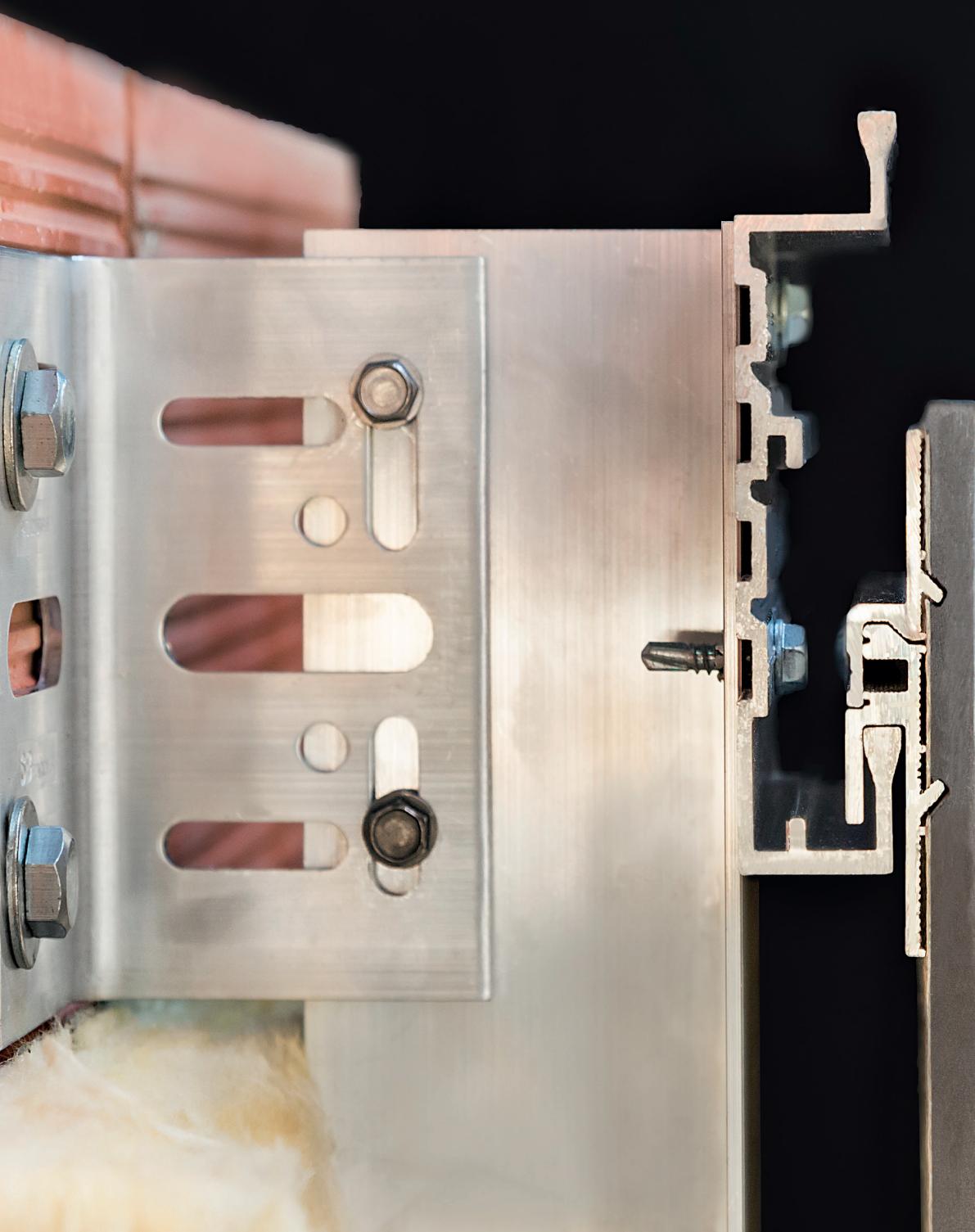


neoLITH®

StrongFix System
Installation Guide



LEGAL BASIS AND GENERAL CONDITIONS:

1. This technical document has been prepared by the TheSize Surfaces Technical Department accordance with:
 - ETAG N° 034 Edition May 2011. GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL of KITS FOR EXTERNAL WALL CLADDINGS.
Part I : Ventilated cladding kits comprising Cladding components and associated fixings.
 - ETAG N° 034 Edition May 2011. GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL of KITS FOR EXTERNAL WALL CLADDINGS.
Part II : Cladding kits comprising cladding components, associated fixings, subframe and possible insulation layer.
2. This Technical document can not be transferred, including transmission by electronic means without the express consent of TheSize Surfaces SL. The texts, drawings and technical documentation provided can not be disseminated without the consent of the company, which owns the copyright on them.
3. Technical document can not be transferred to manufacturers or representatives thereof without the express authorization of TheSize Surfaces SL.

0. DEFINITION AND PRODUCT OPERATION

0.1 REPORT PURPOSE:

The purpose of this technical report is to provide the system's suitability for ventilated facades Neolith StrongFix developed for coating of ventilated facades with thin materials with thicknesses between 5 and 8mm according to ETAG 034 Edition May 2011 Guideline standard for European Technical Approval of external kits for wall Claddings, having been drawn up by the Technical Department of TheSize following specified in the current regulations directly applicable. The metal substructure and its supporting wall anchors (vertical profiles and anchors) are also described in the above 525/09 DIT technical document developed by the Institute of Construction Science Eduardo Torroja.

This Technical document is by definition a favorable technical assessment of the façade system Neolith StrongFix, its fitness for use in construction and adaptation to European regulations. Previous use of the system exposed to equipment or procedures to which it refers, requires the full knowledge of this technical document, not holding itself effect any administrative or accounting authorization of use.

Considering the tests performed by official independent institutes for themselves TheSize Surfaces SL (hereinafter TheSize) and presented in this report on the compliance of the same with European regulations in force ETAG 034 Edition May 2011 Guideline for European Technical Approval of kits for external wall Claddings, states that the Technical Document will represent, provided that all system components are supplied by TheSize a WARRANTY ventilated façade system Neolith StrongFix.

0.2. PRINCIPLE AND SYSTEM DESCRIPTION:

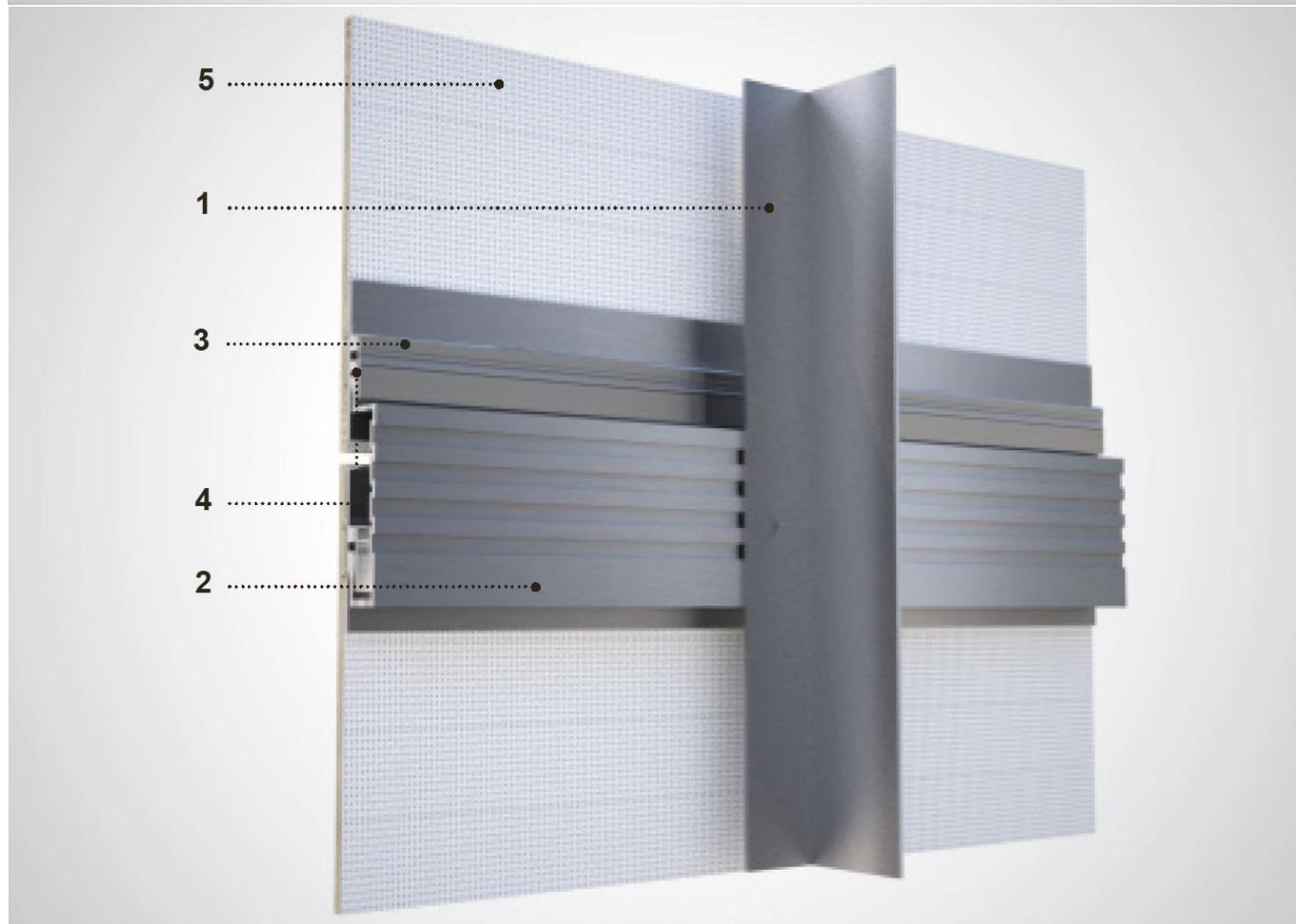
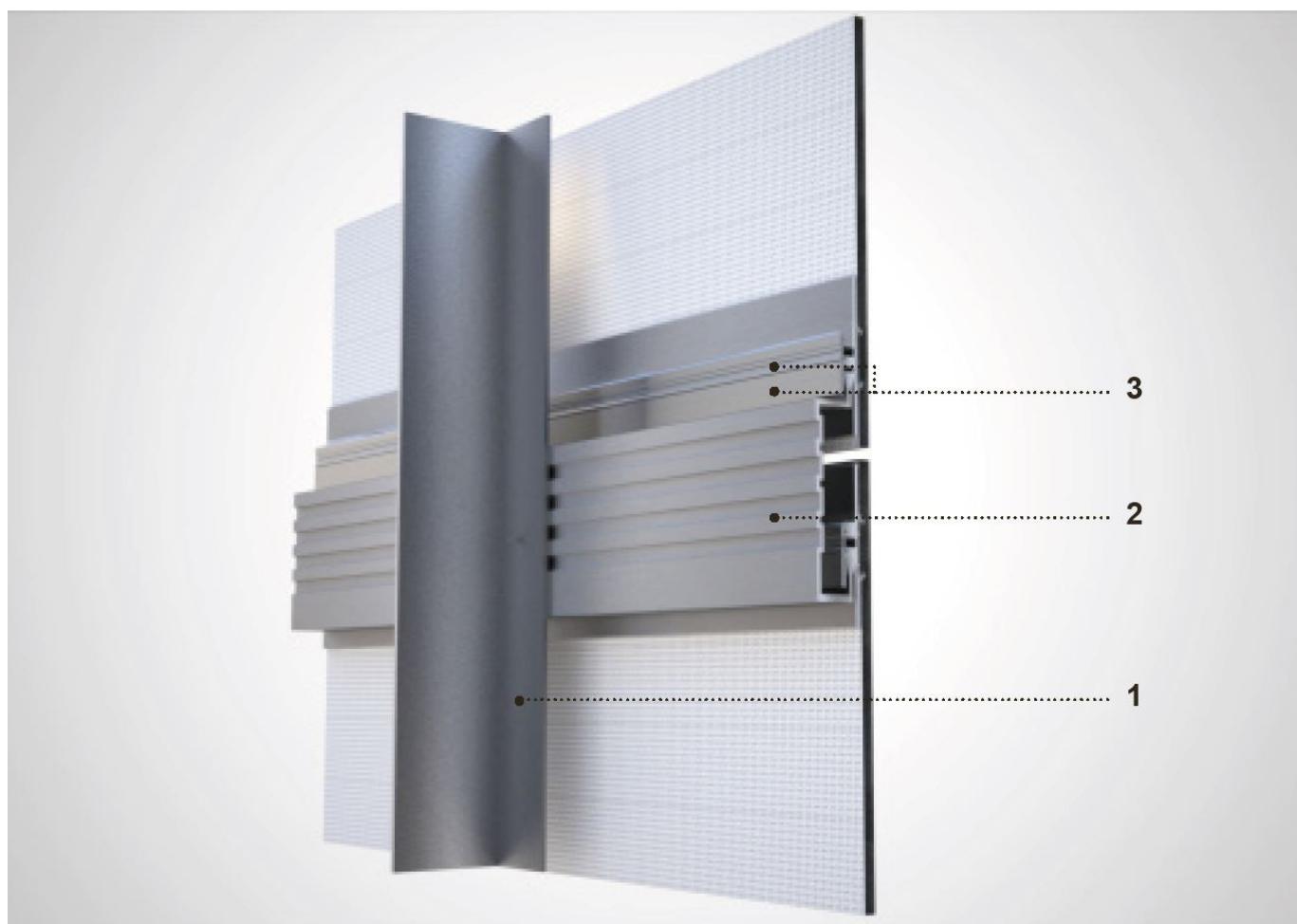
The system commercially known as Neolith StrongFix is a ventilated facade system developed exclusively by TheSize for ventilated façade cladding building new construction or rehabilitation, mainly formed by a slim sintered stone coating materials subject to a metal substructure by a mechanical and chemical fixation.

This substructure is composed of a vertical and horizontal aluminum profiles working like structural mesh, and anchors designed according to the structural load bearing and associated anchors for placement on the support structure, the latter being understood as:

- The curtain wall façade which gives conditions for waterproofing and strength, being better masonry, prefabricated materials, metal or wood.
 - The structure responsible for the absorption and transmission of incident loads on ventilated façade system if it meets the requirement of mechanical strength, it can be concrete, steel or wood.
- The facade system exposed here consists of several mechanical components which require a chemical fixation, which must be done by the adhesive MS-WAN which is included on StrongFix supplied by TheSize for proper assembly.

Thus the system provides mechanical and chemical fixation, multiplying the range safety system facade. The geometric characteristics and mechanical properties of the several elements that make up the system are described in Annex 1 of the Neolith StrongFix Technical Document.

The kit is a constructive set with non-structural nature. By itself does not contribute to the stability and strength of the structural system on which it is installed. However all the existing façade system elements must be defined by the TheSize Technical Department depending on the nature of the project, the support element and the loads calculation to be transmitted in each project.



The Neolith StrongFix cladding system developed by TheSize consists of the following components:

1. Vertical aluminum profiles anchored to the exterior wall by corresponding brackets and anchors.
2. "StrongFix" Horizontal aluminum profile subject to vertical structure by specific screws.
3. Coating anchor profiles. Aluminium profiles "hook" and "lock" incorporated after grooving process and chemical application.
4. Putty - component elastic adhesive polymer MS-WAN.
5. Neolith cladding material with Neolith StrongFix Industrial grooves, according to the grooving sheet issued by the Technical Department of TheSize.

0.3. CONDITIONS OF USE AND IMPLEMENTATION:

The Neolith StrongFix system described herein is intended for lining ventilated facades using sintered stone materials fastened longitudinally through horizontal and vertical aluminum profiles inherent in the system itself, which form a metal substructure by the union between the two families of profiles. This substructure formed by metal framework has no structural function does support member configured as ventilated façade and load transmitting element, both horizontally and vertically, exerted on it.

The implementation of this system must be made through recognized TheSize or specialized companies and approved by the company, thus making it possible technical assistance from TheSize, who reserves the right to inspect the works carried out by the system attachment described herein, whether or not made by the company itself.

The installation company responsible for the work of installing the system will ensure that implementation work is carried out in the same conditions and fields covered by this Technical and respecting the observations made by the Technical Department TheSize Document application.

The Neolith coating element used in the façade system described are not part of the subject of this Technical Document must be guaranteed their mechanical and aesthetic qualities of suitability for use in facades by Thesize and can be further supplemented by TheSize if it requires.

The possible application of fiberglass mesh in the backside of the tiles as a complement to increased mechanical strength must be notified to TheSize, in order to consider its mechanical strength and ensure proper material compatibility in the system.

Notably, the Neolith StrongFix ventilated facade system allows performing façade projects regardless of the thickness of horizontal and vertical joint (recommending a minimum space of 2mm to allow for thermal expansion of the facade material), allowing in turn facade design with locked joints.

INSTALLATION STEPS

1. DESIGN AND CALCULATION OF THE VENTILATED FACADE:

In order to ensure the correct installation of the Neolith StrongFix in a ventilated façade project, it is indispensable to design its layout, taking special attention to the real dimensions of the project, as well as the tiling proposal or slabs sizes designed, the dimension of the façade materials and all the special areas which can be sticking points.

TheSize has a complete Technical Department that gives technical support in all ventilated facade projects, working side by side with architects and engineers in the initial phases of design of each project. This makes possible to give a solution in advance to the potential problematic areas, acting ahead in order to offer technical solutions that allow a correct execution of the ventilated facade.

This previous technical study is really important to ensure façade quality control, allowing significant reduction of material wastes during the construction phases and reducing the installation period.

It should be noted that the grooving process of the Neolith StrongFix is made in a complete industrial way according to the technical specifications of the project described during the Design and Calculation phases of the ventilated façade project. It is therefore extremely important during this stage having a complete and truthful information according to the real conditions of the project, considering that these grooves will be made when TheSize Technical Department determines their exactly position according to the technical information provided.

For all the above mentioned reasons, TheSize recommends to the work team in charge of the installation to be coordinated with TheSize Technical Department in all the projects executed with the Neolith StrongFix System, offering in this way a technical solution having into account all the technical premises that there are in a ventilated facade project.



2. FACADE LEVELS CHECK:

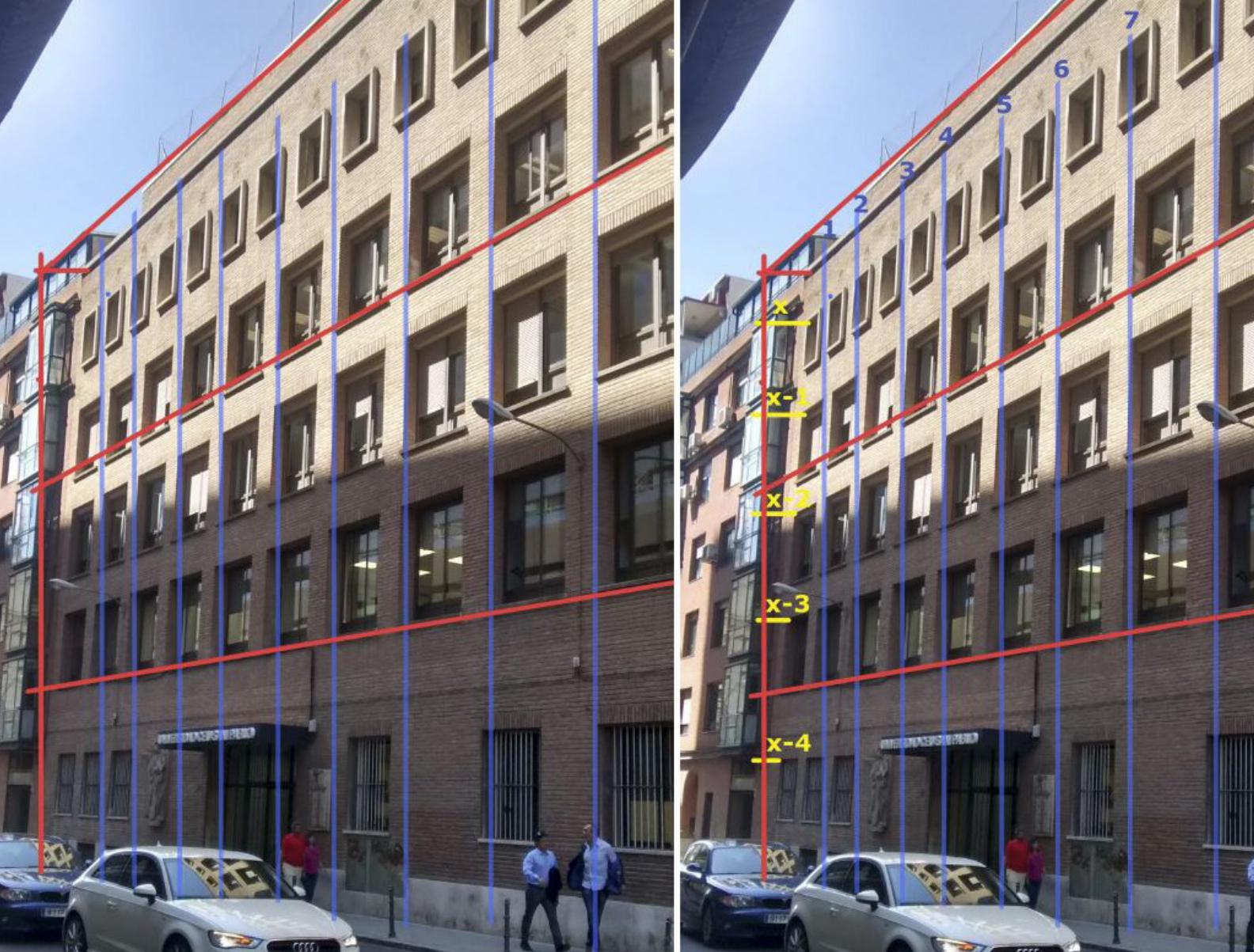
Once the previous steps have been designed and calculated before the beginning of the installation works, it is possible to start the second installation step, which consists on the checking process made on-site of all the vertical and horizontal levels of each facade.

This process will determine which are the points that have more irregularities as well as what is the real flat of the façade in order to be able of installing the ventilated façade correctly.

One of the advantages that the Neolith StrongFix system provides is that the vertical joints are completely independent of the position of the vertical profiles, so it will help the installation team during the process of setting-out, being also possible to install the tiles with discontinuous vertical joint.

Any variation from the real measurements and the design phase must be informed to the TheSize Technical Department and the real status of the building.





3. BRACKETS DISPOSITION:

After studying the project and have checked all the levels and singularities of the existing closing wall where the ventilated façade is being installed, it is time to determine the position of the support brackets, taking into account all the premises and conditioning factors obtained from the aforementioned study.

3.1. VERTICAL PROFILES POSITION:

To determine the position of the support brackets it is necessary to stipulate the exact position of the vertical profiles of the ventilated facade.

As it was said, one of the advantages of the Neolith StrongFix system is the freedom of the vertical profiles disposition. The determination of this position has to be completely coordinated with the technical information prepared by TheSize Technical Department, as this has been determined taking into account the technical specifications considered, which could change according to the nature of each project. As a general rule, the Neolith StrongFix system vertical profiles should not be separated more than 3feet and 11.24 inches.

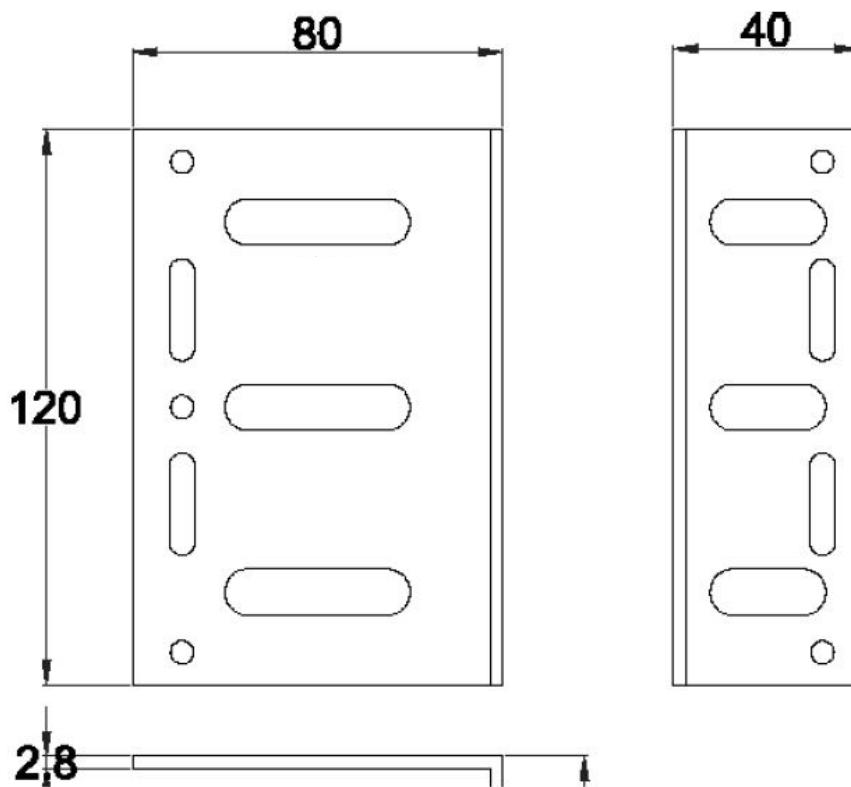
Having studied the real characteristics of the project and taking into consideration all the technical specifications made by TheSize Technical Department, the exact position of the vertical profiles will be established by marking them on the façade with a blue powder chalk or another way considered by the company in charge of its correct installation.

3.2. BRACKETS INSTALLATION:

The real characteristics, geometry and location of the support brackets of the ventilated façade project executed with the Neolith StrongFix System will be always related to the specific conditions of each project. This positions will be determined by TheSize Technical Department, completely independently and exclusively for each project in an individual way.

As a standard type of bracket for the ventilated façade system described herein, it will be considered an Aluminum - Magnesium - Silicon EN AW 6063 with T5 treatment bracket, which dimensions are 4.7" x 3.14" x 1.57" as described below.

In the same way, the standard vertical distance between the brackets to be considered will be 4 feet and 11.05 inches, therefore every 3 brackets at least two of them must be fastened to a structural element of the building, serving the intermediate bracket as an element to reduce the buckling of the vertical structure which will be anchored to the closing wall if it is possible.



In addition, the support brackets must be installed alternately in each vertical profile in order to avoid torsion exerted on the vertical profiles. These brackets have to be installed before any type of thermal insulation, ensuring in every moment that the bracket is anchored directly on the closing wall or in some type of structural element.

In addition, It should be noted that, in case of anchoring the mentioned support bracket of the ventilated façade system in some structural element made of steel, should be provided a spacer element between the aluminum support bracket and the structural steel element in order to prevent galvanic couple. As a standard element, can be considered the arrangement of a strip of self-adhesive elastomer material of at least 3feet and 11.24 inches of thickness.

3.3. SCREWS USED IN BRACKETS ANCHORING:

A very important point in any type of ventilated façade system is the use of the correct anchors necessary for the transmission of loads corresponding to the enclosure, taking always in consideration the real characteristics of each building, such as the type of closing wall, the position of the structural elements, type of structure employed or other complementary factors.

To the correct determination of the screws and anchors used, it is necessary understand the TheSize Technical Department specifications determined down to the last detail in every project, since these conditions can change between buildings according to their different technical conditions.

In general, depending on the wall or element where the support bracket must be fastened, it will be used some of the technical solution exposed below.

3.3.1. ANCHORING ON HOLLOW BRICK CLOSING WALL:

The brick wall must be drilled in its strongest part, being generally the encounter of mortar between bricks. For example, if it is determined the use of a Nylon plug with M7X80 bolts and A2 washer, the layer between bricks should be drilled with a 10mm where afterwards will be inserted the Nylon plug and then the bolt with the corresponding washer.

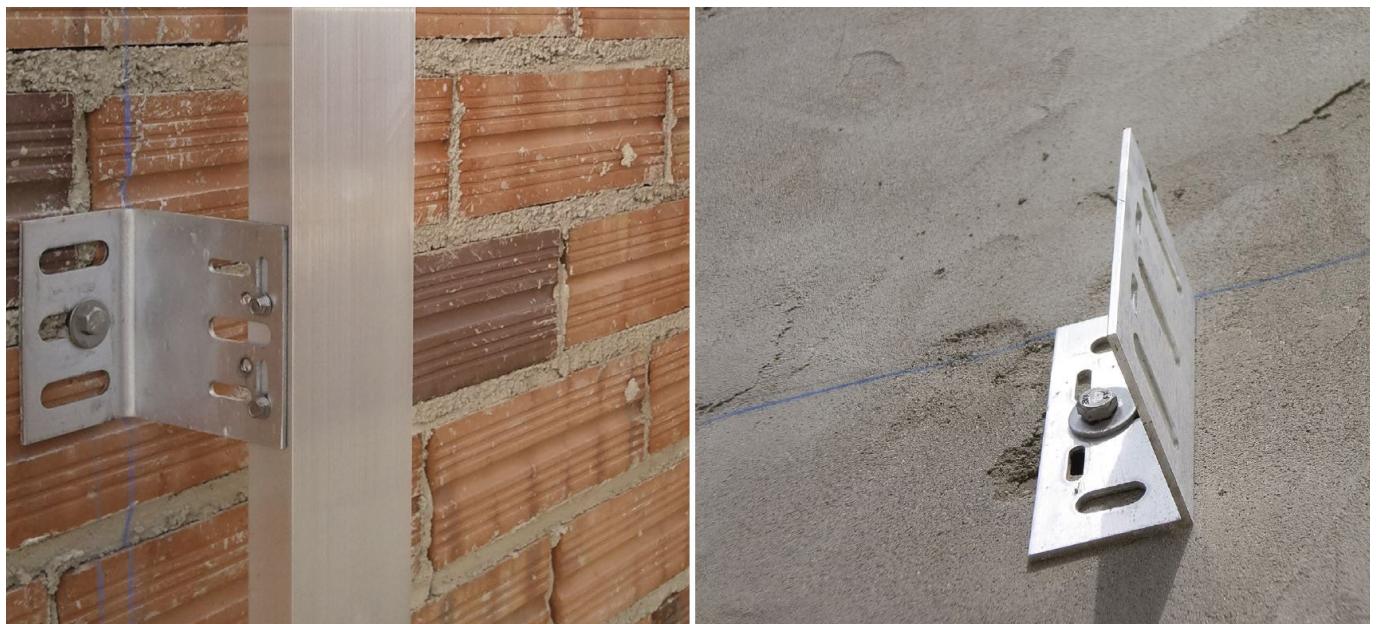


Nylon Plug



M7x80mm Anchor + Washer

The quantity as well as the type of the screws and anchors used by bracket will be determined by TheSize Technical Department in each project.



3.3.2. ANCHORING ON STRUCTURAL ELEMENTS MADE OF REINFORCED CONCRETE:

In any ventilated façade project it is necessary to transmit the loads directly to the supporting structure. That is why it is always necessary to determine at least one type of anchoring directly to the structural elements, considering in that case those made of reinforced concrete.

In these cases, an expansion anchor, generally M8X75 or M8x115 will be used depending on the nature of each project.



M8x75 Expansion Anchor

3.3.3. ANCHORING ON ELEMENTS MADE OF STRUCTURAL STEEL:

In the case of a structural system made of steel, the system should be also fastened in order to transmit the loads directly to the structure. For this purpose, can be used nails shot by a powder gun or self-drilling screws specially designed for drilling steel beams as well as metal elements.



3.3.4. ANCHORING ON ELEMENTS MADE OF STRUCTURAL WOOD:

With wood structural elements, the Neolith StrongFix system should be fastened in order to transmit the loads directly to the structure using special wood screws + washer designed for drilling wood beams as well as wood elements.



4. APPLICATION AND USABILITY:

Assumptions fitness of the facade system Neolith StrongFix depending on the purpose for which designed the façade system and only consider the components described in this report are considered.

Any alteration not notified to the Technical Department TheSize of it will upset the guarantee issued by the company, as is a change in the characteristics and recommendations offered in the product. The defining main aspects of technical suitability are described in the following points.

5. DESIGN:

As it was described in the point 1, the ventilated façade system described should be considered and tested against the conditions of use. It is necessary to take into consideration the mechanics of the system and the various component parts according to the specific nature of each project. Therefore must be studied in each case the nature and conditions of each building, in order to stipulate and define the characteristics of the various components that define the ventilated facade system Neolith StrongFix.

At the same time, it is accurate estimate of load (own weight, wind loads, seismic ...) that can be exerted on the facade, based on the combination of these to stipulate and define those most damaging assumptions in each case, with order to estimate the design and facade system characteristics necessary.

It is necessary to consider the possible differential movements that can be exerted on the building and how they affect the ventilated facade system without damage to the system or its components assembled. It is therefore necessary to stipulate the location of the work to be performed, in order to estimate the seismic loads that may arise. It should also determine the type of environment where the façade system will be installed, as this defines the required treatment to metallic materials that make up the system.

All necessary study before the design and installation of the façade aforementioned calculation can be carried out by the Technical Department TheSize own. TheSize recommends a complete technical assistance for the design and installation of ventilated façade system, based on the nature and specifics of each project.

6. HORIZONTAL PROFILES PREASSEMBLY:

One of the main features that differentiate the façade system Neolith StrongFix of any system is its installation speed. This is possible due to receiving the facade Thin Tiles with horizontal grooving and profiles (hook and lock) preassembled.

This arrangement enables after receipt of the parts that form the facade of the building and the installation of metal profiles, only subtract the final placement of the pieces on said profiles, being a very fast process that allows the cladding of large surfaces in shorter periods of time.

It should be considered than for the end with perfect result close communication between the Technical Department and the end customer must therefore based on the technical documentation provided by this project, TheSize perform a grooving part, which having been prepared by specialized technicians, will consider all those conditions and unique points that can affect the proper performance of the facade for each particular project.

Following the development and confirmation of grooving Technical Department TheSize, shall be conducting longitudinal cuts in the backfill of the pieces of facade (grooved) on which will be installed StrongFix system hook and lock profiles. This process is industrially produced under the strictest safety parameters and accuracy, since the mere 1mm deviation can cause the complete nullity of an anchoring part facade.

Said pre-assembly of the hanger and industrially closure profiles in turn enables the application of chemical bonding under predetermined conditions of humidity and temperature, so as to enable the chemical fixation employed, MS-WAN, acquires the maximum capacities and potential technical. This aspect ensures that the strength of the chemical fixation used in the Neolith StrongFix system optimal, it not being conditioned and / or subject to weather conditions at the time of installation of ventilated façades of each project.

In the event that TheSize not be the company responsible for the installation of the facade Neolith StrongFix TheSize offers its customers the opportunity to stay in touch with his local Technical Service responsible for conducting the grooved part of each project, to facilitate and resolve any clarification or doubts that may arise during the installation process, mentoring at all times the installation of the ventilated facade with the sole aim of ensuring perfect execution during assembly of the façade system

7. INSTALLATION CONSIDERATIONS:

The suitability of employment and use of façade system can be assumed only if the installation work is carried out by fully qualified staff, serving the technical details provided on this report and the detailed Technical Department TheSize specifications. Similarly should not ignore the following:

- The façade system Neolith StrongFix should be used as detailed in this report and TheSize being supplied by not being able to make changes to it or used alternative components which modify their technical characteristics and therefore their behavior.
- The installation itself should be carried out by highly qualified staff, always respecting the specifications and drawings provided by the Engineering Department of TheSize depending on the features and characteristics of each building.
- Special attention to apertures, copings and flashings should be paid. Vertical and horizontal profiles will also be altered in the expansion joints under the building.
- It is recommended that in areas likely to receive façade impacts; such as sockets, blocks additionally reinforced backfill to increase their remarkable mechanical strength are used. TheSize provides additional reinforcement for its facade systems.

The technical documentation provided in this report includes full measurements and technical characteristics of different materials used for proper installation and placement of the system owner. Oversight and technical assistance from the Technical Department TheSize during the phases of design and installation of facade is recommended. The building on the facade kit must meet the building standards of the relevant building built to the applicable legislation will be installed.

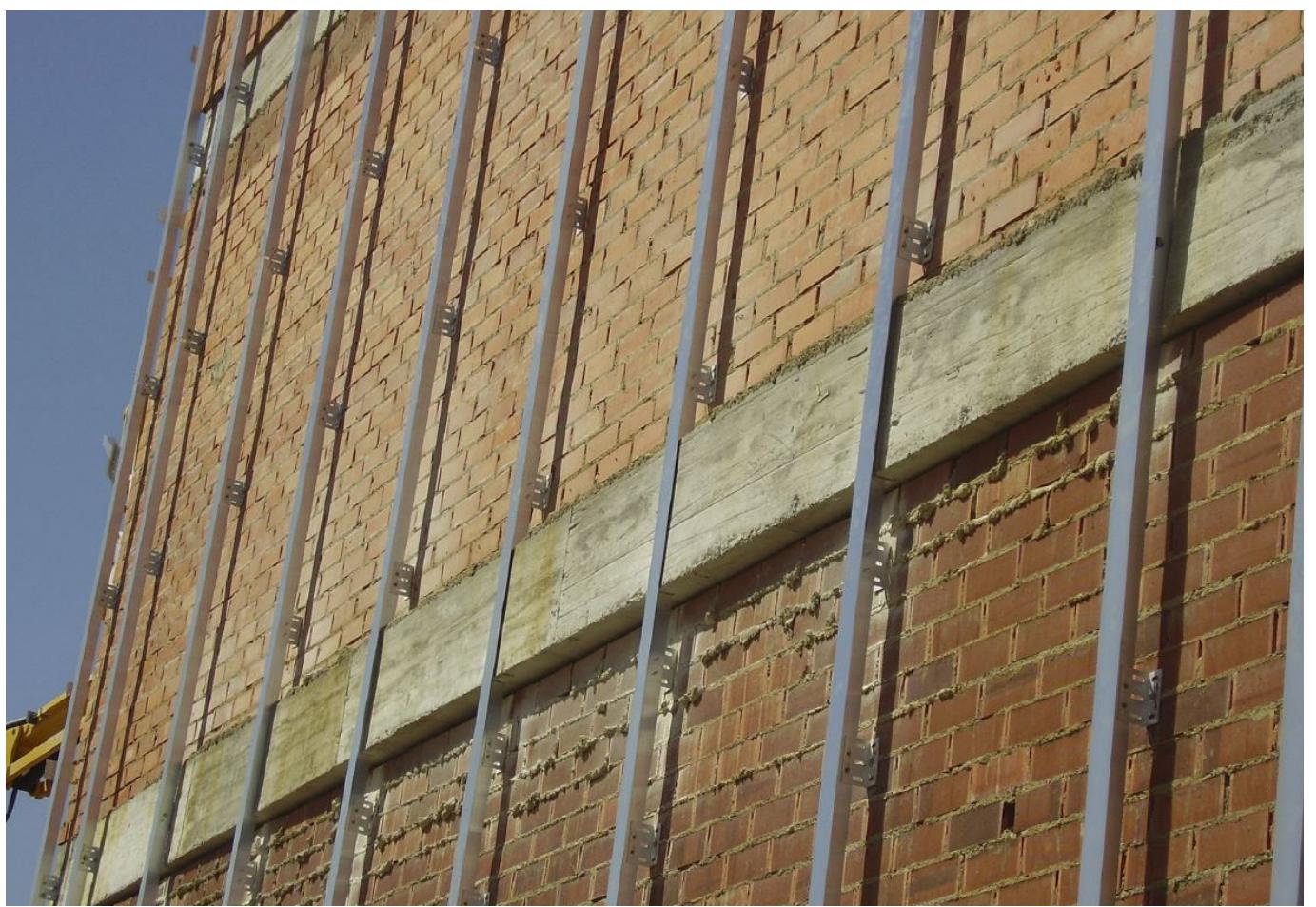
Such compliance must be monitored and ensured by the responsible entity of the building.

8. VERTICAL PROFILES INSTALLATION:

One of the advantages of the Neolith StrongFix system is that it allows us to install the vertical profiles no matter their exact position. Due to the system conforms an aluminum mesh with vertical and horizontal profiles, the installer and facade engineer have the freedom to place them according with the building needs.

We have to take in mind every project needs special attention and an individual study of their charges by the Technical Department of TheSize. This study will inform the installation company where to place the vertical profiles considering the best position for each project. TheSize could consider an standard horizontal distance between vertical profiles of 120cm for the Neolith StrongFix system, although as it is said, it is necessary a particular study to determinate this exact distance.

To fix the vertical profiles to the brackets we will use 5,5x19k self screws, using 2 screws per bracket.

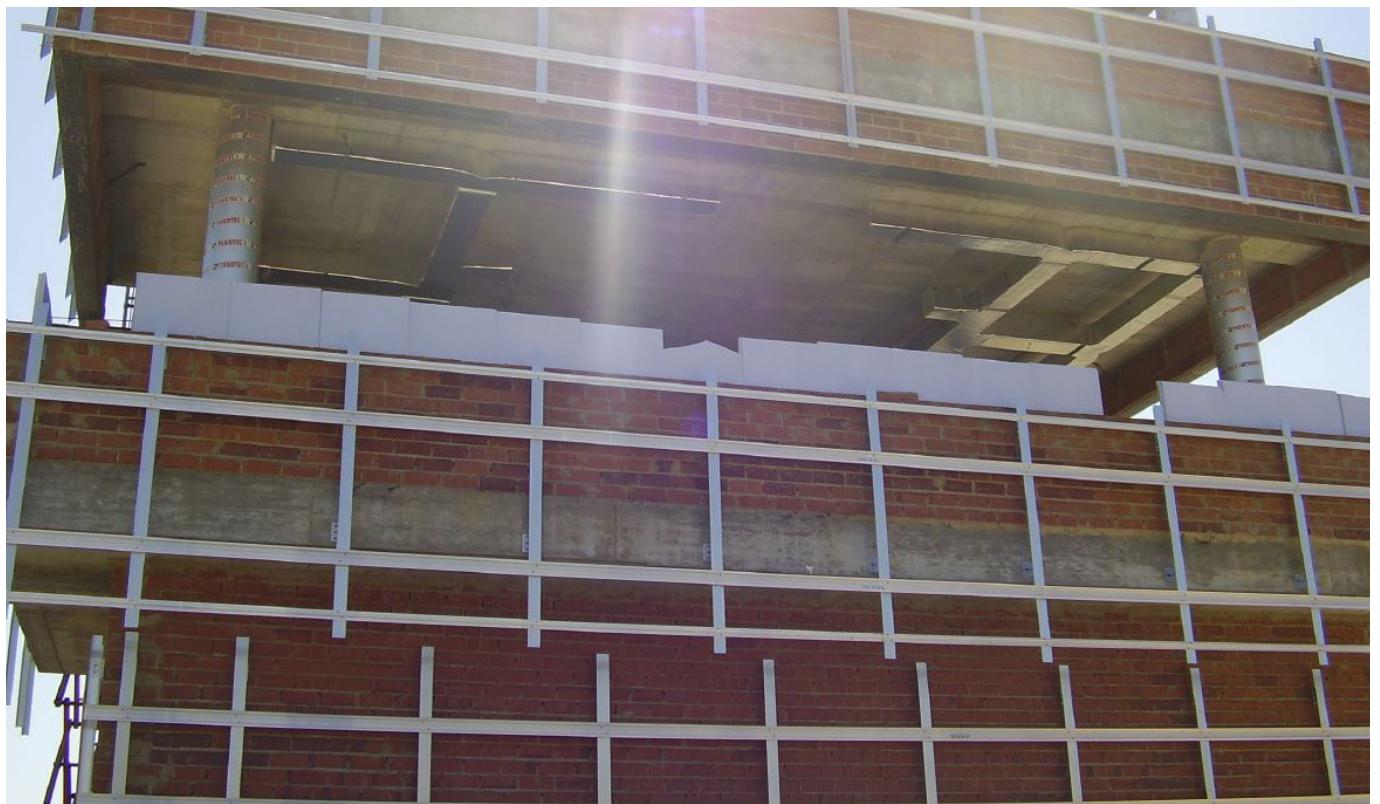


9. HORIZONTAL PROFILES INSTALLATION:

Once the vertical profiles of the façade system have been installed, it is time to install the horizontal profiles. In this process is necessary to study carefully the technical documentation sent by TheSize, which describes the exact position of the horizontal profiles according with the grooves made in the cladding material to conform the Neolith StrongFix System.

To fix the horizontal profiles to the vertical ones we will use the same screws used to fix the vertical profiles to the brackets, the 5,5x19k k self screws. Using that same screws will reduce the possibility to make mistakes during the installation as well as increase the installation speed.

We will install 2 self screws in the different intersection's between the vertical nd the horizontal substructures of the Neolith StrongFix system.



The characteristics, geometry and location of the vertical profiles of the ventilated façade executed with the Neolith StrongFix system will be always conditioned by the specific conditions of each project, being always determined by TheSize Technical Department completely independently and exclusively for each project in an individual way.

The standard vertical profiles used with the Neolith StrongFix system are a T profiles. In the same way, the standard vertical distance between the brackets to be considered will be 4 feet and 11.05 inches, therefore every 3 brackets at least two of them must be fastened to a structural element of the building, serving the intermediate bracket as an element to reduce the buckling of the vertical structure which will be anchored to the closing wall if it is possible.

When the brackets have been fastened is time to start installing the vertical structure. As a general rule, the installation of the vertical profiles will begin in the top of the façade until the bottom part and the length of the vertical profiles will not be more than 19ft 8.22in.



10. DILATATION FOAM INSTALLATION:

The next step will be the Dilatation Foam application. This foam, installed as it is described in the different pictures, eliminates the different dilatation between the hanged tiles and the horizontal profiles. It also eliminates the risk of noises between these two profiles, so it is important its installation, which will be made each 59" approximately.

11. NEOLITH CLADDING:

Once all the substructural has been installed, the last process will be hanging the cladding material in its position according with the Documentation sent by the Technical Department of TheSize. As the tiles will be received in the construction already grooved and with the hang and hock profiles inserted, it is extremely easy to hang the cladding tiles in their exact positions.



RECOMMENDATIONS

A. PACKAGING, TRANSPORTATION AND STORAGE RECOMMENDATIONS:

Each system component Neolith StrongFix is packaged separately attending to the needs of the self and the nature of the material.

The transport and storage of the various components must be in accordance shipping specifications offered by TheSize, given the nature of different materials and conditions established delivery.

The façade system Neolith StrongFix involves receiving parts coating system performed with horizontally grooved and "hook" and "lock" profiles, industrially placed on the material. This enables fast installation of cladding material on site.

However it should be considered the fragile nature of the coating materials during transport, particularly those materials having thinner dimensions. Should be therefore be especially careful in shipping and handling.

B. MAINTENANCE, REPAIR AND REPLACEMENT RECOMMENDATIONS:

Alt is worth mentioning practice it unnecessary maintenance today ventilated façade system, given the open nature of their boards and characteristics of the materials used. However TheSize offers a series of recommendations to prolong the life of the facade system:

- Periodic inspections are recommended in order to ensure the absence of possible corrosion, moisture or water accumulation resulting from incorrect installation executed on site.
- The use of products from paint or cleaning should ensure compatibility with the materials of the façade system, without them look damaged or attacked due to incompatibilities between materials.
- In the case of specified repairs damaged areas due to accidents, they should be carried out with the same components of the façade system described, taking all the time to the specifications provided by the Engineering Department of TheSize, whichever carried them away.

As the installer knows, the Neolith StrongFix ventilated facade system allows replacement of facade parts quickly and without the use of specialized human teams. This requires raising the damaged part and its increased immediately, so that the sum of both displacements in height exceeds the height of the horizontal profile tile holding damaged. Thereby coating said piece is free for replacement.



P.I. Camí Fondo, Supoi 8, C/ Íbers 31
12550 - Almassora (Spain)
+34 964 652 233
info@thesize.es
www.neolith.com