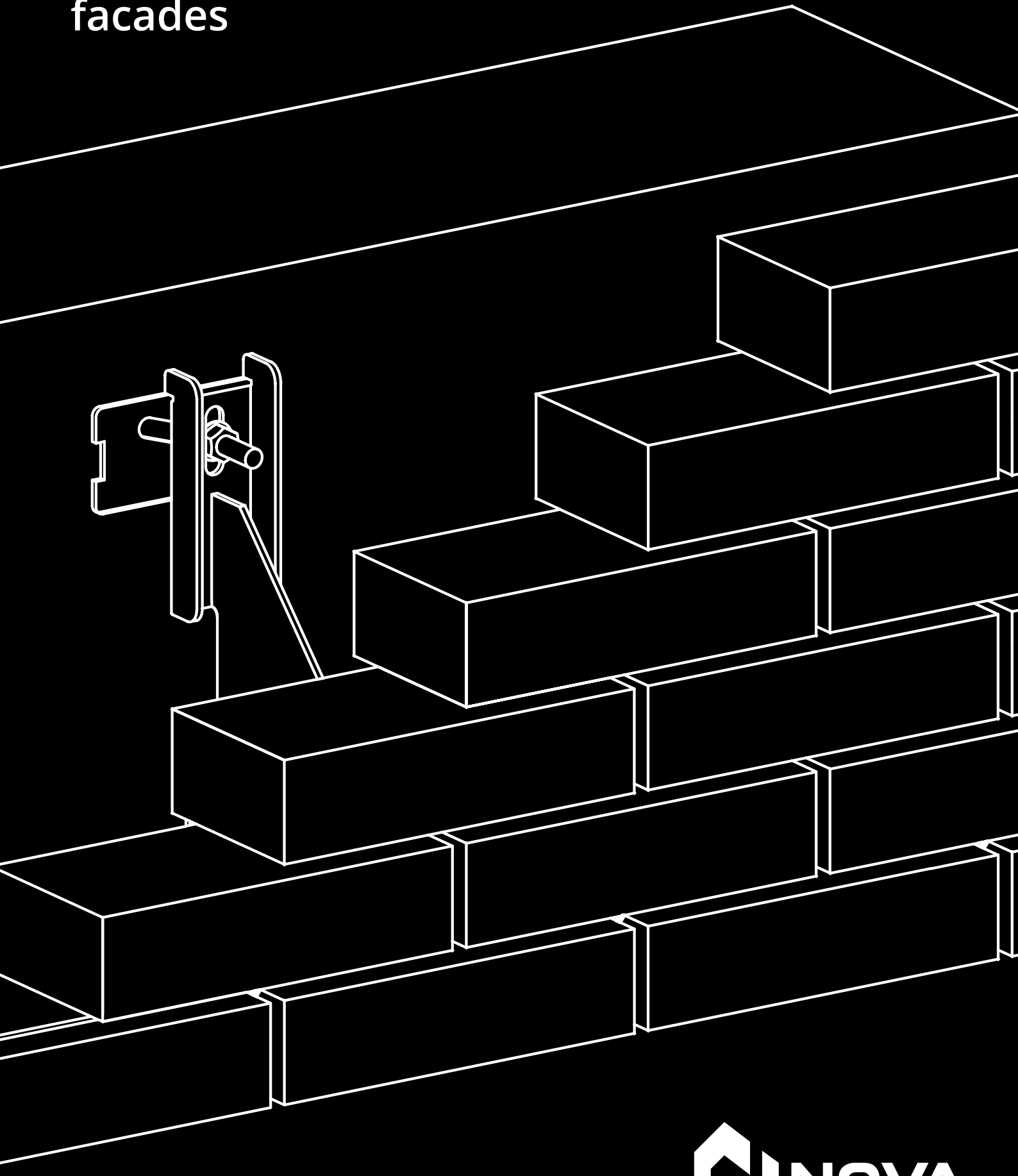
Brick facades



NOVA
Free Your Design

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The Nova company is one of the most dynamically developing companies in the field of modern construction technologies in Europe.

We specialise in the design and production of systems in three areas:

- brick facades;
- architectural concrete facades;
- masonry structures.

For nearly ten years, structures made by our company have been supporting facades with a total area of over one million square meters in over 10 countries. Nova's customer network includes nearly 2,000 enterprises across Europe. We offer our customers support from the construction office at the concept and design stage, until the completion of the construction of a particular facility. What distinguishes our company from others in the facade sector is an individual approach to each investment. We offer a huge number of system solutions. In the case of unique and unusual facilities, we adjust our system exactly to the concept of the architect and investor.


Urząd Dozoru Technicznego
Jednostka Notyfikowana UDT-CERT Nr 1433

CERTYFIKAT ZGODNOŚCI
ZAKŁADOWEJ KONTROLI PRODUKCJI

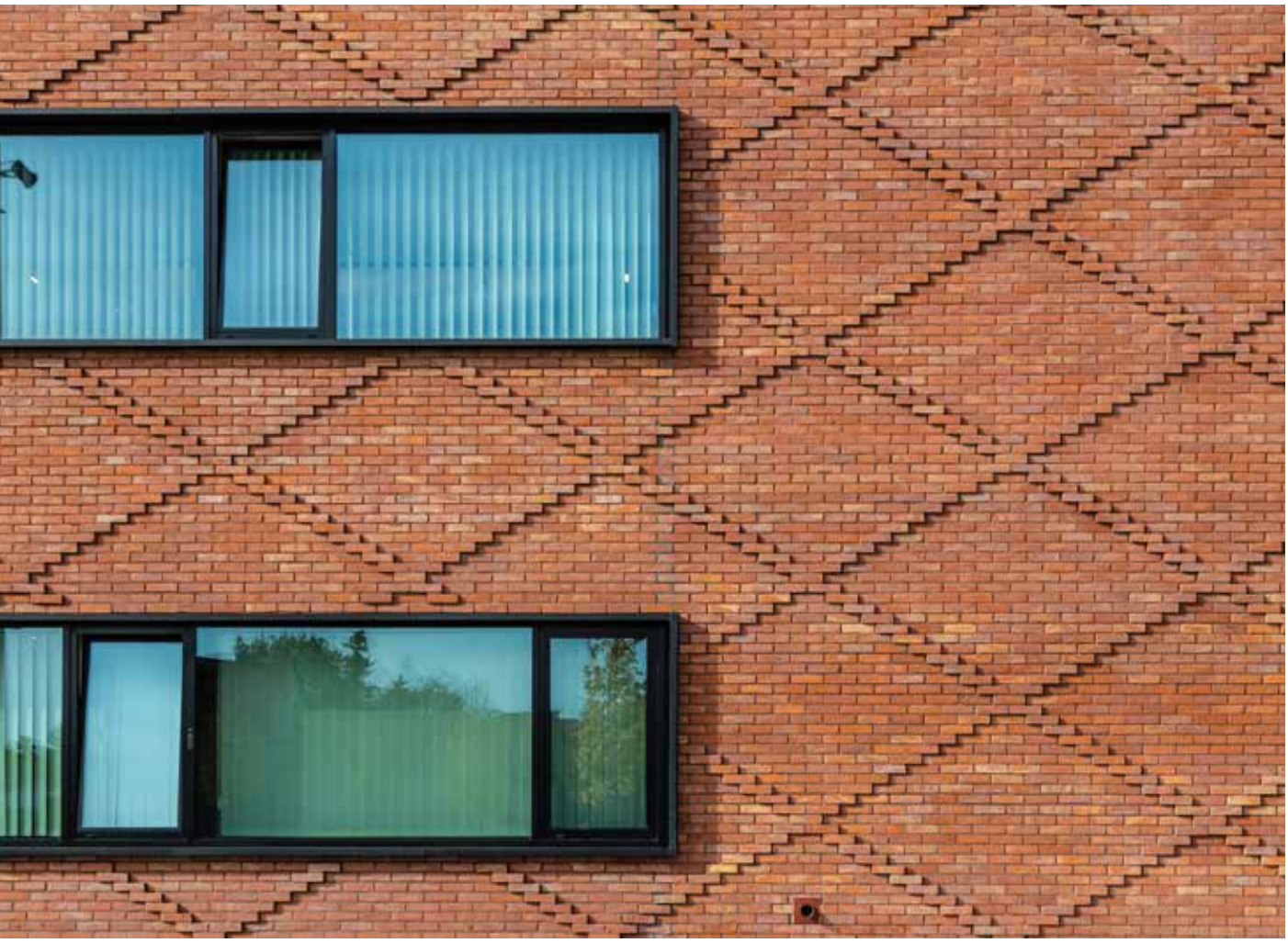
In our company, we attach a great deal of importance to the protection of environment that surrounds us. In the production process, we focus on materials that can be recycled, and our employees undergo regular training in this area. We promote solutions that reduce the negative impact of buildings on the environment. Moreover, we support local charitable initiatives of our employees and partners on a daily basis.

Adam Lisiak
CEO

Adam Lisiak

Brick facade

The facade is the showcase of each building. Brick is the most traditional material, used for centuries. It is a timeless product that is associated with aesthetics, durability and safety. A huge number of colours, sizes and patterns, as well as the ways of arranging bricks in the wall makes it possible to give the structure of the building a unique character. High durability and frost resistance of bricks ensure a beautiful appearance of the facade and comfort of use for decades. Currently, modern brick facades are constructed with the use of a three-layer wall technology. This technology consists in connecting the structural wall of the building with the curtain wall using wire wall ties. The space between the two layers of the wall is filled with non-load bearing thermal insulation material and a ventilation gap. A wall constructed in this way enables achieving the highest thermal and acoustic parameters.



The facade is the hallmark of each building.

The advantages of three-layer walls made with the use of the NOVA System:

Aesthetics

NOVA system is not visible but in spite of that it enables to build the bricks tied in any way. In addition, it ensures the use of spatial solutions such as openwork and rustication.

Sound insulation

The high mass of the elevation layer of the three-layer wall, combined with the NOVA System elements of small cross-sections, allows the insulation continuity to be maintained. This makes it possible to achieve excellent acoustic parameters of the building.

Thermal insulation

The NOVA system allows for the application of a three-layer partition with up to 40 cm thick insulation material. This makes it possible to meet even the most stringent thermal requirements.

Sustainability

The combination of façade bricks, characterised by high frost resistance, with NOVA System elements made of stainless steel allows you to enjoy the beauty of the façade for decades.

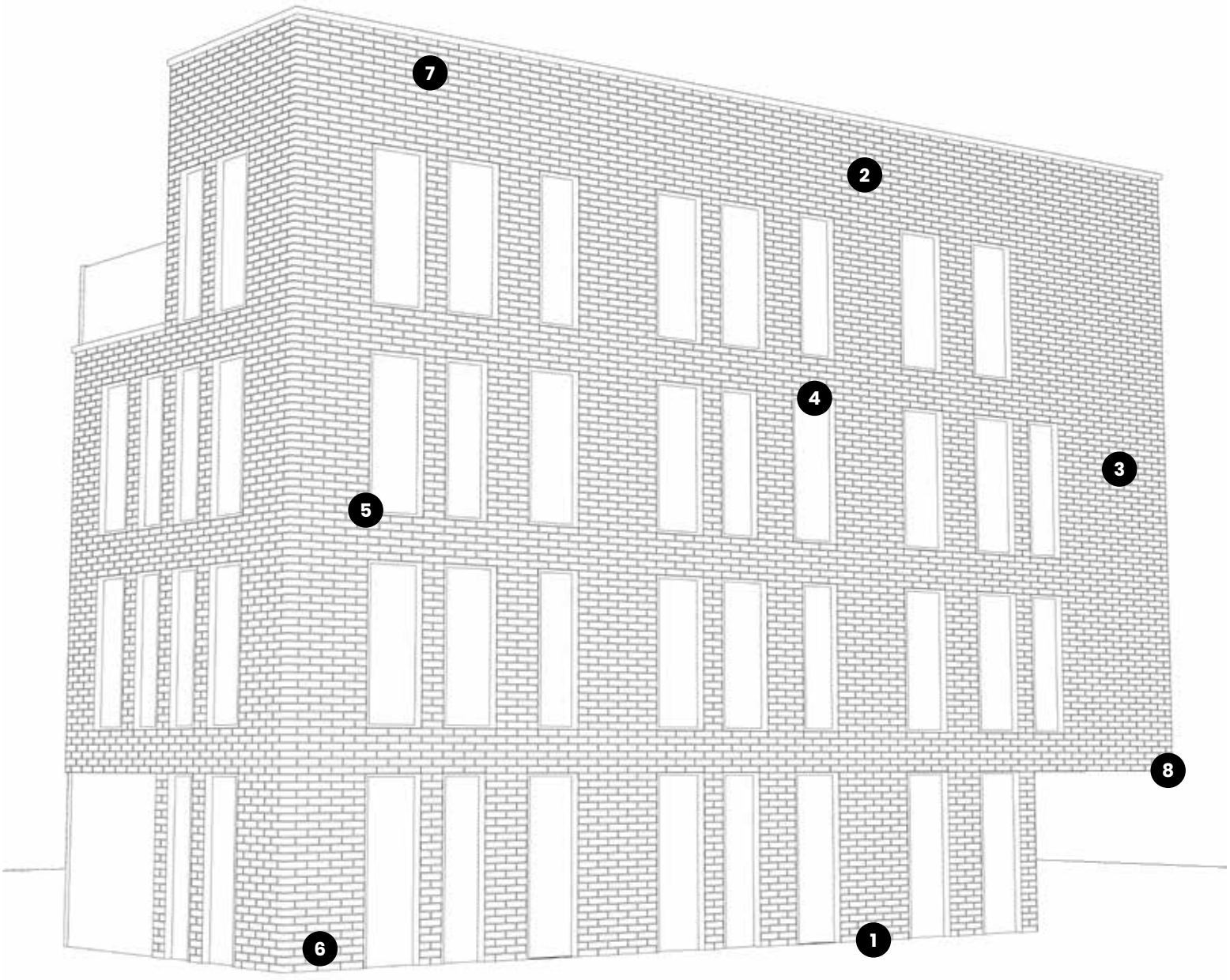
Fire resistance

Both ceramic, concrete and silicate bricks used for masonry elevations are completely non-flammable materials (reaction to fire class A1). NOVA System elements meet all the requirements of the Eurocode 6 standard in this respect.

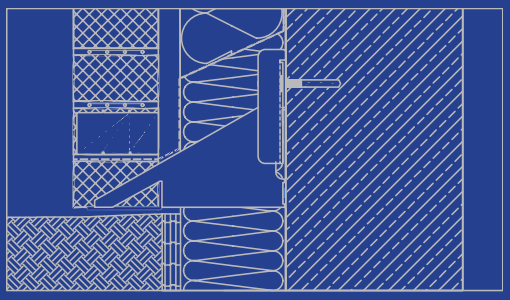
Very low operating costs

All NOVA solutions are designed for a specific investment. This allows for full cost optimization.

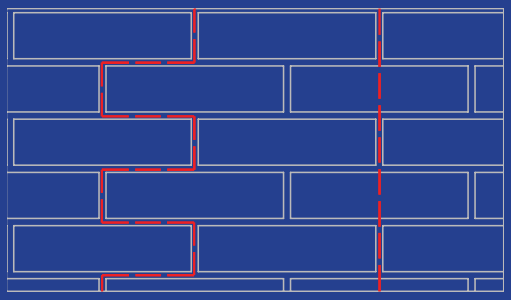
Brick facades



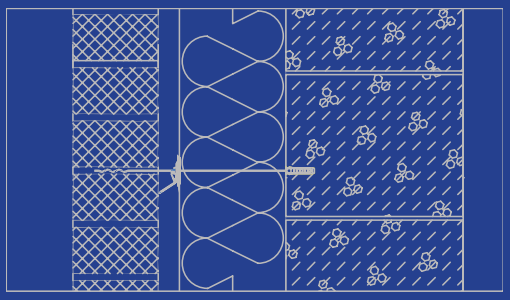
1 Setting



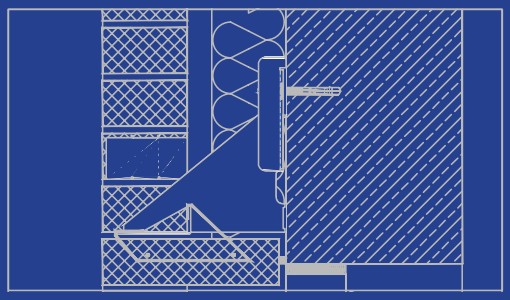
2 Expansion Joints



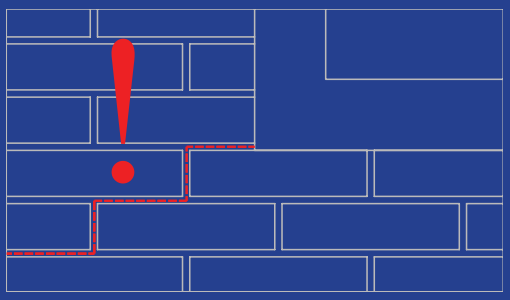
3 Anchoring



4 Lintels



5 Sensitive Zones



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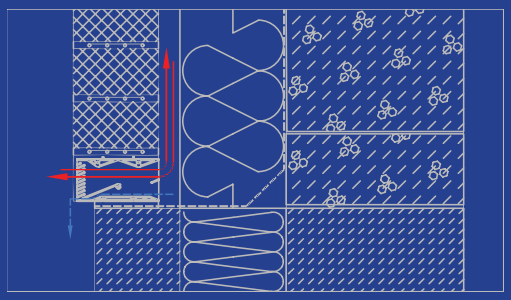
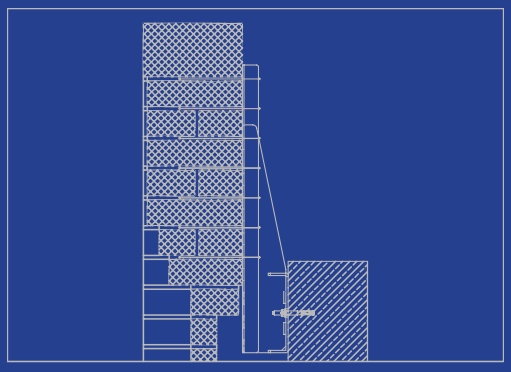
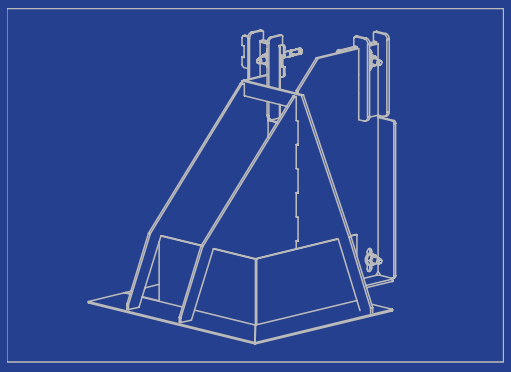


7 Attic



8 Customised Solutions



Setting

Foundation or Masonry Support Systems

Cladding of a three-layer wall must have a stable support that can carry its entire load. Our designs assume that cladding is a flat shield supported on the bottom edge and anchored along the entire surface, in such way the wind pressure and suction forces are transferred to the structure through the anchors. The cladding support can be divided into support in the area of the plinth and support at the height of the building.

Support at Ground Level

Starting from Foundation

This is the easiest and the most cost-effective method of starting the cladding. It is done by supporting the cladding on a foundation wall that is properly anchored to the structure - usually with a recess that create a natural plinth. The most common details of supporting the cladding on the foundation wall are shown below.

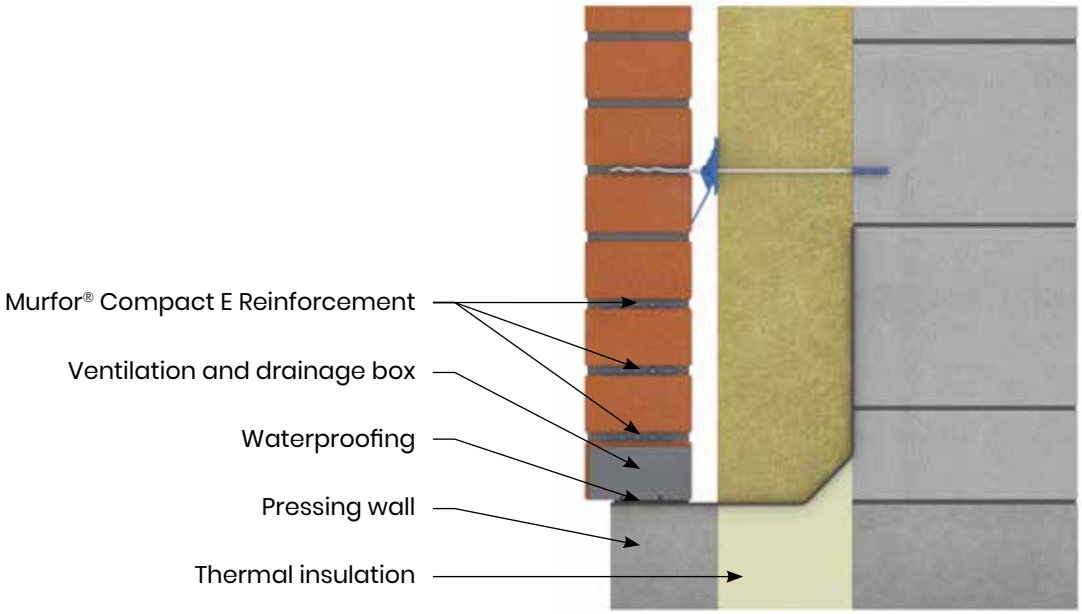


Fig. 1 - Starting from the foundation

Starting from Masonry Support System

In case of foundations that are set very deeply, intended architectural results, high groundwater level or renovation of existing buildings, cladding is set on the masonry support system. The system substitutes foundation by providing a steel shelf mounted on brackets with relevant supporting capacity and with an overhang adapted to the designed thickness of insulation. It is very important to fix the masonry support system to the building structural components with sufficient load-bearing capacity (usually made of

reinforced concrete, solid ceramics or silicate). There are two types of masonry support systems - composite decks (required at corners and expansion joints) and starter angles supported on single brackets (used on long support sections).

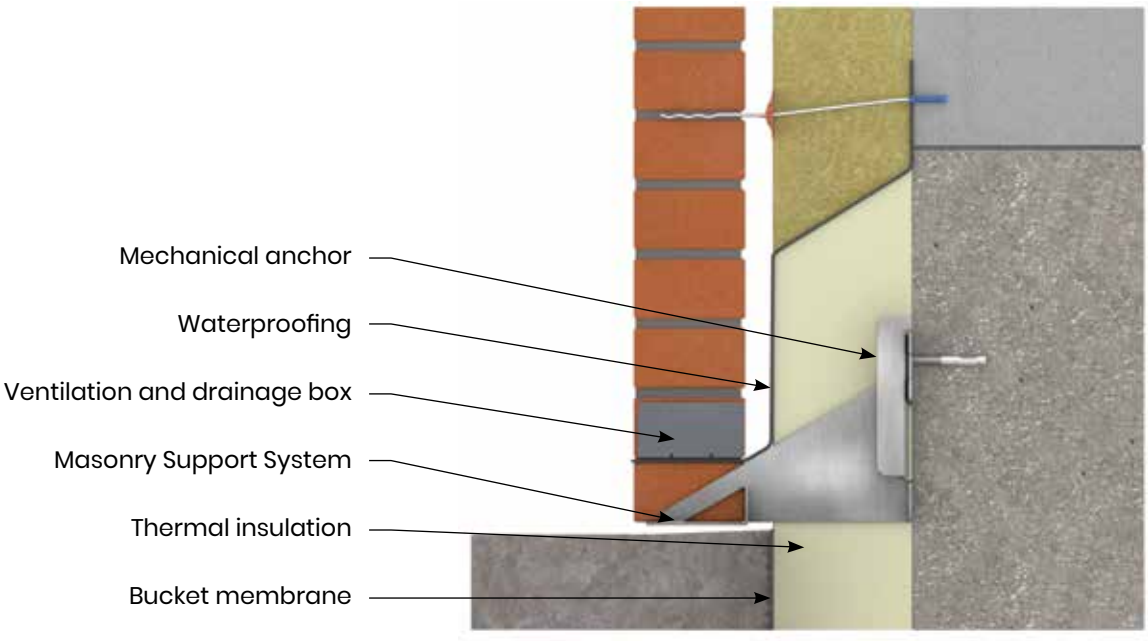


Fig. 2 - Starting from consoles

Supporting the Cladding at the Height of the Building

Nowadays, the cladding very often starts from, for example, the first level. This applies, for example, to buildings with arcades, driveways or various cladding materials. In this case, the cladding is set on the masonry support system, usually using stirrups to mask the substructure and suspend the masonry in the starting layer.

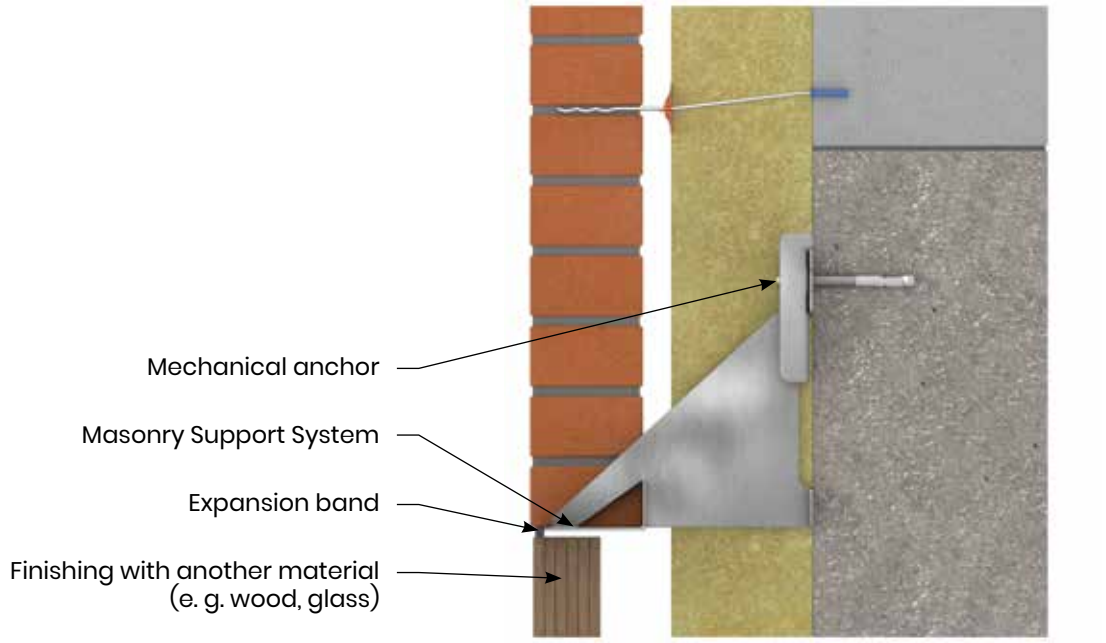


Fig. 3 - Start of elevation at building height, version 1

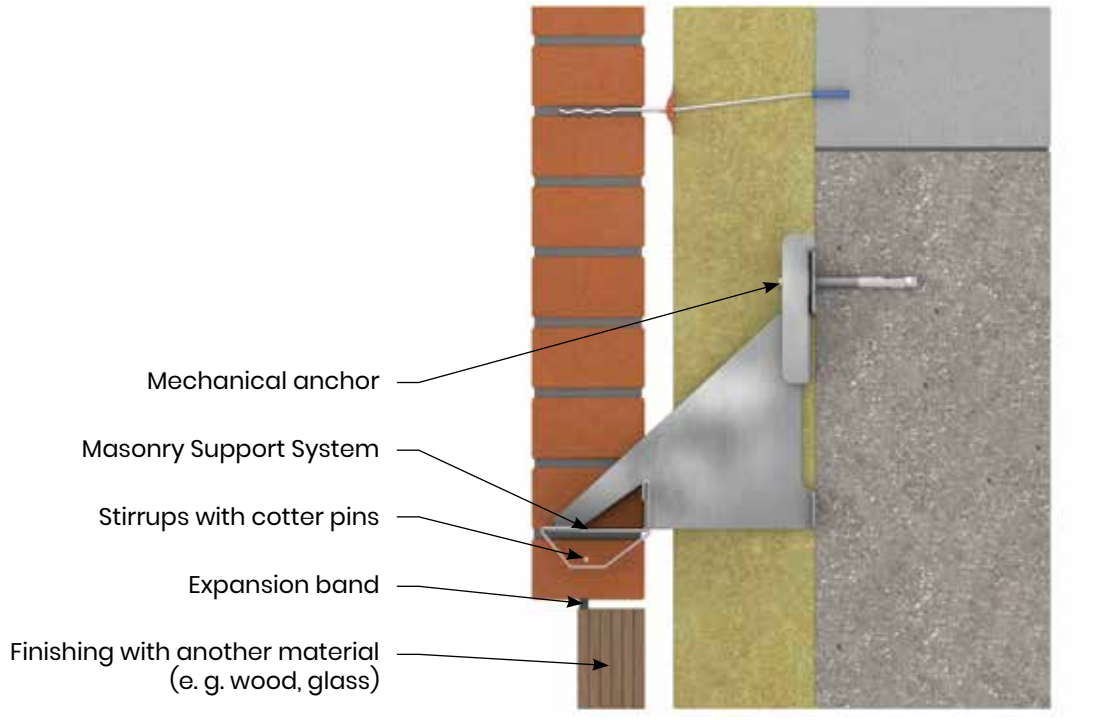


Fig. 4 - Start of elevation at building height, version 2

Support on Precast Masonry Units

In order to speed up construction works, or in case of working with intended architectural details, the cladding is started of precast masonry units made of ceramic and reinforced concrete, or architectural concrete.

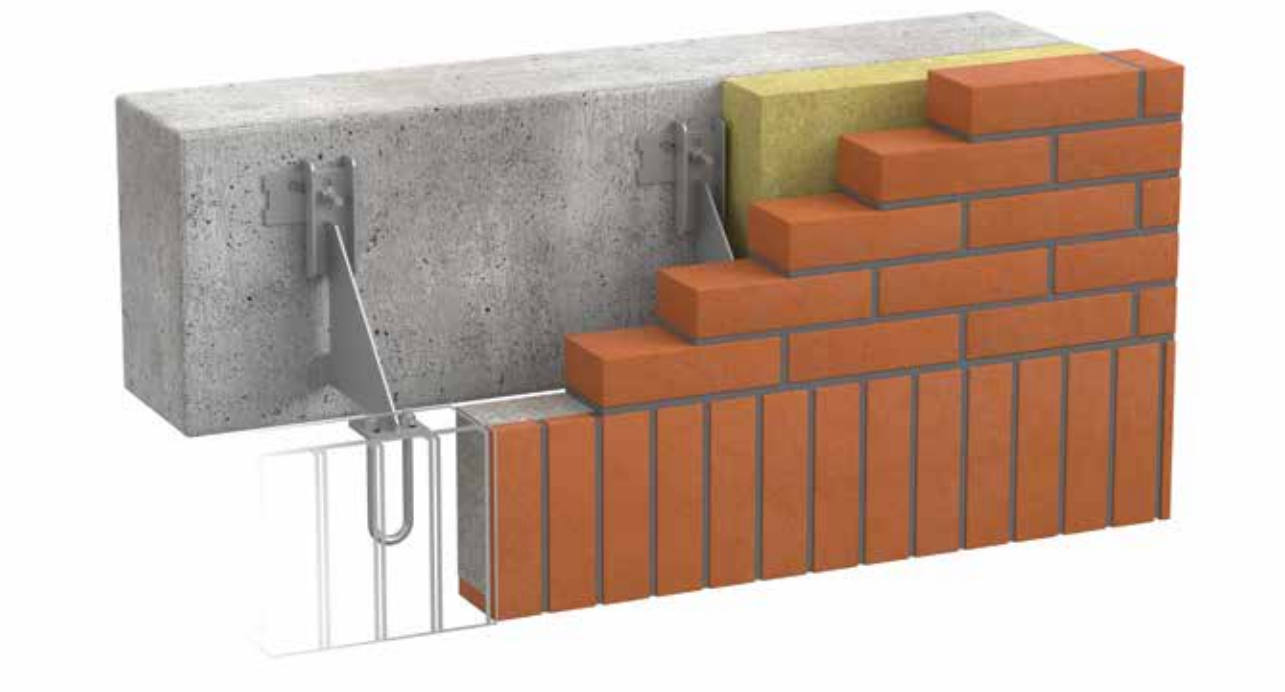


Fig. 5 - Start of prefabricated facade

Expansion Joints

In order to ensure optimal expansion and contraction of the cladding wall layer due to the thermal conditions, the building should have a grid of horizontal and vertical expansion joints. The distance between the expansion joints depends on the cladding's exposure to sunlight (cardinal directions), the cladding material and the degree and method of its reinforcement.

Expansion Joint Spacing

The diagram below shows the recommended division for ceramic facades with a thickness of 9–12 cm.

Fig. 6 - An example of the arrangement of vertical and horizontal joints

Permissible elevation height (applies to bricks 11.5-12 cm thick):

A up to 12 m

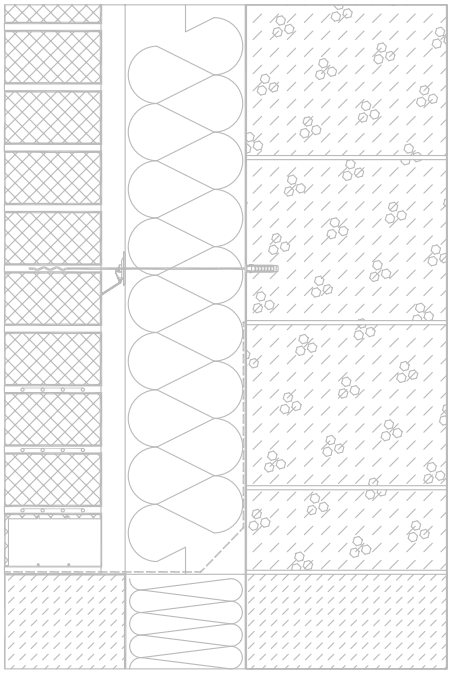


Fig. 7 - Supporting the facade over the entire surface of the brick thickness 6-8 m

B 6-8 m

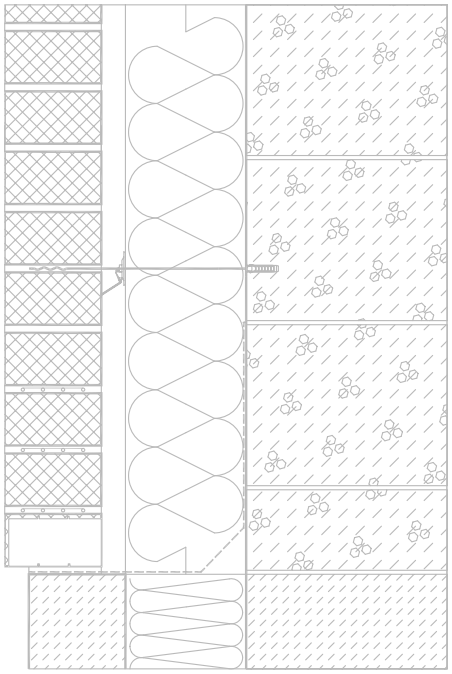


Fig. 8 - Permitted minimum support 2/3 of the brick thickness

Table 1. Distances between dilatations in ceramic walls

a	12-14 m	for the north elevation
	8-9 m	for the south elevation
	10-12 m	for the eastern facade
	7-8 m	for the west facade
b	do 12 m	when the facade is fully supported on the foundation - fig. 7 (on the console up to 8 m as a standard, and in case of meeting appropriate criteria concerning the foundation and the facade material up to 12 m)
	6-8 m	with minimum facade support - fig. 8

NOTE: The values and locations of expansion joints referred to above may change (and sometimes be omitted) if the Murfor® system is properly installed.

Expansion joints are usually needed:

- near corners;
- in case of changes in the setting heights;

- in long or high walls;
- at recesses (or changes in height) on the cladding;
- in places of expansion joints of the building's structure;
- at contact areas of various cladding materials.

Details of Expansion Joints

Expansion joints are created by leaving an empty joint and masking it with an expansion tape in the colour of mortar.

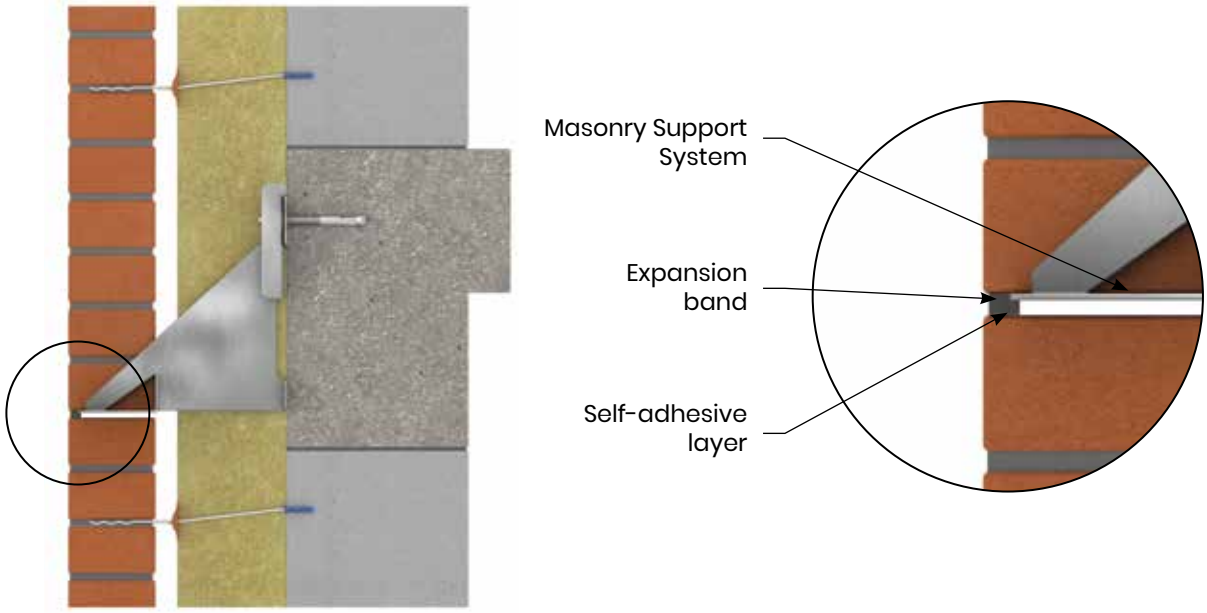


Fig. 9 - Horizontal expansion joint

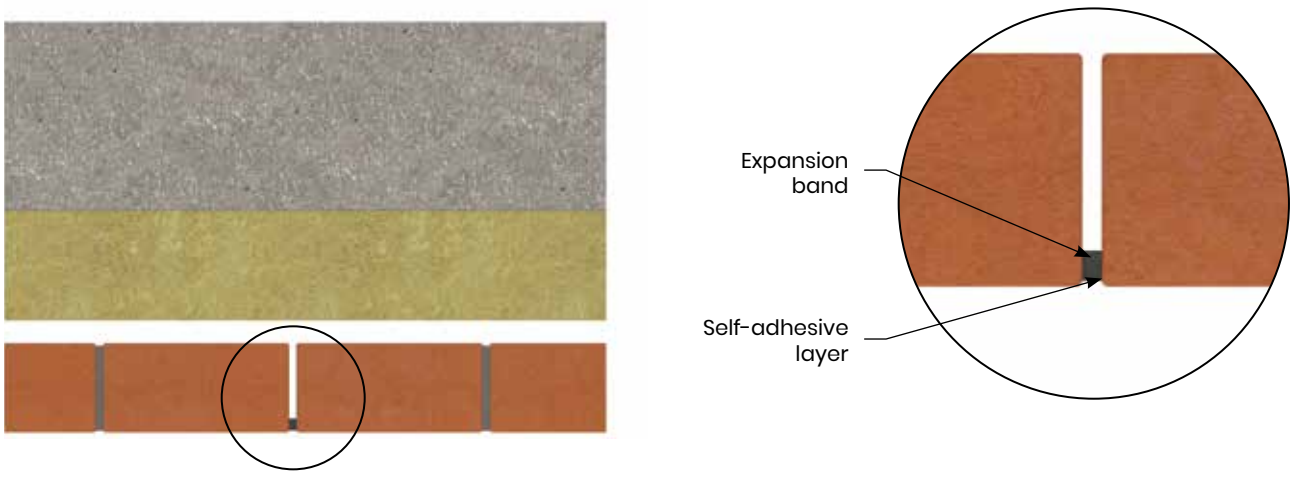
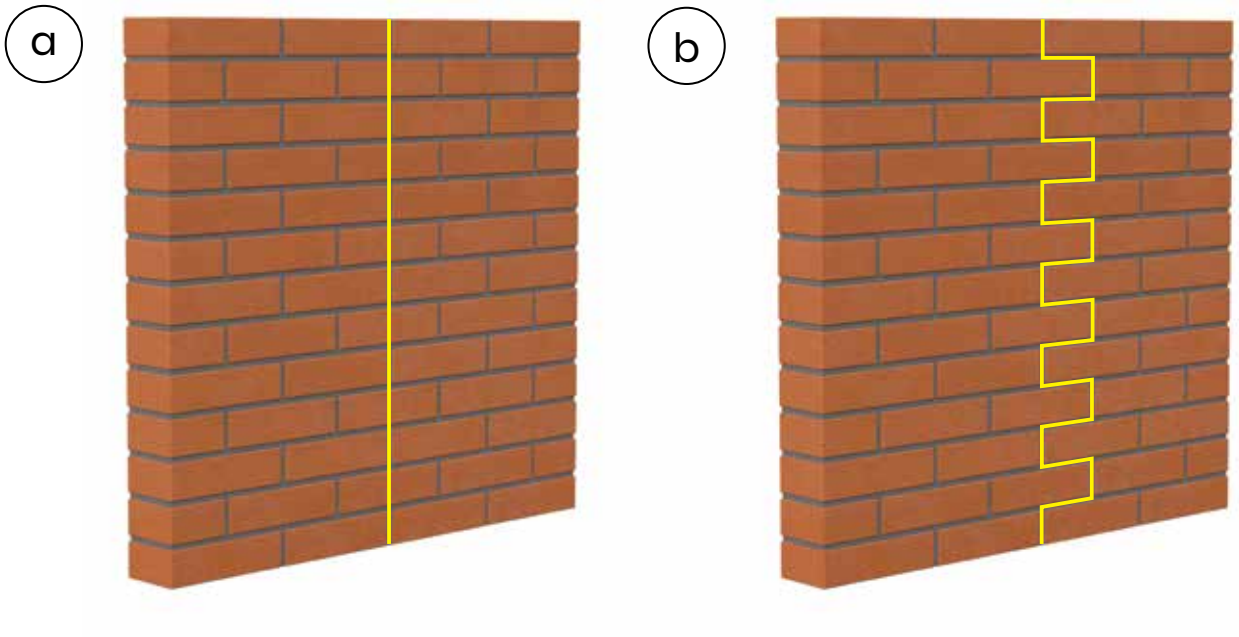


Fig. 10 - Vertical expansion joint



Vertical expansion joints can be made in two ways:

- as a simple dilatation (a),
- as a toothed dilatation (b).

Anchoring

Material

Wire anchors and any other cladding fixing materials should be made of stainless steel grade in accordance with EN-845-1. Only stainless steel can be used.

Spacing

The number of anchors per 1 m² depends on the wind pressure and suction in a given zone, the distance between the cladding and the load-bearing wall, wall surface, solar access and other factors, and should always be recalculated by the design engineer. Usually, 5 anchors per m² is sufficient. In this case, the anchors should be spaced every 50 cm horizontally and every 40-45 cm vertically in a staggered pattern. Additionally, anchors (3 pieces per running meter) should be installed in line 15 cm from the edge around the (window and door) openings along the expansion joints and on the free wall ends.

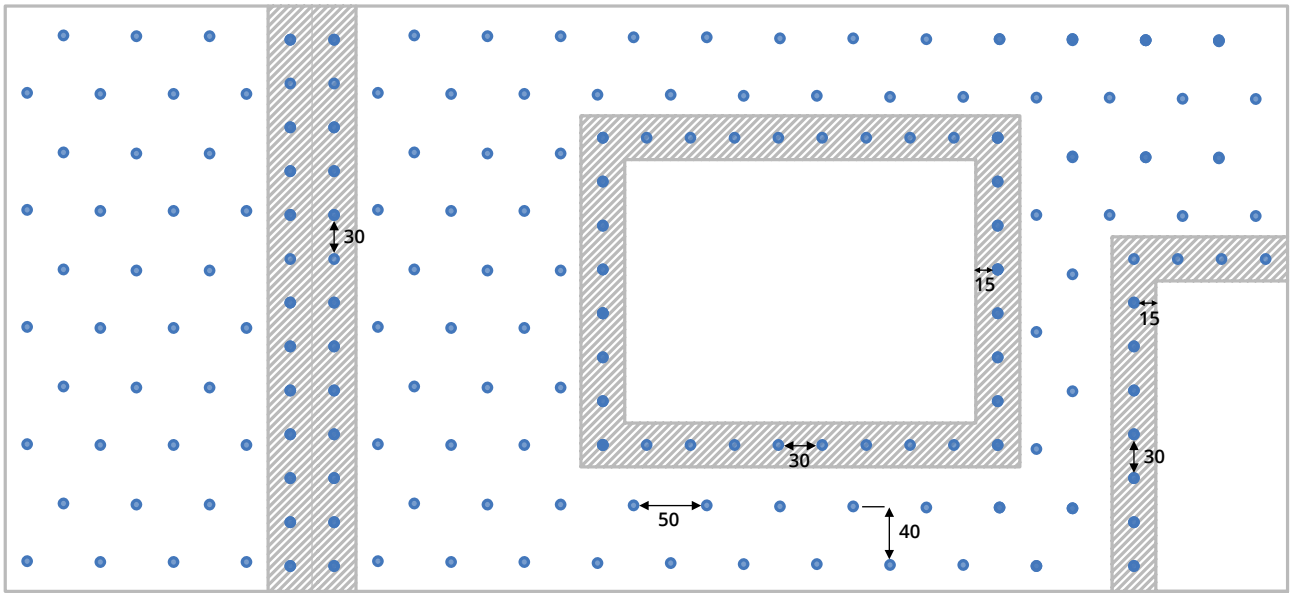


Fig. 11 - Anchor arrangement scheme

Diameter

The cladding is stressed by wind pressure and suction, therefore the anchors must have high compressive and tensile strength. They should be made of a material that is flexible enough to allow separate movement of the cladding and the main wall. Too stiff anchors can lead to cracks in the cladding (when they prevent the movement of cladding in relation to internal walls, if the cladding is heated, for example, by sunlight). Therefore, the anchors must not be too thick. Recommended diameter for gaps ≤ 31 cm is 4 mm and

5 mm for gaps > 31 cm. With high wind loads, the number of anchors per 1 m² of cladding must be increased.

Types

There are two types of anchors:

- cast-in-place anchors,
- post-installed anchors.

Cast-in-place Anchors

These anchors are cast in the mortar when erecting internal walls. Depending on the method of erecting the internal walls (type of mortar), two types of anchors are used:

1. anchors for traditional mortars (NL type)
2. anchors for thin-joint mortars (PRIK type)

Fig. 12 NL Type Anchor

Fig. 13 PRIK Type Anchor

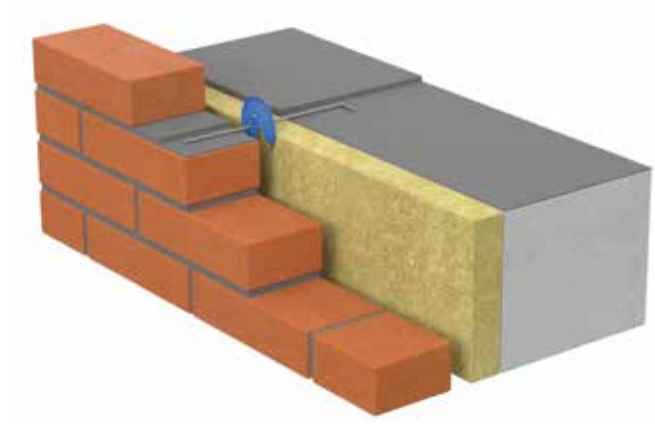


Fig. 14 Sample Application of NL Type Anchor

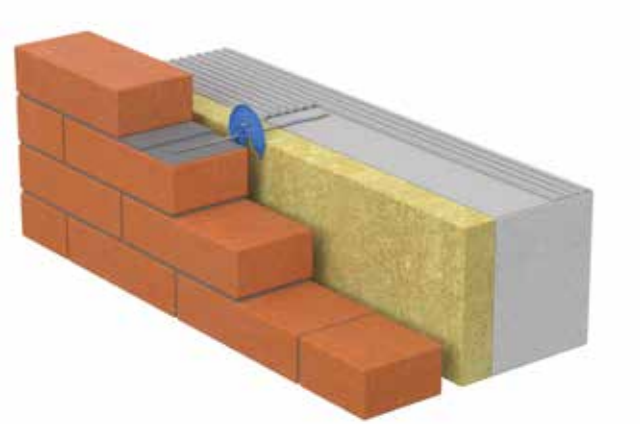


Fig. 15 Sample Application of PRIK Type Anchor

Both types of anchors are best suited when the height of the load-bearing wall components is a multiple of the height of the cladding bricks (or it is the same). The main advantage of this type of anchors is their very simple installation. Their disadvantage - if the position of joints on both walls do not match, bending of anchors is required.

Post-installed Anchors

These anchors are used if:

• the load-bearing wall is made of materials that prevent the setting of NL or PRIK type anchors (e.g. a reinforced concrete wall);

• there is large difference in height of the wall building components and strong bending of anchors would be required;

• cladding is erected on an existing wall;

• reducing the risk of an accident at the construction site is needed (e.g. injuring of workers by anchors sticking out of the wall).

Fig. 16 - NB Type Anchor (Driven) for Traditional Mortar

Fig. 17 - NK Type Anchor (Screw-in) for Traditional Mortar

Fig. 18 - NNK Type Anchor for Thin-joint Adhesive Mortar

Installation method:

• mark horizontal lines on the wall (measured in such a way that they fall in line with the joints of the cladding wall to be erected) in 45-50 cm spacing pattern;
• drill holes on the lines for anchors to be installed at every 50 cm;
• inserting expansion plugs suitable for a given type of wall into the holes;
• screw in or drive the anchors into the expansion plugs (screwing in or driving tools may be required).

Fig. 19 Sample Application of Driven Anchor

Fig. 20 Sample Application of Screw-in Anchor

Anchor Accessories

Clamping Discs

Material

Krążki dociskowe wykonane są z tworzywa sztucznego (polyethylene or polypropylene).

Application

Clamping discs stabilize the insulation layer in the cavity wall so that it adheres to the structural wall. They also lead water vapour off thermal insulation, which is particularly important when using mineral wool. Additionally, clamping discs create a minimum 2-centimeter air gap (KOMBI disc).

Table 2. Types of Clamping Discs

	KOMBI	LIP	ECO
			
Anchor Ø	3,6-5,0 mm	3,6-4,2 mm	3,8-4,2 mm
Description	The most versatile puck. Very easy to install. Suitable for all types of anchors. The air cavity shall not be less than 2.2 cm.	Best puck. It is designed in such a way that it holds the insulation with its whole surface even after bending the anchor. The air void must not be less than 4.7 cm.	Most popular puck. With its low thickness it has a profile that drains away the condensate (drip edge). It is used especially in investments where we fear that the air void may be smaller than 2 cm.
Advantages/ disadvantages	+ simple assembly + discharge waters + forcing of the air void - after bending the anchor, it does not press the insulation layer very well	+ best drainage of condensed water vapour + good penetration of the insulation layer, independent of the bending of the anchor + forcing of the air void - fastened with a clasp, which customers should be made aware of	+ very simple installation + attractive price + low thickness - not the best insulating pressure, especially when bending the anchors

Application Principles

The discs should always be used when the anchor bends upwards towards the facade - they form a barrier on the anchor preventing water from flowing onto the thermal insulation. In addition, they allow a drip edge to form from the anchor.

In case of soft wool, other insulation fasteners are not required.

Hard wool should be glued to the substrate - the anchors do not support this type of joint.

In case of styrofoam – if substrate is even and insulation is thin, EPS panels can be fixed only with wire anchors - in this situation, the LIP disc is required. For uneven substrates and large thickness, panels must be glued to the substrate and the joints may need to be sealed with foam.

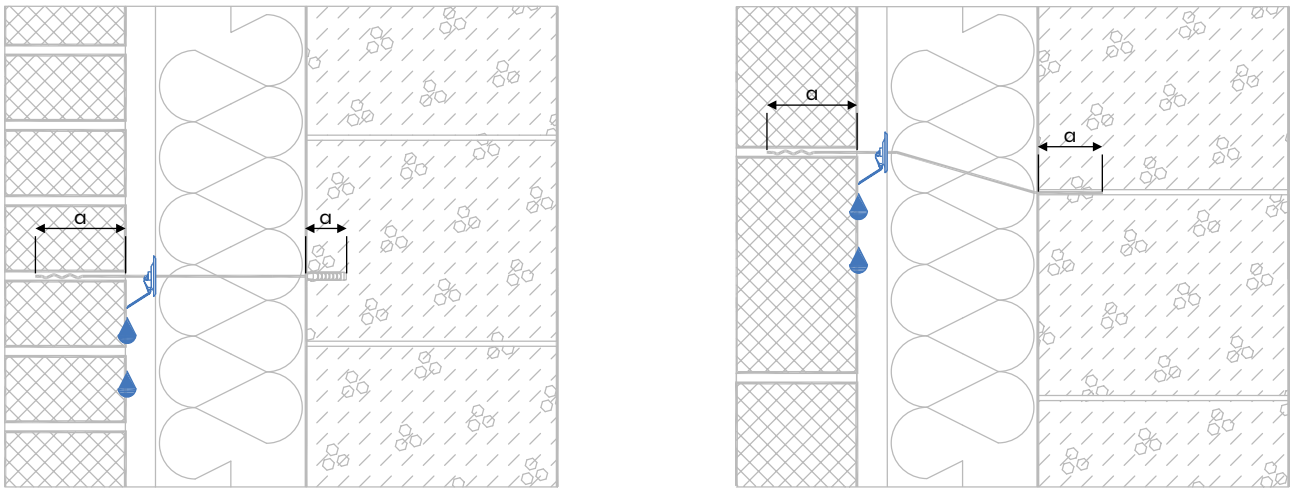


Fig. 21 - Example of anchor installation without or with upward bend.
In this case it is essential to use pressure plates with a drip edge. Anchorage depth depending on the type of anchor used.

Expansion Plugs

Fig. 22 - 4ALL (8 x 40) Expansion Plug for All Types of Materials

In our solutions, we provide one type of expansion plugs for all materials - 4ALL plug.

In order to correctly insert the expansion plug, a Ø8x40 mm hole should be prepared, in solid materials - with a rotary hammer, in porous ceramic materials - with a non-hammer drill, and in aerated concrete with a punch.

Table 3. Selection of anchors for subsequent installation depending on the width of the slot for 8x40 plug

Anchor type	Gap max. (cm)
NB 16	7
NB 19	10
NB 22	13
NB 25	16
NB 27,5	18,5
NB 30	21
NB 32,5	23,5
NB 35	26
NB 37,5	28,5
NB 40	31
NB 50 Ø 5	41
NB 60 Ø 5	51

Anchor type	Gap max. (cm)
NK 16	7
NK 19	10
NK 22	13
NK 25	16
NK 27,5	18,5
NK 30	21
NK 32,5	23,5
NK 35	26
NK 37,5	28,5
NK 40	31

Anchor type	Gap max. (cm)
NNK 16	7
NNK 19	10
NNK 22	13
NNK 25	16
NNK 30	21
NNK 35	26
NNK 40	31

Table 4. Selection of anchors inserted into joints depending on joint width and mortar type

Anchor type	Gap max. (cm)	Mortar	
		Facade	Construction
NL 23	< 13	traditional	traditional
NL 26	< 16	traditional	traditional
NL 29	< 19	traditional	traditional
NL 32	< 22	traditional	traditional
NL 35	< 25	traditional	traditional
NL 40	< 30	traditional	traditional

Anchor type	Gap max. (cm)	Mortar	
		Facade	Construction
PRIK 25	< 11	adhesive/ traditional	adhesive
PRIK 28	< 14	adhesive/ traditional	adhesive
PRIK 31	< 17	adhesive/ traditional	adhesive
PRIK 34	< 20	klejowa/ tradycyjna	klejowa

Lintels

Murfor® reinforcement (supplemented with LHK stirrups) is designed for refitting the wall in the lintel area. It replaces traditional lintel beams. It is very important in the cladding walls, where openings with up to 2 m span can be bridged in a very aesthetic way (the entire reinforcement is hidden in the mortar and only bricks and joints are visible).

NOTE: Regardless of the construction of lintel, window sill area, where the load is concentrated, must be refitted with the Murfor Compact® reinforcement (see fig. 24).

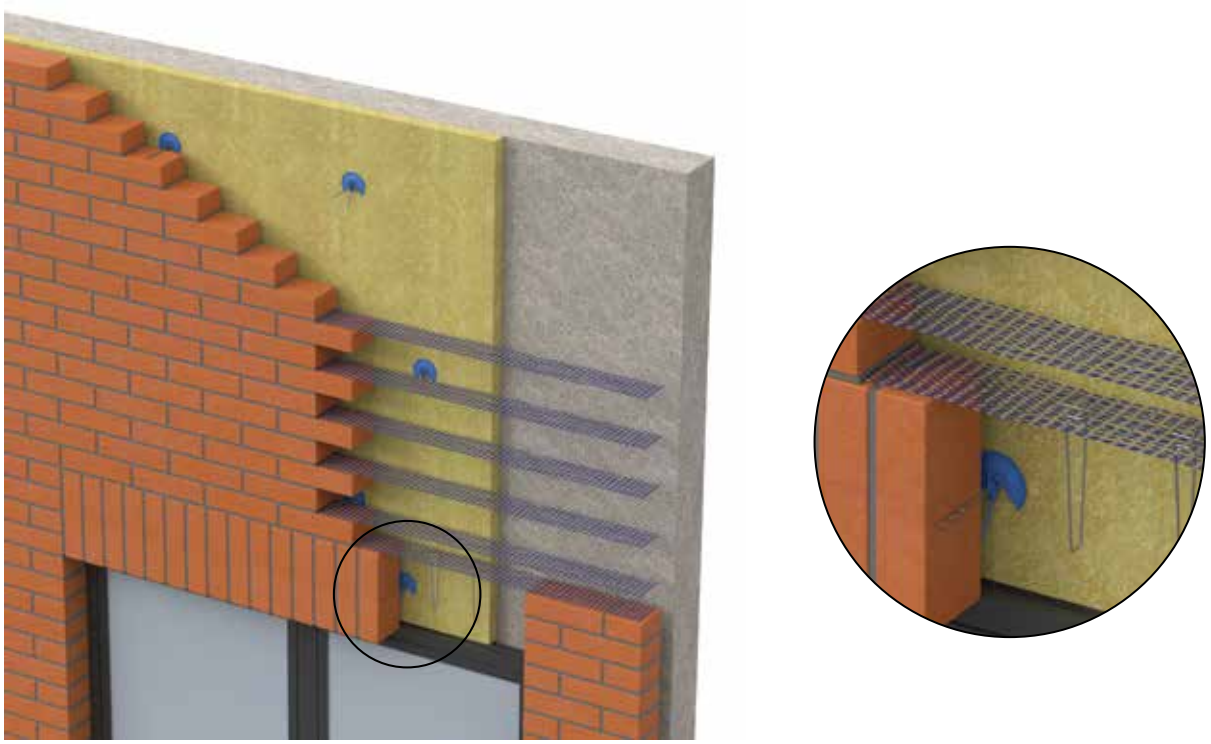


Fig. 23 - Lintel in Murfor® system

Masonry Lintels

It is the easiest, fastest and most cost-effective method of erecting lintels in cladding walls. It ensures a uniform structure of the wall and does not introduce any additional load. The method's additional advantage is that lintels can be erected independently of the building structure, which is very important when using precast L-type lintels in the structural wall - without loading them with torsion moment. Murfor Compact® reinforcement is used to erect lintels in the cladding, which in combination with special stirrups allows to span the opening with virtually any brick layout in the first layer (see fig. 24). However, reinforced lintels have some limitations - depending on the opening width, a proper minimum wall height above the opening is required. If this condition is not met, additional supports (brackets) are used with relevant load-bearing capacity and shape adapted to the thickness of the insulation and the building structure (see fig. 24).

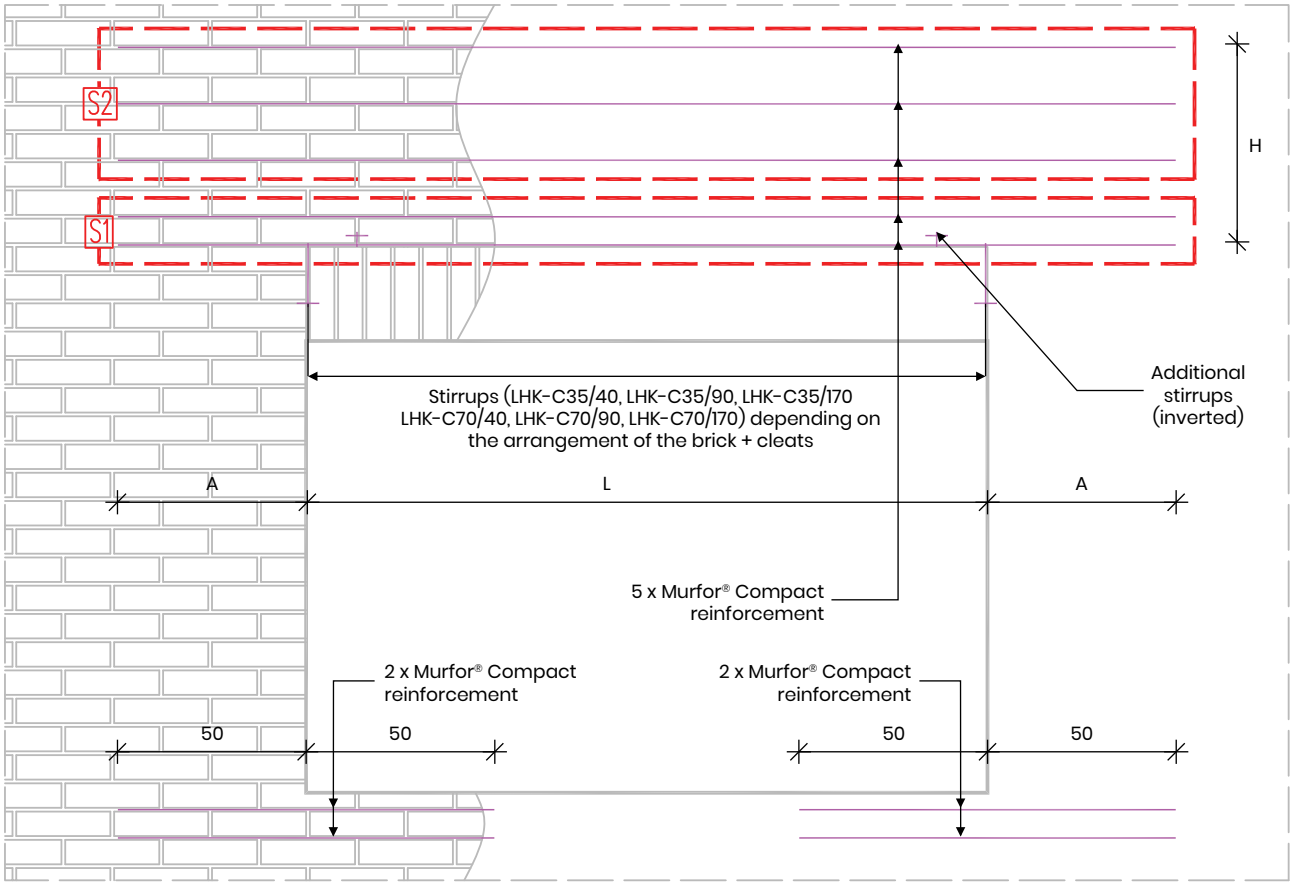


Fig. 24 - List of elements required to make lintels in Murfor® System

General rules that must be observed when designing and erecting lintels in the Murfor® System:

• the minimum height of the façade wall strip above the roller depends on the span of the lintel L, size H according to tables 5 and 6;

• the minimum width of the pillars on both sides of the considered lintel depends on the minimum anchorage length A resulting from the lintel span L and cannot be less than A + 2 cm, size A according to tables 5 and 6;

• apart from the minimum width of the pillars, their bearing capacity and stability should also be verified;

• in the vertical joints of the first layer of bricks, place stirrups, always in the extreme joints and:

- in a flat arrangement (the first layer in the lintel is placed horizontally on the base) - in each joint,

- in a stacked arrangement (the first layer in the lintel is laid on the head, in the vertical position), with whole bricks or cut bricks - in every third joint;

• together with the stirrups, safety pins P 3/80 should be used, placed in the holes made in the side planes of the masonry elements, just above the stirrup line;

• additionally, in order to safely transfer the stresses arising on the pillar style with an underloaded sill area, it is recommended to use Murfor Compact reinforcement in two layers below the edge of the opening, in sections of 100 cm.

Tabela 5. Number of Murfor® Compact E-35 reinforcement layers in zones for solid brick 210 x 100 x 50 mm, class 20MPa, on M10 mortar

			Amount of reinforcement and stirrups (including dowels) for max. L (brick 210 x 100 x 50 mm)					
Light span	Minimum height	Minimum backrest	Zone 1	Zone 2	Large course every 18 cm	Small course every 18 cm	Flat every 22 cm	Additional every 22 cm
L (cm)	H (cm)	A (cm)	S1* (pcs.)	S2** (pcs.)	LHK-C35-170 (pcs.)	LHK-C35-90 (pcs.)	LHK-C35-40 (pcs.)	LHK-C35-40 (pcs.)
20-120	40	52	2	1	8	8	7	-
121-150	60	52	2	2	10	10	8	-
151-180	75	52	2	2	11	11	10	9
181-210	90	52	3	3	13	13	11	10
211-240	110	52	3	4	15	15	12	11
241-270	120	52	3	4	16	16	14	13

Tabela 6. Number of Murfor® Compact E-70 reinforcement layers in zones for solid brick 250 x 120 x 65 mm, class 20MPa, on M10 mortar

			Amount of reinforcement and stirrups (including dowels) for max. L (brick 250 x 120 x 65 mm)						
Light span	Minimum height	Minimum backrest	Zone 1	Zone 2	Large course every 22,5 cm	Small course every 22,5 cm	Flat every 26 cm	Soldier course every 15 cm	Additional every 26 cm
L (cm)	H (cm)	A (cm)	S1* (pcs.)	S2** (pcs.)	LHK-C70-170 (pcs.)	LHK-C70-90 (pcs.)	LHK-C70-40 (pcs.)	LHK-C70-90 + NK (pcs.)	LHK-C70-40 (pcs.)
20-120	40	52	2	0	7	7	6	9	-
121-150	60	52	2	1	8	8	7	11	-
151-180	75	52	2	1	9	9	8	-	7
181-210	90	52	3	1	11	11	10	-	9
211-240	110	52	3	2	12	12	11	-	10
241-270	120	52	3	2	13	13	12	-	11
271-300	135	52	3	2	15	15	13	-	12

*reinforcement spacing in Zone 1 - every joint
** reinforcement spacing in in Zone 2 - every second or third joint

NOTE: Join the reinforcement (except for the first two layers) along the length, with min. 20 cm overlaps at 1/3-1/4 from the support and set it on the pillar according to the A value in the Table above. After installation, lintels should be supported for 14 days.

Lintels on Masonry Support Systems

Lintels on masonry support systems are used on:

• corner windows;

• long openings with a high wall shield;

• windows where the first layer bricks are laid on the soldier course;

• levels with horizontal expansion joints;

• half-brick cladding.

Stainless steel stirrups are required to erect lintels on brackets or angles. Depending on the method of laying the bricks in the first layer, the proper type of stirrups should be used.

Fig. 25 - Lintel on Masonry Support System

Types of Masonry Support Systems

The most popular types of masonry support systems with illustrative cross-section views are shown below.

Basic console architectures based on:

• the bracket shape (taking into account support level and the fastening conditions)

Fig. 26 - NA Masonry Support System

Fig. 27 - NC Masonry Support System

Fig. 28 - NV Masonry Support System

Fig. 29 - NA Masonry Support System

Fig. 30 - NC Masonry Support System

Fig. 31 - NV Masonry Support System

Masonry support systems can also have different angle lengths and angle shapes (see Figures above). Our design team always selects the dimensions of the masonry support system to take full advantage of the material's load-bearing capacity.

• number of brackets

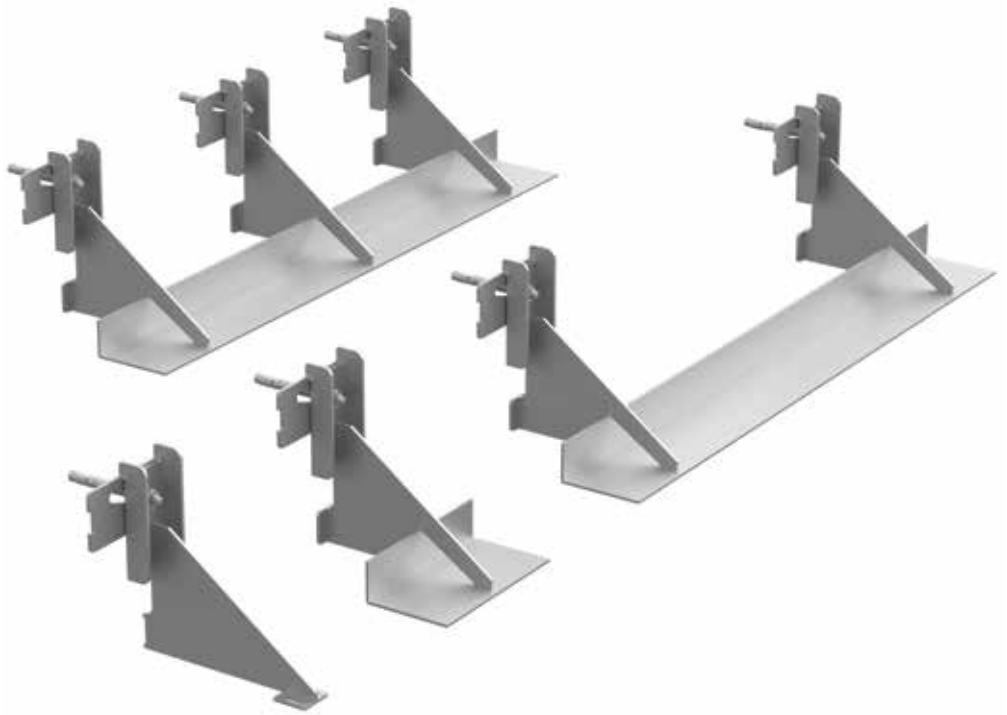


Fig. 32 - NA Masonry Support Systems

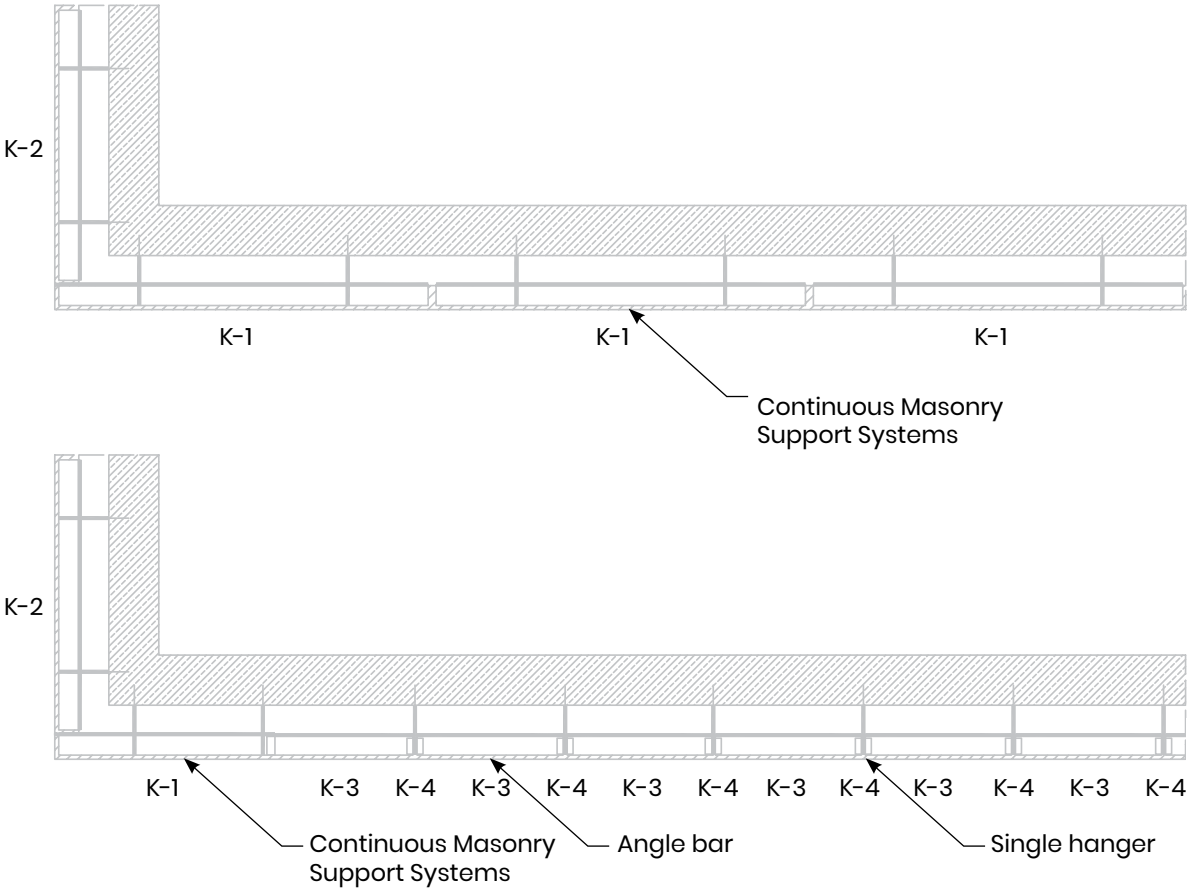


Fig. 33 - Sample Layout of Masonry Support Systems and Angles at the Corner of the Building

Requirements for the Building Structure

As a standard, the masonry support systems are fixed to the reinforced concrete elements of the building structure by means of chemical or mechanical anchors. The minimum dimensions for horizontal reinforced concrete structures depending on the class and overhang of masonry support systems are shown in the Figure and Table below.

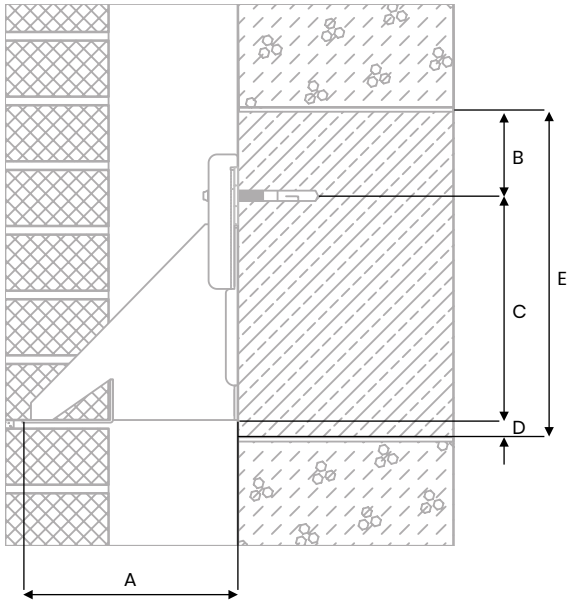


Fig. 34 - Minimum Dimensions

Table 6. Minimum dimensions for horizontal reinforced concrete structures depending on class and extension of consoles (minimum concrete class C20/25)

Load class (kN)	Overhang	Dimension			
	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
3,5	80-210	min. 80	150	min. 20	250
	215-310		175		275
	315-380		200		300
7,0	80-120	min. 110			330
	215-310		250		380
	315-380		300		430
10,5	80-120		250		380
	215-310		300		430
	315-380		350		480

The dimensions of reinforced concrete elements shown above ensure the load capacity of brackets and fixing anchors is fully used and that the masonry support system is fully adjustable. If the building structure does not meet the above-mentioned requirements, number of anchors is reduced, and different types of brackets or alternative fasteners (MZ) shall be used.

Alternative Fasteners

Alternative fasteners are used if typical brackets cannot be used due to the building structure, and the contractor requires the possibility of levelling the masonry support system. The most common types of alternative fasteners (MZ) are shown in the cross-section views below.

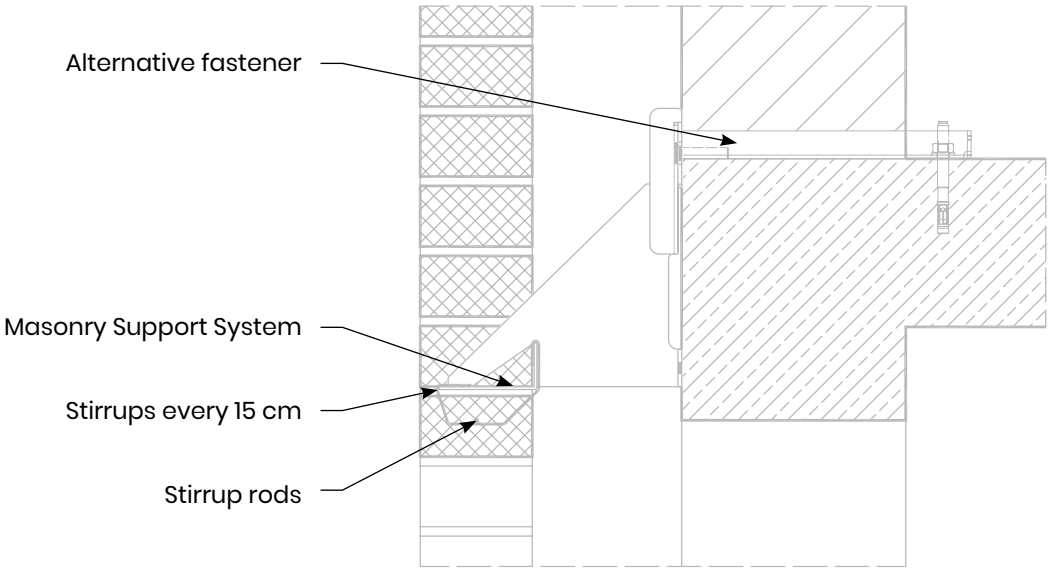


Fig. 35 - 1 NA Masonry Support System + MZ Fastener

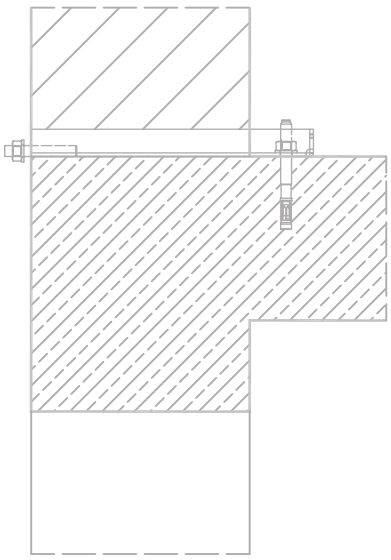


Fig. 36 - MZ Fastener

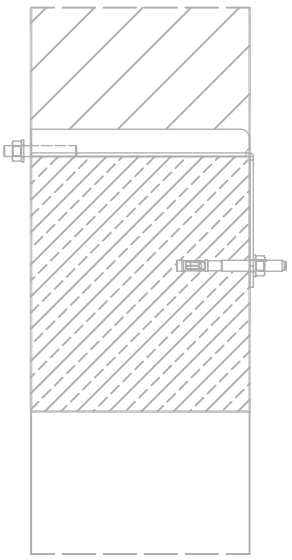


Fig. 37 - MZ-L Fastener

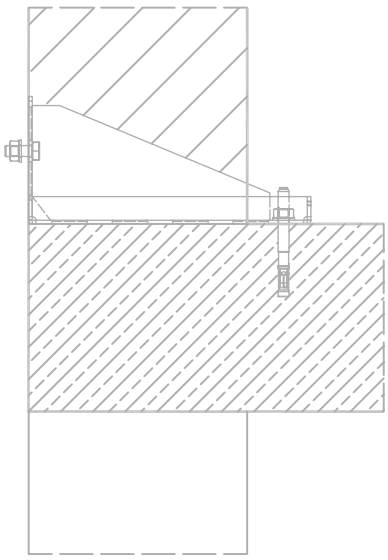


Fig. 38 - MZ-W Fastener

Precast Lintels

They allow for a very fast erection of the cladding but require a special approach in designing and ordering the lintels in an external, dedicated prefabrication plant. It is very important that the lintels are manufactured of the same batch of bricks as those delivered to the construction site - this will minimize the colour difference between the lintel bricks and the cladding. It is also necessary to apply at least two layers of Murfor Compact® reinforcement above the precast lintels in order to reduce the load concentration at the contact point of the wall and the precast components.

Suspended Precast Lintels

They are designed and manufactured as precast ceramic and reinforced concrete beams divided into 100 kg sections (for easier installation). Each beam has pre-assembled components for suspending it to the brackets of required load-bearing capacity. This solution significantly speeds up erecting of the cladding (no formwork and suspending bricks under the masonry support system is required).

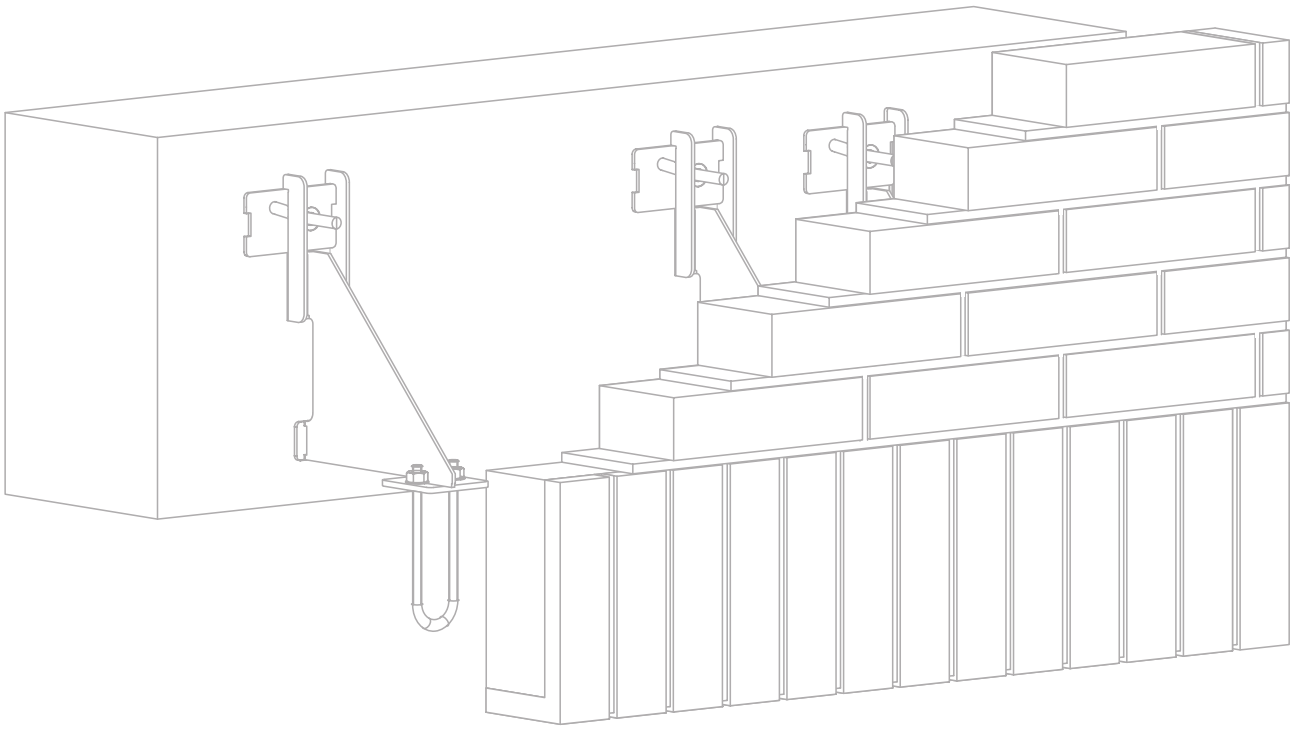


Fig. 39 - Suspended Precast Lintels

Free-standing Precast Lintels

The easiest method of erecting precast lintels. In case of these lintels, load-bearing capacity of the pillars must be checked, wall above the lintel refitted with two Murfor Compact® layers and the entire cladding properly anchored.

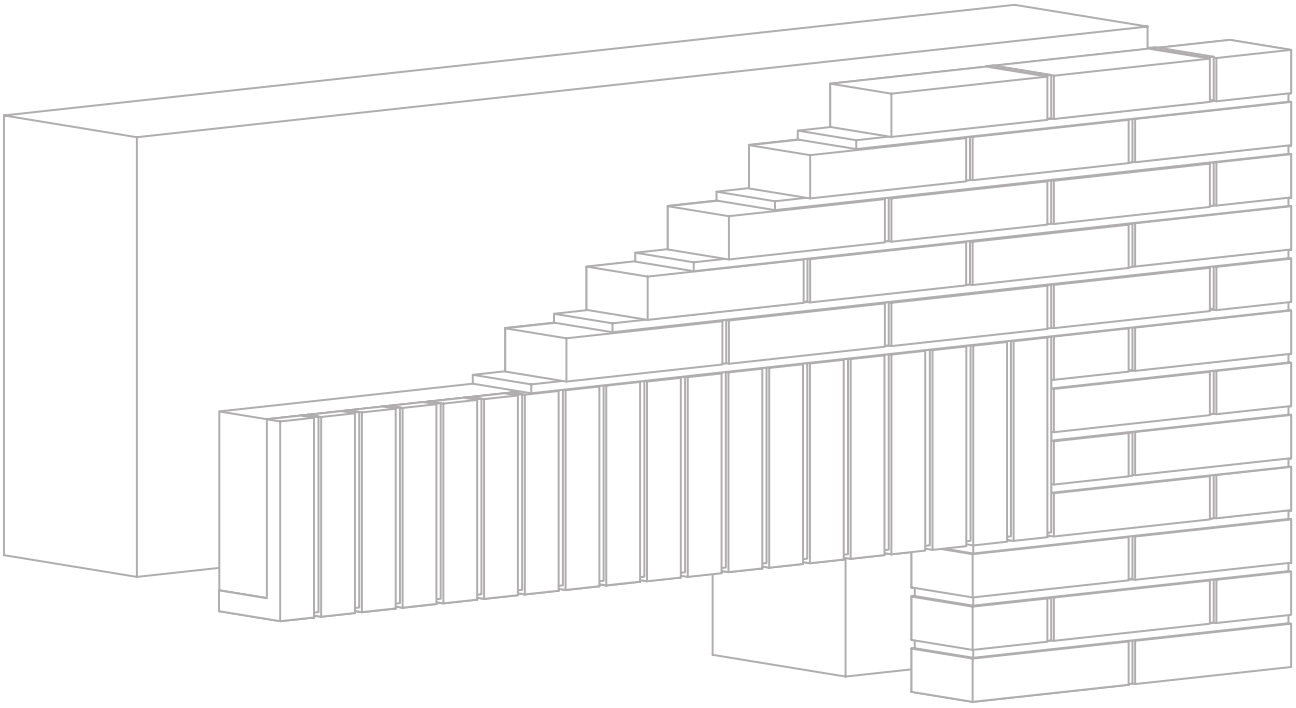


Fig. 40 - Free-standing precast lintels

Lintel Accessories

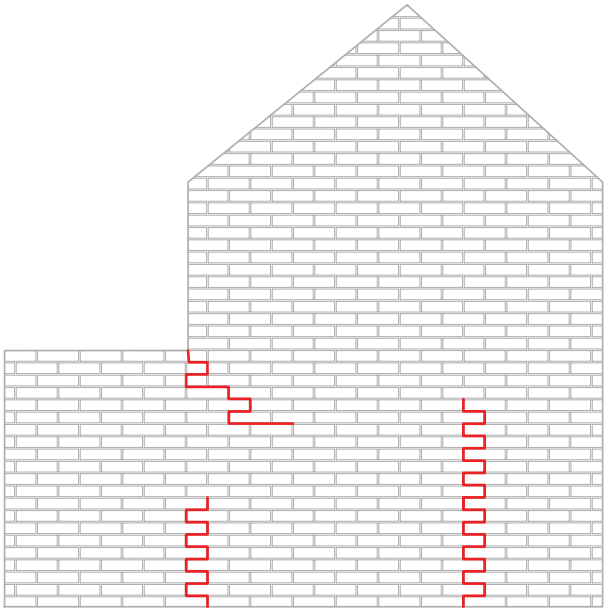
Preparing opening formwork at the construction site can be very difficult, especially for high windows and doors. A part that can make work much easier is the PS-2 formwork tool. When using the tool, punches and expansion bolts are not required, if supporting beam has proper stiffness. PS-2 is set in the joints of the cladding wall. Due to its design, levelling of lintels can be carried out very smoothly.

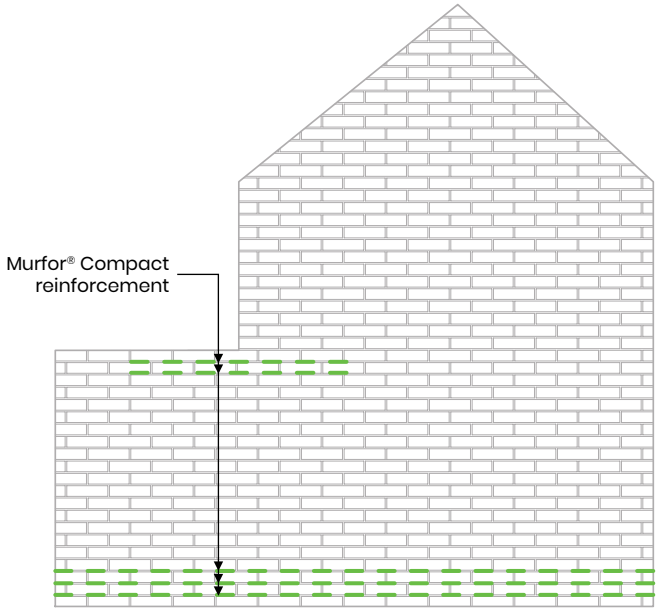
Fig. 41 - Formwork Tool

Sensitive Zones

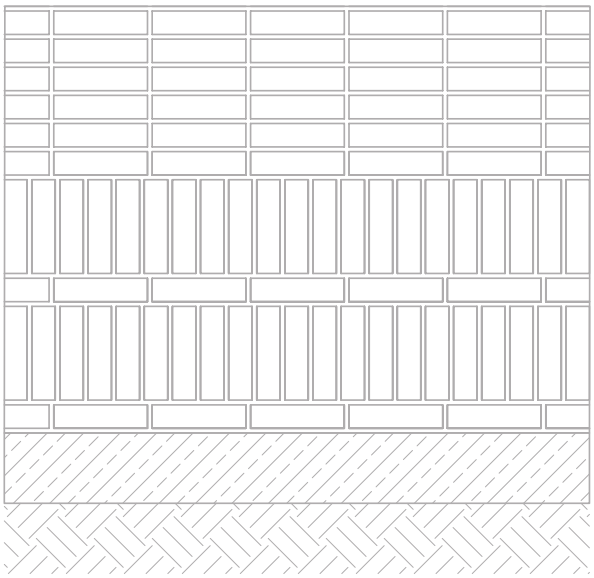
Regardless of the type of bricks, the method of their bonding or the shape of the building, each cladding has zones with load concentration, which can lead to highly undesirable scratches or cracks in the cladding wall.
In order to eliminate scratches or cracks, Murfor Compact® reinforcement is used. Areas where reinforcement should be used are listed below.

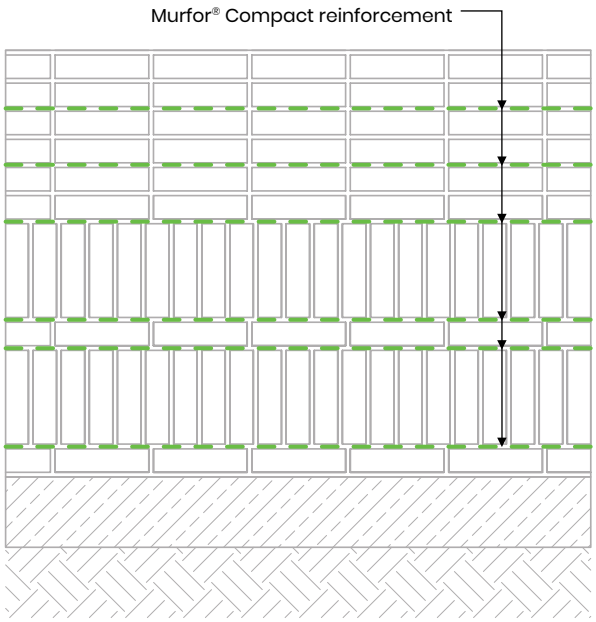
Grounding and facade faults



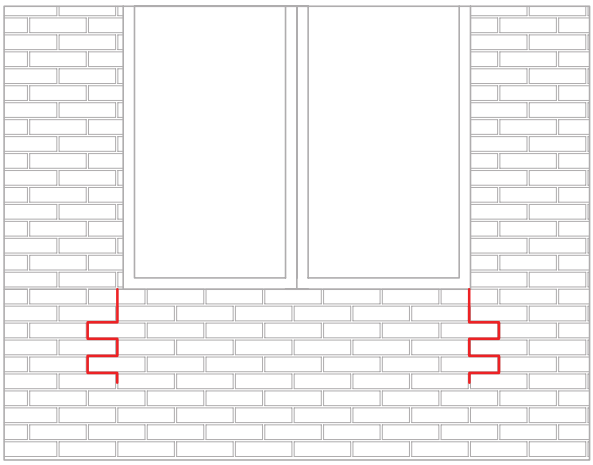


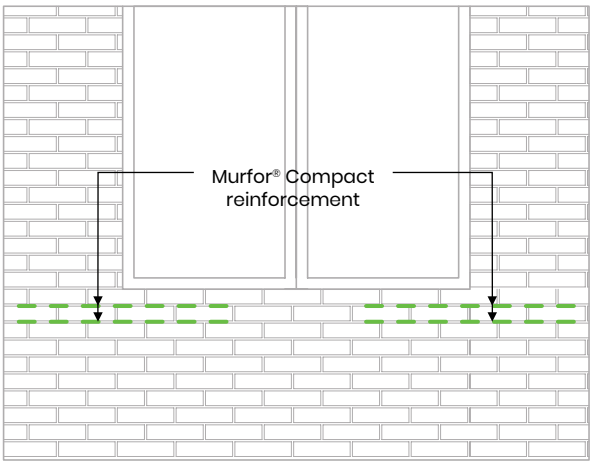
Walls without bindings



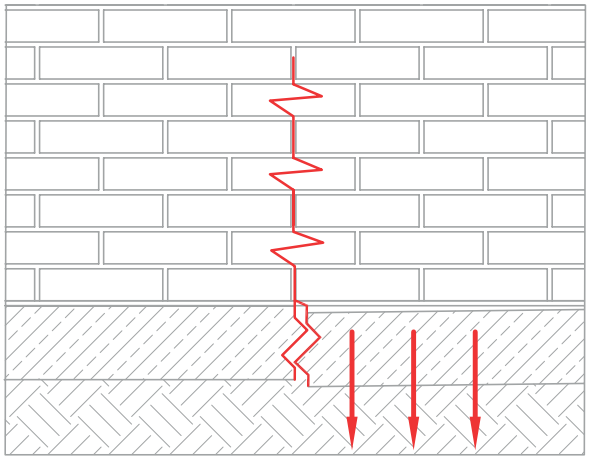


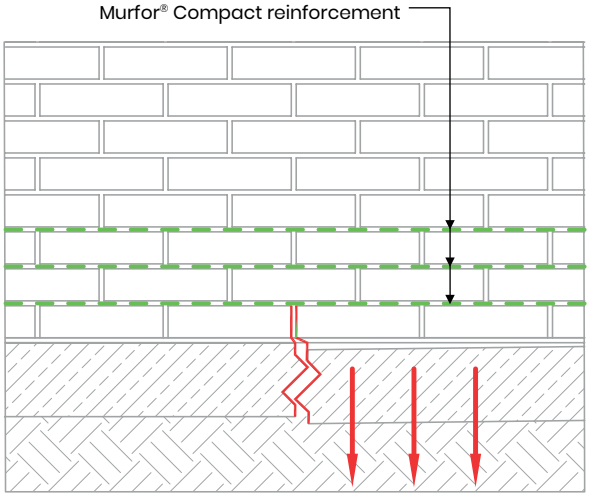
Sub-window Zone



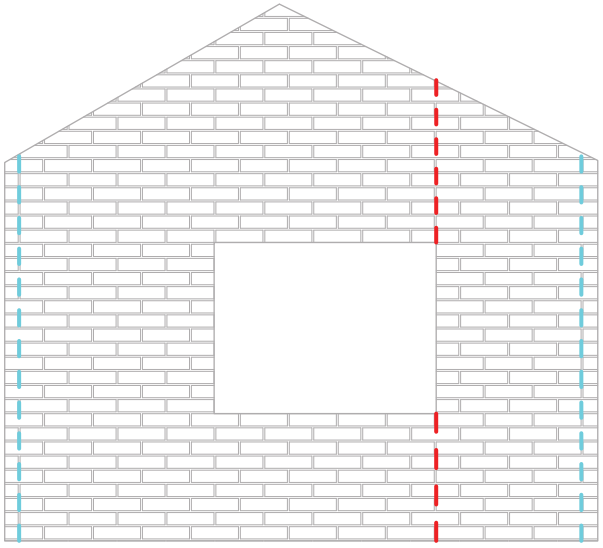


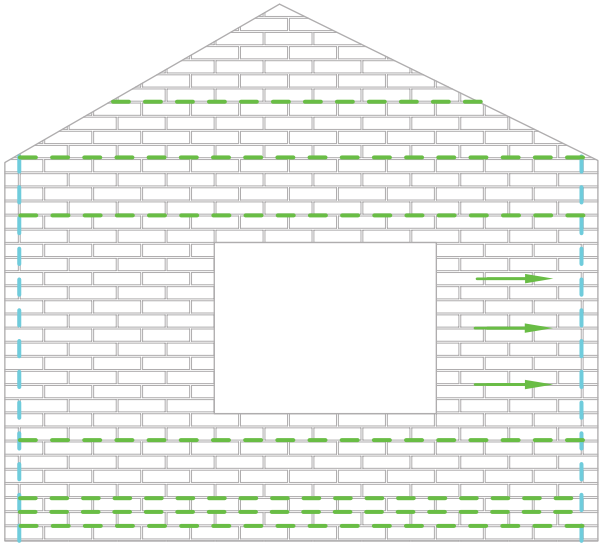
Uneven settlement





Elimination of expansion joints





Ventilation

with Ventilation and Drainage Boxes

Product

1. Dense mesh protecting against rodents and insects.
2. Internal protection against water, and condensation drainage. Overall dimensions 11 x 6 x 1.0 cm.

Fig. 42 - Ventilation and Drainage Boxes - Cross-section View

Ventilation and drainage boxes are entirely made of plastic. They are shaped as a hollow cuboid.

Application

Ventilation and drainage boxes are designed to ventilate cavity walls and drain condensate to the outside of the wall. This ensures the optimum humidity of the insulation layer is maintained, and also reduces the risk of efflorescence on the cladding. Additionally, the boxes protect the inside of the cavity wall against rodents and larger insects (grille in the outer part), and rainwater (special profiles inside the box). To drain water that penetrated through the outer layer of the wall, it is recommended to make an apron of asphalt felt or similar waterproofing material at the bottom of the outer layer, on the cement mortar base coat (Fig. 43).

Note: If the cladding is more than 6 m high, an additional row of boxes should be used in the middle of the cladding.

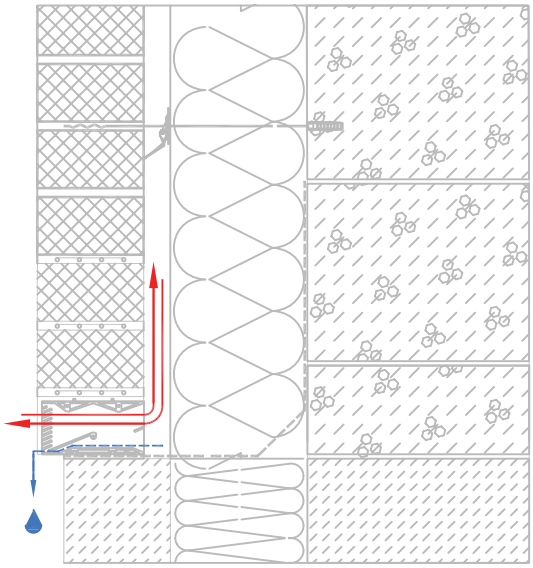


Fig. 43 - Ventilation and Drainage Box Application

A similar solution should be used above the windows. For optimal ventilation of two- and three-layer masonry, maximum every 1 m:

- over the foundation;
- above and after the windows;
- along the top edge of the façade (if the ventilation gap is closed from above).

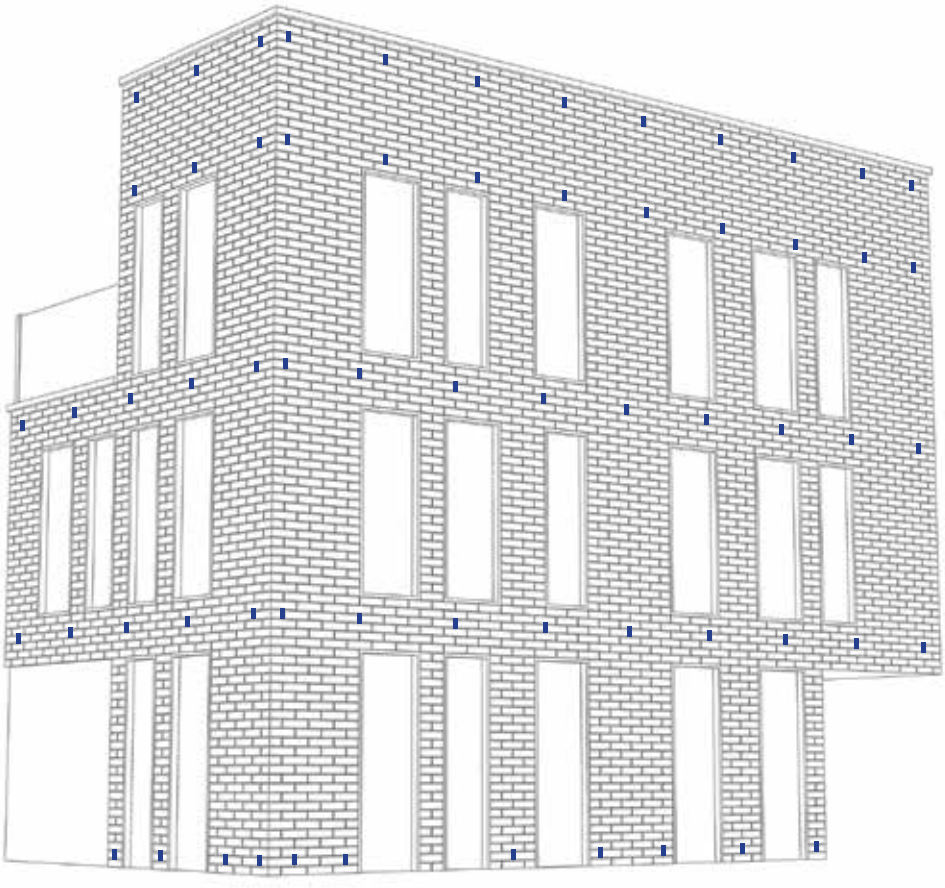


Fig. 44 - Location of Boxes in Cladding – Sample

Features

Ventilation and drainage boxes are manufactured in one size of 11 x 6.0 x 1.0 cm., but in a range of colours.

Main colours include white, light grey, dark grey, graphite, brown and yellow. By choosing the right colour (to match the colour of joints or the colour of plaster, if the cladding is to be plastered), the boxes can be almost completely invisible.

In addition, the boxes have special marks for easier cutting and fitting them into the 9 and 6 cm thick cladding.

Fig. 45 - Ventilation and Drainage Boxes – Colours

Installation

The boxes are installed as specified in section „Application" (page 38), by inserting them between the cladding bricks instead of the vertical joint. The arrows pointing to the top and the face of the wall are shown on the box side walls, which helps to eliminate installation errors. Only proper installation of the boxes in the wall will guarantee their correct operation. Also, particular attention should be paid when erecting the cladding wall in order to protect the inside of the boxes from mortar falling down in the cavity.

Customized solutions

Attics

With sandwich walls there are situations where the facade is significantly elevated above the building structure. The issue to be solved is the proper transfer of horizontal forces resulting from wind pressure and suction. This section is designed as a wall reinforced with Murfor® Compact and supported from behind with attic brackets. The facade is anchored to the brackets with stirrups selected according to the thickness of the facade in the attic.

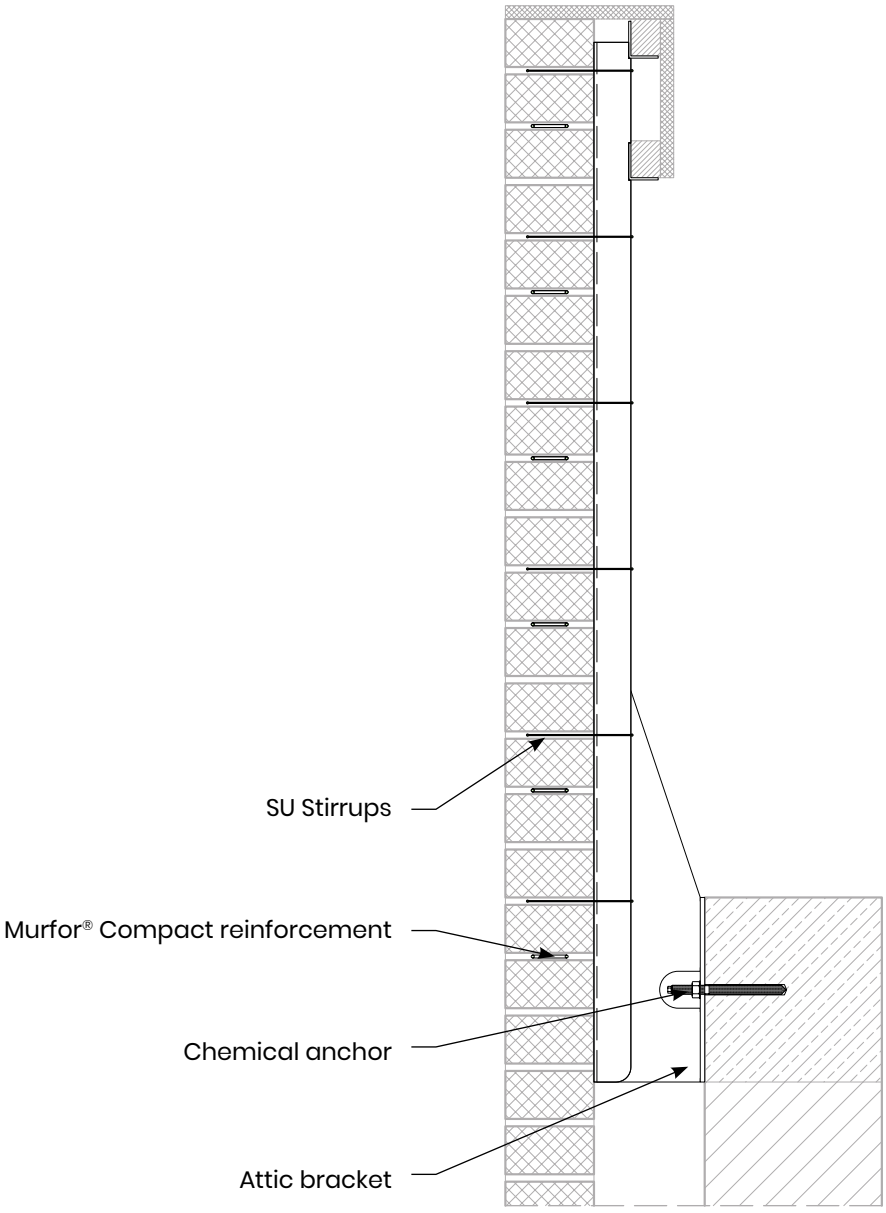


Fig. 46 - Detail of attic solution - type 1.

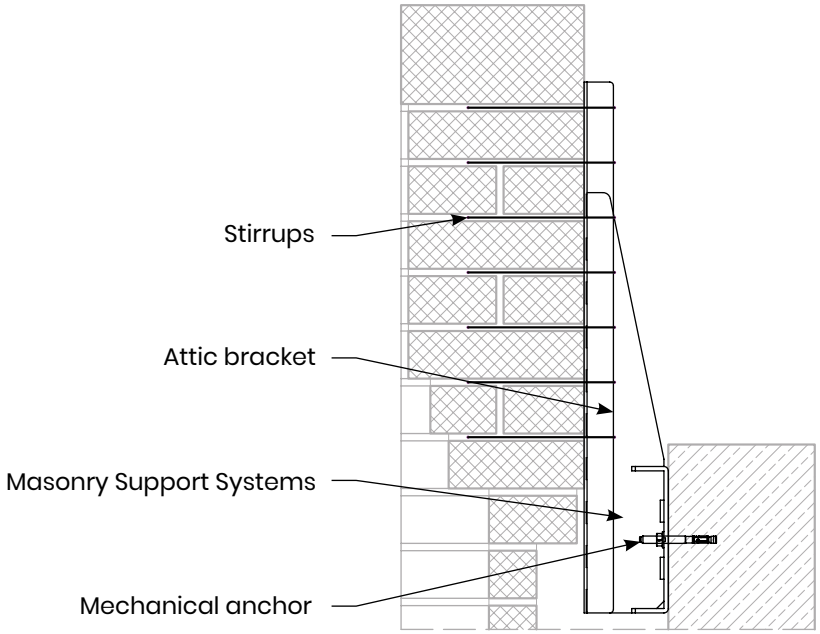


Fig. 47 - Detail of attic solution - type 2.

Cornices

Cornices are one of the most popular and oldest decorations on facades. Letting out brick accents as wide as 25 cm from a 50-75 cm thick wall used to be no problem. The situation changes drastically when we try to do the same by shaping cornices in façade walls 10-12 cm thick, often in the regions of attics, where we cannot use the stabilizing effect resulting from pressing the wall above.

Individually designed tie rods and attic hangers are the solution here.

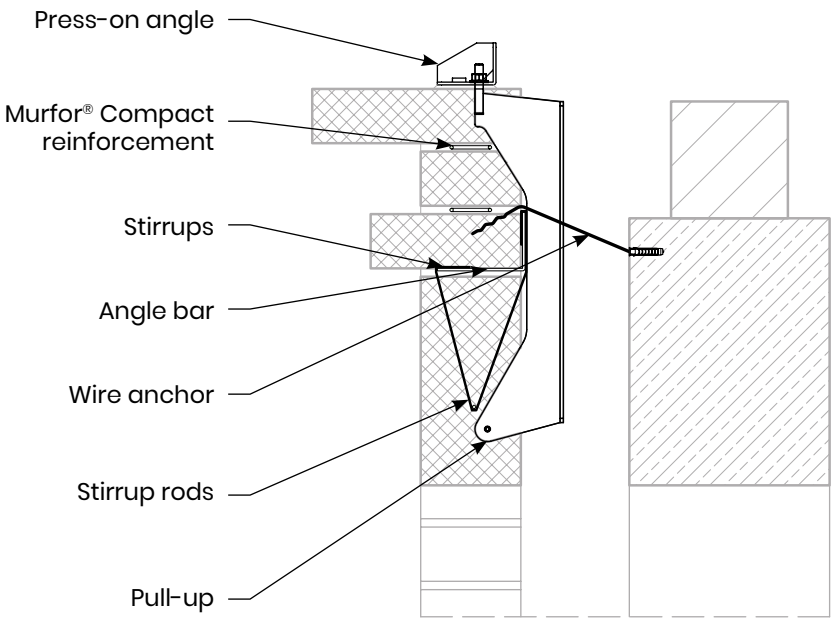


Fig. 48 - Detail of cornice solution - type 1

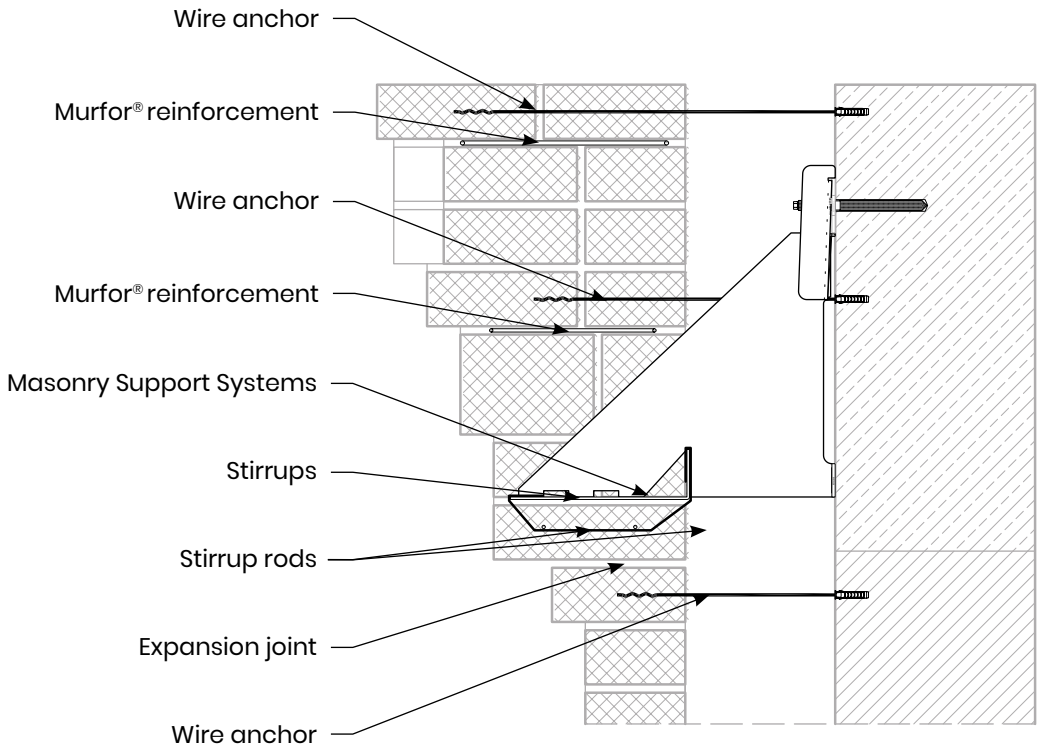


Fig. 49 - Detail of cornice solution - type 2.

Other

Brick allows you to shape many elements such as arches, rustication, openwork, etc. The following is an example of a technical solution.

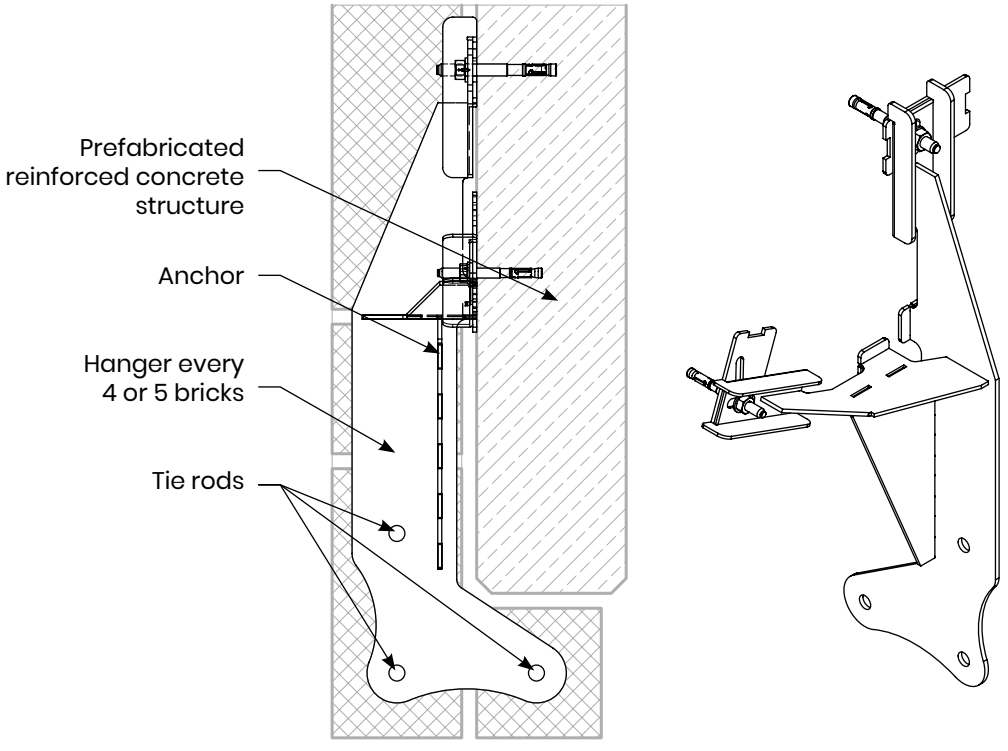


Fig. 50 - Detail of solution of unsupported arch lintel with deep palate

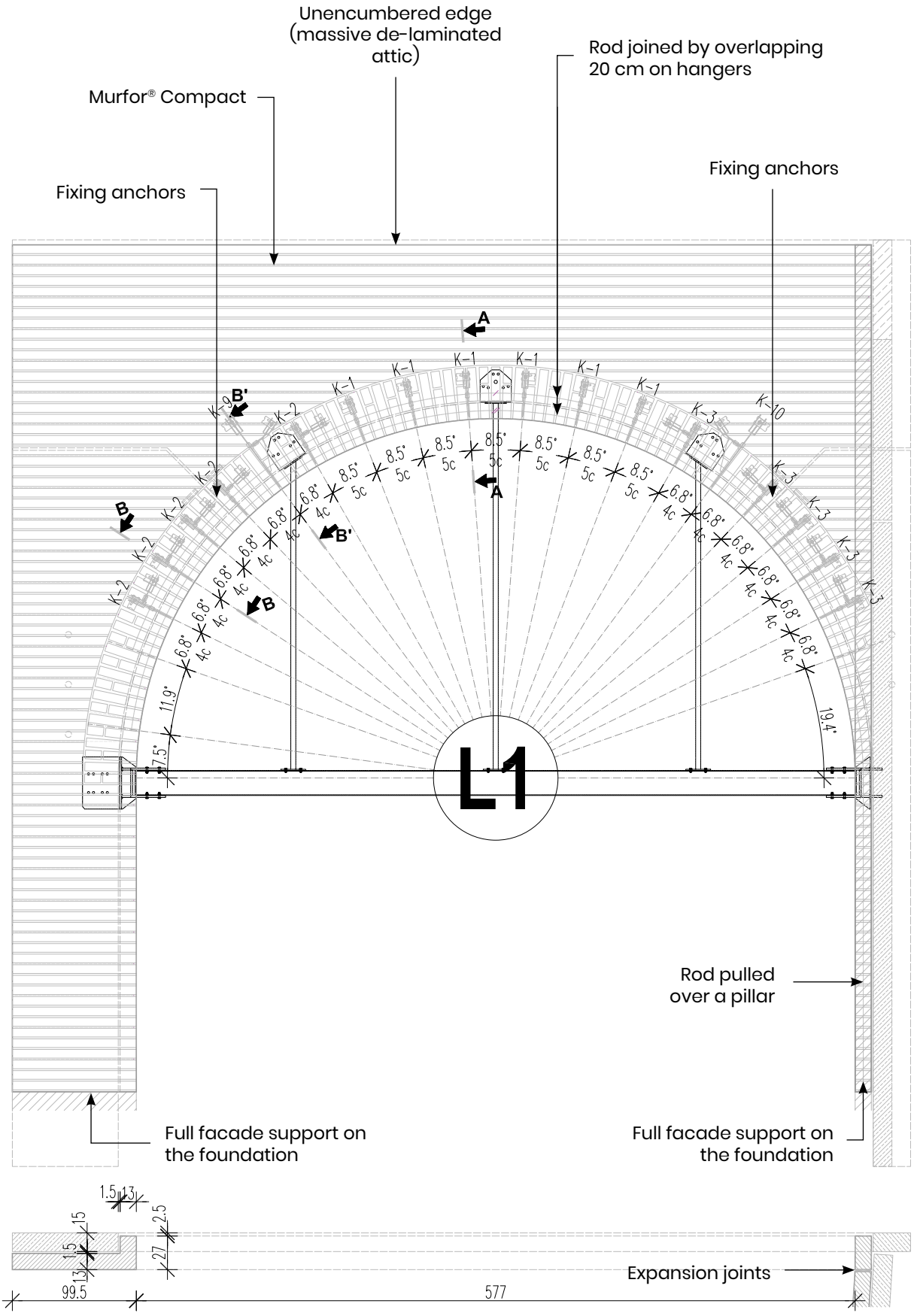


Fig. 51 - Example of non-self supporting arch lintel solution - front view

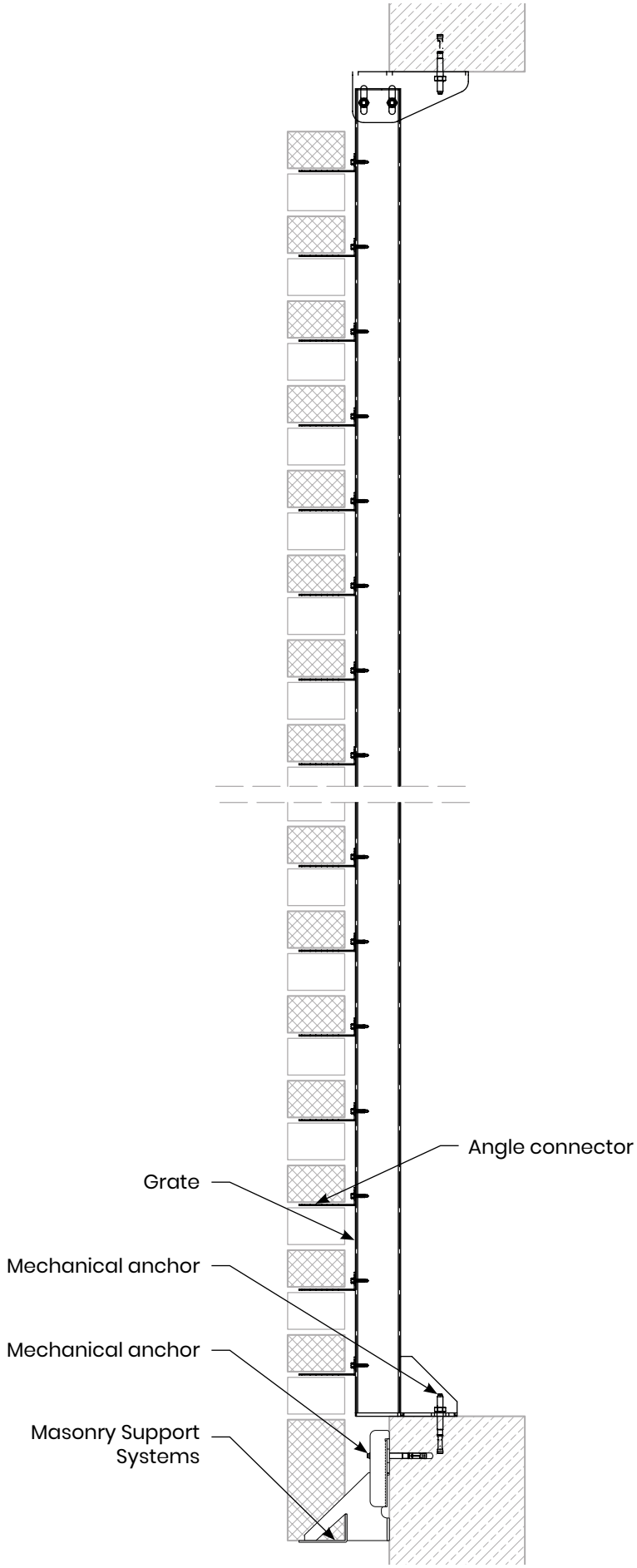


Fig. 52 - Detail of openwork elevation solution

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