



solcraft[®]
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H-BLOCK[®] SYSTEM ASSEMBLY MANUAL





1. H-Block® system

H-Block® is an insulating construction panel made of polyurethane foam, closed in a box construction and permanently connected to the wood-based OSB cladding. Lightweight, but very durable, H-Block® is a structural material for the construction of load-bearing walls, ceilings, roofs and floors in single- and multi-family residential buildings. The creation of the H-Block® system is inextricably linked with the SIP technology (Structural Insulated Panel), which dates back to the 1930s. SIP is a building material that is a combination of a cover layer (usually OSB) and an insulating core (usually a Styrofoam). H-Block® is a new generation of SIP panels.

H-Block® is an innovative, patented, insulating construction panel. Unlike traditional SIP panels, H-Block® has been reinforced with OSB (H-Block®) or plywood (H-Block_{plus}®) webs, and the space between them is tightly filled with polyurethane foam. The box construction and the unique properties of the combination of polyurethane foam with OSB make H-Block® a load-bearing and insulating module at the same time.

The panels are joined using the LHB or LHB_{plus} joint, which is also filled with polyurethane foam. Thanks to this, the thermal bridge effect is maximally reduced, creating a well-insulated, uniform surface of the floor, wall, ceiling or roof.

Due to the unique insulating properties of polyurethane foam, H-Block® is a material dedicated to erecting energy-efficient and passive buildings.



2. H-Block® - structure and application

H-Block® is an insulating construction panel for building load-bearing walls, ceilings, floors and roofs with a reduced roof trusses.

CONSTRUCTION

H-Block® panels are always produced to individual order, "to size" for each building. The maximum dimensions of a single element are 12,000 mm in length and 1,250 mm in width. Each panel has two OSB webs built in at a distance of 4-6 cm from the side edge, and the space between them is tightly filled with PUR foam.



The unique thermal properties of H-Block® panels are ensured by polyurethane foam. Depending on the thickness of the PUR core (100mm, 140mm or 200mm), the heat transfer coefficient U of the H-Block® is at a level of 0.21 to 0.10 [W / m²K].

Total thickness of H-Block®	130 mm	170 mm	230 mm
PUR core thickness	100 mm	140 mm	200 mm
Heat transfer coefficient U	U=0,21 [W/m ² K]	U=0,15 [W/m ² K]	U=0,10 [W/m ² K]

The panels are joined using the LHB joint filled with polyurethane foam. Thanks to this, the thermal bridge effect is reduced, creating a well-insulated, uniform surface of the wall, ceiling, floor or roof.

APPLICATION

Walls

Thanks to the unique mechanical properties, walls in the H-Block® system can carry loads up to 4 storeys. As the wall in the H-Block® system is both an insulating and constructional element, its small total thickness allows for increasing the usable area with the same level of isolation as in traditional construction.

Ceilings and floors

H-Block® can also be used for the construction of inter-storey ceilings, flat roofs and floors. The use of H-Block® insulation panels on the floor eliminates the thermal bridge on the foundation of the building and on the connections between the walls and the floor.

Roofs

Roofs made in the H-Block® system outperform their durability and traditional strength. The insulating layer does not need to be renovated throughout the entire lifetime of the facility, without losing its insulating properties over time. As a composite material, H-Block® panels give unsurpassed anti-shock protection, effectively protecting the building from hurricanes.

Installation of the roof in the H-Block® system can take place in two ways. H-Block® panels joined using LHB can be installed by the rafter-mounted method, reducing the spacing of the rafters needed to support the rafters and the number of thermal bridges. The second solution is the installation of a roof with a hidden rafter, i.e. the H-Block® panels are joined together by means of rafters inserted in place of the LHB joints.

What's more, the use of H-Block® panels on the roof allows for getting higher rooms in the attic, because the PUR insulation layer is almost twice lower than in the case of using mineral wool or polystyrene.

Renovations and superstructures

In every roof installation option, the use of H-Block® reduces the whole operation to one or two assembly days, which is particularly valuable in the case of roof replacement operations on objects already in use (repairs), making assembly work independent of weather caprices.

Due to the extremely low total weight in relation to mechanical strength, H-Block® allows you to create superstructures on an existing structure where weight calculations for traditional materials do not allow this.



3. H-Block_{plus}® - structure and application

H-Block_{plus}® is the first insulating construction panel with increased mechanical strength for the construction of floors, ceilings and roofs.

STRUCTURE

H-Block_{plus}® is manufactured in a module with a width of maximum 1.250mm and length of 13,000mm. Each panel has two plywood webs built within 31 cm from the side edge, and the space between them is tightly filled with PUR foam.



The panels are joined using the LHB_{plus} joint filled with polyurethane foam. Thanks to this, the thermal bridge effect is reduced, creating a well-insulated, uniform surface of the floor, ceiling or roof.

Thanks to the increased load-bearing parameters, it is possible to reduce the traditional construction elements (roof truss, floor beams) necessary for the construction.

Total thickness of H-Block®	130 mm	170 mm	230 mm
PUR core thickness	100 mm	140 mm	200 mm
Heat transfer coefficient U	U=0,21 [W/m ² K]	U=0,15 [W/m ² K]	U=0,10 [W/m ² K]



The unique thermal properties of H-Block_{plus}[®] panels are ensured by polyurethane foam. Depending on the thickness of the PUR core (100mm, 140mm or 200mm), the heat transfer coefficient U of the H-Block_{plus}[®] panel ranges from 0.21 to 0.10 [W / m²K].

APPLICATION

Ceilings and floors

H-Block_{plus}[®] can be used for the construction of inter-storey ceilings, flat roofs and floors. The use of H-Block_{plus}[®] insulation panels on the floors eliminates the thermal bridge on the foundation of the building and on the connections between the walls and the floor.

Roof

The roofs made in the H-Block_{plus}[®] system outperform their durability and traditional strength. The insulating layer does not need to be renovated throughout the entire lifetime of the facility, without losing its insulating properties over time. As a composite material, H-Block_{plus}[®] panels give unsurpassed fire protection, effectively protecting the building from hurricanes.

What's more, the use of H-Block_{plus}[®] panels on the roof allows you to get higher rooms in the attic, because the PUR insulation layer is almost twice lower than in the case of using mineral wool or expanded polystyrene.

The use of H-Block_{plus}[®] reduces the whole operation to one or two assembly days, which is particularly valuable in the case of roof replacement operations on objects already in use (repairs), making assembly work independent of weather caprices.



4. Design requirements

The H-Block[®] system is flexible in terms of individual design. Each project made in any other technology can be redesigned and adapted to the H-Block[®] system. A specially adapted computer program analyzes and optimizes panels consumption for a specific facility, minimizing on-site wastes.

H-Block[®] is primarily a complete system for building objects (floors, walls, ceilings and roofs). However, it can also be used as one of its elements in configuration with other technologies, including brick technology.

H-Block[®] as a self-supporting system, gives the possibility of erecting buildings up to 4 storeys. Due to the extremely low total weight in relation to the mechanical strength (from 23 kg/m² to 35 kg/m²), H-Block[®] allows for building superstructures on an existing structure where weight calculations for traditional materials do not allow this.





5. Transport requirements

Requirements for means of transport

- The basic means of transport of H-Block® insulation panels should be trucks.
- The car's payload must be greater than the weight of the load.
- Width of the minimum load box 2.4 m, standard height - approx. 2.7 m (the dimensions of the trailers differ slightly in relation to their dimensions depending on their manufacturers), in exceptional cases, for large transports - 2.9 m.
- The length of the box depends on the length of the panels being transported - all laid panels have to lie on the platform with their entire length.
- The truck must be equipped with transport belts to protect the load from moving while driving.
- The truck must be able to fully open the side walls (sides and pillars) and tarpaulin.

Loading

Loading of the panel packages takes place only with a forklift through the lateral side. Each stack should be fastened with a minimum of two belts at a distance of not more than 3 m between them. Belt tension must not cause panels' deformation. In the place of the belt's pressure, the linings should be used. The corners of the panels must be protected by cardpanel or plastic.

Unloading

The H-Block® panels require forklift (on solid ground) or any off-road vehicle with forklift in case of unpaved surface for unloading. The H-Block® panel arrives to the construction site without any additional packaging, usually in two rows "for the spacer", so as to maximize the transport space (two H-Block® panels with a width of 1.25m exceed the loading gauge of cars). The panels are not separated by transport spacers, because the OSB lining is not damaged during transport. When picking up the panels at the construction site, remember that:

When picking up the panels at the construction site, remember that:

- Unloading should take place using a crane, forklift, in exceptional cases (when the panels are short) - manually.
- The cart can discharge shorter panels (up to approx. 4-5 m) - longer ones require a traverse. Even short but narrow panels require careful unloading due to their laxity, which they lose only after being installed in the building.
- The crane can unload panels of any length and on belts. It should be remembered that the distance between the belts does not exceed 3-4 m. The belts can be placed under a slightly raised panel on the car or attached to special fastenings attached to the H-Block® panel cladding.





6. Warehouse requirements

The H-Block does not require any special storage conditions, excluding potential exposure to long-lasting wetting resulting in swelling of the panel at the intersections and, as a result, possible - difficult assembly at connections (in locks).

Storage field

Unloaded panels should be placed on a hard surface, on polystyrene pads or other (e.g. wooden) pads placed transversely to the length of the panel at a maximum distance of 2-3 m from each other. The pads should allow for "ventilation" of the panel stack and separation of the panels from the ground. In the case of contacting the panels with the ground, there is a high risk of soaking up the water and wetting the panel. A long-lasting dipping of the panel will weaken its durability and, as a last resort, it will destroy it. Avoid setting more than 2.5 m in height.

Storage

Panels prepared for assembly and stored in a pile should be protected from rain by covering the panel with a tarpaulin. The panel stack should be "roofed" but not wrapped. Tight wrapping of the panel stack will cause moisture in the air to penetrate the lining OSB which can - under favorable conditions) create favorable conditions for the multiplication of bacteria, mold and fungi. Uncovering the sides of the panel stack will allow the pile to "ventilate". This type of H-Block® storage is acceptable in the short term (up to approx. 2 weeks). If it is necessary to store H-Block® panels longer, each panel in the stack should be separated from the next panel with a spacer that will allow ventilation of the space between the panels.

Marking

Each panel has an individual designation corresponding to the assembly documentation, which allows it to be identified and installed in the right place.



7. General rules applicable to the construction of buildings in H-Block® technology

- All connections should be sealed so as to minimize (and ideally completely) the penetration of air into and out of the building. For this purpose, polyurethane foam seals (in LHB / LHB_{plus} joints), soft gaskets and / or sealing bands (in combinations: wood / wood, steel / wood, etc.) should be used. In the case of passive requirements, for joining panels with other panels, slabs with a foundation, roof walls with a roof, a foundation with a foundation, etc. caulking tapes - preferably butyl or bituminous, flexible and sticking to porous surfaces (OSB) can be used.



The sale also includes foils with embedded gasket with a tubular cross-section. Such a gasket ensures point sealing - and above all - air sealing.

- If it is necessary to level the foundation slab for the ground beam, use liquid grouts, after prior leveling the foundation, tamping the foundation to stabilize it and lining the empty space between the foundation slab and the ground beam.
- Any empty spaces in the surface of walls, ceilings, floors and roofs should be filled with polyurethane foam, which, in addition to thermal insulation, has insulating properties against moisture penetration.
- Buildings properly erected with the use of H-Block® technology are very air-tight and moisture-tight, which provides them with an exceptionally high level of energy efficiency. To maintain the last parameter and comfort of use, it is required to use a recuperation system that regulates the exchange of air as well as its humidity. In a variant with a heat exchanger and / or heater, the recuperation system recovers heat from the "ejection" of the air, heats the air "at the inlet" and (in the version with air conditioning) cools it.
- H-Block® panels should not be cut horizontally (grooved) in order to arrange the installation in them. H-Block® panels are structural and the incision of panels (in particular, violating the LHB connection) may disturb the statics of the building and cause a construction disaster. If it is necessary to cut the LHB connection (e.g. for inserting a window opening), the so-called replacements (lintel and pillars supporting the lintel), preferably in the core of the panel and attached to its cladding. If in doubt, it is recommended to contact the manufacturer of H-Block® panels before cutting out the hole or cutting the panel.
- It is not recommended to install the cement, gypsum, lime, etc. elevation directly on the cladding of the H-Block® panel. Direct application of the facade to the H-Block® panels will cause it to crack in a short time. For this reason, it is recommended to use expansion joints separating walls and ceilings from the façade using a frame for gypsum plasterboards and a styrofoam foundation (or mineral wool) under the plaster. In the case of exterior facades, the rules of laying ventilated facades should be followed so that the outer cladding of the H-Block® panel does not become damp.
- If a wooden facade or metal roofing sheet (also bituminous) is installed directly on the H-Block® panels, the outer cladding of the panel should be protected with a damp proofing agent or with wind-insulation, coated paper, bitumen, foil, etc.
- The use of a fireplace requires the preparation of an air inlet, especially for the fireplace. The exhaust (combustion) duct must be made in such a way as to avoid contact of the hot exhaust gases with the H-Block®, in particular with polyurethane. For this purpose, the chimney should be covered at the passage through the ceiling / roof with mineral wool, min. 5 cm.
- Due to the high temperature of incandescent bulbs, halogen lamps, etc., it is forbidden to mount the lighting inside the H-Block® in hollow holes.





8. Assembly requirements

H-Block® panels are manufactured "to size" - with the exception of special cases (e.g. oblique peak-slanted walls), H-Block® panels do not need to be cut at the construction site. For this reason, their assembly is very fast, simple and requires fitters to have basic tools, joints and sealants.

Tools

Each building in H-Block technology will be built using the following basic tools:

- screwdriver and / or pneumatic nailer,
- hand and / or electric saw (disc) with the possibility of setting cutting angles,
- drill with rotating wire brush,
- wood chisels,
- small and large hammers,
- crowbar,
- steel measure,
- pincers,
- angle,
- level,
- pencil
- ladder
- scaffolding

Joints

To connect H-Block® panels only **wood screws** of different lengths are used. It is not allowed to use H-Block® to screw, e.g. the so-called. black gypsum-cardboard screws. Such screws are too weak to withstand the stress of the building, which can cause them to break. Structural joints of elements (corners, foundations, joints, etc.) require screws with increased durability and a wide underlay under the screw head.

Sealers

A low-pressure polyurethane foam is used to seal panel joints. Typical building insulation (e.g. bituminous) is used to separate foundations and foundations. If the building is to meet the specific requirements of air-tightness, sealing joints can be used, but a precise foam seal is in most cases sufficient for a low-energy standard.



Personal protective equipment

As in the case of any other construction, when installing H-Block® panels, the necessary personal protective equipment should be used, adapted to the activities performed. Taking into account the typical scope of work, the installers should be equipped with protective clothing and shoes, gloves, glasses and a helmet. If it is necessary to dig out the foam with a wire brush, the installer should put on a dust mask.

Assemblers

A assembly crew consisting of min. 4 people. Such a number of fitters allows you to do most of the assembly work. In the event that a crane is necessary for assembly, the crane operator must be able to cooperate



9. Foundation

Linear foundation - checking the correctness of the workmanship and repair work before H-Block® panels assembly.

The linear foundation (on benches) can be prepared to use the floor in the H-Block® system or under a traditional screed.

In the case of the foundation for the H-Block® floor, the foundation should be raised above the ground to a minimum height of 30 cm. Ventilation grids should be installed in the walls of the foundation to vent the bottom part of the floor. Ventilation grills should be fixed in such places which ensure airflow. The surface between the walls of the linear foundation must be covered with the so-called lean concrete, preferably cement screed. Such a screed prevents overgrowth of the space under the floor with shade-like plants. The walls of the foundation (screed can also be) should be protected against moisture by applying layers of insulation e.g. bituminous.

In the case of a foundation for a traditional screed (and resignation from floor on columns in the H-Block® system), all the above operations should be also carried out and in addition, the foundation must be thermally insulated in the same way as other standard insulations, i.e. horizontal and vertical insulation.

Before laying a substructure beam for a building, it is necessary to additionally check foundation from the point of view of obtaining a horizontal ground for the substructure. To avoid problems with the verticality of walls and obtaining levels of ceilings, if necessary the foundation should be leveled using rootstocks, and preferably leveling chutes.



Linear foundation - checking the correctness of the workmanship and repair work before H-Block® panels assembly.

The foundation slab should be raised above the ground to a height of min. 10cm.

Checking the correctness of the construction of the foundation slab for the installation of the H-Block requires only checking the correctness of the "perimeter" level and in the wall line and repairing any unevenness as described in the scope of the linear foundation.



10. Substructure

The soleplate and bottom plate are one of the most important elements of the house determining the quality of the walls, ceilings and roof, and the durability of the house in time. **They both should be made of wood with a degree of drying of 15-20% and permanently impregnated.**

Plates on the linear foundation

In buildings in the H-Block® system it is suggested to use the KVH / C24 wood for both the treated soleplate and bottom plate.

The soleplate is laid on the foundation (or foundation slab) on the damp proofing. The soleplate is attached to the foundation by means of bolts for foundation bolts embedded in the foundation during casting (difficult and not precise method) or with anchor bolts or strut anchors. Certified anchor bolts approved for the screws and glue or dowels should be used. The density of foundation fastenings should be consistent with the construction design, but - if it is not available - no less than every 1,5 m.

The bottom plate is laid on the soleplate. It is attached to the soleplate using certified wood screws in spacing consistent with the guidelines of the structural design. In the absence of a design, the fastening to the base should be at least every 2 m and preferably not less than 0.5 m from the location of the soleplate fastening. It should be remembered that the fixing screw should be shorter than the total thickness of the soleplate and bottom plate. The use of a longer screw will perforate the isolation separating the foundation and the base foundations, allowing the penetration of moisture from the foundation to the plate.

The bottom plate should be fixed to the soleplate so that after setting the wall on it, the H-Block panels are based on the soleplate. Under no circumstances is it permissible for any of the H-Block claddings "to hang" beyond the outline of the soleplate. For example, for a 170 mm thick panel, the minimum underlying soleplate width should be 170 mm. The same principle applies to other thicknesses of H-Block panels.

Plates on the foundation slab.

All rules for laying soleplates and bottom plates on a linear foundation apply to a foundation slab.





11. Floors

Floor on the linear foundation/pile

One of the ways to make a floor with very high insulation parameters is to lay H-Block® or H-Block_{plus}® panels on a linear foundation and achieve the so-called "hanging floor" effect. Depending on the thermal and load-bearing requirements, they can be made of an H-Block® panels connected with concealed beams or on pile or H-Block_{plus}® - without beams or on pile.

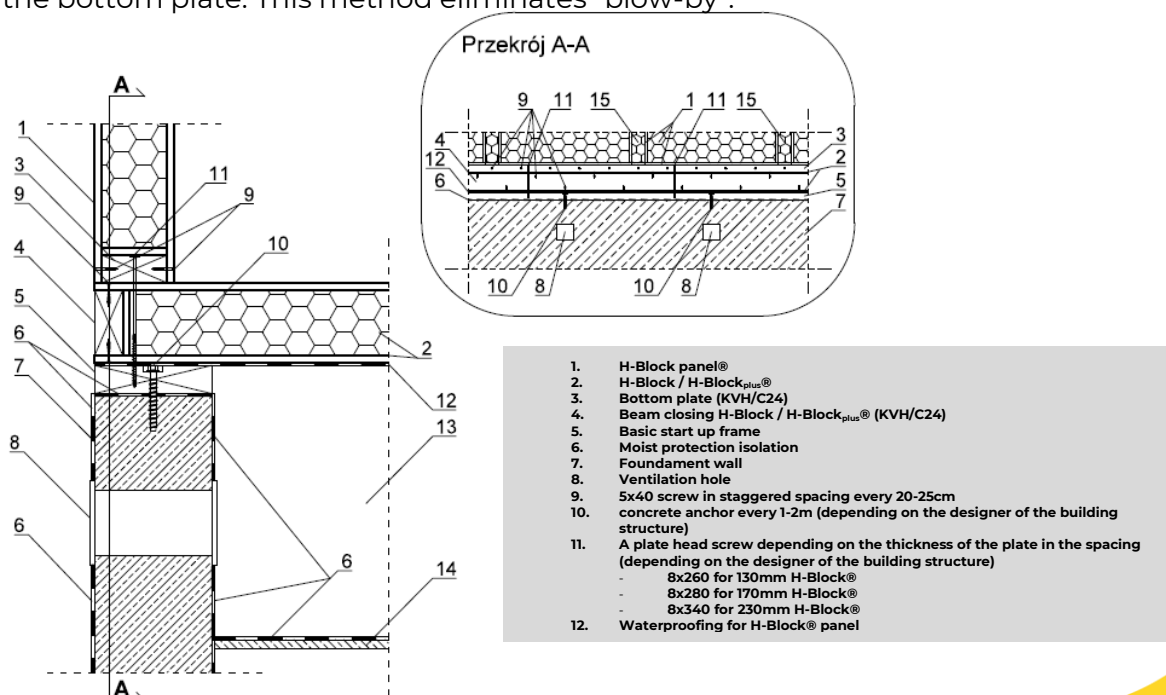
The floor in the H-Block® system with a concealed beam is mainly used for particularly extreme demands on the load-bearing capacity of the floor (e.g. underlayment for underfloor heating). In such cases, the H-Block® panel is the filling of the space between the beams. The floor in the H-Block_{plus}® system is mainly used for standard floor bearing requirements. The supporting structure is part of the H-Block_{plus}®.

A special case is the replacement of the linear foundation with a wooden or steel frame supported on pillars or foundation bolts. Then the frame becomes a structural element of the floor, which should be properly designed and take into account the transfer of floor loads, including loads on external and internal walls. Then the frame becomes a structural element of the floor, which should be properly designed and take into account the transfer of floor loads, including loads on external and internal walls.

Regardless of the choice of the floor system - H-Block® or H-Block_{plus}®, there are several variants of its installation on a linear foundation.

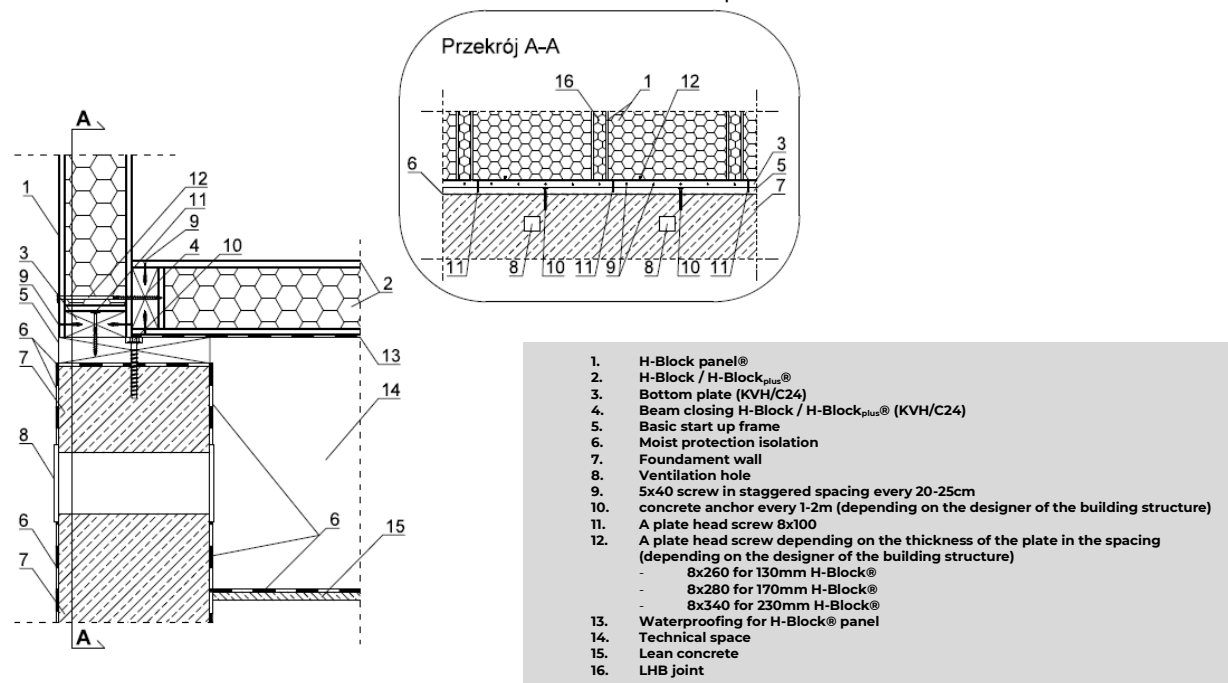
Variant I

In this variant, there is only soleplate on the foundation. Floor is based on it and the bottom plate appropriate for the walls is attached to the upper surface of the floor. Special attention should be paid to the anti-moisture and air-sealing layers. The damp insulation is arranged in a classic way - between the foundation and soleplate. The air gasket is placed on the connection of the floor and the bottom plate. This method eliminates "blow-by".



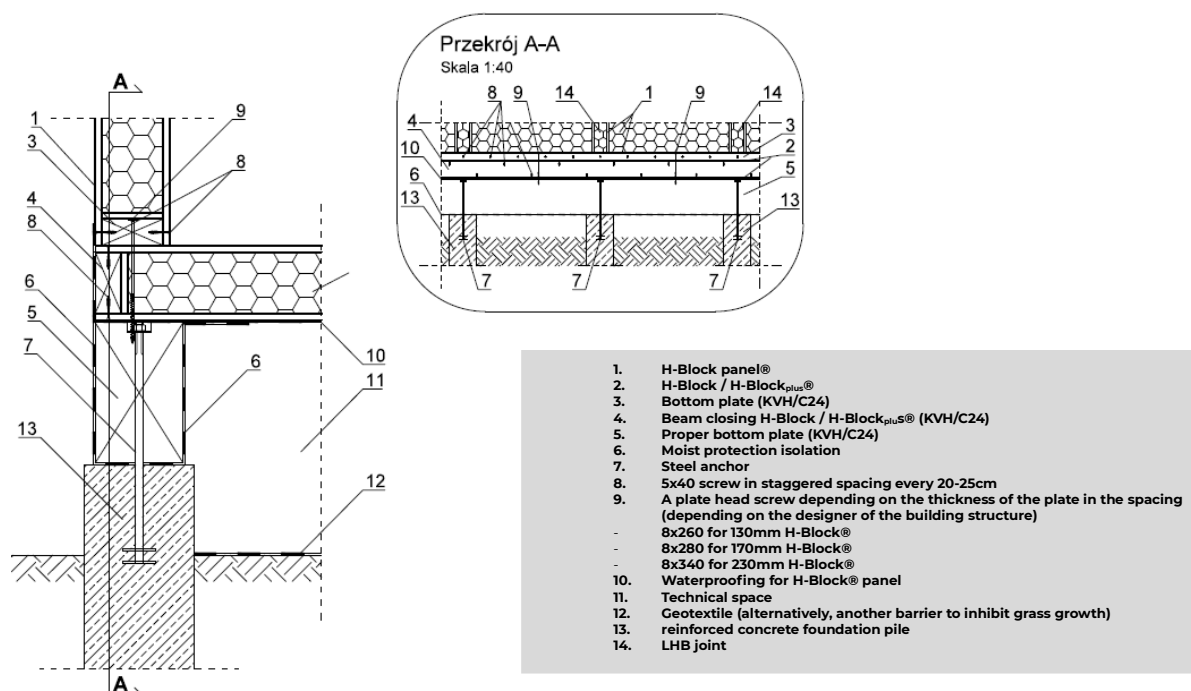
Variant II

In this variant, soleplate and bottom plate are arranged in a classic way. In this solution, the air gasket is eliminated because the floor is based on the soleplate which is of the foundation width.



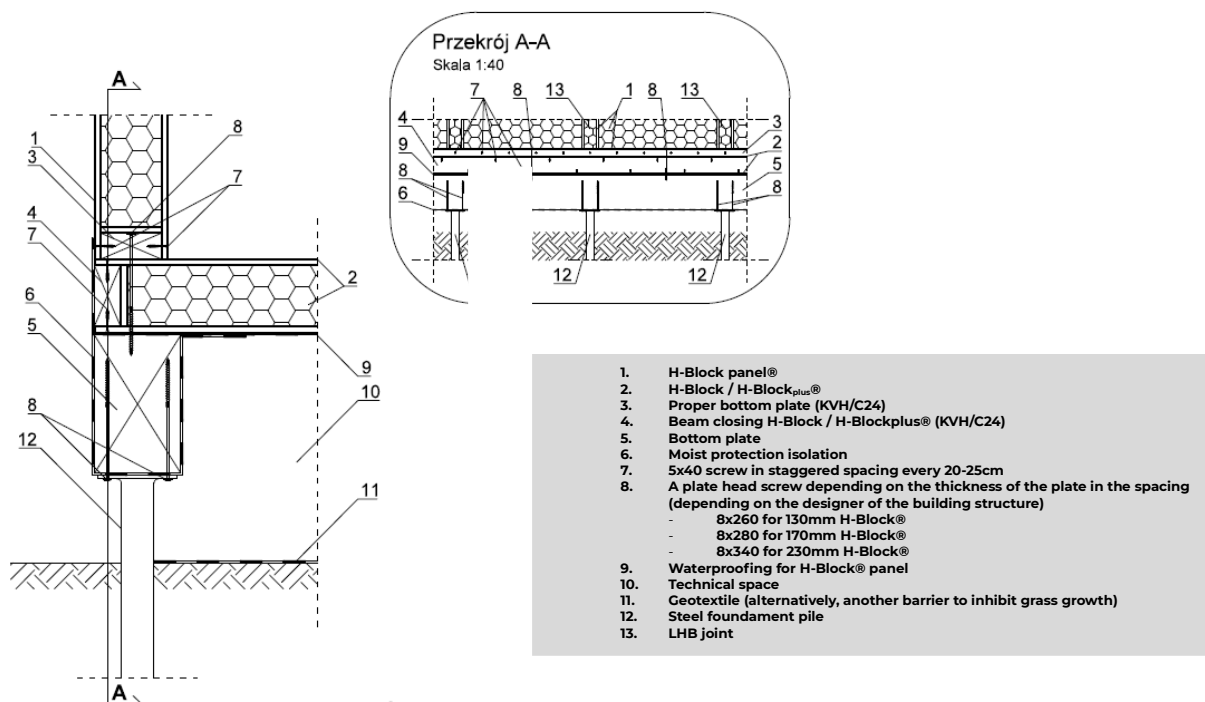
Variant III

H-Block® / H-Block_{plus} floor on wooden frame on concrete pile.



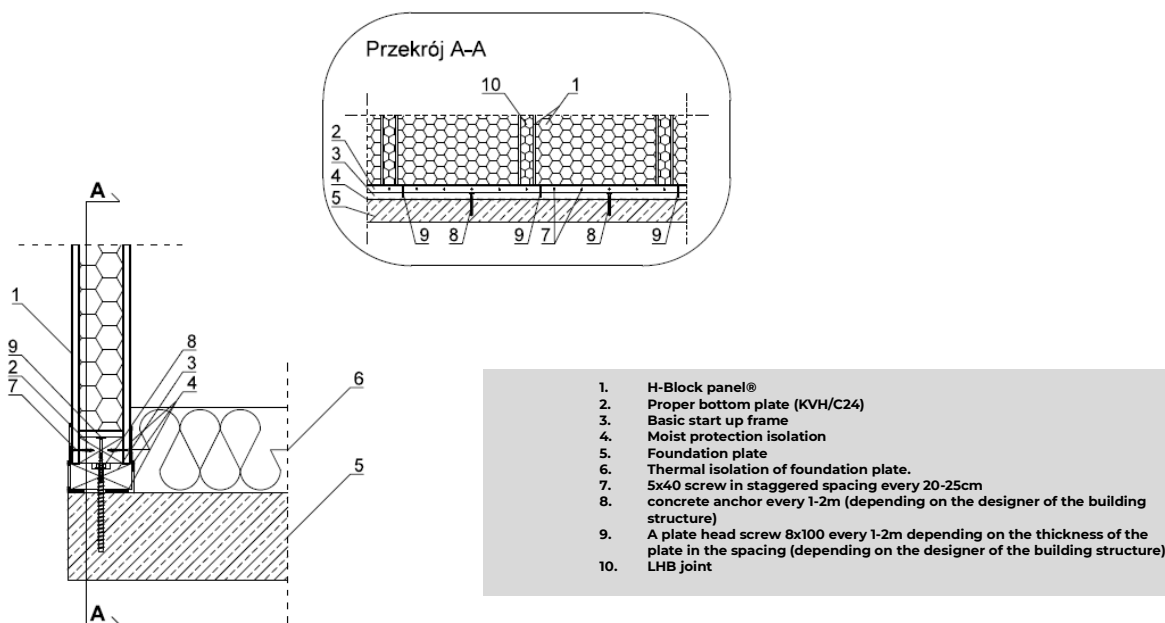
Variant IV

H-Block® / H-Block_{plus} floor on wooden frame on steel pile.

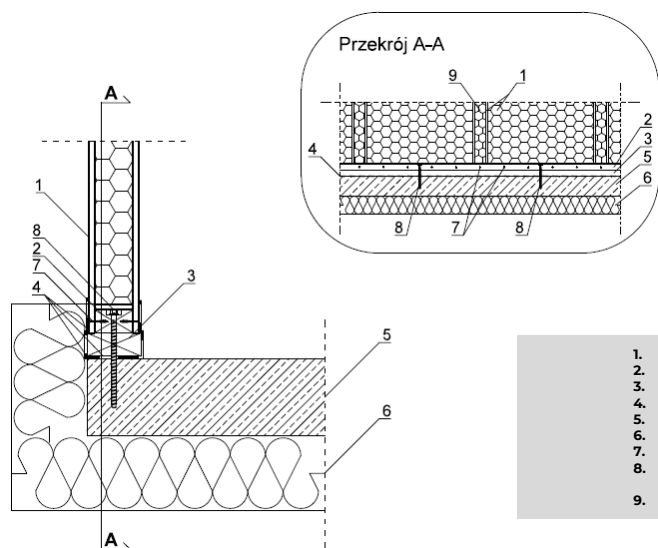


Floor on a non-insulated foundation slab

The floor on the foundation slab is not made of H-Block®. In the variant of "non-insulated" foundation slab, the thermal insulation of the floor is double-layered: as an insulation between the slab and the ground, and as an isolation between the foundation slab and the specific floor. It should be remembered that the foundation slab must protrude above the ground min. 10 cm to eliminate the penetration of moisture into the foundation.



Floor on the insulated foundation slab



1. H-Block panel®
2. Proper bottom plate (KVH/C24)
3. Basic start up frame
4. Moist protection isolation
5. Foundation plate
6. Thermal isolation of foundation plate.
7. 5x40 screw in staggered spacing every 20-25cm
8. concrete anchor every 1-2m (depending on the designer of the building structure)
9. LHB joint



12. Ground floor walls

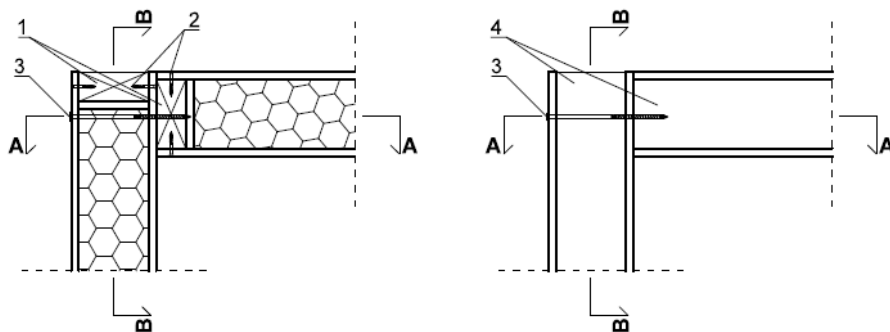
Regardless of the method of making the panels, setting the ground level walls determines the operational quality of the house. It is imperative to pay attention to the verticality of the walls and to maintain a constant distance between successive wall panels.

Corners

After laying the bottom plate, the first element to be assembled is the start corner. Wall assembly in both directions starts from it. There are several options for assembling a corner.

Variant I

In this variant the vertical corner post remains uncovered.

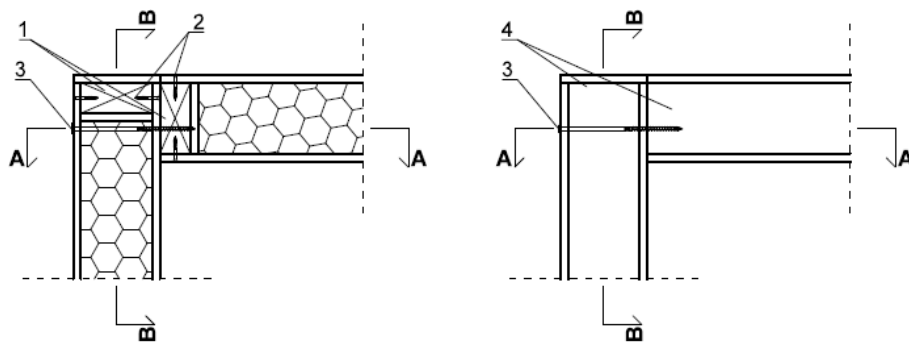


1. Closing beam (KVH/C24)
2. 5x40 screw in staggered spacing every 20-25cm
3. A plate head screw depending on the thickness of the plate in the spacing (depending on the designer of the building structure)
4. A plate head screw depending on the thickness of the plate in the spacing (depending on the designer of the building structure)
 - 8x260 for 130mm H-Block®
 - 8x280 for 170mm H-Block®
 - 8x340 for 230mm H-Block®
5. Closing cap beam



Variant II

In this variant, the vertical corner post is covered with a strip of the width of the post cut at the construction site or a specially prepared corner slab with an extended OSB lining.



1. Closing beam (KVH/C24)
2. 5x40 screw in staggered spacing every 20-25cm
3. A plate head screw depending on the thickness of the plate in the spacing (depending on the designer of the building structure)
 - 8x260 for 130mm H-Block®
 - 8x280 for 170mm H-Block®
 - 8x340 for 230mm H-Block®
4. Closing cap beam

External walls

After assembling the corners, next, the walls are mounted on the bottom plate and joined to the next wall by the LHB joint. From a practical point of view, before the wall is properly installed using sealants, it is possible to pre-assemble "dry" and mark on the foundation the place where the wall should be pressed (it can also be measured with a measuring cup).

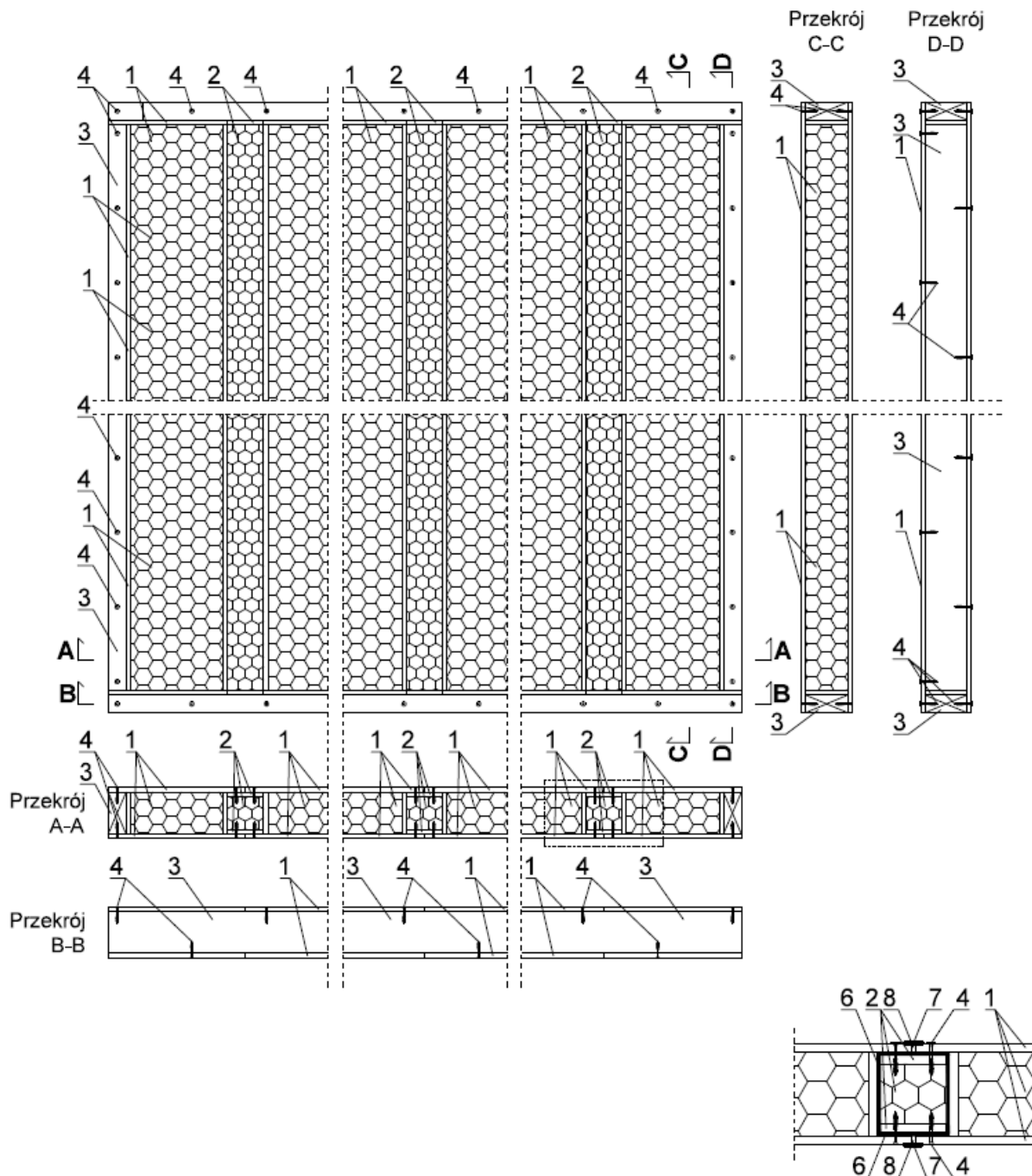
After determining the vertical wall position, the setting panel can be set aside and laid down - preferably on a bottom plate, along the wall under construction. Next, the sealing foam should be applied to the vertical lock of the lying panel and the LHB joint should be inserted. Without waiting for the foam to grow, screw the lying panel with the LHB joint. Rest of the LHB joint can be cut off.

After doing this, apply the foam to the bottom part of the H-Block, the one to be placed on the bottom plate and the standing wall panel lock, to which the prepared panel should be added (with



the LHB joint attached). As soon as possible (so that the sealing foam has not yet grown), we add another H-Block to the already standing wall.

An alternative option (after arranging the mounted wall panel horizontally) is to reverse the steps in such a way that first we put foam on the LHB connector, insert it into the lock of the standing panel and screw it to it. Then we put the foam in the vertical lock of the lying panel and on the bottom plate where the panel will stand, then place the panel vertically and push it to the already standing panel with the LHB connector.



1. H-Block® panel
2. LHB joint
3. Beam closing H-Block® floor (KVH/C24)
4. 5x40 screw in staggered spacing every 20-25cm
5. LHB joint or bea, closing H-Block® floor (KVH/C24) (depending on the designer of the building structure)
6. Montage foam
7. Optional tape for passive buildings



Place the added plate in the place of the marking on the bottom plate that we made earlier. Marking the place on the foundation helps to properly and "first try" the wall in the right place, without moving. It is enough to place the slab vertically along the foundation so that the vertical line of the added wall (from the marking side) is shifted in relation to the marking (towards the standing wall) by about 1 cm. Then the erected wall is gently wedged on the standing wall, but under the influence of its own weight, it drops and sets it in the correct position, without the need to move it later. Check the vertical of the wall (in both directions) and screw it with wood screws with the density in accordance with the instructions (every 20 cm). First, we screw the H-Block® panel with the foundation (after the wall is placed vertically) and only then with the standing wall.

Proper measuring and positioning of subsequent H-Block® panels of the wall will allow for the correct ending of the wall with another corner, i.e. in accordance with the drawings. If, however, it turns out that the last panel of the wall is too wide and protrudes beyond the contour of the sill, it must be cut, first removing the web closing the PUR foam of the H-Block® panel. After cutting the last panel and selecting (e.g. with a wire brush) the excess foam, insert a wooden beam in this place to close the corner. It is not necessary to insert the removed web again (before inserting the beam closing the corner). The structure of the slab will be maintained through the inserted beam. However, you should remember to foam the space between the beam being inserted and the slab core.

After assembling the external wall panels, apply a sealing foam to the top lock of the panel, insert the cap beam and screw everything with wood screws.

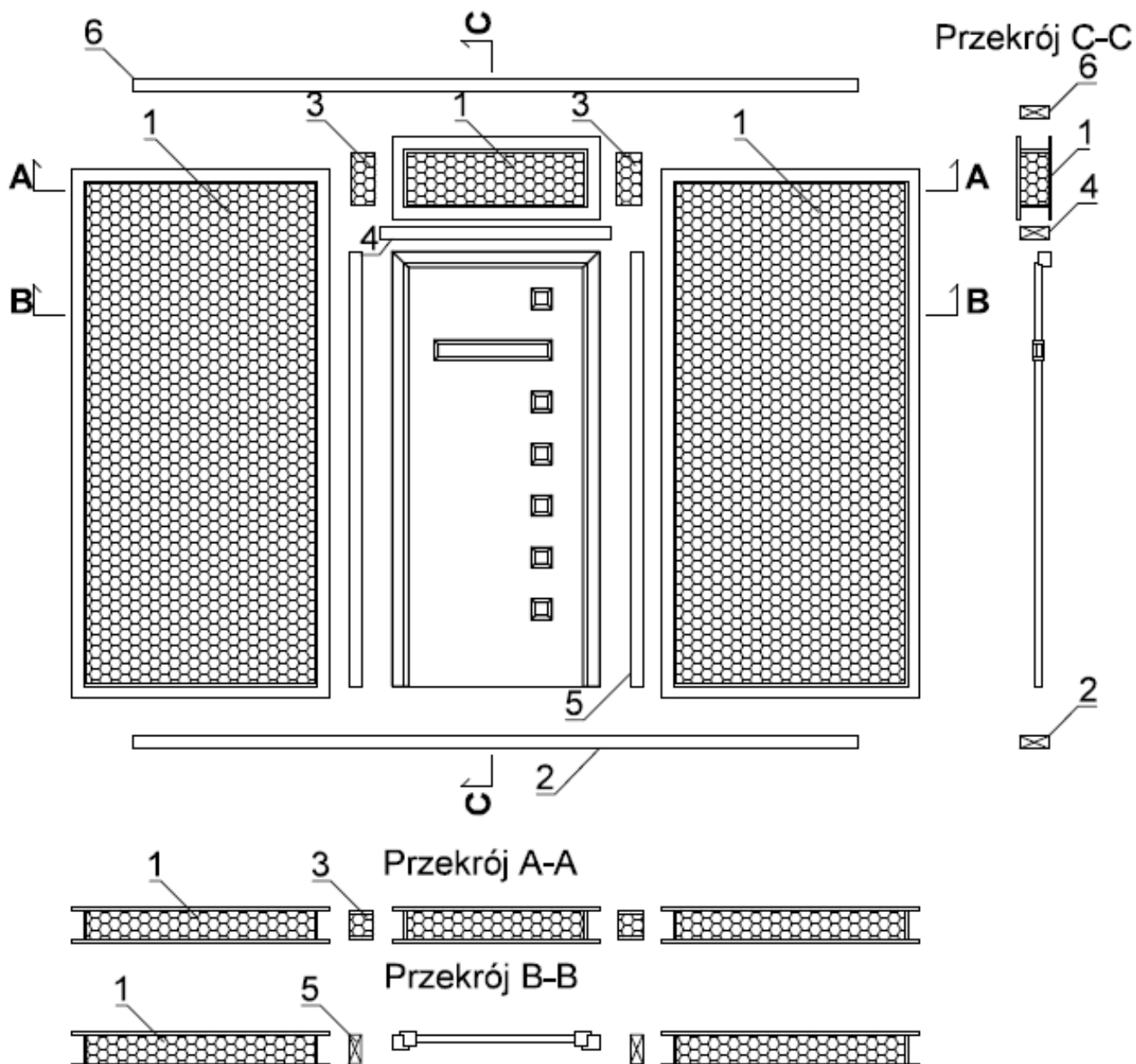
Internal self-supporting walls

Internal self-supporting walls positioned in exactly the same way as external ones, but always starting with attaching the starting beam (vertical) to the base wall. Fixing the last panel in the partition wall looks like the first one, but at the time of its assembly to the opposite base wall (with a vertical beam), the lock connecting it with the last panel of an already standing partition wall should not be filled with the LHB connector. This LHB fastener is inserted into the joint from the top as the last stage of assembly, after the last panel is attached to the base wall (vertical beam) and the sill.

Door openings

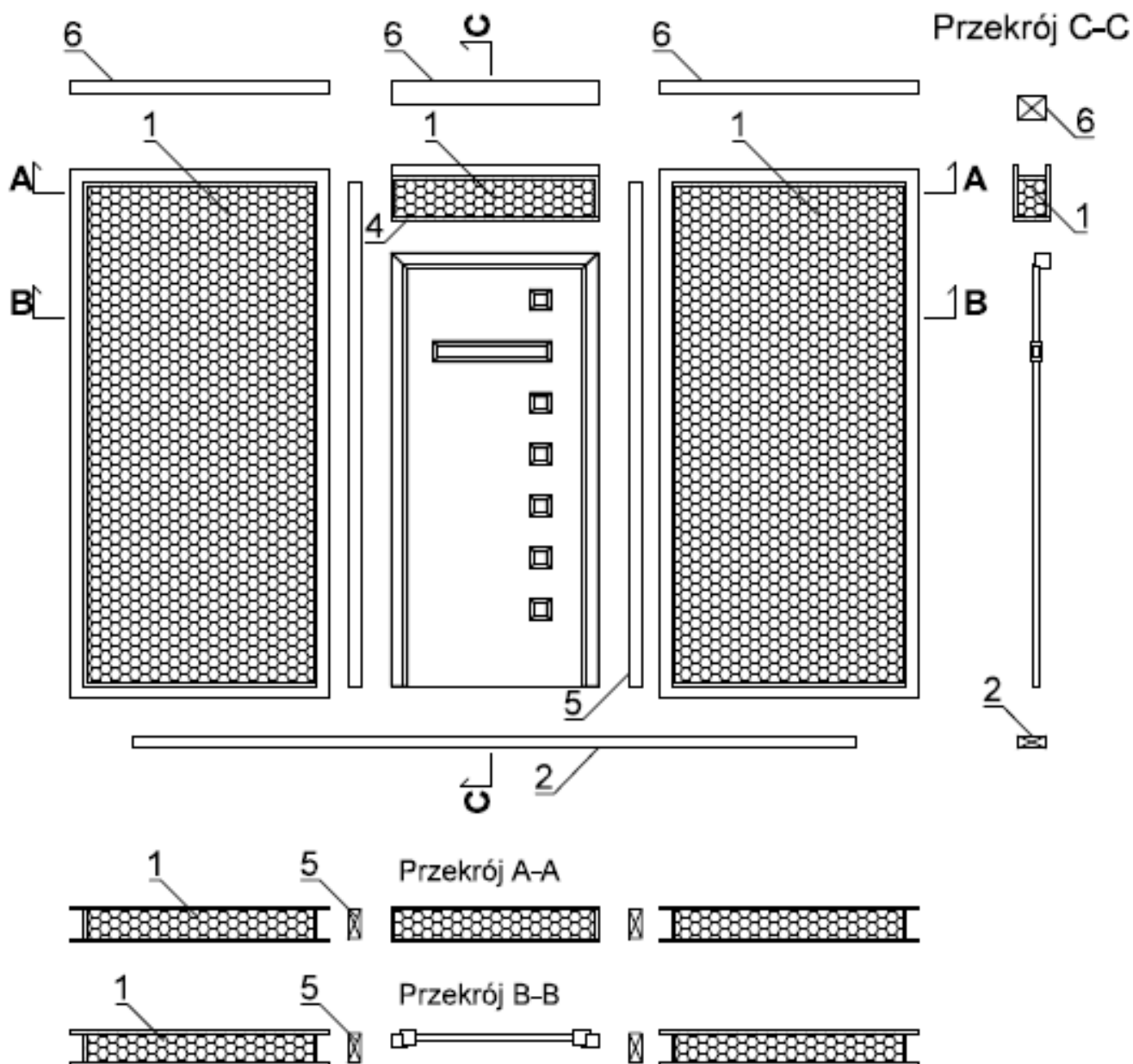
There are many ways to arrange openings in the plane of a wall made of H-Block®. Depending on the loads on the second building level, the door openings should (or not) be reinforced with a load-relieving structure so that no opening problems arise. In the variant presented in the drawing below, the door has been lightened with vertical wooden elements. It is very important that the wooden door lintel is placed on vertical posts and not pushed against them. The wooden door lintel can be removed and the posts extended up to the cap, when the second level of the building does not exert excessive pressure on the walls (e.g. a low knee wall). If there is no structure design, it is suggested to leave the lintel, regardless of the width of the door and the number of storeys.





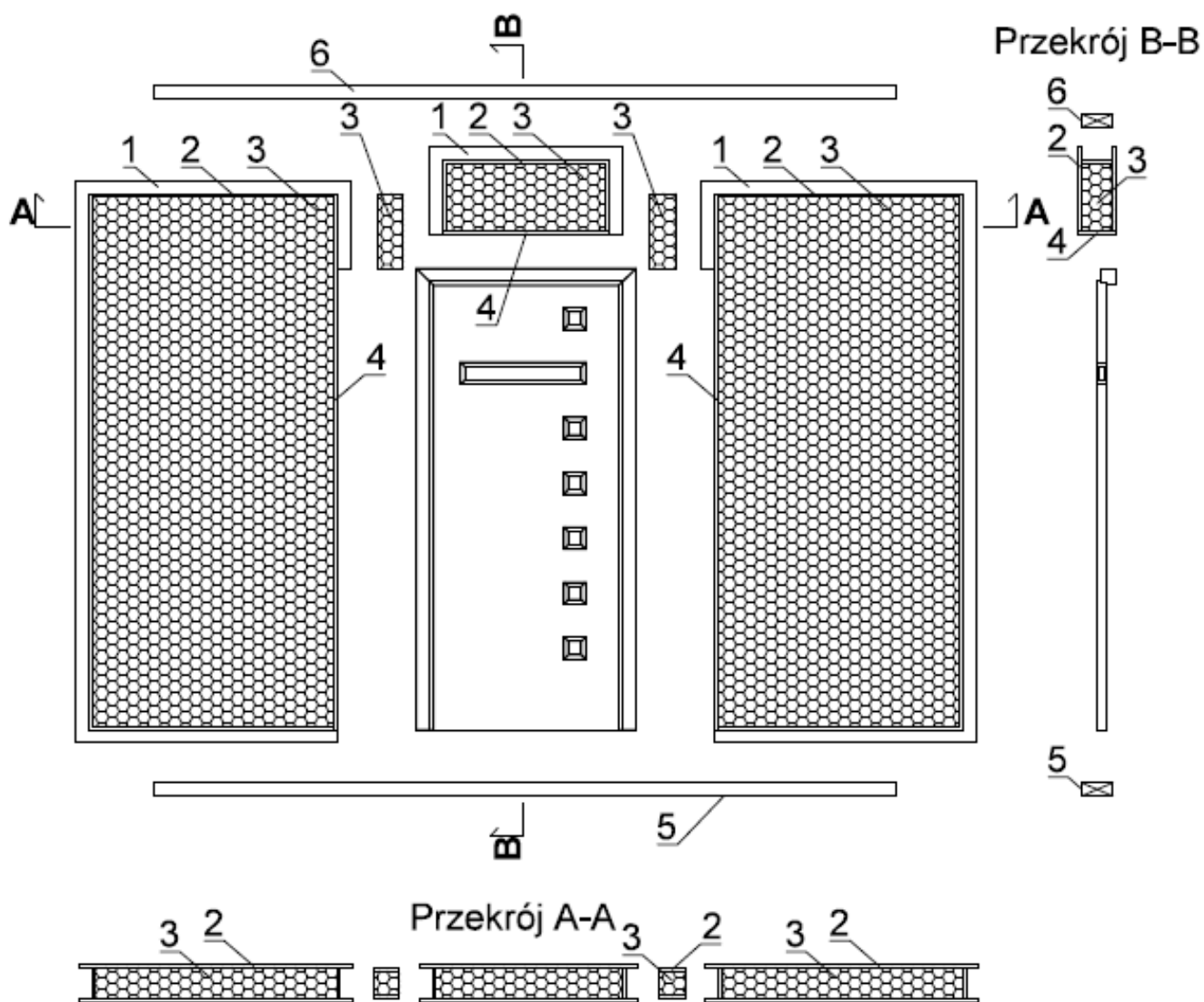
1. H-Block® panel
2. Proper bottom plate (KVH/C24)
3. LHB joint
4. Lintel beam (KVH/C24)
5. Door beam (KVH/C24)
6. Cap beam (KVH/C24)





1. H-Block® panel
2. Proper bottom plate (KVH/C24)
3. LHB joint
4. Plywood
5. Door beam (KVH/C24)
6. Cap beam (KVH/C24)





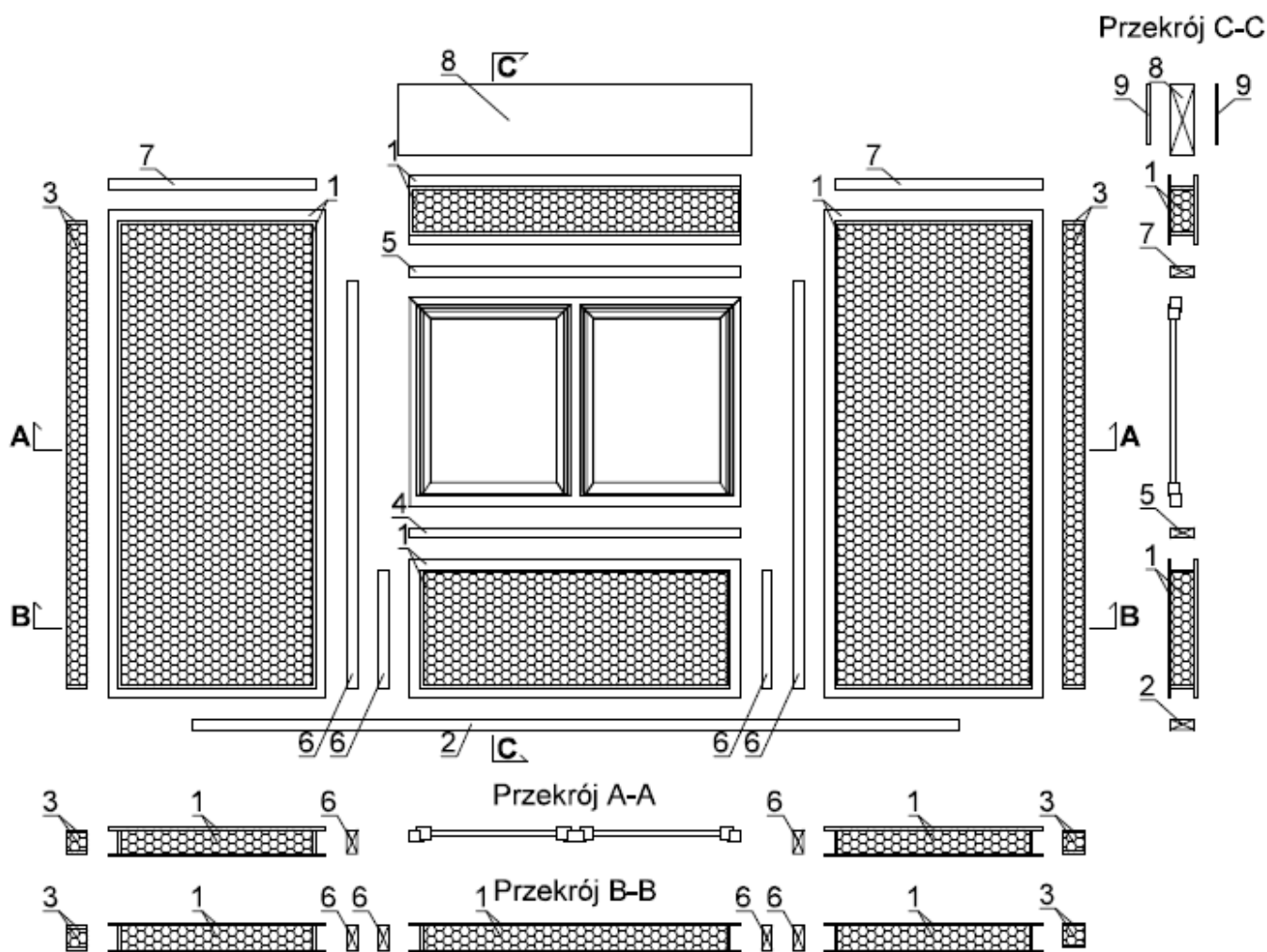
1. 60 cm OSB lock (15mm)
2. OSB plate (15mm)
3. Polyurethane foam
4. Plywood (18mm)
5. Proper bottom plate (KVH/C24)
6. Cap beam (KVH/C24)



Window opening

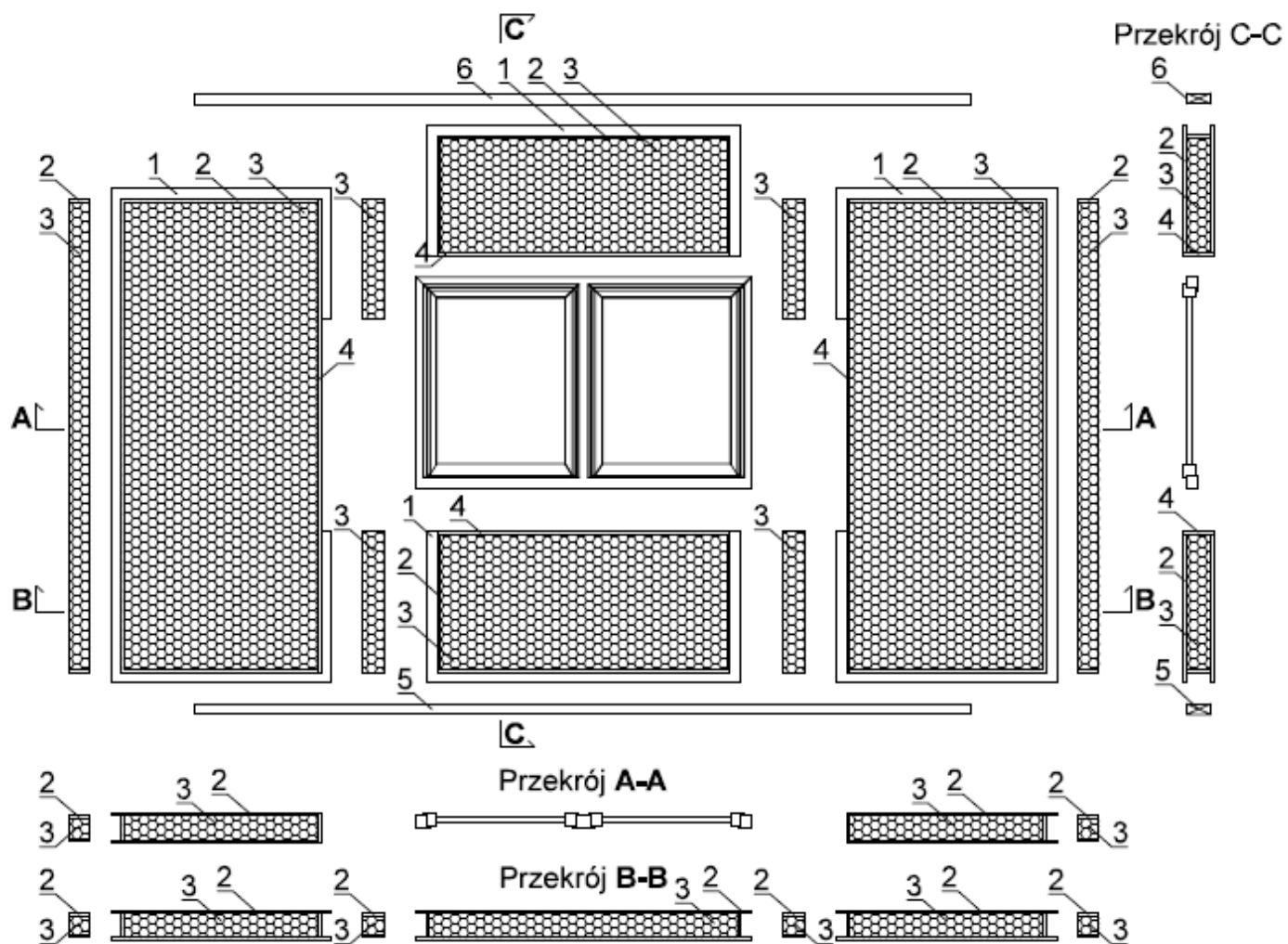
There are many ways to arrange openings in the plane of a wall made of H-Block®. Depending on the loads on the second building level, the window openings should (or not) be reinforced with a load-relieving structure so that no opening problems arise.

In the variant presented in the drawing below, the windows were lightened with vertical wooden elements. It is very important that the wooden window lintel is placed on vertical posts and not pushed against them. The wooden lintel of the window (as long as the window is not very wide) can be removed and the posts extended up to the cap. This variant limiting the use of wood is possible when the second level of the building does not exert excessive pressure on the walls (e.g. a low knee wall) and the windows are not wide. If there is no structure design, it is suggested to leave the lintel, regardless of the width of the window and the number of storeys.



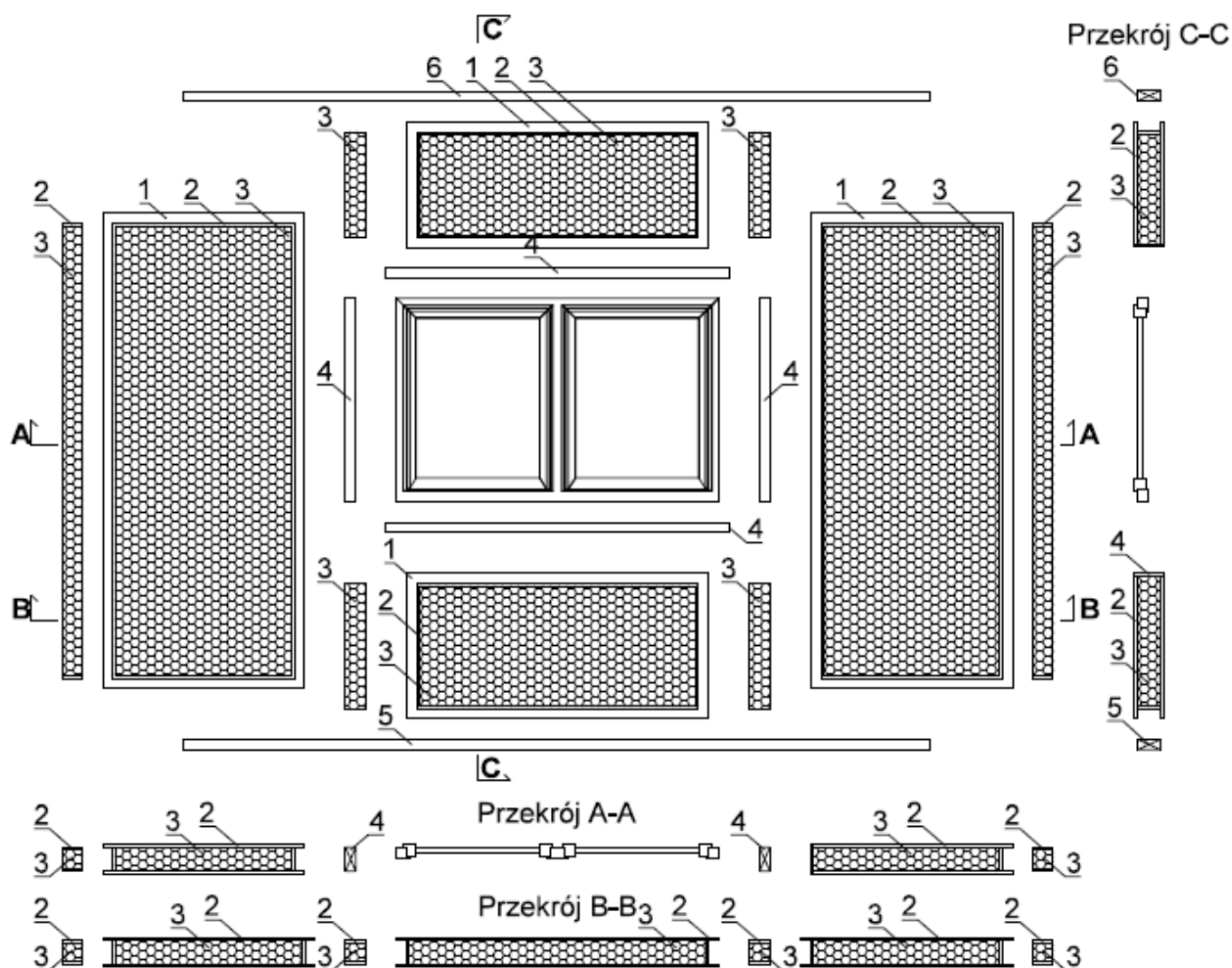
1. H-Block® panel
2. Proper bottom plate (KVH/C24)
3. LHB joint
4. Beam under window (KVH/C24)
5. Beam over window (KVH/C24)
6. Column (KVH/C24)
7. Cap beam (KVH/C24)
8. Lintel (KVH)
9. OSB plate





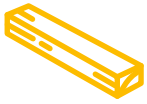
1. 60 cm OSB lock (15mm)
2. OSB plate (15mm)
3. Polyurethane foam
4. Plywood (18mm)
5. Proper bottom plate (KVH/C24)
6. Cap beam (KVH/C24)





- 7. 60 cm OSB lock (15mm)
- 8. OSB plate (15mm)
- 9. Polyurethane foam
- 10. Window frame (KVH/C24)
- 11. Proper bottom plate (KVH/C24)
- 12. Cap beam (KVH/C24)





13. Cap beam

Cap beam that closes the wall from the top and is mounted in the upper socket of the H-Block® wall panel. Cap beam corresponds to the function of a wreath in traditional houses and plays the role of "unifying" the structure of the walls. Together with the ground beam, corners and possibly windows columns - it creates a construction "cage" complementing the H-Block® panel structure. It should be remembered that the cap should be continuous and possible joints should be made by cutting out the joining sockets or by using steel system connections (e.g. with dovetails). Steel connections cannot be continuous (from the outside to the inside of the building), because they will create a thermal bridge that may result in freezing and condensation.

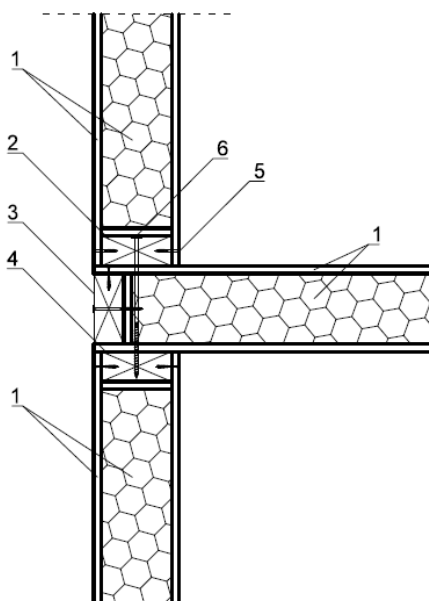


14. Ceiling

H-Block® ceilings are an alternative to other known ceiling systems. Depending on the thermal and self-supporting requirements, they can be made of H-Block® panel connected with hidden beams or H-Block_{plus}® - without beams. It is also possible to connect H-Block® ceilings with other systems, eg H-Block® with visible beams.

As in the case of the floor, H-Block® ceilings with a hidden beam are mainly used for particularly extreme requirements regarding the self-supporting capacity of the ceiling (e.g. underfloor heating screed). In such cases, the H-Block® panel is used to fill the space between the beams. The ceiling in the H-Block_{plus}® system is mainly used for standard requirements regarding the self-supporting capacity of the floor. The load-bearing structure is part of the H-Block_{plus}® panel.

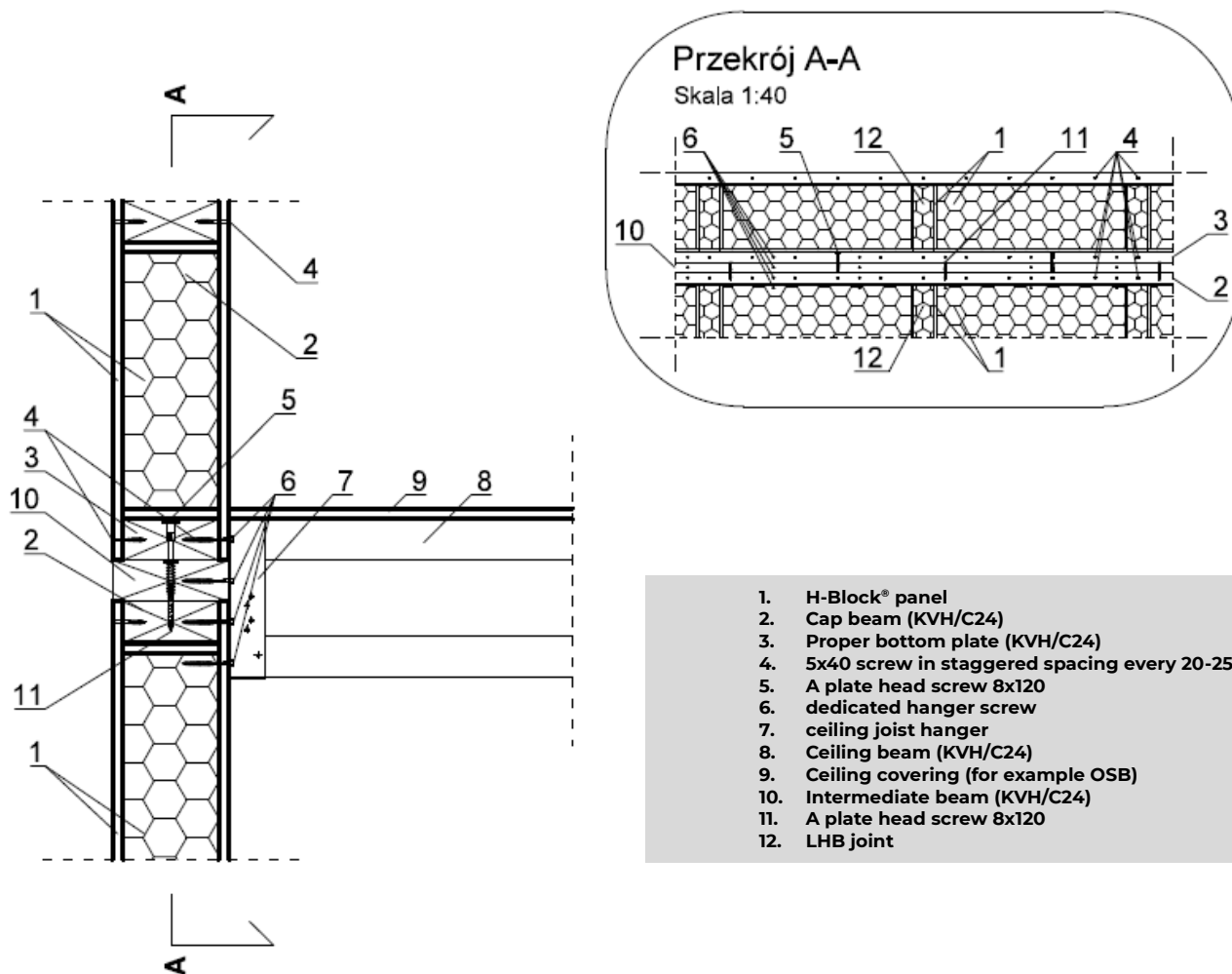
Regardless of the choice of the ceiling system - H-Block® or H-Block_{plus}®, there are several variants of its connection with the H-Block® wall. The figure below shows the method of fixing the ceiling to the wall, which is, in principle, the same as fixing the floor on a linear foundation. The difference is that the sill is replaced with a cap on the ground floor wall.



1. H-Block®/ H-Block_{plus}® panel
2. Proper bottom plate (KVH/C24)
3. Closing beam (KVH/C24)
4. Cap beam (KVH/C24)
5. 5x40 screw in staggered spacing every 20-25cm
6. A plate head screw depending on the thickness of the plate in the spacing (depending on the designer of the building structure)
 - 8x260 for 130mm H-Block®
 - 8x280 for 170mm H-Block®
 - 8x340 for 230mm H-Block®



The use of the H-Block® / H-Block_{plus}® panels does not eliminate the possibility of combining this system with others. Where there is no need to lay "warm" ceilings, you can install "cold" ceilings based on a load-bearing structure, e.g. made of wooden beams and covered with OSB. The solutions presented below provide for fixing steel slings to beams hidden in the walls. In the case of ceilings that do not require high load-bearing capacities, system slings for H-Block® or other SIP panels can be attached to the internal OSB cladding.



15. Bottom plates of next floors

The first floor bottom plate is a wooden beam laid on the ceiling. Its correct arrangement determines the verticality and load-bearing capacity of the walls. The bottom plate should be placed horizontally and at such a distance from the edge of the building that the H-Block® wall panel placed on it should be harmonized with the external wall. It is important to remember that the H-Block® panel cladding must be based on the ceiling - from the inside and outside.

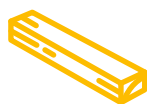


16. Walls of next floors

Setting the external walls of the floor is not different from setting the external walls of the ground floor. Please follow the instructions for the construction of the ground floor.

Slanted gable walls are set with the difference that before inserting them, cut off the slant of the panel corresponding to the slant of the roof. When cutting off the slant, immediately after cutting, in the panel to be installed, at the cut-off point (halfway between the webs, between the panel cladding), insert a wooden element (dowel pin) with the thickness of the insulation. It will "maintain" the internal dimension of the panel necessary to place the wooden beam in it and prevent "pulling" the panel through the insulation polyurethane in which internal stresses occur.

Then, select the foam (e.g. with a wire brush or a special milling machine) to the thickness of the final mounting beam. Prepared slanted panels are attached to the bottom plate of the floor, and the expanding pins are removed just before assembly of the top plate.



17. Cap beams of next floors

The same as on the ground floor top plate.

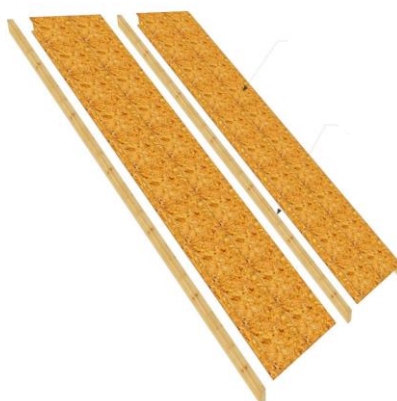


18. Roof

Roofs in the H-Block / H-Block_{plus} system (in addition to thermal insulation) give the possibility to shape roof truss adapted to technical needs (roof load capacity) and/or aesthetic (visible construction).

Roof in the H-Block® system with concealed structure (with "hidden rafter")

This type of roof limits the use of wood to a roof truss to a small extent. In connection with the structural web of the H-Block panel, it gives a very strong construction of the roof, but in the place of wooden beams - it weakens the insulation of the building.

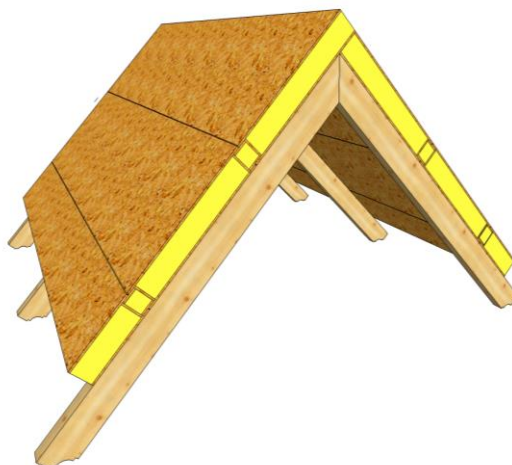


Roof in the H-Block® system with an exposed structure in the "towards a slope decrease"

This type of slope eliminates thermal bridges, but "uncovers" the construction (very limited) of the roof.

A roof in the H-Block® system with an exposed structure in the "across the slope" configuration.

This solution, also for the visible structure, eliminates thermal bridges and "ties laterally" the trusses, structurally strengthening the roof.



The roof in the H-Block_{plus}® system with an exposed structure in the "towards a slope decrease"

This type of roof eliminates thermal bridges, but "uncovers" the construction (very limited) of the roof. Due to the construction of the H-Block_{plus}®, the load capacity of the roof is increased compared to the H-Block®.

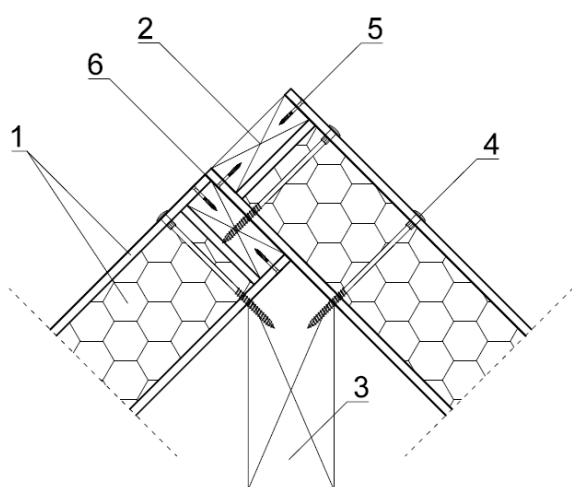


Roof made of H-Block^{plus}® with an exposed structure "across the slope"

This solution, also for the visible structure, eliminates thermal bridges and "ties across" the trusses, thus structurally strengthening the roof. It is the most "load-bearing" solution for the roof structure using the H-Block® system.

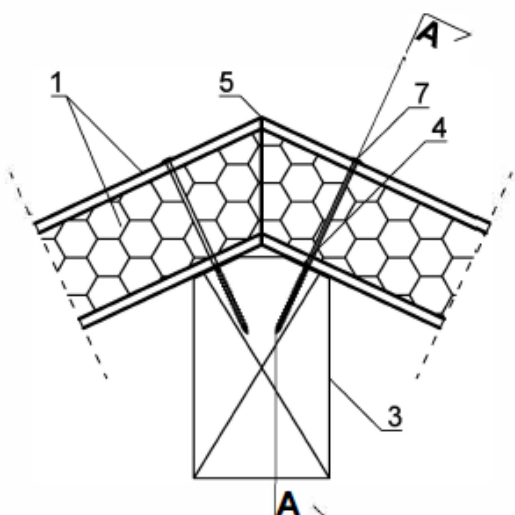
Ridge

Wariant I



1. H-Block®/ H-Block^{plus}® panel
2. Closing beam (KVH/C24)
3. wooden ridge purlin
4. A plate head screw depending on the thickness of the plate in the spacing (depending on the designer of the building structure)
 - 8x260 for 130mm H-Block®
 - 8x280 for 170mm H-Block®
 - 8x340 for 230mm H-Block®
5. 5x40 screw in staggered spacing every 20-25cm
6. Montage foam sealing

Wariant II



1. H-Block^{plus}® panel
2. LHB^{plus} joint
3. Wooden ridge purlin
4. Expansion tape
5. Montage foam sealing
6. 5x40 screw in staggered spacing every 20-25cm
7. A plate head screw depending on the thickness of the plate in the spacing (depending on the designer of the building structure)
 - 8x260 for 130mm H-Block®
 - 8x280 for 170mm H-Block®
 - 8x340 for 230mm H-Block®





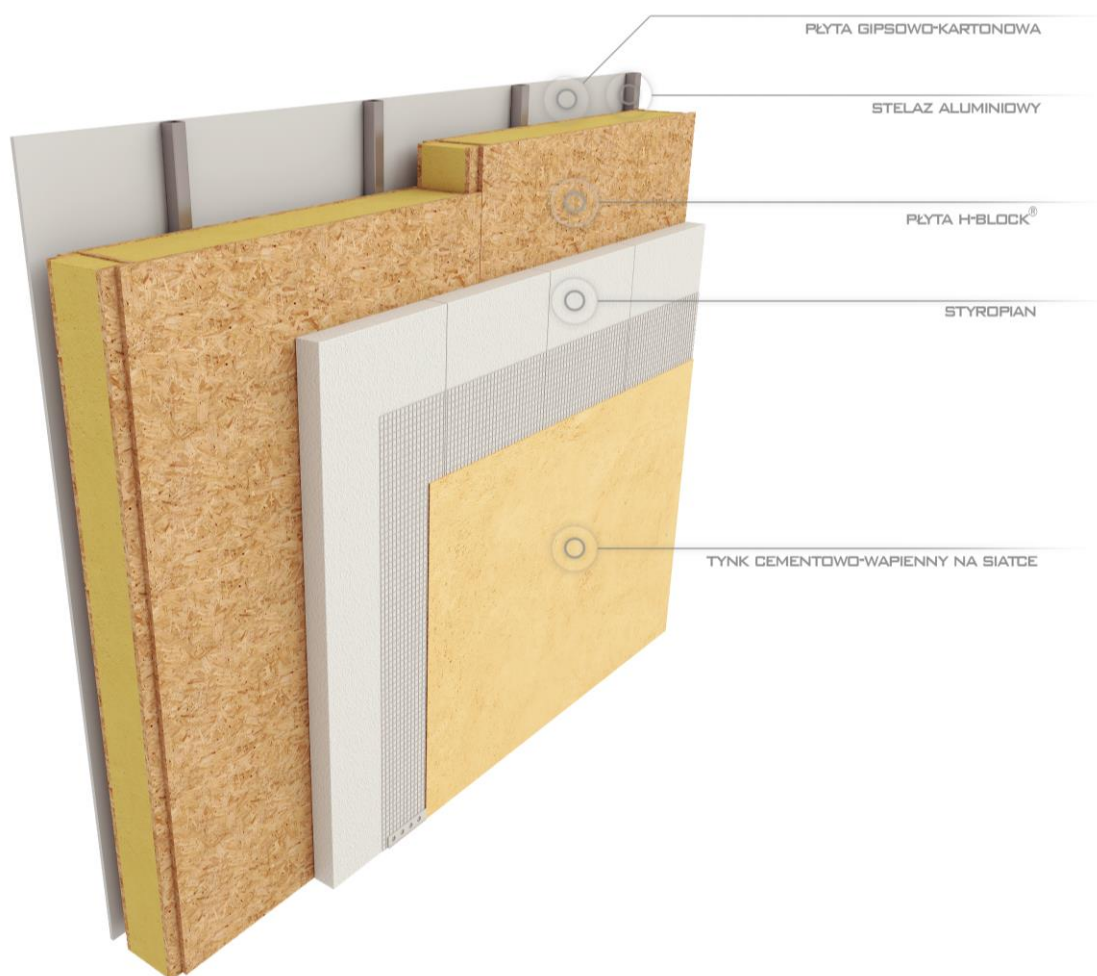
19. Finishing

Exterior wall and roof finishing in the H-Block® system is unrestricted and does not differ from the one in the traditional system. Below are some finishing solutions that can be used in conjunction with the H-Block® system.

External walls finishing

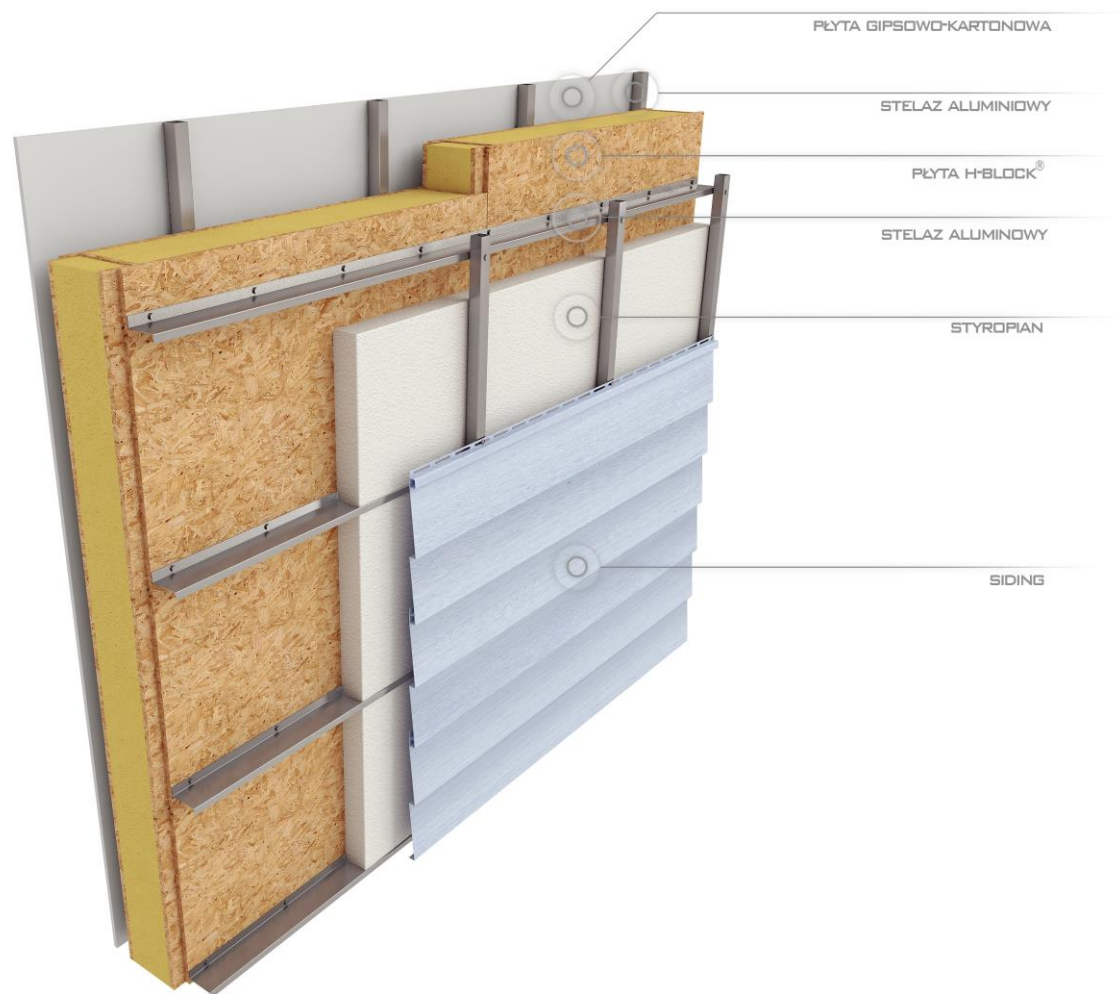
Suggestion no 1:

1. Plaster on mesh, primer and glue
2. Styrofoam glued directly to the H-Block® panels with polyurethane foam in a system of vertical stripes or corrugated polystyrene curved to the panel - a ventilation gap is required
3. H-Block® panel
4. Aluminum or wooden frame
5. Drywall



Suggestion no 2:

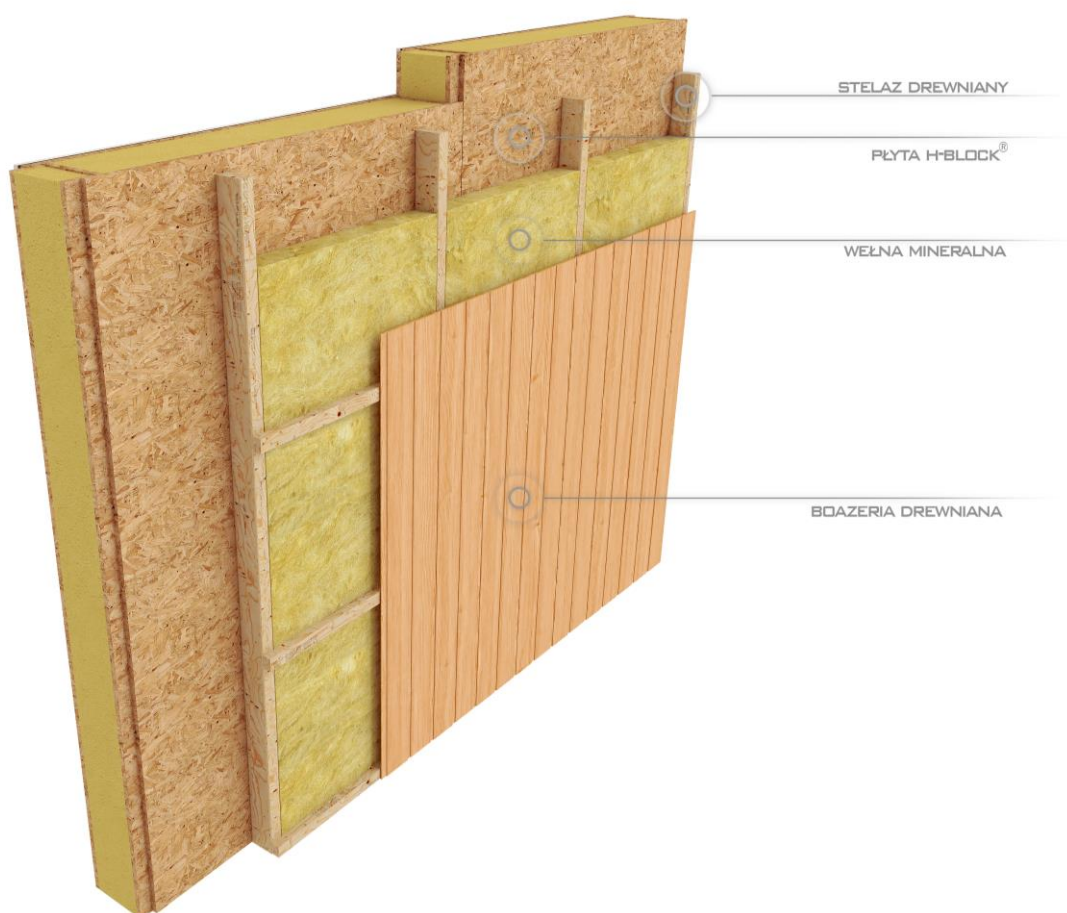
1. Siding on the rack
2. Styrofoam glued directly to the H-Block® panels with polyurethane foam in a system of vertical stripes or corrugated polystyrene curved to the panel - a ventilation gap is required
3. H-Block® panel
4. Aluminum or wooden frame
5. Drywall



Internal walls finishing:

Suggestion no 1:

1. Paneling
2. Mineral wool / or polystyrene
3. Wooden frame under the paneling
4. H-Block® plate



Suggestion no 2:

1. Plasterboard
2. Mineral wool in the space between the H-Block® panel and the plasterboard
3. Aluminum or wooden frame
4. H-Block® panel

Suggestion no 3:

1. 2 x plasterboard
2. H-Block® panel



External roof finishing:**Suggestion no 1:**

1. Bituminous felt
2. H-Block® panel
3. Aluminum or wooden frame
4. Drywall



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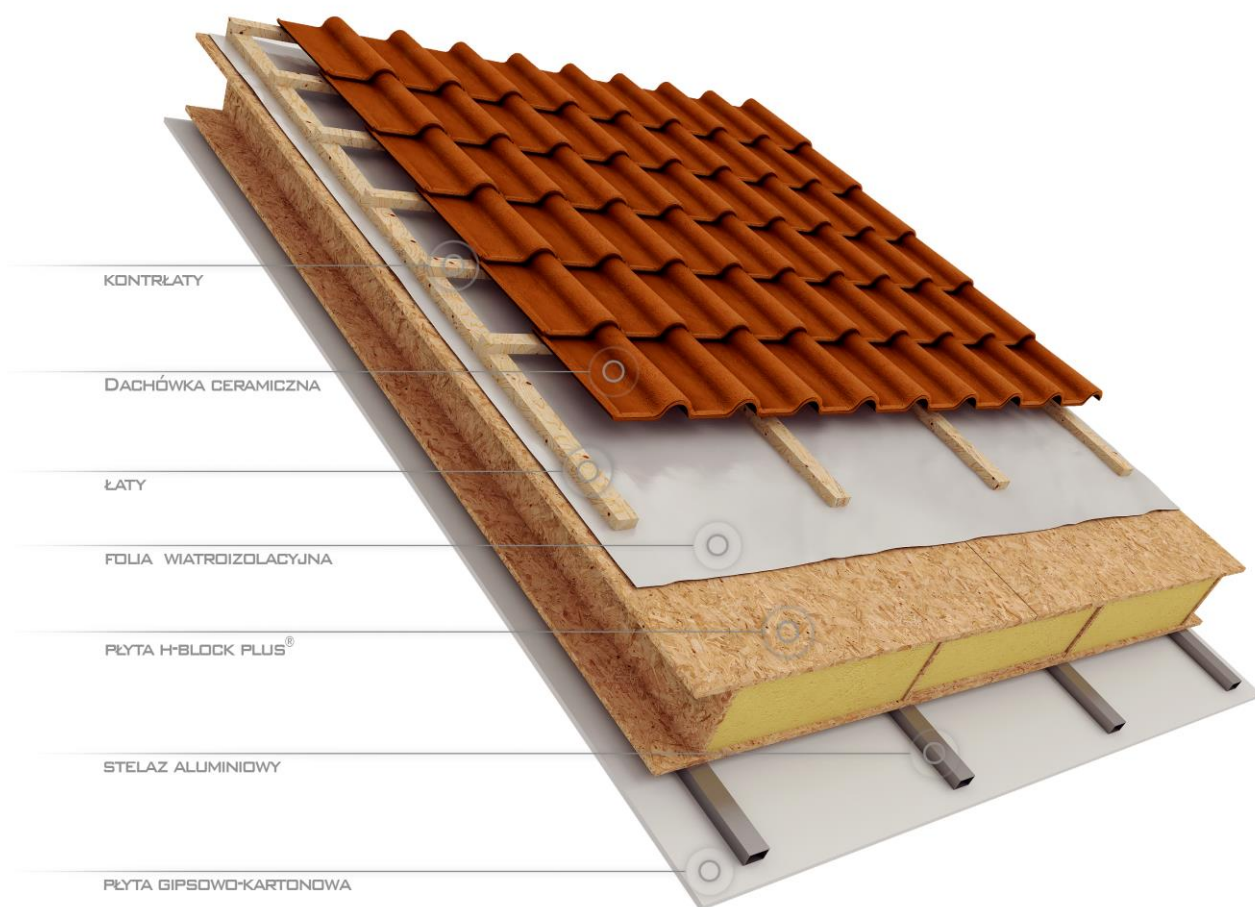
Suggestion no 2:

1. Bituminous shingle
2. Roofing felt underneath the bituminous shingle
3. H-Block® panel
4. Aluminum or wooden frame
5. Drywall



Suggestion no 3:

1. Ceramic tile or metal roof tile
2. Patches
3. Counterbattens
4. Windproof foil
5. H-Block® panel
6. Aluminum or wooden frame
7. Drywall





20. Installations

The manufacturer of the H-Block® system does not recommend the furrowing of H-Block® panels in order to obtain channels for electrical and hydraulic installations. In the case of walls, it is possible to make a wooden or aluminum frame, to distribute cables or pipes in the space obtained, and then cover it with plasterboard or internal wainscot. In the case of ceilings, it is possible to make a suspended ceiling.

