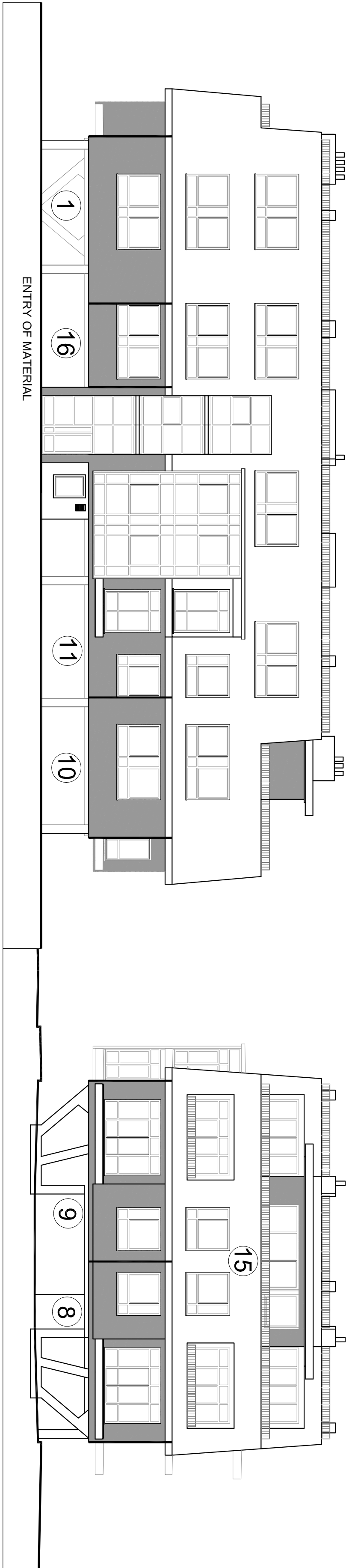
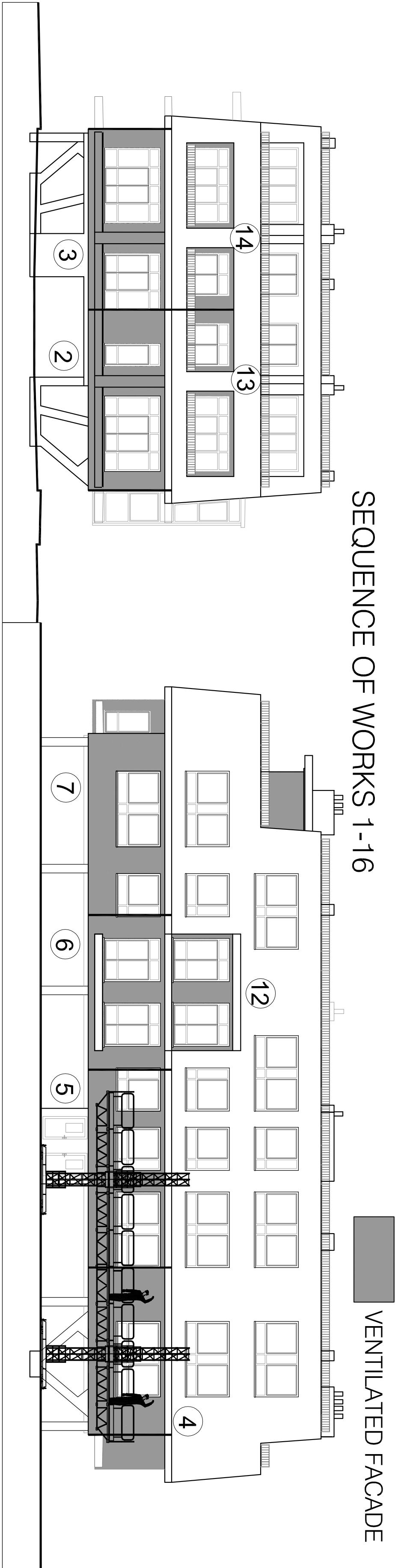
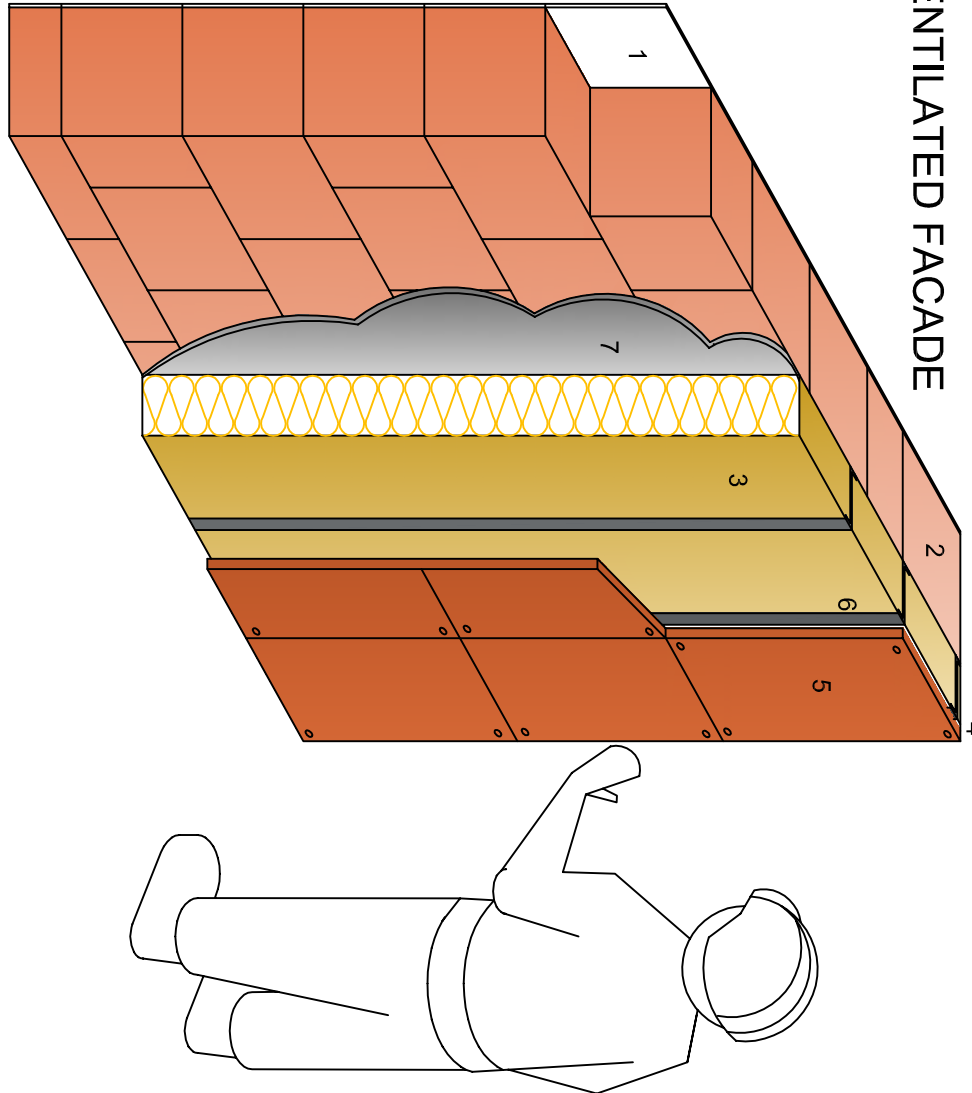


# TECHNOLOGICAL CARD-FACADE

## SEQUENCE OF WORKS 1-16



### 3D OF VENTILATED FACADE



### 4.MACHINES, MATERIALS AND TOOLS

NAME	UNIT	QUANTITY
MACHINES		
drill screw	u	1
radial saw	u	1
MATERIALS		
Lightweight blocks 300x19x19	u	4940
Panel of polystyrene	m2	304.98
Panel adhesive	l	29.05
Cement mortar M 2,5	m3	13.94
Waterproofing cement mortar	m3	2.9
Plaster paste	m3	4.35
Ceramic tiling	m2	280.46
Plastic coating	m2	280.46
TOOLS		
level	u	1
trowel	u	1
carbox	u	1
paint roller	u	1

### 5.HUMAN SAFETY

This work is classified as hazardous because the job is in high, the best solution is to work with a scaffold equipped with skirting board and double-rail as a collective protection. As a individual protection, workers should use harness, work clothes, gloves, protective boots and helmet; the worker has to know how lifting weight is the correct way. If the job is cutting some material, worker must to use protective glasses. The electrical devices must be in perfect conditions and grounded.

### 7.ORGANIZATION OF WORKS

id	NAME OF ACTIVITY	DURATION	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8
1	ventilated facade	6 dias								
2	steakout	1 dia								
3	inner leaf	1 dia								
4	waterproof mortar	1 dia								
5	insulation	1 dia								
6	keys and unions	1 dia								
7	outer leaf	1 dia								
8	interior finishes	1 dia								

### 6.TECHNICAL ECONOMICS INDICATORS

Quantity of works: 81,276.51 € = 280403.98 LTL  
Duration of works: 30,76 days = 91 days  
Wage of official of construction: 90,76 x 8 h = 726,15 h → x 21,2 € = 15394,38 € or 53110,61 LTL  
Wage of peon of construction: 90,76 x 8 h = 726,15 h → x 21,2 € = 15394,38 € or 53110,61 LTL

### 1. THE VENTILATED FACADE

The ventilated facade is a design element consisting of two sheets, one outdoor and one indoor, which contain between them an air vented insulating the seal and protect from direct sunlight.

The inner sheet  
The inner sheet is part of the building may be secured to the carrier or enclosure. This should ensure thermal insulation, will mean the closure of the interior space and form the outer blade holder.

The outer leaf

The outer leaf should be understood as an overall envelope of the building, lying on it as an absolutely independent. Its function is to protect the building from the weather. The outer sheet may be formed of any material that resists weathering. The materials that may be employed are diverse face brick, bricks with continuous coating, cladding stone, metal panels, panels of high density, etc.

Both layers should be as independent as possible, although logically it should be anchored by the foreign keys to the interior, or elements of the structure to be stable.

An important objective of the commissioning work will ensure the free movement of the outer sheet. Their high exposure to weathering (wind, rain, sun, etc.) is a factor that must be taken into account, requiring high differential freedom of movement of each piece and set against the media.

The outer sheet can have varying thicknesses depending on the material used to resolve, with the only limitation established its own stability and union of parts. The most common case is that of a half-foot wall of brick or stucco exterior or without a stone veneer. In any case, the restraint system should be suitable to anchor the material chosen.

The air

The chamber evacuates water which may penetrate through the outer sheet, so that in no case can reach the inner sheet. This ensures the seal and the inner sheet is always dry. This requires that the wires forming the clamps binding and are the only contact between the two sheets, having a central fold act of eaves or a small inclination to the plane of the facade. In addition, heat that accumulates the convection chamber is evacuated, so that the inner element is perfectly protected from direct solar inputs.

### 2. THE CONSTRUCTION PROCESS

In the case of ventilated facade, the exposure is built from the inside out, allowing the work to be performed simultaneously inside ( masonry, flooring, partition walls, plaster ...) and the outer face thereof.

1. Inner leaf

First is the inside of the front sheet (lightweight masonry blocks. In order to ensure a seal and allowing a suitable thermal and acoustic insulation. It is desirable plastering the wall surface of lightweight masonry facing the camera, at least outwardly. At the same time are placed keys or locking stopband the outer sheet. The keys to fixing the exterior sheet in any case should be in sight.

If necessary, insulation materials are added in the areas that may appear thermal bridges.

Lifting the inner leaf is useful to place simultaneously precross the holes. This ensures the correct setting out of the facade and the seal is provided here.

2. Outer leaf

Finally the outer sheet is executed ( mortar avoiding falling within the camera if it is a leaf of brick) , leaving the holes needed to ensure ventilation thereof.

Keep in mind the high exposure of the outer sheet, which may suffer changes in temperature of 50 ° C and 80 ° C, depending on the weather conditions. This requires that the construction of the outer sheet must be made in a way that allows the necessary to ensure free deformation. Each building and each situation will require a precise study of the joints, although it is recommended that the distance between them never exceeds 15 meters. The thickness of these joints will be between 10 and 20 mm.

The maximum height of the outer sheet will be limited by its own stability.  
The sheet should be supported in some way at the edges of the front of each one, two or three planks. Each section of the support he can put you in contact with the bottom sheet. It is therefore advisable to first run the outer sheet of the top floor of the building and go down to the lowest floor. There is the possibility of constructing the outer leaf continuous throughout the height of the building, using keys that slide along guides integral with the structure, being necessary in this case reinforce the facade in bed joint reinforcement.

2.1. Keys and other unions

The stability of the outer sheet is achieved by using keys that anchor to the inner leaf bearing or structural elements. The fastening system will only allow movement of the outer sheet in its own plane, avoiding the approach or separation of the inner sheet.

The arrangement and mechanical strength of the attachment elements depend on various factors: the design of the key itself, the material used, the way of anchoring, the way of fastening, the way of supporting the outer sheet, the way of supporting the inner sheet, the technical indications necessary for proper placing. The position of the keys and the amount will depend directly on their function, they must be correctly specified in the project.

The distance between keys should not exceed 40 cm vertically and 90 horizontally, being suitable alternate available. The recommended amount of 35 to 50 cameras mm2/m2 to less than 10 cm.

They can also distinguish two types of buildings: those that are distributed throughout the inner sheet fixing and exclusively in the heads of the floor. In the latter case the calculation should ensure the strength of the outer pane to the horizontal.  
When the outer sheet extends to the top of several plants, the weight of higher plants compensates for the horizontal tensile stresses that can result in lower plants. Only the top floor, the security of this coverage is a bit low and should increase the number of keys.  
The impossibility of subsequent maintenance of protection of these anchors and exposure to moisture are essential to make stainless steel.

2.2. The support of the outer pane in a building height.

The greatest difficulty in the design of a ventilated facade exterior sheet heavy, raises the same support when building height is considerable limits as thin foil. For buildings over three stories is common the use of support in each slab, or every two or three floors.

To minimize the thermal bridge that is supported by the outer ply in the slab, you can use any of the following systems:

With metallic support, anchoring the edge of the floor supports for the outer pane. These supports are specially designed to support the bricks, stone veneers and the various boards that can be employed. The most common is the use of a boxed wing

angle with the edge of the slab and the other plying to receive the load of the outer pane. The angle should be stainless steel, the outside of the leaf, but stay about 2 cm to allow the rubber seal of the board.

Between the profile and the material forming the outer skin of the facade have an insulating material to prevent thermal bridge at the edge of the slab. It is also very advisable to have a slab waders leading to the outside at the height of each support, protecting the screws and the profile ( in brick walls, evacuation is usually done through the holes of the wounds, freeing one in three bricks in the row of support).

In the case of buildings with a small fight that allows the full support of the outer pane.  
Use special ceramic, thick and high mechanical resistance, placed cantilevered over the edge of the slab and anchored thereby by stainless steel fasteners.

### 3.QUALITY CONTROL

We must to check before built that the materials correspond to those specified in the control plan or, case, the specification the project.

They have the documentation required.  
They are measured by instruments required.

They have been tested, where established in the program Control.

During the execution we will check:

-State of the support, the collapse or deviation from flatness should be able to be offset by the set of joints in brackets.

-Sketch out position of the brackets and insulation according to the project specification.

-Check distance between brackets, flatness, alignment ( tolerance ± 1 mm / m) and horizontal joint ( > 2 mm per m) .

-Check that the insulation covers the entire outer face of the support and the resilient structure of the building and check its thickness.

-Check that the width of the horizontal and vertical joints between tile or plates, meet the tolerance established in the project.

-Check that the building expansion joints coincide with a vertical board cladding system by a double bracket.

-Check the execution in accordance with construction details of the project or system ( leaks, waste water, etc.)

Upon completion of the ventilated facade they will be visited thereof, in order to verify that specifications are met dimensional established in the project.

NAME AND SURNAME	SIGNATURE	DATE	VILNIUS GEDIMINAS TECHNICAL UNIVERSITY	
STUDENT	Ignacio Maria Vaguer Alfonso			
SUPERVISOR	Jones Saparauskas			
CONSULTANT			Page	Pages
HEAD OF DEPARTMENT			TECNO. CARD - FACADE	
REVIEWER			Department of Technology and Management	