JONIEC

# ASSEMBLY INSTRUCTIONS

KOM/1/2022/EN

FOR CONCRETE ELEMENTS / SPANS

## KOMBO®

(Sea, Tide)

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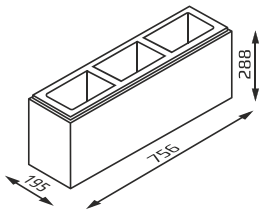
# The instruction manual describes assembly of KOMBO® concrete elements with ROMA Horizon/Perfect/ Mega/Diamond/Classic fencing system

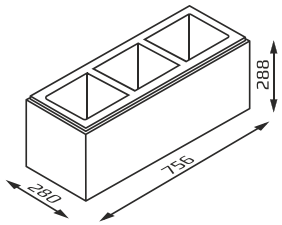
## A. INTRODUCTION

Fencing shall be constructed according to the best construction practices and the provisions of the Building Act. The information contained in this guide shall be understood as general guidelines and recommendations. In the case of designed fences, the recommendations and guidelines of the designer must be taken into account as a matter of priority. The investor and the contractor, who should be suitably qualified and authorised, are responsible for all work. JONIEC® company shall take responsibility only for its products placed on the market, which are manufactured in accordance with the current standard. JONIEC® is not responsible for the execution of the fence.

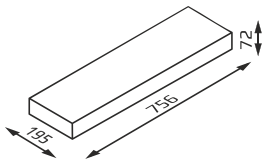
## B. SYSTEM ELEMENTS



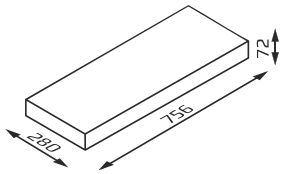

**RM19**
post block/wall block




**RM28**
post block/wall block




**CRM19**
post cap/ wall cap

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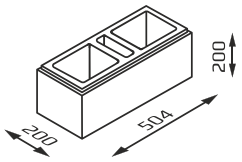
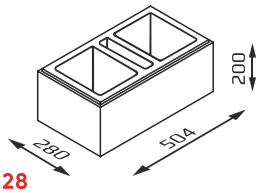
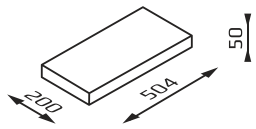
post cap/ wall cap



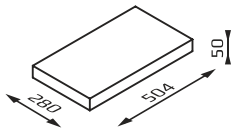

**BH20, RP20, RD20**
post block/wall block



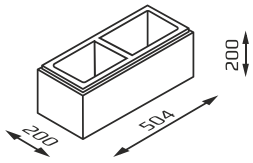

**BH28**
post block/wall block



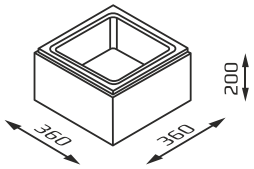

**CH20, CRP20, CRD20, CRSM**
post cap/ wall cap




**CH28**
post cap/ wall cap




**BRSM**
post block/wall block

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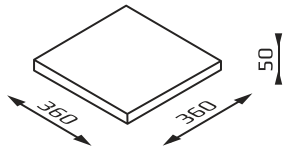
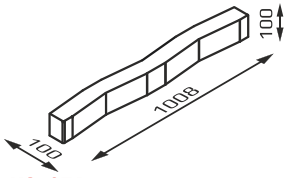
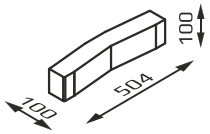


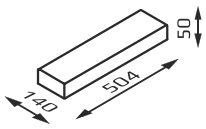

**CRDM**
post cap/ wall cap




**KO_SEA**
concrete element




**KO_TIDE**
concrete element




**DKO**
cap

## C. APPLICATION OF PRODUCTION

VIBRO TECHNOLOGY
thickening of the product structure

CALIBRATION TECHNOLOGY
levelling height differences between blocks

PERFECT HEIGHT
perfect product height

MULTI COLOR®
the product with a melange of colours

COLOURED IN THE MASS
fully dyed product

CERTIFIED PRODUCT
Certificated quality

# D. VERSIONS OF THE FENCE

Using elements of the ROMA Horizon/Perfect/Mega/Diamond/Classic fencing systems and KOMBO® concrete elements, you can create a fence in several ways:

**Version 1** (fig.1)
Posts made of blocks and caps ROMA (20 cm) or (28 cm) fixed on a foundation made along the entire length of the fence. KOMBO® elements placed between them directly on the footing (vertically or horizontally), finished with KOMBO® or ROMA caps.

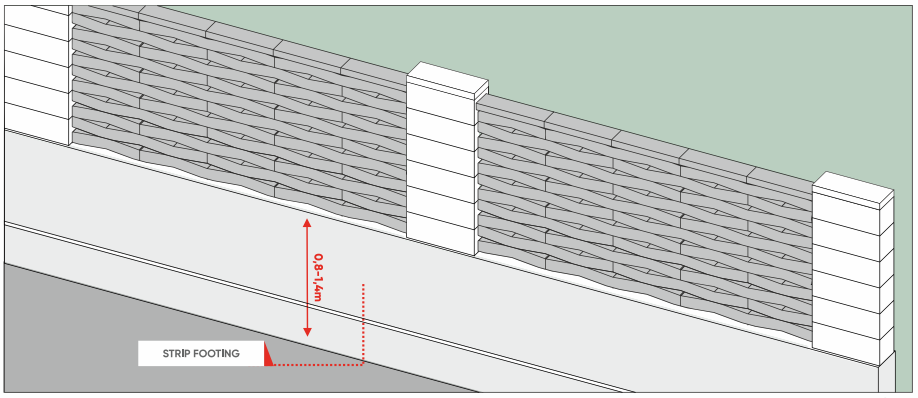


fig.1

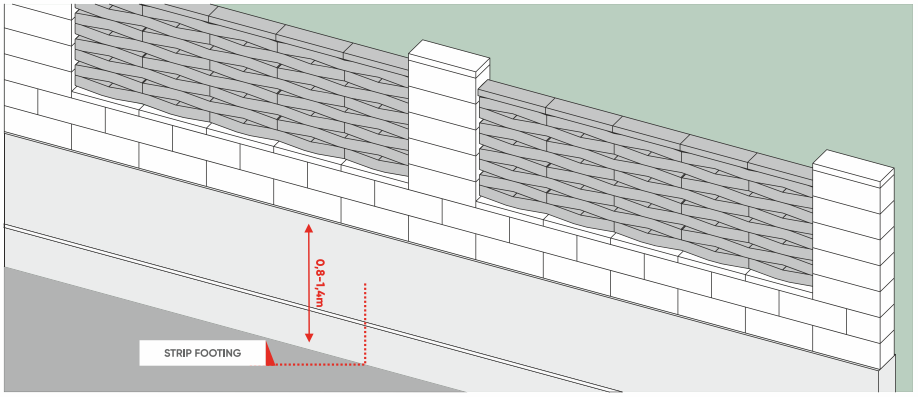


fig.2

**Version 2** (fig.2), (fig.3)
Posts and foundation built of ROMA (20cm) or (28 cm) blocks and caps founded on a footing made along the entire length of the fence. KOMBO® elements laid on the fence base caps (vertically or horizontally laid), finished with KOMBO® or ROMA caps. The fence base can be made classically (brick) as stretcher bond – Fig. 2 or as a modern type "stack bond" – Fig. 3

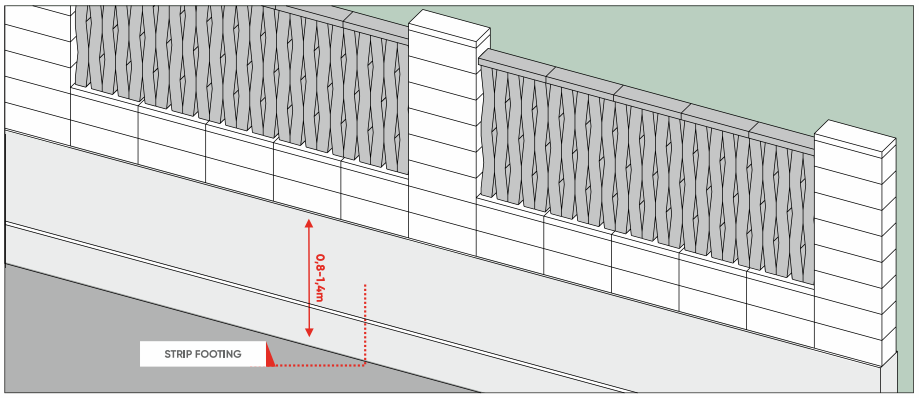


fig.3

**Version 3** (fig.4), (fig.5)
Posts and fence base are made of ROMA blocks and caps placed on a strip footing made along the entire length of the fence. Posts made of widened ROMA blocks and caps (28 cm) placed on a strip footing.
Wall base between the posts is made of standard ROMA blocks and caps (20 cm) placed on a modern style strip footing - „Stack bond" - fig. k, or (brick) as stretcher bond - Fig.5. KOMBO® elements placed vertically or horizontally on the wall base caps, with an option of finishing with KOMBO® or ROMA caps.

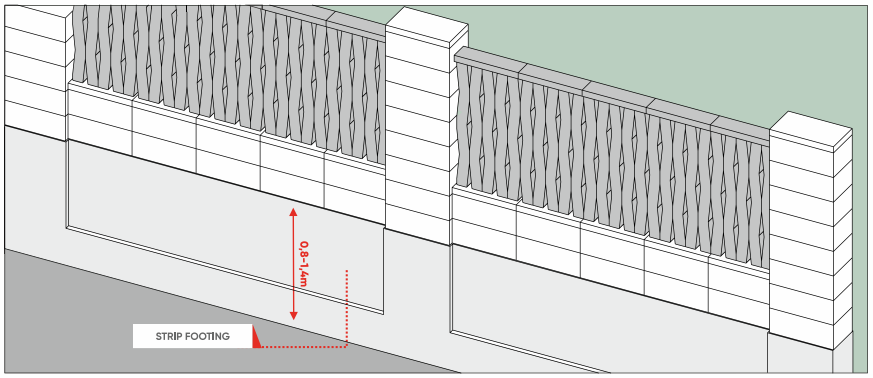


fig.4

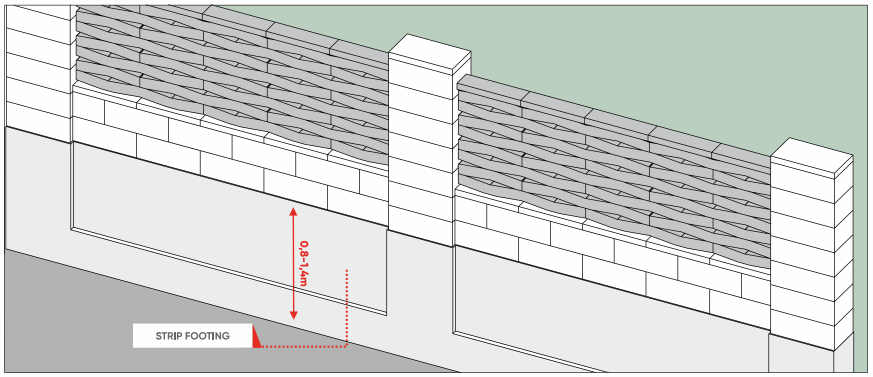


fig.5

**Version 4** (fig.6)
Strip footing for the entire length of the fence. Posts and wall base in appropriate combination (as in previous versions).
KOMBO® elements arranged vertically or horizontally on the caps of the wall base vertically and horizontally, with a layer of caps or blocks with caps in between. KOMBO® elements can be finished with KOMBO® or ROMA caps.

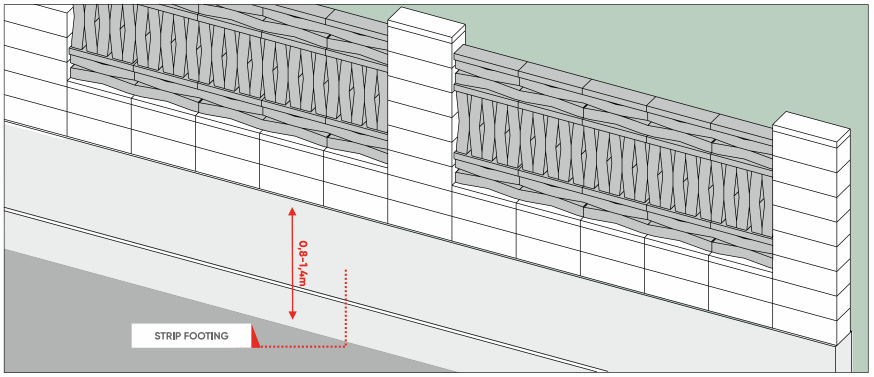


fig.6

**Version 5** (fig.7)
Strip footing along the entire length of the fence. Posts and wall base in appropriate combination (as in previous versions). KOMBO® elements placed vertically or horizontally on the caps of the wall base finished with a layer of blocks topped with Roma caps.

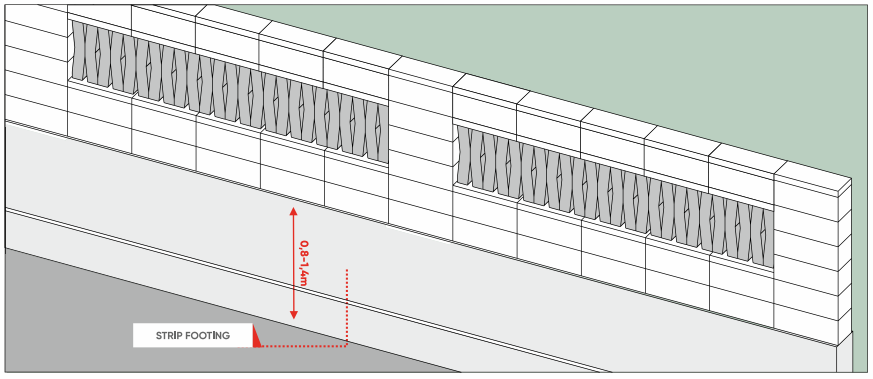
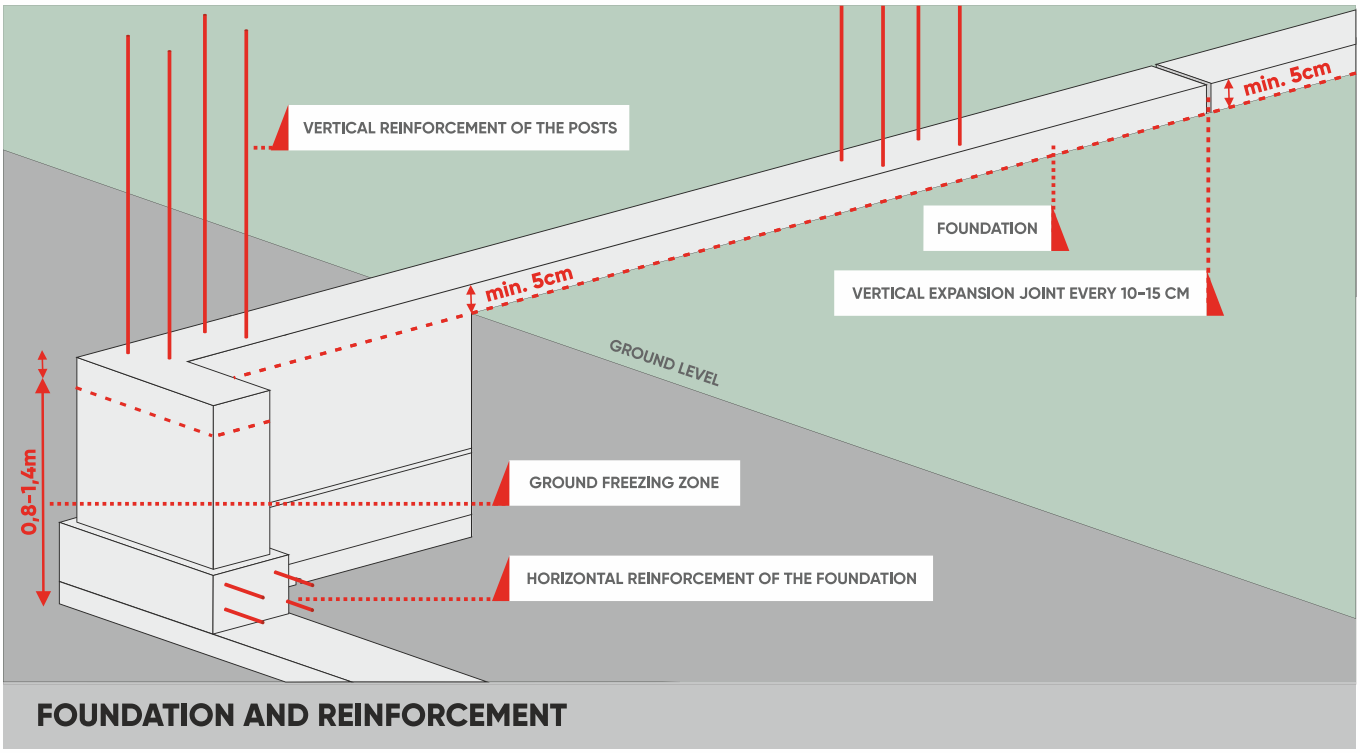


fig.7

# E. FOUNDATION STRUCTURE



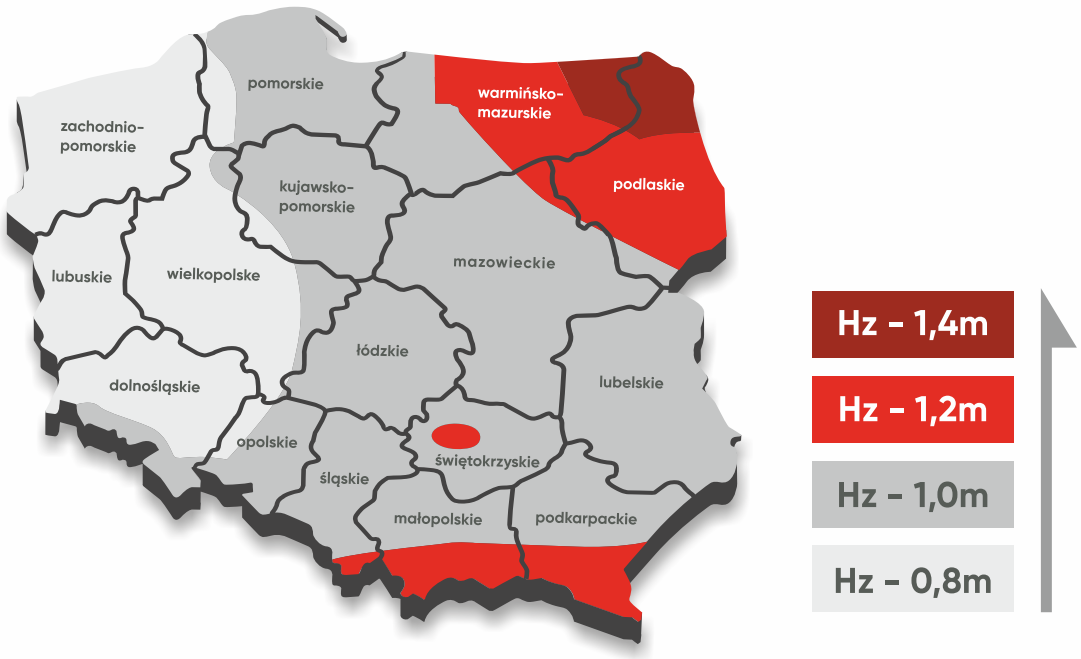

**FOUNDATION AND REINFORCEMENT**

fig.8

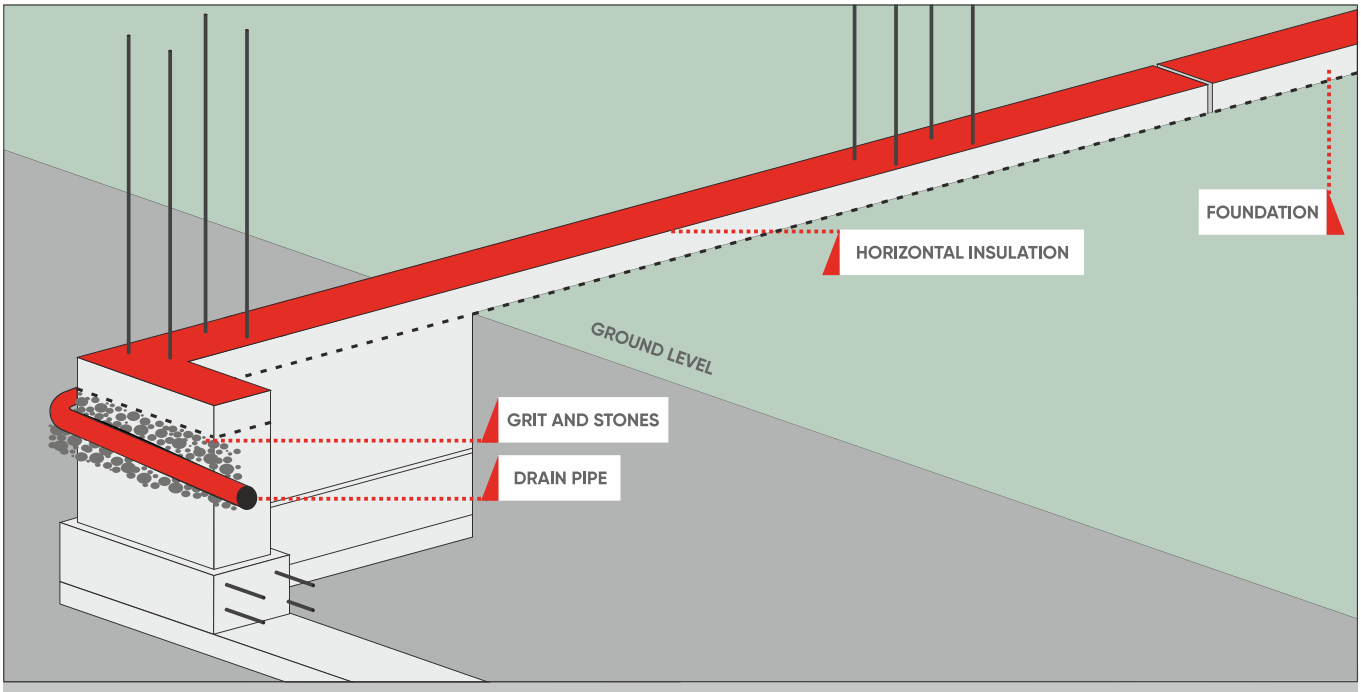
**Recommendations:**

1. Strip footings should be made at a depth below the ground freezing zone:

## GROUND FREEZING ZONE



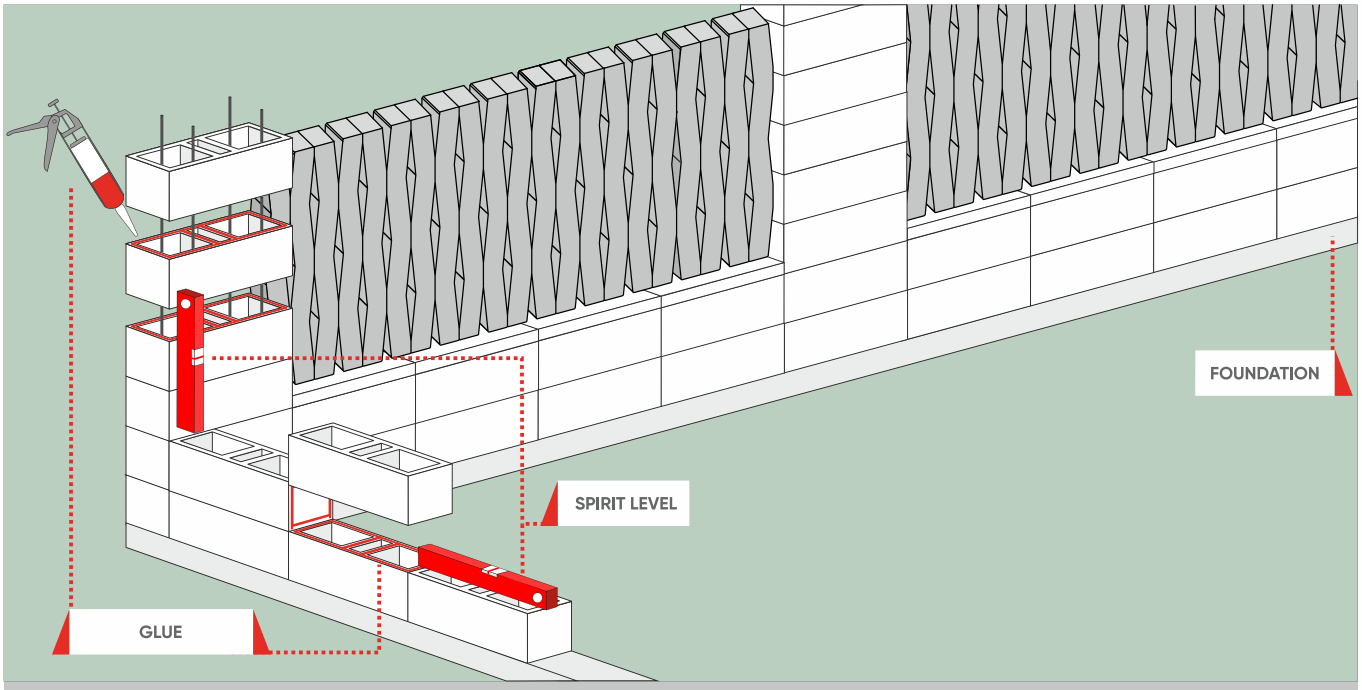
2. Make a vertical expansion joint in the strip footing every 10-15 metres on average.
3. Place horizontal reinforcement in the strip footing.
4. Place vertical reinforcement at the planned posts.
5. Pour the strip footing at least 5 cm above ground level.
6. Apply horizontal insulation on the foundation (e.g. Using IZOHAN film), which will protect the fence against capillary rise of water from the ground.
7. Carry out drainage along the entire fence.




**HYDRO INSULATION**

fig.9

# F. LAYERING OF BLOCKS




LAYERING AND BONDING OF BLOCKS

fig.10

**Recommendations:**

1. The fence should only be build when the air temperature is between **+5°C and +25°C**.
2. Place the fence blocks on a properly constructed foundation. Place the first layer of blocks on JONIEC® sealing glue or cement mortar of class no lower than M12.
3. Level the first layer to correct any unevenness in the foundation.
4. Place the blocks so that they fit tightly together and there is no vertical or horizontal deviation. Eliminate any level deviations by sanding or wedging.
5. Lay successive layers of blocks with the use of JONIEC® glue. Apply the glue on the adjacent side walls of the blocks and on the entire upper edge of the block.
6. If the vertical reinforcement of posts, foundations and walls was not made at the stage of pouring the strip footing or foundation footing - drill holes in the strip footing in appropriate places and install the reinforcement on a chemical anchor.
7. If you are building a fence in direct sunlight - before pouring the concrete mix into the blocks, moisten the chambers of the blocks with water.
8. If you build a fence using blocks in MULTI-COLOR® melange - pay attention to different arrangement of colours in each block. Mix the blocks according to the 3 pallet rule and arrange them to create the prettiest possible melange. The best effect can be achieved by mixing the blocks so that no one colour is saturated in a particular area.

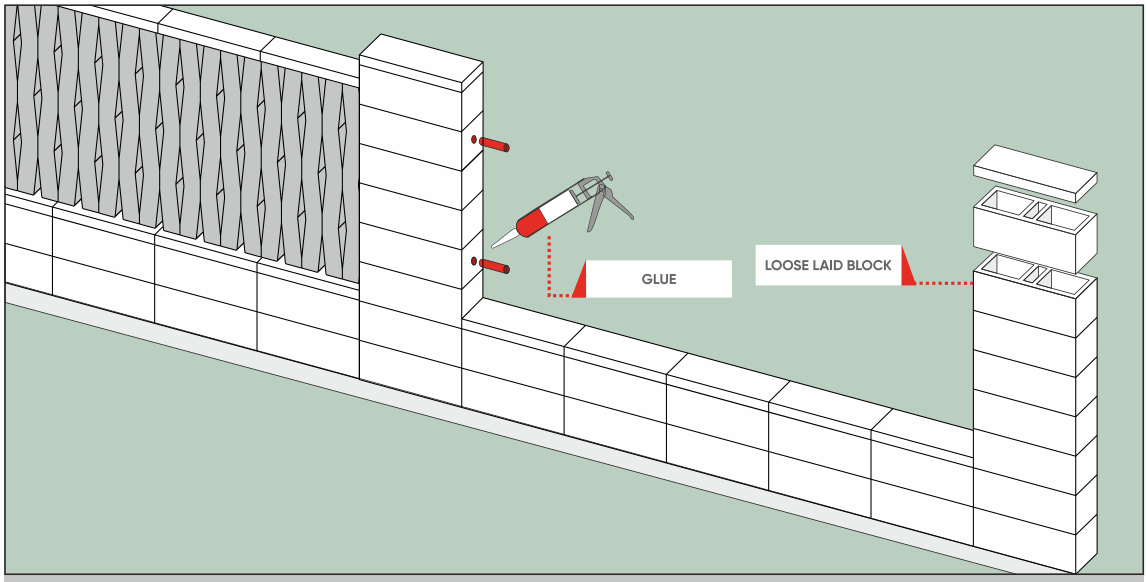
# G. INSTALLING THE KOMBO® ELEMENTS

1. The KOMBO® elements are to be installed with the use of JONIEC® sealing glue.
2. Glue every contact surface of the elements, including their place of contact with the wall base and the blocks of posts.
3. KOMBO® elements are additionally connected with anchoring elements in the places of their contact with posts:
   a) Drill holes in the post blocks where the KOMBO® elements meet the blocks. The holes must have a minimum diameter of 2 mm larger than the anchoring elements.
   b) Apply JONIEC® sealing glue into the holes.
   c) Drill a hole symmetrically in the KOMBO® elements as in the posts
   d) Place the KOMBO® element onto JONIEC® glue.
   e) On one side of the post, make a minimum of 2 connections to anchor the KOMBO® elements to the post.
   f) In addition, anchoring connections should be used where KOMBO® elements meet the foundation and cap connections.
4. Install the other KOMBO® elements using sealing glue, correcting their linear and vertical alignment.
5. KOMBO® elements should be topped with KOMBO® or ROMA caps, using JONIEC® sealing glue.

**Order of assembly of a fence made of ROMA system blocks or KOMBO® elements:**

## I. KOMBO® elements arranged vertically:

1. Build the strip footing with horizontal insulation according to the above mentioned installation instructions.
2. Make the wall base of the ROMA blocks on the entire fence using JONIEC® sealing glue.
3. Fix the first post with ROMA blocks, using JONIEC® sealing glue.
4. Loose lay the second post (without gluing) in order to be able to control the linear and vertical alignment of the KOMBO® elements.
5. Fix the first KOMBO® element with JONIEC® glue, connect this element to the post with anchoring elements fixed with JONIEC® glue.
6. Fix all the other KOMBO® elements of this this fence span using JONIEC® glue.
7. Before installing the last element of KOMBO®, dismantle the second loose laid post.
8. Drill a hole in the last KOMBO® element for inserting the anchoring element with the post and install it the same way as in case of other elements.
9. Fix the second post with ROMA blocks by gluing the blocks together using JONIEC sealing glue and anchoring them in the designated places with the KOMBO® element.
10. Proceed as described above, assembling the next fence span with KOMBO® elements and constructing the next posts and fence span with ROMA blocks and KOMBO® elements.
11. Fix the KOMBO® or ROMA caps and glue them using JONIEC® sealing glue.




1.

fig.11

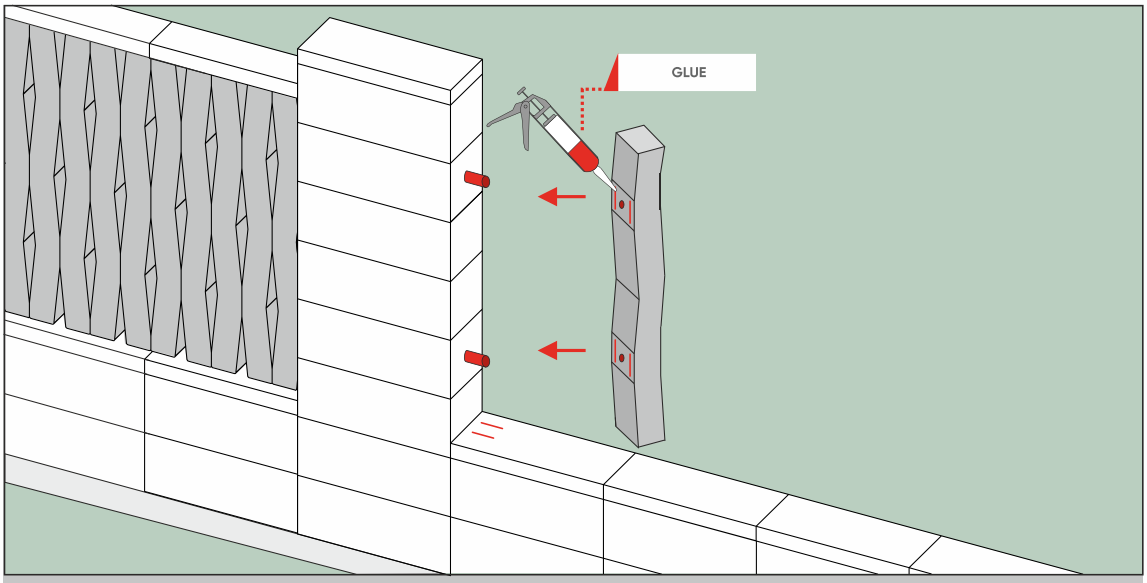



fig.12

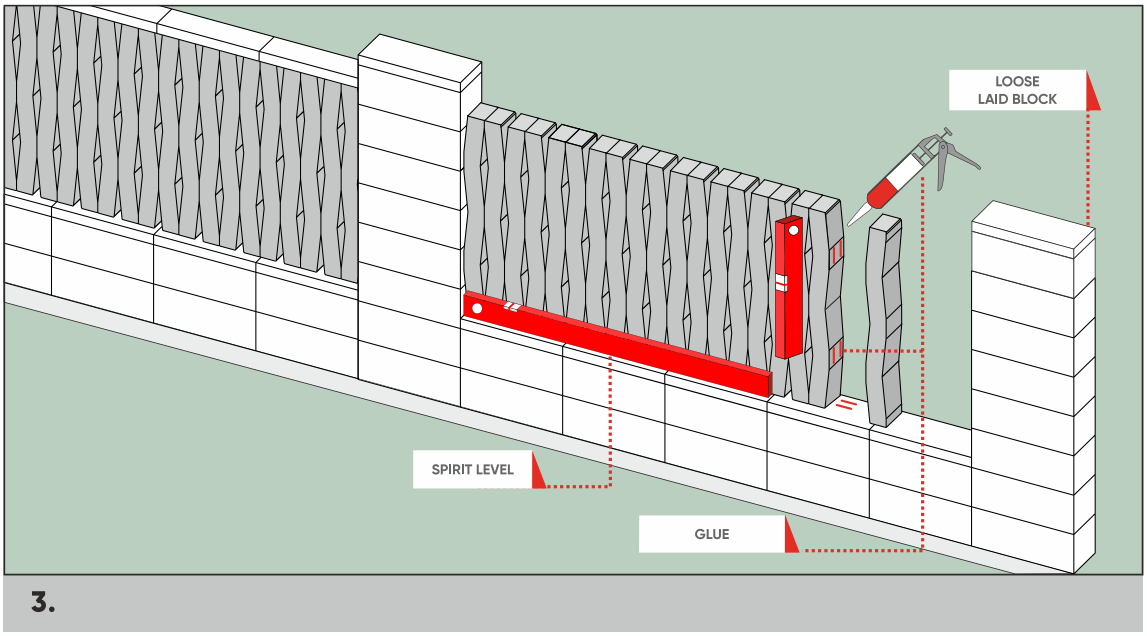



fig.13

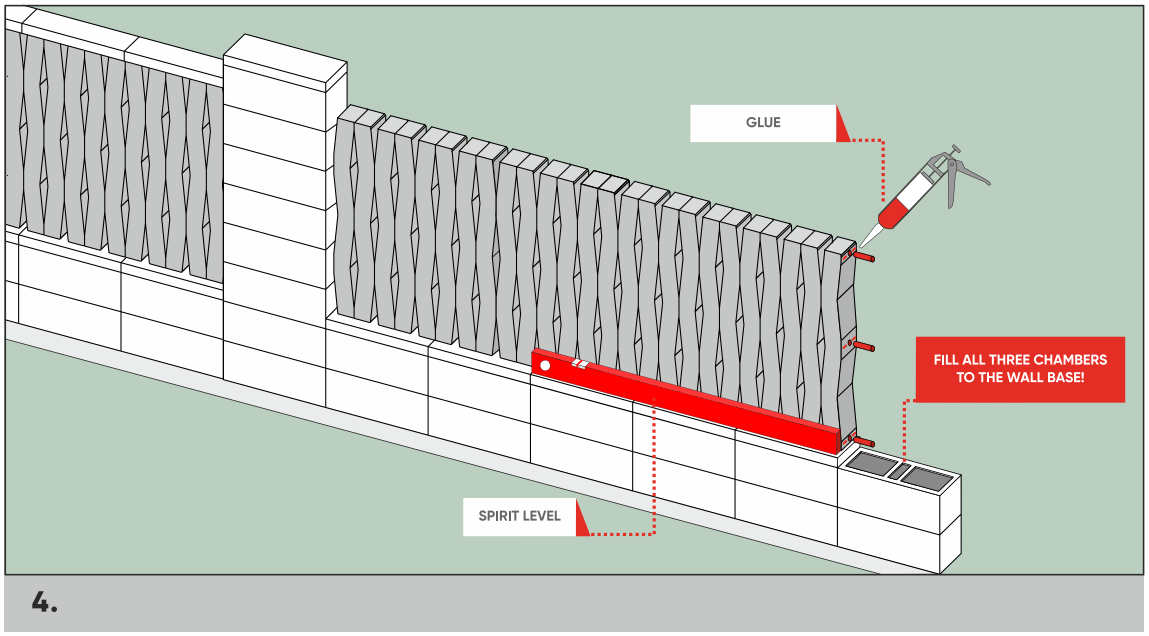
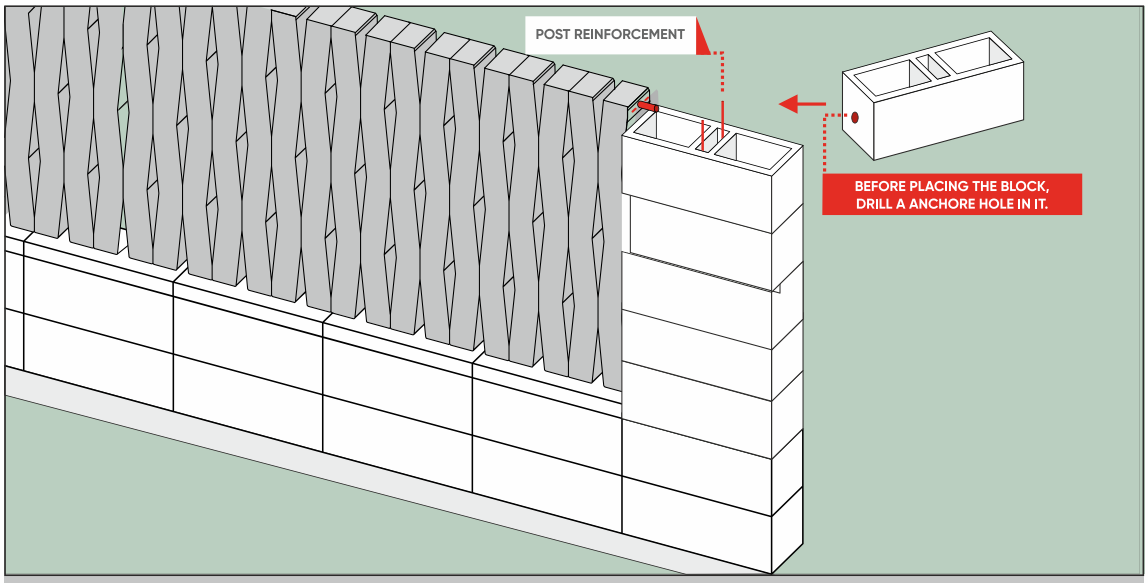
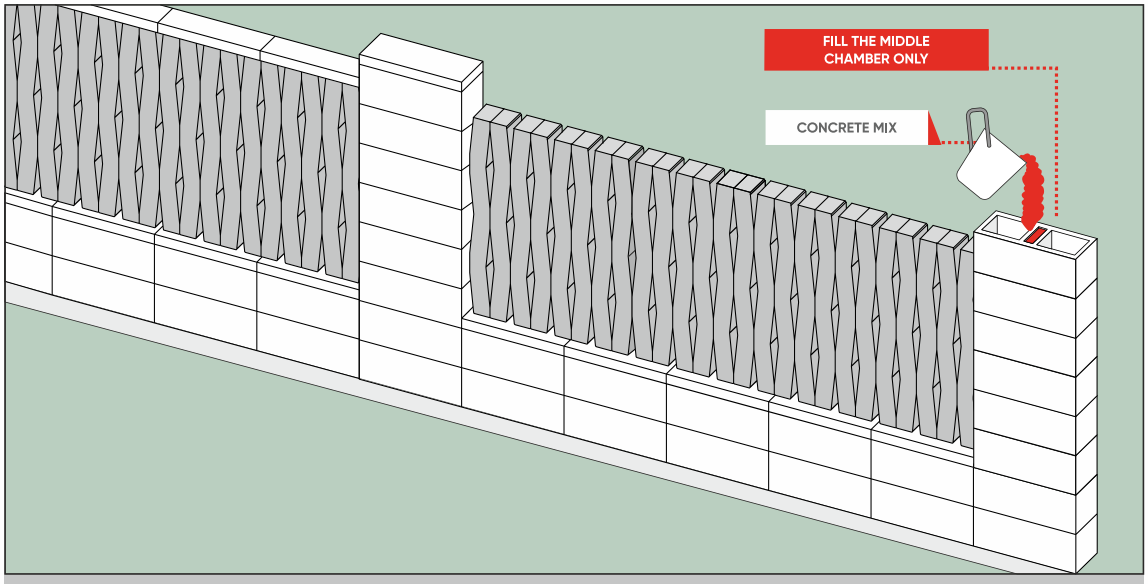



fig.14




**5.**

fig.15




**6.**

fig.16

## II. KOMBO® elements laid vertically:

1. Build the strip footing with horizontal insulation according to the above mentioned installation instructions.
2. Make the wall base of the ROMA blocks on the entire fence using JONIEC® sealing glue.
3. Construct the first post with ROMA blocks, glue the blocks using JONIEC® sealing glue.
4. Install the first horizontal layer of KOMBO® elements by gluing them with JONIEC® sealing glue.
5. Connect the KOMBO® element with the post block by means of anchoring elements fixed with JONIEC® sealing glue.
6. Check the correct linear alignment of KOMBO® elements along the wall base.
7. Install all the KOMBO® elements using JONIEC® glue and check their correct positioning (vertical and linear).
8. Gradually, with the installation of subsequent KOMBO® layers, build the second post with ROMA blocks.
9. Check continuously the linear and vertical alignment of the KOMBO® elements.
10. Lay all KOMBO® elements using JONIEC® sealing glue, anchoring them to the post blocks in the designated places.
11. Proceed as described above, assembling the next posts and fence spans with ROMA blocks and KOMBO® elements.
12. Fix the KOMBO® or ROMA caps and glue them using JONIEC® sealing glue.

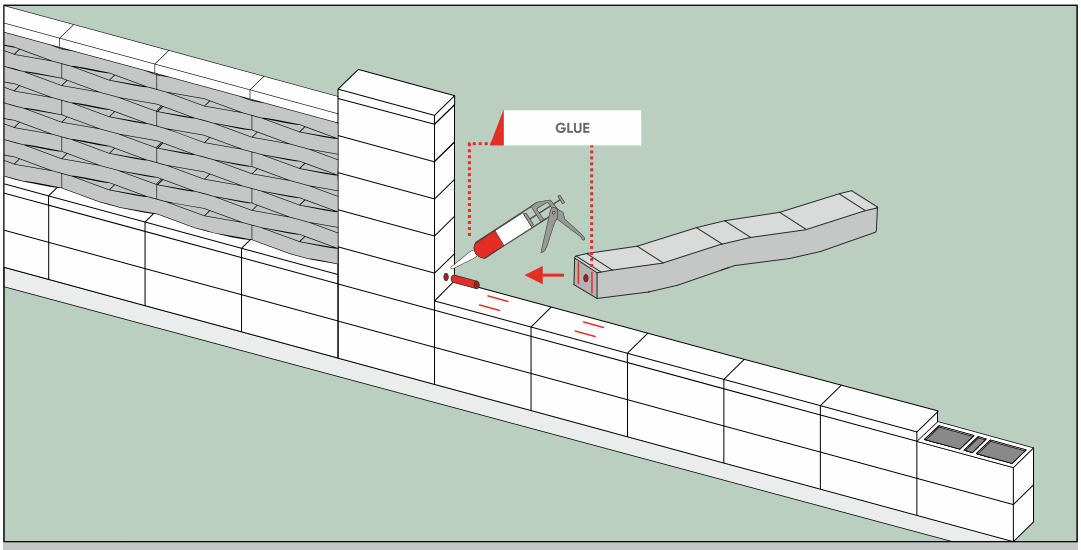



fig.17

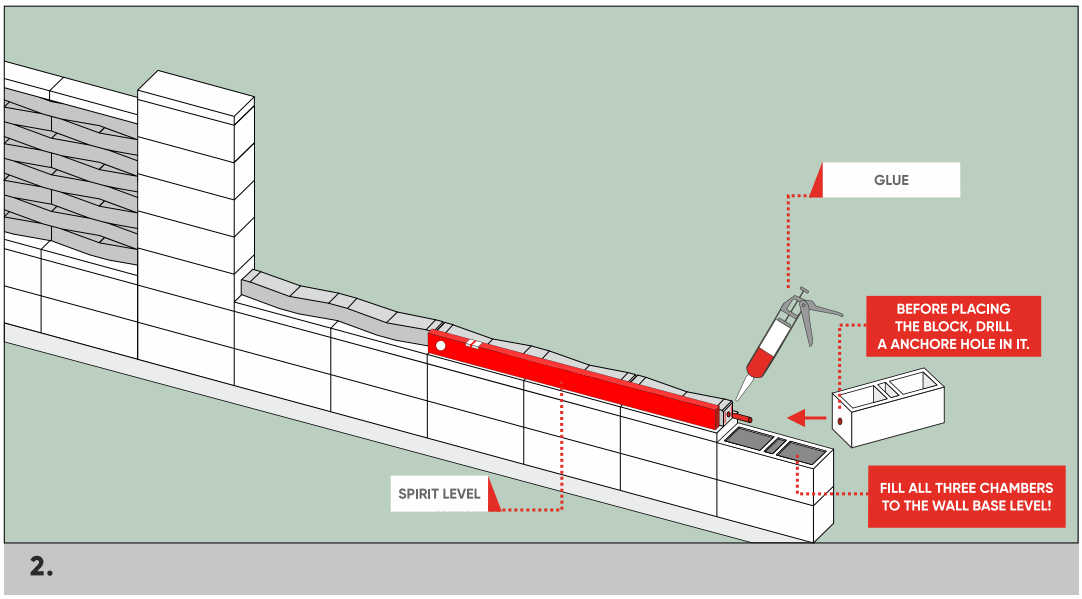



fig.18

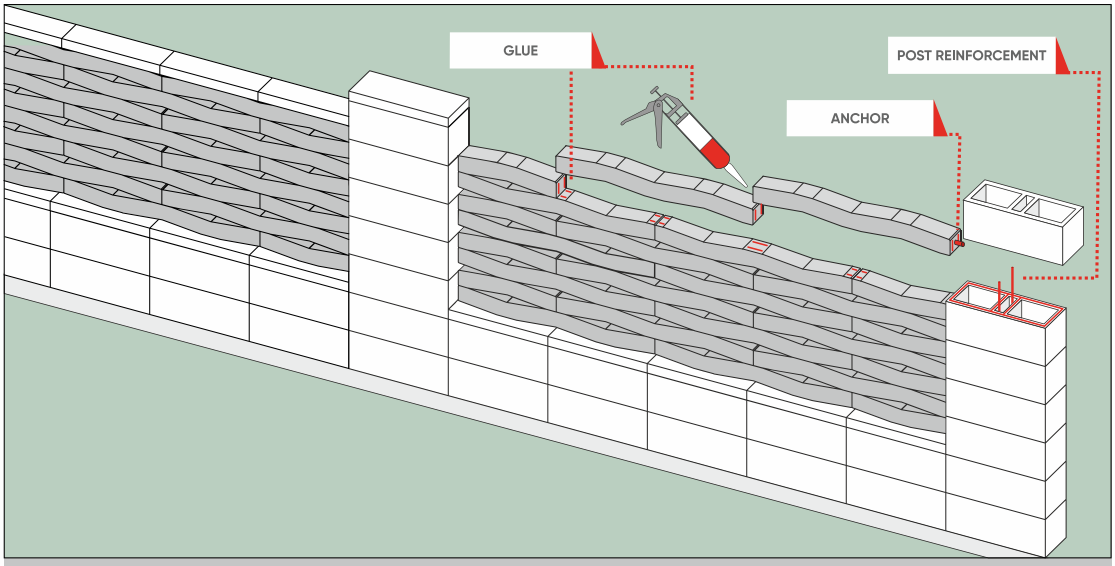



fig.19

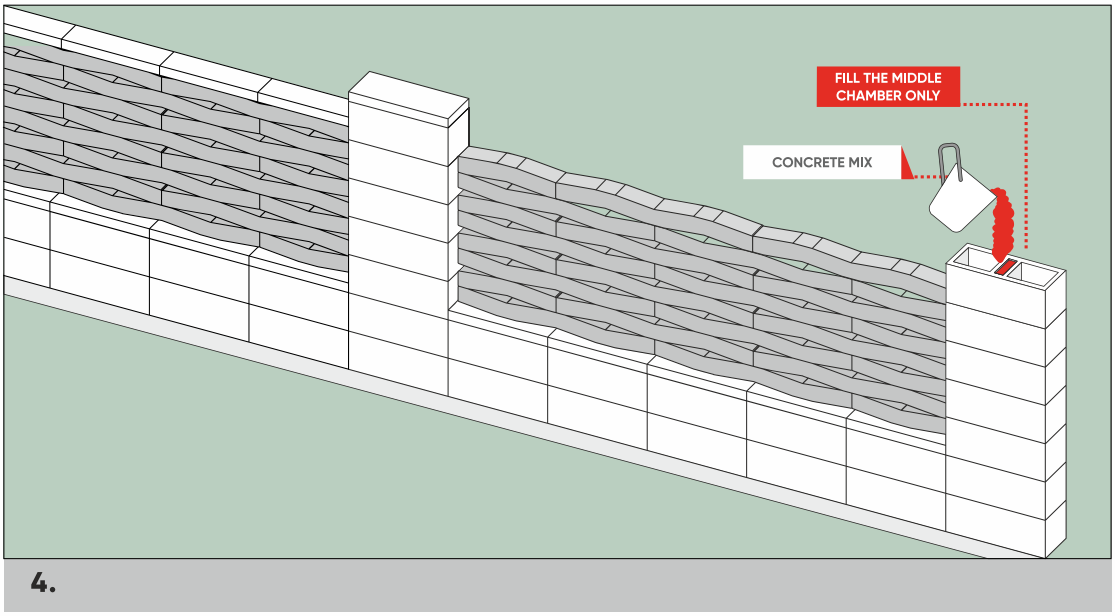



fig.20

## III. KOMBO® elements arranged in a vertical and horizontal combination:

In this case, depending on the project, we use a combination of I and II construction methods.

# H. PREPARATION OF CONCRETE MIX

Concrete mix for filling the blocks should have plastic consistency (S3-S4 acc. To PN-EN 206) so that it can be easily formed and placed in the chambers of the blocks.

Below you will find recommendations on how to proceed in 2 different variants of preparing the concrete mix for filling the blocks:

1. Concrete mix prepared on construction site.
2. Concrete mix brought from a concrete mixing plant.

## 1/ CONCRETE MIX PREPARED ON CONSTRUCTION SITE

### STAGE I

1. Prepare quality ingredients: washed sand + washed aggregates + cement + first measure of water. Cement in bags should have a reliable cement (Polish "Pewny Cement") certificate.
2. Mix everything in a concrete mixer according to the proportions below*.

| | cement I/II 42,5 | water** | sand 0/2 | grit 2/8 | LBN | total |
|---|---|---|---|---|---|---|
| kg | 25,0 (a bag) | 11,5 | 50,8 | 61,2 | 0,25 | 149,0 |
| liters | 20,8 | 11,5 | 30,8 | 38,2 | 0,24 | 102,0 |

* increasing the amount of concrete mix prepared, keep the correct proportions of all ingredients.

** the amount of water added depends on the moisture content of the aggregates to be added (sand, grit) and should be continuously monitored during the concrete mix formation. The resulting concrete mix should be of plastic consistency.

### STAGE II

3. Add LBN to the prepared mix - according to the proportions on the product label.
4. Mix everything in the concrete mixer until a homogeneous and clump-free mass is obtained.

### STAGE III

5. Add the final amount of water and mix to a plastic consistency.

### STAGE IV

6. Construction works should be carried out at an air temperature of **+5°C to +25°C** - first wet the block chambers with water, followed by pouring the prepared mixture over the blocks according to the above scheme.
7. During pouring - compact the concrete mix in the chambers by gently vibrating it with a concrete vibration poker or by manual tapping - until the mixture fills the block chamber tightly.

### STAGE V

8. Remove dirt from the surface of the blocks.

**IMPORTANT!**

1. The entire prepared mix from the concrete mixer MUST be used within max. 40 minutes (working at air temp. +5°C to +25°C).
2. It is not allowed to add water to the mix as in such case the mix will loose its properties such as strength, water absorption and frost resistance.

# 2/ CONCRETE MIX DELIVERED FROM THE PLANT

### STAGE 1

1. Collect the concrete mix prepared at the factory, as well as the concrete specification documents.

**The document from the factory should include the following:**

- **a)** name of the factory
- **b)** no. of delivery and order specification (concrete grade, exposure grade, concrete water absorption)
- **c)** vehicle registration number
- **d)** volume of mixture (m3)
- **e)** declaration of conformity
- **f)** purchaser's data
- **g)** mixing start time
- **h)** delivery time, unloading time

### STAGE 2

2. Construction works should be carried out at an air temperature of **+5°C to +25°C** – first wet the block chambers with water, followed by pouring the concrete mix delivered from the plant.
3. During pouring – compact the concrete mix in the chambers by gently vibrating it with a concrete vibration poker or by manual tapping – until the mixture fills the block chamber tightly.

### STAGE 3

4. Remove dirt from the surface of the blocks.

**IMPORTANT!**

1. The entire prepared mix from the concrete mixer MUST be used within max. 40 minutes (working at air temp. +5°C to +25°C).
2. It is not allowed to add water to the mix as in such case the mix will loose its properties such as strength, water absorption and frost resistance.

## GENERAL GUIDELINES FOR THE PARAMETERS CONCRETE FROM THE FACTORY:

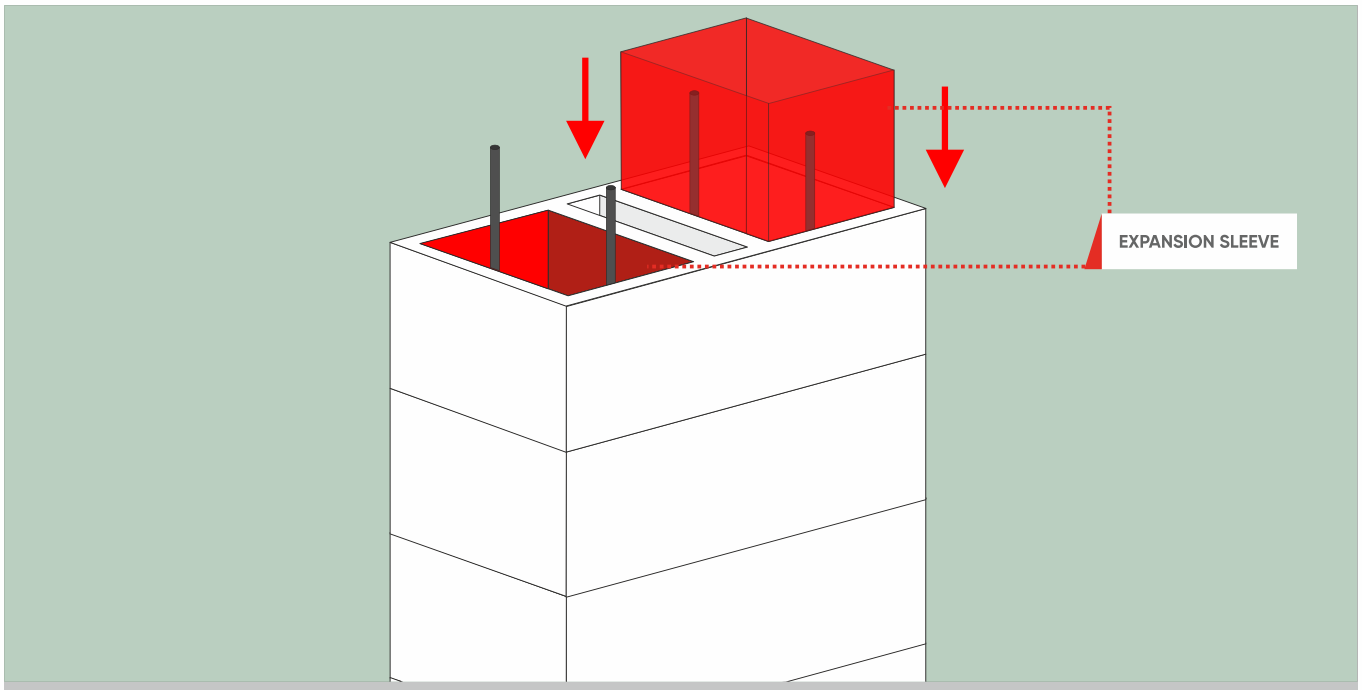
| | | |
|---|---|---|
| **Concrete ordered from a concrete factory** | **concrete strength class** | **C30/37** |
| | **concrete exposure class** | **XF1** |
| | **concrete water absorption** | **up to 5%** |
| | **Max. coefficient** | **w/c=0,55** |
| | **minimum content of cement** | **300 kg/m³** |
| | **consistency** | **S3/S4** |
| | **Max. grit size** | **8 mm** |
| | **suggested strength class of cement** | **42,5** (Portland cement with the reliable cement (Polish "Pewny Cement" certificate) |

# I. FILLING THE BLOCKS

**3-CHAMBER BLOCKS - 2 FILLING METHODS:**

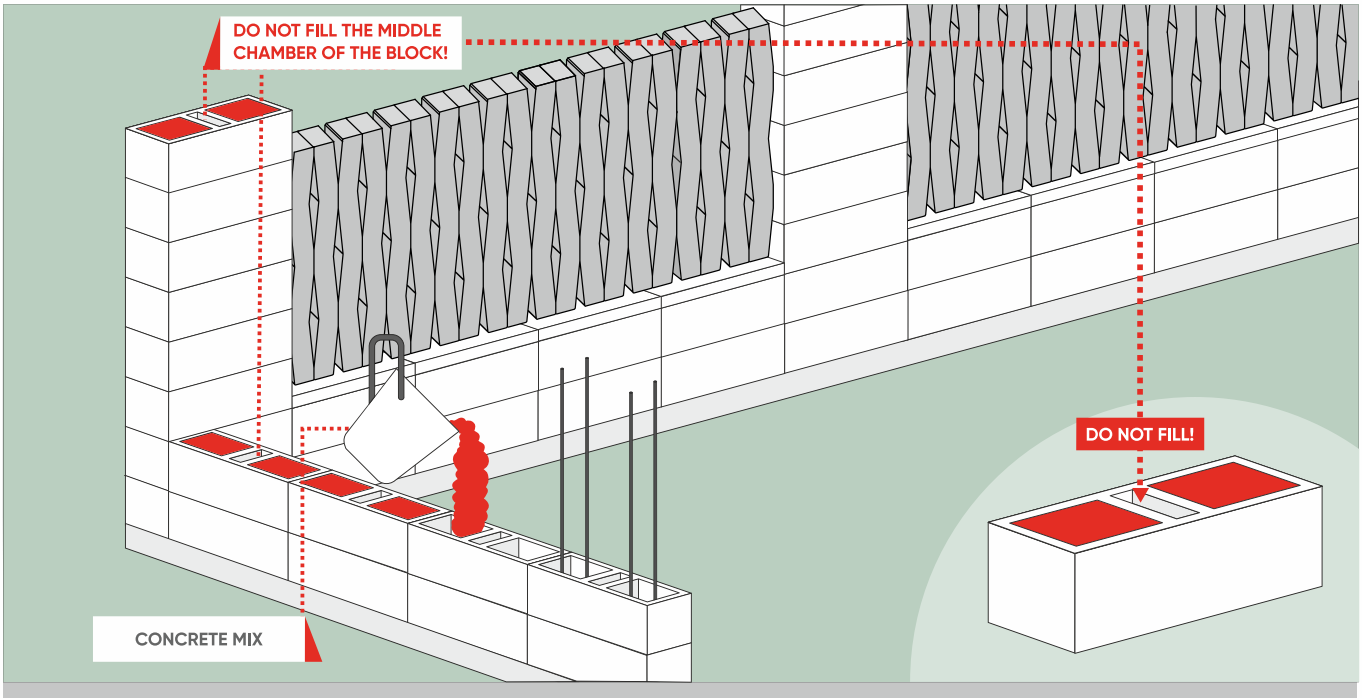
## 1. POURING ONLY THE EXTERNAL CHAMBERS OF THE BLOCK.

In this variant, the reinforcement of foundation blocks and posts, as well as their subsequent pouring of concrete mix should be carried out only in the two outer chambers of the blocks. Use an expansion sleeve in the chambers to be filled with the concrete mix.




**USE OF EXPANSION SLEEVES**

fig.21

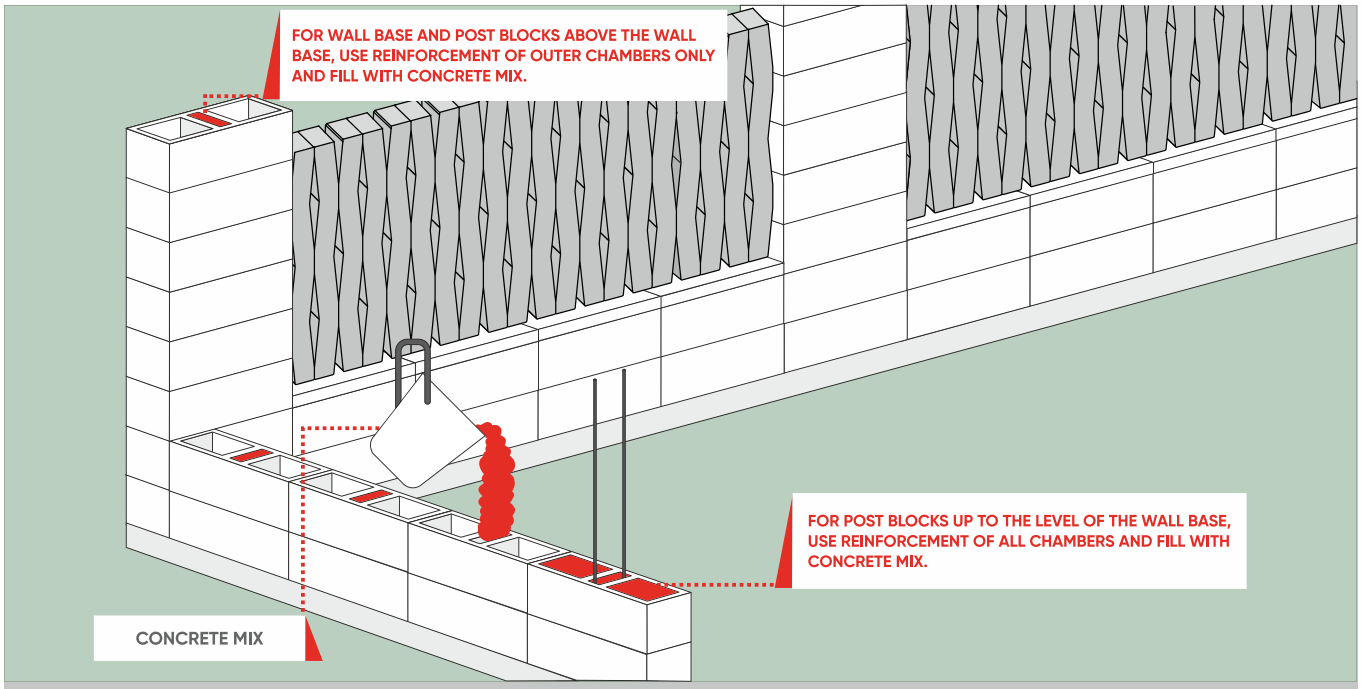



**FILLING THE BLOCKS**

fig.22

## 2. FILLING ONLY THE EXTERNAL CHAMBERS OF THE BLOCK.

1. Post blocks reinforced and filled with concrete up to the height of the wall base.
2. Wall base and post blocks above wall base reinforced. The middle chambers of blocks shall be filled.




**FILLING THE BLOCKS**

fig.23

**IMPORTANT!**

1. The concrete mixture should be used as soon as possible after its preparation or delivery.
2. It is NOT ALLOWED to change the composition of the mixture, especially to add water to the prepared mixture.

# J. MAINTENANCE OF CONCRETE AFTER FILLING WITH THE MIX

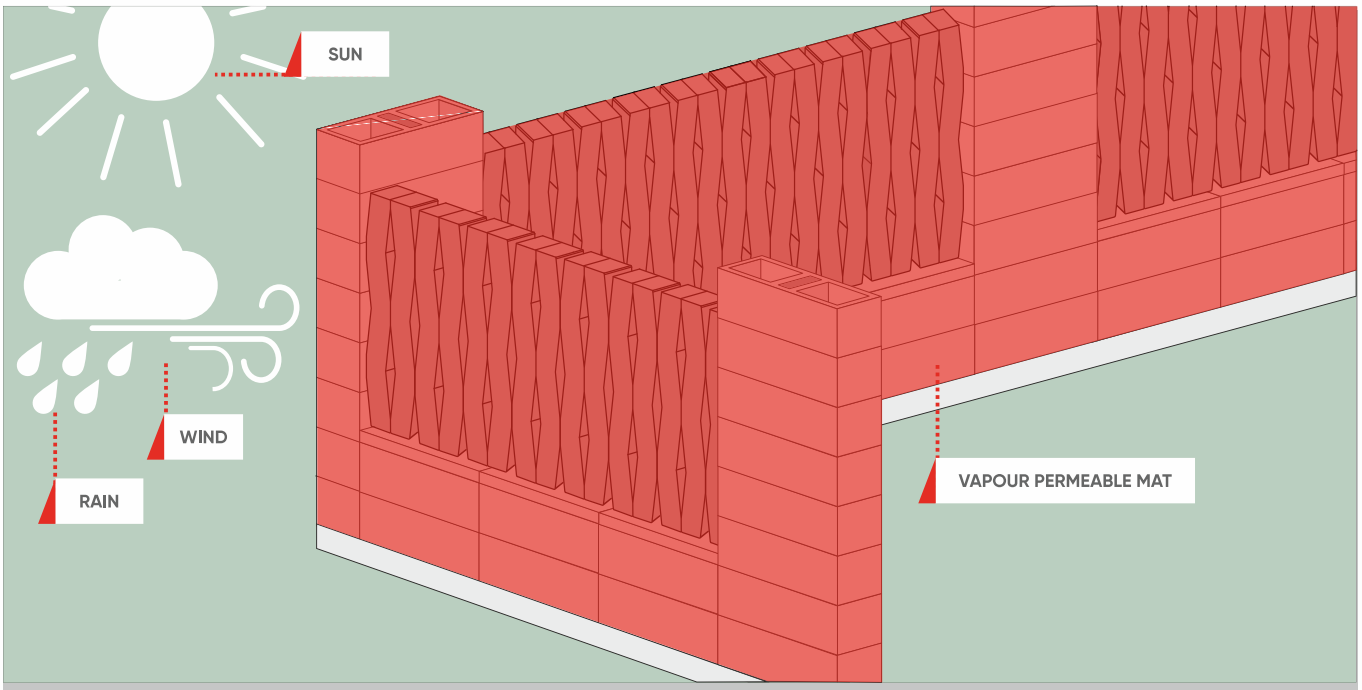



fig.24

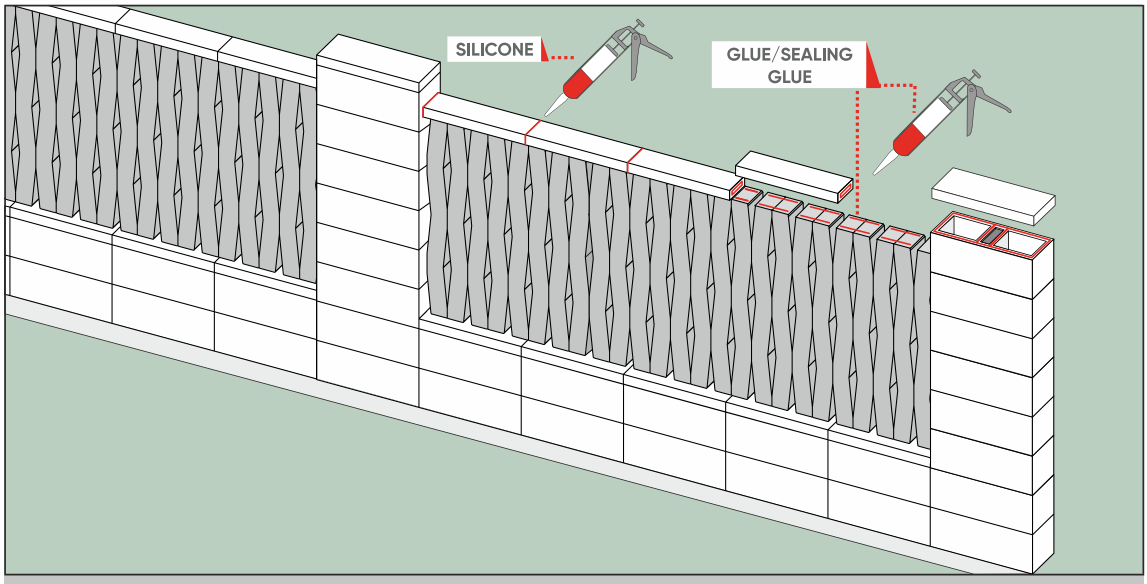
Maintenance is an essential process, but one that is often overlooked when building a fence. Even the highest quality concrete will be worthless if its installation and subsequent maintenance is not carried out correctly. Freshly-mixed concrete must always be protected from damaging effects of wind, high or low temperatures and precipitation, as lack of care leads to damage to the structure of the "young" concrete, resulting in a loss of assumed concrete parameters in the later stage of life of the fence construction.

Fast migration of water from the concrete core mix to the outside of the blocks can cause scratching and cracking of the blocks and also plastic shrinkage of the concrete mix used for filling the blocks. Maintenance is a series of actions designed to promote proper setting and hardening of the cement in the concrete in order to achieve the required properties of the hardened concrete, i.e. resistance to the effects of harmful atmospheric and environmental factors.

**IMPORTANT!**

1. After pouring the concrete mix into the blocks, it is mandatory to carry out fence maintenance in order to eliminate plastic shrinkage, to obtain the right concrete strength, to protect it from harmful effects of weather and freezing. Maintenance consists of controlling the temperature and moisture migration level of the concrete core.
2. During periods of higher temperatures, periodically moisten the fence structures and use covers, e.g. of a vapour-permeable membrane or covering with moistened mats.
3. During periods of low temperature, use covers such as mats, films, blankets and a vapour-permeable membrane to maintain a minimum concrete temperature of +10°C.
4. Maintenance should be continued until the final covering of the fence, i.e. a minimum of 7 days.

# K. INSTALLATION OF CAPS



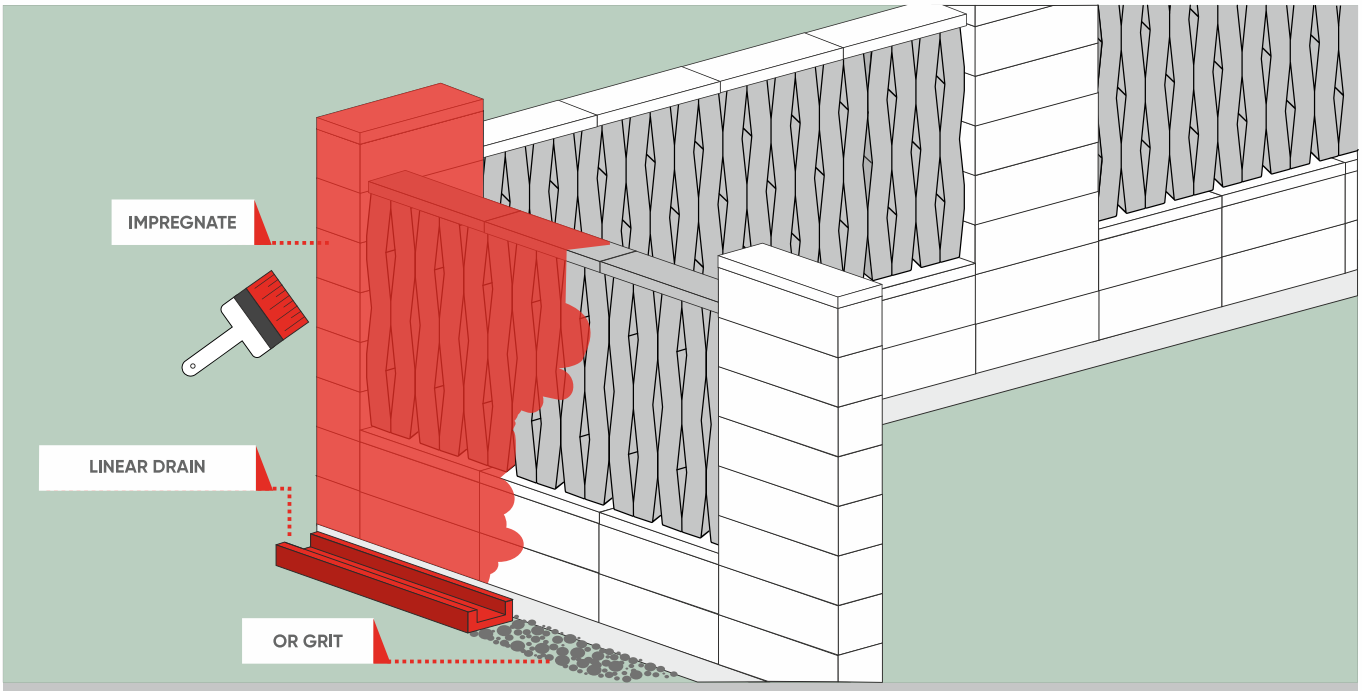

**INSTALLATION OF CAPS**

fig.25

**Recommendations:**

1. ROMA caps do not protrude beyond the outline of the block.
2. Before installing the cap, sand the block on which the cap is to be placed so that it fits tightly to the edge of the block.
3. Place the caps with the use of JONIEC sealing glue.
4. Seal the joints and gaps between the caps, as well as those between caps and blocks with silicone sealant to prevent water, moisture and air from migrating into the block chambers.

# L. IMPREGNATION




**IMPREGNATION**

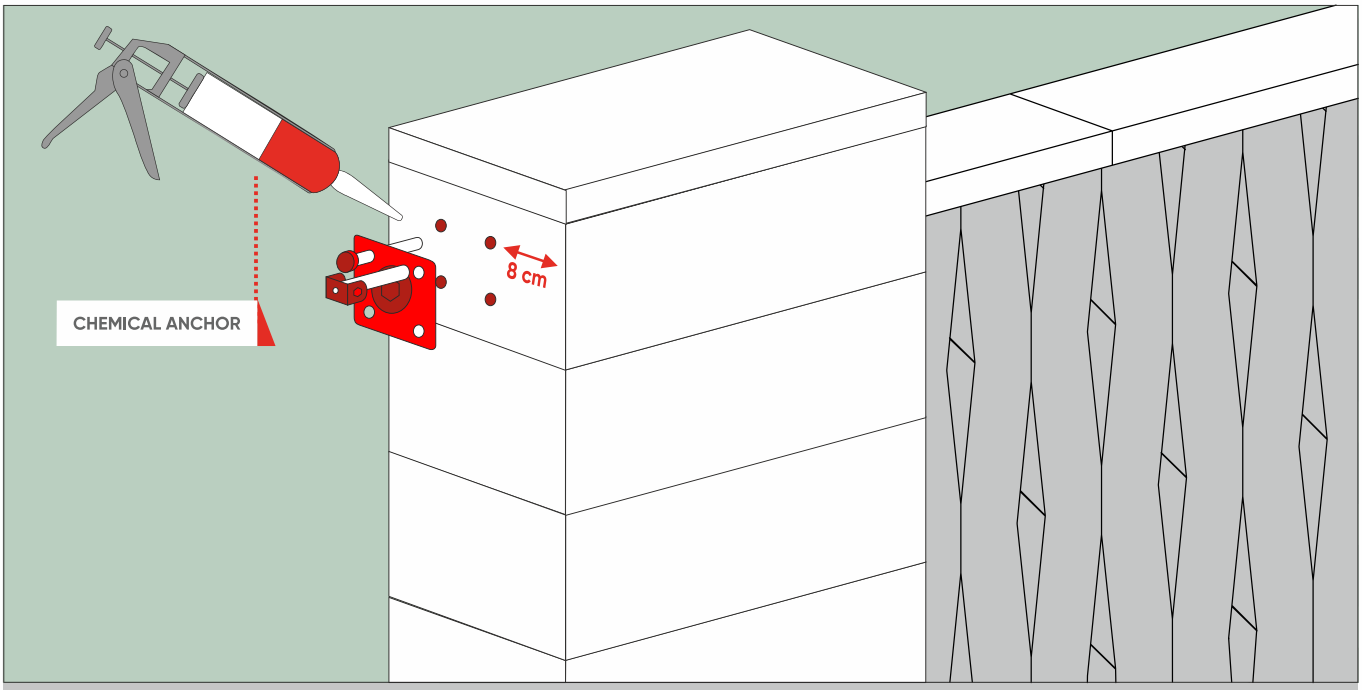
fig.26

**Recommendations:**

1. Clean any residual dirt from the surface of the blocks. Use the cleaner only on the spot according to the instructions for use. The manufacturer recommends the use of JONIEC efflorescence and tarnish remover.
2. Next, rinse abundantly with water.
3. Impregnate the fence - after all elements have been thoroughly dried and with adequate weather. **Remember that the fence elements must be completely dry during impregnation.**
4. To protect the caps from dirt, moss growth or other factors, impregnate them or paint with a good concrete paint.
5. In order to protect the lower surface of the fence from dirt during heavy rainfall and snow melt, create linear drain along the entire fence line or cover the ground with gravel, small stones, etc. This will significantly reduce mud splashes on the fence.

**IMPORTANT!**
1. Do NOT impregnate earlier than after min. 30 days after completion of work on the fence.
2. After the application of JONIEC® efflorescent and tarnish remover the impregnation should be done not sooner than after 5-7 days.

# M. FIXING THE WICKET GATE




**FIXING THE WICKET GATE**

fig. 27

**Recommendations:**

1. Installation of the spans may be proceeded after obtaining full strength of the concrete used for filling the fence blocks, which is achieved within a period no shorter than 28 days from the moment of pouring the concrete into the blocks.
2. The posts for the installation of gates and wickets shall be constructed so that they can bear the weight of the gates and wickets, as well as the wind load.

**IMPORTANT!** 1. It is important that the posts, to which gates and wickets will be mounted, are made of minimum 28 cm wide blocks. 28 cm. For smaller block sizes, it is recommended that gates and wickets should be mounted on independent steel posts, according to the gate and wicket manufacturer's recommendations.

3. The anchor positions should be closest to the vertical axis of the posts and the horizontal axis of the blocks.
4. Do not fix anchors at a distance of less than 8 cm from the outer edge of the block.
5. Fix the fence span with chemical anchors according to the recommendation of the span manufacturer.
6. Check that the anchoring elements are suitable for installation in a concrete block system (there are no anchoring elements on the market which can only be installed in steel posts).
7. Once you have marked the places for the holes - first drill a hole with a small diameter drill bit and then enlarge the hole with the correct drill bit. This way you can drill the mounting holes more precisely and avoid cracking the blocks.
8. Make the holes perpendicular to the block wall - according to the recommendations in the table:

**MOUNTING PARAMETERS - hole in the ground**

| | diameter (mm) | depth (mm) |
|---|---|---|
| M8x110 | 10 | 85 |
| M10x130 | 12 | 95 |
| M12x160 | 14 | 110 |
| M16x190 | 18 | 125 |
| M20x260 | 24 | 180 |
| M24x300 | 28 | 220 |

Steel parameters as per point 3.1 AT-15-8866/2012

9. Once the holes have been cleaned of dust, insert the chemical anchor, followed by, in due time, the steel brackets. 40. Fix the wicket and gate on steel brackets.
10. Befestigen Sie die Pforte und das Tor mit Stahlbefestigungen.
11. When installing gates and posts on independent steel posts, install them according to the manufacturer's recommendations.

## M. WARRANTY

Warranty period: 5 years after purchase.

**THE WARRANTY COVERS:**

The warranty covers damage and defects caused by the manufacturer, i.e. defects in workmanship found upon receipt of the goods.

**THE WARRANTY DOES NOT COVER:**

The warranty does not cover damage resulting from: improper design or improper workmanship of the fencing, improper assembly of purchased products or their installation not in conformity with the rules of good engineering practice, use of improper materials for assembly of products, failure to follow the instructions and recommendations of the Seller concerning the method of assembly, maintenance, insulation, impregnation and protection of products, use of concrete with wrong exposure class for pouring the fences, wrong consistency of the mix, making improper and inconsistent with the rules of the art of construction fence foundation, improper use, inconsistent with the purpose and properties of purchased products, improper storage or transport, force majeure i.e. in particular natural disasters and natural calamities, inappropriate use of the fences, improper waterproofing, impregnation and protection of products the Contractor shall not be liable for any damage caused to the Contractor's property, including in particular natural disasters and other unforeseeable fortuitous events.

The warranty does not cover and is not considered as a defect allowed by the relevant standards and reference documents: deviations in dimensions and appearance of the products, calcium efflorescence in the form of deposits on the surface of the products, natural changes in colouring of the products as a result of their use, possible hairline micro-cracks on the surface resulting from shrinkage associated with maturing of the products, deviations in texture and colour due to the manufacturing process of the products and natural variation in grain size and colour of aggregates and other raw materials, cracks in the elements resulting from the use of concrete of improper exposure class or improper execution and care.

**NOTE!**

- **THE TIME WHICH ELAPSES FROM THE MOMENT OF PREPARING THE CONCRETE MIX TO THE MOMENT OF FILLING THE BLOCKS SHOULD NOT BE LONGER THAN 40 MINUTES UNDER NORMAL WEATHER CONDITIONS.**
- **IT IS FORBIDDEN TO ADD WATER TO THE CONCRETE MIX AFTER IT HAS BEEN MIXED, AS IN THIS CASE IT WILL LOOSE ITS PROPERTIES SUCH AS STRENGTH, WATER ABSORPTION AND FROST RESISTANCE.**
- **CONSISTENCY OF CONCRETE MUST BE PLASTIC (S3/S4 according to PN-EN 206).**
- **AFTER POURING THE CONCRETE MIX INTO THE BLOCKS, IT IS MANDATORY TO CARRY OUT FENCE MAINTENANCE IN ORDER TO ELIMINATE PLASTIC SHRINKAGE, TO OBTAIN THE RIGHT CONCRETE STRENGTH, TO PROTECT IT FROM HARMFUL EFFECTS OF WEATHER AND FREEZING. MAINTENANCE CONSISTS OF CONTROLLING THE TEMPERATURE AND MOISTURE MIGRATION LEVEL OF THE CONCRETE CORE.**

**CALCAREOUS EFFLORESCENCES:**

Calcareous (carbon) efflorescences is a natural phenomenon, independent of the Manufacturer. They are formed by the reaction of calcium hydroxide, which is one of the products of the hydration (bonding) of cement with carbon dioxide from the ambient air. The mechanism of this reaction is based on the transport of calcium hydroxide through the capillary pore system to the surface of the concrete element, where it becomes carbonated, forming a white deposit. This phenomenon is temporary and, depending on its intensity, gradually disappears over time.

**COLOUR SHADES:**

DIFFERENCES IN A SINGLE COLOUR SHADE can be caused by production in different weather conditions and by the variability of the aggregate, which is an ingredient of natural origin. Colour variations are not a product defect and do not constitute grounds for complaint.

**REMEMBER!!!**

**USING THE MANUFACTURER'S VARIOUS PRODUCTS AND SYSTEMS (FENCES, PALISADES, FACADES), - THE TEXTURES AND COLOURS OF THE INDIVIDUAL SYSTEMS VARY DUE TO THE USE OF DIFFERENT TYPES OF AGGREGATES AND PRODUCTION TECHNOLOGY.**