysis.



Mechanical fixing of rear-ventilated panels using the rivets

Technical data sheet form

All data presented below are included in the Q-VENT product specifications. This is possible to supply custom-made profiles and accessories, if it is required for specific design project or static analysis.

Wall supports

Aluminum alloys EN AW-6063 (AlMg0,7Si) EN573-3, T66 EN 577, certificate of type test according to EN 845-1:2003+A1:2008, Method of testing according to EN 845-10:2000

Code

02.fl.xxx
02.ft.xxx
02.fu.xxx

Description

Wall support with the two parts FixU L
Wall support with two parts FixU T
Wall support with the two parts Fix

Length

40–210 mm
100–270 mm
210–550 mm

Support profiles

Aluminum alloys EN AW-6063 (AlMg0,7Si) EN573-3, T66 EN 577
Certificate of type test according to EN 13830:2003
Infill wall
Product standard, method of testing according to EN 12179-2000,
Power requirements according to EN 13116:2001

01.2.140602.6
01.2.130552.6
01.2.120502.6
01.2.120502.6
01.2.120502.6
01.1.66662.6
01.1.60402.6
01.1.40402.6

T profile 140 x 60 x 2 mm
T profile 130 x 55 x 2 mm
T profile 120 x 50 x 2 mm
T profile 110 x 60 x 2 mm
T profile 110 x 45 x 2 mm
L profile 66 x 66 x 2 mm
L profile 60 x 40 x 2 mm
L profile 40 x 40 x 2 mm

Heat insulation

Polypropylene, thermal e, thermal conductivity $\lambda=0,22$ W/mK

05.001.4
05.001.5
05.001.3

SuperPAD FixU L
SuperPAD FixU T
SuperPAD FixU

Fixing elements

Fixing elements must withstand the rated load in tension, shear strength and combination of tension and shear strength which they are exposed.

Blind rivets: aluminum body (AlMg 2,5 EN AW 5052, EN 573) /
Stainless steel core A2, stainless steel body A2 /
Stainless steel core A2

04.1.8105.1
04.1.10105.1
04.2.8100.1
04.2.10100.1
04.5.10
04.4.4812.1

anchoring M8 x 105
anchoring M10 x 105
tenon diameter \varnothing 8 x 100
tenon diameter \varnothing 10 x 100
pad diameter 30 x 10 x 1,5
rivet diameter 4,8 x 12

Specification of profiles accessories and their location must be agreed upon the static analysis.

4.0 Basic anchorage systems

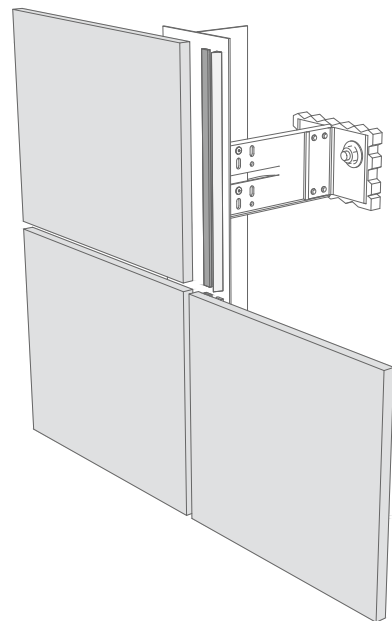
4.2 Gluing
Systems details (QV2)

4.2 Gluing System details (QV2)

4.0 Basic anchorage systems

4.2 Gluing System details (QV2)

Hidden gluing for rear-ventilated panels using gluing technology



Hidden gluing for rear-ventilated panels using gluing technology

Summary of use

Cladding panels are mounted to vertically positioned profiles by rivets. These vertical profiles are attached to the supports. The supports are attached directly to the front wall using bolts or anchors.

Installation instructions for ventilated system

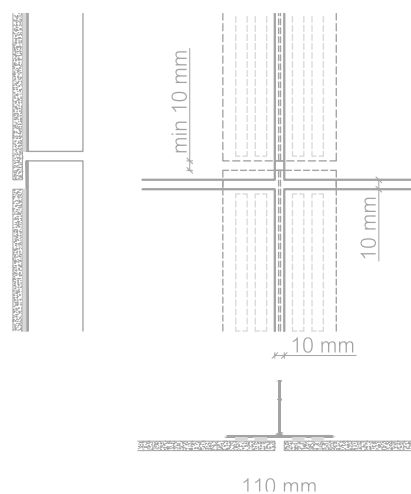
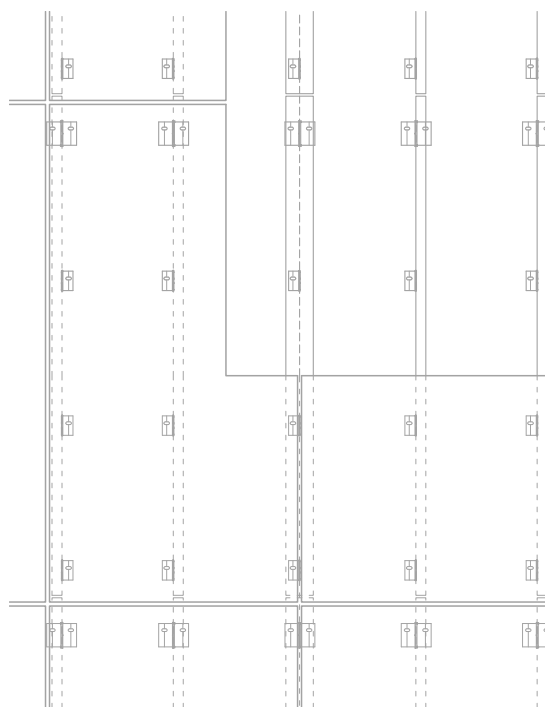
1. Supports are attached to the base of the wall/building using anchors or bolts. Number of supports (pillars) and the distance between them (static diagram) is determined by the static analysis and it is illustrated in the installation plan.
2. Vertical profiles are fixed to the wall supports using rivets. For each profile is only one firm support. All other points are flexible.
3. Rivets are placed to the center of circular holes (solid support) or oval holes (flexible supports), to create the capacity for thermal motions of profiles for both directions.
4. Vertical profiles must be leveled before the final mounting on the wall supports. Precise leveling of the vertical profiles through alignment deviations along the wall construction is carried out using different lengths of supporting anchors.
5. The panels are placed to aluminum construction using adhesive glue (Sika Tack-Panel).

Important

- Solid holders (support) are mounted to a solid foundation (concrete or metal).
- For each project is required to perform static analysis.

Requirements and recommendations

- Vertical profiles in gaps need to have a width with respect to tolerances necessary for installation of cladding panels – 110 mm (min. 80 mm).
- The distance between the vertical profiles is at least 10 mm.
- Vertical bars must be mounted in a perfect vertical position and in the same plane.
- Fixing a panel on the two vertical profiles is not allowed.
- Pads between the wall and the support reduces the thermal bridge through aluminum construction.
- Static analysis must take account of the individuality of the project, specific conditions and local regulations. It provides security control verification.



Specification of profiles accessories and their location must be agreed upon the static analysis.

Hidden gluing for rear-ventilated panels using gluing technology

Instructions for installaton of the cladding panels

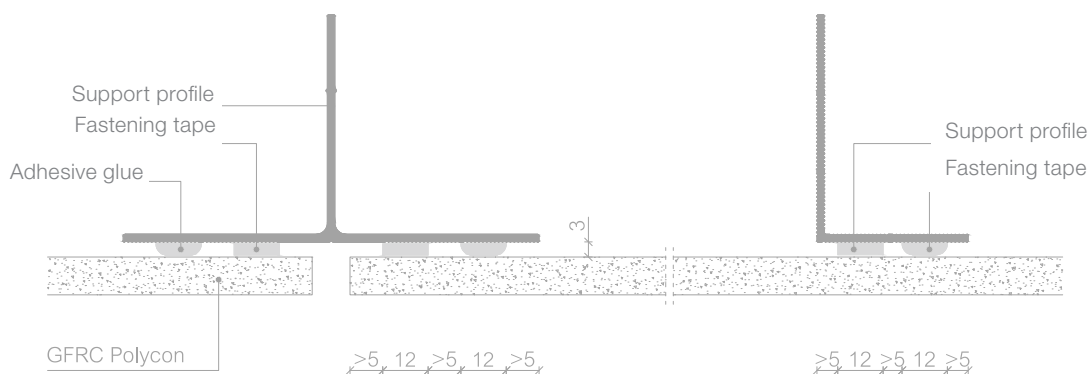
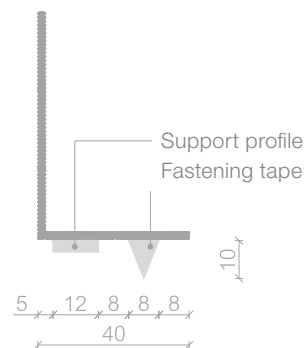
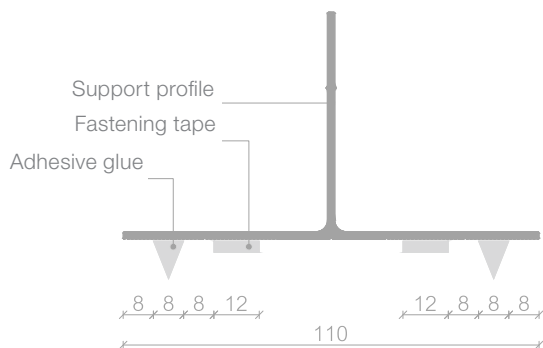
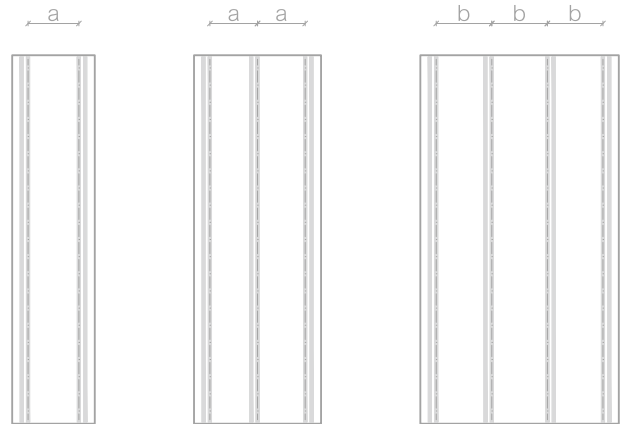
It is necessary to follow all installation instructions of the adhesive manufacturer to ensure the safe performance of the adhesive. For information about system SikaTack Panel see the last page of this chapter.

Important

The distance between the profiles of each panel must be agreed upon the static analysis.

Panel thickness	10 mm	13 mm	15 mm
Maximum spacing „a“	400 mm	450 mm	700 mm
Maximum spacing „b“	450 mm	500 mm	750 mm

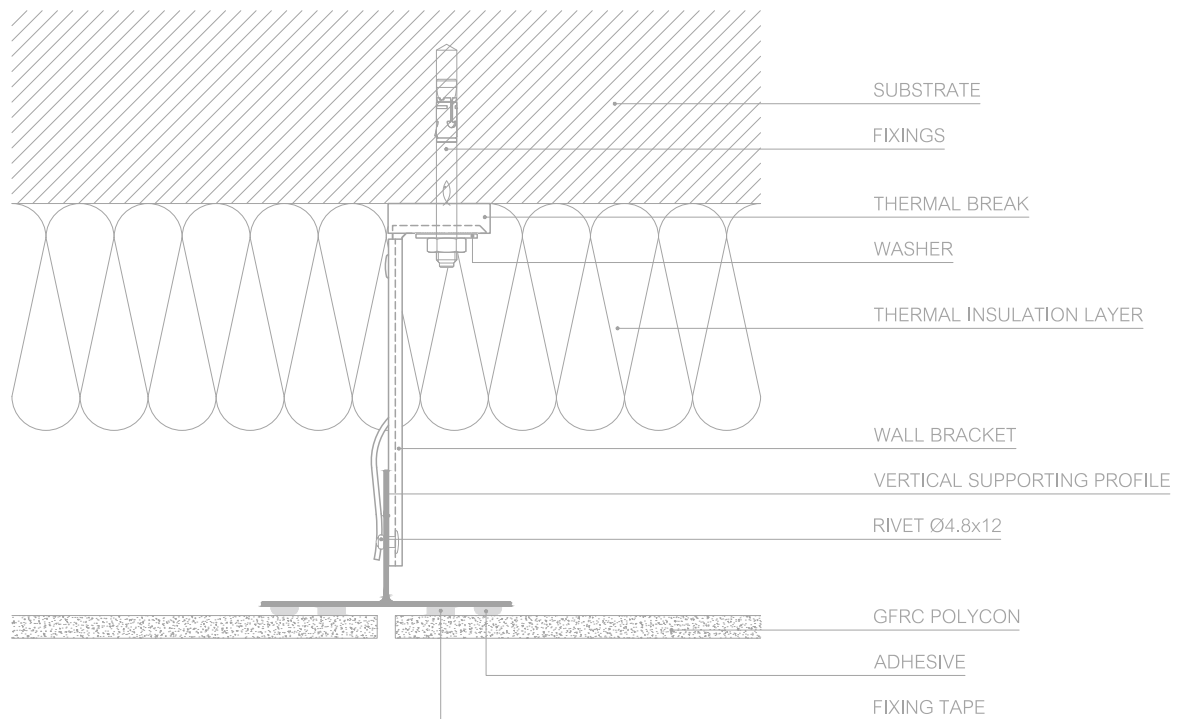
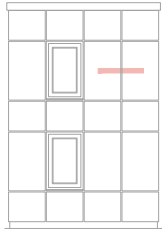
Spacing of fixing listed in the table can be used as a base for the initial scheduling.



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV2

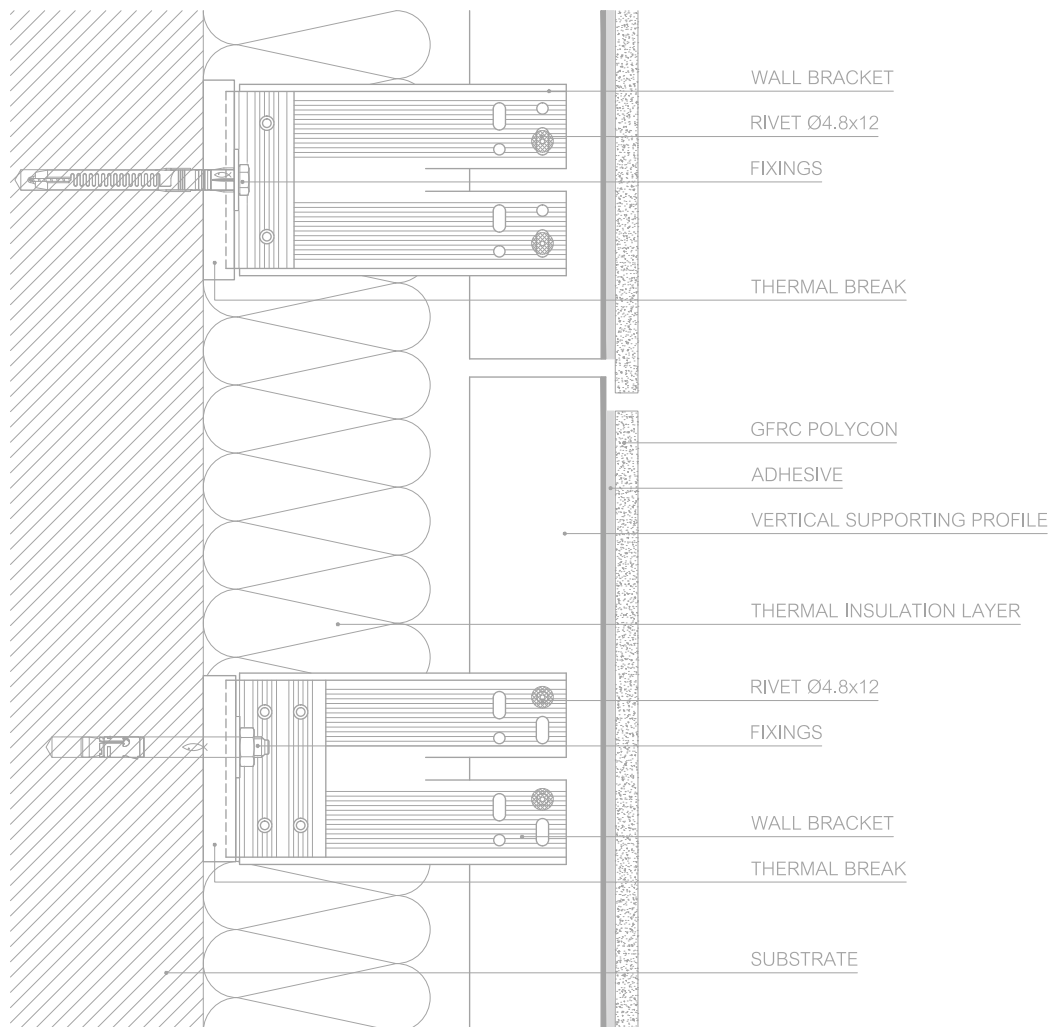
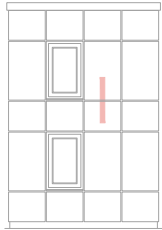
Hidden gluing for rear-ventilated panels using gluing technology



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV2

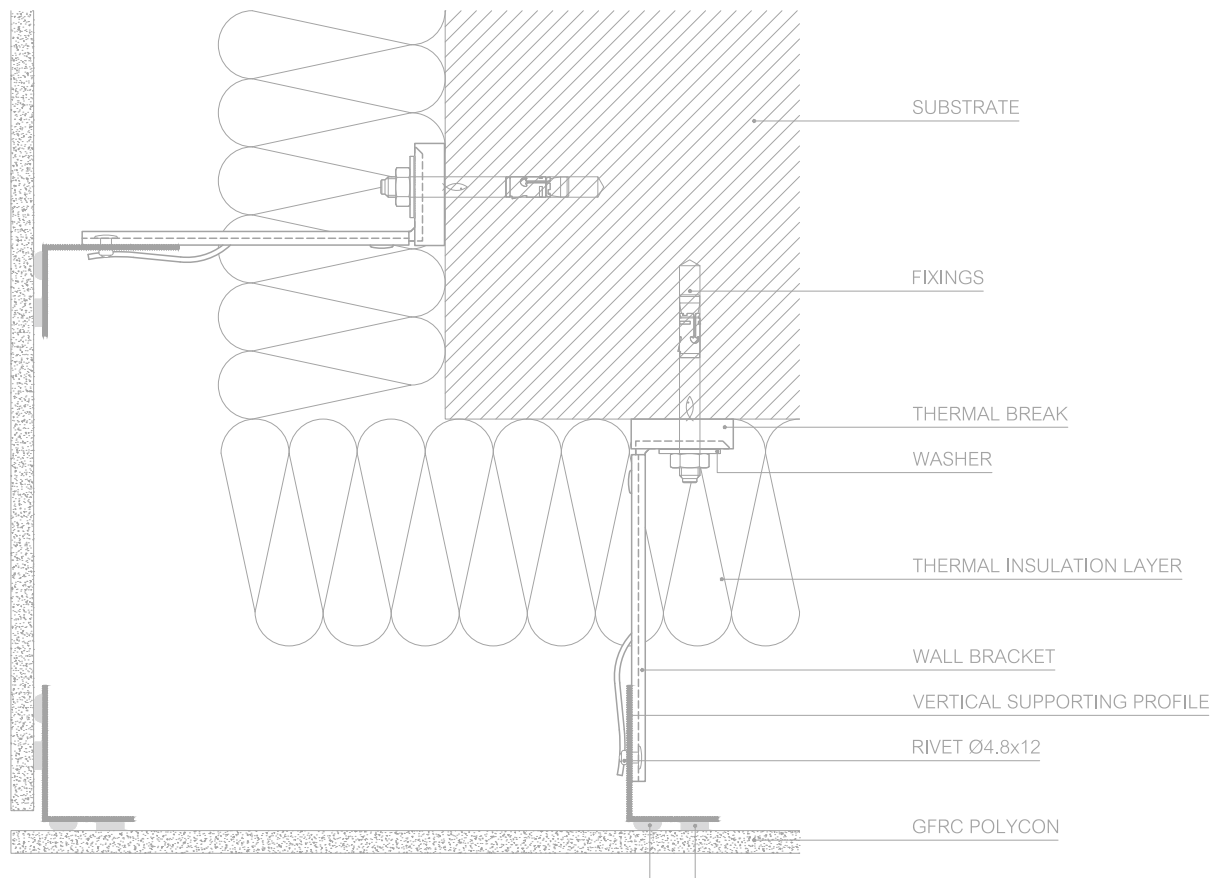
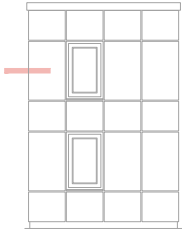
Hidden gluing for rear-ventilated
panels using gluing technology



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV2

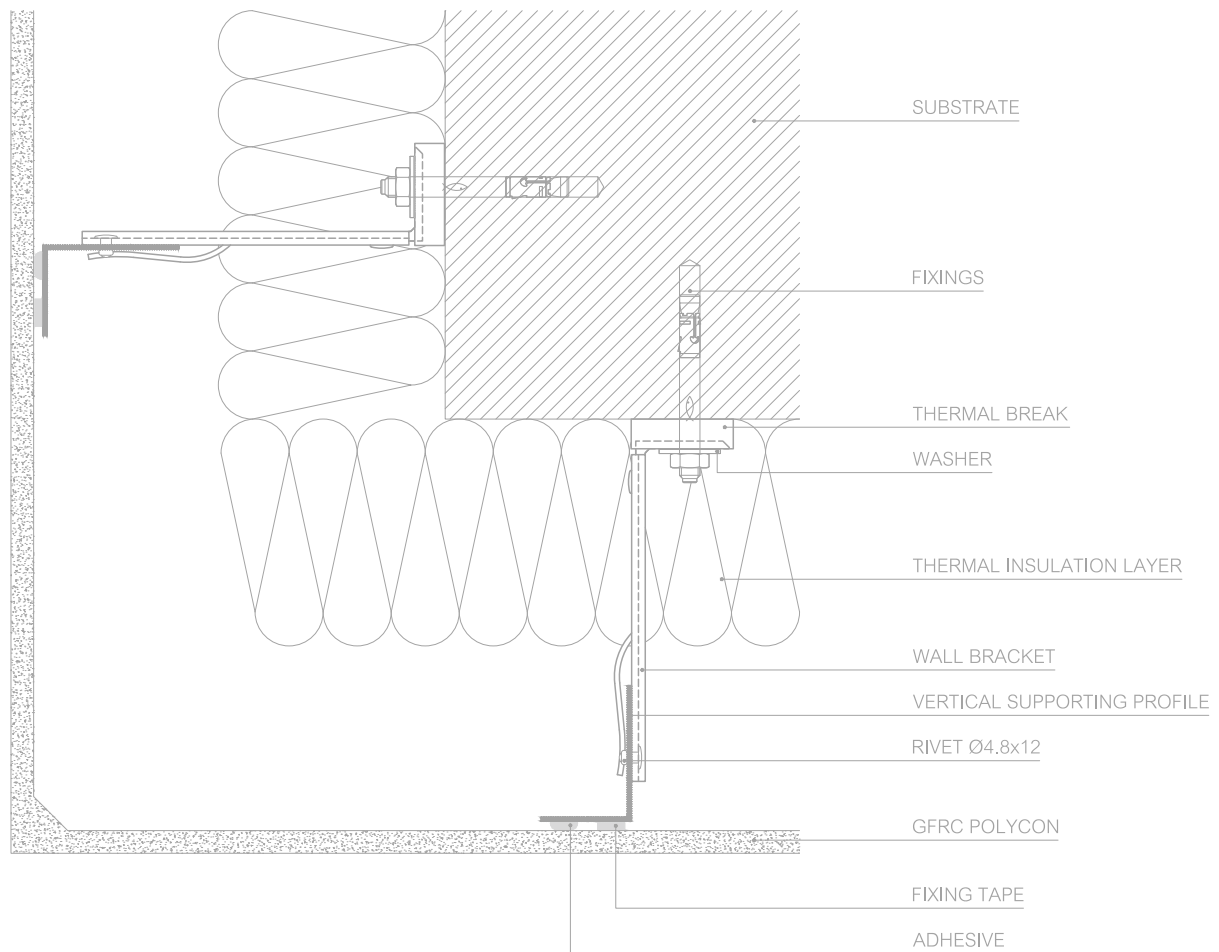
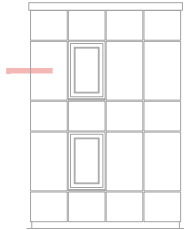
Hidden gluing for rear-ventilated
panels using gluing technology



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV/2

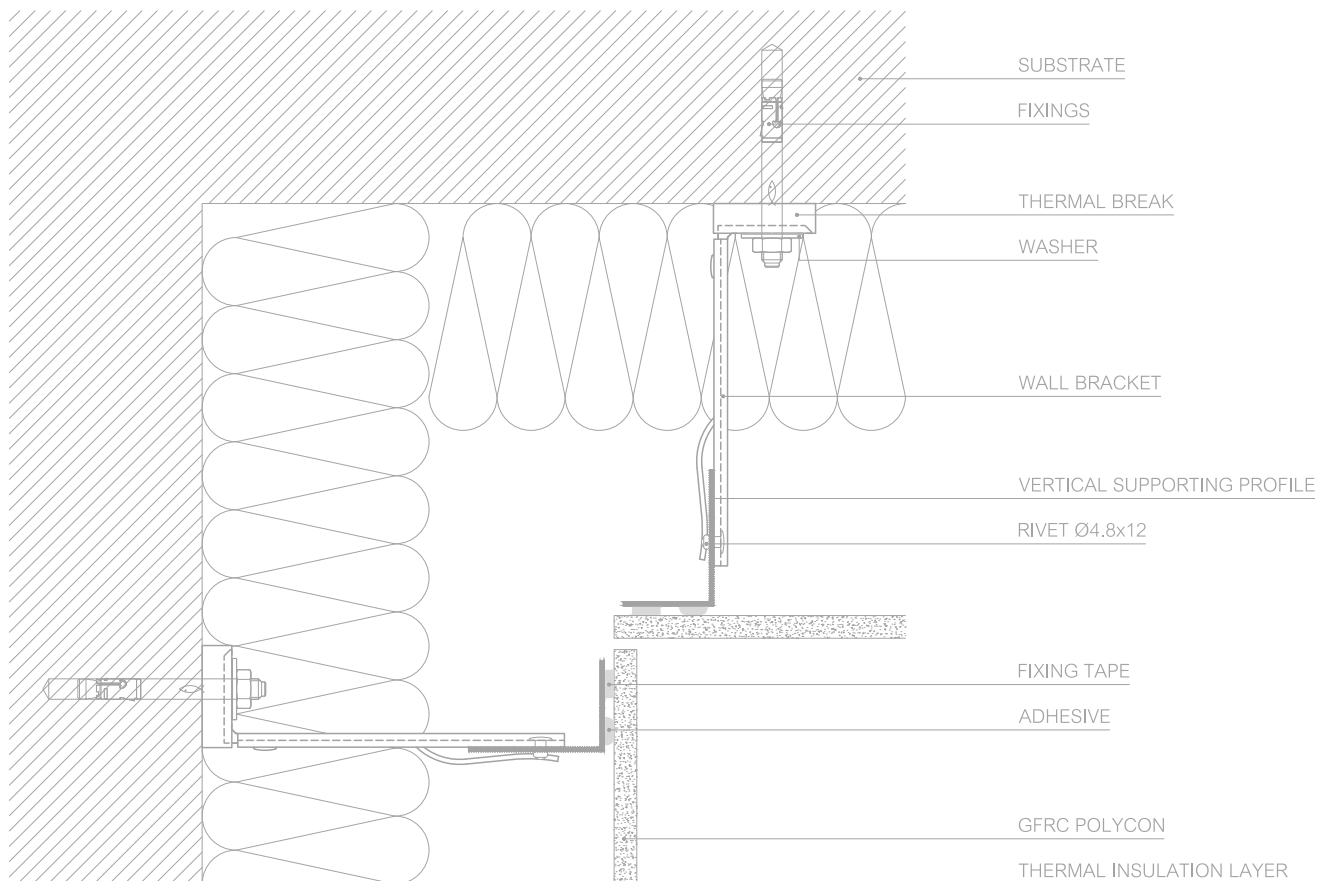
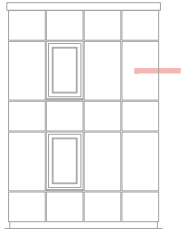
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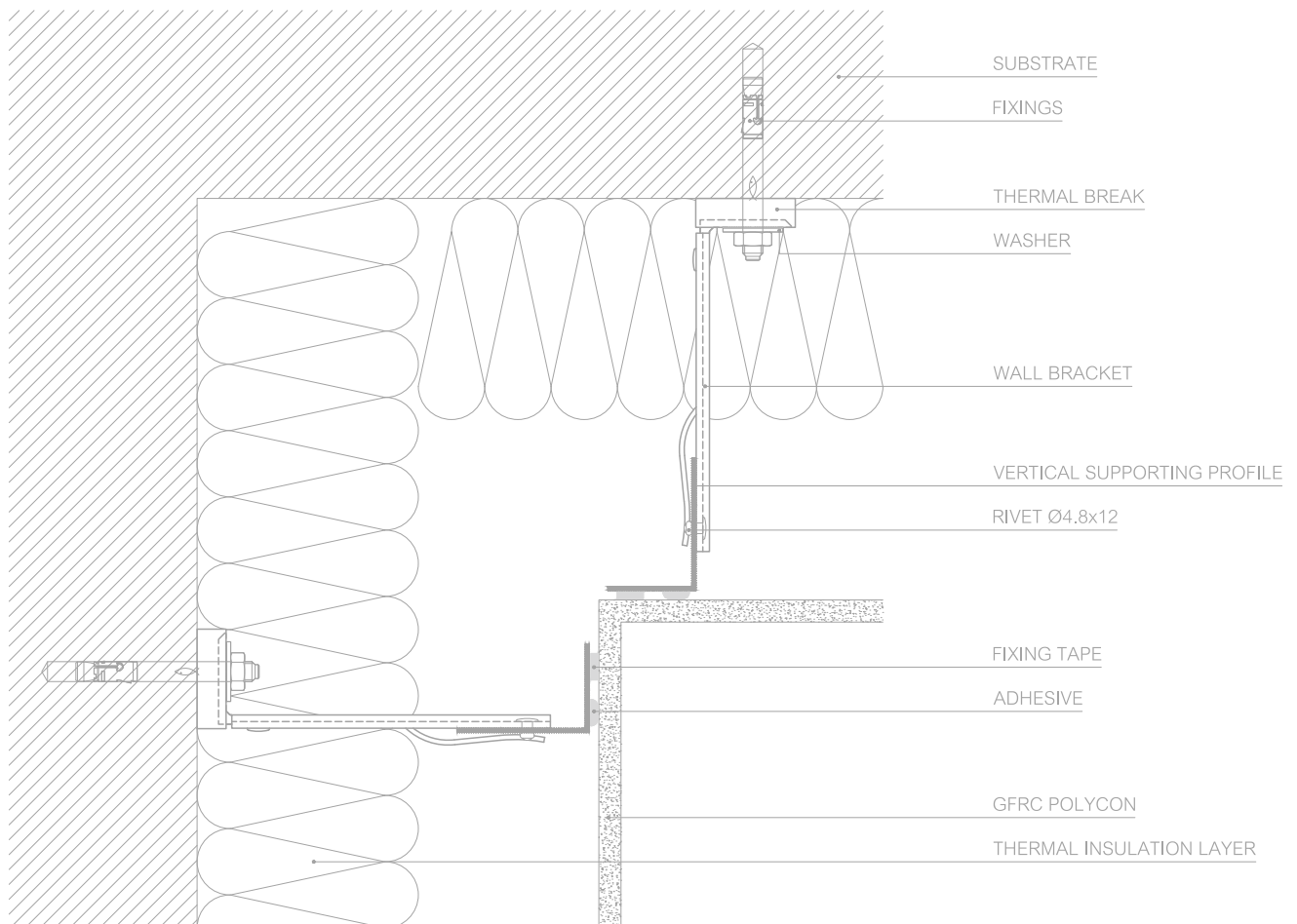
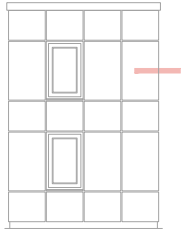
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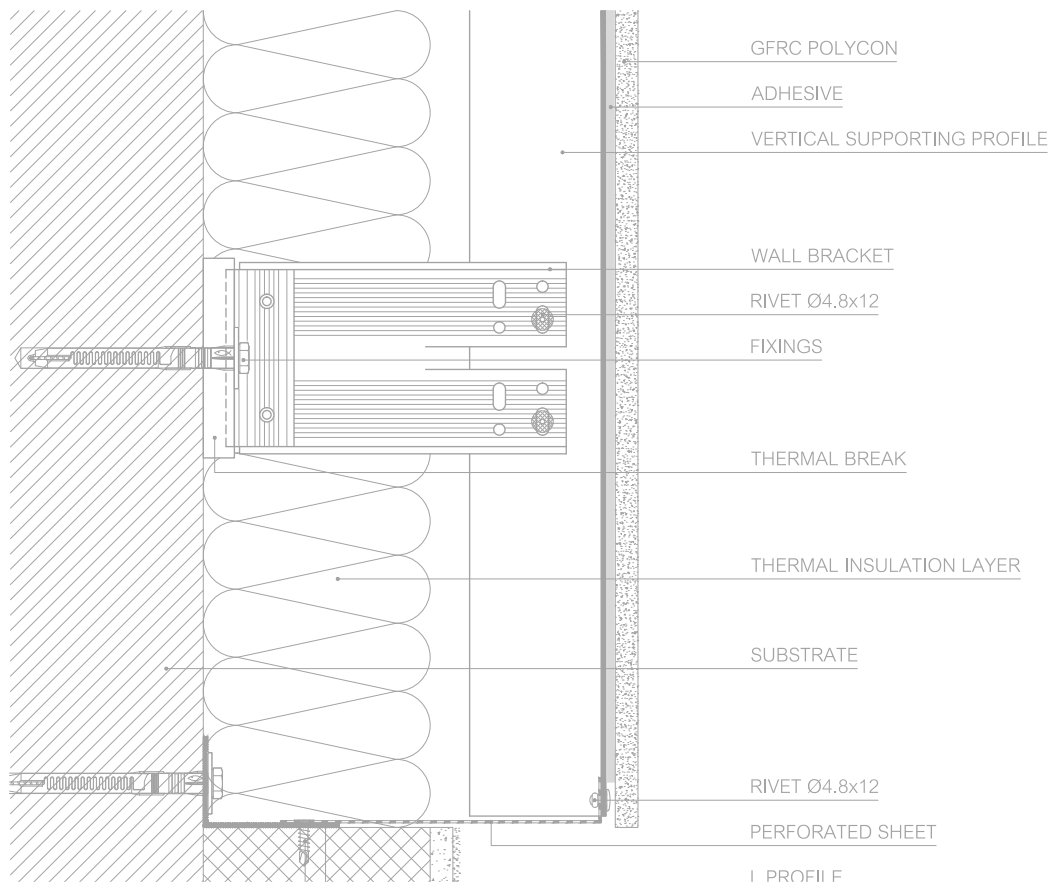
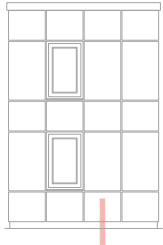
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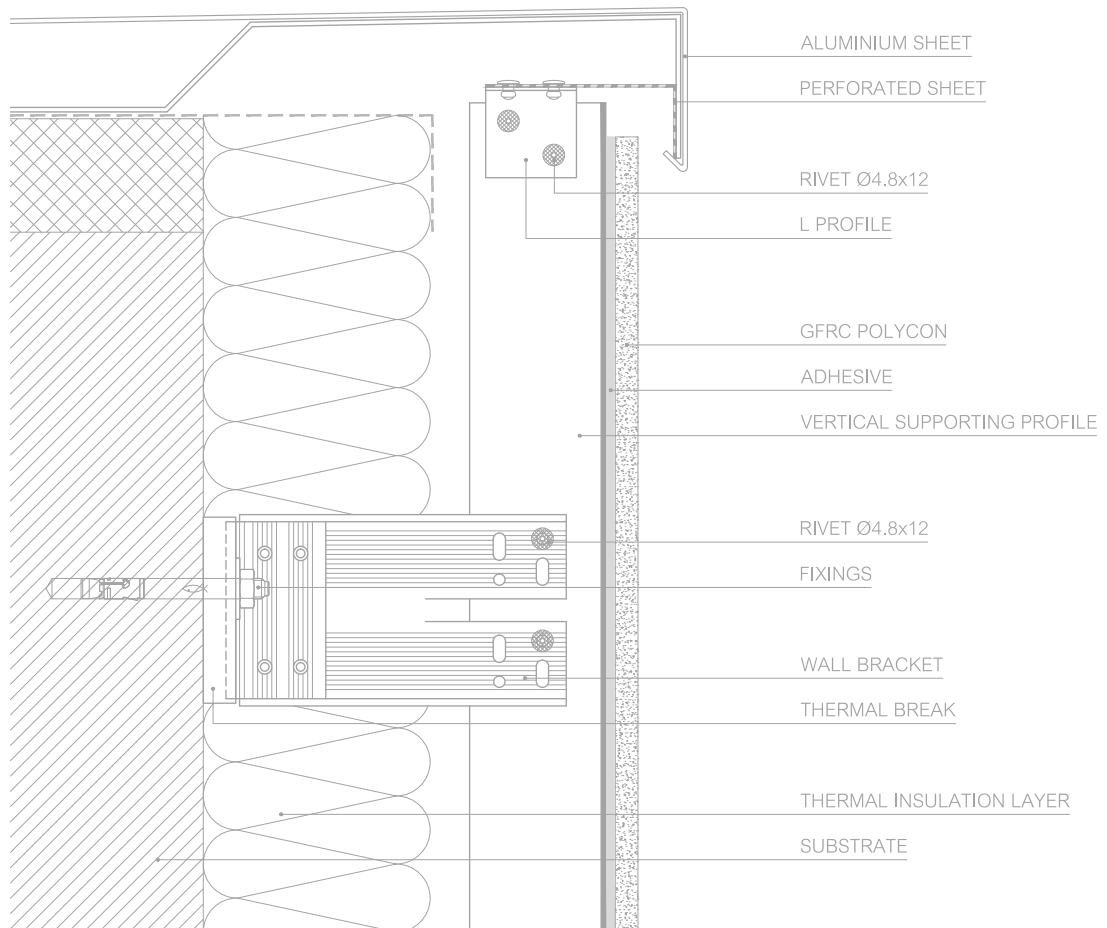
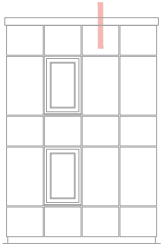
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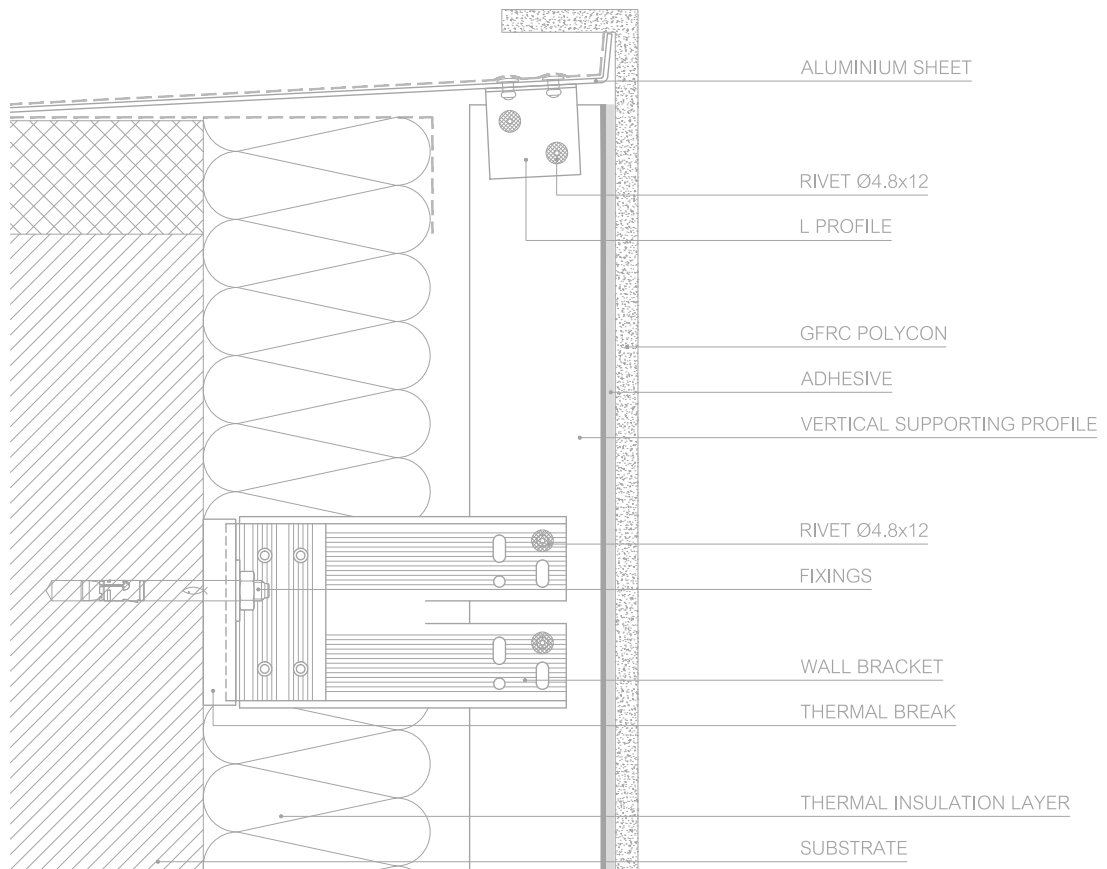
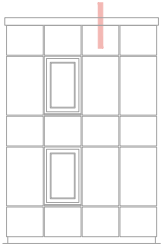
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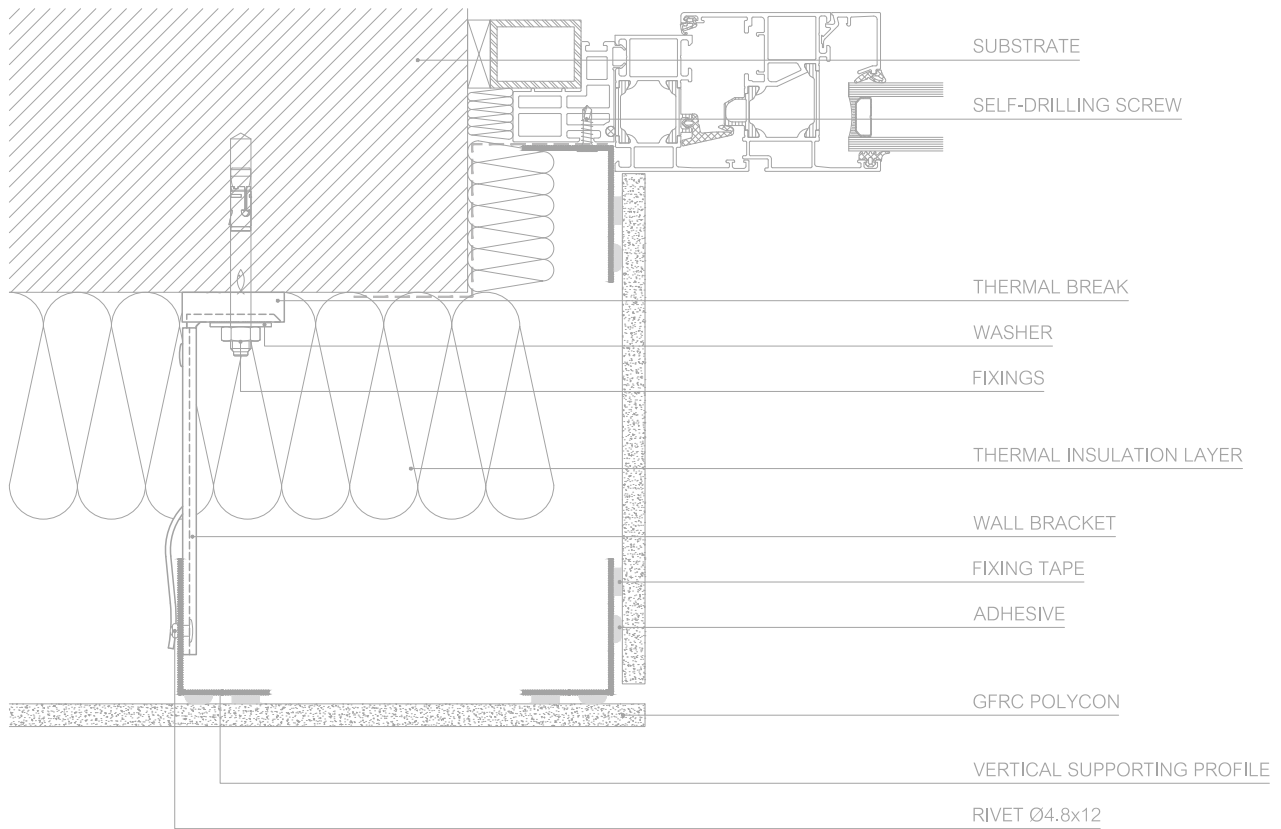
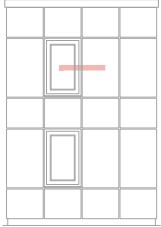
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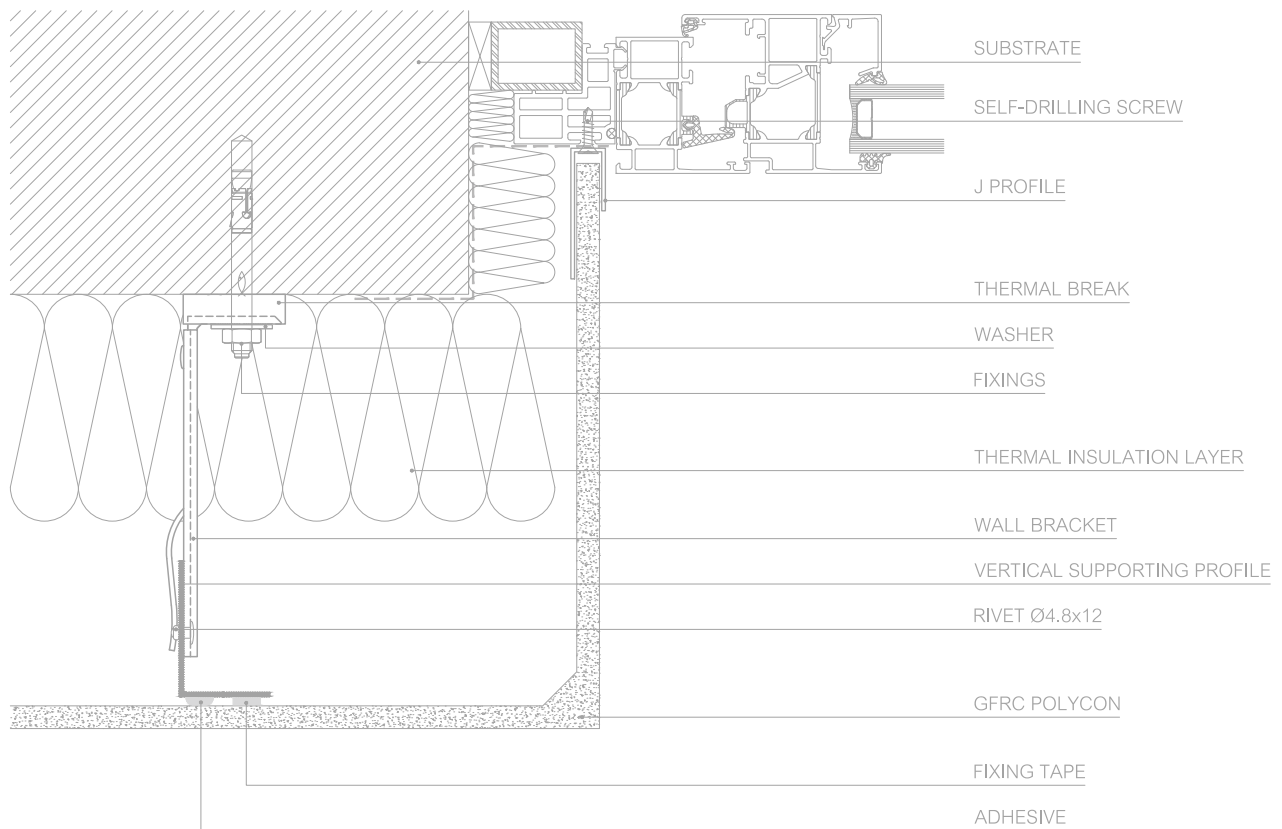
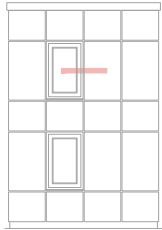
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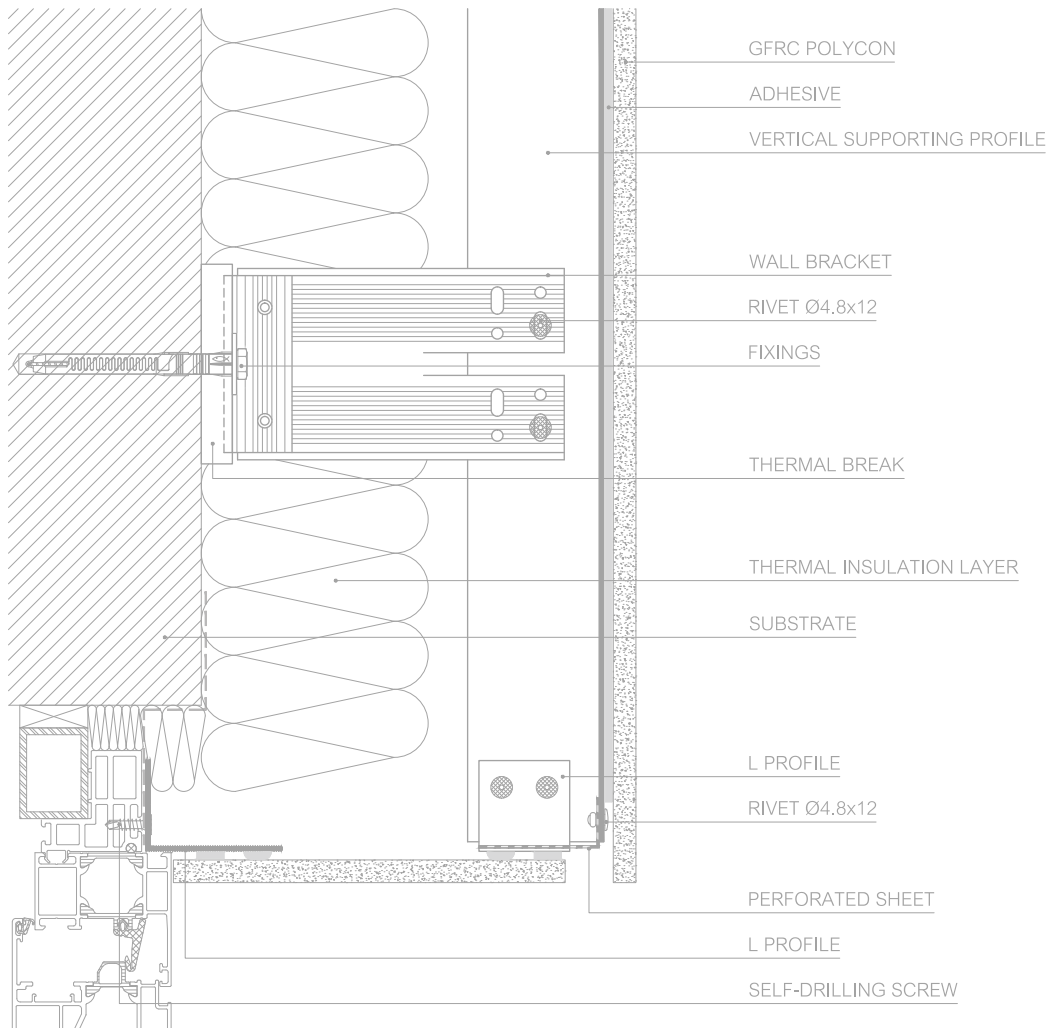
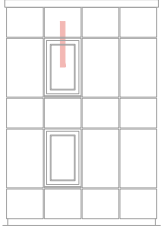
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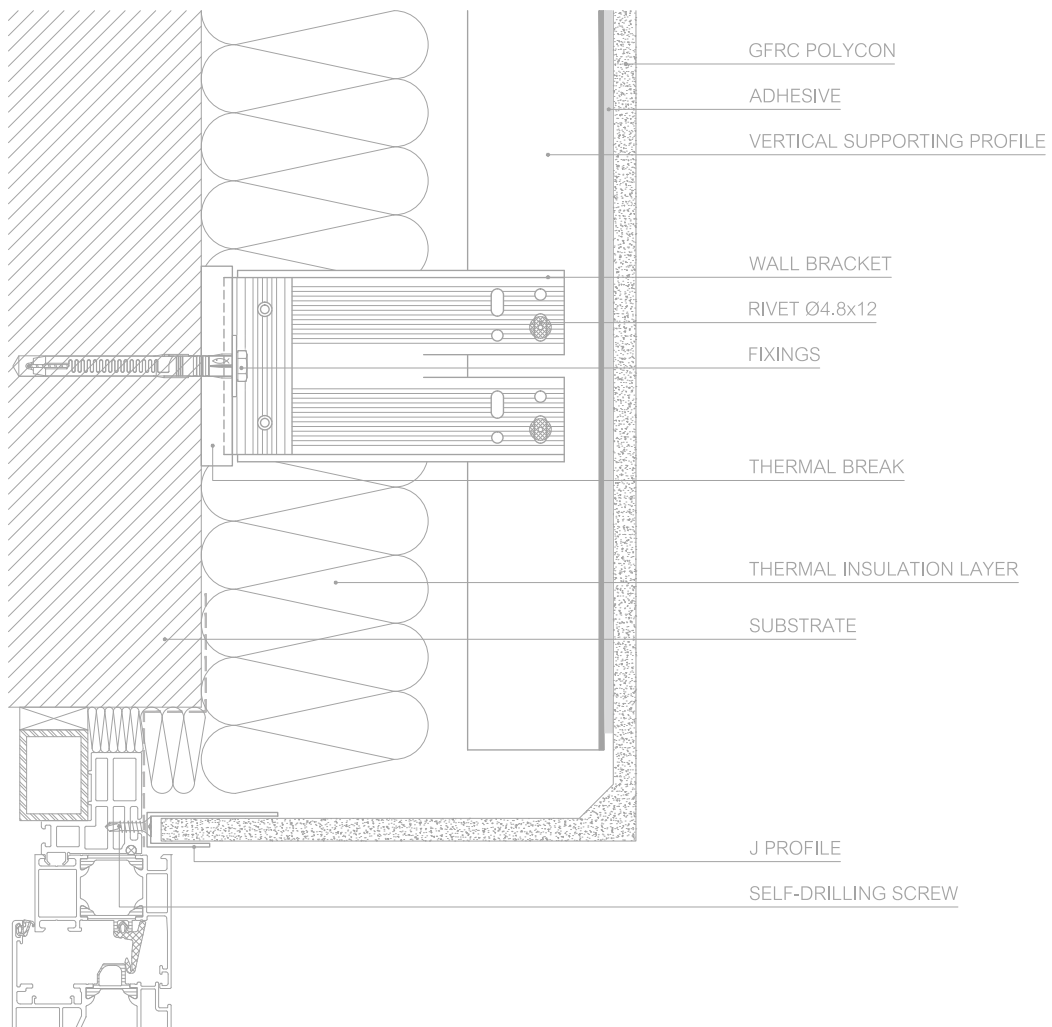
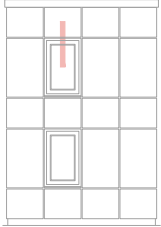
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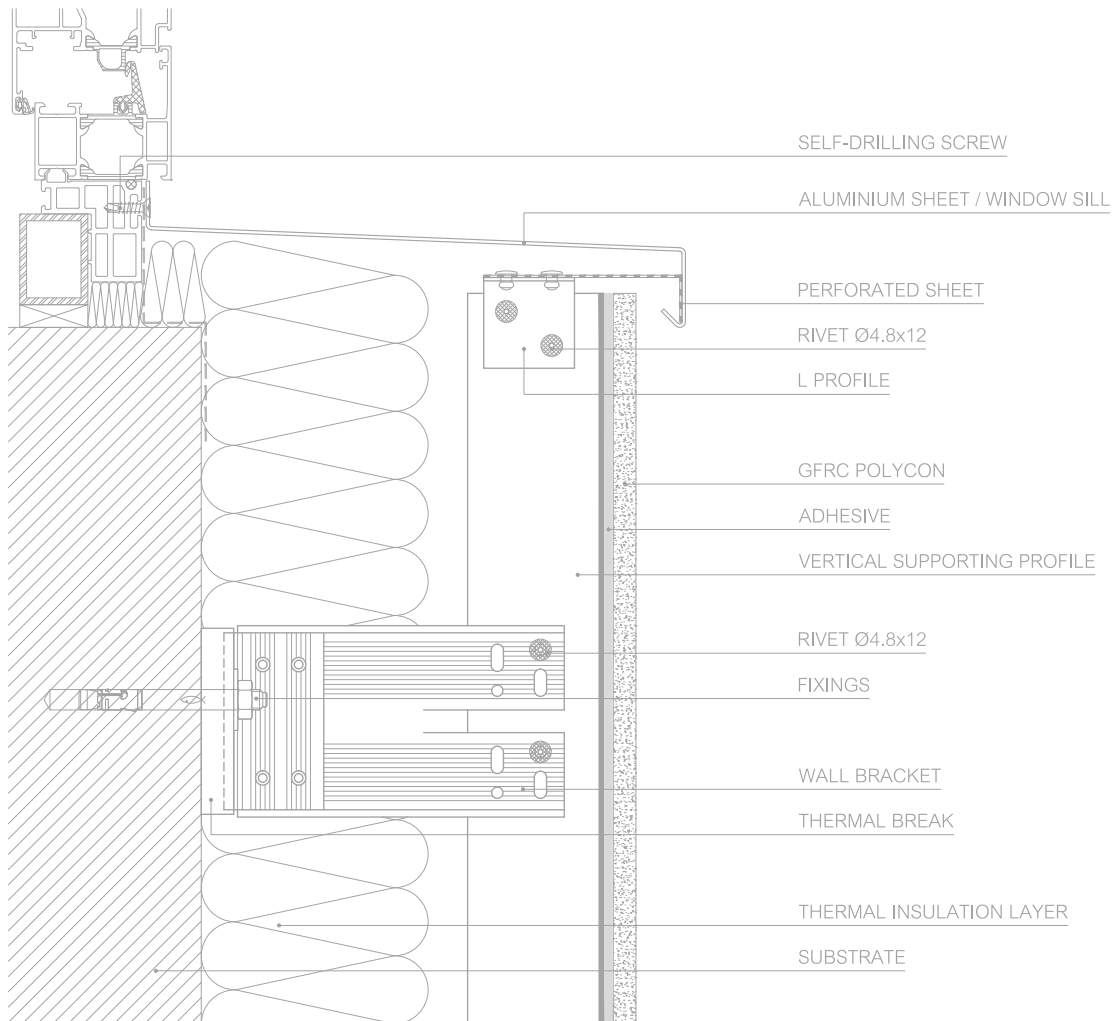
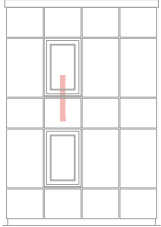
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QV/2

Hidden gluing for rear-ventilated panels using gluing technology



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Hidden gluing for rear-ventilated panels using gluing technology

Technical data sheet form

All data presented below are included in the Q-VENT product specifications. This is possible to supply custom-made profiles and accessories, if it is required for specific design project or static analysis.

Wall supports

Aluminium alloys EN AW-6063 (AlMg0,7Si) EN573-3, T66 EN 577,
Certificate of type test according to EN 845-1:2003+A1:2008,
Method of testing by EN 845-10:2000

Code

02.fl.xxx Wall support with the two parts L
02.ft.xxx Wall support with the two parts FixU T
02.fu.xxx Wall support with the two parts FixU

Code Description

Length

40–210 mm
100–270 mm
210–550 mm

Supporting profiles

Aluminium alloys EN AW-6063 (AlMg0,7Si) EN573-3, T66 EN 577
Certificate of type test according to EN 13830:2003
Infill wall
Product standard, method of testing according to EN 12179-2000,
Power requirements according to EN 13116:2001

01.2.140602.6 T profile 140 x 60 x 2 mm
01.2.130552.6 T profile 130 x 55 x 2 mm
01.2.120502.6 T profile 120 x 50 x 2 mm
01.2.120502.6 T profile 110 x 60 x 2 mm
01.2.120502.6 T profile 110 x 45 x 2 mm
01.1.66662.6 L profile 66 x 66 x 2 mm
01.1.60402.6 L profile 60 x 40 x 2 mm
01.1.40402.6 L profile 40 x 40 x 2 mm

Heat insulation

Polypropylene, thermal conductivity $\lambda=0,22$ W/mK

05.001.4 SuperPAD FixU L
05.001.5 SuperPAD FixU T
05.001.3 SuperPAD FixU

Fixing elements

Fixing elements must withstand the rated load in tension, Shear strength and combined tension and shear, which they are exposed.
Blind rivets: aluminum body (AlMg 2, 5 EN AW 5052, EN 573) / Stainless steel core A2, tělo z nerezové oceli A2 / Stainless steel core A2

04.1.8105.1 anchoring M8 x 105
04.1.10105.1 anchoring M10 x 105
04.2.8100.1 tenon diameter 8 x 100
04.2.10100.1 tenon diameter 10 x 100
04.5.10 underlay diameter \varnothing 30 x 10 x 1,5
04.4.4812.1 rivet -diameter 4,8 x 12



Hidden gluing for rear-ventilated panels using gluing technology

Technical Data Sheet of SikaTack system panel

Certificate BBA 05/4218

Approval „Deutsches Institut für Bautechnik“, Berlin

Erg. No.: Z-10.8-408

Product description

SikaTack – Panel system is a proven adhesive system for shapely and economical installation of facade panels. It system consists of a permanently elastic sikatack® – panel adhesive glue, of a double-sided adhesive mounting tape for immediate fixation plates and of preparations for adequate preparation surfaces bonded materials. Thin facades and decorative plates for conventional construction can be fixed with the SikaTack® – Panel without visible fasteners and fixings.

	Description	Packaging	Consumption
The rate of consumption	Adhesive glue SikaTack – Panel	Tube 600 ml	13 m/tube (44 ml/m ²)
	Primer SikaTack – Panel	bottle 1 000 ml	125 m/bottle (8 ml/m ²)
	SikaTack Fastening tape – Panel 3 mm	Role 33 m	33 m/role
	Sika Cleaner – 205	bottle 1 100 ml	285 m/bottle (3,5 ml/m ²)

Application to aluminum construction

1. Surface grinding by mineral wool.
2. Surface cleaning with Sika® Cleaner 205 using a cloth or paper towel.
3. The waiting time for ventilation minimum 10 minutes. Application SikaTack® – Panel Primer in even thin layer using an adapter or brush.
4. The waiting time for ventilation minimum 30 minutes. After completion of Primeru a application up to 24 hours it is necessary to perform gluing.

Pretreatment of Polycron panels

1. Grinding surface bonded surfaces using mineral pad or using a vibrating sander with sandpaper grain size 80.
2. Surface cleaning with Sika® Cleaner 205 using a cloth or paper towel.
3. The waiting time for ventilation minimum 10 minutes.
4. Application SikaTack® – Panel Primer in even thin layer using an adapter or brush.
5. The waiting time for ventilation minimum 30 minutes. After completion of Primeru a application up to 24 hours it is necessary to perform gluing.
6. The dried first layer of primer may be applied by a second layer. The initial layer must be sanded.

Using and restrictions

Working temperature: 5 °C – 35 °C

Maximum humidity: 75 %

The temperature of the structure must be at least 3 °C above the dew point. Application of binder-adhesive can be done at the workplace.

Application of gluing tapes

Apply the fixing tape SikaTack – Panel for the entire length of vertical components and parallel to the edges. At this moment do not remove the protective foil.

Application of binder-adhesive

Apply the Adhesive glue SikaTack – Panel ordered in a triangular portions using the supplied nozzle shape (width 8 mm, height 10 mm) with a gap of at least 5 mm from fastening band and toward the side of rails. Apply by using the Sika hand gun or pistol with compressed air.

Panel placing

Remove the protective film on the SikaTack – Panel mounting tape. Place the cladding panel to the required position on the adhesive so that it does not touch the panel fastening tape. In order to simplify installation, the panels should be carefully designed. Precisely place the panels and push firmly until they get into contact with SikaTack Panel mounting tape.

Note

The panes placement must occur within 10 minutes of adhesive application profiles Support structures.
Do not clean Polycron panels with Sika Cleaner – 250.
Panels must not be stored horizontally during ejection.
Joining must be vertical.

Important

Competent local planning authority must grant this permission. In some cases, the consultation with a local insurer against fire may be necessary. Only a professional and experienced users may use this product.

4.0 Basic anchorage systems

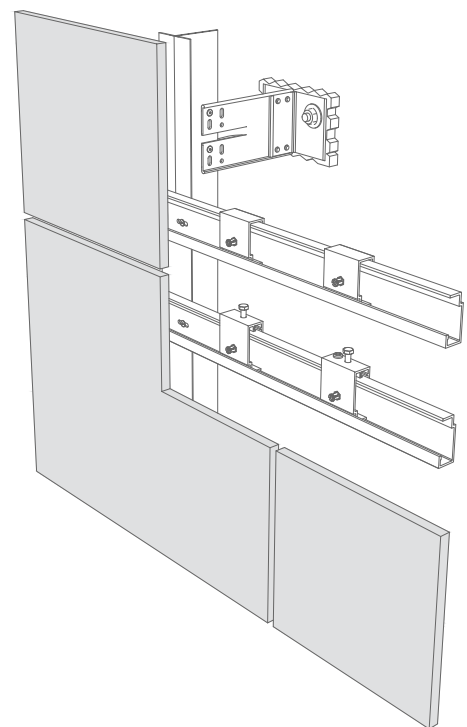
4.3 Keil
System details (QV6)

4.3 Keil System details (QV6)

4.0 basic anchorage systems

4.3 Keil System details (QV6)

Hidden mechanical fastening
device for rear-ventilated panels
using anchors with bottom
notch



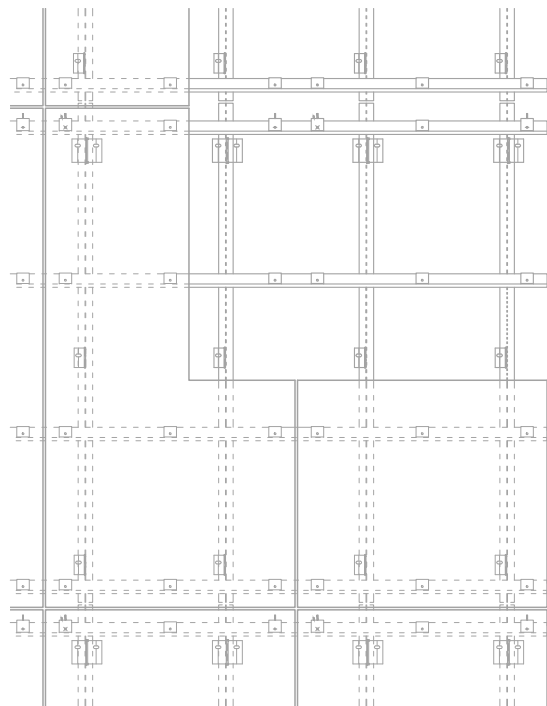
Hidden mechanical fastening device for rear-ventilated panels using anchors with bottom notch

Summary of use

Cladding panels are hung the horizontally arranged profiles with specific anchors placed in drilled holes and anchored using a mechanical support (at least four anchors). These horizontal profiles are fixed to the vertical profiles with rivets. These vertical profiles are attached to the supports, which are attached directly to the front wall walls using anchors or chemical anchors.

Installation instructions for ventilated system

1. Supports are attached to the base of the wall / building using anchors or chemical anchors. Number of supports (pillars) and the distance between them (static diagram) is determined by the static analysis and it is illustrated in the installation plan.
2. Vertical profiles are fixed to the wall supports using rivets. For each profile is only one firm support. All other points are flexible.
3. Vertical profiles must be leveled before the final mounting to the wall supports. Precise leveling of the vertical profiles through alignment deviations along the wall construction is carried out using different lengths of supporting anchors.
4. The horizontal beams are attached to the vertical profiles using rivets placed in pre-drilled round holes (fixed point) and oval holes (flexible points).
5. Cladding panels are hung on horizontal profiles using hooks and finally fixed after the leveling using screws.
6. All rivets are placed to the center of circular holes (solid support) or oval holes (flexible supports), to create the capacity for thermal motions of profiles for both directions.



Important

Solid holders (support) are mounted to a solid foundation (concrete or metal). Static analysis is required for each project

Requirements and recommendations

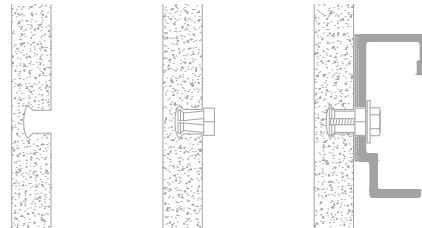
- Specification of profiles, accessories and their location must be agreed upon the static analysis.
- The number and location of the drill holes for each panel is agreed upon the static analysis that takes into account the test report on the lateral and tear load according to the anchor.
- Cladding panels can be mounted using the installation method bottom-up or top-down.
- The minimum horizontal gap between cladding panels when installing from top to bottom is 12 mm.
- Distance between support vertical profiles is at least 10 mm.
- Vertical profiles must be mounted in a vertical position and in the same plane.
- coated aluminum profiles prevent them from being seen through the joint unwanted reflections
- Pads between the wall and the support reduces the thermal bridge through aluminum construction.
- Static analysis must take account of the individuality of the project, specific conditions and local regulations. It provides security control verification and optimization of components.

QV6

Hidden mechanical fastening device for rear-ventilated panels using anchors with bottom notch

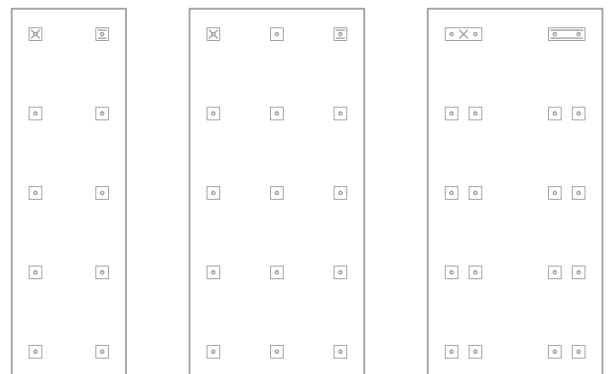
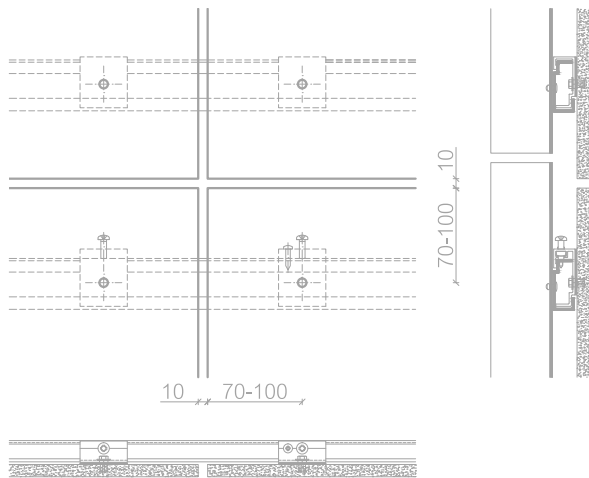
Instructions for installing the brackets






- Holders are fixed to the panel using special anchors which are inserted into pre-drilled holes of the back side panel.
- Holes must be cleaned using a brush or compressed air before inserting anchors
- Only one adjustable fixed and adjustable flexible hook is on each panel. All other hooks are flexible and adjustable.
- Screws are used for hook leveling.
- After the final leveling fixed hook is permanently attached to a horizontal profile with the screw



Important

- The dead weight is transmitted through the two adjustable fasteners in all cases.
- The number and location of the drilled holes in each panel must be agreed with regard to the test report of the lateral and a tensile load, according to the anchors.



-   Adjustable fixed holder
-   Adjustable flexible support
-  Flexible holder

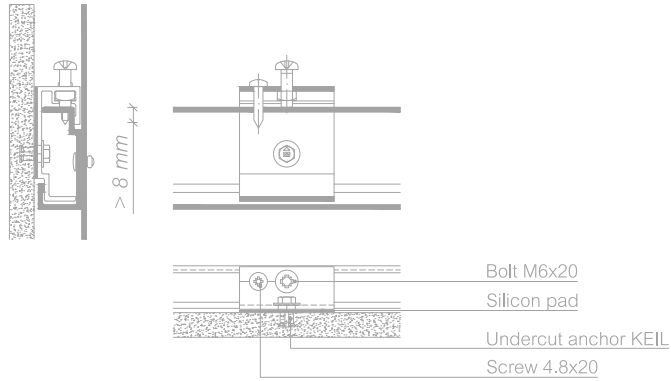
The recommended distance from the edge: 100mm

QV6

Hidden mechanical fastening device for rear-ventilated panels using anchors with bottom notch

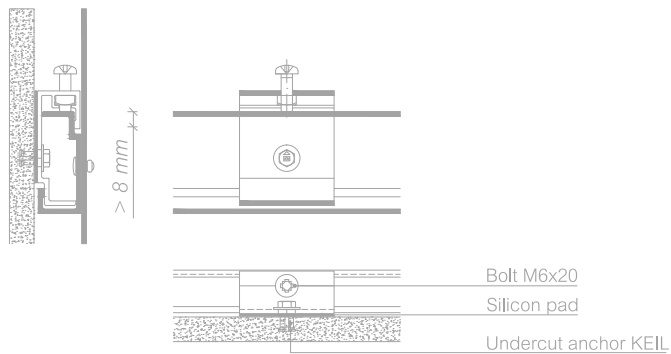
ADJUSTABLE HANGER, FIXED POINT

It bears the vertical load (weight of the structure and facade material mounted on the profile) and a part of the wind load.



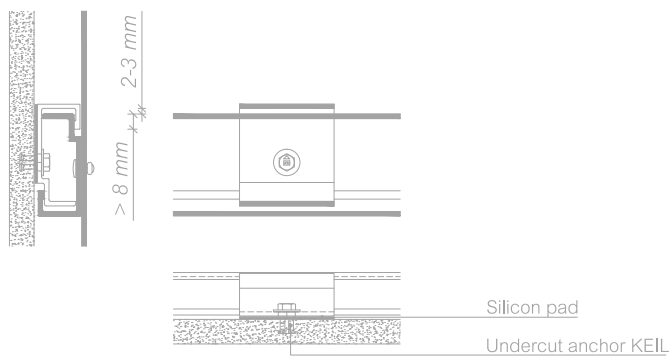
ADJUSTABLE HANGER, FLEXIBLE POINT

It bears the vertical load (weight of the structure and facade material mounted on the profile) and a part of the wind load.



HANGER, FLEXIBLE POINT

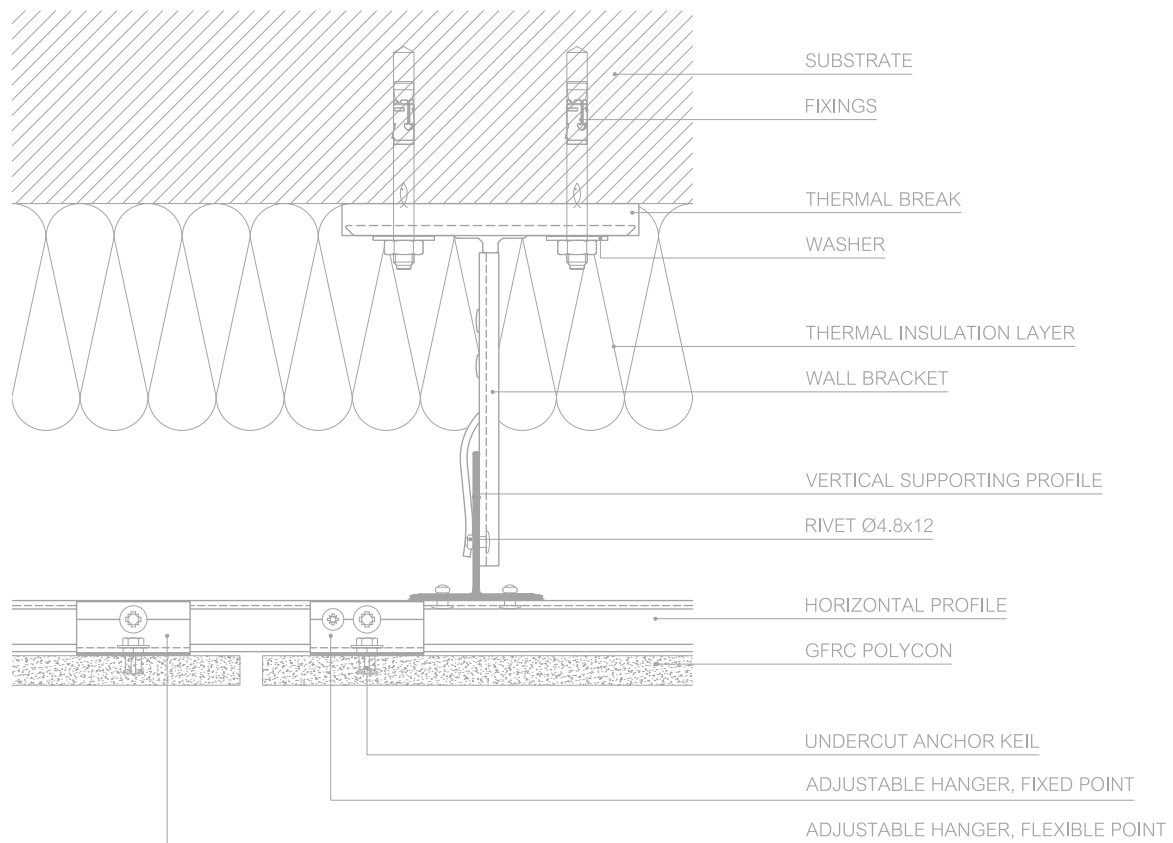
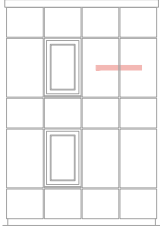
It bears only a part of the wind load.



Specification of profiles accessories and their location must be agreed upon the static analysis.

QV/6

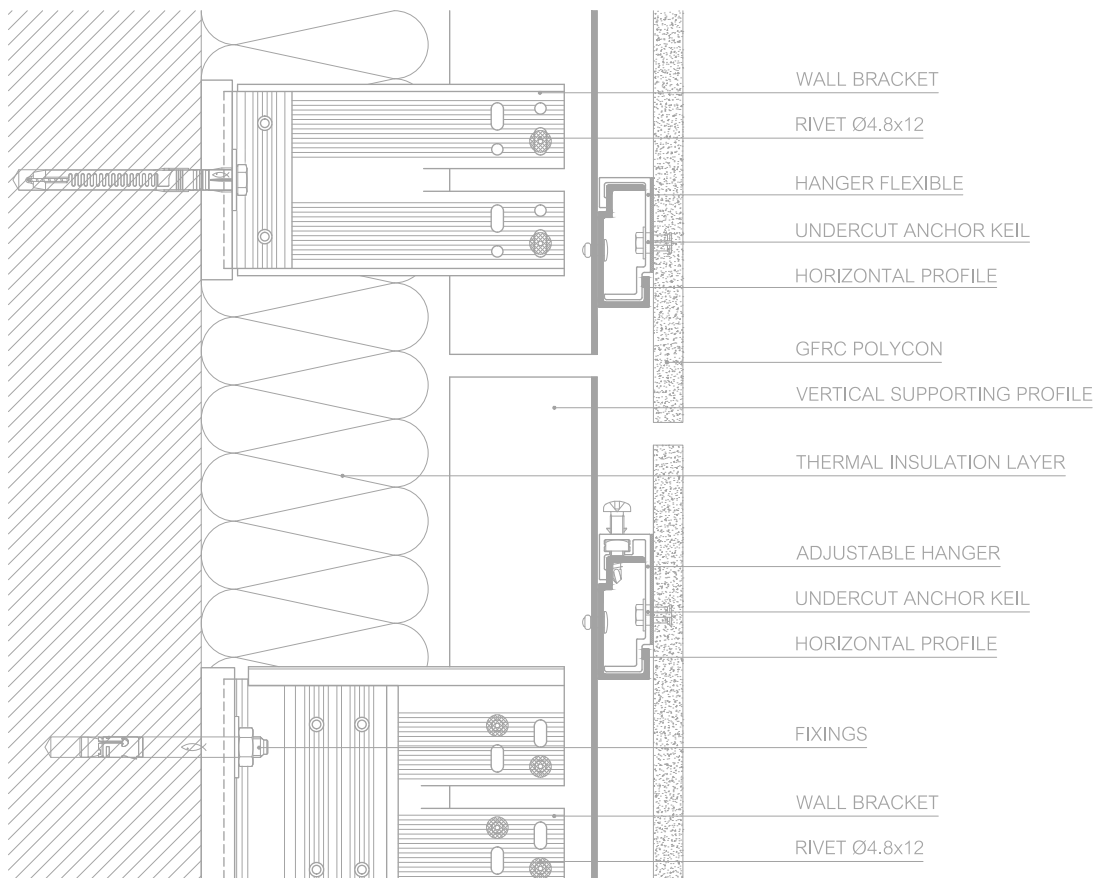
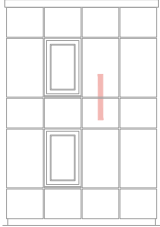
Hidden mechanical fastening
device for rear-ventilated panels
using anchors with bottom
notch



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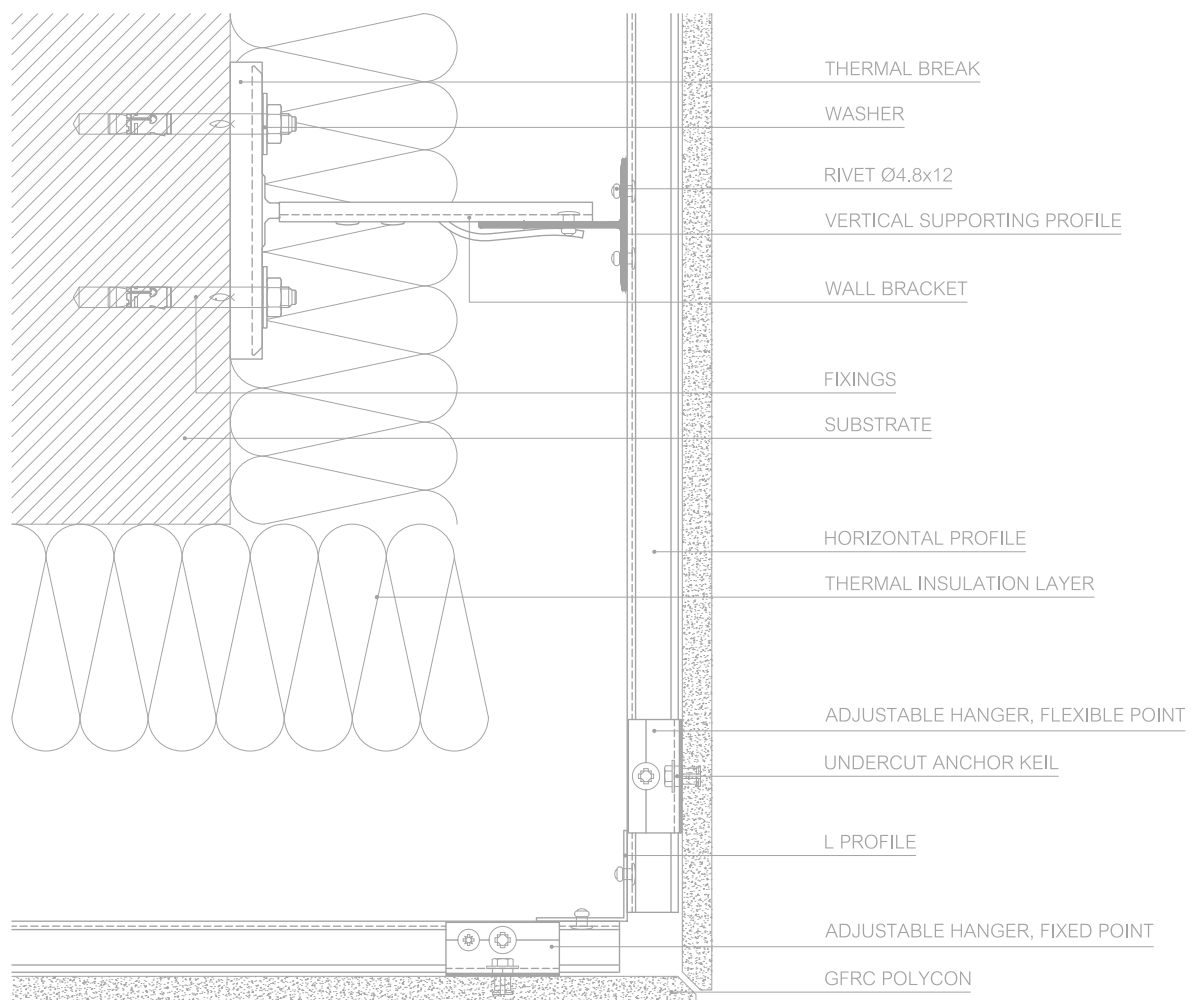
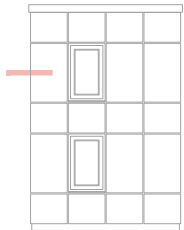
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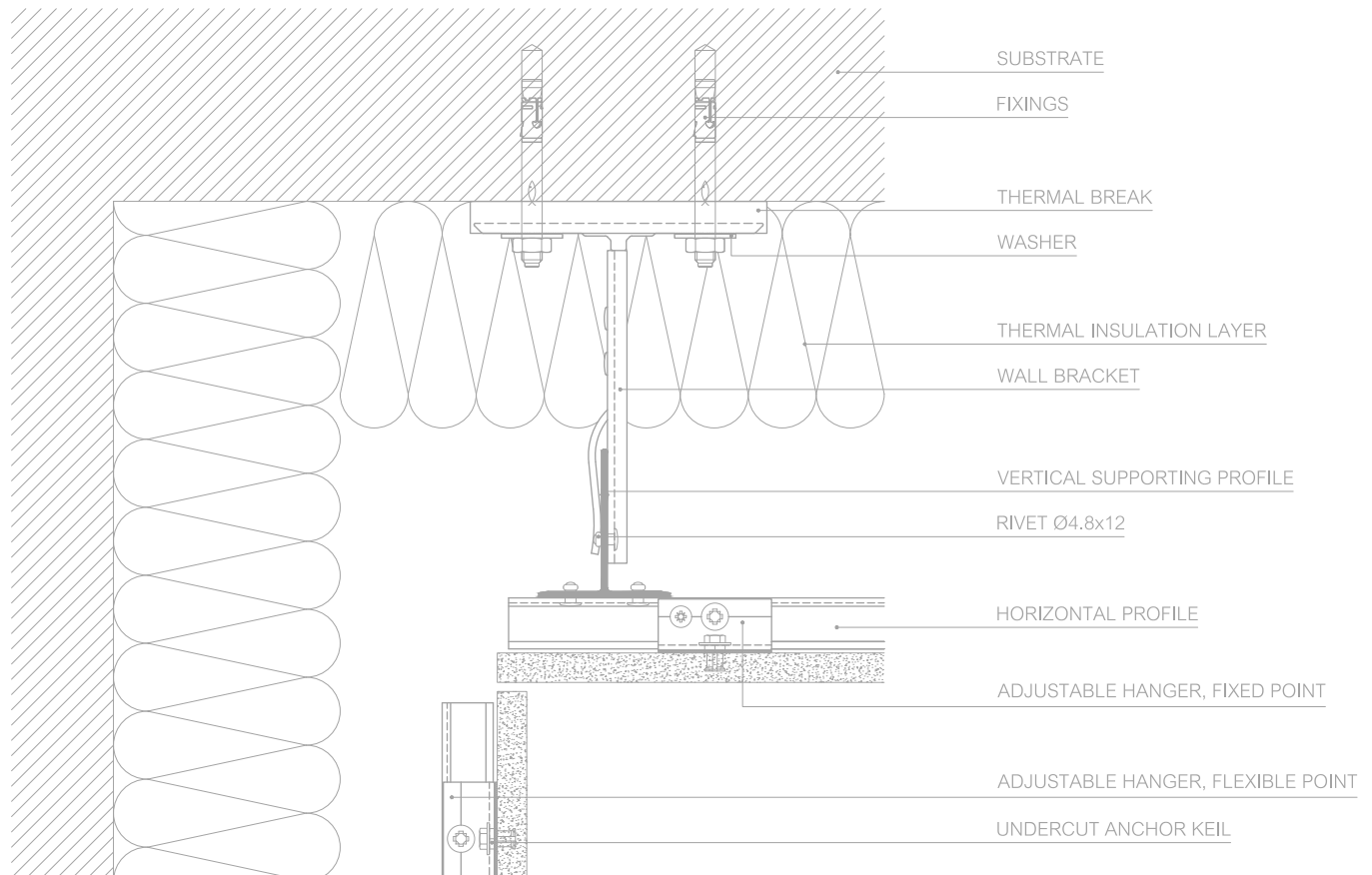
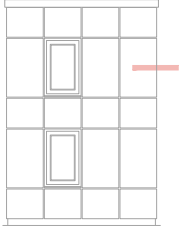
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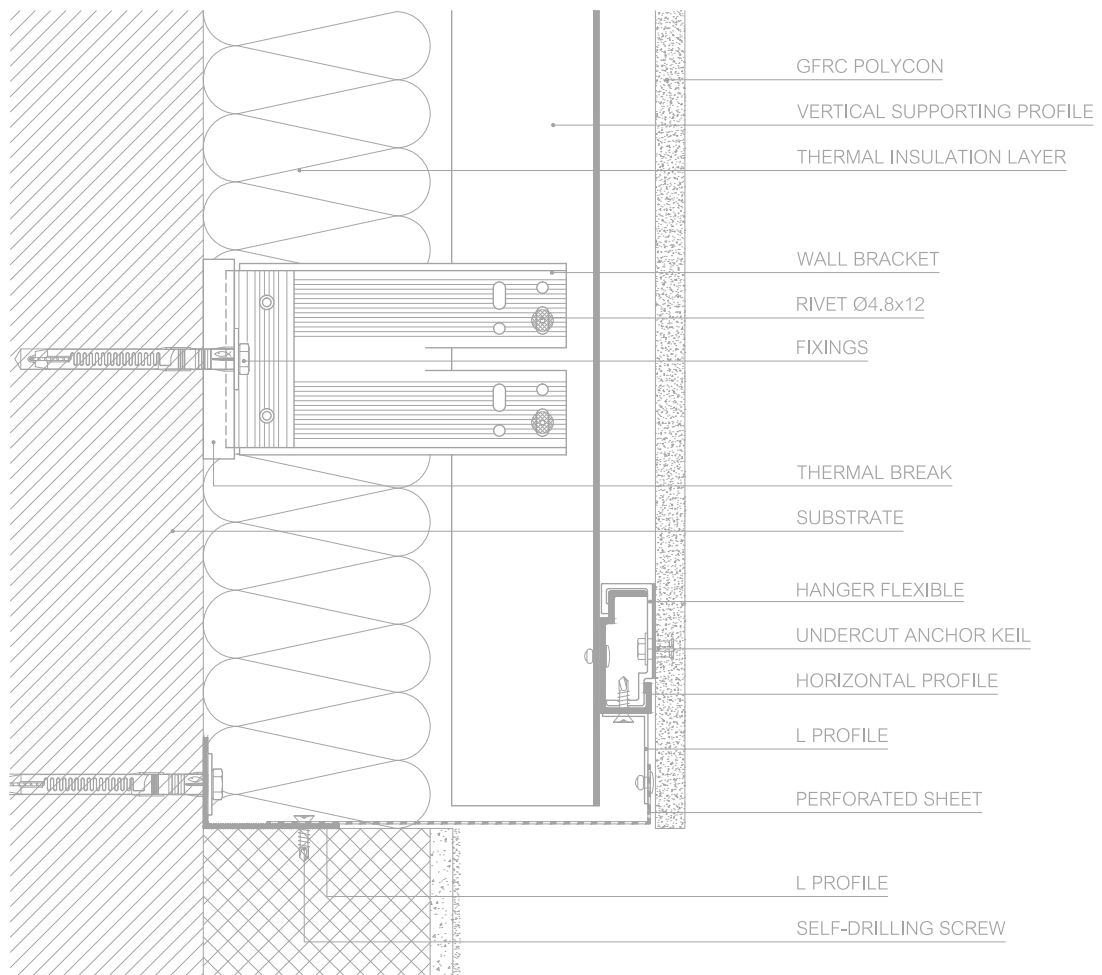
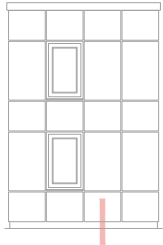
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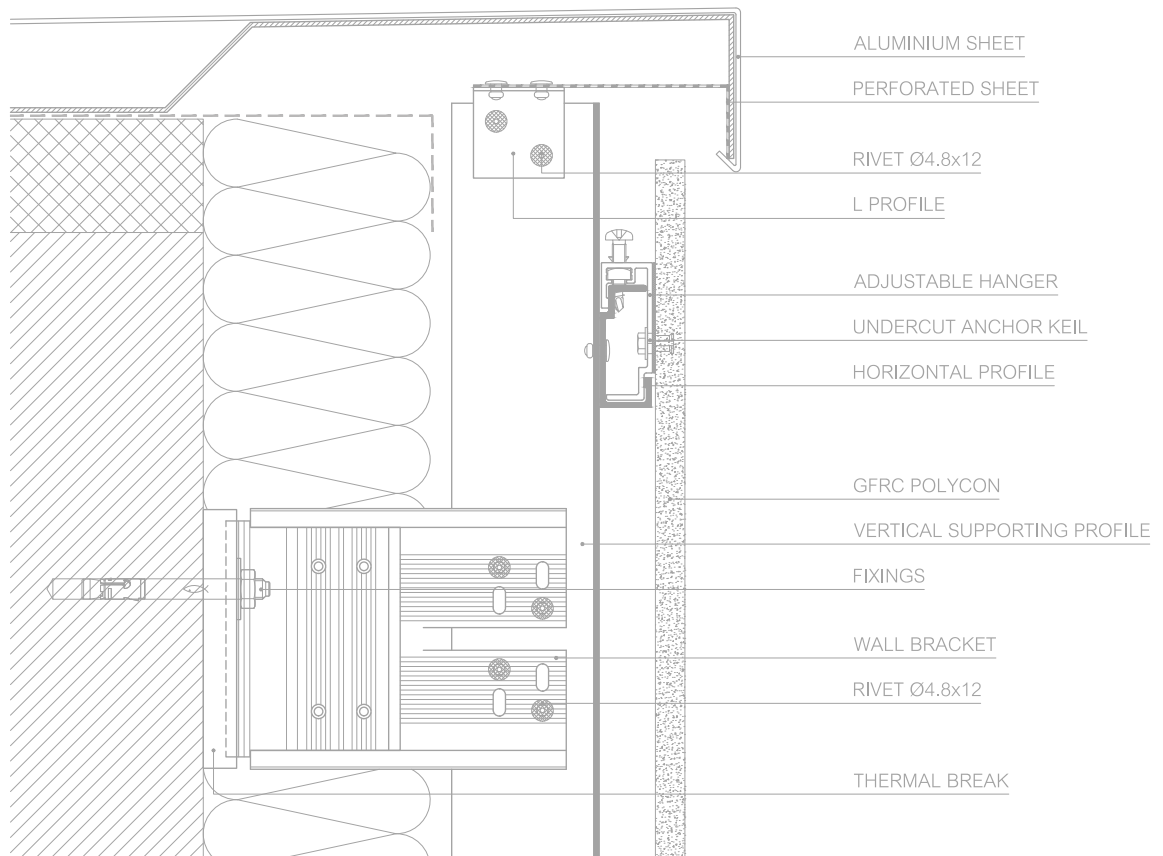
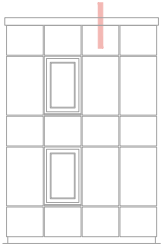
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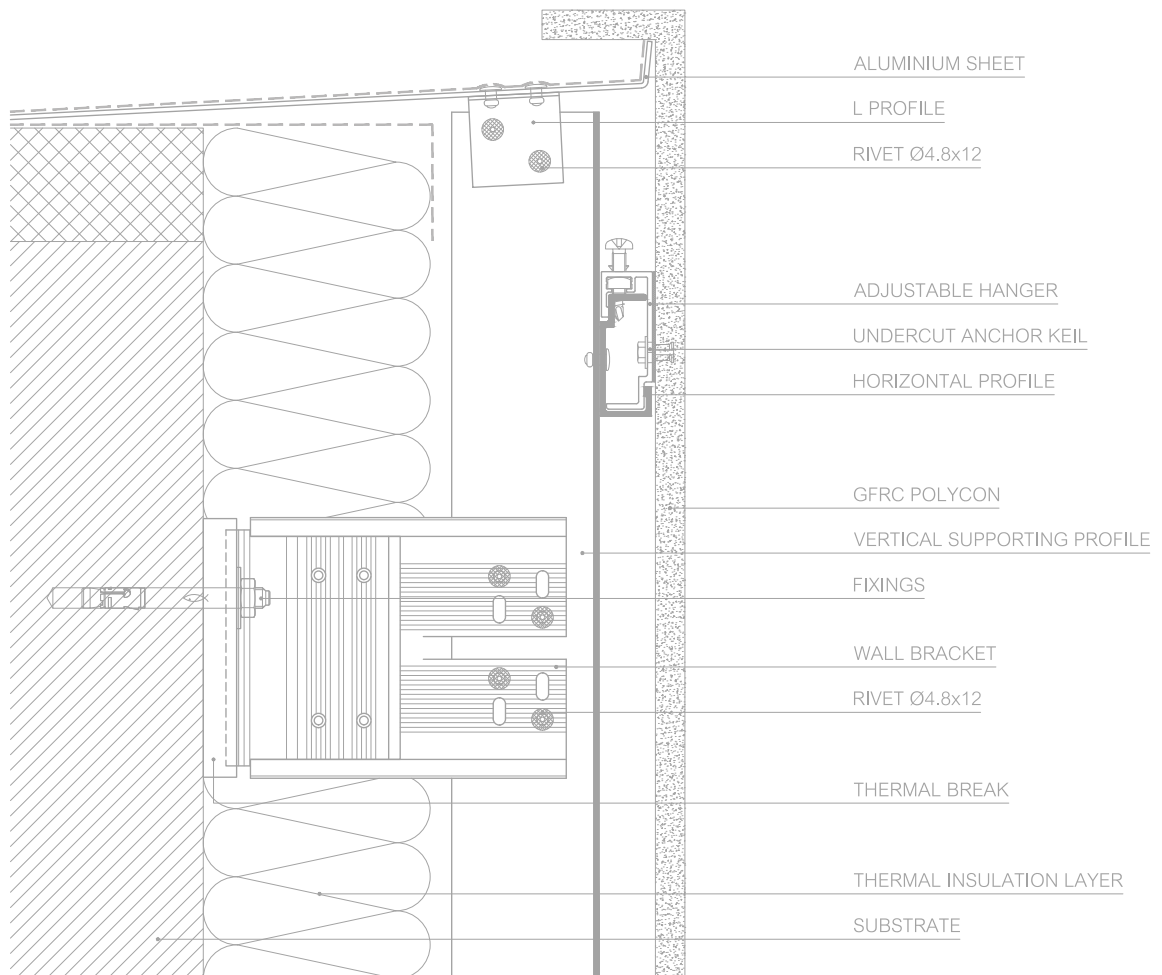
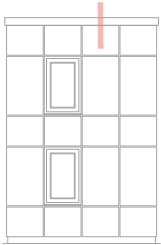
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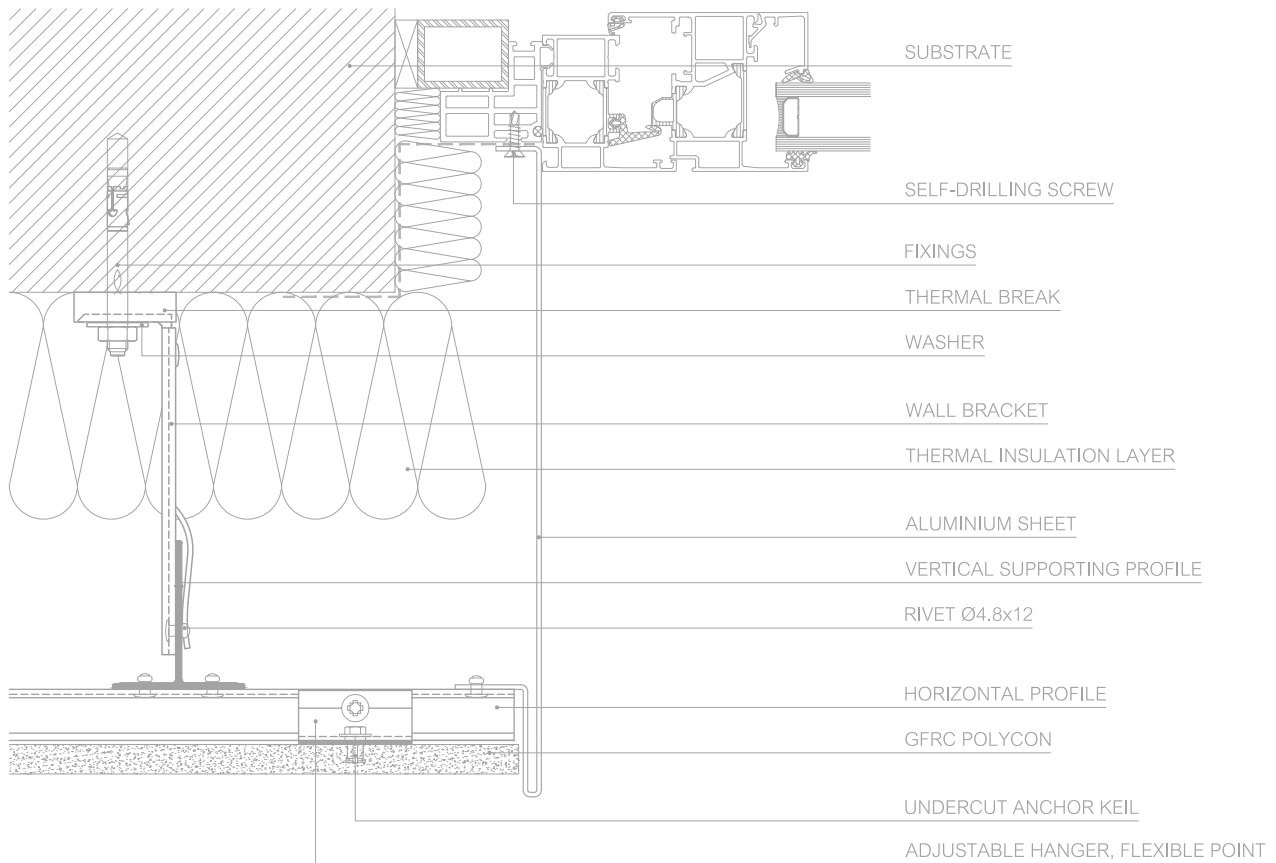
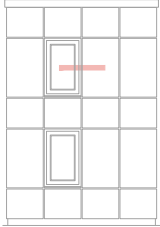
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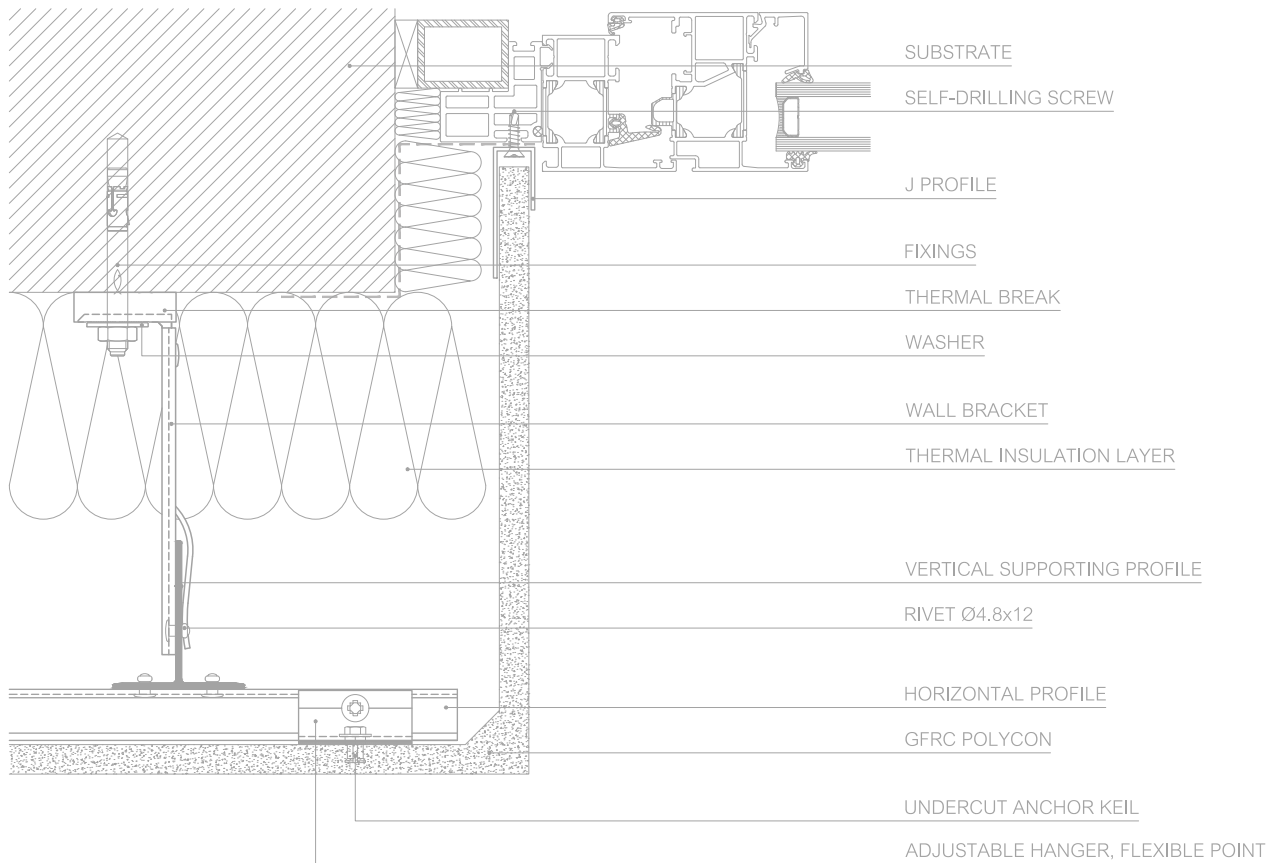
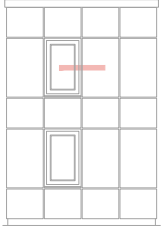
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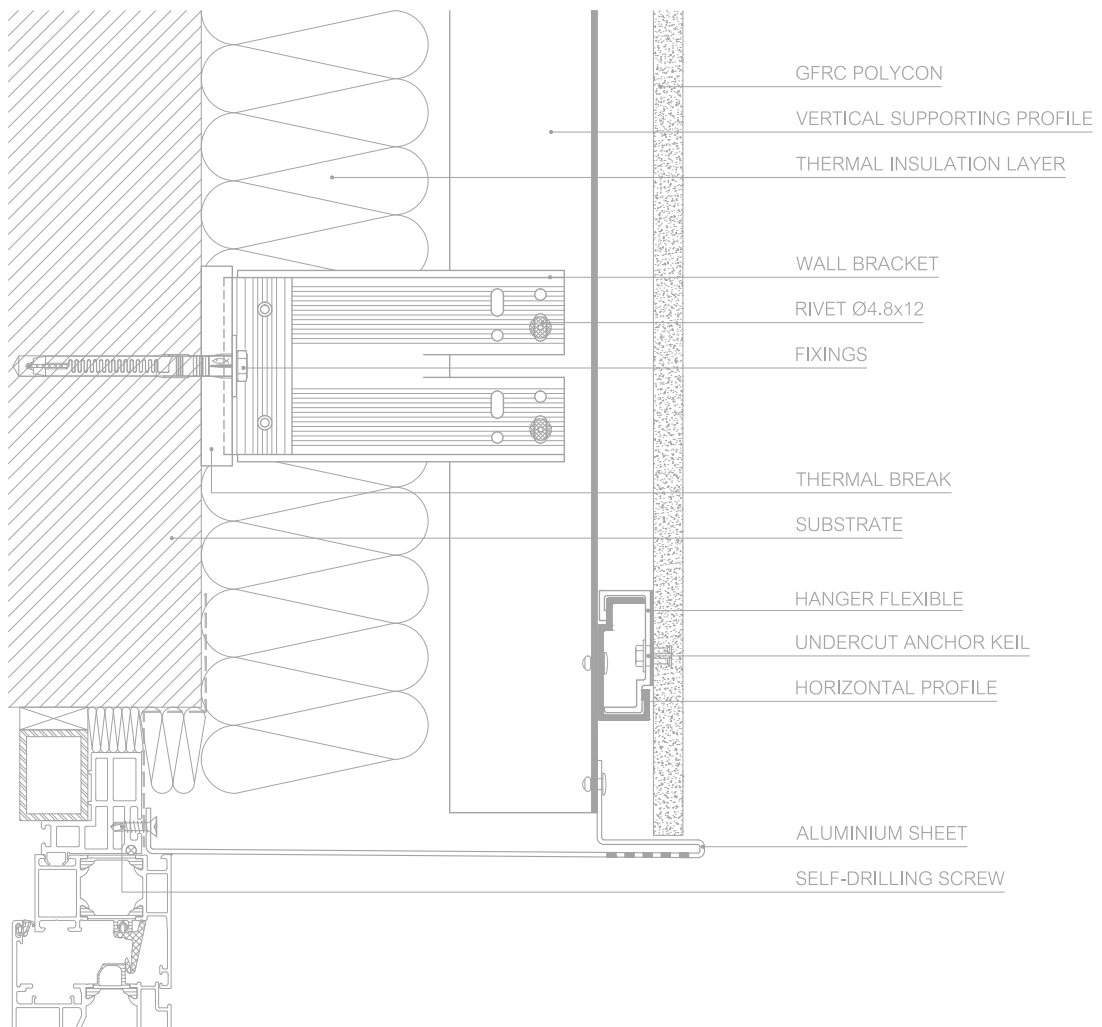
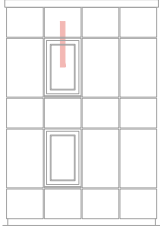
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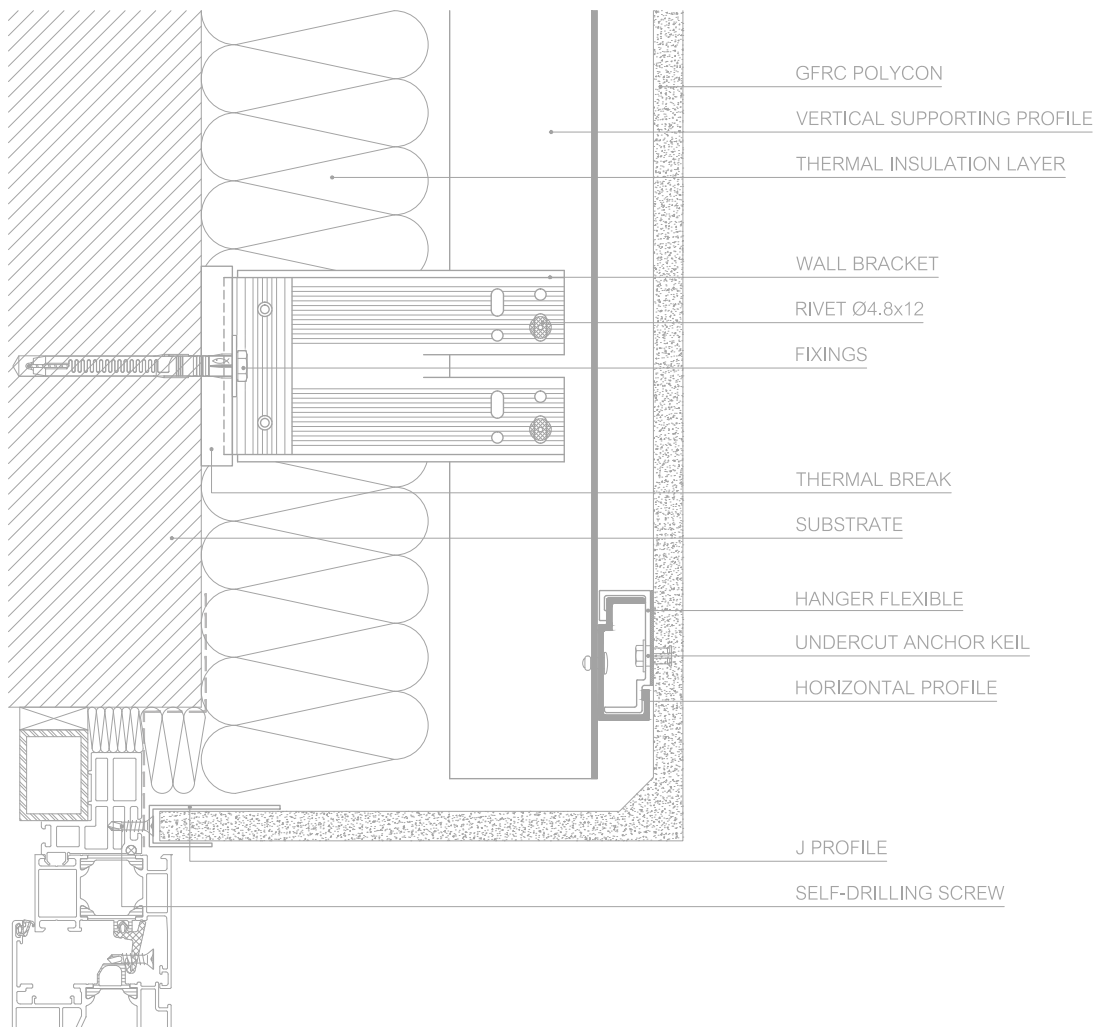
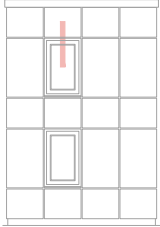
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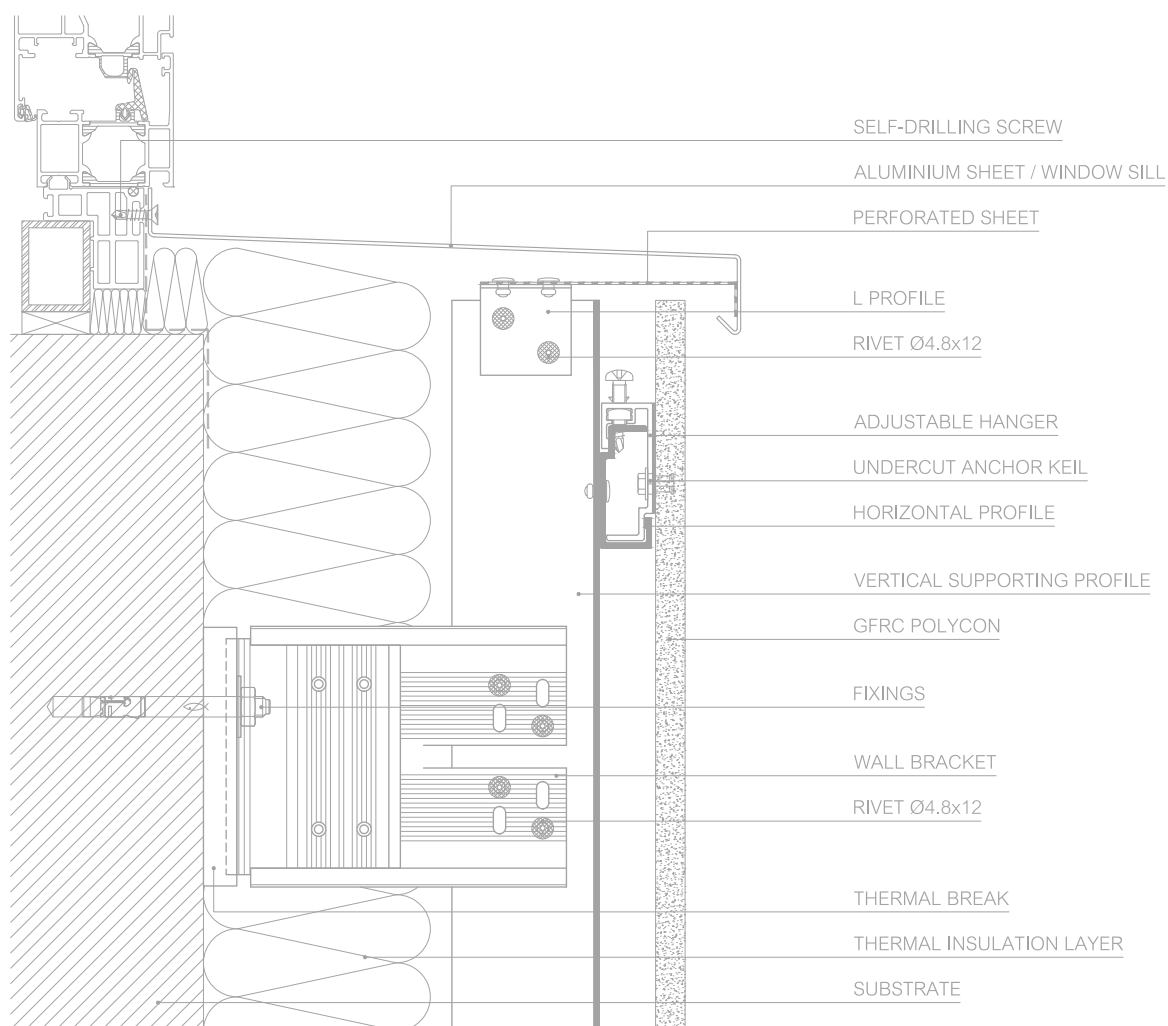
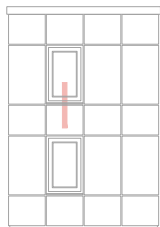
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certificate of type test according to EN 845-1:2003+A1:2008,
Method of testing according to EN 845-10:2000

Code

Description

Length

02.fl.xxx	Wall support with the two parts FixU L	40–210 mm
02.ft.xxx	Wall support with the two parts FixU T	100–270 mm
02.fu.xxx	Wall support with the two parts FixU	210–550 mm

Support profiles

Aluminum alloys EN AW-6063 (AlMg0,7Si) EN573-3, T66 EN 577
certificate of type test according to EN 13830:2003
Infill wall
Product standard, method of testing according to EN 12179-2000,
Power requirements according to EN 13116:2001

01.2.140602.6	T profile 140 x 60 x 2 mm
01.2.130552.6	T profile 130 x 55 x 2 mm
01.2.120502.6	T profile 120 x 50 x 2 mm
01.2.120502.6	T profile 110 x 60 x 2 mm
01.2.120502.6	T profile 110 x 45 x 2 mm
01.1.66662.6	L profile 66 x 66 x 2 mm
01.1.60402.6	L profile 60 x 40 x 2 mm
01.1.40402.6	L profile 40 x 40 x 2 mm

Heat insulation

Polypropylene, thermal e, thermal conductivity $\lambda=0,22$ W/mK

05.001.4	SuperPAD FixU L
05.001.5	SuperPAD FixU T
05.001.3	SuperPAD FixU

Fixing elements

Fixing elements must withstand the rated load in tension, shear strength and combination of tension and shear strength which they are exposed.

Blind rivets: aluminum body (AlMg 2,5 EN AW 5052, EN 573) / stainless steel core A2, stainless steel body A2 / stainless steel core A2

04.1.8105.1	anchoring M8 x 105
04.1.10105.1	anchoring M10 x 105
04.2.8100.1	tenon diameter 8 x 100
04.2.10100.1	tenon diameter 10 x 100
04.5.10	pad diameter 30 x 10 x 1,5
04.4.4812.1	rivet -diameter 4,8 x 12

The manufacturer assumes no responsibility for the stability of the panels of ventilated facades in the following cases:

- * If the static calculations, installation plans or drawings were not available or have not been verified by the manufacturer support system
- * If the profiles and accessories were not supplied or verified by the manufacturer.
- * If the installations were not performed according to the installation instructions and drawings provided by the manufacturer.



Hidden mechanical fastening
device for rear-ventilated panels
using anchors with bottom
notch

Technical data sheet form

All data presented below are included in the Q-VENT product specifications. This is possible to supply custom-made profiles and accessories, if it is required for specific design project or static analysis.

System accessories	Code	Description
Aluminum alloys EN AW-6063 (AlMg0,7Si) EN573-3, T66 EN 577 Certificate of type test according to EN 13830:2003 Product standard, Method of testing according to EN 12179-2000, Power requirements according to EN 13116:2001 Sleeve anchor with KEIL undercut incl. hexagonal screw with latch, design of stainless steel A4	06.2.xxxx	Horizontal profile, customized lengths
	06.001.1	adjustable holder, fixed point
	06.001.2	adjustable holder, flexible point
	06.001.3	holder, flexible point
	06.002.1	corner support
	06.003.3	silicone pad
	06.keil.xxx	KEIL Anchors with bottom notch

The manufacturer accepts no responsibility for the stability of the ventilated facades system panels in the following cases:

- * If the installation plans or drawings are not available or have not been verified by static calculation by the manufacturer of the support system.
- * If the profiles and accessories are not supplied or verified by the manufacturer.
- * If the installation was not performed according to the installation instructions and drawings provided by the manufacturer.

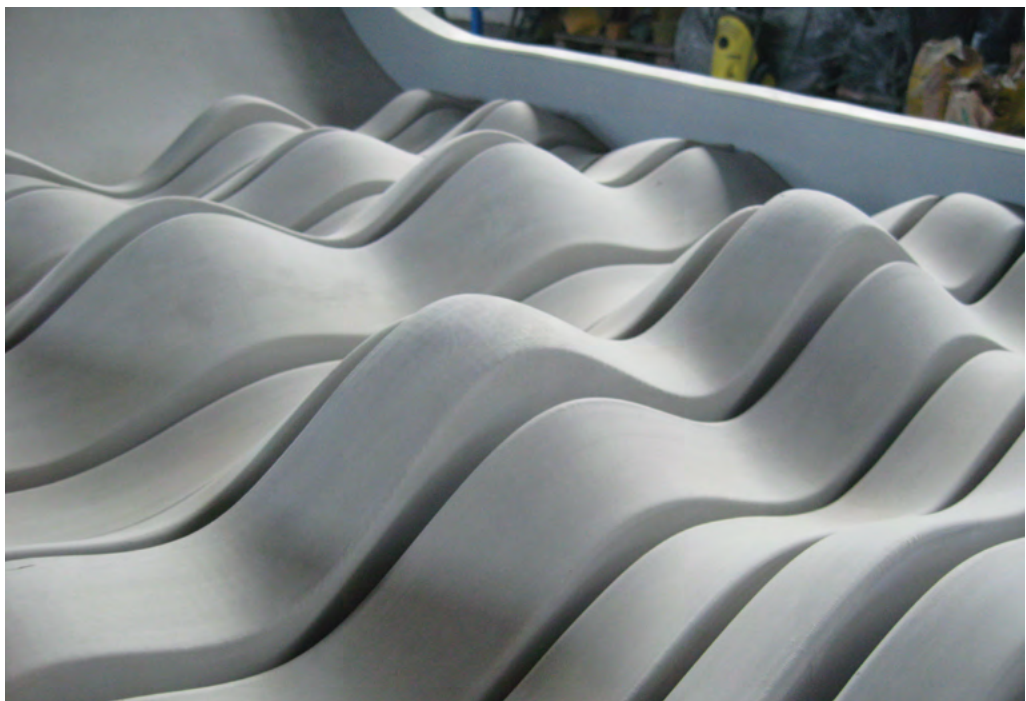
5.0



5.0 Material processing

5.1 Production directly into molds

Basic possibility of direct productions of the final dimensional formats required for the implementation of any project is one of the primary benefits of Polycon material. This contributes to the basic optimization of economic savings because it completely eliminates the excess material, which is produced by other manufacturers due to the forced unification of standard production formats. Polycon material can be made according to your project requirements completely, i.e. you pay only what you really need and use. If necessary, the material can also be machined into the final shape in a way which is usual for this type of material.



5.0 Material processing

5.2 Formatting and milling

The factory is equipped with CNC machining center, which allows you operatively solve customer requirements for final implementation. If you have the possibility or the need to solve the final dimensions and formats using our own capacities, you must meet several basic requirements for quality design.

Basic cutting conditions

The way to store plates:

The plates are always stored facing side up

Type of cutting blade:

Diamond segment (recommended cutting diamond blades for granite, for example – Nicolasi Diamant CDS00012 ND / CE GG D400 3, 2x15x20 Z48)

Type of teeth and cutting surfaces:

According to the manufacturer of cut-off wheel

Recommended speed range:

According to the manufacturer of cut-off wheel (revolutions are given by the manufacturer, eg.: Nicolasi Diamant 2 150 rev / min)

Direction of rotation:

In a clockwise direction

Recommended speed:

Max. 2000 mm / min

Cooling method:

Water

A method of processing of cut edges:

Without further processing

Important notice:

When cutting plates using water cooling, at first the boards must be wetted on the whole surface and then the exposed surfaces must be sufficiently rinsed with clean water (continuously throughout formatting) to prevent storing of fine material structures on the surface of the cut sheets. Consequently, it is necessary to leave the plate to dry out. During drying it is necessary that visible side is stored freely without restrictions. Improper handling of the equipment (especially during wet or humid process) and their improper storage can cause a decrease in visual quality of the products.



5.0 Material processing

5.2 Formatting and milling

Manual formatting

Hand tools may be used in case of modifications sizes and shapes polycon products on site or anywhere outside the factory. It is also necessary to observe the manufacturer's instructions to achieve the best result of the final design.

The way to store plates:

The plates are always stored facing side up

Type of manual device for cutting:

Circular saw, angle grinder

Type of cutting blade:

The blade designed for cutting of concrete dry

Type of teeth and cutting surfaces:

Segment, diamond

Recommended speed range:

According to the manufacturer of cut-off wheel

Direction of rotation:

In a clockwise direction

Recommended speed:

Max. 2000 mm / min

Cooling method:

There is no need, it is cooling itself when cutting

A method of processing of cut edges:

Without further processing

For manual cutting it is recommended to use only high-quality equipment and facilities (completely exclude the Hobby equipment). The strong enough work desk with mounting tools should be used for optimal results and to prevent inappropriate or vibration displacement of the cut material. Circular Saw should be firmly established in the guide. Sawn plates must be (during cutting and immediately after its completion) completely cleaned of fine dust that arises in the actual formatting. In the event that the resulting powder is not immediately cleansed from the surface this may cause its adhesion on the surface and the consequent impairment of the aesthetic requirements.

5.0 Material processing

5.3 Drilling

One variant of panels anchoring on the facade system is using of Keil system (for details of the system see page 150-168). Polycon manufacturing plant is equipped with an automatic drill center (CNC), which guarantees the required drilling holes in the material in the highest possible quality and accuracy. The quality of the implementation of these holes is absolutely necessary for ensuring the stability and static load ratings of the whole anchoring of Keil system. Therefore, it is the most appropriate to follow the instructions and manufacturer's specifications and the technical and professional equipment.

Drilling by KEIL portable drilling equipment

For drilling holes for KEIL system (on-site or anywhere outside the manufacturing plant Polycon) you can use one of the available types of drilling equipment directly from the manufacturer of the complete system - the KEIL company. The geometry of the drilled holes must fully correspond in shape with the anchor nut. It should be strongly advised that for this system only drills and drilling equipment approved by KEIL as guarantor of the whole system can be used

For manual drilling it is important firmly anchored drilled products on a flat and stable surface. Abutment surface of drilling equipment shall perfectly straight fit to drilled area. Drilling depth and layering we must perform by Keil manufacturer's instructions, so that borehole fit desired geometric specifications in all its parameters. Drilled hole shall be cleaned of sediment and dust – in order the anchor completely fills the drilled hole. Any dirt in the drilled hole or incorrectly drilled hole with inappropriate geometry can damage the board or the product and also may cause instability of the whole anchoring system. Prior to start of drilling it is recommended to test the parameters of the drilling equipment and only after full tuning to begin the drilling of required products.

Drilling – rivets

Drilling holes through the plate for rivet or screws using is recommended to be done directly by the manufacturer inside his factory. If this is not possible, then there is the possibility of manual drilling on site in compliance with the basic rules and the following cutting conditions.

Drill type:

Drill for concrete (alternatively, masonry, brick, stone), the drill for glass can also be used.

Drilling method:

Without impact!!, up to 6 mm hole with one drill, since 6 mm two drills, e. g. 8 mm hole (first drill 6 mm, second drill 8 mm)

Recommended revolutions:

Max. 4500 rpm. /min

Feeding speed:

30 mm /min

Cooling method:

No need to cool itself during drilling

The largest allowable diameter drilled holes in one drilling:

6 mm

The direction of drilling:

Always from the visible side

Method for processing edges after cutting:

Without further processing

When manually drilling, it is required to lay the drilling plate throughout the surface on smooth base e. g. on the wooden base. During drilling each hole it is necessary to choose the pressure force in order to avoid surface breaking of the rear side plate near drilled hole and also to avoid hairline cracks creating.

5.0 Material processing

5.4 Water jet cutting

Adjusting of cutting parameters is based by a specific machine. To achieve the quality of cut according to customer's requirement it is necessary to verify the characteristics of each machine.

Recommended cutting speed:

850 mm / min

Pressure of water jet:

2850 bar

Spraying distance:

2, 5 mm

Abrasive material:

80 mesh

Dosage of abrasive:

320 g / min

Cutting speed is directly influenced by the pressure, supply and grit size of abrasives. The higher the values make the higher speed while keeping the quality of the cut. For this type of material it is recommended to use finer abrasives that the cut was smoother. A further increase in speed can be achieved by using the machine with undercut compensation, each manufacturer calls this function differently, for example by FLOW, DYNAMIC WATERJET etc.





6.0

6.0 Handling, treatment and storage

6.0 Handling, treatment and storage

6.1 How to deal with the material on site

Packing

Packing is done according to the type of the contract (flat plate, shaped complex spatial and panels). Individual components or assemblies are fitted with protective elements (PE foil, canvas covers, protective plastic and paper corners and edges, etc.) as needed and then they are replaced into shipping units (pallets, racks, containers, etc.). Glass-fiber reinforced concrete Polycon slabs (the Polycon plates) are stored in a vertical (upright) position so that the longer side is located on a pallet on the soft furnishings. The plates are always interspersed with a flexible layer, in order the visible surface of transported plates were separated from each other and to prevent possible damage of the finishes and visible structures. Polycon plates are always placed by facing (visual) side to each other and backing side to each other.

Loading / unloading / transport

Handling with metal racks, pallets and container shipping is possible using a forklift truck (this transport can be done only on a sufficiently flat and paved surface). The fork of the forklift truck must be fully retracted under the rack and palette (across the whole width) to prevent it from slipping from the fork or pallet when handling. During any manipulation it is necessary to take extra care.

Metal racks or pallets can be handled by crane in compliance with all security measures and policies (especially OSH). During handling by crane, the stand (pallets, containers) must be secured to prevent the particular plates or surround elements from tilting or release!

Handling with elements or transport units (rack, pallet, etc.) must be done on a flat surface (especially when handling with forklift truck) to avoid uneven loads and possible damage.

It is Important to use only such transport vehicles / equipment that are able to bear weight of individual elements or entire package. Weight of individual components or package is listed in the delivery note or on the transport packaging.

Products from Polycon material must be transported only by covered transport vehicle (protection against inclement weather, dust, etc.). Transported drives and units (racks, pallets, and containers) must be secured against possible shift during transport and handling.

It is not permitted to carry or store the transport unit laid on each other (stack them), unless it is recommended by the supplier in writing.



6.0 Handling, treatment and storage

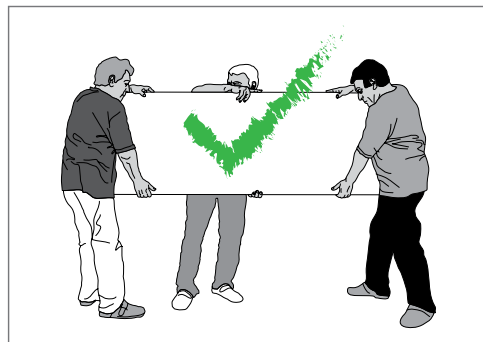
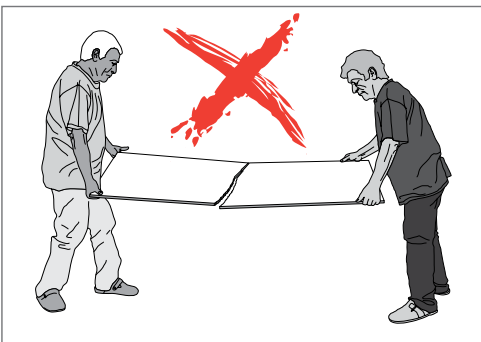
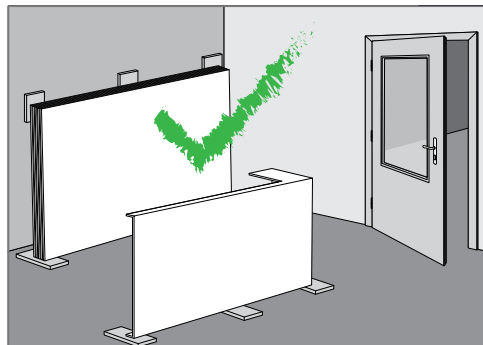
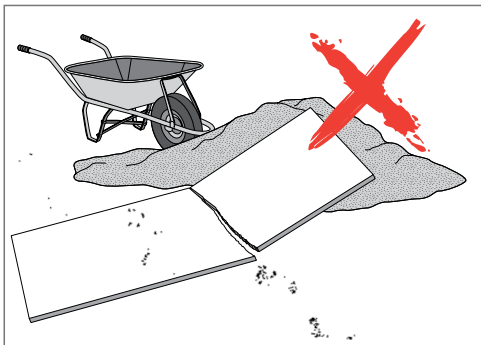
6.2 Acceptance of goods

Transport units must be inspected during unloading due to possible damage to the packaging and goods that might occur during shipment or during transportation. In such event the contractor shall be informed immediately by giving written record of the suffered damage, including photographic documentation. Damage to the packaging or the goods during transport must be reported to shipping documents the shipper on receipt of goods by the customer. Later complaints will not be taken into account!

6.3 Handling and the most frequent mistakes when handling

Manual handling

Manual handling of Polycon plates when loading, unloading or custom assembly must always be carried at least two (2) or more persons (depending on the size and weight of the components). Polycon plates are transported only in a vertical (upright) position to prevent malfunctions, cracks, or even breaking them (you need to take extra care and avoid vibration plates or twisting around corners to avoid damage)! Polycon plates must never be drawn along the base (the ground and the like), also it is not possible to move the plate on each other. Protective slip gloves must be used during handling to prevent slipping out during handling of the plates and simultaneously contamination of visible surfaces.



6.0 Handling, treatment and storage

6.3 Handling and the most frequent mistakes when handling

Tool using

When using auxiliary products for handling it is necessary to give the attention and these products design so that they can be used to avoid damage of the edges or surfaces of glass-fiber reinforced concrete elements. Mating surfaces must have softening features, rounded edges and especially they must be safe. The holes for the future anchorage of plates shall not be used to manipulate because their using for other purposes will damage them.

Handling tools must have sufficient structural thickness to allow the safe handling and at the same time to allow removing of this tools from the joints after the fitting of two adjacent elements in order to avoid damage of edges and corners.

When using suction cups for manipulation it is necessary to check their suitability first and also whether their use will not remain significant traces on the surface. Type of handling suction cups and their use with regard to the size, weight and structure elements must be consulted with the manufacturer (vendor rental) of these devices.

6.4 Using the rocker arm on the crane

The balance beam must be used to ensure safe and proper handling of the stands or goods (pallets, cages) by crane to prevent from overloading of construction of shipping containers and carry the tension to deposited material.

Supporting elements must be routed under the bottom edge of the pallet or product that the weight is evenly carried to the greatest bearing area.

For the handling of elements it is forbidden to use the installed constructions or profiles or draping elements so that the influence of its own weight cannot occur mixed or combined loads. The plates must not be hung by balance beams but they must always be carried by them only!!

6.5 Shape deformation

Shape deformation can occur during plate storage of or during their transport by humidity or temperature change (such as deflection, etc.). This influence is evident in the products around the outer areas of transport units and there the uneven (one-sided) absorption of atmospheric moisture into the material or unilateral thermal exposure occurs. In the case of flat plates you can additionally shape the plate by storing in a dry and clean environment on a flat surface with concave side up and the board is to be stored around 24–48 hours (material does not have the shape memory). In any case, the board must not be burden by any loads; the creep takes place by its own weight.

For small deflections or shape deformations that can normally occur for flat plates, deflection is eliminated by their assembly when the plates are adapted to supporting sub-structure. Material so appropriately takes the flatness of the structure.

The additional creep is almost impossible due to the complicated shapes at shaped elements. Therefore, it is recommended to take adequate care of their storage in a dry and clean environment on a flat surface and to take out the elements from special transport packages immediately before installation.

6.6 Storage on site and moisture penetration

Use a suitable inserts (e. g., polystyrene) to prevent deformations or damage, both in the horizontal and vertical axis due to the load (pressure). Interlayer material (preferably Miralon) must be used, which does not absorb moisture and does not leave consecutive colored spots to avoid delineation of these structures into products. In leaning the first plate leans with the reverse part to the wall and the boards are always placed facing (visual) surface together and the backing surface from each other (spatial elements stand alone!). Do not store panels or spatial elements stored at each other! Maximum number of boards propped against each other is 5 pcs (unless

6.0 Handling, treatment and storage

6.6 Storage on site and moisture penetration

a different number specified by the manufacturer). Polycon boards should not be stored in a horizontal position or on each other or put the burden on them and even pedaling etc.!! Due to big weight plates and Polycon spatial elements and the kind of work it is necessary to work with care especially during handling and assembly and work in compliance with generally applicable safety and health – OSH.

* Although the material is intended for outdoor use, due to its improper storage of the open space its appearance may change. Ingress of water between individual plates may occur due to precipitation (snow, condensation) during storage outside covered spaces and when missing protective covers, and subsequently a permanent change in the appearance of the plates occurs due to prolonged and uneven evaporation of water because it make it impossible generalized venting of material such as when it is mounted.

The protective foil for the transport unit is only used for protection in the transportation. For long-term storage it is necessary to ensure natural conditions (ventilation).

Ventilation of plates on the facade

Change of tonality may occur due to increased humidity (especially during the winter or spring) i. e. the darkening but later by changing of air humidity and the effect of natural ventilation (air circulation) it returns to light tonality. The progressive unification of area shade will also be carried out due to natural ventilation, because the implementation is done in stages and the environmental conditions (under which the individual stages are implemented) may be different

6.7 Surface cleaning

Cleaning and maintenance of glass-fiber-concrete surfaces (if necessary and according to the nature of the surface – surface treatment) is performed using low-pressure water washing and soft plastic bristle brush. For long service life and maintain the properties not recommended cleaning with steam or high pressure cleaning equipment. Products from Polycon material are standard in the natural design. According to customer requirements and usage surface modification can be made through transparent (transparent hydrophobic) or pigmented (colored) paint. They give the characteristic appearance and coloring on visible surface of products and simultaneously increase its resistance to external influences in climatic conditions. Glass fiber-concrete surfaces can be protected against graffiti pollution within Polycon anti-graffiti program. This is a special paint, designed for preventive protection of surface and allowing the subsequent removal of any signs of graffiti. Antigraffiti product forms a protective layer against the colored sprays (such as acrylic, epoxy, nitrocellulose, polyurethane, alkyd spray, etc.), decreases absorption of surface water, reducing the possibility of facade soiling, algae, moss and lichen, but also maintains a high water vapor permeability. Cleaning of graffiti from surfaces preventively treated with special anti-graffiti within Polycon program requires special remover (see technical data sheet). In violation of these instructions and regulations, the supplier is not liable for any damage to or destruction of records and spatial Polycon elements and any complaint cannot be accepted.

6.0 Handling, treatment and storage

6.8 Repair kit and its using

In the event of minor damage to edges and corners during transportation or installation on the construction, the local repair is possible. Repair Polycon REPKIT kits are used for repairs and they are available on request at the manufacturer. Instructions for minor repair Implementation is a part Polycon REPKIT repair kit.

When the component elements are damaged (in particular anchor points) the anchor point must be done again away from the damaged area so as not to affect the overall capacity and structural safety.

Repair kit

Guide for the repair of glass fiber-concrete panels

In the event of damage to the surface or edges of glass-fiber reinforced concrete panels (edge offended, insulted the corner, local surface roughness, etc.) these surfaces or edges can be repaired using the following steps:

1. First, it is necessary to assess the repair extent and choose the appropriate solution (remedy is used for repairing small-scale and aesthetic corrections).
2. In the event that size and nature of correction is in accordance with paragraph 1, their repair can start
3. In the first phase, it is necessary to first clean the repair area. Make sure that the underlying surface is clean and free from ice and free of grease, paint, mold release agents, dust and loose particles.
4. In the event that it is a part repair, wherein the damaged part is still part of this element (minor cracks and the like) the repair can be accomplished either by adding the missing part or damaged or damaged portion being completely separated and then reshaped with the correction of the mixture and separate part of the so-glued stick back and only finishing of surrounding the missing part.

Repairs should be done with regard to the environment, especially with regard to the climatic conditions. The repairing areas must be protected from the sun, wind and rain. Ambient the surface temperature is up to 10 °C.

"Open Time" for use in a matter of minutes (3–5 minimum), so it is necessary to process only the amount that can be effectively utilized.



Before



After

6.0 Handling, treatment and storage

6.8 Repair kit and its using

Repair kit M32

Repair manual for glass-fiber reinforced concrete panels

In the event of damage to the surface or edges of glass-fiber reinforced concrete panels (edge offended, insulted the corner, local surface roughness, etc.) these surfaces or edges can be repaired using the following steps:

1. First, it is necessary to assess the repair extent and choose the appropriate solution (remedy is used for repairing small-scale and aesthetic corrections).
2. In the event that size and nature of correction is in accordance with paragraph 1, their repair can start
3. In the first phase, it is necessary to first clean the repair area. Make sure that the underlying surface is clean and free from ice and free of grease, paint, mold release agents, dust and loose particles.
4. In the event that it is a part repair, wherein the damaged part is still part of this element (minor cracks and the like) the repair can be accomplished either by adding the missing part or damaged or damaged portion being completely separated and then reshaped with the correction of the mixture and separate part of the so-glued stick back and only finishing of surrounding the missing part. In the case of major repairs, we propose to carry out the pre-test. This cannot be used to fill expansion joints (expansion joint between two elements).

Repairs should be done with regard to the environment, especially with regard to the climatic conditions. The repairing areas must be protected from the sun, wind and rain. Processing temperature + 10 °C to + 30 °C.

"Open Time" for use in a matter of minutes (3-5 minimum), so it is necessary to process only the amount that can be effectively utilized.

Complete hardening is finished after 7 days (abrasion resistant after approx. 24 hours).

The optimum water-cement ratio: Approx. 32 % (the mixing ratio, for example: 5 kg KIT M32: approx. 1, 6 liters of pure cold water)

Cleaning products: Water (fresh) for cleaning tools or hardened cement removing

Storage: in a cool and dry place. Storage capability in unopened containers – 6 months

The processing procedure: Mixing until a homogeneous mass is identical timbre. After three minutes, the mass is again mixed! The mixed material must be processed within approx. 45 minutes! Over processing time the slightly stiff material can be mixed without adding water and thus regain to workable consistency (doable once). KIT M32 is injected into the joint through a rubber trowel or a spatula (for spatial parts), surface must be slightly dampened with clean water immediately before use. Excess material is downloaded in a diagonal direction; optionally it is applied again across the board. Freshly paired surfaces must be protected with appropriate action against direct sunlight, strong winds, respectively drafts to prevent hardening of the grout. In case of doubt we recommend wetting the surface with clean water to ensure a successful course of the curing process (hydration).

After curing, the surface can be lightly sanded (fine finish) to unify the surface.

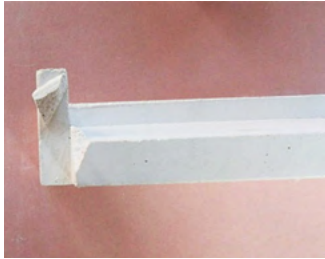
Depending on the used raw materials, the individual production batch may vary slightly in color shade.

6.0 Handling, treatment and storage

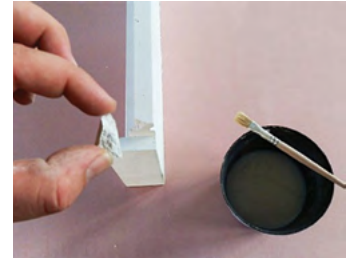
6.8 Repair kit and its using



1. Spatula, brush or sponges, abrasive stone, abrasive sponge, water, liquid glue, cement putty.



2. Checking the surface, free of loose surface material, dust, grease and other contaminants.



3. After cleaning, the liquid adhesive is applied to the damaged areas.



4. Mixing (ratio of liquid adhesive and water 1:10).



5. The final consistency should be like putty plasterboard.



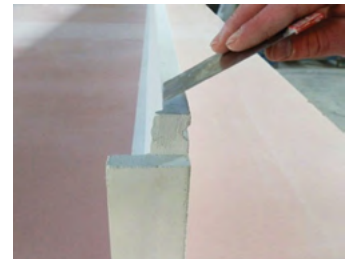
6. First, the surface should be moistened.



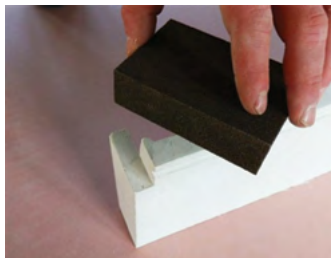
8. Liquid adhesive is applied to both parts.



9. After applying the liquid adhesive, both parts are placed together and lightly pressed (the excess glue carefully wiped), curing approx. 2–3 hours.

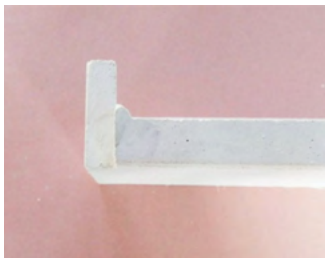


10. When it comes to major repairs, cement sealant should be applied in multiple layers.

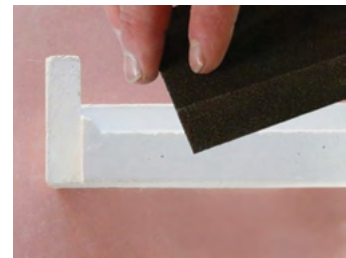


11. Between the layers, it is necessary to wait for hardening approx. 24 hours before applying the next layer of cement paste is necessary to abrade the previous layer and moisturize.

12. The foregoing procedure is repeated until the desired appearance.



13. After curing can proceed (if necessary) to complete the missing parts (offended edges, corners, holes, etc.) using the cement, water and a little liquid glue and spatula.



14. At the end of the surface is lightly sanded to unify the surface, then it is possible to unify the coating on the repaired parts, such as color paint or hydrophobizing.



7.0 Technical characteristics of the material

7.0 Technical characteristics of the material

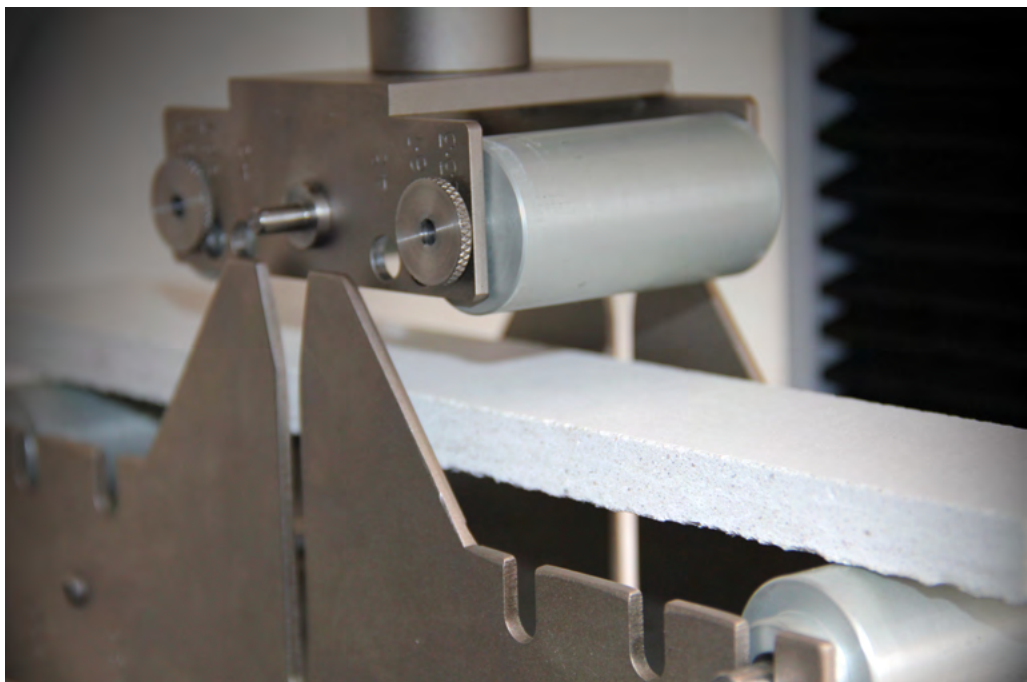
7.1 Basic material properties

Dimensions and tolerances

Dimensions		individual – as required
Shape and design		individual – as required
The thickness		individual – as required
The surface structure	standard upon request	smooth, fine texture, coarser structure RECKLI, imprinting structure Graphic concrete Eluting (blasted) surface Individual – on request
Length tolerance	in lengths up to 2 000 mm In lengths over 2 000 mm	$\pm 1,5 \text{ mm/m}^1$ $\pm 2,0 \text{ mm/m}^1$
Width tolerance	in widths up to 1 000 mm In widths over 1 000 mm	$\pm 1,5 \text{ mm/m}^1$ $\pm 2,0 \text{ mm/m}^1$
Diagonal tolerance	in lengths up to 1 200 mm In lengths over 1 200 mm	$\pm 2,5 \text{ mm/m}^1$ $\pm 3,0 \text{ mm/m}^1$
Thickness tolerance	smooth plate (without structure)	$\pm 1,5 \text{ mm/m}^1$

Other material properties

Thermal expansion (coefficient)	$7\text{--}12 \times 10^{-6} \text{ K}^{-1}$
Specific weight	$1.900\text{--}2.200 \text{ kg/m}^3$
Weight of 1 m ² of thick. 13 mm	$24\text{--}29 \text{ kg/m}^2$
Water absorption	$\leq 13 \%$
Frost resistance	$\geq 0,75$
Tensile rupture (MOR)	$8\text{--}15 \text{ N/mm}^2$
Elastic modulus	$10\text{--}20 \text{ Gpa}$
Flammability	A1
Flame Spread Index	$i_s = 0,0 \text{ m/m}^{-1}$
UV stability	UV resistant pigments



7.0 Technical characteristics of the material

7.2 Natural character

Polycon material is a composite material based on concrete, which is reinforced with glass alkali resistant fibers. This combination is achieved exceptional technical properties such as hardness, strength, durability, ductility, resistance to fire - Class A1 and more. The advantage of this material also consists of its low density and the possibility of producing thin slices or spatial elements. In the production are used as starting materials only high quality materials from reputable manufacturers (glass fibers, minerals and other raw materials), which provide top quality products and their unique and unique appearance.

Products made from Polycon material having a surface texture and appearance as exposed concrete and no further adjustments may have slight surface roughness, irregularities and shade structures, tension trajectories caverns and others that are with regard to the materials used purely natural characteristic and enhance the individuality and uniqueness of appearance the individual exposed surfaces. With these characteristic properties, unrepeatable and different appearance from commonly used materials with smooth artificial surface extends Polycon material fundamental options of technical and aesthetic requirements of customers.



7.0 Technical characteristics of the material

7.3 Possibilities of color and surface differences

Polycon material is a modern progressive natural material, which is popular mainly for its unique features and unique appearance. By making it differs from the commonly used large-sized materials, which is expected and required absolute geometric accuracy, flatness, and the same color over the entire surface and unified appearance (glass, metal, composite boards, and the like). It finds its application wherever it is desirable returns and preservation of nature and structure of the material and in order for the elements and surfaces are possible retain their uniqueness in a spirit of unity with nature and ecological thinking in the design and construction.

High requirements are imposed on the valid standards used for powder and liquid pigments and monitoring internal quality functional surfaces. Only the pigments which are suitable for dyeing materials containing cement. Pigments must be lightfast (UV) and weatherproof resistant. When color measurement and evaluation of measured values (L, b, delta-E) is required take into account the irregularity storage of raw materials, the moisture of the material, including humidity, status and degree of contamination of the measured surface, the intensity of a light source. In assessing the color must also take into account the effects of external factors and the natural processes of aging, where possible color changes cannot be considered as a material defect, as it is a natural process of maturation and aging. Color shade and visible surfaces of areas of individual components may also vary in relation to the incident angle and the light intensity.

When the difference of tonality glass-fiber reinforced concrete slabs it is important to note that the material and air humidity are their primary cause. Increased moisture has ultimately affect the color difference (darker shade) within the visible surfaces visible concrete (Polycon material is hygroscopic and therefore it absorbs and releases moisture, which can cause slight changes in color) that have not undergone conventional continuous temperature cycle on the facade. This process is characteristic of gray and white Portland cement, which can be amplified by the selected surface structure. The supporting and the surface layer made from white or gray Portland cement tends to absorb more moisture from the air in the early months after application (installing) and hold the moisture longer. When an objective assessment – the factors affecting values tonality (as the natural fluctuation of the raw materials, humidity and air panel, external temperature and dew point, pollution, light sources, etc.) must be taken into account. All colors have a natural feature - lighten during moisture desorption. Changes induced by aging, weathering and factors related to the environment are natural processes that cannot be in any way affected by production technology and therefore they cannot be considered as material defects.

Due to these characteristic material properties may get situation, in which the objectively compared presented sample plate of the project (whose age can be on the order of months) or model implementation which age or the way storage is different from new products or production within the first deliveries to the building. Usually the sample plate (sample implementation) is in lighter shade than the tonality of newly manufactured and supplied plates to the building. Since conditions of concrete appearance and color intensity during storage (temperature, humidity) as well as changes in the environment (shift from drier to wetter environments and vice versa) it is necessary to take this into account in the design and actual implementation. Increased differences in the intensity of tonality can be expected especially in the manufacture, supply and implementation in months with high humidity and lower temperatures. Residual moisture of manufacturing material and diffuse from air humidity is absorbed by the dispatched material and it is released much slower from internal material structures (products of gray Portland cement in this period can have very dark areas caused by concentrated moisture). This feature of fresh faced concrete with time is slowly losing, especially if it goes through the normal temperature cycle in the whole year. This feature is quite common for this type of material and therefore it cannot be considered as a defect.

7.0 Technical characteristics of the material

7.3 Possibilities of color and surface differences

It is necessary to count with the fact then this is impossible on the basis of a small sample element and particular natural material require then all the other elements were completely identical because it is a natural material wherein the contrast characteristic feature is the diversity of the material in the surface of the lot, etc. Because it is a natural material this is not possible to seek the best complete uniformity and stability. It is should be noted that all materials are subject of natural aging process since begin – their creation (or production) and so it is impossible within the short time (months, years, decades, etc.) retrospectively compare their appearance when they are exposed to different environments and on the surrounding influences.

Material's ability to react continuously to the external environment and eventually regain their characteristic appearance gives to those products the desired natural character due it they are selected and used. Objective natural material properties cannot be used as an assessment argument of their quality.

7.4 Thickness

For the objective evaluation of the nominal thickness of the material it is necessary to take into account that each product is manufactured by pressure spraying into molds. Manufacturing process and its technology are under constant monitoring, but neither while respecting all technological and control processes, the absolute product conformity in all parts, surfaces, edges, and faces transitions cannot be guarantee. Indication that the material can exhibit some fundamental differences enhances its unique natural character. Characteristics of nominal material thickness measurement are based on the average from the thickness measurements as described below for performing such measurement methods. There is also formulated an indicative table of the declared values of the permissible tolerance deviations of average measured nominal thickness of products. Uniformity and homogeneity of tolerance variations can be objectively assessed only in such types of products that allow the objective evaluation methods. These are the areas and locations of products which are completely smooth, without the surface structure. Only those Polycon products bearing with the imprinting matrix can be assessed and evaluated, which are produced on the same imprinting form or matrix and subsequently compared with each other individual variations of selected matrix. The surface structure is not uniform, not only in the context of functional surfaces exposed surfaces, but also in edges of each product. Disunity of thickness is given by imprinting matrix, then the deviation forms the basis of shape profile of the surface structure.

Spatial and shape Polycon product shall expect that the thickness of the products is greater in locations of connected surfaces and in the corners of the elements, because they are the most statically stressed parts of the external tension-carrying elements in critical areas such as joints and corners. A large amount of internal reinforcement material provides high durability and stability of the molded elements within the handling, transportation and installation.

7.0 Technical characteristics of the material

7.5 Caverns shrinkage cracks, tension trajectories

Glass-fiber reinforced concrete is a material whose matrix formed by gradual hydration of clinker minerals in cement. It is therefore a material whose final material properties are fully available after weeks or months. This must be taken into account for design and implementation of glass-fiber reinforced concrete elements.

Volume changes represent characteristics that need to be taken into account in the design and implementation. These are mainly the following:

Hydration and respectively chemical shrinking, which is related to the initial chemical reaction in which mixing water reacts with clinker minerals creating mostly amorphous calcium silicate hydrate compounds. As a result of these chemical reactions there is a contraction that is associated to the formation of extremely varied pore system.

Shrinkage associated with changes of glass-fiber reinforced concrete humidity. If the glass-fiber reinforced concrete is exposed permanently under water, it tends to acquire (positive volume changes) and conversely cement matrix shrinks during gradual drying. Then the final shrinkage values may amount, depending on the volume of cement phase, to 3 per mille (3 mm/m). Table of humidity and temperature effects on material is listed on page 197.

Classical thermal expansion related to changes in temperature. The standard value of coefficient of thermal expansion is $-10 \times 10^{-6} \times K^{-1}$.

Shaping – volume changes due to elastic-plastic deformation associated with power effects.

In practical terms, the volume changes associated with the drying are most relevant. A common result of these volume changes is the creation of so-called shrinkage cracks. Hairline cracks especially in the corners and edges of the products can become visible by the naked eye, but they have no effect for durability or quality. Volume changes of glass-fiber reinforced concrete are by no means the defect, but they are a natural part of the aging process. These changes are eliminated by using alkali-resistant glass fibers as internal reinforcement. It captures forces, respectively tension resulting from volume changes. It shall ensure that in addition to the visible wide cracks, the plurality of hairline cracks with a width of below 0,1 mm is created. They are both functional and aesthetically virtually meaningless.

Within the design and evaluation of the visible surfaces of Polycon products, it must be said that their purely natural appearance and structure is their primary argument. It may have slight minor irregularities and shade structures, tension caverns trajectories concrete efflorescence, transmission of the glass fibers into the surface and more. These parameters are specific to the used materials and purely natural processes of aging, they enhance the uniqueness and uniqueness appearance of individual exposed surfaces and therefore they cannot be considered as a material defects.

7.0 Technical characteristics of the material

7.6 Shape deformation due to changes in temperature and humidity

Glass-fiber-concrete composite material is very stable. Nevertheless, during structure design it is necessary to allow for the fact that the material with natural character responds to external influences (hygroscopic). The main factors (to be taken into account in the design) are the thermal volume changes and volume changes in humidity.

Thermal volume changes

Although the material glass-fiber-concrete panels has a similar coefficient of thermal expansion $10,7 \times 10^{-6}$ [1/K] (see Appendix 1) as a steel support structure $12,0 \times 10^{-6}$ [1/K], temperature effects cannot be completely ignored. It is necessary to consider the possibility unequal heating and cooling of the outer shell and supporting structure, etc. - See the indicative table (page 197) that shows the approximate values of dimensional stability of glass-fiber-concrete composite with respect to temperature changes and their effect on the material.

Moisture volume changes

As follows from the results of measurements, volume changes occur in glass-fiber-concrete composite relating with its variable humidity. It appears from the measurements that the volume changes are not linear to the degree of saturation of plates with water, and that changes near the full drying have a greater gradient than changes near the full saturation of the material. The following table describes the approximate value of the material behavior depending on various parameters, which indicate that moisture volume changes are very essential aspect in the design and implementation of support structures in the context of allowing free expansion of the material.

In general, the effects of thermal and moisture volume changes are more evident in shaped elements and the flat plates because the internal stress of the material (including external influences to shape) is not dispersed in the free space of plates, but its effect is limited by shaped profile of the product, their corner reinforcement or a combination of related areas. These influences affect the decomposition of internal and external tensions transmitted both individually and in combination. Other factors that must be taken into account when designing and objective evaluation include the type of surface structure, dimensions and shapes related areas because also these parameters affect the decomposition of material tension.

In general it can be concluded, that the design and implementation of shaped elements with regard to objective evaluation of shape and design uniformity shall take into account that any changes of external influences or their combinations (temperature, humidity, etc.) can affect the final shape design. During the design and implementation of supporting structures it is necessary to calculate the influence of temperature and humidity changes so that the substructure allows free expansion of material without restriction in all directions.

7.0 Technical characteristics of the material

7.6 Shape deformation due to changes in temperature and humidity

Orientation table of thermal expansion

Length of the element bm	The temp. diff.	5 °C	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C
0.50 bm	The relative change in element length	0.023 mm	0.045 mm	0.068 mm	0.090 mm	0.113 mm	0.135 mm	0.158 mm	0.180 mm	0.203 mm	0.225 mm
1.00 bm		0.045 mm	0.090 mm	0.135 mm	0.180 mm	0.225 mm	0.270 mm	0.315 mm	0.360 mm	0.405 mm	0.450 mm
1.50 bm		0.068 mm	0.135 mm	0.203 mm	0.270 mm	0.338 mm	0.405 mm	0.473 mm	0.540 mm	0.608 mm	0.675 mm
2.00 bm		0.090 mm	0.180 mm	0.270 mm	0.360 mm	0.450 mm	0.540 mm	0.630 mm	0.720 mm	0.810 mm	0.900 mm
2.50 bm		0.113 mm	0.225 mm	0.338 mm	0.450 mm	0.563 mm	0.675 mm	0.788 mm	0.900 mm	1.013 mm	1.125 mm
3.00 bm		0.135 mm	0.270 mm	0.405 mm	0.540 mm	0.675 mm	0.810 mm	0.945 mm	1.080 mm	1.215 mm	1.350 mm
3.50 bm		0.158 mm	0.315 mm	0.473 mm	0.630 mm	0.788 mm	0.945 mm	1.103 mm	1.260 mm	1.418 mm	1.575 mm
4.00 bm		0.180 mm	0.360 mm	0.540 mm	0.720 mm	0.900 mm	1.080 mm	1.260 mm	1.440 mm	1.620 mm	1.800 mm
4.50 bm		0.203 mm	0.405 mm	0.608 mm	0.810 mm	1.013 mm	1.215 mm	1.418 mm	1.620 mm	1.823 mm	2.025 mm
5.00 bm		0.225 mm	0.450 mm	0.675 mm	0.900 mm	1.125 mm	1.350 mm	1.575 mm	1.800 mm	2.025 mm	2.250 mm
5.50 bm		0.248 mm	0.495 mm	0.743 mm	0.990 mm	1.238 mm	1.485 mm	1.733 mm	1.980 mm	2.228 mm	2.475 mm
6.00 bm		0.270 mm	0.540 mm	0.810 mm	1.080 mm	1.350 mm	1.620 mm	1.890 mm	2.160 mm	2.430 mm	2.700 mm

Orientation table moisture expansion

Length of the element bm	Differ. of satur.	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
0.50 bm	The relative change in element length	0.065 mm	0.130 mm	0.195 mm	0.260 mm	0.325 mm	0.390 mm	0.455 mm	0.520 mm	0.585 mm	0.650 mm
1.00 bm		0.130 mm	0.260 mm	0.390 mm	0.520 mm	0.650 mm	0.780 mm	0.910 mm	1.040 mm	1.170 mm	1.300 mm
1.50 bm		0.195 mm	0.390 mm	0.585 mm	0.780 mm	0.975 mm	1.170 mm	1.365 mm	1.560 mm	1.755 mm	1.950 mm
2.00 bm		0.260 mm	0.520 mm	0.780 mm	1.040 mm	1.300 mm	1.560 mm	1.820 mm	2.080 mm	2.340 mm	2.600 mm
2.50 bm		0.325 mm	0.650 mm	0.975 mm	1.300 mm	1.625 mm	1.950 mm	2.275 mm	2.600 mm	2.925 mm	3.250 mm
3.00 bm		0.390 mm	0.780 mm	1.170 mm	1.560 mm	1.950 mm	2.340 mm	2.730 mm	3.120 mm	3.510 mm	3.900 mm
3.50 bm		0.455 mm	0.910 mm	1.365 mm	1.820 mm	2.275 mm	2.730 mm	3.185 mm	3.640 mm	4.095 mm	4.550 mm
4.00 bm		0.520 mm	1.040 mm	1.560 mm	2.080 mm	2.600 mm	3.120 mm	3.640 mm	4.160 mm	4.680 mm	5.200 mm
4.50 bm		0.585 mm	1.170 mm	1.755 mm	2.340 mm	2.925 mm	3.510 mm	4.095 mm	4.680 mm	5.265 mm	5.850 mm
5.00 bm		0.650 mm	1.300 mm	1.950 mm	2.600 mm	3.250 mm	3.900 mm	4.550 mm	5.200 mm	5.850 mm	6.500 mm
5.50 bm		0.715 mm	1.430 mm	2.145 mm	2.860 mm	3.575 mm	4.290 mm	5.005 mm	5.720 mm	6.435 mm	7.150 mm
6.00 bm		0.780 mm	1.560 mm	2.340 mm	3.120 mm	3.900 mm	4.680 mm	5.460 mm	6.240 mm	7.020 mm	7.800 mm

Values are only approximate.

7.0 Technical characteristics of the material

7.7 Efflorescence

Efflorescence is a common property of all materials on the basis of concrete. Efflorescence is a white deposit, which appears on the surface and does not pose any structural problems.

Efflorescence is formed by migration of soluble salts (especially calcium hydroxide) which is present in the cement and through the pores in the structure it comes to the surface of the material. Either it happens during water evaporation (which makes a crystallized salt) or a soluble salt reacts with carbon dioxide in the atmosphere and creates the carbonate, which is precipitated and formed on the surface as chalky deposits called efflorescence.

Efflorescence is formed mostly by the effect of external sources, such as rain or condensation that are absorbed into the material.

Efflorescence is formed and often occur at low temperatures and high humidity because the evaporation is slower that allows a greater migration of salts to the surface. Also, the calcium hydroxide has a higher solubility at lower temperatures.

Removal of efflorescence

Efflorescence should not be removed during wet or cold conditions, because the dominant moisture may cause the reappearance of efflorescence. Their removal during suitable dry conditions will ensure that the water used for cleaning evaporates quickly, will not penetrate into material and does not have the ability to transmit more salts of the internal structure to its surface. Natural weathering over time removes soluble salts. The insoluble sediment (e. g., calcium carbonate) causes the greatest removal problems. Washing with a suitable cleaner is the only way to eliminate this kind of efflorescence.

Hydrochloric acid (salt), phosphoric acid and acetic acid are commonly used to remove efflorescence. 10 % or weaker solution or 20 % acetic acid solutions are commonly used. Several branded cleaners can also be used. These should be used in accordance with manufacturer's recommendations.

The areas that are to be stripped of efflorescence should be saturated with pure water to avoid the absorption of detergent. After application the detergent it is to be reckoned with some minutes of delay to perform a reaction and then the surface should be thoroughly rinsed with clean water. Scrubbing with a brush with hard bristles (not steel) may be necessary for hard deposits.

Cleaning is recommended within small areas on the order of a square meter. It should be noted that the cleaning agents can cause discoloration unless thoroughly flushed. Especially hydrochloric acid (salt) can create yellow spots.



8.0 Customer Service

8.1 Technical support

Our mutual satisfaction with the overall implementation and approach is a fundamental parameter of supplier-customer relations. Our technical background and many years of experience and is disposal your needs and requirements. Individual approach is important in the context of each project and technical support is an essential part. Our team of professional technicians, engineers and production engineers is able to find a solution within the framework of joint consultations to meet your requirements.

At any stage of project it is possible mutually discuss your project requirements so that the final solution without compromising meet expected demands. The various technical aspects can consult to each other through electronic communication or even through personal visits to project engineers, investors, architects, etc. We also offer special services such as the possibility of personal visits to construction sites carried out before the start of implementation, with regard to the instruction and training of installers and during mounting and installation work as a material control or as a technical authority within the final transfer of finished work to customers.

We are also prepared to offer the possibility of control of products in production (ie before expedition) to the site, that consumer confidence was completely satisfied.



8.0 Customer service

8.2 Sample implementations

As part of the implementation of some projects it is necessary prior to the delivery to build a model implementation (mock up). This model implementation (mock up) should take into account for the final solution of the selected sample project. Implementation model (mock up) should be constructed at a scale of 1:1 for clear assessment of the technical and aesthetic design. It is also appropriate to solve this type of presentation with regard to aesthetics Polycon glass-fiber-concrete tiles because their purely natural character can be misrepresenting in a smaller version. However, it is also necessary to note that all products realized Polycon cannot be totally without exception identical to the samples of the realization mock up, since the nature of the material does not allow this absolute compliance.

Not only architectural and design representation is done in the context of implementation of the model mock up, but also the installation and implementation of standardized design of facades and projects. This is used to test if the chosen solution fully complies with all interested parties, if it meets the expected requirements and if it allows you to use the chosen solution throughout the project scale. Any changes resulting from this technical demonstration must be actively taken into account with all the consequences in the context of the overall solution and final design.

The costs associated with the production of Polycon tiles for the mock up realization are included in the price of supply in the event of the implementation agreement (It is necessary to pre-consult to each other and agree these requirements. Unconditional entitlement for this supply cannot be applied without pre-agreed conditions).

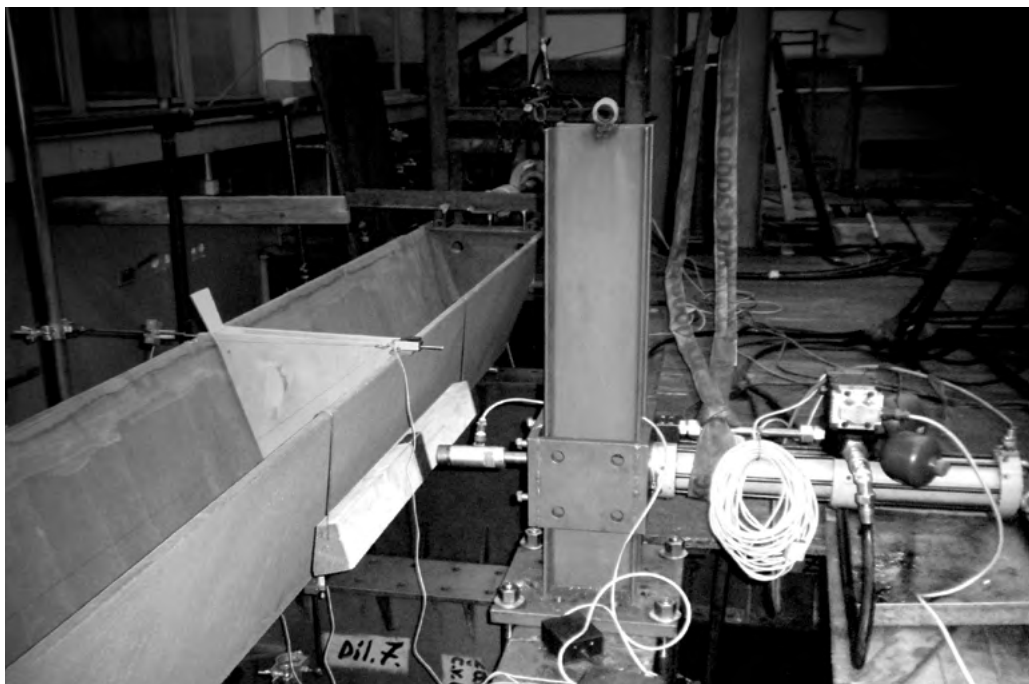


8.0 Customer service

8.3 Cooperation with national professional and authorized institutions

Polycon material is not only below the long-term technical control within their own control processes in the factory, but this is also a form of long-term cooperation with independent professional and technical authorities, which demonstrate the quality and technical competence of the solution through appropriate testing procedures.

If necessary, the design test of selected solutions in the individual realizations can also be selected when it is possible to pre-test the technical aspects of the desired implementations. Test report (which will confirm the selected solution with respect to a suitably chosen safety factor) can serve as a basis for further development in the approval process.



8.0 Customer service

8.4 Necessary documents and information for pricing

The basic foundation for the creation of a mutually successful business relationship constitutes an essential pricing that takes into account the required performance and the all important aspects and information that affect the final price. In order to the responsible and fair pricing could be created, it is necessary to know a number of basic implementation parameters that affect the formation of prices ultimately. It is Important to point out that when some of this basic information is not known at the time of request for price quotation or any changes occur during the selection process, then this ignorance or later change may affect the final price. It is Important to note that pricing is the sum of many partial production and factors of production, in which the synergistic effect may also make an important role. Any change of parameters must therefore be consulted in advance and mutually agreed to avoid any differences to the expected claims.

The following information must be specified as the basic parameters for creating price offer:

- Name and location of the project implementation
- Client/customer
- The total amount, including the specification of the dimensions of individual parts
- Shapes of various elements and products
- Color or shade
- Surface structure
- Required additional processing
- Surface finishing
- Order date
- Delivery Dates
- ... Other Important Aspects

In your interest we are also able to provide you a simple form of .xls and .pdf formats, which can be used in the context of your inquiry.

If any of the above information is not completely accurate or final, then the validity of quotations must have agreed after specification of this information in writing or updated to realistically account of the updated parameters of the task.

8.0 Customer service

8.5 Diagram of the entire process – ordering, production, shipping with gross HMG

For clarity of time-consuming we present an approximate schematic overview of the production processes for ordering of the material in an appropriate manner in advance.

It is Important to note that this is a general scheme that can vary within individual projects. These facts therefore in advance must be with each other discussed and specified according to the type of design and complexity of the implementation process. For small projects the production takes weeks but for large projects it is a long production process with continuous deliveries.



8.0 Customer service

8.6 Samples and promotion

As a responsible manufacturer and supplier we fully meet your expectations. In order to simplify the entire process of selecting and choosing of the most appropriate solutions, we offer the opportunity of manufacturing and supplying of samples as standard in A4, which are relatively faithful to take into account the actual realization requests.

Standard design of samples (A4, 500 × 500 mm)

Production Polycon samples are carried out on request and specifications listed in the order. These specifications shall include:

- Numerical and written designation structure or description of other embodiments
- Numerical and written designation of colors (according to Polycon catalog)
- Sample size in mm (width x length), for linear structures it is necessary to specify the orientation of the structure drawing or description
- Number of units
- Samples are delivered in a format A4; samples can be produced also in dimensions of 500 x 500 mm or less (fine structure)

If any of the previous matrices cannot be used to perform the desired sample, then this matrix must be produced first and then the term of sample production is extended by the term of matrix production process.

Delivery time for samples:

- Manufacture of flat samples: 14 to 28 days + shipping
- Production of structured samples, form elements
- Production of matrix ... days (depending on complexity), production of samples: 21 to 28 days + shipping

If you require an earlier arrival of the samples then shortening of delivery date may affect the design of samples (color, strength, etc.). Therefore, this fact must be considered when handling, processing, testing of mechanical resistance, presentations, etc. If you request the surface finishing then the request of short sample delivery time may also affect the quality of those arrangements due to the technological progress and higher initial humidity of the substrate.

Sample price:

Samples are provided free of charge in the case of standard design and format A4 or 500 x 500 mm and samples are supplied without accessories (mounting connection, substructure, etc.).

Manufacturer chooses the type and mode of transport for the size and total weight of the sample. If you require more frequent deliveries of samples or samples more weight than the customer pays shipping unless agreed otherwise!

Non-standard samples (as requested)

Production Polycon samples are carried out on request and specifications listed in the order. These specifications shall include:

- Numerical and written designation of the structure or description in other modifications
- Numerical and written indication of color design (depending POLYCON catalog)
- Sample size in mm (width x length), for linear structures it is necessary to specify the orientation of the structure drawing or description
- Number of units
- Samples are carried out according to the desired dimensions and formats available matrices used for production (limit of maximum size - see manufacturer's matrix catalog)

8.0 Customer service

8.6 Samples and promotion

If any of the previous matrices cannot be used to perform the desired sample, then this matrix must be produced first and then the term of sample production is extended by the term of matrix production process.

Delivery time for samples:

- Manufacture of flat samples: 21 to 28 days + shipping
- Production of structured samples and form elements: production of matrix ... days (depending on complexity)
- Production of samples 28 days + shipping

If you require an earlier arrival of the samples then shortening of delivery date may affect the design of samples (color, strength, etc.). Therefore, this fact must be considered when handling, processing, testing of mechanical resistance, presentations, etc. If you request the surface finishing then the request of short sample delivery time may also affect the quality of those arrangements due to the technological progress and higher initial humidity of the substrate.

Sample price*:

The price of samples will be determined on the basis of specifications (price for dies, molds, etc.). Manufacturer chooses the type and mode of transport for the size and total weight of the sample.

*In the event that, based on these samples, the contract will be subsequently implemented, the price will be reflected in contract of samples.

Technical support to answer your questions is available on the e-mails and numbers listed in the "Contact Information".



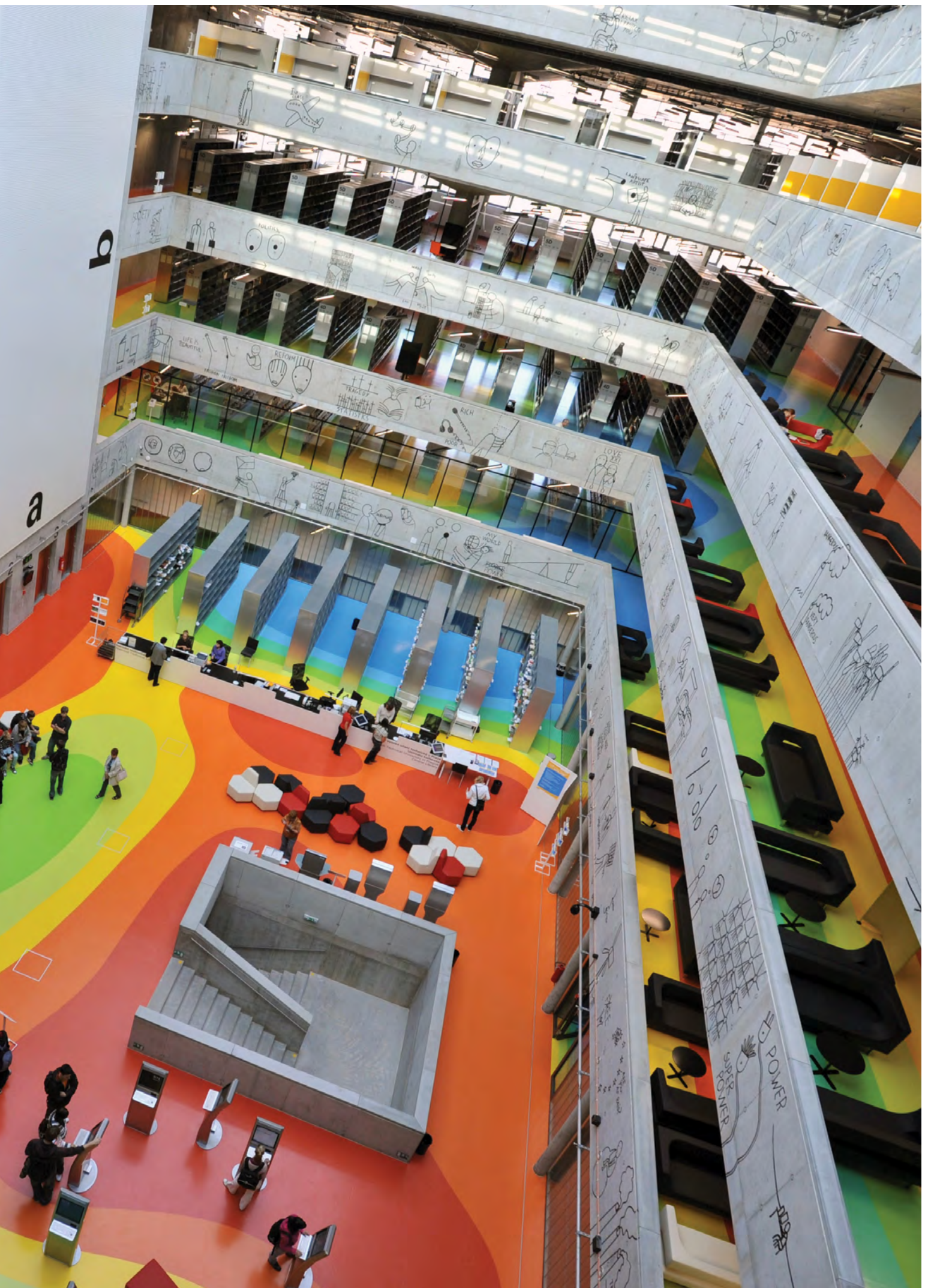




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